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September 4, 1990

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# OFFICIAL GAZETTE

Vol. 1118 Number 1

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

VOL

1118

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OFFICIAL GAZETTE of the  
UNITED STATES PATENT AND TRADEMARK OFFICE

September 4, 1990

Volume 1118

Number 1

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## PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee: .....	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed .....	550.00
—Corresponding prior U.S. national application filed .....	380.00
—Supplemental search fee, per additional invention .....	150.00
European Patent Office as ISA .....	1242.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA .....	400.00
—Additional examination fee, per additional invention .....	130.00
—ISA not the USPTO .....	600.00
—Additional examination fee, per additional invention .....	200.00
International fees	
Basic fee .....	436.00
Basic Supplemental fee (for each page over 30) .....	9.00
Designation fee per country or region for the first 10 national or regional offices .....	106.00
Designation fee for 11th and subsequent designations .....	No Charge
Handling fee .....	134.00

## U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA .....	185.00	370.00
USPTO was neither ISA nor IPEA .....	250.00	500.00

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USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) .....	25.00	50.00
—For each independent claim in excess of 3 .....	18.00	36.00
—For each claim in excess of 20 .....	6.00	12.00
—For each application containing a multiple dependent claim .....	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1) .....	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1) .....	30.00	30.00

Apr. 30, 1990

HARRY F. MANBECK, Jr.  
Assistant Secretary and Commissioner  
of Patents and Trademarks.

## Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on September 1, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,689,828 through 4,691,386  
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on August 30, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,400,829 through 4,402,090  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force

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U. S. PATENT AND TRADEMARK OFFICE

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beyond 4 years; the fee is due by three years and six months after the original grant .....	4,336,069	06/235,190	6/22/82
.....\$245.00	4,336,073	06/293,979	6/22/82
"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant .....	4,336,088	06/258,222	6/22/82
.....\$495.00"	4,336,094	06/268,198	6/22/82
"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:	4,336,099	06/241,280	6/22/82
By a small entity (\$1.9(f)) .....	4,336,110	06/231,794	6/22/82
By other than a small entity .....	4,336,141	06/230,710	6/22/82
.....\$245.00	4,336,142	06/240,568	6/22/82
.....\$490.00"	4,336,200	06/229,257	6/22/82
"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:	4,336,225	06/257,176	6/22/82
By a small entity (\$1.9(f)) .....	4,336,253	06/242,792	6/22/82
By other than a small entity .....	4,336,261	06/216,480	6/22/82
.....\$495.00	4,336,266	06/240,334	6/22/82
.....\$990.00"	4,336,268	06/228,793	6/22/82
The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:	4,336,269	06/237,569	6/22/82
"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 .....	4,336,290	06/254,005	6/22/82
.....\$120.00"	4,336,326	06/252,560	6/22/82
"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:	4,336,327	06/217,302	6/22/82
By a small entity (\$1.9(f)) .....	4,336,346	06/252,802	6/22/82
By other than a small entity .....	4,336,376	06/234,896	6/22/82
.....\$60.00	4,336,391	06/251,068	6/22/82
.....\$120.00"	4,336,403	06/228,284	6/22/82
"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable .....	4,336,409	06/255,250	6/22/82
.....\$550.00"	4,336,491	06/232,186	6/22/82
	4,596,059	06/562,184	6/24/86
	4,596,061	06/693,630	6/24/86
	4,596,063	06/712,004	6/24/86
	4,596,073	06/571,010	6/24/86
	4,596,085	06/627,568	6/24/86
	4,596,087	06/589,557	6/24/86
	4,596,088	06/671,827	6/24/86
	4,596,094	06/509,529	6/24/86
	4,596,100	06/499,800	6/24/86
	4,596,101	06/623,509	6/24/86
	4,596,122	06/429,787	6/24/86
	4,596,129	06/544,997	6/24/86
	4,596,137	06/710,051	6/24/86
	4,596,142	06/626,725	6/24/86
	4,596,147	06/690,623	6/24/86
	4,596,151	06/756,535	6/24/86
	4,596,158	06/455,667	6/24/86
	4,596,166	06/736,947	6/24/86
	4,596,168	06/694,880	6/24/86
	4,596,174	06/687,476	6/24/86
	4,596,179	06/624,121	6/24/86
	4,596,187	06/627,930	6/24/86
	4,596,195	06/622,010	6/24/86
	4,596,197	06/690,661	6/24/86
	4,596,206	06/614,477	6/24/86
	4,596,211	06/626,159	6/24/86
	4,596,212	06/654,781	6/24/86
	4,596,215	06/755,832	6/24/86
	4,596,231	06/671,563	6/24/86
	4,596,232	06/699,412	6/24/86
	4,596,241	06/565,234	6/24/86
	4,596,249	06/517,276	6/24/86
	4,596,256	06/574,009	6/24/86
	4,596,266	06/656,279	6/24/86
	4,596,274	06/704,193	6/24/86
	4,596,279	06/587,053	6/24/86
	4,596,284	06/664,790	6/24/86
	4,596,286	06/658,723	6/24/86
	4,596,291	06/503,326	6/24/86
	4,596,297	06/661,596	6/24/86
	4,596,307	06/603,514	6/24/86
	4,596,331	06/523,038	6/24/86
	4,596,332	06/623,122	6/24/86
	4,596,334	06/528,214	6/24/86
	4,596,346	06/695,379	6/24/86
	4,596,353	06/635,820	6/24/86
	4,596,365	06/675,188	6/24/86
	4,596,369	06/569,606	6/24/86
	4,596,372	06/686,490	6/24/86
	4,596,375	06/625,341	6/24/86
	4,596,384	06/232,398	6/24/86
	4,596,386	06/521,929	6/24/86
	4,596,387	06/675,550	6/24/86
	4,596,388	06/568,409	6/24/86
	4,596,392	06/519,133	6/24/86

PATENTS WHICH EXPIRED JUNE 24, 1990  
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,335,539	06/255,699	6/22/82
4,335,543	06/236,882	6/22/82
4,335,552	06/221,882	6/22/82
4,335,562	06/220,426	6/22/82
4,335,741	06/233,513	6/22/82
4,335,755	06/252,517	6/22/82
4,335,756	06/226,657	6/22/82
4,335,965	06/217,286	6/22/82
4,335,967	06/240,332	6/22/82
4,335,973	06/246,070	6/22/82



Patent Number	Serial Number	Issue Date	4,596,711	06/553,057	6/24/86
4,596,398	06/569,742	6/24/86	4,596,712	06/383,625	6/24/86
4,596,404	06/690,014	6/24/86	4,596,725	06/729,324	6/24/86
4,596,413	06/744,247	6/24/86	4,596,753	06/726,758	6/24/86
4,596,417	06/758,087	6/24/86	4,596,754	06/726,363	6/24/86
4,596,418	06/676,212	6/24/86	4,596,760	06/646,047	6/24/86
4,596,423	06/722,675	6/24/86	4,596,790	06/662,060	6/24/86
4,596,427	06/570,086	6/24/86	4,596,791	06/690,387	6/24/86
4,596,430	06/625,135	6/24/86	4,596,796	06/648,986	6/24/86
4,596,431	06/699,799	6/24/86	4,596,799	06/696,295	6/24/86
4,596,437	06/740,454	6/24/86	4,596,811	06/543,132	6/24/86
4,596,443	06/724,048	6/24/86	4,596,813	06/439,242	6/24/86
4,596,450	06/599,461	6/24/86	4,596,815	06/614,598	6/24/86
4,596,462	06/472,421	6/24/86	4,596,816	06/485,433	6/24/86
4,596,480	06/661,682	6/24/86	4,596,818	06/580,691	6/24/86
4,596,484	06/657,933	6/24/86	4,596,819	06/573,233	6/24/86
4,596,487	06/661,524	6/24/86	4,596,829	06/571,488	6/24/86
4,596,489	06/650,906	6/24/86	4,596,838	06/739,251	6/24/86
4,596,515	06/530,352	6/24/86	4,596,858	06/622,417	6/24/86
4,596,523	06/750,924	6/24/86	4,596,863	06/607,103	6/24/86
4,596,529	06/763,522	6/24/86	4,596,879	06/753,493	6/24/86
4,596,533	06/708,879	6/24/86	4,596,881	06/656,380	6/24/86
4,596,540	06/754,717	6/24/86	4,596,892	06/725,024	6/24/86
4,596,557	06/624,777	6/24/86	4,596,901	06/579,779	6/24/86
4,596,560	06/440,954	6/24/86	4,596,912	06/703,297	6/24/86
4,596,562	06/701,966	6/24/86	4,596,933	06/662,656	6/24/86
4,596,565	06/701,745	6/24/86	4,596,944	06/594,236	6/24/86
4,596,569	06/701,394	6/24/86	4,596,979	06/611,500	6/24/86
4,596,580	06/673,495	6/24/86	4,596,980	06/524,983	6/24/86
4,596,583	06/550,741	6/24/86	4,596,988	06/503,240	6/24/86
4,596,599	06/560,725	6/24/86	4,596,989	06/544,445	6/24/86
4,596,603	06/714,314	6/24/86	4,597,000	06/419,888	6/24/86
4,596,610	06/573,537	6/24/86	4,597,004	06/707,795	6/24/86
4,596,614	06/667,923	6/24/86	4,597,009	06/620,055	6/24/86
4,596,628	06/643,066	6/24/86	4,597,011	06/534,732	6/24/86
4,596,639	06/434,737	6/24/86	4,597,013	06/521,969	6/24/86
4,596,643	06/720,985	6/24/86	4,597,043	06/388,907	6/24/86
4,596,662	06/620,214	6/24/86	4,597,071	06/498,172	6/24/86
4,596,669	06/443,606	6/24/86	4,597,072	06/621,906	6/24/86
4,596,671	06/656,659	6/24/86	4,597,074	06/517,849	6/24/86
4,596,674	06/649,388	6/24/86	4,597,091	06/415,671	6/24/86
4,596,683	06/766,150	6/24/86	4,597,095	06/603,815	6/24/86
4,596,698	06/415,832	6/24/86	4,597,099	06/586,977	6/24/86
			4,597,106	06/723,078	6/24/86

#### NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fee which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,465,956	06/469,957	8/14/84	2/25/83	7/31/90
4,533,831	06/477,375	8/05/85	3/21/83	7/30/90
4,534,609	06/524,987	8/13/85	8/22/83	7/30/90
4,542,969	06/429,343	9/24/85	9/30/82	7/30/90

#### REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**4,332,815**, Re. S. N. 07/558,640, Filed July 27, 1990, Cl. 424/742, INSECTICIDAL PERHALOALKYL VINYL CYCLOPROPANE CARBOXYLATES, John F. Engel, Owner of Record: *FMC Corp.*, Philadelphia, Pa., Attorney or Agent: Francis A. Paintin, Ex. Gp.: 125

**4,458,627**, Re. S. N. 07/557,115, Filed July 25, 1990, Cl. 118/657, DEVELOPING APPARATUS FOR ELECTROSTATIC

IMAGE, Nagao Hosono, et al., Owner of Record: *Inventor*, Attorney or Agent: John A. Krause, Ex. Gp.: 215

**4,701,026**, Re. S. N. 07/468,461, Filed January 22, 1990, Cl. 350/333, METHOD AND CIRCUITS FOR DRIVING A HARD LIQUID CRYSTAL DISPLAY DEVICE, Minoru Yazaki, Owner of Record: *Seiko Epson Kabushiki Kaisha, Tokyo Japan*, Attorney or Agent: Michael I. Wolfson, Ex. Gp.: 254

**4,721,117**, Re. S. N. 07/471,226, Filed January 26, 1990, Cl. 128/772, FORSIONALLY STABILIZED GUIDE WIRE WITH OUTER JACKET, Craig E. Mar, et al., Owner of Record: *Advanced Cardiovascular Systems, Inc.*, Mountain View, Calif., Attorney or Agent: Edward J. Lynch, Ex. Gp.: 335

**4,737,400**, Re. S. N. 07/440,885, Filed November 22, 1989, Cl. 428/230, METHOD FOR MAKING ELASTIC BANDAGING MATERIAL, Charles J. Edison, et al., Owner of Record: *Inventor*, Attorney or Agent: Peter C. Schechter, Ex. Gp.: 154

**4,746,196**, Re. S. N. 07/527,879, Filed May 24, 1990, Cl. 350/332, MULTIPLEXED DRIVING METHOD FOR A LIGHT SHUTTERING ELEMENT ENOKITUBG FERROELECTRIC LIQUID CRYSTAL, Tajai Ynedam, et al., Owner of Record: *Hitachi, Ltd.*, Tokyo, Japan, Attorney or Agent: Melvin Kraus, Ex. Gp.: 254

**4,758,891**, Re. S. N. 07/554,640, Filed July 17, 1990, Cl. 358/166, METHOD AND APPARATUS FOR IMPROVING THE RISE AND FALL TIME OF A VIDEO SIGNAL, James E. Hitchcock, et al., Owner of Record: *North American Philips Corp.*, New York, N.Y., Attorney or Agent: Michail E. Marion, Ex. Gp.: 262

**4,760,022**, Re. S. N. 07/556,148, Filed July 23, 1990, Cl. 435/320, STABILIZED PLASMIDS, Soren Molin, et al., Owner of Record: *A/S Asfred Benzon, Copenhagen, Denmark*, Attorney or Agent: Iver P. Cooper, Ex. Gp.: 185

**4,793,669**, Re. S. N. 07/558,597, Filed July 27, 1990, Cl. 350/1.6, MULTILAYER OPTICAL FILTER FOR PRODUCING COLORED RELECTED LIGHT AND NEUTRAL TRANSMISSION, Bruce E. Perilloux, Owner of Record: *Coherent, Inc.*, San Francisco, Calif., Attorney or Agent: Philip A. Girard, Ex. Gp.: 257

**4,834,107**, Re. S. N. 07/556,101, Filed July 20, 1990, Cl. 128/668, HEART-RELATED PARAMETERS MONITORING APPARATUS, Glenfield Warner, Owner of Record: *Sylvia Warner and Priyamvada Sankar, Quebec, Canada*, Attorney or Agent: Roger A. Vankirk, Ex. Gp.: 335

**4,835,218**, Re. S. N. 07/557,113, Filed July 25, 1990, Cl. 525/98, COMPOSITION FOR DRAWN FILM, COLD DRAWN FILM MADE OF SAID COMPOSITION AND PROCESS FOR MANUFACTURE OF SAID FILM, Isao Yoshimura, et al., Owner of Record: *Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan*, Attorney or Agent: Watson T. Scott, Ex. Gp.: 151

**4,841,170**, Re. S. N. 07/538,932, Filed June 15, 1990, Cl. 307/310, TEMPERATURE CONTROLLED HYBRID ASSEMBLY, Larry E. Eccleston, Owner of Record: *John Fluke Manufacturing Co., Inc.*, Everett, Wash., Attorney or Agent: Richard A. Koske, Ex. Gp.: 254

**4,893,229**, Re. S. N. 07/559,220, Filed July 30, 1990, Cl. 364/140, COMPUTERIZED CAR WASH CONTROLLER SYSTEM, Kevin Dertick, Owner of Record: *Innovative Control Systems, Inc.*, Allentown, Pa., Attorney or Agent: Sanford J. Pillich, Ex. Gp.: 236

#### REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**3,826,728**, Reexam. No. 90/002,091, Requested July 20, 1990, Cl. 204/192.27, TRANSPARENT ARTICLE HAVING REDUCED SOLAR RADIATION TRANSMITTANCE AND METHOD OF MAKING THE SAME, Douglas L. Chambers, et al., Owner of Record: *The Bac Group, Windelsham Surrey, England*, Attorney or Agent: David A. Dragert, New Providence, R. I., Ex. Gp.: 112, Requester: Donald C. Lepiane, PPG Industries, Pittsburg, Pa.

**4,615,385**, Reexam. No. 90/002,093, Requested July 23, 1990, Cl. 165/175, HEAT EXCHANGER, Zalman P. Saper-

stein, et al., Owner of Record: *Modine Manufacturing Co., Racine, Wis.*, Attorney or Agent: Wood, Dalton, Phillips, Mason & Rowe, Chicago, Ill., Ex. Gp.: 347, Requester: Jordon M. Meschkow, Phoenix, Ariz.

**4,663,071**, Reexam. No. 90/002,092, Requested July 20, 1990, Cl. 252/174.19, ETHER CARBOXYLATE DETERGENT BUILDERS AND PROCESS FOR THEIR PREPARATION, Rodney D. Bush, et al., Owner of Record: *Proctor & Gamble Co., Cincinnati, Ohio*, Attorney or Agent: Leonard W. Lewis, Cincinnati, Ohio, Ex. Gp.: 115, Requester: Owner

**4,751,528**, Reexam. No. 90/002,089, Requested July 13, 1990, Cl. 346/140R, PLATEN ARRANGEMENT FOR HOT MELT INK JET APPARATUS, Charles W. Spearley, et al., Owner of Record: *Spectra Inc., Hanover, N. H.*, Attorney or Agent: Francis J. Hone, Brambaugh, Graves, et al., Ex. Gp.: 216, Requester: Stuart Lubitz, Spensley, Horn, Jubas & Lubitz, Los Angeles, Calif.

**4,820,091**, Reexam. No. 90/002,088, Requested July 13, 1990, Cl. 408/197, TOOL AND METHOD FOR FORMING PANEL JOINTS, John T. Koski, Owner of Record: *Inventor*, Battle Creek, Mich., Attorney or Agent: Irvin L. Van Groh, Groh, Vanophem, et al., Requester: John K. Knobke, Minneapolis, Minn.

**4,905,698**, Reexam. No. 90/002,090, Requested July 19, 1990, Cl. 128/653R, METHOD AND APPARATUS FOR CATHETER LOCATION DETERMINATION, Clair L. Strohl, Jr., et al., Owner of Record: *Pharmacia Deltec, St. Paul, Minn.*, Attorney or Agent: A. James Nelson, Merchant & Gould, Ex. Gp.: 335, Requester: Owner

#### Errata

"All reference to Patent No. 4,906,743 to Michele Caruso et al. of Milan, Italy for '4-DEMETHOXY-4-AMINO-ANTHRACYCLINES' appearing in the Official Gazette of March 6, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,914,467 to Satoshi Takami et al. of Tokyo, Japan for 'INTERCHANGEABLE CAMERA AND INTERCHANGEABLE' appearing in the Official Gazette of April 3, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,921,145 to Jimmey L. Crossley et al. of Iowa for 'ICE CREAM EJECTOR' appearing in the Official Gazette of May 1, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,926,494 to Thomas Potter et al. of Los Alamitos, Calif. for 'VEHICLE COMMUNICATION SYSTEM USING EXISTING ROADWAY LOOPS' appearing in Official Gazette of May 15, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,926,939 to Lindley Baugh of Houston, Tex. for 'HYDRAULICALLY ACTUATED LINER HANGER' appearing on the Official Gazette of May 22, should be deleted since no patent was granted."

"All reference to Patent No. 4,939,323 to Frankie H. Allen et al. of Georgia, for 'CIRCUIT BREAKER CONTACT ASSEMBLY' appearing in the Official Gazette of July 3, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,944,363 to Jon Harwood of Ohio for 'STAMP FORMED MUFFLER' appearing in the Official Gazette of July 31, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,932,055 to Ron D. Katznelson of Calif. for 'METERING RETRIEVAL OF ENCRYPTED DATA STORED IN CUSTOMER DATA' appearing in the Official Gazette of June 5, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,933,343 to Cott et al. of Chesire, Conn. for 'METHOD OF TREATMENT OR MELANCHOLIC DEPRESSION' appearing in the Official Gazette of June 12, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,945,615 to James R. Anthony et al. for 'BELT WITH INTERLOCKING DUAL TONGUE' appearing in the Official Gazette of August 7, 1990 should be deleted since no patent was granted."

#### Survey of Registered Practitioners in Patent Cases

Pursuant to 37 CFR 10.11(b), a survey letter was mailed on January 31, 1990 from the Office of Enrollment and Discipline

(OED) to all practitioners in patent cases whose last names began with P through S. Enclosed with the letter was a data sheet which should have been completed and returned to OED as soon as possible. All data sheets returned to OED were acknowledged. Failure by a practitioner to submit a completed data sheet within the time period specified in the survey letter will result in the practitioner being removed from the register in accordance with 37 CFR 10.11(b).

If your last name begins with P through S and you did not receive a data sheet or if you returned the data sheet to OED and you did not receive an acknowledgement within three (3) months after returning the data sheet to OED, please contact Shirley B. Rasheed at (703) 557-1728.

June 26, 1990

CAMERON WEIFENBACH, *Director*  
*Office of Enrollment & Discipline*

## PATENT NOTICES

### Certificates of Correction For Week of September 4, 1990

D. 303,939	4,833,196	4,857,546	4,868,149
4,429,814	4,833,693	4,857,997	4,868,552
4,517,284	4,833,939	4,858,020	4,869,485
4,601,380	4,835,298	4,858,928	4,869,552
4,609,745	4,835,964	4,859,024	4,869,740
4,645,815	4,836,093	4,859,253	4,869,906
4,654,669	4,836,733	4,859,530	4,869,913
4,692,141	4,837,074	4,859,719	4,870,031
4,715,999	4,837,287	4,859,870	4,870,132
4,717,438	4,837,481	4,859,876	4,870,259
4,718,131	4,837,723	4,860,134	4,870,603
4,723,520	4,839,176	4,860,351	4,870,888
4,731,794	4,839,815	4,862,157	4,871,014
4,764,211	4,841,016	4,862,535	4,871,328
4,766,168	4,841,265	4,862,798	4,871,463
4,789,874	4,841,708	4,862,801	4,871,845
4,791,120	4,842,590	4,862,931	4,871,948
4,792,701	4,842,689	4,863,199	4,872,201
4,793,152	4,842,862	4,863,228	4,872,439
4,793,407	4,843,111	4,863,441	4,872,914
4,793,749	4,843,213	4,863,520	4,873,217
4,799,440	4,843,502	4,863,722	4,873,284
4,799,979	4,844,408	4,863,725	4,873,408
4,803,951	4,844,617	4,863,833	4,873,605
4,804,540	4,844,680	4,864,094	4,873,640
4,804,566	4,844,950	4,864,142	4,874,456
4,810,305	4,845,092	4,864,211	4,874,734
4,813,478	4,848,039	4,865,274	4,874,765
4,814,834	4,848,727	4,865,480	4,874,863
4,819,502	4,849,402	4,865,567	4,878,172
4,828,501	4,851,433	4,865,794	4,878,216
4,829,342	4,851,704	4,865,865	4,878,233
4,829,672	4,852,213	4,866,725	4,878,347
4,830,240	4,852,433	4,867,171	4,879,498
4,831,000	4,853,209	4,867,348	4,884,810
4,831,282	4,854,434	4,867,369	4,909,689
4,831,817	4,855,394	4,867,416	4,910,651
4,832,239	4,856,093	4,867,471	4,929,889
4,832,796	4,856,374	4,867,794	

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Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent application prior to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
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Box Assignments	All assignment documents except those filed in new patent applications.
Box SEQUENCE	All application papers, computer readable forms and fees related to applications containing nucleotide sequence and/or amino acid sequence disclosures in accordance with 37 CFR §§ 1.821 through 1.825.

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These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification*, *Index to the U.S. Patent Classification*, *Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effective access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

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JAMES E. DENNY, Acting Assistant Commissioner  
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner  
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PATENT EXAMINING GROUPS

Actual Filing Date of Oldest  
New Case Awaiting Action

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GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	7-7-87
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SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	5-5-89

Expiration of patents: The patents within the range of numbers indicated below expire during July 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents	Numbers 3,742,517 to 3,750,191 inclusive
Plant Patents	3,370 to 3,384 inclusive

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O. G. Notice

Introductory Training Session  
for

Applications Containing Nucleotide Sequence and/or Amino Acid Sequence Disclosures

The Patent and Trademark Office (PTO) is interested in identifying participants for an introductory training session directed to the requirements for patent applications containing nucleotide sequence and/or amino acid sequence disclosures. The requirements are contained in the final rules, published in the *Federal Register*, 55 FR 18230 (May 1, 1990), and in the *Official Gazette*, 1114 O.G. 29 (May 15, 1990). The training session will focus on the requirements of the final rules, especially the submission of computer readable forms. The introductory training session will assume familiarity with the final rules as well as the accompanying discussion and comments/responses. The introductory training session will be open to all interested persons; registration to practice before the PTO is not a requirement for participation. The introductory training session will be held on Friday, September 14, 1990 from 1:00 p.m. until 4:00 p.m. in the PTO's Patent Academy - Crystal Park 1 - Room 501.

Requests to participate in the introductory training session should be made in writing and addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231, Attention: Lois E. Boland; Special Program Examiner, Office of the Assistant Commissioner for Patents - Crystal Park 2, Suite 919. Capacity is limited and, as such, additional sessions will be scheduled as needed. Any questions about the introductory training session should be directed to Lois E. Boland, by telephone, at (703) 557-8384.

Date 8/21/90

*James E. Denny*  
James E. Denny  
Acting Assistant Commissioner  
for Patents

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## REEXAMINATIONS

SEPTEMBER 4, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

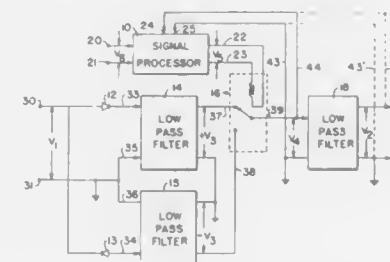
B1 4,042,890 (1346th)  
HIGH EFFICIENCY ELECTRICAL POWER  
CONDITIONER

Joseph S. Eckerle, Star Route 2, La Honda, Calif. 94020  
Reexamination Request No. 90/000,749, Mar. 28, 1985.  
Reexamination Certificate for Patent No. 4,042,890, issued Aug.  
16, 1977, Ser. No. 686,332, May 14, 1976.

Filed Mar. 28, 1985, Ser. No. 686,332  
The portion of the term of this patent subsequent to Mar. 16,  
1994, has been disclaimed.

Int. Cl.<sup>5</sup> H03F 21/00

U.S. Cl. 330—207 A



AS A RESULT OF REEXAMINATION, IT HAS BEEN  
DETERMINED THAT:

Claims 1-16 are cancelled.

[1. A high efficiency power conditioner for providing power amplification of relatively low power input signals, said power conditioner comprising:

power input terminal means adapted to be coupled to an AC voltage source of electrical power;  
high power signal output terminal means adapted to be coupled to a utilization device;  
means coupled to said power input terminal means for converting AC voltages supplied thereto to first and second relatively high DC voltages of different levels, said converting means having first and second output terminals for said first and second relatively high DC voltages, respectively;

controllable switch means having first and second power input terminals coupled respectively to said first and second output terminals of said converting means, an output terminal coupled to said high power signal output terminal means and a control input terminal, said switch means including means responsive to signals present on said control input terminal for alternately coupling said first and second DC voltages of different levels to said output terminal thereof; and

signal processing means having a first input adapted to be coupled to a source of said relatively low power input control signals, a second input coupled to said high power signal output terminal as a feedback signal path, and an output terminal coupled to said control input terminal of said switch means, said signal processor including means for generating relatively low power control signals from said input control signals and a portion of those signals present on the feedback signal path for controlling the state of said switch means, said switch means alternately coupling said first and second DC voltages of different levels to said output terminal thereof in response to said relatively low power control signals from said signal processing means.]

B1 4,539,131 (1347th)  
SOLID DETERGENT COMPOSITION CONTAINING  
SODIUM PERBORATE MONOHYDRATE HAVING  
SPECIFIED SURFACE AREA<sup>A</sup>

Peter F. Garner-Gray, Preston, England, assignor to Lever Brothers Company, New York, N.Y.

Reexamination Request No. 90/001,158, Jan. 30, 1987.  
Reexamination Certificate for Patent No. 4,539,131, issued Sep.  
3, 1985, Ser. No. 501,586, Jun. 6, 1983.

Filed Jan. 30, 1987, Ser. No. 501,586  
Claims priority, application United Kingdom, Jun. 25, 1982,  
8217537; Sep. 24, 1982, 8227308

Int. Cl.<sup>5</sup> C11D 7/54, 7/14, 7/18, 3/395

U.S. Cl. 252—99

AS A RESULT OF REEXAMINATION, IT HAS BEEN  
DETERMINED THAT:

Claims 1-11 are cancelled.

[1. A solid detergent composition comprising:

(a) from 6 to 40% of a detergent active material;  
(b) from 5 to 60% of an alkalimetal aluminosilicate material as a detergency builder;  
from 2 to 50% of sodium perborate monohydrate having the empirical formula:



in particulate form having a specific surface area of at least 5.89 m<sup>2</sup>/g.]

B1 4,763,333 (1348th)  
WORK-SAVING SYSTEM FOR PREVENTING LOSS IN A  
COMPUTER DUE TO POWER INTERRUPTION

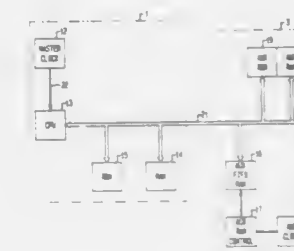
Kerry Byrd, Falls Church, Va., assignor to University Vectors Corporation, Washington, D.C.

Reexamination Request No. 90/001,924, Jan. 16, 1990.  
Reexamination Certificate for Patent No. 4,763,333, issued Aug.  
9, 1988, Ser. No. 894,570, Aug. 8, 1986.

Filed Jan. 16, 1990, Ser. No. 894,570

Int. Cl.<sup>5</sup> G06F 11/00, 13/00

U.S. Cl. 371—66



AS A RESULT OF REEXAMINATION, IT HAS BEEN  
DETERMINED THAT:

The patentability of claims 1-18 is confirmed.

1. In a digital computer having a central processing unit (CPU) driven by an operating system environment external to the CPU and volatile random-access memory (RAM), a data protection system for preventing an unintentional loss due to

an interruption of a main power supply of the computer's application program and operating system stored in RAM and the CPU's state, comprising:

- means for supplying electric power to the computer and the data protection system;
- means for monitoring the main electric power supply and for generating a signal indicative of an interruption thereof;
- means for directing an operation of the computer and for conserving power to be supplied by the power supply means, the directing means being connected to the CPU, being responsive to the interruption signal, including an interrupt program stored in a non-volatile memory, and selectively enabling the power supply means to supply power to the computer; and
- means for storing the application program and operating system stored in the RAM and the CPU's state, the storing means being responsive to the directing means.

**B1 4,780,589 (1349th)  
ROLLER ELECTRODES FOR ELECTRIC-RESISTANCE  
WELDING MACHINE**

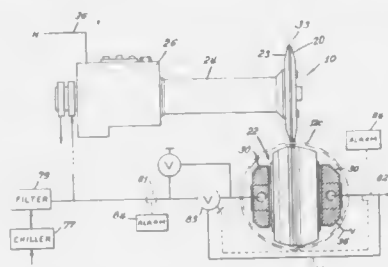
Joseph R. Davies, 220 W. Haven, New Lenox, Ill. 60451  
Reexamination Request No. 90/001,821, Aug. 10, 1989.  
Reexamination Certificate for Patent No. 4,780,589, issued Oct. 25, 1988, Ser. No. 53,375, May 22, 1987.  
Filed Aug. 10, 1989, Ser. No. 53,375  
Int. Cl.<sup>5</sup> B23K 11/06

U.S. Cl. 219—84

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-22 is confirmed.

1. For use in electric resistance seam welding apparatus adapted to weld overlapped metal edges, an improved roller electrode having stator and rotor components, the stator and rotor components having annular surfaces spaced apart across thin gaps, bearing means for mounting said rotor to rotate relative to said stator with movement via said gaps, a conductive liquid simultaneously contacting said annular surfaces to electrically conduct a welding current across said gaps be-



tween the components, said rotor and stator being formed of different materials, said rotor being formed of a copper alloy having approximately 0.3-0.7% Beryllium (Be), 1.5-2.0% Nickel (Ni), with the balance Copper (Cu), thereby being durable under high temperatures and pressures, and electrically and thermally conductive; and said stator being formed of a copper alloy having approximately 1% Chromium (Cr) and the balance Copper (Cu), thereby having less durability under high temperatures and pressures, but having greater electrical and thermal conductivity than the rotor.

# STATUTORY INVENTION REGISTRATIONS

PUBLISHED SEPTEMBER 4, 1990

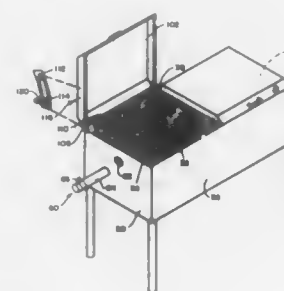
A statutory invention registration is not a patent. It has the defensive attributes of a patent but does not have the enforceable attributes of a patent. No article or advertisement or the like may use the term patent, or any term suggestive of a patent, when referring to a statutory invention registration. For more specific information on the rights associated with a statutory invention registration see 35 U.S.C. 157.

**H813  
COMBINED SMOKER/COOKER UNIT**  
Robert E. Ragon, 4002 Spring Meadow La., Flower Mound, Tex. 75028

Filed Mar. 29, 1988, Ser. No. 174,682  
Int. Cl.<sup>5</sup> A47J 27/122

U.S. Cl. 99—467

15 Claims



1. A combined smoker/cooker comprising:
  - a body having first and second ends, front and rear sides, a bottom and an open top which are associated with each other to form an open-topped container;
  - a partition means mounted within said open-topped container, said partition means being connected to said bottom, and to said sides and extending from said front side to said rear side to divide said open-topped container into a smoker compartment located adjacent to said first end and a fuel compartment located adjacent to said second end, with said compartments extending from said ends to said partition means and from said bottom to said open top, said partition means having a hole defined therethrough for defining a heat and mass transfer path between said smoker compartment and said fuel compartment, said hole being located to be positioned adjacent to said body bottom;
  - a fuel supporting grate mounted in said fuel compartment;
  - a food supporting grille mounted in said smoker compartment;
  - draft means on said body in said fuel compartment and comprising draft openings in the body second end, and means for adjusting the sizes of said draft openings;
  - flue means associated with said smoker compartment for removing smoke and heat from said smoker compartment and comprising a passage defined in said body first end;
  - a smoker compartment cover hingeably connected to said body rear side; and
  - a fuel compartment cover hingeably connected to said body rear side.

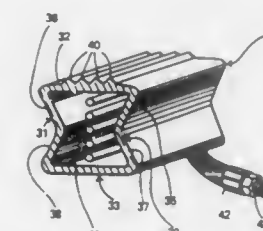
**H814  
COLLAPSABLE SEAL MEMBER**  
Dennis L. Sherrell, Kennewick, Wash., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
Filed Dec. 8, 1983, Ser. No. 559,506  
Int. Cl.<sup>5</sup> F16J 15/46

U.S. Cl. 277—34.3

2 Claims

1. A seal number for providing pressure sealing between relatively movable members comprising: an annular body of resiliently yieldable elastomeric material formed in a unitary, one-piece construction and having a mounting wall secured to

one of said members, a sealing wall in spaced and parallel relation to said mounting wall and a pair of radially spaced inner and outer circumferential side walls, said mounting and sealing walls formed integral with said side walls to define a hollow tubular structure in cross-sectional configuration, said side walls bent inwardly to influence the folding thereof into said tubular structure upon collapse of said tubular structure, said side walls being sufficiently rigid in the normal static state



of said body for exerting forces against said sealing wall to urge said sealing wall in leaktight pressure sealing engagement against a seating surface on said other member, a plurality of integral annular ribs on said sealing wall and coextensive therewith for providing an interference fit with said seating surface, and means for evacuating the interior of said tubular structure to collapse said structure and displace said sealing wall away from said other member seating surface before laterally displacing said movable members relative to each other.

**H815  
LUBRICANT COMPOSITION CONTAINING A  
VISCOSITY INDEX IMPROVER HAVING DISPERSANT  
PROPERTIES**

Carl L. Willis, 15922 Red Willow, Houston, Tex. 77084, and  
Andy M. Arismendi, Jr., 9707 Ravensworth, Houston, Tex. 77031

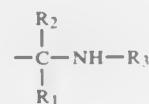
Filed Feb. 17, 1988, Ser. No. 157,355  
Int. Cl.<sup>5</sup> C10M 155/02

U.S. Cl. 252—49.6

23 Claims

1. A lubricant composition comprising:
  - (a) a major amount of a lubricating oil; and
  - (b) a minor effective viscosity improving amount of an oil soluble, functionalized selectively hydrogenated block copolymer to which has been grafted amine functional groups, said functionalized block copolymer comprising:
    - (i) a base block copolymer which comprises
      - (i) at least one polymer block A, said A block being at least predominantly a polymerized alkenyl arene block, and
      - (ii) at least one selectively hydrogenated polymer block B, said B block prior to hydrogenation being at least predominantly a polymerized conjugated diene block, and
    - (2) wherein substantially all of said amine functional groups are grafted to said base block copolymer on said A blocks, and
    - (3) wherein said amine functional groups are represented by the general formula





wherein  $R_1$  and  $R_2$  are the same or different alkyl, cycloalkyl or aryl radicals and wherein  $R_3$  is a hydrogen, alkyl, cycloalkyl, aryl or silyl radical.

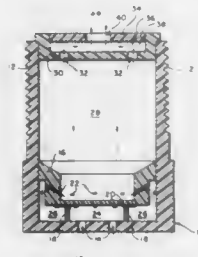
#### H816 STIBINE FILTER AND ANTIMONIAL LEAD ACID BATTERIES

James H. Carder, Gaithersburg; Anh H. Le, Silver Spring, and Chester M. Dacres, Columbia, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 3, 1986, Ser. No. 880,524  
Int. Cl.<sup>5</sup> H01M 2/12

U.S. Cl. 429—86

4 Claims



1. A process for removing stibine from the gases generated by antimonial lead-acid batteries comprising filtering the gases through activated charcoal which causes the stibine to decompose into antimony metal which is deposited on the charcoal and hydrogen gas which is carried away in the exiting gases.

#### H817 PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Masaharu Toriuchi, and Keizo Koya, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Apr. 29, 1988, Ser. No. 188,576  
Claims priority, application Japan, Apr. 30, 1987, 62-104497  
Int. Cl.<sup>5</sup> G03C 1/08, 7/26, 7/32

U.S. Cl. 430—544

7 Claims

1. A photographic light-sensitive material comprising a support having provided thereon at least one silver halide emulsion layer, wherein said light-sensitive material contains

(1) a compound represented by formula (I)

PWR—Time—PUG

wherein PWR represents a group capable of releasing (Time—PUG) upon being reduced; PUG represents a photo-graphically useful group; Time represents a group capable of releasing PUG through a reaction subsequent to the release from FWR in the form of —Time—PUG; and t represents 0 or 1, and

(2) a polymer comprising at least 10 repeating units derived from the same monomer and having a molecular weight of 100 or more.

#### H818 ELASTOMERIC COMPOSITIONS (C-1911)

Joseph Wagonsommer, Westfield; Pawan K. Agarwal, Bridgewater, and Ilan Duvdevani, Leonia, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.  
Continuation of Ser. No. 807,675, Dec. 11, 1985, abandoned.  
This application Apr. 3, 1987, Ser. No. 34,493  
Int. Cl.<sup>5</sup> C08C 19/20; C08F 8/34

U.S. Cl. 525—333.9

2 Claims

1. A sulfonated terpolymer of hexene-1 ethylene/ENB wherein the hexene-1 content of said terpolymer is about 70 to about 99 mole percent and the ethylene content of said terpolymer is about 2 to about 20 mole percent, said sulfonated terpolymer being formed by a solution sulfonation process of said hexene-2/ethylene/ENB.

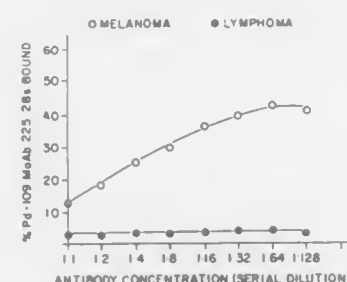
#### H819 PALLADIUM-109 LABELED ANTI-MELANOMA MONOCLONAL ANTIBODIES

Suresh C. Srivastava, Setauket; Rashid A. Fawwaz, Pelham, and Soldano Ferrone, Scarsdale, all of N.Y., assignors to The United States of America as represented by the Secretary of Energy, Washington, D.C.

Filed Apr. 30, 1984, Ser. No. 605,439  
Int. Cl.<sup>5</sup> A61K 43/00, 39/395

U.S. Cl. 530—389

4 Claims



1. A radiopharmaceutical composition consisting of the monoclonal antibodies to human high molecular weight melanoma associated antigens, or fragments of said antibodies which are chelate-conjugated and labeled with palladium-109.

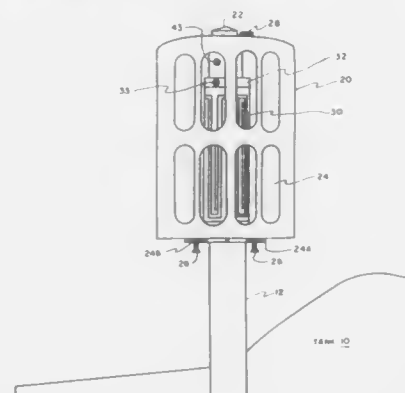
#### H820 INFRARED SAFETY BEACON

Wayne A. Smoot, 12871 Laurel Hills Dr., Woodbridge, Va. 22192

Filed Jun. 1, 1989, Ser. No. 359,601  
Int. Cl.<sup>5</sup> G01J 1/00

U.S. Cl. 250—504 R

7 Claims



1. An infrared safety beacon mountable on a tank during live

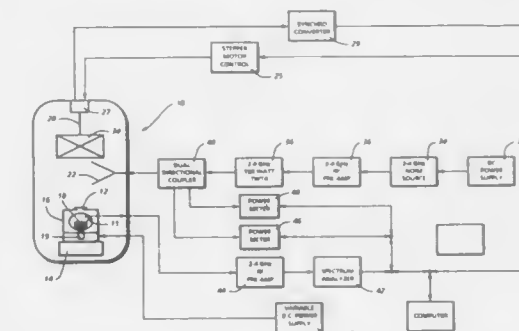
fire training exercise for monitoring by an infrared viewer, said safety beacon comprised of:

infrared generating heater means mounted on the top outer cylindrical portion of a vertical hollow tube attached to a manned tank, said heater means having electrical leads leading through said hollow tube to an internal power supply in said tank;

rotatable thermal chopper means comprised of a cylindrical housing surrounding said heater means, said cylindrical housing having openings over about one half of the circumference; and

motor means for rotating said chopper means, said motor means supported within the upper portion of said hollow tube by a split collar spacer and a flange built around said motor means whose outside diameter is flush with the outside diameter of said hollow tube, said motor means having a power connection through said hollow tube to said tank internal power supply and a drive shaft extending out from said flange and rotatable about bearing means in said flange, wherein said thermal chopper means is rotated around said heater means to provide intermittent flashes of infrared energy to said infrared viewer to identify said tank as a manned vehicle rather than a steady infrared emitting heated silhouette target used in live fire training exercises.

c. exposing said EUT to said uniformly distributed fields within said chamber; and



d. detecting the amplitude of said transmitted radio frequency fields leaking into said EUT.

#### H822 METHOD OF AMPLITUDE MODULATING A LASER BEAM

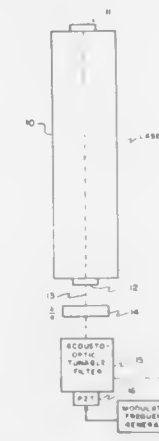
John E. Nettleton, 8106 Oak Hollow Ct., Fairfax Station, Va. 22039, and Dallas N. Barr, 11974 William and Mary Cir., Woodbridge, Va. 22192

Filed Apr. 28, 1989, Ser. No. 344,723

Int. Cl.<sup>5</sup> H01S 3/00

U.S. Cl. 330—4.3

1 Claim



#### H821 MEANS AND METHOD FOR PERFORMING SHIELDING EFFECTIVENESS MEASUREMENTS USING MODE-STIRRED CHAMBERS

Michael O. Hatfield, Fredericksburg, and Lawrence C. Halley, Jr., Zacata, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 27, 1990, Ser. No. 499,747  
Int. Cl.<sup>5</sup> G01R 27/00

U.S. Cl. 324—627

6 Claims

1. A method of determining shielding data for a piece of equipment under test (EUT) using a mode-stirred chamber comprising the steps of:

- transmitting radio frequency fields across a continuous spectrum of test frequencies from a radio frequency noise source into said chamber;
- distributing said radio frequency fields uniformly within said chamber;

1. A method of amplitude modulating a laser beam, including the steps of:

- directing said laser beam into a colinear acousto-optic tunable filter including an anisotropic medium with a piezoelectric transducer affixed thereto; and
- applying an A.C. voltage to said transducer, whereby said laser is amplitude modulated to produce a modulation envelope in accordance with said A.C. voltage.

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## REISSUES

SEPTEMBER 4, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,319

## DISPENSER FOR PASTY COMPOSITIONS

Horst Diener, Ulm-Göggingen, Fed. Rep. of Germany, assignor to Vita Zahnfabrik H. Rauter GmbH & Co., Bad Sackingen, Fed. Rep. of Germany

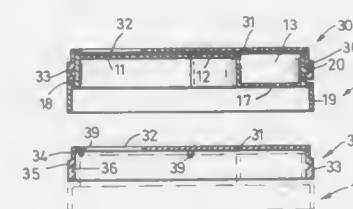
Original No. 4,718,570, dated Jan. 12, 1988, Ser. No. 27,601, Mar. 18, 1987. Application for reissue Feb. 13, 1989, Ser. No. 309,298

Claims priority, application Fed. Rep. of Germany, Apr. 5, 1986, 8609228[U]

Int. Cl.<sup>5</sup> B65D 51/18

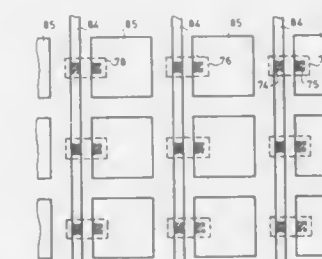
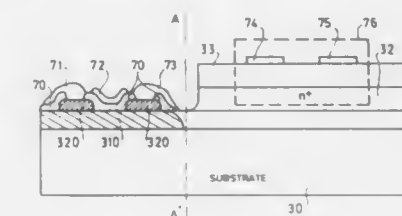
U.S. Cl. 220—253

28 Claims



1. A dispenser for pasty compositions, especially facing material in dental technology and the like, comprising:  
a circular box being closed by a cover and having a bottom and a wall, characterized in that in the peripheral area of the box cavity there is arranged a packing member (11), covering an opening (32) formed in the cover (30) when the cover (30) is in the closing position, and that the cover (30), being guided in an endless groove (36), can be turned on the box (10).

*second active elements in a region of the silicon substrate that were initially amorphous but were transformed by annealing*



*to polycrystalline silicon, said second active elements being used to address the matrix access display screen.*

Re. 33,322

## DRIVE LINE SLIP JOINT ASSEMBLY

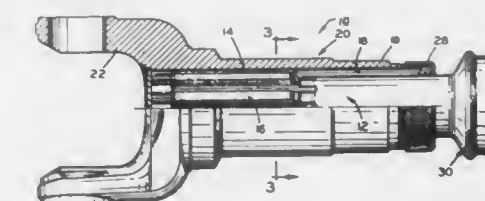
David Sills, Pueblo, Colo., and John Beckman, Toledo, Ohio, assignors to Dana Corporation, Toledo, Ohio

Original No. 4,552,544, dated Nov. 12, 1985, Ser. No. 453,077, Dec. 27, 1982. Application for reissue Nov. 12, 1987, Ser. No. 119,759

Int. Cl.<sup>5</sup> F16C 3/03; F16D 3/06

U.S. Cl. 464—162

6 Claims



5. A drive line slip joint component having a plurality of axially extending splines, each spline comprising an axially extending face, each face having a circumferentially extending width, at least two of said faces each comprising one resilient protuberance, each of said faces further comprising a low-friction coating bonded thereto, each resilient protuberance comprising an integral portion of said coating, said coating generally having a constant thickness over said face, said thickness within the range of 0.007 to 0.014 inch, and said protuberance extending 0.001 to 0.003 inch above the surface of said coating, said protuberances being circumferentially spaced apart about said component, said protuberances providing means for enhancing the dynamic balancing of said component.

Re. 33,321

## PROCESS FOR THE PRODUCTION OF A SUBSTRATE FOR AN ELECTRICALLY CONTROLLED DEVICE AND DISPLAY SCREEN PRODUCED FROM SUCH A SUBSTRATE

Jose Magarino, 9 rue Bagon Aripoli, 923350 Plessis Robinson; Nicholas Szydlo, 6, allée des Arpents, 91470 Limours; Michel Hareng, 17, Chemin De La Garenne, 91290 La Nourville, and Pierre Landouar, 92 Av. Du General Leclerc, 91120 Palaiseau, all of France

Original No. 4,643,527, dated Feb. 17, 1987, Ser. No. 642,527, Aug. 20, 1984. Application for reissue Feb. 16, 1989, Ser. No. 311,710

Claims priority, application France, Aug. 26, 1983, 83 13788

Int. Cl.<sup>5</sup> G02F 1/13; H01L 21/205

U.S. Cl. 350—333

8 Claims

6. A display screen of the matrix access type incorporating an electro-optical material layer inserted between a transparent layer and a silicon substrate comprising:

*first active elements in a region of the silicon substrate consisting of amorphous silicon, said first active elements being in series with the image elements of the display screen, and*

Re. 33,323

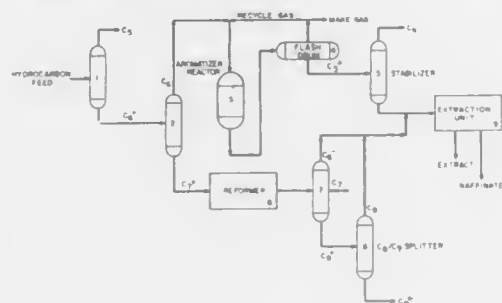
**REFORMING PROCESS FOR ENHANCED BENZENE YIELD**

John C. Roarty, Baton Rouge, La., and Murray Nadler, Houston, Tex., assignors to Exxon Research & Engineering Company, Florham Park, N.J.  
Original No. 4,594,145, dated Jun. 10, 1986, Ser. No. 679,500, Dec. 7, 1984. Application for reissue Jun. 10, 1988, Ser. No. 204,754

Int. Cl.<sup>4</sup> C10G 37/06

U.S. Cl. 208—79

61 Claims



20. A process for reforming a hydrocarbon feed comprising:

- separating said hydrocarbon feed into a lighter fraction, comprising at least one member selected from the group consisting of  $C_6$ ,  $C_7$ , and  $C_8$  hydrocarbons, and a heavier fraction;
- reforming said lighter fraction under reforming conditions in a reformer in the presence of a non-acidic catalyst, said non-acidic catalyst comprising a non-acidic zeolite support, to produce a first reformat;
- reforming said heavier fraction under reforming conditions in the presence of an acidic catalyst to produce a second reformat;
- introducing said first reformat into an extraction unit;
- separating and removing an aromatic extract stream and a non-aromatic raffinate stream from said extraction unit; and
- recycling said non-aromatic raffinate stream to said hydrocarbon feed for reforming under reforming conditions in the presence of a non-acidic catalyst to produce a stream comprising benzene.

Re. 33,324

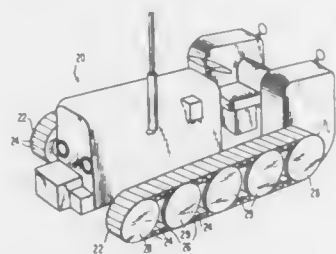
**ENDLESS DRIVE SYSTEM**

John W. Edwards, Brandon; Daniel R. Harper, and Quinton B. McNew, both of Ft. Myers, all of Fla., assignors to Edwards, Harper, McNew & Co., Fort Myers, Fla.  
Original No. 4,569,561, dated Feb. 11, 1986, Ser. No. 607,067, May 4, 1984. Continuation-in-part of Ser. No. 516,831, Jul. 25, 1983, abandoned. Application for reissue May 13, 1987, Ser. No. 49,382

Int. Cl.<sup>5</sup> B62D 55/205

U.S. Cl. 305—35 R

88 Claims



1. An endless drive system comprising:  
a plurality of endless drive sections each including a substantially closed shoe portion having first and second side

edges, first and second substantially closed side walls extending from the first and second side edges of the shoe portion and sloping inwardly therefrom toward the center of the endless drive section, and a central surface joining the first and second side walls to define therewith and with the shoe portion a chamber open at its end faces; and a like plurality of cable connector sections, each including at least one cable member and means to attach one end of the cable connector section to the shoe portion of a first one of the endless drive sections and the other end of the cable connector section to the shoe portion of a second one of the endless drive sections, such attachments being within the chambers of the endless drive sections, to cause the plurality of cable connector sections to join the plurality of endless drive sections in a closed loop as an endless drive system.

Re. 33,325

**REMOTELY CONTROLLABLE CIRCUIT BREAKER**

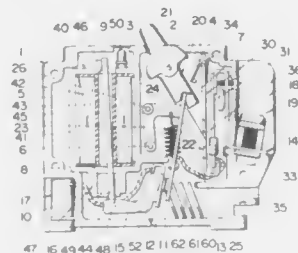
Yoichi Yokoyama, Itami, and Hideya Kondo, Yahata, both of Japan, assignors to Matsushita Electric Works, Ltd., Japan  
Original No. 4,604,596, dated Aug. 5, 1986, Ser. No. 772,912, Sep. 5, 1985. Application for reissue Apr. 7, 1987, Ser. No. 35,485

Claims priority, application Japan, Feb. 1, 1985, 60-18942; Jul. 12, 1985, 60-154455; Jul. 24, 1985, 60-163634

Int. Cl.<sup>5</sup> H01H 75/00

U.S. Cl. 335—14

10 Claims



[1. A remotely controllable circuit breaker comprising in combination:

- a single set of first and second contacts;
- a manually operable switching mechanism for opening and closing the contacts, said manual switching mechanism including a manual handle movable between an ON position and OFF position and including a movable arm carrying the first contact which arm is operatively connected to the manual handle to be actuated thereby between an ON condition and an OFF condition for bringing the first contact into and out of contacting engagement with the second contact;
- a trip mechanism operatively connected to the manually operable switching mechanism so as to open the contacts upon the occurrence of predetermined fault current conditions flowing through the breaker;
- a remotely controllable switching mechanism for forcibly opening and closing the contacts in response to a remote control signal;
- said second contact being movable between an operative position where it is in electrical contacting engagement with the first contact of the movable arm in the ON condition and an inoperative position where it is away from the first contact independently of the conditions of the movable contact arm; and
- said second contact being operatively connected to said remotely controllable switching mechanism in such a way as to be moved from between the operative and the inoperative positions by the latter receiving the remote control signal.]

**PLANT PATENTS**

GRANTED SEPTEMBER 4, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,312

**ROSE PLANT DICMADDER**

Patrick Dickson, Newtownards, Northern Ireland, assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Mar. 6, 1989, Ser. No. 319,649

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—1

1 Claim

1. A new and distinct variety of rose plant of the Shrub class substantially as herein shown and described, characterized particularly as to novelty by vigorous, hardy plant growth, disease resistant, dark green glossy foliage, upright, well branched habit of growth, and abundant bright orange flowers.

7,313

**ROSE PLANT—MEIGRELOU VARIETY**

Alain A. Meilland, Antibes, France, assignor to The Conard-Pyle Company, West Grove, Pa.

Filed May 19, 1989, Ser. No. 354,285

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—24

1 Claim

1. A new and distinct variety of Floribunda rose plant characterized by the following combination of characteristics:

- abundantly forms attractive long lasting semi-double blossoms which are aureolin in coloration,
- forms bronze green adult wood,
- exhibits an erect growth habit,
- is well adapted for growing in a greenhouse for cut flower production, and
- exhibits excellent disease resistance;

substantially as herein shown and described.

7,314

**DARLENE**

William G. Ison, Rte. 1, Box 19, Hwy. 19, Brooks, Ga. 30205  
Filed Mar. 10, 1988, Ser. No. 166,252

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—47

1 Claim

1. The new and distinct variety of grape plant, as described and illustrated.

7,315

**CHRYSANTHEMUM PLANT NAMED LEONA**

Cornelis P. Vandenberg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed May 31, 1989, Ser. No. 359,922

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—74

1 Claim

1. A new and distinct plant of Chrysanthemum named Leona, as described and illustrated.

7,316

**POINSETTIA PLANT NAMED YULETIDE**

Lyndon W. Drewlow, Ashtabula, Ohio, assignor to Mikkelsen, Inc., Ashtabula, Ohio

Filed May 22, 1989, Ser. No. 355,183

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—86

1 Claim

1. A new and distinct cultivar of Poinsettia plant named Yuletide, as illustrated and described.

7,317

**DIEFFENBACHIA PLANT NAMED GOLDEN SUNSET**

Edwin J. Frazer, Brisbane, Australia, assignor to Hartman Plant Laboratories, Inc., Sebring, Fla.

Filed May 18, 1989, Ser. No. 353,706

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—88

1 Claim

1. A new and distinct cultivar of Dieffenbachia plant named Golden Sunset, as illustrated and described.

7,318

**GERBERA PLANT NAMED 'DIVA'**

Th. A. Segers, Hoofddorp, Netherlands, assignor to Twyford Plant Laboratories, Inc., Santa Paula, Calif.

Filed Feb. 28, 1989, Ser. No. 316,909

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—68

1 Claim

1. The new distinct variety of Gerbera plant herein described and illustrated and identified by the characteristics enumerated above.

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## PATENTS

GRANTED SEP. 4, 1990

### ERRATA

For CLASS	See PATENT NO.
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030-392 .....	4,953,301
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033-284 .....	4,953,303
033-355 .....	4,953,304
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033-503 .....	4,953,306
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521-157 .....	4,954,537
528-388 .....	4,954,554



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358-474	4,954,913
358-475	4,954,914
361-098	4,954,917
367-154	4,955,012
362-125	4,955,044

## PATENTS

GRANTED SEPTEMBER 4, 1990

## GENERAL AND MECHANICAL

4,953,231

## SHADE ATTACHMENT FOR EYEGLASSES

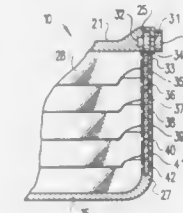
David W. Burnett, Rte. 1 Box 245E, Luther, Okla. 73054

Filed Jul. 19, 1989, Ser. No. 381,852

Int. Cl.<sup>5</sup> G02C 7/16, 1/00

U.S. Cl. 2-13

2 Claims



1. A shade attachment for eyeglasses, comprising:

- a frame;
- a pair of openings defined by said frame, said openings dimensioned for registry with lenses of a pair of eyeglasses;
- a plurality of resilient clips on top and bottom portions of said frame, said clips configured for frictional engagement with top and bottom edges of eyeglass lenses;
- two sets of slats, each set of slats including a plurality of slats extending across one of said openings;
- an axle shaft extending from opposite ends of each of said slats and journaled for rotation in said frame;
- a driven gear secured at one end of each of said slats on said axle shafts, for rotation therewith;
- said driven gears extending in a collinear drive train;
- an idler gear mounted for rotation on said frame between and in direct meshing engagement with each adjacent pair of said driven gears;
- a drive gear mounted for rotation on said frame and in mesh with one of said driven gears;
- all of said gears disposed in a collinear drive train; and
- control means for manually rotating said drive gear.

4,953,232

## COLLAR PROTECTOR

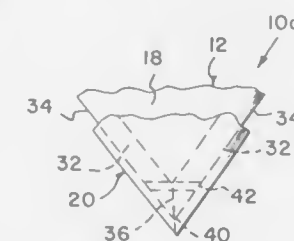
Lee R. Gaines, 410 A Rico St., Salinas, Calif. 93907, and George Spector, 233 Broadway Rm. 3815, New York, N.Y. 10007

Filed Jun. 5, 1989, Ser. No. 361,642

Int. Cl.<sup>5</sup> A41B 3/00

U.S. Cl. 2-60

2 Claims



1. A disposable protector for a collar of a shirt, the collar

having a neck band and outside flap with usual angular spaced corners, said protector comprising:

- (a) a piece of thin moisture absorbent fabric material having a first portion approximately the size and shape of the neck band of the collar and a second portion sized to cover said outside flap and corners with a fold line between said portions;
- (b) a plurality of pressure sensitive adhesive spots carried on one side of said piece of fabric material; and
- (c) a removable backing sheet to cover said pressure sensitive adhesive spots and adapted to be removed so that said first portion of said piece of fabric material can be removably attached to inner surface of the neck band, folded over on the fold line and said second portion of said piece of fabric material can be removably attached to outer surface of the outside flap to absorb salt and moisture from the wearer of the shirt to prevent soiling of the neck band and outside flap of the collar, wherein said second portion of said piece of fabric material further includes a plurality of extended edge segments so that said extended edge segments can be folded over the edges of the outside flap of said collar and corners to be removably attached to inner surface of said outside flap and corner by said pressure sensitive adhesive spots; said extended segments having opposing forward ends adapted to abut each other when folded over said corners.

4,953,233

## BRASSIERE STRAP RETAINER

David R. Moshier, 18620 Hatteras, #275, Tarzana, Calif. 91356

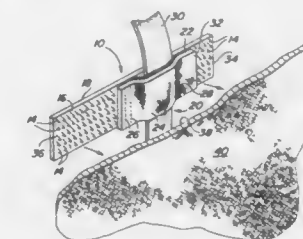
Continuation-in-part of Ser. No. 232,055, Aug. 15, 1988. This

application May 30, 1989, Ser. No. 357,839

Int. Cl.<sup>5</sup> A41F 15/02

U.S. Cl. 2-268

10 Claims



1. An improved brassiere strap retainer, said retainer comprising, in combination:

- (a) a first flexible strip of hook and pad fastener material bearing hooks on one side thereof;
- (b) a second flexible strip having a pad of hook-receiving hook and pad fastener material on one side thereof, facing said first flexible strip, one end of said second flexible strip being fixedly secured to said first flexible strip to expose a portion of said first flexible strip, said second flexible strip including a strap-receiving portion releasably secureable to said first flexible strip so as to releasably trap a brassiere strap between said strips, said exposed portion of said first flexible strip being adapted to releasably hook to an inner surface of a female garment covering said brassiere, so as to control the location of the garment in order to conceal the brassiere strap, and
- (c) wherein said second flexible strip is fixedly secured to said first flexible strip so as to expose both opposite ends of said first flexible strip.



4,953,234

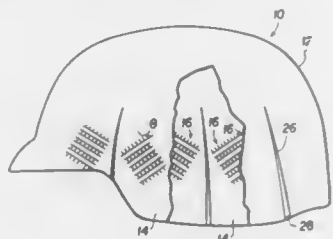
## IMPACT RESISTANT HELMET

H. L. Li, Parsippany, and D. C. Prevorsek, Morris Township, Morris County, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.  
Continuation of Ser. No. 7,081,075, Aug. 3, 1987, abandoned.  
This application Jul. 10, 1989, Ser. No. 377,807

Int. Cl.<sup>5</sup> B32B 5/00

U.S. Cl. 2-412

18 Claims



1. A helmet comprising an impact resistant composite shell comprising a plurality of prepreg packets where each prepreg packet comprises at least 2 prepreg layers, with each prepreg layer comprising a plurality of undirectional coplanar fibers embedded in a ploymeric matrix, the fibers of adjacent layers in the prepreg packets being at an angle of about 45° to 90° from each other, wherein the angle of fibers of adjacent layers in at least two different prepreg packets is different.

4,953,235

## TRAP FITTING ASSEMBLY

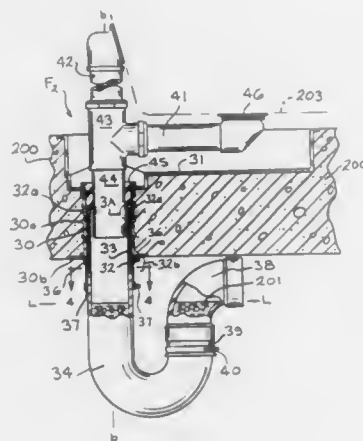
Kenneth R. Cornwall, 4963 Springfield Dr., Dunwoody, Ga. 30338

Filed Jun. 10, 1988, Ser. No. 205,360

Int. Cl.<sup>5</sup> E03C 1/284

U.S. Cl. 4-191

18 Claims



1. An improved trap fitting assembly which prevents the spread of fire and smoke through a floor of a building through the fitting assembly which comprises:

- (a) a flammable tubular coupling means having opposed ends which provides an opening along a longitudinal axis through the floor with an outside wall secured to the floor and an inside wall which defines the opening;
- (b) a non-flammable, thin sleeve means with openings at opposed ends mounted on the inside of the coupling means along the axis between an upper and a lower plane of the floor and with an extension below the lower plane of the floor with a thickness between inner and outer walls of the sleeve means less than the thickness between the walls of the coupling means, wherein the sleeve means has an enlarged ring above an elongate cylindrical portion on an outside wall around the longitudinal axis of the coupling

means and wherein a thin flammable spacer tube means is mounted on the inside wall of the coupling means and on the elongate cylindrical portion of the sleeve means to hold the sleeve means in the coupling means by engagement with the enlarged ring; and

- (c) a non-flammable J-pipe means removably secured to the extension at a lower most of the openings of the sleeve means by a connection means, wherein in use the J-pipe means is filled with water in a lower portion of the J-pipe means thereby preventing smoke and fire from below the floor from moving up through the coupling means and sleeve means to above the floor.

4,953,236

## AUTOMATIC MIXING FAUCET

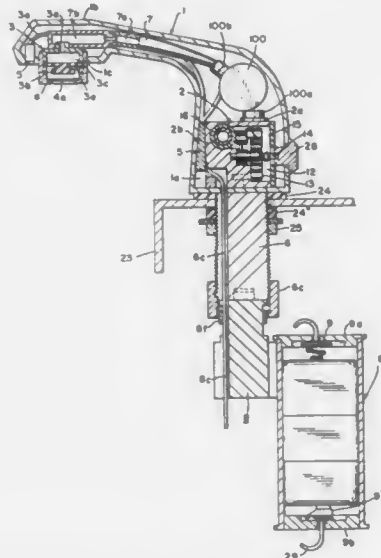
Chang H. Lee, 300 Winston Dr., Apt. 810, Cliffside Park, N.J. 07010, and Young J. Kim, 103-4, Ko cluch-Dunk, Ku-Koku, Seoul, Rep. of Korea

Continuation of Ser. No. 244,135, Sep. 14, 1988, Pat. No. 4,886,207. This application Jun. 1, 1989, Ser. No. 359,994

Int. Cl.<sup>5</sup> E03C 1/04

U.S. Cl. 4-194

3 Claims



1. A compact automatic water tap including a hollow tap body defining the outer shell of the tap adapted to be located above the surface on which the tap is to be mounted, said tap body having a base adapted to be placed on the surface on which the tap is to be mounted and a water discharge end portion, said tap containing within said shell, between said base and said discharge end portion a hot and cold water mixing valve, sensing means for sensing the presence or absence of an object beneath said water discharge end portion; and an automatic water supply valve means in said shell connected to said mixing valve and being operative in response to said sensing means to control water flow from the tap, and check valve means also located within said shell and connected to the water supply valve for preventing water flow from the water supply when the water supply valve is off.

4,953,237

## TWO STAGE FLAPPER VALVE FOR FLUID RESERVOIRS

Bernard C. Perkins, 920 Avenue "T" SE., Winter Haven, Fla. 33880

Filed Mar. 1, 1990, Ser. No. 485,946

Int. Cl.<sup>5</sup> E03D 9/02

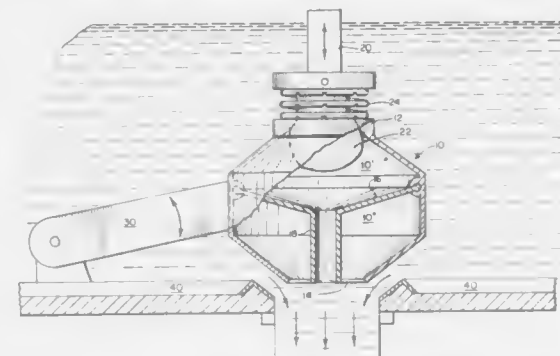
U.S. Cl. 4-324

2 Claims

1. In combination with a fluid reservoir, defining a valve seat

at its bottom and bearing an operating crank lever which is pivoted to a wall of the reservoir;

- (a) a normally submerged globular flapper valve, movably engaging the reservoir in hermetically sealed relation to the reservoir valve seat, said flapper valve having open ends at top and bottom and interconnected top and bottom chambers, wherein the topmost chamber defines a drain extending centrally through the bottom chamber, the drain being coterminous at its end to the open end of the bottom chamber of said flapper valve;
- (b) a normally submerged secondary spring-loaded plunger valve, compressibly mounted upon the flapper valve and having engagement with said crank lever, said plunger valve being adapted to engage the open top of the flapper



valve in hydraulically sealable superposition relative to the top chamber of said flapper valve;

- (c) said operating crank lever operably engaged with the secondary spring-loaded plunger valve by a substantially rigid connector, said crank lever being operable from an intermediate position of repose "R", to a depression position whereby said flapper valve is moved from said valve seat for a full flush "F" and to a combination lift position "H" + "F", wherein said plunger valve is moved from said open top end to relieve air from the top chamber to be replaced with water via said drain thereby reducing the buoyancy of said flapper valve, and sequential depression of the crank lever to position "F", and upon immediate release of the crank lever from position "F", a half flush of the fluid reservoir is effected.

4,953,238

## SANITIZING SPRAY SEAT FOR TOILET

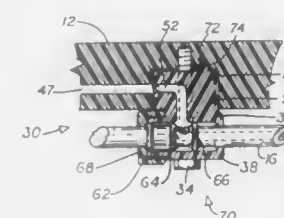
John P. Shifferly, 5729 Estancia Dr., Apt. No. 2232, Orlando, Fla. 32822

Filed Apr. 24, 1989, Ser. No. 342,529

Int. Cl.<sup>5</sup> E03D 9/08

U.S. Cl. 4-420.2

11 Claims



5. A sanitizing spray device for use on a toilet having a seat member, comprising an elongate, generally tubular member having a spray means adjacent one end, means for supplying water at a selected temperature and quantity to said generally tubular member, so that water can be caused to travel for a portion of the length of the tubular member, and then issue as a spray of water from said spray means, mounting means

adapted to be located under the seat member for pivotally mounting said generally tubular member at a location intermediate its ends, said mounting means being constructed to permit said generally tubular member to be swung from a recessed position in which it principally resides under the confines of the seat member, to a deployed position in which said spray means is in approximately a central location with respect to the principal aperture of the seat member and the bowl of the toilet, whereby a user sitting on the toilet seat can cause a sanitizing spray of water of selected temperature to be directed upwardly at the private parts of the user, said means for supplying water being connected to said mounting means, latter means serving to distribute water directly to said tubular member, said mounting means having valve means therein to control the flow of water into said generally tubular member and then to pass outwardly through said spray means, which valve means is sensitive to the longitudinal position in which said generally tubular member resides in said mounting means, said valve means being operative to control such flow of water by the user grasping a portion of said generally tubular member, and then pushing it or pulling it with respect to said mounting means in a direction coinciding with the direction of its longitudinal axis.

4,953,239

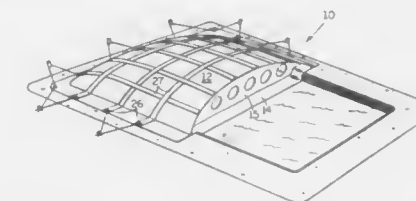
## INFLATABLE POOL COVER

Harold S. Gadsby, 13069 IH 35 North, San Antonio, Tex. 78233  
Filed Aug. 24, 1988, Ser. No. 216,151

Int. Cl.<sup>5</sup> E04H 3/19

U.S. Cl. 4-499

1 Claim



1. An inflatable swimming pool cover comprising: an upper layer having a first perimeter and a lower layer having a second perimeter, said upper and lower layers being made of a material substantially impermeable to air and water, said lower layer having dimensions whereby said lower layer, if laid on the surface of the pool water at a normal level would form a flat shape over said pool water whereon said cover is to be installed, and said record perimeter would extend outwardly beyond said swimming pool's outer boundary, said upper layer having dimensions whereby said upper layer, if inflated, in combination with said lower layer over a swimming pool water surface whereon said cover is to be installed would form a dome shape with relatively steep sides that direct rain water, leaves and other debris off of said cover entirely and over the edge of the pool boundary, said first perimeter would extend outwardly beyond said swimming pool's outer boundary and said first and second perimeters would be coincident; said upper layer having a hole formed therethrough, said hole being small relative to the size of said upper layer; said first and second perimeters are sealingly attached one to the other whereby a substantially air-tight interior space is defined between said upper layer forming said dome shape and said lower layer forming said flat shape except as prevented by said hole; said cover having an air conduit sealingly attached to said upper layer over said hole whereby said air conduit provides the sole avenue of fluid communication between said interior space and space exterior to said cover through an air conduit opening at the terminal end of said air conduit;

blower means for providing a continuous effluence of air for inflating and maintaining the inflation of said interior space with said air, said blower means having an output orifice wherefrom said air exits said blower means;

a blower mating member for lockingly mating with said output orifice of said blower means for receiving substantially all of said blower means' continuous effluence of air, said blower mating member being sized whereby said blower mating member tightly fits within said air conduit at said air conduit opening, said blower mating member being sealingly joined with said air conduit with adhesive means;

a plurality of lengths of synthetic webbing, each of said lengths extending across said upper layer forming said dome shape beginning at a first respective said grommet on a first side or end of said cover and terminating at a second respective said grommet on a second side or end of said cover, said lengths being attached to said upper layer by said respective grommets' passing through said lengths prior to passing through said upper and lower layers, said plurality of lengths being placed in a woven arrangement overlying said upper layer forming said dome shape and being sewn together at said lengths respective intersections, said plurality of lengths providing a safety net for supporting individuals who come to rest on said cover when installed on said pool; and

one or more retaining members situated between and attached to said upper and lower layers, wherein said retaining members are sheets of material cut to approximate the desired cross sectional shape of said cover when inflated, each said retaining member being formed whereby air may move therethrough throughout the interior space of said cover to permit uniform inflation thereof.

in coplanar flow from proximate said headrest surface down said seat backrest surface, said stream entraining air into said



flow to effect a turbulent stream as the water-air mixture moves down said backrest.

4,953,240

## HYDROTHERAPY MASSAGE UNIT

John Gardenier, Guilderland, N.Y., assignor to Saratoga Spa & Bath Company, Latham, N.Y.

Continuation of Ser. No. 110,688, Oct. 20, 1987, Pat. No. 4,860,392. This application Jun. 12, 1989, Ser. No. 364,603. The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.

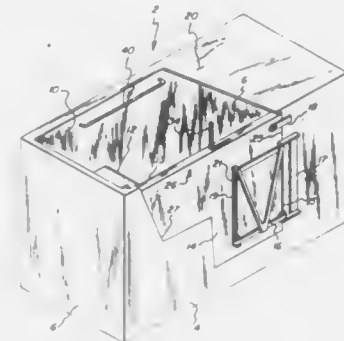
Int. Cl. A61H 33/02

U.S. Cl. 4—542

5 Claims

1. In a hydrotherapy tub having a seat backrest surface, a headrest surface immediately above the top of said seat backrest surface, and water recirculating means, the combination of coplanar ejector means comprising a directional water ejector which is comprised of a base disposed on a flat tub surface portion, water chamber means disposed over said base for confining water therein, said water chamber means having at least one lateral port therein with the exit plane of said port parallel to said base and disposed coplanar with said tub surface, and conduit means for conducting water from said recirculation means into said ejector so that the water is expelled therefrom through said port parallel to and coplanar with said base, said directional water ejector secured to a tub above said tub's normal fill level and near the upper end of said seat backrest surface immediately below the headrest surface so as to be disposed in stand-apart registry with the nape of a user's neck, when said user is seated against said backrest, said ejector positioned to deliver and direct a strong, rapid stream of water

1. A bathtub easily and safely accessible from a sitting position comprising:  
an upwardly opening enclosure having a substantially horizontal floor and having walls rising upwardly from the floor, including an entrance wall and a forward wall transversely adjoining same;



4,953,241

## BATHTUB WITH DOOR FOR EASY ACCESS

Douglas P. Williams, 4 Dussault Drive, Latham, N.Y. 12110

Filed Dec. 30, 1988, Ser. No. 292,395

Int. Cl. A47K 3/02

U.S. Cl. 4—556

15 Claims

a seat member having a seating surface with a forward edge and an entrance edge, said seat being mounted substantially horizontally within said enclosure above the level of the floor with its forward edge spaced apart from the forward wall so as to define a leg space therebetween and having its entrance edge adjacent the entrance wall;

said entrance wall defining an entrance opening having a door mounted therein, said door having a forward edge on its one end adjacent the adjoinment of said wall with the forward wall and a rearward edge on its other end, said door being operable between a closed position in which it forms a watertight seal with said entrance opening and an opened position in which it is substantially parallel to the forward wall and closely adjacent thereto, said door being configured to fit said opening and said opening being defined by a jamb running, at least in part, along the entrance edge of the seat and along the floor so as to provide said opening into the space over the seat and into the leg space; and

means defining the movement of the door so that, in operating from its closed to its opened position, its forward edge moves directly inwardly along the front wall while its rearward edge moves forwardly without any substantial inward movement, whereby said door can be operated between its opened and closed positions while an occupant is seated on the seat member adjacent its entrance edge.

4,953,242

## PADDED FLARE-BACK SOFA

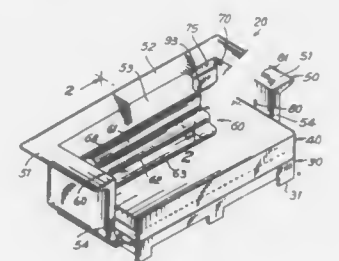
Anne Harris, New York, N.Y., assignor to Anne Harris, New York, N.Y.

Filed Mar. 9, 1989, Ser. No. 321,502

Int. Cl. A47C 17/13, 17/32

U.S. Cl. 5—18.1

15 Claims



1. An article of furniture including two sides and a back, which is convertible between a sitting unit when closed and a sleeping unit when open, comprising:

a top housing wherein both of the sides and the back flare out horizontally at the top, creating a ledge;  
a storage compartment formed within the housing when in the closed position;  
a padded back cushion member forming a first side of the storage compartment when in the closed position and forming a vertical head rest when in the open position;  
a top platform contiguous to the flared sides and back which extends the flat surface of the ledge thereby formed, which platform forms a second side of the storage compartment when in the closed position;  
a wall member within the housing forming a chamber for storage of the top platform when in the open position;  
a double mattress forming a sitting surface in the closed position, which mattress unfolds to form a sleeping surface in the open position; and  
a bottom member, inserted within a sleeve of the top housing when in the closed position, which member slidably protrudes to support in part the mattress in the open position.

4,953,243

## ELECTRONIC CONTROL WITH EMERGENCY CPR FEATURE FOR ADJUSTABLE BED

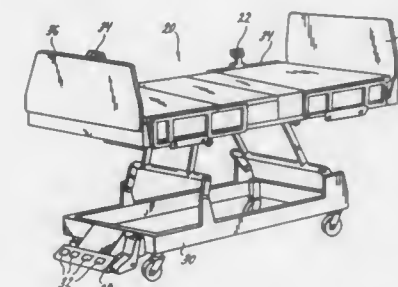
Kenneth R. Birkmann, St. Peters, Mo., assignor to Amedco Health Care, Inc., Wright City, Mo.

Filed Aug. 9, 1989, Ser. No. 391,886

Int. Cl. A61G 7/06

U.S. Cl. 5—60

13 Claims



1. In an adjustable bed having means for repositioning a plurality of portions of said bed with respect to each other, the improvement comprising a control having means for permitting an operator to input a coded command to initiate the automatic repositioning of said plurality of portions so as to bring said bed into a pre-determined position on an emergency basis, said control means having a logic means responsive to the coded operator command in order to prevent inadvertent operation.

4,953,244

## HOSPITAL BED FOR WEIGHING PATIENTS

Clement J. Koerber, Sr., Batesville, and Howard J. Boyd, Odenburg, both of Ind., assignors to Hill-Rom Company, Inc., Batesville, Ind.

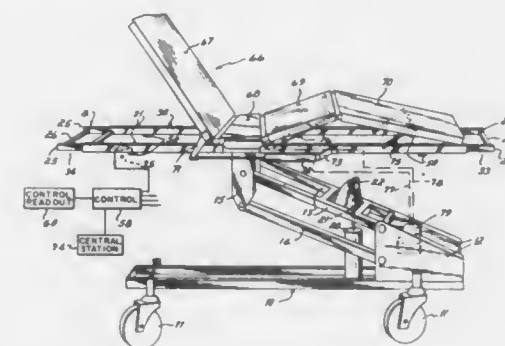
Filed Dec. 28, 1987, Ser. No. 138,829

Int. Cl. A61G 7/00, 19/59

U.S. Cl. 5—60

6 Claims

MICROFICHE APPENDIX INCLUDED  
(1 Microfiche, 37 Pages)



1. A hospital bed comprising:

a base,  
a rectangular support frame mounted on said base, said support frame being rectangular in cross section,  
a rectangular weigh frame overlying said support frame, said weigh frame being formed of spaced parallel frame elements of an inverted U-shape in cross section, said support frame being nested within said inverted U-shaped weight frame elements,  
a load cell at each of the four corner portions of said weigh frame connecting said weigh frame to said support frame.



**4,953,245**  
**DEVICE FOR MOVING PATIENTS WHO ARE**  
**CONFINED TO BED**

Hans Jung, Dammstrasse 9, D-7052, Schwaikheim, Fed. Rep. of Germany

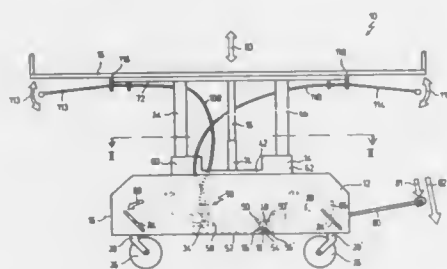
Filed Dec. 5, 1989, Ser. No. 446,079

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1989, 3902027

Int. Cl.<sup>5</sup> A61G 1/02, 7/06

U.S. Cl. 5—81 B

12 Claims



1. Device for moving patients who are confined to bed, comprising a travelling undercarriage which can be locked in place by means of a locking brake, a stretcher support which can be adjusted vertically and laterally relative to the undercarriage, and a locking gear for the stretcher support, wherein a solid block carrying the said vertically adjustable stretcher support is carried itself by at least one guide element extending transversely of the said undercarriage in such a manner that the block can be displaced in a transverse direction between two lateral end positions, and that the said locking gear comprises stop means attached to the said block, said stop means can be controlled from the said stretcher support and engage recesses provided on the said guide element for blocking the relative movement of the said block.

**4,953,246**  
**CUBICLE BED**

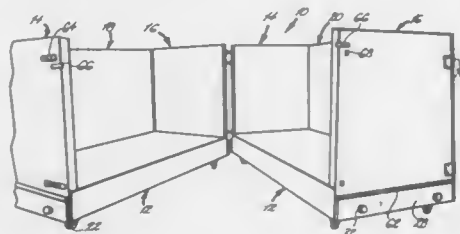
O. H. Matthews, 230 Okemah Trail, SE., Marietta, Ga. 30060

Filed Apr. 2, 1990, Ser. No. 503,628

Int. Cl.<sup>5</sup> A61G 7/06

U.S. Cl. 5—424

11 Claims



1. A cubicle bed for protectively confining a traumatically brain injured patient comprising:  
a horizontal rectangular base having two connectable generally equally sized rectangular base portions with generally coplaner padded upper surfaces;  
an upright removable end panel having a padded interior surface connected to, and upwardly extending from, each of the ends of said base portions;  
two said end panels connectably positionable in side-by-side relationship at each end of each said base;  
a removable upright side door having a padded interior surface pivotally connectable along a mating upright margin of each said end panel at each corner of said base;  
two said upright side doors forming a side panel along each side of said base when closed;  
said end panels and said side doors, when closed, forming a

padded upright enclosure extending upwardly to form a generally horizontal upper perimeter for confining the patient therewithin atop said base;  
said upper perimeter positioned sufficiently high above said base to restrict viewing of normal activity and surroundings adjacent said cubicle bed by the patient.

**4,953,247**

**AIR-OPERATED BODY SUPPORT DEVICE**

Charles E. Hasty, Box 185, Carrollton, Tex. 75006

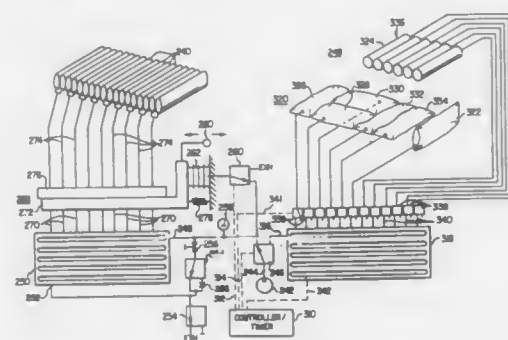
Continuation-in-part of Ser. No. 192,583, May 9, 1988. This

application Apr. 13, 1989, Ser. No. 335,945

Int. Cl.<sup>5</sup> A61G 7/057

U.S. Cl. 5—453

6 Claims



1. An air-operated support apparatus for a patient comprising:

- (a) a plurality of adjacent air sacks formed of a material substantially impervious to the passage of fluids, each sack having an inlet tube;
- (b) an air flow source for producing a stream of forced air;
- (c) a pressure selector communicating with the sacks and the air flow source for selectively maintaining a desired profile of air pressure among the sacks;
- (d) a single valve between the pressure selector and the air sack inlets movable between at least two states: a first state in which the sack inlets are open to fluid communication from the air flow source through the pressure selector; and a second state in which the sack inlets are closed, whereby the pressure profile among the sacks established by the air flow source and pressure selector when the valve is in the first state may be substantially preserved upon movement to the second state.

**4,953,248**

**ELECTRICIAN'S COMPOUND TOOL**

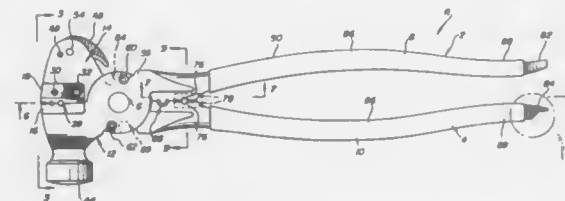
Thomas L. Trombetta, 3943 Roselle Ave., Modesto, Calif. 95355

Filed Feb. 2, 1990, Ser. No. 473,827

Int. Cl.<sup>5</sup> B25F 1/00

U.S. Cl. 7—107

25 Claims



1. A hand tool, comprising:  
(a) first and second members;  
(b) means for pivotally connecting said first member to said second member;  
(c) said first and second members including first and second handle portions, respectively, on one side of said connect-

- ing means and first and second jaw portions, respectively, on the other side of said connecting means;
- (d) said first and second jaw portions being positionable between closed and open positions when said handle portions are brought together or spread apart, respectively;
- (e) first and second cooperating cutter blades disposed on said first and second jaw portions, respectively, for cutting when said first and second jaw portions are closed;
- (f) said first and second cutter blades including first and second straight cutting edge portions, respectively, and at least first and second arcuate edge portions, respectively;
- (g) said at least first and second arcuate edge portions forming at least a circular cutter when said first and second jaw portions are closed;
- (h) one of said first and second jaw portions including an outward transverse extension terminating in a hammer head extending laterally outwardly of said handle portions when brought together; and
- (i) the other of said first and second jaw portions including an outward transverse extension terminating in a pivotable knife blade having a first protected position and a second exposed position.

**4,953,249**

**MODULAR OVERPASS OR RAISED PARKING**  
**STRUCTURE**

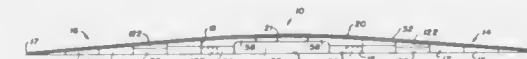
Jack A. Warwick, #103-1515 Chesterfield Avenue, North Vancouver, British Columbia, Canada V7M 2N5

Filed Sep. 11, 1989, Ser. No. 405,199

Int. Cl.<sup>5</sup> E01D 15/00

U.S. Cl. 14—2.4

24 Claims



1. A modular overpass for vehicular traffic comprising: interlockable roadway units including ramp units adapted for fitting together to create entry and exit ramps, each ramp having a low end and a raised end; cantilever units for attachment to said raised ends of said ramps, and suspended span units for joining said cantilever units; flexible footings to support said roadway units, said footings comprising a resilient base, a covering cap sealably fitted over said base to define a cavity, and a packable bearing material partially filling said cavity; and anchoring means to maintain said roadway units in position.

**4,953,250**

**DISPOSABLE WASH MITT WITH DETERGENT**

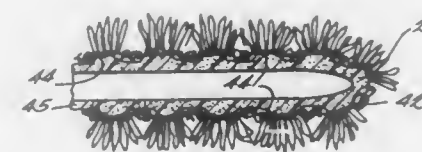
Steven R. Brown, 2003 Granger Rd., Manitowoc, Wis. 54220

Filed Aug. 3, 1989, Ser. No. 389,536

Int. Cl.<sup>5</sup> B08B 1/00; B32B 3/02

U.S. Cl. 15—104.94

8 Claims



1. A disposable, nonwoven, high-pile wash-mitt with timed release of the detergent, including a first-body portion and a second-body portion secured together to form the mitt, at least one of said body-portion including a nonwoven web having a high-pile exterior surface and a plurality of pores formed in an interior surface of said mitt wherein individual pores of said

plurality of pores are disposed opposite corresponding individual portions of said high pile surface, said pores being filled and said interior surface being coated with a water-soluble detergent.

**4,953,251**

**WIPER JOINT STRUCTURE**

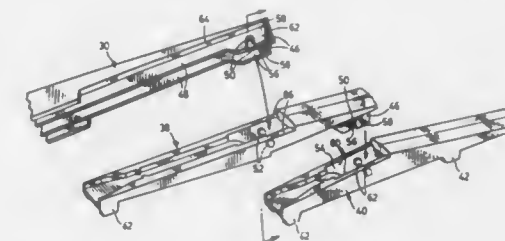
Simon S. M. Chow, Toronto, Canada, assignor to Tridon Limited, Oakville, Canada

Filed Jan. 28, 1987, Ser. No. 7,547

Int. Cl.<sup>5</sup> B60S 1/32

U.S. Cl. 15—250.32

10 Claims



1. In an articulated windshield wiper including a plurality of longitudinally extending yokes pivotally connected to each other to form an elongate holder for supporting a wiper blade, and movable with a wiper arm driven to reciprocate the blade over a windshield in use, at least one pivotal connection being provided for pivotally connecting said yokes, the pivotal connection comprising:

- a resilient outwardly biased inner portion provided on one of said yokes and comprising a pair of spaced parallel flanges;
- a rigid outer portion provided on another of said yokes and adapted to receive the inner portion; and
- hinge means adapted to connect the outer and inner portions comprising a pair of inwardly directed pivot stubs located opposite one another and fixed to inner surfaces of the outer portion, and a corresponding pair of apertures provided on respective flanges of said inner portion, said apertures being adapted to receive the stubs, the inner and outer portions being dimensioned for an interference fit such that insertion of the inner portion into the outer portion biases the flanges towards one another until the pivot stubs snap into engagement with the apertures thereby allowing the flanges to return towards a spaced orientation in which outer surfaces of the flanges are urged into abutment with the inner surfaces of the outer portion such that relative lateral movement between the yokes is minimized to reduce rattling of the wiper upon said reciprocal movement and sufficient pivotal movement at the hinge means is allowed for the articulated wiper to conform to the surface of a curved windshield.

**4,953,252**

**ROLL SURFACE CLEANING DEVICE**

Taiji Akisawa, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 21, 1989, Ser. No. 410,445

Claims priority, application Japan, Sep. 22, 1988, 63-237979

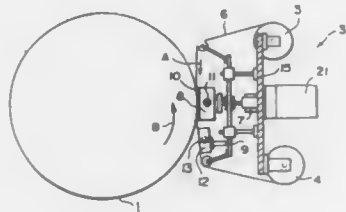
Int. Cl.<sup>5</sup> D21G 9/00

U.S. Cl. 15—308

1 Claim

1. A roll surface cleaning device for cleaning the surface of a roll used in a supercalender, a laminator, a film forming machine or the like comprising:  
a cleaning material strip which is softer than the roll surface and is in a continuous length, a feedout means which feeds out the cleaning material strip, a takeup means which takes up the cleaning material strip, a pressing means

which presses the cleaning material strip against the roll surface between the feed-out means and the takeup means, a vibration generating means which imparts fine vibration to the pressing means, a first suction means which applies suction force to the cleaning material strip from behind at



the portion which is pressed against the roll surface and a second suction means which is provided between the first suction means and the takeup means and applies suction force to the cleaning material from the side opposite to the side which is pressed against the roll surface.

4,953,253

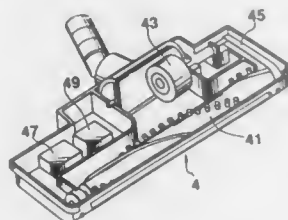
# CANISTER VACUUM CLEANER WITH AUTOMATIC OPERATION CONTROL

Norisuke Fukuda, Tokyo, and Yuji Shimada, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation-in-part of Ser. No. 199,338, May 26, 1988, abandoned. This application Jun. 29, 1989, Ser. No. 373,068 Claims priority, application Japan, May 30, 1987, 62-137198 Int. Cl.<sup>5</sup> A47L 9/28

U.S. Cl. 15—319

4 Claims



1. A canister vacuum cleaner, comprising: a canister including means for providing suction power; and a power nozzle for cleaning floor by using the suction power including: a rotary brush for beating the floor; a rotary brush motor for activating the rotary brush; means for detecting the floor condition; and means for controlling the rotary brush motor in accordance with the detected floor condition.

4,953,254

# SPRAY EXTRACTOR

Albert Kohl, Solothurn, Switzerland, and Roland Schunter, Lorch-Waldhausen, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 372,108, Jun. 28, 1989, abandoned, which is a continuation of Ser. No. 199,968, May 27, 1988, abandoned. This application Dec. 15, 1989, Ser. No. 451,844

Claims priority, application Fed. Rep. of Germany, May 29, 1987, 3718166

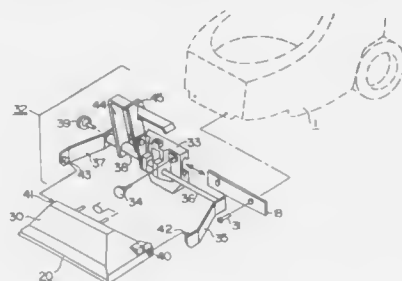
Int. Cl.<sup>5</sup> A47L 11/30

U.S. Cl. 15—320

12 Claims

1. A mobile cleaner apparatus comprising a container for a cleaning preparation and an associated pressure pump which

are integrated into a mobile and steerable chassis, said chassis having a steering handle and comprising a holder for a suction unit having an integrated soil container, a coupling means for fastening to the front side of said chassis a spray nozzle and suction nozzle unit having a roller, said coupling means comprising a fastening rail or bar fixed to and extending substantially across the entire lower front side of said chassis, said coupling means including a clamp block having a groove therein designed to slide over and onto said fastening rail or bar



wherein said clamp block is provided with a screw to secure said clamp block to said fastening rail or bar, said coupling means being also provided with a mounting frame connected to the housing of said spray nozzle and suction nozzle unit, whereby said coupling means enables lateral displacement of said spray nozzle and suction nozzle unit with respect to said chassis, said spray nozzle being suitable for applying a cleaning preparation to a surface to be cleaned and said suction nozzle being suitable for sucking up the applied cleaning preparation.

4,953,255

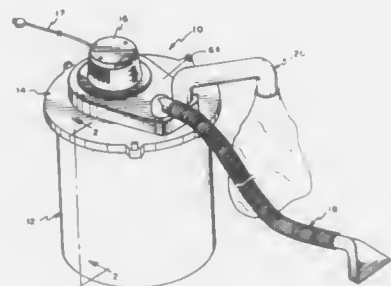
# PORTABLE HOT ASH VACUUM

Overton S. Jenkins, 6206 Sedgefield Dr., Norfolk, Va. 23513 Filed Mar. 16, 1989, Ser. No. 324,443

Int. Cl.<sup>5</sup> A47L 5/36

U.S. Cl. 15—327.02

6 Claims



1. A portable vacuum cleaner for vacuuming hot ashes, comprising: a canister having an outer housing and an inner housing; said inner and outer housings each having side walls, a bottom wall, and a top wall; at least the side walls and bottom wall of the inner housing being spaced inwardly from the side walls and bottom wall of the outer housing, defining a dead air space therebetween; vacuum producing means supported on said canister for producing a vacuum to vacuum up ashes and deposit them in said inner housing, said vacuum producing means comprising a motor having a suction side communicating with the interior of the inner housing, and a discharge side communicating with ambient atmosphere; and thermal insulating material on the side and bottom walls of

one of said inner and outer housings for cooperating with said dead air space to thermally insulate the temperature of hot ashes in the inner housing from the walls of the outer housing.

4,953,256

# COUNTERBALANCE MECHANISM

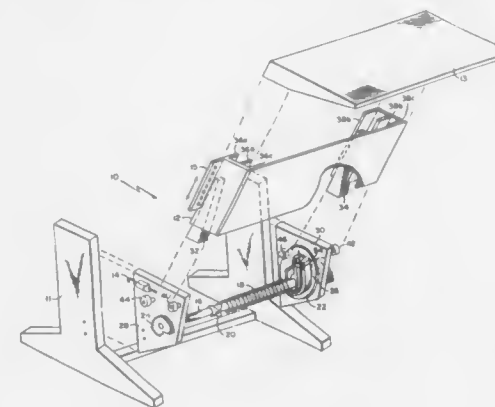
Gordon O. Salmela, Lexington, and Michael L. Pizzarella, Shrewsbury, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Feb. 6, 1989, Ser. No. 306,733

Int. Cl.<sup>5</sup> E05D 13/00; F16M 11/00

U.S. Cl. 16—1 C

16 Claims



1. A counterbalance mechanism comprising: means for guiding a movable portion of an apparatus along a vertical or inclined path; shaft means disposed between stationary sides of said apparatus for providing a force to counter a force of gravity on said movable portion; means for transferring said force to said movable portion in a constant manner independent of said movable portion position, said force transferring means comprises spiral gears disposed on a first end and a second end of said shaft means; and rack gears attached to said movable portion guiding means in a vertically oriented position, each of said rack gears positioned to engage one of said spiral gears.

4,953,257

# CASTER WHEEL

Seynhaeve: André G., Senlis, France, assignor to Delsey S.A., Bobigny Cedex, France

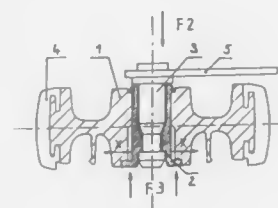
Filed Mar. 21, 1989, Ser. No. 326,061

Claims priority, application France, Apr. 5, 1988, 88 04424

Int. Cl.<sup>5</sup> B60B 5/00, 30/00

U.S. Cl. 16—45

8 Claims



1. A wheel, notably for baggage such as a suit-case or a traveling bag, characterized by the fact that it includes a moulded rim inside the bore of which is resiliently engaged a brace moulded from a resiliently deformable material and a metallic axis forcibly crimped inside a bore of said brace,

wherein said bore of the rim includes a cone with which cooperates a deformable end of said brace.

4,953,258

# BALANCING ARRANGEMENT FOR DOUBLE HUNG WINDOWS

Anthony R. Mennuto, Paramus, N.J., assignor to Metal Industries, Inc., Elizabethtown, Pa.

Filed Jul. 10, 1989, Ser. No. 377,327

Int. Cl.<sup>5</sup> E05F 1/02

U.S. Cl. 16—197

9 Claims



7. A balancing arrangement for use with a double hung window, comprising: spring means secured to a window jamb; balance shoe means secured to a corresponding window sash; the spring means including a spring arrangement secured to the balance shoe means, and including means for supporting the spring arrangement; the balance shoe means having a detent; and the means for supporting the spring arrangement supporting means for engaging the detent when the spring arrangement is unextended.

4,953,259

# ARMREST TORQUE CONTROL

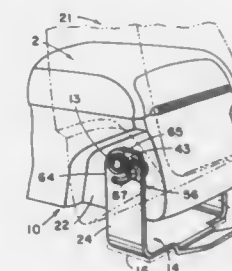
Dale J. Frye; Kenneth M. Liadberg; Alan L. Kindig; Robert J. Stander; Joseph B. Buonodono; Jeffrey D. Gras, and David A. Ozios, all of Holland, Mich., assignors to Prince Corporation, Holland, Mich.

Continuation-in-part of Ser. No. 217,171, Jul. 11, 1988, Pat. No. 4,882,807. This application Sep. 22, 1989, Ser. No. 411,405 The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> E05D 11/08

U.S. Cl. 16—225

12 Claims



1. A torque control for use in conjunction with a component pivotally mounted to a support structure for pivotal movement about a pivot pin, said torque control comprising: at least one cylindrical resistance element adapted to be fixedly mounted to one of said component or structure in



spaced relationship to the pivot pin, said resistance element having a predetermined diameter; and a member composed of a resilient polymeric material for attachment to the other of the component or structure, said member having at least one arcuate slot spaced from the pivot pin and receiving therein said resistance element for movement longitudinally therethrough as the component pivots about the pivot pin; said slot having a width dimension relatively smaller than said diameter of said resistance element, whereby a desired frictional resistance is obtained as the component is pivotally moved, and wherein means is provided to continuously vary the force exerted by the sides of said slot on said resistance element as it travels through substantially the entire arcuate length of said slot whereby a variable frictional resistance is provided on said resistance element as it slides along said slot.

4,953,260

# **AUTOMATIC DOOR CLOSER HAVING AN ADJUSTABLE TORSION SPRING AND CONFIGURED END FITTINGS**

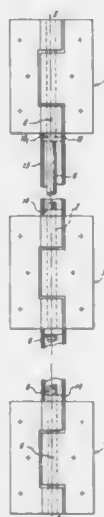
Jean A. Fargnier, 30-33 rue Roger Salengro, Fontenay Sous Bois (Val de Marne), France

Continuation of Ser. No. 149,134, Jan. 27, 1988, Pat. No. 4,845,811. This application May 30, 1989, Ser. No. 358,935. The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> E05F 1/08

U.S. Cl. 16—308

5 Claims



1. Automatic door closer comprising at least two hinges, each of which comprises two hinged components on an axis and one of which, known as the mobile component, is fixed on the door and the other one of which, known as the fixed component, is fixed on the post of the door, a steel spring torsion bar, a first connecting means connecting one end of the steel spring torsion bar to the fixed component of a hinge, a second connecting means connecting the other end of the bar to the mobile component of another hinge, one of these connecting means comprising means for determining restoring torque of the door so as to bring the door back automatically into the closed position, a tube disposed about the bar between the hinges wherein the tube is provided with a lateral slot along its length thereby enabling said tube to be located on said bar after said bar has been regulated for torsion movement, one end of the tube being held coaxially on the bar by a washer sliding freely about the bar and inside the tube.

4,953,261

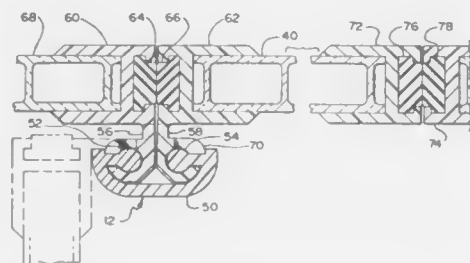
# **WATERPROOF HINGED PANEL ASSEMBLY**

Donald D. Lyons, 204 W. Telegraph, Dowagiac, Mich. 49047  
Filed Aug. 10, 1988, Ser. No. 230,850

Int. Cl.<sup>5</sup> E05D 7/00, 1/04, 11/00

U.S. Cl. 16—354

7 Claims



1. A hinge assembly for a hinged panel assembly comprising:  
a linear hinge channel having a first side section, a second opposed side section and a bottom section;  
a first linear side projection extending from said first side section toward said second side section along the length of said channel and having a rounded linear protruding end;  
a second linear side projection extending from said second side section toward said first side section along the length of said channel and having a rounded linear protruding end;  
a first attachment section having a first front face, a first end face and a first linear hinge projection extending normal to said front face, said first linear hinge projection including a first linear socket rotatably engaging said rounded end of said first linear side projection along its length and a first linear hinge bearing surface opposite said first linear socket;  
a second attachment section having a second front face, a second end face and a second linear hinge projection, said second linear hinge projection including a second linear socket rotatably engaging said rounded end of said second linear side projection along its length and a second linear hinge bearing surface opposite said second linear socket;  
said first and second linear hinge bearing surfaces being adapted to matingly meet each other when the first and second attachment sections are rotated about the first and second rounded linear protruding ends, respectively, within the hinge channel;  
a first sealing strip attached to said first attachment section along said first end face; and  
a second sealing strip attached to said second attachment section along said second end face for sealing abutment with said first sealing strip;  
said first and second attachment sections being rotatable with respect to said linear hinge channel between an open position in which said first and second front faces are parallel and a closed position in which said first and second end faces are located in opposing adjacent relation and said first and second sealing strips abut at an interface plane to provide a water-tight seal.

4,953,262

# **MACHINE FOR PROCESSING MEAT**

Georg Zinser, Winterstettenstadt, Fed. Rep. of Germany, assignor to Albert Handtmann, Maschinenfabrik GmbH & Co. KG, Biberach an der Riss, Fed. Rep. of Germany

Filed Apr. 3, 1989, Ser. No. 332,072

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1988, 3812931

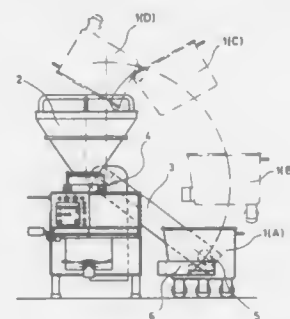
Int. Cl.<sup>4</sup> A22C 5/00

U.S. Cl. 17—1 R

14 Claims

1. A machine for processing meat, particularly sausage meat, comprising a supply hopper supported on top of the machine,

a lift arm mounted for pivoting about a horizontal axle at a fixed position on the machine and carrying a horizontal rotatable tipping shaft, and a carrier frame for a mobile sausage meat container secured to said tipping shaft for rotation in unison therewith, characterized in that between said lift arm axle (4) and said tipping shaft (5) there is provided a first chain transmission (16) having a transmission ratio of 1:1 for guiding said sausage meat container (1) parallel to itself as said lift arm



(3) is raised and lowered, and a second cross-connected chain transmission (19) having a transmission ratio greater than 1 for causing said sausage meat container (1) to be tipped, the driving sprockets (17,20) of said chain transmissions being mounted on said lift arm axle (4) for free rotation thereabout, and adapted to be alternately coupled thereto for rotation therewith, while the driven sprockets (18,21) are non-rotatably secured to said tipping shaft (5).

4,953,263

# **PROCESS FOR STUNNING LIVESTOCK**

Elbert Lambooy, Veenendaal, Netherlands, assignor to Stichting Instituut voor Veeteeltkundig Onderzoek "Schoonoord", Zeist, Netherlands

Continuation-in-part of Ser. No. 240,755, Sep. 2, 1988, Pat. No. 4,875,253. This application Sep. 25, 1989, Ser. No. 411,899

Int. Cl.<sup>5</sup> A22B 3/00

U.S. Cl. 17—1 E

2 Claims



1. In a process for stunning livestock by means of a low frequency electrical current surge transmitted briefly through electrodes to the animal to be stunned, the improvement comprising prior to sticking the animal, administering a stunning alternating current surge followed by an intermittent alternating current surge, the frequency of which is a multiple of the frequency of the stunning current surge.

4,953,264

# **METALLIC WIRE USED WITH TEXTILE FIBER PROCESSING ELEMENTS, IN PARTICULAR, WITH CLEANING ROLLERS**

John D. Hollingsworth, Greenville, S.C., and Akiva Pinto, Gastonia, N.C., assignors to John D. Hollingsworth on Wheels, Inc., Greenville, S.C.

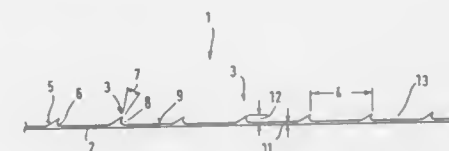
Filed Jun. 20, 1988, Ser. No. 209,016

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1987, 3723872

Int. Cl.<sup>5</sup> D01G 15/84

U.S. Cl. 19—114

22 Claims



1. Metallic toothed wire for processing textile fibers having a wire portion, said toothed wire comprising:  
a plurality of teeth having a tooth distance defined between adjacent teeth of at least 10 mm creating lengthy trough interspaces;  
said teeth having a low height profile defined by an upper tooth tip which extends above a tooth base to a height of about one third of said tooth distance;  
said tooth having a low rear inclination which ascends in a rear inclination over about half said tooth distance from said tooth base to said tooth tip;  
an undercut having an undercut inclination extending downwardly from said tooth tip, said undercut inclination terminating at a transitory inclination which terminates at said tooth base;  
a positive front angle between said rear inclination and said undercut inclination being within a range of 10 degrees to 40 degrees; and  
said low height profile and lengthy trough interspaces of said teeth being constructed and arranged to contain fiber material in said interspaces with waste particles generally unbroken with increased separation of said waste particles from said interspaces over the low height profile of said teeth.

4,953,265

# **DEVICE FOR DETECTING NEPS IN CARDED, TEXTILE FIBER MATERIAL**

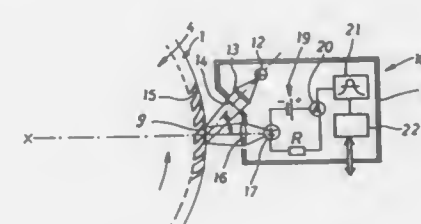
Hans-Jürgen Scheinbütte, Schluddelegi, Switzerland, assignor to Gebrüder Loepfe AG, Kempten, Switzerland

Filed Mar. 1, 1989, Ser. No. 317,299

Claims priority, application Switzerland, Mar. 2, 1988, 785/88

Int. Cl.<sup>5</sup> D01G 15/46

8 Claims



1. A device for detecting neps in a textile fiber fleece band, said fiber fleece band being transported along a transporting path through a carding machine, said device comprising:  
illuminating means arranged at a distance from said trans-

porting path and having light emitting means for illuminating a defined area of said transporting path, said area having an extension transverse to the direction of the transporting path;  
light sensing means arranged in a distance of said transporting path and having at least one imaging optics being provided for projecting an image of said illuminated area of said fiber fleece band on an image plane, and said light sensing means being arranged in said image plane; and  
at least one evaluation circuit connected to said light sensor, said evaluation circuit having a differentiating circuit for forming a first or second derivative of the sensor signal and circuit means for analyzing said differentiated signal.

4,953,266

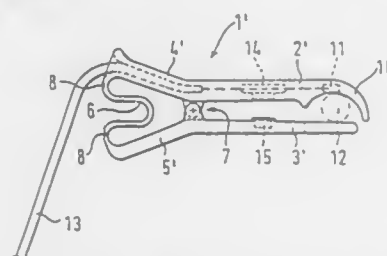
## ONE-PIECE PLASTIC CLIP

Karl Trinkaus, Darmstadt, Fed. Rep. of Germany, assignor to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany  
Filed Aug. 16, 1989, Ser. No. 394,827

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1988, 8810826

Int. Cl.<sup>5</sup> A41F 1/00; A44B 21/00  
U.S. Cl. 24—499

8 Claims



1. A one-piece plastic clip having one end and another end comprising two clamping members at said one end and two spreadable handles at said other end, a pivot bearing structured for assembly by snapping-together, a U-shaped compression spring located inside said spreadable handles and connecting said spreadable handles together, and a Reed-Contact located in one of said clamping members and a permanent magnet located in the other of said clamping members, said clamping members each having a free end portion.

4,953,267

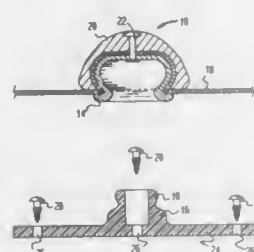
MALE ELEMENT FOR HEAVY DUTY SNAP FASTENER  
John G. Marino, 12 Sandra Ct., Huntington, N.Y. 11746, and Michael Toppato, 18 Meadowbrook Dr., Brentwood, N.Y. 11717

Filed Mar. 29, 1989, Ser. No. 330,568

Int. Cl.<sup>5</sup> A44B 1/18

U.S. Cl. 24—682

2 Claims



1. A snap fastener and support assembly comprising:  
(a) a generally circular male member and a generally circular female member adapted to releasably interlock with one another;  
(b) an elongated base plate adapted for mounting the male

member of the snap fastener, said base plate being integral and unitary with said generally circular male member;  
(c) said base plate having a generally planar bottom surface;  
(d) said integral base plate and male member being formed of a generally weather-resistant and slippery plastic;  
(e) said integral male member and base plate having mounting means for mounting said base plate and male member to a support surface, said mounting means comprising two openings passing through said base plate and a third opening passing through said male member, and three screws or the like extending through said three openings; and  
(f) a vehicle cover mounted in combination with the female member whereby the female member is fastened over the male member when the cover is in position.

4,953,268

## SAFETY DRESS FASTENER

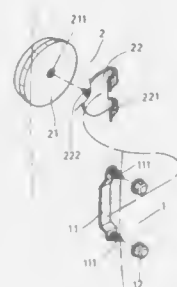
C. C. Chang, 1F. No. 19, Alley 52, Lane 245, Sec. 4, Ba-Deh Rd., Taipei, Taiwan

Filed Jan. 10, 1990, Ser. No. 463,211

Int. Cl.<sup>5</sup> A44B 1/18

U.S. Cl. 24—694

1 Claim



1. A safety dress fastener, including:  
a male member comprised of a retaining plate having two unitary screws upstanding from its both ends, and two safety nuts screwed up with said two screws to secure to a dress; and  
a female member comprised of a decorative button having a center bolt hole, and a hook element, said hook element comprising a hook portion and a screw portion, said screw portion being screwed in said center bolt hole of said decorative button and secured to said dress at a position corresponding to said male member so that said hook portion can hook on said retaining plate to fasten up said dress.

4,953,269

SWIMMING POOL ANCHOR AND REMOVAL TOOL  
Kelly Ragsdale, Salt Lake City, Utah, assignor to Cover-Pools, Inc. A Utah Corporation, Salt Lake City, Utah

Filed Jul. 7, 1989, Ser. No. 377,235

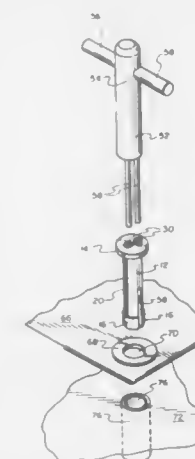
Int. Cl.<sup>5</sup> F16B 19/00; B25B 13/16

U.S. Cl. 24—704.1

19 Claims

1. The combination of fastener and removal tool comprising:  
a resilient, collapsible fastener means for use in detachably securing together a first member, which defines an aperture therethrough, and a second member, having a receiving aperture therein, said fastener means being sized to be inserted through said first member aperture and received within said second member aperture, thereby forming a detachable union of said first and second member; said fastener means including an abutment means mounted thereon, sized to preclude an insertion thereof through said first member aperture; said abutment means defining a plurality of spaced openings therethrough, each said opening being dimensioned to receive slidably a respective said elongate member, each of said openings being

configured to direct a respective elongate member into a biased engagement against said fastener means; and  
a removal means for removing said fastener means from its securement positioning through said first member aperture and in said second member aperture, said removal means including a plurality of elongate members sized to



be inserted through a said first member aperture and positioned in biased contact against said fastener means to effect a collapse of said fastener means while providing a pressure-fit connection with said fastener means to facilitate a withdrawal of said fastener means upon a withdrawal of said removal means.

4,953,270

## METHOD FOR MARKING TEXTILE SUBSTRATES

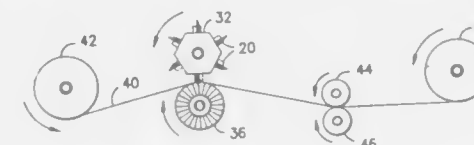
Michael W. Gilpatrick, Chesnee, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Sep. 4, 1987, Ser. No. 93,365

Int. Cl.<sup>5</sup> D06C 23/00

U.S. Cl. 28—163

3 Claims



1. A method for marking a textile fabric, said fabric comprised of a plurality of yarns oriented in a first direction and a plurality of yarns oriented in a second, substantially perpendicular direction, said former and latter yarns defining a fabric plane, said method comprising simultaneously

(a) forming an incision in said fabric by inserting a planar member having a sharpened edge, which penetrates said fabric plane and which is parallel to said first direction, thereby cutting yarns oriented in said second, substantially perpendicular direction without cutting said yarns oriented in said first direction;  
(b) disentangling those portions of cut yarns nearest said incision from uncut yarns nearest said incision which are oriented in said first direction; and  
(c) displacing said disentangled yarn portions nearest said incision from said fabric plane.

4,953,271

## INTERMINGLING NOZZLE

Herbert Wellenhofer, Bobingen; Ingolf Jacob, Untermeitingen, and Josef Geirhos, Bobingen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

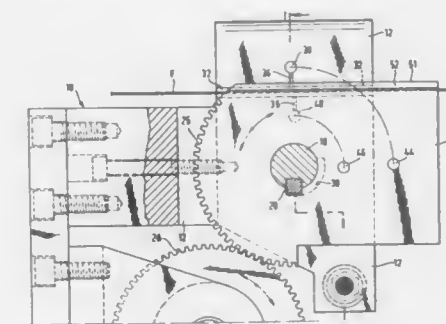
Filed Sep. 20, 1989, Ser. No. 410,311

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1988, 3832283

Int. Cl.<sup>5</sup> D02G 1/16; D02J 1/08

U.S. Cl. 28—272

12 Claims



1. An intermingling nozzle for filaments or yarns, comprising a plurality of plates arranged side by side in the manner of a reed forming yarn channels which are in a parallel arrangement and blowing medium channels which end transversely in the yarn channels, the axes of the yarn channels being in a plane which extends perpendicularly to the plates, wherein pairs of mutually adjoining plates consist of a stationary yarn channel plate (12) and a mobile closing plate (14), of which the yarn channel plate (12) is provided on its side which faces the closing plate (14) with a groove (32) which serves as a yarn channel and the closing plate (14) is movable parallel to the plate planes between an open position which gives access to the yarn channel and a closed position which covers up the yarn channel.

4,953,272

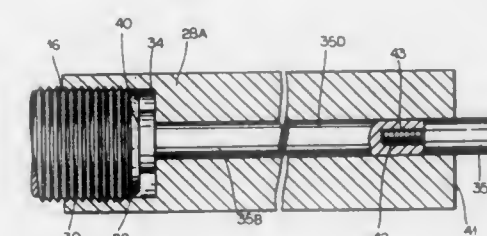
## WHEELED VEHICLE TIRE WHEEL MOUNTING AID

James C. Gevas, One Ford La., Roseland, N.J. 07068  
Continuation-in-part of Ser. No. 164,326, Mar. 4, 1988, Pat. No. 4,847,971. This application Apr. 4, 1989, Ser. No. 333,125  
The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B25B 27/14

U.S. Cl. 29—273

2 Claims



1. For aligning and mounting a tire wheel onto a wheeled vehicle wherein subsequent securing of said tire wheel onto said vehicle is accomplished with vehicle tire wheel mount studs and mating lug nuts, an apparatus, comprising:

(a) an adapter, a first part of a detachable two-part mount stud extension assembly which is hollow along its longitudinal axis, wherein at one end of and centered around the



longitudinal axis of said adapter is an extender alignment hole with an internal hole end which opens into the internal cavity of said adapter, wherein the surrounding face of said internal hole end is formed by an annular face region of the structure of said adapter, and the outer end of said extender alignment hole opens into the outermost face of said adapter at that adapter longitudinal end, wherein there is an adapter threaded end at the other end of the longitudinal axis of said adapter at which centered around the longitudinal axis of said adapter are internal threads which fit those of a mating vehicle tire wheel mount stud; and,

(b) an extender, the second part of said detachable two-part mount stud extension assembly, wherein said extender consists of an unheaded shaft section which butts against a headed end section with which it is approximately co-axial, wherein said headed end section has radial lengths which exceed those of any of the radii of said unheaded shaft section, wherein at the unheaded end of said extender at that end of the longitudinal axis of said extender which is opposite from said headed end section said unheaded shaft section has means for the attachment of an extension to said unheaded shaft section of said extender; and,

(c) wherein said detachable two-part mount stud extension assembly is assembled by the insertion of the unheaded shaft section end of said extender into and through said internal hole end of said extender alignment hole of said adapter, said insertion of said extender continuing through as far as continued insertion travel freedom permits, wherein the longest radial length of said headed end section of said extender is shorter than the shortest radial length of said internal cavity of said adapter body along its longitudinal length from said adapter threaded end to its said annular face region surrounding its said internal hole end of its said extender alignment hole, and wherein when said detachable two-part mount stud extension assembly is mounted onto a mating vehicle tire wheel mount stud by screwing said internal threads of said adapter onto the external threads of a mating vehicle tire wheel mount stud said extender is captured along its longitudinal axis in the direction towards said vehicle tire wheel mount stud by the outermost face of said vehicle tire wheel mount stud and is captured along its longitudinal axis in the direction away from said vehicle tire wheel mount stud by said annular face region of said adapter which surrounds said internal hole end of said extender alignment hole of said adapter, wherein said detachable two-part mount stud extension assembly at its adapter end extends outwards in the direction away from the vehicle at least as far as does said unheaded end of said extender and further than do the rest of the vehicle tire wheel mount studs which are not mated with said detachable two-part mount stud extension assembly.

4,953,273

#### PROCESS FOR APPLYING CONDUCTIVE TERMINATIONS TO CERAMIC COMPONENTS

Victor D. Insetta; Richard V. Monsorno, both of Jacksonville, Fla., and John F. Dorrian, Simpsonville, S.C., assignors to American Technical Ceramics Corporation, Huntington Station, N.Y.

Filed May 25, 1989, Ser. No. 356,518

Int. Cl.<sup>5</sup> H01G 4/12

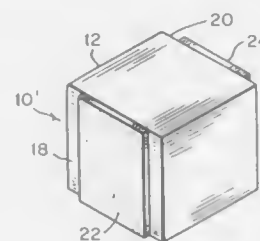
U.S. Cl. 29—25.42

18 Claims

1. A process for applying a plurality of conductive paths on the exterior of a ceramic component having an unsintered ceramic body comprising the steps of:

- applying said paths to said body said paths being composed of only a finely divided metal, and finely divided ceramic particles substantially the same as the ceramic of said body, in an organic carrier;
- applying a termination layer over said paths, said termination layer having finely divided metal in a liquid carrier

and finely divided ceramic particles of substantially the same ceramic as that of said body; and



cofiring said body, said paths and said termination layer to integrate the same into a monolithic integral unit.

4,953,274

#### MACHINE TOOL WITH TWO WORKPIECE SPINDLES

Gerhard Rehage, Gütersloh; Manfred Staeger, Melle, and Hans W. Grünkemeier, Werther, all of Fed. Rep. of Germany, assignors to Gildemeister Aktiengesellschaft, Bielefeld, Fed. Rep. of Germany

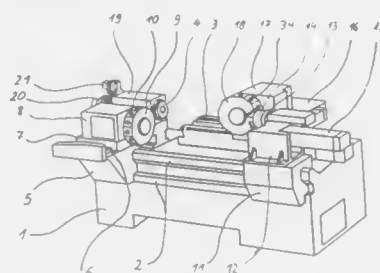
Filed Sep. 26, 1988, Ser. No. 249,587

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1987, 8713204[U]

Int. Cl.<sup>5</sup> B23B 3/30

U.S. Cl. 29—27 C

4 Claims



1. A machine tool, comprising two workpiece spindles having a common spindle axis and located axially opposite to one another, at least one of said workpiece spindles being movable in an axial direction for transferring a workpiece from a clamping location to a working location; at least two tool carriages; guide means for supporting each of said at least two carriages for movement parallel to the spindle axis and perpendicular to the spindle axis, a first tool turret supported on one of said at least two carriages and having a first indexing axis extending perpendicular to the spindle axis; and a second tool turret supported on another of said at least two tool carriages and having a second indexing axis extending parallel to the spindle axis and perpendicular to said first indexing axis, each of said first and second tool turrets having a plurality of tool receptacles formed so that tools received in said tool receptacles extend substantially radially to a respective one of said first and second indexing axes.

4,953,275

#### PROCESS FOR MANUFACTURING ALLOY WHEELS FOR VEHICLE TIRES

Hiroshi Mori, 2751 Aqua Verde Cir., Los Angeles, Calif. 90077

Filed Nov. 27, 1989, Ser. No. 441,888

Int. Cl.<sup>5</sup> B21D 22/16

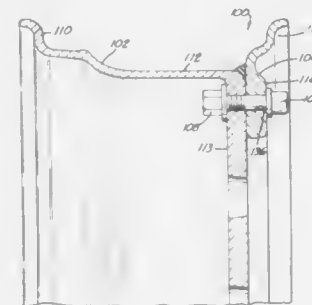
U.S. Cl. 29—894.324

14 Claims

10. A process forming a two-piece vehicle wheel comprising the steps of:

- roll-forming a perimeter portion of a circular plate to draw material in the perimeter portion radially outwardly therefrom and reduce the transverse dimension of said perimeter portion;

bending the roll-formed perimeter portion of the plate to define a first rim flange and a rim spanning portion; roll-forming a perimeter portion of an annular disc to draw material in the perimeter portion radially outwardly therefrom and reduce the transverse dimension of said perimeter portion of said disc;



bending the roll formed perimeter portion of the disc to define a second rim flange; and securing together said plate and said disc such that said rim spanning portion extends horizontally between said first and second rim flanges to define said wheel.

4,953,276

#### APPARATUS FOR INSERTING VALVE SEATS IN VALVE BODIES

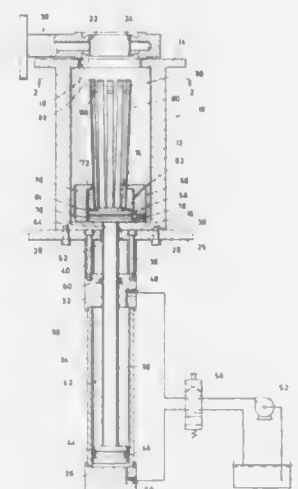
Daniel P. Kusmer, Stafford, and Paul A. Yohner, Houston, both of Tex., assignors to Keystone International Holdings Corp., Houston, Tex.

Filed Jul. 21, 1989, Ser. No. 383,370

Int. Cl.<sup>5</sup> B23P 19/04

U.S. Cl. 29—235

9 Claims



1. An apparatus for inserting a resilient valve seat into a valve body, said valve body having a radially inwardly projecting annular rib, said annular rib defining a bore through said valve body, said valve seat being generally annular and having an annular web portion, a first annular flange portion projecting radially outwardly from a first end of said web portion and a second annular flange portion projecting radially outwardly from a second end of said web portion thereby defining an annular, radially outwardly opening channel for receiving said rib, said first flange portion having an annular, inner surface partially defining said channel and an annular, radially outwardly facing surface, comprising:

a frame, said frame having an opening; means for positioning said valve body adjacent said opening in said frame such that said opening in said frame and said bore in said valve body are in register; and a plunger assembly slidably mounted in said frame, said plunger assembly including:

a mounting means, a plurality of spaced, circumferentially disposed fingers secured to said mounting means, said fingers including engagement means having a first means to engage the inner surface of said first flange portion and a second means to position adjacent said radially outwardly facing surface of said flange portion,

said plunger assembly further including means, operatively connected to said mounting means, to effect positioning of said fingers between a first, compressed position when said mounting means is in a first position in said frame and means to expand said fingers into a second, expanded position when said mounting means is in a second position in said frame and said fingers are positioned such that said engagement means is positioned on the opposite side of said valve body from said frame,

means to move said plunger assembly such that said fingers can be selectively reciprocated through said opening in said frame and said bore in said valve body and that said engagement means can be positioned on the opposite side of said valve body from said frame, whereby said valve seat can be disposed such that said first means of said engagement means engages said inner surface of said first flange portion and said second means of said engagement means is positioned adjacent said radially outwardly facing surface of said first flange portion whereby as said plunger means is moved in a direction toward said frame, said annular rib compresses said fingers inwardly and said valve seat is radially, inwardly distorted sufficient to permit said first flange portion to pass through said bore defined by said rib.

4,953,277

#### MANUFACTURING PROCESS FOR AN ELECTRONIC DEVICE

Norbert Crispin, Markgroeningen; Hartmut Schumacher, Stuttgart; Harald Vogt, Schwieberdingen, and Rudolf Eisenbarth, Salzgitter, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

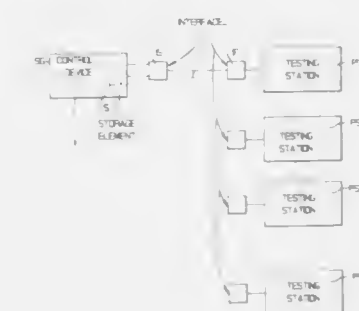
Filed Aug. 7, 1989, Ser. No. 390,644

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1988, 3828988

Int. Cl.<sup>5</sup> B23P 21/00

U.S. Cl. 29—407

10 Claims



1. A manufacturing process for an electronic device having a storage element, comprising testing the device during a plurality of manufacturing stages at respective testing stations, and after being tested at a respective testing station, storing information relating to an inspection step performed at the respective inspection station in the storage element of the electronic device.

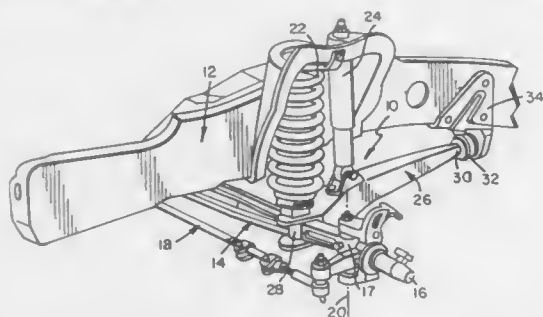
4,953,278

**METHOD FOR ADJUSTING ALIGNMENT OF A WHEEL**  
Gerald A. Spektor, St. Paul, and John Spektor, Golden Valley, both of Minn., assignors to Shim-A-Line, Inc., Minneapolis, Minn.

Division of Ser. No. 83,564, Aug. 7, 1987. This application Jan. 19, 1989, Ser. No. 300,026  
Int. Cl.<sup>5</sup> B23P 19/04

U.S. Cl. 29—402.06

13 Claims



1. A method for adjusting alignment of a wheel attached to a vehicle having a rod member affecting the alignment, the rod member having a portion disposed within a bushing, the rod member and the bushing being adjacent, the method comprising:  
inserting between the rod member and the bushing a shim along one side of the rod member to adjust the alignment of the wheel.

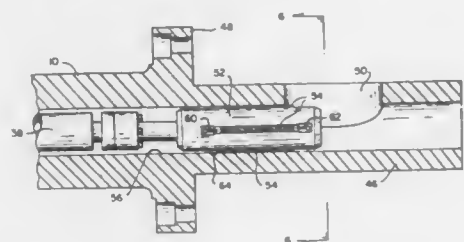
4,953,279

**METHOD AND APPARATUS FOR GROOVING THE BARREL OF A PLASTICATING MACHINE**  
Paul N. Colby, New Castle, Pa., assignor to Spirex Corporation, Youngstown, Ohio

Filed Oct. 6, 1989, Ser. No. 418,238  
Int. Cl.<sup>5</sup> B23P 6/00

U.S. Cl. 29—402.06

6 Claims



1. A method for machining grooves on the interior surface of the barrel of a plasticating machine having a rotating screw, said method comprising  
a. removing said screw from said barrel,  
b. transporting a grooving device having radially adjustable cutting elements to the plasticating operating site of said barrel,  
c. inserting one end of said grooving device into said barrel so that the cutting elements are disposed within said barrel at one end of the barrel and the other end of said grooving device including reciprocating motive means extends outwardly from said barrel at the other end of said barrel,  
d. fixing the angular and longitudinal position of the grooving device within said barrel,  
e. attaching to said barrel at said other end of said barrel a support brace with said brace providing support for said other end of said grooving device,  
f. adjusting the radial position of said cutting elements, and  
g. subjecting said grooving device to reciprocating movement to cut grooves into the interior surface of said barrel.

4,953,280

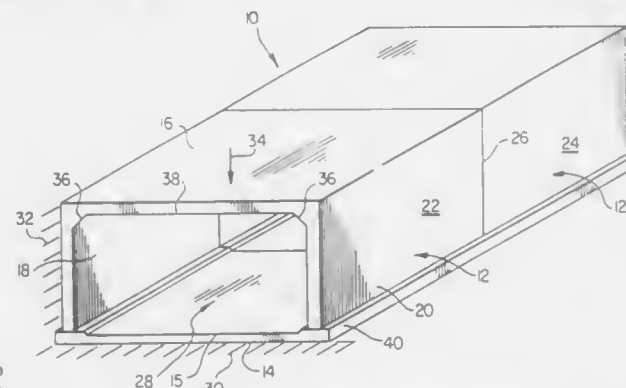
**METHOD OF MANUFACTURING PRESTRESSED CONCRETE CULVERTS**

James K. Kitzmiller, Dallas, Tex., assignor to Gifford-Hill & Company, Inc., Dallas, Tex.

Continuation of Ser. No. 57,772, Jun. 3, 1987, abandoned. This application Jan. 11, 1990, Ser. No. 464,588  
Int. Cl.<sup>5</sup> B23P 17/00; B28B 7/02, 7/24, 11/14

U.S. Cl. 29—412

15 Claims



1. A method for efficiently manufacturing a plurality of three-sided, reinforced modular concrete culverts in an upside-down position, each of said culverts comprising two opposite sidewalls and a top slab formed therebetween, said method comprising the steps of:  
providing a casting table having two opposite sidewalls, said sidewalls forming a pour cavity therebetween, said pour cavity providing for the formation of the top slabs of said plurality of inserted modular concrete culverts;  
providing at least two adjacent pairs of sidewall forms, each sidewall form having a first sidewall form part and a second sidewall form part opposite to said first sidewall form part, said first and second sidewall form parts when in engagement with each other forming a chamber therebetween within which reinforcing steel is placed, each pair of sidewall forms in cooperation with said pour cavity of said casting table providing for the formation of each of said modular concrete culverts including said opposite sidewalls and said top slab formed therebetween;  
positioning at least one prestressing tendon in said pour cavity of said casting table;  
securing reinforcing steel within said chamber of each of said sidewall forms;  
resting said at least two adjacent pairs of sidewall forms upon and across said casting table sidewalls in a generally parallel, spaced relationship one to the other, said chambers projecting generally perpendicularly upward from said casting table sidewalls, thereby providing for the formation of adjacent concrete culverts;  
stressing said at least one tendon by exerting a force from outside said pour cavity;  
pouring concrete into said pour cavity of said casting table and over said at least one prestressed tendon;  
pouring concrete into said chambers of said at least two adjacent pairs of sidewall forms;  
cutting said at least one tendon at an intermediate point between said two adjacent pairs of sidewall forms;  
removing said at least two adjacent pairs of sidewall forms; and  
separating said plurality of inverted modular concrete culverts into individual reinforced modular concrete culverts, said plurality of inverted modular concrete culverts disposed in side-to-side relationship along said casting table, said individual modular concrete culverts each having first and second opposite sidewalls and said top slab formed therebetween.

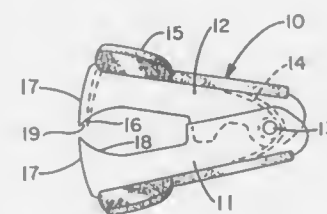
4,953,281

**METHOD OF MAKING A STAPLE REMOVER**  
Yun L. Wang, 424 Barrenwood Dr., Wadsworth, Ohio 44281

Division of Ser. No. 7/173,267, Mar. 25, 1988, Pat. No. 4,903,945. This application May 19, 1989, Ser. No. 354,455  
Int. Cl.<sup>5</sup> B23P 11/00

U.S. Cl. 29—438

11 Claims



1. A method of manufacturing a staple removing device comprising the steps of:  
forming a pair of extraction means in a first plane to be provided on first and second levers respectively;  
each of said extraction means having a spaced apart oppositely positioned pair of points at one end of said extraction means, and one of said pair of extraction means having a projection forming an engaging member located intermediately between said points and formed integrally therewith;  
bending said extraction means on said first and second levers such that said points will extend in a plane substantially perpendicular to said first plane;  
bending said engaging member such that it is disposed intermediately between said points of one of said bent extraction means and forms an engaging gap with both of said extraction points thereof;  
pivotally coupling said levers at one end thereof with said extraction means provided thereon such that said extraction means are movable toward each other whereby said staple will be engaged by said gap and the points of the other of said extraction means to thereby uniformly remove the ends of said staple by said extraction means.

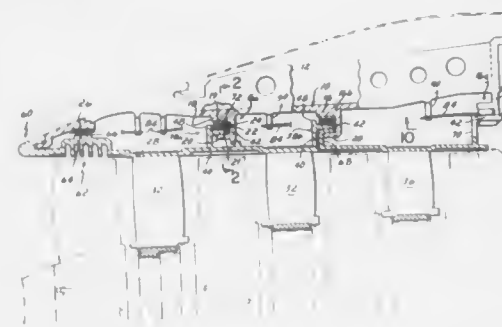
4,953,282

**STATOR VANE MOUNTING METHOD AND ASSEMBLY**  
Robert J. Corsmeier, Cincinnati, and James S. Kelm, Milford, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 142,584, Jan. 11, 1988, Pat. No. 4,868,963. This application Jun. 26, 1989, Ser. No. 371,142  
Int. Cl.<sup>5</sup> B23P 11/00

U.S. Cl. 29—451

12 Claims



1. The method of mounting a first element to a second element, comprising:

providing spaced, first and second clamping surfaces on the first element;  
providing a flange on the second element, said flange being formed with first wedge lock elements extending outwardly from a surface thereof;  
positioning a locking spring having outwardly extending second wedge lock elements upon said surface of said flange so that said second wedge lock elements on said locking spring extend between adjacent first wedge lock elements on said flange;  
inserting both said locking spring and said flange between said spaced first and second clamping surfaces;  
moving said locking spring relative to said flange so that said first wedge lock elements on said flange engage said second wedge lock elements on said locking spring and thereby force said locking spring against said flange and one of said first and second clamping surfaces, said locking spring and said flange being tightly wedged between said first and second clamping surfaces for connecting the first element to the second element.

4,953,283

**METHOD OF HANDLING ELECTRONIC COMPONENT CHIPS**

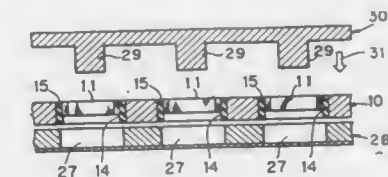
Shoichi Kawabata, Hisanao Tsuge, and Hiromichi Wakatsuki, all of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Nov. 28, 1988, Ser. No. 276,618

Claims priority, application Japan, Nov. 28, 1987, 62-301062  
Int. Cl.<sup>5</sup> B23P 11/02; H05K 3/30

U.S. Cl. 29—593

21 Claims



1. A method of handling a plurality of electronic component chips each having dimensions along longitudinal, crosswise and perpendicular directions measured orthogonal to each other, wherein said longitudinal dimension has the longest size and said crosswise dimension has the second longest size, said method comprising:

preparing an electronic component chip holder which is provided with a plurality of receiving portions defined by through holes for receiving respective ones of said plurality of electronic component chips, each of said receiving portions having a sectional configuration capable of receiving said longitudinal and crosswise dimensions of each said electronic component chip and being provided with an elastic member on at least a pair of opposite portions of an inner peripheral surface defining each said receiving portion for elastically holding each said electronic component chip;  
inserting respective ones of said plurality of electronic component chips into said receiving portions to longitudinally and crosswisely orient the same toward the sectional direction of said receiving portions while elastically holding the same by said elastic member, thereby to hold said plurality of electronic component chips by said electronic component chip holder;  
wherein the electronic component chips are inserted into the holder such that each of said electronic component chips is received in a respective one of said receiving portions and selected regions of said chip are exposed through respective openings of said receiving portion;  
contacting said exposed regions of said chips through said openings while holding said chips in said component chip holder; and



handling said plurality of electronic component chips while holding the same by said electronic component chip holder;

wherein said exposed regions of the chip are external terminal electrodes on both ends along the longitudinal direction of the chip, and said contacting step includes contacting said exposed external terminal electrodes through said openings.

4,953,284

# METHOD FOR RETAINING A MAGNET WITHIN A MOTOR ASSEMBLY

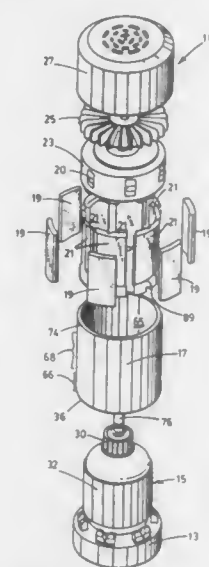
Joe K. Hammer, Bowling Green; Alan H. Fitzsimmons, and Hans Greutmann, both of Toledo, all of Ohio, assignors to Prestolite Electric Incorporated, Toledo, Ohio

Division of Ser. No. 285,091, Dec. 15, 1988, Pat. No. 4,916,344. This application Dec. 1, 1989, Ser. No. 432,500

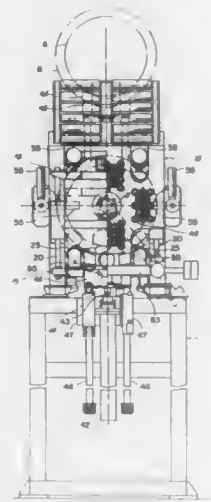
Int. Cl.<sup>5</sup> H02K 15/14

U.S. Cl. 29—596

2 Claims



a bolt hole detecting means for detecting the position of bolt holes in a wheel rotated by said lower rollers; and



a hub pin supported for forward and backward movement and insertable into a bolt hole angularly displaced from a bolt hole detected by said bolt hole detecting means.

4,953,289

## CONDUCTOR TERMINATING METHOD

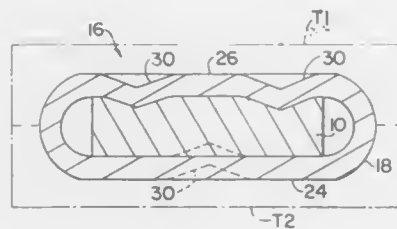
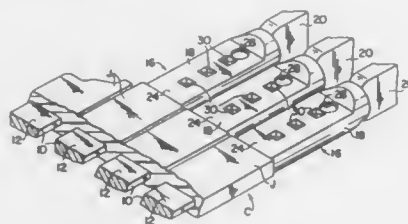
Daniel J. Schreck, Lansdale, and Ronald G. Ehrmann, Warrington, both of Pa., assignors to Pyle Overseas B.V., Amsterdam, Netherlands

Filed Jan. 5, 1989, Ser. No. 361,128

Int. Cl.<sup>5</sup> H01R 43/04

U.S. Cl. 29—863

6 Claims



1. A method for terminating a solid flat conductor of indeterminate length having a generally rectangular cross-section and comprising the steps of forming a terminal including an axially elongated seamless tubular barrel portion having a cylindrical bore, flattening said tubular barrel portion to flatten the cross-sectional configuration of said bore to generally complement the cross-sectional configuration of an associated end portion of said solid flat conductor, inserting said associated end portion of said solid flat conductor into said flattened bore, and simultaneously swaging opposing flattened surfaces of said

barrel portion forming a plurality of spaced apart columns of indentations in one of said opposing surfaces and at least one column of indentations in the other of said opposing surfaces, the indentations in said other opposing surface being out of opposing registry with the indentations in said one opposing surface, said indentations deforming said associated end portion within said bore.

4,953,290

## METHOD OF CONNECTING HEAT EXCHANGE TUBES TO A FLUID CONVEYING DUCT

Alfred Jabs, Grobenzell, Fed. Rep. of Germany, assignor to MTU Motoren- und Turbinen-Union Munchen GmbH, Munich, Fed. Rep. of Germany

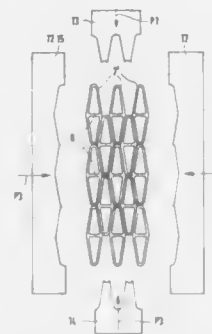
Filed Jul. 25, 1989, Ser. No. 385,012

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1988, 3825486

Int. Cl.<sup>5</sup> B21D 53/02

U.S. Cl. 29—890,043

15 Claims



1. A method of securing the ends of heat exchange tubes to a heat exchanger duct, said method comprising arranging heat exchange tubes in a matrix in which the tubes are of U-shape and form in the matrix straight leg portions connected by a bend region, the tubes in the straight leg portions being spaced from one another, bending the straight leg portions of the tubes proximate the ends thereof to reduce the spacing of the tubes at said ends and bring the ends into proximity with one another, encircling the ends of the tubes with frame elements, applying compression force to said frame elements to deform the ends of the tubes so that the tubes contact one another over substantially the entire surfaces thereof, heating the tubes and frame elements to unite the tubes to one another and to said frame elements to form a unified block assembly, inserting said unified block assembly in an opening in a heat exchanger duct which has the same shape as the unified block assembly, and joining said block assembly to said duct in fluid-tight sealed relation.

4,953,291

## TIRE INTERIOR SUPPORT SYSTEM

Edward G. Markow, Oakdale, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Dec. 9, 1988, Ser. No. 281,714

Int. Cl.<sup>5</sup> B60C 17/06

U.S. Cl. 29—894,351

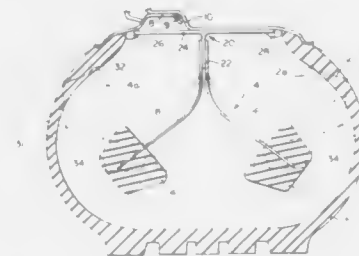
4 Claims

1. An insert for use in a tire and allowing a tire to operate in a run-flat condition, the insert comprising: means for attaching the insert to a tire rim; a pair of flexible annular contoured discs connected to the attaching means and extending radially and axially out-

wardly therefrom in opposite axial directions such that each disc forms a frusto-conical geometric figure; and a circular elastomeric member attached to the outer periphery of each disc, the member being in normally non-contacting relation with the tire interior surface when installed within the tire, each member having a generally trapezoidal cross-section;

the discs having sufficient flexibility for deflecting correspondingly attached elastomeric members into respective bulging folds of a deflected tire side wall thereby preventing collapse of the tire.

3. A method for enhancing a tire for run-flat operation and comprising the steps:



positioning two continuous flexible discs within the interior of the tire; securing a circular elastomeric member to an outer peripheral edge of each disc; orienting the elastomeric members toward opposite sides of the crown of the tire in normally non-contacting relation when the tire is inflated; attaching a radially inward peripheral edge of each disc to a wheel rim thereby providing a structure for transferring load forces from the tire to the rim; wherein tire collapse is prevented by displacement of the elastomeric members into interposed relation with interior side wall areas constituting bulging folds which develop upon tire deflation.

4,953,292

## HAND-HOLDABLE TUBE CUTTING DEVICE

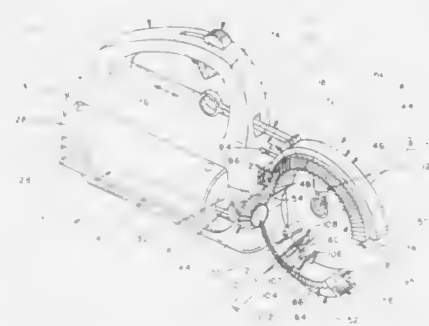
Billy D. Tobey, 23736 E. Virgin St., Catoosa, Okla. 74015

Filed Sep. 26, 1989, Ser. No. 412,340

Int. Cl.<sup>5</sup> B23D 21/08

U.S. Cl. 30—97

9 Claims



1. A hand-holdable tube cutting device comprising:

(A) a case unit which includes

(1) a housing having a top portion and a forward portion, and

(2) a handle mounted on said housing top portion, said handle including an on/off switch movably mounted thereon and a draw-back shaft passage defined through adjacent to said housing forward portion;

(B) a tube clamping unit which includes

(1) a hinge amount fixed to said housing forward portion, (2) a bipartite race connected to said hinge mount and including a top semicircular section movably connected at one end thereof to said hinge mount and having another end diametrically opposite to said one end, a bottom semicircular section movably connected at one end thereof to said hinge mount and having another end diametrically opposite to said bottom section one end, said race top and bottom sections being essentially equal in size to form a circular race when said another ends are in contact,

(3) each of said race sections being hollow and rectangular in cross section and having a top surface, a bottom surface and side surfaces connecting said top and bottom surfaces together with an opening being defined through said bottom surface of each race section, said race section openings cooperating to define a continuous circular channel when said race sections are locked together at said another ends,

(4) a bipartite driven bevel gear slidably mounted on said race and including a semicircular top segment, a semicircular bottom segment, with each segment including a mounting section having a first face, a second face and a top connecting said first face to said second face of each mounting segment, said driven bevel gear segments being essentially equal in size to form a circular element, with said top segment having a projection on one end thereof and said bottom segment having a mating lock element on one end thereof for co-operation with said projection to lock said top segment to said bottom segment to form a circular bevel gear when said top segment is locked to said bottom segment, with said section channels being located to define first and second essentially continuous circular channels in said mounting sections, said circular channels being located and sized to slidably engage said race side surfaces adjacent to said race channels to slidably mount said driven bevel gear on said race to rotate with respect to said race,

(5) two supporting roller units mounted on said driven bevel gear bottom segment,

(6) a tube sanding roller unit mounted on said driven bevel gear bottom segment between said roller units,

(7) a tube cutter unit mounted on said driven bevel gear top segment for movement therewith and including a cutting wheel mounting section, a biasing means, a cutting wheel mounted to be biased by said biasing means toward said sanding roller unit;

(C) a bevel gear driver unit which includes

(1) a motor mounted in said case unit housing and including a drive shaft and means connecting said motor to a power source and to said on/off switch,

(2) a driver bevel gear mounted on said motor drive shaft for rotation therewith and in a position to drivingly engage said driven bevel gear when said driven bevel gear top segment is locked to said driven gear bottom segment; and

(D) a race moving draw-back shaft connected at one end thereof to said race top section and extending through said case unit draw-back shaft passage for movement toward and away from said case unit housing forward end to move said race sections together and apart.

4,953,293

## ELECTRICIAN'S UTILITY KNIFE

Dennis J. Sterlacci, P.O. Box 7043, Cumberland, R.I. 02864

Filed May 19, 1989, Ser. No. 354,385

Int. Cl.<sup>5</sup> B25F 3/00

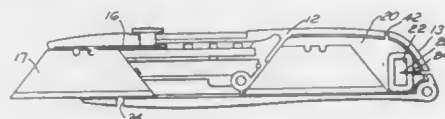
U.S. Cl. 30—124

2 Claims

1. In a utility knife for electricians a handle having two members detachably secured together and separated along a central longitudinal plane, a slot at one end of the handle, a blade carrier adjacent said end of one of the members mounted for movement, a blade held by said carrier to leave the cutting



edge unobstructed, that improvement comprising a notch in the handle adjacent the said end of a depth to allow the blade to protrude therein and permit insulation on a wire to be cut, an oblong aperture in each of the members that form a transverse



passageway for receiving sheath covered parallel electric cable, a cutting blade partially protruding into the passageway centrally thereof and on a plane perpendicular to the longitudinal extent of said members for engaging the sheath of electrical cable.

4,953,294

# PORTABLE HANDHELD TOOL HAVING A DRIVE SHAFT ROTATABLY JOURNALED IN A PROTECTIVE TUBE

Hans-Peter Dohse, Kernen-Rommelshausen, Fed. Rep. of Germany, assignor to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

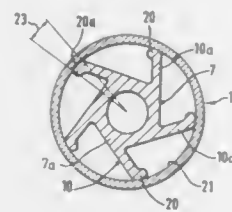
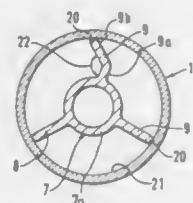
Filed Nov. 20, 1989, Ser. No. 438,056

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1988, 3839548

Int. Cl.<sup>5</sup> B26B 7/00; A01D 34/68

U.S. Cl. 30—276

8 Claims



1. A portable handheld tool such as a brushcutter driven by a motor, the portable handheld tool comprising:
  - a housing for accommodating the motor therein;
  - a protective tube which can be subjected to vibrations during operational use of the tool, the protective tube having a rearward end connected to said housing and having a forward end, said tube also having an inner wall surface;
  - a work tool assembly mounted on said forward end;
  - a drive shaft mounted in said protective tube for connecting said motor to said work tool assembly;
  - a bearing sleeve unit arranged in said protective tube and

which can be subjected to radial pressure forces when mounted in said tube;

said bearing sleeve unit including an annular-like center portion defining a bearing opening for holding and guiding said drive shaft within said protective tube, said center portion having an outer surface in spaced relationship to said inner wall surface of said protective tube;

said bearing sleeve unit further including a plurality of supporting ribs extending outwardly from said outer surface to brace said bearing sleeve unit against said inner wall surface for supporting and centering said bearing sleeve unit within said protective tube; and,

at least one of said ribs being configured to extend approximately tangentially to said annular-like center portion so as to be resilient in a direction extending radially outwardly from said annular-like center portion thereby substantially isolating said annular-like center portion from said pressure forces and said protective tube from said vibrations.

4,953,295

# SEAWATER HYDRAULIC BAND SAW

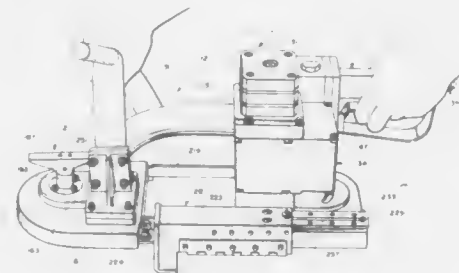
Scott Barradas, Oxnard; Bruce Farber, Oak View, and William B. Luther, Oceanside, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 2, 1990, Ser. No. 479,490

Int. Cl.<sup>5</sup> B27B 13/08

U.S. Cl. 30—380

16 Claims



1. A portable band saw which uses pressurized seawater as the operating fluid comprising:
  - a drive wheel having a pulley tire on the periphery thereof, said pulley tire having an abrasive strip attached thereto;
  - a driven wheel having a pulley tire on the periphery thereof, said pulley tire having an abrasive strip attached thereto;
  - a continuous band-type saw blade mounted on said drive and driven wheels;
  - motor means having an inlet port, an exhaust port, and a shaft, the inlet of said motor means being adapted for receiving pressurized seawater so as to activate said motor means thereby causing the shaft thereof to rotate;
  - control means connected to the inlet port of said motor means and having a trigger, the trigger of said control means when engaged allowing pressurized seawater to pass through said control means to said motor means thereby activating said motor means;
  - means for transmitting the rotational motion of the shaft of said motor means to said drive wheel, said transmitting means being lubricated by pressurized seawater provided through the exhaust port of said motor means;
  - adjustment means for changing said saw blade by moving said driven wheel toward said drive wheel and thereby relaxing tension on said saw blade and then tightening said saw blade by moving said driven wheel away from said drive wheel; and
  - frame means supporting said drive and driven wheels, said transmitting means, said control means, said motor means and said adjustment means.

4,953,296

# METHOD AND APPARATUS FOR PROVIDING RUNOUT COMPENSATION

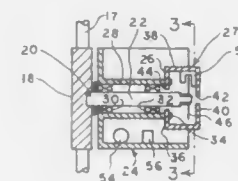
Phillip A. Spainhour, Nashville, Tenn., assignor to J. P. Hennessy, LaVergne, Tenn.

Filed Aug. 24, 1989, Ser. No. 398,001

Int. Cl.<sup>5</sup> G01B 7/315

U.S. Cl. 33—203.18

6 Claims



1. In a wheel alignment system, the combination comprising support means adapted to be mounted to a wheel of a vehicle,
- a shaft extending from said support means in substantial coaxial relationship with the axis of rotation of said wheel,
- a gauge head rotatably carried by said shaft for pendulous movement relative to said shaft,
- sensor means carried by said gauge head for making wheel alignment measurements, and
- encoder means mounted between said shaft and said gauge head for producing a signal indicative of the angular position of said wheel relative to said gauge head.

4,953,297

# METHOD OF AND DEVICE FOR POCKET VENTILATION IN THE DRYING SECTION OF A PAPER MACHINE, IN PARTICULAR FOR HIGH-SPEED PAPER MACHINES

Pekka Eskelinen; Pentti Raatikainen, both of Turku; Mørkku Karlsson, Parainen, and Raimo Virta, Turku, all of Finland, assignors to Valmet Paper Machinery Inc., Finland

PCT No. PCT/FI87/00065, § 371 Date Dec. 27, 1988, § 102(e)

Date Dec. 27, 1988, PCT Pub. No. WO88/08898, PCT Pub.

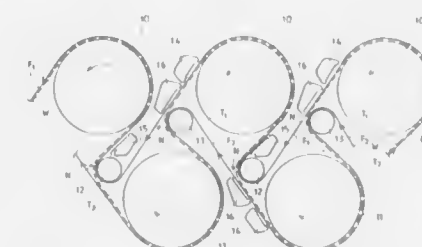
Date Nov. 17, 1988

PCT Filed May 13, 1987, Ser. No. 295,607

Int. Cl.<sup>5</sup> F26B 5/00

U.S. Cl. 34—23

12 Claims



1. Method of operating multi-cylinder dryers of a paper machine, where said dryers comprise two lines of drying cylinders (10, 11), in whose connection a twin-wire draw is applied so that, by means of a first and second drying wire (F1, F2), a closed draw is obtained in the transfer of a paper web (W) from one cylinder line onto another, and in which method, a closed draw is provided, guide rolls (12/13) of the respective first and second drying wires (F1/F2) are placed at the proximity of the run of the other wire (F2/F1) on which the drying wire runs from its drying cylinder (11/10) to its guide roll (13/12) whereat air is blown through said drying wires (F1/F2) so as to ventilate pockets (T1/T2) defined by said wires and free faces of the drying cylinders (10/11), characterized in that an air jet or air jets (S1) are used as ventilation blows, said jets

being directed at the run of the first and second drying wires (F1/F2) at which the respective drying wire (F1/F2) runs from its drying cylinder (11/10) onto its guide roll (13/12), that said air jets are applied within said run of the drying wire (F1/F2) in the area in which the respective drying wire (F1/F2) contacts a portion of the web (W) supported by the other respective drying wire (F2/F1) which runs over a segment of the circumference of the guide roll of the other respective drying wire (F2/F1) and in which blow area there is a widening wedge space (N) defined by the respective drying wire (F1/F2) and its guide roll (13/12), through which wedge space the pocket ventilation blowing takes place.

4,953,298

# KILN CONTROLLER

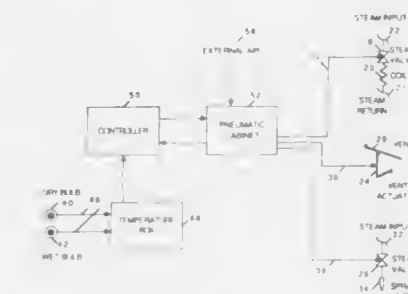
John L. Carter, Portland; Michael M. Sprague, Tigard; Crosby Stone, Eugene, and James A. Felsheim, Rogue River, all of Oreg., assignors to Wagner Electronic Products, Inc., Rogue River, Oreg.

Filed Feb. 24, 1989, Ser. No. 315,153

Int. Cl.<sup>5</sup> F26B 11/12

U.S. Cl. 34—44

14 Claims



1. In a kiln controller for controlling the drying of lumber in a kiln, and comprising measuring means for measuring an evaporation rate of moisture in the lumber, and a computer controlling a schedule for drying the lumber, the schedule having a plurality of steps of variable duration, each step having temperature set points, a method comprising the steps of:
  - (a) comparing the measured evaporation rate to a desired evaporation rate,
  - (b) adjusting the schedule in accordance with the comparison between the measured and desired evaporation rates, and
  - (c) repeating (a) and (b) until the schedule is completed;
 wherein the kiln has a vent with a plurality of positions, and wherein measuring the evaporation rate comprises measuring a vent load of the vent, said vent load indicating the position of the vent.

4,953,299

# PROCESS AND APPARATUS FOR FREEZE-DRYING COMPRISING MEANS FORMING AN ACTIVE THERMAL SHIELD BETWEEN THE FREEZE-DRYING SHELVES

René Gimeño, Pelussin; Alain Huc, Ste Foy Les Lyon, and Pierre DeVictor, La Mulatière, all of France, assignors to Societe Anonyme, Bloetica, Lyon, France

Filed Nov. 16, 1988, Ser. No. 272,483

Claims priority, application France, Nov. 17, 1987, 87 15880

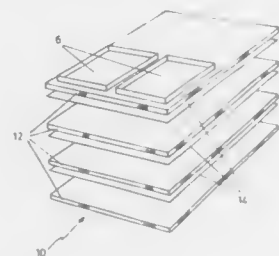
Int. Cl.<sup>5</sup> F26B 5/06

U.S. Cl. 34—92

14 Claims

1. An apparatus for freeze-drying viscous solutions which may be in a comprising:
  - a freeze-drying enclosure;
  - freeze-drying shelves disposed inside the freeze-drying en-

closure to support the products or solutions to be freeze-dried;  
first means for adjusting the temperature associated with each of the freeze-drying shelves; and



means forming an active thermal shield disposed between the freeze-drying shelves, the shield means including second means for adjusting the temperature to slow down heat exchanges between the product or solution to be freeze-dried and the temperature adjusting means associated with the shelves.

4,953,300

## STEAM IRONING PRESS

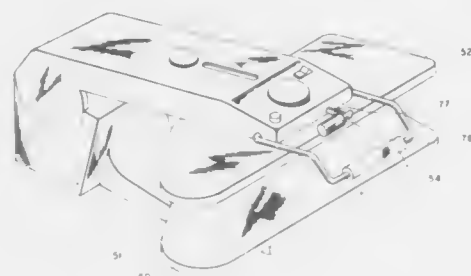
Donald R. Davidson, Chatbam; Pao-Ter Huang, Edison, and H. David Rogers, Fanwood, all of N.J., assignors to SSMC Inc., Edison, N.J.

Filed Jul. 31, 1989, Ser. No. 388,124

Int. Cl.<sup>5</sup> D06F 71/34

U.S. Cl. 38—36

6 Claims



1. A steam iron press adapted to press an article of fabric and comprising:

first and second generally horizontal members, the first member being fixed in position and having an exposed upper surface, the second member having an exposed lower surface with orifices therein and being movable toward and away from the first member so that the exposed lower surface is moved toward and away from the exposed upper surface, said article being disposed removably upon the upper surface for pressing, the pressing action ensuing when the second member is moved toward the first member until the article is squeezed between the two exposed surfaces;

a manually operated mechanism connected to the second member to move said second member into any position between a position of maximum separation and a position of minimum separation (engagement) with respect to the first member;

said second member receiving water supplied thereto and heating said water into steam, the steam being expelled through said orifices in such manner that the article when squeezed is pressed using heat and steam;

a reservoir containing water;

a pump connected between said second member and said reservoir, said pump when actuated feeding water under

pressure from the reservoir to the second member and when deactuated preventing flow of water from said reservoir to said second member; and

a cam device connected between the mechanism and the pump to actuate the pump during a predetermined interval  $t$  between the instant of time  $T_1$  at which the mechanism has initiated movement of the second member toward the first member and the instant of time  $T_2$  at which the article is squeezed between the two surfaces wherein the duration of the interval  $t$  is less than that of the interval  $(T_2 - T_1)$ , said device otherwise deactuating the pump, said device including a stationary cam having a cam surface engaged by a movable follower, the follower being coupled to the pump.

4,953,301

## REPLACEABLE SAW BLADE AND GUIDE

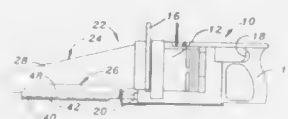
Howard L. Dobbs, Jr., R.R. #5, Box 173-A, Emporia, Kans. 66801

Filed Dec. 26, 1989, Ser. No. 456,510

Int. Cl.<sup>5</sup> B27B 11/02, 33/02

U.S. Cl. 30—392

3 Claims



1. A blade assembly adapted for connection to a reciprocating saw having a housing and means for reciprocating a cutting blade, said assembly comprising:

an elongated, planar support plate adapted for securement to said housing and presenting a main body portion, a lowermost, elongated, fore-and-aft extending bladeengaging margin, and structure defining an elongated slot extending from said margin and along the length of the support the thickness of said blade-engaging margin being essentially equal to or greater than the thickness of said main body portion; and

an elongated, reciprocable cutting blade adapted for connection to said saw reciprocating means and presenting an elongated, lowermost cutting surface, a pair of upwardly extending, laterally spaced apart flanges each extending a fore-and-aft distance which is at least about 50% of the length of said lowermost cutting surface and each terminating at the lower end thereof at a point above said lowermost cutting surface, and a crosspiece extending laterally between and coupled to said flanges,

said blade being operably coupled with said support blade with said crosspiece slidably received in said slot and with said flanges extending upwardly from said plate lower margin a substantial distance in closely adjacent relationship with the opposed faces of said main body portion, said crosspiece being disposed below the upper margins of said flanges.

4,953,302

## INTELLIGENT ARCHERY SIGHTING DEVICE

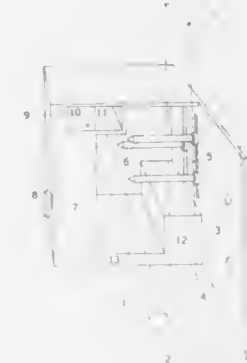
Russell P. Gould, P.O. Box 262, Youngstown, Pa. 15696

Filed Sep. 29, 1989, Ser. No. 414,378

Int. Cl.<sup>5</sup> F41G 1/46

U.S. Cl. 33—265

7 Claims



1. A bow-mounted archery sighting device for aiding an archer in correctly aiming at a target situated at a distance and at an elevation relative to the archer, said archery sighting device comprising:

- multiple sights adjustable for windage and elevation, each such sight provided with a means of individual identification,
- a manually operated optical distance-measuring system which indicates the distance to said target by providing for the controlled alignment of two views from differing angles of the same target,
- pendulum means responsive to the angle of inclination or declination of the bow in the vertical plane of the bow,
- sight-indicating means controlling the selective identification of one or two adjacent sights, said sight-indicating means connected to and responsive to said distance-measuring system,
- correcting means for compensating said sight-indicating means according to deflections of said pendulum means,
- housing means mounting said distance-measuring system said pendulum means sight-indicating means, and correcting means; the bow and said sights are adjustably affixed to said housing means.

4,953,303

## TREE FELLING SPOTTER

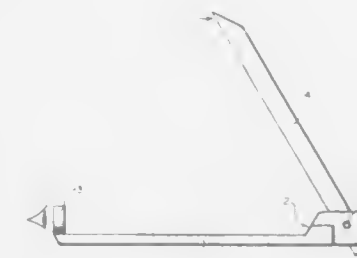
Paul J. Carlin, 422 N. Austin, Oak Park, Ill. 60302

Filed Jan. 6, 1989, Ser. No. 294,302

Int. Cl.<sup>5</sup> G01C 1/00

U.S. Cl. 33—284

1 Claim



1. A clinometer type apparatus for translating a substantially vertical height to a generally non-perpendicular horizontal length along any pre-existing slope, said slope being generally non-perpendicular to said substantially vertical height, said apparatus comprising: a first elongate member and a second

elongate member, said first and second elongate members being operatively attached to a common axis and being independently movable relative to one another about said common axis through an arc of at least one-hundred eighty degrees (180°), sight means operatively attached to said first elongate member distal said common axis for sighting along a line extending therefrom through a forward sight means adjacent said common axis and for sighting along a line extending therefrom and intersecting an end of said second member distal said common axis and a top end of said substantially vertical object; said first member being aligned generally parallel with the generally non-perpendicular slope from which said substantially vertical object projects and said second member being aligned generally parallel with said substantially vertical object, said generally non-perpendicular length of said substantially vertical object being determined at a point along said slope when, with said first and second members adjusted in generally parallel alignment with respect to said slope and said vertical object, said sight means intersects a line formed between said end of said second member and said top end of said substantially vertical object; wherein said second elongate member has a first length measured from said common axis to said end of said second member and said first elongate member has a second length measured from said common axis to said sight means which is 0.6 inches less than said first length of said second member, a third length measured when said sight means of said clinometer apparatus is positioned against a user's eye, said third length being measured from the center of the user's eye to said common axis being substantially equal to said first length of said second member for providing dimensionally accurate translations.

4,953,304  
MASK COMPASS

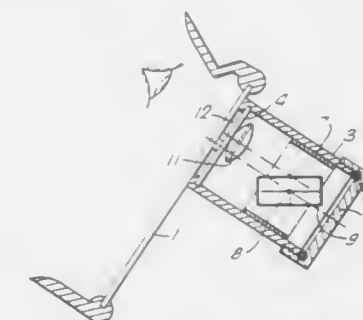
Raimo Raitmaa, Kauniainen, and Per-Olof Jansson, Helsinki, both of Finland, assignors to Oy Master Instruments Ltd., Finland

Continuation-in-part of Ser. No. 152,239, Feb. 4, 1988, abandoned. This application Apr. 27, 1989, Ser. No. 343,826  
Claims priority, application Finland, Feb. 4, 1987, 87 0472

Int. Cl.<sup>5</sup> G01C 17/02

U.S. Cl. 33—355 R

21 Claims



20. A mask compass mounted on goggles, comprising: a watertight outer casing attached to the outer surface of a glass of the goggles, the casing having a transparent wall facing the glass;  
a compass box mounted within the outer casing, said compass box including a dial;  
a compass needle mounted in the box; and  
optical means mounted in the outer casing for enabling the diver to view the compass needle and dial;  
wherein a gap is provided between the outer casing and the glass in the path of light of the optical means said gap being washed by water.



4,953,305

## VEHICLE COMPASS WITH AUTOMATIC CONTINUOUS CALIBRATION

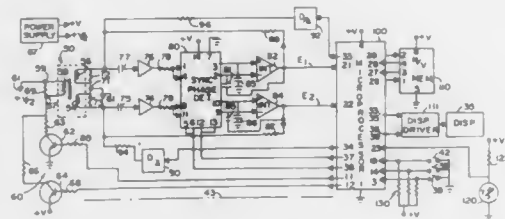
Paul S. Van Lente, Holland, and Steven L. Geerlings, Zeeland, both of Mich., assignors to Prince Corporation, Holland, Mich.

Filed May 27, 1987, Ser. No. 54,885

Int. Cl.<sup>5</sup> G01C 17/30

U.S. Cl. 33—356

20 Claims



1. In an electronic compass system for use in a vehicle such as an automobile comprising:  
sensing means for detecting the earth's magnetic field and for providing electrical signals representative of the direction of movement of the vehicle with respect to the earth's magnetic field;  
circuit means coupled to said sensing means for providing display output signals representing heading information corresponding to the detected direction;  
display means coupled to said circuit means for displaying the vehicle heading in response to said display output signals, wherein the improvement comprises:  
said circuit means including means responsive to the direction representative signals for detecting the rate of change of said direction representative signals, and for determining if the rate of change exceeds a predetermined level thereby indicating the existence of invalid detected direction information; and means for providing an error output signal for display in response to said determining means determining that said rate of change exceeds said predetermined level.

4,953,306

## FLEXIBLE CNC-MULTIPOSITION MEASURING INSTALLATION

Albert Weckenmann, Abrensburg, and Hans-Jürgen Mordhorst, Glinde, both of Fed. Rep. of Germany, assignors to Mauser-Werke Oberndorf GmbH, Oberndorf, Fed. Rep. of Germany

Filed Apr. 20, 1988, Ser. No. 183,828

Claims priority, application Fed. Rep. of Germany, May 5, 1987, 3714862

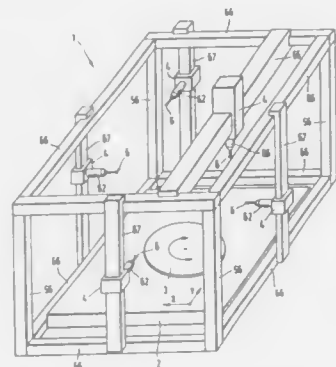
Int. Cl.<sup>5</sup> G01B 5/20

U.S. Cl. 33—503

10 Claims

1. A multiposition measuring installation, comprising:  
a framework;  
a worktable located in said framework to support a work-piece;  
a plurality of measuring devices to measure a multitude of parameters of the workpiece and to generate signals indicating values for said measured parameters;  
support means connecting each of said measuring devices to the framework and supporting each of the measuring devices for movement therealong, each of said support means supporting each of the measuring devices for movement along the framework in two mutually orthogonal directions independent of all of the other of the measuring devices;  
each of said measuring devices including a body and a sensor to sense a parameter of the work piece, the sensor of each measuring device being connected to the body thereof for movement in a direction orthogonal to the two directions

in which the support means supports the measuring device for movement; and



4,953,307

## RIM OFFSET GAUGE

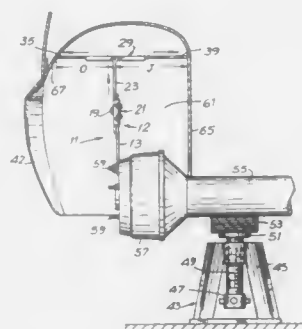
Theodore Loucas, 198-18 51st Ave., Bayside, N.Y. 11365

Filed May 3, 1989, Ser. No. 347,176

Int. Cl.<sup>5</sup> G01D 21/00

U.S. Cl. 33—600

12 Claims



1. An apparatus for measuring fender well width in an automobile in order to determine the maximum sized tire or a wheel assembly which may be mounted on a hub mounting surface disposed in said fender well comprising:  
a handle assembly;  
means for independently and selectively adjusting the length of the handle assembly;  
a head assembly connected to said handle assembly at the upper end thereof and substantially perpendicularly thereto;  
means for independently and selectively adjusting the overall length of the head assembly in order to measure the fender well width;  
wherein said head assembly length adjusting means operates independently of said handle assembly length adjusting means.

4,953,308

## FILTER SYSTEM FOR A FLUID BED GRANULATOR/DRYER

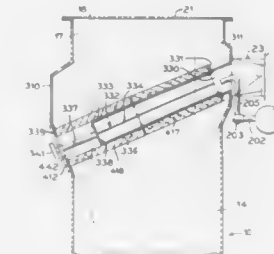
Aaron K. Basten, Solon, and Robert W. Claassen, Swisher, both of Iowa, assignors to Vector Corporation, Marion, Iowa

Filed Feb. 6, 1989, Ser. No. 306,102

Int. Cl.<sup>5</sup> F26B 21/06

U.S. Cl. 34—82

4 Claims



1. A fluid bed dryer machine comprising, a housing, an air inlet attached to a bottom portion of said housing, an exhaust outlet connected to an upper portion of said housing, fan means for moving air from said air inlet through said housing and said air outlet, first support means attached to said housing, a first pair of cylindrically-shaped pleated filters mounted end to end in said upper portion of said housing on said first support means and each formed with an axially extending central opening, one end of said central opening of a first one of said first pair of filters in communication with said air outlet and the other end of said central opening of said first one of said pair of filters in communication with one end of said central opening of a second one of said pair of filters, and sealing means mounted over the other end of said central opening of said second one of said first pair of filters, wherein said support means is formed with a central opening onto which said first pair of end to end cylindrical-shaped pleated filters can be received and said sealing means attached to said support means, including a second support means attached to said housing, a second pair of cylindrically-shaped pleated filters mounted end to end in said upper portion of said housing on said second support means adjacent to said first pair of cylindrically-shaped filters, each of said second pair of filters formed with an axially extending central opening, one end of said central opening of a first one of said second pair of filters in communication with said air outlet and the other end of said central opening of said first one of said second pair of filters in communication with one end of said central opening of a second one of said second pair of filters, and second sealing means mounted over the other end of said central opening of said second one of said second pair of filters, including a source of high pressure air, a first conduit which is attached to said source of high pressure air and extends so as to supply high pressure air into the central openings of said first pair of filters, a second conduit which is attached to said source of high pressure air and extends so as to supply high pressure air into the central opening of said second pair of filters, and first valve means mounted in said first conduit and second valve means mounted in said second conduit, and including control means connected to said first and second valve means and wherein said control means alternately opens and closes said first and second valve means so as to alternately clean said first and second pairs of filters.

4,953,309

## WARMING FOOTWEAR

Stanislav Kaiser, Titovo Velenje, Yugoslavia, assignor to Alpina Tovarna Obutve N.Sol.O., Ziri, Yugoslavia

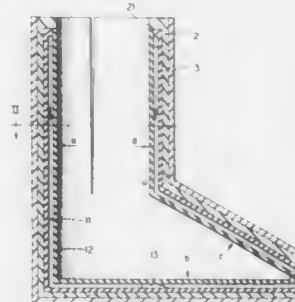
Filed Aug. 1, 1988, Ser. No. 226,734

Claims priority, application Yugoslavia, Sep. 4, 1987, 1644/87; Sep. 4, 1987, 1645/87

Int. Cl.<sup>5</sup> A43B 7/02

U.S. Cl. 36—2.6

4 Claims



1. Warming footwear comprising:  
an upper shoe having a shin portion, an instep portion, a toe portion and a calf portion,  
an insole inserted in said upper shoe,  
a ribbed plate incorporated in said insole and extending from said shin portion, over said instep portion and said toe portion to said calf portion,  
a heat conducting, elastic foil entirely covering said ribbed plate and said foil forming a part of an inner surface of said insole, and  
a heat exchanging system including one side of said ribbed plate includes a border rib defining a periphery of said ribbed plate and a partition rib extending from said calf portion to said instep portion and dividing said one side of said ribbed plate in two portions and said partition rib being everywhere spaced from said border rib, and said elastic foil being fastened to said periphery all along a length of said border rib, and either of two mutually interconnected conduits, which are limited by said ribbed plate, by said foil and by said partition rib, being filled with a heat transferring liquid flowing through said heat exchanging system, and two nonreturn valves being located in a path of said heat transferring liquid and being open in the same direction of the path of said heat transferring liquid.

4,953,310

## SHOCK ABSORBANT HEEL

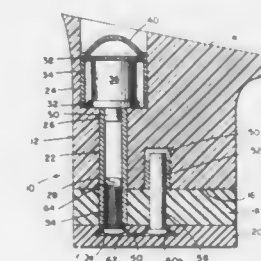
Richard J. Haug, 19 Sweetbriar Ln., Hampton, N.H. 03842

Filed Apr. 13, 1989, Ser. No. 337,396

Int. Cl.<sup>5</sup> A43B 21/26

U.S. Cl. 36—38

11 Claims



1. A heel construction for shoes comprising a heel block

having a bottom surface and a top surface and a lift, a primary bore extending through said bottom surface, an elongated load transmitting means extending from the upper portion of the bore and through the bottom of the heel block, at least one secondary bore extending from the bottom surface into the heel block, a secondary post cooperating with the secondary bore adapted to move within said bore, means to transmit torque secured in the lift and moveably connected to the load transmitted means and to the secondary post whereby the lift is adapted for relative pivotal and vertical movement with reference to the heel block.

4,953,311

## GOLF SHOES AND INSERTS FOR GOLF SHOES

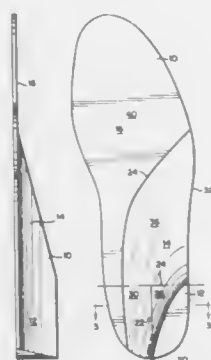
Fred H. Bruggemeier, 1020 Aolua Pl., #309-B, Kailua, Hi. 96734

Filed May 12, 1989, Ser. No. 351,409

Int. Cl.<sup>5</sup> A43B 13/38

U.S. Cl. 36—127

36 Claims



1. A right insert and a left insert for a pair of golf shoes for a right handed golfer, said right insert having a right heel area and a right instep area and said left insert having a left heel area and a left instep area, comprising:

- a right insert having a right maximum thickness in a rightward and rearward portion of said right heel area; and
- a left insert having a left maximum thickness in a rightward portion of said left instep area.

4,953,312

## PANEL TO BE APPLIED TO BACK OF A PICTURE FRAME FOR RETAINING THE PICTURE AND ITS PROTECTIVE PANEL

Pietro Astolfi, Bologna, Italy, assignor to Pico-Glass, S.P.A., Cadriano, Italy

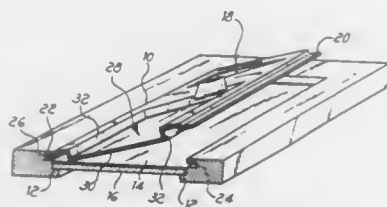
Filed Mar. 22, 1989, Ser. No. 327,292

Claims priority, application Italy, Oct. 4, 1988, 22176 A/88

Int. Cl.<sup>5</sup> A47G 1/06

U.S. Cl. 40—156

6 Claims



1. A rear panel for removable application to the rear of a picture frame, said picture frame having a picture receiving opening of a height and width for retaining a picture and an overlying protective panel in said frame opening, at least one

of the width and height of said rear panel being greater than the corresponding dimension of said picture-receiving opening, said rear panel having a recess for projecting toward the picture when said frame and rear panel are assembled for use, said recess extending in area for a substantial portion of the total surface area of said rear panel, said recess having a substantially flat bottom that touches and retains said picture in the picture receiving opening when said frame and rear panel are assembled for use, said rear panel including two oppositely protruding borders at least along two opposite edges between which said greater dimension is defined, said borders being dimensioned to be received in corresponding longitudinal grooves in the picture-receiving opening of said frame, each said border being received in one of said grooves when said frame and rear panel are assembled for use, said borders being of an unequal width in the direction of said greater dimension, said rear panel being flexible and requiring flexing to enable insertion of said borders into said corresponding grooves, ease of assembly being enhanced by the uneven width of said borders.

4,953,313

## EAR TAG FOR ANIMALS

Michael J. Scott, Feilding, New Zealand, assignor to Allflex New Zealand Limited, Palmerston North, New Zealand

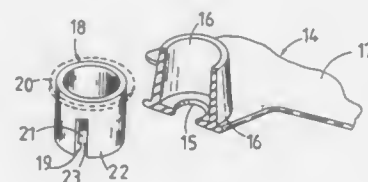
Filed Dec. 21, 1988, Ser. No. 287,856

Claims priority, application New Zealand, Apr. 19, 1988, 224293

Int. Cl.<sup>5</sup> G09F 3/00

U.S. Cl. 40—301

12 Claims



6. A female component for a two piece animal ear tag, said two piece animal ear tag including said female component and a male component, said male component having a stem with a head portion, said female component comprising:

- (a) an opening through which the head portion can be forced to effect coupling of the male and female components, said opening having thereabout an annular wall within which at least the major portion of the head portion resides when the male and female components are coupled together;
- (b) an insert located within the confines of the annular wall, said insert being in the form of a collar having an internal rim which projects inwardly from the inner wall surface of the collar and located adjacent the end of the collar which is located about said opening, the outer wall surface of the collar being in contact with the inner surface of the annular wall in an interference fit; and
- (c) at least one longitudinally disposed slot being formed in the wall of the collar to extend part way along the wall from the end having the internal rim and through the rim, said at least one slot permitting the collar to be at least partially deformable to enable the head portion to enter into the collar whereupon the collar can return to a non-deformed state with the rim located behind the head portion to retain the head portion within the collar, said collar having an external flange disposed at the end of the collar opposite to that having the rim, whereby the external collar extends from the outer surface of the collar and over the end of the annular wall.

4,953,314

## INERT GAS LIGHTING SYSTEM AND MEANS THEREFOR

Herbert F. Moulton, 4524 W. Marlette, Glendale, Ariz. 85301

Filed Feb. 28, 1986, Ser. No. 834,543

Int. Cl.<sup>5</sup> G09F 13/26

U.S. Cl. 40—545

13 Claims



1. A system for wiring the secondary circuitry in an inert gas sign set-up without requiring an external sign cabinet to protect the set up from adverse weather conditions, said system comprising: a plurality of discrete sign characters disposed in a sequence, each of said characters having a tube of preselected shape operatively associated therewith, each said tube having a first end and a second end and being filled with an inert gas capable of glowing when excited by the application of high electrical voltage thereto; a plurality of discrete cable means, each having a proximal end and a distal end, each said proximal end of each said cable means being operatively connected to a different one of said tube first ends and said tube second ends; a high tension terminal box operatively interposed between each pair of adjacent sign characters in said sequence and having a housing member having a sidewall and a bottom, access means defined through said sidewall in equispaced relationship to each other, a terminal block centrally disposed within said housing member in spaced insulated relationship to said sidewall, said terminal block having first and second binder posts disposed therein in electrical communication with each other, each said binder post being adapted to receive and secure said distal end of said cable means extending from a different one of said adjacent sign characters to serially connect a pair of adjacent sign characters therethrough when said distal ends of said cables are secured thereto; a high voltage transformer having two posts; cable means connecting one of said transformer posts to said first end of said tube in the first character in said sequence and connecting the other of said posts to the said second end of said tube in the final of said characters in said sequence to complete the circuit through said sequence; and means for controlling said transformer to selectively energize and deenergize said inert gas in said tubing.

4,953,315

## DISPLAY DEVICE FOR VEHICLES

Richard A. Romaine, 475 SW. View Crest Dr., Gresham, Oreg. 97080

Filed Dec. 27, 1988, Ser. No. 290,425

Int. Cl.<sup>5</sup> G09F 21/04

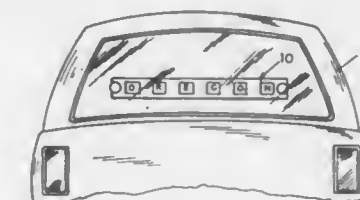
U.S. Cl. 40—593

5 Claims

1. A display device for vehicles, comprising:

- (a) an elongated case having a front face and a pair of opposite ends;
- (b) suction cup mounting means for mounting the case on a vehicle, with its front face outermost;
- (c) the front face having along its length a plurality of spaced display windows;
- (d) an elongated slide mounted on the case for reciprocating sliding movement relative to the case and having a front face underlying the front face of the case;

- (e) stop means limiting the reciprocating movement of the slide between first and second positions; and
- (f) on the front face of the slide a plurality of spaced indicia positioned for viewing through the windows and spelling out first and second messages;
- (g) the spacing of the windows in the case and the indicia on the slide being predetermined to present to view the first message when the slide is shifted to its first position by



application of a displacing force, and to present to view the second message when the slide is shifted to its second position upon the application of said force,

- (h) the ends of the case being open and the suction cup mounting means being positioned one at each end and being provided with mounting posts extending transversely through the case ends, thereby providing the stop means limiting the reciprocating motion of the slide.

4,953,316

## CHOKE STORAGE DEVICE FOR SHOTGUNS

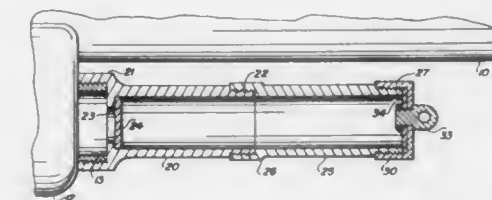
Ernest C. Litton, Sr., 5410 South 12th Ave., Tucson, Ariz. 85706, and Glen F. Thompson, 2701 W. Jennie Ln., Tucson, Ariz. 85713

Filed Sep. 25, 1989, Ser. No. 412,193

Int. Cl.<sup>5</sup> F41A 35/00

U.S. Cl. 42—90

10 Claims



1. A choke holder device for a shotgun having a magazine for holding shells, said magazine having an end thereof closed by a removable cap, said choke holder device including in combination:

- a first hollow choke storage member having first and second ends for storing at least one choke therein, said first storage member having releasable attaching means on the first end thereof for attaching said first end thereof to the magazine of said shotgun with the removable cap thereof removed, said first storage member being substantially closed at the first end thereof to close the end of the magazine of said shotgun; and being open at the second end thereof to permit the insertion of a choke therein;
- a second hollow choke storage member with open first and second ends for storing at least one choke therein; interconnecting means for releasably interconnecting the first end of said second choke storage member with the second end of said first choke storage member to form a continuous passageway through said first and second members; and
- removable closure means for closing the second end of said second choke storage member.

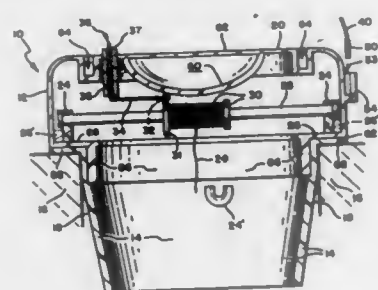


4,953,317

**NONFREEZING FISHING APPARATUS**  
James E. Ruchel, 423 Third St., Albany, N.Y. 12206  
Filed Jul. 7, 1989, Ser. No. 376,833  
Int. Cl.<sup>5</sup> A01K 97/12

U.S. Cl. 43—17

8 Claims



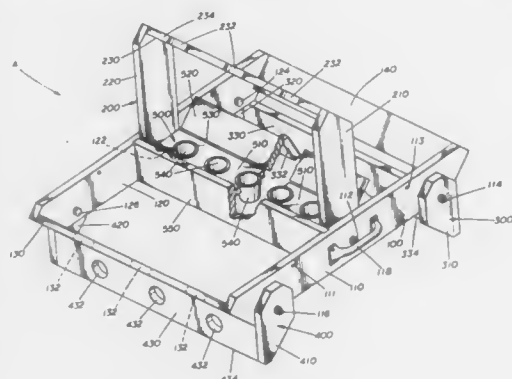
1. A portable totally self-contained and deployable, readily stackable ice fishing assembly comprising:
  - a dome-like shell of suitable, radiant energy absorbing material comprising a cover fixed to an annular, essentially planar base from which depends a short flange conterminous with the annular, internal edge of said base, said shell having a bracket mounted therein and on an interior surface of said shell for mounting a fishing line spoolpiece thereby wholly containing said bracket and spoolpiece; and,
  - a grooved morphological means on the outer top surface of said shell for fittingly stacking a plurality of said shells, one such shell nested or stacked atop another by inserting the short flange into said grooved morphological means, whereby said ice fishing assembly is set up by taking it from a stacked storage array, fishing line is deployed from the internally mounted spoolpiece into an ice hole, and the assembly is placed in superposition on the hole with said base resting on the ice and said short annular base flange projecting part way into the hole.

4,953,318

**FISHING ROD HOLDER**  
Adrian Vasseur, Jr., 2600 Wichita, Lot 65, Pasadena, Tex. 77502  
Filed Jul. 10, 1989, Ser. No. 377,898  
Int. Cl.<sup>5</sup> A01K 93/00

U.S. Cl. 43—21.2

20 Claims



1. An apparatus for holding one or more fishing rods comprising:
  - a frame;
  - a rod support arm rotatably mounted to the frame at a point substantially midway of two opposing sides of the frame and which can upwardly rotate between a stored position

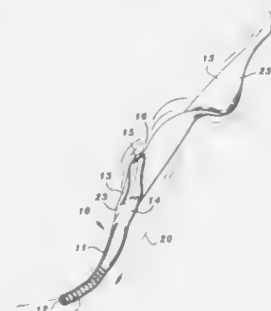
- parallel to the frame and a support position perpendicular to the frame;
- a first support stand mounted to one end of the frame, which is perpendicular to the frame and which has means for inserting a portion of a fishing rod;
- a second support stand mounted to the other end of the frame, which is perpendicular to the frame and which has means for inserting a portion of a fishing rod; and
- wherein the support arm operates in the support position to hold the fishing rod in a fishing position and rotates to a stored position when said fishing rod is supported by said first and second support stands in a carrying position.

4,953,319

**MULTI-ATTRACTANT FISH BAIT**  
John M. Kasper, 11606 Timber Ridge La., Apt. 3, Sharonville, Ohio 45241; Maurice K. Perley, Jr., 1042 Royalton Rd., Orlando, Fla. 32825, and Bradley T. Gullett, 1590 Druid Rd., Maitland, Fla. 32751  
Continuation-in-part of Ser. No. 274,001, Nov. 21, 1988. This application Jul. 25, 1989, Ser. No. 385,218  
Int. Cl.<sup>5</sup> A01K 85/00

U.S. Cl. 43—42.06

19 Claims



1. An artificial fish bait comprising a soft and bulky body having a leading end and a trailing end and being of generally uniform cross-sectional dimension, the improvement which comprises a thin flat tail extending from the trailing end of the bulky body, and at least one thin walled pocket to receive fish attractant located at a junction of the thin flat tail and the trailing end of the bulky body, whereby the thin flat tail flutters in use relative to the body and imparts corresponding movement to the pocket and its contents relative to the body to enhance the effectiveness of the fish attractant.

4,953,320

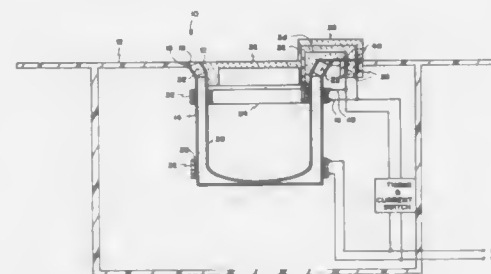
**HEATED COCKROACH TRAP**  
Lawrence L. Nelson, 125 Royal Dr., Apt. 2408, Madison, Ala. 35758

Filed Sep. 15, 1989, Ser. No. 408,118

Int. Cl.<sup>5</sup> A01M 1/02

U.S. Cl. 43—121

20 Claims



1. An insect trap comprising:

- means defining a confined space;
- means for attracting insects into said confined space; and
- means for periodically heating said space at predetermined intervals to a temperature high to kill the insects attracted therein.

4,953,321

**FISHHOOK AND PRODUCING METHOD OF THE SAME**  
Yoshikazu Furuta, 116, Takiro-cho 6-chome, Tajimi-shi, Gifu-ken, Japan

Filed Feb. 24, 1989, Ser. No. 314,800

Claims priority, application Japan, Feb. 3, 1989, 1-26059

Int. Cl.<sup>5</sup> A01K 83/00

U.S. Cl. 43—43.16

3 Claims U.S. Cl. 49—58



1. A fishhook comprising:
  - (a) a metallic base member having a fishhook-like shape provided with a shank, a bend and a point, and
  - (b) at least one film layer made of a hard metallic compound formed on said base member by chemical vapor deposition, said metallic base member having a plurality of projections distributed over an entire surface of said base member thereby,
  - said fishhook having an uneven surface composed of said plurality of projections on which said at least one film layer is formed.

4,953,322

**METHOD AND APPARATUS FOR HYDROPONIC CULTIVATION**

Cyril K. Edwards, 6 Stoughton Close, Oadby, Leicestershire, England

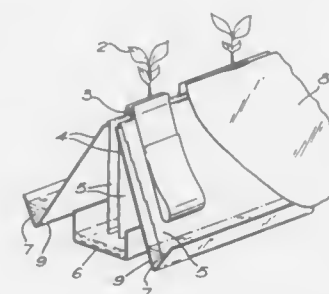
Continuation of Ser. No. 7,997, Jan. 29, 1987, abandoned. This application Mar. 6, 1989, Ser. No. 319,860

Claims priority, application United Kingdom, Feb. 4, 1986, 8602641

Int. Cl.<sup>5</sup> A01G 31/02

U.S. Cl. 47—64

20 Claims

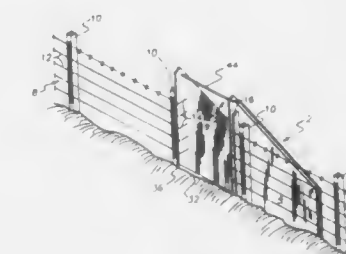


1. A method of growing a plant hydroponically which comprises applying a nutrient solution to the root of said plant and removing exudates which are carried from said root by a sheet of hydrophilic material, which is so disposed that it carries said

4,953,323

**ONE WAY ANIMAL GATE**  
Terry Quisenberry, 895 W. Kuiaha Rd., Maui, HI. 96708  
Filed Mar. 10, 1989, Ser. No. 321,695  
Int. Cl.<sup>5</sup> E06B 9/52

29 Claims



1. An animal gating system, comprising:
  - obstruction means for separating a first location from a second location, and
  - a gate, connected to the obstruction means and extending through the obstruction means, the obstruction means for preventing the movement of animals between the first location and the second location except through the gate, the gate including:
    - a bottom having one way conveying means for conveying the animals along the bottom from the first location to the second location and for preventing the animals from returning to the second location through the gate, and
    - sides, each side having a bottom edge connected to the bottom of the gate, the sides being of trapezoidal shape, each trapezoidal side further including a front edge and a rear edge, the front edge of each side being longer than the rear edge of each side.

4,953,324

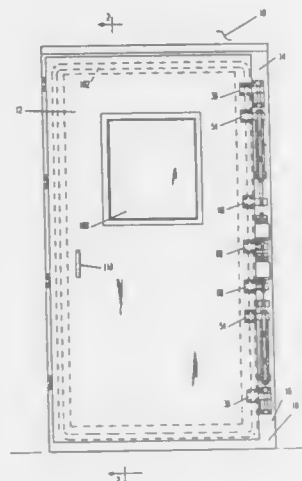
**PERSONNEL DOOR FOR A RF SHIELDED ROOM**  
Karl H. Herrmann, Seattle, Wash., assignor to Nova-Tech Engineering, Inc., Edmonds, Wash.  
Continuation of Ser. No. 129,490, Dec. 7, 1987, abandoned. This application Mar. 30, 1989, Ser. No. 330,828  
Int. Cl.<sup>5</sup> E05F 7/02

U.S. Cl. 49—255

15 Claims

1. A sealing system to prevent RF radiation leakage into or from a room having an access aperture extending to the floor of the room comprising
  - a. a door leaf;
  - b. a floor;
  - c. an opening below floor level directly under said door leaf and outside of the access aperture;
  - d. a door frame having a top portion located at the borders of the access aperture, the door frame having a bottom portion disposed in said opening below floor level;
  - e. slidable hinging means attached to said door leaf and said door leaf and said door frame, said slidable hinging means allowing vertical movement of said door leaf relative to said door frame while allowing said door leaf to pivot relative to said door frame;
  - f. retaining means for retaining said door leaf in a first position above said opening below floor level when said door leaf is in a closed position relative to the access aperture;

- g. energizing means for overcoming said retaining means and sliding said door leaf vertically relative to said door frame to a second position so as to partially dispose said door leaf in said opening below floor level and align the borders of said door leaf with the top and bottom portion of said door frame.
- h. locking means which simultaneously locks said door leaf in a fixed position relative to said door frame as said door leaf is lowered to the second position partially disposed in

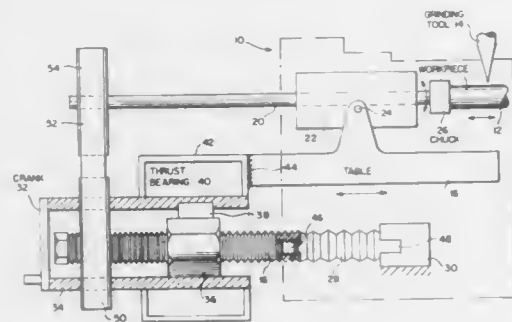


said opening below floor level, said locking means including top locking means which locks the top of said door leaf and said door frame, said locking means further including first side locking means for locking the side of said door leaf having said slidable hinge means, said first side locking means independent of said slidable hinge means, and includes pin means attached to said door frame and adapted to be received by first slot means attached to said door leaf.

**4,953,325**  
**THREAD GRINDING ATTACHMENT**  
Edwin W. Unser, Williston Park, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.  
Filed Jun. 16, 1989, Ser. No. 366,956  
Int. Cl. B24B 3/00

U.S. Cl. 51—95 TG

7 Claims



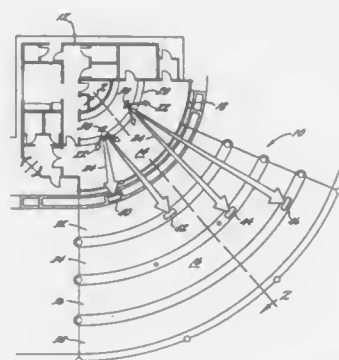
1. An attachment for a cutting tool grinder machine which includes a translatable table and a shaft-driven chuck for securing a cylindrical work piece in contact with a grinding tool, the attachment comprising:
- a fixed removable master thread member;
  - a sleeve coaxially mounted over the master thread member;
  - a nut mounted to the master thread member and keyed to the sleeve;

- a crank connected to the sleeve for rotating the sleeve and the keyed nut;
- means connected between the sleeve and the table for causing the translation of the latter upon turning of the crank at a rate corresponding to the pitch of the master thread member; and
- means connected between the sleeve and a drive shaft of the machine for rotating the work piece while it translates to duplicate the thread of the master threaded member.

**4,953,326**  
**DRIVE-UP TELLER STATION**  
Stuart K. Wexler, Riverwoods; John E. Jones, Winnetka, and Paul A. Jones, Glenview, all of Ill., assignors to Glenview State Bank, Glenview, Ill.  
Filed Mar. 16, 1989, Ser. No. 324,383  
Int. Cl. E04H 3/04

U.S. Cl. 52—33

29 Claims

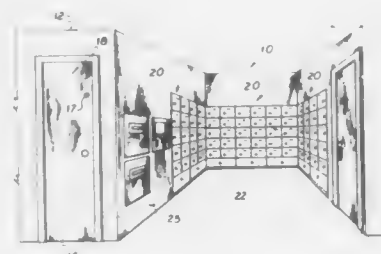


1. A drive-up customer service station, comprising:
- a service counter and an area for employees located on one side of the service counter;
  - a drive-up window located on the opposite side of said service counter;
  - a walk-in customer area located between said service counter and said drive-up window; and
  - a drive-up customer area located on the opposite side of said drive-up window from said walk-in customer area.

**4,953,327**  
**MINI-OFFICE FACILITY**  
Alija Cohodar, 495 NE, 83rd St., Miami, Fla. 33138  
Filed Oct. 27, 1989, Ser. No. 427,499  
Int. Cl. A47B 81/00

U.S. Cl. 52—36

14 Claims



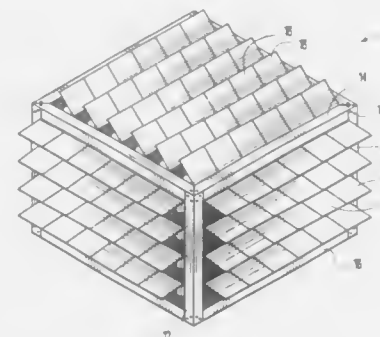
1. A storage and receiving structure designed to define a mini-office facility, said structure comprising:
- (a) a housing comprising a hollow interior defining at least one compartment defining a mini-office and including a front access opening,

- (b) a separating partition extending from a front end of each of said compartments within said housing adjacent said front access opening to a rear end of said compartment;
- (c) said separating partition disposed inwardly from side walls of said compartment and dimensioned and disposed to define, with said side walls, a primary portion and a secondary portion;
- (d) said primary and secondary portions isolated from one another and both including a front end communicating with and accessible through said front access opening;
- (e) a rear access opening formed in said housing in communicating, accessible relation with said secondary portion of said compartment and isolated from said primary portion;
- (f) a front closure means disposed in covering and non-covering relation to said front access opening and said primary and secondary portions and a rear closure means disposed in covering and non-covering relation to said rear access opening and said secondary portion; and
- (g) telephone and electrical utility outlet means mounted on an interior of said primary portion for providing telephone and electrical service to said primary portion;
- (h) whereby a telephone and telephone answering/recording machine may be operatively maintained within said primary portion.

**4,953,328**  
**AIR CONDITIONING COMPRESSOR SECTIONALIZED COVER**  
Scott R. Sewell, 5041 20th Ave. North, St. Petersburg, Fla. 33710, and Diane Fleming, 74 Patti Ct., Franklin, Ohio 45005  
Filed May 24, 1989, Ser. No. 356,174  
Int. Cl. E06B 7/092

U.S. Cl. 52—79.1

5 Claims



1. An air conditioner compressor sectionalized cover, comprising:
- a housing having four generally vertical corner posts; each adjacent pair of said corner posts connected at a top end by a top rail and at a bottom end by a bottom rail, each pair of said top and bottom rails extending in generally horizontal parallel relation;
  - three generally vertical sidewalls and a horizontal ceiling of said housing formed by a plurality of rows of shutters, said housing having an open side;
  - each of said rows of shutters formed by a plurality of pairs of interconnected adjacent shutters;
  - each pair of adjacent shutters of each row joined by mating interlocking fasteners to allow said housing to be assembled in a variety of different dimensions for use with a variety of different sizes of external air compressor units;
  - means mounting each of said rows of shutters for movement between open and closed positions;
  - means for retaining each of said rows of shutters in said open position;
- and

an open bottom end of said housing dimensioned for insertion over an external air compressor unit.

**4,953,329**  
**SINGLE-LAYER, POLYGONALLY-CURVED SUPPORTING FRAME STRUCTURE**  
Erich Frantl, Laudongasse 33/76, A-1080 Wien, Austria  
Filed Jul. 6, 1988, Ser. No. 215,490  
Claims priority, application Austria, Jul. 8, 1987, 1724/87  
Int. Cl. E04B 1/32

U.S. Cl. 52—81

5 Claims



1. A single-layer, polygonally-curved supporting frame structure having increased rigidity by means of prestressed tension members, said structure including a plurality of supporting bars which are connected to each other at bend points, a first set of tension members which members connect pairs of a first plurality of said bend points, and a second set of tension members which members each connect two bend points of a second plurality of said bend points, each two bend points of said second plurality thereof lying on opposite sides of each said bend point which is connected by a tension member of said first set, all of the tension members of said first and second sets being prestressed under tension whereby all of said supporting bars are under compression and the rigidity of the resulting frame structure is improved.

**4,953,330**  
**DAMPING DEVICE IN A STRUCTURE AND DAMPING METHOD USING THOSE DEVICES**

Toshiyuki Noji, Chiba; Hidetoshi Yoshida, Tokyo; Eiji Tatsumi, Chiba; Shinichi Akao, Saitama, and Hideyuki Kosaka, Chiba, all of Japan, assignors to Mitsui Kensetsu Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 8, 1988, Ser. No. 216,496  
Claims priority, application Japan, Dec. 1, 1987, 62-305379; Dec. 24, 1987, 62-327650; Mar. 22, 1988, 63-67950  
Int. Cl. E02D 27/34

U.S. Cl. 52—167 DF

12 Claims



1. A damping device for absorbing vibrations of a structure by providing said damping device on an upper portion of the structure, said damping device comprising:
- an elongated vessel for containing a liquid therein such that movement of the vessel will create a wave motion of the liquid surface in the elongated direction of the vessel;
  - a plurality of damping means disposed inside said vessel for reducing the amplitude of a wave of the liquid in said vessel while substantially allowing the reduced amplitude wave to continue its wave motion; and
  - wave dissipation means for absorbing and dissipating waves



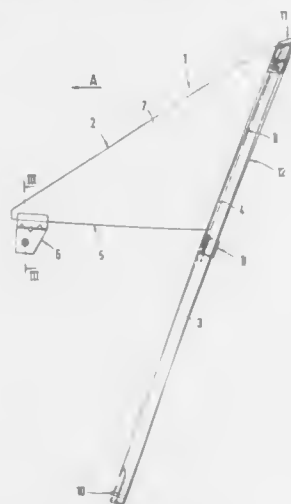
above a predetermined amplitude such that wave amplitude above said predetermined amplitude is absorbed and dissipated and prevented from reflecting and interfering with the wave motion cycle in said elongated vessel.

**4,953,331**  
**STATIONARY WINDOW ARRANGEMENT AT A MOTOR VEHICLE DOOR**

Hermann Ziegler, Renningen; Horst Handte, Heimsheim; Walter Braun, Sindelfingen, and Horst Gutzeit, Wiernsheim, all of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche AG, Weissach, Fed. Rep. of Germany

Filed Mar. 23, 1989, Ser. No. 327,903  
Claims priority, application Fed. Rep. of Germany, Mar. 25, 1988, 3810146

Int. Cl.<sup>5</sup> E06B 3/00  
U.S. Cl. 52—208 6 Claims



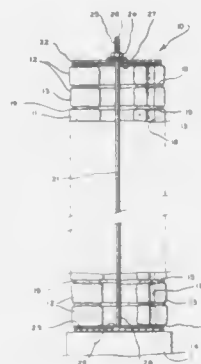
1. A stationary window arrangement of a motor vehicle door comprising a window having a rear edge which is connected with an upright extending holding web by the interposition of a seal means, said holding web having an upper end piece, a holding rail being mounted at the lower edge area of the window and spaced from the holding web and seal means, wherein the window, the holding rail, the seal means, the holding web and said upper end piece for the holding web are prefabricated to form a preassembled unit which is assembled in a single operation and which is able to be installed in the vehicle door by attachment of the holding web and rail to the vehicle door.

**4,953,332**  
**MASONRY STRUCTURE SYSTEM**  
Craig D. Galloway, 3509 West 5175 South, Roy, Utah 84067  
Filed May 15, 1989, Ser. No. 352,026  
Int. Cl.<sup>5</sup> E04C 3/10

U.S. Cl. 52—228 7 Claims

1. A masonry building system using conventional flat sided building units, said system comprising:  
at least one series of at least two of said units arranged with facing pairs of flat sides;  
a flat compressible non-metallic, non-masonry interface plate member placed between each of the pairs of facing sides of the units of the series unbonded thereto; and  
a pair of plates, one bearing upon the outermost flat side of one end unit and the other upon the outermost flat side of the remaining end unit of the series; and

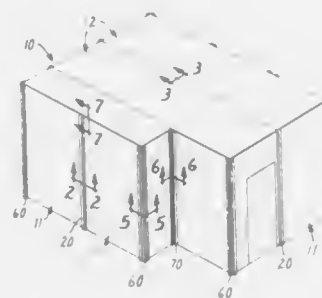
at least one tension member placed to act between the pair of plates to urge the units into forcible contact of their facing



flat sides with the flat compressible interface plate member therebetween.

**4,953,333**  
**CLEAN ROOM ENCLOSURE**  
Bruce M. Carlson, P.O. Box 33427, St. Paul, Minn. 55133-3427  
Filed Nov. 17, 1986, Ser. No. 931,615  
Int. Cl.<sup>5</sup> E04B 1/00

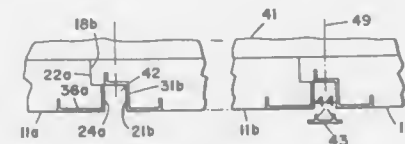
U.S. Cl. 52—281 10 Claims



1. A clean room enclosure comprising a ceiling and side walls, said side walls comprising side wall panels fixedly attached to support studs such that at least a portion of said studs are exposed to said enclosure; said studs having a plurality of slots in the exposed surface thereof and disposed adjacent said panels, said slots containing flexible sealing members therein; a vertical trim member displaced over said exposed surfaces of said studs, said trim member comprising a flat plate having extended inwardly from at least the outboard edges thereof slotted members containing flexible sealing members therein; and, means for operatively attaching said trim member to said studs in a manner such that all sealing members effectively prevent passage of air therethrough, wherein said means for operatively attaching said trim members to said studs comprises substantially parallel channel members integral with said trim member and extending inwardly from said flat plate toward said stud, the ends of said channel members being tapered inwardly, and a threaded member threadedly attached to said support stud, the head of said threaded member being engaged by said ends of said channel members, such that said threaded member can rotatably increase the sealing force of said sealing members.

**4,953,334**  
**ECONOMY BUILDING PANEL**  
Luther I. Dickens, Radford, Va., assignor to RADVA Corporation, Radford, Va.

Filed Oct. 29, 1987, Ser. No. 114,048  
Int. Cl.<sup>5</sup> E04C 1/00  
U.S. Cl. 52—309,4 6 Claims

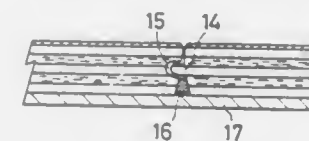


1. An improved insulating building panel comprising an expanded cellular core with substantially parallel front and back faces,  
said core having first and second side edges with complementary stepped configurations with a first edge having a wider step than the second edge, and  
thin reinforcing strips bonded to the front face of said core adjacent said side edges with the strip on the first edge extending along the lateral step surface a distance substantially equal to the difference in width of said steps at said first and second edges.

**4,953,335**  
**DECORATIVE BOARD HAVING HOT-MELT RESIN JOINTS**

Shiro Kawaguchi, and Katsunori Kai, both of Osaka, Japan, assignors to Eidai Industry Co., Ltd., Osaka, Japan  
Filed Apr. 26, 1988, Ser. No. 186,379  
Int. Cl.<sup>5</sup> E04B 5/00

U.S. Cl. 52—384 4 Claims

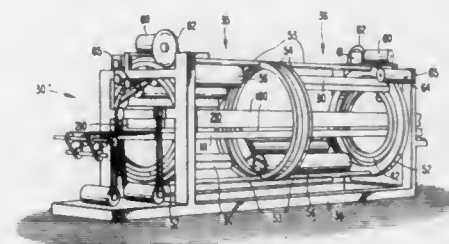


1. A flooring board assembly comprising:  
a plurality of board parts, each said board part having a front surface and a back surface, the back surfaces of the assembled said plurality of board parts being coated with a flexible sheet;  
each said board part providing generally opposed tongue and groove formations thereon engagable with the groove and tongue formations, respectively, on an adjacent said board part of said assembly, each said board part being further formed with a first notched surface below said tongue formation thereon and a second notched surface below said groove formation thereon, the corresponding said first and second notched surfaces of any pair of adjacent said board parts forming a groove-like cavity upon engagement of the corresponding said tongue and groove formations thereof; response to upward or downward flexure, respectively, of one of the corresponding pair of engaged said board parts so as to conform said flooring board assembly to an uneven floor system; and  
each said board part being further formed with a plurality of perpendicular grooves on the front surface thereof and a plurality of notches on the back surface thereof.

**4,953,336**  
**HIGH-TENSILE WRAPPING APPARATUS**  
Patrick R. Lancaster, III, and William G. Lancaster, both of Louisville, Ky., assignors to Lantech, Inc., Louisville, Ky.  
Continuation of Ser. No. 186,649, Apr. 19, 1988, Pat. No. 4,866,909, which is a continuation of Ser. No. 804,542, Dec. 4, 1985, abandoned, which is a continuation-in-part of Ser. No. 582,779, Feb. 23, 1984, abandoned. This application Aug. 17, 1989, Ser. No. 395,041

The portion of the term of this patent subsequent to Sep. 19, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> B65B 13/12

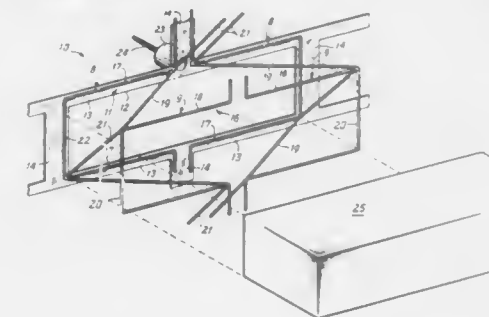
U.S. Cl. 53—556 4 Claims



1. An apparatus for stretch wrapping a bundle with a film web dispensed from a film web dispenser comprising:  
a film web dispenser for dispensing a film web;  
means for maintaining a substantially constant supply speed of the film web at the film web dispenser by preventing the supply speed of the film web at the film web dispenser from increasing and preventing the supply speed of the film web at the film web dispenser from decreasing;  
an applicator mandrel having a noncircular cross-section;  
means for revolving the film web dispenser relative to the applicator mandrel to wrap the film web onto the applicator mandrel;  
means for moving a bundle through the applicator mandrel;  
means for transferring the film web from the applicator mandrel onto the bundle so as to provide a containment force in the film web after it is applied onto the bundle.

**4,953,337**  
**METHOD AND APPARATUS FOR CONSTRUCTING A MASONRY STRUCTURE**  
Ronald L. Mills, 2338 Bolton Rd., N.W., Apt. 12, Atlanta, Ga. 30318

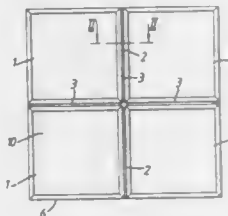
Filed Dec. 8, 1987, Ser. No. 130,015  
Int. Cl.<sup>5</sup> E04F 13/08  
U.S. Cl. 52—385 7 Claims



1. A method of erecting a masonry structure adjacent a wall comprising the steps of:  
laying a support foundation adjacent the base of the wall;  
securing a level support bar to the foundation;  
placing a jig defining a plurality of masonry unit accepting compartments adjacent the wall with the bottom portion of the jig resting on the support bar;

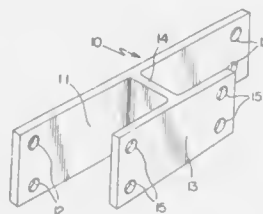
placing spacers between the jig and the wall;  
placing attaching means through the jig and through the spacers;  
securing the attaching means to the wall;  
placing masonry units in the masonry unit accepting compartments with the masonry units defining spaces therebetween;  
placing one end portion of a nozzle within the space between the masonry units a predetermined distance below the surface of the masonry units with the one end portion having a predetermined shape;  
connecting the other end portion of the nozzle to a source of mortar under pressure;  
actuating the flow of mortar under pressure through the nozzle and into the space between the masonry units;  
moving the nozzle at a predetermined speed within the space between the masonry units in the direction of the space while maintaining the one end portion of the nozzle at the predetermined distance below the surface of the masonry units within the space whereby the space between the masonry units is filled with mortar and the exposed surface of the mortar is sculpted by the one end portion of the nozzle to a shape corresponding to the predetermined shape of the one end portion of the nozzle.

4,953,338  
**SCREEN ASSEMBLY**  
Mervyn Wilson, Kettering; Martin Gibbons, Weybridge, both of England, and Simon Perutz, Evanston, Ill., assignors to Nimlok Limited, England  
Continuation of Ser. No. 76,489, Jul. 22, 1987, abandoned. This application Jun. 23, 1989, Ser. No. 370,605  
Int. Cl.<sup>5</sup> A47B 5/00  
U.S. Cl. 52—586



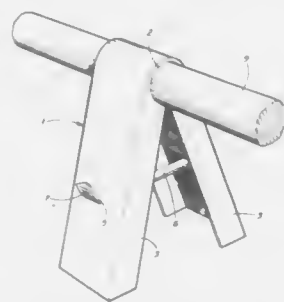
1. A portable display system comprising a plurality of removable display panels arranged in adjacent edge to edge relation; at least one elongate connecting member disposed between and interconnecting adjacent panels, each of said adjacent panels including a frame member provided with an outwardly facing elongate slot having an enlarged interior portion and a narrow exterior entrance communicating therewith, the connecting member having a pair of relatively spaced slot-engaging protuberances having enlarged heads sized to slidably fit within corresponding slot interior portions and narrow neck segments slidably disposed within corresponding narrow entrances, and a body portion interconnecting said protuberances; at least one of the adjacent interconnected display panels including a fastening element having a foot portion securable in the frame member slot, and a supporting portion for mounting an external device on at least the one adjacent panel.

4,953,339  
**DECK BRACKET FOR OF ATTACHING A DECK TO A BUILDING**  
Ricky S. Jewell, RFD #2, P.O. Box 4985, Mechanic Falls, Me. 04256  
Division of Ser. No. 139,968, Dec. 31, 1987, Pat. No. 4,811,542. This application Jan. 24, 1989, Ser. No. 301,322  
Int. Cl.<sup>5</sup> E04C 3/30  
U.S. Cl. 52—729 3 Claims



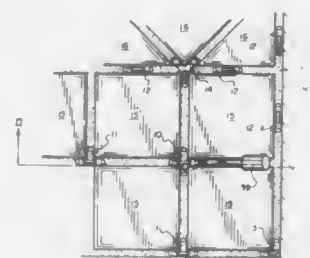
1. A deck bracket for mounting a deck horizontally to a building comprising a wide flange, said wide flange having openings at its ends adapted to mount said wide flange to a building therethrough, a narrow flange, said narrow flange having openings at its ends adapted to mount said narrow flange to a deck therethrough, a web, said web intermediate of said flanges, and said wide flange and said narrow flange being integral and spaced apart by said web.

4,953,340  
**BAR SUPPORT FOR CONCRETE**  
Howard A. Anderson, Pittsburgh, Pa., assignor to Mobay Corporation, Pittsburgh, Pa.  
Filed Jun. 16, 1989, Ser. No. 366,986  
Int. Cl.<sup>5</sup> E04C 5/07  
U.S. Cl. 52—684 6 Claims



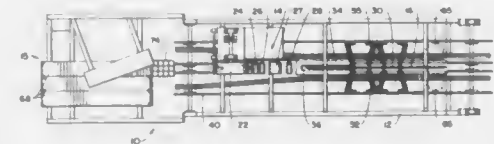
1. As an article of manufacture, a chair for maintaining and supporting a cylindrical, horizontally extending, reinforcing rod in a fixed position in connection with a concrete installation said chair comprising a thermoplastically molded or extruded channel having two side walls running along its long dimension, each of said walls having a section cut therefrom, said channel being sufficiently elastic to enable its bending across its long dimension to attain a shape enabling the embrace within said section, the at least partial circumferential cross-section of said reinforcing rod, said chair further containing means to secure said channel in said shape.

4,953,341  
**SPACERS FOR LAYING TILE AND METHOD OF USE**  
Bob Joos, 760 E. 12000 S., Draper, Utah 84020  
Filed Aug. 14, 1989, Ser. No. 393,236  
Int. Cl.<sup>5</sup> E04G 21/16  
U.S. Cl. 52—747 9 Claims



1. A method of laying tiles to maintain uniform spacing between rows and columns of the tiles, said method comprising spreading an adhesive material on a substrate to which said tiles are to be applied;  
placing said tiles in columns and rows on the substrate and in contact with said adhesive;  
placing spacer elements into said adhesive material between the edges of adjacent tiles as the tiles are laid, said spacer elements consisting of a plurality of legs extending radially from a common juncture, each of said legs having a top surface, bottom surface, and an end surface, each of said bottom surfaces lying entirely in a single plane, at least one of said legs of each spacer element having a beveled edge which extends partially above the level of the adhesive material when the spacer is positioned between the edges of adjacent tiles in contact with the adhesive;  
allowing the adhesive to set and firmly adhere the laid tiles and the spacer elements to the substrate;  
applying a tool to the beveled edge of said at least one leg of the spacer elements to lift the spacer away from said adhesive and said tiles to form substantially open channels between the adjacent tiles; and  
filling the channels between the tiles with a grout.

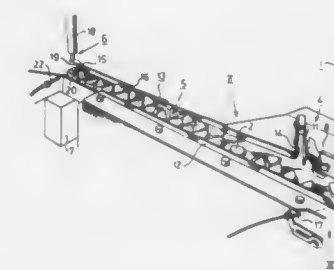
4,953,342  
**MULTI PACKAGE CONTAINERS**  
Charles M. Hynes, 10116 Shiller Blvd., Franklin Park, Ill. 60131  
Division of Ser. No. 394,200, Jul. 1, 1982, abandoned. This application May 9, 1988, Ser. No. 193,199  
Int. Cl.<sup>5</sup> B65B 27/04, 35/44  
U.S. Cl. 53—398 4 Claims



1. A method of creating a multi-package for cans, or the like, including the steps of;  
arraying a plurality of containers in rank and row configuration and assembling a primary package making device on a series of selected numbers of containers to create a series of sub-packages so that the containers in each sub-package so created are firmly arrayed and contained relative to one another,  
arranging a continuous roll of serially separable secondary packaging bands adjacent the sub-packages,  
positioning the separable bands loosely over a set of jaws

which includes at least four jaws arranged so they form corners of an imaginary rectangle,  
moving the jaws linearly away from a longitudinal center line of the bands in a direction outwardly and at an angle to perpendicular from the center line, to open and slightly stretch the band without substantial movement of the jaws relative to the bands,  
moving the jaws and stretched band combination continuously over a continuously moving stream of sub-packages on a conveyor,  
the movement of the jaws, with stretched bands, being both longitudinally relative to the movement of the containers and downwardly onto telescopic association over the arrayed sub-packages.

4,953,343  
**MACHINE FOR PACKAGING FLAT, UNSYMMETRICAL OBJECTS**  
Stig Hellman, Vällingby, Sweden, assignor to Akerlund & Rausing Licens Aktiebolag, Jarfalla, Sweden  
PCT No. PCT/SE88/00136, § 371 Date Nov. 18, 1988, § 102(e) Date Nov. 18, 1988, PCT Pub. No. WO88/07471, PCT Pub. Date Oct. 6, 1988  
PCT Filed Mar. 18, 1988, Ser. No. 278,440  
Claims priority, application Sweden, Mar. 26, 1987, 8701268  
Int. Cl.<sup>5</sup> B65B 35/44, 35/56, 57/20, 65/08  
U.S. Cl. 53—500 11 Claims

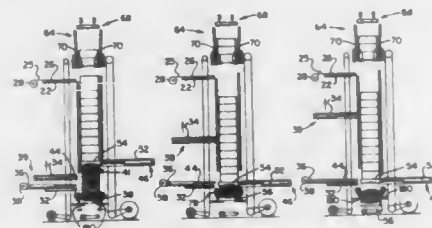


1. Apparatus for packaging non-rotation-symmetrical objects with an exact preselected number of objects in each package, each object having at least one flat side on which the object is advanced, said apparatus comprising an object storage unit (1), a transport unit (3, 4, 5) for advancing objects received from the object storage unit (1) and having means (11, 13) for preventing objects from becoming jammed as the objects are advanced, a counting unit (22) for counting objects advanced by the transport unit (3, 4, 5), and a discharge unit (23, 24) for releasing a preselected number of objects advanced by the transport unit, characterized in that the transport unit (3, 4, 5) has means for preventing objects from being advanced one above another or on edge, the transport unit includes a front transport trough partially defined by opposing sidewalls and slopping toward one side, said sidewalls converging toward an output end having a width slightly larger than the largest dimension of an object to be packaged, said sidewalls including a fixed lower sidewall (12) and a resiliently yieldable upper sidewall (13), said upper sidewall (13) being outwardly yieldable when acted upon by objects in said trough.

4,953,344  
**PACKAGING FIBRE BATTS**  
Kelth Wallace, Corunna, Canada, assignor to Fiberglas Canada Inc., Canada  
Filed May 20, 1987, Ser. No. 52,724  
Claims priority, application United Kingdom, Jun. 6, 1986, 8613760  
Int. Cl.<sup>5</sup> B65B 1/24; B30B 15/06  
U.S. Cl. 53—528 15 Claims  
1. In an apparatus for packaging batts of glass fiber material

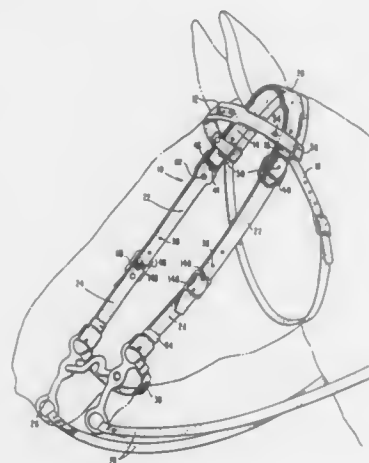


having a width  $W$  and which are adapted to be compressible and elastic in one direction but not in two directions perpendicular to said one direction, the apparatus comprising a pair of compression members, means for effecting relative displacement of said compression members to compress a stack of said batts therebetween and means for providing a covering around the compressed stack to retain said batts in a compressed state, the improvement comprising opposed concave surfaces on said compression members for forming correspondingly convex



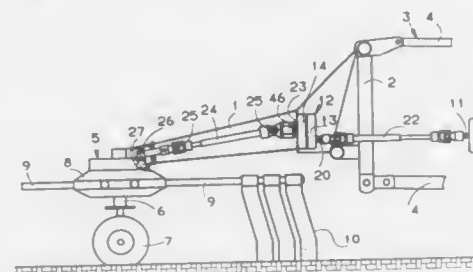
surfaces at opposite ends of said stack during the compression thereof, said correspondingly convex surfaces being at least substantially similar in shape to corresponding convex upper and lower surfaces of said covering around the compressed stack, said concave surfaces being curved surfaces having a radius of curvature of between about  $W/2$  and about  $3W$ , thereby facilitating compression of the stack counteracting damage to said batts during the compression thereof and promoting satisfactory recovery of said batts upon release from said covering.

**4,953,345**  
**HORSE BRIDLE**  
Raymond N. Boone, New Haven, Ky., assignor to Leatherhead Shop, Inc., Louisville, Ky.  
Filed Jul. 21, 1988, Ser. No. 222,711  
Int. Cl.<sup>5</sup> B68B 1/04  
U.S. Cl. 54—6 R  
11 Claims



1. A horse bridle comprising;  
a crown having opposite ends;  
a pair of cheek straps each of which is attached to an opposite end of said crown;  
attachment means for attaching said pair of cheek straps to opposite sides of a bit;  
a spare crown having opposite ends removably attached to said pair of cheek straps  
wherein said spare crown is designed and arranged to be removed from said pair of cheek straps to serve as a replacement for said crown or either of said pair of cheek straps.

**4,953,346**  
**TRACTOR DRIVEN FARM MACHINE**  
Jerome Aron, Bouxwiller, France, assignor to Kuhn S.A., Saverne, France  
Filed May 22, 1989, Ser. No. 354,832  
Claims priority, application Japan, May 26, 1988, 88 07194  
Int. Cl.<sup>5</sup> A01D 69/06  
U.S. Cl. 56—11.1  
12 Claims



1. A farm machine having tool means to be rotatably driven by a power takeoff shaft of a tractor, comprising:  
a frame connectable to the tractor;  
rotatably drivable tool means mounted relative to said frame; and  
means for transmitting rotational drive from said power takeoff to said tool means, comprising:  
(a) a transmission housing mounted to said frame,  
(b) first and second drive shafts journaled to said housing,  
(c) first and second meshing gears positioned in said housing and respectively mounted on said first and second drive shafts, said first and second gears having different diameters and a different number of teeth,  
(d) an input shaft having one end connectable to the power takeoff shaft of the tractor and another end selectively connectable to portions of one of said first and second drive shafts located outside of said transmission housing,  
(e) a third gear rotatably held in said housing by a driven shaft,  
(f) transmission means for drivingly connecting said driven shaft to said tool means, and  
(g) means for selectively meshing said third gear with one of said first and second gears, wherein said means for selectively meshing comprises eccentric means for journaling said driven shaft to said housing and means for rotating said eccentric means such that said third gear moves between said first and second gears when said eccentric means is rotated,  
whereby said tool means may be driven at a desired rotational speed by connecting said input shaft to a selected one of said drive shafts, and whereby said tool means may be rotatably driven in a desired direction by meshing said third gear with one of said first and second gears.

**4,953,347**  
**GARDENING TOOL**  
Todd R. Siegfried, 405 Lyoncross Way, San Jose, Calif. 95123  
Filed Apr. 21, 1989, Ser. No. 341,782  
Int. Cl.<sup>5</sup> A01B 1/16; A01D 7/00  
U.S. Cl. 56—400.12  
7 Claims

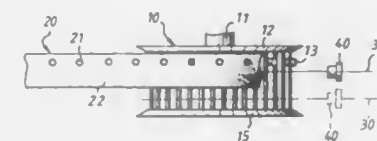
1. An apparatus for picking up and compressing low density matter comprising:  
a. a first member and a second member, each of said members comprising:  
(1) a substantially rectangular blade having a face and a back, the blade including a plurality of folds dividing blade into planar sections including two end sections and at least one central section forming a concave surface,

(2) a cylindrical handle having a grippable end opposite from an attaching end, and  
(3) means for attaching said attaching end of said handle to the central section of said blade, said folds being perpendicular to said handle  
b. rotatable means for attaching said handle from said first member to said handle from said second member, said



blade from said first member being maintained in a face to face relationship with said blade of said second member so that the concave surface of the first member is juxtaposed to the concave surface of the second member, said attaching means forming a pivot allowing said blades to be brought together or separated by moving said members relative to one another in a scissor-like manner.

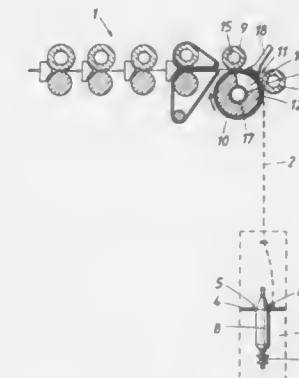
**4,953,348**  
**SYNCHRONOUS YARN FEEDING DEVICE**  
Jen F. Chen, P.O. Box 1-79, Taipei, Taiwan 10602  
Continuation of Ser. No. 216,959, Jul. 11, 1988, abandoned. This application Oct. 23, 1989, Ser. No. 425,392  
Int. Cl.<sup>5</sup> D01H 13/14  
U.S. Cl. 57—85  
15 Claims



1. A yarn feeding device for use in a textile machine, said textile machine including a machine body and a frame fixed on said body, said yarn feeding device comprising:  
a drum rotatably mounted on said frame;  
a yarn guiding means movably mounted beside said drum on said frame;  
an endless driving belt provided to engage said drum at the outer circumference thereof;  
a yarn being fed by said belt on said drum; wherein said drum includes an outer periphery with a first portion having a first rigid projecting engaging means for engaging a corresponding portion of said driving belt, a second drum portion adjacent said first drum portion for receiving a portion of yarn being fed onto said drum when said drum is engaged with a corresponding portion of said driving belt, and a third drum portion for receiving a portion of yarn being fed off said drum when said yarn guiding means is operatively moved toward said third portion of said drum;  
said driving belt includes a first belt portion having a second engaging means for cooperative engagement with said first drum portion and said first engaging means, and a second belt portion having a substantial major portion adjacent said first belt portion for pressing a portion of

yarn against said drum second portion as a portion of yarn is fed onto said drum; and wherein  
said first engaging means provided on said drum and said second engaging means provided on said driving belt are cooperatively interlocked with each other to maintain the position of said belt second portion relative to said drum second portion in an axial direction with respect to said drum so as to effectively prevent said belt from an axial movement; and  
said yarn guiding means is operatively controlled to guide movement of said yarn only in the region between said second drum portion and said third drum portion;  
whereby when said yarn guiding means is operatively moved to guide said yarn toward said second portion of said belt and said drum, said yarn will be pressed between and driven by the inner surface of said second belt portion and the outer surface of said second drum portion in synchronism with said driving belt and the rotation of said drum so that a substantially constant and uniform yarn feeding operation is provided; and when said yarn guiding means is operatively moved to guide said yarn from said second portion to said third portion of said drum, said yarn is not driven by said driving belt.

**4,953,349**  
**APPARATUS FOR MAKING A YARN**  
Ernst Fehrer, Auf der Gugl 28, A-4020 Linz, Austria  
Filed Sep. 6, 1989, Ser. No. 403,706  
Claims priority, application Austria, Sep. 29, 1988, 2403/88; Nov. 29, 1988, 2928/88; Dec. 23, 1988, 3142/88  
Int. Cl.<sup>5</sup> D01H 5/18, 5/32, 5/70, 5/74  
U.S. Cl. 57—315  
2 Claims



1. In an apparatus for making a yarn, comprising ring spinning means, drawing means defining at least one draft path and operable to draw at least one roving along said at least one draft path, said drawing means also comprising delivery roller means defining at least one clamping nip and operable to deliver at least one drawn roving from said at least one draft path through said at least one clamping nip to said ring spinning means, said delivery roller means comprising a deflecting delivery roller, which has a peripheral surface portion that extends from said at least one clamping nip to a delivery end remote from said at least one clamping nip, said apparatus further comprising means for contacting said at least one drawn roving with said peripheral surface portion from said at least one clamping nip to said delivery end so that said peripheral surface portion constitutes a guiding surface for deflecting said drawn roving on said deflecting delivery roller, the improvement residing in that said peripheral surface portion is formed with a slideway, which adjoins said delivery end and is arranged to guide

said at least one drawn roving on said peripheral surface portion transversely to the axis of said drawn roving, at least one pressure-applying roller is provided to urge said at least one drawn roving against said peripheral surface portion at a distance from said delivery end, said peripheral surface portion is provided between said at least one clamping nip and said pressure-applying roller with at least one suction zone having two mutually opposite longitudinal sides extending in the peripheral direction of said delivery roller, and

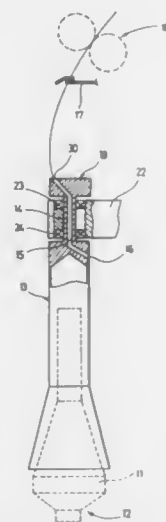
blasting means are provided, which are laterally outwardly spaced from at least one of said longitudinal sides of said at least one suction zone and are operable to discharge against said peripheral surface portion an air blast so that said air blast flows on said peripheral surface portion toward said suction zone transversely to said peripheral direction.

**4,953,350**  
**FUNNEL FOR A FUNNEL SPINNING APPARATUS ON A TEXTILE MACHINE**

Günter Schulz, Ebersbach/Fils; Frieder Probst, Eislingen, and Hermann Güttler, Uhingen, all of Fed. Rep. of Germany, assignors to Zinser Textilmaschinen GmbH, Fed. Rep. of Germany

Filed Apr. 19, 1989, Ser. No. 340,382  
Claims priority, application Fed. Rep. of Germany, Apr. 21, 1988, 3812267

Int. Cl.<sup>5</sup> D01H 7/00, 7/26, 7/66, 13/04  
U.S. Cl. 57—354 9 Claims



1. A yarn feeding funnel for use in a textile machine of the type in which yarn is wound on a bobbin and which has a bearing for rotatably supporting the yarn feeding funnel in yarn guiding relation to the bobbin, comprising:

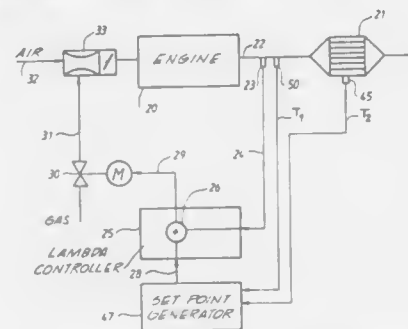
an upper shaft portion having a yarn inlet opening and a yarn passage extending from said inlet opening for passage of yarn through said upper shaft portion, said upper shaft portion being rotatably supportable above the bobbin by the bearing for rotation about an axis and said inlet opening being radially offset from said axis; and

a body portion extending downwardly from said upper shaft portion and having a yarn passage extending from said yarn passage in said upper shaft portion to an outlet opening for passage of yarn traveling from said upper shaft portion through said body portion to the outside of said funnel for feeding to the bobbin.

**4,953,351**  
**COMBUSTION CONTROL**  
Karl Motz, Bergkirchen-Eisolzried, and Markus Diehl, Furstenfeldbruck, both of Fed. Rep. of Germany, assignors to Man Technologie GmbH, Munich, Fed. Rep. of Germany  
Filed Nov. 14, 1988, Ser. No. 270,087

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1987, 3738454; Jul. 2, 1988, 3822415  
Int. Cl.<sup>5</sup> F02D 41/14

U.S. Cl. 60—285 9 Claims



1. A method of automatically controlling the air/fuel ratio of an IC engine having a catalyst, comprising producing a signal representative of air/fuel ratio of a combusted mixture by a lambda probe which samples exhaust gas from an IC engine upstream of the catalyst, measuring exhaust gas temperatures both upstream of the catalyst and after the exhaust gas has passed through at least a portion of the catalyst, determining in a lambda controller on the basis of the measured exhaust gas temperatures and the air/fuel ratio signal from the lambda probe a set point for controlling the air/fuel ratio of the engine, maintaining the engine at a constant load condition while the set point is determined, said determining of said set point being effected by varying the air/fuel ratio of the engine in steps which causes variation in the value of the exhaust gas temperature after the exhaust gas has traveled through at least a portion of said catalyst and establishing the value of the set point for an air/fuel ratio at which the temperature of the exhaust gas after passing through at least a portion of the catalyst is in a maximum temperature range.

**4,953,352**  
**EXHAUST SYSTEM**  
Monty A. Campbell, 4989 Holt Blvd., Montclair, Calif. 91763  
Continuation-in-part of Ser. No. 107,870, Oct. 8, 1987, Pat. No. 4,800,719, which is a continuation of Ser. No. 769,995, Aug. 26, 1985, abandoned, which is a continuation of Ser. No. 461,863, Jan. 28, 1983, abandoned. This application Jan. 31, 1989, Ser. No. 304,239

Int. Cl.<sup>5</sup> F02B 27/02 11 Claims

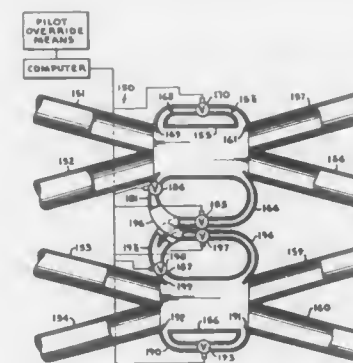
1. An exhaust system for an internal combustion engine having at least four exhaust ports and having an exhaust pipe flow connected to each port; said system comprising:

(a) at least two chambers;

(b) said exhaust pipes in pairs and each pair being flow connected opposite the end thereof adapted to be connected to said exhaust ports at one of said chambers; and

(c) a duct flow connecting two of said chambers; said duct

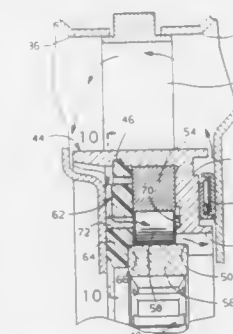
including flow directing means for directing a minor portion of a feedback emission flow passing through a first



of said chambers such that said minor portion flows into a second of said chambers through said duct.

**4,953,353**  
**ROLLER CLUTCH FOR STATOR ASSEMBLY**  
Frederick E. Lederman, Sandusky, Ohio, assignor to General Motors Corporation, Detroit, Mich.  
Filed Aug. 23, 1989, Ser. No. 397,211

Int. Cl.<sup>5</sup> F16D 33/00 2 Claims  
U.S. Cl. 60—345



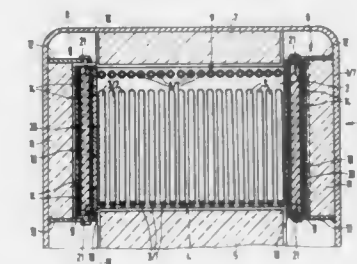
1. A torque converter stator assembly, comprising, a stator having a central cylindrical hub with an end wall and a retention groove, a pair of clutch races disposed coaxially within said hub with a predetermined radial spacing therebetween, an integrally molded cage unit including a front race retention wall, said cage unit retention wall having a flexible retention means engageable with said retention groove to prevent said races from moving away from said end wall within said hub, said cage unit retention wall further having an evenly spaced plurality of windows arrayed in a circle and opening axially therethrough into said radial space, said windows having a radial width less than said predetermined radial spacing, said cage unit further including a plurality of journal blocks extending axially inwardly from said retention wall between said windows, said journal blocks having a radial thickness approximately equal to said predetermined radial spacing, said cage unit further including a circular end ring disposed parallel to and axially spaced from said retention wall and integral with said journal blocks so as to form a plurality of pockets, said end ring further occupying only radial space unoccupied by said windows, so that said cage unit may be bypass molded, and,

a roller and energizing spring located in each of said pockets, whereby, said cage unit, rollers and springs may be installed as a subassembly between said races, after which said windows provide direct visual access to said rollers and springs.

**4,953,354**  
**THERMALLY INSULATED STIRLING ENGINE-HOT GAS HEATER SYSTEM COMBINATION**  
Anton Erber, Mühlhausen; Helmut Hoff, Königsbrunn; Günter Reuchlein, Augsburg; Hanno Schaaf, Friedberg, and Gerhard Schlessl, Augsburg, all of Fed. Rep. of Germany, assignors to MAN Technologie GmbH, Munich, Fed. Rep. of Germany  
Filed Nov. 10, 1988, Ser. No. 269,639

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1987, 3739926; Feb. 26, 1988, 3806114  
Int. Cl.<sup>5</sup> F02G 1/04

U.S. Cl. 60—517 20 Claims



1. The combination of a hot gas engine (1) with a hot gas heating system (1/6), said combination, at least in part, having an outer wall (1/7) surrounding the hot gas heating system (1/6) and an inner, heat insulating lining therefore, wherein said heat insulating lining includes an inner insulating wall (9), spaced from the outer wall (1/7), said insulating wall (9) comprising a plurality of replaceably retained insulating elements (14, 19, 24) of ceramic material; and ceramic heat insulating material (11) including at least one of: batts, and loose lump material filling the space between the outer wall (1/7) and said replaceably retained insulating elements forming the inner wall (9).

**4,953,355**  
**STEAM TURBINE INSTALLATION WITH ADJUSTED BLEEDING**  
Jean Poulain, Lamorlaye, and Jacques Desdoutis, Chaville, both of France, assignors to GEC Alsthom SA, Paris, France  
Filed Aug. 14, 1989, Ser. No. 393,209

Claims priority, application France, Aug. 16, 1988, 88 10921

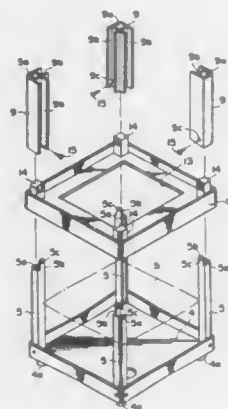
Int. Cl.<sup>5</sup> F01K 13/02 3 Claims

1. In a steam turbine installation provided with means including a bleed line for bleeding the turbine installation to adjust the pressure in the bleed line to a predetermined pressure P, the installation driving a load and including a bleed outlet disposed between two successive stages and opening to said bleed line, the improvement comprising an exhaust duct, and a servo valve disposed on the exhaust duct and controlled



1. A refrigerator-freezer unit comprising:  
a lower machine room for a refrigerator;  
an upper cold room for cooling goods and positioned generally above said lower machine room;  
vertical machine room pillars associated with said lower machine room, said machine room pillars having machine room pillar top portions;

vertical cold room pillars associated with said upper cold room, said cold room pillars having cold room pillar bottom portions substantially connected to said machine room pillar top portions; and



a frame disposed between said machine room and said cold room, said frame having a plurality of fitting means onto which both said machine room pillars top portions and said cold room pillar bottom portions are fitted.

4,953,363

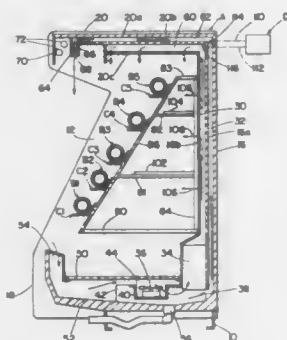
## FLORAL DISPLAY CASE

Randolph J. Primoic, Willoughby Hills, Ohio, assignor to Floriline Display Products Corp., Willoughby, Ohio  
Filed Dec. 13, 1989, Ser. No. 450,174

Int. Cl.<sup>5</sup> A47F 3/04

U.S. Cl. 62—255

33 Claims

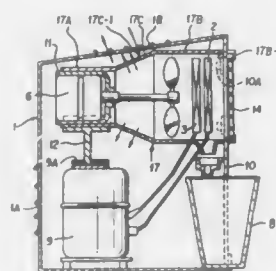


22. A display case for cut flowers, said case having a back wall, an open front and an overhead portion, a plurality of elongated tubular manifolds extending substantially horizontally and parallel to one another and being spaced apart in upwardly terraced relationship from said open front toward said back wall, each said manifold having a plurality of spaced apart upwardly facing openings therein for receiving and supporting stem portions of cut flower bouquets which are viewable and physically accessible through said open front of said case, said overhead portion being spaced above and overlying said manifolds, refrigerated air supply means for supplying a cascade of refrigerated air through said overhead portion for descent upon said manifolds, air curtain supply means for supplying a narrow curtain of air through said overhead portion for descent along said open front of said case, and air stabilizing means extending between said back wall and said manifolds for stabilizing the mixture and movement of air in the space between said back wall and said manifolds.

4,953,364  
SUCTION GUIDE DEVICE FOR DEHUMIDIFIER  
Shin H. Lee, Suwon, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Rep. of Korea  
Filed Jul. 5, 1989, Ser. No. 375,627  
Int. Cl.<sup>5</sup> F25D 21/14

U.S. Cl. 62—285

28 Claims



21. A suction guide device for installation within the outer enclosure of an air conditioning apparatus, comprising: a unitary inner enclosure in the shape of a hopper, said inner enclosure having an extended inlet section with an air inlet and adapted to house an evaporator adjacent said air inlet and a condenser adjacent said evaporator; an insertion section for housing a suction means for directing a flow of air through said unitary inner enclosure; a central tapered section formed between said insertion section and said extended section, said central tapered section having an air outlet; and a supporter means for connecting said insertion section of said enclosure to said outer enclosure and for absorbing vibrations of said unitary inner enclosure.

4,953,365

## HELICAL CONVEYOR FREEZER

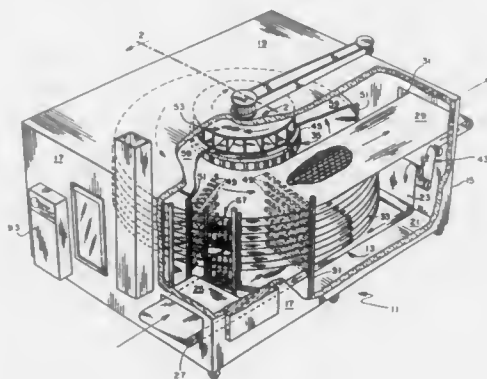
Gary D. Lang, Naperville; Donald S. Finan, Chicago, and George D. Rhoades, La Grange, all of Ill., assignors to Liquid Carbonic Corporation, Chicago, Ill.

Filed Jun. 28, 1989, Ser. No. 373,056

Int. Cl.<sup>5</sup> F25D 25/02

U.S. Cl. 62—381

25 Claims



1. A cryogenic food freezer comprising a thermally insulated enclosure, a cage located within said enclosure mounted for rotation about a vertical axis, said cage being of generally circular cross-section and having a generally open sidewall formed of a plurality of generally vertically extending members, means for rotating said cage about its vertical axis, an endless flexible conveyor belt within said enclosure and disposed helically about said cage in engagement along its inner edge with said cage, said belt also having loading and unloading sections,

said enclosure having entrance means and exit means through which food products being frozen can be introduced and removed,

blower means in communication with one axial end of said cage for circulating gas within said enclosure to withdraw heat from food products being frozen, said blower means being located to such gas from the interior of said cage and means at the other axial end of said cage preventing gas flow therethrough toward said blower means, so that high pressure gas is directed into a region generally between the interior wall of said enclosure and said helically disposed belt, from which a generally radially inward gas flow is created across the food products being carried on said helical belt, and

refrigeration means for cooling the gas within said enclosure to a temperature of about  $-30^{\circ}$  F. or below, said refrigeration means comprising cryogen injection means positioned to inject liquid cryogen radially inward so that said injection cryogen impinges upon food products carried on and positioned across the width of said helical belt aided by said radially inward concurrent gas flow and also cools the gas.

4,953,366

## ACOUSTIC CRYOCOOLER

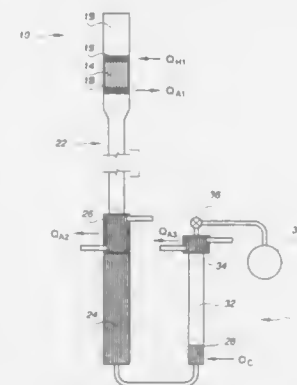
Gregory W. Swift, Santa Fe; Richard A. Martin, Los Alamos, both of N. Mex., and Ray Radebaugh, Louisville, Colo., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 26, 1989, Ser. No. 412,712

Int. Cl.<sup>5</sup> F25B 1/00

U.S. Cl. 62—467

18 Claims



1. A thermoacoustic cryocooler having no moving parts, comprising:

- a pulse tube refrigerator including a pulse tube, a first heat exchanger adjacent said pulse tube for inputting heat from a thermal load, and second heat exchanger for removing heat transferred from said first heat exchanger across said pulse tube;
- said pulse tube being responsive to a fluid driving frequency for moving heat from said first heat exchanger to a higher temperature at said second heat exchanger;
- a thermoacoustic prime mover for generating a standing acoustic wave at said fluid driving frequency and at a pressure amplitude effective to drive said pulse tube for obtaining a selected temperature at said first heat exchanger; and
- a standing wave tube supporting said standing wave and defining an antinode adjacent said pulse tube refrigerator.

4,953,367

## SYSTEM FOR CONTROLLING SUPPLY OF YARN TO A YARN UTILIZATION APPARATUS, PARTICULARLY MULTI-FEED CIRCULAR KNITTING MACHINE

Gustav Memminger, Freudenstadt; Heinz Fabschitz, Westham, and Falk Kühn, Rottenburg, all of Fed. Rep. of Germany, assignors to Memminger Iro GmbH, Freudenstadt, Fed. Rep. of Germany

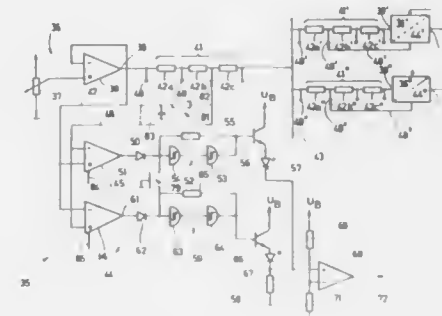
Filed Jul. 14, 1989, Ser. No. 380,145

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1988, 3824034

Int. Cl.<sup>5</sup> D04B 15/38; B65H 59/38

U.S. Cl. 66—132 R

32 Claims



1. System for controlling supply of yarn (12) to a yarn utilization apparatus, particularly a multi-feed circular knitting machine having

- a plurality of yarn supply means (1);
- a plurality of yarn utilization stations, receiving the yarn from the yarn supply means;
- a plurality of sensing means (21, 22) coupled to the yarn (12) running between the yarn supply means and the utilization stations and providing yarn supply parameter signals;
- a plurality of measuring circuits (36 . . . 36'') coupled to receive the yarn parameter signals and having output terminals (39 . . . 39'') for delivering output signals which have a characteristic of the parameter of the yarn during supply of the yarn (12) from the yarn supply means to the utilization station,

and comprising, in accordance with the invention reference signal generating means (38, 41 . . . 41'', 43) coupled to a predetermined plurality of the measuring circuits for generating a reference signal, which reference signal is dependent on all the output signals from said predetermined plurality of measuring circuits (36 . . . 36''); a deviation signal generating circuit (44—44'') associated with each of the yarn supply means and coupled to receive (a) the reference signal; and (b) the output signals from the measuring circuit associated with the respective yarn supply means, and generating respective deviation signals if the output signals applied to the deviation signal generating circuit, and the reference signals representative of the respective parameters of the predetermined plurality of measuring circuits, differ by a predetermined value.



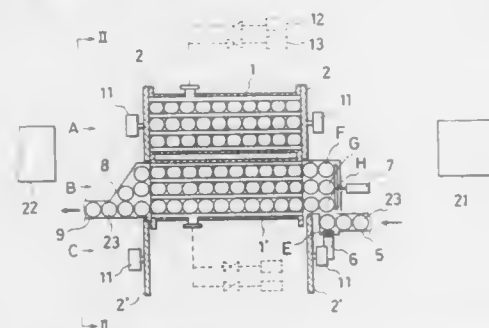
**4,953,368**  
**METHOD OF AND APPARATUS FOR HEAT-TREATING BOBBINS OF YARN**

Takuya Kawasaki, Takarazuka, and Osamu Kawakami, Amagasaki, both of Japan, assignors to Nikku Industry Co., Ltd., Itami, Japan

Filed Feb. 17, 1988, Ser. No. 156,789  
Claims priority, application Japan, May 1, 1987, 62-106360;  
Jul. 17, 1987, 62-177162

Int. Cl.<sup>5</sup> D06B 3/09  
U.S. Cl. 18—5 C

7 Claims



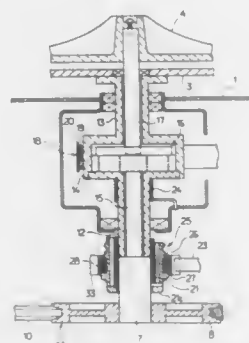
1. A heat treatment apparatus for bobbins of yarn installed on a conveyor line which connects a spinning machine and a winding machine together, the heat treatment apparatus, comprising: a hermetically enclosed container means being in a hermetically-sealed state for performing a series of heat treatment operations therein such as a vacuum process and a steam-heating process; a heat treatment container being in a non-hermetically-sealed state for allowing a series of upright bobbins of yarn to be supplied into the heat treatment apparatus from one side and discharged from the other side; a vacuum pump means for evacuating the hermetically enclosed container means; and a transfer means for moving the hermetically enclosed container means to the non-hermetically-sealed state, and the heat treatment container to the hermetically-sealed state, each of said bobbins having a non-perforated tube for taking up said yarn.

**4,953,369**  
**WASHING MACHINE**  
Michiaki Ito, Seto, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 23, 1989, Ser. No. 397,954  
Claims priority, application Japan, Aug. 26, 1988, 63-213049;  
Nov. 25, 1988, 63-299200

Int. Cl.<sup>5</sup> D06F 37/40  
U.S. Cl. 68—23.7

8 Claims



1. A washing machine comprising:  
(a) a rotating tub provided with a hollow tub shaft extended from the outer bottom thereof;

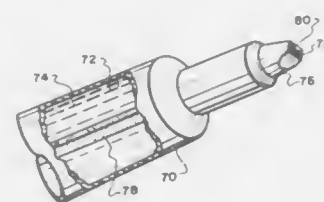
- (b) a drive shaft disposed so as to be axially adjacent to an extended end of the tub shaft;  
(c) an agitator shaft directly coupled with the drive shaft so as to be rotated therewith and inserted in the tub shaft;  
(d) an agitator mounted within the rotating tub so as to be rotated by the agitator shaft;  
(e) an electric motor provided for driving the drive and agitator shafts;  
(f) a clutch spring formed into a coil shape and wound about the outer peripheries of the tub and drive shafts so as to be tightly wound up about the tub shaft, the clutch spring being wound up with rotation of the drive shaft to thereby transmit rotation of the drive shaft to the tub shaft, the clutch spring having two ends;  
(g) an inner cylindrical member disposed so as to enclose the clutch spring and having an engagement portion engaging one end of the clutch spring at the drive shaft side;  
(h) an outer cylindrical member having a plurality of engagement claws formed on the outer periphery thereof, the inner cylindrical member being fitted within the outer cylindrical member so as to be rotatable with a predetermined frictional resistance against the outer cylindrical member;  
(i) a clutch lever engaging any one of the engagement claws of the outer cylindrical member to thereby prevent a wind-up action of the clutch spring such that rotation of the drive shaft is prevented from being transmitted to the tub shaft, the clutch lever being disengaged from the engagement claw of the outer cylindrical member to thereby allow the clutch spring to be wound up such that rotation of the drive shaft is transmitted to the tub shaft;  
(j) a brake mechanism applying a braking force to the tub shaft when said any one of the engagement claws is engaged with the clutch lever and releasing the braking force from the tub shaft when the engagement claw is disengaged from the clutch lever; and  
(k) a stopper provided in the inner cylindrical member, the stopper including an edge against which the other end of the clutch spring strikes when the clutch spring is loosened a predetermined amount in a rotative movement of the clutch spring in the direction that the same is loosened, against the braking force applied to the tub shaft by the brake mechanism and thereafter, causing the inner cylindrical member to rotatively move relative to the outer cylindrical member against the frictional resistance thereof with movement of said other end of the clutch spring.

**4,953,370**  
**HANDICRAFT FOR PRODUCING SIMULATED NEEDLEPOINT**  
Perry N. Hambricht, 23515 Oxnard St., Woodland Hills, Calif. 91367

Filed Sep. 5, 1989, Ser. No. 403,164  
Int. Cl.<sup>5</sup> D06B 1/12

U.S. Cl. 68—213

3 Claims



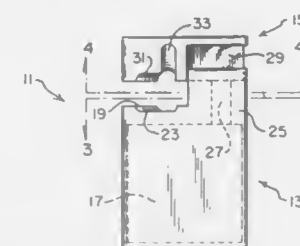
1. In combination with a textile, said textile being formed of a plurality of yarn loops located in a closely spaced array, a color marking instrument for transferring a particular color of dye onto a single said yarn loop, said color marking instrument comprising:

a casing adapted to be grasped by the hand of a human being, said casing being hollow forming an internal chamber, said internal chamber to function as a reservoir for a quantity of a dye, said casing having a tip, said tip terminating in an outer edge, said tip having an opening, the transverse size of said opening being slightly larger than the transverse cross-sectional size of each said yarn loop with all said yarn loops having substantially the same cross-sectional size;  
a wick mounted within said opening, a portion of said wick extending into said reservoir and another portion of said wick being mounted within said opening, said portion of said wick within said opening being spaced inwardly of said outer edge becoming a recessed marking nib, whereby a said loop must enter said opening to contact said wick to pick up the color of the dye from said reservoir which has impregnated said wick.

**4,953,371**  
**SHACKLELESS PADLOCK**  
Paul Appelbaum, 2125 S. Ammons St., Lakewood, Colo. 80227  
Filed Dec. 11, 1989, Ser. No. 448,219  
Int. Cl.<sup>5</sup> F05B 67/36

U.S. Cl. 70—32

3 Claims



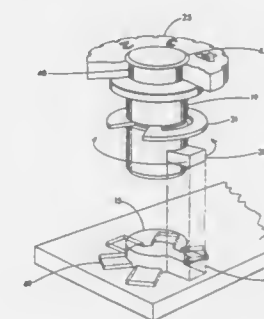
1. Improved padlock for securing a latching member, comprising:  
(a) main case having a bottom, spaced-apart side walls and an upper wall with at least one shaft-receiving bore therein, said walls enclosing a locking mechanism, and including portions of said side walls that extend upwardly beyond said case upper wall and that surround said at least one bore, and said upper wall having an upper face providing a first shaped portion for engaging a latching member;  
(b) latching head, disposed above said main case, and having at least one shaft-like connecting member fixedly attached to said head and extending from the bottom of said head into said at least one bore to make lockable engagement and limited axial movement therein, said head having outer wall portions that are slidably embraced within said upwardly extending side wall portions of said case for guiding said head in vertical movement relative to said case and for shielding said at least one shaft-like connecting member, and said latching head having a lower face providing a second shaped portion for engaging a latching member;  
(c) wherein said padlock has a locked position in which said at least one shaft-like member is locked within said case and said first shaped portion lies in close proximity to said second shaped portion, and said latching head being releasable to an open position in which said first and second shaped portions are spaced apart wherein said first shaped portion is contoured with a first arcuate groove, and a second arcuate groove lies in said second shaped portion, and said first and second grooves adapted to grasp and hold a U-shaped member when said padlock is in locked position, and  
a third arcuate groove in said second shaped portion, and wherein when said padlock is in locked position, said first, second and third grooves are adapted to grasp and hold a U-shaped member in a first orientation with respect to said padlock in which said first and second arcuate grooves grasp said U-shaped member, or in a second orientation at about 90° to said first orientation in which said third arcuate groove grasps said U-shaped member.

padlock in which said first and second arcuate grooves grasp said U-shaped member, or in a second orientation at about 90° to said first orientation in which said third arcuate groove grasps said U-shaped member.

**4,953,372**  
**INEXPENSIVE KEYLESS USER CUSTOM CODED LOCK**  
Walter C. Lovell, 348 Mountain Rd., Wilbraham, Mass. 01095, and Robert L. Nathans, 36 Stag Dr., Billerica, Mass. 01821  
Filed Sep. 22, 1988, Ser. No. 247,675  
Int. Cl.<sup>5</sup> E05B 65/00

U.S. Cl. 70—89

14 Claims



1. A method of enabling user customization of a combination code of a lock comprising the steps of:  
(a) providing a lock for preventing relative movement between a first component and a second component including:  
(a-1) first and second anchor means to be fastened to said first and second component respectively, said second anchor means including an apertured member having an upper portion and a lower portion, together with aperture means formed therethrough, and a movable cover plate means;  
(a-2) cover plate coupling means for coupling said cover plate means to said first anchor means;  
(a-3) a plurality of individually rotatable coding elements extending through said cover plate means and said aperture means and each having an angular position indicating element coupled thereto via a slip coupling means, and each rotatable coding element having a blocking member coupled thereto and positioned beneath the lower portion of said apertured member when said lock is locked, and wherein said aperture means includes a passageway associated with each of said rotatable coding elements for permitting each of said blocking members to completely pass through an associated passageway upon the proper angular settings of each of said rotatable coding elements required to open said lock;  
(b) positioning said cover plate means with respect to said second anchor means for causing said blocking members to co-act with said second anchor means to prevent rotation of said rotatable coding elements;  
(c) selectively rotating each angular position indicating element, in accordance with a user created combination code, relative to an associated coding element by virtue of said slip coupling and a reaction torque produced by each blocking member co-acting with said second anchor means, while maintaining said cover plate means in the position set forth in paragraph (b);  
(d) lowering said cover plate means to position each blocking member beneath said apertured member of said second anchor means; and  
(e) rotating each angular position indicating element causing each blocking member to be displaced from its associated passageway to lock said lock.

- A. moving said movable jaw to an initial position in spaced adjacent relation to said fixed jaw;
- B. introducing said base tube (23) from the input end of the machine through fixed jaw (3) and into contact with said stop of said movable jaw (4);
- C. closing said jaws (3, 4) to clamp and hold said base tube in said stationary nonrotating position;
- D. moving said cutting means (1) down to a cutting position in said space (23) between said fixed and movable jaws (3, 4) and cutting said base tube at a predetermined position in relation to the fixed and movable jaws to create a front end on said base tube and a cutoff tube piece (24) having a rear end adjacent said front end of said base tube;
- E. moving only said movable jaw (4) together with said cutoff tube piece (24) still clamped therein, axially a predetermined distance away from said fixed jaw (3) to create a work space and maintaining said base tube (23) and said cutoff tube piece (24) in coaxial relation with respect to each other while moving said cutting means (1) out of said cutting position;
- F. moving said double acting metal working means (2) into said work space between said front end of said base tube (23) and said rear end of said cutoff tube piece (24);
- G. actuating said metal working means (2) and at the same time moving only said movable jaw (4) axially to place said rear end of the cutoff tube piece into contact with said metal working means (2), and continuing axial movement of only said movable jaw while said tube piece rear end is in contact with said metal working means to force said metal working means to move axially into contact with



said front end of said base tube (23) to cause both of said front and rear tube ends to be concurrently worked by the metal working means;

H. removing said metal working means from said work space; and

I. unclamping said fixed and movable jaws (3, 4, removing said cutoff tube piece (24), and returning said movable jaw to said initial position for commencement of a new cycle of operation.

**4,953,378**  
**APPARATUS FOR CUTTING CORRUGATED STRIP STOCK AT VARIABLE LENGTHS**

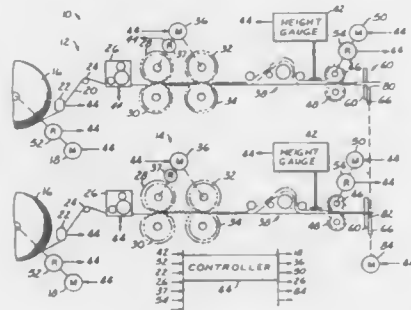
Bernard J. Wallis, 2215 Dacosta, Dearborn, Mich. 48128

Filed Jan. 13, 1989, Ser. No. 296,681

Int. Cl.<sup>5</sup> B21D 53/02

U.S. Cl. 72—185

43 Claims



1. In a machine for corrugating a continuous length of strip stock that includes means for feeding a continuous length of strip stock in a continuous uninterrupted motion, opposed corrugation roller means positioned to receive strip stock therebetween from said feeding means for forming corrugations in said stock, means for cutting said corrugated stock into individual stock lengths, and apparatus positioned to receive corrugated stock from said roller means in said continuous uninterrupted motion for periodically arresting motion of the stock and for controlling lengths of stock severed by said cutting means comprising:

- a measurement roller having teeth positioned to engage corrugations in said corrugated stock between said roller means and said cutting means,
- means responsive to rotation of said measurement roller for measuring running length of corrugated stock fed to said cutting means,
- a motor coupled to said measurement roller for selectively driving corrugated stock engaged by said roller toward said cutting means,

means responsive to said measuring means for simultaneously energizing said cutting means and de-energizing said motor when said running length equals a predetermined length so as to arrest motion of said corrugated stock when said cutting means is activated, and slack take-up means positioned between said roller means and said measurement gear for taking up slack in said corrugated stock fed through said roller means in said continuous uninterrupted motion while motion of said corrugated stock is arrested at said measurement roller.

**4,953,379**  
**HOT-ROLLED STEEL BAR WITH HELICALLY EXTENDING RIBS, METHOD OF AND APPARATUS FOR PRODUCING THE STEEL BAR**

Erich Richtarz, Grafing B. Manlich, Fed. Rep. of Germany, assignor to Dyckerhoff & Widmann Aktiengesellschaft

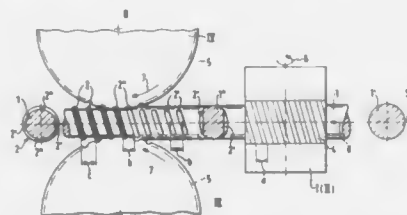
Filed Oct. 25, 1988, Ser. No. 262,454

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1987, 3736942

Int. Cl.<sup>5</sup> B21H 3/00

U.S. Cl. 72—187

5 Claims



1. A method of producing an axially elongated threaded steel bar, such as a concrete reinforcing bar, from a steel bar with a circular cross section comprising the steps of producing a continuous uninterrupted thread in a hot rolling operation, wherein initially hot rolling first ribs on a partial circumferential region on opposite sides of a bar with the ribs spaced apart in the circumferential direction and extending along a helical line, and immediately following formation of the first ribs hot-rolling second ribs extending along the helical line between and interconnecting the first ribs on opposite sides of the bar for providing a continuous helically extending thread made up of the first and second ribs, the hot rolling of the first and second ribs immediately follows the hot rolling of the steel bar and utilizes the rolling heat, the first ribs are formed in a first roll stand and the second ribs are formed in a second roll stand and a first axial spacing of the ribs formed in the first roll stand is less than a second axial spacing of the ribs in the second roll stand with the difference in spacing produced by the amount of extension of the steel bar in passing through the first roll stand to the second roll stand, and the second spacing is less than a final spacing of the ribs after exiting from the second roll stand by the amount of the extension of the steel bar due to its passage through the second roll stand, feeding the circular steel bar for forming the first ribs and shaping the circular steel bar so that it has an oval shape after the formation of the first ribs, and reshaping the steel bar in forming the second ribs so that the steel bar has a circular cross section after the formation of the second ribs with the first and second ribs forming the continuous thread.

**4,953,380**  
**DEVICE FOR GUIDING ROLLING MATERIAL IN A ROLLING MILL STAND OF A STRUCTURAL MILL**

Alexander Svagr, Hilden, Fed. Rep. of Germany, assignor to SMS Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Jun. 29, 1989, Ser. No. 373,800

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1988, 3821929

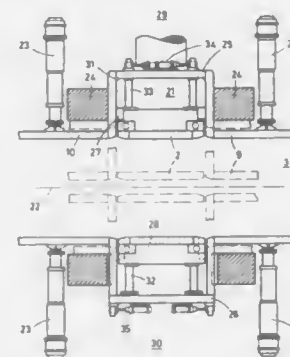
Int. Cl.<sup>5</sup> B21B 39/14

U.S. Cl. 72—250

10 Claims

1. A device for guiding rolling stock in a flange edging roll stand of a shape steel rolling mill, the roll stand being within a reversing tandem group including a first universal stand, an edging stand and a second universal stand, the device comprising lateral flange guides 6 constructed of three parts including a center flange guide piece arranged in an area of a stand window 21 of the roll stand 3 or in an area of roll chocks 17, 18 arranged in the stand window 21, respectively, so as to be exchangeable and displaceable, and two outer flange guide

elements 9, 10 arranged on a side of the stand, and further comprising hydraulically actuable adjusting means 23 connected with the outer flange guide elements 9, 10 of a flange



guide on the stand side, the outer flange guide elements 9, 10 being lockable with a respective flange guide piece 8 so as to form a guide surface.

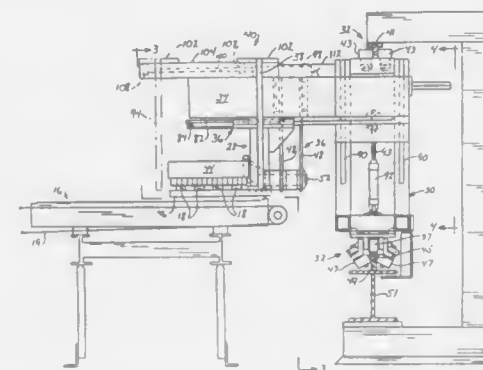
**4,953,381**  
**EXTRUSION PULLER WITH STRIPPER FINGER**  
James T. Visser, Ada, Mich., assignor to Granco Clark, Inc., Belding, Mich.

Filed Nov. 16, 1989, Ser. No. 438,574

Int. Cl.<sup>5</sup> B21C 35/02

U.S. Cl. 72—257

12 Claims



1. An extrusion pulling apparatus comprising: an extrusion run-out table, having a longitudinal axis and a cooling table adjacent to the longitudinal axis; an extrusion puller having a support frame, an upper jaw which is mounted for reciprocal vertical movement between clamping and release positions on the support frame, and a lower jaw which is mounted for reciprocal lateral movement between clamping and release positions on the support frame; means mounting said puller for movement along the run-out table between a loading position and a release position to pull the work along the longitudinal axis as the extrusion puller moves between the loading and release positions; the improvement which comprises: means on the extrusion puller for pushing the work laterally toward the cooling table and from the longitudinal axis when the puller reaches the release position along the run-out table.

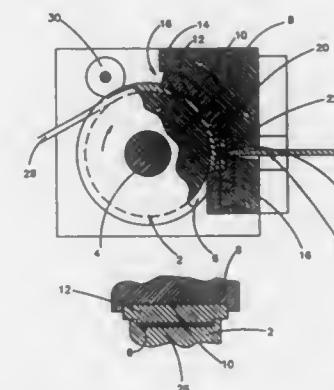
**4,953,382**  
**EXTRUSION OF STRIP MATERIAL**  
Sankaranarayanan Ashok, Bethany; Harvey P. Cheskis, North Haven, and Eugene Shapiro, Hamden, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Dec. 8, 1989, Ser. No. 447,762

Int. Cl.<sup>5</sup> B21C 23/01, 25/02

U.S. Cl. 72—262

8 Claims



1. A process for forming metal shapes having a substantially larger width than height in cross section, said process comprising:

- a. feeding material in elongated strip form into one end of a passageway formed between a first member and a second member, said strip having a substantially larger width than height in cross section, said first member having a greater surface area for engaging said metal than said second member, said passageway having a closed end remote from said one end and having die means adjacent said closed end, said die means having an opening of predetermined configuration which has a greater overall width than height, and
- b. moving said first member relative to said second member in a direction toward said die means from said one end to said closed end so that the frictional drag of the passageway defining surface of the first member draws the metal through the passageway and through the die means.

**4,953,383**  
**CRIMPING DEVICE, ADJUSTING RING THEREFOR**  
C. Edward Stiver; George J. Teti, both of Ocala, Fla.; Charles S. Pearson, Waynesville, N.C., and Kenneth R. Brown, Silver Springs, Fla., assignors to Dayco Products, Inc., Dayton, Ohio

Division of Ser. No. 150,263, Jan. 29, 1988, Pat. No. 4,862,725.

This application Jun. 14, 1989, Ser. No. 366,083

The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.

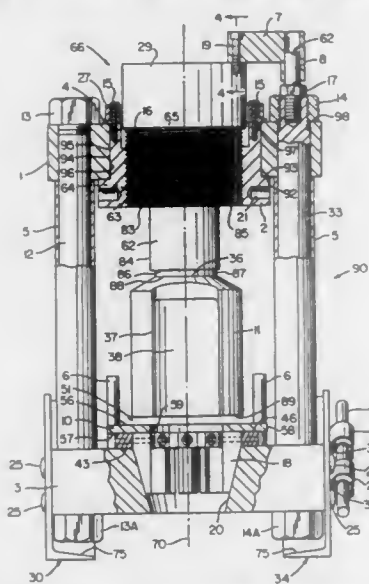
Int. Cl.<sup>5</sup> B21D 41/04, 39/04

U.S. Cl. 72—402

20 Claims

1. In a device for crimping a coupling to an end of a hose, said device comprising support means, die means carried by said support means for holding said hose end and said coupling, and crimping means carried by said support means and spaced apart from said die means a certain distance and in axial alignment therewith and comprising a cylinder member having a stop means and a piston member carried by said cylinder member adapted to be moved axially relative to said cylinder member into engagement with said die means to axially move said die means therewith until a part of said piston member abuts said stop means, the improvement comprising adjusting means carried by said support means and being operatively interconnected to said cylinder member of said crimping means for adjusting the entire axial position of said crimping means relative to said die means to change said certain distance to a new certain distance whereby when said piston member of said

crimping means is moved into engagement with said stop means said coupling is crimped to said hose end by said die means in accordance with a predetermined relationship that is determined by said new certain distance, said adjusting means comprising a calibration ring means, said calibration ring



means having an outer periphery and a first scale means disposed on said outer periphery of said ring means, said adjusting means comprising a second calibration means disposed in linear relationship with said cylinder member and said support means.

4,953,384

## MAGAZINE-TYPE WIRING ACCESSORY CRIMPING TOOL

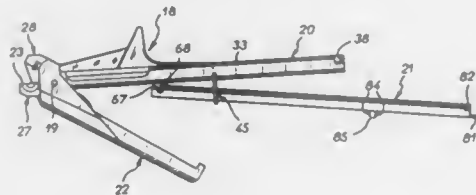
Alain Baillet, Montville; Francois Loisel, Maromme, and Daniel Paulin, Bosc Le Hard, all of France, assignors to Legrand, Limoges Cedex, France

Filed Feb. 3, 1989, Ser. No. 305,638

Claims priority, application France, Feb. 5, 1988, 88 01355  
Int. Cl.<sup>5</sup> B25B 27/14; H01R 43/042

U.S. Cl. 72—410

31 Claims



1. Magazine-type wiring accessory crimping tool comprising two handles articulated to each other, one of said handles

defining a magazine removably receiving a dispenser, said dispenser accommodating a plurality of wiring accessories disposed parallel to one another, said dispenser being insertable into said magazine for loading the plurality of wiring accessories thereto, access means through said magazine for providing direct access to wiring accessories in said dispenser to advance the same towards crimping means, said crimping means being defined on a first of said handles for forming at least one crimping deformation in a wiring accessory in position between said handles when squeezed together, the other of said handles being the first handle, said crimping means comprising a crimping blade, said one handle including a crosspiece aligned when the handles are squeezed together with said crimping blade, said crosspiece being adapted to withstand crimping force applied by said crimping blade, said handles crossing each other at an articulation zone where the handles are articulated to each other, free ends of said handles being adjacent said articulation zone, and constituting respective jaws, and the jaw on said one handle incorporating said crosspiece and the jaw on said other handle incorporating said crimping blade.

4,953,385

## INFORMATION STORAGE STAMPER AND METHOD OF MANUFACTURING DISKS USING THE SAME

Masaki Aoki, Minou; Hideo Torii, Higashiosaka; Kiyoshi Kuribayashi, Neyagawa; Hideto Monji, Katano; Makoto Umetani, Hirakata, and Eiji Fujii, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Filed Aug. 22, 1989, Ser. No. 396,622

Claims priority, application Japan, Aug. 22, 1988, 63-207660;  
Nov. 18, 1988, 63-292685

Int. Cl.<sup>5</sup> B21D 37/01

U.S. Cl. 72—462

8 Claims



1. An information storage disk stamper-comprising a mother disk comprising, a cemented carbide alloy containing a tungsten carbide (WC) or a chromium carbide (Cr<sub>3</sub>C<sub>2</sub>) or a cermet, and an iridium (Ir) alloy film coated on said mother disk and having formed thereon guide grooves for tracking servo.

4,953,386

## METHOD AND APPARATUS FOR PROVING ELECTRONIC GAS METERS

Arthur N. J. Pearman, St. Paul; Gerald D. Hunter, Lino Lakes; Robert E. Gilman, St. Michael; Michael A. Woessner, Golden Valley, and Daniel T. Lyden, Minneapolis, all of Minn., assignors to Gas Research Institute, Chicago, Ill.  
Continuation of Ser. No. 255,771, Oct. 11, 1988, abandoned.  
This application Nov. 13, 1989, Ser. No. 434,595

Int. Cl.<sup>5</sup> G01F 25/00

U.S. Cl. 73—3

12 Claims

1. A method for proof testing of an electronic gaseous fluid flow meter including a solid state fluid flow sensor and a signal processing circuit, the flow sensor of the meter providing a signal output indicative of fluid flow measured thereby, the signal processing circuit of the meter including timing means for generating periodically recurring timing signals defining sampling intervals for the meter, sampling means which samples the signal output of the fluid flow sensor during the sampling intervals to obtain flow measurement data representing the volume of fluid that has been passed through the meter, and memory means for storing the flow measurement data, the method comprising the steps of:

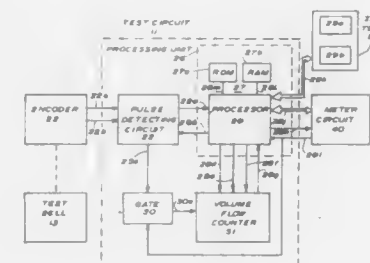
supplying to the meter under test a volume of a gaseous test fluid using a volume measurement standard apparatus;

generating an enabling signal for the signal processing circuit of the meter under test to cause the sampling means to start sampling the signal output of the fluid flow sensor during sampling intervals defined by the timing means and accumulating in the memory means of the meter measurement data representing the volume of test fluid measured by the meter in response to fluid flow through the meter during the sampling intervals;

generating a plurality of electrical pulses, the number of pulses generated being indicative of the actual volume of the test fluid which is passed through the meter during the test;

causing the signal processing circuit of the meter to enable a pulse counter to start registering the electrical pulses at the start of the first sampling interval during which the signal processing circuit of the meters starts sampling the signal output of the fluid flow sensor;

monitoring the pulse counter to determine when a pre-



selected number of pulses has been registered by the pulse counter, the preselected number of pulses being indicative of a preselected volume of test fluid having been passed through the meter under test;

causing the meter to stop conducting fluid flow measurements when said preselected number of pulses has been registered by the pulse counter;

causing the signal processing circuit of the meter to disable the pulse counter at the start of the first sampling interval after the pulse counter registers said preselected number of pulses; and

correlating measurement data stored in the memory means of the meter indicative of the volume of test fluid which is measured by the meter during the test with data representing the count registered by the pulse counter indicative of the actual volume of the test fluid passed through the meter during the test for proving the operation of the meter.

4,953,387

## ULTRATHIN-FILM GAS DETECTOR

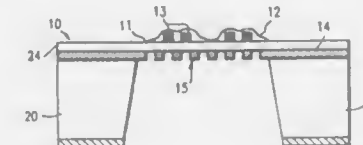
Christy L. Johnson; Johannes Schwank, and Kensall D. Wise, all of Ann Arbor, Mich., assignors to The Regents of the University of Michigan, Ann Arbor, Mich.

Filed Jul. 31, 1989, Ser. No. 386,713

Int. Cl.<sup>5</sup> G01N 27/12

U.S. Cl. 73—25.03

27 Claims



1. A device for detecting a gaseous species, comprising:

(i) a substrate having two opposed major surfaces and including a dielectric window region;

(ii) heater means situated on said dielectric window region on one of said opposed surfaces; and

(iii) a conductivity cell electrode means/thin transducing metal film assembly situated on said dielectric window region on the other of said opposed surfaces;

wherein:

said thin transducing metal film contacts said conductivity cell electrode means;

said heater means heats said thin transducing film; and

said conductivity cell electrode means senses the conductivity and capacitance of said thin transducing film.

4,953,388

## AIR GAUGE SENSOR

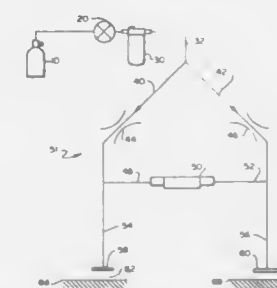
Andrew H. Barada, New Canaan, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Jan. 25, 1989, Ser. No. 301,088

Int. Cl.<sup>5</sup> G01B 13/12

U.S. Cl. 73—37.5

1 Claim



1. An air gauge sensor having low volumetric air flow resulting in minimum influence on particulate contamination on a surface for detecting an air gap between two surfaces comprising:

an air supply;

regulator means, associated with said air supply, for regulating the air pressure supplied by said air supply;

a filter through which air from said air supply flows;

a conduit attached to one end of said filter;

a junction dividing said conduit into a reference channel and a measurement channel;

a restrictor placed in each of said reference and measurement channels, said restrictors each having an orifice substantially the same size;

a reference probe at the distal end of said reference channel forming a predetermined reference gap with a reference surface whereby air is released from said reference channel through the reference gap;

a measurement probe at the distal end of said measurement channel forming a gap with a surface whereby air is released from said measurement channel through the gap; and

mass air flow sensor means, coupled between said reference and measurement channels, for sensing the mass air flow therebetween, whereby there will be no mass air flow between said channels when said reference gap is equal to the gap.

4,953,389

## CAPTIVE BUBBLE SURFACE TENSIO METER

Samuel Schurch, Calgary, Canada, assignor to University of Calgary, Calgary, Canada

Filed Oct. 17, 1989, Ser. No. 322,547

Claims priority, application Canada, May 2, 1989, 599518

Int. Cl.<sup>5</sup> G01N 13/02

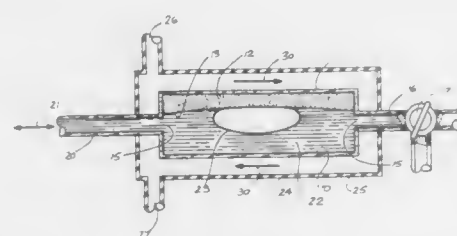
U.S. Cl. 73—64.4

42 Claims

1. A method of determining the interface tension between a gas and a liquid comprising the steps of providing a liquid



medium in a chamber, injecting a bubble of the gas into the liquid medium, increasing and decreasing the pressure of the



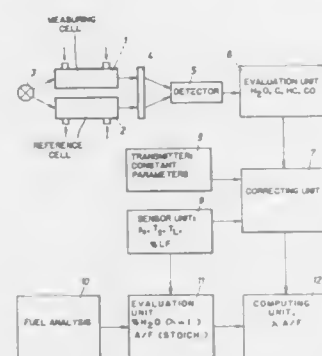
liquid medium within the chamber to reduce and expand said bubble, and determining the surface tension of the gas-liquid interface from the shape of said bubble.

#### 4,953,390 METHOD AND A DEVICE FOR MEASURING THE AIR/FUEL RATIO OF AN INTERNAL COMBUSTION ENGINE

Peter W. Krempl, Ragnitz; Wolfgang Schindler, Graz, and Erich J. Schiefer, Selzthal, all of Austria, assignors to AVL Gesellschaft für Verbrennungskraftmaschinen und Messtechnik M.B.H. Prof.Dr.Dr.h.c Hans List, Graz, Austria  
Filed May 15, 1989, Ser. No. 351,215  
Claims priority, application Austria, May 17, 1988, 1289/88  
Int. Cl.<sup>5</sup> G01M 15/00

U.S. Cl. 73—116

25 Claims



1. A method of measuring the air/fuel ratio ( $\lambda$ ) of an internal combustion engine to which fuel and gas for combustion are supplied and from which an exhaust gas is emitted, comprising the steps of:

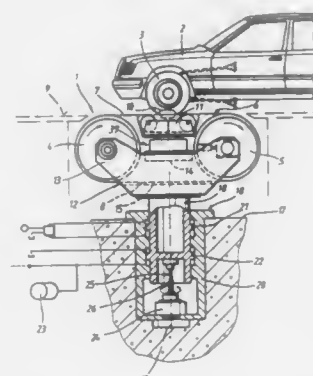
- analyzing the fuel,
- measuring the concentration of water vapor in the exhaust gas,
- measuring the concentration of water vapor in the gas supplied for combustion of said fuel, and
- computing said air/fuel ratio from said concentration values obtained in steps (b) and (c) and from data on the molecular composition of said fuel obtained by the chemical analysis in step (a).

4,953,391  
**FLAT-TRACK UNIT FOR MOTOR VEHICLE TEST BEDS**  
Karl Schober, Weinstadt, and Norbert Schaub, Remseck, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany  
Filed Aug. 30, 1989, Ser. No. 400,732  
Claims priority, application Fed. Rep. of Germany, Sep. 3, 1988, 3830350

Int. Cl.<sup>5</sup> G01M 15/00

U.S. Cl. 73—117

19 Claims



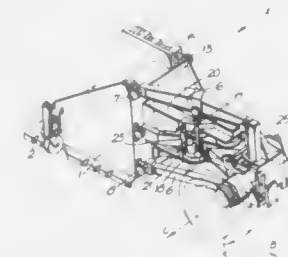
- A flat-track unit for motor vehicle test beds, comprising: a roadway-simulating belt which is guided over two rollers for accommodating a vehicle wheel on a top on its upper side; the top of the upper side of the belt is orientated roughly horizontally at ground level and is supported in a sliding or rolling manner at a wheel contact region by a supporting shoe; the two rollers are mounted in a frame which is supported in a vertically floating manner and is mechanically guided in the vertical direction; excitement means are provided to develop vertical oscillations in the frame; the excitement means including a vertically orientated hydraulic cylinder and a cylinder housing locating roughly in line with wheel contact region; one of the two rollers is connected via a universal-joint shaft to a drive and braking unit which is arranged to be vertically immovable and is spaced at a distance from the frame; the drive and braking unit is provided with an output shaft which is aligned with a roller axis of the one roller; wherein the hydraulic cylinder of the excitement means is firmly secured on a foundation to resist tilting and rotation and has a piston and piston rod rigidly connected to the frame in terms of rotation and tilting to act as a mechanical vertical guide for the frame; said piston being rotatable together with the cylinder housing forming a pivot bearing for pivoting the frame about a vertical axis; a pivot drive means for pivoting the piston rod and its rigidly connected frame about the vertical axis; wherein said universal-joint shaft between the one roller and the drive and braking unit is provided with length-compensation means having a diameter corresponding to a multiple of the diameter of corresponding to a multiple of the diameter of the universal-joint shaft; wherein the drive and braking unit is attached to a drivable slide which is displaceable along a circular arc-shaped horizontal guide running concentrically to the vertical axis; and wherein there is a drivable slide means for displacing the drivable slide as a function of a deflection angle of the universal-joint shaft to position the universal-joint shaft into a straightened position between the drivable slide and the one roller.

4,953,392  
**TIRE TEST MACHINE**  
Clifford W. Barson, Staffs, Great Britain, assignor to Sumitomo Rubber Industries, Limited, Hyogo, Japan  
Filed Oct. 19, 1989, Ser. No. 424,341  
Claims priority, application United Kingdom, Nov. 9, 1988, 8826217

Int. Cl.<sup>5</sup> G01M 17/02

U.S. Cl. 73—146

6 Claims



- A tire test machine involving a moving road surface and a tire and wheel suspension system, which comprises a pair of triangular upper and lower main suspension frames, each lying substantially in a horizontal plane and having a first long side extending substantially in the direction of movement of the road surface, one end of the first long side of each frame being mounted at one corner to a fixed machine frame by a pivot bearing and the other ends of each of the first long sides being pivotally connected to the upper and lower ends respectively of a vertically extending axle support; a wheel bearing assembly mounted to the axle support such that in the mid portion, the wheel axis is substantially perpendicular to the direction of movement of the road and the long sides of the two parallel main suspension frames, vehicle load applying means acting between one of the first long sides and the machine frame to apply a vertical load, an upper actuator disposed between the third corner of the upper main frame and the machine frame to apply a horizontal movement to said third corner in a direction parallel to the first side, a lower actuator acting parallel to the first actuator to apply a horizontal movement to the third corner of the lower machine frame, and a steering means connected to the wheel hub to cause rotation about the axle support such that the upper and lower actuators act together to provide tire lateral movement proportional to the average movement of the actuators and camber movement proportional to the difference of the said movements.

4,953,393  
**TRANSDUCER**  
Philip E. Galasko, Sandton, and Frans J. Kruger, Pretoria, both of South Africa, assignors to Philip Elliot Galasko, Sandton, South Africa  
Filed Jul. 2, 1987, Ser. No. 69,309

Claims priority, application South Africa, Jul. 4, 1986, 86/4988; Dec. 23, 1986, 86/9672

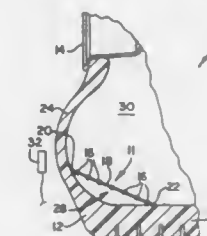
Int. Cl.<sup>5</sup> B60C 23/02; G01L 9/12

U.S. Cl. 73—146.5

26 Claims

- A passive electrically operable monitoring means for use with a transducer for monitoring a physical parameter, the monitoring means having an inherent resistance and a characteristic capacitance and inductance only, the characteristic

capacitance and inductance being responsive to variations in the physical parameter such that the monitoring means has a

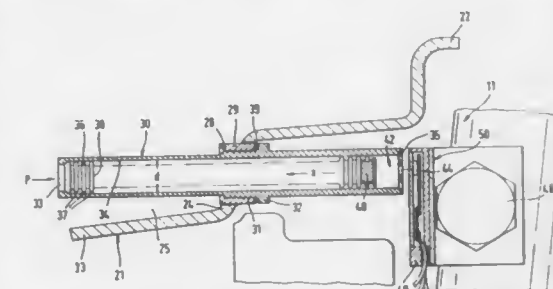


natural frequency of oscillation that varies in accordance with variations in the physical parameter.

4,953,394  
**DEVICE AND PROCESS FOR CONTROLLING AIR  
PRESSURE IN TIRES**  
Horst Franke, Aalen, and Hans-Jörg Schmid, Aalen-Essingen, both of Fed. Rep. of Germany, assignors to Alligator Ventilfabrik GmbH, Giengen/Brenz, Fed. Rep. of Germany  
Filed Oct. 7, 1988, Ser. No. 255,036  
Claims priority, application Fed. Rep. of Germany, Oct. 8, 1987, 3734053; Aug. 12, 1988, 3827354  
Int. Cl.<sup>5</sup> B60C 23/02

U.S. Cl. 73—146.5

21 Claims



- Apparatus for monitoring the air pressure in a pneumatic tire carried by the rim of a vehicle wheel which comprises: a pneumatic tire having a tire air space; a vehicle wheel having a rim carrying said tire along an axis; a sensing element arranged at the rim which can be deformed and acted upon by tire pressure; a permanent magnet as a measurement value generator connected to the sensing element; a measurement value sensor in operative relationship to the permanent magnet arranged in the region of rotary movement of the wheel and fixed to the vehicle in a stationary position; an evaluation circuit connected to the measurement value sensor; wherein the sensing element is in the form of a bellows mounted with a substantially axis-parallel direction of movement; and wherein the permanent magnet which is connected to the sensing element is displaceable in axis-parallel relationship at the outside of the tire in dependence on the tire pressure, wherein at normal tire pressure the permanent magnet remains in a position close to the measurement value sensor with a greater spacing therebetween at reduced tire pressure, said apparatus including an attachment housing on the rim with said bellows projecting from said attachment housing into the tire air space, a bistable rocker member for moving said permanent magnet and an axial rod connecting said bellows with said rocker member, wherein said permanent magnet is mounted in axis-parallel relationship.



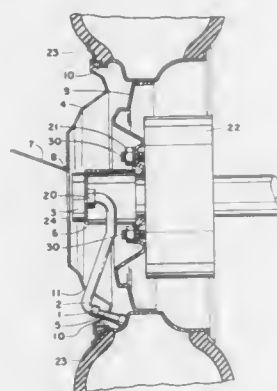
4,953,395

## TIRE PRESSURE INDICATOR

James E. Jard, 506 W. Holly Rd., Virginia Beach, Va. 23451  
Continuation-in-part of Ser. No. 206,666, Jun. 15, 1988,  
abandoned. This application Jan. 24, 1990, Ser. No. 471,665  
Int. Cl.<sup>5</sup> B60C 73/02

U.S. Cl. 73—146.8

11 Claims



1. An air pressure measuring device for measuring the pressure of pneumatic tires mounted on lug bolt-mounted tire rims, comprising:

- an air pressure gauge;
- a gauge mounting member;
- means for attaching said gauge to said gauge mounting member;
- means for attaching said gauge mounting member to said lug bolts;
- a pneumatic conduit, said pneumatic conduit being in communication with said air pressure gauge at one end and means for attaching the other end of said conduit to a valve stem of said pneumatic tire;
- said gauge being disposed approximately at the centerline of said tire rim;
- said means for attaching said gauge mounting member to said lug bolts comprising at least two threaded nuts;
- said means for attaching said pneumatic conduit to said valve stem comprising a threaded female fitting;
- a wheel rim covering member attachable to said tire rim by which said threaded nuts are enclosed between said wheel rim covering member and said tire rim;
- a first opening disposed in the center of said wheel rim covering member through which said air pressure gauge is visible;
- a second opening in said wheel rim covering member through which said pneumatic conduit passes;
- and means for temporarily closing said first opening in said wheel rim covering member, comprising a door pivotally attached to said wheel rim covering member.

4,953,396

## LEAK DETECTOR FOR CONTAINERS

John W. Langsdorf, Crystal, and Tina O. Outlaw, Inver Grove Heights, both of Minn., assignors to General Mills, Inc., Minneapolis, Minn.

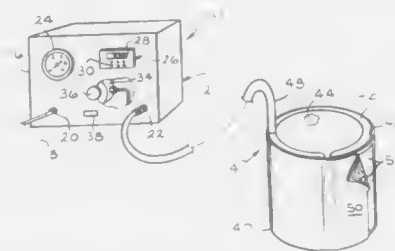
Filed Aug. 18, 1989, Ser. No. 395,832  
Int. Cl.<sup>5</sup> G01M 3/32

U.S. Cl. 73—49.3

16 Claims

1. A leak detection apparatus for a container comprising, in combination,
- regulator means for providing air at a pressure of less than about 500 mm Hg,
  - timing means for providing an adjustable cycle time,
  - a valve means having an inlet port in fluid communication with said regulator means for providing air, a vent port to atmosphere, a common port outlet and an operator coupled to said timing means for alternately and exclusively

placing said common port in fluid communication with said inlet and said vent, and  
a shroud for receiving a container to be tested, said shroud



including releasable means for securing said shroud about said container, at least one inflatable air chamber and means for providing fluid communication between said air chamber and said outlet of said valve means.

4,953,397

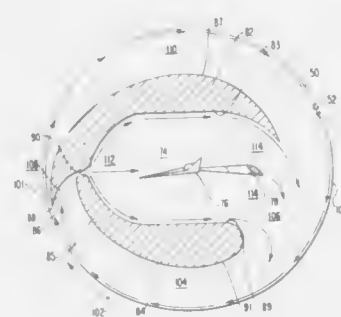
## CONTINUOUS FLOW HYPERSONIC CENTRIFUGAL WIND TUNNEL

Robert L. Burton, Salem, Va., assignor to The Boeing Company, Seattle, Wash.

Filed Jul. 25, 1989, Ser. No. 384,638  
Int. Cl.<sup>5</sup> G01M 9/00

U.S. Cl. 73—147

17 Claims



1. A wind tunnel for testing an aerodynamic surface, said tunnel comprising:
- rotor means defining a cylindrical cavity for circulating a gas around the periphery of said cavity;
  - first and second elements each having inner and outer surfaces extending between a nozzle end and an exhaust end of said wind tunnel, said elements being mounted in opposed relation in said cavity, the inner surfaces of said elements cooperating to define a nozzle, a test region and an exhaust region;
  - means disposed proximate said nozzle for diverting a predetermined portion of said circulating gas through said nozzle, test region, and exhaust region, the exhaust region being open to said cavity to permit the diverted gas to rejoin the circulating gas; and
  - means for mounting said aerodynamic surface in said test region.

4,953,398

## METHOD AND APPARATUS FOR DETECTING ACOUSTIC VIBRATIONS IN A BOREHOLE

Jean-Pierre Masson, Richmond, Tex.; Jacky Bourseul, Saclay, and Claude Fierfort, Lozere, both of France, assignors to Schlumberger Technology Corp., New York, N.Y.

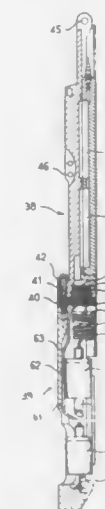
Filed Oct. 19, 1988, Ser. No. 260,088

Claims priority, application France, Oct. 27, 1987, 87 14812

Int. Cl.<sup>5</sup> E21B 47/00

U.S. Cl. 73—151

18 Claims



18. A resilient suspension for an acoustic vibration detector placed in a fluid, comprising two helical portions in endwise arrangement having reversed directions of winding, said portions having the same length, said portions being made of a tubular wire capable of withstanding pressure and having routed therein an electrical conductor provided for connection to the detector.

4,953,399

## METHOD AND APPARATUS FOR DETERMINING CHARACTERISTICS OF CLAY-BEARING FORMATIONS

Walter H. Fertl, and Ashok K. Sinha, both of Houston, Tex., assignors to Western Atlas International, Inc., Houston, Tex.  
Continuation of Ser. No. 177,941, Apr. 6, 1988, abandoned, which is a continuation of Ser. No. 829,340, Feb. 14, 1986, Pat. No. 4,756,189, which is a continuation-in-part of Ser. No. 416,826, Sep. 13, 1982, Pat. No. 4,594,887. This application May 16, 1989, Ser. No. 353,221

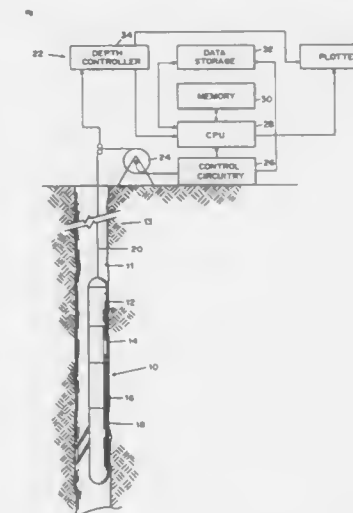
Int. Cl.<sup>5</sup> E21B 49/00

U.S. Cl. 73—152

10 Claims

1. A method of determining the relative percentages of a plurality of three known different types of clay groups present in a subsurface shaly sand formation, comprising the steps of:
- determining a plurality of log derived characteristics of the shaly sand formation;
  - determining the total volume of clay including all of the plurality of known different types of clay groups contained within the shaly sand formation in response to said log derived characteristics of said shaly sand formation;
  - determining a hydrogen index value for said total volume of clay;
  - determining a cation exchange capacity value for said total volume of clay;
  - establishing a hydrogen index value solely related to each of the plurality of known clay groups present in said volume of clay in response to said log derived characteristics of said shaly sand formation, said total volume of clay and said hydrogen index therefor;
  - establishing a cation exchange capacity value solely related to each of the plurality of known clay groups present in

said volume of clay in response to said log derived characteristics of said shaly sand formation, said total volume of clay and said cation exchange capacity therefor;  
establishing a parameter for each of the plurality of known clay groups directly related to said established hydrogen index and cation exchange capacity values established therefor;



- establishing a clay group reference comprising said parameters established for each of the plurality of known clay groups; and  
comparing said hydrogen index and cation exchange capacity values determined for the total volume of clay with said established clay group reference for determining the relative percentage of each of the plurality of known different types of clay groups.

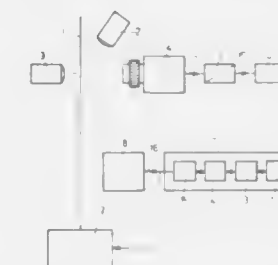
4,953,400

## METHOD OF MEASURING THE YARN DENSITY OF A WOVEN FABRIC OR THE STITCH DENSITY OF A KNIT FABRIC FOR READJUSTING THE PRODUCTION MACHINE IN QUESTION

Filip O. P. Bossuyt, Kortrijk, Belgium, assignor to "Wetenschappelijk en Technisch Centrum van de Belgische Textiel-nijverheid", afgekort tot "Centexbel", Brussels, Belgium  
Continuation-in-part of Ser. No. 152,364, Feb. 4, 1988, abandoned. This application Aug. 15, 1989, Ser. No. 394,270  
Claims priority, application Belgium, Feb. 5, 1987, 08700088  
Int. Cl.<sup>5</sup> G01B 11/00; D03D 51/00

U.S. Cl. 73—159

30 Claims



1. A method of measuring the yarn density of a woven fabric comprising:
- recording a video image of the woven fabric to be examined by means of a video camera, converting the video image by an analog-to-digital converter into digital video data, storing the digital video data in a digital image memory,

retrieving and passing the digital image memory data to a central processing unit and converting said data by said central processing unit into the yarn density whereby said converting by said central processing unit comprises converting said digital image memory data by a digital band filter with a central circle frequency  $\omega_0$  which digital band filter is arranged in such a manner that it operates according to the formula:

$$Y_k = A_m X_k - m + A_{m-1} X_{k-1} - m + 1 + \dots + A_0 X_k - B_1 Y_{k-1} - B_2 Y_{k-2} - \dots - B_n Y_{k-n}$$

wherein:

$X_k$  represents a series of points of the digital information characteristic at interspace T before the digital filtering;  $Y_k$  represents the said series of points k of the filtered digital information characteristic via digital filtering at the same interspace T; the coefficients A and B are a function of the quality Q, the central circle frequency  $\omega_0$  and the interspace T, the converting by said digital band filter being followed by a computation proper of the yarn density from the data converted by said filter.

9. An apparatus for measuring the yarn density of a woven fabric, which comprises:

- a video camera for recording an analog video image of the woven fabric to be examined,
- an analog-to-digital converter for converting the analog video image into digital video data,
- an image memory for storing the digital video data, and
- a processing unit for converting the digital video data into the yarn density, said processing unit comprising a digital filter with central circle frequency  $\omega_0$  and operating according to the formula:

$$Y_k = A_m X_k - m + A_{m-1} X_{k-1} - m + 1 + \dots + A_0 X_k - B_1 Y_{k-1} - B_2 Y_{k-2} - \dots - B_n Y_{k-n}$$

wherein:

$X_k$  represents a series of points of the digital data characteristic at interspace T before the digital filtering;  $Y_k$  represents the said series of points k of the filtered digital data characteristic via digital filtering at the same interspace T; the coefficients A and B are a function of the quality Q, the central circle frequency  $\omega_0$  and the interspace T, and a computer unit for the computation proper of the yarn density from the data converted by said filter.

4,953,401

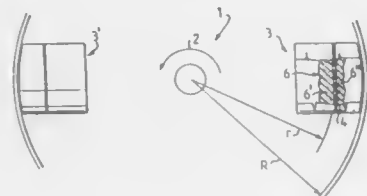
#### METHOD FOR DETERMINING THE QUALITY OF GLUTEN IN WHEAT

Harald Perten, Sonder 14-17, CH-9042 Spelcher, Switzerland  
PCT No. PCT/SE87/00514, § 371 Date Jul. 3, 1989, § 102(e)  
Date Jul. 3, 1989, PCT Pub. No. WO89/04483, PCT Pub.  
Date May 18, 1989

PCT Filed Nov. 3, 1987, Ser. No. 391,523  
Int. Cl. G01N 33/10

U.S. Cl. 73-169

11 Claims



1. A method of determining the quality of gluten in wheat, in which method a gluten sample taken from a wheat dough is placed on a sieve in a centrifuge and centrifuged against the sieve, characterized by determining the extent to which the gluten sample penetrates the sieve under the influence of the

centrifugal force generated and taking this extent of penetration as a measurement of the gluten quality.

4,953,402

#### WIND MEASURING SYSTEM (ANEMORHUMBOMETER)

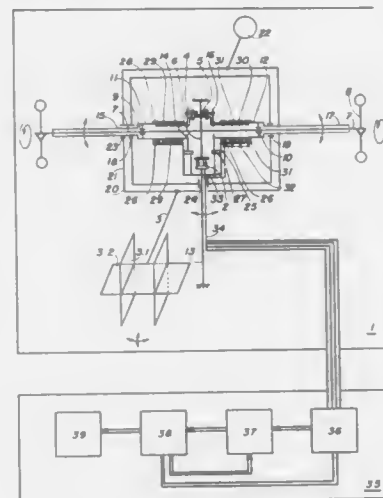
Valentin S. Tersiev, Sofia, Bulgaria, assignor to TK "Orgtehnika", Silistra, Bulgaria

Filed Aug. 16, 1989, Ser. No. 395,122

Claims priority, application Bulgaria, Aug. 16, 1988, 85256  
Int. Cl. G01W 1/02

U.S. Cl. 73-189

6 Claims



1. A wind measuring system comprising a velocity sensor, a horizontal direction sensor and a vertical direction sensor;
- said velocity sensor comprising a reference disk and a first stationary optical sensor, said reference disk being mechanically driven to rotate in a first direction by a velocity component of the wind, said first optical sensor sensing the speed of rotation of said reference disk in said first direction;
- said horizontal direction sensor comprising a second optical sensor movable relative to said reference disk, movement of said second optical sensor being mechanically driven in a direction parallel to said first direction by a horizontal direction component of the wind, said second optical sensor sensing a position relative to said first optical sensor by reference to said reference disk;
- said vertical direction sensor comprising a third optical sensor movable relative to said reference disk, movement of said third optical sensor being mechanically driven in a direction parallel to said first direction by a vertical direction component of the wind, said third optical sensor sensing a position relative to said first optical sensor by reference to said reference disk; and
- circuit means for calculating wind velocity and horizontal and vertical wind direction based respectively on the speed of rotation of the reference disk and the positions of the second and third sensors relative to the first sensor.

4,953,403

#### POSITIVE DISPLACEMENT FLUSHABLE FLOW METER

Carl M. Springer, Barrington, Ill., assignor to Binks Manufacturing Company, Franklin Park, Ill.

Filed Mar. 15, 1989, Ser. No. 324,389

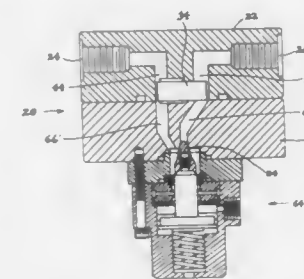
Int. Cl. G01F 3/10, 15/12

U.S. Cl. 73-198

11 Claims

1. A positive displacement flow meter for measuring the

volume flow of liquid coating material delivered to spray coating apparatus and for being flushed clean of coating material by fluidic flushing media, said flow meter comprising a housing having inlet passage means and outlet passage means; means for supplying either liquid coating material at a first volume flow rate and under pressure or fluidic flushing media at a second and greater volume flow rate and under pressure to said inlet passage means; movable liquid flow sensing means intermediate said inlet and outlet passage means for flow through of coating material and flushing media from said inlet to said outlet passage means, said sensing means being moved



in response to and at a rate in accordance with the volume flow rate of coating material or flushing media therethrough and generating an indication of the volumetric flow of coating material flowing therethrough; bypass valve means for selectively shunting a portion of the fluid in said inlet passage means around said flow sensing means to said outlet passage means; and means for operating said bypass valve means so that no fluid is shunted around said flow sensing means when coating material is supplied to said inlet passage means so that a portion of the fluid is shunted around said flow sensing means when flushing media is supplied to said inlet passage means.

4,953,404

#### MECHANISM FOR AN ANEROID BAROMETER

Christian Bouteille; Pascal Blaise; Gabriel Bosson; Emile Mesnier, all of Morteau, and Pierre Vuillemin, Villiers le Lac, all of France, assignors to Altitude S.A., De Gaele, France

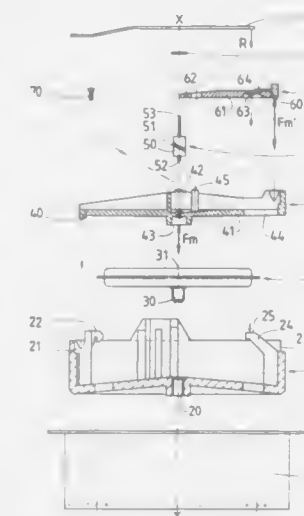
Filed Jun. 13, 1989, Ser. No. 365,419

Claims priority, application France, Jun. 17, 1988, 88 08407

Int. Cl. G01L 7/12

U.S. Cl. 73-387

4 Claims



1. A apparatus that is an aneroid barometer comprising a support which houses means for detecting barometric changes, said means comprised of an aneroid cell fixed to the support, a

primary lever in contact with the cell, the lever being fixably mounted at one end to the support, said end comprising the axis of rotation of the lever, the lever carrying an endless screw integrally attached to the primary lever, said endless screw having means for receiving an end of a secondary lever and said screw having a spindle which carries an indicator needle, a secondary lever contacting the upper end of the primary lever, said secondary lever possessing means for rotating the endless screw, a spring which bears upon the support and the secondary lever and exerting a resisting force upon the secondary lever which transmits it to the primary lever, the combined action of the aneroid cell, primary lever, secondary lever, endless screw, means for receiving an end of the secondary lever, and spring comprising means for converting the deformation of the aneroid cell into angular rotational movement of the indicator needle, said movement being measured by means of a dial, wherein the center (43) of the primary lever (4) is held in contact with the center (31) of the cell (3) by a spring (8), the axis of rotation (40) of this lever being located in a housing (21) at the periphery of the support (2), the free end (41) of the primary lever supporting the axis of rotation (60) of the secondary lever (6) at the level of a notch (23) of the support.

4,953,405

#### ULTRASONIC MEASURING APPARATUS FOR MEASURING A PREDETERMINED BOUNDARY SURFACE INSIDE AN OBJECT

Kazuhiko Hara, Yokohama; Toshiaki Takahashi, Tachikawa, and Masato Nagura, Chofu, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

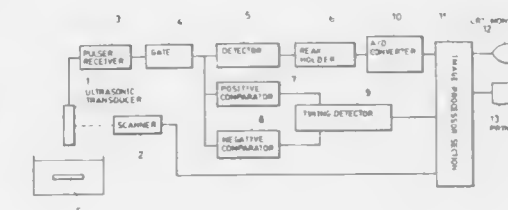
Filed Mar. 28, 1989, Ser. No. 329,814

Claims priority, application Japan, Mar. 29, 1988, 63-77829

Int. Cl. G01N 29/00

U.S. Cl. 73-602

7 Claims



1. An ultrasonic measuring apparatus for measuring a predetermined boundary surface inside an object, comprising: pulse generating means for transmitting an ultrasonic pulse to the object;
- moving means for moving said pulse generating means in two dimensions relative to said object;
- reception means for receiving a reception signal generated when said ultrasonic pulse is reflected by the object;
- means for taking a reflected signal out from the boundary surface, passing the reflected signal through a time gate according to the depth of the boundary surface to be examined inside the object;
- level detection means for detecting a level of a reflected signal from the boundary surface, and producing an output;
- phase detection means, different from said level detection means, for detecting a phase of a reflected signal from the boundary surface, and producing an output;
- means for providing the output from said level detection means with either a positive or a negative sign in accordance with the output from said phase detection means and for outputting the output from said level detection means provided with positive or negative signs as measurement data;
- memory means for storing each measurement data obtained at each measurement position on the boundary surface; and



means for forming and outputting an ultrasonic image of the boundary surface, in two dimensions, in accordance with the data of each measurement position on the boundary surface stored in said memory means.

4,953,406

## RHEOMETER DIE ASSEMBLY

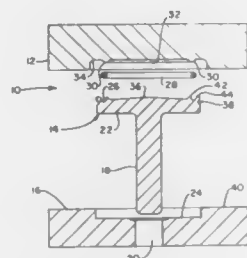
John B. Putman, 4638 Commodore Dr., Stow, Ohio 44224

Filed Oct. 2, 1989, Ser. No. 416,025

Int. Cl.<sup>5</sup> G01N 3/24

U.S. Cl. 73—843

20 Claims



1. A rheometer die assembly, comprising: an upper die having a horizontal surface; a lower die having a horizontal surface; and seal means interposed between said horizontal surfaces of said upper and lower dies for sealing said dies in contacting engagement with each other and defining a cavity therebetween.

4,953,407

## ION-DRAG FLOWMETER

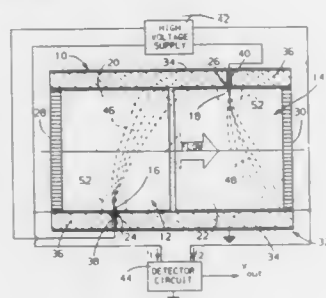
Gerard W. Malaczynski, Bloomfield Hills, and Thaddeus Schroeder, Rochester Hills, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 8, 1988, Ser. No. 229,873

Int. Cl.<sup>5</sup> G01F 1/56

U.S. Cl. 73—861.09

15 Claims



1. In a method for measuring the flow rate of a gas including a variable concentration of polar molecules, the method involving the steps of:

generating a stream of ions that is deflected by the gas flow wherein the amount of deflection is dependent upon the concentration of polar molecules in the gas, and sensing the degree of deflection of the ion stream to provide a measure of the gas flow rate,

an improvement comprising the additional step of:

keeping the ambient electric field sufficiently weak that the deflection of the ion stream is rendered independent of the concentration of polar molecules in the gas.

4,953,408

## CAPACITIVE TYPE ELECTROMAGNETIC FLOWMETER

Eggert Appel, Dransfeld; Wilfried Kiene, Menden; Rudi Kuchemann, Hardeggen; Dieter Meler, Göttingen, and Peter Nissen, Rosdorf, all of Fed. Rep. of Germany, assignors to Fischer &amp; Porter Company, Warminster, Pa.

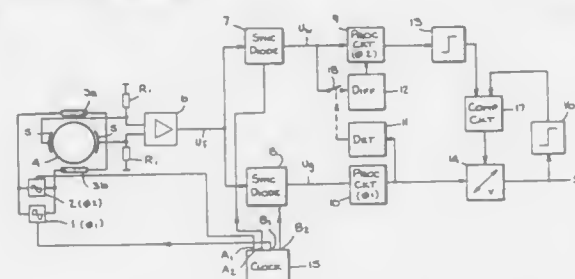
Filed Aug. 30, 1989, Ser. No. 400,558

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1988, 3829564

Int. Cl.<sup>5</sup> G01F 1/60

U.S. Cl. 73—861.16

7 Claims



1. An electromagnetic flowmeter of the capacitive type comprising:

(a) a primary having a flow tube through which a fluid to be metered is conducted to intercept a composite magnetic field produced by a pair of electromagnet coils to induce therein a signal voltage which is picked up by a pair of capacitive electrodes, said composite field being formed by a low-frequency comparison field having a long period and a high-frequency switched field having a short period; and

(b) a secondary including an input amplifier to which said signal voltage from the primary is applied through a high-pass filter, said input amplifier yielding an amplified output voltage originating from the composite field, means to analyze said output voltage to derive therefrom separate components, one originating from the comparison field and the other from the switched field, and means to produce an output signal in accordance with the time phasing of said components after compensating for the signal loss experienced in the filter by the comparison field component by means of a compensation voltage derived from the switched field component.

4,953,409

## NOISE AND OFFSET VOLTAGE-COMPENSATED ELECTROMAGNETIC FLOWMETER

Werner Marcbeuka, Nen-Elchenberg; Karl-Heinz Rackebandt, Adelsbren; Klaus Schäfer, Hann-Münden, and Albert Seebode, Rosdorf, all of Fed. Rep. of Germany, assignors to Fischer &amp; Porter Company, Warminster, Pa.

Filed Aug. 31, 1989, Ser. No. 401,318

Int. Cl.<sup>5</sup> G01F 1/60

U.S. Cl. 73—861.17

7 Claims

1. A flowmeter provided with a primary in which a fluid whose flow rate is to be metered is conducted through a flow tube to intersect a magnetic field established therein by electromagnet coils to induce a voltage therein that is transferred to electrodes to produce an electrode signal that depends on flow rate and includes a noise voltage, and a secondary operatively coupled to the primary, said secondary comprising:

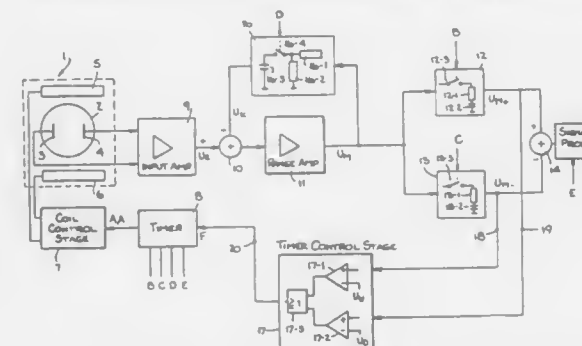
(a) an input amplifier responsive to the electrode signal from the primary;

(b) a summing stage having two inputs, to one of which is applied the output of the input amplifier;

(c) a range amplifier responsive to the output of the summing stage to produce a test signal voltage, said input and range amplifiers having offset voltages produced therein which

together with the primary noise voltage disturb the accuracy of the flowmeter; and

(d) means to derive from the test signal voltage a compensat-



ing voltage which is applied to the other input of a summing stage to effect compensation for said noise and offset voltages when the test signal voltages exceed a predetermined threshold value.

4,953,410

## PRESSURE DISTRIBUTION DETECTING DEVICE

Jun Tabata, Kyoto, Japan, assignor to Murata Manufacturing Co., Ltd., Japan

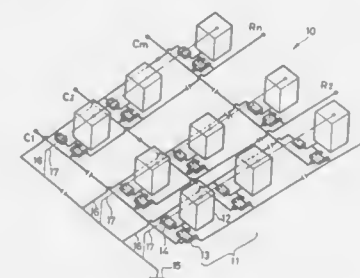
Filed Aug. 25, 1989, Ser. No. 398,741

Claims priority, application Japan, Aug. 25, 1988, 63-211718

Int. Cl.<sup>5</sup> G01L 1/22, 5/16

U.S. Cl. 73—862.04

4 Claims



4. A pressure distribution detecting device, comprising: a plurality of piezo-electric sensor elements arranged in a first direction and a second direction intersecting there-with; each of said piezo-electric sensor elements comprising a piezo-electric element for outputting a voltage corresponding to a pressure change, and switching means connected to said piezo-electric element; a plurality of control lines extending in said first direction for rendering said switching means conductive; a plurality of reading lines extending in said second direction and connected to said switching means for reading an output voltage of said piezo-electric element; selecting means for selecting a piezo-electric element whose output voltage is to be read by controlling said plurality of control lines; and accumulating means for accumulating an output voltage read from a piezo-electric element selected by said selecting means through a reading line; said accumulating means accumulating an increment or decrement of an output voltage in each piezo-electric element.

4,953,411

## ANGULAR BEVEL GEAR DRIVE FOR AGRICULTURAL IMPLEMENTS

Karl Coenen, Siegburg; Michael Flanhardt, Cologne, and Hans-Jürgen Laugen, Frechen, all of Fed. Rep. of Germany, assignors to Jean Walterscheid GmbH, Siegburg, Fed. Rep. of Germany

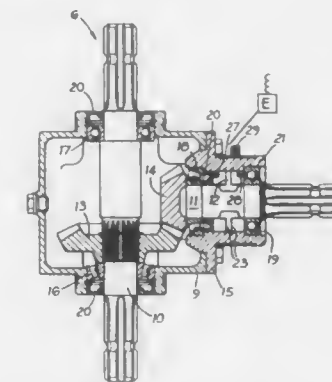
Filed May 8, 1989, Ser. No. 348,818

Claims priority, application Fed. Rep. of Germany, May 18, 1988, 3816828

Int. Cl.<sup>5</sup> G01L 3/10, 3/12

U.S. Cl. 73—862.33

7 Claims



1. An angular bevel gear drive for the drive of, or the drives in, agricultural implements, having an input shaft and at least one output shaft, with the input shaft and/or at least one output shaft being associated with a torque measuring device, wherein the drive comprises a housing, and at least one individual bearing unit for a bevel gear detachably mounted on the housing in which unit a torque measuring device is integrated, the torque measuring device being a measuring device operating in a contact-free way and being arranged between two bearings for supporting a shaft in the bearing unit.

4,953,412

## PIPELINE CALIPER PIG

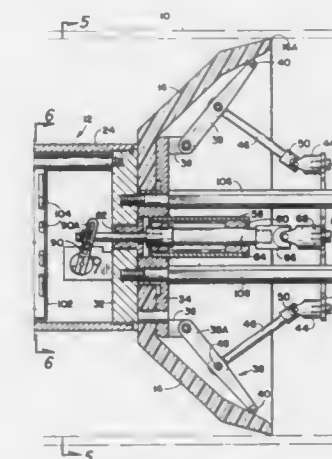
Jeffrey S. Rosenberg, and Kevin W. Lockyear, both of Tulsa, Okla., assignors to T. D. Williamson, Inc., Tulsa, Okla.

Filed Jan. 17, 1986, Ser. No. 822,755

Int. Cl.<sup>5</sup> G01B 5/00

U.S. Cl. 73—865.8

15 Claims



1. An improved pipeline caliper pig for providing indica-



tions of the deviations of an inner wall of a pipeline from a nominal cross-sectional configuration, comprising:

- a pig body assembly having a longitudinal axis and means for supporting the pig body assembly in a pipeline and for impeding the flow of fluid therepast so that the pig body is propelled by such fluid along the pipeline;
- an integrator plate carried by said pig body assembly;
- means for deflecting said integrator plate in response to deviations in the internal pipeline wall;
- means for axial oriented detection of the deflection of said integrator plate and for recording the detected deflections; and
- means for simultaneously determining and recording the orientation of said pig body assembly about its longitudinal axis relative to the vertical whereby the axial orientation of detected deviations is determinable.

4,953,413

## DRIVING DEVICE HAVING A VIBRATOR

Koji Iwata, Shigeru Okuma, both of Nagoya; Yoshimasa Kimura, Yokohama; Yoshihiro Konata, Tokyo, and Kiyoshi Kaneko, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

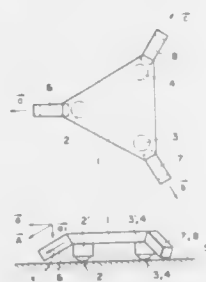
Continuation of Ser. No. 103,712, Oct. 2, 1987, abandoned. This application Jan. 5, 1990, Ser. No. 464,635

Claims priority, application Japan, Oct. 6, 1986, 61-237444; Oct. 8, 1986, 61-237445

Int. Cl.<sup>5</sup> H01L 41/09

U.S. Cl. 74—1 SS

12 Claims



1. A driving device comprising:
  - (a) a base plate
  - (b) a plurality of drive sources disposed at different portions on said base plate, each of said plurality of drive sources having a vibrator adapted to vibrate upon application of an electrical signal thereto and causing relative movement between said base plate and a contact surface contact surface by the vibration of each of said vibrators;
  - (c) sensor means respectively provided for each of said drive sources, each of said sensor means detecting the driving state of each said drive sources;
  - (d) a first adjusting circuit respectively provided for each of said drive sources for individually adjusting the electrical signal applied to each of said drive sources on the basis of the output from said sensor means; and
  - (e) a second adjusting circuit for adjusting a common electrical signal applied to all of the drive sources on the basis of combined outputs from all of the sensor means.

4,953,414

## OVERHANG-TYPE STARTER

Hirokazu Ueno, and Hiroyuki Morikane, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

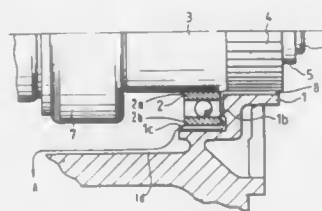
Filed Apr. 28, 1989, Ser. No. 344,571

Claims priority, application Japan, Jun. 3, 1988, 63-74439[U]

Int. Cl.<sup>5</sup> F02N 15/06

U.S. Cl. 74—6

3 Claims



1. An overhang-type starter comprising:
  - a front bracket having a substantially horizontal bearing support portion and an interior portion;
  - a ball bearing structure fixedly fitted in said front bracket to said support portion and having an upper and lower portion;
  - a pinion drive shaft supported by and moveable over said ball bearing structure;
  - a pinion formed on said pinion drive shaft at the front end thereof, said pinion being moveable with said shaft, said pinion being disposed with respect to said front bracket such that a gap is formed in communication with said upper portion of said bearing structure; and
  - a water drain hole provided in the bearing support portion of said front bracket at said lower portion of said ball bearing structure and a water drain passage that communicates between said hole and said interior portion of said front bracket.

4,953,415

## ARRANGEMENT FOR CONVERTING RECIPROCATING MOTION INTO EVEN ROTATIONAL MOTION

Kari Lehtonen, Paimio, Finland, assignor to Tuaturipyyora Oy, Turku, Finland

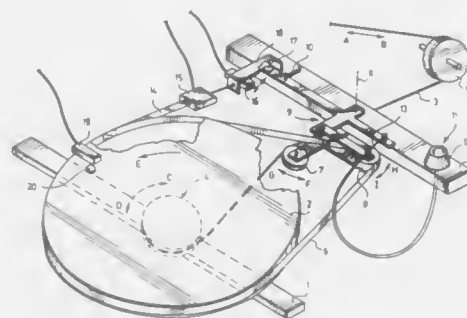
Filed Aug. 4, 1989, Ser. No. 389,518

Claims priority, application Finland, Aug. 10, 1988, 883726

Int. Cl.<sup>5</sup> F16H 27/02; A63B 69/06; F16D 49/10

U.S. Cl. 74—141

6 Claims



1. An arrangement for converting reciprocating motion into even rotational motion, comprising a frame (1, 31) and a flywheel (2, 32) placed thereon, a pull member (3, 33) being attached to the flywheel by means of a free gear mechanism (4, 34) so as to move in a reciprocating manner and a braking band being arranged around the flywheel (2, 32) so as to be pressed against its peripheral surface, whereby the flywheel (2, 32) is

arranged to rotate in a predetermined direction when the pull member is pulled and the brake band is arranged to resist the rotational motion of the flywheel, characterized in that the arrangement comprises a relieve means (7, 37) connected to the brake band (6, 36) and to the frame (1, 31) by means of a lever mechanism (9, 39), whereby the pull member (3, 33) is arranged to be pressed against the relieve means (7, 37) during a pulling movement along a direction (A) and to pivot the lever mechanism (9, 39) so that the brake band is tightened against the flywheel (2, 32), the lever mechanism (9, 39) being arranged to pivot so that tightening force exerted by the brake band (6, 36) on the peripheral surface of the flywheel (2, 32) is decreased when the pull member is displaced by the free gear mechanism (4, 34) in a direction (B) opposite to the pulling direction, and a detector (16, 17) connected to the lever mechanism (9, 39) for detecting a number of pivoting movements of the lever mechanism (9, 39).

4,953,416

## POWER STEERING VALVE WITH TWO SPOOLS OF DIFFERENT SIZE TO COMPENSATE UNBALANCED CYLINDER

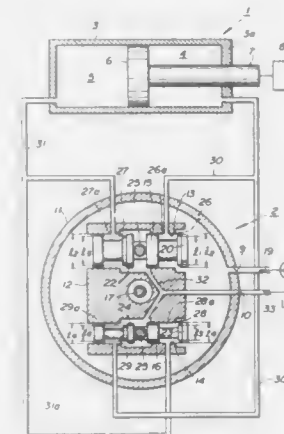
Koichi Komatsu, Atsugi, Japan, assignor to Atsugi Motor Parts Company Limited, Atsugi, Japan

Filed Aug. 21, 1985, Ser. No. 767,330

Int. Cl.<sup>5</sup> B62D 5/08

U.S. Cl. 74—388 PS

9 Claims



1. An automotive steering system having an unbalanced cylinder and a fluid control valve disposed in a hydraulic circuit connecting said cylinder to a fluid pressure source and to a fluid reservoir for controlling supply and drain of working fluid to said cylinder, comprising:
  - said unbalanced cylinder having:
    - an enclosed hollow cylinder;
    - a piston disposed within the internal space of said cylinder so as to divide same into first and second working chambers; and
    - a piston rod connected to said piston at one end and connected at the other end to a steering member which actuates re-alignment of vehicular wheels for steering, said piston rod extending through said first chamber and exiting said cylinder for connection to said steering member at said other end;
  - said fluid control valve having:
    - a valve housing connected to a manually operable steering stub shaft by means of a yielding structural member;
    - first and second bores passing through a valve body, said first and second bores having axes extending substantially parallel to each other and substantially perpendicular to said steering stub shaft and having one end communicating with a pressurized fluid chamber, said first bore having a larger internal diameter than that of said second bore;
    - first and second spool valves disposed reciprocally within

said first and second bores respectively, said first and second spool valves being connected to said steering stub shaft so as to be driven reciprocally in response to relative displacement between said valve housing and said steering stub shaft due to yielding of said yielding member, and said first spool valve having first, second, third and fourth lands respectively having an external diameter substantially corresponding to the internal diameter of said first bore for defining between said first and second lands a first working chamber communicating with said first chamber of said cylinder via a first port, between said second and third lands a third drain chamber communicating with a first drain line, said second spool valve having fifth, sixth, seventh and eighth lands having an external diameter substantially corresponding to the internal diameter of the second bore for defining between said fifth and sixth lands a fourth working chamber communicating with said second chamber of said cylinder via a fourth port, between said seventh and eighth lands a fifth working chamber communicating with said first chamber via a fifth port, and between said sixth and seventh lands a sixth drain chamber communicating with a second drain line, said first and fourth working chambers being in communication with said pressurized fluid chamber, and said second and fifth working chambers being in communication with said third and sixth drain chamber;

first means defining a first supply orifice for establishing and blocking fluid communication between said first working chamber and said pressurized fluid chamber and a first drain orifice for establishing and blocking fluid communication between said second working chamber and said third drain chamber, between said first spool valve and the inner periphery of said first bore, the flow cross-section of said first supply orifice varying with the position of said first spool valve for control of the supply of working fluid to said first working chamber in said cylinder, and the flow cross-section of said first drain orifice varying with the position of said first spool valve for control of drainage of working fluid from said second working chamber; and

second means for defining a second supply orifice for establishing and blocking fluid communication between said fourth working chamber and said pressurized fluid chamber and a second drain orifice for establishing and blocking fluid communication between said fifth working chamber and said drain chamber, between said second spool valve and the inner periphery of said second bore, the flow cross-section of said second supply orifice varying with the position of said second spool valve for control of the working fluid supply to said second working chamber of said cylinder, and the flow cross-section of said second drain orifice varying with the position of said second spool valve for control of drainage of working fluid from said first chamber of said cylinder, and said flow cross-section of said first supply orifice and said first drain orifice being greater than that of the corresponding second supply orifice and second drain orifice.

4,953,417

## MECHANICAL GEAR DRIVE

Klaus Baumgarten, Elgharting, and Kurt Schloegmann, Taufkirchen, both of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Mar. 14, 1989, Ser. No. 323,438

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1988, 3809577

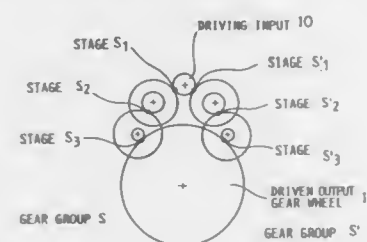
Int. Cl.<sup>5</sup> F16H 55/18

U.S. Cl. 74—409

5 Claims

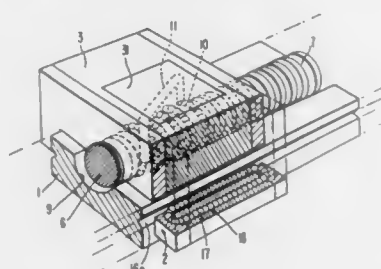
1. A mechanical closed gear drive train, comprising a driving input wheel (10), a driven output wheel (11), and a plurality of intermediate stage wheels engaged between said driving input wheel (10) and said driven output wheel, said intermedi-

ate stage wheels between said driving input wheel (10) and said driven output wheel (11) being arranged in two sets parallel to each other to form said closed gear drive train, prestressed torsion spring means (12) directly connected in at least one location anywhere in said closed gear drive train (S1 to S'3), and means (13) for adjusting a biasing force of said torsion spring means (12), said adjusting means being located any-



where in said closed gear drive train, said adjusting means being adjusted so that a respective spring prestressing torque is greater than a maximum torque at which said gear drive should still run without backlash or play, for eliminating any backlash and avoiding any play between said driving input wheel and said driven output wheel, said biasing force being constantly effective for self-adjusting said closed gear drive train.

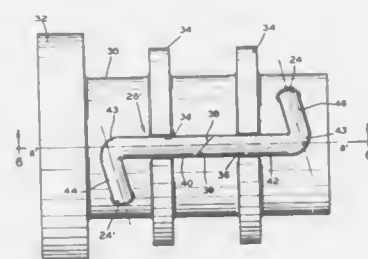
**4,953,418**  
**LINEAR FEED MECHANISM**  
Kazuya Hirose, Tokyo, Japan, assignor to Hihaisuto Seiko Kabushiki Kaisha, Tokyo, Japan  
Filed May 5, 1989, Ser. No. 347,901  
Claims priority, application Japan, Feb. 3, 1988, 63-23391  
Int. Cl. F16H 26/22; F16C 29/06  
U.S. Cl. 74-424.8 A 10 Claims



1. A linear feed mechanism comprising:
  - a track member having a top face with a semi-circular groove formed therein, and said track member semi-circular groove having a substantially smooth surface;
  - a moving member movably disposed on said track member and having a bottom face, said moving member having a semi-circular groove formed in said bottom face thereof, said moving member semi-circular groove having a spirally threaded face, and said moving member semi-circular groove and said track member semi-circular groove jointly defining a substantially circular through hole formed between said track member and said moving member;
  - a linear motion bearing means disposed between said track member and said moving member for movably supporting said moving member on said track member;
  - a threaded ball screw shaft rotatably attached to said track member and disposed in said through hole, said threaded ball screw shaft having a spiral thread on the outer surface thereof corresponding to said spirally threaded face of said moving member semi-circular groove;
  - a first ball bearing circulating passage in said moving member, said first ball bearing circulating passage communicat-

ing one part of said spirally threaded face of said moving member semi-circular groove with another part of said spirally threaded face of said moving member semi-circular groove for causing ball bearings in said first ball bearing circulating passage to move from said one part of said spirally threaded face of said moving member semi-circular groove to said other part of said spirally threaded face of said moving member semi-circular groove when said threaded ball screw shaft is rotated for linearly moving said moving member relative to said track member; and a first plurality of ball bearings disposed in said first ball bearing circulating passage, between said spiral thread on the outer surface of said threaded ball screw shaft and said spirally threaded face of said moving member semi-circular groove, and between said spiral thread on the outer surface of said threaded ball screw shaft and said substantially smooth surface of said semi-circular groove of said track member.

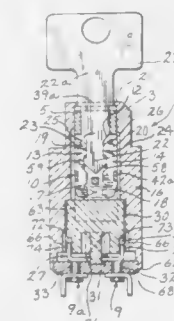
**4,953,419**  
**BALL SCREW RETURN SYSTEM**  
Theodore R. Schlenker, Troy, Mich., assignor to Dana Corporation, Toledo, Ohio  
Filed Sep. 19, 1989, Ser. No. 409,549  
Int. Cl. F16H 25/22  
U.S. Cl. 74-459 3 Claims



1. In a ball screw assembly including an axially extending elongated screw, said screw defining an exterior helical groove, said assembly including a nut adapted for axial movement along said screw, said nut defining an interior mating helical groove, said assembly further including a plurality of ball bearings adapted to traverse a helical path in said nut between the grooves of said nut and said screw from one end of said nut to the other, said nut containing a pair of spaced apertures extending transversely to said screw, each aperture extending from said interior mating groove to the exterior of said nut, and a ball bearing return tube secured to said nut to provide recirculation of said ball bearings from one of said apertures to the other, said tube engaging said spaced transverse apertures; an improvement comprising: (a) each of said apertures in said nut is oriented parallel to the helix angle of the mating groove in said nut and tangent to said mating groove, and (b) said ball return tube comprises first and second members, each member having a major leg and a minor leg integrally joined together, each minor leg engaging one of said transverse apertures of said nut, wherein said major legs are positioned over the exterior of said nut in an axially aligned relationship, each of said minor legs forming an acute angle to its respective major leg, wherein said apertures comprise counterbores sized for receiving said minor legs, wherein said minor legs provide passage of said balls (a) tangent to said helical groove in said nut, and (b) parallel to the helix angle of said mating groove in said nut, wherein the centerlines of said mating groove in said nut, wherein the centerlines of said major and minor legs of said first member of said return tube lie in a first plane, wherein the centerlines of said major and minor legs of said second member lie in a second plane, wherein said first and second planes are separate and distinct, wherein the centerlines of said major legs, and the axes of said nut and said screw are all parallel and lie in a third plane, wherein center-

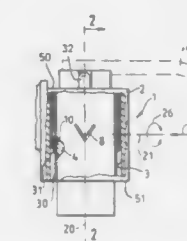
lines of said minor legs intersect but lie outside of said third plane, wherein said first and second planes intersect said third plane along a line coincident with the centerline of said major legs, wherein said first and second planes form equal but opposite angles with said third plane, wherein said acute angle between said major and minor legs is equal to ninety degrees minus the helix angle of said mating groove in said nut, wherein each of said minor legs is integrally coupled to a major leg by an elbow, and wherein said nut comprises a pair of axially paced circumferentially extending flanges positioned immediately along said nut, said flanges having slots adapted to accommodate said major legs.

**4,953,420**  
**KEY LOCK APPARATUS**  
Larry J. Krubsack, Colgate; John G. Lawton, Milwaukee, and Allen L. Handy, North Prairie, all of Wis., assignors to Clum Manufacturing Company, Inc., Hartland, Wis.  
Filed Sep. 29, 1989, Ser. No. 414,914  
Int. Cl. E05B 29/06  
U.S. Cl. 70-366 22 Claims



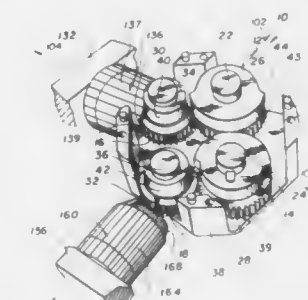
1. A keylock unit, comprising a housing having an internal bore, a rotating lock assembly mounted within said bore, said rotating lock assembly including a locking member rotatably mounted within said bore, said locking member having a longitudinal opening extending parallel to the axis of rotation of the locking member and a locking wall fixed within the bore of said housing, said longitudinal opening extending transversely to said locking wall, a locking element movably mounted within said longitudinal opening and having a lock portion and a control portion oppositely movable with respect to said locking wall and movable transversely into locking engagement with said locking wall, said locking element having a pivot support engaging locking member, a resilient means holding said pivot support in said engagement with said locking member and permitting movement of said control element relative to said locking wall and establishing opposite movement of said lock portion and said control portion relative to said locking wall, said housing having a key opening aligned with said longitudinal opening for receiving of a key having an elongated portion for insertion into said lock assembly and having a central portion edge aligned with said opening and thereby aligned with said control portion, said key having an enlarged end portion adapted to engage said control portion to position the control portion into engagement with said locking wall and thereby simultaneously move said lock portion from said locking wall and having a second portion immediately adjacent said enlarged portion to move the control portion and the lock portion in spaced relation to said locking wall and thereby permitting rotation of the lock assembly.

**4,953,421**  
**POWER-TRANSMISSION JOINT**  
Michael Eigel, Nenndorf; Karl-Heinz Pepping, Schleiden, and Gunther Gebhardt, Stadtkyll, all of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany  
Filed Jan. 30, 1989, Ser. No. 305,387  
Claims priority, application Fed. Rep. of Germany, Mar. 1, 1988, 3806522  
Int. Cl. G05G 1/04  
U.S. Cl. 74-523 5 Claims



1. A power-transmission joint for a manual transmission for insertion intermediate a drive shaft of said transmission of a shift rod forming a universal joint, comprising a cage; a sliding block fixed in said cage for the receipt of a steering journal, said cage forming a frame having a rectangular cut-out portion, said sliding block having a box-like shape with a central bore therethrough in conformance with said cut-out portions; retaining means for retaining said sliding block along the perimetrical sides thereof for pivoting without play within a pivoting plane about a predetermined axis and including unhindered paths in the direction of displacement for said sliding block for a defined floating movement thereof and a rubber-elastic shock absorber means positioned between said cage and said sliding block.

**4,953,422**  
**COMPOUND ANGLE LIMITING DEVICE**  
William L. Chapman; Charles F. Marner; Daniel K. Schotter, all of Tucson, Ariz., and Ronald L. Hehn, Euless, Tex., assignors to Hughes Aircraft Company, Los Angeles, Calif.  
Filed Mar. 28, 1988, Ser. No. 174,055  
Int. Cl. G05G 5/04; F16M 11/12; H01Q 3/08  
U.S. Cl. 74-526 19 Claims



1. A compound angle limiting device for limiting the movement of a mass within first and second prescribed angular ranges about first and second axes respectively comprising:
  - first means mechanically coupled to said mass for sensing movement of said mass about said first axis;
  - second means mechanically coupled to said mass for sensing movement of said mass about said second axis;
  - a first cam mechanically coupled to said first means and movable in response to thereto; and
  - a second cam mechanically coupled to said second means and movable in response thereto;



said first and second cams mounted for physical contact at at least one point to limit the compound angular excursion of said mass via said first and second means.

4,953,423

**STEERING WHEEL WITH SHOCK ABSORBER**

Kouzo Maeda, Yokohama; Masanobu Yoshioka, and Makoto Hikone, both of Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

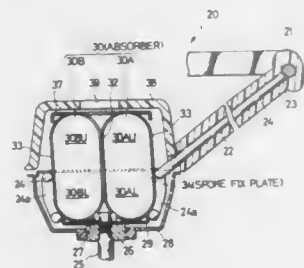
Filed Jun. 8, 1989, Ser. No. 363,186

Claims priority, application Japan, Jun. 9, 1988, 63-76818[U]; Feb. 28, 1989, 148754; Mar. 10, 1989, 159279

Int. Cl.<sup>5</sup> B62D 1/11

U.S. Cl. 74—552

26 Claims



1. A steering wheel provided with a shock absorber, comprising:
  - (a) a steering wheel including a rim, a cover pad, and at least one spoke extending from said rim to under said cover pad;
  - (b) shock absorbing means disposed under said cover pad; and
  - (c) connecting means for connecting a radially inner end of said spoke to a roughly middle peripheral surface of said shock absorbing means so as to divide said shock absorbing means into a lower shock absorbing portion for mainly absorbing a shock applied to said rim in dependence upon shearing deformation thereof and an upper shock absorbing portion for mainly absorbing a shock applied to said cover pad in dependence upon compressive deformation thereof.

4,953,424

**DEVICE FOR COMMUNICATING BETWEEN TWO MEDIA SEPARATED BY A SLOTTED WALL**

Jean-Pierre Lazzari, Corenc, France, assignor to Commissariat a l'Energie Atomique, Paris, France

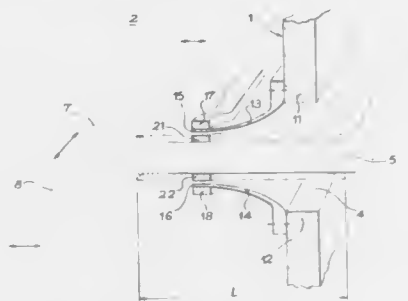
Filed Feb. 22, 1989, Ser. No. 313,715

Claims priority, application France, Mar. 2, 1988, 88 02636

Int. Cl.<sup>5</sup> G05G 1/00; A44B 21/00

U.S. Cl. 74—566

4 Claims



1. Device comprising a wall (1) separating two media (2, 3), the wall having a slot (4) through which passes an arm (5), the slot being provided with a packing constituted by two lips (13,

14) fixed to the wall and each lip having an edge (15, 16) provided with magnets (17, 18), the edges facing one another and the magnets of the edges attracting each other to join the edges together and close the slot, wherein the arm is provided with magnets (21, 22) moving away the magnets of the edges in order to locally separate the lips around the arm, a clearance (23) extending between the arm and the lips.

4,953,425

**BICYCLE PEDAL ATTACHMENT**

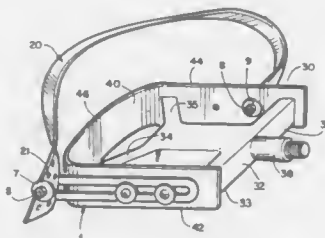
Derek Barefoot, 2183 Tovar Ct., Grand Junction, Colo. 81503

Filed Oct. 12, 1989, Ser. No. 420,301

Int. Cl.<sup>5</sup> G05G 1/14

U.S. Cl. 74—534.6

3 Claims



1. The combination of a bicycle pedal and a foot attachment assembly comprising:
  - a bicycle pedal having a body having a front end, a rear end, an outer side and an inner side, said front end and said rear end being substantially parallel to each other, said outer side and said inner side being substantially parallel to each other;
  - a spindle extends transversely from said inner side and it is externally threaded;
  - a single elongated strap having a front end and a rear end; means for detachably securing the front end of said strap to said bicycle pedal at a point adjacent the intersection of its front end and its outer side;
  - means for detachably securing the rear end of said strap to said bicycle pedal at a point adjacent the intersection of its rear end and its inner side; and
  - the above structure forms a closed arched loop into which a bicyclist can first insert his foot from the outer side of the bicycle pedal and then by rotating his heel inwardly cause his foot to be captured for as long as desired wherein said means for detachably securing the front end of said strap comprises at least one aperture adjacent the front end of said strap, an elongated bracket having an inner end and an outer end, a stud means extends transversely from said outer end and through the aperture adjacent the front end of said strap.

4,953,426

**HOUSING SUPPORT FOR HYDRAULIC DISPLACEMENT UNIT SWASHPLATE**

Alan W. Johnson, Ames, Iowa, assignor to Sauer-Sundstrand Company, Ames, Iowa

Filed Mar. 3, 1989, Ser. No. 318,731

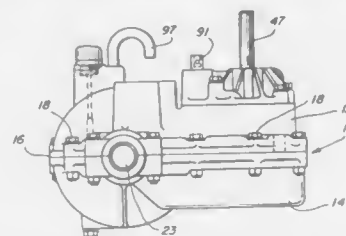
Int. Cl.<sup>5</sup> F16H 57/02

U.S. Cl. 74—606 R

11 Claims

1. In combination, a hydraulic displacement unit having a swashplate and a two-part housing therefor, a drive output shaft extending from said unit, said two-part housing having a split line between housing parts with said drive output shaft centerline being located in the plane coincident with said split line, said swashplate extending across said split line, and means on one housing part only providing the only support for the

swashplate relative to hydraulic forces imposed thereon including means for providing support integral with said one



housing part and which extends across the split line between housing parts.

4,953,427

**VEHICLE SPEED CONTROL SYSTEM**

Kenzo Ushiro, Sakai, Japan, assignor to Kubota Ltd., Japan

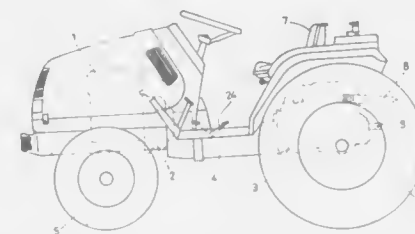
Filed Aug. 28, 1989, Ser. No. 399,170

Claims priority, application Japan, Aug. 31, 1988, 63-218859

Int. Cl.<sup>5</sup> B60K 41/12

U.S. Cl. 74—872

4 Claims



1. A speed control system for a vehicle having an engine, a stepless change speed device for receiving output of the engine, and an auxiliary change speed device for transmitting output of the stepless change speed device in a plurality of speeds to rear wheels, said speed control system comprising:
  - a speed governor for controlling rotational rate of the engine,
  - an accelerator lever for operating said speed governor,
  - interlocking means for interlocking said speed governor and said stepless change speed device such that the rotational rate of the engine is increased with an accelerating operation of said stepless change speed device through said speed governor, and is decreased with a decelerating operation of said stepless change speed device through said speed governor, and
  - interlock breaker means for prohibiting said interlocking means from interlocking said speed governor and said stepless change speed device when said auxiliary change speed device is in a low speed state.

4,953,428

**TOOL FOR STRIPPING CABLES, IN PARTICULAR CONSTITUTED CABLES**

Bernard Commes, Saint Médard d'Eyrans, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Dec. 18, 1989, Ser. No. 452,759

Claims priority, application France, Dec. 22, 1988, 88 16999

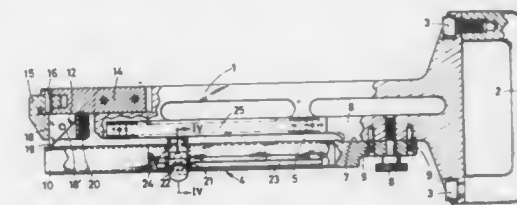
Int. Cl.<sup>5</sup> H02G 1/12

U.S. Cl. 81—9.4

13 Claims

1. Tool for stripping a cable having at least one conductor and an outer sheath, said tool comprising a tubular element having a wall defining a bore having an opening for receiving said at least one conductor and causing said tubular element to penetrate between said at least one conductor and said outer sheath, orientable cutting means, means for feeding said cable along said tubular element, said wall of said tubular element

having a first end portion and a second end portion opposed to said first end portion, an aperture provided in the thickness of the wall of said first end portion of said tubular element, a support of elongated shape, said tubular element being held in such position by said second end portion of said tubular element on said support as to extend substantially parallel to said



4,953,429

**APPARATUS FOR ROTATABLY SUPPORTING AND FEEDING ELONGATED ROD MEMBER**

Tomokichi Arisaka, and Mitsuyoshi Yamaguchi, both of Nagano, Japan, assignors to Kabushiki Kaisha ALPS TOOL, Japan

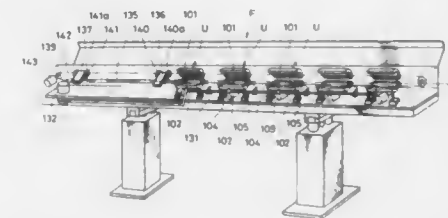
Division of Ser. No. 112,094, Oct. 21, 1987. This application Sep. 15, 1989, Ser. No. 408,146

Claims priority, application Japan, Oct. 24, 1986, 61-253271; May 28, 1987, 62-129946

Int. Cl.<sup>5</sup> B23B 5/14

U.S. Cl. 82—127

6 Claims



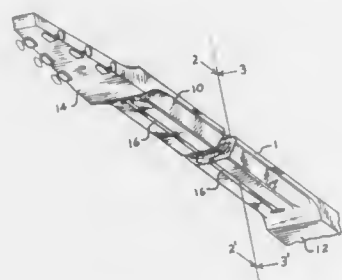
1. An elongated rod member supporting apparatus provided in a rod feeding machine having a frame for feeding and rotatably supporting said elongated rod member to a working machine, said apparatus comprising:
  - a plurality of rod supporting units each positioned spaced away and arranged along a length of said rod feeding machine, each of said rod supporting units having both axial end portions provided with bearing portions for rotatably supporting said elongated rod member;
  - damper means provided between each of said rod supporting units and said frame for elastically supporting said rod supporting units;
  - means for supplying oil to each space defined between said bearing portions and said elongated rod member;
  - each of said rod supporting units comprising a bushing support for internally supporting said bearing portions, said bushing support being supported by said damper means;
  - each of said rod supporting units comprising an upper body and a lower body, said upper and lower bodies having semi-cylindrical shape and said upper body being pivotally supported to said lower body for providing an open space above said lower body upon opening of said upper body.



A detailed technical drawing of the internal mechanism of a mechanical device, likely a watch movement. The drawing shows a complex arrangement of gears, shafts, and components, all labeled with numbers from 1 to 17. The mechanism is housed within a rectangular frame. Key components include a large central gear (1), a smaller gear (2) on a shaft (3), and a series of gears (4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17) arranged in a row. The drawing is a black and white line drawing, showing the intricate details of the mechanical parts.

1. An improved trussed neck construction, for a stringed musical instrument, comprising:  
an elongated neck having a front side defining a fingerboard region and having at a rear side a rear surface configured with a longitudinal groove;  
an elongated metallic truss disposed within said groove substantially flush with the rear surface;

anchoring means disposed at a first end of said truss, adapted to constrain said truss longitudinally relative to said neck; and

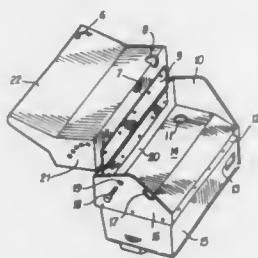


adjustment means, disposed at a second end of said truss and thus accessible from the rear side of the neck, comprising an adjustment part adapted to adjustably constrain said truss longitudinally relative to said neck.

**4,953,436**  
**FOLDING HOUSING FOR ELECTRONIC M.I.D.I. ACCORDION**  
Giorgio F. Carletto, 6109 Nevada Ave. NW., Washington, D.C. 20015  
Filed Oct. 16, 1989, Ser. No. 422,757  
Int. Cl.<sup>5</sup> G10D 11/00

U.S. Cl. 84—376 A

1 Claim

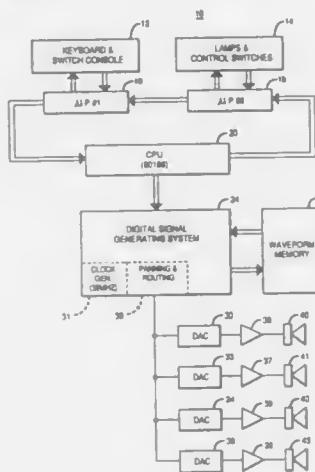


1. A folding housing for electronic M.I.D.I. accordion, said folding housing consisting of a complete electronic M.I.D.I. accordion bassboard housing, said bassboard housing being connected on one side by the extreme inner edges of its long front and back surfaces and its short top and bottom surfaces to a matching rectangular metal brace comprising a long wide frontal surface, an equally long but considerably narrower back surface, a short partially tapered top surface and a similarly short partially tapered bottom surface, and one electronic M.I.D.I. accordion keyboard extending, lengthwise, into a very short rectangular protuberance having a long narrow front surface, a long narrow back side, a short top end (containing a semicircular sequence of perforations) and a short bottom end and a long rectangular narrow side panel sealing the opening of said very short rectangular protuberance, said long rectangular narrow side panel of said electronic M.I.D.I. accordion keyboard's protuberance being connected, by means of a piano hinge, to the back side of said long wide frontal surface of said rectangular metal brace, said short partially tapered top surface of said rectangular metal brace having a thumb screw-like manual control interacting with said semicircular sequence of perforations to regulate the desired angle of two halves of the folding housing for electronic M.I.D.I. accordion, said short partially tapered top surface of said rectangular metal brace also containing one of the two attachments required by the single back strap and said keyboard housing's back surface having the second of said two attachments of said

single back strap fastened to its lower right corner, the control panel being in the shape of a narrow single row of push buttons facing laterally rightward and merging longitudinally, on one side, with the outer edge of said long narrow front surface of said very short rectangular protuberance, and bordering lengthwise, on the opposite side, with the inner edge of said electronic M.I.D.I. keyboard.

**4,953,437**  
**METHOD AND APPARATUS FOR DIGITALLY GENERATING MUSICAL NOTES**  
David T. Starkey, San Diego, Calif., assignor to Gulbransen Incorporated, Las Vegas, Nev.  
Filed Jan. 17, 1989, Ser. No. 297,887  
Int. Cl.<sup>5</sup> G10H 1/057, 1/24, 7/06, 7/12  
U.S. Cl. 84—603

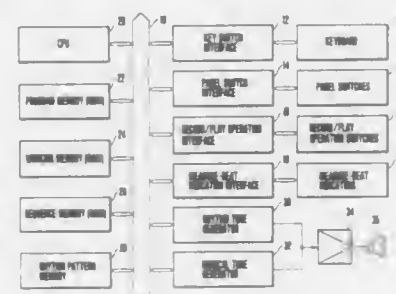
5 Claims



4. A digital signal generator for musical notes comprising: digital computer means having first input means including a plurality of stops for selecting one of a set of harmonic structures, and second input means including a plurality of keys for producing selection signals each of which indicates the selection of a note having a predetermined pitch and one of the set of harmonic structures; memory means for storing a first plurality of digital samples representing a waveform having the selected harmonic structure; means for producing a completed sample output following a predetermined number of interpolation cycles, including a source of digital values representative of phase angle increments controlled by said digital computer means and responsive to a change in said selection signals for sampling the samples stored in said memory means at a fixed clocking rate for selecting a note, and further including interpolator means for repetitively interpolating between successive samples read from said waveform memory means and producing a plurality of completed sample outputs, each of which represents more accurately than does either of such successive samples a point on the stored waveform instructed by the selection signals, said interpolator means including a digital adder, having a first input connected to receive samples read from the waveform stored in said memory means, a first latch under clock control connected between the output and a second input of said adder for dividing an output sum signal by two and coupling the resulting signal to the second input of said adder, and a second latch connected to receive the output of said adder as the plurality of completed sample outputs; and means for converting the plurality of completed sample outputs produced by said interpolator means into an analog output.

**4,953,438**  
**AUTOMATIC PERFORMANCE APPARATUS STORING AND EDITING PERFORMANCE INFORMATION**  
Takeo Shibukawa, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan  
Filed Feb. 3, 1988, Ser. No. 152,025  
Claims priority, application Japan, Feb. 6, 1987, 62-25682  
Int. Cl.<sup>5</sup> G10H 7/00  
U.S. Cl. 84—609

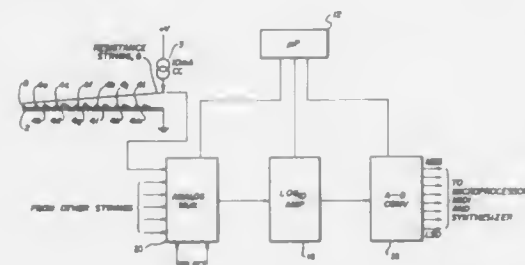
6 Claims



1. An automatic performance apparatus for an electronic musical instrument, comprising:  
input means for inputting music performance information;  
a memory device having a plurality of addresses for storing music performance information input by the input means in plural music performance units of certain length each having not less than two notes;  
write means for sequentially writing music performance information at the addresses of said memory device on the basis of an operation of said input means, wherein music performance information is written in said memory device to designate a start point for each music performance unit;  
switching means for commanding rewriting; and  
write control means, responsive to a command from said switching means, for returning said memory device to the start point of a predetermined music performance unit in accordance with music performance information written in said memory device designating said start point of said predetermined music performance unit.

**4,953,439**  
**ELECTRONIC MUSICAL INSTRUMENT WITH QUANTIZED RESISTANCE STRINGS**  
Harold R. Newell, South Newbury, N.H., assignor to Mesur-Matic Electronics Corp., Salem, Mass.  
Filed Jun. 26, 1987, Ser. No. 66,584  
Int. Cl.<sup>5</sup> G10H 1/18, 5/00  
U.S. Cl. 84—655

12 Claims

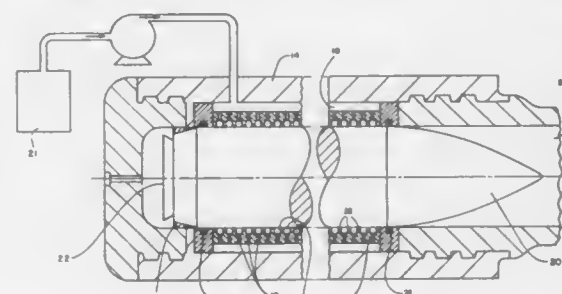


1. In an electronic musical instrument of the stringed type, wherein the instrument includes a body and a fingerboard having conducting portions each connected to ground, the fingerboard being attached to a body and wherein the electronic instrument further comprises:  
a plurality of spaced parallel resistance wire strings superposed over the fingerboard for completing respective

electrical circuits when they contact said conducting portions;  
means for electrically energizing said electrical circuits;  
means for securing the strings in relative spaced relationship with respect to the fingerboard;  
circuit means for ensuring that when at least one of the resistance strings is displaced toward the fingerboard and comes into contact with a conducting portion thereon for completing one of said electrical circuits, an analog voltage which has a magnitude which is dependent on the length of the string with respect to the contacted area and a reference point is generated, the length of the string representative of an effective electrical resistance; and  
means for quantizing the generated analog voltage to a representative level which is determined by the magnitude of the voltage generated, the possible magnitudes which may be generated being divided into a plurality of first voltage magnitude ranges for each string and said means for quantizing being operative to quantize all voltage magnitudes within each range to the same level associated with such range, for minimizing undesired effects of resistance variations of the string due to contact resistance effect.

**4,953,440**  
**LIQUID MONOPROPELLANT GUN**  
William M. Moscrip, Fredericksburg, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
Filed Nov. 26, 1975, Ser. No. 636,342  
Int. Cl.<sup>5</sup> F41F 1/04  
U.S. Cl. 89—7

6 Claims



1. A liquid monopropellant gun having a propellant lined breech when ready for firing comprising:  
a gun tube;  
a breech fixed to one end of said gun tube;  
a plurality of annular combustion chambers formed on the interior wall of said breech, the interior wall of each of said combustion chambers being defined by the surface of a projectile introduced into said breech; and  
means for introducing liquid monopropellant into said annular combustion chambers.

**4,953,441**  
**METHOD AND CONSTRUCTION FOR CONTROL OF CURRENT DISTRIBUTION IN RAILGUN ARMATURES**  
William F. Weldon; Herbert H. Woodson, and Glen C. Long, all of Austin, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.  
Continuation of Ser. No. 885,915, Jul. 15, 1986, abandoned. This application Jun. 1, 1988, Ser. No. 203,556  
Int. Cl.<sup>5</sup> F41B 6/00

U.S. Cl. 89—8

8 Claims

1. An electromagnetic railgun comprising:  
an electrical power supply;  
armature means having a leading edge and a trailing edge; and  
rail means having a pair of spaced, juxtaposed rails defining

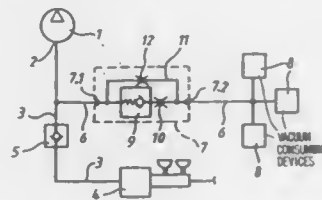


1. A vacuum supply system for a brake power assist unit in a motor vehicle, as well as for at least one additional vacuum consuming device comprising:

- a main pipe being provided between a suction connection of a vacuum generating device and the brake power assist unit and having a first check valve therein;
- a branch pipe branching off from the main pipe to the at least one additional consuming device and which is connected



between the suction connection and the first check valve and contains a second check valve therein; the second check valve permits a suction flow from the at least one additional consuming device to the vacuum generating device;



- a first flow control device fluidly connected in series with the second check valve;
- a bypass pipe having a second flow control device fluidly connected in parallel to the second check valve and the first flow control device.

4,953,448

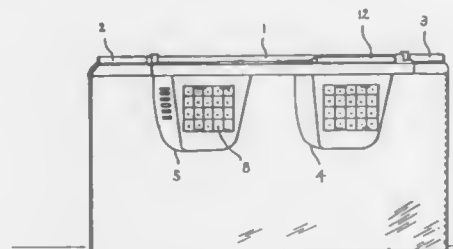
APPARATUS OF HEAT PREVENTER OF A CAR  
Gabri C. B. Duh, No. 267, Lane 376, Sec. 1, Kwang-fu Rd., Hsinchu, Taiwan

Filed Aug. 16, 1989, Ser. No. 394,722

Int. Cl.<sup>5</sup> B60H 1/24

U.S. Cl. 98—2.02

1 Claim



1. An apparatus for ventilating the interior of a car, comprising:
  - a body having a U-shaped groove for receiving the upper edge of a car window, the body having tooth profiles at opposite ends thereof, the body having an outer panel with a curved shield and vent therein for communicating air outside of the car with air inside of the car, and an inner panel;
  - a pair of boxes connected to said inner panel for being positioned in a car, each box having a battery space at the bottom thereof for receiving at least one battery, and each box having a seat for receiving a motor and fan combination therein for connection to a battery for circulation of air, one of said boxes having a housing with a plurality of inlet vents and a plurality of outlet vents for receiving and discharging air through said housing of the one box for circulation of air within the car, the other box having a housing with inlet vents only, the housing of the other box being operatively connected to the curved shield and vent for discharging air from the interior of the other box outwardly through the curved shield and vent;
  - a motor and fan combination mounted in each of said boxes;
  - a switch connected to a side of each of said boxes and operatively connected to each respective motor and fan combination for activation thereof;
  - a solar panel connected over each box on a surface thereof facing said outer panel for receiving sunlight from outside of said car to energize batteries in said boxes; and
  - a pair of plates each having a tooth rack for engaging one of

the tooth profiles at one end of said body, for varying the overall length of said body with said plates on an upper edge of the window of the car.

4,953,449

FILTERED POSITIVE VENTILATION SYSTEM FOR VEHICLE

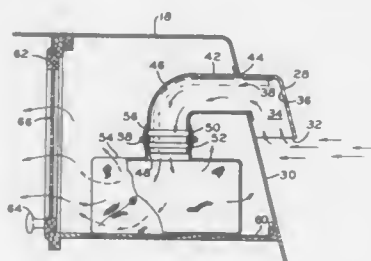
Ernest E. Jackson, 4505 Lower Huntington Rd., Fort Wayne, Ind. 46809

Filed Jul. 5, 1989, Ser. No. 375,713

Int. Cl.<sup>5</sup> B60H 3/06

U.S. Cl. 98—2.11

9 Claims



1. A filtered positive ventilation system for a vehicle for alleviating entry of dust therein comprising:
  - an air intake opening through a front wall of the motor vehicle, said intake opening being the only deliberate forward facing air permeable opening in the vehicle;
  - an air scoop connected to the front wall of the vehicle and communicating with said intake opening, said air scoop being arranged and configured to direct air impinging on the front wall of the motor vehicle due to forward motion thereof into said air intake opening, said air scoop including a front wall positioned in front of said intake opening, said air scoop including side and top walls for defining with the vehicle front wall a downwardly facing opening and air passage for guiding air to said intake opening;
  - conduit means disposed interiorly of said vehicle and communicating at one end exclusively with said intake opening;
  - air filter means disposed interiorly of said vehicle and communicating exclusively with the other end of said conduit means and being sealed thereto such that all air entering said vehicle through said intake opening necessarily passes through said air filter means, said air filter means including a hollow filter bag; and
  - a bulkhead located between said air filter means and the interior of the vehicle, said bulkhead including an outlet means, said air filter means including an elastic coupling means for readily removing and replacing said filter bag; whereby positive air pressure is generated in the vehicle by forward motion thereof to prevent air and dust infiltration into the vehicle through incidental cracks and crevices, and whereby such air as is deliberately permitted into the vehicle is filtered of particulates.

4,953,450

CRAWL SPACE VENTILATOR SYSTEM

Paul D. Remondino, Spring Lake, Mich., assignor to Windward Products, Inc., Grand Haven, Mich.

Filed Sep. 6, 1989, Ser. No. 404,109

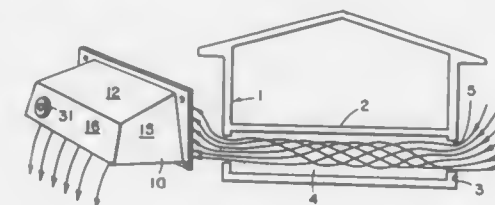
Int. Cl.<sup>5</sup> F24F 7/007

U.S. Cl. 98—33.1

14 Claims

1. A system for venting the foundation of a building in which a space is provided below the floor of the building and the foundation surrounds such space comprising:
  - an inlet opening for admitting air into said space;
  - an exhaust opening for exhausting air from said space;

ventilating means for drawing air into said space through said inlet and exhausting air out of said space; control means for controlling the operation of said ventilating means; and



means whereby said ventilating means is operated only after sundown and before sunrise.

4,953,451

VENTILATION DEVICE

Willem D. Arbouw, Harderwijk, Netherlands, assignor to Aluart Aluminum B.V., Nieuwegein, Netherlands

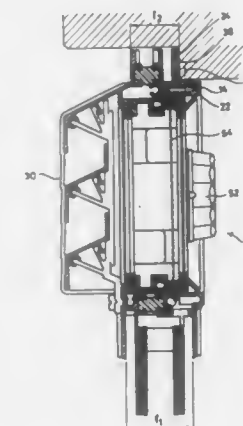
Filed Nov. 3, 1989, Ser. No. 431,091

Claims priority, application Netherlands, Nov. 8, 1988, 8802740

Int. Cl.<sup>5</sup> E06B 7/02

U.S. Cl. 98—98

9 Claims



1. A ventilation device comprising a rectangular frame having a barrier element and comprising a pair of spaced end parts to define sides of the frame, said frame further comprising a bottom side fitted between said end parts and shaped to receive an edge of a glass panel and an upper side fitted between said end parts, said upper side comprising a profiled strip which is L-shaped in cross-section and having a horizontal leg which is directed toward the room to be ventilated and an upright leg, said horizontal leg having a free end which merges into an upright edge which in turn merges into a first end edge directed towards said upright leg, a second end edge projecting at right angles from said upright leg toward said first end edge, said first and second end edges and said horizontal leg defining an accommodation space, and an inverted profiled T-section having a horizontal leg received within said accommodation space and further having an upright leg off set from the center of said horizontal leg.

4,953,452

COLLAPSIBLE STEAMER BASKET

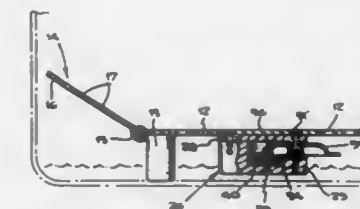
Kenneth A. Tarlow, 138 Waterview, Playa del Rey, Calif. 90293

Filed Sep. 30, 1988, Ser. No. 252,175

Int. Cl.<sup>5</sup> A47J 27/212

U.S. Cl. 99—344

17 Claims



1. A steamer basket comprising:
  - a base plate having a plurality of spaced openings therein;
  - a plurality of overlapping leaves pivotally connected to said base plate, each of said leaves having a plurality of spaced openings therein and interconnecting means between each of said leaves and said base plate for retaining each of said leaves and said base plate for retaining said leaves in a first fixed position at an angle with respect to the horizontal and allowing said leaves to pivot to a second position inwardly toward said base plate; and
  - audible signal means associated with said base plate for providing an audible signal when the temperature encountered at said base plate exceeds a predetermined temperature, said audible signal means including a housing mounted to the underside of said base plate, said housing having an inner bell-shaped chamber with a cymbal resiliently mounted therein and a striker mounted in said housing for striking said cymbal when said predetermined temperature is exceeded, said cymbal having a bell-shaped portion with a flat annular ring, said ring extending out of said housing through an opening communicating with said bell-shaped chamber.

4,953,453

APPARATUS FOR OPERATING LOCKS OF BAKING TONGS FOR PRODUCING ROTTABLE, PREFERABLY EDIBLE WAFERS FROM WAFER DOUGH IN A WAFER BAKING OVEN OR AN AUTOMATIC WAFER BAKING MACHINE

Franz Haas, Sr., Vienna; Franz Haas, Jr., Leobendorf, and Johann Haas, Klosterneuburg, all of Austria, assignors to Franz Haas Waffelmaschinen Industriegesellschaft m.b.H., Vienna, Austria

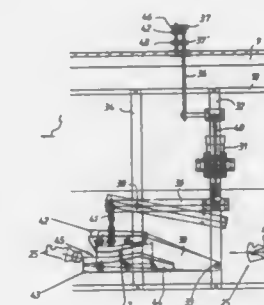
Filed Oct. 17, 1989, Ser. No. 422,584

Claims priority, application Austria, Oct. 20, 1988, 2597/88

Int. Cl.<sup>5</sup> A21B 5/02

U.S. Cl. 99—373

12 Claims



1. In a wafer baking oven comprising

an oven structure defining an oven space, a series of wafer baking tongs, each of which is movable between an open position and a closed position and is provided with a lock, which is movable between an unlocking position, in which said lock permits said tongs to be moved from said closed position to said open position, and a locking position, in which said lock is adapted to lock said tongs in said closed position, each of said tongs also comprising a movable actuating member, which is coupled to said lock and is operable in a locking sense to move said lock from said unlocking position to said locking position and in an unlocking sense to move said lock from said locking position to said unlocking position, and is arranged to assume a predetermined final position when said lock is in said locking position of said lock, said oven also comprising tong drive means for moving said series of tongs in succession in a predetermined direction of travel along a predetermined endless path extending in said oven space, said oven also comprising an operating apparatus, which is mounted on said oven structure at a stationary location adjacent to said path and comprises a closing element, which is movable to and from a predetermined operative position and in said operative position is arranged to engage said actuating member of each of said tongs as said tongs move past said location and to operate said actuating member in said locking sense, and biasing means urging said closing element to said operative position, wherein said closing element engaging said actuating member is arranged to be pushed back from said operative position against the action of said biasing means when the movement of said actuating member in said locking sense has been stopped before said lock has reached said locking position as said tongs move past said predetermined location, the improvement residing in that said operating apparatus comprises an unlocking element, which is movable from a position of rest to an engaging position and in said engaging position is arranged to engage said actuating member when said closing member has pushed back at least a predetermined distance from said operative position, and to move said actuating member in said unlocking sense so as to move said lock to said unlocking position, and an actuator, which is operable to move said unlocking element to said engaging position when said closing element has been pushed back by said actuating member at least said predetermined distance from said operative position.

**4,953,454**  
**STEAM CHAMBER**  
Merle V. Liere, R.R. 2, Colton, S. Dak. 57018  
Filed Dec. 7, 1988, Ser. No. 280,929  
Int. Cl.<sup>5</sup> A23L 1/01

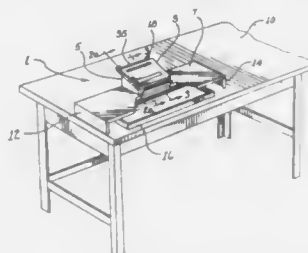
U.S. Cl. 99—426 **6 Claims**  
1. An apparatus adapted to be connected to a steam source for steaming materials therein, said apparatus comprising: chamber means for receiving and passing therethrough said material to be steamed, said chamber means being comprised of an upper chamber and a lower chamber, said upper chamber having a top and a bottom and being wider at said bottom than at said top; planar partitioning means within said upper chamber for partitioning said upper chamber into at least two compartments, said compartments being substantially unobstructed an increasing in cross sectional area along the length thereof; and

steam means adapted to be connected to said steam source and positioned at spaced intervals between said top and



said bottom of said upper chamber for delivering steam into said compartments within said upper chamber.

**4,953,455**  
**FOOD WRAPPER APPARATUS**  
Rosalino Figueras, and George Micko, both of Springfield, Ill., assignors to EFG Foods, Inc., Springfield, Ill.  
Continuation-in-part of Ser. No. 101,105, Sep. 25, 1987, abandoned. This application Feb. 29, 1988, Ser. No. 163,241  
Int. Cl.<sup>5</sup> A21C 9/00; A23P 1/00  
U.S. Cl. 99—450.6 **13 Claims**



1. A food wrapper apparatus, comprising: a base means for mounting onto a work table; a support member means for mounting onto said base means; an upper member means for mounting onto said support member means; a roller means for rolling on said support member means and for enclosing food with a food wrapping material entirely on said support member means; and at least one cutting means operably coupled to said base means for cutting wrapped food into multiple pieces.

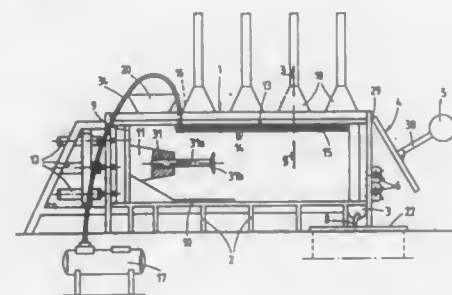
**4,953,456**  
**TOOL HOLDER FOR A PICKLING MACHINE AND TOOL COMBINATION FOR USE IN SUCH A HOLDER**  
Otto Prosenbauder, Innstrasse 23, A-1201 Wien, Austria  
PCT No. PCT/AT87/00066, § 371 Date May 19, 1989, § 102(e) Date May 19, 1989, PCT Pub. No. WO88/03758, PCT Pub. Date Jan. 2, 1988  
PCT Filed Nov. 13, 1987, Ser. No. 359,654  
Int. Cl.<sup>5</sup> A23B 4/02; A22C 9/00  
U.S. Cl. 99—533 **12 Claims**  
1. Tool holder for a pickling machine comprising a pricking

frame having at least one row of take-up means is provided equal to each other and each including a brine supply line; take-up means tools selectively affixed to said brine supply line at a chosen position, said take-up means tools being different from each other and including pickling needles having brine channels formed therein, each tool having a connection head tightly connected to said take-up means; each said connection head fitting into said take-up means, and including a connection channel for the brine supply to each pickling needle, said connection channels being connected to said brine supply line;



said connection heads being disposed at said chosen position, said connection heads including a bottom and combinations of one or more knives and, needles disposed on said bottoms; each connecting head having means for plugging to said take-up means and openings for the stream of the brine only for the needles carried by the connection head, said take-up means being closed with respect to the brine supply line for the knives; and a pull-off safety measure for the connection head, engaging the connection head from below and having slots entered by the needles or knives, respectively.

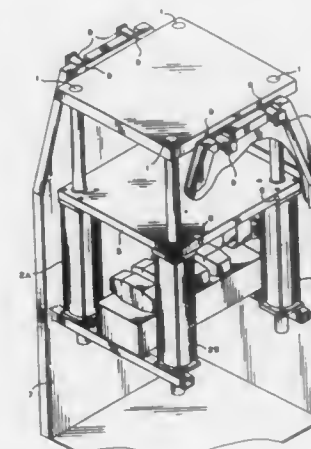
**4,953,457**  
**METHOD AND A CONTINUOUS CYCLE COMPACTOR-APPARATUS, INCLUDING A CIRCULATING FORCED AIR PRE-CHAMBER FOR TREATING BIODEGRADABLE SOLID URBAN WASTE MATERIALS AND FOR SEPARATING AND RECYCLING THE NON-BIODEGRADABLE COMPONENTS THEREOF**  
Liborio Campo, Via Monte Grappa 58, 91011 Alcamo, Italy  
Filed Mar. 14, 1989, Ser. No. 323,331  
Claims priority, application Italy, Mar. 14, 1988, 86201 A/88  
Int. Cl.<sup>5</sup> B30B 9/02, 9/00, 9/06  
U.S. Cl. 100—37 **3 Claims**



1. A method for treating biodegradable solid urban waste materials and for separating and recycle of non-degradable waste materials, comprising: feeding said waste materials into a substantially closed but

ventilated tubular room, of a variable volume, into which compressed air is conveyed; compressing said waste material in said room to a predetermined degree; removing biogas produced therein through a plurality of pipes, and passing and filtering said gas through hydraulic siphon filters; removing percolate obtained in the compression step, and partially recycling the percolate into the treatment room, for moistening the compressed mass; and discharging solid non-biodegradable material using kneading means for the treated compressed waste material mass.

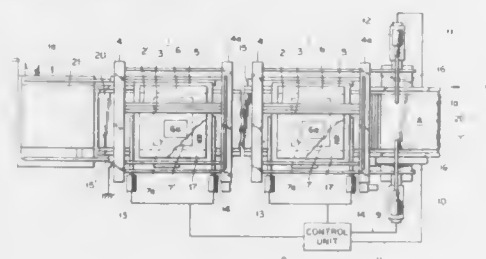
**4,953,458**  
**MULTI-ACTUATOR HYDRAULIC PRESS**  
Charles L. Day, P.O. Box 1097, Days Mills Rd., Kennebunk, Me. 04043  
Filed Mar. 13, 1989, Ser. No. 322,531  
Int. Cl.<sup>5</sup> B30B 1/34  
U.S. Cl. 100—269 R **18 Claims**



1. A hydraulic press comprising: a pair of platens defining a work area therebetween; a plurality of pairs of like double-acting hydraulic actuators, each actuator interconnecting the platens to provide an actuating force to change the spacing between the platens, each said pair of actuators being disposed symmetrically about said work area whereby upon actuation of at least a said pair of actuators in unison a force is created acting along an axis passing through said work area with all said pairs of actuators, when acting in unison, producing an actuating force along the same said axis, and a control means associated with said hydraulic press and interconnecting said pairs of actuators with hydraulic fluid for controlling a supply of the hydraulic fluid under pressure to the actuators so that, in a first operating mode, a said first pair of said actuators function in series to provide a first rate of change of said spacing, in a second mode, at least said first pair of actuators function in parallel to provide a second rate of change of said spacing which is less than the rate of change of the first mode and, in a third mode, at least said first pair of actuators function in accordance with said second mode while simultaneously a second pair of said actuators function in parallel with said first pair of actuators thereby to provide a maximum actuating force of which first and second pairs of said actuators together are capable for that fluid supply.



**4,953,459**  
**METHOD FOR POSITIONING MATERIAL IN A PLURALITY OF PRINTING POSITIONS FOR MULTI-COLOR SILKSCREEN PRINTING**  
 Sylve J. D. Ericsson, Tumba, Sweden, assignor to Svecia Silk-screen Maskiner AB, Sweden  
 Filed Aug. 29, 1988, Ser. No. 237,703  
 Claims priority, application Sweden, Sep. 23, 1987, 8703669  
 The portion of the term of this patent subsequent to Aug. 7, 2007, has been disclaimed.  
 Int. Cl.<sup>5</sup> B41F 15/10  
 U.S. Cl. 101—115 15 Claims



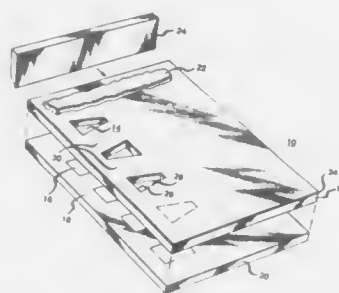
1. A method in multi-color silkscreen printers which incorporate a multiple of printing stations, for positioning in each of the printing stations in relation to print material a second print pattern which is to be applied to said print material and which derives from a first print pattern carried by a stencil, such that respective second print patterns will take a pre-determined position or location relative to said print material, in which method the second pattern is applied by causing coating substance to pass through the first pattern in one printing position and onto the print material comprising the steps of:

- determining the position of the print material in relation to a reference value in a first print-material registered position, a material feed position, and storing the resultant measurement value;
- transferring the print material to a second registered position, a printing position in a printing station for receipt of a second pattern belonging to the first printing station;
- moving the material printed with the second pattern back to the first position and determining the position of the printed second pattern in relation to said reference value in the first position, and storing the measurement value;
- displacing the stencil frame carrying the first pattern in the first printing station to an extent and in a direction such as to minimize a discrepancy established between the actual position of the pattern, obtained in the transfer and the pre-determined position of said pattern; and
- applying a second pattern with minimized discrepancy in the second position in the first printing station to each subsequent material registered in a similar manner in the first and the second position.

**4,953,460**  
**METHOD AND APPARATUS FOR SCREEN PRINTING**  
 Thaddeus Wojcik, Hopewell, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.  
 Filed Oct. 2, 1989, Ser. No. 415,805  
 Int. Cl.<sup>5</sup> B41M 1/12  
 U.S. Cl. 101—129 5 Claims

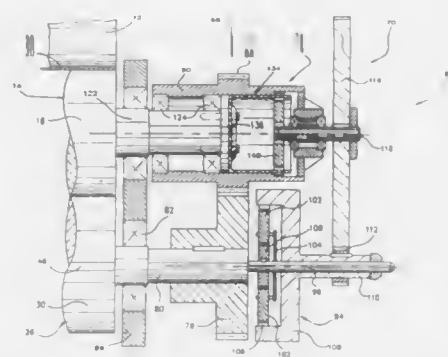
1. A stencil comprising:  
 a substrate having at least a pair of trapezoidal openings, each of which has a pair of parallel ends and a pair of tapered longitudinal sides, the openings being arranged in alternating fashion such that the taper of the longitudinal sides of each opening is opposite to the taper of the sides of the openings adjacent thereto, thereby creating a web

with tapered sides lying between the trapezoidal opening, the web having a greater resistance to buckling when a



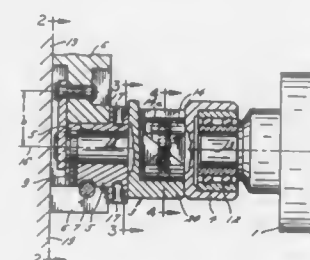
squeegee crosses the web in a direction along a path at an angle to the trapezoidal opening sides.

**4,953,461**  
**SYSTEM FOR CONTINUOUSLY ROTATING PLATE A BLANKET CYLINDERS AT RELATIVELY DIFFERENT SURFACE SPEEDS**  
 John M. Gaffney, Kittery Point, Me.; Wilfred R. Gelinas, Jewett City, Conn.; Joel C. Hern, Dover, N.H., and Charles L. Krouse, Ashaway, R.I., assignors to Harris Graphics Corporation, Dover, N.H.  
 Filed May 20, 1988, Ser. No. 196,439  
 Int. Cl.<sup>5</sup> B41F 7/12, 13/14  
 U.S. Cl. 101—142 25 Claims



1. An apparatus operable to repetitively print the same image on sheet material, said apparatus comprising a rotatable plate cylinder having a peripheral surface for carrying the image to be printed on the sheet material, a rotatable blanket cylinder having a peripheral surface disposed in engagement with the peripheral surface of said plate cylinder to receive the image to be printed on the sheet material from said plate cylinder, and drive means connected with said cylinders for continuously rotating said plate and blanket cylinders during operation of said apparatus to print on sheet material, said drive means including a blanket cylinder gear connected in a coaxial relationship with said blanket cylinder, a plate cylinder gear connected in a coaxial relationship with said plate cylinder and disposed in meshing engagement with said blanket cylinder gear, and means for continuously rotating a first one of said cylinders relative to the one of said gears connected in a coaxial relationship with said first one of said cylinders throughout operation of said apparatus to print one sheet material.

**4,953,462**  
**BEARING FOR ROTARY PRESS CYLINDERS**  
 Ulrich Krober, Offenbach am Main, Fed. Rep. of Germany, assignor to Man Roland Druckmaschinen AG, Fed. Rep. of Germany  
 Filed Feb. 16, 1989, Ser. No. 311,724  
 Claims priority, application Fed. Rep. of Germany, Feb. 19, 1988, 3805143  
 Int. Cl.<sup>5</sup> B41F 13/20, 13/28, 31/34  
 U.S. Cl. 101—216 4 Claims

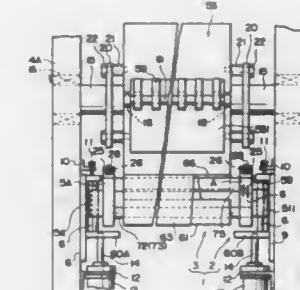


1. An adjustable bearing arrangement for mounting the spindle end of a rotary printing press cylinder, comprising: a press frame, an eccentric bushing rotatably mounted in an aperture in the press frame, clamping means for selectively locking said bushing in position in said frame aperture, a cylinder mounting bracket having a substantially axially extending locating pin rotatably received coaxially in said eccentric bushing, and an anti-friction bearing carried by said mounting bracket coaxially with said locating pin for journalling said cylinder spindle, rotation-inhibiting means for locking said locating pin in an operative position including a rotation-inhibiting lever, a substantially vertical groove formed in the end of said locating pin for receiving and guiding one end of said rotation-inhibiting lever, a knuckle joint disposed parallel to said locating pin, the other end of said lever being pivotally mounted on said press frame around said knuckle joint, said anti-friction bearing including an outer race disposed in an enclosed bearing support ring having a coaxially extending, generally round support pin formed with two substantially vertical and flat outer faces, said cylinder mounting bracket having a bearing support member for receiving said support pin and formed with an open radial slot on one side thereof aligned with said vertical groove in said locating pin and dimensioned to receive said flat outer faces of said support pin therebetween, and said support pin being rotatable within said support member so that said flat outer faces are out of registry with said slot and said support pin is retained in said support member.

**4,953,463**  
**CLEANING APPARATUS FOR A CYLINDER**  
 Akira Hara, Tokyo, Japan, assignor to B-J Trading Limited, Tokyo, Japan  
 Filed Sep. 27, 1988, Ser. No. 249,955  
 Claims priority, application Japan, Nov. 6, 1987, 62-280645  
 Int. Cl.<sup>5</sup> B41F 35/00  
 U.S. Cl. 101—425 3 Claims

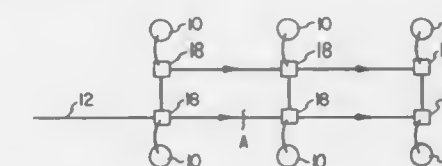
1. An apparatus for cleaning an outer peripheral surface of a rotating cylinder provided with a projection through said outer peripheral surface comprising:  
 a cleaner unit located in the vicinity of said cylinder and adapted to be brought into and out of contact with said outer peripheral surface of said cylinder, said cleaner unit including a cloth supply roll and a cloth take-up roll having a cleaning cloth wound at both ends on and tensioned between said cloth supply roll and said cloth take up roll, a driving device to intermittently rotate said cloth take up roll, a pressure pad for pressing said cleaning cloth onto the surface of said rotating cylinder to clean the same with said cleaning cloth being disposed between said

pressure pad and the surface of said cylinder, and a pair of guide members for retractably moving said cleaning unit into and out of contact with said outer peripheral surface of said cylinder, at least one cam plate mounted on said cylinder at one end thereof, said cam plate having a cam



surface positioned so that its rotational phase corresponds to the rotational phase of the projection on said cylinder, and at least one cam follower attached to said cleaner unit adapted to cooperate with said plate cam and to retract said cleaner unit away from said cylinder when the projection on said cylinder is passing over said pressure pad.

**4,953,464**  
**MULTI-DIRECTIONAL SIGNAL TRANSMISSION IN A BLAST INITIATION SYSTEM**  
 Peter F. Reiss, Sugarloaf, Pa., assignor to Atlas Powder Company, Dallas, Tex.  
 Division of Ser. No. 72,544, Jul. 13, 1987, Pat. No. 4,821,645.  
 This application Nov. 23, 1988, Ser. No. 276,412  
 Int. Cl.<sup>5</sup> F42B 3/10; C06C 5/00  
 U.S. Cl. 102—312 11 Claims



1. A method for increasing the reliability of explosive detonation by providing more than one signal path comprising:  
 (a) connecting a downline from an explosive charge to be detonated to a first connector block such that the downline is in close proximity of a blasting cap contained within the connector block, said cap being connected to a first signal path;  
 (b) adjoining one or more additional connector blocks containing blasting caps which are each connected to a separate signal path to the connector block which is connected to the downline, such that the blasting caps contained in the adjoining connected blocks are in close proximity such that detonation of any one of the caps by a signal from any one of the signal paths will sympathetically detonate the other caps and initiate a detonation signal in the downline.

4,953,465

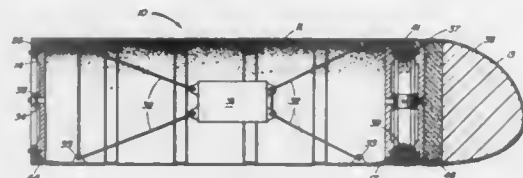
## FLEXIBLE MINE CASE

Ralph E. Hightower, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 31, 1963, Ser. No. 320,578

Int. Cl.<sup>3</sup> F42B 22/00

U.S. Cl. 102—406



1. In a marine mine, a casing composed almost entirely of an outermost flexible, non-magnetic material and having at least one opening therein through which said casing may be loaded with an explosive charge and means for detonating said charge, means for sealedly closing said opening, and reinforcing means secured externally to said casing for substantially maintaining the casing in a given general configuration when supplied with air under pressure, whereby said loaded casing retains said general configuration when thereafter inflated to a predetermined pressure but is distorted when planted underwater at depths where the sea pressure is greater than said predetermined pressure to lose said general configuration and thereby disguise its identity as a mine.

4,953,466

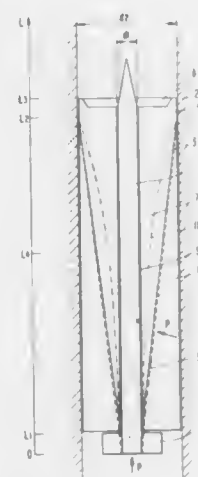
PROPULSION CAGE FOR A SUBCALIBER PROJECTILE  
Johann von Gerlach, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

Filed Apr. 7, 1989, Ser. No. 334,367

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1988, 3811597

Int. Cl.<sup>3</sup> F42B 14/08

U.S. Cl. 102—521



1. A propulsion cage separated into segments and in shape-mating relationship to a subcaliber projectile, the propulsion cage including a forward guide zone and a propulsion zone with a driving surface, the driving surface has a continuously increasing contour extending substantially over an entire length of the subcaliber projectile from a rear end of the subcaliber projectile to the forward guide zone and wherein an area in which the propulsion cage is adapted to abut a barrel is

disposed at a maximally forward position of the propulsion cage.

4,953,467

## TRACK SURFACING MACHINE WITH TRACK STABILIZATION

Josef Theurer, Vienna, Austria, assignor to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Filed Apr. 26, 1989, Ser. No. 343,072

Claims priority, application Austria, Sep. 15, 1988, 2270/88

Int. Cl.<sup>3</sup> E01B 27/00

U.S. Cl. 104—7.1

6 Claims



1. A continuously advancing track surfacing machine for compacting a ballast bed supporting a track consisting of two rails fastened to ties, the rails having facing gage sides and the ties having opposite ends, which comprises

- (a) a machine frame,
- (b) front and rear undercarriages supporting the machine frame on the track of mobility in an operating direction,
- (c) a drive for propelling the machine frame along the track,
- (d) a power actuated, vertically adjustable track stabilization assembly mounted on the machine frame between the undercarriages, the track stabilization assembly including
  - (1) rail-engaging roller tools,
  - (2) drive means for pressing the roller tools into engagement with the facing gage sides of the rails and
  - (3) means for vibrating the roller tools,
- (e) a drive for vertically adjusting the track stabilization assembly,
- (f) a track leveling reference system monitoring the track level,
- (g) a vertically adjustable plow arrangement for smoothing the ballast bed mounted on the machine frame between the undercarriages and associated with the track stabilization assembly, the plow arrangement extending across the track at least from one of the tie ends to the opposite tie end, and
- (h) a drive for vertically adjusting the plow arrangement into engagement with the ballast bed.

4,953,468

## LARGE SPAN GONDOLA LIFT

Denis Creissels, Meylan, France, assignor to Pomagalski S.A., France

Continuation of Ser. No. 587,639, Mar. 8, 1984, abandoned. This application Jan. 24, 1986, Ser. No. 821,527

Claims priority, application France, Mar. 21, 1983, 83 04707

Int. Cl.<sup>3</sup> E01B 25/00

U.S. Cl. 104—123

5 Claims



1. An aerial cable transport installation for a gondola-lift or a cablecar having a large span, said installation comprising: two towers located apart by a large spaced distance, each tower having a base anchored to the ground and a head forming a support point,

a carrier cable stretched between the two towers, said car-

rier cable being slidably supported on the tower heads and following a predetermined catenary trajectory, at least one car carried by the carrier cable to travel on said trajectory, a tower guying cable for each tower, each tower guying cable extending from an anchoring point adjacent the tower base to the tower head, and said towers being inclined and arranged to lean only towards one another to reduce the span of the carrier cable between the two towers and reduce a vertical height component of the towers required to span an identical horizontal distance between the bases of the towers, the distance between the carrier cable support points on the inclined towers being smaller than the distance between the bases anchored to the ground, each tower gradient being substantially perpendicular to said catenary trajectory of the carrier cable between the two towers at a point adjacent to that tower to minimize the tower height, each tower guying cable extending in a direction opposite a leaning direction of the corresponding tower.

4,953,469

## SELECTIVELY POSITIONABLE VARIABLE HEIGHT WORKSTATION AND METHOD OF USE

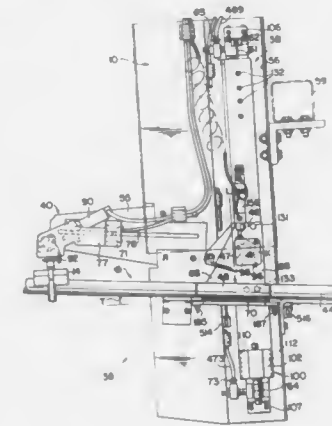
Richard Kuchta, Tolland; Larry Billings, Manchester; Vladimir Evenzon, Vernon, and Donald Bristow, Ellington, all of Conn., assignors to Gerber Garment Technology, Inc., Tolland, Conn.

Filed Sep. 15, 1989, Ser. No. 407,862

Int. Cl.<sup>3</sup> B61B 5/00

U.S. Cl. 104—127

29 Claims



29. A trolley delivery apparatus, positionable in a gap formed between adjoining rails, said apparatus comprising: a moveable rail section having opposite distal ends supported for movement between one position where said moveable rail section bridges a gap between opposed portions of adjoining rails and another position remote from said one position where said moveable rail section is positioned generally adjacent a workstation; engagement means for arresting travel of a trolley at a position on said moveable rail section between said distal ends and for controllably accelerating said trolley off said rail section when said rail section is in said one position; said engagement means being connected with and spaced from said moveable rail section such that said engagement means and said moveable rail section move in unison between said one and said another positions; actuator means mounted to a support for moving said moveable rail section and said engagement means with one another between said one and said another positions; control means for controllably energizing and deenergizing said engagement means and said actuator means so that a trolley traveling along said moveable rail section can be either diverted to said another position adjacent said workstation or allowed to pass from the moveable rail

section onto one of said adjoining rails without being diverted from said one position; said actuator means including a vertically oriented actuator capable of vertically moving said rail section and said engagement means between said one and said another position; said actuator means having stop means including a lower adjustable stop for adjustably limiting the downward movement of said moveable rail section; and said engagement means comprises a pivotal cam biased in either rotational direction by a dual-action actuator connected with said control means such that said control means is capable of orienting said cam in either an open or closed orientation.

4,953,470

## ATTRACTION TYPE MAGNETIC LEVITATION VEHICLE SYSTEM

Hitoshi Yamaguchi, Kawasaki, Japan, assignor to Fuji Electric Co., Ltd., Kanagawa, Japan

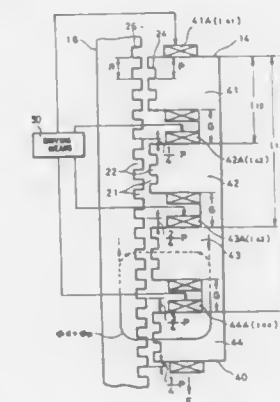
Filed Nov. 25, 1988, Ser. No. 276,353

Claims priority, application Japan, Dec. 29, 1987, 62-335389

Int. Cl.<sup>3</sup> B60L 13/04; H02K 41/00

U.S. Cl. 104—282

3 Claims



1. In an attraction type magnetic levitation vehicle system of the type comprising a magnetic rail laid on the side of a track and a levitation vehicle having a projection type supporting means and a projection type guide means each having a plurality of electromagnets excited by exciting coils, said plurality of electromagnets being arranged along the direction of said track such that a magnetic pole surface of each of said plurality of electromagnets is opposed to a surface of said magnetic rail, respectively, whereby said levitation vehicle is levitated above said magnetic rail without contact therewith by magnetic attraction forces between said magnetic rail and both said supporting means and guide means, the improvement comprising:

said plurality of electromagnets of said guide means being four in number; each of the distances between adjacent ones of the four electromagnets being respectively offset by a distance which is  $\frac{1}{4}$  of the distance corresponding to said predetermined pitch from an integer multiple of said predetermined pitch; the distance between a first sequential one of said four electromagnets and a fourth sequential one of said electromagnets is equal to an integer multiple of said predetermined pitch, while the distances between the first and second electromagnets and between the third and fourth electromagnets are respectively offset by  $\frac{1}{4}$  of the distance corresponding to said predetermined pitch from an integer multiple of said predetermined pitch; the magnetic pole surfaces of (a) at least one of said supporting means and guide means and (b) the surface of said magnetic rail opposed to said magnetic pole surfaces each

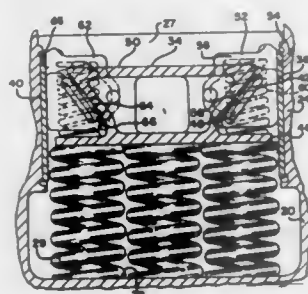


being in the form of a rectangular waveform having a plurality of alternating groove-and-tooth pairs arranged at a predetermined pitch along the direction of said track; at least one of the distances from one of said plurality of electromagnets which are in the form of a rectangular waveform to a remaining one of said plurality of electromagnets which are in the form of a rectangular waveform being offset from an integer multiple of said predetermined pitch along the direction of said track by a distance which is less than the length of one pitch; respective magnetic pole surface of both said supporting means and said guide means and the surfaces of said magnetic rail opposed to said magnetic pole surfaces having a shape in the form of said rectangular waveform; and means for driving the exciting coils of each of said plurality of electromagnets which are in the form of a rectangular waveform by applying exciting currents, said exciting currents including a DC bias current for imparting magnetic force in a transverse direction to said track and pulse currents having a predetermined timing and sequence, thereby causing thrust to be produced on the levitation vehicle in the direction of said track.

**4,953,471**  
**FRICION SHOE ASSEMBLY FOR REPAIR OF WORN RAILWAY TRUCK**  
Robert D. Wronkiewicz, Park Ridge, and Charles Moehling, Arlington Heights, both of Ill., assignors to AMSTED Industries Incorporated, Chicago, Ill.  
Filed Aug. 4, 1989, Ser. No. 389,410  
Int. Cl.<sup>5</sup> B61F 5/12

U.S. Cl. 105—198.4

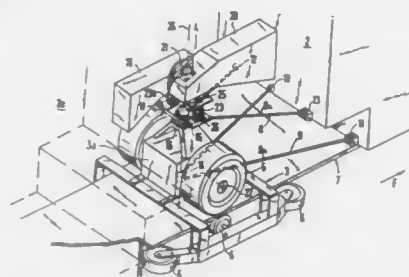
12 Claims



7. A friction shoe assembly for use in repair of a railway truck in which an abutting sloped surface of a truck bolster end has become worn during service, said friction shoe assembly comprising:

a friction shoe having a metal base section having a generally vertical, generally planar front face and at least one sloped surface extending downwardly at an acute angle in relation to an upper portion of said front face, and elastomeric pad means one of each received on each said sloped surface of said friction shoe for abutment to said corresponding sloped surface of said bolster end, said sloped surface of said friction shoe adapted to receive and retain said elastomeric pad, said elastomeric pad being trapezoid shaped in cross-section having a greater thickness at its upper end than its lower end and having an overall thickness such that, upon insertion of said elastomeric pad into said sloped surface of said friction shoe, a top surface of said elastomeric pad is adjacent to said abutting service worn sloped surface of said bolster end, thereby restoring said friction shoe to its original damping position.

**4,953,472**  
**RAIL VEHICLE, PARTICULARLY MONORAIL**  
Peter Totzer, Kornwestheim, Fed. Rep. of Germany, assignor to Von Roll Transportsysteme AG, Thun, Switzerland  
Continuation of Ser. No. 96,332, Sep. 14, 1987, abandoned. This application Aug. 4, 1988, Ser. No. 228,037  
Claims priority, application Fed. Rep. of Germany, Sep. 16, 1986, 3631461; Jan. 31, 1987, 3702900  
Int. Cl.<sup>5</sup> B61G 5/02  
U.S. Cl. 105—4.3 24 Claims



1. A rail vehicle, particularly a monorail, comprising: a plurality of cars defining adjacently arranged cars; each of said cars having a median longitudinal plane; interconnecting a means including a respective coupling device for interconnecting two adjacently arranged cars; a respective bogie disposed between each of said two adjacently arranged cars and having a longitudinally extending vertically oriented median plane; each said bogie being provided with axle suspension means for carrying and supporting guide wheels capable of running on a track; said axle suspension means including a wheel axle provided for said supporting wheels; a guide arrangement supported on the bogie; said guide arrangement including said interconnecting means and being provided with at least bearing means in said plane of said bogie; spaced pivot means on an end of one only of each of said adjacently arranged cars and having pivot axes extending at a right angle to the said longitudinal plane of said one car; guide means extending from said bearing means only to said spaced pivot means; each said coupling device being provided with a connecting joint; and said connecting joint together with said guide arrangement forming a steering axis which, in said median longitudinal planes of each two adjacently arranged ones of said cars, passes both through said connecting joint and through said bearing means of said guide arrangement supported on said bogie, said guide arrangement maintaining said longitudinal plane of said one car in an orientation to substantially contain said steering axis.

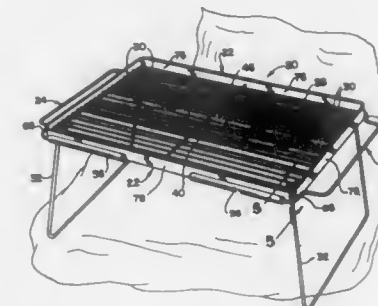
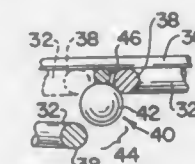
**4,953,473**  
**COMBINATION SERVING TRAY, BED TRAY AND BATHTUB TRAY**  
Leonard P. Tomaka, #4817 175 E. Delaware Pl., and Larry M. Dreyfus, #4819 175 E. Delaware Pl., both of Chicago, Ill. 60611  
Filed Jan. 18, 1990, Ser. No. 466,770  
Int. Cl.<sup>5</sup> A47B 3/00

U.S. Cl. 108—132

17 Claims

16. In a combination serving tray, bed tray and bathtub tray, the subcombination which comprises:  
(a) an elongated tray frame providing a support surface for objects to be placed on the tray;  
(b) a "U"-shaped leg hinged at each end of the tray to swing

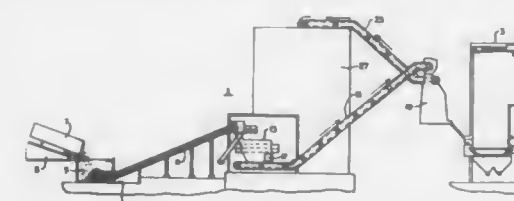
from a closed position located underneath the tray frame, in which position the leg is substantially parallel to the bottom surface of the tray, downward into a vertical position and then beyond into an over-center, open position, in which position the leg is generally upright, said "U"-shaped leg having a bight portion that is normally stiff but is resiliently bendable under pressure;  
(c) stop means for each of said "U"-shaped legs, said stop means being configured to limit the leg from moving beyond said over-center, open, generally upright position, in which position the two "U"-shaped legs hold the tray at a predetermined height above the surface on which the legs are supported; and



(d) latch means located on the underside of the tray, said latch means including a camming surface associated with each of said "U"-shaped legs, each of said camming surfaces facing an end of the tray in a position to engage the bight portion of its associated "U"-shaped leg when the leg is swung up from its open position to its closed position, said camming surface being configured to bend said resiliently bendable bight portion of the leg as the bight portion (i) is pushed toward the bottom of the tray by the user of the tray, (ii) slides across said camming surface, and (iii) after riding over the camming surface, snaps back to its normal shape to hold the leg in its closed position beneath the tray.

**4,953,474**  
**FUEL METERING BIN LEVEL CONTROL**  
Albert Armitage, Milton, Wash., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Jan. 26, 1990, Ser. No. 470,472  
Int. Cl.<sup>5</sup> F23K 3/00  
U.S. Cl. 110—101 CD 8 Claims

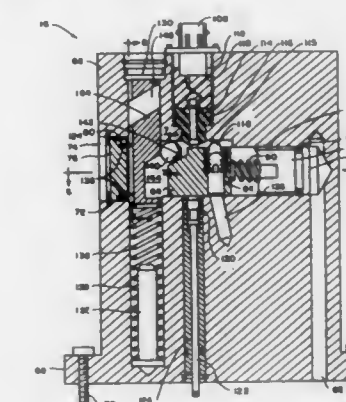
1. A fuel metering bin level control for a fuel bin having a feed conveyor which supplies fuel to the metering bin, a an



auger conveying system for moving fuel across the top of the bin, and a storage conveyor for transferring excess fuel from the metering bin to a storage silo, said fuel metering bin level control comprising an opening at the bottom of the auger

conveyor, a chute extending downwardly from said opening, means for opening and closing off the bottom of said chute, and means for responding to the level of fuel in said metering bin to operate said chute opening and closing means to close the chute when the level of fuel in the fuel metering bin reaches a level above a predetermined level and to open said chute when a level below the predetermined level is reached, whereby bridging of the fuel in the fuel metering bin is eliminated.

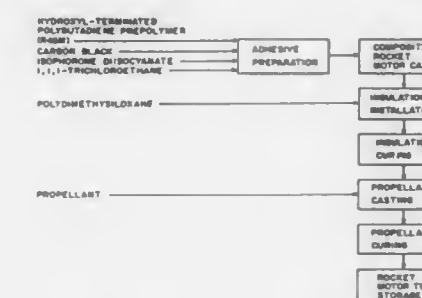
**4,953,475**  
**SAFETY-ARMING SYSTEM FOR LAUNCHED PROJECTILES**  
Arnold S. Munach, Rockville, and John Q. Nguyen, Silver Spring, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
Filed Dec. 7, 1989, Ser. No. 447,329  
Int. Cl.<sup>5</sup> F42B 15/32  
U.S. Cl. 102—229 33 Claims



16. In a safety system carried by a projectile having a detonator and control means responsive to operating energy applied thereto enabling the detonator, means responsive to launching of the projectile for storing the operating energy therein and means operatively connected to the control means for delaying the application of the operating energy thereto from the storing means in response to acceleration of the projectile during said launching thereof.

**4,953,476**  
**SILOXANE-BASED ELASTOMERIC INTERCEPTOR MOTOR INSULATION**  
David C. Sayles, 9616 Dortmund Dr. SE., Huntsville, Ala. 35803  
Filed Jan. 16, 1990, Ser. No. 465,818  
Int. Cl.<sup>5</sup> C06D 5/06  
U.S. Cl. 102—289 3 Claims

1. A method of installing a polysiloxane insulation in an interceptor rocket motor, said method comprising of completing following the steps:



(i) providing a composite rocket motor case designed for use in an interceptor rocket motor;

- (ii) applying an adhesive siloxane composition that is compatible with said composite rocket motor case to the inner surfaces of said composite rocket motor case;
- (iii) providing a polysiloxane elastomer having an empirical formula represented by the following structural formula:



wherein R is an alkyl group and n is a whole integer and said polysiloxane elastomer prior to curing has the physical properties of a viscous fluid;

- (iv) introducing said polysiloxane elastomer and any added reinforcing fibers, including fragile fibers, into a mixer-extruder;
- (v) extruding and transporting said polysiloxane elastomer and any added reinforcing fibers to an application head where a payoff wheel rolls a strip of said polysiloxane elastomer and any added reinforcing fibers onto the inner surface of said composite rocket motor case as said composite rocket motor case is being rotated and while said application head is moved axially by carriage means;
- (vi) controlling the axial speed of said application head so that each turn of said strip overlaps the previous turn similar to the way that a roof is shingled;
- (vii) means for controlling the uniformity of application of said polysiloxane elastomer and any added reinforcing fibers to complete the installing of said polysiloxane insulation in an uncured state;
- (viii) curing said polysiloxane insulation;
- (ix) casting a solid propellant composition onto said cured polysiloxane insulation; and;
- (x) curing said solid propellant composition to complete said method of installing a polysiloxane insulation in an interceptor rocket motor.

4,953,477

#### METHOD AND APPARATUS FOR REGULATING THE FURNACE OUTPUT OF INCINERATION PLANTS

Johannes J. E. Martin, Munich, Fed. Rep. of Germany, assignor to Martin GmbH für Umwelt- und Energie-Technik, Munich, Fed. Rep. of Germany

Filed Jul. 21, 1989, Ser. No. 384,214

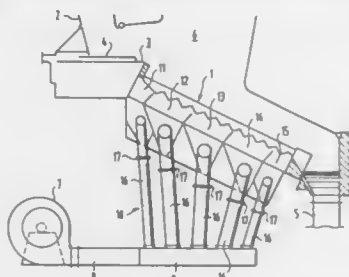
Claims priority, application Fed. Rep. of Germany, Jul. 29, 1988, 3325931

Int. Cl.<sup>5</sup> F23N 5/02

U.S. Cl. 110—190

7 Claims

1. A method for regulating the furnace output of incineration plants having a combustion grate, in which the primary air supply is regulated variously by zones along the length of the grate, the steps of the method comprising: regulating the primary air supply variously by zones in the transverse direction



of the combustion grate, monitoring the individual combustion zones and supplying the primary air quantities to the individual combustion zones corresponding to the burning behavior of the combustible material prevailing in the respective zones.

#### 4,953,478 ODOR CONTROL FOR A SLUDGE TREATMENT PROCESS

John D. Glorioso, Clearwater, Fla., assignor to Enviro-Gro Technologies, Baltimore, Md.

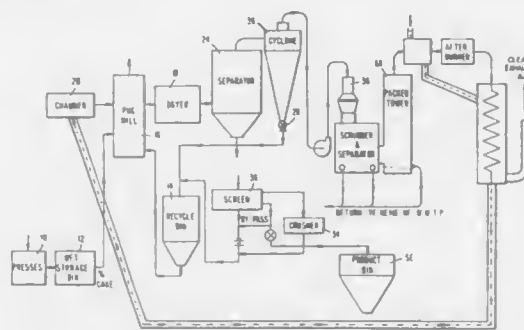
Division of Ser. No. 220,207, Jul. 18, 1988, Pat. No. 4,860,671, which is a continuation-in-part of Ser. No. 924,630, Oct. 29, 1986, Pat. No. 4,761,893. This application May 9, 1989, Ser. No. 350,059

The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> F23J 15/00

U.S. Cl. 110—215

17 Claims



1. A process for drying mechanically dewatered sewage sludge to produce pellets of a predetermined small and uniform size comprising the steps of:

mixing said sludge with recycled, previously dried sludge particles and pellets;

drying said mixture in a thermal drier to form pellets and particles thereof;

conveying the dried pellets and particles and dryer off-gas to a low velocity gas/solids separator and separating and collecting the pellets and a substantial portion of the particles;

clarifying the collected pellets and particles and separating and collecting the pellets of a predetermined size, from the undersized pellets and particles and the oversized pellets and collecting the undersized pellets and particles and the oversized pellets for recycling;

mechanically crushing the recycle materials and collecting the crushed pellets and particles;

recycling the collected pellets and particles by mixing said recycled materials with said incoming sludge to the drier;

collecting the off-gas from the gas/solids separator and removing substantially all of the fines therefrom;

condensing at least a portion of the water vapor contained therein;

and burning said gases to remove impurities therein before releasing said gases into the atmosphere.

#### 4,953,479 METHACOL INTEGRATED COMBINED CYCLE POWER PLANTS

Leonard J. Keller, and Austin N. Stanton, both of 1501 N. Cedar St., Bonham, Tex. 75418

Continuation-in-part of Ser. No. 204,240, Jan. 9, 1989, abandoned. This application Dec. 21, 1989, Ser. No. 454,141

Int. Cl.<sup>5</sup> F23B 7/00

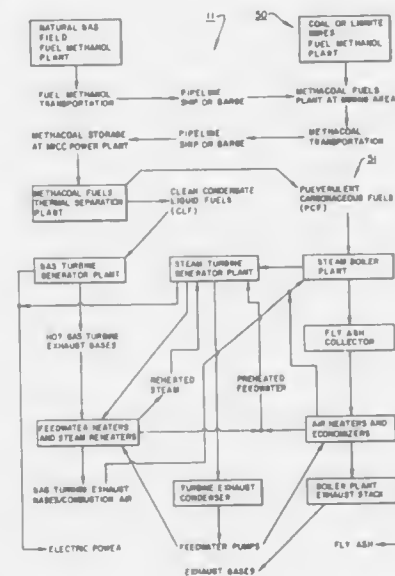
U.S. Cl. 110—233

17 Claims

1. Improved means of providing low-capital-cost, fuel-integrated, fully-fired, combined cycle power plants, called Methacol Integrated Combined Cycle (MICC) Power Plants, for utilizing anhydrous or low moisture content coal-methanol slurry fuels (Methacol fuels), and capable of achieving very high energy conversion efficiencies and low-cost electric power generation, and also capable of substantially reducing exhaust gas emissions of nitrogen oxides, sulphur oxides and ultra-fine (one-tenth micron particle size range) particulates, compared to conventional coal-fired or conventional lignite-

fired power plants which are not equipped with the most advanced chemical scrubbers, comprising:

- a thermal separation plant for said Methacol fuels for producing clean condensate liquid fuels (CLF), and highly reactive pulverulent carbonaceous fuels (PCF);
- a gas turbine generator plant for burning said CLF, in liquid or vapor form, to produce electric power;
- a steam boiler plant, or steam generator plant, for burning said PCF to produce steam for said electric power generation;
- a relatively small firebox for said steam boiler plant, designed to accommodate the rapid-burning said PCF, provide near-optimum retention time for the products of combustion at the high firebox temperatures, and provide substantially complete combustion, limit the retention time sufficiently to minimize the formation of said nitrogen oxides, and minimize ash fusion problems and slagging problems in said firebox and in other parts of said steam boiler plant;



a steam turbine generator plant for using said steam to produce additional said electric power;

said gas turbine generator plant and said steam turbine generator plant sized in capacity, with respect to one another, to provide the total capacity desired, and to also allow the use of essentially all of said CLF and essentially all of said PCF, during normal operating conditions and ranges of load requirements, to allow adequate management of inventories of said CLF and said PCF as fuels for said MICC power plant;

means for utilizing essentially all of the gas turbine exhaust gases as the principal source of firebox combustion air for burning of said PCF in said firebox, during most of said normal operating conditions and said normal ranges of load requirements, to effect the recovery and reuse of most of the heat energy from said gas turbine exhaust gases for use in the generation of said steam.

#### 4,953,480 ROTARY WATERWALL COMBUSTOR WITH IMPROVED TIRE ATTACHMENT

William G. Collins, Jr., Greensburg, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

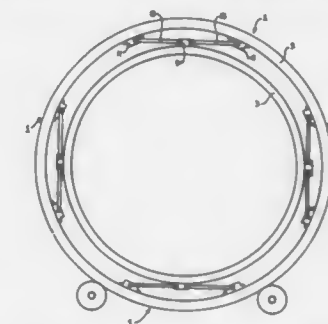
Filed Jul. 31, 1989, Ser. No. 387,672

Int. Cl.<sup>5</sup> A47J 36/00

U.S. Cl. 110—246

12 Claims

1. A plurality of improved attachments connecting a rotary waterwall combustor to a tire, each of said improved attachments comprising a support block attached to said rotary



ment to support said rotary waterwall combustor within said tire, maintain the position of the central axis of the rotary waterwall combustion and provide for differential thermal expansion of the rotary waterwall combustor, the linkage and the tire.

4,953,481

#### METHOD FOR CONTROL OF SLAG BUILD-UP IN SOLID WASTE INCINERATORS

Dennis A. Clayton, Stanchfield, Minn., assignor to Utility Chemicals, Inc., Cambridge, Minn.

Filed Sep. 1, 1989, Ser. No. 401,761

Int. Cl.<sup>5</sup> F23B 7/00

U.S. Cl. 110—342

11 Claims

1. The method of controlling slag build-up in waste burning incinerators, which comprises adding to the burning waste in the combustion zone of the combustion chamber of the primary incinerator per ton of waste fuel about 1/4 to 5 pounds of a melting point enhancing particulate material comprised of a mixture of magnesium oxide and calcium carbonate in the ratio of 2:1 to 1:2, and having a particle size between about 50 and 500 mesh, sufficient to raise the melting point of slag-forming ash above the highest operating temperature of the incinerator.

4,953,482

#### MULCHING AND SEEDING APPARATUS AND METHOD WITH FILM SEVERING AND COVERING

Jean Y. Emily, Landernau, France, assignor to Atochem, Paris, France

PCT No. PCT/FR85/00195, § 371 Date Jul. 17, 1986, § 102(e)

Date Jul. 17, 1986, PCT Pub. No. WO86/00780, PCT Pub.

Date Feb. 13, 1986

PCT Filed Jul. 17, 1985, Ser. No. 862,360

Claims priority, application France, Jul. 18, 1984, 84 11617

Int. Cl.<sup>5</sup> A01C 5/06

U.S. Cl. 111—144

8 Claims

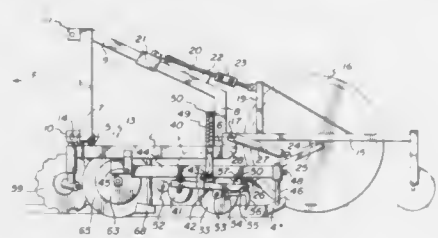
1. In a mulching and seeding apparatus for forming a soil seed bed row, depositing film on the ground over said soil seed bed row from a rotatable film reel on said apparatus, forming orifices in said film and planting seeds in said soil seed bed through said orifices in said film, the improvement comprising:

- a. severing means attached to said apparatus for severing said film from said reel at the end of a row to leave a ground film end and a reel film end, and concurrently depositing soil on said ground film end to hold said ground film end in place on said seed bed; and
- b. means on said apparatus for preventing said reel film end from being unreel during movement of said apparatus to the beginning of another seed bed row which is to be formed, covered with film and seeded, and wherein said severing means comprises:
- c. a knife blade rotatably mounted on said apparatus in a first



- position above and extending transversely across said film when deposited on said soil seed bed; and
- d. driven means for rotating said knife blade through a stroke of the blade to a second position in a direction toward said soil to sever said film and create an end thereof while during said same stroke burying said end with said knife blade.
8. In a method of forming a soil seed bed row with mulching apparatus, covering said row with a plastic film from a reel on said apparatus and forming openings in said film by said apparatus through which seeds are planted in said seed bed, the improvement comprising the steps of:

- a. operating a knife on said apparatus through a stroke of said knife by driven means and with said knife severing said film from said reel during said stroke at the end of a seed



- bed row to leave a seed bed end and a reel end of said film;
- b. during some stroke of said knife depositing soil on said seed bed end of said film with said knife to hold said film in place on said seed bed;
- c. preventing said reel end of said film from unwinding from said reel by setting a brake on said apparatus during movement of said apparatus from the end of a completed seed bed row to the beginning of another seed bed;
- d. depositing soil on the reel end of said film with a further driven operation of said knife at the beginning of said another seed bed row to hold said film in place; and
- e. allowing rotation of said film reel by releasing said brake during movement of said apparatus while forming said another seed bed row thereby depositing a film cover over said another seed bed row.

4,953,483

# **AUTOMATIC QUILTING MACHINE AND METHOD FOR SPECIALIZED QUILTING OF PATTERNS WITH SEPARATE COMPUTERS TO CONTROL THE STITCHING AND TABLE MOVEMENT FUNCTIONS**

David Brower, Tarzana, and Thomas K. Jernigan, North Hollywood, both of Calif., assignors to TD Quilting Machinery, Burbank, Calif.

Filed Aug. 4, 1989, Ser. No. 389,892

Int. Cl.<sup>5</sup> D05B 21/00

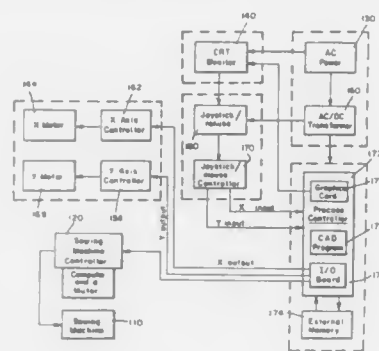
U.S. Cl. 112-119

11 Claims

1. A frame quilting machine comprising:
- a frame member for retaining a fabric;
  - said frame member mounted on a structure which can be moved in the X-direction, the Y-direction, or any X-Y combination direction;
  - a first cross beam extending horizontally over said frame member;
  - a second cross beam aligned parallel to said first cross beam and extending horizontally beneath said frame member;
  - a first motor to generate movement of said frame member in the X-direction;
  - an X axis controller connected to said first motor;
  - a second motor to generate movement of said frame member in the Y-direction;

- a Y axis controller connected said second motor;
- a first process controller having an Input/Output board having an X-output connected to said X-axis controller and a Y-output connected to said Y-axis controller to thereby process commands to enable the frame member and the fabric retained thereon to be moved horizontally in the X-direction, the Y-direction, and any combination X-Y direction between said first cross beam and said second cross beam;

- a monitor;
- a sewing machine head attached to said first cross beam and having a source of thread;
- a sewing needle extending from said sewing machine head and positioned to sew threads into said fabric while the frame member and structure move underneath said first cross beam and above said second cross beam;
- a sewing machine plate attached to said second cross beam and aligned with said sewing machine head and sewing needle;
- said monitor and said process controller connected to a source of power;
- said first process controller further comprising a graphics card to enable commands from the process controller to be viewed on said monitor;
- a graphic movement apparatus which enables a graphic cursor to draw patterns on said monitor;
- said first process controller further comprising a memory to store machine readable patterns;
- said first process controller programmed with a computer aided design program which comprises menus



of selected shapes which can be viewed on said monitor and used to sketch all or a portion of a desired pattern to be sewn into said fabric; and

- a second process controller connected to said sewing machine head for processing sewing function commands to the sewing machine head, the second process controller also connected to said Input/Output board of said first process controller;
- whereby an operator may draw a pattern on said monitor through use of the graphic movement apparatus combined with the computer aided design program, convert the pattern into machine readable language through the computer aided design program, store the pattern in machine readable language in the memory of the computer and cause the pattern to be duplicated on the fabric through commands from the process controller to the X-axis controller and Y-axis controller which causes said frame member to move relative to said first and second cross-beam to thereby bring locations on the fabric into alignment with said sewing needle as the pattern is sewn into said fabric, and new programs for the frame movement can be programmed into said first process controller independently of reprogramming the second process controller and new sewing machine commands can be programmed into said second process controller independently of said first process controller.

4,953,484

# **OVEREDGE SEWING MACHINE FOR CUTTING THE EDGE OF A FABRIC WHILE SEWING AN OVEREDGE STITCH**

Hiroaki Fukao, Kasugai; Teruhiko Ohkita, Nagoya; Nobusuke Nagasaka, Aichi, and Tateo Ueno, Mizunami, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

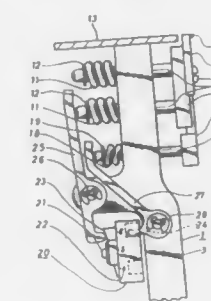
Filed May 23, 1989, Ser. No. 355,677

Claims priority, application Japan, May 26, 1988, 63-129370; May 28, 1988, 63-131070

Int. Cl.<sup>5</sup> D05B 37/06

U.S. Cl. 112-162

10 Claims



1. An overedge sewing machine comprising:
- a needle location for holding a needle, said needle location having a feed side over which fabric is fed prior to reaching the needle location, fabric being fed toward the needle location in a fabric-feed direction;
  - upper and lower knives disposed on the feed side of the needle location for cutting an edge of a fabric being fed toward the needle location;
  - a lower knife holder movable in a direction perpendicular to the fabric-feed direction for supporting the lower knife;
  - a stitch-support member near the needle location, extending away from the feed side and movable in the direction perpendicular to the fabric-feed direction;
  - an adjustment member for adjusting the stitch width;
  - displacement means responsive to said adjustment member for moving said lower knife holder and said stitch-support member by first and second displacement amounts respectively on movement of said adjustment member by a given amount.

4,953,485

# **AUTOMATIC QUILTING MACHINE FOR SPECIALIZED QUILTING OF PATTERNS WHICH CAN BE CREATED BY UTILIZING COMPUTER GRAPHICS IN CONJUNCTION WITH A REPROGRAMMABLE COMPUTER**

David Brower, Tarzana, and Thomas K. Jernigan, Canoga Park, both of Calif., assignors to TD Quilting Machinery, Burbank, Calif.

Filed Apr. 10, 1989, Ser. No. 336,007

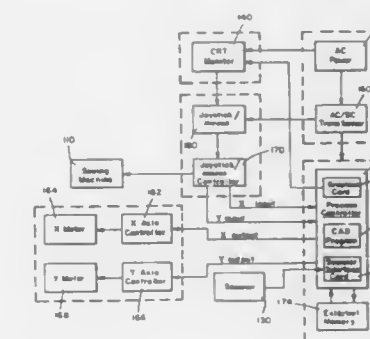
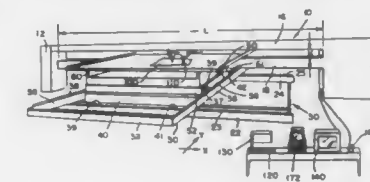
Int. Cl.<sup>5</sup> D05B 21/00

U.S. Cl. 112-262.3

51 Claims

50. The method of repetitively sewing a pattern into a fabric having a large surface comprising:
- positioning a sewing machine head having a source of thread and a sewing needle relative to said fabric;
  - retaining said fabric on a movable structure which can be made to move in a horizontal direction relative to the sewing needle and which can cause a portion of the surface of the fabric to be reached by the sewing needle so that thread can be sewn into the fabric;
  - controlling the movement of the movable structure relative to the sewing needle by a process controller;
  - creating a pattern on a monitor through use of a cursor and cursor movement apparatus combined with a computer aided design program which converts the pattern into machine readable language;

- storing the machine readable pattern in the memory of said process controller; and
- mapping the completed pattern on a computer grid to select where the pattern is to be duplicated on said fabric;



- whereby the process controller can cause the movement of the movable structure relative to the sewing needle to thereby duplicate the pattern stored in its memory at any multiplicity of desired locations.

4,953,486

# **ELECTRONIC ZIGZAG SEWING MACHINE**

Yasuro Sano, 1601-2, Narahara-cho; Akira Orii, 432, Terada-cho, and Eiji Murakami, 682-1, Izumi-cho, all of Hachioji, Tokyo, Japan

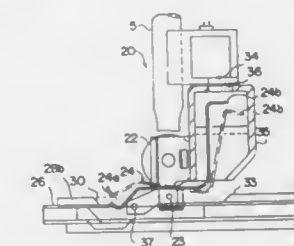
Filed Oct. 24, 1988, Ser. No. 261,879

Claims priority, application Japan, Oct. 23, 1987, 62-266205

Int. Cl.<sup>5</sup> D05B 3/06

U.S. Cl. 112-447

3 Claims



1. An improved electronic zigzag sewing machine comprising memory means for storing stitch control data for each stitch of a plurality of stitch patterns including one or more of buttonhole stitch pattern, said buttonhole stitch pattern being divided into plural parts to be sequentially produced in response to stitch control data assigned to each of said parts; selecting means for selecting a desired one of said stitch patterns; control means for reading out said stitch control data for a selected one of said stitch patterns, thereby controlling a needle amplitude and a fabric feeding amount; and signal generating means for generating a signal commanding a timing at which stitching operation of said buttonhole stitch pattern is to proceed from one part to the next part, said signal being supplied to said control means for reading out the stitch control data for the said next part of said buttonhole stitch pattern; the improvement wherein said signal generating means comprises an automatic generating means for generating a first timing signal when sensor means mounted on a first presser foot automatically detects a final stitch of said one part of said

buttonhole stitch pattern, and a manual generating means manually operated by an operator for generating a second timing signal when the operator visually detects said final stitch of said one part of said buttonhole stitch pattern, said control means being operated to read out the stitch control data for the said next part of said buttonhole stitch pattern in response to any one of said first and second timing signals.

4,953,487

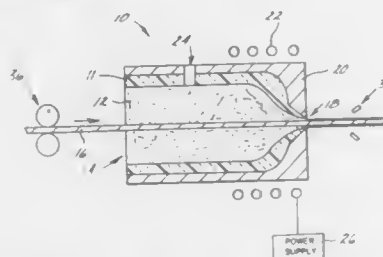
**ELECTROMAGNETIC SOLDER TINNING SYSTEM**  
Brian G. Lewis, Branford, Conn., assignor to Olin Corporation,  
New Haven, Conn.

Continuation of Ser. No. 26,429, Mar. 16, 1967, abandoned. This  
application Dec. 21, 1988, Ser. No. 289,403

Int. Cl.<sup>5</sup> B05C 3/02, 3/12

U.S. Cl. 118—620

4 Claims



1. An apparatus for applying a coating having a desired thickness to at least one surface of a substrate, said apparatus comprising:

means for containing a supply of coating material, said containing means having an inlet through which said substrate enters and an outlet through which said coated substrate exits; means for applying pressure to said coating material to restrict the flow of said material through said outlet and to control the thickness of said coating on said substrate; said pressure applying means including means for generating an electromagnetic field, said electromagnetic field causing the generation of heat within said coating material to maintain it in a molten condition and creating magnetic forces for damming the flow of said coating material through said outlet and controlling said coating thickness; said electromagnetic field generating means including an inductor surrounding at least a portion of said containing means and means for supplying a time varying current at a desired frequency to said inductor; and  
a flux concentrator intermediate said inductor and said containing means, said flux concentration being positioned close to said outlet.

4,953,488

**BOAT CARROUSEL**

Heinrich Heidtmann, RR 6 Box 11500, Rio Piedras, P.R.  
00928

Filed Oct. 25, 1988, Ser. No. 223,939

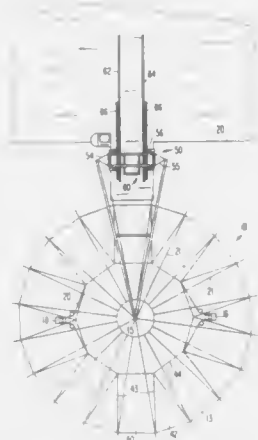
Int. Cl.<sup>5</sup> B63B 35/44

U.S. Cl. 114—44

5 Claims

1. A storage facility for individually movable units comprising a cylindrical storage tower formed as a rotatable structure having a spaced series of superposed annular stories each sub-divided into circumferentially spaced, substantially radial storage regions of sizes to receive said units, each region having an outer end opening to the exterior of said storage tower, and elevator means including a lift tower fixed in close spaced adjacency to the exterior of said storage tower, and a lift car movable vertically on said lift tower between a loading/unloading station at the bottom of said lift tower and any level corresponding to a selected story of said storage tower, said lift car including a pair of laterally spaced movable fingers substantially radially arranged with respect to the vertical axis of

said cylindrical storage tower, means carried by said lift car for moving said fingers between a retracted position wherein said fingers are clear of said storage tower and an extended position wherein said fingers project from said lift car into a selected



storage region to deposit or pickup a unit therein, and power means for rotating said storage tower to a position wherein the open end of said selected storage region is in radial alignment with said lift tower.

4,953,489

**TRIRADIAL SAIL PANEL CONFIGURATION WITHOUT BIAS EDGES**

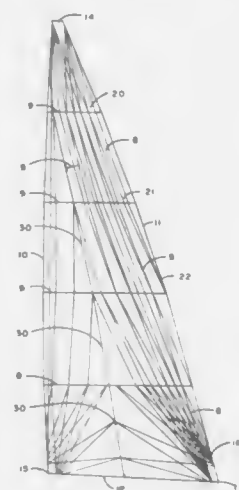
Clarke C. Bassett, 84 Waterside La., Cottage #1, Clinton, Conn.  
06413

Filed Jul. 13, 1989, Ser. No. 379,428

Int. Cl.<sup>5</sup> B63H 9/04

U.S. Cl. 114—103

11 Claims



1. A sail comprising a number of pluralities of radial panels, each panel comprising a pair of parallel edges parallel to a longitudinal axis of symmetry of the panel:  
each of the pluralities oriented to substantially radiate from a respective attachment means for transferring wind loads to a sailing vessel:  
said panels of each plurality oriented and angled to each other  
to converge near said attachment means,  
to overlap more of each other near said attachment means, to diverge distant from said attachment means, and  
to overlap less of each other distant from said attachment means.

4,953,490

**WAVE OPERATED BOAT PUMP**

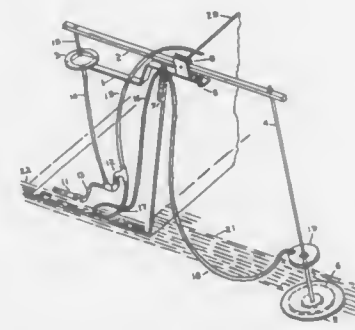
Winston J. Smith, 6550 Edgewater Dr., Erie, Mich. 48133,  
assignor to Winston J. Smith, Erie, Mich.

Filed Dec. 19, 1989, Ser. No. 454,439

Int. Cl.<sup>5</sup> B63B 13/00

U.S. Cl. 114—183.00 A

5 Claims



1. A wave operated boat pump comprising:  
a diaphragm pump having an actuating attachment bolt;  
a rocking arm coupled to said diaphragm pump through said actuating attachment bolt;  
a pivoting means that allows said rocking arm to rock or pivot on a mounting bracket;  
a rocking arm stop means positioned on said mounting bracket as to limit said rocking arm movement;  
a submerged resistance plate linked to said rocking arm by a connecting arm;  
a neutral buoyancy component attached to said submerged resistance plate;  
said mounting bracket supporting said diaphragm pump, and including detachable installation means to a boat hull;  
a bilge water discharge check valve assembly having an inlet side and an outlet side, said bilge water discharge check valve assembly connected to said diaphragm pump by an upper pumping tube, and said bilge water discharge check valve assembly also connected to a bilge water intake check valve assembly by a lower pumping tube;  
a standpipe tube connected to said outlet side of said bilge water discharge check valve assembly;  
a bilge water siphon discharge tube connected to said outlet side of said bilge water check valve assembly; and  
a bilge water siphon discharge tube float having means for buoyantly supporting the discharge end of said bilge water siphon discharge tube.

4,953,491

**TEMPORARY, REUSABLE, MOVABLE HULL PATCH FOR A DAMAGED OIL TANKER**

Hanna Zaitoun, 358 89th St., Brooklyn, N.Y. 11209

Filed Dec. 4, 1989, Ser. No. 445,407

Int. Cl.<sup>5</sup> B63B 43/16

U.S. Cl. 114—229

6 Claims

1. A temporary, reusable, movable hull patch for a damaged oil tanker hull having sides, said hull patch, comprising:  
(a) an upper track being rigidly affixed to each side of the hull;  
(b) a lower track being rigidly affixed to each side of the hull and spaced a distance below said upper track;  
(c) a body portion;  
(d) four flaps framing said body portion and having four free edges, respectively, and containing a resilient material so as to provide a good seal between said hull and said four flaps, said four flaps having a sealed position and an unsealed position;

(e) four pivots for pivotally connecting said four flaps to said body portion, respectively;  
(f) four hydraulic cylinders for moving said four flaps from



said sealed position to said unsealed position and vice versa; and  
(g) two trucks attached to and riding on said lower track and said upper track.

4,953,492

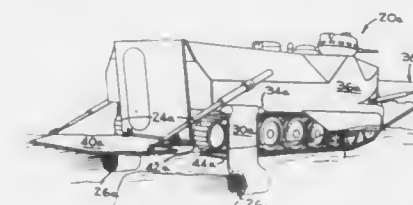
**WATER SUPPORTING AND PROPULSION SYSTEMS**  
Bryan Duffy, Gilroy, Calif., assignor to FMC Corporation,  
Chicago, Ill.

Filed Jun. 21, 1989, Ser. No. 369,178

Int. Cl.<sup>5</sup> B60F 3/00

U.S. Cl. 114—282

14 Claims



1. A power driven watercraft having a longitudinal axis, comprising:  
means defining transversely aligned right and left water propulsion systems attached only to the rear portions of side walls of the watercraft and each supporting a water propulsion module, and each propulsion system including a single mounting leg and a hydrofoil extending substantially perpendicular to the associated mounting leg and defining an apex therebetween;  
first power means connected between said watercraft and associated ones of said mounting legs for moving said right and left propulsion systems transversely of said axis between an operative position within the water and a stowed position above the water; and  
second power means carried by said watercraft and disposed at associated ones of said apexes for driving said right and left water propulsion systems for propelling the watercraft up to a speed of at least 20 miles per hour when supported by water.



# 4,953,493 RATTLE RESISTANT GEARSHIFT POSITION INDICATOR

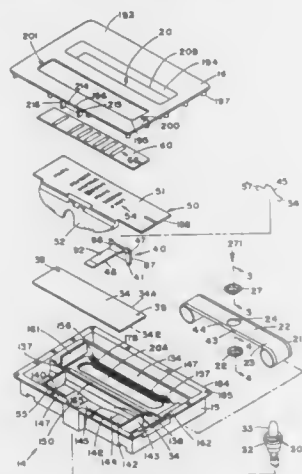
James W. Richmond, Carmel, Ind., assignor to Emhart Industries, Inc., Towson, Md.

Filed Dec. 22, 1988, Ser. No. 288,224

Int. Cl.<sup>5</sup> G09F 09/40

U.S. Cl. 116—28.1

5 Claims



1. A gearshift level operating position indicating mechanism comprising:

- a housing having a window in it and having an aperture means for passing said shift lever through the housing;
- indicia means for labeling the operating positions of said gearshift lever, said indicia means being viewable in said window and including a plurality of indicia;
- an indicating member;
- indicating member support means for connecting said member to said gearshift lever and for movably supporting said indicating member within said housing over a range of movement along a first axis that permits it to be visually aligned in said window with said plurality of indicia, said indicating member including a surface at an angle to said first axis; and
- spring means preventing movement of said member along second and third axes substantially orthogonal to said first axis and to each other to prevent said member from rattling, said spring means comprising a single piece of wire engageable with said housing and said surface.

# 4,953,494 METHOD FOR MOLDING LARGE PLASTIC UNITARY CORE BOATS

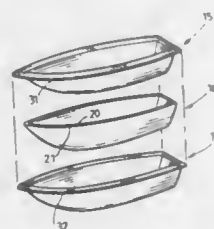
Zach McClendon, Jr., Rte. 2, Box 31B, Monticello, Ark. 71655

Continuation of Ser. No. 1,367, Jan. 8, 1987, abandoned. This application May 19, 1988, Ser. No. 195,910

Int. Cl.<sup>5</sup> B63B 35/00

U.S. Cl. 114—357

16 Claims



1. A method for making a large boat comprising the steps of:  
a. molding a unitary plastic foam core extending from bow to stern having an inner surface and an outer surface, said

core having a thickness of at least one foot in all dimensions;

- b. heat curing the core;
- c. individually molding an outer skin configured to match the outer surface of the core, and having a mating edge, said outer skin being substantially thinner in cross-sectional thickness than said core;
- d. individually molding an inner skin configured to match the inner surface of the core, and having a mating edge, said inner skin being substantially thinner in cross-sectional thickness than said core;
- e. bonding the outer skin and the inner skin to the outer and inner surfaces, respectively, of the core; and
- f. bonding together the mating edges of the outer skin and the inner skin to sealingly enclose the core.

# 4,953,495 ARTICLE COATING SYSTEM

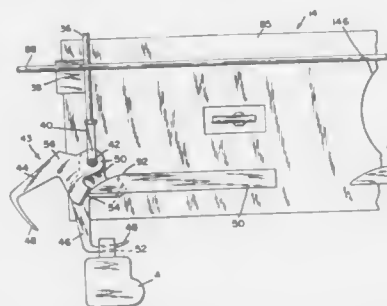
Richard Salisbury, Laguna Niguel, Calif., assignor to Blodgett & Blodgett, Worcester, Mass.

Filed Feb. 1, 1989, Ser. No. 305,453

Int. Cl.<sup>5</sup> B05C 1/02, 19/04

U.S. Cl. 118—70

18 Claims



1. A apparatus for applying a coating of plastic to a metallic article having a configuration which enables the article to be suspended on the free end of a projecting element, said apparatus comprising:

- (a) an overhead conveyor which moves along a predetermined path,
- (b) a metallic connector which is suspended from said conveyor for movement along said path,
- (c) a metallic carrier assembly which comprises a pair of carriers for jointly carrying the article, each of said carriers having a projecting lower free end portion for supporting the article in suspension, each of said carriers being mounted on said connector for movement relative to the connector from a lower article supporting position to an upper position in which the carrier is completely free of the article, while the article is carried solely by the other of said carriers,
- (d) a spray station along the path of said conveyed article for spraying a loose coating of ionized plastic particles on said article,
- (e) cleaning means along the path of said conveyed article downstream of said spray station for moving each carrier in succession to the upper position and for removing said plastic particles from at least the lower free end of each of said carriers when it is in the upper position, and
- (f) a curing oven along the path of said conveyed article downstream of said cleaning station for curing said plastic particles to form a permanent coating of plastic on the article.

# 4,953,496 HIGH PRESSURE WATER JET CLEANER AND COATING APPLICATOR

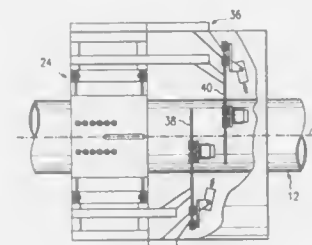
Sidney A. Taylor, Houston, and Stanley J. Rogala, Katy, both of Tex., assignors to CRC-Evans Pipeline International, Inc., Houston, Tex.

Filed Jul. 17, 1989, Ser. No. 381,103

Int. Cl.<sup>5</sup> B05C 1/04

U.S. Cl. 118—72

9 Claims



- 1. An apparatus for treating a pipeline, comprising:  
a centering assembly mounted on the pipeline for movement along the pipeline, said centering assembly having a frame member and at least one arm pivotally mounted to the frame member for movement between a first operating position and a second installation position;
- a nozzle carriage assembly mounted on the arm and defining at least one arcuate ring, the arcuate ring being concentric to the center axis of the pipeline when the arm is in the first operating position and spaced from the pipeline when the arm is in the second installation position to allow the apparatus to be installed and removed from the pipeline; and
- at least one spray nozzle mounted on the arcuate ring.

# 4,953,497 APPARATUS FOR COATING CONTINUOUS WEBS

Hans Kessler, Hanau, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

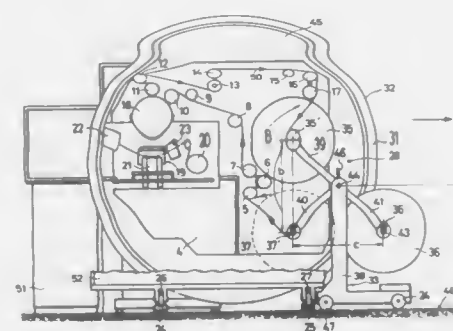
Filed Oct. 30, 1987, Ser. No. 115,263

Claims priority, application Fed. Rep. of Germany, Aug. 6, 1987, 3726113

Int. Cl.<sup>5</sup> C23C 14/00

U.S. Cl. 118—718

4 Claims



- 1. An apparatus for vacuum coating continuous web materials comprising a housing, a removable cover disposed on at least one side of said housing for the hermetic closure of same, winding means comprising pulley cylinders, tension measuring cylinders, stretching cylinders and tightening cylinders journaled between two plates, plus at least one coating cylinder, means for coating said web held stationary in said housing and positioned along the web path between said feed roll and said take up roll, at least one take-up roll, at least one feed roll and at least one fresh roll, said two plates containing therebetween

said cylinders and said rolls, being so arranged to form a unit, said unit being capable of traveling on rolling means on tracks, thereby enabling the loading and unloading of said apparatus, with the result that all of said cylinders and said rolls are freely accessible from without said housing; and transport means which can move transversely to said tracks used in conjunction with said unit, said transport means being provided with pairs of arms journaled on said rolling means, the common pivot axis of said pairs of arms being disposed parallel to said tracks, and the free ends of said pairs of arms being equipped with supporting eyes for holding one fresh roll and one take-up roll.

# 4,953,498 MICROWAVE PLASMA CVD APPARATUS HAVING SUBSTRATE SHIELDING MEMBER

Junichiro Hashizume, Ueno; Tetsuya Takei; Shigehira Iida, both of Kaya; Keishi Saitoh, Nabari, and Takayoshi Arai, Ueno, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

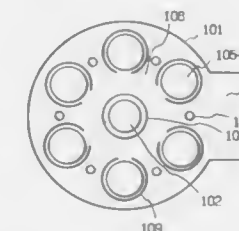
Continuation of Ser. No. 403,990, Sep. 7, 1989, abandoned, which is a continuation of Ser. No. 173,606, Mar. 25, 1988, abandoned. This application Feb. 7, 1990, Ser. No. 477,123

Claims priority, application Japan, Mar. 27, 1987, 62-73562; Mar. 10, 1988, 62-57297

Int. Cl.<sup>5</sup> C23C 16/50

U.S. Cl. 118—719

7 Claims



- 1. In an apparatus for the formation of a functional deposited film on a plurality of cylindrical substrates by means of microwave plasma chemical vapor deposition, said apparatus having a cylindrical deposition chamber with a center longitudinal axis and comprising a circumferential wall having an end portion thereof provided with a microwave introducing window to which a waveguide extending from a microwave power source is connected, said cylindrical deposition chamber having a plasma generation space and plurality of rotatable cylindrical substrate holders therein, each of said substrate holders capable of having one of said cylindrical substrates positioned thereon, said rotatable cylindrical substrate holders being concentrically arranged in said cylindrical deposition chamber substantially parallel and equidistant from said center longitudinal axis of said deposition chamber, said cylindrical deposition chamber being provided with means for supplying a film-forming raw material gas into said plasma generation space and means for evacuating said cylindrical deposition chamber, the improvement with comprises a cylindrically shaped shielding member made of a material selected from the group consisting of aluminum, nickel, stainless steel, ceramics, and heat-resistant polymer, said shielding member positioned so as to be adjacent to each of said cylindrical substrates while maintaining a constant distance between said shielding member and each of said cylindrical substrates in said plasma generation space, said shielding member being provided with a plurality of openings, each of said openings being directed to one of said cylindrical substrates and each of said openings being longitudinally situated along one of said cylindrical substrates so as to allow active species capable of contributing to the formation of a deposited film generated in said plasma generation space to pass through said openings toward the cylindrical substrate.

4,953,499

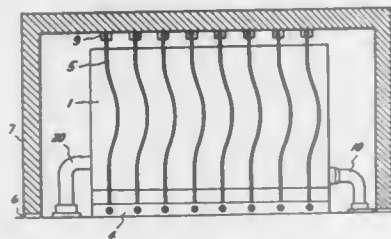
**APPARATUS FOR SYNTHETIC DIAMOND DEPOSITION INCLUDING CURVED FILAMENTS AND SUBSTRATE COOLING MEANS**

Thomas R. Anthony, Schenectady; Robert C. DeVries, Burnt Hills; Richard A. Engler; Robert H. Ettinger, both of Schenectady, and James F. Fleischer, Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 3, 1989, Ser. No. 389,212  
Int. Cl.<sup>5</sup> C23C 16/46

U.S. Cl. 118—724

6 Claims



1. Apparatus for deposition of diamond on substrates by chemical vapor deposition, comprising:

- a closed reaction chamber having at least one gas inlet and at least one exhaust means, said chamber being capable of being maintained at a pressure below atmospheric;
- support means for supporting said substrates in said chamber parallel to each other and spaced apart to permit gas flow between said substrates;
- resistance heating means comprising a plurality of vertically extending linear, electrically conductive filaments pre-stressed to curve in a single plane substantially equidistant from and parallel to said substrates, each of said filaments being fixedly secured at each end to a pair of fixed electrodes; and
- substrate cooling means situated adjacent one of said substrates on the opposite side from said filaments.

4,953,500

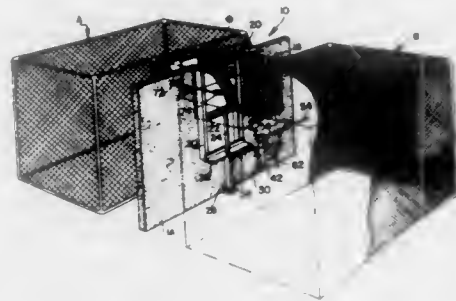
**DOOR SYSTEM FOR LARGE PRIMATE CAGING**

E. Sue Savage-Rumbaugh; Duane M. Rumbaugh, both of Ellenwood, Ga.; Samuel O. Smith, Apex, N.C., and Michael B. Smith, Lilburn, Ga., assignors to Emory University, Atlanta, Ga.

Filed Dec. 7, 1988, Ser. No. 281,260  
Int. Cl.<sup>5</sup> A01K 1/00, 1/08

U.S. Cl. 119—17

3 Claims



1. A primate door system for an opening separating two areas comprising:

- (a) a door movable between a first position to close said opening and a second position to open said opening;
- (b) a piston having a distal end that is connected to said door;
- (c) a hydraulic cylinder having said piston slidable therein;
- (d) a source of fluid;
- (e) a control cylinder located between and in fluid communi-

cation with said hydraulic cylinder and said source of fluid, wherein said control cylinder comprises a spool valve in said control cylinder that is connected to said electrical switching system; and

- (f) an electrical switching system connected to said control cylinder to selectively direct fluid into and out of said hydraulic cylinder to act upon said piston so as to move said door between said first and second positions, wherein said electrical switching system comprises a solenoid electrically connected to said spool valve; at least two electrical door switches, at least one of said switches being located in each one of said areas, said door switches operable by said primate and being connected to said solenoid; a timer and relay system in line with said solenoid and said door switches; a master switch in line with said door switches and said timer and relay system, a cut-off switch located between said door switches and said timer and relay system, said cut-off switch operable by the caretaker for said primate to render selectively inoperable said door switches and a source of electrical current operably connected to said solenoid, said door switches, said master switch, said timer and relay system and said cut-off switch.

4,953,501

**FLOORING UNIT**

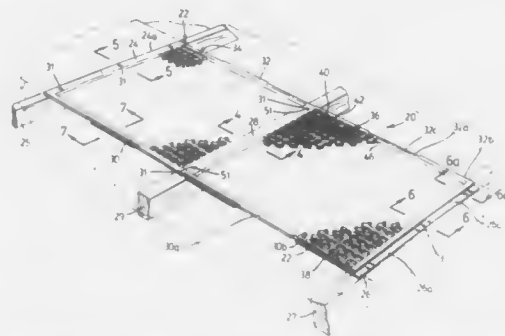
Pierre A. Moreau, Calgary, Canada, assignor to BCM Manufacturing Ltd., Calgary, Canada

Filed Mar. 23, 1989, Ser. No. 327,838

Int. Cl.<sup>5</sup> A01K 1/00

U.S. Cl. 119—28

19 Claims



1. A flooring unit for an animal enclosure, being of relatively thin and flat rectangular shape overall for mounting between substantially parallel joist means and defining:

- a planar tread surface;
- two elongated mounting members being disposed at respectively opposite ends of the unit and extending over substantially the entire width of the unit, each mounting member including a portion adapted to overlap a corresponding portion of a complementary mounting member whereby two flooring units can be arranged end-to-end with complementary mounting members fitted together and overlapping one another to define a mounting area, each mounting member including fastener receiving means, the fastener receiving means being located such that when a portion of a mounting member overlaps a corresponding portion of a complementary mounting member the fastener receiving means of the portions are aligned to receive a single fastening element to be driven into a joist means therebelow;

- two elongate engagement members disposed at opposite sides of the unit and having shapes which are complementary to each other so that two flooring units can be arranged side-by-side with the complementary engagement members fitted together; and

a grid-like area between said member including openings through which waste material can pass.

4,953,502

**THREE-DIMENSIONAL MAZE PET TOY**

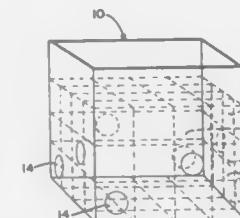
Judith L. Hoover, 3108 Killian Rd., Unioatown, Ohio 44685

Filed Sep. 21, 1989, Ser. No. 410,256

Int. Cl.<sup>5</sup> A01K 15/00

U.S. Cl. 119—29

17 Claims



1. A three-dimensional maze for small animals comprising: a containment structure with at least one open end for accessing maze elements and cleaning, and at least one aperture large enough to accommodate the passage of a small animal;
- a plurality of maze elements encased in said containment structure, said maze elements further comprising a plurality of grid elements, said grid elements containing an indeterminate number of apertures large enough to accommodate a small animal;
- a first means for altering the maze wherein the grid elements are interchanged; and
- a plurality of planar surfaces which separate the maze elements.

4,953,503

**WINDOW-MOUNTED BIRD FEEDER APPARATUS**

Timothy Lundquist, P.O. Box 386A, Tivoli, N.Y. 12583

Filed Jan. 3, 1989, Ser. No. 292,900

Int. Cl.<sup>5</sup> A01K 39/01, 39/04

U.S. Cl. 119—51.01

1 Claim



1. In combination with window-mounted bird feeder apparatus comprising suction cups attachable to respective window panes divided by at least one mullion, a feeder body having a front side accessible to birds and a rear adapted to face the window panes, and hanger means projecting from said rear side, improved mounting brackets comprising

- (a) at least two flat elongated rigid members each spanning at least two of said panes across the mullion;
- (b) hanger receiving means on each of said rigid members for removably holding the feeder body;
- (c) a plurality of suction cup mounting holes in each of said rigid members; and
- (d) suction cup support means secured to said mounting holes for affixing the suction cups to the associated rigid

members with the rigid members spanning the panes across the mullion, each of said support means comprising (i) screw means extending through the mounting hole into securing engagement with the associated suction cup, and

(ii) a spacer cylinder around the screw means between the rigid member and the suction cup.

4,953,504

**ANIMAL FEEDER**

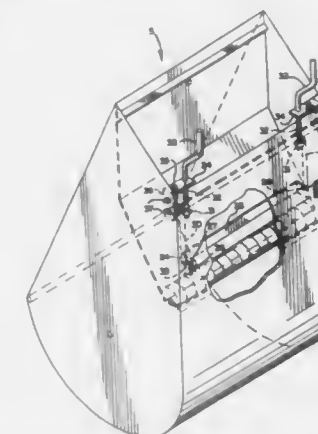
Ian A. Taylor, Quincy, Ill., assignor to Moorman Manufacturing Company, Quincy, Ill.

Filed Jan. 23, 1990, Ser. No. 468,642

Int. Cl.<sup>5</sup> A01K 5/01

U.S. Cl. 119—54

8 Claims



1. In an animal feeder for individual animal self-regulated release of free flowing particulate animal feed from an elevated feed supply hopper into a subjacent feed trough and comprising a generally vertical rear wall, opposed side walls, a feed trough extending between said sidewalls and joined at its rear to the bottom portion of said rear wall, an at least in part inclined hopper wall extending between said sidewalls with its bottom edge forming in cooperation with the opposing juxtaposed portion of said rear wall a generally horizontal elongated feed outlet slot which extends longitudinally between said sidewalls, and animal actuable slot closing means, the improvement wherein said slot closing means comprises

- a plurality of relatively short tubular segments within said hopper and resting in end-to-end slot-closing and elongated tube-forming relationship in said elongated slot, a rod resting loosely within said tubular segments and extending between the opposing end segments, and a generally horizontal segment restraining member mounted above said tubular segments in position to limit lifting of said segments, said rod and restraining member cooperating to maintain said tubular segments in their said end-to-end relationship.

4,953,505

**SAFETY DEVICE FOR CHICKS IN AUTOMATIC POULTRY FEEDERS**

Peder Lia, Hvittingfoss, Norway, assignor to Modum Stiger a.s., Vikersund, Norway

Filed Feb. 1, 1989, Ser. No. 304,647

Claims priority, application Norway, Feb. 1, 1988, 880424

Int. Cl.<sup>5</sup> A01K 39/014

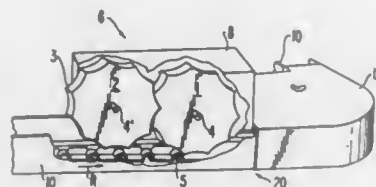
U.S. Cl. 119—57.2

15 Claims

1. A safety device for chicks in an automatic poultry feeder, said automatic poultry feeder having a feed trough and a feed chain for movement in said feed trough, said safety device comprising:

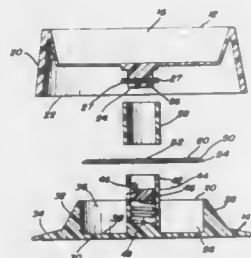


a downstream roller;  
an upstream roller positioned upstream of said downstream roller with respect to the direction of travel of said feed chain;



means for supporting said rollers such that said rollers are in contact with one another and such that said downstream roller can be driven by said feed chain, whereby movement of said feed chain drives said downstream roller and said downstream roller drives said upstream roller so that the upstream roller can eject any chick on said feed chain.

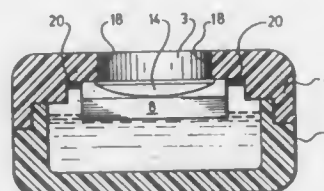
**4,953,506**  
**FEED BOWL FOR ANIMALS**  
Daniel T. Sanders, 1834 McJenkin Dr., NE., Atlanta, Ga. 30345  
Filed Apr. 21, 1988, Ser. No. 184,437  
Int. Cl.<sup>5</sup> A01K 5/00  
U.S. Cl. 119—61



1. Apparatus adapted for being placed on a support surface for feeding an animal, such as a pet dog or cat, comprising: an upper bowl portion including an upper recess therein for receiving food or water; a lower base portion removably attached to said top bowl portion, said lower base portion including a generally circular recess formed in an upper part thereof; coupling means secured to said upper bowl portion and said lower base portion interconnecting said upper and lower portions together and elevating the upper bowl portion above the support surface, including a pair of centrally located generally cylindrical post members which telescope together and are respectively secured to said upper bowl portion and said lower bowl portion, said post members comprising a male type post member secured to the underside of said upper bowl portion and a female type post member secured to and located within the recess of the lower base portion; a generally flat, relatively thin replaceable disk located in the circular recess of said lower base portion, said disk including an annular most region of generally sticky material on the outer surface thereof surrounding said coupling means for inhibiting the travel of crawling insects across said annular region and thus preventing the insects from gaining access to the upper bowl portion; a cylindrical sleeve fitted over said female post member abutting said disk and holding said disk in place in said recess of the lower base portion; means locking said male and female post members together including an elongated pin extending through and out-

wardly from said male post member a predetermined distance to provide a pair of exposed end portions and a pair of notched grooves in the top portion of said female post member, said end portions removably engaging said notched grooves to thereby provide a bayonet type of connection, said end portions also retaining said cylindrical sleeve adjacent the disk and thereby holding the disk within the circular recess.

**4,953,507**  
**LIVESTOCK WATERING APPARATUS**  
S. Eric Robinson, R.R. 2, Warton, Ontario, Canada N0H 2T0  
Filed Jun. 15, 1988, Ser. No. 207,642  
Int. Cl.<sup>5</sup> A01K 7/00  
U.S. Cl. 119—73

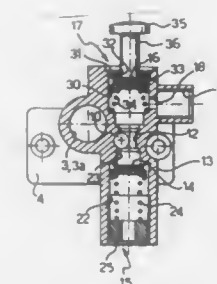
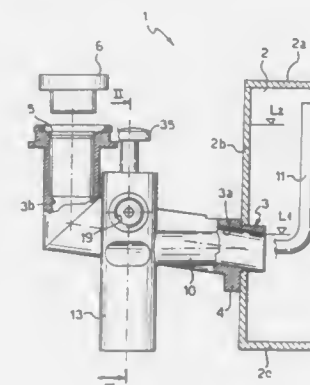


1. A livestock watering device, comprising: an insulated tank for receiving water from a water supply, said tank having a bottom, a top, and sidewalls; at least one opening through said top whereby an animal may gain access to water in the tank; beneath each said at least one opening, at least one horizontally arranged buoyant door having an upper surface and an underside, said at least one door being pivotally connected at one side thereof to the underside of said top adjacent to said at least one opening, for swinging up and into or down and away from said at least one opening, the upper surface of each said at least one door having a flat periphery along the pivotally connected side and adjacent sides of the door, for engaging the underside of the top of the tank adjacent said at least one opening, and a scooped central portion falling away from said flat periphery to a low point at an edge opposite said pivotally connected side so as to drain water away from said periphery, a small gap into the tank being provided in the area of said low point of the scooped portion, whereby water may drain from the upper surface of the at least one door into said tank, said flat periphery of said at least one door being set back horizontally from said at least one opening, such that the entire portion of said at least one door directly beneath the opening is scooped and thus lower than said flat periphery, thereby draining water towards said gap; and an automatic valve means responsive to the water level in said tank for connection to said water supply for maintaining the water level in said tank at a level sufficient to hold each said at least one door closed by buoyancy.

**4,953,508**  
**BOILER FOR STEAM FLATIRONS, INCORPORATING AN IMPROVED REPLENISHMENT MANIFOLD**  
Giuseppe Glannelli, Olgiate Comasco, Italy, assignor to Micromax S.p.A., Como, Italy  
Filed Feb. 24, 1989, Ser. No. 315,099  
Claims priority, application Italy, Feb. 24, 1988, 19514 A/88  
Int. Cl.<sup>5</sup> F22D 33/00, 5/26  
U.S. Cl. 122—7 R

1. A boiler for steam flatirons comprising: a closed receptacle having side walls, a top wall and a base wall; a replenishment manifold disposed in communication with said receptacle and having two tubular sections, a first

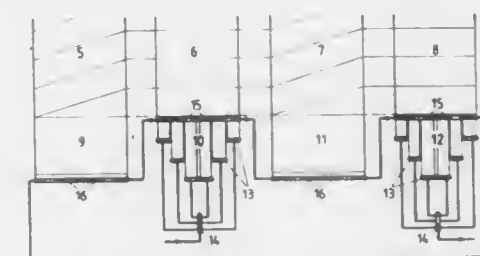
tubular section having an outlet end in said receptacle at an intermediate location between said base wall and said top wall and a second tubular section connected to said first tubular section and having an inlet end at a level between said intermediate location and said top wall; a steam delivery manifold comprising a tubular section extending into said receptacle and having a free end located at a level between said top wall and a level coplanar with said inlet end of said second tubular section of said replenishment manifold; and



a normally closed manually operated valve means for venting said receptacle whereby upon supplying water to said receptacle through said replenishment manifold with said valve means closed, the water will rise only to said intermediate location and upon supplying water to said receptacle through said replenishment manifold with said valve means open, the water will rise to said level of said inlet end of said second tubular section of said replenishment manifold.

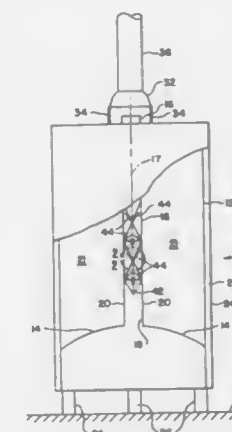
**4,953,509**  
**FORCED-CIRCULATION STEAM GENERATOR**  
Manfred Klein, Oberhausen, Fed. Rep. of Germany, assignor to Deutsche Babcock Werke Aktiengesellschaft, Oberhausen, Fed. Rep. of Germany  
Filed Jun. 29, 1989, Ser. No. 373,992  
Claims priority, application Fed. Rep. of Germany, Jul. 6, 1988, 3822804  
Int. Cl.<sup>5</sup> F22B 37/00  
U.S. Cl. 122—6 A

1. A forced-circulation steam generator comprising: a combustion chamber having a cone; said combustion chamber having piping walls with at least partly slanting pipes; said cone having piping walls with upright pipes; separating header means separating the pipes in said combustion chamber from



the pipes in said cone and forming a separating plane; a flow medium from the pipes in said cone to the pipes in said combustion chamber having uniform enthalpy in said separating plane due to said separating header means.

**4,953,510**  
**APPARATUS AND METHOD FOR HEATING WATER**  
Marc W. Akkala, New Berlin, and Kenneth R. Walther, Milwaukee, both of Wis., assignors to A. O. Smith Corporation, Milwaukee, Wis.  
Filed Aug. 17, 1989, Ser. No. 395,031  
Int. Cl.<sup>5</sup> F22B 5/00  
U.S. Cl. 122—17



1. An improved apparatus for exchanging heat between a first fluid retained within said apparatus and a second fluid flowing through said apparatus, said apparatus comprising: a storage tank for retaining the first fluid, a flue means passing in heat exchange relationship with the first fluid in said storage tank, the first fluid being in heat transfer contact with a first surface of said flue means, and the second fluid flowing through said flue means being in heat transfer contact with a second surface thereof; and flow control means disposed within said flue means for directing said second flowing fluid toward said second surface of said flue means when heat exchange is desired between the first and second fluids, and for directing said second flowing fluid away from said second surface of said flue means when heat exchange between the first and second fluids is undesirable.

4,953,511

**CORROSION RESISTANT LIQUID HEATING MODULE**

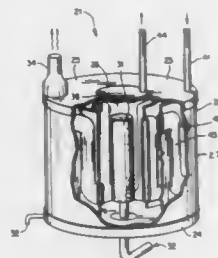
John K. Boah, Manlius; Charles T. Cooney, Jr., Syracuse; Stephen A. Schoch, Clay, and Howard W. Sibley, Baldwinsville, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 22, 1989, Ser. No. 454,886

Int. Cl.<sup>5</sup> F22B 5/02

U.S. Cl. 122—18

3 Claims



1. A condensing heating module for heating a fluid adapted for use with a radiant infrared burner comprising: an enclosure having a clamshell heat exchanger spirally disposed about a central burner cavity and an external flue for gases of combustion produced by said burner to exit said module; said heat exchanger having an inlet for fluid to be heated to enter and an outlet for heated fluid to exit; said heat exchanger having a corrosion resistant metal section coextensive with said central burner cavity and a noncorrosion resistant metal section; and a coating of a corrosion resistant plastic material bonded to said noncorrosion resistant metal section of said heat exchanger.

4,953,512

**METHANE CATALYTIC COMBUSTION BOILER FOR OBTAINING HOT WATER FOR HOUSE-HOLD AND INDUSTRIAL USES**

Pietro Italiano, Cernusco Sul Naviglio, Italy, assignor to GRIV S.r.l., Milan

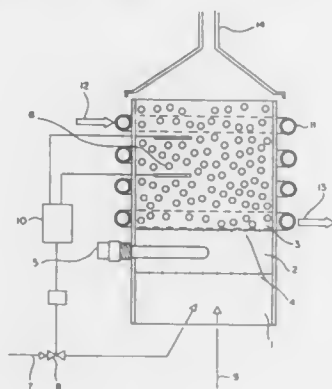
Filed Jul. 28, 1989, Ser. No. 386,195

Claims priority, application Italy, Jul. 29, 1988, 21568 A/88

Int. Cl.<sup>5</sup> B09B 3/00; F22B 1/00

U.S. Cl. 122—4 D

6 Claims



1. Methane catalytic combustion boiler for obtaining hot water for household and industrial uses by catalytic complete combustion of the methane contained in an air/methane mixture fed to it, said mixture containing oxygen in an amount corresponding at least to the stoichiometric amount necessary for said complete combustion of methane, comprising a catalyst container containing a non-fluidized bed of a

catalyst consisting of a metal oxide or a mixture of metal oxides selected from the group of the oxides of Cr, Mn, Fe, Co, Ni, Cu, Sn and Zn maintained at a temperature of less than 750° C.;

- a metal heat-sink means supported on the outer surface of said catalyst container for heat exchange between the combustion gases and the water to be heated;
- an electrical ignition system placed near the inlet of said air/methane mixture for starting the methane combustion; and
- one or more thermocouple means sunk in the catalyst bed which signal a system blocking the methane feed if the temperature falls below the ignition limits of said air/methane mixture.

4,953,513

**ENGINE CONTROL APPARATUS**

Masahiro Sasaki, Osamu Abe, and Hildeaki Ishikawa, all of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Automotive Engineering, Inc., Ibaraki, both of Japan

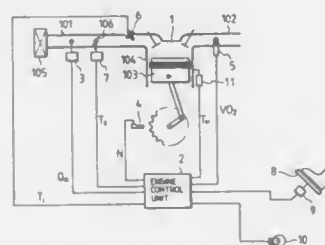
Filed Mar. 10, 1989, Ser. No. 321,383

Claims priority, application Japan, Mar. 12, 1988, 63-57355

Int. Cl.<sup>5</sup> F02M 51/00

U.S. Cl. 123—489

19 Claims



1. In an engine control apparatus in which a basic fuel injection pulse width is calculated based on data outputs from various sensors provided for an engine, said basic fuel injection pulse width is corrected by various factors determined on the basis of detected engine conditions including the addition of a fuel increment for acceleration, and a fuel injector provided for the engine is controlled on the basis of the corrected fuel injection pulse width, the improvement comprising means for detecting an acceleration degree of the engine, means for detecting the length of a period of time from a time the time is controlled to accelerate, at which time the air-fuel ratio changes into a lean state, until a time the air-fuel ratio changes into a rich state, means for selecting a reference value of a period of time optimum to the detected acceleration degree from a plurality of reference values of a period of time each of which is determined in advance as a time period for change of the air-fuel ratio from a lean state to a rich state according to a respective acceleration degree, and means for correcting said fuel increment for acceleration so that the detected length of the period of time will converge on a selected reference value representing an optimum period of time capable of imparting an optimum acceleration to the engine for a detected deceleration degree.

4,953,514

**DEVICE FOR THE METERED SUPPLYING OF FUEL VAPOR INTO THE INTAKE PIPE OF A COMBUSTION ENGINE**

Bernd Beicht, Gross-Umstadt; Reinhard Tinz, Gross-Biebrach, and Joachim Heinemann, Weinheim, all of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim/Bergstr., Fed. Rep. of Germany

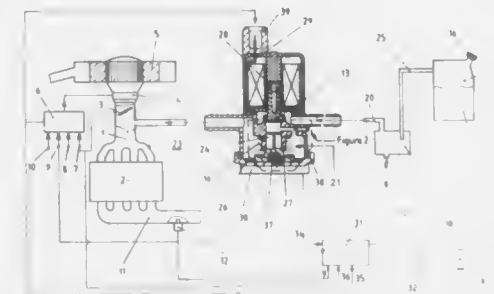
Filed Sep. 8, 1989, Ser. No. 404,857

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1988, 3830722

Int. Cl.<sup>5</sup> F02M 39/00

U.S. Cl. 123—520

12 Claims



1. Device for the temporary storage and metered supply of fuel vapor from a fuel tank system to a combustion engine, said fuel tank system comprising a fuel tank having a free space therein, a deaeration pipe connecting said free space to the surrounding atmosphere, and a storage chamber having an absorptive element incorporated in said deaeration pipe, said device being located between said storage chamber and said engine and comprising an electromagnetic stop valve, a control chamber disposed serially between said stop valve and said engine, an auxiliary valve disposed in said control chamber to change the metering capacity of the stop valve, a bypass provided parallel to said auxiliary valve, said bypass having an adjustable cross-section, and vacuum control means for controlling the position of the auxiliary valve, said vacuum control means being responsive to the differential pressure between the control chamber and the atmosphere.

4,953,515

**DIESEL ENGINE SECONDARY FUEL INJECTION SYSTEM**

William A. Fehr, 2957 Pinewood Avenue, Prince George, British Columbia, Canada V2N 1J1, and Brian G. Beck, S.S. #E, Haldi Road, Prince George, British Columbia, Canada V2N 2S7

Filed Nov. 28, 1988, Ser. No. 277,083

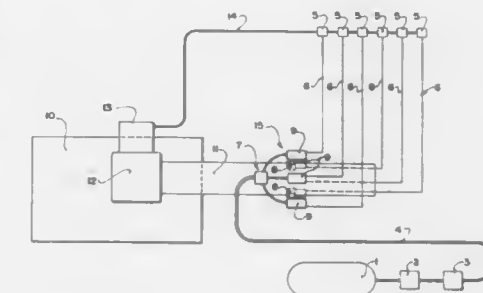
Int. Cl.<sup>5</sup> F02M 39/00

U.S. Cl. 123—526

3 Claims

1. A method of operating a turbo-charged diesel engine, comprising the steps of: (a) controllably injecting pressurized diesel fuel into said engine; (b) coupling a plurality of pressure sensors to said engine turbo-charger, said sensors for sensing the boost pressure output of said engine turbo-charger; (c) coupling an equal plurality of normally closed valves between said engine and a secondary fuel reservoir, said valves being openable in response to applied signals to allow said secondary fuel to flow to said engine; (d) adjusting each of said sensors to detect a selected turbo-charger boost pressure within a pressure range, such that each of said sensors produces an output signal when said engine turbo-charger boost pressure is increased to said corresponding selected boost pressure, and such that said

plurality of sensors together produce a plurality of output signals distributed within said pressure range; and,



- (e) applying said output signals to corresponding ones of said valves,

4,953,516

**INTELLIGENT CONTROL OF MOTOR VEHICLE GAS EQUIPMENT**

Jouke van der Weide, Rijswijk, and Adrianus J. T. Hoozeboom, Harmelen, both of Netherlands, assignors to Necam B.V., Utrecht, Netherlands

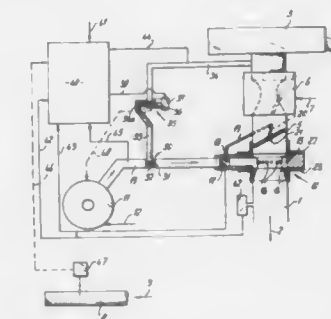
Filed Jan. 12, 1989, Ser. No. 364,319

Claims priority, application Netherlands, Jan. 17, 1988, 8801554

Int. Cl.<sup>5</sup> F02M 21/02

U.S. Cl. 123—527

5 Claims



1. In a device for the control of a carburetor unit for a gaseous fuel, for an internal combustion engine, comprising a vaporizer/pressure regulator for the supply of gas at a pressure near the air pressure upstream of the carburetor unit, a venturi type mixing device for mixing the gas with combustion air sucked in by a said internal combustion engine, a connecting line for connecting the vaporizer/pressure regulator to said mixing device, a main throttle valve for the intake of combustion air to control the engine output, said main throttle valve being adapted to be coupled to an accelerator pedal and being situated upstream of said mixing device, and a regulating valve in said connecting line for regulating the quantity of gas supplied to the mixing device, said regulating valve being coupled to said main throttle valve; the improvement comprising a mixing air supply device in said connecting line between said vaporizer/pressure regulator and said regulating valve, said supply device comprising a further venturi and an annular channel having a throat through which said gas flows between said vaporizer/pressure regulator and said regulating valve, a mixing air supply pipe that supplies air to said air supply device, said further venturi sucking said mixing air into said annular channel, a mixing air regulating valve in said mixing air supply pipe, the first-mentioned regulating valve being so dimensioned as to be adapted to supply too rich a gas/air



mixture to the engine, and correction means controlling the opening of said mixing air regulating valve to dilute said gas with mixing air, thereby to supply to the engine a leaner gas/air mixture.

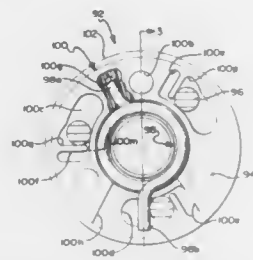
#### 4,953,517 TORSION DAMPING MECHANISM FOR A SUPERCHARGER

Kevin M. McGovern, Dearborn Heights, and Robert C. Schoenhals, Davisburg, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Apr. 14, 1989, Ser. No. 339,332  
Int. Cl. F02B 33/38

U.S. Cl. 123—559.1

30 Claims



1. A torsion damping mechanism adapted to be rotatably interposed between first drive means rotatably driven in one direction by torque from a periodic combustion engine and second drive means for driving a first gear in constant mesh with a second gear; the mechanism characterized by:

- annular means disposed for rotation about an axis and fixed to one of the drive means, the annular means including a plurality of circumferentially spaced apart and generally arcuate-shaped slots each having first and second ends respectively defining stops in the one direction and in the opposite direction of rotation;
- axially extending pins each having one end loosely received by one of the slots and the other end fixed to the other drive means;
- a first spring means for drivingly interconnecting the other drive means and the annular means, and operative in a static state of the mechanism to position the pins closer to the second stops than to the first stops; and
- second spring means fixed at one end to the annular means and having a free end extending radially in cantilever fashion into at least one of the slots, said second spring means interposed between the second stop of the one slot and the pin therein and circumferentially spaced closer to the second stop than the first stop.

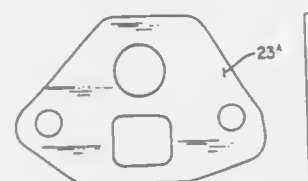
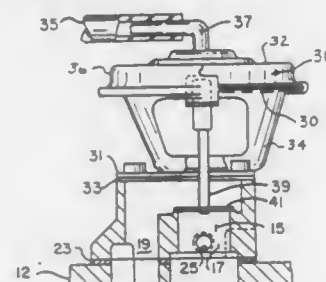
4,953,518  
EXHAUST GAS RECIRCULATION VALVE  
Robert F. Killion, Florissant, and Michael J. Wolfe, Villa Ridge, both of Mo., assignors to Tomco Incorporated, St. Louis, Mo.  
Filed Apr. 14, 1989, Ser. No. 339,193  
Int. Cl. F02M 25/07

U.S. Cl. 123—568

8 Claims

4. An exhaust gas recirculation valve having a universal base, said base having a surface with an entrance and an exit adapted to communicate with openings in the intake manifold of an internal combustion engine of a vehicle, an enlarged cavity in said surface around at least one of said entrance and

said exit, and a plurality of model-specific gaskets for individual use with said valve, each of said gaskets being sized and shaped to fit between said surface and said intake manifold, each said gasket including openings aligned with the openings



in the manifold, wherein said gaskets have differently placed openings therein, and at least some of said plurality of model-specific gaskets cover a part of said cavity in said surface of said base.

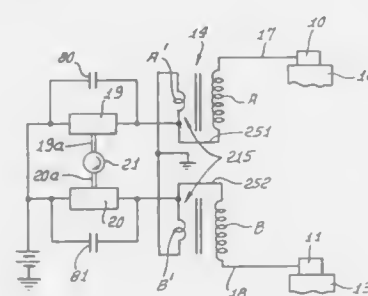
#### 4,953,519 DUAL CONTACT IGNITION SYSTEM FOR MOTORCYCLE INTERNAL COMBUSTION ENGINE

Herbert W. Hoeptner, III, Morgan Hill, Calif., assignor to Custom Chrome, Inc., Morgan Hill, Calif.

Filed Aug. 9, 1989, Ser. No. 391,031  
Int. Cl. F02P 15/02

U.S. Cl. 123—622

19 Claims



1. In an ignition system for a motorcycle two cylinder internal combustion engine, the system including magnetically coupled primary and secondary coil means, spark plugs at the cylinders, a source of electrical current, and first and second pairs of contacts respectively controlling electrical current flow to the primary coil means for producing high voltage outputs from the secondary coil means to be delivered to the spark plugs, the combination comprising

- (a) rotary cam means driven by the engine for controlling opening of the pairs of contacts, the cam means rotatable about a first axis,
- (b) first and second carrier means respectively carrying the first and second pairs of contacts, and each adjustably rotatable about said axis, one of said first and second carrier means operatively connected to the other of said first and second carrier means for adjustment relative thereto,
- (c) and non-rotary support means to which said carrier

means is connected, in adjusted positions of the first and second pairs of contacts,  
(d) whereby the timing of spark effected ignitions by the spark plugs may be controlled.

#### 4,953,520 IGNITION APPARATUS OF INTERNAL COMBUSTION ENGINE

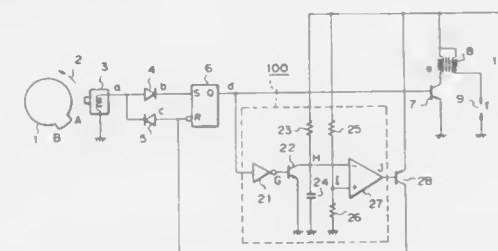
Atsushi Hashizume, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 14, 1988, Ser. No. 257,582  
Claims priority, application Japan, Oct. 14, 1987, 62-259930; Oct. 14, 1987, 62-259931

Int. Cl. F02P 11/00

U.S. Cl. 123—631

12 Claims



1. An ignition apparatus of an internal combustion engine comprising:

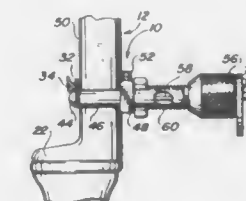
- a sensor for generating first and second angle signals corresponding to first and second crank angles of the internal combustion engine;
  - a flip-flop circuit which is set or reset by the first angle signal of said sensor and is reset or set by the second angle signal of the sensor;
  - a transistor for controlling a primary current of an ignition coil on the basis of an output of said flip-flop circuit and for performing an igniting operation on the basis of the second angle signal;
  - a detecting circuit for detecting a state of the engine wherein reverse rotation is taking place; and
  - a circuit for inhibiting the setting or resetting of the flip-flop circuit in accordance with a detection output of said detecting circuit.
6. An ignition apparatus of an internal combustion engine comprising:
- sensor means whose output level is inverted and set to a first state at a first angle position of the internal combustion engine and is again inverted and set to a second state at a second angle position;
  - a transistor for allowing a primary winding current of an ignition coil to be supplied or shut off on the basis of an output of said sensor means;
  - a detecting circuit for detecting a state of the engine wherein reverse rotation is taking place by determining that a predetermined period of time has passed after first angle position has passed said sensor means of first time, without said second angle position passing said sensor means; and
  - ignition blocking means for blocking the generation of an ignition spark in a secondary output of said ignition coil in response to a detection output of the detecting circuit.

4,953,521  
ARCHERY BOW ASSEMBLY  
Vincent F. Troncoso, Montrose, Colo., and Richard Gangloff, Caliente, Calif., assignors to Golden Key-Futura, Inc., Montrose, Colo.

Filed Dec. 18, 1989, Ser. No. 452,346  
Int. Cl. F41B 5/00

U.S. Cl. 124—24.1

6 Claims



1. An improved archery bow assembly, said assembly comprising, in combination:

- (a) an archery bow having a pair of limbs connected to a handle riser defining an arrow window above an arrow shelf, said limbs being interconnected through a bowstring;
- (b) a pendulum-type disappearing arrow rest mounted in said handle riser and extending into said arrow window, said rest comprising
  - (i.) a pair of forwardly extending, flexible, resilient inner and outer blades, said inner blade lying next to the sidewall of said riser defining said window and including a front arrow support adapted to project through a notch in said outer blade when said inner blade is biased outwardly, said outer blade serving as a side pressure plate for said arrow;
  - (i.i.) a transverse bar behind said riser connected to the rear ends of said blades;
  - (i.ii.) an elongated mounting block connected to the sidewall of said riser on the side opposite said window, and projecting rearwardly behind said riser and adjustably receiving and securing said bar;
  - (i.v.) a tube with a central passageway therethrough, passing transversely through and secured to said block and said riser for communication of said passageway with said window;
  - (v.) a pin slideably disposed in said tube, with one end abutting the inner surface of said inner blade and the opposite end of said pin projecting out of said tube on the side of said riser opposite said window, said pin bearing a notch in said opposite end; and,
  - (v.i.) a flat pendulum plate pivotally mounted on the end of said tube adjacent said pin notch for swinging forwardly and rearwardly, said pin end passing through an opening in said plate, said pin being biasable into said tube against the spring action of said inner blade to releasably engage said plate in said notch, thereby holding said front support in an arrow-supporting position, but being disengageable therefrom automatically in response to vibration in said bow upon release of said bowstring during shooting, whereby said front support springs back to a retracted non-supporting position for improved arrow and arrow vane clearance.

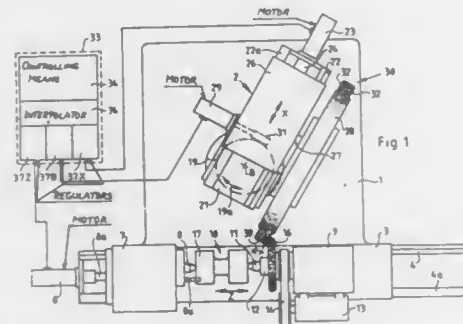
# 4,953,522 METHOD OF DRESSING GRINDING WHEELS IN GRINDING MACHINES

Ulrich Vetter, Stuttgart, Fed. Rep. of Germany, assignor to Schaudt Maschinenbau GmbH, Stuttgart, Fed. Rep. of Germany

Division of Ser. No. 275,122, Nov. 22, 1988. This application  
Sep. 22, 1989, Ser. No. 410,923  
Int. Cl.<sup>5</sup> B24B 53/053

U.S. Cl. 125—11.01

4 Claims



1. A method of path-controlled dressing of a profiled working surface of a rotating grinding tool, which is rotatable about a predetermined axis, with a dressing tool in a grinding machine, comprising the steps of positioning the dressing tool and the grinding tool at a predetermined inclination relative to each other and contacting the working surface by the dressing tool; moving the dressing tool and the grinding tool relative to each other, in a direction of at least two axes which are inclined relative to each other, to an extent which is dependent upon the profile of the working surface while the dressing tool continues to contact the working surface; changing the inclination of the grinding tool and dressing tool relative to each other as a function of the profile of the working surface, including changing the orientation of the grinding tool, said orientation changing step including turning the grinding tool about a further axis which is remote from the point of contact between the working surface and the dressing tool; moving at least one of the tools linearly in a direction of one of said at least two axes to an extent which is a function of said orientation changing step; and compensating for deviations of movement of the grinding and dressing tools in the directions of said at least two axes during dressing of the working surface as a result of changes of orientation of the grinding tool.

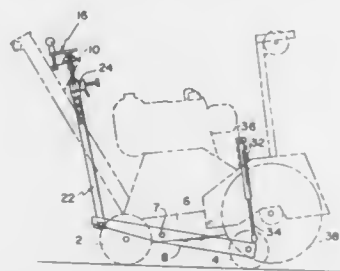
# 4,953,523 QUICK RELEASE MECHANISM FOR THE TOOL OF A CONCRETE/ASPHALT ABRADER

Leo Swan, Jefferson, Md., assignor to Equipment Development Company, Inc., Frederick, Md.

Filed Oct. 16, 1989, Ser. No. 421,941  
Int. Cl.<sup>5</sup> B28D 1/00; B24B 23/02

U.S. Cl. 125—14

11 Claims



1. A quick release mechanism for retracting a cutting or

abrading tool of masonry cutting apparatus from a work surface, comprising:

tool positioning means, including a cut control linkage and a screw threaded rod moveable axially to actuate the cut control linkage to engage the tool upon the work surface; compression spring means connected to the cut control linkage, said spring means being compressed when said tool positioning means is operated to engage a tool upon the work surface; and

quick release means mounted on said cut control linkage, said quick release means including a support structure, a separable split collar housing a first and a second collar portion, each of said collar portions having an inner surface engageable with said threaded rod, said first collar portion further being pivotally affixed to said support structure and moveable between a closed position and an open position, said inner surface of said first collar portion also being threaded and engaging threads on said threaded rod when in said closed position, said second collar portion being rigidly fixed to said support structure, said inner surface of said second collar portion being unthreaded and frictionally engaging said threaded rod, and manually operable release means attached to said first collar portion and biased to maintain said first collar portion in said closed position, said release means being operable when actuated to pivot said first collar portion away from said second collar portion to said open position whereby said compressing spring expands to drive said cut control linkage axially upward and to disengage the tool from the work surface.

# 4,953,524 RADIAL PISTON ENGINE

Peter Wüsthof, Lohr, Fed. Rep. of Germany, and Sinclair Cunningham, Kinghorn, United Kingdom, assignors to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany

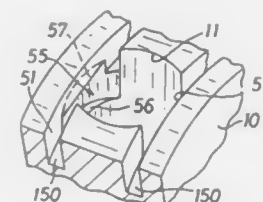
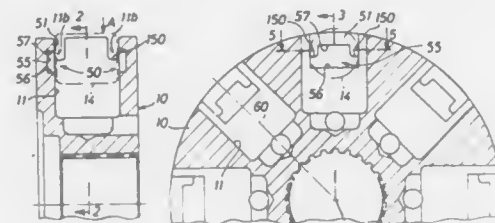
Filed Aug. 18, 1989, Ser. No. 395,720

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1988, 3828131

Int. Cl.<sup>5</sup> F02B 57/00

U.S. Cl. 123—43 C

6 Claims



1. A radial piston engine comprising:  
a housing,  
an annular cam disk fixedly mounted in said housing,  
a cylinder block rotatably mounted about an axis with respect to said cam disk,  
a plurality of bores arranged in said cylinder block in a position radially with respect to said axis of rotation,

a plurality of pistons respectively mounted in said bores, and cylindrical rollers for supporting said pistons on said cam disk, said rollers having axes which extend parallel to the axis of rotation of the cylinder block, and wherein said bores of said cylinder block which are adapted to receive said pistons are provided with recesses in the area of movement of said rollers, so as to receive sections of said rollers on both endfaces of said rollers.

# 4,953,525 COOLING SYSTEM FOR V TYPE ENGINE

Kenichi Sakurai, and Yoshihide Takano, both of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

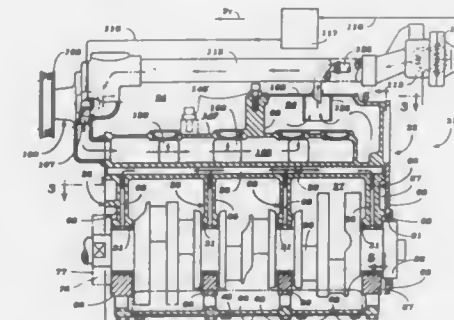
Filed Sep. 29, 1989, Ser. No. 414,679

Claims priority, application Japan, Sep. 30, 1988, 63-246136

Int. Cl.<sup>5</sup> F02B 75/18

U.S. Cl. 123—41.28

7 Claims



1. A cooling system for an internal combustion engine having a cylinder block with angularly disposed banks forming respective cylinder bores, said cylinder banks defining a valley therebetween, a coolant manifold passage formed in said cylinder block at the base of said valley, cooling delivery passages formed in said cylinder block for communicating said coolant manifold passage with cooling jackets surrounding said cylinder bores.

# 4,953,526 PORTABLE WORK MACHINE

Yoshiaki Hironaka, Sayama; Tatsuhiko Matsubayashi; Yoshiaki Kamata, both of Hachioji, and Takasoba Tasaki, Tokyo, all of Japan, assignors to Ecloritz Corporation, Tokyo, Japan

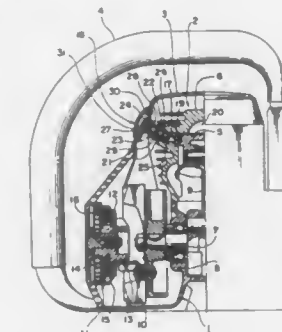
Filed Sep. 11, 1989, Ser. No. 405,166

Claims priority, application Japan, Oct. 5, 1988, 63-130017[U]

Int. Cl.<sup>5</sup> F02N 17/08

U.S. Cl. 123—182

1 Claim



1. A portable work machine comprising: an internal combus-

tion engine disposed in the machine main body; a cover surrounding said engine; a handle capable of being manually held by the operator; a manual starter for starting said engine; a starting pressure reducing device mounted on a cylinder of said engine for reducing, at starting of said engine, pressure within a combustion chamber defined in the cylinder; a hole formed at a portion of said cover which is within reach of a finger of a hand holding said handle; and a flexible cap closing said hole, an actuating portion of said starting pressure reducing device being disposed inside said cap.

# 4,953,527 SPHERICAL ROTARY VALVE ASSEMBLY FOR AN INTERNAL COMBUSTION ENGINE

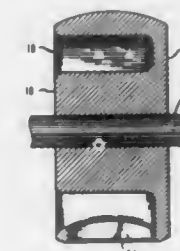
George J. Costes, 2500 Belmar Blvd., Wall Township, Monmouth County, N.J. 07719

Filed Nov. 14, 1988, Ser. No. 270,037

Int. Cl.<sup>5</sup> F01L 7/00

U.S. Cl. 123—190 B

13 Claims



1. A spherical rotary valve assembly for use in internal combustion engines of the piston and cylinder type, said spherical rotary valve assembly comprising:

- a removable two-piece cylinder head securable to the internal combustion engine, said two-piece removable cylinder head comprising an upper and lower cylinder head section, said upper and lower cylinder head section when secured to said internal combustion engine define a cavity radially aligned with the cylinders of said internal combustion engine, said cavity defining a first drum accommodating cavity and a second drum accommodating cavity for each of said cylinder of said internal combustion engine, said lower cylinder head section and said first drum accommodating cavity having an inlet port in communication with said cylinder; said lower cylinder head section and said second drum accommodating cavity having an outlet port in communication with said cylinder;
- a sealing means associated with said inlet and said outlet port;
- a first passageway for the introduction of a fuel/air mixture into said cylinder head by way of said first drum accommodating cavity and a second passageway for the evacuation of exhaust gases from said cylinder by way of said second drum accommodating section;
- a shaft means journaled on bearing surfaces within said cavity of said removable two-piece cylinder head, said shaft having positioned thereon a first drum in said first drum accommodating cavity and a second drum in said second drum accommodating cavity for each said cylinder, each drum having a spherical section defined by two parallel planes of a sphere, the planes being disposed symmetrically about the center of said sphere, the intersection between the planes and the spherical section being rounded off defining a drum having a spherical periphery and planar end walls; said shaft means occupying said journaled bearing surface in said cavity in gas tight sealing contact, each of said drums occupying said drum accommodating cavity in gas tight sealing contact with said inlet



1. A combustible package comprising:  
a substantially horizontal platform, said platform comprising  
an upper surface and a lower surface, a perimeter, a central  
aperture, and a plurality of peripheral apertures adjacent  
to said perimeter;  
circulation means circumscribing said platform adjacent said  
perimeter, said circulation means being in communication  
with said plurality of peripheral apertures;  
a chimney positioned substantially coaxial to said central  
aperture of said platform, said chimney extending upwardly  
from said upper surface of said platform, said

chimney forming a flue contiguous said central aperture; and  
 igniter means located beneath said platform; whereby ignition of said igniter means produces combustion gases beneath said lower surface of said platform, said combustion gases flowing inwardly and upwardly through said central aperture and said chimney, and said combustion gases also flowing outwardly and upwardly through said peripheral apertures, thereby entering said circulation means.

4,953,534

## GAS BURNER ASSEMBLY OF EXTRA FLAT TYPE

Jean-Bernard L. De Gouvill, Joue-Les-Tours, and Bernard Dane, Monthazon, both of France, assignors to Sourdillon-Airindex, France

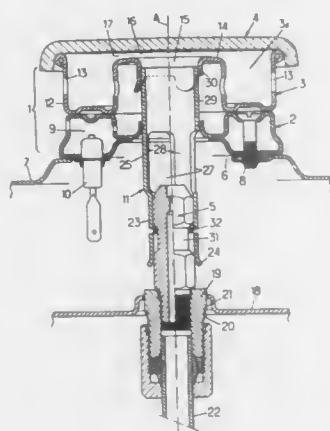
Filed Jan. 17, 1990, Ser. No. 466,614

Claims priority, application France, Jan. 20, 1989, 89 00693

Int. Cl.<sup>5</sup> F24C 3/00

U.S. Cl. 126—39 H

8 Claims



1. Gas burner of the extra flat type for gas appliances, particularly household appliances, which comprises:

- a burner body (1) comprising an annular expansion chamber (3a) whose external sidewall (12) is formed with a multitude of flame passages (13) spaced apart circumferentially, having a central orifice (15) open downwards for the intake of a gas-air mixture into the expansion chamber, this burner body being further adapted to be fixed in an approximately axial position on the periphery of an opening (6) formed in a top plate (7) of the gas appliance,
- a cap (4) covering said burner body (1) and closing said expansion chamber (3a), the facing zones of the internal face (16) of the cap (4) and of the upper face of a central plate (14) diverging radially away from each other outwardly so as to form a diffuser or annular venturi (17),
- and a gas injector (5) connected to a gas intake tube (22) and disposed vertically and axially under said gas-air mixture intake orifice (15) of the burner body and at a distance therefrom, said injector being adapted to be supported by a structural element (18) of the gas appliance situated below said top plate (7), characterized, in that it comprises a tubular member or similar (11) extending vertically and axially between the gas-air mixture intake orifice (15) of the burner body and the injector (5);
- in that this tubular member (11) has a first end portion (23) which cooperates closely with the external contour of the injector (5), an intermediate portion (25) extending between the injector and the burner body and having at least one aperture (27) formed in its wall for the intake of primary air, and a second end portion (29) opposite the first one which cooperates closely with the contour of the gas-air mixture intake orifice (15) of the burner body; and in that the injector rests freely in an overdi-

mensioned housing (20) of the structural element (18) which supports it; whereby the injector (5) already positioned in its housing in the structural element is automatically positioned by said tubular member, coaxially with the gas-air mixture intake orifice of the burner body, during positioning of said burner body on the top plate.

4,953,535

## FLUE CONTROL DEVICE

Grant E. Hagan, 15915 Goggs Ave., White Rock, British Columbia, Canada V4B 2N9

Continuation of Ser. No. 281,922, Dec. 5, 1988, Pat. No.

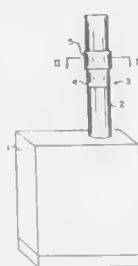
4,850,336, which is a continuation of Ser. No. 62,864, Jun. 16, 1987, abandoned. This application Jul. 18, 1989, Ser. No.

381,293

Int. Cl.<sup>5</sup> F23J 11/00

U.S. Cl. 126—307 R

10 Claims



1. A flue control device comprising:

- (a) a first hollow cylindrical pipe section having a first end adapted to communicate with a furnace exhaust stack;
- (b) a second hollow cylindrical pipe section having a first end adapted to communicate with a furnace exhaust stack and a second end adapted to slidably receive the second end of said first pipe section;
- (c) a flexible helical element mounted in the interior of said first and second pipe sections having first and second ends, an intermediate helical section between said ends, said intermediate helical section having an inner diameter providing an area of open flow of gases along the central axis of said pipe sections, and an outer diameter slightly less than the inner diameter of said pipe sections, whereby said outer diameter of said helical section is free to move relative to said inner diameter of said pipe sections;
- (d) means securing the first end of said helical element to the interior surface of said first pipe section;
- (e) means securing the second end of said helical element to the interior surface of said second pipe section; and
- (f) means for releasably securing said first and second pipe sections in a fixed relative position.

4,953,536

## WATER HEATING APPARATUS

Cedric Israelsohn, 351 Huntingdale Rd., Oakleigh South Victoria, Australia 3167, and Andrew J. Read, 683 Pretoria Main Road, Wynberg, Sandton, South Africa 2090

Filed Jul. 7, 1988, Ser. No. 216,114

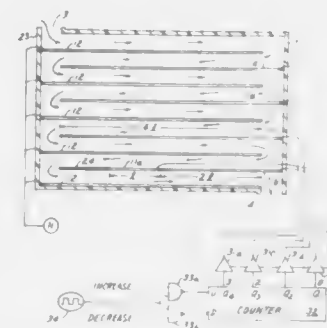
Int. Cl.<sup>5</sup> A47J 27/00

U.S. Cl. 126—374

10 Claims

- 1. A water heating apparatus for water having an electrical conductivity, comprising:
  - (a) a plurality of electrode pairs immersed in water;
  - (b) switching means for selectively connecting one or more of the electrode pairs to a source of electrical power whereby the water is heated by the passage of electrical current therethrough, each of the electrode pairs being configured for transmitting a different magnitude of elec-

trical power into the water relative to the other electrode pairs; and



(c) transducer means operatively responsive to the electrical current for controlling the switching means.

4,953,537

## BARREL-SHAPED SOLAR ROOFING ELEMENT AND METHOD FOR IT MANUFACTURE

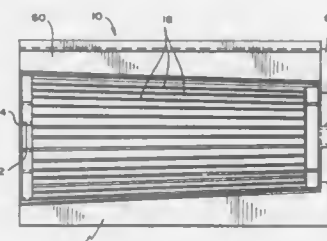
Joseph Allegro, Boca Raton, Fla., assignor to Inner Solar Roof System, Inc., Boca Raton, Fla.

Filed Sep. 18, 1989, Ser. No. 408,727

Int. Cl.<sup>5</sup> F24J 2/04

U.S. Cl. 126—432

21 Claims



- 1. A solar roofing element system comprising
  - a curved panel portion of plastic formed by injection molding having a liquid passageway therethrough and presenting an outer surface adapted for receiving solar energy constructed generally of insulative material having a relatively thin dimension between the outer surface and the liquid passageway comprising a tapered barrel-shaped construction with a smaller substantially closed end of conic section opposed to a larger substantially closed end of conic section,
  - and means for connecting the passageway extending throughout the panel to a solar system for processing heat exchange fluid, including
  - a male coupling and a female coupling at opposite ends of the passageway being adapted for interlocking of adjacent panels with the couplings when installed.

4,953,538

## PIGGY BACK EVAPORATING FOR MAPLE SYRUP EVAPORATOR APPARATUS OR THE LIKE

Gordon L. Richardson, R.R. #1, Box 678, and James G. Richardson, R.R. #1, Box 676, both of Woodstock, Vt. 05091

Continuation of Ser. No. 55,225, May 29, 1987, Pat. No.

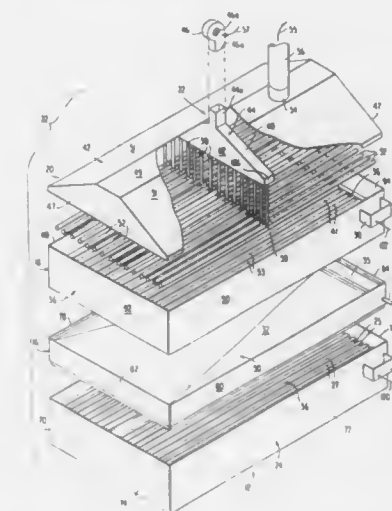
4,819,615. This application Nov. 4, 1988, Ser. No. 267,191

The portion of the term of this patent subsequent to Apr. 11, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B01D 1/26; C13F 1/00

U.S. Cl. 127—9

4 Claims



1. A piggy back evaporator for carrying syrup to boil off vaporizable constituents thereof said piggy back evaporator comprising:

- a drip pan, an oblique condensate drain sheet extending over the major length of the same, a steam hole within said condensate drain sheet, a piggy back pan sized to and mounted to the top of the drip pan, said piggy back pan being upwardly open and including a corrugated bottom wall defining a series of laterally spaced troughs therein interiorly of the piggy back pan and a series of vertical flues on the exterior of the piggy back pan bottom wall facing said drip pan, a hood covering an open top of said piggy back pan, being sealed about edges thereof to said piggy back pan, said drip pan, said piggy back pan and said hood comprising a vertically stacked assembly, at least one steam exhaust chimney carried by said hood and extending upwardly therefrom, a plenum assembly mounted to said hood said plenum assembly including a high pressure air blower an air inlet passing through said hood and connected to said blower, a plenum chamber internally of said hood and connected to said air inlet said piggy back evaporator further comprising a plurality of downpipes projecting downwardly from said plenum chamber and opening to the interior of the plenum chamber and a plurality of sparging tubes extending the length of the piggy back pan and being connected to respective downpipes said sparging tubes being located within the bottoms of said troughs, longitudinally spaced holes within said sparging tubes, means for feeding sap to the piggy back pan of the piggy back evaporator, means for drawing off concentrate from the piggy back pan, and wherein, the capacity of the blower, the number and size of the holes within said sparging tubes, the size of said at least one steam exhaust chimney and the vertical length of said at least one chimney are such that steam condensing on the bottom wall of the piggy back pan effectively boils off the sap within the piggy back pan with significant portions of steam condensing on the undersurface of the piggy back pan due to the application of sparging air flow



via said blower, said plenum chamber and said sparging tubes to the surface of the upper side of the piggy back pan, scouring the metal surfaces of the troughs within the piggy back pan bottom wall and creating an effective frothing action with the sap to form a sap and air mixture whereby the air in passing through the sap is effectively heated and saturated with moisture with the resulting evaporation of the moisture captured by the air consuming a large quantity of heat to maintain the temperature differential between the sap and air mixture and the condensing steam under the piggy back pan at a level to insure that almost all of the steam is condensed in the area between the drip pan and the piggy back pan to increase trath of the sap processed thereby.

4,953,539

## ENDOSCOPE APPARATUS

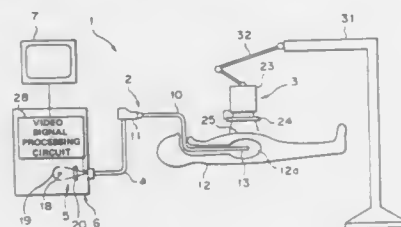
Kazunari Nakamura, Hachioji; Toshihiko Hagiwara, Hino, and Akira Takano, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 137,779, Dec. 24, 1987, abandoned, and a continuation-in-part of Ser. No. 230,820, Aug. 11, 1988, abandoned. This application Jul. 5, 1989, Ser. No. 375,435

Claims priority, application Japan, Dec. 26, 1986, 61-313274; Dec. 26, 1986, 61-313271; Sep. 1, 1987, 62-219337; Dec. 8, 1987, 62-311297

Int. Cl.<sup>5</sup> A61B 1/06

U.S. Cl. 128—6



1. An endoscope apparatus comprising: external illuminating means for illuminating an interior of an organic body across an organic tissue of said body with an illumination light including at least infrared rays; an elongated insert portion to be inserted into said body; and image pickup means, having a light-receiving portion provided on said insert portion and being sensitive at least to infrared rays, said image pickup means for picking up an image of an object in or on said body formed by the illumination light emitted from said external illuminating means and transmitted through said organic tissue of said body.

4,953,540

## FRAMEWORK FOR SUPPORTING SURGICAL INSTRUMENTS AT A SURGICAL WOUND

Charles D. Ray, Wayzata, and Eugene A. Dickhdt, Minneapolis, both of Minn., assignors to Surgical Dynamics, Inc., Alameda, Calif.

Continuation-in-part of Ser. No. 66,147, Jun. 25, 1987, Pat. No. 4,805,599. This application May 27, 1988, Ser. No. 199,754

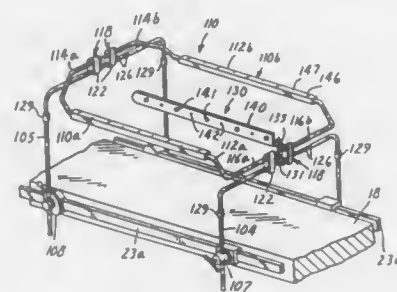
Int. Cl.<sup>5</sup> A61B 17/02

U.S. Cl. 128—20

6 Claims

1. Framework for supporting surgical instruments at a surgical wound, said framework comprising: a rigid frame comprising a long leg and first and second relatively short, parallel crossarms projecting substantially orthogonally from ends of the leg, each of said crossarms defining a projecting end located distally from said leg, first and second rigid crosspieces, means adapted for supporting the first and second crosspieces from an operating table in order for the first and

second crosspieces to extend above and across a patient who is lying on the operating table, means for releasably and rotatably attaching the projecting ends of said first and second crossarms to the first and



second crosspieces, respectively in order to support the rigid frame above and across a patient who is lying on the operating table and to allow the rigid frame to be rotatably moveable with respect to the table.

4,953,541

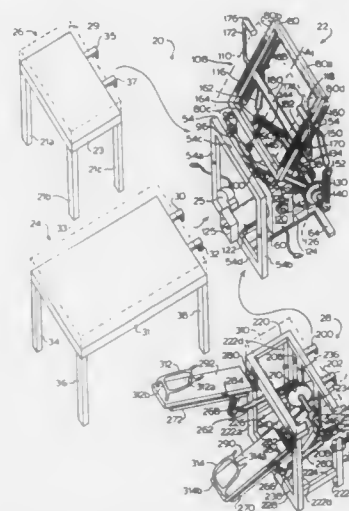
## INTERCHANGEABLE PASSIVE EXERCISING APPARATUS

Alonzo E. Parker, Jr., 1031 Plum St., Durham, N.C. 27703  
Continuation-in-part of Ser. No. 245,024, Sep. 16, 1988, Pat. No. 4,827,913. This application May 4, 1989, Ser. No. 347,466

Int. Cl.<sup>5</sup> A61H 1/02

U.S. Cl. 128—25 R

10 Claims



1. A passive exercising apparatus comprising:

- (a) a first body exercising platform supported on a first frame and including means on the first frame enabling said first platform to pivot on said first frame about a first axis perpendicular to the central longitudinal axis of said first platform and to pivot about a second axis comprising the central longitudinal axis of said first platform or simultaneously pivot about both said axes;
- (b) a second leg exercising apparatus on a second frame including a pair of outwardly extending leg supports pivotally supported on said second frame;
- (c) connector means for detachably connecting said first and second frames together; and
- (d) a drive mechanism having detachable driving means operable when said frames are connected together for driving both said first platform and said leg supports

simultaneously to cause said leg supports to pivot up-and-down in coordination with pivotal movement of said first platform about said axes.

4,953,542

## DEVICE FOR TREATMENT OF SEXUAL IMPOTENCE IN HUMAN MALES

Moisei V. Tsirjulnikov, Vasilievsky ostrov, 15 linia, 14, kv. 8, and Zinoviy A. Zusmanovsky, 5-ya Sovetskaya ulitsa, 34, kv. 42, both of, Leningrad, U.S.S.R.

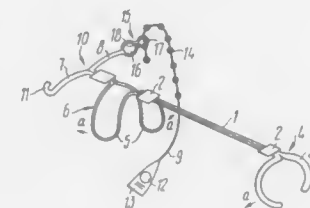
PCT No. PCT/SU87/00157, § 371 Date Sep. 26, 1988, § 102(e) Date Sep. 26, 1988, PCT Pub. No. WO88/05292, PCT Pub. Date Jul. 28, 1988

PCT Filed Dec. 28, 1987, Ser. No. 271,958

Claims priority, application U.S.S.R., Jan. 27, 1987, 4185874 Int. Cl.<sup>5</sup> A61F 5/41

U.S. Cl. 128—79

1 Claim



1. A device for treatment of sexual impotence in human males, comprising parallel rods movably interconnected with a possibility of pivoting around their axes; a retainer of the glans penis formed of arcuate members shaped as curved plates and one of the ends of the arcuate members of said retainer being connected to each of said parallel rods; a control retainer formed of arcuate members and one of the ends of the arcuate members of said control retainer being connected to each of said parallel rods; a retainer of the penile base formed of arcuate members, first ends of the arcuate members of said retainer of the penile base being connected to each of said parallel rods and a second end of a first of said arcuate members of said retainer of the penile base having a hook; an elastic member having an eyelet of the same material as the elastic member, said eyelet interacting with said hook, and said elastic member interconnecting said arcuate members of said retainer of the penile base; and a mechanism for reversible adjustment of the degree of tension of the elastic member made as spheroid thickenings provided on the elastic member and interacting with a lock located on a second end of a second of said arcuate members of the retainer of the penile base, said lock being made as first and second holes interconnected through a recess, the diameter of said first hole exceeding the diameter of the spheroid thickenings and the diameter of the second hole being smaller than that of the spheroid thickenings.

4,953,543

## CRUCIATE LIGAMENT LEG BRACE

Tracy E. Grim, Broken Arrow, Okla., and Jeffrey R. Haines, Encino, Calif., assignors to Royce Medical Company, Westlake Village, Calif.

Filed Aug. 9, 1988, Ser. No. 230,445

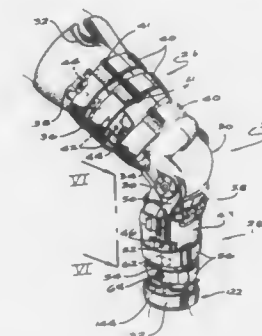
Int. Cl.<sup>5</sup> A61F 5/00

U.S. Cl. 128—80 C

27 Claims

14. A knee brace comprising: an upper pair of struts; a lower pair of struts; means for mounting said upper pair of struts on the inner and outer sides of the thigh; means for mounting said lower pair of struts on the inner and outer sides of the lower leg; means for pivotally connecting said upper and lower pairs of struts to simulate limited normal knee movement;

means for applying force to the tibia adjacent the knee to restrict subluxation of the tibia relative to the femur; and anti-pistoning means for preventing downward displacement



ment of said knee brace, including means for resiliently engaging the ankle of a user immediately above the ankle bone protruberance, and mechanically supporting said brace.

4,953,544

## USE OF SORBENT SHEET MATERIALS AS EVAPORATIVE COOLANTS

Paul E. Hansen; Thomas I. Insley, both of Lake Elmo, Minn., and Christopher J. Libbey, St. Joseph, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 387,010, Jul. 31, 1989, Pat. No. 4,921,743. This application Jan. 19, 1990, Ser. No. 467,389

Int. Cl.<sup>5</sup> A61L 15/00

U.S. Cl. 128—156

21 Claims

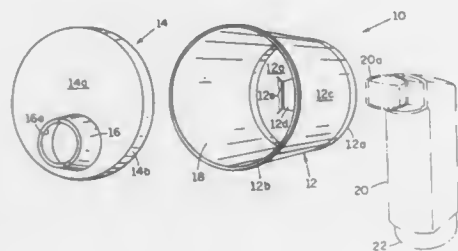


1. A method of evaporative cooling comprising (a) wetting a sorbent sheet material comprising a web comprising fibers having an average diameter of about 1–20 microns and a solid high-sorbency liquid-sorbent polymeric material contained within said web with a liquid for which said polymeric material exhibits high-sorbency; (b) placing said wetted sorbent sheet material in contact with the object to be cooled; and (c) allowing said liquid contained in said wetted sorbent sheet material to evaporate while said wetted sheet material is in contact with the object to be cooled to provide a cooling effect on said object.

**4,953,545**  
**DISPOSABLE RESPIRATORY MEDICATION**  
**DISPERSION CHAMBER**

Jerry McCarty, 8305 Windway Dr., San Antonio, Tex. 78239  
Filed Oct. 18, 1989, Ser. No. 423,352  
Int. Cl.<sup>5</sup> A61M 11/00  
U.S. Cl. 128—200.23

1 Claim



1. A disposable medication dispersion device for use with commercially available metered-dosage inhalers, comprising an elongated, tapered chamber having a second cross-section; said chamber being constructed of plastic material; said chamber having a flat, small end; an insertion aperture located centrally in said small end; said aperture having a substantially oval shape with four corners; said aperture further having a cut at each of said corners; said cuts permitting said aperture to accommodate various sizes and shapes of commercially available metered-dosage inhalers; said chamber further having a large open end having an exterior edge; said open end being covered by a removable cap; said cap having a round, tapered mouthpiece being significantly off-set from the center of the cap; said cap having a rim that forms a bead-like member that engages the exterior edge of the large open end of said dispersion chamber; said chamber having a longitudinal axis that runs through the center of said small end, said cap, and said chamber; said insertion aperture being significantly off-set relative to said longitudinal axis.

**4,953,546**  
**METHOD AND APPARATUS FOR PULMONARY AND**  
**CAROTID VASCULAR CONDITIONING OF THE YOUNG OF**  
**LARGE ANIMALS**

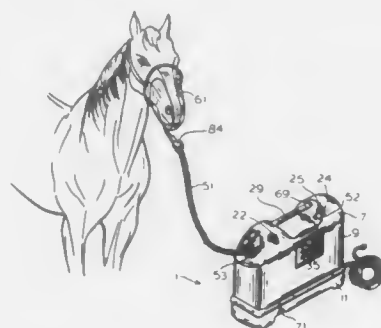
Richard H. Blackmer, Scotia, and Jonathan W. Hedman, Burnt Hills, both of N.Y., assignors to Transpirator Technologies, Inc., Somerset, N.J.  
Continuation-in-part of Ser. No. 841,300, Mar. 19, 1986, which is a continuation-in-part of Ser. No. 755,562, Jul. 16, 1985, Pat. No. 4,722,334. This application Jan. 10, 1989, Ser. No. 295,656. The portion of the term of this patent subsequent to Feb. 2, 2005, has been disclaimed.  
Int. Cl.<sup>5</sup> A61M 16/00

U.S. Cl. 128—203.16

11 Claims

1. A method for the therapeutic treatment of a young veterinary animal's respiratory tract comprising the step of continuously delivering to the young veterinary animal's respiratory tract a humidified stream of gas at a dew point temperature

which is greater than the ambient dew point temperature at flow rates exceeding the veterinary animal's peak resting inhalation rate to condition the veterinary animal's respiratory, pulmonary and cardiovascular system.



lation rate to condition the veterinary animal's respiratory, pulmonary and cardiovascular system.

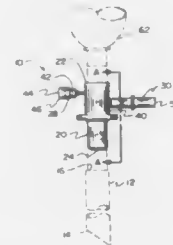
**4,953,547**  
**DRUG ADMINISTERING ENDOTRACHEAL**  
**RESPIRATION SYSTEMS**

Samuel E. Poole, Jr., 6354 Saint Andrews Cir., Fort Myers, Fla. 33919

Filed Jan. 26, 1989, Ser. No. 301,723  
Int. Cl.<sup>5</sup> A61B 5/08

U.S. Cl. 128—203.12

11 Claims



10. For use in a drug administering respiration endotracheal system for administering vital life-saving drugs into the lungs of a victim while maintaining the flow of life-supporting gas thereto via ventilation apparatus, the system including a gas supply; a tube for establishing gas flow exchange between the lungs of the victim and the gas supply, the tube having a proximal end and a distal end for insertion into the trachea of the victim; an improved connector, the improved connector adapted to couple the proximal end of the tube to the gas supply, the improved connector being formed as a cylinder with a gas input end, a gas discharge end and a linear axial passageway therebetween, the connector having a self-sealing hypodermic needle port coupled with a first aperture in the connector and extending into the linear passageway, the hypodermic needle port being rigid and adapted for receiving a hypodermic needle for injecting vital life-saving drugs in liquid form into the passageway for being atomized and then into the distal end of the tube intermixed with the gas, the improved connector further having a self-sealing syringe port coupled with a second aperture in the connector and extending into the linear passageway, the syringe port being rigid and adapted for receiving a syringe for injecting vital life-saving drugs in liquid form into the passageway for being atomized and then into the distal end of the tube intermixed with the gas, the axial passageway adapted for atomizing and intermixing of the life-saving drugs with the flow of life-supporting gas, the ports being located between the ends of a connector and having axes which are co-planar with respect to the axis of the connector and one port being located on the annular surface of the con-

nector substantially 180 degrees away from the other port as measured on the annular surface of the connector, the ports being as substantially right angles with respect to its longitudinal axis of the passageway.

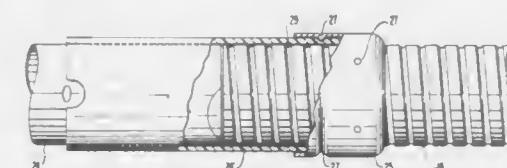
**4,953,548**  
**LASER RESISTANT VENTILATING DEVICE WITH**  
**LOCKING FERRULE**

Philip V. Stoddard, Greenwich, N.Y.; Craig J. Bell, Winchester, N.H., and Donald R. Schnelder, Cambridge, N.Y., assignors to Mallinckrodt, Inc., St. Louis Mo.

Continuation-in-part of Ser. No. 9,747, Feb. 2, 1987, Pat. No. 4,834,087. This application Nov. 3, 1988, Ser. No. 266,666  
Int. Cl.<sup>5</sup> A61M 16/04, 25/00, 29/02; A62B 9/00

U.S. Cl. 128—207.14

15 Claims



1. A surgical ventilation device which is resistant to laser-caused dysfunction during laser surgery, comprising a ventilation device defining a continuous gas passageway for passage of ventilation gases during surgery, the device further comprising:

- (a) a distal end for insertion into a patient's airway, the distal end defining a portion of said continuous gas passageway;
- (b) a proximal end for connecting the continuous gas passageway to a source of gas;
- (c) a flexible airtight metal tube connecting the distal end and the proximal end of the device, the metal tube being resistant to damage by a surgical laser and having a matte outer surface for dispersing unfocused light when a surgical laser beam is directed against said outer surface, the metal tube defining a substantial portion of said continuous gas passageway;
- (d) a lower liquid-inflatable cuff comprising means for making sealing contact with the patient's trachea and means for preventing leakage of gas between the lower cuff and the trachea, and an upper liquid-inflatable barrier cuff for contacting the patient's trachea, the lower and upper cuffs connected to and longitudinally disposed along the ventilation device at approximately the distal end of the device, the trachea-sealing lower cuff being disposed between the upper cuff and the distal end, the barrier cuff providing shielding means for the sealing cuff from damage by laser energy directed toward the sealing cuff;
- (e) a lower polymeric tubing assembly having an outer surface on which said lower and upper cuffs are mounted, the lower polymeric tubing assembly having a distal end which is the distal end of the ventilating device and a proximal end section within which is received a distal end of the metal tube, the ventilation device being airtight from the proximal end thereof to said cuffs on said lower polymeric tubing assembly;
- (f) a locking ferrule that extends around said proximal end section of the lower polymeric tubing assembly, at least a portion of the locking ferrule being pinched inwardly so as to compress the proximal end section of the lower polymeric tubing assembly against the metal tube and thereby prevent disengagement of the lower polymeric tubing assembly from the metal tube;
- (g) means for inflating the lower cuff with liquid to bring the lower cuff into sealing contact with a patient's airway to prevent leakage of gas between the lower cuff and the airway, the means for inflating the lower cuff including a first conduit disposed within the metal tube and protected thereby from laser damage, the first conduit being in

communication with the lower cuff and connectable with a source of liquid for inflating the lower cuff; and (h) means for inflating the upper cuff with liquid, bringing the upper cuff into contact with said airway, and shield the lower cuff from damage caused by laser energy directed toward the lower cuff, the means for inflating the upper cuff including a second conduit disposed within the metal tube and protected thereby from laser damage, the second conduit being in communication with the upper cuff and connectable with a source of liquid for inflating the upper cuff.

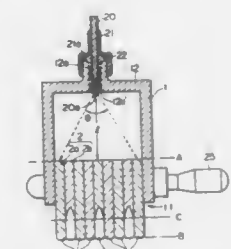
**4,953,549**  
**LIGHT RADIATOR**

Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan  
Filed Sep. 25, 1989, Ser. No. 412,357

Claims priority, application Japan, Jan. 18, 1989, 64-19427  
Int. Cl.<sup>5</sup> A61N 5/06

U.S. Cl. 128—398

5 Claims

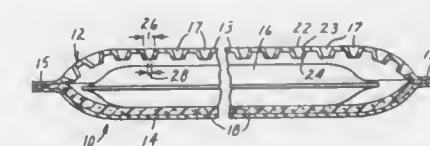


1. A light radiator comprising a tubular body having opposite ends, fiber optical cable means for transmitting light rays mounted on one of said ends of said tubular body, said fiber optical cable means having a light-emitting end, a plurality of parallel light-guide rods disposed at the other of said ends of said tubular body, said plurality of light-guide rods receiving said light rays transmitted from said light-emitting end of said optical cable means, said plurality of light-guide rods comprising first and second groups of light-guide rods, said first group having light-emitting ends disposed in a first plane, said second group having light-emitting ends disposed in a second plane, said first plane being located further from said one of said ends of said tubular body than said second plane, each of said light-guide rods of said first group being in contact with one of said light-guide rods of said second group, said light-emitting ends of said second group of light-emitting rods having a tapered concave configuration.

**4,953,550**  
**CHEMICAL THERMAL PACK HAVING AN OUTER**  
**POUCH PROVIDED WITH CAPILLARIES**  
Wayne K. Dunshee, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Filed Nov. 9, 1988, Ser. No. 269,155  
Int. Cl.<sup>5</sup> A61F 7/02

U.S. Cl. 128—403

23 Claims



1. A chemical thermal pack consisting of a flexible liquid tight inner bag containing a temperature-retaining composition and a non-water absorbant insulation sheet, said inner bag



being disposed within an outer pouch constructed at least partially from a sheet of liquid impermeable material provided with capillaries each having a base in the plane of the sheet and an apex remote from said plane of said sheet.

4,953,551

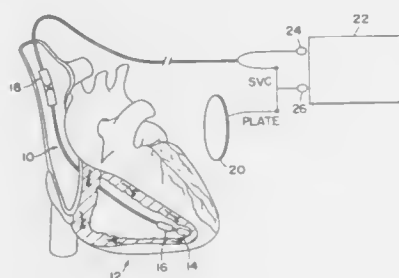
**METHOD OF DEFIBRILLATING A HEART**

Rahul Mehra, Stillwater, and William Combs, Minneapolis, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn. Continuation of Ser. No. 3,358, Nov. 14, 1987, abandoned. This application Aug. 7, 1989, Ser. No. 394,249

Int. Cl.<sup>5</sup> A61N 1/00

U.S. Cl. 128—419 D

12 Claims



1. A method of applying electrical energy to a human heart, comprising:
  - implanting a first electrode having a first terminal within the ventricle of said heart;
  - implanting a second electrode adjacent the exterior of said heart;
  - implanting a third electrode remote from said heart;
  - electrically interconnecting said second and third electrodes, forming an electrode pair having a second terminal; and
  - discharging a capacitor between said first and second terminals for a first predetermined time period, followed by reversing the polarity of said capacitor with respect to said first and second terminals, then discharging said capacitor between said first and second terminals for a second predetermined time period, forming an asymmetrical biphasic pulse waveform.

4,953,552

**BLOOD GLUCOSE MONITORING SYSTEM**

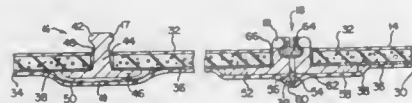
Arthur P. DeMarzo, 2S558 White Birch La., Wheaton, Ill. 60187

Filed Apr. 21, 1989, Ser. No. 341,429

Int. Cl.<sup>5</sup> A61B 5/00

U.S. Cl. 128—635

26 Claims



1. A blood glucose monitoring system, comprising:
  - a patch having a top surface, an underside and being configured for removable attachment to the skin of a patient;
  - a needle type glucose sensor being secured to said patch and having a needle electrode depending from said patch underside so as to penetrate the skin of the patient;
  - a second electrode secured to said patch and having a surface exposed on said underside of said patch to permit electrical contact with the skin;
  - a pair of structurally distinguishable electrode connectors secured to said patch, exposed at said top surface of said

patch and connected to said needle electrode and said second electrode, respectively.

processing means having a display, and positive and negative leads, each said lead having a lead end attachment positively and releasably connected only to a corresponding one of said electrode connectors, said processing means being programmed for receiving signals from said needle electrode, for calculating an average current value over a specified time period, for converting said current value into blood glucose and for displaying said value on said display.

4,953,553

**PRESSURE MONITORING GUIDEWIRE WITH A FLEXIBLE DISTAL PORTION**

William S. Tremulis, Redwood City, Calif., assignor to Advanced Cardiovascular Systems, Inc., Santa Clara, Calif.

Filed May 11, 1989, Ser. No. 350,500

Int. Cl.<sup>5</sup> A61B 5/00

U.S. Cl. 128—637

10 Claims



1. A guidewire which facilitates advancing a catheter within a patient's vasculature and which allows fluid pressure at the distal extremity of the guidewire to be determined from the proximal end thereof, comprising:
  - (a) an elongated tubular member having an inner lumen extending essentially from the proximal end to the distal end thereof;
  - (b) a relatively short flexible plastic tubular member which is secured by the proximal end thereof to the distal end of the elongated tubular member, which has an inner lumen in fluid communication with the inner lumen of the tubular member and which is provided with at least one pressure monitoring port;
  - (c) a core member which extends distally through at least a portion of the flexible plastic tubular member and which is secured to the flexible tubular element; and
  - (d) a flexible coil disposed about and secured to the core member.

4,953,554

**MAGNETIC RESONANCE IMAGING METHOD**

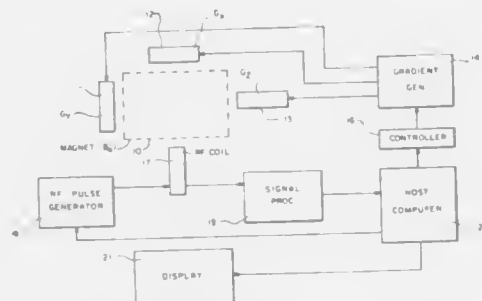
Elias Zerhouni, Baltimore, Md., and David M. Parish, Palo Alto, Calif., assignors to Resonex, Inc., Sunnyvale, Calif. and Johns Hopkins University, Baltimore, Mass.

Filed Mar. 4, 1988, Ser. No. 164,263

Int. Cl.<sup>5</sup> A61B 5/055

U.S. Cl. 128—653 A

9 Claims



1. A magnetic resonance imaging (MRI) method to track the motion of tissue where an image is produced by application of

a radio frequency (RF) pulse sequence to a tissue specimen which produces signals utilized for forming said image, the method comprising the following steps:

- at least partially saturating protons in at least one plane by applying a slice select gradient and at least one RF pulse to impose a grid system in the tissue specimen each of said, at least one saturated plane forming a saturated line of said grid system, the saturation causing said grid system to produce substantially no said signals during a subsequent imaging step;
- delaying a variable period of time less than the T1 relaxation time of said tissue specimen to allow the tissue specimen of interest to move; following said delay producing an image of the tissue specimen, said image being taken perpendicular to said at least one said saturated plane whereby motion of the tissue specimen between the saturation and imaging steps is reflected in distortion and/or translation of said saturated line as seen in the image.

4,953,555

**PERMANENT MAGNET STRUCTURE FOR A NUCLEAR MAGNETIC RESONANCE IMAGER FOR MEDICAL DIAGNOSTICS**

Herbert A. Leopold, Eatontown, and Ernest Potenziani, II, Ocean, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

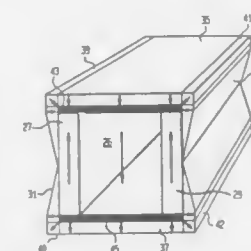
Continuation of Ser. No. 112,192, Oct. 20, 1987, abandoned.

This application Oct. 12, 1989, Ser. No. 420,745

Int. Cl.<sup>5</sup> A61B 5/055

U.S. Cl. 128—653 A

5 Claims



1. A magnetic device for nuclear magnetic resonance diagnostics comprising, in combination:

a longitudinally extending magnet element comprising a pair of flux carrying magnets made of a compound containing one or more rare earth elements, said pair of magnets aligned parallel to and separated from each other a given distance, and a pair of pole pieces aligned parallel to each other and bridging the edges of said pair of flux carrying magnets, said pair of magnets and said pair of pole pieces forming a diagnostic workspace conforming generally to the size and shape of the human body, a magnetic field being generated by said magnet element, said magnetic field extending transversely through said workspace;

cladding magnet means for confining said magnetic field in said workspace, said cladding magnet means coextending longitudinally with said longitudinally extending magnet element, disposed and arranged in lateral relation thereto and having a magnetization substantially normal to the magnetic field of said longitudinally extending magnet element thereby confining said magnetic field in said workspace;

bucking magnets arranged and mounted, coextensive with each pole piece, each bucking magnet having a magnetization directed parallel to the magnetic field produced by the longitudinally extending magnet element.

4,953,556

**METHOD AND APPARATUS FOR THE MEASUREMENT OF THORACIC FIELD POTENTIOMETRY**

John M. Evans, Bell Cottage, Oakmere, Appleton, Abingdon, Oxfordshire, OX13 5JS, United Kingdom

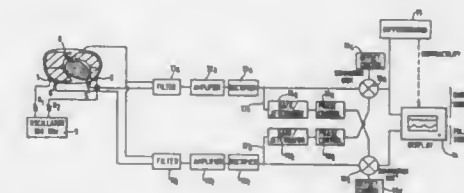
Filed Feb. 29, 1988, Ser. No. 162,256

Claims priority, application United Kingdom, Dec. 13, 1984, 8431500

Int. Cl.<sup>5</sup> A61B 5/205

U.S. Cl. 128—671

17 Claims



1. A method of measuring cardiac activity, which method comprises
  - generating an oscillating electrical signal,
  - applying the oscillating electrical signal to the thorax of a patient,
  - providing in the oesophagus of the patient an oesophageal probe including a first electrode,
  - providing a second electrode on the left side of the chest of the patient in a position such that measurement of voltage between the said first and second electrodes provides a measure of cardiac volume, and
  - measuring the voltage induced between the first and second electrodes and producing therefrom an output signal indicative of cardiac activity in the patient.

4,953,557

**BLOOD PRESSURE MONITOR**

Michael Frankenreiter, Sindelfingen; Rainer Rometsch, Wildberg, and Jens-Peter Seher, Stuttgart, all of Fed. Rep. of Germany, assignors to Hewlett-Packard Company, Palo Alto, Calif.

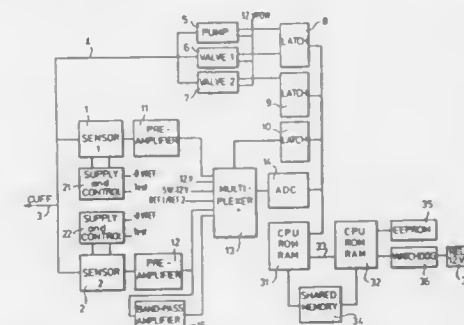
Filed May 1, 1989, Ser. No. 345,927

Claims priority, application European Pat. Off., May 14, 1988, 88107800.0

Int. Cl.<sup>5</sup> A61B 5/02

U.S. Cl. 128—677

26 Claims



1. Apparatus for automated measurement of blood pressure by application of air pressure to a cuff in such a manner as to prevent a harmful pressure from occurring in said cuff comprising
  - air control means including a pump for inflating or deflating a cuff via an outlet,
  - first and second pressure sensors adapted to be coupled to a cuff so as to respectively provide first and second signals indicative of the pressure in the cuff,

means having stored calibration data for each of said pressure sensors;  
 electronic means for activating said pump, for determining from said first and second signals and said calibration data the calibrated values of pressure for each of said sensors and for causing said air control means to deflate a cuff if either of said calibrated values exceeds a predetermined amount, and  
 said electronic means having means for comparing said calibrated pressure values and for causing said air control means to deflate a cuff when they differ by more than a predetermined amount.

4,953,558

## TISSUE SAMPLING DEVICE

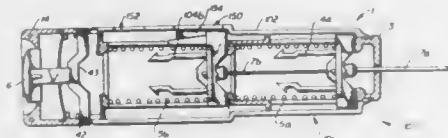
Dan Akerfeldt, Uppsala, Sweden, assignor to C. R. Bard, Inc., Murray Hill, N.J.

Continuation-in-part of Ser. No. 270,368, Nov. 14, 1988. This application Feb. 16, 1990, Ser. No. 481,444

Claims priority, application Sweden, Nov. 19, 1987, 8704559 Int. Cl.<sup>5</sup> A61B 10/00

U.S. Cl. 128—751

3 Claims



1. A tissue sampling device comprising:
  - a guide sleeve having front and rear guide sleeve ends and defining a longitudinal axis extending between said front and rear guide sleeve ends;
  - a hollow first needle positioned within said guide sleeve and extendable from said front guide sleeve end, said hollow first needle being moveable along said axis;
  - a second needle extending through said hollow first needle and movable along said axis, said second needle having a tip which is extendable from said hollow first needle and said front guide sleeve end, and said second needle having a tissue sample receiving recess located adjacent said tip;
  - a first needle holder coupled to said hollow first needle and mounted within said guide sleeve for movement along said longitudinal axis to move said hollow first needle along said axis;
  - a second needle holder coupled to said second needle and mounted within said guide sleeve for movement along said longitudinal axis to move said second needle along said axis;
  - a first spring disposed within said guide sleeve and operatively associated with said second needle holder, said first spring being capable of being placed into an energized mode to store energy, and said first spring being releasable from said energized mode to propel said second needle holder along said axis towards said front guide sleeve end, such that said tip of said second needle is extended from said hollow first needle, whereby a tissue sample can be captured within said recess;
  - a second spring positioned within said guide sleeve and operatively associated with said first needle holder, said second spring being capable of being placed into an energized mode to store energy, and said second spring being releasable from said energized mode to propel said first needle holder along said axis towards said front guide sleeve end, said hollow first needle being extended from said front guide sleeve end such that said recess of said second needle is enclosed by said hollow first needle;
  - a first latch means selectively releasable from outside said guide sleeve for releasably holding said first spring in said energized mode;
  - a second latch means for releasably holding said second spring in said energized mode, said second latch means

being releasable in response to and subsequent to release of said first spring;  
 a tensioning sleeve rotatably mounted on said guide sleeve and operative upon rotation thereof to move said first needle holder and second needle holder along said axis towards said rear guide sleeve end to cause said first latch means to hold said first spring in said energized mode and to cause said second latch means to hold said second spring in said energized mode; and  
 indicator means operatively associated with one of said first and second needle holders and visible from without said tensioning sleeve for indicating the energized status of said first and second springs;  
 whereby a user can visually confirm by viewing said indicator means whether said springs are in said energized modes.

4,953,559

## CATHETER FOR ENDOCARDIAL BIOPSY, WHICH CAN ALSO BE USED FOR IDENTIFYING THE POINT OF ORIGIN OF VENTRICULAR ARRHYTHMIA

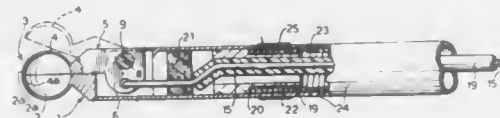
Jorge A. Salerno, Pavia, Italy, assignor to Consiglio Nazionale Delle Ricerche, Rome, Italy

Filed Nov. 14, 1988, Ser. No. 270,582

Claims priority, application Italy, Nov. 16, 1987, 67978 A/87 Int. Cl.<sup>5</sup> A61B 10/00

U.S. Cl. 128—751

4 Claims



1. A catheter for cardiac biopsy, including distal and proximal end portions, biopsy forceps provided at the distal end and including two jaws which are movable relative to each other between an open position and a closed position, and means which are operable from the proximal end of the catheter for moving the jaws, wherein at least two electrodes are provided in correspondence with the distal portion, said electrodes being constituted by the two jaws of the forceps, with said jaws being made from electrically conductive material and being electrically insulated from each other in their open position, wherein two terminals are situated at the proximal end of the catheter and are connected electrically to the electrodes so that the catheter can be used for identifying the point of origin of a ventricular arrhythmia, wherein the distal end of the catheter has a supporting body which incorporates one jaw of the forceps, and wherein the catheter also includes a lever which forms the other jaw and a pin of insulating material by means of which the lever is articulated to the supporting body, and wherein the catheter includes a helical metal spiral which runs along the whole length of the catheter, one end of the spiral being connected to the supporting body and an opposite end of the spiral being connected to one of the terminals.

4,953,560

## APPARATUS, METHOD, AND TEST KIT FOR DIAGNOSIS OF VAGINAL YEAST INFECTIONS

Bernard Samuels, 5624 Evelyn Ct., New Orleans, La. 70124

Filed Dec. 7, 1989, Ser. No. 447,466

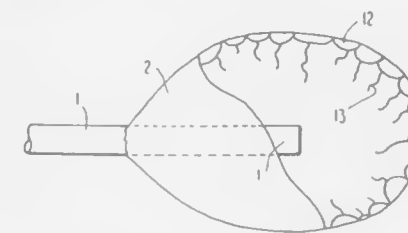
Int. Cl.<sup>5</sup> A61B 10/00

U.S. Cl. 128—759

20 Claims

1. A diagnosis device for vaginal yeast infections comprising:
  - a support stick;

a swab having loosely woven fibers attached to one end of said support stick; and



a growth media for culturing and diagnosing vaginal yeast infection infiltrated between said loosely woven fibers of said swab.

4,953,561

## URINE TESTING MODULE AND METHOD OF COLLECTING URINE ANTIGEN

Raouf A. Guirguis, Rockville, Md., assignor to Cancer Diagnostics, Inc., Rockville, Md.

Continuation-in-part of Ser. No. 408,547, Sep. 18, 1989. This application Sep. 22, 1989, Ser. No. 411,041

Int. Cl.<sup>5</sup> A61M 5/165

U.S. Cl. 128—771

18 Claims



1. An apparatus for testing molecular specimens in a biological fluid comprising a syringe, a specimen treatment unit mounted to said syringe, said specimen treatment unit comprising means comprising a housing with an inlet and outlet means, a filter means mounted to said housing which allows fluid flow and antigens carried by said biological fluid to flow there through, a primary antibody bead means contained in said housing on the syringe side of said filter means which is adapted to capture designated antigens carried by said fluid.

4,953,562

## METHOD OF URINE SPECIMEN IDENTIFICATION

Fred Rosen, 8069 Caminito Mallore, La Jolla, Calif. 92037, and Bernard Rimland, 4182 Adams Ave., San Diego, Calif. 92116

Filed Nov. 4, 1988, Ser. No. 267,197

Int. Cl.<sup>5</sup> A61B 5/00

U.S. Cl. 128—771

7 Claims

1. A method for identifying the source of a urine sample to be collected for biological or chemical analysis which comprises:
  - a. administering to a person or animal whose urine is to be tested a formulation containing predetermined portions of one or more identifying substances selected from the group consisting of thiamine, riboflavin, niacinamide, pyridoxine, and mixtures thereof;
  - b. maintaining an identification of said formulation so that said person or animal to which it was administered and a

urine collecting means for said person or animal can be identified;  
 c. obtaining a urine sample from said person or animal in said urine collecting means;  
 d. analyzing said urine sample for the presence of said identifying substances or their metabolites.

4,953,563

## PROTECTIVE DISPOSABLE SHEATH FOR MUSCLE MONITOR

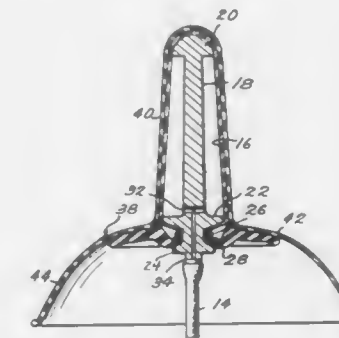
Howard Kaiser, and Laurie A. C. Kaiser, both of 75-04 249 St., Bellerose, N.Y. 11426

Filed Jun. 20, 1986, Ser. No. 876,484

Int. Cl.<sup>5</sup> A61B 5/22

U.S. Cl. 128—778

4 Claims



1. A generally funnel-shaped protective disposable sheath for use with a muscle monitor of the kind including a compressible-expandable elongated blub insertable into a body cavity and a generally annular flange of greater diameter than the bulb adjacent one end of the bulb for limiting the extent of penetration of the bulb into the body cavity, said sheath being made of flexible elastomeric material and including a posterior end portion and an anterior end portion adapted to fit over the bulb, said anterior portion being of elongated tubular configuration having a closed free end, the opposite end of said anterior portion being open and merging in an axial direction into a generally cup-shaped posterior portion of enlarged diameter adapted to overlie that surface of a muscle monitor flange which faces the bulb of the monitor, said cup-shaped posterior portion diverging outwardly along essentially its entire length and terminating in a skirt having an open end of maximum diameter.

4,953,564

## SCREW-IN DRUG ELUTING LEAD

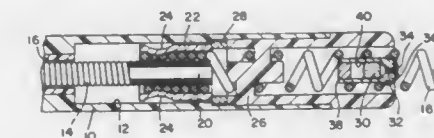
Wendy A.W. Berthelsen, Range, Mich., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Aug. 23, 1989, Ser. No. 398,199

Int. Cl.<sup>5</sup> A61N 1/05

U.S. Cl. 128—784

9 Claims



1. An electrical medical lead comprising:
  - an elongated insulative lead body having a proximal end and a distal end;
  - an elongated conductor, mounted within said lead body, said conductor having a proximal end and a distal end;
  - an electrode assembly mounted at the distal end of said insu-



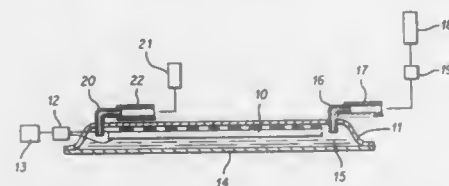
lative lead body, said electrode assembly comprising an electrode head member having a lumen open to the distal end of said lead body; a fixation helix mounted within said lumen of said head member, said fixation helix having a proximal end and a distal end, said fixation helix mounted in said lumen of said head member such that said helix is advanceable from a first, retracted position within said lumen of said head member in which the distal end of said helix is adjacent the distal end of said lead body to a second, advanced position in which the distal end of said fixation helix projects distally of the distal end of said lead body, said electrode assembly further comprising a drug release device having a proximal end and distal end and having means for releasing a drug contained within said drug release device at least adjacent the distal end of said drug release device, said drug release device mounted to said fixation helix such that when said fixation helix is in said first, retracted position within said lumen of said head member, the distal end of said drug release device is located within the lumen of said electrode head member and such that when said helix is advanced to said second, extended position, the distal end of said drug release device is adjacent the distal end of said lead body, the distal end of said helix extending distally of the distal end of said drug release device, said electrode assembly further comprising at least one conductive electrode surface coupled to the distal end of said elongated conductor; and means for advancing said fixation helix from said first, retracted position to said second, extended position.

**4,953,565**  
**ENDERMIC APPLICATION KITS FOR EXTERNAL MEDICINES**

Shunro Tachibana, 1-6-18, Kusagae, Chuo-ku, Fukuoka-shi, Fukuoka-ken, and Uichi Shibata, Tokyo, both of Japan, assignors to Shunro Tachibana, Fukuoka and Meiji Seika Kaisha, Ltd., Tokyo, both of Japan  
Continuation-in-part of Ser. No. 120,555, Nov. 13, 1987, Pat. No. 4,821,740. This application Mar. 28, 1989, Ser. No. 329,913  
Claims priority, application Japan, Nov. 26, 1986, 61-282703  
Int. Cl.<sup>5</sup> A61N 1/00

U.S. Cl. 128—798

4 Claims



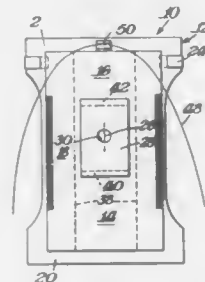
1. An endermic application kit for external medicines, comprising:

- a container for retaining liquid containing drug, said container having a bottom opening, an inlet for the liquid, and an outlet for the liquid,
- means for supplying the liquid containing drug into the container,
- a drug permeable layer attached to the container to cover the bottom opening of the container, and
- an ultrasonic oscillator situated inside the container so that when the ultrasonic oscillator and supplying means are actuated, the liquid containing drug is continuously supplied to the container and the drug contained in the liquid is applied to a skin of a patient through the drug permeable layer by means of the ultrasonic oscillator.

**4,953,566**  
**BODY WRAP FOR USE IN DIAGNOSTIC PROCEDURE**  
Lloyd R. Garren, P.O. Box 3738, Wilmington, Del. 19807  
Filed May 18, 1989, Ser. No. 337,939  
Int. Cl.<sup>5</sup> A61F 13/00

U.S. Cl. 128—849

3 Claims



1. A disposable body wrap configured to be worn by a person in the manner of a diaper, the body wrap comprising a sheet having front and back area portions interconnected by a crotch area portion, each of the front and back area portions having a waistband portion and means for releasably securing these waistband portions together around the waist of a person wearing the body wrap, a small access opening in the form of a slit in the crotch area portion of the sheet positioned and dimensioned to permit instrumentation to pass therethrough for rectal examination of a person wearing the body wrap, and a flap on the outside of the sheet covering the small access opening in the crotch area portion, the flap having first and second pairs of opposite edges fixedly secured to the outside of the sheet and also having a small access opening in the form of a slit offset and parallel to the slit in the sheet positioned and dimensioned to permit instrumentation to pass therethrough for rectal examination purposes.

**4,953,567**  
**PROPHYLACTIC DEVICE FOR USE WITH A TELEPHONE**  
Dale Ward, 3848 Charlotte Rd., Rex, Ga. 30273  
Filed Dec. 5, 1988, Ser. No. 279,944  
Int. Cl.<sup>5</sup> A61F 13/00

U.S. Cl. 128—851

8 Claims



1. A prophylactic device for protection from exposure to germs contained on a telephone receiver and dial pad comprising:

- (a) a sleeve having an open end, a closed end and a continuous wall connecting said open end and said closed end, said wall having interior and exterior sides, said sleeve being of appropriate length and width to envelop a telephone receiver;
- (b) a manipulator member having a front side and a back side, said manipulator member being detachably secured

to and extending from the said sleeve at said open end where said front side is continually connected to said interior wall of said sleeve and said back side is continuously connected to the exterior wall of said sleeve, said manipulator member extending partially around the diameter of said open end of said sleeve and being of a size to protect a user's hand while grasping a telephone receiver.

**4,953,568**  
**ADJUSTABLE THUMB BRACE**  
Charles W. Theisler, 1749 S. Racoon Rd., Austintown, Ohio 44515

Filed Mar. 1, 1990, Ser. No. 486,871

Int. Cl.<sup>5</sup> A61F 13/00

U.S. Cl. 128—878

4 Claims



1. An adjustable thumb restraint for engagement on a person's hand, comprises a resilient annular band member, said band member having spaced parallel upper and lower edge portions, a thumb retaining sleeve secured to said annular band member, said sleeve extending both above and below said parallel edges of said annular band, an elongated adjustable tab extending from said sleeve, fastening means secured in oppositely disposed relation on said elongated tab inwardly from its free end, a secondary elongated adjustable tab secured to said annular band in spaced relation to said thumb receiving sleeve, fastening means secured said secondary elongated tab and said annular band for registration therewith.

**4,953,569**  
**JOINT PROTECTOR PAD**  
Robert Leonardo, Treasure Island, Fla., assignor to L'nard Associates, Inc., St. Petersburg, Fla.  
Filed May 17, 1988, Ser. No. 194,930  
Int. Cl.<sup>5</sup> A61F 13/00

U.S. Cl. 128—892

1 Claim



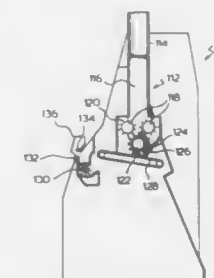
1. A pad for preventing skin abrasions at the joints of persons having impaired mobility, comprising,  
a substantially round pad means having a concave shape and

inner and outer sides, a peripheral edge, and a central portion,  
said outer side of said pad means being comprised of a wear-resistant material,  
the inner side of said pad means being comprised of a first pad element extending over substantially all of the wear-resistant material and being permanently secured to said wear-resistant material so as to prevent relative movement therebetween, said first pad element having the texture of wool fleece, and having a central portion,  
a second pad element permanently secured to the central portion of said first pad element to prevent relative movement therebetween and so as to be in covering relation to the central portion,  
strap means on said pad means for securing the pad means to the person,  
fastening means on said strap means adapted to be secured together to secure said pad means to the joint of a person wearing the pad means,  
said second pad element and said strap portions being comprised of foam rubber of modular open cell construction, said strap means being secured to at least the peripheral edge of said pad means,  
and at least one ventilation hole in said wear-resistant material and said second pad element.

**4,953,570**  
**CIGARETTE MAKING MACHINE HOPPER**  
Warren A. Brackmann; Stanislav M. Snaird, both of Mississauga; Takeshi Nehyo, Willowdale, and Michael H. Sheahan, Toronto, all of Canada, assignors to Rothmans, Benson & Hedges Inc. and Rothmans International Services Limited, both of Toronto, Canada  
Division of Ser. No. 190,122, May 4, 1988, Pat. No. 4,867,180.  
This application May 26, 1989, Ser. No. 357,300  
Int. Cl.<sup>5</sup> A24C 5/39

U.S. Cl. 131—109.1

7 Claims



1. A method of forming a tobacco filler rod suitable for the formation of cigarettes, which comprises:  
providing a source of cut tobacco located in an upright reservoir zone of generally rectangular cross-section having a tobacco receiving upper inlet and a lower outlet, metering cut tobacco from said lower outlet of said reservoir zone by a cooperating pair of counterrotating rollers having pins extending from the surfaces thereof so as to meter tobacco from the outlet,  
opening said metered cut tobacco to separate the individual tobacco particles one from another by a third roller having pins extending from the surface thereof, so as to interact with the pins of the cooperating pair of rollers to open tobacco metered by the cooperating pair of rollers, forming a wide stream of tobacco particles from all the individual separated tobacco particles directly on the external surface of a rectilinear tobacco-conveying device, transporting said wide stream of tobacco particles on said device.

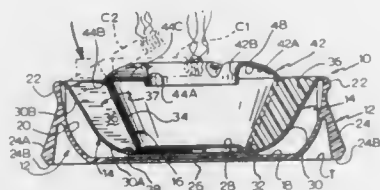
tobacco-conveying device to a location of formation of a vertically-moving shower, forming a vertically-moving shower of cut tobacco particles from said transported wide stream of tobacco particles while maintaining said tobacco particles in their individual separated condition, and forming said filler rod directly from said vertically-moving shower.

#### 4,953,571 ASH TRAYS

Raymond Tremblay, Montreal, Canada, assignor to Les Entrepreneurs Dupont et Lanctot Inc., St. Constant, Canada  
Filed May 30, 1989, Ser. No. 358,409  
Int. Cl.<sup>5</sup> A24F 19/02, 19/14

U.S. Cl. 131—231

6 Claims



1. An ash tray comprising a bowl and a bottomless cup fitted within said bowl; said bowl defining an upwardly-outwardly-diverging side wall having an upper edge section and a bottom wall, said cup defining an upwardly-outwardly extending side wall having a top edge and a bottom edge resting on the bowl bottom wall, a plurality of winglets radially, outwardly projecting from said cup side wall, the radially-outward edge of said winglets conforming to the shape of said bowl and snugly fitting therewithin, whereby a plurality of small compartments are defined between the bowl and the cup side walls and between each pair of successive winglets; a cigarette being engageable in any selected one of said compartments, for extinguishing the same; said cup further including a ring-like member, radially, inwardly extending from the top edge thereof and defining cigarette supporting means; further including an outer shell having a side wall and a bottom wall and into which is fitted said bowl; said bowl bottom wall being upturned; the upper edge portion of said bowl side wall supported by said shell side wall, whereby the bowl bottom wall is spaced from said shell bottom wall; the latter having a central bore, whereby ventilation is facilitated between the outer shell and the bowl.

4,953,572  
METHOD AND APPARATUS FOR AIDING IN THE REDUCTION OF INCIDENCE OF TOBACCO SMOKING  
Jed E. Rose, 907 Kimball Dr., Durham, N.C. 27705; Murray E. Jarvik, 2001 Georgina Avenue, Santa Monica, Calif. 90402, and Karce D. Rose, 4050 W. Soda Rock Dr., Healdsburg, Calif. 95448

Division of Ser. No. 727,525, Apr. 25, 1985. This application  
Feb. 19, 1988, Ser. No. 157,948

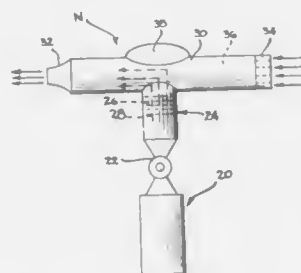
Int. Cl.<sup>5</sup> A24F 47/00

U.S. Cl. 131—270

21 Claims

1. A low concentration nicotine aerosol spray for inhalation to aid in smoking incidence reduction, said aerosol spray having droplets within the size range of between about 1 micron to about 10 microns in diameter and with the droplet size selected to stimulate either the upper respiratory tract or the lower respiratory tract or both, and which spray contains nicotine which renders an amount of about 0.005 mg to about 0.03 mg per inhalation rendering a nicotine concentration substantially less than that obtained from a puff of cigarette smoke and

which does not produce any significant level of nicotine still provides the throat and respiratory tract stimuli obtained from



#### 4,953,573

#### ROD MONITORING DEVICE

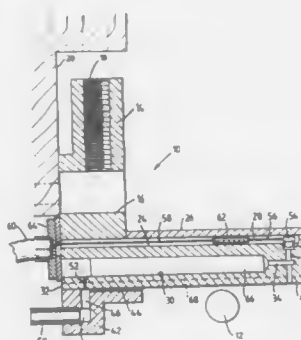
Michael J. Cahill, and John Dawson, both of Coventry, England, assignors to Molins plc, Milton Keynes, England  
Filed Jun. 23, 1989, Ser. No. 369,756

Claims priority, application United Kingdom, Jan. 23, 1988, 8814929

Int. Cl.<sup>5</sup> A24C 5/32

U.S. Cl. 131—280

14 Claims



11. A monitoring device, particularly for detecting imperfect longitudinal seams in the wrapper of a cigarette or cigarette filter rod, comprising a fixed surface which may be located adjacent to an axial path of the rod, means for directing an air stream along said surface in a direction generally transverse to said path, and means for monitoring sound caused by said stream after it has passed adjacent said path, whereby disturbance of said stream caused by defects in a rod on said path may be detected by said monitoring means, said sound monitoring means comprising a microphone located to receive sound through a passage having an opening in said surface, and further including means for establishing an air flow in said passage to eliminate or reduce contamination.

#### 4,953,574

#### HAIR CURLER WITH A CLAMPING MEMBER

Eiji Tsuji, Hikone, and Hideharu Nakano, Oomihachiman, both of Japan, assignors to Matsushita Electric Works, Ltd., Kadoma, Japan

Continuation of Ser. No. 4,739, Jan. 20, 1987, abandoned. This application May 24, 1989, Ser. No. 357,649

Claims priority, application Japan, Jan. 20, 1986, 61-9295

Int. Cl.<sup>5</sup> A45D 1/04

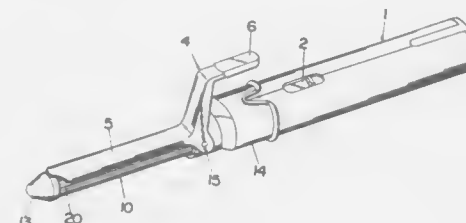
U.S. Cl. 132—232

2 Claims

1. A hair curler comprising a barrel provided with an electric

cal resistance heating element extending along the exterior thereof and a hair clamping member adapted to clamp hair to the heating element on the barrel;

said hair clamping member comprising a clamping plate section adapted to be placed over one circumferential portion of the barrel in closely adjacent relation thereto; and said heating element comprising a plurality of resistor segments connected in a series-parallel combination across an electric source, extend lengthwise of the barrel and are



spaced circumferentially therearound, with said resistor segments on the portion of the barrel located away from the clamping plate section of said hair clamping member connected in parallel and said resistor segments mounted on the portion of the barrel located closely adjacent to said clamping plate section connected in series to produce a greater amount of heat at that section than the resistor segments connected in parallel on the portion of the barrel located away from the clamping plate section of said hair clamping member.

#### 4,953,575

#### WASHING DEVICE

Jukka Tervamäki, Helsinki, Finland, assignor to Labsystems Oy, Helsinki, Finland

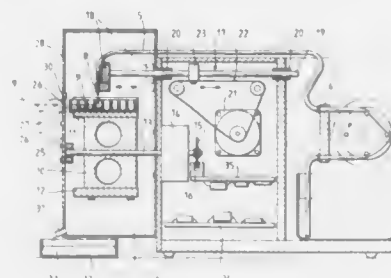
Filed Oct. 2, 1989, Ser. No. 415,636

Claims priority, application Finland, Sep. 30, 1988, 884502

Int. Cl.<sup>5</sup> B08B 3/02

U.S. Cl. 134—57 R

10 Claims



1. A washing device for washing cuvette sets comprising: a frame (1) a tube pump (4) supported within said frame having cooperatively associated therewith a vessel (2) for containing washing liquid (3) therein, at least one hose (5) cooperatively associated with said tube pump, said hose (5) communicating with said vessel (2) and extending through said tube pump and to a cuvette holding means located downstream of said tube pump (4) whereby said tube pump (4) causes washing liquid (3) to flow from said vessel (2), through said pump and to said cuvette holding means via a dosage transfer device (17) to which an end of said hose (5) is connected, a compartment located downstream of said tube pump (4)

with said dosage transfer device (17) slidably mounted therein,

a stepping motor (21) mounted within said compartment and drivingly coupled to said dosage transfer device, said dosage transfer device (17) being mounted to move backward and forward via said stepping motor, a chamber (24) fixed to a joining wall of said compartment into which said dosage transfer device (17) extends, a rotor assembly (10) mounted on a shaft (13) rotatably supported in said chamber, said shaft extending into said compartment and coupled to a motor (14) mounted in said compartment, and said cuvette holding means (11) disposed on a surface of said rotor assembly (10) for detachably mounting a cuvette set thereto to be washed, said dosage transfer device having means at its end for supporting at least one hose (5) extending into said chamber (24) from said tube pump, whereby cuvette sets are washed by feeding washing liquid (3) via said tube pump (4) to said at least one hose (5) connected at its end to said transfer device (17) by depositing washing fluid (3) into said cuvettes and the washing fluid thereafter removed by centrifugal force by rotating said rotor confined in said chamber (24).

#### 4,953,576

#### METHOD AND APPARATUS FOR STAKING ARTICLES TO A GROUND SURFACE

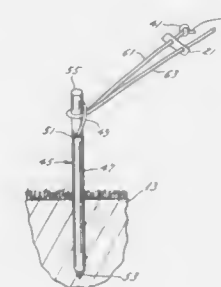
Thomas R. Connelly, 423 Pratt St., Niles, Ohio 44406

Filed May 2, 1989, Ser. No. 345,991

Int. Cl.<sup>5</sup> E04H 15/62

U.S. Cl. 135—118

3 Claims



1. A method of securing an article, having a rope extending therefrom, using an elongated stake having a sharp first end of a body portion for driving into a ground surface, a blunt second end, of said body portion for transferring a driving force to said body portion and a ring-shaped outrigger secured to said body portion proximate said second end and freely rotatable about a horizontal axis, said method comprising the steps of: looping a free end of said rope; drawing the loop formed by said free end of said rope through said ring-shaped outrigger; passing the eye of said loop over said blunt second end of said body portion; and drawing said rope taut between said stake and said article, thereby rotating said ring-shaped outrigger upwardly about said horizontal axis and into a biased engagement with said body portion of said stake.



4,953,577

## SPRAY ENCAPSULATION OF PHOTOVOLTAIC MODULES

Jack Marshall, Glenolden, Pa., assignor to Solarex Corporation, Rockville, Md.

Filed Jul. 6, 1989, Ser. No. 375,954

Int. Cl.<sup>5</sup> H01L 31/048

U.S. Cl. 136—251

14 Claims



10. An encapsulated photovoltaic module comprising: a superstrate and one or more photovoltaic cells having an exposed surface disposed on said superstrate; and a barrier coating applied to said exposed surface of the one or more photovoltaic cells, said barrier coating comprising the reaction product of a mixture comprising a two component fluorinated polyurethane and 3-glycidoxypropyltrimethoxy silane.

4,953,578

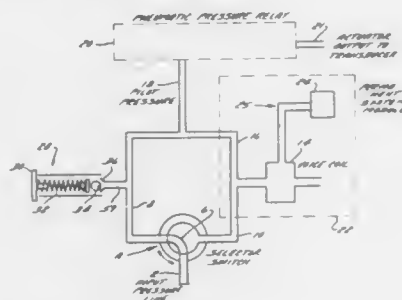
DUAL MODE PNEUMATIC CONTROL SYSTEM  
Thomas O. Kautz, Mequon, Wis., assignor to Johnson Service Company, Milwaukee, Wis.

Filed Nov. 2, 1989, Ser. No. 430,716

Int. Cl.<sup>5</sup> G05D 16/00

U.S. Cl. 137—14

17 Claims



15. A method for operating an HVAC system, comprising the steps of:  
providing pneumatic fluid to the system;  
selecting the mode of operation of the system;  
diverting the pneumatic fluid to a pathway corresponding to the mode selected;  
regulating the pressure of the diverted pneumatic fluid;  
supplying the pneumatic fluid to a pressure relay; and  
providing from the pressure relay an output of pneumatic fluid for operating the components of the HVAC system.

4,953,579

## QUICK ACTING DIVERSION VALVES

Robert E. Phillips, 12217 Iredell St., Studio City, Calif. 91601, and Ben A. Otsap, 7661 Airport Blvd., Los Angeles, Calif. 90045

Filed Feb. 20, 1987, Ser. No. 17,321

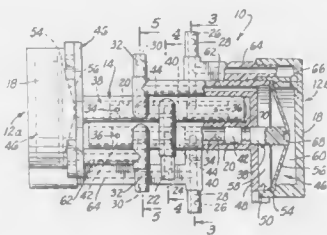
Int. Cl.<sup>5</sup> G05D 7/01

U.S. Cl. 137—106

7 Claims

1. A valve including a housing, said housing having an internal cavity, an inlet and two outlet ports located in said housing so as to lead into the interior of said cavity, said valve also including a valve body located within said cavity, said valve body being capable of being moved between a first position in which it places said inlet port in communication

with one of said outlet ports and a second position in which it closes off the one of said outlet ports, said valve also including actuating means for moving said valve body between said first and second positions, said actuating means being connected to said valve body in which the improvement comprises:  
said cavity is an elongated bore within said housing,  
said valve body is a valve spool which is capable of being moved along the length of said bore in being shifted between said first and second positions,  
said actuating means including wall means defining a hollow cavity, a diaphragm means having two positions of stability locate within said cavity and having its periphery held by said wall means so as to divide said cavity into two compartments, a first control port leading through said wall means into a first of said compartments, a second control port leading through said wall means into a second



of said compartments, and mechanical means connecting the center of said diaphragm means to said valve body, said diaphragm means, said mechanical means and said valve body being physically related so that in a first stable position of said diaphragm means said valve body is in said first position and in the second stable position of said diaphragm means said valve body is in said second position,  
said diaphragm means being responsive to the fluid pressure differential between said compartments so as to be oriented in either of said positions of said diaphragm means in accordance with such differential,  
the center of said diaphragm means is aligned with said bore in both of said positions and in moving between said positions, and  
said mechanical means is a rigid member extending in alignment with said bore.

4,953,580

## BOLTED PIPE JOINT RELEASABLE BY REMOTE CONTROL AND COMBINATION TOOL THEREFOR

Hans-Peter Schabert, Erlangen; Erich Strickroth, Buckenhof, and Erwin Laurer, Moehrendorf, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Hanover and Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH, Munich, both of, Fed. Rep. of Germany  
Filed Jul. 15, 1988, Ser. No. 219,979

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1987, 3723386

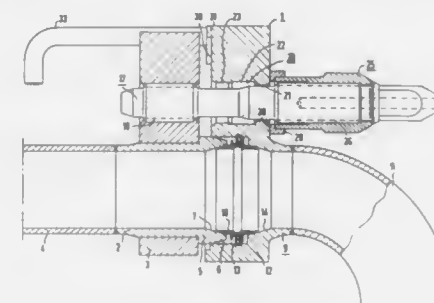
Int. Cl.<sup>5</sup> F16L 55/00

U.S. Cl. 285—23

29 Claims

1. Bolted pipe joint releasable by remote control, comprising a fixed flange and a releasable flange each being disposed at a respective one of two pipe end, a centering aid cooperating with both of said flanges, a seal, and a fastening screw being retained by said releasable flange in a disengaged position and pressing said two flanges together in an engaged position, said

fastening screw having first and second threaded regions being successively engaged upon pressing said flanges together, said



4,953,581

## SELF DRAINING VALVE MEMBER FOR USE IN UNDERGROUND WATER LINES

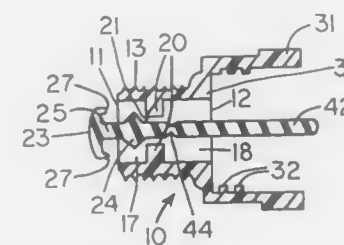
Don Patterson, 4298 Shirley La., Salt Lake City, Utah 84121

Filed Aug. 14, 1989, Ser. No. 393,231

Int. Cl.<sup>5</sup> F16K 15/14

U.S. Cl. 137—107

11 Claims



1. A self draining valve member for use with a water line of an underground water distribution system, said valve member comprising

- a first conduit having first and second ends and a cylindrical outer surface
- screw threads formed on at least a portion of said outer surface which is adjacent to the first end of said conduit, wherein said screw threads are adapted to engage a threaded fitting on the water line such that said first end of said conduit is in fluid flow communication with said water line;
- a first bore extending axially inward from the first end of said conduit;
- a second bore extending axially inward from the second end of said conduit;
- a transverse wall positioned across an intermediate section of the conduit to separate the first and second bores, with opposite first and second sides of said transverse wall being substantially flat and forming the innermost ends of the first and second bores, respectively;
- a drain bore extending through the transverse wall to establish flow communication between said first and second bores, with said drain bore having a reduced passage relative to either of the first and second bores;
- a first valve seat formed by the substantially flat first side of said transverse wall circumscribing said drain bore at the inner end of said first bore;
- a second valve seat formed by the substantially flat, second side of said transverse wall circumscribing said drain bore at the inner end of said second bore;
- a first, resilient valve head in said first bore, said valve head having a face which seats on said first valve seat;

a second resilient valve head in said second bore to seat on said second valve seat;  
a valve stem extending through said drain bore and connecting said first and second valve heads, wherein said valve stem has a length somewhat greater than the distance along the drain bore between said first and second sides of said transverse wall,  
whereby said first valve head responds to a minimum water pressure in said water line to seat against said first valve seat to inhibit flow of water from said conduit through said drain bore and allows water in said water line to drain through said drain bore when there is less than the minimum water pressure in the water line, with said second valve head being capable of seating against said second valve seat in response to pressure of ground water to inhibit backflow of ground water into the water line, with said valve member further comprising  
a flange projecting circumferentially from said second end of said conduit;  
a hollow cylindrical hood extending from said flange away from said conduit;  
internal screw threads formed on at least a portion of the internal surface of said hood which is adjacent to said flange;  
a threaded plug which engages said internal threads from the open end of said hood such that one end of said threaded plug can be screwed tightly against said second end of said conduit, with the other end of said threaded plug facing away from said conduit;  
an opening through said threaded plug which establishes flow communication between said second end of said conduit and said hollow, cylindrical hood; and  
a porous filter element sealed between said second end of said conduit and said threaded plug when said threaded plug is screwed against said second end of said conduit, whereby said threaded plug and said porous filter element form a closed end of said second bore in said conduit to prevent foreign, solid objects such as dirt and pebbles from infiltrating into said second bore.

4,953,582

## COMBINED PRESSURE REGULATOR AND RELIEF VALVE HAVING A SINGLE BIASING MEANS

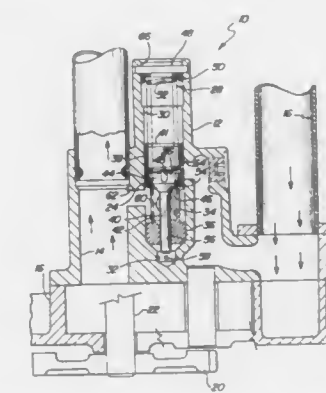
Lawrence C. Kennedy, Birmingham, Mich., assignor to Detroit Diesel Corporation, Detroit, Mich.

Filed Jul. 27, 1989, Ser. No. 385,400

Int. Cl.<sup>5</sup> G05D 16/00

U.S. Cl. 137—115

10 Claims



1. A pressure regulation and relief valve assembly comprising:  
a valve body including a bore;  
a regulating valve comprising a hollow spool having first and second ends defining one diameter, a center portion having a reduced diameter with respect to said first and

second ends and including a relief chamber defined by the center section of said hollow spool;

a poppet relief valve having a stem portion, a fluted crown portion and a frustoconical portion interconnecting said crown portion and said stem portion, said poppet valve being disposed within said regulating valve and said regulating valve being disposed within said bore, said regulating valve being movable between closed and open positions in response to a predetermined gallery pressure, said relief valve being moveable between said closed and open positions in response to a predetermined relief pressure;

a single biasing means within said valve body for biasing said regulating valve and relief valve to closed positions said valves being located at the same end of said biasing means, said biasing means exerting a predetermined force to bias both of said valves toward said closed position and being responsive to both said predetermined gallery pressure and said predetermined relief pressure to allow said first regulating valve move to said open position and said relief valve to move to said second position.

4,953,583

## TANK PRESSURE CONTROL VALVE

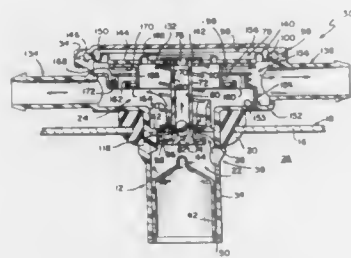
Emil Szlaga, Connersville, Ind., assignor to Stant Inc., Connersville, Ind.

Filed Mar. 24, 1989, Ser. No. 328,451

Int. Cl.<sup>5</sup> F16K 17/196

U.S. Cl. 137—118

30 Claims



1. An apparatus for controlling discharge of fuel vapors from a fuel tank during refueling, the apparatus comprising means for conducting fuel vapor between the fuel tank and a fuel vapor treatment site situated outside of the fuel tank, means for selectively blocking flow of fuel vapor through the conducting means, the blocking means being operable between a flow-blocking position and a flow-delivery position, means for yieldably biasing the blocking means toward its flow-blocking position, and means defining a venting control chamber in communication with the blocking means for receiving and using fuel vapor pressure from the fuel tank having a magnitude in excess of a predetermined threshold level to exert an opening force on the blocking means in opposition to the biasing means so that the blocking means is moved to its flow-delivery position, thereby permitting discharge of pressurized fuel vapor in the tank to said fuel vapor treatment site through the conducting means, the blocking means being formed to include means for communicating fuel vapor from the fuel tank to the venting control chamber.

4,953,584

## VACUUM BREAKER VALVE

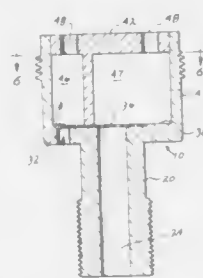
Lajos Vegso, Culver, Ind., assignor to Bristol Corporation, South Bend, Ind.

Filed May 12, 1987, Ser. No. 48,810

Int. Cl.<sup>5</sup> F16K 24/00; E03C 1/10

U.S. Cl. 137—218

6 Claims



1. A valve for preventing backflow and siphoning, comprising a valve body having an air inlet port, a liquid inlet port and a liquid outlet opening,

an insert part including a plate member which extends into said valve body and constitutes means serving to divide the valve into first and second separate chambers, said first chamber having said air inlet port and being in communication with said liquid outlet opening, said second chamber having said liquid inlet port and being in communication with said liquid outlet opening,

a single piece diaphragm overlying both said inlet ports and being of such resiliency as to permit movement at each inlet port independently of the other in response to pressure conditions within each of said chambers,

said plate member overlying contacting said diaphragm to anchor the diaphragm at said inlet ports.

4,953,585

## TUB TRANSFER-DIVERTER VALVE WITH BUILT-IN VACUUM BREAKER AND BACK-FLOW PREVENTER

Pietro Rollini, Suno, Italy, and Domenico Luisi, Woodbridge, Canada, assignors to Rubinet Brass Canada Limited, Woodbridge, Canada

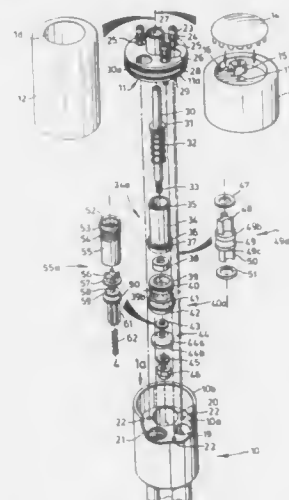
Filed May 19, 1989, Ser. No. 355,011

Claims priority, application Canada, Mar. 31, 1989, 595350

Int. Cl.<sup>5</sup> F16K 11/00, 24/02

U.S. Cl. 137—218

5 Claims



1. A valve assembly comprising a main body housing having

at least one fluid inlet and at least two fluid outlets, flow paths associated with each of the inlets and outlets, and passages connecting the inlets and associated flow paths to the outlets and associated flow paths, one such passage being open to atmosphere; a diverter valve for transferring flow from one inlet to one or another of the outlets and comprising a hand actuated diverter rod connected to a bicone washer biased in a first position whereby fluid flows from an inlet to a first outlet and the second outlet is closed and sealed, and on actuating the diverter rod, the bicone washer is moved to a second position where it is maintained by pressure of fluid flow from the inlet to the second outlet and the first outlet is closed and sealed, and flow thereto ceases; a back-flow preventer/vacuum breaker valve located in the inlet flow path and a connecting passage, and movable, in response to changes in fluid flow direction or atmospheric pressure, from a first position, whereby back-flow is prevented as the valve closes and seals the inlet flow path, and opens the connecting passage outlet to atmosphere, to a second position in response to fluid flow from the inlet, whereby the connecting passage outlet to atmosphere is closed and sealed against fluid flow, the valve being normally located in the first position and returnable thereto with changes in fluid flow pressure and direction or atmospheric pressure; the valve having a truncated cone shape with an upper flange, guide means on each valve end and sealing means at each end to engage valve seats at the upper and lower limits of the path of travel of the valve; a back-flow preventer valve located in the first outlet flow path movable from a first position in which the valve is normally biased, whereby the inlet flow path is closed and sealed against flow, to a second position in response to fluid flow from the inlet path, the valve being of spindle-like shape with a whorl-like base having guide means and sealing means associated with it, and upper valve seat means to engage the valve sealing means.

4,953,586

## APPARATUS FOR ADJUSTMENT OF ROTARY VALVE ACTUATORS

Paul P. Weyer, 48811 286th Ave. SE, Enumclaw, Wash. 98022

Filed Jan. 16, 1990, Ser. No. 465,437

Int. Cl.<sup>5</sup> F16K 43/00, 31/16

U.S. Cl. 137—315

12 Claims



1. In a system having a valve with open and closed positions, and a rotary valve actuator for controlling the opening and closing of the valve, apparatus for adjusting the fully open and fully closed positions of the valve comprising

- a sub base having an upper surface and a lower surface, said sub base mounted to the valve, said sub base having threaded fasteners extending from the upper surface;
  - ring means fixedly attached to the actuator around the circumference of the actuator, said ring means having open portions for allowing passage of said threaded fasteners of said sub base therethrough;
  - a cover plate fitting around the actuator and resting on said ring means, said cover plate having holes to receive said threaded fasteners of said sub base;
  - fastening means compatible with said threaded fasteners for fastening said cover plate to said threaded fasteners of said sub base;
- adjusting means within said ring means for rotating said ring

means and the actuator relative to the sub base, said adjusting means is selected to abut against said fastening means causing said ring rotation thereby allowing fine adjustment of the fully open and fully closed positions of the valve.

4,953,587

## BALL VALVES FOR PIPELINES

John Steele, Dunfermline, United Kingdom, assignor to T K Valve Limited, United Kingdom

PCT No. PCT/GB88/00660, § 371 Date Feb. 9, 1990, § 102(e)

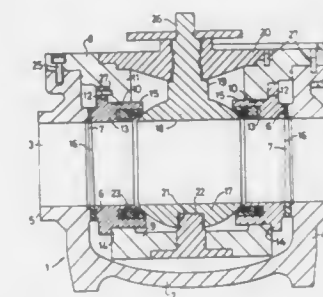
Date Feb. 9, 1990, PCT Pub. No. WO89/01583, PCT Pub. Date Feb. 23, 1989

PCT Filed Aug. 10, 1988, Ser. No. 460,865

Int. Cl.<sup>5</sup> F16K 43/00, 5/06, 25/00

U.S. Cl. 137—315

2 Claims



1. A ball valve comprising an outer housing (1) in the form of a substantially cylindrical pot open at one axial end and closed at the opposite axial end and having two diametrically opposing openings (3) in a wall (4) of the housing (1), the outer sides (5) of the openings (3) being adapted for connecting the housing (1) into a pipeline and flat annular seat faces (6) being formed around the openings (3) at the inner sides thereof, an annular wedge-shaped ring (7) located against each one of said seat faces (6) with the shallowest dimension of the ring (7) nearest the open end of the outer housing (1), an inner housing (8) having two opposing openings (10) in a wall (11) of the inner housing (8), with radial flat annular seats (12) being formed around the openings (10) at the outer sides thereof, two annular wedged shaped adaptors (13) each having a radial annular shoulder (14) located against the respective seats (12) on the inner housing (8), an inclined annular surface (16) on the outer side of each adaptor (13) with the deepest dimension of each adaptor (13) nearest the open end of the outer housing (1), a ball member (17) mounted for rotation within the inner housing (8), the ball member (17) having a diametrical through passage (18) and a rotatable operating stem (19) journaled in a removable closure bonnet (20), the inner housing (8), the adaptors (13), the ball member (17) and operating stem (19) being insertable into and withdrawable as a single subassembly from the outer housing (1) through its open end, and to reveal the ball member (17) and the seal adaptors (13) for inspection without having to removably detach the ball member (17) itself when the subassembly is withdrawn from the outer housing (1), the subassembly being insertable into the outer housing (1) to a fully assembled condition therewith where the inclined annular surface (16) of each adaptor (13) is wedgingly engaged with one of said annular wedge-shaped rings (7) for automatically causing a sealing engagement between the ball member (17) and the outer housing (1), and the ball member (17) is rotatable between an open position where its through passage (18) is aligned with the aligned openings in the outer housing (1) and the adaptors (13) and a closed position where the openings are blocked by the ball member (17), characterised in that the inner housing (8) is also in the form of a substantially cylindrical pot open at one axial end and closed at the opposite axial end, the two opposing openings (10) in the



wall (11) of the inner housing (8) also diametrically opposing each other, the ball member (17) being rotatable about the axis of the inner housing (8) and being installable into the inner housing (8) through the open end thereof, and the removable bonnet (20) closing the inner housing (8) which in turn closes and is rigidly secured within and to the outer housing (1), and in that each adaptor (13) also has a cylindrical neck (15) projecting through the associated opening (10) in the inner housing (8), the neck (13) housing annular seal means (23) resiliently engaging the ball member (17).

4,953,588

## DUAL CHECK VALVE

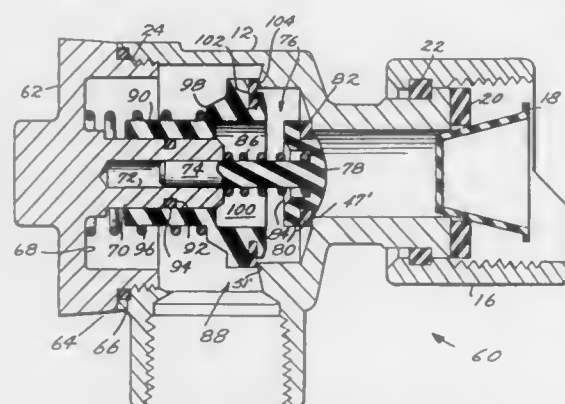
Robert E. Sands, Shelbyville, Ill., assignor to Mueller Co., Decatur, Ill.

Filed Aug. 16, 1989, Ser. No. 394,647

Int. Cl. F16K 15/06

U.S. Cl. 137—512.3

13 Claims



1. A valve device comprising a housing having an inlet, an outlet and an interior passage connecting said inlet and outlet, said interior passage having first and second spaced apart valve seats each surrounding a common axis of said interior passage, a first valve means, means for mounting said first valve means for movement in said housing toward and away from said first valve seat and second valve means, said means for mounting including support means for said second valve means with said support means permitting movement of said second valve means toward and away from said second valve seat independently of said first valve means, first spring means urging said first valve means toward said first valve seat and having one end engaging a portion of said housing, second spring means urging said second valve means toward said second valve seat and having one end engaging said support means and an opposite end engaging said second valve means with said second spring means being out of contact with said first valve means for all positions of said second valve means.

4,953,589

## SEALING DEVICE OF DELIVERY VALVE FOR FUEL INJECTION UNITS

Hisashi Nakamura, Higashimatsuyama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Jan. 4, 1990, Ser. No. 461,078

Claims priority, application Japan, Feb. 8, 1989, 1-13708[U]

Int. Cl. F16K 15/06

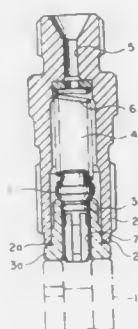
U.S. Cl. 137—543.23

5 Claims

1. In a sealing device of a delivery valve of a fuel oil injection unit for use in an internal combustion engine, said delivery valve including a valve body, a valve holder having a valve bore formed therein and accommodating said valve body, and an end portion defining therein an opening of said valve bore, a valve seat fitted into said opening of said end portion of said valve holder in an airtight manner, said valve seat having an axial through bore formed therethrough and slidably receiving said valve body, and a coiled spring received within said valve

bore of said valve holder and urging said valve body toward said valve seat,

the improvement wherein said end portion of said valve holder has an end face thereof formed with an annular



4,953,590

## ELECTROMAGNETIC DIRECTIONAL CONTROL VALVE

Toshifumi Kakinuma, Sano, and Kiyoshi Hayashi, Takebayashi, both of Japan, assignors to Tokyo Keiki Company Ltd., Tokyo, Japan

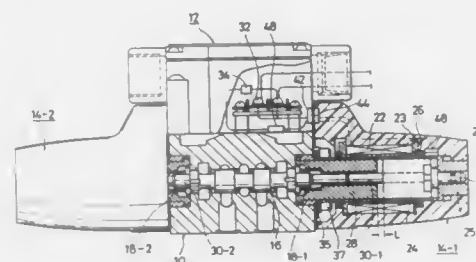
Filed Mar. 31, 1989, Ser. No. 331,381

Claims priority, application Japan, Apr. 22, 1988, 63-99495; May 12, 1988, 63-115129; Jun. 17, 1988, 63-149293

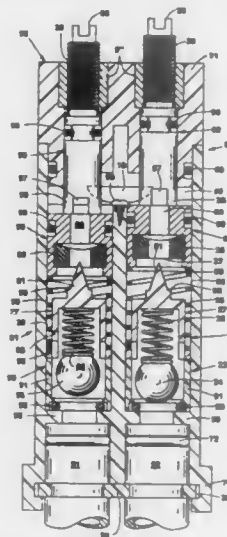
Int. Cl. F15B 13/044

U.S. Cl. 137—554

7 Claims



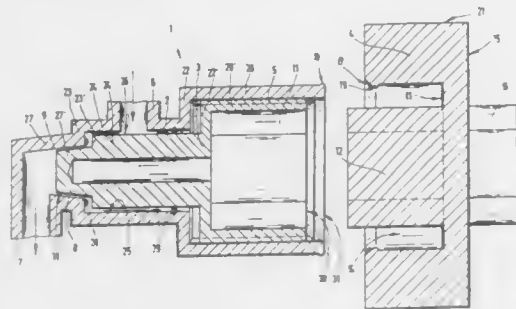
a means for adjusting the proximal relationship between said washer and said needle valve to adjust the degree



to which said needle valve restricts the flow through the orifice of said washer.

**4,953,594**  
**FLOW CONTROL**  
Peter von Berg, Neukeferloh, Fed. Rep. of Germany, assignor to Peter Von Berg Extrakorporale Systeme Medizintechnik, Kirchseon/Eglharting, Fed. Rep. of Germany  
Filed Nov. 25, 1987, Ser. No. 165,951  
Claims priority, application Fed. Rep. of Germany, Aug. 20, 1987, 3727816; Jan. 9, 1987, 3700502; Japan, Dec. 15, 1986, 3642182

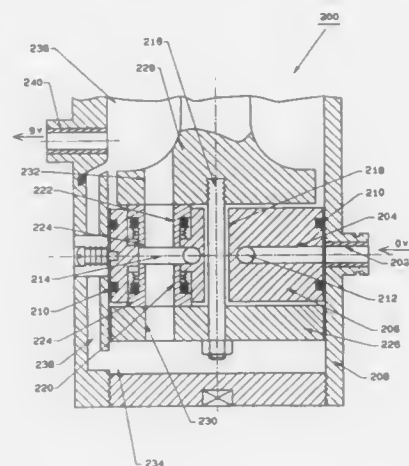
Int. Cl.<sup>5</sup> A61M 5/005  
U.S. Cl. 137—614.18 13 Claims



1. A metering device for adjusting a flow rate of a liquid to be infused into or taken out from the body of a living being, comprising:  
adjusting means including an inlet means for admitting liquid into the metering device and outlet means for discharging liquid from the metering device, and two adjusting members defining therebetween a flow passage from said inlet means to said outlet means, one of said adjusting member being rotatable relative to another adjusting member to adjust a flow resistance of said flow passage and thus the flow rate of the liquid passing therethrough;  
actuating means disengageably-engageable with said adjusting means to induce rotation of said one adjusting member relative to another; and  
locking means provided on said actuating means and said adjusting means and adapted to effect engagement of said actuating means with said adjusting means and connect them to each other in a key-locking manner, said locking

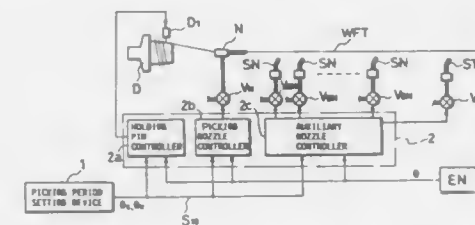
means being constructed so that said actuating means can be disengaged from said adjusting means in any adjusted position of said adjusting means to thereby avoid unintentional or erroneous adjustment of said two adjusting members relative to each other.

**4,953,595**  
**MUD PULSE VALVE AND METHOD OF VALVING IN A MUD FLOW FOR SHARPER RISE AND FALL TIMES, FASTER DATA PULSE RATES, AND LONGER LIFETIME OF THE MUD PULSE VALVE**  
Oleg Kotlyar, Salt Lake City, Utah, assignor to Eastman Christensen Company, Salt Lake City, Utah  
Continuation of Ser. No. 79,092, Jul. 29, 1987, abandoned. This application May 10, 1989, Ser. No. 349,777  
Int. Cl.<sup>5</sup> F16K 3/02  
U.S. Cl. 137—624.13 8 Claims



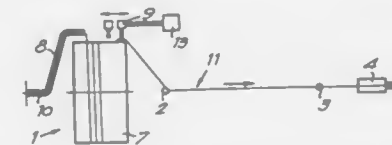
1. A mud pulsing valve, comprising: a body;  
a stator disposed within said body, said stator having at least two opposing surfaces, said stator having a plurality of stator ports therein, said stator ports extending between said opposing surfaces;  
a rotor rotatively disposed within said body and rotatable relative to said stator, said rotor having a plurality of ports defined therethrough, said rotor having first and second portions, a first portion proximate a first of said opposing surfaces of said stator and a second portion proximate the second of said opposing surfaces of said stator, said stator ports being cooperatively arranged and configured within said stator relative to said rotor ports in an analogous geometric configuration as said rotor ports are arranged and configured within said rotor, so that a predetermined rotation of said rotor relative to said stator causes simultaneous opening and closing of passages formed by said stator and rotor ports, one of said passages being opened when one of said stator ports and a rotor port are at least partially aligned with each other and said passage being closed when no portion of said one of said stator ports overlaps any portion of a rotor port;  
whereby the rotor ports extending through both opposing surfaces of said rotor substantially simultaneously aligned with the stator ports extending respectively through both opposing surfaces of said stator.

**4,953,596**  
**PICKING PERIOD SETTING DEVICE FOR A LOOM**  
Yujiro Takegawa, Ishikawa, Japan, assignor to Tsudakoma Kogyo Kabushiki Kaisha, Kanazawa, Japan  
Filed Sep. 12, 1989, Ser. No. 405,974  
Claims priority, application Japan, Sep. 16, 1988, 63-233197  
Int. Cl.<sup>5</sup> D03D 47/36  
U.S. Cl. 139—435.1 8 Claims



1. A picking period setting device for a loom said loom having shedding curves, heddle frames, a main shaft, said heddle frame having a curved shedding stroke, said loom further having reed beating angles and for producing cloth and having a crank angle, comprising:  
shedding curve calculating means for calculating the shedding curves representing the positional variation of the heddle frames of the loom with the crank angle of the main shaft of the loom;  
desired shedding stroke calculating means for calculating desired shedding stroke curves representing the variation of the shedding strokes of the heddle frames as a function of a weft yarn passing range defined on the reed, beating angle, the position of the cloth fell and the crank angle of the loom; and  
appropriate picking period deciding means for deciding an appropriate picking period on the basis of comparison of the shedding curves and the desired shedding stroke curves

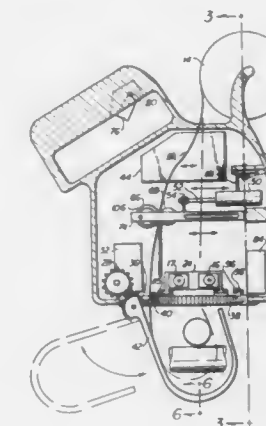
**4,953,597**  
**APPARATUS FOR ADJUSTING WEFT THREAD LENGTHS BY CHANGING THE LENGTH OF WEFT THREAD SUPPLY PATH**  
Philippe Van Bogaert, Schaarbeek, and Frank Ampe, Leffinge-Middelkerke, both of Belgium, assignors to Picanol N.V., Belgium  
Division of Ser. No. 355,127, May 16, 1989, Pat. No. 4,901,722, which is a continuation of Ser. No. 98,386, Sep. 18, 1987, abandoned. This application Jul. 31, 1989, Ser. No. 386,601  
Claims priority, application Belgium, Sep. 23, 1986, 2/61057  
Int. Cl.<sup>5</sup> D03D 47/34  
U.S. Cl. 139—452 5 Claims



1. In an apparatus for controlling insertion of a weft thread into a weaving loom shed, said apparatus including an accumulator drum, an insertion device and supply means including a surface of said drum for supplying weft thread to said insertion device along a predetermined path which coils around the drum a predetermined number of times, the improvement comprising:  
thread guiding means comprising at least two moveable thread locking elements located adjacent to the drum surface for engaging the drum surface in a radial direction to retain the weft thread coils on the drum and for disen-

gaging the drum surface in said radial direction to release the weft thread coils from the drum;  
drive means for automatically moving the thread locking elements relative to the surface of the drum in a direction other than said radial direction in order to control the amount of thread supplied to the insertion device during release of the weft thread coils; and  
control means for controlling the amount by which the drive means moves said locking elements in said direction other than said radial direction.

**4,953,598**  
**WIRE TYING TOOL FOR CONCRETE REINFORCING STEEL**  
William M. McCavey, 1830-C Ashborough Ct., Marietta, Ga. 30067  
Filed Apr. 13, 1989, Ser. No. 337,484  
Int. Cl.<sup>5</sup> B21F 9/02  
U.S. Cl. 140—57 11 Claims



1. A tool for making wire ties about reinforcing bars on the like, comprising:  
means for feeding a first end of the wire from a supply source with said wire remaining connected to the supply source;  
means for guiding said wire around the members to be tied;  
means for moving said wire from the supply source into substantially parallel alignment with said first end of said wire;  
means for clamping said wire from the supply source to said first end of said wire; and  
means for separating said wire from the supply source.

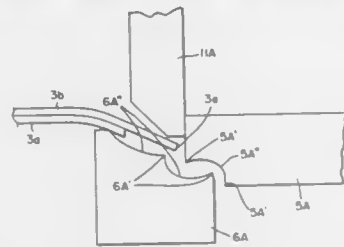
**4,953,599**  
**METHOD OF GRIPPING A STRAP FOR BONDING THE STRAP END PORTIONS TO EACH OTHER**  
Kanami Kato, Sakai, Japan, assignor to Signode Corporation, Glenview, Ill.  
Filed Jul. 17, 1989, Ser. No. 380,490  
Int. Cl.<sup>5</sup> B21F 15/06  
U.S. Cl. 140—93.4 6 Claims

1. A method for gripping a portion of a binding strap to be used in an article binding operation wherein the strap is supplied from a supply source, encircled about the article to be bound such that a leading end portion of said binding strap is disposed in overlapping relationship with a trailing end portion of said binding strap which, in turn, is integrally connected to a residual supply portion of said binding strap supplied from said supply source, said residual supply portion of said binding strap is retracted while a portion of said binding strap disposed upstream of said leading end portion of said binding strap is securely gripped so as to impart a predetermined amount of tension within said binding strap for securely binding said



article to be bound, and wherein said trailing end portion of said binding strap is to be severed by cutting means from said residual supply portion of said binding strap after said overlapped leading and trailing end portions of said binding strap have been bonded to each other so as to bind said article to be bound under tensioned conditions, said method for gripping said portion of said binding strap disposed upstream of said leading end portion of said binding strap comprising the steps of:

- providing upon said cutting means at least two laterally spaced convex gripping portions and at least one concave gripping portion interposed and defined between said at least two laterally spaced convex gripping portions;
- providing upon a jaw member at least two laterally spaced convex gripping portions and at least one concave gripping portion interposed and defined between said at least two laterally spaced convex gripping portions;
- laterally positioning said cutting means and said jaw member such that one of said at least two laterally spaced convex



gripping portions of said cutting means is laterally aligned with and disposed within said at least one concave gripping portion of said jaw member, while one of said at least two laterally spaced convex gripping portions of said jaw member is laterally aligned with and disposed within said at least one concave gripping portion of said cutting means;

- inserting said portion of said binding strap disposed upstream of said leading end portion of said binding strap between said convex and concave gripping portions of said cutting means and said jaw member; and
- moving said cutting means and said jaw member relatively toward each other such that said convex and concave gripping portions of said cutting means and said jaw member grip said portion of said binding strap disposed upstream of said leading end portion of said binding strap in an undulated manner so as to securely grip said portion of said binding strap disposed upstream of said leading end portion of said binding strap while said binding strap is being tensioned.

4,953,600

**METHOD AND APPARATUS FOR TRANSFERRING A PREDETERMINED PORTION TO A CONTAINER**  
Claude Tribert, Bedminster, and Felix R. Grat, Parsippany, both of N.J., assignors to Howden Food Equipment, Inc., Boston, Mass.

Filed Apr. 14, 1989, Ser. No. 338,873  
Int. Cl.<sup>5</sup> B65B 3/04

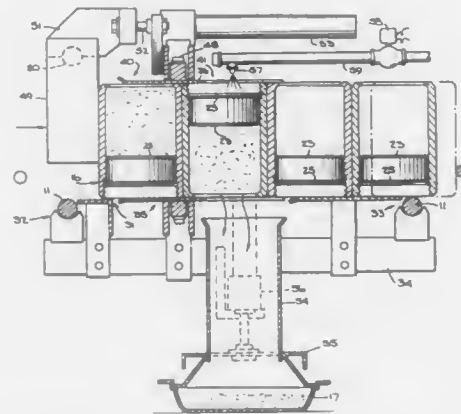
U.S. Cl. 141—1

21 Claims

19. A method for delivering a predetermined amount of material to a container comprising receiving at a delivery zone transfer receptacles each filled with a predetermined amount of material to be delivered to a container, discharging the predetermined amount filled into each successive transfer receptacle into a succession of containers at a delivery zone, and returning the empty transfer receptacles for subsequent filling, wherein the step of discharging the contents of successive transfer receptacles comprises:
- (a) shifting a filled transfer receptacle upon arrival at the

delivery zone into a first station adjacent to the arriving containers;

- (b) rotating the receptacle in the first station 180° about an axis parallel to the shifting direction while covering the open top of the receptacle to prevent discharge of the contents therefrom;
- (c) shifting a subsequently arriving filled transfer receptacle into the first station, the latter receptacle displacing the inverted previous receptacle into a second station adjacent to the first station;



- (d) uncovering the open top of the inverted receptacle in the second station to discharge the contents of that receptacle into one of a line of containers passing underneath the delivery zone;
- (e) rotating the receptacles in the first station 180° about the axis defined in step (b); and
- (f) repeating steps (c) and (e) as successive filled receptacles arrive at the delivery zone.

4,953,601

**TRANSFORMABLE TOOL-BOX**

Julien Herdies, Archennes, Belgium

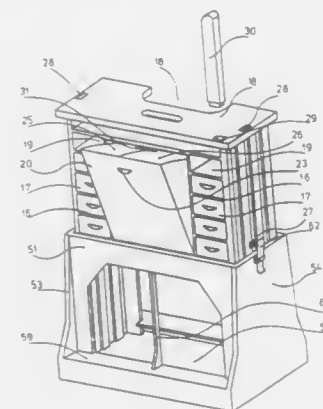
PCT No. PCT/BE87/00010, § 371 Date Apr. 10, 1989, § 102(e)  
Date Apr. 10, 1989, PCT Pub. No. WO88/10176, PCT Pub. Date Dec. 29, 1988

PCT Filed Jun. 25, 1987, Ser. No. 353,646

Int. Cl.<sup>5</sup> B25H 3/02, 1/12

U.S. Cl. 144—285

12 Claims



1. A tool box for storing tools and the like, comprising, in combination:

- (a) a female enclosure open at its upper end, and having a base, a pair of side walls, and a pair of front and rear walls having openings therein;

- (b) a male box assembly vertically slidably mounted in said female enclosure between a first position and a second position, said male box assembly comprising a pair of side walls, a base and a top horizontal work surface, and a plurality of slidably mounted drawers located in two spaced vertical columns on opposite sides within said male box assembly and defining a cavity therebetween;
- (c) locking means for securing said male box assembly in said first position within said female enclosure; and
- (d) an outwardly pivotally mounted tool tray carried within said male box assembly in the cavity between the said vertical columns of drawers.

4,953,602

**APPARATUS AND ASSOCIATED METHODS FOR FORMING CURVED WOODEN HAND RAILS FOR SPIRAL STAIRCASES AND THE LIKE**

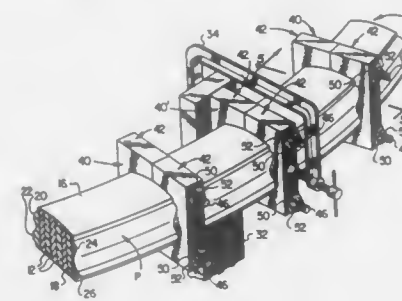
Lynn H. Smith, Rt. 1 - Box 110, Gunter, Tex. 75058

Filed Dec. 8, 1989, Ser. No. 447,626

Int. Cl.<sup>5</sup> B27D 1/00; B27H 1/00

U.S. Cl. 144—349

16 Claims



12. A method of constructing a curved staircase handrail comprising the steps of:
- providing a series of elongated flexible laminae having laterally facing side surfaces;
  - applying an adhesive material to at least some of said side surfaces;
  - positioning said laminae in a laterally abutting relationship to form therefrom an elongated flexible bending rail having, along its length, an exterior surface contour defined by generally laterally facing opposite first and second side surfaces extending between third and fourth opposite side surfaces; and
  - utilizing surfaces of opposed pairs of clamping members, positioned at longitudinally spaced sections of the bending rail, to conformingly engage and exert uniformly distributed, laterally directed clamping forces along longitudinally spaced sections of said first and second side surfaces, each clamping member pair additionally engaging longitudinal sections of said third and fourth side surfaces in a manner preventing relative shifting of the laminae in a direction parallel to the side surfaces thereof.

4,953,603

**TOWEL-PROTECTING COVER ASSEMBLY**

Richard S. Holden, 1626 Hampton Rd., Abington, Pa. 19001

Filed Sep. 8, 1989, Ser. No. 404,598

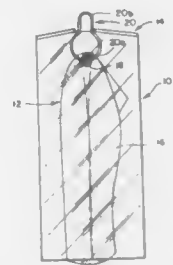
Int. Cl.<sup>5</sup> A47K 10/12; A63B 47/04, 57/00

U.S. Cl. 150—154

4 Claims

1. A towel-protective cover assembly comprising:
- a towel;
  - an openable fastener means, connected to one edge of said towel, for releasably securing said towel to a ring support; and
  - a protective cover comprising a bag fabricated of a plastic material which is at least water resistant; said bag being open at the bottom thereof and comprising four sides including a first pair of opposed sides having gussets

formed therein at the top thereof, and a second pair of opposed sides which are sealed together at the top edges thereof to form a sealed upper edge portion and to seal together, to form lateral portions of said sealed upper edge, the top edges of respectively inwardly extending



portions of said first pair of sides and corresponding lateral portions of said top edges of said second pair of opposed sides so as to thereby form said gussets in said first pair of opposed sides, said sealed upper edge having a central cutout opening therein through which a portion of said openable fastener means extends.

4,953,604

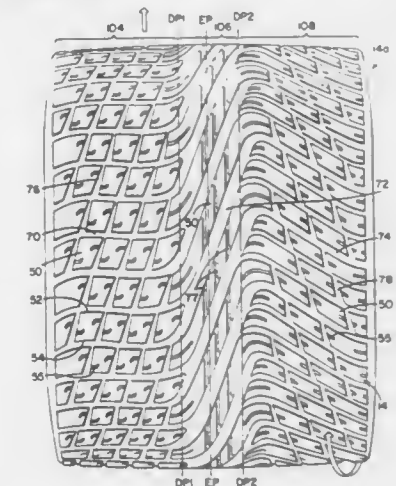
**TREAD FOR A UNIDIRECTIONAL PNEUMATIC TIRE**  
Peter R. Shepler, Stow; Nathan A. Gammon, Akron; William M. Hopkins, Hudson; James E. Koerner, Uniontown, and Charles K. Schmalix, Canal Fulton, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed May 25, 1989, Ser. No. 357,147

Int. Cl.<sup>5</sup> B60C 11/04

U.S. Cl. 152—209 A

12 Claims



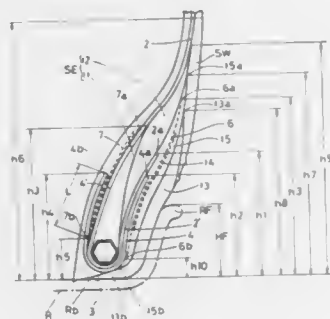
1. A tread for unidirectional pneumatic tire, the tire being for use on paved road surfaces, the tread, when mounted on a casing, comprising:

- first, second and third circumferentially extending zones, the edges of the zones being parallel to the equatorial plane of the tire, the second zone being disposed between and contiguous with the first and third zone;
- the width of the first zone being between 25% and 50% of the tread width, the width of the second zone being between 15% and 35% of the tread width, the width of the third zone being between 25% and 50% of the tread width;
- the first zone having substantially aligned lateral wide groove segments extending across the width of the first zone, the lateral wide groove segments, over a majority of their length in the first zone, forming an angle between 70

degrees and 90 degrees with a plane in the first zone parallel to the equatorial plane, the second zone having substantially aligned lateral wide groove segments extending across the width of the second zone, the lateral wide groove segments, over a majority of their length in the first zone, forming an angle between 10 degrees and 45 degrees with a plane in the second zone parallel to the equatorial plane; and

the third zone having substantially aligned lateral wide groove segments extending across the width of the third zone which are generally perpendicular to the lateral wide groove segments of the second zone, the lateral wide groove segments of the third zone, over a majority of their length in the third zone, forming an angle between 45 degrees and 70 degrees with a plane in the third zone parallel to the equatorial plane, provided that the angle of the lateral wide groove segments of the third zone are smaller than the angle of the lateral wide groove segments of the first zone.

**4,953,605**  
**REINFORCING STRUCTURE FOR BEAD PORTION OF RADIAL TIRE FOR HEAVY LOAD**  
Kazuhiko Kawamura, Shirakawa, and Kazuo Sato, Kobe, both of Japan, assignors to Sumitomo Rubber Industries, Ltd., Japan  
Continuation-in-part of Ser. No. 874,059, Jun. 13, 1986, abandoned. This application May 17, 1988, Ser. No. 194,900  
Claims priority, application Japan, Jun. 13, 1985, 60-129301  
Int. Cl.<sup>5</sup> B60C 15/06  
U.S. Cl. 152—541 10 Claims



1. A radial tire for heavy loads comprising:
  - a pair of bead parts each provided with a bead core and having a bead base part surrounding the bead core, the bead base part having a bead base radially inward of the bead core;
  - a carcass extending between the beads and having a ply of metallic cords laid at an angle of 90 to 60 degrees to the equatorial plane of the tire, the ends thereof turned up around the bead cords from the axially inside to outside thereof to form a carcass main part on the inside of the bead core and a carcass turned up part on the outside of the bead core extending radially outwardly;
  - a pair of sidewalls on the carcass extending to the bead part;
  - a metallic cord reinforcing layer having a ply of metallic cords and turned up around the bead core to form an outside part extending radially outwardly along the axially outside of the carcass turned up part and an inside part extending radially outwardly along the axially inside of the carcass main part;
  - an outside reinforcing layer having a ply of organic fiber cords and disposed axially outside from a point (h10) in the bead base part to a point (h3) beyond both the radially outer end of the metallic cord reinforcing layer and the radially outer end of the carcass turned up part;
  - an inside reinforcing layer having a ply of organic fiber cords and disposed on the axially inside of the carcass main part, the inside reinforcing layer extending from a

point (h3) radially outward of the radially outer end of the inside part of the metallic reinforcing layer to a point (h5) in the bead base part so as to be interposed between the carcass main part and the inside part of the metallic cord reinforcing layer;

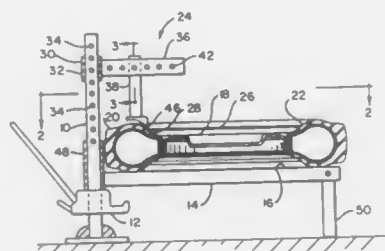
a bead apex disposed between the carcass main part and the carcass turned up part and extending radially outwardly and decreasing in thickness from the bead core to a point (h9) beyond the radially outer end of the outside reinforcing layer;

a rubber chafer made of a hard rubber having a modulus of elasticity of 50 to 60 kgf/sq.cm at 100% elongation and a JIS (A) hardness of 75 to 85 and disposed outside the outside reinforcing layer, the rubber chafer extending radially outwardly from the bead base part, the radially outer part thereof gradually decreased in thickness toward the end thereof;

an inner sidewall made of a soft rubber having a modulus of elasticity of 15 to 25 kgf/sq.cm at 100% elongation and a JIS (A) hardness of 55 to 65 and disposed between the outside reinforcing layer and the rubber chafer, the inner sidewall extending radially inwardly to a point in the bead base part beyond the radially inner end of the outside reinforcing layer and further extending radially outwardly to a point (h7) beyond the radially outer end of the outside reinforcing layer so as to contact with the bead apex; and

the radially outer part of the rubber chafer and the radially outer part of the inner sidewall being interposed between the bead apex and the sidewall.

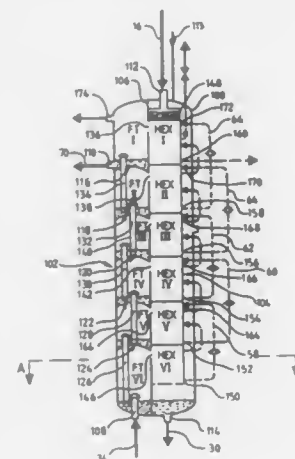
**4,953,606**  
**TIRE BEAD-BREAKER**  
Daniel E. Brown, Jr., Rt. 2, Afton, Tenn. 37616  
Continuation-in-part of Ser. No. 214,114, Jun. 30, 1988, abandoned. This application Sep. 13, 1989, Ser. No. 406,565  
Int. Cl.<sup>5</sup> B60C 25/06  
U.S. Cl. 157—1.17 12 Claims



1. A tire bead breaker comprising jack stanchion means adapted for substantially vertical use, jack body means mounted on said stanchion means for axial movement therealong, wheel support means functionally associated with and movable with said body means, said support means having a sleeve segment axially slidably mounted on said stanchion means above said body means and forcibly engageable by said body means in response to actuation of said jack body means, said support means further having at least one elongated member affixed at one of its ends to said sleeve segment, said member extending outwardly from said sleeve segment substantially normally to the longitudinal axis of said stanchion means to provide an unattached end and an essentially unobstructed planar bed means for supporting a wheel in substantially horizontal posture with a portion of the tire tread juxtaposed said stanchion means such that the side wall thereof faces substantially upwardly, butting means affixed to said stanchion means above said support means and substantially adjacent said stanchion means for engaging a tire side wall adjacent the tire rim to break the tire bead from said rim in response to upward

movement of said body means and support means and a wheel supported thereon.

**4,953,607**  
**MULTISTAGE EVAPORATING SYSTEM**  
Kiiskila Erkki, Karhala, Finland, and Ryham Rolf, Princeton, N.J., assignors to A. Ahlstrom, Noormarkku, Finland  
Continuation-in-part of Ser. No. 312,424, Feb. 17, 1989, which is a continuation of Ser. No. 110,710, Jul. 29, 1987, abandoned.  
This application Jun. 14, 1989, Ser. No. 365,953  
Int. Cl.<sup>5</sup> B01D 1/22, 1/26  
U.S. Cl. 159—13.3 8 Claims



1. A multiple effect evaporator system for concentrating black liquor from a sulfate cook comprising:
  - a plurality of successive evaporation effects having heat elements for operation at successively decreasing temperatures and pressures;
  - a plurality of flash tanks for expanding heated black liquor, comprising n flash tanks connected in series, each flash tank including a vapor outlet;
  - a plurality of heat exchangers for heating the black liquor, comprising n+1 heat exchangers connected in series, including a first heat exchanger which receives black liquor from one of the evaporator effects;
  - a reactor vessel for heat treatment of the black liquor comprising means for receiving black liquor from the (n+1)th heat exchanger, and means for transferring the black liquor from the reactor vessel to the nth flash tank;
  - means for operatively connecting the vapor outlet of each of the flash tanks to a corresponding one in the series of heat exchangers, except to the (n+1)th heat exchanger;
  - means for supplying steam from an external source to the (n+1)th heat exchanger; and
  - means for transferring the black liquor from the first of the series of flash tanks to the next, in relation to the black liquor flow, downstream evaporator effect following said one of the evaporator effects.
2. A multistage flash evaporator and heater apparatus, wherein successive evaporation stages are operated at successively decreasing temperatures and pressures to generate vapors from a heated liquor, which vapors are used to heat the same or another liquor to successively increasing temperatures in successive heating stages, said apparatus comprising:
  - a shell divided into a first and a second compartment by a partition wall, the first compartment having a liquor inlet in the lower portion of the shell and a liquor outlet in the upper portion of the shell, the second compartment having a liquor inlet in the upper portion of the shell and a liquor outlet in the lower portion of the shell;
  - a plurality of flash tanks for expanding heated liquor disposed on top of each other within the first compartment of the shell, the top wall of each flash tank, except the upper-

most, constituting the bottom wall of the flash tank positioned on top thereof, each flash tank being connected operatively to the flash tank on top thereof via a riser tube, and each flash tank having a vapor outlet;

a plurality of heat exchange elements for heating the liquor introduced through the inlet in the upper portion of the shell by vapors generated by expansion of heated liquor in the flash tanks, and for condensing the heating vapor, said heat exchange elements being positioned on top of each other within the second compartment of the shell, each heat exchange element having a vapor inlet and a condensate outlet;

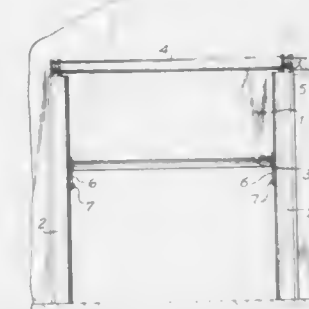
means for connecting the vapor outlet of each flash tank to the vapor inlet of a corresponding one in the series of the heat exchange elements, the number of flash tanks being the same as the number of heat exchange elements in series;

means for connecting the condensate outlet of each heat exchange element, except the uppermost, to the next, in relation to the liquor flow, upstream heat exchange element;

means for distributing the liquor on the surface of the uppermost heat exchange element; and

means for passing the liquor from the heat exchange element of one stage to a subsequent stage.

**4,953,608**  
**SAFETY DEVICE, PARTICULARLY FOR ROLL-UP DOORS**  
Nils H. I. Larsson, Halmstad, Sweden, assignor to Nomafa AB, Halmstad, Sweden  
PCT No. PCT/SE87/00405, § 371 Date Mar. 17, 1989, § 102(e) Date Mar. 17, 1989, PCT Pub. No. WO88/02804, PCT Pub. Date Apr. 21, 1988  
PCT Filed Sep. 9, 1987, Ser. No. 340,418  
Claims priority, application Sweden, Oct. 9, 1986, 8604283  
Int. Cl.<sup>5</sup> E05F 15/20 8 Claims



1. A safety device, particularly intended for use in a roll-up door, said roll-up door including a roll-up door leaf extending horizontally between two upright posts defining a width for said roll-up door, said roll-up door further including an upper cross beam onto and off of which said door leaf is wound to open and close said roll-up door, respectively, and a lower cross beam connected to a bottom edge of said door leaf, said bottom edge of said door leaf being adjacent to a plane base surface when said roll-up door is in a closed position, said safety device comprising at least one signal emitting means (7) which is arranged to emit a signalling beam across the width of the door-leaf at a distance below the lower cross beam on said bottom edge of the door-leaf so that any object, obstructing a movement of the roll-up door into said closed position, interrupts the signalling beam emitted by the signalling means and causes a stopping of the closing movement of the door-leaf before the bottom edge thereof hits said object, characterized in that the signal emitting means (7) is mounted on a



support arm (9) which is slideably mounted in a holder (8) mounted on said lower cross beam, said support arm (9) arranged to abut against said plane base surface upon closing of the door so that the signal emitting means are displaced relatively to and towards the door-leaf to a position at least in level with the bottom edge of said door-leaf during the final closing movement thereof.

4,953,609

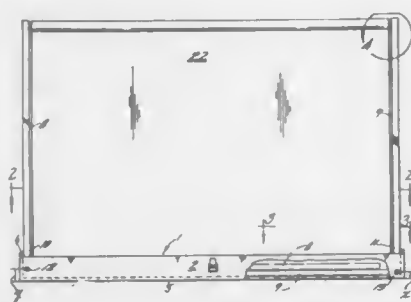
## PORTABLE SCREEN

David R. Annin, 4542 SE. 104th Ave., Portland, Ore. 97266, and Rusty L. Kelley, 8324 NE. Sumner, Portland, Ore. 97220  
Filed Sep. 11, 1989, Ser. No. 405,653

Int. Cl.<sup>5</sup> A47H 7/00

U.S. Cl. 160—24

7 Claims



1. A portable screen comprising, an enclosure having front, rear, end and bottom walls, a roller mounted screen in place on one of said walls and including a rigid cross member at the screen outer end, a pair of vertically positionable unitary tubular leg members having upper ends when vertically positioned receiving said cross member to support same and the screen when extended, adjustable pivot means attaching the remaining ends of said leg member to the interior of said enclosure, a partition having movable end portions frictionally engageable with said remaining ends of said leg members to retain same against undesired pivotal movement, and said adjustable pivot means in threaded engagement with said end portions to urge same into biased engagement with said leg members to retain the leg members in upright positions.

4,953,610

## DOUBLE WINDOW SHADE ASSEMBLY WITH INDEPENDENT SHADE MOVEMENT

William R. Phillips; Blaine A. Bush, both of Lakewood; John J. O'Brien, Littleton, and Charles R. Thalken, Denver, all of Colo., assignors to Ultimate Window Coverings, Inc., Lakewood, Colo.

Filed Mar. 17, 1989, Ser. No. 325,375

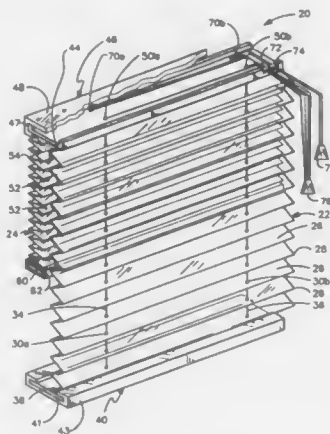
Int. Cl.<sup>5</sup> E06B 3/94

U.S. Cl. 160—84.1

10 Claims

1. A window shade assembly adapted to be used with a window frame having a first end and a second end, comprising: a first pleated shade; first means for moving said first pleated shade; a second pleated shade independently movable relative to said first pleated shade, said first and second pleated shades being positioned in a front-to-back relationship; second means for moving said second pleated shade; first header beam means connected to said first pleated shade and movable relative to the window frame with said first pleated shade; and second header beam means connected to said second pleated shade and movable relative to the window frame with said second pleated shade; wherein said first header beam means has a width greater

than the width of said second header beam means and is detached therefrom, with said second header beam means being movable relative to said first header beam means but, when said first header beam means is moved in a substantially vertical direction, said second header beam



means is adapted to be contacted by portions of said first header beam means so that said first header beam means and said second header beam means are able to move vertically together using said first header beam means movement.

4,953,611

## PARTITION WALL CONSISTING OF DOUBLE-WALLED PANELS COUPLED PIVOTALLY TO EACH OTHER

Markus F.J. Verstraten, Maasbree, Netherlands, assignor to Pella B.V., Netherlands

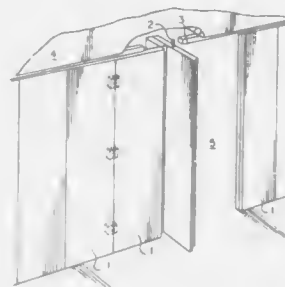
Filed Apr. 7, 1989, Ser. No. 334,447

Claims priority, application Netherlands, Apr. 11, 1988, 8800936

Int. Cl.<sup>5</sup> E05D 15/12

U.S. Cl. 160—199

18 Claims



1. A partition wall for an opening comprising a plurality of panels movable between an extended closed position and a retracted open position, said panels having spaced opposite walls and including upper and lower edges connected by opposite side edges, adjacent panels having adjacent side edges thereof pivotally connected to one another, a guide rail disposed above and adjacent the upper edges of said panels, a pair of alternate panels each having a guide member disposed substantially at the center portion of the upper edge thereof and extending upwardly therefrom for engaging said guide rail, an intermediate panel disposed between said alternate panels and pivotally interconnected therewith, said intermediate panel including movable guide means extending upwardly from the upper edge thereof for engaging said guide rail, said guide means being movable toward and away from one of the side

edges of said intermediate panel, and biasing means biasing said guide means toward said one side edge.

4,953,612

## COMPOSITE METAL ARTICLES

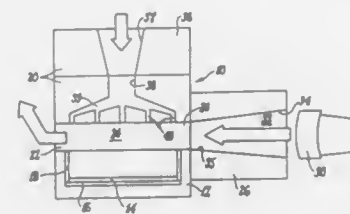
Ian R. Sare, Coromandel Valley; Ian Henderson, Glen Osmond; Teunis Heijkoop, Highbury; Michael R. Bosworth, Walkerville; Ronald E. Aspin, Henley Beach, and Brian K. Arnold, Panorama, all of Australia, assignors to Commonwealth Scientific & Industrial Research Organization and Vida-Weld Pty. Limited, both of, Australia

Continuation of Ser. No. 266,301, Oct. 31, 1988, abandoned, which is a continuation of Ser. No. 914,817, Oct. 3, 1986, abandoned. This application Jun. 2, 1989, Ser. No. 361,753. Claims priority, application Australia, Jul. 5, 1983, PG0130; Nov. 22, 1983, PG2499; Nov. 22, 1983, PG2500

Int. Cl.<sup>5</sup> B22D 19/08

U.S. Cl. 164—102

10 Claims



1. A composite metal article having a first component and a second component, wherein said second component is cast against a bond surface of the first component, said article being characterized by a diffusion bond between said components obtained on solidification of melt providing said second component substantially without fusion of said bond surface; wherein said first component is a ferrous metal and said second component is selected from the group consisting of a ferrous metal and a cobalt base alloy and said diffusion bond is formed by:

- (a) applying a flux coating over said bond surface of said first component after rendering said surface substantially oxide-free;
- (b) preheating said first component to a preheat temperature of about 350° to about 800° C.; and
- (c) pouring said melt of said second metal to provide said second component, said melt being poured at a superheated temperature and such that said melt flows over said bond surface to thereby displace said flux coating from said bond surface and wet said bond surface, said superheated temperature being substantially in excess of said preheat temperature, whereby said melt raises the temperature of said bond surface to achieve an initial temperature equilibrium between said surface and the melt, and a substantially instantaneous interface temperature therebetween which is at least equal to the liquidus temperature of the melt, such that on solidification of the melt said bond substantially in the absence of fusion of said bond surface is attained between the components.

4,953,613

## LIFTING DEVICE ON A CONTINUOUS CASTING MOLD

Werner Schumers, Meerbusch, Fed. Rep. of Germany, assignor to Thyssen Edelstahlwerke AG, Fed. Rep. of Germany

Continuation of Ser. No. 176,762, Apr. 1, 1988, abandoned, which is a continuation of Ser. No. 162,795, Feb. 26, 1988, abandoned. This application Jan. 5, 1990, Ser. No. 462,858

Int. Cl.<sup>5</sup> B22D 11/04

U.S. Cl. 164—416

5 Claims

1. Lifting device in combination with a continuously casting mold of the type having a rotating drive (B) and two rotatingly driven eccentric shafts (A) which are articulated to an elevating platform for the continuous casting mold or directly to the

continuous casting mold, wherein at least one Cardan shaft (D) which meets at least one of following two conditions is operatively coupled at a first end thereof to said two eccentric shafts (A) via a first joint head (G) and a flanged coupling (L) and operatively coupled at a second end thereof remote from said first end via a second joint head (H) to said rotating drive (B):



- (a) the position of said second joint head (H) is adjustable so as to vary an angle between said at least one Cardan shaft and a horizontal plane defined through said first joint head,
- (b) the first and second joint heads are mutually rotatable.

4,953,614

## MODULAR CONTINUOUS CASTER

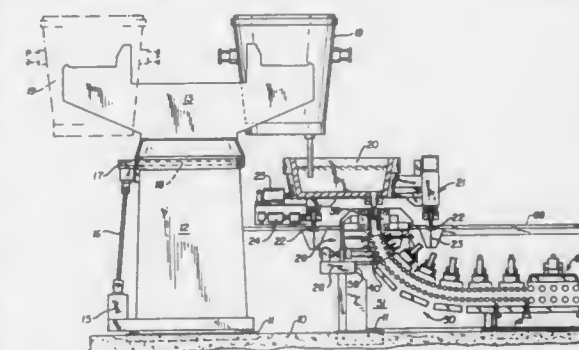
Herbert Lempert, 130 Canterbury Rd., McMurray, Pa. 15317  
Continuation-in-part of Ser. No. 147,222, Jan. 22, 1988, Pat. No. 4,799,535, which is a continuation of Ser. No. 36,407, Apr. 9, 1987, abandoned. This application Jan. 24, 1989, Ser. No. 301,227

The portion of the term of this patent subsequent to Jan. 24, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B22D 11/00, 11/08

U.S. Cl. 164—416

13 Claims



1. In a continuous caster of the type having a mold assembly followed by a plurality of roll segments and related components for handling and treating a cast strand discharged from beneath the mold, a mold oscillator apparatus comprising:

- a mold oscillator frame including structural legs supporting an upper base frame portion;
- a pair of spaced shafts, each shaft having first and second ends mounted for rotation on the upper base frame portion, the first and second ends having offset cylindrical portions thereon, four bearing blocks joined on the eccentric shafts adjacent the first and second ends thereof and defining eccentrics at said shaft ends;
- a pair of elongated, wide flange beam members having upper and lower flanges interconnected by a web, each beam extending above one of the pair of spaced eccentric shafts and mounted on a lower flange respectively at each end to one of the bearing blocks of the eccentrics;
- said oscillator base frame including a mold table comprising a planar frame-like structure adapted to support the mold thereon, said mold table, rigidly secured to the respective upper flanges of said beam members;
- oscillator drive means for rotating said pair of shafts and said eccentrics at a controlled rate whereby a controlled vertical oscillatory motion is transmitted from said eccentrics

through the web portions of said wide flange beams to the mold table and thence to the mold situated thereon.

8. In a continuous caster of the type having a mold assembly followed by a plurality of roll segments and related components for handling and treating a cast strand, a straightening module comprising:

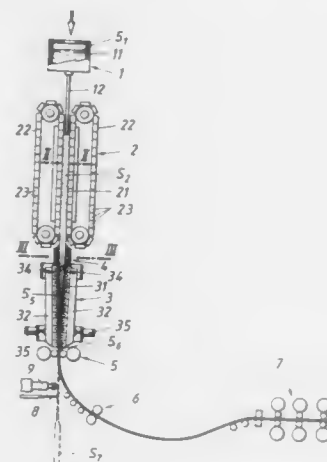
- a frame means having slots therein to compensate for thermal expansion;
- a plurality of spaced-apart roll sets defining a plurality of strand bending points therealong whereby a cast strand entering said straightening module passes through said roll sets and is bent from a curved to a straight configuration.

4,953,615  
PLANT FOR THE CONTINUOUS CASTING OF STEEL  
Anton Hulek, Goglerfeldgasse 15, A - 4020 Linz, Austria  
Filed Jan. 24, 1989, Ser. No. 301,315

Claims priority, application Austria, Feb. 1, 1988, 193/88  
Int. Cl.<sup>5</sup> B22D 11/00

U.S. Cl. 164-417

10 Claims

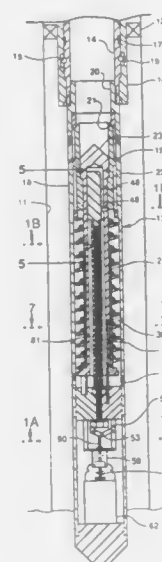


1. A plant for the continuous casting of molten steel into a strand of a flat planoparallel cross-section, which comprises
  - (a) a first stage comprising a mold defining a mold cavity of a constant cross-section of flat parallelogram shape, the mold having means for cooling the molten steel as it moves downwardly through the mold cavity until a strand of steel having a solid shell has been formed therein and the steel has been entirely solidified at the narrow sides thereof, and
  - (b) a second stage succeeding the first stage and comprising a second, separate strand deforming mold defining a mold cavity having an entrance portion arranged to receive the moving strand from the first stage mold, the entrance being of substantially the same cross-section as the first-stage mold and the mold cavity of the deforming mold tapering towards an exit portion thereof in the narrower dimension of its parallelogram cross-section to be of flat planoparallel shape.

4,953,616  
SOLENOID ACTUATOR AND PULSE DRIVE  
Louis H. Borden, Los Altos, and T. Charles Moore, Sunnyvale, both of Calif., assignors to Develco, Inc., San Jose, Calif.  
Filed Apr. 14, 1988, Ser. No. 181,599  
Int. Cl.<sup>5</sup> E21B 34/10

U.S. Cl. 166-66.4

5 Claims



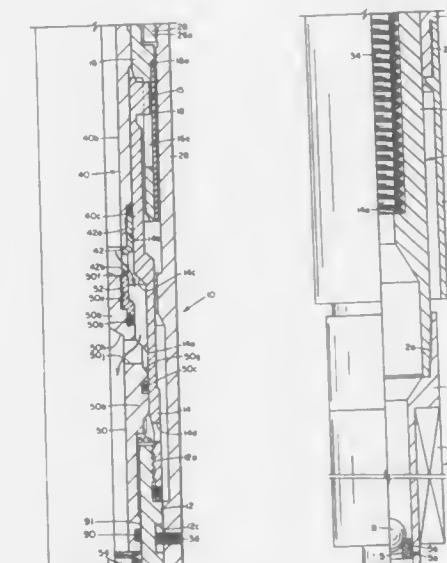
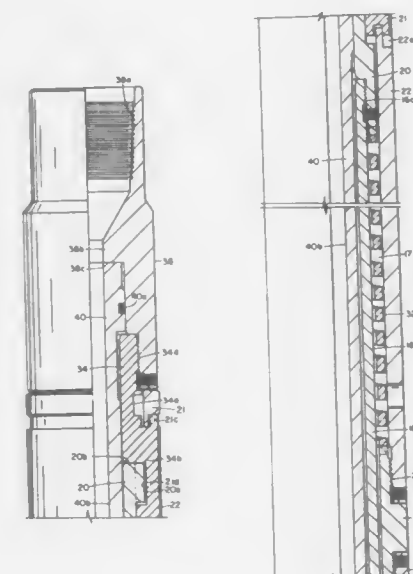
1. A control actuator for controlling operation of a device located downhole in a well from a location which is remote from said device, comprising:

- A. means defining a self-contained source of power to be positioned with said device at the downhole location;
- B. control means to be positioned with said device at the downhole location, responsive to receipt of a signal defining when it is desired that the device operate downhole in a selected operating state by indicating said operating state;
- C. latch means to be positioned with said device at said downhole location, operatively connected to said control means and said power source means and responsive to said control means indicating said operating state by using energy from said power source means to maintain said device in said operating state as long as said power source means is capable of maintaining a power output greater than a predetermined threshold level; and
- D. means as part of said control means for directing a train of pulses generated from said power source means to said latch means as long as said power means is capable of furnishing energy to assure that the average power output provided by said pulses is greater than said predetermined threshold level, said pulse train directing means including means to assure that if said pulse train directing means provides a voltage at a steady-state level, then the power directed to said device will be decreased to below the level required to maintain said device in said selected operating state.

4,953,617  
APPARATUS FOR SETTING AND RETRIEVING A  
BRIDGE PLUG FROM A SUBTERRANEAN WELL  
Richard J. Ross, and Jim H. Roddy, both of Houston, Tex., assignors to Baker Hughes Incorporated, Houston, Tex.  
Filed Oct. 19, 1989, Ser. No. 423,889  
Int. Cl.<sup>5</sup> E21B 33/127, 34/06

U.S. Cl. 166-187

14 Claims

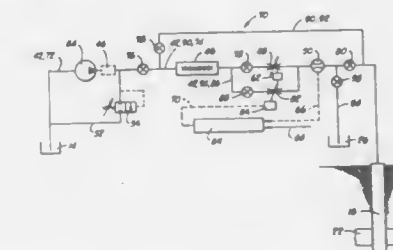


1. lower seal bores, thereby defining a downwardly facing shoulder;
- a generally cylindrical valve plug having a solid upper end on a tubular lower portion;
- a radial port in said tubular lower portion;
- a first external seal element below said radial port sealably engagable with said middle seal bore;
- a second external seal element above said radial port engagable with said upper seal bore when said valve plug abuts said downwardly facing shoulder;
- a third seal element below the middle seal engagement with the lower seal bore;
- resilient means disposed within the lower portions of said tubular valve housing urging said valve plug into abutting engagement with said downwardly facing shoulder, thereby achieving a closed position preventing fluid flow through said valve plug into said inflatable element; and
- port means in said tubular valve housing below said middle seal bore for applying the pressure of surrounding well fluids to the exterior of said valve plug, thereby urging said valve plug to said closed position and balancing the well fluid forces on said valve plug when said valve is in said closed position, whereby said valve plug may be readily shifted upwardly to said closed position by said resilient means and downwardly to an open position by a small downward force exerted by a running tool and sufficient to overcome the force of said resilient means.

4,953,618  
INJECTION MANIFOLD AND METHOD  
Syed Hamid, Duncan; Jackie K. Lucas, Marlow, both of Okla., and Russell R. Lockman, Williston, N. Dak., assignors to Haliburton Company, Duncan, Okla.  
Filed Jan. 12, 1989, Ser. No. 296,265  
Int. Cl.<sup>5</sup> E21B 49/00

U.S. Cl. 166-250

19 Claims



1. A bridge plug comprising:
  - a tubular body supporting an annular inflatable element;
  - a tubular valve housing operatively secured at its lower end to said tubular body;
  - said tubular valve housing defining in its medial portions three vertically spaced, internal seal bores with the middle seal bore having a larger diameter than the upper and

1. An apparatus for use on a well, said apparatus comprising:
  - a first line interconnecting a fluid supply reservoir with said well;
  - pumping means for pumping fluid from said supply reservoir to said well;
  - metering means in said first line for measuring a fluid flow rate through said first line;
  - valve means in said first line for adjusting fluid flow there-through in response to said fluid flow rate;



bypass means for adjusting a discharge pressure of said pumping means;  
a second line interconnecting said well with a discharge reservoir; and  
second valve means for adjusting fluid flow through said second line from said well to said discharge reservoir in response to a second fluid flow rate through said metering means in a flow-back test.

4,953,619

## ENHANCED OIL RECOVERY PROCESS

Francis A. Dullien; Ioannis Chatzis, and Ian F. Macdonald, all of Waterloo, Canada, assignors to University of Waterloo, Waterloo, Canada

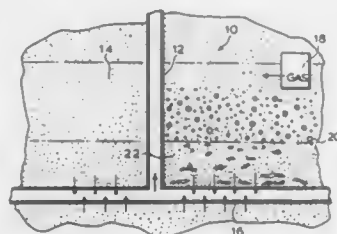
Continuation-in-part of Ser. No. 377,775, Jul. 7, 1989, abandoned, which is a continuation of Ser. No. 268,603, Nov. 7, 1988, abandoned, which is a continuation of Ser. No. 106,792, Dec. 13, 1987, abandoned. This application Oct. 17, 1989, Ser. No. 422,503

Claims priority, application United Kingdom, Oct. 10, 1986, 8624387

Int. Cl.<sup>5</sup> E21B 33/138, 43/12, 43/16

U.S. Cl. 166—265

8 Claims



1. A method for recovery of oil from a water-wet porous formation containing oil which comprises:  
introducing a gas into an upper part of said formation to permit the gas to enter and pass through the pores at a flow rate of about  $10^{-2}$  ft/day to about 1 ft/day,  
mobilizing said oil by spontaneously spreading to form an oil film on water upon contact with the gas,  
draining said oil films from pores filled with gas to pass downwardly through the formation and gradually accumulate more oil at a rate determined by gravitational forces,  
forming from said drained oil films a continuous oil mass migrating downwardly in the formation at a rate determined by gravitational forces, and  
discharging said continuous oil mass to a well bore from which the oil is recovered to a surface location.

4,953,620

## ACCELERATING SET OF RETARDED CEMENT

J. Benjamin Bloys, Plano; Robert B. Carpenter, Hurst, and William N. Wilson, Plano, all of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Aug. 14, 1989, Ser. No. 393,546

Int. Cl.<sup>5</sup> E21B 33/138, 33/14, 33/16

U.S. Cl. 166—293

7 Claims

1. In a method of treating cement in a well completed into subterranean formations for producing a desired hydrocarbonaceous fluid therefrom which includes the steps of:

a. squeezing highly retarded cement into said annular voids or perforations;

the improvement comprising:

washing over said cement with a solution of a compatible organic accelerator comprising a material that will produce a formate ion in the cement slurry and selected from the class consisting of formamide, formic acid, salt of formic acid, and ester of formic acid.

6. In a method of setting a volume of cement in a well completed in subterranean formations, in which a cement is or may

become retarded and is pumped into said well and allowed to set to form a hard cementitious material therewithin, the improvement comprising:

contacting by admixing at the surface said cement with a solution of a compatible organic accelerator comprising material that will produce formate ions in the cement slurry; said compatible organic accelerator being formamide, said formamide being admixed with said cement slurry initially in a concentration within the range of 0.05–2.5 gallons of formamide per barrel of cement slurry.

4,953,621

## ORGANIC TITANIUM COMPOSITIONS USEFUL AS CROSS-LINKERS

Donald E. Putzig, Newark, and Kenneth C. Smeltz, Wilmington, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 77,020, Jul. 23, 1987, abandoned, which is a continuation of Ser. No. 714,513, Mar. 21, 1985, abandoned.

This application May 9, 1989, Ser. No. 349,881

The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.

Int. Cl.<sup>5</sup> E21B 43/26, 43/267

U.S. Cl. 166—308

28 Claims

1. A composition comprising an aqueous solution containing at least two titanium compounds at least one of which effects cross-linking of hydroxyl-containing materials more rapidly than the other titanium compound, each of which titanium compounds is the reaction product of a polyol, water and an  $\alpha$ -hydroxycarboxylic acid plus a tetravalent titanium compound of an inorganic acid, the relative amounts of the titanium compounds being such that the cross-linking rate of the solution is intermediate those of the titanium compound in the solution that has the most rapid cross-linking rate and the titanium compound in the solution having the slowest cross-linking rate, said polyol being selected from glycerol, erythritol, arabitol, xylitol, sorbitol, dulcitol, mannitol, inositol, monosaccharides, and disaccharides, and said  $\alpha$ -hydroxycarboxylic acid being selected from lactic acid, glycolic acid, malic acid, citric acid, tartaric acid, saccharic acid, gluconic acid, glyceric acid and mandelic acid, each of said titanium compounds having an  $\alpha$ -hydroxycarboxylic acid:titanium mol ratio between about 1:1 about 3:1, a polyol:titanium mol ratio between about 0.25:1 and about 2:1, and a water:titanium mol ratio between about 36:1 and about 60:1, and the volume:volume ratio of the titanium compound that has the most rapid cross-linking rate to the titanium compound having the slowest cross-linking rate being in the range between about 10:1 to about 1:10.

8. In a hydraulic fracturing process wherein an aqueous cross-linked polysaccharide gel is introduced into a subterranean oil- or gas-contained formation at a flow rate and pressure sufficient to create or extend one or more fractures therein, the improvement comprising effecting cross-linking of the gel with the composition of claim 1.

4,953,622

## SUBTERRANEAN WELL CASING FLOAT TOOL

Douglas J. Lehr, Houston; Merle L. Bell, New Waverly; Richard P. Rubbo, The Woodlands; all of Tex., and Richard L. Forehand, Jurung, Sweden, assignors to Baker Hughes Incorporated, Houston, Tex.

Continuation of Ser. No. 252,043, Sep. 30, 1988, Pat. No. 4,872,510. This application Aug. 14, 1989, Ser. No. 392,906

The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> E21B 34/08; F16K 15/00

U.S. Cl. 166—327

7 Claims

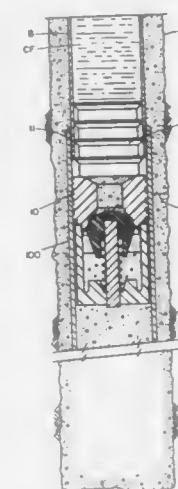
1. A subterranean well casing float tool, comprising:

(a) a tubular metal housing securable to a well casing conduit;

(b) valving means implaced within said housing, said valving means comprising:

(1) a frame;

(2) valve head and valve seat means operatively carried relative to said frame and selectively movable relative to one another from an open position to a closed position;



(3) biasing means for relatively urging said valve head toward said valve seat means;

(4) a compartment including said valve head for enclosure around the biasing means when the valve head is moved fully away from the valve seat means; and

(c) means for directly securing said valving means to said housing.

4,953,623

## PROTECTED L-SHAPED ENVIRONMENT USING SINGLE CHEMICAL NOZZLE

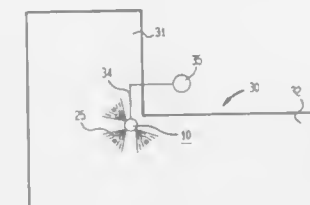
Donald W. Applegate, Jamesburg, N.J., assignor to Pem All Fire Extinguisher Corporation, Cranford, N.J.

Filed Mar. 16, 1989, Ser. No. 324,386

Int. Cl.<sup>5</sup> A62C 37/10

U.S. Cl. 169—37

7 Claims



1. A protected environment, comprising:

space defining means having a horizontal base member and a wall member extending substantially vertically upward from said horizontal base member, said wall member defining a substantially L-shaped area on said base member having first and second protected regions adjacent to one another;

coupling means having first and second coupling ends, said first coupling end for connecting to the supply of the fire suppression fluid, and said second coupling end being arranged within said substantially L-shaped area distal from said base member, in the vicinity where said first and second protected regions join one another; and

a nozzle member coupled to said second coupling end of said coupling means, said nozzle member having a chamber wall for defining a distribution chamber having an input

port for communicating with the supply of the fire suppression fluid and receiving the fire suppression fluid, and exclusively first, second, and third nozzle apertures disposed through said chamber wall for directing the fire suppression fluid in said distribution chamber toward the first and second protected regions of said substantially L-shaped area, said first and second ones of said nozzle apertures being arranged substantially axially parallel with respect to each other, and said third nozzle aperture being arranged substantially orthogonal to said first and second ones of said nozzle apertures, said chamber wall, except for said first, second, and third nozzle apertures, being impermeable.

4,953,624

## CYLINDER PRESSURE SWITCH FOR AUTOMATIC FIRE PROTECTION SYSTEMS

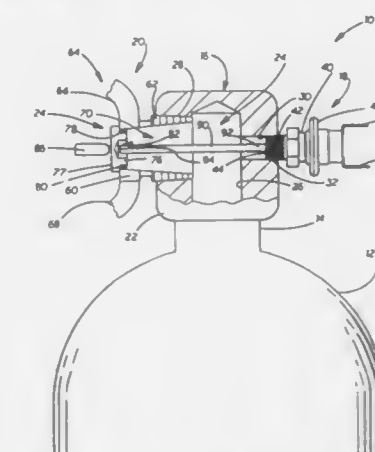
Mark L. Turner, Grand Rapids, Mich., assignor to Convenience Marine Products, Inc., Grand Rapids, Mich.

Filed Jul. 17, 1989, Ser. No. 380,855

Int. Cl.<sup>5</sup> A62C 37/22

U.S. Cl. 169—60

18 Claims



1. A fire extinguisher for an engine compartment or the like, said extinguisher including:

a pressure vessel having an outlet;

a manifold secured to said vessel, said manifold defining a passage having an inlet aligned with said vessel outlet and a manifold outlet, said manifold further defining a switch passage communicating with said passage outlet;

a head having a body defining a nozzle, a frame, a cap disposed within said nozzle and a thermally responsive trigger engaging said cap;

a pressure switch disposed within said switch passage said switch being actuated by a reduction in pressure; and  
accelerator means operatively connected to said pressure switch for accelerating switch actuation upon release of said cap.

4,953,625

## ADJUSTABLE, PIVOTABLE BLADE FOR BULLDOZERS AND THE LIKE

Samuel G. Hurworth, Port Angeles, Wash., assignor to Delmar Industries, Inc., Port Angeles, Wash.

Filed Mar. 28, 1989, Ser. No. 329,444

Int. Cl.<sup>5</sup> E02F 3/815

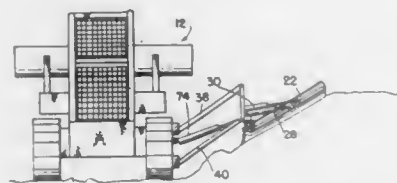
U.S. Cl. 172—305

9 Claims

1. An adjustable blade apparatus for use with an earth moving vehicle, such as a bulldozer or the like, comprising:

a support assembly, including a connecting frame member, supported relative to the vehicle such that the connecting

frame is movable as a unit in a single vertical plane when the vehicle is in a horizontal position;  
 an earth moving blade movably secured to the connecting frame;  
 means independent of the earth moving blade for moving the connecting frame in said vertical plane without changing the orientation, other than the vertical position, of the earth moving blade secured thereto;  
 means independent of the connecting frame moving means for moving the earth moving blade relative to the connecting frame, wherein said blade moving means includes means for moving the blade in a first plane relative to the connecting frame member and a second plane which is at right angles to the first plane, wherein the blade is rotatably connected in the vicinity of one end thereof to the



connecting frame member and wherein said means for moving the blade in a first plane includes a first hydraulic cylinder connected between the connecting frame member at a point substantially removed from the rotatable connection of the blade element and the blade at a selected point substantially removed from the one end thereof, and wherein the blade is pivotably connected in the vicinity of said one end thereof to the connecting frame member in the immediate vicinity of the rotatable connection thereof, and wherein the means for moving the blade in a second plane includes a second hydraulic cylinder connected between the connecting frame member in the vicinity of the pivotable connection of the blade and thereto and the blade at a point substantially removed from the one end thereof.

4,953,626

# RAM BORING MACHINE HAVING A PULL-AND-TURN REVERSING GEAR

Franz-Josef Püttmann, and Alfons Hesse, both of Lennestadt, Fed. Rep. of Germany, assignors to Paul Schmidt, Lennestadt, Fed. Rep. of Germany

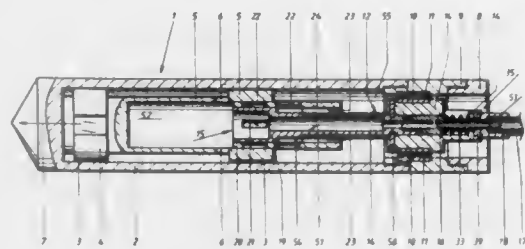
Filed Feb. 2, 1989, Ser. No. 306,033

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1988, 3807831

Int. Cl.<sup>5</sup> B25D 9/00

U.S. Cl. 173—91

14 Claims



1. A ram boring machine, comprising: a tubular housing; a striking piston axially displaceable in said tubular housing and having radial control apertures; a control pipe (15) rotatably supported in said tubular housing so as to travel beyond the radial control apertures in said striking piston to control forward and return motion of said striking piston, said control pipe being made up of at least two parts including a rear part

(16), viewed in the striking direction, and a front part (19), and having control apertures corresponding to those of said piston, said piston having an overtravel with respect to said control pipe; a pressure medium supply hose connected to said rear part of said control pipe; a bearing pipe (14) having control apertures (22) and being arranged in said housing so as to support said control pipe; an axially unlockable locking device actable upon by a force and provided so as to connect said rear part of said control pipe to said bearing pipe and so as to relieve said rear part from an operational pressure, said locking device being unlockable by a pull at said supply hose counter to the acting force, said rear part allowing a reversal of striking direction of said striking piston without interruption of the pressure medium; and securing means for fixing said front part to said bearing pipe so that said front part is arranged so as to completely carry the operational pressure.

4,953,627

# CERAMIC HEAT EXCHANGERS AND PRODUCTION THEREOF

Toshikazu Ito, Komaki; Takashi Harada, Nagoya, and To-shiyuki Hamanaka, Suzuka, all of Japan, assignors to NGK Insulators, Ltd., Japan

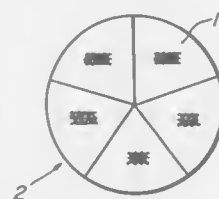
Filed Sep. 20, 1989, Ser. No. 409,947

Claims priority, application Japan, Sep. 29, 1988, 63-242543

Int. Cl.<sup>5</sup> F28D 19/00

U.S. Cl. 165—8

2 Claims



1. A ceramic heat transmission type or regenerative heat exchanger comprising a plurality of matrix segments, said matrix segments being bonded together with a bonding material, wherein a difference in coefficient of thermal expansion between the matrix segments and the bonding material is not more than 0.02% at 800° C. and a Young's modulus of the bonding material is not less than 0.4 times to not more than 1.8 times that of the matrix segments.

4,953,628

# LATENT HEAT STORAGE APPARATUS

Kazuo Yamashita, Ikoma, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 62,650, Jun. 16, 1987, Pat. No. 4,817,704.

This application Aug. 22, 1988, Ser. No. 234,777

Claims priority, application Japan, Jun. 17, 1986, 61-140757; Jul. 30, 1986, 61-179074; Oct. 20, 1986, 61-248724

Int. Cl.<sup>5</sup> F28D 20/00

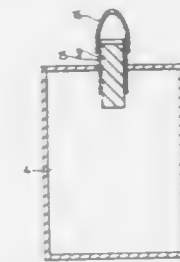
U.S. Cl. 165—10

2 Claims

1. A heat storage apparatus comprising a receptacle filled with a heat storage material for allowing supercooling and discharging latent heat by a phase change from liquid to solid in response to stimulation, said receptacle being provided with a port, a capillary member to be stimulated being tightly fitted in said port and having a portion thereof embedded in said heat storage material, and said port being covered with a removable

cap for preventing said capillary member from being exposed to the outside air and from being accidentally stimulated.

independent of the flow direction of the heat exchanging media.



4,953,630

# APPARATUS FOR CONTROLLING AN AUTOMOBILE AIR-CONDITIONER TO CONTROL DEFROST BLEED AIR

Katsumi Iida, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Sep. 27, 1989, Ser. No. 413,391

Claims priority, application Japan, Sep. 27, 1988, 63-241261

Int. Cl.<sup>5</sup> F25B 29/00; B60H 3/00

U.S. Cl. 165—17

3 Claims

wherein, for obtaining heat, said removable cap is removed from the receptacle and said capillary member is stimulated.

4,953,629

# PACK OF HEAT TRANSFER PLATES

Kurt Karlsson, Tyresö, and Birger Pettersson, Värmdö, both of Sweden, assignors to Svenska Rotor Maskiner AB, Stockholm, Sweden

PCT No. PCT/SE88/00083, § 371 Date Aug. 4, 1989, § 102(e)

Date Aug. 4, 1989, PCT Pub. No. WO88/06709, PCT Pub.

Date Sep. 7, 1988

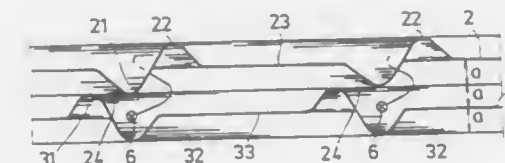
PCT Filed Feb. 25, 1988, Ser. No. 382,650

Claims priority, application Sweden, Feb. 27, 1987, 8700856

Int. Cl.<sup>5</sup> F28D 19/04, 17/02

U.S. Cl. 165—10

2 Claims



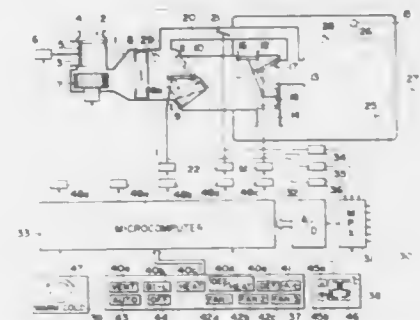
1. In a pack of heat transfer plates for heat exchangers, comprising:

a plurality of mutually identical profiled plates (2,3) which are arranged in mutually contiguous relationship and which form channels for passage of a heat exchanging media, said channels extending between two mutually opposing end surfaces (4,5) of the pack (1), and in which each plate in the pack (1) has provided thereon corrugations in the form of mutually parallel S-shaped double ridges (21,22;31,32) which project symmetrically and obliquely from both opposite sides of each said plate; said plates (2,3) being oriented such that the double ridges of one plate intersect the double ridges of an adjacent plate, and said adjacent plates being in contact with one another solely at points of intersection (24) of said intersecting double ridges and;

said double ridges of respective plates extending symmetrically and obliquely in mutually opposite directions relative to main flow directions (6) of the heat exchanging media flowing in the channels formed between adjacent plates;

the improvement wherein:

said plates (2,3) are mutually oriented such that each pair of double ridges which, as viewed in the main directions (6) of the flows of heat exchanging media, converge towards a point of intersection (24) presents a part (21) of the double ridge of one plate (2) which projects into an intermediate channel, and also a part (32) of the double ridge of the other plate (3) which projects away from said intermediate channel, so as to provide substantially equal flow of said heat exchanging media between all plates of said pack



1. An apparatus for controlling air-conditioning of a motor vehicle comprising:

- a duct defining an air flow passageway and having a defroster outlet, a vent outlet, and a heat outlet, each of said outlets opening to a compartment of the motor vehicle to allow air to be blown off from said duct into said vehicle compartment;
- a heater core disposed in said air flow passageway of said duct, at a position biased toward one end of said air flow passageway, for heating air passing said heater core;
- an air-mix door disposed in said duct upstream of said heater core for regulating an amount of air passing through said heater core and an amount of air bypassing said heater core;
- an evaporator disposed in said duct upstream of said heater core for cooling air passing said evaporator;
- at least one mode door disposed in said duct for opening and closing said outlets selectively;
- air-mix door opening calculation means for calculating the amount of opening of said air-mix door based on at least a vehicle compartment temperature and a setting temperature;
- blown-off air temperature calculation means for calculating the temperature of air blown off into the vehicle compartment based on the amount of opening of said air-mix door and the cooling temperature of said evaporator;
- defrosting-air bleeding determination means for determining the amount of air bleeding from said defroster outlet, based on at least an outside temperature and the calculated amount of opening of said air-mix door, when the blown-off air temperature calculated by said blown-off air temperature calculation means is higher than a predetermined temperature; and
- drive and control means for driving and controlling said mode door in such a manner that the amount of air bleeding from said defroster outlet is equal to an amount determined by said defrosting-air bleeding determination means.

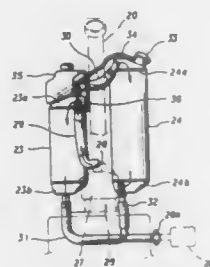


4,953,631

## RADIATOR DEVICE OF MOTORCYCLE

Fumikazu Kimura, Hamamatsu, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan  
 Filed Dec. 27, 1989, Ser. No. 457,446  
 Claims priority, application Japan, Jan. 24, 1989, 1-13125  
 Int. Cl.<sup>5</sup> F01P 11/02; B60K 11/04  
 U.S. Cl. 165—41

9 Claims



1. A radiator device for a motorcycle of the type operatively connected to an engine unit provided with a water jacket and within which cooling liquid circulates, comprising:

- a pair of first and second upstanding radiator units arranged in a laterally spaced fashion with respect to a body portion of said motorcycle, each of said radiator units being composed of upper and lower tanks disposed in an upright arrangement thereof, the upper tank of said first radiator unit having a top portion thereof disposed at a level which is lower than a top portion of the upper tank of said second radiator unit when said motorcycle is disposed in a normal vertically upright positional mode;
- a first water tube means connecting said upper tank of said first radiator unit and said water jacket of said engine unit;
- a second water tube means interconnecting said upper tanks of said first and second radiator units; and
- tube means connected to said lower tanks of said first and second radiator units for combining cooling water flows from said lower tanks of said first and second radiator units into one cooling water flow.

4,953,632

## HEAT PIPE AND METHOD OF MANUFACTURING THE SAME

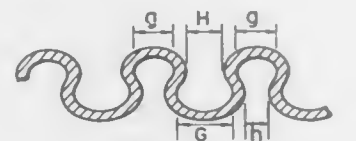
Masuji Sakaya, Narashino; Ryūichi Okai, Yotsukaido; Masataka Mochizuki, Nagareyama, and Kouichi Mashiko, Tokyo, all of Japan, assignors to Fujikura Ltd., Tokyo, Japan  
 Division of Ser. No. 282,025, Dec. 7, 1988, This application Jun. 13, 1989, Ser. No. 365,531

Claims priority, application Japan, Dec. 9, 1987, 62-309669; Apr. 27, 1988, 63-102422; Apr. 27, 1988, 63-102423; Apr. 27, 1988, 63-102424

Int. Cl.<sup>5</sup> F28D 15/02

U.S. Cl. 165—104.26

1 Claim



1. A heat pipe comprising:

- a pipe formed by welding mating edges of a metal tape;
- a wick layer on an inner surface of said pipe; and
- Ω-shaped grooves in which a length of a wave of an outer projecting portion is larger than that of an inner recessed portion, formed on an outer surface of said pipe in a radial direction thereof.

4,953,633

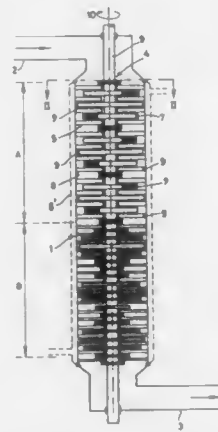
## APPARATUS FOR KEEPING AT A DETERMINED TEMPERATURE A PRODUCT MIXTURE CONSISTING OF A LIQUID CONTAINING SOLID PIECES

Willem F. Hermans, Amstelveen, Netherlands, assignor to Stork Amsterdam B.V., Amsterdam, Netherlands  
 Filed Nov. 2, 1989, Ser. No. 430,817  
 Claims priority, application Netherlands, Nov. 3, 1988, 8802697

Int. Cl.<sup>5</sup> F28F 13/12

U.S. Cl. 165—109.1

11 Claims



1. Apparatus for keeping at a determined temperature, for a determined time, a product mixture flowing therethrough and consisting of a liquid of low to medium viscosity containing solid pieces, which comprises a cylindrical vessel provided at one end with an inlet and at the other end with an outlet for the mixture, a conveyor mechanism acting selectively on the solid pieces in the mixture being disposed in the vessel, whereby the speed at which the solid pieces are conveyed through the vessel can be adjusted irrespective of the rate of flow of the liquid through the vessel, said conveyor mechanism having a rotor in the form of a shaft coaxially rotatable in the vessel and provided with at least one series of rotor arms on the shaft, extending radially and lying substantially next to one another and spaced apart in the axial direction, the ends of said arms reaching to a point close to the inner wall of the vessel, and also having a stator in the form of at least one series of stator arms extending radially inwards from the wall of the vessel and lying substantially next to one another and spaced apart in the axial direction, said stator arms extending between the rotor arms and reaching to a point close to the rotor shaft, and the mutual distance between the rotor arms and the mutual distance between the stator arms in the axial direction, varying from the inlet to the outlet, the variation occurring mainly in one direction, while in the case both of the rotor arms and of the stator arms a radially extending side edge of an arm is, viewed in the axial direction of the rotor and the stator, adjacent to or situated within the periphery of a following arm, so that a solid piece moving through the vessel can pass through between two neighbouring arms only transversely to the axial direction of the vessel.

4,953,634

## LOW PRESSURE HIGH HEAT TRANSFER FLUID HEAT EXCHANGER

Richard D. Nelson, and Dennis J. Herrell, both of Austin, Tex., assignors to Microelectronics and Computer Technology Corporation, Austin, Tex.

Filed Apr. 20, 1989, Ser. No. 341,006

Int. Cl.<sup>5</sup> F28F 13/08

U.S. Cl. 165—147

12 Claims

1. A fluid heat exchanger for cooling an electronic component comprising,

4,953,636

## ELECTRICAL CONDUCTOR ARRANGEMENTS FOR PIPE SYSTEM

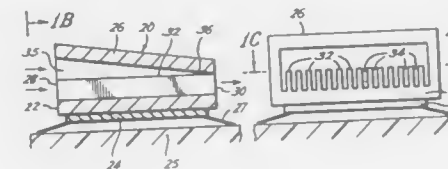
Frank Mohn, London, England, assignor to Framo Developments (UK) Limited, London, England  
 Filed Jun. 24, 1988, Ser. No. 210,784  
 Claims priority, application United Kingdom, Jun. 24, 1987, 8714754

Int. Cl.<sup>5</sup> E21B 17/02, 47/00

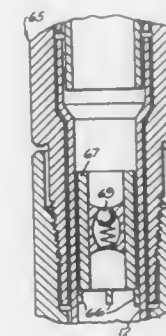
U.S. Cl. 166—65.1

25 Claims

a housing for receiving heat from an electronic component, said housing having a fluid inlet and a fluid outlet at opposite ends of the housing,  
 the cross-sectional area perpendicular to the direction of fluid flow in the housing for conveying fluid from the inlet to the outlet decreasing from the inlet to the outlet,  
 the housing includes a top and a wall, said wall adapted to be positioned adjacent said electronic component in a heat conducting relationship,  
 a plurality of fins, separated by channels, positioned in the housing and connected to the wall, and  
 said top of the housing is spaced from the fins.  
 12. A fluid heat exchanger for cooling an electronic component comprising,



a housing having a base for receiving heat from an electronic component, a top, first and second opposing ends, a fluid inlet at the first end and a fluid outlet at the second end, a plurality of spaced fins, said fins including a top and a bottom, said bottom being connected to the base and extending from the inlet to the outlet,  
 said top of the housing positioned in a non-parallel relationship relative to the tops of the fins, said housing top being closer to the fins at the fluid outlet than at the fluid inlet providing a cross-sectional area in the housing for conveying fluid from the inlet to the outlet decreasing from the inlet to the outlet.



4,953,635

## METHOD FOR IMPROVING THE STEAM SPLITS IN A MULTIPLE STEAM INJECTION PROCESS

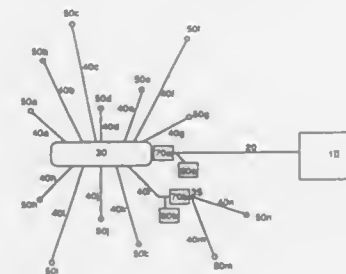
George R. Stowe, III, Bakersfield, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jul. 27, 1989, Ser. No. 386,525

Int. Cl.<sup>5</sup> E21B 36/00, 43/24

U.S. Cl. 166—303

6 Claims



1. A method for enhancing the uniformity of steam distribution in a multiple steam injection system comprising a steam generator, a steam header, a primary steam line connecting the generator to the header, and a plurality of secondary steam lines connecting the header to a plurality of steam injection wells, the method comprising:

- (a) injecting a surfactant into the primary steam line, and
- (b) mixing the surfactant and steam sufficiently so that the surfactant and the steam enter the header as an foam.

1. A pipe assembly comprising:

- a pipe member having connector means at each end thereof for connection of the pipe member between cooperating pipe members in a pipestack.
- an elongate tubular electrical conductor element having means at each end thereof for electrical connection of the element between cooperating tubular conductor elements, said pipe member and said conductor element being shaped and dimensioned for relative lengthwise movement one within the other, and
- a preformed configuration provided on said conductor element and a cooperating preformed configuration on said pipe member engageable by said conductor element configuration, said configuration being so dimensioned that said conductor element is suspended thereby from said pipe member in predetermined concentric and lengthwise relationship therewith when said lengthwise relative movement has brought said configuration into engagement.

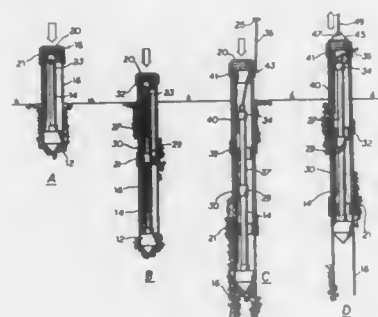
# 4,953,637 APPARATUS FOR RECOVERING GROUND SOIL SAMPLES

Robert C. Starr, Cambridge, and Robert A. Ingleton, Waterloo, both of Canada, assignors to University of Waterloo, Waterloo, Canada

Filed May 5, 1989, Ser. No. 347,716  
Claims priority, application United Kingdom, May 9, 1988, 8810942

Int. Cl.<sup>5</sup> E21B 25/10  
U.S. Cl. 175—20

6 Claims



1. Apparatus for recovering ground soil samples, wherein: the apparatus includes a piston assembly, comprising a piston and a piston rod; the piston rod is of solid robust construction, whereby the piston rod is able to transmit downwardly directed drive forces rigidly to the piston; the apparatus includes a tubular container, in which the piston is sealingly slidable; the ground soil sample is collected in the tubular container from a ground soil source as a core sample; the apparatus includes a two-condition drive-transmitting means; in the first condition, the drive-transmitting means is effective to transmit the drive force acting downwards on the apparatus to the piston assembly; in the second condition, the drive-transmitting means is effective to transmit said drive force to the container.

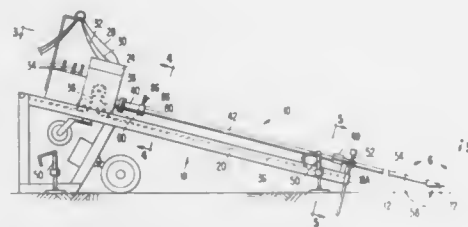
# 4,953,638 METHOD OF AND APPARATUS FOR DRILLING A HORIZONTAL CONTROLLED BOREHOLE IN THE EARTH

Richard P. Dunn, Wichita Falls, Tex., assignor to The Charles Machine Works, Inc., Perry, Okla.

Filed Jun. 27, 1988, Ser. No. 211,889  
Int. Cl.<sup>5</sup> E21B 7/06, 10/00

U.S. Cl. 175—61

5 Claims



2. A method of forming a borehole in the earth such as for passing under a roadway or the like comprising the steps of: (1) positioning a boring machine on the surface of the earth adjacent a selected borehole entry point, the machine having means to axially advance and to rotate a drill string made up of a series of lengths of drill pipe, the drill string

having a drill bit thereon, the drilling bit having a blade means inclined at an angle to the axis of the drill pipe to which the drill bit is attached;

- (2) attaching a clamp means having a pointer thereon to said drill string adjacent said boring machine to indicate the rotational orientation of the drill bit;
- (3) simultaneously rotating and advancing the drill string by means of said boring machine in an axial direction inclined to the earth's surface to establish a borehole in the earth generally in the direction of the drill pipe extending from the drilling machine;
- (4) adding a new length of drill pipe as necessary to extend the length of the drill string;
- (5) maintaining the orientation of said pointer with respect to said drill pipe when said clamp means is transferred from one drill pipe to a successive length of drill pipe by using a liquid bubble level;
- (6) reattaching said clamp means to the drill string adjacent said boring machine as each new length of drill pipe is added to the drill string to continue to indicate the rotational orientation of the drill bit;
- (7) continue rotating and advancing the drill string to form a borehole until a change in the direction of the borehole is desired;
- (8) stopping the rotation of the drill string;
- (9) orienting the rotational position of the drill string with the aid of said clamp means so that the drill bit blade is inclined towards the new direction of the borehole desired;
- (10) advancing the drill string and thereby the drill bit a short distance without rotation;
- (11) resuming simultaneous rotation and advancement of the drill string for a short distance;
- (12) sequentially repeating steps (8), (9), (10) and (11) until the direction of the borehole is in the new direction desired;
- (13) thereafter simultaneously rotating and advancing the drill string to advance the borehole until another new direction of the borehole is desired and reattaching said clamp means as each new length of drill pipe is added; and
- (14) when another change in the direction of the borehole is desired, repeating steps (8), (9), (10) and (11).

# 4,953,639

CLOSED LOOP HYDRAULIC DRILL FEED SYSTEM  
Jeffrey W. Hamner, Allen, and George P. Schivley, Jr., Richardson, both of Tex., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

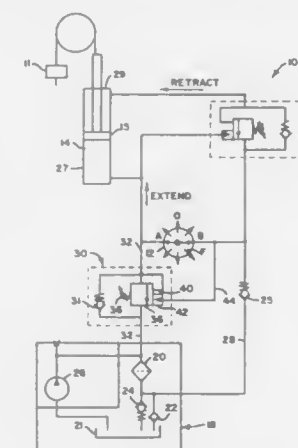
Filed Sep. 8, 1989, Ser. No. 404,601  
Int. Cl.<sup>5</sup> E21B 19/08

U.S. Cl. 175—203

8 Claims

7. A closed loop, drill feed hydraulic system for a rotary drilling apparatus, comprising:
- a drill string;
  - extendible-retractable feed cylinder means for supplying a force to the drill string;
  - variable, reversible displacement pump means for pumping fluid from either one of first and second ports thereof including pumping fluid to the feed cylinder means;
  - reservoir means for retaining a supply of fluid for the system;
  - check valve means for supplying additional fluid to the pump means in response to the feed cylinder means being extended; and
  - overcenter valve means connected to each of the first and

second ports for controlling flow from the system in response to pressures received from the first and second



ports when the feed cylinder means is extended and retracted.

# 4,953,640

## QUICK DETACH BIT

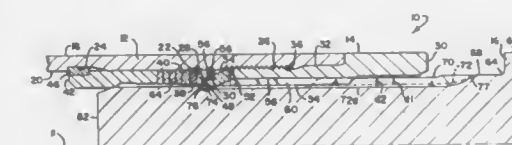
Ewald H. Kurt, 2933 Rosalind Ave., Roanoke, Va. 24014

Filed Aug. 21, 1989, Ser. No. 395,997

Int. Cl.<sup>5</sup> E21B 17/046, 17/06; F16D 1/10; F16L 37/00

U.S. Cl. 175—320

14 Claims



1. A quick detach bit apparatus, comprising: a bit having an outer circumferential surface; a plurality of alternating, substantially axially extending splines and grooves formed in the surface; means for accommodating a quick release tool, said means being a tool access groove substantially axially extending along the outer circumferential surface in one of the said splines and grooves, the depth of said tool access groove being greater than the depth of said other grooves, whereby the tool is permitted to be moved axially along the tool access groove.

# 4,953,641

TWO CONE BIT WITH NON-OPPOSITE CONES  
Rudolf C. O. Pessier, Houston, Tex., assignor to Hughes Tool Company, Houston, Tex.

Filed Apr. 27, 1989, Ser. No. 344,134

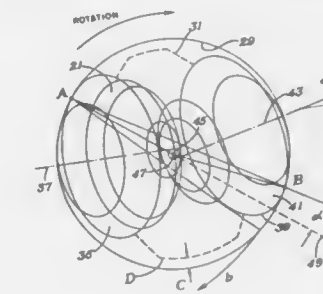
Int. Cl.<sup>5</sup> E21B 10/08

U.S. Cl. 175—353

6 Claims

3. An improved earth boring bit comprising: a body composed of two section; a cantilevered bearing shaft with an axis extending inwardly and downwardly on each section; a rotatable, generally conical cutter on each bearing shaft, said cutter having a conical gauge surface to engage and define a borehole with a wall of selected gauge diameter; a pressure compensating and lubrication means in each section; the axis of one cutter being skewed relative to the other to cause the conical gauge surfaces of the two cones to en-

gage the wall of the hole at points that are other than 180 degrees apart;



a line through said points being separated from a line from one of said point through the center of the bit by an angle not greater than about 13 degrees.

# 4,953,642

## ROCK DRILL BIT

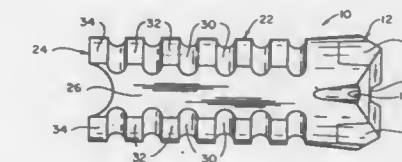
Roger D. Skaggs, 323 Church St., Bonne Terre, Mo. 63628

Filed Mar. 20, 1989, Ser. No. 326,079

Int. Cl.<sup>5</sup> E21B 10/44, 10/60

U.S. Cl. 175—393

13 Claims



1. A rock drill bit comprising an elongated body of tubular cross section rotatable about an axis and having a head end portion closing one end of the body which head end portion engages a drill face to be drilled, said body having an outer surface and an opposite trailing end portion having an opening for receiving a drill rod, the largest transverse dimension of the body being substantially smaller than the length thereof, the head end portion having portions formed or relatively hard material for engaging and drilling the drill face when the bit is rotated, means including at least one opening through the head end portion for drilling fluid to pass to the area around the head end portion, at least two circumferentially spaced axially extending cutouts formed in the outer surface of the bit body forming passages along substantially the length of the bit body with the surface of a bore being drilled through which drilling fluid and cuttings removed during drilling can pass as it moves away from the drill face, elongated outwardly extending body portions extending along substantially the length of the body between the cutouts and from the head end portion to the trailing end portion and defining the rearwardmost points of the drill bit, the outwardly extending body portions having a plurality of axially spaced circumferentially extending grooves dividing the outwardly extending body portions into a plurality of outwardly extending elements, rotation of the bit in a bore causing the elements to rotate in closely spaced relationship to the surface of the bore whereby drilling fluid and cuttings moving along the body in the passages will be swirled and further pulverized by the elements as the bit rotates in the bore, rotation of the head end portion of the bit producing a bore diameter that is somewhat greater than the diameter of rotation of the outwardly extending elements.



4,953,643

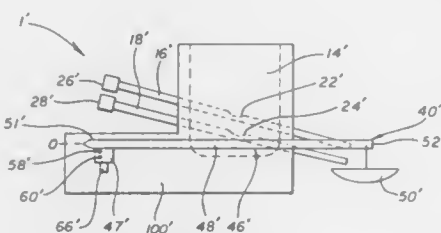
**POWDER DISPENSING AND MEASURING DEVICE**  
Dolores D. Ellion, and M. Edmund Ellion, both of 2152 Highland Oaks Dr., Arcadia, Calif. 91006

Filed Mar. 6, 1989, Ser. No. 318,963

Int. Cl.<sup>5</sup> G01G 13/02; B65G 69/06

U.S. Cl. 177—123

2 Claims



1. An improved powder dispensing apparatus comprising: barrel means for transferring powder from a first retainer to a second retainer, said barrel means including first and second barrels mounted at first and second angles for fast and slow transfer of powder from said first retainer to said second retainer; vibrating means for inducing vibration in said barrel effective to cause said powder to translate on a surface thereof; and control means for controlling the activation of said vibrating means.

4,953,644

**STABILIZING AND WEIGHING DEVICE**  
Rune Akesson, Hyllinge, and Giuliano Pegoraro, Bjuv, both of Sweden, assignors to Nestec S.A., Vevey, Switzerland

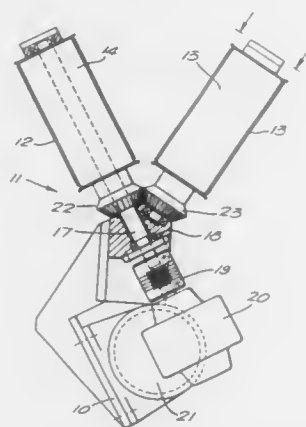
Filed Nov. 29, 1989, Ser. No. 442,944

Claims priority, application European Pat. Off., Dec. 17, 1988, 88121200.5

Int. Cl.<sup>5</sup> G01G 19/00; B65G 15/14

U.S. Cl. 177—145

8 Claims



1. A device for stabilising and weighing articles of irregular shapes and sizes which comprises a weighing machine and two upstream to downstream successive pairs of adjacent parallel conveyors, wherein each pair of conveyors have parallel upper surfaces having adjacent parallel longitudinal edges for transporting the articles and wherein the upper surfaces of the two conveyors of each pair of conveyors are inclined to one another at their adjacent longitudinal edges so that the upper surfaces form an acute angle, the upstream pair of conveyors providing a unit for stabilising the articles transported and the downstream pair of conveyors providing a load-bearing plat-

form for the weighing machine to form a weighing unit for weighing the articles transported.

4,953,645

**ELECTRIC WHEEL-CHAIR**

Hans W. Körber; Reinhard Köster, both of Kiel; Ewald Linse, Heikendorf, and Dieter Simmat, Kiel, all of Fed. Rep. of Germany, assignors to Ortopedia GmbH, Kiel, Fed. Rep. of Germany

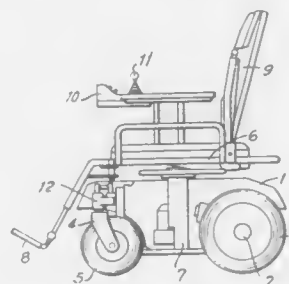
Filed Dec. 19, 1988, Ser. No. 286,530

Claims priority, application Fed. Rep. of Germany, Jan. 12, 1988, 3800649; Sep. 21, 1988, 3832125

Int. Cl.<sup>5</sup> A61G 5/04

U.S. Cl. 180—6.5

17 Claims



1. An electric wheel-chair comprising:

- a chassis;
- a first axle having drive wheels, which is connected to the chassis;
- a pair of second axles which are connected to the chassis, each having a swivel wheel that is pivotable about an axis perpendicular to movement direction of the wheel-chair, so that the swivel wheels change steering radius in response to change in running direction of the wheel-chair;
- an actuator independently coupled to each swivel wheel for steering the wheel in response to steering control signals;
- a seat assembly mounted on the chassis;
- a drive unit coupled to each drive-wheel for driving the wheel in response to maneuvering control signals indicative of desired wheel-chair maneuvers to be executed by the drive unit;
- an operating unit coupled to the drive units and the actuators for causing generation of the control signals; and
- means for selectively disengaging coupling of at least one of the swivel wheels from the actuator.

4,953,646

**ELECTRONIC DRIVE PROPULSION DEVICE FOR MOTOR VEHICLES**

Chang H. Kim, Hyaesong Yonrip Na-Dong, Room 205, 551-9, Shinwol-Dong, Kwanak-ku, Seoul, Rep. of Korea

Continuation of Ser. No. 81,093, Aug. 3, 1987, abandoned. This application May 5, 1989, Ser. No. 348,134

Claims priority, application Rep. of Korea, May 8, 1986, 11729

Int. Cl.<sup>5</sup> B60K 1/02

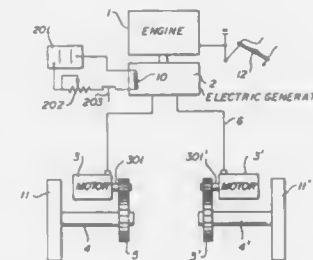
U.S. Cl. 180—65.4

3 Claims

- 1. An electric drive propulsion system for a motor vehicle comprising:
  - a vehicle having an engine for providing propulsion power thereto, including a vehicle engine accelerator, wherein rotational speed of said engine is controlled exclusively by said vehicle engine accelerator;
  - an electric generator connected to said engine to be driven thereby, said generator including an exciting coil for causing electric energy to be generated upon excitation thereof, the exciting coil being connected for excitation to a source of DC current through a preset electric resistance

adjusting device, such that electric energy output of said generator varies solely with variations of said engine rotational speed; whereas the other one is driven by the primary of said hydro-

- at least one electric motor mounted on said vehicle and coupled with an axle thereof to drive the axle to provide propulsion for said vehicle, said at least one electric motor being directly connected to said generator by an electric circuit having no intermediate control devices so as to be driven solely by the entire electric energy generated thereby;
- said vehicle being provided with a brake and a brake pedal for operating said brake;
- a pair of normally closed contact terminals of a power switch connected in said generator excitation circuit between said exciting coil and said source of DC current,



said power switch being operated by said brake pedal to open said contact terminals upon application of pressure to said brake pedal and to close said contact terminals upon release of said brake pedal, operation of said brake pedal thereby causing discontinuation of vehicle propulsion and release of said brake pedal causing continuation of propulsion;

such that said at least one electric motor is connected to receive the entire output of electric energy generated by said electric generator as the sole source of energy for propulsion of said vehicle so as to increase and decrease speed of said at least one electric motor both in accordance with increase and decrease of speed of said engine as controlled by said vehicle engine accelerator and continuation and discontinuation of vehicle propulsion as caused by operation of said brake pedal.

4,953,647

**TRANSMISSION SYSTEMS FOR HIGH-SPEED TRACK-LAYING VEHICLES OR VEHICLES WITH NON-STEERABLE WHEELS**

Pierre Leboime, Paris, France, assignor to Zone Industrielle d'Epluchues, Saint-Ouen-l'Aumône, France

Filed Sep. 13, 1989, Ser. No. 406,718

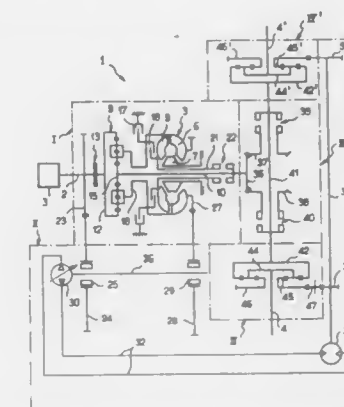
Claims priority, application France, Sep. 14, 1988, 88 11967

Int. Cl.<sup>5</sup> B62D 11/12; F16H 47/08

U.S. Cl. 180—9.1

10 Claims

1. Transmission for high-speed track-laying vehicles or vehicles with non-steerable wheels having an engine adapted to produce substantially constant power over a wide range of speeds, said transmission comprising a gearbox equipped with a hydrodynamic torque converter, said hydrodynamic torque converter having a primary (pump) and a secondary (turbine) and functioning in a power splitting arrangement, an output shaft of said gearbox, steering means adapted to procure continuous variation of the turning radius, and a reversing gearing associated with epicyclic output gears, and further comprising a positive clutch coupling the secondary of said hydrodynamic torque converter to said gearbox output shaft, together with two freewheel clutches driving the said steering means, one of



dynamic converter, whereby the highest drive speed is selected at all times.

4,953,648

**REAR WHEEL STEERING APPARATUS**

Hiroshi Ohmura, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Continuation of Ser. No. 335,355, Apr. 10, 1989, abandoned.

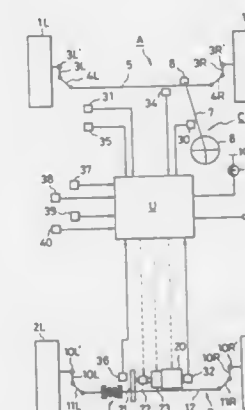
This application Feb. 1, 1990, Ser. No. 472,403

Claims priority, application Japan, Apr. 8, 1988, 63-85371

Int. Cl.<sup>5</sup> B62D 5/04

U.S. Cl. 180—79.1

27 Claims



- 1. A rear wheel steering apparatus comprising:
  - a rear wheel steering mechanism for steering rear wheels;
  - a neutral holding means for holding the rear wheel steering mechanism always at a neutral position, which is connected to the rear wheel steering mechanism;
  - a motor as a driving source connected to the rear wheel steering mechanism and arranged for displacing the rear wheel steering mechanism in resistance to the neutral holding means;
  - a clutch being interposed between the rear wheel steering mechanism and the motor and arranged for connecting or disconnecting the rear wheel steering mechanism to or from the motor;
  - a start detecting means for detecting the turning of an ignition switch on; and
  - an initial check means for carrying out an initial check of a drive control system of the motor to determine the absence or presence of any abnormality therein including the motor by disconnecting the clutch when the start detecting means detects that the ignition switch is turned on.

#### 4,953,649 FOUR-WHEEL STEERING DEVICE FOR AN AUTOMOBILE

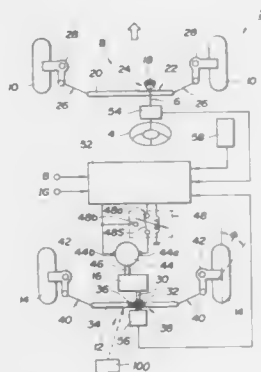
Yoshikazu Kawai, Chosuke Sato, and Masaru Kato, all of Shizuoka, Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Dec. 2, 1988, Ser. No. 279,557

Claims priority, application Japan, Dec. 10, 1987, 62-310946  
Int. Cl.<sup>5</sup> B62D 5/06

U.S. Cl. 180—79.1

3 Claims



1. A four-wheel steering device for an automobile comprising main turning means for steering main steered wheels, subsidiary turning means for steering subsidiary steered wheels, neutral position biasing means for yieldably urging the subsidiary steered wheels to a neutral position having a steering angle of zero, and a control system including a motor having terminals, first steering angle sensor means for main steered wheels for detecting a first steering angle of the main steered wheels, second steering angle sensor means for subsidiary steered wheels for detecting a second steering angle of the subsidiary steered wheels, and control means responsive to a state change of the first and second detected steering angles for judging an operating state of the control system, said control means being operable when said control system operates normally for driving and controlling the motor and thereby the subsidiary turning means so as to steer the subsidiary steered wheels depending on the steering angle of the main steered wheels, said control means being further operable when said control system operates abnormally for cutting off the power source to the motor in order to converge, by the urging of the neutral position biasing means, the steering angle of the subsidiary steered wheels gradually to zero and to also short-circuit the terminals of the motor.

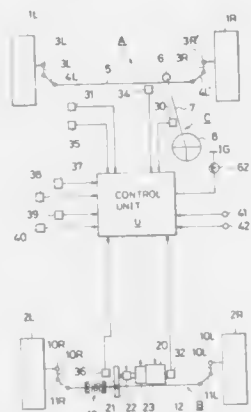
4,953,650  
**REAR WHEEL STEERING CONTROL SYSTEM**  
Hiroshi Ohmura, Higashi-Hiroshima, Japan, assignor to Mazda Motor Company, Hiroshima, Japan  
Filed Mar. 13, 1989, Ser. No. 322,502  
Claims priority, application Japan, Mar. 14, 1988, 63-58251  
Int. Cl.<sup>5</sup> B62D 7/14, 5/04

U.S. Cl. 180—79.1

15 Claims

1. A rear wheel steering control system comprising a rear wheel steering mechanism for steering rear wheels of a vehicle, drive motor means connected with said rear wheel steering mechanism for actuating the same, target setting means for setting a target steering angle of the rear wheels in accordance with a predetermined factor, motor control means for controlling said drive motor means so as to accomplish the target steering angle of the rear wheels, magnetic brake means for preventing the rear wheel steering mechanism from any steering movement when the target steering angle of the rear wheels is substantially constant, release means for releasing the

magnetic brake means to allow the steering movement of the rear wheel steering mechanism under a predetermined condition even when the target steering angle of the rear wheels is substantially constant.



#### 4,953,651 COUPLING ARRANGEMENT IN POWER STEERING FOR VEHICLES

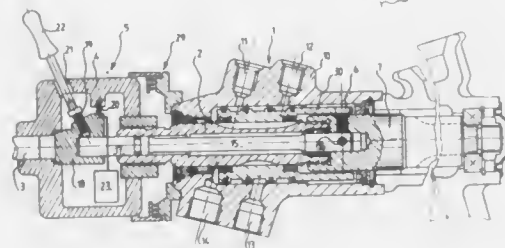
Emmanuel Lescaut, Les Clayes Sous Bois, France, assignor to Automobiles Peugeot and Automobile Citroen, both of France, a part interest

Filed Jul. 21, 1987, Ser. No. 76,023

Claims priority, application France, Jul. 25, 1986, 86 10851  
Int. Cl.<sup>5</sup> B62D 5/09

U.S. Cl. 180—132

7 Claims



1. A power-assisted steering device for an automotive vehicle, comprising  
a power-assisted steering valve having a rotor rotatively coupled to a steering shaft of the vehicle,  
a stationary body comprising a box including said rotor, a tubular sleeve located within the box, coaxially surrounding said rotor and rotatively coupled to a steering mechanism operating member,  
a connecting rod coaxially located within said valve and having an end located within said valve which is rotatively coupled to said operating member and an opposite end, and  
a resilient coupling means interconnecting said steering shaft and said opposite end of said connecting rod for allowing said steering shaft to resiliently rotate with respect to said connecting rod.

#### 4,953,652 FOUR-WHEEL STEERING SYSTEM FOR MOTOR VEHICLE

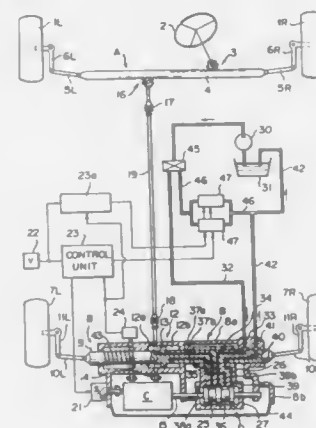
Hiroshi Ohmura, Higashi-Hiroshima; Takashi Nakashima, Hiroshima, and Takeshi Mural, Hatsukaichi, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 29, 1988, Ser. No. 187,920

Claims priority, application Japan, May 1, 1987, 62-106261  
Int. Cl.<sup>5</sup> B62D 5/04

U.S. Cl. 180—140

25 Claims



1. A four-wheel steering system for motor vehicle including a front wheel steering mechanism for steering front wheels in response to an operation of a steering wheel, a rear wheel steering mechanism for steering rear wheels in accordance with the steered movement of the front wheels, control means having driving condition detecting means for detecting a vehicle driving condition and controlling the rear wheel steering mechanism in accordance with the vehicle driving condition, fail judging means for judging of a failure of the control means and producing a failure signal denoting the failure, and fail-safe means for receiving the failure signal from the fail judging means and controlling the rear wheel steering mechanism independently from the control means when the control means is in an unusual condition, wherein the fail judging means being provided with first fail judging means and second fail judging means adapted to be actuated independently for judging different fail conditions, the control means being provided with a control unit for receiving signals from said driving condition detecting means and producing control signals to the rear wheel steering mechanism, the first fail judging means being provided in the control unit, and the second fail judging means being provided in a back up control unit independent from the control unit.

4,953,653  
**FLUID POWER ASSIST RACK AND PINION STEERING  
GEAR WITH END-TAKE-OFF**  
Edwin G. Klosterhaus, Livonia, Mich., assignor to TRW Inc., Livonia, Ohio

Filed Jan. 17, 1989, Ser. No. 297,761

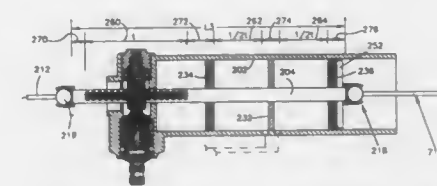
Int. Cl.<sup>5</sup> B62D 5/06

U.S. Cl. 180—148

3 Claims

2. A fluid power assist steering gear for steering a pair of steerable wheels of a vehicle, said steering gear comprising:  
a housing attachable to the vehicle;  
a rack member movable in said housing, said rack member having first and second axially opposite ends connectable

with a respective one of a pair of ball joints associated with said steerable wheels;  
a plurality of rack teeth formed in a row on said rack member at a first axial section of said rack member corresponding in length with said row of rack teeth;  
a rotatable pinion gear in meshing engagement with said rack teeth;  
a hydraulic motor for moving said rack member to provide steering power assist, said hydraulic motor comprising:  
a piston fixed to said housing and having an axial passage through which said rack member moves; and  
first and second end wall members fixed to said rack member on opposite axial sides of said piston and movable with said rack member when pressurized fluid is directed into a space between said piston and one of said end wall members, said first end wall member corresponding in length with a second axial section of said rack member, said second end wall member corresponding in length with a third axial section of said rack member;



a bearing fixed to said rack member and supporting said rack member for reciprocating movement in said housing and in a path having a predetermined length, said bearing corresponding in length with a fourth axial section of said rack member;  
said first axial section of said rack member being adjacent to said first end of said rack member;  
said second axial section of said rack member being adjacent to said first axial section;  
said fourth axial section of said rack member being contiguous to said third axial section;  
said second end of said rack member being contiguous to said fourth axial section; and  
said rack member having a position centered on said path of movement, said second end of said rack member being receivable within said housing to locate the respective ball joint within said housing when said rack member is in said centered position.

#### 4,953,654 VEHICULAR DIFFERENTIAL LIMITING TORQUE CONTROL SYSTEM

Takashi Imaseki, and Yuji Kobari, both of Zushi, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Oct. 13, 1988, Ser. No. 256,518

Claims priority, application Japan, Oct. 14, 1987, 62-259038;  
Dec. 10, 1987, 62-312489

Int. Cl.<sup>5</sup> B60K 23/04, 31/00

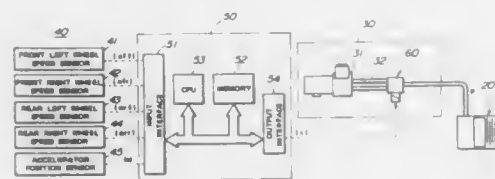
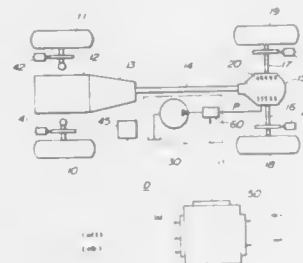
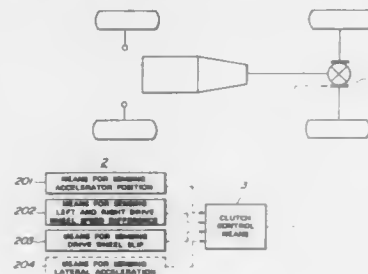
U.S. Cl. 180—197

12 Claims

1. A differential limiting torque control system for a vehicle, comprising:  
differential limiting clutch means provided between left and right drive wheels of the vehicle for varying an actual differential limiting torque in response to a control signal, sensor means comprising first sensing means for sensing a throttle opening degree of the vehicle, second sensing means for sensing a left and right drive wheel speed difference, and third sensing means for sensing a drive wheel slip, and  
control means for producing said control signal to control said actual differential limiting torque in accordance with signals sent from said sensor means, said control means comprising first function generating means connected



with said second sensing means for producing a first limiting torque signal representing a first differential limiting torque which increases as said left and right drive wheel speed difference increases, second function generating means connected with said first sensing means for producing a second limiting torque signal representing a second differential limiting torque which increases as said throttle opening degree increases, third function generating means connected with said third sensing means for producing a



third limiting torque signal representing a third differential limiting torque which increases as said drive wheel slip increases, and summing means connected with said first, second and third function generating means for producing said control signal representing a final desired differential limiting torque which is equal to a remainder resulting from subtraction of said third differential limiting torque from a sum of said first and second differential limiting torques.

4,953,655

## ACOUSTIC APPARATUS

Kazunari Furukawa, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Mar. 30, 1989, Ser. No. 330,457

Claims priority, application Japan, Apr. 4, 1988, 63-81344; Apr. 4, 1988, 63-81345

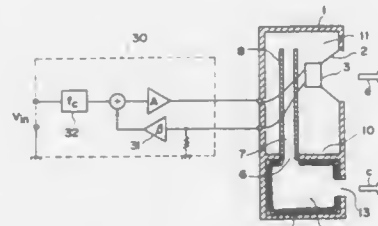
Int. Cl.<sup>5</sup> H05K 5/00

U.S. Cl. 181-160

11 Claims

1. An acoustic apparatus, comprising:  
a first enclosure defining a first chamber;  
a second enclosure defining a second chamber;  
a duct for causing the first and second chambers to communicate with each other, the duct constituting a Helmholtz resonator together with the first enclosure;  
a vibrator mounted to the first enclosure, the vibrator having

an inner surface which faces inside the first enclosure and an opposing outer surface, the vibrator directly externally radiating an acoustic wave from the outer surface and driving the Helmholtz resonator by the inner surface;  
an opening formed in the second enclosure and constituting a low-pass type acoustic filter together with the second



enclosure, the acoustic filter having a cutoff frequency which is set to be higher than a resonance frequency of the Helmholtz resonator and to be lower than an open duct resonance frequency of the duct; and  
a vibrator driver for driving the vibrator to cancel an air counteraction from the resonator when the Helmholtz resonator is driven.

4,953,656

## OFFSET DRIVE FOR BALLOON TIRED MOTORCYCLE

Hiroshi Kondo, Iwata, and Tadao Okada, Fukuroi, both of Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

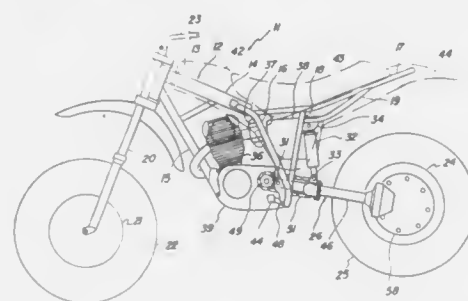
Filed Feb. 28, 1986, Ser. No. 834,607

Claims priority, application Japan, Mar. 4, 1985, 60-41206

Int. Cl.<sup>5</sup> B62M 7/02

U.S. Cl. 180-226

5 Claims



1. In a motorcycle having a frame means, a dirigible front wheel supported by said frame means, power means supported by said frame means and driving an output shaft, a rear wheel supported by said frame means a low pressure balloon tire mounted upon said rear wheel, said rear wheel and mounted tire having a width at least equal to the width of said frame means, the improvement comprising means for driving said rear wheel from said output shaft comprising a driven ring gear affixed for rotation with said rear wheel and having its teeth disposed at least in substantial part laterally inwardly from the outer periphery of said rear wheel, and a pinion gear driven from said engine output shaft and in mesh with said ring gear.

4,953,657

## TIME DELAY SOURCE CODING

Bruce L. Edington, Houston, Tex., assignor to Halliburton Geophysical Services, Inc., Houston, Tex.

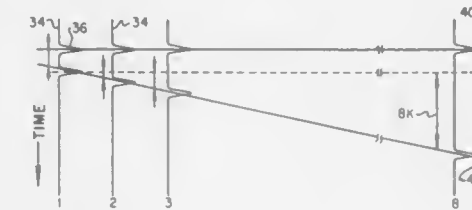
Continuation of Ser. No. 126,346, Nov. 30, 1987, abandoned.

This application Feb. 14, 1989, Ser. No. 312,360

Int. Cl.<sup>5</sup> G01V 1/00

U.S. Cl. 181-111

10 Claims U.S. Cl. 181-207



6. A method of obtaining seismic data for a geophysical survey, said method comprising the steps of:  
activating a first seismic energy source having a selected frequency component;  
receiving seismic signals from said first seismic energy source at at least one point within said geophysical survey;  
activating a second seismic energy source after a first selected time delay from activation of said first seismic energy source and while said seismic signals from said first seismic energy source are being received, said first selected time delay being a non-integral multiple of the period of said selected frequency component;  
receiving seismic signals from said second seismic energy source at said at least one point within said geophysical survey;  
activating said first seismic energy source a second time;  
receiving seismic signals from said second activation of said first seismic energy source at said at least one point within said geophysical survey;  
activating said second seismic energy source after a second selected time delay from said second activation of said first seismic energy source and while said seismic signals from said second activation of said first seismic energy source are being received;  
recording, as a function of time, the amplitudes of the seismic signals received at said at least one point within said geophysical survey for each activation of said first and second seismic energy source;  
summing the amplitudes of the received seismic signals from each activation as a function of time;  
utilizing said selected time delays to time shift the received seismic signals from each activation so that the signals received from said second source are received at the same times for each activation;  
summing the amplitudes of said time shifted seismic signals as a function of time;  
utilizing said selected time delays to derive an appropriate time domain operator for each summation;  
deriving the Fourier transform to the frequency domain of each time domain operator;  
deriving the Fourier transform to the frequency domain of each summation;  
calculating the signals received from each seismic energy source in the frequency domain for each frequency; and  
deriving the inverse Fourier transform to the time domain of the signals received from each seismic energy source.

4,953,658

## SEISMIC ISOLATOR

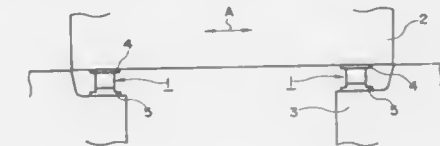
Yozo Goto, Tokyo, Japan, assignor to Ohbayashi Corporation, Osaka, Japan

Filed Dec. 28, 1989, Ser. No. 458,377

Claims priority, application Japan, Jan. 7, 1989, 1-143155

Int. Cl.<sup>5</sup> F16M 1/00

8 Claims



1. A seismic isolator comprising a laminated member adapted to be interposed between a structure and foundation, said laminated member comprising thin steel sheets having concavities and convexities extending in a single direction, flexible sheets stacked alternately with said steel sheets, and upper and lower end plates, said steel sheets, flexible sheets and upper and lower end plates being unitarily and fixedly bonded together, said upper and lower end plates being fixed to said structure and said foundation, respectively, in such a manner that said concavities and convexities extend in a direction in which earthquake vibrations are to be isolated from said structure.

4,953,659

## FLUID BLOW-OFF MUFFLER

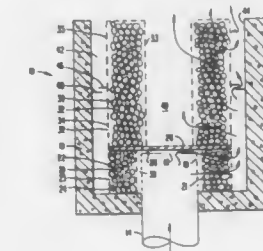
Thomas R. Norris, 15 Patricia Rd., Orinda, Calif. 94563

Filed Aug. 25, 1989, Ser. No. 398,792

Int. Cl.<sup>5</sup> F01N 1/10

U.S. Cl. 181-257

40 Claims



1. A method for muffling sound of flowing fluid comprising the steps of:  
introducing a pressurized fluid into a first flow resisting means disposed within a housing having fluid inlet and outlet means;  
passing substantially all of the fluid from the first flow resisting means into a first void disposed within the housing;  
splitting the flow in the first void into first and second subflows;  
passing the first subflow from the first void into a second flow resisting means disposed within the housing;  
passing the first subflow out of the housing; and  
passing the second subflow from the first void out of the housing without passing into the second flow resisting means.  
15. A device for muffling the sound of flowing fluid, the fluid having a pressure and the device having fluid resistance characteristics, comprising:  
a housing;  
a fluid inlet disposed in the housing;  
a fluid outlet disposed in the housing;

a first void disposed in the housing, the void being in fluid communication with the fluid outlet of the housing; first means for attenuating the sound of flowing fluid, the first means being disposed in the housing, the first means having an inlet and an outlet, the first attenuating means inlet being in fluid communication with the fluid inlet of the housing, the first attenuating means outlet being in fluid communication with the first void; second means for attenuating the sound of flowing fluid, the second means being disposed in the housing, the second means having an inlet and an outlet, the second attenuating means inlet being in fluid communication with the first void, the second attenuating means outlet being in fluid communication with the fluid outlet of the housing; and means for splitting the fluid flowing in the first void into first and second and separate subflows, the first void communicating the first subflow with the first attenuating means inlet and the second subflow with the fluid outlet of the housing.

4,953,660

## MUFFLER WITH TWO PART HOUSING AND FLOW TUBES

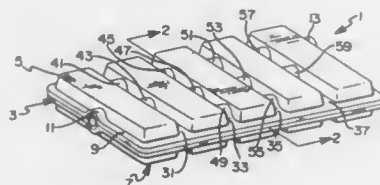
Raymond S. Jewell, Jr., Jackson, and William E. Hill, Ann Arbor, both of Mich., assignors to Tennessee Gas Pipeline Company, Lincolnshire, Ill.

Filed Feb. 9, 1989, Ser. No. 308,134

Int. Cl.<sup>3</sup> F01N 1/02, 1/08, 7/18

U.S. Cl. 181-282

20 Claims



1. A sound attenuating exhaust gas muffler for automotive type exhaust gas systems comprising a housing having an inlet collar and an outlet collar, said housing including an upper sheet metal blank having a rim extending all around the blank and having a pair of recesses drawn in the blank inside of said rim, said upper blank having a divider section extending from one side of the rim to the other and located between and at adjacent edges of the recesses, said rim and said divider section of said upper blank being coplanar and substantially flat, said housing including a lower sheet metal blank having a rim extending all around the blank and having a pair of recesses drawn in the blank inside of said rim, said lower blank having a divider section extending from one side of the rim to the other and located between and at adjacent edges of the recesses, said rim and said divider section of said lower blank being coplanar and substantially flat, the rims of the upper and lower sections and the divider sections of said upper and lower sections fitting against each other to form said housing, the recesses of the upper blank extending upwardly away from the plane of the fitted together rims and the recesses of the lower blank extending downwardly away from the plane of the fitted together rims, the recesses of the upper blank being aligned with the recesses of the lower blank and each pair of aligned upper and lower blank recesses combining to form an internal chamber whereby said housing has a pair of internal chambers separated by said fitted together divider sections, said divider sections each having a curved portion therein providing communication between the adjacent recesses, the curved portions of the divider sections in the upper and lower blanks being aligned and combining to form a tubular passage, a gas flow tube fitting in said tubular passage and providing for gas flow

between the internal chambers, said inlet and outlet collars being in gas flow communication with said internal chambers.

4,953,661

## LADDER ATTACHMENT

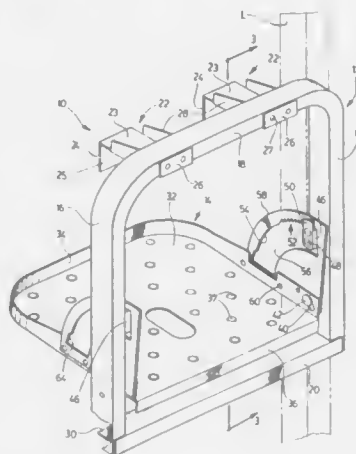
Allan R. Hilton, 10 Crawford Avenue, Chorley, Lancashire, England PR7 4DY, and Phillip Mathews, 1 Mansion Street, Bramalea, Ontario, Canada L6S 3C9

Filed Oct. 17, 1989, Ser. No. 422,531

Int. Cl.<sup>3</sup> E06C 7/14, 7/16

U.S. Cl. 182-120

14 Claims



1. A ladder attachment for use with a ladder having side members and a plurality of rungs, said ladder attachment being adapted to be attached to two said rungs intermediate the ends of said ladder, said ladder attachment comprising:

frame means having opposed parallel side frame members, and opposed parallel upper and lower frame cross members extending between said side members and forming a generally rectangular four-sided frame, and adapted to be releasably attached to said rungs on said ladder intermediate said ends, and defining upper and lower ends;

support means extending from side to side of said frame means between said side members, and being swingably mounted to said frame means adjacent said lower end thereof, and being swingable between a retracted position, and an extended position angled away from said frame means, and extending through said ladder between said side members and said rungs whereby to provide support means when said ladder is in use at an angle and thereby support a person working on said ladder;

downwardly open attachment means secured to said upper frame cross member, said attachment means being interengageable with a rung of said ladder by downward movement of said frame means relative to said ladder and being releasable therefrom by upward axial movement relative thereto, and,

means on said frame means remote from said downwardly open attachment means for engaging said ladder and restraining lateral movement of said frame means relative to said ladder.

4,953,662

## CLIMBING APPARATUS

William M. Porter, 404 White Store Rd., Wadesboro, N.C. 28170

Filed Jan. 17, 1989, Ser. No. 297,123

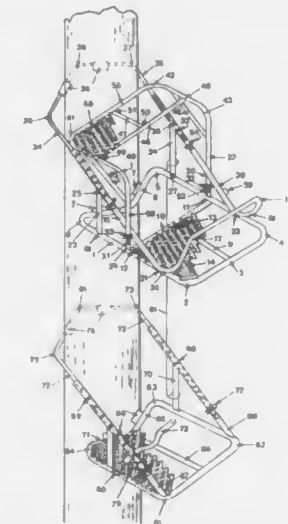
Int. Cl.<sup>3</sup> A45F 3/26; A47C 9/10

U.S. Cl. 182-135

10 Claims

1. An apparatus for climbing a tree or like vertical columnar member comprising an upper climbing member including a

main frame having a tree engagement gripper support attached to the terminal ends of the main frame, lower gripper means attached to said gripper support and positioned to provide gripping pressure against a tree, a shaped rail attached to said main frame opposite the terminal ends thereof, and comprising an elevated safety-bar portion in the form of a convoluted loop with two open ends, a tree engagement portion in telescopic sliding adjustment engagement with the open ends of the shaped rail for selectively affixing the shaped rail to a tree, upper gripper means attached to the tree engagement portion



and positioned to provide gripping pressure against the tree, a plurality of vertical rear bracing means positioned near the terminal ends of the main frame and joining the main frame to the shaped rail, a main frame platform covering the area between the center and the non-terminal ends portion of the main frame, a plurality of opposed vertical center bracing means joining said main frame and shaped rail a pair of pivotable tubular holders mounted on opposed vertical center bracing means, a detachable seat telescopically inserted into the tubular holders and a foot climber member.

4,953,663

## OIL SUPPLY FOR INTEGRATED DRIVE GENERATOR

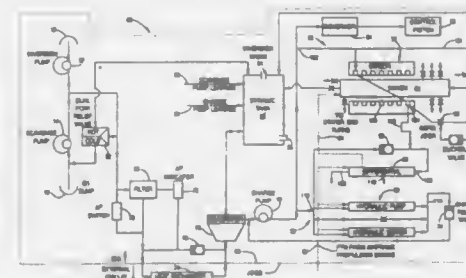
Kenneth B. Sugden, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Mar. 17, 1989, Ser. No. 324,756

Int. Cl.<sup>3</sup> F01M 9/00

U.S. Cl. 184-6.12

25 Claims



1. An integrated drive generator oil supply for providing pressurized oil to a constant speed drive transmission, which drives a rotor of an alternating current generator at a constant velocity to generate constant frequency alternating current, and to at least one additional apparatus requiring pressurized

oil and discharging oil into an oil reservoir during generation of the alternating current comprising:

a pump for providing pressurized oil from the oil reservoir of the integrated drive generator; means for providing pressurized oil from the pump to an oil circuit within the alternating current generator for cooling the alternating current generator; and means for providing oil directly from oil discharged from the oil circuit to at least a part of the constant speed drive transmission which after lubricating the constant speed drive transmission is discharged into the oil reservoir.

4,953,664

## ERGONOMICALLY DESIGNED CHECK-OUT COUNTER SYSTEM FOR SUPERMARKET AND MERCHANDISING INDUSTRIES

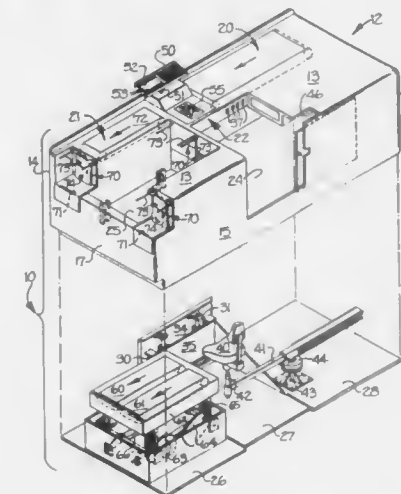
Caril D. Vrooman, and Dennis R. Taylor, both of Hartsville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Filed May 4, 1989, Ser. No. 347,757

Int. Cl.<sup>3</sup> A47F 9/04; A63F 9/02

U.S. Cl. 186-59

22 Claims



1. An ergonomically designed check-out counter system for supermarket and merchandising industries characterized by provisions for differences in human heights, hand and position of operators and for ease in handling of merchandise to reduce fatigue and injury to operators while providing maximum productivity under both light and heavy throughput requirements, said check-out counter system comprising:

elongate housing means having interconnected countertop and side and end wall portions for defining generally the overall shape of said check-out counter system including an upstream end portion for receiving the merchandise being checked-out, a downstream end portion for bagging the checked-out merchandise and an intermediate portion between said upstream and downstream end portions for receiving a cashier for checking-out the merchandise, and said housing means having an opening in said intermediate portion through at least a portion of said countertop and one of said side wall portions for the positioning of a cashier and an opening in said downstream end portion through a longitudinally extending intermediate area of said countertop;

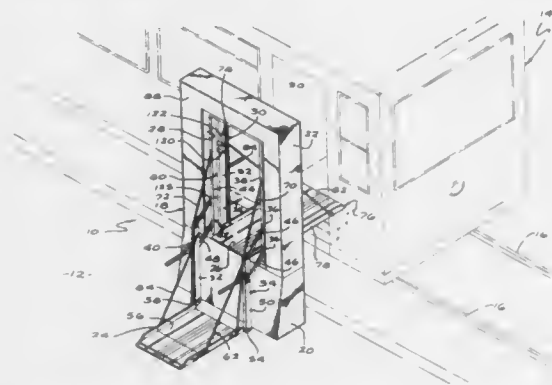
movable floor means positioned under said intermediate opening in said housing for receiving the cashier thereon and including means for moving said floor means vertically up and down to position the cashier at a desired height in said check-out counter system regardless of the human height of the cashier;

movable chair means positioned in said intermediate opening in said housing means above said floor means for receiving



the cashier and including means for adjusting the position of said chair means vertically relative to said floor means to position the cashier and his legs at desired heights and horizontally from desired positions within said intermediate opening to a position out of said intermediate opening to provide the cashier with the option of sitting at various positions within said intermediate opening or standing; keyboard means for entering price data of the merchandise by the cashier and including means mounting said keyboard means on said housing means in said intermediate portion at a desired height and for generally horizontal movement between a position in front of the right shoulder to a position in front of the left shoulder of the cashier when facing said keyboard means for accommodating right-handed and left-handed cashiers; and merchandise bagging means positioned in said downstream end portion of said housing means and including driven longitudinally-extending conveyor means positioned in said opening in said downstream end portion for conveying the merchandise away from the cashier and means mounting each end of said driven conveyor means for up and down generally vertical movement, so that said conveyor means may be placed in a first generally horizontal position lower than said countertop for receiving a bag at the end thereof adjacent to the cashier for direct bagging by the cashier by sliding the merchandise directly off said countertop and into the bag for conveying of the bagged merchandise away to the end of said check-out counter system, and so that said conveyor means may be placed in a second generally downwardly angled position extending from said countertop for transfer by the cashier of the merchandise from said countertop to said conveyor means for conveying to the end of said check-out counter system for bagging by a bagger.

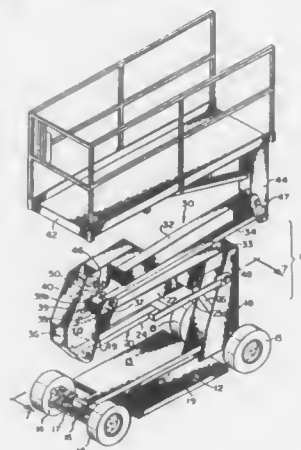
**4,953,665**  
**WAYSIDE LIFT**  
Gregory J. Paquin, Los Angeles, Calif., assignor to Ricon Corporation, Pacoima, Calif.  
Division of Ser. No. 142,040, Jan. 11, 1988, abandoned. This application Apr. 24, 1989, Ser. No. 342,009  
Int. Cl.<sup>5</sup> B66B 9/20  
U.S. Cl. 187—9 R 8 Claims



1. A lift apparatus for providing handicapped access from a landing to a guideway mounted vehicle comprising:  
a support structure having a lift opening on a first side and a bridge opening on a second side opposite the first side, comprising:  
a pedestal defining a top surface and  
a housing extending upward from the pedestal, the housing having a top region and a passageway therethrough between the lift opening and the bridge opening,  
lift means mounted in the lift opening of the support structure comprising:

a right linkage have an upper end mounted to the housing along one side of the passageway;  
a left linkage having an upper end mounted to the housing along the other side of the passageway opposite the one side, the right linkage and the left linkage each having a lower end;  
a platform coupled for pivotal movement about the lower ends of the right and left linkages;  
means for preventing pivotal movement of the platform below a generally horizontal position, and  
lift movement means coupled for selectively moving the platform between a lowered position adjacent the landing and a raised position adjacent the top surface of the pedestal and selectively pivoting the platform between the raised position and a vertical lift storage position in the passageway adjacent the lift opening;  
bridge means mounted in the bridge opening of the support structure comprising:  
a bridge member mounted to the support structure for pivoting between a generally horizontal position for providing access from the top surface of the pedestal along the bridge to the guideway mounted vehicle, and a generally vertical bridge storage position in the passageway adjacent the bridge opening;  
bridge movement means coupled for selectively moving the bridge between the horizontal position and the bridge storage position; and  
bridge control means for selectively actuating the bridge movement means; and  
lift control means for selectively actuating the lift movement means.

**4,953,666**  
**ELEVATING APPARATUS HAVING AN OFFSET UPPER BOOM MAINTAINING A WORKSTATION LEVEL ON A CANTILEVERED ANGULARLY MOVABLE SUPPORT THAT RETRACTS INTO A COMPACT POSITION**  
James Ridings, Glenmoore, Pa., assignor to Strato-Lift, Inc., Morgantown, Pa.  
Filed Mar. 31, 1989, Ser. No. 332,291  
Int. Cl.<sup>5</sup> B66B 9/20; B66F 11/04  
U.S. Cl. 187—9 R 4 Claims



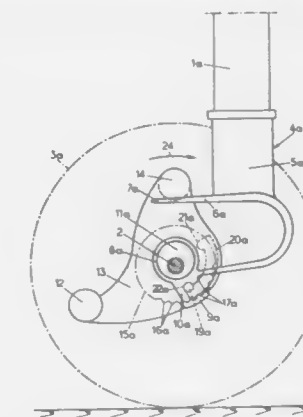
1. An elevating apparatus having a stored position and multiple extended positions comprising:  
a support base;  
a first boom assembly including an elongated first boom and an elongated first control arm of length substantially equal thereto and in a substantially parallel relationship therewith, said first boom and said first control arm each having a distal end and a pivot end, the pivot end being pivotally connected to said support base such that the first boom assembly is movable in a vertical plane between a

multiplicity of positions ranging from a downwardly declining limit position to an upwardly inclining limit position;  
a lifting means operatively connected to said first boom;  
a boom assembly coupler pivotally connected to the distal ends of the first boom and the first control arm;  
a second boom assembly including an elongated second boom and a second control arm assembly, said second boom having a pivot end pivotally connected to said boom assembly coupler and having a distal end laterally offset from said pivot end of said first boom assembly to afford movement of said distal end of the second boom between opposite limit positions corresponding to the limit position of said first boom assembly, said offset affording travel of the second boom distal end past the pivot end of the first boom assembly as the boom assemblies move from the upwardly inclining positions to the downwardly declining positions, said second control arm assembly including an elongated, straight second control arm having a pivot end and a distal end, and second control arm pivot means for pivotally connecting the pivot end of said second control arm to said boom assembly coupler such that said pivot end is laterally offset from the second boom pivot end by a distance less than the offset of the distal end of the second boom from its pivot end, so as to be out of said vertical plane of movement of the first boom, said second control arm pivot means including a pivot mounting connection, said pivot mounting connection being fixedly mounted on a side of the boom assembly coupler proximate to said laterally offset distal end of the second boom, the pivot end of said second control arm being pivotally mounted at the pivot mounting connection so as to be axially offset from the pivot of said second boom, said second control arm further being substantially equidistant from said second boom and angularly disposed with respect to said vertical plane of movement of the first boom assembly;  
a rigid compression link operatively interconnected within said vertical plane between the distal end of said first boom and the pivot end of said second boom such that the movement of the first boom assembly causes movement of the second boom assembly;  
a workstation; and  
a workstation support member with a rigid end rigidly connected to said workstation and a pivot end pivotally connected to the distal end of the second boom assembly such that said workstation remains in a level attitude throughout the range of movement of said first and second boom assemblies.

**4,953,667**  
**WHEEL BRAKING DEVICE, PARTICULARLY FOR A BABY CARRIAGE**  
Jean Bigo, Cholet, France, assignor to AMPAFRANCE, Boulogne-Billancourt, France  
Filed May 26, 1989, Ser. No. 357,714  
Claims priority, application France, May 26, 1988, 88 07012  
Int. Cl.<sup>5</sup> B60T 1/06  
U.S. Cl. 188—31 11 Claims  
1. A wheel braking device, particularly for a baby carriage, comprising:

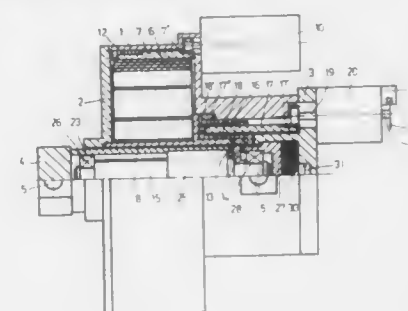
a chassis mounted by means of a connection member of the suspension type, or directly on at least one axle common to a pair of wheels and  
a brake member operated by a brake pedal and adapted for braking the rotation of at least one wheel, wherein the brake pedal is mounted to rotate with the axle wherein the suspension comprises  
two suspension members of which at least one is mounted near a wheel about an eccentric fastened to the axle each suspension member having a brake member; wherein at least one wheel is provided with a brake drum fastened thereto and adapted to cooperate on its

periphery with a corresponding brake member when the axle is turned in a first direction through action on



the brake pedal, thus bring the brake member towards and in contact with the periphery of the brake drum.

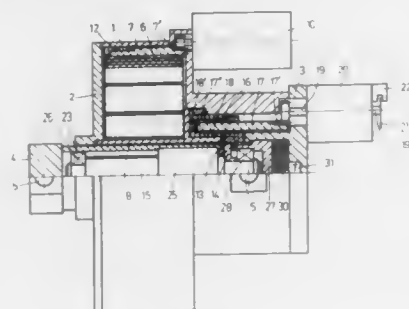
**4,953,668**  
**ACTUATOR**  
Lars M. Severinsson, Hishult, Sweden, assignor to SAB Nordic AB, Landskrona, Sweden  
Filed Mar. 20, 1989, Ser. No. 326,118  
Claims priority, application Sweden, Mar. 21, 1988, 8801027  
Int. Cl.<sup>5</sup> B61H 13/00; F16D 65/34  
U.S. Cl. 188—158 9 Claims



1. An actuator, comprising in combination a housing, a drive sleeve to be subjected to rotational movement and a drive ring for supplying a rotational movement, clutch means coupled between the drive sleeve and the housing for permitting rotation of the drive sleeve in a first direction, a locking spring for connection between the drive sleeve and the drive ring and coaxial therewith, and means for controlling the locking spring to drivingly connect the drive sleeve with the drive ring only at the rotation of the drive sleeve in the first direction but to allow rotation of the drive ring in a second opposite direction.

**4,953,669**  
**ELECTRO-MECHANICAL BRAKE UNIT, PREFERABLY FOR A RAIL VEHICLE**  
Lars M. Severinsson, Hishult, Sweden, assignor to SAB Nife AB, Landskrona, Sweden  
Filed Mar. 20, 1989, Ser. No. 326,119  
Claims priority, application Sweden, Mar. 21, 1988, 8801026  
Int. Cl.<sup>5</sup> R61H 13/00; F16D 65/34  
U.S. Cl. 188—171 10 Claims  
1. A brake unit, comprising energy storing means for providing energy by rotational movement, electric motor and drive means for supplying energy to said storing means, and a drive

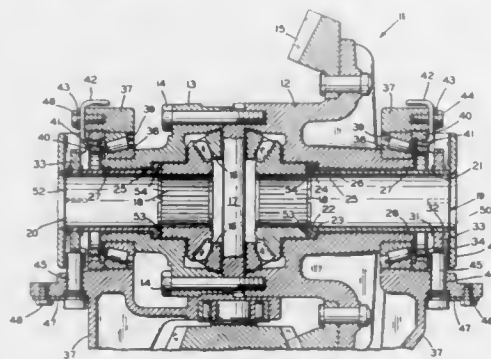
mechanism for transmitting a rotational movement from said energy storing means to conversion means for transforming said rotational movement into an axial movement of a force transmitting member, characterized in that clutch and control



means are arranged between the drive mechanism and said conversion means for accomplishing a controlled force transmission from the energy storing means to the force transmitting member.

**4,953,670**  
**VEHICLE WHEEL SPEED SENSOR**  
Tad M. Chemelewski, Fort Wayne, Ind., assignor to Dana Corporation, Toledo, Ohio  
Filed Nov. 30, 1988, Ser. No. 278,039  
Int. Cl. B60T 8/02  
U.S. Cl. 188—181 A

15 Claims



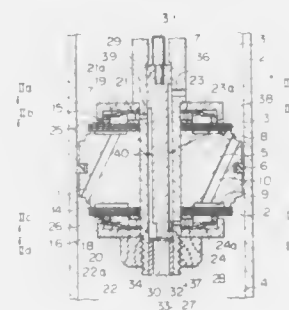
1. An apparatus for sensing the angular speed of a wheel mounted on the end of a drive axle of a vehicle, the drive axle including a housing enclosing an axle shaft and a differential carrier assembly with a side gear for rotating the axle shaft and an associated wheel, comprising:

- a tone wheel having a plurality of generally evenly spaced radially extending teeth formed thereon and means for detachably coupling said tone wheel for rotation with an axle shaft;
- a sleeve adapted to be rotatably mounted inside a housing for enclosing an axle shaft, said sleeve having means formed at an outer end thereof for engaging said means for detachably coupling said tone wheel and means formed at an inner end thereof for detachably coupling to a side gear of a differential carrier assembly for rotation of said sleeve;
- a generally radially outwardly extending flange formed on said inner end of said sleeve and being adapted to cooperate with a differential case mounted in the housing to restrict axial movement of said sleeve with respect to the housing; and
- a sensor adapted to be mounted through a wall of the housing adjacent a periphery of said tone wheel for detecting the passage of said teeth as the side gear rotates said sleeve

and said tone wheel whereby a predetermined air gap is maintained between said sensor and said tone wheel.

**4,953,671**  
**DAMPING FORCE ADJUSTABLE HYDRAULIC SHOCK ABSORBER**  
Tomio Imaizumi, Kanagawa, Japan, assignor to Tokico Ltd., Kanagawa, Japan  
Filed Aug. 10, 1989, Ser. No. 392,270  
Claims priority, application Japan, Aug. 12, 1988, 63-201313  
Int. Cl. F10F 9/44  
U.S. Cl. 188—299

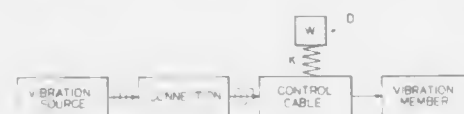
6 Claims



1. A damping force adjustable hydraulic shock absorber comprising:
- a piston attached to one end of a piston rod and slidably fitted in a cylinder, said piston dividing the interior of said cylinder into two cylinder chambers;
  - a passage provided in said piston, said passage communicating with each of said two cylinder chambers;
  - a damping force generating valve provided at the downstream side of said passage to generate a damping force;
  - a back-pressure chamber formed at the side of said damping force generating valve which is remote from said piston to apply pressure to said valve;
  - a bypass passage formed in said piston rod to provide communication between said back-pressure chamber and the upstream cylinder chamber that is provided at the upstream side of said passage; and
  - a shutter externally operated to control the condition of communication between said upstream cylinder chamber and said back-pressure chamber, thereby adjusting the level of pressure inside said back-pressure chamber.

**4,953,672**  
**CONTROL CABLE SYSTEM WITH DEVICE FOR REDUCING VIBRATION**  
Sadahiro Onimaru, Minoo; Fumiyasu Kuratani, Akashi, and Hiroyoshi Yoshino, Takarazuka, all of Japan, assignors to Nippon Cable System, Inc., Takarazuka, Japan  
Filed Mar. 31, 1989, Ser. No. 331,209  
Claims priority, application Japan, Apr. 28, 1988, 63-106604; Apr. 28, 1988, 63-106606  
Int. Cl. F16F 7/10  
U.S. Cl. 188—378

26 Claims

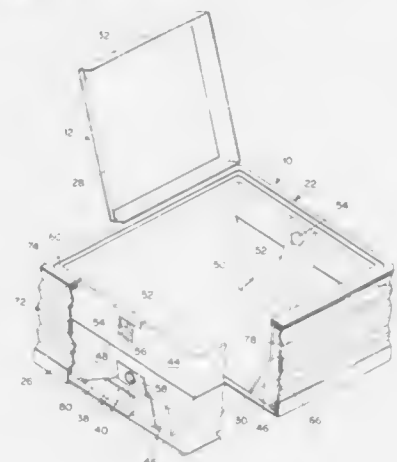


1. A control cable system with a damper for reducing a vibration comprising:

a control cable for transmitting a mechanical displacement and which has one end connected to a vibration source and vibrates in an axial direction; means locating a vibration member on said control cable and which resonates due to a vibration transmitted by said control cable from said source; and dynamic damper means attached to an element of said control cable and located concentrically relative to said control cable, said dynamic damper means vibrating in response to frequencies in a range including a plurality of resonance frequencies of said vibration member and resonating in response to a predetermined one of said resonance frequencies, whereby the posture of said dynamic damper means can be easily determined without measurement of direction of vibration since the control cable vibrates in an axial direction and the dynamic damper means does not introduce any stroke-loss to the control cable since the dynamic damper means is located concentrically relative to the control cable and not directly inserted in the operational force transmitting route of the control cable system.

**4,953,673**  
**EXPANDABLE LUGGAGE**  
Emilio Ambasz, 295 Central Park West, New York, N.Y. 10024  
Filed Jul. 17, 1989, Ser. No. 381,458  
Int. Cl. A45C 7/00, 13/04, 13/36  
U.S. Cl. 190—103

4 Claims



1. An item of expandable luggage comprising a rigid top peripheral frame, a rigid bottom peripheral frame, a rigid intermediate peripheral frame, each frame having side and end portions fully bounding a planar, substantially rectangular opening and all such openings being of the same size, a rigid rectangular top wall member affixed to the top frame, a rigid rectangular bottom wall member affixed to the bottom frame, an upper peripheral wall member of a pleated sheet material affixed to and extending coextensively with the top and intermediate frames, a lower peripheral wall member of pleated sheet material affixed to and extending coextensively with the bottom and intermediate frames, the pleats of the peripheral wall members extending peripherally so that the peripheral wall members can be selectively expanded and collapsed to define a larger volume and a smaller volume of the luggage item, and foldable rigid side and end wall members, each having an upper portion rigidly affixed to the top frame along a corresponding side or end portion thereof inwardly of the pleated wall members and disposed orthogonally to the plane of the opening defined by the top frame and a lower portion foldable along a fold line parallel to the top and bottom frames, the fold lines of all of the rigid said end wall members being equidistant from the top of same to further define when

unfolded the large volume and when folded the smaller volume.

**4,953,674**  
**GARMENT BAG APPARATUS**  
Scott D. Landes, 9906 Kell Ave. S., Bloomington, Minn. 55437  
Filed Nov. 8, 1989, Ser. No. 433,281  
Int. Cl. A45C 3/08, 13/10, 13/22, 13/38  
U.S. Cl. 190—108

8 Claims



1. A garment bag apparatus for an airline traveler that permits the traveler to use a collapsible garment bag carrier to protect a garment bag during transfer of the garment bag from one airport to another airport with the garment bag carrier sufficiently large so as to both protect the garment bag and to stow items before checking the garment bag apparatus at an airlines comprising:

a first shell of flexible material, said first shell having at least three edges;

a second shell of flexible material, said second shell having at least three edges, said first shell connected to said second shell to permit a user fold said first shell against said second shell, said first shell and said second shell having a first opening, a second opening, and a third opening;

closure means connecting said first shell to said second shell to permit a user to temporarily fasten said first shell to said second shell to define a compartment therebetween, said compartment sufficiently large so as to separately and in a side by side relationship contain the garment bag and miscellaneous traveler items, said first shell, said second shell, and said closure means defining the collapsible garment bag carrier;

- a handle connected to said first shell to permit a user to carry said first shell and said second shell;
- a first flap located over the first opening in one of said shells, said first flap having closure means to permit a user to open said first flap and extend a shoulder strap of the garment bag through the first opening;
- a second flap located over the second opening in one of said shells, said second flap having closure means to permit a user to open said second flap and extend the shoulder strap of the garment bag through said second opening so that a traveler can carry the garment bag located in said first shell and said second shell with the shoulder strap of the garment bag, said first flap and said second flap operable for closing to permit a traveler to stow the shoulder strap of the garment bag during the transfer of the garment bag between airport terminals;
- a third flap extending over the third opening, said third flap located between said first flap and said second flap to permit a user to extend a handgrip of the garment bag through the third opening to permit a traveler to carry the garment bag located in said shells by either the shoulder strap of the garment bag or the handgrip of a garment bag said first flap, said second flap and said third flap completely operable for closing over the said openings to protect shoulder strap and handgrip during airport handling of the garment bag, and



a pouch, said pouch made of a flexible material, said pouch having a compartment sufficiently large to nest the collapsible garment bag carrier therein when the collapsible garment bag carrier is in a collapsed condition, said pouch including a fastener to permit a traveler to temporarily attach said pouch to the garment bag if the traveler does not want to use the collapsible garment bag carrier.

4,953,675

**SIMPLY SUPPORTED SECONDARY SHAFTING SYSTEM TORQUE SENSOR**

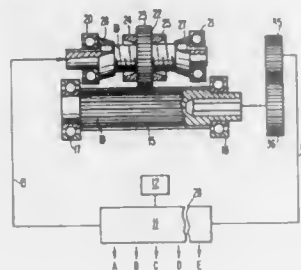
Allyn M. Aldrich, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jan. 17, 1989, Ser. No. 297,322

Int. Cl.<sup>5</sup> F16D 43/22

U.S. Cl. 192—8 R

16 Claims



1. A torque manner in a secondary shafting system operatively associated with a primary shafting system, comprising: a first rotatable shaft simply supported between bearings and receiving a first torque input from the secondary shafting system; a second rotatable shaft simply supported between bearings and receiving a second torque input from the secondary shafting system; a threaded portion being associated with said first rotatable shaft; a first gear threadably mounted on said threaded portion for axial movement along said first rotatable shaft; a second gear associated with said second rotatable shaft and in meshing engagement with said first gear throughout the axial movement of said first gear as a result of differential motion between said first and second rotatable shafts when torque is transmitted between said first and second shafts resulting from different first and second torque inputs thereto, wherein said differential motion does not occur when said first and second torque inputs are the same and the primary and secondary shafting systems are rotating at normal speeds; and means for causing friction is jamming between said first gear and said first rotatable shaft at an end of said first rotatable shaft, whereby the simply supported first and second rotatable shafts minimizes oscillatory motion and premature failures of the torque sensor.

4,953,676

**SPRING COUPLER**

Yukifumi Yamada, Takami Terada, both of Toyota, and Keiichi Hibino, Okazaki, all of Japan, assignors to Aisin Seiko Co. Ltd., Japan

Filed May 24, 1988, Ser. No. 197,919

Claims priority, application Japan, May 29, 1987, 62-85277[U]

Int. Cl.<sup>5</sup> F16D 67/00

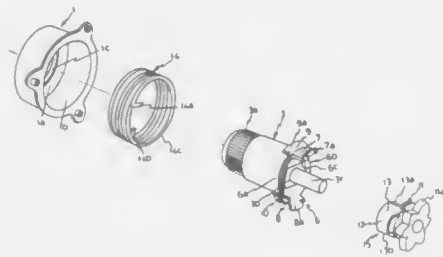
U.S. Cl. 192—8 C

1 Claim

1. A spring coupler comprising: a casing; a drive member rotatably mounted within said casing, said drive member including a shaft having a connecting sec-

tion with an oval cross section and a core having an oval aperture with inner chamfered surfaces, said connecting section of said shaft being staked into said oval aperture of said core with said connecting section engaging said inner chamfered surfaces to fixedly secure said shaft to said core;

a driven member rotatably mounted within said casing, said driven member including a main portion and a core portion press fit together to be fixedly secured, said driven member core portion being engageable with said drive member core upon the rotation thereof; and



a coil spring disposed between the drive member and the casing and normally engaged with said casing, said coil spring having first and second tangs, wherein said drive member engages said first or second tang upon rotation in a clockwise or a counterclockwise direction, respectively, thereby reducing the radius of said coil spring and transmitting rotation to said driven member and whereby said driven member engages said first or second tang upon rotation in a clockwise or counterclockwise direction, respectively, thereby expanding the radius of said coil spring and preventing rotation of said drive member.

4,953,677

**METHOD OF AND APPARATUS FOR CONTROLLING DIRECT COUPLING MECHANISM IN HYDRODYNAMIC DRIVING APPARATUS**

Takashi Aoki, Saitama; Satoshi Terayama, Tokyo; Yoshihisa Iwaki; Hiroyuki Shimada, both of Saitama; Kimihiko Kikuchi, Tokyo, and Hiroshi Nakayama, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

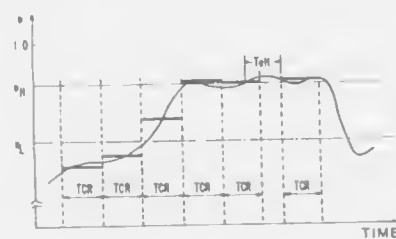
Filed Mar. 29, 1989, Ser. No. 330,221

Claims priority, application Japan, Mar. 30, 1988, 63-77488; Mar. 30, 1988, 63-77489

Int. Cl.<sup>5</sup> F16H 45/02

U.S. Cl. 192—3.3

11 Claims



1. A method of controlling a direct coupling mechanism disposed between input and output members of a hydrodynamic driving apparatus to mechanically connect or disconnect the input and output members, wherein engagement of the direct coupling mechanism is controlled so that a parameter indicative of slippage between said input and output members

falls in a predetermined fixed reference range, said method comprising the steps of:

determining an average value of said parameter which is measured in a prescribed time interval; determining a control value for said engagement in a next prescribed time interval based on a difference between said average value and said predetermined reference range value; and controlling engagement of said direct coupling mechanism based on said control value in said next time interval.

8. An apparatus for controlling a direct coupling mechanism disposed between input and output members of a hydrodynamic driving apparatus to mechanically connect or disconnect the input and output members, and said apparatus comprising:

a shift valve for selectively engaging and disengaging said direct coupling mechanism; a control valve for controlling the amount of engagement of said direct coupling mechanism; a timing valve for keeping said direct coupling mechanism in a fully engaged condition; a first solenoid valve which can be selectively turned on and off;

a second solenoid valve which can be controlled in duty ratio;

said shift valve, said control valve, and said timing valve being controllable in operation solely by a constant oil pressure supplied dependent on the turning on and off of said first solenoid valve and a duty-ratio-controlled oil pressure supplied dependent on the duty ratio control of said second solenoid valve;

said direct coupling mechanism being operable selectively into a disengaged condition by supplying an oil pressure to a release passage thereof, a partly engaged condition by supplying a control oil pressure corresponding to said duty-ratio-controlled oil pressure to said release passage, and a fully engaged condition by cutting off the supply of the oil pressure to said release passage.

4,953,678

**CLUTCH ACTUATION SYSTEM**

Ronald C. Page, Coventry, and Alan W. Hunt, Kenilworth, both of England, assignors to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

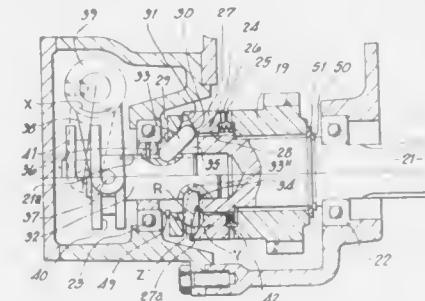
Filed May 9, 1989, Ser. No. 349,462

Claims priority, application United Kingdom, May 11, 1988, 8811086

Int. Cl.<sup>5</sup> F16D 11/04

U.S. Cl. 192—67 R

12 Claims



1. A clutch actuating system comprising:

an actuating member movable between a first position in which the clutch is disengaged and a second position in which the clutch is engaged,

a pair of adjacent reaction members with mutually inclined wedging surfaces on confronting faces, one of said reaction members being operatively connected with the clutch,

and at least one elongated toggle member operatively con-

nected at one end with the actuating member and extending between the wedging surfaces of the reaction members at its other end, the arrangement being such that movement of the actuating member from its first to its second position causes the toggle member to execute a toggle action and to be forced further between the wedging surfaces to separate the reaction members to engage the clutch and causes the toggle member to assume a stable position in which the actuating member is held in its second position by the transmission of force along the toggle member between its ends thus holding the clutch engaged.

4,953,679

**SLIP CONTROL SYSTEM FOR LOCK-UP CLUTCH OF AUTOMATIC TRANSMISSION**

Yoshinori Okino, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

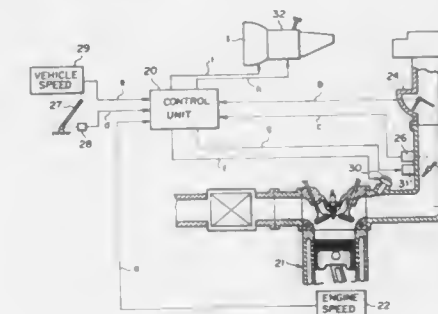
Filed Jan. 5, 1989, Ser. No. 293,689

Claims priority, application Japan, Jan. 12, 1988, 63-5336

Int. Cl.<sup>5</sup> B60K 41/02; F16D 47/06

U.S. Cl. 192—0.096

8 Claims



1. In a slip control system for an automatic transmission of an automotive vehicle having fuel cut means for interrupting a fuel supply to an engine when an engine operating condition is in a predetermined fuel cut zone, including a torque converter disposed between the engine and the automatic transmission for controlling an amount of a torque transmitted from the engine to the transmission, lock-up clutch means provided in the torque converter for connecting an input and output member of the torque converter directly, the improvement comprising slip control means for controlling an engaging force of the lock-up clutch means to accomplish a slip condition in which a predetermined rotation speed difference is produced between the input member and output member of the torque converter, the slip condition being defined as an intermediate condition between a lock-up condition in which a rotation speed of the input member of the torque converter is substantially the same as a rotation speed of the output member thereof and a converter condition in which the lock-up clutch means is fully released, transient control means for controlling the engaging force of the lock-up clutch means to accomplish a target rotation speed difference between said input member and said output member greater than said predetermined rotation difference in the slip condition when the engine operating condition is a transient zone included in the fuel cut zone and adjacent to a fuel supply zone in which a fuel is supplied for the engine.

4,953,680

**CLUTCH ADJUSTER**

Richard A. Flotow, Butler, and Patrick M. Sullivan, Auburn, both of Ind., assignors to Dana Corporation, Toledo, Ohio

Filed Mar. 29, 1989, Ser. No. 330,234

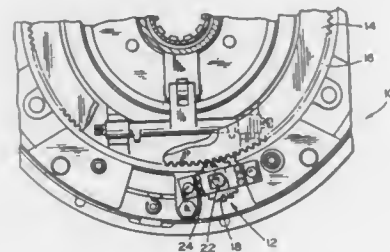
Int. Cl.<sup>5</sup> F16D 11/00, 13/75

U.S. Cl. 192—111 B

8 Claims

1. In a clutch adjuster adapted to compensate for disc wear

in a friction clutch including a cover and an adjusting ring rotatable relative to said cover, said adjuster including a rotary gear supported by said cover, said rotary gear in mesh with said adjusting ring, said adjuster further including an adjuster shaft extending through said cover and having one end thereof fixed to said rotary gear, said shaft having means external to said cover for rotating said shaft, by which means said rotary gear and said adjusting ring are also rotated; an improvement comprising: resilient means positioned external to said cover, said resilient means adapted to secure said ad-



juster against rotation in a first, unrestrained position, wherein said adjuster may be freely rotated whenever said resilient means is biased to a second position by application of a disengagement force by depressing said resilient means wherein said means external to said cover for rotating said adjuster shaft comprises a bolt head on said shaft, wherein said resilient means is fixed to said cover for securing said adjuster, and wherein said means comprises a spring lock including an aperture sized and positioned for surrounding and engaging said bolt head in said normally unrestrained first position, said lock thus being adapted to restrain said bolt head against rotation.

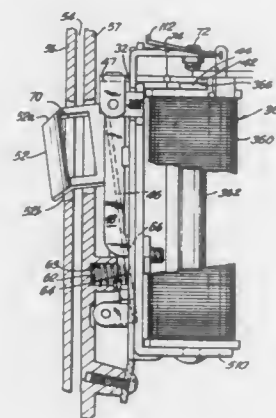
**4,953,681**  
**COMPACT, LOW POWER GATE APPARATUS FOR COIN OPERATED MACHINES**

John Zouzoulas, West Chester, Pa., assignor to Mars Incorporated, McLean, Va.

Filed May 26, 1988, Ser. No. 199,138  
Int. Cl.<sup>5</sup> G07F 9/04

U.S. Cl. 194—346

26 Claims



19. A gate apparatus for controlling the direction of travel of a coin moving along a coin path of a coin operated machine, said gate comprising:  
a coin diverting plate, a pivot, and a means for rotating said plate about said pivot;  
said plate having a first angle of inclination along a coin path for directing said coin along said coin path; and  
a second angle of inclination toward a side wall of said coin

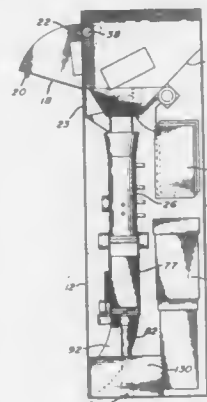
path for diverting said coin against said wall, dissipating its kinetic energy,  
wherein said second angle of inclination directs a component of force due to an impact of a coin on said plate perpendicular to said second angle of inclination, toward said pivot point.

**4,953,682**  
**AUTOMATIC REVERSE VENDING MACHINE FOR ALUMINUM CAN RECYCLING**  
Salah Helbawi, 49 De La Moselle, St. Lambert, Quebec, Canada J4S 1W1

Filed Apr. 25, 1989, Ser. No. 342,803  
Int. Cl.<sup>5</sup> G07F 7/06

U.S. Cl. 194—208

17 Claims



1. An apparatus for receiving aluminum cans, detecting and rejecting ferrous metal and non metal cans or other items, crushing aluminum cans, and providing compensation for the crushed aluminum cans, comprising:

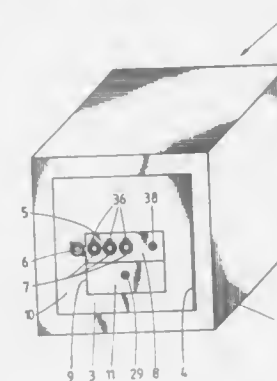
a sheet metal enclosure;  
opening in the front of the sheet metal enclosure for receiving aluminum cans and other items leading to a chute to guide aluminum cans and other items, to fall one at a time with a cylindrical axis of each can substantially vertical;  
dispensing means at the bottom of the chute to release one aluminum can or other item individually through an aperture in a sole plate under the chute;  
detector means to detect if a can or other item to be released by the dispensing means is ferrous metal or non metal;  
reject deflector means to deflect ferrous metal and non metal cans or other items falling through the aperture in the sole plate, to a reject chute;  
at least one gate with opening and closing means to close on the underside of the sole plate across the aperture;  
hydraulic cylinder with vertical moving cylinder rod positioned under the sole plate, the cylinder rod having a platen at the top to crush an aluminum can against the closed gate on the underside of the sole plate;  
ejection plate positioned on top of the platen with pivot means to flip up and discharge a crushed aluminum can into a discharge container at the bottom of the enclosure, and  
compensation dispensing means for dispensing compensation commensurate with the number of aluminum cans crushed.

**4,953,683**  
**SAFE EQUIPPED WITH A PERMUTATION LOCK WHOSE LOCKING FUNCTION IS RELEASED BY THE INSERTION OF A COIN OR COINS**  
Armin Eisermann, Velbert, Fed. Rep. of Germany, assignor to Schulte Schlagbaum Aktiengesellschaft, Velbert, Fed. Rep. of Germany

Filed Feb. 24, 1987, Ser. No. 17,771  
Claims priority, application Fed. Rep. of Germany, Feb. 24, 1986, 3605859; Jul. 19, 1986, 8619493[U]  
Int. Cl.<sup>5</sup> E05G 1/02

U.S. Cl. 194—235

28 Claims



1. A safe comprising  
a safe door;  
a permutation lock including a bolt slide for locking said door, the permutation lock having an externally operable reset device for resetting a combination of the lock;  
a coin-operated release mechanism adapted for releasing the bolt slide of said lock for locking said door of the safe and wherein  
said coin-operated release mechanism comprises an auxiliary lock;  
said auxiliary lock includes an auxiliary locking slide operable by said release mechanism for locking said safe;  
said release mechanism is operative to release a locking function of said release mechanism upon insertion of a coin;  
upon insertion of the coin, said auxiliary lock operates to release said auxiliary locking slide to move in coupled connection with said bolt slide of the permutation lock;  
said coin-operated release mechanism includes a supplementary lock for releasing a locking element in said release mechanism without the insertion of a coin, and wherein said supplementary lock includes a web and a locking pawl operative with said locking slide, said pawl being movable to an unlocking position by operation of a coin or said web.

**4,953,684**  
**STOPPER ELEVATOR CONVEYOR**  
Frank Beswick, Phoenixville, and Robert W. Winship, Downingtown, both of Pa., assignors to The West Company, Incorporated, Phoenixville, Pa.  
Continuation of Ser. No. 76,777, Jul. 17, 1987, Pat. No. 4,856,640. This application Nov. 7, 1988, Ser. No. 267,823  
The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> B65G 41/00

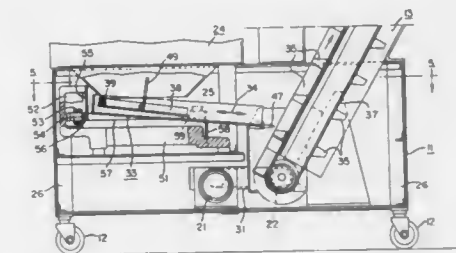
U.S. Cl. 198—311

4 Claims

1. The device for transferring small discrete objects such as pharmaceutical stoppers and caps comprising:  
a frame having locking castors and movably positionable at a predetermined location for delivery of said objects;  
an angularly displaced conveyor on said frame and having a discharge chute at a predetermined location for discharg-

ing objects thereof, said conveyor including a conveyor chain means defining a path from a transfer point to said discharge chute, said chain having bucket flight means including holes in said flights to convey said objects along said path while subjecting said objects to an ambient drying condition;

a delivery chute on said frame for transferring said objects to said transfer point, said delivery chute including a first tray inclined with respect to the horizontal and having an open lower terminal end adjacent said transfer point, which end is positioned to feed said objects to said conveyor chain, said end including terminal plate means hinged to be deflected upon contact with objects carried

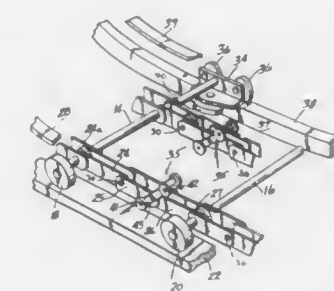


by said conveyor, said delivery chute further including a second tray located within said first tray at the same or greater angle with respect to the incline of the first tray and positioned to receive said objects, said second tray having an open lower terminal end for feeding said objects to said first tray, said first tray being mounted to said frame on a plurality of leaf spring means, and said delivery chute further including vibrating means for oscillating said trays to impart linear movement of said objects toward the lower terminal ends of said trays; and  
hopper means removably mounted on said frame for holding a quantity of said objects, said hopper being mounted on a detachable mobile frame and including a hopper chute for gravity feed of said objects to said delivery chute.

**4,953,685**  
**STEP CHAIN FOR CURVED ESCALATOR**  
Gerald Johnson, Farmington, Conn., assignor to Otis Elevator Company, Farmington, Conn.  
Filed Aug. 10, 1989, Ser. No. 391,893  
Int. Cl.<sup>5</sup> B65G 21/00

U.S. Cl. 198—328

11 Claims



7. A step chain for an escalator assembly which escalator assembly moves along a curved path of travel when viewed in plan, said step chain comprising:  
(a) a plurality of serially connected links having overlapping ends;  
(b) means for connecting escalator step axles to spaced apart ones of said links; and  
(c) rotatable eccentric camming means connecting adjacent



adjustable links intermediate said spaced apart ones of said links for varying the extent of overlap of said adjustable links to selectively increase and decrease the effective length of said chain while maintaining rectilinear alignment of said adjustable links at the maximum and minimum effective lengths of the chain.

4,953,686

# **BALUSTRADE FOR A TRANSPORTATION APPARATUS ESPECIALLY AN ESCALATOR OR A PASSENGER WALKWAY**

Gerhart Rülke, Vienna, Austria, assignor to Inventio AG, Heriswil, Switzerland

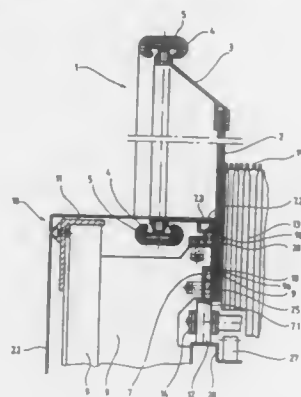
Filed Jul. 5, 1989, Ser. No. 375,741

Claims priority, application Switzerland, Jul. 11, 1988, 02645/88

Int. Cl.<sup>5</sup> B66B 23/22

U.S. Cl. 198—332

11 Claims



1. A balustrade for a transportation apparatus, especially an escalator or a moving passenger walkway, comprising: a support body member; two spaced apart oppositely disposed balustrade side walls; said two spaced apart oppositely disposed balustrade side walls being supported inwardly of the support body member; each balustrade side wall being provided with a movable handrail; endless revolvingly driven transport means arranged between said balustrade side walls; outer cover means mounted at said support body member laterally outwardly of said two spaced apart oppositely disposed balustrade side walls; said outer cover means having two oppositely disposed sides associated with respective ones of said two spaced apart oppositely disposed balustrade side walls; outer deck cover means of said outer cover means being arranged at both of said two oppositely disposed sides of said outer cover means; said balustrade side walls being arranged substantially in upright disposition; balustrade panel means provided for each one of said balustrade side walls and defining glass plates; said balustrade panel means laterally guiding said endless revolvingly driven transport means; said endless revolvingly driven transport means being provided with tread element means having a predetermined width; said balustrade panel means being spaced from one another at a distance which is slightly greater than the predetermined width of the tread element means; said endless revolvingly driven transport means having a treadable forward run as viewed in a transport direction of the transportation apparatus; and said treadable forward run of said endless revolvingly driven transport means being arranged such as to protrude

above the outer deck cover means and to be visible through said glass plates defining said balustrade panel means of said two spaced apart oppositely disposed balustrade side walls.

4,953,687

# **METHOD AND APPARATUS FOR AUTOMATICALLY TRANSFERRING AND ACCUMULATING GROUPS OF FLACCID ARTICLES**

Vincio Gazzarrini, Firenze, Italy, assignor to Solis S.R.L., Firenze, Italy

Filed Sep. 22, 1988, Ser. No. 247,709

Claims priority, application Italy, Sep. 22, 1987, 9491 A/87 Int. Cl.<sup>5</sup> B65G 25/00

U.S. Cl. 198—347.1

15 Claims



1. A method of automatically transferring and accumulating groups of flaccid articles such as pantyhose or other hosiery or similar articles between loading and unloading stations and to and from intermediate accumulating stations and wherein there is a pair of said loading stations and one unloading station between said loading stations, comprising: loading articles at a loading station to provide a group of articles thereat; unloading articles at an unloading station independent of said loading; upon completion of loading a group of articles at a loading station, advancing the group of articles from the loading station toward an unloading station to an intermediate accumulating station having no group of articles thereat while retaining any particles that are at an unloading station and retaining any group of articles that are at other intermediate accumulating stations; during each of said advancements all groups of articles of intermediate accumulating stations on the opposite side of said unloading station are retained at their respective station; and upon unloading of all articles at an unloaded station, advancing a group of articles from an intermediate accumulating station to the unloading station.

4,953,688

# **CONVEYOR WITH ARTICLE ALIGNMENT**

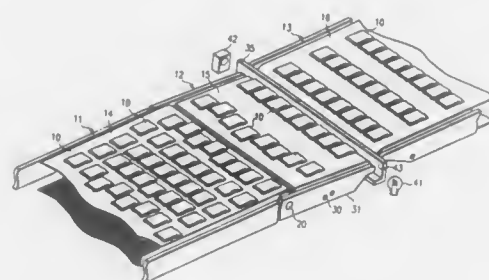
James R. Kross, Pacific, Mo., assignor to Anheuser-Busch Companies, Inc.

Filed Jul. 21, 1989, Ser. No. 384,260

Int. Cl.<sup>5</sup> B65G 47/26

U.S. Cl. 198—434

23 Claims



1. Apparatus comprising: an alignment conveyor having an upstream end and a down-

stream end and having a first conveying surface suitable for conveying in a first direction of travel toward said downstream end a plurality of discrete articles which would be at least generally arrayed on said first conveying surface in a plurality of successive rows, each of said rows extending transversely to said first direction of travel and containing at least two of said articles, first drive means for moving said first conveying surface in said first direction of travel at a first rate of movement, an alignment element positioned downstream of and adjacent to said downstream end of said alignment conveyor and having an article contact surface extending transversely to said first direction of travel in at least a generally horizontal direction which is at least generally parallel to said downstream end of said alignment conveyor, means for effecting relative movement between said downstream end of said alignment conveyor and said alignment element generally vertically between a first position wherein a row of article on said first conveying surface can encounter said contact surface of said alignment element to cause the articles in the encountering row to become aligned according to said contact surface, and a second position wherein a row of articles exiting said alignment conveyor clears said alignment element, wherein said means for effecting movement comprises pivot means for pivotally mounting said upstream end of said alignment conveyor for pivotal rotation about an axis which is at least generally parallel to said first conveying surface and at least generally perpendicular to said first direction of travel, and means for moving said downstream end of said alignment conveyor between said first and second positions by causing said alignment conveyor to pivot about said axis,

further comprising an upstream conveyor having an upstream end and a downstream end, said upstream conveyor having a second conveying surface and being positioned such that a row of articles exiting the downstream end of said upstream conveyor is received by said first conveying surface at the upstream end of said alignment conveyor and is conveyed by said first conveying surface to the downstream end of the alignment conveyor, second drive means for moving said second conveying surface at least generally in said first direction of travel at a second rate of movement which is less than said first rate of movement to thereby increase the distance between successive rows of articles on said first conveying surface as compared to the distance between successive rows of articles on said second conveying surface, wherein said second drive means comprises a horizontally positioned drive roll for said upstream conveyor, wherein the axis about which said alignment conveyor is pivotable is the longitudinal axis of said drive roll, and wherein said first drive means comprises a drive roll for said alignment conveyor and means for rotating said drive roll for said alignment conveyor responsive to the rotation of said drive roll for said upstream conveyor.

4,953,689

# **CONVEYOR BELT CLEANER**

Edwin H. Peterson; Harold M. Stetson, both of Neponset, and Robert T. Swinderman, Kewanee, all of Ill., assignors to Martin Engineering Company, Neponset, Ill.

Filed Sep. 2, 1986, Ser. No. 902,566

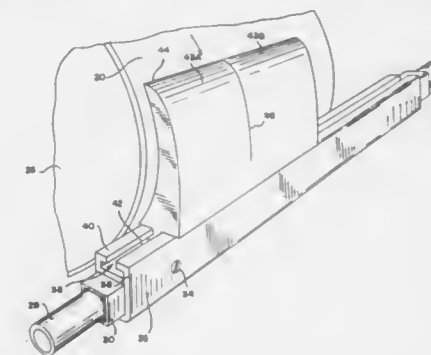
Int. Cl.<sup>5</sup> B65G 45/00

U.S. Cl. 198—497

14 Claims

1. A conveyor belt cleaning arrangement including support means positioned to support belt cleaner elements, a sleeve member mounted on said support means and selectively connectable thereto, one or more belt cleaner elements each having a scraping edge at one end thereof for engaging said conveyor belt and each having mounting means at the other end thereof for connecting said element to said sleeve member, wherein said sleeve member is formed of a plastic having a

high degree of lubricity and a low sliding coefficient of friction, said sleeve member defining a plastic sliding surface



adapted to facilitate removal and replacement of said cleaner elements.

4,953,690

# **CONVEYOR WITH SLIPPAGE STOPS ON THE CONVEYOR SURFACE**

Harry Herzke, Allensteiner, Fed. Rep. of Germany, assignor to Firma Ernst Siegling, Hanover, Fed. Rep. of Germany

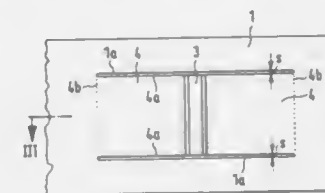
Filed Sep. 19, 1989, Ser. No. 409,091

Claims priority, application Japan, Sep. 29, 1988, 3833034

Int. Cl.<sup>5</sup> B65G 15/44

U.S. Cl. 198—690.2

3 Claims



1. A conveyor comprising: an endless elastic conveyor belt, said belt having a conveyor surface, guide rollers around which said conveyor belt passes to define a conveying portion and a returning portion of said belt, support means for supporting said returning portion of said conveyor belt, a plurality of parallel slits formed in said conveyor belt at longitudinally spaced intervals in the direction of travel of said belt, said slits defining a plurality of longitudinally spaced tongues in said conveyor belt, each of said tongues having two longitudinal free edges, and two transverse transition edges at opposite ends of said tongue whereat the tongue merges flush into said belt, and a plurality of stops spaced longitudinally apart on said conveyor surface for engaging material carried by said conveying portion of said conveyor belt to prevent or halt slippage of said material on said conveying portion, said stops being disposed on said tongues.

4,953,691

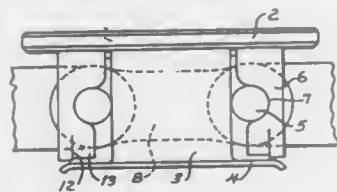
**CONVEYOR CHAIN AND ATTACHMENTS THEREFOR**  
Wolfgang Janzen, Wilndorf-Obersdorf, Fed. Rep. of Germany,  
assignor to Flexna Holland, B.V., Amsterdam, Netherlands  
Filed Jul. 22, 1988, Ser. No. 222,766

Claims priority, application Fed. Rep. of Germany, Jul. 23,  
1987, 3724354

Int. Cl.<sup>5</sup> B65G 17/14

U.S. Cl. 198—803.01

14 Claims



1. A roller chain conveyor and a detachable top plate assembly therefor, said top plate assembly comprising top plate base member means, a plurality of guide plate means, each depending from opposite sides of said base member means so as to overlap roller links of said chain conveyor, the lateral distance between said guide plate means being at least equal to the overall length of connecting pins of said roller links, at least four resilient spring-like tongue member means, each depending from said opposite sides of said base member means disposed about and separated by a vertical space from each of said guide plate means, each said tongue member means having yieldable contact with side bars of said roller links, recess means formed in each of said tongue member means, first and second pairs of said recess means having a coincident transverse axis and being adaptable to receive and maintain therein a one of said connecting pins, and top plate carrying means secured to said top plate base member means.

4,953,692

**DRIVE FRAME FOR A SCRAPER CHAIN CONVEYOR**  
Brian R. Stoppani, Doncaster, and Norman Cummings, Barnsley, both of England, assignors to Gullick Dobson Limited, Wakefield, England

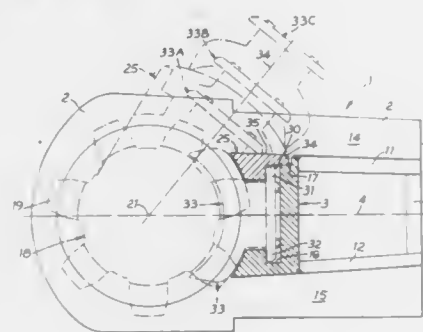
Filed Dec. 14, 1988, Ser. No. 284,102

Claims priority, application United Kingdom, Dec. 18, 1987,  
8729508; Apr. 21, 1988, 8809423

Int. Cl.<sup>5</sup> B65G 23/06

U.S. Cl. 198—834

28 Claims



1. A drive frame for a scraper chain conveyor comprising a pair of spaced-apart parallel sidewalls, a cross-member interconnecting said sidewalls by being welded thereto; a sprocket barrel assembly, at least one sprocket ring provided on said sprocket barrel assembly, at least one endless chain assembly of

said conveyor being adapted to engage said at least one sprocket ring; at least one seating surface provided on said sprocket barrel assembly, at least one seating surface provided on the cross-member, said at least one sprocket barrel assembly seating surface and said at least one cross-member seating surface being mutually engageable; at least one abutment face provided on said cross-member; at least one abutment face provided on said sprocket barrel assembly in close but spaced proximity from said cross-member abutment face to define at least one upwardly open pocket; and a releasable fastening means for securing said sprocket barrel assembly to said drive frame via said mutually engageable seating surfaces, that is lowerable into, and raisable from, said at least one pocket, and that is also actuatable and accessible from above whereby, after the lowering of said fastening means from above, actuation of said fastening means from above in a first direction, causes said at least one seating surface of said sprocket barrel assembly to be urged into tight seating engagement with said at least one seating surface of said cross-member and hence with said drive frame, and upon actuation of said fastening means again from above, in an opposite direction, causes said sprocket barrel assembly to be released from tight seating engagement with said cross-member and hence with said drive frame, whereupon said fastening means can be lifted from said at least one pocket to provide for access, disassembly and serving.

4,953,693

**MODULAR LINK CONVEYOR SYSTEM**

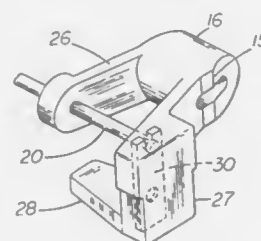
Jorgen Draebel, Copenhagen, Denmark, assignor to Span Tech Corporation, Glasgow, Ky.

Filed Jan. 23, 1989, Ser. No. 300,829

Int. Cl.<sup>5</sup> B65G 17/06

U.S. Cl. 198—853

27 Claims



1. A modular link conveyor system, comprising: a plurality of modular links, each link including an apex and two legs extending therefrom, said apex further including a slot passing transversely therethrough, said legs further terminating in a distal end portion, each said end including a hole passing transversely therethrough; a plurality of transverse connecting means, said connecting means passing through said slots and said holes to engage said modular links together and form a conveyor belt; conveyor belt guide means; said modular links including side links formed by the inclusion of a depending arm to said modular links for engaging said conveyor belt guide means, each said side link further including integral locking means for engaging said connecting means, said side links performing the dual function of retaining said connecting means in position and cooperatively engaging said conveyor belt guide means to allow said conveyor belt to traverse a bend; and drive means to impart motion to said conveyor.

4,953,694

**DISTILLING APPARATUS**

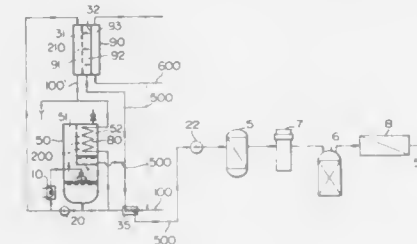
Nobuatsu Hayashi, Abiko; Sankichi Takahashi, Hitachi; Katsuya Ebara, Mito; Hideaki Kurokawa; Akira Yamada, both of Hitachi; Yasuo Koseki, Hitachi; Harumi Matsuzaki, Hitachi, and Hiroaki Yoda, Tsuchiura, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 942,795, Dec. 17, 1986,  
abandoned. This application Jun. 17, 1988, Ser. No. 208,212  
Claims priority, application Japan, Dec. 18, 1985, 60-282901;  
Feb. 5, 1986, 61-21938

Int. Cl.<sup>5</sup> B01D 61/00

U.S. Cl. 202—180

5 Claims



1. A distilling apparatus for producing ultrapure water by condensing vapor generated from raw water, the distilling apparatus comprising: means for defining a closed cylindrical main distilling body; raw water tank means formed in said main distilling body for collecting raw water therein; first heating means for heating and hence degassing the raw water at a pressure approximately equal to atmospheric pressure; means for feeding the degassed water into the closed cylindrical main distilling body; second heating means for heating the degassed water fed thereto at a pressure approximately equal to atmospheric pressure; a hydrophobic porous film means arranged in said closed cylindrical main distilling body so as to divide the same into an evaporation chamber means for generating vapor from the degassed water heated by said second heating means and a condensation chamber means for receiving the vapor from the evaporation chamber means after passing throughout the hydrophobic porous film means into said condensation chamber means; means disposed in said condensation chamber means for condensing the vapor passed through the hydrophobic porous film means into said condensation chamber means; and distilled water tank means formed in said condensation chamber means for collecting distilled water from the condensing means.

4. A distilling apparatus for producing ultrapure water from raw water, the distilling apparatus comprising: main distilling body means separated into an evaporator chamber means and a condensation chamber means, said main distilling body means including a raw water tank in a lower portion of the evaporation chamber means and a distilled water tank in a lower portion of said condensation chamber means; means for introducing raw water into said evaporator chamber means; heating means for heating said water being introduced to a temperature above a saturation temperature of said raw water at a pressure approximately equal to atmospheric pressure; means for generating vapor from said heated raw water introduced to said evaporation chamber means; a hydrophobic porous film means for allowing said vapor to pass from said evaporation chamber means to said conden-

sation chamber means without allowing liquid to pass from said evaporation chamber means to said condensation chamber means; means disposed in said condensation chamber means for condensing said vapor in said condensation chamber means such that the vapor becomes distilled water and is collected in said distilled water tank; a thermobar vaporization means connected with said main distilling body means, said thermobar vaporization means comprising: raw water chamber means for receiving raw water; air chamber means located next to said raw water chamber means; a cooling chamber means located next to said air chamber means; a hydrophobic porous film means for separating said raw water chamber means and said air chamber means; a cooling surface separating said air chamber means and said cooling chamber means; means for feeding raw water from said condensation means to said raw water chamber means; and means for feeding raw water from said raw water chamber means to said condensation chamber means.

4,953,695

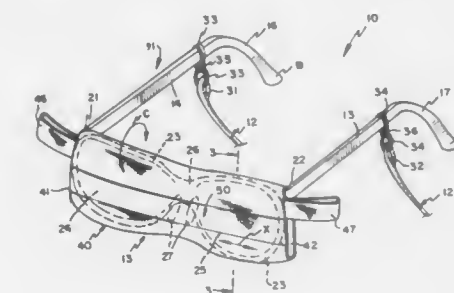
**PROTECTIVE COVER FOR EYEGLASSES**

Brett C. Tallman, Lupfer Ave., Box 1261, Whitefish, Mo. 59937  
Filed Sep. 22, 1989, Ser. No. 410,785

Int. Cl.<sup>5</sup> B65D 85/38

U.S. Cl. 206—5

6 Claims



1. The combination of a pair of eyeglasses and a protective cover comprising a pair of eyeglasses defined by a frame front, lenses, bridge, nose pads and temples; a protective cover comprising a generally tubular member having axially opposite open ends, said tubular member being constructed from generally resilient material, said tubular member in a first operative condition of said combination snugly housing therein at least said frame front, lenses, bridge and nose pads, an elongated retainer having opposite ends secured one to each of said temples, and said tubular member in a second operative condition of said combination being in external sliding telescopic relationship to said frame front, temples and elongated retainer whereby said tubular member can be slipped to and from said front frame and to and from said elongated retainer generally along said temples.

4,953,696

**DETACHABLE STATIONERY CASE RACK**

Tony Huang, No. 165, Tzslu N. Rd., Chang-Hwa City, Chang-Hwa Hsien, and Johnny Huang, 7F-1, No. 101, Sec. 2, Ho-Ping E. Rd., Taipei, both of Taiwan

Filed Oct. 10, 1989, Ser. No. 419,191

Int. Cl.<sup>5</sup> A45C 11/34

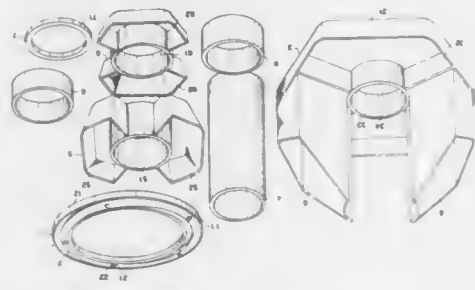
U.S. Cl. 206—214

3 Claims

1. A detachable stationery case rack, including: a base cushion having ring-shaped body comprising raised



- side-wall, and a plurality of bottom legs covered with elastic material;
- a circular packing having an outer diameter slightly smaller than said base cushion and comprising a plurality of holes made thereon for insertion therein of equal number of balls respectively to permit rotating against said base cushion when it is mounted thereon;
- a bottom case being an equilateral polygonal case divided by division walls into several compartments and comprising hollow shaft raised from the bottom in the center;
- a central column having a tubular structure specially arranged in shape and size suitable for insertion into said hollow shaft of said bottom case;
- a middle rack comprising a central hollow collar with lateral cases extending therefrom, which central hollow collar



- being arranged in size suitable for insertion therethrough of said central column;
- an upper rack comprising a central hollow collar with lateral cases extending therefrom, which central hollow collar being arranged in size suitable for insertion therethrough of said central column;
- an upper cap being a ring-shaped cap comprising inner circular wall specially arranged in size for insertion into said central column to let the upper cap be firmly secured thereto; and
- two side cases being bottom enclosed cases having a section matching with the compartments of said bottom case in which they stand, and said central column, said middle rack and said upper rack, of which the height does not exceed by said central column.

4,953,697

## SELF-RETAINING GOLF BAG COVER EMPLOYING PLAIN SLEEVE

Jack M. Stanley, 6989 Polvadero Dr., San Jose, Calif. 95119  
Filed Sep. 15, 1989, Ser. No. 407,910

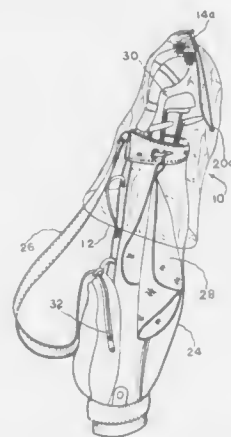
Int. Cl.<sup>5</sup> A63B 55/00; B65D 65/02

U.S. Cl. 206—315,400

2 Claims

1. A covered container comprising a container and a cover for protecting objects in said container comprising:
- (a) a container, said container comprising a golf bag having a plurality of golf clubs in said bag, said bag having an open top end through which said clubs can be removed from said bag, said cover being positioned over said open top end of said bag;
- (b) a cover comprising a tubular sleeve of flexible material for slipping over and surrounding at least a top part of said container, said sleeve having a loose, open bottom that is plain, continuous, smooth, imperforate, and free of any fastening means or discontinuity;
- (c) said sleeve having a drawcord mounted in a top portion thereof so that said top can be opened and closed by means

of said drawcord so as to provide access to the top of said container or cover the top of said container,



- (d) said cover having a uniform diameter of about 46 centimeters, a length of about 66 centimeters, and a thickness of about 100 microns.

4,953,698

## UNITARY CARTON SYSTEM FOR FANS

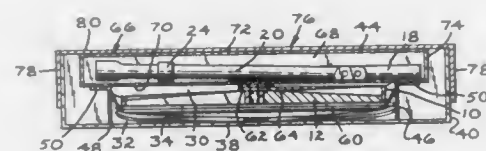
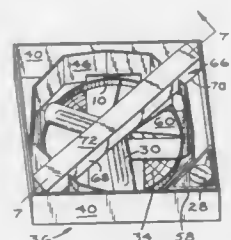
Daniel A. Gregorich, and Frank E. Breining, both of Jackson, Mich., assignors to Airmaster Fan Company, Jackson, Mich.

Filed Feb. 14, 1990, Ser. No. 487,456

Int. Cl.<sup>5</sup> B65D 85/68

U.S. Cl. 206—319

10 Claims



1. A unitary carton system for shipping a floor mounted fan consisting of a column supporting base, an elongated column, an electric motor, a fan blade assembly, and a pair of nestable blade guards each having concave and convex sides comprising, in combination, a rectangular carton having a closed bottom panel, side walls and an open upper end, intersecting side walls defining first and second pairs of opposed interior corner regions, an interior central region defined on said closed bottom panel receiving the blade guards wherein the blade guards are nested within each other such that the convex side of the blade guards is disposed toward said bottom panel and the concave side of the blade guards is disposed toward said carton open end, the column supporting base being received within the nested blade guards located adjacent the concave side of the blade guard closest to said carton open end, the fan blade assembly being located adjacent the base intermediate the base and said carton open end, column structure supporting means defined within said carton extending from said bottom panel

and located between the nested blade guards and said carton side walls, column structure supporting ledges defined on said column structure supporting means adjacent said first pair of opposed corner regions whereby column structure supported on said ledges is diagonally oriented within said carton, said ledges being spaced from said bottom panel a distance whereby column structure supported upon said ledges is closely superimposed over the blade assembly, motor receiving and confining means defined in one of said second pairs of corner regions receiving a motor therein, and means maintaining said column structure upon said column structure supporting ledges whereby said column structure maintains the blade guards, base and blade assembly in the aforesaid stacked relationship during shipping.

9. A unitary carton system for shipping a floor mounted fan consisting of a column supporting base, an elongated column, an electric motor, a fan blade assembly, and a pair of nestable blade guards each having concave and convex sides comprising, in combination, a rectangular carton having a closed bottom panel, side walls and an open upper end, intersecting side walls defining first and second pairs of opposed interior corner regions, an interior central region defined on said closed bottom panel receiving the nested blade guards, column supporting base and blade assembly in a stacked relationship, motor receiving and confining means defined in one of said interior corner regions, column structure supporting means defined within said carton, column structure supported upon said supporting means superimposed over the stacked blade guards, base and blade assembly in contiguous relationship thereto and means maintaining said column structure upon said supporting means whereby said column structure and stacked components will be retained during shipping.

4,953,699

## TAPE STRUCTURE PROVIDED WITH ELECTRONIC COMPONENTS

Akira Mohri, and Toshikazu Kato, both of Fukui, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

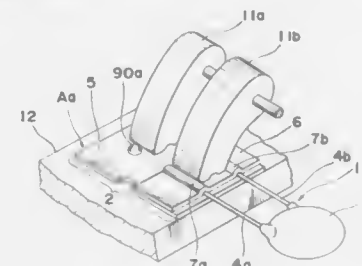
Filed Dec. 20, 1985, Ser. No. 811,664

Claims priority, application Japan, Dec. 24, 1984, 59-200905[U]

Int. Cl.<sup>5</sup> B65D 73/02

U.S. Cl. 206—330

9 Claims



1. A tape structure having first and second half sides defined therein and being provided with electronic components each having one or more terminal legs, for supplying the components to an automatic component mounting machine having at least one pressing arm for pressing at least the second half side of the tape structure, the tape structure comprising:

- (a) a base tape having a width;
- (b) an attachment tape having a width which is approximately half the width of said base tape, said attachment tape extending parallel to and along said first half side of said base tape;
- said base tape and said attachment tape being bonded together so as to support said terminal legs of said electronic components between said base tape and said attachment tape and thereby defining corrugations in said attachment tape where said terminal legs are located; and
- (c) projection means provided on said second half side of

said base tape, said projection means being configured and located for engaging the pressing arm so as to prevent rotation of the tape structure while said tape structure is pressed by said pressing arm.

4,953,700

## DISPLAY CARD FOR A BATTERY PACKAGE

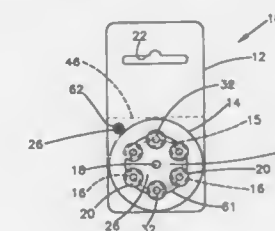
Jeffery L. DeDino, Kirtland, Ohio, assignor to The Shelby Paper Box Company, Canterbury, Ohio

Filed Feb. 7, 1990, Ser. No. 477,248

Int. Cl.<sup>5</sup> B65D 73/00

U.S. Cl. 206—333

16 Claims



1. An apparatus for supporting a plurality of batteries for movement in a circular path and for enabling electrical testing of each of the plurality of batteries, said apparatus comprising:
- a first panel having a conductive surface thereon;
- a second panel overlying said conductive surface of said first panel and having a non-conductive outer surface thereon and having a first opening extending therethrough to expose a portion of said conductive surface of said first panel, said first opening in said second panel being located relative to the circular path through which the batteries move so that at least one of the plurality of batteries in the circular path is partly in contact with said portion of said conductive surface and partly in contact with said non-conductive surface; and
- thereby enabling electrical testing of the one battery by a first test probe which engages the one battery and a second test probe which engages said conductive surface of said first panel.

4,953,701

## FLUORESCENT TUBE CARRIER

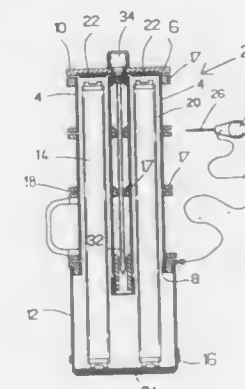
Paul T. Maddock, 943 Raymo Rd., Windsor, Ontario, Canada N8Y 4A7

Filed Aug. 16, 1989, Ser. No. 394,532

Int. Cl.<sup>5</sup> B65D 85/42

U.S. Cl. 206—419

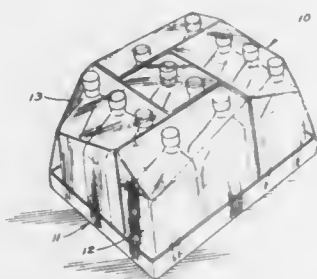
11 Claims



1. For use with a plurality of fluorescent tubes, a carrier for

transporting or disposing of said tubes, said carrier comprising a plurality of capsules, one for each tube desired to be carried, each capsule having two ends, at least one end of each capsule being at least partially closed by a cover, the cover of said at least one end of each capsule being removable so that said end can be opened, with means on said carrier for breaking independently, if desired, the tube located in any particular capsule while not breaking, if desired, the tubes in other capsules, all of said capsules being held in a fixed relationship to one another by a plurality of spacers located along the length of the capsules, each spacer having openings for each of the capsules, said carrier having a rod that is long enough to force pieces of a broken fluorescent tube to an area of the carrier where the pieces can be disposed of, each spacer having an additional opening that provides a location for storing said rod on the carrier.

**4,953,702**  
**STACKER DEVICE FOR A PACKAGE**  
Robert M. Bryan, P.O. Box 35664, Minneapolis, Minn. 55435  
Filed Sep. 1, 1989, Ser. No. 402,223  
Int. Cl.<sup>5</sup> B65D 71/08, 5/48, 21/02  
U.S. Cl. 206—432



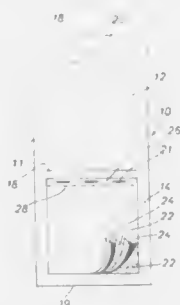
1. A stacker device for a package of a plurality of identical plastic or paper containers supported in a tray or box, said device comprising:

- (A) a first rectangular segment of stiff sheet material having a relatively narrow end section, a center section and a relatively wider end section connected along parallel vertically extending fold lines, the width of said sheet material being at least equal to the height of the plastic or paper containers to be packaged;
- (B) a second rectangular segment of stiff sheet material similar to said first segment;
- (C) a third and fourth rectangular segment of stiff sheet material, the height of said segments being the same as the height of said first and second segments;
- (D) first and second laminated joints between the inner surfaces of each of the narrow end sections of said first and second segments and the outermost edge surface of the wider end sections of the other of said segments; and
- (E) third and fourth laminated joints between the outer surface of each of the center sections of said first and second segments and one end of one of said third and fourth segments.

**4,953,703**  
**ANTIBACTERIAL PROTECTIVE ELEMENT FOR MICROPHONES AND TELEPHONE RECEIVERS, AND PACKAGE CONTAINING SAID ELEMENT**  
Lerza Virginio, Via Vespucci 75, 10129 Turin, Italy  
Filed May 18, 1989, Ser. No. 353,721  
Claims priority, application Italy, Jun. 1, 1988, 67506 A/88  
Int. Cl.<sup>5</sup> B65B 75/00

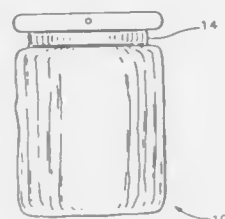
U.S. Cl. 206—451  
1. A package of antibacterial protective elements for microphones and telephone receivers, comprising a plurality of antibacterial protective elements each of which is formed of a flexible non-perforated self-adhering thermoplastic film of a

size substantially corresponding to that of the microphones and telephone receivers, and a plurality of anti-adhesive separating sheets interposed between said antibacterial protective elements to form a stack therewith and prevent them from adhering to each other; a foldable cover enclosing said stack; and



retaining means, said antibacterial protective elements and said separating sheets being all secured along one side thereof by said retaining means to said cover inside thereof, said cover being formed of a pair of leaves, one of said leaves being provided with flexible closure means.

**4,953,704**  
**PLASTIC TRASH BAG**  
Alfred J. Cortese, 5615 Redwood St., San Diego, Calif. 92105  
Filed Mar. 13, 1989, Ser. No. 323,542  
Int. Cl.<sup>5</sup> B65D 33/30  
U.S. Cl. 206—493

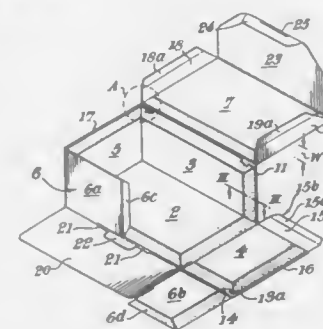


1. An improved trash bag comprising: a trash bag formed from thin sheet plastic material, said trash bag having a closed bottom end, lateral side walls, and an open top end that defines a top edge; elastic means secured to said trash bag adjacent its top edge that automatically gathers said top edge inwardly thereby closing its top end, said elastic means being easily stretched to open the top end of said trash bag to provide access to its interior; and said trash bag being mounted on a display board formed of a planar sheet of material having a top edge, laterally spaced side edges and a bottom edge, an aperture is formed adjacent said top edge for hanging said display board, said display board being inserted into the interior of said trash bag and its elastic means gripping the side edges of said display board adjacent its top end to hold it thereon.

**4,953,705**  
**PACKAGE HAVING DETENT-ENGAGED CUSHIONING LINING**  
David L. Evamy, Goring-by-Sea, England, assignor to Psychopax Limited, Worthing, England  
Filed Jan. 23, 1989, Ser. No. 298,928  
Claims priority, application United Kingdom, Jan. 22, 1988, 881393

Int. Cl.<sup>5</sup> B65D 81/10  
U.S. Cl. 206—594

20 Claims



1. A package comprising an outer container formed of sheet material and an inner lining formed of a cushioning material, the package including at least one elongate slot having an open entrance and two longitudinal side faces, a first longitudinal side face of the said at least one slot being defined by the sheet material of the outer container and a second longitudinal side face of the said at least one slot being defined by the cushioning material of the inner lining, the said second longitudinal side face including an abutment surface oriented substantially perpendicularly to the plane of the said first side surface of the said at least one slot and facing away from the said entrance of the said at least one slot, and the said outer container including a tab formed from the said sheet material of the outer container and having a detent, the said tab being capable of entering said at least one slot through said entrance to a position in which said detent engages said abutment surface to resist withdrawal of said tab from said at least one slot.

**4,953,706**  
**MECHANICAL OIL CAN SEAL BREAKER**  
Don Piccard, 1445 East River Rd., Minneapolis, Minn. 55414  
Filed Nov. 17, 1989, Ser. No. 437,756  
Int. Cl.<sup>5</sup> B65D 3/26  
U.S. Cl. 206—603

2 Claims



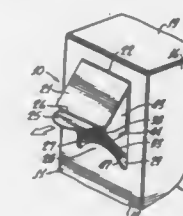
1. In combination with a container having a generally cylindrical configuration with a bottom wall, a circular spout-like top with a closure cap adapted to be threadably engaged about a planar annular seal surface therearound and with said container including flexible side panels with a front panel, rear

panel and end panels depending from said top and joining with said bottom wall, a closure film forming a secondary seal with said planar annular seal surface and being adhesively bonded to the surface of said annular seal surface, and means disposed within said container for achieving perforation of said closure film forming said secondary seal upon innerdeflection of said flexible end panels:

- (a) said seal film perforation means comprising first and second elongated rod members pivotally joined together at an apex in generally right angular relationship, one to the other;
- (b) said first rod member having an anvil means coupled to the free tip thereof and with said anvil being normally disposed generally at the juncture between one of said end panels and the bottom closure wall;
- (c) said second rod member having a cutter blade coupled to the free tip end thereof and with said cutter blade being normally disposed along the interior of said spout-like tip adjacent to the innersurface of said closure film;
- (d) the arrangement being such that upon the application of inwardly directed pressure to said end panels sufficient for inward deflection thereof, the angular relationship between said first and second elongated rod at said apex increases to cause outward movement of said second rod member to force said cutter blade to move more outwardly of said spout and perforate said closure film.

**4,953,707**  
**BOX WITH POURING SPOUT**  
Sam Wein, 5061 Aegina Way, Oceanside, Calif. 92056  
Filed Jul. 3, 1989, Ser. No. 374,739  
Int. Cl.<sup>5</sup> B65D 5/54  
U.S. Cl. 206—621.4

23 Claims



1. A box having a pouring spout comprising a cardboard structure defining a container having two side panels, a top panel, a bottom panel and two end panels, one of said panels including a first outer layer and a second layer inwardly of said first layer, said first layer including a first flap pivotal about one edge thereof, said second layer including a second flap pivotal about one edge thereof, said second flap including means for permitting bending of said second flap at a location spaced from said one edge thereof, said first flap overlying and being secured to said second flap between said one edge of said second flap and said location, said structure including a third layer inwardly of said second layer, said first layer including a portion overlying a portion of said second flap, said third layer having an opening covered by said second flap, whereby to achieve an open position, said first flap is pivoted about said one edge thereof, said second flap is caused to pivot about said one edge of said second flap, said second flap is bent at said location, said portion of said second flap is withdrawn from said portion of said first layer overlying the same, and said opening in said

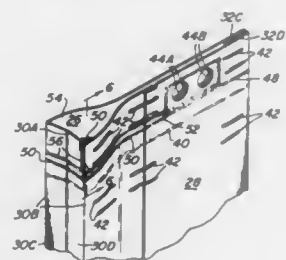


third layer is uncovered to permit dispensing through said opening in said third layer.

#### 4,953,708 FLEXIBLE PACKAGE WITH POUR SPOUT AND HANDLE

Jeffrey S. Beer, Perkiomenville; Michael D. Gracie, Sr., Kennett Square, and Tullio U. Vignano, Gwynedd Valley, all of Pa., assignors to Fes-co System USA, Inc., Telford, Pa.

Filed Aug. 23, 1989, Ser. No. 398,204  
Int. Cl.<sup>3</sup> B65B 33/10, 33/20, 33/22, 33/38  
U.S. Cl. 206—632 9 Claims



1. A flexible tubular package having a longitudinal axis and formed from flexible sheet material, said package comprising first and second panels disposed opposite each other and connected on laterally opposite sides thereof, said package having a sealed lower end portion and an upper end portion terminating in a free edge, said upper end portion of said package being folded over itself along a transverse fold line to form a flap with the portion of said first panel between said free edge and said fold line abutting the contiguous portion of said first panel below said fold line, said abutting portions being releasably secured to each other by first releasably securable adhesive means interposed therebetween, said flap including at least one opening extending through said first and second panels to form a handle for said package, a first seal line extending transversely across said panels adjacent said fold line from one of said sides to an intermediate point, a second seal line extending transversely across said panels adjacent said fold line from said intermediate point to the other of said sides, said first seal line permanently sealing said first and second panels together therealong, said second seal line being peelable for releasably sealing said first and second panels together therealong, said first releasably securable adhesive means being peelable to enable said flap to be unfolded to provide access to said second seal line, whereupon said second seal line can be peeled apart to form a pour spout for said package.

#### 4,953,709 MULTI-STAGE MEANS FOR SORTING MIXTURES OF SOLID MATERIALS

Hans Kaufmann, Flaesheim, Fed. Rep. of Germany, assignor to Kaufmann GmbH, Flaesheim, Fed. Rep. of Germany  
Filed Apr. 26, 1989, Ser. No. 344,311

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1988, 3813990

Int. Cl.<sup>3</sup> B03B 7/00, 9/00

U.S. Cl. 209—44 10 Claims

1. A multi-stage apparatus for sorting a mixture of solid materials into lightweight and heavy materials, with said mixture having lumpy, granular, and pulverous constituents of differing specific gravity, and being, for example, mixtures of coal and mine waste or ore and refined ore, said apparatus comprising:

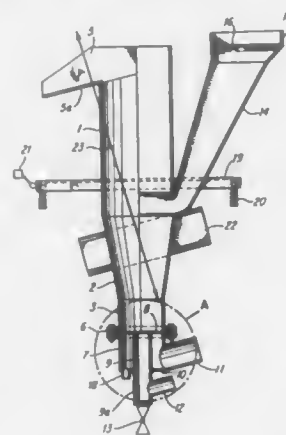
a slim, upright container for receiving said material that is to be sorted, with said container comprising a cylindrical upper portion, a central downwardly tapering conical portion, and a cylindrical lower portion, with said entire

container being mounted for vibration on resilient support element means;  
vibrator means for vibrating said container in a linear manner along an axis that extends essentially transverse to the horizontal;

an upwardly extending feed chute, with said upper container portion having a top end, and a bottom end that is provided with an opening to which said feed chute is connected, said feed chute being provided with a feed hopper that is disposed at the level of said top end of said upper container portion;

a discharge channel for lightweight material disposed on said top end of said upper container portion;

a collecting container secured to said lower container portion via a flange connection that has a plane of separation, with said collecting container having a base remote from said flange connection;



a tubular member that extends centrally through said collecting container, with said tubular member having a top end, and remote therefrom a part that extends downwardly beyond said base of said collecting container and forms a bottom end of said tubular member;

an annular screen that is secured in said plane of separation of said flange connection and through which extends said top end of said tubular member to communicate with said lower container portion;

a controllable closure means provided at said bottom end of said tubular member;

a first upwardly extending air supply tube connected to and communicating with said collecting container;

a second upwardly extending air supply tube connected to and communicating with said downwardly extending part of said tubular member; and

a short pipe attached to said base of said collecting container for the discharge of fine material therefrom.

#### 4,953,710 AUTOMATED APPARATUS FOR INSPECTING COLUMNAR BODIES BY EDDY CURRENT METHOD

Chung-Mei Chen; Jena Fu Yang; Weng-Jay Lee; Tsai-Sheng Lin, and Yung-Hsing Tsay, all of Kaohsiung, Taiwan, assignors to China Steel Corporation, Taiwan

Filed Dec. 21, 1988, Ser. No. 287,022

Int. Cl.<sup>3</sup> B07C 5/00, 5/344, 5/38

U.S. Cl. 209—518 8 Claims

1. An automated apparatus for inspecting columnar bodies by an eddy current method, comprising:

a stockup zone for storing a plurality of columnar bodies, said stockup zone being provided with feed means for feeding out each of the plurality of columnar bodies one by one;

a feed zone disposed near said stockup zone for receiving the columnar bodies fed from said stockup zone, said feed

zone being provided with transfer means for transferring the columnar bodies;

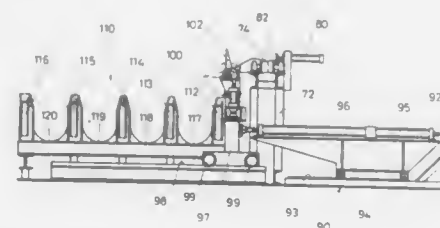
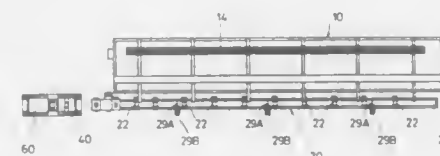
eddy current inspection means disposed downstream of said feed zone and in alignment with said feed zone;

guide means disposed between said feed zone and said eddy current inspection means for receiving the columnar bodies fed from said feed zone and guiding the columnar bodies to be inspected into said eddy current means in a proper manner;

computer means coupled to said eddy current inspection means for sampling the signals generated by said eddy current inspection means for each predetermined distance travelled by the columnar bodies and processing the signals sampled to estimate the classes of the columnar bodies inspected and subsequently sending out class signals in accordance with the estimate of the classes;

a discharge zone disposed downstream of said eddy current inspection means for the columnar bodies coming out from said eddy current inspection means, said discharge zone being provided with push means for discharging said columnar bodies from said discharge zone;

a distribution zone disposed near said discharge zone, said distribution zone being provided with distribution means and a plurality of storage areas; and



control means respectively coupled to said stockup zone, said feed zone, said eddy current inspection means, said guide means, said computer means, said discharge zone and said distribution zone for controlling said feed means to feed each of the plurality of columnar bodies into said feed zone one by one at a proper timing;

said control means further controlling said transfer means to transfer the columnar bodies toward said eddy current inspection means and to conduct the leading end portion of a following columnar body to urge the trailing end portion of a leading columnar body so as to impel the columnar bodies though said eddy current inspection means to reach said discharge zone, controlling said push means to push the columnar body in said discharge zone onto said distribution means, responding to the class signals sent from said computer means to enable said distribution means to allocate the columnar body on said distribution means into one of said storage areas;

said distribution means including a carriage and a first actuation means coupled to said carriage and to said control means and enabled by said control means to move said carriage among the storage areas.

#### 4,953,711 METHOD AND DEVICE FOR ELIMINATING IMPERFECT CIGARETTES IN CONNECTION WITH A CIGARETTE PACKAGING MACHINE

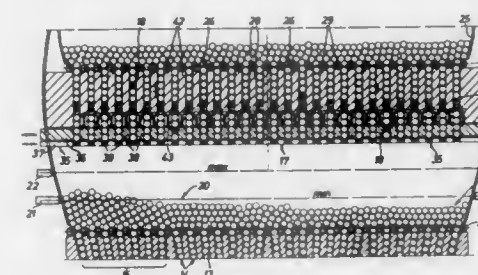
Heinz Focke, Verden, Fed. Rep. of Germany, assignor to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany  
Continuation of Ser. No. 60,887, Jun. 12, 1987, abandoned. This application Mar. 24, 1989, Ser. No. 330,922

Claims priority, application Fed. Rep. of Germany, Jun. 20, 1986, 3620735

Int. Cl.<sup>3</sup> B07C 5/00

U.S. Cl. 209—535

5 Claims



1. A cigarette magazine (12) comprising:  
a plurality of vertical magazine chutes (13) for vertically conveying a plurality of vertical columns (14) of horizontally disposed, elongated cigarettes whose longitudinal dimensions lie in a horizontal plane, and for forming and discharging groups of the cigarettes; and  
a testing unit means (17) integral with said magazine and located vertically above said magazine chutes (13) and extending horizontally through the cigarette magazine (12) for detecting and separating out defective from non-defective cigarettes;  
wherein said testing unit means (17) comprises:  
for the purpose of accommodating a plurality of vertical test columns (26) of cigarettes (11), a plurality of respective vertical, straight-walled, parallel test chutes (28) which are defined by a plurality of parallel, horizontally spaced, vertical dividing walls (42) and which correspond in number to the number of said magazine chutes (13);  
at least two testing means (30), associated with each test chute (28), for simultaneously testing two cigarettes (11), disposed one on top of another, in each test chute;  
cigarette delivery and discharge means (35) located underneath said test chutes (28) in a region in which tested defective cigarettes are ejected from the magazine in the direction of their longitudinal dimension and in which tested, non-defective cigarettes are released downwards inside the magazine (12), said cigarette delivery and discharge means (35) comprising only first and second movable guiding and supporting cog plate means (36 and 37) which are disposed in, and are movable relative to one another and relative to said test chutes (28) in, respective vertically spaced horizontal planes so that said first cog plate means (36) is above said second cog plate means (37);  
said first cog plate means (36) being disposed immediately underneath said test chutes (28) and having vertically extending cog webs (38) with the same horizontal spacing as that of said dividing walls (42); said cog webs (38) having a test position in which said cog webs (38) are vertically aligned with said test chutes (28) for supporting respective said test columns (26) and retaining two previously received and tested cigarettes between adjacent cog webs (38) during testing of the cigarettes in said test chutes (28); and said cog webs (38) having an initial position in which said cog webs (38) are vertically aligned with said dividing walls (42) for receiving said two previously tested cigarettes at a time between adjacent cog webs (38);  
said second cog plate means (37) having support webs (39), with the same horizontal spacing as said cog webs (38),

1. An improved multiple garment hanging device for simultaneously hanging and storing several articles of clothing or the like on a clothes hanger rod, said garment hanging device being of the type which includes a rigid bar, said rigid bar having a plurality of holes extending therethrough for the receipt of clothes hanging elements therein, a pair of hooks pivotably mounted at opposite ends of said rigid bar, said pair of hooks being substantially alignable toward each other for being held by a human hand for supporting the garment hanging device at least during insertion of the clothes hanging elements in said holes of said rigid bar, said improvement comprising:

    said rigid bar having a central plane and a longitudinal axis lying within said central plane;

    said plurality of holes in said rigid bar being separated one from the other and displaced substantially along said longitudinal axis;



each of said holes extending substantially perpendicular to said central plane;  
 said rigid bar having a first transverse dimension within said central plane, said first transverse dimension being perpendicular to said longitudinal axis at each of said holes;  
 said rigid bar having a second transverse dimension within said central plane, said second transverse dimension being perpendicular to said longitudinal axis in an area thereof between said holes;  
 said first transverse dimension being greater than said second transverse dimension;  
 said rigid bar having a pivot hole at each of said opposite ends thereof; said pivot hole extending substantially perpendicular to said central plane;  
 each of said pair of hooks lying substantially along a circle, said circle having a center;  
 said each of said pair of hooks extending along a substantial portion of said circle to have a free end and a pivot end; said pivot end of said hook having a pivot axis;  
 said circle having a portion being substantially adjacent to said pivot axis;  
 said pivot axis being substantially tangential to said portion of said circle;  
 said pivot axis being disposed within said pivot hole of said rigid bar with said center of said circle of said hook being located within said central plane of said rigid bar during relative rotation of said pivot axis within said pivot hole;  
 said hook having a first bearing member substantially at one side of said pivot axis and a second bearing member substantially at the other side of said pivot axis;  
 said rigid bar having a first side and a second side which are substantially parallel with the central plane;  
 said first bearing member including an annular surface substantially perpendicular to said pivot axis for bearing against said first side of said rigid bar at said pivot hole;  
 said second bearing member being disposed against at least a portion of said second side of said rigid bar at said pivot hole;  
 said pivot axis including slot means at said second bearing member for having provided means for inward deflection of said second bearing member during insertion of said pivot axis in said pivot hole during assembly; and  
 said central plane for extending vertically below the clothes hanger rod when both of said hooks are engaged with the clothes hanger rod and said central plane for extending vertically below the clothes hanger rod when only one of said hooks is engaged with the clothes hanger rod.

4,953,718

## CLOTHES HANGING ASSEMBLY

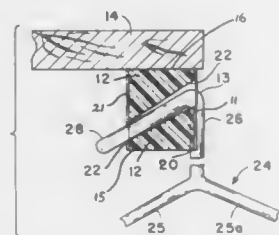
James C. Graff, and Frederick K. Robertson, both of Williamsburg, Va., assignors to Paul B. Austin and Charles J. Graff, both of Williamsburg, Va.

Filed Jun. 14, 1989, Ser. No. 365,796

Int. Cl.<sup>5</sup> A47H 1/00

U.S. Cl. 211-123

9 Claims



1. A clothes hanging assembly comprising in combination: a clothes hanger support bar having a top surface, a bottom surface and a first and a second side surface, a plurality of spaced, vertically extending, grooves extend-

ing from said bottom surface along said first side surface to a point thereon short of said top surface,  
 each said vertically extending groove merging with an angularly directed through opening leading from said first side surface downwardly through said second side surface at a point short of said bottom surface.

a plurality of clothes hangers, each having a vertical section thereon received by one of said vertically extending grooves and a hook section extending from said vertical section at an acute angle thereto and mating with, and releasably retained by, said angularly directed through opening to thereby permit hanging of clothes on said hanger in spaced adjacency relative to each other while preventing relative horizontal movement thereof.

4,953,719

## ARTICLE ORGANIZER DISPLAY UNIT

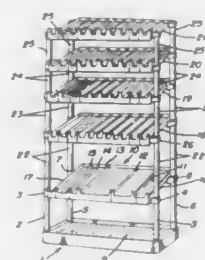
William S. Spamer, Roswell, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed Oct. 3, 1989, Ser. No. 416,345

Int. Cl.<sup>5</sup> A47F 43/00

U.S. Cl. 211-188

8 Claims



1. An article organizer display unit comprising a stack of at least two vertically spaced shelves, a plurality of sockets each having a mounting bracket including a base plate, a cradle structure and a tubular cavity, said cradle structure having a pair of support arms secured respectively to opposite ends of said base plate and arranged in enveloping relation to said tubular cavity, some of said sockets being arranged with their mounting brackets secured about the periphery of one of said shelves and others of said sockets being arranged with their mounting brackets secured about the periphery of the other of said shelves, and a plurality of vertically disposed tubular posts arranged with their ends in engagement with the tubular cavities of the sockets associated with one shelf and the shelf immediately above said one shelf and determining the vertical space therebetween, the axes of the tubular cavities associated with at least one of said shelves being perpendicular to the plane of said one shelf and the axes of the tubular cavities associated with at least one other of said shelves being disposed at an acute angle to the plane of said one other shelf.

4,953,720

## CRANE AND METHOD FOR USING CRANE

Tadashi Okano, and Tadayoshi Honda, both of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Tokyo, Japan

Filed Oct. 17, 1989, Ser. No. 422,950

Claims priority, application Japan, Oct. 21, 1988, 63-265855 Int. Cl.<sup>5</sup> B66C 23/34

U.S. Cl. 212-176

7 Claims

1. A crane for conveying construction elements comprising:  
 (a) a base;  
 (b) a driving body for driving and controlling the crane disposed on the base rotatable in a horizontal plane;  
 (c) an articulated arm attached to the driving body pivotable in a vertical plane, the arm being folded and extended in a vertical plane;

(d) a clutching means for clutching the construction elements, the clutching means being tiltably and detachably connected to a forward end of the arm; and



(e) a fixing means tiltably and detachably connected to the forward end of the arm as a substitute for the clutching means, the fixing means being capable of being fixed to the construction, whereby the driving body can be moved while the fixing means is fixed to the construction.

4,953,721

## ANTI-SWAY CRANE REEVING APPARATUS

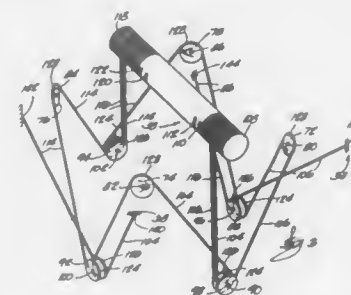
Vilem Folt, Greenfield, Wis., assignor to Harnischfeger Corporation, Brookfield, Wis.

Filed Dec. 9, 1988, Ser. No. 281,590

Int. Cl.<sup>5</sup> B66C 13/06

U.S. Cl. 212-147

15 Claims



1. A reeving apparatus for a crane having an overhead frame, winding drum means mounted on the frame, and a lifting beam positioned below the frame and subject to sway forces and movement transverse to the vertical comprising:  
 a plurality of spaced-apart rotatable sheaves affixed to the lifting beam, each of said sheaves having first and second grooves; and  
 a plurality of rope means affixed to the drum means and overhead frame and wrapped around the sheaves for supporting the lifting beam, each of the plurality of rope means including a pair of first and second rope means, the first and second rope means both extending to and [wrapped] wrapping around a different one of the plurality of sheaves respectively in the first and second grooves of the one of the sheaves for generating friction forces with said sheaves which dissipates the energy of the swaying forces on the lifting beam.

4,953,722

## CRANE AND LIFT ENHANCING BEAM ATTACHMENT WITH MOVEABLE COUNTERWEIGHT

Thomas K. Becker, Manitowoc; Terry S. Casavant, Two Rivers; P. Ralph Helm, Manitowoc; Terry L. Petzold, Kiel; Michael J. Wanek, Two Rivers, and Art G. Zuehlke, Manitowoc, all of Wis., assignors to The Manitowoc Company, Inc., Manitowoc, Wis.

Filed Nov. 9, 1988, Ser. No. 269,222

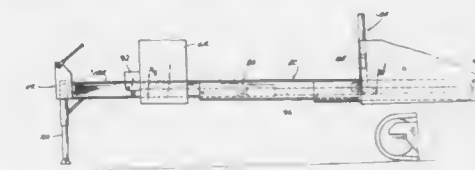
Int. Cl.<sup>5</sup> B66C 23/76

U.S. Cl. 212-156

37 Claims

1. An attachment for increasing the lifting capacity of a

crane where the crane includes  
 a counterweight,  
 a mobile lower works,  
 an upper works mounted on the lower works and including  
 a rear portion adapted to support the counterweight,  
 a pivotally mounted boom having a top,  
 an upwardly projecting mast having a top,  
 means for lifting a load from the top of the boom,  
 rigging means interconnecting the top of the boom and the top of the mast, and  
 means interconnecting the top of the mast and the rear portion of the upper works for opposing a load lifted from the top of the boom;  
 said attachment comprising:  
 a counterweight support beam including a plurality of connected segments movable relative to each other, a fore end



adapted to be connected to the crane upper works, and an aft end rearward from the rear portion of the upper works, said beam being extendable by moving said connected segments relative to each other between a first position wherein said aft end is spaced from said rear portion of said crane upper works, and a second position wherein said aft end is spaced further from said rear portion of said crane upper works,  
 a counterweight carrier adapted to carry the counterweight when the counterweight is supported on said support beam for movement along the length thereof and over one or more of the connections between said segments, and means for selectively moving said counterweight fore and aft along said beam.

4,953,723

## APPARATUS FOR SUPPRESSING QUAKY MOVEMENTS OF MOBILE CRANES

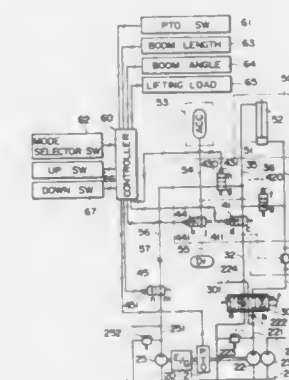
Yoshimi Saotome, Takasago; Kiyotsuna Kuchiki, and Tsuyoshi Katada, both of Kakogawa, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Aug. 9, 1989, Ser. No. 391,048

Claims priority, application Japan, Apr. 21, 1989, 1-103250 Int. Cl.<sup>5</sup> B66C 13/12, 23/56

U.S. Cl. 212-159

6 Claims



1. An apparatus for suppressing quaky movements of a mobile type crane, comprising:  
 a vehicle body supported on driven wheels;  
 a boom including a hydraulic cylinder and pivotally sup-

ported on said vehicle body via said hydraulic cylinder for pivoting movements about a horizontal shaft;  
 main hydraulic pumps connected through a transmission mechanism to an engine mounted on said vehicle body and switchable between on- and off-positions;  
 a direction control valve for respectively selectively supplying and draining the discharge oil pressures of said main pumps to and from a first load-holding main oil chamber and an opposing second oil chamber of said hydraulic cylinder;  
 a counter-balancing valve provided at a position fluidically between said hydraulic cylinder and said direction control valve;  
 an accumulator provided at a position fluidically between said hydraulic cylinder and said counter-balancing valve for suppressing quaky movements of said vehicle body;  
 travel and work mode switching means comprising a plurality of change-over valves;  
 a mode selector means for switching the mode of operation between a vehicle travel mode wherein a closed circuit is formed through said first and second oil chambers and said accumulator, and a working mode wherein the closed circuit is opened for supplying and draining oil pressure separately to and from said first and second oil chambers; and  
 a controller having means for permitting said mode selector means to switch to said travel mode position only when said main pumps are in an off state.

4,953,724

## JIB STRETCHING AND FOLDING DEVICE

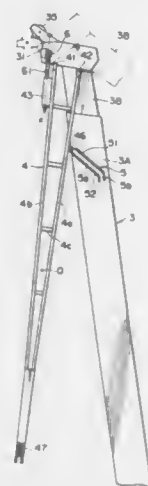
Yukio Koizumi, Akashi, Japan, assignor to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Jan. 29, 1989, Ser. No. 373,027

Int. Cl.<sup>5</sup> B66C 23/42

U.S. Cl. 212—188

21 Claims



1. In a crane including a telescopic boom having a forward end portion provided with a pair of jib mounting shafts laterally projecting from opposite side surfaces of said forward end portion, and a strut type jib having a base end portion provided with a pair of jib feet adapted to be detachably connected with said jib mounting shafts, wherein said jib may be folded along a vertical side surface of said boom in a jib folded condition where said jib feet are disposed in vertical alignment, while said jib may be stretched in a stretching operation from said forward end portion of said boom with said jib feet connected to said jib mounting shafts, a jib stretching and folding device comprising:

a connecting member comprising means for being detachably connected to a one of said jib mounting shafts to which a lower one of said jib feet arranged at a lower position in the jib folded condition is to be connected in

the stretching operation, independently of said lower one of said jib feet and in such a manner as to be rotatable about said one jib mounting shaft, and  
 a supporting shaft mounted to a lower member of said jib at the base end portion of said jib in such a manner as to extend below said lower member when in the jib folded condition, wherein said connecting member is supported on said supporting shaft and wherein said connecting member is rotatable about said jib, whereby said jib can rotate on said one of said jib mounting shafts such that said lower one of said jib feet can pivot around said one of said jib mounting shafts.

4,953,725

## CHILDREN'S DRINKING VESSEL

Elena M. D. M. D. Gil Buj, 105 Carretera General, Hermigua, Gomera, Tenerife, Spain

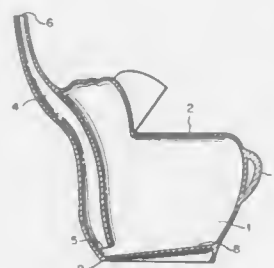
Filed May 10, 1989, Ser. No. 349,828

Claims priority, application Spain, May 10, 1988, 8801480

Int. Cl.<sup>5</sup> A47G 19/22

U.S. Cl. 215—1 A

3 Claims



1. A drinking vessel for containing a supply of liquid comprising an internal pipe integrally formed along the internal wall of the vessel and having a bottom opening adjacent to the bottom of the vessel and having a top opening protruding above the entrance opening of the vessel, said pipe defining a straw to allow the contents of the vessel to be drained out, said vessel having a slanting surface formed on the bottom of the vessel, said slanting surface sloping downwardly toward the bottom opening of said pipe, and said slanting surface forming the entire bottom surface of said vessel.

4,953,726

## ELECTRIC VEHICLE COUPLING BETWEEN TWO RAIL VEHICLES

Dominique Loutan, Geneva, Switzerland, assignor to Asea Brown Boveri Ltd., Baden, Switzerland

Filed Apr. 27, 1989, Ser. No. 343,599

Claims priority, application Switzerland, Apr. 28, 1988, 1586/88

Int. Cl.<sup>5</sup> B61G 5/06

U.S. Cl. 213—1.3

7 Claims

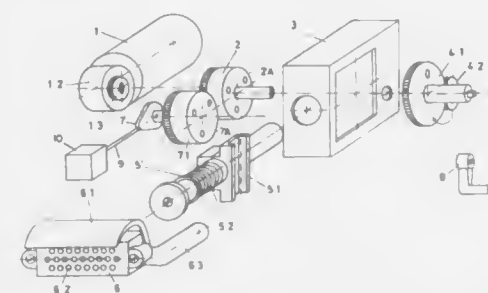
1. An electrical vehicle coupling between two rail vehicles, comprising:

an electrical contact bush for each of said vehicles, each of said contact bushes being movable between an advanced position where said contact bushes are mutually coupled and provide electrical connection between said two rail vehicles and a retracted position where said contact bushes are mutually uncoupled;

drive means for moving each of said bushes between said advanced position and said retracted position, each of said drive means including:

an eccentric element mounted to a rotatable disk wheel at a position eccentric to the axis of rotation of said disk wheel; means for rotating said disk wheel in one direction; a slide rail associated with a respective said bush, wherein

said eccentric element moves in a slide of said slide rail, whereby said bush moves from said retracted position to said advanced position and back to said retracted position for each revolution of said disk wheel;



thrust pins on which said bushes are respectively mounted, said slide rails being respectively slidably mounted to said thrust pins for movement in the direction of the axis of said thrust pins, wherein each said slide extends perpendicular to a respective one of said thrust pins.

4,953,727

## PISTON AND SHAFT ASSEMBLY OF RAILROAD END-OF-CAR CUSHIONING DEVICES AND METHOD OF REPAIRING SAME

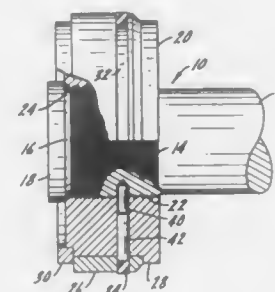
Howard E. Tonn, Lombard; Robert Davidson, Vernon Hills; David B. Shultz, Villa Park, and Keith R. Miller, Schiller Park, all of Ill., assignors to Co-Ordinated Railway Services, Inc., Broadview, Ill.

Filed Jul. 3, 1989, Ser. No. 374,954

Int. Cl.<sup>5</sup> B61G 9/12

U.S. Cl. 213—8

7 Claims



1. A piston and shaft assembly for an end-of-car cushioning device, comprising:

a shaft having a threaded portion formed on the shaft surface and a radially-extending hole formed in the shaft in the area of the threaded portion;

a piston having an axial bore through its center with threads formed on the surface of the axial bore, said bore's threads being adapted to mate with the threads of the shaft such that the mating threads provide a positive abutment to axial movement of the piston along the shaft, the piston further including a radial hole aligned with the hole of the shaft;

a pin disposed in the aligned radial holes of the piston and shaft and extending across the interface thereof to provide positive abutment to rotational movement of the piston on the shaft, the pin having a diameter less than that of the radial hole of the piston so as to provide clearance between the pin and the piston; and

retainer means for holding the pin in the radial hole.

4,953,728

## TAMPER PROOF BOTTLE

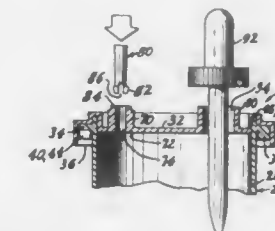
John R. Meek, P.O. Box 622, R.R. 1, Crawfordsville, Ind. 47933

Filed Dec. 5, 1988, Ser. No. 279,862

Int. Cl.<sup>5</sup> B65D 41/00, 39/00

U.S. Cl. 215—250

25 Claims



1. A tamper-proof bottle having a cylindrical wall means providing an outlet, and a cap means also having a cylindrical wall means and a disc means extending to the cylindrical wall means of the cap means,

there being two or more abutment body means sets respectively having abutment body means respectively carried on portions of the bottle's wall means and the cap means, the engagement of the bottle's wall means and the disc means of the cap means providing a closing of the bottle outlet and also an axial limiting abutment condition which limits how far the bottle and cap means may be moved axially into overlapping relationship,

the improvement for such a bottle and cap means comprising the provision of abutment walls on both the abutment body means of the bottle's wall means and of the cap means, said abutment walls being operatively oppositely facing circumferentially when the cap means is operatively affixed to the bottle as herein set forth for closing the bottle outlet,

one of the said abutment body means of the bottle and cap means having a resiliently flexible extension portion which is unconnected to the respective bottle or cap means except through the respective abutment body means by which the extension portion is carried, and is sufficiently flexible as to be forceable past the other abutment body means as the bottle and cap means are relatively rotated while the bottle and the cap means are then in said axial limiting abutment condition,

the location of the abutment body means of the bottle and cap means being such that without such flexibility the extension portion would be blocked by the other abutment body means so that the extension portion could not pass, during a rotation of the bottle and cap means in a first direction, the said other abutment body means sufficiently circumferentially as to let the abutment walls pass circumferentially relative to one another, the flexibility of the extension portion being such as to permit the extension portion to move relatively axially to let the abutment walls pass circumferentially relative to one another, when the bottle and cap means are relatively rotated in that first direction; and the resilience of the extension portion being such that after passing one another circumferentially by their relative axial movement, during relative rotation movement of the bottle and cap means in that first direction, the extension portion will move in the opposite relative axial direction to cause the two abutment walls to then be operatively oppositely facing circumferentially as aforesaid, thus blocking the bottle and cap means from being relatively rotated in the opposite direction, thus operatively locking the bottle and cap means together with the disc means of the cap means sealing the bottle's outlet.



4,953,729

**SANITATION SHIELD FOR WATER COOLER BOTTLE**

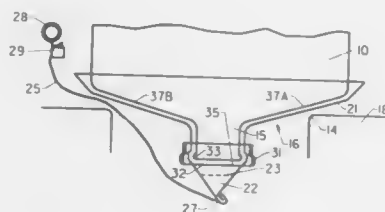
George Kloosterhouse, P.O. Box 650, Malabar, Fla. 32950

Continuation-in-part of Ser. No. 319,482, Apr. 12, 1989, abandoned. This application Sep. 27, 1989, Ser. No. 413,123

Int. Cl.<sup>5</sup> B65B 3/04

U.S. Cl. 215—255

11 Claims



1. For use with a water bottle which, when installed in a water cooler, is placed in an inverted position over an opening in the water cooler tank, a device for effectively shielding the water cooler tank from contaminant material that may be present on the outside of the water bottle comprising:

- a shroud of non porous material sized to extend over the mouth, neck and shoulder region of said water bottle, so that, when said bottle is supported over said opening in the water cooler tank, said shroud extends beyond the edge of said opening, said shroud having a removable region for placement over the mouth of the bottle;
  - a retainer cap having an opening through which the removable region of said shroud extends, said retainer cap cooperating with the mouth of said bottle, so that said shroud is retained thereby and extends over the shoulder region of said bottle; and
- means, attached to the removable region of said shroud, for removing the removable region of said shroud, thereby allowing the contents of said bottle to pass through the mouth of the bottle and into the water cooler tank.

5. A method of effectively shielding a water cooler tank from contaminant material that may be present on the outside of a water bottle which, when installed in a water cooler, is placed in an inverted position over an opening in the water cooler tank, comprising the steps of:

- (a) providing a shroud of non porous material having a removable region for placement over the mouth of the bottle and a pull cord attached to said removable region of said shroud;
- (b) placing said shroud over the mouth, neck and shoulder region of said water bottle, so that said removable region is located over the mouth of said bottle;
- (c) securing said shroud to the mouth of said bottle by attaching a retainer cap, having an opening through which the removable region of said shroud extends, to the mouth of said bottle, whereby said shroud is retained thereby and extends over the shoulder region of said bottle;
- (d) inverting said bottle, to the mouth of which said shroud has been secured by means of said retainer cap, and placing the inverted bottle upon said water cooler tank so that the neck of the bottle extends into the opening of the water cooler tank; and
- (e) pulling said pull cord, thereby removing the removable region of said shroud, and allowing the contents of said bottle to pass through the mouth of the bottle and into the water cooler tank.

4,953,730

VAT

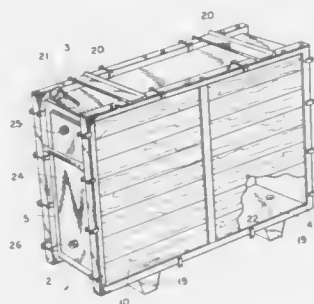
Martlyn L. Prime, Morphet Vale; Peter F. Warren; Geoffrey D. Johnston, both of McLaren Vale, and John C. Babidge, McLaren Vale, all of Australia, assignors to Stakvat Pty. Ltd., Adelaide, Australia

Filed Oct. 18, 1988, Ser. No. 259,325

Int. Cl.<sup>5</sup> B65D 88/10

U.S. Cl. 217—4

20 Claims



1. A vat for the storage of liquids such as wine, said vat comprising:

- an annular metal frame, each side of said metal frame having a peripheral side flange;
- side walls of wooden staves closing said sides of said annular frame;
- means on each of said sides closed by said wooden staves clamping said wooden staves to its respective side flange of said annular metal frame;
- said wooden staves of each said side wall being supported in an angular frame, said clamping means clamping each said angular frame to its respective side flange;
- said staves of each said side being arranged in parallel abutting relationship to each other;
- means for applying pressure to said staves in a direction to maintain said adjacent abutting edges in sealing relationship, said pressure applying means comprising a pressure plate extending along the free edge of the stave closest to a side of said angular frame; and
- pressure adjusting screws bearing against said pressure plate.

20. A vat for the storage of liquids such as wine, said vat comprising:

- an annular metal frame, each said having a peripheral flange, side walls of wooden staves closing said sides of said annular frame;
- an angular frame supporting said wooden staves of each side wall in parallel abutting relation to each other, clamping means clamping each angular frame to the respective side flange of the annular frame;
- a pressure plate extending along a free edge of the stave closest to the angular frame; and
- pressure adjusting screws bearing against said pressure plate to maintain the adjacent abutting edges of the staves in sealing relationship.

4,953,731

**KEYLESS LOCKING APPARATUS FOR SELECTIVELY SECURING A LID TO A BOX**

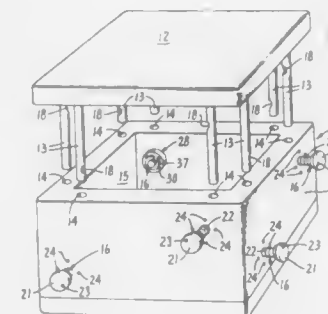
Michael R. Thornton, and Allison A. Thornton, both of 1495 Oak Ter., St. Joseph, Mich. 49085

Filed May 19, 1989, Ser. No. 354,291

Int. Cl.<sup>5</sup> B65D 43/00

U.S. Cl. 217—56

13 Claims



1. A keyless locking apparatus for selectively securing a lid to a box, comprising

- a box,
- a lid for said box,
- a post projecting from said lid,
- said box being formed with a first bore in one of its walls configured to receive said post when said lid is closed,
- an elongated locking member engagable with said post, said box being formed with a second bore through said wall in perpendicularly partially intersecting relation to said first bore,
- said locking member being mounted in said second bore for both axial and rotational adjustment relative to said first bore,
- said post being formed with a notch registrable with said locking member when said lid is positioned to close said box,
- said locking member being formed with a notch registrable with said post to permit withdrawal of said post from said first named bore when said locking member is in a predetermined rotational and axial position, whereby said post is prevented by said locking member from being withdrawn from said first bore when said notch in said locking member is not in said predetermined rotational and axial position with said post,
- and settable means for effecting desired rotational and axial positioning of said locking member.

4,953,732

**WASTE MATERIAL COLLECTING BIN**

David C. Cocks, London, England, assignor to The Wellcome Foundation Limited, London, England

Continuation of Ser. No. 296,242, Jan. 12, 1989, abandoned. This application Mar. 8, 1990, Ser. No. 492,349

Claims priority, application United Kingdom, Jan. 13, 1988, 8800660

Int. Cl.<sup>5</sup> B65D 90/00

U.S. Cl. 220—502

8 Claims

1. A waste material collecting bin, comprising:
- a storage container;
  - an inlet to said storage container;
  - a reservoir of a fluent material-treating substance;
  - fluent addition means for adding said fluent substance from said reservoir to waste material added to said container; and
  - an arcuate support means provided in said inlet for temporarily supporting waste material while it is contacted by said fluent substance from said reservoir, said fluent addi-

tion means being disposed above said arcuate support means such that said fluent substance is added to the waste



material temporarily supported on said arcuate support means from above.

4,953,733

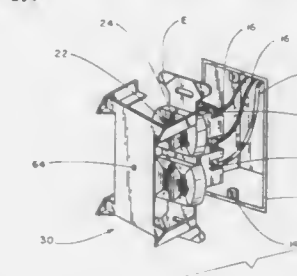
**ELECTRICAL OUTLET BOX MARKING DEVICE**  
Gaetano R. Loscuto, 7100 W. Stamford Dr., Bridgeview, Ill. 60455

Filed Nov. 28, 1989, Ser. No. 441,986

Int. Cl.<sup>5</sup> B25H 7/04

U.S. Cl. 220—3.4

1 Claim



1. A marking device for defining the exact location of an electrical outlet box in a wall panel consisting of:

- an I-shaped monolithic plate element having a rectangular central body portion having a front surface and a rear surface, side edges and a fastener-receiving hole defined centrally therein, a top portion and a bottom portion, said top portion having a top end edge, and said bottom portion having a bottom end edge, said top and bottom portions extending transversely of said central body portion side edges and extending beyond said side edges and forming ears on the four corners of said rectangular central body portion, each of said ears including a top edge and a bottom edge, with said top edges being collinear with said top end edge and said bottom end edge associated therewith;
- each ear having an anchoring element located adjacent to said rear surface of said central body portion and a marking element adjacent to said central body portion front surface,
- each of said anchoring elements being L-shaped and each including a first leg that extends parallel to the central body portion side edges and is located to be coplanar with one ear end edge, and a second leg that is located to be coplanar with an ear bottom edge and to be essentially perpendicular to said first leg, said anchoring elements being essentially half the length of said central body portion as measured between the bottom end edges E of the ears;
- each of said marking elements being arrow-head shaped and including a first leg that is positioned to be coplanar with said anchoring element first leg and a second leg that is

positioned to be coplanar with said anchoring element second leg, said marking element legs each being triangular in shape and including a base attached to an associated ear and a point-forming apex spaced from the ear with a hypotenuse connecting said base and said apex, said marking element legs being perpendicularly arranged to define a biplanar point.

4,953,734

# CABIN-LIKE COVER ESPECIALLY FOR COVERING A MACHINE

Albert Stobr, Am Wiegenberg 8, 8015 Markt Schwaben, Fed. Rep. of Germany

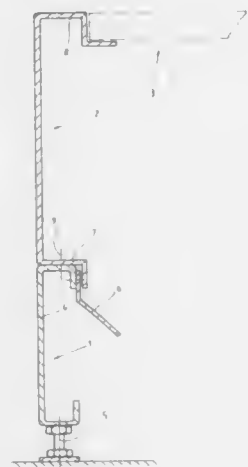
Filed Mar. 2, 1989, Ser. No. 317,944

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1988, 8803330[U]

Int. Cl.<sup>3</sup> E04B 1/08; E04H 1/00

U.S. Cl. 220-4.02

11 Claims



1. A cabin-like cover, especially for covering a machine, including a base frame (1) and wall elements (2) mounted on said base frame in a modular system, characterized by the following features:

- (a) said wall elements characterized by having been formed of sheet material and shaped by bending, each of said wall elements including an L-shaped lower portion (7) for mounting on said base frame (1) of the cabin-like cover, said L-shaped lower portion comprising a first portion for positioning atop said base frame and a second portion depending from said first portion for engaging a side portion of said base frame;
- (b) said wall elements including at their side edges vertical bends (2a, 2'a) juxtaposed vertical bends of the adjacent wall elements; and
- (c) adjacent wall elements being connected to one another by fastener means securing said vertical bends to one another.

4,953,735

# CONTAINER MOVABLE FROM FLAT TO CHANNEL-SHAPED CONFIGURATION

Cosmo N. Tisbo, Barrington, and Robert J. Mack, Hoffman Estates, both of Ill., assignors to Custom Plastics, Inc., Elk Grove, Ill.

Continuation-in-part of Ser. No. 156,720, Feb. 17, 1988, abandoned. This application Jul. 17, 1989, Ser. No. 380,763

Int. Cl.<sup>3</sup> B65D 5/26, 6/18; B32B 7/06; H02G 3/04

U.S. Cl. 220-6

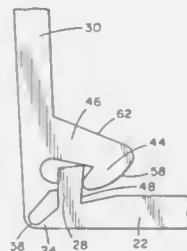
21 Claims

1. An elongate container of one-piece resilient thermoplastic construction, said container comprising:

- a first wall having first and second lateral edges with a first

latching component positioned adjacent the first lateral edge;

- a second wall having first and second lateral edges with a second latching component for interlocking with said first latching component and positioned adjacent the last-mentioned second lateral edge to fasten said walls together in a predetermined relative orientation; and
- a hinge joining the first lateral edge of said first wall and the second lateral edge of said second wall, said hinge comprising a web of material having a thickness less than the thickness of said walls, said walls being relatively movable about said hinge between an as-formed position in which said first and second latching components are spaced, and a use position in which said first and second walls extend



relative to each other at a predetermined angle and said first and second latching components are in locking engagement, said container having a generally uniform cross section throughout its length so that it can be formed by extrusion,

one of said first and second latching components comprising a catch having an engagement surface extending upwardly from its respective wall.

the other of said first and second latching components comprising hook means including a support extending upwardly from its respective wall and having an undersurface extending in the direction of said catch, said undersurface adapted to engage said engagement surface and maintain said first and second walls in said use position.

4,953,736

# PAINT SPLATTER BOX

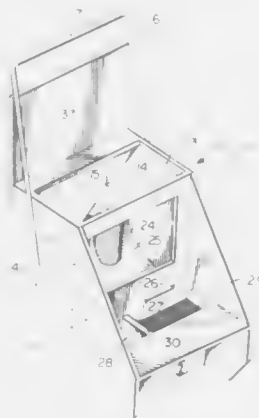
Frank Magnotto, 5203 Kipling St., Springfield, Va. 22151

Filed Jan. 8, 1990, Ser. No. 462,025

Int. Cl.<sup>3</sup> B65D 85/00

U.S. Cl. 220-20

7 Claims



1. A multi compartmented splatter box comprising a box, said box being defined by side walls, a roof, a bottom and a back wall which slopes downwardly, the roof has a depression

terminating at its lowest point in an opening therethrough, the sloping wall has a vertical upstanding rounded means extending from the sloping wall upwardly to the roof, at least two wells capable of containing a liquid disposed in front of the sloping wall, the box is open from the one side facing the sloping wall whereby a brush may be dipped selectively into the wells when containing a liquid and the brush may be then struck against the upstanding rounded means to thereby knock off unwanted liquid.

4,953,737

# SELF-RIGHTING VESSEL

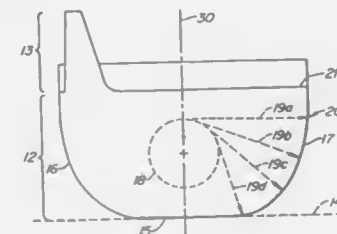
Kenneth A. Meyers, Reedsburg, Wis., assignor to Gerber Products Company, Fremont, Mich.

Filed Jan. 28, 1987, Ser. No. 3,460

Int. Cl.<sup>3</sup> A47G 19/22

U.S. Cl. 250-70

13 Claims



1. A self-righting vessel comprising a planar base and sides each of whose vertical cross section is an involute defined by a circle inside said vessel.

4,953,738

# ONE PIECE CAN BODY WITH DOMED BOTTOM

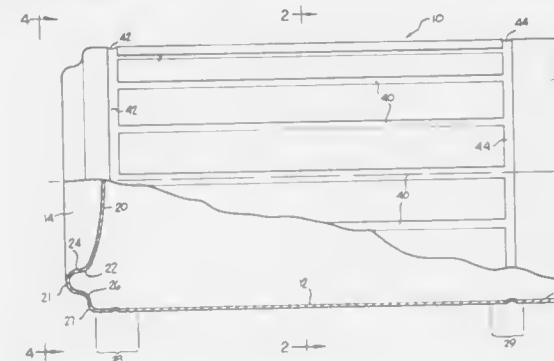
James S. Stirbis, 5451 S. Federal Cir., Apt. D-106, Littleton, Colo. 80123

Filed Feb. 19, 1988, Ser. No. 157,804

Int. Cl.<sup>3</sup> B65D 8/12, 6/38

U.S. Cl. 220-606

36 Claims



1. A drawn and ironed one-piece metallic aluminum can body member for beverages such as beer and soft drinks comprising:

- a cylindrical relatively thin side wall portion;
- a rigid dome-shape bottom wall portion;
- an open end rim portion; and
- stiffening means in said side wall portion for resisting deformation of said side wall portion by internal pressure, said stiffening means comprising:
- a pair of axially spaced radially inwardly extending concave annular groove-rib portions of curved cross-sectional shape in said side wall portion, one of said concave annular groove-rib portions being located axially adjacent said rim portion and another one of said concave annular

groove-rib portions being located axially adjacent said bottom wall portion; and

- a plurality of circumferentially spaced parallel radially inwardly extending concave axial groove-rib portions in said side wall portion of curved cross-sectional shape and extending axially between said pair of concave annular groove-rib portions; said dome-shape bottom wall portion comprising:
- a radially innermost concave dome-shape central portion;
- a convex axially outwardly extending lowermost annular support rib portion connected to said dome-shape central portion; and
- a radially outermost inclined connecting wall portion extending between said side wall portion and said lowermost annular support rib portion;
- a plurality of circumferentially spaced radially inwardly extending convex groove-rib portions in said concave dome-shape central portion and extending radially inwardly from said lowermost annular support rib portion; and
- a plurality of circumferentially spaced radially and axially extending concave groove-rib portions in said radially outermost inclined connecting wall portion and extending between said lowermost annular support rib portion and said side wall portion.

3. A one-piece drawn and ironed aluminum can body member for beverages such as beer and soft drinks and made from one piece of drawn and ironed aluminum sheet material and comprising:

- a cylindrical relatively thin side wall portion with a central longitudinal axis;
- an open end rim portion;
- an annular bottom wall portion having an annular concave dome-shape central portion extending radially outwardly from said central longitudinal axis and terminating in an annular peripheral portion, a convex axially outwardly extending lowermost annular support rib portion connected to said annular peripheral portion of said dome-shape central portion, and a radially outermost annular inclined connecting wall portion extending between said side wall portion and said lowermost annular support rib portion;
- a plurality of circumferentially spaced radially inwardly extending convex groove-rib portions formed in said concave dome-shape central portion and extending radially inwardly from said lowermost annular support rib portion toward said central longitudinal axis for strengthening and stiffening of said concave dome-shape central portion against deflection by internal pressure forces, each of said radial groove-rib portions having a radially innermost end portion which terminates in radially outwardly spaced relationship to said central longitudinal axis to provide an unribbed smooth surface centermost section of said concave dome-shaped central portion; and
- an annular convex groove-rib portion formed in said concave dome-shape central portion and being radially inwardly spaced from said lowermost annular support rib portion and intersecting a mid-portion of each of said radially inwardly extending convex groove-rib portions for further strengthening and stiffening of said concave dome-shape central portion.

28. A one-piece metallic can body member comprising:

- a cylindrical relatively thin side wall portion;
- an open end rim portion;
- a dome-shape bottom wall portion having a concave dome-shape central portion, a convex axially outwardly extending lowermost annular support rib portion connected to said dome-shape central portion, and a radially outermost inclined connecting wall portion extending between said side wall portion and said lowermost annular support rib portion;
- a plurality of circumferentially spaced radially inwardly extending convex groove-rib portions in said concave



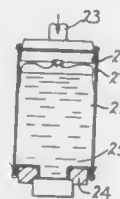
dome-shape central portion and extending radially inwardly from said lowermost annular support rib portion; an annular convex groove-rib portion located in said concave dome-shape central portion and intersecting said radially inwardly extending convex groove-rib portions; and a plurality of circumferentially spaced radially and axially extending concave groove-rib portions in said radially outermost inclined connecting wall portion and extending between said lowermost annular support rib portion and said side wall portion for strengthening and stiffening said inclined connecting wall portion.

**4,953,739**  
**CONTAINER OF SOLID COMPOSITION FOR USE AS A HOT-MELT**

Christian Wooge, Bad Homburg, and Joachim Speisebecher, Oberursel, both of Fed. Rep. of Germany, assignors to Emhart Industries, Inc., Hartford, Conn.

Filed Jun. 19, 1989, Ser. No. 368,447  
Claims priority, application United Kingdom, Aug. 12, 1988, 8819233

Int. Cl.<sup>5</sup> B65D 25/10  
U.S. Cl. 220—93 5 Claims



1. A moisture-proof container of solid, moisture-curable composition comprising a reusable tubular body portion open at one end, a closure member provided with an outlet removably secured to said open end to close said tubular body portion, a slideable piston-head confining the composition in the body portion between the piston-head and the closure member, said piston-head having a rim projecting towards the closure member and in sliding, sealing engagement with the inner walls of said tubular body portion a bag of heat-resistant resilient foil open at one end and secured around said open end by said closure member, said bag being unattached to said tubular body portion, and solid, moisture-curable composition contained within the receptacle defined by said bag and said closure member.

**4,953,740**  
**WASTEBASKET HAVING LID HINGE AND ACTUATING MECHANISM PROTECTOR**

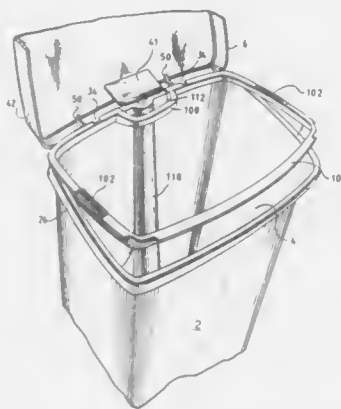
Walter Koda, Newtown, Conn., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 6, 1989, Ser. No. 319,018  
Int. Cl.<sup>5</sup> B65D 43/00

U.S. Cl. 220—263 12 Claims

1. A wastebasket, which comprises:  
a container having a top rim defining a top opening formed therein;  
a lid pivotally mounted on the container and adapted to pivot about a pivot axis to cover and uncover the top opening; said lid including a top surface and a bottom surface;  
means for pivotally mounting the lid to the container;  
means for maintaining said lid in an open and substantially upright position with respect to said container;  
means for actuating pivotal movement of the lid with respect to the container between positions covering and uncovering the top opening, the lid movement actuating means including a generally horizontal operating lever mounted

on the container at the lower portion thereof, and link means operatively interconnecting the operating lever and said lid; and

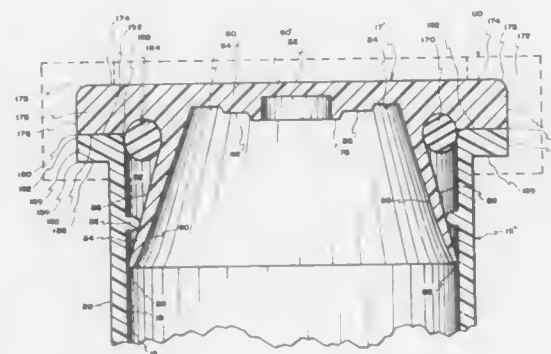
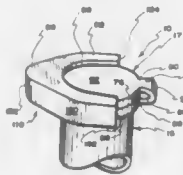


a projection extending from said bottom surface of said lid, said projection extending at least partially over said top rim of said container and said link means when said lid is in said open substantially upright position.

**4,953,741**  
**MEDICAL FAIL SAFE RELEASIBLE LOCKS AND/OR SEALS FOR CAPPED DISPOSABLE CENTRIFUGE CONTAINERS, CRYOGENIC VIALS AND THE LIKE**  
Paul M. Jessop, and David H. Jeffs, both of Salt Lake City, Utah, assignors to Multi-Technology Inc., Midvale, Utah  
Continuation of Ser. No. 265,178, Oct. 31, 1988, Pat. No. 4,874,102, which is a continuation-in-part of Ser. No. 191,518, May 9, 1988, Pat. No. 4,830,209. This application Jul. 24, 1989, Ser. No. 385,349

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B65D 45/00  
U.S. Cl. 220—273 9 Claims

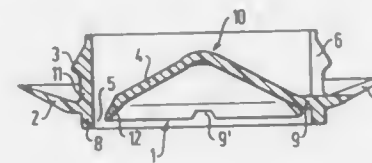


1. In combination:  
a container for receiving a biological sample to be processed

by centrifuging, boiling, freezing and the like during laboratory testing and during shipping;  
the container comprising a cylindrical wall closed at one end and open at the other end defining a hollow interior;  
a compression fit threadless lid releasibly closable in respect to the container comprising a resilient male portion which projects through the open end into and forcibly engages the hollow interior of the container, when the lid is closed, and a flange portion superimposed, when the lid is closed, across the end of the container which is open when the lid is not closed;  
seal means separate from the lid, the seal means compressively engaging the cylindrical wall at the container opening and the male portion of the lid.

**4,953,742**  
**PLASTIC SEALING COVER**  
Willibald Kraus, Grünstadt, Fed. Rep. of Germany, assignor to TRW United Carr GmbH & Co. KG, Enkenbach-Alsenborn, Fed. Rep. of Germany  
Filed Mar. 2, 1989, Ser. No. 318,151  
Claims priority, application Fed. Rep. of Germany, Mar. 4, 1988, 3807174

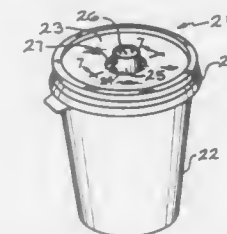
Int. Cl.<sup>5</sup> B65D 39/00  
U.S. Cl. 220—367 11 Claims



1. A sealing cover formed of plastic for closing an opening in a support panel and having a circumferential elastic sealing lip for pressing against one side of the support panel with a holding stay (3) lying opposite the sealing lip (2) for pressing against the other side of the support panel and an arched sealing zone forming the central portion of the cover, the improvement wherein a circumferential wall (11) connects the sealing lip (2) with the holding stay 3, and wherein between the arched sealing zone (10) and the wall (11) there is provided at least one opening (5) and the sealing zone (10) is arched in a direction from the sealing lip toward the holding stay (3).

**4,953,743**  
**SPLASH PROOF RAISED VENT LID**  
Robert C. Dart, Okemos, Mich., and John R. Darras, Leola, Pa., assignors to Dart Container Corporation, Mason, Mich.  
Filed Jun. 19, 1989, Ser. No. 367,602  
Int. Cl.<sup>5</sup> B65D 51/16

U.S. Cl. 220—369 4 Claims

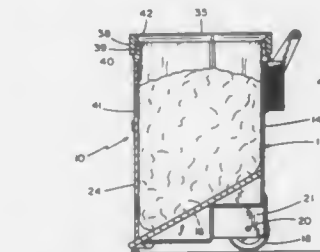


1. A splash proof lid for use on a drinking cup comprising:  
a lid having a central horizontal cover portion, said lid adapted to matingly engage the upper peripheral edge of a drinking cup so as to selectively maintain said lid in a covering relationship on said cup;  
vent means provided in said cover portion, said vent means

comprising a circular, horizontal top portion with a vent opening therethrough;  
a first wall depending downwardly from the perimeter of said top portion, said first wall having a terminal end below the surface of said cover portion;  
a second wall merged with the terminal end of said first wall, said second wall extending upwardly in an outwardly spaced apart relationship to said first wall so as to merge with the said horizontal cover portion;  
a plurality of spaced apart radially extending ribs connecting said first wall and said second wall, said ribs cooperating with said first wall and said second wall to define downwardly depending arcuate wave dampening baffle means which encircle said vent means below said cover surface in close proximity thereto so as to minimize splashing of the cup contents below said lid so as to prevent accidental spillage through said vent means.

**4,953,744**  
**MOBILE REFUSE CONTAINER**  
Kunio Koyama, 22798 W. Lochmara, Hawthorn Woods, Ill. 60047  
Filed Apr. 7, 1989, Ser. No. 334,475  
Int. Cl.<sup>5</sup> B65D 25/16, 83/00

U.S. Cl. 220—404 10 Claims



1. A mobile refuse container, comprising: a container having an open top forming a loading opening for refuse and flexible plastic bags, said container having an open side forming a discharge opening for the flexible plastic bag when full, said open side having sufficient height to discharge a full plastic bag, releasable means on the container for selectively holding the bag in the container near its top in an open condition, and means for automatically ejecting the bag from the container when the releasable means is activated, said means for automatically ejecting the bag from the container including a steeply inclined ramp in the bottom of the container on which the bag rests, said ramp having an uninterrupted upper surface constructed to support the flexible plastic bag.

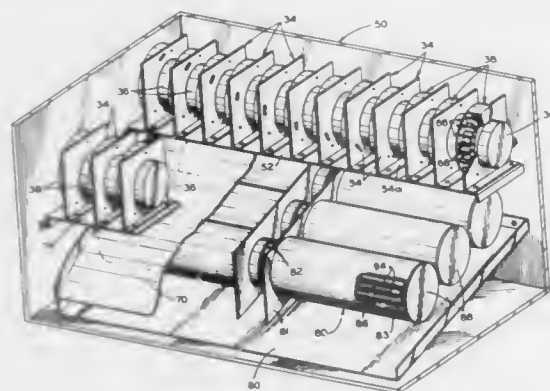
5. A mobile refuse container, comprising: a container having an open top forming a loading opening for refuse and flexible plastic bags, said container having an open side forming a discharge opening for the flexible plastic bag when full, releasable means on the container for selectively holding the bag in the container, means for automatically ejecting the bag from the container when the releasable means is activated, and including a pair of wheels mounted on the lower end of the container.

7. A mobile refuse container, comprising: a container having an open top forming a loading opening for refuse and flexible plastic bags, said container having an open side forming a discharge opening for the flexible plastic bag when full, releasable means on the container for selectively holding the bag in the container, means for automatically ejecting the bag from the container when the releasable means is activated, and including a bag supply container on one side of the container.

10. A mobile refuse container, comprising: a container having a bottom and at least one side wall with an upper opening forming a loading opening for bags and refuse, a side opening

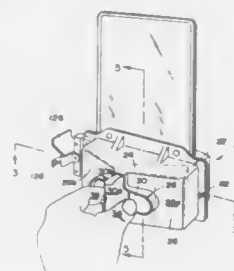
on the container forming a discharge opening, a selectively opening member over the side opening to prevent discharge of the bag, a ramp in the bottom of the container upon which the bag rests, said ramp having a sufficient inclination so that when the opening member is opened, the bag will discharge automatically from the container, the ramp being angled approximately 40 degrees to a horizontal plane, the pivotal member is a door, a pair of wheels mounted on the lower end of the container, a handle on the container to assist in transporting the container, and a bag supply container on one side of the container.

**4,953,745**  
**MEDICATION DISPENSING APPARATUS**  
James R. Rowlett, Jr., 8102 E. Jefferson St., Detroit, Mich. 48214, assignor to James R. Rowlett, Jr., Royal Oak, Mich.  
Continuation of Ser. No. 533,234, Sep. 19, 1983, abandoned. This application Feb. 20, 1986, Ser. No. 828,559  
Int. Cl.<sup>5</sup> B65D 83/04  
U.S. Cl. 221—5 14 Claims



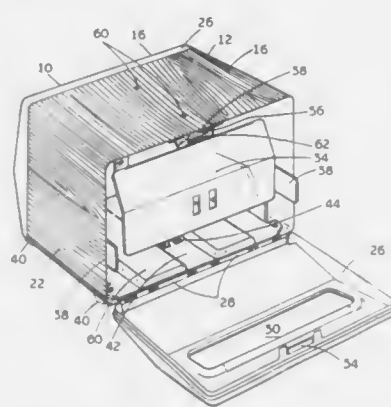
1. An apparatus for dispensing a selected one of a plurality of drugs to a selected one of plurality of patients comprising: a plurality of individual dispensing mechanisms, each of said dispensing mechanisms adapted to store a plurality of selected drug units and responsive to a selected one of a plurality of drug dispense signals for dispensing one of the selected drug units; means for generating an input authorization signal representing an operator; means for generating a selected one of a plurality of patient identification signals representing a selected patient for which a drug is to be selected; means for generating a selected one of a plurality of drug select signals representing the drug to be dispensed; control means responsive to the input authorization signal, the patient identification signal, and the drug select signal for generating a drug dispense signal corresponding to the selected drug to cause said dispensing mechanism to dispense the selected drug; said control means including means responsive to said drug dispense signal for recording the dispensing transaction including the operator, the patient, and the dispensed drug; said control means being operable to supply any of said plurality of drug units for any of said plurality of patients upon receiving the required input authorization, patient identification, and drug select signals.

**4,953,746**  
**ONE-AT-A-TIME COUPON DISPENSER**  
Michael Andriash, P.O. Box 3881 Main Post Office, Vancouver, B.C., Canada V6B 3Z3  
Continuation-in-part of Ser. No. 23,405, Mar. 9, 1987, abandoned. This application Aug. 10, 1988, Ser. No. 230,479  
Int. Cl.<sup>5</sup> B65H 1/02, 1/12  
U.S. Cl. 221—35 7 Claims



1. A sheet dispenser for dispensing sheets, comprising: (a) a pair of separable hollow enclosures each having a front wall and an opening therein with a height dimension equal to the height dimension of said sheets and a width dimension sufficient to permit a user to insert at least one finger into said opening and fold a portion of a front sheet outwardly of a stack of sheets through said opening, each of said front walls having front wall portions inclined from the opening rearwardly towards the ends, forming planar or slightly concave surfaces, each of said enclosures for holding a stack of individual sheets and each having means for resiliently urging an associated stack of sheets against a corresponding one of said front walls; and (b) means for mounting a sidewall of said enclosures to a shelf edge such that said enclosures extend outwardly of such shelf edge with front walls thereof substantially perpendicular to said shelf edge.

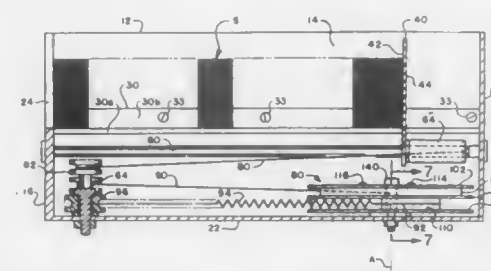
**4,953,747**  
**TABLE MODEL NAPKIN DISPENSER**  
Gregory J. Wenkman, 6690 Shamrock Glen Cir., Middleton, Wis. 53562, and Ferdinand F. Salzmann, 605 Ray St., Prairie du Sac, Wis. 53578  
Filed Apr. 7, 1988, Ser. No. 178,575  
Int. Cl.<sup>5</sup> A65D 83/00  
U.S. Cl. 221—45 3 Claims



1. A dispenser for folded sheets of flexible material comprising: (a) a cabinet having a front end, a back end, a top, a bottom, and two sides, the bottom of the cabinet having two centrally located slots; (b) a door forming at least one of the two ends, the door

having an access window for extraction of folded sheets of flexible material and means for opening the door; (c) means for pushing the folded sheets of flexible material against the door; and (d) a clip for securing and detaching the cabinet to and from a horizontal surface, the clip comprising: (i) a flat plate with a first side and a second side that is independent of the cabinet; (ii) two vertical barbs that extend vertically from the first side of the flat plate and that engage with the slots in the bottom of the cabinet, the flat plate being disengaged from the cabinet upon pinching of the barbs together; and (iii) means for affixing the second side of the flat plate to the desired surface.

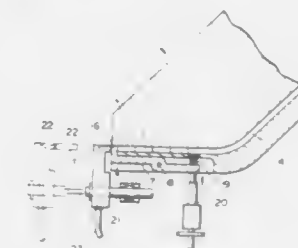
**4,953,748**  
**FORCE MODIFYING DEVICE**  
Norman R. Wheelock, Mentor, Ohio, assignor to Diebold, Incorporated, North Canton, Ohio  
Continuation of Ser. No. 236,066, Aug. 23, 1988, abandoned. This application Feb. 14, 1990, Ser. No. 480,370  
Int. Cl.<sup>5</sup> B65H 1/12  
U.S. Cl. 221—59 4 Claims



1. An elongated, generally rectangular currency canister for moving a stack of sheet currency toward a dispensing position at one end thereof where individual sheets are dispensed, said canister having a first lengthwise compartment for holding said stack of currency, a second lengthwise compartment, and a device for biasing said stack in the direction of said dispensing position, said biasing means comprising: plate means disposed within said first and second compartments movable along a predetermined plate path between a first position remote from said dispensing opening and a second position adjacent said dispensing opening for pushing said stack in said first compartment toward said dispensing position, plate cable means having a first end and second end, said first end being connected to said plate means in said second compartment, a tension spring disposed in said second compartment having a stationary end fixed relative to said dispensing position and a free end movable along a predetermined spring path within said second compartment between a first position wherein said spring is extended a predetermined distance and a second contracted position, said spring defining a tension force having a predetermined value when in said first position which diminishes as said spring retracts along said spring path toward said second position, spring cable means having a first and a second end, said first end being connected to said free end of said tension spring, and a force modifying member disposed in said second compartment for transmitting said tension force in said spring to said plate means to move said plate means along said plate path, said modifying member being rotatable through at least 270 degrees about an axis fixed relative to said dispensing opening from a first rotation position corresponding to said first spring position and second rotation position corresponding to said second spring position and

having first and second outwardly facing noncircular arcuate surfaces to receive said tension spring cable means and said plate cable means respectively, said first arcuate surface being generally helical in shape and spiraling outwardly, said second ends of said cable means being attached to said modifying member wherein said spring cable means is disposed on said first surface when said spring is in said first position, said tension force biasing said modifying member to rotate in a predetermined direction wherein said plate cable means is wound onto said second arcuate surface and said spring cable means is unwound from said first arcuate surface and said rotation of said member producing a resultant force on said plate means via said plate cable means to force said plate means toward said dispensing position, said first and second surfaces being dimensioned to vary the respective distances between said spring cable means and said plate cable means and said axis as said modifying member rotates, the ratio of the distance between said spring cable and said axis relative to the distance between said plate cable and said axis continually increasing as said modifying member rotates from said first position to said second position.

**4,953,749**  
**CHIP SEPARATION AND ALIGNMENT APPARATUS**  
Shigeru Kobota, Tokyo; Shoji Kanou, Yokohama, and Masahiro Kubo, Sagami, all of Japan, assignors to Nitto Kogyo Kabushiki Kaisha, Tokyo, Japan  
Division of Ser. No. 54,497, May 27, 1987, Pat. No. 4,801,044. This application Dec. 5, 1988, Ser. No. 280,222  
Claims priority, application Japan, May 27, 1986, 61-121799; Nov. 17, 1986, 61-273682; Mar. 12, 1987, 62-057649  
Int. Cl.<sup>5</sup> B23Q 7/12; B65H 9/06  
U.S. Cl. 221—168 5 Claims



1. A chip separation and alignment apparatus comprising: (a) a chip separation and alignment section; (b) said chip separation and alignment section comprising a chip cassette formed into a flat rectangular box-like shape; (c) said chip cassette being formed therein with: (i) a chip storage chamber; (ii) a chip alignment hole provided with an upper end opening through which said chip alignment hole is communicated with a lower portion of said chip storage chamber and a lower end opening; and (iii) at least one air ejection port arranged near said upper end opening to intermittently eject air therethrough; and (d) a chip separation section arranged at said lower end opening of said chip alignment hole to separate chips one by one and successively supply said separated chips to a subsequent step, wherein said chip separation section includes: (i) a see-saw rod formed at a distal end thereof with a shutter for operating said lower end opening of said chip alignment hole and pivotally mounted below said lower end opening and (ii) a chip suction head arranged in front of said lower end



-opening so as to be reciprocated by a predetermined distance.

**4,953,750**  
**DISPENSING METHOD FOR A VARIABLE VOLUME DISPOSABLE CARBONATED BEVERAGE CONTAINER**  
Frank W. Abernathy, 1518 River Bend Rd., Columbus, Ohio 43223

Filed Apr. 3, 1989, Ser. No. 332,581  
Int. Cl.<sup>5</sup> B65D 23/02, 25/16; B67D 5/00  
U.S. Cl. 222—1 1 Claim



1. A method for retaining carbonation in carbonated beverages which comprises:  
supplying an inner collapsible bag liner filled with a liquid carbonated beverage and having a mouth attached to a nozzle and which filled liner is placed within a container having an opening wherein said nozzle retains said liner mouth at said container opening;  
dispensing said carbonated beverage from said liner; and  
after said dispensing, tying off said liner at the liquid/air interface so as to prevent loss of carbonation from said carbonated beverage in said liner.

**4,953,751**  
**OVERFLOW PREVENTION FOR SOFT DRINK DISPENSERS**

Joseph W. Shannon, Kent, Ohio, assignor to ABC/Sebrn Tech-Corp., Akron, Ohio  
Filed Mar. 30, 1989, Ser. No. 330,767  
Int. Cl.<sup>5</sup> B67D 5/30

U.S. Cl. 222—14 12 Claims  
10. A system for dispensing a drink into a container, comprising:

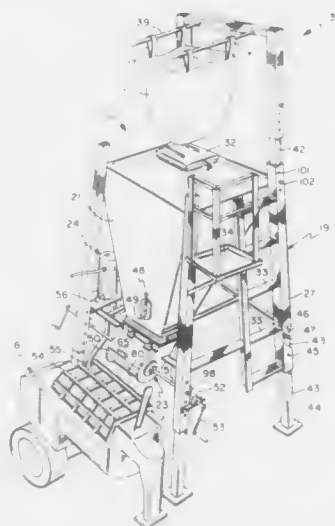
a dispensing head receiving a first conduit defining a first flow path for a first fluid, and a second conduit defining a second flow path for a second fluid;  
valve means interposed within said first and second conduits for enabling and inhibiting respective flows of said first and second fluids from said first and second flow paths for sensing completion of an electrical connection between said first and second flow paths.

**4,953,752**  
**CONCRETE AND MORTAR DISTRIBUTION PROCESS AND APPARATUS**

Robert C. Tousignant; James W. Tousignant, and Richard L. Tousignant, all of St. Paul, Minn., assignors to E-Con-Mega Mix, St. Paul, Minn.  
Filed Dec. 16, 1988, Ser. No. 285,126  
Int. Cl.<sup>5</sup> G01F 11/24

U.S. Cl. 222—23 24 Claims  
1. A hopper apparatus for dispensing premixed and predetermined quantities of granulated materials comprising:  
a. a body structure having a side wall structure, a bottom portion, and a top portion having an inlet port, said side wall structure having at least a portion with a sloped configuration of a predetermined angle;  
b. a discharge chute structure mounted at the bottom portion

of said body structure in a predetermined position, said chute structure having metering means mounted therein and being constructed and arranged to provide a predetermined output of granulated material and being operable at the exterior of said body structure, said metering means further being a rotatable vane structure having a rotating shaft and a plurality of vane members, said chute and



rotatable vane structure being mounted to said body structure bottom whereby two adjacent vane members are exposed between generally the one and three o'clock position; and  
c. Adjustable leg structures having means to adjust the height of said apparatus so as to vertically position said discharge chute structure.

**4,953,753**  
**FLUID DISPENSING APPARATUS WITH PRESTRESSED BLADDER**

Norman Gortz, Newport Beach, Calif., assignor to The Norman Company, Newport Beach, Calif.  
Filed Jun. 10, 1988, Ser. No. 205,158  
Int. Cl.<sup>5</sup> B65D 37/00

U.S. Cl. 222—105 18 Claims



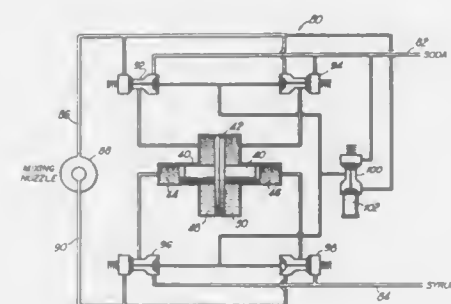
1. A fluid dispenser comprising  
a container body;  
a resilient bladder of generally tubular shape having an open end; and  
an internal prestressing mandrel comprising a first end, a second end, at least three fins joined at a common longitudinal edge to form a plurality of passages therealong, and a flange on the first end connectable to a valve means, said resilient bladder being stretched around the mandrel and sealed around the first end and the second end of the

mandrel, the resilient bladder being subjected to both radial and axial stresses,  
wherein the valve means comprises a ferrule having a gasket surface on one side thereof; a spring; a cup member positioned within the first end of the mandrel, the cup member having a shoulder therein and biased by the spring against the gasket surface to form a seal against the gasket surface; and a hollow stem inserted through the ferrule and the gasket surface and into the cup member contacting the shoulder therein, the gasket surface sealing against an outer surface of the hollow stem, the cup member being movable away from the gasket surface by depression of the hollow stem forming a communication channel from the passages, past the gasket surface into the cup member, and into the hollow stem,  
wherein the ferrule secures the valve means to the flange.

**4,953,754**  
**BEVERAGE DISPENSER SYSTEM USING VOLUMETRIC RATIO CONTROL DEVICE**

William S. Credle, Jr., Stone Mountain, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.  
Division of Ser. No. 888,546, Jul. 18, 1986, abandoned. This application Oct. 31, 1988, Ser. No. 265,203  
Int. Cl.<sup>5</sup> B67D 5/56

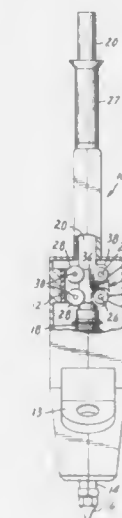
U.S. Cl. 222—129.2 3 Claims



1. A dispensing valve for a beverage dispenser comprising:  
(a) a body including a water passageway therethrough and a separate concentrate passageway therethrough;  
(b) valve means for controlling the flow through said passageways;  
(c) a nozzle for mixing together water and concentrate and for dispensing said mixture therefrom;  
(d) a double acting volumetric ratio control device in said dispensing valve for controlling the ratio of water to concentrate in the beverage dispensed from said dispensing valve, said device including a reciprocable piston in a cylinder defining two water chambers and two concentrate chambers, said water passageway being in fluid communication with each water chamber and said concentrate passageway being in fluid communication with each concentrate chamber;  
(e) said valve means including a single solenoid, a pilot valve using water as the pilot fluid, and four 3-way poppet valves, two in each of said water and concentrate passageways between the ratio control device and said nozzle, said solenoid being connected to said pilot valve, and said pilot valve operating said 3-way valves, each one of said four 3-way poppet valves being connected in said passageways to control the flow to and from a respective one of said four chambers; and  
(f) means for energizing said solenoid once for every cycle of operation of said device.

**4,953,755**  
**AUTOMATED THERMOPLASTIC DISPENSING DEVICE**  
Richard L. Dennison, Burnsville, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Filed Oct. 3, 1988, Ser. No. 252,688  
Int. Cl.<sup>5</sup> B67D 5/62

U.S. Cl. 222—146.5 1 Claim



1. A device for dispensing molten thermoplastic material comprising:  
a frame;  
a barrel member mounted on said frame and having an internal melting chamber communicating with an outlet opening through a nozzle;  
a sleeve having one end secured at said barrel member and a through opening communicating with the end of said melting chamber opposite said outlet-opening, said sleeve being adapted to receive a rod of solid thermoplastic material with one end portion of the rod in the melting chamber and the rod projecting through said sleeve along a predetermined path;  
means for heating said barrel member to melt the end portion of the rod therein;  
driving means adapted to be switched between a deactivated state and different forward activated states for driving said rod of solid thermoplastic material into said melting chamber at different predetermined rates to expel molten thermoplastic material through said nozzle at different predetermined rates, said driving means comprising at least one drive roller having an axis and a periphery adapted for engagement with said rod of solid thermoplastic material, means for rotatably mounting said drive roller on said frame adjacent the end of said sleeve opposite said chamber with said axis transverse of said path and said periphery positioned to afford driving engagement with a said rod of solid thermoplastic material projecting through said sleeve along said path, a reversible direct current motor having a rotor, drive means for coupling said rotor to said drive roller, and motor control means for deactivating said motor and for operating said motor to rotate said rotor shaft in a forward rotational direction at different predetermined rates of speed so that said motor rotates said drive roller in a direction to move said rod of solid thermoplastic material into said melting chamber at different predetermined rates to expel molten thermoplastic material through said nozzle at different predetermined rates; and  
suck back means operable upon switching of said drive means from any one of said forward activated states to said deactivated state adapted for moving said rod of solid thermoplastic material a single predetermined distance out

of said melting chamber to cause molten thermoplastic material in said nozzle to flow toward said melting chamber and restrict movement of that molten thermoplastic material out of the nozzle, said suck back means comprising means in said motor control means sequentially operated upon deactivation of said motor for shorting electro motive forces in said motor to ground, and for applying a predetermined amount of power to said motor to rotate said rotor in said motor in a reverse rotational direction through a predetermined angle.

4,953,756

## MODULAR DISPENSING SYSTEM

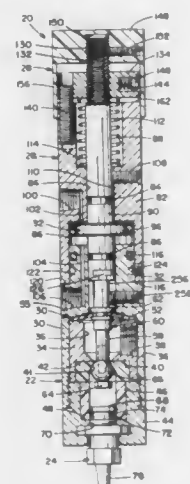
John P. Breault, New Britain, and Ewald F. Dickau, Glastonbury, both of Conn., assignors to Loctite Corporation, Newington, Conn.

Continuation-in-part of Ser. No. 176,877, Apr. 4, 1988, Pat. No. 4,930,669, which is a continuation-in-part of Ser. No. 57,614, Jan. 3, 1987, abandoned. This application Sep. 26, 1989, Ser. No. 412,770

Int. Cl.<sup>5</sup> F16D 1/00; B05C 11/00

U.S. Cl. 222—309

18 Claims



1. A modular system for dispensing precise quantities of fluid product comprising:

- a self-contained dispensing unit including dispensing means for dispensing the fluid product when in an open configuration and for stopping or prohibiting dispensing when in a closed configuration, said dispensing means including (i) a housing defining a reservoir for containing the fluid product under pressure, (ii) an inlet for introducing said fluid product to said reservoir under pressure, (iii) a valve means for controlling the dispensing of the fluid product from said reservoir, (iv) an end member and (v) sealing means intermediate said fluid product and an actuator means for sealingly isolating said actuator means from said fluid product;
- a self-contained actuator unit including (i) a cylindrical body having a cavity at one end and (ii) actuating means for effecting said valve means between the open and closed configurations; and
- two sets of mutually engageable locking means on said dispensing unit and on said actuator unit for releasably fixedly attaching said dispensing unit to said actuator unit, said first set of mutually engageable locking means comprising a male T-connector on said valve means and a similarly formed female receptive slot on said actuating means such that when the end member of said dispensing unit is inserted into the cavity of said actuator unit the male T-connector, when aligned with the female slot, is received by the slot and the actuator unit is rotated 90° relative to the dispenser unit, withdrawal of the male T-connector from the female slot is thereby prevented and

the valve means and actuating means are locked together and operate in a unitary manner; and said second set of mutually engageable locking means comprises an annular groove formed in said end member and one or more set-screws threadingly engaged through the cylindrical body of the actuator unit into the cavity such that when the end member is inserted into the cavity, said set-screws engage the annular groove;

said modular system characterized by the ability to readily connect and disconnect said dispensing unit from said actuator unit without loss of fluid product.

4,953,757

## FRONT RACK FOR A TRUCK

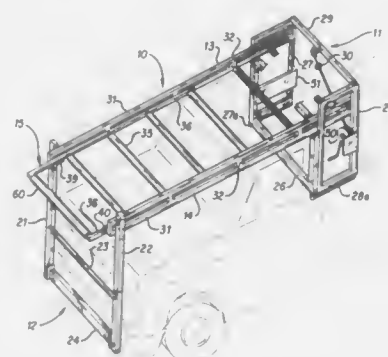
James R. Stevens, and Jodi Stevens, both of 515 Douglas St., Tillamook, Oreg. 97141

Filed Jun. 14, 1989, Ser. No. 365,703

Int. Cl.<sup>5</sup> B60R 9/00; B60P 3/10

U.S. Cl. 224—310

7 Claims



1. A front loading truck rack comprising:

- a bed frame assembly mounted immediately behind the cab of a truck;
- a vertical bumper post assembly mounted to the bumper in front of said truck;
- a horizontal frame assembly horizontally disposed between said bed frame assembly and said bumper assembly and attached thereto, said horizontal frame assembly mounted over the truck cab;
- ramp means pivotably mounted to said horizontal frame assembly in front of said truck cab, said ramp means being lowerable so that a load can be disposed on top of the ramp means and lifted up easily and without great difficulty;
- said bed frame, bumper post, horizontal frame and ramp assemblies are formed from hollow tubing;
- said bed frame comprises two parallel rectangular bed side frames and one rectangular bed front frame connecting said two side frames;
- said bumper post assembly comprises two parallel vertical posts, a lower post cross member disposed and attached between the bottom of said posts, and a middle post cross member disposed and attached between the middle of said posts to prevent said ramp means from resting on the hood of a vehicle;
- said horizontal frame assembly comprises two parallel elongated side frame members, each elongated side frame member attached to one of said vertical posts and one of said bed side frames;
- said ramp means comprising two parallel ramp side members, and ramp cross members disposed between said ramp side members, said ramp side members are disposed between and pivotably mounted at a pivot point to an adjacent horizontal side frame member;
- threaded shafts mounted inside said bumper posts;

threaded nuts mounted around said threaded shafts; longitudinal slots on said bumper posts; lever means affixed to said threaded nuts and extending through said bumper post slots, said ramp means resting atop said lever means, said lever for lifting up or lowering said ramp means; gearing mounted on a lower end of said bumper post shaft; threaded shafts mounted inside said middle post cross member, said middle post cross member shafts having gearing at one end intermeshing with said gearing on said bumper post shafts, said middle post cross member shafts having gearing at an opposite end; drive gear mounted in the center of said middle post cross member and intermeshing with said gearing on said opposite ends of said middle post cross member shafts, such that when said drive gear is rotated said middle post cross member shafts and said bumper post shafts rotate raising or lowering said nut and therefore raising or lowering said ramp means.

4,953,758

## VALVE CONSTRUCTION

Vincent Passalacqua, Yonkers, N.Y., assignor to Mark-O Industries, Mount Vernon, N.Y.

Filed Oct. 24, 1988, Ser. No. 245,025

Int. Cl.<sup>5</sup> B65D 88/54

U.S. Cl. 222—341

14 Claims



- 1. A valve for pumping fluid from a container comprising: a valve body;
- a valve chamber having a wall, said chamber being in said valve body;
- a first end of said body having an entrance passage there-through communicating with said chamber to provide a passage for the flow of fluid from a container to said valve chamber;
- a plunger;
- a piston within said chamber, connected to said plunger and movable therein in response to depression of said plunger;
- a seat in said chamber;
- flexible sealing means adjacent to said piston and movable therewith, said sealing means including a resilient washer and a rigid washer in axial abutment, said rigid washer being between said resilient washer and said entrance passage, said resilient washer having a diameter slightly larger than the diameter of said valve chamber, said rigid washer having a diameter slightly less than the diameter of said valve chamber;
- biasing means in said body of biasing said seal against said seat;
- a spout;
- an exit passage extending between said spout and said chamber and sealed by said seal when said seal is in the seated position;
- and a normally closed check valve between said chamber and said entrance passage;
- depression of said plunger causes said resilient washer to flex sufficiently to permit passage of fluid between said seat and said chamber wall to said exit passage, and return of said plunger creates a decreased pressure in said valve

chamber to permit fluid to flow through said entrance passage and open said check valve to refill said chamber, said resilient washer wiping the valve chamber wall when said piston returns.

4,953,759

## METERING VALVE FOR DISPENSING AEROSOLS

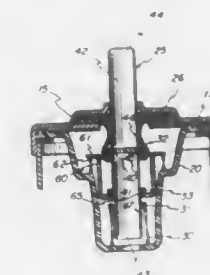
William J. Schmidt, Xenia, Ohio, assignor to Vernay Laboratories, Inc., Yellow Springs, Ohio

Filed Apr. 14, 1989, Ser. No. 338,800

Int. Cl.<sup>5</sup> B05B 1/00

U.S. Cl. 222—402.2

6 Claims



- 1. A metering valve assembly for dispensing measured quantities of an aerosol from a pressurized container, comprising: (a) an annular member forming a cap for sealed attachment to a pressurized container,
- (b) a main housing attached to said cap and adapted to depend therefrom in said container with the interior thereof open to said container,
- (c) a tubular valve member supported in said cap and housing for lengthwise movement between charging and dispensing positions,
- (d) said valve member having an internal wall separating the interior thereof into an inlet chamber and a discharge chamber within the inner and outer ends of said valve member,
- (e) said discharge chamber having a supply port in the side thereof adjacent said wall and a dispensing outlet spaced lengthwise of said valve member from said supply port and open to the atmosphere,
- (f) said inlet chamber having an outlet port adjacent said wall and an inlet port spaced from said outlet port lengthwise of said valve member and open to the interior of said container,
- (g) diaphragm means within said housing including a partition wall of resilient material surrounding said valve member and of normally larger inner periphery than the outer periphery of said valve member to define therewith an annular metering chamber,
- (h) inner and outer annular seal means forming the opposite inner and outer ends of said metering chamber and having slidable sealing engagement with said valve member, and
- (i) said supply and outlet ports being located in predetermined spaced relation on said valve member such that when said valve member is in said charging position, said supply port will be sealed from said metering chamber and said outlet port will be open to said metering chamber for flow of the contents of said container into said metering chamber, and when said valve member is in said dispensing position, said outlet port will be sealed from said metering chamber and said supply port will be open to said metering chamber,
- (j) whereby upon movement of said valve member from said charging position to said dispensing position, the pressure within said container will collapse said diaphragm wall and thereby force the contents of said metering chamber through said supply port to said dispensing outlet.

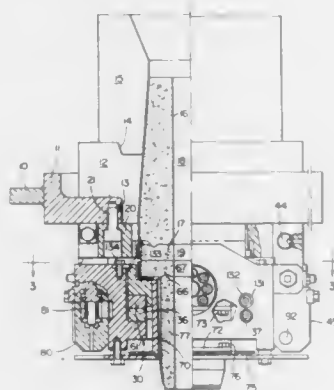


4,953,760  
SLIDE-GATE POURING APPLIANCE FOR LADLES AND  
SIMILAR DEVICES

Salvatore Foglio, Taranto, Italy, assignor to Nuova Sanac S.p.A.  
and ILVA S.p.A., both of Genoa, Italy  
Filed Jun. 9, 1989, Ser. No. 363,857  
Int. Cl.<sup>5</sup> B22D 41/40

U.S. Cl. 222—690

15 Claims



1. Slide-gate pouring device comprising:  
a first metal frame, solid with the bottom of a ladle, and supporting a first fixed holed refractory plate,  
a second removable metal frame, hanging with a clearance from said first metal frame and supporting a pair of fixed guides on which, through complementary guides there runs  
a third sliding metal frame supporting a second holed refractory plate, between a first working position in which the hole in the first fixed refractory plate is aligned with the hole in the second holed refractory plate, and a second working position in which the holes in said first fixed and said second refractory plates are out of axis and do not interfere with each other, in which said slide-gate pouring appliance has tightening means capable of pressing said second holed and said first fixed hole refractory plates against one another and maintaining contact between them, on each side of said second removable metal frame a container for springs is jointed to a lower end of a pair of link rods, upper ends of which are jointed to said first metal frame, and in which said springs apply a prod against an outer flange on said second removable metal frame and in which the axis of action of the springs is outside a straight line joining centres of pins articulating said link rods.

4,953,761  
STOPPER ROD SPATIAL CONTROL MECHANISM  
Oleg Fishman, Maple Glen, Pa.; Satyen N. Prabhu, Maple Shade; John P. Burk, Mt. Holly, both of N.J., and Emad Tabatabaei, Bensalem, Pa., assignors to Inductotherm Corp., Rancocas, N.J.

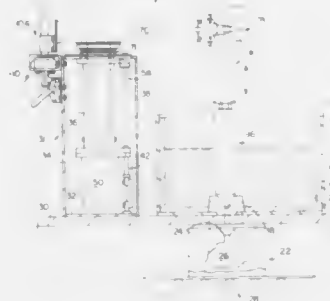
Filed Sep. 27, 1988, Ser. No. 249,806  
Int. Cl.<sup>5</sup> B22D 37/00

U.S. Cl. 222—602

15 Claims

1. A stopper rod spatial control mechanism for use with a bottom discharge holding reservoir for molten metal having a nozzle, comprising  
a base;  
an outer tube having a longitudinal axis perpendicular to said base, said outer tube being swingably mounted about an axis parallel to and spaced away from said longitudinal axis;  
an inner tube telescopically mounted within said outer tube,

and being reciprocally movable along said longitudinal axis and being rotatable about said longitudinal axis, a servomotor fixedly mounted at a lower end of said outer tube;  
a ball screw connected to said servomotor;  
a ball nut affixed to said inner tube and cooperating with said ball screw;  
a boom having a first end and a second end, being affixed to said inner tube adjacent said first end and being rotatable with said inner tube about said longitudinal axis;



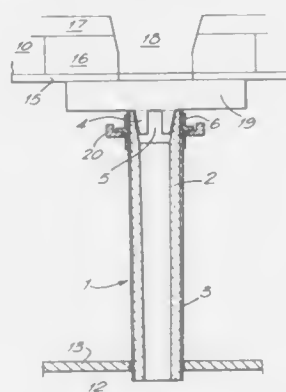
a stopper rod depending from said second end of said boom; and  
means operatively associated with said boom for braking said boom;  
whereby said stopper rod is aligned with the nozzle by the combined movements of rotating said inner tube about said longitudinal axis and swinging said outer tube about said axis parallel to said longitudinal axis, then fixing said alignment via said braking mechanism, and thereafter reciprocally moving said stopper rod above the nozzle by actuation of said servomotor.

4,953,762  
POURING TUBES  
Jean P. Villani, Charleville-Mezieres, France, assignor to Fosco International Limited, Birmingham, England  
Filed Sep. 26, 1988, Ser. No. 248,987  
Claims priority, application United Kingdom, Sep. 24, 1987, 8722442

Int. Cl.<sup>5</sup> B22D 41/54

U.S. Cl. 222—606

8 Claims

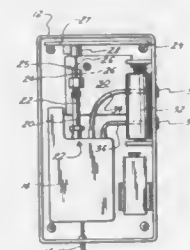


1. A pouring tube for use in casting molten metal consisting of an inner tube of refractory heat insulating material, said inner tube having an exterior peripheral surface; and an outer layer of fibrous mat intimately laminated to said inner tube only over substantially all of said exterior peripheral surface thereof.

4,953,763  
ANIMAL SCENT DISPENSING APPARATUS  
Chandler T. Kierum, 124 Jeanson St., Pineville, La. 71360,  
and Leonard J. Dupree, 2007 Dixie St., Alexandria, La. 71309  
Filed Nov. 4, 1988, Ser. No. 267,537  
Int. Cl.<sup>5</sup> G04C 5/08

U.S. Cl. 222—644

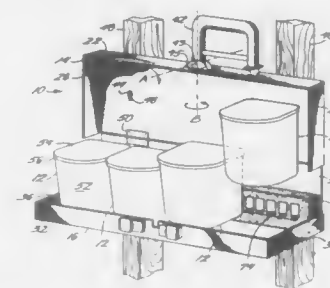
8 Claims



1. An animal scent dispensing apparatus comprising:  
(a) a housing that can be supported in an elevated position above the ground;  
(b) animal lure dispensing reservoir means contained by the housing for containing a liquid animal scent to be dispensed from the reservoir in small amounts at intervals and over several days;  
(c) outlet means for releasing a small volume of fluid scent from the reservoir at pre-selected time intervals as determined by a timer within said housing, each in a drip-like fashion so that the dispensed fluid scent will ball to the ground;  
(d) valved air line means communicating with the reservoir means, for maintaining a vacuum on the reservoir means when not dispensing fluid therefrom;  
(e) timed valving means within the housing responsive to said timer and operable between open and closed flow positions for venting the reservoir means at the valved air line means to thereby valve flow from the reservoir means via the outlet means; and  
(f) power supply means within the housing for powering the timed valving means.

4,953,764  
CONTAINER SYSTEM FOR MANAGING NAILS,  
SCREWS AND THE LIKE  
Kovacs, Mark S., 117 Brookline Dr., Apartment 2107, Columbia, S.C. 29210  
Filed Sep. 5, 1989, Ser. No. 402,908  
Int. Cl.<sup>5</sup> A45C 15/00; A45F 5/02; B25H 3/02; A47F 5/08  
U.S. Cl. 224—151

14 Claims



1. A system for use with small objects, such as nails, screws and the like, comprising:  
a plurality of containers dimensioned for holding a multiplicity of said small objects; and  
a means for storing said plurality of containers,

said containers each having  
a container body with a curved interior and a rim, and  
a lid removably attachable to said container body, said container body and said lid removably from said storing means;  
said storing means having  
a lower portion dimensioned for said plurality of containers;  
an upper portion opposing said lower portion, said lower portion hingedly attached thereto about a first axis on one side of said storing means to said upper portion, and  
means for latching an opposing side of said storing means, said upper portion latched to said lower portion, said latching means having a carrying handle pivotally attached to said storage means, said carrying handle pivoting about a second axis from a latching position to an unlatching position and further pivoting about a third axis perpendicular to said first axis from said unlatching position to a noninterfering position with respect to said storing means.

4,953,765  
HORSE GROOMING ORGANIZER  
Vicki A. Little, P.O. Box 781, 204 Sun Season, and Barbara J. Barton, P.O. Box 782, 213 Whispering Sands, both of Santa Teresa, N. Mex. 88008, assignors to Vicki A. Little and Barbara J. Barton, a part interest to each  
Filed Jan. 6, 1989, Ser. No. 294,008  
Int. Cl.<sup>5</sup> A45F 4/00; B65D 30/22  
U.S. Cl. 224—151

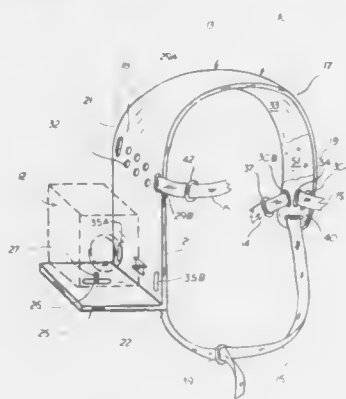
7 Claims



1. A horse grooming organizer system comprising:  
a generally rectangular sheet-form body member made of flexible fabric;  
a doubled over edge at a top end of said sheet-form body member and connected at its edge in firm assembly with said body member to form a transverse channel;  
stiffening means comprising a rod-like pole in said channel; eyelet support members positioned at opposite sides of said transverse channel by means of which said body member can be suspended from a support;  
a folded over edge at a bottom end of said sheet-form body member and operatively connected in firm assembly with said body member to form a plurality of transversely extending rectangular channel sections;  
planar rigidifying means in said channel sections;  
strap means connected to opposite sides of the bottom end of said body member at the endmost of said channel sections and to lateral edges of said body member thereby to form

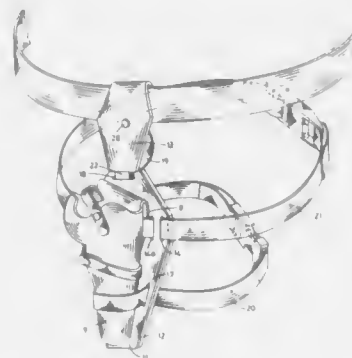
the channel sections into a rectangular trough-shaped shelf;  
 a plurality of transversely extending hook and loop fastening strips connected to said body member to form spaced apart parallel connecting means; and  
 a plurality of pouches and pockets forming storage members releasably secured to the connecting means, each storage member having a cooperating hook and loop fastening strip attached to a backside thereof for matching with one of said connecting means, said pockets and pouches being variably shaped and configured to receive horse grooming components of complementary size and shape.

4,953,766  
**HEADGEAR CAMERA MOUNT**  
 Thomas R. Cruickshank, 6431 Askeland Dr., Anchorage, Ak. 99507  
 Filed Oct. 31, 1989, Ser. No. 430,868  
 Int. Cl.<sup>5</sup> A42B 1/24; G03B 29/00  
 U.S. Cl. 224—181



1. A headgear device for mounting a camera substantially at eye level comprising:
  - (a) a frame having an elongated arcuate portion adapted to fit over the top of the wearer's head, a flat side panel having opposed outer and inwardly directed surfaces and upper and lower extremities, said upper extremity being emergent from said arcuate portion as a continuous integral extension thereof in a manner permitting resilient movement of said arcuate portion, and a shelf panel positioned perpendicularly and connected to said side panel and adapted to be disposed in a horizontal orientation when in use, said shelf panel having a positioning slot elongated in the direction of said side panel and a threaded bolt adapted to more within said positioning slot and secure a camera to said shelf, and strap-holding slots disposed within said side panel and arcuate portion,
  - (b) a first retaining strap of adjustable length adapted to lie against the wearer's forehead and engaging said strap-holding slots,
  - (c) a second retaining strap of adjustable length adapted to lie against the rear of the wearer's head and engaging said strap-holding slots, and
  - (d) a third retaining strap of adjustable length adapted to lie beneath the chin of the wearer and engaging said strap-holding slots.

4,953,767  
**HOLSTER MOUNTING PLATFORM**  
 Christopher E. Bennett, P.O. Box 8226, Raleigh, N.C. 27611-8226  
 Filed Oct. 31, 1989, Ser. No. 430,671  
 Int. Cl.<sup>5</sup> F41C 33/02; A45F 5/00  
 U.S. Cl. 224—192

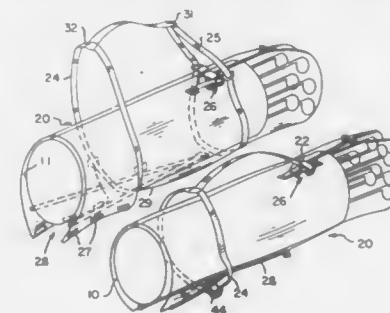


1. A handgun holster mounting platform for mounting a holster to a leg of a user, comprising:
  - (a) a lower mounting platform sized and adapted to receive a handgun holster thereon having a plurality of horizontal and vertical slots located therein;
  - (b) an upper faceplate having folded over flap at the upper portion thereof defining a loop through which a user's waist belt may be threaded;
  - (c) a disc means having an aperture therethrough, said loop loosely passing through said aperture;
  - (d) a strap means for adjustably connecting the upper faceplate to the lower platform by threading said strap through said aperture of said disc means and through not less than two horizontal slots located in said lower mounting platform;
  - (e) an upper mounting belt sized to fit around a leg of a user and adjustably threaded through not less than four upper vertical slots located in the lower mounting platform;
  - (f) a lower mounting belt sized to fit around a leg of a user and adjustably threaded through not less than two lower vertical slots located in the lower mounting platform;
  - (g) buckling means located at the ends of said upper mounting belt;
  - (h) buckling means located at the ends of said lower mounting belt; and whereby said upper and lower mounting belts cooperate with a handgun holster to secure a handgun holster to said mounting platform and to a leg of a user.

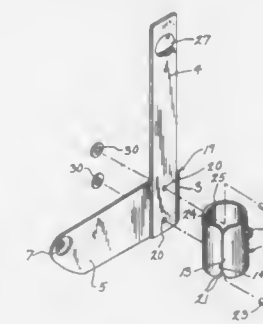
4,953,768  
**GOLF BAG RAIN COVER**  
 Clarence W. Muse, 7613 Burgess St. W., Apt. D, Tacoma, Wash. 98467  
 Filed Feb. 28, 1989, Ser. No. 316,812  
 Int. Cl.<sup>5</sup> A45C 11/00  
 U.S. Cl. 224—205

1. A golf bag rain cover comprising: a cover member surrounding a golf bag, a connecting means to removably attach a portion of an inside of said cover member to said golf bag; and a shoulder strap attached at an upper end of said strap to said connecting means; wherein said connecting means comprises an inner webbing affixed to said inside of said cover

member, on a strapsided portion of said cover member, above a midpoint of a centerline of said cover member, said inner

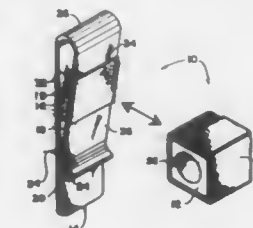


4,953,769  
**BATON CLIP**  
 Kevin L. Parsons, 16 Wagon Wheel Dr., Appleton, Wis. 54915;  
 Gary M. Gruody, 921 E. Hamilton St., Milwaukee, Wis. 53201, and Jacqueline M. Dunstan, 604 Aspen St., South Milwaukee, Wis. 53172  
 Filed Mar. 31, 1989, Ser. No. 332,237  
 Int. Cl.<sup>5</sup> A45F 5/00  
 U.S. Cl. 224—247



1. In a baton clip of the type which includes a base member, a retaining band attached to the base member, the retaining band having a generally cylindrical shaped wall member when in a relaxed state, and having a longitudinal slit extending through the wall member defining two longitudinal engaging edges which form a longitudinal break in the generally cylindrical shaped wall member in the relaxed state, the retaining band being adapted for holding the baton by slidably inserting the baton therethrough, and the retaining band being deformable to allow the baton to be broken out laterally through the longitudinal break, the improvement wherein: the longitudinal edges are formed of a hard material; and the retaining ring has a high restorative force toward the relaxed state; whereby when the baton is broken out through the longitudinal break, and after the baton has cleared the longitudinal edges, the retaining band sharply restores toward the relaxed state, thrusting the hard longitudinal edges together with sufficient velocity to produce a loud snapping sound.

4,953,770  
**POOL CUE CHALK HOLDER**  
 Thomas Bond, Sr., 16885 McGregor Blvd., Fort Myers, Fla. 33908  
 Filed Jan. 24, 1989, Ser. No. 301,520  
 Int. Cl.<sup>5</sup> A45F 3/14; A63D 15/16  
 U.S. Cl. 224—250



4 Claims

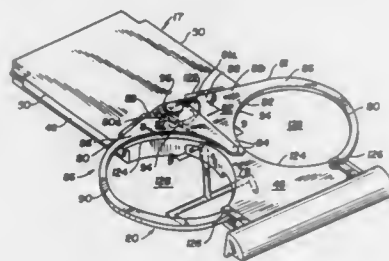
1. A pool cue chalk holder comprising: a clip that is selectively attachable to an article of clothing, said clip including an elongate, generally flat inner member that is engagable with an inner surface of the article of clothing, an elongate outer member having a generally plate-like outer face area and being interconnected with said inner member and extendable over an outer surface of the article of clothing, and spring means for urging said inner and outer members toward each other; complementary first and second hook and loop fastening elements, said first element including a strip of hook and loop material that is secured to said outer face area of said outer clip member and said second fastening element surrounding and being attachable to a pool cue chalk; said second fastening element having sections engaging at least four sides of said pool cue chalk; at least a portion of each section having complementary hook and loop material attached such that a selected one of at least four sides of said chalk may be placed against said clip causing said second fastening element to engage with said first fastening element to detachably fasten said chalk to said clip.

4,953,771  
**DRAWER MOUNTED CUP HOLDER**  
 Douglas A. Fischer, Grand Rapids, and Joseph S. Meinke, Rockford, both of Mich., assignors to Lesco, Inc., Kentwood, Mich.  
 Filed Feb. 28, 1989, Ser. No. 316,971  
 Int. Cl.<sup>5</sup> A47B 37/00; F16M 13/00; A47C 7/62  
 U.S. Cl. 224—273

1. A cup holder for supporting at least one beverage container in a vehicle, comprising a drawer member, fixed support means therefor, and container retaining means carried by the drawer member, the fixed support means including means for mounting the holder in a vehicle, and means supporting the drawer member on the mounting means for reciprocating movement relative to the mounting means between an operative position extending outwardly of the mounting means and a storage position extending inwardly relative to the mounting means, the container retaining means being mounted to the drawer member for pivotal movement therewith about a verti-

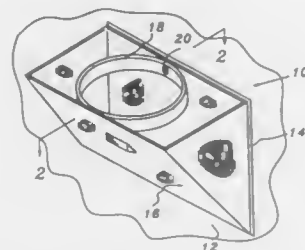


cal axis relative to the fixed support means and for movement relative to the drawer member between a retaining position forming therewith a container retaining configuration and a collapsed position forming with the drawer member a compact configuration occupying a space smaller than the space occupied by the container retaining configuration, the cup holder further comprising means carried by the drawer member biasing the container retaining means toward the retaining position, the fixed means including cam means engaged with the container retaining means to urge the container retaining means to the collapsed position upon movement of the drawer



member from the operative position to the storage position, the drawer member comprising a substantially flat horizontal member formed with a first curved edge portion, the container retaining means comprising a cup ring and means mounting the cup ring on the drawer member for pivotal movement relative thereto about a vertical axis between the retaining position and the collapsed position, the cup ring being formed with a second curved edge portion complementary to the first curved edge portion to define therewith a container receiving aperture when the cup ring is in the retaining position, the biasing means comprising a spring interposed between the drawer member and the cup ring.

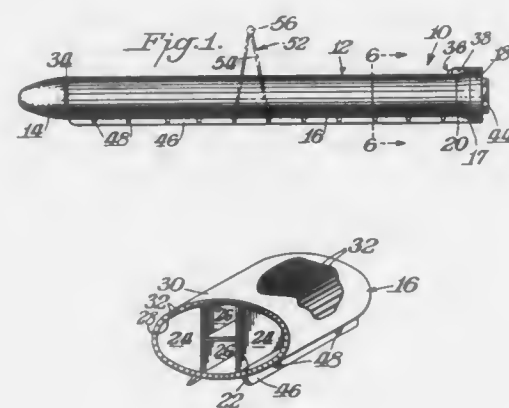
**4,953,772**  
**ASHTRAY REPLACEMENT DRINK HOLDER**  
Greg Phifer, Rte. 2, Box 816, Henry, Nebr. 69349  
Filed Nov. 17, 1986, Ser. No. 930,890  
Int. Cl.<sup>5</sup> B60R 7/00  
U.S. Cl. 224—282



1. A drink holder for mounting within a conventional ashtray holding slot formed in a vehicle dash, said drink holder comprising:
  - a. drawer positionable within said ashtray holding slot;
  - b. drink holding ring securable to said drawer, said drink holding ring being rotatably mounted to said drawer; and,
  - c. drink bottom support means slidably attached to a bottom portion of said drawer, said drink bottom support means being positionable beneath said drink holding ring.

**4,953,773**  
**SKI CARRIER**  
John G. Wirth, R.D. #2, Box 140 F, Landenberg, Pa. 19350  
Filed Aug. 14, 1989, Ser. No. 393,225  
Int. Cl.<sup>5</sup> B60R 9/12  
U.S. Cl. 224—328

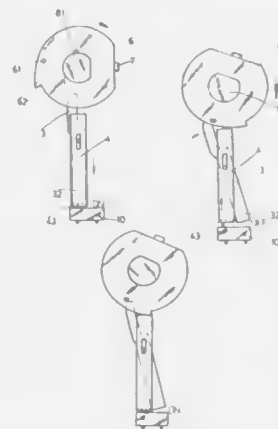
31 Claims



1. A ski carrier in combination with two skis, said ski carrier comprising a generally rigid tube having a front nose and a rear cap interconnected by a body portion, a divider in said body portion dividing said body portion into a plurality of individual compartments, said cap being connected to said body portion by connecting means whereby said cap is selectively movable to an open position which provides access to said compartments and to a closed position which closes said compartments, locking means for selectively maintaining said cap in said closed position, said compartments including a pair of side compartments each of which is dimensioned to snugly hold an individual ski therein with the binding of the ski spaced from the wall of said body portion, and each of said skis being in a separate one of said compartments.

**4,953,774**  
**ELECTRIC STAPLING GUN WITH AUTO-RESET, ENERGY-SAVING AND SHOCK-ABSORBING FUNCTIONS**  
Motor Lai, Taichung-Hsien, Taiwan, assignor to Regitar Power Tools Co., Ltd., Taya Taichung Hsien, Taiwan  
Filed Apr. 26, 1989, Ser. No. 344,684  
Int. Cl.<sup>5</sup> B25C 5/15  
U.S. Cl. 227—131

1 Claim

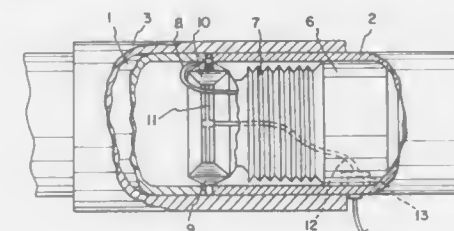


1. An electric stapling gun comprising:

- a trigger mounted in the stapling gun;
- a first link rod pivoted on an inner side of said trigger and capable of moving therewith;
- a second link rod formed with an elongated slot put on to a pin on the inner side of said trigger and a projection for receiving a lower end of said first link rod so that said second link rod will move downwards when said first link rod is pressed and will return to original position by means of a spring when said trigger is released;
- a cam fixedly mounted on an output shaft of a gearing and having a lobe on which there is a pin for pushing a ram, said lobe being designed such that when said cam rotates, said lobe will push said first link rod away from said micro-switch and press said second link rod to activate said micro-switch once again;
- a micro-switch disposed below said first link rod so that when said trigger is pressed to move said first link rod downwards, said first link rod will turn on said micro-switch with a lower end thereof and connect a power supply to a driving motor to rotate said cam so as to urge said ram to hit a staple out of said stapling gun;
- a spring with different pitches at both ends and used to push said ram to carry out stapling action; and
- a metallic protective ferrule fixedly mounted in said electric stapling gun and used to receive said spring and part of said ram and having a rubber pad on an inner end thereof.

**4,953,775**  
**METHOD OF EFFECTING A SINGLE JOINT BETWEEN TWO PIPES**  
Goran Lande, Stockholm, Sweden, assignor to Norabel AB, Nora, Sweden  
Filed Mar. 15, 1988, Ser. No. 168,156  
Claims priority, application Sweden, Apr. 7, 1987, 8701441  
Int. Cl.<sup>5</sup> B23K 20/08  
U.S. Cl. 228—107

5 Claims

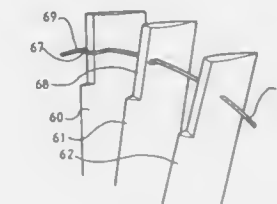


1. A method for effecting a single joint between the ends of two pipes, comprising the steps of:
  - inserting into the end of one said pipe a displacement device and peripherally anchoring said displacement device to the inner surface of the pipe;
  - inserting into the end of said one said pipe with displacement device a single inner peripheral body including explosive charge and detonator, said inner peripheral body being located between said displacement device and the pipe end;
  - arranging an outer peripheral body around the outer surface of one of the pipes, leaving the pipe end exposed;
  - arranging said pipes such that the ends are opposite each other without axial displacement, and substantially abutting each other;
  - expanding the anchored displacement device in the axial direction so as to cause the inner peripheral body to move toward the pipe ends and be centered between the pipe ends, and subsequently collapsing said displacement device so that it is no longer anchored;
  - locating said outer peripheral body over the pipe ends; and
  - detonating the explosive so as to explosion weld the pipe ends, with the single inner peripheral body joined to the

pipe ends and the outer peripheral body serving as a support.

**4,953,776**  
**TURBINE BLADE REPAIR**  
Michael J. Fraser, Broughton Hackett, United Kingdom, assignor to Refurbished Turbine Components Limited, Droltwich, United Kingdom  
Filed Sep. 15, 1989, Ser. No. 407,637  
Claims priority, application United Kingdom, Sep. 16, 1988, 8821812  
Int. Cl.<sup>5</sup> B23K 31/00; F01D 5/28; B23P 15/02  
U.S. Cl. 228—119

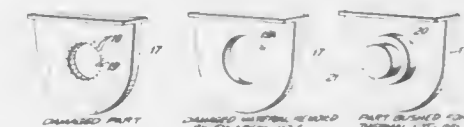
15 Claims



1. A method of repairing a turbine blade of the type having a lacing wire, said method incorporating the steps of:
  - (a) removing any connection between the lacing wire and the turbine blade to be repaired and other blades adjacent the blade to be repaired;
  - (b) removing any connection interconnecting adjacent members making up the lacing wires;
  - (c) causing relative movement in a circumferential direction of said lacing wire members in a direction clockwise and/or anti-clockwise so that the lacing wire members are moved in a direction away from the blade to be repaired;
  - (d) carrying out a repair step on the blade to be repaired after said lacing wire has been removed therefrom;
  - (e) moving the members forming said lacing wire in opposite directions to which it had previously been moved so as to re-establish said lacing wire in its proper position;
  - (f) remaking any connection previously disconnected to enable said movement.

**4,953,777**  
**METHOD FOR REPAIRING BY SOLID STATE DIFFUSION METAL PARTS HAVING DAMAGED HOLES**  
Glenn E. Griffith; Joaquin Bustamante; Michael D. Scheel, all of San Antonio, and Herbert Koven, Southlake, all of Tex., assignors to Chromalloy Gas Turbine Corporation, Orangeburg, N.Y.  
Continuation of Ser. No. 916,642, Oct. 8, 1986, abandoned. This application May 11, 1988, Ser. No. 193,213  
Int. Cl.<sup>5</sup> B23K 31/00  
U.S. Cl. 228—119

28 Claims



1. A method for repairing by solid state diffusion a damaged portion of an inner surface of a pin-mounting hole of a used turbine engine metal part, wherein said hole has been stress damaged during service while mounted to another part via a pin passing through said hole, which comprises,
  - machining said stress damaged hole to provide a cylindrical diameter sufficient to remove the damaged portion there-

from and provide said used component with a new hole with a smooth finish,  
 providing a metal bushing having inner and outer diameters, said outer diameter being of size and finish relative to the machined diameter of the said hole to provide a close fit therewith,  
 the composition of said metal bushing being compatible with that of the metal part,  
 inserting said bushing into the machined hole of the metal part,  
 providing a cylindrical metal single piece mandrel of diameter corresponding to the inner diameter of the bushing, the diameter of said mandrel being sufficient to provide a close fit with said bushing,  
 inserting said single piece mandrel into the bushing to provide an assembly thereof with said metal part,  
 said metal single piece mandrel having a mean coefficient of thermal expansion of at least about 10% greater than that of the metal bushing for a selected solid state diffusion temperature sufficient to provide pressure to said bushing, and then subjecting said assembly under substantially non-oxidizing conditions to solid state diffusion at an elevated solid state temperature corresponding to at least about 50% of the absolute melting point (solidus) of the metal part for a time at least sufficient to diffusion bond the bushing under pressure to said metal part by virtue of the expansion of said mandrel in said bushing at said diffusion temperature, but not exceeding that temperature and time at which substantial grain growth occurs,  
 cooling said assembly to ambient,  
 removing said mandrel,  
 and then machining the inner diameter of said diffusion-bonded bushing to the specified diameter of said metal part.

4,953,778

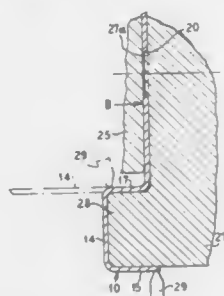
# METHOD OF MAKING TORSIONAL VIBRATION DAMPER HAVING A ROLL SPUN HOUSING

Thomas J. Critton, East Amherst, N.Y.; Donald S. Johnson, Fort Erie, Canada; Walter P. Pukalo, Bladell, N.Y., and Ralph Yorlo, Easton, Pa., assignors to Vibratex, Inc., Buffalo, N.Y. Division of Ser. No. 81,003, Aug. 3, 1987, Pat. No. 4,872,369. This application Jun. 8, 1989, Ser. No. 363,621

Int. Cl.<sup>5</sup> B21D 22/16

U.S. Cl. 228—173.6

14 Claims



1. A method of making a viscous torsional vibration damper of the kind operating on the shear film principle and having an annular channel shaped housing providing an annular working chamber within which is mounted an annular complementary inertia mass ring and a viscous damping fluid substantially filling shear film spaces between working surfaces of the inertia ring and confronting working surfaces of the housing within said chamber, comprising:

roll spinning a metal blank into a generally channel shaped housing shell and by said roll spinning providing an axially facing base wall and annular radius corners joining said base wall to spaced generally axially extending radially

inner and radially outer walls and which walls provide said housing working surfaces;  
 providing an integral annular hub flange extending radially inwardly from the distal edge of said radially inner wall;  
 providing an annular series of spaced bolt holes in said hub flange;  
 forming a spinning roll work hardened burnished finish on said housing working surfaces;  
 forming a rabbet having an axially outwardly facing shoulder seat on the distal edge of said radially outer wall and encircled by an annular lip flange of larger inside diameter than the inside diameter of said radially outer wall;  
 providing a circular closure of an outside diameter complementary to and closely fitting within said lip flange and seating an axial face at said outside diameter of the cover plate on said shoulder seat;  
 providing bolt holes in said closure and matching said bolt holes in said hub flange;  
 hermetically sealing the interfaces of said hub flange and said cover plate;  
 and hermetically sealing and radially outer edge of said cover plate within said rabbet.

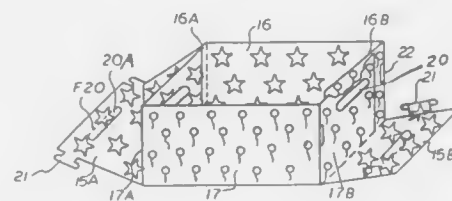
4,953,779

# REVERSIBLE FOLDABLE CONTAINER AND CLOSURE THEREFOR

Mark S. Densen, 18 Blackburn Pl., Summit, N.J. 07901 Continuation of Ser. No. 104,354, Oct. 5, 1987, abandoned, which is a continuation of Ser. No. 888,365, Jul. 23, 1986, abandoned, which is a continuation of Ser. No. 674,691, Nov. 26, 1984, abandoned. This application Jun. 6, 1988, Ser. No. 203,068 Int. Cl.<sup>5</sup> B65D 5/42

U.S. Cl. 229—23 R

2 Claims



2. A knock-down container and cover therefor for use as a utility domestic storage box for home use comprising a first blank of foldable sheet material having a first pair of spaced apart foldlines to define opposed side and connected end panels, and a second pair of spaced apart foldlines spaced intermediate the width of said blank and extending normal to and between said first pair of spaced apart foldlines to define therebetween a bottom panel, opposed outer end panels connected to said bottom panel, said outer end panels being separated from its contiguous inner end panels whereby said side panels and inner end panels can be folded relative to said bottom panel to define a rectangular container in the erected position of said first blank, and said outer end panels being folded into overlying position relative to the contiguously folded inner end panels in the erected position of said container, means for detachably interlocking said panels in the erected position of said container, indicia means disposed on both sides of said first blank, said indicia means defining a separate and different predetermined decorative and complementary pattern on each side of said first blank which are co-extensive in area to that of said first blank, and a second blank of foldable sheet material, said second blank of sheet material having transverse foldlines to define a cover panel and connected side and end flaps adapted to be oppositely folded relative to said cover panel to form a cover for said container in the erected position of said second blank, said second blank having complementary indicia means defining a predetermined and different decorative pattern on each side of said second blank co-extensive in area to

that of said second blank, said indicia means on said first blank complementing said indicia on said second blank, each of said blanks being adapted to be reversely folded about its respective foldlines so that in their respective erected positions, said container and closure therefor can be formed with mixed and matched indicia depending upon the direction in which the respective blanks are folded in erecting said container and closure therefor.

4,953,780

# POSTCARD WITH PERSONAL PHOTOGRAPH

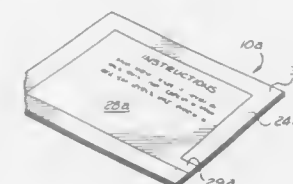
Thomas H. Ross, 4525 E. Gainey Ranch Rd. #254g330401, Scottsdale, Ariz. 85258

Filed Sep. 5, 1989, Ser. No. 402,339

Int. Cl.<sup>5</sup> B42D 15/02; B44C 5/02

U.S. Cl. 229—92.8

6 Claims



1. A postcard comprising:
  - (a) a substantially rigid sheet member having a first surface, a second surface, and a plurality of edges, said first surface having a space for an address and a space for a personal message;
  - (b) adhesive means on said second surface of said sheet member for holding a photograph of a first predetermined size thereon;
  - (c) a protective sheet for covering said adhesive means, said protective sheet including
    - (i) a central portion overlying said adhesive means, said central portion having a plurality of sides,
    - (ii) a perimetric border portion surrounding said central portion and divided from said central portion by means of a weakened line, said perimetric border portion comprising a plurality of outer edges coextensive with the edges of said sheet member and parallel to the sides of said central portion, and
    - (iii) pull means attached to said central portion for facilitating separation of said central portion from said perimetric border portion, said pull means comprising a tab extending from a side of said central portion to an edge of said perimetric border portion,
 said central portion being detachable from said perimetric border portion and releasable from said adhesive means to define a space for receiving a photograph.

4,953,781

# CLOSURE FOR A CONTAINER

William T. Bryan, 927 Garmon Dr., Springfield Township, Hamilton County, Ohio 45231

Filed Jul. 22, 1988, Ser. No. 222,850

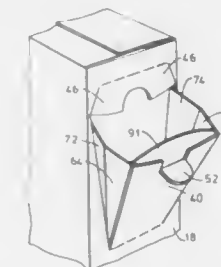
Int. Cl.<sup>5</sup> B65D 17/28, 5/74

U.S. Cl. 229—125.11

20 Claims

1. A pour spout assembly for a container having a wall which comprises a first tongue formed from the wall and hinged to the wall and a second tongue formed from the wall and hinged to the wall, the first tongue being defined by a transverse slit in said wall and downwardly extending upright slits in said wall at opposite ends of the transverse slit, the first tongue being hinged to the wall at lower ends of the upright slits, the second tongue being defined by said transverse slit and by upwardly extending slits at opposite ends of the transverse slit, the second tongue being hinged to the wall at upper ends of the upright slit of the second tongue, and a web mem-

ber a central portion attached to an inner face of the first tongue, outer glue panels attached to an inner face of the container adjacent the first tongue, and accordin pleat panels connecting the central portion and the outer glue panels, free edges of the central panel of the web being hinged to the accordin pleat panels, outer edges of the accordin pleat



4,953,782

# FRESH PRODUCE SHIPPING CONTAINER WITH SELF-LOCKING TOP

Carl M. Noland, Winter Haven, Fla., assignor to Nekoosa Packaging Corporation

Filed Sep. 20, 1989, Ser. No. 409,780

Int. Cl.<sup>5</sup> B65D 5/10

U.S. Cl. 229—157

37 Claims



1. A shipping container having an interior and an exterior and being formed from a generally rectangular blank of a relatively rigid, foldable sheetlike material, said container comprising:

a tubular body portion formed from four serially connected body panels in said blank by bending along fold lines at the junctures of said body panels and by connecting the first and last of said serially connected body panels to one another, said tubular body portion including a first pair of opposed, spaced apart body panels that extend generally parallel to one another and a second pair of opposed, spaced apart body panels that extend generally parallel to one another and generally transversely of said first pair of opposed, spaced apart body panels, said tubular body portion having a first end extending transversely of said body panels and a second end spaced from said first end and extending transversely of said body panels; and self-locking means closing one of said first end and said second end of said tubular body portion, said self-locking means comprising:

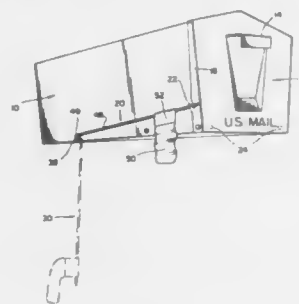
first flap means comprising a pair of flaps, one of said pair of flaps having a free edge and being foldably attached to one of said first pair of body panels at a first transverse fold line, said one of said pair of flaps further being folded at said first transverse fold line to extend transversely with respect to said one of said first pair of body panels toward the other of said first pair of body panels, the other of said pair of flaps having a free edge and being foldably at-



tached to the other of said first pair of body panels at a second transverse fold line, said other of said pair of flaps further being folded at said second transverse fold line to extend transversely with respect to said other of said first pair of body panels toward said one of said first pair of body panels, said one of said pair of flaps comprising at least one elongate slot extending transversely substantially from said first transverse fold line partly to the free edge of said one of said pair of flaps, said other of said pair of flaps comprising at least one elongate slot extending transversely substantially from said second transverse fold line partly to the free edge of said other of said pair of flaps; and

second flap means comprising at least one flap, said at least one flap having a free edge and being foldably attached to one of said second opposed pair of body panels at a third transverse fold line and being folded at said third transverse fold line to extend transversely with respect to said one of said second opposed pair of body panels toward the other of said second opposed pair of body panels, said at least one flap being cut along spaced apart, parallel cut lines extending transversely from said free edge of said at least one flap partly to said third transverse fold line to form first and second end tabs and an intermediate tab between said first and second end tabs in said free edge of said at least one flap, a first inward portion between said first end tab and said third transverse fold line and a second inward portion between said second end tab and said third transverse fold line, said first end tab being received in said at least one elongate slot in said one of said pair of flaps interiorly of said one of said pair of flaps, said second end tab being received in said at least one elongate slot in the other of said pair of flaps interiorly of said other of said pair of flaps, said intermediate tab, said first inward portion and said second inward portion being positioned exteriorly of said one of said pair of flaps and said other of said pair of flaps, said first end tab being substantially coplanar with an immediately adjacent portion of said first inward portion and being non-hingedly connected thereto.

4,953,783  
MAILBOX SIGNAL DEVICE  
John D. Chambers, Rt. 2 Box 363C, Azle, Tex. 76020  
Filed Dec. 20, 1988, Ser. No. 286,694  
Int. Cl.<sup>5</sup> D65D 91/00; A47G 29/12  
U.S. Cl. 232—35



1. An automatic signaling device for attachment to a standard rural delivery mailbox having a sidewall, said mailbox having a door at the front end, said door having a flange bent rearward a short distance over said sidewall and a bent out tab formed on said rearwardly bent flange, said door being mounted for pivotable movement about the bottom edge of said front end from open to closed positions with respect to said front end, comprising:

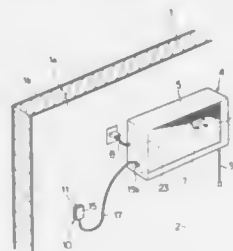
- (a) a rod member; and
- (b) fastening means connecting said rod member near the rear end of said sidewall for allowing said rod member to pivot by gravity from a position extending forwardly and

upwardly adjacent said side wall to a position extending downwardly below the lower boundary of said sidewall;

(c) said rod member having a length sufficient to engage said bent out tab formed on said rearwardly bent flange at a position between said forwardly and upwardly extending position and said downwardly extending position and said rod member front end being a straight configuration;

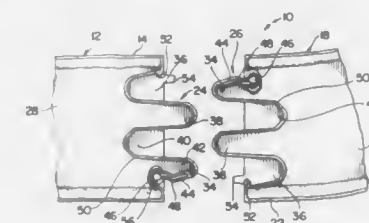
(d) whereby when said door is closed and said rod member then moves downward from said forwardly and upwardly extending position, said straight front end of said rod member comes to rest on said bent out tab on said door flange in a substantially forwardly extending position, said rod member being released to fall into said downwardly extending position when said door is opened.

4,953,784  
VENTILATOR DRIVE SYSTEM  
Hitoshi Yasufuku, and Toshikazu Ogata, both of Nagayo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Continuation of Ser. No. 099919, Sep. 22, 1987, abandoned. This application Apr. 10, 1989, Ser. No. 334,819  
Claims priority, application Japan, Dec. 24, 1986, 61-313767  
Int. Cl.<sup>5</sup> F24F 7/00  
U.S. Cl. 236—44 A



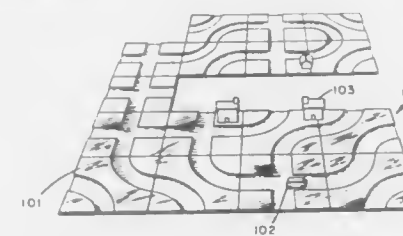
1. A ventilator drive system comprising:
- (a) an electric motor for driving a fan for ventilation of a room;
  - (b) humidity sensing means for sensing the relative humidity of indoor air, said humidity sensing means comprising a humidity sensing element formed from a material having an electrical resistance value which varies when subjected to said humidity and a base plate secured to a wall of said room with a metallic heat transferable member interposed therebetween, said humidity sensing element being disposed on said base plate so that heat is transferred from said wall to said humidity sensing element, said humidity sensing means producing a signal, the level of which corresponds to sensed relative humidity of said indoor air;
  - (c) reference level setting means for setting a reference level of said relative humidity of said indoor air, said reference level setting means being provided with a plurality of reference levels which are selectively set therein, one of said reference levels corresponding to a relative humidity of approximately 100%, said reference level setting means producing a reference signal, the level of which corresponds to any one of said reference levels of said relative humidity of said indoor air; and
  - (d) control circuit means for comparing said signal produced from said humidity sensing means with said reference signal produced from said reference level setting means, thereby driving said motor when said relative humidity of said indoor air exceeds said reference level.

4,953,785  
TRACK ASSEMBLY FOR TOY VEHICLE  
Tadeusz Keska, Smithfield, R.I., assignor to Hasbro, Inc., Pawtucket, R.I.  
Filed Aug. 29, 1988, Ser. No. 237,843  
Int. Cl.<sup>5</sup> E01B 23/00; A63H 19/30  
U.S. Cl. 238—10 A



1. A track assembly for a toy vehicle comprising a first track section having a first end and a second track section having a second end, each of said track sections including at least one longitudinally extending track element for guiding said vehicle in its movement thereon, said first track section including an integrally molded fastening tongue element on he first end thereof, said second track section including means defining a receiving slot on the second end thereof, said fastening tongue element being of elongated configuration and including an elongated longitudinally extending main portion which extends outwardly terminating in an outer end and an elongated longitudinally extending resilient finger which is integrally joined to said main portion adjacent said outer end and extends inwardly along one side of said main portion, said finger being resiliently deflectable to enable said fastening tongue element to be releasably resiliently snap received in engagement in said receiving slot for releasably connecting said first and second track sections together so that they are maintained in substantially aligned end-to-end relation.

4,953,786  
TOY ROADWAY TILE  
Duane R. Arsenault, 860 Prospect St., Gardner, Mass. 01440, assignor to Duane R. Arsenault, Gardner and Alan J. Kirby, Tyngsboro, both of, Mass.  
Continuation of Ser. No. 6,931,639, Nov. 17, 1986, abandoned. This application Dec. 30, 1988, Ser. No. 292,463  
The portion of the term of this patent subsequent to Jul. 17, 2007, has been disclaimed.  
Int. Cl.<sup>5</sup> E01B 23/00  
U.S. Cl. 238—10 B



1. A two-sided reversible toy roadway tile, comprising:
- (a) a first main body having a top surface, a bottom surface and at least three straight edges of equal length and contour along which the full length of each said edge the main body of a similar roadway tile abutts, wherein the intersections of said edges coincide with the vertices of an imaginary circumscribed regular polygon, wherein the center points of said edges coincide with the center points of the straight edges of said imaginary circumscribed regular polygon, wherein each of said edges is antisymmetric

about said center points, and wherein said top surface forms one side of the roadway tile,

- (b) a second main body having a top surface, a bottom surface and at least three straight edges of equal length, and contour along which the full length of each said edge the main body of a similar roadway tile abutts, wherein the intersections of said edges coincide with the vertices of an imaginary circumscribed regular polygon, wherein the center points of said edges coincide with the center points of the straight edges of said imaginary circumscribed regular polygon, wherein each of said edges is antisymmetric about said center point, and wherein said top surface forms the reverse side of the roadway tile,
- (c) roadways defining a pattern on said top surface of the first main body and on said surface of the second main body, and wherein the roadways of said first main body are of a different pattern than the roadways of said second main body,
- (d) configurations defining land areas on said top surface of the first main body and on said top surface of the second main body, and wherein the land areas of said first main body are of a different configuration than the land areas of the second main body,
- (e) a tab plate which is interspaced between the bottom surface of said first main body and the bottom surface of said second main body, and wherein each straight edge of the imaginary circumscribed regular polygon of said first main body is aligned with a congruent straight edge of the imaginary circumscribed regular polygon of said second main body to form a roadway tile, said tab plate having a projection which extends beyond each of said sets of aligned edges to provide means for engaging a similar roadway tile, and wherein said projection is inserted between a main body and corresponding tab plate of said similar roadway tile, so that, when the two roadway tiles are properly engaged, an edge of either the first main body or of the second main body of said roadway tile abutts an edge of either the first main body or of the second main body of said similar roadway tile, and whereby the pattern of roadways on said roadway tile and said similar roadway tiles are contiguous, and
- (f) means for securing the bottom surface of said first main body and the bottom surface of said second main body to opposite sides of said tab plate, wherein the patterns of roadways on said joined roadway tiles may be varied by reversing the orientation of one of said sides of the roadway tile, or alternatively by changing the alignment of an edge of either said first main body or of said second main body in relation to an edge of said similar roadway tile.

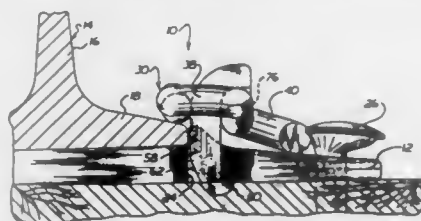
4,953,787  
TWO PIECE RAIL FASTENING ASSEMBLIES FOR WOODEN CROSS TIES  
Graham M. Fee, Geneva, Ohio, assignor to Chemetron-Railway Products, Inc., Wheeling, Ill.  
Continuation of Ser. No. 6/266,928, May 26, 1981, abandoned, which is a continuation-in-part of Ser. No. 6/240,411, Mar. 4, 1981, abandoned, and a continuation-in-part of Ser. No. 6/228,804, Jan. 27, 1981, Pat. No. 4,442,973, and a continuation-in-part of Ser. No. 6/262,710, May 11, 1981, Pat. No. 4,625,912, said Ser. No. 6/240,411, Continuation of Ser. No. 6/930,232, said Ser. No. 6/228,804, Continuation of Ser. No. 5/933,630, said Ser. No. 4/262,710, Continuation of Ser. No. 6/57,823. This application Oct. 20, 1988, Ser. No. 260,479  
The portion of the term of this patent subsequent to Dec. 29, 2004, has been disclaimed.  
Int. Cl.<sup>5</sup> E01B 09/30

- U.S. Cl. 238—349
1. A boltless two-piece rail fastening assembly for fastening a railway rail supported on a conventional tie plate to a wooden cross tie, comprising:
- (a) an S-shaped rail clip having a singular central leg, and a rail bearing leg and a tie bearing leg spaced on opposite

6 Claims

sides of said central leg and joined thereto by arcuate portions extending from opposite ends thereof, said clip further having latching means including a detent on said central leg; and

(b) a chair having a body including jaw means defining a lip for receiving said clip in latching engagement therewith, latching means on said body including a mating protuber-



ance on the lip of said chair for securing said clip on said chair when the former is driven into engagement with the latter, and anchor means for securing said body proximate the base flange of a railway rail supported on the tie plate, said anchor means including at least one downwardly depending leg configured to pass through a spike hole in a conventional tie plate affixed to a wooden tie.

4,953,788

## WATER SPRAY FITTING

Albert F. Hansen, Punga Grove, New Zealand, assignor to Hansen Developments Limited, Punga Grove, New Zealand  
Filed Sep. 30, 1988, Ser. No. 252,242

Int. Cl.<sup>5</sup> B05B 15/02, 1/14

U.S. Cl. 239—107

7 Claims



3. A miniature plastic moulded irrigation spray fitting, comprising a body part and a cap part, the body part comprising an upright portion carrying threads and a skirt portion extending about the base of the upright portion and providing a downwardly directed annular face extending about the base of the upright portion, the cap part comprising a gripping portion about the exterior of the cap part and being adapted to threadedly mount on the body part and comprising an annular face about the base of the cap part arranged to engage the body part face when the cap part is screwed home on the body part, and at least one of either the body part face or cap part face having at least one groove extending across the face from a water supply port from the interior to the exterior of the body part adjacent said face, such that a spray outlet of the fitting is defined when the cap part is screwed home onto the body part, whereby said spray outlet may be opened for cleaning by loosening of the cap part on the body part.

4,953,789

## ARRANGEMENT FOR THE METERED SUPPLY OF A FUEL, ESPECIALLY INTO THE COMBUSTION SPACE OF AN INTERNAL COMBUSTION ENGINE

Wolfgang Strobl, Eichstaett; Walter Peschka, Sindelfingen, and Gottfried Schneider, Stuttgart, all of Fed. Rep. of Germany, assignors to Bayerische Motoren Werke AG, Fed. Rep. of Germany

PCT No. PCT/EP87/00247, § 371 Date Jan. 22, 1988, § 102(e) Date Jan. 22, 1988, PCT Pub. No. WO87/07336, PCT Pub. Date Dec. 3, 1987

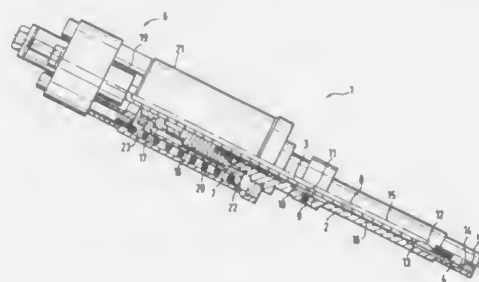
PCT Filed May 13, 1987, Ser. No. 190,687

Claims priority, application Fed. Rep. of Germany, May 22, 1986, 3617255

Int. Cl.<sup>5</sup> B05B 15/00

U.S. Cl. 239—132.5

16 Claims



1. An arrangement for the metered feeding of a fuel, especially into the combustion space on an internal combustion engine comprising:

a valve body means having a discharge opening at its distal end arranged downstream of a valve seat;

a valve for engaging the valve seat to close the discharge opening and actuated by movement of a hollow stem means guided in the valve body means by guide means, the valve intermittently controlling the opening of the discharge opening by movement of the stem means away from the discharge opening;

a fuel reservoir chamber means, formed in the hollow stem means, which is connected by channels means arranged in the stem means with an overflow chamber upstream and adjacent the valve seat;

a fuel conducting connection which communicates with an inflow chamber adjacent the proximal end of the valve body means;

the valve body means and stem means being sized to form a gap therebetween which connects the inflow chamber to the overflow chamber in a fuel conducting manner at least when the valve is moved to open the discharge opening; and

at least one radial opening in the stem means, adjacent the inflow chamber of the fuel-conducting connection for conducting fuel to the fuel reservoir chamber of the stem means.

4,953,790

## LOW COST APPLICATOR AND METHOD OF USE

John E. Waldrum, 349 Fairview Ave., Ambler, Pa. 19002

Filed Oct. 3, 1988, Ser. No. 252,784

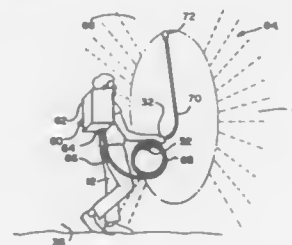
Int. Cl.<sup>5</sup> B05B 9/08

U.S. Cl. 239—154

6 Claims

1. The method of using a low cost sprayer of the type comprising a length of flexible hose, the hose having an inlet and an outlet and a nozzle secured to the hose outlet comprising placing the hose inlet end into an agricultural chemical containing tank; elevating a portion of the hose and the nozzle above the tank; and rotating the portion of the hose and the nozzle through an

arc of three hundred and sixty degrees to cause agricultural chemical flow through the nozzle; moving the tank while rotating the portion of the hose and the nozzle; and



rotating the nozzle at non-uniform velocity through the arc of rotation.

4,953,791

## MANUALLY OPERATED TRIGGER TYPE DISPENSER, METHOD OF ASSEMBLING THE SAME, AND A SPINNER FOR USE IN THE DISPENSER

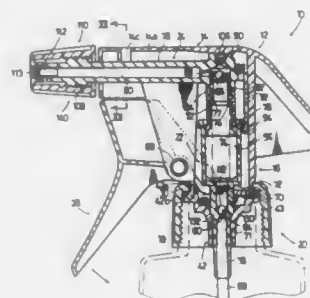
Atsushi Tada, 2-6-3 Kakinokizaka, Meguro-ku, Tokyo, Japan  
Division of Ser. No. 169,776. This application Dec. 18, 1989, Ser. No. 452,803

Claims priority, application Japan, Apr. 24, 1987, 62-101265; Aug. 11, 1987, 62-200149; Nov. 12, 1987, 62-286226; Nov. 30, 1987, 62-302816; Feb. 5, 1988, 63-25233

Int. Cl.<sup>5</sup> B05B 9/043

U.S. Cl. 239—333

7 Claims



1. A manually operated trigger type dispenser, comprising: a dispenser body including an upper portion and a lower portion vertically extending from the upper portion; a bottle cap for detachable coupling the lower portion of said dispenser body with a neck of a container filled with a liquid to be dispensed; a cylinder defining a pump chamber and engaged with a back portion of a swingable trigger, so as to reciprocate between an upper operation-position and a lower non-operation position when said trigger is squeezed and released; a substantially L-shaped piston made of a synthetic resin and including a horizontal nozzle interposed within the upper portion of said dispenser body, and a vertical piston body located within the lower portion of said dispenser body, for guiding said cylinder; a nozzle cap having an orifice and attached to a distal end of the nozzle of said piston; and a return spring biasing said cylinder to the lower non-operation position thereof; the nozzle of said piston including a pair of plates each unitarily formed with said nozzle via a hinge, a hole being formed in each lower end portion of the plates, in which a pair of pins projecting from inner surfaces of said trigger

being loosely fitted, for pivotally attaching said trigger to said nozzle.

4,953,792

## DRY POWDER APPLICATOR

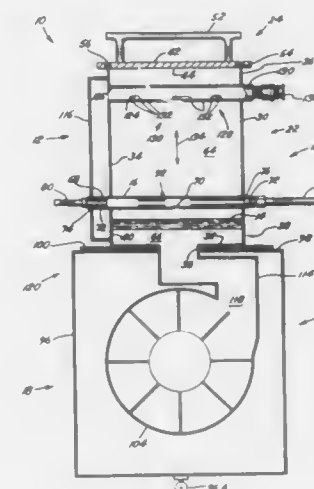
William E. Evans, Jacksonville, Fla., assignor to Roussel Bio Corporation, Englewood Cliffs, N.J.

Filed Feb. 10, 1989, Ser. No. 309,282

Int. Cl.<sup>5</sup> B65G 53/38

U.S. Cl. 239—654

7 Claims



1. An apparatus for dispensing a powdered material comprising, in combination:

a housing adapted to receive said powdered material;

a fluidizing medium positioned within said housing so as to define a lower expansion chamber and an upper hopper chamber;

a dusting duct extending through said upper hopper chamber and including a fluid inlet external to said housing, a powder inlet within said housing, and a dusting outlet external to said housing, said powder inlet having a substantially downward orientation;

blower means for generating a mixture fluid flow into said expansion chamber and a dispersion fluid flow into said fluid inlet, said mixture fluid flow passing through said fluidizing medium to create a fluidized bed of said powdered material within said hopper chamber; and dispenser means, in communication with said dusting outlet, for selectively dispensing said powdered material, said dispenser means having an open state for dispensing and a closed state;

said dispersion fluid flow passing through said dusting outlet at a predetermined flow rate and drawing said fluidized bed at a predetermined mixture rate through said powder inlet to create a powdered stream whenever said dispenser means is in said open state;

said dispersion fluid flow passing through said powder inlet into said upper hopper chamber whenever said dispensing means is in said closed state to purge said powder inlet of said powdered material accumulated therein, whereby clogging thereof is substantially avoided.



4,953,793

**BOWL-AND-ROLLER MILL**

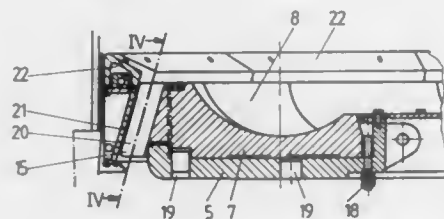
Dieter Kiefer, Wesel-Bislich, and Helmut Grommes, Duisburg, both of Fed. Rep. of Germany, assignors to Deutsche Babcock Werke Aktiengesellschaft, Oberhausen, Fed. Rep. of Germany  
Filed Jun. 29, 1989, Ser. No. 373,986

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1988, 3822290

Int. Cl.<sup>5</sup> B02C 15/00

U.S. Cl. 241-119

1 Claim



1. A roller bowl mill comprising: a housing; a rotating grinding bowl in said housing; said grinding bowl having a replaceable grinding track element attached to said grinding bowl; stationary rollers rolling over said grinding track element; said grinding track element comprising individual grinding bowl segments; a nozzle ring surrounding said grinding bowl; said nozzle ring being formed of nozzle ring segments; blades on said nozzle ring; said blades being formed on the outer periphery of the individual grinding bowl segments; each grinding bowl segment forming with a corresponding nozzle ring segment a single replaceable and interchangeable part.

4,953,794

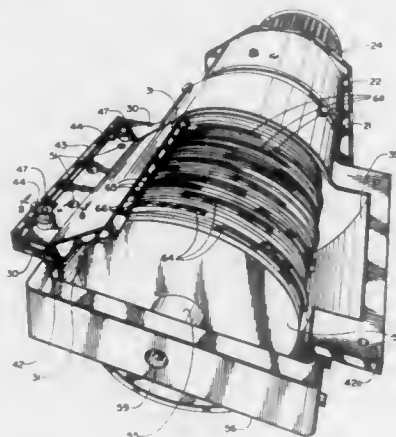
**SINGLE PROCESS DESINING AND DEBONING MACHINE AND METHOD**

Stephen A. Paoli, 1006 Highview Ave., Rockford, Ill. 61108  
Continuation-in-part of Ser. No. 511,102, Ser. No. 695,137, and Ser. No. 820,248. This application May 4, 1987, Ser. No. 46,435

Int. Cl.<sup>5</sup> B02C 19/12

U.S. Cl. 241-24

20 Claims



1. A method of mechanically separating meat from an agglomeration of waste material said method comprising the steps of:

- feeding said agglomeration and meat to a rotor having closely spaced helical cutting elements;
- engaging said agglomeration and meat with a plurality of cutting teeth on certain of said helical cutting elements extending in planes substantially perpendicular to the rotor axis;
- forcing said agglomeration and meat between a breaker

bar and said rotor into a wedge shaped pocket of progressively decreasing thickness in the direction of rotation of the rotor; and

- said breaker bar having a plurality of parallel grooves and teeth registering interdigitally with the cutting teeth of said helical cutting elements, whereby the meat is separated from the waste material by pulling, cutting, pressing, and wedging said agglomeration and meat by forcing said agglomeration and meat into said wedge shaped pocket between the teeth of said breaker bar, moving the meat through the helical cutting elements into a collecting receptacle, and retaining the waste material on the outside of said helical cutting elements which eject it into a waste receptacle.

4,953,795

**WOOD CHIP CRACKING APPARATUS**

Joseph Bielagus, Tualatin, Oreg., assignor to Beloit Corporation, Beloit, Wis.

Filed Oct. 24, 1988, Ser. No. 261,455

Int. Cl.<sup>5</sup> B02C 4/30

U.S. Cl. 241-159

20 Claims



1. An apparatus for destructuring wood chips comprising: first and second rolls disposed for rotational operation substantially parallel to each other, and spaced from each other a preselected distance for applying compressive force to wood chips passing therebetween, means for supplying a flow of wood chips to said first and second rolls and for distributing the wood chips along the axial extent of said first and second rolls, at least one of said first and second rolls being connected to means for rotating said at least one roll about its longitudinal axis, at least one of said rolls having an aggressively contoured roll surface including a matrix of outwardly extending discrete projections, said projections being of a height substantially equivalent to the desired chip thickness, causing said chips to be cracked primarily in a direction parallel to the chip fibers as compressive force is applied thereto when the chips pass between said first and second rolls.

4,953,796

**REFINER SEGMENT**

Nils Virving, Vällingby, Sweden, assignor to Sunds Defibrator Aktiebolag, Sweden

PCT No. PCT/SE88/00076, § 371 Date Jun. 27, 1989, § 102(e) Date Jun. 27, 1989, PCT Pub. No. WO88/06490, PCT Pub. Date Sep. 7, 1988

PCT Filed Feb. 23, 1988, Ser. No. 378,224

Claims priority, application Sweden, Feb. 25, 1987, 8700790

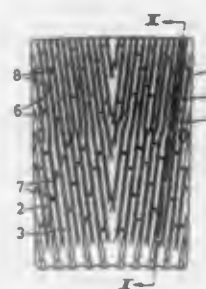
Int. Cl.<sup>5</sup> B02C 7/12

U.S. Cl. 241-298

7 Claims

1. An improved disc refiner for refining fibrous materials, said disc refiner having a refiner segment formed with a pattern including a plurality of radially disposed bars having an upper surface, a plurality of grooves radially disposed interme-

diate said bars, and a plurality of flow restrictions traversing said grooves between adjacent ones of said bars and extending upward in said grooves to said upper surfaces of said adjacent



ones of said bars, at least one of said bars including connecting means for enabling direct communication between a pair of said grooves adjacent said at least one of said bars.

4,953,797

**WOVEN CROSS-COIL WINDING SYSTEM**

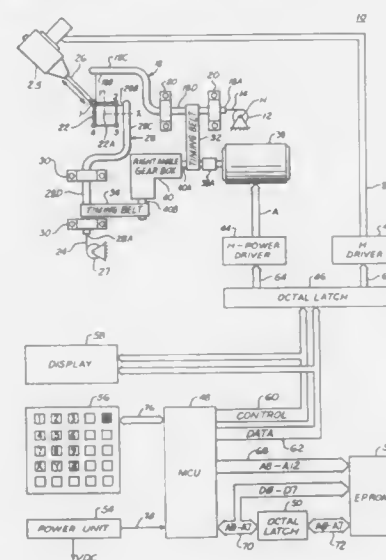
Paul A. Markow, Huntsville, and William Nolle, Hazel Green, both of Ala., assignors to Acustar, Inc., Troy, Mich.

Filed Nov. 16, 1989, Ser. No. 437,236

Int. Cl.<sup>5</sup> H02K 15/00

U.S. Cl. 242-7.11

6 Claims



1. Winding system for weaving a pair of orthogonally positioned stator coils about a non-metallic, coil-bobbin, square frame, the frame having four corner post, four side walls and a central region containing a non-metallic rotor chamber housing a permanent magnet rotor, the rotor having a shaft extending from a centroid of the rotor and through a port of the chamber in the direction of the posts, the centroid being located at an origin of an X-Y coordinate axis plane with a first, second, third and fourth post (counting in a clockwise manner about the origin) positioned at a location in a quadrant bound by a positive Y and a negative X axis, a positive Y and a positive X axis, a negative Y and a positive X axis, and a negative Y and a negative X axis respectively, said system comprising:

- (a) first winding means for winding a first length of wire about a perimeter of the frame in a spiral-type, counter-clockwise motion from a first post in a positive X-axis direction to within the location of said second and third posts and then in a negative X-axis direction towards said first and fourth posts;
- (b) second winding means coupled to said first winding

means for winding a second length of wire about the perimeter of the frame in a spiral-type, clockwise motion from said second post in a negative Y-axis direction to within the location of said third and fourth posts and then in a positive Y-axis direction towards said first and third posts, said second winding means winding said second length of wire simultaneously with said first winding means winding said first length of wire such that at each revolution of the winding of the wires, said first wire interlaces with the second wire in a planes perpendicular to said bobbin shaft about a top and a lower surface of said bobbin;

- (c) bobbin positioning means having a retractable shaft coupled to the first post of said bobbin for repositioning the bobbin after each revolution of the winding that interlaces the first length of wire with the second length of wire, said shaft being repositioned along a path extending 45 degrees from the origin of the X-Y axis plane in a quadrant bound by the negative X and positive Y-axis in a manner that causes the centroid of the bobbin to move in a negative X-axis direction to cause placements of interlaced first and second lengths of wire over the bobbin to form a layer of interlaced windings and thereafter to move in a positive X-direction to cause: placements of interlaced first and second lengths of wire over the layer to form another layer over the layer, the movements in the negative and positive directions along the X-axis being repeated until the stator coils are completed; and
- (d) computer control means coupled to said first winding means and said bobbin positioning means for providing logic control and command signals for controlling winding a revolution of the interlaced winding and for controlling repositioning the bobbin after each completion of the revolution of the interlaced winding.

4,953,798

**WINDING UNIT**

Shoichi Tone, Kyoto, and Masaharu Kiriake, Joyo, both of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

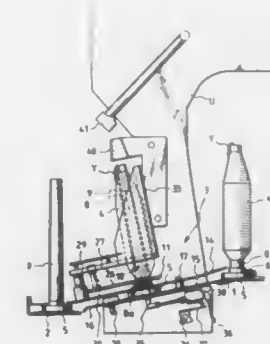
Filed Mar. 9, 1989, Ser. No. 321,525

Claims priority, application Japan, Mar. 17, 1988, 63-64198

Int. Cl.<sup>5</sup> B65H 54/20, 67/02

U.S. Cl. 242-35.5 R

6 Claims



1. In a winding unit operable with a bobbin and feeding means for feeding the bobbin to a winding position to be unwound, apparatus comprising:

- a tray having a peg on which the bobbin is supported as the bobbin is fed to the winding position; and
- a bobbin dislodgement preventing means provided adjacent the winding position for contacting the exterior of the bobbin take-up tube to thereby prevent the bobbin from being dislodged from the peg as the bobbin is unwound.

4,953,799

**CUTTING APPARATUS FOR SEVERING TRAILING YARNS ON SPINNING BOBBINS**

Wilhelm Küpper, Wegberg, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Moenchengladbach, Fed. Rep. of Germany

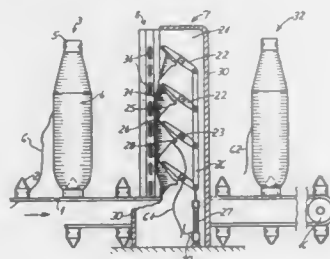
Filed Sep. 6, 1989, Ser. No. 403,701

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1988, 8811305[U]

Int. Cl.<sup>5</sup> B65H 54/22

U.S. Cl. 242—35.6 E

8 Claims



1. Cutting assembly, comprising a transport apparatus transporting spinning bobbins upright on mandrels along a transport route, a cutting apparatus disposed at a given level on one side of said transport apparatus for severing trailing yarns on the bobbins, and a feeder disposed at said given level on the opposite side of said transport apparatus for feeding the trailing yarns to said cutting apparatus.

4,953,800

**YARN WINDING DEVICE**

Tadahiko Okubo, Jun Takagi, and Tadashi Kohara, all of Otsu, Japan, assignors to Toray Engineering Co., Ltd., Osaka, Japan

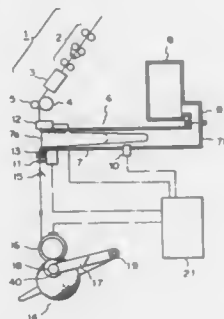
Continuation of Ser. No. 414,584, is a continuation of Ser. No. 143,938, Jan. 14, 1988, abandoned. This application Jan. 31, 1990, Ser. No. 473,114

Claims priority, application Japan, Jan. 16, 1987, 62-008828; Aug. 17, 1987, 62-204407

Int. Cl.<sup>5</sup> B65H 59/38

U.S. Cl. 242—45

23 Claims



1. A yarn winding device which comprises: yarn feeding means for feeding a yarn at a predetermined speed, yarn winding means for winding the yarn on a bobbin while traversing said yarn back and forth across the bobbin, absorbing means located between the yarn feeding means and the winding means for absorbing variations in the winding speed of the yarn fed from the yarn feeding means by storing the yarn therein in a U-shaped loop, said absorbing means comprising a vacuum box and means for creating a negative pressure therein, whereby the loop of

the yarn is pulled into the box by a suction air flow created by the negative pressure, detecting means generating a signal in response to the presence or lack of presence of the yarn loop in the absorbing means, tensioning means for mechanically applying a predetermined tension to the yarn located downstream of the absorbing means, and control means for controlling the yarn winding speed of the yarn winding means in response to signals from the yarn detecting means wherein when the detecting means signals the presence of the yarn loop in the absorbing means, the control means operates the winding means at a higher yarn winding speed in which the yarn winding speed is higher than the speed at which the yarn is fed by the yarn feeding means at a predetermined constant ratio and when the detecting means signals the lack of the presence of the yarn loop in the absorbing means, the control means operates the yarn winding means at a lower yarn winding speed in which the average yarn winding speed is lower than the speed at which the yarn is fed by the feeding means.

4,953,801

**CLIP**

Ryuetsu Oikawa, Kosai, Japan, assignor to Yazaki Corporation, Tokyo, Japan

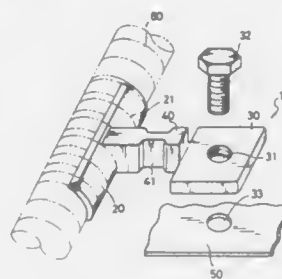
Filed Oct. 25, 1988, Ser. No. 261,898

Claims priority, application Japan, Oct. 28, 1987, 62-164734[U]

Int. Cl.<sup>5</sup> F16L 3/08

U.S. Cl. 248—65

12 Claims



1. A clip adapted to support a wiring harness to a support structure comprising: a holder head portion for longitudinally gripping the wiring harness; a retainer stem portion for securing the clip to the support structure; and a flexible bridging portion, including end portions and a flexible portion intermediate the end portions, said bridging portion for connecting the holder head portion to the retaining stem portion, being resiliently bendable from a first position, in which the bridging portion is straight and perpendicular to the gripped wiring harness, to a second position, in which the bridging portion is configured at approximately a 90 (ninety) degree angle, whereby the retaining stem portion may be positioned adjacent to the wiring harness to decrease the overall transverse dimension of the clip during installation of the clip through a hole in the support structure said flexible bridging portion having opposed generally parallel walls establishing an overall thickness dimension from end to end sufficient to rigidly support the holder head portion in a direction perpendicular to the transverse dimension of the clip and said flexible intermediate portion having a reduced thickness in the transverse direction for imparting flexibility thereto.

4,953,802

**METHOD OF MOUNTING CHUCK STRUCTURES**

Peter Busenhardt, Winterthur, Switzerland; Ruedi Schneeberger, Turbenthal, Switzerland; Erwin Holbela, Spartanburg, S.C.; Armin Wirz, Ossingen, Switzerland; Adolf Flüeli, and Hansueli Maier, both of Winterthur, Switzerland, assignors to Rieter Machine Works Ltd., Winterthur, Switzerland

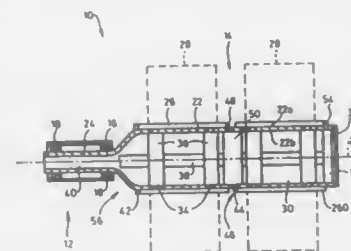
Continuation of Ser. No. 911,816, Sep. 26, 1986, Pat. No. 4,811,910. This application Dec. 2, 1988, Ser. No. 279,184

Claims priority, application United Kingdom, Oct. 2, 1985, 8524303

Int. Cl.<sup>5</sup> B65H 54/547

U.S. Cl. 242—46.2

8 Claims



1. A method of mounting a chuck structure of a high speed winder comprising the steps of: providing a chuck having a first elongated tubular portion which possesses a wall having substantially constant wall thickness throughout substantially its entire length and thereby defining an internal chamber, and an external circumference adapted to receive one or more bobbin tubes for rotation about an axis of rotation to enable formation of one or more packages in use, and a second elongated tubular portion integral with said first elongated tubular portion and of reduced external diameter relative thereto; inserting, through one end of said first elongated tubular portion remote from said second elongated tubular portion, into said internal chamber of said first elongated tubular portion, internal elements containing bobbin tube engaging elements reversibly displaceable through openings in said wall of said first elongated tubular portion for releasably holding said one or more bobbin tubes at said external circumference of said first elongated tubular portion; and mounting unsplit bearing means at said second elongated tubular portion such that said first elongate tubular portion and said second elongated tubular portion are rotatable about said axis of rotation.

4,953,803

**FILAMENT WINDING APPARATUS**

George W. LeCompte, Tucson, Ariz., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Feb. 28, 1989, Ser. No. 316,614

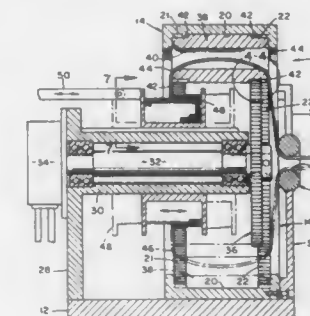
Int. Cl.<sup>5</sup> B65H 54/02

U.S. Cl. 242—47

6 Claims

1. Apparatus for winding a filament onto a tubular bobbin; said apparatus comprising: a cylindrical case, having a longitudinal axis, a base plate, said case having an inner wall surface formed into a continuous circumferentially extending groove having gear teeth arranged therealong; an eyelet secured to the case with the eyelet opening lying on the axis of the cylindrical case; a sun gear mounted within the case for rotation about an axis colinear with the axis of the cylindrical case and the gear teeth of said sun gear lying directly opposite the case groove; means for rotating the sun gear; and a tubular bail having a set of teeth on an outer surface for

meshing with the sun gear, the dimensions of the bail being such as to simultaneously mesh with the gear teeth in the case groove;



means for mounting a bobbin colinear with the axis of the case; such that the filament passes through the eyelet and the tubular bail prior to being wound on a bobbin.

4,953,804

**ACTIVE LAG ANGLE DEVICE**

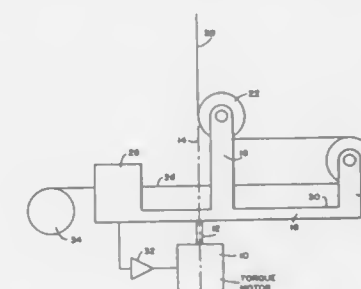
Troy L. Hester, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 2, 1990, Ser. No. 502,968

Int. Cl.<sup>5</sup> B65H 54/02, 54/28, 57/28

U.S. Cl. 242—47

3 Claims



1. An active lag angle device for an optical fiber being wound on a bobbin comprising a torque motor with a housing thereof adapted to be fixedly mounted, said torque motor having a rotary output shaft projecting therefrom, a reference surface structure secured to said shaft and being integral therewith, said reference surface structure having an outrigger pulley mounted at one end thereof, a guide pulley mounted on said reference surface structure at an intermediate section thereof with the circumferential surface of the guide pulley being tangent to a center line axis of the rotary output shaft, and the opposite end of said reference surface structure from said outrigger pulley having a position sensor mounted thereat, said position sensor sensing deviations of an optical fiber when the optical fiber is positioned along said axis to said guide pulley which turns the optical fiber 180° to position the optical fiber above a predetermined reference line on said reference surface structure and producing output signals for controlling the torque motor to maintain the optical fiber relative to said reference line.

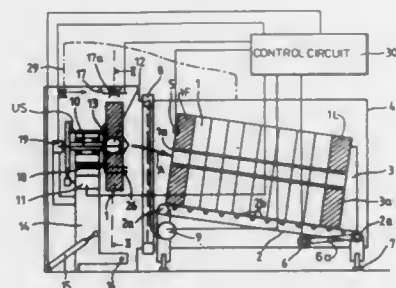


**4,953,805**  
**METHOD OF AND APPARATUS FOR DELIVERING**  
**WEBS OF PHOTOSENSITIVE MATERIAL TO A**  
**PRINTER**

Hans-Jürgen Raab, Munich, Fed. Rep. of Germany, assignor to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 16, 1988, Ser. No. 272,101  
 Claims priority, application Fed. Rep. of Germany, Dec. 2, 1987, 3740806

Int. Cl.<sup>5</sup> B65H 19/12  
 U.S. Cl. 242—58.6 32 Claims



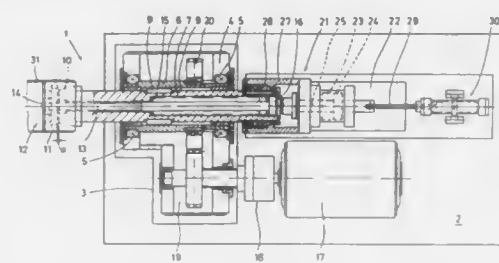
8. Apparatus for delivering to a processing machine, such as a printer, successive webs of photosensitive material which are convoluted on cores and form therewith rolls and each of which has a leader, comprising a conveyor defining a sloping path and arranged to support a stack which consists of coaxial rolls and has an axis which is slightly inclined to the horizontal so that the stack has a topmost roll which is located at a predetermined level and a lowermost roll, said conveyor having means for propping the lowermost roll of the stack in said path against overturning under the action of gravity and/or under the weight of other rolls in the stack; means defining an unwinding station which is spaced apart from the topmost roll at said level; means for transferring the topmost roll of the stack to said station, including a rotary transfer member movable between a first position at said station and a second position of engagement with the core of the topmost roll at said level, and means for moving the transfer member between said positions; means for unwinding the web from the core of the roll at said station, including means for rotating the core; means for threading the leader of the web at said station into the processing machine; means for expelling the core from said station upon completed unwinding of the web therefrom; and means for advancing the conveyor so as to advance successive rolls to said predetermined level upon completed transfer of topmost rolls from said path.

**4,953,806**  
**WINDING REEL FOR ROLLED STRIP**  
 Manfred Rothenpieler, Slegen, and Wolfgang Moos, Freutzal, both of Fed. Rep. of Germany, assignors to SMS Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany  
 Continuation of Ser. No. 98,777, Sep. 17, 1987, abandoned, which is a continuation of Ser. No. 823,622, Jan. 29, 1986, abandoned. This application Apr. 12, 1989, Ser. No. 338,404

Int. Cl.<sup>5</sup> B21C 47/30  
 U.S. Cl. 242—72.1 7 Claims

1. A reel for winding and unwinding rolled strip on a coil, the strip having a center, comprising a drum including a plurality of segments movable between a first position of rest and a second spread-apart position, said segments defining conically shaped sliding surfaces, a stationary reel housing, a tubular drive shaft mounted rotatably and axially immovably in said housing, a tubular reel shaft having an axis and an end facing said drum, said end defining conically shaped surfaces contacting said sliding surfaces of said segments, said tubular reel shaft mounted in said tubular drive shaft, said tubular reel shaft having axially extending splines and said tubular drive shaft

defining axially extending grooves engaged by said splines, so that said tubular reel shaft is rotatable together with said tubular drive shaft in said reel housing and axially slidable relative to said tubular drive shaft, a plunger mounted in said tubular reel shaft, a flange attached to said plunger for connecting said plunger to said segments, a compression spring surrounding said plunger, said spring acting on said tubular reel shaft and said plunger in axial direction for biasing said segments into said spread-apart position, wherein said segments are moved between said first and second position by an axial movement of said tubular reel shaft, a non-rotating, axially movable position-



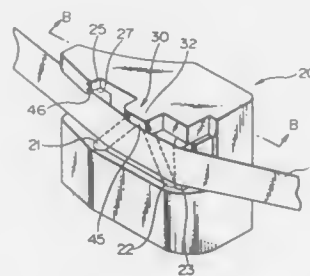
ing drive formed by a piston-cylinder unit including a first piston rod, the positioning drive effecting a relative axial movement between said tubular reel shaft and said plunger for moving said segments from said spread-apart position against the force of said compression spring to said position of rest and a stationary displacement drive formed by a piston-cylinder unit including a second piston rod for axially moving said drum in and out relative to the coil and to effect an adjustment relative to the strip center, said first and second piston rods connected to each other and configured to hold said plunger and said segments in fixed axial position during the movement of said segments between said first and second position.

**4,953,807**  
**STATIONARY TAPE GUIDE FOR A MAGNETIC TAPE**  
**RECORDER**

Yoshihiro Noguchi, Tokyo, Japan, assignor to Nakamichi Corporation, Tokyo, Japan

Filed Nov. 4, 1988, Ser. No. 267,488  
 Claims priority, application Japan, Nov. 6, 1987, 62-169939[U]

Int. Cl.<sup>5</sup> B65H 23/10, 27/00  
 U.S. Cl. 242—76 6 Claims



1. A stationary tape guide, for use with a magnetic tape recorder having an inclined cylinder mounted on a chassis, the tape-guide comprising a guide block mounted on the chassis having:  
 a first tape surface guide inclined with respect to a first reference plane;  
 a second tape surface guide inclined with respect to the first reference plane and located further from the inclined cylinder than the first tape surface guide;

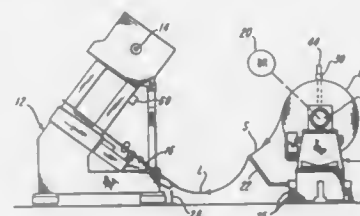
a third tape surface guide oriented orthogonal to the first reference plane and located further from the inclined cylinder than the second tape surface guide;  
 a first tape edge guide extending from the guide block beyond a second reference plane defined by the first and second tape surface guides and having a first tape edge contact surface;  
 a second tape edge guide extending from the guide block beyond a third reference plane defined by the first tape surface guide in cooperation with the cylinder, and having a second tape edge contact surface which is located further from the first reference plane than the first tape-edge contact surface.

**4,953,808**  
**APPARATUS FOR SUPPLYING A SHEET METAL STRIP**  
**TO A PRESS**

Michael R. Craycraft, Piqua, Ohio, assignor to Perfecto Industries, Inc., Piqua, Ohio

Filed Aug. 8, 1988, Ser. No. 229,348  
 Int. Cl.<sup>5</sup> B65H 59/00, 23/22

U.S. Cl. 242—78.6 15 Claims



1. Apparatus for controlling the feeding of a strip of metal from a supply coil on a pay-off reel to a reciprocating press requiring intermittent and incremental advancement of the strip into the press, said apparatus comprising a variable speed drive connected to feed the strip from the coil, strip speed sensing means for detecting the rate of longitudinal movement of the strip being fed from the supply coil in response to operation of said drive, strip feeding means for intermittently advancing the strip in successive increments into the press, press sensing means for detecting the rate of reciprocating operation of the press, loop sensing means for detecting elevation changes in the bottom of a generally U-shaped loop formed in the strip between said strip speed sensing means and said strip feeding means, and computer control means connected for automatically changing the speed of said drive in response to signals received from said loop sensing means, said press sensing means and said strip speed sensing means.

**4,953,809**  
**MICROPHONE RETRIEVAL DEVICE**

Stephen D. Barrus, 52 Afton, Rochester, N.Y. 14612

Filed Jun. 20, 1989, Ser. No. 369,082  
 Int. Cl.<sup>5</sup> B65H 75/48

U.S. Cl. 242—107.300 17 Claims

1. An apparatus for retrieving a microphone, comprised of:  
 (a) an extendable and retractable body assembly;  
 (b) means for extendably connecting said body assembly to an interior surface of a vehicle;  
 (c) means for removably attaching a microphone to said body assembly;  
 (d) a line cord attached to said body assembly, wherein said cord comprises a first end and a second end, and wherein said first end of said line cord is attached to said body assembly;  
 (e) means for attaching said second end of said line cord to an interior surface of a vehicle;  
 (f) means for imparting tension to said line cord, which means are disposed within said body assembly;  
 (g) means for adjusting the amount of tension imparted to

said line cord, which means are disposed within said body assembly;  
 (h) means for retracting said line cord into said body assembly of said apparatus, which means are disposed within said body assembly; and

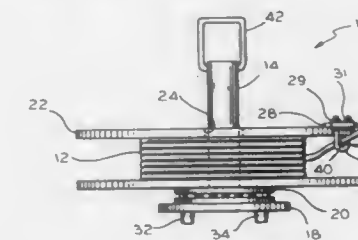


(i) means for slowing the rate of retraction of said line cord into said body assembly, which means are disposed within said body assembly.

**4,953,810**  
**HOLDER AND DISPENSER FOR A COILED ARTICLE**  
 Allen L. Stadig, R.F.D. #1, Box 1103, Soldier Pond, Me. 04781

Filed Feb. 8, 1990, Ser. No. 476,688  
 Int. Cl.<sup>5</sup> B65H 49/28

U.S. Cl. 242—129 11 Claims



1. A device for holding and dispensing a coiled article comprising:  
 a rotatable turntable having a support surface;  
 a post extending co-axially from said turntable;  
 a plate mounted co-axially on said post parallel to said support surface of said turntable for slidable movement toward and away from said turntable; and  
 means associated with said plate for guiding said coiled article during dispensing and for braking the rotation of said turntable upon cessation of said dispensing.

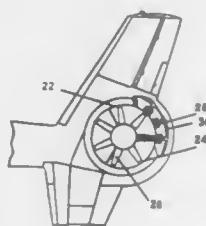
**4,953,811**  
**SELF-DRIVING HELICOPTER TAIL ROTOR**  
 Bert J. Smith, Gloucester Point, Va., assignor to The United States of America as Represented by the Secretary of the Army, Alexandria, Va.

Filed Oct. 19, 1988, Ser. No. 260,209  
 Int. Cl.<sup>5</sup> B64C 27/82

U.S. Cl. 244—17.19 3 Claims

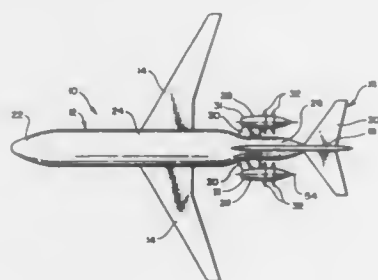
1. A tail rotor propulsion apparatus for a helicopter comprising a plurality of rotor blades connected at their root ends to a shaft to form a tail rotor, bearing means, retaining means securing the tail rotor shaft in the bearing means so that the tail rotor freely rotates, a circumferential housing surrounding the arc described by the rotating tail rotor blades, permanent magnets generating magnetic flux, means attaching the permanent magnets to the tip of each rotor blade, primary winding coils mounted within the circumferential housing so that their flux forms a properly oriented traveling-wave field to coact with

the flux from the permanent magnets, means for commutating the field windings in sequence to produce in the primary windings a traveling-wave field, electrical means energizing the primary windings so that the traveling-wave field forms a high reluctance flux path which coacts with the magnetic flux of the



permanent magnets in the rotor blade tips, saliency thus produced, converting the rotor into both a reluctance motor and a self-driving tail rotor as a result of the pulsation of flux imposed by cyclic variation in the reluctance of a magnetic circuit.

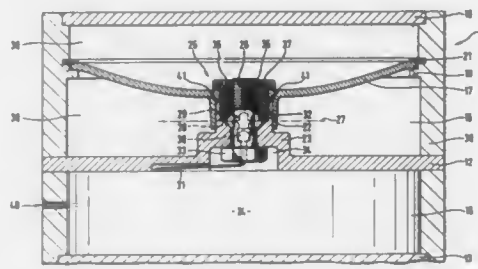
**4,953,812**  
**AIRCRAFT CONFIGURATION WITH AFT MOUNTED ENGINES AND METHOD**  
Antonius J. Van der Hoeven, Issaquah, Wash., assignor to The Boeing Company, Seattle, Wash.  
Filed Nov. 13, 1987, Ser. No. 120,587  
Int. Cl.<sup>5</sup> B64D 27/20  
U.S. Cl. 244—55 13 Claims



1. A method of designing an aircraft, where the aircraft comprises:
  - (a) a fuselage having a longitudinal center axis, a forward portion, an intermediate main portion, and a rear portion,
  - (b) first and second engines mounted adjacent to an exterior surface of said rear portion, said engines having first and second propeller means at first and second propeller locations, said propeller means being arranged to rotate about first and second propeller axes, respectively, with each propeller axis having a substantial alignment component parallel to said longitudinal axis,
  - (c) said fuselage having first and second longitudinally extending surface portions which extend lengthwise along said rear fuselage portion and which are adjacent to said first and second propeller means, respectively,
 said method comprising:
  - (a) establishing longitudinally extending reference contours for each surface portion, where each contour creates an optimized pressure distribution pattern over the side surface portions under conditions where the propeller means are absent,
  - (b) identifying modified pressure distribution patterns over said surface portions, which modified pressure distribution patterns result from placing and operating the propeller means at said propeller locations to create thrust,
  - (c) recontouring the side surface portions from the reference contours to actual contours to create pressure effects

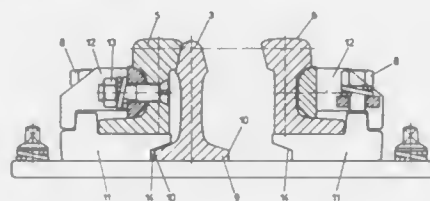
which counteract adverse pressure effects created by the thrusting propellers being present so as to bring the pressure distribution pattern over the side surface portions more closely to the optimized pattern, said actual contours of the side surface portions being characterized in that forward regions of the surface portions slant rearwardly and inwardly toward said longitudinal center axis at a relatively greater angle relative to said longitudinal axis and curve concavely to join their related intermediate regions which are more in alignment with said longitudinal center axis relative to their related forward surface regions, the intermediate regions joining to their related rear regions in a convex curve with each rear region slanting rearwardly and inwardly to a closure location.

**4,953,813**  
**EJECTABLE MEMBER WITH PARACHUTE**  
Gunter Postler, Rothenbach/Peg.; Erich Bock, Nuremberg; Wolfgang von Entress-Fursteneck, Leinburg, and Werner Rudenauer, Roth, all of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany  
Filed Dec. 29, 1988, Ser. No. 291,688  
Claims priority, application Fed. Rep. of Germany, Jan. 8, 1988, 3800330  
Int. Cl.<sup>5</sup> B09D 17/00  
U.S. Cl. 244—147 12 Claims



1. An ejectable member having a storage space for a parachute; a rear wall on said ejectable member; a cassette for said parachute rearwardly of said rear wall; a pyrotechnically severable connector element for centrally axially clamping said cassette to said rear wall, said storage space for said parachute being separated in the region of a predetermined plane of separation from said pyrotechnically severable connector element by a telescopic seal with a sleeve.

**4,953,814**  
**RAILWAY SWITCH COMPRISING A FROG HAVING A MOVABLE MAIN POINT AND AUXILIARY POINT**  
Johannes R. Oswald, Zeltweg, and Eduard Guggenberger, Weiskirchen, both of Austria, assignors to Voest-Alpine Maschinenbau Gesellschaft m.b.H., Linz, Austria  
Filed May 17, 1989, Ser. No. 353,022  
Claims priority, application Austria, May 20, 1988, 1340/88  
Int. Cl.<sup>5</sup> E01B 7/00, 7/22  
U.S. Cl. 246—382 5 Claims



1. A railway switch comprising a frog with a movable main

point and a movable auxiliary point, the main and the auxiliary points being formed of standard rail sections having a thick web, a first height and a rail foot, said railway switch further comprising outer wing rails being formed of asymmetric tongue sections having a second height, said second height being less than said first height, with said outer wing rails being at least partially fixed on base plates.

**4,953,815**  
**FOLDABLE RACK FOR POSITIONING A PLASTIC BAG AS A RECEPTACLE AND FOR SPARE BAG STORAGE**  
Norman Beymer, P.O. Box 126714, San Diego, Calif. 92112-6714, and Gary W. Kite, 422 Wolford Dr., Spring Valley, Calif. 92077  
Filed Dec. 7, 1989, Ser. No. 447,041  
Int. Cl.<sup>5</sup> B65B 67/12  
U.S. Cl. 248—97 7 Claims

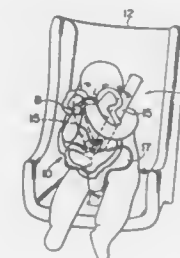


1. A rack for supporting pliable bags having an open top comprising:
  - a pair of rectangular formed closed wire loops, each of said loops having opposing S shaped bends angularly offset from the plane of said loops along opposite side thereof and a centrally positioned coplanar protruding rectangular ear formed on one end of each of said loops, when the S shaped bends are reversed one to the other they interlock said loops together in a pivotable fashion with said ears adjacently opposing each other;
  - a removable locking member for locking said closed loops in substantially a maximum pivoted apart position, said locking member having two fixedly positioned arms in a cruciform configuration with one arm having a C shaped end for resting in the interlocked S bends and an end having a combined bag storage support and handle, the other arm of said locking member having locking means on each end thereof for securing said loops in a relative spaced apart position; and
  - a pliable bag with sits in adjacent sides thereof each of said slits being placed over one of said ears whereby said bag is supported in a substantially maximum top open condition for use as a receptacle.

**4,953,816**  
**NURSING BOTTLE HOLDER**  
Eileen Wilkinson, 12 Webb Rd., Naugatuck, Conn. 06770  
Filed Jan. 19, 1989, Ser. No. 299,782  
Int. Cl.<sup>5</sup> A47D 15/00  
U.S. Cl. 248—102 12 Claims

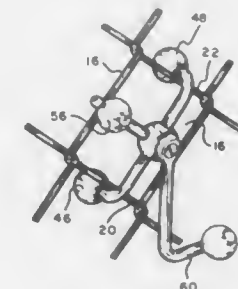
1. The combination comprising an infant safety seat having restraining means for releasably securing an infant in seated position thereon, a nursing bottle holder including a soft resilient flexible pad having front and rear surfaces, and fastening means for releasably attaching said pad to the restraining means in a bottle supporting position in front of an infant releasably secured in seated position on the safety seat by the restraining means and including one fastener component attached to said rear surface and a mating fastener component attached to said

restraining means for connecting engagement with said one fastener component, said pad including a chest shielding portion for substantially covering the frontal profile of the seated infant's chest when the pad is in its bottle supporting position, said pad having means for supporting a nursing bottle in a nursing position relative to the seated infant and including a pair of laterally spaced apart and upwardly projecting bottle retaining portions extending from the upper end of said chest



shielding portion, said bottle retaining portions defining an upwardly open bottle receiving yoke for cradlingly supporting a nursing bottle received therein in a nursing position with the longitudinal axis of the nursing bottle extending in a transverse direction relative to the plane of the pad when the pad is in its bottle supporting position, said bottle retaining portions frictionally engaging associated opposite side portions of a nursing bottle such as aforesaid cradled within said yoke.

**4,953,817**  
**CHAIN LINK FENCE HANGER**  
Peter Mosteller, 103 Linden Ave., Riverton, N.J. 08077  
Filed Sep. 18, 1989, Ser. No. 408,863  
Int. Cl.<sup>5</sup> A47F 7/00  
U.S. Cl. 248—222.2 19 Claims



1. A hanger for attaching items to a chain link type fence comprising:
  - a hub member, said hub member having a front, opposed sides and a top;
  - first and second opposed arms, each of said first and second arms being connected to said hub member and having main portions which extend generally outwardly from either side thereof, the free end of each of said first and second arms extending rearwardly such that said free ends are spaced apart but substantially parallel to each other;
  - a third arm connected to said hub and extending generally upwardly therefrom, said third arm having a main portion which is in substantially the same plane as but perpendicular to said main portions of said first and second arms, the free end of said third arm extending forwardly and downwardly,
  - said main portions of said first and second arms and said free ends thereof lying generally in a plane perpendicular to the main portion of said third arm, and



attaching means connected to and accessible from the front of said hub member for supporting articles when said hanger is secured to a fence.

4,953,818

## HOLDER FOR BEVERAGE BOXES

Bernard Contant, 731 Boul., Desaulniers, St.-Lambert, Qc, Canada J4P 1P7

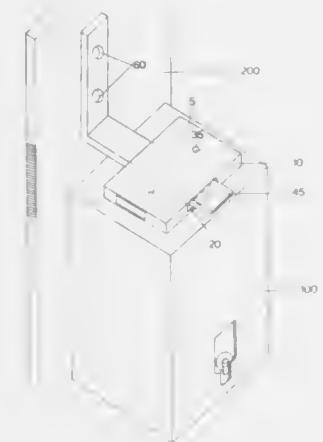
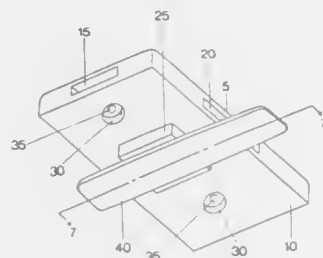
Filed Jul. 19, 1988, Ser. No. 221,214

Claims priority, application United Kingdom, Jul. 20, 1987, 8717127

Int. Cl.<sup>5</sup> B67D 5/06

U.S. Cl. 248—222.3

10 Claims



1. A holder adapted to be mounted to a fixed supporting surface for holding a beverage box having a handle means on an upper surface thereof; said holder comprising:

- a main portion, a support member having means for mounting said support member to a fixed supporting surface, and a bracket extending from said support member with inter-engaging means that releasably engage second engaging means provided on said main portion;
- a generally elongated member having sharp ends secured to said main portion; and
- said generally elongated member having means for engaging a handle means of a beverage box and for retaining a beverage box handle means on said elongated member by executing a 90° relative rotation between said main portion and a beverage box.

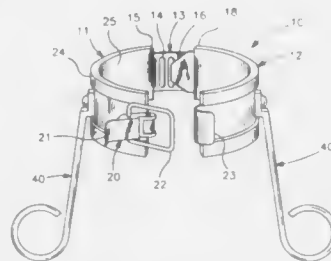
4,953,819  
ADJUSTABLE SUPPORT CLAMP APPARATUS AND METHOD

Dale C. Davis, 2531 Bonita St., Lemon Grove, Calif. 92045  
Filed Nov. 15, 1989, Ser. No. 437,024

Int. Cl.<sup>5</sup> A47B 96/06

U.S. Cl. 248—230

10 Claims



1. A support clamp comprising:
  - a. two arcuate pliable bands;
  - b. an adjustably coacting connection at their first adjoining ends;
  - c. a coacting off-center tension clamp at their second adjoining ends;
  - d. a resilient pliable gasket secured to each of the two arcuate pliable bands;
  - e. a textured surface on the gasket; and
  - f. a plurality of supporting means attached to the arcuate pliable bands to support items.

4,953,820

## LAMP WITH RETAINING RING

Ronald L. Yoder, Topeka, Ind., assignor to Universal Consolidated Methods, Inc., Topeka, Ind.

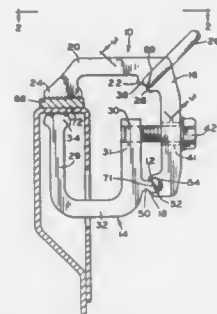
The portion of the term of this patent subsequent to Feb. 20, 2007 has been disclaimed

Continuation-in-part of Ser. No. 747,122, Jun. 20, 1985. This application Apr. 10, 1989, Ser. No. 335,222

Int. Cl.<sup>5</sup> B61D 45/00

U.S. Cl. 248—231.5

5 Claims



5. An adjustable clamp having first and second members joined for limited pivotal relative motion about an axis, the first and second members having first and second pressure pads respectively with the pressure pads moving toward and away from one another as the first and second members are subjected to said relative pivotal motion, and a D-shaped retaining ring pivotally fixed to one of the members, the D-shaped ring including a straight segment and an arcuate segment, both segments being of generally circular cross-sectional configuration, and one of said members including a concave generally cylindrical channel for receiving the straight segment of the D-shaped ring with the ring pivoting about the axis of the cylindrical channel and the axis of said pivotal motion being parallel to the axis of the cylindrical channel, said first member comprising a generally uniform L-shaped cross-sectional con-

figuration with the first pressure pad near one end of the L, a portion of a hinge structure near the other end of the L, and the concave generally cylindrical channel intermediate the L ends, and the second member comprising a generally uniform cross-sectional configuration with the second pressure pad near one end and a second portion of a hinge structure adapted to slidingly mate with the portion of the hinge structure of the first member.

4,953,821

## SUSPENSION APPARATUS FOR CONTROL DEVICES, CONTROL PANELS, OR THE LIKE

Wolfgang Reuter, Burbach-Wurgendorf; Jurgen Debus, Dietzholz, and Lothar Lehr, Burbach-Oberdreselndorf, all of Fed. Rep. of Germany, assignors to Rittal-Werk Rudolf Loh GmbH & Co. KG, Fed. Rep. of Germany

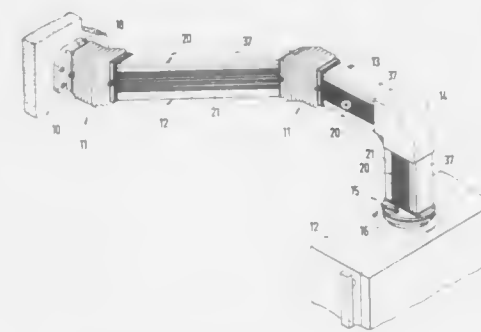
Filed Feb. 21, 1989, Ser. No. 313,224

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1988, 3805425

Int. Cl.<sup>5</sup> E04G 13/00

U.S. Cl. 248—276

21 Claims



1. In a suspension apparatus for control devices and control panels which can be assembled from a connection flange and a connection rotary joint, support body sections, angle units, and intermediary joints connectable with a stationary body, and a coupling unit connectable with the control device and the control panel, the improvement comprising:

- said support body sections (20) having an essentially U-shaped base profile section (21) which with a separating bar (25) parallel to a bar (22) is used to divide into a closed support part (TP) and an open U-shaped reception mounting part (AP) turned away from said bar (22);
- a plurality of longitudinally directed connection bars (28, 29, 31, 32) having penetrating threaded reception mountings integrally formed on said support part (TP) and on said reception mounting part (AP);
- a plurality of lateral limb sections (26, 27) of said reception mounting part (AP) proceeding into connection ends (33, 35) having longitudinally directed and penetrating rear-cut sections (34, 36); and
- a cover profile section (37) having a U-shaped cross section and lateral limbs (38, 40) having longitudinally directed and penetrating suspension or locking attachments (39, 41) removably connectable with said connection ends (33, 35) of said reception mounting profile (AP), whereby said mounting profile (AP) can be closed.

4,953,822

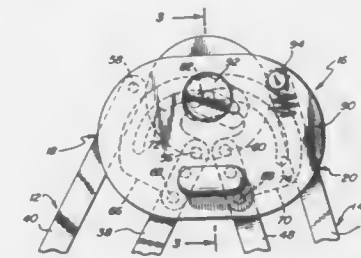
## ADJUSTABLE ARM STRUCTURES

Jerry Sharber, Cypress, and Frank Kilby, Lawndale, both of Calif., assignors to Eldon Industries, Inc., Inglewood, Calif.  
Continuation of Ser. No. 54,422, May 26, 1987, abandoned. This application Jun. 19, 1989, Ser. No. 368,913

Int. Cl.<sup>5</sup> E04G 3/00

U.S. Cl. 248—281.1

4 Claims



1. An improved adjustable arm structure which includes first and second elongated arm assemblies located relative to one another so as to have adjacent ends and remote ends, a connecting joint means connecting the adjacent ends of said elongated arm assemblies, a mounting joint means for use in mounting said structure at the remote end of said first elongated arm assembly, each of said arm assemblies including first and second parallel links, said links of said first arm assembly being pivotally connected to said mounting joint means and said connecting joint means, said links of said second arm assembly being pivotally connected to a holding joint means and said connecting joint means, in which the improvement comprises: said connecting joint means including a frame means, said links of said arm assemblies being pivotally connected to said frame means at different locations on said frame means;
- said connecting joint means also including a first sector plate attached to a link of said first arm assembly and a second sector plate attached to a link of said second arm assembly, said sector plates extending parallel to one another, said sector plates overlying one another, and said sector plates containing arcuate slots which overlap each other in all positions of said sector plates whereby said arm assemblies may be independently moved and positioned relative to said connecting joint means;
- said connecting joint means also including a bolt means extending through said arcuate slots of said sector plates for clamping and securing said sector plates within said frame means so as to hold said arm assemblies against movement by preventing any change in the distance between the links in said arm assemblies;
- said bolt means being mounted on said frame means so as to be incapable of transverse movement relative to said frame means during the use of said arm structure whereby said bolt means will remain stationary during any movement of said arm assemblies and said arcuate slots;
- said bolt means further including a nut means for use in securing said sector plates by tightening and loosening said bolt means.

4,953,823

## COASTER AND WIPE

William G. Sheaffer, and Robin L. Sheaffer, both of 4545 S. Mission Rd., lot 332, Tucson, Ariz. 85714

Filed Jul. 25, 1989, Ser. No. 385,308

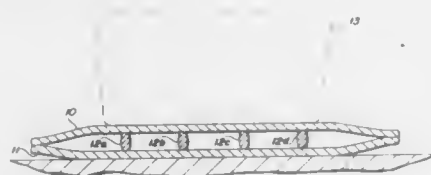
Int. Cl.<sup>5</sup> A47G 91/00

U.S. Cl. 248—346.1

17 Claims

1. A coaster/wipe comprising:
  - (a) a first layer of flexible absorbent material of a preselected first size;
  - (b) a second layer of flexible absorbent material having a size

substantially the same as the preselected first size, said second layer of flexible absorbent material being bound to the first layer of flexible absorbent material around its periphery thereof; and,

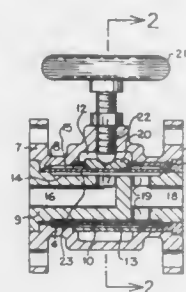


(c) at least two semi-rigid spacers positioned between said first layer of flexible absorbent material and the second layer of flexible absorbent material.

**4,953,824**  
**DEFLECTABLE SLEEVE TYPE VALVE**  
Hans D. Baumann, 32 Pine St., Rye, N.H. 03870  
Filed Mar. 5, 1990, Ser. No. 488,627  
Int. Cl.<sup>5</sup> F16K 7/06

U.S. Cl. 251-8

3 Claims



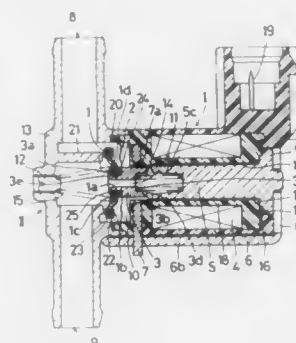
1. Deflectable Sleeve Type Valve comprising:

- a valve housing having a central horizontal bore and a central, enlarged cavity;
- a unitary insert having a central access port terminating in at least one radially extending vertical orifice at one side of a partition wall portion and having a second opposite access port located along the same horizontal axis on the opposite side of the partition wall portion and communicating with at least one more vertical port to the exterior of said circular insert, said circular insert having a recessed exterior portion encompassing the areas where the orifice and at least one additional vertical port are located said circular insert being inserted within the horizontal bore while extending along the entire length of said valve housing and abutting a first shoulder means on said valve housing when said circular insert has been fully inserted within said valve housing and providing as slightly extending surface at both ends thereon to provide a fluid seal when the valve housing is attached to as piping system.
- a tubular seal extending and surrounding the substantial length of said circular insert and having their outer extremities retained within said cylindrical bore of the valve housing between said circular insert at said first shoulder means and a second shoulder means on the other end of the valve housing;
- a plunger slidably engaged within the radial recess of said housing, the lower surface being in close contact with the outside diameter of said tubular seal;
- a mechanical actuating means attached to said valve housing and capable of displacement of said plunger and thereby forcing only the central portion of the tubular seal against said recessed exterior portion in order to open and close only said vertical orifice in the cylindrical insert

circular insert to reduce the bending stresses on the tubular seal.

**4,953,825**  
**ELECTRO-MAGNETIC PROPORTIONAL FLOW CONTROL VALVE**  
Toru Osumi, Toyota; Shoji Ito, Nagoya, and Kenji Hashimoto, Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan  
Filed Aug. 30, 1989, Ser. No. 400,766  
Claims priority, application Japan, Aug. 30, 1988, 63-112799[U]  
Int. Cl.<sup>5</sup> F16K 31/06  
U.S. Cl. 251-129.17

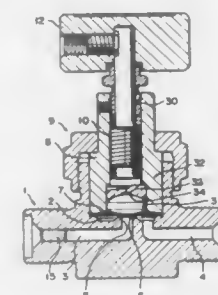
7 Claims



1. An electro-magnetic proportional flow control valve, comprising:
  - an electromagnet solenoid including a bobbin having an axial bore and a fixed core in said axial bore;
  - a valve housing defining a first port, a second port and a valve seat fluidically positioned between said first and second ports;
  - a valve normally in a closing position for closing said valve seat and interrupting fluid communication between said first and second ports;
  - a movable core fixed to said valve and positioned relative to said electro-magnetic solenoid such that said movable core is attracted to said fixed core upon excitation of said electro-magnetic solenoid to fluidically communicate said first and second ports;
  - an annular diaphragm positioned between said valve and said electro-magnetic solenoid and sealingly mounted to said movable core so as to form a fluid tight pressure chamber on a side of said diaphragm opposite said valve, wherein an outer circumference of said diaphragm is fixed relative to said axial bore of said bobbin, whereby said movable core is held in said axial bore and coaxial thereto by said diaphragm, and wherein said diaphragm comprises a corrugated metal disc having a center hole, said disc having an outer circumference sealingly imbedded in a wall of said bobbin and being sealingly mounted to said movable core via said center hole; and
  - a passage in said movable core for fluidically communicating said pressure chamber with said second port, whereby forces acting on said valve due to pressure differences across said valve are cancelled.

**4,953,826**  
**METAL DIAPHRAGM VALVE**  
Tadahiro Ohmi; Yohichi Kanno; Kazuhiko Satoh, and Tadahiro Hatayama, all of Sendai, Japan, assignors to Motoyama Eng. Works, Ltd., Miyagi, Japan  
Filed Aug. 4, 1989, Ser. No. 389,704  
Claims priority, application Japan, Aug. 12, 1988, 63-200008  
Int. Cl.<sup>5</sup> F16K 7/16  
U.S. Cl. 251-331

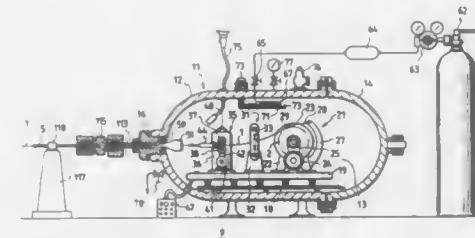
9 Claims



1. A metal diaphragm valve comprising:
  - a valve cage;
  - a metallic valve seat integral with the valve cage;
  - a metal diaphragm having a peripheral edge portion supported in a liquid-tight manner by the valve cage and a central portion facing the valve seat to touch and leave the seat;
  - drive means for opening and closing the metal diaphragm; and
  - diaphragm pressing means formed of resin material, interposed between the drive means and the metal diaphragm, for pressing the diaphragm against the valve seat at a uniform sealing pressure.

**4,953,827**  
**METHOD FOR INSERTING THREAD INTO TUBE**  
Nobuo Araki, Tokyo; Kazufumi Tabata, Narashino; Kiyomi Yokoi, and Ashidate Tadami, both of Tokyo, all of Japan, assignors to Nippon Steel Welding Products & Engineering Co., Ltd., Tokyo, Japan  
Filed Feb. 14, 1989, Ser. No. 310,671  
Claims priority, application Japan, Aug. 11, 1988, 63-199015; Aug. 15, 1988, 63-201910  
Int. Cl.<sup>5</sup> B66F 3/24  
U.S. Cl. 254-134.4

17 Claims



1. A method of inserting a thread into a tube which comprises the steps of:
  - placing a thread in a sealed container;
  - positioning the leading end of the thread relative to one end of a tube connected to the sealed container where it is ready for insertion into one end of the tube;
  - supplying a pressurized gas into the sealed container and passing the pressurized gas into the tube from the end thereof, the stream of the pressurized gas carrying the thread from the sealed container forward through the tube, the pressure of the gas in the sealed container being

high enough to keep the mean flow rate of the gas at any given point of the tube above the advancing speed of the thread; and  
causing the thread to move within the tube so that a portion of the thread is aslant to the center axis of the tube for building up a difference in the static pressure of the gas ahead of and behind the aslant portion for giving a positive longitudinal surging motion to the thread advancing through the tube.

**4,953,828**  
**APPARATUS FOR PRACTICING A PNEUMATIC SUCTION PROCESS PERMITTING DRAWING CABLES THROUGH SHEATHS**  
Sauro S. Baldecchi, 174 Chemin de Glières, 06370 Mouans Sartoux, France, and Patrick Bourgin, 264 Chemin du Fort Carré, 06140 Vence, France  
Filed May 4, 1989, Ser. No. 347,037  
Int. Cl.<sup>5</sup> B66F 3/00  
U.S. Cl. 254-134.4

4 Claims



1. Disposable device for drawing conductive cables through a sheath by means of vacuum applied to one end of the sheath, which is of one-piece construction of self-lubricating plastic, comprising a body of rotation in the form of a cap having a flexibly deformable skirt which flares rearwardly outwardly and which ensures pneumatic sealing with the interior of the sheath, an anchor extended axially in one direction from the cap and having an opening therethrough in which the cables can be received, an axle extending forwardly in the other direction from the cap, and an enlargement on the end of the axle remote from the cap, by which enlargement the device can be grasped for manually pulling on the assembly of the device and the conductive cables drawn thereby, the enlargement having an exposed outermost periphery that is rounded.

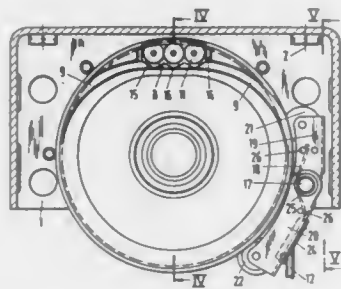
**4,953,829**  
**FASTENING A CABLE OR A DRUM**  
Karl Knaack, Dortmund, and Rainer Horbach, Witten, both of Fed. Rep. of Germany, assignors to Mannesmann AG, Dueseldorf, Fed. Rep. of Germany  
Filed Jun. 3, 1987, Ser. No. 57,957  
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1986, 3618759; Mar. 12, 1987, 3708212  
Int. Cl.<sup>5</sup> B66D 1/34, 1/35  
U.S. Cl. 254-333

11 Claims

1. A winch including structure for fastening a cable to an end face of a cable drum having a longitudinal axis, the drum having a helical peripheral groove and a recessed groove wall on said end face, the groove wall being perpendicular to the longitudinal axis of the drum, comprising:
  - a cable end receiving groove in said end face, comprising a straight groove portion and at least one curved groove portion which merges with said peripheral groove for receiving one end of the cable;
  - at least one axially extending fastening screw means having head means; and
  - at least one axially extending threaded bore in said groove

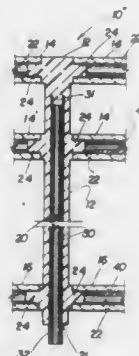


wall adjacent said straight groove portion, for receiving the screw means, the axial bore being positioned so that



the head means of the screw means clamps the cable in the straight groove portion and against the recessed groove wall.

**4,953,830**  
**RAILING ASSEMBLY**  
James R. Weaver, III, Miami, Fla., assignor to Safton, Inc., Miami, Fla.  
Continuation-in-part of Ser. No. 302,634, Jan. 27, 1988, abandoned. This application Sep. 28, 1989, Ser. No. 413,876  
Int. Cl.<sup>5</sup> E04H 17/14  
U.S. Cl. 256—65 14 Claims



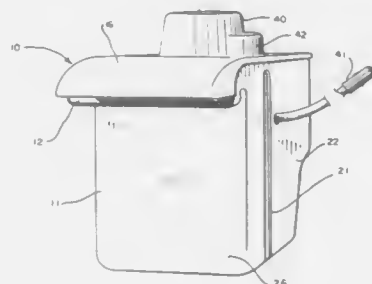
1. A railing assembly formed from a plurality of interconnected components of moldable material, said assembly comprising:

- a plurality of spaced apart, vertically oriented elongated support stanchions each having a hollow interior extending along the length thereof and including a lower end adapted to be anchored to a support surface;
- at least one cross brace having opposite ends thereof connected to spaced apart, next adjacent ones of said support stanchions disposed at said opposite ends of said cross brace;
- each of said plurality of support stanchions including reinforcement means formed thereon for strengthening thereof and comprising an elongated, high strength material reinforcement member secured continuously to each stanchion along the length of said reinforcement member;
- each of said plurality of stanchions formed by injection molding the length thereof in bonded engagement with an exterior surface of a different one of said reinforcement members to define an integral, unitary construction therewith;
- each of said stanchions including an anchor means for securing said lower end to the support surface at least partially defined by a tapered lower end portion having a reduced wall thickness of each stanchion at said lower end

relative to the thickness of a remainder of a wall of said stanchion;

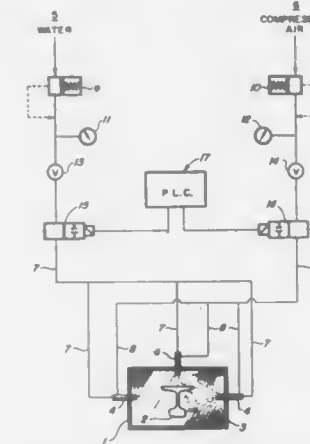
- said assembly further comprising a plurality of cross braces, each connected at opposite ends thereof to adjacent ones of said stanchions in transverse relation thereto and each cross brace having a hollow configuration along its length; a plurality of pickets disposed in spaced, parallel relation to one another and to said stanchions and each picket having an opposite end thereof extending into said hollow interior of a correspondingly positioned one of said cross braces; and
- said assembly including locking means securing said pickets to said cross braces and including an elongated strip of extrudable material disposed on the interior of said cross brace in confronting engagement with interior surface portions thereof, each of said strips comprising at least one free longitudinal edge disposed in locking engagement with correspondingly positioned ends of said plurality of pickets in spaced apart locations along said longitudinal edge.

**4,953,831**  
**EVAPORATIVE AIR COOLER**  
Charles W. Albrecht, Evanston, Wyo., assignor to Cool Pet Industries, Inc., Evanston, Wyo.  
Filed Jun. 21, 1989, Ser. No. 369,190  
Int. Cl.<sup>5</sup> F24F 3/14  
U.S. Cl. 261—102 18 Claims



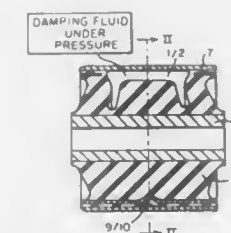
1. An evaporative air cooling device, comprising:  
means defining an air flow passage;  
air blower means mounted to cause air to flow through the passage;  
an evaporation pad having a thickness substantially smaller than at least one of its length and width, said thickness being defined by an upstream surface and an opposing surface of the pad, the pad being installed in a portion of the passage, said portion being shaped and sized to generally conform to the length and width of the pad and to be substantially greater in width than the thickness of the pad in the direction of said thickness, so that an unimpeded flow channel of substantial cross sectional area is provided through said portion of the passage, said channel extending substantially both the length and the width of the pad and being bordered on at least one of its sides the upstream surface of the pad; and  
means wetting the pad with water without prior contact of the water with a stream of air to be cooled.

**4,953,832**  
**APPARATUS FOR THE CONTROLLED COOLING OF HOT ROLLED STEEL SAMPLES**  
Gary D. Kotsch, Annaville; Philip M. Giles, Jr., Bethlehem, and Raymond H. Blemiller, Harrisburg, all of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.  
Filed Mar. 24, 1988, Ser. No. 173,709  
Int. Cl.<sup>5</sup> C21D 1/667  
U.S. Cl. 266—82 3 Claims



1. Apparatus for the controlled cooling of a hot steel sample or samples in preparation for laboratory analysis comprising a closable sample container, a plurality of spray nozzles within said container, conduits connecting said nozzles to a source of cooling water and to a source of compressed air, programmed means to spray predetermined amounts of cooling water and compressed air from said nozzles against said sample for predetermined periods of time.

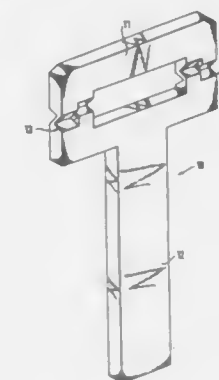
**4,953,833**  
**HYDRAULICALLY DAMPING ELASTIC BEARING**  
Kurt Schmidt, Heimerheim, and Detlef Walozyk, Titz-Rödingen, both of Fed. Rep. of Germany, assignors to Boge AG, Fitorf, Fed. Rep. of Germany  
Filed Aug. 17, 1989, Ser. No. 395,018  
Claims priority, application Fed. Rep. of Germany, Aug. 17, 1988, 3827905  
Int. Cl.<sup>5</sup> F16F 13/00  
U.S. Cl. 267—140.1 13 Claims



1. A hydraulically damping elastic bearing comprising:  
an inner tube;  
an outer tube disposed about and separated from said inner tube;  
at least one elastic member between said inner tube and said outer tube;  
at least one of said inner tube, said outer tube and said at least one elastic member defining at least two chambers within said bearing;  
throttle passage means between said at least two chambers; and  
a damping medium in said at least two chambers and said

throttle passages means therebetween at a predetermined elevated pressure above atmospheric pressure;  
said damping medium having at least one predetermined vaporization pressure; and  
said predetermined elevated pressure being greater than said at least one predetermined vaporization pressure;  
said at least two chambers and said throttle passage means being configured to substantially maintain said predetermined elevated pressure of said damping medium, such that, said at least two chambers, said throttle passage means, and said damping medium comprising means for minimizing formation of at least one of:  
gas bubbles and cavitation  
of said damping medium during use of said elastic bearing.

**4,953,834**  
**PENDULUM WITH BENDING SPRING JOINT**  
Wolfram Ebert, Freiburg; Eberhard Handrich, Kirchzarten; Martin Hafen, Rottweil, and Bruno Ryrko, Denslingen, all of Fed. Rep. of Germany, assignors to Litet GmbH, Freiburg im Breisgau, Fed. Rep. of Germany  
Filed Jan. 20, 1988, Ser. No. 146,295  
Claims priority, application European Pat. Off., Jan. 20, 1987, 87100744.9  
Int. Cl.<sup>5</sup> F16F 1/18  
U.S. Cl. 267—160 4 Claims



1. A pendulum device comprising in combination:  
(a) a generally T-shaped pendulum;  
(b) a pendulum fastening device;  
(c) said pendulum and said pendulum fastening device being formed from a wafer;  
(d) said pendulum being joined to said pendulum fastening device by means of two homologous micromechanical bending spring joints comprising a pair of leaf springs arranged alongside each other and at oblique angles with respect to the major surfaces of said wafer; and  
(e) said pendulum device being selectively etched from a single wafer.

4,953,835

## WIRE FOR COILED SPRING

Yukio Matsumoto; Horiyuki Saito, and Kuniki Morita, all of Utsunomiya, Japan, assignors to Murata Hatsujo Co. Ltd., Tochigi, Japan

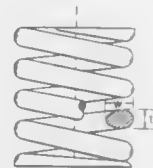
Continuation of Ser. No. 177,269, Apr. 4, 1988, abandoned, which is a division of Ser. No. 9,041, Jan. 28, 1987, Pat. No. 4,735,903, which is a continuation of Ser. No. 638,602, Aug. 7, 1984, abandoned. This application Jul. 12, 1989, Ser. No. 378,678

Claims priority, application Japan, Dec. 1, 1983, 58-225484. The portion of the term of this patent subsequent to Apr. 5, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> F16F 1/06

U.S. Cl. 267—180

2 Claims



1. A spring wire, intended for use in making a coiled spring, in which a cross sectional shape of said wire has a surface that is semicircular at the outside of the coiled spring made therefrom and substantially semielliptical at the inside of said coiled spring, said wire having a sectional shape over the entire substantially semielliptical surface defined by a semielliptical portion and a straight line portion connecting said semielliptical portion and said semicircular surface, wherein the length (L) measured on a coordinate from the center of the semicircular surface (O) to the substantially semielliptical surface is greater than the corresponding dimension (L<sub>0</sub>), taken on the same coordinate, of an ellipse expressed by  $a/b = (2w)/t - 1$ , where a is a long diameter and b the short diameter of the ellipse, t is the maximum dimension of said wire along a longitudinal axis of the coiled spring formed of said wire, and W is the maximum dimension of said wire at a right angle to said axis, such that the surface distribution of stress in coils of the spring made from said wire, when plotted at various angles (psi) taken about the center of gravity (G) of said wire, is made essentially uniform along a substantial portion of said plot, whereby low maximum surface stress is achieved for given dimensions t and W of said wire.

4,953,836

## WORK HOLDER APPARATUS

Mark Starck, 1228 Fourth St., Berthoud, Colo. 80513

Filed Mar. 20, 1989, Ser. No. 326,082

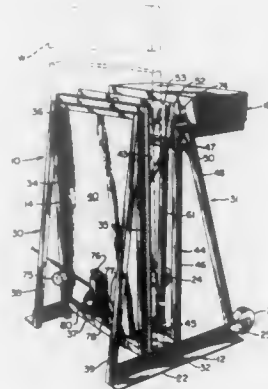
Int. Cl.<sup>5</sup> B23Q 1/04

U.S. Cl. 269—17

11 Claims

1. Work holder apparatus for handling large workpieces, such as, doors, countertops and panels comprising:  
a base support member;  
a pair of spaced upright frame members disposed on said base support unit and extending upwardly from said unit with a common channel therebetween for insertion and positioning of a workpiece in said channel;  
a movable clamping member including means pivotally mounting said clamping member adjacent to an upper end of one of said frame members for movement toward and away from the other of said frame members, and a work-piece-engaging surface on said clamping member in facing relation to said other of said frame members; and  
clamp control means for horizontally advancing said clamping member toward and away from said other of said frame members whereby to rigidly clamp said workpiece in said channel, said clamp control means including fluid-

actuated cylinder means engageable with said clamping member, and means for actuating said cylinder means to



cause pivotal movement of said clamping member toward and away from the workpiece in said channel.

4,953,837

## METHOD AND APPARATUS FOR INSTALLATION AND ALIGNMENT OF A SERIES OF POSTS

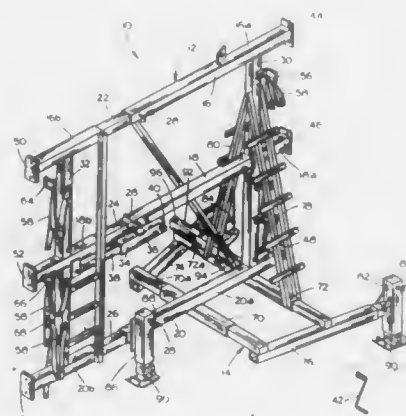
D. William Giroux, 694 Umpqua Pl., LaConner, Wash. 98257

Filed Mar. 17, 1989, Ser. No. 324,608

Int. Cl.<sup>5</sup> B25B 1/20

U.S. Cl. 269—43

8 Claims



1. An apparatus for locating and aligning a post with respect to another post, comprising:

a frame means having an upper and lower elongated generally horizontal member, each horizontal member having first and second ends;  
a first vertical member mounted between said upper and lower members adjacent said first ends, to maintain said first ends in vertically-aligned and spaced-apart relationship;  
a second vertical member mounted between said upper and lower members adjacent said second ends to maintain said second ends in vertically-aligned and spaced-apart relationship;  
foot members connected to said frame means for supporting said frame means in the desired alignment above the ground;  
first operable attachment means for selectively, removably attaching a first post to said first ends of said frame; and  
second operable attachment means for selectively, removably attaching a second post to said second ends of said frame;  
said upper and lower horizontal members and first and sec-

ond vertical members being connected such that said second post will be positioned at a predetermined distance from said first post in a substantially vertically disposed position parallel to said first post, such that a rectangular panel may be installed between said first and second posts.

4,953,838

## WORK POSITIONING DEVICE

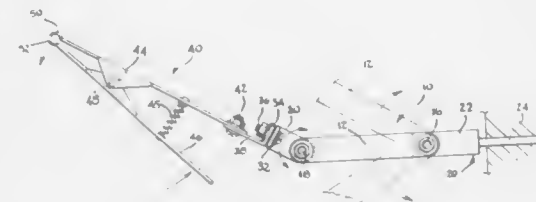
Michael X. Peters, 13967 Marquesas Way, No. 46, Marina Del Ray, Calif. 90292

Filed Sep. 5, 1989, Ser. No. 402,235

Int. Cl.<sup>5</sup> B25B 1/22

U.S. Cl. 269—45

15 Claims



1. A work positioning device for positioning a work piece with respect to a tool in an essentially unlimited number of positions, said work positioning device comprising:

(a) a frame;  
(b) a mounting arm pivotally connected to one end of said frame enabling said frame to be rotatable about a first axis, said mounting arm being adapted for securement to a fixed structure;  
(c) a first positioning arm pivotally connected to another end of said frame and being rotatable about a second axis with respect to said frame, said second axis being generally parallel in space to said first axis so that the first positioning arm moves in a plane generally parallel to said mounting arm;  
(d) a second positioning arm pivotally connected to said first positioning arm and being rotatable about a third axis which is generally perpendicular in space to said second axis;  
(e) a work holding arm pivotally connected to said second positioning arm and being rotatable with respect thereto about a fourth axis, said work holding arm being capable of being moved to an essentially unlimited number of positions through said four axes with respect to a tool;  
(f) means associated with said mounting arm to permit said mounting arm to be pivotally connected to a fixed structure about a fifth axis; and  
(g) means associated with said work holding arm to releasably secure a work piece thereto.

4,953,839

## VICE

Sen-Kuen Chern, No. 660, Hsing-HO Rd., Sha-Lu Town, Taichung Hsing, Taiwan

Filed Sep. 28, 1989, Ser. No. 414,171

Int. Cl.<sup>5</sup> B23Q 1/04

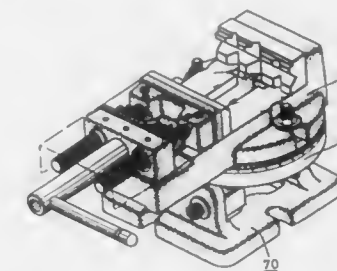
U.S. Cl. 269—73

11 Claims

1. A vise comprising:  
a base having two side walls and a base line for an aligning purpose;  
an elongate body having a first end, a second opposite end having an intermediate hole and side holes, a middlely longitudinal through groove, and two end side plates one of which is provided with an angular scale capable of being utilized together with said base line to indicate an angle included by said base and said elongate body;  
a connecting rod pivotally connecting together said base and

said elongate body and capable of allowing said side walls to fixedly clamp therebetween said side plates;  
a movable seat having a lower engaging piece which includes two side extensions and is capable of being slidably guided in said groove;

two following gears rotatably, untranslatably and horizontally spacedly attached to said second end;  
two guiding screw rods respectively passing through two side holes, screwedly rotatably and respectively coaxially mounted in said following gears and respectively having one ends thereof capable of horizontally spacedly urging against said movable seat;



a shaft rotatably mounted in said second end and passing through said intermediate hole;  
an active gear mounted on said shaft and meshed between said following gears;  
a driving handle connected to said shaft;  
a first jaw member attached to said first end;  
a second jaw member attached to said movable seat;  
a reinforcing locking member having a threaded hole; and  
a bolt passing through one of said side walls to be threaded into said threaded hole and capable of being rotated to assistantly tightly urge one of said side plates against said one side wall.

4,953,840  
VICE JIG

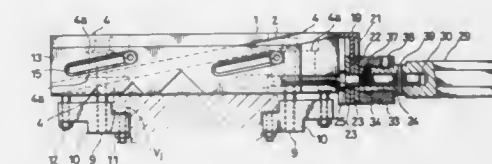
Akira Nishimura, Kanazawa, Japan, assignor to Kabushiki Kaisha Nishimura Jig, Kanazawa, Japan

Filed Sep. 8, 1989, Ser. No. 404,570

Int. Cl.<sup>5</sup> B23Q 1/04

U.S. Cl. 269—282

11 Claims



1. A work holding vice jig to be removably attached to a jaw of a vice, wherein said jig comprises a body and a pair of fixing pieces, said body having a pair of parallel through holes and also having one side face thereof parallel to said through holes which one side face serves as a work holding face having grooves for holding works of special shapes, said fixing pieces being threadedly engaged with the tip ends of bolts inserted through said through holes; wherein an inclined guide slot is formed in a side face opposite to the side face serving as the work holding face of said body; a slide member having a rib adapted to be fitted in said guide slot and also having a horizontal work resting surface is provided; a pair of threaded holes are formed in the vicinity of said guide slot; and elongated through holes for the mounting of bolts are formed in said slide member in positions corresponding to said threaded holes.



# 4,953,841 MACHINE AND PROCESS FOR SEPARATING SIGNATURES

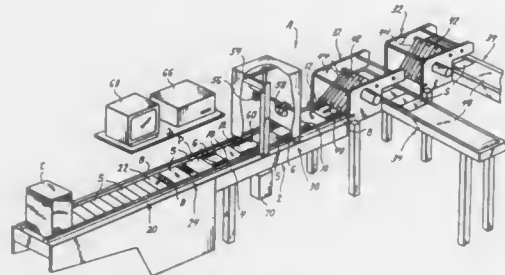
Kenneth J. Polarek, Effingham, Ill., assignor to World Color Press, Inc., Effingham, Ill.

Filed Oct. 7, 1988, Ser. No. 254,581

Int. Cl.<sup>5</sup> B65H 39/02

U.S. Cl. 270—58

18 Claims



1. An apparatus for separating like book signatures from a mixture of book signatures, said apparatus comprising: means for moving the signatures one after the other along a path in a predetermined orientation in the path; a camera located along the path such that the signatures as they are advanced by the conveying means come successively within the field of view for the camera; diverting means located along the path for directing signatures to selected locations upon command, with each location being separate from the other locations and being reserved for like signatures; and computing means connected with the camera and to the diverting means for

- storing within a memory an image of a limited area of interest from each of several signatures that are to be separated into groups of like signatures and the locations of those limited areas within the signatures;
- through the camera capturing images from signatures that come within the field of view for the camera;
- comparing the stored images one after the other with each successive captures image, with each comparison being between the limited area of interest for the stored image and an area of similar location in the captured image so as to identify those captured images which correspond with stored images both as to content and location, with the comparison being two dimensional in character; and
- as to each identified captured image, commanding the diverting means to direct the signature having that image to the location reserved for signatures having that image, whereby like signatures are isolated at separate locations.

4,953,842

# MAIL THICKNESS MEASURING APPARATUS

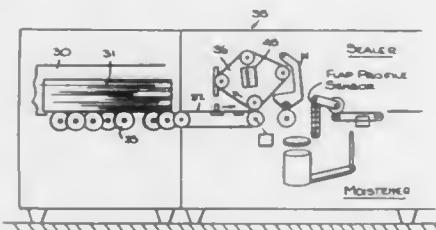
Robert J. Tolmie, Jr., Brookfield, and Donald T. Dolan, Ridgefield, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 28, 1988, Ser. No. 291,038

Int. Cl.<sup>5</sup> B65H 3/04

U.S. Cl. 271—2

7 Claims



1. Apparatus for measuring the thickness of mail pieces,

comprising means for generating a magnetic field pattern, an array of magnetic field detectors for outputting a binary signal in response to the field pattern, said field generating means and detectors being configured such that the outputted binary signal is absolute and Gray encoded over a range of thicknesses of the mail, means for contacting the mail and movable in response to the thickness of the contacted mail, and means connecting the contacting means and generating means for moving the latter past the array over the distance proportional to the movement of the contacting means, the field generating means being a magnet having plural poles arranged in a row a first pole segment, a second pole segment, and a third pole segment of the same type as the first pole, the three segments having differing lengths, the magnetic field detectors being equally spaced apart.

4,953,843

# METHOD OF, AND APPARATUS FOR, LOADING A SINGLING INSTALLATION FOR PRINTED PRODUCTS

Walter Reist, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

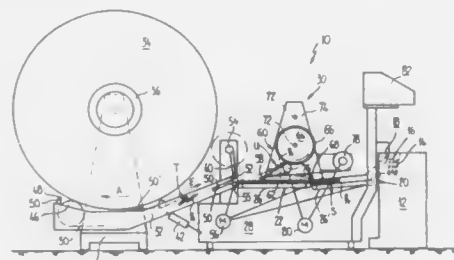
Filed Jul. 21, 1988, Ser. No. 223,956

Claims priority, application Switzerland, Jul. 24, 1987, 02821/87

Int. Cl.<sup>5</sup> B65H 5/02

U.S. Cl. 271—3.1

22 Claims



1. A method of loading a processing apparatus for printed products, and comprising the steps of forming an arriving imbricated stream of printed products, singling the printed products of the arriving stream, forming the singled printed products into an imbricated buffer stack leading to the processing apparatus and including reducing the imbrication pitch of the products, selectively removing some of the singled printed products to a buffer package and winding the products thereupon, unwinding the printed products from the buffer package upon an interruption of the arriving imbricated stream, and delivering the unwound printed products in imbricated formation to said imbricated buffer stack.

4,953,844

# PAPER SUPPLY DEVICE WITH A FUNCTION OF AUTOMATICALLY SENSING THE LIFE OF FEED ROLLERS

Yasuhiro Iwata, and Yuzi Uchigasaki, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 23, 1989, Ser. No. 314,036

Claims priority, application Japan, Mar. 2, 1988, 63-47403

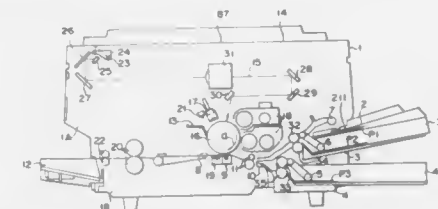
Int. Cl.<sup>5</sup> B65H 5/06

U.S. Cl. 271—9

16 Claims

1. A paper supply device comprising: first roller means arranged in at least two feed paths for alternative use when a copying operation is performed; second roller means for sequentially and downstream feeding sheets of copying paper supplied from said first roller means; and detecting means for detecting the frequency of use of said

second roller means from the rotational frequency of said second roller means corresponding to a sum of the rota-



tional frequency of said first roller means in the feed paths, rotated by feeding said sheets of copying paper.

4,953,845

# DEVICE FOR HANDLING AND GUIDING BUNDLES WITH VERTICAL SHEET STACKERS

Antonio Castiglioni, Varallo Pombia, Italy, assignor to Civieme S.r.l., Italy

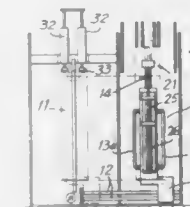
Filed Nov. 8, 1988, Ser. No. 268,740

Claims priority, application Italy, Nov. 20, 1987, 22720 A/87

Int. Cl.<sup>5</sup> B65H 31/00

U.S. Cl. 271—217

7 Claims



1. An arrangement for handling and guiding a bundle of sheets in and between stacking and binding stations in which the sheets are stacked and bound, respectively, comprising:

- means for pressing the sheets in the bundle in the stacking station to form a pressed bundle, said pressing means including an arm mounted for displacement between a pressing position in which the arm engages an uppermost sheet in the bundle, and a removed position in which the arm is disengaged from the uppermost sheet;
- means for moving the pressed bundle along a stacking path through the stacking station with the arm in the pressing position;
- said pressing means includes means for moving the arm in a direction generally parallel to the stacking path;
- said pressing means being mounted on a support that, in turn, is guidably mounted for movement in a direction generally parallel to the stacking path;
- means for conveying the pressed bundle from the stacking station along a transfer path to the binding station with the arm in the pressing position;
- means for displacing the arm to the removed position to form a released bundle in the binding station; and
- means for compressing the released bundle with the arm in the removed position prior to binding in the binding station.

4,953,846

# APPARATUS FOR CONVEYING A SHEET OBLIQUELY

Takahiro Azeta, Kawasaki; Toru Kameyama, Tokyo; Harukazu Sekiya, Yokohama; Toshifumi Moritani, Yokohama; Akira Higeta, Yokohama; Kenji Baba, Kofu; Takeshi Matoba, Yokohama; Shinji Goto, Tokyo, and Kazuyuki Kubota, Yamana-shi, all of Japan, assignors to Canon Kabushiki Kaisha and Nippon Seimitsu Kogyo Kabushiki Kaisha, Tokyo, Japan

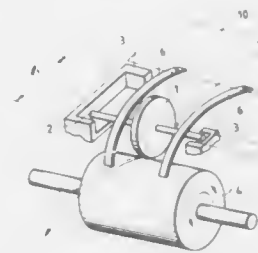
Filed Aug. 17, 1988, Ser. No. 233,485

Claims priority, application Japan, Aug. 19, 1987, 62-206648; Aug. 19, 1987, 62-126686[U]

Int. Cl.<sup>5</sup> B65H 9/16

U.S. Cl. 271—251

10 Claims



1. A sheet obliquely conveying apparatus comprising: a pair of sheet conveying means having a forwardly and reversely rotatable drive roller and a follower roller rotatable in contact with said drive roller, said follower roller being mounted on a shaft; bearing means for rotatably supporting the shaft of said follower roller, the dimension of a first bearing portion of said bearing means which supports one end of the shaft of said follower roller being greater generally along a direction of conveyance of a sheet material than the dimension of a second bearing portion of said bearing means which supports the other end of said shaft; and resilient means generally parallel to the direction of conveyance of the sheet material for pressing the shaft of said follower roller, said resilient means comprising an elongated member elongated in the conveyance direction and pressing the shaft of the follower roller such that the shaft of the follower roller rolls on a surface of the elongated member.

4,953,847

# METHOD OF AND APPARATUS FOR OUTFEEDING PRINTED PRODUCTS ARRIVING IN AN IMBRICATED FORMATION

Werner Honegger, Tann-Ruti, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Filed Feb. 27, 1989, Ser. No. 316,339

Claims priority, application Switzerland, Mar. 3, 1988, 00809/88

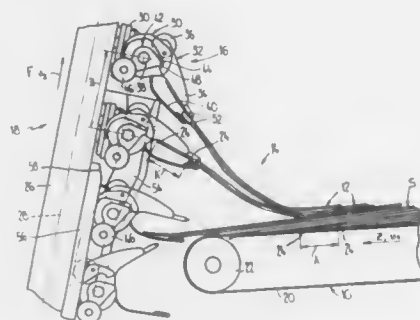
Int. Cl.<sup>5</sup> B65H 5/08

U.S. Cl. 271—277

16 Claims

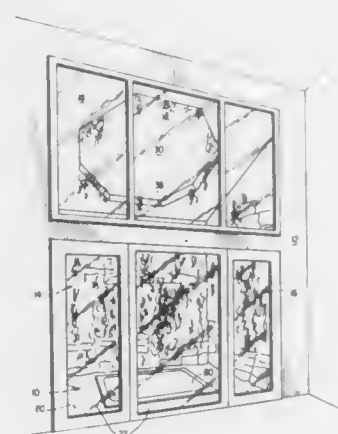
1. A method of outfeeding printed products, particularly multi-sheet and preferably folded printed products, comprising the steps of: infedding in an imbricated formation the printed products arranged in tandem and at a predetermined spacing and imbricatingly overlapping one another; engaging each time at least two printed products in region of leading edges thereof by means of grippers of an outfeed device; said step of engaging each time at least two printed products entailing the engagement of at least two printed products by a single gripper while maintaining the predetermined spacing which said at least two printed products occupy in said infed imbricated formation;

retaining said at least two printed products having the predetermined spacing; and



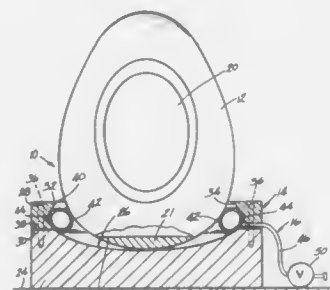
outfeeding said at least two printed products having the predetermined spacing.

**4,953,848**  
**INDOOR STRUCTURE THAT SIMULATES AN OUTDOOR ENVIRONMENT**  
Michael Braunstein, 2500 Stonehaven Ct. South, Columbus, Ohio 43220, and Richard Huggins, Columbus, Ohio, assignors to Michael Braunstein, Columbus, Ohio  
Filed Sep. 19, 1989, Ser. No. 409,060  
Int. Cl.<sup>5</sup> A63G 1/00  
U.S. Cl. 272—8.5



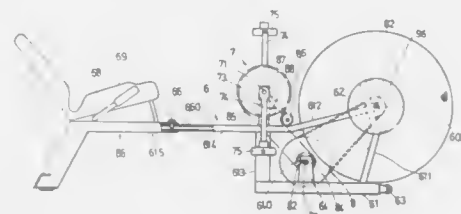
1. An indoor structure that simulates an outdoor environment, said structure comprising:
  - (a) a front wall having at least one transparent window therein, said front wall having a first side and a second side;
  - (b) a ceiling which slants from a high end at or adjacent said second side of said front wall to a low end removed from said front wall, said ceiling having an inside surface facing said wall and an outside surface facing away from said wall;
  - (c) an aperture in said ceiling, said aperture having a periphery;
  - (d) a concave dome located on the outside of said ceiling over said aperture, said concave dome having a light reflecting inside surface facing said ceiling and an outside surface facing away from said ceiling;
  - (e) first means for shining light on said light reflecting inside surface of said concave dome; and
  - (f) second means for concealing said first means from a viewer located on said first side of said front wall.

**4,953,849**  
**RIDING CAPSULE DEVICE WITH CONTROL MECHANISM**  
Victoria K. Reed, 1778 Peck La., Cheshire, Conn. 06410  
Continuation-in-part of Ser. No. 922,942, Oct. 24, 1986. This application Nov. 17, 1989, Ser. No. 437,746  
Int. Cl.<sup>5</sup> G65G 1/00  
U.S. Cl. 272—35



1. A riding capsule device including a capsule member, a base, and control mechanism, said capsule member having a bottom configuration in the form of a convex spherical segment, said base having a lower portion with a top configuration in the form of a concave spherical segment engaged by said bottom configuration of said capsule member and having a radius of curvature which is larger than the radius of curvature of said bottom configuration of said capsule member, said base further having an upper portion with an internal concavely arcuate surface that forms a smooth continuation of and overlies said concave spherical segment of said bottom portion of said base said control mechanism including a circular, tubular control member that is inflatable and deflatable and which when inflated is doughnut shaped, and which is attached to said concavely arcuate surface of said upper portion, and which, when inflated engages and immobilizes said capsule member, and which, when deflated, goes limp and disengages said capsule member.

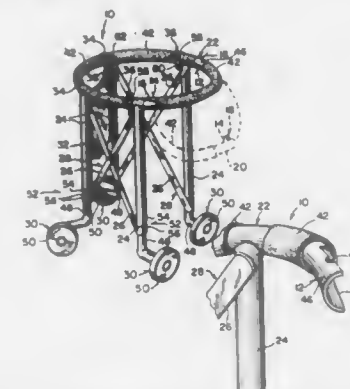
**4,953,850**  
**WIND-DRAG TYPE EXERCISE BICYCLE WITH PEDALS DISPOSED IN FRONT OF THE SEAT THEREOF**  
Peter K. Lo, P.O. Box 13-124, Taipei, Taiwan  
Filed Sep. 27, 1989, Ser. No. 413,119  
Int. Cl.<sup>5</sup> A63B 21/00  
U.S. Cl. 272—73



1. An exercise bicycle comprising:
  - a frame assembly adapted to rest on a horizontal surface;
  - a seat with a back fixed on a rear end portion of said frame assembly for positioning of a user thereon;
  - two handlebars fixed on said frame assembly at two sides of said seat so that the user can grip thereon;
  - a drive assembly including a driving shaft journaled on a middle portion of said frame assembly, a driving sprocket sleeved rigidly on said driving shaft, two crank arms respectively secured to two ends of said driving shaft, and

- two pedals respectively secured to said crank arms so that the user's feet can step thereon;
  - means for adjusting the distance between said seat and said drive assembly;
  - a wheel assembly including a wheel axle journaled on a front end portion of said frame assembly, a hub sleeved rigidly on said wheel axle, a wheel body sleeved rigidly on said hub, and a driven pulley sleeved rigidly on said hub, said wheel body having a plurality of generally radially extending wheel blades;
  - a driven shaft assembly including a driven shaft journaled on said frame assembly between said drive assembly and said wheel assembly, a driven sprocket sleeved rotatably on said driven shaft, a chain trained on said driving sprocket of said drive assembly and said driven sprocket of said driven shaft assembly, a freewheel clutch interposed between said driven sprocket and said driven shaft so as to lock said driven sprocket on said driven shaft when said pedals are rotated in one direction, a driving pulley sleeved rigidly on said driven shaft, and a V-belt trained on said driving pulley of said driven shaft assembly and said driven pulley of said wheel assembly; and
  - a tensioning device connected to said chain so as to tension said chain;
- whereby, rotation of said pedals can be transmitted to said driven shaft and subsequently to said wheel body.

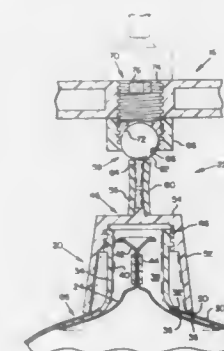
**4,953,851**  
**SAFETY MOBILIZER WALKER**  
Lila A. Sberlock, 280 Collins Ave., Mt. Vernon, N.Y. 10552, and Maryann P. Finn, 246-31 137th Rd., Rosedale, N.Y. 11442  
Filed Nov. 7, 1988, Ser. No. 268,035  
Int. Cl.<sup>5</sup> A61H 3/00  
U.S. Cl. 272—70.3



1. A safety mobilizer walker which comprises:
  - (a) a generally circular shaped rim member having a stationary portion and allowing user to grip said generally circular shaped rim member during an atoxia attack, a vertigo attack, or fatigue until help arrives;
  - (b) a curved arm member hinged at one end to said generally circular rim member;
  - (c) means for securing said arm member at its free end in a closed position to said generally circular rim member and forming an "O"-shaped configuration, said arm member securing means including a rivet pin carried on top of said free end of said curved arm member and said generally circular rim member having a cutout area with topnotch in distal end thereof to receive said rivet pin when free end of said curved arm member swings into said cutout area in said distal end of said generally circular rim member, said cut out area contained in said free end of said fixed member to assist in connecting said free end of said fixed member with said free end of said curved arm member while said fixed end remains pivotable in a plane defined by said generally circular rim member, since said generally circular rim member and said curved arm member are substantially curved and only said curved arm member is disposed pivotally in the same plane as said generally circular

- rim member the connection can only be achieved by pivotable means so that said free end of said curved arm member swings into said free end of said generally circular rim member;
- (d) four vertical support legs spaced about and affixed to said stationary portion of said generally circular rim member;
- (e) four brace members affixed diagonally between said support legs to form two X-shaped frames for stabilizing and for preventing torsional deformation and shear stress of said support legs;
- (f) four wheel assemblies, each mounted to bottom of each of said support legs and having adjustment means to adjust height of said generally circular rim member without having to remove any members so that a disabled person can enter said generally circular rim member, close said arm member and be supported therein when moving about;
- (g) a non-rigid sling seat having a second side and a first side, said first side being disposed on and removably suspended from said generally circular shaped rim member, said sling being readily adjustable while being removably attached at said first end and said second end to said generally circular shaped rim member so that said sling is readily removed for cleaning incontinence accidents, in addition to the normal cleaning, and repairing;
- (h) means for removably suspending said sling seat from said second side said sling seat being disposed on said generally circular shaped rim member and said sling seat being in an open position so that the disabled person can sit within said sling seat which is in said opened position and be supported therein when moving about; and
- (i) means for suspending said sling seat in a folded position onto itself so that the disabled person can stand within said walker and be supported therein when moving about.

**4,953,852**  
**PUNCHING BAG AND SUPPORT**  
Patrick T. Donohue, 1822 NE. 143rd, Portland, Oreg. 97230  
Filed Apr. 26, 1988, Ser. No. 186,453  
Int. Cl.<sup>5</sup> A63B 69/00  
U.S. Cl. 272—78



1. A punching bag assembly comprising:
  - a first bag, inflatable and having a wall of a first elastic material and an inflation orifice;
  - a second bag having a wall of a second elastic material and an opening in the wall, said first and second materials having substantially similar material properties, the first bag being contained within the second bag with the inflation orifice in register with the opening and inflated so that it exerts pressure outwards and distends the second bag, the elasticity of the materials helping to establish a tension in the walls of both bags so that said walls substantially unite to define a single resilient envelope; and
  - suspension means having a collar including an orifice and

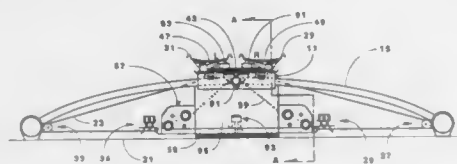


disposed in the opening of the second bag so as to be captured by the bags upon inflation of the first bag and retained between said walls by the tension established in the respective walls so that the opening of the second bag is distended elastically over the collar and the suspension means is substantially integrated with the walls and the first bag inflation orifice is accessible through the collar orifice.

**4,953,853**  
**SKI EXERCISING APPARATUS**  
R. Joel Loane, 535 Placitas Ave., Atherton, Calif. 94025  
Continuation-in-part of Ser. No. 80,755, Jul. 30, 1987, Pat. No. 4,743,014. This application Apr. 6, 1988, Ser. No. 178,354  
The portion of the term of this patent subsequent to May 10, 2005, has been disclaimed.  
Int. Cl.<sup>5</sup> A63B 69/00

U.S. Cl. 272—97

9 Claims



1. A device for exercising comprising: at least two rails positioned in a spaced apart parallel relationship; brace means for holding said rails in said spaced apart relationship, said brace means comprising a first brace element at one end of said rails, a second brace element at the other end of said rails, and a third brace element attached to said rails between said first brace element and said second brace element; carriage means for providing a stable riding area for riding along said rails; first resilient means for providing a restoring force on said carriage means toward the middle of said rails, said first resilient means attached at substantially its midpoint to said carriage means, one end of said first resilient means passing around a first roller means at said first brace element and attaching to said third brace element, the other end of said first resilient means passing around a second roller means at said second brace element and attaching to said third brace element; second resilient means for providing a second restoring force on said carriage means toward the middle of said rails; and adjustment means for adjusting the magnitude of said second restoring force, said adjustment means contacting said second resilient means at least three points, with a first one of said three points located in a vertical plane on one side of the middle of said rails, with a second one of said three points located in a vertical plane on the other side of the middle of said rails, and with a third one of said three points associated with said carriage means and moving therewith.

**4,953,854**  
**STRING EXERCISER**  
Stephen J. Pizur, Sr., 905 Oak Ave., Barnesboro, Pa. 15714  
Filed Aug. 22, 1989, Ser. No. 396,650  
Int. Cl.<sup>5</sup> A63B 21/22; A63H 1/32

U.S. Cl. 272—93

4 Claims

1. An exerciser comprising a flexible, elongated tension member structure incorporating a pair of axially spaced multi-strand tension member end sections, said end sections including pairs of adjacent and remote ends and handle means supported from said remote ends against twisting relative thereto, said tension member structure including a circular cross sec-

tion central spinner body mounted between said adjacent ends and against spinning relative thereto about the longitudinal extent of said tension member structure, said adjacent ends being independently anchored relative to central portions of the remote sides of said spinner body facing toward the corresponding end section remote ends, said adjacent ends of said tension member end sections being twistable, in opposite directions, about the longitudinal extent of said tension member structure, relative to said remote ends of said tension member structure end sections and said handle means supported therefrom, said handle means comprising elongated handle members adapted to be gripped in and enclosed within clenched hands of a user, the longitudinal mid-length portions of said handle members including eye portions outstanding therefrom disposed in planes each normal to the longitudinal extent of the



corresponding handle member and to which said remote ends are anchored, each of said end sections including a single elongated multi-strand tension member section having a longitudinal mid-portion thereof passed through the corresponding eye portion and its opposite ends anchored to the central portion of the corresponding side of said remote sides of said spinner body, said spinner body being hollow, each of said remote side central portions including a pair of apertures formed therein, said opposite ends of said tension member sections being slidably received through the corresponding apertures and secured together within the interior of said spinner body, at least one of said remote sides including an access port therein spaced radially outwardly of the corresponding central portion through which each pair of said secured together opposite ends of said tension member sections may be withdrawn.

**4,953,855**  
**METHOD AND APPARATUS FOR VARIABLE PROPORTIONAL WEIGHT LIFTING EXERCISES**  
William D. Shields, 3031 Dalehurst Dr. West, Jacksonville, Fla. 32211

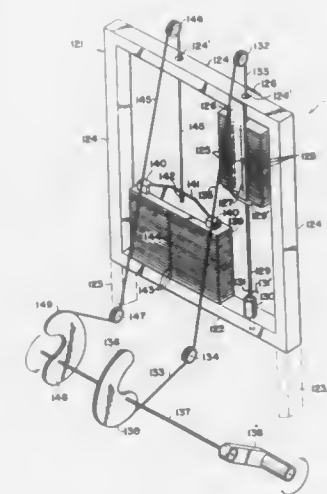
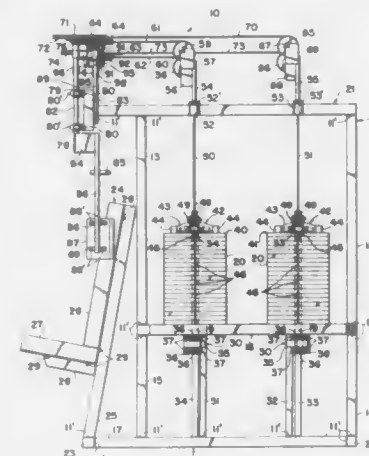
Filed May 18, 1989, Ser. No. 353,784  
Int. Cl.<sup>5</sup> A63B 21/062

U.S. Cl. 272—118

64 Claims

1. A method of changing the weight loading on an exercise element when the element is being operated during an exercise motion by an exerciser comprising the steps of:
  - A. mounting a cam means having a plurality of separate phases each having lift to be movable in response to the exercise element;
  - B. providing a stack of weights for each phase of the cam; and

- C. moving each stack of weights independently in response to movement of the respective separative phase of the cam



means providing predetermined velocities of movement of respective weight stacks during the exercise motion.

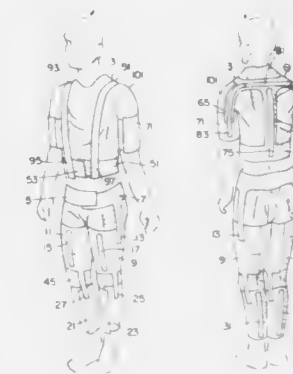
**4,953,856**  
**EXERCISE GARMENT**  
Charles E. Fox, III, 115 Ashford Pl., Greenwood, S.C. 29646  
Filed Mar. 17, 1989, Ser. No. 324,729  
Int. Cl.<sup>5</sup> A63B 21/065

U.S. Cl. 272—119

4 Claims

1. An exercise garment comprising: an elastomeric waistband; a pair of upper leg straps for placement about the thigh; said upper leg straps being attached to said waistband; removably secured weights on the front portion of said upper leg straps positioned on the front of a runner wearing said suit; a pair of lower leg straps suspended from said upper leg straps said lower leg straps having a position for removably securing weights to the back leg portion of a runner; an upper waist strap to encircle the waist of a runner; a generally T-shaped member extending from said upper waist strap up the spinal area of the runner to the shoulder portion and extending in a T-like fashion from the shoulders down the backs of the arm to the elbow; said generally T-shaped member having a weight removea-

bly secured to leg of the "T" extending generally up the spinal portion of the user; weights removably secured to the cap portion of the "T" extending to the elbows of the user; and

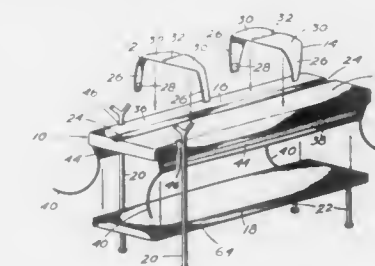


suspender shoulder straps extending from the upper portion of the "T" back to the waistband to maintain weights in proper position.

**4,953,857**  
**ORTHOPEDIC BACK SUPPORT ATTACHMENT FOR A WEIGHT LIFTER'S BENCH**  
Brett J. Lemire, 5605 Laguna Dr., Sacramento, Calif. 95758  
Filed Jul. 27, 1989, Ser. No. 385,380  
Int. Cl.<sup>5</sup> A63B 21/072

U.S. Cl. 272—123

5 Claims



1. An orthopedic back support attachment for a weight lifting bench comprising:

a substantially rectangular, longitudinally elongated padded mat, said padded mat having a use surface side and an oppositely disposed attachment surface side, and said padded mat having a groove providing a narrow channel centrally longitudinally aligned in said use surface side; a pair of belts for removably attaching said padded mat to a support structure, each said belt having one end attached to the longer sides of said padded mat, the free ends of said pair of belts having fasteners being adjustably attachable to each other for releasably attaching said padded mat to the support structure; and means on said padded mat for removably affixing attachments to said padded mat.

**4,953,858**  
**SLOPING ROTATABLE EXERCISER**  
Joseph M. Zelli, Houston, Tex., assignor to Michael P. Breston, Houston, Tex., a part interest  
Filed Nov. 10, 1986, Ser. No. 928,552  
Int. Cl.<sup>5</sup> A63B 21/04

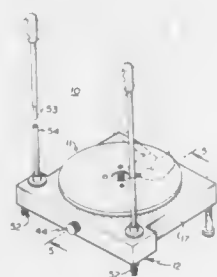
U.S. Cl. 272—146

19 Claims

1. An exerciser to simulate the motions and conditions inci-

dent to making turns on a ski slope, and for perfecting body movements that are important for the safety of skiers on a snow-covered slope during a downhill run, and to condition and prepare skiers to carry out swaying movements, one-footed skiing, and other movements of the type normally expected from a downhill skier while making turns, comprising:

- a platform for supporting a person;
- support means including a frame;
- a shaft fixedly mounted on said frame;



bearing means mounted on and supported by said shaft, and said bearing means and said shaft supporting the entire weight of said platform for substantially frictionless rotation in accordance with shift of weight and movements of the person; and

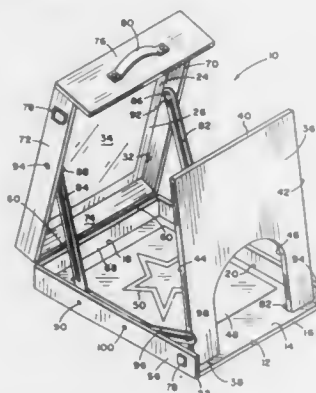
elastic rotation restraining means coupled between said platform and said frame, said restraining means being effective to yieldably resist with increasing force the increasing tendency of the platform to rotate clockwise or counter-clockwise from a neutral start position relative to the frame.

#### 4,953,859 GAME DEVICE

Allen D. West, Drawer 310, Catoosa, Okla. 74015  
Filed Oct. 2, 1989, Ser. No. 415,659  
Int. Cl.<sup>5</sup> A63F 9/06

U.S. Cl. 273—1 GA

4 Claims



1. A game device comprising:

- a horizontal base having a top flat surface dimensioned to receive a drawing sheet thereon and having a front edge and a rear edge;
- a back board extending upwardly from adjacent said base rear edge and having a forward surface;
- a mirror supported to said back board forward surface;
- a front board having a top edge and a bottom edge, the bottom edge being secured to said base adjacent said front

edge thereof and extending uprightly therefrom, the front board having an opening in the lower portion thereof communicating with said lower edge, the opening being dimensioned to loosely receive the hand and forearm of a user therethrough;

a drawing sheet supported on said base top surface, said opening in the lower portion of said front board providing means for the user to extend his/her hand therethrough whereby the user can peer over said top edge of said front board into said mirror to view a reflection of said drawing sheet and whereby the user may view a drawing made by him/her on said drawing sheet as reflected in said mirror, the top portion of said front board occluding the user's direct view of said drawing sheet.

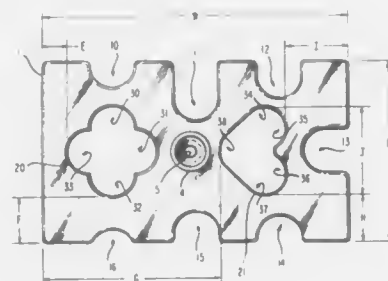
#### 4,953,860

##### POOL CUE BRIDGE

Marc L. Ames, 539 Lyme Rock Rd., Bridgewater, N.J. 08807  
Filed Mar. 3, 1989, Ser. No. 318,740  
Int. Cl.<sup>5</sup> A63B 71/00

U.S. Cl. 273—23

7 Claims



1. An improved pool cue bridge which is comprised of a rectangular shaped bridge having width and length sides containing seven cue support positions, three of which being disposed along each long side of said rectangular bridge, said bridge further containing at least one opening within the perimeter thereof, said opening being generally heart shaped and having at least one cue support position.

#### 4,953,861

##### BALL HITTING SPORTS TOOL

Motoyasu Nakanishi, Fujishi, Japan, assignor to Kabushiki Kaisha Sigel, Tokyo, Japan  
Filed Feb. 26, 1988, Ser. No. 161,130

Claims priority, application Japan, Mar. 2, 1987, 62-30114; Mar. 30, 1987, 62-47049

Int. Cl.<sup>5</sup> A63B 59/00, 53/00

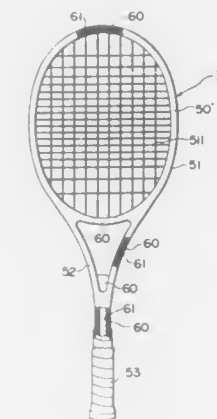
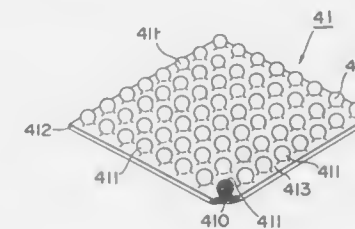
U.S. Cl. 273—73 J

4 Claims

1. A ball hitting sports tool comprising

- a ball hitting part for hitting a ball,
- a stem attached to said ball hitting part, and
- a grip attached to said stem and held by a player, said grip having a buffer part, said buffer part having at least one buffer layer which is positioned so that a shock from said ball hitting part is conducted to the position where said buffer part is located, said buffer layer being a gel material filled sheet filled with a gel material with a penetration

value of approximately 50 to 200 according to Japanese Industrial Standard K2530 and having substantially non-



elastic deformation and substantially no repulsive elasticity in response to a shock wave.

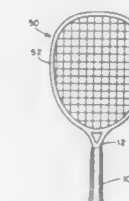
#### 4,953,862

HAND GRIP FOR SPORTING EQUIPMENT OR TOOLS  
Alan K. Uke, 5980 Rancho Diegueno, P.O. Box 8531, Rancho Santa Fe, Calif. 92067, and Lawrence P. Monty, 54 Briar Rd., Leominster, Mass. 01453

Filed Apr. 18, 1989, Ser. No. 339,689  
Int. Cl.<sup>5</sup> A63B 49/08, 59/06, 53/14; B25G 1/01

U.S. Cl. 273—75

10 Claims



1. A hand grip for a handle shaft, comprising:

- an elongated sleeve of elastomeric material having an inner surface for fitting over the outer surface of a handle shaft and an outer, gripping surface;
- at least one surface of the sleeve having a plurality of indentations, comprising holes, extending over at least part of

its area to allow deflection of the surface in that area under normal impact loads;

the inner and outer surfaces being of octagonal cross-section, including upper and lower flats, and side flats separated from the upper and lower flats by diagonal flats, the indentations being provided at least on the upper and lower flats; and

the outer gripping surface having indentations comprising a plurality of holes extending along the upper, lower and diagonal flats, and the side flats being at least less indented.

#### 4,953,863

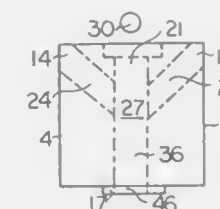
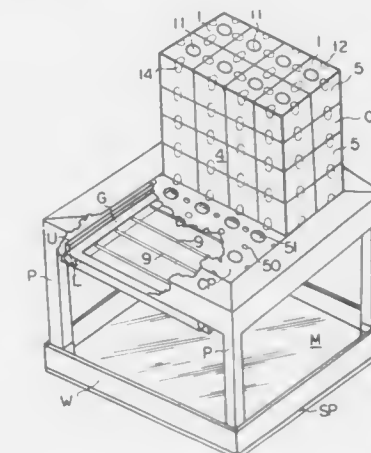
##### GAME ASSEMBLY

Douglas D. Zeldler, and Dennis E. Zeldler, both of Rte. 1, Box 69M, Floyds Knobs, Ind. 47119

Filed Apr. 5, 1989, Ser. No. 333,988  
Int. Cl.<sup>5</sup> A63B 7/00

U.S. Cl. 273—113

17 Claims



1. A game assembly, comprising in combination:

A. a plurality of balls;

B. a plurality of cubes adapted to be stacked in arrays, each cube comprising:

1. six faces, including:

- a. a top face;
- b. a bottom face; and
- c. four side faces;

2. engagement means, including:

- a. a first engagement means on the top face;
- b. a second engagement means on bottom face;

3. an opening in the center of the top face;

4. an opening along the edge of the intersecting side faces and the top face of each cube;

5. entry passageways running from each opening to a common chamber within said cube;

6. at least one exit passageway in communication with said common chamber;

7. an exit opening in operative relationship with said exit passageway in the area of the bottom face of said cube;

8. said exit passageway being in operative relation with



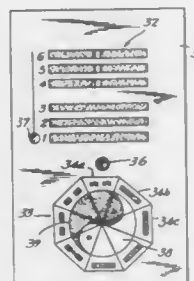
the entry openings or the center opening of an adjacent cube;

- C. a plurality of interconnected passages formed by an array of stacked cubes allowing uninterrupted passage of said plurality of balls through different passageways;
- D. a board in spaced and parallel relationship to the bottom plane of said arrays of stacked cubes, comprising:
1. two or more designated areas for collection of balls dropped through said stacked cubes.

**4,953,864**  
**METHOD AND APPARATUS FOR CHANCE CONTROLLED FORMATION OF A SYMBOL**  
 Daniel Katz, 531 E. 20th St., New York, N.Y. 10010  
 Filed Jun. 21, 1989, Ser. No. 369,615  
 Int. Cl.<sup>5</sup> A63F 9/18

U.S. Cl. 273—161

46 Claims



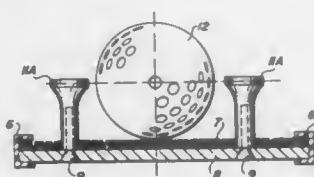
1. A method for determining by chance the state for each of a plurality of lines having more than one possible state, comprising the steps of:

- (a) inducing a magnetic interaction between two randomly selected magnetic poles;
- (b) assigning to said magnetic interaction a predetermined one of the possible states for a line;
- (c) obtaining a visual representation of a line in accordance with said assigned state; and
- (d) repeating steps (a)–(c) until the state of each line is visually apparent.

**4,953,865**  
**PUTTING PRACTICE DEVICE**  
 Donald W. Coombs, Tucson, Ariz., and Andrew A. Anderson, Antioch, Ill., assignors to Matthew C. Dunne, Tucson, Ariz.  
 Filed Sep. 27, 1989, Ser. No. 413,251  
 Int. Cl.<sup>5</sup> A63B 69/36

U.S. Cl. 273—176F

10 Claims



9. A putt practice device comprising in combination:

- (a) an elongated, narrow, flexible, planar base having an upper putting surface, a putting end, and a target end, and a longitudinal center axis, the base including a thin, flexible steel plate and a thin layer of carpet material uniformly disposed on the steel plate, the combined thickness of the steel plate and the layer of carpet being approximately one-fourth of an inch;
- (b) first and second rows of means attached to said base and extending upward from the upper surface and positioned

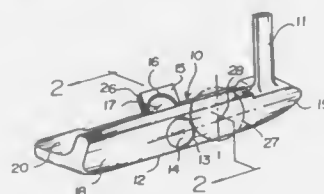
parallel to and symmetrically disposed about the center axis for defining a putting path along the upper surface.

**4,953,866**  
**GOLF PUTTER HAVING A MIRROR**  
 Kook B. Bang, 115 Bryn Mawr Ave., Newtown Square, Pa. 19073

Filed Jul. 20, 1989, Ser. No. 382,274  
 Int. Cl.<sup>5</sup> A63B 69/36

U.S. Cl. 273—183 D

5 Claims



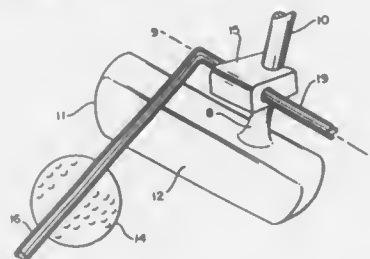
1. A golf putter comprising:

- a putting shaft,
- a putting head having a front ball striking face and a rear face,
- viewing means extending through the putting head, below the upper edge of said front ball striking face, and extending from said ball striking front face to the rear face thereof, and
- a supporting plate containing a mirror mounted to the rear face of the putting head and extending at an angle of 45° from the rear face, said mirror being mounted in horizontal alignment with the viewing means disposed in the putting head, whereby the golfer, from a putting position can view both the ball and the flag marking the location of the hole by looking at the surface of the mirror to see through said viewing means.

**4,953,867**  
**GOLFER'S TRAINING AID**  
 Bill B. Rigsby, 7707 Queensferry, Dallas, Tex. 75248  
 Filed Oct. 31, 1988, Ser. No. 264,776  
 Int. Cl.<sup>5</sup> A63B 69/36

U.S. Cl. 273—183 D

4 Claims



3. In a conventional golf ball putter having a hand held shaft terminating in a putter head with a ball striking face, the improved training means, comprising:

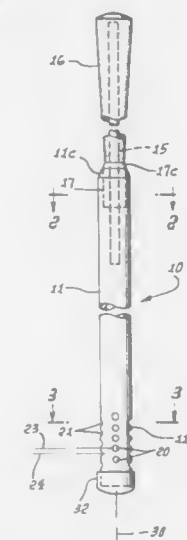
- a. a one-piece pliable bracket slideably engaging said shaft,
- b. an alignment piece comprising solely a pointer and an arm slideably and rotatably engaging said bracket,
- c. a shaft clamping opening in said bracket, and
- d. an alignment piece engaging opening in said bracket adapted to position said pointer of said alignment piece in alignment with the center of a golf ball and an imaginary target line toward a golf cup for training purposes.

**4,953,868**  
**GOLF SWING TRAINING DEVICE**  
 Stanley C. Thompson, 2707 S. Fairfax Ave., Culver City, Calif. 90232, and Elmer R. Fredericks, 5355 Caminito Providencia, Rancho Santa Fe, Calif. 92067

Filed Nov. 24, 1989, Ser. No. 441,044  
 Int. Cl.<sup>5</sup> A63B 69/36

U.S. Cl. 273—186 A

9 Claims



1. In a swing training device usable by a golfer, the combination comprising

- (a) an axially elongated lightweight tubular shaft adapted to be swung by a golfer to produce either a desirably accelerated or insufficiently accelerated swing, corresponding respectively to a desirably or insufficiently accelerated swing of a golf club, relative to a golf ball, the shaft having a longitudinal bore and an exterior surface,
- (b) the shaft having, and confined near one end thereof, through holes intersecting said bore and said exterior surface, to produce a distinctive audible sound when said lightweight shaft is swung so as to define a desirably accelerated swing, the holes spaced about said axis,
- (c) means for closing said one end of the tubular shaft,
- (d) and a golf club shaft section extending into the opposite end of the tubular shaft, remotely from said holes and being bonded to said bore, and a golf club grip on said golf club shaft section, exteriorly of said tubular shaft.

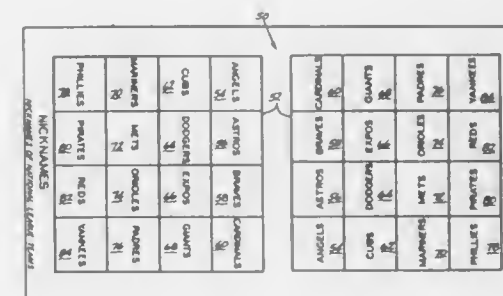
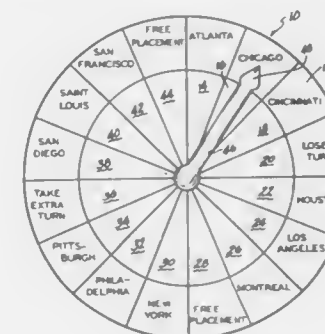
**4,953,869**  
**LEARNING GAME**  
 Annie Muhammad, 168 Frank St., New Haven, Conn. 06519  
 Filed Aug. 31, 1989, Ser. No. 401,234  
 Int. Cl.<sup>5</sup> A63F 3/06, 9/18

U.S. Cl. 273—236

5 Claims

1. A learning game for a particular factual subject, said game comprising a spin wheel bearing spin wheel designators including question-asking designators appropriate to the subject, a plurality of markers and a related game board including a plurality of identical displays, one for each player, each said display having thereon designators among which are designators providing correct answers to all said question-asking designators, and said display also having thereon a designator which gives an answer to some question relating to the subject but which is not the correct answer to any question posed by said question-asking designators, said display designators to be

covered by markers as the game is played, and said spin wheel designators including a non-question asking designator giving



a player spinning the same the opportunity to place a marker on any board designator.

**4,953,870**  
**TOSSABLE STRATEGY-TYPE GAME WITH TRI-DIMENSIONAL PLAYING SURFACE**  
 Richard Norman, Sonja Norman, both of Sutton, and David Chamberlain, Knowlton, all of Canada, assignors to Profitable Entertainment Products, Inc., Knowlton, Canada  
 Continuation of Ser. No. 104,992, Oct. 6, 1987, abandoned. This application Oct. 16, 1989, Ser. No. 421,363  
 Int. Cl.<sup>5</sup> A63F 3/00

U.S. Cl. 273—241

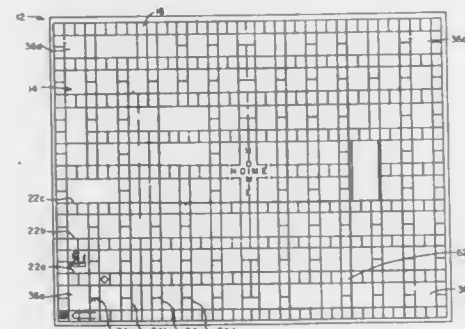
23 Claims



1. A tossable, lightweight, tri-dimensional game comprising: a tri-dimensional body to be tossed and caught during play, said body including an endless playing surface; said endless playing surface including distinct areas defining at least first and second visually distinguishable surface areas forming an uninterrupted alternating pattern; and a plurality of playing pieces, said playing pieces each having attachment means for being releasably attached to at least said first surface areas with sufficient strength to be re-

tained on said selected surface areas during tossing while enabling said playing pieces to be manually detached from said selected surface areas.

**4,953,871**  
**TRAFFIC BOARD GAME**  
 Samuel Antwi, 1 - 15 Litchfield Gardens, Winsted, Conn. 06098  
 Filed Nov. 22, 1988, Ser. No. 274,916  
 Int. Cl.<sup>5</sup> A63F 3/00, 9/18  
 U.S. Cl. 273—252 13 Claims



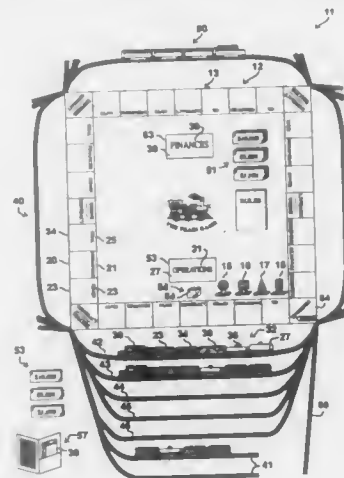
1. A board game apparatus of the type wherein each player moves a respective game piece along a playing surface, comprising:

- a plurality of playing pieces, each representing a vehicle to be controlled by a respective player;
- board means defining a playing surface substrate;
- a playing surface supported by the board means, said playing surface having differentiated markings thereon including, symbolic representations of the topography of a hypothetical community including a multiplicity of intersecting roadways,
- means for dividing each roadway into a multiplicity of distinct, serially connected road segment intervals along which the game pieces are to be moved,
- a first class of indicia associated with some of the road segment intervals, for defining a plurality of first traffic control parameters that influence the movement of the game pieces, each of the first parameters having a respective point value associated therewith, and
- a second class of indicia associated with some of the road segment intervals, for indicating the occurrence of unusual events when traversed by a game piece;
- chance means for specifying the number of road segment intervals that a player can move a game piece along a roadway during a given turn;
- a plurality of event cards, one of which must be taken by a player upon traversing a roadway interval having said second class of indicia associated therewith, some of the event cards describing a particular one of a respective plurality of possible traffic violations;
- a police report sheet containing,
  - a list of all violations appearing on said event cards,
  - a question corresponding to each violation on the list, each question pertaining to automotive safety or traffic laws,
  - a correct answer to each of said questions, and
  - a point value associated with each violation on the list.

**4,953,872**  
**TRANSPORTATION INDUSTRY GAME**  
 Gerald C. Schultz, R.R. 1, Box 47, Bloomfield, Mont. 59315  
 Filed Aug. 3, 1989, Ser. No. 388,842  
 Int. Cl.<sup>5</sup> A63F 3/00 20 Claims

1. A method of playing a transportation industry game including the steps of providing a playing surface with a plurality

of adjacent areas forming a first continuous pathway around said surface, a distinguishable marker for each player, a common money supply source, money and stock for each player, each player in a repeating sequence activating random number selection means, advancing the player's marker along said first pathway the number of areas specified by said number selection means to stop on a particular area, reading the legend on said area and performing the action specified, when the legend corresponds to a miniature drive or commodity carrier unit



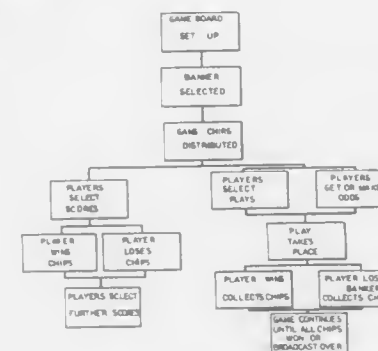
selecting the particular unit and assembling it with a previously selected miniature unit disposed adjacent to a second continuous pathway surrounding said first pathway, when the legend corresponds to that of a particular stack of cards selecting the top card therefrom and performing the action specified, transferring stock and money when specified, moving unit assemblies along said second pathway to fulfill contracts when specified; whereby each player attempts to maximize assets during the playing of the game.

**4,953,873**  
**METHOD OF AND MEANS FOR PLAYING A SPORTS GAME OF CHANCE**  
 Michael R. Jacobson, 4-5-39 #105, Minami Azabu, Minato, Tokyo, Japan 107  
 Filed Apr. 24, 1989, Ser. No. 342,166  
 Int. Cl.<sup>5</sup> A63F 3/00 1 Claim

1. A method of playing a sports game of chance, comprising the steps of:

- providing a game board displaying all the possible play outcomes for a particular sport and the odds of each said play or sequence of plays occurring;
- providing a plurality of chips of varying value to each individual player;
- assigning to one of said players the responsibility for the control of said chips, said controlling player to be known as the banker;
- having each player place said chips on the position on said game board corresponding to said play or sequence of plays they believe will occur, said board position being referred to as a placement square;
- observing said play on the broadcast of said sports game;
- having said banker pay out the proper number of said chips based upon the number of said chips bet times said odds shown on said placement square of said game board;
- having said banker remove said chips on the game board on said positions of said game board that did not occur during said play;
- continuing said game in the above-described manner until one player has won all of said available chips;

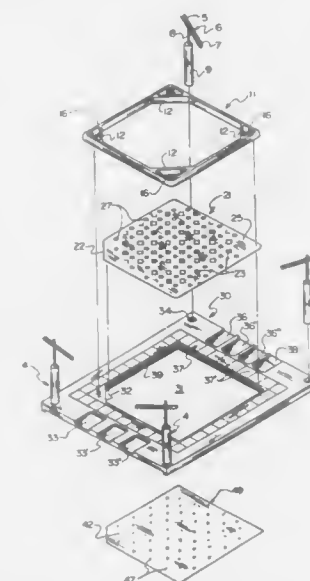
allowing said game board display to have said odds on a number of said placement squares and allowing said certain other placement squares to have open negotiated odds; and



Violations	RUN	Long Shot	Pass	Home
0	0-10	0-10	0-10	0
1	1-10	1-10	1-10	1
2	2-10	2-10	2-10	2
3	3-10	3-10	3-10	3
4	4-10	4-10	4-10	4
5	5-10	5-10	5-10	5
6	6-10	6-10	6-10	6
7	7-10	7-10	7-10	7
8	8-10	8-10	8-10	8
9	9-10	9-10	9-10	9

permitting said negotiated odds to be accepted or rejected by said banker.

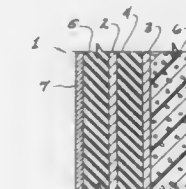
**4,953,874**  
**EDUCATIONAL MARBLE BOARD GAME**  
 Gary L. Golomb, 2021 E. Wood St., Tampa, Fla. 33604  
 Filed Dec. 21, 1989, Ser. No. 453,822  
 Int. Cl.<sup>5</sup> A63F 7/28 14 Claims



1. Marble board game comprising a game board and accessories, the game board including  
 a playing field indented by rest positions for marbles launched onto the playing field, wherein the surface of the playing field between marble rest positions is higher than the marble rest positions and is generally uneven,

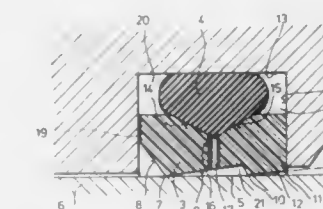
and marble rest positions contain therein answers to questions and have associated therewith questions to which such answers are the correct answers displayed on the board adjacent respective marble rest positions containing their correct answers;  
 the accessories including  
 marbles launchable onto the playing field to occupy such rest positions, and means for so launching the marbles.

**4,953,875**  
**ELECTRICALLY SHORTING TARGET**  
 Moises Sudit, 73 Forestbrook Ct., Getzville, N.Y. 14068  
 Filed Jul. 24, 1989, Ser. No. 383,587  
 Int. Cl.<sup>5</sup> F41J 5/04 16 Claims



6. An electrically responsive target for registering projectile contact which comprises sequentially abutting each other a front insulating layer, a front electrode, an intermediate insulating layer, a rear electrode, and a back insulating layer, said front electrode being a metallic foil having a thickness of at least 0.005 inches thick, said intermediate layer being an open cell foam insulator having a thickness of at least 0.10 inches thick, and wherein said rear electrode is a metallic wire screen having a mesh of about 15 to about 50 and having means to electrically connect said target to an electrical circuit.

**4,953,876**  
**SEALING RING STRUCTURE**  
 Heinz K. Müller, Waiblingen, Fed. Rep. of Germany, assignor to Busak & Luyken GmbH & Co., Stuttgart, Fed. Rep. of Germany  
 Filed Nov. 16, 1988, Ser. No. 272,193  
 Claims priority, application Fed. Rep. of Germany, Nov. 17, 1987, 3738988  
 Int. Cl.<sup>5</sup> F16J 15/24, 15/32, 15/56 4 Claims



1. Sealing ring structure for sealing the gap between two concentric machine parts which are arranged for linear movement relative to each other, the first machine part being provided with a groove having a bottom and axially spaced and opposed sides connected by said bottom while the second machine part comprises a plain contact surface arranged opposite the said groove, the said sealing ring structure comprising a sealing ring made of a tough-elastic plastic material fitted into the groove, said sealing ring having a high pressure end and a low pressure end, and having first and second circumferential surfaces disposed between said ends, said first circumferential



surface facing said contact surface and said second circumferential surface facing the bottom of the groove, and being provided with sealing edges which are arranged spaced from said ends on said first circumferential surface facing the said contact surface and by which the sealing ring bears against the contact surface of the second machine part, and being further provided with an annular recess arranged in said second circumferential surface facing the bottom of the groove, the sealing ring structure comprising further a stressing ring made of a rubber-elastic material arranged between the said sealing ring and the bottom of the groove, in the recess provided in the second circumferential surface of the sealing ring, the axial extension of the said stressing ring between the axially spaced and opposed sides being smaller than that of the sealing ring, the improvement wherein the said recess is provided in the area between the two sealing edges of the said sealing ring, and the dimensions of said recess are selected so that its width decreases as its depth rises, and that the said stressing ring engaging said recess is free to shift towards the low-pressure end of the sealing ring and the sealing ring includes at least one radial bore communicating between the space defined between the two sealing edges and the bottom of the said recess.

4,953,877

## FLUID ACTUATED CHUCK

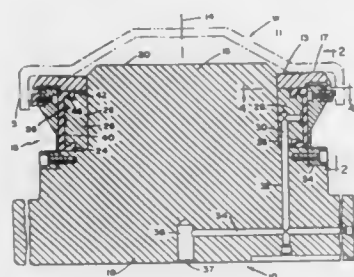
Gene Slachta, 494 E. Morley, Saginaw, Mich. 48601, and Kim F. Stemler, 744 Basloms, Saginaw, Mich. 48603

Filed Sep. 23, 1988, Ser. No. 248,045

Int. Cl.<sup>5</sup> B23B 31/40

U.S. Cl. 279—2 A

11 Claims



1. A chuck for holding and gripping a thin, easily distortable hollow workpiece having a peripheral wall radially adjacent to said chuck to be gripped comprising:

- a rigid chuck body having an axis and a cylindrical mounting surface concentric with said axis;
- a plurality of generally axially extending, generally co-extensive, discrete flexible chuck fingers circumferentially spaced from one another throughout their length;
- means individually removably axially fixing one end of each finger on said mounting surface, each of said fingers having an opposite free end spaced axially from said mounting surface and swingable radially relative to said axially fixed end to radially grip said peripheral wall of a radially adjacent workpiece;
- an inflatable pliant ring concentrically mounted axially fixedly on said chuck body radially between said body and fingers radially adjacent and in operative engagement with portions of said fingers spaced from said axially fixed ends; and
- means for inflating said ring with fluid under pressure to expand it to move said free ends of the fingers individually radially to grip said workpiece, and for deflating said ring to permit said free ends to return radially to release said workpiece.

4,953,878

## COLLAPSIBLE CART

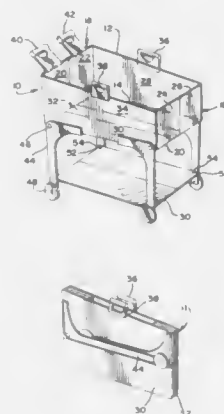
Frank J. Sbragia, Rt. 1, Box 2377 Checker Rd., Long Grove, Ill. 60047

Filed Oct. 31, 1988, Ser. No. 265,060

Int. Cl.<sup>5</sup> B62B 3/02

U.S. Cl. 280—30

5 Claims



1. A unitary collapsible cart comprising an upper body portion, a lower planar surface and legs for supporting said upper body portion; said upper body portion defining an upper compartment, said upper compartment having opposing side walls, foldable end walls hingedly secured to said side walls and a foldable bottom having a first and a second panel, each of said first and second panels hingedly attached to one of said side walls, and a third panel attached to each of said first and second panels in a hinged manner so that said bottom can be folded into a tri-fold shape, said legs being pivotably secured to said upper body portion to permit the folding of said legs to a position adjacent said upper body portion; said lower planar surface being removably secured to each of said legs and having at least two planar panels hingedly attached along a longitudinal axis; said legs and said cart being held in an unfolded, open position by said lower planar surface, removal of said lower planar surface permits the cart to be collapsed into a compact rectangular shape.

4,953,879

## MOVABLE DISPLAY RACK

Bertram J. Cain, Porage; Wesley S. Devon, Grand Rapids, and Ronald F. Patton, Muskegon, all of Mich., assignors to Cole's Quality Foods, Inc., Muskegon, Mich.

Filed Dec. 30, 1988, Ser. No. 292,389

Int. Cl.<sup>5</sup> B62B 1/00

U.S. Cl. 280—47.19

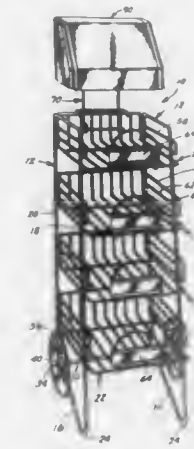
15 Claims

1. A movable display assembly for products including bakery goods or the like comprising:

- a pair of spaced, generally upright, lateral supports, each support including front and rear legs, a top bar and a bottom bar, said front legs being longer than said rear legs, each said bottom bar sloping downwardly and forwardly to a floor engaging portion below its respective front leg;
- a pair of spaced wheels, one wheel rotatably mounted adjacent the bottom end of each rear leg;
- a plurality of vertically spaced shelves mounted between said lateral supports;
- side retention means on said legs adjacent to and spaced above each shelf for retaining items on said shelves at the sides thereof; said side retention means and shelves each extending beyond the front surface of said front legs of said lateral supports;

front retention means on each of said shelves for retaining items on said shelves at the front thereof; said front retention means being mounted on each said shelf at a position spaced forwardly of said front legs;

rear retention means extending adjacent said rear legs and adjacent and above each shelf for retaining items on said shelves at the rear thereof;



said shelves being supported in front of said wheels such that the weight of said shelves and any items thereon will urge said floor engaging leg portions toward the floor or other support surface; said assembly being tiltable off said floor engaging portions for movement on said wheels.

4,953,880

## JOGGING STROLLER

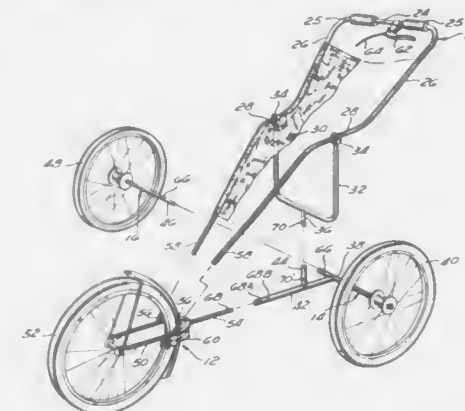
Carle H. Sudakoff, and Billie D. Matthews, both of San Clemente, Calif., assignors to Tandem Mfg., Inc., San Clemente, Calif.

Filed Jan. 23, 1989, Ser. No. 299,132

Int. Cl.<sup>5</sup> B62B 7/14

U.S. Cl. 280—47.38

7 Claims



1. A three wheeled stroller comprising:

a base frame formed of an elongate longitudinal spine member having a front end and a rear end, the rear end of said elongate longitudinal spine member being connected normally to a transverse rear axle member to form a generally T-shaped base frame configuration;

a front wheel receiving fork formed on the front end of said longitudinal spine member of said base frame;

an inclined upper frame assembly having left and right frame members, a front end, a rear end and a handlebar formed on the rear end thereof;

a seat suspended from said upper frame assembly;

a generally U-shaped vertical support member hingedly attached to said left and right frame members of said upper

frame assembly and extending between said base frame and said upper frame assembly to hold said upper frame assembly in a substantially fixed position on said base frame;

means for releasably attaching the lower end of said vertical support member to said spine member and means for releasably attaching the front end of said upper frame assembly to said front wheel receiving fork;

a front wheel rotatably mounted within said front wheel receiving fork;

a right rear wheel rotatably mounted on the right end of said transverse rear axle; and

a left rear wheel rotatably mounted on the left end of said transverse rear axle.

4,953,881

## MECHANICAL STEERING DEVICE FOR THE REAR WHEELS OF MOTOR CARS WITH FOUR-WHEEL STEERING

Giorgio Lupo, Rivalta, and Pier Carlo Capra, Turin, both of Italy, assignors to Fiat Auto S.p.A., Turin, Italy

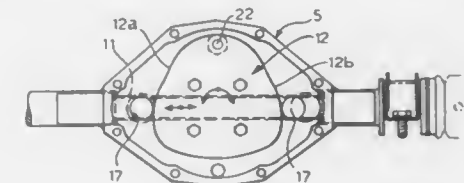
Filed Apr. 7, 1989, Ser. No. 334,506

Claims priority, application Italy, Apr. 11, 1988, 67323 A/88

Int. Cl.<sup>5</sup> B62D 3/02

U.S. Cl. 280—91

5 Claims



1. A mechanical steering device for the rear wheels of motor cars with four-wheel steering, including a front steering unit, a rear steering unit and a longitudinal transmission shaft coupling for rotation said front and rear steering units, and for rotation said front and rear steering units, and in which the rear steering unit comprises a transverse bar and respective steering joints and tie rods connecting said transverse bar to the rear wheels, and transmission means for transforming the rotation of the longitudinal shaft into translation of the transverse bar, wherein the transmission means are constituted by a positive cam (12), said cam (12) being constituted by a plate which is rotatable about an axis perpendicular to the transverse bar (11) and which is provided with convexo-concave lateral active profiles (12a, 12b) against which two roller-followers (17) carried by the transverse bar (11) react from opposite sides.

4,953,882

## TRANSMISSION APPARATUS FOR BICYCLE OR LIKE PEDAL-OPERATED VEHICLE

Chester L. Craig, Jr., 3460 Cuervo La., Yuma, Ariz. 85365

Filed Mar. 29, 1989, Ser. No. 330,185

Int. Cl.<sup>5</sup> B62M 1/04

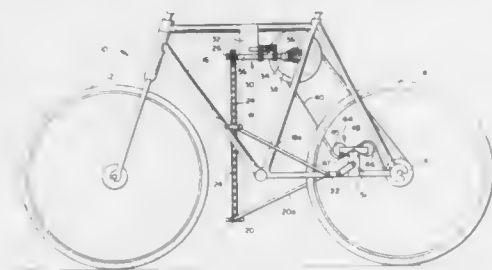
U.S. Cl. 280—258

10 Claims

1. A pedal driven vehicle comprising:

- a frame;
- at least one driven wheel mounted on said frame for, when driven, providing locomotion of the frame;
- first and second pedals mounted on the frame so as to move up and down alternately, in tandem;
- an elongate flexible drive chain disposed in a plane perpendicular to the plane of the frame and connected at the ends thereof to said pedals and movable back and forth in opposite directions in response to the up and down movement of the pedals, and
- transmission means, connected between the drive chain and

the driven wheel and driven by said drive chain, for converting the back and forth motion of the drive chain into rotary motion used in providing rotation of said driven wheel, said transmission means including first and second concentric driven shafts extending parallel to the longitudinal axis of the frame, means driven by said drive chain for providing rotation of said first and second driven shafts in opposite directions in response to downward



movement of respective pedals of the first and second pedals, and means for converting rotation of one of said shafts in a first direction into rotation of the other shaft in the opposite direction so that irrespective of which pedal is moved downward said other shaft is caused to rotate in the same direction, and output means driven by said other shaft and operatively connected to said driven wheel to provide rotation thereof.

4,953,883

## TRUCK TRAILER HITCH

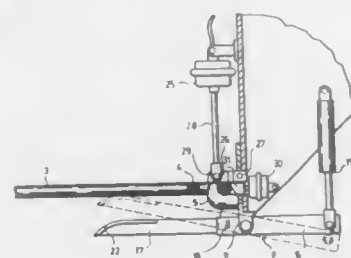
Simon Helie, 500, Rivière Baionne Sud, Berthierville (Quebec), Canada J0K 1A0

Filed Apr. 26, 1989, Ser. No. 344,242

Int. Cl.<sup>5</sup> B60D 1/04, 1/26

U.S. Cl. 280—477

12 Claims



1. A trailer hitch for hitching to a motor vehicle a trailer having a draw pole with a first end attached to the trailer and with a second end which is free, the trailer hitch comprising: a first coupling member secured to the second end of the draw pole, the first coupling member comprising a coupling ring secured to the second end of the draw pole; a second coupling member fixedly attached to the motor vehicle and engageable with the first coupling member to hitch the trailer to the said motor vehicle, the second coupling member comprising an upwardly projecting pintle hook with an upper free end fixedly attached to the said motor vehicle;

an arm pivotally mounted on the motor vehicle through a substantially horizontal pivot, said arm having a free end distant from the said pivot and provided with means for supporting the said draw pole, the substantially horizontal pivot being lower than the said pintle hook; said draw pole supporting means comprises the free end of the pivoting arm formed with an arcuate, convex surface for engaging the underside of said draw pole arm rotating means for rotating said pivoting arm about a

substantially horizontal pivot, the arm rotating means comprising means for rotating the said arm about a pivot in a first direction of rotation with the draw pole supported by the said arcuate, convex surface to lift the coupling ring until the same is higher than the upper free end of the pintle hook, whereby said coupling ring may be positioned above the pintle hook by moving the motor vehicle toward the trailer with the draw pole sliding on the arcuate surface;

said arm rotating means also comprising means for rotating said pivoting arm about the substantially horizontal pivot in a second direction of rotation opposite to the first rotation direction with the draw pole supported by the arcuate surface when the coupling ring is above the pintle hook in order to lower the coupling ring on the pintle hook and thereby engage the said ring with the said pintle hook; and whereby, in operation, said pivoting arm is rotated about said pivot with the free end of the arm supporting the draw pole in order to control in height the position of the pole, the second end and the first coupling member and thereby enable engagement of the said first coupling member with the second coupling member.

4,953,884

## SKI HAVING A VARIABLE WIDTH UPPER SURFACE

Jean-Luc Diard, and Francois Guers, both of Annecy, France, assignors to Salomon S.A., Annecy Cedex, France

Filed Jul. 13, 1988, Ser. No. 218,144

Claims priority, application France, Jul. 15, 1987, 87 10330

Int. Cl.<sup>5</sup> A63C 5/48

U.S. Cl. 280—609

42 Claims



1. A ski for use on snow comprising:

- (a) a longitudinally extending body having a central region interposed between an anterior segment as the front of the ski terminating in a spatula and a posterior segment at the rear of the ski;
- (b) said body having a lower sliding surface connected to two lateral side surfaces defining a pair of opposed lower edges;
- (c) the two lateral side surface of the body being inclined relative to the lower surface, and being connected to an upper surface; and
- (d) said upper surface having a width defined by two upper edges which converge in both the anterior and posterior segments, the width decreasing from the rear of the ski in the posterior segment thereof towards the front of the ski in said anterior segment.

4,953,885

## SKI CONSTRUCTION

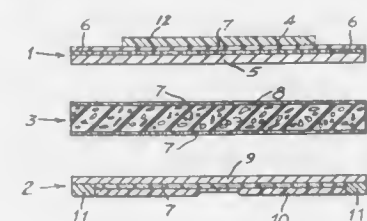
Ahmet Comert, Chaineux; Michel Ladang, Herve, and Dominique Petit, Housse-Blegny, all of Belgium, assignors to Norton Company

Filed Oct. 21, 1987, Ser. No. 111,384

Int. Cl.<sup>5</sup> A63C 5/00

U.S. Cl. 280—610

8 Claims



1. A laminated ski having a top surface bearing section, a bottom surface bearing section, a core section therebetween, wherein a bonding layer is provided between the top and bottom surface bearing sections and said core section, wherein said bonding layer is a hot melt adhesive, wherein said hot melt adhesive contains an predetermined amount of an adhesion promoter, and a boot pad adhesively attached to the base of said top surface bearing section with a hot melt adhesive containing an predetermined amount of an adhesion promoter.

4,953,886

## MOBILE STRETCHER SUPPORT

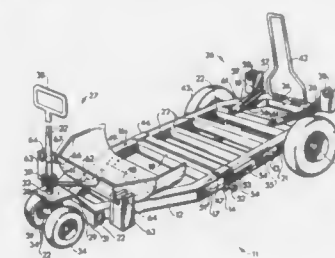
Fred W. Grant, 3177 Terrace Ct., Apt. H, Norcross, Ga. 30092

Filed Jul. 21, 1989, Ser. No. 382,911

Int. Cl.<sup>5</sup> A61G 1/00

U.S. Cl. 280—640

10 Claims



1. An emergency hand truck comprising an elongated flat frame member having front and rear sections, a first pair of wheels mounted at the front of said front section and a second pair of wheels mounted approximately at the rear of said rear section, said first pair of wheels being swivelly mounted to said frame, means for steering said truck comprising means for swivel- ing said first pair of wheels, and means for supporting a litter on said truck above said frame comprising first and second elongated flat plates, each having one end mounted to said frame adjacent a front corner thereof, and third and fourth elongated flat plates each having one end mounted to said frame adjacent a rear corner thereof, each of said flat plates having an upstanding support arm having its lower end mounted to the distal end of said flat plate and having a notch formed in its upper end, and a support plate extending from said support arm toward the mounted end of said flat plate, said support plate having a concave upper edge curving down and away from said support arm, whereby said means for supporting a litter supports the

handles of a stretcher in the notched ends of said support arms, or supports a Stokes basket type litter on the curved upper edges of said support plates.

4,953,887

## BABY CARRIAGE CAPABLE OF SERVING AS SHOPPING CAR

Takehiko Takahashi, and Hitoshi Kato, both of Tokyo, Japan, assignors to Combi Co., Ltd., Tokyo, Japan

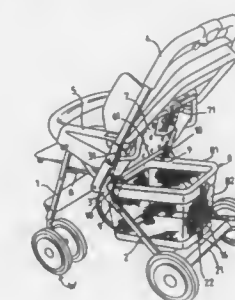
Filed Mar. 10, 1989, Ser. No. 321,709

Claims priority, application Japan, Jul. 18, 1988, 63-93994[U]; Aug. 3, 1988, 63-102941[U]

Int. Cl.<sup>5</sup> B62B 9/12

U.S. Cl. 280—647

4 Claims



2. A baby carriage capable of serving as a shopping car comprising a frame, a seat plate, a back rest means and a plurality of wheels mounted to said frame; further wherein an article-holding container of which an upper end defines a larger opening is detachably mounted below said seat plate at a rear portion of said seat plate on which seat plate a baby is to be seated; said article-holding container includes a frame bar having a U-shape as seen from above and engaging members mounted respectively on upper surfaces of front end portions of said frame bar; and said engaging members are detachably fitted respectively in holders mounted on the underside of said seat plate at opposite sides of said seat plate, wherein each of said holders is pivotally movable at said rear portion of said seat plate about a mounting arm formed on the upper surface of each said holder body at its proximal end portion and serving as a fulcrum for said pivotal movement.

4,953,888

## LUGGAGE CART

Edward B. Stein, Chicago, Ill., assignor to Stecco Products Corporation, Chicago, Ill.

Continuation of Ser. No. 124,506, Nov. 23, 1987, abandoned.

This application Aug. 7, 1989, Ser. No. 390,406

Int. Cl.<sup>5</sup> B62B 1/12

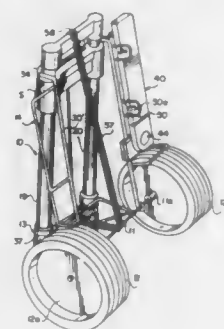
U.S. Cl. 280—654

32 Claims

1. In a collapsible luggage cart including an axle, wheels mounted thereon, an upright stand mounted on the axle and a luggage carrier pivotally mounted on the cart and being pivotally movable from a upright storage position to a generally horizontal luggage carrying position, the improvement comprising a swingable latch bar swivelly mounted only at one end on the luggage carrier and selectively movable in a plane substantially parallel to the luggage carrier from a storage position to a luggage carrier locking position, latch means carried on an opposite end of said bar and locking the latch bar in said storage position with said luggage carrier so as not to interfere with pivoted folding movement of the luggage carrier and also alternatively locking the latch bar to said luggage carrier when the carrier is in the generally horizontal luggage carrying position for ready transport of luggage, the latch bar extending



along the length of the luggage carrier when in said upright storage position and extending transversely of the luggage



carrier and adjacent and abutting said upright stand when the luggage carrier is in said luggage carrying position.

4,953,889

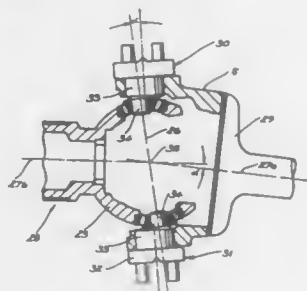
**ADJUSTMENT OF CAMBER IN FOUR WHEEL DRIVE**  
Bruce J. Reilly, Lot B & C, Campbell Street, Narellan, New South Wales, Australia, assignor to Bruce John Reilly and Joyce Lynette Reilly, both of New South Wales, Australia  
Continuation of Ser. No. 97,774, Sep. 18, 1987, abandoned. This application Feb. 21, 1989, Ser. No. 312,393

Claims priority, application Australia, Sep. 18, 1986, PH8099

Int. Cl.<sup>5</sup> B62D 17/00

U.S. Cl. 280—661

8 Claims



1. A complementary pair of upper and lower king pin bearing caps for providing camber adjustment in a closed knuckle steering system, each bearing cap comprising:

- a backing plate rigidly connectable to said closed steering knuckle;
  - a first part extending from said backing plate and engageable in said closed steering knuckle; and
  - a second part extending eccentrically from said first part, said second part being engageable rotatably in an axle tube end of said closed knuckle steering system;
- eccentricity between said first and second parts providing camber adjustment when said complementary upper and lower bearing caps are installed in said closed knuckle steering system.

4,953,890

**SUSPENSION APPARATUS OF A VEHICLE**  
Shoichi Kamimura, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Nov. 30, 1989, Ser. No. 443,477

Claims priority, application Japan, Nov. 30, 1988, 63-300858

Int. Cl.<sup>5</sup> B60G 11/26

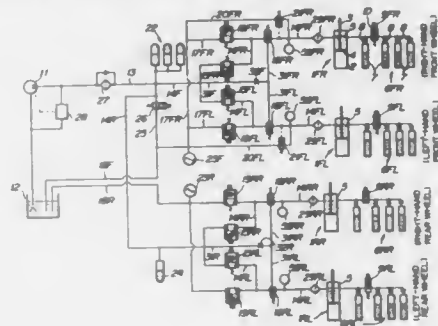
U.S. Cl. 280—707

33 Claims

1. A suspension apparatus of a vehicle, in which each of wheels is provided with an actuator for controlling a height of

a vehicle body in accordance with a supply or discharge of an operating fluid and the supply or discharge of the operating fluid to or from the actuator is controlled in accordance with a predetermined condition;

wherein acceleration in a vertical direction acting upon the



vehicle body is used as a control parameter for determining a control value for supplying or discharging the operating fluid; and

wherein three sensor means for sensing the acceleration in the vertical direction are provided so as to define a virtual plane extending in a substantially horizontal direction.

4,953,891

**CONNECTING STRUCTURE FOR CONNECTING A SPRING AXLE SUSPENSION TO A VEHICLE CHASSIS**  
Johan M. Zantinge, Rheden, Netherlands, assignor to Wewler N.V., Apeldoorn, Netherlands

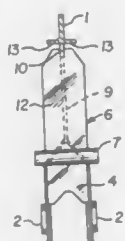
Filed Jan. 6, 1989, Ser. No. 294,164

Claims priority, application Netherlands, Jan. 7, 1988, 8800027

Int. Cl.<sup>5</sup> B60G 7/02

U.S. Cl. 280—788

20 Claims



1. Connecting structure adapted to be connected to a vehicle chassis, for connecting a spring axle suspension to a vehicle chassis, characterized in that the spring axle suspension engages with a part which is rigid in the transverse and lengthwise direction of the vehicle, and which is fastened underneath to a chassis bar running in the lengthwise direction of the vehicle, with a longitudinal strip; said longitudinal strip forming a much narrower fastening part in the transverse direction of the vehicle, also much narrower than said chassis bar, while two opposite rigid parts with which said axle suspension engages are connected by a transverse connection to form a rigid unit.

4,953,892

SKI POLE CLIP

Kelth W. Atkins, E. 1644 Nebraska, Spokane, Wash. 99207

Filed Apr. 21, 1989, Ser. No. 341,542

Int. Cl.<sup>5</sup> A63C 11/22

U.S. Cl. 280—814

8 Claims

1. In combination, a ski pole and a clip for attaching the ski

pole to a ski lift, the ski lift including a ski pole mounting structure having substantially horizontal extending bar with a substantially circular cross-section, the combination comprising:

- a ski pole having a handle portion, a basket portion, and a shaft portion, the shaft portion interconnecting the handle portion and the basket portion and tapering from a larger diameter portion adjacent the handle portion to a smaller diameter portion adjacent the basket portion;
- a clip attachable to the ski pole, said clip, including a first clip body portion, having a longitudinal shaft aperture extending therethrough defined by a pair of substantially semi-cylindric wall formations, outer ends of said wall formations being spaced apart to define a first passage means adapted for permitting entry of said smaller diameter portion into said shaft aperture by lateral movement of said smaller diameter portion relative to said clip and adapted for preventing exit of said larger diameter portion



from said shaft aperture by lateral movement of said larger diameter portion relative to said clip, the shaft being movable within said shaft aperture from said smaller diameter portion to a position adjacent said handle portion by longitudinal movement of said shaft relative to said clip, said clip further including a second clip body portion coupled to said first clip body portion and attachable to the ski pole mounting structure, said second clip body portion including a mounting structure aperture extending therethrough and defined by a substantially semi-cylindric second wall formation having outer ends spaced apart to define second passage means adapted for permitting entry of the ski lift mounting structure into said mounting structure aperture whereby the longitudinal axis of said shaft aperture extends substantially vertically and said second passage means comprises a substantially downwardly facing opening when said bar of said ski lift is received within said mounting structure aperture.

4,953,893

**SELF-DETACHABLE BICYCLE AUXILIARY WHEEL BRACKET STRUCTURE**

K. H. Hsiao, No. 4, Lane 11, Tzu Chiang St., Tu Cheng Shiang, Taipei Shien, Taiwan

Filed Aug. 4, 1989, Ser. No. 389,406

Int. Cl.<sup>5</sup> B62H 13/00

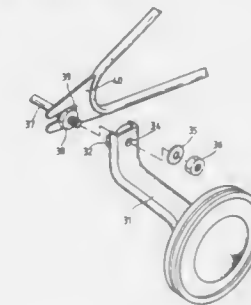
U.S. Cl. 280—293

2 Claims

1. A bracket for detachably securing an auxiliary wheel to a bicycle of the type having a rear fork provided with a front notch formed therein and the threaded end of a free-wheel axle being disposed through the front notch and secured to the rear fork by a nut, with a portion of the threaded end extending outwardly from the nut, which bracket comprises:

- (a) a bracket body having a recess formed therein, the recess being defined by a lateral side wall and a bottom wall; and
- a through-hole formed in the center of the bottom wall;
- (b) the recess being sized to receive the nut securing the free-wheel axle to the rear fork of a bicycle and permit a portion of the threaded end of the axle extending outwardly of the nut to extend through the through-hole for

engagement by a washer and nut assembly to secure the bracket to the axle; and



(c) a pair of projecting rods extending outwardly from opposite sides of the recess side wall, the rods being engageable within the front notch of the rear fork when the bracket is connected to the axle.

4,953,894

**ADJUSTABLE FASTENING OF A BALL JOINT TO A TRACK ROD FOR STEERING RODS OF MOTOR VEHICLES**

Lothar Broszat, Monheim; Michael Servos, and Dieter Schaitzler, both of Hilden, all of Fed. Rep. of Germany, assignors to TRW Ehrenreich GmbH & Co. KG, Fed. Rep. of Germany

Filed Nov. 8, 1988, Ser. No. 268,502

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1987, 3739704

Int. Cl.<sup>5</sup> B62D 7/20

U.S. Cl. 280—846

13 Claims



1. An adjustable fastening of a ball joint (2) to a track rod (1) for steering rods of motor vehicles, the ball joint (2) having a ball stud (12) supported for movement in all directions around a central axis (17) in a joint housing, the central axis (17) being movable relative to the track rod (1) by adjusting the ball joint (2), said adjustable fastening comprising:

- a fastening plate (16) associated with the ball joint (2) and having a bearing bore (18) arranged eccentric to the central axis (17) of the ball stud (12);
- fastening means (22) for supporting said fastening plate (16) at the bearing bore (18) for swinging movement of said fastening plate (16) between a number of swing positions; fixing means (23) for gripping said fastening plate (16) to fix the ball joint (2) in a certain swing position; and
- wherein the track rod (10) has a forked head (9) which receives between a side wall (7) and another side wall (8) said fastening plate (16) of the ball joint (2).

4,953,895

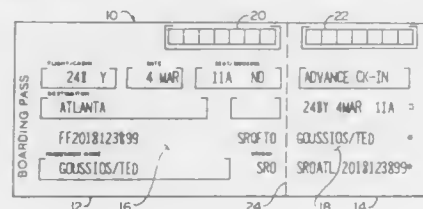
**DUAL PURPOSE LOTTERY TICKET AND BOARDING PASS**

Theodore Goussios, Sarasota, Fla., assignor to Inspiration Markets, Inc., Sarasota, Fla.

Continuation-in-part of Ser. No. 332,694, Apr. 3, 1989, abandoned. This application May 22, 1989, Ser. No. 354,924  
Int. Cl.<sup>5</sup> B42D 15/00; A63F 3/06, 3/08

U.S. Cl. 283—102

4 Claims



1. A dual-purpose lottery play ticket and air carrier boarding pass issued by a commercial passenger air carrier to each passenger boarding an aircraft for commercial flight comprising:

- a paper sheet having a first part and a second part separated and partially defined by a tear line of weakness therebetween;
- said first and second parts having similar viewable indicia printed thereon describing each passenger by name and information defining a particular scheduled flight designation;
- said first part separable from said second part along said tear line of weakness when each passenger boards the aircraft, said first part to be retained by the air carrier for validating each person's entry into a lottery selection;
- said second part to be retained by the passenger as proof of entry into the lottery and the selection made;
- said first part having an array of spaces defined thereon structured for receiving a randomly selected viewable numerical lottery indicia written within each space of said array;
- said second part having array of spaces defined thereon identical to the array of spaces on said first part.

4,953,896

**STRUCTURE FOR CONNECTING BRANCH PIPE IN HIGH-PRESSURE FUEL MANIFOLD**

Masayoshi Usui, Numazu, Japan, assignor to Usui Kokusai Sangyo Kaisha Ltd., Japan

Filed Jun. 27, 1988, Ser. No. 211,969

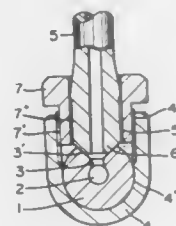
Claims priority, application Japan, Jun. 29, 1987, 62-99724

The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> F16L 41/00

U.S. Cl. 285—197

6 Claims



1. A structure for connecting branch pipes to a main pipe in a high-pressure fuel manifold, comprising:
- a main pipe for supplying fuel under high pressure, said main pipe having a peripheral wall and a longitudinally extending flow passage defined therein, said main pipe comprising

ing at least one through-hole extending laterally through the peripheral wall and communicating with the longitudinally extending flow passage, portions of said peripheral wall surrounding said through-hole defining an outwardly opening recessed pressure bearing surface;

- a coupling member having an axially aligned engagement bore extending therethrough and a laterally extending threaded bore extending therethrough and into communication with the axially extending engagement bore, said coupling member being disposed over the main pipe such that the axially extending engagement bore of said coupling member is mounted in engagement with the peripheral wall of said main pipe and such that the laterally extending threaded bore of said coupling member substantially surrounds the outwardly opening recessed pressure bearing surface of said main pipe, said coupling member being secured to the peripheral wall of said main pipe;
- a nut having opposed inner and outer peripheries, the inner and outer peripheries of said nut defining respective inner and outer threaded surfaces, the outer threaded surface of said nut being threadedly engaged with the threaded bore of said coupling member, the inner threaded surface of said nut being threaded in an opposite direction to the outer threaded surface thereof; and
- a branch pipe having a joint end portion of a configuration conforming to the shape of the outwardly opening recessed pressure bearing surface of the main pipe, said branch pipe having a threaded outer surface adjacent the end portion thereof, said threaded outer surface of said branch pipe being threadedly engaged with the inner threaded surface of said nut, said nut being threadedly tightened relative to said coupling member and said branch pipe such that the joint end portion of said branch pipe is pressed against the outwardly opening recessed pressure bearing surface of the main pipe for achieving secure connection between the branch pipe and the main pipe for delivering high-pressure fuel therebetween.

4,953,897

**VENT PIPE COUPLING**

Johannes Klöber, Theodor-Storm-Strasse 4, D-5628 Ennepetal, Fed. Rep. of Germany

Continuation of Ser. No. 272,503, Nov. 16, 1988, abandoned.

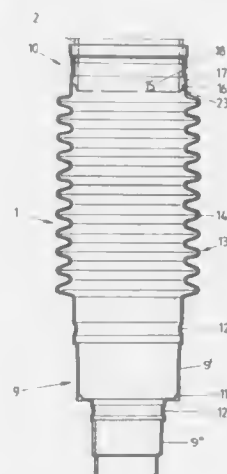
This application Feb. 16, 1990, Ser. No. 483,272

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1988, 8805399[U]

Int. Cl.<sup>5</sup> F16L 51/02

U.S. Cl. 285—226

3 Claims



1. A one-piece flexible vent pipe coupling having a single-ply wall comprised of an elastic plastic material of substantially

uniform thickness, the wall comprising a cylindrical socket end receiving a first short connection pipe section of a roof vent inserted into the socket end, another cylindrical end connected to a second pipe section of the roof vent and a central compressible bellows portion between the ends, the central bellows portion being comprised of a series of folds including an inwardly projecting end fold adjacent the socket end, the folds of the bellows portion in the relaxed condition thereof defining an inner diameter of the bellows portion which is substantially equal to the outer diameter of the short connection pipe section, the inwardly projecting end fold of the central bellows portion being constricted under compression upon insertion of the short connection pipe section of the roof vent into the socket end and the constricted end fold forming an abutment for the inserted connection pipe section, the elastic plastic material of the cylindrical wall of the socket end of the vent pipe coupling being deformed by depressing the wall material to form an inwardly directed circumferential arcuate protrusion pressing against, and sealingly retaining, the inserted first short connection pipe section, the depression of the wall material forming a circumferentially extending annular groove.

4,953,898

**MECHANICAL FASTENER FOR PLASTIC CONDUITS**

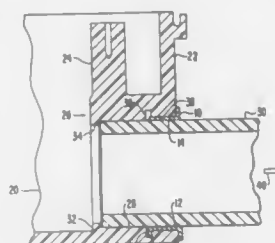
Robert W. Jorgensen, Niles, Mich.; Vance W. Young, Jr., and Scott L. Misenar, both of South Bend, Ind., assignors to Hubbell Incorporated, Orange, Conn.

Filed Mar. 29, 1989, Ser. No. 330,370

Int. Cl.<sup>5</sup> F16L 19/00

U.S. Cl. 285—340

4 Claims



1. A connector structure for attaching an end of a length of generally tubular conduit to a body having a cylindrical recess dimensioned to receive the conduit end through an open end of said cylindrical recess comprising:

- means in said cylindrical recess defining an annular recess and an annular inwardly facing shoulder, said annular, inwardly facing shoulder being located in said cylindrical recess a predetermined depth from the open end thereof; and
  - a retaining clip having
    - a substantially flat annular ring dimensioned to abut a surface of said body around said open end of said cylindrical recess substantially coaxially with said cylindrical recess, said annular ring having a central opening dimensioned to receive said conduit,
    - a first plurality of fingers extending inwardly from the inner periphery of said ring at an angle of between about 10° and about 80° from a plane containing said ring,
    - at least one said finger having a length substantially equal to said predetermined depth which engages said annular shoulder and having at the distal end thereof an outwardly bent portion forming a locking tab dimensioned to engage said annular recess when said finger is flat against the inner surface of said cylindrical recess,
    - and a second plurality of fingers extending from the inner periphery of said ring for engaging said conduit,
- whereby when said ring is placed against said body around said open end of said cylindrical recess with said fingers extending into said cylindrical recess and an end of said

conduit is inserted through said ring, said fingers frictionally engage the outer surface of said conduit and are bent outwardly so that said locking tab at the distal end of said at least one finger engages said shoulder to inhibit withdrawal of said retaining clip from said cylindrical recess, said fingers inhibiting withdrawal of said conduit therefrom.

4,953,899

**CLAMP ASSEMBLY**

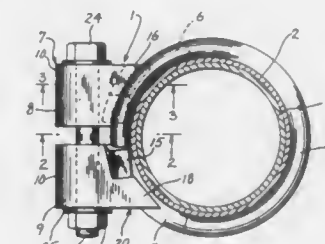
Frederick H. Printiss, Sr., Neillville, Wis., assignor to Nelson Industries, Inc., Stoughton, Wis.

Filed Feb. 21, 1989, Ser. No. 312,921

Int. Cl.<sup>5</sup> F16L 19/02

U.S. Cl. 285—420

5 Claims



5. In an exhaust system, a pair of metal tubes disposed in axial alignment with adjacent end portions of said tubes being disposed in overlapping relation, and a clamp assembly comprising a ring to receive the overlapping adjacent end portions of said tubes and having a pair of overlapping ring ends disposed in direct contact with each other, a generally U-shaped bracket for each of said ring ends, each bracket having opposed first and second legs, means for securing a first leg of each bracket to one of said ring ends and the second leg of each bracket being disposed in contact with the outer surface of the other of said ring ends whereby the other ring end can slide relative to the respective bracket, each bracket defining an opening with said openings being in alignment, a generally shaped extension connected to the first leg of each bracket and having a first section extending longitudinally of the axis of said ring and disposed in contact with the outer surface of said overlapping ring ends, said extension also having a second section extending radially inward from the outer end of said first section and disposed in contact with said other ring end whereby said other ring end can slide relative to the respective extension, and fastening means extending freely through said aligned openings for drawing said brackets in a direction toward each other to contract said ring and clamp said overlapping ends of said tubes.

4,953,900

**SINGLE USE LOCK**

George F. Pickett, 3453 Beechway Blvd., Toledo, Ohio 43614

Filed May 7, 1990, Ser. No. 520,021

Int. Cl.<sup>5</sup> B65D 55/06

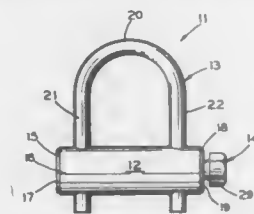
U.S. Cl. 292—307 R

11 Claims

1. A locking apparatus comprising:
- a generally cylindrical lock body having a pair of spaced apart radially extending lock ring apertures formed therein and a screw aperture formed in an end of said lock body and extending to an adjacent one of said lock ring apertures;
  - a lock ring having a curved central portion attached at opposite ends to a pair generally straight legs, said legs adapted to extend into corresponding ones of said lock ring apertures; and
  - a lock screw having a head attached to one end of a threaded



body, said threaded body adapted to threadably engage said screw aperture and having a cutting edge formed on an opposite end for engaging one of said legs extending into said adjacent one of said lock ring apertures, said cutting edge being formed with an internal chamfer at an



angle of approximately thirty degrees with respect to a line generally parallel to a longitudinal axis of said lock screw whereby when said legs are inserted into said apertures and said lock screw is threaded into engagement with said one leg, said lock ring is retained by said lock body.

4,953,901

# HIGH SECURITY KEEPER AND REINFORCEMENT BAR FOR ENTRY DOOR

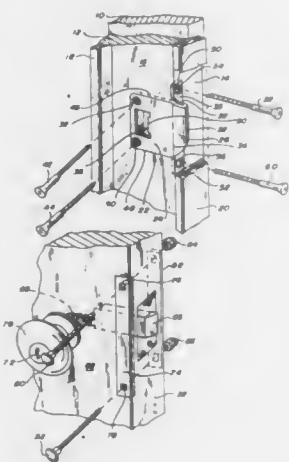
Randy A. Hegdahl, 7521 Jersey Ave. North #205, Brooklyn Park, Minn. 55428

Filed Feb. 2, 1990, Ser. No. 473,905

Int. Cl.<sup>5</sup> E05C 1/16, 21/02

U.S. Cl. 292—340

4 Claims



1. In an entry door structure having an exterior side and an interior side, and comprising a frame and a door, said door having an exterior side and an opposing interior side, a free vertical edge, and a latch member biased to project outwardly from the free vertical edge, said frame having a vertical jamb which has a vertical interior edge surface and a vertical face surface, said vertical face being substantially parallel and proximate to the free vertical edge of the door when the door is closed, a vertical stop strip fixed to said jamb toward the exterior side of said door structure for abutment stopping of swinging closure motion of said door in said frame, a vertical trim strip along the vertical interior edge surface of said jamb, and a strike plate on said jamb at a location to be struck by the latch member of said door on swinging closure of said door in said frame, said entry door structure being characterized by the following improvements for enhancing strength of latching of said door, and for thwarting unauthorized forced opening of said door from the exterior side, wherein:

said strike plate consists of a unitary metal member having a face portion which merges into a curved lip portion which

merges into a lateral flange oriented perpendicularly to the face portion, said face portion has upper and lower edges defining the vertical dimension thereof and has a recess for receiving said latch member and has spaced mounting holes through which mounting screws extend into said jamb to fix said face portion on the face surface of said jamb, said lateral flange has upper and lower edges defining the vertical dimension thereof, said vertical dimension of said lateral flange being greater than the vertical dimension of said face portion, said lateral flange having mounting holes therethrough exclusively at locations higher and lower than the mounting holes through said face portion, and said lateral flange being securely mounted to the interior edge surface of said jamb beneath said trim strip by screw members which extend through the mounting holes of said flange into said jamb, whereby all screws mounting said face portion of said strike plate on said jamb extend into said jamb at locations between the jamb penetration of the screws mounting said flange on said jamb so as to enhance the resistance of said strike plate from being forced out of said jamb by application of pressures on the door from the exterior side thereof.

4,953,902

# DEVICE FOR ADHESIVELY HOLDING SMALL OBJECTS

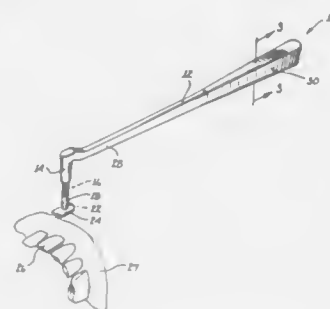
Martin A. Brown, 11604 Manitou Dr., Fountain Hills, Ariz. 85268

Filed Sep. 21, 1988, Ser. No. 247,403

Int. Cl.<sup>5</sup> A61C 3/00; B25J 15/00

U.S. Cl. 294—1.1

6 Claims



1. A placement holder for lifting small objects comprising, in combination: adhesive material by which said small objects are lifted; plunger means for releasing said adhesive material; a hollow cylinder slidably mounted on said plunger means, said cylinder forming open-ended chamber means for containing said adhesive material; and handle means fixedly coupled to said plunger means for manipulating said placement holder, said handle means having a first end portion comprising a peripheral wall cantilevered therefrom coaxially with said plunger means forming a cylindrical cavity therebetween, with said cylinder slidably mounted within said cylindrical cavity, and second end portion.

4,953,903

# TOOL TO ASSIST ATTACHING FABRIC TOP TO VEHICLE BODY

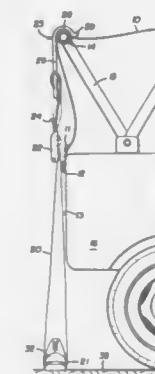
David M. Warner, 2830 Palmer Dr., Hollywood, Fla. 33021

Filed Apr. 21, 1989, Ser. No. 341,411

Int. Cl.<sup>5</sup> B25B 25/00; B60J 7/12; B66F 19/00

U.S. Cl. 294—1.1

9 Claims



1. For use with a utility vehicle resting on a support surface and having: a back with fastener elements thereon; a horizontal rear cross rod spaced substantially vertically above said back of the vehicle and displaceable slightly downward by a downward force on the rear cross rod; and a flexible fabric top extending from front to back across the top of said rear cross rod and down behind said rear cross rod to said back of the vehicle, said fabric top having fastener elements at its lower end for attachment to said fastener elements on the back of the vehicle; a tool for pulling said cross rod down slightly to facilitate the attachment of said fastener elements on the fabric top to said fastener elements on the back of the vehicle comprising: an elongated flexible belt having upper and lower ends and having a loop at its lower end for receiving a person's foot to pull down on the belt; and a hook member connected to the upper end of said belt and having a lower segment extending up from said belt and an arcuate hook segment joined to the upper end of said lower segment and presenting a downwardly-facing recess for engagement over said canvas top on said cross rod; said hook member and belt having a combined length slightly less than the vertical distance of said rear cross rod on the vehicle down to said support surface so that, when the person's foot pulls the belt down to engage said loop with the support surface, the belt pulls said rear cross rod on the vehicle down a slight distance to lower said fastener elements on said fabric top toward said fastener elements on the back of the vehicle.

4,953,904

# MATTRESS CARRIER

William S. Danboise, 4119 E. Beryl, Phoenix, Ariz. 85028

Filed Feb. 9, 1989, Ser. No. 308,302

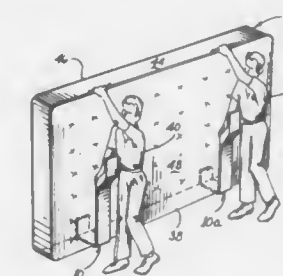
Int. Cl.<sup>5</sup> B65G 7/12

U.S. Cl. 294—15

5 Claims

1. A mattress carrier comprising: a unitary member, said member including a first plate-like side opposed to a second plate-like side; a plate-like bottom, said first and second sides and said bottom forming an open ended cradle where said bottom is connected to a proximal portion of each of said first and second sides, the interior distance between said first and second sides being at least equal to the thickness of a mattress to be carried, said first side having an outwardly

curving portion between said proximal portion of said first side and a distal portion of said first side; a pair of opposed end plates extending upwardly from said curving portion and perpendicularly to said first side; and



a handle connected to said end plates and positioned outwardly of the plane of said first side.

4,953,905

# TELESCOPING DISPLAY DEVICE

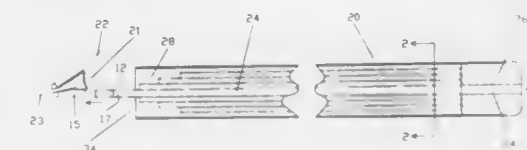
Abraham Cohen, 642 Milton Ave., Lyndhurst, N.J. 07071

Filed May 11, 1989, Ser. No. 350,165

Int. Cl.<sup>5</sup> B25J 1/02; F16B 7/10; G09F 21/02

U.S. Cl. 294—19.1

1 Claim



1. A telescoping device for the display of information, comprising: (a) a plurality of annularly disposed conical segments, each of said segments having a base having an outside diameter in excess of one inside diameter of that conical segment within which it is annularly disposed; (b) a cylindrical housing within which said plurality of conical segments, when axially telescoped within each other, may be stored; (c) a mouthpiece having substantially the diameter of said housing and integrally secured to one base thereof, said mouthpiece having an axial channel in fluid communication with the inside diameter of an innermost of said annular substantially conical segments; (d) clasp means secured at end of said innermost of said annular segments and in fluid-tight fit with the inside diameter of said end, said end of said innermost annular segment being opposite to that end in fluid communication with said mouthpiece, whereby by providing a pressurized fluid input to said axial channel of said mouthpiece, said innermost annular segment will be advanced in the direction of said pressurized fluid input and after a sufficient advance of said innermost annular segment, the base of said segment will engage the interior of a corresponding opposite end of the next surrounding annular segment, thereby engaging said opposite end of said next surrounding segment to result in the successive expansion of said plurality of annular substantially conical segments, in which information may be held by said clasp means after said expression has occurred.

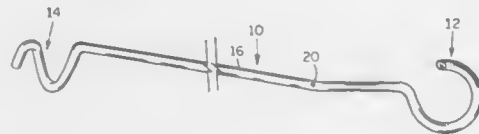
4,953,906

## GOLF BALL RETRIEVER

Charles S. White, 338 Prinz, San Antonio, Tex. 78213  
Filed Apr. 14, 1989, Ser. No. 337,918Int. Cl.<sup>5</sup> A63B 47/02

U.S. Cl. 294—19.2

3 Claims



1. A golf ball retriever comprising a single rod member having a first end being formed into a partial substantially unyielding loop which partially defines a circle, a second end being formed into club grip attachment means for attachment of said golf ball retriever to the end portion of the grip of a golf club and a linear segment which intersects said partial loop and extends from said first end toward said second end; said partial loop originating at the intersection of said linear segment of said rod with said partial loop and terminating after extending circularly through approximately 1.3 pi radians of curvature, said partial loop being situated off-center relative to said linear segment of said rod member whereby a first imaginary line which coincides with the longitudinal axis of said linear segment of said rod member and a second imaginary line being parallel to the first imaginary line and passing through the center point of said circle are separated by a distance equal to one-fourth of the diameter of said circle; said first imaginary line delineating a first larger portion of said circle and a second smaller portion of said circle, said second smaller portion of said circle wholly incorporating the arc of said circle left undefined by said partial loop.

4,953,907

## MOLDING FOR CAR WINDOWPANE

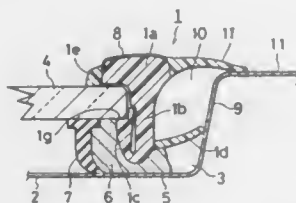
Tooru Sugita, Okazaki, Japan, assignor to Nifco Inc., Yokohama, Japan

Filed Apr. 13, 1989, Ser. No. 337,843

Int. Cl.<sup>5</sup> B60J 1/02

U.S. Cl. 296—93

4 Claims



1. A molding assembly for a car windowpane disposed between a windowpane mounting recess provided in an edge wall of a window opening and a corresponding edge of the windowpane to seal a gap formed therebetween, wherein said molding assembly comprises:  
an adhesive connected to said edge wall;  
a strip upper portion bridging the gap between said windowpane and the edge wall of said window opening;  
a leg portion depending from said strip upper portion and having a free end positioned in said adhesive;  
a first engaging portion extending from said free end towards said windowpane and being integrally molded with said leg portion; and  
a second engaging portion extending toward the edge wall of said recess and being integrally molded with said leg portion, at least opposite sides of said strip upper portion contacting the edge of said opening window and said

windowpane being made of a synthetic resin having a reduced frictional characteristic.

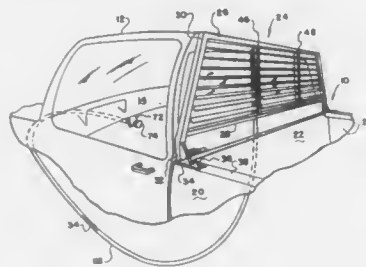
4,953,908

## LOUVERED HEADACHE RACK

Jerry A. Dondlinger, P.O. Box 2891, Amarillo, Tex. 79105-2891  
Filed Aug. 23, 1989, Ser. No. 398,826Int. Cl.<sup>5</sup> B60J 3/00

U.S. Cl. 296—97.4

18 Claims



1. On a pickup truck having  
a. a bed behind  
b. a cab,  
c. a rear window in the cab, and  
d. an instrument panel in the cab;  
e. an improved adjustable louvered headache rack comprising:  
f. a frame having four edge members each in the form of a tube, namely:  
i. a top tube,  
ii. a bottom tube, parallel to the top tube, and  
iii. two side tubes,  
g. said frame attached to the pick up truck, so that  
h. the frame is behind the rear window, and  
j. a plurality of louver slats in the frame,  
k. each slat  
i. parallel to the top and bottom tubes, and  
ii. journaled to the side tubes by  
iii. a pin at each end of each slat,  
l. an operating bar extending from about the top tube to about the bottom tube, and  
m. a finger rigidly attached to each of said slats,  
n. each finger journaled to said operating bar.

4,953,909

## VEHICLE HOOD PROTECTOR WITH SPECIALIZED ATTACHING APPARATUS

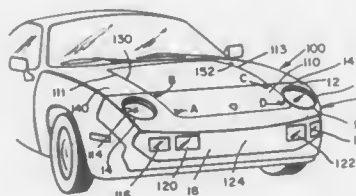
Timothy N. F. Crane, 1140 N. Clark, Suite 209, West Hollywood, Calif. 90069

Filed Dec. 14, 1989, Ser. No. 450,735

Int. Cl.<sup>5</sup> B62D 25/00

U.S. Cl. 296—136

8 Claims



1. A vehicle hood protector in which the vehicle has at least a vehicle hood, two front fenders on either side of the vehicle hood, the hood being defined by two side edges adjacent a respective front fender and a hood channel between an edge of

the vehicle hood and its adjacent fender, the vehicle hood protector, comprising:

- a one piece hood shield which is sized to conform to the shape of the front portion of the vehicle hood and front fenders of the vehicle when laid over the vehicle hood and front fenders;
- four retaining blocks, with a respective one retaining block spaced at the two front corners of the vehicle hood and adjacent a respective side edge of the vehicle hood and at the rear intersections of the hood shield and rear-most areas of the portion of the vehicle hood adjacent its sides edges over which the hood shield lays;
- each retaining block having a top surface, a bottom surface, transverse ends, and further comprising,
  - at least one suction member on its lower surface which serves to retain the retaining block on the vehicle hood,
  - an interior longitudinal slot extending for most of the length of the retaining block and opening out the transverse end of the retaining block adjacent the side edge of the vehicle hood proximate the location of the retaining block,
  - at least one transverse shaft extending through most of the thickness of the retaining block and opening out of the top surface of the retaining block, the transverse shaft intersecting a portion of the longitudinal interior slot;
- a mating retaining block attaching member for each retaining block, further comprising,
  - an upper elongated section sized to fit into the interior longitudinal slot of a retaining block and having at least one transverse opening located to be in alignment with the at least one transverse shaft of a retaining block when the upper elongated section is inserted into the interior longitudinal slot of the retaining block,
  - a lower section having a grooved endpiece defining a channel which is dimensioned to accommodate a portion of a side edge of the vehicle hood,
  - a vertical section joining the upper elongated section and the lower section and sized to permit the upper elongated section to fit into the longitudinal slot of a retaining block while simultaneously permitting the channel in the grooved endpiece of the lower section to receive a portion of a side edge of the vehicle hood, a portion of the vertical section resting within a hood channel;
- said one piece hood shield having a least one transverse opening at each of four locations where the retaining block and retaining block attaching member assemblies are positioned, with said at least one transverse opening at each location aligned with the opening of the transverse shaft and the opening in the longitudinal upper section of the retaining block attaching means; and
- a securing means for each retaining block and retaining block attaching means extending through the at least one transverse opening in the one piece hood shield, through the opening of the transverse shaft in the retaining block and through the at least one opening in the longitudinal upper section of the retaining block attaching means at each of the four locations to thereby join the one piece hood shield, the retaining block and the retaining block attaching member together at each of the four locations.

4,953,910

## OPENABLE ROOF CONTROL DEVICE OF WHEELED MOTOR VEHICLE

Junichi Maekawa, Yokohama; Masanori Abe, Ayse; Hirofumi Ienaga, Kawasaki, and Shigeaki Hashimoto, Chigasaki, all of Japan, assignors to Nissan Motor Co., Ltd. and Ohi Seisakusho Co., Ltd., both of Japan

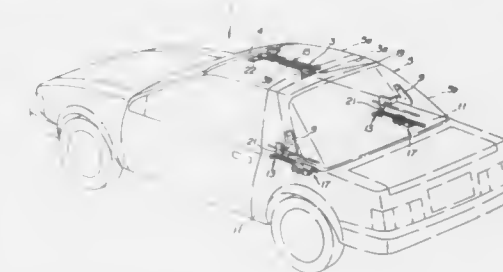
Filed Oct. 18, 1988, Ser. No. 260,127

Claims priority, application Japan, Oct. 19, 1987, 62-261735; Oct. 19, 1987, 62-261736; Oct. 19, 1987, 62-158815

Int. Cl.<sup>5</sup> B60J 7/057

U.S. Cl. 296—223

20 Claims



1. In a wheeled motor vehicle having a slidably openable roof on a roof construction, an openable roof control device for controlling operation of said openable roof, which comprises:  
three slide mechanisms arranged on mutually spaced portions of the body of said vehicle, one of said three-slide mechanisms being mounted on said roof construction and the other two of said three slide mechanisms being respectively mounted to laterally opposed sides of the vehicle body, each slide mechanism including a carrier device which carries thereon said openable roof for moving said openable roof between a full closed position and a full open position;  
three electric actuators which are respectively connected to said three slide mechanisms for moving, when electrically energized, the carrier devices between positions corresponding to said full closed position of the openable roof and the other positions corresponding to said full open position of the openable roof;  
latch means for latching at least two of said carrier devices relative to the vehicle body when said openable roof comes to one of said full closed and full open positions; and  
control means for controlling operation of said three electric actuators.

4,953,911

## CONVERTIBLE SEAT FOR MOTORCYCLE

Michael W. Hanagan, San Jose, Calif., assignor to Corbin Pacific, Watsonville, Calif.

Filed Nov. 23, 1988, Ser. No. 275,421

Int. Cl.<sup>5</sup> B62J 1/00

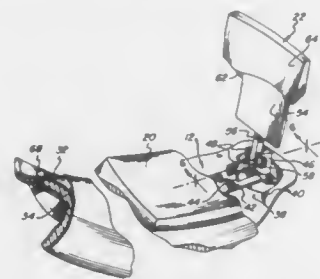
U.S. Cl. 297—195

8 Claims

1. A unitary tandem motorcycle seat for attachment to the frame of a motorcycle comprising a unitized assembly of:  
(a) a unitary rigid, elongated platform member having side margins and configured to seat upon and be secured to the frame of the associated motorcycle for firm support thereby, said platform member having mounting means on its lower surface and spaced inwardly of the side margins thereof for engagement to the frame and adapted to be substantially concealed when the seat is mounted on the motorcycle;  
(b) an elongated tandem saddle on said platform member providing a driver seat portion at its front end and a passenger seat portion at its rear end, said saddle having side margins;



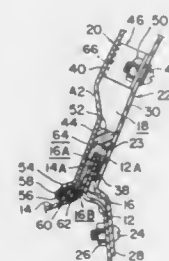
- (c) a backrest for a person seated on said passenger seat and having a depending arm spaced inwardly from the side margins of said saddle, said backrest having side margins;
- (d) support means on said platform member pivotably mounting said backrest arm to said platform member adjacent the rear end of said saddle, said support means being spaced inwardly from the side margins of said backrest and saddle and being disposed below an adjacent upper surface of said saddle, whereby said backrest is movable between a substantially horizontal passenger seat covering position and an erected backrest position, said



- support means and a portion of said arm of said backrest being disposed below an upper surface of said backrest and saddle so as to be substantially concealed upon pivoting of said backrest into its seat covering position; and
- (e) cooperating releasable locking means on said support means and said backrest, said locking means being spaced inwardly from the side margins of said backrest and saddle for locking said backrest to said platform member in said seat covering position, said mounting means, said support means and a portion of said depending arm all being spaced below said backrest and saddle so as to be concealed when said backrest is in said seat covering position.

**4,953,912**  
**STRUCTURE OF A BLIND PANEL WINDOW FOR AN AUTOMOBILE**  
 Masahiro Munemura, and Kenji Takahashi, both of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 27, 1989, Ser. No. 385,822  
 Claims priority, application Japan, Aug. 5, 1988, 63-103874  
 Int. Cl.<sup>5</sup> B60R 27/00  
 U.S. Cl. 296—191 6 Claims



1. In a structure of a blind panel window for an automobile, in which the blind panel is attached by an adhesive to a circumferential flange portion of a window frame panel of the automobile in position to externally cover a window frame panel opening defined by the circumferential flange portion, the improvement which comprises:
- an inner frame mounted internally to the window frame panel for covering the circumferential flange portion, the inner frame including supporting means for supporting the

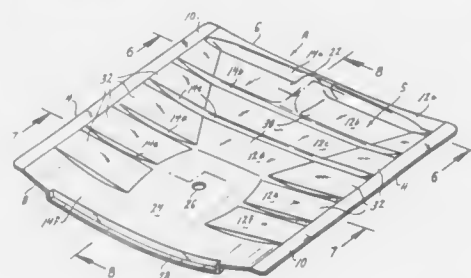
blind panel at a predetermined interval from the circumferential flange portion of the window frame panel; and adhesive portion defining means for defining a portion receiving the adhesive,

first circumferential resilient damming means for damming an outward flow of the adhesive between the inner frame and the circumferential flange portion while curing the adhesive, the first circumferential damming means bridging between the inner frame and the circumferential flange portion and extending along the circumferential flange portion,

second circumferential resilient damming means for damming an outward flow of the adhesive between the inner frame and the blind panel until setting of the adhesive, the second circumferential damming means bridging between the inner frame and the blind panel and extending to internally surround the circumferential flange portion of the window frame panel, and

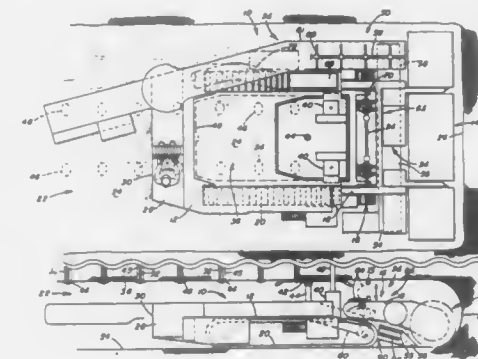
third circumferential resilient damming means for damming an outward flow of the adhesive between the blind panel and the circumferential flange portion of the window frame panel while curing the adhesive, the third circumferential damming means being attached to the peripheral portion of the blind panel so as to extend along the peripheral portion.

**4,953,913**  
**CONTOURED SEAT BASE**  
 Robert H. Graebe, 4 Signal Hill Blvd., Belleville, Ill. 62223  
 Filed Nov. 3, 1988, Ser. No. 266,867  
 Int. Cl.<sup>5</sup> A47C 7/16, 7/62  
 U.S. Cl. 297—459 20 Claims



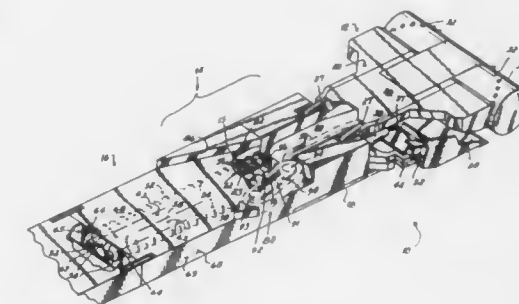
1. A seat base formed from a substantially rigid material of generally uniform thickness, said seat base having spaced apart sides and a plurality of spaced apart ribs which extend transversely toward the sides and project downwardly, the ribs being generally hollow and creating upwardly opening grooves, the seat base also having panels located between the grooves with the panels being generally wider than the ribs, the upwardly presented surfaces of the panels establishing an upper effective contour which is suited for seating purposes, in that it is at least in part slightly concave, and the downwardly presented surfaces of the ribs establishing a lower effective contour which is substantially different from the upper effective contour in that the spacing between the downwardly presented surfaces of at least some of the ribs and the panels adjacent to those ribs varies along the lengths of the ribs, so that none of those ribs possesses a uniform height, the lower effective contour being generally uniform to conform to an underlying supporting surface of generally uniform shape.

**4,953,914**  
**MINING MACHINE WITH ROOF BOLTING APPARATUS**  
 Maurice K. LeBegue, Fairmont, W. Va., assignor to Baker Hughes Incorporated, Houston, Tex.  
 Continuation of Ser. No. 212,337, Jun. 27, 1988, abandoned, which is a continuation of Ser. No. 9,278, Jan. 30, 1987, Pat. No. 4,753,486, and a continuation-in-part of Ser. No. 759,329, Jul. 26, 1985, abandoned. This application Mar. 28, 1989, Ser. No. 329,592  
 The portion of the term of this patent subsequent to Jan. 28, 2005, has been disclaimed.  
 Int. Cl.<sup>5</sup> E21D 20/00  
 U.S. Cl. 299—11 15 Claims



1. A mining machine for dislodging material from a vertical face comprising:
- a frame;
- roof bolting means movably mounted within said frame;
- dislodging means mounted on one end of said frame;
- propelling means for propelling said machine within a mine along the floor of said mine to advance said dislodging means into a face of said mine to dislodge material therefrom while actuating said roof bolting means to install roof bolts in the mine roof;
- said roof bolting means arranged to remain in a stationary position and install roof bolts in the mine roof while said mining machine advances and dislodges material from the face;
- transverse conveyor means mounted on said frame rearwardly of and below said dislodging means for gathering said material dislodged thereby; and
- longitudinal conveyor means mounted on said frame and extending from said transverse conveyor means rearwardly of said machine to receive said material from said transverse conveyor means and to transport said material to a location rearwardly of said machine.
12. A method of dislodging material from a vertical face comprising the steps of:
- providing a mining machine having dislodging means mounted on one end thereof and a frame member, said frame member having a pair of spaced longitudinal side members;
- propelling said mining machine within a mine along a floor of said mine to advance said dislodging means into a face of said mine to dislodge material therefrom; and
- maintaining a roof bolt means in fixed position and installing roof bolts in the roof of said mine above said mining machine at locations between said frame member longitudinal side members when said dislodging means of said mining machine is located at said face of said mine.

**4,953,915**  
**ROOF FALL SEPARATING AND REMOVING APPARATUS AND METHOD FOR USE IN THIN SEAM HIGHWALL MINING**  
 Manfred Jasser, Versailles, and Thomas Lipinski, Winchester, both of Ky., assignors to Metec, Inc., Lexington, Ky.  
 Filed Jul. 31, 1989, Ser. No. 387,621  
 Int. Cl.<sup>5</sup> E21C 35/20  
 U.S. Cl. 299—18 31 Claims



11. A mining machine comprising:
- a cutter head operable to mine material from a mined seam by cutting a hole while advancing forwardly into the seam;
- a conveyor assembly connected at its forward end to said cutter head, said assembly comprising a box-like column having a conveyor housed therein, said conveyor being operable to convey therethrough material which has been directed into said conveyor;
- means carried by said cutter head for directing material mined by said cutter head into said conveyor when said cutter head is advancing forwardly into the seam;
- a partition on the upper side of said box-like column for supporting material fallen from the roof of the mined hole and maintaining the fallen rock separate from mined material being conveyed by said conveyor when the cutter head is advancing into the seam; and
- means carried by said conveyor assembly for directing fallen roof material supported by said partition into said conveyor when said assembly and said cutter head are being withdrawn from the mined hole.
26. A method of mining coal from a seam at a highwall comprising the steps of:
- advancing a cutting head forwardly into the seam by exerting compressive force against the rear of the cutting head through a pushbeam from the highwall such that the pushbeam follows the cutting head forwardly into the seam;
- conveying mined coal through a conveyor housed within said pushbeam while the cutting head is being advanced;
- supporting above the pushbeam roof rock which falls upon the pushbeam, and maintaining the fallen rock separate from the conveyed coal as the cutting head is being advanced;
- withdrawing the cutting head and pushbeam from the coal seam by pulling the pushbeam rearwardly at the highwall to draw the pushbeam followed by the cutting head rearwardly from the seam;
- directing the separated fallen rock supported upon the pushbeam into the conveyor and conveying the fallen rock through the conveyor as the pushbeam and cutter head are being withdrawn from the seam.

4,953,916

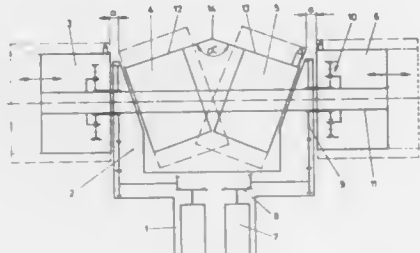
## DRIVE ARRANGEMENT FOR DRIVING CUTTING ROLLS

Erich Brandl, Grosslobming, Austria, assignor to Voest-Alpine Maschinenbau Gesellschaft M.B.H., Linz, Austria  
Filed Nov. 9, 1988, Ser. No. 268,771

Claims priority, application Austria, Nov. 11, 1987, 2982/87  
Int. Cl. E21C 25/08

U.S. Cl. 299—76

9 Claims



1. A rotary cutting roll arrangement for a machine for cutting material from a drift face having a width, comprising:
  - a straight drive shaft arranged to be supported for rotation about its own longitudinal axis with said axis extending widthwise of the drift face;
  - a cutting roll means having a radially outer periphery provided with a plurality of axially and angularly spaced cutting bits; said cutting roll means being divided into a plurality of cutting roll portions juxtaposed end to end in a series and mounted by respective mounting means on said drive shaft for rotation therewith; said cutting roll portions including at least two laterally outer portions respectively flanking two more medial portions;
  - said mounting means for said laterally outer cutting roll portions mounting said laterally outer cutting roll portions coaxially with one another and with said drive shaft; and said mounting means for said two more medial cutting roll portions being constituted by respective universal joint means which mount respective ones of said two more medial cutting roll portions on said drive shaft;
  - said two more medial cutting roll portions having respective one ends disposed proximally of one another, and respective other ends disposed distally of one another, said universal joint means being so located relative to said one ends as to predispose said two more medial cutting roll portions to remain disposed in use with their longitudinal axes at an obtuse angle to one another.

4,953,917

## STEERING-BRAKE SYSTEM

Kurt Wittich, Flörsbachtal, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Fed. Rep. of Germany  
Filed Jan. 18, 1989, Ser. No. 298,114

Claims priority, application Fed. Rep. of Germany, Jan. 18, 1988, 3801228

Int. Cl. B60T 11/24, 15/36; B62D 11/08

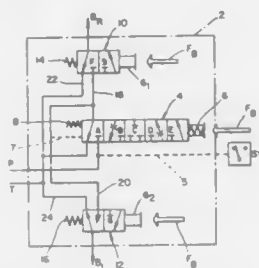
U.S. Cl. 303—961

15 Claims

1. Fluid-operated steering brake system for selectively operating one or both of two wheel brake cylinders located on opposite sides of a vehicle, comprising:
  - a high pressure fluid source,
  - a low pressure fluid region,
  - steering-brake unit comprising:
    - a brake-valve device interposed between said pressure source and said wheel brake cylinders, and
    - first and second reversing valves each interposed between said brake-valve device and a respective one of said wheel brake cylinders for conducting pressurized fluid from said brake valve device to said respective wheel brake cylinder, each of said reversing valves being movable against a restoring force independent of pres-

surized braking fluid from a first position communicating said respective wheel brake cylinder with said low pressure region to a second position communicating said respective wheel brake cylinder with high pressure fluid received from said brake-valve device, each of said reversing valves comprising:
 

- a housing forming a brake-line port communicating with a respective wheel brake cylinder, and a brake pressure port communicating with said brake-valve device for receiving pressurized fluid therefrom,
- a movable valve body including spaced lands defining channel means which communicate said brake-line port selectively with said brake pressure port and said low pressure region, one of said lands being configured to overlie said brake pressure port in said first position of said reversing valve to block said brake pressure port from both said brake line port and said low pressure region,



means defining said restoring force for biasing said movable valve body to said first position wherein said one land blocks said brake pressure port from both said brake line port and said low pressure region, and actuating pedal means comprising half-pedals each associated with said brake valve device and a respective one of said reversing valves, whereby depression of one half-pedal actuates said brake valve device and a respective reversing valve, and depression of both half-pedals actuates said brake valve device and both of said reversing valves, either of two depressed half-pedals being releasable while the other half-pedal remains depressed, whereupon said one land associated with said released half-pedal is moved to said position blocking said brake pressure port from both said brake line port and said low pressure region so that the braking pressure associated with the still depressed half-pedal is not influenced in any way whatsoever.

4,953,918

## MODULATOR FOR USE IN AN ANTI-LOCK BRAKE CONTROL SYSTEM

Kolchi Hashida, and Teruhisa Kohnno, both of Itami, Japan, assignors to Sumitomo Electric Industries Ltd., Osaka, Japan  
Filed Sep. 1, 1989, Ser. No. 401,845

Claims priority, application Japan, Sep. 3, 1988, 63-116187[U]  
Int. Cl. B60T 8/46

U.S. Cl. 303—115

2 Claims

1. In an anti-lock brake control system for an automobile vehicle, which system including:
  - a master cylinder;
  - a main fluid passage means communicating between the master cylinder and at least one wheel brake;
  - a recirculating passage means branched off from the main fluid passage means for recirculating a fluid medium from the main fluid passage means back to an upstream portion of the main fluid passage means with respect to the direction of flow towards the wheel brake;
  - an electric motor having an eccentric drive shaft;
  - a motor-driven plunger pump means disposed on the recir-

4,953,919

## TRACK SUSPENSION SYSTEM

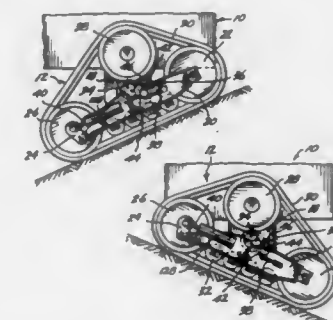
Frederic E. Langford, Redmond, Wash., assignor to Phoenix Engineering, Inc., Redmond, Wash.

Filed Feb. 15, 1989, Ser. No. 311,153

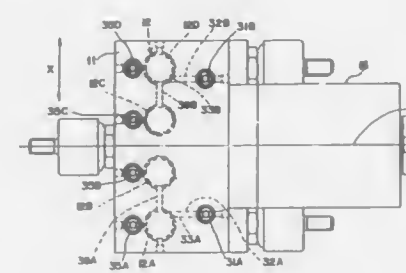
Int. Cl. B62D 55/30

U.S. Cl. 305—31

9 Claims



1. A triangular track suspension system for a vehicle comprising:
  - a pivot shaft affixed to said vehicle,
  - a drive sprocket mounted on said vehicle and positioned adjacent and above said pivot shaft;
  - a track frame having first and second ends, said track frame being mounted for rocking movement on said pivot at a location between said first and second ends,
  - an idler wheel link pivotally attached to the first end of the track frame and extending upwardly therefrom and terminating in an upward end,
  - a first idler wheel mounted for rotation on the upper end of said idler wheel link,
  - a second idler wheel and means mounting said second idler wheel for rotation on the second end of said track frame,
  - a continuous track engaging said drive sprocket, said first idler wheel, and said second idler wheel, and
  - take-up means mechanically linking said idler wheel and link and said vehicle for moving the upper end of said idler wheel link away from said pivot shaft in direct reaction to the rocking motion of said track frame away from the horizontal so as to move said first idler wheel away from said pivot shaft and thereby maintain substantially constant circumference around the idler wheels and drive sprocket.



1. A revolving, inextensible, flexible band, especially a track for vehicles, that is made endless via connecting means disposed in a zone of connection, with the outer surface of the band body being provided with ribs including first projections distributed with regularity in a uniform distribution over the length of the band in a spacing as to each other greater by a multiple than width thereof, and with said connecting means being disposed between ones of said ribs, said band further comprising:
  - additional second projections that are disposed non-uniformly distributed on said outer surface of said band body and concentrated particularly in the region of said zone of connection, with said additional second projections projecting from said outer surface of said band body

4,953,920

## REVOLVING, INEXTENSIBLE BAND, PARTICULARLY A TRACK FOR VEHICLES

Andreas Jäger, Burgdorf, Fed. Rep. of Germany, assignor to Arnold Jäger, Burgdorf, Fed. Rep. of Germany  
Filed Nov. 3, 1988, Ser. No. 266,711

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1987, 3738324; Jul. 14, 1988, 3823875

Int. Cl. B62D 55/18

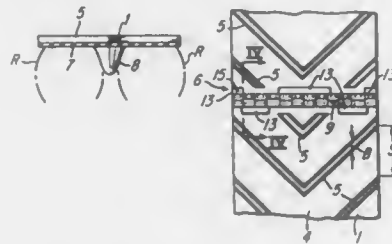
U.S. Cl. 305—35 EB

23 Claims

1. A revolving, inextensible, flexible band, especially a track for vehicles, that is made endless via connecting means disposed in a zone of connection, with the outer surface of the band body being provided with ribs including first projections distributed with regularity in a uniform distribution over the length of the band in a spacing as to each other greater by a multiple than width thereof, and with said connecting means being disposed between ones of said ribs, said band further comprising:
  - additional second projections that are disposed non-uniformly distributed on said outer surface of said band body and concentrated particularly in the region of said zone of connection, with said additional second projections projecting from said outer surface of said band body



at least as far as do said connecting means, and with said additional second projections, said ribs, and said band body all at least essentially comprising rubber or rubber-



like material, said first and second projections precluding wear effects and premature damage, especially abrasion, relative to said connecting means.

4,953,921

# GROUND ENGAGING SURFACE FOR ENDLESS TRACKS, WHEELS AND TIRES

Alan R. Buras, Mosman Park, Australia, assignor to Altrack Limited, Australia

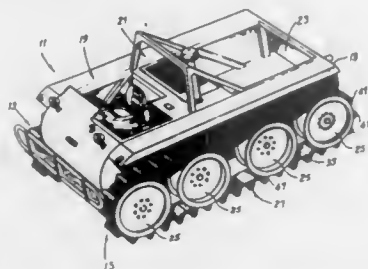
PCT No. PCT/AU86/00318, § 371 Date Aug. 20, 1987, § 102(e) Date Aug. 20, 1987, PCT Pub. No. WO87/02953, PCT Pub. Date May 21, 1987

PCT Filed Oct. 21, 1986, Ser. No. 105,382

Int. Cl. B62D 55/24

U.S. Cl. 305—35 EB

17 Claims



1. An endless track for tracked vehicles comprising an endless flexible band having an inner surface and an outer surface, and a plurality of elongated tread elements provided in a spaced relationship on said outer surface of said band and extending transversely with respect to the direction of motion of said track, each of said track elements being of resiliently deformable construction and being hollow, defining a cavity, said cavity being unpressurized and open to ambient atmospheric pressure.

4,953,922

# WEB MATERIAL FOR CAMOUFLAGE AGAINST ELECTROMAGNETIC RADIATION

Claes Göran Granqvist, Mölndal, Sweden, assignor to HB Radiocool Research & Development, Sweden

PCT No. PCT/SE87/00367, § 371 Date Feb. 7, 1989, § 102(e) Date Feb. 7, 1989, PCT Pub. No. WO88/01363, PCT Pub. Date Feb. 25, 1988

PCT Filed Aug. 21, 1987, Ser. No. 314,764

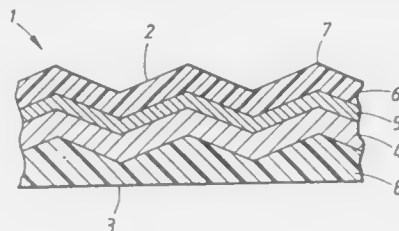
Claims priority, application Sweden, Aug. 21, 1986, 8603522 Int. Cl. F41H 3/00; G02B 5/22, 5/26, 5/28

U.S. Cl. 350—1.7

6 Claims

1. Web material for camouflaging against electromagnetic radiation, and having a front side, which is intended to face a potential observer or detector, as well as a backside, which is intended to face an object, which is to be camouflaged, the

material comprising several layers, a first layer of a metal foil with a first reflective surface facing the front side and with a second reflective surface facing the backside; a second layer covering the first surface of the first layer and chosen to be of a material which is absorbent for visible light and near-infrared radiation as well as transparent for thermal infrared radiation;



and on the second layer, a third layer, an outer surface of which forms said front side, the third layer being a plastic layer, provided to have a precisely determined thickness to perform an adapted absorption of radiation in the region 8–13 μm by means of interference, the outer surface forming the front side being textured in an embossed pattern having closely spaced grooves.

4,953,923

# SYSTEM FOR REDUCING NOISE HOLOGRAMS

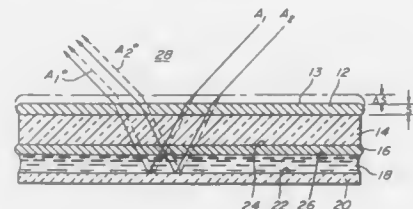
John E. Wreede, Monrovia, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 1, 1988, Ser. No. 226,593

Int. Cl. G03H 1/04

U.S. Cl. 350—3.61

20 Claims



1. A system for recording a hologram with an exposure beam, comprising:  
a substrate transparent to said exposure beam;  
a recording medium positioned on said substrate;  
an absorbent member means having a thickness and being positioned relative to said exposure beam and fixed on a surface of said substrate for absorbing and releasing fluid respectively from and to a surrounding environment and for varying said thickness in response to a change in fluid content thereof during an exposure time of said recording medium.

4,953,924

# ENHANCED NONDESTRUCTIVE HOLOGRAPHIC RECONSTRUCTION

Redfield Stephen R., Austin, Tex., and Lambertus Hesselink, Woodside, Calif., assignors to Microelectronics and Computer Technology Corporation, Austin, Tex.

Filed Dec. 30, 1987, Ser. No. 139,319

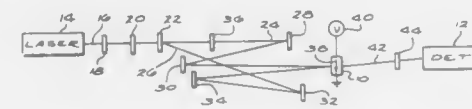
Int. Cl. G02F 1/01; G03H 1/04

U.S. Cl. 350—3.64

17 Claims

1. A recording/reconstruction cycle for a hologram in photorefractive media, comprising:  
forming an interference pattern with light having a selected polarization state;  
exposing photorefractive recording media to said interfer-

ence pattern to produce a diffusion field and record a hologram therein;  
applying a first electric field to said recording media during said recording, said first electric field, said recording media, and said interference pattern being selected to produce drift dominated recording and values of said first electric field and diffusion field smaller than the saturation field for said recording media;



terminating said recording when the cumulative recording energy exceeds a value which produces an initial peak reconstruction efficiency; and  
illuminating said recorded hologram with light having a selected polarization state relative to the polarization state of said light used to form said interference pattern to generate reconstructed light from said hologram.

4,953,925

# SCANWHEEL ASSEMBLY WITH STRAIN RELIEVED HUB

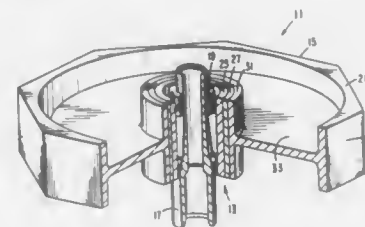
Merle D. Parker, Oceanside, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 21, 1989, Ser. No. 383,826

Int. Cl. G02B 26/10

U.S. Cl. 350—6.1

8 Claims



1. A bearing mounted scanwheel assembly comprising in combination:  
(a) a bearing assembly having an inner member and an outer member mounted for rotation about said inner member, said outer member having a cylindrical outer surface;  
(b) a scanwheel having a hub with a cylindrical inner surface, said scanwheel being mounted by its hub upon said outer member; and  
(c) a circumferential strain relief channel in one of said surfaces.

4,953,926

# SCANNING OPTICAL SYSTEM FOR USE IN A LASER BEAM PRINTER

Akira Morimoto, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 13, 1989, Ser. No. 322,030

Claims priority, application Japan, Mar. 14, 1988, 63-59821; Jan. 19, 1989, 1-10633

Int. Cl. G02B 26/10

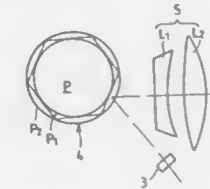
U.S. Cl. 350—6.8

14 Claims

1. A scanning optical system for use in a laser beam printer that comprises a cylindrical lens for imaging laser light in an auxiliary scanning cross section at a point in front of a deflector and an anamorphic scanning lens unit which converges light rays deflected by the deflector at a point on a scanning surface, said scanning lens unit having, in order from the deflector side, a first lens which is a negative lens element having a concave toric surface with a stronger curvature in the auxiliary scan-

ning cross section and a second lens having a convex toric surface with a stronger curvature in the auxiliary scanning cross section, said optical system further satisfying the following condition:

$$0.015f < l < 0.160f$$



4,953,927

# LENS ASSEMBLY FOR LONG-LIFE LASER IMAGING SYSTEM

Hans J. Vedder, Puchheim, Fed. Rep. of Germany, assignor to Agfa-Gevaert AG, Leverkusen, Fed. Rep. of Germany

Filed Dec. 2, 1988, Ser. No. 279,570

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3742837

Int. Cl. G02B 26/10, 3/06

U.S. Cl. 350—6.8

2 Claims



1. A system for imaging a line, the system comprising:  
means including a laser for emitting a modulated laser-light beam;  
an image-receiving surface;  
means including a deflecting element between the laser and the surface for deflecting the beam in an x-direction of the line to be imaged onto the surface;  
a lens assembly including a cylinder lens between the laser and the deflecting element for focussing the beam on the deflecting element; and  
a telescopic lens system between the deflecting element and the surface and including an upstream lens spaced by its focal length downstream from the deflecting element and a downstream lens focussed downstream;  
a middle lens between the upstream and downstream lenses, constituted as a simple cylinder lens, and having a refractive power perpendicular to the x-direction, and  
a projecting lens between the downstream lens and the image surface receiving the beam from the downstream lens and focussing it on the surface.

4,953,928

## MOS DEVICE FOR LONG-TERM LEARNING

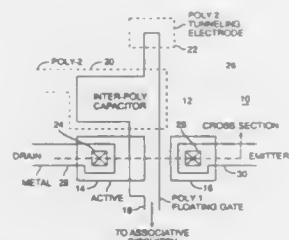
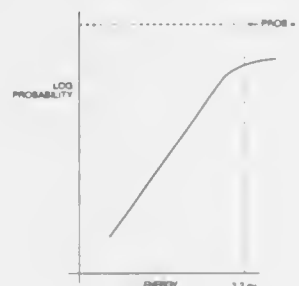
Jameen D. W. Anderson, Fremont, and Carver A. Mead, Pasadena, both of Calif., assignors to Synaptics Inc., San Jose, Calif.

Filed Jun. 9, 1989, Ser. No. 363,678

Int. Cl.<sup>5</sup> H01L 29/78, 27/02; G11C 11/34

U.S. Cl. 357—23.5

12 Claims



I. A semiconductor structure for long term learning including:

- a p-type region in a semiconductor substrate,
- a first n-type region disposed in said p-type region,
- a floating gate disposed above said p-type region, said floating gate at least partially overlapping one edge of said first n-type region and separated from the surface of said substrate by a gate oxide under a portion of said floating gate including at least where it partially overlaps the edge of said first n-type region,
- means for applying a first positive potential to said first n-type region with respect to said p-type region to reverse bias said first n-type region, said first positive potential having a magnitude of greater than about 3.2 volts relative to said p-type region, but less than the voltage required to induce avalanche breakdown in the junction between said first n-type region and said p-type region,
- means for capacitively coupling a second positive potential to said floating gate, said second positive potential having a magnitude of greater than about 3.2 volts relative to said p-type region,
- a second n-type region in contact with said p-type region,
- means for applying a negative potential to said second n-type region with respect to said p-type region to forward bias said second n-type region, and to thereby inject minority electrons into said p-type region,
- an insulating layer over said floating gate,
- a conductive region disposed over said insulating layer and capacitively coupled to said floating gate,
- means for selectively applying a third positive potential to said conductive region with respect to said floating gate, whereby said first and second positive potentials act to accelerate said minority electrons to an energy sufficient to surmount the barrier energy of said gate oxide and thereby inject said minority electrons onto said floating gate and whereby said third positive potential causes electrons to tunnel from said floating gate to said conductive region.

4,953,929

## FIBER OPTIC CONNECTOR ASSEMBLY AND ADAPTER FOR USE THEREWITH

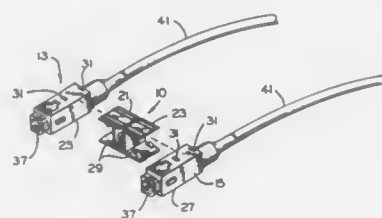
Joseph F. Basista, Owego; Wai M. Ma, and John J. Squires, both of Endicott, all of N.Y., assignors to International Business Machines, Armonk, N.Y.

Filed Jul. 21, 1989, Ser. No. 382,925

Int. Cl.<sup>5</sup> G02B 6/38

U.S. Cl. 350—96.2

23 Claims



11. A fiber optic connector assembly comprising:
- a connector housing defining a pair of chambers therein;
  - at least two, individual fiber optic connectors of the push-pull variety, each being positioned within a respective one of said chambers of said connector housing; and
  - an adapter for holding said fiber optic connectors in a predetermined manner of alignment prior to said positioning thereof within said connector housing, said adapter including first and second clamp members, each of said clamp members adapted for clamping onto a respective one of said fiber optic connectors to hold said fiber optic connectors in a substantially side-by-side relationship, and resilient means interconnecting said first and second clamp members and oriented substantially therebetween for enabling said clamp members to move in at least four different orientations relative to each other while holding said connectors in said substantially side-by-side relationship to provide adjustable alignment between said clamp members prior to said positioning of said connectors within said connector housing, thereby facilitating said alignment.

4,953,930

## CPU SOCKET SUPPORTING SOCKET-TO-SOCKET OPTICAL COMMUNICATIONS

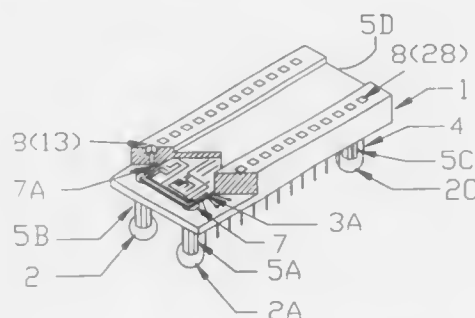
Bernard Ramsey, Springfield; Dean A. Christy, Manassas, both of Va.; Richard S. Beverly, Bowie, Md., and Jerome M. Wucher, Fairfax, Va., assignors to Ramtech, Inc., Springfield, Va.

Filed Mar. 15, 1989, Ser. No. 327,708

Int. Cl.<sup>5</sup> G02B 6/12

U.S. Cl. 350—96.11

21 Claims



20. A data system comprising:
- (a) a first intelligent socket for detachably receiving, supporting and electrically interfacing with a first integrated

circuit device having plural electrically conductive pin connections, said first intelligent socket including:

- a first socket body supporting said first integrated circuit device,

- a first set of conductive electrical signal connectors disposed on said socket body for electrically coupling with the electrically conductive pins of said first integrated circuit device, and

- first active circuit means, disposed within said first socket body and operatively connected to said first set of electrical connectors, for communicating electrical signals with said first integrated circuit device in a first signalling protocol particular to said first integrated circuit device;

- (b) a second intelligent socket for detachably receiving, supporting and interfacing with a second integrated circuit device having electrically conductive pin connections, said second intelligent socket including:

- a second socket body supporting said second integrated circuit device;

- a second set of conductive electrical signal connectors disposed on said second socket body for electrically coupling with the electrically conductive pins of said second integrated circuit device, and

- second active circuit means, disposed within said second socket body and operatively connected to said second set of electrical connectors, for communicating electrical signals to and from said second integrated circuit device in a second electrical signalling protocol different from said first signalling protocol, said second protocol being particular to said second integrated circuit device; and

- (c) optical communication means, coupled between said first socket body and said second socket body, for communicating optical signals between said first and second active circuit means, said optical signals having a generic optical data signalling protocol different from said first and second electrical signalling protocols;

- wherein said first active circuit means within said first socket body includes first protocol conversion means for generating electrical signals in said first electrical signalling protocol in response to said optical data signalling protocol signals communicated by said optical communications means, and said second active circuit means within said second socket body includes second protocol conversion means for generating signals in said second electrical signalling protocol in response to said generic optical data signalling protocol signals communicated by said optical communications means.

4,953,931

SECOND HARMONIC WAVE GENERATING DEVICE  
Yasumitsu Miyazaki, Aichi; Ryo Enomoto, and Masaya Yamada, both of Gifu, all of Japan, assignors to Ibdien Co., Ltd., Gifu-Ken, Japan

Filed Dec. 19, 1989, Ser. No. 452,505

Claims priority, application Japan, Mar. 30, 1989, 64-76853; Apr. 7, 1989, 64-86885; Nov. 16, 1989, 64-298599

Int. Cl.<sup>5</sup> G02B 6/10

U.S. Cl. 350—96.12

7 Claims

1. A second harmonic wave generating device comprising a LiNbO<sub>3</sub> thin film waveguide layer formed on a LiTaO<sub>3</sub> substrate, characterized in that said LiTaO<sub>3</sub> substrate has an ordinary refractive index ( $n_{o51}$ ) of 2.10 to 2.20 at a fundamental wavelength ( $\lambda_{\mu m}$ ) and an extraordinary refractive index ( $n_{e52}$ ) of 2.22 to 2.28 at a second harmonic wavelength ( $\lambda_{\mu m}/2$ ), and an ordinary refractive index ( $n_{oF1}$ ) at said fundamental wavelength ( $\lambda_{\mu m}$ ) of said LiNbO<sub>3</sub> thin film waveguide layer, an extraordinary refractive index ( $n_{e52}$ ) at said second harmonic wavelength ( $\lambda_{\mu m}/2$ ) of said LiTaO<sub>3</sub> substrate, and an extraordinary refractive index ( $n_{eF2}$ ) at said second harmonic wavelength ( $\lambda_{\mu m}/2$ ) of said LiNbO<sub>3</sub> thin film waveguide layer have a relation

$$2.0 \leq \frac{(n_{oF1} - n_{e52})}{(n_{eF2} - n_{e52})} \leq 30.0.$$

4,953,932

## OPTICAL SLIP RING

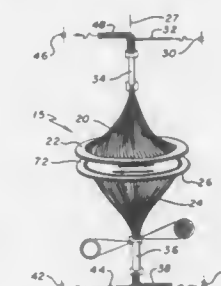
Alexander Mihich, Manhattan Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 25, 1989, Ser. No. 343,754

Int. Cl.<sup>5</sup> G02B 6/26

U.S. Cl. 350—96.15

17 Claims



1. An optical slip ring comprising:
- first supporting means for supporting a first plurality of optical fibers in a predetermined pattern, said first supporting means having a radial axis; and
  - second supporting means, disposed along said radial axis, for supporting a second plurality of optical fibers in said predetermined pattern for optically communicating with said first plurality of optical fibers, said second supporting means comprising a flexible coupling joint for minimizing alignment variations between said first and second supporting means, and wherein each of said first and second plurality of optical fibers being arranged to function as a transmitting and a receiving light conductor for communicating with a light generator and a light detector.

4,953,933

## OPTICAL ENCODER READING DEVICE

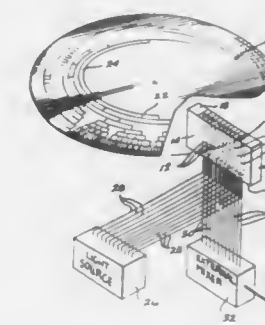
Romeal F. Asmar, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jul. 10, 1989, Ser. No. 377,723

Int. Cl.<sup>5</sup> G02B 6/26, 6/30; G01D 5/34; G06K 7/10

U.S. Cl. 350—96.15

10 Claims



1. A readhead for an optical encoder comprising:
- at least one glass substrate; and
  - a plurality of ion diffused optical transmission channels formed in the interior region of each said glass substrate, said optical transmission channels including a plurality of spaced apart optical waveguides for supplying light to a



predetermined region of said optical encoder and for receiving light that is reflected from said predetermined region of said optical encoder, said optical transmission channels also including at least one optical waveguide for supplying light to said optical transmission channel and for outputting light from said optical transmission channel;

each said optical transmission channel further including an optical mixer section located intermediate to said plurality of optical waveguides and said at least one optical waveguide with said optical mixer section being in optical communication with both said plurality of optical waveguides and said at least one optical waveguide.

4,953,934

# WAVEGUIDE TYPE LIGHT MERGING AND BRANCHING DEVICE

Katsuyuki Imoto, Hitachi; Hirohisa Sano, Kokubunji; Masaru Miyazaki, Ome; Naoyuki Matsuoka, Kokubunji, and Hisato Uetsuka, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Hitachi Cable, Ltd., Tokyo, Japan

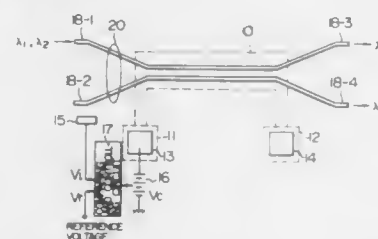
Filed Dec. 7, 1988, Ser. No. 280,855

Claims priority, application Japan, Dec. 9, 1987, 62-309652

Int. Cl.<sup>5</sup> G02B 6/26

U.S. Cl. 350—96.15

2 Claims



1. A waveguide type light merging and branching device comprising:

- a substrate;
- a resistance layer arranged on at least one side of said substrate, having electrodes through which a voltage is applied;
- a low refractive index layer superposed on said substrate with the resistance layer;
- two core waveguide layers, arranged in parallel on said low refractive index layer;
- a cladding layer covering said two core waveguide layers; and
- thermo-detecting element disposed on said cladding, wherein the voltage applied to the resistance layer is varied by the output of said thermo-detecting element.

4,953,935

# INTEGRATED OPTIC STAR COUPLER

Paul G. Suchoski, Jr., East Hartford; Talal K. Findakly, and Frederick J. Leonberger, both of Glastonbury, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Mar. 27, 1989, Ser. No. 328,940

Int. Cl.<sup>5</sup> G02B 6/28; G02F 1/00

U.S. Cl. 350—96.16

12 Claims

1. A single polarization integrated optic (IO) star coupler, comprising:

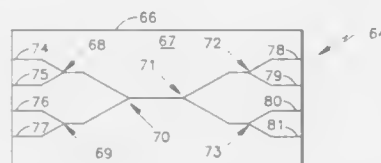
- substrate means, comprising a refractive material having a major surface; and
- star coupler array means, including one or more 1×2 optical power splitter means disposed in cascade on said major surface to provide an array having N number of signal inputs and M number of signal outputs arranged in an N×M star coupler architecture;

as characterized by:

said star coupler array means being formed in said major

surface by a two step proton exchange (TSPE) process comprising the steps of:

immersing said substrate, for a period of from two to sixty minutes, in a benzoic acid bath at a temperature of from 150°C to 250°C;



removing said substrate from said bath following said step of immersing; and

appealing said substrate for period of from one to five hours at temperature of from 300°C to 400°.

4,953,936

# OPTICAL WAVEGUIDE MODULE WITH FIBER COUPLING

Rolf Regener, Schorndorf, and Joachim Scholz, Marbach, both of Fed. Rep. of Germany, assignors to Standard Elektrik Lorenz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

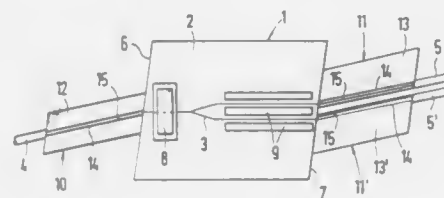
Filed Sep. 1, 1989, Ser. No. 401,937

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1988, 3831905

Int. Cl.<sup>5</sup> G03B 6/30

U.S. Cl. 350—96.17

4 Claims



1. In an integrated optical waveguide module with fiber coupling including a substrate which supports at least one integrated optical waveguide whose ends are each optically coupled, at two sides of the substrate, to one end of a respective optical fiber fixed in the groove of a respective holder attached, after adjustment, to the substrate; the improvement wherein: each holder is a fillet-shaped supporting body having a respective said groove on its top side which extends in the direction of the longitudinal axis of the supporting body; the fiber end of each respective optical fiber is free of a primary coating and an outer jacket and is completely sunk and embedded in adhesive in a respective said groove; and each of said fiber end and each said supporting body is formed of quartz glass.

4,953,937

# ILLUMINATION OPTICAL SYSTEM

Akira Kikuchi, and Katsuya Ono, both of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 16, 1989, Ser. No. 352,492

Claims priority, application Japan, May 17, 1988, 63-118154; Oct. 25, 1988, 63-267196; Mar. 28, 1989, 1-73796

Int. Cl.<sup>5</sup> G02B 6/32

U.S. Cl. 350—96.18

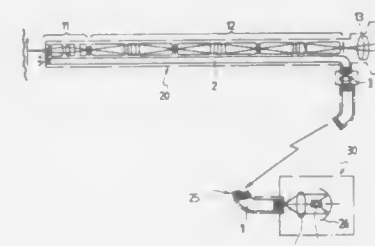
38 Claims

1. An illumination optical system comprising a surface-shaped light source having a two-dimensional extent across an optical axis, and a positive lens system positioned so as to have its front focal point in the vicinity of the light source, said lens

system being adopted to receive light from said light source and to direct the received light toward a surface to be illuminated, the illumination optical system being designed to satisfy a following condition (1) at more than 50% of the sectional area of effective light flux within the range defined by the following condition (2),

$$(d\theta/dr_1)/(d\theta/dr_1)r_1 = 0 < f/\sqrt{r_1^2 - r_1^2}$$

(1)



$$0 \leq |r_1| \leq |f|$$

(2)

wherein the reference symbol  $r_1$  represents distance as measured from the optical axis to an optional point on said surface-shaped light source, the reference symbol  $\theta$  designates angle of incidence on a surface to be illuminated formed between the optical axis and the ray emerging from said point in parallel to the optical axis and incident on said illuminated surface, and the reference symbol  $f$  denotes focal length of said lens system.

4,953,938

# OPTICAL FIBER EXPANDED BEAM CONNECTOR

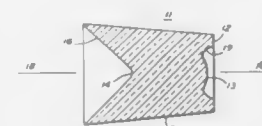
Carl F. Buhner, Framingham, and Alfred H. Bellows, Wayland, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Oct. 28, 1985, Ser. No. 791,669

Int. Cl.<sup>5</sup> G02B 6/32

U.S. Cl. 350—96.18

10 Claims



1. A lensing and alignment device for an optical fiber comprising an integral body of optical quality transparent material formed in a generally truncated conical configuration, said body having a conical axis, said body having a base at one end thereof, said body having a planar, annular, reference surface at the other end thereof,

- (A) said body, at said other end, having
  - (1) said planar surface perpendicular to said axis,
  - (2) a lens having a convex surface formed in said body, recessed inward from said reference surface, and
  - (3) curved surface means surrounding said lens surface for serving as a smooth transition toward said planar reference surface; and
- (B) said body, at said one end, having
  - (1) a truncated, conical depression terminating at a circular, planar surface having a center coinciding with the focal point of said lens, said circular planar surface being perpendicular to said axis, said focal point lying on said axis,

wherein said base has a diameter  $d_1$ , said annular surface has an outer diameter  $d_2$ , and where  $d_1 \neq d_2$ .

4,953,939

# OPTICAL FIBRE TRANSMISSION SYSTEMS

Richard E. Epworth, Bishops Cleeve, Great Britain, assignor to STC PLC, London, England

Continuation of Ser. No. 749,050, Jun. 26, 1985, abandoned.

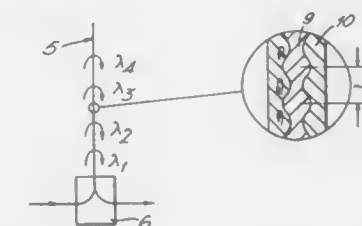
This application Dec. 16, 1987, Ser. No. 134,549

Claims priority, application United Kingdom, Jul. 11, 1984, 8417662

Int. Cl.<sup>5</sup> G02B 6/34

U.S. Cl. 350—96.19

17 Claims



1. A chromatic dispersion equaliser which produces an equalising optical delay for an optical signal having variable wavelength and transmitted along an optical fiber, which variable wavelength results in chromatic dispersion in the form of unwanted delay of the transmitted optical signal, which unwanted delay varies with the variations in the wavelength and which equalising optical delay is to compensate for said unwanted delay, the optical fibre having a delay versus wavelength characteristic with a minimum delay at a particular wavelength, the delay decreasing with increasing wavelength up to said particular wavelength and increasing with increasing wavelength after said particular wavelength, the chromatic dispersion equaliser comprising a chirped Bragg reflector and directional coupler means associated with the chirped Bragg reflector, the directional coupler means, in use of the equaliser, coupling the optical signal transmitted along the optical fiber to the chirped Bragg reflector and redirecting the optical signal as reflected by the chirped Bragg reflector back into the optical fiber to continue its transmission therealong, the chirped Bragg including means responsive to the wavelength to vary the distance the optical signal travels through the chirped Bragg reflector before reflection depending on the wavelength and to produce said equalising optical delay in response to said wavelength and thus compensate for said unwanted delay and equalise the chromatic dispersion of the transmitted signal, the distance variation being such that for wavelength variations below said particular wavelength longer wavelengths have to travel further distances than shorter wavelengths before said reflection, and for wavelength variations above said particular wavelength shorter wavelengths have to travel further distances than longer wavelengths before said reflection.

4,953,940

# OPTICAL FIBER TERMINATION DEVICE HAVING CUTTING MEANS

Carmen Lanzetta, Jr., Hatboro; Michael Kieli, Bensalem, both of Pa.; Guenter Schindler, Lakewood, and Russell H. Williams, Flemington, both of N.J., assignors to Thomas & Betts Corporation, Bridgewater, N.J.

Filed Jan. 24, 1985, Ser. No. 694,353

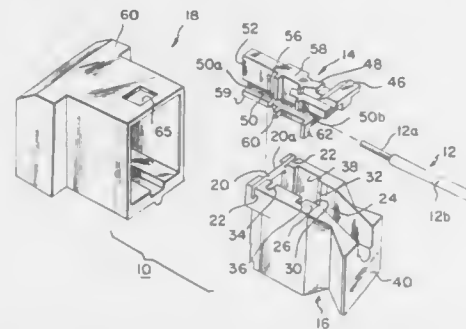
Int. Cl.<sup>5</sup> G02B 6/36, 7/26

U.S. Cl. 350—96.20

6 Claims

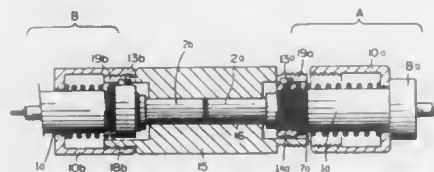
1. An apparatus for cutting an optical fiber with a cutting device and terminating said optical fiber, said apparatus comprising:

a first housing defining a channel and supporting said cutting device across a portion of said channel; and  
a second housing insertably received in said first housing for supporting said fiber; said second housing including first and second integrally attached spaced-apart fiber accommodating portions each for accommodating and supporting respectively and end extent of said fiber and a successive spaced-apart longitudinal extent of said fiber, said first and second fiber accommodating portions defining a passage thereinbetween which receives said cutting device



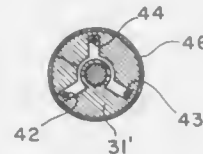
upon insertion of said second housing into said first housing to thereby sever said fiber between said first and second spaced-apart fiber accommodating portions and to thereby define a fiber termination surface adjacent to said passage; said second fiber accommodating portion being resident interiorly of said first housing channel and said first fiber accommodating portion being resident exteriorly of said first housing channel upon insertion of said second housing into said first housing; and wherein said first fiber accommodating portion is frangibly removable from said second fiber accommodating portion.

**4,953,941**  
**OPTICAL FIBER CONNECTING DEVICE**  
Mitsuo Takahashi, Matsudo, Japan, assignor to Seikoh Giken Co., Ltd., Chiba, Japan  
Filed Nov. 21, 1988, Ser. No. 274,184  
Int. Cl.<sup>5</sup> G02B 6/36  
U.S. Cl. 350—96.20 6 Claims



1. An optical fiber connecting device comprising a pair of optical connector plug assemblies and an aligning sleeve, each of said pair of optical connector plug assemblies including:  
a ferrule member having a central hole for receiving and holding an optical fiber, said ferrule member including a threaded portion formed on an outer-diameter portion thereof adjacent one end;  
a cylindrical position-determining movable ring slidably fitted around the outer-diameter portion of said ferrule member and having an internally threaded through-hole rotatably engaged with the threaded portion of said ferrule member, said cylindrical position-determining movable ring further having a position-determining key on an outer-diameter portion of said ring;  
a ferrule member-urging compression coil spring; and  
an engagement nut formed with an internally threaded hole, said coil spring and engagement nut being slidably fitted around the outer-diameter portion of said ferrule member.

**4,953,942**  
**OPTICAL FIBER CABLE AND METHOD OF MAKING THE SAME**  
Kazuya Sasaki, Mitaka, Japan, assignor to Fujitsu Limited, Kawasaki, Japan  
Filed Apr. 4, 1989, Ser. No. 332,733  
Claims priority, application Japan, Apr. 8, 1988, 63-087633  
Int. Cl.<sup>5</sup> G02B 6/44; D02G 3/36; B21D 3/00  
U.S. Cl. 350—96.23 20 Claims

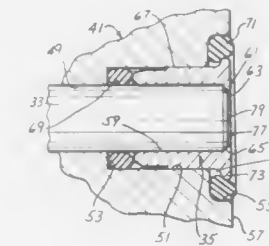


1. A method of making an optical fiber cable, comprising the steps of:  
(a) providing a flat-type spacer having a straight groove along a length thereof and positioning an optical fiber therein along substantially the same plane; and  
(b) forming the straight groove into a closed space in which the optical fiber is held, by transforming the flat-type spacer into a circular rod-type spacer while the optical fiber remains positioned in the groove.  
11. An optical fiber cable, comprising:  
(a) a plurality of optical fibers;  
(b) spacer means, for holding and protecting the optical fibers in closed spaces, the spacer means including a plurality of section blocks connected together to form a plurality of closed spaces between adjacent blocks in which the optical fibers are positioned; and,  
(c) a tension member positioned in the center of the spacer means and formed within a portion of one of the blocks.

**4,953,943**  
**SECOND HARMONIC WAVE GENERATING DEVICE**  
Yasumitsu Miyazaki, Aichi; Ryo Enomoto, and Masaya Yamada, both of Gifu, all of Japan, assignors to Iriden Co., Ltd., Gifu-Ken, Japan  
Filed Dec. 19, 1989, Ser. No. 452,506  
Claims priority, application Japan, Mar. 30, 1989, 61-76853; Apr. 7, 1989, 61-86885; Nov. 16, 1989, 61-298600  
Int. Cl.<sup>5</sup> G02B 6/10  
U.S. Cl. 350—96.12 8 Claims

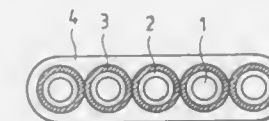
1. A second harmonic wave generating device comprising a LiNbO<sub>3</sub> thin film waveguide layer formed on a LiTaO<sub>3</sub> substrate, characterized in that a fundamental wavelength ( $\lambda$   $\mu$ m), a thickness (T  $\mu$ m) of said LiNbO<sub>3</sub> thin film waveguide layer, an ordinary refractive index ( $n_{oF1}$ ) of said LiTaO<sub>3</sub> substrate at said fundamental wavelength ( $\lambda$   $\mu$ m), an ordinary refractive index ( $n_{oF1}$ ) of said LiNbO<sub>3</sub> thin film waveguide layer at said fundamental wavelength ( $\lambda$   $\mu$ m), an extraordinary refractive index ( $n_{eF2}$ ) of said LiTaO<sub>3</sub> substrate at a second harmonic wavelength ( $\lambda$   $\mu$ m/2), and an extraordinary refractive index ( $n_{eF2}$ ) of said LiNbO<sub>3</sub> thin film waveguide layer at said second harmonic wavelength ( $\lambda$   $\mu$ m/2) are individually within the following specific values:  
 $\lambda = 0.68$  to  $0.94$   $\mu$ m  
 $T = 0.3$  to  $16$   $\mu$ m  
 $n_{oF1} = 2.22$  to  $2.38$   
 $n_{oF1} = 2.10$  to  $2.25$   
 $n_{eF2} = 2.24$  to  $2.42$   
 $n_{eF2} = 2.22$  to  $2.38$

**4,953,944**  
**MULTI-CHANNEL HERMAPHRODITIC LENS TYPE FIBER OPTIC CONNECTOR**  
Norbert L. Moulin, Placentia, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
Filed Oct. 12, 1988, Ser. No. 256,686  
Int. Cl.<sup>5</sup> G02B 6/38  
U.S. Cl. 350—96.21 9 Claims



1. A lens-type connector comprising:  
a connector body having a passage extending therethrough in a first direction;  
a bushing fixedly retained in the passage of the connector body and having a bushing passage extending generally in said first direction completely through the bushing, the passage including a bore and a counterbore at the end of the connector body, said bushing received in the counterbore;  
said bushing having a radially inwardly projecting shoulder in said passage of said bushing and an annular interface seal circumscribing the bushing at said one end of the connector body and means including the bushing for retaining the seal;  
a graded index rod in said passages, said graded index rod having an end face and being movable in said first direction in said passages, said shoulder and the end face of said graded index rod having mating conical surfaces which engages when the index rod is urged against the shoulder, whereby the end face of the graded index rod can be urged against said shoulder to at least assist in centering and retaining the graded index rod in said passages.

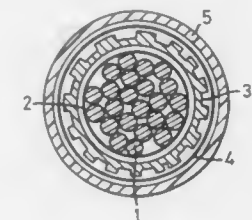
**4,953,945**  
**TRANSMISSION PROTECTIVE COATED OPTICAL FIBER TAPE**  
Akira Nishimura, and Masaaki Nakasuji, both of Kanagawa, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan  
Filed Jun. 2, 1988, Ser. No. 201,407  
Claims priority, application Japan, Jun. 3, 1987, 62-86458[U]; Apr. 11, 1988, 63-48541[U]  
Int. Cl.<sup>5</sup> G02B 6/44  
U.S. Cl. 350—96.23 1 Claim



1. A coated optical fiber tape comprising:  
a plurality of optical fibers each having a coating and being aligned parallel in the same plane,  
a common coating layer covering the area of said optical fibers, and  
a peelable cured coating layer being provided between each of the coatings on the optical fibers and said common coating layer to prevent the latter from being bonded to said coatings on the optical fibers, said peelable cured

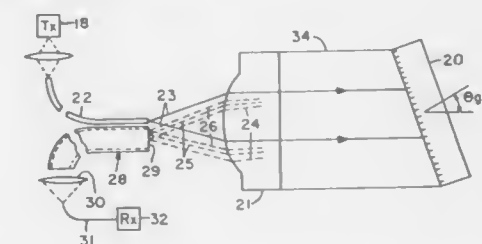
coating layer comprising a material having a compression modulus of elasticity of at least 5 kg/mm<sup>2</sup> but not exceeding 300 kg/mm<sup>2</sup>.

**4,953,946**  
**CABLES WITH LOW MS HEC WATER-BLOCKING MATERIAL**  
Serge Huybrechts, Doune, Great Britain, assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.  
PCT No. PCT/EP88/00159, § 371 Date Feb. 13, 1988, § 102(e) Date Feb. 13, 1988, PCT Pub. No. WO88/06741, PCT Pub. Date Sep. 7, 1988  
PCT Filed Mar. 3, 1988, Ser. No. 272,700  
Claims priority, application United Kingdom, Mar. 7, 1987, 8704938  
Int. Cl.<sup>5</sup> G02B 6/44; H02G 15/20  
U.S. Cl. 350—96.23 6 Claims



1. An electrical or fibre optic cable comprising one or more conductive filaments within a protective sheath and having a hydroxyethyl cellulose powder between the protective sheath and the filaments wherein the improvement comprises using hydroxyethyl cellulose which has a hydroxyethyl molar substitution, i.e. an MS value, of from about 0.7 to about 1.25 and has not been treated with glyoxal.

**4,953,947**  
**DISPERSION TRANSFORMER HAVING MULTICHANNEL FIBER**  
Venkata A. Bhagavatula, Big Flats, N.Y., assignor to Corning Incorporated, Corning, N.Y.  
Filed Aug. 8, 1986, Ser. No. 894,575  
Int. Cl.<sup>5</sup> G02B 6/22  
U.S. Cl. 350—96.33 8 Claims



1. An optical fiber transmission system dispersion transformer comprising  
a multimode optical waveguide having an input endface and an output endface, and  
means for dispersing a light beam into a plurality of spatially separated beams and for directing said beams onto a portion of said input endface,  
said multimode optical waveguide being characterized in that it comprises a plurality of light-conducting channels, adjacent ones of which are separated by cladding regions having refractive indices lower than those of said light conducting channels, said multimode optical waveguide



being a planar structure having a substrate on which there is disposed a plurality of light conducting laminae, adjacent ones of which are separated by a cladding lamina of lower refractive index than said light conducting laminae.

4,953,948

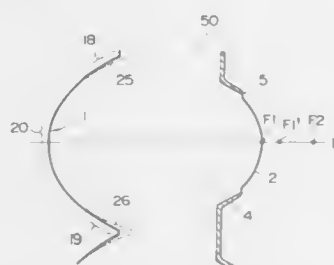
## REAR PROJECTION SCREEN

Akira Ito, Atsugi, and Mizuo Okada, Yokohama, both of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan  
Filed Jan. 9, 1989, Ser. No. 294,875

Claims priority, application Japan, Jan. 14, 1988, 63-4985  
Int. Cl.<sup>5</sup> G03B 21/60

U.S. Cl. 350—128

6 Claims



1. In a rear-projection screen having an entrance side and an exit side, said screen being formed with a plurality of entrance lenses on said entrance side each having a center portion and side portions at both sides of said center portion, and having a plurality of exit lenses corresponding to said entrance lenses formed on said exit side, and wherein light rays incident upon said entrance lenses are emitted from said exit lenses, the improvement wherein each of said entrance lenses has a cross-section defined by a line having a center part corresponding to said center portions and side parts corresponding to said side portions, said center part and said side parts of said line having respective light converging characteristics which are different from each other, wherein said center part of said line is defined by a secondary order algebraic curve, and wherein the inclination of said side parts of said line is more gentle than that of said center part.

4,953,949

## DEVICE FOR FORMING A PICTURE

William J. Dallas, Tucson, Ariz., assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 810,440, Dec. 17, 1985, abandoned.

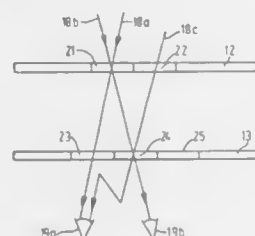
This application Apr. 28, 1989, Ser. No. 346,275

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1984, 3445973

Int. Cl.<sup>5</sup> G02B 27/22

U.S. Cl. 350—130

8 Claims



1. A device for forming a picture from picture elements too small to be resolved by human eyes at normal viewing distances comprising  
a first transparent constituent picture including a distributed plurality of adjacent first picture elements in a first plane,

each of said first picture elements being of a size too small to be resolved by human eyes at normal viewing distances, second transparent constituent picture disposed behind said first transparent constituent picture in a viewing direction but separated from said first transparent constituent picture by a small amount, said second transparent constituent picture including a distributed plurality of adjacent second picture elements in a second plane, each of said second picture elements also being of a size too small to be resolved by human eyes at normal viewing distances, and

a composite picture provided to said human eyes at said normal viewing distances from said first and second constituent pictures, said composite picture including a distributed plurality of third picture elements, said third picture elements having a transmittance equal to the product of the respective transmittance of said first and second picture elements forming said third picture elements, said composite picture having a transmittance equal to an average value of the products of transmittance of said first and second constituent pictures.

4,953,950

## APPARATUS FOR PRODUCING ULTRA-HIGH POWER ULTRA-HIGH DENSITY LASER BEAM

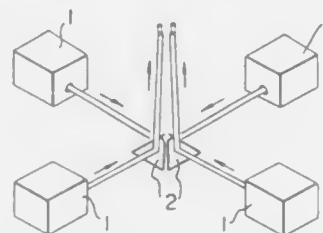
Yoshiaki Arata, 3-13-11, Mukonoso, Amagasaki-shi, Hyogo, and Tatsuharu Oda, 2-17-2, Shinsenri Minamimachi, Toyonaka-shi, Osaka, both of Japan

Filed Nov. 15, 1988, Ser. No. 271,270

Claims priority, application Japan, Apr. 30, 1987, 62-107675  
Int. Cl.<sup>5</sup> G02B 27/14, 17/06

U.S. Cl. 350—174

4 Claims



1. The apparatus for generating an ultra-high power, ultra-high density pseudo-single laser beam, comprising:  
a plurality of lasers arranged in a plane radially around a reference axis, each generating a laser beam toward the reference axis; and  
a plurality of directing mirrors arranged, in the same plane as said plurality of lasers, at such an angle with respect to said lasers as to converge reflected beams of said laser beams into a limited narrow space.

4,953,951

## METHOD FOR MAKING HOLOGRAMS WITH COHERENT RADIATION FROM A STABILIZED LASER DIODE THAT HAS BEEN ACTIVELY COOLED

Gail C. Gilbreath, Accokeek, Md., and Anne E. Clement, Birmingham, Mich., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
Filed Jan. 13, 1988, Ser. No. 143,492

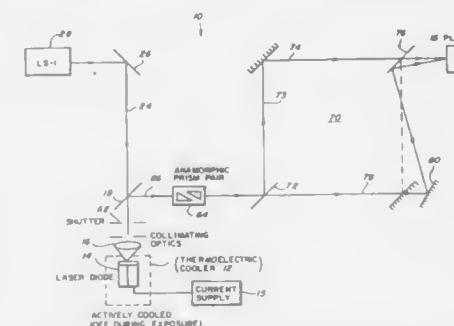
Int. Cl.<sup>5</sup> G03H 1/00

U.S. Cl. 350—320

12 Claims

1. A method for repeatedly constructing a viable hologram with good wavefront fidelity and high diffraction efficiency made with a mode stabilized laser diode by exposing a recording medium sensitive to infrared coherent radiation which is characteristic of laser diode emission, comprising the steps of:  
running an actively cooled laser diode at a specific current density for an interval prior to exposing a recording me-

dium to stabilize single-mode radiation from the diode and monitoring the diode's modal response indicating that the diode is producing a specific wavelength of coherent radiation as a result of being actively cooled immediately prior to exposure, and turning off said active cooling means and other sources of environmental instability; constructing an interference pattern from the coherent radi-



ation via an interferometer, and exposing a recording medium to the formed interference pattern for an interval of sufficient duration to form a hologram in the medium once the medium is developed, the interval being short enough that the intensity of the radiation incident on the medium does not suffer attenuation; and developing the exposed recording medium to form said hologram.

4,953,952

## COLOR LIQUID CRYSTAL DISPLAYING PANELS

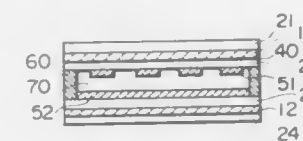
Takuzo Okumura, Tokyo; Toyokazu Okada; Hitoshi Kikui, both of Osaka, and Kazuo Nakata, Tokyo, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan  
Division of Ser. No. 858,727, May 2, 1986, abandoned. This application Jul. 7, 1988, Ser. No. 218,487

Claims priority, application Japan, May 2, 1985, 95103/85

Int. Cl.<sup>5</sup> G02F 1/133

U.S. Cl. 350—337

6 Claims



1. A color liquid crystal display panel comprising:  
a liquid crystal layer; and  
a first light-polarizing plate arranged on a first side of said liquid crystal layer, said first light-polarizing plate including layers in the following order: a first exterior protective film layer of non-rotatory polarization polymer, a first light-polarizing layer, a first color filter layer of three primary colors formed with pigments or dyes and having no polarizing layer, a second protective film layer comprising a non-rotatory polarization polymer having an outside surface upon which an inner surface of said first color filter layer is formed, and a first transparent conductive layer formed on the inside surface of said second protective film layer and being in contact with said liquid crystal layer; and  
a second light-polarizing plate arranged on a second side of said liquid crystal layer opposite to said first side, said second light-polarizing plate including layers in the following order: a third exterior protective film layer of non-rotatory polarization polymer, a second light-polarizing layer, a fourth protective film layer of non-rotatory polarization polymer and a second transparent conductive layer formed on an inside surface of said fourth protective

film layer and being in contact with said liquid crystal layer.

4,953,953

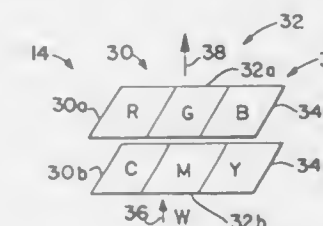
## COMPLEMENTARY COLOR LIQUID DISPLAY

James L. Ferguson, Atherton, Calif., assignor to Manchester R & D Partnership, Pepper Pike, Ohio  
Continuation of Ser. No. 358,574, May 26, 1989, which is a continuation of Ser. No. 942,517, Dec. 16, 1986, Pat. No. 4,834,508, which is a continuation-in-part of Ser. No. 707,486, Mar. 1, 1985, abandoned. This application Dec. 21, 1989, Ser. No. 456,060

Int. Cl.<sup>5</sup> G02F 1/13

U.S. Cl. 350—339 F

16 Claims



1. A method for producing a light output, comprising directing light to a plurality of color aligned in optical series, wherein a first one of such filters has one color characteristic and a second one of such filters has the complementary color characteristic, and controlling the amount of filtering by at least one of such filters, whereby such light output has characteristics that are a function of the filtering of both such first and second filters.

9. Apparatus for producing a light output, comprising means for directing light to a plurality of color filters aligned in optical series, said plurality of color filters including a first filter having one color characteristic and a second filter having the complementary color characteristic, and means for controlling the amount of filtering by at least one of said filters, whereby such light output has characteristics that are a function of the filtering of both said first and second filters.

4,953,954

## PHASE-CONJUGATE COMMUNICATION USING MUTUALLY INCOHERENT LASER BEAMS

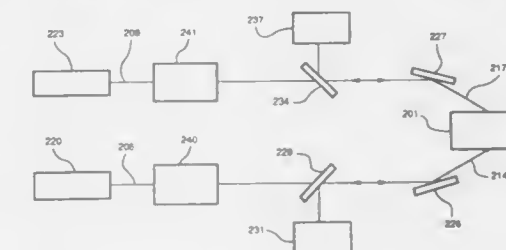
Mark D. Ewbank, Newbury Park; Tallis Y. Chang, Woodland Hills, and Jack L. Feinberg, Manhattan Beach, all of Calif., assignors to Rockwell International Corporation, Thousand Oaks, Calif.

Filed Feb. 10, 1989, Ser. No. 308,580

Int. Cl.<sup>5</sup> G07B 5/23; H04B 1/00; G02F 1/60

U.S. Cl. 350—354

30 Claims



1. A phase-conjugate optical communication system, comprising:  
a first source of coherent radiation for producing a first beam having a nominal wavelength  $\lambda$ ;

a first modulator for temporally modulating the first beam;  
a second source of coherent radiation, mutually incoherent with the first source, for producing a second beam having the nominal wavelength  $\lambda$ ;  
a second modulator for temporally modulating the second beam; and  
a mutually pumped phase conjugator, the conjugator being positioned such that the first and second beams fan in the conjugator and produce a set of shared fanning holograms, the holograms causing a third beam, which is the phase conjugate of the first beam and on which is imposed the temporal modulation of the second beam, to be diffracted in a direction opposite to the first beam and causing a fourth beam, which is the phase conjugate of the second beam and on which is imposed the temporal modulation of the first beam, to be diffracted in a direction opposite to the second beam.

4,953,955

## PHOTOVOLTAIC DRIVEN MULTIPLE QUANTUM WELL OPTICAL MODULATOR

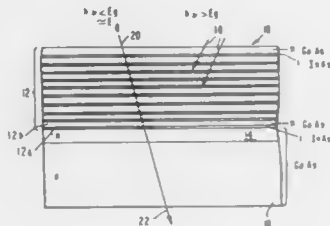
Joseph Maserjian, Goleta, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Continuation-in-part of Ser. No. 149,653, Jan. 28, 1988, Pat. No. 4,818,079, which is a division of Ser. No. 3,633, Jan. 15, 1987, abandoned. This application Jun. 10, 1988, Ser. No. 204,739

Int. Cl.<sup>5</sup> G02F 1/01

U.S. Cl. 350—354

18 Claims



1. An internally photovoltaically driven optical modulator comprising a multiple quantum well structure formed on a substrate layer of a first material, said multiple quantum well structure comprising a plurality of alternating layers of said first material and a second material, said first material having a bandgap greater than that of said second material, said layers of said first material each comprising a doped semiconductor provided with a selectively-doped profile across the thickness of each layer thereof and forming a plurality of space charge barriers having predetermined tunneling times by control of doping and thickness thereof and said second material comprising an undoped semiconductor.

4,953,956

## LIQUID PRISM DEVICE

David J. Carpenter, 3309 4th St., Boulder, Colo. 80302

Filed Jun. 10, 1988, Ser. No. 205,367

Int. Cl.<sup>5</sup> G02B 3/14, 5/04

U.S. Cl. 350—419

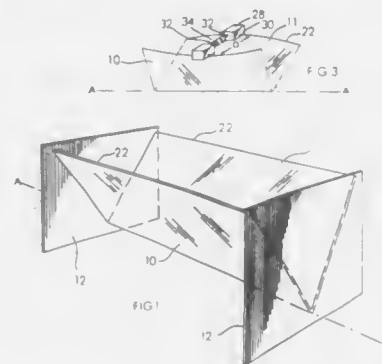
13 Claims

1. An apparatus for producing an effect on light passing through portions of the apparatus, comprising:

a container formed of a pair of rectangular plates joined along one longitudinal edge thereof to form an upright "V" shaped trough, said plates having their other longitudinal edges spaced to form the upper ends of the angularly spaced legs of the "V" shape, said plates each having at least a portion being translucent;

end cap means sealingly enclosing the end edges of the plates

to form a V shaped trough with its open side facing upwardly and ends enclosed so as to hold a fluid therein, said



end caps being rigid to hold the lateral edges at the ends of the plates in a fixed configuration.

4,953,957

## ZOOM LENS SYSTEM

Yuko Kobayashi, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 21, 1989, Ser. No. 326,633

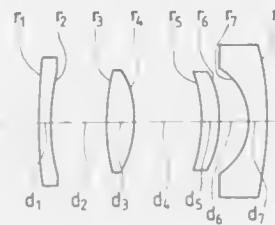
Claims priority, application Japan, Mar. 24, 1988, 63-70730

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> G02B 15/14, 9/58

U.S. Cl. 350—423

6 Claims



1. A zoom lens system comprising a lens group having positive refractive power and another lens group having negative refractive power, and so adapted as to perform variation of focal length by varying the airspace reserved between said lens groups, said lens group having the positive refractive power comprising at least one graded refractive index lens component having the shape of a negative meniscus lens and a refractive index distribution wherein refractive indices are lowered as the lens portions are farther from the optical axis in the direction perpendicular to the optical axis and, when the refractive index distribution of said graded refractive index lens is given by the following formula, said zoom lens system satisfying the following condition (1):

$$n(y)_d = N_{0d} + N_{1d}y^2 + N_{2d}y^4 + \dots$$

$$-12 < N_{1d}f_w^2 < -0.5$$

(1)

wherein the reference symbol  $y$  represents distance from the optical axis in the direction perpendicular to the optical axis, the reference symbol  $n(y)_d$  designates refractive index for the d-line at the distance  $y$ , the reference symbol  $N_{0d}$  denotes refractive index for the d-line on the optical axis, the reference symbol  $N_{1d}$ ,  $N_{2d}$ , ... represent the coefficients of refractive index distribution for the d-line, and the reference symbol  $f_w$  designates focal length of the zoom lens system as a whole at the wide position thereof.

4,953,958

## VARIABLE MAGNIFICATION DUPLICATOR LENS SYSTEM

Toshiaki Katsuma, and Nagayoshi Hirano, both of Omiya, Japan, assignors to Fujl Photo Optical Co., Ltd., Omiya, Japan

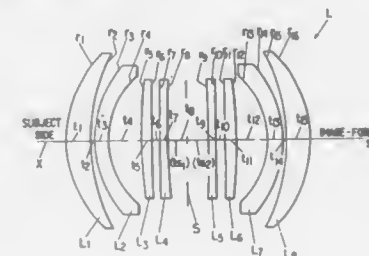
Filed Dec. 23, 1988, Ser. No. 289,379

Claims priority, application Japan, Jan. 14, 1988, 63-6623

Int. Cl.<sup>5</sup> G02B 15/00

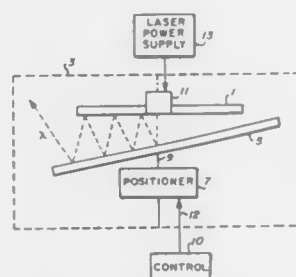
U.S. Cl. 350—425

5 Claims





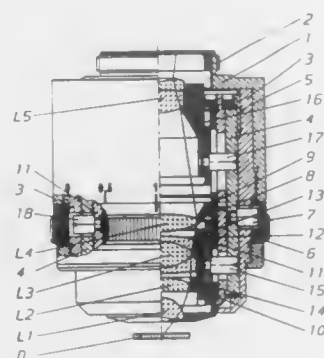
cated with one of said reflectors overlying the other to define a region therebetween with the respective electromagnetic energy reflecting surfaces facing one another to reflect electromagnetic energy therebetween; one of said electromagnetic energy reflecting surfaces being of a larger area than the other one of said surfaces and one of said surfaces being inclinable at an angle in three dimensions to the other to define a bisecting plane of symmetry with respect thereto, whereby said bisecting plane of symmetry may be selectively oriented in radial direction; control means coupled to one of said electromagnetic energy reflecting surfaces for selectively varying said angle of incline of said coupled surface relative to the other



electromagnetic energy reflecting surface and for radially positioning said bisecting plane of symmetry; and means for inputting an electromagnetic energy beam produced by said electromagnetic energy source into said region with said beam entering said region in a direction orthogonal to one of said electromagnetic energy reflecting surfaces and coaxial with said one surface; whereby said electromagnetic energy beam undergoes multiple reflections at the reflecting surfaces as the beam propagates in the region between said surfaces and exits from between said surfaces at an angle relative to the surface of the one of said electromagnetic energy reflecting surfaces having the greater size and at a radial direction determined by said control means.

**4,953,962**  
**MICROSCOPE OBJECTIVE FOR ACCOMMODATING DIFFERENT COVER-GLASS THICKNESSES**  
Karlheinz Esswein, and Ludwig Kummer, both of Aalen, Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heldenheim/Brenz, Fed. Rep. of Germany  
Filed Mar. 30, 1989, Ser. No. 331,683  
Claims priority, application Fed. Rep. of Germany, Apr. 16, 1988, 3812745

Int. Cl.<sup>5</sup> G02B 21/02, 11/30  
U.S. Cl. 350—507



1. In a microscope for observing objects covered by cover-

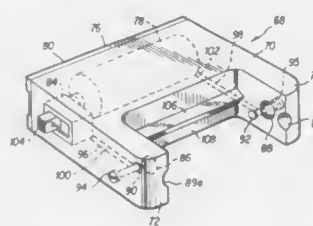
glasses of differing thicknesses, an objective having a linear magnification of between  $32\times$  and  $60\times$ , an aperture of at least 0.5, and an optical axis along which are aligned, in the order of light transmission, a stationary first lens (L1), a movable second lens (L2/L3), and a stationary third lens (L4), said microscope objective comprising:

- a movable fourth lens (L5) arranged beyond said third lens in said order of light transmission; and
- an adjusting device, selectively positionable in accordance with the thickness of the cover-glass covering an object being observed, for moving said second and fourth lenses to adjust the objective to compensate for said cover-glass thickness, the movement of said fourth lens being in a direction opposite to movement of said second lens.

**4,953,963**  
**AVIATOR'S NIGHT VISION SYSTEM**  
Alan K. Miller, 1220 Hubbell Dr., Virginia Beach, Va. 23454  
Filed Aug. 17, 1989, Ser. No. 394,875  
Int. Cl.<sup>5</sup> G02B 23/00

U.S. Cl. 350—547

7 Claims



1. In improved aviator's night vision system of the type comprising a night vision goggle assembly and a mount for removably attaching the aviator night vision goggle assembly to an aviator's helmet, said mount including a first goggle-assembly receptacle to be fixedly attached to the helmet for removably receiving a goggle assembly plug of the goggle assembly and holding the goggle assembly on said helmet until sufficient force is applied thereto to remove said goggle assembly from said helmet, said first goggle assembly receptacle and said goggle assembly plug respectively including first and second opposite engaging means for engaging one another to allow said goggle assembly to be repeatedly mounted on and removed from said helmet, said first goggle assembly receptacle and said goggle assembly plug further including respective first and second electrical contacts which are in engagement one with the other when said opposite engagement means are engaged, said mount further including a mount power pack including an electrical battery and electrical leads for being mounted on said helmet and supplying electrical energy from said battery to said electrical contact of said first goggle-assembly receptacle to supply energy to said goggle assembly when said goggle assembly is mounted on said helmet;

the improvement wherein is further included a small portable battery pack separate from said first goggle assembly receptacle and said goggle-assembly plug being attachable to said goggle-assembly plug, said portable battery pack comprising a portable battery pack housing for containing a battery with a second goggle assembly receptacle being rigidly affixed thereto, said second goggle assembly receptacle including the same type of engaging means and electrical contacts coupled to said battery as the first engaging means for engaging the second engaging means of said plug and said first contact means for contacting said second contact means of said plug;

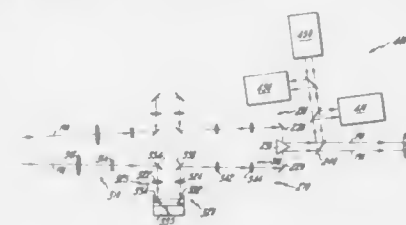
whereby, when said goggle assembly plug is removed from said first goggle-assembly receptacle of said mount so that said goggle assembly is not mounted on the helmet, said portable battery pack can be mounted on said goggle

assembly and said goggle assembly is thereby powered and can then be used for enhancing night vision.

**4,953,964**  
**PHASED ARRAY TELESCOPE**  
David Anafi, West Palm Beach, and Philip A. Slaymaker, Palm Beach Gardens, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.  
Filed Oct. 24, 1988, Ser. No. 263,435  
Int. Cl.<sup>5</sup> G02B 23/02, 26/06

U.S. Cl. 350—557

5 Claims

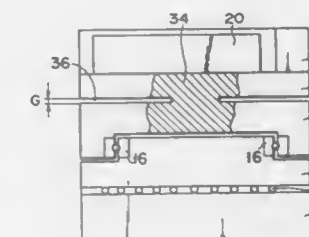


1. An optical telescope system for combining a plurality of telescope sub-images formed from a plurality of sub-beams from a plurality of optical telescopes to form a composite image of an object and comprising a plurality of telescopes, each having an object path length from an object to a first optical element and a telescope path length along a telescope axis from said first optical element to a common reference plane and an input aperture and an exit aperture of a sub-beam; in which system each optical telescope includes telescope path length control means to adjust said telescope path lengths of said plurality of optical telescopes such that each optical telescope delivers a telescope image to said reference plane in phase; and image combining means for combining said plurality of telescope images from said plurality of optical telescopes on a common image surface to form said composite image, characterized in that at least one telescope further includes:

- image relay means for relaying an image of said first optical element of said telescope to said common reference plane, said image relay means including at least one optical relay and at least one path length control module;
- beam displacement means for controlling a relative reference-plane transverse displacement from said telescope axis at said common reference plane of first and second sub-beams to have the same ratio to a corresponding relative input transverse displacement at said first optical elements of said telescopes of said first and second sub-beams as the ratio of corresponding diameters of said exit and input apertures of said first and second sub-beams, and;
- beam tilt means for directing said sub-beams on said common reference plane with a predetermined image tilt angle, said optical relay, control module and beam tilt means being disposed and adjusted to preserve Lagrange invariance between each of said telescope sub-images, whereby said sub-images combine to form said composite image.

**4,953,965**  
**HIGH-ACCURACY TRAVELLING TABLE APPARATUS**  
Akira Iwase, and Akira Suzuki, both of Shizuoka, Japan, assignors to Toshiba Machine Company, Ltd., Tokyo, Japan  
Continuation of Ser. No. 201,283, May 27, 1988, abandoned, which is a continuation of Ser. No. 945,855, Dec. 23, 1986, abandoned. This application Jan. 15, 1989, Ser. No. 368,150  
Claims priority, application Japan, Dec. 26, 1985, 60-291985; Dec. 26, 1985, 60-291986; Feb. 5, 1986, 61-15531[U]; Aug. 25, 1986, 61-129078[U]; Aug. 25, 1986, 61-129079[U]  
Int. Cl.<sup>5</sup> G02B 7/18; A47B 7/00  
U.S. Cl. 350—632

6 Claims



1. A high-accuracy travelling table apparatus comprising:
  - a base;
  - a first table mounted on said base for movement relative thereto in a first direction;
  - at least two guide ways mounted on said first table and extending in a second direction, said second direction being perpendicular to said first direction;
  - a second table mounted on said at least two guide ways for movement in said second direction, said second table being preloaded in said first direction relative to said at least two guide ways and said second table having a planar upper surface;
  - a mount having an upper surface and a planar lower surface that is parallel to said planar upper surface of said second table, said mount being a little thinner than said second table;
  - a partial coupling portion extending from a central portion of said planar upper surface of said second table to a central portion of said planar lower surface of said mount, said partial coupling portion providing the sole support for said mount and the length of said partial coupling portion being small relative to the thickness of said mount, whereby said planar lower surface of said mount and said planar upper surface of said second table are separated by a gap the thickness of which is nominally equal to the length of said partial coupling portion, and the thickness of said gap is small relative to the dimensions of said partial coupling portion perpendicular to said gap;
  - a workpiece fixing means mounted on said upper surface of said mount; and
  - a laser mirror mounted on said upper surface of said mount.

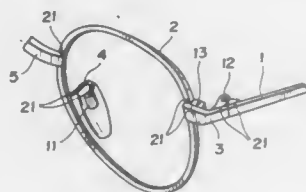
**4,953,966**  
**SPECTACLE FRAME**  
Kazuo Segoshi, Toshlyuki Okuda, Kenji Okamura, and Mizuo Yoshida, all of Fukui, Japan, assignors to Sigma Co., Ltd., Fukui, Japan  
Filed Jan. 6, 1989, Ser. No. 294,192  
Int. Cl.<sup>5</sup> G02C 1/00

U.S. Cl. 351—41

3 Claims

1. A spectacle frame comprising:
  - a face-contacting portion formed of a shape memory alloy; a lens-fixing portion formed of a shape memory alloy; and a connecting member formed of a  $\beta$ -phase titanium alloy

connecting said face-contacting portion and said lens-fixing portion with each other.



said face-contacting portion and said lens-fixing portion being soldered to said connecting member with a palladium based soldering material.

4,953,967

## NASION-SECURED SPORT GLASSES

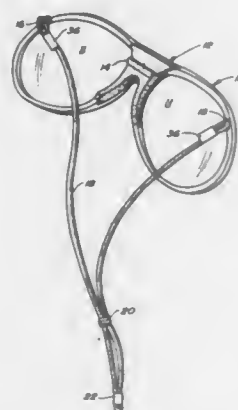
Walter D. Somerville, P.O. Box 223254, Carmel, Calif. 93922

Filed May 31, 1989, Ser. No. 359,706

Int. Cl.<sup>5</sup> G02C 5/12

U.S. Cl. 351—136

8 Claims



1. An ophthalmic device, comprising:  
at least one lens,  
mounting means for holding said lens in front of the eyes of a wearer,  
a nose rest attached to a rear side of said mounting means facing said wearer,  
said nose rest made of a material having at least a small amount of flexibility, said nose rest having a configuration comprising an essentially flat forehead rest, a nasion protrusion below said forehead rest sized and shaped to mate with a human nasion, said nasion protrusion extending rearwardly from said flat forehead rest, and two legs sized and shaped to straddle a human nose bridge below said nasion protrusion, and  
holding means for urging said nasion protrusion into said nasion when said ophthalmic device is held by said mounting means in front of said eyes of said wearer, said holding means lying in a horizontal plane substantially aligned with said nasion protrusion, thereby to urge said nasion protrusion directly into said nasion and hence securely hold said ophthalmic device upon said wearer's face.

4,953,968

## AUTOMATED VISUAL ASSESSMENT SYSTEM WITH STEADY VISUAL EVOKED POTENTIAL STIMULATOR AND PRODUCT DETECTOR

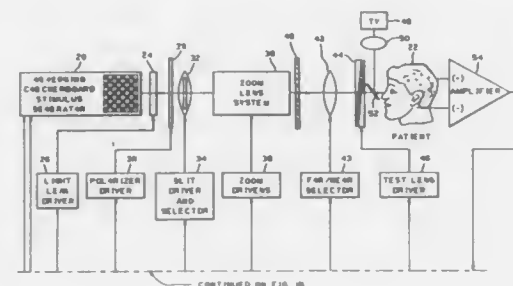
Gary W. Sherwin, Yukon; Lewis F. Hanes, Pittsburgh, and Albert L. Schmidt, Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 893,758, Aug. 6, 1986, Pat. No. 4,861,154. This application Mar. 22, 1989, Ser. No. 327,046

Int. Cl.<sup>5</sup> A61B 3/10

U.S. Cl. 351—211

10 Claims



1. A method of testing a patient's vision, comprising the steps of:

- stimulating a patient's visual system with a test image at a stimulus frequency during one of a selected one of refractometry, acuity, astigmatism, contrast and color vision tests;
- detecting evoked potentials produced by the test image in the patient's brain at the stimulus frequency during the selected test;
- analyzing the evoked potentials produced by the patient during the selected test and displaying the results of the selected test; and
- providing a reference image to the patient and having the patient focus on said reference image during the selected test to prevent eye drift.

4,953,969

## DEVICE FOR CORRECTING OCULAR REFRACTION ANOMALIES

Svyatoslav N. Fedorov, pereulok Dostoerskogo, 1/21, kv.32., Moscow, U.S.S.R.

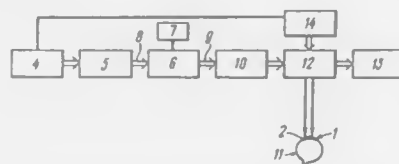
Filed Jul. 11, 1989, Ser. No. 378,030

Claims priority, application U.S.S.R., Jul. 11, 1988, 4457772

Int. Cl.<sup>5</sup> A61B 3/10

U.S. Cl. 351—221

29 Claims



26. A device for correcting ocular refraction anomalies, comprising:  
an ultraviolet pulsed laser operating at a wavelength of 223 nm;  
a uniform light beam former optically connected with said pulsed laser;  
a slotted mask optically connected with said uniform light beam former from which a uniform light beam is projected on said slotted mask and having at least two slots, each of which is shaped as a lobe;  
a drive for rotating said slotted mask providing for uniform

axisymmetric distribution of ultraviolet radiation over the exposed surface of the cornea;  
a means for forming an image of said slotted mask on the corneal surface, said means for forming the image on the corneal surface, positioned at the same optical axis with said slotted mask and having an optical outlet;  
a unit to monitor energy density of ultraviolet radiation incident on the corneal surface arranged at said optical outlet of said means for forming the image; a microscope to observe the emission of ultraviolet radiation to the surface of the cornea and the correction process, said microscope being optically connected with said slotted mask image former.

4,953,970

## SELF EXAMINATION DEVICE

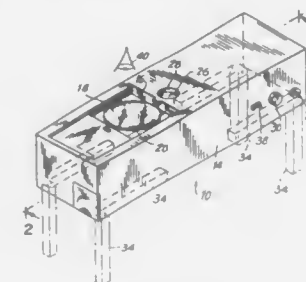
Arthur Telchin, 160 E. 48th St., New York, N.Y. 10028

Filed May 15, 1989, Ser. No. 352,066

Int. Cl.<sup>5</sup> A61B 3/02

U.S. Cl. 351—223

9 Claims



1. An eye self-examination device for a user comprising a device housing, means for providing a light source, means for adjusting the intensity of the light source by said user, without replacement thereof, and a power supply therefor within said housing for emitting light outside of said housing, an objective lens proximate said light source, a separate reflecting device immediately beneath said objective lens for reflecting an image of an eye from without said housing, through said objective lens, the reflection of said image following a path through said objective lens.

4,953,971

## INTERACTIVE IMAGE PROJECTION APPARATUS

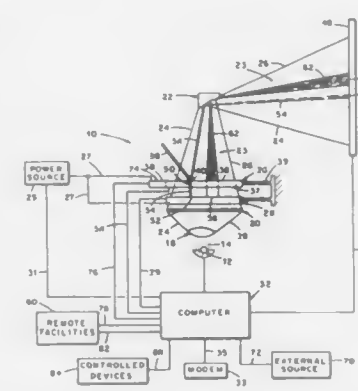
Robert R. Highfill, 114 Norway Ln., Oak Ridge, Tenn. 37830

Filed Oct. 17, 1988, Ser. No. 258,605

Int. Cl.<sup>5</sup> G03B 21/00

U.S. Cl. 353—122

13 Claims



1. An interactive image projection apparatus for the presentation of computer generated images on a projection surface in

cooperation with a light source and projection optics for projecting a beam of light from the light source onto the projection surface, comprising:

a substantially transparent image display device for interacting with a computer that generates and sends image-defining signals to the image display device and including means for receiving the image-defining signals from the computer and for producing an image based on said image-defining signals, said image display device being disposed in the beam of light so that the image produced by said image display device is projected onto the projection surface in the beam of light; and

a touch screen for interacting with the computer, at least a portion of said touch screen being substantially transparent and disposed in the beam of light between the display device and the projection surface so that the beam of light passes in sequence through the display device and the touch screen on its way to the projection screen, said touch screen including means for generating a signal when touched and sending the touch-generated signal to the computer for use as input information at the computer so that upon receiving the touch-generated signals, the computer modifies the image produced by the image display device in accordance with the touch-generated signals; and

said touch screen being arranged in close physical proximity to the display device to render the touch screen/image display device arrangement relatively compact.

4,953,972

## RANGE DISPERSION SENSOR

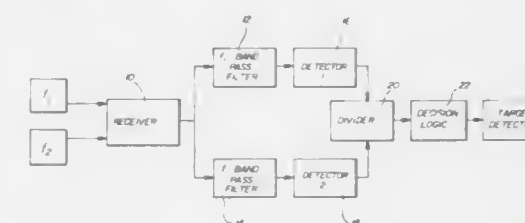
David M. Zuk, Ann Arbor, Mich., assignor to Environmental Research Institute of Michigan, Ann Arbor, Mich.

Filed Dec. 27, 1988, Ser. No. 290,754

Int. Cl.<sup>5</sup> G01C 3/08

U.S. Cl. 356—4

25 Claims



1. A range dispersion sensor comprising:  
a source operative to provide an output beam of electromagnetic energy;  
a modulator associated with the source and operative in conjunction therewith to modulate the output beam at a first frequency "f<sub>1</sub>" with a second frequency "f<sub>2</sub>";  
means for directing said beam of electromagnetic energy onto a target zone for reflection therefrom;  
means for detecting the reflected energy and providing a first detector signal corresponding to detected energy modulated at f<sub>1</sub> and a second detector signal corresponding to detected energy modulated at f<sub>2</sub>;  
and processing means for receiving and comparing said first and second detector signals and providing an output signal corresponding to the ratio thereof said output signal indicative of the range dispersion of said target zone.



4,953,973

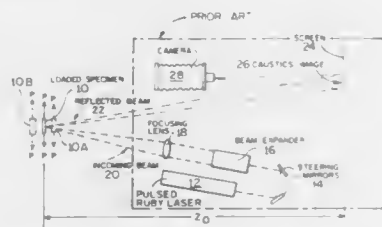
**DETECTION OF COMPRESSIVE RESIDUAL STRESSES USING THE METHOD OF CAUSTICS**

Basil P. Leftheris, Huntington, and Robert C. Schwarz, Dix Hills, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed May 16, 1989, Ser. No. 352,305  
Int. Cl.<sup>3</sup> G01B 11/16

U.S. Cl. 356—32

6 Claims



1. A method for detecting the residual stress around a hole formed in a metal sheet specimen, the method comprising the steps of:

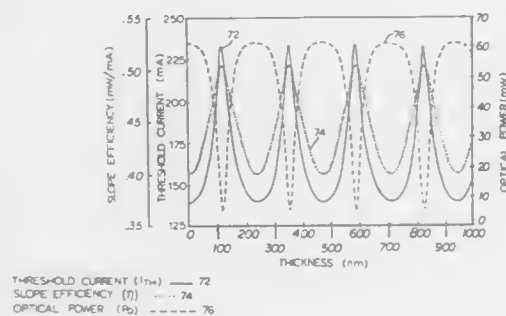
- loading the specimen with a preselected force;
  - directing an incoming laser beam toward the hole in the specimen at a focal point aligned with the hole and immediately outside the specimen;
  - directing a beam reflected from the specimen toward a screen so that a caustic image is displayed thereon; and
  - photographing the resulting caustic image on the screen, the image including a caustic tail related in length to a crack tail extending between the hole and a crack tip, in a generally radially outward direction;
- wherein the geometry of the image is indicative of the residual stress in the vicinity of the hole.

4,953,974

**OPTICAL MEASUREMENT OF THIN FILMS**  
William J. Fritz, Florissant, Mo., assignor to McDonnell Douglas Corporation, Long Beach, Calif.Filed Dec. 19, 1988, Ser. No. 286,297  
Int. Cl.<sup>3</sup> G01N 21/41, 21/59; G01B 11/06

U.S. Cl. 356—128

6 Claims



1. A method to measure a property of a thin film of a fluid in real time comprising:

- confining the fluid within an optically thin cavity of known thickness adjacent one output facet of an injection laser diode having certain operating parameters and material characteristics wherein the output from the facet passes through the cavity and illuminates associated photodetector means such that any solid wall acting to confine the fluid is optically transparent and has a thickness which is an even number of quarter wavelengths of the laser output beam passing therethrough,

measuring the output power of the injection laser diode with the photodetector means, and

calculating the property of the thin film of a fluid as a function of the measured output power and the operating parameters and the material characteristics of the laser diode.

4,953,975

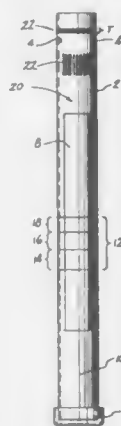
**CORRECTION OF MATERIAL LAYER VOLUME MEASUREMENTS**

Robert A. Levine, 31 Pilgrim La., Guilford, Conn. 06437, and Stephen C. Wardlaw, 191 N. Cove Rd., Old Saybrook, Conn. 06475

Filed Jan. 30, 1989, Ser. No. 303,125  
Int. Cl.<sup>3</sup> G01N 21/07

U.S. Cl. 356—246

8 Claims



1. A material sampling assembly comprising: a transparent tube for holding a material sampling to be separated by centrifugation; a cylindrical float for placement in the tube when the sample is centrifuged; and means printed on the tube or float which provides an indication of the ratio of the square of the tube bore radius to the difference between the squares of the tube bore radius and the float radius.

4,953,976

**GAS SPECIES MONITOR SYSTEM**

Steven Adler-Golden, Newtonville; Neil Goldstein, Medford, and Fritz Bien, Concord, all of Mass., assignors to Spectral Sciences, Inc., Burlington, Mass.

Filed Mar. 20, 1989, Ser. No. 325,981  
Int. Cl.<sup>3</sup> G01J 3/44; G01N 21/65

U.S. Cl. 356—301

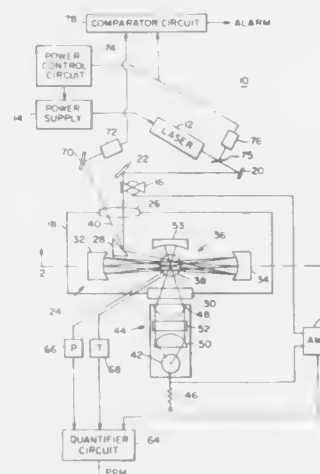
6 Claims

1. A gas species monitor system comprising:

- a sample volume for receiving a gas to be monitored;
- an external, independent laser source;
- means for directing the laser radiation to said volume;
- a multipass optical cell, responsive to said means for directing, for multiplying the laser radiation intensity in the sample volume;
- means for sensing the intensities of the laser radiation at said laser source and in said multipass optical cell after the beam of laser radiation has made predetermined number of reflections in said multipass optical cell through said sample volume;
- means for comparing said intensities of the laser radiation at said laser source and in said multipass cell to determine whether a system fault is present;
- means, responsive to said means for sensing, for controlling the power output of said laser source to maintain a predetermined value of power output;
- means for continuously flowing the gas to be monitored through the sample volume;

a narrow bandpass filter;

means for collecting more than a steradian of Raman scattered radiation from the sample in the volume and directing the collected radiation in parallel through said narrow bandpass filter; and



means, responsive to the parallel radiation from the filter, for detecting and quantifying scattered radiation representative of the concentration of the species in the gas sample being monitored.

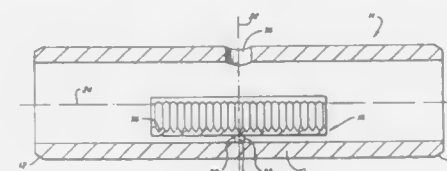
4,953,977

**ELECTROTHERMAL ATOMIZATION FURNACE**  
Rolf Tamm, Salem, Fed. Rep. of Germany, assignor to Bodenseewerk Perkin-Elmer & Co., GmbH, Überlingen, Fed. Rep. of GermanyFiled Dec. 16, 1988, Ser. No. 285,884  
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1987, 3743286

U.S. Cl. 356—312

Int. Cl.<sup>3</sup> G01N 21/74

19 Claims



1. An electrothermal atomization furnace comprising:

- a tubular electrothermal furnace body adapted for passing a radiation beam therethrough, said furnace body having a centrally positioned lateral inlet aperture,
- means for passing an electrical current through said furnace body to heat said furnace body sufficient to atomize a sample on a platform within said furnace body,
- an elongated sample platform having a sample holding recess and being positioned centrally within said furnace body opposite said inlet aperture and integrally connected to said furnace body,
- web means for integrally connecting said platform to said furnace body, said web means being configured and positioned to maintain a substantially uniform electrical potential thereacross to substantially prevent a heat-generating current flow through said platform when current flows through said furnace body and to sufficiently impede heat conduction from said furnace body to said platform so that sample on said platform is thermally atomized substantially by radiation from said furnace body,
- said furnace body having a longitudinally axis and a longitu-

4,953,978

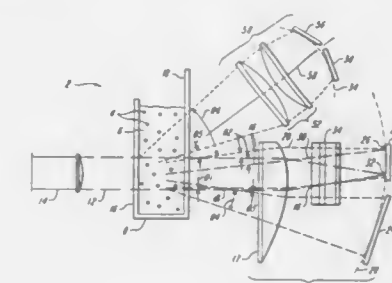
**PARTICLE SIZE ANALYSIS UTILIZING POLARIZATION INTENSITY DIFFERENTIAL SCATTERING**

Steven E. Bott, Conway, and W. Howard Hart, Amherst, both of Mass., assignors to Coulter Electronics of New England, Inc., Amherst, Mass.

Filed Mar. 3, 1989, Ser. No. 319,480  
Int. Cl.<sup>3</sup> G01N 15/02, 21/53

U.S. Cl. 356—336

5 Claims



1. A system for measuring the size of particles suspended in a sample cell, comprising

- illumination means for illuminating the sample cell along a first interrogating axis with one or more interrogating light beams, each characterized by a selected wavelength and including at least a first interrogating component having a polarization parallel to a scattering plane and a second interrogating component having a polarization perpendicular to said scattering plane,
- photodetector means for detecting light scattered by said suspended particles for at least one selected wavelength and in a scattering plane at at least two selected scattering angles,
- said photodetector means including means for generating a first intensity signal representative of an intensity of scat-

tered light corresponding to said first interrogating component, said photodetector means including means for generating a second intensity signal representative of an intensity of scattered light corresponding to said second interrogating component, and intensity differential processing means, coupled to said photodetector means, for generating a signal representative of the particle size distribution in said sample cell for at least one selected wavelength, said intensity differential processing means including means for generating a difference signal representative of the difference of said first and second intensity signals, said intensity differential processing means including calculation means for generating a resultant signal representative of a selected arithmetic transformation of said difference signal.

**4,953,979**  
**OPTICAL SYSTEM FOR SIGNAL LIGHT DETECTION IN A FLOW PARTICLE ANALYSIS APPARATUS**  
Shinichi Hirako, Kyoto, Japan, assignor to Omron Tateisi Electronics Company, Kyoto, Japan  
Filed Nov. 15, 1988, Ser. No. 271,575  
Claims priority, application Japan, Nov. 18, 1987, 62-291465  
Int. Cl.<sup>5</sup> G01N 21/53  
U.S. Cl. 356—338 5 Claims

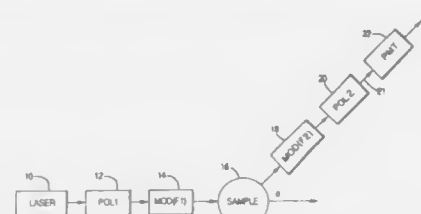


1. An optical system for signal light detection of a flow particle comprising:  
means for directing light onto flow particles flowing in a flow cell; a condenser lens for condensing signal light emitted from the flow particles, a photodetector for receiving signal light exiting from said condenser lens, an aperture provided between said condenser lens and said photodetector for removing undesired light, and a convergence-type collimating lens provided between said aperture and said photodetector, said aperture being disposed at a front focal position of said convergence-type collimating lens, and an exit pupil of said condenser lens and a photosensitive surface of said photodetector being located respectively at conjugate points of said convergence-type collimating lens, whereby the photosensitive surface of said photodetector is located at the image of said exit pupil.

**4,953,980**  
**PARTICLE IDENTIFYING APPARATUS**  
Burton DeVolk, Albuquerque; Fritz Allen, Corrales; Cathy D. Newman, and Robert J. Fraatz, both of Albuquerque, all of N. Mex., assignors to Mesa Diagnostics, Inc., Albuquerque, N. Mex.  
Filed Aug. 5, 1988, Ser. No. 228,741  
Int. Cl.<sup>5</sup> G01N 21/21, 21/49  
U.S. Cl. 356—338 10 Claims

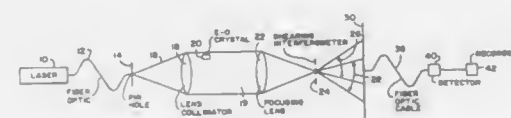
1. In apparatus for identifying a particulate substance in suspension based on the radiation scattering behavior of the substance, which apparatus includes means for generating a collimated beam of substantially monochromatic radiation which is linearly polarized along a first polarization axis transverse to the beam axis, first modulation means disposed in the path of the linearly polarized beam for effecting polarization modulation of the linearly polarized beam about a first dynamic axis at a first modulation frequency; means for holding a sample of the particulate substance in the path of the modu-

lated beam emerging from said first modulation means so that radiation is scattered by the substance in a scattering plane, second modulation means disposed in the scattering plane for receiving radiation scattered by the sample and effecting polarization modulation of the scattered radiation about a second dynamic axis at a second modulation frequency; polarizing means disposed in the scattering plane for receiving scattered radiation from said second modulation means and having a second polarization axis for passing that portion of the scattered radiation which is parallel to the second polarization axis; detector means connected to receive radiation passed by said polarizing means and to produce a signal corresponding to the intensity of that radiation; and signal processing means connected to receive the signal for producing an indication of the



intensity of the radiation received by the detector means at frequencies corresponding to selected elements of a Mueller matrix which characterizes the radiation scattering properties of the substance, the Mueller matrix being a  $4 \times 4$  matrix composed of element  $f_{ij}$ , where  $i$  is the row number and  $j$  is the column number of each element, the improvement wherein aid signal processing means are operative for only deriving indications: of the intensity of the received radiation corresponding to element  $f_{11}$  of the Mueller matrix; and of three selected frequency components of the received radiation, which components have amplitudes corresponding to elements  $f_{12}$ ,  $f_{34}$  and  $f_{44}$  of the Mueller matrix, and said polarization axes and dynamic axes are oriented for causing the radiation arriving at said detector means to contain said selected frequency components.

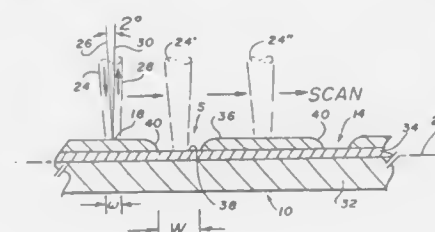
**4,953,981**  
**LATERAL-SHEARING ELECTRO-OPTIC FIELD SENSOR**  
Walter L. Hales, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.  
Filed Aug. 3, 1989, Ser. No. 389,136  
Int. Cl.<sup>5</sup> G01B 9/02  
U.S. Cl. 356—353 3 Claims



1. A lateral-shearing electro-optic field sensor comprising a coherent light source, means for diffracting said light into a spacially coherent beam, a collimating lens mounted for receiving said spacially coherent beam and converting said beam to an emerging collimating beam, an electro-optic crystal mounted in a minor portion of said collimated beam, a focusing lens mounted at a distance greater than its focal length from said electro-optic crystal, said focusing lens focusing said collimated beam to a point focus, a lateral-shearing interferometer mounted at said focus point and producing an amplitude division of the focused light at said focus point to produce two overlapping beams that propagate at slightly different angles, and presenting said two overlapping beams on an image plane

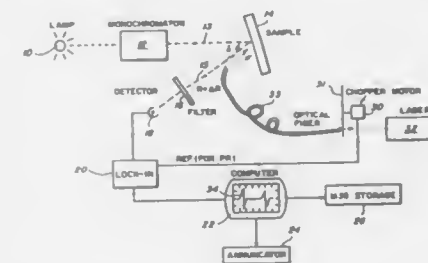
that is positioned such that it and said electro-optic crystal are at conjugate foci of said focusing lens.

**4,953,982**  
**METHOD AND APPARATUS FOR ENDPOINT DETECTION IN A SEMICONDUCTOR WAFER ETCHING SYSTEM**  
Peter Ebbing, Los Altos, and Manoocher Birang, both of Santa Clara, Calif., assignors to Applied Materials, Inc., Santa Clara, Calif.  
Filed Jul. 20, 1988, Ser. No. 221,979  
Int. Cl.<sup>5</sup> G01B 9/02  
U.S. Cl. 356—357 16 Claims



1. A method for endpoint detection in a semiconductor wafer etching system comprising the steps of:  
making multiple scans of a semiconductor wafer surface along a substantially identical path with a narrowly focused beam of radiant energy and detecting a reflected portion of said beam;  
firstly analyzing said reflected portion to determine a preferred parking spot on a preferred flat area of said surface, said preferred flat area having a minimum transverse dimension greater than a spot size of said beam, said step of firstly analyzing said reflected portion including analyzing a region of a first scan and a corresponding region of a second scan;  
parking said beam at said preferred spot; and  
secondly analyzing said reflected portion of said beam to determine when said preferred flat area has been etched through.

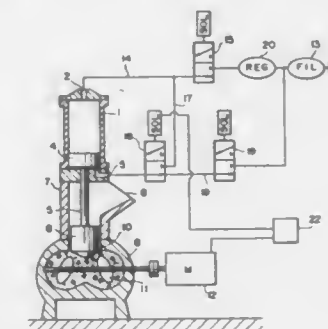
**4,953,983**  
**NON-DESTRUCTIVELY MEASURING LOCAL CARRIER CONCENTRATION AND GAP ENERGY IN A SEMICONDUCTOR**  
Nicholas Bottka, 5642 Mt. Burnside, Burke, Va. 22015; D. Kurt Gaskill, 3187 Lawson Hill Pl., Alexandria, Va. 22310, and Robert Glosser, 2909 Deep Valley Trail, Plano, Tex. 75075  
Filed Mar. 25, 1988, Ser. No. 172,921  
Int. Cl.<sup>5</sup> G01N 21/55, 21/84  
U.S. Cl. 356—445 14 Claims



1. A method for measuring local carrier concentration in a preselected portion of a semiconductor, said method comprising steps for:  
illuminating said preselected portion of said semiconductor

with a substantially monochromatic light of a preselected photon energy;  
measuring change in photo reflectance of said portion of said semiconductor responsive to said illuminating by said light of said preselected photon energy;  
recording said change in photo reflectance;  
repeating said steps for illuminating, measuring, and recording, each said repeating of said steps for illuminating, measuring, and recording being done with a substantially monochromatic light of a different preselected photon energy;  
said repeating of said steps being done a sufficient number of times to permit location of at least two Franz-Keldysh peaks, and identification of the respective photon energies and peak indices  $n$  corresponding to each of said at least two Franz-Keldysh peaks;  
recording each of said respective photon energies and peak indices  $n$ ;  
using said each of said respective photon energies and peak indices  $n$  to calculate said local carrier concentration.

**4,953,984**  
**OVERLOAD PREVENTING SYSTEM FOR KNEADING MACHINE**  
Tsuyoshi Miyoshi, Akashi, Japan, assignor to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan  
Filed Jul. 24, 1989, Ser. No. 383,623  
Int. Cl.<sup>5</sup> B29B 1/06  
U.S. Cl. 366—76 6 Claims

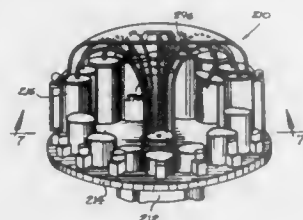


1. In a kneading machine having a cylinder provided in upper and lower positions with upper and lower ports for inflow and outflow of compressed fluid, a piston slidably fitted in the cylinder and having a weight connected to the underside thereof, a case on which is erected the cylinder in a position where an upper opening of said case is closed and opened by said weight, and kneader blades disposed within said case, an overload preventing system including:  
an upper pipe extending from said upper port to a compressed fluid feed source, said upper pipe having means for selectively cutting off communication between said upper port and said compressed fluid feed source, said upper pipe also having means for selectively opening said upper port to the atmosphere;  
a lower pipe extending from said lower port to a compressed fluid feed source, said lower pipe having means for selectively cutting off communication between said lower port and said compressed fluid feed source, said lower pipe also having means for selectively opening said lower port to the atmosphere;  
connecting means for selectively connecting said upper port to said lower port such that compressed fluid in said upper port can flow into said lower port;  
means for detecting a load imposed on a drive means for driving said kneader blades; and  
means for operating said connecting means for selectively connecting said upper port to said lower port in accor-



dance with the load detected by said load detecting means, whereby compressed fluid can be transferred from said upper port to said lower port when an overload is detected so that a force applied by said weight to said casing is reduced.

**4,953,985**  
**MIXING STRUCTURE FOR PAINT COLORANT IN A DISPENSING APPARATUS**  
William A. Miller, Buffalo Grove, Ill., assignor to Fluid Management Limited Partnership, Wheeling, Ill.  
Filed Jul. 17, 1989, Ser. No. 381,046  
Int. Cl.<sup>5</sup> B01F 7/16  
U.S. Cl. 366—244



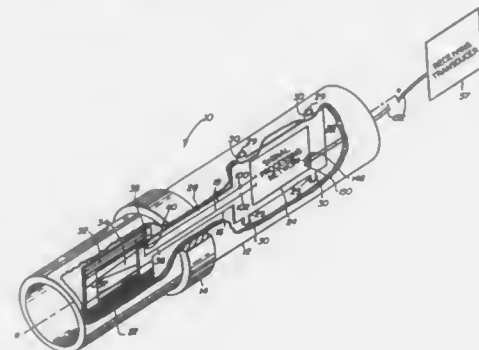
1. In a paint colorant dispenser and mixer apparatus including a plurality of colorant containers each having an open upper end, means for mounting an agitator for rotation within each colorant container for mixing colorant therein, a plurality of agitator drive cables each having a drive end and a driven end, and drive means for rotating the driven ends of the cables to thereby effect rotation of the drive ends of the cables, the improvement comprising:

- a plurality of container covers to close the open ends of the containers;
- joining means on each cover and container for releasably joining the covers to the containers;
- rotatable coupling means carried on the covers for releasably engaging the agitator within a container enclosed by the cover and for disengaging the agitator when the cover is withdrawn from said container, and said rotatable coupling means further comprising connector means for connecting the drive ends of the cables to the rotatable coupling means on the covers to impart rotation to the rotatable coupling means; and
- biasing means for biasing the covers against the containers to maintain the closure thereof and to maintain engagement of the rotatable coupling means with their associated agitators when said agitators are rotatably driven within said containers.

**4,953,986**  
**AIR/SEA TEMPERATURE PROBE**  
Jack R. Olson; Herbert V. Hittney, both of San Diego; Richard A. Paulus, La Mesa, and Kenneth D. Anderson, Lemon Grove, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
Filed Apr. 27, 1989, Ser. No. 348,740  
Int. Cl.<sup>5</sup> G01K 13/00, 1/14  
U.S. Cl. 374—136

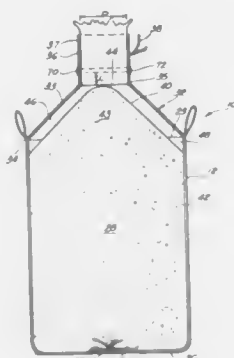
1. A probe for measuring the temperatures of air and water at the air/sea interface, comprising:  
a tubular, electrically nonconductive, solar radiation shield having first and second open ends for permitting said air and water to flow therethrough;

first means positioned within said shield for detecting said temperatures; and



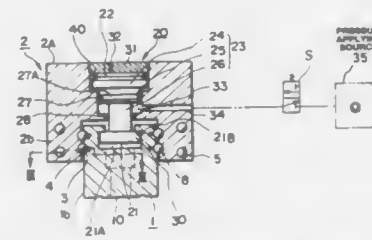
second means operably coupled to said first means and mounted to said shield for providing a first output functionally related to said detected temperatures.

**4,953,987**  
**CONE TOP TO FLAT TOP FABRIC TRANSPORT BAG**  
Daniel R. Schnaars, 204 "A" Easy St., Lafayette, La. 70506  
Filed Dec. 6, 1988, Ser. No. 287,262  
Int. Cl.<sup>5</sup> B65D 33/16  
U.S. Cl. 383—67



1. A fabric bag for storage of dry bulk material, the bag comprising:
- (a) four side walls, and a bottom portion, for defining a bulk containing space therewithin;
  - (b) a top portion, secured to the four side walls, the top portion forming a truncated cone;
  - (c) an inlet spout secured to an upper end of the truncated cone, the inlet spout having a diameter (D) and defining an opening for introducing bulk into the bulk containing space of the bag;
  - (d) a channel formed along an outer peripheral wall of the inlet spout, the channel positioned a distance above a point of contact between the inlet spout and the upper end of the truncated cone which is less than half the diameter (D) of the inlet spout; and
  - (e) a tie cord secured within the channel, so that constriction of the tie cord to form an iris closure of the inlet spout also draws fabric of the truncated cone inwardly so that when the bag is filled with bulk the truncated cone is laid substantially flat against the bulk upon full closure of the inlet spout.

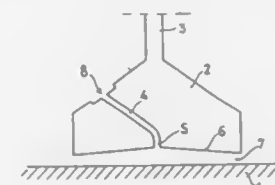
**4,953,988**  
**LINEAR GUIDE APPARATUS WITH CLAMP DEVICE**  
Toru Tanaka, Gumma, Japan, assignor to Nippon Selko Kabushiki Kaisha, Tokyo, Japan  
Filed Nov. 7, 1989, Ser. No. 432,481  
Claims priority, application Japan, Nov. 9, 1988, 63-146086[U]  
Int. Cl.<sup>5</sup> F16C 29/06  
U.S. Cl. 384—8



1. In a linear guide apparatus with a clamp device comprising an axially extended guide rail having a square cross section and rolling member rolling grooves respectively formed in both lateral side surfaces, a slider movably and straddlingly mounted on said guide rail and having rolling member rolling grooves respectively formed in the inner surfaces of both side walls to respectively oppose the rolling member rolling grooves of said guide rail, and a plurality of rolling members rollably inserted in opposing ones of the rolling member rolling grooves of said guide rail and said slider, the improvement comprising:

- a groove formed in an upper surface of said guide rail extending over the whole length thereof;
- a cylinder bore formed in said slider extending upwardly from an inner surface to oppose said groove in said guide rail;
- a top and a piston integrally formed together, said top engaging said groove of said guide rail and prevented from slipping out of said groove, said piston engaging said cylinder bore;
- elastic energizing means for energizing said piston in a non-clamp direction to separate said top from a groove surface of said groove of said guide rail and to bring said guide rail and said slider into a non-clamp condition; and
- fluid pressure applying means for applying a fluid pressure to said piston to energize said piston in a clamp direction against said elastic energizing means to make said top held by the groove surface of said groove of said slider in a clamp condition.

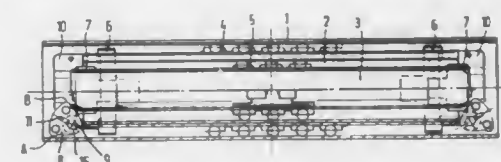
**4,953,989**  
**GAS BEARING PART, AND DEVICE PROVIDED WITH SUCH A GAS BEARING PART**  
Carel W. J. Hooykaas, Rotterdam, Netherlands, assignor to Pelt & Hooykaas B.V., Rotterdam, Netherlands  
Filed Jan. 26, 1989, Ser. No. 302,570  
Claims priority, application Netherlands, Feb. 22, 1988, 8800440  
Int. Cl.<sup>5</sup> F16C 32/06  
U.S. Cl. 384—12



1. Gas bearing part provided with gas supply means which

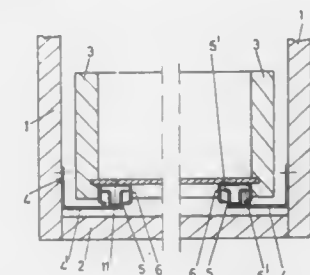
open out into a recessed working surface of said gas bearing part which can be placed opposite a carrier plate to permit formation of a gas bearing relative to the carrier plate, wherein said gas bearing part is a completely solid body having a working surface defined by an essentially conical recess, the top of the conical recess being essentially in the center of the surface, the gas supply means opening out substantially and exclusively into the top of the conical recess and wherein the roughness of the working surface is less than 10 ru.

**4,953,990**  
**OVEREXTENSIBLE, THREE-PIECE TELESCOPIC GUIDE**  
Hendricus T. Wojcik, Eijsden, Netherlands, assignor to Thomas Regout N.V., Maastricht, Netherlands  
Filed Aug. 14, 1989, Ser. No. 393,287  
Claims priority, application Netherlands, Aug. 16, 1988, 8802030  
Int. Cl.<sup>5</sup> A47B 88/00  
U.S. Cl. 384—18



1. An overextensible, three-piece telescopic guide comprising an outer or housing bar, a middle bar and one inner or drawer bar, which bars are slidable relatively to each other by means of two ball cages respectively mounted between the housing bar and the middle bar and between the middle bar and the drawer bar, there being provided end stops engaging with the ball cages for locking the bars in the extended position relatively to each other in the direction of extension, characterized in that at both ends of the two ball cages (4,5) loose sliding buffers (6,7) are mounted which are slidable within the corresponding bars and lock the middle and the drawer bars (2,3) in both extended end positions by means of end stops (12,14).

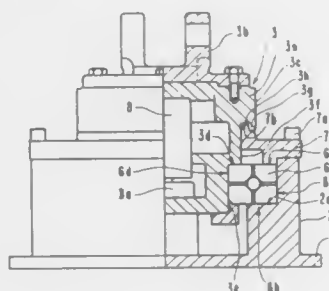
**4,953,991**  
**PULL-OUT GUIDE ASSEMBLY FOR DRAWERS**  
Erich Röck, Höchst, Austria, assignor to Julius Blum Gesellschaft m.b.H., Höchst, Austria  
Filed Dec. 28, 1989, Ser. No. 458,371  
Claims priority, application Austria, Jan. 9, 1989, A 30/89  
Int. Cl.<sup>5</sup> F16C 29/00  
U.S. Cl. 384—19



1. A pull-out guide assembly for drawers, comprising, on each side of the drawer, a pull-out rail on the side of the drawer and a supporting rail on the side of the body, and load-transmitting slides or rollers mounted in a carriage, the supporting rails in longitudinal direction being divided into a mounting member fastenable to the furniture side wall and a running member,

and the mounting member being adapted to be coupled to the running member, a horizontal flange of the running member being at the rear end pushed below a hook bent out from a horizontal flange of the mounting member, and at the front end of the supporting rail a positioning pin for the running member being provided, characterized in that said positioning pin is a hook, and that a slide is mounted at said mounting member, said slide pressing said running member in the push-in direction of the drawer towards the rear end and underneath a projection of said positioning pin.

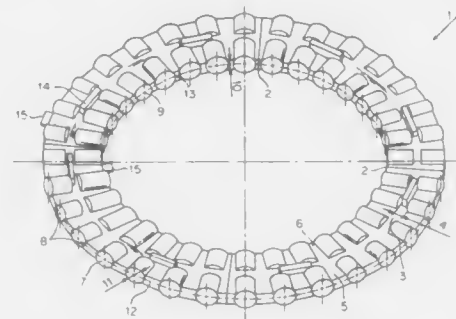
**4,953,992**  
**INDUSTRIAL ROBOT SWIVEL SHAFT APPARATUS**  
Nobutoshi Torii, Hachioji, and Kazuhisa Otsuka, Hino, both of Japan, assignors to Faruc Ltd., Yamanashi, Japan  
PCT No. PCT/JP87/00849, § 371 Date Apr. 21, 1988, § 102(e) Date Apr. 21, 1988, PCT Pub. No. WO88/03464, PCT Pub. Date May 19, 1988  
PCT Filed Nov. 4, 1987, Ser. No. 210,515  
Claims priority, application Japan, Nov. 13, 1986, 61-270619  
Int. Cl.<sup>5</sup> F16C 33/78  
U.S. Cl. 384—607



1. An industrial robot rotation shaft apparatus comprising: a stationary support having an upper end and a lower end for supporting an industrial robot, a rotatable support rotatably connected to the stationary support for rotating thereon with a gap formed therebetween, bearing means coupled to the stationary support and the rotatable support in the gap therebetween to facilitate rotation of the rotatable support relative to the stationary support, said rotatable support having an outer cylindrical surface and a skirt portion extending downwardly from the outer cylindrical surface towards the stationary support; and a holder connected to the upper end of the stationary support for holding the bearing means to the stationary support and having a collar portion formed inwardly of the skirt portion and projecting upwardly from the holder, the collar portion being disposed in a complementary, sealing relationship with the skirt portion, wherein the rotatable support has a lower, first outer diameter portion, a middle, second outer diameter portion, and a third, upper outer diameter portion, the skirt portion being formed by an annular groove which extends upwardly between the second and third diameter portions, the bearing means supporting the rotatable support at a shoulder formed between the first and second diameter portions, and the collar portion of the holder fitting into the annular groove of the rotatable support so as to overlap with the skirt portion.

**4,953,993**  
**CAGED COMB FOR A LARGE ROLLER BEARING**  
Diethelm Bahr, Wermelskirchen, Fed. Rep. of Germany, assignor to Hoesch AG, Dortmund, Fed. Rep. of Germany  
Filed Jul. 11, 1989, Ser. No. 378,247  
Claims priority, application Fed. Rep. of Germany, Jul. 16, 1988, 3824279  
Int. Cl.<sup>5</sup> F16C 33/49  
U.S. Cl. 384—623

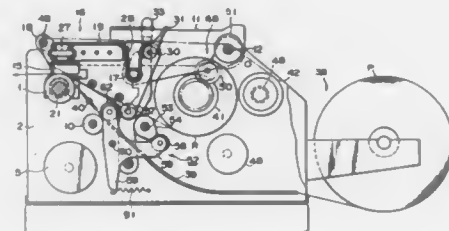
12 Claims



1. A comb-caged thrust bearing comprising circular-shaped segments for an axial two-row roller race carrying rollers in a large centrally-open roller bearing; said segments forming a web with radially oppositely-lying comb stages for holding and guiding said rollers; said comb stages of said web enclosing said rollers along three sides of said rollers, said rollers being enclosed by said comb stages along oppositely-lying axial lines on the periphery of said rollers, said rollers having one end enclosed by said comb stages substantially along a diameter of said one end of said rollers, said diameter having ends connected to said axial lines, said rollers having another end that is free from being enclosed by said comb stages.

**4,953,994**  
**THERMAL PRINTER WITH RECIPROCAL PAPER FEED CONTROL**  
Tsugio Shiozaki, Susono; Satoshi Kitahara, Mishima; Osamu Koizumi, Shizuoka, and Ikuzo Sugiyama, Sagami, all of Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan  
Filed Oct. 11, 1988, Ser. No. 256,762  
Claims priority, application Japan, Oct. 14, 1987, 62-157117; May 6, 1988, 63-59824  
Int. Cl.<sup>5</sup> B41J 3/02  
U.S. Cl. 400—120

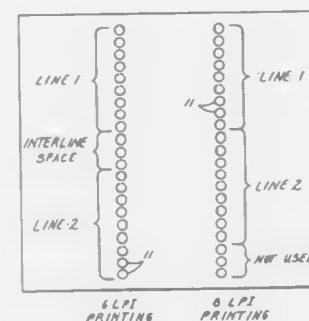
9 Claims



1. A thermal printer comprising: a platen (1); platen supporting means (2) for rotatably supporting the platen; platen drive means (3, 5, 7) for rotating the platen; a thermal head (15) for printing on a paper sheet, the paper sheet being arranged in a region between the platen and the thermal head; head drive means (11, 16) for selectively moving the thermal

head between a first position in which the terminal head is pressed against the platen, and a second position in which the thermal head is disengaged from the platen; sheet transportation means (9, 10, 62) for selectively feeding a paper sheet in a first direction, such that the paper sheet is fed to the region between the platen and the thermal head, and in a second direction such that the paper sheet is returned from the region between the platen and the thermal head, when the thermal head is in the second position; and detecting means (40) for detecting the passing of the paper sheet moving in the second direction between the platen and the sheet transportation means and for driving the sheet transportation means to transport the paper sheet in the first direction.

**4,953,995**  
**DOT MATRIX PRINTER AND METHOD FOR PRINTING MULTIPLE LINES AT DIFFERENT LINE SPACINGS**  
Louis Sims; Fred LeFrie, both of Spokane, Wash.; Joseph Dubner, Hayden Lake, Id., and Brian Peavey, Spokane, Wash., assignors to Output Technology Corporation, Spokane, Wash.  
Continuation of Ser. No. 924,352, Oct. 29, 1986, abandoned.  
This application Apr. 25, 1988, Ser. No. 185,452  
Int. Cl.<sup>5</sup> B41J 3/10  
U.S. Cl. 400—121



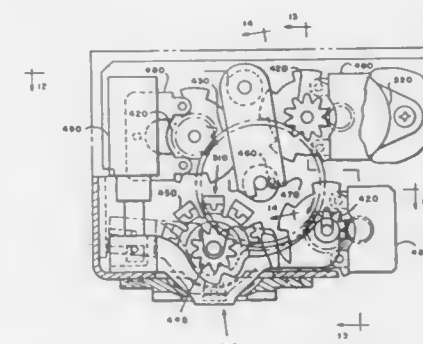
1. A dot matrix printer for simultaneously printing successive groups of multiple lines of characters on a recording medium within dot matrices of a common predetermined character height at a selected line spacing of one-sixth inch or one-eighth inch, while maintaining the predetermined character height constant independently of the selected line spacing, comprising:

a printhead having an uninterrupted array of functionally identical print elements arranged in positions for individually marking single dots within a column presentation on a recording medium during simultaneous printing of a group of two or more lines of characters generated within dot matrices of a predetermined constant character height, the number of print elements being greater than twice the number of dots in the height of each dot matrix; wherein the print elements are evenly spaced at a uniform print element pitch related to a "whole fraction" multiple of the difference between the one-sixth inch and one-eighth inch line spacing; memory means for storing columnar data for two or more lines of characters; control means for directing columnar data from the memory means to different selected sets of print elements to vary the character to character vertical spacing between the multiple lines in each group of lines while maintaining the character height constant independently of whether the one-sixth inch or one-eighth inch line spacing is chosen; and means for advancing the recording medium, after printing of each group of multiple lines, by a distance that will space

the successive groups of multiple lines by the selected character to character vertical line spacing with each group.

**4,953,996**  
**PRINTWHEEL SETTING DEVICE FOR A POSTAGE METER**  
Gilbert N. Riley, Wilton; Richard S. Holodnak, Stratford; Richard A. Malin, and Arno Muller, both of Westport, Conn., assignors to Pitney Bowes Inc., Stamford, Conn.  
Continuation of Ser. No. 114,358, Oct. 27, 1987, abandoned.  
This application Jul. 6, 1989, Ser. No. 376,175  
Int. Cl.<sup>5</sup> B41J 1/34  
U.S. Cl. 400—162.2

10 Claims



1. A printwheel setting device for positioning a printwheel of a postage meter comprising: a printwheel having a plurality of printing characters about the periphery thereof; a motor; a gear train drivingly connecting said motor to said printwheel; said gear train including at least one gear such that a plurality of positions of said at least one gear correspond respectively to a printing position of each of the plurality of printing characters on said printwheel; means for determining the path of rotation of said at least one gear to a nearest one of said plurality of positions to place said at least one gear into a position wherein a desired character on said printwheel is in the printing position; and means for operating said motor to move said at least one gear wheel to said position.

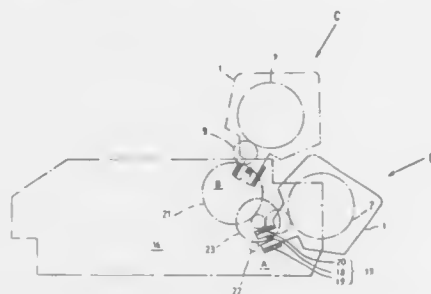
**4,953,997**  
**TRACTOR UNITS FOR PUSH-PULL PRINTER**  
Kazumi Hasegawa, Tokyo; Hiroshi Ikeda, Tokorozawa, and Wataru Ito, Koganei, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 91,129, Aug. 31, 1987, abandoned. This application May 2, 1989, Ser. No. 348,110  
Claims priority, application Japan, Aug. 30, 1986, 61-202699  
Int. Cl.<sup>5</sup> B41J 11/28  
U.S. Cl. 400—616.3

8 Claims

1. A push-pull printer, comprising: a printer body having push and pull feed positions; at least one tractor unit; first mounting means having a first mounting portion secured to said push feed position of said printer body, said first mounting means being arranged to detachably support a corresponding one of said at least one tractor unit at said push feed position; and second mounting means having a second mounting portion secured to said pull feed position of said printer body, said second mounting means being arranged to detachably support a corresponding one of said at least one tractor

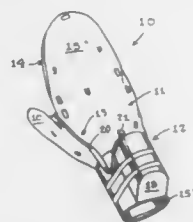


unit at said pull feed position, wherein each of said at least one tractor unit is provided at its opposite end portions with a pair of frames; said first mounting means having a first pair of projections secured at said push feed position of said printer body, a first engaging pin secured between said projections and cooperating with said first pair of projections to form said first mounting portion, and a first fork-like mounting portion formed in a lower portion of each of the pair of frames of the tractor unit associated with said first mounting means and detachably supported



by said first pair of projections and said first engaging pin; and said second mounting means having a second pair of projections secured to said pull feed position of said printer body, a second engaging pin secured between said projections and cooperating with said second pair of projections to form said second mounting portion, and a second fork-like mounting portion formed in a lower portion of each of the pair of frames of the tractor unit associated with said second mounting means and detachably supported by said second pair of projections and said second engaging pin.

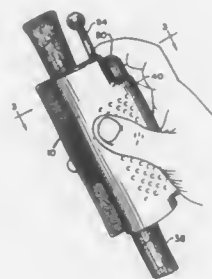
**4,953,998**  
**POLISHING GLOVE APPARATUS**  
Stone W. McCartherens, 916 Cedar Ave., Albany, Ga. 31701  
Filed Jun. 30, 1989, Ser. No. 374,029  
Int. Cl.<sup>5</sup> A46B 5/04; A47K 7/02; A47L 1/08, 13/18  
U.S. Cl. 401-7 **1 Claim**



1. A glove apparatus for applying polish wherein the glove apparatus consists of:  
a glove unit including a waterproof hand covering member including a wrist covering portion, a finger covering portion, a thumb covering portion, a first plurality of cooperating releasable securing means and a web formed between the thumb covering portion and the finger covering portion;  
a reservoir unit for holding a liquid wherein second releasable securing means releasably secures the reservoir unit with the glove unit, said reservoir unit comprises a fluid reservoir member;  
a fluid delivery unit including a fluid conduit having an inlet and an outlet and a fluid control member operatively connected to the fluid reservoir member wherein the fluid control member includes an outlet in communication with the inlet of the fluid conduit, the fluid control member

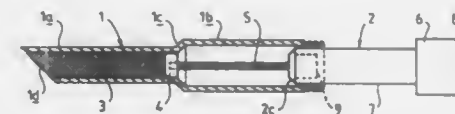
controls the delivery of the contents of the fluid reservoir member to the fluid conduit; and,  
a polishing cloth unit comprising a layer of absorbent material which covers at least the bottom portion of the glove unit wherein the layer of absorbent material is provided with a second plurality of releasable cooperating securing means for operably engaging said first plurality of cooperating releasable securing means for attaching the polishing cloth unit to the glove unit; and, wherein said second releasable securing means includes a plurality of straps for releasably yet captively engaging the reservoir unit to the glove unit and the fluid conduit outlet is connected to the web on the glove unit at a location spaced from the end of the web.

**4,953,999**  
**GOLF CLUB GRIP CLEANER**  
Joseph L. Rivers, Boston, Mass., assignor to Randr, Inc., Cambridge, Mass.  
Filed Aug. 8, 1988, Ser. No. 229,638  
Int. Cl.<sup>5</sup> A47L 13/17, 25/00  
U.S. Cl. 401-9 **8 Claims**



1. A hand-held portable device for cleaning a golf club grip comprising:  
a generally tubular, elongate housing open at its ends and having a slot extending along its length from one end to the other end, the slot communicating with the open ends; cleaner pad means mounted within the housing and having a longitudinally extending slot and open ends, said slot and open ends being aligned with the slot and open ends of the housing, the cleaner pad means being generally U-shaped in transverse cross-section, the cleaner pad means including a wetting pad and a flexible, resilient backing sheet to which the wetting pad is mounted;  
the ends of the housing having flanges for engagement with and containment of opposed ends of the backing sheet;  
means for precluding rotation of the cleaner pad means about a longitudinally extending axis comprising flanges extending along the edges of the longitudinally extending slot for engaging the backing sheet of the pad assembly;  
means carried by the housing for wetting the wetting pad including a liquid reservoir carried by the housing and pump means for pumping liquid from the reservoir onto the wetting pad;  
whereby a golf club grip may be inserted into the cleaner pad means transversely through the slots in the housing and the cleaner pad means and may be substantially encompassed by the cleaner pad means, and may then be drawn longitudinally whereby the cleaner pad means may effect a cleaning action on the grip.

**4,954,000**  
**REFILLABLE DISPENSER INCLUDING A TRANSLATABLE PLUNGER**  
Jean-Louis Gueret, Paris, France, assignor to L'Oreal, Paris, France  
Filed Apr. 14, 1989, Ser. No. 338,226  
Claims priority, application France, Apr. 15, 1988, 88 05026  
Int. Cl.<sup>5</sup> A45D 40/06  
U.S. Cl. 401-68 **11 Claims**

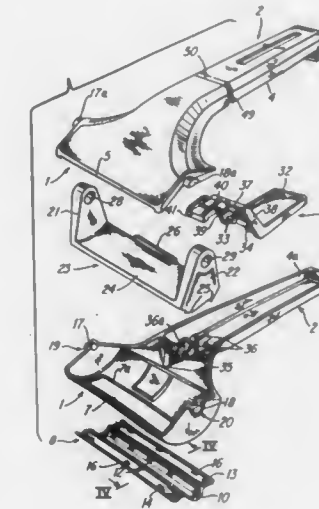


1. A dispenser of a product (3) contained in a cylindrical reservoir (1) in which said product (3) is disposed between the dispensing opening (1d) and a plunger (4) displaceable in translation in the reservoir (1), the plunger (4) being mounted at the end of a threaded rod (5) which cooperates with a fixed nut (9) supported by a support (7) integrally joined with the reservoir (1), the threaded rod (5) being displaceable in rotation incrementally by means of a mechanism also supported by said support (7), this movement being initiated by the action of the user upon a displaceable maneuvering device (8) supported by the support (7), in order to obtain the translation of the plunger (4) and the dispensing of the product (3)  
the said dispenser comprising two sub-assemblies, the first sub-assembly including the mechanism, the threaded rod (5), the nut (9), the maneuvering device (8), the support (7) and the plunger (4), the second sub-assembly being the reservoir (1), and  
the first sub-assembly being joined in a removable manner to the second sub-assembly by connecting means (6);  
the nut (9) that cooperates with the threaded rod (5) is slit along at least one diametrical plane over the entire length of its threaded hole (11), the sectors of the nut being held together by a flexible zone (14) which assures the fixation of the nut (9) on the support (7);  
the reservoir (1) includes a frustoconical surface (1c), which comes to be pressed against a corresponding frustoconical surface (2c) of the nut (9), when the movable reservoir (1) is joined with the support (7) to assure the pinching of the sectors of the nut about the threaded rod (5) driven by the mechanism.

**4,954,001**  
**MULTI-PURPOSE CLEANING DEVICE, IN PARTICULAR FOR VEHICLE WINDOWS AND THE LIKE**  
Alain E. Billat, 49 avenue de Gouvieux, 60260 Lamorlaye, Oise, France  
Filed Sep. 26, 1989, Ser. No. 412,663  
Int. Cl.<sup>5</sup> A47L 13/26, 13/22  
U.S. Cl. 401-139 **7 Claims**

1. A multi-purpose cleaning device, in particular for vehicle windows, comprising:  
a head that includes a portion on which is disposed a wiper blade, with said head having an underneath part;  
a spongy body that is supported on said underneath part of said head;  
a stirrup that is disposed on said head and includes at least one scraping rib;  
a handle that carries said head and contains a treatment agent;  
trigger means disposed on said handle for dispensing said treatment agent;  
said head and said handle being an assembly of two complementary half shells, one of which forms a cradle for hous-

ing spraying means of a flask that is accommodated in said handle and contains said treatment agent;  
a head portion of one of said half shells is provided with an aperture that has edges that form a retaining means for a support means for said spongy body; and



said support means comprises a substantially U-shaped median portion having sides that are connected via hinge means to respective wings that are each provided with studs that cooperate with openings of said support means to fix said spongy body thereon.

**4,954,002**  
**WRITING INSTRUMENT WITH MEMBRANE VENT AND THEIR MANUFACTURE**  
Philip Wallis, Newhaven, United Kingdom; Robert E. Burkhalter, and Thomas D. Hall, both of Janesville, Wis., assignors to Parker Pen (Benelux) B.V., Breda, Netherlands  
Continuation of Ser. No. 474,523, Mar. 11, 1983, abandoned.  
This application Sep. 17, 1985, Ser. No. 776,095  
Claims priority, application United Kingdom, Mar. 16, 1982, 8207675  
Int. Cl.<sup>5</sup> B43K 7/00, 5/00  
U.S. Cl. 401-217 **21 Claims**



1. A writing instrument comprising an ink reservoir and an air hole, the air hole being spanned by barrier means, formed as a porous non-absorbent ink repellent membrane of substantially uniform pore size comprising a membrane formed from microfibers fixed together at their intersections, non-porously sealed along its entire periphery to the wall of the hole, for allowing the macroscopic flow of air therethrough in both directions while preventing the escape of ink therethrough and therearound.

4,954,003

## COUPON ORGANIZER

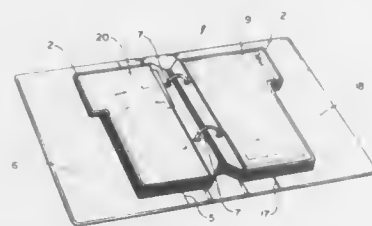
Patrick A. Shea, 736 NE. Capital Blvd., Salt Lake City, Utah 84103

Filed Oct. 30, 1989, Ser. No. 428,065

Int. Cl.<sup>5</sup> B42F 13/00

U.S. Cl. 402—079

20 Claims



19. A coupon organizer comprising a plurality of leaves and a means for holding said leaves; wherein each of said leaves comprises a coupon pocket on one face of the leaf and an aisle card pocket on the opposite face of the leaf; wherein said coupon pocket can be used to hold coupons; wherein each of said leaves further comprises an aisle card held in the aisle card pocket of the leaf; wherein each of said aisle cards comprises a representation of at least one shopping aisle; wherein each of said aisle cards can be used to record shopping items found in at least one aisle of a store; and wherein each aisle card pocket is paired with a coupon pocket in such a manner that coupons in said coupon pocket and the aisle card in said aisle card pocket can be viewed together.

4,954,004

## COUPLING DEVICE BETWEEN TWO ELEMENTS

Kurt H. A. E. Faber; Ute M. I. Faber, both of Sandviken; Knut Faber, Västerås; Inken A. H. Faber, Stockholm, and Andrea J. Faber, Sandviken, all of Sweden, assignors to AB Sandvik Coromant, Sandviken, Sweden

Division of Ser. No. 29,807, Mar. 25, 1987, Pat. No. 4,854,764.

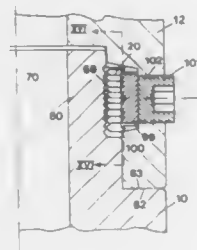
This application Jun. 15, 1989, Ser. No. 365,901

Claims priority, application Sweden, Mar. 25, 1986, 8601370; Nov. 26, 1986, 8605062

Int. Cl.<sup>5</sup> B25G 3/00; F16L 55/00

U.S. Cl. 403—13

7 Claims



1. In combination, first and second elements, and means coupling said first and second elements together; said first element comprising an external circumferential surface containing a radially outwardly open generally circumferential first groove, said second element comprising an internal circumferential surface sized to receive said external surface, said internal surface containing a radially inwardly open generally

circumferential groove opposing said outwardly open first groove,

one of said grooves including a first end surface extending substantially perpendicularly relative to a longitudinal axis defined by said internal and external surfaces, the other of said grooves including a second end surface oriented at an acute angle relative to said longitudinal axis and spaced longitudinally from said first end surface, said second end surface facing toward a longitudinal direction which is opposite a longitudinal direction toward which said first end surface faces,

a split ring member disposed partially in said first groove and partially in said second groove, said ring member including a split region defined by mutually opposing first and second end walls, wherein relative movement of said end walls in a circumferential direction is opposed by an elastic bias of said ring, said ring member having a wedge-shaped cross-section formed by first and second circumferentially extending locking surfaces, said ring member being movable to a radially inwardly deformed position against said elastic bias wherein

said first locking surface is disposed parallel to, and in engagement with, said first end surface, said second locking surface disposed parallel to, and in engagement with, said second end surface, and

an actuating wedge including first and second wedge surfaces engaging said first and second end walls, respectively, by means of tooth-and-slot connections as said wedge surfaces are advanced progressively into engagement with said end walls, said tooth and slot connections being defined partially by said end walls and partially by said wedge surfaces and arranged to impart circumferential forces on said end walls for displacing said end walls toward one another in a manner deforming said ring member in a radial inward direction to said radially inwardly deformed position, against said elastic bias, for maintaining engagement between said first end surface and said first locking surface and between said second end surface and said second locking surface for preventing withdrawal of said first element from said second element.

4,954,005

## SAFETY COUPLING DEVICE FOR ROBOTIC TOOLING

Harold E. Kaasel, Springfield, and David A. Grigsby, Medway, both of Ohio, assignors to Process Equipment Company, Tipp City, Ohio

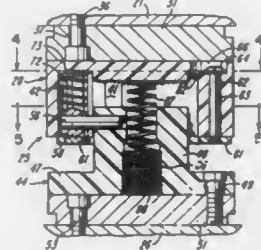
Continuation of Ser. No. 88,559, Aug. 24, 1987, abandoned, which is a continuation-in-part of Ser. No. 6,923, Jan. 26, 1987, Pat. No. 4,786,769, which is a continuation of Ser. No. 708,561, Mar. 6, 1985, Pat. No. 4,639,184. This application Jul. 25, 1989, Ser. No. 385,231

The portion of the term of this patent subsequent to Jan. 27, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> F16D 3/16; B25J 19/06, 17/02

U.S. Cl. 403—57

10 Claims



1. A robot assembly for moving tooling along a predetermined path, comprising an arm, means supporting said arm for predetermined vertical and horizontal movement, a safety coupling connecting said tooling to said arm to protect against

inadvertent damage to said robot and/or said tooling and to minimize down time of said robot, said coupling including a first support member, means for securing said first support member to said arm of said robot, a second support member, means for securing said second support member to said tooling, means connecting said first and second support members and providing for relative universal tilting movement between said first and second support member from a normal position where said first support member is aligned on an axis with said second support member, said connecting means including plurality of at least three pin members secured to one of said support members and spaced angularly about said axis, said pin members projecting outwardly in a spoke-like manner from said one support member with each said pin member having a radial axis and an outer end portion, the other said support member having means defining a corresponding plurality of cavities receiving said outer end portions of said pin members for relative movement within said cavities, seat members mounted on said other support member and forming a precision and positive stop surface within each of said cavities, stop members carried by said outer end portions of said pin members and engaging the corresponding said seat members when said first and second support member are axially aligned at said normal position, means for biasing said stop members against said seat members, said other support member being free to tilt relatively to each of said pin members and against said biasing means, said stop members being movable with said pin members within said cavities when said other support member tilts relative to said one support member, and control means responsive to said tilting movement for stopping the movement of said arm of said robot.

4,954,006

## BALL JOINT

Kazumasa Suzuki; Masahiro Yamada, and Keiichiro Suzuki, all of Shizuoka, Japan, assignors to Ishikawa Tekko Kabushiki Kaisha, Tokyo, Japan

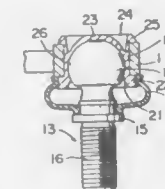
Filed Feb. 21, 1989, Ser. No. 313,028

Claims priority, application Japan, Oct. 18, 1988, 63-135779[U]

Int. Cl.<sup>5</sup> F16D 1/12

U.S. Cl. 403—135

9 Claims



1. In a ball joint of the type that includes: a ball seat having an immovable closed side, an open inserting side, an outer wall portion and a ball stud having a ball portion mounted in said ball seat by insertion through said open side to provide a ball seat and ball stud subassembly; a housing having spaced apart opposite sides, a cylindrical bore passing therethrough from one of said sides to the other of said sides for receiving said outer wall portion and upper and lower opened edges on said housing sides, respectively, around said bore for holding said subassembly therein;

the improvement comprising:

said ball seat being formed out of a hard synthetic elastically deformable material;

said ball seat including an upper annular flange in spaced surrounding relation to said immovable closed side of said ball seat having a radially outward enlarged portion of a diameter that is, prior to insertion of said subassembly into said bore, greater than the inner diameter of said housing bore, said annular flange being engageable with said upper opened edge at said one side of said

housing, and an inner circumferential side opposite said radially enlarged portion; and an annular recess adjacent said inner circumferential side of said upper annular flange and spaced radially inward in opposed relation to said radially outward enlarged portion to provide a space adjacent said immovable closed side into which said upper annular flange can move to thus permit said upper annular flange enlarged portion to be elastically deformed without deforming said closed side, to a diameter at least equal to the inner diameter of said housing bore upon insertion of said subassembly therein.

4,954,007

## FRAMEWORK FOR CABINET STRUCTURE

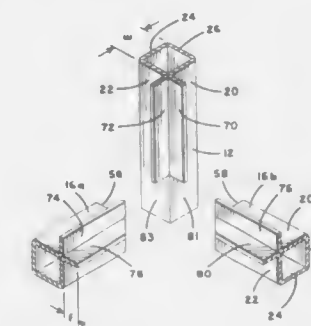
Richard C. Pinney, 2110 Deodar St., Santa Ana, Calif. 92701

Filed May 8, 1989, Ser. No. 348,562

Int. Cl.<sup>5</sup> F16D 1/00

U.S. Cl. 403—172

22 Claims



1. A frame structure for a cabinet, comprising: a plurality of structural members, each structural member comprising a substantially closed square shaped tube having four walls, four corners therebetween and two end portions, the four walls forming a hole therethrough, two of said four walls substantially adjacently abutting at one of said four corners but turning and extending outwardly therefrom to form first and second right angle flanges, said flanges being welded together at said one corner; and means for securely attaching said plurality of structural members in a rigid corner arrangement.

4,954,008

## QUICK RELEASE MECHANISM AND SUPPORTING DEVICE HAVING A QUICK RELEASE MECHANISM

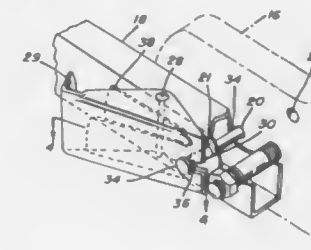
Grant D. Dicke, 1130 Franklin St., Downers Grove, Ill. 60515, and Jeffrey A. Williams, 610 Preston St., Bollingbrook, Ill. 60439

Filed Oct. 24, 1988, Ser. No. 261,707

Int. Cl.<sup>5</sup> F16B 1/00

U.S. Cl. 403—24

21 Claims



1. A quick release mechanism that secures a member to a structure, the mechanism comprising:



- (a) a pin which slidably resides in an opening in the member;  
 (b) a lever arm attached to the member in a pivotable fashion, the lever arm having a handle end and an operating end, the operating end engaging a first end of the pin, the handle end having an apron wall that extends angularly towards the member to such a degree that the apron wall acts as a stop to the pivotable movement of the lever arm so that the movement of the pin out of the opening is limited; and  
 (c) a resilient means for forcing a second end of the pin into an opening in the structure, the resilient means being in a location that permits a force to be exerted on the underside of the lever arm's handle end.

4,954,009

## ROAD BARRIER SYSTEMS AND METHODS

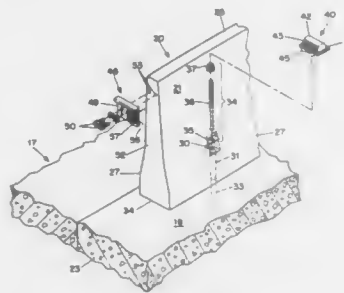
Roger C. Kellison, 8200 Boulevard East, North Bergen, N.J. 07047

Filed Sep. 30, 1988, Ser. No. 252,517

Int. Cl.<sup>5</sup> E01F 13/00, 15/00

U.S. Cl. 404—6

30 Claims



1. A barrier system for roadways includes a cast concrete barrier member having a side to extend parallel to a road traffic lane, at least one recess defined in the side, a generally vertical opening from the recess to the bottom of the barrier, adapted to receive a fastener therethrough affixing the barrier to a supporting surface on which it rests, a cap having a lower projecting portion conforming to the recess and adapted to fit therein, and an upper reflector support means for projection outward of the recess and locating a reflector outward of the recess beyond the surface of the barrier and facing generally horizontally along the barrier to visibly identify the location of the barrier by reflection of light from vehicle headlights.

4,954,010

## TRANSVERSE-MOUNTED SLURRY SEALANT BOX ASSEMBLY

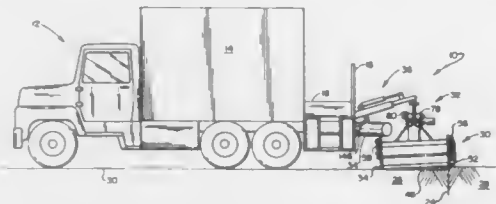
Darryl R. Montgomery, 3109 Amity Rd., Hilliard, Ohio, and David C. Raber, 10999 Converse Rd., Plain City, Ohio 43064

Filed Feb. 21, 1990, Ser. No. 484,163

Int. Cl.<sup>5</sup> E01C 19/22; E04G 21/10

U.S. Cl. 404—96

22 Claims



1. A sealant box assembly connectable to a vehicle and adapted to fill transverse roadway cracks, said roadway having a center line, which comprises:

- a sealant box adapted to receive and dispense fluent material onto a roadway;  
 a boom assembly which carries said sealant box and has a drive for moving said sealant box along the length of said boom assembly, transversely of said roadway, one end of said boom assembly positioned for said sealant box to be located at the center line of said roadway while said vehicle is spaced apart therefrom;  
 a chute extending from said vehicle to said sealant box for filling said sealant box with fluent material; and  
 a mounting assembly connectable to the vehicle and pivotally connected to the boom assembly for its vertical movement.

4,954,011

## POWERED METHOD AND APPARATUS FOR LIFTING A BOAT

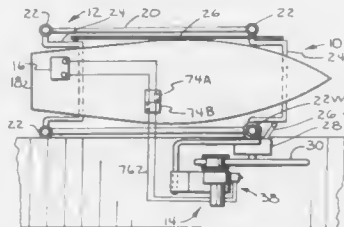
Samuel H. Stenson, HCR 77, Pine River, Minn. 56474

Filed Aug. 1, 1988, Ser. No. 226,800

Int. Cl.<sup>5</sup> B63C 3/08

U.S. Cl. 405—3

21 Claims



1. An electrically powerable boat lift assembly, comprising  
 (a) a mechanical boat lift having a fixed frame, a relatively movable boat lifting means movably mounted in said frame for lifting a boat in the lift up and out of the water, a drive movement interconnecting said frame to said lift means, and a lever for operating said drive movement;  
 (b) a tractive drive unit having a tractive frictional drive wheel, a DC electric motor, and a reduction drive connecting the motor to the drive wheel;  
 (c) mount means for movably mounting and supporting said drive unit on said frame with said drive wheel normally being in direct frictional engagement with and against said lever;  
 (d) self-operating biasing means for resiliently biasing said wheel directly against and into said frictional engagement with said lever;  
 (e) polarized connector means for both quick electrical connection and disconnection of said motor to a battery in the boat;  
 (f) electrical switch means connected to said connector means and to said motor for selectively running the motor in either direction, for selective raising and selective lowering the lifting means and the boat therein with the tractive drive motor being powerable by the boat battery.

4,954,012

## METHOD OF COASTAL EROSION CONTROL USING MASSIVE SEA BLOCK SYSTEM

Jack L. Wheeler, P.O. Box 6092, Lake Charles, La. 70606

Continuation of Ser. No. 77,582, Jul. 24, 1987, Pat. No. 4,820,079. This application Apr. 10, 1989, Ser. No. 335,559

The portion of the term of this patent subsequent to Apr. 11, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> E02B 3/06

U.S. Cl. 405—23

15 Claims

1. A method of coastal erosion control comprising the steps of:  
 a. transporting a plurality of massive and transportable hol-

- low concretious blocks of concrete reinforced with steel to a coastal site where erosion is to be controlled;  
 b. arranging the massive blocks in an array that extends along the erosion site so that the blocks can dissipate wave action;



- c. filling the hollow blocks with refuse until each of the blocks has a weight of at least twenty five (25) tons; and  
 d. sealing each block after refuse is added so that wave action cannot scatter the refuse during heavy seas.

4,954,013

## MEANS AND METHOD FOR STABILIZING SHORELINES

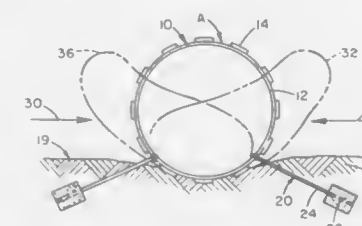
Bruce A. Lamberton, Strongsville, Ohio, assignor to Jacquelyn Lamberton, Strongsville, Ohio

Filed Jun. 12, 1987, Ser. No. 62,132

Int. Cl.<sup>5</sup> E02B 3/06

U.S. Cl. 405—25

14 Claims



1. An offshore barrier module adapted to retard the wave-induced erosion of an adjacent shoreline comprising:  
 a porous barrier means for retarding the flow of water therepast to reduce the velocity thereof and to thereby promote the deposition of particulate matter at and adjacent to said barrier means, said barrier means comprising an elongated hollow substantially cylindrical body which includes flexible horizontal and vertical elements that extend around the periphery of said body and are secured to each other, and wherein said horizontal elements comprise a plurality of spaced apart elongated slats and said vertical elements comprise at least two spaced apart hoop-like straps to which said slats are secured, said slats extending substantially around a periphery of said straps and wherein said body is flexible so that the force of waves transverse to the axis of said body can deform said body and so that objects striking said body can deform said body; and,  
 a ballast means for weighing down said barrier means.

4,954,014

## SURFING-WAVE GENERATORS

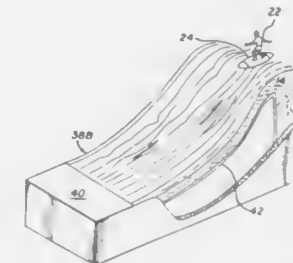
Charles E. Sauerbier, Arroyo Grande, Calif., and Thomas J. Lochtefeld, 1620 Cresdo Dr., La Jolla, Calif. 92037, assignors to Thomas J. Lochtefeld, La Jolla, Calif.

Continuation-in-part of Ser. No. 54,521, May 27, 1987, Pat. No. 4,792,250. This application Dec. 19, 1988, Ser. No. 286,964

Int. Cl.<sup>5</sup> A63B 69/00

U.S. Cl. 405—79

26 Claims



1. A wave-forming means for forming a tunnel wave on the surface of a body of water, comprising:  
 a. means of propelling a body of water in a first direction;  
 b. generator hull means being partially submerged in said body of water, said body of water moving thereagainst in said first direction, and said generator hull means having an area of shaped face thereon having width and length thereof, said shaped face:  
 1. having concave curvature in sections both parallel and normal to said surface;  
 2. facing generally in a second direction opposite to said first direction and having:  
 A. an inclination with respect to said surface and said second direction; and  
 B. an attitude with respect to said second direction.

4,954,015

## GUTTER SEAL

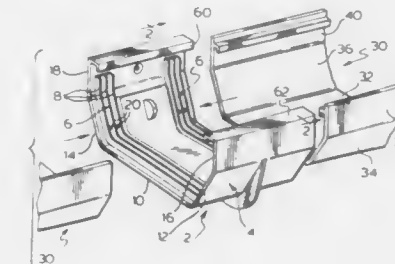
Vince J. McGowan, Thornton, Canada, assignor to GSW Inc., Barrie, Canada

Filed Apr. 4, 1990, Ser. No. 503,936

Int. Cl.<sup>5</sup> E02B 5/00

U.S. Cl. 405—121

15 Claims



1. An eavestrough fitting comprising a moulded plastic member having secured thereto a gasket, said gasket having at least two ribs extending across said member and up the sides thereof, said ribs being sized to form a seal with an appropriately shaped eavestrough inserted within said fitting, said moulded plastic member having a generally flat base connected to outwardly angled sidewalls which terminate in a short vertical section, said gasket conforming to the shape of said moulded plastic member and including resilient aligning members associated with said ribs either side of said base on said outwardly angled sidewalls, said resilient aligning members urging the sidewalls of an inserted eavestrough towards

the center of said fitting causing the base of the inserted eaves-trough to remain in sealing contact with the portion of said ribs secured to said base.

4,954,016

## SEWER PIPE RELINING METHOD

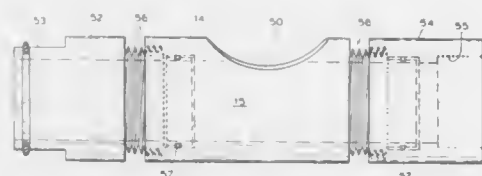
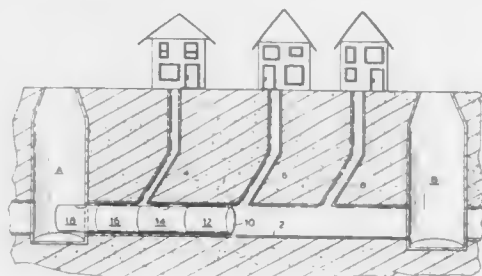
Christer Storgard, Vasa, Finland, assignor to Oy Wiik & Høglund AG, Vasa, Finland

Filed Mar. 9, 1989, Ser. No. 320,999

Claims priority, application Canada, Apr. 13, 1988, 564,076-8  
Int. Cl.<sup>5</sup> F16L 55/18, 9/22; E03F 3/06

U.S. Cl. 405—184

4 Claims



1. In a method for the repair of sewer mains having lateral openings with reliner pipe by the steps of: measuring a section of sewer main to determine the length thereof and location of lateral openings; preparing short lengths of reliner pipe adapted to fit together and conform with the measurements of the sewer mains; providing certain sections of reliner pipes with lateral openings corresponding to the lateral openings in the sewer main; inserting the aforesaid lengths in sequence and advancing the connected sections through the sewer main until the reliner pipe extends through the entire section of the sewer main; the improvement which comprises adapting the lengths of reliner pipe which have lateral openings to fit together with adjacent lengths of reliner pipe by means which will allow circumferential and longitudinal adjustment of the reliner lateral openings relative to the sewer main lateral openings by rotation of said lateral opening reliner pipe lengths after the reliner pipe has been installed throughout the entire section of the sewer main.

4,954,017

## EXPANSION BOLT AND MINE ROOF REINFORCEMENT

Robert L. Davis, and Harold D. Keith, both of Rolla, Mo., assignors to The Curators of the University of Missouri, Columbia, Mo.

Continuation of Ser. No. 205,601, Nov. 10, 1980, Pat. No. 4,636,115. This application Sep. 10, 1986, Ser. No. 906,269  
The portion of the term of this patent subsequent to Jan. 13, 2004, has been disclaimed.

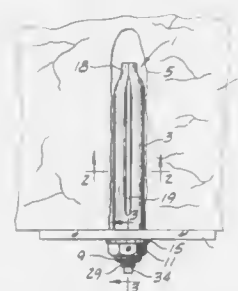
Int. Cl.<sup>5</sup> E21D 21/00

U.S. Cl. 405—259

32 Claims

1. An expansion bolt adapted for insertion in an initial unexpanded condition in a circular hole drilled in a body in which

the bolt is to be anchored, and adapted to be expanded girthwise after being inserted in the hole to anchor it in the hole, said bolt having an elongate hollow shank portion constituted by a relatively thin-walled tubular metal member closed at one end constituting its inner end as inserted in the hole and having a head at its other end constituting its outer end, said head being exteriorly threaded for reception of a nut and extending out of the hole when the bolt is anchored in the hole, said tubular member being adapted to receive a fluid under pressure, said tubular member being of closed cross section and of generally circular overall outline smaller than the circular hole



for insertion of the bolt therein and being of fluted formation with a portion within said outline such as to enable girthwise expansion thereof under pressure of fluid therein for pressure engagement of a major portion thereof having a generally cylindrical outer surface with the body within the hole, and said head being constructed for delivery of fluid under pressure into said tubular member whereby, following insertion of the tubular member in a hole, fluid under pressure may be delivered into the tubular member to cause it to expand girthwise into pressure engagement of said generally cylindrical outer surface with the body within the hole for anchoring it in the hole.

4,954,018

## YIELD TUBE BOLT ASSEMBLY

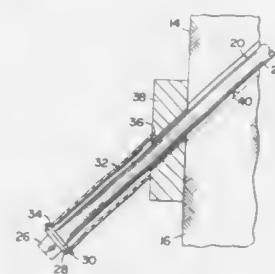
Michael Gauna, Tuscaloosa, Ala., assignor to Jim Walter Resources, Inc., Birmingham, Ala.

Continuation of Ser. No. 741,995, Jun. 6, 1985, abandoned. This application Jan. 15, 1987, Ser. No. 6,304

Int. Cl.<sup>5</sup> E21D 21/00

U.S. Cl. 405—259

4 Claims



1. In a mine in which an elongated rib bolt is fixed at one end in a receiving hole in a mine wall and said rib bolt has an exposed portion extending outwardly beyond the face of said mine wall and terminating in an exposed end, said rib bolt having a predetermined failure strength, the combination comprising a bearing plate mounted on said rib bolt portion and resting against said mine wall, a collapsible cylindrical metal tube encompassing said rib bolt mounted on said exposed portion between said bearing plate and said exposed end, and means mounted on said exposed end for tightly compressing said cylindrical metal tube and said bearing plate together and

forcing said bearing plate tightly against said face of said mine with a predetermined torque, said cylindrical metal tube being capable of withstanding said predetermined torque but being gradually, longitudinally collapsible in response to an applied force greater than said predetermined torque but lower than said predetermined failure strength of said rib bolt, whereby said mine wall expands outwardly while said cylindrical metal tube keeps constant tension on said rib bolt.

4,954,019

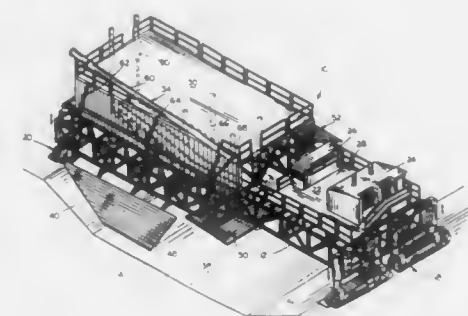
## METHOD AND APPARATUS FOR LINING A CANAL

D. William Giroux, 694 Umpqua Pl., LaConner, Wash. 98257  
Filed Aug. 18, 1989, Ser. No. 395,811

Int. Cl.<sup>5</sup> E02B 5/02

U.S. Cl. 405—268

23 Claims



5. A machine for lining a water filled irrigation canal having a generally horizontally disposed bottom and side walls extending upwardly and outwardly therefrom, comprising, an elongated frame means having a length sufficient to span the canal, means on the opposite ends of said frame means for propelling said frame means along the length of the canal, means on said frame means for laying an elongated sheet of flexible, impervious material on a portion of the canal as said frame means is propelled along the canal, means on said frame means for applying a layer of concrete over a majority of said sheet material as said frame means is propelled along the canal, and means for substantially shielding the sheet material from water current as the sheet material is applied.

4,954,020

## APPARATUS FOR LOADING MATERIALS INTO A STORAGE COMPARTMENT

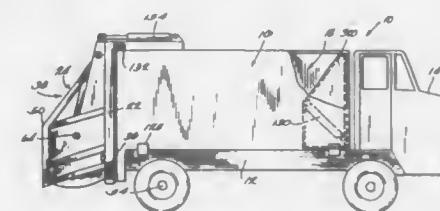
Fred T. Smith, and Fred P. Smith, both of Palos Verdes Peninsula, Calif., assignors to The Hell Co., Milwaukee, Wis.

Filed Mar. 13, 1989, Ser. No. 322,346

Int. Cl.<sup>5</sup> B30B 1/08

U.S. Cl. 406—38

37 Claims



1. An apparatus for loading materials into a storage compartment having a floor and a ceiling comprising wall means defining a hopper for receiving the materials to be loaded, said wall means further defining an inlet for receiving the materials into said hopper and an outlet that, in use, communicates with the storage compartment generally at the level of the floor thereof; first panel means operative for movement within said hopper

between an opened position permitting material to enter said hopper inlet and a closed position closing said hopper inlet; and

packing means on said first panel means for expelling materials from said hopper through said outlet during movement of said first panel means from said opened position toward said closed position, said packing means including packer wall means movable through the hopper outlet in a path that pushes the materials upwardly above the level of the floor of the compartment and in the direction of the ceiling of the compartment.

4,954,021

## INSERTED ROTARY CUTTER

Osamu Tsujimura, Kawasaki; Tatsuo Arai, Kitamoto, and Takayoshi Saito, Shinagawa, all of Japan, assignors to Mitsubishi Metal Corporation, Tokyo, Japan

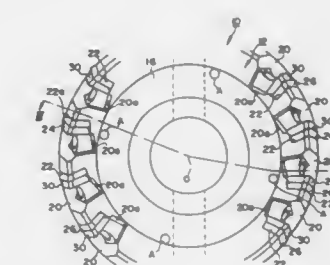
Filed Jun. 9, 1989, Ser. No. 363,937

Claims priority, application Japan, Jun. 10, 1988, 63-143033; Jun. 10, 1988, 63-076983[U]

Int. Cl.<sup>5</sup> B23C 5/22

U.S. Cl. 407—35

12 Claims



1. An inserted rotary cutter comprising: a tool body having an axis of rotation therethrough and having a plurality of insert mounting seats formed on a forward end portion thereof; at least one first insert having at least one end cutting edge facing forwardly of the body for the purpose of removing material from a workpiece and at least one wiper insert for removing a thin layer of material in a smoothing operation, said wiper insert having at least one end cutting edge which is longer than that of said first insert, each of said inserts being releasably mounted to a respective insert mounting seat and being arranged so that the end cutting edge of said wiper insert projects further from said tool body than the end cutting edge of said first insert by a predetermined distance; and indicating means provided on said tool body for distinguishing visually said insert mounting seat for said wiper insert from said insert mounting seat for said first insert; said insert mounting seat for said wiper insert being distinguishable and being formed so as to have a dimensional precision within 0.01 mm in an axial direction, while said insert mounting seat for said first insert is formed as to have a dimensional precision above 0.01 mm in an axial direction.

4,954,022

## METHOD FOR MACHINING MULTIPLE CUTS IN A WORKPIECE TO A UNIFORM DEPTH

James L. Underwood, Kennesaw; Floyd K. Williams, Marietta, and Ricky W. Tumlin, Ackworth, all of Ga., assignors to Underwood Mold Co., Inc., Woodstock, Ga.

Filed Jun. 16, 1989, Ser. No. 367,030

Int. Cl.<sup>5</sup> B23B 35/00

U.S. Cl. 408—1 R

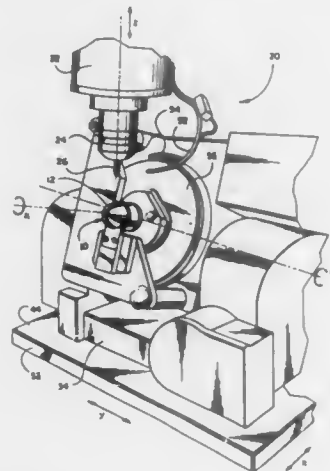
18 Claims

1. A method for machining a surface of a workpiece with a



tool to provide multiple cuts having uniform depths comprising the steps of:

- orienting the workpiece with respect to a reference coordinate;
- recording an expected position of the surface of the workpiece with respect to the reference coordinate;
- advancing the tool toward the surface;
- sensing contact of the tool with the surface;
- advancing the tool a predetermined distance to thereby machine the workpiece to a predetermined depth;



- recording a sensed position of the workpiece with respect to the reference coordinate as a result of the contact of the tool with the surface;
- comparing the sensed position to the expected position and calculating a deviation of the surface from the reference coordinate; and
- using the deviation to monitor the position of the workpiece to assure that the position of the surface of the workpiece is accurately sensed during subsequent machining steps.

4,954,023

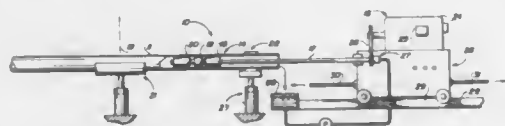
**INTERNAL CUTTING HEAD FOR DRIFTING PIPE**  
Scott Bromley, Lovington, N. Mex., assignor to Scott Tech International, Inc., Lovington, N. Mex.

Filed Sep. 27, 1989, Ser. No. 413,540

Int. Cl. B23B 47/00

U.S. Cl. 408—1 R

23 Claims



19. A method for drifting large casing that can be used for casing a borehole comprising the steps of:

- supporting a track means in aligned relationship with a shaft; releasably securing a joint of casing in aligned relationship with said shaft, rotating one end of said shaft by a motor mounted on a cart; and moving said cart along said track while one end of said shaft is supported to said cart on said track means;
- connecting a cutterhead to the other end of said shaft wherein said cutterhead is arranged for removing irregularities from the inside of a joint of casing, including a plurality of cutter devices on said cutterhead;
- cutting the inner wall of a joint of casing to thereby provide the joint of casing with a minimum inside diameter; pro-

viding said cutterhead with a mandrel adapted to be connected to said rotatable shaft and adapted to be moved axially along the interior of the casing by movement of said cart along said track;

mounting a first and a second alignment device, spaced from one another, on said mandrel; connecting said cutter device to be rotated by said mandrel; mounting the cutter device between the alignment devices; and arranging said cutter device and said first and second alignment device along a common axial center line;

forming cylinders within each said alignment device and arranging said cylinders in radially aligned relationship respective to the mandrel and circumferentially arranging said cylinders within said alignment device; reciprocatingly mounting a radially active piston within each cylinder; extending said pistons into contact with the inner wall of the casing and thereby engaging the interior wall of the casing;

flowing cutting oil through said shaft, mandrel, cutter device, and to the cutting elements; and forming a return flow path for the cutting oil to return from the cutterhead, through the casing interior, and to a location where the oil can be accumulated and reused;

moving said cart along said track whereby joints of casing are sequentially positioned in alignment with said cutterhead and the inner surface thereof engaged with the cutterhead to provide a casing section of a minimum diameter.

4,954,024

**PRECISION BORING TOOL**

Dieter Kress, Aalen, and Friedrich Häberle, Lauchheim, both of Fed. Rep. of Germany, assignors to Mapal Fabrik Fur Präzisionswerkzeuge Dr. Kress KG, Fed. Rep. of Germany

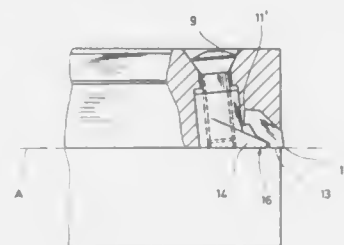
Filed Dec. 7, 1988, Ser. No. 281,089

Claims priority, application Fed. Rep. of Germany, Dec. 7, 1987, 3741332; Dec. 17, 1987, 3742740

Int. Cl. B23B 51/00

U.S. Cl. 408—153

21 Claims



1. A precision boring tool for an inner machining of bores comprising

- a boring tool body having a longitudinal rotation axis;
- a cutting plate having a cutting edge;
- a bracing claw holding the cutting plate in position against the boring tool body, wherein the cutting plate is tilted relative to a plane running through the cutting edge of the cutting plate and through the longitudinal rotation axis of the boring tool body, and thus the cutting plate is disposed in a groove furnished in the boring tool body of the precision boring tool, wherein the cutting plate contacts a surface, generated by the cutting edge moving with the rotating boring tool body, only with the active cutting edge.

4,954,025

**ANCHOR SET TOOL**

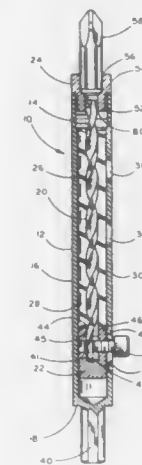
Danny E. Crawford, and Doug Rogge, both of Charles City, Iowa, assignors to Diversified Fastening Systems, Inc., Charles City, Iowa

Filed Jan. 16, 1990, Ser. No. 466,058

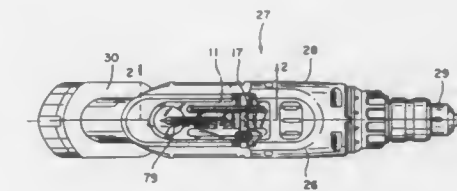
Int. Cl. B25F 3/00

U.S. Cl. 408—238

4 Claims



ceiving either a screwdriver bit or one chuck key portion; and



a third cavity perpendicular to and intersecting the first and second cavities, said third cavity for receiving the other chuck key portion.

4,954,027

**PROCESS FOR THE DISCONTINUOUS PROFILE GRINDING OR PROFILE MILLING OF GEAR WHEELS**  
Ingo Faulstich, Ludwigsburg, Fed. Rep. of Germany, assignor to Hermann Pfauter GmbH & Co., Ludwigsburg, Fed. Rep. of Germany

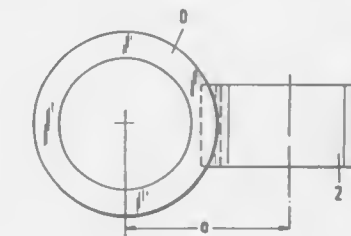
Filed May 12, 1989, Ser. No. 350,897

Claims priority, application Fed. Rep. of Germany, May 12, 1988, 3816270

Int. Cl. B23F 5/20; B24B 1/00

U.S. Cl. 409—26

3 Claims



1. An improved tool adapted for use with a hand drill for installing screw anchors in concrete or masonry walls or the like, comprising:

- a sleeve type body having:
  - an axial bore with a closed rear end and an open front end;
  - a longitudinally aligned open slot in said body;
  - at least one depth notch associated with the front portion of said slot.
- a handle extending outwardly from the rear end of said body and receivable in the chuck of said drill;
- a bit holder slidably located in said bore and having an axial cavity and a bit retention means that extends from one side of said holder through the slot in said body and secures said bit in said cavity such that the sidewalls of said bit holder cavity closely encircle said bit handle;
- a drill bit with a handle secured in said bit holder cavity;
- a coil spring through which said bit extends and having a rear end that abuts against said bit holder, said spring serving as a bias means to urge said bit in a rearward direction;
- a driver means located at the front end of said body and having:
  - a head portion with a stair stepped socket; and
  - a neck portion positioned in the bore of said body and having a passageway that extends from the bottom of said head socket through said neck portion and opens to said body bore for closely encircling said bit to serve as a bit guide means; and
- means for securing said driver means to said body.

4,954,026

**SCREWDRIVER BIT AND CHUCK KEY RETAINER**

Donald W. Zurwelle, Lutherville, Md., assignor to Black & Decker, Inc., Newark, Del.

Filed Feb. 2, 1990, Ser. No. 474,193

Int. Cl. B23B 45/00

U.S. Cl. 408—241 R

14 Claims

1. A retainer for alternatively storing a screwdriver bit or a chuck key having two portions, said retainer comprising:

- a base;
- first and second parallel spaced cavities in the base for re-

1. A process for the discontinuous profile grinding or milling of gear wheels with wheel-type or shank-type tools in which the flanks of a workpiece are worked with one tool or with a tool for the right and left flanks in separate operations, comprising the steps of:

- setting approximate parameters  $a$ ,  $e$ ,  $\zeta$  and  $\psi$  for the workpiece to be worked by the tool so as to avoid large profile deviations, wherein  $a$  is the center-to-center or profile distance between predetermined points on the tool and workpiece,  $e$  is the eccentricity of the tool,  $\zeta$  is the swiveling angle of the tool, and  $\psi$  is the initial angle of rotation of the tool;
- determining by calculation or trial the profile of the workpiece resulting from work on the workpiece by the tool based on said approximate parameters;
- providing a predetermined required profile for the finished workpiece;
- comparing said work results and profile with the required profile of the finished workpiece;
- altering said setting parameters;
- determining the work profile of the workpiece based on the altered setting parameters, and
- repeating the process in the aforesaid manner until the work profile corresponds with the required profile for the finished workpiece.

4,954,028

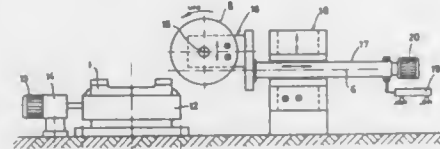
**PROCESS FOR MAKING, FINISHING CROWN WHEELS**  
Jan M. Seroo, Bochelt, Belgium; Martinus H. Cuypers, Eindhoven, and Anthonius J. H. M. Oude Maatman, Oldenzaal, both of Netherlands, assignors to Hankamp B.V., Netherlands  
Filed Feb. 23, 1989, Ser. No. 314,543

Claims priority, application Netherlands, Feb. 24, 1988, 8800472

Int. Cl.<sup>5</sup> B23F 23/10, 5/08

U.S. Cl. 409—26

12 Claims



1. A method of using a disc-type element to make and/or finish a crown wheel, said crown wheel being intended for mating and meshing with a predetermined cylindrical gear, said disc-type element being rotatable about a first axis of rotation, said disc-type element having a peripheral working section, the cross-sectional profile of said working section of said disc-type element corresponding substantially to the tooth profile of the cylindrical gear, the diameter of said disc-type element being considerably larger than the diameter of the cylindrical gear, the method comprising the steps of:

positioning said disc-type element relative to said crown wheel such that said working section of said disc-type element is disposed in a position to work a longitudinal tooth space of said crown wheel;  
working said tooth space by rotating said disc-type element about said first axis;  
tilting said disc-type element about a second axis of rotation, said second axis being perpendicular to said first axis and parallel to said longitudinal tooth space, said second axis coinciding with the axis of rotation of the cylindrical gear; rotating said crown wheel during the step of tilting said disc-type element such that the ratio of the angular velocity of said tilting of said disc-type element to the angular velocity of said rotating of said crown wheel equals the transmission ratio between the cylindrical gear and said crown wheel.

4,954,029

**REMOVABLE CHASSIS FRONT PIN AND FRONT BOLSTER END ASSEMBLY**

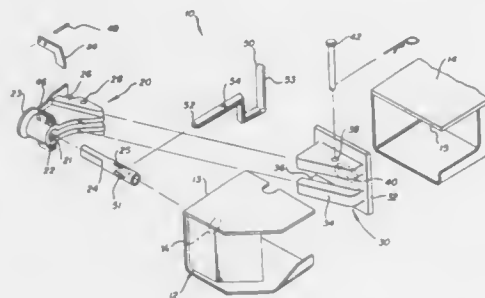
Robert O. Durkin, 1735 Twentieth St., NW., Washington, D.C. 20009

Filed Aug. 2, 1985, Ser. No. 761,836

Int. Cl.<sup>5</sup> B60P 7/00

U.S. Cl. 410—80

11 Claims



1. A device for front end locking of containers on a chassis comprising a lock pin, a guideway assembly, said guideway

assembly comprising a keyway member and a key member slideably mounted to said keyway member, said lock pin being moveable between a locking position in which one end of said lock pin protrudes from one end of said guideway assembly and a release position in which said one end of said lock pin is retracted into said guideway assembly, an operating handle pivotally mounted to said guideway assembly for pivotal movement within said guideway assembly, said lock pin including a chamber into which a portion of said handle extends allowing said handle when pivoted to cam said lock pin and reciprocally drive the lock pin within said guideway assembly.

4,954,030

**LOAD HAULER**

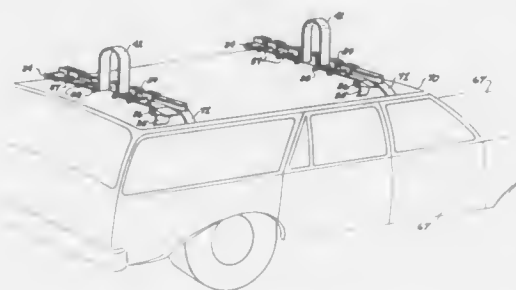
Robert M. Szucs, 2585 Dodge Rd., East Amherst, N.Y. 14051, and Roy L. Bright, 5038 Tonawanda Creek Rd., North Tonawanda, N.Y. 14120

Filed Apr. 26, 1989, Ser. No. 343,285

Int. Cl.<sup>5</sup> B65D 63/00

U.S. Cl. 410—96

4 Claims



1. A load hauler device comprising a stabilizer bar, isolator pins, binder means, a tension means, and support securing means, said stabilizer bar being an elongated member having fixed to one end thereof a binder securing means and at an opposite end thereof said tension means, said binder means secured to said binder securing means and extending at a length beyond said opposite end of said stabilizer bar, a plurality of said isolator pins extending outwardly from a side of said stabilizer bar, and wherein said isolator pins have tightening means and have a portion which encircles the side periphery of said stabilizer bar, and an extending portion connected to the portion which encircles, and said extending portion extending beyond the side periphery of said stabilizer bar, said binder means extendable through and beyond a portion of said stabilizer bar containing said pins, said binder capable of entering said tension means and being tightened thereby, said support securing means positioned near terminal end portions of said stabilizer bar and having means to connect said stabilizer bar to a supporting surface on a transporting vehicle.

4,954,031

**TIE RAIL CONSTRUCTIONS**

Joseph S. Geeck, III, 701 Roseland Pkwy., Harahan, La. 70123  
Continuation-in-part of Ser. No. 240,849, Sep. 6, 1988. This application May 15, 1989, Ser. No. 351,381

Int. Cl.<sup>5</sup> B61D 45/00

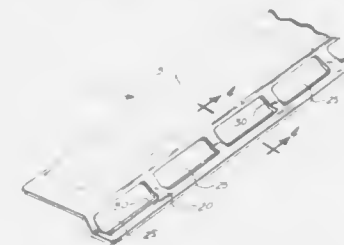
U.S. Cl. 410—110

20 Claims

1. A tie down device for attachment to the top of an upstanding linear wall, which device comprises:

(1) a linear top section adapted to be fastened longitudinally onto the top of said linear wall; and  
(2) a linear side section depending from said top section such that when said top section is fastened longitudinally onto the top of said wall, the side section extends downwardly and outwardly at an obtuse angle alpha from the top section, said side section being further characterized in that:

(a) said side section flares outwardly at an obtuse angle beta along its median portion to thereby form  
(i) a linear upper portion immediately adjacent said top section and  
(ii) a linear lower portion spaced from said top section by said linear upper portion, said linear upper portion



and said lower portion being in a non-planar relationship; and

(b) said side section contains a plurality of linearly disposed apertures adapted to receive at least one flexible tying member, said apertures being linearly disposed at least in part in said linear lower portion.

4,954,032

**ANTI-BACKLASH NUT**

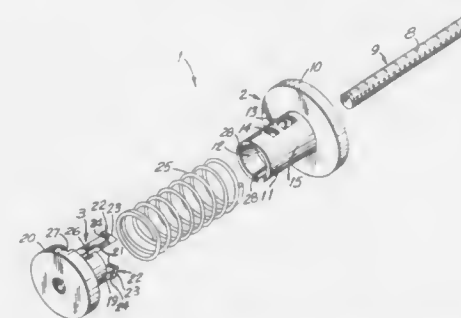
Victor H. Morales, Westbury, N.Y., assignor to Windfred M. Berg, Inc., Brooklyn, N.Y.

Filed Nov. 13, 1989, Ser. No. 435,190

Int. Cl.<sup>5</sup> F16B 38/22; F16H 1/14

U.S. Cl. 411—289

35 Claims



1. An anti-backlash nut comprising at least two nut segments, each nut segment having an internal threaded bore adapted to receive a threaded member therein, one nut segment having at least a portion thereof insertable within the other nut segment, means for interlocking the nut segments together, said interlocking means comprising resilient lock means on one nut segment and means on the other nut segment for removably receiving the resilient lock means and resilient means acting on said nut segments to exert pressure on the nut segments to permit them to move linearly relative to each other.

4,954,033

**TRANSFER MECHANISM FOR CONVEYOR**

Raymond H. Sanders, Alta Loma, Calif., assignor to Unico, Inc., Ontario, Calif.

Filed Jun. 11, 1984, Ser. No. 619,531

Int. Cl.<sup>5</sup> B65G 57/04; B65H 29/00

U.S. Cl. 414—27

10 Claims

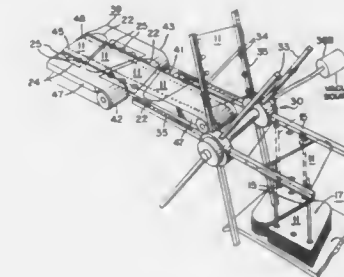
1. A conveyor system for conveying a succession of thin flexible sheets from a sheet forming mechanism to a sheet stacking mechanism, comprising in combination:

(a) a first conveyor belt for carrying a succession of thin flexible sheets from a sheet forming mechanism, said first conveyor belt having a plurality of vent holes therein, said

sheets being positioned to extend beyond at least one side of said belt;

(b) a source for providing a vacuum force through said vent holes to hold said sheets onto said belt;

(c) auxiliary conveyor belt means operatively positioned alongside said first belt at least in the region of said sheet forming mechanism, to support the portion of said sheets extending beyond the side of said first belt, said first belt and said auxiliary conveyor belt means being flat and



substantially level and underlying substantially the entire surface of each sheet;

(d) wherein said first belt extends beyond the end of said auxiliary conveyor belt means a sufficient distance to support at least one entire sheet, with a portion of the sheet overhanging one side of said first belt; and

(e) transfer means having extensions movable upwardly adjacent at least one side of said first belt to lift the overhanging portion of each sheet off of said first belt and deposit the sheet onto a sheet stacking mechanism.

4,954,034

**VIBRATORY FUEL FEEDER FOR FURNACES**

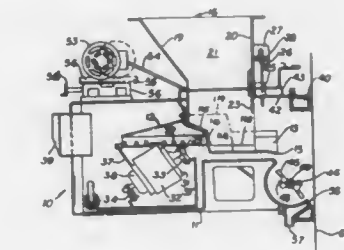
Joseph L. Durante, Eric A. Nelson, and Fere C. Nieminski, all of Erie, Pa., assignors to Zurn Industries, Inc., Erie, Pa.

Continuation-in-part of Ser. No. 657,876, Oct. 5, 1984, abandoned, which is a continuation-in-part of Ser. No. 374,525, May 3, 1982, abandoned. This application Mar. 24, 1986, Ser. No. 843,296

Int. Cl.<sup>5</sup> B65G 49/00

U.S. Cl. 414—156

9 Claims



1. In combination a stoker for feeding solid fuel to a furnace and a furnace comprising,

a vibratory feeder having a frame,

a furnace,

means connecting said vibratory feeder frame to said furnace,

a vibratory feeder supported on said frame,

said vibratory feeder comprising a tray having a bottom and electrical means to vibrate said tray,

resilient means supporting said tray on said frame,

said tray having a first end and a discharge end adapted to be positioned adjacent said furnace and a loading area adjacent the first end thereof,



a solenoid operated movable free means to vibrate said tray and move said fuel relative to said tray to move fuel on said tray from said first end toward said discharge end, said vibrating means being supported on resilient means from said frame, said tray having an extension means oppositely directed from the tray discharge, said tray having a bottom surface engaging resilient means and non-resilient means extending from said vibrating means, a hopper means supported above said first end of said tray in vertical spaced relation thereto, and fuel moving means supported below said discharge end for receiving fuel from said discharge end of said tray and moving said fuel into said furnace, said fuel moving means comprises a rotary distributor supported below said discharge end of said tray, said rotary distributor comprising a shaft extending laterally of said feeder, said shaft having a plurality of blades thereon, said distributor blades being supported in a housing.

4,954,035

## VEHICLE PARK FOR PARKING VEHICLES BELOW A WATER SURFACE

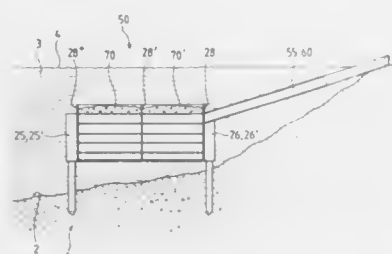
Hannes Strelbel, Luppman, Hittman, Switzerland  
Filed Oct. 24, 1988, Ser. No. 261,506

Claims priority, application Switzerland, Oct. 26, 1987, 4175/87

Int. Cl.<sup>5</sup> E04H 6/00

U.S. Cl. 414-228

12 Claims



1. Vehicle garage for parking vehicles below water surface of a lake, a river, or the like, comprising a large container constructed as a ship-hull and which can be stationed below the water surface, said container including at least one parking level, and at least one tubular tunnel arranged on said parking level and connected to a lake or river bank for a transit of vehicles and persons; and raising and lowering means for raising and lowering the garage with respect to said water surface to level the garage depending upon topographical conditions and loading-dependent changes thereof.

4,954,036

## VARIABLE HEIGHT SILO CHARGE SYSTEM

Harold A. Walker, 326 Hickory Bluff, Johnson City, Tenn. 37601

Filed Jul. 15, 1988, Ser. No. 220,030

Int. Cl.<sup>5</sup> B65G 65/38

U.S. Cl. 414-295

18 Claims

1. In a silo for receiving, holding and discharging particulate matter, including delivery means for delivering said matter to the top of said silo, said delivery means being fixed in location with respect to said silo, comprising:

(a) a plurality of containers disposed within said silo, said containers being movable between a respective first position which is fixed in location at and with respect to the top of said silo, and a respective second position, the location of said second positions being immediately above and varying with the level of said matter previously de-

posited into said silo, said containers configured to receive said matter at said first position, to transport said matter from said first position to said second position, and to discharge said matter at said second position;

(b) means for transporting each of said containers between said first position and said second position;

(c) means located at the top of said silo for receiving said matter from said delivery means and for depositing said



matter into said containers when said containers are located at said first position, said receiving means being fixed in location with respect to said silo and to said delivery means; and

(d) means for discharging said matter from each of said containers when said container is at said second position, whereby when said matter is discharged from said container, said matter falls a sufficiently short distance such that said matter remains substantially intact.

4,954,037

## METHOD FOR ALIGNING, LIFTING AND TILTING A CONTAINER RELATIVE TO A VERTICAL APERTURE

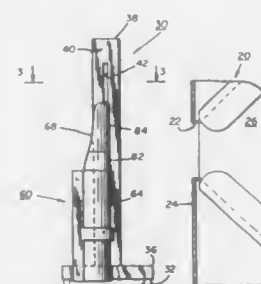
Helmut Habicht, 15 Royal Park Ter., Hillsdale, N.J. 07642

Filed Jul. 10, 1989, Ser. No. 377,063

Int. Cl.<sup>5</sup> B65G 65/23

U.S. Cl. 414-389

14 Claims



1. A method of discharging articles from a container into a defined substantially vertical aperture by lifting and selectively tilting the container carried on a discharge lifting platform of a power assisted lifting apparatus which includes the following steps:

(a) placing a major axis of the discharge lifting platform in a substantially vertical array by positioning a bottom shelf of the discharge lifting platform in a substantially downward and horizontal condition, and a tapered discharge chute in an upwardly extending vertical condition;

- (b) aligning the vertical major axis of the discharge lifting platform in a selected spaced relationship with the center of the vertical aperture;
- (c) retaining the container of articles on the bottom shelf of the discharge lifting platform in substantially vertical array;
- (d) simultaneously inserting the tapered discharge chute into and through the vertical aperture while lifting and rapidly tilting the discharge lifting platform during a first segment of the lifting movement;
- (e) maintaining the insertion of the tapered discharge chute in and through the vertical aperture by tilting the discharge lifting platform at a slower uniform angular rate during at least one subsequent lifting segment as and when the discharging platform is brought to a fully lifted height;
- (f) guiding the articles discharging from the container into and through the vertical aperture by carrying the articles on and over the tapered discharge chute;
- (g) returning the empty container to a more or less starting position by lowering and tilting the discharge lifting platform and bringing its major axis to substantially vertical array.

4,954,038

## TWO-TIER STORAGE RACK FOR VEHICLES

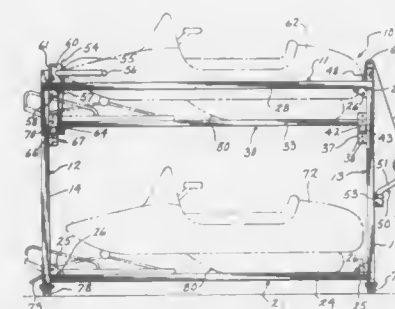
Thomas H. Sheahan, 2389 W. Rawson Ave., Oak Creek, Wis. 53154

Filed Jul. 18, 1989, Ser. No. 381,308

Int. Cl.<sup>5</sup> B60P 3/08

U.S. Cl. 414-482

16 Claims



- 1. A two-tier storage rack for vehicles comprising: a generally rectangular open framework, including a lower horizontal frame member and a pair of spaced vertical rear legs and a pair of spaced vertical forward legs, each of said legs being attached to and extending upwardly from said horizontal lower frame member each of said legs having an upper portion;
- an upper vehicle support platform overlying said horizontal frame member and having a pivotal connection at one end to the upper portion of the rear legs, such that said platform may be pivoted between an inclined loading position with its other end adjacent one end of the lower frame member and an upper storage position with said other end raised to the upper portion of said forward legs;
- said pivotal connection including a series of vertically spaced pivot holes on the upper portion of each rear leg, the pivot holes in each rear leg disposed in horizontal alignment with the pivot holes in the other rear leg, and a pivot bar demountably insertable through said one end of the upper vehicle support platform and a pair of aligned pivot holes in said rear legs to selectively establish the vertical position of said pivotal connection; and,
- positioning means operatively attached to said framework for pulling a first vehicle onto said upper support platform in the loading position, for raising said other end of said upper support platform and a first vehicle thereon to the storage position, and for pulling a second vehicle onto said

lower horizontal frame member beneath said support platform.

4,954,039

## UNIFRAME ROLLOFF DUMPSTER

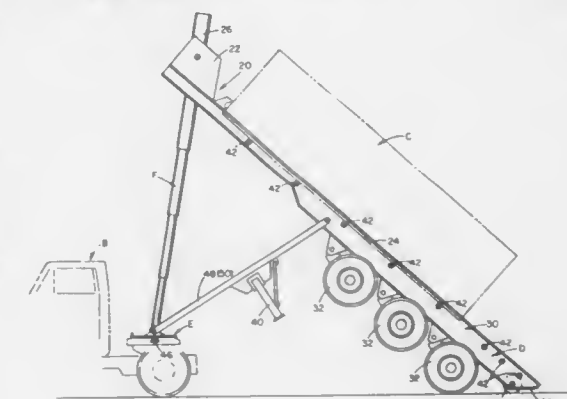
William T. Johnston, Randolph; Leslie Smith, Jr., Beloit, and David K. Barker, Alliance, all of Ohio, assignors to Trailstar Mfg. Corp., Alliance, Ohio

Filed Oct. 27, 1988, Ser. No. 263,532

Int. Cl.<sup>5</sup> B60P 1/08

U.S. Cl. 414-500

1 Claim



- 1. A trailer adapted for attachment to an associated tractor for transporting containers, the trailer comprising: an elongated, rigid frame having opposed first and second ends;
- a jack stand assembly disposed adjacent the frame first end for maintaining the frame generally horizontal when the trailer is disconnected from the associated tractor;
- wheels disposed adjacent the frame second end for transporting the trailer;
- a support plate adapted for selective engagement with a fifth wheel of an associated tractor, the support plate being substantially smaller than the frame, and securing the frame to the tractor without an intermediary frame element;
- first and second draft arms each pivotally secured at opposite ends to the support plate and frame, respectively;
- means for selectively raising the frame first end and pivoting the frame about the wheels, the raising means adapted to facilitate loading and unloading of an associated container on and off the frame, a first end of the raising means being secured to the support plate and a second end of the raising means being secured to the frame first end;
- a double acting power cylinder and cable arrangement received on the frame for moving the associated container relative to the frame at least twice the distance of the stroke of the power cylinder, one end of the cable being secured to the frame, extending around a first pulley disposed at one end of the power cylinder, around a second pulley disposed at the opposite end of the power cylinder, around a third pulley disposed at the one end of the power cylinder, around a fourth pulley at the other end of the power cylinder, and adapted for connection with the associated container; and
- means for locking the frame against longitudinal and lateral movement relative to the support plate.

4,954,040

**REFUSE TRUCK BODY HAVING LOAD CARRYING  
EJECTOR ASSEMBLY**

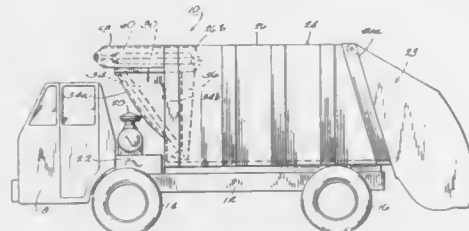
Fred T. Smith, and Fred P. Smith, both of Palos Verdes Peninsula, Calif., assignors to The Heil Co., Milwaukee, Wis.

Filed Mar. 14, 1989, Ser. No. 322,999

Int. Cl.<sup>5</sup> B65F 3/00; B62D 23/00

U.S. Cl. 414—513

4 Claims



1. In a refuse collection truck having front and rear wheels, and a cab positioned entirely forward of at least a portion of the front wheels, a truck body adapted to receive and compress refuse, comprising:

- a container having an open forward end and an open rearward end, said forward end being located rearward of the front wheels and said rearward end being open for loading refuse into and discharging refuse from said container;
- a tailgate for releasably closing said open rearward end;
- an ejector assembly mounted for longitudinal movement within the container between a retracted position over at least a portion of the front wheels and an ejection position nearer the rear of the truck, said ejector assembly having triangular side panels and an upwardly forwardly inclined ejection panel, such that a portion of said ejection panel is positioned simultaneously underneath part of the refuse and over said portion of the front wheels, thus allowing at least a portion of the refuse to rest forward of said forward end of said container and partially over the front wheels; and

a linear actuator mounted horizontally above said ejector assembly and the front wheels, for moving said ejector assembly longitudinally within said container.

4,954,041

**TRIPLE SECTION TELESCOPIC BOOM MATERIALS  
HANDLING VEHICLE**

E. Arthur Dahlquist, Burnville; Allan D. Jenkins, Maple Plain; David C. Truehart, Lakeville, and Richard B. Baxter, Two Harbors, all of Minn., assignors to Lull Corp., St. Paul, Minn.

Continuation of Ser. No. 111,823, Oct. 21, 1987, abandoned.

This application May 24, 1989, Ser. No. 356,804

Int. Cl.<sup>5</sup> B66F 9/06

U.S. Cl. 414—718

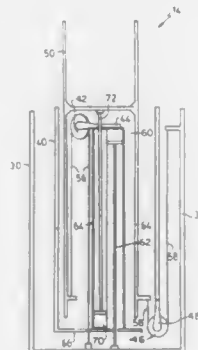
31 Claims

1. A variable reach rough terrain load lifting apparatus comprising:

- a vehicle having a frame;
- a boom comprising innermost, intermediate and outermost telescoping boom segments, said intermediate boom segment having first and second hydraulic cylinders mounted therein, said first hydraulic cylinder connecting said outermost and intermediate boom segments for extending and retracting said intermediate boom segment, and said second hydraulic cylinder connecting said intermediate and innermost boom segments for extending and retracting said innermost boom segment, said innermost boom including end effector means attached to the forward end thereof;
- fluid conduit means extending through said boom segments at least a portion of which includes flexible hose extending from a first position fixed on said innermost boom segment to a second position fixed on said outermost boom segment for directing hydraulic fluid through said boom to said end effector means, said intermediate boom segment fur-

ther comprising a pair of pulleys positioned on opposite sides of said hydraulic cylinders in a rearward portion of said intermediate boom segment, said pulleys contacting said flexible hose and traveling between first and second positions for preventing entanglement of said flexible hose when said innermost and intermediate boom segments are extended or retracted;

means for pivotal connection of the boom to the vehicle frame and capable of reciprocal longitudinal movement



therewith, while preventing buildup of corrosion products which would interfere with the pivotal movement of said boom with respect to said vehicle and further facilitating repair or replacement thereof due to normal operation;

means for elevating and lowering said boom;

means for reciprocating longitudinal movement of said boom and pivotal connection means with respect to said vehicle frame; and

means for stabilizing said vehicle when said boom is extended.

4,954,042

**DOUBLE TELESCOPING ARM FOR ROBOTIC  
PALLETIZERS AND THE LIKE**

Kenneth F. Becicka, Alvin, and Neal C. Chamberlain, Hoopston, both of Ill., assignors to FMC Corporation, Chicago, Ill.

Filed Sep. 12, 1988, Ser. No. 242,669

Int. Cl.<sup>5</sup> B66C 23/00

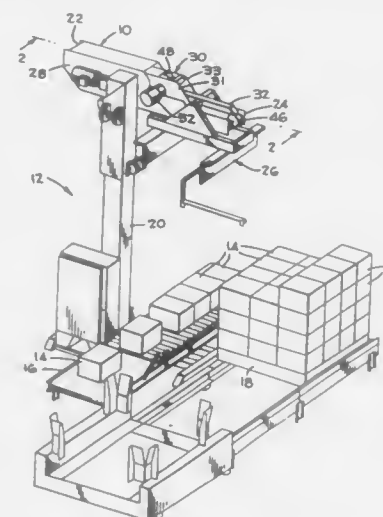
U.S. Cl. 414—718

4 Claims

1. A telescoping horizontal arm adapted for use in a robotic palletizer, comprising:

- an elongate outer member having an associated longitudinal axis;
- an elongate intermediate member having a longitudinal axis aligned substantially parallel with said outer member longitudinal axis and telescopically received in said outer member, said intermediate member including an elongate lower surface;
- an idler wheel mounted within said intermediate member for rotating in a substantially vertical plane, said idler wheel extending partly below said lower surface into contact with said outer member;
- an elongate inner member telescopically disposed within said intermediate member and having a longitudinal axis aligned, substantially parallel with said intermediate member longitudinal axis and said inner member engaging said idler wheel; and
- means for displacing said inner member relative to said intermediate member in a direction substantially parallel to said inner member longitudinal axis, said displacing means rotating said idler wheel and said idler wheel displacing said intermediate member and said inner member relative to said outer member, said means for displacing comprises a motorized wheel fixedly mounted on said intermediate member and engaging said inner member so

as to extend said inner member relative to said intermediate member in response to rotation of said motorized



wheel in one direction and to retract said inner member relative to said intermediate member in response to rotation of said motorized wheel in the opposite direction.

4,954,043

**BALANCE MECHANISM OF AN INDUSTRIAL ROBOT**

Mitsutoshi Yoshida; Toshio Tsubota, and Hiroshi Okumura, all of Nagoya, Japan, assignors to Mitsubishi Jukogyo K.K., Tokyo, Japan

Continuation of Ser. No. 7/234,269, Aug. 19, 1988, abandoned.

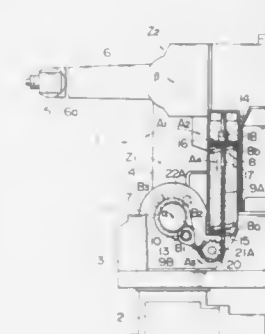
This application Feb. 7, 1990, Ser. No. 477,114

Claims priority, application Japan, Nov. 17, 1987, 62-288347

Int. Cl.<sup>5</sup> B66C 23/72

U.S. Cl. 414—719

2 Claims



1. A balance apparatus for an industrial robot having a first arm swingably disposed at a center of rotation on a stand and a second arm swingably disposed at a distal end of the first arm about a center of rotation, said apparatus comprising:

- 1. a first balance mechanism including:
  - a. a coupling body disposed in the center of rotation of a proximal end of the first arm and adapted to move angularly in synchronism with said first arm;
  - b. a pin support removably fixed to said coupling body at a number of changeable positions, a pin projecting from said support at a position spaced from the center of rotation of said coupling body;
  - c. a coupling element rotatably disposed at said pin of said pin support;
  - d. a spring having one end fixed to the stand;
  - e. a flexible coupling device having one end fixed to said

coupling element and another end fixed to the other end of said spring; and

- f. a guide for guiding said flexible coupling device to move said spring in a direction in which said spring is deformed when said first arm is moved angularly such that said flexible coupling device can move a distance corresponding to the rotation of said first arm; and

II. the second arm having one operative wrist at one side of the center of rotation of the second arm, a second balance mechanism, including:

- a. a weight adjusting counter balancer opposite to the operative wrist with respect to the center of rotation of said second arm to balance the weight of said operative wrist about the center of its rotation relative to said first arm,

III. the position of said removably fixed pin support on said coupling body being changeable to any one of a number of positions to vary the compression of said spring to correspond to the load of the first and second arms due to the posture of the installation of the robot.

4,954,044

**METHOD AND MECHANISM FOR ORIENTATING CUP  
BODIES FOR A SYSTEM FOR AUTOMATICALLY  
CONNECTING HANDLES TO THE CUP BODIES**

Isao Chizaki, Toki, Japan, assignor to Shin-Ei Kiko Co., Ltd., Nagoya, Japan

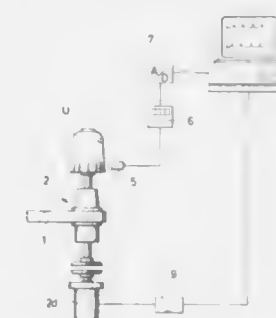
Filed Aug. 28, 1989, Ser. No. 399,309

Claims priority, application Japan, Nov. 30, 1988, 63-303483

Int. Cl.<sup>5</sup> B25J 1/00

U.S. Cl. 414—754

5 Claims



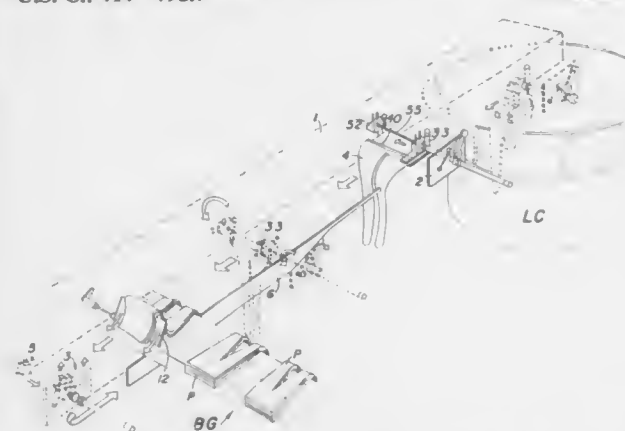
1. A mechanism for automatically orientating cup bodies for a system for automatically connecting handles to the cup bodies, which includes support means for supporting cup bodies and a transparent means for conveying the cup bodies from a cup-body loading position to a cup discharge position, said mechanism comprising

- (a) a cup-body rotating means,
- (b) means for measuring a peripheral configuration of a side wall of a cup body conveyed from the cup-body loading position by the transport means, while the cup body is rotated about a central vertical axis thereof by the cup-body rotating means,
- (c) a central control means for comparing the peripheral configuration of the side wall of the cup body and a peripheral configuration of a side wall of a sample cup body as determined in advance, for determining whether the two peripheral configurations coincide with each other, and for determining an angle by which the cup body is to be rotated to orientate it in a selected direction for the connection of a handle to the cup body at a predetermined position thereon if the two peripheral configurations do not coincide with each other, and
- (d) means for rotating the cup-body rotating means by said angle to orientate the cup body in the selected direction.



**4,954,045**  
**APPARATUS AND METHOD FOR TRANSFERRING**  
**ARTICLES FROM A SEWING MACHINE**  
 Vinicio Gazzarrini, Florence, Italy, assignor to Solis S.r.l., Florence, Italy  
 Filed Oct. 17, 1988, Ser. No. 259,039  
 Claims priority, application Italy, Oct. 16, 1987, 9511-A/87  
 Int. Cl.<sup>5</sup> D05B 21/00  
 U.S. Cl. 414—792.7

13 Claims



1. An apparatus for automatically transferring pantyhose articles having a body portion including an opening with an elastic band and two leg portions and which have spaced-apart seams in said body portion with an unloading station for packing the pantyhose, comprising a sewing machine unloading station, a packing station spaced from said unloading station, a bearing structure including a straight horizontal track extending from said unloading station to said packing station, a carriage movable backwardly and forwardly on said track and provided with a gripper engageable with the elastic band of the pantyhose when the pantyhose is still fitted over a shape portion of the sewing machine so that the opening of the pantyhose around the elastic band is turned inwardly of the sewing machine, a stylus on said carriage relatively moveable apart with respect to said gripper, said gripper lying in a vertical plane, to orient the pantyhose elastic band while the elastic band is held by said gripper with the seams of the pantyhose substantially on the vertical plane, rotation means including a cam fixed on said bearing structure for rotating said elastic band of thus oriented pantyhose about a horizontal axis, a lever with a roller sliding on said cam, a sector gear affixed to said lever and engaged with a gear on said cam shaft, a return spring affixed to said gripper, a shelf underlying said gripper engageable against the pantyhose for allowing the pantyhose to be oriented so as to lay the elastic band on one side of said underlying shelf over said unloading station with the leg portions of said pantyhose on the other side of said shelf.

**4,954,046**  
**PERISTALTIC PUMP WITH MECHANISM FOR**  
**MAINTAINING LINEAR FLOW**  
 Ronald D. Irvin, Ramona, Calif.; David Burkett, Baldwin, Ga.; David E. Kaplan, Moraga, and Ronald J. Harvey, Escondido, both of Calif., assignors to IMED Corporation, San Diego, Calif.

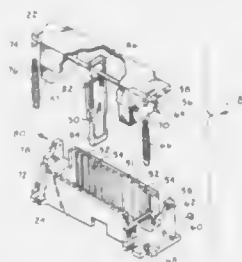
Filed Dec. 8, 1989, Ser. No. 447,880  
 Int. Cl.<sup>5</sup> F04B 43/12

U.S. Cl. 417—53

17 Claims

1. A linear peristaltic pump having a mechanism for maintaining linear flow of fluid through an I.V. tube comprising: a casing;  
 a rotatable camshaft having an upstream end and a downstream end operatively mounted on said casing;  
 a plurality of fingers coupled to said camshaft;  
 a housing for establishing linear reciprocal movement of said fingers in response to rotation of said camshaft for estab-

lishing a moving zone of occlusion along said tube from an upstream end to a downstream end of said tube; and



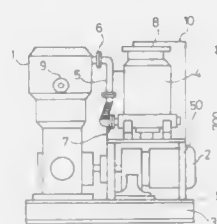
aligning means connecting said casing to said housing and adjustable to tilt said camshaft to prevent unwanted pressure build up in said tube and maintain substantially linear flow of fluid therethrough.

**4,954,047**  
**EVACUATION APPARATUS**  
 Nobuhisa Okuyama; Shiuichi Goto, both of Chiba, and Tsugio Enomoto, Kyoto, all of Japan, assignors to Toyo Engineering Corporation, Tokyo, Japan and Mikuni Jukogyo Co., Ltd., Osaka, Japan

Filed Oct. 5, 1989, Ser. No. 417,569  
 Claims priority, application Japan, Oct. 8, 1988, 63-252895  
 Int. Cl.<sup>5</sup> F04B 23/10

U.S. Cl. 417—203

6 Claims



1. An evacuation apparatus, comprising: a reciprocating, cylinder-and-piston, vacuum pump and a turbomolecular pump connected in series with said reciprocating vacuum pump;

said reciprocating vacuum pump comprising a casing, said casing having therein at least one pump set composed of a non-lubricated cylinder having a reciprocating piston therein, said piston and said cylinder of each set having two suction-delivery chambers defined between the opposite end faces of said piston and the opposing internal end walls of said cylinder, said suction-delivery chambers being connected in series, a suction nozzle and a delivery nozzle for each suction-delivery chamber, a suction valve for each suction nozzle, a delivery valve for each delivery nozzle, the suction nozzle of the first suction-delivery chamber of the series being open for connection to the delivery opening of the turbomolecular pump, the delivery nozzle of the last suction-delivery chamber of the series being adapted to be connected to the ambient atmosphere or other receiver, each other delivery nozzle being connected to the suction nozzle of the next following suction-delivery chamber, an elongated, reciprocable piston rod connected to the piston of each pump set and extending therefrom through the end wall of the associated cylinder, said piston rod having a longitudinally extending portion located outside said casing, the longitudinally extending portion of said piston rod having a radially enlarged section opposed to the end wall of said casing, a metallic bellows fixed at one end thereof to said radially enlarged section of said piston rod and fixed at the

other end thereof in sealing relationship to said casing, said bellows surrounding said piston rod for sealing the space outside said bellows from the space inside the casing;  
 said turbomolecular pump comprising a substantially cylindrical housing having a suction opening at one axial end thereof, said suction opening having a diameter of the same order of magnitude as the diameter of said housing, said housing being closed at the other axial end thereof and having a delivery opening in the vicinity of the other axial end of said housing, a coaxial rotatable shaft in said housing, a coaxial drive motor mounted in said housing close to said delivery opening and connected to the adjacent end of said shaft, a rotor coaxial with said motor and connected to said shaft at the end thereof adjacent to said suction opening, a plurality of movable blades mounted on said rotor for rotation therewith, said movable blades extending radially outwardly with respect to said the rotor, said movable blades being arranged to define a plurality of axially spaced-apart stages and each movable blade being inclined in a common direction relative to a plane perpendicular to the axis of rotation of said rotor, said housing having a plurality of stationary blades mounted thereon and extending radially inwardly therefrom, said stationary blades being arranged to define a plurality of axially spaced-apart stages with the stages of said movable and stationary blades being interdigitated with each other, each stationary blade being inclined in a common direction and reversely to the direction of said movable blades relative to a plane perpendicular to the axis of rotation of said rotor, blade angles of said movable blades being arranged so that a gas is driven from the suction opening to the delivery opening when said rotor is rotated, the suction opening of said turbomolecular pump being connectible to the apparatus to be evacuated.

**4,954,048**  
**PROCESS AND DEVICE FOR CONVEYING BOILABLE LIQUIDS**

Dirk Ohrt, Stolberg, Fed. Rep. of Germany, assignor to Rendamax BV, Netherlands

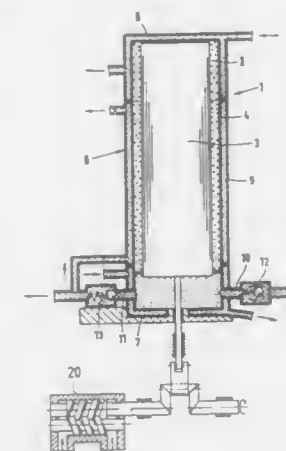
Filed Dec. 30, 1988, Ser. No. 292,335

Claims priority, application Fed. Rep. of Germany, Dec. 30, 1987, 3744487

Int. Cl.<sup>5</sup> F04B 19/24

U.S. Cl. 417—209

10 Claims



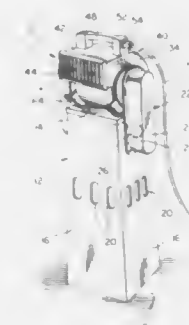
1. A process for conveying boilable liquids wherein the required delivery pressure is generated by alternately changing the boiling pressure of a boilable liquid from a low starting point to a boiling pressure, increased by the desired increase in pressure by an external heat input and then the original state is reproduced by reducing the pressure to the low boiling pressure by dissipating the heat externally, wherein in the vessel through which the boilable liquid to be conveyed flows, a

subquantity of the boilable liquid to be conveyed is subjected directly to the work performing cyclic process in the wet steam region.

**4,954,049**  
**AIR CIRCULATION DEVICE**  
 Joseph M. Armbruster, 2700 NE. 47th St., Lighthouse Point, Fla. 33064  
 Continuation of Ser. No. 73,085, Jul. 14, 1987, abandoned. This application Jun. 27, 1989, Ser. No. 372,175  
 Int. Cl.<sup>5</sup> F04B 39/12

U.S. Cl. 417—234

8 Claims



1. An air circulation device comprising a hollow housing having a squirrel cage blower rotatably mounted therein and driven by an internally mounted motor with the housing including oppositely disposed air inlets for the squirrel cage blower, an air discharge outlet incorporated into said housing for discharge of air, said discharge outlet including adjustable louvers to provide directional control for air being discharged from the blower, and a vertically disposed supporting stand for the blower housing, said stand being hollow and including air inlet openings adjacent the lower end thereof but spaced upwardly from the lower end thereof, filter means in said stand above the air inlet openings for filtering air passing inwardly through the inlet openings and upwardly in the stand, air passage means extending from the upper end of the stand to the inlets in the blower housing, said air passage means including externally mounted tubular members connected to the air inlets through doughnut shaped, compressible, resilient foam seals thereby providing air circulation of filtered air, said filter means including a pair of upwardly inclined filter members inserted through slot-like openings in the stand above the air inlet openings, said blower housing including a handle and mounting plates engaged with the upper end of the stand for detachable connection thereto for enabling the blower and housing to be separated from the stand and used independently thereof.

**4,954,050**  
**WOBBLE PLATE TYPE COMPRESSOR WITH**  
**VARIABLE DISPLACEMENT MECHANISM**  
 Teruo Higuchi; Kiyoshi Terauchi, both of Isesaki; Kazuhiko Takai, Maebashi; Sei Kikuchi, and Hideto Kobayashi, both of Isesaki, all of Japan, assignors to Sanden Corporation, Gunma, Japan  
 Division of Ser. No. 157,782, Feb. 19, 1988, Pat. No. 4,875,834.  
 This application May 15, 1989, Ser. No. 352,056  
 Claims priority, application Japan, Feb. 19, 1987, 62-36443; Feb. 19, 1987, 62-36444

Int. Cl.<sup>5</sup> F04B 27/08

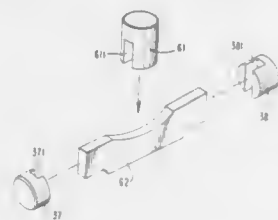
U.S. Cl. 417—269

1 Claim

1. In a wobble plate type compressor with a variable displacement mechanism, said compressor comprising a compressor housing having a cylinder block provided with a plurality of cylinders and a crank chamber adjacent said cylinder block,

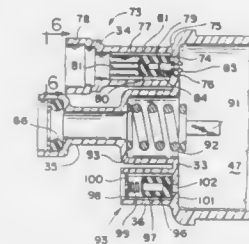
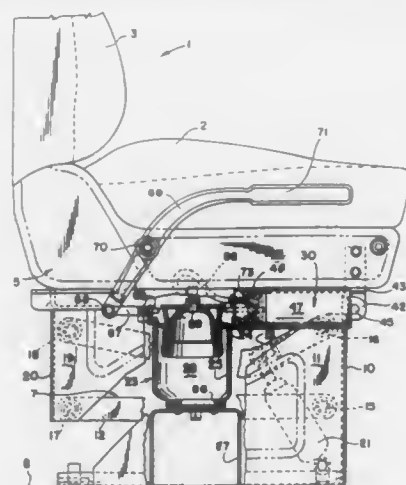
a front end plate attached to said housing at one end adjacent said crank chamber, a piston slidably fitted within each of said cylinders, a drive shaft rotatably supported in said housing, a rotor fixed on said drive shaft and further connected to a variably inclined plate, a wobble plate adjacent said inclined plate with each of said plurality of pistons coupled at one end with said wobble plate, rotational motion of said inclined plate being converted into nutational motion of said wobble plate, and a rotation preventing mechanism to prevent rotation of said wobble plate, the improvement comprising:

said rotation preventing mechanism comprising a pair of



circular discs, each said circular disc including an elongated slit at one end surface thereof, one said disc rotatably disposed in a hole formed on an inner surface of said front end plate and the other of said discs rotatably disposed in a hole formed on the surface of said cylinder block, a guide plate extending within said crank chamber, each end surface of said guide plate disposed in one of said elongated slits of said circular discs, said circular discs and said guide plate rotatable together, and a cylindrical block disposed in a hole formed in an extended portion of said wobble plate, said cylindrical block including a vertical groove therein slidably fitted on said guide plate.

cal portion operative at the end of the compression stroke to exhaust any pressurized fluid remaining between the piston and

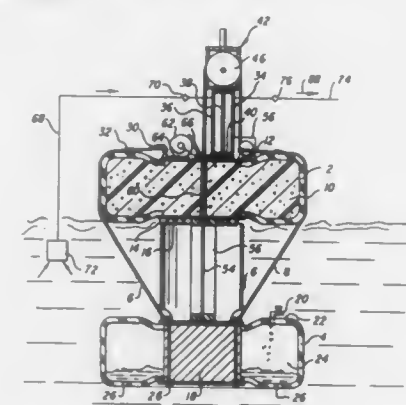


first end to stabilize the piston relative to the cylindrical portion in an at rest position.

**4,954,052**  
**WAVE POWERED PUMP**  
Walter J. Simmons, Martinsburg, W. Va., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.  
Filed Mar. 16, 1989, Ser. No. 324,546  
Int. Cl.<sup>5</sup> F04B 17/00

U.S. Cl. 417—331

14 Claims



1. A land and water transportable apparatus positionable in a body of water for extracting energy from wave action in said body of water, comprising:

- (a) a wheel-shaped float means positionable on the surface of said body of water operable by wave action;
- (b) a wheel-shaped anchor means for positioning on the bottom of said body of water for anchoring said float means;
- (c) a spacer being disposed between said float means and said anchor means for securing said float means to said anchor

**4,954,051**  
**AIR SPRING SEAT AND AIR PUMP**  
Rod Smith, Seymour, Tenn.; Timothy L. Oliphant, Federal Way, and Charles E. Stephens, Kent, both of Wash., assignors to National Seating Company, Vonore, Tenn.  
Division of Ser. No. 103,934, Oct. 2, 1987, Pat. No. 4,809,944.  
This application Jan. 12, 1989, Ser. No. 282,515  
Int. Cl.<sup>5</sup> F04B 49/00

U.S. Cl. 417—305

9 Claims

1. A fluid pump comprising a body means having a first end, a second end and a generally cylindrical portion extending therebetween cooperatively to define a fluid chamber; a piston reciprocally movable in the fluid chamber and guided by the cylindrical portion of the body means, the piston having a compression stroke toward the first end and a return stroke toward the second end; a floating seal carried by the piston slidably to engage the cylindrical portion during the compression stroke to seal the piston to the cylindrical portion and to provide a clearance between the seal and the cylinder during the return stroke; fluid inlet means in the second end to admit fluid to the fluid chamber during the compression stroke of the piston; fluid outlet means in the first end, said outlet means being operative to deliver pressurized fluid from the fluid chamber during the compression stroke of the piston; and pressure equalizing means adjacent the first end of the cylindri-

means when said apparatus is transported to a deployment site;

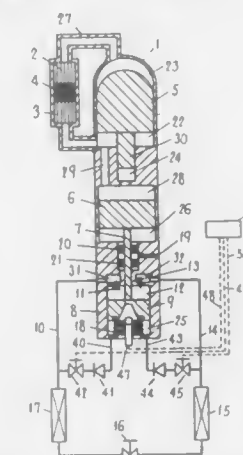
- (d) said spacer having release means for separating said float means from said anchor means upon positioning of said apparatus at the deployment site;
- (e) means for securing said float means to said anchor means when said float means is separated from said anchor means; and
- (f) means associated with said float means for converting wave action energy to useful work.

**4,954,053**  
**FREE-PISTON COMPRESSOR WITH GAS SPRING CONTROL**  
Kenichi Inoda, Hirakata, and Terumaru Harada, Ikoma, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Filed Dec. 14, 1988, Ser. No. 284,122  
Claims priority, application Japan, Dec. 14, 1987, 62-315915; Aug. 30, 1988, 63-215432

Int. Cl.<sup>5</sup> F04B 49/08

U.S. Cl. 417—379

8 Claims

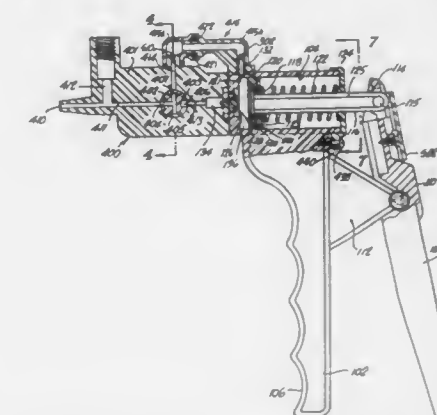


1. A free-piston type compressor comprising:

- a cylinder;
- a compressor piston means, disposed movably in said cylinder, for dividing said cylinder into a spring chamber and a compression chamber and for compressing fluid contained in said compression chamber;
- low-pressure fluid flow means, connected to said compression chamber, for introducing low-pressure fluid into said compression chamber;
- high-pressure fluid flow means, connected to said compression chamber, for receiving high-pressure fluid from said compression chamber after its has been compressed by said compressor piston means;
- a first pipe fluidically connected between said low-pressure fluid flow means and said spring chamber;
- a first control valve disposed in said first pipe;
- a first check valve means, disposed in said first pipe, for preventing flow through said first pipe from said low-pressure fluid flow means to said spring chamber;
- a second pipe fluidically connected between said high-pressure fluid flow means and said spring chamber;
- a second control valve disposed in said second pipe;
- a second check valve means, disposed in said second pipe, for preventing flow through said second pipe from said spring chamber to said high-pressure fluid flow means;
- detecting means for detecting the dead space between said compressor piston and an end of said cylinder; and
- control means for controlling said control valves and to adjust one of the top-dead position and the bottom-dead position of said compressor piston to be at a predetermined location in said cylinder.

**4,954,054**  
**HAND-HELD VACUUM AND PRESSURE PUMP**  
Theodore C. Neward, 9251 Archbald Ave., Cucamonga, Calif. 91730  
Continuation-in-part of Ser. No. 904,697, Sep. 8, 1986, Pat. No. 4,775,302. This application Sep. 30, 1988, Ser. No. 252,195  
Int. Cl.<sup>5</sup> F04B 41/00, 39/10  
U.S. Cl. 417—440

10 Claims



5. An adapter for converting a hand-held vacuum pump to be convertible between either a vacuum pump or a pressure pump, said vacuum pump having:

- (a) a cylinder means and having an inlet opening and an outlet opening;
- (b) a biased piston means for creating a pressure differential and for drawing air through the inlet opening of the cylinder means when said biased piston means is drawn back;
- (c) inlet valve means coupled with the inlet opening of the cylinder means, and outlet valve means coupled with the outlet opening of the cylinder means;
- (d) said adapter comprising valving means for location between the inlet valve means and the outlet valve means, having a port to the valving means, the valving means being movable between a first position wherein the differential pressure creates a pressure at the port and the pump acts as a pressure pump, and a second position wherein a vacuum is created at the port and the pump acts as a vacuum pump.

**4,954,055**  
**VARIABLE ROLLER PUMP TUBING**  
Donald A. Raible, Santa Ana, and William K. Morrow, San Clemente, both of Calif., assignors to Baxter International, Inc., Deerfield, Ill.  
Filed Jun. 22, 1989, Ser. No. 369,806  
Int. Cl.<sup>5</sup> F04B 43/12

U.S. Cl. 417—477

4 Claims



1. A roller pump assembly comprising:

- a pump head assembly having a tube raceway along which one or more pump rollers travel; and
- a variable diameter tubing having a substantially constant wall thickness situated which is formed with two end portions having substantially similar internal diameters and a central larger diameter section situated between said two end portions, said larger diameter central section gradually increasing in diameter from each of said end portions, with said gradual increase in diameter being at a rate of no greater than about thirty degrees per inch, and



wherein said tubing central section is dimensioned to lie substantially along the entire length of said raceway.

ated by said hydrodynamic bearing to said hydrostatic bearing to lubricate same, said passage communicating with said hy-

4,954,056

# SCROLL MACHINE WITH PIN COUPLING

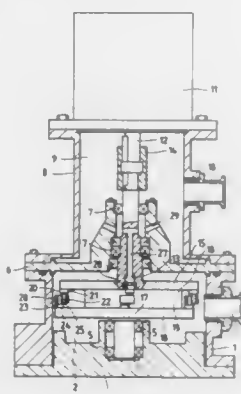
Yoshifumi Muta, and Kozaburo Fujii, both of Fukuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 281,372, Dec. 8, 1988, abandoned. This application Feb. 13, 1990, Ser. No. 480,345

Claims priority, application Japan, Apr. 14, 1988, 63-93940 Int. Cl.<sup>5</sup> F01C 1/04; F16D 3/16

U.S. Cl. 418—55.3

3 Claims



1. A scroll machine, comprising: a first scroll (13) driven by a driving source (11), a second scroll (17) disposed eccentrically with respect to said first scroll and associated therewith to compress fluid, a plurality of first pins (22) arranged on said first scroll along a first circle coaxial with said scroll and protruding axially of said first scroll, an equal plurality of second pins (25) arranged on said second scroll along a second circle having the same radius as that of said first circle and protruding axially thereof, and an equal plurality of connecting members (26) for individually coupling associated and proximate pairs of said first pins and said second pins such that center positions of said first and said second scrolls are always separated from each other by an eccentricity of said second scroll with respect to said first scroll, wherein each of the first and second pins has a convex cylindrical configuration, and each connecting member comprises an annular ring having a concave inner surface.

4,954,057

# SCROLL COMPRESSOR WITH LUBRICATED FLAT DRIVING SURFACE

Jean-Luc Caillat, Dayton, and Stephen M. Selbel, Sidney, both of Ohio, assignors to Copeland Corporation, Sidney, Ohio

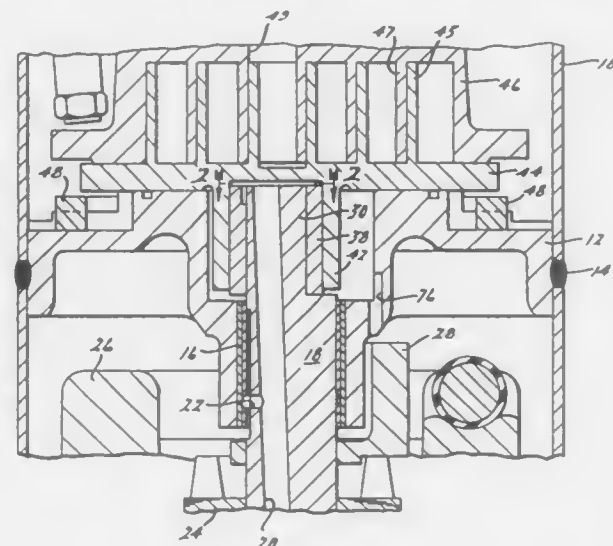
Filed Oct. 18, 1988, Ser. No. 259,252

Int. Cl.<sup>5</sup> F04C 18/04, 29/02; F16C 32/06, 33/10

U.S. Cl. 418—55.6

36 Claims

1. In a machine having two bearings, wherein one is a hydrodynamic bearing and the other is a hydrostatic bearing, the improvement comprising: first means for supplying lubricating oil from a source thereof to said hydrodynamic bearing; and an oil passage for supplying lubricating oil under pressure gener-



drodynamic bearing at a point where only relatively high pressures are developed by said hydrodynamic bearing.

4,954,058

# METHOD FOR MAKING COMPOSITE SINTERED APEX SEAL MATERIAL

Gopal S. Revankar, Moline, Ill., assignor to Deere & Company, Moline, Ill.

Division of Ser. No. 211,732, Jun. 27, 1988, This application Jan. 25, 1990, Ser. No. 471,195

Int. Cl.<sup>5</sup> B22F 1/00

U.S. Cl. 419—18

6 Claims



1. A method of making a wear resistant member comprising sintering a mixture of: (a) tungsten carbide particle and cobalt; and (b) a molybdenum, iron and cobalt alloy to form a sintered body containing more non-angular tungsten carbide particles than before sintering.

4,954,059

# SEALANT BEAD PROFILE CONTROL

Jay Lee, Kings Park, and Alex Mauro, Wheatley Heights, both of N.Y., assignors to Robotic Vision Systems, Inc., Hauppauge, N.Y.

Division of Ser. No. 875,262, Jun. 17, 1986, Pat. No. 4,778,642. This application Jun. 10, 1988, Ser. No. 205,075

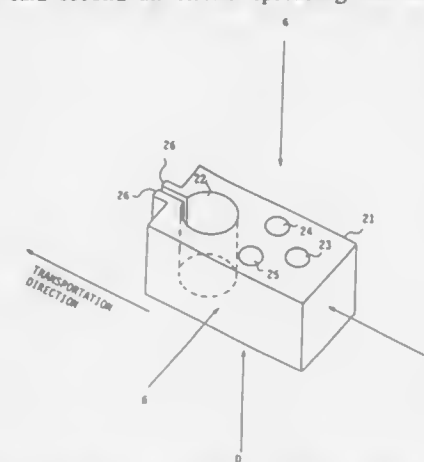
Int. Cl.<sup>5</sup> B29C 47/02; B05C 11/06; B05D 1/26

U.S. Cl. 425—72.1

6 Claims

1. Apparatus for obtaining improved dispensed material profile control, comprising: a dispensing nozzle forming a viscous material under pressure into a stream of said material for forming a bead of said material on a surface; at least one first orifice located lateral to said nozzle and forming air under pressure into a first air stream directed toward said material stream; wherein the improvement comprises: at least one sec-

ond orifice located at a lateral distance greater than said first orifice from said nozzle and forming air under pressure into a second air stream directed toward said bead formed on said surface when said material stream is transported along said surface, said second air stream spreading out said bead of



viscous material; said at least one first orifice and said at least one second orifice being positioned behind said dispensing nozzle and symmetrically about a line through and along said material stream of viscous material formed by said dispensing nozzle to selectively deform the cross-section of said bead into a predetermined shape.

4,954,060

# APPARATUS FOR AGGLOMERATION

Sheng H. Hsu, Marysville, Ohio, assignor to Nestec S.A., Vevey, Switzerland

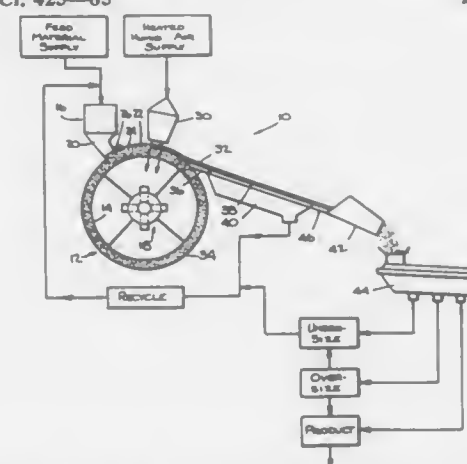
Division of Ser. No. 180,226, Apr. 11, 1988, Pat. No. 4,840,809.

This application Mar. 28, 1989, Ser. No. 329,530

Int. Cl.<sup>5</sup> A23F 5/12

U.S. Cl. 425—85

24 Claims



1. Apparatus for agglomerating particles of water-soluble particulate materials comprising means having a porous surface for conveying a layer of particulate material, means for directing a laminar flow of heated humid air towards the layer of material on the conveying means, and means for applying a reduced pressure from beneath the porous surface for drawing the heated humid air to the conveyed layer of material for contacting the heated humid air with the layer of particulate material for fusing particles of the material at points of contact between surfaces of the particles while substantially avoiding condensation of moisture in voids between the surfaces of the particles.

4,954,061

# MULTI-ORIFICE COEXTRUSION APPARATUS

Kenneth M. Repholz, Crystal Lake, and Pradeep G. Kanade, Algonquin, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

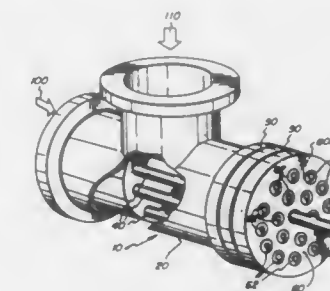
Division of Ser. No. 90,699, Aug. 28, 1987, Pat. No. 4,900,572.

This application Oct. 11, 1989, Ser. No. 419,680

Int. Cl.<sup>5</sup> B29C 47/06; A21C 11/16

U.S. Cl. 425—131.1

20 Claims



1. A multi-orifice coextrusion apparatus comprising: (i) a first extruder positioned to feed a first extruded material into a manifold through a plurality of tubes; (ii) a plurality of tubes extending from said first extruder through which said first extruder can feed the first extruded material into a manifold; (iii) a second extruder positioned to feed a second extruded material into a manifold so as to flow around said plurality of tubes; (iv) a manifold, which comprises a chamber into which said plurality of tubes extend and having a port for introduction of the second extruded material from said second extruder, wherein said chamber comprises a substantially open area to permit the second extruded material to flow around said plurality of tubes; (v) a spacer plate mounted on said manifold which comprises a plurality of spacer passages each of which corresponds to each of said plurality of tubes, each of said spacer passages having an inner diameter greater than the outer diameter of each of said plurality of tubes, and each of said plurality of tubes being disposed in one of said plurality of spacer passages wherein an outer annular opening about an inner opening is formed by each spacer passage/tube combination, wherein said outer annular openings and said inner openings converge to form a plurality of extrusion orifices and said outer annular openings are configured to maintain substantially uniform distribution of the second extruded material about the first extruded material and substantially constant volumetric flow across the cross section of each of said extrusion orifices, said spacer passages each having a rotatable sleeve circumferentially variable in wall thickness.

4,954,062

# APPARATUS FOR CASTING

Jere J. Willing, Grays Lake, Ill., assignor to Nu-Jer Electronics & Mfg. Inc., Grays Lake, Ill.

Filed Aug. 18, 1989, Ser. No. 395,902

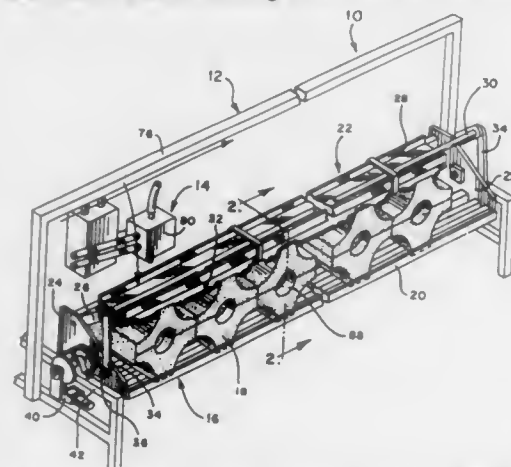
Int. Cl.<sup>5</sup> B29C 39/04

U.S. Cl. 425—135

20 Claims

1. A mechanized apparatus for casting ceramic holloware, comprising: a frame; at least one rotatable table assembly mounted on said frame and dimensioned to releasably retain a plurality of molds therein, said table assembly including a table and a clamp member mounted between a pair of end plates, said end plates pivotally connected to said frame through first and second shafts associated therewith, said clamp member

being positionable between a closed position and an opened position relative to said table; automated control means for positioning said clamp member between said opened position and said closed position, said control means including a load detector for detecting



a predetermined clamping pressure applied to said molds by said clamp member, said clamp member and said table retaining said plurality of molds therebetween; and automated rotation means for rotating said table assembly when said clamp member is in said closed position.

#### 4,954,063 INJECTION PRESSURE CONTROL APPARATUS FOR A DIE CAST MACHINE AND AN INJECTION MOLD MACHINE

Northiro Iwamoto, Zama, Japan, assignor to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

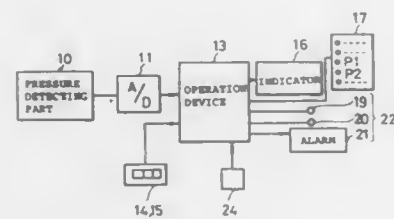
Filed Mar. 29, 1989, Ser. No. 330,287

Claims priority, application Japan, Mar. 29, 1988, 63-41738[U]

Int. Cl.<sup>5</sup> B29C 45/82

U.S. Cl. 425-149

5 Claims



1. An injection pressure control apparatus for a die cast machine comprising:

a pressure detecting part connected to an oil pressure circuit of an injection cylinder,

means for setting a first pressure value to be set based on a pressure value obtained when a pressure of said injection cylinder is increased and a second pressure value to be increased by a predetermined value more than the first pressure value,

an operation device including clock means which clocks a time duration from when a pressure value detected by the pressure detecting part exceeds the first pressure value to when said detected pressure value reaches to the second value, and means for comparing and processing whether said time duration clocked by the clock means is within a desired time or not,

an indicator means indicating the compared and processed result in the operation device.

#### 4,954,064 APPARATUS FOR WINDING SHEETS OF DOUGH ON A DOUGH REEL AND DOUGH SHEETER EQUIPPED WITH A DOUGH SHEETER WINDER

Peter Siegenthaler, Toffen, Switzerland, assignor to Seewer AG, Burgdorf, Switzerland

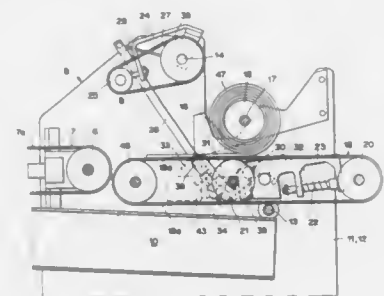
Filed Jul. 22, 1988, Ser. No. 223,290

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1987, 3725090

Int. Cl.<sup>5</sup> A21C 3/06

U.S. Cl. 425-162

7 Claims



5. In a dough winder for a dough sheeter having a dough reel, a conveyor belt for receiving a sheet of dough and conveying it to the dough reel, a drive roller, a support roller, and a guide roller movable between a resting position and a stand-by position, the conveyor belt running over the drive roller, the support roller, and the guide roller and resting at least in part against the dough reel when the guide roller is in the stand-by position, wherein the improvement comprises:

a motor and

a swivel support connected to said guide roller and pivotable by said motor from the stand-by position into the resting position.

#### 4,954,065 MASTER DISK

Koji Shindo, and Masaru Tsuchihashi, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 154,339, Feb. 10, 1988, abandoned.

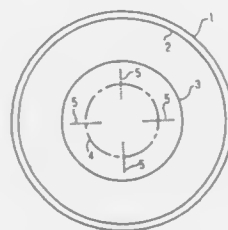
This application Sep. 14, 1989, Ser. No. 406,848

Claims priority, application Japan, Mar. 24, 1987, 62-69478

Int. Cl.<sup>5</sup> B29C 33/42

U.S. Cl. 425-175

7 Claims



1. A master disk, provided with guide tracks, forming a matrix of a stamper having a center hole whose center is the position corresponding to the center of said guide tracks, having an appointed number of calibration tracks formed at an appointed pitch symmetrically relative to a center of said guide tracks on both sides of a position corresponding to an edge portion of said center hole.

#### 4,954,066 THERMOFORMING AND CONVEYOR CHAIN GUIDE APPARATUS

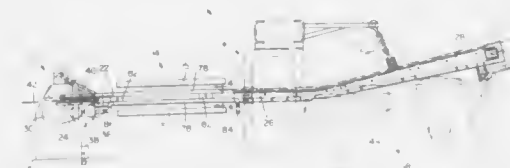
Lynn Leary, and Ronald C. Schumann, both of Batavia, Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Dec. 20, 1988, Ser. No. 286,925

Int. Cl.<sup>5</sup> B29C 49/28; B65G 15/10

U.S. Cl. 425-388

11 Claims



1. A guided chain conveyor apparatus comprising:
  - (a) a roller conveyor chain having means for carrying a web of sheet material along a predetermined path;
  - (b) lower guide means positioned below the chain and extending in the direction of the predetermined path for supporting and guiding a run of chain;
  - (c) cover means positioned above the lower guide means and spaced therefrom to permit free passage of the chain between the lower guide means and the cover means, the cover means extending over the chain as a protective cover to prevent debris from falling onto the chain; and
  - (d) upper guide means for the run of chain positioned between the cover means and the chain and spaced from the lower guide means to define therewith a chain receiving passageway extending in the direction of the predetermined path, the upper guide means being a thin flexible member extending over the chain and sufficiently close thereto to provide an upper retaining surface to prevent tilting of the chain about an axis extending in the direction of the predetermined path.

#### 4,954,067 HYDRAULIC PRESS

Richard Brüssel, Sulzfeld, Fed. Rep. of Germany, assignor to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Japan

Filed Jan. 30, 1989, Ser. No. 303,348

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1988, 3802761

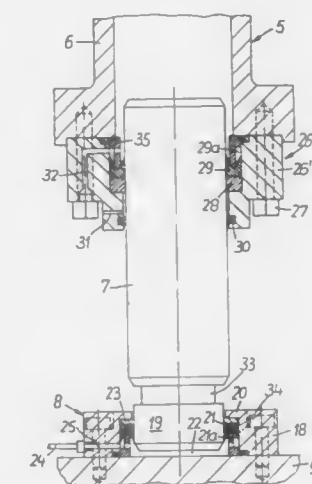
Int. Cl.<sup>5</sup> B29C 43/32; B30B 15/24

U.S. Cl. 425-406

14 Claims

1. A hydraulic press comprising
  - (a) a press stand;
  - (b) a generally horizontal press plate vertically movably supported in the press stand and arranged for executing forward and return strokes;
  - (c) a plurality of hydraulic press cylinder units mounted in said press stand above the press plate; each press cylinder unit having
    - (1) a power cylinder having an end oriented towards said press plate; and
    - (2) a plunger slidably received in the power cylinder and extending from the power cylinder to said press plate; said plunger having a lower terminus;
  - (d) a plurality of hydrostatic bearings mounted on said press plate; a separate one of said hydrostatic bearings being associated with each plunger; each said hydrostatic bearing defining a chamber containing hydraulic fluid; said lower terminus of said plunger projecting into said chamber; the hydrostatic bearings constituting a force-transmitting arrangement between the plungers and said press plate and having means for permitting a tilting motion of the plungers relative to the press plate; and
  - (e) means mounted at said end of each said power cylinder for sealingly and tiltably guiding the plunger at said end of

each said power cylinder, said tilting and guiding means including a guide ring surrounding said plunger, and said



guide ring having a sufficiently short axial length for permitting the tilting of the plunger at said end of said power cylinder.

#### 4,954,068 HYDRAULIC PRESS

Richard Brüssel, Sulzfeld, Fed. Rep. of Germany, assignor to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany

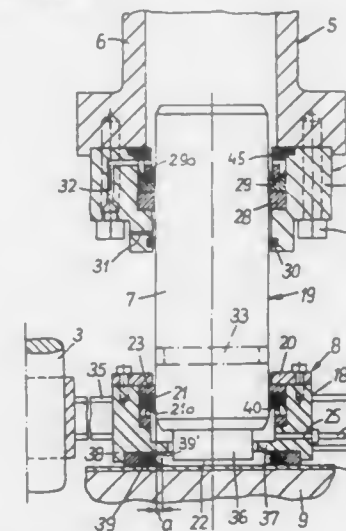
Filed Jan. 30, 1989, Ser. No. 303,350

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1988, 3802761

Int. Cl.<sup>5</sup> B29C 43/32; B30B 15/24

U.S. Cl. 425-406

12 Claims



1. A hydraulic press comprising
  - (a) a press stand;
  - (b) a generally horizontal press plate vertically movably supported in the press stand and arranged for executing forward and return strokes;
  - (c) a hydraulic press cylinder unit mounted in said press stand above the press plate and having
    - (1) a power cylinder having an end oriented towards said press plate; and
    - (2) a piston rod longitudinally slidably received in the power cylinder and extending from the power cylinder



- to said press plate; said piston rod having a lower terminus;
- (d) a hydrostatic floating bearing assembly being loosely placed on a surface of said press plate for allowing displacement of the bearing assembly relative to the press plate; said hydrostatic floating bearing assembly defining a chamber containing hydraulic fluid; said lower terminus of said piston rod projecting into said chamber; the hydrostatic floating bearing assembly constituting a force transmitting arrangement between the piston rod and said press plate; said hydrostatic floating bearing assembly comprising:
- (1) an annular body surrounding said lower terminus of said piston rod and being coaxial therewith; said annular body being a sleeve-shaped component open at both axial ends; and
  - (2) a sealing ring positioned between said annular body and said surface of said press plate and being generally coaxial with said piston rod; said sealing ring sealingly engaging said annular body and said surface and having a working inner diameter which is smaller than the diameter of said lower terminus of said piston rod.

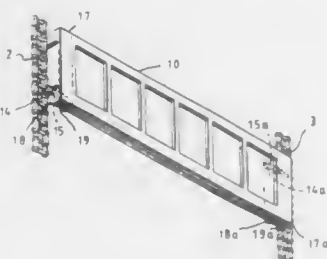
4,954,069

# APPARATUS FOR MOLDING CHOCOLATE BARS

Franklin Friedwald, 3781 Mahlon Brower Dr., Oceanside, N.Y. 11572

Continuation-in-part of Ser. No. 138,960, Dec. 29, 1987, abandoned. This application Feb. 15, 1989, Ser. No. 311,475  
Int. Cl. B29C 39/06; A23G 1/26  
U.S. Cl. 425—453

2 Claims



1. A machine for moulding chocolate bars, said machine comprising:
  - a pair of spaced apart conveyor chains, each chain having a plurality of spaced apart pins extending toward the other chain;
  - a plurality of unitary mould and carrier combinations each including at least one mould cavity depending from an upper horizontally extending wall of said mould and carrier combination and means for connecting each end of said combination directly to a respective adjacent chain, said means on each said end including a sheath slot extending from at least one downwardly extending wall, said wall extending downwardly from said upper wall of said mould and carrier combination and spaced from said cavity.

4,954,070

# IN-MOLD LABEL DISPENSER HAVING SINGLE ACTUATOR FOR DISPENSING HEAD AND LABEL CARRIER

Richard L. Dunlap, Cairo, Ohio, assignor to Plastipak Packaging, Inc., Plymouth, Mich.

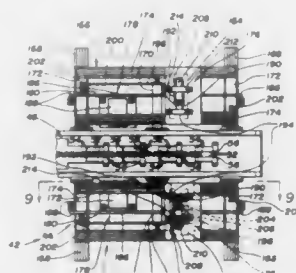
Filed May 8, 1989, Ser. No. 330,095  
Int. Cl. B29C 49/24

U.S. Cl. 425—503

27 Claims

1. An in-mold label dispenser for supplying labels to a plastic blow molding machine mold including a pair of mold sections that define cavity sections and are mounted for movement

along a first direction toward and away from each other without any other movement between an open position spaced from each other and a closed position where the cavity sections define an enclosed cavity in which blow molding is performed, the label dispenser comprising: a base; a label supply; a dispensing head mounted by the base for rectilinear movement in a second direction perpendicular to the first direction between a withdrawn position with respect to the mold and an inserted position between the open mold sections; an actuator that moves the dispensing head between the withdrawn and inserted positions; a label carrier having an elongated shape including a first end pivotally mounted on the dispensing head and a second end for carrying labels from the label supply to the mold; the label carrier having a retracted position where the elongated shape thereof extends from the first end thereof toward the mold to the second end thereof along the second direction during movement of the dispensing head between the withdrawn and inserted positions; the label carrier having a label transfer position where the elongated shape thereof extends from the first end thereof toward the second end thereof along the first direction to transfer a label thereon to the mold; and a cam mechanism that pivotally moves the label carrier between the retracted and label transfer positions as the dispensing head moves under the impetus of the actuator to and from the inserted position while the second end of the label



carrier is moved along the first direction during the pivoting of the label carrier to ensure accurate positioning of the label within the mold.

25. An in-mold label dispenser for supplying labels to a plastic blow molding machine mold including a pair of mold sections each of which defines a plurality of cavity sections and is mounted for movement along a first direction toward and away from the other mold section without any other movement between an open position spaced from the other mold section and a closed position where the cavity sections define a plurality of enclosed cavities in which blow molding is performed, the label dispenser comprising: a base; a dispensing head mounted by the base for rectilinear movement in a second direction transverse to the first direction between a withdrawn position with respect to the mold and an inserted position between the open mold sections; an actuator that moves the dispensing head between the withdrawn and inserted positions; a plurality of label carriers respectively mounted on the dispensing head; a label supply including a single label magazine; a magazine carrier that supports the label magazine for movement adjacent the dispensing head when the dispensing head is in the withdrawn position; a magazine actuator; and an eccentric rotatively driven by the magazine actuator and moving the magazine carrier in a cycloidal path while the dispensing head remains stationary in the withdrawn position in order to supply labels from the label magazine to said plurality of label carriers.

4,954,071

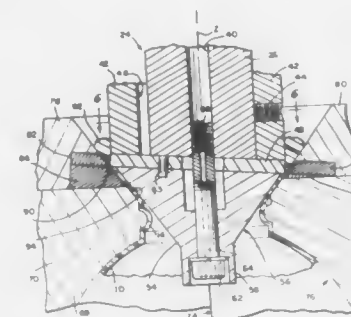
# CALIBRATING BLOW PIN

George H. Austin, Marietta, Ga., assignor to Sewell Plastics, Inc., Atlanta, Ga.

Filed Sep. 28, 1989, Ser. No. 414,105  
Int. Cl. B29C 49/50, 49/58

U.S. Cl. 425—531

20 Claims



1. A blow pin and blowing mold for use in blow-molding articles from an extruded parison comprising:

a mold having an article body defining portion and a finish defining portion including an anvil portion to permit severing of a flash portion of the parison from the article being molded, and

a blow pin, mounted for reciprocation with respect to the mold along an axis, having a first portion for introduction into the parison including a blow hole to inject blowing medium therein and a shearing ring portion for cooperation with the anvil portion to sever the flash portion of the parison from the article being molded,

the shearing ring portion and anvil portion both being inclined with respect to a plane normal to the axis of reciprocation of the blow pin to form an inclined finish on the article being molded.

8. A blow pin assembly for use in injecting blowing medium into an extruded parison comprising:

a center shaft including a blow hole along an axis thereof to permit the injection of blowing medium therethrough having a first end for receiving blowing medium and a second end, the surface of the center shaft surrounding the second end being inclined with respect to said axis;

a shearing ring mounted in contact with the center shaft inclined surface having an outer periphery extending radially beyond the periphery of the center shaft to form an inclined finish on an article to be created by the blowing medium;

a sleeve surrounding the center shaft including an inclined end surface contacting a surface of the shearing ring adjacent the periphery thereof, and coupling means for coupling the sleeve to the center shaft; and

a blow pin tip fixed to the shearing ring on a side opposite the center shaft and fastener means coupling the blow pin tip to the center shaft.

4,954,072

# ELECTRICALLY HEATED PIN-POINT GATE

Wolfgang Zimmerman, Tulpenstrasse 15, D-8201 Schechen, Fed. Rep. of Germany

PCT No. PCT/EP87/00532, § 371 Date Mar. 10, 1989, § 102(e) Date Mar. 10, 1989, PCT Pub. No. WO88/01928, PCT Pub. Date Mar. 24, 1988

PCT Filed Sep. 17, 1987, Ser. No. 332,279

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1986, 3631850

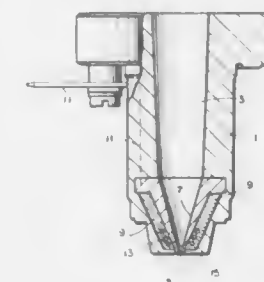
Int. Cl. B29C 45/20

U.S. Cl. 425—549

13 Claims

11. An electrically heatable pinpoint gate nozzle for injecting plastic material into a cavity of a molding machine, said

gate nozzle comprising means defining a nozzle body having a central flow channel for the plastic material, a low mass inside nozzle located inside said central flow channel and facing the



mold cavity, said inside nozzle including a Peltier element for heating said inside nozzle and means for supplying electrical energy to said Peltier element.

4,954,073

# APPARATUS FOR HIGH FREQUENCY MOLDING OF LIQUID PLASTIC MATERIAL

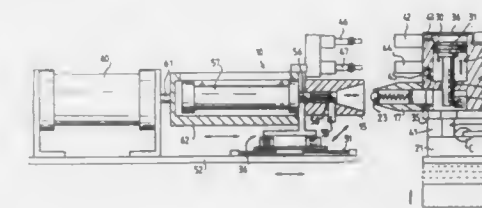
Robert Oriez, Vendome, and Elie Gras, Genay, both of France, assignors to Anver, Maisons-Alfort Cedex, France

Filed May 4, 1989, Ser. No. 347,306

Claims priority, application France, May 4, 1988, 88 05968  
Int. Cl. B29C 45/22

U.S. Cl. 425—547

3 Claims



1. High frequency molding apparatus for producing a molded object having a plastic part shaped as a closed loop around a substrate, said apparatus comprising:

a mold assembly (11) having a first opening and a second opening (40) and defining a mold cavity therewith;

feeding means (10) for filling the cavity of said mold by injecting a heat curable plastic into said first opening and for venting the cavity of said mold through said second opening, said feeding means comprising a female injection nozzle (15) and a female venting nozzle (16);

high frequency curing means (12) for subjecting said filled cavity to high frequency heating and pressure;

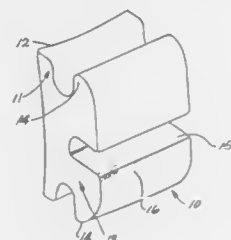
a male injection nozzle (17) and a male venting nozzle on said mold assembly respectively adjacent said second and first openings for communicating with said female injection nozzle and said female venting nozzle respectively;

control means (30) for controlling opening and closing of said male nozzles, said control means comprising first and second double action actuators comprising respective piston cylinder ram assemblies respectively associated with said male injection nozzle and said male venting nozzle, and comprising respective pistons and piston rods made of a material which does not exhibit dielectric loss, said actuators being mounted so that said piston rods slide respectively into and out from said first and second openings for respectively closing and opening the communication between said nozzles and said first and second openings, said male nozzles and said actuators forming a unit assembly removably associated with each mold fitted therewith.

35. A translucent orthodontic appliance for coupling to a tooth surface, formed of a single phase, self-bonded, polycrystalline ceramic having substantially randomly oriented crystals with an average grain size larger than the wavelength of visible



light and no more than ten percent of the thickness of the thinnest section of the appliance, said crystals scattering visible light passing through said appliance while having an in-line transmittance of visible light of at least 20% through 0.5 millimeter thickness of ceramic for minimizing backscattering of

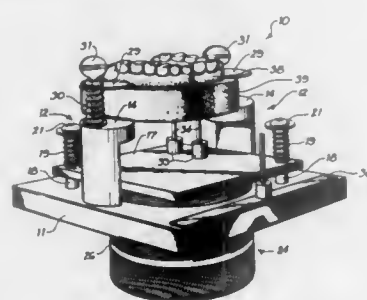


said visible light, whereby said visible light passing through said appliance is reflected from said tooth surface and retransmitted back through said appliance for emission therefrom, wherein said appliance substantially assumes a color corresponding to said tooth surface.

**4,954,081**  
**DENTAL DOWEL PIN REMOVAL METHOD AND APPARATUS**  
Barkley B. Williams, 316 Concord Woods Dr., Smyrna, Ga. 30080

Filed Dec. 2, 1988, Ser. No. 279,027  
Int. Cl.<sup>5</sup> A61C 19/00

U.S. Cl. 433—53



1. An apparatus for simultaneously separating segments of a dental cast from their plaster base wherein the segments are mounted to the base with pins positioned within holes that extend through the base, said apparatus comprising:

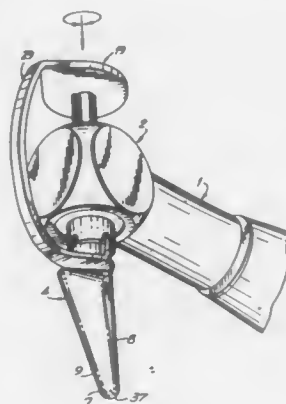
- a platform;
- mounting means for mounting, the base in a predetermined position spaced from said platform;
- pin engaging means adapted to be positioned upon said platform and aligned for insertion into the holes of a base located at said predetermined position; and
- means for moving said predetermined position and said platform toward each other,

whereby the pin engaging means engages the dental cast pins upon relative movement of the platform and base to dislodge the pins and separate the dental cast segment from the base.

**4,954,082**  
**RECIPROCATING DENTAL TOOL**  
Bernard Weissman, 225 E. 48th St., New York, N.Y. 10017  
Filed Apr. 8, 1988, Ser. No. 179,332  
Int. Cl.<sup>5</sup> A61C 17/02

U.S. Cl. 433—80

17 Claims

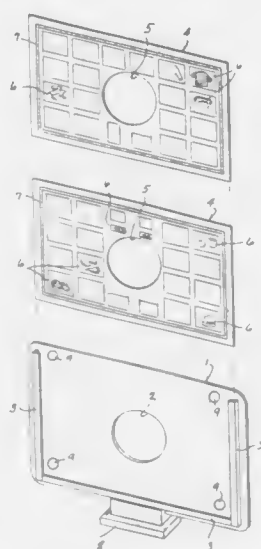


1. In a dental device comprising reciprocating drive means, a sleeve member operatively connected to the drive means for reciprocating motion, and designed to retain a dental tool, and a dental tool having a shank and a blade portion and being retained in said sleeve by said shank, the improvement comprising an internal channel extending axially along a central portion of the shank, and a plenum chamber within the blade portion in fluid flow connection with the shank channel, outlet openings through the blade surface, and pressure means and closure means for the shank channel, operable to force any fluid material within the channel and plenum out through the outlet openings.

**4,954,083**  
**COMMUNICATION AID**  
Ruth B. Leff, and Aaron N. Leff, both of 6589 N. Crestwood Dr., Glendale, Wis. 53209  
Filed Aug. 17, 1989, Ser. No. 394,965  
Int. Cl.<sup>5</sup> G09B 21/00

U.S. Cl. 434—112

15 Claims



15. A communication aid for a handicapped patient, comprising a panel having a central opening therein, a plurality of overlay sheets each having a central aperture therein, mounting means on said panel for individually and removably mount-

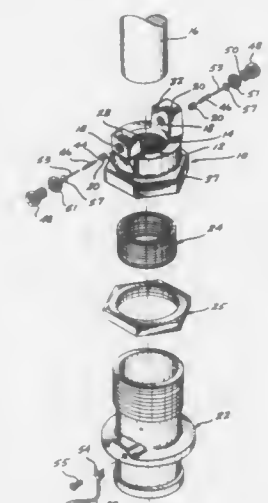
ing each sheet in general flatwise relation to the panel with the aperture being aligned with said opening, and a plurality of symbols disposed around the aperture of each sheet, the symbols on one sheet being different than the symbols on the other sheets, wherein with a sheet mounted on said panel an observer looking through the aligned opening and aperture can follow the eyes of the patient to determine the symbol at which the patient's eyes are directed.

**4,954,084**  
**SHAFT-GROUNDING STUFFING BOX COVER**  
John F. Pugh, Bellevue, and Ann L. Magallanes, Redmond, both of Wash., assignors to Marine Hardware, Inc., Redmond, Wash.

Filed Sep. 6, 1989, Ser. No. 404,286  
Int. Cl.<sup>5</sup> H01R 39/00, 4/66

U.S. Cl. 439—29

14 Claims



1. A stuffing box cover comprising:  
a ring member having an aperture dimensioned to accommodate a rotating shaft extending therethrough and adapted for attachment to a stuffing box housing so as to form a liquid-tight seal around the rotating shaft; and  
a grounding assembly integral with said ring member having a conductive brush that contacts the rotating shaft so as to provide a conductive path to it and to allow substantially free movement of the rotating shaft, said grounding assembly including  
a brush holder attached to said ring member and spaced apart from the rotating shaft, said brush holder having an opening radially disposed relative to the rotating shaft, said conductive brush being seated within said opening and directed toward the rotating shaft, and biasing means for urging said conductive brush into conductive contact with the rotating shaft, said biasing means comprising a fastener secured within said opening and a spring means disposed within said opening extending between said fastener and said conductive brush.

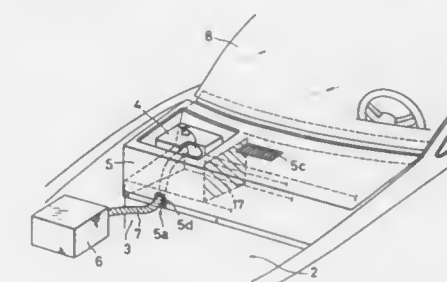
**4,954,085**  
**WIRING STRUCTURE**  
Toshihiro Inoue, and Kazuhiro Ozawa, both of Utsunomiya, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,066  
Claims priority, application Japan, Jul. 24, 1987, 62-183689; Jul. 24, 1987, 62-183690; Jul. 31, 1987, 62-190382; Jul. 31, 1987, 62-190383; Jul. 31, 1987, 62-190384

Int. Cl.<sup>5</sup> H01R 33/74

U.S. Cl. 439—34

10 Claims



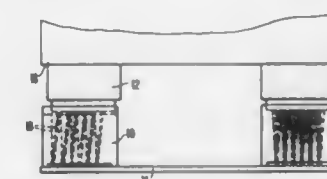
1. A wiring joint structure in a vehicle, comprising:  
a connector guide having an end mounted to a partition wall, bounding an indoor side and an outdoor side of the vehicle, penetrating through a hole formed in said partition wall, said connector guide having a clip-like projection for temporarily fixing said connector guide to said partition wall;  
a first connector positioned opposite to said end of the connector guide;  
a second connector positioned within said connector guide to receive said first connector, said second connector slidably supported by said connector guide;  
a bolt member provided rotatably on said first connector; and  
a nut member fixed to said second connector as directed in a sliding direction thereof;  
wherein making the first and second connectors butt against each other in a predetermined positional relationship and rotating said bolt member, said bolt member is threadedly inserted into said nut member, said second connector slides along said connector guide, and connect elements provided in respective connectors are therein connected with each other.

**4,954,086**  
**FLOAT/GUIDE MEMBER FOR CARD EDGE CONNECTOR**  
Edward W. D. Hill; William P. Buckley, both of Toronto, and Robert Hennessey, Ajax, all of Canada, assignors to Burndy Corporation, Norwalk, Conn.

Filed Jun. 21, 1989, Ser. No. 370,590  
Int. Cl.<sup>5</sup> H01R 13/629

U.S. Cl. 439—65

4 Claims



1. A one-piece float/guide member for directly connecting a

daughter printed circuit card to a motherboard, said float/guide member having a transverse plane, comprising an insulative body member, said body member being defined by top, bottom, front, rear and side walls, a plurality of contact receiving cavities provided in said body member, each contact receiving cavity communicating with at least one first opening in said top wall, each of said contact receiving cavities communicating with a second opening in said bottom wall, a card edge connector having a plurality of thinned and lengthened pin contact members associated with said top wall, a pair of parallel upstanding rail members provided on said top wall for limiting movement of said connector perpendicular to the transverse plane of said body member, each of said contact members being received in said body member through a respective one of said first openings so as to extend within a respective one of said contact receiving cavities and to project from a respective one of said second openings and directly engage to said motherboard, said first openings being oversized with respect to said contact members, each of said contact receiving cavities having a first portion proximate said second opening for snugly receiving the contact member and a second portion extending from said first portion to said first opening which is enlarged with respect to said contact member, said daughter printed circuit board being associated with said card edge connector such that said daughter printed circuit board may be associated with a second card edge connector by floating said first card edge connector with respect to said float/guide member in the lateral direction on its contact members by allowing said contact members in said enlarged portion to bend, said daughter printed circuit board floating as a unit.

4,954,087

# STATIC-FREE INTERROGATING CONNECTOR FOR ELECTRIC COMPONENTS

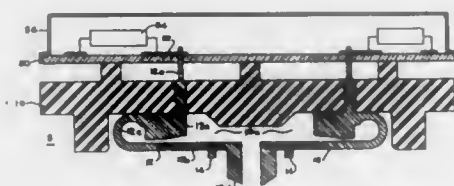
Imants R. Lauks, Morrisville, Pa., and Michael P. Zelin, Plainsboro, N.J., assignors to I-Stat Corporation, Princeton, N.J. Continuation of Ser. No. 187,665, Apr. 27, 1988, abandoned.

This application Mar. 2, 1990, Ser. No. 489,844

Int. Cl.<sup>5</sup> H01R 9/09, 13/648

U.S. Cl. 439—71

13 Claims



1. A connector for contacting an electric component comprising:
  - a housing including means for locating said component in a specified physical relationship to said housing;
  - a plurality of contact members carried by and biased with respect to said housing so as to be urged into physical contact with a predetermined electric component in said specified physical relationship to said housing;
  - conductor means located such that at least some of said biased contact members are urged into electrically conductive relation with said conductor means when no electric component is in said specified physical relationship to said housing, and such that selected contact members are displaced out of their electrically conductive relation to said conductor means when an electric component is in said specified physical relationship to said housing, different combinations of said contact members being displaced by different electric components; and
  - means connected to said contact members for determining the combination of displacements of said contact members when an electric component is in said specified physical

relationship to said housing, and for identifying the component responsive thereto.

4,954,088

# SOCKET FOR MOUNTING AN IC CHIP PACKAGE ON A PRINTED CIRCUIT BOARD

Tsutomu Fujizaki, Yokohama, and Minoru Shibata, Matsuzaka, both of Japan, assignors to Matsushita Electric Works, Ltd., Japan

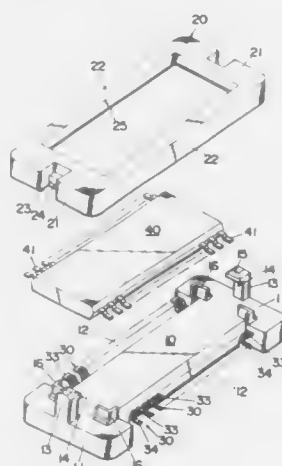
Filed Feb. 16, 1990, Ser. No. 480,908

Claims priority, application Japan, Feb. 23, 1989, 1-44611; Ser. 26, 1989, 1-112424[U]

Int. Cl.<sup>5</sup> H01R 9/09

U.S. Cl. 439—73

9 Claims



1. A socket adapted for mounting on a printed circuit board an IC chip package having a plurality of sideward extending leads comprising:
  - an elongated socket body of electrically insulating material;
  - a plurality of contact elements carried by said socket body to be aligned along the length thereof;
  - a cover frame of electrically insulating material fitted on said socket body in order to press said IC chip leads against the corresponding ones of said contact elements for positive electrical connection therebetween;
  - each of said contact elements comprising a base and an anchor leg at one end of said base, the other end of said base extending laterally and being bifurcated to form a vertically spaced pair of a spring leg for contact with the corresponding one of said IC chip leads and a terminal leg for connection with a circuit on said printed board, said contact elements fixed to said socket body with said anchor leg fixed to the lateral center portion of said socket body in such a way as to project said spring leg and terminal legs laterally outwardly of said socket body and to form an open space between said spring and terminal legs; and
  - said socket body provided at its longitudinal ends with catch means for detachably engagement with the corresponding ends of said cover frame for supporting said cover frame in position on said socket body.

4,954,089

# TERMINATOR ASSEMBLY FOR INTERCONNECTING COMPUTER DEVICES

William T. Jensen, Mundelein; Vincent B. Brown, Prospect Heights; Cathy J. Edgerton, Barrington, all of Ill., and Robert W. Masterson, Denver, Colo., assignors to Methode Electronics, Inc., Chicago, Ill.

Division of Ser. No. 572,173, Jan. 18, 1984, Pat. No. 4,857,002. This application Sep. 8, 1989, Ser. No. 404,694

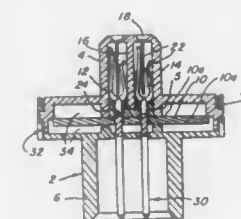
The portion of the term of this patent subsequent to Aug. 15,

2006, has been disclaimed.

Int. Cl.<sup>5</sup> H01R 9/09, 13/66

U.S. Cl. 439—76

6 Claims



1. In an assembly for providing code compatibility between a computer and peripheral devices, and including a housing for supporting a plurality of electrical contact members, said housing defining a plurality of openings at one end thereof to form a female receptacle, each of said electrical contact members having one end which is disposed within one of said openings to provide electrical contact with a male pin that is inserted into the respective opening, the improvement comprising, in combination:

- a circuit board formed of insulative material and defining a plurality of holes therethrough;
- an electrically conductive plating extending through said holes;
- a resistor network carried by said circuit board, said resistor network comprising thick film polymer resistors connected to said conductive plating in a selected array;
- said electrical contact members extending through said plated holes, whereby said housing, electrical contact members and said circuit board form a compact, unitary assembly;
- said assembly also including a second male housing member which is connectable to said female receptacle to form an assembly comprising a female receptacle on one side of said circuit board and a male plug on the opposite side of said circuit board, said electrical contact members projecting through said plated holes in said circuit board and through corresponding openings in said second male housing member to form male pins at the side of said circuit board opposite from said female receptacle.

4,954,090

# ELECTRIC CONNECTION BOX

Eiji Shimochi, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan

Filed May 30, 1989, Ser. No. 358,227

Claims priority, application Japan, May 31, 1988, 63-131708

Int. Cl.<sup>5</sup> H01R 9/09

U.S. Cl. 439—76

6 Claims

1. In an electric connection box of the type having a pair of upper and lower cases connected together to provide a casing, at least one of said upper and lower cases having an electrically insulating housing; a wiring assembly accommodated within said casing and including an electrically insulating plate and a plurality of bus bars mounted on said insulating plate; and external connection terminals electrically connected to said bus bars and having respective contact portions received within said insulating housing;

the improvement comprising, each of said external connection terminals including a base portion fixed to said one

case, a plurality of said contact portions formed on one lateral edge of said base portion and extending into said housing, and a bus bar-gripping portion formed on the other lateral edge of said base portion and press-fitted to a said bus bar, and wherein each bus bar includes a bent

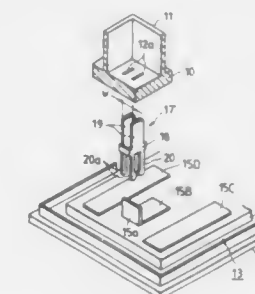


plate portion disposed substantially vertically for receiving said bus bar-gripping portion, in which said external connection terminal has two said bus bar-gripping portions press-fitted relative to at least one of said bus bars, respectively.

4,954,091

# CONVERTIBLE GROUND SAFETY PLUG

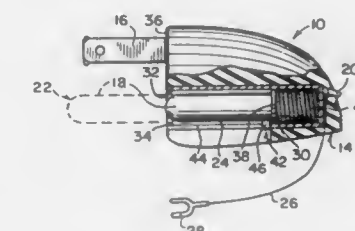
Steven C. Marble, 330 S. Washington, and Gary D. Marble, 304 W. Grand, both of Neosho, Mo. 64850

Filed Dec. 14, 1989, Ser. No. 450,540

Int. Cl.<sup>5</sup> H01R 4/66

U.S. Cl. 439—103

1 Claim



1. A convertible ground safety plug in combination with a three conductor power cord, comprising:
  - (a) an insulated housing;
  - (b) a pair of power prongs securely embedded in said housing electrically connected to two of the conductors and projecting outwardly from said housing;
  - (c) a grounding prong carried in said housing electrically connected to the third conductor;
  - (d) means for moving said grounding prong between an active position projecting outwardly from said housing and an inactive position not projecting outwardly from said housing so that said plug can be utilized for a three slot receptacle and a two slot receptacle to complete an electrical circuit, said moving means including a conductive general cylindrical sleeve having an open end with an internal retaining lip therein, said sleeve embedded in said housing so that said retaining lip is in alignment with the end of said housing having said power prongs projecting outwardly therefrom and electrically connected to the third conductor, said grounding prong having an enlarged ring on an inner end adapted to slide within said sleeve so that when said ring contacts said retaining lip it will prevent said grounding prong from disengaging from said sleeve, and a spring mechanically and electrically secured between the interior of said sleeve and said ring on said grounding prong to provide electrical contact between



the third conductor and said grounding prong, said spring being of sufficient resilience to independently, automatically maintain said grounding prong in its outwardly projecting active position when said plug is inserted into the three slot receptacle and automatically allowing said grounding prong to retract to its inactive position within said sleeve when said plug is inserted into the two slot receptacle;

(c) a wire with a "C"-shaped connector on one end and electrically connected at the other end to the third conductor so that said connector can be attached to a ground screw when said plug is utilized for the two slot receptacle to ground said plug; and

(f) means for locking said grounding prong in its outwardly projecting active position before said plug is inserted into the three slot receptacle, said locking means including said sleeve having a longitudinal slot therein, and a locking tab extending from the side of said grounding prong adjacent said enlarged ring on the inner end thereof so that said grounding prong can be turned to place said locking tab in alignment with said slot to allow said grounding prong to go into its retracted inactive position and to place said locking tab out of alignment with said slot to lock said grounding prong in its outwardly projecting active position.

4,954,092

## ELECTRICAL CONTACT UNIT

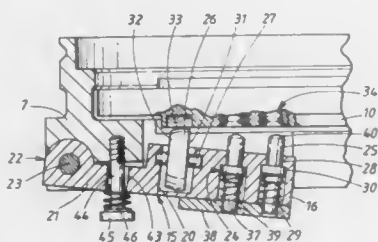
Rolf G. Fransson, Angered; Bertil E. Jansson, deceased, late of Askim, and Magnus Jansson, Administrator, Jönköping, all of Sweden, assignors to Victor Hasselblad Aktiebolag, Göteborg, Sweden

Filed Sep. 15, 1988, Ser. No. 244,904

Claims priority, application Sweden, Sep. 15, 1987, 8703553  
Int. Cl.<sup>5</sup> G03B 17/14

U.S. Cl. 439—152

9 Claims



1. Electrical contact unit for electrically connecting a first main member, having a generally planar first supporting surface, with a second main member, having a generally planar second supporting surface, the second main member being mountable on the first main member, in which:

the first main member comprises a contact cradle, which exhibits a generally planar outer cradle surface and comprises first electrical contacts and a supporting member, which extends from the outer cradle surface;  
the second main member comprises second electrical contacts and is provided with a receiving recess;  
the contact cradle is rotatably journaled on a cradle axle;  
the second main member assuming:

- a first mounting position, in which the first supporting surface is parallel to and is located immediately adjacent to the second supporting surface, and the rolling/sliding member lies against the second supporting surface, the contact cradle thereby assuming a retracted position, in which none of the first electrical contacts is in physical contact with the second main member, and
- a second mounting position, in which the first supporting surface is parallel to and is located immediately adjacent to the second supporting surface, the supporting member being located in the receiving recess, the contact cradle thereby assuming a contact position, in which

each of the first electrical contacts is in contact with a corresponding one of the second electrical contacts; and in which the second main member moves from the first mounting position to the second mounting position and vice versa by the two main members being rotated relative to one another.

4,954,093

## SHUNT CONNECTION DEVICE FOR ELECTRICAL CONNECTORS

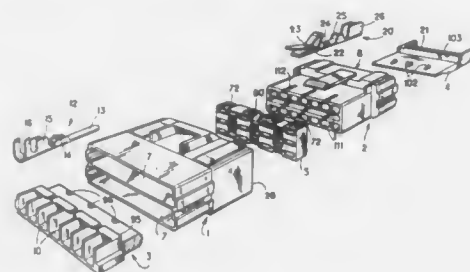
Leonard Nadin, L'Union, France, assignor to Labinal, Montigny le Bretonneux, France

Filed Apr. 27, 1989, Ser. No. 343,603

Claims priority, application France, May 11, 1988, 8806397  
Int. Cl.<sup>5</sup> H01R 29/00

U.S. Cl. 439—188

14 Claims



1. A shunt connection device for an electrical connector, said electrical connector comprising a first casing member, a plurality of male contact members each incorporating a tang, a series of housings in said first casing member each adapted to receive a respective male contact member, a second casing member complementary to said first casing member, a plurality of female contact members each adapted to cooperate with a tang on a respective male contact member to make an electrical connection and a series of housings in said second casing member each adapted to receive a respective female contact member; said shunt connection device comprising a plurality of electrical connection channels each adapted to have a tang pass through it and a shunt module adapted to receive said electrical connection channels and comprising an insulative material body and a series of passages adapted to coincide with the respective housings of said first casing member and to receive a respective electrical connection channel, in which shunt module at least two of said electrical connection channels are electrically interconnected to provide a shunt connection, the connector further comprising a skirt on one casing member adapted to receive said shunt module.

4,954,094

## SLIDING GIMBAL CONNECTOR

James C. Humphrey, Russell, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed Sep. 15, 1989, Ser. No. 407,826

Int. Cl.<sup>5</sup> H01R 13/64

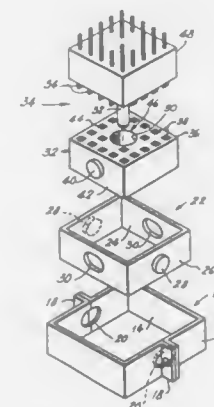
U.S. Cl. 439—247

6 Claims

- 1. A gimballed electrical connector comprising:
  - a. a first hollow mounting frame having an inner surface and an outer surface;
  - b. at least one mounting member on said outer surface;
  - c. a pair of oppositely disposed stud receiving slots formed on said first frame inner surface, said pair of slots being elongated;
  - d. a second hollow mounting frame having an inner surface and an outer surface;
  - e. a pair of oppositely disposed cylindrical studs projecting from said second frame outer surface and engaging said

first pair of slots formed on the inner surface of said first mounting frame when said second frame is mounted within said first frame;

f. a pair of oppositely disposed protuberance receiving slots formed in said second frame inner surface, said pair of protuberance receiving slots being elongated and being formed in surfaces adjacent to and orthogonal to said second frame outer surfaces carrying said cylindrical studs; and



g. a first half of an electrical connector mounted within said second hollow mounting frame, said first half of said electrical connector comprising a body carrying electrical contacts, a pair of opposite disposed cylindrical protuberances on body outer walls which engage said pair of oppositely disposed protuberance receiving slots, said body further having a surface transverse to said body outer walls, said transverse surface carrying connector aligning means for aligning the second half of said connector.

4,954,095

## CABLE EMPLOYING TUBULAR CONDUCTORS

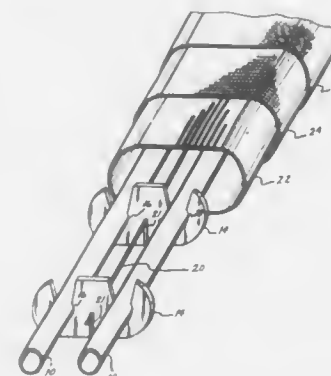
Kenneth L. Cogan, 1609 Young St., Cincinnati, Ohio 45210

Filed Mar. 1, 1989, Ser. No. 317,631

Int. Cl.<sup>5</sup> H01R 25/00; H01B 11/00; H02G 15/02

U.S. Cl. 439—284

2 Claims



- 1. In combination a cable and a nonconductive terminal plug for use in a high-fidelity sound or video system for making electrical connection with a conventional female connector of the type having a central internal connection port and a conductive external cylindrical surface projecting thereabout and insulated therefrom,
  - said cable comprising
  - a first and a second cylindrical tubular conductor, said first conductor being of such outer diameter as to fit within and

make conductive contact with the internal connection port of a conventional female connector, and means to hold said conductors spaced apart and provide a dielectric between them, and

said nonconductive terminal plug, including outer and inner end faces, a cylindrical cavity extending inward from said outer end face and sized to receive the cylindrical surface of the female connector, the cavity terminating short of said inner end face, there being a first longitudinal bore through said plug inner end face aligned with the axis of the cavity,

and a second longitudinal bore through said plug inner end face, parallel to the first bore, said second bore being at a spacing from the first bore substantially equal to the radius of the cavity plus the greater part but not all of the radius of said second tubular conductor whereby said second bore intersects with and interrupts the cylindrical cavity wall,

said bores being of such diameter as to receive and hold said tubular conductors,

one of said tubular conductors extending through said first bore and along the axis of said cavity and projecting outwardly therefrom beyond said outer end face,

the second of said tubular conductors extending through said second bore substantially to but not beyond the outer end face of said body, with its side surface exposed at and along said interruption of the cavity wall,

whereby the exposed portion of the side surface of said second conductor makes conductive contact with the external cylindrical surface of such female conductor as the projecting end of said first conductor is inserted into and makes conductive contact with the central connection port of such female conductor.

4,954,096

## ELECTRICAL JACK WITH FIXED DETENT

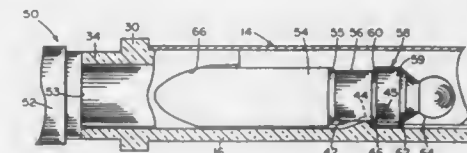
John J. Frank, Chicago, Ill., assignor to Switchcraft, Inc., Chicago, Ill.

Continuation of Ser. No. 318,095, Mar. 2, 1989, abandoned. This application Feb. 8, 1990, Ser. No. 477,135

Int. Cl.<sup>5</sup> H01R 4/50

U.S. Cl. 439—346

13 Claims



- 1. An electrical jack housing comprising:
  - a dielectric box-like enclosure having an end wall provided with aperture means for permitting an electrical jack plug to be inserted through said end wall and along a predetermined path in said enclosure, said aperture means including an aperture extended axially through the thickness of said end wall and communicating with the interior of said enclosure, said aperture being surrounded by a sleeve with flexible wall means for yielding resiliently to permit angular disposition of said plug in said sleeve relative to the axial centerline of said aperture; and
  - said enclosure having side wall means disposed substantially orthogonal to said end wall and extended along said predetermined path for supporting fixedly in said path rigid retaining means, said retaining means being disposed for releasably engaging a portion of said jack plug and rigidly resisting withdrawal of said jack plug from said enclosure, said side wall means including a side wall of said enclosure having an inner surface portion disposed in alignment with said aperture, said side wall comprising a guide channel extending along said predetermined path,

said retaining means comprising a rigid projection having a sloped surface extending integrally from said side wall in said channel wherein, during insertion of said plug in said guide channel along said predetermined path, said plug slides up said sloped surface of said rigid projection to an angle with respect to said axial centerline of said aperture and said side wall, said sleeve resiliently yielding and maintaining resiliently opposing pressure on said plug.

4,954,097

**CONNECTOR PLUG WITH LOCKING MECHANISM**  
Shigemi Sekiguchi, Kiryu, Japan, assignor to Hosiden Electronics Co. Ltd., Osaka, Japan

Filed Sep. 6, 1989, Ser. No. 403,511

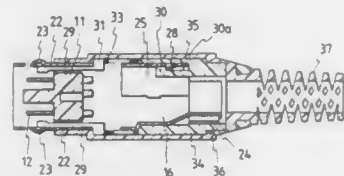
Claims priority, application Japan, Sep. 21, 1988, 63-124293[U]

The portion of the term of this patent subsequent to May 29, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> H01R 13/627

U.S. Cl. 439—352

6 Claims



1. A connector plug with a locking mechanism comprising: an insulating body made of a resin material and carrying pin contacts;
- a metal cover composed of a cylindrical front half portion and a semi-cylindrical rear half portion, said cylindrical portion housing said insulating body and having at least one tongue-shaped locking piece which has a projection and extends forward in the axial direction of said metal cover;
- a metal clamping member attached to the rear end of said metal cover, for clamping a cable;
- an elastic support piece made of a resin material and mounted in said metal cover in a manner to be axially slidable on the inner surface of said tongue-shaped locking piece, said elastic support piece having an actuating member at the rear end thereof;
- a semi-cylindrical metal auxiliary cover for covering said semi-cylindrical rear half portion of said metal cover;
- a coiled spring mounted around said metal cover, a front end portion of said coiled spring urging said actuating member forwardly to bias said elastic support piece forwardly;
- a cap of a resin material into which said semi-cylindrical rear half portion and said auxiliary cover are inserted, for holding the entire connector plug structure; and
- a tubular member of a resin material for covering said entire connector plug structure, said tubular member having a portion which engages said actuating member to slide said elastic support piece rearwardly when said tubular member is pulled rearwardly.

4,954,098

**SEALED INSULATION DISPLACEMENT CONNECTOR**  
Elmoot E. Hollingsworth, and Gary W. Schlaeger, both of Austin, Tex., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 1, 1989, Ser. No. 430,863

Int. Cl.<sup>5</sup> H01R 4/24

U.S. Cl. 439—404

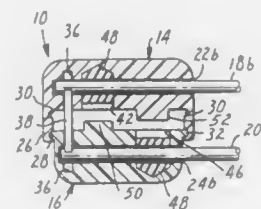
12 Claims

1. A device for electrically connecting two or more wires, comprising:

a cap member having a first channel therein for receiving

one of the wires, and having a first void therein in fluid communication with said first channel;

a base member having a second channel therein for receiving another one of the wires, and having a second void therein in fluid communication with said second channel, said base and cap members defining a clearance space, and each of said voids opening toward said clearance space; sealing material in each of said voids;



- contact means located within said cap member and said base member for providing an electrical connection between the wires;
- a first piston extending from said cap member into said clearance space opposite said second void in said base member; and
- a second piston extending from said base member into said clearance space opposite said first void in said cap member.

4,954,099

**ELECTRODE RECEPTACLE**

Wasył Slowski; Darrel Slowski, both of Islington, and David Slowski, Mississauga, all of Canada, assignors to Williams Sign Supplies Ltd., Mississauga, Canada

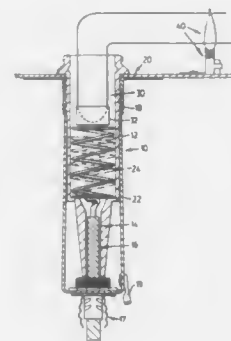
Continuation of Ser. No. 923,198, Oct. 27, 1986, abandoned.

This application Feb. 6, 1989, Ser. No. 306,387

Int. Cl.<sup>5</sup> H01R 33/02

U.S. Cl. 439—244

15 Claims



1. In an electrical receptacle having a generally hollow cylindrical section for receiving high tension wire means at one end and light means at another end, said light means adapted for electrical connection with said high tension wire means interiorly of said hollow cylindrical section, said hollow cylindrical section comprising of carbonate resin plastic for resisting sudden heat increases within said hollow cylindrical section in the region of said electrical contact with said light means and said high tension wire means wherein said carbonate resin plastic has a melt flow of 9 to about 12 g/10m at 300 degrees Centigrade and 1,200 g load and tensile stress at yield of 63 MPa, a tensile stress at break of 68 MPa, a deflection temperature under load at 1.8 MPa of 133 degrees Centigrade and a dielectric strength of greater than 16 KV/mm.

4,954,100

**RIBBON CROSSOVER CABLE ASSEMBLY AND METHOD**

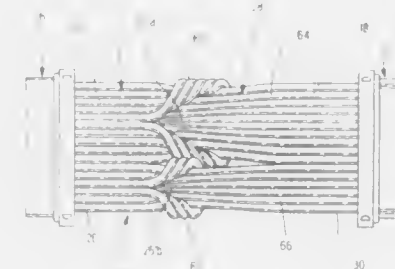
Earl W. McCleerey, Mechanicsburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 1, 1989, Ser. No. 444,504

Int. Cl.<sup>5</sup> H01R 9/07

U.S. Cl. 439—492

9 Claims



1. A ribbon crossover cable assembly, comprising:
- a first ribbon cable, said first ribbon cable having conductors surrounded by insulation, first and second ends and an opening formed by a separation through a limited segment of said first ribbon cable between a centrally located pair of conductors, said first ribbon cable having said first end passed through the opening such that said first end is looped through said ribbon cable;
- a second ribbon cable, said second ribbon cable having conductors surrounded by insulation and second ends, said first end passing through the opening in the first cable;
- a first connector having contacts, said contacts terminated to respective ones of the conductors of the first and second cables at the first ends thereof; and
- a second connector having contacts, said contacts terminated to respective ones of the conductors of the first and second cables at the second ends thereof.

4,954,101

**IMPROVED CABLE FOR COUPLING BETWEEN DATA TERMINALS AND DATA SETS**

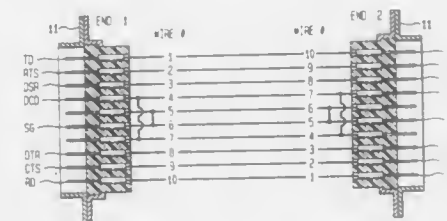
Neal Nelson, 1019 S. Humphrey, Oak Park, Ill. 60304

Filed Jul. 6, 1989, Ser. No. 376,554

Int. Cl.<sup>5</sup> H01R 11/00

U.S. Cl. 439—502

14 Claims



1. A data communications device for the transfer of data between data terminals and a data sets comprising:
- at least one of a first data terminal and a first data set;
- at least one of a second terminal and a second data set;
- a first connector comprising a plurality of individual electrical leads operatively coupled to said at least one of a said first data terminal and a first data set;
- a second connector comprising a plurality of individual electrical leads operatively coupled to said at least one of said second data terminal and second data set;

a cable means comprising a plurality of electrical wires for electrically connecting said first and second connectors; the total number of said plurality of electrical wires of said cable means being an even number; a first one of said wires of said cable means being permanently, physically and electrically coupled to a second one of said wires of said cable means; first bridge-connector means for electrically connecting said first and second ones of said wires; said second one of said wires of said cable means being an asymmetric one not having a paired wire associated therewith, whereby said cable means is made symmetric so that it may be used to connect at least one of a first data terminal and data set to said at least one of a second data terminal and a second data set.

4,954,102

**WIRING CONNECTION APPARATUS**

Keiichi Ozaki; Naoki Manabe; Tatsumi Shibata; Hideharu Hayashi; Yukio Muramatsu, and Masaki Yamamoto, all of Shizuoka, Japan, assignors to Yazaki Corporation, Japan

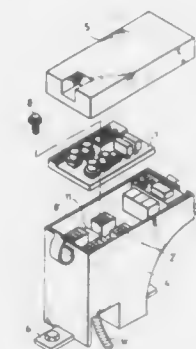
Filed Mar. 22, 1989, Ser. No. 327,056

Claims priority, application Japan, Mar. 25, 1988, 63-69824

Int. Cl.<sup>5</sup> H01R 13/00

U.S. Cl. 439—535

9 Claims



1. A wiring connection apparatus in which an electric connection box connected to connectors of terminals of wire harnesses is housed and fixed in a protecting cover, said apparatus comprising an improvement wherein a reception seat for fixing said electric connection box is fixed within said protecting cover, and a first lock means is provided between said reception seat and said connectors of the terminals of said wire harnesses so that said electric connection box and said connectors are simultaneously connected to each other when said electric connection box is fixed to said reception seat.

4,954,103

**PRESS IN CONTACT ELEMENT FOR CIRCUIT BOARDS**  
Ernst Liebich, Geltendorf, Fed. Rep. of Germany, and Jacques Longueville, Oostkamp, Belgium, assignors to Siemens Aktiengesellschaft, Berlin and Munich

Filed Dec. 1, 1989, Ser. No. 444,749

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1988, 8815052[U]

Int. Cl.<sup>5</sup> H01R 13/428

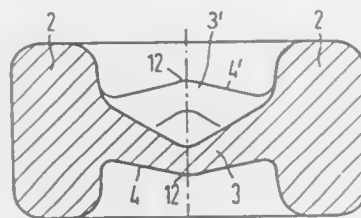
U.S. Cl. 439—751

20 Claims

1. A contact element having a pin-shaped section for being plugged into a bore of a printed circuit board, said pin-shaped section including two leg members extending side-by-side in a plug-in direction and merging into one another at their ends to provide transition zones and including a resilient section comprising at least one web extending between the leg members, said web having curved portions, the improvement comprising



said web being divided into at least two web portions following one another in a longitudinal direction of the pin-shaped

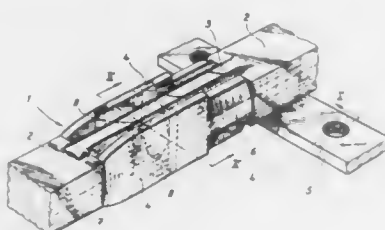


section with alternating web portions extending to respective opposite sides of the element.

**4,954,104**  
**PRESS-FIT ELECTRICAL TERMINAL**  
Egidius T. R. Thomassen, Maren-Kessel, Netherlands, assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.  
Continuation of Ser. No. 328,882, Mar. 27, 1989, abandoned.  
This application Feb. 8, 1990, Ser. No. 477,179  
Claims priority, application Netherlands, Nov. 30, 1988, 8802705

Int. Cl.<sup>5</sup> H01R 13/41  
U.S. Cl. 439—751

7 Claims



1. An electrical contact terminal for press-fit insertion into an opening in a substrate such as a circuit board wherein said terminal has a mounting section comprising an oblong base portion having an approximately elliptical cross-section and two separately formed flexible fins extending lengthwise in contact with two opposite surfaces of said base portion with the largest radius of curvature, said opposite surfaces being flattened in the area contacting the fins so that a longitudinal midsection of each fin extends in contact with each said flattened opposite surfaces of the base portion and a longitudinal free edge of each said fin extends away from said base portion, each said edge being rounded on a side facing away from the base portion, said fins being tapered and welded to the base portion at one end and clamped to the base portion at the other end.

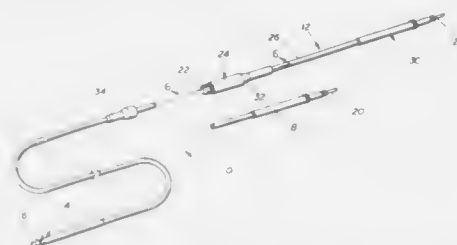
**4,954,105**  
**REPLACEMENT CONNECTOR FOR IMPLANTED LEADS**  
Elmar R. Fischer, Lake Jackson, Tex., assignor to Intermedics, Inc., Angleton, Tex.  
Filed Dec. 28, 1989, Ser. No. 458,175

Int. Cl.<sup>5</sup> H01R 11/11  
U.S. Cl. 439—864

16 Claims

1. A connector for replacement of a proximal end of an implanted lead, the connector comprising:  
means for making an electrical connection with an electrical conductor in a severed end of the implanted lead from which the proximal end of the implanted lead has been removed;

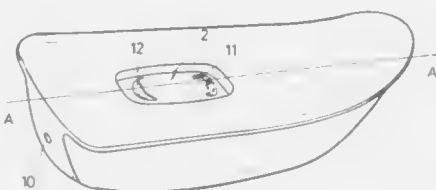
means for securing a distal end of the connector to the severed end of the implanted lead;  
terminal means at a proximal end of the connector for electrical connection to a medical device; and



conductor means electrically connecting the connection making means to the terminal means.

**4,954,106**  
**AQUATIC SPORTS DEVICE**  
Lin Shuh-Chin, No. 5, 35th Lane, 4th Alley, An-Lo Rd., Chung-Ho City, Taipei Hsien, Taiwan  
Filed Feb. 8, 1989, Ser. No. 308,130  
Int. Cl.<sup>5</sup> B63H 11/02, 16/00  
U.S. Cl. 440—21

1 Claim

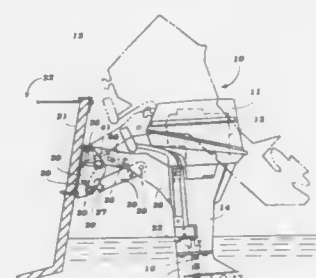


1. An aquatic sports device, comprising:  
(A) a buoyant body for buoyantly supporting a user above the surface of a body of water, said buoyant body having a forward end and a rear end, said buoyant body being formed of lightweight material, said buoyant body having a streamlined outer configuration; and  
(B) moving means for moving said buoyant body and the user through the body of water, said moving means including:  
(a) a cylindrical tank located within said buoyant body, said tank being located more toward said rear end of said body than said forward end;  
(b) a first pipe connected to the bottom of said tank for conveying water from said tank and through said rear end of said buoyant body, said pipe including a nozzle located at said rear end;  
(c) a circular piston which slides downwardly from an upper position within said tank under the weight of the user to force water from said tank, through said first pipe, and through said rear end of said buoyant body to move said buoyant body and the user through the body of water, said piston including an annular slot;  
(d) a spring located within said tank for returning said piston upwardly to said upper position;  
(e) a second pipe connected to the bottom of said tank for conveying water from said forward end of said buoyant body and into said tank as said piston is returned to said upper position by said spring;  
(f) a first one-way valve for preventing water from passing from said rear end of said buoyant body and through said first pipe as said piston moves upwardly, said one-way valve being located at an end of said first pipe;  
(g) a second one-way valve for preventing water from passing out of said tank and through said second pipe as

said piston moves downwardly, said second one-way valve being located at an end of said second pipe; and  
(h) a seal ring for preventing water from leaking from said tank and past said piston, said seal ring being received within said annular slot of said piston.

**4,954,107**  
**TILT CYLINDER DEVICE**  
Yukio Sumigawa, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan  
Filed Jun. 13, 1989, Ser. No. 365,665  
Claims priority, application Japan, Jun. 13, 1988, 63-143504  
Int. Cl.<sup>5</sup> B63H 5/12  
U.S. Cl. 440—61

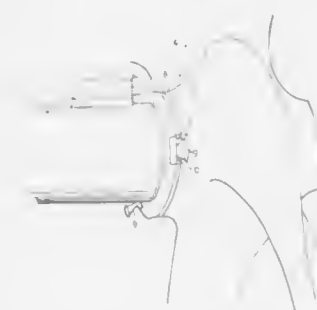
20 Claims



1. An outboard drive unit carrying propelling means for propelling a marine vessel having a hull through the water, said outboard drive unit further comprising, a clamp bracket attached to the hull of said vessel, a tilt shaft, a swivel bracket rotatably secured to said clamp bracket by said tilt shaft about a tilt axis, a stop pin secured to said clamp bracket for setting the downward position of said swivel bracket, and a tilt cylinder device pivotally connected at one end to said swivel bracket and pivotally connected at the other end to said clamp bracket such that a line segment extending between said pivotal connections does not intersect any line segments extending between said tilt axis and the position where said stop pin is secured to said clamp bracket for decreasing the stress acting on the tilt cylinder device and its associated parts, said tilt cylinder device being adapted to maintain the drive unit in the downward position when the propelling means of the drive unit is operated in reverse.

**4,954,108**  
**LINE CUTTER FOR MARINE PROPELLERS**  
Donald T. Govan, Box 350246, Fort Lauderdale, Fla. 33335  
Filed Dec. 4, 1989, Ser. No. 444,997  
Int. Cl.<sup>5</sup> B63H 1/28  
U.S. Cl. 440—73

11 Claims



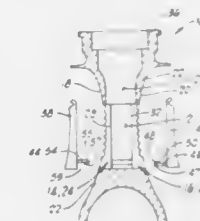
1. An apparatus that cuts foreign matter including lines,

wires, nets and weeds of the type that may be encountered by propeller driven vessels when under way, said vessels of the type where the propeller is mounted to a rotatable propeller shaft that extends from a propeller shaft housing connected to the vessel's hull, and in which there is negligible axial movement of said shaft, said apparatus comprising:

- (A) at least one first blade means for cutting, said first blade means having a first shearing plane, said first blade means arranged to rotate in conjunction with said propeller with said first shearing plane substantially perpendicular to the axis of said shaft;
- (B) first support means for supporting said first blade means in position extending radially and beyond said first support means to engage said foreign matter, said first support means including means for fixedly attaching to at least one member of the pair consisting of said shaft and said propeller;
- (C) at least one second blade means for cutting, said second blade means having a second shearing plane, said second blade means arranged with said second shearing plane substantially parallel to said first shearing plane of said first blade means;
- (D) second support means for supporting said second blade means in a position extending radially parallel to, and within shearing distance of, said first blade means to engage said foreign matter for shearing said foreign matter between said first and second blade means, said second support means for fixedly attaching to a non-rotating member of said hull;
- (E) said first blade means and said second blade means each having radially extending, sharp edges at two margins of said shearing planes for cutting said foreign matter;
- (F) said second support means supporting said second blade means in a pivotal structure arranged to permit said second blade means to pivot about a blade axis parallel to the axis of said shaft;
- (G) a combination of a wedge means and a substantially V-shaped valley means for applying force to said second blade means for forcing said second blade means toward said first blade means when said second blade means pivots about said blade axis; and
- (H) wherein one of said combination of said wedge means and said valley means is connected to said second blade means and the other is connected to said second support means.

**4,954,109**  
**WATER PICKUP INSERT**  
Lee W. McMorries, IV, Stillwater, Okla., assignor to Brunswick Corporation, Fond du Lac, Wis.  
Filed Jul. 20, 1989, Ser. No. 382,297  
Int. Cl.<sup>5</sup> B63H 21/38  
U.S. Cl. 440—78

15 Claims



9. A cooling water pickup insert assembly for a marine outdrive, comprising:  
a first cooling water pickup insert;  
a second cooling water pickup insert; and  
locking means, defined on said first and second inserts, for locking said first and second inserts together to hold said inserts in place on said outdrive, when said inserts are

pushed toward and engaged with each other through said locking means, with said outdrive sandwiched between said first and second inserts.

**4,954,110**  
**UNDERWATER BUOY PROVIDED WITH**  
**HYDRODYNAMIC STABILIZING MEANS AND**  
**DESIGNED TO BE SUSPENDED, NOTABLY FROM A**  
**HELICOPTER**

Francois Warnan, Trappes, France, assignor to Thomson-CSF, Puteaux, France

Filed Apr. 11, 1989, Ser. No. 336,058

Claims priority, application France, Apr. 12, 1988, 88 04829  
Int. Cl.<sup>5</sup> B63B 22/18

U.S. Cl. 441—22

3 Claims



1. An underwater buoy, provided with hydrodynamic stabilization means and designed to be suspended from a carrier vehicle by a cable, said buoy comprising a body, said body having a ring placed on the upper part of the body, fins placed on the lower part of the body, which get folded during the descent into the water so as to then have a substantially null effect, and get unfolded during the rising stage to stabilize the motion of the buoy by preventing the buoy from being made to rotate, wherein the fins extend substantially vertically and have a leading edge of which is pointed towards the bottom of the buoy, said buoy further comprising a ballast placed in the lower part of the body, said ballast being machined so that it is recessed from the circumference of the body, and being provided with joint features, located on its circumference, to hold fins.

**4,954,111**  
**SWIMMING FLIPPER MADE OF TWO DIFFERENT**  
**MATERIALS**

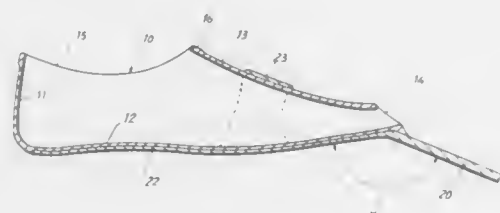
Leopoldo A. Cressi, Genoa, Italy, assignor to Cressi-Sub S.p.A., Genoa, Italy

Filed Oct. 28, 1988, Ser. No. 264,266

Claims priority, application Italy, Nov. 30, 1987, 12591 A/87  
Int. Cl.<sup>5</sup> A63B 31/11

U.S. Cl. 441—61

6 Claims



1. A swimming flipper comprising, a shoe made of a relatively resilient material and having a sole and an upper having a heel and open at the front for the toes of a wearer to extend therethrough, a blade made of a lesser resilient material than

the shoe molded on the sole of the shoe extending forwardly of the shoe and having a portion thinner in thickness extending toward the heel of the shoe defining an outer sole of the shoe, said outer sole narrowing in width toward the heel of the shoe starting about half way along the length of the shoe and terminating at the heel of the shoe, the blade having opposite side edge ribs for stiffening thereof, and an arched outer strap extending over a front part of the shoe integrally joining the side edge ribs with each other, said outer strap being made of a material less resilient than the shoe and embedded therein.

**4,954,112**  
**FLIPPER FOR FLIPPER SWIMMING**

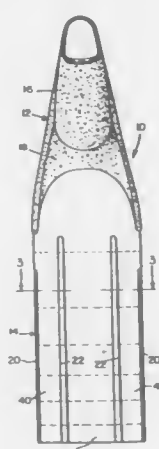
Giovanni Negrini, Via Carlo Porta, 13, and Roberto Chiola, Via Talamone, 8, both of 1 27029 Vigevano, Italy

Filed Mar. 30, 1989, Ser. No. 330,785

Int. Cl.<sup>5</sup> A63B 31/10

U.S. Cl. 441—64

2 Claims



1. A swimming flipper comprising a shoe and a blade, said blade being formed from resin sheets of varying lengths interposed between resin sheets of longer length thereby forming a blade of stratified thickness, and said blade having rubber inserts longitudinally disposed along the length of said blade, said inserts being hot-pressed with said blade.

**4,954,113**  
**LIGHT BULB HAVING A MULTICOLORED DESIGN**  
**AND METHOD OF MANUFACTURING THEREOF**

Young G. Kim, Oyang Apt. 3-505, Kwang-An 4-Dong Nam-ku, Pusan, Rep. of Korea

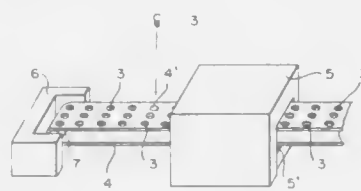
Filed Jun. 20, 1989, Ser. No. 368,608

Claims priority, application Rep. of Korea, May 9, 1989, 89-6146

Int. Cl.<sup>5</sup> H01J 9/20

U.S. Cl. 445—58

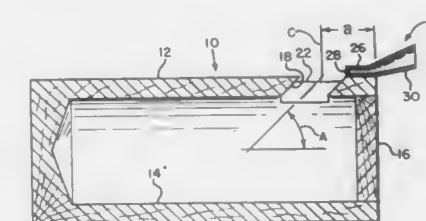
4 Claims



1. A method for manufacturing a light bulb having a multicolored design which comprises the steps of:  
(a) printing on a transfer film a multicolored design,

(b) attaching said transfer film with printed multicolored design onto the surface of a light bulb, and  
(c) burning said light bulb with said transfer film with multicolored design attached thereto at a temperature of about 550°-650° C. for 1-2 hours so as to manufacture said light bulb having a multicolored design, said transfer film attached onto the surface of the light bulb being substantially burned away leaving said multicolored design in a burning chamber which contains a tunnel for passing a conveyor belt having a plurality of apertures for receiving a plurality of said light bulbs to be burned.

an inlet of said passage, said passage having a square outlet into said chamber; and



means on said body for directing the flow of air across said inlet.

**4,954,114**  
**COMBINATION TOY WITH A COVER AND INNER**  
**MEMBERS**

Atuko Kawashima, 1641-28A, 3rd Ave., New York, N.Y. 10128

Filed Oct. 6, 1989, Ser. No. 418,201

Int. Cl.<sup>5</sup> A63H 33/04, 3/00, 33/00

U.S. Cl. 446—75

7 Claims



1. A combination toy comprising:  
a cover made of a flexible material and having a closing device at one side so that inside of the cover can be substantially completely disclosed when the closing device is opened, and at least one first engaging device fixed inside the cover at a side opposite to the closing device, and  
a plurality of inner members removably disposed in the cover, each inner member having the same size and shape with each other, each inner member including a second engaging device at one side so that the inner member can be detachably attached to the first engaging device, a third engaging device at a side opposite to the second engaging device for detachably engaging another second engaging device so that the inner members can be detachably engaged with each other in any desired order, and a sign fixed onto the inner member, said signs of the inner members being different from each other to identify the respective inner members.

**4,954,116**  
**HAND-SPINNABLE TOP AND KIT THEREFOR**

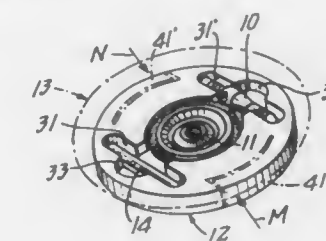
John Rubino, R.D. 2, Box 2721, Stowe, Vt. 08572

Continuation of Ser. No. 82,109, Aug. 6, 1978, abandoned. This application Mar. 24, 1989, Ser. No. 328,180

Int. Cl.<sup>5</sup> A63H 1/00

U.S. Cl. 446—256

14 Claims



1. A spin-top comprising an elongate metal spindle having semispherical upper-end and lower-end profiles, said spindle having an enlarged hub portion between and offset from both end profiles, the lower end of said hub terminating in a downwardly facing radial shoulder, and said spindle having an externally threaded portion beneath and adjacent said shoulder and at relatively short offset from the lower end of said spindle; and a flywheel having an internally threaded bore, said flywheel being removably engaged via said bore to the threaded portion of said spindle, said flywheel having an outwardly facing circumferential groove with an elastomeric O-ring fitted to said groove, and said semispherical lower-end profile projecting beyond said flywheel when the latter is threaded into abutment with said shoulder, the extent of both spindle-end profile projections axially beyond said flywheel being such as to dictate non-spinning support of the top sole via said O-ring and either of the ends of said spindle.

**4,954,117**  
**SAWING ACTION FIGURE TOY**

Camille Daleus, deceased, late of Montreal; by Ursule Dubrenille, legal representative, and by Régine Daleus, legal representative, both of 11,950 Grenet, Apartment 501, Montreal, all of Canada (H4J 2L6)

Filed Jun. 13, 1989, Ser. No. 365,540

Int. Cl.<sup>5</sup> A63H 11/12

U.S. Cl. 446—280

8 Claims

1. An action comprising a main frame, a pair of wheels journaled to said frame by a shaft member for rollingly supporting said frame on a flat horizontal surface, a handle fixed to said frame, a hollow human figure defining feet, legs, a trunk, a head, arms, forearms, hands, a waist, a neck, shoulders, elbows, said feet being anchored to the rearward section of said frame so that said legs extend upwardly therefrom, a log an-

**4,954,115**  
**GAME CALL**

Dru G. Metiva, 1945 19 Mile Rd., Marion, Mich. 49665

Filed Dec. 5, 1988, Ser. No. 279,858

Int. Cl.<sup>5</sup> A63H 5/00

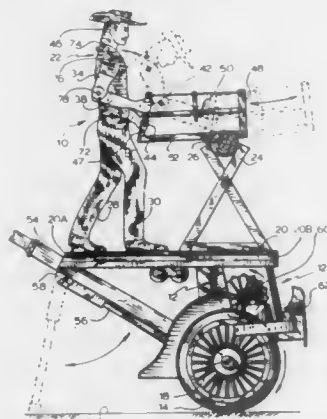
U.S. Cl. 446—204

10 Claims

1. A game call comprising:  
a hardwood body including an internal chamber closed on opposite ends and a passage through a wall of said body angled at 45 degrees relative to the longitudinal axis of the chamber in a direction toward a flow of air directed across



chored to the frontward section of said frame in substantially horizontal register with said hands, a bucksaw having a rear handle grasped by said hands and a lower generally horizontal blade slidably engaging a groove made about a transverse section of said log; wherein said human figure includes waist, shoulders, neck, and elbows pivot members, for pivotal action thereabout; further including transmission means, to transmit



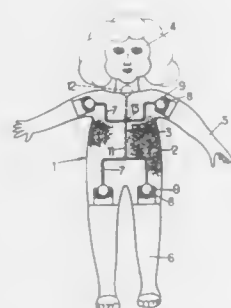
power from that induced by the continuous rotation of said shaft member, to actuate said pivot members concurrently and transform said continuous rotation into a reciprocating fore-and-aft motion of said arms and of said forearms relative to said arms, and into an alternating up-and-down motion of said trunk and of said head relative to said trunk; whereby apparent sawing of said log by the human figure with his bucksaw is effected by rolling the toy on said horizontal surface.

**4,954,118**  
**FLEXIBLE BODIED DOLLS**  
Jacques Refabert, St Cyr Sur Loire, France, assignor to Corolle S.A., France

Filed Sep. 28, 1989, Ser. No. 414,030  
Claims priority, application France, Sep. 30, 1988, 88 12820  
Int. Cl.<sup>5</sup> A63H 3/46, 3/02

U.S. Cl. 446—375

4 Claims



1. A stuffed doll comprising a flexible body, rigid members and a frame embedded in the body, said frame having projecting portions in the form of at least partial balls capped with an easy fit by shells which are connected to the respective member, wherein the framework is in the form of at least one rod formed by a metal wire and having a cross section of between 3 and 13 mm<sup>2</sup>, which rod extends along a sinuous path in a generally "U" shape and terminates at at least one of its ends in a said ball.

**4,954,119**  
**SLIDING UNIVERSAL JOINT HAVING CYLINDRICAL HOLDER POSITIONING MEANS**

Akira Sasaki; Seiji Esaki; Yasushi Hashimoto, and Shigeo Kurita, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

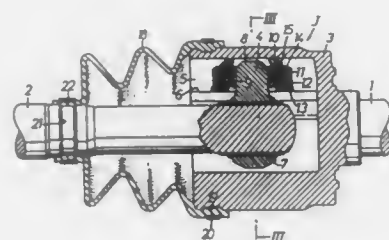
Filed Jun. 28, 1988, Ser. No. 212,535

Claims priority, application Japan, Jul. 1, 1987, 62-101633  
The portion of the term of this patent subsequent to Jan. 2, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> F16D 3/205

U.S. Cl. 464—111

3 Claims



1. In a sliding universal joint including a cylindrical outer member connected to one transmitting shaft and having an inner periphery formed with a plurality of transmitting grooves arranged circumferentially equally spaced from each other and extending axially, an inner member connected to another transmitting shaft and having a plurality of trunnions radially extending to project into said transmitting grooves, an inner roller slidably engaged with an outer periphery of each trunnion, a cylindrical holder having a spherical inner periphery relatively oscillatably engaging with a spherical outer periphery of each said inner roller, and an outer roller rotatably supported to an outer periphery of each said holder and engaged with the respective transmitting groove, wherein said spherical inner periphery of each said holder is formed with a pair of opposed cutouts for installing said inner roller into said holder;

the improvement comprising a positioning means provided between said holder and said outer member for positioning said holder so as to make the direction of arrangement of said pair of cutouts coincident with the longitudinal direction of said transmitting groove and retaining said pair of cutouts coincident with the longitudinal direction of said transmitting groove.

**4,954,120**  
**SLIDABLE CONSTANT VELOCITY JOINT**  
Katsuyuki Kobayashi, Aichi, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

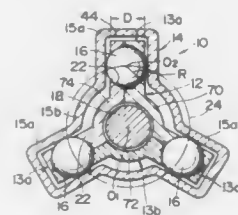
Filed Jan. 19, 1989, Ser. No. 299,066

Claims priority, application Japan, Jan. 25, 1988, 63-12485; Feb. 12, 1988, 63-28880

Int. Cl.<sup>5</sup> F16D 3/221

U.S. Cl. 464—141

7 Claims



1. A slidable constant velocity joint comprising:  
an inside part provided integrally with a first shaft and hav-

ing three first holding portions disposed spacedly apart circumferentially at equal intervals and extending radially and axially from the first shaft;  
an outside part provided integrally with a second shaft and having three second holding portions disposed spacedly apart circumferentially at equal intervals, each second holding portion having a recess extending axially of the second shaft to receive said first holding portion; and  
a rolling body disposed in said each recess so as to be in contact with the first holding portion of said inside part and the second holding portion of said outside part;  
wherein said each first holding portion includes a concave surface being in contact with and holding in position said rolling body while said each second holding portion includes two planes being in contact with said rolling body and being parallel to an imaginary plane which includes an axis of the first shaft and a radius extending from said axis and passing through a center of said first holding portion which is received in said second holding portion in a direction orthogonal to said axis.

**4,954,121**  
**REAR DERAILLEUR FOR BICYCLES OR SIMILAR VEHICLES**

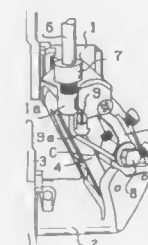
Henri Juy, Dijon, France, assignor to Simplex, S.A., France

Filed Jul. 11, 1989, Ser. No. 378,322

Claims priority, application France, Jul. 12, 1988, 88 09758  
Int. Cl.<sup>5</sup> F16H 11/00

U.S. Cl. 474—82

6 Claims



1. A rear derailleur for bicycles and similar vehicles, of the type which comprises a top bracket (1) fixed to the bicycle and a bottom bracket (2) carrying a chain guide (3), these brackets (1) and (2) being connected by a linkage system (4-5) making a deformable parallelogram linked to an operating cable (C) integral with a lever, this cable working in conjunction with a fixed part (1a) of the derailleur, in particular the top bracket and a fixing point (8) on a moving part, wherein it has, at the fixed part which takes the cable, a facility (9) for moving at will the supporting and return point (A) of the cable to change the angle (α) which the cable makes so as to increase or reduce the extent of transverse movement of the parallelogram for the same extent of angular movement of the lever.

**4,954,122**  
**DIFFERENTIAL GEAR APPARATUS WITH WORM GEARS**

Toshiyuki Nakao, and Naomichi Adachi, both of Chiryu, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Mar. 28, 1989, Ser. No. 329,676

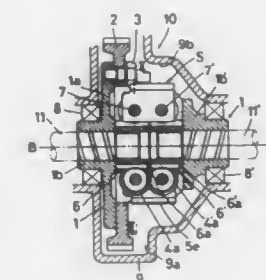
Claims priority, application Japan, Mar. 31, 1988, 63-042110  
Int. Cl.<sup>5</sup> F16H 1/38

U.S. Cl. 475—160

2 Claims

1. A differential gear apparatus, comprising:  
a power source;  
housing means for rotation about a predetermined axis when driven by said power source and including a lubricating oil reservoir;

worm gear means including first and second worm gears mounted in the housing means for rotation therein; and  
an enlarged washer member disposed between the housing



means and said worm gear means for guiding lubricating oil from the lubricating oil reservoir to the first and second worm gears against centrifugal force created by rotation of said housing means.

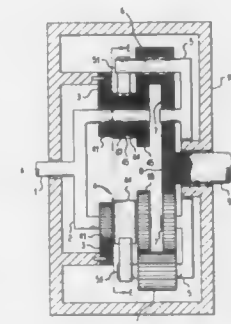
**4,954,123**  
**RADIAL HELIX DRIVE HORSE POWER AMPLIFIER**  
Eugens Kurywczak, 238 Murray St., Elizabeth, N.J. 07202

Filed Dec. 12, 1988, Ser. No. 282,512

Int. Cl.<sup>5</sup> F16H 1/32, 1/46

U.S. Cl. 475—179

5 Claims



1. A radial helix drive horse power amplifier comprising a casing, in which means are provided to house a planetary gear train with an input and output power means, comprising a centrally positioned pinned ring gear, whose axis defines a system axis of rotation of a system instituting the said planetary gear train, concentric to the said system axis, a rotatable input shaft protruding outside the said casing providing means for connection with a power source and to which an input carrier is rigidly affixed and provides means to mount a rotatable compound iso-planet of one piece construction, comprising a planet gear, which meshes with the said pinned ring gear and to which, a larger by at least one tooth planet gear, whose teeth extend outward past the pitch radius of the said pinned ring gear and a hub are pinned to whose rim an angular rotation isolation system isolating its rotation around its center is bonded, comprising a bearing and a non-circular coupling, which is bonded to the outer rim of the said bearing and provides an isolated, by a frictionless agent of the said bearing, means of mating with the said iso-planet inward from the said pitch radius of the pinned ring gear, concentric to the said system axis an idler carrier is rotatably mounted and where at means are provided for a coupling mate, rigidly secured to the said idler carrier and mates with the said non-circular coupling of the iso-planet, making the said idler carrier slave to the tangential displacement of the said iso-planet, a rotatably mounted driver gear meshed with the said larger iso-planet

gear outward past the said pitch radius of the pinned ring gear and a rotatably mounted idler gear meshed with the said driver gear and concentric to the said system axis, an output sun gear, meshed with the said idler gear and rigidly affixed to a rotatable output shaft, which protrudes outside the said casing and provides means of connection with a load.

4,954,124

# STAND-UP PLASTIC BAG AND METHOD OF MAKING SAME

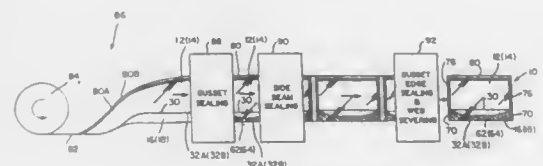
Laurence R. Erickson; R. Douglas Behr, and Roger D. Vrooman, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 171,053, Mar. 21, 1988, Pat. No. 4,837,849. This application Jan. 30, 1989, Ser. No. 303,310

Int. Cl.<sup>5</sup> B31B 37/64

U.S. Cl. 493—195

8 Claims



1. A method of making a stand-up plastic bag, comprising the steps of:

- (a) supplying a multi-layered film of first and second thermoplastic materials, said first material being heat-sealable at a temperature within a first temperature range and said second material being heat-sealable at a temperature within a second temperature range which is a range of temperatures higher than the temperatures in said first temperature range;
- (b) folding said film to form a pair of front and rear side walls and a pair of front and rear bottom gusset walls disposed between said side walls with said first and second materials being on respective interior and exterior surfaces of said side and gusset walls;
- (c) heat sealing at a temperature within said first temperature range to form a first set of heat seals which join lower portions of said front and rear bottom gusset walls with corresponding lower portions of said front and rear side walls at contiguous regions of said first material on said interior surfaces thereof and to form a bottom wall of connected upper portions of said front and rear bottom gusset walls which extend between said front and rear side walls, said first set of heat seals forming a support band which is connected to and extends below the periphery of said bottom wall;
- (d) heat sealing at a temperature within said first temperature range to form a second set of heat seals which join said front and rear side walls with said front and rear bottom gusset walls along opposite longitudinal edges thereof at contiguous portions of said first material on interior surfaces of said longitudinal edges of said walls;
- (e) heat sealing at a temperature within said second temperature range to form a third set of heat seals which join said front and rear bottom gusset walls together along their opposite longitudinal edges at contiguous portions of said second material on said exterior surfaces thereof and thereby complete formation of said support band as a continuous self-standing structure to define with said bottom wall a stand-up base on a bag; and
- (f) separating said film into completed plastic bags by severing said film through at each of said heat seals at each of said longitudinal edges of said walls.

4,954,125

# CATALYST FOR POLYMERIZATION OF CONJUGATED DIENE AND PROCESS FOR PRODUCING CONJUGATED DIENE POLYMER

Hisao Ono; Ryuji Sato, and Takumi Miyachi, all of Yokkaichi, Japan, assignors to Japan Synthetic Rubber Company, Ltd., Tokyo, Japan

Filed Jun. 20, 1988, Ser. No. 208,664

Claims priority, application Japan, Jul. 20, 1987, 62-180605

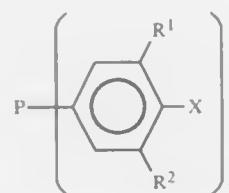
Int. Cl.<sup>5</sup> C08F 4/609, 36/06

U.S. Cl. 526—138

15 Claims

1. A process for producing a conjugated diene polymer, which comprises polymerizing butadiene-1,3 in a hydrocarbon or halogenated hydrocarbon solvent in the presence of

- (A) a cobalt compound selected from the group consisting of cobalt(II)-triphenylphosphine complex, cobalt(II) acetylacetonate, cobalt octenoate, cobalt naphthenate, cobalt(II) chloride, cobalt(II) bromide, cobalt(II) iodide, pyridine complexes of these cobalt halides and cobalt ethylxanthogenate,
- (B) an organic phosphorous compound represented by the formula:



wherein R<sup>1</sup> and R<sup>2</sup> are independently hydrogen atoms, alkyl groups or aryl groups, provided that at least one of R<sup>1</sup> and R<sup>2</sup> is an alkyl group, and three X's, which may be the same or different, are independently selected from the group consisting of a methoxy group, an ethoxy group, a propoxy group, a butoxy group, a phenoxy group, a hydroxyl group, a dimethylamino group, a diethylamino group, a dipropylamino group, a dibutylamino group, a methylamino group, an ethylamino group and an amino group,

- (C) an organoaluminum compound selected from the group consisting of triethylaluminum, tripropylaluminum, triisobutylaluminum, trihexylaluminum, triphenylaluminum, diethylaluminum monochloride, dipropylaluminum monochloride and diisobutylaluminum monochloride, and
- (D) 0.25–1.5 mole, per mole of the organoaluminum compound (C), of water.

4,954,126

# PROSTHESIS COMPRISING AN EXPANSIBLE OR CONTRACTILE TUBULAR BODY

Hans I. Wallstén, Denens, Switzerland, assignor to Shepherd Patents S.A., Switzerland

Continuation of Ser. No. 219,800, Jul. 15, 1988, abandoned,

which is a continuation of Ser. No. 946,064, Dec. 24, 1986,

abandoned, which is a continuation of Ser. No. 571,549, Dec. 7, 1983, abandoned. This application Mar. 28, 1989, Ser. No. 330,975

Claims priority, application Sweden, Apr. 30, 1982, 8202739;

PCT Int'l Appl., Apr. 11, 1983, PCT/SE83/00131

Int. Cl.<sup>5</sup> A61F 2/04, 2/06; A61M 29/00

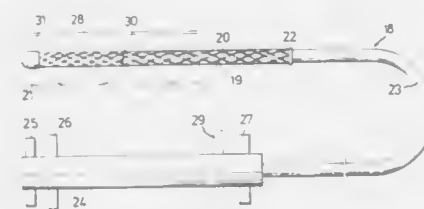
U.S. Cl. 600—36

6 Claims

1. A method for forming and completely inserting a prosthesis in a body vessel, said prosthesis having a radially and axially flexible elastic tubular body with a diameter that is variable under axial movement of the ends of the body relative to each other and which is composed of a plurality of flexible and elastic thread elements, each of which extends in helix configuration along the center line of the body as a common axis, the

flexible and elastic elements defining a radially self-expanding body, said self-expanding body provided by a first number of elements having a common direction of winding but being axially displaced relative to each other and crossing a second number of elements also axially displaced relative to each other but having an opposite direction of winding, said method comprising the steps of:

- (a) crossing the first and second elements such that an axially directed angle between the crossing elements is greater than 90°, the axially directed angle being defined by the



- crossing of the first and second elements extending in the direction of the longitudinal axis of the cylinder;
- (b) holding the prosthesis in a contracted state;
- (c) inserting the prosthesis in its entirety into the body vessel at a first location;
- (d) transferring the prosthesis in its entirety to a second location, remote from said first location, in the vessel; and
- (e) allowing the prosthesis to expand within the vessel at said second location so as to fixably implant said prosthesis at said second location.

4,954,127

# PROCESS FOR PREPARING AN ARTIFICIAL VESSEL

Kazuaki Kira, Kobe, Japan, assignor to Kanegafuchi Kagaku

Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 165,365, Feb. 29, 1988, Pat. No. 4,857,069,

which is a continuation of Ser. No. 840,169, Mar. 17, 1986,

abandoned, which is a continuation-in-part of Ser. No. 706,693,

Feb. 28, 1985, abandoned. This application Jun. 26, 1989, Ser.

No. 371,874

Claims priority, application Japan, Mar. 1, 1984, 59-39972;

Mar. 7, 1984, 59-44396; Mar. 16, 1984, 59-51768; Mar. 19, 1984,

59-52674; Jan. 29, 1985, 60-14909; Feb. 9, 1985, 60-23983

Int. Cl.<sup>5</sup> A61F 2/06

U.S. Cl. 600—36

3 Claims

1. A process for preparing an artificial vessel having a compliance and a stress-strain curve which are approximate to those of a vital vessel, said process comprising the steps of:

- (1) coating a mandrel with an elastomer solution in which is dispersed a pore-forming agent;
- (2) immersing the coated mandrel into a coagulating liquid for said elastomer;
- (3) repeating steps (1) and (2) at least once;
- (4) arranging a tubular element made of fibers on the man-

drel or coated mandrel in at least one of steps (1) to (3); and

- (5) removing the tubular article obtained after steps (1) to (4) from the mandrel and immersing the obtained tubular article in a liquid in which the pore-forming agent is soluble, so as to dissolve the pore-forming agent.

4,954,128

# THERAPEUTICS PLASMA EXCHANGE SYSTEM

Michael G. Ford, Riverside, Calif., assignor to Baxter International Inc., Deerfield, Ill.

Filed Aug. 23, 1988, Ser. No. 235,056

Int. Cl.<sup>5</sup> A61M 1/38

U.S. Cl. 604—5

15 Claims

1. A plasma exchange system for separating blood received from a donor into constituents and infusing the donor with a first blood constituent and a replacement fluid, comprising:

- a separator for separating first and second blood constituents from whole blood;
- a reservoir for containing the first blood constituent and having a single port;
- a single venepuncture needle for supplying whole blood from the donor to said separator during a whole blood collection cycle and infusing the donor with the first blood constituent and a replacement fluid during an infusion cycle;
- means for supplying the first blood constituent from said separator through said port to said reservoir during said collection cycle;
- means including said single venepuncture needle in communication with said reservoir through said port for flowing the first blood constituent in said reservoir to the donor during the infusion cycle;
- a fluid replacement supply source; and
- means in communication with said fluid replacement supply source and said flow means for supplying replacement fluid to the donor during the infusion cycle;

wherein said means for flowing the first blood constituent to the donor and said means in communication with said fluid replacement supply source lie in communication one with the other for continuously mixing the first blood constituent and the replacement fluid one with the other for simultaneous combined return to the donor.

4,954,129

# HYDRODYNAMIC CLOT FLUSHING

David Giuliani, Mercer Island, Wash., and Gerald G. Verek, Mt. View, Calif., assignors to Abbott Laboratories, Abbott Park, Ill.

Filed Jul. 25, 1988, Ser. No. 224,074

Int. Cl.<sup>5</sup> A61M 5/00, 25/00

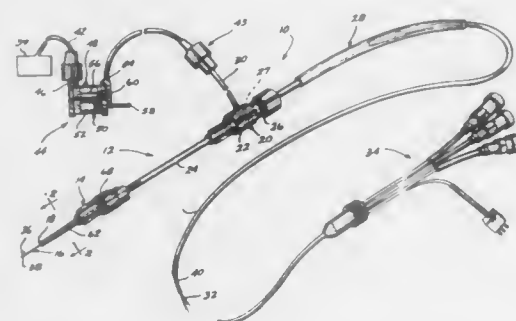
U.S. Cl. 604—53

17 Claims

1. A process for flushing clots from an intravascular probe, comprising the steps of:



inserting a catheter assembly in a blood vessel, the catheter assembly comprising a catheter segment having an internal axial bore, the segment fitted substantially throughout its bore with an intravascular probe, wherein the intravascular probe does not completely occlude the internal axial bore;



delivering a flushant through the catheter bore and past the probe at a continual rate sufficient to maintain the catheter bore substantially free of blood clots; and periodically delivering through the catheter bore a pulse of flushant at a rate that is higher than the continual rate and effective to substantially clear the probe of incipient blood clots.

4,954,130

# CATHETER/HEPARIN LOCK AND METHOD OF USING SAME

John Edwards, Orange, Calif., assignor to William P. Waters, Balboa Island, Calif.

Continuation of Ser. No. 146,267, Jan. 20, 1988, abandoned. This application Apr. 17, 1989, Ser. No. 341,701  
Int. Cl.<sup>5</sup> A61M 5/178

U.S. Cl. 604-169

5 Claims

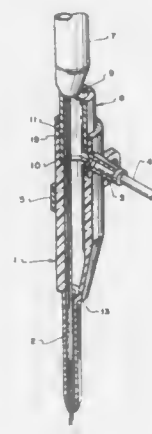
1. An intravenous access device comprising: an elongated body having a hollow interior for the passage therethrough of fluid, said body having front and rear ends and having a hollow tip at the front end thereof for insertion into a vein;
- an intravenous fluid port connected to said body intermediate its ends for connection in fluid communication with a

supply line connected in fluid communication with a source of intravenous fluid under pressure for delivering said fluid to the interior of said body for administration to a patient;

means disposed at said port for connecting sealably and removably the end of said line to said port;

a hollow tubular member disposed coaxially within said body located at the rear end thereof, said hollow member having a front and a rear opening;

a membrane closing said rear opening resealably for admitting injectable fluids therethrough;



means defining an aperture in the side of said member for being positioned in alignment with said port to permit said intravenous fluid to flow into the hollow interior of said body and for being positioned out of alignment with said port for fluid blocking purposes; and

means for mounting said member movably coaxially within said body for movement into and out of alignment with said intravenous fluid port to control fluid flow therethrough, so that said port can be closed and the supply line removed from said port, to permit said device to remain indwelling a vein and permitting introduction of injectable fluids through said membrane and the withdrawal of blood therethrough.

4,954,131

# SUBSTITUTED METAAMINOPHENOLS, A PROCESS FOR THEIR PREPARATION, HAIR-DYEING COMPOSITIONS CONTAINING THEM AND A HAIR-DYEING PROCESS

Andrée Bugaut, Boulogne, and Alex Junino, Aulnay, both of France, assignors to L'Oreal, Paris, France

Division of Ser. No. 618,149, Jun. 7, 1984, Pat. No. 4,863,480.

This application Jul. 26, 1989, Ser. No. 385,496

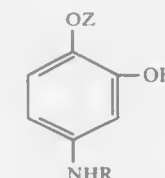
Claims priority, application France, Jun. 13, 1983, 83 09734

Int. Cl.<sup>5</sup> A61K 7/13; C07C 91/40, 91/42

U.S. Cl. 8-421

20 Claims

1. A metaaminophenol having the formula:



wherein

Z represents a monohydroxylated or polyhydroxylated hydrocarbon radical having 1-6 carbon atoms, and

R represents a monocarbonyl alkyl, dicarbonylalkyl, aminoalkyl, acyl, carbalkoxyalkyl, carbamyl or monoalkyl-carbamyl, wherein the alkyl moieties contain 1-6 carbon atoms,

or an acid salt thereof.

4,954,132

# TINTED CONTACT LENS AND METHOD OF TINTING WITH REACTIVE DYE AND QUATERNARY AMMONIUM SALT

William M. Hung, and Kai C. Su, both of Alpharetta, Ga., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 14, 1989, Ser. No. 323,355

Int. Cl.<sup>5</sup> D06P 5/00

U.S. Cl. 8-507

10 Claims

1. An improvement in a process for preparing a soft contact lens tinted over at least a portion of its surface having the steps of forming an aqueous tinting solution comprising a reactive dyestuff and applying said tinting solution to a polymeric hydrogel contact lens material, wherein the improvement comprises adding an effective amount of an ammonium quaternary salt to said tinting solution before said applying step.

4,954,133

# MIXTURES OF A 1:1 COPPER OR NICKEL COMPLEX OF A STILBENE-AZO OR STILBENE-AZOXY COMPOUND HAVING TWO 4,4'-(2,2'-DISULFOSTILBENYLENE) RADICALS AND A 1:1 COPPER OR NICKEL COMPLEX OF A STILBENE-AZO OR STILBENE-AZOXY COMPOUND HAVING ONE SUCH RADICAL

Max Oppliger, Allschwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 705,744, Feb. 26, 1985, abandoned, which is a continuation of Ser. No. 455,140, Jan. 3, 1983, abandoned. This application Feb. 12, 1986, Ser. No. 828,934

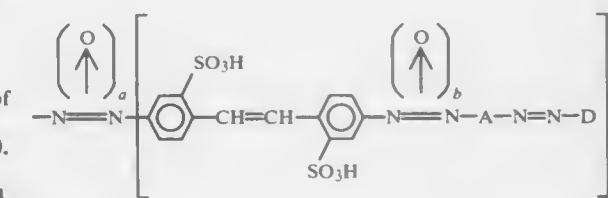
Claims priority, application Fed. Rep. of Germany, Dec. 31, 1981, 3151978

Int. Cl.<sup>5</sup> C09B 67/22, 67/24, 45/28; C07C 238/08

U.S. Cl. 8-681

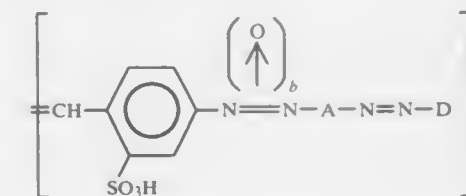
10 Claims

1. A mixture consisting essentially of (a) a 1:1 copper complex of a compound of the formula

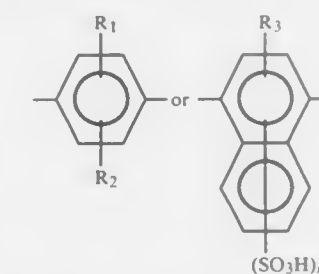


or a salt thereof each cation of which is independently a non-chromophoric cation, and (b) a 1:1 copper complex of a compound of the formula

(1)

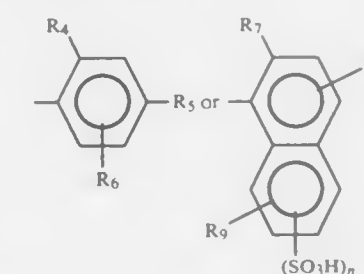


or a salt thereof each cation of which is independently a non-chromophoric cation, wherein each A is independently



wherein

R<sub>1</sub> is hydrogen, halo, C<sub>1-4</sub>alkyl or C<sub>1-4</sub>alkoxy, R<sub>2</sub> is hydrogen, halo, C<sub>1-4</sub>alkyl, C<sub>1-4</sub>alkoxy, ureido or (C<sub>1-4</sub>alkyl)carbonylamino, R<sub>3</sub> is hydrogen or methoxy, and m is 0, 1 or 2, each D is independently



wherein

R<sub>4</sub> is hydrogen, hydroxy or methoxy, R<sub>5</sub> is hydrogen, hydroxy, C<sub>1-4</sub>alkyl, C<sub>2-4</sub>hydroxyalkyl, C<sub>1-4</sub>alkoxy, C<sub>2-4</sub>hydroxyalkoxy or -N(R<sub>14</sub>)<sub>2</sub>, wherein each R<sub>14</sub> is independently hydrogen, C<sub>1-4</sub>alkyl or C<sub>2-4</sub>alkyl substituted by 1 or 2 substituents each of which is independently hydroxy, cyano, halo or C<sub>1-4</sub>alkoxy, R<sub>6</sub> is hydrogen, C<sub>1-4</sub>alkyl, C<sub>2-4</sub>hydroxyalkyl, C<sub>1-4</sub>alkoxy, (C<sub>1-4</sub>alkyl)carbonylamino, carboxy or sulfo, R<sub>7</sub> is hydrogen, hydroxy or methoxy, R<sub>8</sub> is hydrogen, carboxy or sulfo,

1. A polishing pad for obtaining a mirror-like surface of a semiconductor wafer, said pad comprising a sheet of foamed fluorine-containing resin, wherein said pad of said foamed fluorine-containing resin has an average pore size of 10 to 2000  $\mu\text{m}$  and porosity of 60 to 95%.



**4,954,142**  
**METHOD OF CHEMICAL-MECHANICAL POLISHING AN ELECTRONIC COMPONENT SUBSTRATE AND POLISHING SLURRY THEREFOR**

Jeffrey W. Carr, Fishkill; Lawrence D. David, Wappingers Falls; William L. Guthrie, Hopewell Junction; Frank B. Kaufman, Amawalk; William J. Patrick, Newburgh; Kenneth P. Rodbell, Poughkeepsie; Robert W. Pasco, Wappingers Falls, and Anton Nenadic, Red Hook, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 7, 1989, Ser. No. 285,435  
 Int. Cl.<sup>5</sup> C09C 1/68

U.S. Cl. 51—309

24 Claims

1. A chem-mech polishing slurry comprising:  
 abrasive particles;  
 a transition metal chelated salt; and  
 a solvent for said salt.

**4,954,143**  
**GAS SEPARATION**  
 Graham W. Scott, Northwich; Paul Gough, Runcorn; Brian N. Hendy, and Michael B. Cinderey, both of Middlesbrough, all of England, assignors to Imperial Chemical Industries PLC, London, England

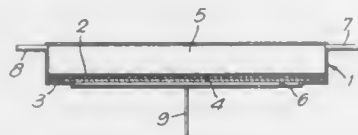
Continuation of Ser. No. 148,099, Jan. 26, 1988, abandoned, which is a continuation of Ser. No. 865,023, May 20, 1986, abandoned. This application Jul. 24, 1989, Ser. No. 384,059

Claims priority, application United Kingdom, May 21, 1985, 8512764

Int. Cl.<sup>5</sup> B01D 53/22, 71/68

U.S. Cl. 55—16

24 Claims



1. A gas separation process in which a gas feed mixture of two or more gases is contacted with a surface of a gas separation membrane and a gas, or a gas mixture having a different composition from that of the gas feed mixture, is removed from the vicinity of an opposite surface of the membrane, wherein the gas separation membrane is formed from a polyarylsulphone, where said polyarylsulphone carry groups SO<sub>3</sub>M, where M is a hydrogen atom, a metal atom and/or a group NR<sub>4</sub>, and wherein the groups M may be the same or different and the proportion of groups M is sufficient to combine with the unsatisfied valencies of the group —SO<sub>3</sub>; where R is a hydrogen atom or an alkyl group, and where said polyarylsulphone comprises 10 mol % to 100 mol % of a polymer containing repeated units of the formula D:



wherein,

Ph<sup>2</sup> represents phenylene residue, and  
 Ph<sup>3</sup> represents phenylene residue having one or two of said groups SO<sub>3</sub>M.

**4,954,144**  
**POLYIMIDE MEMBRANES AND THEIR USE FOR GAS SEPARATION**

William F. Burgoyne, Jr., Emmaus; Michael Langsam, Allentown, both of Pa., and Robert L. Fowles, Milton, Fla., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Sep. 12, 1989, Ser. No. 406,225

Int. Cl.<sup>5</sup> B01D 53/22, 71/64

U.S. Cl. 55—16

6 Claims

1. A process for separating a component of a gas mixture containing at least one other component, said process comprising bringing said gas mixture into contact with a membrane

formed of a polyimide having repeating units formed from a dianhydride and 2,5-di-*t*-butyl-1,4-phenylene diamine, such that one component of said gas mixture selectively permeates said membrane.

**4,954,145**  
**FILLED MEMBRANES FOR SEPARATION OF POLAR FROM NON-POLAR GASES**

Yatin B. Thakore, East Brunswick, and Vladimir Stoy, Princeton, both of N.J., assignors to Kingston Technologies, Dayton, N.J.

Continuation-in-part of Ser. No. 926,447, Nov. 3, 1986, abandoned. This application Feb. 16, 1988, Ser. No. 155,986  
 Int. Cl.<sup>5</sup> B01D 53/22, 61/38

U.S. Cl. 55—16

21 Claims

1. The process which comprises passing a mixture of gases across a first side of a gas permeable, filled pore membrane at a pressure higher than that which obtains on the second side of said membrane, said membrane comprising:

(a) a porous membrane, the pores of which have a size of from about 5 angstroms to about 10 microns, and  
 (b) a substantially non-aqueous composition filling said pores, said composition comprising:

(i) a polar organic solvent of low volatility and having a boiling point of at least about 150° C., said solvent consisting of at least one member selected from the group consisting of an alkane polyglycol of 2 to 6 carbon atoms and a poly(alkyleneoxy) of an alkane glycol of 2 to 4 carbon atoms having a molecular weight up to 600; and  
 (ii) at least one gas carrier component selected from the group consisting of alkali metal salts of weak acids having a pK at 25° C. exceeding 2.0, amines, and (hydroxy lower alkyl)amines, said amines and (hydroxy lower alkyl)amines having low volatility and a boiling point of at least about 150° C.,

whereby gases in said mixture which react with said gas carrier component diffuse preferentially to said second side of said membrane.

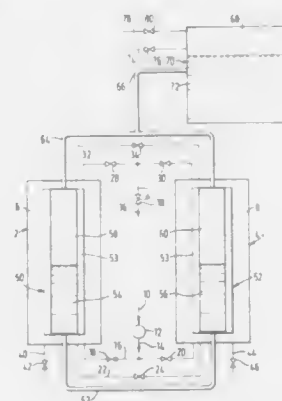
**4,954,146**  
**SEPARATION OF GASEOUS MIXTURES**  
 Michael E. Garrett, Woking, United Kingdom, and William R. Weltmer, Jr., Murray Hill, N.J., assignors to The BOC Group plc, Windlesham, England

Filed Apr. 20, 1989, Ser. No. 340,964  
 Claims priority, application United Kingdom, May 24, 1988, 8812263

Int. Cl.<sup>5</sup> B01D 53/04

U.S. Cl. 55—25

11 Claims



1. A method of separating a gaseous mixture by pressure swing adsorption utilizing at least two beds of adsorbent material capable of adsorbing at least one component of said mixture comprising:

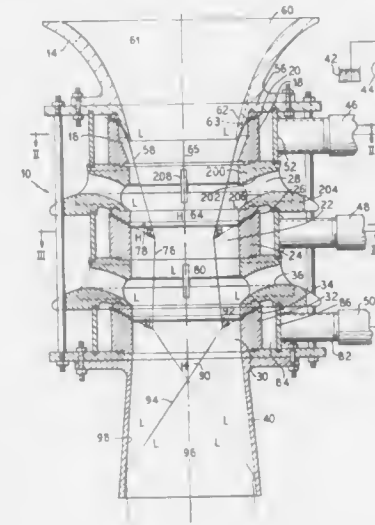
(a) admitting the mixture to a bed of adsorbent material under pressure, thereby adsorbing said component and discharging a gas relatively lean with regard thereto, and  
 (b) desorbing said adsorbed component from said bed by subjecting the bed to a pressure lower than that at which adsorption is performed and discharging said component, wherein said method is carried out in a cyclic manner with the beds out of phase such that, in each cycle, a portion of the time in which each of said beds is undergoing adsorption, another is undergoing desorption, the method further including transferring heat generated in said bed undergoing adsorption by causing vapor to be evolved from a volatile liquid contained in a heat exchange chamber within said adsorbing bed and causing said vapor to be condensed in a heat exchange chamber in said desorbing bed, the upper and lower portions, respectively, of said heat exchange chambers being in fluid flow communication, such that there is a net flow of vapor from the chamber in the adsorbing bed to the chamber in the desorbing bed and a net flow of liquid from the chamber in the desorbing bed to the chamber in the adsorbing bed.

**4,954,147**  
**WATER CONDITIONING APPARATUS AND METHOD**  
 Randy A. Galgon, Nuremberg, Pa., assignor to Hazleton Environmental Products, Inc., Hazleton, Pa.

Filed Jun. 15, 1989, Ser. No. 366,641  
 Int. Cl.<sup>5</sup> B01D 17/038

U.S. Cl. 55—53

13 Claims



1. An apparatus for treating water comprising:  
 an axially aligned series of stripping chambers;  
 said stripping chambers comprising inlets for introducing raw water to be treated into said chambers;  
 an atmospheric air inlet interposed between adjacent stripping chambers and at one end of said series of chambers; and  
 an outlet connected at an opposite end of said series of chambers.

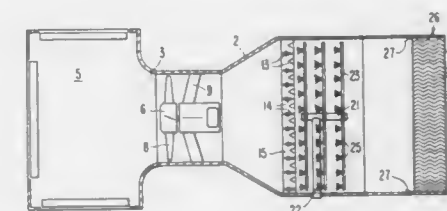
**4,954,148**  
**APPARATUS FOR TREATING GAS**  
 Jack L. Alexander, Sr., Danville, Va., assignor to Rockwell International Corporation, El Segundo, Calif.  
 Continuation of Ser. No. 111,637, Oct. 23, 1987, abandoned.  
 This application Nov. 7, 1988, Ser. No. 270,453  
 Int. Cl.<sup>5</sup> B01D 47/12

U.S. Cl. 55—223

12 Claims

1. In an apparatus for treating a gas stream with a liquid, the combination of a housing having side walls and an inlet and an outlet for the gas stream, means for moving the gas stream at a high velocity through the housing generally horizontally from

the inlet to the outlet, means for placing substantial quantities of liquid into intimate contact with the gas stream to condition the gas stream, and an eliminator for removing liquid particles from the gas stream, the improvement comprising means in the housing upstream of the eliminator for removing from the gas

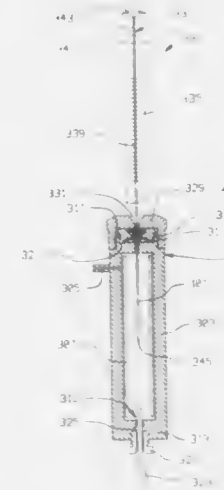


stream large quantities of the liquid which travel along the side walls of the housing, said liquid removing means comprising substantially vertical elements projecting from the side walls of the housing toward the center of the gas stream, said vertical elements being positioned upstream of and adjacent to the eliminator.

**4,954,149**  
**INJECTION SEPTUM**  
 James S. Fullemann, Half Moon Bay, Calif., assignor to Merlin Instrument Company, Half Moon Bay, Calif.  
 Filed Oct. 25, 1989, Ser. No. 427,033  
 Int. Cl.<sup>5</sup> B01D 15/08

U.S. Cl. 55—386

10 Claims



1. A septum for permitting injection of a fluid by extension of a needle therethrough, said needle having an injection diameter, said septum comprising:

aperture means for defining a complex aperture, said complex aperture including an annular aperture with a minimum diameter and a duckbill aperture with a duckbill perimeter, said aperture means including elastic material bounding said complex aperture, said minimum diameter being less than said injection diameter when no needle is penetrating therethrough, said minimum diameter being substantially equal to said injection diameter when said needle penetrates said annular aperture, said perimeter being at least as great as said injection diameter when said needle penetrates through said duckbill aperture, said elastic material contacting and generally conforming to the cross section of said needle at said annular aperture and said duckbill aperture when said needle extends completely through said complex aperture.

4,954,150

## DEVICE FOR BRANCHING GAS FLOWS

Franz Etzweiler, Greifensee, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

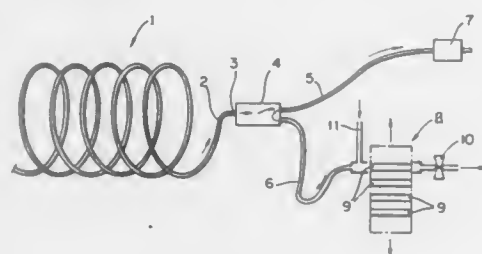
Filed Oct. 7, 1988, Ser. No. 254,990

Claims priority, application Switzerland, Oct. 8, 1987, 3948/87

Int. Cl.<sup>5</sup> B01D 15/08

U.S. Cl. 55—386

2 Claims



1. A device for branching gas flows, more particularly in a gas chromatograph, the device having an inlet branch connected to the output of a separating column; two outlet branches which extend from a junction to subsequent parts of the plant, characterized in that a first outlet branch (6) is connected by way of a shutoff valve (10) to means producing a pressure lower than the pressure in the other outlet branch (5); an interceptor in the first outlet branch (6) between the junction and the valve (10); and a scavenging gas feed (11) between the junction and the interceptor extending into the first outlet branch (6).

4,954,151

## METHOD AND MEANS FOR OPTIMIZING BATCH CRYSTALLIZATION FOR PURIFYING WATER

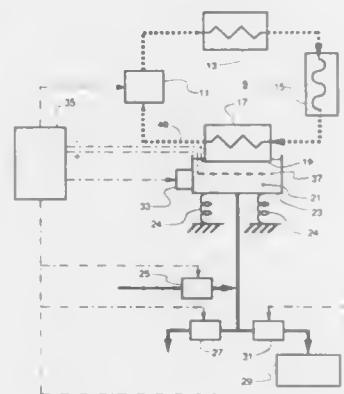
Chung-Nan Chang, Los Altos; William M. Conlon, Palo Alto, and Donald M. Hendricks, Moraga, all of Calif., assignors to Polar Spring Corporation, Menlo Park, Calif.

Filed Jan. 10, 1989, Ser. No. 295,651

Int. Cl.<sup>5</sup> B01D 9/04

U.S. Cl. 62—532

51 Claims



1. Apparatus for removing impurities from impure water comprising:  
a chamber for confining a volume of water to be purified; heat transfer means including a freeze plate disposed to contact the surface of water within the chamber to extract heat therefrom substantially only from upper regions thereof to form a layer of ice in a volume of water adjacent the upper region of the chamber;  
circuit means disposed within the chamber to establish an

electric field relative to the freeze plate for exerting electrostatic force upon impurities in water within the chamber in a direction away from the freeze plate;  
heater means disposed to melt ice within the chamber; and means connected to the chamber for removing water therefrom associated with melting ice therein.

4,954,152

## HIGH STRENGTH OPTICAL FIBER SPLICE

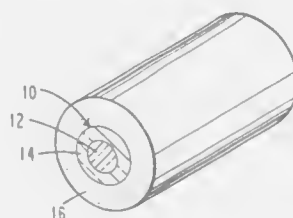
Hui-Pin Hsu, Northridge, and Soon Jang, Los Angeles, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 19, 1988, Ser. No. 286,447

Int. Cl.<sup>5</sup> C03C 25/02; C03B 23/207, 6/255

U.S. Cl. 65—3.1

13 Claims



1. A method for splicing together two optical glass fibers to form a single spliced optical glass fiber, comprising the steps of:

cleaving each of the glass fibers to form a splicing face on each fiber, the orientations of the splicing faces being in a linear opposing fashion;  
precleaning the splicing face and adjacent region of each fiber to remove impurities present on the splicing face and adjacent lateral surface of the fiber, and removing any precleaning residue;  
aligning the two fibers in a linear opposing fashion with the cleaved faces in a facing relationship to each other, the linear opposing relation being determined by maximizing the light transmitted through the fibers;  
fusing the two fibers by use of a laser and by the steps of preheating the fiber ends to a temperature below the melting point of the glass for a time sufficient to remove impurities and dust on the fiber surfaces and ends, heating the fiber ends to a temperature above the melting point of the glass and simultaneously forcing the fiber ends together to fuse the two fibers into a single length of spliced fiber, and  
annealing the single length of fiber adjacent to the splice at a temperature below the melting point of the glass for a time sufficient to remove residual stresses, said preheating, heating and annealing steps being accomplished by changing the focus of said laser; and  
postcleaning the spliced fiber to remove silica particles and other contaminants remaining on the surface after the step of fusing, and removing any postcleaning residue.

4,954,153

## PROCESSING GLASS SHEETS WITH CERAMIC ENAMEL BANDS

Charles R. Coleman, Pittsburgh; Terry L. Wolfe, Allison Park; John A. Winter, and Elizabeth A. Flano, both of Pittsburgh, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jul. 3, 1989, Ser. No. 374,910

Int. Cl.<sup>5</sup> C03C 3/00, 17/04; C03B 23/02

U.S. Cl. 65—60.53

13 Claims

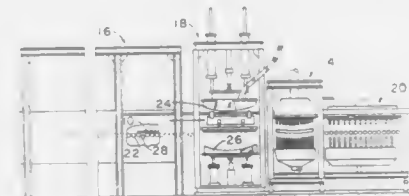
1. A method of processing a glass substrate having a ceramic enamel material supported on the glass substrate, the glass

substrate having a predetermined softening temperature, comprising:

applying a ceramic enamel material having a predetermined firing temperature to selected portions of a glass substrate, wherein said firing temperature is greater than said softening temperature of said substrate;  
preheating said glass substrate and material to a temperature at or below said softening temperature;  
exposing said selected portions of said glass substrate and said material to thermal radiation of predetermined wave-

lengths, wherein said material is preferentially absorbed by and more responsive to said thermal radiation than said substrate, for a period of time sufficient to increase the temperature of said material to said firing temperature while maintaining the temperature of said selected portions of said glass substrate at or below said softening temperature;

controllably cooling said material to about the same temperature as said preheated glass substrate; and  
shaping said glass substrate.



4,954,154

## CONTROLLED RELEASE FERTILIZER GEL COMPOSITION AND PROCESS FOR ITS PRODUCTION

Harvey M. Goertz, Marysville, Ohio, assignor to The O. M. Scott &amp; Sons Company, Marysville, Ohio

Continuation of Ser. No. 844,095, Mar. 26, 1986, abandoned.

This application Dec. 27, 1988, Ser. No. 290,857

Int. Cl.<sup>5</sup> C05G 3/02; C05C 9/00

U.S. Cl. 71—3

24 Claims



1. A gel composition comprising:  
a gel structure formed by subjecting a liquid medium containing particulate methylene urea polymers in the absence of added thickener - suspending agents to a shearing action, said shearing action comprising the application of force to the particles in said liquid medium, said methylene urea polymers in said liquid medium including methylene diurea particles in an amount greater than the solubility limit of methylene diurea in the liquid me-

dium and in an amount sufficient, upon subjecting said methylene diurea particles in said liquid medium to said shearing action, to provide a gel structure for suspending insoluble particles therein,

and said methylene diurea particles being subjected to sufficient force by said shearing action to cause a reduction of the size of the methylene diurea particles to molecular size whereby the methylene diurea enters into solution and subsequently recrystallizes from said liquid medium substantially in crystalline form to form said gel structure with said liquid medium.

4,954,155

## SONIC GELLING OF CLAY IN SUSPENSION FERTILIZERS

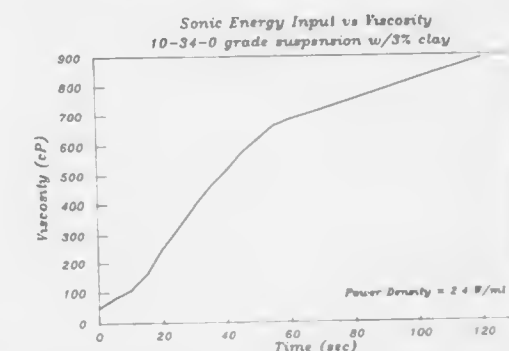
Jimmie L. Elrod, and Robert G. Lee, both of Killen, Ala., assignors to Tennessee Valley Authority, Muscle Shoals, Ala.

Filed Apr. 6, 1988, Ser. No. 178,726

Int. Cl.<sup>5</sup> C05C 9/00; C05G 3/00

U.S. Cl. 71—28

4 Claims



1. In an improved process for effecting production of suspension fertilizer product, said suspension fertilizer product having high plant food contents, high available N or P<sub>2</sub>O<sub>5</sub> or both, excellent flow properties, relatively low initial viscosities of greater than about 250 centipoises, and excellent long term storage properties including post storage viscosities of less than about 1,000 centipoises, comprising the steps of:

(a) introducing a stream of fluid fertilizer material into reactor means, said fluid fertilizer material comprising from about 96 percent to about 99 percent by weight of the materials introduced thereinto;  
(b) introducing a stream of gelling channelized 2:1 clay material into said reactor means, said gelling channelized 2:1 clay material ranging from about 1 percent to about 4 percent by weight of the material introduced thereinto;  
(c) subjecting the mixture of said fluid fertilizer material and said clay material resulting from the introduction of streams thereof into said reactor means to agitation to effect a resulting suspension fertilizer therein; and  
(d) removing at least a portion of the resulting suspension fertilizer from said reactor means as product;

the improvement in combination therewith for more efficiently imparting energy to the particles of clay material so as to cause said particles to be physically broken and deagglomerated into their component individual needlelike crystals thereby effecting the formation of a gel characterized by its capability to both cause an increase in the viscosity of the resulting suspension and to minimize the settling of particles therein during storage, said particles ranging upwards to about 20 mesh in size, which improvement in combination therewith comprises the additional step of:

(1) providing agitation in step (c) supra for a period of time ranging from about 0.25 to about 10 minutes by operatively connecting ultrasonic energy output transducer means with said mixture, said transducer means operating



at a frequency ranging from about 10 to about 40 kilohertz and at an energy output level sufficient to impart to said mixture an average power density ranging from about 1 to about 5 W/ml;

said improved process characterized by the fact that the total energy, per unit of product produced, necessary to supply said ultrasonic induced agitation in step (1) supra ranges from about 5 to about 100 percent of that which would otherwise be required to provide agitation through the utilization of conventional mechanical means for imparting shear energy thereto.

**4,954,156**  
**N,N-DIHALO-2-IMIDAZOLIDINONES AND**  
**N-HALO-2-OXAZOLIDINONES AS UREASE AND**  
**NITRIFICATION INHIBITORS**

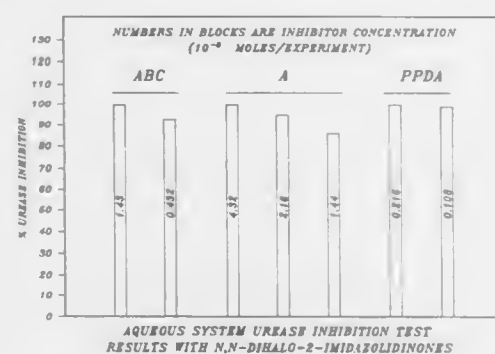
Joe Gautney, Sheffield; Shelby D. Worley, Auburn, and Doris H. Ash, Florence, all of Ala., assignors to Tennessee Valley Authority, Muscle Shoals and Auburn University, Auburn, both of, Ala.

Filed Jan. 17, 1989, Ser. No. 297,165

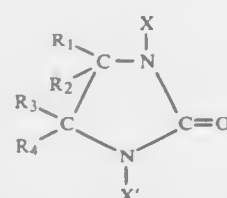
Int. Cl.<sup>5</sup> C05G 3/08

U.S. Cl. 71—28

32 Claims



1. A method for controlling enzymatic decomposition of urea juxtaposed soil systems or in vivo solution systems, said enzymatic decomposition of said urea being to ammonia and carbonic acid and being due to the action of the enzyme urease thereupon, said method consisting essentially of exposing said enzyme to relatively small predetermined amounts of at least one N,N'-dihalo-2-imidazolidinone of the formula



wherein X and X' are halogens selected from the group consisting of chlorine, bromine, and mixtures thereof; wherein R1, R2, R3, and R4 are selected from the group consisting of hydrogen, C1-C4 alkyl, C1-C4 alkoxy, hydroxy, substituted phenyl, and mixtures thereof; and wherein not more than one of the substituents R1-R4 is hydrogen.

**4,954,157**  
**PLANT GROWTH REGULATING COMPOSITION AND**  
**METHOD FOR REGULATING GROWTH OF A PLANT**  
 Takeshige Miyazawa, Shizuoka, and Kazuhiko Kawano, Niiza, both of Japan, assignors to Kumiai Chemical Industry Co., Ltd., Tokyo, Japan

Filed May 18, 1989, Ser. No. 353,550

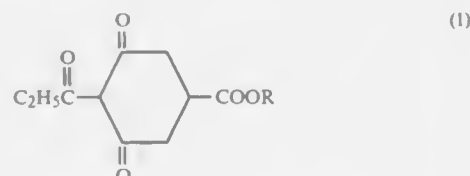
Claims priority, application Japan, May 19, 1988, 63-122268

Int. Cl.<sup>5</sup> A01N 31/06, 57/12, 57/20

U.S. Cl. 71—86

4 Claims

1. A plant growth regulating composition comprising a member selected from the group consisting of 3,5-dioxo-4-propionylcyclohexane carboxylic acid and its esters and salts, represented by the formula:



wherein R is a hydrogen atom, a lower alkyl group or a cation, and (2-chloroethyl) phosphonic acid, as active ingredients, in a ratio of 1:0.2-20 by weight and an agricultural carrier or diluent.

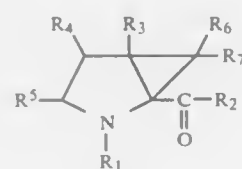
**4,954,158**  
**2,3-METHANOPROLINE**  
 Charles H. Stammer, Athens, Ga., assignor to University of Georgia Research Foundation, Inc., Athens, Ga.  
 Continuation-in-part of Ser. No. 41,642, Apr. 22, 1987, which is a continuation of Ser. No. 879,842, Jun. 26, 1986, which is a continuation of Ser. No. 636,091, Aug. 3, 1984, which is a continuation-in-part of Ser. No. 523,080, Aug. 16, 1983. This application Dec. 15, 1988, Ser. No. 285,542

Int. Cl.<sup>5</sup> A01N 43/38; C07D 209/52

U.S. Cl. 71—76

7 Claims

1. A compound of the general structure



wherein:

R1 is H, R9, COR3, CO2R3, SO2R3, or R3CH(NH2)CO—;  
 R2 is H, R9, OR3, OH, Cl, Br, F, I, NH2, NHR3, N(R3)2, benzyl, phenyl, or substituted benzyl or phenyl wherein the substituents are selected from the group consisting of F, Cl, Br, I, R9, OR9, NHR9, N(R9)2, SR9, SO2R9, COR9, or CO2R9;  
 R3 is H, R9, phenyl or substituted phenyl wherein the substituents are selected from the group consisting of F, Cl, Br, I, R9, OR9, NHR9, N(R9)2, SR9, SO2R9, COR9, CO2R9;  
 R4 is H, Cl, Br, I, F, OR8 or OH;  
 R5 is R3 or =O;  
 R6 and R7 are R3 or COR3;  
 R8 is R3, R3CO, or R3SO2; and  
 R9 is a straight, branched, or cyclic alkyl group of from C1 to C12.

7. A method of inhibiting ethylene production in plant material comprising administering in a botanically acceptable carrier the compound of the general structure

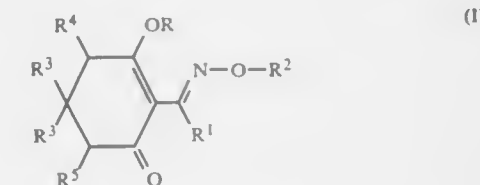
**4,954,160**  
**OXIMINO ETHER COMPOUNDS**  
 Terence Gilkerson, Canterbury, and Robert W. Shaw, Sittingbourne, both of England, assignors to Shell Internationale Research Maatschappij, B.V., The Hague, Netherlands  
 Filed Sep. 21, 1988, Ser. No. 247,273  
 Claims priority, application United Kingdom, Sep. 29, 1987, 8722838

Int. Cl.<sup>5</sup> A01N 43/40

U.S. Cl. 71—88

21 Claims

1. A compound of the formula



wherein

R is selected from a hydrogen atom, an optionally substituted alkyl group, an optionally substituted acyl group, a C2-6 alkenyl group, a C2-6 alkynyl group, and an organic or inorganic cation selected from alkali and alkaline earth metal ions, transition metal ions, and ammonium ions optionally substituted with 1-4 groups selected from optionally substituted alkyl, phenyl and phenylalkyl groups, R1 is selected from alkyl, haloalkyl, C2-6 alkenyl, C2-6 alkynyl, or an optionally substituted phenyl group, R2 is selected from cycloalkyl, C2-6 alkenyl or haloalkynyl, C2-6 alkynyl, or an optionally substituted alkyl group, R3 is an optionally substituted alkyl group, one of R4 and R5 represents a hydrogen atom or an alkyl group while the other of R4 and R5 represents an optionally substituted phenyl group, said optional alkyl substituents being selected from the group consisting of halogen, C1-6 alkoxy, C1-6 alkylthio, (C1-6 alkoxy)carbonyl and optionally substituted phenyl groups, said optional phenyl substituents being selected from the group consisting of halogen, nitro, cyano, C1-6 alkyl, C1-6 haloalkyl, C1-6 alkoxy, C1-10 alkylene dioxy, C1-6 alkylthio and C2-6 alkenylthio and amino, acetamido, mono(C1-4) alkylamino and di(C1-4-alkyl)amino groups, and acyl groups, said optionally substituted acyl group being selected from C2-6 alkanoyl and optionally substituted benzoyl groups, sulfonyl groups, sulphonamido groups of the formula SO2NQ1Q2 wherein each of Q1 and Q2 independently represents a hydrogen atom or an alkyl group.  
 7. A herbicidal composition comprising at least one carrier and a herbicidally-effective amount of a compound of formula (I) as defined in claim 1.

**4,954,161**  
**HERBICIDAL COMPOSITION AND METHOD FOR**  
**SAFENING GRAMINEOUS CROPS AGAINST**  
**HETEROCYCLIC PHENYL ETHERS**

Ronald S. Pidskalny, Edmonton, and Paul G. Kneeshaw, Saskatoon, both of Canada, assignors to American Cyanamid Company, Stamford, Conn.

Filed Jan. 9, 1989, Ser. No. 294,855

Int. Cl.<sup>5</sup> A01N 43/56, 43/76

U.S. Cl. 71—88

7 Claims

1. A herbicidal composition for controlling undesirable plant species, selected from the group consisting of wild oats, green foxtail and combinations thereof which are growing in barley comprising a fenoxaprop ethyl in combination with a difenzoquat salt wherein said composition protects said crop from injury.

3. A method for controlling undesirable plant species, se-

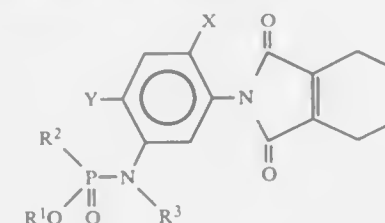
wherein:

R1 is H, R9, COR3, CO2R3, SO2R3, or R3CH(NH2)CO—;  
 R2 is H, R9, OR3, OH, Cl, Br, F, I, NH2, NHR3, N(R3)2, benzyl, phenyl, or substituted benzyl or phenyl wherein the substituents are selected from the group consisting of F, Cl, Br, I, R9, OR9, NHR9, N(R9)2, SR9, SO2R9, COR9, or CO2R9;  
 R3 is H, R9, phenyl or substituted phenyl wherein the substituents are selected from the group consisting of F, Cl, Br, I, R9, OR9, NHR9, N(R9)2, SR9, SO2R9, COR9, CO2R9;  
 R4 is H, Cl, Br, I, F, OR8 or OH;  
 R5 is R3 or =O;  
 R6 and R7 are R3 or COR3;  
 R8 is R3, R3CO, or R3SO2; and  
 R9 is straight, branched, or cyclic alkyl group of from C1 to C12.

**4,954,159**  
**PHOSPHORYLAMINOPHENYL-TETRAHYDROPH-**  
**THALIMIDE HERBICIDES**  
 George Theodoridis, Princeton, N.J., assignor to FMC Corporation, Philadelphia, Pa.  
 Continuation-in-part of Ser. No. 259,073, Oct. 18, 1988, abandoned. This application Mar. 17, 1989, Ser. No. 326,450  
 Int. Cl.<sup>5</sup> A01N 57/32; C07F 9/24; C07D 209/48  
 U.S. Cl. 71—86

19 Claims

1. A compound of the formula



in which

X and Y are independently F, Cl, or Br;  
 R1 is selected from lower alkyl, lower haloalkyl, cycloalkyl of 3 to 7 ring carbon atoms, lower alkenyl, lower haloalkenyl, lower alkynyl, lower haloalkynyl, and benzyl which is unsubstituted or substituted on the phenyl ring with one or more substituents selected from halogen, lower alkyl, lower alkoxy, lower alkoxycarbonyl, cyano, and nitro;  
 R2 is independently selected from among —OR1 or is hydroxy, amino, lower alkylamino, or lower dialkylamino; and R3 is H, alkyl, or lower alkenyl; or  
 a base addition salt of the compound as defined above in which R2 is hydroxy.  
 9. A herbicidal composition comprising an herbicidally effective amount of the compound of claim 1 in admixture with a suitable carrier.

lected from the group consisting of wild oats, green foxtail and combinations thereof which are growing in the presence of barley, which comprises applying to the locus in which said barley is growing a herbicidally effective amount of fenoxaprop ethyl and a difenzoquat salt, wherein the herbicidal combination is safe for said barley.

4. A method for protecting barley from injury by fenoxaprop ethyl which comprises applying a difenzoquat salt with the fenoxaprop ethyl in a non-phytotoxic antidotal amount.

#### 4,954,162 AZOLYMETHYL-CYCLOPROPYL CARBINOL DERIVATIVES

Klaus Stroeck, Solingen; Dietmar Beilefeldt, Ratingen; Wilhelm Brandes, Leichlingen, and Stefan Dutzmann, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 9, 1988, Ser. No. 204,470

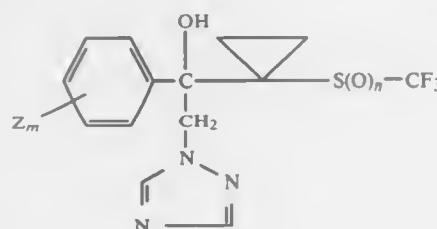
Claims priority, application Fed. Rep. of Germany, Jun. 24, 1987, 3720756

Int. Cl.<sup>5</sup> A01N 43/653; C07D 249/08

U.S. Cl. 71-92

12 Claims

1. An azolymethyl-cyclopropyl carbinol derivative of the formula



in which

Z is fluorine, chlorine or methyl, m is 0, 1, 2 or 3, and

n is 0, 1 or 2, or an addition product thereof with an acid or metal salt.

#### 4,954,163 SUBSTITUTED 1,2,4-TRIAZOLO[1,5-A]PYRIMIDINE-2-SULFONAMIDES, COMPOSITIONS CONTAINING THEM, AND THEIR UTILITY AS HERBICIDES

William A. Kleschik, Martinez, Calif.; Robert J. Ehr, Eden Prairie, Minn.; Mark J. Costales, Concord, Calif.; Ben C. Gerwick, III, Clayton, Calif.; Richard W. Meikle, deceased, late of Walnut Creek, Calif. (by Diane Meikle); William T. Monte, Concord, Calif., and Norman R. Pearson, Walnut Creek, Calif., assignors to The Dow Chemical Company, Midland, Mich.

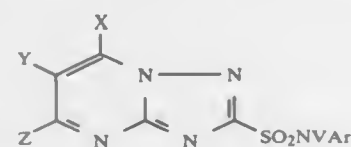
Division of Ser. No. 261,460, Oct. 21, 1988, Pat. No. 4,886,883, Division of Ser. No. 940,480, Dec. 10, 1986, Pat. No. 4,818,273, which is a continuation-in-part of Ser. No. 768,393, Aug. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 551,758, Nov. 14, 1983, abandoned. This application Sep. 13, 1989, Ser. No. 406,676

Int. Cl.<sup>5</sup> C07D 487/04; A01N 43/54

U.S. Cl. 71-92

133 Claims

1. A compound having the formula:



wherein Ar represents an aromatic or heteroaromatic ring chosen among phenyl; 1- or 2-naphthyl; 2-, 3-, or 4-pyridyl; 2-

or 3-thienyl; 2- or 3-furyl; 2-, 4-, or 5-thiazoyl; 2-, 4-, or 5-imidazolyl; 2-, 4- or 5-oxazolyl; 3-, 4-, or 5-isothiazoyl; 3-, 4-, or 5-isoxazolyl; 3-, 4-, or 5-pyrazoyl; 2-benzthiazoyl; 2-benzoxazolyl; 2-benzimidazolyl; or 1-benztriazoyl; and Ar is unsubstituted except in the case of where Ar is phenyl or Ar is substituted with one to four substituents chosen from among C<sub>1</sub>-C<sub>6</sub> alkyl; benzyl; halo; C<sub>1</sub>-C<sub>6</sub> mono- or polyhaloalkyl; phenyl; phenyl substituted with one or more groups chosen from halo, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>4</sub> haloalkyl; hydroxy; C<sub>1</sub>-C<sub>6</sub> alkoxy; C<sub>1</sub>-C<sub>6</sub> mono- or polyhaloalkoxy; phenoxy; phenoxy substituted with one or more groups chosen from halo, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>4</sub> haloalkyl; 2-pyridyloxy; 2-pyridyloxy substituted with one or more groups chosen from halo, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>4</sub> haloalkyl; amino; C<sub>1</sub>-C<sub>6</sub> alkylamino; C<sub>1</sub>-C<sub>6</sub> dialkylamino; nitro; C<sub>1</sub>-C<sub>6</sub> alkylthio; C<sub>1</sub>-C<sub>6</sub> polyhaloalkylthio; C<sub>1</sub>-C<sub>6</sub> alkylsulfenyl; C<sub>1</sub>-C<sub>6</sub> polyhaloalkylsulfenyl; C<sub>1</sub>-C<sub>6</sub> alkylsulfonyl; C<sub>1</sub>-C<sub>6</sub> polyhaloalkylsulfonyl; phenylthio; phenylthio substituted with one or more groups chosen from halo, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>4</sub> haloalkyl; phenylsulfenyl; phenylsulfenyl substituted with one or more groups chosen from halo, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>4</sub> haloalkyl; cyano; carboxyl; C<sub>1</sub>-C<sub>10</sub> alkoxy-carbonyl; phenoxy-carbonyl; phenoxy-carbonyl substituted with one or more groups chosen from halo, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>4</sub> haloalkyl; alkoxyalkoxy-carbonyl wherein the number of carbons in the alkoxyalkoxy fragment ranges from 2-10 and the number of oxygens in the alkoxyalkoxy fragment ranges from 2-4; 2-pyridylmethoxy-carbonyl; dialkylaminoalkoxy-carbonyl wherein the number of carbons in the dialkylaminoalkoxy fragment ranges from 3-10 and the number of oxygens in the dialkylaminoalkoxy fragment is one; C<sub>3</sub>-C<sub>6</sub> alkenyloxy-carbonyl; COON=C(R<sup>14</sup>)(R<sup>15</sup>) wherein R<sup>14</sup> independently represents hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl or phenyl; amino-, C<sub>1</sub>-C<sub>6</sub> alkylamino- or di C<sub>1</sub>-C<sub>6</sub> alkylaminocarbonyl; C<sub>1</sub>-C<sub>10</sub> alkoxy-sulfonyl; C<sub>1</sub>-C<sub>4</sub> polyhaloalkoxy-sulfonyl; di C<sub>1</sub>-C<sub>6</sub> alkylaminosulfonyl; formyl; C<sub>1</sub>-C<sub>6</sub> alkylcarbonyl; C<sub>1</sub>-C<sub>6</sub> mono- or polyhaloalkylcarbonyl; phenylcarbonyl; phenylcarbonyl substituted with one or more groups chosen from halo, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>4</sub> haloalkyl; or C(R<sup>15</sup>)(R<sup>16</sup>)OR<sup>16</sup> wherein each R<sup>15</sup> independently represents hydrogen or C<sub>1</sub>-C<sub>6</sub> alkyl and R<sup>16</sup> represents hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, benzyl, phenylcarbonyl, or C<sub>1</sub>-C<sub>6</sub> alkylcarbonyl; (except in the cases of thio, sulfinyl, and sulfonyl substituents where if one of these substituents is present the other one to three Ar substituents may not be chosen from among the other two; oxycarbonyl substituents where the other one to three Ar substituents may not be chosen from among different oxycarbonyl substituents or aminocarbonyl substituents where the other one to three Ar substituents may not be chosen from among different aminocarbonyl substituents); X, Y, and Z independently represent hydroxyl; carboxyl; hydrogen; C<sub>1</sub>-C<sub>6</sub> alkyl; C<sub>1</sub>-C<sub>6</sub> mono- or polyhaloalkyl; C<sub>1</sub>-C<sub>6</sub> alkoxy; C<sub>1</sub>-C<sub>6</sub> mono- or polyhaloalkoxy; amino; C<sub>1</sub>-C<sub>4</sub> alkylamino; or di C<sub>1</sub>-C<sub>4</sub> alkylamino; phenyl; phenyl substituted with one or more groups chosen from halo, nitro, C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>1</sub>-C<sub>6</sub> mono- or polyhaloalkyl; C<sub>1</sub>-C<sub>6</sub> alkylthio; or halo; or two adjacent substituents (i.e. X and Y or Y and Z) are joined together to form a five, six, or seven-membered saturated cyclic structure of carbon atoms or one said carbon atom of X, Y or Y, Z is replaced by a heteroatom chosen from among nitrogen, oxygen, and sulfur (i.e. X, Y or Y, Z is -(CH<sub>2</sub>)<sub>n</sub> wherein n is 3, 4, or 5; or X, Y or Y, Z is -(CH<sub>2</sub>)<sub>n</sub>-A-(CH<sub>2</sub>)<sub>m</sub> wherein n is 0-4, the value of m is equal to the ring size minus (n+3) and A is NH, O, or S; and V is H or R and R represents C<sub>1</sub>-C<sub>10</sub> alkyl, C<sub>3</sub>-C<sub>10</sub> alkenyl, C<sub>3</sub>-C<sub>10</sub> alkynyl, phenylalkyl, C<sub>2</sub>-C<sub>10</sub> alkanoyl, C<sub>1</sub>-C<sub>10</sub> alkoxy-carbonyl, phenoxy-carbonyl, di C<sub>1</sub>-C<sub>6</sub> alkylaminocarbonyl, C<sub>1</sub>-C<sub>6</sub> alkylsulfonyl, phenylsulfonyl, C<sub>1</sub>-C<sub>10</sub> alkoxythiocarbonyl or phenoxythiocarbonyl wherein alkyl, alkenyl, alkynyl and alkoxy in each instance is optionally substituted by halo and each phenyl moiety is optionally substituted by one or two groups selected from halo, nitro, C<sub>1</sub>-C<sub>4</sub> alkyl, and C<sub>1</sub>-C<sub>4</sub> haloalkyl; and, when V represents hydrogen, agriculturally acceptable salts thereof.

#### 4,954,164 PYRAZOLESULFONYLUREA DERIVATIVES, PREPARATION THEREOF, HERBICIDE CONTAINING SAID DERIVATIVE AS ACTIVE INGREDIENT AND HERBICIDAL METHOD BY USE THEREOF

Fumio Suzuki, Onoda; Yoshihiro Iwasawa, Ichikawa; Toshiaki Sato, Funabashi; Takasi Ikai, Tokyo, and Tosibiko Oguti, Urawa, all of Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

Filed Feb. 24, 1983, Ser. No. 469,458

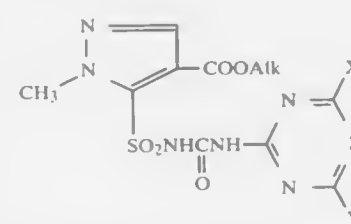
Claims priority, application Japan, Feb. 27, 1982, 57-31377; Aug. 18, 1982, 57-142069

Int. Cl.<sup>5</sup> A01N 43/54, 43/66; C07D 239/47

U.S. Cl. 71-92

5 Claims

1. A method of controlling the growth of undesired vegetation in rice growing sites without harming the rice plants which comprises applying to a rice growing site an effective amount of a compound of the formula



wherein Alk is methyl or ethyl; X is methyl or methoxy; Y is methoxy; and Z is CH.

#### 4,954,165 SUBSTITUTED BENZOYL DERIVATIVES AND SELECTIVE HERBICIDES

Masatoshi Baba, Takuya Kakuta; Norio Tanaka; Eiichi Oya, all of Funabashi; Takashi Ikai, Tokyo; Tsutomu Nawamaki, Shiraoka; Shigeomi Watanabe, Shiraoka, and Koichi Suzuki, Shiraoka, all of Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

Filed Oct. 18, 1988, Ser. No. 259,587

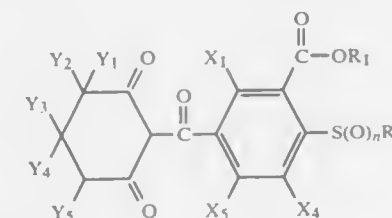
Claims priority, application Japan, Oct. 19, 1987, 62-263060; Nov. 20, 1987, 62-293804

Int. Cl.<sup>5</sup> A01N 31/04, 37/34; C07C 49/792, 43/21

U.S. Cl. 71-103

5 Claims

1. A substituted benzoyl derivative having the formula:



wherein

X<sub>1</sub> is C<sub>1</sub>-C<sub>4</sub> alkoxy or halogen;  
X<sub>4</sub> is hydrogen, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or halogen;  
X<sub>5</sub> is hydrogen or fluorine;  
Y<sub>1</sub>, Y<sub>2</sub>, Y<sub>3</sub>, Y<sub>4</sub> and Y<sub>5</sub> are independently hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl;  
R<sub>1</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl;  
R<sub>4</sub> is C<sub>1</sub>-C<sub>3</sub> alkyl;  
n is an integer of 0, 1 or 2.  
2. The compound of claim 1 wherein:  
X<sub>1</sub> is halogen;  
X<sub>4</sub> is hydrogen;  
X<sub>5</sub> is hydrogen;

Y<sub>1</sub>, Y<sub>2</sub>, Y<sub>3</sub>, Y<sub>4</sub> and Y<sub>5</sub> are independently hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sub>1</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sub>4</sub> is C<sub>1</sub>-C<sub>3</sub> alkyl;

n is an integer of 0, 1 or 2.

3. The compound of claim 2 wherein:

X<sub>1</sub> is chlorine;

R<sub>1</sub> is methyl;

R<sub>4</sub> is methyl.

5. The method of controlling undesirable vegetation comprising applying to the area where control is desired, an herbicidally effective amount of the compound of claim 3.

#### 4,954,166 PRODUCTION OF SPONGE METAL FROM SPONGE METAL FINES

Hani A. M. Abodishish; Randy W. Wahlquist, both of Ogden, and Dale A. Lopez, South Weber, all of Utah, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 17, 1989, Ser. No. 437,948

Int. Cl.<sup>5</sup> C22B 5/02

U.S. Cl. 419-38

8 Claims

1. A process for the production of a sintered, coherent mass of sponge metal from sponge metal fines of a metal of a kind that can be produced in the form of sponge, comprising bringing said fines into contact with molten magnesium under conditions of temperature above the melting point of magnesium to wet the surfaces of said metal fines with said magnesium; lowering the temperature to or below the melting point of magnesium so as to solidify said molten magnesium; and sintering and fusing together the metal fines by raising the temperature to or above the vaporization point of the magnesium, thereby distilling off said magnesium.

#### 4,954,167 DISPERSING GAS INTO MOLTEN METAL

Paul V. Cooper, 8389 Sherman Rd., Chesterland, Ohio 44026

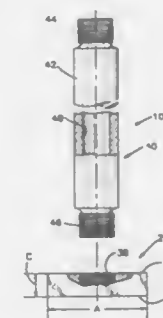
Division of Ser. No. 222,934, Jul. 22, 1988, Pat. No. 4,898,367.

This application Jul. 10, 1989, Ser. No. 377,484

Int. Cl.<sup>5</sup> C22B 9/00

U.S. Cl. 75-708

10 Claims

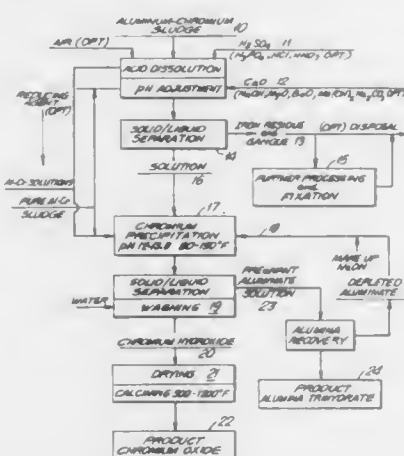


1. A method for dispersing gas into molten metal, comprising the steps of:  
providing an impeller in the form of a rectangular prism having upper and lower faces, a width (A), a depth (B), and a height (C), with (A) being equal to (B), the impeller having a gas discharge outlet opening through the lower face of the prism;  
providing an elongate, rotatable shaft rigidly connected to the impeller and projecting from the upper face of the impeller;  
providing means for conveying gas to the gas discharge outlet;  
providing a vessel within which molten metal is contained; immersing the impeller into the molten metal contained within the vessel;  
rotating the shaft about its longitudinal axis; and



pumping gas through the gas discharge outlet while rotating the shaft.

**4,954,168**  
**RECLAIMING OF ALUMINUM-CHROMIUM WASTE MATERIALS FROM ETCHING OPERATIONS**  
Ranko Crnojević; Edward I. Wiewirowski, both of New Orleans, and Andrew B. Case, Harvey, all of La., assignors to AMAX Inc., New York, N.Y.  
Filed May 15, 1989, Ser. No. 352,301  
Int. Cl.<sup>3</sup> C22B 3/00; C01G 37/00; C01F 7/00  
U.S. Cl. 423—55 10 Claims



1. A method for treating sludge containing substantial amounts of chromium, aluminum and iron which comprises: forming a slurry of said sludge in water at a temperature ranging from ambient to about 150° F. with the specific gravity of the slurry ranging from about 1.02 to 1.25, adding a mineral acid to said slurry to provide a pH ranging from about 0.1-3 to dissolve selectively said aluminum and said chromium and leave a solids residue containing gangue material comprising an oxidized iron compound, calcium sulfate, calcium fluoride, and calcium silicate, controlling the pH of said solution at range of about 2 to 3.5 to precipitate the iron present, without substantially adversely affecting the dissolved chromium and aluminum, separating said chromium/aluminum-containing solution from said solids therein to provide a substantially purified solution of chromium/aluminum, raising the pH of the solution to a range of about 12 to 13.8 to precipitate chromium as chromium hydroxide and provide a pregnant aluminate solution, and then subjecting said chromium hydroxide-containing solution to solid/liquid separation and thereby extract chromium hydroxide therefrom and provide a pregnant aluminate solution which is thereafter treated to recover alumina therefrom.

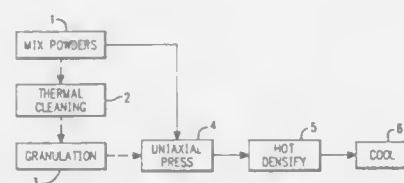
**4,954,169**  
**FINE-GRAINED, HIGH-PURITY EARTH ACID METAL POWDERS, A PROCESS FOR THEIR PRODUCTION AND THEIR USE**  
Dieter Behrens, Bad Harzburg, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
Filed Jun. 12, 1989, Ser. No. 364,844  
Claims priority, application Fed. Rep. of Germany, Jun. 22, 1988, 3820960  
Int. Cl.<sup>3</sup> B22F 1/00 18 Claims

U.S. Cl. 75—228  
1. Earth acid metal powders consisting of agglomerates for powder metallurgical applications for the production of sintered compacts, wherein the mean grain size of the agglomer-

ates is no more than 2.0  $\mu\text{m}$ , determined by the Fisher Sub-Sieve Sizer, and wherein the agglomerates consist of primary individual agglomerated particles of mean grain size of no more than 0.7  $\mu\text{m}$ .

**4,954,170**  
**METHODS OF MAKING HIGH PERFORMANCE COMPACTS AND PRODUCTS**  
Maurice G. Fey, Plum Borough; Natraj C. Iyer, Monroeville; Alan T. Male, Murrysboro, and William R. Lovic, New Kensington, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Jun. 30, 1989, Ser. No. 374,324  
Int. Cl.<sup>3</sup> B22F 1/00 39 Claims

U.S. Cl. 75—229



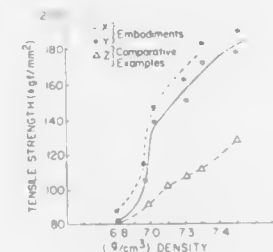
1. A method of forming a pressed, dense compact, comprising the steps:

- (1) providing a compactable particulate combination of:
  - (a) Class 1 metals selected from the group consisting of Ag, Cu, Al, and mixtures thereof, with
  - (b) material selected from the class consisting of  $\text{CdO}$ ,  $\text{SnO}$ ,  $\text{SnO}_2$ , C, Co, Ni, Fe, Cr,  $\text{Cr}_3\text{C}_2$ ,  $\text{Cr}_7\text{C}_3$ , W, WC,  $\text{W}_2\text{C}$ , WB, Mo,  $\text{Mo}_2\text{C}$ ,  $\text{MoB}$ ,  $\text{Mo}_2\text{B}$ , TiC, TiN,  $\text{TiB}_2$ , Si,  $\text{SiC}$ ,  $\text{Si}_3\text{N}_4$ , and mixtures thereof;
- (2) uniaxially pressing the particulate combination, having a maximum dimension up to approximately 1,500 micrometers, to a density of from 60% to 95%, to provide a compact;
- (3) placing at least one compact in an open pan having a bottom surface and containing side surfaces where the compact contacts a separation material which aids subsequent separation of the compact and the pan;
- (4) evacuating air from the pan;
- (5) sealing the open top portion of the pan, where at least one of the top and bottom surfaces of the pan is pressure deformable;
- (6) stacking a plurality of the pans next to each other, with plates having a high electrical resistance disposed between each pan so that the pans and plates alternate with each other, where a layer of thermally conductive, granular, pressure transmitting material, having a diameter of up to approximately 1,500 micrometers, is disposed between each pan and plate, which granular material acts to provide heat transfer and uniform mechanical loading to the compacts in the pans upon subsequent pressing, and where the plates and the granular material used to provide uniform loading having a melting point above that of the lowest melting component used in the compacts;
- (7) placing the stack in a press, passing an electrical current through the pans and high electrical resistance plates to cause a heating effect on the compacts in the pans, and uniaxial pressing the alternating pans and plates, where the pressure is between 352.5  $\text{kg}/\text{cm}^2$  (5,000 psi) and 3,172  $\text{kg}/\text{cm}^2$  (45,000 psi) and the temperature is from 0.5° C. to 100° C. below the melting point or decomposition point of the lowest melting component in the press, to provide uniform, simultaneous hot-pressing and densification of the compacts in the pans to over 97% of theoretical density;
- (8) cooling and releasing pressure on the alternating pans and plates; and

(9) separating the pans from the plates and the compacts from the pans.

**4,954,171**  
**COMPOSITE ALLOY STEEL POWDER AND SINTERED ALLOY STEEL**  
Shigeaki Takajo; Osamu Furukimi; Kuniaki Ogura; Keiichi Maruta; Teruyoshi Abe, and Ichio Sakurada, all of Chiba, Japan, assignors to Kawasaki Steel Corp.  
PCT No. PCT/JP88/01007, § 371 Date Jul. 14, 1989, § 102(e) Date Jul. 14, 1989, PCT Pub. No. WO89/02802, PCT Pub. Date Apr. 6, 1989  
PCT Filed Sep. 30, 1988, Ser. No. 381,652  
Claims priority, application Japan, Sep. 30, 1987, 62-244074; Jun. 6, 1988, 63-137400  
Int. Cl.<sup>3</sup> C22C 1/00 15 Claims

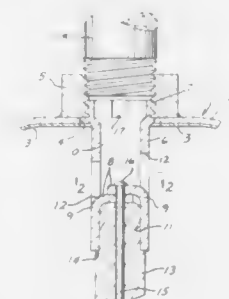
U.S. Cl. 75—246



1. A composite alloy steel powder for powder metallurgy composed of iron powder particles and powdery alloy components attached by diffusion to parts of the surfaces of the iron powder particles, which comprises Ni and Mo as alloy components, said alloy powder comprising 0.05-3.50 wt. % of Ni, 0.65-3.50 wt. % of Mo, and the remainder of Fe and inevitable impurities, wherein the content of Ni and the content of Mo in the particles of alloy steel powder which have particle diameters smaller than 45  $\mu\text{m}$  are in the range of 2.0-4.2 times the average content of Ni and of Mo in the entire alloy steel powder.

**4,954,172**  
**COMBINATION ANODE MOUNT AND HOT WATER OUTLET FOR WATER HEATER**  
Timothy H. Houle, Wauwatosa, and Robert M. Schurter, Elm Grove, both of Wis., assignors to A. O. Smith Corporation, Milwaukee, Wis.  
Filed Aug. 7, 1989, Ser. No. 390,962  
Int. Cl.<sup>3</sup> C23F 13/00 9 Claims

U.S. Cl. 204—197



1. In a water heater, a tank to contain water to be heated and having an upper head, said head having an opening therein, an annular spud secured to the outer surface of said head in alignment with said opening, a tubular metal body having an upper end extending through said opening and connected to said

spud, said body having a pair of opposed apertures, a tab integrally connected to the bottom edge of each aperture, said tabs extending transversely of said body and disposed in lapping relation to provide a wall dividing said body into an upper chamber and a lower chamber, heated water from the tank being adapted to be discharged through said apertures to said upper chamber, and an anode of a metal electro-negative to steel having an upper end disposed in said lower chamber and in electrical contact with said body.

**4,954,173**  
**LIPOPHOBICATING SOLUTION FOR ELECTROPHOTOGRAPHIC PLATES FOR OFFSET PRINTING**  
Hajime Yoshida, Nagoya, Japan, assignor to Nikken Chemical Laboratory Co., Ltd., Nagoya, Japan  
Filed Nov. 8, 1988, Ser. No. 268,948  
Claims priority, application Japan, Nov. 19, 1987, 62-292630  
Int. Cl.<sup>3</sup> C09K 3/00; B41M 5/025 14 Claims

U.S. Cl. 106—2  
1. A lipophobicating solution for an electrophotographic plate for offset printing, comprising:

- (a) an effective amount of phytic acid to prevent oily printing ink from sticking to nonimage areas of the surface of said electrophotographic plate;
- (b) an amount of a diamine, having the general formula  $\text{NH}_2\text{—R—NH}_2$  wherein R is an alkyl or aryl group having from 2 to 8 carbon atoms, effective to adjust the pH of said lipophobicating solution to a value in the range of from about 3.0 to about 6.0, and
- (c) water; and
- (d) at least about 60 mol % by weight, based on said phytic acid, of a mixture of at least two dicarboxylic acids selected from the group consisting of carboxylic acids represented by the formula  $\text{HOOC—(CH}_2\text{)}_n\text{—COOH}$  (wherein n is an integer in the range of 1 to 6) and phthalic acid.

**4,954,174**  
**ERASABLE INK COMPOSITIONS**  
Kiyotaka Imagawa, Osaka, Japan, assignor to Sakura Color Products Corporation, Osaka, Japan  
Filed Aug. 24, 1988, Ser. No. 235,569  
Claims priority, application Japan, Aug. 24, 1987, 62-209545  
Int. Cl.<sup>3</sup> C09D 11/16; C09K 3/00 7 Claims

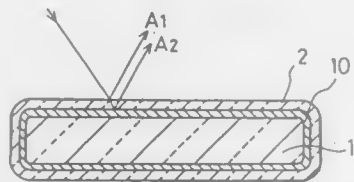
U.S. Cl. 106—27  
1. An erasable ink composition for use in writing with a marking pen which comprises an organic solvent, optionally a resin soluble in the solvent, a pigment dispersed in the solvent and additives, the improvement in the additives comprising:

- (a) a fatty acid monoester of an aliphatic alcohol wherein the fatty acid has not less than six carbons in amounts of about 0.5-20% by weight;
- (b) a fatty acid triglyceride in amounts of about 0.5-20% by weight;
- (c) a higher aliphatic hydrocarbon which is liquid at normal temperatures in amounts of about 0.2-5% by weight; and
- (d) a polyoxyethylene alkyl ether phosphoric acid ester in amounts of about 0.5-7% by weight; each based on the ink composition.

**4,954,175**  
**PIGMENT**  
Hiroshi Ito, Ichinomiya; Junichi Handa, Toyota; Yoshio Takagi, Nagoya, and Taketoshi Minohara, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan  
Filed Feb. 7, 1989, Ser. No. 306,980  
Claims priority, application Japan, Jul. 20, 1988, 63-181215; Jan. 25, 1989, 64-15385  
Int. Cl.<sup>3</sup> C04B 14/20 11 Claims

U.S. Cl. 106—417  
1. A pigment comprising:  
a substrate;

a transparent inorganic compound layer formed on a surface of said substrate; and  
a metallic layer having metallic luster formed in a scattered manner on an interface between said substrate and said transparent inorganic compound layer,



whereby said pigment produces color by light interference of a ray reflected on a surface of said transparent inorganic compound layer and a ray passed through said transparent inorganic compound layer and reflected on a surface of said metallic layer.

#### 4,954,176 PIGMENT

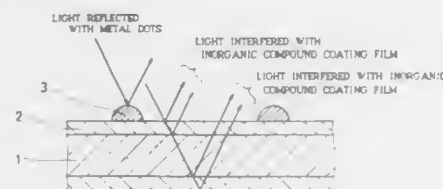
Taketoshi Minohara, Toyota; Yoshio Takagi, Nagoya; Tadashi Isobe, and Keita Suzuki, both of Okazaki, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Oct. 3, 1988, Ser. No. 252,313

Claims priority, application Japan, Oct. 21, 1987, 62-265795  
Int. Cl.<sup>5</sup> C04B 14/00

U.S. Cl. 106—417

27 Claims



17. A pigment comprising:  
a ceramic scaly substrate;  
a transparent inorganic compound coating film formed on all over the surfaces of said ceramic scaly substrate;  
a transparent coloring film formed on all over the surfaces of said inorganic compound coating film; and  
metal dots or metal alloy dots formed on the surfaces of said coloring film in a ratio of from 0.05 to 95% of the total surface area of said coloring film.

#### 4,954,177 DISPERSION

John D. Schofield, Bury, England, assignor to Imperial Chemical Industries PLC, London, England

Continuation-in-part of Ser. No. 22,091, Mar. 5, 1987, abandoned. This application Aug. 31, 1988, Ser. No. 238,607  
Claims priority, application United Kingdom, Mar. 26, 1986, 8607596

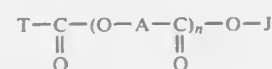
The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C08K 5/09; C09C 3/00

U.S. Cl. 106—499

16 Claims

1. A composition comprising a finely-divided ceramic solid whereof the primary particles have a mean diameter of below 25 microns and a dispersant which is an organic compound of the formula



wherein

A is a divalent aliphatic radical containing 17 carbon atoms;  
J is a hydrogen, a metal, ammonium, or substituted ammonium;  
T is an optionally substituted alkyl, cycloalkyl, polycycloalkyl, aryl or polyaryl group wherein the optional substituent is at least one group selected from hydroxy, halo and alkoxy groups; and  
n has a value from 1 up to 3.

#### 4,954,178 STARCH HYDROLYZATE PRODUCT

Dennis W. Caton, Marion, Iowa, assignor to Penford Products Co., Cedar Rapids, Iowa

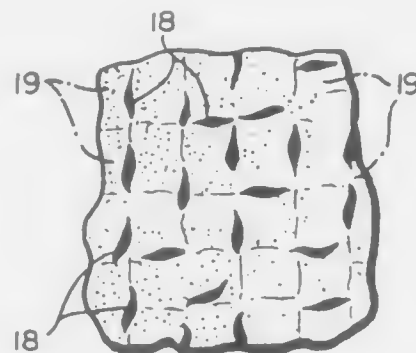
Division of Ser. No. 170,705, Mar. 19, 1988, Pat. No. 4,810,307, which is a continuation of Ser. No. 436, Jan. 5, 1987, abandoned.

This application Oct. 27, 1988, Ser. No. 263,286

Int. Cl.<sup>5</sup> C13F 3/02; C08B 30/00

U.S. Cl. 127—32

10 Claims



1. A starch hydrolyzate product produced by the partial hydrolysis of cereal and root based starches and composed of particles at least some of which are in the size range —30 to 80 mesh, wherein:

the untapped bulk density of said product for particles thereof in the size range —80 to +80 mesh is greater than 0.5 g/cc;  
and a substantial portion of said particles have a surface topography comprising cracks, crevices and fissures into which liquid can infiltrate to increase the speed of dissolution of said particles compared to particles of the same size without said surface topography;  
said starch hydrolyzate product being the product of a process comprising the steps of:  
mixing particles of a starch hydrolyzate product produced by the partial hydrolysis of cereal and root based starches with an added liquid which will occupy spaces between the particles when they are compacted;  
forming a blend of said particles and said added liquid as a result of said mixing step;  
providing said blend with a water content derived from the bound water in said particles and the water in said added liquid;  
controlling said water content of the blend, by controlling the amount of said added liquid and the concentration thereof, so that the blend's total water content is greater than 3 wt. % and no greater than about 7 wt. %;

compacting said blend of particles and liquid between a pair of compacting rolls to form a sheet of compacted material composed of formerly discrete starch hydrolyzate particles crushed together, with said liquid occupying spaces between said crushed-together particles;  
breaking said sheet of compacted material, after said compacting, into compacted particles of said material, wherein at least a substantial portion of said particles have a surface topography comprising cracks, crevices and fissures as a result of said above-recited steps;  
and drying said material after said breaking to eliminate said liquid which occupied the spaces between the particles;  
said liquid being one which has the ability to blend with said particles and to lubricate said compacting rolls and which is more volatile than water to facilitate the removal of the liquid during said drying step;  
said liquid being selected from the group consisting of ethyl alcohol, acetone, hexane, cyclohexane, methyl ethyl ketone, ethyl acetate, propyl alcohol, butyl alcohol and pentyl alcohol.

#### 4,954,180 METHOD FOR CLEANING SPINNERETTES

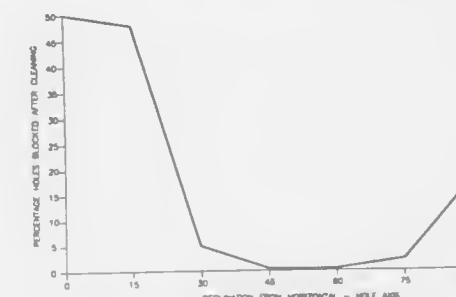
James C. Malloy, 404 W. Saratoga, Ferndale, Mich. 48220, assignor to James Christopher Malloy, Ferndale, Mich.

Continuation-in-part of Ser. No. 50,008, May 15, 1987, abandoned. This application Jun. 9, 1988, Ser. No. 204,595

Int. Cl.<sup>5</sup> B08B 3/10

U.S. Cl. 134—22.13

17 Claims



1. A method of cleaning organic material from the orifices of spinnerettes comprising the steps of:  
immersing the spinnerette in a fused oxidizing salt bath maintained between about 500° F. and 900° F., positioning the spinnerette in a position with the orifices extending at an angle of from about 30° to about 75° with respect to the horizontal to allow trapped gases to escape, and with the inlet ends of the orifices oriented upwardly;  
removing the spinnerette from the bath, and quenching the spinnerette.

#### 4,954,179 METHOD AND APPARATUS FOR CLEANING A PIPE SYSTEM PROVIDED FOR THE OPERATION OF BATHS

Thomas K. Fränninge, Luks Road Old Windsor, Berkshire SL4 2QX, Great Britain

Continuation of Ser. No. 70,222, Jul. 6, 1987, Pat. No. 4,857,112.

This application Apr. 5, 1989, Ser. No. 333,586

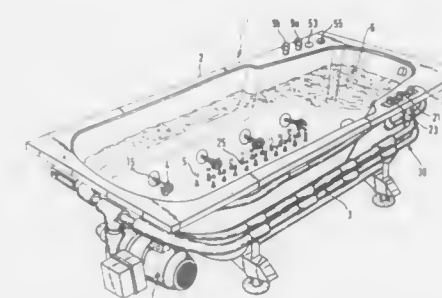
Claims priority, application Sweden, Jul. 7, 1986, 8603014; Oct. 3, 1986, 8604204; Feb. 23, 1987, 8700739

The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B08B 3/02

U.S. Cl. 134—22.12

14 Claims



1. A method of cleaning a pipe system for a bathtub comprising flushing the pipes in the pipe system with water from a water source after a bath has been taken, wherein the flushing water is taken from a water source which is the same water source which supplies the bathtub with bath water, thereby using the water pressure of the source, and wherein flushing water is delivered to the conduits by flushing jets from a plurality of successive sections within the conduits and directed substantially in a transverse direction towards the inner surfaces of said conduits at a pressure so as to hit the inner surfaces of the conduits with sufficient force to dislodge impurities situated on the inner surface of the conduits before said impurities have dried on the inner surface of said conduits.

#### 4,954,181 SOLAR CELL MODULE AND METHOD OF MANUFACTURE

Masaharu Nishiura; Takeshige Ichimura, and Michinari Kamiyama, all of Yokosuka, Japan, assignors to Fuji Electric Company Ltd. and Fuji Electric Corporate Research and Development Ltd., Japan

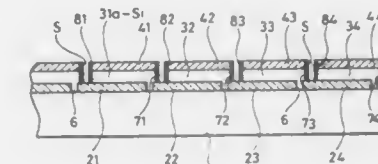
Filed Sep. 25, 1985, Ser. No. 780,093

Claims priority, application Japan, Oct. 5, 1984, 59-209212; Oct. 12, 1984, 59-213736

Int. Cl.<sup>5</sup> H01L 31/042, 31/18

U.S. Cl. 136—244

3 Claims



1. A solar cell module, comprising:  
an insulating substrate carrying a transparent electrode on one surface;  
an amorphous semiconductor film overlying said transparent electrode;  
a metal electrode layer overlying said semiconductor film;  
each of said electrode, film and layer being divided into regions to form a plurality of adjacent cells, said divided regions of the transparent electrode and said metal layer being in positions shifted from one another to define a gap between adjacent cells; and  
said semiconductor film having a portion projecting into said gap from between said transparent electrode and said metal layer, said projecting portion being crystallized



after assembly of the electrode, film and metal layer so as to form a low resistivity connection between the metal electrode layer of one cell and the transparent electrode of an adjacent cell.

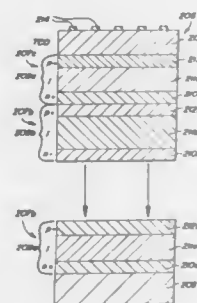
**4,954,182**  
**MULTIPLE CELL PHOTORESPONSIVE AMORPHOUS PHOTO VOLTAIC DEVICES INCLUDING GRADED BAND GAPS**

Stanford R. Ovshinsky, Bloomfield Hills, Mich., and David Adler, Lexington, Mass., assignors to Energy Conversion Devices, Inc., Troy, Mich.  
Continuation of Ser. No. 710,947, Mar. 13, 1965, Pat. No. 4,891,074, which is a continuation of Ser. No. 427,757, Sep. 29, 1982, abandoned, which is a continuation of Ser. No. 206,580, Nov. 13, 1980, abandoned. This application Mar. 13, 1989, Ser. No. 301,916

Int. Cl.<sup>5</sup> H01L 31/06

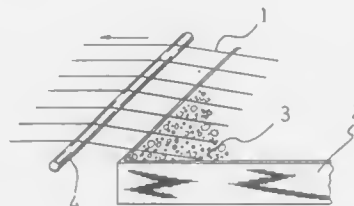
U.S. Cl. 136—249

8 Claims



1. An improved photoresponsive tandem multiple cell device, said device comprising:  
at least first and second superimposed solar cells;  
said first cell being formed of an amorphous silicon alloy material;  
said second amorphous silicon alloy cell having an active photoresponsive region in which radiation can impinge to produce charge carriers, said amorphous silicon alloy cell body including at least one element for reducing the density of defect states to about  $10^{16}$  defects per cubic centimeter and a band gap adjusting element graded through at least a portion of the photoresponsive region thereof to enhance the radiation absorption;  
said adjusting element being germanium, and the band gap of said cell being adjusted for a specified photoresponse wavelength threshold function different from said first cell;  
said second cell being a multi-layer body having deposited silicon alloy layers of opposite (p and n) conductivity type, the n-type layer being formed by introducing during the deposition of the layer an n-dopant element and the p-type layer being formed by introducing during deposition of the layer a p-dopant element, and having deposited between said p and n doped layers said active photoresponsive region formed of substantially intrinsic amorphous silicon alloy; and  
said first cell being formed with said second cell in substantially direct junction contact therebetween, said first and second cells designed to generate substantially matched currents from each cell from a light source directed through said first cell and into said second cell.

**4,954,183**  
**LEAD HEAT TREATMENT OF WIRE WITH PREVENTION OF LEAD ENTRAINMENT**  
Marc DeWitte, Moen, Belgium, assignor to N.V. Bekaert S.A., Zvevegem, Belgium  
Filed Mar. 22, 1989, Ser. No. 327,086  
Claims priority, application European Pat. Off., Apr. 25, 1988, 88200789.1  
Int. Cl.<sup>5</sup> C21D 1/48, 9/58; C23C 2/18, 2/20  
U.S. Cl. 148—15 11 Claims



1. A process of heat treatment of at least one elongated steel element consisting essentially of:  
conducting said elongated steel element through a bath of molten lead, and  
immediately upon exit from said bath of molten lead, contacting said elongated steel element with an amount of a substance that is capable of transforming lead oxide to lead or a lead compound sufficient to reduce lead entrainment on said elongated steel element at the exit conditions of said elongated steel element from said bath of molten lead.

**4,954,184**  
**SOLDER TINNING PASTE FOR AUTOMOBILE APPLICATION**  
Paul J. Conn, Grand Island, N.Y., assignor to S. A. Day Manufacturing Co., Inc., Buffalo, N.Y.  
Filed May 17, 1989, Ser. No. 353,340  
Int. Cl.<sup>5</sup> B23K 35/34

U.S. Cl. 148—24 21 Claims  
1. Solder tinning paste composition suitable for use as an underlayer for metallic solder when solder filling base metal braze joints to facilitate formation of the solder joint between the base metals, said paste exhibiting a melting point lower than 450° F., said paste consisting essentially of:  
from about 35.0 weight percent to about 85.0 weight percent substantially pure tin powder;  
from about 0.25 weight percent to about 3.0 weight percent suspending agent;  
from about 4.0 weight percent to about 15.0 weight percent inorganic based flux; and  
from about 10.0 weight percent to about 40.0 weight percent solvent.

**4,954,185**  
**METHOD OF APPLYING ADHERENT COATING ON COPPER**  
Thomas S. Kohm, Huntington, N.Y., assignor to Kollmorgen Corporation, Simsbury, Conn.  
Division of Ser. No. 282, Jan. 14, 1987, Pat. No. 4,774,279. This application Jul. 7, 1988, Ser. No. 216,117  
Int. Cl.<sup>5</sup> C23C 8/10

U.S. Cl. 148—282 11 Claims  
1. A method of adherently bonding a primer coating composition to a surface, at least a portion of the surface being a metal, comprising:  
removing essentially all soil from the surface, and removing all oxides and oxide films from the surface of the metal to expose a substantially pure metallic surface;

dehydrating the surface before the formation of a metallic oxide film greater than about 2.5 nm thick;  
thereafter applying the primer coating composition to the surface before said metallic oxide film grows to greater than 2.5 nm, said primer coating composition including the product of reacting between 20 to 60% by weight of a poly(vinyl acetal) resin with 80–40% by weight of a thermosetting phenolic resin in the presence of an acidic catalyst, between 0.3 and 2% of a coupling agent having one to three amino substituted aromatic groups covalently bonded to a titanium or zirconium central atom via an oxygen containing linkage and an organic solvent; and  
heat curing the primer coating composition on the surface at a temperature below 200° C., the cured coating being capable of maintaining the adhesion, essentially without outgassing, for at least 10 seconds when heated at 250° C.

**4,954,186**  
**REAR EARTH-IRON-BORON PERMANENT MAGNETS CONTAINING ALUMINUM**  
Mohammad H. Ghandehari, Brea, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.  
Division of Ser. No. 869,045, May 30, 1986. This application Apr. 4, 1988, Ser. No. 177,094  
Int. Cl.<sup>5</sup> H01F 1/04

U.S. Cl. 148—302 28 Claims  
1. A rare earth-iron-boron permanent magnet containing aluminum and added rare earth oxide prepared by the method comprising the steps of:  
(a) mixing (1) a particulate alloy, containing at least one rare earth metal, iron, and boron, with (2) particulate aluminum and (3) about 0.5 to about 10 weight percent of particulate rare earth oxide, calculated by weight of said particulate alloy;  
(b) aligning magnetic domains of the mixture in a magnetic field;  
(c) compacting the aligned mixture to form a shape; and  
(d) sintering the compacted shape; and wherein said permanent magnet comprises a rare earth metal, iron, boron, added rare earth oxide and about 0.05 to about 1.0 percent by weight of aluminum.

**4,954,187**  
**PRECIPITATES COPPER-ZINC ALLOY WITH NICKEL SILICIDE**  
Norbert Gaag, Leinburg, and Peter Ruchel, Lauf/Pegn., both of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany  
Filed Oct. 20, 1988, Ser. No. 260,199  
Claims priority, application Fed. Rep. of Germany, Oct. 22, 1987, 3735783  
Int. Cl.<sup>5</sup> C22F 1/08

U.S. Cl. 148—413 5 Claims  
1. A copper-zinc alloy, consisting essentially of 50 to 60 wt. % copper 1 to 6 wt. % aluminum, 0.5 to 5 wt. % silicon, 5 to 8 wt. % nickel, 0 to 1 wt. % iron, 0 to 2 wt. % lead, 0 to 2 wt. % manganese, with the remainder being zinc, said nickel being primarily present in an intermetallic composition with silicon as nickel-silicides, which are present in a rounded off shaped finely and uniformly distributed form, said alloy having a good load carrying capacity, a high resistance to wear and possessing a uniformly high coefficient of friction.

**4,954,188**  
**HIGH STRENGTH ALUMINUM ALLOY RESISTANT TO EXFOLIATION AND METHOD OF MAKING**  
Basil M. Ponchel, Tarentum, and James D. Walsh, Cheswick, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.  
Continuation of Ser. No. 85,666, Aug. 13, 1987, Pat. No. 4,828,631, which is a continuation-in-part of Ser. No. 630,998, Jul. 16, 1984, abandoned, which is a continuation-in-part of Ser. No. 333,684, Dec. 23, 1981, abandoned. This application Dec. 7, 1988, Ser. No. 280,876  
The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C22C 21/10; C22F 1/053  
U.S. Cl. 148—417 17 Claims



10. An improved aluminum alloy product having a compressive yield strength of at least 77 ksi and improved resistance to exfoliation comprising an aluminum-base alloy consisting essentially of: 5.9 to 8.2 wt. % zinc, 1.5 to 3 wt. % copper, 1.5 to 4 wt. % magnesium, 0.05 to 0.25 wt. % zirconium, 0.1 wt. % max. manganese, less than 0.01 wt. % boron, not more than 0.04 wt. % chromium, not more than 0.06 wt. % titanium, not more than 0.12 wt. % silicon, not more than 0.15 wt. % iron, the balance comprising aluminum, said alloy being hot worked, solution heat treated, quenched, then aged, within a temperature range of about 265° F. to 290° F. for about 6 to 60 hours.

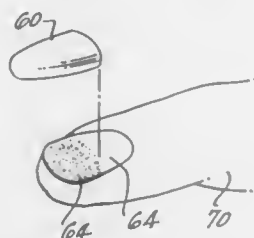
**4,954,189**  
**SILICON WAFERS FOR PRODUCING OXIDE LAYERS OF HIGH BREAKDOWN STRENGTH AND PROCESS FOR THE PRODUCTION THEREOF**  
Peter Hahn, Burghausen; Hubert Piontek, Burghausen; Anton Schnegg, and Werner Zulehner, both of Burghausen, all of Fed. Rep. of Germany, assignors to Wacker-Chemtronik Gesellschaft für Elektronik-Grundstoffe mbH, Burghausen, Fed. Rep. of Germany  
Filed Sep. 28, 1988, Ser. No. 250,395  
Claims priority, application Fed. Rep. of Germany, Nov. 6, 1987, 3737815

Int. Cl.<sup>5</sup> H01L 21/304, 21/306, 21/322  
U.S. Cl. 148—33.2 18 Claims  
1. A process for producing an oxide layer of high breakdown strength on a semiconductor wafer having an interior thereof exhibiting regions of gettering action, which has been produced by a heat treatment, comprising the steps of:  
heating the semiconductor wafer to produce oxygen precipitations exhibiting an intrinsic gettering action in the interior of the semiconductor wafer;  
smoothing at least one surface of the semiconductor wafer to reduce surface irregularities; and  
heating the semiconductor wafer in an oxygen-containing atmosphere for a predetermined time to form the oxide layer on said at least one surface after smoothing thereof.  
16. A silicon wafer comprising:  
an interior containing oxygen precipitations exhibiting an intrinsic gettering action; and,  
a front side and a rear side, at least one of said front side or said rear side having been given a polishing treatment before the formation of said interior and a smoothing treatment after the formation of said interior.

4,954,190  
METHOD AND MEANS FOR SUPPLYING AND USING  
ARTIFICIAL FINGERNAIL MATERIAL  
Sandra D. Taeckens, 77811 Calle Sinaloa, La Quinta, Calif.  
92253

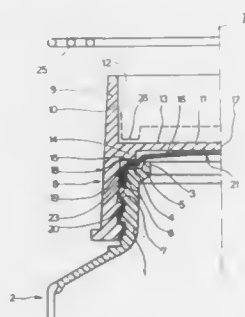
Filed May 18, 1989, Ser. No. 353,867  
Int. Cl.<sup>5</sup> B32B 31/12; A45D 31/00  
U.S. Cl. 156—61

3 Claims



1. The method of supplying artificial fingernail fabric material for use in creating artificial fingernails comprising: cutting a sheet of fabric material suitable to be used in creating artificial fingernails to a desired shape from which a multiplicity of individual artificial fingernail segments may be cut; mounting the cut piece of artificial fingernail fabric material upon a backing board along one edge thereof; die-cutting said fabric material upon said board in such manner as to cut the material into pre-determined fingernail shapes, leaving a very small portion of the die-cut shaped segment attached to the fabric material; premarking and scoring a plastic envelope of suitable size to contain the die-cut fabric material upon its backing board in such manner that individual strips may be removed from said plastic envelope; enclosing the die-cut fabric material upon its backing board within said plastic envelope; removing the die-cut fabric on its backing board from the plastic envelope when desired to use the material; taking an individual die-cut fingernail segment from the fabric material and tearing it from its joinder to the basic fabric sheet; and applying the individual segment to a natural fingernail.

4,954,191  
PACK COMPRISING A TUBE, A SCREW CAP AND A  
COVER TO WELD OVER THE NECK OF THE TUBE, AND  
A METHOD OF SEALING SAID TUBE  
Frédéric Despaul, and Bernard Schneider, both of Sainte-  
Ménébould, France, assignors to Cebal, Clichy, France  
Division of Ser. No. 274,953, Nov. 22, 1988, Pat. No. 4,893,718.  
This application Jun. 28, 1989, Ser. No. 372,548  
Claims priority, application France, Dec. 23, 1987, 87 18527  
Int. Cl.<sup>5</sup> B32B 31/20; B65D 41/62  
U.S. Cl. 156—69



1. A method of sealing a tube (2) with a plastic neck (1) using a cap (8) also made of plastic and a cover, comprising the steps of:

(a) providing a deformable laminate with little or no spring-

- back effect comprising at least 2 external layers based on plastics and a barrier layer, the laminate being from 0.10 to 0.40 mm thick;
- (b) cutting a cover (21) out of the laminate, the cover having a circular outline (22) with a diameter between the outside diameter of the end (4) of the neck (1) minus 0.3 mm and that diameter plus 0.5 mm, and comprising a radially projecting tab 23 or a plurality of regularly spaced radially projecting tabs (23), the cover (21) being of a type which can straddle a burr (5) on the neck (1) without any risk of bursting;
- (c) preparing a tube (2) with a screw thread on the neck (1) and the cap (8), the end (13) of the cap having a peripheral shoulder (14) to bear on the end (4) of the neck (1), the inside diameter of the shoulder (14) being between the inside and outside diameters of the neck (1) and being chosen so that it does not bear on burrs (5) not cut off at the end of the neck (1) and hence does not press the cover (21) onto such a burr (5), the outside of the neck and the inside of the cap below that shoulder having a space between them which can contain the tab or tabs (23) projecting from the cover (21);
- (d) arranging the cover (21) at or near the end (13) of the cap (8), the circular portion of the cover being centered therein and its projecting tab or tabs being bent back towards the inside lateral surfaces (19 and 20) of said cap (8);
- (e) screwing the cap thus fitted with the cover (21) right down onto the neck (1) of the tube; and
- (f) welding the cover (21) onto the end (4) of the neck (1) either by induction or by ultrasound, according to the nature of the cover (21).

4,954,192  
PROCESS FOR APPLYING IDENTIFICATION TO  
OBJECTS MADE OF POROUS MATERIAL  
John T. Dziekan, Racine, Wis., assignor to Pristine Products,  
Racine, Wis.  
Filed Aug. 30, 1989, Ser. No. 400,673  
Int. Cl.<sup>5</sup> B05D 1/32, 3/00; B29C 39/12; B44C 1/22  
U.S. Cl. 156—154

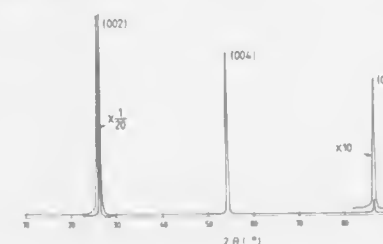


1. A process for applying a permanent filled engraved identification to the surface of an object made of porous material comprising the steps of:
- A. coating said surface on which the identification is to be applied with a water soluble sealant of sodium silicate and allowing said coating to dry; applying a second coat of sodium silicate and allowing it to dry;
- B. placing a perforated stencil on said surface to provide an opening defining the identification to be applied;
- C. removing said soluble sealant coating and a portion of said porous material from said stencil opening and to a desired depth in said object to provide an engraved identification in said object;
- D. removing said stencil from said object;
- E. applying a flowable epoxy resin to said engraved identification, which resin will set in and fill said engraved identification;
- F. allowing said resin to set; and
- G. applying water to said object for a period of time sufficient to dissolve said water soluble sealant and cause any of said resin which is not in said engraved identification to be released and removed from said surface of said object.

4,954,193  
METHOD FOR MAKING A GRAPHITE FILM OR SHEET  
Mutsuki Murakami, Tokyo; Naomi Nishiki, Kyoto; Susumu Yoshimura, Yokohama, and Kazuhiro Watanabe, Kawasaki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka and Research Development Corporation of Japan, Tokyo, both of Japan

Filed Aug. 26, 1988, Ser. No. 236,999  
Claims priority, application Japan, Aug. 26, 1987, 62-212112; Aug. 26, 1987, 62-212113  
Int. Cl.<sup>5</sup> B32B 31/20, 31/26  
U.S. Cl. 156—155

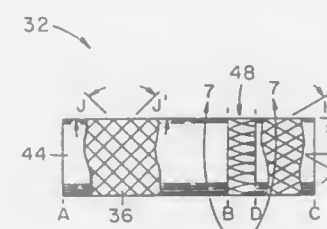
12 Claims



1. A method for marking a graphite sheet or block which comprises:
- (a) providing at least two films made of a polymer selected from the group consisting of a polyoxadiazole, an aromatic polyimide and an aromatic polyamide, said at least two films having, respectively, a thickness not greater than 400 micrometers; and
- (b) pressing the at least two films at a pressure of not lower than 4 kg/cm<sup>2</sup> at a temperature of not lower than 2200° C. for a time sufficient to graphitize the at least two films in an inert gas, thereby obtaining a graphite sheet or block.

4,954,194  
METHOD FOR MAKING AN AIRSPRING AND SLEEVE  
Michael L. Crabtree, Arvada, Colo., assignor to The Gates Rubber Company, Denver, Colo.  
Division of Ser. No. 32,212, Mar. 30, 1987, Pat. No. 4,763,883.  
This application May 23, 1988, Ser. No. 197,376  
Int. Cl.<sup>5</sup> B65H 54/02; B29D 23/00  
U.S. Cl. 156—175

13 Claims



1. In a method of making an airspring sleeve by embedding successive layers of cord at opposite helical angles in an elastomer and forming a chamber portion and a rolling lobe portion intermediate opposite ends of the sleeve, the improvement comprising the step of:
- winding cord of successive layers at inconstant helical angles intermediate ends of the sleeve and in an annular band portion of one of the sleeve chamber and rolling lobe portions from first opposite helical angles to second opposite helical angles.

4,954,195  
PRODUCTION OF THERMOSET COMPOSITES  
CONTAINING THERMOPLASTIC FILLERS  
Russell L. Turpin, Canyon Country, Calif., assignor to Lockheed Corporation, Calabasas, Calif.  
Filed Feb. 13, 1989, Ser. No. 309,579  
Int. Cl.<sup>5</sup> B29C 43/20

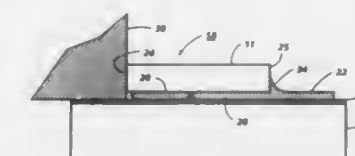
- U.S. Cl. 156—242
1. In a process for producing thermoset composites, the steps which comprise:
- providing a suitable thermoplastic resin composition comprised of particles of a suitable thermoplastic resin having a particle size ranging from about 10 to about 80 microns, providing a base thermosetting resin curable by heating, said thermoplastic resin being insoluble in said thermosetting resin at room temperature and at elevated processing temperatures prior to curing, but soluble in said thermosetting resin at cure conditions thereof, and
- mixing said particles of thermoplastic resin and said thermosetting resin in liquid form in a proportion of about 5% to about 40% of said thermoplastic resin, by weight of said mixture, and forming a substantially uniform dispersion of said thermoplastic resin particles and said thermosetting resin, said particles of thermoplastic resin being substantially non-agglomerating in said thermosetting resin.

4,954,196  
PROCESS FOR CURING EPOXY RESIN ANHYDRIDE  
BLENDS AT MODERATELY ELEVATED  
TEMPERATURES  
Ronald L. De Hoff, 43 Dickman Dr., Lavallette, N.J. 08735  
Filed Aug. 30, 1989, Ser. No. 400,433  
Int. Cl.<sup>5</sup> C08G 59/42

- U.S. Cl. 156—169
1. A process for curing an epoxy resin-acid anhydride blend at moderately elevated temperatures comprising the steps of:
- (a) reacting an epoxy compound and a polyol for about 1 to 4 hours at elevated temperatures to produce a resinous polyol;
- (b) mixing an acid anhydride with the resinous polyol from step (a);
- (c) adding the anhydride-resinous polyol mixture from step (b) to an epoxy resin which has been heated to about 50° C. to reduce its viscosity; and
- (d) heating the mixture from step (c) at from 60° C. to 90° C. for one hour to effect cure.

4,954,197  
PROCESS FOR ASSEMBLING SMALLER ARRAYS  
TOGETHER TO FORM A LONGER ARRAY  
Josef E. Jedlicka, Rochester; Ewart O. LeBlanc, Fairport, and Judith A. Masseth, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.  
Filed Mar. 30, 1989, Ser. No. 330,664  
Int. Cl.<sup>5</sup> B32B 31/20, 31/28  
U.S. Cl. 156—273.7

6 Claims



1. A method of fabricating a full width array comprised of a plurality of discrete chips mounted on an elongated substantially non-transparent substrate in end-to-end abutting relation to one another, comprising the steps of:
- (a) applying a discrete amount of heat activated adhesive to said substrate where each of said chips is to be mounted,



said heat activated adhesive being electrically conductive to allow electrical contact of said chips with said substrate;

(b) applying a discrete amount of a photocurable adhesive to said substrate adjacent to and spaced from each of said heat activated adhesive amounts,

said photocurable adhesive amounts being located so that on mounting of said chips on said substrate, an exterior fillet-like mass of photocurable adhesive is created forming an adhesive bridge spanning between at least one side of said chips and said substrate;

(c) mounting said chips on said substrate over said heat activated and said photocurable adhesives;

(d) exposing said photocurable adhesive to ultraviolet light whereby the portion of said photocurable adhesive forming said adhesive bridge is cured to temporarily bond said chips to said substrate;

(e) heating said heat activated adhesive to permanently bond said chips in position on said substrate.

4,954,198

# METHOD OF FABRICATING GOLF CLUBS AND ASSEMBLY OF TUBES FOR FORMING CLUBS OBTAINED BY THE METHOD

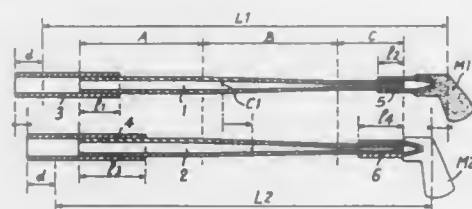
Paul H. Viellard, 22 rue Spontini, F-75116 Paris, France  
Continuation-in-part of Ser. No. 5,161, Feb. 2, 1987, abandoned.

This application Dec. 20, 1988, Ser. No. 286,815

Claims priority, application France, Apr. 19, 1985, 85 05968; May 2, 1985, 85 06638; May 15, 1985, 85 07346; PCT Int'l Appl., Apr. 11, 1986, FR86/0019

Int. Cl.<sup>5</sup> B32B 27/04

U.S. Cl. 156—294



1. A method of producing a set of golf clubs, all having the same flexibility, in order to obtain a frequency matching, comprising the steps of:

- forming the shaft of each club from three different tubes including an intermediate tube having cylindrical ends made from synthetic fibers,
- fitting the ends of said intermediate tube in the other two tubes, from which one other tube forms a support for the head of the club and the second other tube forms a handle,
- varying the amount of overlap of the tubes which are fitted together to hold the vibration frequency of the club constant for said set of golf clubs,
- bonding said tubes together in the area of said overlap, and
- varying the vibration frequency from a first set of clubs to another set of clubs dependent on the desired flexibility required by the player.

4,954,199

# TWO COMPONENT POLYURETHANE ADHESIVE

Randall C. Rains; Jeffrey F. Dormish, both of Pittsburgh; Susan A. Stanton, Evans City, all of Pa., and James N. Rieck, Wheeling, W. Va., assignors to Mobay Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 925,002, Oct. 29, 1986, abandoned, which is a continuation-in-part of Ser. No. 868,866, May 30, 1986, abandoned. This application Jul. 23, 1987, Ser. No. 76,951

Int. Cl.<sup>5</sup> C09J 3/14

U.S. Cl. 156—331.7

3 Claims

1. A method for bonding laminae comprising applying to at least one surface to be bonded an adhesive comprising the reaction product of (a) 100 parts by weight of at least one hydroxy functional material having a molecular weight of at least 300 and a functionality of at least 2; (b) about 0.2 to about 20 parts by weight of at least one member selected from the group consisting of isophorone diamine, methylene bis(cyclohexyl amine), diethyl-toluene diamine, diethylene triamine and 1-methyl-3,5-diethyl-2,4-diaminobenzene said member having a molecular weight of at least 60; and (c) an organic isocyanate in a sufficient amount to render the isocyanate index of the adhesive about 70 to about 150; said reaction product being further characterized in that said (c) is not prereacted with any of said (a) and (b).

4,954,200

# METHOD OF MAKING DRILL BACK-UP MATERIAL FOR SMALL BORE DRILLING OF CIRCUIT BOARDS

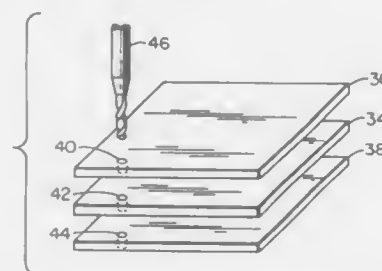
Carl E. Trewiler, Coshocton, Ohio, assignor to The General Electric Company, Worthington, Ohio

Division of Ser. No. 118,990, Nov. 10, 1987. This application Dec. 22, 1988, Ser. No. 289,568

Int. Cl.<sup>5</sup> B32B 31/18

U.S. Cl. 156—344

6 Claims



1. In a method for small bore drilling of a workpiece wherein back-up sheets are placed on both sides of said workpiece during said drilling, the improvement for making said back-up sheets for backing said workpiece during said small bore drilling process which comprises:

- disposing the uncured ingredients for said sheet on the matte side of an electrodeposited metal foil;
- pressing and heating the ingredients/foil formed in step (a) to at least partially cure said ingredients for forming said sheet; and
- removing said metal foil from said sheet for said sheet to be used as a backing during said small bore drilling process.

4,954,201

# APPARATUS FOR ETCHING SUBSTRATES WITH A LUMINOUS DISCHARGE

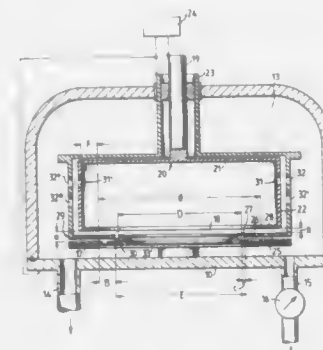
Rudolf Latz, Rodgan-Dudenhofen, and Thomas Martens, Krombach, both of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau I, Fed. Rep. of Germany  
Filed Nov. 29, 1988, Ser. No. 277,137

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1988, 3855153

Int. Cl.<sup>5</sup> H01L 21/306; C23C 14/34

U.S. Cl. 156—345

6 Claims



1. Apparatus for etching substrates with a luminous discharge in a vacuum, comprising

- a vacuum chamber,
- a substrate holder for holding an at least substantially planar substrate at a situs in said chamber,
- an electrode spaced opposite said situs, said electrode having an approximately cylindrical projecting rim at a common potential with said electrode and extending toward said substrate holder so that a gap is provided between said projection and the plane of said substrate, said electrode further having a diaphragm ring adjacent said gap and extending radially inward from said rim in a plane parallel to the plane of said substrate, a pot-shaped grounded shield at least partially enclosing said electrode and overlapping said rim,
- an insulator ring of electrically insulating material supported by said grounded shield and extending radially inward from said grounded shield toward said situs at least substantially in the plane of said substrate, and
- a radio frequency generator with an output frequency above 100 kHz, said generator having output electrodes respectively connected to said electrode and to said substrate holder, whereby the luminous discharge is limited to the space between the electrode and the substrate holder.

4,954,202

# APPARATUS FOR MAKING V-GROOVE INSULATION

Donald Price; Frank Price, and Charles M. Nelson, all of Houston, Tex., assignors to Industrial Insulations of Texas, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 119,821, Nov. 12, 1987, Pat. No. 4,838,968. This application Jun. 12, 1989, Ser. No. 364,452

Int. Cl.<sup>5</sup> B32B 31/18

U.S. Cl. 156—353

51 Claims

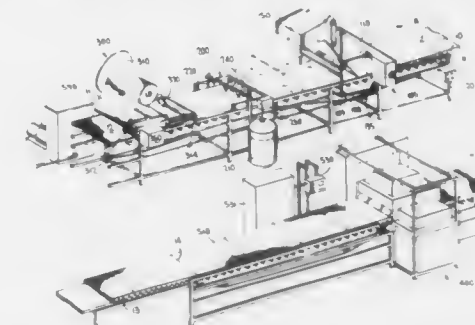
1. An apparatus for the fabrication of grooved lengths of insulation material from sectional lengths of such material, said apparatus comprising in combination:

- a frame;
- a conveyor system disposed along the frame and adapted to travel in a longitudinal direction;
- feeding means situated at an upstream end of the conveyor system, and adapted to place sectional insulation lengths in an end-to-end, abutting relationship on the belt;
- a planing means disposed above and secured to said frame

downstream from said feeding means, said planing means adapted to establish a desired thickness in said lengths as the lengths move longitudinally along said frame;

a spraying system positioned along said frame above the belt, and adapted to apply an adhesive coating over the upper, exposed surface of said lengths of insulation material as they move downstream from said planing means;

a backing device situated downstream from said spraying system and in transversely movable relation to said frame, said backing device comprising a backing spool and a contact arm arranged to position backing from said spool onto the upper surface of said insulation sheet in such a manner that the combination backing material and abutting insulation sections form a continuous integral sheet;



a grooving means slidably disposed in a lateral direction relative to said frame and beneath the level of said belt, said grooving means constructed and arranged to form a series of lateral grooves or notches in the underside of said integral sheet as it progresses longitudinally down said frame and comprising means for supporting said integral sheet during formation of said lateral grooves;

movable unitary support means capable of moving laterally beneath said support means for said integral sheet; and

a pair of saw assemblies adjustably mounted on said movable unitary support in an offset inclined relationship to each other; and

a microprocessor assembly adapted to control the movement of said insulation lengths through said apparatus.

4,954,203

# LABELLING SYSTEM

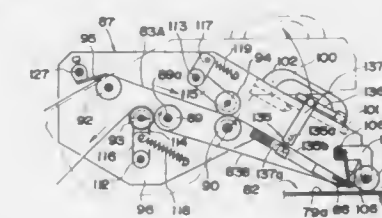
Mitsuo Matsumoto, Hyogo, Japan, assignor to Kanzaki Seishi Co., Ltd., Tokyo and Sun-Tec Co., Ltd., Hyogo, both of Japan  
Filed Dec. 5, 1988, Ser. No. 280,020

Claims priority, application Japan, Dec. 7, 1987, 62-186199[U]; Dec. 7, 1987, 62-186200[U]; Dec. 7, 1987, 62-186201[U]; Dec. 7, 1987, 62-186202[U]

Int. Cl.<sup>5</sup> B65C 1/00

U.S. Cl. 156—361

8 Claims



1. A labelling system for applying adhesive labels to a series of post cards or the like including conveyor means for conveying cards or the like to be labelled one at a time along a label-

ling path, and a labelling mechanism positioned alongside said labelling path for successively applying labels to cards being advanced along said path, said labelling mechanism comprising

- (a) web guide means for guiding a label carrier web toward a labelling position along said path,
- (b) said web guide means including a guide roller and cooperating pressure member for retaining the passage of said carrier web,
- (c) a knife member for sharply reversing the direction of travel of said carrier web at the labelling position,
- (d) an exit drive roller and cooperating pressure member for pulling said carrier web on the exit side of said knife member,
- (e) means mounting said labelling mechanism for swinging movement toward and away from said conveyor means about an axis remote from said knife member to allow said knife member to be retracted from said conveyor means for threading of a carrier web, and
- (f) cam-like means co-acting with each of said pressure members and operative upon swinging of said labelling mechanism for retraction of said knife member to effect separation of said cooperating pressure members in order to free said carrier web for unimpeded movement through the mechanism for web threading operations.

4,954,204

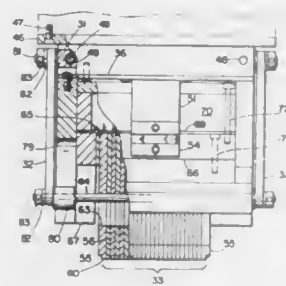
**PRESSER MEMBER FOR CONTOURED SURFACES**  
Michael N. Grimshaw, Milford, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Nov. 25, 1988, Ser. No. 275,822

Int. Cl.<sup>5</sup> B32B 31/08

U.S. Cl. 156—361

5 Claims



1. In a machine for applying fiber reinforced composite material to a work surface, wherein the machine has:
    - a base frame located in a predetermined position with respect to the surface;
    - a head, movably mounted on the base frame, for applying the material; and
    - means for controlling relative movement of the head with respect to the surface, along plural axes, while applying material,
  - an improved presser member for the head, wherein the improvement comprises:
    - a presser member housing, including means for affixing said housing to said head;
    - a plurality of wafer-like plates, having flat parallel opposite faces, stacked in adjacent face-to-face array in said housing,
    - said plates each having a common workpiece presser edge extending from said housing, and
    - said plates each also having a biasing portion extending into said housing;
  - means for independently guiding said plates in parallel movements with respect to said housing;
  - bladder spring means in said housing for yieldably biasing said plates away from said housing; and
  - power means for controlling common movement of said plates at predetermined times,
- wherein as said workpiece presser edges are relatively run

over material in contact with a work surface, said plates may slip parallel to one another to permit said presser edges to conform to workpiece contours.

4,954,205

# JOINING DEVICE FOR CORD-REINFORCED BELT-SHAPED MATERIALS

Jiro Agawa, Nagasaki, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

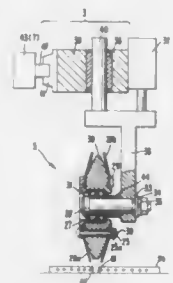
Filed Jan. 5, 1989, Ser. No. 293,841

Claims priority, application Japan, Jan. 7, 1988, 63-620

Int. Cl.<sup>5</sup> B29D 30/30

U.S. Cl. 156—502

1 Claim



1. A joining device for joining ends of elastic belt-shaped material, said device comprising:
  - a wrapping drum; and
  - a splicer confronting said wrapping drum for joining spaced apart opposing ends of elastic belt-shaped material wrapped around said drum,
- said splicer including a splicing roller rotatably supported in the device, said splicer roller having an outer circumferential contact surface and tapered in a radial direction extending from the center thereof toward said circumferential contact surface, spring discs fixedly secured to said roller at opposite sides of said roller, said spring discs having outer circumferential portions extending toward one another from respective central portions of the spring discs and terminating at outer peripheries of the spring discs located radially outwardly of said roller such that the spacing between said spring discs at the central portions thereof is greater than the spacing between said spring discs at the outer peripheries thereof, said spring discs having slits extending radially therein at said outer circumferential portions, and said spring discs exhibiting resiliency which allows said outer peripheries thereof to be resiliently bendable toward one another, press means connected to said roller for moving said roller and said spring discs fixedly secured thereto toward and away from said wrapping drum, and lateral moving means connected to said roller for moving said roller and said spring discs fixedly secured thereto axially of said drum.

4,954,206

# WELDING APPARATUS FOR WELDING PLASTIC WEB INCLUDING TENSIONED STRIPS OF POLYTETRAFLUOROETHYLENE

Hans-Ludwig Voss, Tecklenburg, Fed. Rep. of Germany, assignor to Windmüller & Hölischer, Lengerich, Fed. Rep. of Germany

Filed Sep. 27, 1988, Ser. No. 249,687

Claims priority, application Fed. Rep. of Germany, Sep. 28, 1987, 3732639

Int. Cl.<sup>5</sup> B30B 15/04, 15/34

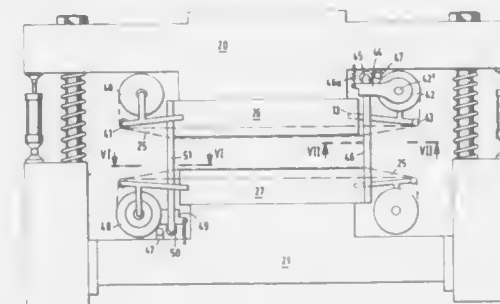
U.S. Cl. 156—537

5 Claims

1. A welding apparatus for welding flat webs or web sec-

tions made of synthetic thermoplastics, said welding apparatus comprising

- two parallel welding bars adapted to be raised and lowered relative to each other, each having a top welding surface and lateral side surfaces,
- tensioned strips of polytetrafluoroethylene covering said welding bars and fixed on rolls disposed beyond opposite ends of each welding bar, said rolls serving to wind up and unwind said tensioned strips,
- said tensioned polytetrafluoroethylene strips covering the top welding surfaces and at least part of one of said lateral side surfaces and extending in a longitudinal direction of said bars, said rolls being movably mounted beyond opposite ends of said welding bars on axles extending transversely to said longitudinal direction of said welding bars, and
- guiding elements provided at least on one side of said lateral side surfaces of each welding bar and each of said elements together with one lateral side surface of the associated welding bar defining a passage for guiding an edge portion of said strips.



5. A welding apparatus for welding flat webs or web sections made of synthetic thermoplastics, said welding apparatus comprising

- two parallel welding bars adapted to be raised and lowered relative to each other,
- tensioned strips of polytetrafluoroethylene covering said welding bars and fixed on rolls disposed beyond opposite ends of each welding bar, said rolls serving to wind up and unwind said tensioned strips,
- said tensioned strips covering the welding bars extend in a longitudinal direction of said bars,
- the rolls being movably mounted beyond opposite ends of the welding bars on axles extending transversely to said longitudinal direction of said welding bars, and
- one of the rolls withdraws the polytetrafluoroethylene strip and is mounted on its associated axle by a free-wheel and is provided with a lever, said lever being intermittently moved in small angular increments and is adapted to be reset, and
- means for intermittently moving the lever in small angular increments by moving the welding jaws, and
- spring means for resetting the levers.

4,954,207

# APPARATUS FOR AUTOMATICALLY TAPING ELECTRONIC COMPONENTS

Hirokazu Higuchi, and Mitsuro Hamuro, both of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Mar. 1, 1989, Ser. No. 317,639

Claims priority, application Japan, Mar. 2, 1988, 63-50540

Int. Cl.<sup>5</sup> B65H 5/26

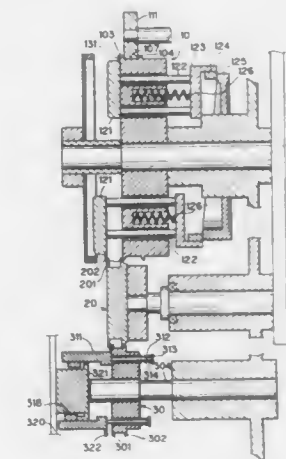
U.S. Cl. 156—552

17 Claims

1. An apparatus for handling electronic components, said apparatus comprising:
  - (A) advancing means for advancing an elongated support member in a first direction, said elongated support mem-

ber having a plurality of electronic components supported thereon;

- (B) extracting means for automatically extracting said electronic components from said elongated support member in a second direction while said elongated support member is advancing in said first direction, said second direction being substantially perpendicular to said first direction; and



- (C) means for placing said extracted electronic components between first and second opposed elongated tapes to fix said electronic components between said tapes; wherein said advancing means includes a first rotatable drum; wherein said extracting means includes: movable plates which are rotatable together with said drum; and means for moving said plates in said second direction while said plates rotate together with said drum.

4,954,208

# HAND-HELD LABELLER

Paul H. Hamisch, Jr., Franklin, and James A. Makley, Miami, both of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio

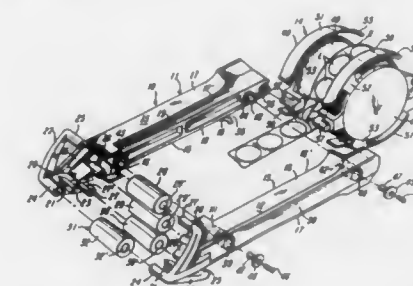
Continuation of Ser. No. 408,309, Aug. 16, 1982, abandoned.

This application Aug. 23, 1984, Ser. No. 643,745

Int. Cl.<sup>5</sup> B31F 1/00

U.S. Cl. 156—577

9 Claims

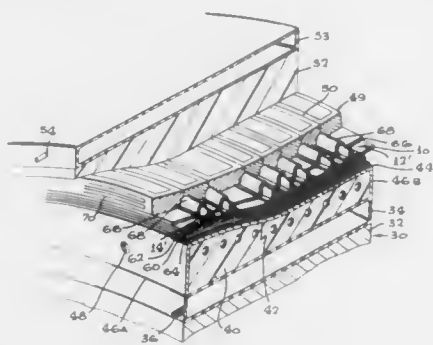


1. A hand-held labeler for applying labels releasably adhered to a carrier web, the labeler comprising: a body, means mounted on the body for supporting a label supply roll, means mounted on the body for delaminating means for applying labels, means defining a feed path for the carrier web through the body, means for advancing the carrier web through the feed path to dispense a label into label applying relationship with respect to the label applying means, the label supporting



means including a pair of separate and identical, spaced apart wall members between which a label supply roll is adapted to be supported.

**4,954,209**  
**APPARATUS FOR PRODUCING MOLDED ARTICLES**  
 Robert M. Baron, Los Angeles, Calif., assignor to Lockheed Corporation, Calabasas, Calif.  
 Filed Dec. 12, 1988, Ser. No. 282,521  
 Int. Cl.<sup>3</sup> B30B 5/02  
 U.S. Cl. 156—583.1 11 Claims

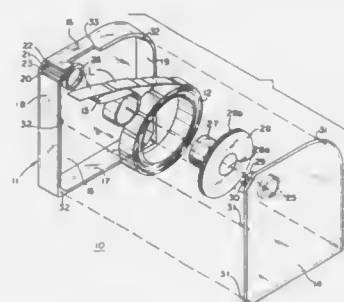


1. An apparatus for molding a part for having two opposed principle surfaces and made from layed-up molded materials, the apparatus comprising:  
 a support;  
 containment means moveable in relationship to said support;  
 a first mold part having a surface for forming one of the principle surfaces of the lay up, said first mold part attached to said support and mounted within said containment means;  
 a second mold part having a surface for forming the opposed principle surface of the lay up, said second mold part mounted within said containment means and movable in relationship to said first mold part;  
 at least one layer of expandable material mounted on each of said surface of said first and second mold parts, said layers of material expandable upon the application of heat thereto;  
 first and second inflatable container means made of a flexible material mounted between said containment means and said first and second mold parts for supporting said first and second mold parts, respectively;  
 means to heat said layers of expandable material and to raise the temperature of the lay up therebetween to forming temperatures; and  
 means to pressurize said first and second container means; such that during the molding process said first mold part is held stationary and said expandable layers of material expand and compact the lay up and said container means supports the first and second mold parts and the reaction forces are absorbed by the containment means.

**4,954,210**  
**DISPENSER FOR ROLLED PRESSURE SENSITIVE LABELS**  
 John W. Desmond, 104 Walter Dr., Media, Pa. 19063  
 Continuation-in-part of Ser. No. 334,078, Apr. 6, 1989, abandoned. This application Nov. 6, 1989, Ser. No. 432,059  
 Int. Cl.<sup>3</sup> B65C 11/00  
 U.S. Cl. 156—584 17 Claims

1. A dispenser for dispensing labels from a label strip comprising a backing strip upon which the labels are mounted with a pressure-sensitive adhesive backing on the labels, the labels being adapted to be peeled away from the backing strip by

sharply reversely bending the backing strip over an edge, the improvement comprising:  
 a housing for containing a supply roll of such a label strip, said housing having side walls, a top, a bottom and end walls, said housing being provided with an edge adjacent the junction of one of said end walls and the top thereof, together with an opening adjacent said junction, the strip being adapted to be withdrawn from said housing through said opening toward and over said edge to dispense a label;  
 a second opening in said housing adjacent to and spaced from said first named opening to permit the backing strip to reenter the housing after dispensing a label, said openings and said edge comprising a dispensing maze for the backing strip, said dispensing maze including two vertically spaced cantilevered fingers each supported by one of

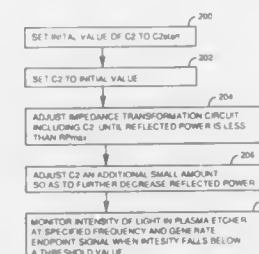


said side walls, said cantilevered fingers being separated at their outer ends by an interlocking structure supported by the opposite one of said side walls,  
 bearing means carried by at least one of the side walls within said housing and spaced from the periphery of the roll of label strip;  
 a shaft carried by said bearing means within said housing, said shaft being adapted to have the backing strip wound thereon after the pressure-sensitive adhesive backed labels are peeled therefrom; and  
 a hand wheel fixed to one end of said shaft for rotating said shaft, said hand wheel being positioned within said housing between said side walls and partially extending through an opening in said housing for manual rotation to dispense label from the backing strip and for storing the backing strip on said shaft within said housing as the strip is unwound from the roll.

**4,954,211**  
**MONOCRYSTALLINE LANTHANUM ORTHOGALLATE LASER MATERIAL**  
 Roger F. Belt, Morristown, and Robert Uhrin, Brookside, both of N.J., assignors to Litton Systems, Inc., Morristown, N.J.  
 Filed Mar. 4, 1988, Ser. No. 164,110  
 Int. Cl.<sup>3</sup> C04B 35/48; C01F 11/02  
 U.S. Cl. 156—617.1 71 Claims

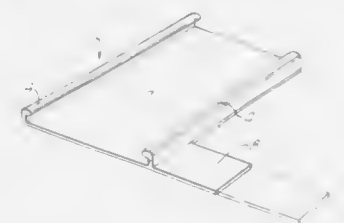
1. A laser rod composed of monocrystalline lanthanum orthogallate grown from a pure melt along a predetermined crystallographic direction and doped with an impurity ion that functions as a laser activator, said laser rod having a wavefront distortion  $< \frac{1}{4}$   $\lambda$  per cm length at the lasing wavelength ( $\lambda$ ) and an optical loss  $< 0.005$  per cm length.

**4,954,212**  
**ENDPOINT DETECTION SYSTEM AND METHOD FOR PLASMA ETCHING**  
 Calvin T. Gabriel, Pacifica, and James E. Nulty, San Jose, both of Calif., assignors to VLSI Technology, Inc., San Jose, Calif.  
 Filed Sep. 26, 1989, Ser. No. 412,697  
 Int. Cl.<sup>3</sup> H01L 21/306; B44C 1/22; C03C 15/00, 25/06  
 U.S. Cl. 156—627 12 Claims



7. A method of detecting the completion of etching of a designated layer of material in a plasma etching system, the steps of the method comprising:  
 placing a target having a designated layer to be etched and a underlying layer below said designated layer in a plasma etching chamber;  
 coupling a power supply means to said plasma etching chamber with an adjustable impedance circuit, enabling said power supply to provide power to said plasma etching chamber;  
 monitoring the amount of power from said power supply means reflected by said plasma etching chamber;  
 adjusting the impedance of said adjustable impedance circuit so that the amount of reflected power reflected by said plasma etching chamber will increase when said plasma etching chamber completes the etching of said designated layer and begins etching said underlying layer; and  
 detecting when said plasma etching chamber completes the etching of said designated layer and begins etching said underlying layer.

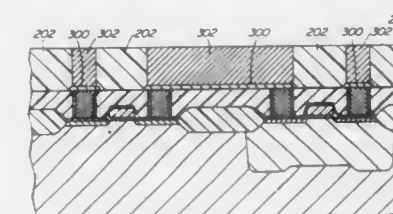
**4,954,213**  
**WRAP-AROUND RECOVERABLE SLEEVE**  
 Doucet Jos, Kessel-Lo, and Mendes L. Neves, Begijnendijk, both of Belgium, assignors to Raychem Corporation, Menlo Park, Calif.  
 Filed Oct. 27, 1988, Ser. No. 263,571  
 Claims priority, application United Kingdom, Oct. 27, 1987, 8725146  
 Int. Cl.<sup>3</sup> H01B 13/06  
 U.S. Cl. 156—49 20 Claims



1. A method of enclosing a splice between cables which comprises:  
 (1) wrapping around the splice a sleeve, said sleeve comprising:  
 a first web of dimensionally-recoverable material that can substantially surround the splice;  
 a first closure member at a first longitudinal edge portion of the first web;  
 a second closure member at a second longitudinal edge

portion of the first web, the first and second closure members being capable of being held together to maintain the sleeve in a wrapped-around configuration around the splice; and  
 a second web of material that extends from the first closure member in a direction substantially perpendicular to the running length of that closure member, as determined when the closure member is in flat sheet form, and has a width extending along the running length of that closure member that is less than the length of the closure member, the sleeve being positioned such that the second web is positioned around one of the cables adjacent the splice; and  
 (2) causing dimensional-recovery of the first web.

**4,954,214**  
**METHOD FOR MAKING INTERCONNECT STRUCTURES FOR VLSI DEVICES**  
 Vu Quoc Ho, Kanata, Canada, assignor to Northern Telecom Limited, Montreal, Canada  
 Filed Jan. 5, 1989, Ser. No. 293,789  
 Int. Cl.<sup>3</sup> H01L 21/308, 21/283  
 U.S. Cl. 156—628 14 Claims



1. A method for making interconnect structures for semiconductor devices, said devices initially being covered with a first substantially planar dielectric insulating layer having contact holes extending therethrough over contact regions of the devices, and said contact holes being filled with conductive material, the method comprising:  
 providing said devices initially being covered with a first substantially planar dielectric insulating layer;  
 forming a layer of seed material at and connected to an exposed surface of said first substantially planar dielectric insulating layer and at and connected to said filled contact holes at predetermined locations where interconnect conductor for interconnecting said semiconductor devices is desired;  
 forming a second substantially planar dielectric insulating layer over the first substantially planar dielectric insulating layer;  
 forming openings extending through the second layer at the predetermined locations to expose at least a portion of the seed material; and  
 selectively depositing conductive material on the exposed seed material to fill the openings while avoiding deposition of the conductive material on the second dielectric insulating layer adjacent to the seed material.

4,954,215

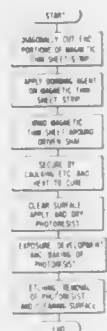
**METHOD FOR MANUFACTURE STRESS DETECTOR**  
Hiroshi Satou; Yoshihiko Utsui; Kiyotugu Tuneyoshi; Takashi Taniguchi; Kousuke Haraga; and Keitarou Tsukui, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP88/00727, § 371 Date May 5, 1989, § 102(e) Date May 5, 1989, PCT Pub. No. WO89/00770, PCT Pub. Date Jan. 26, 1989

PCT Filed Jul. 20, 1988, Ser. No. 346,112

Claims priority, application Japan, Jul. 21, 1987, 62-182712; Oct. 26, 1987, 62-271164; Oct. 26, 1987, 62-271165; Dec. 18, 1987, 62-322008

Int. Cl.<sup>3</sup> B44C 1/22; B23K 9/00; C23F 1/02; C03C 15/00  
U.S. Cl. 156—630 10 Claims



1. A method for manufacturing a stress detector comprising the steps of securing a strip of magnetic thin sheet around the driven shaft receiving a stress, and applying a selective coating removal treatment to said magnetic thin sheet secured to said driven shaft to form magnetic elements parallelly arranged at a predetermined angle relative to the central axis of said driven shaft.

4,954,216

**PROCESS OF MAKING THIN FILM VECTOR MAGNETOMETER**

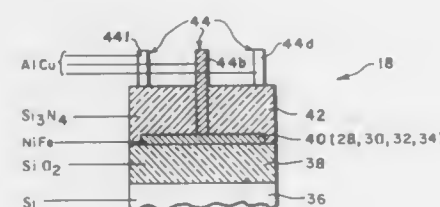
Paul Hunter, Burtonsville, and Leonard J. Schwee, Silver Spring, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation of Ser. No. 623,893, Jun. 25, 1984, abandoned.

This application Dec. 26, 1989, Ser. No. 456,231

Int. Cl.<sup>3</sup> C23F 1/02; B44C 1/22; C03C 15/00, 25/06

U.S. Cl. 156—634 16 Claims



1. A process of fabricating a thin film vector magnetometer, comprising the steps of:

- (1) fabricating a magnetoresistive bridge including the steps of:
  - (1a) fashioning a suitable substrate for fabrication thereon;
  - (1b) depositing a magnetic material to a predetermined thickness onto said suitable substrate so as to form a predetermined number of magnetoresistors each having a predetermined geometric pattern of meandering resistor

lines, the depositing of said magnetic material being accomplished in the environment of a dc magnetic field so as to produce a well defined easy axis therein;

- (1c) depositing an insulating material over said magnetoresistors so as to create vias for making electrical connections thereto; and
- (1d) depositing a conducting material within the insulating material to create electrical bonding pads to said magnetoresistors;
- (2) affixing said magnetoresistive bridge to a chip carrier; and
- (3) affixing a bias magnet to said chip carrier so as to produce a bias field in said magnetoresistors of said magnetoresistive bridge orthogonal to the easy axis thereof.

4,954,217

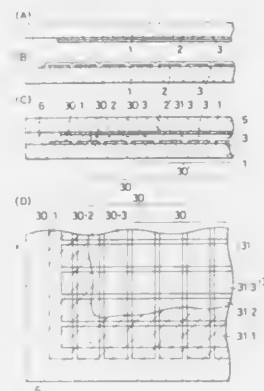
**METHOD FOR MANUFACTURING LIQUID CRYSTAL DEVICE HAVING ELECTRODE STRIPS OF NO USE**  
Shunpei Yamazaki, Tokyo; Akira Mase, Atsugi, and Hiroyuki Sakayori, Machida, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Division of Ser. No. 82,544, Aug. 7, 1987, Pat. No. 4,854,675.

This application Jul. 21, 1988, Ser. No. 222,634

Claims priority, application Japan, Aug. 8, 1986, 61-186201

Int. Cl.<sup>3</sup> B44C 1/22; B32B 31/12 3 Claims  
U.S. Cl. 156—643



1. A method for manufacturing a liquid crystal device comprising the steps of:

- forming on the surface of a transparent substrate a plurality of first electrode strips elongated along a X direction and separated with respect to each other;
- forming on the surface of an opposed substrate a plurality of second electrode strips elongated along a Y direction and separated with respect to each other; and
- joining said transparent and opposed substrates with said first and second electrode strips facing each other together with a liquid crystal layer inbetween while the perimeter of said substrates is sealed by a sealing member; said method characterized in that said joining step is carried out in such a manner that the sealing member extends between the peripheral portions of said electrode strips.

4,954,218

**METHOD FOR ETCHING A PATTERN**

Katsuya Okumura; Tohru Watanabe, and Masami Watase, all of Kanagawa, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Aug. 4, 1989, Ser. No. 389,681

Claims priority, application Japan, Sep. 8, 1988, 63-233503

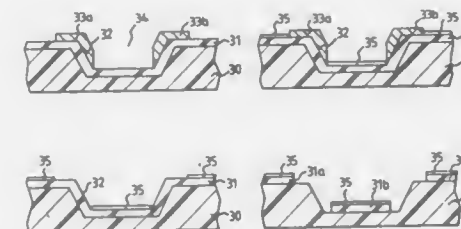
Int. Cl.<sup>3</sup> B44C 1/22; C03C 15/00, 25/06; C23F 1/02  
U.S. Cl. 156—643 7 Claims

1. A method for forming a prescribed pattern, comprising the steps of:

4,954,220

**POLYSILICATE MICROGELS AS RETENTION/DRAINAGE AIDS IN PAPERMAKING**  
John D. Rushmere, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
Filed Aug. 7, 1989, Ser. No. 388,967  
Int. Cl.<sup>3</sup> D21H 21/10 7 Claims

1. A method for improving retention and drainage in a papermaking process of the type wherein aqueous paper furnish containing pulp is formed and dried which comprises adding to the pulp a water soluble polysilicate microgel formed by partial gelation of an alkali metal silicate in combination with at least about 0.001 wt percent, based on the dry weight of the paper furnish, of a water soluble cationic polymer.



immersing the substrate having the first patterned layer into a predetermined solution to form a third layer selectively on the exposed portions of the first layer; removing the first patterned layer; and etching the first layer using the third layer as a mask.

4,954,219

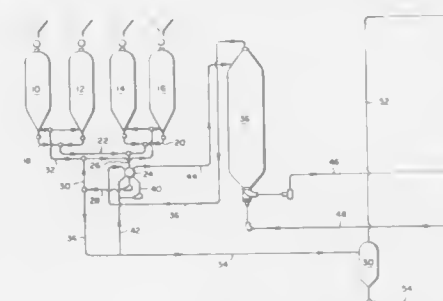
**METHOD FOR TRANSFER OF FIRROUS MATERIALS TRANSPORT BY LIQUIDS**

Stig Glöersen, Karlstad, Sweden, assignor to Beloit Corporation, Beloit, Wis.

Continuation of Ser. No. 823,840, Jan. 31, 1986, abandoned, which is a continuation of Ser. No. 387,474, Jun. 11, 1982, abandoned, which is a continuation of Ser. No. 184,407, Nov. 2, 1979, abandoned. This application Aug. 18, 1988, Ser. No. 233,978

Claims priority, application Sweden, Mar. 2, 1978, 7802408 The portion of the term of this patent subsequent to Mar. 14, 1995, has been disclaimed.

Int. Cl.<sup>3</sup> D21C 7/08, 7/14, 9/02, 11/00  
U.S. Cl. 162—41 8 Claims



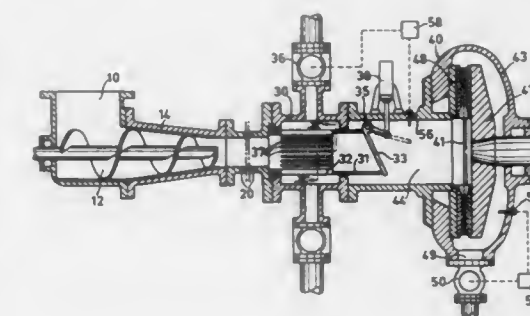
4. A method for transporting and treating fiber material, which comprises:

- introducing a fiber material and cooking liquor into a first liquid circuit from at least one discontinuous cooking digester;
- transferring said fiber material via said at least one liquid circuit to a continuous washing station, said fiber material being displaced to said continuous washing station by providing a rotary valve in the first liquid circuit;
- introducing fiber material and cooking liquor into the rotary valve;
- displacing the cooking liquor with washing liquor from said washing station;
- transporting the fiber material in a second liquid circuit to the washing station by introducing said displaced cooking liquor into the rotary valve to remove the fiber material.

4,954,221

**APPARATUS FOR FEEDING LIGNOCELLULOSE-CONTAINING MATERIAL THROUGH A STEAM SCREEN INTO A REFINER**  
Rolf B. Reinhold; Johan G. I. Johansson, both of Bellevue, Wash., and Anders V. Mokvist, Eden Prairie, Minn., assignors to Sunds Defibrator Aktiebolag, Sundsvall, Sweden  
PCT No. PCT/SE84/00120, § 371 Date Nov. 19, 1984, § 102(e) Date Nov. 19, 1984, PCT Pub. No. WO84/04113, PCT Pub. Date Oct. 25, 1984

PCT Filed Apr. 3, 1984, Ser. No. 681,847  
Claims priority, application Sweden, Apr. 12, 1983, 8302014  
Int. Cl.<sup>3</sup> D21B 1/26 4 Claims



1. An apparatus for making fibre pulp from lignocellulose-containing material, comprising a refiner provided with at least two opposed refiner discs, the refiner discs being rotatable relative to each other and defining a gap therebetween, a feed channel including a plug pipe of predetermined cross-sectional area and an inlet opening for feeding the material to the gap in a compressed state, wherein a steam screen pipe is positioned directly downstream from the plug pipe, the steam screen pipe being provided with apertures for discharging steam, the steam screen pipe having a cross-sectional area slightly greater than the predetermined cross-sectional area of the plug pipe, the apertures being provided as axially directed slits extending adjacent to a channel section having a cross-sectional area greater than the cross-sectional area of the steam screen pipe.

4,954,222

**DRY CLEANING SOLVENT FILTRATION AND RECOVERY SYSTEM WITH FILTER RINSING APPARATUS**

Larry L. Durr, 9102 Grinnell, Indianapolis, Ind. 46268; B. Jan Clay, 7650 Eagle Valley Pass, Indianapolis, Ind. 46224, and Larry J. Durr, 5210 Kathcart Way, Indianapolis, Ind. 46254  
Filed Nov. 18, 1988, Ser. No. 273,261

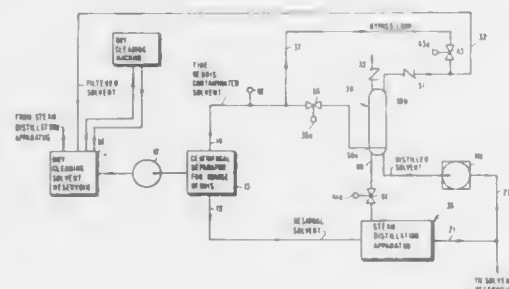
Int. Cl.<sup>3</sup> B01D 3/38, 36/00  
U.S. Cl. 202—176 13 Claims

1. In an industrial solvent recovery and filtering system



having a supply of a debris contaminated solvent fluid, a distillation apparatus for producing a quantity of distilled solvent fluid, and a fluid flowpath between the supply and the distillation apparatus, the improvement comprising:

- a filtration path receiving at an inlet the debris contaminated solvent fluid from the supply and discharging at an outlet a filtered solvent fluid, said filtration path including;
- filtering means for removing the debris from the contaminated solvent fluid, said filtering means including a perforated filter element having a debris collection surface; and
- means for flowing the contaminated solvent fluid through said filter element in a first direction so that the debris in



the solvent fluid is collected on said collection surface while the filtered solvent fluid passes through the perforations in said filter element; and

filter cleaning means, separate from said filtration path, for cleaning said filter element without removing said filter element from the filtration path, said filter cleaning means including;

a nozzle for directing a spray of rinsing under pressure against said collection surface of said filter element can be cleaned without backflow fluid pressure on said filter element; and

means for removing debris dislodged from said filtering means.

4,954,223

## DISTILLATION APPARATUS

Joseph E. Leary, 10994 Terrace Dr., Forrester, Calif. 95436, and Edward L. Parr, 301 Cuyamaca St., El Cajon, Calif. 92020  
 Filed Jul. 29, 1988, Ser. No. 225,736  
 Int. Cl.<sup>3</sup> B01D 1/28, 3/10

U.S. Cl. 203—1

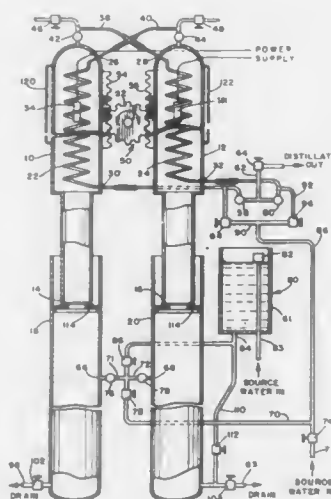
7 Claims

1. A distillation apparatus, comprising:
  - a pair of vertically arranged, side by side two-part vessels; each two-part vessel comprising a lower vessel having an open upper end, and a vertically arranged, elongate upper vessel having an open lower end, and means for slidably mounting said upper vessel at its lower end in said lower vessel;
  - a first heat exchanger mounted in a first one of the upper vessels and having an inlet and an outlet;
  - a second heat exchanger mounted in a second one of the upper vessels and having an inlet and an outlet;
  - a first conduit connecting the upper end of the first upper vessel with the inlet of the second heat exchanger;
  - a second conduit connecting the upper end of the second upper vessel with the inlet of the first heat exchanger;
  - supply means connected to each of the two-part vessels for supplying a liquid to be distilled to the vessels;
  - outlet conduits connected to the outlets of both heat exchangers for conveying distillate out of the vessels;
  - reciprocating drive means connected to the upper vessels for alternately driving the upper vessels up and down in opposite directions to simultaneously effect compression and heating of vapor in a space above a liquid level in the first one of the upper vessels and expansion and cooling of

vapor in a space above a liquid level in the second one of the upper vessels; and

solid collection means at the lower end of each of the lower vessels for collecting solids separated out from the liquid in the vessels.

7. A method of distilling liquids, comprising the steps of:
  - supplying liquid to be distilled to a pair of two-part vessels so as to leave a space above the liquid level in each vessel, each two-part vessel comprising an upper, vertically extending elongate vessel having an open lower end and a lower vessel having an open upper end in which said upper vessel is slidably mounted;
  - reciprocating said upper vertically extending elongate ves-



sels up and down in opposite directions in said lower vessels;

compressing and heating vapor in each upper vessel during its downward stroke and expelling vapor from the upper end of the downwardly moving vessel;

collecting vapor expelled from the upper end of each upper vessel during its downward stroke and conducting the collected vapor into a heat exchanger located in the other, upwardly moving upper vessel;

condensing vapor in the heat exchanger;

conducting the condensed distillate to an outlet of said heat exchanger; and

draining collected solids from the lower end of each lower vessel and collecting the drained solids.

4,954,224

## EXTRACTIVE DISTILLATION OF HYDROCARBON FEEDS EMPLOYING MIXED SOLVENT

Ronald E. Brown, 6419 Quail Ridge Rd., and Fu M. Lee, 645 Castle Dr., both of Bartlesville, Okla. 74006  
 Filed Sep. 8, 1989, Ser. No. 404,704  
 Int. Cl.<sup>3</sup> B01D 3/40

U.S. Cl. 203—51

27 Claims

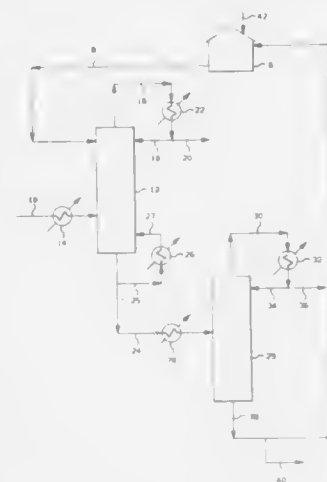
1. In a process for separating at least one cycloalkane containing 5-10 carbon atoms per molecule from at least one close-boiling alkane by extractive distillation of a feed consisting essentially of said at least one cycloalkane and said at least one alkane,
  - the improvement comprising the use of a solvent consisting essentially of a mixture of (a) at least one N-mercaptoalkyl-2-pyrrolidone, wherein the mercaptoalkyl group contains 1-5 carbon atoms, and (b) at least one N-alkyl-2-pyrrolidone, wherein the alkyl group contains 1-3 carbon atoms;
  - wherein said extractive distillation process produces (i) an overhead distillate product which contains a smaller volume percentage of said at least one cycloalkane and a

larger volume percentage of said at least one alkane than said feed, and (ii) a bottoms product which contains said solvent and a larger volume percentage of said at least one cycloalkane and a smaller volume percentage of said at least one alkane than said feed; and wherein said at least one cycloalkane is separated from said solvent and recovered from said bottoms product.

23. In a process for separating at least one cycloalkane containing 5-10 carbon atoms per molecule from at least one close-boiling alkane by extractive distillation of a feed consisting essentially of said at least one cycloalkane and said at least one alkane,

the improvement comprising the use of a solvent consisting essentially of a mixture of

(a) at least one N-mercaptoalkyl-2-pyrrolidone, wherein the mercaptoalkyl group contains 1-5 carbon atoms,



- (b) at least one N-alkyl-2-pyrrolidone, wherein the alkyl group contains 1-3 carbon atoms, and
  - (b2) at least one saturated alcohol selected from the group consisting of alkanols and cycloalkanols containing 5-9 carbon atoms and 1 OH group per molecule;
- wherein said extractive distillation process produces (i) an overhead distillate product which contains a smaller volume percentage of said at least one cycloalkane and a larger volume percentage of said at least one alkane than said feed, and (ii) a bottoms product which contains said solvent and a larger volume percentage of said at least one cycloalkane and a smaller volume percentage of said at least one alkane than said feed; and wherein said at least one cycloalkane is separated from said solvent and recovered from said bottoms product.

4,954,225

## METHOD FOR MAKING NOZZLE PLATES

Joseph J. Bakewell, Boxford, Mass., assignor to Dynamics Research Corporation, Wilmington, Mass.  
 Filed Jan. 10, 1990, Ser. No. 463,261  
 Int. Cl.<sup>3</sup> C25D 1/08

U.S. Cl. 204—11

9 Claims

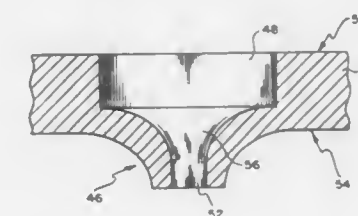
1. A method for fabricating a nozzle plate having a plurality of holes, comprising the steps of:
  - applying onto a transparent mandrel a coating of an opaque, conductive material having a pattern of holes of selected diameters and at selected locations corresponding to the diameters and locations of the holes of the nozzle plate;
  - applying over said holes in said opaque, conductive coating, a non-conductive, transparent material to form a plurality of masked areas of selected dimensions, each area over one of said holes;
  - applying a layer of photoresist of selected thickness over

said opaque, conductive coating and said non-conductive, transparent masked areas;

exposing said layer of photoresist from the backside of said transparent mandrel through said holes in said opaque, conductive coating and through said non-conductive, transparent masked areas to form on said masked areas a plurality of raised photoresist posts of selected dimensions, each post over one of said masked areas and in registration with said holes in said opaque, conductive material;

electroforming to a desired thickness a layer of a first metal onto said opaque, conductive coating until said layer of said first metal overgrows said masked areas by a selected amount;

electroforming to a desired thickness a first layer of a second metal over said layer of said first metal until said first layer of said second metal plates around said photoresist posts a desired amount, and wherein depressions are formed in said first and second metal layers in registration with said masked areas and said photoresist posts;



filling said depressions with a planarizing material to form a plurality of filled depressions;

applying a layer of photoresist of a selected thickness onto said first layer of said second metal and said filled depressions;

exposing said layer of photoresist to form a plurality of cured photoresist discs of select dimensions, each disc in registration with one of said filled depressions;

electroforming to a desired thickness a second layer of said second metal onto said first layer of said second metal;

separating said layers of said first and second metals, said non-conductive, transparent masked areas and said opaque, conductive coating from said transparent mandrel; and

removing said layer of said first metal, said non-conductive, transparent masked areas and said opaque, conductive coating from said first and second layers of said second metal.

4,954,226

## ADDITIVE PLATING BATH AND PROCESS

Issa S. Mahmoud, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.  
 Continuation-in-part of Ser. No. 289,995, Dec. 21, 1988, abandoned. This application Oct. 25, 1989, Ser. No. 427,922  
 Int. Cl.<sup>3</sup> C25D 3/38, 7/00

U.S. Cl. 204—15

10 Claims

1. An additive copper plating bath for plating copper for printed circuitry consisting essentially of:
  - an aqueous solution of from about 0.50 to about 0.75 mols sulfuric acid; from about 0.3 to about 0.50 mols copper sulfate; from about 1 to about 2 g/l urea, from about 2 to about 3 ml/l glycerin; and from about 0.5 to about 1.0 ml/l surface active agent and sufficient deionized water to make one liter.
7. A method of electroplating thick film circuitry on substrates with copper comprising:
  - preparing an aqueous bath including 0.50 to 0.75 mols sulfuric acid, 0.30 to 0.50 mols hydrated copper sulfate,

0.05 to 0.10 mols urea,  
0.02 to 0.03 mols glycerin,  
1% by volume, surfactant; and  
electrodepositing a layer of copper on said thick film circuitry from the bath at a current density of between 15 and 25 amperes per square foot and at a bath temperature substantially equal to room temperature.

4,954,227

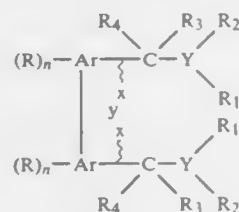
## PREPARATION OF BIDENTATE LIGANDS

Thomas A. Puckette, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.  
Division of Ser. No. 118,573, Nov. 9, 1987, Pat. No. 4,879,008.  
This application Jul. 24, 1989, Ser. No. 383,697  
Int. Cl.<sup>5</sup> C25C 3/00

U.S. Cl. 204—72

11 Claims

1. A process for preparing a bidentate ligand of the formula:

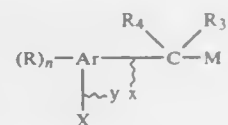


wherein:

each Ar is independently selected from aromatic ring compounds having 6 up to 14 carbon atoms;  
the x bonds and the y bonds are attached to adjacent carbon atoms on the ring structures;  
each R, when present as a substituent, is independently selected from alkyl, alkoxy, aryloxy, aryl, aralkyl, alkaryl, alkoxyalkyl, cycloaliphatic, halogen, alkanoyl, alkanoyloxy, alkoxycarbonyl, carboxyl, cyano or formyl radicals;  
n is a whole number in the range of 0-4 where Ar is phenyl; 0-6 where Ar is naphthyl; and 0-8 where Ar is phenanthryl or anthracenyl;  
each R<sub>1</sub> and R<sub>2</sub> is independently selected from alkyl, aryl, aralkyl, alkaryl or cycloaliphatic radicals, or substituted derivatives thereof, wherein the substituted derivatives are selected from ethers, amines, amides, sulfonic acids, esters, hydroxyl groups or alkoxy groups;  
each R<sub>3</sub> and R<sub>4</sub> is independently selected from hydrogen and the R<sub>1</sub> substituents;  
each of the above alkyl groups or moieties is a straight or branched chain of 1-20 carbons;  
each aryl group contains 6-10 ring carbons;  
each cycloaliphatic group contains from 4-8 ring carbons; and  
each Y is independently selected from the elements N, P, As, Sb and Bi;

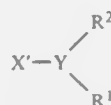
said process comprising:

(i) contacting a reagent having the structure:

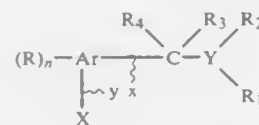


wherein X is a halogen;

M is selected from the group consisting of Li, MgX, Na, K, Cd, Zn and Ca; and  
the x bonds and the y bonds are attached to adjacent carbon atoms on the ring structures;  
with a compound of the formula:



wherein X' is halogen or a suitable leaving group  
under conditions suitable to form a reactant of the formula:



then

(ii) maintaining a redox reaction system comprising  
(a) said reactant,  
(b) a polar, aprotic solvent,  
(c) a nickel compound, and  
(d) a reducing agent, which has a sufficient reducing potential to promote the reduction of Ni(II) to Ni(O), at a temperature and for a time sufficient to form said ligand.

4,954,228

## DRUM ELECTROLYSIS

Thomas Thomassen, Brekkesto, Norway, assignor to Cheminust, A.S., Norway  
PCT No. PCT/NO88/00002, § 371 Date Dec. 19, 1988, § 102(e)  
Date Dec. 19, 1988, PCT Pub. No. WO88/09399, PCT Pub. Date Dec. 1, 1990

PCT Filed Jan. 8, 1988, Ser. No. 294,145

Claims priority, application Norway, Jun. 5, 1987, 872243;  
Jun. 5, 1987, 872388

Int. Cl.<sup>5</sup> C25C 1/00

U.S. Cl. 204—105 R

5 Claims



1. Process for electrowinning using a rotating drum cathode and at least one anode arrangement positioned inside the drum cathode into which is introduced and submerged a particulated material in an electrolyte containing the desired metal, and onto which particulated cathode material the desired metal is deposited when applying a suitable voltage over the cathode/anode arrangement, characterized in that the electrolyte is continuously introduced at one end of the drum and that the electrolyte, partly depleted of the desired metal(s), is exhausted at the opposite end, and that the anode arrangement comprises a number of baffle plates disposed at intervals along the length of the drum and thus providing a tortuous path for the electrolyte.

4,954,229

## BIOELECTROCHEMICAL DESULFURIZATION OF PETROLEUM

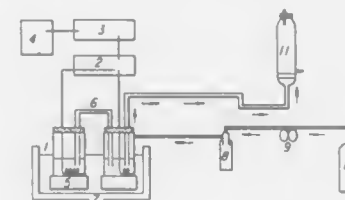
Byung-Hong Kim; Tae-Sung Kim, and Hae-Yeong Kim, all of Seoul, Rep. of Korea, assignors to Korea Advanced Institute of Science and Technology, Seoul, Rep. of Korea  
Filed Dec. 20, 1988, Ser. No. 286,811

Claims priority, application Rep. of Korea, Dec. 31, 1987, 1987-15573

Int. Cl.<sup>5</sup> C25F 5/00

U.S. Cl. 204—130

10 Claims



1. A method for removing sulfur from a sulfur containing fuel by reducing the sulfur compound to gaseous hydrogen sulfide, which comprises subjecting the fuel to a bioelectrochemical process, comprising contacting said sulfur containing fuel with an aqueous phase containing an electron mediator and bacterium having the ability to catalyze the reduction of a sulfur compound in a cathode compartment of an electrolytic cell, providing an anode counterelectrode in said cell, imposing an electric current on said cell sufficient to cause said sulfur to form hydrogen sulfide, and removing said hydrogen sulfide.

4,954,230

## DECONTAMINATION OF WASTE WATER

Rudolf Kirch, Immenstaad, Fed. Rep. of Germany, assignor to Dornier System GmbH, Friedrichshafen, Fed. Rep. of Germany  
Filed Feb. 24, 1988, Ser. No. 160,324

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1987, 3705956

Int. Cl.<sup>5</sup> C02F 1/46

U.S. Cl. 204—149

7 Claims

1. Method for removing heavy metal in particular cadmium, nickel, copper, tin and zinc and oxidizable contaminants in particular tensides, cyanides, and nitrides from waste water in a combined cathodic/anodic process comprising the steps of: electrolytically treating said waste water to obtain metallic precipitation of the heavy metal on a cathode while simultaneously other contaminants are anodic oxidized; using an anode being lead oxide coated Ti or graphite and a cathode made of stainless steel; and passing the partially decontaminated electrolyte of the electrolytic treatment through an adsorber for further removal of said contaminants.

4,954,231

## FUNCTIONAL CHLOROFLUORO COMPOUNDS AND THEIR PREPARATION

Yves Correia, Chateau-Arnoux; Gilles Drivon, Saint-Martien en Haut, and Jean Lesparre, Volonne, all of France, assignors to Societe Atochem, Puteaux, France

Filed Dec. 19, 1989, Ser. No. 452,339

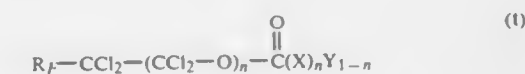
Claims priority, application France, Dec. 27, 1988, 88 17241

Int. Cl.<sup>5</sup> C07C 69/00

U.S. Cl. 204—157.6

11 Claims

1. Functional chlorofluoro compound, comprising the general formula:



in which R<sub>F</sub> denotes a perfluoroalkyl radical, n is equal to 0 or 1, X denotes a chlorine or fluorine atom or a trichloromethyl or trifluoromethyl radical, and Y denotes a chlorine atom, an optionally salfied or esterified hydroxyl group or an optionally mono- or di-substituted amino group, the arrangement R<sub>F</sub>-CCl<sub>2</sub>-(CCl<sub>2</sub>-O)<sub>n</sub> containing at least 3 carbon atoms.

4,954,232

## MAGNETO-OPTICAL RECORDING ELEMENT AND METHOD FOR FABRICATION THEREOF

Takashi Yamada, Kagoshima; Hisao Arimurae, and Takashi Maeda, both of Kokubu, all of Japan, assignors to Kyocera Corporation, Kyoto, Japan

Continuation of Ser. No. 42,273, Apr. 24, 1987, Pat. No. 4,851,096, which is a division of Ser. No. 752,927, Jul. 8, 1985, Pat. No. 4,680,742. This application May 26, 1989, Ser. No. 358,554

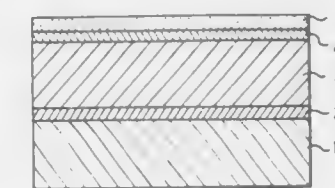
Claims priority, application Japan, Jul. 7, 1984, 59-143079; May 30, 1985, 60-119342

The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C23C 14/14

U.S. Cl. 204—192.23

12 Claims



1. A method for the fabrication of a magneto-optical recording element, which comprises maintaining a substrate on which a film is to be formed, a first target composed of a sintered composition comprising (a) silicon nitride and (b) at least one additive selected from the group consisting of single elements, oxides, nitrides, sulfides and silicides of elements of the groups IIIa, IVa, IIb, IIIb, IVb and VIb of the Periodic Table and a second target composed of a magnetic layer-forming metal in an inert gas atmosphere maintained at 1×10<sup>-3</sup> to 50×10<sup>-3</sup> Torr and forming a magnetic layer and a dielectric layer alternately on the substrate by sputtering, wherein said additive (b) is contained in the first target in an amount of 4 to 20 mole %.

4,954,233

## COMBINATION ANODE MOUNT AND HOT WATER OUTLET UTILIZING A CAM LOCK

Timothy H. Houle, Wauwatosa, and Robert M. Schurter, Elm Grove, both of Wis., assignors to A. O. Smith Corporation, Milwaukee, Wis.

Filed Aug. 7, 1989, Ser. No. 390,971

Int. Cl.<sup>5</sup> C23F 13/00

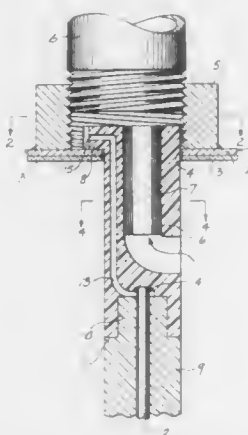
U.S. Cl. 204—197

18 Claims

1. In a water heater, a tank to contain water to be heated and having an upper head with an opening therein, an annular metal spud secured to the upper head and having an aperture communicating with said opening, a body formed of an electrically insulating material, said body extending through said opening and having an upper end disposed within the aperture of said spud, passage means in said body with one end of said passage means extending through the side of said body and communicating with said tank and the other end of said passage means extending to the upper end of said body whereby heated water in the tank can flow through said passage means



for discharge, an anode formed of a metal electro-negative to steel and secured to the lower end of said body, electrical connecting means connected to said anode and having an upper end disposed at the upper end of said body, and laterally extending cam means on the upper end of said body, said cam



means being constructed and arranged so that rotation of said body relative to said spud will wedge said cam means into engagement with said spud and effect a positive electrical connection between the upper end of said electrical connecting means and said spud.

4,954,234

## DRUM ELECTROLYSIS

Thomas Thomassen, Brekkesto, Norway, assignor to Cheminvest A.S., Norway

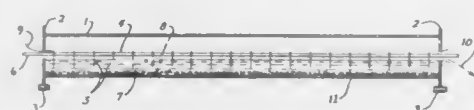
Division of Ser. No. 294,145, Dec. 19, 1988. This application

Nov. 16, 1989, Ser. No. 437,546

Int. Cl.<sup>5</sup> C25C 7/00

U.S. Cl. 204—212

6 Claims



1. Device for performing an electrowinning process comprising a rotatable drum cathode (1) being connected to a current source, characterized in a device having supply and exhaust conduits (9,10) for introducing fresh electrolyte and removing lean electrolyte, and an anode arrangement (4,5) positioned inside the cathode drum (1), the drum having end walls (2) electrically isolated from the rest of the drum (1) and the anode arrangement having anode baffle plates (5) disposed at intervals along the length of the drum (1).

4,954,235

## ELECTROPLATING OF FINE PARTICLES WITH METAL

Elki Takeshima; Kiyoshi Takatsu, both of Chiba; Youichi Kojima, Hyogo, and Takahiro Fujii, Chiba, all of Japan, assignors to Nisshin Steel Co., Ltd., Tokyo, Japan

Division of Ser. No. 340,670, Apr. 20, 1989, Pat. No. 4,908,106.

This application Dec. 27, 1989, Ser. No. 457,955

Claims priority, application Japan, Apr. 25, 1988, 63-100204

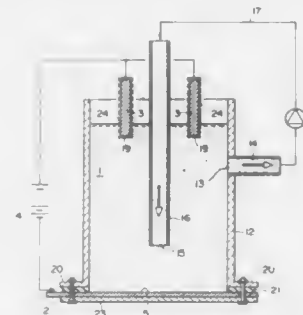
Int. Cl.<sup>5</sup> C25D 17/00

U.S. Cl. 204—273

2 Claims

1. An apparatus for electroplating fine particles which comprises a tubular vessel containing an electroplating electrolyte disposed with its axis vertical, a cathode plate disposed at the bottom of said vessel with its electrically conductive surface

horizontal, an anode disposed nearly at a level of said electrolyte, an electric source for applying a predetermined electric potential between said cathode plate and anode, an inhaling pipe having an opening for inhaling the electrolyte from said vessel at a level between said cathode plate and said anode, an exhaling pipe having an opening for exhaling the electrolyte into said vessel at a level between said cathode plate and said anode, a passage communicating said inhaling pipe with said exhaling pipe for circulation of said electrolyte therethrough,



4,954,236

## APPARATUS AND METHOD FOR GEL CASTING AND ELECTROPHORESIS IN A SINGLE ENCLOSURE

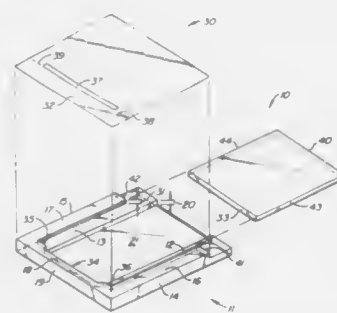
Gregory Kushner, Richmond, and Timothy E. Delony, Hercules, both of Calif., assignors to Bio-Rad Laboratories, Inc., Hercules, Calif.

Filed Jun. 28, 1989, Ser. No. 373,118

Int. Cl.<sup>5</sup> G01N 27/28, 27/26; B61D 57/02

U.S. Cl. 204—299 R

15 Claims



1. An electrophoresis gel enclosure for use in both gel casting and electrophoresis, comprising:

a first plate rectangular in shape;

a second plate rectangular in shape, having shoulders along first and second opposing sides thereof and raised edges along said shoulders and a third side thereof, respectively, said raised edges arranged to receive said first plate therebetween with said first plate resting against said shoulders, said first and second plates thereby combinable to define a rectangular slab-shaped chamber of thickness defined by said shoulders; and

a fluid-impermeable sealing sheet sized to cover said first and second plates when so combined, adhering to said raised edges and said first plate, thereby sealing said rectangular slab-shaped chamber against leakage between said first plate and said raised edges, one edge of said fluid-impermeable sealing sheet along said third side of said second plate being removable.

4,954,237

## AUTOMATIC ELECTROPHORESIS APPARATUS

Robert J. Sarrine, Beaumont; Henry A. Garsee, Kountz; Charles D. Kelley, Beaumont, and Philip A. Guadagno, Vidor, all of Tex., assignors to Helena Laboratories, Beaumont, Tex.

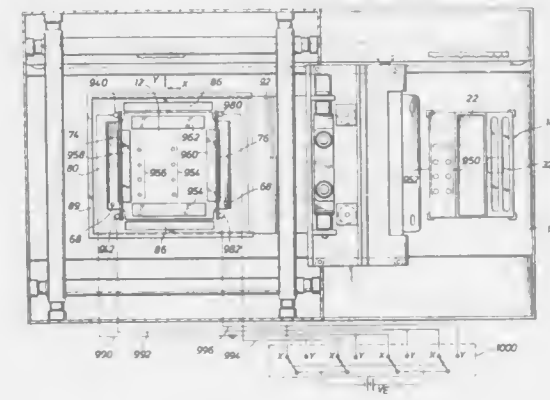
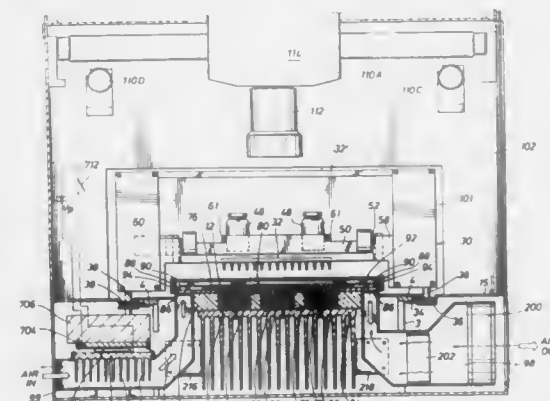
Continuation-in-part of Ser. No. 26,465, Mar. 16, 1987, Pat. No.

4,810,348. This application Jan. 30, 1989, Ser. No. 302,936

Int. Cl.<sup>5</sup> G01N 27/28, 27/26; B01D 57/02

U.S. Cl. 204—299 R

7 Claims



1. Electrophoresis apparatus comprising

a base,

an application plate longitudinally disposed on said base,

an electrophoresis support medium removably disposed on

said application plate having longitudinal and lateral di-

mensions, said support medium including an electrically

non-conductive backing having electrophoresis media

placed thereon including an application well on its surface

and having first and second electrically conductive reser-

voir strips disposed laterally at each of the longitudinal

ends of said support medium,

first and second electrodes adapted for connection to oppo-

site polarities of a source of electric potential and adapted

for lateral placement across said support medium respec-

tively in electrical contact with said first reservoir strip

and with said second reservoir strip,

means for applying a liquid sample to said application well of

said support medium,

means for connecting said electrical potential source be-

tween said first and second electrodes whereby electro-phoresis electrical current is passed longitudinally through said support medium substantially uniformly across its lateral extent, and

heat transfer means for removing heat resulting from said

electrophoresis electrical current in said support medium.

5. Electrophoresis apparatus comprising

a base,

an application plate longitudinally disposed on said base,

an electrophoresis support medium removably disposed on

said application plate having longitudinal and lateral di-

mensions, said support medium including an electrically

non-conductive backing having electrophoresis media

placed thereon and having

first and second electrically conducting reservoir strips

disposed laterally at each of the longitudinal ends of the

support medium,

third and fourth electrically conducting reservoir strips

disposed longitudinally at each of the lateral ends of the

support medium,

said electrophoresis media being of substantially uniform

thickness forming a planar surface atop said backing, and

electrode means for applying longitudinal electrophoresis

current through said support medium between said first

and second reservoir strips during one time period and for

applying lateral electrophoresis current through said sup-

port medium between said third and fourth reservoir strips

during another time period.

4,954,238

## MOISTURE-SENSING HYGROMETER ELEMENT

Hiroshi Kato, 123, Minamigata, Yoshinaga-cho, Wake-gun, and Eiichi Torikai, 9-20, 3-chome, Higashikyuboji, Yao-Shi, Osaka-Fu, both of Japan

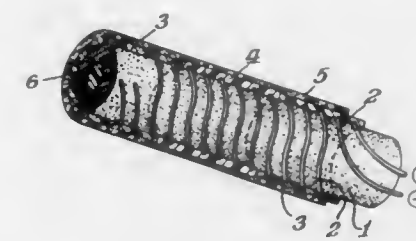
Filed Feb. 23, 1989, Ser. No. 314,642

Claims priority, application Japan, Feb. 23, 1988, 63-38528

Int. Cl.<sup>5</sup> G01N 27/26

U.S. Cl. 204—430

3 Claims



1. A moisture-sensing hygrometric element comprising an electrolytic moisture-sensing mechanism integrally formed on the surface of a porous substrate, said porous substrate being resistant to oxidation and reduction and resistant to acids, and wherein said moisture-sensing mechanism comprises a pair of platinum group metal electrodes constituting an anode and a cathode and having a fluororesin cation exchange resin membrane layer thereover, wherein said porous substrate is porous expanded polytetrafluoroethylene.

4,954,239

## PREFILLED CATHETER TIP SYRINGE KIT

Louis H. Mueller, 2836 Fox Squirrel Dr., Palm Harbor, Fla. 34684

Continuation-in-part of Ser. No. 182,259, Apr. 15, 1988, Pat. No.

4,878,903. This application May 31, 1989, Ser. No. 359,135

Int. Cl.<sup>5</sup> B65D 83/10

U.S. Cl. 206—571

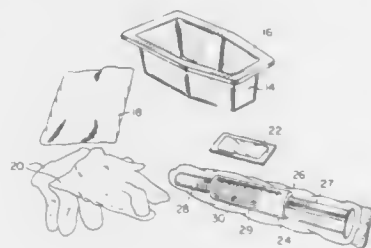
4 Claims

1. A device for use as a single use, disposable, sterile irriga-

tion kit for catheter irrigation, comprising:

a prefilled sterile piston syringe containing from about 45 to

about 75 cc of a fluid selected from sterile water, saline solution and dilute aqueous acetic acid solutions, said syringe including a catheter tip sized to operably connect to a conventional catheter tube, a cap on said tip removably mounted to selectively prevent escape of said fluid from said syringe and prevent movement of said piston while said cap is on said tip, said kit further including a disposable pouch for enclosing said filled syringe, said



pouch and said filled syringe being sterilize after enclosure of said syringe in said pouch, said device further including a container having a tear-off top labeled with the specific solution in said syringe and a color code system marking at least a portion of said device with a color identifying the particular solution, said container enclosing said pouch containing said filled syringe and further including sterilized gloves and an applicator pad.

4,954,240

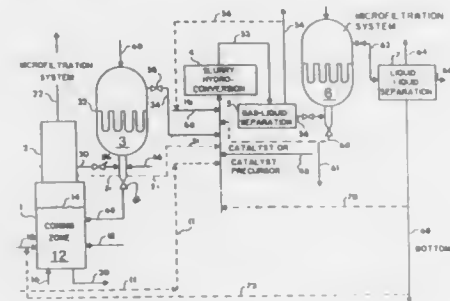
## COMBINATION COKING AND HYDROCONVERSION PROCESS

Clarence M. Eidd, Jr., Chatham, N.J.; Clyde L. Aldridge, and Roby Bearden, Jr., both of Baton Rouge, La., assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 97,121, Sep. 16, 1987, abandoned. This application Dec. 19, 1988, Ser. No. 286,100 Int. Cl.<sup>5</sup> C10G 69/06

U.S. Cl. 208—50

17 Claims



1. An integrated coking and hydroconversion process which comprises the steps of:

- (a) treating a hydrocarbonaceous feed having a Conradson carbon content of at least 5 weight percent in a coking zone at coking conditions, including a pressure ranging from zero to about 100 psig, to produce coke and a vapor phase product, including hydrocarbonaceous comprising constituents boiling above 975° F.;
- (b) separating a heavy bottoms fraction having a Conradson carbon content of at least about 5 weight percent, including said constituents boiling above 975° F., from said hydrocarbonaceous material;
- (c) adding a hydroconversion catalyst or hydroconversion

catalyst precursor to at least a portion of said heavy bottoms fraction to form a mixture;

- (d) subjecting at least a portion of said mixture of step (c) to hydroconversion conditions, in the presence of hydrogen, in a slurry hydroconversion zone to produce a lower boiling hydroconverted product containing entrained catalyst particles;
- (e) passing at least a portion of the lower boiling hydrocarbonaceous product through a microfiltration system containing a sintered porous ceramic or metal membrane filtering means having a substantially uniform pore size and capable of retaining at least about 95 percent of the entrained particles while maintaining an effective flux, thereby resulting in a solids-free fraction and a hydrocarbonaceous filtrate;
- (f) subjecting at least a portion of the hydrocarbonaceous filtrate to a liquid-liquid separation, resulting in a light and intermediate boiling fraction and a heavy fraction; and
- (g) recycling at least a portion of the heavy fraction to the coking zone.

4,954,241

## TWO STAGE HYDROCARBON CONVERSION PROCESS

Simon G. Kukes, Naperville, Ill.; Albert L. Hensley, Jr., Munster, Ind.; Jeffrey C. Kelterborn, Hinsdale, and James L. Aderhold, Jr., Wheaton, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 160,683, Feb. 26, 1988, Pat. No. 4,797,195. This application Dec. 20, 1988, Ser. No. 287,398

The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C106 65/12

U.S. Cl. 208—59

6 Claims

1. A multiple stage process for hydroconversion of a hydrocarbon feedstock containing nitrogen- and sulfur-containing compounds which comprises:

- (a) contacting said feedstock in a hydrotreating stage comprising a hydrotreating reaction zone wherein hydrogen is contacted with said hydrocarbon feedstock in the presence of a hydrotreating catalyst at hydro-treating conditions wherein a substantial portion of the nitrogen- and sulfur-containing compounds are converted to hydrogen sulfide and ammonia;
- (b) passing at least a portion of the effluent from said hydrotreating reaction zone to a stripping zone wherein a substantial portion of the hydrogen sulfide and ammonia is removed from the hydrotreating reaction zone effluent to form a stripping zone effluent;
- (c) contacting at least a portion of said stripping zone effluent in a hydrocracking stage, comprising a plurality of hydrocracking reaction zones in series, with hydrogen at hydrocracking conversion conditions which comprises:
  - (i) contacting said stripping zone effluent in a first hydrocracking reaction zone with a first hydrocracking reaction zone catalyst comprising a nickel component and a molybdenum component deposited on a support component consisting essentially of a refractory inorganic oxide;
  - (ii) contacting the effluent from said first hydrocracking reaction zone in a second hydrocracking reaction zone with a second hydrocracking reaction zone catalyst comprising a nickel component and a tungsten component deposited on a support component consisting essentially of an alumina component and a crystalline molecular sieve component; and
  - (iii) contacting the effluent from said second hydrocracking reaction zone in a third hydrocracking reaction zone with a third hydrocracking reaction zone catalyst comprising a cobalt component and a molybdenum component deposited on a support component comprising a silica-alumina component and a crystalline molecular sieve component.

4,954,242

## PROCESS FOR REFRACTORY COMPOUND REMOVAL IN A HYDROCRACKER RECYCLE LIQUID

Adrian J. Grifa, Lake Bluff, Ill., assignor to UOP, Des Plaines, Ill.

Filed Jul. 19, 1989, Ser. No. 381,903

Int. Cl.<sup>5</sup> C10G 67/06, 25/03

U.S. Cl. 208—99

12 Claims

1. A catalytic hydrocracking process which comprises:
- (a) contacting a hydrocarbonaceous feedstock having a propensity to form 11+ ring heavy polynuclear aromatic compounds and a liquid recycle stream in a hydrocracking zone with added hydrogen and a metal promoted hydrocracking catalyst at elevated temperature and pressure sufficient to convert a substantial portion of said feedstock to lower boiling hydrocarbon products;
  - (b) partially condensing the hydrocarbon effluent from said hydrocracking zone to produce a gaseous hydrocarbon stream comprising hydrogen, and an unconverted hydrocarbon stream having components boiling above about 400° F. and comprising trace quantities of 11+ ring heavy polynuclear aromatic compounds;
  - (c) partially condensing at least a portion of said gaseous hydrocarbon stream comprising hydrogen recovered in step (b) to produce a hydrogen-rich gaseous stream and a liquid stream comprising lower boiling hydrocarbon products;
  - (d) contacting at least a portion of said unconverted hydrocarbon stream having components boiling above about 400° F. and comprising trace quantities of 11+ ring heavy polynuclear aromatic compounds recovered in step (b) with an adsorbent in an adsorption zone which selectively retains said 11+ ring heavy polynuclear aromatic compounds to produce an unconverted hydrocarbon stream having components boiling above about 400° F. and having a reduced concentration of 11+ ring heavy polynuclear aromatic compounds;
  - (e) introducing at least a portion of said unconverted hydrocarbon stream having components boiling above about 400° F. and having a reduced concentration of 11+ ring heavy polynuclear aromatic compounds resulting from step (d) and said liquid stream recovered from step (c) into a separation zone to produce a stream of lower boiling hydrocarbon products and a stream of unconverted hydrocarbonaceous compounds boiling above about 400° F.; and
  - (f) recycling at least a portion of said stream of unconverted hydrocarbonaceous compounds boiling above about 400° F. recovered in step (e) and at least a portion of said unconverted hydrocarbon stream having components boiling above about 400° F. and having a reduced concentration of 11+ ring heavy polynuclear aromatic compounds resulting from step (d) to said hydrocracking zone as at least a portion of said liquid recycle stream.

4,954,243

## CATALYTIC CRACKING WITH FRAMEWORK ALUMINUM EXTRACTED ZEOLITE

Guenther H. Kuehl, Cherry Hill, and Edward J. Rosinski, Pe-dricktown, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 313,370, Feb. 21, 1989, abandoned, which is a continuation of Ser. No. 218,412, Jul. 11, 1988, abandoned, which is a continuation of Ser. No. 548,590, Nov. 3, 1983, abandoned. This application Dec. 22, 1989, Ser. No. 456,037

Int. Cl.<sup>5</sup> C10G 11/02

U.S. Cl. 208—120

11 Claims

5. A process for converting a feedstock comprising hydrocarbon compounds to conversion product comprising hydrocarbon compounds of lower molecular weight than feedstock hydrocarbon compounds which comprises contacting said feedstock at conditions sufficient to convert said feedstock to said product with a catalyst composition comprising a zeolite

selected from the group consisting of ZSM-5 and ZSM-12 in the acid form, said zeolite having framework aluminum whereby the zeolite framework silica:alumina mole ratio is greater than about 12, wherein said zeolite has been treated to increase its acid activity by a treatment consisting of subjecting the zeolite with a silica:alumina ratio of greater than 12 to an aluminum extraction reagent selected from the group consisting of sulfuric acid and ethylenediaminetetraacetic acid at a temperature of 50° to 300° C. at a pressure sufficient to maintain a liquid phase to increase the acid activity of said zeolite, wherein at least about 5% of said framework aluminum is extracted; and producing said conversion product.

4,954,244

## TREATMENT OF SPENT CRACKING CATALYSTS

Chia-Min Fu, and Michael K. Maholland, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 22, 1989, Ser. No. 370,471

The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C10G 11/05; B01J 38/66, 29/38

U.S. Cl. 208—120

41 Claims

1. A process for reactivating a spent zeolite-containing cracking catalyst composition comprising the steps of:
- (a) contacting a spent zeolite-containing catalytic cracking catalyst composition, which contains at least one metal contaminant, with a solution of an ammonium compound other than ammonium fluoride, under such conditions as to enhance the catalytic cracking activity of said catalyst composition;
  - (b) at least partially separating the catalyst composition having enhanced catalytic cracking activity obtained in step (a) from said solution used in step (a);
  - (c) contacting the at least partially separated cracking catalyst composition having undergone steps (a) and (b) with at least one fluorine compound selected from the group consisting of  $\text{NH}_4\text{F}$ ,  $\text{NH}_4\text{HF}_2$  and  $\text{HF}$ , under such conditions as to enhance the catalytic cracking activity of the catalyst composition having undergone steps (a) and (b); and
  - (d) treating the reactivated catalyst composition obtained in step (c) with at least one metals passivating agent selected from the group consisting of compounds of beryllium, magnesium, calcium, strontium, barium, boron, aluminum, antimony, and phosphorus, under such conditions as to reduce hydrogen generation caused by said at least one metal contaminant during catalytic cracking.

4,954,245

## CATALYST AND PROCESS FOR HIGH SELECTIVITY REFORMING WITH PT/RE ON BA-K-L ZEOLITE

Jeffrey T. Miller, and Victor K. Shum, both of Naperville, Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Dec. 20, 1988, Ser. No. 287,397

Int. Cl.<sup>5</sup> C10G 35/085

U.S. Cl. 208—138

13 Claims

1. A reforming process comprising contacting a hydrocarbon feedstock at reforming conditions with a catalyst comprising a Zeolite L component having cationic sites ion exchanged with at least one member of the group consisting of potassium and barium; a Group VIII noble metal component; and a rhenium component; where the catalyst, prior to contacting with the feedstock, is precluded from contact with sulfur in a presulfiding pretreatment step and the catalyst has been calcined at temperatures less than 550° F.



4,954,246

**SLURRY-PHASE GASIFICATION OF CARBONACEOUS MATERIALS USING ULTRASOUND IN AN AQUEOUS MEDIA**

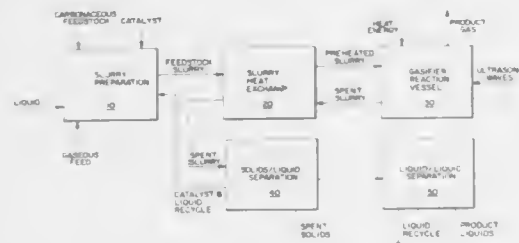
Dharamvir Punwani, Naperville, and Michael C. Mensinger, Darien, both of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Filed Mar. 31, 1988, Ser. No. 175,869

Int. Cl.<sup>5</sup> C10G 1/00

U.S. Cl. 208—402

20 Claims



1. A process for slurry-phase gasification of carbonaceous materials comprising:

- combining solid carbonaceous feedstock materials with a slurry liquid to form a feedstock slurry;
- conveying said feedstock slurry to a gasifier reaction vessel;
- gasifying said carbonaceous feedstock in said gasifier vessel in slurry phase at reaction temperatures from about 200° F. to about 1000° F. at elevated pressures and in the presence of water and an effective intensity of ultrasonic waves having a frequency of about 20 kHz to about 55 kHz to form product gases comprising primarily methane and carbon dioxide.

4,954,247

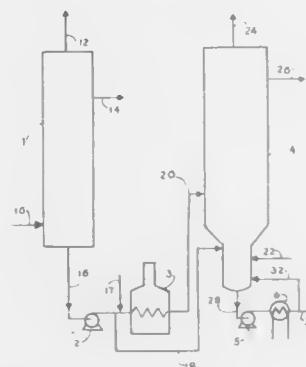
**PROCESS FOR SEPARATING HYDROCARBONS**  
Gregory M. Lipkin, Secaucus, and Joseph L. Niedzwiecki, Fanwood, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Oct. 17, 1988, Ser. No. 258,531

Int. Cl.<sup>5</sup> C10G 7/06

U.S. Cl. 208—355

10 Claims



1. In a process for separating a fluid hydrocarbonaceous mixture comprising the steps of:

- (a) introducing said hydrocarbonaceous mixture into an atmospheric distillation zone to separate said oil into fractions, including a heavy bottoms fraction;
- (b) passing at least a portion of said heavy bottoms fraction to a heating zone;
- (c) introducing the resulting heated portion of said heavy bottoms fractions to a separation zone maintained under

vacuum to produce fractions, including a vacuum residuum fraction;

- (d) recycling at least a portion of said vacuum residuum fraction to said vacuum separation zone;
- the improvement which comprises:
- (e) passing directly as a separate stream at least a portion of said heavy bottoms fraction of step (a) from said atmospheric distillation zone to the bottom stripping part of said vacuum separation zone.

4,954,248

**ELECTRICAL DRUM-TYPE SEPARATOR**

Anatoly I. Urvantsev, ulitsa Panelnaya, 11a, kv. 30; Jury S. Elantsev, ulitsa Bardina, 3, korpus 3, kv. 1; Alexei M. Komlev, ulitsa P. Tolyatti, 7, kv. 53; Saliman K. Kusembaev, ulitsa Sofii Perovskoi, 103, kv. 23, all of Sverdlovsk; Jury I. Stepanov, Svetlanovskiy prospekt, 79, kv. 146, and Viktor P. Vasiliev, Nevskiy prospekt, 27, kv. 43, both of Leningrad, all of U.S.S.R.

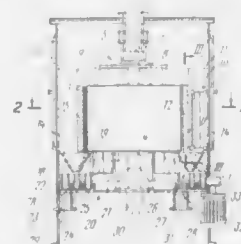
PCT No. PCT/SU87/00043, § 371 Date Dec. 16, 1988, § 102(e) Date Dec. 16, 1988, PCT Pub. No. WO88/08331, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 21, 1987, Ser. No. 294,561

Int. Cl.<sup>5</sup> B03C 7/12

U.S. Cl. 209—127.1

5 Claims



- 1. An electrostatic drum-type separator for separating a mixture of electrically conductive and non-conductive particles, comprising a housing having mounted therein a rotatable drum serving as a precipitation electrode, means for feeding a mixture of loose materials onto a peripheral surface of the drum, a corona-discharge electrode spaced from the peripheral surface of the drum for electrically charging particles of the mixture of loose materials in an electric field set up between the corona-discharge electrode and a portion of the peripheral surface of the drum, a brush for sweeping non-conductive particles off the peripheral surface of the drum, arranged behind the corona-discharge electrode in a direction of rotation of the drum, and main receptacles arranged in a direction of the streams of electrically conductive particles, aggregates of electrically conductive and non-conductive particles, and non-conductive particles, the drum being mounted so that its axis extends vertically, there being provided at least one additional corona-discharge electrode spaced from the peripheral surface of the drum, and additional brushes for sweeping non-conductive particles off the peripheral surface of the drum, equalling in number the additional corona-discharge electrodes, each additional brush being arranged behind the respective one of the additional corona-discharge electrodes in the direction of rotation of the drum, and additional receptacles arranged in the respective paths of the additional streams of electrically conductive particles, aggregates of electrically conductive particles and non-conductive particles, and non-conductive particles, the main and additional corona-discharge electrodes and brushes being spaced substantially uniformly about the periphery of the drum, and the main and additional receptacles being arranged to underlie the drum.

4,954,249

**WAVE SCREEN PLATE**

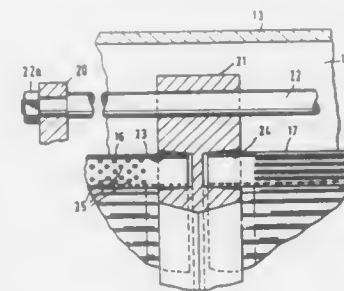
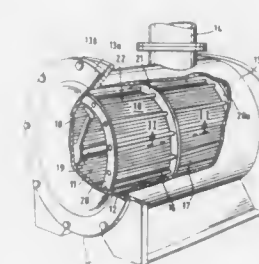
William Gero, and Frank Paskowski, both of Pittsfield, Mass., assignors to Beloit Corporation, Beloit, Wis.

Filed Jun. 10, 1988, Ser. No. 206,151

Int. Cl.<sup>5</sup> B07B 1/46

U.S. Cl. 209—273

7 Claims



- 1. A modular screen plate assembly for use in screening apparatus in which stock to be screened is introduced on one side of the screen plate assembly, with some of said stock flowing through said screen plate assembly to the opposite side thereof, said modular screen plate assembly comprising:

a generally cylindrically shaped screen plate section formed from relatively thin material defining a series of adjacent undulations, said generally cylindrical screen plate section having inner surfaces and outer surfaces defined by said undulations;

rigid annular ring support members disposed at opposite ends of said generally cylindrical screen plate section, said rigid annular ring support members each having annular grooves therein, each of said grooves being defined by radially inner and radially outer groove side walls, a groove bottom, and a groove opening in a surface of the rigid annular ring support member, said grooves being adapted for receiving therein end edges of said cylindrical screen plate section, said openings to said grooves of said rings being at least partly radially inward in said annular rings from at least part of said groove bottoms, and said inner surfaces of said screen plate section being substantially in line with said inner surface of said annular rings; and

tie members disposed between said rigid annular ring support members, fixing said rigid support members in location relative to each other, and securing said cylindrical screen plate section in said grooves of said rigid annular ring support members.

4,954,250

**FLATWARE SEPARATING APPARATUS**

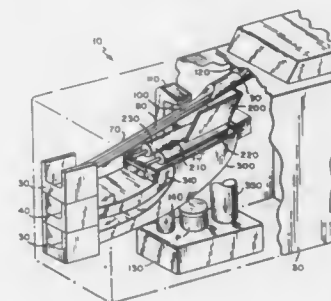
Clyde Weihe, Needham Heights; Lewis Maroti, Melrose, and Peter Albertini, Dover, all of Mass., assignors to Food Service Innovations, Inc., Dover, Mass.

Filed May 16, 1989, Ser. No. 352,356

Int. Cl.<sup>5</sup> B07C 5/12

U.S. Cl. 209—629

39 Claims



- 1. A flatware separating apparatus comprising:
- a track means having a top surface for receiving and delivering different items of flatware along a selected path;
- means for contacting selected items of the flatware at a selected point along the path of the track means and pushing the selected items off the surface of the track means and allowing other selected items of the flatware to remain on the surface; and
- means for further separating the selected items of flatware pushed off the surface of the track means.

4,954,251

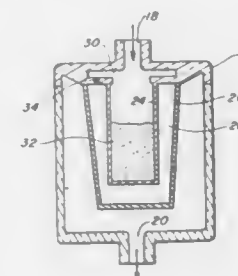
**CONCENTRIC MICROAGGREGATE BLOOD FILTER**  
Bruce E. Barnes, Kensington; Richard Furuzawa, Berkeley, and Paul Kahn, San Francisco, all of Calif., assignors to Miles Inc., Elkhart, Ind.

Filed Jan. 31, 1989, Ser. No. 304,735

Int. Cl.<sup>5</sup> B01D 29/35, 29/58

U.S. Cl. 210—806

12 Claims



- 1. A microaggregate blood filtering system comprising a flexible, filter housing having inlet and outlet ports and an interior containing two generally elongated concentric filtering screens, an inner pre-filter screen and an outer microaggregate filter screen, the inner pre-filter screen having an average pore size of about 150 microns and being adapted to receive blood from the inlet port and adapted to hold back blood aggregates larger than about 150 microns without substantially interfering with the passage of smaller micro aggregates through the inner filter, and the outer filter screen having an average pore size of about 40 microns and being adapted to hold back blood microaggregates larger than about 40 microns without substantially interfering with the passage of smaller aggregates through the outer filter and the outlet port.

4,954,252

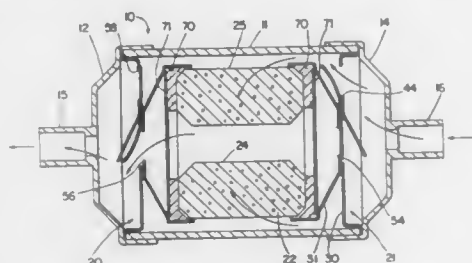
## BIFLOW FILTER DRIER

Gary E. Griffin, Penn Yan, and Walter O. Krause, Newark, both of N.Y., assignors to Parker Hannifin Corporation, Cleveland, Ohio

Continuation of Ser. No. 59,087, Jan. 8, 1987, abandoned. This application Nov. 8, 1988, Ser. No. 268,588  
Int. Cl.<sup>3</sup> B01D 27/02, 35/15

U.S. Cl. 210—136

18 Claims



1. A bidirectional filter drier, comprising a casing having opposed ends, closure means at said opposed ends, a flow port in each of said closure means, first and second check valve assemblies supported in said casing at said opposed ends, and filter drier means supported by and between said valve assemblies, each said check valve assembly comprising first and second supports respectively having first and second openings therein, and a valve plate disposed between said first and second supports, said valve plate having first and second flapper valves respectively disposed adjacent said first and second openings normally to close said openings, said flapper valves being movable in opposite directions away from said respective openings in response to fluid flow in respective opposite directions through said drier, said second opening in each said second support being centrally located, and said filter drier means including a tubular core of desiccant material having a central passage communicating with and extending between said centrally located second openings in said second supports, and wherein said first support is a centering plate having a central opening, said first opening is offset from said central opening, said second support is a core support cup having a flat bottom wall and a conical sidewall, said centrally located second opening is located in said bottom wall, said valve plate has an annular support portion surrounding said second flapper valve adjacent said second opening, and said support portion is sandwiched between said support cup bottom wall and said centering plate to maintain the same in spaced apart parallel relationship.

4,954,253

# DEVICE FOR PREPARING A GRADIENT SOLUTION FOR A HIGH-PRESSURE LIQUID CHROMATOGRAPH

Maxim L. Alexandrov, Vsevolod V. Shevkunov, and Alexandr J. Pavlov, all of Leningrad, U.S.S.R., assignors to Nauchno-Tekhnicheskoe Objedinenie Akademii Nauk SSSR, Leningrad, U.S.S.R.

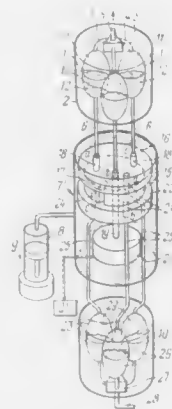
Continuation of Ser. No. 332,932, Jan. 23, 1989, abandoned, which is a continuation of Ser. No. 307,309, Jan. 23, 1989, abandoned. This application Aug. 7, 1989, Ser. No. 390,702  
Int. Cl.<sup>3</sup> B01D 15/08

U.S. Cl. 210—198.2

2 Claims

1. A device for preparing a gradient solution for a high-pressure liquid chromatograph comprising vessels (1) containing eluents communicating by way of pipes (6) through a switch-

over unit (7) with a displacement chamber (8) of a piston-type pump (9) and through a mixer (4) with the inlet of a chromatographic column characterized in that each of the eluent-containing vessels (1) is provided with a movable partition (10) dividing the interior of the vessel (1) into two chambers (11,12), the chamber (11) communicating with the mixer (4) and filled with an eluent, whereas the chamber (12) is filled with an inert liquid and communicates with the switch-over unit (7) fashioned as a flow-through chamber (13) arranged between outlets (14) of the pipes (6) and displacement chamber



(8) of the piston-type pump (9), and a rotatable switch-over valve disposed inside the flow-through chamber (13) of the rotatable valve having a rotor (15) and a stator (16), the rotor (15) having one through passage (17) communicating with the interior of the flow-through chamber (13), the stator (16) having through passages (18) equal in number to the number of eluent-containing vessels (1), each communicating through the pipe (6) with the corresponding vessel (1) and arranged so that during rotation of the rotor (15) the through passage (17) provided therein can alternately connect it to the passages (18) of the stator (16).

4,954,254

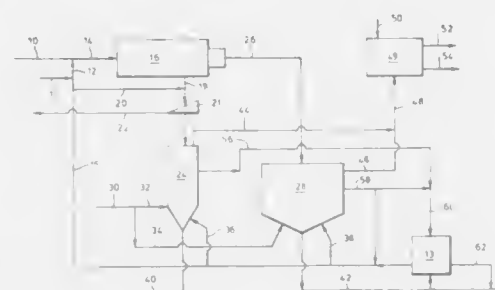
# METHOD AND APPARATUS FOR SEPARATION OF HETEROGENEOUS PHASES

Aldo Corti, Calgary, Canada, and John A. Falcon, Milan, Italy, assignors to Gulf Canada Corporation and RTR Oil Sands (Alberta) Ltd., both of Calgary, Canada

Division of Ser. No. 47,356, May 6, 1987, Pat. No. 4,828,688. This application Mar. 8, 1989, Ser. No. 320,759  
Int. Cl.<sup>3</sup> B01D 21/06

U.S. Cl. 210—209

2 Claims



1. A phase separation device to separate a feed into a tailings phase and at least one other phase comprising: a feed inlet to allow said feed to enter the vessels; a vessel wherein said feed separates into a tailings phase and at least one other phase;

outlets for each of the separated phases; a rake rotatably mounted near the base of vessel to rake the tailings phase in the base of the vessel; and a water injector for injecting water with air dissolved therein under pressure, said injector being supported on said rake and rotatable therewith at a location directly below the interface of said tailings phase and said other phase.

4,954,255

# FILTERING APPARATUS WITH PLEATED FILTERING MATERIAL

Roger Müller, Aedermannsdorf, and Giancarlo Bee, Welschenrohr, both of Switzerland, assignors to S.F. Müller & Partner, Egerkingen, Switzerland

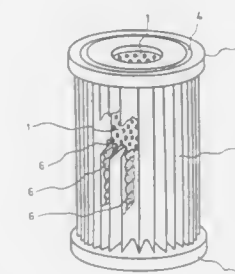
Filed Mar. 20, 1989, Ser. No. 326,222

Claims priority, application Switzerland, Apr. 2, 1988, 01227/88; Oct. 15, 1988, 03838/88

Int. Cl.<sup>3</sup> B01D 27/06

U.S. Cl. 210—437

12 Claims



1. A filtering apparatus having an inflow side and an outflow side, comprising: at least one filtering material pleated in fanfold manner and arranged between the inflow side and the outflow side of the filtering apparatus; said at least one pleated filtering material containing a plurality of pleats which are open towards said inflow side and a plurality of pleats which are open towards said outflow side; each pleat of said at least one pleated filtering material having a predetermined pleat depth; each one of said plurality of pleats which are open towards said inflow side containing a rounded base; said rounded base having a radius in the range of 0.05 to 0.3 times said predetermined pleat depth; each one of said plurality of pleats which are open towards said outflow side being structured to possess an acute angle; a dimensionally stable insert positioned within said each one of said plurality of pleats which are open towards said outflow side; each said dimensionally stable insert is formed of a substantially flat material comprising bilaterally protuberant deformations; and at least said bilaterally protuberant deformations being provided with holes.

4,954,256

# HYDROPHOBIC MEMBRANES

Peter J. Degen, Huntington; Isaac Rothman, Brooklyn, and Thomas C. Gsell, Glen Cove, all of N.Y., assignors to Pall Corporation, Glen Cove, N.Y.

Filed May 15, 1989, Ser. No. 351,219

Int. Cl.<sup>3</sup> B01D 25/04

U.S. Cl. 210—490

18 Claims

1. A microporous polymeric membrane having pores with diameters of about 0.05  $\mu\text{m}$  or greater and a CWST less than about 28 dynes/cm comprising a microporous polymeric mem-

brane substrate and, permanently chemically bonded to all portions of the surface thereof, a superstrate fluoropolymer formed from a monomer containing an ethylenically unsaturated group and a fluoroalkyl group.

4,954,257

# BIOLOGICAL PURIFICATION LOOP DEVICE AND METHOD HAVING DEFLECTOR PLATE WITHIN GUIDE PIPE

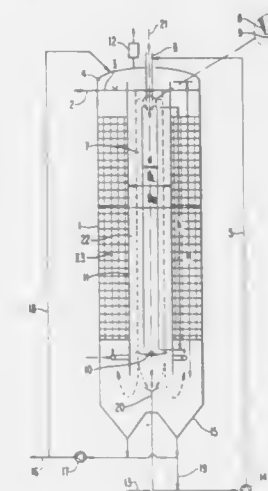
Alfons Vogelpohl, Clausthal-Zellerfeld, and Norbert Rabiger, Meisenweg, both of Fed. Rep. of Germany, assignors to Tecon GmbH, Clausthal-Zellerfeld, Fed. Rep. of Germany

Filed Feb. 23, 1989, Ser. No. 313,849

Int. Cl.<sup>3</sup> C02F 3/02

U.S. Cl. 210—607

19 Claims



9. A process for biological purification of pollutant-containing water in a reactor, such that said reactor is a closed vessel, and said purification is carried out by means of loop operation, said reactor comprising:

- (a) an insertable pipe located centrally and vertically within said vessel, such that said pipe is open at both ends, with the entrance end having a two-fluid nozzle project therein such that a biomass-water-gas mixture to be purified may be fed into said pipe;
- (b) a guide pipe having imperforate walls located concentrically around said insertable pipe within said vessel, such that said pipe is open at both ends and such that an inner annulus is formed between said insertable pipe and said guide pipe and an outer annulus is formed between said guide pipe and said vessel, said guide pipe projecting above and below the ends of said insertable pipe;
- (c) a deflector plate located below the exit end of said insertable pipe and within said guide pipe, such that said biomass-water-gas mixture is partly deflected into said inner annulus, and
- (d) at least one conically shaped sedimentation chamber located in the lower part of the reactor, such that said chamber is below the exit ends of said guide and said insertable pipes, wherein said process comprises the steps of:
  - (i) a biomass-water-gas mixture is fed into the insertable pipe of the reactor by means of the two-fluid nozzle;
  - (ii) said mixture is deflected toward the inner annulus by means of the deflector plate, such that part of the mixture flows upward into the inner annulus, part flows downward through a suction pipe, and part flows into the outer annulus;
  - (iii) the part of the mixture emerging at the upper end of the inner annulus is mixed with freshly incoming water-



gas-biomass mixture by a driving-jet action of the two-fluid nozzle and is fed into the insertable pipe;  
(iv) the part of the mixture flowing upward in the outer annulus is subjected to a posttreatment reaction; and  
(v) said water from the biomass-water-gas mixture is removed as purified water from the reactor through an outlet pipe.

**4,954,258**  
**MICROBIOLOGICAL DEGRADATION OF HALOGENATED HYDROCARBONS IN WATER**  
C. Deane Little, 619 Watson Ave., Pensacola, Fla. 32503  
Filed Nov. 10, 1988, Ser. No. 269,642  
Int. Cl.<sup>5</sup> C02F 3/00, 3/02

U.S. Cl. 210—611 7 Claims

1. In the process of degrading halogenated aliphatic hydrocarbons by the aerobic growth in water of methanotrophic bacteria in the presence of a source of oxygen and an alkane as the principal carbon source, the improvement which comprises substituting at least a growth stimulating quantity of at least one lower alkanol as a carbon source for a substantial quantity of said alkane.

7. The process of degrading 1,1,2-trichloroethylene in water by allowing at least one methanotrophic bacteria to grow in the water in the presence of a source of oxygen and at least a growth stimulating quantity of methanol as substantially the sole source of carbon.

**4,954,259**  
**PROCESS FOR THE TREATMENT AND PURIFICATION OF WATER BY THE FLOCCULATION OF SUSPENDED PARTICLES IN A FLUIDIZED BED**

Samuel Elmaleh, Castelnau le Lez, and Alain Grasmick, Montferrier-Lez, both of France, assignors to Mornex Limited, London, England  
Continuation of Ser. No. 735,862, May 20, 1985, Pat. No. 4,743,376. This application Jan. 26, 1988, Ser. No. 148,498  
Claims priority, application France, May 23, 1984, 84 08026; Nov. 16, 1984, 84 17539

The portion of the term of this patent subsequent to May 7, 2002, has been disclaimed.  
Int. Cl.<sup>5</sup> C02F 1/54

U.S. Cl. 210—617

16 Claims



1. A process for separating particles selected from the group consisting of organic particles, inorganic particles, and mixtures thereof of suspended matter from water comprising the steps of:

- providing in said water sufficient bacteria to secrete an effective amount of flocculating agent, and passing the water through unsaturated granular material as a fluidized bed to flocculate into aggregates said bacteria and said particles in said fluidized bed,
- collecting the flocculated aggregates downstream from the fluidized bed, and
- subjecting the water to a suitable liquid/solid separation technique,

whereby separately a liquid effluent and solid aggregates of the flocculated particles are produced wherein the ratio of the

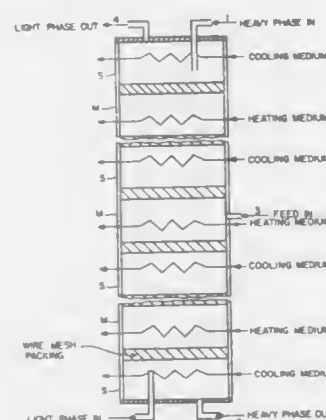
velocity of said effluent to the minimum velocity of the granular material is between 1.1 to 15, the particle-size of the granular material is between about 50  $\mu\text{m}$  and 1 cm, and the density of the granular material is between 0.8 and 3  $\text{g/cm}^3$ .

**4,954,260**  
**COUNTERCURRENT SEPARATION PROCESS AND APPARATUS**

Zvi Ludmer, Kefar Gibton, Rehovot 76910, Israel; Reuel Shinnar, 110 Ash Dr., Great Neck, N.Y. 11021, and Victor Yakhot, 10 Braeburn Dr., Princeton, N.J. 08540  
Filed Jun. 8, 1989, Ser. No. 363,156  
Int. Cl.<sup>5</sup> B01D 11/04

U.S. Cl. 210—634

19 Claims



1. A countercurrent separation process having a multiplicity of stages, each stage including a mixer zone and a settler zone which comprises: passing a first solvent and a second solvent in countercurrent flow path through said stages, said solvents being fully miscible at a first temperature and forming two phases at a second temperature; maintaining the first temperature in the mixer zone and the second temperature in the settler zone of each stage; feeding at least one solute, one of which is preferentially soluble in said first solvent, into said flow path; and recovering said first solvent, rich in said preferentially soluble solute, from one end of said flow path and recovering said second solvent, lean in said preferentially soluble solute, from the opposite end of said path.

**4,954,261**  
**METHOD FOR EXTRACTING COMPOUNDS HAVING A HIGH ADDED VALUE FROM COMPLEX SOLUTIONS AND MEMBRANE DEVICE FOR IMPLEMENTING SUCH METHOD**

Stéphane Alexandre, Saint Etienne Du Rouvray; Michel Thellier, Darnetal, and Jean-Claude Vincent, Cleres, all of France, assignors to Centre National de la Recherche Scientifique - Cnrs, Paris, France

PCT No. PCT/FR87/00180, § 371 Date Jan. 30, 1989, § 102(e) Date Jan. 30, 1989, PCT Pub. No. WO87/07294, PCT Pub. Date Dec. 3, 1987

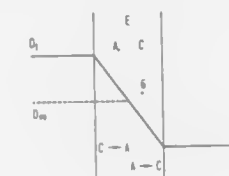
PCT Filed May 22, 1987, Ser. No. 309,765  
Claims priority, application France, May 30, 1986, 86 07792  
Int. Cl.<sup>5</sup> B01D 63/08

U.S. Cl. 210—638

17 Claims

1. A method of selective extraction of a compound from a complex solution comprising:  
introducing said solution into a system comprising a cell subdivided into two compartments by a reactive membrane system, said two compartments comprising donor compartment D and receptor compartment R;  
said reactive membrane system comprising a membrane structure carrying enzymatic catalysts which confer enzy-

matic activity on said membrane structure, a first barrier layer provided on a first surface of said membrane, and a second barrier layer provided on a second surface of said membrane, said barrier layers adapted to prevent the passage through said active membrane of substance other than the compound to be extracted;  
transporting the compound to be extracted from donor compartment D to an intramembranal space containing a liquid medium, using a monoenzymatic reactive membrane system suitable for catalyzing a reversible reaction; wherein in said intermembranal space are contained at least the compound to be extracted;  
establishing an electrochemical potential gradient of said at least one compound, said gradient creating asymmetric functional conditions which conditions force the revers-



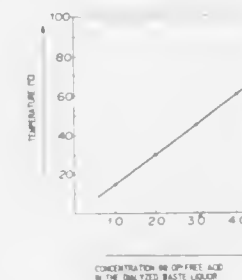
ible reaction to be conducted in one direction on one side of the reactive membrane system and in the other direction on the other side of the reactive membrane system; providing means for providing an alternative to a pressurization means including a reaction loop which makes said compound to be extracted pass from the one side of the reactive membrane to the other side of the reactive membrane, said compound to be extracted accumulates on said other side of said reactive membrane, wherein said transport is facilitated by the presence on one of the two side of said membrane a layer facilitating transport intermembranal space at least one compound other than said compound to be extracted; and  
recovering said compound to be extracted in receptor compartment R.

**4,954,262**  
**METHOD AND APPARATUS FOR RECOVERING SULFURIC ACID FROM A TITANIUM SULFATE WASTE LIQUOR**

Yoshiharu Aoki, and Toshikatsu Hamano, both of Chiba, Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan  
Filed Oct. 31, 1989, Ser. No. 429,379  
Claims priority, application Japan, Nov. 8, 1988, 63-280412; Dec. 6, 1988, 63-306977; Dec. 22, 1988, 63-321916  
Int. Cl.<sup>5</sup> B01D 61/32

U.S. Cl. 210—638

12 Claims



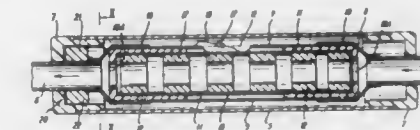
1. A method for recovering sulfuric acid from a titanium sulfate waste liquor by diffusion dialysis in a diffusion dialytic

cell provided with anion exchange membrane, which comprises:  
subjecting the titanium sulfate waste liquor to precision filtration to remove a solids content having a particle size of at least 0.1  $\mu\text{m}$  to a level of not more than 100  $\mu\text{g/l}$ ; and  
placing the filtered liquor to face water with an anion exchange membrane interposed therebetween so that sulfuric acid in the titanium sulfate waste liquor is recovered by diffusion dialysis at a temperature sufficiently low to substantially preclude adherence of titanium oxide particles to said membrane.

**4,954,263**  
**COAGULATION TREATMENT OF FLUIDS**  
Derek A. Woodhouse, Stafford, England, assignor to D.A.W. Enterprises Limited, England  
Filed Mar. 31, 1988, Ser. No. 175,769  
Claims priority, application United Kingdom, Apr. 4, 1987, 8708115

Int. Cl.<sup>5</sup> B01D 35/06; C02F 1/48, 1/50  
U.S. Cl. 210—695

26 Claims



1. A method for the treatment of a fluid comprising introducing oligo-dynamic particles into the fluid by electrolytic means using the fluid as an electrolyte whereby to form sites for coagulation and crystal formation in the fluid, passing the fluid between like magnetic poles generating a repulsive magnetic field, and permitting the thus treated particles to remain in and flow with the fluid whereby to enhance subsequent coagulation and crystal formation of the introduced particles and particles already present in the fluid.

**4,954,264**  
**APPARATUS FOR SEPARATING MONONUCLEAR CELLS FROM BLOOD AND METHOD OF MANUFACTURING AND USING THE SAME**  
Ward C. Smith, Mahwah, N.J., assignor to Becton-Dickinson and Company, Franklin Lakes, N.J.

Filed Feb. 2, 1989, Ser. No. 305,953  
Int. Cl.<sup>5</sup> B01D 33/02; B04B 3/00; A61K 35/14  
U.S. Cl. 210—782

41 Claims



1. Apparatus for separating mononuclear cells from blood, which comprises:  
a collection tube having a bottom closed end and an opposite open top end for receiving a blood sample, and being adapted to be centrifuged;  
a first layer of a liquid density gradient medium contained in the collection tube and situated at the closed end of the tube;  
a second layer of a gel-like substance contained in the collec-

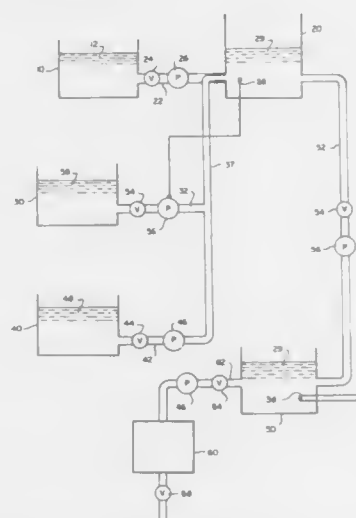
tion tube and placed on top of the first layer of liquid density gradient medium, the second layer having a specific gravity which is less than that of the first layer so that it floats on top of the first layer; and

a porous foam member contained in the collection tube and situated on top of and in contact with the second layer of gel-like substance;

the collection tube being of sufficient size to define a free space above the porous foam member to receive a blood sample;

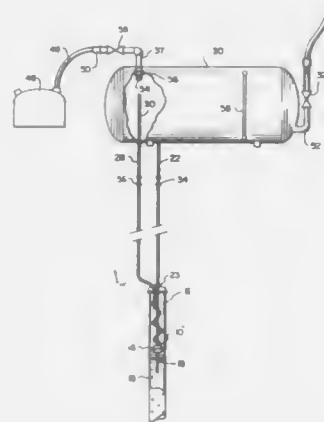
the second layer of gel-like substance being adapted to coat a portion of the porous foam member with which it is in contact to form a hydraulic barrier between a blood sample received by the tube and the first layer of liquid density gradient medium to prevent intermixing of the first layer and the blood sample prior to centrifuging the tube.

**4,954,265**  
**METHOD OF PROCESSING SPENT ELECTROLESS BATH AND BATH FOR USE THEREIN**  
 Bernard Greenberg, Brooklyn, and Andrew Sulner, New York, both of N.Y., assignors to Environmental Recovery Systems, Inc., New York, N.Y.  
 Filed Feb. 1, 1989, Ser. No. 305,246  
 Int. Cl.<sup>5</sup> B01D 21/01; C02F 1/54  
 U.S. Cl. 210—710 33 Claims



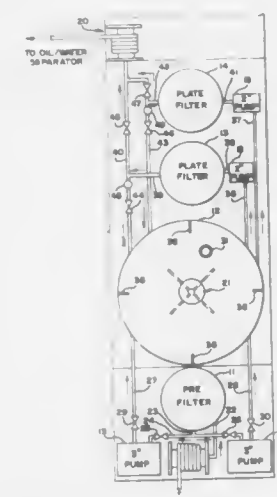
1. A method of processing an aqueous feed liquid to precipitate at least one metal in a form to make the metal subsequently removable from the feed liquid by filtration, comprising the steps of:
  - (a) adding a base to an aqueous feed liquid containing a soluble salt of the metal to be removed, wherein the metal is selected from the group consisting of nickel, copper and combinations thereof, the base being in a quantity sufficient to precipitate a metal oxalate;
  - (b) thereafter, mixing with the feed liquid oxalic acid in excess of that required to react with the metal and a pH-adjusting liquid in a quantity sufficient to lower the pH of the feed liquid to a point between that at which the feed liquid becomes slightly supersaturated with respect to the oxalate of the metal and that at which precipitation of the metal oxalate is initiated;
  - (c) allowing the mixture to stand for a period of time sufficient to form metal oxalate; and
  - (d) separating the formed metal oxalate from the feed liquid to leave an aqueous liquid in which the metal concentration is less than about four parts per million.

**4,954,266**  
**METHOD AND SYSTEM FOR RECOVERING FREE FLOATING LIQUIDS FROM GROUND WATER**  
 Lowell Lingo, Jr., R.D. #1, Box 53, Pleasant Valley Rd., Morrisville, N.Y. 13408  
 Filed Oct. 3, 1988, Ser. No. 252,648  
 Int. Cl.<sup>5</sup> E02B 15/08  
 U.S. Cl. 210—747 6 Claims



1. A method of removing a liquid hydrocarbon having a specific gravity less than one from the surface of a body of water within a pre-drilled well upon which said hydrocarbon is floating solely by means of barometric and gravitational forces, without the use of externally powered means, said method comprising:
  - (a) positioning an airtight reservoir at a vertical level higher than that of said first liquid;
  - (b) filling said reservoir with water;
  - (c) providing a vent selectively movable between open and closed positions in an upper portion of said reservoir, opening said vent to permit communication of said reservoir with the atmosphere during said filling step, and closing said vent to render said reservoir airtight upon completion of said filling step;
  - (d) connecting upper and lower ends of an enclosed, elongated first tube in airtight communication with the interior of said reservoir and said body of water within said well, respectively;
  - (e) connecting upper and lower ends of an enclosed, elongated second tube in airtight communication with the interior of said reservoir and a floatation device, respectively;
  - (f) placing said floatation device in said body of water within said well, said floatation device having a buoyancy so related to the specific gravities of said first liquid and said body of water that said second tube lower end remains just below the surface of said hydrocarbon as the distance between said reservoir and the surface of said hydrocarbon varies;
  - (g) positioning at least one selectively actuable valve in each of said first and second tubes, closing said valves during said filling step, and opening said valves following closing of said vent; and
  - (h) permitting said water to flow through said first tube by gravity out of said reservoir into said well and said hydrocarbon to rise through said second tube by barometric pressure into said reservoir to replace said water flowing therefrom.

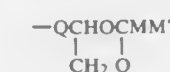
**4,954,267**  
**HYDROCARBON RECLAIMER SYSTEM**  
 Michael J. Uremovich, R.R. #2, Elwood Rd., Manhattan, Ill. 60442  
 Filed May 2, 1989, Ser. No. 346,132  
 Int. Cl.<sup>5</sup> B01D 37/02  
 U.S. Cl. 210—771 19 Claims



recovered as a filter cake from a pressure filtration, the improvement wherein said pressure filtration is conducted in a rotary pressure filter containing a multi-layered wire mesh filter medium comprised of mesh layers having different mesh sizes wherein said filter medium comprises a multi-layer square-opening mesh, linen-bonded to a filter cloth with at least one protective mesh on each side and wherein said filter cloth has a mesh size corresponding to about the mean particle diameter size of the cellulose ether suspension particles and, subsequent to removal of said filter cake from said filter medium, said filter medium is cleaned with steam, compressed air or water under pressure.

**4,954,269**  
**DIOXOLANE FUNCTIONAL SILICON COMPOUNDS AND METHOD FOR THEIR PREPARATION AND USE**  
 Peter Y. K. Lo, Midland, and Anthony Revis, Freeland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.  
 Filed Jul. 10, 1989, Ser. No. 377,346  
 Int. Cl.<sup>5</sup> D06M 7/00  
 U.S. Cl. 252—86 17 Claims

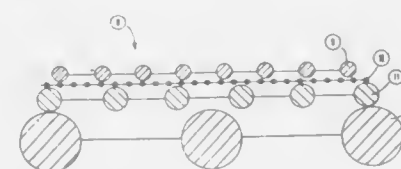
1. A method of treating textiles in order to increase the water absorptivity of the textiles comprising contacting the textiles with an effective amount of a dioxolane-substituted organosilicon compound containing at least one silicon-bonded dioxolane radical having the formula



1. A filtering process for filtering sludge from a finished product oil storage tank and thereby separating solids from oil and hydrocarbon, the process requiring no added water, solvents or diluents and comprising the steps of:
  - pumping a volume sludge from a finished product oil storage tank to a mixing tank;
  - mixing the sludge;
  - sampling the sludge to determine solid content;
  - adding filter aid comprising diatomaceous earth to the mixing tank;
  - mixing the filter aid with the sludge in the mixing tank;
  - enclosing and sealing a plurality of filter plates inside a horizontal plate filter;
  - pressurizing said horizontal plate filter by operation of pump means;
  - pumping the sludge from the mixing tank through the horizontal plate filter to filter out solids;
  - recirculating the sludge from the horizontal plate filter back through the mixing tank; and,
  - pumping a purified hydrocarbon and water filtrate from the horizontal plate filter.

where Q is a divalent organic radical which is bonded to the silicon atom by way of a silicon-carbon bond, M is a monovalent hydrocarbon radical free of aliphatic unsaturation containing from 1 to 6 carbon atoms and M' is H or M; all remaining silicon valences of the dioxolane-substituted organosilicon compound being satisfied by radicals free of aliphatic unsaturation selected from the group consisting of monovalent hydrocarbon radicals, monovalent haloalkyl radicals, monovalent hydrolyzable radicals, hydrogen atoms and divalent radicals joining silicon atoms.

**4,954,268**  
**PROCESS FOR REMOVING CELLULOSE ETHERS FROM A CELLULOSE ETHER SUSPENSION**  
 Guenther Just, Verdistrasse 48, 4010 Hilden, and Willi Wuest, Fasenering 32, 4030 Ratingen, both of Fed. Rep. of Germany  
 Filed Feb. 3, 1989, Ser. No. 306,427  
 Claims priority, application Fed. Rep. of Germany, Feb. 5, 1988, 3803370  
 Int. Cl.<sup>5</sup> B01D 33/48  
 U.S. Cl. 210—772 20 Claims



1. In a process for removing cellulose ethers from a cellulose ether particle suspension in which the cellulose ethers are

**4,954,270**  
**FABRIC SOFTENING COMPOSITION: FABRIC SOFTENER AND HYDROPHOBICALLY MODIFIED NONIONIC CELLULOSE ETHER**  
 Robert M. Butterworth, Heidelberg, Fed. Rep. of Germany, and Kenwyn D. Saunders, New Malden, Great Britain, assignors to Lever Brothers Company, New York, N.Y.  
 Filed Feb. 27, 1989, Ser. No. 316,379  
 Claims priority, application United Kingdom, Mar. 1, 1988, 8804818  
 Int. Cl.<sup>5</sup> C11D 1/62, 3/22; D06M 13/18, 15/09  
 U.S. Cl. 252—8.8 6 Claims

1. An aqueous fabric conditioning composition comprising
  - (i) a fabric softener selected from the group of water-insoluble quaternary ammonium compounds, water-insoluble hydrocarbyl imidazolinium compounds, nonionic fabric softening agents, amine softening materials or mixtures thereof; and
  - (ii) from 0.01 to 0.30% by weight of a nonionic cellulose ether which is a methyl, hydroxyethyl or hydroxypropyl cellulose having a degree of substitution sufficient to make it water soluble prior to being hydrophobically modified which has been hydrophobically modified by substitution with one or more hydrocarbon radicals having 10–24 carbon atoms in an amount between 0.20% by weight and the amount which renders the modified cellulose ether less than 1% by weight soluble in water at 20° C.



4,954,271

## NON-TOXIC FIRE EXTINGUISHANT

Raymond W. Green, Vancouver, Canada, assignor to Tag Investments, Inc., Vancouver, Canada

Filed Oct. 6, 1988, Ser. No. 255,133  
Int. Cl.<sup>5</sup> A62D 1/00; A62C 1/00, 3/00

U.S. Cl. 252-8

4 Claims

1. A non-toxic fire extinguishant consisting essentially of:  
65% trichlorofluoromethane,  
15% dichlorodifluoromethane,  
15% 1,2-dichlorotetrafluoroethane, and 5% dipentene by weight of the overall extinguishant.

4,954,272

## PROCESS FOR PREPARING OVERBASED CALCIUM SULFONATES

Tze C. Jao, Fishkill; Nancy A. Morton, Hopewell Junction, both of N.Y., and Robert W. Erickson, Jr., Nederland, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Mar. 27, 1989, Ser. No. 329,129  
Int. Cl.<sup>5</sup> C10M 135/10

U.S. Cl. 252-25

7 Claims

1. A process for producing an overbased oil soluble calcium sulfonate having a TBN of 325, said process comprising:  
(a) diluting a neutral calcium sulfonate with a hydrocarbon solvent and a lower alcohol;  
(b) adding to the diluted calcium sulfonate solution, CaO, Ca(OH)<sub>2</sub> and H<sub>2</sub>O in molar ratios of CaO:Ca(OH)<sub>2</sub> of about 90:10 to about 20:80 and of H<sub>2</sub>O:CaO of about 0.15:1 to about 0.30:1;  
(c) heating the sulfonate mixture to a temperature ranging from about 100° F. to about 170° F. under a pressure ranging from about 0 to about 50 psig;  
(d) passing CO<sub>2</sub> into the heated sulfonate mixture for a period of about 50 to about 200 minutes;  
(e) adding a diluent oil to the CO<sub>2</sub> treated sulfonate mixture;  
(f) separating the solids from the liquid of the sulfonate mixture; and  
(g) stripping the hydrocarbon solvent from the resulting over-based oil soluble sulfonate product having TBN of 325.

4,954,273

## OIL FORMULATIONS CONTAINING OVERBASED MULTI-FUNCTIONAL ADDITIVE

Richard A. Denis, Auburn Township, Cuyahoga County, and Frederick W. Koch, Willoughby Hills, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

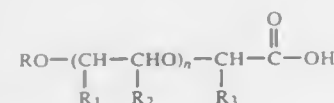
Continuation-in-part of Ser. No. 20,287, Feb. 27, 1987, Pat. No. 4,784,781. This application Oct. 27, 1988, Ser. No. 263,578. The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> C10M 105/22

U.S. Cl. 252-39

20 Claims

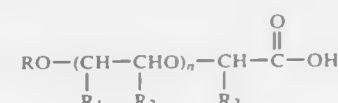
1. A crank case oil composition, comprising:  
an oil of lubricating viscosity in an amount of 50% or more by weight based on the total weight of the composition and a minor amount, sufficient to improve performance characteristics of the composition of oil dispersible additive, comprising:  
an overbased salt of a compound having structural formula (I)



wherein R is a hydrocarbyl containing 1 to 44 carbons, R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are independently hydrogen or an alkyl moiety containing 1 to 21 carbons, and n is in the range of from 1 to 20.

12. An oil additive concentrate, comprising:

about 10% to about 50% by weight of an oil of lubricating viscosity; and  
an overbased salt of a compound having structural formula (I):



wherein R is a hydrocarbyl containing 1 to 44 carbons, R<sub>1</sub> and R<sub>3</sub> are hydrogen and R<sub>2</sub> is hydrogen or methyl, and n is an integer in the range of from 1 to 20.

4,954,274

## SULFURIZED OLEFIN EXTREME PRESSURE ADDITIVES

Edward F. Zaweski, 12260 Brookshire Ave., Baton Rouge, La. 70815, and James G. Jolly, 5233 Halls Ferry Dr., Baton Rouge, La. 70817

Continuation of Ser. No. 138,937, Dec. 29, 1987, abandoned.

This application Jun. 6, 1989, Ser. No. 363,443

Int. Cl.<sup>5</sup> C10M 135/02

U.S. Cl. 252-45

16 Claims

1. A sulfurized olefinic lubricating oil additive which imparts extreme pressure properties made by the process comprising (i) reacting sulfur monochloride with aliphatic monoolefin consisting essentially of monoolefin selected from isobutene, 2-methyl-1-butene and 2-methyl-2-butene, wherein the ethylenic double bond adjoins a tertiary carbon atom, in the presence of minor amounts of an active Lewis acid at about 30°-100° C. using about 0.45 to 1.5 gram moles of aliphatic monoolefin for each 0.3 to 0.75 gram mole of sulfur monochloride to produce an adduct which, after sulfurization, affords a lubricant additive which is soluble at a concentration of 5 percent by weight at a temperature of 0° C. in polyalphaolefin synthetic oils, (ii) reacting the adduct so produced with sulfur and sodium sulfide in an aqueous alkanol medium at a temperature of about 50° C. up to reflux using about 0.02-0.4 gram atom of sulfur gram mole of sodium sulfide, and (iii) recovering said additive.

4,954,275

## USE OF PHENOL-MERCAPTOCARBOXYLIC ACID ESTERS AS STABILIZERS FOR LUBRICANTS

Siegfried Rosenberger, Riehen, and Kurt Schwarzenbach, Pfefingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 919,605, Oct. 14, 1986, abandoned, which is a continuation-in-part of Ser. No. 347,399, Feb. 10, 1982. This application Nov. 19, 1986, Ser. No. 932,431

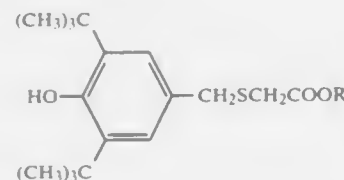
Claims priority, application Switzerland, Feb. 29, 1981, 1107/81

Int. Cl.<sup>5</sup> C10M 135/26

U.S. Cl. 252-48.6

3 Claims

1. A lubricant composition comprising mineral oil or synthetic oil or mixture thereof and an effective stabilizing amount of a compound of the formula

wherein R is C<sub>8</sub>-C<sub>13</sub> alkyl.

4,954,276

## LACTONE MODIFIED ADDUCTS OR REACTANTS AND OLEAGINOUS COMPOSITIONS CONTAINING SAME

Antonio Gutierrez, Mercerville, and Robert D. Lundberg, Bridgewater, both of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Division of Ser. No. 916,113, Oct. 7, 1986, Pat. No. 4,866,139.

This application Aug. 31, 1989, Ser. No. 401,603

Int. Cl.<sup>5</sup> C10M 155/00, 155/04

U.S. Cl. 252-49.6

91 Claims

1. A C<sub>5</sub>-C<sub>9</sub> lactone adduct material useful as an oil additive and formed by first reacting at a temperature of from about 100 to about 250° C. for a period of from about 1 to about 10 hours a hydrocarbyl substituted C<sub>4</sub>-C<sub>10</sub> dicarboxylic acid producing material (I) with the reaction product (II) of a C<sub>5</sub>-C<sub>9</sub> lactone with a member selected from the group consisting of (a) a polyamine having from about 2 to 60 total carbon atoms and from about 2 to about 12 nitrogen atoms, (b) an aliphatic polyhydric alcohol containing up to about 100 carbon atoms and from about 2 to about 10 hydroxyl groups, (c) an amino alcohol containing up to about 50 total carbon atoms, from 1 to about 3 nitrogen atoms and from 1 to about 15 hydroxyl groups, or (d) mixtures thereof, and then post-treating the reaction product of (I) and (II) with a boron compound; said reaction product (II) being prepared at a temperature of from about 30 to about 200° C. when said C<sub>5</sub>-C<sub>9</sub> lactone is reacted with said polyamine and at a temperature of about 50 to about 200° C. when said C<sub>5</sub>-C<sub>9</sub> lactone is reacted with said aliphatic polyhydric alcohol or with said amino alcohol, said hydrocarbyl substituted acid producing material being formed by reacting an olefin polymer of a C<sub>2</sub>-C<sub>10</sub> monoolefin having a number average molecular weight of about 300 to about 10,000 and a C<sub>4</sub>-C<sub>10</sub> monounsaturated dicarboxylic acid material selected from the group consisting of acids, esters and anhydrides and containing an average of from about 0.7 to about 2.0 moles of dicarboxylic acid producing material per mole of said olefin polymer used in the reaction, said adduct having, on the average, a degree of polymerization of C<sub>5</sub>-C<sub>9</sub> lactone of less than about 100.

4,954,277

## LACTONE MODIFIED, ESTERIFIED OR AMINATED ADDITIVES USEFUL IN OLEAGINOUS COMPOSITIONS AND COMPOSITIONS CONTAINING SAME

Antonio Gutierrez, Mercerville, and Robert D. Lundberg, Bridgewater, both of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Division of Ser. No. 916,217, Oct. 7, 1986, Pat. No. 4,866,141.

This application Aug. 31, 1989, Ser. No. 401,373

Int. Cl.<sup>5</sup> C10M 145/00, 149/00, 159/12

U.S. Cl. 252-49.6

90 Claims

1. A C<sub>5</sub>-C<sub>9</sub> lactone derived material useful as an oil additive and formed by (I) simultaneously reacting at a temperature of from about 100 to about 220° C. for a period of from about 1 to about 10 hours a hydrocarbyl substituted C<sub>4</sub>-C<sub>10</sub> dicarboxylic acid producing material with a C<sub>5</sub>-C<sub>9</sub> lactone and a member selected from the group consisting of (a) a polyamine having from about 2 to 60 total carbon atoms and from about 2 to about 12 nitrogen atoms, (b) an aliphatic polyhydric alcohol containing up to about 100 carbon atoms and from about 2 to about 10 hydroxyl groups, (c) an amino alcohol containing up to about 50 total carbon atoms, from 1 to about 3 nitrogen atoms and from 1 to about 15 hydroxyl groups, or (d) mixtures thereof, and (2) post-treating the reaction product formed in step (I) with a boron reactant, said hydrocarbyl substituted acid producing material being formed by reacting an olefin polymer of a C<sub>2</sub>-C<sub>10</sub> monoolefin having a number average molecular weight of about 300 to about 10,000 and a C<sub>4</sub>-C<sub>10</sub> monounsaturated dicarboxylic acid material selected from the group consisting of acids, esters and anhydrides and containing an average of about 0.7 to about 2.0 molar equivalents of dicarboxylic acid producing moieties per molar equivalent of said olefin polymer, said C<sub>5</sub>-C<sub>9</sub> lactone having undergone ring opening polymerization such that the degree of polymerization

of said C<sub>5</sub>-C<sub>9</sub> lactone in the final C<sub>5</sub>-C<sub>9</sub> lactone derived material is from about 0.2 to about 100.

29. An oleaginous composition comprising (I) a lubricating oil and (II) a C<sub>5</sub>-C<sub>9</sub> lactone derived material which has been prepared by first simultaneously reacting at a temperature of from about 100° to about 220° C. for a period of from about 1 to about 20 hours (i) a C<sub>5</sub>-C<sub>9</sub> lactone, with (ii) a member selected from the group consisting of (a) a polyamine having from about 2 to about 60 total carbon atoms and from about 2 to about 12 nitrogen atoms, (b) an aliphatic polyhydric alcohol containing up to about 100 total carbon atoms and from about 2 to about 10 hydroxyl groups, and (c) an amino alcohol containing up to about 50 total carbon atoms, from 1 to about 3 nitrogen atoms and from 1 to 15 hydroxyl groups, and (d) mixtures of (a), (b) and (c), and with (iii) a hydrocarbyl substituted C<sub>4</sub>-C<sub>10</sub> dicarboxylic acid producing material, and then post-treating the product obtained by reacting (i), (ii) and (iii) with a boron reactant; said hydrocarbyl substituted C<sub>4</sub>-C<sub>10</sub> dicarboxylic acid producing material being formed by reacting an olefin polymer of a C<sub>2</sub>-C<sub>10</sub> monoolefin having a number average molecular weight of from about 300 to about 10,000 with a C<sub>4</sub>-C<sub>10</sub> monounsaturated dicarboxylic acid material and containing an average of from about 0.7 to about 2.0 dicarboxylic acid producing moieties per molecule of said olefin polymer, said C<sub>5</sub>-C<sub>9</sub> lactone having undergone ring opening polymerization such that the degree of polymerization of said lactone in said final lactone derived material is from about 0.2 to about 100.

4,954,278

## EUTECTIC COMPOSITION FOR COOLNESS STORAGE

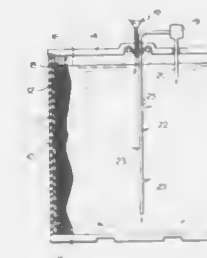
Calvin D. MacCracken, Englewood, N.J., and Maria Telkes, North Miami, Fla., assignors to Calmac Manufacturing Corp., Englewood, N.J.

Filed May 8, 1989, Ser. No. 348,965

Int. Cl.<sup>5</sup> C09K 5/06

U.S. Cl. 252-70

10 Claims



1. A eutectic composition consisting essentially of approximately 3.3% to approximately 4.3% by weight of sodium sulfate, approximately 0.5% to approximately 1.0% by weight of sodium tetraborate decahydrate, and the balance water.

4,954,279

## AIRCRAFT DE-ICING AND ANTI-ICING COMPOSITION

Frank Ma, St. Leonard, and Daniel Comeau, Lachenaie, both of Canada, assignors to Union Carbide Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 142,335, Dec. 29, 1987, abandoned, which is a continuation of Ser. No. 907,258, Sep. 15, 1986, abandoned. This application Feb. 8, 1988, Ser. No. 153,212

Claims priority, application Canada, Aug. 28, 1986, 517026

Int. Cl.<sup>5</sup> C09K 3/18

U.S. Cl. 252-70

14 Claims

1. A de-icer and anti-icing composition comprising a micro-emulsion having a continuous phase and a discontinuous phase, said continuous phase comprising:

(a) from 5% to 85% by weight based on the weight of the total composition of a glycol selected from the group

consisting of ethylene glycol, diethylene glycol, triethylene glycol, propylene glycol, dipropylene glycol, glycerol and mixtures thereof, and

(b) from 5% to 95% by weight of water based on the weight of the total composition;

said discontinuous phase comprising: up to 5.0% by weight based on the total weight of the composition of a water insoluble oil, the oil comprises at least one substantially water-insoluble, partially polar compound in an amount of from 0.1% to 2.5% by weight based on the weight of the total composition, and the remainder of the composition comprising:

(c) from 0.05% to 10.0% by weight based on the weight of the total composition of a thickening agent selected from the group consisting of natural and artificial gums, cellulose ethers, carboxymethylcellulose and hydroxyethylcellulose,

(d) an emulsifier selected from the group consisting of anionic surfactants and non-ionic surfactants and mixtures thereof, said emulsifier being present in an amount of from 0.1 times to 100 times the concentration of the water insoluble oil, and

(e) from 0.1% to 2.5% by weight of alkanolamines based on the weight of the total composition;

said total composition having a pH of from 6 to 10.

4,954,280

## MACHINE DISHWASHING COMPOSITION

David L. Elliott, Hawthorne; Steven P. Christiano, Maplewood, both of N.J.; David J. Lang, Ossining, N.Y., and Rosemary M. Sisco, Hackensack, N.J., assignors to Lever Brothers Company, New York, N.Y.

Continuation-in-part of Ser. No. 161,228, Feb. 17, 1988, abandoned, which is a continuation of Ser. No. 62,521, Jun. 12, 1987, abandoned. This application Jun. 2, 1988, Ser. No. 202,087 Int. Cl.<sup>5</sup> C11D 7/36, 7/56, 17/00

U.S. Cl. 252—90 13 Claims

1. An aqueous based fluid automatic dishwashing composition comprising:

(a) a thickening system comprising a synthetic water-soluble polymer, a swellable clay, and a soluble or solubilized multivalent cation,

(b) a sufficient level of a source of available chlorine to produce at least about 0.5% thereof;

(c) a sufficient amount of an alkaline source to produce a pH of at least about 10.5; and

(d) a builder;

said composition being characterized by exhibiting thixotropic behavior, by having a yield point of about 30 to 100 pascals at 20° C., and by having an available chlorine level of at least about 0.5% by weight after about six weeks storage at 25° C.

4,954,281

## SOAP COMPOSITIONS OF ENHANCED ANTIMICROBIAL EFFECTIVENESS

Carol M. Resch, Rutherford, N.J., assignor to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 199,568, May 27, 1988, Pat. No. 4,832,861. This application Mar. 14, 1989, Ser. No. 322,858

Int. Cl.<sup>5</sup> C11D 9/44, 9/50/17/00

U.S. Cl. 252—107 6 Claims

1. A cleaning composition comprising:

(i) a C<sub>12</sub>—C<sub>22</sub> fatty acid salt;

(ii) a non-soap anionic surface active agent which is a C<sub>10</sub>—C<sub>22</sub> alkyl glycerol ether sulfonate; and

(iii) 2,4,4'-trichloro-2'-hydroxy diphenyl ether in an amount effective to reduce body odor, the ratio of fatty acid salt to surface active agent being from 4:1 to 1:0.98.

4,954,282  
ACYL ISETHIONATE SKIN CLEANSING COMPOSITIONS

Karla J. Rys, Little Ferry; Alan P. Greene, Flemington; Frederick S. Osmer, Parsippany, all of N.J., and Joseph J. Podgorsky, Slate Hill, N.Y., assignors to Lever Brothers Company, New York, N.Y.

Filed Apr. 19, 1989, Ser. No. 340,185

Int. Cl.<sup>5</sup> C11D 9/32, 1/28

U.S. Cl. 252—117 4 Claims

1. A skin cleansing composition comprising:

(i) acyl esters of isethionic acid salts, said esters being C<sub>16</sub>—C<sub>18</sub> acyl isethionates and having no more than 25% C<sub>14</sub> or lower acyl groups; and

(ii) at least one co-active surfactant which is an amido sulfosuccinate;

wherein the weight ratio of said acyl esters to co-active ranges from about 20:1 to about 1:1, and soap is present in an amount from 0 to 10% by weight of the composition.

4,954,283

## POLYETHYLENE GLYCOL ETHER LOW TEMPERATURE FOAM SUPPRESSING AGENTS IN LOW-FOAM CLEANING AGENTS

Karl H. Schmid, Mettmann; Alfred Meffert, Monheim; Gilbert Schenker, Erkrath; Adolf Asbeck, Duesseldorf, and Rolf Scharf, Monheim, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jan. 11, 1989, Ser. No. 295,872

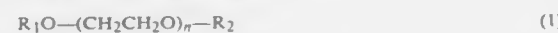
Claims priority, application Fed. Rep. of Germany, Jan. 11, 1988, 3800493

Int. Cl.<sup>5</sup> C11D 3/075, 1/72

U.S. Cl. 252—135 22 Claims

1. A low foam cleaning composition which comprises:

a foam suppressing amount of at least one polyethylene-glycol ether of the formula:



wherein,

R<sub>1</sub> is a straight-chain or branched alkyl- or alkenyl radical having from 20 to 28 carbon atoms,

R<sub>2</sub> is an alkyl radical having from 4 to 8 carbon atoms and n is an integer from about 6 to about 20; and at least one

composition selected from the group consisting of non-ionic surfactants, anionic surfactants, alkali metal hydroxide, builders, complexing agents, alkali metal phosphates, alkali metal silicates, alkali metal borates, alkali metal carbonates, polyacrylates, phosphonic acid and organic solvents.

4,954,284

## AZEOTROPE-LIKE COMPOSITIONS OF DICHLORO-TRIFLUOROETHANE AND ETHYLENE OXIDE

James A. Batt, Depew; Robert G. Richard, Cheektowaga; Ian R. Shankland, and David P. Wilson, both of Williamsville, all of N.Y., assignors to Allied-Signal Inc., Morris Township, N.J.

Continuation-in-part of Ser. No. 251,729, Oct. 3, 1988,

abandoned. This application Aug. 30, 1989, Ser. No. 400,607

Int. Cl.<sup>5</sup> C11D 7/30, 7/50

U.S. Cl. 252—170 17 Claims

1. Azeotrope-like compositions consisting essentially from about 11 weight percent to about 3 weight percent ethylene oxide and from about 89 weight percent to about 97 weight percent dichlorotrifluoroethane selected from the group with

of 1,1-dichloro-2,2,2-trifluoroethane and 1,2-dichloro-1,2,2-trifluoroethane, or mixtures thereof, which compositions with 1,1-dichloro-2,2,2-trifluoroethane boil at about 28.8° C. at 744 mm Hg, which compositions with 1,2-dichloro-1,2,2-trifluoroethane boil at about 29.5° C. at 741 mm Hg and which compositions containing a mixture of 1,1-dichloro-2,2,2-tri-

fluoroethane and 1,2-dichloro-1,2,2-trifluoroethane boil at about 29.15° C. at 742.5 mm Hg.

4,954,285

## PERFUME, PARTICLES, ESPECIALLY FOR USE IN DRYER RELEASED FABRIC SOFTENING/ANTISTATIC AGENTS

Thomas J. Wierenga, Cincinnati; Joseph M. Ladd, Jr., Cleves; Russell J. Merz, Hamilton, and Alyce E. Nicholson, Morrow, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 164,678, Mar. 7, 1988, abandoned. This application Feb. 7, 1989, Ser. No. 306,334

Int. Cl.<sup>5</sup> C11D 13/46

U.S. Cl. 252—174.11 24 Claims

1. A dry, flowable silica particle having a particle size of from about 0.001 micron to about 15 microns and having a perfume composition suitable for use in a fabric conditioning process adsorbed onto said silica particle, the ratio of said perfume composition to the silica particle being from about 0.001:1 to about 6:1 and there being no more than about 10% based on the weight of the silica and the perfume of other organic materials present.

4,954,286

## FABRIC PRETREATMENT CLEANING COMPOSITIONS

Ralph R. Sepulveda, Suffern, N.Y., and Jesse L. Lynn, Jr., Oradell, N.J., assignors to Lever Brothers Company, New York, N.Y.

Filed Apr. 14, 1988, Ser. No. 181,287

Int. Cl.<sup>5</sup> C11D 1/835, 1/72

U.S. Cl. 252—174.22 15 Claims

1. An aqueous, clear homogeneous liquid composition comprising:

(a) from 1 to 20% of a mixture of surfactants comprising:

(i) a first nonionic surfactant having an HLB from about 7.9 to less than 10, said first nonionic surfactant being an ethoxylated C<sub>12</sub>—C<sub>15</sub> alkanol; and

(ii) a second nonionic surfactant having an HLB of at least 12 said second nonionic surfactant being an ethoxylated C<sub>12</sub>—C<sub>15</sub> alkanol;

the ratio of (i) to (ii) being 2:1 to 1:2;

(b) from 1 to 30% of a hydrocarbon solvent; and

(c) from 1 to 20% of an alkanolamine salt of a C<sub>12</sub>—C<sub>22</sub> fatty acid.

4,954,287

## CHLOROFLUOROHYDROCARBON COMPOSITIONS

Neil Winterton, Pantasaph, and John G. Carey, Warrington, both of United Kingdom, assignors to Imperial Chemical Industries PLC, London, United Kingdom

Filed Apr. 1, 1988, Ser. No. 176,763

Claims priority, application United Kingdom, Apr. 3, 1987, 8707962

Int. Cl.<sup>5</sup> C09K 3/00; C08G 18/14; C07C 17/42

U.S. Cl. 252—182.26 9 Claims

1. A chlorofluorohydrocarbon composition comprising trichlorofluoromethane or 1,1,2-trichloro-1,2,2-trifluoroethane stabilized against reaction with active hydrogen compounds by incorporating therein a stabilising amount of ortho(isopropenyl) aniline.

3. A mixture which is reactive with a polyisocyanate to yield polyurethane foam comprising one or more active hydrogen compounds and trichlorofluoromethane or 1,1,2-trichloro-1,2,2-trifluoroethane having incorporated therein a stabilising amount of a stabilizer selected from amylene, ortho-(isopropenyl)aniline and diisobutylene.

4,954,288

## SIDE CHAIN LIQUID CRYSTALLINE POLYMERS EXHIBITING NONLINEAR OPTICAL RESPONSE

Anthony J. East, Morris, N.J., assignor to Hoechst Celanese Corp., Somerville, N.J.

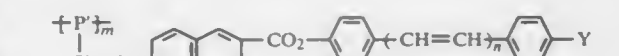
Division of Ser. No. 280,096, Dec. 5, 1988, Pat. No. 4,913,836.

This application Nov. 14, 1989, Ser. No. 435,759

Int. Cl.<sup>5</sup> C09K 19/52

U.S. Cl. 252—299.01 9 Claims

1. A thermotropic liquid crystalline polymer which is characterized by a recurring monomeric unit corresponding to the formula:



where P<sup>+</sup> is a polyvinyl polymer main chain unit, m is an integer with a value of at least 5, n is an integer with a value of zero or one, S<sup>+</sup> is a flexible spacer group having a linear chain length of between about 2–20 atoms, and Y is an electron-withdrawing substituent, and where the recurring monomeric unit comprises at least about 50 weight percent of the polymer, and the polymer has a glass transition temperature between about 0°–120° C.

4,954,289

## AZEOTROPES OF HYDROGEN-CONTAINING HALOCARBONS WITH BUTANES

Philip L. Bartlett; Joseph A. Creazzo, both of Wilmington, and Robert A. Gorski, Newark, all of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 12, 1989, Ser. No. 366,370

Int. Cl.<sup>5</sup> C09K 3/00, 3/30

U.S. Cl. 252—305 10 Claims

1. An azeotropic composition consisting essentially of a member of the group consisting of 84.6 to 88.2 weight percent 1-chloro-1,2,2,2-tetrafluoroethane and 11.8 to 15.4 weight percent n-butane; 68.5 to 76.5 weight percent 1-chloro-1,2,2,2-tetrafluoroethane and 23.5 to 31.5 weight percent isobutane; 74.6 to 83.2 weight percent 1-chloro-1,1-difluoroethane and 16.8 to 25.4 weight percent n-butane; and 58.6 to 62.4 weight percent 1-chloro-1,1-difluoroethane and 37.6 to 41.4 weight percent isobutane.

4,954,290

## AZEOTROPES OF A HYDROGEN-CONTAINING HALOCARBON WITH PENTANES

Philip L. Bartlett; Joseph A. Creazzo, both of Wilmington, and Robert A. Gorski, Newark, all of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 12, 1989, Ser. No. 366,369

Int. Cl.<sup>5</sup> C09K 3/30, 3/00

U.S. Cl. 252—305 5 Claims

1. An azeotropic composition consisting essentially of a member of the group consisting of 83.4 to 90.6 member percent 1,1-dichloro-2,2,2-trifluoroethane and 9.4 to 16.6 weight percent n-pentane; and 65.2 to 72.2 weight percent 1,1-dichloro-2,2,2-trifluoroethane and 27.8 to 34.8 weight percent isopentane.

4,954,291

## CRYSTALLINE RESIN COMPOSITIONS

Toshiaki Kobayashi, Nara, and Keiko Motomatsu, Oomagari, both of Japan, assignors to New Japan Chemical Co., Ltd., Kyoto, Japan

Filed Sep. 6, 1989, Ser. No. 403,395

Claims priority, application Japan, Sep. 16, 1988, 63-232896

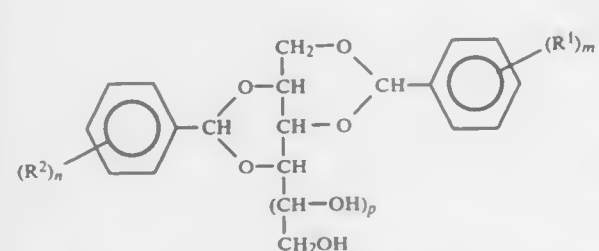
Int. Cl.<sup>5</sup> B01J 13/00

U.S. Cl. 252—315.1 4 Claims

1. A nucleating agent composition which comprises

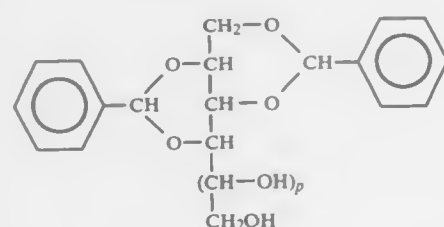


(a) at least one of the compounds represented by the formula



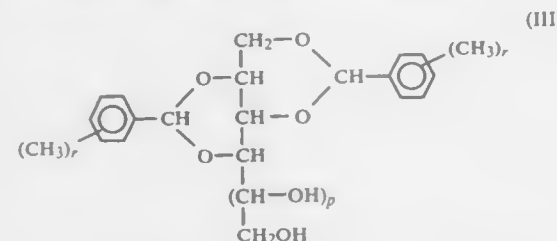
wherein  $R^1$  is methyl,  $R^2$  is hydrogen atom, and  $m$  is 2 or 3; or  $R^1$  is hydrogen atom,  $R^2$  is methyl, and  $n$  is 2 or 3; and  $p$  is 0 or 1,

(b) at least one of the compounds represented by the formula



wherein  $p$  is 0 or 1, and

(c) at least one of the compounds of the formula



wherein  $r$  is the same and is an integer of 2 or 3, and  $p$  is 0 or 1, the proportions of the components (a), (b) and (c) to be combined being such that  $Z$  calculated according to the equation

$$Z = A/(A+B+C)$$

wherein  $A$ ,  $B$  and  $C$  are each the amount by weight of the components (a), (b) and (c), respectively, is within the range of about 0.3 to about 0.8.

4,954,292

# DETERGENT COMPOSITION CONTAINING PVP AND PROCESS OF USING SAME

Michael Hull, Helsby, and Reginald V. Scowen, Wirral, both of United Kingdom, assignors to Lever Brothers Co., New York, N.Y.

Filed Sep. 14, 1987, Ser. No. 97,009

Claims priority, application United Kingdom, Oct. 1, 1986, 8623586; Oct. 20, 1986, 8625102

Int. Cl.<sup>5</sup> C11D 1/83, 3/28, 3/37

U.S. Cl. 252-542

5 Claims

1. A detergent composition for washing soiled fabrics comprising 5 to 90% by weight of an inorganic detergency builder; 5 to 40% by weight of an anionic detergent active material; polyvinyl pyrrolidone having a molecular weight of from about 5,000 to about 100,000; and an alkoxylated nonionic material or a mixture thereof, wherein the HLB value of the

nonionic material or its mixture is not more than 10.5; the ratio of the polyvinyl pyrrolidone to the nonionic material is within the range from 8:2 to 2:8 and the total level of the polyvinyl pyrrolidone and the nonionic material is within the range from 0.1 to 5% by weight.

4,954,293

# SEPARATION OF THORIUM AND RARE EARTH VALUES FROM FLUORIDE CONCENTRATES THEREOF

Francinet Cailly, and Frederic Fabre, both of Paris, France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Nov. 28, 1988, Ser. No. 276,665

Claims priority, application France, Nov. 27, 1987, 87 16452 Int. Cl.<sup>5</sup> C01F 15/00, 17/00

U.S. Cl. 252-625 16 Claims  
1. A process for the separation of thorium and rare earth values from a fluoride concentrate thereof, comprising decomposing such concentrate with aqueous sodium hydroxide under conditions such that the amount of sodium hydroxide is at least 1.4 times the stoichiometric amount and the initial sodium hydroxide/water ratio in the medium of decomposition ranges from 1% to 30% by weight, whereby a precipitate of thorium hydroxide and rare earth hydroxides is produced, together with a solution of sodium fluoride, and then separating the NaF solution therefrom.

4,954,294

# VAPOR/LIQUID CONTACT APPARATUS

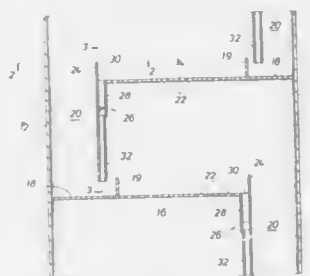
Robert P. Bannon, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Aug. 11, 1989, Ser. No. 392,314

Int. Cl.<sup>5</sup> B01F 3/04

U.S. Cl. 261-114.1

4 Claims



1. Apparatus for sealing vapor/liquid contacting trays on startup in a downcomer-equipped vapor/liquid contactor, said apparatus comprising:

at least one downcomer-equipped upright vapor/liquid contacting column, comprising a series of gas/liquid contacting trays, at least some of said trays having associated therewith a weir to maintain a liquid level thereon, a downcomer whereby liquid may flow down to the next lower tray and a seal pan positioned underneath said downcomer for providing a liquid seal between successive trays in said series; and

collecting means, provided on at least one said contacting tray having said weir, said downcomer and said seal pan associated therewith, and said collecting means having an upper part disposed at an elevation substantially at the elevation of the tray it is disposed on, and said upper part of said collecting means being dimensioned to provide sufficient liquid depth to permit flow of liquid and preclude gas flow through a lower part of said collecting means during start-up conditions; said collecting means having a lower part disposed to provide liquid to said seal pan, said collecting means being dimensioned for collecting liquid from said tray so that no appreciable level has to build up on said tray before it flows into and through said

lower part into said seal pan which is disposed underneath said downcomer.

4,954,295

# PROPELLER AERATOR WITH PERIPHERAL INJECTION OF FLUID AND METHOD OF USING THE AERATOR

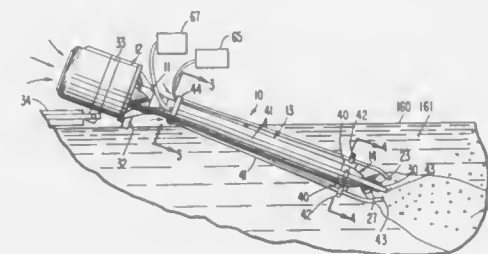
Joseph A. Durda, Wazatta, Minn., assignor to Aeration Industries, Inc., Chaska, Minn.

Filed Jan. 12, 1989, Ser. No. 297,062

Int. Cl.<sup>5</sup> B01F 3/04

U.S. Cl. 261-16

14 Claims



1. A propeller type aeration apparatus for inducing the flow of fluids into a liquid being treated by the rotation of a propeller in the liquid comprising:

an outer housing having a hollow interior, opposite first and second ends, and a longitudinal dimension extending between the two ends;  
a drive shaft supported for rotary motion about its axis within the hollow interior of said outer housing;  
motor means connected to a first end of said drive shaft for rotating said drive shaft;  
a propeller attached to a second end of said drive shaft whereby the rotation of said drive shaft rotates said propeller and induces a flow of the liquid in which the propeller is disposed;  
a first fluid outlet extending through the center of said propeller; and  
at least one elongate conduit attached to an outer surface of said outer housing, one end of said conduit having a second fluid outlet located adjacent to and downstream of the periphery of said propeller and in the path of the flow of the liquid caused by the propeller, and a second end of the conduit being in communication with a fluid to be injected into the fluid.

4,954,296

# GAS INJECTION EQUIPMENT

Wilfried Ott, Langenhagen, Fed. Rep. of Germany, assignor to Rita Ott, Langenhagen, Fed. Rep. of Germany

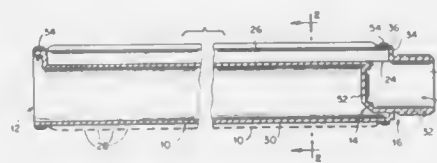
Filed Jun. 5, 1989, Ser. No. 361,135

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1988, 3819305

Int. Cl.<sup>5</sup> B01F 3/04

U.S. Cl. 261-122

8 Claims



1. A gas injection device for introducing a gas into a liquid, especially air into sewage, comprising:  
a tubular nozzle having a first end and a second end; said

nozzle being open at the first end and being closed at the second end;

a partition for closing said second end of said nozzle;  
a fastening connection at the second end for securing the nozzle to a supply of gas;  
a membrane having perforations and said membrane placed around the outside of the nozzle;  
a gas-supply channel that opens in the vicinity of the membrane; said gas-supply channel comprising a chamber that is coaxial with the second end of the nozzle and is demarcated by said partition, and said gas-supply channel also comprising a radial outlet that is adjacent to the chamber and extends through the wall of the nozzle;  
said chamber having a bore, one end of which is closed off by the partition; and  
said nozzle and said fastening connection being in one piece.

4,954,297

# METHOD AND APPARATUS FOR FORMING A MATTE FINISH ON RESIN-COATED WEBS OR SHEETS

Jack Beery, Centerville, and Charles W. Joiner, Jr., Dayton, both of Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Dec. 5, 1988, Ser. No. 279,683

Int. Cl.<sup>5</sup> B29C 59/04; B29D 11/00

U.S. Cl. 264-1.3

2 Claims



1. The method of forming a matte finish on the resin surface only of resin coated web and paper material, comprising the steps of:

providing a resin casting surface in the form of a flexible endless belt,  
heating said belt to a temperature sufficient to coalesce said resin coating at said casting surface;  
applying the resin coated surface of such material against said casting surface in which said casting surface has a non-locking diffraction grating configuration formed with a series of lands separated by grooves, the sides of said grooves forming a valley which is narrower at the bottom than at the top adjacent the lands and free of resin-trapping overhang portions and in which the pitch of said grooves is randomized and is approximately between 1.6 and 2.6 microns,  
applying pressure to said material while so cast on said heated casting surface to coalesce the resin coating,  
cooling said belt to cool said material, and  
removing said cooled material from said casting surface.

2. In a belt-type glosser for applying a matte finish to resin-coated sheets by the application of heat and pressure to the resin coated surface of the sheet while it is molded against a casting surface of heated flexible endless belt, the improvement comprising:

means on said belt casting surface defining a grooved pattern in the form of a diffraction grating, in which a plurality of closely spaced individual grooves in the belt surface are configured with walls which are narrower at the bottoms of the grooves than at the tops thereof to provide a non-locking matte surface configuration on the resin surface only of said sheets, said grooves having a randomized pitch of between 1.6 to 2.6 microns.

4,954,298

## METHOD FOR PRODUCING MICROCAPSULE

Masaki Yamamoto, Osaka; Shigeyuki Takada, Suita, and Yasuaki Ogawa, Ibaraki, all, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan  
Continuation of Ser. No. 826,968, Feb. 7, 1986, abandoned. This application Sep. 23, 1988, Ser. No. 249,198

Claims priority, application Japan, Feb. 7, 1985, 60-22978; Nov. 27, 1985, 60-267977

The portion of the term of this patent subsequent to Mar. 24, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 9/50, 9/52, 9/66; B01J 13/02

U.S. Cl. 264—4.6

20 Claims

1. A method of producing sustained-release microcapsules for injection containing a water-soluble drug, which comprises preparing a W/O emulsion composed of a water-soluble drug-containing solution as the inner aqueous phase and a biodegradable polymer-containing solution as the oil phase, adjusting the viscosity of the W/O emulsion used in preparing the W/O/W emulsion to from about 150 to about 10,000 centipoises by the procedure of increasing the polymer concentration in the oil phase; adjusting the ratio of the aqueous phase to the oil phase; adjusting the temperature of said W/O emulsion; adjusting the temperature of the external aqueous phase; adjusting the temperature of the W/O emulsion with a line heater or cooler or the like in infusing the W/O emulsion into the external aqueous phase; or carrying out the above procedures in combination, dispersing said emulsion in an aqueous phase and subjecting the resulting W/O/W emulsion to an in-water drying to form microcapsules.

4,954,299

## STRUCTURES OF PLASTICS MATERIAL

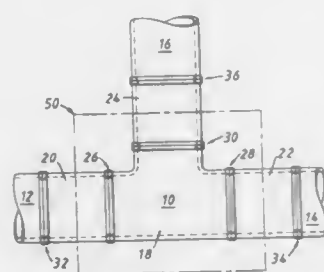
Joha M. Greig, 24 Chevington Grove, Whitley Bay, Tyne & Wear NE25 9UG, England, and Jeremy A. Bowman, 62 Leas Drive, Iwer, Buckinghamshire, SLO 9RD, England  
Continuation of Ser. No. 84,207, Aug. 12, 1987, abandoned. This application Jun. 28, 1989, Ser. No. 373,641

Claims priority, application United Kingdom, Aug. 18, 1986, 8620071

Int. Cl.<sup>5</sup> B29C 71/02, 71/04, 65/02

U.S. Cl. 264—22

5 Claims



1. A method of making a relatively large multi-component pipe fitting of polymeric plastics material which fitting is capable of being joined to a pipe of polymeric plastics material in the field by fusion, said fitting comprising a self-supporting hollow body moulded rotationally from rotational moulding grade polymeric plastics material having a relatively high melt flow index of 1.5 or greater and formed with at least one annular body end portion having a relatively large diameter, said fitting further comprising for each said body end portion a corresponding self-supporting hollow pup formed by extrusion from extrusion grade polymeric plastics material having a relatively low melt flow index of 1.0 or less, said pup having at opposite ends thereof first and second annular pup end portions having an outside diameter and a wall thickness the match the annular body end portion to which it is joined, said method comprising the steps of:

(i) forming an annular joint between each said body end portion and said first pup end portion of said correspond-

ing pup under factory conditions by fusion thus forming a multi-component structure, said fusion step comprising heating the body to a first relatively higher temperature and the pup end to a second relatively lower temperature, said temperatures being chosen to compensate for the difference in melt flow indexes;

(ii) shielding each said second pup end portion against the effect of gamma radiation, leaving the remainder of said structure unshielded;

(iii) exposing the whole of said remainder of said structure, including each said joint, to gamma radiation to produce cross-linking within said remainder to thereby enhance the resistance thereof to slow crack growth; said second pup end portion affording capability for said pup to be joined to said pipe in the field by fusion as aforesaid.

4,954,300

## GLASS REPAIR METHOD AND APPARATUS

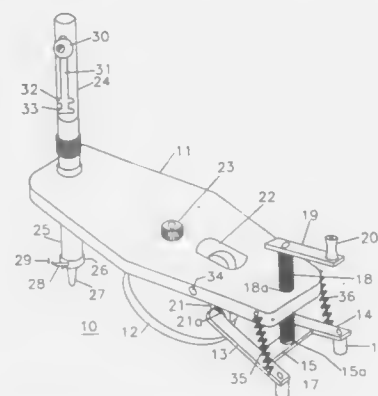
Jimmy R. Dotson, Balch Springs, Tex., assignor to John E. Vandigriff, Lewisville, Tex.

Filed Jun. 14, 1989, Ser. No. 366,757

Int. Cl.<sup>5</sup> B32B 35/00

U.S. Cl. 264—36

16 Claims



1. A method for repairing chips and cracks in windshields by injecting a repair chemical into the chip or crack that cures to a clear state, comprising the steps of:  
affixing an apparatus holding an injector mechanism firmly against the windshield such that an end of the injector covers the chip or crack;  
filling the injector with the repair chemical;  
heating the repair chemical to a temperature from about 75° F. to about 150° F. prior to injecting it into the chip or crack;  
injecting the repair chemical into the chip or crack; and  
maintaining pressure on the repair chemical for a period of time to ensure that repair chemical has completely filled the chip or crack.

4,954,301

## TRANSFER MOLDING PROCESS AND AN APPARATUS FOR THE SAME

Junichi Saeki; Aizo Kaneda, both of Yokohama, and Kunihiro Nishi, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 153,608, Feb. 8, 1988, abandoned. This application Jul. 12, 1989, Ser. No. 378,505

Claims priority, application Japan, Feb. 25, 1987, 62-40169

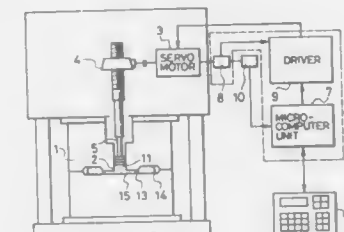
Int. Cl.<sup>5</sup> B29C 45/2, 45/76

U.S. Cl. 264—40.1

17 Claims

1. A transfer molding process for sealing an electronic device in a resin by driving a plunger downward in a pot to inject molten resin into a cavity of a mold, characterized in that a rotary motion of an output shaft of an electric motor is trans-

mitted to the plunger to drive the plunger downward after said rotary motion is converted into a linear motion, that the electric motor is controlled by a control means, the control means having stored therein primary and secondary maximum currents as upper limits of current to be supplied to the electric motor, and that the current supplied to the electric motor is



changed from the primary maximum current to the secondary maximum current, at a predetermined displacement of the plunger, before the cavity of the mold is filled completely with the molten resin, the changing from the primary maximum current to the secondary maximum current being controlled by a displacement detecting means detecting displacement of the plunger.

4,954,302

## PROCESS FOR CONTROLLING QUALITY OF YARNS

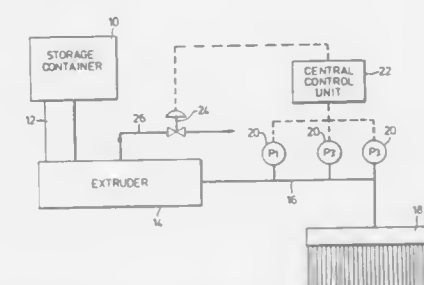
Ernest K. A. Marchildon; Douglas W. Muzyka, and Michel M. Dumoulin, all of Kingston, Canada, assignors to Du Pont Canada, Inc., Mississauga, Canada

Filed Aug. 31, 1988, Ser. No. 238,507

Int. Cl.<sup>5</sup> D01F 1/02, 6/58

U.S. Cl. 264—40.1

4 Claims



1. A process for controlling the relative viscosity of synthetic yarns made from polymer during production thereof by controlling the water content of the polymer comprising the steps of:

taking at least three pressure measurements at at least three spaced locations in a transfer line for carrying polymer between a melting zone and a spinneret;  
measuring temperature and throughput of polymer in said transfer line;  
calculating an estimated relative viscosity of yarn produced by employing the equation:

$$RV = \left[ \frac{(AdP1 + BdP2 + C)}{(THPT \cdot T_{corr})} \right]^{(1/3.5)}$$

wherein:

A, B and C=constants

RV=throughput of polymer

THPT=P1 - P2

dP1=P3 - P2

P1, P2, P3=pressure measurements taken

$T_{corr}$  = temperature correction factor  
=  $\exp(-Ea/RT)$

wherein:

Ea=activation energy for viscosity

R=ideal gas constant

T=absolute temperature of process; and

adjusting the water content of the polymer in response to deviations in the estimated relative viscosity of said yarn from a desired relative viscosity of said yarn.

4,954,303

## APPARATUS AND PROCESS FOR DEVOLATILIZATION OF HIGH VISCOSITY POLYMERS

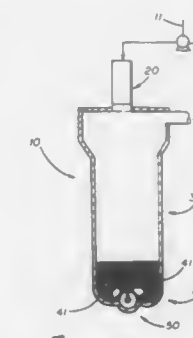
Eugene R. Moore, and Tom E. Wessel, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 10, 1989, Ser. No. 308,720

Int. Cl.<sup>5</sup> B29C 47/00, 47/76

U.S. Cl. 264—101

40 Claims



1. An apparatus for devolatilizing polymeric materials containing volatile constituents comprising, in combination:

a vertically disposed heating zone, said heating zone having an inlet means for receiving a stream of polymeric material, means for heating polymeric material within said zone and an outlet means for discharging polymer from said heating zone;

a vertically disposed vacuum zone having an upper half and a bottom half, the upper half of said vacuum zone being in open communication with said heating zone and being adapted to receive heated polymer from said heating zone, said upper half of said vacuum zone having a means for withdrawing volatile constituents from said vacuum zone;

a vertically disposed low shear mixing means located in the bottom half of said vacuum zone and being adapted to receive and agitate polymeric material within said vacuum zone; and

a vertically disposed discharge means, said discharge means being in open communication with said low shear mixing means and being adapted to receive devolatilized polymeric material from said low shear mixing means and to discharge devolatilized material from said apparatus.

21. A method for devolatilizing polymeric material containing volatile constituents comprising:

introducing a stream of polymeric material containing volatile impurities into a vertically disposed heating zone;

raising the temperature of said stream of polymeric material during its residence in said heating zone;

gravitationally passing said heated stream of polymeric material to a vertically disposed vacuum zone having an upper half and a lower half, and including a volatile constituent withdrawal means located in said upper half of said vacuum zone for withdrawing volatile constituents from said vacuum zone and a vertically disposed low shear mixing means located in said bottom half of said



vacuum zone and mixing under conditions of low shear said polymeric material in said vacuum zone to separate volatile constituents from said polymeric material during its residence in said devolatilizing zone; withdrawing separated volatile constituents from said vacuum zone through said volatile constituent withdrawal means; and discharging said devolatilized polymeric material from said vacuum zone.

#### 4,954,304 PROCESS FOR PRODUCING PREPREG AND LAMINATED SHEET

Toshikazu Ohtake; Munekazu Hayashi; Satoshi Idemura; Kazumi Ohi, and Yuji Kunitake, all of Chiba, Japan, assignors to Dainippon Ink and Chemical, Inc., Tokyo, Japan  
Filed Mar. 31, 1989, Ser. No. 331,144

Claims priority, application Japan, Apr. 4, 1988, 63-81329; Sep. 12, 1988, 63-227784; Sep. 26, 1988, 63-240462  
Int. Cl.<sup>5</sup> B29C 67/12

U.S. Cl. 264—137 19 Claims  
1. A process for producing a prepreg comprising impregnating a fibrous base with an impregnating resin composition consisting essentially of (A<sub>1</sub>) a room temperature liquid epoxy resin, (A<sub>2</sub>) an epoxy resin curing agent having an average epoxy equivalent of from 100 to 400, a resin containing a polymerizable unsaturated group, (B<sub>1</sub>) a room temperature liquid polymerizable vinyl monomer having 4 to 18 carbon atoms, (B<sub>2</sub>) a polymerizable initiator and containing no solvent other than said polymerizable vinyl monomer (B<sub>2</sub>), to obtain an impregnated base, and then removing the polymerizable vinyl monomer present in said impregnated base and converting the resin components to the B-stage.

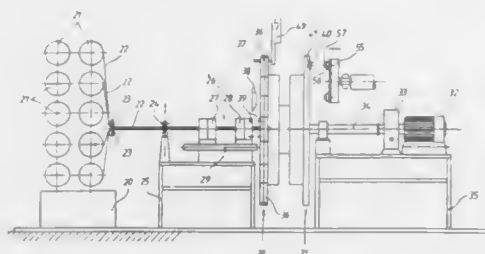
#### 4,954,305 PROCESS AND APPARATUS FOR PRODUCING PLASTIC BRISTLE ARTICLES

Georg Weihrach, Wald-Michelbach, Fed. Rep. of Germany, assignor to Coronet-Werke Heinrich Schlerf GmbH, Wald-Michelbach, Fed. Rep. of Germany  
Filed May 27, 1988, Ser. No. 199,905

Claims priority, application Fed. Rep. of Germany, Jun. 5, 1987, 3718811

Int. Cl.<sup>5</sup> B29C 65/02; B29L 31/42

U.S. Cl. 264—157 10 Claims



1. Process for the production of plastic bristle articles comprising a bristle carrier and bristles, the process comprising the steps of, on a first movement path in respective stations, clamping the bristles in a number and arrangement corresponding to the bristle occupancy of the finished bristle article by means of clamping devices which move the bristles, and melting the clamped bristles at the end thereof to be joined to the bristle carrier, and concurrently on a second movement path in respective station, holding the bristle carriers by means of holders which are moved with the bristle carriers, and melting the bristle carriers at least zonely at their side for receiving the bristles, the bristles and bristle carriers being timed between the stations on the respective movement paths and brought together in the still plastic state and fused, wherein in said step

of bringing the bristles and bristle carriers together one of the clamping devices with the bristles and the holders with the bristle carriers are moved from one movement path to the other at a transfer station at the start of a transfer and cooling section, the brought together clamped bristles and held bristle carriers with their respective clamping devices and holders are moved together along said other movement path in said transfer and cooling section, and at the end of the transfer and cooling section the bristles are detached from the clamping devices and said one of the clamping devices and the holders are returned to their respective movement path.

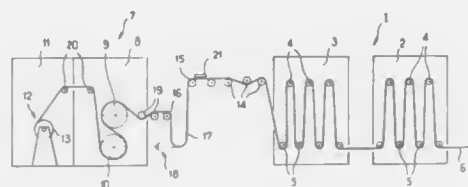
#### 4,954,306 METHOD AND DEVICE FOR THE MANUFACTURE OF A SHEET OF POLYVINYL BUTYRAL

Bernard Jamet, Compiègne, France, assignor to Saint-Gobain Vitrage, Courbevoie, France

Filed Oct. 26, 1988, Ser. No. 262,783

Claims priority, application France, Oct. 26, 1987, 87 14764  
Int. Cl.<sup>5</sup> B29C 47/88

U.S. Cl. 264—210.2 13 Claims



1. A method for manufacturing a sheet of polyvinylbutyral to be used in laminated glazings, comprising extruding a sheet of polyvinylbutyral, subjecting said extruded sheet to a humid atmosphere at elevated temperature to relax said sheet by passing it through said atmosphere while stretching it between roller means, allowing the sheet to form a first free loop immediately before passing said sheet through cooling means, the cooling means fixing the properties of said sheet, and forming a roll of said sheet under tension on roller means.

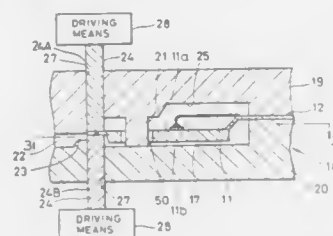
#### 4,954,307 METHOD FOR MANUFACTURING PLASTIC ENCAPSULATED ELECTRONIC SEMICONDUCTOR DEVICES

Takaaki Yokoyama, Niiza, Japan, assignor to Sanken Electric Co., Ltd., Saitama, Japan

Filed Dec. 28, 1988, Ser. No. 291,065

Claims priority, application Japan, Dec. 31, 1987, 62-336561  
Int. Cl.<sup>5</sup> B29C 45/02, 45/14

U.S. Cl. 264—272.15 13 Claims



1. A method for manufacturing plastic encapsulated electronic devices comprising the steps of:  
a. preparing a lead frame assembly and a mold assembly, the lead frame assembly including a support pad and external leads at least one of which is connected to one end of the support pad, the support pad having a first main surface on which an electronic element or a printed circuit substrate is deposited, the mold assembly including a mold cavity

and a gate formed at a side surface of the mold cavity, the mold assembly having slidable means movable toward and away from the mold cavity in the vicinity of the side surface of the mold cavity;  
b. disposing the lead frame assembly in the mold assembly so that the other end of the support pad is positioned opposed to the side surface of the mold cavity; then, clamping the external leads by the mold assembly, and clamping the support pad by the slidable means so that a second main surface of the support pad is positioned in spaced relation to a corresponding surface of the mold cavity so that the gate is partially covered by the slidable means;  
c. injecting fluid plastic encapsulating material through the gate into the mold cavity until more than half volume of the mold cavity is filled with the fluid plastic encapsulating material;  
d. moving the slidable means away from the support pad to fully open the gate;  
e. further injecting plastic encapsulating material through the gate into the remainder of the mold cavity including the space formed by movement of the slidable means, thereby causing the plastic encapsulating material to encapsulate the entire surface of the support pad.

#### 4,954,308 RESIN ENCAPSULATING METHOD

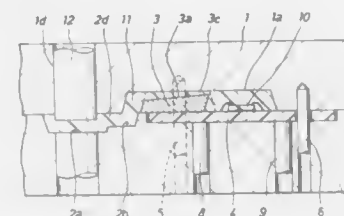
Isao Yabe, Tokorozawa; Katsuji Komatsu, Kawagoe, and Hiroyuki Kaneko, Hoya, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Dec. 27, 1988, Ser. No. 290,227

Claims priority, application Japan, Mar. 4, 1988, 63-50738; Mar. 15, 1988, 63-59409

Int. Cl.<sup>5</sup> B29C 45/02, 45/14

U.S. Cl. 264—272.17 6 Claims



1. A method of resin encapsulating an electronic part mounted on a flat resin circuit board having metallic wiring thereon, the method comprising the steps of:  
sandwiching said circuit board between a first mold and a second mold so as to position said electronic part in a cavity formed by at least the first mold wherein said electronic part is disposed within said cavity;  
selecting a gate plate having a gate groove formed on one surface thereof;  
arranging said gate plate adjacent to said cavity on an intermediate portion of a surface of the circuit board, the intermediate portion being spaced from the edge of the circuit board;  
orienting said gate plate such that said gate groove faces a surface of said mold opposite the surface on which said circuit board is disposed and forming a side gate between said first mold and said gate groove, thereby connecting said side gate to a side surface of said cavity at a position spaced from an upper surface of said circuit board; and filling said cavity with resin through said side gate.

#### 4,954,309 METHOD OF FORMING A POLYMERIC CASING WITH TEXTURED SURFACE

Mark W. McGlothlin, and Alice A. DePaul, both of San Diego, Calif., assignors to Apex Medical Technologies, Inc., San Diego, Calif.

Continuation-in-part of Ser. No. 148,788, Jan. 27, 1988, abandoned. This application Oct. 20, 1988, Ser. No. 260,157  
Int. Cl.<sup>5</sup> B29C 41/00

U.S. Cl. 264—307 36 Claims  
1. A method for the manufacture of a polymeric casing of preselected shape having a lubricous surface, said method comprising:  
(a) immersing a form of said preselected shape in a solution of a solid-polymer-forming material dissolved in a first liquid;  
(b) withdrawing said form from said solution to retain a liquid film thereof on said form;  
(c) contacting said film with a second liquid which is miscible in all proportions with said first liquid and in which said solid-polymer-forming material is substantially insoluble;  
(d) converting said solid-polymer-forming material to a solid polymer film over said form with a matte surface; and  
(e) removing said solid polymer film from said form.

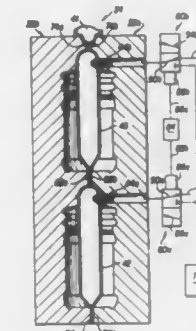
#### 4,954,310 TANDEM MOLDING OF PLASTIC CONTAINERS

Jorn W. Andersen, Newburgh, Ind., assignor to Ball Corporation, Muncie, Ind.

Continuation of Ser. No. 106,306, Oct. 9, 1987, abandoned. This application Jul. 14, 1989, Ser. No. 379,720

Int. Cl.<sup>5</sup> B29C 49/04, 49/36, 49/60, 49/78

U.S. Cl. 264—520 1 Claim



1. A method for molding plastic containers in a tandem mold which method comprises:  
a. Providing a plastic tubing parison that includes a first portion, and a second portion that has been extruded subsequent to said first portion and that is at a higher average temperature than said first portion;  
b. simultaneously enclosing said first portion in a first container cavity of said mold and said second portion in a second container cavity of said mold;  
c. pneumatically isolating said first portion of said parison from said second portion;  
d. inserting a first blow needle into said first portion and inserting a second blow needle into said second portion;  
e. communicating pressurized air to said first blow needle while isolating said pressurized air from said second blow needle, thereby forming a first container form said first portion;  
f. cooling said second portion; and  
g. communicating pressurized air to said second blow needle, thereby forming a second container from said second portion subsequent to said cooling step.

4,954,311

**CONTROL ROD HOUSING ALIGNMENT**

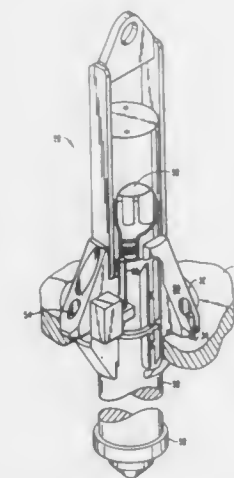
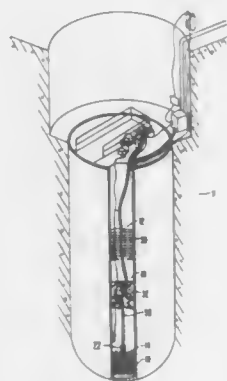
Robert C. Dixon, Morgan Hill; Gerald A. Deaver; James R. Patches, both of San Jose; Guy E. Singleton, Fremont; John G. Erbes, San Jose, and Henry P. Offer, Los Gatos, all of Calif., assignors to General Electric Company, San Jose, Calif.

Filed Jan. 10, 1989, Ser. No. 295,413

Int. Cl.<sup>5</sup> G21C 17/00

U.S. Cl. 376—258

3 Claims



1. A process for measuring the vertical alignment between a hole in a core plate and the top of a corresponding control rod drive housing within a boiling water reactor including the steps of:

- providing an alignment apparatus, said alignment apparatus including a lower end for fitting to the top of said control rod drive housing;
- an upper end for fitting to the aperture in said core plate, and a leveling means attached to said alignment apparatus to read out the difference in angularity with respect to gravity, and alignment pin registering means for registering to the alignment pin on said core plate;
- lowering said alignment device on a depending support through a lattice position in the top guide through said hole in said core plate down into registered contact with the top of said control rod drive housing;
- registering said upper end to the sides of said hole in said core plate;
- registering said alignment pin registering means to an alignment pin on said core plate to impart to said alignment device the required angularity; and
- reading out the angle of said control rod drive housing with respect to the hole in said core plate through said leveling devices whereby the angularity of the top of said control

rod drive housing with respect to the hole in said core plate can be determined.

4,954,312

**REMOTELY INSTALLED STEAM GENERATOR NOZZLE DAM SYSTEM**

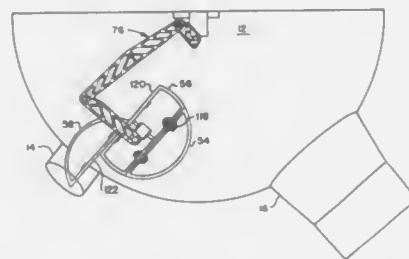
Francis X. McDonald, Enfield; Eric M. Weisel, Windsor Locks, and Glen E. Schukel, South Windsor, all of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Dec. 15, 1988, Ser. No. 285,056

Int. Cl.<sup>5</sup> G21C 13/06; B21D 53/00

U.S. Cl. 376—260

10 Claims



3. A method for remotely installing a dam unit in a nozzle or a nuclear steam generator head, the head including a manway, comprising the steps of:

- (a) mounting an articulated manipulator to an internal surface of the head, the manipulator having a free end which carries a jaw member;
- (b) positioning the manipulator so that the jaw member is adjacent the manway and substantially on the manway axis;
- (c) passing a first dam segment through the manway and attaching the jaw member to the first segment;
- (d) positioning the manipulator so that the jaw member holds the first dam segment on one side of the manway axis;
- (e) passing a second dam segment through the manway into engagement with the first dam segment to form a dam subassembly;
- (f) translating the manipulator through the head until the dam subassembly is adjacent the nozzle;
- (g) advancing the jaw member toward the nozzle until the dam subassembly is positioned substantially at the desired location of the dam unit with respect to the nozzle; and
- (h) deploying the manipulator to install dam support structure between the dam subassembly and the steam generator, thereby forming an installed dam unit.

4,954,313

**METHOD AND APPARATUS FOR FILLING HIGH DENSITY VIAS**

John F. Lynch, Half Moon Bay, Calif., assignor to Amdahl Corporation, Sunnyvale, Calif.

Filed Feb. 3, 1989, Ser. No. 306,623

Int. Cl.<sup>5</sup> B22F 3/00, 7/00

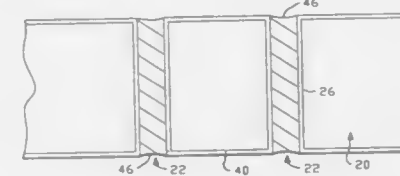
U.S. Cl. 419—9

19 Claims

1. A method for filling high density vias in a substrate, comprising the steps of:

- (a) providing a metal paste on a first surface of the substrate;

(b) applying a vacuum to each via at the second surface of the substrate; and



(c) applying pressure to the metal paste on the first surface of the substrate concurrently with said step (b).

4,954,314

**METHOD AND APPARATUS FOR MANUFACTURING SYNTHETIC PRODUCTS**

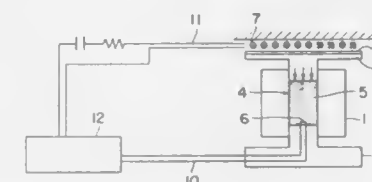
Yukio Nishiyama; Junzo Fujioka, both of Akashi; Haruki Hino; Yuji Matsuzaki, both of Kobe; Masayuki Sakiyama, Ono, and Minoru Yokoyama, Akashi, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Feb. 7, 1990, Ser. No. 476,544

Int. Cl.<sup>5</sup> B22F 3/00

U.S. Cl. 419—45

3 Claims



- 1. A method of manufacturing synthetic products comprising the steps of:
  - mixing a plural number of types of material powders; causing a self-exothermic reaction continuously inducing chemical reactions between the material powders caused by heat of reaction released when the mixed material powders synthesize; and
  - pressing the synthesized material at high temperature by utilizing an electromagnetic force just after the finish of the self-exothermic reaction.

4,954,315

**METHOD FOR RECOVERY OF STERILIZING GAS**

Sudhir R. Brahmabhatt, Macungie, Pa., assignor to MG Industries, Valley Forge, Pa.

Filed Feb. 3, 1988, Ser. No. 151,878

Int. Cl.<sup>5</sup> A61L 2/00; F25J 3/00

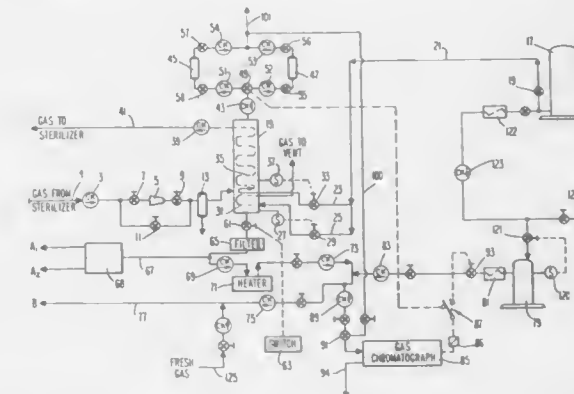
U.S. Cl. 422—31

12 Claims

4. A method for recovery of a sterilizing gas, the sterilizing gas including a sterilizing agent and a relatively inert diluent, the sterilizing gas having been discharged from a sterilizing chamber, the method comprising the steps of:

- (a) cooling a sterilizing gas, to a temperature sufficient to liquefy a sterilizing agent and a diluent gas so as to produce a liquid mixture of the sterilizing agent and the diluent, but not sufficient to liquefy other gaseous impurities mixed with the sterilizing gas;
- (b) venting the gaseous impurities remaining after the cooling step;
- (c) vaporizing the mixture of sterilizing agent and diluent;
- (d) adjusting the proportion of sterilizing agent in the vaporized mixture by adding more sterilizing agent, and

(e) returning the vaporized mixture to the sterilizing chamber,



wherein all steps of the method are performed repeatedly without adding additional diluent only.

4,954,316

**STABLE, ACTIVE CHLORINE CONTAINING ANTI-MICROBIAL COMPOSITIONS**

Alfred R. Globus, 26-53 210th St., Bayside, N.Y. 11365  
Continuation-in-part of Ser. No. 116,203, Oct. 3, 1987, abandoned. This application Dec. 22, 1988, Ser. No. 288,241  
Int. Cl.<sup>5</sup> A61L 218/00

U.S. Cl. 422—37

11 Claims

- 1. An antimicrobial composition, in the form of a dry free flowing powder comprising
  - (a) a chlorinated isocyanuric acid or its salt,
  - (b) ammonium perfluoroalkylpercarboxylate, as surfactant
  - (c) potassium chloride, and
  - (d) potassium monohydrogen phosphate,
 wherein the last two mentioned components are present in the form of potassium chloride particles, the preponderance of which have a mesh size of about -100 to +325 coated over with the potassium monohydrogen phosphate.

4,954,317

**BLOOD OXYGENATOR**

Donald A. Raible, Santa Ana, Calif., assignor to Baxter International, Inc., Deerfield, Ill.

Continuation of Ser. No. 230,657, Aug. 9, 1988, abandoned, which is a continuation of Ser. No. 646,026, Aug. 29, 1987, abandoned, which is a continuation of Ser. No. 689,971, May 26, 1976, Pat. No. 4,268,476, which is a continuation-in-part of Ser. No. 584,464, Jun. 6, 1975, abandoned. This application Aug. 23, 1989, Ser. No. 399,424

The portion of the term of this patent subsequent to May 19, 1998, has been disclaimed.

Int. Cl.<sup>5</sup> A61M 1/14

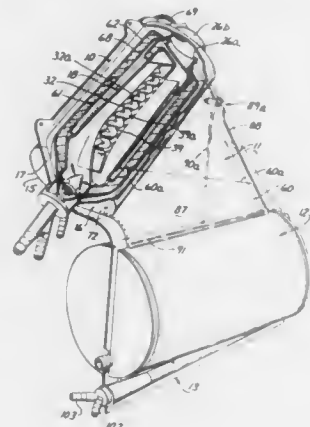
U.S. Cl. 422—46

3 Claims

- 1. A bubble-type oxygenator having therein a bubble column having a first end and a second end, said bubble column being provided with a plurality of segments in end-to-end relationship, at least one of said segments having a serpentine passageway formed therein to promote secondary flow of blood bubbles passing therethrough, said passageway being provided with a plurality of turns so that said blood bubbles are continuously rotated throughout their passage through said passageway.



way, and a heat exchange conduit disposed in effective heat exchange relationship with, but not in, the bubble column of



said oxygenator and in direct contact with the blood flow therefrom.

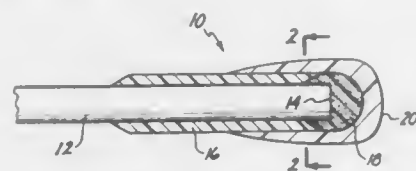
#### 4,954,318 OPTICAL SENSOR

Masao Yafuso, El Toro; Cheng F. Yan, Irvine; Thomas G. Hacker, Anaheim; Henry K. Hui, Irvine; Thomas P. Maxwell, and William W. Miller, both of Santa Ana, all of Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 31, 1987, Ser. No. 91,432  
Int. Cl.<sup>5</sup> G01N 21/77

U.S. Cl. 422-59

25 Claims



1. An apparatus for measuring the concentration of a component in a medium comprising:  
optical sensor means including at least one optical indicator, which optical indicator provides an optical signal which varies according to the concentration of a component in a medium;  
optical signal receiving means for receiving said optical signal from said optical sensor means; and  
supply means containing additional optical indicator, said supply means being positioned adjacent to said optical sensor means and acting to provide said additional optical indicator to said optical sensor means.

#### 4,954,319 MECHANISM FOR SUPPLYING ANALYTICAL TAPE FOR BIOCHEMICAL ANALYSIS BY PREDETERMINED LENGTH

Takashi Koizumi, and Hideo Ishizaka, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 15, 1988, Ser. No. 284,638  
Claims priority, application Japan, Dec. 16, 1987, 62-318149;  
Dec. 16, 1987, 62-318150

Int. Cl.<sup>5</sup> G01N 35/00

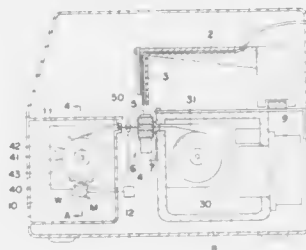
U.S. Cl. 422-67

9 Claims

1. A mechanism for supplying in sequence unused regions of an analytical tape by a predetermined length to an analytical section arranged in an apparatus for biochemical analysis of a

liquid sample wherein application of the liquid sample onto an unused region of the analytical tape, incubation of an applied sample, and photometric measurement of an incubated sample are performed at the analytical section, one end and the unused regions following said end of the analytical tape being encased in a cassette and another end of the analytical tape being encased in another cassette for receiving the used regions of the analytical tape after the photometric measurement is complete, which comprises:

driving means for moving an analytical tape to supply unused regions of the analytical tape to an analytical section;



- detecting means for detecting a length of the unused regions of the analytical tape supplied to the analytical section comprising a roller which is arranged in contact with a surface of the analytical tape so that said roller rotates with movement of the analytical tape for the supply of the unused regions to the analytical section and a means for detecting one of a number of rotations and an angle of a rotation of said roller; and  
controlling means for controlling said driving means according to said one of said detected number of rotations and said angle of said rotation of said roller detected by said detecting means.

#### 4,954,320 REACTIVE BED PLASMA AIR PURIFICATION

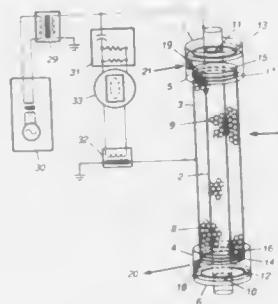
Joseph G. Birmingham, Joppa, and Robert R. Moore, Fallston, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 184,848, Apr. 22, 1988, abandoned. This application Aug. 31, 1989, Ser. No. 401,199

Int. Cl.<sup>5</sup> B01J 19/08

U.S. Cl. 422-186.04

13 Claims



1. A packed, alternating current electrical discharge plasma device to decompose toxic contaminants in air for the purposes of air purification and general toxic and hazardous materials processing, including removal of ozone, carbon monoxide, and nitrogenous oxides from air, comprising:  
(a) a first electrode facing a second electrode;  
(b) a nonconducting packing material in a bed residing between said first and second electrodes;

- (c) an alternating current power supply to include but not limited to a frequency range of 0.5 kilohertz to 40 kilohertz frequency;
- (d) said power supply being connected to a transformer to produce high voltage alternating current to include but not limited to a voltage range of 4 kilovolts to 28 kilovolts;
- (e) said transformer being connected between said first and second electrodes to produce an air plasma throughout a packed bed;
- (f) said power supply, said transformer, said electrodes, and said packing comprising a complex impedance wherein impedance matching is provided;
- (g) said powder supply, said transformer, said electrodes, and said packing comprising a resonant electrical circuit wherein frequency tuning is provided; and
- (h) said plasma with a power density necessary to achieve high decomposition efficiencies of toxic contaminants at both trace and percent concentrations, and flow capacities of 10 CFM or greater.

#### 4,954,321 METHOD AND APPARATUS FOR OZONE GENERATION

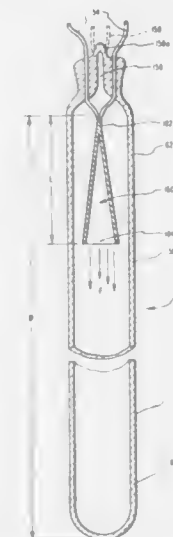
Lonald H. Jensen, Twin Falls, Id., assignor to Scott Jensen Industries, Inc., Salt Lake City, Utah

Continuation-in-part of Ser. No. 317,215, Feb. 24, 1989, abandoned. This application Mar. 24, 1989, Ser. No. 328,485

Int. Cl.<sup>5</sup> B01J 19/08, 19/12

U.S. Cl. 422-186.19

89 Claims



1. An apparatus for use with a source of high energy alternating electric power to generate ozone, said apparatus comprising:  
(a) a first electrode; and  
(b) an insulated second electrode comprising:  
(i) a sealed dielectric envelope having first and second portions, said first portion being positioned remote from said first electrode, and said second portion being positioned proximate to said first electrode, thereby to define between said second portion and said first electrode a reaction space wherein ozone is generated from an oxygen-bearing feed gas; and  
(ii) discharge means for generating electrical phenomena in said dielectric envelope, thereby to generate ozone from the feed gas in said reaction space, said discharge means comprising:  
(A) an inert gas under low pressure filling said dielectric envelope; and  
(B) an electric terminal located in said first portion of said dielectric envelope and being couplable through said dielectric envelope to said first electrode when the source of high energy alternating electric power

is applied between said first electrode and said electric terminal.

#### 4,954,322 PROCESS FOR THE RECOVERY OF METAL VALUES CONTAINED IN A GANGUE

Jean-Michel DeMarthe, Mont Saint Elol, France, assignor to Metaleurop S.A., Fontenay Sous Bois, France

Filed Jul. 27, 1989, Ser. No. 385,456

Claims priority, application France, Jul. 29, 1988, 88 10304  
Int. Cl.<sup>5</sup> C01G 15/00, 17/00, 49/14

U.S. Cl. 423-95

10 Claims

7. Process for the recovery of metal values contained in a ferric gangue, characterized in that it comprises the following stages:

- (a) dissolution of the metal values from the ferric gangue with sulphuric acid;
- (b) recovery of the metal values;
- (c) evaporation of the acid ferric solution resulting from stage (b) so as to increase the acidity to a value of between about 50 and 100% so as to take the ferric iron concentration to a value of between approximately 1M and 2M, the said evaporation being followed by a stage of addition of concentrated sulphuric acid or oleum to adjust the sulphuric acid concentration to a value greater than about 10N;
- (d) crystallization from this solution, at a temperature of between -10° and 50° C., of a hydrated iron sulphate of formula  $\text{Fe}_2(\text{SO}_4)_3 \cdot 9\text{H}_2\text{O}$ .

#### 4,954,323 AOG INCINERATOR NO<sub>x</sub> EMISSION CONTROL VIA NH<sub>3</sub> INJECTION

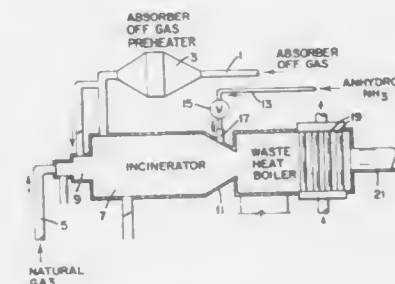
Edward J. Sockell, Port Lavaca, Tex., assignor to The Standard Oil Company, Cleveland, Ohio

Filed Nov. 1, 1988, Ser. No. 265,739

Int. Cl.<sup>5</sup> C01B 21/00

U.S. Cl. 423-235

6 Claims



1. The process for the non-catalytic reduction of the concentration of NO<sub>x</sub> from combustion effluents by means of injecting ammonia into said effluents wherein the process comprises injecting said ammonia tangentially into said effluents through an opening in a venturi, wherein said effluents are experiencing an increased flow velocity within said venturi, and wherein said venturi directly connects a means for incineration to produce said combustion effluents to a means for cooling said combustion effluents.

4,954,324

## METHOD OF BAGHOUSE BROWN PLUME POLLUTION CONTROL

Richard G. Hooper, Littleton, Colo., assignor to NaTec Resources, Inc., Houston, Tex.  
Division of Ser. No. 174,654, Mar. 29, 1988, Pat. No. 4,908,194.  
This application Mar. 10, 1989, Ser. No. 321,308  
Int. Cl.<sup>5</sup> B01J 8/00; C01B 21/00, 17/00

U.S. Cl. 423—239 16 Claims  
1. An SO<sub>x</sub>/NO<sub>x</sub> air pollution control process employing a baghouse to simultaneously control particulate emissions comprising the steps of:

- introducing a sodium-based sorbent into a stream of flue gas from an industrial or utility plant burning fossil fuels or waste to generate electricity, steam or heat, said flue gas containing SO<sub>x</sub> and NO<sub>x</sub> and having a temperature above about 200° F. and below about 700° F.;
- introducing as additives, urea and ammonia into said flue gases in an amount ranging from about 1 to about 25% by weight of said sodium-based sorbent;
- maintaining said sorbent and said additives in contact with said flue gas for a time sufficient to react said sorbent with some of said SO<sub>x</sub> and NO<sub>x</sub> thereby reducing the concentration of said SO<sub>x</sub> and NO<sub>x</sub> in said flue gas;
- said additives, as compared to use of said sorbent without said additives, increasing the percent SO<sub>x</sub> removal and the percent NO<sub>x</sub> removal by said sorbent while suppressing conversion of NO to NO<sub>2</sub> by said sorbent to below about the visible brown plume threshold; and
- collecting said reacted sorbent and additive in a baghouse.

4,954,325

## COMPOSITION OF SYNTHETIC POROUS CRYSTALLINE MATERIAL, ITS SYNTHESIS AND USE

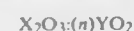
Mae K. Rubin, Bala Cynwyd, Pa., and Pochen Chu, West Deptford, N.J., assignors to Mobil Oil Corp., New York, N.Y.  
Continuation-in-part of Ser. No. 98,176, Sep. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 890,268, Jul. 29, 1986, abandoned. This application Oct. 6, 1988, Ser. No. 254,524

Int. Cl.<sup>5</sup> C01B 33/26

U.S. Cl. 423—328 30 Claims

1. A synthetic porous crystalline material characterized by an X-ray diffraction pattern in its calcined form including values substantially as set forth in Table III of the specification and having equilibrium adsorption capacities of greater than about 10 wt. % for water vapor, greater than about 4.5 wt. % for cyclohexane vapor and greater than about 10 wt. % for n-hexane vapor.

16. A method for preparing a synthetic crystalline material characterized by an X-ray diffraction pattern including values substantially as set forth in Table III of the specification and having equilibrium adsorption capacities of greater than about 10 wt. % for water vapor, greater than about 4.5 wt. % for cyclohexane vapor and greater than about 10 wt. % for n-hexane vapor, said crystalline material having a composition comprising the molar relationship



wherein n is at least about 10, X is a trivalent element and Y is a tetravalent element, said method comprising preparing a reaction mixture capable of forming said material upon crystallization, said reaction mixture containing sufficient amounts of alkali or alkaline earth metal cations, a source of tetravalent Y oxide containing at least about 30 wt. % solid YO<sub>2</sub>, a source of trivalent X oxide, water and hexamethyleneimine, and maintaining said reaction mixture under sufficient crystallization conditions until crystals of said material are formed.

4,954,326

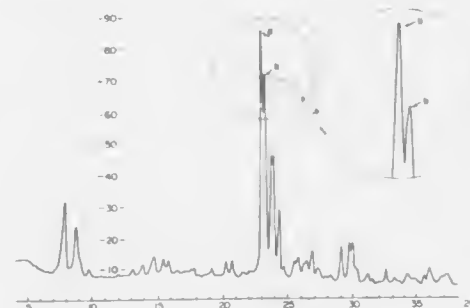
## PREPARATION OF CRYSTALLINE ALUMINOSILICATE ZEOLITE, AND ITS PRODUCT

Tamio Onodera; Tokuji Sakai; Yasuo Yamasaki, and Koji Sumitani, all of Matsuyama, Japan, assignors to Teijin Petrochemical Industries, Ltd., Tokyo, Japan  
Continuation of Ser. No. 891,063, Jul. 31, 1986, abandoned, which is a continuation of Ser. No. 757,928, Jul. 23, 1985, abandoned, which is a continuation of Ser. No. 495,825, May 18, 1983, abandoned. This application Jul. 12, 1989, Ser. No. 380,723

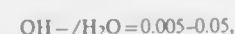
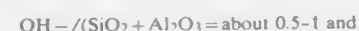
Claims priority, application Japan, May 19, 1982, 57-83240  
Int. Cl.<sup>5</sup> C01B 33/28

U.S. Cl. 423—328

14 Claims



1. A process for producing a crystalline aluminosilicate zeolite characterized by having (a) a silica/alumina mole ratio of from 10 to 100, (b) X-ray lattice distances d shown in Table A of the specification, (c) a specific n-hexane adsorption, as measured on a precisely weighed sample of the zeolite which has been calcined at 450° for 8 hours until the pressure reaches 50±1 mm Hg, and maintained at 20±1° C. for 2 hours of at least 0.07 g/g, (d) a (2-methylpentane/cyclohexane) adsorption ratio of from 1.2 to 1.6, and (e) when the intensity (I<sub>0</sub>) of the X-ray diffraction peak at d(Å)=3.86 is taken as 100, the relative intensity (I/I<sub>0</sub>) of the X-ray diffraction peak at d(Å)=3.83 is at least 70, which comprises maintaining a silica source, an alumina source, and a seed zeolite selected from the group consisting of zeolite ZSM-5 and zeolites having said characteristics (a)-(e) inclusive, specified above, in an aqueous solution containing 1 to 200 millimoles, per gram of said zeolite, of an alkali metal hydroxide, in such proportions that the silica source, the alumina source and the alkali metal hydroxide satisfy the following mole ratios in terms of SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> and OH—:



and under such temperature, pressure and time conditions as to produce a crystalline aluminosilicate zeolite.

4,954,327

## PRODUCTION OF SILICA AEROGELS

David H. Blount, 6728 Del Cerro Blvd., San Diego, Calif. 92120  
Filed Aug. 12, 1988, Ser. No. 231,353

Int. Cl.<sup>5</sup> C01B 33/12; B01J 13/00; C03C 3/00

U.S. Cl. 423—338

6 Claims

1. The process for the production of silica aerogels which consists of foaming, mixing and reacting the following components in water:

- oxidized silicon compound selected from the group consisting of alkali metal silicates, alkaline earth metal silicates, silicate minerals, silicic acid sol, aqueous suspension

- colloidal silica and mixtures thereof, in the amount of 50 to 100 parts by weight;
- salt forming compound selected from the group consisting of mineral acid, organic acids and mixtures thereof, in the amount of 1 to 10 parts by weight; and
- gas selected from the group consisting of air, nitrogen, hydrogen, oxygen, organic gases and mixtures thereof, in the amount of 1 to 10 parts by weight to produce a foamed silica gel, the foamed silica gel is then dried.

4,954,328

## SYNTHESIS OF HYDROXYLAMINE SALTS

Kerry L. Wagaman, Clinton, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 28, 1983, Ser. No. 470,812

Int. Cl.<sup>5</sup> C01B 21/14

U.S. Cl. 423—386

14 Claims

1. A method for preparing a hydroxylamine acid salt which comprises:  
preparing a slurry of hydroxylamine sulfate in an alcohol at a temperature not in excess of about 60° C.;  
high-shear mixing sodium alkoxide with said slurry to form a hydroxylamine-alcohol solution and sodium sulfate while maintaining the temperature of said slurry at or below 60° C.;  
removing sodium sulfate;  
agitating said solution;  
admixing an acid selected from the group consisting of perchloric acid and nitric acid with said solution at a temperature not in excess of about 55° C. to form said hydroxylamine acid salt; and  
recovering said hydroxylamine acid salt.

4,954,329

## PROCESS AND APPARATUS FOR PREPARATION OF FINELY GRAINED LEAD AZIDE

Botho Klossner, Hilterfingen, and Paul Lörtscher, Brenzikofen, both of Switzerland, assignors to Schweizerische Eidgenossenschaft, Thun, Switzerland

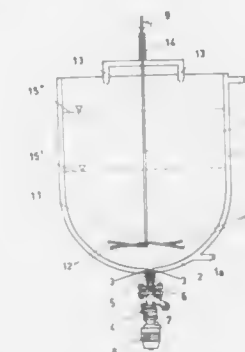
Filed Jul. 17, 1989, Ser. No. 380,303

Claims priority, application Switzerland, Jul. 28, 1988, 02882/88

Int. Cl.<sup>5</sup> C01B 21/08

U.S. Cl. 423—410

5 Claims



1. A process for the preparation of finely grained lead azide, in which aqueous solutions of lead nitrate and sodium azide are stirred in a vessel at constant temperature, characterized in that in a first process step the aqueous solution of lead nitrate and an aqueous solution of sodium citrate are poured into the vessel wherein the weight of sodium citrate is about 0.32% the weight of the lead nitrate; in a second process step, the aqueous solution of sodium azide is dosed into the vessel over a period of time of 30 to 40 minutes; the aqueous solutions poured into

the vessel are stirred at a peripheral stirring speed of between 0.2 m/sec and 1.0 m/sec, and the constant temperature is maintained with a range of 50° C. to 80° C.

4,954,330

## PROCESS FOR PURIFYING HYDROGEN FLUORIDE

William C. Ziegenhain, Ponca City, Okla., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.

Filed Nov. 30, 1989, Ser. No. 443,373

Int. Cl.<sup>5</sup> C01B 7/19; C01G 28/00; B01D 3/34

U.S. Cl. 423—484

8 Claims

1. A process for purifying anhydrous hydrogen fluoride comprising the steps of:

- contacting anhydrous hydrogen fluoride containing trivalent arsenic impurities with an effective amount of hexavalent chromium oxide and oxygen to oxidize substantially all of said trivalent arsenic to pentavalent arsenic; and
- distilling the resulting mixture, thus recovering anhydrous hydrogen fluoride with reduced levels of impurities.

4,954,331

## SULFUR RECOVERY PROCESS USING METAL OXIDE ABSORBENT

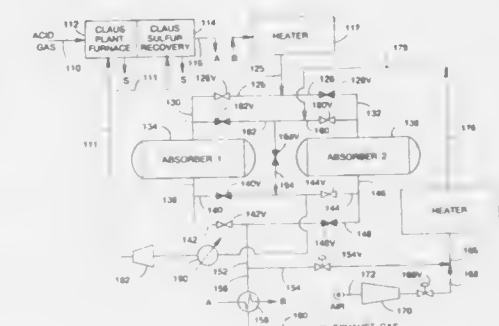
Min-Hsiun Lee, and Paul T. Pendergraft, both of Tulsa, Okla., assignors to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 195,426, May 11, 1988, abandoned, which is a continuation of Ser. No. 893,111, Aug. 4, 1986, abandoned. This application Jan. 10, 1989, Ser. No. 296,294  
The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B01D 53/34; C01B 17/04

U.S. Cl. 423—574 R

11 Claims



1. In a process for the recovery of sulfur comprising (a) introducing a H<sub>2</sub>S containing stream into a Claus plant producing Claus plant effluent; (b) during an absorption period introducing Claus plant effluent into a first absorption zone containing ZnO absorbent and reacting at least H<sub>2</sub>S with ZnO producing sulfided absorbent ZnS and absorber effluent; and (c) concurrently introducing O<sub>2</sub> and a fraction of first absorption zone effluent into a second absorption zone regenerating ZnS to ZnO and returning effluent to the Claus plant, the improvement comprising:

- lengthening the absorption period in the first absorption zone by introducing a feed consisting of Claus plant effluent having H<sub>2</sub>S:SO<sub>2</sub> in a 2:1 molar ratio into at least one Claus catalytic reaction zone operated under conditions including temperature effective for depositing a preponderance of sulfur formed on Claus catalyst to thereby produce effluent provided to the first absorption zone having a reduced content of sulfur compounds relative to Claus plant effluent;
- decreasing rate of return of effluent to the Claus plant due to (i) a reduced content of sulfur compounds in feed provided to the first absorption zone resulting from step



(1) combined with (ii) a reduced fraction of absorber effluent being provided to the second absorption zone regenerating ZnS to ZnO, said reduced fraction being less than 20% of the absorber effluent, and lengthening the regeneration period in the second absorption zone correspondingly to the lengthened absorption period in the first absorption zone and concurrently introducing O<sub>2</sub> in minimum amounts necessary for complete regeneration of ZnS to ZnO in the lengthened regeneration period.

**4,954,332**  
**PHOTOPROTECTION COMPOSITIONS COMPRISING TOCOPHEROL SORBATE AND AN ANTI-INFLAMMATORY AGENT**

Donald L. Bissett, Hamilton; Rodney D. Bush, Cincinnati, and Ranjit Chatterjee, Fairfield, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio  
Division of Ser. No. 112,575, Oct. 22, 1987, Pat. No. 4,847,071.  
This application Jun. 26, 1989, Ser. No. 346,435  
Int. Cl.<sup>5</sup> A61K 7/027, 7/106, 7/42, 9/12

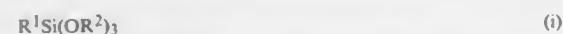
U.S. Cl. 424—59 20 Claims  
1. A photoprotective composition useful for topical application comprising:

- a safe and photoprotectively effective amount of a radical scavenging compound selected from the group consisting of tocopherol and tocopherol esters selected from acetate, succinate, propionate, oleate, orotate, benzoate, p-aminobenzoate, p-nitrobenzoate, linoleate, nicotinate, 2-ethylhexanoate and sorbate, and mixtures thereof;
- a safe and photoprotectively effective amount of an anti-inflammatory agent selected from the group consisting of a steroidal anti-inflammatory agent; a non-steroidal anti-inflammatory agent selected from the group consisting of the oxycams, the salicylates, the acetic acid derivatives, the fenamates, the propionic acid derivatives, the pyrazoles, the 2,6-di-tert-butyl phenol derivatives, and the 2-naphthyl-containing ester compounds; and a natural anti-inflammatory agent selected from the group consisting of candelilla wax, alpha bisabolol, *Aloe vera*, Manjistha, and Guggal;
- a safe and photoprotectively effective amount of a sunscreensing agent; and
- a safe and effective amount of a topical carrier.

**4,954,333**  
**TRANSPARENT ANTIPERSPIRANT COMPOSITIONS AND METHOD OF PREPARATION**  
Andrew H. Ward, Midland County, Mich., assignor to Dow Corning Corporation, Midland, Mich.  
Filed Jan. 31, 1989, Ser. No. 304,075  
Int. Cl.<sup>5</sup> A61K 7/32, 7/34, 7/36, 7/38

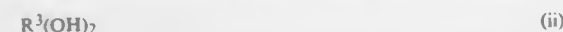
U.S. Cl. 424—66 9 Claims

1. A transparent antiperspirant composition comprising:
  - from 5 to 30 wt. % of the reaction product of:
    - 5 to 15 parts by weight of an antiperspirant salt selected from the group consisting of the hydrated chlorine salts of aluminum, zirconium and zinc, the hydrated bromine salts of aluminum, zirconium and zinc and mixtures thereof; and
    - 1 part by weight of a silane of the formula:



wherein R<sup>1</sup> represents a member of the group consisting of alkyl groups of from C<sub>2</sub> to C<sub>5</sub>, and aryl groups of from C<sub>6</sub> to C<sub>18</sub>, and R<sup>2</sup> represents an alkyl group of from C<sub>1</sub> to C<sub>5</sub>;

- from 60 to 95 wt. % of a polyol having the formula:



wherein R<sup>3</sup> represents an alkyl group of from C<sub>2</sub> to C<sub>6</sub>.

**4,954,334**  
**FOOT POWDER COMPOSITION**  
Monroe S. Pugh, and Robert L. Pugh, both of Rte. 1, Box 48, Mouth of Wilson, Va. 24363  
Continuation-in-part of Ser. No. 2,560, Jan. 12, 1987, abandoned. This application Jan. 12, 1989, Ser. No. 296,483  
Int. Cl.<sup>5</sup> A61K 7/38

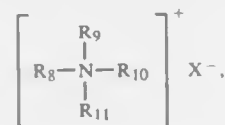
U.S. Cl. 424—68 4 Claims  
1. A composition for suppressing perspiration of the feet consisting essentially of boric acid powder and aluminum ammonium sulfate powder, said powders each being present to the extent of 40% to 60% by weight of the composition, said aluminum ammonium sulfate being characterized in that its two percent aqueous solutions will have a pH between 3.4 and 3.5, a two percent aqueous solution of the composition having a pH between 3.5 and 3.6.

**4,954,335**  
**CLEAR CONDITIONING COMPOSITION AND METHOD TO IMPART IMPROVED PROPERTIES TO THE HAIR**  
Ben Janchipraponvej, Niles, Ill., assignor to Helene Curtis, Inc., Chicago, Ill.

Filed May 31, 1989, Ser. No. 359,483  
Int. Cl.<sup>5</sup> A61K 7/075

U.S. Cl. 424—070 35 Claims

1. A hair-conditioning composition comprising:
  - from about 0.5% to about 5% by weight of a quaternary ammonium compound, wherein the quaternary ammonium compound has a general structure:



wherein R<sub>8</sub> is an alkyl group including from about 8 to about 22 carbon atoms; R<sub>9</sub> is selected from the group consisting of an alkyl group including from about 8 to about 22 carbon atoms, a hydrogen atom, a methyl group, an ethyl group, a hydroxymethyl group and a hydroxyethyl group; R<sub>10</sub> is selected from the group consisting of a benzyl group, a hydrogen atom, a methyl group, an ethyl group, a hydroxymethyl group and a hydroxyethyl group; R<sub>11</sub> is selected from the group consisting of a hydrogen atom, a methyl group, an ethyl group, a hydroxymethyl group and a hydroxyethyl group; and X is selected from the group consisting of chloride, bromide, methosulfate, ethosulfate, tosylate, acetate, phosphate and nitrate;

- from about 0.1% to about 5% by weight of an amidoamine compound, wherein the amidoamine compound has a general structure:



wherein R<sub>1</sub> is a fatty acid chain containing from about 11 to about 21 carbon atoms; R<sub>2</sub> is an alkylene group containing from two to about four carbon atoms; R<sub>3</sub> is hydrogen, a methyl group an ethyl group or a hydroxyalkylene group containing from one to about three carbon atoms; R<sub>4</sub> is a methyl group, an ethyl group or a hydroxyalkylene group containing from one to about three carbon atoms; and Y is an organic heterocyclic nitrogen-containing moiety;

- from about 0.5% to about 5% by weight of a volatile conditioning agent selected from the group consisting of a linear polydimethylsiloxane having a viscosity at 25° C. in the range from about 0.5 centistokes to about 5 centistokes and a boiling point at atmospheric pressure ranging from

about 100° C. to about 250° C., a cyclic polydimethylsiloxane having a viscosity at 25° C. of from about 2 centistokes to about 6 centistokes and a boiling point at atmospheric pressure ranging from about 150° C. to about 250° C., an aliphatic hydrocarbon having from about 10 carbon atoms to 26 carbon atoms and a boiling point at atmospheric pressure in the range of from about 100° C. to about 300° C., and mixtures thereof;

- from about 1% to about 10% by weight of a nonionic surfactant capable of solubilizing the volatile conditioning agent;
- from about 10% to about 30% by weight of a polyhydric alcohol selected from the group consisting of glycols, triols, polyols and mixtures thereof; and
- a suitable liquid vehicle; wherein the weight ratio of the nonionic surfactant to the volatile conditioning agent is at least 1 to 1 and the pH of the composition is in the range of from about 4 to about 7.

**4,954,336**  
**NON-AEROSOL PUMP HAIR SPRAY COMPOSITIONS**  
Jui-Chang Chuang, Wayne; Edward Walls, Jr., Cranford; Stephen C. Johnson, Newton, and Mohammed Tazi, Wayne, all of N.J., assignors to GAF Chemicals Corporation, Wayne, N.J.

Filed May 22, 1989, Ser. No. 354,870  
Int. Cl.<sup>5</sup> A61K 7/11

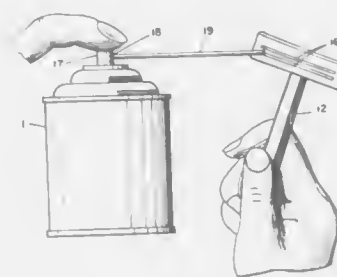
U.S. Cl. 424—71 9 Claims

1. A non-aerosol pump hair spray composition capable of being applied by the user as a fine spray mist which dries rapidly and provides effective hair holding power without nozzle clogging consisting essentially of from about 6 to 20% by weight of a hair fixative resin derived from an ethanol solution of a C<sub>2</sub>-C<sub>4</sub> alkyl which half-ester of a 1:1 alternating copolymer of maleic anhydride and a C<sub>1</sub>-C<sub>5</sub> alkyl vinyl ether, the solution having a relative viscosity of about 1.20 to about 1.35, the carboxyl groups of which are 10 to 100% neutralized with a water soluble base and about 65 to 94% ethanol or aqueous ethanol solvent.

**4,954,337**  
**NOVEL SHAVING COMPOSITION**  
Anna A. Gripp, Nutley, and Gottfried Metzler, III, Brookside, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 26, 1988, Ser. No. 198,909  
Int. Cl.<sup>5</sup> A61K 7/15

U.S. Cl. 424—73 15 Claims

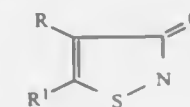


1. A composition for treating the blade of a razor such that shaving can be performed in the absence of first applying any shaving preparation directly to the area to be shaved comprising an effective amount of a mixture a non-foaming lubricant and a solubilizer wherein said lubricant contains at least a silicone glycol copolymer.

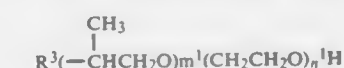
**4,954,338**  
**MICROBICIDAL MICROEMULSION**  
John R. Mattox, Perkaskie, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 81,922, Aug. 5, 1987, abandoned. This application Jan. 22, 1988, Ser. No. 209,620  
Int. Cl.<sup>5</sup> A61K 31/74; A01N 25/00, 31/14; C11D 3/48  
U.S. Cl. 424—78 29 Claims

1. A microemulsion comprising from 0.1-50% by weight of an isothiazolone having a water solubility of less than 1% by weight of the formula:



wherein Y is  
an unsubstituted alkyl group of 2 to 18 carbon atoms,  
a substituted alkyl group of 2 to 18 carbon atoms having at least one hydrogen atom replaced by hydroxy, halo, cyano, alkylamino, dialkylamino, phenylamino, halo-phenylamino, carboxy, carbalkoxy, alkoxy, aryloxy, morpholino, piperidino, pyrrolidonyl, carbamoyl, or isothiazolonyl, wherein the total number of carbon atoms in the substituted alkyl group does not exceed 18,  
an unsubstituted or halo-substituted alkenyl group of 4 to 18 carbon atoms,  
unsubstituted or halo-substituted alkynyl group of 4 to 18 carbon atoms,  
an unsubstituted or alkyl-substituted cycloalkyl group having a four to six carbon atom ring and up to 12 carbon atoms,  
an unsubstituted or a halo-, lower alkyl-, or lower alkoxy-substituted aralkyl group wherein the total number of carbon atoms in the aralkyl group does not exceed 10; or  
an unsubstituted or a halo-, nitro-, lower alkyl-, or lower carbalkoxy-, substituted aryl group wherein the total number of carbon atoms in the aryl group does not exceed 10; and  
R and R<sup>1</sup> are the same or different substituent selected from hydrogen, halogen, or a (C<sub>1</sub>-C<sub>4</sub>) alkyl group; and  
from 0.1 to 25% by weight of an anionic surfactant;  
from 0.1 to 25% by weight of a cosurfactant selected from alkyl alcohols and alkylalkoxylated alcohols;  
from 0.5 to 50% by weight of a polyoxyethylene/polyoxypropylene block copolymer of the formula:



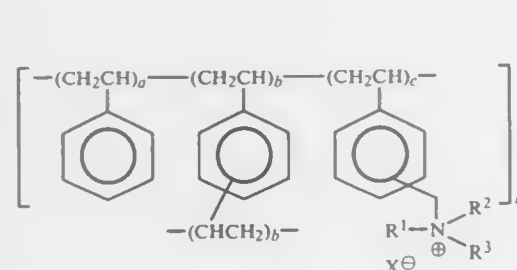
wherein R<sup>3</sup> is lower alkoxy or a radical of the formula HO(CH<sub>2</sub>CH<sub>2</sub>O)<sub>n</sub><sup>1</sup> where m<sup>1</sup> is an integer greater than 15 and n<sup>1</sup> is an integer greater than 10;  
from 10 to 99% by weight of water; and from 0 to 30% by weight of an adjuvant or adjuvants.

**4,954,339**  
**NOVEL POLYSTYRENE ANION EXCHANGE POLYMERS**  
Albert A. Jaxa-Chamiec, Rickmansworth, and Deirdre M. B. Hickey, Saffron Walden, both of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Filed Dec. 21, 1988, Ser. No. 288,049  
Claims priority, application United Kingdom, Dec. 23, 1987, 8730010

Int. Cl.<sup>5</sup> A61K 31/74; C08C 19/12; C08F 12/36, 112/36  
U.S. Cl. 424—78 16 Claims

1. A crosslinked polystyrene polymer of structure (I)



in which,

R<sup>1</sup> is a saturated or unsaturated C<sub>8</sub> to C<sub>20</sub> alkyl group;  
R<sup>2</sup> and R<sup>3</sup> are the same or different and are each C<sub>1-4</sub>alkyl;  
X<sup>-</sup> is a physiologically acceptable counter ion;

a, b and c are numbers which indicate the relative molar percentages of the units present in a random distribution in said polymer, (b) being from about 0.5 to about 10 molar percent, and (c) being from about 30 to about 99 molar percent; and

n is a number indicating the number of repeating units in said polymer.

4,954,340

#### METHOD FOR ACTIVATING HEMOCYTES OF BIVALVES FOR PEARL PRODUCTION

Haruhisa Maeda, Kumamoto; Akira Tsujikawa, Hondo, and Sadao Susumi, Kumamoto, all of Japan, assignors to Juridical Foundation The Chemo-Sero-Therapeutic Research Institute, Kumamoto, Japan

Filed Aug. 2, 1988, Ser. No. 227,400

Claims priority, application Japan, Apr. 23, 1988, 63-100979  
Int. Cl.<sup>3</sup> C01F 11/18; A61K 35/56, 39/02

U.S. Cl. 424—92

16 Claims

1. A method for producing a pearl by a nucleus insertion operation including the step of inserting a nucleus and a section of a mantle part of a donor bivalve into a bivalve capable of producing a pearl, characterized by the step of applying a mitogen selected from the group consisting of lipopolysaccharides, lectins, purified protein derivatives derived from acid-fast bacteria and inactivated microorganisms containing lipopolysaccharides to the section of the mantle part of the donor bivalve to be inserted.

4,954,341

#### HAIR COSMETIC COMPOSITION

Sigemi Nakamura, Chiba; Hideo Kurokawa, Machida, and Jouji Mitamura, Tokyo, all of Japan, assignors to Lion Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 938,491, Dec. 5, 1986, abandoned. This application Jun. 21, 1988, Ser. No. 220,957

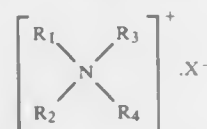
Claims priority, application Japan, Dec. 10, 1985, 60-278813  
Int. Cl.<sup>3</sup> A61K 7/00

U.S. Cl. 424—70

5 Claims

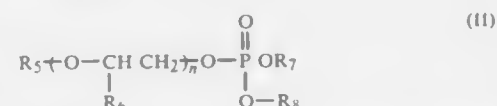
1. A hair cosmetic composition comprising:

(A) at least one quaternary ammonium salt in an amount of 0.05 to 10% by weight, having the formula:

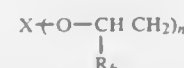


wherein R<sub>1</sub> is an alkenyl having 14 to 24 carbon atoms, R<sub>2</sub> in an alkyl or alkenyl having 14 to 24 carbon atoms, R<sub>3</sub> and R<sub>4</sub> are independently methyl, ethyl, a polyoxyethylene having an average polymerization degree of 1 to 5, or polyoxypropylene having an average polymerization degree of 1 to 5, and X<sup>-</sup> is an anion, and having an iodine value of 35 to 100; and

(B) a phosphate in an amount of 0.05 to 10% by weight, having the formula:



wherein R<sub>5</sub> is a linear alkyl having 1 to 22 carbon atoms, a hydroxyalkyl having 1 to 22 carbon atoms, an alkenyl having 2 to 22 carbon atoms, an alkylphenyl having 7 to 22 carbon atoms, or glyceryl, R<sub>6</sub> is hydrogen or methyl, R<sub>7</sub> is hydrogen, an alkali metal, a C<sub>1</sub>–C<sub>20</sub> alkyl-substituted ammonium, or a C<sub>1</sub>–C<sub>20</sub> hydroxyalkyl-substituted ammonium, R<sub>8</sub> is a group having the formula:



or R<sub>7</sub>, n is an integer of 0 to 100, and X is the same as defined above.

4,954,342

#### PHARMACEUTICAL COMPOSITION FOR INTERARECTAL ADMINISTRATION OF A CALCITONIN AND UNIT DOSAGE FORMS PREPARED THEREFROM

Filippo Lattanzi, and Riccardo Vanni, both of Siena, Italy, assignors to Sclavo S.p.A., Siena, Italy

Filed Sep. 26, 1988, Ser. No. 249,776

Claims priority, application Italy, Sep. 25, 1987, 22031 A/87  
Int. Cl.<sup>3</sup> A61K 9/02, 9/48

U.S. Cl. 424—436

28 Claims

1. A pharmaceutical composition containing a calcitonin as the active ingredient and suitable for the preparation of capsules for intrarectal administration or microenemas, said composition comprising a calcitonin dissolved in a liquid vehicle comprising:

(a) at least 70% by weight of a polyethylene or polypropylene glycol or a mixture of polyethylene or polypropylene glycols of different molecular weights, having the consistency of a homogeneous fluid at room temperature, and  
(b) less than 15% by weight of a physiologically acceptable aqueous buffer having a pH range of from 4.5 to 6.5.

4,954,343

#### DERMAL PHARMACEUTICAL PREPARATIONS

Yoshifumi Hosaka; Saburo Otsuka; Takashi Kinoshita, and Yusuke Ito, all of Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 175,985, Mar. 31, 1988, abandoned.

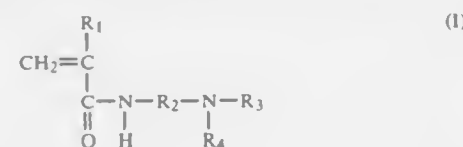
This application Sep. 12, 1989, Ser. No. 406,200

Int. Cl.<sup>3</sup> A61F 13/02

U.S. Cl. 424—448

7 Claims

1. A dermal pharmaceutical preparation comprising a soft support having provided thereon a pressure-sensitive adhesive layer containing a pressure-sensitive adhesive and a drug in the amount of 0.1 to 30% by weight based on the total weight of said adhesive and drug wherein said pressure-sensitive adhesive is a copolymer comprising a (meth)acrylamide having an amino group as a comonomer unit, wherein the (meth)acrylamide having an amino group is represented by formula (I):



wherein R<sub>1</sub> represents a hydrogen atom or a methyl group; R<sub>2</sub> represents an alkylene group; and R<sub>3</sub> and R<sub>4</sub> each represents a hydrogen atom, an alkyl group, or a phenyl group.

4,954,344

#### METHOD FOR TREATING NOCTURNAL ANGINA

Robert M. Gale, Mountain View, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Continuation of Ser. No. 132,829, Dec. 14, 1987, Pat. No. 4,812,313. This application Nov. 10, 1988, Ser. No. 269,835

The portion of the term of this patent subsequent to Dec. 4, 2001, has been disclaimed.

Int. Cl.<sup>3</sup> A61K 9/00; A01N 25/12

U.S. Cl. 424—448

4 Claims

1. A method for diminishing the occurrence of nocturnal angina attacks in a patient, which method comprises:

(a) positioning on the skin at a location selected from the group consisting of arm, abdomen, chest, back, thigh, leg and buttocks of a patient prone to nocturnal anginal attacks, a medical bandage comprising:

(1) a backing member that is substantially impermeable to the passage of drug;

(2) a reservoir in contact with the backing member, the reservoir comprising an oil selected from the group consisting of natural and synthetic oils, rheological means for increasing the viscosity of the oil, and a drug useful for diminishing the occurrence of nocturnal anginal attacks;

(3) a rate controlling membrane in contact with the backing member and the reservoir comprising a polymeric composition that aids in controlling the release of the drug from the medical bandage; and,

(b) administering transdermally the drug to the patient in a therapeutically effective amount of producing the intended therapy.

4,954,345

#### DERMALLY ACTING PHARMACEUTICAL PREPARATION WITH LIPOSOMES AS VEHICLE MEANS

Joseph Müller, Lindenfels, Fed. Rep. of Germany, assignor to Rohm Pharma GmbH, Weiterstadt, Fed. Rep. of Germany  
Continuation of Ser. No. 924,014, Oct. 28, 1986, abandoned.

This application Aug. 15, 1988, Ser. No. 232,545

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1985, 3542773

Int. Cl.<sup>3</sup> A61K 9/127, 37/22

U.S. Cl. 424—450

13 Claims

1. A dermally acting pharmaceutical preparation for external application to the skin, consisting essentially of:

a dispersion, wherein said dispersion comprises urea and at least one active ingredient selected from the group consisting of corticosteroids and trihydroxyanthracenes and is in dissolved, emulsified or suspended form,

and wherein said urea and said active ingredient are incorporated or enclosed in liposomes.

4,954,346

#### ORALLY ADMINSTRABLE NIFEDIPINE SOLUTION IN A SOLID LIGHT RESISTANT DOSAGE FORM

Gregory Sparta, Boulder, Colo., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 8, 1988, Ser. No. 204,060

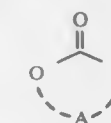
Int. Cl.<sup>3</sup> A61K 9/40

U.S. Cl. 424—456

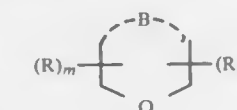
24 Claims

1. A gelatin encapsulated liquid fill formulation of nifedipine which is substantially stable against light degradation condition comprising a capsule wall formulation encasing a capsule fill formulation, said capsule wall formulation comprising gelatin in an amount sufficient to encapsulate said capsule fill composition, with or without a pharmaceutically acceptable, ingestible, plasticizer for gelatin; said fill formulation comprising 5–60 mg of nifedipine, and a mixture of a carbonate and a

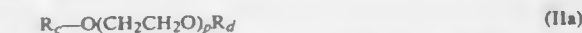
surfactant in an amount sufficient to dissolve said nifedipine, and in a ratio of carbonate to surfactant of from 99:1 to 1:99, said carbonate being selected from a di-C<sub>1-10</sub> alkyl carbonate and a compound of the formula



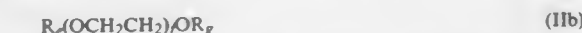
wherein A is a C<sub>1-4</sub>-alpha,omega-alkylene which is unsubstituted or substituted by C<sub>1-4</sub>alkyl; said surfactant being selected from compounds of formula II, IIa, and IIb, decaglycerol mono-dioleate, glycerol polyethylene glycol ricinoleate, and glycerol polyethylene glycol oxystearate; said formula II being a substituted cyclic ether having d ring members and being



wherein B is a C<sub>1-4</sub>-alpha,omega-alkylene; n is an integer 0 to d–1; m is an integer of from 0 to (d–n–1); each R is each R' is independently H or a C<sub>1-4</sub> alkyl which is unsubstituted or substituted by at least one R<sup>1</sup>; each R<sup>1</sup> is independently a hydroxy which is free, etherified by R<sup>2</sup>, or esterified by R<sup>3</sup>, each R<sup>2</sup> is a C<sub>2-4</sub> straight or branched oxyalkylene or poly(C<sub>2-4</sub> straight or branched oxyalkylene), the terminal oxygen of which is bound to H or R<sup>3</sup>; and each R<sup>3</sup> is independently an acyl of a C<sub>2-24</sub> alkanic acid or a C<sub>4-24</sub> alkenic acid; provided that in each compound of formula II there is at least one free hydroxy group, and at least one R<sup>3</sup> group; said formula IIa being



wherein p is, on average, 6–8, R<sub>c</sub> is stearyl or palmitoyl or mixtures thereof, and R<sub>d</sub> is hydrogen or the same as R<sub>c</sub>; said formula IIb being



wherein R<sub>c</sub> is C<sub>10-18</sub> alkyl, f is an integer of from about 10 to about 60, and R<sub>g</sub> is hydrogen or the same as R<sub>c</sub>; said gelatin encapsulated liquid fill formulation further comprising a dye in at least one of said shell formulation and said capsule fill formulation.

4,954,347

#### LONG LASTING COMPOSITION OF PROPAFENONE AND QUINIDINE FOR TREATMENT OF CARDIAC CONDITIONS

Edward B. Kristen, Nutley, N.J., and Juan R. Guerrero, Durham, N.C., assignors to BASF K & F Corp., Whippany, N.J.  
Filed May 3, 1988, Ser. No. 189,544

Int. Cl.<sup>3</sup> A61K 9/20

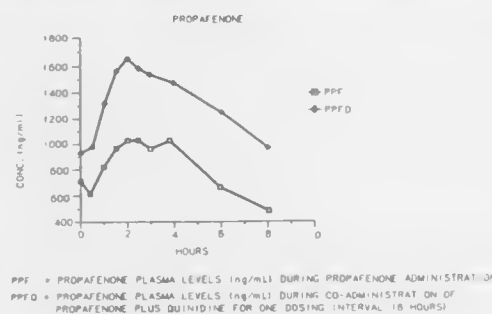
U.S. Cl. 424—456

13 Claims

1. A pharmaceutical composition suitable for the treatment of a patient having cardiac arrhythmia comprising: an antiar-



rhythmic therapeutically effective amount of propafenone of 50-600 mg and a subtherapeutic amount of quinidine effective



for prolonging the elimination half-life of the propafenone, in combination with a pharmaceutical carrier therefor.

4,954,348

#### NON-IONIC POLYOL CONTRAST MEDIA FROM IONIC CONTRAST MEDIA

Milos Sovak, Rancho Santa Fe, Calif., and Ramachandran Ranganathan, Princeton, N.J., assignors to Cook Imaging Corporation, Bloomington, Ind.

Division of Ser. No. 110,110, Oct. 13, 1987, abandoned, which is a continuation of Ser. No. 894,934, Aug. 8, 1986, abandoned, which is a continuation-in-part of Ser. No. 764,274, Aug. 9, 1985, abandoned. This application Jul. 1, 1988, Ser. No. 214,663

Int. Cl.<sup>5</sup> C07C 237/46; A61K 31/165, 49/04

U.S. Cl. 424—5

2 Claims

1. A contrast medium formulation comprising 5-(N-2,3-dihydroxypropylacetamido)-2,4,6-triiodo-N-(2,3-dihydroxypropyl)-N'-(2-hydroxyethyl)-isophthalamide in a physiologically acceptable medium at a concentration in the range of about 50 to 400 mg/l/ml.

2. 5-(N-b 2,3-dihydroxypropylacetamido)-2,4,6-triiodo-N-(2,3-dihydroxypropyl)-N'-(2-hydroxyethyl)-isophthalamide.

4,954,349

#### ORAL MAGNESIUM AND POTASSIUM COMPOSITIONS AND USE

Pravin B. Sheth, Netcong, and Frederick J. Decbow, Summit, both of N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 95,750, Sep. 11, 1987, abandoned. This application Mar. 17, 1989, Ser. No. 325,106

Int. Cl.<sup>5</sup> A61K 9/36

U.S. Cl. 424—461

9 Claims

1. A solid oral composition in the form of a tablet, capsule or sachet for the treatment or prophylaxis of potassium and magnesium deficiency in skeletal and cardiac muscle in a patient, said composition containing, as the active ingredients thereof,

(a) about 3 to about 50 milliequivalents of bioavailable potassium in the form of a salt;

(b) about 0.1 to about 25 milliequivalents of bioavailable magnesium in the form of a salt;

(c) wherein the milliequivalent ratio of potassium to magnesium is between about 2:1 and about 14:1; and

(d) wherein the potassium is in a controlled release form comprising said potassium and an overcoat layer comprising at least one polymer selected from cellulose, cellulose derivative, and acrylic containing or methacrylic containing polymers, adapted so that upon oral administration, the bioavailable potassium is released into the gastrointestinal tract at a rate sufficiently low so as to minimize potassium induced local gastrointestinal irritation.

4,954,350

#### PHARMACEUTICAL FORMULATIONS CONTAINING ACRIVASTINE

Harry P. Jones; Robert J. Mackey, and Michael J. D. Gamlen, all of Dartford, England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Continuation of Ser. No. 173,262, Mar. 25, 1988, abandoned.

This application May 15, 1989, Ser. No. 355,142

Claims priority, application United Kingdom, Mar. 27, 1987, 8707416

Int. Cl.<sup>5</sup> A61K 9/16

U.S. Cl. 424—493

12 Claims

1. A controlled release pharmaceutical formulation for oral administration which comprises discrete units comprising acrivastine or a pharmacologically and pharmaceutically acceptable salt thereof coated with a mixture containing:

(a) a copolymer or polymer containing repeating monomer units selected from alkyl esters of acrylic and methacrylic acids and

(b) ethyl cellulose.

4,954,351

#### METHOD OF PRODUCING STANDARDIZED POVIDONE IODINE PREPARATIONS AND SUCH PREPARATIONS

Mortimer D. Sackler, Schattdorf; Ronald B. Miller, Basel, both of Switzerland; Erwig O. Pinter; Helmut E. W. Rackur, both of Limburg/Lahn, Fed. Rep. of Germany; Raymond R. Sackler; Richard S. Sackler, both of Greenwich, Conn., and Alfred Halpern, deceased, late of Great Neck, N.Y. (by Marjorie A. Halpern, administratrix), assignors to Euroceltique S.A., Luxembourg

Continuation of Ser. No. 927,841, Nov. 5, 1986, abandoned, which is a continuation-in-part of Ser. No. 802,322, Nov. 27, 1985, abandoned, which is a continuation of Ser. No. 585,428, Mar. 2, 1984, abandoned. This application Sep. 22, 1988, Ser. No. 247,876

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1983, 3307219; Apr. 15, 1983, 3313655

Int. Cl.<sup>5</sup> A61K 33/36

U.S. Cl. 424—667

9 Claims

1. A method of producing a povidone iodine preparation having a predetermined concentration of free iodine which is immediately achieved and which remains constant and having predictable microbicidal effectiveness and long duration of action, the method comprising the steps of treating a mixture of povidone iodine and iodine ion in acidic solution with iodate ion to form an acidic solution containing between 2 and 20 ppm of free iodine and having an available iodine to iodide ratio between 2:1 and 10:1, increasing the pH of said acidic solution to between 5 and 6, and adding additional iodate ion to the thus formed solution in an amount sufficient to maintain the amount of free iodine therein at a concentration of between 2 and 20 ppm, whereby the free iodine concentration is immediately achieved and remains stable for at least 12 months at 20° C.

4,954,352

#### APPARATUS FOR PRODUCING PARTICLES OF THERMOPLASTIC MATERIAL

Norman E. Luker, Baton Rouge, La., assignor to Exxon Chemical Patents Inc., Linden, N.J.

Filed Aug. 9, 1988, Ser. No. 225,059

Int. Cl.<sup>5</sup> B28B 11/16; B26F 3/00

U.S. Cl. 425—296

16 Claims

1. Apparatus for producing particles of thermoplastic material comprising:

an extrusion device including a multi-orifice die plate having a face from which extruded material extends;

a cutting chamber;

a source of gas coupled to said cutting chamber;

a restricted throat means interposed between said source of gas and said face of said die plate for causing said gas to

pass across said die plate at a velocity sufficient to sever extruded material to form crumb particles; a sloping wall member within said cutting chamber extending from said restricted throat means towards a material



discharge region of said chamber for forming a product accumulation region in the vicinity of said orifices having an increasing cross-sectional area proceeding from said throat means towards the ones of said orifices nearest to said discharge region.

4,954,353

#### ANHYDROUS CHEWING GUM WITH IMPROVED STABILITY

Subraman R. Cherukuri, Towaco, N.J.; Gul Mansukhani, Staten Island, N.Y., and Tommy L. Chau, Bridgewater, N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Dec. 29, 1988, Ser. No. 291,707

Int. Cl.<sup>5</sup> A23G 3/30

U.S. Cl. 426—5

23 Claims

1. An anhydrous chewing gum composition resistant to moisture pickup comprising:

(a) a homogeneous mixture of a gum base, a flavoring agent, a sweetening agent and

(b) a hydrophobic softening agent, wherein the hydrophobic softening agent is admixed with the mixture from step (a) to provide moisture resistance to the composition.

4,954,354

#### PROCESS UTILIZING ALCOHOL OXIDASE

Thomas R. Hopkins, and Dennis S. Banasiak, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 10, 1988, Ser. No. 208,329

Int. Cl.<sup>5</sup> A23B 1/10; C12G 1/00; A23L 1/00; B65D 81/28

U.S. Cl. 426—8

12 Claims

1. A process for removing residual oxygen gas from the gas phase of a closed container comprises contacting the gas phase of a closed dry container wherein a dry food product is stored with an oxygen scavenger consisting essentially of

(a) a dried alcohol oxidase containing agent selected from the group consisting of whole cells, broken cells and cell extracts of methylotrophic yeast or fungi having a moisture content in the range of about 10 to about 30 weight percent; and

(b) at least one suitable alcohol substrate provided as a vapor or a liquid wherein said liquid is provided in the range of about 0.075 to about 0.15 grams of alcohol per liter of atmospheric volume scavenged, wherein said alcohol oxidase containing agent and said suitable substrate are present in an amount sufficient to effect the substantial elimination of said oxygen gas from the gas phase of the closed container.

4,954,355

#### FEED RAW MATERIAL AND FEED CONTAINING ZERO FIBRE AND PROCEDURE FOR PRODUCING THESE

Asko Haarasilta, Putousrinne 1 D 26, SF-01600 Vantaa; Leo Vuorenlinna, Munkkiniemen puistotie 2 B, SF-00330 Helsinki, and Kalevi Laiho, Vaskihubbantie 4-6 H 58, SF-00740 Helsinki, all of Finland

Filed Mar. 30, 1988, Ser. No. 175,149

Claims priority, application Finland, Mar. 30, 1987, 871389

Int. Cl.<sup>5</sup> A23K 1/00

U.S. Cl. 426—61

22 Claims

9. A process for producing an improved feed material for ruminants; said process including steps of:

(a) providing a dry, zero fibre mixture including:  
(i) 80-99% by weight cellulose-containing wood conversion industry zero fibre; and  
(ii) at least 1% and no more than 20% by weight molasses;  
(b) dry granulating said zero fibre mixture to form a granulated zero fibre product; and  
(c) admixing said zero fibre product, in an amount of 1-50% by weight, with ruminant feed, to form an admixture.

4,954,356

#### OVENABLE PACKAGE FOR BACON AND THE LIKE

Kenneth C. Kappes, Hartland, Wis., assignor to Milprint, Inc., Milwaukee, Wis.

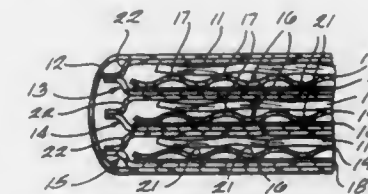
Continuation of Ser. No. 96,125, Sep. 11, 1987, Pat. No. 4,857,342. This application Aug. 1, 1989, Ser. No. 388,122

The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B65B 25/00; B65D 81/00

U.S. Cl. 426—107

20 Claims



1. A microwavable package for containing a food product during storage and cooking, said microwavable package comprising:

a bed formed of absorbent material for supporting the food product during storage and cooking, the food product disposed in direct contact with said bed;  
a substantially sealed and movable plastic member covering said bed and the food product; and  
venting means in said plastic sleeve for permitting the passage of vapor generated during cooking through said plastic member so that said plastic member moves away from said bed and the food product during cooking.

4,954,357

#### METHOD OF MAKING PIZZA DOUGH

Konstantinos Poulgouras, Box 1975, Tisdale, Saskatchewan, Canada (S0E 1T0)

Filed May 3, 1989, Ser. No. 346,931

Claims priority, application Canada, Aug. 3, 1988, 573700

Int. Cl.<sup>5</sup> A21D 8/00

U.S. Cl. 426—302

7 Claims

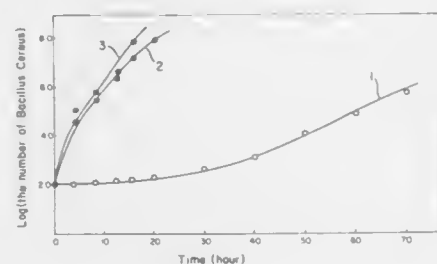
1. In the preparation of a pizza dough the improvement comprising flavoring said dough by the steps of:

(1) preparing a concoction by placing a flavour material in warm water until the water absorbs the taste of said material;  
(2) assembling the ingredients of a pizza dough and adding the concocted liquid thereto;

- (3) mixing the ingredients and concocted liquid in a mixing machine to produce a dough mixture; and  
(4) pouring oil over said dough mixture to keep it moist.

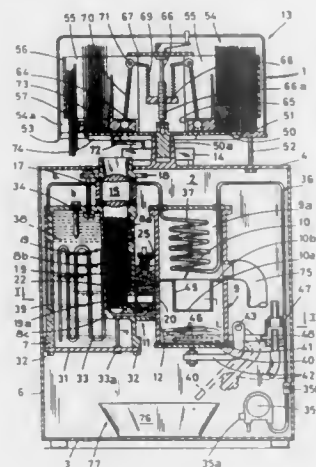
**4,954,358**  
**MULTIPLICATION INHIBITOR FOR *BACILLUS CEREUS***

Ryuzo Ueno; Yatsuka Fujita; Munemitsu Yamamoto, and Hiroshi Kozakai, all of Nishinomiya, Japan, assignors to Kabushiki Kaisha Ueno Selyaku Oyo Kenkyujo, Osaka, Japan  
Filed Dec. 3, 1987, Ser. No. 128,557  
Claims priority, application Japan, Dec. 4, 1986, 61-289715  
Int. Cl.<sup>5</sup> A21D 4/00; A61K 37/08  
U.S. Cl. 426—331 13 Claims



1. A method of inhibiting multiplication of *Bacillus cereus* in processed foods, comprising adding an inhibitor composition comprising a *Bacillus cereus* multiplication inhibitor protamine or a salt thereof to processed food in an amount of 0.001 to 2 percent protamine by weight of the food, wherein inhibition of the multiplication of *Bacillus cereus* is effected without the addition of heat.

**4,954,359**  
**PROCESS FOR THE FAST COOKING OF PASTA**  
Modesto Pratolongo, Milan, Italy, assignor to Electronics for Industry, Ltd., United Kingdom  
Division of Ser. No. 123,110, Oct. 19, 1987, Pat. No. 4,869,160.  
This application Jun. 7, 1989, Ser. No. 351,610  
Claims priority, application Italy, Feb. 18, 1986, 19447/86  
Int. Cl.<sup>5</sup> A23L 1/00  
U.S. Cl. 426—557 3 Claims



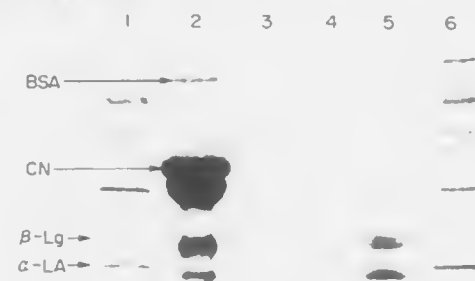
1. A process for the fast cooking of pasta, comprising the following steps:  
vertically introducing a predetermined amount of pasta into a containing chamber, said pasta being homogeneously

distributed in the whole section of the containing chamber;  
filling the containing chamber with cooking water and saturated wet vapor under pressure, said water and vapor flowing at controlled speed through the whole section of the containing chamber and homogeneously impregnating pasta;  
ejecting pasta, water and vapor from the containing chamber and conveying them into a pause chamber having a lower pressure than that created in the containing chamber during the preceding step;  
separating excess vapor and cooking water from the pasta; keeping the pasta in said pause chamber together with a predetermined amount of cooking water for a period of time sufficient for the pasta to partially reabsorb said predetermined amount of cooking water while simultaneously cooking said pasta therein; and  
transferring pasta and residual cooking water into a vessel, where cooking of pasta is brought to an end by the complete absorption of residual water.

**4,954,360**  
**METHOD OF INHIBITING ICE CRYSTAL GROWTH IN FROZEN FOODS AND COMPOSITIONS**  
Ronald E. Barnett, R.D. 5, Gage Rd., Brewster, N.Y. 10509  
Continuation-in-part of Ser. No. 77,142, Jul. 23, 1987, abandoned. This application Jul. 15, 1988, Ser. No. 218,531  
Int. Cl.<sup>5</sup> A23G 9/00  
U.S. Cl. 426—565 20 Claims

1. A method of inhibiting ice crystal growth in a frozen food product which comprises adding to the frozen aqueous ingredient mixture prior to freezing an effective ice crystal growth inhibiting amount of a partially delignified plant fiber, a hemi-cellulose B or mixtures thereof.

**4,954,361**  
**HYPOALLERGENIC MILK PRODUCTS AND PROCESS OF MAKING**  
Leonard S. Girsh, Melrose Park, Pa., assignor to Immunopath Profile, Inc., Melrose Park, Pa.  
Filed Jan. 13, 1989, Ser. No. 297,451  
Int. Cl.<sup>5</sup> A23C 9/00, 11/00, 21/00  
U.S. Cl. 426—580 25 Claims



1. A hypoallergenic milk which has the flavor and smell of natural whole milk comprising:  
a permeate of milk, said permeate being substantially free of milk protein and fat, said permeate having been prepared by filtration of whole or skim milk through a filtration membrane without pretreating said milk to denature or hydrolyze the protein contained therein before filtration, which filtration membrane will only allow molecules with a molecular weight less than or equal to about 5 kDa to pass therethrough;  
hypoallergenic protein; and  
hypoallergenic fat.

**4,954,362**  
**PROCESS FOR PREPARING EDIBLE FAT PRODUCT**  
Leendert H. Wesdorp, Schiedam, and Mattheus Struik, Vlaardingen, both of Netherlands, assignors to Lever Brothers Company, New York, N.Y.  
Division of Ser. No. 101701, Sep. 28, 1987. This application Apr. 4, 1989, Ser. No. 333,390  
Claims priority, application European Pat. Off., Sep. 26, 1986, 86201673.0; Sep. 26, 1986, 86201674.8  
Int. Cl.<sup>5</sup> A23D 3/00

- U.S. Cl. 426—602 11 Claims  
1. Process for preparing an edible fat product comprising the steps of:  
(a) emulsifying at least one first fat with a water phase to obtain an emulsion;  
(b) adjusting said emulsion to a temperature below 15° C. thereby obtaining a cold water-in-oil emulsion containing at least 1 weight % of crystallized fat; and  
(c) mixing said cold water-in-oil emulsion with at least one of a second fat having a slip melting point above that of said first fat, said second fat being maintained at a temperature at which said second fat has a N-value of not more than 25.

**4,954,363**  
**COMPOSITIONS AND PROCESS FOR ALFALFA DRYING**  
Doanld D. Staker, and William S. Kain, both of Cincinnati, Ohio, assignors to Henkel Corporation, Ambler, Pa.  
Continuation of Ser. No. 26,090, Mar. 16, 1987, Pat. No. 4,762,724, which is a continuation-in-part of Ser. No. 769,238, Aug. 26, 1985, abandoned. This application Jul. 14, 1988, Ser. No. 219,107  
Int. Cl.<sup>5</sup> H23K 1/00  
U.S. Cl. 426—636 4 Claims

1. An aqueous composition suitable for application to alfalfa to increase the drying rate consisting essentially of  
(a) 85 to 99 weight percent water;  
(b) 0.10 to 10 weight percent paraffinic or isoparaffinic hydrocarbon;  
(c) 0.25 to 10 weight percent methyl ester of a C<sub>12-18</sub> fatty acid or fatty acid mixture wherein the predominant acids have from 12 to 18 carbon atoms, said methyl ester having an acid value from 5 to 30; and  
(d) 0.5 to 5 weight percent potassium or sodium carbonate.

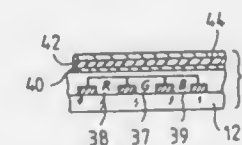
**4,954,364**  
**METHOD FOR COATING SUBSTRATES WITH UV CURABLE EPOXYSILICONE COMPOSITIONS**  
Judith Stein, Schenectady, N.Y.; Tracey M. Leonard, Essex Junction, Vt., and James L. Desoreie, Clifton Park, N.Y., assignors to General Electric Company, Schenectady, N.Y.  
Filed Jun. 22, 1989, Ser. No. 369,799  
Int. Cl.<sup>5</sup> B05D 3/06  
U.S. Cl. 427—54.1 8 Claims

1. A method for imparting control release characteristics to a paper or plastic substrate, which comprises:  
(A) treating the paper or plastic substrate with a UV curable epoxysilicone mixture, and  
(B) UV curing the treated substrate until a nonsmear tack-free adherent film is formed,  
where the UV curable epoxysilicone mixture comprises by weight,  
(C) 100 parts of epoxysilicone having from about 5 to 12 mole percent of condensed epoxysiloxane units based on the total moles of condensed diorganosiloxane units,  
(D) an effective amount of a photosensitive polyarylium-hexafluorometalloid salt and  
(E) 0.1 to 50 parts of a member selected from the class consisting of  
(i) C<sub>8-20</sub> alkyl phenols  
(ii) phenolalkyl substituted organodisiloxanes.

**4,954,365**  
**METHOD OF PREPARING A THIN DIAMOND FILM**  
Richard A. Neifeld, Springfield, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.  
Filed Dec. 18, 1989, Ser. No. 451,699  
Int. Cl.<sup>5</sup> B05D 3/06  
U.S. Cl. 427—53.1 9 Claims

1. Method of preparing a thin diamond film from a substrate immersed in a liquid containing carbon and hydrogen comprising subjecting the substrate to at least one laser pulse.

**4,954,366**  
**METHOD FOR THE METALLIZATION OF A LUMINESCENT SCREEN**  
Antimo Pezzulo, Anagni, and Himanshu Patel, Rome, both of Italy, assignors to Videocolor, Montrouge, France  
Filed Oct. 19, 1988, Ser. No. 259,906  
Claims priority, application France, Oct. 20, 1987, 87 14430  
Int. Cl.<sup>5</sup> B05D 5/06  
U.S. Cl. 427—68 5 Claims



1. A method for the metallization of a luminescent screen comprising the following steps:  
depositing a layer of at least one luminophor containing a binder on a transparent face panel;  
depositing on said layer a sub-layer consisting of an aqueous emulsion of a water-insoluble resin, the emulsion being neutral or alkaline and being capable of forming a hydrophobic film;  
drying of the sub-layer;  
depositing on said sub-layer a coating consisting of an aqueous emulsion of a water-insoluble film-forming resin, and at least hydrogen peroxide and a water-soluble polymer;  
drying the coating;  
depositing a metallic layer, and  
volatilizing the binder contained in the luminophor layer, the sub-layer and the coating.

**4,954,367**  
**VAPOR DEPOSITION OF BIS-TRIBUTYL TIN OXIDE**  
Karl H. Bloss, Pittsburgh, and Peter P. Harmon, North Huntingdon, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.  
Filed Jul. 5, 1988, Ser. No. 219,691  
Int. Cl.<sup>5</sup> B05D 5/12  
U.S. Cl. 427—109 12 Claims

1. A method of forming a tin oxide coating comprising the steps of:  
a. contacting a surface of a substrate in an oxidizing atmosphere with bis-tributyltin oxide and a fluorine-containing compound;  
b. maintaining a temperature sufficient to thermally react said bis-tributyltin oxide; and  
c. pyrolyzing said bis-tributyltin oxide to deposit a fluorine-containing tin oxide film on said surface.



4,954,368

## COATING COMPOSITIONS

Leonard S. G. Hartridge, Windsor; David W. Taylor, Reading, and Roger L. Waters, Bucks, all of England, assignors to Imperial Chemical Industries PLC, London, England  
Division of Ser. No. 144,729, Jan. 14, 1988, Pat. No. 4,868,232, which is a continuation of Ser. No. 4,254, Jan. 5, 1987, abandoned, which is a continuation of Ser. No. 664,032, Oct. 23, 1984, abandoned. This application Apr. 26, 1989, Ser. No. 343,498

Claims priority, application United Kingdom, Nov. 2, 1983, 8329299; Nov. 10, 1983, 8329955; Aug. 2, 1984, 8419720  
Int. Cl.<sup>5</sup> B05D 1/28

U.S. Cl. 427—256

4 Claims

1. A method for providing a coating of paint on a substrate with less spattering of the paint wherein the method comprises the steps of

- (1) providing a container comprising a tray adapted to receive a paint roller and closable by a lid,
- (2) providing in the tray an aqueous structured solid paint which comprises as essential ingredients a latex polymer dispersion, a thickener and a structuring agent selected from natural and synthetic clays, titanium chelates, zirconium chelates, and mixtures thereof so that the paint has either

- I (a) a gel strength of at least 100 g.cm when measured 4 weeks from manufacture and a gel strength of not greater than 400 g.cm when measured 1 year from manufacture and
- (b) a viscosity (when measured by a technique, including a preshearing step) in the range 1.5 to 13 poise 4 weeks from manufacture and which remains in this range 24 weeks from manufacture when it is intended to provide a coating having a relatively smooth non-textured surface

II

- (a) a gel strength of at least 100 g.cm when measured 4 weeks from manufacture and a gel strength of not greater than 400 g.cm when measured 1 year from manufacture,
- (b) a viscosity (when measured by a technique, including a preshearing step) in the range 1.5 to 50 poise 4 weeks from manufacture and which remains in this range 24 weeks from manufacture when it is intended to provide a coating having textured, patterned or relief surface,
- (3) closing the tray with a lid to permit transport and storage of the solid paint,
- (4) removing the lid from the tray to enable the tray to receive a paint roller and
- (5) taking up paint from the tray onto a paint roller and applying the taken up paint to the substrate by means of the paint roller.

4,954,369

## CHEMICAL DEPOSITION OF COPPER FROM ALKALINE AQUEOUS BATHS

Alfred Oftring; Chung-Ji Tschang, both of Bad Duerkheim; Ekhard Winkler, Mutterstadt; Guenther Gotsmann, Frankenthal, and Klaus Glaser, Mutterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Feb. 21, 1989, Ser. No. 312,926

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1988, 3806306

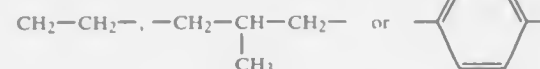
Int. Cl.<sup>5</sup> C23C 26/00

U.S. Cl. 427—430.1

3 Claims

1. A process for the chemical deposition of copper from an alkaline aqueous bath which contains a copper salt and a customary assistant and also as a complexing agent a polyacetal obtainable by reacting

- (a) a dialdehyde of the formula

where A is  $-\text{CH}_2-$ ,  $-\text{CH}_2-\text{CH}_2-$ , $-\text{CH}_2-\text{CH}_2-\text{CH}_2-$ ,  $-\text{CH}_2-\text{CH}_2-$ 

and n is 0 or 1, with

- (b) a polyolcarboxylic acid which contains 2 or more OH groups and has from 4 to 7 carbon atoms, in a molar ratio of (a):(b) of 1:from 0.5 to 3 in the presence of an acidic catalyst which process comprises depositing copper from said bath onto an object in said bath.

4,954,370

## ELECTROLESS PLATING OF NICKEL ON ANODIZED ALUMINUM

Issa S. Mahmoud, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 21, 1988, Ser. No. 289,994

Int. Cl.<sup>5</sup> C23C 26/00

U.S. Cl. 427—438

5 Claims

1. A method of plating an anodized aluminum substrate comprising:

- surface activating the substrate;
- immersing the substrate in an aqueous neutral bath composed of
- nickel sulfate in the range of from about 30 to about 40 grams per liter,
- sodium citrate in the range of from about 20 to about 25 grams per liter,
- lactic acid in the range of from about 8 to about 12 grams per liter,
- dimethylborane in the range of from about 20 to about 25 grams per liter,
- deionized water in the amount of from about 800 to about 900 milliliters,
- at a temperature of about 40 to about 50 degrees centigrade,
- for a period sufficient in duration for plating to a predetermined thickness.

4,954,371

## FLASH EVAPORATION OF MONOMER FLUIDS

Angelo Yializis, Tucson, Ariz., assignor to Spectrum Control, Inc., Erie, Pa.

Continuation of Ser. No. 877,175, Jun. 23, 1986, abandoned.

This application Jul. 7, 1987, Ser. No. 70,085

Int. Cl.<sup>5</sup> B05D 3/06; C23C 16/00

U.S. Cl. 427—44

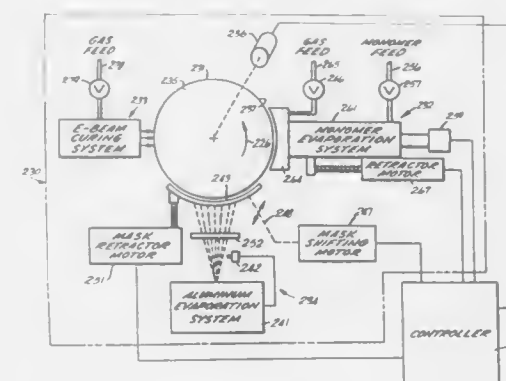
23 Claims

1. A method for continuously supplying a uniform vapor of a polymerizable material, said method comprising: supplying a continuous liquid flow of said material at a temperature below both the decomposition temperature and the polymerization temperature of said material; continuously atomizing the liquid flow into a continuous flow of liquid droplets; and continuously vaporizing said liquid droplets by causing said droplets to contact a heated surface which is maintained at a temperature at or above the boiling point for said material, but below the temperature at which said droplets would undergo pyrolysis before vaporizing.

6. A method for depositing a layer of a polymerizable material on a substrate comprising:

- supplying a continuous liquid flow of said material at a temperature below both the decomposition and the polymerization temperature of said material;

continuously atomizing said liquid flow into a continuous flow of liquid droplets;  
continuously vaporizing said liquid droplets by causing said droplets to contact a heated surface which is maintained at a temperature at or above the boiling point for said material but below the temperature at which said droplets would undergo pyrolysis before vaporizing;



maintaining at least a portion of said substrate at a temperature which is below the boiling point of said material and in a region which is at a lower pressure than said vaporized material, to provide a positive flow of vaporized material toward said substrate; and directing the flow of vaporized material onto said substrate.

4,954,372

## METAL SURFACE HYDROPHILICIZING PROCESS AND COMPOSITION

Ryohsuke Sako; Akihiko Hasebe; Akira Nishihara, and Hiroshi Okita, all of Kanagawa, Japan, assignors to Nihon Parkerizing Co., Ltd., Tokyo, Japan

Filed Apr. 20, 1989, Ser. No. 340,945

Claims priority, application Japan, Apr. 20, 1988, 63-98022

Int. Cl.<sup>5</sup> B05D 3/02

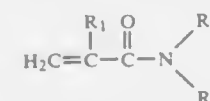
U.S. Cl. 427—388.2

18 Claims

5. A process for forming a hydrophilic surface on a metal substrate, comprising the steps of:

- (A) coating the substrate with a film of a fluid aqueous composition consisting essentially of materials selected from the group consisting of water, water-soluble organic solvents, water soluble polymers, polymer crosslinking agents, corrosion inhibitors, fillers, colorants, surfactants, antifoaming agents, leveling agents, and biocides, said fluid aqueous composition comprising:

- (1) a first water soluble polymer having a molecular weight of at least about 5,000 and having a chemical structure formally obtainable by polymerizing a mixture of molecules all containing addition-polymerizable carbon-carbon double bonds, wherein at least 40 number percent of the molecules in the mixture have a structure according to the general formula (I)



wherein R<sub>1</sub> represents H or CH<sub>3</sub>; R<sub>2</sub> and R<sub>3</sub> each independently represents H, alkyl having 1 to 4 carbon atoms, benzyl, or hydroxyalkyl having 2 to 3 carbon atoms;

- (2) a second water soluble polymer having a molecular weight of at least about 1,000 and having a chemical structure formally obtainable by polymerizing a mixture of molecules all containing addition-polymerizable car-

bon-carbon double bonds, wherein at least 60 number percent of the molecules in the mixture also contain a moiety selected from the group consisting of carboxyl groups, carboxylate salts, sulfonic acid group, sulfonate salts, phosphonic acid group, phosphonate salts, amino groups, salts of amino groups, and quaternary ammonium groups; and

- (3) a water-soluble crosslinking agent which is cosoluble with both (2) and (3),

the weight ratio of component (2) to component (1) in said fluid aqueous composition being in the range from about 0.01 to 4 and the weight ratio of component (3) to component (1) in said fluid aqueous composition being in the range from about 0.01 to about 4; and

- (B) heating the coated substrate formed in step (A) for a sufficient time to dry the coating and make it adherent to the substrate.

4,954,373

## FIBROUS SUBSTRATES CONTAINING HOT MELT COATINGS MADE FROM A NOVEL PETROLEUM WAX

Richard L. Jones, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Nov. 30, 1988, Ser. No. 278,700

Int. Cl.<sup>5</sup> B05D 1/30

U.S. Cl. 427—389.9

15 Claims

1. A process for coating fibrous substrates which comprises:

- (a) forming a falling curtain of viscous, molten, thermoplastic wax composition,
- (b) causing a fibrous substrate to pass through said curtain of wax so as to deposit the curtain of wax on at least one surface of said fibrous substrate, and
- (c) permitting the wax to congeal on the surface of the fibrous substrate; the improvement which comprises employing as the falling curtain of wax a wax composition which comprises:

- (1) from about 50 weight percent to about 90 weight percent of a recrystallized 650 distillate heavy intermediate petroleum wax having a boiling point range of from about 155° F. to about 185° F. having a clear color;
- (2) from about 10 weight percent to about 30 weight percent of a polymeric hydrocarbon compound having a molecular weight of from about 2,000 to about 100,000 and a melt index of from about 1 to about 250 at 375° F.;
- (3) from about 0.01 weight percent to about 15 weight percent of a hydrocarbon resin derived from a C<sub>5</sub> olefin petroleum feedstock or terpene resin wherein said hydrocarbon resin has a softening point of from about 180° F. to about 250° F.; and
- (4) from about 0.01 weight percent to about 0.1 weight percent of a petroleum wax soluble, phenolic anti-oxidant.

4,954,374

## DECORATIVE MODULE HAVING A CONCAVE FACE

Gilbert Lemire, 1565 Victoria, Suite 209, St-Lambert, Quebec, Canada J4R 1R6

Continuation-in-part of Ser. No. 136,946, Dec. 23, 1987, Pat. No. 4,806,403. This application Dec. 23, 1988, Ser. No. 289,235

(1) The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B65D 5/26

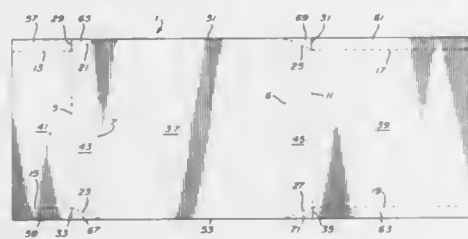
U.S. Cl. 428—34.1

12 Claims

1. A decorative module made of a single sheet of material, which comprises:

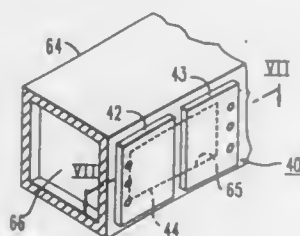
- a rectangularly shaped concave face derived from an intermediate portion of said sheet of material;
- a rearwardly and inwardly directed angled border formed along one side of said concave face to define a male end of said decorative module;
- a rearwardly and outwardly directed angled border formed along the other side of said concave face;

means enabling remaining portion of said sheet of material to extend from said rearwardly and inwardly directed angled border to define therewith a female end of said decorative module capable of engaging said male end;



said concave face forming an arc of circle whose height is at least 1/25th the length of the chord of said arc of a circle; so constructed and arranged that said module is self-supporting and capable of being applied against an outer surface by fixation of said remaining portion thereto.

**4,954,375**  
**VIBRATION DAMPING APPARATUS**  
Stanley S. Sattinger, Mount Lebanon, Pa.; Leo K. H. Lu, Cupertino, and Jerry R. Smerecky, Sunnyvale, both of Calif., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Dec. 29, 1988, Ser. No. 290,395  
Int. Cl.<sup>5</sup> E04B 1/84  
U.S. Cl. 428—34.1

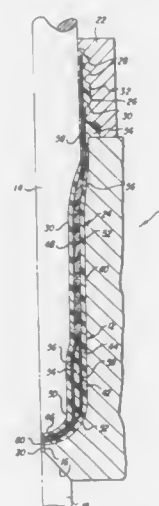


1. A vibrationally damped structure, comprising:
  - (A) a hollow beam structure having a plurality of wall portions;
  - (B) at least one of said wall portions including a plurality of apertures therethrough;
  - (C) a plurality of shear damping assemblies operable to absorb energy from unwanted vibrational excitation, with each said shear damping assembly including a plurality of plate members and which extends across a respective one of said apertures with a first said plate member being secured to said wall portion on one side of said aperture and a second said plate members being secured to said wall portion on an opposite side of said aperture.

**4,954,376**  
**TWO MATERIAL THREE/FIVE LAYER PREFORM**  
Suppayan M. Krishnakumar, Nashua; Thomas E. Nahill, Amherst; Steven L. Schmidt, and Wayne N. Collette, both of Merrimack, all of N.H., assignors to Continental Pet Technologies, Inc., Norwalk, Conn.  
Filed Dec. 30, 1988, Ser. No. 292,440  
Int. Cl.<sup>5</sup> B65D 1/00

1. An injection molded plastic preform for blow molding to form a container, said preform being in part formed in three layers and in part five layers, said preform comprising a neck finish portion, a shoulder forming portion, a body forming portion, and a base forming portion, at least said body forming portion and said base forming portion having inner and outer

layers formed of a primary material and separated by a layer of a secondary material; said preform being improved in that in said base forming portion a central part of said secondary material is replaced by a core layer of material other than and

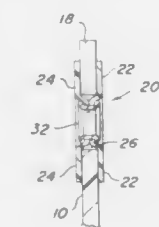


less costly than said secondary material, thus producing said five layer part, said preform at least in said body forming portion being formed of only three layers with said secondary material forming a relatively thick core layer.

**4,954,377**  
**LOAD BEARING CONNECTIVE DAMPER**  
Eugene C. Fischer, Stevensville, and Roger M. Crane, Arnold, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
Filed Nov. 22, 1988, Ser. No. 274,587  
Int. Cl.<sup>5</sup> B32B 25/02; B66C 1/18; F16D 3/56; F16F 1/36  
U.S. Cl. 428—36.1

1. A load bearing connective damper, comprising:
  - a multidimensionally braided textile shape having a multiplicity of strands forming a multiplicity of interstrand spaces; and
  - a viscoelastic material disposed in a contiguous relationship with said strands and said interstrand spaces.

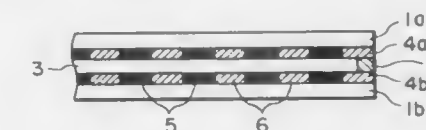
**4,954,378**  
**REPAIR KIT FOR SHOWER CURTAIN AND THE LIKE**  
Allan L. Goodman, 685 Wedgewood Rd., Bethlehem, Pa. 18017  
Filed Nov. 18, 1988, Ser. No. 272,941  
Int. Cl.<sup>5</sup> B32B 1/04  
U.S. Cl. 428—63



1. A repair and reinforcing means for use in repairing tears in sheet material or reinforcing said sheet material about one or more apertures located adjacent the top edge of said sheet material, said apertures being used to suspend said sheet material from a suspension means using one or more hangers con-

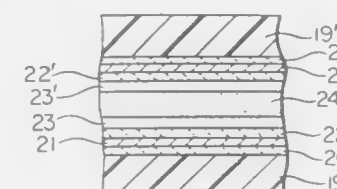
necting the suspension means to the sheet material at said apertures, said repair and reinforcing means comprising substantially circular, thin, pliable disc members of uniform diameter having inner and outer surfaces and a centrally located hole through each disc member, each said disc member extends inwardly a uniform distance into the centrally located hole and is clamped one to the other by a rivet having a central bore forming a manipulatable reinforcing unit for insertion through one of said apertures in the sheet material adjacent a tear such that the inner surface of each disc member lies in proximate juxtaposition over the sheet material surrounding and defining said apertures and bonding means for adherence of said inner surface of each disc member to the overlaid outer surface of the sheet material.

recording region and a tracking region having an optic la characteristic different from that of the data recording region



for guiding a laser beam for recording and reproduction, said tracking region being free of unevenness.

**4,954,379**  
**INFORMATION RECORDING THIN FILM AND METHOD FOR RECORDING INFORMATION**  
Tetsuya Nishida, Koganei; Motoyasu Terao, Tokyo; Yasushi Miyauchi, Sakai, and Shinkichi Horigome, Tachikawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Continuation of Ser. No. 946,843, Dec. 29, 1986, abandoned.  
This application Jun. 14, 1989, Ser. No. 368,060  
Claims priority, application Japan, Dec. 27, 1985, 60-292635  
Int. Cl.<sup>5</sup> B32B 3/02  
U.S. Cl. 428—64



1. An information-recording thin film capable of changing an atomic configuration upon exposure to a recording beam, formed on a substrate directly or through a protective layer composed of at least one of inorganic materials and organic materials, an average composition in the film thickness direction of the information-recording thin film being represented by the following general formula:



wherein X, Y, Z,  $\alpha$  and  $\beta$  are in a range of  $1 \leq X < 30$ ,  $0 \leq Y \leq 25$ ,  $40 < Z + \alpha \leq 65$  and  $35 \leq \beta < 60$  in atomic percentage; C is at least one element of Sb and Sn; B is at least one element of Ti, halogen elements and alkali metal elements; and A is Se; and wherein said information-recording thin film has a thickness of 15 to 350 nm.

**4,954,380**  
**OPTICAL RECORDING MEDIUM AND PROCESS FOR PRODUCTION THEREOF**  
Osamu Kanome, Kawasaki, and Takayoshi Tsutsumi, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Nov. 28, 1988, Ser. No. 276,543  
Claims priority, application Japan, Nov. 27, 1987, 62-297482; Jan. 18, 1988, 63-006948; Jan. 18, 1988, 63-006949  
Int. Cl.<sup>5</sup> B32B 3/02  
U.S. Cl. 428—64

1. An optical recording medium, comprising a transparent substrate and an optical recording layer disposed on the substrate, wherein said optical recording layer comprises a data

**4,954,381**  
**PREPARATION OF POROUS SUBSTRATES HAVING WELL DEFINED MORPHOLOGY**  
Israel Cabasso, Syracuse, N.Y., and Moshe Levy, Rehovot, Israel, assignors to The Research Foundation of the State University of New York, Albany, N.Y.  
Continuation of Ser. No. 947,929, Dec. 30, 1986, abandoned.  
This application Mar. 21, 1988, Ser. No. 171,497  
Int. Cl.<sup>5</sup> B01J 13/02; B29D 7/00; B32B 3/12  
U.S. Cl. 428—116

1. A method of making a microporous membrane having a preselected pore structure, the diameters of the pores being within a preselected range, the method comprising:

- a. providing a solution of polymer (A) in an organic solvent, said polymer (A) having at least about 5% by weight of one or more water-soluble groups on its polymer chain or pendant to the backbone of the polymer (A) and also having one or more functional groups capable of reacting, complexing or polymerizing with polymer (B);
- b. providing a solution of a polymer (B) in an aqueous solution which is immiscible in said organic polymer (A) solution, said polymer (B) having at least about 5% by weight of at least one functional group which can react, complex, or polymerize with polymer (A), or, said polymer (B) is capable of coagulating in the presence of polymer (A);
- c. uniformly dispersing the organic polymer (B) solution in the water-soluble polymer (A) solution to form a multiplicity of micro-spherical droplets of the polymer (A) solution enveloped by a skin composed of the product of reaction of polymers (A) and (B) or the coagulated polymer (B), said polymer (A) solution droplets being uniformly dispersed within a continuous phase comprised of said organic polymer (B) solution;
- d. evaporating the organic solvent to form a honeycomb-like structure comprised of said micro-spherical droplets uniformly dispersed within and held together by a solid continuous phase of said polymer (B); and
- e. dehydrating the honeycomb-like structure which cracks the exposed surfaces of the micro-spherical droplets and forms the microporous membrane comprised of a solid continuous phase of polymer (B) having a network of pores uniformly dispersed therein, with no overlapping pores, the pores at the surface having preselected sizes between about submicron and about 10 microns in diameter.

14. A microporous membrane having a preselected pore structure, the diameter of the pores being within a preselected range, said membrane comprised of a solid continuous phase of polymers (A) and (B) configured to have a bee-hive morphology defining a network of pores, with no overlapping pores, the pores at the surface having preselected sizes between submicron and about 10 microns in diameter said polymer (A) having at least about 5% by weight of one or more water-soluble groups on its polymer chain or pendant to its backbone and also having one or more functional groups capable of reacting, complexing or polymerizing with polymer (B), and said polymer (B) having at least about 5% by weight of at least one functional group which can react, complex or polymerize

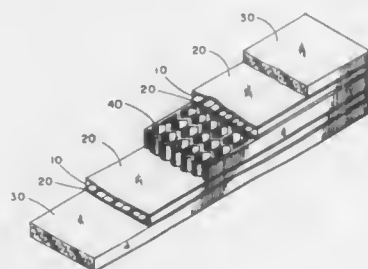


with polymer (A), or said polymer (B) being capable of coagulating in the presence of polymer (A).

**4,954,382**  
**INTERLEAF LAYER IN FIBER REINFORCED RESIN LAMINATE COMPOSITES**  
R. Scott Riefler, Belair, and John W. Powers, Jarrettsville, both of Md., assignors to American Cyanamid Company, Stamford, Conn.

Filed Nov. 1, 1988, Ser. No. 264,309  
Int. Cl.<sup>5</sup> B32B 3/12  
U.S. Cl. 428—116

6 Claims

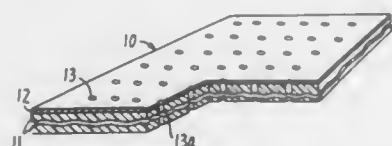


1. In a laminated composite comprising fiber reinforced thermosetting resin layers and at least one interleaved thermoplastic resin film between two layers of which one is a fiber reinforced thermosetting resin layer and the other is either a honeycomb core or a second fiber reinforced thermosetting resin layer in said composite, the improvement wherein said thermoplastic resin film is coated on both sides with thermosetting adhesive resin.

**4,954,383**  
**PERFORATED GLUE THROUGH FILMS**  
Robert N. King, Sunnyvale, and Gerald R. Behling, Santa Clara, both of Calif., assignors to Southwall Technologies, Inc., Palo Alto, Calif.

Filed Jul. 29, 1988, Ser. No. 225,743  
Int. Cl.<sup>5</sup> B32B 3/00  
U.S. Cl. 428—131

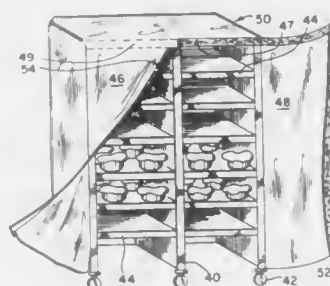
14 Claims



1. In a plastic sheet product comprising a 0.25 to 20 mil thick metallizable plastic sheet substrate having deposited on one or both of its sides a coating comprising an electrically conductive metal layer, said metal layer being from 5 nm to 500 nm in thickness, the improvement comprising a plurality of perforations through said plastic sheet and said coating, said perforations being selected from a plurality of slits, said slits being not greater than 2 cm in length and spaced not more than 1 cm from one another and from a plurality of holes said holes being of a size and density such that the holes constitute from about 1% to about 90% of the surface area of said plastic sheet.

**4,954,384**  
**FOOD RACK COVER**  
Carol Hartwell, 16877 Orchard Ridge, Hazel Crest, Ill. 60429  
Continuation of Ser. No. 290,030, Dec. 27, 1988, abandoned.  
This application Jan. 10, 1990, Ser. No. 463,921  
Int. Cl.<sup>5</sup> B32B 3/06; B65D 65/26  
U.S. Cl. 428—100

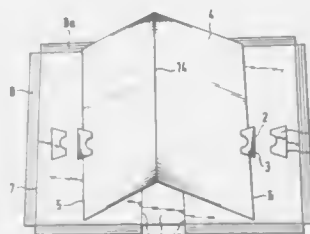
7 Claims



1. A protective cover for use on a rack adapted for holding one or more trays of food items, the cover being a single layer of air-pervious canvas cloth in the form of an open bottom hood and being divided at one or more locations to form two separable mating edge portions and having non-metallic fastening means joining said separable edge portions, said cover having a configuration conforming substantially to the configuration of the rack on which it is used and being of a size to fit over said rack so as to form an open bottom hood thereover and substantially enclose and protect food items held within said rack.

**4,954,385**  
**CARTON PAD**  
Heinz Sämann, Karlsruhe, Fed. Rep. of Germany, assignor to Haarkosmetik und Parfumerien, Fed. Rep. of Germany  
Filed Oct. 18, 1988, Ser. No. 259,276  
Claims priority, application Fed. Rep. of Germany, Oct. 19, 1987, 8714015  
Int. Cl.<sup>5</sup> B65D 81/02; B32B 3/10  
U.S. Cl. 428—131

10 Claims



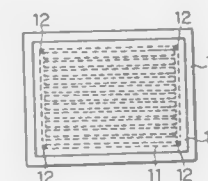
1. A carton pad, comprising a base portion having dimensions essentially corresponding to a base area of the carton and comprising several tabs arranged in a row thereon, each said tab being joined to said base portion along a substantially straight side thereof, and being otherwise free and bendable out of a plane substantially parallel to a surface of said base portion, each said tab being arranged with said substantially straight side thereof extending substantially perpendicularly to a direction in which said row of said tabs extends, said row of said tabs being divided into two separate row sections, and a gabled support of variable gable angle, having an edge for engaging a respective tab of one of said row sections and an opposite edge for engaging a respective tab of the other of said row sections,

with respective said edges of said support being supported along said straight sides of said respective tabs and engaged with the same.

**4,954,386**  
**JOINED CERAMIC-METAL COMPOSITE SUBSTRATE AND METHOD FOR PRODUCTION THEREOF**  
Nobuyuki Mizunoya; Hiroshi Komorita, both of Kanagawa; Tadasbi Tanaka, Chiba, and Kazuo Matsumura, Kanagawa, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Dec. 8, 1988, Ser. No. 281,365  
Claims priority, application Japan, Dec. 18, 1987, 62-320741  
Int. Cl.<sup>5</sup> B32B 3/00  
U.S. Cl. 428—137

11 Claims



1. A joined ceramic-metal composite substrate comprising a ceramic substrate having opposite surfaces and a copper sheet having a face directly joined to one of the surfaces of the ceramic substrate, at least one through hole in the copper sheet, and at least one groove on a portion of the face of the copper sheet, the face including a groove-free marginal area completely surrounding said portion.

**4,954,387**  
**COMPOSITE MATERIAL OF METAL AND PLASTIC**  
Seigfried Sikorski, Munich, Fed. Rep. of Germany, assignor to MTU Motoren-und Turbinen-Union Munchen GmbH, Munich, Fed. Rep. of Germany  
Filed Jun. 3, 1988, Ser. No. 202,792  
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 3718676  
Int. Cl.<sup>5</sup> B32B 3/24, 7/08, 15/08  
U.S. Cl. 428—138

10 Claims



1. A composite material comprising a flat metal substrate provided with a plurality of apertures distributed therein, a body of plastic material in which said flat metal substrate is embedded and a plurality of reinforcing fibers on said substrate and wound through said apertures, said reinforcing fibers being embedded with said substrate in said plastic material and being substantially out of contact with said substrate.

**4,954,388**  
**FABRIC REINFORCED COMPOSITE MEMBRANE**  
Robert S. Mallouk, Box 332, R.D. #1, Chadds Ford, Pa. 19317; Phillip A. Branca, 132 Country Flower Rd., Newark, Del. 19711, and Randal L. Perry, 1006 Timberwyck Rd., Wilmington, Del. 19810  
Filed Nov. 30, 1988, Ser. No. 278,224  
Int. Cl.<sup>5</sup> B32B 27/14  
U.S. Cl. 428—198

27 Claims

1. A multilayer composite membrane comprising a synthetic

fabric bonded at points of contact to one side of a layer of porous, expanded polytetrafluoroethylene (EPTFE), said EPTFE layer having a continuous perfluoro ion exchange



polymer film laminated thereto on the side opposite said one side, said fabric and porous EPTFE having a coating on at least a portion of the internal and external surfaces thereof of a perfluoro ion exchange resin.

**4,954,389**  
**MULTI-LAYER ELECTRICALLY CONDUCTIVE ARTICLE**  
Ramadas U. Acharya, South Bend, and Lawrence I. Hill, Granger, both of Ind., assignors to Uniroyal Plastics Company, Inc., Mishawaka, Ind.  
Filed Jul. 5, 1989, Ser. No. 375,764  
Int. Cl.<sup>5</sup> B32B 3/26

U.S. Cl. 428—212

33 Claims

1. A multi-layer conductive article comprising a first layer of a thermoplastic polymer having a volume resistivity of between about  $10^7$  and  $10^{12}$  ohm-cm, a second layer in direct physical and electrical contact with said first layer of a conductive thermosetting material having a surface resistance from 100 to 900 ohms/square, and a third layer in direct physical and electrical contact with said second layer of an expanded thermoplastic polymer having a volume resistivity of  $10^7$  to  $10^{12}$  ohm-cm so that said article is capable of dissipating static electric charges which are impressed thereupon.

**4,954,390**  
**THERMAL TRANSFER RECORDING MEDIUM**  
Kunihiko Koshizuka, and Takao Abe, both of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan  
Filed Oct. 3, 1988, Ser. No. 252,877  
Claims priority, application Japan, Oct. 13, 1987, 62-257886  
Int. Cl.<sup>5</sup> B41M 5/26

U.S. Cl. 428—212

20 Claims

1. A thermal transfer recording medium comprising a support having thereon at least two heat softening layers in the order of a first heat softening layer and a second heat softening layer, wherein at least one of said first and second heat softening layers contains a colorant, and said second heat softening layer contains a heat fusible substance in an amount of from 15% to 50% by weight; a thermoplastic resin in an amount of from 20% to 80% by weight; and a tackifier in an amount of from 5% to 35% by weight;

said heat fusible substance being a vegetable wax, animal wax, petroleum wax, mineral wax, higher fatty acid, higher alcohol, amide, higher amine, or higher fatty acid ester, or a combination thereof;

said thermoplastic resin being a polyamide resin, polyester resin, polyurethane resin, polyolefin resin, acrylic resin, vinyl chloride resin, cellulose resin, ionomer resin, a diene copolymer, natural rubber, isoprene rubber, chloroprene rubber, phenol resin, cyclopentadiene resin, an aromatic hydrocarbon resin, or a mixture thereof; and, said tackifier being a rosin selected from the group consisting of an unmodified rosin, a hydrogenated rosin, a rosin maleic resin, a polymerized rosin, and rosin phenol resins; a terpene resin; or a petroleum resin.

4,954,391

**HIGH DENSITY POLYETHYLENE TYPE  
TRANSPARENT FILM AND PROCESS FOR  
PRODUCTION THEREOF**

Terumitsu Kotani, Kawasaki; Toshio Taka, Fujisawa, and Yoshimasa Saito, Kawasaki, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP86/00566, § 371 Date Jul. 7, 1987, § 102(e) Date Jul. 7, 1987, PCT Pub. No. WO87/02933, PCT Pub. Date May 21, 1987

PCT Filed Nov. 7, 1986, Ser. No. 80,514

Claims priority, application Japan, Nov. 7, 1985, 60-248079; Nov. 25, 1985, 60-262672; Nov. 25, 1985, 60-262673; Jun. 3, 1986, 61-127206

Int. Cl.<sup>5</sup> C08L 23/04

U.S. Cl. 428—220

14 Claims

1. A film having a thickness of 10 to 200  $\mu\text{m}$  comprised of high density polyethylene having a density of 0.935  $\text{g}/\text{cm}^3$  or more and having an MFR of 0.1  $\text{g}/10 \text{ min}$  or less, said high density polyethylene type film having a film surface roughness of 0.001 to 0.15  $\mu\text{m}$ , a coefficient of C axis orientation of the crystals in the film (Fc) of 0.10 to 0.50, a difference  $\Delta n$  of the birefringence of the amorphous portions and crystalline portions in the form of 0.1000 to 0.1070, an impact strength of 250  $\text{kg}\cdot\text{cm}/\text{mm}$  or more and a transparency of a haze of less than 10%, said film being produced by passing an original material film, formed using high density polyethylene having a density of 0.935  $\text{g}/\text{cm}^3$  or more by inflation at a blow ratio of 3 or more, through at least three heating rolls under temperature conditions such that the temperature of the second from the last heating roll  $R_2$  is set higher than the temperatures of the first, or third from the last, heating roll  $R_1$  and the last heating roll  $R_3$ , and the temperature of  $R_2$  is set at 105° C. or more but below the melting point of said film.

4,954,392

**CHEMICAL SUIT LINER**

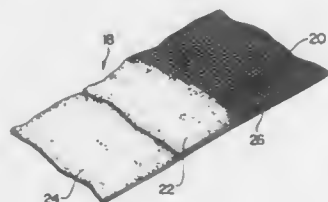
Stanley Goldberg, Providence, R.I., assignor to Duro Industries, Inc., Fall River, Mass.

Filed Dec. 1, 1989, Ser. No. 444,766

Int. Cl.<sup>5</sup> B32B 5/16

U.S. Cl. 428—244

5 Claims



1. A chemical suit liner comprising an air permeable fabric layer, a foam backing bonded to said fabric layer and completely covering a surface thereof, said foam backing being impregnated with a chemical that prevents penetration of harmful gaseous vapors therethrough, said foam backing consisting of a plurality of foam layers laminated to each other.

4,954,393

**POLYMERIC FILMS**

Mark A. Jones, Bridgwater, England, assignor to Courtaulds Films &amp; Packaging (Holdings) Ltd., Somerset, England

Filed Apr. 21, 1989, Ser. No. 341,761

Claims priority, application United Kingdom, May 17, 1988, 8811643

Int. Cl.<sup>5</sup> B32B 27/40, 27/32; D04H 1/08

U.S. Cl. 428—288

10 Claims

1. A multilayer polymeric film comprising a layer of a nylon polymer having a Vicat A (DIN 53460) softening point of not more than 170° C. and being substantially impermeable to

styrene, and a layer of weldable synthetic plastics composition bonded to one side of the layer of the nylon polymer and an impregnable fibrous mat bonded directly to the other side of the layer of the nylon polymer.

4,954,394

**PHENOLIC RESIN COMPOSITIONS**

Francois Bolaot, Lievin; Michel Cousin, Loison-sous-Lens; André Hochin, Bruay-en-Antois, and Nicolas Meyer, Lens, all of France, assignors to Norsolor, Paris la Defense, France

Continuation of Ser. No. 118,063, Nov. 6, 1987, Pat. No. 4,912,178, which is a continuation of Ser. No. 762,482, Aug. 5, 1985, abandoned. This application Jan. 22, 1990, Ser. No. 468,413

Claims priority, application France, Aug. 3, 1984, 84 1227

Int. Cl.<sup>5</sup> D04H 1/58

U.S. Cl. 428—289

5 Claims

1. A prepreg mat comprising a fiber mat impregnated with a phenol-formaldehyde resole resin having a formaldehyde-to-phenol ratio of 1.2–2.5 and based on the resole resin from 5 to 60% by weight of an additive containing at least 20% by weight of a lithium metaborate or an alkaline earth metal borate.

4,954,395

**RECORDING MEDIUM**

Kenji Hasegawa, Isehara; Takahiro Mori, Ayase, and Masahiko Higuma, Sagami, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 6, 1988, Ser. No. 178,265

Claims priority, application Japan, Apr. 10, 1987, 62-87095; Mar. 31, 1988, 63-79263

Int. Cl.<sup>5</sup> B41M 5/00

U.S. Cl. 428—318.4

34 Claims

1. A recording medium comprising a non-porous ink-retaining layer and a porous ink-transporting layer laminated on a substrate in this order, said ink-transporting layer comprising (i) at least one of a surfactant and a penetrant, and (ii) a material which is capable of fixing a colorant contained in an ink, which colorant remains in said ink-transporting layer after application of said ink to said recording medium.

4,954,396

**POLYESTER FILM COATED IN-LINE WITH AN SILANE**

Howard W. Swofford, Taylors; Sandra W. Rice, Greer; Grover L. Farrar, Greenville, all of S.C., and David Rudd, Naples, N.C., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Continuation-in-part of Ser. No. 240,701, Sep. 6, 1988. This application Jun. 13, 1989, Ser. No. 366,051

Int. Cl.<sup>5</sup> B32B 27/08, 27/36

U.S. Cl. 428—340

17 Claims

1. An oriented polyester film having a primer coating composition on at least one side thereof, said primer coating composition comprising the dried residue of a hydrolyzed aminosilane compound having the formula in the unhydrolyzed state:



wherein  $R^1$  is a functional group with at least one primary amino group,  $R^2$  is a hydrolyzeable group selected from the group consisting of a lower alkoxy group having 1–8 carbon atoms,  $C_1$  to  $C_8$ , an acetoxy group, or a halide group, and  $R^3$  is a nonreactive, nonhydrolyzeable group selected from the group consisting of a lower alkyl having 1–8 carbon atoms, or a phenyl group; with (a) being greater than or equal to 1; (b) being greater than or equal to 1; (c) being greater than or equal to zero, and with  $a+b+c=4$ , said primer coating composition being applied in-line to said polyester film prior to heat setting said film at a weight effective to improve the adhesion of one or more extrusion coated polymers to said polyester film.

4,954,397

**LIGHT RECEIVING MEMBER HAVING A  
DIVIDED-FUNCTIONALLY STRUCTURED LIGHT  
RECEIVING LAYER HAVING CGL AND CTL FOR USE  
IN ELECTROPHOTOGRAPHY**

Hiroshi Amada; Tatsuyuki Aofke; Takehito Yoshino, all of Nagahama, and Ryuji Okamura, Shiga, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 111,768, Oct. 23, 1987, abandoned.

This application Oct. 18, 1989, Ser. No. 423,680

Claims priority, application Japan, Oct. 27, 1986, 61-255114; Oct. 29, 1986, 61-258946; Oct. 31, 1986, 61-261153; Nov. 1, 1986, 61-261129; Nov. 4, 1986, 61-262451; Nov. 5, 1986, 61-264351; Nov. 6, 1986, 61-264293; Nov. 7, 1986, 61-266315

Int. Cl.<sup>5</sup> G03G 5/085

U.S. Cl. 430—58

44 Claims

1. A light receiving member for use in electrophotography comprising a substrate for electrophotography and a light receiving layer having, in sequence, (i) a charge carrier generation layer and (ii) a charge carrier transport layer on said substrate, said charge carrier generation layer (i) being formed of a non-single-crystal material substantially consisting of silicon atoms as the main constituent atoms and at least one kind selected from the group consisting of hydrogen atoms and halogen atoms in a total amount of 1 to 40 atomic percent and said charge carrier transport layer (ii) being formed of a non-single-crystal material containing silicon atoms as the main constituent atoms, carbon atoms, a conductivity controlling element capable of providing p-type conductivity or n-type conductivity in an unevenly distributed state in the thickness direction and at least one kind selected from the group consisting of hydrogen atoms and halogen atoms.

4,954,398

**MODIFIED GROOVED POLYESTER FIBERS AND  
PROCESS FOR PRODUCTION THEREOF**

Shriram Bagrodia, Kingsport, and Bobby M. Phillips, Jonesborough, both of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 157,551, Feb. 16, 1988, Pat. No. 4,842,792.

This application Jan. 23, 1989, Ser. No. 299,904

Int. Cl.<sup>5</sup> D02G 3/00

U.S. Cl. 428—400

18 Claims



1. A fiber comprising a polyester material wherein said fiber has formed therein and extending along the length thereof at least one continuous groove, wherein the mean EB Roughness at the bottom of said groove is about 10% to about 600% higher than the mean EB Roughness outside said groove and the EB Roughness outside said groove is about 0.06  $\mu$  to about 0.20  $\mu$ , and wherein said fiber has  $L_1/L_2 > 1.2$ , where  $L_1$  and  $L_2$  are the respective major and minor axes of the cross-section.

4,954,399

**POROUS POLYMER PARTICLES AND PREPARATION  
METHOD THEREOF**

Sumio Tani, Neyagawa; Kazuhiko Kogoh, Osaka; Yuri Nozaki, Kurashiki, and Kunihiko Oshima, Osaka, all of Japan, assignors to Kurashiki Boseki Kabushiki Kaisha, Kurashiki, Japan

Continuation of Ser. No. 256,805, Oct. 12, 1988, abandoned.

This application Oct. 2, 1989, Ser. No. 415,479

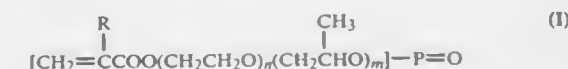
Claims priority, application Japan, Oct. 13, 1987, 62-257896

Int. Cl.<sup>5</sup> C08F 30/02

U.S. Cl. 428—402

8 Claims

1. Porous polymer particles prepared by the process of polymerizing monomers comprising a compound according to formula (I):



wherein R is hydrogen or methyl, n is 0 to 30, m is 0 to 30, with the proviso that  $m+n > 1$ ,

and a hydrophilic monomer polymerizable with said compound according to formula (I),

wherein the weight ratio of the compound according to formula (I) and the hydrophilic monomer is between 50:50 and 10:90, and

wherein said pore size of said particles is between 30 and 5000 Å.

4,954,400

**ARTICLES UTILIZING ACETAL COPOLYMER  
BONDING RESINS**

George L. Collins, Maplewood; Hongkyu Kim, Basking Ridge, and William M. Pleban, Stanhope, all of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.

Filed Oct. 11, 1988, Ser. No. 255,569

Int. Cl.<sup>5</sup> B32B 27/38; C08G 2/10

U.S. Cl. 428—414

13 Claims

1. An article comprising elements having surfaces bonded together by a bonding resin which is an elastomeric copolymer of about 15 to 45 mol % of trioxane and about 55 to 85 mol % of 1,3-dioxolane based on the total of trioxane and 1,3-dioxolane, and about 0.005 to 0.15 wt. % of 1,4-butanediol diglycidyl ether or butadiene diepoxide as a bifunctional monomer, based on the total weight of copolymer, said elastomeric copolymer being substantially non-crystalline in the unstretched state at room temperature.

4,954,401

**PROCESS OF CURING METHYLHYDROSILOXANES**

Anthony Revis, Saginaw County, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Aug. 11, 1989, Ser. No. 392,320

Int. Cl.<sup>5</sup> B32B 27/36

U.S. Cl. 428—412

18 Claims

1. A process of curing and cross-linking methylhydrosiloxanes comprising contacting and forming a mixture of an allyl ester with at least one methylhydrosiloxane in the presence of a Group VIII metal catalyst, and heating the mixture of the allyl ester, the methylhydrosiloxane, and the Group VIII metal catalyst, in the presence of ambient moisture until the methylhydrosiloxane becomes cured and cross-linked.

4,954,402

**EROSION RETARDER FOR REFRACTORY CORNERS**

James L. Houston, 4329 S. Lakewood, Tulsa, Okla. 74135

Filed Aug. 28, 1989, Ser. No. 399,597

Int. Cl.<sup>5</sup> E04C 5/07

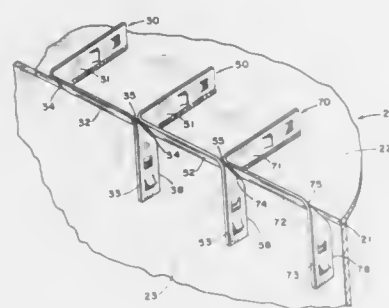
U.S. Cl. 428—597

10 Claims

1. A bracket for use in anchoring refractory material along a corner of a refractory over which fluid flows, comprising:



horizontal means for embedding in the refractory material disposed on the horizontal portion of the refractory corner;  
upright means for embedding in the refractory material disposed on the vertical portion of the refractory corner; and



baffle means integrally connecting said horizontal means and said upright means for embedding in the refractory material disposed on the corner portion of the refractory corner.

4,954,403

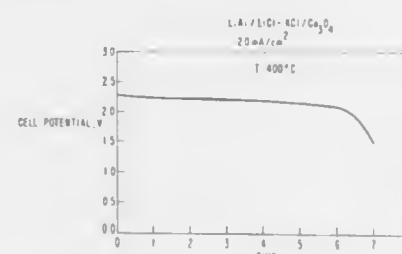
# HIGH TEMPERATURE MOLTEN SALT THERMAL ELECTROCHEMICAL CELL

Edward J. Plichta, Howell, and Wishvender K. Behl, Ocean, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.  
Filed Feb. 12, 1990, Ser. No. 478,796

Int. Cl.<sup>5</sup> H01M 4/36, 6/36

U.S. Cl. 429—103

5 Claims



1. A high temperature molten salt thermal electrochemical cell including a lithium-aluminum alloy as the anode, a cathode of cobalt oxide (Co<sub>3</sub>O<sub>4</sub>) spaced from said anode, and a separator including lithium chloride-potassium chloride eutectic electrolyte in the space between said anode and said cathode.

4,954,404

# DEVELOPING METHOD AND DEVICE AND COLOR IMAGE FORMING METHOD AND APPARATUS USING SAME

Masahiro Inoue, Yokohama; Hatsu Tajima, Matsudo; Yuji Sakemi, and Kenji Okado, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 3, 1988, Ser. No. 251,780

Claims priority, application Japan, Oct. 5, 1987, 62-252046

Int. Cl.<sup>5</sup> G03G 13/01, 13/09

U.S. Cl. 430—45

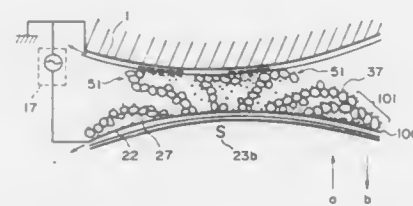
28 Claims

8. A color image forming method, comprising: forming sequentially developed images in different colors by repeating reverse development for depositing toner particles on a light potential area of an electrostatic latent

image formed on an image bearing member, said reverse development including,

forming a layer of a developer on a developer carrying member behind which magnetic field generating means is disposed, the developer including the toner particles and magnetic carrier particles for charging the toner particles to a polarity which is the same as a polarity of a dark potential of the image bearing member;

carrying the developer layer to a developing position where



the developer carrying member and the image bearing member are opposed; and forming an alternating electric field in the developing position; wherein a relative volumetric ratio Q (%) of the magnetic carrier particles in the developing position satisfies:

$$15.0 \leq Q \leq 28.0; \text{ and}$$

superimposing the plural color developed images.

4,954,405

# PHOTOCONDUCTOR FOR ELECTROPHOTOGRAPHY COMPRISING SQUARYLIUM CONTAINING GENERATOR LAYER AND HYDRAZONE CONTAINING TRANSPORT LAYER

Yoshinobu Sugata; Noboru Furusho, and Tomomi Tanaka, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Jun. 28, 1989, Ser. No. 373,684

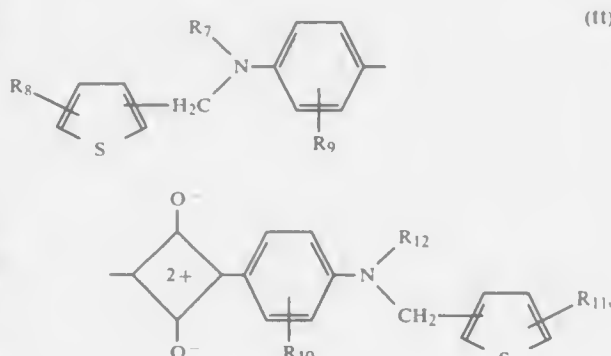
Claims priority, application Japan, Jun. 30, 1988, 63-163017

Int. Cl.<sup>5</sup> G03G 5/14

U.S. Cl. 430—58

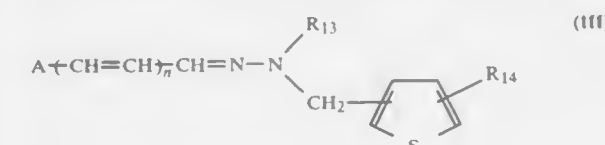
3 Claims

1. A photoconductor for electrophotography, comprising: an electrically conductive substrate; and a laminate formed on said substrate and including a charge generating layer and a charge transporting layer; wherein said charge generating layer includes at least one squarylium compound represented by the following general formula (II) as a charge generating substance:



wherein each of R<sub>7</sub> and R<sub>12</sub> stands for one of an alkyl group, an aryl group, an aralkyl group, and an alkenyl group, each of which groups may be or may not be substituted, each of R<sub>8</sub> and R<sub>11</sub> stands for one of a hydrogen atom, a halogen atom, an alkyl group and an aryl group,

both of which groups may be or may not be substituted, and each of R<sub>9</sub> and R<sub>10</sub> stands for one of a hydrogen atom, a halogen atom, a hydroxy group, an alkyl group and an alkoxy group; and wherein said charge transporting layer includes at least one hydrazone compound represented by the following general formula (III) as a charge transporting substance:



wherein A stands for one of an aryl group and a heterocyclic group, both of which may be or may not be substituted, R<sub>13</sub> stands for one of an alkyl group and an aryl group, both of which may be or may not be substituted, R<sub>14</sub> stands for one of a hydrogen atom, a halogen atom, an alkyl group and an aryl group, both of which groups may be or may not be substituted and n stands for an integer which is 0 or 1.

4,954,406

# ELECTROPHOTOGRAPHIC PLATE INCLUDING AN UNDERCOATING LAYER HAVING A SMOOTH SURFACE

Keiichi Endo; Yasushi Shinbo; Akira Kageyama; Yasuo Katsuya; Chihiro Kato; Masato Fukasawa, and Makoto Sekine, all of Hitachi, Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan

Filed Nov. 1, 1988, Ser. No. 265,557

Claims priority, application Japan, Nov. 2, 1987, 62-277737

Int. Cl.<sup>5</sup> G03G 5/14

U.S. Cl. 430—60

7 Claims



1. An electrophotographic plate comprising an electroconductive substrate, an undercoating layer formed on the substrate, and a photosensitive layer formed on the undercoating layer, said undercoating layer having a smooth surface when observed by a scanning electron microscope and an electric conductivity of at least  $2 \times 10^{-14} \Omega^{-1} \text{cm}^{-1}$ ; said undercoating layer containing a polyamide resin which has an amido group concentration of  $3.0 \times 10^{-3}$  equivalent weight/g or less.

4,954,407

# ELECTROPHOTOGRAPHIC PHOTORECEPTOR COMPRISING BINDER RESIN CONTAINING ACIDIC GROUPS

Eiichi Kato, and Kazuo Ishii, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 29, 1989, Ser. No. 414,334

Claims priority, application Japan, Sep. 30, 1988, 63-244417;

Nov. 8, 1988, 63-280391; Nov. 17, 1988, 63-288971

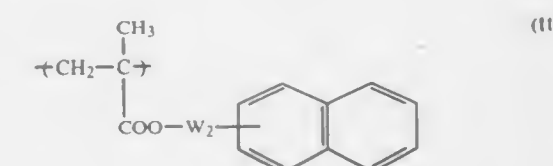
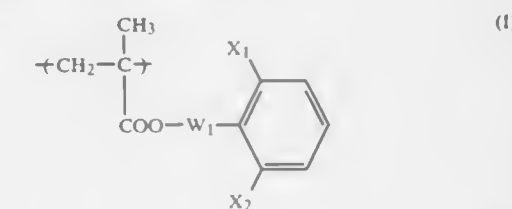
Int. Cl.<sup>5</sup> G03G 5/087

U.S. Cl. 430—96

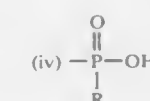
11 Claims

1. An electrophotographic photoreceptor comprising a

support having thereon at least one photoconductive layer containing at least inorganic photoconductive particles and a binder resin, wherein said binder resin has a weight average molecular weight of from  $1 \times 10^3$  to  $5 \times 10^4$  and comprises (A) at least one resin comprising, as a polymerization component, (a-i) not less than 30% by weight of at least one repeating unit represented by formula (I) or (II):



wherein X<sub>1</sub> and X<sub>2</sub>, which may be the same or different, each represents a hydrogen atom, a hydrocarbon group having from 1 to 10 carbon atoms, a chlorine atom, a bromine atom, —COY<sub>1</sub> or —COOY<sub>2</sub>, wherein Y<sub>1</sub> and Y<sub>2</sub> each represents a hydrocarbon group having from 1 to 10 carbon atoms, provided that both X<sub>1</sub> and X<sub>2</sub> do not simultaneously represent a hydrogen atom; and W<sub>1</sub> and W<sub>2</sub> each represents a bond or a linking group containing from 1 to 4 linking atoms which connects —COO— and the benzene ring, with at least one acidic group selected from the group consisting of (i) —PO<sub>3</sub>H<sub>2</sub>, (ii) —SO<sub>3</sub>H, (iii) —COOH,



wherein R represents a hydrocarbon group having from 1 to 10 carbon atoms or —OR', wherein R' represents a hydrocarbon group having from 1 to 10 carbon atoms, and (v) a cyclic acid anhydride-containing group, being bonded to only one of the terminals of the polymer main chain thereof.

4,954,408

# POLYSILOXANE CROSSLINKED STYRENE/BUTADIENE COPOLYMERS

Michael K. Georges, Guelph, Canada, assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 20, 1989, Ser. No. 325,715

The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> G03G 9/10

U.S. Cl. 430—108

19 Claims

1. A toner composition comprised of a crosslinked polysiloxane styrene/butadiene copolymer represented by the formula of FIG. 1 wherein X is aryl or alkyl; Y is aryl or alkyl; m is a number of from about 2 to about 10; n is a number of from about 10 to about 1,000; k, l, o, p, q, r, s, t, u are weight fraction numbers totaling one with the sum of k+p+r+t being from about 0.35 to about 0.94; the sum of l+q+s+u being from about 0.05 to about 0.2 and o is from about 0.02 to about 0.5; R is CH<sub>2</sub>CH(R'), alkyl-CR''C(O)O and alkylene-CR''C(O)O, where R' is an aromatic or substituted aromatic substituent and R'' is hydrogen or an alkyl substituent, and pigment particles.

4,954,409

DEVELOPER FOR ELECTROPHOTOGRAPHY  
Takayoshi Aoki, and Masayuki Takeda, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan  
Filed May 22, 1987, Ser. No. 52,817  
Claims priority, application Japan, May 22, 1986, 61-117827; May 22, 1986, 61-117828; May 22, 1986, 61-117829; May 22, 1986, 61-117830

Int. Cl.<sup>5</sup> G03G 9/10

U.S. Cl. 430—108 14 Claims  
1. A developer comprising a negatively chargeable toner having a colorant dispersed in a binder resin and a carrier having a core material that is coated with a layer containing a polymer of a fluorinated alkyl acrylate or methacrylate, said binder resin being composed of more than 50 wt % of a styrene-based monomer as a monomer component, and said fluorinated alkyl acrylate or methacrylate constituting less than 50 wt % of the total coating material.

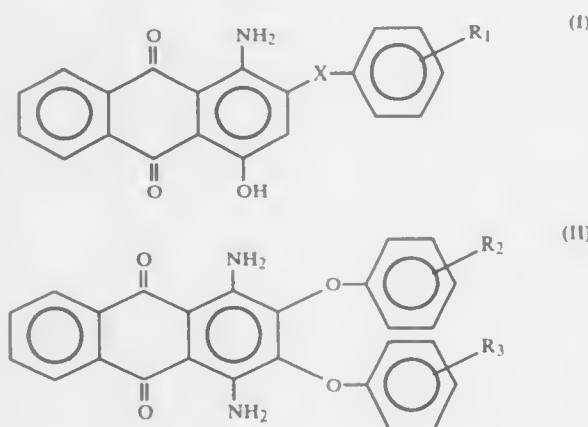
4,954,410

COLOR TONER COMPOSITION  
Keisuke Takuma; Tsukasa Ohyama, both of Ohmuta; Isamu Gboda, Kobe; Tamio Mikoda, Ohmuta; Hitoshi Koshida, Nishinomiya, and Akitoshi Igata, Ohmuta, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Feb. 24, 1989, Ser. No. 315,051

Claims priority, application Japan, Feb. 26, 1988, 63-42358  
Int. Cl.<sup>5</sup> G03G 9/09

U.S. Cl. 430—109 15 Claims  
1. A color toner composition for electrostatic charge development which comprises a binding resin and at least one dye-stuff having good light fastness and melt miscibility, which provides stable image density after repeated development by continuous duplication and which is represented by the general formulae (I) or (II)



wherein X is an oxygen atom or sulfur atom, and each of R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> is an alkyl, alkoxy, alkoxyalkoxy or hydroxyl group or a halogen atom.

4,954,411

STATIC LATENT IMAGE DEVELOPMENT TONER  
Katsumi Nishibayashi, Hirakata, and Takashi Teshima, Ibaraki, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Mar. 3, 1989, Ser. No. 318,251

Claims priority, application Japan, Mar. 11, 1988, 63-59135; Jun. 24, 1988, 63-157465

Int. Cl.<sup>5</sup> G03G 9/08, 9/10

U.S. Cl. 430—111 11 Claims  
1. Static latent image developing toner comprising, at least, coloring agent and bonding resin, and having 5 through 20 milliseconds of relaxation time at 100 KHz of frequency.

4,954,412

PROCESSES FOR THE PREPARATION OF  
ENCAPSULATED TONER COMPOSITIONS  
Marcel P. Breton, Mississauga; Yves Deslandes, Gloucester, and Guerino Sacripante, Cambridge, all of Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 31, 1988, Ser. No. 265,199

Int. Cl.<sup>5</sup> G03G 9/08

U.S. Cl. 430—137 50 Claims  
1. A process for the preparation of encapsulated toner compositions which comprises (1) providing a core comprised of a monomer capable of being polymerized by free radical polymerization, a colorant or pigment, a free radical initiator, a polymer and a first shell monomer dissolved in the core monomer; (2) dispersing said core components in an aqueous phase containing a surfactant, an antifoaming agent, and a phase transfer agent; (3) adding a second shell monomer to the aqueous phase; (4) encapsulating the core components by accomplishing polymerization of the first and second shell monomers; (5) heating the aqueous phase dispersion of (2) and (3) thereby effecting in situ polymerization of the core monomers; and (6) spheroidizing the polymerized shell of (4) by heating at a temperature of from about 20° to about 0° C. below the sticking temperature of the formed toner composition, and wherein the shell is comprised of a thermotropic liquid crystalline polymer.

4,954,413

METHOD OF MAKING PHOTOCONDUCTIVE  
PARTICLES

Fusaoki Uchikawa, and Kenji Nomura, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 168,993, Mar. 16, 1988, abandoned.

This application Oct. 18, 1989, Ser. No. 423,694

Claims priority, application Japan, Mar. 17, 1987, 62-62895; Mar. 27, 1987, 62-71733

Int. Cl.<sup>5</sup> G03G 5/09

U.S. Cl. 430—135 7 Claims  
1. A method of making a photoconductive powder which comprises the steps of:

mixing in a solution a first principal material containing one or more compounds selected from the group consisting of a metal alkoxide and metal acetylacetonate, which are combined with the respective metal, with a first pigment having a spectral absorption band within the wavelength region of red color so as to provide a first suspension; mixing in a solution a second principal material containing one or more of said compounds with a second pigment having a spectral absorption band within the wavelength region of blue color so as to provide a second suspension; mixing in a solution a third principal material containing one or more of said compounds with a third pigment having a spectral absorption band within the wavelength region of green color so as to provide a third suspension; allowing said first, second and third principal materials to undergo hydrolysis to produce corresponding, first, second and third composite particles composed of particles of oxides of the respective metal and particles of said first, second and third pigments.

4,954,414

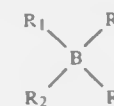
PHOTOSENSITIVE COMPOSITION CONTAINING A  
TRANSITION METAL COORDINATION COMPLEX  
CATION AND A BORATE ANION AND  
PHOTOSENSITIVE MATERIALS EMPLOYING THE  
SAME

Paul C. Adair, Springboro, and Peter Gottschalk, Centerville, both of Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Nov. 8, 1988, Ser. No. 268,433

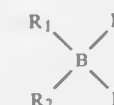
Int. Cl.<sup>5</sup> G03C 1/78, 1/495, 1/68

U.S. Cl. 430—138 37 Claims  
1. A photoinitiator including a cationic transition metal coordination complex and a borate anion wherein said borate anion is represented by the following formula:



wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are the same or different and are selected from the group consisting of alkyl, aryl, aralkyl, alkenyl, alkenyl, alicyclic, heterocyclic, and allyl groups, and wherein said photoinitiator is capable of absorbing actinic radiation and producing free radicals.

10. A photoresist material comprising a free radical addition polymerizable or crosslinkable compound and a photoinitiator including a cationic transition metal coordination complex and a borate anion wherein said borate anion is represented by the following formula:



wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are the same or different and are selected from the group consisting of alkyl, aryl, aralkyl, alkenyl, alkenyl, alicyclic, heterocyclic, and allyl groups, and wherein said photoinitiator is capable of absorbing actinic radiation and producing free radicals which can initiate free radical polymerization of said polymerizable or crosslinkable compound.

20. The material according to claim 10 wherein said composition is microencapsulated.

4,954,415

PHOTOINITIATOR COMPOSITIONS CONTAINING  
O-ACYLTHIOHYDROXAMATE OR AN  
N-ALKOXYPYRIDINETHIONE AND  
PHOTOHARDENABLE COMPOSITIONS CONTAINING  
THE SAME

Paul D. Davis, Centerville, Ohio; Gary B. Schuster, Champaign, Ill.; Jacqueline G. Truini, Dayton, and Al Fentiman, Miami, both of Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Mar. 9, 1989, Ser. No. 321,256

Int. Cl.<sup>5</sup> G03F 7/029, 7/031

U.S. Cl. 430—138 13 Claims  
1. A photohardenable composition comprising a free radical addition polymerizable or crosslinkable material and a photoinitiator composition, said photoinitiator composition including a compound which absorbs actinic radiation and directly or indirectly generates free radicals, and an O-acylthiohydroxamate or an N-alkoxy pyridinethione.

4,954,416

TETHERED SULFONIUM SALT PHOTOINITIATORS  
FOR FREE RADICAL POLYMERIZATION  
Bradford B. Wright, North St. Paul, and Robert J. DeVoe, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

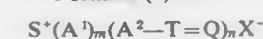
Filed Dec. 21, 1988, Ser. No. 287,909

Int. Cl.<sup>5</sup> G03C 1/78, 5/00; C08F 2/50

U.S. Cl. 430—281 17 Claims  
1. A free radical polymerizable composition comprising an ethylenically unsaturated monomer, at least one of an electron donor and a sensitizer, and a triarylsulfonium salt, wherein at least one of said electron donor and sensitizer is tethered with said sulfonium salt through at least one tetracoordinate carbon atom which is bonded to four separate substituents.

2. The free-radical polymerized composition according to claim 1 wherein said tethered sulfonium salt has a formula selected from formulae (1) and (2) wherein

Formula (1) is:

wherein S<sup>+</sup> is a positively charged sulfur atom,A<sup>1</sup> is an aryl or substituted aryl group having 6 to 50 carbon atoms,A<sup>2</sup> is an arylene group having 6 to 50 carbon atoms, which is connected to Q through a tether T, m = 0, 1, or 2; n = 1, 2, or 3; with the proviso that n + m = 3,

Q represents an electron donor,

T represents the tether which joins the triarylsulfonium salt moiety and Q and contains at least one tetracoordinate carbon atom which is bonded to four separate substituents,

with the proviso that every path from A<sup>2</sup> to Q contains at least one tetracoordinate carbon atoms; and

X is a counterion,

Formula (2) is:

wherein S<sup>+</sup>, A<sup>2</sup>, T, Q and X<sup>-</sup> are as previously defined, j = 0, 1, 2, 3, or 4, k = 0, 1, or 2,A<sup>3</sup> is a polycyclic group having 1 to 40 carbon atoms comprising at least two distinct fused or single phenyl rings, wherein both phenyl rings are singly and individually bonded to S<sup>+</sup>.

16. A method for providing a patterned layered structure comprising the steps:

- (a) providing a substrate which is transmissive to actinic radiation having a pattern on a first surface thereof,
- (b) coating on at least a portion of the second surface of said substrate a layer of the composition according to claim 1,
- (c) subjecting said first surface to actinic radiation for a time sufficient to polymerize said composition,
- (d) washing said second surface with a liquid suitable for removing unpolymersed composition in patterned areas to provide a patterned layered structure.

4,954,417

LIGHT-SENSITIVE MICROCAPSULE CONTAINING  
POLYMERIZABLE COMPOUND AND SILVER HALIDE,  
AND LIGHT-SENSITIVE MATERIAL EMPLOYING THE  
SAME

Taku Nakamura; Tsumoru Hirano; Elji Funatsu, and Shunichi Ishikawa, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 933,510, Nov. 21, 1986, abandoned.

This application Apr. 11, 1989, Ser. No. 336,491

Claims priority, application Japan, Nov. 21, 1985, 60-261888;

Jan. 22, 1986, 61-11556

Int. Cl.<sup>5</sup> G03C 1/72

U.S. Cl. 430—138 8 Claims

1. A light-sensitive element comprising a support and a



light-sensitive layer containing silver halide, a polymerizable compound having an ethylenic unsaturated group, a reducing agent having a function of reducing the silver halide or a function of accelerating or restraining polymerization of the polymerizable compound, and a binder,

said silver halide being contained in the light-sensitive layer in such an amount that the total silver content is in the range of from 0.1 mg/m<sup>2</sup> to 10 g/m<sup>2</sup>, said polymerizable compound being contained in the light-sensitive layer in an amount of from 5 to 1.2 × 10<sup>5</sup> times by weight as much as the amount of silver halide, and said reducing agent being contained in the light-sensitive layer in an amount of from 0.1 to 1,500 mole % based on the amount of silver, wherein the silver halide and polymerizable compound are contained in microcapsules which are dispersed in the light-sensitive layer, said polymerizable compound being arranged as a core material of the microcapsule, and a shell material of the microcapsules containing the silver halide under the condition that the core material contains silver halide in an amount of not more than 30% by weight of the amount of the silver halide in the shell material.

**4,954,418**  
**FORMATION METHOD AND PHOTORESIST COMPOSITION FOR PHOSPHOR SCREENS OF COLOR PICTURE TUBES**

Norio Koike, Fnkaya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 143,718, Jan. 14, 1988, Pat. No. 4,857,428. This application May 31, 1989, Ser. No. 359,621

Claims priority, application Japan, Jan. 22, 1987, 62-11255 Int. Cl.<sup>5</sup> G03F 7/008, 7/021; G03C 1/34

U.S. Cl. 430—175 4 Claims

1. A photoresist composition comprising an admixture of a phosphate of a formalin condensation product of diazodiphenylamine; 2,5-bis(4'-azide-2'-sulphobenzilidene) cyclopentanone and its salts as cross-linking agent; polyvinylalcohol; and polyvinylpyrrolidone, wherein the ratio of the phosphate of the formalin condensation product of diazodiphenylamine to the 2,5-bis(4'-azide-2'-sulphobenzilidene) cyclopentanone and its salts is within the range of about 1:5 to 1:15 by weight and the ratio of the polyvinylalcohol to polyvinylpyrrolidone is within the range of about 1:1 to about 1:8 by weight.

**4,954,419**  
**DIFFUSION TRANSFER PHOTOGRAPHIC FILM UNIT**  
Yukio Shinagawa; Toru Oikawa; Junichi Yamanouchi, and Kentaro Shiratsuchi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 5, 1989, Ser. No. 333,228  
Claims priority, application Japan, Apr. 6, 1988, 63-84666; Jun. 23, 1988, 63-155934

Int. Cl.<sup>5</sup> G03C 5/54, 1/90  
U.S. Cl. 430—215 20 Claims

1. A diffusion transfer photographic film unit comprising a support having thereon outwardly from said support (a) a dye image receiving layer; (b) a first peeling layer containing a copolymer of at least (i) an ethylenically unsaturated monomer containing at least one hydrocarbon group containing from 7 to 18 carbon atoms, and (ii) an ethylenically unsaturated monomer, the homopolymer of which is soluble in water or an aqueous alkaline solution; (c) a second peeling layer containing a cellulose ester; and (d) a light-sensitive silver halide emulsion layer containing a light-sensitive silver halide and a dye image forming substance.

**4,954,420**  
**METAL-CONTAINING INDOANILINE COMPOUND AND OPTICAL RECORDING MEDIUM EMPLOYING THE COMPOUND**

Shuichi Maeda, Saitama; Toshio Kaneko, Ebina; Yutaka Kurose, Kawasaki; Michio Kimura, Shizuoka; Hidemi Yoshida, Atsugi; Kenichi Uchino, Tama, and Shizue Inaba, Yokohama, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

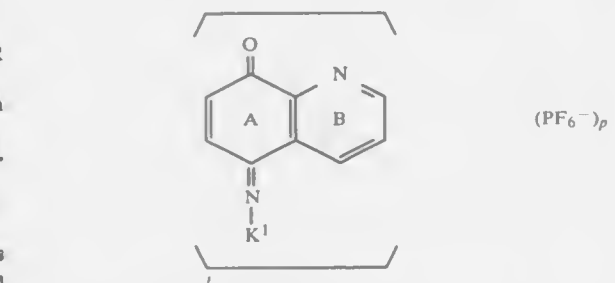
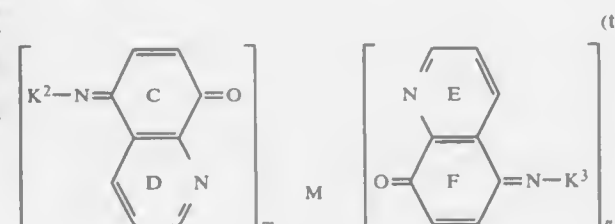
Filed Sep. 30, 1988, Ser. No. 251,364

Claims priority, application Japan, Oct. 2, 1987, 62-249519; Mar. 11, 1988, 63-57846

Int. Cl.<sup>5</sup> G11B 7/24; G03C 1/72

U.S. Cl. 430—270 8 Claims

1. A metal-containing indoaniline compound having the formula:



wherein M is a metal atom of Group VIII, Ib, IIb, IIIb, IVa, Va, VIa or VIIa of the Periodic Table or its halide or oxide, rings A, B, C, D, E and F may have substituents, each of K<sup>1</sup>, K<sup>2</sup> and K<sup>3</sup> is a residue of a substituted or unsubstituted aromatic amine, each of l, m and n is 0 or 1, provided 1 + m + n = 2 or 3, and p is 2, 3 or 4.

**4,954,421**  
**PHOTOFLASHING A LIQUID POLYMER LAYER ON A PHOTOTOOL SURFACE EXPOSED TO AIR**

Donald F. Sullivan, Paradise, Pa., assignor to M&T Chemicals Inc., Woodbridge, N.J.

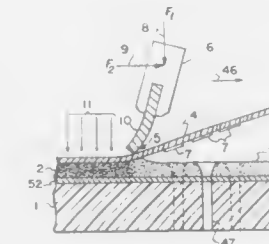
Continuation-in-part of Ser. No. 147,726, May 8, 1980, Pat. No. 4,669,869, and a continuation-in-part of Ser. No. 672,500, Nov. 19, 1984, which is a continuation-in-part of Ser. No. 364,309, Apr. 1, 1982, Pat. No. 4,506,004. This application Apr. 2, 1986, Ser. No. 847,188

Int. Cl.<sup>5</sup> G03C 1/78 8 Claims

1. In the method of producing intermediate products used in printing on a substrate surface an insulation pattern formed by a polymer coating, the steps of disposing on an image bearing photographic film transparency a layer of liquid photopolymer with its outer surface exposed to air, exposing the layer with that amount of curing radiation passed through the film to partially expose the layer through its thickness and harden portions in a pattern corresponding to the image on the film

and leaving the layer surface exposed to air in liquid polymer uncured state for contact with said substrate surface as an

forming a pillar masking pad on said pillar layer; photolithographically patterning and etching the pillar and



intermediate liquid polymer layer between the outcured polymer layer and the substrate.

**4,954,422**  
**RECORDING MATERIAL CONTAINING A LAYER OF POLYMER PARTICLES AND A SUPERIMPOSED METALLIC LAYER**

Josef Lamprecht, Frankenthal; Gregor Ley, Wattenheim; Arend Werner, and Helmut Barzynski, both of Bad Duerkheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 66,999, Jun. 29, 1987, abandoned. This application Jan. 13, 1989, Ser. No. 296,962

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1986, 3621685

Int. Cl.<sup>5</sup> G03C 1/72, 1/94

U.S. Cl. 430—275 3 Claims

1. A photosensitive recording material for recording information by means of a local change in the properties of a recording layer under the action of light having a high energy density, which recording material consists essentially of

- a base;
  - a particulate layer consisting of virtually spherical particles on said base, said particles being formed from an organic polymer having a softening point above 50° C. and having a mean particle diameter of not more than 5,000 nm; and
  - a metallic layer applied to the top of the particulate layer.
3. The photosensitive recording material of claim 1, wherein the virtually spherical particles of the particulate layer consist of an organic polymer having a softening point of from 50 to 150° C. and a mean particle diameter of from 30 to 5000 nm.

**4,954,423**  
**PLANAR METAL INTERCONNECTION FOR A VLSI DEVICE**

Ronald E. McMann; Evaristo Garcia, Jr., both of Rosenberg; Michael T. Welch, Sugar Land, and Stephen W. Thompson, Richmond, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 11,355, Jan. 19, 1987, abandoned, which is a continuation of Ser. No. 762,885, Aug. 6, 1985, abandoned. This application Mar. 13, 1989, Ser. No. 323,108

Int. Cl.<sup>5</sup> G03C 5/00 27 Claims

1. A method of forming a contact or interconnect for a semiconductor integrated circuit device, comprising: forming first and pillar layers of electrically conducting material on a face of the semiconductor

first layers to the dimension of a first lead confining said pillar masking pad; and etching the pillar layer to form a pillar.

**4,954,424**  
**PATTERN FABRICATION BY RADIATION-INDUCED GRAFT COPOLYMERIZATION**

Kozo Mochiji, Hachioji; Hiroaki Oizumi, Kokubunji; Yasunari Soda, Koganei; Taro Ogawa, Kodaira, and Takeshi Kimura, Higashimurayama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

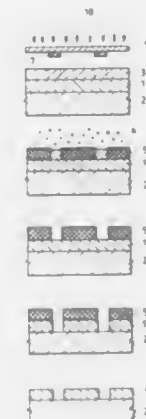
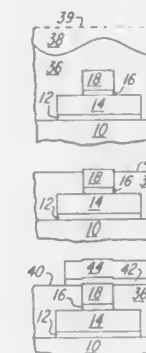
PCT No. PCT/JP88/00691, § 371 Date Dec. 20, 1988, § 102(e) Date Dec. 20, 1988, PCT Pub. No. WO89/01187, PCT Pub. Date Feb. 9, 1989

PCT Filed Jul. 11, 1988, Ser. No. 295,209

Claims priority, application Japan, Jul. 27, 1987, 62-185480 Int. Cl.<sup>5</sup> G03C 5/16

U.S. Cl. 430—323 13 Claims

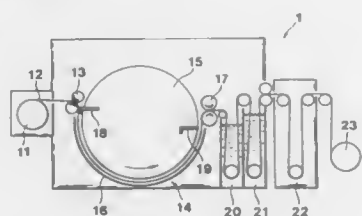
1. A method of pattern fabrication by radiation induced graft copolymerization comprising a coating step of forming, on the surface of a substrate to be fabricated, a resist layer composed of a poly(methacrylate) having a phenyl group and which is capable of graft-copolymerization, an exposure step of irradiating a predetermined region of said resist layer with radiation, a graft copolymerization step of introducing a monomer to graft copolymerize said resist layer with said monomer, a development step of developing said resist layer to fabricate a predetermined resist pattern, and an etching step of conducting dry etching of the surface of said substrate by making use of said resist pattern as a mask.



# 4,954,425

## METHOD FOR FORMING INTENSIFIED COLOR IMAGE

Haruhiko Iwano, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
 Filed Aug. 15, 1988, Ser. No. 232,253  
 Claims priority, application Japan, Aug. 13, 1987, 62-200856  
 Int. Cl.<sup>3</sup> G03C 7/40, 7/26, 7/30  
 U.S. Cl. 430—373 15 Claims



1. A method for forming an intensified color image comprising subjecting an image-wise exposed silver halide color photographic material substantially free from silver iodide as the photosensitive silver halide and containing 80 mole % or more of silver chloride to color-development processing using a monobath development-intensifying solution containing

- (1) hydrogen peroxide or a compound that releases hydrogen peroxide,
- (2) a color-developing agent,
- (3) bromide ions in an amount of  $2 \times 10^{-4}$  mol/l or less, and
- (4) iodide ions in an amount of  $3 \times 10^{-3}$  mol/l or less, in an amount of 5 l to 0.05 l of monobath development-intensifying solution per m<sup>2</sup> of the photographic material.

# 4,954,426

## METHOD FOR PROCESSING SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIALS

Takatoshi Ishikawa, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan  
 Filed Apr. 28, 1988, Ser. No. 187,600  
 Claims priority, application Japan, Apr. 30, 1987, 62-106600  
 Int. Cl.<sup>3</sup> G03C 7/16, 7/42

U.S. Cl. 430—386 15 Claims  
 1. A method for processing a silver halide color photographic light-sensitive material having a coated silver halide in an amount of not more than 0.8 g/m<sup>2</sup> as an amount of elemental silver, which comprises color developing the light-sensitive material and then subjecting the developed material to a bleach-fixing treatment of a single bleach-fixing bath containing a bleach-fixing solution, the amount of bleach-fixing solution replenished being 0.2 to 15 times the volume of the color developer carried over, to the bleach-fixing bath by the processed light-sensitive material per unit area thereof, and the amount of the replenisher for the bleach-fixing bath also being 20 to 250 ml per 1 m<sup>2</sup> of the processed light-sensitive material, and further wherein not less than 80 mole % of the total non-metallic cations present in the replenisher for the bleach-fixing solution comprise ammonium ions.

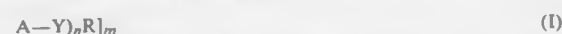
# 4,954,427

## PROCESS FOR THE FORMATION OF DIRECT POSITIVE IMAGES

Noriyuki Inoue, Tetsuro Kojima, Tatsuo Heki, and Shigeo Hirano, all of Minami Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
 Filed Jun. 12, 1987, Ser. No. 60,790  
 Claims priority, application Japan, Jun. 12, 1986, 61-136949  
 The portion of the term of this patent subsequent to Dec. 6, 2005, has been disclaimed.  
 Int. Cl.<sup>3</sup> G03C 5/22, 5/24

U.S. Cl. 430—409 32 Claims  
 1. A process for the formation of direct positive color images

which comprises (1) imagewise exposing to light a light-sensitive material comprising a photographic emulsion layer containing unfogged internal latent image type silver halide particles on at least one support, and (2) developing said light-sensitive material with a processing solution with a pH of 9.5 to 11.5 containing as a main component a p-phenylenediamine and in the presence of a nucleating agent and at least one nucleation accelerator of general formula (I):



wherein A represents a group which is adsorbed by a silver halide; Y represents a divalent linkage group consisting of a hydrogen atom, a carbon atom, a nitrogen atom, an oxygen atom, and a sulfur atom; R represents an organic group containing at least one of a thioether group, an amino group, an ammonium group, an ether group, and a heterocyclic group; n represents an integer of 0 or 1; and m represents an integer of 1 or 2, to form direct positive color images.

# 4,954,428

## COATING FOR INCREASING SENSITIVITY OF A RADIATION IMAGEABLE POLYACETYLENIC FILM

David F. Lewis, Monroe, Conn., and Robert D. Schenfele, Caldwell, N.J., assignors to GAF Chemicals Corporation, Wayne, N.J.  
 Division of Ser. No. 258,522, Oct. 17, 1988. This application Sep. 1, 1989, Ser. No. 401,717  
 Int. Cl.<sup>3</sup> G03C 1/72, 1/78

U.S. Cl. 430—495 17 Claims  
 1. The process which comprises overcoating as a discrete overcoat layer the surface of an imageable polyacetylenic layer disposed on an irradiation imageable film with an effective sensitizing amount of the composition comprising between about 0.001% and about 1.0% by weight of an N-alkyl lactam dispersing aid and a metal nitrate, acetate or persulfate salt of a metal having an atomic number of at least 50 or a mixture of said metal salts dispersed in between about 4% and about 50% by weight of an aqueous solution of a binder compatible with the binder of imageable polyacetylene crystals; said composition having a weight ratio of metal salt to binder between about 0.4:1 and about 2.5:1.

# 4,954,429

## SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL FOR LASER RECORDING

Yukihide Urata, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
 Filed Oct. 27, 1988, Ser. No. 263,226  
 Claims priority, application Japan, Oct. 29, 1987, 62-274233  
 Int. Cl.<sup>3</sup> G03C 1/10, 7/26

U.S. Cl. 430—503 8 Claims  
 1. A color photographic material comprising a support having thereon at least one red-sensitive silver halide emulsion layer, at least one green-sensitive silver halide emulsion layer and at least one blue-sensitive silver halide emulsion layer, wherein each of the silver halide emulsion layers is sensitized by adding at least one sensitizing dye at 50° C. to 80° C., and with respect to helium-cadmium laser light having a wavelength of 441.6 nm,  
 (1) the ratio of the sensitivity of the green-sensitive emulsion layer to that of the blue-sensitive emulsion layer is at most 0.1 and  
 (2) the ratio of the sensitivity of the red-sensitive emulsion layer to that of the blue-sensitive emulsion layer is at most 0.10;  
 with respect to argon laser light having a wavelength of 514.5 nm,  
 (1) the ratio of the sensitivity of the blue-sensitive emulsion layer to that of the green-sensitive emulsion layer is at most 0.1 and  
 (2) the ratio of the sensitivity of the red-sensitive emulsion

layer to that of the green-sensitive emulsion layer is at most 0.10; and  
 with respect to helium-neon laser light having a wavelength of 632.8 nm,  
 (1) the ratio of the sensitivity of the blue-sensitive emulsion layer to that of the red-sensitive emulsion layer is at most 0.1 and  
 (2) the ratio of the sensitivity of the green-sensitive emulsion layer to that of the red-sensitive emulsion layer is at most 0.10.

# 4,954,430

## SILVER HALIDE PHOTOGRAPHIC ELEMENT WITH POLYESTER BASE

Kunio Ishigaki, and Takashi Naol, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
 Continuation of Ser. No. 157,835, Feb. 19, 1988, abandoned.  
 This application Jan. 19, 1990, Ser. No. 467,284  
 Claims priority, application Japan, Feb. 19, 1987, 62-36244; Apr. 16, 1987, 62-94133; Jun. 4, 1987, 62-140634; Jul. 15, 1987, 62-176626  
 Int. Cl.<sup>3</sup> G03C 1/82

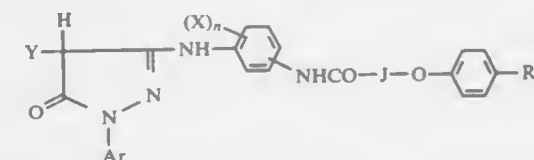
U.S. Cl. 430—534 6 Claims  
 1. A silver halide element comprising, in sequence:  
 (i) a biaxially oriented polyester support having a thickness of 40 to 200  $\mu$ m,  
 (ii) a polymer layer on both surfaces of said polyester support, and  
 (iii) at least one hydrophilic colloid layer containing from 0.01 to 1.0 parts by weight of a polymer latex per 1.0 part by weight of a binder in said hydrophilic colloid layer, on at least one side of said polyester support, wherein at least one of said hydrophilic colloid layers is a silver halide emulsion layer, and wherein said polymer layer consists essentially of a copolymer containing from 50-99.5% by weight vinylidene chloride and 50.5% by weight of at least one comonomer, and wherein each polymer layer has a thickness of at least 0.3  $\mu$ m.

# 4,954,431

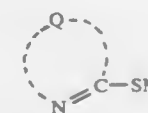
## SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Toyoki Nishijima, and Masaki Tanji, both of Odawara, Japan, assignors to Konica Corporation, Tokyo, Japan  
 Filed Jun. 23, 1989, Ser. No. 370,814  
 Claims priority, application Japan, Jul. 6, 1988, 63-166895  
 Int. Cl.<sup>3</sup> G03C 7/38

U.S. Cl. 430—546 15 Claims  
 1. A silver halide photographic light-sensitive material comprising a support having thereon a silver halide emulsion layer and a non-light-sensitive layer, wherein said silver halide emulsion layer contains at least one of the magenta couplers represented by the following Formula I, and at least one of said silver halide emulsion layer and said non-light-sensitive layer contains at least one of the compounds represented by the following Formula S:



wherein Ar is an aryl group; Y is a hydrogen atom or a group capable of being split off upon reaction with the oxidation product of a color developing agent, X is a halogen atom, an alkoxy group or an alkyl group; R<sub>1</sub> is a straight or branched chain alkyl group having 1 to 20 carbon atoms; J is a straight or branched chain alkylene group; and n is an integer of 0 to 4,



provided that the groups represented by X may be the same with or different from each other when n is 2 or more,

wherein Q is a group of atoms necessary to complete a five- or six-member heterocyclic ring which is allowed to be condensed with a benzene ring or a naphthalene ring; M is a hydrogen atom, an alkali metal atom or an ammonium group.

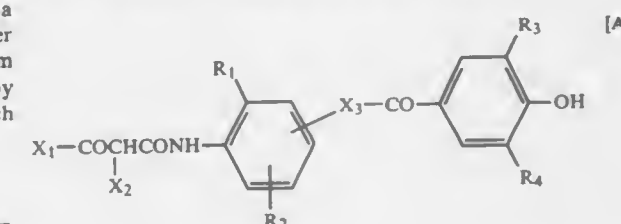
10. The material of claim 1, wherein a high-boiling organic solvent having a dielectric constant of not more than 6.5 is contained in said silver halide emulsion layer.

# 4,954,432

## PHOTOGRAPHIC MATERIAL WITH SOLVENT HAVING DIELECTRIC CONSTANT OF 6 OR LESS AND YELLOW COUPLER

Toyoki Nishijima, Odawara, Japan, assignor to Konica Corporation, Tokyo, Japan  
 Filed Dec. 29, 1988, Ser. No. 291,750  
 Claims priority, application Japan, Jan. 7, 1988, 63-2076  
 Int. Cl.<sup>3</sup> G03C 7/34, 7/36

U.S. Cl. 430—546 18 Claims  
 1. A silver halide light-sensitive photographic material comprising a support and provided thereon at least one silver halide emulsion layer containing a yellow dye-forming coupler having a formula [A] below and a high boiling organic solvent having a dielectric constant of not more than 6.0;



wherein R<sub>1</sub> represents a halogen atom or a substituted or unsubstituted alkoxy group having 1 to 4 carbon atoms; R<sub>2</sub> represents a hydrogen atom, a halogen atom, a substituted or unsubstituted alkyl group or a substituted or unsubstituted alkoxy group; R<sub>3</sub> and R<sub>4</sub> independently represent a substituted or unsubstituted alkyl group which is capable of making said coupler non-diffusible in the photographic material; X<sub>1</sub> represents a substituted or unsubstituted tertiary butyl group or a substituted or unsubstituted p-alkoxy phenyl group; X<sub>2</sub> represents a hydrogen atom or a group which is capable of being split off during color development; and X<sub>3</sub> represents a linking group.

# 4,954,433

## METHOD FOR THE IMMUNOLocalization OF ANTIGENS WITH THE USE OF ANTIBODIES DIRECTED AGAINST EPITOPES OF NON-GLUCIDIC NATURE

Paolo Ruggiero, Siena, and Roberto Petracca, Monteroni D'Arbia, both of Italy, assignors to Sclavo S.p.A., Siena, Italy  
 Filed Sep. 2, 1988, Ser. No. 239,642  
 Claims priority, application Italy, Sep. 4, 1987, 21792 A/87  
 Int. Cl.<sup>3</sup> G01N 33/535

U.S. Cl. 435—7 8 Claims  
 1. Method for the immunolocalization of antigens by means of the use of antibodies directed against epitopes of non-glucidic nature, which comprises:  
 (a) submitting the sample to a treatment for modifying or masking any possibly present glucidic residues,



- sting live infection containing

pine family or Nopaline family to promote production of T-strand DNA in said induced species, and thereafter infecting the plant cells with an inoculum comprising the vir gene induced *Agrobacterium* species.

4,954,443

# METHOD OF IMMOBILIZING BIOCHEMICALLY ACTIVE SUBSTANCE WITH XANTHAN GUM

Osamu Yamada, and Tadasu Fujita, both of Yokohama, Japan, assigns to The Nisshin Oil Mills, LTD., Tokyo, Japan  
Continuation of Ser. No. 810,600, Dec. 19, 1985, abandoned.  
This application Nov. 18, 1988, Ser. No. 274,604  
Claims priority, application Japan, Dec. 27, 1984, 59-273786; Feb. 12, 1985, 60-24988

Int. Cl.<sup>5</sup> C12N 11/10, 11/02, 11/04

U.S. Cl. 435—178

11 Claims

1. A method of immobilizing a biochemically active substance, consisting essentially of: mixing a first aqueous solution containing at least one biochemically active substance and an immobilizing agent selected from the group consisting of xanthan gum and derivatives thereof with a second aqueous solution containing metal ions having a valence of 3 or more, selected from the group consisting of iron, tin, manganese and titanium ions in an amount sufficient to precipitate the xanthan gum or derivatives thereof and obtain a precipitate containing the biochemically active substance immobilized therein.

4,954,444

# ENZYME IMMOBILIZATION AND BIOAFFINITY SEPARATIONS WITH PERFLUOROCARBON POLYMER-BASED SUPPORTS

John William d. Eveleigh, Hockessin, and Robert K. Kobos, Wilmington, both of Del., assigns to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
Continuation-in-part of Ser. No. 20,808, Mar. 2, 1987, Pat. No. 4,885,250. This application Dec. 17, 1987, Ser. No. 134,028  
The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C12N 11/06, 11/08; G01N 33/549; C07K 17/08

U.S. Cl. 435—181

25 Claims

1. A solid support containing an attached ligand or binder for the ligand consisting essentially of:  
(A) a chemically inert, water immiscible solid perfluorocarbon polymer carrier having low nonspecific binding to a ligand or binder for the ligand;  
(B) a highly fluorinated isocyanate-modified ligand or binder for the ligand securely but reversibly attached to the surface of said carrier through said highly fluorinated isocyanate; and  
(C) a nonionic fluorosurfactant coating on said carrier.

4,954,445

# NAD(P)H OXIDASE

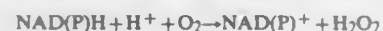
Yoshio Yoshihama, Otsu; Asuka Kagaya, Nishinomiya; Susumu Matsui, Otsu, and Akira Obayashi, Uji, all of Japan, assigns to Takara Shuzo Co., Ltd., Kyoto, Japan  
Filed Aug. 11, 1987, Ser. No. 83,921  
Claims priority, application Japan, Aug. 12, 1986, 61-188824; Nov. 28, 1986, 61-283240

Int. Cl.<sup>5</sup> C12N 9/06, 9/02

U.S. Cl. 435—191

1 Claim

1. Novel NAD(P)H oxidase having the following enzymological properties:  
(1) Action  
It oxidizes NADH or NADPH in the presence of oxygen to form NAD or NADP and hydrogen peroxide.



- (2) Substrate specificity  
It acts upon NADH and NADPH.  
(3) Optimum pH

Its optimum pH lies in the range of about 9 to 10.

4,954,446

# AROMATIC STEROID 5- $\alpha$ -REDUCTASE INHIBITORS

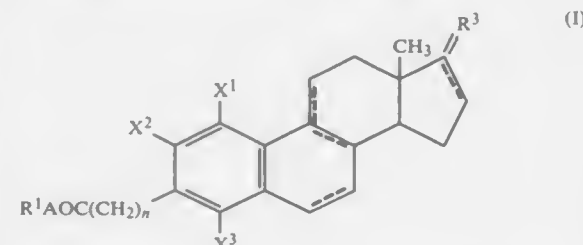
Dennis A. Holt, Downingtown; Mark A. Levy, St. Davids, and Brian W. Metcalf, Radnor, all of Pa., assigns to SmithKline Beecham Corporation, Philadelphia, Pa.  
Continuation-in-part of Ser. No. 198,534, May 25, 1988, abandoned. This application Jul. 14, 1989, Ser. No. 380,226

Int. Cl.<sup>5</sup> A61K 31/56; C07J 41/00

U.S. Cl. 435—184

14 Claims

1. A compound represented by the formula:



in which:

the B, C, and D rings have optional double bonds where indicated by the broken lines, provided that the C ring does not have a double bond when the B ring has a C8-C9 double bond and the D ring does not have a C16-C17 double bond when R3 represents two substituents or a divalent substituent;

X1, X2, and X3 are any accessible combination of H, Cl, F, Br, I, CF<sub>3</sub>, or C<sub>1-6</sub>alkyl OH, C<sub>1-6</sub>alkoxy, CN, NO<sub>2</sub>, N(R<sup>1</sup>)<sub>2</sub>, CHO, or CO<sub>2</sub>R<sup>1</sup>;

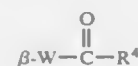
A is O or S;

n is 0 or 1;

R<sup>1</sup> each independently is H or C<sub>1-8</sub>alkyl; and

R<sup>3</sup> is

- (1)  $\alpha$ -hydrogen,  $\alpha$ -hydroxyl, or  $\alpha$ -acetoxy and/or  
(a)



where W is a bond or C<sub>1-12</sub>alkyl, and R<sup>4</sup> is

- (i) hydrogen,  
(ii) hydroxyl,  
(iii) C<sub>1-8</sub>alkyl,  
(iv) hydroxy C<sub>1-8</sub>alkyl,  
(v) C<sub>1-8</sub>alkoxy,  
(vi) NR<sup>5</sup>R<sup>6</sup>, where R<sup>5</sup> and R<sup>6</sup> are each independently selected from hydrogen, C<sub>1-8</sub>alkyl, C<sub>3-6</sub>cycloalkyl, phenyl; or R<sup>5</sup> and R<sup>6</sup> taken together with the nitrogen to which they are attached represent a 5-6 membered saturated ring comprising up to one other heteroatom selected from oxygen and nitrogen, or  
(vii) OR<sup>7</sup>, where R<sup>7</sup> is alkali metal, C<sub>1-8</sub>alkyl, or benzyl, or  
(b)  $\beta$ -Alk-OR<sup>8</sup>, where Alk is C<sub>1-12</sub>alkyl, and R<sup>8</sup> is  
(i) phenylC<sub>1-6</sub>alkylcarbonyl,  
(ii) C<sub>5-10</sub>cycloalkylcarbonyl,  
(iii) benzoyl,  
(iv) C<sub>1-8</sub>alkoxycarbonyl,  
(v) amino, or C<sub>1-8</sub>alkyl substituted amino, carbonyl, or  
(vi) C<sub>1-8</sub>alkyl,  
(2)  $\text{=CH-W-CO-R}^4$  or  $\text{=CH-W-OR}^8$ , where W is a bond or C<sub>1-12</sub>alkyl and R<sup>4</sup> and R<sup>8</sup> have the same meaning as above and R<sup>8</sup> also is C<sub>1-20</sub>alkylcarbonyl;  
(3)



where the dashed bond replaces the 17- $\alpha$ -hydrogen,  
(4)  $\alpha$ -hydrogen and  $\beta$ -NHCOR<sup>9</sup> where R<sup>9</sup> is C<sub>1-12</sub>alkyl or  $\beta$ -NR<sup>5</sup>R<sup>6</sup> where R<sup>5</sup> and R<sup>6</sup> have the same meaning as above,  
(5)  $\alpha$ -hydrogen and  $\beta$ -cyano,  
(6)  $\alpha$ -hydrogen and  $\beta$ -tetrazolyl, or  
(7) keto;  
or a pharmaceutically acceptable salt thereof; except the compound in which:  
R<sup>1</sup> is CH<sub>3</sub>, n is 0, A is O, and R<sup>3</sup> is keto.

4,954,447

# FERAXANASE, A HIGHLY SPECIFIC ENZYME FOR HYDROLYSIS OF COMPLEX POLYSACCHARIDES

Donald J. Nevins, Davis, Calif., and Kazuhiko Nishitani, Kagoshima, Japan, assigns to The Regents of the University of California, Oakland, Calif.

Filed Jul. 22, 1988, Ser. No. 223,125

Int. Cl.<sup>5</sup> C12N 15/56, 9/24

U.S. Cl. 435—200

12 Claims

1. A composition comprising a substantially pure enzyme which degrades arabinoxylan and has a molecular weight of about 45,000.

4,954,448

# MODULATION OF ADENYLATE CYCLASE RESPONSE

Karl E. Wiegand, Baton Rouge, La., and Robert K. Rude, Los Angeles, Calif., assigns to Nelson Research & Development Company, Irvine, Calif.

Filed Dec. 27, 1988, Ser. No. 290,307

Int. Cl.<sup>5</sup> C12N 9/88

U.S. Cl. 435—232

7 Claims

1. A process for modulating the enzymatic activity of an adenylate cyclase, said process comprising contacting said cyclase with a modulating amount of silicic acid said modulating amount being no more than about the level of saturation of silicic acid.

4,954,449

# HUMAN MONOCLONAL ANTIBODY REACTIVE WITH POLYRIBOSYL-RIBITOL PHOSPHATE

Kenneth W. Hunter, Kensington, and Gerald W. Fischer, Galtersburg, both of Md., assigns to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 411,115, Aug. 24, 1982, Pat. No. 4,744,982.

This application Feb. 12, 1988, Ser. No. 155,437

Int. Cl.<sup>5</sup> C12N 5/00; C07K 15/00, 15/28

U.S. Cl. 435—240.27

2 Claims

1. A self-reproducing hybridoma containing genes that produce a human monoclonal antibody reactive with antigenic polyribosylribitol phosphate capsular polysaccharide.

4,954,450

# METHOD FOR CONTROLLING THE CONCURRENT GROWTH OF TWO OR MORE LACTIC ACID PRODUCING BACTERIA

Carl F. Brothersen, Millville, Utah, and Willard R. W. Knoespel, Green Bay, Wis., assigns to Miles Laboratories, Inc., Madison, Wis.

Filed Aug. 17, 1987, Ser. No. 86,155

Int. Cl.<sup>5</sup> C12N 1/20; C12P 39/00, 7/56; A23C 19/00

U.S. Cl. 435—252.4

1 Claim

1. A method of growing a mixture of lactic acid producing

*Lactobacillus bulgaricus* or *L. helveticus* and *Streptococcus thermophilus* in a suitable nutrient medium which comprises:

- (a) allowing the mixture of bacteria to grow at a temperature of from 44° to 46° C. until the lactic acid produced thereby lowers the pH of the medium to a level of from 4.7 to 5.0;  
(b) maintaining the pH within the range specified in step (a)  $\pm 0.2$  pH units while maintaining the temperature of the medium at a level of from about 44° to 46° C. for a time sufficient for the *Lactobacillus* sp. to grow to the desired concentration;  
(c) adding neutralizer to the medium to raise the pH to a level of from 5.4 to 6.0; and  
(d) maintaining the pH within the range specified in step (c)  $\pm 0.2$  pH units while maintaining the temperature of the medium at a level of from about 36° to 40° C. until the *S. thermophilus* grow to the desired concentration; and  
(e) cooling the medium to a level where further growth of the bacteria is inhibited.

4,954,451

# AGENT FOR DIMINISHING ASCORBATE INTERFERENCE IN REAGENT SYSTEMS AND METHOD RELATING THERETO

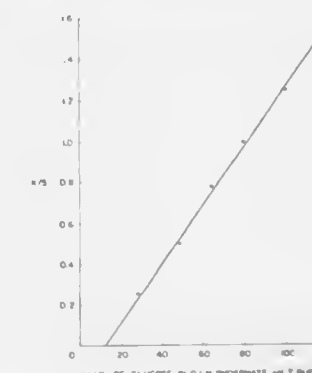
James P. Albarella, and Mietak T. Yip, both of Elkhart, Ind., assigns to Miles Inc., Elkhart, Ind.

Filed Jun. 26, 1989, Ser. No. 371,253

Int. Cl.<sup>5</sup> G01N 1/00, 33/00, 33/72

U.S. Cl. 436—175

2 Claims



1. A method for substantially eliminating ascorbate interference in a reagent system, said method comprising:  
combining a reagent system containing a redox indicator with a water insoluble cerium IV compound.

4,954,452

# NON-METAL COLLOIDAL PARTICLE IMMUNOASSAY

David A. Yost, Round Lake Park, Ill.; John C. Russell, Greenfield, Wis., and Heechung Yang, Green Oaks, Ill., assigns to Abbott Laboratories, Abbott Park, Ill.

Filed Jul. 9, 1987, Ser. No. 72,084

Int. Cl.<sup>5</sup> G01N 33/551, 33/566, 33/543, 33/536

U.S. Cl. 436—524

28 Claims

1. A method for determining the presence or amount of an analyte in a sample comprising the steps of: contacting said sample with a non-metal labelled constituent comprising colloidal non-metal inorganic particles selected from the group consisting of sulfur, selenium, and tellurium having conjugated thereto a binding component capable of specifically recognizing said analyte; and then determining the presence or amount of analyte/colloidal non-metal particle complexes as a measure of the amount of analyte in the sample.



4,954,453

**METHOD OF PRODUCING AN ARTICLE COMPRISING A MULTICHIP ASSEMBLY**

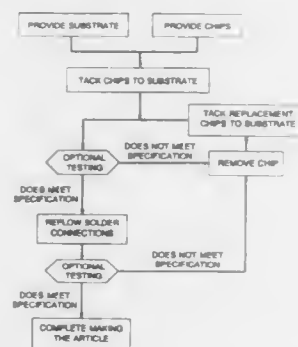
John H. Venutolo, Summit, N.J., assignor to AT&amp;T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 24, 1989, Ser. No. 316,050

Int. Cl.<sup>5</sup> H05K 3/00; H01L 21/66

U.S. Cl. 437-8

5 Claims



1. Method of producing an article comprising a multichip assembly that comprises a substrate with a multiplicity of electronic subassemblies thereon, a given subassembly attached to the substrate by means of a multiplicity of localized solder regions, the subassemblies to be referred to as "chips" and the localized solder regions to be referred to as "solder bumps"; the method comprising

- producing multichip assemblies;
- testing at least some of the multichip assemblies;
- if the testing indicates that a given assembly does not meet predetermined criteria due to a fault associated with a given chip or chips then the given chip or chips are removed from the substrate, and a replacement chip or chips are attached to the substrate; and the method further comprises
- completing producing the article; CHARACTERIZED IN THAT step (c) comprises
- heating at least the solder bumps between the given chip and the substrate to a temperature  $T_r$ , such that  $T_r < T_m$ , where  $T_m$  is the absolute solidus temperature of the solder, the heating carried out such that a temperature gradient exists across the solder bumps; and
- applying to the given chip a combination of a torque and a lifting force, the combination being sufficient to cause separation of the given chip from the substrate.

4,954,454

**METHOD FOR FABRICATING A POLYCRYSTALLINE SILICON RESISTOR**

Kazuhiko Kobushi, Osaka; Shuichi Kameyama, Itami, and Tadao Komeda, Ikoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 131,739, Dec. 11, 1987, abandoned.

This application Jun. 30, 1989, Ser. No. 374,608

Claims priority, application Japan, Dec. 16, 1986, 61-299436; Dec. 16, 1986, 61-299437

Int. Cl.<sup>5</sup> H01L 21/265

U.S. Cl. 437-21

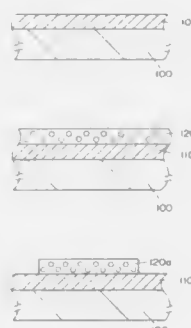
5 Claims

1. A method for fabricating a polycrystalline silicon resistor comprising the steps of:

- forming a dielectric film on a substrate;
- forming a polycrystalline silicon film on said dielectric film;
- ion-implanting first atoms which do not determine conductivity type into said polycrystalline silicon film without making a surface of said polycrystalline silicon film, which does not contact said dielectric film, amorphous;
- applying a first heat treatment to said polycrystalline silicon film which contains said first atoms which do not deter-

mine conductivity type, to substantially increase the uniformity of distribution of said first atoms in said polycrystalline silicon film and to substantially increase the crystal grain size and uniformity of said polycrystalline silicon film;

applying second atoms which determine conductivity type into said polycrystalline silicon film which said heat treatment is applied to; and



applying a second heat treatment to said polycrystalline silicon film which contains said second atoms to substantially increase the uniformity of distribution of said second atoms in said polycrystalline silicon film and wherein said polycrystalline silicon film is patterned and used as a resistor on said dielectric film.

4,954,455

**SEMICONDUCTOR MEMORY DEVICE HAVING PROTECTION AGAINST ALPHA STRIKE INDUCED ERRORS**

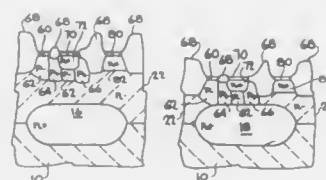
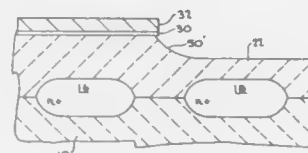
Drew Wanderman, Palo Alto, and Matthew Weinberg, Mountain View, both of Calif., assignors to Advanced Micro Devices, Sunnyvale, Calif.

Continuation of Ser. No. 211,179, Jun. 24, 1988, abandoned, which is a continuation of Ser. No. 683,288, Dec. 18, 1984, abandoned. This application Oct. 18, 1988, Ser. No. 259,472

Int. Cl.<sup>5</sup> H01L 21/331

U.S. Cl. 437-31

20 Claims



1. A method of constructing an improved bipolar integrated circuit device having bipolar memory transistors and bipolar logic transistors comprising the steps of:

- forming first and second buried collector layer regions of a first conductivity type on a silicon substrate;
- forming an epitaxial silicon layer of said first conductivity type over said silicon substrate and first and second buried collector layer regions thereon;
- selectively masking a portion of said epitaxial silicon layer including portions over said first buried collector layer

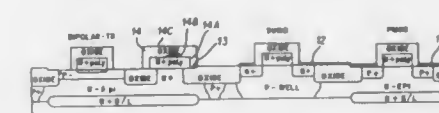
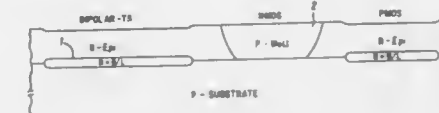
region to expose substantially only portions of said epitaxial silicon over said second buried collector layer region; removing at least some of said exposed epitaxial silicon layer;

simultaneously forming base regions of a second conductivity type in said epitaxial layer over said first buried collector layer region and in said epitaxial layer over said second buried collector layer region; and

simultaneously forming emitter regions of said first conductivity type in said base regions over said first buried collector layer region and said second buried collector layer region;

whereby a memory transistor with said second buried collector layer region has increased base-collector capacitance and greater immunity from alpha particle strikes compared to a logic transistor with said first buried collector layer region.

carrying out a diffusion in order to form a P<sup>+</sup> extrinsic base area; and



removing photoresist film of the masking area so that the polysilicon remains at the base region of the bipolar transistor.

4,954,457

**METHOD OF MAKING HETEROJUNCTION BIPOLAR TRANSISTORS**

Chakrapani G. Jambotkar, Hopewell Junction, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 264,428, Oct. 31, 1988. This application Jan. 22, 1990, Ser. No. 467,850

Int. Cl.<sup>5</sup> H01L 21/331

U.S. Cl. 437-31

23 Claims

1. In a process of forming a bipolar transistor in a compound semiconductor body wherein a larger area base electrode layer forms on one side thereof a p-n junction with a buried electrode layer and on the other side of said base layer a smaller area electrode forms a p-n junction therewith, the improvement comprising the step of

providing an overhang capability on the portion of said smaller area electrode separated from said p-n junction, said overhang imparting the combined properties of masking of said base layer in at least one of a conductivity conversion and a metal deposition operation orthogonally directed with respect to said base layer,

4,954,456

**FABRICATION METHOD FOR HIGH SPEED AND HIGH PACKING DENSITY SEMICONDUCTOR DEVICE (BICMOS)**

Kwang S. Kim; Sang Hun Chai; Young S. Koo; Yeo H. Kim, and Jin H. Lee, all of Chung Nam, Rep. of Korea, assignors to Electronics and Telecommunications Research Institute, Rep. of Korea

Filed Jul. 25, 1988, Ser. No. 224,020

Claims priority, application Rep. of Korea, Jul. 25, 1987, 87-8119

Int. Cl.<sup>5</sup> H01L 21/225

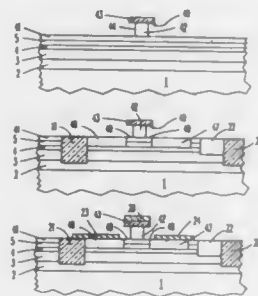
U.S. Cl. 437-31

3 Claims

1. In a fabrication method for high speed and high packing density semiconductor devices, the steps of:

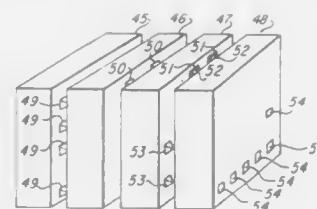
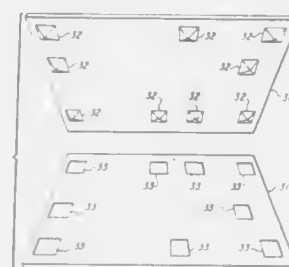
- forming an N<sup>+</sup>-type buried layer upon a P-type substrate;
- growing an N-epitaxial layer upon it;
- depositing an oxide film and carrying out a masking process for defining a P-well;
- implanting and diffusing an impurity down to the N-epitaxial layer in order to form a P-well;
- removing the oxide film on the P-well and N-epitaxial layer;
- growing a buffer oxide film, and depositing a nitride film on the oxide film upon the P-well and N-epitaxial layer;
- growing an oxide film in order to complete a device isolation region, after the formation of a P<sup>+</sup> junction isolation region;
- growing a gate oxide film of CMOS after removal of the buffer oxide film;
- ion-implanting an impurity in order to form a base and a collector of bipolar transistors;
- after removal of photoresist film, depositing polysilicon, and implanting an impurity in order to make the polysilicon an N<sup>+</sup> type;
- depositing an oxide film upon the N<sup>+</sup> polysilicon;
- forming gates of CMOS elements and emitters and collectors of bipolar transistors;
- implanting an impurity in order to form source/drains of PMOS devices;
- implanting an impurity in order to form source/drains of NMOS devices;
- depositing an oxide film, and carrying out an etching so that an oxide film remains on a side wall of the N<sup>+</sup> type polysilicon;
- depositing polysilicon upon oxide film and doping an impurity by a thermal diffusion method or an ion-implantation method to make the polysilicon a P<sup>+</sup> type;

ledge type direction change in shape in lift-off separation of deposited materials, and



vertical distance processing guidance in an erosion operation conducted orthogonally with respect to said base layer.

second substrate by forming an electrically conductive bond between said elevated portions on said first substrate



with said electrically conductive pads on said second substrate.

#### 4,954,459 METHOD OF PLANARIZATION OF TOPOLOGIES IN INTEGRATED CIRCUIT STRUCTURES

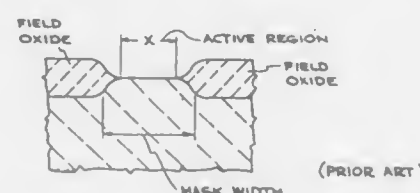
Steven C. Avanzino, Cupertino, and Jacob D. Haskell, Palo Alto, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Continuation-in-part of Ser. No. 193,478, May 12, 1988. This application Jul. 3, 1989, Ser. No. 376,176

Int. Cl.<sup>5</sup> H01L 21/465

U.S. Cl. 437—228

21 Claims

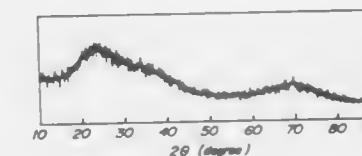


17. A method of making a highly planarized integrated circuit structure having field oxide regions formed therein

between active regions of a substrate, and at the same level as the active regions, which comprises:

- (a) patterning a silicon substrate with a first photoresist mask having openings therein conforming to desired formation of field oxide regions in said substrate between said active regions;
- (b) etching said silicon substrate through said photoresist mask to form openings in said substrate having a depth of from about 0.45 microns to about 0.55 microns;
- (c) removing said first photoresist mask;
- (d) depositing from about 7000 to about 9000 Angstroms of a conformal oxide layer over said substrate;
- (e) forming a second photoresist mask over said conformal oxide layer, said mask having openings therein in registry with the portions of said substrate between said openings etched in said substrate;
- (f) isotropically etching said conformal oxide layer through said second mask to a level substantially equal to the level of the masked portions of said conformal oxide layer;
- (g) removing said second photoresist mask;
- (h) polishing said conformal oxide layer to remove raised portions of said conformal oxide layer; and
- (i) anisotropically etching said conformal oxide layer to expose said active regions of said substrate to form a highly planarized structure having field oxide regions formed therein between said active regions in said substrate with the upper surface of said field oxide regions substantially level with the surface of said active regions.

4,954,461  
**HIGH PURITY AND HIGH STRENGTH INORGANIC SILICON NITRIDE CONTINUOUS FIBER**  
Kiyohito Okamura, Mito; Mitsuhiro Sato; Yoshio Hasegawa, both of Higashi-Ibaraki; Tadao Seguchi, Fujioka, and Shunichi Kawanishi, Takasaki, all of Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan  
Filed Mar. 18, 1988, Ser. No. 170,184  
Claims priority, application Japan, Mar. 20, 1987, 62-67391  
Int. Cl.<sup>5</sup> C04B 35/58; C01B 21/063, 33/06  
U.S. Cl. 501—95 1 Claim



1. An inorganic silicon nitride continuous fiber consisting essentially of an amorphous material composed of Si and N, crystals of  $\delta$ -Si<sub>3</sub>N<sub>4</sub>, or crystals of  $\alpha$ -Si<sub>3</sub>N<sub>4</sub> uniformly distributed in the amorphous material composed of Si and N, wherein said fiber has a tensile strength of 140 to 400 kg/mm<sup>2</sup>, an elastic modulus of 12 to 40 ton/mm<sup>2</sup>, a density of 2.1 to 3.1 g/cm<sup>3</sup>, a specific resistivity of at least 10<sup>7</sup> Ω·cm, and a dielectric constant of 6.0 to 9.5.

#### 4,954,462 MICROCRYSTALLINE ALUMINA-BASED CERAMIC ARTICLES

Thomas E. Wood, and David M. Wilson, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 58,564, Jun. 5, 1987, abandoned. This application Mar. 1, 1989, Ser. No. 318,450

Int. Cl.<sup>5</sup> C04B 35/10; B01J 13/00

U.S. Cl. 501—95 35 Claims

1. A solid, fired refractory article comprising in the range of 0.1 to 7.0 percent by weight iron equivalence and at least 60% alumina by weight in which at least 99 percent of the alumina is in the alpha phase having a uniform grain structure comprising alpha alumina crystallites wherein the average crystallite diameter is less than 0.5 micrometer, at least 95 percent of the alpha alumina crystallites are less than 0.5 micrometer in diameter and no grains are larger than 0.5 micrometer in diameter, the density of the article is greater than 90% of theoretical density, and the surface roughness height of the article is less than 100 nm.

26. A process for forming an alumina-based ceramic article, the process comprising the steps:

- a. preparing a solution of a basic aluminum salt or other hydrolyzable alumina precursor and iron-containing nucleating agents, said nucleating agents being hydrous iron polymers which are formed by hydrolysis of an iron salt solution;
- b. forming the solution into a desired form or coating, and at least one of gelling and drying the solution to obtain a solid form; and
- c. calcining the solid;

the ceramic article comprising in the range of 0.1 to 7.0 percent by weight iron equivalence and at least 60% alumina by weight in which at least 99 percent of the alumina is in the alpha phase having a uniform grain structure comprising alpha alumina crystallites wherein the average crystallite diameter is less than 0.5 micrometer and at least 95 percent of the alpha alumina crystallites are less than 0.5 micrometer in diameter and all are less than 0.7 micrometer in diameter, and the density of the article is greater than 90% of theoretical density.

4,954,460  
**WATER-PERMEABLE CERAMIC MATERIAL**  
Fumikazu Tanemura; Toru Hosoda; Shigetoshi Ohta; Yoshiharu Kajita, all of Aichi, and Tatsushi Kachi, Tokyo, all of Japan, assignors to Mino Yogyo Co., Ltd., Mizunami, Japan  
Continuation-in-part of Ser. No. 274,712, Nov. 21, 1988, abandoned, which is a continuation of Ser. No. 177,872, Apr. 1, 1988, abandoned, which is a continuation of Ser. No. 75,189, Jul. 1, 1987, abandoned, which is a continuation of Ser. No. 824,292, Jan. 23, 1986, abandoned, which is a continuation-in-part of Ser. No. 704,384, Feb. 22, 1985, abandoned. This application Aug. 29, 1989, Ser. No. 399,924  
Claims priority, application Japan, Feb. 24, 1984, 59-33449  
Int. Cl.<sup>5</sup> C04B 38/00, 33/24

U.S. Cl. 501—80

3 Claims

1. A water-permeable ceramic material comprising porcelain particles having a particle size in the range of 7–60 mesh, a bulk density of 2.3 kg/l or more and a porosity of up to about 16.7%, and a matrix having a melting temperature lower than a melting point of said porcelain particles, which is formed from one or more primary binders selected from the group consisting of organic binders, clay and water glass and one or more glassy secondary binders, said ceramic material having an apparent porosity of from about 10 to less than 53%, said ceramic material having continuous pores connecting front to back of the ceramic material each of which has an average diameter of at least 0.1 mm therein, said ceramic material<sub>2</sub> having a water permeability of at least 50 ml/min cm<sup>2</sup>, said ceramic material being formed by mixing said particles with said primary and secondary binders, compressing the resultant mixture under a pressure of from about 30–200 kg/cm<sup>2</sup>, and sintering the compressed mixture.



4,954,463

**MAGNESIUM ALUMINATE SPINEL REFRACTORY**  
Richard J. Knauss, Swissvale, Pa., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Dec. 12, 1988, Ser. No. 283,230

The portion of this patent subsequent to May 23, 2006, has been disclaimed.

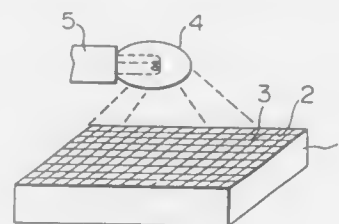
Int. Cl.<sup>5</sup> C04B 35/04

U.S. Cl. 501—120

13 Claims

1. A refractory mix for forming an in situ magnesium aluminate spinel refractory shape consisting essentially of about 65 to 99 wt.% magnesite having an MgO content of at least about 92 wt.% and, correspondingly, about 35 to 1 wt.% calcined bauxite having an alumina content of at least about 83 wt.% and a silica content of no more than about 7 wt.%; the total silica content of the mix being no more than about 4 wt.%.

absorbent for absorbing stink ingredient or as mixed and kneaded with said absorbent, said photocatalyst decomposing



the stink ingredient absorbed on said absorbent when excited by light and a light source for exciting said photocatalyst.

4,954,466

**RECOVERY OF COBALT CATALYST VALUES**  
Robert B. Weisenfeld, Manchester, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 30, 1989, Ser. No. 443,281

Int. Cl.<sup>5</sup> B11J 31/40; B01J 38/68; C10G 51/04, 51/06

U.S. Cl. 502—24

12 Claims

1. A process for recovering cobalt values from a mixture of N-acetylaminodiacetic acid and a cobalt catalyst used to produce the N-acetylaminodiacetic acid which comprises:

- dissolving said mixture in a hydrochloric acid solution or hydrobromic acid solution;
- extracting the resulting acid solution with an extractant which consists essentially of a liquid hydrocarbon solvent containing an effective cobalt extracting amount of a trialkylamine;
- separating the extractant phase containing the cobalt values from the aqueous phase;
- stripping the extractant phase with water;
- precipitating the cobalt values from the stripping water by adding an alkali metal hydroxide or alkali metal carbonate; and
- recovering the precipitated cobalt values.

4,954,467

**PASSIVATION OF METAL CONTAMINATED CRACKING CATALYSTS USING AQUEOUS SUSPENSIONS OF ANTIMONY OXIDE**  
Marvin M. Johnson, Bartlesville, Okla., and Donald C. Tabler, Fort Collins, Colo., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 907,767, Sep. 15, 1987. This application Oct. 28, 1988, Ser. No. 264,295

The portion of the term of this patent subsequent to May 22, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> B01J 29/38, 21/20, 13/00; C90G 11/05

U.S. Cl. 502—26

14 Claims

1. A method for restoring the activity of a hydrocarbon cracking catalyst in which the cracking activity of said cracking catalyst is at least partially decreased by contaminating metals deposited thereon comprising the step of injecting a metals passivating agent suspension comprising antimony onto said cracking catalyst while said cracking catalyst is in the catalyst regeneration cycle, further characterized by the fact that said metals passivating agent suspension comprises

- water;
- antimony oxide; and
- a vinyl copolymer, wherein said vinyl copolymer is the ammonium salt of hydrolyzed copolymers of methylvinyl ether and maleic anhydride, wherein the antimony oxide is present in the form of a first source of particulate antimony oxide comprising large diameter antimony oxide particles, wherein at least 70 percent of said large diameter antimony oxide particles are in the range of about 1 mi-

4,954,465

**APPARATUS FOR REMOVING STINK**  
Masaei Kawashima, Fujikamachi; Reishi Naka; Teruo Tsunoda, both of Ohiramachi; Nobuyoshi Suenaga, Oyama; Syozo Ogawa, Ohiramachi; Masaaki Kashiwabuchi, Tochigi; Miyakichi Kameda, Sano, and Koosuke Tanaka, Ohiramachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 11, 1989, Ser. No. 295,754

Claims priority, application Japan, Jan. 22, 1988, 63-10601; Jan. 22, 1988, 63-10602

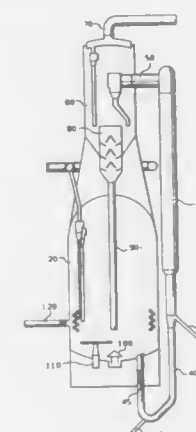
Int. Cl.<sup>5</sup> B01J 37/34

U.S. Cl. 502—5

7 Claims

1. A stink removing apparatus using absorbent, comprising a member in which photocatalyst is applied on a surface of said

cron to about 5 microns, and a second source of particulate antimony oxide of smaller diameter antimony oxide particles than in said first source, wherein at least 90 per-



cent of said small diameter antimony oxide particles are in the range of from about 0.01 microns to about 0.99 microns.

4,954,468

**SYNTHETIC ALLKALI METAL ALUMINO-SILICATES, METHODS AND USES, COMPOSITIONS AND THEIR METHODS OF PREPARATION**

Satish K. Wason, Macon, Ga., assignor to J. M. Huber Corporation, Rumson, N.J.

Division of Ser. No. 116,805, Nov. 3, 1987, Pat. No. 4,812,299, which is a continuation-in-part of Ser. No. 875,120, Jun. 17, 1986, abandoned. This application Jan. 19, 1989, Ser. No. 299,279

Int. Cl.<sup>5</sup> B01J 20/16, 21/16, 29/06

U.S. Cl. 502—63

9 Claims

1. A dry-up liquid or carrier composition which contains as the effective ingredient, an alkali metal alumino-silicate having a composition in terms of mole ratio of oxides as follows:



wherein x is the number of moles of alkali metal oxide and is an integer of 0.01 to 2.0, M is an alkali metal, y is the number of moles of SiO<sub>2</sub> associated with the compositions and is an integer of 2.0 to 20.0, and z is the number of moles of bound water and is an integer of 1.0 to 5.0, wherein primary particles of said alkali metal alumino-silicate comprise a core of clay platelets having an integral adjacent area of essentially amorphous alkali metal silicate base-kaolin clay reaction product.

4,954,469

**GRANULATED ACTIVATED CARBON FOR WATER TREATMENT**

Ken K. Robinson, 5 N 553 Jens-Jensen La., St. Charles, Ill. 60175

Continuation-in-part of Ser. No. 226,789, Aug. 1, 1988, abandoned. This application Jun. 15, 1989, Ser. No. 368,077

Int. Cl.<sup>5</sup> B01J 20/12, 20/20, 20/26; B29C 67/02

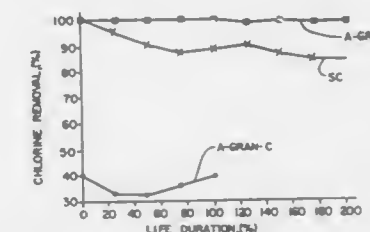
U.S. Cl. 502—80

9 Claims

1. A process of preparing a spherically-shaped, agglomerated granulated carbon composition from an activated carbon powder, the major portion of which is a carbon powder having a surface area of from about 2800 to about 3800 m<sup>2</sup>/gm and exhibiting a trimodal pore volume distribution of peak volumes in the micropore size of <10 Å, the meso-pore size of from about 40 to about 200 Å, and a macro-pore size of >1000 Å, which process comprises the steps of:

- mixing with agitation to form spherically-shaped gran-

ules an aqueous slurry of the carbon powder with from about 40 to about 60%, based on the weight of the carbon, of a hydrocarbon bridging liquid, and from about 5 to about 25%, based on the weight of the carbon, of a binder selected from the group consisting of clays and organic polymer adhesives;



- separating and drying the granules; and
- activating the granules by steam treatment at a temperature of about from 105° to about 120° C. to produce granules having particle diameters of from about 0.17 to about 0.71 mm.

4,954,470

**CHLORINATED ALCOHOL-CONTAINING CATALYST COMPOSITION FOR POLYMERIZING ALPHA-OLEFINS**

Thomas E. Nowlin, Somerset, and Kenneth G. Schurzky, Bridgewater, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 143,989, Jan. 14, 1988, Pat. No. 4,849,389. This application Dec. 21, 1988, Ser. No. 287,214

The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

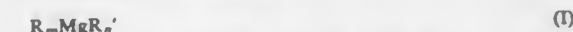
Int. Cl.<sup>5</sup> C08F 4/64, 4/68

U.S. Cl. 502—107

50 Claims

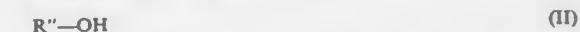
1. A process for preparing a supported alpha-olefin polymerization catalyst composition which comprises the steps of:

- contacting a slurry of a solid, porous carrier and a non-polar solvent with at least one organomagnesium composition having the formula



where R and R' are the same or different C<sub>4</sub>-C<sub>12</sub> alkyl groups, m and n are each 0, 1 or 2, provided that m+n is equal to the valence of Mg;

- contacting the slurry of step (i) with at least one chlorinated alcohol of the formula



where R'' is a C<sub>2</sub>-C<sub>10</sub> chlorinated alkyl group;

- contacting the slurry of step (ii) with at least one transition metal compound soluble in the non-polar solvent; and
- combining the product of step (iii) with a catalyst activator.

4,954,471

**HOMOGENEOUS OR SUPPORTED VANADIUM BASED CATALYST FOR OLEFIN POLYMERIZATION**

Steven A. Best, Houston, Tex., assignor to Exxon Chemical Patents Inc., Linden, N.J.

Filed Nov. 28, 1988, Ser. No. 276,978

Int. Cl.<sup>5</sup> C08F 4/68

U.S. Cl. 502—110

21 Claims

1. A method for preparing a hydrocarbon soluble vanadium based catalyst component for the production of polyolefins, comprising the steps of:

- forming a hydrocarbon insoluble reaction product from a

I. A multi-layer substrate, comprising:



a plurality of insulating layers laminated into a multi-layer structure, the insulating layers being fired and having holes penetrated therethrough;  
interconnection layers of an oxide superconductive ceramic material located between the insulating layers, said superconductive, interconnection layers being fired,  
wherein said plurality of insulating layers is made of a glass-ceramic material fired at a temperature lower than a temperature for firing the superconductive interconnection layers;  
superconductive ceramic material filling said holes of said insulating layers and electrically connecting said interconnection layers; and  
a metal layer encapsulating the interconnection layers of the superconductive ceramic material, the metal of the metal layer being selected from the group of gold, silver, platinum and an alloy thereof.

4,954,481

## SUPERCONDUCTOR-POLYMER COMPOSITES

Aimé S. DeReggi, Boyds; Chwan-Kang Chiang, Rockville, and George T. Davis, Gaithersburg, all of Md., assignors to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed Dec. 29, 1988, Ser. No. 292,601

Int. Cl.<sup>5</sup> B32B 3/02

U.S. Cl. 505—1

8 Claims

1. Composite material, comprising a matrix formed of a thermoplastic polymer and a superconductor powder dispersed in the matrix, the superconductor powder having a composition  $\text{RBa}_2\text{Cu}_3\text{O}_{7-x}$  wherein R is a rare earth metal and x is less than or equal to 1, said thermoplastic polymer comprising a vinylidene fluoride homopolymer or copolymer.

4,954,482

## NEW GLYCOPOLYMER ANTIBIOTIC

Hiroshi Maeda; Junsuke Tone, both of Chita, Japan; John C. Ruddock, Ash, and Kelvin S. Holdom, Minster, both of England, assignors to Pfizer Inc., New York, N.Y.

Continuation of Ser. No. 101,626, Sep. 28, 1987, abandoned. This application Jun. 20, 1989, Ser. No. 384,052

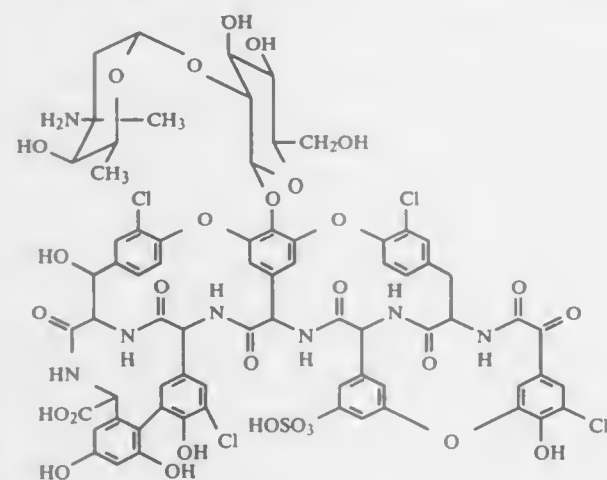
Claims priority, application United Kingdom, Oct. 16, 1986, 8624806

Int. Cl.<sup>5</sup> A61K 37/02; C07K 9/00, 7/50

U.S. Cl. 514—8

4 Claims

1. The antibiotic UK-68,597 having the formula



or a pharmaceutically acceptable cationic salt thereof.

4,954,483

## CARBOXYLIC ACID ESTER DERIVATIVES OR DEGLUCOTECICOPLANIN

Adriano Malabarba, Milan; Paolo Strazzolini, Fiume Veneto; Aldo Trani, Milan; Ambrogio Magni, Osnago, and Bruno Cavalleri, Milan, all of Italy, assignors to Gruppo Lepetit, S.p.A., Italy

PCT No. PCT/EP85/00262, § 371 Date Feb. 6, 1986, § 102(e) Date Feb. 6, 1986, PCT Pub. No. WO86/00075, PCT Pub. Date Jan. 3, 1986

Continuation-in-part of Ser. No. 131,245, Dec. 7, 1987, abandoned, which is a continuation of Ser. No. 839,320, Feb. 6, 1986, abandoned. This PCT application Jun. 2, 1985, Ser. No. 243,168

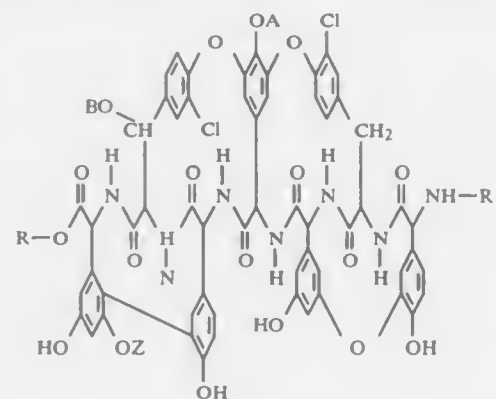
Claims priority, application United Kingdom, Jun. 13, 1984, 8415092

Int. Cl.<sup>5</sup> A61K 37/02; C07K 7/50; A23K 1/00

U.S. Cl. 514—9

15 Claims

1. An ester derivative of deglucotecicoplanin of the formula



wherein

R represents a methyl or ethyl group, a benzyl group, a hydroxy (C<sub>1</sub>-C<sub>4</sub>)alkyl group, or a halo(C<sub>1</sub>-C<sub>4</sub>)alkyl group  
R<sub>1</sub> represents hydrogen or an amino-protecting group,  
A, B, and Z each individually represent a hydrogen group or a pharmaceutically acceptable acid addition salt thereof.

4,954,484

## PARASITICIDES AND INSECTICIDES

Jean-Claude Gebret, Aesch, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 24, 1988, Ser. No. 172,616

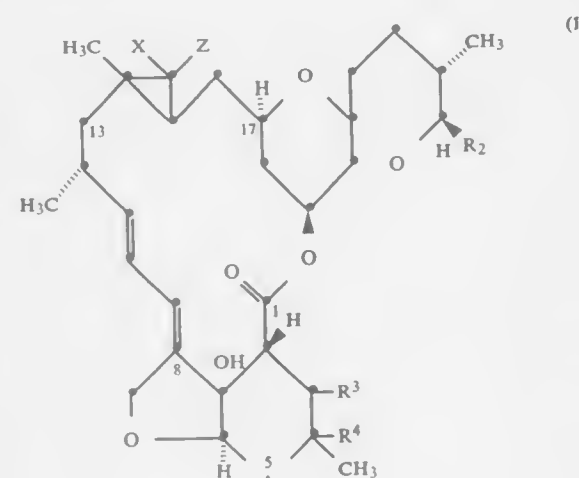
Claims priority, application Switzerland, Mar. 27, 1987, 1180/87

Int. Cl.<sup>5</sup> C07D 493/22; A61K 31/365

U.S. Cl. 514—30

13 Claims

1. A compound of formula I



in which  
A is a

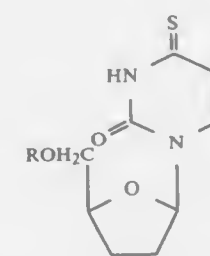


group wherein R<sub>1</sub> is hydrogen, R<sub>5</sub>-C(O), Si(R<sub>6</sub>)(R<sub>7</sub>)(R<sub>8</sub>) or 2,3,4,6-tetraacetylglucopyranosyl;

R<sub>5</sub> is C<sub>1</sub>-C<sub>10</sub>-alkyl, C<sub>1</sub>-C<sub>10</sub>-haloalkyl, a phenyl or a benzyl, which is unsubstituted or its substituted by at least one substituent selected from the group consisting of halogen, C<sub>1</sub>-C<sub>3</sub>-alkyl, C<sub>1</sub>-C<sub>3</sub>-haloalkyl, C<sub>1</sub>-C<sub>3</sub>-alkoxy, C<sub>1</sub>-C<sub>3</sub>-haloalkoxy, cyano and nitro;

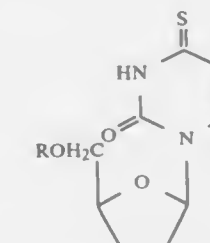
R<sub>6</sub>, R<sub>7</sub> and R<sub>8</sub> independently of each other are C<sub>1</sub>-C<sub>4</sub>-alkyl, benzyl or phenyl; R<sub>11</sub> is hydrogen, R<sub>5</sub>C(O)Si(R<sub>6</sub>)(R<sub>7</sub>)(R<sub>8</sub>) C<sub>1</sub>-C<sub>8</sub>-alkyl or C<sub>3</sub>-C<sub>6</sub>-cycloalkyl; R<sub>2</sub> is methyl, ethyl isopropyl, sec-butyl or a -C(CH<sub>3</sub>)=CH-E group wherein E is methyl, ethyl or isopropyl;

R<sub>3</sub> and R<sub>4</sub> together represent a bond between the two carbon atoms to which they are bound, or together represent a -C(X')(Z')- group wherein Z' and Z' each represents, independently of the other, hydrogen or halogen; and X and Z each represents, independently of the other, hydrogen or halogen.



wherein R is hydrogen or a hydroxyl-protecting group.

9. A method of treating a virus disease, comprising administering to an animal in need thereof, and antiviral-effective amount of a 2',3'-dideoxy-4-thiouridine derivative having the formula (I):



4,954,486

## FUROSEMIDE AS TINNITUS SUPPRESSANT

Paul S. Guth, New Orleans, La., assignor to Tulane Educational Fund, New Orleans, La.

Continuation of Ser. No. 363,408, Jun. 7, 1989, abandoned, which is a continuation of Ser. No. 95,697, Sep. 14, 1987, abandoned, which is a continuation-in-part of Ser. No. 937,460, Dec. 2, 1986, Pat. No. 4,735,968, which is a continuation of Ser. No. 742,347, Jun. 5, 1985, abandoned. This application Dec. 20, 1989, Ser. No. 456,201

Int. Cl.<sup>5</sup> A61K 31/635

U.S. Cl. 514—158

3 Claims

1. A method of treating the symptoms of tinnitus in a person experiencing same comprising administering to said person a tinnitus-alleviating effective amount of furosemide.

4,954,487

## PENETRATING TOPICAL PHARMACEUTICAL COMPOSITIONS

Eugene R. Cooper; Maurice E. Loomans, both of Cincinnati, and Richard R. Wickert, Ross, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 56,344, May 27, 1987, abandoned, which is a division of Ser. No. 516,005, Jul. 20, 1983, abandoned, which is a continuation of Ser. No. 296,706, Aug. 27, 1981, abandoned, which is a continuation-in-part of Ser. No. 167,167, Jul. 9, 1980, abandoned, which is a continuation-in-part of Ser. No. 149,104, May 12, 1980, abandoned, and a continuation-in-part of Ser. No. 1,974, Jan. 8, 1979, abandoned. This application Feb. 15, 1989, Ser. No. 312,354

Int. Cl.<sup>5</sup> A61K 31/60

U.S. Cl. 514—159

8 Claims

1. A composition of matter for topical administration, said composition comprising

(a) from about 0.5% to about 35% by weight of a nonsteroidal anti-inflammatory agent selected from the group consisting of salicylic acid, ibuprofen, sulindac, naproxen,

4,954,485  
2',3'-DIDEOXY-4-THIO-URIDINE DERIVATIVES, PROCESS FOR THEIR PREPARATION AND ANTIVIRUS AGENTS USED THEM

Hidetoshi Yoshitaka; Eiji Kojima; Shuji Ishida; Hiroyuki Yoshitaka, and Kunichika Murakami, all of Iwakuni, Japan, assignors to Sanyo-Kokusaku Pulp Co., Ltd., Tokyo, Japan

Filed Jun. 1, 1988, Ser. No. 200,903

Claims priority, application Japan, Oct. 20, 1987, 62-265083

Int. Cl.<sup>5</sup> A61K 31/505, 31/70; C07D 239/56

U.S. Cl. 514—49

12 Claims

1. A 2',3'-dideoxy-4-thiouridine derivative having the formula (I)

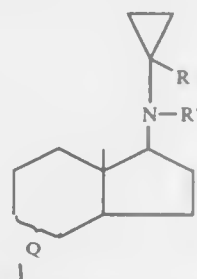
- ketoprofen, ethofenamate, and indomethacin, and the pharmaceutically-acceptable salts and esters thereof;
- (b) from 0% to about 70% by weight ethanol or 2-propanol; and
- (c) a penetration-enhancing carrier consisting essentially of
- from about 10% to about 98% by weight of the composition of propylene glycol; and
  - from about 1% to about 5% by weight of the composition of a cell envelope-disordering compound selected from the group consisting of methyl myristate, methyl laurate, methyl caprate, ethyl myristate, ethyl laurate, ethyl caprate, myristyl acetate, lauryl acetate and capric acetate.

**4,954,488**  
**METHOD OF TREATING HYPERALDOSTERONISM USING 17 $\beta$ -CYCLOPROPYLAMINOANDROSTENE DERIVATIVES**  
 J. O'Neal Johnston, Milford, Ohio, assignor to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio  
 Filed Jun. 14, 1989, Ser. No. 366,551  
 Int. Cl.<sup>5</sup> A61K 31/56

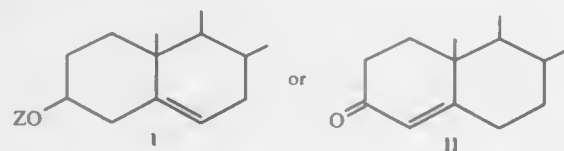
U.S. Cl. 514—177

6 Claims

1. A method for treating hyperaldosteronism which comprises administering to a patient having said condition a therapeutically effective amount of a compound of the



wherein R is hydrogen or methyl; R' is hydrogen, C<sub>1</sub>-C<sub>4</sub> alkyl or cyclopropyl; and Q is

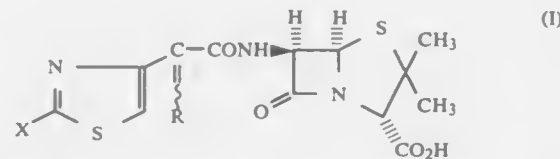


wherein Z is hydrogen, alkanoyl of 1-10 carbon atoms, cyclopentane-alkanoyl or benzene-alkanoyl wherein the alkanoyl portion of the cyclopentane-alkanoyl or benzene-alkanoyl contains up to 4 carbon atoms.

**4,954,489**  
**PENICILLINS HAVING A SUBSTITUTED ACRYLAMIDO SIDE CHAIN**  
 Roger J. Ponsford, and Andrew V. Stachulski, both of Betchworth, England, assignors to Beecham Group p.l.c, England  
 Filed Apr. 5, 1989, Ser. No. 333,554  
 Claims priority, application United Kingdom, Apr. 6, 1988, 8806032; Aug. 4, 1988, 8818513; Sep. 26, 1988, 8822511  
 Int. Cl.<sup>5</sup> A61K 31/43; C07D 499/12, 499/54  
 U.S. Cl. 514—195

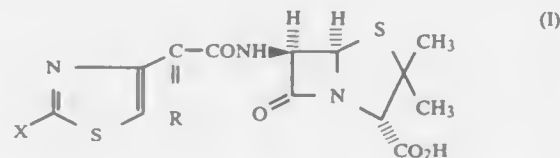
19 Claims

1. A compound of formula (I) or a pharmaceutically acceptable salt or in-vivo hydrolysable ester thereof:



wherein X is hydrogen or a group NHR<sup>1</sup>, wherein R<sup>1</sup> is hydrogen or an amino protecting group, and R is optionally substituted cycloalkyl of 5 to 8 carbon atoms or cycloalkenyl of 5 to 8 carbon atoms.

8. A pharmaceutical composition useful for treating bacterial infections in human and non-human animals which comprises an anti-bacterially effective amount of a compound of formula (I):



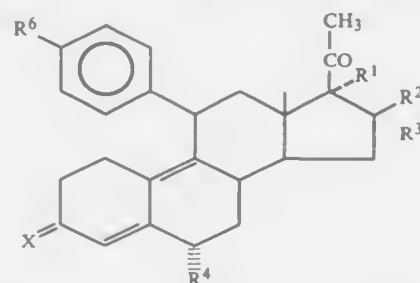
or a pharmaceutically acceptable salt or in-vivo hydrolysable ester thereof wherein X is hydrogen or a group NHR<sup>1</sup>, wherein R<sup>1</sup> is hydrogen or an amino protecting group, and R is optionally substituted cycloalkyl of 5 to 8 carbon atoms or cycloalkenyl, in combination with a pharmaceutically acceptable carrier.

**4,954,490**  
**11 $\beta$ -SUBSTITUTED PROGESTERONE ANALOGS**  
 C. Edgar Cook, Durham; Mansukh C. Wani, Research Triangle Park; Y.-W. Lee, Chapel Hill, all of N.C.; Jerry R. Reel, Delmar, N.Y., and Douglas Rector, Raleigh, N.C., assignors to Research Triangle Institute, Research Triangle Park, N.C.  
 Filed Jun. 23, 1988, Ser. No. 210,503  
 Int. Cl.<sup>5</sup> A61K 31/56; C07J 1/00

U.S. Cl. 514—176

31 Claims

1. An 11 $\beta$ -aryl-19-norprogesterone of the formula:



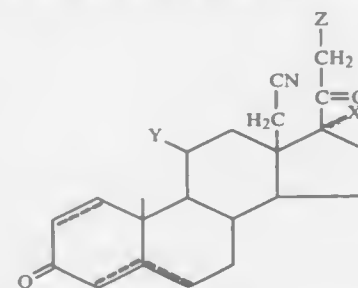
wherein R<sup>1</sup> is OC(O)CH<sub>3</sub>, or OC(O)R<sup>5</sup>, wherein R<sup>5</sup> is C<sub>2-8</sub> alkyl, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl or aryl, R<sup>2</sup> is H, R<sup>3</sup> is H, C<sub>1-4</sub> alkyl, C<sub>2-4</sub> alkenyl or C<sub>2-4</sub> alkynyl, R<sup>4</sup> is H, CH<sub>3</sub>, F or Cl, or R<sup>6</sup> is H, (CH<sub>3</sub>)<sub>2</sub>N, CH<sub>3</sub>O, CH<sub>3</sub>CO, CH<sub>3</sub>S, CH<sub>3</sub>SO, CH<sub>3</sub>SO<sub>2</sub>, and X' is O or NOCH<sub>3</sub>.

**4,954,491**  
**METHOD OF TREATMENT USING 18-CYANOPROGESTERONE DERIVATIVES**  
 J. O'Neal Johnston, Milford, and Gene W. Holbert, Loveland, both of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio  
 Filed Jan. 27, 1989, Ser. No. 303,367  
 Int. Cl.<sup>5</sup> A61K 31/57; C07J 9/00, 5/00

U.S. Cl. 514—174

6 Claims

1. A method for treating hyperaldosteronism which comprises administering to a patient having said condition a therapeutically effective amount of a compound of the formula



wherein X is H or OH; Y is H, OH or O(C<sub>2-6</sub> Alkanoyl); Z is H, OH or O(C<sub>2-6</sub> Alkanoyl); Q is 0,  $\beta$ -OH or  $\beta$ -O(C<sub>2-6</sub> Alkanoyl); and the dotted lines indicate the optional presence of a double bond with the dotted lines showing optional double bonds at the 4- and 5-positions being selected in such a way that a maximum of one of those dotted lines is a double bond and that double bond is located at the 4-position when Q is 0 and at the 5-position when Q is  $\beta$ -OH or  $\beta$ -O(C<sub>2-6</sub> Alkanoyl); and the hydrogen at the 5-position is  $\beta$  or  $\beta$  when no double bond is present.

**4,954,492**  
**SYNTHETIC GTF CHROMIUM MATERIAL FOR DECREASING BLOOD LIPID LEVELS AND PROCESS THEREFOR**  
 Ned L. Jensen, Martinez, Calif., assignor to The William Seroy Group, Walnut Creek, Calif.  
 Division of Ser. No. 186,149, Apr. 26, 1988, which is a continuation-in-part of Ser. No. 512,111, Jul. 8, 1983, abandoned. This application Nov. 14, 1989, Ser. No. 416,371  
 Int. Cl.<sup>5</sup> A61K 31/555; C07D 213/80

U.S. Cl. 514—188

4 Claims

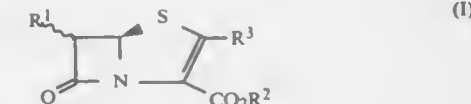
1. A method of decreasing blood lipid levels in a mammal, comprising administering an effective amount of a chromium-nicotinate GTF material to the mammal, wherein the chromium-nicotinate GTF material is obtained by reacting an alkali metal salt of nicotinic acid with a pharmaceutically acceptable trivalent chromium salt.

**4,954,493**  
**6-SUBSTITUTED PENEM ESTERS AS ANTI-INFLAMMATORY AND ANTI-DEGENERATIVE AGENTS**  
 Marco Alpegiani; Ettore Perrone, both of Milan; Piergiuseppe Orezzi, Quarto, Genova; Paolo Carminati, Milan, and Giuseppe Cassinelli, Voghera, Pavia, all of Italy, assignors to Farmitalia Carlo Erba S.r.l., Milan, Italy  
 Filed Jun. 14, 1988, Ser. No. 206,375  
 Claims priority, application United Kingdom, Jun. 19, 1987, 8714413  
 Int. Cl.<sup>5</sup> C07D 499/00; A61K 31/425

U.S. Cl. 514—195

3 Claims

1. A method of treating or managing elastase-mediated diseases comprising the administration to mammalian species in need of such treatment an effective amount of a 6-substituted penem ester of formula (I):

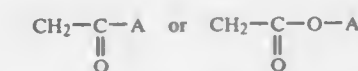


wherein R<sup>1</sup> is

- chloro, bromo or fluoro;
- C<sub>1</sub>-C<sub>4</sub> alkyl;
- C<sub>1</sub>-C<sub>4</sub> alkoxy;
- phenyl, phenoxy or benzyl; or
- sulfonyloxy RSO<sub>2</sub>O—, wherein R is either C<sub>1</sub>-C<sub>4</sub> alkyl, phenyl, naphthyl, benzyl, p-aminobenzyl, p-tolyl or adamantyl;

R<sup>2</sup> is

- C<sub>1</sub>-C<sub>4</sub> alkyl;
- benzyl;
- diphenylmethyl;
- 

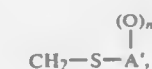


wherein A represents a group selected from methyl, ethyl, isopropyl, tert-butyl, benzyl, p-nitrobenzyl and p-methoxybenzyl; or

(5) —(CH<sub>2</sub>)<sub>m</sub>—COOB wherein B is a hydrogen atom or a negative charge and m is 1, 2 or 3; and

R<sup>3</sup> is —CH=CH—R<sub>7</sub> wherein R<sub>7</sub> is hydrogen, C<sub>1</sub>-C<sub>4</sub> alkyl, or

(a)



where n represents 1 or 2,

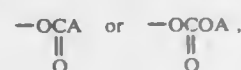
- CH<sub>2</sub>SA';
- CH<sub>2</sub>OA';
- CH<sub>2</sub>A';
- OZ or SZ,
- carboxy,
- COOA,
- COA',
- unsubstituted phenyl or (C<sub>1</sub>-C<sub>4</sub> alkyl) phenyl;
- a heterocyclic group selected from, tetrazole, triazole, 1,3,4-thiadiazole, tetrazolo/1,5-b/pyridazine, 1,3-thiazole, pyridine, pyrazole, imidazole, furane, oxazole and indole, unsubstituted or substituted by an atom or group chosen from halogen, C<sub>1</sub>-C<sub>4</sub> alkyl, oxo, phenyl, benzyl, amino, carboxy, C<sub>1</sub>-C<sub>3</sub> alkoxycarbonyl, hydroxymethyl and hydroxy,
- fluoromethyl, difluoromethyl or trifluoromethyl,
- amino (C<sub>1</sub>-C<sub>4</sub> alkyl), or
- (N-phthalimido)-, (N-succinimido)- or (N-methylamino)-methyl, wherein A is as defined above and wherein Z represents a heterocyclic group which is linked through a carbon atom and is selected from tetrazole, triazole, 1,3,4-thiadiazole, tetrazolo/1,5-b/pyridazine, 1,3-thiazole, pyridine, pyrazole, imidazole, furane, oxazole, and indole, unsubstituted or substituted by an atom of group chosen from halogen, C<sub>1</sub>-C<sub>4</sub> alkyl, oxo, phenyl, benzyl, amino, carboxy, C<sub>1</sub>-C<sub>3</sub> alkoxycarbonyl, hydroxymethyl and hydroxy;

A' represents:

- an organic radical selected from C<sub>1</sub>-C<sub>4</sub> alkyl unsubstituted or substituted by fluoro; benzyl; and phenyl either unsubstituted or substituted by one or more group or atom chosen from nitro, amino, aminoethyl, azido-methyl, (N-pyridinio)methyl, hydroxy, hydroxymethyl and chloro; or



(ii) a heterocyclic group selected from, tetrazole, triazole, 1,3,4-thiadiazole, tetrazolo/1,5-b/pyridazine, 1,3-thiazole, pyridine, pyrazole, imidazole, furane, oxazole, and indole, unsubstituted or substituted by an atom or group chosen from halogen, C<sub>1</sub>-C<sub>4</sub> alkyl, oxo, phenyl, benzyl, amino, carboxy, C<sub>1</sub>-C<sub>3</sub> alkoxy, carbonyl, hydroxymethyl and hydroxy; and wherein A' is C<sub>1</sub>-C<sub>4</sub> alkyl, phenyl or benzyl; and pharmaceutically acceptable salts thereof; the C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, phenyl, phenoxy, and benzyl groups in the definitions (2), (3), (4) and (5) or R<sup>1</sup>, (1) and (2) of R<sup>2</sup> and of R<sup>3</sup> being either unsubstituted or substituted by radicals chosen from methyl, methoxy, trifluoromethyl, fluoro, chloro, bromo, cyano, carboxy, sulfoamino, amino, carbamoyl, carbamoyloxy, guanidino, C<sub>1</sub> or C<sub>2</sub> aminoalkyl, C<sub>1</sub>-C<sub>3</sub> carbamoylalkyl and C<sub>1</sub>-C<sub>3</sub> carbamoyloxyalkyl wherein the amino, guanidino, carbamoyl and carbamoyloxy radicals can be optionally substituted at the nitrogen atom(s) by one or two methyl or ethyl groups; methylsulfonyl, azido, C<sub>2</sub>-C<sub>5</sub> alkoxy, carbonyl, benzyloxy, carbonyl, acetyloxy, acetyloxymethyl, trifluoroacetyloxymethyl, carboxymethyl, (C<sub>1</sub>-C<sub>4</sub> alkoxy)carbonylmethyl, hydroxy, acylated hydroxy



wherein A is as defined above; and formyloxy.

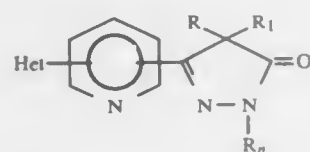
**4,954,494**  
**PYRIDYL-PYRIDAZINONE AND**  
**PYRIDYL-PYRAZOLINONE COMPOUNDS AND THEIR**  
**USE IN THE TREATMENT OF CONGESTIVE HEAT**  
**FAILURE**

Donald E. Kuhla, Doylestown; Henry F. Campbell, Lansdale; William L. Studt, Harleysville, and William C. Faith, Ambler, all of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

Division of Ser. No. 11,490, Feb. 5, 1987, Pat. No. 4,826,835, which is a continuation-in-part of Ser. No. 790,426, Oct. 23, 1985, Pat. No. 4,783,463. This application Jan. 30, 1989, Ser. No. 303,879

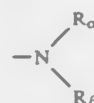
Int. Cl.<sup>5</sup> C07D 401/14; A61K 31/44, 31/495, 31/535  
U.S. Cl. 514-210 19 Claims

1. A compound of the formula:



where:

Het is imidazol-1-yl or 1,2,4-triazol-1-yl;  
R<sub>n</sub> is hydrogen, alkyl, aralkyl, acetyl, propionyl, benzoyl, carbalkoxy, carbamyl, carbalkoxyalkyl, hydroxyalkyl, alkoxyalkyl or amidino;  
R<sub>1</sub> is hydrogen, alkyl or aralkyl; and  
R<sub>2</sub> is hydrogen or  $-(CH_2)_y-Y$  where y is 1-3 and Y is hydrogen,  $-O-R_a$ ,  $-S-R_a$  or

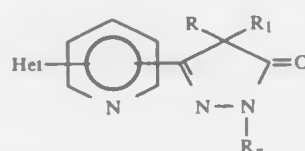


where

R<sub>a</sub> is hydrogen, alkyl or acetyl, propionyl, benzoyl and;  
R<sub>b</sub> is hydrogen or alkyl; and  
R<sub>a</sub> and R<sub>b</sub> together with the nitrogen to which they are

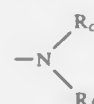
attached may form a 3 to about 6 membered ring selected from the group consisting of aziridinyl, azetidyl, piperidyl, N-methylimidazolidinyl, piperazinyl, substituted piperazinyl where the substituent may be N-methyl, N-benzyl or N-phenyl, morpholinyl or thiomorpholinyl; or a pharmaceutically acceptable salt thereof.

11. A method for increasing cardiotoxic contractility in a human or other mammal requiring such treatment which comprises administering thereto an effective inotropic amount of a compound of the formula:



where:

Het is imidazol-1-yl or 1,2,4-triazol-1-yl;  
R<sub>n</sub> is hydrogen, alkyl, aralkyl, acetyl, propionyl, benzoyl, carbalkoxy, carbamyl, carbalkoxyalkyl, hydroxyalkyl, alkoxyalkyl or amidino;  
R<sub>1</sub> is hydrogen, alkyl or aralkyl; and  
R<sub>2</sub> is hydrogen or  $-(CH_2)_y-Y$  where y is 1-3 and Y is hydrogen,  $-O-R_a$ ,  $-S-R_a$  or



where

R<sub>a</sub> is hydrogen, alkyl or acetyl, propionyl, benzoyl and;  
R<sub>b</sub> is hydrogen or alkyl; and  
R<sub>a</sub> and R<sub>b</sub> together with the nitrogen to which they are attached may form a 3 to about 6 membered ring selected from the group consisting of aziridinyl, azetidyl, piperidyl, N-methylimidazolidinyl, piperazinyl, substituted piperazinyl where the substituent may be N-methyl, N-benzyl or N-phenyl, morpholinyl or thiomorpholinyl; or a pharmaceutically acceptable salt thereof.

**4,954,495**  
**FUNGICIDES AND PLANT-GROWTH CONTROLLING**  
**AGENTS**

Thomas Strumpf, Potsdam; Horst Lyr, Eberswalde; Dieter Zanke, Potsdam-Babelsberg; Gerlinde Zollfrank nee Baumann, Potsdam, all of German Democratic Rep.; Gyula Oros; Ferenc Viranyi, both of Budapest, Hungary, and Tibor Ersek, Columbia, Mo., assignors to Chinolin Gyogyszer es Vegyeszeti Termekiek Gyara R.T., Budapest, Hungary

Continuation-in-part of Ser. No. 835,608, Mar. 3, 1986. This application Apr. 26, 1989, Ser. No. 344,009  
Claims priority, application Fed. Rep. of Germany, Mar. 4, 1985, 273728

Int. Cl.<sup>5</sup> A01N 37/12, 37/44, 43/54  
U.S. Cl. 514-231.2 3 Claims

1. A fungicidal composition effective against Plasmodium halstedii which comprises a synergistic effective amount of:

- (a) Tridemorph; and
- (b) Benalaxyl;

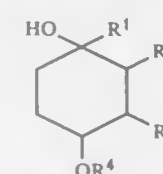
in a weight ratio of substantially 5:1 to substantially 1:1; together with a fungicidally acceptable inert carrier.

**4,954,496**  
**CYCLOHEXANE DERIVATIVES AND**  
**PHARMACEUTICAL COMPOSITIONS**

Teruo Oku; Chiyoshi Kasahara; Takehiko Ohkawa, and Masashi Hashimoto, all of Tsukuba, Japan, assignors to Fujisawa Pharmaceutical Company, Ltd., Osaka, Japan

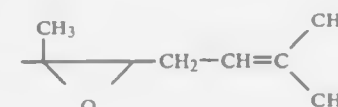
Filed Jul. 28, 1989, Ser. No. 386,232  
Claims priority, application United Kingdom, Aug. 12, 1988, 8819257; Apr. 10, 1989, 8908005; Apr. 28, 1989, 8909794  
Int. Cl.<sup>5</sup> A61K 31/335, 31/535; C07D 303/22, 413/12  
U.S. Cl. 514-231.5 4 Claims

1. A cyclohexane derivative of the formula:

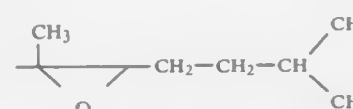


wherein

R<sup>1</sup> is halomethyl; or arylthiomethyl which may have amino, lower alkoxy or acylamino,  
R<sup>2</sup> is lower alkoxy,  
R<sup>3</sup> is



or



and

R<sup>4</sup> is hydrogen, lower alkylcarbamoyl, lower alkylcarbamoyloxy(lower)alkylcarbamoyl, heterocyclic carbonyl or heterocyclic carbamoyl,

4. A pharmaceutical composition which comprises, as an active ingredient, the cyclohexane derivative of claim 1 and pharmaceutically acceptable carrier(s).

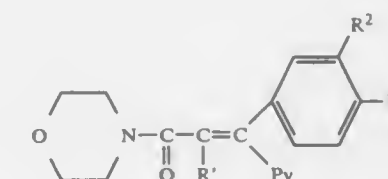
**4,954,497**  
**ACRYLIC ACID MORPHOLIDES AND FUNGICIDAL**  
**COMPOSITIONS**

Toshiya Kamikado; Yasuyuki Kando, both of Hyogo; Kazuo Matsuura, Kyoto, and Junji Yamada, Nara, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Feb. 16, 1989, Ser. No. 310,926  
Claims priority, application Japan, Feb. 22, 1988, 63-039130; May 24, 1988, 63-126358

Int. Cl.<sup>5</sup> A01N 43/84; C07D 413/06  
U.S. Cl. 514-235.5 9 Claims

1. A compound of the formula:



wherein R<sup>1</sup> is hydrogen or a lower alkyl group; R<sup>2</sup> and R<sup>3</sup> independently are a lower alkoxy group; and Py is an optionally substituted pyridyl group with the substituents being non heterocyclic groups, or a salt thereof.

9. A fungicidal composition which comprises an effective fungicidal amount of a compound claimed in claim 1 and a carrier.

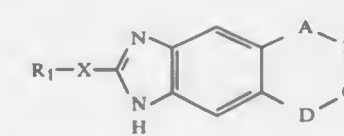
**4,954,498**  
**TRICYCLIC BENZIMIDAZOLE COMPOUNDS,**  
**PHARMACEUTICAL COMPOSITIONS AND METHODS**  
**OF USE**

Alfred Mertens, Schriesheim; Wolfgang von der Saal, Weinheim; Erwin Boehm, Ladenburg, and Klaus Strein, Hemsbach, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

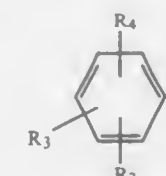
Filed Jan. 15, 1988, Ser. No. 144,514  
Claims priority, application Fed. Rep. of Germany, Jan. 17, 1987, 3701277

Int. Cl.<sup>5</sup> A61K 31/505; C07D 487/04, 471/04  
U.S. Cl. 514-254 8 Claims

1. A tricyclic benzimidazole compound of the formula:



wherein R<sub>1</sub> is a phenyl of the formula:



wherein R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> can be the same or different and each id hydrogen, methoxy, ethoxy, chlorine, methyl, hydroxyl, dimethylamino, diethylamino, imidazol-1-yl, allyloxy, cyano or aminocarbonyl or R<sub>1</sub> is a methylenedioxyphenyl or a pyridyl, quinolyl, pyridazinyl, pyrazolyl or thienyl or a methyl-substituted derivative thereof or, when X is a valency bond, besides the above groups, R<sub>1</sub> is methyl, n-hexyl or hydroxyl,

X is a valency bond, C<sub>1</sub>-C<sub>4</sub> alkylene or vinylene, imino or amide ( $-CONH-$ ) and wherein A and C are nitrogen which can be substituted by hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl or C<sub>3</sub>-C<sub>7</sub> cycloalkyl, and B and D are carbon which can be substituted by hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>3</sub>-C<sub>7</sub> cycloalkyl, hydroxyl or oxo, and wherein the six-membered ring containing A, B, C and D can be saturated, partly unsaturated or unsaturated, the tautomers thereof and the physiologically acceptable salts thereof with inorganic and organic acids together with the optically active compounds and racemates.

5. A pharmaceutical composition for the treatment and inhibition of the aggregation of thrombocytes and erythrocytes, to lower blood pressure and increase the power of the heart wherein said composition contains a pharmaceutically

effective amount of at least one compound of claim 1 in a pharmaceutically acceptable carrier.

6. A method of treatment and inhibition of the aggregation of thrombocytes and erythrocytes, to lower blood pressure and increase the power of the heart comprising administering an effective amount of at least one of a pharmaceutically acceptable compound of claim 1.

4,954,499

## PYRIDAZINONE DERIVATIVES

Helmut Prücher, Heppenheim, Fed. Rep. of Germany, assignor to Merck Patent Gesellschaft Mit Beschränkter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Feb. 16, 1988, Ser. No. 156,512

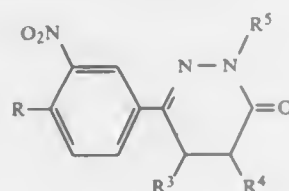
Claims priority, application Fed. Rep. of Germany, Feb. 17, 1987, 3704879

Int. Cl.<sup>5</sup> C07D 413/04; A61F 31/535

U.S. Cl. 514-247

20 Claims

1. A pyridazinone derivative of the formula



wherein

R is F, Cl, Br, I or R<sup>1</sup>R<sup>2</sup>N, R<sup>1</sup> and R<sup>2</sup> are each independently H, C<sub>1-4</sub>-alkyl or benzyl, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are each independently H or C<sub>1-4</sub>-alkyl, or a pharmaceutically acceptable salt thereof, wherein, if R is benzylamino, R<sup>3</sup> is CH<sub>3</sub> and R<sup>4</sup> is H, R<sup>5</sup> is C<sub>1-4</sub>-alkyl.

4,954,500

## AROMATIC

## 2-AMINOALKYL-1,2-BENZOISOTHIAZOL-3(2H)ONE-1,1-DIOXIDE DERIVATIVES

Marcel Hibert, Strasbourg, and Maurice W. Gittos, Plobsheim, both of France, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

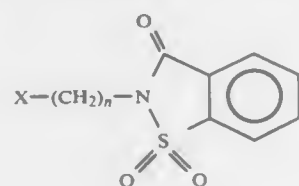
Division of Ser. No. 366,824, Jun. 15, 1989, Pat. No. 4,920,118, which is a division of Ser. No. 244,894, Sep. 12, 1988, Pat. No. 4,857,526, which is a division of Ser. No. 158,432, Feb. 22, 1988, Pat. No. 4,789,676, which is a division of Ser. No. 836,276, Mar. 5, 1986, Pat. No. 4,748,182. This application Feb. 2, 1990, Ser. No. 475,468

Int. Cl.<sup>5</sup> A61K 31/495; C07D 241/42

U.S. Cl. 514-249

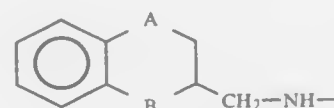
10 Claims

1. An aromatic 2-aminoalkyl-1,2-benzisothiazol-3(2H)one-1,1-dioxide derivative having the formula



wherein

n is an integer of from 2 to 5;  
X is



wherein A is =NR' and B is =NR'' wherein R' is hydrogen or methyl and R'' is hydrogen or methyl, or a pharmaceutically acceptable acid addition salt thereof.

8. A method for lowering blood pressure in a person in need thereof, which comprises the administration to said patient of an antihypertensive effective amount of a compound of one of claims 1-6.

4,954,501

## PIPERAZINE SUBSTITUTED

## 6-PHENYLDIHYDRO-3(2H)-PYRIDAZINONES, AND PHARMACEUTICAL PREPARATIONS CONTAINING THESE

Rolf Herter, Schwabach; Peter Mörsdorf, Langenzenn; Volker Pfahler, Nuremberg; Heidrun Engler, Cadolzburg; Helmut Schickaneder, Eckental, and Kurt-Henning Ahrens, Nuremberg, all of Fed. Rep. of Germany, assignors to Heumann Pharma GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Sep. 21, 1988, Ser. No. 247,868

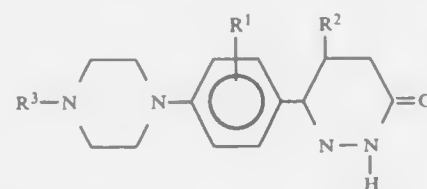
Claims priority, application Fed. Rep. of Germany, Feb. 12, 1988, 3804490

Int. Cl.<sup>5</sup> A61K 31/50; C07D 237/06

U.S. Cl. 514-252

7 Claims

1. A 6-(4-piperazino)-phenyl-4,5-dihydro-3(2H)-pyridazinone, comprising



wherein R<sup>1</sup> is nitro or cyano; R<sup>2</sup> is selected from the group consisting of hydrogen, methyl and hydroxymethyl and R<sup>3</sup> is selected from the group consisting of a C<sub>1-6</sub> alkyl group, a C<sub>1-6</sub> alkyl group substituted with amino or hydroxy, a phenyl group, a naphthyl group, a heteroaryl group wherein the hetero atom is selected from the group consisting of O, S and N, a substituted such aryl or heteroaryl group wherein the substituents are selected from the group consisting of halogen, C<sub>1-3</sub> alkyl and C<sub>1-3</sub> alkoxy, a cyano group, an acyl group with the proviso that, when said acyl group is aroyl, the aroyl ring may be substituted with substituents selected from the group consisting of halogen, C<sub>1-3</sub> alkyl and C<sub>1-3</sub> alkoxy, a carbonyl group and a C<sub>1-6</sub> alkoxy carbonyl group, and a physiologically acceptable salt thereof.

4,954,502

## 1-INDOLYLALKYL-4-(SUBSTITUTED-PYRIDINYL)PIPERAZINES

David W. Smith, Clinton; Frank D. Yocca, Madison; Joseph P. Yevich, Southington, and Ronald J. Mattson, Meriden, all of Conn., assignors to Bristol-Myers Squibb Company, New York, N.Y.

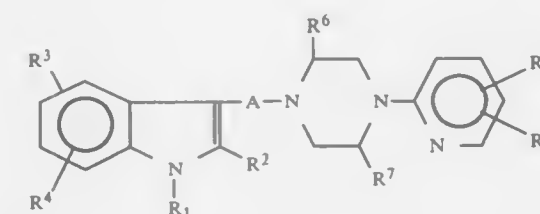
Continuation-in-part of Ser. No. 204,845, Jun. 10, 1988, abandoned. This application Apr. 14, 1989, Ser. No. 338,253

Int. Cl.<sup>5</sup> A61K 31/495, 31/44; C07D 401/14

U.S. Cl. 514-253

58 Claims

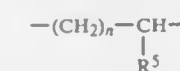
1. A compound of Formula I or the pharmaceutically acceptable acid addition salts thereof,



wherein

R<sup>1</sup> and R<sup>2</sup> are independently selected from hydrogen and lower alkyl, wherein lower means C<sub>1-4</sub>;

R<sup>3</sup>, R<sup>4</sup>, R<sup>8</sup> and R<sup>9</sup> are independently selected from hydrogen, lower alkyl, lower alkoxy, carboxamide, halogen, trifluoromethyl and thio-lower alkyl, with the proviso that R<sup>8</sup> and R<sup>9</sup> cannot both be hydrogen at the same time; A is a C<sub>5-7</sub> cycloalkanyl or cycloalkenyl ring, or A is



wherein n is an integer from 1 to 3 and R<sup>5</sup> is the same as R<sup>1</sup>; and

R<sup>6</sup> and R<sup>7</sup> are independently selected from hydrogen, methyl or R<sup>6</sup> and R<sup>7</sup> can be taken together as a methylene bridge.

57. A method for ameliorating of depression in a mammal comprising administration to said mammal of an effective antidepressant amount of a compound claimed in claim 1.

58. A antidepressant pharmaceutical composition in dosage unit form suitable for systemic administration to a mammalian host comprising a pharmaceutical carrier and from about 1 to 500 mg of an active compound selected from the compounds claimed in claim 1.

4,954,503

## 3-(1-SUBSTITUTED-4-PIPERAZINYL)-1H-INDAZOLES

Joseph T. Strupczewski, Flemington, N.J., and Kenneth J. Bordeaux, Upper Black Eddy, Pa., assignors to Hoechst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

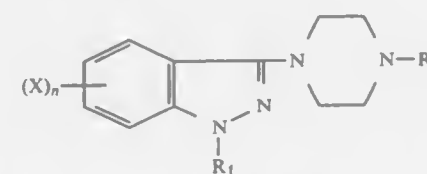
Filed Sep. 11, 1989, Ser. No. 405,161

Int. Cl.<sup>5</sup> A61K 31/495; C07D 401/14, 403/04, 403/14

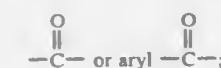
U.S. Cl. 514-254

187 Claims

1. A compound of the formula



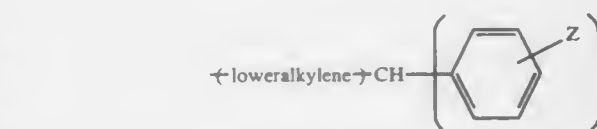
wherein R<sub>1</sub> is hydrogen, lower alkyl, arylloweralkyl, acyl, cycloalkylloweralkylene, and phenylsulfonyl; wherein the term "aryl" signified a phenyl group optionally substituted by one or more hydrogen or halogen atoms or loweralkyl, loweralkoxy, trifluoromethyl, nitro or amino groups; the term "cycloalkyl" refers to a saturated hydrocarbon possessing at least one carbocyclic ring of three to seven carbon atoms; and the term "acyl" refers to a substituent having the formula loweralkyl



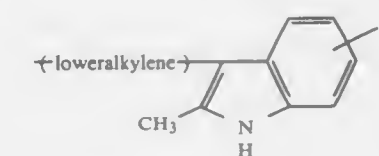
and R<sub>2</sub> is hydrogen, lower alkyl, hydroxyloweralkyl of the

formula -(loweralkylene)-OH, arylloweralkyl, acyl, cycloalkylloweralkylene,

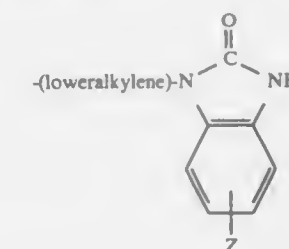
-(loweralkylene)-OH, arylloweralkyl, acyl,



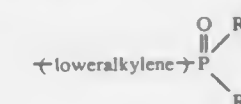
where Z is selected from hydrogen, halogen, loweralkoxy, CF<sub>3</sub>, NO<sub>2</sub> and NH<sub>2</sub>;



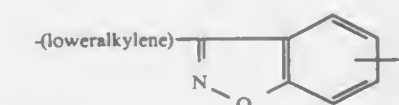
where Z is as defined above,



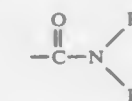
where Z is as defined above;



where R<sub>3</sub> and R<sub>4</sub> are each independently hydrogen and loweralkyl;



where Z is as defined above;



where R' and R'' are each independently hydrogen and loweralkyl; X is hydrogen, loweralkyl, hydroxyl, halogen, loweralkoxy, CF<sub>3</sub>, NO<sub>2</sub> and NH<sub>2</sub>; n is an integer of 1 to 4, with the proviso that if X is a chlorine atom attached at the 5 or 6



position of the benzene ring, R<sub>2</sub> cannot be hydrogen or lower-alkyl and R<sub>1</sub> cannot be hydrogen or

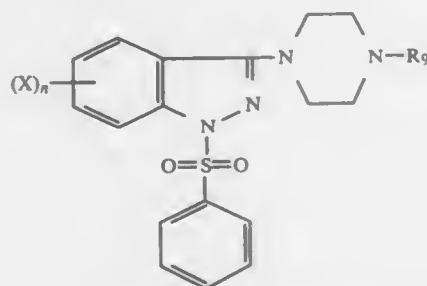


the pharmaceutically acceptable acid addition salts thereof; and where applicable the geometric and optical isomers thereof and the racemic mixtures thereof.

185. A method of alleviating pain in a mammal which comprises administering a pain alleviating amount of a compound as defined in claim 1.

186. A method of alleviating psychoses in a mammal in need thereof which comprises administering to the mammal a psychoses alleviating amount of a compound as defined in claim 1.

187. A compound of the formula



wherein R<sub>9</sub> is loweralkyl, CN and n is an integer of 1 to 4; and X is hydrogen, loweralkyl, hydroxy, halogen, loweralkoxy, CF<sub>3</sub>, NO<sub>2</sub>, NH<sub>2</sub>.

4,954,504

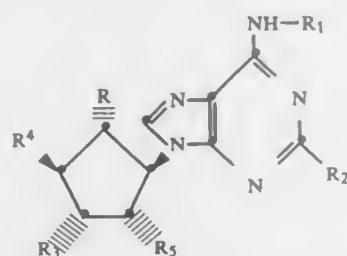
#### N<sub>9</sub>-CYCLOPENTYL-SUBSTITUTED ADENINE DERIVATIVES HAVING ADENOSINE-2 RECEPTOR STIMULATING ACTIVITY

Jen Chen, Middlesex, and Alan J. Hutchison, Verona, all of N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 137,554, Dec. 23, 1987, abandoned, which is a continuation-in-part of Ser. No. 931,327, Nov. 14, 1986, abandoned. This application May 13, 1988, Ser. No. 193,969

Int. Cl.<sup>5</sup> A61K 31/52; C07D 473/18, 473/34  
U.S. Cl. 514-265 24 Claims

1. A compound of the formula



wherein R, R<sub>3</sub> and R<sub>5</sub> independently represent hydrogen or hydroxy provided that at least one of R, R<sub>3</sub> and R<sub>5</sub> represents hydroxy; R<sub>1</sub> represents hydrogen, lower alkyl, C<sub>3</sub>-C<sub>7</sub>-alkenyl, hydroxy-lower alkyl, optionally substituted cycloalkyl or optionally substituted cycloalkyl-lower alkyl, bicycloalkyl, bicycloalkyl-lower alkyl, adamantyl, tetrahydropyranyl, tetrahydrothiopyranyl, tetrahydropyranyl-lower alkyl, tetrahydrothiopyranyl-lower alkyl, adamantyl-lower alkyl, aryl-hydroxy-lower alkyl, aryl, aryl-lower alkyl, aryl-C<sub>3</sub>-C<sub>6</sub>-cycloalkyl, 9-fluorenyl, 9-fluorenyl-lower alkyl or cycloalkenyl-lower alkyl; or R<sub>1</sub> represents a bicyclic benzo-fused 5 or 6-membered saturated carbocyclic radical or a benzo-fused 5 or 6-membered saturated heterocyclic radical containing a heteroatom

selected from oxygen and sulfur directly attached to the fused benzene ring, any said bicyclic radicals being optionally substituted on the benzo portion by lower alkyl, lower alkoxy or halogen, or R<sub>1</sub> represents any said bicyclic radical substituted-lower alkyl; R<sub>2</sub> represents hydrogen, halogen, —S—R<sub>1</sub>, —NR<sub>6</sub>—R<sub>1</sub>, or —NH—R<sub>1</sub> in each of which R<sub>1</sub> has meaning as defined for R<sub>1</sub> provided that R<sub>1</sub> in —SR<sub>1</sub> does not represent hydrogen; R<sub>6</sub> represents lower alkyl; [R<sub>4</sub> represents lower alkoxy-methyl or lower alkylthiomethyl; or] R<sub>4</sub> represents —CONHR<sub>6</sub> in which R<sub>6</sub> represents C<sub>2</sub>-C<sub>4</sub>-alkyl, aryl-lower alkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl or hydroxy-lower alkyl; a pharmaceutically acceptable ester derivative thereof in which free hydroxy groups are esterified in form of a pharmaceutically acceptable ester, and the term optionally substituted cycloalkyl in the above definitions represents C<sub>3</sub>-C<sub>7</sub>-cycloalkyl, unsubstituted or substituted by hydroxy, lower alkyl or a substituent W—Z in which W represents a direct bond or lower alkylene, and Z represents cyano, carboxy derivatized in the form of a pharmaceutically acceptable ester or amide; or a pharmaceutically acceptable salt thereof.

22. A method of stimulating adenosine-2 receptors in mammals comprising the administration to a mammal in need thereof of an effective amount of a compound of claim 1 or of a pharmaceutical composition comprising said compound.

23. A method of treating cardiovascular conditions responsive to adenosine-2 receptor stimulation in mammals comprising the administration to a mammal in need thereof of an effective adenosine-2 receptor stimulating amount of a compound of claim 1 or of a pharmaceutical composition comprising a said compound.

24. A method of treating hypertension in mammals comprising the administration to a mammal in need thereof of an effective antihypertensive amount of a compound of claim 1 or of a pharmaceutical composition comprising a said compound.

4,954,505

#### USE OF OXOQUINAZOLINE DERIVATIVES IN THE TREATMENT OF HYPERURICAEMIA

Gerhard Rauber, Ingelheim am Rhein, and Roland Stechert, Bingen am Rhein, both of Fed. Rep. of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Fed. Rep. of Germany

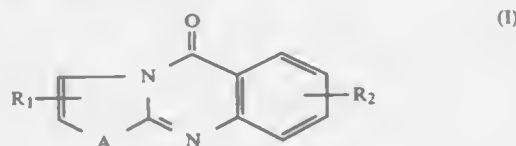
Division of Ser. No. 323,511, Mar. 14, 1989, which is a division of Ser. No. 152,190, Feb. 4, 1988, Pat. No. 4,861,784. This application Sep. 25, 1989, Ser. No. 411,793

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1987, 3704203

Int. Cl.<sup>5</sup> A61K 31/505

U.S. Cl. 514-267 1 Claim

1. A method for treating hyperuricaemia or a disease state caused thereby, which method comprises orally administering to a host suffering from hyperuricaemia or a disease state caused thereby, a therapeutically effective amount of a compound of the formula



wherein

A represents —CH=N—

R<sub>1</sub> represents (a) hydrogen, a lower alkyl or alkoxy group or a condensed-on benzene ring or (b) a cyano, tetrazol-5-yl or —COR<sub>3</sub> group.

R<sub>2</sub> represents a cyano, tetrazol-5-yl or COR<sub>4</sub> group or, if R<sub>1</sub> has one of the meanings given in (b), R<sub>2</sub> may also represent hydrogen, a lower alkyl or alkoxy group or a condensed-on benzene ring.

R<sub>3</sub> represents a lower alkoxy group, an amino, hydrox-

ylamino or tetrazol-5-yl amino group or, if R<sub>2</sub> does not represent hydrogen, R<sub>3</sub> may also represent a hydroxy group and

R<sub>4</sub> represents a lower alkoxy group, a hydroxy, amino, hydroxylamino or tetrazol-5-yl amino group, or a pharmaceutically acceptable salt thereof.

4,954,506

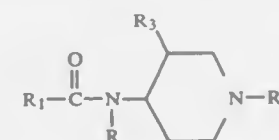
#### N-HETEROCYCLIC-N-(4-PIPERIDINYL)AMIDES AND PHARMACEUTICAL COMPOSITIONS AND METHODS EMPLOYING SUCH COMPOUNDS

Jerome R. Bagley, North Plainfield, and H. Kenneth Spencer, Chatham, both of N.J., assignors to BOC, Inc., Murray Hill, New Providence, N.J.

Division of Ser. No. 362,119, Jun. 6, 1989, Pat. No. 4,916,142, which is a continuation-in-part of Ser. No. 9,857, Feb. 2, 1987, Pat. No. 4,791,112. This application Jan. 22, 1990, Ser. No. 468,381

Int. Cl.<sup>5</sup> A61K 31/505, 31/445; C07D 239/42  
U.S. Cl. 514-272 8 Claims

1. A compound having the formula:



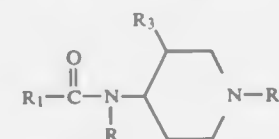
and the optically active isomeric forms, and the pharmaceutically acceptable acid addition salts thereof, in which formula:

R is pyrimidinyl which may be unsubstituted or substituted with substituents independently selected from the group consisting of halogen, lower-alkyl, lower-alkoxy, halogenated lower-alkyl, lower-alkylthio, oxygen, or combinations thereof;

R<sub>1</sub> is selected from the group consisting of furanyl lower-alkyl, thienyl lower-alkyl, pyrrolyl, pyrrolyl lower-alkyl, and lower-alkyl and lower-cycloalkyl of 2 to 6 carbons, wherein the R<sub>1</sub> groups may be either unsubstituted or substituted with the substituents independently selected from the group consisting of halogen, lower-alkyl, lower-alkoxy, halogenated lower-alkyl, lower-alkylthio, oxygen or combinations thereof;

R<sub>2</sub> is selected from the group consisting of thienyl lower-alkyl, thienyl hydroxy lower-alkyl, pyrazoyl lower-alkyl, and (4,5-dihydro-5-oxo-1H-tetrazol-1-yl) lower-alkyl, which may be substituted in the 4-position with a group selected from lower-alkyl, wherein the R<sub>2</sub> group may be either unsubstituted or substituted with the substituents independently selected from the group consisting of halogen, lower-alkyl, lower-alkoxy, halogenated lower-alkyl, lower-alkylthio, oxygen, or combinations thereof; and

R<sub>3</sub> is hydrogen.  
6. A narcotic antagonistic or analgesic composition comprising a non-toxic pharmaceutically acceptable carrier and an analgesically or antagonistically effective amount of a compound having the formula:



and the optically active isomeric forms, and the pharmaceutically acceptable acid addition salts thereof, in which formula:

R is pyrimidinyl which may be unsubstituted or substituted with substituents independently selected from the group consisting of halogen, lower-alkyl, lower-alkoxy, halogenated lower-alkyl, lower-alkylthio, oxygen, or combinations thereof;

R<sub>1</sub> is selected from the group consisting of furanyl, furanyl

lower-alkyl, thienyl, thienyl lower-alkyl, pyrrolyl, pyrrolyl lower-alkyl, lower-alkyl, lower-cycloalkyl, and lower-alkoxy lower-alkyl of 2 to 6 carbons, wherein the R<sub>1</sub> groups may be either unsubstituted or substituted with substituents independently selected from the group consisting of halogen, lower-alkyl, lower-alkoxy, halogenated lower-alkyl, lower-alkylthio, oxygen, or combinations thereof;

R<sub>2</sub> is selected from the group consisting of phenyl lower-alkyl, thienyl lower-alkyl, thienyl hydroxy lower-alkyl, pyrazoyl lower-alkyl, and (4,5-dihydro-5-oxo-1H-tetrazol-1-yl) lower-alkyl, which may be substituted in the 4-position with a group selected from lower-alkyl, wherein the R<sub>2</sub> group may be either unsubstituted or substituted with substituents independently selected from the group consisting of halogen, lower-alkyl, lower-alkoxy, halogenated lower-alkyl, lower-alkylthio, oxygen, or combinations thereof; and

R<sub>3</sub> is methyl.

4,954,507

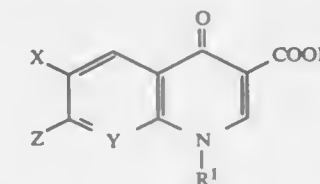
#### 1-TERTIARY-ALKYL-SUBSTITUTED NAPHTHYRIDINE CARBOXYLIC ACID ANTIBACTERIAL AGENTS

Abraham Weber, Saint-Mande; Daniel Bouzard, Franconville; Munir Essiz, Naisy le Grand; Pierre Di Cesare, Meaux; Jean-Pierre Jacquet, Menestreau-en-Villette, and Philippe Remozon, Paris, all of France, assignors to Bristol-Myers Company, New York, N.Y.

Continuation of Ser. No. 99,231, Sep. 25, 1987, abandoned, which is a continuation-in-part of Ser. No. 916,752, Oct. 8, 1986, abandoned. This application Dec. 19, 1988, Ser. No. 287,502

Int. Cl.<sup>5</sup> A61K 31/435; C07D 471/04  
U.S. Cl. 514-300 16 Claims

1. A compound having the formula



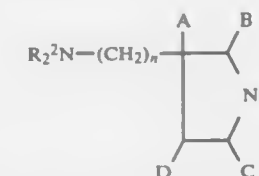
wherein:

R<sup>1</sup> is —C(CH<sub>3</sub>)<sub>3</sub> optionally substituted by 1-3 fluorine atoms;

X is a member of the group selected from F, Cl, Br, CF<sub>3</sub>, and CCl<sub>3</sub>;

Y is N; and

Z is



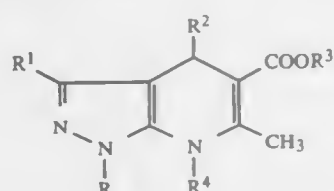
wherein each R<sup>2</sup> is independently selected from H, unsubstituted and substituted alkyl having 1 to 6 carbon atoms wherein the substituent is independently selected from 1-3 hydroxy, fluoro, chloro, amino, alkylamino, trifluoroacetyl-amino, and phenyl groups; cycloalkyl having 3 to 6 carbon atoms, and cycloalkenyl having 3 to 6 carbon atoms; and wherein A, B, C, and D, are independently selected from H; unsubstituted and substituted lower alkyl having 1 to 4 carbon atoms wherein the substituent is independently selected from 1-3 hydroxy, fluoro, chloro, amino, alkylamino, trifluoroacetyl-amino, and phenyl groups; amino; hydroxy; fluoro; chloro; and phenyl

groups; and wherein n is selected from the integers 0, 1, 2, and 3, and wherein when each of the R<sup>2</sup> is other than H, the R<sup>2</sup> group is independently selected from CH<sub>3</sub> and C<sub>2</sub>H<sub>5</sub>, and pharmaceutically acceptable acid addition and base salts thereof.

4,954,508  
PHARMACOLOGICALLY ACTIVE  
PYRAZOLOPYRIDINES

Giorgio Winters, Arese, Italy, assignor to Gruppo Lepetit S.p.A., Milan, Italy  
Continuation-in-part of Ser. No. 562,796, Dec. 19, 1983, abandoned. This application Dec. 20, 1988, Ser. No. 286,917  
Claims priority, application United Kingdom, Dec. 20, 1982, 8236131

Int. Cl.<sup>5</sup> A61K 31/44; C07D 471/04  
U.S. Cl. 514—303 7 Claims  
1. A 4,7-dihydropyrazolo[3,4-b]pyridine-5-carboxylic acid compound of the formula:

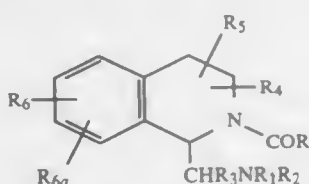


wherein R represents a methyl group; R<sup>1</sup> represents a C<sub>4</sub> alkyl group; R<sup>2</sup> represents a 2-methylphenyl group; R<sup>3</sup> represents a methyl group; and R<sup>4</sup> represents hydrogen; or a physiologically acceptable salt thereof.

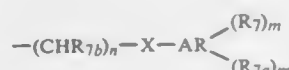
4,954,509  
ISOQUINOLINE DERIVATIVES AND THEIR USE AS  
ANALGESICS

Vittorio Vecchiotti, and Giuseppe Giardina, both of Baranzate, Italy, assignors to Dr. Lo. Zambelletti S.p.A., Italy  
Filed Feb. 17, 1989, Ser. No. 312,648  
Claims priority, application United Kingdom, Feb. 19, 1988, 8803919.1; Jun. 24, 1988, 8815089

Int. Cl.<sup>5</sup> A61K 31/47; C07D 401.06  
U.S. Cl. 514—307 10 Claims  
1. A compound, or a solvate or salt thereof, of formula (I):



in which:  
RCO is an acyl group in which the group R has the formula (II):



in which  
n is 0, 1 or 2;  
m is 0, 1 or 2;  
m' is 0, 1 or 2, provided m + m' ≤ 2  
X is a direct bond, or O S or NR<sub>8</sub> in which  
R<sub>8</sub> is hydrogen or C<sub>1-6</sub> alkyl;  
Ar is either a single or fused ring carbocyclic aromatic group having 6 to 12 ring atoms or a single or fused ring heterocyclic aromatic group have 5 to 12 ring atoms, comprising

up to four hetero atoms in each ring selected from oxygen, nitrogen and sulphur;  
each of R<sub>7</sub> and R<sub>7a</sub> is C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1-6</sub> haloalkyl, C<sub>2-6</sub> haloalkenyl, C<sub>2-6</sub> haloalkynyl, phenyl, phenylalkyl, hydroxy, C<sub>1-6</sub> alkoxy, thiol, C<sub>1-6</sub> alkylthio, C<sub>1-6</sub> haloalkoxy, C<sub>1-6</sub> haloalkylthio, halogen, NO<sub>2</sub>, CN, CF<sub>3</sub>, —OCF<sub>3</sub>, —OCHF<sub>2</sub>, —OCF<sub>2</sub>CF<sub>2</sub>H, —OCCl<sub>2</sub>CF<sub>3</sub>, —COOR<sub>9</sub>, —CONR<sub>10</sub>R<sub>11</sub>, —SO<sub>3</sub>R<sub>12</sub>, —SO<sub>2</sub>NR<sub>13</sub>R<sub>14</sub> or —COR<sub>15</sub> in which each of R<sub>9</sub> to R<sub>15</sub> is independently hydrogen, C<sub>1-6</sub> alkyl, phenyl or phenylalkyl;

or, when m is 2 and m' is 0, two R<sub>7</sub>'s form a C<sub>2-6</sub> polymethylene group;

and R<sub>7b</sub> is hydrogen or C<sub>1-6</sub> alkyl;  
R<sub>1</sub> and R<sub>2</sub> are independently hydrogen, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>3-6</sub> cycloalkyl or C<sub>4-12</sub> cycloalkylalkyl groups or together form a C<sub>2-8</sub> branched or linear polymethylene or C<sub>2-6</sub> alkenylene group optionally interrupted with an oxygen or sulphur atom to form an ether or thioether, respectively;

R<sub>3</sub> is hydrogen, C<sub>1-6</sub> alkyl, or phenyl, or R<sub>3</sub> together with R<sub>1</sub> forms a —(CH<sub>2</sub>)<sub>3</sub>— or —(CH<sub>2</sub>)<sub>4</sub>— group; R<sub>4</sub> and R<sub>5</sub>, which may be the same or different and may be attached to the same or different carbon atoms of the isoquinoline nucleus, are each hydrogen, halogen, hydroxy, C<sub>1-6</sub> alkyl, phenyl, or R<sub>4</sub> together with R<sub>5</sub> form a —(CH<sub>2</sub>)<sub>p</sub>— group, where p is an integer from 1 to 5 and one or more of the —(CH<sub>2</sub>)— moieties is optionally substituted by a C<sub>1-6</sub> alkyl group; and

R<sub>6</sub> and R<sub>6a</sub>, which may be the same or different, are each hydrogen, C<sub>1-6</sub> alkyl, —CH<sub>2</sub>OR<sub>6b</sub>, halogen, hydroxy, C<sub>1-6</sub> alkoxy, C<sub>1-6</sub> alkoxycarbonyl, thiol, C<sub>1-6</sub> alkylthio,



—NHCOR<sub>6d</sub>, —NHSO<sub>2</sub>R<sub>6e</sub>, —CH<sub>2</sub>SO<sub>2</sub>NR<sub>6f</sub>R<sub>6g</sub>, in which each of R<sub>6b</sub> to R<sub>6g</sub> is independently hydrogen, C<sub>1-6</sub> alkyl, phenyl or phenylalkyl with the proviso that R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub> and R<sub>6a</sub> are not simultaneously hydrogen.

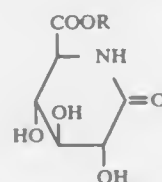
10. A method of treating pain in mammals which comprises administering an effective, non toxic amount of a compound according to claim 1 to a sufferer.

4,954,510  
ANTIVIRAL AGENT CONTAINING LACTAM  
COMPOUND

Takashi Tsuroka; Satoru Nakabayashi; Yuji Matsushashi; Haruo Yamamoto; Shigeharu Inouye, and Shinichi Kondo, all of Kanagawa, Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

Filed Dec. 23, 1988, Ser. No. 289,152  
Claims priority, application Japan, Dec. 25, 1987, 326747; Dec. 26, 1987, 328387

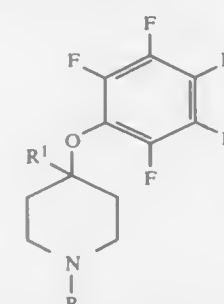
Int. Cl.<sup>5</sup> A61K 31/445 6 Claims  
U.S. Cl. 514—315 6 Claims  
1. A method of treating viral infection which comprises administering to a host so infected an effective amount of D-glucaro-δ-lactam compound represented by formula (I')



wherein R represents a hydrogen atom or a straight-chain or

branched-chain alkyl group of 1 to 8 carbon atoms, or a pharmaceutically acceptable salt.

4,954,511  
4-PENTAFLUOROPHENOXYPYPERIDINES  
Grover C. Helsley, Pluckemin; Larry Davis, Sergeantsville, and Gordon E. Olsen, Somerset, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.  
Division of Ser. No. 167,941, Mar. 14, 1988, Pat. No. 4,914,204.  
This application Jan. 24, 1990, Ser. No. 456,720  
Int. Cl.<sup>5</sup> A61K 31/445; C02D 211/94  
U.S. Cl. 514—327 41 Claims  
1. A compound of the formula



wherein R<sup>1</sup> is hydrogen or aryl; and R is a monovalent radical selected from the group consisting of hydrogen, cyano, loweralkyl, arylloweralkyl, bis-arylloweralkyl, aminoloweralkyl, (loweralkylamino)loweralkyl, (diheteroalkylamino) loweralkyl, (diheteroalkylphosphinyl) loweralkyl, the term aryl in each occurrence signifying a phenyl group optionally substituted by one or more substituents selected from the group consisting of halogen, loweralkyl, loweralkoxy and trifluoromethyl.

35. A method of treatment which comprises administering to a mammal in need of relief from convulsions a pharmaceutically effective amount of a compound as defined in claim 1.

37. A method of treatment which comprises administering to a mammal in need of relief from depression a pharmaceutically effective amount of a compound as defined in claim 1.

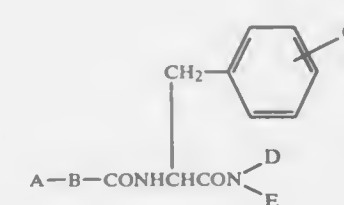
39. A method of treating a patient in need of relief from high blood pressure which comprises administering to the patient an effective amount of the compound as defined in claim 1.

41. A method of alleviating pain comprising administering to a mammal in need of pain alleviation a pain alleviating effective amount of a compound as defined in claim 1.

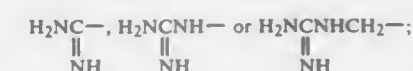
4,954,512  
ANTI-ULCER COMPOSITION  
Katsunori Oguro; Hiroshi Nojima; Nobuyuki Hashizume; Norio Ohno, and Takatoshi Naito, all of Tokyo, Japan, assignors to Shosuke Okamoto, Hyogo and Showa Denko Kabushiki Kaisha, Tokyo, both of Japan

Filed Nov. 23, 1988, Ser. No. 275,193  
Claims priority, application Japan, Nov. 24, 1987, 62-297082  
The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.

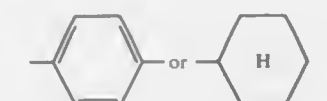
Int. Cl.<sup>5</sup> A61K 31/44, 31/16, 31/24, 31/195 9 Claims  
U.S. Cl. 514—352 9 Claims  
1. An anti-peptic ulcer composition comprising, as an active ingredient, a therapeutically effective amount of a compound having the formula (I):



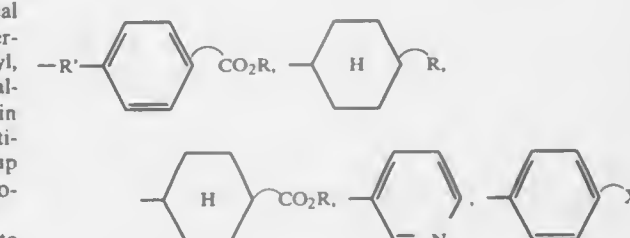
wherein A represents H<sub>2</sub>NCH<sub>2</sub>—,



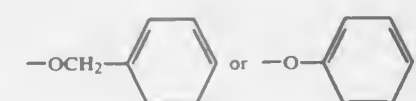
B represents



D and E each independently represent H, R, —R'CO<sub>2</sub>R, —R'(OH)CO<sub>2</sub>R,



or D and E with the nitrogen to which they are bonded may form a piperidino ring which is substituted with a CO<sub>2</sub>R wherein x represents H, CONR<sub>2</sub>, CONHR, CONH<sub>2</sub>, CO<sub>2</sub>H, CO<sub>2</sub>R, or COR; R' represents a lower alkylene group and R represents a lower alkyl group; G represents H,



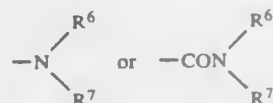
or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

4,954,513  
LEUKOTRIENE ANTAGONISTS  
John G. Gleason, Downingtown; Ralph F. Hall, Villanova, and Joanne Smallbeer, Landenberg, all of Pa., assignors to Smith-Kline Beecham Corporation, Philadelphia, Pa.  
Filed Dec. 23, 1988, Ser. No. 288,827  
Int. Cl.<sup>5</sup> A61K 31/18; C07C 143/74, 143/80  
U.S. Cl. 514—381 14 Claims  
1. A compound represented by the following structural formula (I):





hydrogen or halogen atom, a cyano, azido, carboxyl, hydroxyl, formyl or alkoxy carbonyl group or a substituted or unsubstituted alkyl, alkoxy, phenoxy, cycloalkyl, carbamoyl, amino or phenyl group;  $R^4$  represents a hydrogen or halogen atom, a nitro, cyano, carboxyl, alkanoyl, hydroxyl or alkoxy carbonyl group, a substituted or unsubstituted alkyl, alkoxy, alkylthio, phenylthio, lower alkynyl, lower alkenyl, sulfamoyl, alkylsulfonyl, alkylsulfonyl, amidino, phenyl or heterocyclic group or a group of the formula,



( $R^6$  is a hydrogen atom, a hydroxyl, cyano or alkoxy carbonyl group or a substituted or unsubstituted alkyl, cycloalkyl, phenyl, amino, alkanoyl, benzoyl, carbamoyl, alkylsulfonyl, imino-methyl or amidino group and  $R^7$  is a hydrogen atom or a substituted or unsubstituted alkyl, alkoxy, phenyl, cycloalkyl or heterocyclic group, or  $R^6$  and  $R^7$ , when taken together with the nitrogen atom to which the two are bonded, form a substituted or unsubstituted azetidin-1-yl, pyrrolidin-1-yl, piperidin-1-yl or pyrrol-1-yl group);  $R^5$  represents a substituted or unsubstituted phenyl, thienyl, furyl or pyridyl group;  $Z$  represents an oxygen or sulfur atom or an imino group and the broken line means a single or double bond;

the alkyl, alkoxy, cycloalkyl, phenoxy, amino, carbamoyl and phenyl groups for  $R^3$ , the alkyl, alkoxy, alkylthio, phenylthio, amidino, lower alkenyl, lower alkynyl, sulfamoyl, alkylsulfonyl, alkylsulfonyl, phenyl and heterocyclic groups for  $R^4$ , the alkyl, cycloalkyl, phenyl, amino, alkanoyl, benzoyl, carbamoyl, alkylsulfonyl, iminomethyl and amidino groups for  $R^6$ , the alkyl, alkoxy, cycloalkyl, phenyl and heterocyclic groups for  $R^7$ , the azetidin-1-yl, pyrrolidin-1-yl, piperidin-1-yl or pyrrol-1-yl group which  $R^6$  and  $R^7$  form with the nitrogen atom to which the two are bonded and the phenyl, thienyl, furyl and pyridyl groups for  $R^5$  may each be substituted by at least one substituent selected from the group consisting of halogen atoms and alkoxy, alkylthio, phenoxy, carboxyl, alkanoyl, alkoxy carbonyl, carbamoyl, sulfamoyl, cyano, alkylsulfonyl, hydroxyl, mercapto, alkanoylamino, alkylamino, dialkylamino, alkyl, cycloalkyl, oxo, nitro, haloalkyl, amino, phenyl, alkoxy-carbonylamino, hydroxyimino and heterocyclic groups; and the term "heterocyclic group" mentioned for  $R^4$ ,  $R^7$  and above substituent represents thienyl, furyl, pyrrolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, benzimidazolyl, benzthiazolyl, 1,2,3-thiadiazolyl, 1,2,4-thiadiazolyl, 1,3,4-thiadiazolyl, 1,3,4-oxadiazolyl, 1,2,3-triazolyl, 1,2,4-triazolyl, tetrazolyl, pyridyl, quinolyl, isoquinolyl, pyrimidinyl, piperazinyl, pyrazinyl, pyridazinyl, 1,2,3,4-tetrahydroquinolyl, 1,2,4-triazinyl, imidazo[1,2-b][1,2,4]triazinyl, pyrrolidinyl, morpholinyl or quinuclidinyl group.

4,954,519

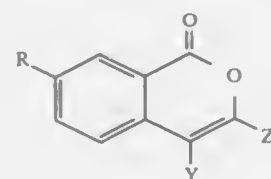
#### ISOCOUMARINS WITH BASIC SUBSTITUENTS AS SERINE PROTEASES INHIBITORS, ANTICOAGULANTS AND ANTI-INFLAMMATORY AGENTS

James C. Powers, Atlanta; Chih-Min Kam, Roswell; Steven W. Owel, and David N. Ku, both of Decatur, all of Ga., assignors to Georgia Tech Research Corporation, Atlanta, Ga. Continuation-in-part of Ser. No. 43,647, Apr. 28, 1987, Pat. No. 4,845,242. This application Jul. 3, 1989, Ser. No. 374,980 Int. Cl.<sup>5</sup> A61K 31/40

U.S. Cl. 514—456

9 Claims

1. A method of inhibiting blood clotting of mammalian blood comprising contacting said blood with a therapeutically amount of a compound having the following structure:



or a pharmaceutically acceptable salt thereof, wherein  $R$  is selected from the group consisting of  $-N-H-C(=NH)NH_2$ ,  $-C(=NH)NH_2$ , amino- $C_{1-6}$  alkyl, and isothiureido- $C_{1-6}$  alkyl,  $Z$  is selected from the group consisting of H, halogen,  $C_{1-6}$  alkyl,  $C_{1-6}$  alkyl with a phenyl group attached to the alkyl group,  $C_{1-6}$  fluorinated alkyl,  $C_{1-6}$  alkyl with a hydroxyl group attached to the alkyl group,  $C_{1-6}$  alkyl with a  $C_{1-6}$  alkoxy group attached to the alkyl group,  $C_{1-6}$  alkoxy,  $C_{1-6}$  fluorinated alkoxy,  $C_{1-6}$  alkoxy with a phenyl group attached to the alkoxy group, benzyloxy group wherein the phenyl group is unsubstituted or substituted by one or two substituents selected from halogen, trifluoromethyl,  $NO_2$ , cyano, methyl, methoxy, acetyl, carboxyl, OH, and amino, and  $Y$  is selected from the group consisting of H, halogen, trifluoromethyl, methyl, OH, and methoxy.

4,954,520

#### 1,3-DIOXOLANE DERIVATIVES USEFUL IN THE TREATMENT OF INFLAMMATION

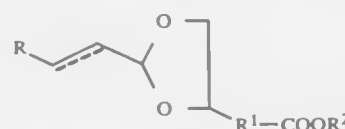
Stevan W. Djuric, Glenview, and Thomas D. Penning, Des Plaines, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Jan. 19, 1989, Ser. No. 299,366  
Int. Cl.<sup>5</sup> A61K 31/335; C07D 317/26

U.S. Cl. 514—467

30 Claims

1. A compound of the formula



or a pharmaceutically acceptable salt thereof, wherein  $R$  is alkyl of 5 to 14 carbon atoms, alkenyl of 5 to 14 carbon atoms or alkynyl of 5 to 14 carbon atoms;  $R^1$  is lower alkylene or phenylene; and  $R^2$  is hydrogen or lower alkyl.

4,954,521

#### METHODS FOR ADMINISTERING ANTI-THROMBOTIC COMPOUNDS

Philip N. Sawyer, 7600 Ridge Blvd., Brooklyn, N.Y. 11209, and Leon D. Freeman, 101 Casabuena Dr., Corte Madera, Calif. 94925

Division of Ser. No. 817,178, Jan. 9, 1986, Pat. No. 4,727,164, which is a continuation of Ser. No. 317,763, Nov. 3, 1981, abandoned, which is a division of Ser. No. 117,066, Jan. 31, 1980, Pat. No. 4,329,290, which is a continuation-in-part of Ser. No. 35,637, May 3, 1979, abandoned, which is a continuation of Ser. No. 701,874, Jul. 1, 1976, Pat. No. 4,164,585. This application Dec. 2, 1987, Ser. No. 108,258  
Int. Cl.<sup>5</sup> A61K 31/34

U.S. Cl. 514—474

9 Claims

1. A method for reducing thrombotic tendencies in a host which comprises administering to the host a therapeutically effective amount of a mixture of esters of para amino benzoic acid and ascorbic acid to reduce thrombotic tendencies therein.

4,954,522

#### LYOPHILIZED PREPARATION OF PLATINUM COMPOUND

Shintaro Suzuki; Noriaki Yanagisawa, and Taka'aki Ohkuma, all of Tokyo, Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 22, 1988, Ser. No. 275,008

Claims priority, application Japan, Dec. 3, 1987, 62-304509  
Int. Cl.<sup>5</sup> A61K 31/28

U.S. Cl. 514—492

3 Claims

1. A lyophilized preparation comprising dextrane having a molecular weight of 40,000 to 150,000 and cis-1,1-cyclobutanedicarboxylate(2R)-2-methyl-1,4-butanediamine platinum (II), and the amount of dextrane being from about 0.2 part to about 5 parts per part by weight of the platinum compound, wherein said preparation is easily redissolved in a period of time within a range substantially less than 5 minutes and extending down to a period of time as short as 10–15 seconds.

4,954,523

#### BENZOPHENONE OXIME ETHER COMPOUNDS, PHARMACEUTICAL COMPOSITIONS AND TREATMENT METHODS

Youji Yamagishi, Kamiinayoshi; Kozo Akasaka; Takeshi Suzuki, both of Ushiku; Mitsuaki Miyamoto, Ibaraki; Kouji Nakamoto, Tsuchiura; Kazuo Okano, Yatabemachi; Shinya Abe; Hiroonori Ikuta, both of Ushiku; Kenji Hayashi; Hiroyuki Yoshimura, both of Yatabemachi; Tooru Fujimori, Toyosato; Kouichi Harada, Yatabemachi, and Isao Yamatsu, Ushiku, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

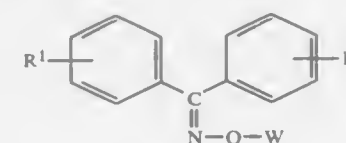
Division of Ser. No. 24,737, Mar. 11, 1987, Pat. No. 4,886,834. This application Jun. 9, 1989, Ser. No. 364,712

Claims priority, application Japan, Mar. 17, 1986, 61-57061; Mar. 26, 1986, 61-65963  
Int. Cl.<sup>5</sup> A61K 31/15, 31/44, 31/385, 31/40, 31/415; C07C 251/56, 251/50, 213/56

U.S. Cl. 514—521

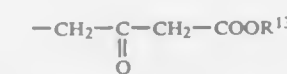
19 Claims

1. A substituted benzophenone oxime ether derivative having the formula



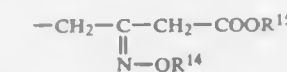
wherein each of  $R^1$  and  $R^2$  is hydrogen, hydroxyl or lower alkoxy;  $W$  is

(1)



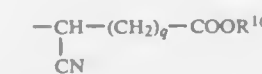
in which  $R^{13}$  is hydrogen or lower alkyl,

(2)



in which  $R^{15}$  is hydrogen or lower alkyl and  $R^{14}$  is lower alkyl,

(3)



in which  $R^{16}$  is hydrogen or lower alkyl and  $q$  is an integer of 1, 2 or 3, or,  
(4)  $-(CH_2)_p-Z$  in which  $-Z$  is  $-SH$  or  $-SCN$ , and  $p$  is an integer of 1 or 2, or pharmacologically acceptable salt thereof.

18. A pharmaceutical composition which comprises a pharmacologically effective amount of the substituted benzophenone oxime ether derivative as defined in claim 1 or a pharmacologically acceptable salt thereof and a pharmacologically acceptable carrier.

4,954,524

#### CARBACYCLINS, THEIR PREPARATION AND USE AS MEDICINAL AGENTS

Werner Skuballa; Bernd Radwisch; Helmut Vorbrueggen, all of Berlin; Jorge Casals-Stenzel, Mainz; Gerda Mannesmann, Cologne; Ekkehard Schillinger, and Michael H. Towa, both of Berlin, all of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Continuation of Ser. No. 188,944, May 2, 1988, abandoned, which is a continuation of Ser. No. 77,279, Jul. 24, 1987, abandoned, which is a continuation of Ser. No. 859,977, May 5, 1986, abandoned, which is a continuation of Ser. No. 510,121, Jul. 1, 1983, abandoned. This application Apr. 6, 1989, Ser. No. 333,812

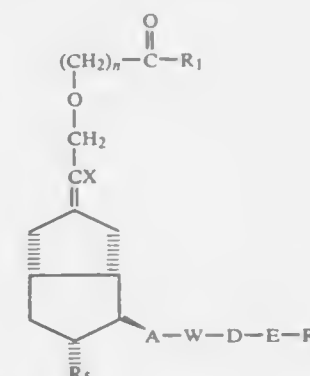
Claims priority, application Fed. Rep. of Germany, Jul. 13, 1982, 3225287

Int. Cl.<sup>5</sup> C07C 177/00; H61K 31/557

U.S. Cl. 514—530

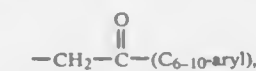
46 Claims

1. A carbacyclin of the formula



wherein  $R_1$  is hydrogen or  $OR_2$ ,  
wherein

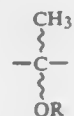
$R_2$  is (a) hydrogen, (b)  $C_{1-10}$  alkyl, (c)  $C_{1-10}$  alkyl substituted by halogen; hydroxy;  $C_{1-4}$  alkoxy;  $C_{6-10}$  aryl;  $C_{6-10}$  aryl substituted by 1–3 halogen atoms, a phenyl group, 1–3  $C_{1-4}$  alkyl groups as a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, hydroxy or  $C_{1-4}$  alkoxy group; di- $C_{1-4}$  alkylamino; or tri- $C_{1-4}$  alkylammonium; (d)  $C_{3-10}$  cycloalkyl, (e)  $C_{3-10}$  cycloalkyl substituted by  $C_{1-4}$  alkyl, (f)  $C_{6-10}$  aryl, (g)  $C_{6-10}$  aryl substituted by 1–3 halogen atoms, a phenyl group, 1–3  $C_{1-4}$  alkyl groups or a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, hydroxy or  $C_{1-4}$  alkoxy group, (h) an aromatic heterocycle of 5 or 6 ring atoms one of which is O, N or S, the remainder being carbon atoms, or (i)



wherein the aryl group is unsubstituted or substituted by (A) (1–3 phenyl groups, each of which is unsubstituted or



substituted by 1-3 halogen atoms; (B) 1-3 —C<sub>1-4</sub>-alkoxy groups; or (C) 1-3 halogen atoms; or R<sub>1</sub> is NHR<sub>3</sub>, wherein R<sub>3</sub> is R<sub>2</sub> or the acyl group of a C<sub>1-15</sub>-hydrocarbon carboxylic or sulfonic acid; W is —CHOR—, or

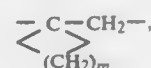


wherein the OR-group is in the α- or β-position; R is H, tetrahydropyranyl, tetrahydrofuranyl, α-ethoxyethyl, trimethylsilyl, dimethyl-tert-butylsilyl, tribenzylsilyl or an acyl group of a C<sub>1-15</sub>-hydrocarbon carboxylic or sulfonic acid;

n is 3, 4, or 5;

X is hydrogen,

A is —CH<sub>2</sub>—CH<sub>2</sub>—, trans—CH=CH—, or —C=C—,



C<sub>1-10</sub>-alkylene, or C<sub>2-10</sub>-alkenylene, each of which is optionally substituted by fluorine;

m is 1, 2, or 3;

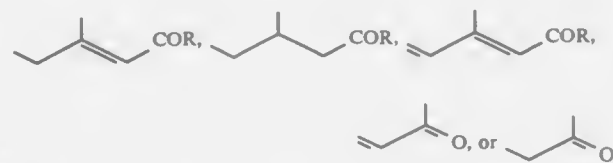
E is —C=C—, or —CR<sub>6</sub>=CR<sub>7</sub>—, wherein R<sub>6</sub> is H, C<sub>1-5</sub> alkyl and R<sub>7</sub> is H, halo or C<sub>1-5</sub> alkyl;

R<sub>5</sub> is OR;

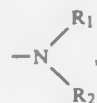
R<sub>4</sub> is (a) a C<sub>1-10</sub> hydrocarbon aliphatic radical, (b) a C<sub>1-10</sub> hydrocarbon aliphatic radical substituted by C<sub>6-10</sub> aryl or by C<sub>6-10</sub> aryl substituted by 1-3 halogen atoms; a phenyl group, 1-3 C<sub>1-4</sub> alkyl groups or a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, hydroxy or C<sub>1-4</sub> alkoxy group; (c) C<sub>3-10</sub> cycloalkyl, (d) C<sub>3-10</sub> cycloalkyl substituted by C<sub>1-4</sub> alkyl, (e) C<sub>6-10</sub> aryl, (f) C<sub>6-10</sub> aryl substituted by 1-3 halogen atoms, a phenyl group, 1-3 C<sub>1-4</sub> alkyl groups or a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, hydroxy or C<sub>1-4</sub> alkoxy group; or (h) an aromatic heterocycle of 5 or 6 ring atoms one of which is O, N or S, the remainder being carbon atoms;

or when R<sub>1</sub> is H, a physiologically compatible salt thereof with a base.

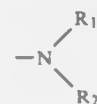
and B is



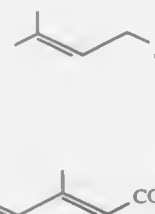
or wherein R is hydroxy, lower alkoxy, or



in which each of R<sub>1</sub> and R<sub>2</sub> is hydrogen, lower alkyl or aryl; with the proviso that R is lower alkoxy or



when n is 1, m is 0, A is



and B is

to a patient orally or parenterally in the dosage ranging from 40 mg to 4 g/day for an adult human being.

4,954,525

#### METHOD OF TREATING SKIN DISEASES

Isao Yamatsu, Saitama; Yuichi Inai; Shinya Abe, both of Tokyo; Takeshi Suzuki, Abiko; Yoshikazu Suzuki, Ichinomiya; Osamu Tagaya, Gifu; Kouichi Suzuki, Kakamigahara; Kouichi Abe, Fuchu, and Kouji Yamada, Tokyo, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed May 6, 1981, Ser. No. 260,870

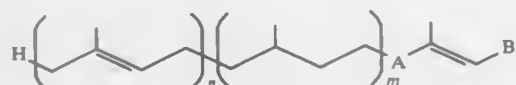
Claims priority, application Japan, Dec. 24, 1980, 55-182116 The portion of the term of this patent subsequent to Aug. 24, 1999, has been disclaimed.

Int. Cl.<sup>5</sup> A01N 37/02; C07C 57/03

U.S. Cl. 514—549

10 Claims

1. A method for treating skin diseases with keratinization and allergic or inflammatory skin diseases which comprises administering a polyprenyl compound having the formula (I):



in which each of n and m is 0, 1 or 2, n+m is 0, 1 or 2, A is

4,954,526

STABILIZED NITRIC OXIDE - PRIMARY AMINE COMPLEXES USEFUL AS CARDIOVASCULAR AGENTS Larry K. Keefer, Bethesda, Md., assignor to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Feb. 28, 1989, Ser. No. 316,958

Int. Cl.<sup>5</sup> A61K 31/13, 31/20, 31/195, 31/655

U.S. Cl. 514—611

20 Claims

1. A method of treating hypertension, wherein said method comprises administering to a mammal, in need thereof, a therapeutically effective amount of a compound of the formula:



wherein:

R is C<sub>3-8</sub> lower alkyl, phenyl, benzyl, or C<sub>3-8</sub> cycloalkyl, any of which R groups may be substituted by one to three substituents, same or different, selected from the group consisting of halo, hydroxy, C<sub>1-8</sub> alkoxy, —NH<sub>2</sub>, —C(O)NH<sub>2</sub>, —CH(OH), —C(O)OH and —NO<sub>2</sub>;

X is a pharmaceutically acceptable cation, a pharmaceutically acceptable metal center, or a pharmaceutically acceptable organic group selected

from the group consisting of C<sub>1-8</sub> lower alkyl, —C(O)CH<sub>3</sub> and —C(O)NH<sub>2</sub>; and Y is one to three, consistent with the valence of X.

4,954,527

#### NOVEL POLYACETYLENE COMPOSITIONS AND THEIR METHODS OF USE

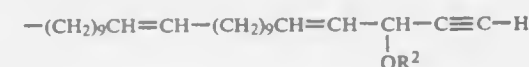
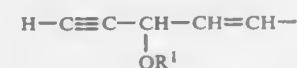
Amy E. Wright, Ft. Pierce; Winnie C. Thompson, and May S. Lui, both of Vero Beach, all of Fla., assignors to Harbor Branch Oceanographic Institution, Inc., Fort Pierce, Fla. Continuation of Ser. No. 879,071, Jun. 26, 1986, abandoned, which is a continuation-in-part of Ser. No. 825,060, Jan. 31, 1986, abandoned. This application Dec. 7, 1987, Ser. No. 131,233

Int. Cl.<sup>5</sup> C07C 33/044; A61K 31/045, 31/12, 31/22

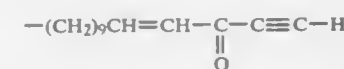
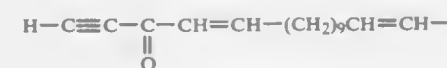
U.S. Cl. 514—675

6 Claims

1. A substantially pure compound of the formulae:



or



wherein R<sup>1</sup> and R<sup>2</sup> are the same or different and are selected from the group consisting of lower acyl and hydrogen.

4,954,529

(THIO)BENZOYLUREAS AND FUNCTIONAL DERIVATIVES THEREOF, PROCESSES FOR THEIR PREPARATION, AGENTS CONTAINING THEM AND THEIR USE AS AGENTS FOR COMBATING PESTS Volker Koch, Kelkheim; Stefan Schnatterer, Frankfurt am Main; Werner Bonin, Kelkheim; Manfred Kern, Lörzweiler; Werner Knauf, Eppstein/Taunus, and Anna Walterdorfer, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 2, 1988, Ser. No. 278,966

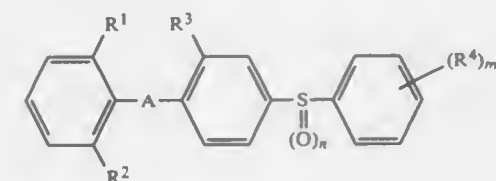
Claims priority, application Fed. Rep. of Germany, Dec. 4, 1987, 3741062

Int. Cl.<sup>5</sup> A01N 47/30; C07C 275/02, 275/54

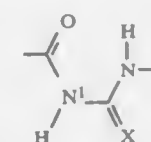
U.S. Cl. 514—594

11 Claims

1. A compound of formula I



in which A is the radical A<sup>1</sup>



R<sup>1</sup> to R<sup>3</sup> in each case independently of one another are hydrogen or halogen, the radicals R<sup>4</sup> in each case independently of one another are halogen, (C<sub>1</sub>-C<sub>3</sub>) halogenoalkyl or nitro, X is oxygen, n is 0 and m is a number from 1 to 4

or, an agriculturally suitable salt thereof, provided that (R<sup>4</sup>)<sub>m</sub> is not by itself halogen or is not by itself nitro.

10. An acaricidal or insecticidal agent which comprises an effective amount of a compound of formula I as claimed in claim 1 and a suitable carrier therefor.

4,954,530

#### PREVENTING AGENT FOR HUMAN IMMUNODEFICIENCY VIRUS INFECTION COMPRISING MENFEGOL

Tsutomu Miyamoto; Hisanaga Igarashi, both of Nagasaki, and Sugiyama Hidenori, Tokyo, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed May 24, 1989, Ser. No. 356,367

Claims priority, application Japan, May 25, 1988, 63-125661

Int. Cl.<sup>5</sup> A61K 31/075, 31/74

U.S. Cl. 514—718

4 Claims

1. A method for the prevention of human immunodeficiency virus infection which comprises causing male semen of an infected male at the time of ejaculation to come into contact with a preparation which comprises menfegol as an active ingredient in an amount ranging from 10 to 100 mg per dose and a pharmaceutically acceptable carrier therefor.

4,954,528

#### HYPOCHOLESTEROLEMIC USE OF BIS(3,5-DI-TERTIARY-BUTYL-4-HYDROXYPHENYL-THIO)METHANE

Simon J. T. Mao, Loveland, and Richard L. Jackson, Cincinnati, both of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 281,433, Dec. 8, 1988, Pat. No. 4,900,757. This application Nov. 15, 1989, Ser. No. 433,985

The portion of the term of this patent subsequent to Feb. 13, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 31/10

U.S. Cl. 514—712

2 Claims

1. A method of lowering total serum cholesterol in a patient in need thereof comprising administering to said patient a therapeutically effective hypcholesterolemic amount of bis(3,5-di-tertiary-butyl-4-hydroxyphenylthio) methane.

**4,954,531**  
**USE OF 2,5-ANHYDRO-D-MANNITOL AS A FOOD**  
**INTAKE MODIFIER**

Mark I. Friedman, Merion; Michael G. Tordoff; Michael J. DiNovi, both of Philadelphia, and Robert J. Rafka, Ardmore, all of Pa., assignors to Monell Chemical Senses Center, Philadelphia, Pa.

Division of Ser. No. 910,698, Sep. 23, 1986, Pat. No. 4,808,626.

This application Aug. 15, 1988, Ser. No. 231,941

The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 31/045

U.S. Cl. 514—738

6 Claims

1. A method of altering the food intake of mammal, comprising administering 2,5-anhydro-D-mannitol to said mammal in an amount and at a time effective to alter the food intake of said mammal.

**4,954,532**  
**COSMETIC FORMULATION**  
 Thomas J. Elliott, London, and Susan Dutton, Northolt, both of England, assignors to Beecham Group p.l.c., England  
 Filed Jan. 30, 1985, Ser. No. 696,269

Claims priority, application United Kingdom, Feb. 1, 1984, 8402637

Int. Cl.<sup>5</sup> A61K 7/075, 7/48, 47/00

U.S. Cl. 514—846

5 Claims

1. A degreasing or moisturizing composition, comprising from 0.1 to 5% by weight of a silanized silica gel, from 2.5 to 15% by weight of a humectant moisturizing agent, and an inert carrier or diluent therefor.

**4,954,533**  
**LOW VISCOSITY SILICONE FOAM COMPOSITIONS**  
 Frank J. Modic, Scotia, and Richard A. Striker, Troy, both of N.Y., assignors to General Electric Company, Waterford, N.Y.  
 Division of Ser. No. 225,903, Jul. 29, 1988, Pat. No. 4,871,782.  
 This application Jul. 18, 1989, Ser. No. 381,426  
 Int. Cl.<sup>5</sup> C08J 9/02, 9/04

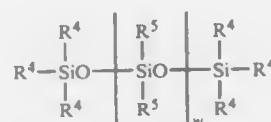
U.S. Cl. 521—82

2 Claims

1. A foamable composition in packages comprising, a first package comprising:  
 (a) from 0 to 100 parts by weight vinyl-containing polysiloxane comprising:  
 (i) vinyl endcapped polysiloxane composition having a viscosity between about 10,000 and 1,000,000 centipoise at 25° C. and containing vinyl endcapped polysiloxane having the formula:



where R is vinyl and R<sup>1</sup> is selected from substituted or unsubstituted hydrocarbon radicals of from 1 to 20 carbon atoms, such that the polymer contains from 0.0002 to 3% by weight vinyl and x varies such that the viscosity of said vinyl endcapped polysiloxane varies from 100 to 1,000,000 centipoise at 25° C., and  
 (ii) in an amount of from 1/9 to 9/1 by weight to said vinyl endcapped polysiloxane composition a low viscosity vinyl-containing polysiloxane composition comprising low viscosity vinyl-containing polysiloxane having the formula



where R<sup>4</sup> and R<sup>5</sup> are selected from substituted or unsubstituted hydrocarbon radicals of from 1 to 20 carbon atoms, at most, one R<sup>4</sup> is vinyl, the polymer contains 0.0002 to 1% by weight vinyl, and w varies such that the viscosity of said low viscosity vinyl-containing polysiloxane varies from 50 to about 2,000 centipoise at 25° C.; and

(b) from 1 to 50 parts by weight of a hydride polysiloxane of the formula:



where R<sup>2</sup> is selected from the group consisting of independently, hydrogen, alkyl radicals of from 1 to 8 carbon atoms, aryl radicals of from 1 to 8 carbon atoms, haloalkyl radicals of 3 to 8 carbon atoms and simultaneously, a single —O— to form a cyclic polymer and R<sup>3</sup> is selected from the group consisting of alkyl radicals of from 1 to 8 carbon atoms, aryl radicals of from 1 to 8 carbon atoms, and fluoroalkyl radicals of 3 to 8 carbon atoms, where the hydride polysiloxane has a hydrogen content varying from 0.3 to 1.6% by weight and z and y vary such that the polymer has a viscosity varying from 1 to 500 centipoise at 25° C.;

a second package comprising:

(a) from 0 to 100 parts by weight said vinyl-containing polysiloxane, of (i and ii) of component (a); and  
 (c) a hydroxyl source selected from the group consisting of water, organic alcohol, hydroxylated siloxane, and combinations thereof in an amount to provide a molar ratio of from about 0.02/1 to about 5/1 of hydroxyl radicals to silicon-bonded hydrogen atoms of component (b); and

a third package comprising:

(a) from 0 to 100 parts by weight said vinyl-containing polysiloxane, of (i and ii) of component (a);  
 wherein the sum total of said vinyl-containing polysiloxane, of (i and ii) of component (a), is 100 parts and there is mixed with said vinyl-containing polysiloxane in either the second or third packages or both  
 (d) from about 1 to about 250 parts per million based on said foamable composition of platinum catalyst.

**4,954,534**  
**PHOTODECOMPOSING ORGANOSILICON**  
**COMPOUNDS AND PHOTOPOLYMERIZABLE EPOXY**  
**RESIN COMPOSITIONS CONTAINING THE**  
**ORGANOSILICON COMPOUNDS**

Tetsu Yamamuro, Yamato, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 15, 1988, Ser. No. 219,193

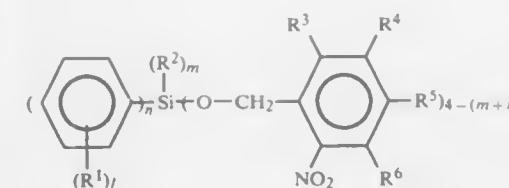
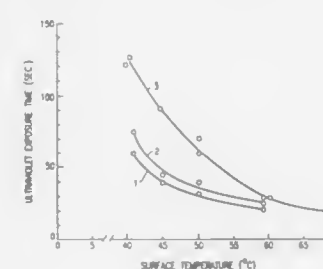
Claims priority, application Japan, Jul. 23, 1987, 62-185061; Jul. 23, 1987, 62-185062

Int. Cl.<sup>5</sup> C08G 58/70; C07F 7/10

U.S. Cl. 522—28

9 Claims

4. A photopolymerizable epoxy resin composition prepared by mixing an epoxy resin component, an photodecomposing organosilicon compound having general formula (I), and an aluminum compound:



wherein R<sup>1</sup> represents fluorine; l is an integer of 1 to 5; R<sup>2</sup> represents a lower alkyl group, a lower unsaturated alkyl group or an aromatic group, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup> and R<sup>6</sup> each represent hydrogen, halogen, an alkyl group, an aryl group, a nitro group, a cyano group, and an alkoxy group, which may be the same or different; m is an integer of 0 to 2, when m is 2, each R<sup>2</sup> may be the same or different; and n is an integer of 1 to 3, provided that m+n is not more than 3 (m+n ≤ 3).

**4,954,535**  
**HIGH-DURABILITY PLATE BRICK FOR SLIDING GATE**  
**NOZZLE APPARATUS**

Tsutomu Harada, and Hiroshi Shikano, both of Kitakyushu, Japan, assignors to Kurosaki Refractories Co., Ltd., Kitakyushu, Japan

Filed Sep. 30, 1988, Ser. No. 252,084

Claims priority, application Japan, Oct. 15, 1987, 62-261336

Int. Cl.<sup>5</sup> C08K 3/08

U.S. Cl. 523—139

7 Claims

1. A method of producing a high-durability plate brick for a sliding gate nozzle apparatus comprising mixing a refractory aggregate composition containing a metal having a melting point of not higher than 1000° C., a thermosetting resin exhibiting a higher mechanical strength when heated to about 150° to 250° C., and 10 to 90 wt % based on the amount of thermosetting resin of a silicon resin, the thermosetting resin and silicon resin being present in an amount of 2 to 15 wt % based on the amount of refractory aggregate composition, and heating the mixture to form said plate brick.

**4,954,536**  
**BRAKE-FRICTION MATERIAL**  
 Teruyuki Komori; Shingo Miyake, both of Yokohama, and Yoshio Senoo, Komae, all of Japan, assignors to Tokico Ltd., Kawasaki, Japan

Filed Apr. 19, 1989, Ser. No. 340,440

Claims priority, application Japan, Apr. 20, 1988, 63-97410; May 20, 1988, 63-123368

Int. Cl.<sup>5</sup> C08K 7/04, 3/30, 3/08, 3/04

U.S. Cl. 523—149

11 Claims

1. A brake-friction material comprising:  
 (a) a base material having a fiber structure for giving high mechanical strength and high friction coefficient to the brake-friction material;  
 (b) a lubricant for decreasing wear of the brake-friction material;  
 (c) a filler for giving heat stability to the brake-friction material;

and helping friction characteristic of the brake-friction material; and  
 (d) a bonding material composed of condensed polynuclear aromatic hydrocarbon resin.

**4,954,537**  
**INTERNAL MOLD RELEASE AGENT FOR USE IN**  
**POLYUREA RIM SYSTEMS**

Frank Sanns, Jr., Pittsburgh, Pa., assignor to Mobay Corporation, Pittsburgh, Pa.

Filed Jun. 8, 1989, Ser. No. 362,906

Int. Cl.<sup>5</sup> C08G 18/14

U.S. Cl. 521—157

22 Claims

1. A process for the production of an optionally cellular, polyurea elastomer molding which comprises reacting a reaction mixture containing

(I) a polyisocyanate,  
 (II) a polyether having at least two isocyanate-reactive groups and a molecular weight of 1800 to 12,000 in which at least 50% of the isocyanate-reactive groups are primary and/or secondary amino groups,  
 (III) about 5 to 50% by weight, based on the weight of component (II), of a chain extender comprising a sterically hindered aromatic diamine and  
 (IV) about 1 to 20% by weight, based on the weight of components (II) and (III), of an active hydrogen-containing fatty acid ester having a molecular weight of about 500 to 5000 and prepared by reacting an alcohol with an aliphatic, saturated or unsaturated fatty acid, said ester being characterized in that at least one aliphatic acid which contains more than 8 carbon atoms is built into the molecule, said ester further characterized as having an acid number of 0 to 100 and a hydroxyl number of 0 to 150 with at least one of said numbers being greater than 0, wherein said fatty acid ester is initially blended with component (II), component (III) or a mixture thereof and the reaction mixture is processed as a one-shot system by the RIM process at an isocyanate index of about 70 to 130.

**4,954,538**  
**MICRO-EMULSIFIED GLYOXALATED ACRYLAMIDE**  
**POLYMERS**

David L. Dauplaise, Norwalk; Joseph J. Kozakiewicz, Trumbull, and Joseph M. Schmitt, Ridgefield, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Dec. 19, 1988, Ser. No. 286,091

The portion of the term of this patent subsequent to Sep. 11, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C08K 7/16; D21H 17/00

U.S. Cl. 523—223

9 Claims

1. A composition comprising microparticles of a glyoxylated (meth)acrylamide-containing polymeric material having (1) sufficient glyoxal-reactive amide substituents and —CHOH—CHO substituents to continually self cross-link said material at ambient conditions, said —CHOHCHO substituents being present in a excess of about 0.5 weight percent and (2) diameters ranging from about 200 to about 3000 Å.

**4,954,539**  
**AQUEOUS SILICONE EMULSIONS CONTAINING TIN**  
**MONOCHELATE CROSSLINKING CATALYSTS**  
 Jacques Cavezzan, Villeurbanne, and Michel Peignier, L'Arbresle, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Jun. 23, 1989, Ser. No. 370,782

Claims priority, application France, Jun. 23, 1988, 88 08702

Int. Cl.<sup>5</sup> C08L 5/00

U.S. Cl. 524—27

8 Claims

1. A crosslinkable aqueous silicone emulsion, comprising, emulsified in water, (a) an α,ω-dihydroxydiorganopolysiloxane, (b) an organohydroxydiorganopolysiloxane containing at least 3



hydrogen atoms bonded to silicon atoms per molecule, (c) a polyvinyl alcohol, (d) a nonionic emulsifying agent, and (e) a crosslinking catalytically effective amount of a monochelate of pentacoordinated tin of valency IV.

4,954,540

# HALOGEN-CONTAINED POLYESTER RESIN COMPOSITE AND ELECTRIC WIRE

Toshio Nakane, Fuji; Kenji Hijikata, Mishima; Yukihiko Kageyama, Fujinomiya, and Michio Naka, Fuji, all of Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

Filed Mar. 3, 1988, Ser. No. 164,225

Claims priority, application Japan, Apr. 13, 1987, 62-90599  
Int. Cl.<sup>5</sup> C08K 5/34

U.S. Cl. 524—86

15 Claims

1. A halogen-containing polyester resin composition comprising bisaziridine compounds and a flame-resisting aromatic polyester copolymer containing a halogen in an amount of 0.5 to 30% by weight, said polyester copolymer obtained by polycondensating

(A) mainly aromatic dicarboxylic acids or ester-forming derivatives thereof;

(B) mainly aliphatic glycols or ester-forming derivatives thereof; and

(C) halogen-containing ester-forming compounds, said bisaziridine compounds being present in an amount of 0.1 to 10% by weight based on the total quantity of the composite.

4,954,541

# FLAME-RETARDANT RESIN COMPOSITION AND ELECTRIC WIRE

Toshio Nakane; Yukihiko Kageyama; Hiroaki Konuma, and Kenji Hijikata, all of Shizuoka, Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

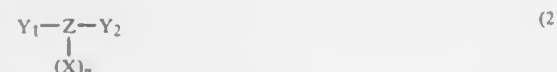
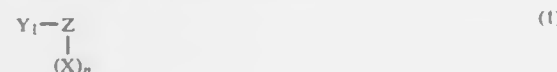
Filed Nov. 15, 1988, Ser. No. 271,323

Claims priority, application Japan, Dec. 9, 1987, 62-311547  
Int. Cl.<sup>5</sup> C08K 5/35, 5/34

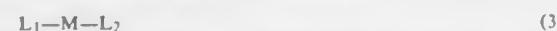
U.S. Cl. 524—86

13 Claims

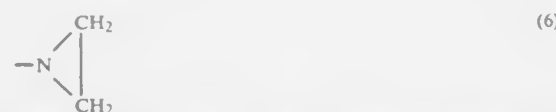
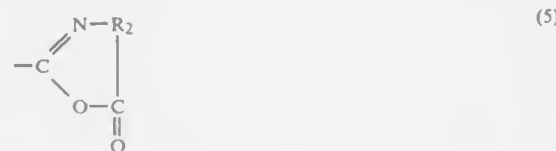
1. A flame-retardant resin composition consisting of essentially of (A) an aromatic polyester prepared by condensation polymerization between (a) a component substantially comprising an aromatic dicarboxylic acid or an ester-forming derivative thereof and (b) a component substantially comprising an aliphatic glycol or an ester-forming derivative thereof, (B) 0.1 to 30% by weight based on the total amount of the composition of a halogenated containing compound represented by the general formula (1) or (2) and (C) 0.1 to 30% by weight based on the total amount of the composition of a compound represented by the general formula (3):



wherein X stands for a halogen atom; Y<sub>1</sub> and Y<sub>2</sub> are each a member selected from the group consisting of hydroxyl, carboxyl, glycidyl ester and glycidyl ether; Z is a monovalent or divalent organic group and n is an integer of 1 or more and



wherein L<sub>1</sub> and L<sub>2</sub> may be the same or different and are each a 3- to 8-membered cyclic reactive group selected from among those represented by the general formulae (5) and (6):



R<sub>2</sub> is a divalent organic group wherein a hydrogen atom directly bonded to the ring may be substituted with an alkyl and/or aryl group and M is a divalent organic group.

4,954,542

# TETRAHALOPHTHALATE ESTERS AS FLAME RETARDANTS FOR POLYBUTYLENE TEREPHTHALATE RESINS (PBT)

Joseph M. Bohlen, King of Prussia, and Ronald F. Lovenguth, Doylestown, both of Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed Mar. 25, 1988, Ser. No. 173,343

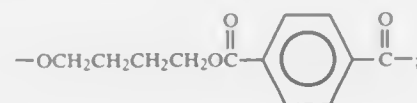
Int. Cl.<sup>5</sup> C08K 5/12

U.S. Cl. 524—89

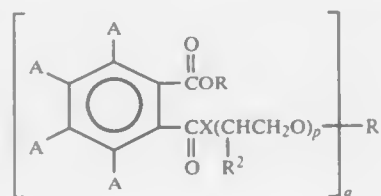
18 Claims

1. A uniform flame retardant molding composition comprising:

(i) a polybutylene terephthalate resin having the following repeated structural units:

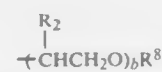


(ii) a flame retarding effective amount of a tetrahalophthalate ester flame retardant processing aid of the formula:



wherein

(a) R is selected from the group consisting of hydrogen, an alkyl or substituted alkyl of 1 to 30 carbons, and



where R<sup>8</sup> is an alkyl or substituted alkyl of 1 to 18 carbons, and b is 1 to 50;

(b) R<sup>1</sup> is selected from the group consisting of an alkyl or substituted alkyl of 1 to 30 carbons, alkenyl or substituted alkenyl of 2 to 22 carbons,



where R<sup>7</sup> is an alkyl of 1 to 18 carbons;

4,954,544

# MODIFIED ADHESIVE COMPOSITION WHICH UNDERGOES COLOR CHANGES UPON APPLICATION

Ashok K. Chaudhary, Ontario, Canada, assignor to Conros Corporation, Ontario, Canada

Filed Mar. 3, 1989, Ser. No. 319,112

Int. Cl.<sup>5</sup> C08K 5/15

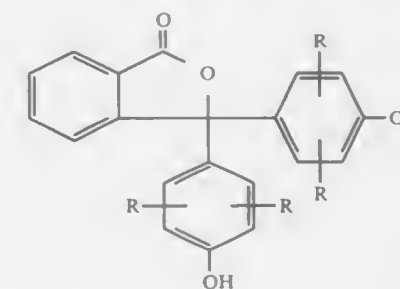
U.S. Cl. 524—111

11 Claims

1. An adhesive composition, which upon application to a substrate, undergoes a change from colored to colorless, said composition comprised of:

(a) polyvinylpyrrolidone in an aqueous organic medium with a soap forming gelling agent,

(b) a colored indicator additive which upon exposure to air becomes colorless, and which has the formula:



wherein each R individually represents hydrogen or lower alkyl,  
(c) a carbamide, and  
(d) a non-ionic surfactant.

4,954,545

# PROCESS FOR CLEANING POLYMER PROCESSING EQUIPMENT

Fay W. Bailey, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 78,338, Jul. 27, 1987, Pat. No. 4,838,948.  
This application Dec. 12, 1988, Ser. No. 283,350

Int. Cl.<sup>5</sup> C08K 3/26, 3/32, 3/34; C11D 1/12

U.S. Cl. 524—158

12 Claims

1. A polymeric composition consisting essentially of:

(a) from 92 to 97.4 weight percent of a polymer wherein said polymer is selected from the group consisting of homopolymers of α-olefins, copolymers of α-olefins, homopolymers of conjugated dienes, homopolymers of monovinyl arenes, copolymers of conjugated dienes and monovinyl arenes, homopolymers of polyamides, copolymers of polyamides, homopolymers of polyphenylene sulfide, copolymers of polyphenylene sulfide, fluoroplastics and acrylic resins;

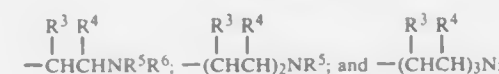
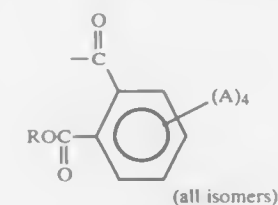
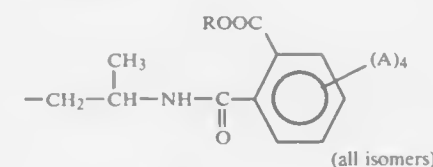
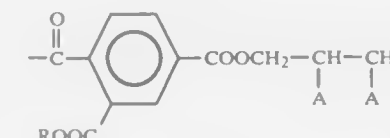
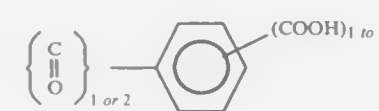
(b) from 2.4 to 6.4 weight percent of a mild abrasive, wherein said mild abrasive is selected from the group consisting of calcium carbonate, calcium phosphate, calcium silicate and aluminum silicate and;

(c) from 0.2 to 1.6 weight percent of a sulfonated surfactant wherein said sulfonated surfactant is selected from the group consisting of

(1) alkyl sulfonates of the formula RSO<sub>3</sub><sup>-</sup>M<sup>+</sup>, wherein R is selected from the group consisting of alkyl groups containing from 8 to 20 carbon atoms and M is selected from the group consisting of sodium, calcium and lithium;

(2) alkyl benzyl sulfonates of the formula RC<sub>6</sub>H<sub>4</sub>SO<sub>3</sub><sup>-</sup>M<sup>+</sup>, wherein R is selected from the group consisting of alkyl groups containing from 8 to 20 carbon atoms and M is selected from the group consisting of sodium, calcium and lithium; and

(3) α-olefin-sulfonates of the formula RCH=CHSO<sub>3</sub><sup>-</sup>M<sup>+</sup>, wherein R is selected from the



with the proviso that the valence of R<sup>1</sup> is equal to q;

(c) R<sup>2</sup> is independently selected from the group consisting of H and CH<sub>3</sub>;

(d) R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and R<sup>6</sup> are independently selected from the group consisting of H and an alkyl of 1 to 18 carbons;

(e) p is an integer of 0 to 50;

(f) q is an integer of 1 to 6;

(g) X is selected from the group consisting of 0 or NH;

(h) A is selected from the group consisting of Cl or Br; and

(i) provided further that when p is zero and X is oxygen that R and R<sup>1</sup> are other than a neopentyl group.

4,954,543

# COATING FOR INCREASING SENSITIVITY OF A RADIATION IMAGEABLE POLYACETYLENIC FILM

David F. Lewis, Monroe, Conn., and Robert D. Schenfele, Caldwell, N.J., assignors to GAF Chemicals Corporation, Wayne, N.J.

Filed Oct. 17, 1988, Ser. No. 258,522

Int. Cl.<sup>5</sup> C08F 222/06

U.S. Cl. 524—104

12 Claims

1. A dispersion composition comprising between about 0.001% and about 1.0% by weight of an N-C<sub>10-22</sub> alkyl lactam dispersing aid, a metal nitrate, acetate or persulfate salt of a metal having an atomic number of at least 50 or a mixture of said lactams or metal salts dispersed in between about 4% and about 50% by weight of an aqueous solution of a binder compatible with the binder of imageable polyacetylene crystals; said composition having a weight ratio of metal salt to binder between about 0.4:1 and about 2.5:1.

group consisting of alkyl groups containing from 6 to 18 carbon atoms.

4,954,546

# PVC RESIN BLEND COMPOSITIONS STABILIZED WITH LAURYL TIN COMPOUNDS

Gerd Abeler, Darmstadt, and Hans J. Sander, Lorsch, both of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 219,900, Jul. 18, 1988, abandoned, which is a continuation of Ser. No. 54,718, May 27, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,039  
Claims priority, application Switzerland, May 30, 1986, 2207/86

Int. Cl.<sup>5</sup> C08K 5/58

U.S. Cl. 524—180

12 Claims

1. In a polymer blend of 20 to 80% by weight of poly(vinylchloride) and 80 to 20% by weight of at least one copolymer selected from the group consisting of polystyrene/polyethylene/butylene, acrylate/rubber, acrylate/rubber/styrene, acrylonitrile/styrene/acrylate, acrylonitrile/butadiene/styrene, acrylonitrile/butadiene, acrylonitrile/acrylate, styrene/acrylonitrile, ethylene/vinyl acetate, and modified ethylene/vinyl acetate, which blend contains a dialkyl-tin mercaptide stabilizer, the improvement reducing loss of the stabilizer from the blend upon prolonged exposure to light and heat which comprises employing as the dialkyl-tin mercaptide an effective stabilizing amount of at least one compound of the formula:



wherein n is 1 or 2, and each of R and R<sup>1</sup>, independently of the other, is alkyl of 6 to 18 carbon atoms.

4,954,547

# USE OF FATTY ACIDS FOR IMPROVEMENT IN SHEAR STABILITY OF WATER-IN-OIL EMULSIONS

Merle L. Branning, Warrenville, Ill., assignor to Nalco Chemical Company, Naperville, Ill.

Continuation of Ser. No. 41,492, Apr. 23, 1987, abandoned. This application Feb. 16, 1988, Ser. No. 158,103

Int. Cl.<sup>5</sup> C08K 5/20

U.S. Cl. 524—232

1 Claim

1. A water-in-oil emulsion having improved mechanical shear stability which contains:

- a water phase having dissolved therein a water-soluble acrylic acid polymer having a molecular weight of at least 500,000;
- an oil phase;
- a water-in-oil emulsifying agent; and additionally contains from 0.5 to 5.0 weight percent of a mechanical shear stabilizing agent of an admixture of oleic acid and a 1:1 mole ratio of oleic/linoleic diethanolamide, said shear stabilizing agent being further characterized as acting as an inverting agent which allows the water-soluble acrylic acid polymer to be dissolved rapidly in water.

4,954,548

# ETHYLENE-CARBON MONOXIDE COPOLYMER STABILIZATION

George B. Klingensmith, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 27, 1989, Ser. No. 343,770

Int. Cl.<sup>5</sup> C08K 5/18

U.S. Cl. 524—258

20 Claims

1. A composition stabilized against degradation caused by exposure to UV light which comprises a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon and a stabilizing quantity of a mix-

ture of a diphenylamine and a weakly acidic channel-type carbon black with a pH from about 3.5 to about 6.5.

4,954,549

# SUBSTANTIALLY TRANSPARENT FLAME RETARDANT AROMATIC POLYCARBONATE COMPOSITIONS

Larry N. Lewis, Scotia, and Stephen C. Bunnell, Ballston Lake, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 28, 1989, Ser. No. 399,094

Int. Cl.<sup>5</sup> C08L 5/54

U.S. Cl. 524—264

5 Claims

1. A substantially transparent flame retardant halogen-free aromatic polycarbonate comprising an aromatic polycarbonate resin, and an effective amount of a triarylsilane of the formula



(1)

where R is a C<sub>(6-13)</sub> aromatic organic radical and Y is a member selected from the class consisting of vinyl, OH and (R)<sub>3</sub>Si-

4,954,550

# SYSTEM FOR THERMOPLASTIC CROSS-LINKING ADHESIVES, THEIR PREPARATION AND A CORRESPONDING METHOD OF GLUING

Kurt Sorg, Eragny, France, assignor to Societe Chimique des Charbonnages S.A., France

PCT No. PCT/FR87/00237, § 371 Date Apr. 1, 1988, § 102(e) Date Apr. 1, 1988, PCT Pub. No. WO88/00225, PCT Pub. Date Jan. 14, 1988

PCT Filed Jun. 22, 1987, Ser. No. 163,753

Claims priority, application France, Jun. 27, 1986, 86 09391

Int. Cl.<sup>5</sup> C08L 5/01, 5/11, 5/12; C09J 153/02

U.S. Cl. 524—271

13 Claims

1. A system for a thermoplastic cross-linking adhesive comprising:

- a first composition not containing any anhydride groups and comprising per 100 parts per weight of said first composition:
  - from 25 to 60 parts by weight of at least one polymer chosen from thermoplastic polymers and synthetic rubbers;
  - from 1 to 20 parts by weight of at least one compound containing at least one group capable of reacting with anhydride groups;
  - from 5 to 60 parts by weight of at least one tackifying resin; and
  - 0 to 20 parts by weight of at least one plasticizer;
- a second composition containing per 100 parts per weight of said second composition:
  - from 50 to 30 parts by weight of at least one polymer chosen from thermoplastic polymers and synthetic rubbers;
  - from 20 to 60 parts by weight of at least one compound containing at least one anhydride group;
  - from 5 to 60 parts by weight of at least one tackifying resin; and
  - from 0 to 20 parts by weight of at least one plasticizer;
- at least one activator of the reaction between the reactive groups of the constituent Ab and the anhydride functions of the constituent Bb;

wherein the molar ratio of the reactive groups of the constituent Ab to the anhydride groups of the constituent Bb is at least equal to 1, and the molar ratio of the activator C to the anhydride groups of the constituent Bb is at least equal to 0.5;

the thermoplastic polymers included in the definition of the constituents Aa and Ba are selected from the group consisting of the group consisting of C<sub>2</sub>-C<sub>12</sub> alkene/C<sub>1</sub>-C<sub>12</sub>-alkyl (meth) acrylate copolymers, and the polymers of norbornene and/or of its derivatives;

the synthetic rubbers included in the definition of the con-

stituents Aa and Ba are selected from the group consisting of styrene-diene-styrene block copolymers;

the tackifying resins Ac and Bc are selected from the group consisting of polyterpenes, colophonies and colophony esters as well as their hydrogenated derivatives, and petroleum resins;

the plasticizers Ad and Bd are selected from the group consisting of polyterpenes, colophonies and colophony esters as well as their hydrogenated derivatives, and petroleum resins;

the plasticizers Ad and Bd are selected from the group consisting of semi-aliphatic oils, polyisobutylenes of very low molecular weight and aromatic, naphthenic or paraffinic petroleum oils, alkylbenzenes, esters derived from saturated organic acids, and ethylene-vinyl acetate copolymers of very low molecular weight; and

the activator C is selected from the group consisting of tertiary amines, phosphines, aryl or alkyl phosphonium halides and the tertiary amides of fatty acids.

4,954,551

# HALOGEN-CONTAINING ORGANOMETALLIC COMPOUNDS

Robert A. Schleifstein, Baton Rouge, La., and Mohammed A. Khaddus, Matawan, N.J., assignors to Ethyl Corporation, Richmond, Va.

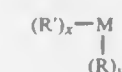
Filed Mar. 31, 1989, Ser. No. 331,163

Int. Cl.<sup>5</sup> C08K 5/59; C07F 9/94, 9/92

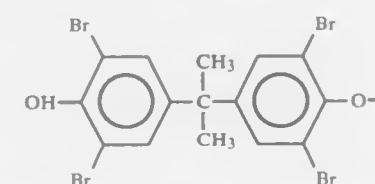
U.S. Cl. 524—327

6 Claims

1. A compound of the formula



wherein: M is Sb(III) or Bi(III), x and y are whole integers and x = 1, 2, or 3, y = 0, 1 or 2 and x + y = 3; each R is independently selected from hydroxy radicals, alkoxy radicals and phenoxy radicals; and each R' is



4. A formulation comprising a flammable macromolecular material and a flame retardant amount of the compound of claim 1.

4,954,552

# STABILIZED CARBON MONOXIDE-OLEFIN COPOLYMER COMPOSITIONS

Edgar J. Smutny, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed May 15, 1989, Ser. No. 351,510

Int. Cl.<sup>5</sup> C08K 5/07

U.S. Cl. 524—356

14 Claims

1. A composition stabilized against undue loss of crystallinity when subjected to melting and solidification which comprises:

a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon, wherein the polymer is of the repeating formula



wherein G is a moiety of an ethylenically unsaturated hydrocarbon of at least 3 carbon atoms polymerized through the

ethylenic unsaturation and the ratio of y:x is no more than about 0.5; and

a stabilizing quantity of barium acetylacetonate or titanium acetylacetonate.

4,954,553

# MODIFIED WATERBORNE PHENOXY RESINS

Robert N. Johnson, Basking Ridge, N.J., and Ismael Colon, Cary, N.C., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Sep. 30, 1988, Ser. No. 251,253

Int. Cl.<sup>5</sup> C08K 5/06

U.S. Cl. 524—376

23 Claims

1. An aqueous coating composition comprising:

(a) a waterborne, neutralized, carboxyl-bearing phenoxy resin,

(b) about 5 to about 50% by weight of the total resin of a modifier resin which is relatively soft in comparison to the phenoxy resin and is compatible with the phenoxy resin and has:

- a reduced viscosity of about 0.1 to about 2 dL/g in tetrahydrofuran at 25° C.;
- a T<sub>g</sub> of about -120 to about 30° C.;
- a solubility in Cellosolve acetate at 25° C. of at least about 1 g per 100g of solvent;
- a number average molecular weight of about 500 to about 90,000,

said modifier resin being a neutral, non-carboxylbearing, liquid or waterborne resin which will form a clear film with the waterborne phenoxy resin at 25-300 degrees centigrade upon evaporation of any solvents and all the water in the system;

(c) optionally, about two to about 25% by weight of the total emulsion of a coalescing solvent, with a relative evaporation rate above about 0.001 (butyl acetate=100), for the waterborne phenoxy-modifier resin mixture;

(d) optionally, a particulate material;

(e) optionally, a crosslinker;

(f) water in an amount sufficient to disperse the phenoxy and modifier resins therein.

4,954,554

# SILICONE EMULSIONS

David J. Bunge, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Feb. 27, 1989, Ser. No. 316,376

Int. Cl.<sup>5</sup> C08K 5/05

U.S. Cl. 528—388

18 Claims

1. An emulsion composition consisting essentially of:

(A) a curable composition comprising an organopolysiloxane bearing silicon-bonded curing radicals selected from the group consisting of the hydroxyl radical and olefinic radicals;

(B) a polyvinylalcohol emulsifying agent, having an average degree of hydrolysis of at least 90 mol %, as the sole emulsifying agent and

(C) water.

4,954,555

# STABILIZED CARBON MONOXIDE-OLEFIN COPOLYMER COMPOSITIONS

Edgar J. Smutny, Houston, Tex., and Robert G. Lutz, Santa Rosa, Calif., assignors to Shell Oil Company, Houston, Tex.

Filed May 30, 1989, Ser. No. 358,218

Int. Cl.<sup>5</sup> C08K 5/09

U.S. Cl. 524—399

11 Claims

1. A composition stabilized against undue loss of crystallinity when subjected to melting and solidification which comprises a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon, wherein the polymer is of the repeating formula





wherein G is a moiety of an ethylenically unsaturated hydrocarbon of at least 3 carbon atoms polymerized through the ethylenic unsaturation and the ratio of y:x is no more than about 0.5, and a stabilizing quantity of aluminum stearate.

4,954,556

## WATER-BASED INK COMPOSITIONS

Larry J. Bull, Marietta, Ga.; Raymond Sieradzki, North Huntingdon, and Kurt G. Olson, Gibsonia, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 123,627, Nov. 23, 1987, abandoned.

This application Nov. 20, 1989, Ser. No. 439,013

Int. Cl.<sup>5</sup> C08K 5/06

U.S. Cl. 524—378

6 Claims

1. A water-based fast-drying ink composition comprising:  
(a) a water-based polymer prepared by an emulsion polymerization technique, having a T<sub>g</sub> of about 50° C. to 120° C. or higher,  
(b) a surfactant in an amount of about 15 to 50 percent by weight solids of the ink composition.

4,954,557

## PROCESS FOR PREPARING MOLDED ARTICLE

Teruo Iwanami, Ibaraki; Shigeo Miyata, Takamatsu, and Takamasa Moriyama, Suita, all of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka and Kyowa Kogyo Kabushiki Kaisha, Kagawa, both of, Japan

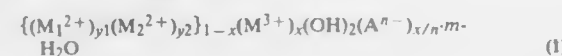
Filed Jan. 25, 1989, Ser. No. 301,903

Int. Cl.<sup>5</sup> C08K 3/26, 3/24; C08L 29/04, 23/02

U.S. Cl. 524—399

7 Claims

1. In a process for preparing a molded article by melt-molding a mixture of (A) a hydrolyzed ethylene-vinyl acetate copolymer having an ethylene content of 20 to 80% by mole and a degree of hydrolysis in the vinyl acetate units of at least 90% by mole and (B) an olefin resin,  
the improvement which comprises melt-molding said mixture in the presence of a hydrotalcite solid solution (C) having the formula (I):



wherein M<sub>1</sub><sup>2+</sup> is at least one metal selected from Mg, Ca, Sr and Ba; M<sub>2</sub><sup>2+</sup> is Zn, Cd, Pb or Sn; M<sup>3+</sup> is a trivalent metal; A<sup>n-</sup> is an anion with a valence of n; x is a positive number satisfying the equation: 0 < x ≤ 0.5; y<sub>1</sub> and y<sub>2</sub> are positive numbers satisfying the equations: 0.5 < y<sub>1</sub> < 1, y<sub>1</sub> + y<sub>2</sub> = 1; and m is a positive number satisfying the equation: 0 ≤ m < 2.

5. The process of claim 1, wherein said mixture is melt-molded in the presence of a metal salt of higher fatty acid having 10 to 22 carbon atoms (D) in addition to said hydrotalcite solid solution (C).

4,954,558

## RESIN-FORTIFIED EMULSION POLYMERS AND METHODS OF PREPARING THE SAME

Sheng-Liang Tsaur, Racine County, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Division of Ser. No. 205,536, Jun. 9, 1988, Pat. No. 4,820,762,

which is a continuation of Ser. No. 899,281, Aug. 22, 1986,

abandoned. This application Jan. 11, 1989, Ser. No. 296,248

Int. Cl.<sup>5</sup> C08F 2/16

U.S. Cl. 525—460

2 Claims

1. A resin-fortified polymer emulsion having Newtonian-like flow characteristics, the resin-fortified polymer emulsion being made by a method which comprises the following steps:

- (a) emulsion-polymerizing a monomer charge comprising at least one emulsion-polymerizable monomer in the presence of a polymeric stabilizer and an initiator under emulsion-polymerization reaction conditions effective for initiating emulsion polymerization of an emulsion-polymeriza-

tion mixture, the polymeric stabilizer being present in an amount that is effective for preventing coagulation of emulsion polymer particles which are forming in the emulsion-polymerization mixture; and thereafter

- (b) adding to the emulsion-polymerization mixture, while emulsion polymerization of the emulsion-polymerizable monomer is occurring, an effective amount of at least one support resin for controllably affecting the physical characteristics of the emulsion polymer product, said resin being selected from the group consisting of water soluble resins, water dispersible resins, alkali soluble resins, alkali dispersible resins and mixtures thereof, said resin having been produced either by a solution-polymerization method or by a bulk-polymerization method, wherein the resin is produced from at least one ethylenically-unsaturated monomer selected from the group consisting of olefins, mono vinylidene aromatics, alpha beta ethylenically-unsaturated carboxylic acids and esters thereof, ethylenically-unsaturated dicarboxylic anhydrides, and mixtures thereof,

thereby producing the resin-fortified polymer emulsion having Newtonian-like flow characteristics.

4,954,559

## WATERBASED METHYLOL (METH) ACRYLAMIDE ACRYLIC POLYMER AND POLYURETHANE CONTAINING COATING COMPOSITION

Herman C. Den Hartog, Rochester, Mich.; Eileen E. Konsza, Swedesboro, N.J.; James F. Matthews, and Ervin R. Werner, Jr., both of Levittown, Pa., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 5, 1989, Ser. No. 402,293

Int. Cl.<sup>5</sup> C08F 20/58; C08L 75/06, 75/08

U.S. Cl. 524—507

18 Claims

1. A waterbased coating composition comprising about 10–30% by weight of film forming binder dispersed in an aqueous carrier; wherein the binder consist essentially of about a. 60–90% by weight, based on the weight of the binder, of an methanol (meth)acrylamide acrylic polymer consisting essentially of polymerized monomers of alkyl methacrylate, alkyl acrylate or mixtures thereof, 1–10% by weight, based on the weight of the acrylic polymer, of methylol methacrylamide, methylol acrylamide or mixtures thereof, 0.5–10% by weight, based on the weight of the acrylic polymer of an ethylenically unsaturated carboxylic acid, 0.5–10% by weight, based on the weight of the acrylic polymer, of an ethylenically unsaturated hydroxyl containing monomer, said acrylic polymer having a glass transition temperature of –40° to +40° C. and a weight average molecular weight of 500,000 to 3,000,000; and the carboxyl groups of the carboxylic acid are reacted with ammonia to provide a pH of about 7.0–10;

- b. 10–40% by weight, based on the weight of the binder, of a polyurethane selected from the group consisting of polyester urethane, polyether urethane or polyacrylourethane.

4,954,560

## STABLE POLYMER/POLYOLS MADE WITHOUT MACROMONOMER

Richard M. Gerkin; Michael W. Jorgenson, both of Cross Lanes, W. Va., and Paul W. Leuzzi, II, New Milford, Conn., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Jun. 30, 1989, Ser. No. 373,923

Int. Cl.<sup>5</sup> C08L 75/04

U.S. Cl. 524—714

11 Claims

1. A process for the preparation of a stable polymer polyol which comprises the in situ reaction of a monomer mixture in a polyol blend wherein at least one monomer of the monomer mixture is a bifunctional compound containing both an isocya-

nate group and an ethylenically unsaturated group and wherein the polyol blend comprises:

- (a) a base polyol and
- (b) an effective amount of an amine terminated polyether which is more reactive with the bifunctional compound than is the base polyol and which has a molecular weight approximately equal to or greater than the base polyol and wherein the ratio of the bifunctional compound the amine terminated polyether is in the range of from about 0.5 to about 1.5 moles of bifunctional compound per mole of amine terminated polyether.

4,954,561

## STABILIZERS FOR POLYMER/POLYOLS

Richard M. Gerkin, and John F. Timberlake, both of Cross Lanes, W. Va., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

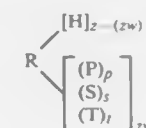
Filed Jun. 30, 1989, Ser. No. 373,925

Int. Cl.<sup>5</sup> C08L 33/00

U.S. Cl. 524—728

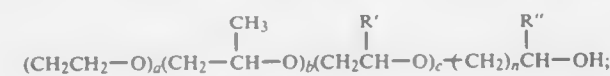
10 Claims

1. A process for the manufacture of polymer polyol stabilizers which comprises reacting a bifunctional unsaturated compound with an amine of the general formula:

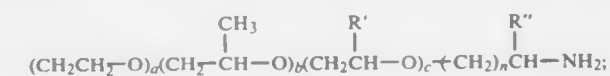


wherein:

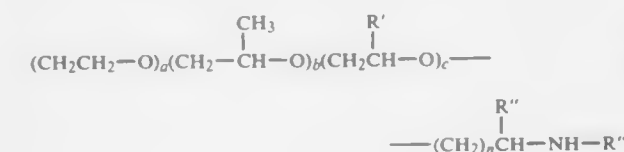
- R represents an initiator radical based on a compound containing Zerewitinoff active hydrogen atoms;  
H represents a hydroxy containing group of the formula:



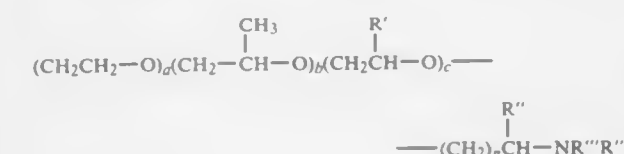
P represents a primary amine containing group of the formula:



S represents a secondary amine containing group of the formula:



T represents a tertiary amine containing group of the formula:



- a is 0 to 175;  
b is 0 to 175;  
c is 0 to 30;  
n is 1 to 3;

the sum a + b + c must be greater than or equal to 2 when n equals 1;

R' is an alkyl group containing from two carbon atoms to eighteen carbon atoms;

R'' is hydrogen or an alkyl group containing up to eighteen carbon atoms;

R''' and R'''' are independently alkyl groups containing from two to twelve carbon atoms;

p is a mole fraction of the aminated portion of the amine reactant and is from 0 to less than 0.75;

s is a mole fraction of the aminated portion of the amine reactant and is from 0.25 to 1.0;

t is a mole fraction of the aminated portion of the amine reactant and is from 0 to 0.15;

w is the percent amination of the zerewitinoff active hydrogen atoms on the intermediate compound, generally 30 percent to 100 percent, and preferably 70 percent or more;

(zw) is the product of z and w;

p + s + t = 1; and

z is an integer derived from the number of Zerewitinoff active hydrogens on the initiator.

4,954,562

## WATER ABSORBENT RESINS

Mark Anderson, Wheaton, Ill., assignor to American Colloid Company, Arlington Heights, Ill.

Continuation-in-part of Ser. No. 854,000, Apr. 21, 1986, Pat. No. 4,677,174, Ser. No. 872,654, Jun. 10, 1986, Pat. No. 4,755,562, and Ser. No. 67,233, Jun. 25, 1980, Pat. No. 4,802,773. This application Jan. 30, 1989, Ser. No. 303,815

Int. Cl.<sup>5</sup> C08K 3/22; C08F 8/32

U.S. Cl. 524—779

44 Claims

1. A process for preparing a solid water absorbing resin comprising mixing a solution of (A) acrylic acid neutralized 70–100 mole percent; (B) a non-reactive and water-insoluble metal oxide in an amount of about 0.001% to about 5% based on the total weight of the solution; and (C) a water-miscible to water-soluble polyvinyl monomer in a combined concentration of (A), (B) and (C) of at least 30 wt. %; with water to form a mixed solution wherein the monomers of the mixed solution consist essentially of (A) and (C) and initiating polymerization of monomers (A) and (C) such that during polymerization, the exothermic heat of reaction is substantially the only heat energy used to accomplish polymerization, crosslinking and to drive off sufficient water to obtain a solid crosslinked resin including metal oxide (B) and having a water content of 15 percent by weight or less.

4,954,563

## MONOAZO DYES CONTAINING SULFOINDOLE COUPLING COMPONENTS

Rudolf Hurter, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 27, 1984, Ser. No. 584,176

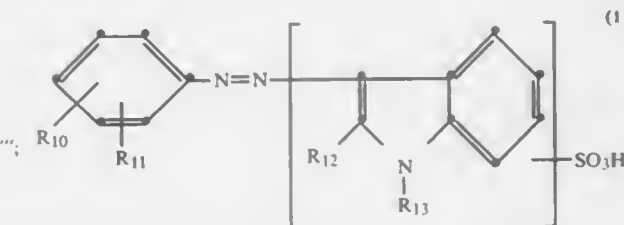
Claims priority, application Switzerland, Mar. 8, 1983, 1246/83

Int. Cl.<sup>5</sup> C09B 29/01, 29/40; D06P 1/39, 3/24

U.S. Cl. 534—783

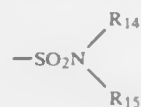
11 Claims

1. A monoazo dye of the formula

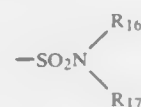


wherein R<sub>10</sub> is hydrogen and R<sub>11</sub> is phenoxy or naphthoxy

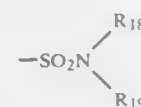
each unsubstituted or substituted by C<sub>1-4</sub>-alkyl, C<sub>1-4</sub>-alkoxy, halogen, C<sub>1-6</sub>-alkanoylamino or hydroxyl, or



and R<sub>14</sub> and R<sub>15</sub> are each independently C<sub>1-4</sub>-alkyl, C<sub>1-4</sub>-hydroxyalkyl or C<sub>5-7</sub>-cycloalkyl; or R<sub>10</sub> is C<sub>1-4</sub>-alkyl and R<sub>11</sub> is phenoxy or naphthoxy each unsubstituted or substituted by C<sub>1-4</sub>-alkyl, C<sub>1-4</sub>-alkoxy, halogen, C<sub>1-6</sub>-alkanoylamino or hydroxyl; or R<sub>10</sub> is C<sub>1-4</sub>-alkoxy and R<sub>11</sub> is hydrogen, halogen, C<sub>1-12</sub>-alkyl, phenoxy, naphthoxy, phenoxysulfonyl, naphthoxysulfonyl each unsubstituted or substituted by C<sub>1-4</sub>-alkyl, C<sub>1-4</sub>-alkoxy, halogen, C<sub>1-6</sub>-alkanoylamino or hydroxyl, or



and R<sub>16</sub> and R<sub>17</sub> are each independently C<sub>1-12</sub>-alkyl unsubstituted or substituted by halogen, hydroxyl, cyano, C<sub>1-4</sub>-alkoxy, C<sub>1-6</sub>-alkanoyl or benzoyl, cycloalkyl containing 5- to 7-membered ring unsubstituted or substituted by C<sub>1-4</sub>-alkyl; or R<sub>10</sub> is halogen and R<sub>11</sub> is phenoxy or naphthoxy each unsubstituted or substituted by C<sub>1-4</sub>-alkyl, C<sub>1-4</sub>-alkoxy, halogen, C<sub>1-6</sub>-alkanoylamino or hydroxyl; or R<sub>10</sub> is C<sub>2-4</sub>-alkanoylamino and R<sub>11</sub> is hydrogen, halogen, C<sub>1-12</sub>-alkyl, phenoxy, naphthoxy, phenoxysulfonyl or naphthoxysulfonyl each unsubstituted or substituted by C<sub>1-4</sub>-alkyl, C<sub>1-4</sub>-alkoxy, halogen, C<sub>1-6</sub>-alkanoylamino or hydroxyl, or



and R<sub>18</sub> and R<sub>19</sub> are each independently C<sub>1-12</sub>-alkyl unsubstituted or substituted by halogen, hydroxyl, cyano, C<sub>1-4</sub>-alkoxy, C<sub>1-6</sub>-alkanoyl or benzoyl, cycloalkyl containing 5- to 7-membered ring unsubstituted or substituted by C<sub>1-4</sub>-alkyl; or phenyl or naphthyl each unsubstituted or substituted by C<sub>1-4</sub>-alkyl, C<sub>1-4</sub>-alkoxy, halogen, trifluoromethyl, C<sub>1-6</sub>-alkanoylamino, hydroxyl or carbonyl; R<sub>12</sub> is C<sub>1-12</sub>-alkyl unsubstituted or substituted by halogen, hydroxyl, cyano, C<sub>1-4</sub>-alkoxy, C<sub>1-6</sub>-alkanoyl or benzoyl or phenyl or naphthyl each unsubstituted or substituted by C<sub>1-4</sub>-alkyl, C<sub>1-4</sub>-alkoxy, halogen, trifluoromethyl, C<sub>1-6</sub>-alkanoylamino, hydroxyl, carboxyl or sulfo; and R<sub>13</sub> is hydrogen or C<sub>1-12</sub>-alkyl.

4,954,564

#### PROCESS FOR PREPARING UNSATURATED NITROGEN CONTAINING ACIDS

Woodrow W. White, Akron, Ohio, assignor to GenCorp Inc., Fairlawn, Ohio

Continuation of Ser. No. 930,485, Nov. 14, 1986. This application Jul. 5, 1988, Ser. No. 214,968

Int. Cl.<sup>5</sup> C08J 33/00

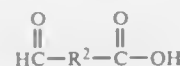
U.S. Cl. 524—813

5 Claims

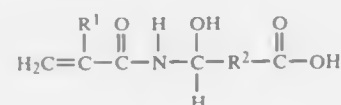
1. A process for preparing a solution containing an unsaturated nitrogen containing acid, comprising the steps of: adding an unsaturated amide reactant to a vessel, said unsaturated amide having the formula



where R<sup>1</sup> is H, or an alkyl having from 1 to 3 carbon atoms, adding an aldehyde acid reactant to said vessel, said aldehyde acid having the formula



where R<sup>2</sup> is nonexistent, CH<sub>2</sub>, or C<sub>2</sub>H<sub>4</sub>, wherein the amount of said unsaturated amide is from 1.2 to about 2.4 equivalents for each equivalent of aldehyde acid, reacting said reactants in the presence of an acidic aqueous reaction medium having an acidic pH of from about 1.2 to less than 7.0 and producing a salt free unsaturated nitrogen containing acid, said unsaturated nitrogen containing acid having the formula



wherein R<sup>1</sup> is H, or an alkyl having from 1 to 3 carbon atoms, wherein R<sup>2</sup> is nonexistent, CH<sub>2</sub>, or C<sub>2</sub>H<sub>4</sub>, adding said unsaturated nitrogen containing acid in said acidic aqueous reaction medium to a latex forming monomer solution, and polymerizing said latex solution.

4,954,565

#### PRECURED SILICONE EMULSION

Donald T. Liles, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Sep. 25, 1989, Ser. No. 411,800

Int. Cl.<sup>5</sup> C08L 83/04

U.S. Cl. 524—860

21 Claims

1. An aqueous silicone emulsion having an improved shelf life and which yields an elastomer upon removal of the water at ambient conditions comprising

- (1) 100 parts by weight of an anionically stabilized, hydroxyl endblocked polydiorganosiloxane having a weight average molecular weight of above 50,000, the organic radicals being monovalent hydrocarbon radicals containing less than 7 carbon atoms per radical or 2-(perfluoroalkyl)ethyl radicals having less than 7 carbon atoms per radical, present as an emulsion of dispersed particles in water, the emulsion having a pH of from 4 to 10.5,
- (2) from 0.1 to 1.0 parts by weight of tin (II) (stannous) catalyst,
- (3) from 0.1 to 5 parts by weight of crosslinker selected from the group consisting of (a) silane of the formula R<sub>2</sub>Si(OR')<sub>4-6</sub> where R is hydrogen, monovalent hydrocarbon radical or substituted hydrocarbon radical of from 1 to 6 carbon atoms inclusive, functionalized hydrocarbon radicals, or amine containing radicals, with the proviso that R be chosen such that the crosslinker must be capable of migrating from the aqueous phase into the emulsion micelle of (1), R' is a lower alkyl radical of from 1 to 6 carbon atoms inclusive or a radical of the formula —N=CR''<sub>2</sub> where R'' is hydrogen or monovalent hydrocarbon radical of from 1 to 6 carbon atoms inclusive, a is 0 or 1; (b) siloxane having at least 3 reactive groups bonded to silicon per molecule, the reactive group being selected from the group consisting of hydrogen, reactive group of the formula OR' where R' is as defined above, and an amine radical of the formula —NR''<sub>2</sub> where R'' is as defined above; and (c) silazane of the formula R<sub>2</sub>Si(NR''<sub>2</sub>)<sub>4-6</sub> where R, R', and a are as defined above, and
- (4) colloidal silica reinforcement,

the emulsion being able to be reinforced with colloidal silica

without loss of shelf life, and yielding an elastomer upon removal of the water.

4,954,566

#### PREPARATION OF POLYMERS WITH PENDANT ORGANIC MOIETIES BOUND THERETO VIA ESTER AND/OR AMIDE BRIDGES

John W. Gowan, Jr., Washington, D.C., assignor to Westvaco Corporation, New York, N.Y.

Filed May 4, 1989, Ser. No. 347,328

Int. Cl.<sup>5</sup> C08F 8/14

U.S. Cl. 525—61

20 Claims

1. A one pot process for preparing a polymer carrying pendant organic residues attached to the polymer via a linking bridges, comprising forming an organic solvent solution or suspension of an organic acid, the solvent being capable of forming a water-solvent azeotropic solution; combining 2 molecules of the acid to form the corresponding organic acid anhydride and water and distilling off a water-solvent azeotropic solution from an organic solvent solution or suspension of the anhydride; admixing into the solvent solution or suspension of said anhydride a polymer selected from the group consisting of polymers having pendant residues capable of reacting with a —COOH or a =(CO)<sub>2</sub>O residue under conditions effective to form free organic acid and a derivatized polymer, said polymer having a pendant residue(s) of said anhydride attached thereto via a bridge resulting from the reaction of the =(CO)<sub>2</sub>O residue of the anhydride and the residue of the polymer; and separating the derivatized polymer from the free organic acid solution or suspension.

4,954,567

#### PROCESS FOR PREPARING POLYVINYL ALCOHOL HAVING HIGH DEGREE OF POLYMERIZATION

Tsukasa Oishi, Muko, and Tomohisa Okuda, Nara, both of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 1, 1988, Ser. No. 176,534

Claims priority, application Japan, May 30, 1987, 62-137346

Int. Cl.<sup>5</sup> C08F 8/00

U.S. Cl. 525—62

8 Claims

1. A process for preparing polyvinyl alcohol particles, a 4% of by weight aqueous solution of which has a viscosity at 20° C. of not less than 80 cps, which comprises stirring in a heterogeneous system polyvinyl ester particles having an intrinsic viscosity of not less than 1.3 dl/g with a solution consisting essentially of an alcohol and an alkali catalyst, said solution containing from 0.18 to 10 moles of the alkali catalyst per liter of the alcohol.

4,954,568

#### IMPACT RESISTANT BLENDS OF THERMOPLASTIC POLYESTERS AND MODIFIED BLOCK COPOLYMERS

Richard Gelles, Carl L. Willis, both of Houston, Tex.; Robert G. Lutz, Santa Rosa, Calif., and William P. Gergen, Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 140,008, Dec. 31, 1987, abandoned, which is a continuation-in-part of Ser. No. 766,216, Aug. 16, 1985, Pat. No. 4,797,447. This application Feb. 15, 1989, Ser. No. 311,009

Int. Cl.<sup>5</sup> C08L 67/02; C08F 297/04

U.S. Cl. 525—92

7 Claims

1. A process for producing a toughened polymeric composition having an Izod impact greater than 10 ft-lb/in comprising the steps of:

- (a) providing a functionalized selectively hydrogenated block copolymer comprising,
  - (i) at least on polymer block A, block A being predominantly a polymerized alkenyl arene block,
  - (ii) at least one selectively hydrogenated polymer block B,

block B being predominantly a polymerized block of at least one conjugated diene, and

- (iii) grafted predominantly to the A blocks on the average of from one carbonyl group for each 44 alkenyl arene monomer units to one carboxyl group for each 6.6 alkenyl arene monomer units;
- (b) acidifying the functionalized selectively hydrogenated block copolymer by contacting the functionalized selectively hydrogenated block copolymer with an organic acid to form an acidified functionalized selectively hydrogenated block copolymer;
- (c) neutralizing a portion of the acidified functionalized selectively hydrogenated block copolymer by contacting the acidified functionalized selectively hydrogenated block copolymer with an amount of metal salt effective to neutralize from about 19 mole percent to about 55 mole percent of the carboxylic acid functionality of the acidified functionalized block copolymer to form a partially neutralized functionalized block copolymer;
- (d) blending the partially neutralized functionalized block copolymer with a thermoplastic polymer composition comprising poly(1,4-butylene terephthalate) wherein the thermoplastic polymer is present in a weight ratio of about 50:50 up to about 85:15 relative to the functionalized hydrogenated block copolymer; and
- (e) recovering a toughened polymeric composition.

4,954,569

#### USE OF HOMOPOLYCARBONATES OF 3,3'-DIHYDROXYDIPHENYL ETHER FOR MODIFYING FILMS OF THERMOPLASTICS

Günther Weymans, Bayer Aktiengesellschaft, D-5090 Leverkusen; Klaus Berg, Bayer Aktiengesellschaft, D-4150 Krefeld-Uerdingen; Ulrich Grigo, Bayer Aktiengesellschaft, D-4150 Krefeld-Uerdingen; Karsten-Josef Idel, Bayer Aktiengesellschaft, D-4150 Krefeld-Uerdingen, and Ludwig Bottenbruch, Woehlerstrasse 5, D-4150 Krefeld, all of Fed. Rep. of Germany

Filed Jun. 26, 1989, Ser. No. 371,086

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1988, 3823306

Int. Cl.<sup>5</sup> C08L 69/00

U.S. Cl. 525—146

12 Claims

1. Films of thermoplastics modified by the addition of 3% to 30% by weight of thermoplastic homopolycarbonates of 3,3'-dihydroxydiphenyl ether, the thermoplastics being selected from: polycarbonates based on diphenols, excepting homopolycarbonates of 3,3'-dihydroxyphenyl ether; aromatic polyester carbonates; aliphatic polyesters; polyamides; thermotropic polymers; homopolymers or copolymers of poly-C<sub>1</sub>-C<sub>4</sub>-alkyl methacrylates; linear and branched polyarylene sulfides; polyarylene sulfones; polyphenylene oxides and; copolymers of styrene or styrene and methyl styrene with acrylonitrile or acrylonitrile and methacrylonitrile.

4,954,570

#### POLYKETONE POLYMER BLEND

Edgar J. Smutny, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed May 24, 1988, Ser. No. 198,546

The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C08L 71/00

U.S. Cl. 525—185

14 Claims

1. A composition comprising a non-miscible blend of (a) a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon of from 2 to 20 carbon atoms inclusive and (b) an propylene-α,β-ethylenically unsaturated carboxylic acid copolymer, said α,β-ethylenically unsaturated carboxylic acid having up to 10 carbon atoms, wherein the acid is present in the copolymer in a quantity of about 0.1% to about 35% by weight based on the total copolymer and



wherein the amount of said propylene- $\alpha,\beta$ -ethylenically unsaturated carboxylic acid in said blend is 0.01% to 35% by weight based on the total blend.

4,954,571

## RUBBER DISPERSED COPOLYMER RESIN

Mune Iwamoto, Yokohama; Norifumi Ito, Kamakura; Sugazaki Kazuo, Yokohama; Tetsuyuki Matsubara, Yokohama, and Toshihiko Ando, Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan  
Division of Ser. No. 899,867, Aug. 25, 1986, Pat. No. 4,808,661.  
This application Sep. 26, 1988, Ser. No. 248,951  
Claims priority, application Japan, Aug. 27, 1985, 60-186638; Dec. 27, 1985, 60-293192  
Int. Cl.<sup>5</sup> C08L 35/06, 35/04

U.S. Cl. 525—205

17 Claims

1. A rubber dispersed copolymer resin composition comprising:

(a) a dispersed phase formed of a multicomponent gel, which contains the following three components:

(i) a rubber selected from the group consisting of polybutadiene rubber, acrylonitrile-butadiene copolymer rubber, styrene-butadiene copolymer rubber, acrylic rubber and ethylene-propylene-diene terpolymer rubber;

(ii) a copolymer of a styrene monomer; and an acrylonitrile monomer;

(iii) a copolymer of a styrene monomer, an acrylonitrile monomer and a maleimide monomer,

wherein

the rubber (i) is contained in an amount of 30 to 70 weight percent and the total amount of the latter two copolymers (ii) and (iii) is 70 to 30 weight percent based on the total amount of the multicomponent gel, the crosslinking degree index of the dispersed phase being 4 to 11, the total amount of multicomponent gel particles, each of which contains at least one cell having a diameter of at least 0.05  $\mu$ m, accounts for at least 50 weight percent of the whole multicomponent gel; and

(b) a continuous phase which is formed of a copolymer of 10 to 80 weight percent of styrene monomer, 15 to 50 weight percent of acrylonitrile monomer and 1 to 30 weight percent of maleimide, the reduced viscosity of an 0.5 weight percent solution of the continuous phase forming copolymer in dimethylformamide being 0.5 to 1.0 dl/g at 30° C.; said rubber being contained in an amount of 3 to 20 weight percent on the total weight of said resin composition.

4,954,572

## DISPERSANT ADDITIVES PREPARED FROM MONOEPOXY ALCOHOLS

Jacob Emert, Brooklyn, N.Y., and Robert D. Lundberg, Bridgewater, N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Nov. 7, 1988, Ser. No. 268,135

Int. Cl.<sup>5</sup> C08F 255/08

U.S. Cl. 525—285

15 Claims

1. An oil soluble adduct useful as an oil additive to oleaginous fluids comprising a polymer-substituted epoxy ester adduct of:

(A) a long chain hydrocarbyl polymer substituted with at least one of C<sub>4</sub> to C<sub>10</sub> monounsaturated dicarboxylic acid producing moieties and C<sub>3</sub> to C<sub>10</sub> monounsaturated monocarboxylic acid producing moieties, said substituted polymer formed by reacting an olefin polymer of C<sub>2</sub> to C<sub>10</sub> monoolefin having a number average molecular weight of about 700 to 5,000 and a monounsaturated carboxylic reactant comprising at least one member selected from the group consisting of (i) monounsaturated C<sub>4</sub> to C<sub>10</sub> dicarboxylic acids; (ii) anhydride and C<sub>1</sub> to C<sub>5</sub> alcohol derived mono- or di-ester derivatives of (i); (iii) monounsaturated C<sub>3</sub> to C<sub>10</sub> monocarboxylic acids wherein the carbon-car-

bon double bond is conjugated to the carboxy group; and (iv) C<sub>1</sub> to C<sub>5</sub> alcohol derived monoester derivatives of (iii); and  
(B) a monoepoxy alcohol.

4,954,573

## MODIFIED CHLORINATED POLYOLEFINS

Slatco E. Fry; David W. Magouyrk; Allen J. Blankenship, all of Batesville, Ark.; Paul J. Greene, and Larry K. Johnson, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

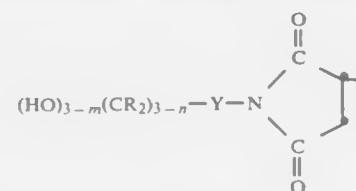
Division of Ser. No. 196,659, May 20, 1988. This application Jan. 16, 1990, Ser. No. 466,124

Int. Cl.<sup>5</sup> C08F 8/32

U.S. Cl. 525—327.6

8 Claims

1. The novel polymer composition comprising a polyolefin of at least one olefin selected from the group consisting of C<sub>2</sub> up to C<sub>10</sub> olefins; wherein said polyolefin contains in the range of about 10 up to 40 weight % chlorine; wherein said polyolefin further contains in the range of about 10 up to 30 hydroxyimide moieties per polymer chain pendant directly from the chain; wherein said hydroxyimide has the structural formula:



wherein m=0, 1 or 2; n=0, 1, 2 or 3; R is H or a hydrocarbyl radical having in the range of 1 up to 20 carbon atoms; and Y is a hydrocarbyl moiety having in the range of 1 up to 20 carbon atoms.

4,954,574

## IMIDE POLYMERS

Michael P. Hallden-Abbott, Maple Glen; Newman M. Bortnick, Orelan; Leslie A. Cohea, Langhorne, all of Pa.; William T. Freed, Stockton, N.J., and Harry C. Fromuth, Treviso, Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.  
Continuation of Ser. No. 108,383, Nov. 23, 1987, abandoned, which is a division of Ser. No. 770,034, Aug. 27, 1985, Pat. No. 4,727,117. This application Dec. 19, 1989, Ser. No. 452,991

Int. Cl.<sup>5</sup> C08F 8/32

U.S. Cl. 525—327.6

17 Claims

1. A polymer containing glutarimide units wherein the degree of imidization, by weight, on said polymer is from about 1% to about 95%, and the degree of imidization and the acid and anhydride functionality on said polymer, expressed in milliequivalents per gram of total imidizable and imidized polymer units are as set forth below:

when the degree of imidization on said polymer is	the milliequivalents of acid and anhydride per gram are
from about 1% to about 10%	0 to about 0.20
above about 10% to about 20%	0 to about 0.28
above about 20% to about 30%	0 to about 0.32
above about 30% to about 40%	0 to about 0.31
above about 40% to about 50%	0 to about 0.28
above about 50% to about 60%	0 to about 0.28
above about 60% to about 70%	0 to about 0.27
above about 70% to about 80%	0 to about 0.28
above about 80% to about 90%	0 to about 0.33
and above about 90% to about 95%	0 to about 0.40

4,954,575

## METHACRYLIMIDE CONTAINING POLYMER

Isao Sasaki, Otake; Kozi Nishida, Toyama, and Hisao Anzai, Otake, all of Japan, assignors to Mitsubishi Rayon Company, Limited, Tokyo, Japan

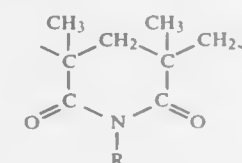
Filed Dec. 28, 1989, Ser. No. 458,396

Claims priority, application Japan, Dec. 29, 1988, 63-334722  
Int. Cl.<sup>5</sup> C08F 8/32

U.S. Cl. 525—330.5

7 Claims

1. A methacrylimide containing polymer comprising from 2 to 100% by weight of a structural unit represented by the general formula (I):



where R represents a hydrogen atom or an aliphatic group, aromatic group or cycloaliphatic hydrocarbon group with 1 to 20 carbon atoms, and from 0 to 98% by weight of a structural unit derived from an ethylenic monomer, the polymer having a distribution range of an imidization ratio of less than 5%.

4,954,576

## PROCESS FOR HYDROGENATING CONJUGATED DIENE POLYMERS

Yoichiro Kubo, Yokohama, and Kiyomori Ohura, Kamakura, both of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Feb. 22, 1989, Ser. No. 313,489

Claims priority, application Japan, Feb. 22, 1988, 63-39306  
Int. Cl.<sup>5</sup> C08F 8/04

U.S. Cl. 525—339

15 Claims

1. A process for hydrogenating a conjugated diene polymer derived from 10 to 100% by weight of at least one conjugated diene monomer selected from the group consisting of 1,3-butadiene, 2,3-dimethylbutadiene, isoprene and 1,3-pentadiene and 90 to 0% by weight of an ethylenically unsaturated monomer copolymerizable with said at least one conjugated diene which comprises hydrogenating the carbon-carbon double bond of the conjugated diene polymer in the presence of a hydrogenation catalyst supported on a carrier, the carrier being an oxide of an element of Group IVa of the periodic table.

4,954,577

## LACQUER BINDERS, COATING COMPOSITIONS AND WIRE ENAMELS BASED ON POLYAMIDEIMIDES AND ISOCYANATES CARRYING CARBODIIMIDE AND/OR URETHANE IMINE GROUPS

Willi Dünwald; Hans Schlegel, both of Leverkusen; Reinhard Halpaap, and Josef Pedain, both of Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 18, 1988, Ser. No. 184,494

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1987, 3714033

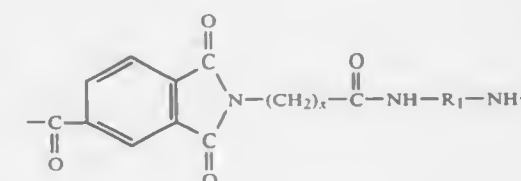
Int. Cl.<sup>5</sup> C08G 18/64, 18/80

U.S. Cl. 525—420

6 Claims

1. Lacquer binders containing polyamide imides suitable for the production of highly heat-resistant films and coatings mixtures of

(a) high molecular weight compounds containing recurring structural units corresponding to the following general formula



in which

R<sub>1</sub> is an alkylene radical, a cycloalkylene radical or an arylene radical optionally containing methylene bridges, these radicals optionally being substituted by alkyl groups or halogen, and

x is an integer of 2 to 12,

and organic compounds containing (i) carbodiimide and/or urethane imine groups and (ii) blocked isocyanate groups, with 1 to 100 parts by weight of component (b) being used to parts by weight of component (a).

4,954,578

## FINE DOMAIN COMPOSITE FILMS OF POLYIMIDE MIXTURES

Moonhor Ree, Wappingers Falls, N.Y.; Sally A. Swanson, Calif.; Willi Volksen, both of San Jose, Calif., and Do Y. Yoon, Los Gatos, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 25, 1988, Ser. No. 262,559

Int. Cl.<sup>5</sup> C08L 79/08

U.S. Cl. 525—432

5 Claims

1. A thin film of polyimide having a glass transition temperature above 400° C. and good adhesion, said film comprising fine domains of about 1  $\mu$ m diameter or smaller of relatively flexible fluorinated polyimide containing at least one fluorinated component in an amount from about 10–40% by weight of the total polyimide dispersed in a matrix of relatively rigid polyimide in an amount from about 60–90% by weight of total polyimide.

4,954,579

## POLYALKYLOXAZOLINE-POLYCARBONATE-POLYALKYLOXAZOLINE TRIBLOCK COPOLYMER COMPATIBILIZER FOR

## POLYCARBONATE/POLYAMIDE BLENDS

Bruce P. Thill, and Bruce A. King, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 31, 1988, Ser. No. 264,920

Int. Cl.<sup>5</sup> C08G 73/02, 64/12; C08L 69/00

U.S. Cl. 525—467

12 Claims

1. A process for the preparation of a triblock copolymer, comprising the steps of sequentially:

(A) contacting together an  $\alpha,\omega$ -hydroxyalkanoic acid having from 8 to 20 carbon atoms and an alkylsulfonyl halide or arenesulfonyl halide having from 7 to 14 carbon atoms, to prepare an  $\Omega$ -sulfonylalkanoic acid;

(B) next, contacting the  $\Omega$ -sulfonylalkanoic acid from step A with a chlorinating agent, to prepare an  $\Omega$ -sulfonylalkanoyl chloride;

(C) thereafter, contacting the  $\Omega$ -sulfonylalkanoyl chloride from step B with an aromatic dihydroxy compound and phosgene, under polycarbonate forming conditions, to prepare a polycarbonate having sulfonate end groups; and

(D) finally, contacting the polycarbonate from step C with a 2-alkyl-2-oxazoline, to prepare a polyalkyloxazoline-poly-carbonate-polyalkyloxazoline triblock copolymer.





is, in the water swollen hydrated state, soft and flexible, which copolymer comprises the polymerization product of, with weight percent based on the total weight of monomers (a), (b), (c) and (d), of

- (a) 24.9 to 70 percent by weight of N,N-dimethylacrylamide,  
(b) 65 to 19.9 percent by weight of a vinyl monomer selected from the group consisting of the acrylate or methacrylate esters of formula B1



wherein

R<sub>1</sub> is hydrogen or methyl,

n is an integer from 1-4,

m is an integer from 0-11,

X is hydrogen or fluorine, with the proviso that, when m is 0, X is fluorine; and hexafluoroisopropyl methacrylate,

- (c) 10 to 40 percent by weight of a C<sub>2</sub>-C<sub>4</sub>-hydroxyalkyl acrylate or methacrylate, a C<sub>2</sub>-C<sub>4</sub>-alkoxy-alkyl acrylate or methacrylate or an oligosiloxanyl-silylalkyl acrylate or methacrylate containing 2 to 10 silicon atoms, or mixture thereof, and

- (d) 0.1 to 3 percent by weight of a crosslinking agent having at least two copolymerizable vinyl groups.

#### 4,954,588 FLUORINE-CONTAINING NON-CRYSTALLINE COPOLYMER

Masahiko Oka, Ohtsu; Hiroshi Uemoto, and Yasuji Iwasaki, both of Settsu, all of Japan, assignors to Daikin Industries Ltd., Osaka, Japan

Filed Sep. 7, 1989, Ser. No. 403,867

Claims priority, application Japan, Sep. 10, 1988, 63-227185; Oct. 31, 1988, 63-275276; Mar. 7, 1989, 1-54475

Int. Cl.<sup>5</sup> C08F 16/24

U.S. Cl. 526-247

7 Claims

1. A fluorine-containing non-crystalline copolymer comprising 10 to 90% by mole of repeating units derived from tetrafluoroethylene and 90 to 10% by mole of repeating units derived from a fluorovinyl ether of the formula:



wherein X is a halogen atom or a hydrogen atom and n is a number of 2 to 8.

#### 4,954,589 SOLUBLE AND CURABLE FLUORINE-CONTAINING COPOLYMER SUITABLE AS PAINT VEHICLE

Kiyomi Sugawara, Kamifukuoka; Kentaro Tsutsumi, and Mikio Otani, both of Kawagoe, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed May 17, 1989, Ser. No. 353,032

Claims priority, application Japan, May 17, 1988, 63-118353

Int. Cl.<sup>5</sup> C08F 14/22

U.S. Cl. 526-255

9 Claims

1. A copolymer comprising:

25 to 75 mol % of first repeating units which originate from a fluoroolefin;

10 to 70 mol % of second repeating units which originate from a fatty acid ester selected from the group consisting of vinyl esters and isopropenyl esters;

3 to 40 mol % of third repeating units which originate from a hydroxyl-containing allyl ether; and

0.1 to 20 mol % of fourth repeating units which originate from a carboxyl-containing monomer, selected from the group consisting of acrylic acid, vinylacetic acid, allyloxycetic acid, allylacetic acid, methacrylic acid and maleic anhydride.

#### 4,954,590 PREPARATION OF POLYMER HAVING ISOINDOLE STRUCTURES

Haruo Yoshida; Nobuo Uotani, and Yoshihiro Saida, all of Oita, Japan, assignors to Showa Denko-Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 92,916, Aug. 6, 1987, Pat. No. 4,833,231.

This application Mar. 23, 1989, Ser. No. 327,875

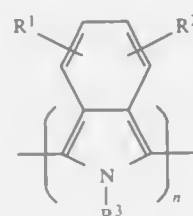
Claims priority, application Japan, Dec. 6, 1985, 60-273501

Int. Cl.<sup>5</sup> C08G 61/12

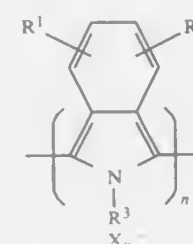
U.S. Cl. 526-259

1 Claim

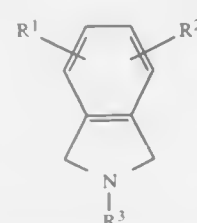
1. A process for the preparation of a polymer having an isoindole structure containing monomer units selected from the group consisting of monomer units of the formula:



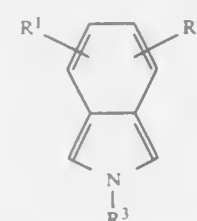
and



wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> independently represent a hydrogen atom or a hydrocarbon group having 1 to 5 carbon atoms, X<sup>-</sup> represents an anion of an electrolyte, y is a number of from 0.01 to 1, which indicates the proportion of the anion to 1 mole of the monomer, and n is a number of from 5 to 500, which indicates the degree of polymerization, which comprises subjecting an isoindoline compound represented by the following general formula (IIa):



wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are as defined above, or an isoindole compound represented by the following general formula (IIb):



wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are as defined above, to oxidative polymerization in a solvent by the action of an oxidant.

#### 4,954,591 ABRASION RESISTANT RADIATION CURABLE COATING FOR POLYCARBONATE ARTICLE

Hector Belmares, Petaluma, Calif., assignor to Pilkington Visioncare Holdings, Inc., Menlo Park, Calif.

Filed Nov. 6, 1987, Ser. No. 118,116

Int. Cl.<sup>5</sup> C08F 26/08

U.S. Cl. 526-264

11 Claims

1. A polymerizable and cross-linkable, radiation curable coating composition for a polycarbonate article comprising a mixture of:

- (a) 25-94% by weight of a polyfunctional acrylate or methacrylate monomer having at least three acrylate functional groups per molecule or a mixture of such monomers;  
(b) 3-50% by weight of a monomer selected from N-vinyl derivatives of linear or cyclic secondary amides, tetrahydrofurfuryl acrylate or methacrylate, N,N-di(lower alkyl) acrylamide, ethylenically unsaturated monosilane, or a mixture of such monomers; and  
(c) 3-40% by weight of an ethylenically unsaturated monomer having a Tg less than 80° C. or 3-30% of an unsaturated monomer having a Tg less than 80° C. or 3-30% of an ethylenically unsaturated copolymer with a Tg less than 100° C., said monomer and copolymer being effective to impart tintability to the coating composition after it is cured.

#### 4,954,592 OPTICALLY ACTIVE STYRENE DERIVATIVES, POLYMERS OBTAINED FROM THESE, COMPLEXES WITH IRIIDIUM(I) AND THEIR USE

Jürgen Kaschig, Freiburg, Fed. Rep. of Germany, assignor to Ciba-Gelgy Corporation, Ardsley, N.Y.

Division of Ser. No. 258,368, Oct. 17, 1988, Pat. No. 4,891,412, which is a division of Ser. No. 47,099, May 8, 1987, Pat. No. 4,800,224. This application Oct. 11, 1989, Ser. No. 419,792

Claims priority, application Switzerland, May 16, 1986, 1985/86

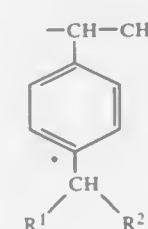
Int. Cl.<sup>5</sup> C08F 26/06; C08C 19/42

U.S. Cl. 526-265

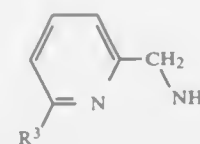
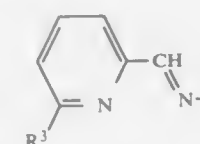
2 Claims

1. A homopolymer or copolymer having optically active side groups and containing, relative to the polymers

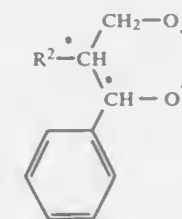
- (a) 0.005 to 100 mol% of at least one repeating structural element of the formula VII



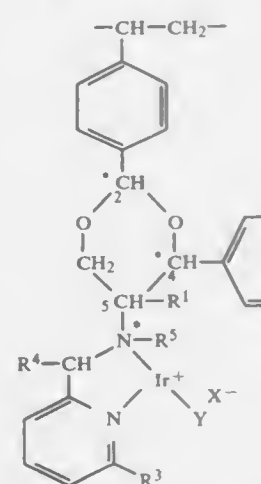
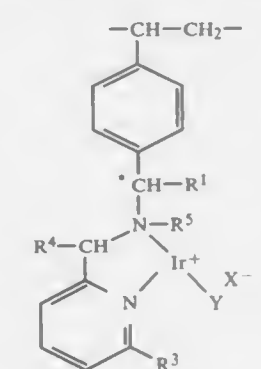
in which R<sup>1</sup> is C<sub>1</sub>-C<sub>4</sub>-alkyl, phenyl or benzyl, R<sup>2</sup> is a radical if the formula II or IIa



in which R<sup>3</sup> is H or -CH<sub>3</sub>, or R<sup>1</sup> and R<sup>2</sup> together form a radical of the formula



in which R<sup>2</sup> has the meaning given above; and \* represents predominantly R or predominantly S configuration, and (b) 99.995 to 0 mol % of at least one structural element which is derived from an olefinic comonomer and differs from (a), wherein at least some of the structural elements of the formula VII are complexed with iridium(I) and correspond to the formula IX and X



in which R<sup>1</sup> and R<sup>3</sup> are as defined above, R<sup>4</sup> and R<sup>5</sup> are each H or together form a bond X<sup>⊖</sup> is an anion of a monobasic inorganic or organic acid and Y is an open-chain or cyclic diene having 6 to 10 C atom wherein each double is separated by 1 or 2 C atoms.

#### 4,954,593 FURANONE/VINYL ETHER COPOLYMERS

Fulvio J. Vara, Chester; James A. Dougherty, Pequannock, both of N.J., and Jeffrey S. Plotkin, Monsey, N.Y., assignors to GAF Chemical Corporation, Wayne, N.J.

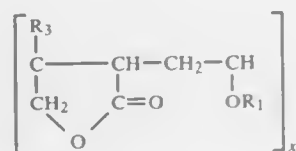
Filed Aug. 18, 1989, Ser. No. 395,687

Int. Cl.<sup>5</sup> C08F 234/02

U.S. Cl. 526-270

11 Claims

1. The copolymer having the formula



wherein  $R_3$  is lower alkyl or hydrogen;  $x$  is an integer having a value of from 100 to 150,000;  $R_1$  is a saturated radical or a radical having a terminal vinyl group and is selected from the group consisting of alkoxyated vinyl; alkoxyated alkanol; alkyl optionally substituted with one or more vinyl ether, alkylate, hydroxy or alkoxyated vinyl groups, phenyl optionally substituted with one or more lower alkyl, hydroxy, alkyl-ene alkoxyate or alkoxyated vinyl groups and a functional derivative of the radicals when  $R_1$  contains a functional vinyl group.

**4,954,594**  
**COPOLYMERS OF ETHYLENE AND METHOXYACETIC ACID VINYL ESTER**  
 Wolfgang Payer, Wesel; Heinz D. Bühnen, and Wilhelm Zoller, both of Oberhausen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany  
 Continuation of Ser. No. 248,549, Sep. 23, 1988, abandoned. This application Jun. 26, 1989, Ser. No. 372,235  
 Claims priority, application Fed. Rep. of Germany, Sep. 29, 1987, 3732721

Int. Cl.<sup>5</sup> C08F 18/04

U.S. Cl. 526—320

3 Claims

1. A copolymer comprising 95 to 50 percent by weight ethylene and 5 to 50 percent by weight methoxyacetic acid vinyl ester having an average molecular mass ( $M_n$ ) of 500 to 10,000 g x mol<sup>-1</sup>.

**4,954,595**  
**METHOD FOR PREPARING VINYL CHLORIDE POLYMERS**

Tadashi Amano, Hazaki, and Shigehiro Hoshida, Kamisu, both of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Japan  
 Filed Sep. 6, 1988, Ser. No. 240,734  
 Claims priority, application Japan, Sep. 8, 1987, 62-224763; Dec. 28, 1987, 62-335422; Jan. 8, 1988, 63-2345; Apr. 27, 1988, 63-104892; May 19, 1988, 63-123227

Int. Cl.<sup>5</sup> C08F 14/06, 2/20

U.S. Cl. 526—344.2

8 Claims

1. A method for preparing vinyl chloride polymers which comprises suspension polymerizing vinyl chloride monomer or a vinylic monomer mixture composed or vinyl chloride in an aqueous medium in the presence of a polymerization initiator, characterized by washing a piping and an opening of a polymerizer for charging the polymerization initiator into the polymerizer, with hot water heated to not less than 90° C. at which the half-life of the polymerization initiator is not more than about one hour, after introducing the initiator into the polymerizer.

**4,954,596**  
**PROCESS FOR MANUFACTURING ORGANIC SILAZANE POLYMERS AND CERAMICS THEREFROM**  
 Yoshifumi Takeda; Minoru Takamizawa, and Tsutomu Takeno, all of Kubikimura, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

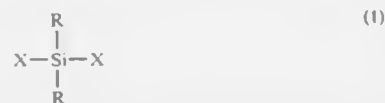
Filed Dec. 12, 1988, Ser. No. 283,316  
 Claims priority, application Japan, Dec. 11, 1987, 62-313264  
 Int. Cl.<sup>5</sup> C08G 77/06

U.S. Cl. 528—14

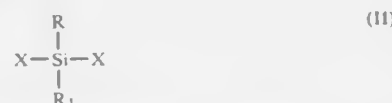
10 Claims

1. A method for manufacturing organic silazane polymers comprising:

forming a mixture consisting essentially of 20 to 90 mol. % of at least one organosilicic compound having the formula:



in which  $R$  is the same or different and represents a methyl group, an ethyl group or a phenyl group, and  $X$  represents a chlorine or a bromine atom; and 80 to 10 mol. % of at least one organosilicic compound having the formula:



in which  $R$  represents a methyl group, an ethyl group or a phenyl group,  $R_1$  represents a hydrogen atom or a vinyl group and  $X$  represents a chlorine or a bromine atom; reacting this mixture with ammonia to produce silazane compounds; and polymerizing the silazane compounds in the presence of an alkali metal hydroxide catalyst to obtain organic silazane polymers.

**4,954,597**  
**METHYLHYDROSILOXANE PAPER COATINGS**  
 Anthony Revis, Saginaw County, Mich., assignor to Dow Corning Corporation, Midland, Mich.  
 Continuation-in-part of Ser. No. 392,320, Aug. 11, 1989. This application Oct. 10, 1989, Ser. No. 418,596  
 Int. Cl.<sup>5</sup> C08G 77/06

U.S. Cl. 528—15

11 Claims

1. A process of preparing a paper coating film from a cured and cross-linked methylhydrosiloxane comprising contacting and forming a mixture of an allyl ester with at least one methylhydrosiloxane in the presence of a Group VIII metal catalyst, coating the mixture on a paper substrate, and heating the mixture of the allyl ester, the methylhydrosiloxane, the Group VIII metal catalyst, and the substrate, in the presence of ambient moisture until the methylhydrosiloxane becomes cured and cross-linked.

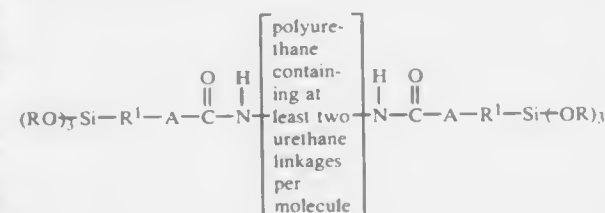
**4,954,598**  
**FAST-CURE POLYURETHANE SEALANT COMPOSITION CONTAINING SILYL-SUBSTITUTED GUANIDINE ACCELERATORS**  
 Jamil Baghdachi, Northville, and Keith H. Mahoney, Grosse Pointe City, both of Mich., assignors to BASF Corporation, Clifton, N.J.

Filed Oct. 13, 1988, Ser. No. 257,486  
 Int. Cl.<sup>5</sup> C08G 77/08

U.S. Cl. 528—22

16 Claims

1. A one-component, moisture-curable sealant composition comprising a mixture of  
 (a) a silane-terminated polyurethane polymer of the formula



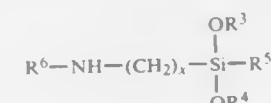
wherein

$R$  is lower alkyl of from 1 to 6 carbon atoms;

$R^1$  is a divalent bridging radical selected from the group consisting of a divalent hydrocarbon radical, a divalent hydrocarbon ether radical, and a divalent hydrocarbon amino radical;

$A$  is selected from the group consisting of  $-S-$  and  $-NR^2-$  where  $R^2$  is hydrogen or alkyl of from one to six carbon atoms;

(b) from 0.2 to 1.0 parts by weight of an aminosilane per 100 parts by weight of said silane-terminated polyurethane polymer, said aminosilane having the structure



wherein

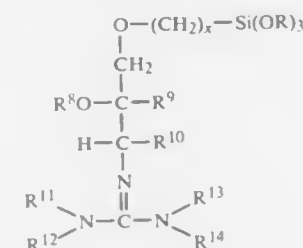
$x$  is an integer of from one to three;

$R^3$  and  $R^4$  may be the same or different and are selected from alkyl of from one to four carbon atoms;

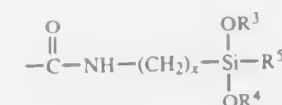
$R^5$  is alkyl of from one to four carbon atoms or alkoxy of from one to four carbon atoms;

$R^6$  is hydrogen or  $-(CH_2)_yNHR^7$  wherein  $R^7$  is hydrogen or 13  $(CH_2)_2NH_2$  and wherein  $y$  and  $z$  may be the same or different and are integers of from one to three;

(c) from 0.2 to 1.0 parts by weight of an accelerator per 100 parts by weight of said silane-terminated polyurethane polymer, said accelerator selected from the group consisting of compounds or mixtures thereof having the structure



where  $x$  and  $R$  are as previously defined;  $R^8$  is hydrogen or



where  $R^3$ ,  $R^4$ ,  $R^5$ , and  $x$  are as defined above;  $R^9$  and  $R^{10}$  are hydrogen or, when taken together with the carbon atoms to which they are attached, form a saturated six-membered carbocyclic ring; and  $R^{11}$ ,  $R^{12}$ ,  $R^{13}$ , and  $R^{14}$  are independently hydrogen or alkyl of from one to four carbon atoms.

**4,954,599**  
**FORMED, POLYMERIC, TERTIARY OR SECONDARY ORGANO-SILOXANE AMINE COMPOUNDS, METHODS OF THEIR PREPARATION AND USE**

Peter Panster, Rodenback, and Peter Kleinschmitt, Hanau, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany  
 Filed Jan. 11, 1989, Ser. No. 295,886

Claims priority, application Fed. Rep. of Germany, Jan. 12, 1988, 3800563

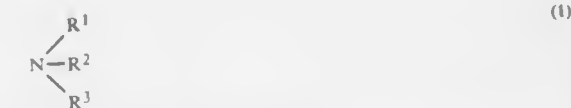
Int. Cl.<sup>5</sup> C08G 77/26

U.S. Cl. 528—38

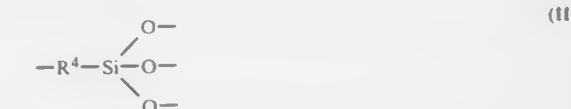
21 Claims

1. A spherically formed, polymeric, tertiary or secondary

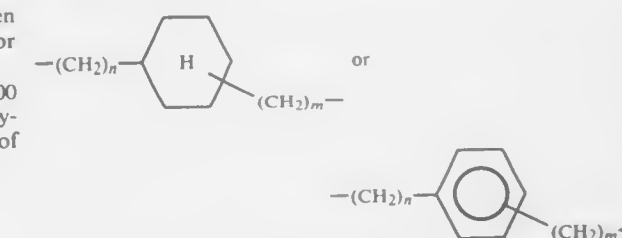
organosiloxane amine compound containing recurring units of the formula:



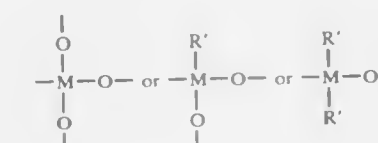
in which  $R^1$  and  $R^2$  are identical or different and represent a group of the formula:



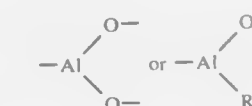
in which formulae the nitrogen atoms in (I) are connected to the silicon atoms in (II) via the  $R^4$  groups and  $R^4$  represents an alkylene group with 1 to 10 C atoms, a cycloalkylene group with 5 to 8 C atoms or a unit of the general formula:



in which  $n$  is a number from 1 to 6 and indicates the number of methylene groups in nitrogen position and  $m$  is a number from 0 to 6 and the free valences of the oxygen atoms bound to the silicon atom are attached either to  
 (a) silicon atoms of other groups of formula (II) or to  
 (b) metal atoms of one or more of the cross-linking binding links



or



or a combination of (a) and (b)  
 in which  $M$  is a silicon, titanium or zirconium atom and  $R'$  a linear or branched alkyl group with 1 to 5 C atoms and the ratio of the silicon atoms of the groups of general formula (II) to the metal atoms in the binding links is 1:0 to 1:10 and in which  $R^3$  is equal to  $R^1$  or  $R^2$  or hydrogen, or a linear or branched alkyl of 1 to 10 C atoms, a cycloalkyl of 5 to 8 C atoms or is benzyl, wherein the said compound is in the form of macroscopically spherical particles with a diameter of 0.01 to 3.0 mm, a specific surface area of up to 1000 m<sup>2</sup>/g, a specific pore volume of 0 to 6.0 ml/g as well as by a bulk density of 50 to 1000 g/l.

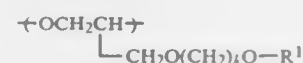


4,954,600  
FERROELECTRIC LIQUID-CRYSTALLINE POLYMER AND EPOXIDE USABLE TO PREPARATION OF THE FERROELECTRIC LIQUID-CRYSTALLINE POLYMER  
Satoshi Hachiya, Chiba, Japan, assignor to Idemitsu Kosan Co., Ltd., Tokyo, Japan

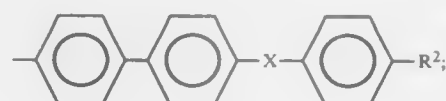
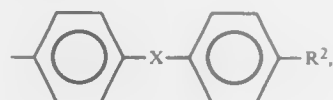
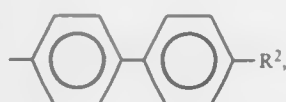
Filed Jun. 16, 1989, Ser. No. 367,252  
Claims priority, application Japan, Jun. 27, 1988, 63-156789; Apr. 27, 1989, 1-105788

Int. Cl.<sup>5</sup> C08G 65/22; C09K 19/52  
U.S. Cl. 528—89 6 Claims

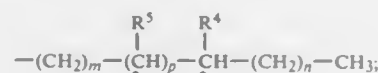
1. A ferroelectric liquid-crystalline polymer consisting essentially of at least one repeating unit represented by the following general formula:



wherein  
k is an integer having a value of 2 to 30;  
R<sup>1</sup> is



X is —COO— or —OCO—; and  
R<sup>2</sup> is —COOR<sup>3</sup>, —OCOR<sup>3</sup> or —OR<sup>3</sup>;  
wherein  
R<sup>3</sup> is



wherein  
each of R<sup>4</sup> and R<sup>5</sup> is independently —CH<sub>3</sub>, a halogen atom or —CN;  
each of m and n is independently an integer having a value of 0 to 10, with the proviso that when R<sup>4</sup> is —CH<sub>3</sub>, n is not an integer having a value of 0;  
p is an integer having a value of 0 or 1; and  
C marked with \* is an asymmetric carbon atom.

4,954,601  
POLYIMIDE PRECURSORS AND METHOD FOR PREPARING CROSSLINKED POLYIMIDES USING SAID PRECURSORS

Russell K. King, Beaver, Mich., assignor to Dow Corning Corporation, Midland, Mich.

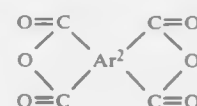
Filed Jan. 3, 1989, Ser. No. 293,153  
Int. Cl.<sup>5</sup> C08G 18/80, 73/06, 73/10

U.S. Cl. 528—45 8 Claims

1. In a heat curable polyimide precursor comprising  
A. a polyamic acid prepared by reacting at least one aromatic diamine represented by the formula



with at least one aromatic tetracarboxylic acid dianhydride, represented by the formula



where Ar<sup>1</sup> represents a divalent aromatic hydrocarbon radical, Ar<sup>2</sup> represents a tetravalent aromatic hydrocarbon radical, and the carbon atoms of each of the two anhydride groups are bonded to adjacent carbon atoms of an aromatic ring structure, and  
B. a blocked polyfunctional isocyanate in an amount sufficient to cure said precursor,

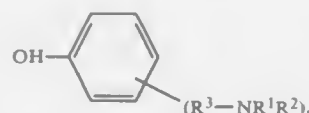
the improvement comprising (1) the presence of said polyamic acid as an oligomer containing an average of from 2 to 30 repeating units per molecule, no —C—O—C— groups in Ar<sup>1</sup> or Ar<sup>2</sup> and terminal groups of the formula —C(O)OC(O)—, where the free valences of said terminal groups are bonded to adjacent carbon atoms of an aromatic ring structure. (2) a molar ratio of blocked isocyanate to said terminal groups, of 1:1, and (3) a decomposition temperature of said blocked isocyanate that is above the lowest temperature at which said oligomer will convert to a thermoplastic polyimide.

4,954,602  
LIQUID, EPOXY RESIN COMPOSITION  
Ichiro Akutagawa, Nagareyama; Tsutomu Yamaguchi; Toshihiro Hanamori, both of Saitama; Kunimitsu Matsuzaki, Yono, and Shinobu Okamura, Shimada, all of Japan, assignors to Somar Corporation, Japan

Filed Jun. 23, 1989, Ser. No. 369,998  
Claims priority, application Japan, Jun. 24, 1988, 63-154889  
Int. Cl.<sup>5</sup> C08G 59/24, 59/68

U.S. Cl. 528—93 14 Claims

1. A liquid, epoxy resin composition comprising:  
(A) a mixture containing  
(a<sub>1</sub>) a Bisphenol A epoxy resin, and  
(a<sub>2</sub>) an alicyclic epoxy resin; and  
(B) a curing agent including  
(b<sub>1</sub>) an acid anhydride, and  
(b<sub>2</sub>) a phenol compound of the general formula:



wherein R<sup>1</sup> and R<sup>2</sup> represent independently from each other a lower alkyl, R<sup>3</sup> represents a lower alkylene and n is an integer of 1-5, the amount of said phenol compound being 2-8% based on the weight of the mixture (A).

4,954,603  
EPOXY RESIN  
Toshimasa Takata, Ichihara; and Kenichi Mizuno, Iwakuni, both of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

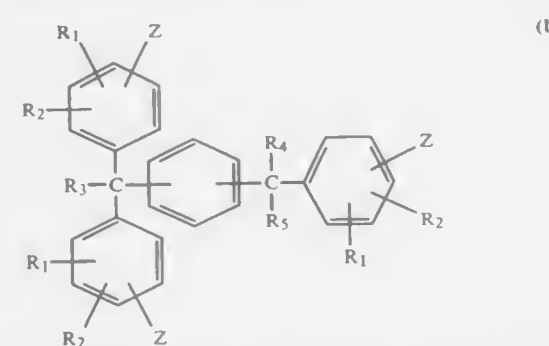
Continuation-in-part of Ser. No. 30,340, Mar. 26, 1987, abandoned, and a continuation-in-part of Ser. No. 227,773, Aug. 3, 1988, Pat. No. 4,894,432, which is a division of Ser. No. 916,099, Oct. 7, 1986, Pat. No. 4,778,936. This application Jun. 6, 1989, Ser. No. 362,289

Claims priority, application Japan, Oct. 8, 1985, 60-224305; Dec. 20, 1985, 60-237288

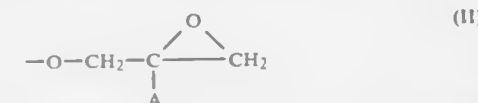
Int. Cl.<sup>5</sup> C08G 59/24; C07D 303/12

U.S. Cl. 528—98 15 Claims

1. A heat-resistant flame-retardant epoxy resin composition comprising a halogen-containing epoxy resin obtained by reacting (A) a trifunctional epoxy compound represented by the following general formula (I):



wherein R<sub>1</sub> and R<sub>2</sub> stand for a hydrogen atom, an alkyl group having 1 to 12 carbon atoms, an aryl group or a cycloalkyl group having 3 to 6 carbon atoms, R<sub>3</sub> stands for a hydrogen atom or an alkyl group having 1 to 10 carbon atoms, R<sub>4</sub> and R<sub>5</sub>, independently, stand for a hydrogen atom or an alkyl group having 1 to 4 carbon atoms and Z stands for a group represented by the following general formula (II):



in which A stands for a hydrogen atom or a methyl group, or a combination of said trifunctional epoxy compound and a difunctional epoxy compound obtained by condensation of a bisphenol with an epichlorohydrin with (B) a halogenated bisphenol in the presence of a catalyst.

4,954,604  
PROCESS FOR THE PRODUCTION OF AROMATIC POLYETHER KETONES  
Joachim Genz; Hans-Rudolf Dicke; Volker Eckhardt, all of Krefeld, and Frank Kleiner, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 31, 1988, Ser. No. 238,406  
Claims priority, application Fed. Rep. of Germany, Sep. 12, 1987, 3730690

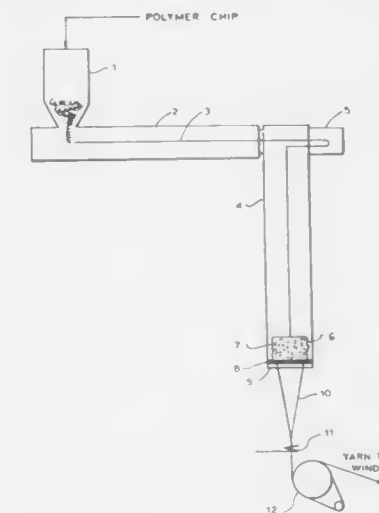
Int. Cl.<sup>5</sup> C08C 8/02, 8/14

U.S. Cl. 528—125 4 Claims

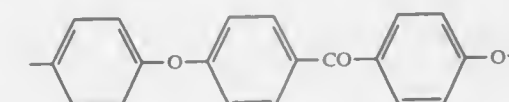
1. A process for the production of a high molecular weight, crystalline, aromatic polyether ketone from an aromatic dihydroxy compound and an aromatic dihalogen compound containing a keto group in the presence of alkali salts, characterized in that N—C<sub>1</sub>—C<sub>5</sub>—alkyl caprolactams are used as the solvent.

4,954,605  
AROMATIC POLYETHERKETONE FIBER PRODUCT  
Martin H. G. Deeg, Maplewood, N.J., assignor to Hoechst Celanese Corp., Somerville, N.J.  
Division of Ser. No. 107,845, Oct. 6, 1987, Pat. No. 4,849,148, which is a continuation of Ser. No. 732,537, May 10, 1985, abandoned. This application Mar. 31, 1989, Ser. No. 332,532  
The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C08G 8/02, 65/38; D02G 3/00; D01F 1/00  
U.S. Cl. 528—125 3 Claims



1. Multifilament and yarns of a polymer having an inherent viscosity of at least 0.7 measured in concentrated sulfuric acid, said polymer containing in the polymer chain at least 50 percent of the repeating units:



said fibers and yarns having at least ten filaments and a dpf of about 15 to 100, a tenacity of about 1 to 2 grams per denier, an elongation at break of about 50 to 160 percent, and a modulus of about 20 to 30 grams per denier.

4,954,606  
SOLID PHASE POST POLYMERIZATION CONDENSATION OF THERMOTROPIC POLYESTER IMIDES

Hans-Rudolf Dicke, Bestwig; Joachim Genz, Krefeld; Volker Eckhardt, Krefeld, and Ludwig Bottenbruch, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 19, 1988, Ser. No. 259,768  
Claims priority, application Fed. Rep. of Germany, Oct. 31, 1987, 3737067

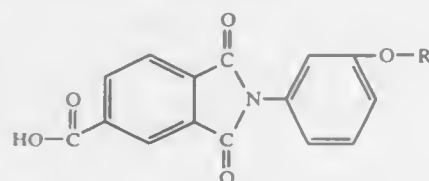
Int. Cl.<sup>5</sup> C08G 73/16

U.S. Cl. 528—170 1 Claim

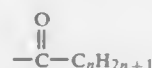
1. A process for preparing polyester imides comprising the solid phase after-condensation of polyester imides prepared by reacting a compound of the formula:



with a compound of the formula,



wherein R is hydrogen,



or —Ar, n = 1 or 3 and Ar is phenyl or tolyl, optionally in the presence of catalysts, chain breaking agents, branching agents, or mixtures thereof at temperatures from 150° to 380° C., optionally at reduced pressure.

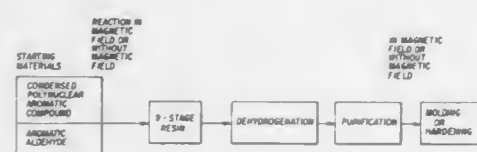
#### 4,954,607 FERROMAGNETIC ORGANIC SUBSTANCE HAVING TRIARYL METHANE STRUCTURE AND PROCESS FOR MANUFACTURING THE SAME

Sugio Otani, Akira Kojima, both of Kiryu, and Michiya Ota, Maebashi, all of Japan, assignors to Gunma University, Maebashi, Japan

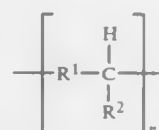
Filed Aug. 15, 1989, Ser. No. 393,775  
Claims priority, application Japan, Aug. 25, 1988, 63-209522;  
Mar. 28, 1989, 1-74097

Int. Cl.<sup>5</sup> C08G 4/00  
U.S. Cl. 528—230

15 Claims



1. A ferromagnetic organic substance having a triaryl methane structure which comprises a triaryl methane basic structural unit represented by the general formula,



wherein R<sup>1</sup> is a substituted or non-substituted, condensed polynuclear arylene group comprising at least two aromatic rings which, however, can contain a hetero atom including N, S or O as a ring member, or a phenylene group substituted with an electron donating group, R<sup>2</sup> is a substituted or non-substituted aryl group, and n is an integer of at least 3, and which is characterized in that a free radical concentration of methine carbon positions is at least 10<sup>17</sup> radicals/g.

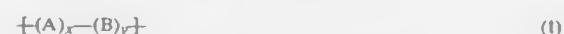
#### 4,954,608 COPOLYMERIZED POLYAMIC ACID SALTS AND PROCESS OF PRODUCING THEM

Masakazu Uekita, and Hiroshi Awaji, both of Hyogo, Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki, Osaka, Japan

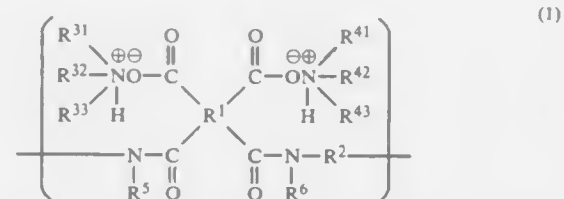
Filed Jun. 1, 1987, Ser. No. 55,973  
Claims priority, application Japan, May 30, 1986, 61-126575;  
Jun. 20, 1986, 61-145718  
Int. Cl.<sup>5</sup> C08G 73/10, 69/26, 69/32  
U.S. Cl. 528—350

23 Claims

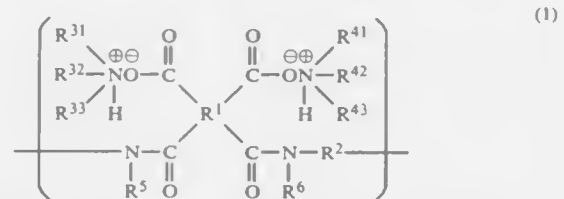
1. A copolymerized polyamic acid salt having a recurring unit represented by formula



wherein (A) represents a formula



wherein, R<sup>1</sup> represents a tetravalent group having at least 2 carbon atoms; R<sup>2</sup> represents a divalent group having at least 2 carbon atoms; and R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup>, R<sup>41</sup>, R<sup>42</sup>, R<sup>43</sup>, R<sup>5</sup>, and R<sup>6</sup> each represents a monovalent group having 1 to 30 carbon atoms selected from an aliphatic group, an alicyclic group, an aromatic group, a group in which an aliphatic group is combined with an alicyclic group or an aromatic group, each of these groups substituted by a halogen atom, a nitro group, an amino group, a cyano group, a methoxy group, or an acetoxy group, or a hydrogen atom; at least one of said R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup>, R<sup>41</sup>, R<sup>42</sup>, R<sup>43</sup>, R<sup>5</sup> and R<sup>6</sup> do not take a group having 1 to 11 carbon atoms or a hydrogen atom; and (B) represents one or more formula



wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup>, R<sup>41</sup>, R<sup>42</sup>, R<sup>43</sup>, R<sup>5</sup> and R<sup>6</sup> are as defined in (A) except that at least one of said R<sup>1</sup>, R<sup>2</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup>, R<sup>41</sup>, R<sup>42</sup>, R<sup>43</sup>, R<sup>5</sup> and R<sup>6</sup> do not take the same group as defined in (A); and x and y represent a ratio which satisfies 0 < x < 1, 0 < y < 1 and x + y = 1.

#### 4,954,609 INTERMEDIATE MOLECULAR WEIGHT FLUORINE CONTAINING POLYIMIDE AND METHOD FOR PREPARATION

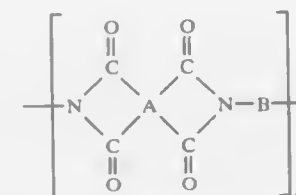
Rohitkumar H. Vora, Westfield, N.J., assignor to Hoechst Celanese Corp., Somerville, N.J.

Filed Feb. 28, 1989, Ser. No. 317,169  
Int. Cl.<sup>5</sup> C08G 73/10

U.S. Cl. 528—353

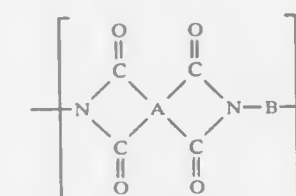
12 Claims

1. A process for producing a polyimide polymer having recurring groups of the structure:



wherein the moiety A is a tetravalent aromatic radical containing at least one benzene, naphthalene or poly-phenyl nucleus, the moiety B is a divalent aromatic group, and n is an integer ranging from about 100 to about 200, comprising:

(a) forming a dispersion of an approximately equimolar mixture of an aromatic diamine monomer and an aromatic dianhydride monomer in organic solvent at the monomer solid level within the range of from about 8 to about 12% by weight, at least one of said monomers containing a



group linking two aromatic moieties, wherein R is CF<sub>3</sub> or phenyl;

(b) subjecting said monomer mixture to isothermal polymerization conditions in the absence of a monomer end capping agent to form a polyamic acid; and

(c) cyclizing said polyamic acid to form a polyimide; said polymerization step being of sufficient length of time and uniformity of temperature to achieve a polyamide having a weight average molecular weight within the range of about 80,000 to about 135,000, an inherent viscosity within the range of from about 0.45 to about 0.70 as measured from a solution of the polymer in dimethyl acetamide at 25° C. at a polymer concentration of 0.5 weight percent, and a polydispersity within the range of from about 1.7 to about 2.6.

#### 4,954,610 POLYAMIDE-IMIDE POLYMERS HAVING FLUORINE-CONTAINING LINKING GROUPS

Paul N. Chen, Sr., Morris, and Rohitkumar H. Vora, Westfield, both of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.

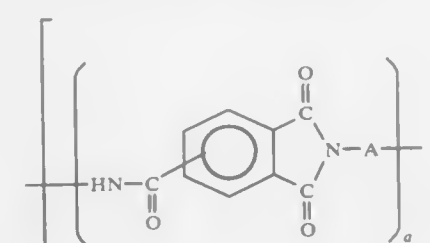
Filed Feb. 27, 1989, Ser. No. 316,380  
The portion of the term of this patent subsequent to May 27, 1989, has been disclaimed.

Int. Cl.<sup>5</sup> C08G 69/26, 69/28

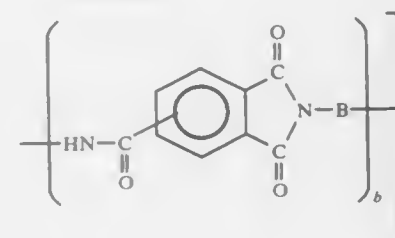
U.S. Cl. 528—350

13 Claims

1. A polyamide-imide polymer containing at least one recurring structural unit of the formula:

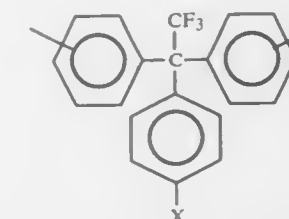
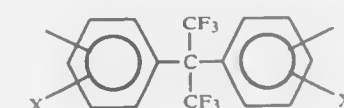


-continued



wherein the terms (a) and (b) are equal to the mole fraction of each recurring unit in the polymer chain and (a) ranges from about 0.0 to about 0.95, (b) ranges from about 1.00 to about 0.05, with the proviso that the sum of (a) and (b) is equal to 1.00, n is a number sufficient to give rise to a polyamide-imide inherent viscosity of at least about 0.05 as measured from a solution of the polymer in dimethylacetamide at 25° C. at a polymer concentration of 0.5 weight percent;

A is a divalent aromatic moiety, and B is a divalent aromatic moiety containing the ring substituted or ring unsubstituted residuum selected from:



wherein x is a non-interfering monovalent substituent selected from the group consisting of hydrogen, chloro, fluoro, lower alkyl or alkoxy having 1 to 6 carbon atoms, hydroxy and phenyl.

#### 4,954,611 SHAPED ARTICLES FROM POLYAMIDE-IMIDE POLYMERS HAVING FLUORINE CONTAINING LINKING GROUPS

Paul N. Chen, Sr., Gillette, and Rohitkumar H. Vora, Westfield, both of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.

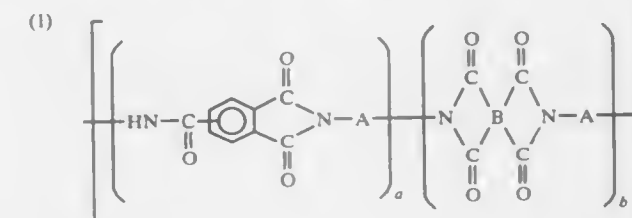
Filed Feb. 27, 1989, Ser. No. 316,342  
The portion of the term of this patent subsequent to May 8, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C08G 69/26, 69/28

U.S. Cl. 528—353

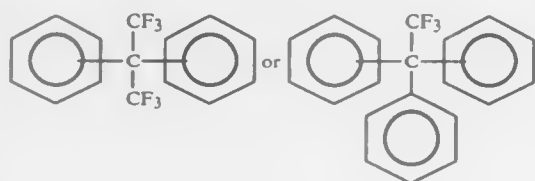
15 Claims

1. A shaped article prepared by heat processing a polyamide-imide polymer composition containing at least one recurring structural unit of the formula:





wherein the terms (a) and (b) are equal to the mole fraction of each recurring unit in the polymer chain and (a) ranges from about 0.05 to about 0.95, (b) ranges from about 0.05 to about 0.95, with the proviso that the sum of (a) and (b) is equal to 1, n is a number sufficient to give rise to a polyamide-imide inherent viscosity of at least about 0.1 as measured from a solution of the polymer in dimethylacetamide at 25° C. at a polymer concentration of 0.5 weight percent, A is a divalent aromatic moiety, and B is a tetravalent aromatic moiety containing the ring substituted or ring unsubstituted residuum selected from:



**4,954,612**  
**SOLVENT-SOLUBLE POLYIMIDE AND PRODUCTION THEREOF**

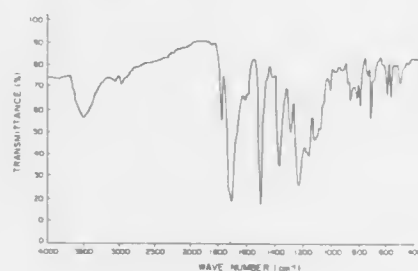
Yoshihiro Nomura; Kazuhito Hanabusa; Hiroshi Minamisawa, all of Ichihara; Takashi Morinaga, Chiba; Toichi Sakata, Katsuta; Yoshiyuki Mukoyama, Hitachi; Hiroshi Nishizawa, Kitaibaraki, and Hiromu Miyajima, Ichihara, all of Japan, assignors to Hitachi Chemical Co., Ltd., Tokyo, Japan

Filed Feb. 14, 1989, Ser. No. 309,878

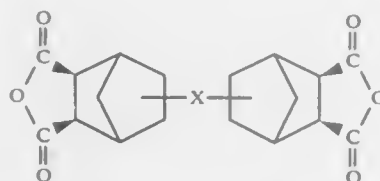
Claims priority, application Japan, Feb. 15, 1988, 63-32360  
Int. Cl.<sup>5</sup> C08G 69/12, 69/26, 75/00, 79/02

U.S. Cl. 528—353

13 Claims



1. A solvent-soluble polyimide obtained by reacting an exo-form dicarboxylic acid anhydride represented by the formula:



wherein X is S or SO<sub>2</sub>, with an aromatic diamine in a polar solvent, followed by dehydration ring closure.

**4,954,613**  
**CATALYTIC PREPARATION OF POLYCARBONATE FROM DIALKYL CARBONATE AND BIS PHENOL DICARBOXYLATE**

Barry Hudson, Beverley, United Kingdom, assignor to BP Chemicals Limited, London, England

PCT No. PCT/GB88/00568, § 371 Date Mar. 7, 1989, § 102(e)  
Date Mar. 7, 1989, PCT Pub. No. WO89/00590, PCT Pub.

Date Jan. 26, 1989

PCT Filed Jul. 14, 1988, Ser. No. 326,568

Claims priority, application United Kingdom, Jul. 15, 1987, 8716675

Int. Cl.<sup>5</sup> C08G 64/30

U.S. Cl. 528—371

6 Claims

1. An integrated process for producing polycarbonates, said process comprising:

- reacting in a transesterification reaction a dialkyl carbonate with a bisphenol dicarboxylate in contact with a catalyst to form a carbonate oligomer and an alkyl ester, and separating the alkyl ester from the oligomer;
- carbonylating the alkyl ester from step A with carbon monoxide in the presence of a carbonylation catalyst to form a product comprising an anhydride;
- reacting the product comprising the anhydride from step B with a bisphenol to form the bisphenol diester, and recycling the diester to step A; and
- heating the oligomer from step A in contact with a catalyst to form the polycarbonate.

**4,954,614**  
**PROCESS FOR MINIMIZING RESIDUAL HYDRAZINE IN POLYMER LATICES**

Henry W. Schiessl, Northford, and Steven A. Manke, Wallingford, both of Conn., assignors to Olin Corporation, Cheshire, Conn.

Filed May 11, 1989, Ser. No. 350,653

Int. Cl.<sup>5</sup> C08F 6/10, 6/16, 6/24

U.S. Cl. 528—483

10 Claims

1. A process for reducing or eliminating hydrazine from a mixture of hydrazine and polymer, wherein said polymer is in latex form, which comprises contacting said hydrazine in said mixture with an oxygen-containing gas which is air or oxygen at an elevated pressure and a temperature of between about 20° C. and about 100° C. in the presence of a quinone or hydroquinone catalyst in order to effect a reaction of said hydrazine with said oxygen-containing gas in order to produce a purified mixture containing a reduced amount of hydrazine.

**4,954,615**  
**PROCESS FOR DRYING CARBOXYL CONTAINING POLYMERS OF VINYLIDENE MONOMERS**

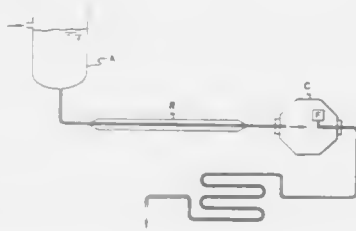
Jong S. Kim, Seongnam; Ki T. Lee, and Dong B. Shu, both of Pohang, all of Rep. of Korea, assignors to Korea Steel Chemical Co., Ltd., Seoul, Rep. of Korea

Filed Jun. 17, 1988, Ser. No. 208,414

Int. Cl.<sup>5</sup> C08F 6/24

U.S. Cl. 528—501

21 Claims



1. A process for drying a slurry mixture comprising a carboxyl containing polymer of vinylidene monomers having at

least one terminal methylene group and polymerizing solvent which comprises:

- (1) passing said slurry mixture through one or a plurality of jacketed and preheated tubular heat exchangers arranged in parallel by employing a transfer means obtained by applying to said slurry mixture a pressure ranging from 0.5 Kg/cm<sup>2</sup> to 5 Kg/cm<sup>2</sup>, wherein each of said jacketed tubular heat exchangers has an inner diameter ranging from 1/2" to 1 1/4" and a length in excess of 20 meters and is heated at a temperature at or slightly above the glassification temperature (T<sub>g</sub>) of said polymer in order to produce turbulent flow of a two-phase mixture of said polymer in a pulverized state and said solvent in a vaporized state; and, thereafter,
- (2) feeding said two-phase mixture to a rotary vacuum dryer wherein the pulverized polymer is further dried and the vaporized solvent is recovered through a filtering means.

**4,954,616**  
**USE OF GUANIDINE-RELATED COMPOUNDS COMPRISING A SUBSTITUTED TETRAPHENYLBORATE ION IN SOLUTION PHASE PEPTIDE SYNTHESIS**

Roland Callens, Gent-Drongen, and André Collin, Ligny, both of, Belgium, assignors to Solvay & Cie (Société Anonyme), Brussels, Belgium

Filed Jun. 17, 1988, Ser. No. 207,877

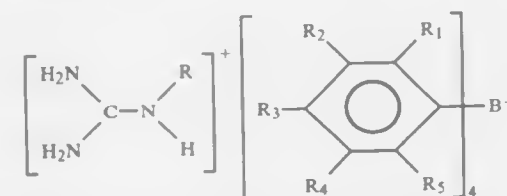
Claims priority, application France, Jun. 19, 1987, 87 08696  
The portion of the term of this patent subsequent to May 8, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C07K 1/02

U.S. Cl. 530—333

4 Claims

1. Use of a guanidine-related compound in solution phase peptide synthesis, the guanidine-related compounds comprising a tetraphenylborate ion and having the general formula:



wherein R denotes an organic radical comprising at least one amine group, and R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> denote inorganic or organic groups independently of each other.

**4,954,617**  
**MONOCLONAL ANTIBODIES TO FC RECEPTORS FOR IMMUNOGLOBULIN G ON HUMAN MONONUCLEAR PHAGOCYTES**

Michael W. Fanger, Lebanon; Paul M. Guyre, Hanover, both of N.H., and Clark L. Anderson, Columbus, Ohio, assignors to Trustees of Dartmouth College, Hanover, N.H.

Continuation-in-part of Ser. No. 882,181, Jul. 7, 1986,

abandoned. This application Jul. 1, 1987, Ser. No. 69,412

Int. Cl.<sup>5</sup> A61K 39/395; C07K 15/14; C12N 5/00

U.S. Cl. 530—387

8 Claims

1. A monoclonal antibody which binds, through its antigen binding region, specifically to the 72 K.D. affinity Fc receptor for IgG on human monocytes, the antibody binding site on the receptor being distinct from the ligand binding site for Fc and binding not being blocked by human IgG.

**4,954,618**  
**CLONED STREPTOCOCCAL GENES ENCODING PROTEIN G AND THEIR USE TO CONSTRUCT RECOMBINANT MICROORGANISMS TO PRODUCE PROTEIN G**

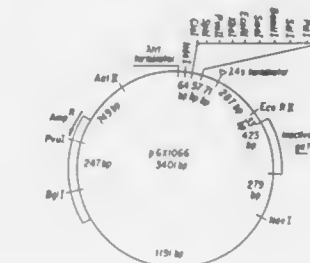
Stephen R. Fahnestock, Olney, Md., assignor to Genex Corporation, Galthersburg, Md.

Division of Ser. No. 63,959, Jun. 19, 1987, which is a continuation-in-part of Ser. No. 329, Feb. 17, 1987, which is a continuation-in-part of Ser. No. 854,887, Apr. 23, 1986, abandoned, which is a continuation-in-part of Ser. No. 829,354, Feb. 14, 1986, abandoned. This application Mar. 15, 1989, Ser. No. 280,963

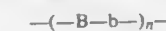
Int. Cl.<sup>5</sup> C07K 3/00; C08H 1/00; C12N 15/00

U.S. Cl. 530—387

6 Claims



1. A protein having the immunoglobulin binding specificity of protein G having the formula:



wherein B is B1, B2, or B3,  
n is 1-20, B1 is the immunoglobulin binding sequence;

THR TYR LYS LEU ILE LEU ASN GLY LYS THR  
ACT TAC AAA TTA ATC CTT AAT GGT AAA ACA  
B1

LEU LYS  
TTG AAA 1294

240  
GLY GLU THR THR THR GLU ALA VAL ASP ALA  
GGC GAA ACA ACT ACT GAA GCT GTT GAT GCT  
B1

250  
ALA THR ALA  
GCT ACT GCA 1333

260  
GLU LYS VAL PHE LYS GLN TYR ALA ASN ASP  
GAA AAA GTC TTC AAACAA TAC GCT AAC GAC  
B1

ASN GLY VAL  
AAC GGT GTT 1372

270  
ASP GLY GLU TRP THR TYR ASP ASP ALA THR  
GAC GGT GAA TGG ACT TAC GAC GAT GCG ACT  
B1

LYS THR PHE  
AAG ACC TTT 1411

280  
THR VAL THR GLU  
ACA GTT ACT GAA  
B1

B2 is the immunoglobulin binding sequence:

THR TYR LYS LEU VAL ILE ASN  
ACT TAC AAA CTT GTT ATT AAT 1489  
B2

310  
GLY LYS THR LEU LYS GLY GLU THR THR THR  
GGT AAA ACA TTG AAA GGC GAA ACA ACT ACT  
B2  
LYS ALA VAL  
AAA GCA GTA 1528

320  
ASP ALA GLU THR ALA GLU LYS ALA PHE LYS  
GAC GCA GAA ACT GCA GAA AAA GCC TTC AAA  
B2

330  
GLN TYR ALA  
CAA TAC GCT 1567

340  
ASN ASP ASN GLY VAL ASP GLY VAL TRP THR  
AAC GAC AAC GGT GTT GAT GGT GTT TGG ACT  
B2

TYR ASP ASP  
TAT GAT GAT 1606

350  
ALA THR LYS THR PHE THR VAL THR GLU  
GCG ACT AAG ACC TTT ACG GTA ACT GAA  
B2

B3 is a 55 amino acid hybrid sequence of B1 and B2, wherein the first N amino acids correspond to the first N amino acids of B1 or B2 and the last 55-N amino acids correspond to the last 55-N amino acids of B2 or B1, respectively; and b is the amino sequence:

290  
LYS PRO GLU VAL ILE ASP ALA SER GLU  
AAA CCA GAA GTG ATC GAT GCG TCT GAA 1450  
b  
LEU THR PRO ALA VAL THR  
TTA ACA CCA GCC GTG ACA  
b

with the proviso that the amino acid sequence of said protein is not the same as the amino acid sequence of wild type protein G or a fragment thereof.

#### 4,954,619 O-BENZYL-N-HYDROXYALKYL DERIVATIVES OF CHITOSAN AND NAIL POLISH CONTAINING THE SAME

Günther Lang, Reinheim; Gerhard Maresch, and Hans-Rudi Lenz, both of Darmstadt, all ofr, Fed. Rep. of Germany, assignors to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany

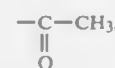
Filed Jul. 11, 1988, Ser. No. 217,763  
Claims priority, application Fed. Rep. of Germany, Jul. 18, 1987, 3723811

Int. Cl.<sup>5</sup> C08B 37/00; A61K 7/00  
U.S. Cl. 536—20 15 Claims  
1. Nail polish based upon a film-former, a resin component and a solvent system, comprising as film-former or resin component an O-benzyl-N-hydroxyalkyl-chitosan of the formula (I)

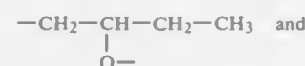
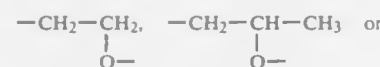


wherein  
m is any numerical value from 0 to 0.6,

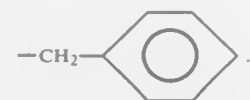
n is any numerical value from 0.1 to 10 and  
q is any numerical value from 0.1 to 4,  
p is an integer from 50 to 5,000,  
R<sup>1</sup> is



R<sup>2</sup> is



R<sup>3</sup> is

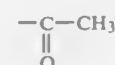


12. An O-benzyl-N-hydroxyalkyl chitosan of the formula (I)

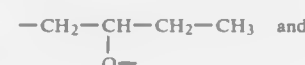
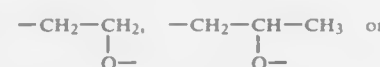


wherein

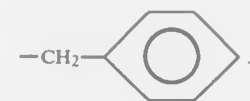
m is any numerical value from 0 to 0.6,  
n is any numerical value from 0.1 to 10 and  
q is any numerical value from 0.1 to 4,  
p is an integer from 50 to 5,000,  
R<sup>1</sup> is



R<sup>2</sup> is



R<sup>3</sup> is



#### 4,954,620 THERMOCONDENSED LIGNOCELLULOSE MATERIAL, AND A METHOD AND AN OVEN FOR OBTAINING IT

Jean-Paul Bourgeois, Creteil, France, assignor to Association Pour la Recherche et le Developpement des Methodes et Processus Industriels, France

Division of Ser. No. 941,178, Dec. 12, 1986, Pat. No. 4,816,572.

This application Sep. 27, 1988, Ser. No. 249,939  
Claims priority, application France, Dec. 18, 1985, 85 18765  
Int. Cl.<sup>5</sup> C08G 18/08

U.S. Cl. 536—56 4 Claims

1. A thermocondensed lignocellulose material obtained by heat treatment of lignocellulose material characterized by:

- (1) the material being highly hydrophobic and having a residual hemi-cellulose content, wherein the said residual hemi-cellulose content is less than 2% by mass;
- (2) a substantially total absence of internal tar and having a benzopyrene content, wherein the said benzopyrene content is less than 2 µg/kg and having a fixed carbon content, wherein the said fixed carbon content is between about 27 and 35% by weight; and
- (3) a net calorific value (PCI) which is at least 20% greater than that of the material prior to treatment.

#### 4,954,621 PROCESS FOR PRODUCING SUCROSE FATTY ACID POLYESTER

Kazuhiko Masaoka, Suzuka, and Yukio Kasori, Yokkaichi, both of Japan, assignors to Mitsubishi Kasei Corporation, Japan  
Filed Jun. 6, 1989, Ser. No. 362,275

Claims priority, application Japan, Jun. 14, 1988, 63-144743; Jun. 14, 1988, 63-144744; Jun. 14, 1988, 63-144745

Int. Cl.<sup>5</sup> C07H 13/00, 1/00; B01J 20/00  
U.S. Cl. 536—119 10 Claims

1. A process for producing a sucrose fatty acid polyester comprising reacting sucrose with fatty acid lower alcohol ester(s) in a solvent in the presence of an alkaline catalyst, wherein said fatty acid lower alcohol ester(s) are employed in an amount at least 5 times by mol as much as said sucrose; the alkaline catalyst component is removed from the reaction product thus obtained; and the obtained sucrose fatty acid polyester-containing solution is catalytically treated with activated clay.

#### 4,954,622 PHARMACEUTICAL COMPOSITION AND METHOD CONTAINING GAMMA INULIN OR DERIVATIVE THEREOF

Peter D. Cooper, Monash, Australia, assignor to The Australian National University, Acton, Australia

PCT No. PCT/AU86/00311, § 371 Date Aug. 3, 1987, § 102(e)  
Date Aug. 3, 1987, PCT Pub. No. WO87/02679, PCT Pub. Date May 7, 1987

PCT Filed Oct. 17, 1986, Ser. No. 86,634  
Claims priority, application Australia, Oct. 31, 1985, PH3187/85

Int. Cl.<sup>5</sup> C08B 37/18; A61K 31/715  
U.S. Cl. 536—127 1 Claim

1. A process for the preparation of gamma inulin from crude inulin, which comprises the steps of:

- (a) recrystallizing said crude inulin from water at a temperature substantially below 37° C. to obtain a finely divided particulate in suspension;
- (b) heating said suspension at a temperature in the range of from about 25° to 45° C. for approximately 1 to 3 days;
- (c) further heating said suspension at a temperature in the range of from about 40° to 55° C. for approximately 0.5 to 1.5 hours; and
- (d) isolating the thus-formed insoluble gamma inulin from the suspension.

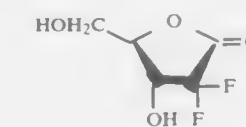
#### 4,954,623 RECOVERY OF DIFLUORO SUGAR

Ramakrishnan Nagarajan, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

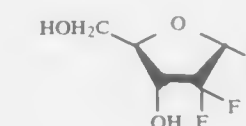
Continuation-in-part of Ser. No. 325,726, Mar. 20, 1989. This application Nov. 13, 1989, Ser. No. 434,219

Int. Cl.<sup>5</sup> C07H 1/00, 5/00; C07D 307/00  
U.S. Cl. 536—127 30 Claims

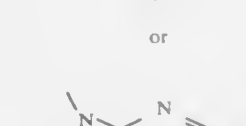
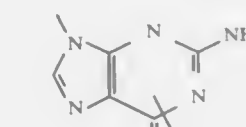
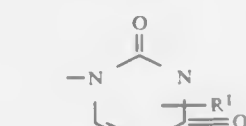
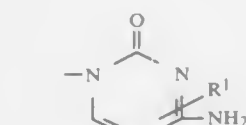
15. A process for preparing 2-deoxy-2,2-di-fluororibofurano-1,4-lactone of the formula



comprising reacting an α-difluoronucleoside of the formula



wherein R is



R<sup>1</sup> is hydrogen, C<sub>1</sub>–C<sub>3</sub> alkyl or halo;  
with a reducing agent capable of reducing the double bond β to the point of attachment of the R moiety;  
hydrolyzing the reduced intermediate in an aqueous acid medium;  
and oxidizing the pyranose.

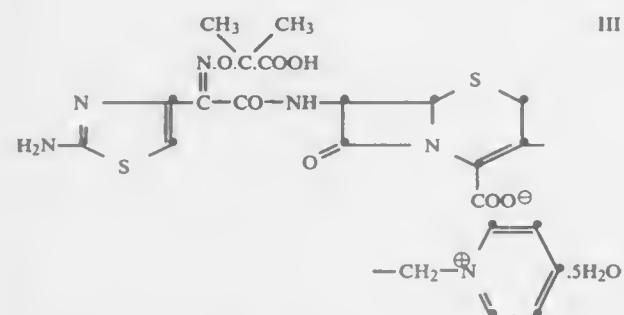


4,954,624

PROCESS FOR THE PRODUCTION OF  
CEPHALOSPORIN DERIVATIVESBernhard C. Prager, Wörgl, Austria, assignor to Sandoz Ltd.,  
Basel, SwitzerlandContinuation of Ser. No. 213,570, Jun. 7, 1988, abandoned. This  
application Jun. 29, 1989, Ser. No. 385,591Int. Cl.<sup>3</sup> C07D 501/38; A61K 31/545

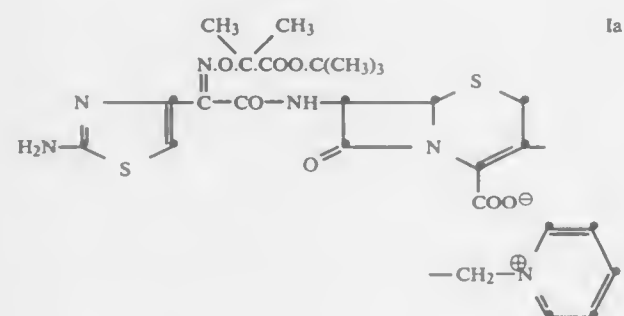
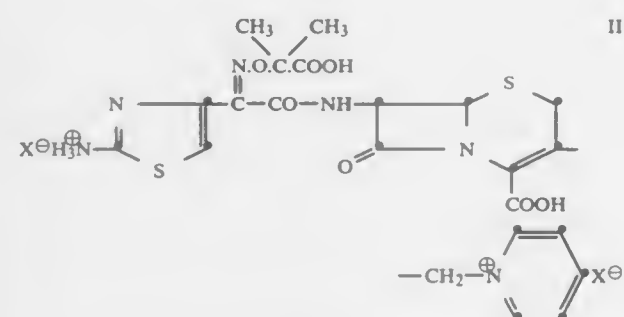
U.S. Cl. 540—225

15 Claims

1. A process for the preparation of the pentahydrate of  
ceftazidime of formula III

which consist essentially of the steps:

(a) hydrolyzing the ester of formula Ia

in concentrated hydrochloric acid to form an aqueous  
solution of the dihydrochloride salt of formula II

where X is a chloride anion, and

(b) adjusting the pH of the aqueous solution of the dihydro-  
chloride salt of formula II from step a to 3.6 to 4.1 with a  
base to obtain the pentahydrate of formula (III).4,954,625  
PIPERIDINE DERIVATIVES, THEIR PRODUCTION  
AND USEHirosada Sagihara, Osaka; Kohel Nishikawa, Kyoto, and Kat-  
sumi Ito, Osaka, all of Japan, assignors to Takeda Chemical  
Industries, Ltd., Osaka, JapanDivision of Ser. No. 218,951, Jul. 14, 1988, Pat. No. 4,871,842,  
which is a continuation of Ser. No. 806,810, Dec. 10, 1985,

abandoned. This application Aug. 30, 1989, Ser. No. 400,680

Claims priority, application PCT Int'l Appl., Dec. 21, 1984,  
PCT/JP84/00608; Feb. 8, 1985, PCT/JP85/00052; May 22,

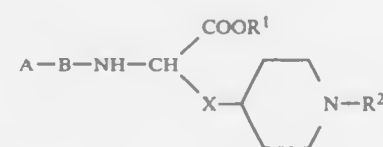
1985, PCT/JP85/00280; Japan, Sep. 20, 1985, 60-209319 Int.

Int. Cl.<sup>3</sup> C07C 103/52, 417/12; A61K 37/02, 31/55

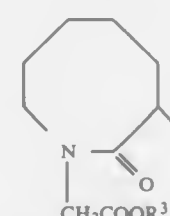
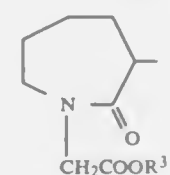
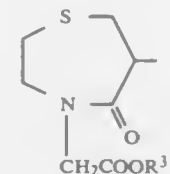
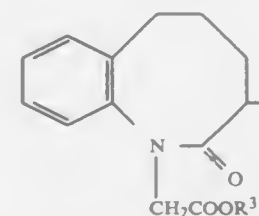
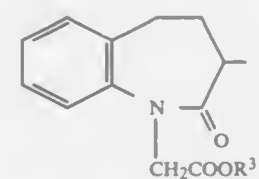
U.S. Cl. 540—500

9 Claims

1. A compound of the formula:



wherein A—B is a group represented by the formula:



4,954,627

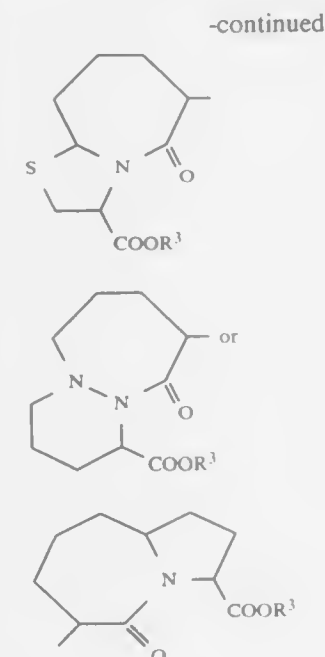
PROCESS FOR DESULFURIZATION OF  
ISOTHIUREAS AND ISOTHIOAMIDESDennis E. Jackman, Prairie Village, and John G. Morgan, Stil-  
well, both of Kans., assignors to Mobay Corporation, Pitts-  
burgh, Pa.

Filed Nov. 30, 1988, Ser. No. 277,739

Int. Cl.<sup>3</sup> C07D 253/00

U.S. Cl. 544—182

6 Claims

1. A process for the desulfurization of a compound selected  
from isothiureas and isothioamides comprising heating the  
compound to be desulfurized in the presence of a mercaptanol  
to produce the corresponding desulfurized keto compound.wherein R<sup>3</sup> is hydrogen, lower alkyl or aralkyl; R<sup>1</sup> is hydro-  
gen, lower alkyl or aralkyl; R<sup>2</sup> is hydrogen, lower alkyl, aralkyl,  
or acyl; and X is alkylene;  
or a pharmaceutically acceptable salt thereof.

4,954,628

## PROCESS FOR PREPARING N-SULFONYL-UREAS

Gábor Besenyei; Sándor Németh; László Simándi; Mária Belák;  
Mária Szabó, all of Budapest; József Dukai, Veszprém; Lajos  
Nagy, Füzfőgyártelep; Elemér Tömördi, Veszprém; Csaba  
Söptei, Veszprém, and Erzsébet E. Diószeginé, Veszprém, all  
of Hungary, assignors to Nitrokátelepek, Füzfőgyártelep and  
Magyar Tudományos Akadémia Központi Kémiai Kutató  
Intézete, Budapest, both of, Hungary

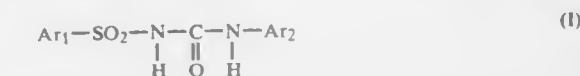
Filed Mar. 2, 1989, Ser. No. 317,769

Claims priority, application Hungary, Mar. 4, 1988,  
2251-1062/88Int. Cl.<sup>3</sup> C07D 251/42, 239/69, 239/42, 213/75

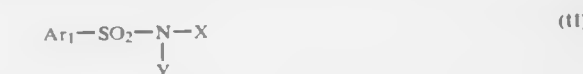
U.S. Cl. 544—211

16 Claims

15. A process for preparing a sulfonylurea of the formula



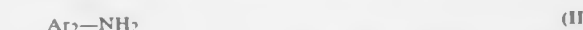
wherein

Ar<sub>1</sub> is phenyl, naphthyl- or thienyl moiety or the derivatives  
thereof substituted by C<sub>1-4</sub> alkyl, C<sub>1-4</sub> haloalkyl, (halo)al-  
koxycarbonyl, (halo)alkyloxy, nitro, cyano moiety, or by  
halogen atoms,Ar<sub>2</sub> is a phenyl-, pyridyl-, pyrimidinyl or triazinyl moiety or  
the derivatives thereof substituted by C<sub>1-4</sub> (halo)alkyl,  
C<sub>1-4</sub> (halo)alkyloxy, amino, O-aryl-sulfonyl, O-(sub-  
stituted carbamoyl)-moiety, or by halogen atoms,which comprises reacting a N-halogen-aryl-sulfonamide of the  
formula

wherein

Ar<sub>1</sub> has the above meaning,

X is chlorine or bromine,

Y is a sodium, potassium, quaternary ammonium or quater-  
nary phosphonium moiety, with an aromatic amine of the  
formulawherein Ar<sub>2</sub> has the above meaning, in the presence of a carbo-  
nylation catalyst and carbon monoxide.

-continued

4,954,626

TETRAHYDROINDAZOLYL-BENZOXAZINES, THEIR  
PRODUCTION AND USEMasayuki Enomoto, Takarazuka; Eiki Nagano, Tokyo; Toru  
Haga, Toyonaka; Konichi Morita, Kasai, and Ryo Sato, To-  
kyo, all of Japan, assignors to Sumitomo Chemical Company,  
Limited, Osaka, Japan

Division of Ser. No. 234,619, Aug. 22, 1988, Pat. No. 4,877,444.

This application Mar. 20, 1989, Ser. No. 326,214

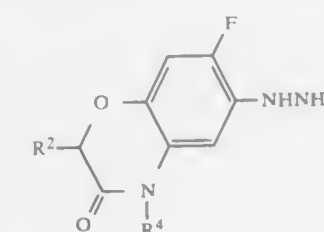
Claims priority, application Japan, Aug. 27, 1987, 62-213946;

Feb. 24, 1988, 63-42922

Int. Cl.<sup>3</sup> C07D 265/36

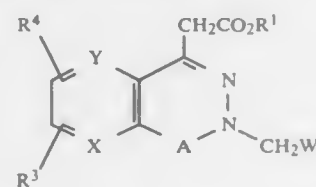
U.S. Cl. 544—105

1. A compound of the formula:

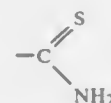
wherein R<sup>2</sup> is a hydrogen atom or a methyl group and R<sup>4</sup> is a  
hydrogen atom, a C<sub>1-6</sub> alkyl group, a C<sub>3-7</sub> alkenyl group, a  
C<sub>3-7</sub> alkynyl group, a halo(C<sub>1-5</sub>)alkyl group, a halo(C<sub>3-4</sub>-  
)alkenyl group, a halo(C<sub>3-4</sub>)alkynyl group, a C<sub>1-4</sub> alkox-  
y(C<sub>1-2</sub>)alkyl group or a C<sub>1-2</sub> alkylthio(C<sub>1-2</sub>)alkyl group.

4,954,629  
PROCESS AND INTERMEDIATES FOR THE  
PREPARATION OF OXOPHTHALAZINYL ACETIC  
ACIDS AND ANALOGS THEREOF  
Banavara L. Mylari, Waterford, and William J. Zembrowski,  
Oakdale, both of Conn., assignors to Pfizer Inc., New York,  
N.Y.

Filed May 11, 1989, Ser. No. 350,997  
Int. Cl.<sup>5</sup> C07D 519/00, 417/06, 471/04, 487/04  
U.S. Cl. 544—237 2 Claims  
1. A compound of the formula



wherein W is

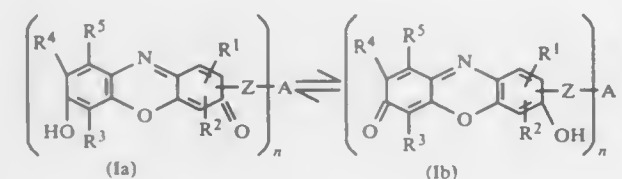


R<sup>1</sup> is C<sub>1</sub>-C<sub>6</sub> alkyl; R<sup>3</sup> and R<sup>4</sup> are the same or different, and are hydrogen, fluoro, chloro, bromo, trifluoromethyl, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, C<sub>1</sub>-C<sub>4</sub> alkylsulfinyl, C<sub>1</sub>-C<sub>4</sub> alkylsulfonyl, or nitro, or R<sup>3</sup> and R<sup>4</sup> taken together are C<sub>1</sub>-C<sub>4</sub> alkylendioxy; X and Y are CH, and A is C=O.

4,954,630  
RESORUFIN DERIVATIVES  
Christian Klein, Weilheim; Hans-Georg Batz, Tutzing, and  
Rupert Herrmann, Weilheim, all of Fed. Rep. of Germany,  
assignors to Boehringer Mannheim GmbH, Mannheim, Fed.  
Rep. of Germany

Filed Jul. 24, 1986, Ser. No. 889,676  
Claims priority, application Fed. Rep. of Germany, Jul. 25,  
1985, 3526565

Int. Cl.<sup>5</sup> C07D 265/38 9 Claims  
U.S. Cl. 544—102  
1. A resorufin derivative of the formula:

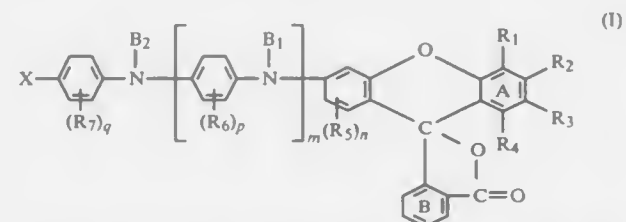


wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup>, which can be the same or different, are hydrogen, halogen, carboxyl, carboxamido, C<sub>1</sub>-C<sub>5</sub> alkoxy-carbonyl, cyano, nitro, C<sub>1</sub>-C<sub>5</sub> alkyl, C<sub>1</sub>-C<sub>5</sub> alkoxy; or C<sub>1</sub>-C<sub>5</sub> alkyl or C<sub>1</sub>-C<sub>5</sub> alkoxy substituted by carboxyl, carboxamido, C<sub>1</sub>-C<sub>5</sub> alkoxy-carbonyl, cyano or nitro; or R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are as defined above and R<sup>4</sup> and R<sup>5</sup> together represent an anellated aromatic residue, Z is bridge member, A is the residue of a ligand and n is a whole number of from 1 to 200.

4,954,631  
FLUORAN COMPOUNDS AND COLOR FORMING  
RECORDING MATERIALS USING SAME  
Takeo Obitsu, Omiya; Yutaka Ohnishi, Urawa; Shinji Yoshinaka, Iwatsuki; Minoru Koguchi, Ageo; Mitsuhiro Yanagita, and Nobuyuki Hirai, both of Tokyo, all of Japan, assignors to Shin Nisso Kako Co., Ltd., Japan

Division of Ser. No. 79,456, Jul. 29, 1987, Pat. No. 4,826,806.  
This application Feb. 2, 1989, Ser. No. 305,554  
Claims priority, application Japan, Jul. 31, 1986, 61-181224; Oct. 27, 1986, 61-253650; Nov. 7, 1986, 61-263889; Dec. 8, 1986, 61-290379; Dec. 19, 1986, 61-301421

Int. Cl.<sup>5</sup> C07D 211/14, 207/08 13 Claims  
U.S. Cl. 546—15  
1. A fluoran compound of formula (I)

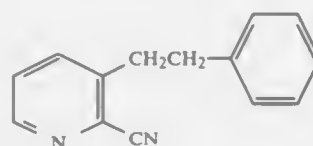


wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are the same or different and each is selected from the group consisting of hydrogen, halogen, lower alkoxy, alkyl of 1 to 9 carbons, cycloalkyl of 5 or 6 carbons, substituted and unsubstituted benzyl or phenyl, said substituted benzyl or phenyl having substituents selected from the group consisting of halogen, lower alkyl and lower alkoxy, and further, R<sub>1</sub> and R<sub>2</sub>, as well as R<sub>3</sub> and R<sub>4</sub>, when taken together with ring A, form a naphthalene ring, said naphthalene ring being unsubstituted or substituted by a halogen, lower alkyl or lower alkoxy group; R<sub>5</sub>, R<sub>6</sub> and R<sub>7</sub> are the same or different and each represents a halogen, lower alkyl or lower alkoxy group; B<sub>1</sub> and B<sub>2</sub> are the same or different and each represents hydrogen, alkyl or 1 to 8 carbons, benzyl or phenyl, said benzyl or phenyl being unsubstituted or substituted by a halogen, lower alkyl, lower alkoxy, or alkyl-substituted amino group; X represents hydrogen or —NR<sub>8</sub>R<sub>9</sub> wherein R<sub>8</sub> and R<sub>9</sub> are the same or different and each represents hydrogen, alkyl of 1 to 8 carbons, cycloalkyl of 5 or 6 carbons, or benzyl, said benzyl being unsubstituted or substituted by a halogen, lower alkyl, lower alkoxy, or alkyl-substituted amino group; and further, R<sub>8</sub> and R<sub>9</sub>, when taken together with the adjacent nitrogen atom to which they are attached form a pyrrolidino, piperidino or morpholino ring; ring B being unsubstituted or substituted by a halogen; n, p and q independently represent 0, 1 or 2; and m represents 0, 1, 2 or 3, provided that when m is 0 or 1, x is not a hydrogen atom.

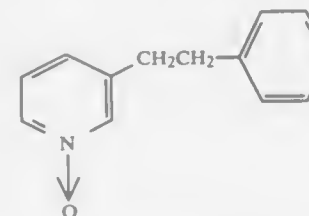
4,954,632  
PROCESS FOR PREPARING INTERMEDIATES FOR  
AZATIDINE  
Raymond E. Dagger, Warminster, and Linda A. Motyka, Exton, both of Pa., assignors to SmithKline Beecham Corporation, Philadelphia, Pa.

Division of Ser. No. 127,840, Dec. 2, 1987, Pat. No. 4,843,163.  
This application Feb. 10, 1989, Ser. No. 308,571  
Int. Cl.<sup>5</sup> C07D 211/68, 211/78, 401/00

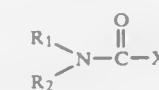
U.S. Cl. 546—194 4 Claims  
1. A process for preparing 3-phenethyl-2-cyanopyridine of the formula:



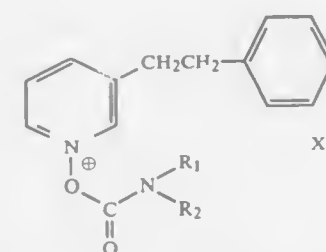
which comprises reacting 3-phenethylpyridine-N-oxide of the formula:



with a carbamoyl halide of the formula:



in which R<sub>1</sub> and R<sub>2</sub> are C<sub>1-4</sub> alkyl or, taken together with nitrogen atom to which they are attached, pyrrolidinyl or piperidinyl and X is chloro, bromo or iodo, to obtain a 3-phenethyl-1-carbamoyloxypyridinium halide of the formula:

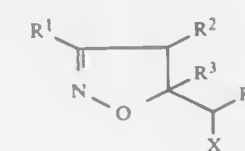


in which R<sub>1</sub>, R<sub>2</sub> and X are as defined above; and reacting the pyridinium halide with an alkali metal cyanide in aqueous solution.

4,954,633  
ISOXAZOLINES AS INTERMEDIATES TO FURANS  
Hans Theobald, Limburgerhof; Rainer Becker, Bad Dürkheim, and Walter Himmele, Walldorf, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany  
Continuation of Ser. No. 270,475, Nov. 4, 1988, abandoned, which is a continuation of Ser. No. 154,431, Feb. 8, 1988, abandoned, which is a continuation of Ser. No. 813,981, Dec. 27, 1985, abandoned. This application Jul. 25, 1989, Ser. No. 384,910

Claims priority, application Fed. Rep. of Germany, Dec. 29, 1984, 3447793; Apr. 20, 1985, 3514384

Int. Cl.<sup>5</sup> C07D 261/04 3 Claims  
U.S. Cl. 548—240  
1. An isoxazoline of the formula II



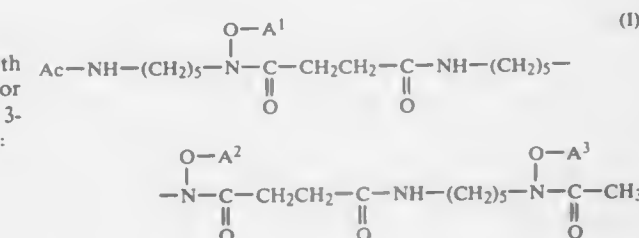
in which  
R<sup>1</sup> is benzyl or benzyl substituted by halogen,  
R<sup>2</sup> is hydrogen,  
R<sup>3</sup> is hydroxymethyl or hydroxymethyl which is blocked by a protective group selected from the group consisting of t-butyl, trimethylsilyl, acetyl or benzyl,  
R<sup>4</sup> is hydrogen or methyl,  
X is hydroxy, halogen or hydroxy blocked by a protective

group selected from the group consisting of t-butyl, trimethylsilyl, acetyl or benzyl.

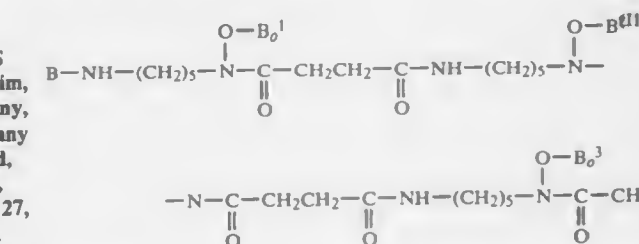
4,954,634  
PROCESS FOR THE SELECTIVE N-ACYLATION OF  
AMINOHYDROXAMIC ACID DERIVATIVES AND  
STARTING MATERIALS USED THEREIN  
Peter Heinrich, Binningen, and Theophile Moerker, Füllinsdorf, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 20, 1988, Ser. No. 221,953  
Claims priority, application Switzerland, Jul. 23, 1987, 2792/87

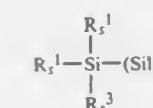
Int. Cl.<sup>5</sup> C07D 233/54 10 Claims  
U.S. Cl. 548—341  
1. A process for the manufacture of a compound of formula I



in which Ac is C<sub>2</sub>-C<sub>20</sub>-alkanoyl, benzoyl, C<sub>18</sub>-alkenoyl, (C<sub>1</sub>-C<sub>12</sub>-alkoxy)carbonyl, a radical of the formula —CO—O—(CH<sub>2</sub>—CH<sub>2</sub>—O)<sub>n</sub>—lower alkyl in which n is from 1 to 19, chlorocarbonyl, (1-imidazolyl)-carbonyl, N-di-lower alkylcarbamoyl, N-(C<sub>1</sub>-C<sub>5</sub>-alkyl)-carbamoyl substituted in the 1- or 2-position of the alkyl moiety by (C<sub>1</sub>-C<sub>4</sub>-alkoxy)-carbonyl, N-(chlorosulfonyl)-carbamoyl, N-(lower alkoxy-sulfonyl)-carbamoyl or a radical of the formula —SO<sub>2</sub>—N—H—CO—O—(CH<sub>2</sub>—CH<sub>2</sub>)<sub>n</sub>—lower alkoxy in which n is from 0 to 19, and A<sup>1</sup>, A<sup>2</sup> and A<sup>3</sup> are each hydrogen, characterized in that a compound of formula II



in which each of B, B<sup>1</sup>, B<sup>2</sup> and B<sup>3</sup> is an organic silyl group (sil) of formula



wherein R<sub>5</sub><sup>1</sup> and R<sub>5</sub><sup>2</sup>, independently of one another, are each C<sub>1</sub>-C<sub>8</sub>-alkyl, phenyl, p-tolyl, benzyl or phenethyl and R<sub>5</sub><sup>3</sup> is C<sub>1</sub>-C<sub>8</sub>-alkyl, phenyl, p-tolyl, benzyl, phenethyl or chlorine, is reacted with an acylating agent selected from the group consisting of

(1) Ac<sup>4</sup>Y, wherein Ac<sup>4</sup> is C<sub>2</sub>-C<sub>20</sub>-alkanoyl, benzoyl, C<sub>18</sub>-alkenoyl, (C<sub>1</sub>-C<sub>20</sub>-alkoxy)-carbonyl, a radical of the formula —CO—O—(CH<sub>2</sub>—CH<sub>2</sub>—O)<sub>n</sub>—lower alkyl in which n is from 1 to 19, chlorocarbonyl, (1-imidazolyl)-carbonyl, N-di-lower alkylcarbamoyl, N-(C<sub>1</sub>-C<sub>5</sub>-alkyl)-carbamoyl substituted in the 1- or 2-position of the alkyl moiety by (C<sub>1</sub>-C<sub>4</sub>-alkoxy)carbonyl, or a radical of the





of sodium at 21 degrees Centigrade which is not greater than -5.3 when measured in ethanol at a concentration of 1%.

4,954,641

# NOVEL ANTITUMOR ANTIBIOTIC SUBSTANCE AND A METHOD FOR PRODUCTION THEREOF

Yoshikazu Sato; Hiroomi Watabe; Shigetaka Ishii; Tadashi Nakazawa; Takashi Shomura; Masaji Sezaki, and Shinichi Kondo, all of Kanagawa, Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

Filed Jan. 30, 1989, Ser. No. 303,230

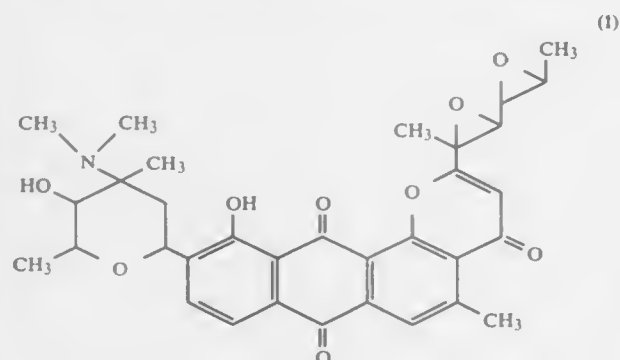
Claims priority, application Japan, Jan. 28, 1988, 63-15983

Int. Cl.<sup>5</sup> C07D 311/78

U.S. Cl. 549—384

1 Claim

1. An antibiotic substance represented by formula (I)



or a pharmaceutically acceptable salt thereof.

4,954,642

# FORSKOLIN COMPOUNDS

Tochiro Tatee, Tokyo; Takashi Takahira, Yono; Kouwa Yamashita, Urawa; Masao Sakurai, Ageo; Akira Shiozawa, Omiya, and Kazuhisa Narita, Tokyo, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 926,102, Nov. 3, 1986, abandoned. This application May 30, 1989, Ser. No. 361,763

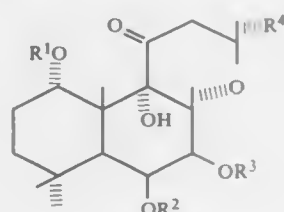
Claims priority, application Japan, Nov. 15, 1985, 60-254693; Jan. 27, 1986, 61-13771; Mar. 13, 1986, 61-53709; Mar. 26, 1986, 61-65947

Int. Cl.<sup>5</sup> C07D 311/92

U.S. Cl. 549—389

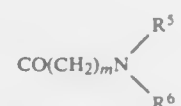
8 Claims

1. A forskolin derivative represented by the formula



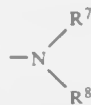
wherein;

R<sup>1</sup> is hydrogen and R<sup>4</sup> is vinyl, ethyl, or cyclopropyl, and (1) either of R<sup>2</sup> and R<sup>3</sup> denotes a residue represented by the formula



wherein each of R<sup>5</sup> and R<sup>6</sup> denotes hydrogen or lower alkyl and m is an integer of 1 to 5, and the other one of

R<sup>2</sup> and R<sup>3</sup> denotes hydrogen or a residue represented by the formula CO(CH<sub>2</sub>)<sub>n</sub>X, X being hydrogen or



wherein, each of R<sup>7</sup> and R<sup>8</sup> denotes hydrogen or lower alkyl and n being an integer of 1 to 5, or

(2) R<sup>2</sup> denotes hydrogen or —COCH<sub>2</sub>CH<sub>2</sub>CO<sub>2</sub>H and R<sup>3</sup> denotes hydrogen, —COCH<sub>3</sub>, —COCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CO<sub>2</sub>H, or —COCH(OH)CH<sub>2</sub>OH with the proviso that R<sup>3</sup> is one of the last two residues when R<sup>2</sup> is hydrogen, and

physiologically acceptable salts of said forskolin derivative.

4,954,643

# PROCESS FOR PREPARATION OF PERFLUOROPROPANE OXIDE

Giorgio Bornengo, 8, via Paletta; Filippo M. Carlini, 7, C.so Torino; Michele Pontevivo, 4, via Monte Nero, and Giorgio Bottaccio, 16, via Manin, all of Novara, Italy

Continuation of Ser. No. 902,078, Aug. 28, 1986, abandoned, which is a continuation of Ser. No. 674,920, Nov. 26, 1984, abandoned. This application Jan. 31, 1989, Ser. No. 306,262

Claims priority, application Italy, Nov. 28, 1983, 23908 A/83

Int. Cl.<sup>5</sup> C07D 303/00

U.S. Cl. 549—531

12 Claims

1. A process for the preparation of perfluoropropene oxide by:

(A) mixing perfluoropropene with an inert organic solvent substantially immiscible with water, an aqueous solution of hydrogen peroxide, an organic water miscible solvent, and a phase transfer catalyst selected from the group consisting of quaternary ammonium salts, quaternary phosphonium salts, and lipophilic complexing agents for cations at a temperature between -10° C. to -60° C.; and (B) gradually adding to the mixture with stirring an aqueous solution of an inorganic base over a period of time from between 15 minutes to 6 hours, the rate of addition being chosen so as to maintain the temperature of the reaction mixture constant.

4,954,644

# RUTHENIUM-PHOSPHINE COMPLEX

Noboru Sayo; Toshiro Takemasa, and Hidenori Kumobayashi, all of Tokyo, Japan, assignors to Takasago International Corporation, Tokyo, Japan

Filed Sep. 7, 1988, Ser. No. 241,434

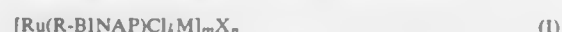
Claims priority, application Japan, Sep. 8, 1987, 62-224288

Int. Cl.<sup>5</sup> C07F 15/00, 3/06, 7/22, 7/28

U.S. Cl. 556—14

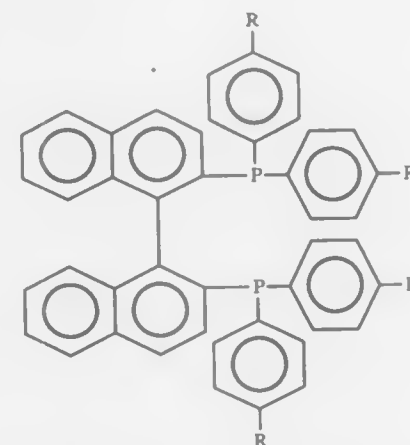
5 Claims

1. A ruthenium-phosphine complex of formula (I):



wherein R-BINAP is a tertiary phosphite of formula (II):

liquid reaction mixture and gas, and the temperature during the separation of liquid and gas being 20 to 60° C.



wherein R is the same and is hydrogen atom or methyl group; M is a Lewis acid selected from ZnCl<sub>2</sub>, AlCl<sub>3</sub>, TiCl<sub>4</sub>, and SnCl<sub>4</sub>; X is N(C<sub>2</sub>H<sub>5</sub>)<sub>3</sub> or CH<sub>3</sub>CO<sub>2</sub>; in the same case that X is N(C<sub>2</sub>H<sub>5</sub>)<sub>3</sub>, then k is 2, m is 2, and n is 1; and in the case that X CH<sub>3</sub>CO<sub>2</sub>, then k is 0, m is 1, and n is 2.

4,954,645

# DITHIOACID RHENIUM SULFIDE DIMER COMPOSITIONS

Thomas R. Halbert, Annandale; Liwen Wei, Somerville, and Edward I. Stiefel, Bridgewater, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation of Ser. No. 202,341, Jun. 6, 1988, abandoned. This application Jul. 26, 1989, Ser. No. 385,049

Int. Cl.<sup>5</sup> C07F 13/00

U.S. Cl. 556—45

8 Claims

1. A compound having the formula [L<sub>2</sub>Re (μ-S)]<sub>2</sub> wherein L is a 1,1-dithioacid and μ denotes that the sulphur atoms in the core of the compound bridge the rhenium atoms in the compound.

4,954,646

# PROCESS FOR THE PREPARATION OF SULFATED ALKANOL OXETHYLATES OR ALKYLPHENOL OXETHYLATES HAVING A LOWERED CONTENT OF 1,4-DIOXANE

Rudolf Aigner; Günther Müller, both of Burgkirchen; Rainer Müller, and Horst Reuner, both of Burghausen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 1, 1989, Ser. No. 305,298

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1988, 3803110

Int. Cl.<sup>5</sup> C07C 141/02, 141/16

U.S. Cl. 558—31

10 Claims

1. A process for the preparation of sulfated alkanol oxethylates or alkylphenol oxethylates, in which at least one liquid alkanol oxethylate or alkylphenol oxethylate is brought into contact, with cooling, with a gas mixture which contains in addition to at least one inert gas, 1 to 8% by volume, relative to the gas mixture, of gaseous SO<sub>3</sub> in the ratio of 0.9 to 1 mol of SO<sub>3</sub> per mol of OH groups in the alkanol oxethylate or alkylphenol oxethylate, after completion of the reaction the liquid reaction mixture and the gas are separated from one another and the liquid reaction mixture is neutralized using aqueous alkali metal hydroxide, magnesium hydroxide, ammonium hydroxide or substituted ammonium hydroxide, which comprises admixing 0.1 to 5% by weight, relative to the alkanol oxethylate or alkylphenol oxethylate employed, of at least one of the following compounds: water, ethanol, 1-propanol, 2-propanol or nheptane to the reaction mixture after completion of the reaction with SO<sub>3</sub>, but before the separation of

4,954,647

# PROCESS FOR OPTICALLY ACTIVE 3-(METHANE-SULFONYLOXY) THIOLANE AND ANALOGS

Frank J. Urban, Groton, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 183,102, Apr. 19, 1988, Pat. No. 4,874,877.

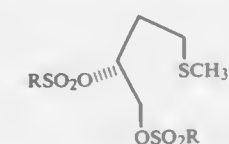
This application Jul. 19, 1989, Ser. No. 382,602

Int. Cl.<sup>5</sup> C07C 141/02

U.S. Cl. 558—46

3 Claims

1. A compound having the formula



wherein R is (C<sub>1</sub>-C<sub>3</sub>)alkyl, phenyl or tolyl.

4,954,648

# METHOD FOR THE BROMINATION OF AROMATIC COMPOUND

Ori Lerman, Ramat-Gan, and Shlomo Rozen, Tel-Aviv, both of Israel, assignors to Ramot University Authority of Applied Research and Industrial Development Ltd. and ICL Industries Ltd., both of Israel

Filed May 11, 1989, Ser. No. 350,394

Claims priority, application Israel, May 12, 1988, 86353

Int. Cl.<sup>5</sup> C07C 121/52, 69/72

U.S. Cl. 558—425

10 Claims

1. A method for the bromination of an aromatic compound comprising reacting said aromatic compound with a bromination agent comprising bromine-trifluoride and bromine at a temperature of above about minus ten degrees centigrade, and separating the obtained brominated aromatic compound from the original reactants by known organic chemistry techniques.

4,954,649

# METHOD FOR PRODUCING CITRATES

Ezekiel H. Hull, Greensboro, and Edward P. Frappier, Kernersville, both of N.C., assignors to Morflex Chemical Company, Inc., Greensboro, N.C.

Continuation of Ser. No. 97,801, Sep. 17, 1987, Pat. No. 4,883,905, which is a continuation of Ser. No. 886,463, May 22, 1986, Pat. No. 4,710,532, which is a continuation of Ser. No. 711,284, Mar. 13, 1985, abandoned, which is a

continuation-in-part of Ser. No. 619,583, Jun. 11, 1984, abandoned. This application Jun. 21, 1989, Ser. No. 369,127 The portion of the term of this patent subsequent to Dec. 8, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> C07C 67/08

U.S. Cl. 560—180

12 Claims

1. A method of producing a 99% pure citrate ester selected from the group consisting of acetyltri-n-butyl citrate, acetyltri-n-hexyl citrate, n-butyltri-n-hexyl citrate, acetyltri-n-(hexyl-octyl/decyl) citrate and acetyltri-n-(octyl/decyl) citrate, comprising the steps of: heating an alcohol and citric acid in the presence of an organic titanate at a temperature to effect esterification, removing the excess alcohol, alkoxylating the ester while maintaining the temperature below approximately 110° C. until the alkoxylation reaction is complete, cooling and thereafter neutralizing the ester, said ester being 99% pure.





carrier, acidic resins, and heteropolyacids at a temperature of 120° to 200° C.

#### 4,954,661 PROCESS FOR PREPARING HIGH-PURITY BISPHENOL A

Shigeru Imuro, Yoshio Morimoto, and Takashi Kitamura, all of Aichi, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

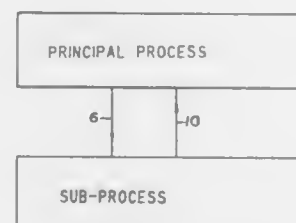
Filed Mar. 9, 1989, Ser. No. 321,218

Claims priority, application Japan, Mar. 11, 1988, 63-56335; Mar. 16, 1988, 63-60277

Int. Cl.<sup>5</sup> C07C 37/20, 37/84, 39/16

U.S. Cl. 568—727

10 Claims



1. A method for preparing high-purity bisphenol A comprising a principal process which comprises the steps of (1) reacting phenol with acetone at a temperature of 40 to 90° C. of an acid catalyst which catalyzes the reaction of phenol and acetone to form bisphenol A to obtain a first reaction solution, (2) removing a part of the phenol and/or the catalyst and water from the first reaction solution to form a first concentration adjusted solution, (3) cooling the first concentration adjusted solution to obtain a first slurry containing an adduct of bisphenol A with phenol, (4) subjecting the first slurry to solid-liquid separation to form primary crystals and a first mother liquor and (5) removing phenol from the first crystal to obtain bisphenol A; and a sub-process which comprises the steps of (6) reacting p-isopropenylphenol with phenol in the presence of an acid catalyst to form a second reaction solution, (7) removing a part of the phenol and/or the catalyst and water from the second reaction solution to form a second concentration adjusted solution, (8) cooling the second concentration adjusted solution to obtain a second slurry, (9) subjecting the second slurry to solid-liquid separation to obtain secondary crystals and a second mother liquor and (10) treating the second mother liquor to obtain p-isopropenylphenol and phenol, the first mother liquor from the principal process being fed to the sub-process and the secondary crystals from the sub-process being fed to the principal process.

4,954,662  
SELECTIVE CHLORINATION OF  
ORTHO-SUBSTITUTED PHENOLS  
Jean-Roger Desmurs, Saint-Symphorien d'Ozon; Bernard Besson, Pont de Claix, and Isabelle Jonve, Villenbanne, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Jul. 18, 1988, Ser. No. 220,254

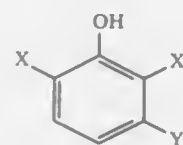
Claims priority, application France, Jul. 17, 1987, 87 10417

Int. Cl.<sup>5</sup> C07C 37/62, 39/24

U.S. Cl. 568—779

18 Claims

1. A process for the selective chlorination of an ortho-substituted phenolic compound having the formula (I):



(I)

in which:

the symbols X, which may be identical or different, are each a chlorine atom, a bromine atom, a methyl or ethyl group, a methoxy or ethoxy group, an acetoxy group, an NO<sub>2</sub> group or an acylamino group having 1 to 4 carbon atoms, and

the symbol Y is a hydrogen atom, a methyl or ethyl group, a methoxy or ethoxy group, comprising conducting said selective chlorination with gaseous chlorine, in the presence of a selectivity-enhancing effective amount of at least one organic cation comprising an onium ion derived from nitrogen, phosphorus, arsenic, sulfur, selenium, oxygen, carbon or iodine and which is coordinated with a hydrocarbon moiety.

#### 4,954,663 PROCESS FOR PREPARING LONG CHAIN ALKYL PHENOLS

David O. Marler, Deptford, and John P. McWilliams, Woodbury, both of N.J., assignors to Mobil Oil Corp., New York, N.Y.

Continuation-in-part of Ser. No. 254,524, Oct. 6, 1988, which is a continuation-in-part of Ser. No. 98,176, Sep. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 890,268, Jul. 29, 1986, abandoned. This application Jan. 25, 1990, Ser. No. 470,015

Int. Cl.<sup>5</sup> C07C 37/11

U.S. Cl. 568—791

23 Claims

1. A process for the production of a relatively long chain alkyl-substituted phenolic compounds which comprises contacting at least one alkylatable phenolic compound with at least one alkylating agent possessing an alkylating aliphatic group having at least six carbon atoms under alkylation reaction conditions and in the presence of an alkylation catalyst to provide an alkylated phenol possessing at least one alkyl group derived from said alkylating agent, said catalyst comprising a synthetic porous crystalline material characterized by an X-ray diffraction pattern including values substantially as set forth in Table A of the specification.

#### 4,954,664 PROCESS FOR THE DIRECT HYDROGENATION OF BUTTERFAT

Franz-Josef Carduck, Haan; Juergen Falbe, Neuss; Theo Fleckenstein, Hilden; Gerd Goebel, Erkrath, and Joachim Pohl, Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 166,956, Mar. 11, 1988, abandoned.

This application Jan. 25, 1990, Ser. No. 470,428

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1987, 3708430

Int. Cl.<sup>5</sup> C07C 27/00

U.S. Cl. 568—864

21 Claims

1. A process for the direct catalytic hydrogenation of butterfat which comprises:

A. continuously reacting non-deacidified butterfat with hydrogen under pressures of from about 20 to about 300 bar and at temperatures of from about 180° to about 250° C. with molar ratios of hydrogen to fatty acid residues in the butterfat of from about 10 : 1 to about 500 : 1, the reaction being carried out in the presence of a catalyst which contains from about 30 to about 40% by weight copper, from about 23 to about 30% by weight chromium,

from about 1 to about 10% by weight manganese, from about 1 to about 10% weight silicon and from about 1 to about 7% by weight barium, the percentages by weight being based on the total weight of the catalyst, to form a reaction product containing fatty alcohols, oxo- and hydroxyfatty alcohols corresponding to the butterfat composition and propylene glycol, and;  
B. separating the reaction products from residue.

4,954,665  
METHANOL HOMOLOGATION  
Jose' L. Vidal, Kanawha, W. Va., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.  
Continuation of Ser. No. 795,725, Nov. 7, 1985, abandoned, which is a continuation of Ser. No. 653,050, Sep. 21, 1984, abandoned. This application Aug. 27, 1986, Ser. No. 900,275

Int. Cl.<sup>5</sup> C07C 29/34

U.S. Cl. 568—902.2

2 Claims

1. An improved process for the production of ethanol by the reaction of methanol with synthesis gas in contact with a homogeneous catalyst system consisting of cobalt, ruthenium, iodine and an alkali metal at a pressure of from 2,000 psig to 10,000 psig and a temperature of from about 180° to about 210° C., wherein the mole atom ratio of Co:Ru is from 3:1 to 7:1, the mole ratio of alkali metal atom M:Ru is from 2:1 to 20:1 and the mole atom ratio of I:Ru is from 3:1 to 27:1, the concentration of cobalt in the reactor 0.013 is from 0.025 to 0.035 mole per liter, the concentration of iodine in the reactor is from 0.026 to 0.6 mole per liter, the concentration of alkali metal in the reactor is from 0.7 to 0.6 mole per liter, and the source of the alkali atom being sodium iodide, sodium bicarbonate or sodium tetraborate.

2. An improved process for the production of ethanol by the reaction of methanol with synthesis gas in contact with a homogeneous catalyst system consisting of cobalt, ruthenium, iodine, at least one organic amine and at least one alkali metal at a pressure of from 2,000 psig to 10,000 psig and a temperature of from about 180° to about 210° C., wherein the mole atom ratio of Co:Ru is from 3:1 to 7:1, the mole ratio of alkali metal atom M:Ru is from 2:1 to 20:1 and the mole atom ratio of I:Ru is from 3:1 to 27:1, the concentration of cobalt in the reactor is from 0.013 to 0.15 mole per liter, the concentration of ruthenium in the reactor is from 0.025 to 0.035 mole per liter,

the concentration of iodine in the reactor is from 0.026 to 0.6 mole per liter, the concentration of alkali metal in the reactor is from 0.7 to 0.6 mole per liter, the source of the alkali atoms being sodium iodide, sodium bicarbonate or sodium tetraborate, the catalyst system containing from 0.02 to 0.04 mole per liter of an organic amine, and the organic amine being selected from the group consisting of trimethylamine, triethylamine, tri-n-butylamine, tri-t-butylamine, tri-2-ethylhexylamine, methyl dibutylamine, tridodecylamine, tristearylamine, ethyl dibutylamine, tricyclohexylamine, triphenylamine, tri(4-methoxyphenyl)amine, tri(p-chlorophenyl)amine, dibutyl phenylamine, diphenyl cyclopentylamine, ethyl diphenylamine, trinaphthylamine, tri-p-tolylamine, tri-benzylamine, tri(3-methylcyclohexyl)amine, and a mixture of two or more of said organic amines.

#### 4,954,666 PROCESS FOR PREPARING FLUORINATED C<sub>4</sub> TO C<sub>6</sub> HYDROCARBONS AND NOVEL CYCLIC FLUORINATED HYDROCARBONS AND THEIR USE AS PROPELLANT GAS AND WORKING FLUID FOR HEAT PUMP SYSTEMS

Dietmar Bleiefeldt, Ratingen; Albrecht Marhold, Leverkusen, and Michael Negele, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Division of Ser. No. 257,351, Oct. 13, 1988, Pat. No. 4,902,839.

This application Dec. 21, 1989, Ser. No. 454,577

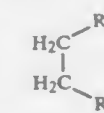
Claims priority, application Fed. Rep. of Germany, Oct. 20, 1987, 3735467

Int. Cl.<sup>5</sup> C07C 19/02, 23/08, 17/24, 17/00

U.S. Cl. 570—132

3 Claims

1. A compound of the formula



wherein the two R<sub>f</sub> groups taken together are —CF<sub>2</sub>—CF<sub>2</sub>—, —CF<sub>2</sub>— or CH(CF<sub>3</sub>)—CH(CF<sub>3</sub>)—.



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## ELECTRICAL

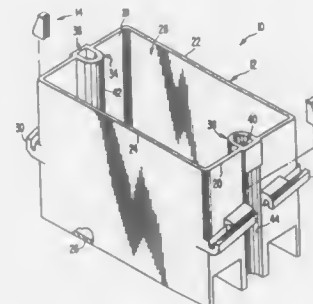
4,954,667

**ELECTRICAL BOX WITH COUPLING MEMBERS**  
Robert W. Jorgensen, Niles, Mich., and Kenneth R. Schnell,  
South Bend, Ind., assignors to Hubbell Incorporated, Orange,  
Conn.

Filed Feb. 15, 1989, Ser. No. 311,334  
Int. Cl.<sup>5</sup> H02G 3/08

U.S. Cl. 174—53

8 Claims



6. A coupling member adapted to be positioned in an opening formed in an electrical box, the combination comprising:  
a body portion having a curved face portion and a downwardly and outwardly sloping face portion opposed to said curved face portion; and  
a head portion coupled to said body portion and having a first shoulder extending outwardly therefrom in the same direction as said sloping face portion, and second and third shoulders extending outwardly from said head portion on opposite sides of said first shoulder, said first, second and third shoulders forming a continuous shoulder, whereby, upon insertion of said coupling member into the opening, said shoulders will engage corresponding ledges formed in the opening for mounting and retaining said coupling member within the opening.

4,954,668

**APPARATUS FOR RESETTING APPLIANCE**  
Yuji Sako, Nagoya, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

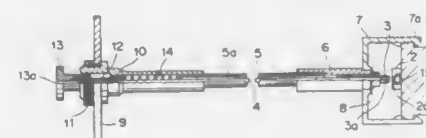
Continuation of Ser. No. 923,881, Oct. 28, 1986, abandoned.  
This application Jul. 22, 1988, Ser. No. 224,221

Claims priority, application Japan, Dec. 13, 1985, 60-190965[U]

Int. Cl.<sup>5</sup> H01H 9/00

U.S. Cl. 200—314

4 Claims



1. In a resetting apparatus having an inner cable with first and second ends, said first end including an end member for contacting a reset button of an appliance mounted inside a control panel, said second end being connected to a push button protruding outside said control panel, and an outer cable enveloping said inner cable, said outer cable being fixed at one end to said control panel and to said appliance at the other end thereof, said reset button being depressed by said end member when said push button is depressed, the improvement comprising a light emitting means mounted in said reset button for indicating an operation mode of said appliance, and said inner cable including a flexible portion extending between said end member and said second end, said flexible portion being made of an optical conductor, said optical conductor being

housed within said end member said end member having an aperture for transmitting light from said light emitting means to said optical conductor, whereby light emitted from said light emitting means is directed towards said push button.

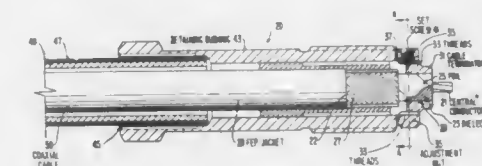
4,954,669

**COAXIAL CABLE CONNECTOR ASSEMBLY**  
Harmon W. Banning, Derwood, Md., and Daniel C. Neil, Newark, Del., assignors to W. L. Gore & Associates, Inc., Newark, Del.

Filed Jan. 25, 1989, Ser. No. 301,575  
Int. Cl.<sup>5</sup> H02G 15/02

U.S. Cl. 174—75 C

9 Claims



1. A coaxial cable and terminator comprising:  
(a) A coaxial cable further comprising:  
1. a central conductor,  
2. a layer of dielectric material surrounding said central conductor,  
3. at least one layer of foil as an outer conductor surrounding said dielectric material,  
4. a braid of metallic material surrounding said outer conductor, and  
(b) a cable terminator having smooth inner surfaces and a void space capable of receiving an end of said coaxial cable, said terminator rigidly attached to the braid and foil, and  
(c) a jacket further surrounding substantially all of the braid of said coaxial cable and which abuts said cable terminator.

4,954,670

CABLE SPLICE CASE

Michael L. Jensen, Overijse; Jean-Marie E. Nolf, Hamme-Mille; Jan Vansant, Leuven, and Luiz N. Mendes, Begijnendijk, all of Belgium, assignors to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 18,221, Feb. 24, 1987, abandoned. This application Nov. 9, 1988, Ser. No. 274,722

Claims priority, application United Kingdom, Feb. 24, 1986, 8604501

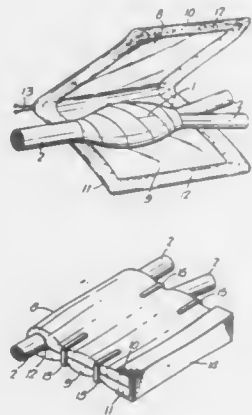
Int. Cl.<sup>5</sup> H02G 15/08

U.S. Cl. 174—92

19 Claims

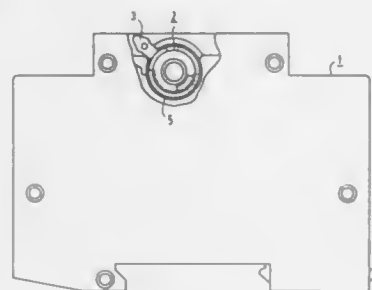
1. An article for environmentally protecting an elongated substrate, which comprises:  
a first sheet having a first edge portion;  
a second flexible substantially planar sheet having a second edge portion;  
a heat-activatable sealing material that can be positioned between the first and second edge portions;  
means for displacing the sealing material to form a seal between the first and second edge portions and around the substrate; and  
a substantially rigid casing that can surround the first and second sheets when the first and second sheets enclose the substrate, said casing includes a hole in the casing so that a rod or plate can protrude through the hole and hold the first and second edge portions together around the substrate.  
16. A substantially rigid casing suitable for surrounding a branched cable splice enclosed by first and second sheets, said casing having means operable from outside the casing for bringing together the first and second sheets between the

branching cables wherein the means operable from the outside comprises a hole or opening through which a plate or rod can



be inserted to bring together first and second sheets between the branching cables.

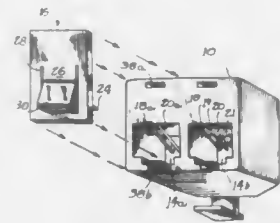
**4,954,671**  
**CONNECTIBLE SWITCHING DEVICE**  
Hans Schmidt, Regenstauf, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany  
Filed Mar. 14, 1989, Ser. No. 323,347  
Claims priority, application Fed. Rep. of Germany, Mar. 14, 1988, 3808472  
Int. Cl.<sup>5</sup> H01H 9/20, 3/58  
U.S. Cl. 200—50 C



1. A switching device in a system having a plurality of switching devices, said switching device being coupled to mountable switching, auxiliary switching or signal devices, said switching device comprising a housing, a cylindrical, manually operated part disposed in the housing and having a switching axis, a manually operable selector attached to the cylindrical part, the cylindrical part having two coupling directions determined by movement of said selector, and further comprising a coupling element pair comprising a jaw-shaped coupling element and a cone-shaped coupling element, one of said jaw-shaped coupling element and cone-shaped coupling element being disposed on the cylindrical part in the direction of the switching axis, the jaw-shaped and cone-shaped coupling elements being in engagement, the jaw-shaped coupling element having a jaw tooth, said jaw tooth being in engagement depth only for one coupling direction of the cylindrical part at a shallow penetration by the cone-shaped coupling element into the jaw-shaped coupling element and said jaw tooth being in engagement depth for both coupling directions at a deep penetration by the cone-shaped coupling element into the jaw-shaped coupling element.

**4,954,672**  
**GROUND START KEY SWITCH**  
William E. Ruehl, Wheeling, Ill., assignor to Illinois Tool Works, Inc., Chicago, Ill.  
Filed Mar. 30, 1989, Ser. No. 330,774  
Int. Cl.<sup>5</sup> H01R 33/96  
U.S. Cl. 200—51.09

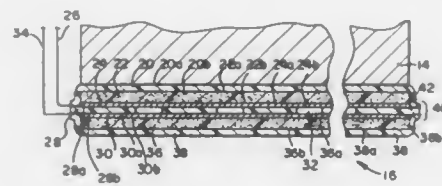
22 Claims



1. A ground start key switch for use with a modular duplex adapter to permit shorting momentarily a pair of jack terminals comprising:  
switch actuator means adapted to be mounted onto a modular duplex adapter having a pair of jack terminals;  
conductor means attached to said switch actuator means; and  
said switch actuator means including a resilient lever arm being depressible for causing engagement of said conductor means with said pair of jack terminals so as to electrically short said pair of jack terminals together, said lever arm causing disengagement of said conductor means with said pair of jack terminals when released.

**4,954,673**  
**HIGHLY SENSITIVE SWITCH FOR ACTUATION OF A DEVICE UPON FORCE BEING APPLIED THERETO**  
Norman K. Miller, Concordville, Pa., assignor to Miller Edge, Inc., Concordville, Pa.  
Filed Jul. 21, 1989, Ser. No. 384,348  
Int. Cl.<sup>5</sup> H01H 3/16  
U.S. Cl. 200—61.43

14 Claims

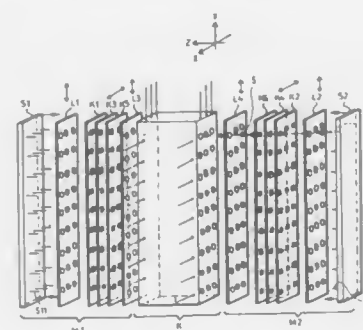


1. A highly sensitive switch for actuating of a device upon force being applied to said switch, said switch comprising:  
a first layer of non-conducting material for attachment to a surface, said first layer of material having a first face and a second face;  
a first sheet of resiliently compressible material having a first face and a second face, said first face of said first sheet of resiliently compressible material being in engagement with said second face of said first layer of material;  
a first sheet of flexible, electrically conductive material having a first face and a second face, said first face of said first sheet of flexible, electrically conductive material being in engagement with said second face of said first sheet of resiliently compressible material;  
a second layer of non-conductive material having a first face and a second face, said first face of said second layer of material being in engagement with said second face of said first sheet of flexible, electrically conductive material, said second layer of non-conductive material including at least one opening extending therethrough between said first

and second faces thereof, said first and second layers of non-conducting material being constructed of the same material;  
a second sheet of flexible, electrically conductive material having a first face and a second face, said first face of said second sheet of flexible, electrically conductive material being in engagement with said second face of said second layer of non-conductive material;  
a second layer of resiliently compressible material having a first face and a second face, said first face of said second sheet of resiliently compressible material being in engagement with said second face of said second sheet of flexible, electrically conductive material;  
a third layer of non-conductive material having a first face and a second face, said first face of said third layer of non-conducting material being in engagement with the second face of said second sheet of resiliently compressible material, said third layer of non-conducting material being constructed of the same material as said first and second layers of non-conducting material, said first and second sheets of flexible, electrically conductive material being spaced apart by said second layer of non-conductive material and present opposed portions to each other through said opening whereby upon the application of force to said switch, a portion of said first sheet of flexible electrically conductive material deflects into the opening in said second layer of non-conducting material and into contact with a portion of said second sheet of flexible, electrically conductive material to thereby actuate the device.

**4,954,674**  
**MATRIX CROSSPOINT SWITCHING DEVICE**  
Sture G. Roos, Bergshamra, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden  
PCT No. PCT/SE88/00452, § 371 Date May 10, 1989, § 102(e) Date May 10, 1989, PCT Pub. No. WO89/02650, PCT Pub. Date Mar. 23, 1989  
PCT Filed Sep. 2, 1988, Ser. No. 354,432  
Claims priority, application Sweden, Sep. 10, 1987, 8703521  
Int. Cl.<sup>5</sup> H01H 1/16, 67/26  
U.S. Cl. 200—175

12 Claims



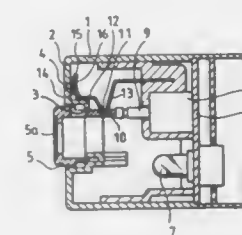
1. A matrix crosspoint switching device for making, breaking or switching contacts between a plurality of first conductor pairs and a plurality of second conductor pairs, conductors in first sets of said first pairs and conductors in first sets of said second pairs forming a first matrix of crosspoints and conductors in second sets of said first and second pairs forming a second matrix of crosspoints, each of said crosspoints in said first and second matrices including a contact area in a connection block, said connection block including a plurality of cavities extending from one side of said connection block to the opposite side of said connection block, the crosspoints of said first matrix occupying first end spaces of said cavities and the crosspoints of said second matrix occupying second opposite end spaces of said cavities on either side of the symmetry axis of said connection block, a first and a second pair of roller

elements movably disposable within each cavity, one of said roller elements in each pair being electrically conductive while the other one is non-conductive, such that said one element in each pair is able to achieve electrically conductive contact when moved into contact with a contact area and such that said other element in said pair is unable to achieve electrically conductive contact when moved into contact with a contact area;

the device further including control means for controlling the movements of said roller elements, said control means including on each side of said connection block first and second positioning means for positioning said roller elements in front of said cavities, a first and a second plurality of apertured combination plate means, and actuation means to actuate predetermined ones of said roller elements based on the relative positions of said combination plate means to attain a selective connection or disconnection of determined crosspoints in said first and second matrices.

**4,954,675**  
**SWITCH OPERATION INDICATOR**  
Masayosi Iwata; Toshiya Muto; Minoru Morikawa; Satoshi Kozawa; Akihiko Takase, and Naoki Terano, all of Aichi, Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan  
Filed Sep. 14, 1988, Ser. No. 244,373  
Claims priority, application Japan, Sep. 18, 1987, 62-143505[U]; Sep. 18, 1987, 62-143506[U]  
Int. Cl.<sup>5</sup> H01H 9/16  
U.S. Cl. 200—317

3 Claims



1. A switch operation indicator comprising a frame fitted with a push-type switch having a drive member locked into a pressed-in position by a first pressing-in action and unlocked and returned to an original position by the next pressing-in action; a push button fitted in said frame so that said push button can be pressed in; a coupling bar for coupling said push button and said drive member to each other and having an operating notched portion; an indication opening provided in said frame adjacent to said button; and an indication member attached to said frame and shaped in complementary fashion with respect to said notched portion to respond to said pressing-in actions to be engaged with or disengaged from said notched portion, said indication member having an indicating portion which swings to face said opening upon the first pressing-in action and swings back to not face said opening upon the next pressing-in action.

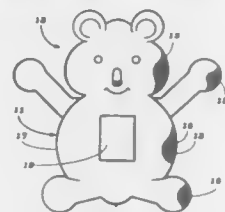
**4,954,676**  
**ELECTRICALLY HEATED STUFFED TOY WITH CONCENTRATED HEAT DISSIPATION**  
Martin D. Rankin, Roleystone, Australia, assignor to Axti Pty Ltd., Mt. Hawthorn, Australia  
Filed Jan. 14, 1988, Ser. No. 144,561  
Claims priority, application Australia, Jan. 15, 1987, PH9886  
Int. Cl.<sup>5</sup> H05B 3/00; A61F 7/08  
U.S. Cl. 219—200

17 Claims

1. A heating means to be used by a person and held against the person's body for warmth comprising a soft flexible body



having a flexible outer casing, a stuffing material substantially filling said outer casing, said outer casing and said stuffing material defining a cavity adjacent a portion of said outer body and extending into and surrounded by said stuffing material, a heat source within said outer casing and supported within and by said stuffing material at a base of said cavity spaced from said outer casing portion, and a flexible heat transfer means



within said cavity, said flexible heat transfer means having a first portion engaged with said heat source and a spaced portion engaged with said portion of said outer casing of said body for transferring heat thereto from said heat source, the remaining portion of said heat transfer means not engaged with said heat source or with said outer casing portion being surrounded by said stuffing material, said heat transfer means being of higher thermal conductivity than said stuffing material.

4,954,677

## TIRE PRESSURE SENSOR FOR MOTOR VEHICLES

Günther Alberter, Nuremberg; Helmut Deeg, Zirndorf; Gerhard Hettich, Dietershofen; Klaus Neidhard, Wendelstein; Hans-Dieter Schmid, Nuremberg, and Hans Schruppf, Oberasbach, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
PCT No. PCT/DE87/00341, § 371 Date Apr. 21, 1989, § 102(e) Date Apr. 21, 1989, PCT Pub. No. WO88/03879, PCT Pub. Date Jun. 2, 1988

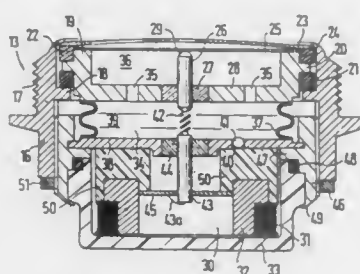
PCT Filed Aug. 4, 1987, Ser. No. 347,775

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1986, 3639688

Int. Cl.<sup>5</sup> H01H 35/32

U.S. Cl. 200—834

12 Claims



1. A tire pressure sensor to be fastened to a rim of a vehicle wheel for sensing an inflation pressure of a tire mounted on the rim, said pressure tire sensor comprising reference pressure chamber means having a filled reference pressure volume and including a reference pressure chamber for monitoring the tire inflation pressure; an electrically conductive diaphragm sealingly separating said reference pressure chamber from a tire interior; a sensor electric circuit is said sensor; a contact pin

located in said reference pressure chamber and removably contacting said electrically conductive diaphragm for closing said sensor electric circuit when the tire inflation pressure is at a predetermined value; and means defining a deformable portion of the reference pressure chamber means and enclosing at least partially said reference chamber volume, and means other than the tire pressure for deforming said deformable portion to thereby change said reference chamber volume and establish a predetermined reference pressure in said reference pressure chamber.

4,954,678

## ANNULAR RF SEALER AND METHOD

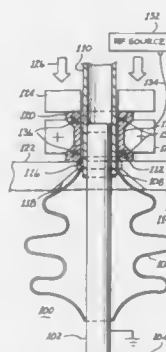
Daniel C. Harmony, John B. Gummere, and Stephen C. Minney, all of Tucson, Ariz., assignors to Engineering & Research Associates, Inc., Tucson, Ariz.

Filed Jun. 6, 1988, Ser. No. 202,317

Int. Cl.<sup>5</sup> H05B 6/54

U.S. Cl. 219—10.43

13 Claims



1. A method of sealing with RF energy a length of tubing; said method comprising the steps of:

- locating a first electrode within the length of tubing;
- circumstriking the length of tubing with a second electrode;
- radially compressing the length of tubing to effect a closure of the tubing; and
- radiating RF energy between the first and second electrodes to heat the tubing; accommodate compression of the tubing and seal the closure.

4,954,679

## METHOD FOR THE RAPID THAWING OF CRYOPRESERVED BLOOD, BLOOD COMPONENTS, AND TISSUE

Frank M. Harms, Marietta; Victor Tripp, Tucker, and Thomas B. Wells, Smyrna, all of Ga., assignors to Lifeblood Advanced Blood Bank Systems, Inc., Atlanta, Ga.

Division of Ser. No. 292,574, Dec. 30, 1988, Pat. No. 4,874,915. This application Jul. 24, 1989, Ser. No. 384,564

Int. Cl.<sup>5</sup> H05B 6/64

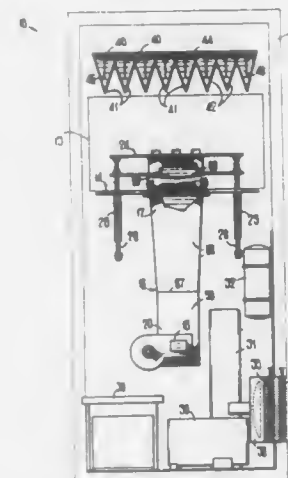
U.S. Cl. 219—10.55 M

7 Claims

1. A method for thawing a container of frozen plasma, comprising the steps of:

- surrounding a container of frozen plasma with a dielectric medium having a dielectric constant substantially similar to the dielectric constant of frozen plasma;
- generating microwaves;
- guiding said generated microwaves to propagate through said dielectric medium in the direction of said container of frozen plasma;
- dispersing said microwaves propagating through said dielectric medium across an area of predetermined size which encompasses said container of frozen plasma; and
- supporting multiple odd-numbered harmonic modes of prop-

agation of said microwaves such that the cumulative effect of said multiple harmonic modes creates an approxi-



mately uniform electromagnetic field across said area of predetermined size which encompasses said container of frozen plasma.

4,954,680

## HIGH FREQUENCY HEATING APPARATUS HAVING SEALABLE AND DETACHABLE MOUNTING ROCK

Shinji Takenouchi, Nagoya, Japan, assignor to Kabushiki Kai-

sha Toshiba, Kawasaki, Japan

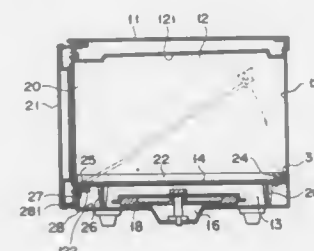
Filed Jul. 17, 1989, Ser. No. 380,453

Claims priority, application Japan, Jul. 26, 1988, 63-184705

Int. Cl.<sup>5</sup> H05B 6/76

U.S. Cl. 219—10.55 E

18 Claims



1. A high frequency heating apparatus comprising: a housing including a heating chamber having an opening at one end, a door for exposing/closing said opening of said heating chamber, and means for supplying a heating high frequency output from a bottom portion of said heating chamber to the inside of said heating chamber;

a mounting rack for partitioning said bottom portion of said heating chamber from an upper portion thereof, and for supporting an object to be heated, said mounting rack having engaging portions engaged with a lower edge of said opening of said heating chamber, by means of which said mounting rack can pivot about said engaging portions and be detached from said lower edge, and having recesses respectively formed on lower surfaces of edges opposite to wall surfaces, except for said opening; and sealing means for sealing a gap between a wall surface of said heating chamber and an opposing edge of said mounting rack, said sealing means having a projection fitted in a corresponding one of said recesses of said mounting rack, a base portion formed integral with said projection and brought into tight contact with each of said opposite

edges of said mounting rack, and a tongue formed integral with said base portion and urged against a corresponding one of the wall surfaces of said heating chamber and creating a sealed contact therewith.

4,954,681

## DRYING AND CRYSTALLIZING APPARATUS FOR GRANULES, WHICH EMPLOYS A MICROWAVE DEVICE

Kanzo Ishikawa, Uji; Ryutaro Hayashi, Mino, and Akira Yoshimoto, Sakai, all of Japan, assignors to Kawata Co., Ltd., Osaka, Japan

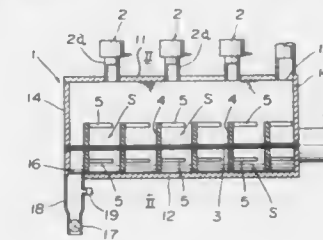
Filed Mar. 30, 1989, Ser. No. 330,783

Claims priority, application Japan, May 31, 1988, 63-134895; Jun. 30, 1988, 63-164177

Int. Cl.<sup>5</sup> H05B 6/78; B29B 13/08

U.S. Cl. 219—10.55 A

7 Claims



1. A drying and crystallizing apparatus for granules, comprising:

- a heating tank formed in the shape of a rectangular parallelepiped having at one lengthwise side thereof a material inlet and at its other lengthwise side a material outlet,
- a plurality of microwave units for radiating microwaves on said granules charged into said heating tank through said material inlet, and
- an agitating unit housed in said heating tank for agitating said granules, comprising a plurality of spaced-apart disc-like partitions for providing in said heating tank a plurality of partitioned spaces between adjacent disc-like partitions across said material inlet and said material outlet, a driving shaft for supporting said partitions so as to rotate them, and agitating vanes mounted on each of said partitions so as to agitate said granules in each of said partitioned spaces and transfer said granules from one partitioned space successively into adjacent partitioned spaces in the direction of the material outlet side.

4,954,682

## INTERNAL WELD BEAD METALLIZING SYSTEM AND METHOD

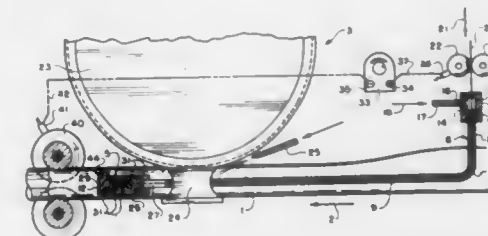
Ireneusz W. Baran, Chicago, and Humberto A. Hijiuelos, East Hazelcrest, both of Ill., assignors to Mameely-Illinois, Inc., Chicago, Ill.

Filed May 1, 1989, Ser. No. 345,683

Int. Cl.<sup>5</sup> B23K 9/04

U.S. Cl. 219—76.14

8 Claims

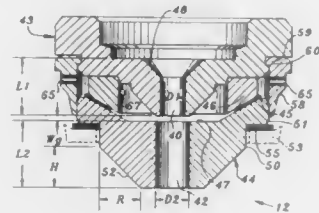


1. A system for continuously coating a weld bead on an





provide beveled cuts while maintaining a relatively short standoff distance from a workpiece, and comprising an electrode defining a discharge end and a longitudinal axis, an upper nozzle member mounted adjacent said discharge end of said electrode and having a first bore therethrough of predetermined length L1 and which is aligned with said longitudinal axis, a lower nozzle member mounted adjacent said upper nozzle member on the side thereof opposite said electrode and having a second bore therethrough of predetermined length L2 which is aligned with said longitudinal axis, said lower nozzle member comprising a cylindrical body portion defining a forward end portion and a rearward end portion and having said second bore extending coaxially therethrough and defining a bore diameter D2, an annular mounting flange positioned on said rearward end portion of said body portion, a frusto-conical surface formed on the exterior of said forward end portion so as to be coaxial



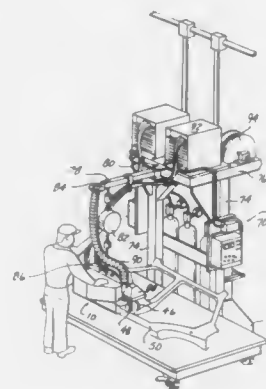
with said second bore and having a cone angle of between about 60° and 120°, an axial height H, and a radial dimension R, means for creating an electrical arc extending from said discharge end of said electrode through said first and second bores and to a workpiece located adjacent the side of said lower nozzle member opposite said upper nozzle member, means for generating a vortical flow of a gas between said electrode and said upper nozzle member and so as to create a plasma flow outwardly through said first and second bores and to said workpiece, means for introducing a jet of liquid between said upper and lower nozzle members and so as to envelope said plasma as it passes through said second bore, and wherein length L2 is at least as great as length L1, H is equal to at least about one half L2, L2 is between about 0.16 to 0.60 inches, and D2 is between 0.125 to 0.260 inches.

**4,954,689**  
**WELDING UNIT**  
Chalmers O. Smith, 825 Woodridge, Rochester, Mich. 48063  
Filed Jul. 12, 1989, Ser. No. 379,351  
Int. Cl. B23K 9/12

U.S. Cl. 219—125.1 12 Claims

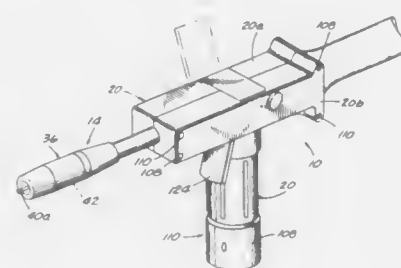
1. A multi-head, indexing weld unit comprising: a plate-like base member; first and second slider assemblies, mounted to said base member, in spaced parallel relationship for movement axially along parallel axes; rack and pinion means, disposed between, and fixedly mounted to said first and second slider assemblies to transfer linear motion of said first slider assembly along its respective axis to opposite motion of said second slider assembly, relative to said first assembly, along its respective axis; motor means, fixed relative to said base member, attached to said first slider assembly, to drive said first slider assembly along its respective axis; first and second welding units, mounted on said first and second slider assemblies respectively, having first and second welding heads extending outwardly from said units to terminate at predetermined locations, said first

welding unit advanced along said first slider axis and said second welding unit retracted along said second slider axis; said motor means actuable to move said first welding unit along said first slider assembly to a retracted position relative to said first slider axis and to move said second welding unit along said second slider assembly to an advanced position relative to said second slider axis thereby indexing said outwardly extending weld heads relative to each other.



9. A multi-head indexing weld unit, as defined in claim 1, each of said first and second welding units further comprising: an automatic feed, gas metal arc (GMA) spot welding unit having means for continuously feeding welding rod to said welding head; conduit means for delivery of inert gas to said welding head; and electrical means for establishing a desired electrical potential at said weld head and in said workpiece during welding operations.

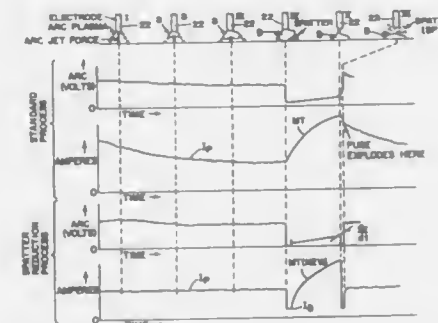
**4,954,690**  
**MODULAR WELDING GUN**  
Milo M. Kensrue, 49-320 Sunrose Ln., Palm Desert, Calif. 92260  
Filed Apr. 3, 1989, Ser. No. 332,873  
Int. Cl. B23K 9/12  
U.S. Cl. 219—137.31 3 Claims



1. A welding gun including, an elongated mounting block made of an electrically conductive material and having a rear face, a central section, a front face, and a passageway extending through the block from the rear face to the front face, drive means mounted in the central section for feeding welding wire entering the gun at the rear face, passing through the block and exit the block through the front face, barrel means having a tip and opposed rear end which is removably attached to the front face by the rear end, said welding wire being fed by the drive means through the barrel to exit at said tip,

valve means mounted within the block in communication with the passageway for controlling the flow of gas through the passageway, said valve means including a valve actuator which opens the valve to allow gas to flow through the passageway and out said tip, motor means removably mounted to the block near the central section and connected to drive means to provide the means for turning the drive means, said motor means being generally elongated to provide a handle for the gun, and including a variable speed control mechanism so that the wire may be moved through the gun at different speed rates, said control mechanism including, variable speed control means for the motor means which is mounted at the free end of the motor opposite the end of the motor mounted to the block, said speed variable control means including a potentiometer having slider means which moves through at least a 1000 degrees of rotation, and tactile response means which enables a user of the gun to experience through the sense of touch a high degree of control with minimum sensitivity in the control adjustment, switch means mounted to the block which controls the operation of the motor means, said switch means being near the valve actuator, a removable insulating casing member which encloses the block and motor, and trigger means adjacent the motor including a trigger element which when the trigger is depressed first engages the valve actuator to open said valve and next engages the switch means to turn on the motor means.

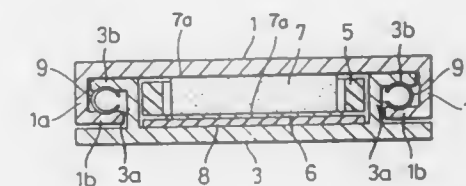
**4,954,691**  
**METHOD AND DEVICE FOR CONTROLLING A SHORT CIRCUITING TYPE WELDING SYSTEM**  
John M. Parks, Solon, and Elliott K. Stava, Brecksville, both of Ohio, assignors to The Lincoln Electric Company, Cleveland, Ohio  
Division of Ser. No. 940,880, Dec. 11, 1986, Pat. No. 4,717,807.  
This application Apr. 24, 1989, Ser. No. 343,238  
The portion of the term of this patent subsequent to Jan. 5, 2005, has been disclaimed.  
Int. Cl. B23K 9/10  
U.S. Cl. 219—137 PS 4 Claims



1. A device for reducing spatter when a welding power supply is employed for depositing metal from a welding wire onto a workpiece by the short circuiting transfer mode wherein a welding current causes the welding wire to alternate between a short circuit condition and an arc condition, with metal transfer during a short circuit condition requiring a transfer time  $T_P$  during which transfer time the welding current rises and then falls as a melted portion of said wire is transferred to said workpiece, said device comprising: (a) means for sensing the short circuit condition; (b) switching means having a first switched conductive condition wherein said welding current is allowed to

reach the normal unimpeded current level controlled by said power supply and a second switched non-conductive condition wherein said welding current is forced to flow through a low resistance resistor to limit the welding current to a low level background current, said switching means having low stored energy when shifted into either of said conditions; (c) shift means responsive to said sensing means for shifting said switch means into said second switched condition before said short circuit condition; (d) means responsive to said shift means for holding said switch means in said second, low current condition for a cycle  $T_1$  beginning with said short circuit condition, wherein cycle  $T_1$  has a duration with a maximum time less than said transfer time  $T_P$ ; and, (e) means operable during said short circuit condition for shifting said switch means to said first condition for the remainder of said short circuit condition whereby said welding current is allowed to reach the normal unimpeded current level in an unrestricted manner unless said arc condition is established during said short circuit condition.

**4,954,692**  
**POSITIVE TEMPERATURE COEFFICIENT THERMISTOR DEVICE FOR A HEATING APPARATUS**  
Takashi Shikama; Asami Wakabayashi, both of Yokaiichi, and Kiyofumi Torii, Ohmihachiman, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan  
Filed Sep. 9, 1988, Ser. No. 242,966  
Claims priority, application Japan, Sep. 11, 1987, 62-229161  
Int. Cl. H05B 3/04  
U.S. Cl. 219—365 9 Claims



1. A positive temperature coefficient thermistor device for use in a heating apparatus, which device comprises a board-type positive temperature coefficient thermistor element and a first and a second multi-finned radiator for radiation disposed adjacent a front and a rear surface of said thermistor element, respectively; each of said first and second radiators having a pair of fitting flanges which are respectively arranged on a pair of opposed sides of said each radiator and which have longitudinal ends oriented to meet transverse to the flow direction of air to be heated by said positive temperature coefficient thermistor device; corresponding fitting flanges of said first and second radiators being engaged with each other by means of respective resilient urging means which are inserted between respective pairs of opposing surfaces of the facing flanges to hold said facing flanges in fixed relation to each other; and said thermistor element being contained in a space surrounded by said first and second radiators.

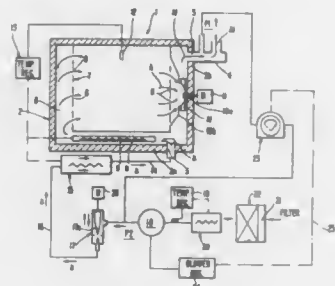
4,954,693

VENTILATION REGULATED HOT AIR SUPPLIED  
CONSTANT TEMPERATURE OVEN

Kenichi Mitsuhashi, Kanagawa, and Shigeru Suga, Tokyo, both of Japan, assignors to Suga Test Instruments Co., Ltd. and The Yokohama Rubber Co., Ltd., both of Tokyo, Japan  
Filed Jul. 11, 1989, Ser. No. 378,293  
Int. Cl. 5 F24H 3/04

U.S. Cl. 219—400

4 Claims



1. A ventilation regulated hot air supplied constant temperature oven wherein heated air of a predetermined temperature is supplied to a test oven body provided with an air supply port and an air discharge port with the ventilation of said test oven carried out at a predetermined rate at predetermined time intervals, comprising an oven body having an air supply port and an air discharge port to which a discharge cylinder is joined, a blower connected to said air supply port via an air supply passage, a differential pressure detector connected to said discharge cylinder and adapted to detect a differential pressure corresponding to the air flow rate on the basis of the data obtained in advance on the relation between a difference between the pressure at an outlet port of said blower and that at said discharge cylinder and the air flow rate, and a blower's revolutions regulator provided between said blower and said differential pressure detector and adapted to control the number of revolutions per minute of said blower in accordance with an output level of a signal corresponding to a differential pressure measured with said differential pressure detector.

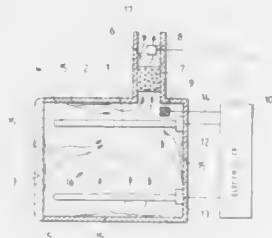
4,954,694

COOKING OVEN HAVING FUNCTION TO  
AUTOMATICALLY CLEAN SOILS ATTACHED TO  
INNER WALLS THEREOF

Takeshi Nagai, Hiroshi Fukuda, Masahiko Itoh, all of Nara, and Takao Shitaya, Yamato Kouriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan  
Filed Jan. 30, 1989, Ser. No. 303,882  
Int. Cl. 5 H05B 1/02

U.S. Cl. 219—413

9 Claims



8. A self-cleaning type cooking oven having a function to pyrolytically eliminate food soils accumulated therein, said cooking oven comprising:  
a cooking chamber;  
heating means for supplying heat into said cooking chamber

so as to allow pyrolytic degradation of the food soils accumulated on walls of said cooking chamber;  
an exhausting passage coupled to said cooking chamber to exhaust gases generated due to the pyrolytic degradation in said cooking chamber to an ambient atmosphere;  
an oxidizing catalyst provided in said exhausting passage to oxidize said gases passing therethrough;  
gas sensor means provided in said exhausting passage to detect a gas component therearound and arranged to generate a gas signal indicative of the amount of said gas component;  
temperature sensor means provided in said cooking chamber so as to generate a temperature signal indicative of a temperature of said cooking chamber; and  
heat control means electrically connected to said heating means for controlling supply of heat into said cooking chamber, said heat control means being responsive to said gas signal from said gas sensor means and said temperature signal from said temperature sensor means so as to maintain a temperature of said cooking chamber up to a predetermined cleaning temperature and to determine a heating time period on the basis of the amount of said gas component indicated by said gas signal so that said cooking chamber is heated for said heating time period whereby the food soils accumulated on said walls of said cooking chamber is substantially degraded during said heating time period, said heat control means including:  
first means responsive to said gas signal at a predetermined time, interval so as to generate a signal indicative of variation of the amount of said gas component;  
second means for detecting a changing point from increasing to decreasing or vice versa in the variation of the amount of said gas component on the basis of said variation signals from said first means; and  
third means for detecting a second changing point from decreasing to increasing or vice versa in the variation of said gas component after the detection of said first-mentioned changing point,  
wherein said heat control means determines said heating time period on the basis of said second changing point detected by said third means.

4,954,695

SELF-LIMITING CONDUCTIVE EXTRUDATES AND  
METHODS THEREFOR

Robert Smith-Johannsen, and Jack M. Walker, both of Portola Valley, Calif., assignors to Raychem Corporation, Menlo Park, Calif.  
Continuation of Ser. No. 475,885, Mar. 16, 1983, abandoned, which is a continuation of Ser. No. 175,356, Aug. 4, 1980, abandoned, which is a division of Ser. No. 868,517, Jan. 11, 1978, Pat. No. 4,286,376, which is a continuation of Ser. No. 542,592, Jan. 20, 1975, abandoned, which is a continuation of Ser. No. 287,444, Sep. 8, 1972, Pat. No. 3,861,029. This application May 12, 1988, Ser. No. 195,558  
Int. Cl. 5 H05B 3/10

U.S. Cl. 219—548

18 Claims



1. An elongate self-regulating heater which comprises  
(1) a melt-extruded element composed of a conductive polymer composition which comprises conductive carbon black dispersed in a crystalline polymeric material, said crystalline polymeric material consisting essentially of  
(a) a mixture of polyethylene and a copolymer of ethylene

4,954,697

## VENDING APPARATUS FOR SELF-SERVICE STORE

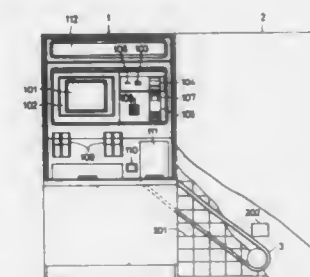
Yoshikazu Kokubun; Akihito Kurosawa; Kohel Ushikubo, and Shinji Todokoro, all of Gunma, Japan, assignors to Sanden Corporation, Gunma, Japan

Continuation of Ser. No. 915,647, Oct. 6, 1986, abandoned. This application Apr. 6, 1989, Ser. No. 333,804

Claims priority, application Japan, Oct. 5, 1985, 60-222317  
Int. Cl. 5 G06F 7/08

U.S. Cl. 235—381

3 Claims



1. A vending apparatus, comprising:  
cabinet means provided with storage means for storing a plurality of different items available for purchase;  
memory means for storing product data associated with said plurality of different stored items, said product data including multiple displays of more precise product information on successive screen displays;  
information transmission means for visually and audibly reproducing selected corresponding segments of the product data including image display means for displaying visual video information on said plurality of different stored products available for purchase, and speaker means for reproducing audio information corresponding to said plurality of different stored products available for purchase, said image display means including an image display unit having a display panel;  
input means for receiving selection and designation data from user in accordance with the data in said information transmission means, said input means including a touch sensing input device on said display panel;  
deposit means for receiving payment for items selected for purchase; and  
dispensing means responsive to the payment means and the input means for ejecting items selected by the user for receipt by the user.

4,954,698

SENSOR ALIGNING MEANS FOR OPTICAL READING  
APPARATUS

Yoshitaka Yasunaga, and Toru Nakamura, both of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 818,207, Jan. 13, 1986, abandoned. This application Sep. 2, 1988, Ser. No. 240,453  
Claims priority, application Japan, Jan. 14, 1985, 60-3248[U]  
Int. Cl. 5 G06K 7/10, 13/063

U.S. Cl. 235—454

4 Claims

1. An apparatus for optically reading characters from any of a plurality of record media having lines of characters at different heights, comprising:

a housing;  
means in said housing for defining a gap through which a record medium may be passed;  
optical reader means in said housing near said gap reading characters from the record medium passing through said gap;  
means for adjusting a height of said optical reader means

and a vinyl ester, the mixture containing at least 50% by weight of the polyethylene;  
(b) a mixture of polyethylene and a copolymer of ethylene and ethylacrylate, the mixture containing at least 50% by weight of the polyethylene; or  
(c) one or more of polyethylene, polypropylene, poly(dodecamethylene pyromellitimide), ethylene-propylene copolymers, terpolymers of ethylene, propylene and one or more non-conjugated dienes, polyvinylidene fluoride, and copolymers of vinylidene fluoride and tetra fluoroethylene; and  
(2) a pair of elongate parallel electrodes which are disposed in spaced-apart relation along and embedded in said element and are joined by a web of said composition, and which can be connected to a source of electrical power to cause current to pass through the element, the percentage by weight(L) of conductive carbon black in said composition, based on the total weight thereof, being not greater than about 15, and the room temperature resistivity (R) in ohm-cm of said conductive polymer being such that

$$2L + 5 \log_{10} R \leq 45.$$

4,954,696

SELF-REGULATING HEATING ARTICLE HAVING  
ELECTRODES DIRECTLY CONNECTED TO A PTC  
LAYER

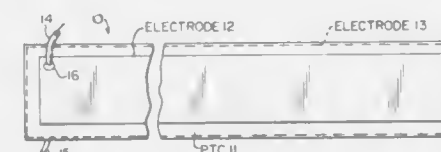
Kazunori Ishii; Seishi Terakado, both of Nara; Yasutomo Funakoshi, and Tadashi Sakairi, both of Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 809,966, Dec. 17, 1985, Pat. No. 4,783,587. This application May 5, 1988, Ser. No. 190,562  
Claims priority, application Japan, Dec. 18, 1984, 59-266640; Dec. 18, 1984, 59-266641; Dec. 18, 1984, 59-266647; Dec. 18, 1984, 59-266649; Dec. 18, 1984, 59-266664; Dec. 18, 1984, 59-266665; Dec. 18, 1984, 59-266666; Dec. 18, 1984, 59-266668; Dec. 18, 1984, 59-266669; Oct. 18, 1985, 60-233618  
The portion of the term of this patent subsequent to Nov. 8, 2005, has been disclaimed.

Int. Cl. 5 H05B 3/10

U.S. Cl. 219—548

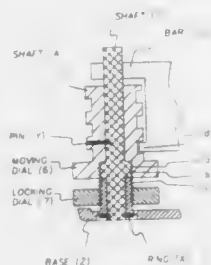
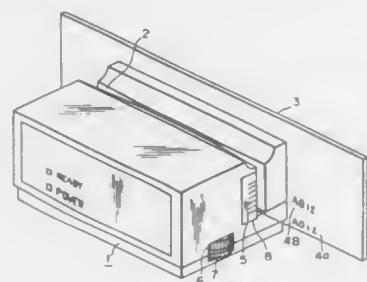
70 Claims



1. A self-regulating heating article comprising:  
a first conductive elongate layer comprising a crystalline polymeric composition of high crystallinity and conductive particles dispersed in said polymeric composition to exhibit a positive temperature coefficient of resistance, the first layer having a thickness of 1 millimeter or less; and  
a pair of second conductive elongate layers adapted for connection to a power supply, said second layers being metallic and secured one on each surface of said first layer to develop a potential in the direction of thickness of the first layer and to effect an effective exothermic portion at said first layer where said pair of second layers overlaps, said second layers having a creeping distance therebetween along peripheral edges, said creeping distance being greater than the thickness of said first layer.



including an adjustment dial on an outer surface of said housing; and means, visible from outside said housing, for indicating the height of said optical reader means, said indicating means



being positioned adjacent said gap so that the indicated height of said optical reader means can readily and directly be compared to a line of characters on a portion of the record medium which extends out of said gap.

#### 4,954,699 SELF-ADMINISTERED SURVEY QUESTIONNAIRE AND METHOD

Steve Coffey, and William Weber, both of Glen Cove, N.Y., assignors to NPD Research, Inc., Port Washington, N.Y.  
Filed Apr. 13, 1988, Ser. No. 181,403  
Int. Cl.<sup>5</sup> G06K 7/10

U.S. Cl. 235-462

15 Claims



1. In a survey questionnaire comprising a plurality of survey questions, and a plurality of selectable responses associated with each of said survey questions; the improvement comprising a bar code scannable pattern associated with each response, said bar code scannable pattern comprising a selectable response to a particular survey question and a skip pattern prompt indication embedded therein comprising prompting

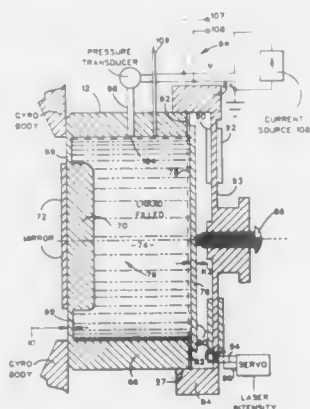
information corresponding to a next question to be answered in said plurality of survey questions in said survey questionnaire based on selection of said selectable response, said bar code scannable pattern being adapted for scanning by a bar code scanning device having a storage means and a display associated therewith for storing the scanned selectable response and displaying said prompting information, whereby a self-administered survey questionnaire may be provided.

#### 4,954,700 PATHLENGTH CONTROL SYSTEM WITH DEFORMABLE MIRROR HAVING LIQUID-FILLED HOUSING

Ludd A. Trozpek, Claremont, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.  
Filed Jul. 24, 1989, Ser. No. 383,674  
Int. Cl.<sup>5</sup> G01J 1/20

U.S. Cl. 250-201.9

6 Claims



1. A pathlength control system responsive to a pathlength control signal for adjusting a pathlength of a light beam in an optical signal process dependent on coherent light, the pathlength control system comprising:

- a housing containing a liquid filled chamber, said liquid filled chamber having an extendable wall having an inner surface subject to the pressure of the liquid and an external surface perpendicular to a central axis, the external surface having a mirrored surface for insertion into and control of the light path, the central axis being coaxial with the light path, the liquid filled chamber also having a deformable wall having an inner surface subject to the pressure of the liquid and an external surface;
- a displacement transducer, the displacement transducer being coupled to the deformable wall and responsive to a control signal of a first polarity for deflecting the internal surface of the deformable wall in a first direction to increase the pressure of fluid in the chamber to extend the extendable surface in a first direction.

the displacement transducer being responsive to a control signal of a second polarity for deflecting said internal surface of the deformable wall in a second direction to decrease the pressure of fluid in the chamber to extend the extendable surface in a second direction,

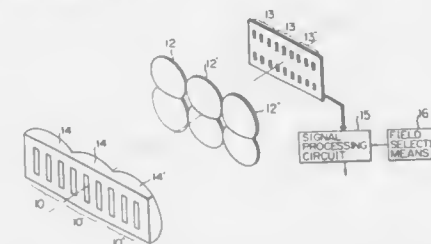
- a control means for sampling coherent light from said light path and for providing said control signal to the displacement transducer to optimize the intensity of the beam; and
- a transducer means responsive to fluid pressure within the liquid filled chamber for providing a chamber pressure signal.

#### 4,954,701 FOCUS DETECTING APPARATUS PROVIDED WITH A PLURALITY OF DETECTING FIELDS

Kenji Suzuki, Keiji Ohtaka, and Yasuo Suda, all of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Dec. 9, 1988, Ser. No. 281,781  
Claims priority, application Japan, Dec. 14, 1987, 62-315490  
Int. Cl.<sup>5</sup> G01J 1/20; G03B 3/00

U.S. Cl. 250-201.8

6 Claims



1. An apparatus for detecting a focus-adjusted state of an objective lens, comprising a plurality of juxtaposed units, each unit having:

- a lens assembly for receiving light fluxes passed through different areas of a pupil of the objective lens and forming light intensity distributions whose relative position varies in conformity with the focus-adjusted state of the objective lens; and

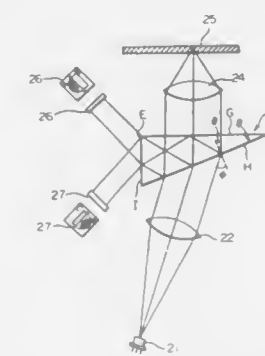
a plurality of photoelectric sensor arrays disposed in a direction orthogonal to a direction in which said areas are arranged, for receiving the light intensity distributions and forming a signal indicative of the focus-adjusted state of the objective lens on the basis of the relative position of the light intensity distributions, said juxtaposed units being disposed in the same optical path.

#### 4,954,702 PROCESS FOR DETECTING A FOCAL POINT IN AN OPTICAL HEAD

Tatsuji Kurogama; Masanori Kawai, both of Hachioji; Koji Matsushima, Akishima, and Mitsuru Watanabe, Hachioji, all of Japan, assignors to Konica Corporation, Tokyo, Japan  
Filed Oct. 13, 1988, Ser. No. 257,367  
Claims priority, application Japan, Oct. 14, 1987, 62-259233; Nov. 30, 1987, 62-304110; May 31, 1988, 63-134690  
Int. Cl.<sup>5</sup> G01J 1/20

U.S. Cl. 250-201.2

34 Claims



1. A method for detecting a focal point by the use of an optical system comprising,

- (a) a light source for emitting a luminous flux to irradiate a recording medium;
- (b) a prism including a first surface into which said luminous flux emanating from said recording medium enters, said first surface being substantially perpendicular to said luminous flux emanating from said recording medium, a sec-

ond surface which is inclined relative to said first surface for reflecting luminous flux traversing said first surface, and a third surface, joining said first surface and said second surface, through which said luminous flux passes; (c) an objective lens provided between said prism and said recording medium;

(d) a photodetector for detecting the intensity of the light flux emanating from said recording medium, through said objective lens, and through said third surface of said prism, and converting the intensity of the light flux to an electric signal; and

(e) lens driving means attached to said objective lens and capable of moving said objective lens in a direction perpendicular to the surface of said recording medium in response to said electric signal;

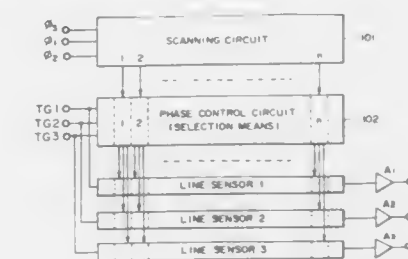
said method comprising the steps of: placing said prism so that the incident angle of said luminous flux emanating from said recording medium through said objective lens is smaller than the emergent angle of said flux from said prism to said photodetector; detecting said intensity of the light flux emerged from said third surface of said prism by said photodetector to convert into an electric signal; and operating said lens driving means to adjust the distance between said recording medium and said objective lens in response to said electrical signal.

#### 4,954,703 COLOR LINE SENSOR APPARATUS

Hayao Ohzu, Fuchu, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Dec. 15, 1988, Ser. No. 284,607  
Claims priority, application Japan, Dec. 21, 1987, 62-321422  
Int. Cl.<sup>5</sup> H01J 40/14

U.S. Cl. 250-208.1

18 Claims



- 1. A color line sensor apparatus comprising:
  - (a) a plurality of color line sensors;
  - (b) selection means for selecting one of said plurality of color line sensors; and
  - (c) one scanning means, capable of scanning each of the plurality of color line sensors, for scanning the color line sensor selected by said selecting means by providing a scanning signal.

#### 4,954,704 METHOD TO INCREASE THE SPEED OF A SCANNING PROBE MICROSCOPE

Virgil B. Elings, Santa Barbara, and Peter Malvaud, Goleta, both of Calif., assignors to Digital Instruments, Inc., Santa Barbara, Calif.

Filed Dec. 4, 1989, Ser. No. 445,280  
Int. Cl.<sup>5</sup> H01J 37/26

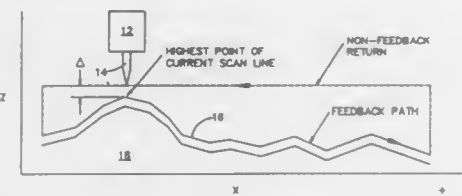
U.S. Cl. 250-307

28 Claims

1. In a scanning probe microscope having a probe moved in perpendicular X and Y directions over the surface of a sample to create a raster scan thereof and controlled and sensed in a Z direction vertical to the surface to gather data about the topography of the surface, the method of operation for increasing

the speed of gathering data about the surface being scanned comprising the steps of:

- (a) traversing the surface from a first edge of a scanning area with the probe in a +X direction at a first rate of speed while feedback controlling and sensing the Z direction;



- (b) lifting the probe above the surface a clearance distance at a second edge of the scanning area opposite the first edge in the +X direction; and,  
(c) returning the probe to the first edge in a -X direction without feedback control thereof at a second rate of speed which is faster than the first rate of speed.

4,954,705

# METHOD FOR EXAMINING A SPECIMEN IN A PARTICLE BEAM INSTRUMENT

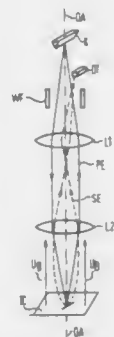
Matthias Brunner, Kirchheim, and Burkhard Lischke, Mnencben, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
Filed Oct. 2, 1989, Ser. No. 416,996

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1989, 3902165

Int. Cl.<sup>5</sup> H01J 37/28

U.S. Cl. 250—310

13 Claims



1. A method for examining a specimen in a particle beam instrument in which the specimen is irradiated by a particle probe, comprising the steps of:  
generating a line-shaped cross section particle probe;  
directing the particle probe onto the specimen to cause the generation of a line-shaped secondary particle source; and  
imaging the secondary particle source onto a detector of the particle beam instrument.

4,954,706

# RADIOGRAPHIC IMAGE PICKUP APPARATUS

Tetsuhiko Takahashi, Tokyo; Kenichi Okajima, Hoya, and Hiroshi Takenchi, Matsudo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 181,694, Apr. 14, 1988. This application Mar. 30, 1989, Ser. No. 330,495

Claims priority, application Japan, Apr. 1, 1988, 63-78009

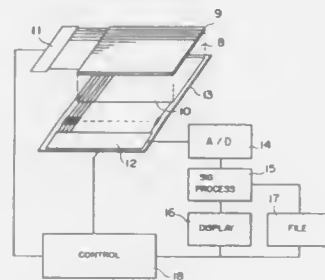
Int. Cl.<sup>5</sup> G03B 42/00

U.S. Cl. 250—327.2

6 Claims

1. A radiographic image pickup apparatus comprising:

a phosphor layer for converting a radiographic image into an optical image;  
at least one photoconductive layer optically coupled with said phosphor layer;  
a first and a second electrode sandwiching said photoconductive layer, at least one of the first and the second electrodes being divided into one-dimensional array-formed elements aligned in a first direction;  
a substrate on which at least said photoconductive layer and said first and second electrodes are integrated in one body;



exciting light-emitting means optically coupled with said photoconductive layer, said exciting light-emitting means being divided into one-dimensional array-formed elements aligned in a second direction orthogonal to said first direction;  
selection means for selectively connecting respective elements of one of said one-dimensional array-formed elements to one signal line, wherein said selection means is formed on said substrate in a region which is not exposed to said radiographic image.

4,954,707

# SYSTEM FOR USE WITH SOLID STATE DOSIMETER

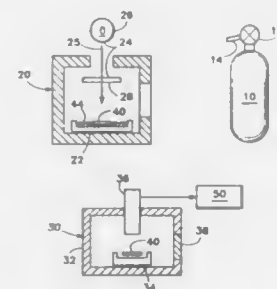
Steven D. Miller, Richland; Joseph C. McDonald, Pasco; Fred N. Eichner, Kennewick, and Paul L. Tomeraasen, Richland, all of Wash., assignors to Battelle Memorial Institute, Ohio

Filed Jun. 29, 1988, Ser. No. 213,245

Int. Cl.<sup>5</sup> G01T 1/115

U.S. Cl. 250—337

15 Claims



1. A method for measuring the dosage of ionizing radiation to which a thermoluminescent material has been exposed, comprising the steps of:  
(a) cooling said thermoluminescent material down to a temperature substantially below 200° K.;  
(b) exposing said thermoluminescent material to light radiation in order to photoconvert high temperature traps into low temperature traps; and  
(c) detecting the light released by said thermoluminescent material as it is allowed to warm.

4,954,708

# LOW DISTORTION FOCAL PLANE PLATFORM

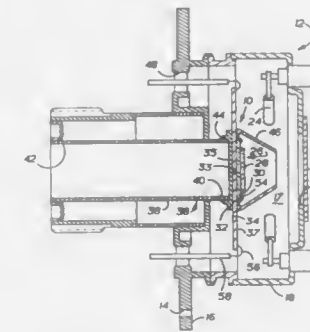
Donald E. Salzer, Santa Barbara, and Nevil Q. Maassen, Goleta, both of Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Filed Aug. 23, 1989, Ser. No. 397,808

Int. Cl.<sup>5</sup> G01J 5/06

U.S. Cl. 250—352

20 Claims



1. A detector assembly comprising:  
a dewar housing providing an evacuated cavity;  
a focal plane platform within said evacuated cavity, said focal plane platform having a tungsten end-cap and a ceramic mounting board;  
a detector mounted on said ceramic mounting board;  
means for cooling said focal plane platform and said detector; and  
whereby said focal plane platform inhibits thermal distortion during cooling of said detector while providing thermal conductivity between said cooling means and said detector.

4,954,709

# HIGH RESOLUTION DIRECTIONAL GAMMA RAY DETECTOR

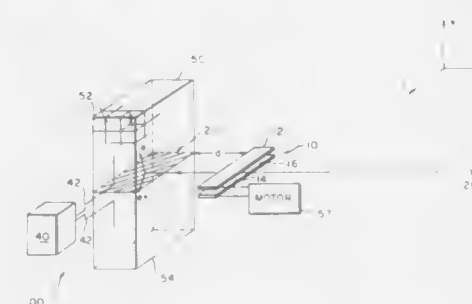
Arie Zigler, Yossef Eisen, and Yossef Eisen, all of Rishon Le Zion, Israel, assignors to Apti, Inc., Washington, D.C.

Filed Aug. 16, 1989, Ser. No. 394,331

Int. Cl.<sup>5</sup> G01T 1/29, 7/00

U.S. Cl. 250—385.1

14 Claims



1. A directional gamma ray detector, comprising:  
a first multicell gas chamber and a second multicell gas chamber, each multicell gas chamber having a plurality of gas cells that generate a signal indicative of an electron or positron passing through the gas cell;  
a reaction foil located between and separating the first and second multicell gas chambers, wherein the foil reacts with gamma rays incident to an edge of the foil to produce electron/positron pairs;  
a shield located adjacent to at least one edge of the foil and having a thickness sufficient to prevent gamma rays origi-

nating from a direction other than the direction of interest from reacting with the foil within a predetermined acceptable value;  
a collimator having a collimator opening which permits passage of gamma rays originating from a direction of interest; and  
an electronic computation system coupled to the first and second multicell gas chambers to receive the signals generated from the gas cells.

4,954,710

# PARALLAX-FREE GAS DETECTOR FOR X-RAYS

Vincent Comparat, Grenoble; Jean Ballon, Moirans; Pierre Carrechio, Saint Martin le Vinoux, and Alain Pelissier, Fontaine, all of France, assignors to Centre National de la Recherche Scientifique, Paris and Societe Inel, Les Ulis, both of, France

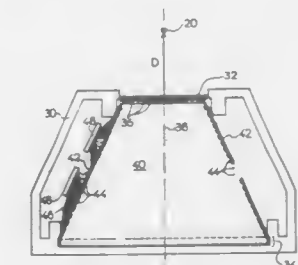
Filed Apr. 27, 1989, Ser. No. 343,627

Claims priority, application France, Apr. 27, 1988, 88 06018

Int. Cl.<sup>5</sup> H01J 47/02

U.S. Cl. 250—385.1

10 Claims



1. A gas detector for radiations emitted by a sample (20), comprising a closed chamber (30) containing a gas absorbing the radiation, an input window (32) transparent to the radiations to be detected, an absorption and drift space (40) behind the input window and, at the extremity of this space, a plane two-dimensional detector for the localization of electrons (34) for determining the coordinates of an arrival point of electrons generated by a photon impact in the absorbing gas, the detector further comprising a set of input electrodes (36) placed behind the input window and highly radiation-transparent, further comprising a set of lateral electrodes (44) surrounding the absorption and drift space, the individual input electrodes (36) and the individual lateral electrodes (44) being set to voltages different the ones from the others and variable as a function of the position where it is desirable to place the sample with respect to the input window, the voltages determined for each of the electrodes being such that the absorption and drift space is shared into two parts without using electrodes physically delimiting this separation, the equipotentials in the first part being spheric or quasi-spheric and centered on the position of the sample, and the equipotentials in the second part being continuously variable from a spheric shape, at the place of the separation, to a plane shape at close proximity of the plane electron detector.



4,954,711

## LOW-VOLTAGE SOURCE FOR NARROW ELECTRON/ION BEAMS

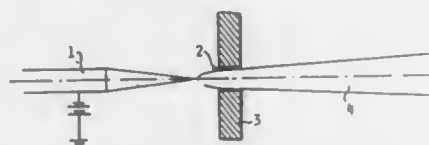
Hans-Werner Fink, Gattikon, Switzerland; Roger Moria, Mar-selles, France; Heinz Schmid, Oberrieden, Switzerland, and Werner Stocker, Wädenswil, Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 27, 1989, Ser. No. 427,651

Claims priority, application European Pat. Off., Nov. 1, 1988, 88310742

Int. Cl.<sup>3</sup> H01J 37/073, 37/08  
U.S. Cl. 250—423 R

8 Claims



1. Low-voltage source for electron/ion beams, comprising a pointed tip (1, 15) connected to a source of electrical potential, characterized in that said tip (1, 15) is aligned with an aperture (2, 14) in a thin sheet (3, 13), the distance between said tip (1, 15) and said aperture (2, 14) being between 1 and 10 nanometers, the diameter of said aperture (2, 14) being less than 1 micrometer, and the potential at said tip (1, 15) being such that free electrons are spontaneously emitted from said tip (1, 15) and passed through said aperture (2, 14) to form a beam (4) of charged particles on the downstream side of said sheet (3, 13).

4,954,712

## SPECIMEN RETAINING RING SYSTEM FOR AN ELECTRON MICROSCOPE

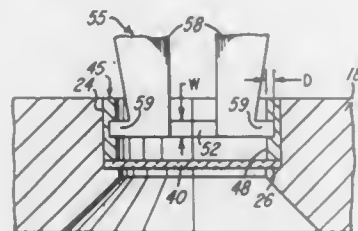
Harry P. Wilcox, 2761 Varisty Dr., Fairborn, Ohio 45324

Filed Oct. 16, 1989, Ser. No. 421,827

Int. Cl.<sup>3</sup> H01J 37/20

U.S. Cl. 250—440.1

15 Claims



1. In a specimen holder assembly for use in an electron microscope and including a specimen grid block defining a generally cylindrical bore extending from an inwardly projecting shoulder for supporting a circular specimen grid, an improved specimen grid retaining ring system comprising a generally cylindrical ring-like body extending into said bore and having an inner surface and an outer surface engaging said grid block, said body being split in an axial direction and being slightly flexible in a radial direction, means defining a recess within said inner surface, a hand tool having spaced relatively movable legs adapted to extend into said body, and said legs including outwardly projecting tip portions adapted to extend into said recess for releasably gripping said body with said tool to facilitate precision insertion and retraction of said body from said bore for removably retaining the specimen grid.

4,954,713

## DEVICE FOR CHARACTERIZING SEMICONDUCTOR SAMPLES BY PHOTOLUMINESCENCE WITH HIGH SPATIAL RESOLUTION AND AT LOW TEMPERATURE

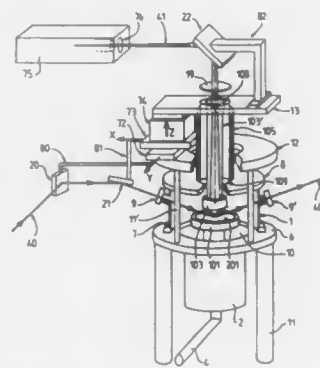
Jean Le Bris, Quincy-Sous-Senart; Marko Erman, Paris, and Gérard Gillardin, Villecresnes, all of France, assignors to U.S. Phillips Corporation, New York, N.Y.

Filed Jul. 7, 1989, Ser. No. 377,361

Claims priority, application France, Jul. 8, 1988, 88 09296  
Int. Cl.<sup>3</sup> G01N 21/64

U.S. Cl. 250—458.1

22 Claims



1. A device for characterizing wafers of semiconductor materials by photoluminescence with high spatial resolution and at low temperature, this device comprising at least:

- a cryostatic vacuum chamber provided with a cooled sample carrier adapted to receive the wafers and provided with at least one window for the transmission of the light beams implied in the photoluminescence process;
- optical means for forming a luminous spot on the wafer from a laser beam and for transmitting the re-emitted photoluminescence beam to a detector, characterized in that the optical means comprise first optical means for forming on the wafer from the laser beam a wide unfocused luminous spot and second optical means with high resolution for forming with a magnification exceeding unity on the receiving surface of the detector the photoluminescence image of the surface of the luminous spot, a device characterized in that said optical means comprise a catadioptric optical system comprising mirrors having a large numerical aperture arranged in the path of the photoluminescence beam and operating at the diffraction limit so that from a large central zone of the surface to the luminous spot considered as an object a quasi parallel image beam is formed at the wavelength of the photoluminescence with a large magnification and in that the detector is apt to supply a digitized image thereof.

4,954,714

## APPARATUS FOR TIME-RESOLVED PHOTOGRAPHY OF FLUORESCENCE

Alfred Pollak, and Michael Maszkiewicz, both of Toronto, Canada, assignors to HSC Research Development Corporation, Toronto, Canada

Filed Sep. 26, 1988, Ser. No. 248,723

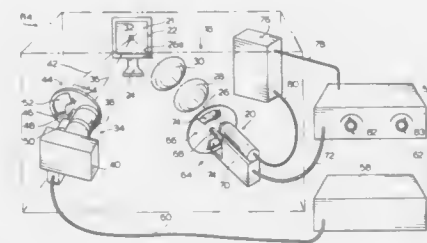
Int. Cl.<sup>3</sup> G03B 15/04, 42/08; G03C 5/04

U.S. Cl. 250—458.1

12 Claims

1. An apparatus for time-resolved photographic analysis of an excited sample capable of emitting fluorescent radiation, said apparatus comprising means for emitting radiation pulses at a prescribed frequency for exciting a sample which may contain a label capable of fluorescing on a prolonged basis when excited compared to short-lief background fluorescence of a sample, means for holding a sample to be analyzed,

means for focusing radiation pulses emitted by said radiation emitting means along a first path towards a sample held by said holding means, a camera focused along a second path on a sample held by said holding means where said second path diverges in relation to said first path, said camera being adapted to expose continuously a photographic film in said camera at least while said apparatus is in operation, a rotating chopper element having at least one aperture located therein which repetitiously crosses said second path, drive means for rotating said chopper element, means for coordinating phase relationship of the rotation of



said chopper element relative to said prescribed frequency of radiation pulses from said emitting means, said coordinating means being adjustable to select a phase relationship which causes each of said apertures to cross said second path to expose photographic film of said camera to fluorescent radiation emitted by a fluorescing label present in a sample after short-life background fluorescence of sample components has subsided and before the next pulse of radiation from said emitting means occurs, said photographic film of said camera being repetitively exposed to fluorescent radiation to record thereby all photon energy from repetitive exposures on said photographic film of fluorescent radiation received from repetitive fluorescent emissions of a fluorescing label in a sample being analyzed.

4,954,715

## METHOD AND APPARATUS FOR AN OPTIMIZED MULTIPARAMETER FLOW-THROUGH PARTICLE AND CELL ANALYZER

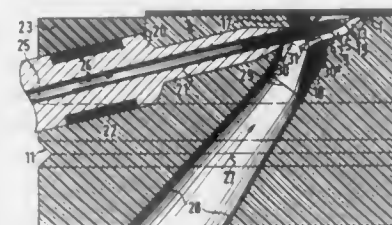
Tibor Zöld, Philippi Str. 13, 4400 Münster, Fed. Rep. of Germany

Continuation of Ser. No. 372,232, Jun. 26, 1989, abandoned, which is a continuation of Ser. No. 598,151, Apr. 9, 1984, abandoned. This application Jan. 29, 1990, Ser. No. 474,628

Int. Cl.<sup>3</sup> G01N 21/64, 21/05

U.S. Cl. 250—461.1

22 Claims



a body;  
a tube forming a nozzle within said body for leading a center-stream liquid coaxially into a chamber of said nozzle, said nozzle chamber having smooth, hydrophilic and streamlined curved inside walls so that said chamber is turbulence-free, a large part of the chamber being occupied by said nozzle; an entrance channel joined to said chamber so as to lead the liquid for the enveloping stream into said chamber with a small angle between the enveloping stream and the nozzle, so that the nozzle splits the entering enveloping stream into three partial streams including one partial stream flowing underneath the nozzle and two partial streams flowing around the nozzle, said entrance channel having a cross-sectional shape substantially the same as that of said chamber at a point where said chamber and said entrance channel are joined;  
a surface combination included at the top of the nozzle, said surface combination having a concave-sided wedge-shape, and being tightly fitted against the nozzle so as to force said two partial streams flowing around the nozzle to reunite at a small angle and be parallel to the nozzle; and  
the inside walls of said chamber being formed so as to reunite said three partial streams at a small angle with respect to each other and to wrap around the nozzle so as to form a hollow turbulence-free stream, so that said hollow stream sweeps bubbles out of the chamber and fills up a space between said nozzle and the walls of said chamber completely and in an air-bubble-free manner;  
said nozzle having a tapered top so as to allow the reunited streams to form the hollow stream which envelops the very thin center stream and focuses it hydrodynamically at a pointed part of the wedge-shaped surface combination as said stream combination leaves said chamber, so that a stable thin center-stream is reliably obtained.

4,954,716

## PACKAGE AND SUPPORT STRUCTURE FOR RADIATION DETECTOR

Robert V. Wheeler, Lemont, Ill., assignor to Tech/Ops Land-aer, Inc., Glenwood, Ill.

Filed Jul. 13, 1988, Ser. No. 218,640

Int. Cl.<sup>3</sup> G03B 42/00; G01T 1/04

U.S. Cl. 250—482.1

20 Claims



1. A package for shielded handling of detector element and for selective exposure of said detector element to irradiation such as in radon detection, said package comprising:

- a support structure for securing said detector within said package;
- a shielding structure for selective insulation of said detector member from said radiation in a shielding position of said support structure;
- an exposure structure for exposing said detector member to said irradiation or the like in an exposing position of said support structure, said exposure structure and said shielding structure being longitudinally separated for enabling said selective exposure; and
- transport means carrying said support structure and detector member for longitudinally displacing said sup-

port structure and detector member between said shielding and exposure structures in order to selectively displace said detector member between said shielding and exposing positions of said support structure.

4,954,717

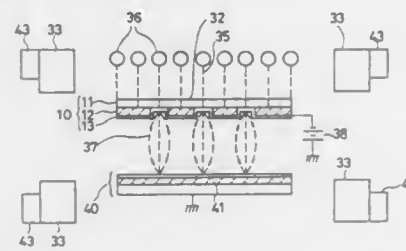
**PHOTOELECTRON MASK AND PHOTO CATHODE IMAGE PROJECTION METHOD USING THE SAME**  
Kilichi Sakamoto, Tokyo; Hiroshi Yasuda, Yokohama; Akio Yamada, and Jinko Kudou, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 13, 1988, Ser. No. 283,982

Claims priority, application Japan, Dec. 15, 1987, 62-316901  
Int. Cl.<sup>5</sup> H01J 40/06

U.S. Cl. 250-492.3

15 Claims



1. A photoelectron mask for photo cathode image projection, comprising:

- a transparent substrate;
- a pattern formed on a main surface of said transparent substrate, said pattern including a non-transparent material; and
- a photo cathode film formed covering the main surface of said transparent substrate on which said pattern is formed and having a thickness between 10 to 300 Å, said photo cathode film including a material selected from the group consisting of pure platinum, a platinum-rich material containing platinum as the major component, and a platinum compound.

4,954,718

**CIRCUIT ARRANGEMENT FOR DRIVING A PULSE-MODULATED INFRARED-RADIATION SOURCE**  
Hans Mattheissen, Gross Parin, Fed. Rep. of Germany, assignor to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

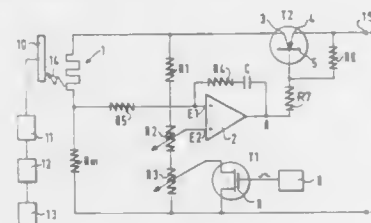
Filed Jan. 5, 1989, Ser. No. 361,487

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1988, 3819987

Int. Cl.<sup>5</sup> H01K 1/02

U.S. Cl. 250-493.1

6 Claims



1. A circuit arrangement for providing a pulse-modulated power feed to an infrared radiation source which emits radiation detected by a receiver, the circuit arrangement comprising:

- power supply means for supplying power for the radiation source;
- control means for applying said power to said radiation source to directly control said radiation source alternately between an upper temperature desired value  $T_o$  for the duration of the pulse to cause said radiation source to radiate energy measuring signals to enable said receiver to

detect measurement data and a lower temperature desired value  $T_u$  during the pulse off-time to cause said radiation source to radiate energy reference signals to enable said receiver to detect reference data; said control means having a desired value input; and, pulse generating means connected to said control means at said desired value input for triggering the change between said two desired values ( $T_o$ ,  $T_u$ ).

4,954,719

**SHEET THICKNESS GAUGING METHOD AND SYSTEM WITH AUTO CALIBRATION**

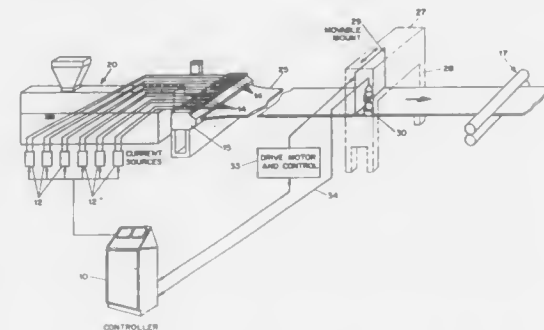
Holton E. Harris, Westport, Conn., assignor to Harrel, Inc., East Norwalk, Conn.

Filed Sep. 7, 1988, Ser. No. 241,486

Int. Cl.<sup>5</sup> G01N 21/86

U.S. Cl. 250-560

13 Claims



1. In a method of gauging extruded sheet of the kind that includes the movement of a gauge transversely across the extruded sheet during regular thickness gauging of the sheet, the improved calibration for sheet width comprising the steps of:

- (a) moving the gauge to a first position near a first edge of the sheet;
- (b) moving the gauge more slowly towards the first edge;
- (c) monitoring the sheet thickness with the gauge during the progress of the gauge towards the first edge;
- (d) determining when apparent thickness measurement has dropped a predetermined substantial amount signifying the first edge of the sheet being located in the area of inspection of the gauge; and
- (e) setting a limit to the regular thickness gauging movement of the gauge across the sheet at a location proximate the location where the gauge resides when the apparent thickness measurement has dropped the predetermined substantial amount that signifies the sheet edge.

4,954,720

**METERING APPARATUS AND METHOD FOR THE MEASUREMENT OF A FIXED LENGTH OF CONTINUOUS STRAND**

Thomas H. Jensen, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 3, 1990, Ser. No. 460,491

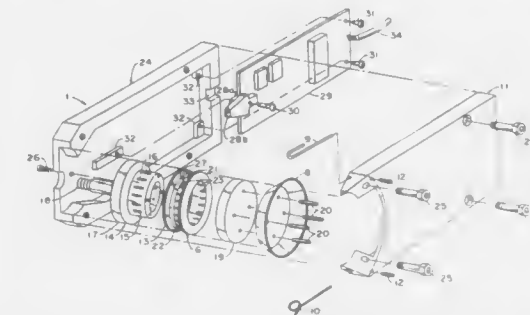
Int. Cl.<sup>5</sup> G01V 9/04

U.S. Cl. 250-561

30 Claims

1. In an apparatus for measuring a fixed length of strand as it is advanced from a supply source onto a rotating take-up reel by an appropriately powered winding mechanism operatively connected between said supply source and take-up reel so as to engage said strand and cause it to advance past an annular rotatable metering rim interposed between said supply source and take-up reel, the path of said advancing strand being partially wrapped about the circumference thereof, thereby causing said rim to rotate concentrically about a stationary hub

contained within a housing, said hub having means therein for the introduction and exit of a pressurized gas into the annular region formed between said hub and the inner wall of said rim thereby supporting the rim on a layer of pressurized gas about which said rim rotates at substantially the same tangential velocity as said advancing strand and with substantially zero



friction, the improvement comprising: a metering rim having a plurality of apertures through the surface thereof to allow said pressurized gas to partially escape from the annular region between said stationary hub and inner wall of said rim whereby any broken filaments of said strand are sloughed off from the surface of said rim.

4,954,721

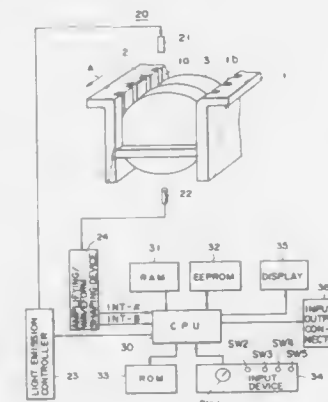
**APPARATUS FOR DETECTING AN ARRAY OF WAFERS**  
Fujio Suzuki, Shiroshima, Japan, assignor to Tel Sagami Limited, Kanagawa, Japan

Filed Mar. 29, 1989, Ser. No. 330,214

Claims priority, application Japan, Mar. 30, 1988, 63-76968  
Int. Cl.<sup>5</sup> G01N 21/86

U.S. Cl. 250-561

11 Claims



1. An apparatus for detecting an array of wafers, comprising: reference information generating means for generating reference information from the reference condition in which wafers are arranged on a first wafer carrier; window setting means for setting wafer-detecting windows at those positions where the wafers are to be arranged on a second wafer carrier, in accordance with the reference information supplied from said reference information generating means; wafer detecting means for detecting the wafers arranged on the second wafer carrier and generating information representing the presence of the wafers on the second wafer carrier; signal generating means for generating signals from the information generated by said wafer detecting means; and wafer-position determining means for collating the signals supplied from said signal generating means with said wafer-detecting windows, thereby to detect the shape of that portion of any signal that corresponds to a wafer

window, and to determine the position of the wafer from the shape of said portion of the signal.

4,954,722

**SCANNING SCATTERING MICROSCOPE WITH HEMISPHERICAL MIRROR AND MICROFOCUSED BEAM**

Joseph Fine, Silver Spring, and Denes Marton, Rockville, both of Md., assignors to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed Jul. 21, 1989, Ser. No. 382,884

Int. Cl.<sup>5</sup> H01J 3/14; G01N 21/86, 21/47

U.S. Cl. 250-571

4 Claims



1. A scanning scattering microscope apparatus for providing two dimensional micrographs of the overall surface microtopography of a specimen in response to the quantitative measurement of off-specularly reflected light wherein the apparatus comprises:

- a light source unit comprising a conventional light source;
- a focusing unit comprising a focusing lens for producing a micro focused beam of light from said light source;
- a sample holding unit comprising a movable sample holding member wherein the sample holding member is designed to accommodate a specimen and is movable in the x, y, and z planes relative to the longitudinal axis of said focused beam of light which can scan the entire surface area of said specimen;
- a light beam scanning unit which can scan the focused beam on a point by point basis in an X-Y direction over the specimen surface to obtain a high lateral resolution image of surface features;
- a mirror unit comprising an apertured hemispherical mirror having an aperture hole formed therein at a location that is slightly offset relative to the center of the external periphery of the mirror; and,
- a detector unit comprising a conventional photodetector member which is mounted at a point which is symmetrically located with respect to the focal point of the focusing lens wherein the center of symmetry is the center of the hemispherical mirror; and, wherein the signal output of the photodetector member provides data that can be used to produce a quantitative measurement of off-specularly reflected light from the specimen to plot a two-dimensional micrograph of the surface microtopography of the specimen.

4,954,723

**DISK SURFACE INSPECTION METHOD AND APPARATUS THEREFOR**

Ippel Takahashi, and Takeshi Wakita, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 13, 1989, Ser. No. 372,632

Claims priority, application Japan, Jun. 13, 1988, 63-145356  
Int. Cl.<sup>5</sup> G01N 21/89

U.S. Cl. 250-572

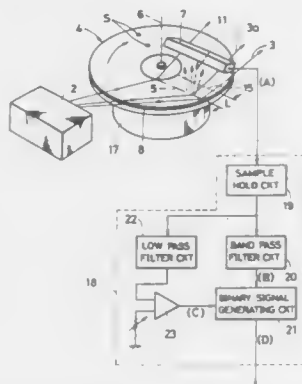
4 Claims

1. A method of scanning a surface of a disk having signal recording pits or bumps covered with a transparent layer, with a flying spot to detect surface defects of the disk surface, said method comprising:

- rotating said disk at a constant speed of rotation;
- scanning said disk surface along a scanning line parallel to



but spaced from a line radial to the center of rotation of said disk; and



receiving diffused light reflected by said disk surface to provide output corresponding to the intensity of said diffused light.

4,954,724

## OPTICAL FUEL GAUGE FOR VEHICLES

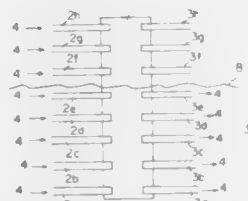
Hideo H. Koda, 1880 Century Park East, Ste. 519, Los Angeles, Calif. 90067, and Bill Yoshida, 6242 Warner Ave., Apt. 23 E, Huntington Beach, Calif. 92647

Continuation of Ser. No. 178,144, Apr. 6, 1988, abandoned. This application Dec. 26, 1989, Ser. No. 456,945

Int. Cl.<sup>5</sup> G01N 15/06

U.S. Cl. 250—577

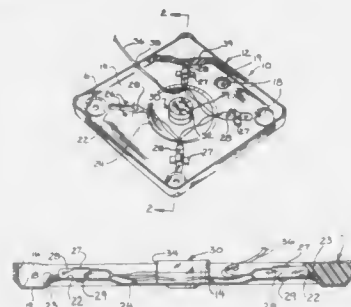
5 Claims



1. A fuel gauge to be provided in a fuel tank for vehicles, comprising:

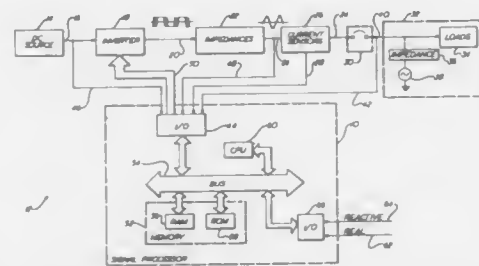
- a light source;
- a set of light emitting optical fibres, said fibres being arranged such that first light receiving ends thereof are disposed adjacent to said light source and second light emitting ends thereof are vertically distributed;
- a set of light receiving optical fibres, said fibres being arranged such that a first light receiving end thereof is aligned along a straight line optical path with a corresponding second light emitting end of said light emitting optical fibre and second ends thereof are disposed to a display means; and
- a solid optical medium provided in between and in said optical straight line path between said second ends of said light emitting optical fibres and said first ends of said light receiving optical fibres with a fluid space between said ends of said light emitting and light receiving optical fibers and said optical medium, said medium being positioned such that light emitted from said second end of said light emitting optical fibres reaches said first end of said light receiving optical fibres only if fuel is disposed on said fluid space between said ends and said optical medium.

4,954,725  
BI-PLANAR SWITCH DEVICE WITH LEVEL INDICATOR  
Todd Webster, South Bend, Ind., assignor to Power Components of Midwest, Inc., Mishawaka, Ind.  
Filed Mar. 20, 1989, Ser. No. 326,565  
Int. Cl.<sup>5</sup> H01H 35/02, 35/14  
U.S. Cl. 307—10.1 1 Claim



1. A switch device adapted for connection to a vehicle, said switch device for indicating the orientation of said vehicle relative to horizontal and comprising a base, a plurality of switches, said base having a plurality of seating means for supporting said plurality of switches, each switch being seated in a said seating means and having an open position and a closed position dependent upon the orientation of the switch relative to the horizontal, each switch supported in said seating means at a predetermined angle relative to said base, said angle being indicative of an at rest position of said vehicle relative to the horizontal when the switch device is connected to said vehicle, each of said switches independently shift between its open and closed positions when said vehicle is positioned at an angle which exceeds the switches predetermined angle, wherein each seating means is an indentation formed in said base, each indentation being spaced from another indentation and includes an end shoulder constituting means for supporting a portion of said switch whereby said predetermined angle of said switch is increased.

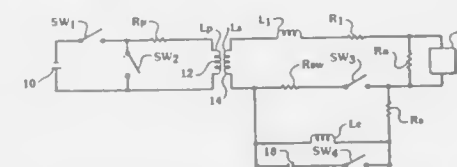
4,954,726  
SWITCHING AN INVERTER WITH STORED SIGNAL SEQUENCES  
Kenneth Lipman, and Douglas G. Young, both of West Hartford, Conn., assignors to International Fuel Cells Corporation, South Windsor, Conn.  
Continuation of Ser. No. 890,664, Jul. 30, 1986, abandoned. This application Dec. 22, 1989, Ser. No. 456,043  
Int. Cl.<sup>5</sup> H02J 3/18 2 Claims  
U.S. Cl. 307—46



1. A method for controlling the conduction states of the output stage switches of an inverter connected to a power grid for controlling the real and reactive power components of the single frequency output of the inverter to the grid according to the respective magnitudes of real and reactive power command signals, comprising the steps of:

storing a plurality of groups of sequences of transition initiating signals for initiating transitions in the conduction states of the inverter output stage switches, each sequence for effecting a selected number of inverter output current reversals, each group of stored sequences having the same number of transition initiating signals within each of its sequences which is different than the number of transition initiation signals in the sequences of each other group; selecting in response to a reactive power command signal a stored sequence of transition initiating signals from one of said groups and providing a corresponding timed sequence of inverter output current reversals which in turn effects the commanded reactive power output component, said selected one of said groups being a group having a greater number of transition initiating signals in each of its sequences for a decreasingly leading and increasingly lagging reactive power command signal, said selected one of said groups being a group having a lesser number of transition signals in each of its sequences for an increasingly leading and decreasingly lagging reactive power command signal; and responding to leading and lagging real power command signals by respectively advancing and retarding the phase of the selected sequence to effect the commanded real power output component.

4,954,727  
HYBRID TRANSFORMER CURRENT ZERO SWITCH  
Mohamed A. Hilal, Madison, Wis., assignor to General Dynamics Corp., Space Systems Division, San Diego, Calif.  
Filed Aug. 1, 1988, Ser. No. 227,974  
Int. Cl.<sup>5</sup> H02B 1/24 6 Claims  
U.S. Cl. 307—112



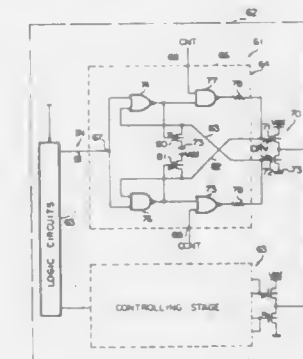
1. A hybrid transformer current-zero switch, said transformer having a primary winding formed from a conductor means which has minimal resistance when in a superconducting first state and substantially uniform resistance along its length in a normal conducting second state, a load, a normal conducting secondary winding one end of which is connected directly to said load, means for establishing said primary winding in said first state, first power means for charging said primary winding while in said first state and means for changing said primary winding from said first state to said second state causing the charge in said primary winding to be transferred to said secondary winding and said load comprising:  
a series parallel circuit connected between the other end normal conducting secondary winding and said load said series parallel circuit comprising a switch in parallel with storage inductor; and  
a second power supply for selectively charging said storage inductor, when said storage inductor is fully charged and said switch is closed just prior to said primary winding changing from said first to said second state high current flows through said switch and when said charge on said primary winding is transferred to said secondary winding current flows in said secondary winding causing said high current flow through said switch to approach zero whereby said switch can be opened without damage thereto thereby transferring the stored energy from said storage inductor into said load.

4,954,728  
STABILIZED GENERATOR FOR SUPPLYING A THRESHOLD VOLTAGE TO A MOS TRANSISTOR  
Antoine Pavlin, Aix En Provence, France, assignor to SGS-Thomson Microelectronics S.A., Gentilly, France  
Filed Mar. 6, 1989, Ser. No. 318,870  
Claims priority, application France, Mar. 9, 1988, 88/03751  
Int. Cl.<sup>5</sup> H03K 3/01; H03F 3/45 12 Claims  
U.S. Cl. 307—296.8



1. A stabilized bias generator for supplying a biasing voltage to a threshold voltage circuit wherein the threshold circuit supplies a threshold voltage to a MOS transistor of an integrated circuit, said threshold voltage circuit including a first comparator (1) having first and second inputs for respectively receiving an input voltage and a reference voltage, and an output connected to a first inverter (2) said biasing voltage being equal to the threshold voltage of the MOS transistor (M) when input voltages applied to said first and second inputs of said first comparator (1) are substantially equal, said stabilized bias generator comprising:  
a second comparator (11) substantially equivalent to said first comparator (1) and having first and second inputs interconnected to receive a reference voltage;  
a second inverter (12) substantially equivalent to said first inverter (2) and connected to receive an output from said second comparator; and  
a third inverter (13) connected to receive an output from said second inverter (12) and an output (14) connected to supply said biasing voltage to said first and second comparators (1,11), said third inverter (13) having a threshold voltage substantially equal to the threshold voltage of the MOS transistor.

4,954,729  
OUTPUT BUFFER CIRCUIT USED FOR STABLE VOLTAGE SOURCE  
Takahiko Urai, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan  
Filed Jun. 27, 1989, Ser. No. 371,865  
Claims priority, application Japan, Jun. 27, 1988, 63-159655  
Int. Cl.<sup>5</sup> H03K 17/16, 19/02, 5/12 11 Claims  
U.S. Cl. 307—443

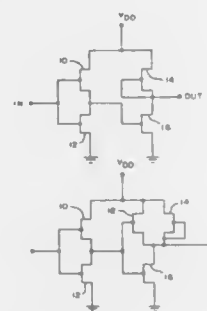


1. An output buffer circuit for a bit of an input signal, comprising  
(a) an output stage formed by a series combination of first

and second field effect transistors supplied with a pair of driving signals, respectively, for being complementarily shifted between on-states and off-states and coupled between first and second constant voltage sources respectively producing first and second voltage levels different in voltage level from each other, said driving signals taking high and low voltage levels in first and second states, respectively,

- (b) an output node provided between said first and second field effect transistors, and
- (c) a controlling stage supplied with the bit of said input signal and operative to change the levels of said driving signals from one of said high and low voltage levels to the other of the high and low voltage levels through a transition period between said first and second states, a time delay taking place between the driving signals, in which said controlling stage comprises, (c-1) driving signal producing means responsive to the bit of said input signal and operative to produce said driving signals, (c-2) load means coupled to said driving signal producing means and operative to cause said driving signals to gradually swing between said high and low voltage levels, and (c-3) speed controlling means coupled between gate electrodes of said first and second field effect transistors and said driving signal producing means and responsive to voltage levels at the gate electrodes of said first and second transistors for accelerating changes in said first and second driving signals in said transition period thereby to slowly vary said driving signals in an early stage of said transition period and to rapidly vary said driving signal in a later stage of said transition period, thereby preventing said driving signals from overlapping in said transition period.

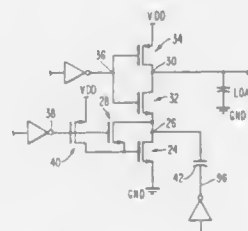
**4,954,730**  
**COMPLEMENTARY FET CIRCUIT HAVING MERGED ENHANCEMENT/DEPLETION FET OUTPUT**  
Kanji Yoh, Osaka, Japan, assignor to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.  
Filed Apr. 21, 1989, Ser. No. 342,224  
Int. Cl.<sup>3</sup> H03K 19/094, 17/12, 19/092, 17/687  
U.S. Cl. 307—451 12 Claims



1. An FET circuit comprising a complementary FET circuit including at least one pair of serially connected complementary enhancement-mode transistors having a common terminal therebetween and with an output terminal at said common terminal, and an output circuit including a first depletion-mode transistor serially connected with a first enhancement-mode transistor and having a common terminal therebetween, said first enhancement-mode transistor having a gate electrode

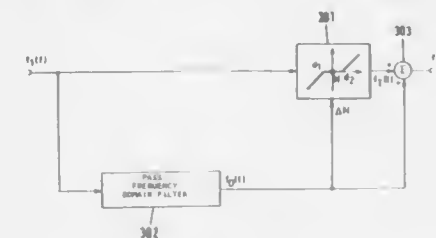
connected to said output terminal of said complementary FET circuit, the first depletion-mode transistor having a gate electrode connected to said common terminal of said first serially connected depletion-mode transistor and said first enhancement-mode transistor, the output terminal of said output circuit being said common terminal.

**4,954,731**  
**WORDLINE VOLTAGE BOOSTING CIRCUITS FOR COMPLEMENTARY MOSFET DYNAMIC MEMORIES**  
Sang H. Dhong, Mahopac; Wei Hwang, Armonk, and Nicky C. Lu, Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.  
Filed Apr. 26, 1989, Ser. No. 344,340  
Int. Cl.<sup>3</sup> H03K 17/10  
U.S. Cl. 307—482 11 Claims



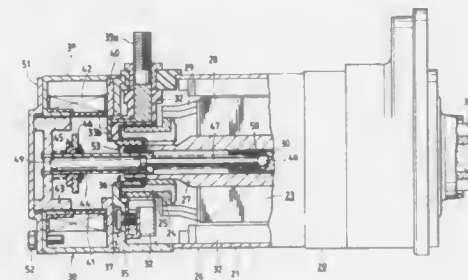
1. A voltage boosting clock circuit for semiconductor memory array wordlines comprising:  
a boost capacitor element,  
first, second, third, fourth and fifth transistor devices, said first and fifth transistor devices being of a first conductivity type and said second, third and fourth transistor devices being of a second conductivity type,  
said first and second transistor devices having electrodes thereof connected together at a first node to a wordline of a memory array,  
said third transistor device having an electrode thereof connected to an electrode of said second transistor device and an electrode thereof connected to said boost capacitor element,  
said fourth transistor device having an electrode thereof connected to an electrode of said second transistor device, said fifth transistor device having an electrode thereof connected to an electrode of said fourth transistor device, a source of potential VDD and a source of ground potential GND,  
said first and fifth transistor devices also having electrodes thereof connected to said potential source VDD, and said first transistor device having an electrode thereof connected to a source of timing signals at a second node, wherein initially said timing signals at said second node are in a first level condition and said first transistor device is on and said second transistor device is off, wherein said wordline connected to said first node is at a potential VDD,  
wherein, in response to said timing signals going to a second level condition, said first transistor device turns off, said second transistor device, turns on, the voltage level of VDD of said wordline connected to said first node discharges through at least said second transistor device and said wordline at said first node becomes connected to said boost capacitor through said second transistor device and the voltage level at said wordline therefore becomes more negative than said ground potential GND.

**4,954,732**  
**ADAPTIVE NONLINEAR FREQUENCY DOMAIN FILTER WITH LOW PHASE LOSS**  
Michael Surauer, Chieming, and Helmut Bltner, Munich, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow Blohm GmbH, Munich, Fed. Rep. of Germany  
Filed Jul. 28, 1988, Ser. No. 225,276  
Claims priority, application Fed. Rep. of Germany, Jul. 29, 1987, 3725107  
Int. Cl.<sup>3</sup> H03K 5/00, 1/00  
U.S. Cl. 307—520 25 Claims



1. A nonlinear frequency domain filter for the suppression of unwanted signals which are superposed on a wanted signal variable in a given frequency range, comprising a dead-zone member and a pass-band filter, the dead-zone member having a zero point, an input for receiving an input signal to be filtered and an output for providing an output signal, the pass-band filter having an input for receiving said input signal and also having an output for providing an output signal, said input signal comprising said wanted signal and said unwanted signals, and further comprising means for zero point adaptation of said dead-zone member such that the zero point follows proportionally said output signal of the pass-band filter, the output signal from the pass-band filter further being added to the output signal from the dead-zone member to provide an output signal of the filter.

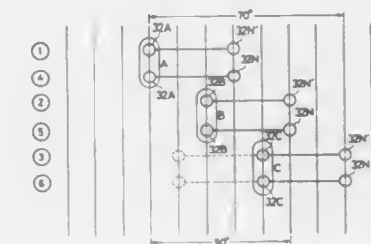
**4,954,733**  
**COAXIAL STARTER**  
Shuzoo Isozumi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Mar. 16, 1989, Ser. No. 324,506  
Claims priority, application Japan, Mar. 17, 1988, 63-66019  
Int. Cl.<sup>3</sup> H02K 11/00, 7/10; F02N 11/00  
U.S. Cl. 310—71 2 Claims



1. A coaxial starter comprising:  
an electric motor having an armature shaft which is hollow;  
an output rotary shaft which is disposed at a front end of said motor and inserted in an internal opening of said armature shaft at one end of said output rotary shaft so as to be slidable in an axial direction of said output rotary shaft and has a pinion at another end thereof so that said pinion is engaged with or disengaged from a ring gear of an engine;  
an electromagnetic switch disposed at a rear end of said

motor so as to energize said motor and slide said output rotary shaft;  
a housing nearly shaped as a cup and having a through hole in a rear portion of said housing provided between a yoke of said motor and said switch;  
a bearing for supporting said armature shaft and provided in said housing;  
a brush holder of said motor supported in such a manner that said holder is covered with said housing and projects out of a nearly central portion of said housing; and  
fixed contact members attached to said holder integrally therewith and projecting out of said through hole in such a manner that said fixed contact members face a movable contact of said switch, wherein a disk-shaped hollow core, which constitutes a magnetism passage of the electromagnetic switch, is provided in contact with the rear end of the housing; and said fixed contact members project out of the through hole of said housing and a notch of said core in such a manner that said core is supported around said fixed contact members.

**4,954,734**  
**THREE PHASE ALTERNATOR WITH COMMON NEUTRAL LEADS**  
Kazuyoshi Iguchi; Tashima, Masatoshi; Ryoichi Tazi; Soichi Yoshino, and Motoo Yagi, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed May 26, 1988, Ser. No. 199,074  
Claims priority, application Japan, May 26, 1987, 62-130223; May 27, 1987, 62-134293  
Int. Cl.<sup>3</sup> H02K 15/04; H01R 13/415  
U.S. Cl. 310—71 4 Claims



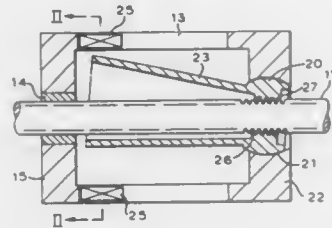
1. In a stator of a vehicle mounted alternator having a rotor and a rectifier, said stator including an armature core formed in an inner periphery thereof with a plurality of slots and three-phase armature coils wound in respective said slots of said armature core, coil lead terminals and a neutral lead terminal of said armature coils for each phase being arranged in a limited area so that connections thereof to said rectifier of said alternator are facilitated, an improvement comprising said neutral leads of said armature coils for three phases derived directly at a single position between said coil leads of said armature coils, respectively, to thereby minimize the length of said neutral leads of each phase to said single position and at least one metal binder for bundling and electrically connecting said neutral leads together at said point from which a neutral lead terminal to be connected to said rectifier is derived.

**4,954,735**  
**LINEAR ACTUATOR**  
Bryan N. V. Parsons, Stoney Stanton, England, assignor to Jaguar Cars Limited, England  
Filed May 14, 1989, Ser. No. 366,592  
Claims priority, application United Kingdom, Jun. 16, 1988, 8814324  
Int. Cl.<sup>3</sup> H02K 7/06  
U.S. Cl. 310—82 6 Claims

1. A linear actuator comprising a screw threaded shaft



mounted so that it is restrained from rotational movement, a cage mounted in sliding relationship on the shaft, an internally threaded member mounted towards one end of the cage in a spherical bearing, the threadform of the internally threaded member being similar to that of the shaft but of larger diameter, the internally threaded member having a skirt formation coaxial with the internal thread, said skirt formation extending towards the other end of the cage, at least a circumferential



portion of the skirt formation remote from the internally threaded member being made of ferromagnetic material, and a series of angularly spaced coils being provided around the cage adjacent to the ferromagnetic portion of the skirt, said coils being arranged to be energized sequentially, so that they will attract the ferromagnetic portion of the skirt and cause the internally threaded member to skew so that the threads thereof engage the threads of the shaft.

4,954,736

#### PERMANENT MAGNET ROTOR WITH MAGNETS SECURED BY SYNTHETIC RESIN

Tetsuo Kawamoto; Ryo Motohashi; Toshihiro Sakamoto; Yasuo Suzuki, and Hideaki Abe, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Japan

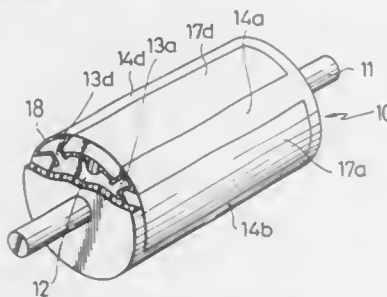
Filed Apr. 20, 1989, Ser. No. 340,764

Claims priority, application Japan, Apr. 25, 1988, 63-101788; Jan. 27, 1988, 63-158461

Int. Cl.<sup>5</sup> H02K 21/12, 1/04, 1/22

U.S. Cl. 316—156

9 Claims



1. A permanent magnet rotor comprising:

a rotor shaft;

a yoke which is coaxially secured to said rotor shaft, said yoke having a central portion and a plurality of magnet-holding projections which project radially outward from the central portion of said yoke and extend in the axial direction of said yoke, each magnet-holding projection having a radially inner end which is secured to the central portion of said yoke and a radially outer end which has a greater width than the radially inner end;

a plurality of permanent magnet segments which extend in the circumferential direction of said yoke between adjacent magnet-holding projections, each of said magnet segments having end portions cooperating with the radially outer ends of said magnet-holding projections in the circumferential direction of said yoke to prevent the segment from moving radially outward, each segment being separated from said yoke by a gap along at least a portion of its periphery, the end portions being separated from said magnet-holding projections by gaps;

thermosetting synthetic resin filling the gaps between said

magnet segments and said yoke and between the end portions of said segments and said magnet-holding projection and maintains the positions of said permanent magnet segments constant with respect to said yoke; and said yoke having a recess which is formed on the outer periphery of the central portion of said yoke in the gap between the central portion and said permanent magnet segments, which extends in the axial direction of said yoke, and which is filled with said synthetic resin.

4,954,737

#### PULSE GENERATOR FOR A ROTARY SPEED SENSOR

Jean Guichard, La Garenne Colombes, France, assignor to Messier-Hispano-Bugatti, Montrouge, France

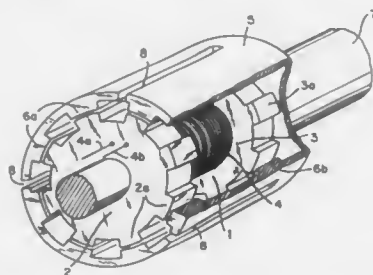
Filed Jun. 21, 1989, Ser. No. 369,606

Claims priority, application France, Jun. 30, 1988, 88 08837

Int. Cl.<sup>5</sup> H02K 1/22; G01P 3/48

U.S. Cl. 310—168

4 Claims



1. A pulse generator having a magnetic circuit closed around a stationary part by a portion of the wall of a bell-shaped part rotating about its axis and coupled at one of its ends to a drive member, said wall portion and said stationary part together defining an air gap which varies depending on the relative angular positions of the wall portion and the stationary part, such that during rotation magnetic field variations are generated at a frequency proportional to the speed of rotation of the rotation part, the generator including an electrically conductive winding in which the field variations generate electrical pulses, wherein the wall includes at least one longitudinal slot.

4,954,738

#### CURRENT SOURCE TECHNOLOGY

Gene J. Gaudenzi, Purdys, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 197,779, May 23, 1988, abandoned.

This application Mar. 20, 1990, Ser. No. 497,758

Int. Cl.<sup>5</sup> H03K 19/013, 19/086, 5/12

U.S. Cl. 307—454

5 Claims

1. A high speed, low power, current-controlled logic system comprising:

a first section including input logic means (T1) for receiving a logic input signal and providing an output current in response thereto,

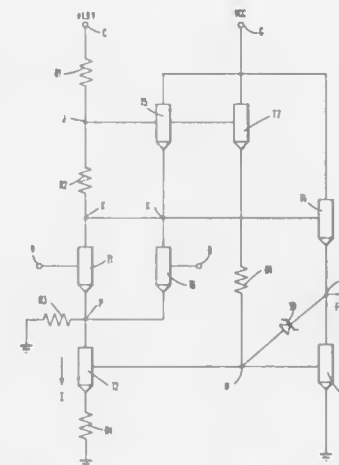
(a) an output section (T3) having an input (M), said output section (T3) providing an output signal (F) in response to a signal at said input (M) thereof,

(b) a switching device having a lower current circuit (T7 and RB) and a higher current circuit (T2)

(1) said higher current circuit (T2) including a higher current transistor (T2) carrying said output current from said input logic means (T1), and

(2) said lower current circuit (T7 and RB) providing a rapid change in potential across said lower current

circuit in response to a change in said higher current circuit, and



means for coupling said rapid change in potential from said low current circuit to the input (M) of said output section (T3).

4,954,739

#### SERVO MOTOR WITH HIGH ENERGY PRODUCT MAGNETS

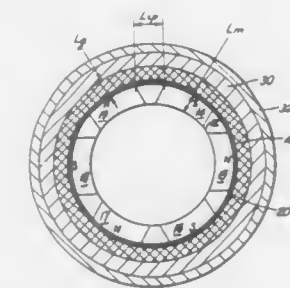
Roy D. Schultz, Dearborn, Mich.; Thomas R. England, and A. Clark Altizer, both of Radford, Va., assignors to Kollmorgen Corporation, Simsbury, Conn.

Continuation of Ser. No. 27,843, Mar. 19, 1987, abandoned, which is a continuation-in-part of Ser. No. 709,763, Mar. 8, 1985, Pat. No. 4,679,313. This application Nov. 3, 1988, Ser. No. 270,373

Int. Cl.<sup>5</sup> H02K 21/14

U.S. Cl. 310—156

18 Claims



1. A dynamoelectric machine operating near the maximum energy point and having a high resistance to demagnetization and low roll-off to enable a high peak torque, comprising:

a permanent magnet rotor including a plurality of radially extending NdFeB permanent magnets providing pole faces separated by a non-magnetic medium, and each magnet having an energy product in excess of 30 MGOe; a slotless cylindrical outer stator shell of magnetic material defining an air gap between said magnets and said stator shell;

an insulated wire winding secured to the inside surface of said stator shell; and

an encapsulating resin for impregnating said insulated wire winding to secure said winding to said slotless stator shell and, for withstanding the maximum torque force throughout the range of operating temperatures; wherein said energy product and a ratio of the spacing between said pole faces to said air gap enable the machine

to operate near the maximum energy point, have a high resistance to demagnetization and have low roll-offs for enabling a high peak torque.

4,954,740

#### STATOR WINDING FOR TWO-SPEED ELECTRODYNAMIC MACHINES HAVING FRACTIONAL SPEED RATIOS

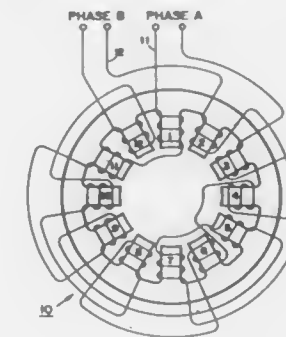
Robert N. Brigham, Monroe, Conn., assignor to The Superior Electric Company, Bristol, Conn.

Filed Oct. 27, 1987, Ser. No. 112,781

Int. Cl.<sup>5</sup> H02K 1/00

U.S. Cl. 310—185

3 Claims



1. A stator for an A.C. motor, comprising: a plurality of legs, each leg having wound thereon an energizing coil, said coils being serially connected in one of two phases, in one of first and second conditions, to produce the polarities in the following table, where p = the number of stator pole pairs and n = all integers from 2 to p, inclusive:

First Condition		
Leg No.	Phase	Polarity
1 + 4(p' - n)	A	+
2 + 4(p' - n)	B	+
3 + 4(p' - n)	A	-
4 + 4(p' - n)	B	-
Second Condition		
Leg No.	Phase	Polarity
1 + 6(p - n)	A	+
2 + 6(p - n)	A	+
3 + 6(p - n)	B	+
4 + 6(p - n)	B	+
5 + 6(p - n)	A	-
6 + 6(p - n)	B	-

where p' = 1.5 p;  
where p ≥ 2.

4,954,741

#### CONTROL CIRCUIT FOR A VIBRATION WAVE MOTOR

Etsuro Furutsu, Kawasaki, and Kazuhiro Izukawa, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 346,281, May 1, 1989, abandoned, which is a continuation of Ser. No. 143,753, Jan. 14, 1988, abandoned. This application Oct. 10, 1989, Ser. No. 420,619

Claims priority, application Japan, Jan. 19, 1987, 62-9442

Int. Cl.<sup>5</sup> H01L 41/08

U.S. Cl. 310—316

28 Claims

1. A control circuit for a vibration wave motor comprising: an electro-mechanical energy transducing element arranged on a vibration member;

application means for applying periodic signals to said en-

1. A multi-colored thin-film electroluminescent device comprising:  
a substrate;

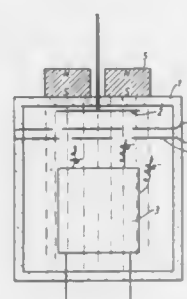


filter means for filtering light disposed on a first portion of a surface of said substrate;  
 first electrode means for providing a first selecting potential to said device, said first electrode means being disposed on said surface of said substrate and also overlying said filter means;  
 first insulator means for insulating said first electrode means, said first insulator means being disposed on said first electrode means;  
 first means for emitting light, said first light emitting means being disposed on a surface of said first insulator means and in optical alignment with said filter means;  
 second electrode means for providing a second selecting potential to said device, said second electrode means being disposed adjacent said first light emitting means; and  
 second insulating means for insulating said first light emitting means from said second electrode means, said second insulating means being disposed between said first light emitting means and said second electrode means.

**4,954,748**  
**THYRATRON GAS DISCHARGE DEVICE WITH MAGNETIC FIELD FOR IMPROVED IONIZATION**  
 Clifford R. Weatherup, Chelmsford, United Kingdom, assignor to EEV Limited, Chelmsford, United Kingdom  
 Filed Dec. 2, 1988, Ser. No. 278,892  
 Claims priority, application United Kingdom, Dec. 5, 1987, 8728503

Int. Cl.<sup>5</sup> H01J 17/14  
 U.S. Cl. 313—153

19 Claims



1. In a thyatron gas discharge device including an anode, a cathode and a grid structure located between said anode and said cathode; the improvement comprising means arranged to produce a magnetic field within the device such that charged particles of a discharge between said anode and said cathode have a longer path length than they would in the absence of the magnetic field whereby the amount of ionisation within the device is increased.

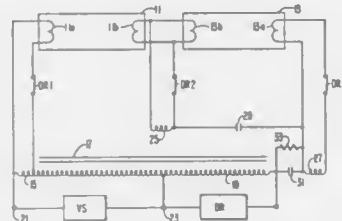
**4,954,749**  
**FLUORESCENT LAMP ELECTRODE DISCONNECT METHOD AND ARRANGEMENT FOR PRACTICING THE METHOD**  
 Joseph A. Crawford, Chicago, Ill., assignor to North American Phillips Corporation, New York, N.Y.  
 Filed Nov. 15, 1988, Ser. No. 271,557  
 Int. Cl.<sup>5</sup> H05B 41/00

U.S. Cl. 315—97

21 Claims

1. A rapid start fluorescent lamp system comprising, a plurality of fluorescent lamps each having a pair of electrodes, a ballast for connection to a source of voltage, said ballast including a primary winding, a secondary winding and a plurality of electrode windings connected to said electrodes, and disconnect means connected in parallel with said secondary

winding, said disconnect means being responsive to the voltage across said secondary winding when said plurality of lamps

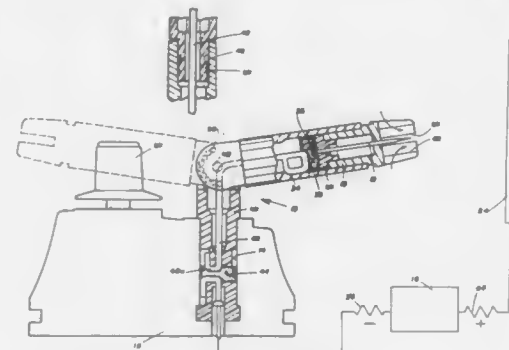


turn on for interrupting the connection of each of said electrodes to its respective electrode winding.

**4,954,750**  
**FLEXIBLE ION EMITTER**  
 Albert Barsimanto, 2242 Paradise Dr., Tiburon, Calif. 94920, and Maris Ambats, 77 Bleecker St., Apt. 533, New York, N.Y. 10012  
 Filed Jul. 7, 1988, Ser. No. 216,096  
 Int. Cl.<sup>5</sup> H01J 27/02

U.S. Cl. 315—111.81

8 Claims



1. A flexible ion emitter comprising:  
 a tubular barrel having an open discharge end;  
 a pointed electrode needle mounted along the axis of said barrel centrally spaced and contained entirely therein with the point thereof near said open end;  
 a support member;  
 an ion collector mounted in lateral spaced relation to the other end of said barrel;  
 said other end being pivotally mounted on said support member so that said barrel may be aimed at a selected angle to said ion collector;  
 means applying a voltage differential in excess of 5,000 volts to said electrode and said collector so that said electrode will project a stream of ions out said open end of said barrel to said collector.

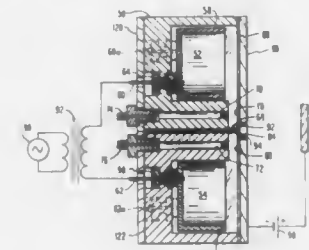
**4,954,751**  
**RADIO FREQUENCY HOLLOW CATHODE**  
 Harold R. Kaufman, 925 Columbia, Apt. 622, Fort Collins, Colo. 80525, and Raymond S. Robinson, 2612 Bradbury Ct., Fort Collins, Colo. 80521  
 Continuation of Ser. No. 838,765, Mar. 12, 1986, abandoned.  
 This application Oct. 27, 1988, Ser. No. 368,872  
 Int. Cl.<sup>5</sup> H01J 7/24

U.S. Cl. 315—111.81

12 Claims

1. A cathode assembly comprising:  
 a housing assembly;  
 a pair of electrodes mutually spaced apart within and electrically isolated from said assembly;  
 means for introducing an ionizable gas into the said housing

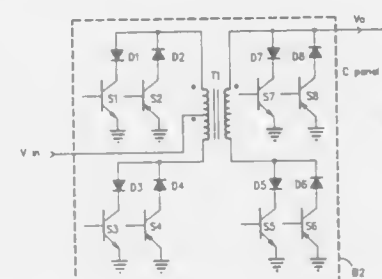
and into the individual vicinity of respective ones of said electrodes;  
 means for establishing an electrically balanced radio frequency energy discharge between said electrodes to create a plasma exhibiting respective plasma sheaths immediately adjacent to corresponding different ones of said electrodes beyond which sheaths the radio frequency voltages within said plasma, relative to said assembly, are substantially smaller than those within said sheaths;  
 and means for effecting extraction from said assembly of electrons created within said plasma.



**4,954,752**  
**ROW DRIVER FOR EL PANELS AND THE LIKE WITH TRANSFORMER COUPLING**  
 Edward L. Young, Shelton, and Mohan L. Kapoor, Orange, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.  
 Filed Dec. 9, 1988, Ser. No. 282,147  
 Int. Cl.<sup>5</sup> G09G 3/30

U.S. Cl. 315—169.3

16 Claims



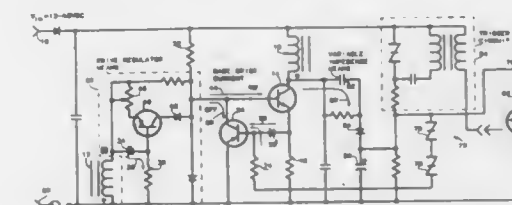
1. In an electrical display panel system, including:  
 a display panel having row and column electrodes, said panel being capable of displaying indicia thereon in response to appropriate electrical signals to said row and column electrodes from a row driver and column driver, respectively;  
 at least one electrical power source ( $V_{in}$ );  
 a column driver connected to a power source and being capable of electrically driving said column electrodes; and  
 an output load, including said row electrodes ( $C_{panel}$ ) of said panel, which load is essentially capacitive;  
 a row driver capable of electrically driving said row electrodes, said row driver being powered by said power source; and  
 row switches causing the drive signals from said row driver to be sequentially pulsed to said row electrodes;  
 the improvement in said row driver comprising:  
 a transformer coupling ( $T_1$ ) being provided between the row driver power source and the capacitive row electrode panel load, said transformer coupling having a primary coil and a secondary coil;  
 a first switch ( $S_1$  of FIG. 4;  $S_1$  or  $S_3$  of FIG. 6) with unidirectional current flow ( $D_1$  of FIG. 4;  $D_1$  or  $D_3$  of FIG. 6)

being connected to one end of said primary coil and to a common primary voltage reference level, with said power source ( $V_{in}$ ) being connected to a different end of said primary coil; said first switch when closed allowing said power source to provide a current flow through said primary coil, storing energy in it;  
 a second switch ( $S_2$  of FIG. 4;  $S_3$  or  $S_6$  of FIG. 6) with unidirectional current flow ( $D_2$ ;  $D_5$  or  $D_6$ ) being connected to one end of said secondary coil and to a common secondary voltage reference level, with the row electrode load ( $C_{panel}$ ) of the panel being connected across said secondary coil and said common secondary voltage reference level; the opening of said first switch causing the electrical energy in said primary coil to be provided to said capacitive row electrode load through said secondary coil, charging and driving said capacitive row electrode load; the closing of said second switch causing the transformer to be re-energized and the voltage across said capacitive row electrode load to at least approach said common secondary voltage reference level; the opening of said second switch allowing the energy restored in the transformer to be dumped back into said power source through said primary coil.

**4,954,753**  
**STROBE FLASH LAMP POWER SUPPLY WITH INPUT VOLTAGE FEEDTHROUGH AFTERFLOW PREVENTION CIRCUIT**  
 Scott T. Sikora, Mesa, Ariz., assignor to Tomar Electronics, Inc., Gilbert, Ariz.  
 Continuation of Ser. No. 42,357, Apr. 24, 1987, Pat. No. 4,775,821, which is a continuation-in-part of Ser. No. 794,415, Nov. 4, 1985, Pat. No. 4,755,723. This application Aug. 29, 1988, Ser. No. 238,039  
 Int. Cl.<sup>5</sup> H05B 37/02

U.S. Cl. 315—219

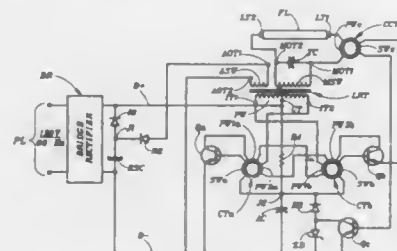
16 Claims



1. Apparatus for delivering current to an intermittently energized gaseous discharge tube having a low impedance conductive state and a high impedance non-conductive state, comprising:  
 a. a DC to DC converter for receiving a DC input voltage on a converter input terminal, for generating a pulsed output voltage on a converter output terminal and for periodically energizing the gaseous discharge tube into the low impedance conductive state, the apparatus defining a first current flow path for enabling the DC input voltage to cause a DC current to flow through the converter to the gaseous discharge tube;  
 b. energy storage means coupled between the converter output terminal and the gaseous discharge tube for periodically receiving and storing energy from the converter when the gaseous discharge tube is in the non-conductive state and for periodically transferring energy into the gaseous discharge tube when the tube is in the conductive state, the apparatus defining a second current flow path from the converter output terminal to the energy storage means and a third current flow path from the energy storage means to the gaseous discharge tube; and  
 c. a current limiting device coupled in series with the first current flow path between the converter output terminal and the energy storage means for limiting the flow of DC current from the converter input terminal into the gaseous

discharge tube to thereby prevent afterglow of the gaseous discharge tube caused by feedthrough of the DC input voltage.

**4,954,754**  
**CONTROLLED ELECTRONIC BALLAST**  
Ole K. Nilssen, Caesar Dr., Barrington, Ill. 60010  
Filed May 2, 1988, Ser. No. 189,399  
Int. Cl.<sup>5</sup> H05B 37/02, 39/04; G05F 1/00  
U.S. Cl. 315—219



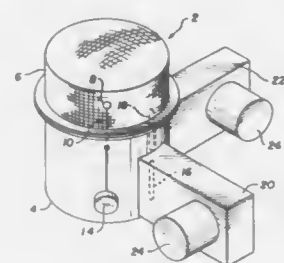
1. An arrangement comprising:  
a source of AC voltage;  
rectifier means connected with the source of AC voltage and operative to provide a first unidirectional current to a pair of DC terminals, there being a main DC voltage present across the DC terminals;  
inverter means connected with the DC terminals and operative to provide a high-frequency voltage at a high-frequency output, the frequency of the high-frequency voltage being substantially higher than that of the AC voltage;  
tuned L-C circuit means connected with the high-frequency output and operative to provide a high-frequency current at a pair of load terminals;  
lamp load means connected with the load terminals, the lamp load means being operative: (i) during certain periods to draw a certain amount of power from the load terminals; and (ii) during certain other periods to draw substantially less than said certain amount of power from the load terminals; and  
power feedback means connected in circuit between the high-frequency output and the DC terminals, the power feedback means including a source of auxiliary DC voltage and being operative therefrom to provide a second unidirectional current to the DC terminals, thereby to cause the instantaneous absolute magnitude of the main DC voltage to be approximately equal to the larger of: (i) the instantaneous absolute magnitude of the AC voltage; and (ii) the instantaneous absolute magnitude of the auxiliary DC voltage;  
the arrangement being operative to cause the instantaneous absolute magnitude of the auxiliary DC voltage to be: (i) substantially lower than the peak absolute magnitude of the AC voltage during said certain periods; and (ii) substantially equal to the peak absolute magnitude of the AC voltage during said certain other periods.

8 Claims

**4,954,755**  
**ELECTRODELESS LAMP HAVING HYBRID CAVITY**  
Donald Lynch, Germantown; Mohammad Kamarehi, Rockville; Michael G. Ury, Bethesda, and Charles H. Wood, Rockville, all of Md., assignors to Fusion Systems Corporation, Rockville, Md.  
Continuation of Ser. No. 865,488, May 21, 1986, Pat. No. 4,749,915, which is a continuation-in-part of Ser. No. 677,137, Nov. 30, 1984, abandoned, which is a continuation-in-part of Ser. No. 381,482, May 24, 1983, Pat. No. 4,507,587. This application Apr. 4, 1988, Ser. No. 177,434  
Int. Cl.<sup>5</sup> H05B 41/16

U.S. Cl. 315—248

6 Claims

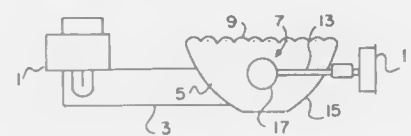


1. An electrodeless light source which is powered by a plurality of means for generating microwave energy, comprising:  
a microwave cavity having a cylindrical shape and being comprised of first and second portions of cylindrical shape,  
said first cylindrical portion being constructed of a mesh, and said second cylindrical portion being constructed of solid material,  
a bulb containing a plasma forming medium disposed in said cavity in or near said first cylindrical portion,  
said second cylindrical portion of said cavity having a plurality of coupling slots disposed therein parallel to the cylindrical axis of the cavity,  
a waveguide feeding each coupling slot, and  
a means for generating microwave energy feeding each waveguide.

**4,954,756**  
**METHOD AND APPARATUS FOR CHANGING THE EMISSION CHARACTERISTICS OF AN ELECTRODELESS LAMP**  
Charles H. Wood, Rockville, Md., and David Mosher, Falls Church, Va., assignors to Fusion Systems Corporation, Rockville, Md.  
Continuation of Ser. No. 73,670, Jul. 15, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 256,227  
Int. Cl.<sup>5</sup> H01J 7/46

U.S. Cl. 315—39

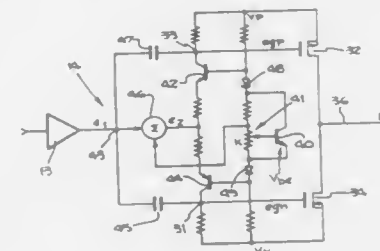
7 Claims



1. A method of changing the emission properties of an electrodeless lamp, said lamp comprising an envelope which contains a plasma-forming medium and means for coupling electromagnetic energy to the medium within said envelope to generate an electric field and form a light-emitting plasma, said method comprising establishing an axis of rotation which is at an angle of between about 30° and 90° with respect to the electric field, and rotating said envelope about said axis at a

rate of at least about 1000 rpm, said rate being great enough for the centrifugal forces produced thereby to modify surface heating and the distribution of plasma-forming medium about the inner surface of said envelope and concomitantly change the emission properties of the electrodeless lamp, said rotation rate being significantly greater than that which is required to produce a substantially uniform temperature about lines of constant latitude of said envelope while leaving non-uniformities along lines of constant longitude.

**4,954,757**  
**LINEAR DEFLECTION AMPLIFIER WITH ENERGY RECOVERY**  
Ted W. Berwin, Playa del Rey, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
Filed Oct. 27, 1988, Ser. No. 263,459  
Int. Cl.<sup>5</sup> H01J 29/70, 29/76  
U.S. Cl. 315—403

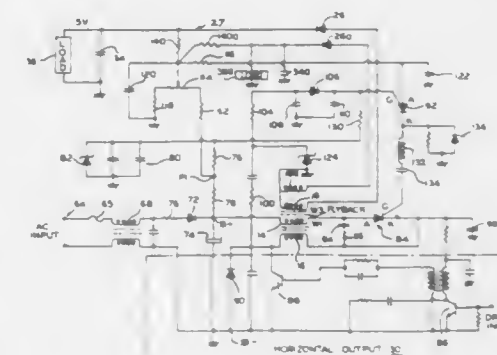


1. A linear deflection amplifier system, for use in a magnetic deflection CRT, comprising:  
a deflection yoke;  
amplifier means for receiving a predetermined sweep signal;  
power stage means for providing a limited current source, with a dc voltage gain maintained at unity, connected to said amplifier means, wherein said power stage means comprises:  
a unity gain amplifier coupled to a first pair of complementary transistors,  
said first pair of transistors configured as a Class B amplifier and each of said first pair of transistors coupled to an adjustable temperature compensating means,  
a summing amplifier coupled to the output of said unity gain amplifier,  
a series circuit linking a second pair of complementary transistors, said series circuit coupled to said summing amplifier and providing a dc signal to said first pair of complementary transistors, and  
a current limiting circuit means coupled to said series circuit for limiting the average current through one of said second pair of complementary transistors,  
wherein a current source is achieved having low cross-over distortion;  
flyback switching means connected to receive current from said power stage means, said flyback switching means positioned between said power stage means and said deflection yoke;  
said deflection yoke connected to receive current from said power stage means through said flyback switching means; and  
means for feeding back a controlling current signal from said deflection yoke to said amplifier means.

**4,954,758**  
**POWER SOURCE CIRCUIT**  
George R. Runk, Forest Park, Ill., assignor to Xcel Corporation (Computron Display Systems Division), Pasadena, Calif.  
Continuation of Ser. No. 784,697, Oct. 3, 1985, which is a continuation-in-part of Ser. No. 316,952, Oct. 30, 1981, abandoned. This application Oct. 25, 1988, Ser. No. 221,936  
Int. Cl.<sup>5</sup> H01J 29/70

U.S. Cl. 315—411

2 Claims



1. A power source circuit comprising:  
a horizontal sweep flyback transformer having a magnetic core with an oversized cross section, having wound next to said core a plurality of unitarily-wound power supply windings, having an insulative layer over said power supply windings, having wound over said insulative layer a primary winding, and also having a high-voltage secondary windings and a commutating secondary winding;  
a source of alternating current;  
rectification means connecting to said source of alternating current for rectifying said alternating current to provide an unregulated direct current potential source;  
voltage regulator means for drawing current intermittently from said unregulated direct current potential source and for providing a non-isolated, regulated direct current potential source, said voltage regulator means including a series circuit formed from the flyback transformer's commutating secondary winding and a triggerable controlled conduction device having a trigger input;  
a horizontal sweep circuit comprising two circuit elements connected in series across said non-isolated, regulated direct current potential source, the first circuit element comprising the flyback transformer's primary winding, and the second circuit element comprising the parallel combination of an electronic switch operated at the horizontal sweep frequency rate, a damper diode, and a horizontal deflection coil circuit;  
high-voltage rectification means connected in series with the flyback transformer's high-voltage secondary winding and oriented to conduct during horizontal retrace intervals, rather than during horizontal scanning intervals, for rectifying the retrace interval voltage peaks;  
a plurality of series circuits formed from diode rectifiers connected in series with filter capacitors, each of said series circuits connecting across one or more of said plurality of power supply windings, said series circuit diode rectifiers being oriented to conduct during horizontal scanning intervals, rather than during horizontal retrace intervals, each of said filtering capacitors forming an isolated, regulated direct current potential source;  
at least one high wattage load whose wattage needs fluctuate substantially over time connecting to at least one of said isolated, regulated direct current potential sources; and  
scan regulator and pulse generation means for regulating said isolated and regulated direct current potential sources by adjusting the timing, relative to the horizontal retrace



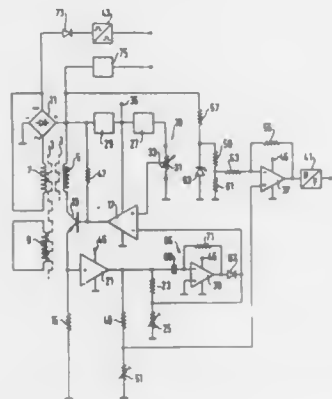
interval, of trigger pulses provided to said controlled conduction device, said scan regulator and pulse generation means having a feedback input connecting to at least one of said isolated, regulated direct current potential sources and having a pulse output connecting to said trigger input of said controlled conduction device; whereby a power supply is achieved in which fluctuations in load currents drawn from the isolated, regulated direct current potential sources do not adversely affect the operation of the high voltage and horizontal deflection circuitry.

**4,954,759**  
**CONTROL CIRCUIT FOR AN ELECTROMAGNETIC BREAKING ARRANGEMENT**

Rainer Fey, Schweinfurt, Fed. Rep. of Germany, assignor to Fichtel & Sachs AG  
Filed Mar. 16, 1988, Ser. No. 168,678  
Claims priority, application Fed. Rep. of Germany, Apr. 1, 1987, 3710842

Int. Cl.<sup>5</sup> H02P 3/00  
U.S. Cl. 318—375

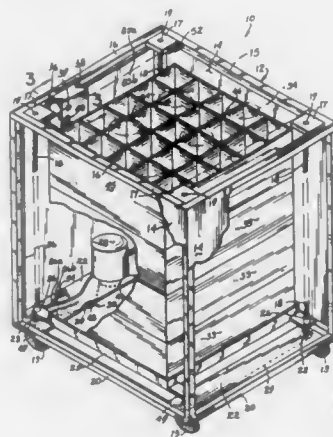
15 Claims



1. An electromagnetic braking arrangement, in particular for an ergometer, comprising:  
a stator and a rotor movable relative to the stator, the stator and the rotor each having an iron circuit which forms a multipole magnetic flux circuit,  
a generator winding and a short-circuited winding on a first one of said iron circuits,  
an exciting winding on a second one of said iron circuits and supplied from the generator winding, wherein the second iron circuit has residual magnetic properties and induces magnetic alternating fields in the poles of the first iron circuit,  
a control circuit for controlling the current fed to the exciting winding from the generator winding, wherein the control circuit comprises a transistor having a control terminal and two load terminals and an amplifier having operating voltage terminals for supplying a rated operating voltage, said load terminal of the transistor being connected in series with the exciting winding, said control terminal of the transistor being connected to the amplifier and said operating voltage terminals of the amplifier being connected to the generator winding,  
and a coupling circuit coupling the control terminal of the transistor fully conductive at a generator winding voltage which is lower than the rated operating voltage of the amplifier.

**4,954,760**  
**SELF LEVELING DISPENSER**  
Max G. Futch, 322 Wilton Dr., Baton Rouge, La. 70895, and Ronald H. Drushel, Baton Rouge, La., assignors to Max G. Futch, Baton Rouge, La.  
Division of Ser. No. 264,089, Oct. 28, 1988. This application Sep. 25, 1989, Ser. No. 411,668  
Int. Cl.<sup>5</sup> B65G 1/07; A47F 10/06  
U.S. Cl. 318—480

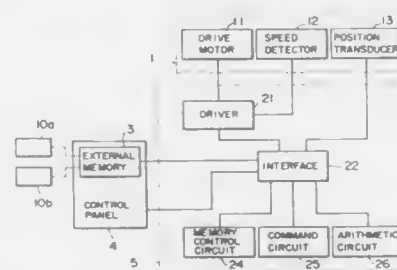
4 Claims



1. An electronic circuit for a self leveling dispenser, the dispenser having a rack vertically movable relative to ground, and being adapted to support a desired number of trays in stacked arrangement one on top of the other, said circuit comprising:  
a sensing device located above said rack, said device functioning to sense the presence and absence of trays at the vertical location of said sensing device, and  
a reversible motor electrically connected to said sensing device and drivably connected to said rack, said sensing device and said motor cooperatively functioning to automatically and continuously reposition said rack as required so that a top tray on said rack will be located at a desired dispensing height relative to ground.

**4,954,761**  
**CONTROL SYSTEM OF AN INDUSTRIAL ROBOT**  
Yutaka Kimura; Hiroshi Okumura; Hirokata Mihara, and Mitsutoshi Yoshida, all of Nagoya, Japan, assignors to Mitsubishi Jukogyo K. K., Tokyo, Japan  
Filed Aug. 19, 1988, Ser. No. 234,266  
Claims priority, application Japan, Oct. 23, 1987, 62-266526; Nov. 16, 1987, 62-174802[U]  
Int. Cl.<sup>5</sup> G05B 19/18  
U.S. Cl. 318—568.1

2 Claims



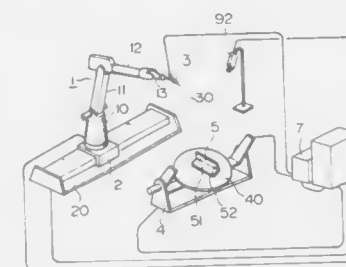
1. A control system of an industrial robot in which an operation program of the robot is read out from a storage medium and is processed to obtain data to control a robot machine on the basis of the data, said robot being characterized in

external memory means for selectively reading out a program from a plurality of stored operation programs said external memory means including a data transmission device for transmitting the program,  
control means, including an IC card loader, for supplying the operation program to control the robot machine, and  
a data transmission cable having a connection terminal mounted at one end thereof for insertion into said IC card loader to connect between said data transmission device and said IC card loader and for supplying the operation program from said external memory means through the data transmission cable to said control means.

**4,954,762**  
**METHOD AND APPARATUS FOR CONTROLLING TRACKING PATH OF WORKING POINT OF INDUSTRIAL ROBOT**

Norihisa Miyake, Matsudo; Masaki Sumita, Yachiyo, and Shinichi Sarugaku, Funabashi, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Kelyo Engineering Co., Ltd., Narashino, both of Japan  
Filed Jan. 30, 1990, Ser. No. 472,082  
Claims priority, application Japan, Feb. 1, 1989, 01-020712  
Int. Cl.<sup>5</sup> G06F 15/46  
U.S. Cl. 318—568.19

9 Claims



1. A method for controlling a tracking path of a working element so that the working element moves along a path having a predetermined positional relationship with a working object by adjusting the relative positional relationship between the working element and the working object through the movement of individually movable at least one moving element each being operatively coupled with either the working element or the working object in a prescribed coupling condition, comprising the steps of:  
allotting individual coordinate systems each having a discriminator to said working element, said working object and said moving elements to provide the coordinate systems with the corresponding discriminators;  
setting as a coordinate system expressing the data for controlling the movement of said working element a first coordinate system selected from said coordinate systems;  
describing, using a second coordinate system selected from the coordinate systems, the data representing the positions of the working element corresponding to specific points on the tracking path along which said working element is to move on the basis of a prescribed working schedule to store the data together with the discriminator representative of the corresponding coordinate system;  
deciding in executing a real work if or not said first coordinate system and said second coordinate system are the same from their discriminators; and  
if both coordinate systems are different coordinate systems, converting the position data of the working element corresponding to the specific points into the data expressed in the first coordinate system and controlling the movement of said working element on the basis of the converted data.

**4,954,763**  
**RESOLVER ANALOG TO DIGITAL INPUT MODULE FOR USE IN A PROGRAMMABLE CONTROLLER SYSTEM**

Shalabh Kumar, Kildeer, and Duane Edgar, Lisle, both of Ill., assignors to Micro Fast Controls, Inc., Carol Stream, Ill.  
Filed Jan. 31, 1989, Ser. No. 304,144  
Int. Cl.<sup>5</sup> G05B 19/31  
U.S. Cl. 318—605

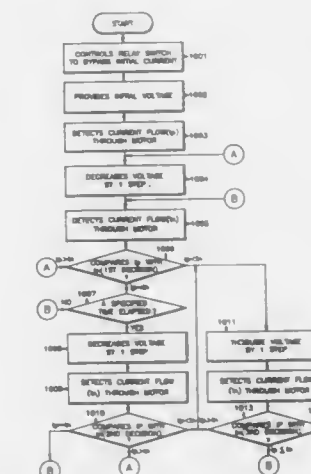
21 Claims



1. A programmable controller system which is coupled to a resolver, said system including a rack mounting circuit modules and having a PLC backplane (a circuit connector board), a programmable controller logic processor connected to said backplane, a resolver analog-to-digital decoder circuit module mountable in said rack for being coupled directly to and through said PLC backplane to said logic processor, and transmission line coupling means for coupling analog output signals from a resolver to said resolver analog-to-digital decoder circuit module forming part of said controller system.

**4,954,764**  
**CIRCUIT AND METHOD FOR POWER EFFICIENCY IMPROVEMENT OF INDUCTION MOTORS**  
Jung-Soo Kim, Sawon, Rep. of Korea, assignor to Samsung Electronic Co., Ltd., Sawon Kyung Ki-Do, Rep. of Korea  
Filed Dec. 30, 1987, Ser. No. 139,735  
Int. Cl.<sup>5</sup> H02P 5/40  
U.S. Cl. 318—798

18 Claims



means to bypass said starting current for a specified period of time during an initial start-up;

combination logic means for combining said zero crossing signal with a PWM waveform to produce first output signals;

coupling buffer means for controlling and buffering said first output signals from said combination logic means to provide second output signals;

base driver means for controlling said power controller means with said second output signals from said coupling buffer means;

current/voltage converter means for detecting load current of said induction motor and converting said load current to voltage;

digital/analog converter means adapted to convert digital reference data into analog values;

a comparator to compare said voltage converted in said current/voltage converter means with said analog value of said digital/analog converter means; and

a microprocessor coupled to receive said zero crossing signal, provide a transient state indicating signal to said relay controller means, receive a comparison signal provided by said comparator means by comparing said voltage converted in said current/voltage converter means with said analog value, provide and periodically vary on the basis of said comparison signal provided by said comparator means the value of said digital reference data to said digital/analog converter means, and provide said PWM waveform to said combination logic means in response to reception of said zero crossing signal.

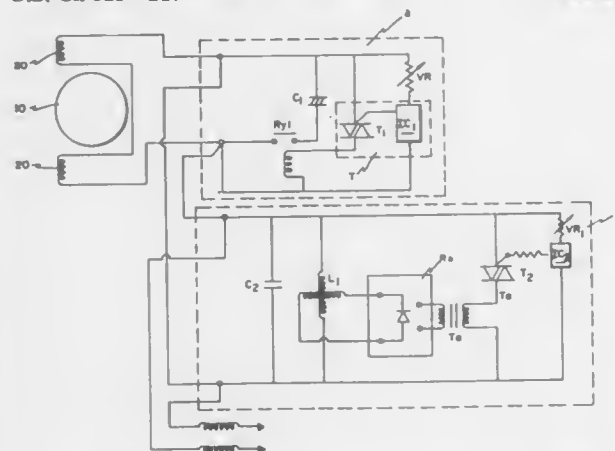
4,954,765

**FULLY AUTOMATIC PHASE CONTROLLER FOR A NON-COIL ARMATURE TYPE GENERATOR**  
Long-Hai Hu, No. 9, 2 Road, Industry District, Taichung City, Taiwan

Filed Jun. 29, 1989, Ser. No. 372,758  
Int. Cl.<sup>5</sup> G05F 5/00

U.S. Cl. 323—217

2 Claims



1. An automatic phase controller for a non-coil armature-type generator, comprising:

a starting control circuit, including a first capacitor electrically connected between a first stator coil and a relay, a first variable resistor connected to the first stator coil for setting a desired starting voltage, a first TRIAC switch controller comprising a first TRIAC electrically connected between said first stator coil and the control terminal of said relay and a first voltage stabilizer arranged to trigger said first TRIAC when the voltage across said first variable resistor reaches said desired starting voltage, whereby said first TRIAC opens said relay when triggered said first voltage stabilizer; and

an automatic voltage control circuit, including a second variable resistor electrically connected to the output of said starting control circuit, a second TRIAC switch

controller comprising a second voltage stabilizer and a second TRIAC, a second transformer electrically connected between said second TRIAC and said generator, a second capacitor arranged in parallel with said generator; and

an inductive magnetic saturation regulator arranged in parallel with said generator;

whereby said second TRIAC switch controller is arranged to induce a current to flow in said magnetic saturation regulator so that said magnetic saturation regulator shifts the generator output current phase a desired amount in accordance with the values of said second capacitor and said second variable resistor, said generator output current flowing only when said relay is opened.

4,954,766

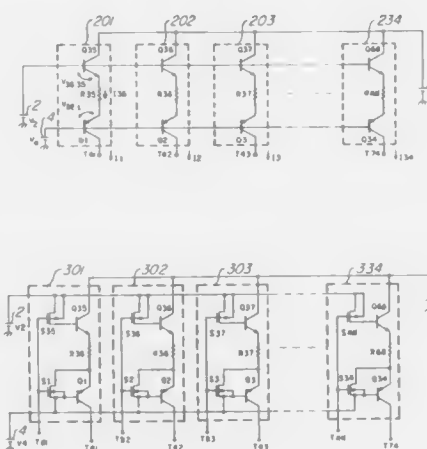
**POWER SUPPLY CIRCUIT AND SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE USING IT**

Shulchi Ishikawa, Kawasaki, and Hiromichi Kuwano, Tokyo, both of Japan, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 10, 1989, Ser. No. 377,508  
Claims priority, application Japan, Jul. 11, 1988, 63-172481  
Int. Cl.<sup>5</sup> G05F 1/56

U.S. Cl. 323—272

12 Claims



1. A power supply circuit comprising:

a first bipolar transistor;

a second bipolar transistor having a polarity opposite to that of said first bipolar transistor;

each of said first and second bipolar transistors having an emitter, a base and a collector;

one of the emitter and the collector of said first bipolar transistor being the input thereof and being connectable to a power supply for controlling the voltage change of the power supply;

said one of the emitter and the collector of said second bipolar transistor being the output thereof and being connectable to an output terminal; and

a resistor interposed between said first and second bipolar transistors and being connected at one end thereof to the other of the emitter and the collector of said first bipolar transistor as the output thereof and at the other end thereof to the said other of the emitter and the collector of said second bipolar transistor as the input thereof for controlling the voltage change of the power supply.

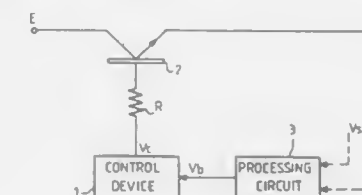
4,954,767

**CONTROL DEVICE FOR SWITCHED POWER SUPPLY**  
Jean-Michel Buisson, Colombes, and Jean-Marie Soubrier, Gentilly, both of France, assignors to Thomson-CSF, Puteaux, France

Filed Jan. 8, 1990, Ser. No. 461,690  
Claims priority, application France, Jan. 20, 1989, 89 00687  
Int. Cl.<sup>5</sup> G05F 1/575

U.S. Cl. 323—283

4 Claims



1. A device for the control of a switched supply, this supply receiving a voltage to be cut off and comprising a processing circuit to give a signal with an index value to the control device, and a switching circuit to cut off the voltage under the control of a switching signal, the control device comprising a first memory circuit containing pre-programmed zones to give, as a signal, the switching signal, a second memory circuit to make a pre-determined zone, among the pre-programmed zones, correspond to each value of the signal with an index value and reading means for the cyclical reading of the pre-determined zone.

4,954,768

**TWO WIRE LOW VOLTAGE DIMMER**

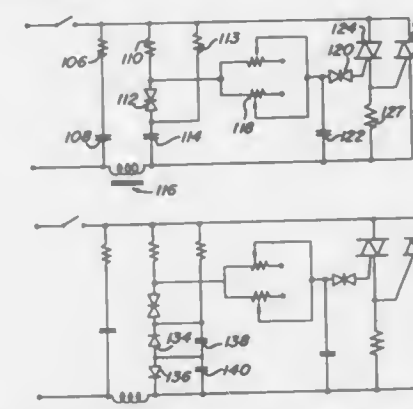
David G. Luchaco, Macungie, Pa., and Charles C. Houng, Clinton, N.J., assignors to Lutron Electronics Co., Inc., Cooperburg, Pa.

Division of Ser. No. 122,588, Nov. 17, 1987, Pat. No. 4,876,498, which is a continuation of Ser. No. 839,304, Mar. 13, 1986, abandoned. This application May 26, 1989, Ser. No. 358,329

Int. Cl.<sup>5</sup> G05F 5/02

U.S. Cl. 323—300

20 Claims



1. In a two wire AC dimming circuit of the type having electronic bidirectional switch means with control input means for selectively rendering the electronic switch means conductive according to repetitive timed control signals applied to the control input means to control the RMS value of an AC voltage applied to the load, a circuit for regulating the RMS value of the AC voltage applied to the load and for decreasing damaging DC current caused by loads having both resistive and inductive components comprising:

- first means for providing a signal having a value indicative of a DC current flowing through the load;
- second means responsive to the signal provided by the first means for adjusting the timing of the control signals

during selected half cycles of the waveform of the AC voltage applied to the load to decrease the DC current flowing through the load; and

(c) third means in electrical series with the first means for automatically adjusting the timing of the control signals in response to fluctuations in the AC voltage supplied to the dimmer to thereby regulate the RMS value of the AC voltage applied to the load.

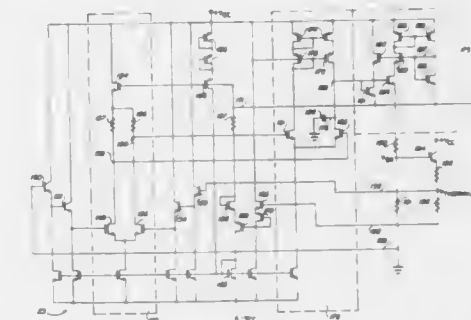
4,954,769

**CMOS VOLTAGE REFERENCE AND BUFFER CIRCUIT**  
Timothy V. Kalthoff, Tucson, Ariz., assignor to Burr-Brown Corporation, Tucson, Ariz.

Filed Feb. 8, 1989, Ser. No. 308,109  
Int. Cl.<sup>5</sup> G05F 3/30

U.S. Cl. 323—313

21 Claims



1. A voltage reference circuit that is resistant to power supply noise, comprising in combination:

- a band gap circuit including first and second transistors having different current densities therein and having a resistor coupled between a base of the first transistor and a base of the second transistor, a first FET differential amplifier circuit having first and second input terminals coupled to an emitter of the first transistor and an emitter of the second transistor, respectively;
- a first FET having a gate coupled to an output of the first FET differential amplifier circuit and a source coupled to a first output conductor and producing thereon a first reference voltage;
- feedback means coupled to the output of the first FET differential amplifier circuit for applying a portion of the first reference voltage to maintain a  $V_{THERMAL}$  voltage across the resistor equal to the difference between a  $V_{BE}$  voltage of the first transistor and a  $V_{BE}$  voltage of the second transistor so as to maintain equal voltages on the first and second input terminals;
- a power supply noise rejection circuit including:
  - a second FET having a gate coupled to the output of the first FET differential amplifier circuit and a source coupled to the first output conductor, the second FET having a channel width-to-length ratio substantially less than a channel width-to-length ratio of the first FET;
  - a first cascode FET coupling a drain of the first FET to a first supply voltage conductor;
  - a second cascode FET having a source coupled to a drain of the second FET;
  - a third FET having a source coupled to the first supply voltage conductor, and a gate and a drain coupled to a drain of the second cascode FET;
  - a fourth FET having a source coupled to the first supply voltage conductor and a gate coupled to the gate of the third FET, and a drain coupled to the gate of the first and second cascode FETs;
  - a fifth FET having a gate and drain coupled to the gate of the first and second cascode FETs and a source coupled to the first output conductor.



4,954,770

## SPIN-POLARIZATION DETECTOR

Hideo Matsuyama, Kokubunji; Kazuyuki Koike, Tokyo, and Kazunobu Hayakawa, Chofu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

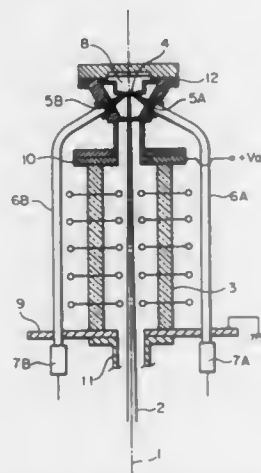
Filed Feb. 16, 1989, Ser. No. 310,896

Claims priority, application Japan, Feb. 26, 1988, 63-41991

Int. Cl.<sup>3</sup> G01N 23/00

U.S. Cl. 324—71.3

12 Claims



1. A spin-polarization detector comprising: acceleration means applying a high voltage for accelerating a measured electron beam having spin polarization; a metal target for scattering the accelerated electron beam; and a fluorescent screen for detecting the intensity of an electron beam scattered from the metal target, and optical signal from the fluorescent screen being transmitted to photoelectric conversion means through an optical guide, to be converted into an electric signal, wherein the fluorescent screen is disposed in a region which exists in the neighborhood of the metal target and is supplied with said high voltage by means of the acceleration means, the fluorescent screen and the metal target being applied with said high voltage, and wherein the photoelectric conversion means is disposed in a region applied with a ground potential.

4,954,771

## STIMULUS GENERATOR

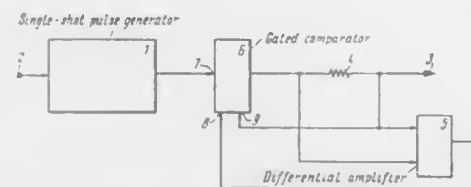
Jury L. Spirin, ulitsa Martenovskaya, 7, kv. 38; Jury M. Korbašov, ulitsa Taganskaya, 24, korpus 5, kv. 39; Konstantin V. Semin, ulitsa Entuziastov, 24/43, kv. 34, and Alexandr S. Sigov, ulitsa Akademika Piljagina, 8, kv. 91, all of Moscow, U.S.S.R.

Filed Sep. 23, 1988, Ser. No. 249,351

Int. Cl.<sup>3</sup> G01R 29/02

U.S. Cl. 324—158 R

1 Claim



1. A stimulus generator intended to induce a stimulating pulse in a selected point of the circuit under test by means of an output electric signal of this generator, with the pulse voltage level adaptable to variations of electric parameters of the circuit under test, these variations evidenced during transistion of reversible (self-healing) electric breakdown of a p-n junction to

an irreversible thermal breakdown of the junction, and comprising:

- single-shot pulse generator means for generating an initial signal which sets a maximally possible duration of an operational cycle of the stimulus generator, said single-shot pulse generator means being equipped with a trigger signal input and an output;
- control bus means for setting the start of generation of the initial signal;
- probe means for directly introducing said output electric signal of the stimulus generator into the selected point of the said circuit under test;
- measuring resistor means for detecting a pattern of current variations of the output electric signal of the stimulus generator during transistion from a self-healing electric breakdown of the p-n junction of a component of the circuit under test to an irreversible thermal breakdown of this junction, said measuring resistor means provided with first and second leads, with said first lead of said measuring resistor means connected to said probe means;
- differential amplifier means for amplifying a voltage drop across said measuring resistor means, said amplifier means provided with first and second inputs and an output, with said first input of said differential amplifier means connected to said first lead of said measuring resistor means, and said second input of said differential amplifier means connected to said second lead of said measuring resistor means; and
- gated comparator means for identifying the moment of onset of mismatch between the patterns of variation of current and voltage of the output signal of the stimulus generator, these patterns being registered by said differential amplifier means, said gated comparator means being provided with first, second, and third inputs and an output, with said first input of said gated comparator means connected to said output of the single-shot pulse generator means, said second input of said gated comparator means connected to said output of said differential amplifier means, said third input of said gated comparator means connected to said first lead of said measuring resistor means, and said output connected to the second lead of said measuring resistor means, so that the output is connected to said circuit under test through said measuring resistor means.

4,954,772

## TEST METHOD OF AN ELECTROSTATIC BREAKDOWN OF A SEMICONDUCTOR DEVICE AND AN APPARATUS THEREFOR

Haruo Funakoshi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

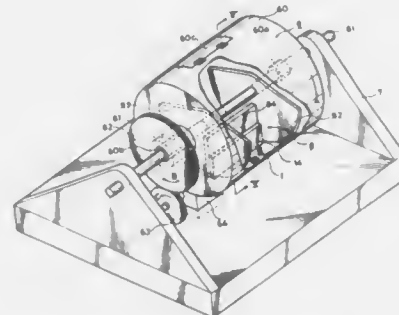
Filed Mar. 14, 1988, Ser. No. 167,793

Claims priority, application Japan, Nov. 12, 1987, 52-287985

Int. Cl.<sup>3</sup> G01R 31/26

U.S. Cl. 324—158 R

16 Claims



1. For a method of testing an electrostatic breakdown of a semiconductor device being incorporated in a package and having lead terminals mounted on said package in an aligned

orientation and connected to a semiconductor chip in said semiconductor device, by electrostatically discharging said semiconductor device in said package to perform a test to determine whether an electrostatic breakdown is caused in said semiconductor device, a method of charging and discharging said device, comprising the steps of:

- disposing a plurality of said semiconductor devices such that said aligned orientations thereof form random angles with respect to each other on a main surface of a member electrostatically charged with a predetermined voltage;
- moving said semiconductor devices on the main surface of said member and mutually contacting said lead terminals of different ones of said semiconductor devices to causes discharge to said semiconductor devices; and
- removing the static electricity which has been charged in said semiconductor devices.

4,954,773

## VOLTAGE MEASUREMENT WITH AN ELECTRON PROBE WITHOUT EXTERNAL TRIGGER SIGNAL

Hans D. Brust, Dudweiler, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

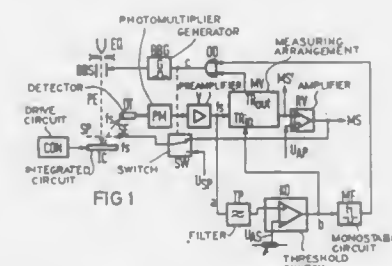
Filed Jul. 28, 1988, Ser. No. 227,304

Claims priority, application Fed. Rep. of Germany, Aug. 6, 1987, 3726234

Int. Cl.<sup>3</sup> G01R 19/28

U.S. Cl. 324—158 R

22 Claims



1. A method for voltage measurement with a particle probe without an external trigger signal, comprising the steps of: charging a point on a sample carrying a first signal with a continuous primary beam; deriving a secondary signal from the point; supplying the secondary signal to a measurement processing unit; obtaining from the secondary signal a first trigger signal which is synchronous to the first signal; blanking of the primary beam for a first time interval, said blanking caused by the first trigger signal; causing a second trigger signal by the first trigger signal, the second trigger signal causing generation of a pulse of the primary beam within the first time interval; and providing a measurement signal from the secondary signal.

4,954,774

## AUTOMATIC CONTROL SYSTEM OF INTEGRATED CIRCUITS

Michel Binet, Tournan, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 13, 1989, Ser. No. 366,106

Claims priority, application France, Jun. 24, 1988, 88 08502

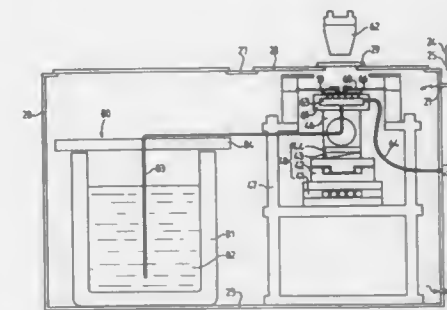
Int. Cl.<sup>3</sup> G01R 35/00, 31/06

U.S. Cl. 324—158 F

8 Claims

1. A system for testing of integrated circuits on a wafer comprising:
  - (a) chamber means for enclosing wafer testing equipment,
  - (b) at least one inlet nozzle means for introducing inert dry gas into said chamber means,

- (c) at least one exhaust nozzle means for exhausting said inert dry gas from said chamber means,
- (d) means connected to said at least one exhaust nozzle means for controlling and maintaining an excess pressure of said inert dry gas in said chamber means,
- (e) sample carrier means inside said chamber means for supporting a wafer having integrated circuits, said sample carrier means including a cooling cavity,
- (f) probe card means inside said chamber means for applying electrical connections to said wafer,



- (g) mechanical means inside said chamber means for displacing in a controlled manner said sample carrier means relative to said probe card means,
- (h) container means inside said chamber means for holding cooling liquid, said container means including a top cover, and
- (i) tube means extending through said top cover into said container means for conducting said cooling liquid from said container means to said cooling cavity, said tube means including further means for conducting liquid and vapor from said cooling cavity to an exhaust structure.

4,954,775

## AUTOMOTIVE WHEEL SPEED SENSOR ASSEMBLY WITH MULTIPOLE ROTOR MOUNTED ON WHEEL BEARING SPINDLE

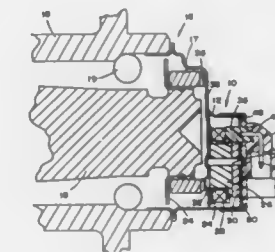
James W. Richmond, Carmel, Ind., assignor to Emhart Industries Inc., Towson, Md.

Division of Ser. No. 171,162, Mar. 21, 1988, Pat. No. 4,904,936, which is a continuation of Ser. No. 835,514, Mar. 3, 1986, abandoned. This application Feb. 6, 1989, Ser. No. 306,086

Int. Cl.<sup>3</sup> G01P 3/488

U.S. Cl. 324—174

3 Claims



1. The combination of a vehicle wheel speed sensor with a vehicle wheel assembly, said combination comprising:
  - a wheel bearing housing;
  - a wheel bearing spindle rotatable about an axis in said wheel bearing housing;
  - rotor means fixedly mounted on said spindle for providing one or more poles that rotate with said spindle;
  - stator means for providing one or more poles that do not

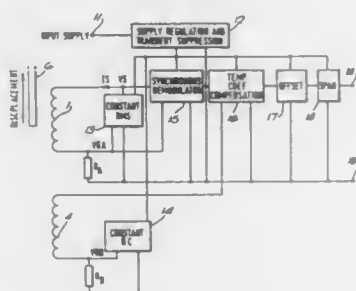
rotate with said spindle, said stator means including a field coil for sensing a changing magnetic flux;  
magnetic means mounted on said stator for providing a magnetic flux through said rotor means and said stator means, said magnetic means comprising;  
a magnet for producing said magnetic flux;  
ferromagnetic means for causing said magnetic flux to sweep through said field coil when said one or more rotor poles move from a position in which they are aligned with said one or more stator poles to a position in which they are not so aligned; and  
flange means attached to and encircling said spindle about a radius that is further from said axis of said spindle than said one or more rotor poles and for providing a flux path from said one or more rotor poles to said magnet;  
support means for fixedly supporting said stator means on said housing so that as said spindle turns said one or more rotor poles are at times aligned with said one or more stator poles across on air gap and at other times are no aligned across said air gap, said air gap being substantially in a plane perpendicular to said axis about which said spindle rotates.

**4,954,776**  
**LINEAR DISPLACEMENT TRANSDUCERS UTILIZING VOLTAGE COMPONENT IN PHASE WITH CURRENT THAT VARIES LINEARLY WITH CORE DISPLACEMENT**

Stephen Husher, Fordingbridge, United Kingdom, assignor to Penny & Giles Controls Limited, Dorset, United Kingdom  
Filed Feb. 21, 1989, Ser. No. 313,034  
Claims priority, application United Kingdom, Apr. 22, 1988, 8909575

Int. Cl.<sup>5</sup> G01B 7/14  
U.S. Cl. 324—20716

6 Claims

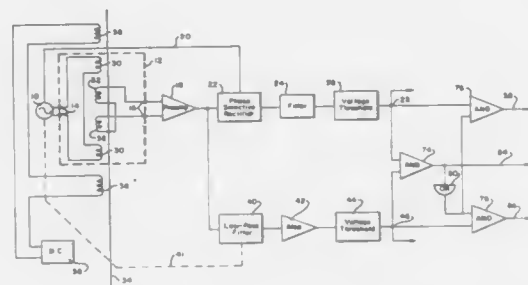


1. A linear displacement transducer comprising:  
a winding;  
a magnetic core which is linearly displaceable relative to said winding; and  
means for energizing said winding with a constant RMS alternating current of a fixed frequency sufficiently high for the losses in said magnetic core to cause the voltage across said winding in phase with the current to vary substantially linearly relative to the linear displacement of said magnetic core.

**4,954,777**  
**DEVICE FOR DEFECT TESTING OF NON-FERROMAGNETIC TEST SAMPLES AND FOR FERROMAGNETIC INCLUSIONS**  
Walter Klopfer, Mossingen; Fritz Haug, Pliezhausen, both of Fed. Rep. of Germany; Dale Gabauer, Freedom, and James Workley, Imperial, both of Pa., assignors to Institut Dr. Friedrich Forster Prüfgeratebau GmbH & Co. KG, Ruetlingen, Fed. Rep. of Germany  
Filed Dec. 9, 1988, Ser. No. 282,450  
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1987, 3743521

Int. Cl.<sup>5</sup> G01N 27/82, 27/90  
U.S. Cl. 324—232

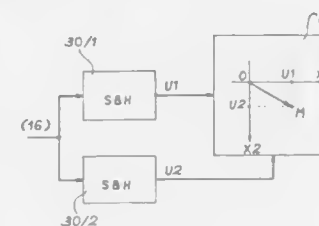
1 Claim



1. A device for defect testing of non-ferromagnetic test samples and for the presence of ferromagnetic inclusions in said test samples, comprising:  
means for inducing alternating eddy currents in the test samples including a coil arrangement energized by a selectively variable alternating current generator;  
a permanent magnet yoke of such strength as to produce magnetic saturation of ferromagnetic samples for inducing a constant D.C. field in the test samples at the same time as the alternating eddy currents;  
receiver coil means including two spaced apart differentially connected receiver coils coupled to the test samples for developing a first signal corresponding to the reaction of alternating eddy currents with the non-ferromagnetic test samples and a second signal corresponding to a reaction of the D.C. field in the test samples with a ferromagnetic inclusion, said first and second signals existing in composite form;  
a first thresholded circuit connected to the receiver coil means for producing a third signal responsive to the first signal indicating the presence of a physical defect in the non-ferromagnetic test sample;  
a second thresholded circuit including a low-pass filter connected to the receiver coil means for preventing passage of the first signal and for producing a fourth signal responsive to the second signal to indicate the presence of a ferromagnetic inclusion in the test samples, said low-pass filter being variable in common with the current generator;  
a preamplifier interconnected between the receiver coil means and the first and second circuits;  
a logic circuit fed by both the third and fourth signals for producing a fifth signal indicating the presence of both the third and fourth signals; and  
means responsive to said third, fourth and fifth signals for providing sixth, seventh and eighth signals indicative of, respectively, the existence of a defect only in a material separation or inhomogeneity of the surface of the sample not in the presence of a ferromagnetic inclusion, the existence of a ferromagnetic inclusion underneath the sample surface, and the existence of a ferromagnetic inclusion with surface contact.

**4,954,778**  
**EDDY CURRENT TESTING SYSTEM USING TWO SAMPLES WITH DIFFERENT TIME LAGS**  
Francois Champanois, Paris; Bernard David, Gif/Yvette, and Francis Joffre, Bures sur Yvette, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France  
Filed Feb. 16, 1989, Ser. No. 311,356  
Claims priority, application France, Feb. 26, 1988, 88 02377  
Int. Cl.<sup>5</sup> G01N 27/90; G01R 33/12  
U.S. Cl. 324—233

16 Claims

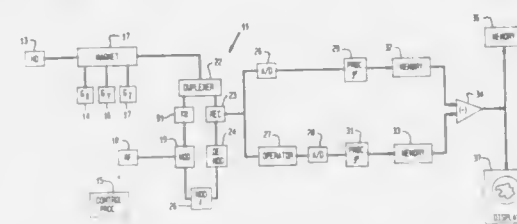


9. Pulsed eddy current testing apparatus comprising:  
a probe having first and second coils positioned facing a part to be inspected,  
a generator for emitting at least one pulse of predetermined shape and duration, said pulse being applied to said first coil of said probe,  
at least two sample and hold channels having an input connected to said second coil of said probe, said channels sampling a measuring pulse at different instants designated by a time lag counted from the start of the measuring pulse supplied by the probe and holding the sampled amplitude, means for displaying a point having for the first coordinate on a first axis one of the sampled and held amplitudes obtained with a short sampling lag and as the second coordinate along a second axis a second sample and held amplitude obtained with a long sampling lag.

**4,954,779**  
**CORRECTION FOR EDDY CURRENT CAUSED PHASE DEGRADATION**  
Yuval Zur, Herzliya, Israel, assignor to Elscint Ltd., Haifa, Israel  
Filed Apr. 28, 1989, Ser. No. 344,806  
Claims priority, application Israel, Apr. 29, 1988, 86231

Int. Cl.<sup>5</sup> G01R 33/20  
U.S. Cl. 324—306

12 Claims



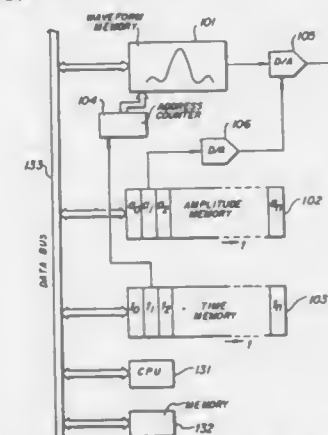
7. A system for correcting for eddy current caused phase distortions in magnetic resonance images, said system comprising:  
means for acquiring normal resolution time domain magnetic resonance imaging (MRI) data,  
means for acquiring low resolution time domain magnetic resonance imaging (MRI) data,  
means for Fourier transforming the normal resolution time domain MRI data,  
means for Fourier transforming the low resolution MRI data,  
means for obtaining the phase images in the frequency domain after the steps of Fourier transforming, and  
means for subtracting the phase image of the low resolution

data from the phase image of the normal resolution data to provide a phase image corrected for eddy current caused phase distortion.

**4,954,780**  
**SCAN CONTROLLER FOR NMR IMAGING DEVICE**  
Toru Shimazaki, Tokyo, Japan, assignor to Yokogawa Medical Systems, Limited, Tokyo, Japan  
Continuation-in-part of Ser. No. 251,226, Jul. 22, 1988, abandoned. This application Aug. 23, 1989, Ser. No. 397,402  
Claims priority, application Japan, Jan. 29, 1986, 61-17371  
Int. Cl.<sup>5</sup> G01R 33/20

U.S. Cl. 324—318

4 Claims



1. A scan controller for use in an NMR imaging device to control high frequency pulses and/or gradient magnetic fields, said controller comprising  
waveform memory means for storing control signal waveforms;  
amplitude memory means for storing control signal amplitudes;  
time memory means for storing control signal durations;  
central processing means for causing the reading out of said waveform memory means, said amplitude memory means, and said time memory means;  
address counter for assigning addresses to parts of said waveform in said waveform memory means as related to a cycle represented by values read out from said time memory means, so that said central processing means reads out from said waveform memory means and said amplitude memory means values of signals stored therein in a specified order of events; and  
means for multiplying the read out values from said amplitude memory means and the read out values from said waveform memory means and for producing an output signal representing the multiplied product with a value representing the amplitude of the control signal stored in said amplitude memory means.

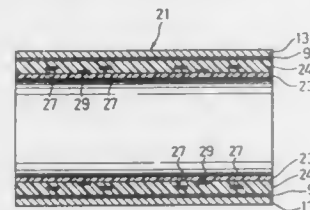
**4,954,781**  
**NUCLEAR MAGNETIC RESONANCE IMAGING APPARATUS WITH REDUCED ACOUSTIC NOISE**  
Haruhiko Hirata, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Jun. 8, 1989, Ser. No. 362,950  
Claims priority, application Japan, Jun. 14, 1988, 63-144887  
Int. Cl.<sup>5</sup> G01R 33/20

U.S. Cl. 324—318  
1. A nuclear magnetic resonance imaging apparatus, comprising:

a main magnet for generating a static magnetic field in a measurement space in which a body to be examined is to be placed;  
gradient coil means for producing gradient magnetic fields over the static magnetic field;



means for detecting signals from the body in the static and gradient magnetic fields due to a nuclear magnetic resonance phenomenon;  
means for processing the detected signals so as to obtain



tomographic images of the body at arbitrary cross sections; and  
a sandwich structure which is located between the body and the main magnet, comprising a viscoelastic layer sandwiched by a first and a second sandwiching members.

4,954,782

# SELF-CHECKING OHMMETER THAT CHECKS FOR CONTACT RESISTANCE OF ITS PROBES

Edward R. Ball, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

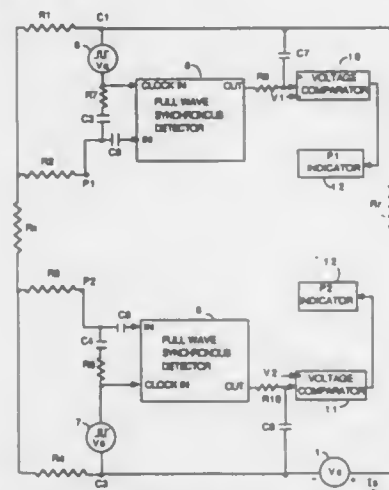
Division of Ser. No. 48,021, May 8, 1987, Pat. No. 4,876,515.

This application Jun. 29, 1989, Ser. No. 374,486

Int. Cl.<sup>5</sup> G01R 27/14

U.S. Cl. 324—538

14 Claims



1. A four terminal ohmmeter apparatus including a source of voltage, a reference resistance in series with said source of voltage, means for determining the voltage across said reference resistance, current terminal means terminating the series circuit including said source of voltage and said reference resistance, said current terminal means being provided with manually operable current connecting means, potential terminal means and means for determining the voltage thereacross, said potential terminal means being provided with manually operable potential connecting means, wherein said current and potential connecting means are adapted to provide conductive connection with means under test, said connection being characterized as resistive, said ohmmeter apparatus further comprising:

means coupled to said current terminal means for determining the voltage thereacross when said connecting means are applied to means under test,  
means coupled to said potential terminal means for determining voltages at said potential terminal means when said connecting means are applied to means under test, and  
indicating means for providing notification when the voltage

across said current terminal means is within predetermined acceptable limits and when voltages at said potential terminal means are within predetermined acceptable limits.

4,954,783

# APPARATUS AND METHOD FOR TESTING MOISTURE OF EAR CORN

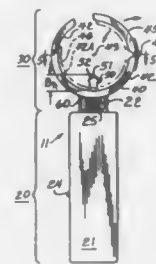
Robert H. Spry, 21 Sunset Rd., Bloomington, Ill. 61701

Filed Aug. 28, 1989, Ser. No. 398,714

Int. Cl.<sup>5</sup> G01R 27/22

U.S. Cl. 324—696

17 Claims



1. A corn moisture tester for measuring the moisture content of corn kernels on an ear of corn, said ear of corn defining a longitudinal ear axis and having a cob and a plurality of said corn kernels over the surface of said cob in a plurality of rows, said rows extending in the general direction of said ear axis and each of said kernels having an exterior pericarp and an interior endosperm, said moisture tester comprising:

a moisture tester for vegetable matter having a pair of terminals, meter means for measuring an electrical property of said matter, and a visual display;

cradle means for receiving and partially enveloping an ear of corn;

a pair of electrodes held by said cradle means at a fixed spacing and in electrical communication with said terminals, said electrodes being constructed and arranged such that each electrode pierces the pericarp of at least one of said kernels and is in electrical contact with the endosperm of at least one kernel, without contacting said cob when said ear of corn is received in said cradle;

said display generating a signal representative of the moisture content of said corn.

4,954,784

# PHASE ADJUSTMENT CIRCUIT

Tsutomu Kitamura, Tokyo, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

PCT No. PCT/JP88/01146, § 371 Date Jul. 7, 1989, § 102(e)

Date Jul. 7, 1989, PCT Pub. No. WO89/05081, PCT Pub.

Date Jun. 1, 1989

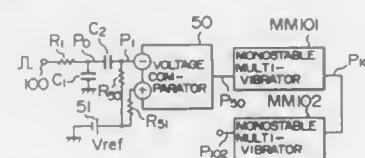
PCT Filed Nov. 14, 1988, Ser. No. 381,641

Claims priority, application Japan, Nov. 16, 1987, 62-288770

Int. Cl.<sup>5</sup> H03K 5/13, 5/159

U.S. Cl. 328—155

2 Claims



1. A phase adjustment circuit comprising: an input terminal for inputting a synchronizing signal thereto; an integration

circuit having an input side thereof connected to said input terminal; a d.c. blocking capacitor having one end thereof connected to an output side of said integration circuit; a voltage comparator having both first and second input terminals thereof connected to the same reference d.c. voltage source through respective resistors and having one of said first and second input terminals connected to the other end of said d.c. blocking capacitor and producing an output pulse signal having a pulse width substantially equal to one half period of the synchronizing signal; and a delay circuit which is triggered by the output pulse signal from said voltage comparator to produce a pseudo synchronizing signal.

4,954,785

# AUTO TRACKING NOTCH FILTER USING SWITCHED CAPACITORS TO MEASURE HARMONIC DISTORTION AND NOISE CONTAINED IN A SIGNAL SOURCE

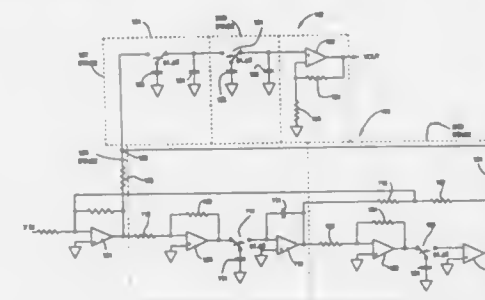
Para Segaram, Campbell, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Apr. 12, 1989, Ser. No. 337,082

Int. Cl.<sup>5</sup> H03B 1/04; H03H 7/12

U.S. Cl. 328—167

32 Claims



1. A tunable filter having a filter characteristic tracking an input signal comprising:  
a signal source providing a variable frequency signal to be tracked by the filter characteristic;  
a frequency detector, coupled to the signal source, for producing a detector output signal which is a function of the frequency of the variable frequency signal;  
means, responsive to the frequency detector output signal, for generating at least one switching signal having a variable frequency proportional to the detector output signal;  
a first capacitor having a first terminal coupled to a reference potential and a second terminal; and  
first switching means, having an input coupled to the variable frequency signal, responsive to the at least one switching signal, and in response to changes in level of the at least one switching signal alternately coupling the input of the first switching means to the second terminal of the first capacitor and coupling the second terminal of the first capacitor to an output of the first switching means coupled to an output of the filter.

4,954,786

# OPTICAL AMPLIFYING DEVICE

Hideaki Yamakawa; Nobuo Suzuki, both of Tokyo, and Takeshi Ozeki, Saitama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 5, 1989, Ser. No. 446,095

Claims priority, application Japan, Jan. 12, 1989, 1-5422

Int. Cl.<sup>5</sup> G01J 1/32; H01S 3/103

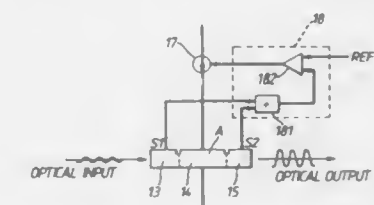
U.S. Cl. 330—4.3

23 Claims

1. A device for amplifying an input optical signal comprising:

optical amplifying means having a gain control portion for amplifying the input optical signal to produce an amplified optical signal in accordance with a gain control signal, and having a first detecting portion for detecting the input

optical signal and a second detecting portion for detecting the amplified optical signal from the gain control portion; controlling means responsive to detected signals from the first and second detecting portions for producing a source control signal related thereto; and



signal source means, coupled to the amplifying means, for generating the gain control signal corresponding to the source control signal.

4,954,787

# AUDIO SIGNAL TRANSMISSION SYSTEM WITH NOISE SUPPRESSION NETWORK

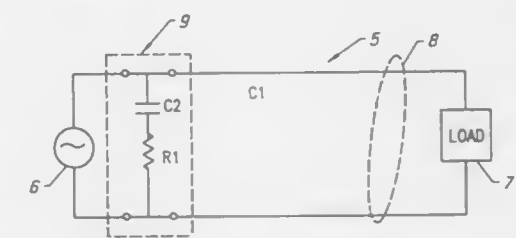
Bruce A. Brisson, 3037 Grass Valley Hwy., Auburn, Calif. 95603

Filed May 18, 1989, Ser. No. 354,517

Int. Cl.<sup>5</sup> H03F 1/26

U.S. Cl. 330—149

10 Claims



1. An audio signal transmission system with an audible noise suppression circuit comprising:  
amplifying means for amplifying audio signals, said amplifying means having a positive and a negative output terminal and a predetermined bandwidth;  
an audio signal transmission cable having a first distributed capacitance, a positive input terminal coupled to said positive output terminal of said amplifier and a negative input terminal coupled to said negative output terminal of said amplifier;  
means for providing a second capacitance which is coupled to said positive output terminal of said amplifier; and  
means for providing a resistance which is coupled between said second capacitance providing means and said negative output terminal of said amplifier, the total of said first and said second capacitances having a value C and said resistance having a value R such that the reciprocal of the decay time t defined by the equation:

$$t = RC$$

comprises a frequency

$$f = 1/t$$

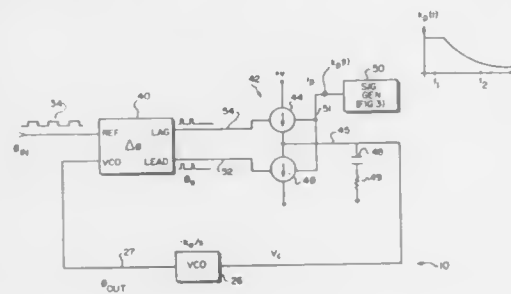
which is above the audio frequency spectrum and within said bandwidth of said amplifying means so as to prevent the generation of noise at audio frequencies in said system.

4,954,788

**PHASE LOCKED LOOP WITH BANDWIDTH RAMP**  
Michael Leis, Framingham; Gary S. Engelson, Shrewsbury, and Bruce J. Lawrence, Worcester, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.  
Continuation of Ser. No. 193,337, May 12, 1988, abandoned.  
This application Dec. 18, 1989, Ser. No. 453,356  
Int. Cl.<sup>5</sup> H03L 7/00

U.S. Cl. 331-16

6 Claims



1. A phase locked loop arranged to receive an input signal having a preamble portion and a data portion, the phase locked loop comprising:

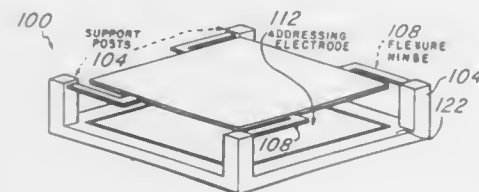
- signal generating means, for providing a response control signal which monotonically decreases in amplitude beginning at a time when the phase locked loop receives the preamble portion and continuing to monotonically decrease during at least a portion of the time that the phase locked loop receives the data portion; and
- loop control means, coupled to the phase locked loop and the signal generating means, for adjusting the response time of the phase locked loop in accordance with the amplitude of the response control signal.

4,954,789

**SPATIAL LIGHT MODULATOR**  
Jeffrey B. Sampell, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.  
Filed Sep. 28, 1989, Ser. No. 413,924  
Int. Cl.<sup>5</sup> G02B 26/08

U.S. Cl. 330-4.3

6 Claims



1. A spatial light modulator, comprising:

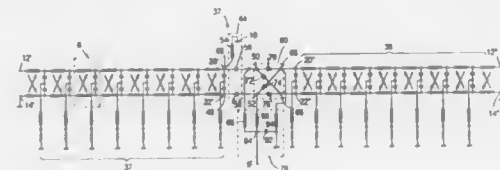
- a plurality of pixels;
- each of said pixels including
  - an electrostatically deflectable reflecting element over an addressing electrode; and
  - a plurality of supports for said element, said supports constraining deflection of said element to positions parallel to an undeflected position.

4,954,790

**ENHANCED COUPLED, EVEN MODE TERMINATED BALUNS, AND MIXERS AND MODULATORS CONSTRUCTED THEREFROM**  
Richard G. Barber, El Dorado Hills, Calif., assignor to Avantek, Inc., Milpitas, Calif.  
Filed Nov. 15, 1989, Ser. No. 437,510  
Int. Cl.<sup>5</sup> H03C 1/14; H04B 1/26; H03H 7/42

U.S. Cl. 332-164

25 Claims



1. A balun section comprising:  
a circuit ground;  
first and second input terminals;  
first, second and third transmission lines;  
first and second output terminals;  
first and second capacitors; and  
a resistor;

wherein the first and second capacitors are connected in series between the first and second output terminals and form a common node at the point that the first capacitor connects to the second capacitor, the third transmission line is connected in series with the resistor from the common node to the circuit ground, the first transmission line is connected between the first input terminal and the first output terminal, and the second transmission line is connected between the second input terminal and the second output terminal.

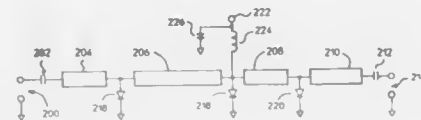
4,954,791

**NON-COMMENSURATE LINE LENGTH RF MODULATOR**

Mary K. Koenig, Santa Rosa, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.  
Filed Sep. 29, 1989, Ser. No. 414,946  
Int. Cl.<sup>5</sup> H03C 1/62

U.S. Cl. 332-164

16 Claims



1. In a reflective shunt-diode RF modulator having an input, a first transmission line section, a second transmission line section and an output connected in series, said first transmission line section having a first electrical length and said second transmission line section having a second electrical length, a first shunt diode connecting said input to ground, a second shunt diode connecting a junction between said first transmission line section and said second transmission line section to ground and a third shunt diode connecting said output to ground and means to place said first, second and third diodes in a conducting state, the improvement wherein said first electrical length differs from said second electrical length.

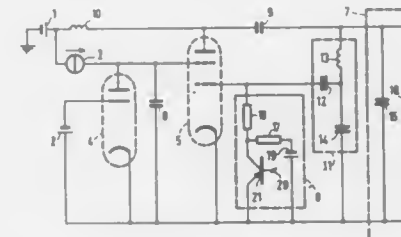
4,954,792

**MULTI-GRID ELECTRON TUBE HIGH FREQUENCY POWER OSCILLATOR**

Christian S. A. E. Patron, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.  
Filed Aug. 15, 1989, Ser. No. 394,342  
Claims priority, application Netherlands, Aug. 17, 1988, 8802035

U.S. Cl. 331-169

7 Claims



1. A high-frequency power oscillator comprising: a multi-grid electron tube which includes at least a control grid, a screen grid and a cathode, a constant current source connected to the screen grid, a voltage-limiting circuit having one terminal connected to the screen grid and another terminal connected to the cathode of the electron tube, said voltage-limiting circuit having a low impedance for a voltage difference between the two said terminals above a preset threshold value and a high impedance for a voltage difference below said threshold value.

4,954,793

**FILTER BANK**

Koichiro Misu; Shusou Wadaka, and Tsutomu Nagatsuka, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Jul. 1, 1988, Ser. No. 214,521  
Claims priority, application Japan, Dec. 25, 1987, 327240  
Int. Cl.<sup>5</sup> H03H 7/46, 9/76

U.S. Cl. 333-133

4 Claims



1. A filter bank, comprising:

- a plurality of T-type circuits connected in cascade between a signal source and a terminal impedance, each T-type circuit including,  
a surface acoustic wave (SAW) filter having a frequency pass band for passing power signals therethrough, and  
a plurality of reactance elements connected in series forming a series element,  
said SAW filter having an input side connected between two predetermined reactance elements of said series element and having an output side connected to an output terminal;  
each SAW filter in said plurality of T-type circuits having a pass band of a different frequency for passing power signals from said signal source therethrough;  
each T-type circuit having its series element connected to series elements of adjacent T-type circuits to form said plurality of T-type circuits connected in cascade between said signal source and said terminal impedance;  
reactance elements of selected ones of said T-type circuits consisting of inductance elements and reactance elements of other T-type circuits consisting of a parallel connection

of an inductance element and a capacitance element, to reduce transmission of spurious power signals through said SAW filters.

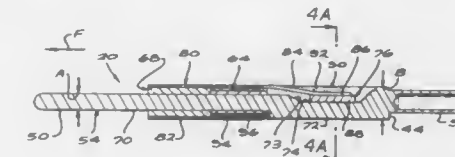
4,954,794

**FILTER CONTACT**

Gerald R. Nleman, Glendale; Clarence L. Ciyatt, III, Phoenix; Eric J. Paulus; Scott A. Zehrung, both of Scottsdale; Albert Ragl, Mesa, all of Ariz., and John R. Moore, Tustin, Calif., assignors to ITT Corporation, New York, N.Y.  
Filed Apr. 10, 1989, Ser. No. 335,413  
Int. Cl.<sup>5</sup> H03H 7/00

U.S. Cl. 333-182

10 Claims



1. In a connector with a housing and a plurality of filter contact assemblies in the housing, the improvement wherein each contact assembly comprises:

- a signal conductor with first and second ends, an inductor/resistor element coupled to said signal conductor, a ground conductor, a diode connected between the signal and ground conductors, a first capacitor connected between said signal and ground conductors, said diode having a predetermined capacitance, said diode and first capacitor connected to locations along said signal conductor which lie on opposite sides of said inductor/resistor element, and said capacitor having a capacitance substantially equal to the capacitance of said diode.

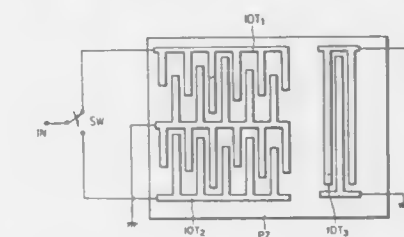
4,954,795

**SURFACE ACOUSTIC WAVE FILTER FOR SUPPRESSING SURFACE TO SURFACE INTERFERENCE FOR A SATELLITE COMMUNICATION RECEIVER**

Young H. Choi, Seoul, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Rep. of Korea  
Filed Aug. 18, 1988, Ser. No. 234,141  
Claims priority, application Rep. of Korea, Aug. 19, 1987, 1987-9050

U.S. Cl. 333-194

5 Claims



1. A filter for suppressing surface to surface interference in an IF band of a satellite communication receiver, comprising:  
a substrate of piezoelectric material for propagating a surface acoustic wave;  
a first input interdigital transducer, having a first frequency response, disposed on the substrate for passing said IF band and generating said surface acoustic wave in response to an input signal applied thereto;  
a second input interdigital transducer, having a second frequency response, disposed on the substrate for suppressing an interference signal in said IF band and generating said surface acoustic wave.



surface acoustic wave in response to said input signal applied thereto;  
 means for switching said input signal into either of said first and second input interdigital transducers; and  
 an output interdigital transducer receiving said surface acoustic wave in said substrate;  
 wherein said first and second input interdigital transducers are so configured that said first frequency response of said first input interdigital transducer has a predetermined band width, and said second frequency response of said second input interdigital transducer has said predetermined band width, while having a reduced gain in a predetermined frequency range within said band width for suppressing said interference signal,  
 wherein said first and second input interdigital transducers extend side by side along said substrate, and  
 wherein said first and second input interdigital transducers include a common electrode structure.

4,954,796

## MULTIPLE RESONATOR DIELECTRIC FILTER

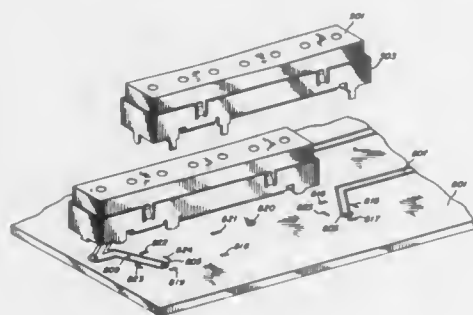
Steven R. Green, Glendale Heights; David M. De Muro, Cary; Michael F. Moutrie, Buffalo Grove, all of Ill.; Raymond L. Sokola, Albuquerque, N. Mex., and Phillip J. Gordon, Carmel, Ind., assignors to Motorola, Inc., Schaumburg, Ill.

Division of Ser. No. 92,870, Sep. 3, 1987, Pat. No. 4,829,274, which is a division of Ser. No. 890,686, Jul. 25, 1986, Pat. No. 4,692,726. This application Aug. 10, 1988, Ser. No. 230,408. The portion of the term of this patent subsequent to Sep. 8, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> H01P 1/205

U.S. Cl. 333—206

10 Claims



1. A duplex radio transceiver coupled to one antenna for both receive and transmit functions, comprising:

- a transmitter;
- a receiver;
- a duplex filter disposed between said transmitter and the antenna, and between said receiver and the antenna, said duplex filter further comprising:
  - (a) at least two volumes of dielectric material, each volume of dielectric material having first, second, and side surfaces, said second and side surfaces of each volume of dielectric material being substantially covered with a conductive material;
  - (b) a plurality of holes extending through each said volume of dielectric material from said first surface to said second surface, the surface of at least two of said holes through each of said volume of dielectric material being substantially covered with a conductive material which is electrically common at said second surface of each respective volume of dielectric material, thereby forming at least two resonators in each said volume of dielectric material;
  - (c) first means for coupling a first of said at least two resonators of a first one of said at least two volumes of dielectric material to a first input/output terminal;
  - (d) second means for coupling a second of said at least two

- resonators of a first one of said at least two volumes of dielectric material to a second input/output terminal;
- (e) third means for coupling a first of said at least two resonators of a second one of said at least two volumes of dielectric material to a third input/output terminal;
- (f) fourth means for coupling a second of said at least two resonators of a second one of said at least two volumes of dielectric material to a fourth input/output terminal;
- (g) mounting means comprising a conductive material for supporting at least one of said volumes of dielectric material on a substrate; and
- (h) a first transmission line disposed on said substrate and coupling said first input/output terminal to said third input/output terminal and to the antenna whereby receiver signals from the antenna may be rejected by said first volume of dielectric material and transmitter signals from the transmitter may be rejected by said second volume of dielectric material.

4,954,797

## VEHICLE WINDOW GLASS ANTENNA COUPLED WITH DEFOGGING HEATER

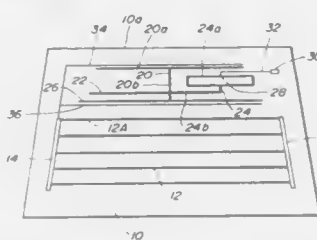
Masao Shinnai; Kazuya Nishikawa; Tokio Tsukada, and Tohru Hirotsu, all of Matsusaka, Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Sep. 23, 1988, Ser. No. 248,093

Int. Cl.<sup>5</sup> H01Q 1/02, 1/32

U.S. Cl. 343—704

13 Claims



1. A vehicle window glass antenna attached to a vehicle window glass which is provided with a plurality of heater strips extending horizontally, the antenna being located above the heater strips and comprising:

- a first element which is a T-shaped conductive strip comprising a horizontal part and a vertical part extending from said horizontal part toward the heater strips;
- a second element which is a conductive strip and extends horizontally from a point on said vertical part of said first element so as to exist only on one side of said vertical part;
- a third element which is a conductive strip and comprises a primary part which constitutes at least three sides of a horizontally elongate rectangle on the other side of said vertical part of said first element and a secondary part which extends horizontally from a point on said vertical part and connects to said primary part;
- a connecting line which extends from a point on said primary part of said third element to a feed point disposed on the window glass;
- an auxiliary conductive line which connects with said heater strips and comprises a horizontal part which makes capacitive coupling with said horizontal part of said first element, and
- another auxiliary conductive line connecting with said heater strips and including a horizontal part making capacitive coupling with at least one of said second element and said secondary part of said third element.

4,954,798

## DEVICE FOR COUPLING REVERSIBLE ELECTROMAGNETIC CONTACTORS TO EACH OTHER WITH AN INTERLOCK UNIT

Mitsuharu Kasahara; Kuniyuki Kogawa, and Takato Hirota, all of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

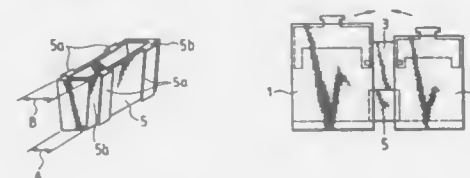
Filed Aug. 18, 1988, Ser. No. 233,528

Claims priority, application Japan, Aug. 19, 1987, 62-126044[U]; Aug. 19, 1987, 62-126045[U]

Int. Cl.<sup>5</sup> H01H 9/20

U.S. Cl. 335—161

6 Claims



1. A device comprising:

- an interlock unit;
- first and second electromagnetic contactors, each electromagnetic contactor having a bottom side, a coupler side surface, and engagement grooves formed in the coupler side surface; and
- a coupler integrally coupling said electromagnetic contactors to each other with the interlock unit sandwiched therebetween, the coupler having a front end, a rear end, a varying width, and first and second opposite side surfaces each having engagement portions inserted into the engagement grooves from the bottom sides of said electromagnetic contactors, wherein the width of said coupler at a portion thereof abutting on the coupler side surface of each of said electromagnetic contactors is larger at the rear end than at the front end thereof.

4,954,799

## PROPORTIONAL ELECTROPNEUMATIC SOLENOID-CONTROLLED VALVE

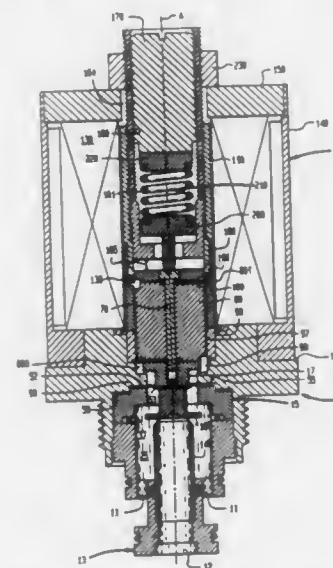
Viraraghavan S. Kumar, Palm Bay, Fla., assignor to Puritan-Bennett Corporation, Overland Park, Kans.

Filed Jun. 2, 1989, Ser. No. 360,429

Int. Cl.<sup>5</sup> H01F 7/13; F16K 31/06

U.S. Cl. 335—236

18 Claims



1. A rectilinear motion proportional solenoid device comprising:

- a housing containing an electromagnetic coil, said electro-

magnetic coil having a longitudinal axis and a bore coaxial therewith, for producing a magnetic field, said housing containing magnetic material for providing a flux path for said magnetic field;  
 a magnetic pole piece disposed within the bore of said electromagnetic coil;  
 a movable armature assembly of magnetic material;  
 suspension spring means within said bore of said electromagnetic coil for supporting said movable armature within said bore adjacent to one end of said magnetic pole piece for axial movement within said electromagnetic coil, so that an axial gap is formed between a first portion of said armature assembly and said magnetic pole piece and a radial gap is formed between a second portion of said armature assembly and a first portion of said housing; and  
 means for causing the force imparted to said movable armature by the application of a current to said electromagnetic coil to be substantially constant irrespective of the magnitude of said axial gap for a variation in said axial gap over a prescribed range.

4,954,800

## MAGNET AND METHOD OF MANUFACTURING THE SAME

Naoki Ohtsuka, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

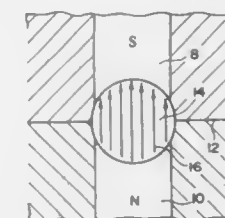
Filed May 15, 1987, Ser. No. 49,966

Claims priority, application Japan, May 20, 1986, 61-113583; Feb. 7, 1987, 62-25583; Feb. 7, 1987, 62-25584; Feb. 7, 1987, 62-25585

Int. Cl.<sup>5</sup> H01F 7/02

U.S. Cl. 335—284

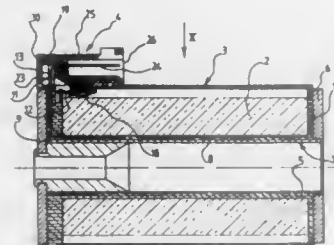
4 Claims



1. A method for manufacturing a magnet having a plurality of pairs of magnetic poles comprising the steps of:

- setting a molding apparatus for molding a resin material including magnetic powder into a predetermined shape, the molding apparatus having a cavity for pouring the resin therethrough and magnetic flux generating means for applying the magnetic flux to the resin material, the cavity being defined by a non-magnetic material and pairs of magnetic pole members, with each pair having a starting magnetic pole and a terminal magnetic pole and being made of ferromagnetic material, with the number of magnetic pole members being the same as the number of magnetic poles of the magnet, and the magnetic powder being oriented so that in the central portion of the molded article the magnetic powder is substantially parallel with a line connecting a starting magnetic pole and a terminal magnetic pole such that the magnetic powder in a peripheral portion of the molded article converges toward the central portion of a magnetic peak formed between the starting magnetic pole and the terminal magnetic pole;
- demagnetizing the molded product; and
- magnetizing the molded product by a magnetizing apparatus having the same number of magnetizing poles as the magnetic poles of the magnet, the magnetic powder of the central portion of the molded product being magnetized in the same direction of the magnetic poles of the magnet.

**4,954,801**  
**ELECTRIC COIL AND IN PARTICULAR ELECTROMAGNET ARRANGEMENT COMPRISING A COIL SPOOL AND A COIL CASING**  
 Patrick Urbanski, Saint Just en Chaussée, France, and Jo Smolders, Wespelaar, Belgium, assignors to Bristol Babcock S.A., Mouy, France  
 Filed Dec. 11, 1989, Ser. No. 448,317  
 Claims priority, application France, Dec. 12, 1988, 88 16328  
 Int. Cl.<sup>5</sup> H01R 27/04  
 U.S. Cl. 336—90 5 Claims

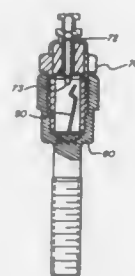


1. An electrical coil and in particular electromagnet arrangement of the type comprising a coil spool which includes a cylindrical coil-carrying body and at each end a flange, a sleeve-shaped coil casing enclosing said coil and a device for the outer electrical connection of the arrangement which comprises terminal connectors associated with one of said flanges and provided each one with a pin connected to the coil and with an outer connection pin, wherein the improvement consists in that the coil casing is coaxially positioned on the spool and is adapted to be positioned through axial fitting on the cylindrical body, in that the terminal connectors are anchored within the flange adjacent to the forward end of the casing by an anchoring lug portion extending into the flange from the periphery thereof, those portions which form the connecting pins are folded back so as to extend in parallel relation to the centre line axis of the arrangement from the plane of the anchoring flange in the direction of the other flange so that those portions which form the outer connection pin be located at a distance from the axis of the arrangement which is greater than that of the outer peripheral surface of the casing and in that the latter carries at its end adjacent to the anchoring flange a wall which extends at right angles to the axis of the arrangement and exhibits axial holes through which the outer folded back pins extend upon the fitting of the casing onto the cylindrical body.

**4,954,802**  
**BI-METAL TEMPERATURE SWITCH**  
 Henry Wasserstrom, and Vlorei Drambarean, both of Chicago, Ill., assignors to Stewart Warner Instrument Corporation, Chicago, Ill.  
 Filed May 19, 1989, Ser. No. 354,498  
 Int. Cl.<sup>5</sup> H01H 37/04, 37/52  
 U.S. Cl. 337—380 6 Claims

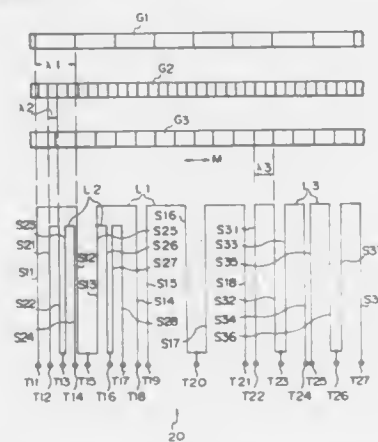
1. A temperature switch assembly comprising:  
 a probe which is threaded at one end and has an indentation at the other end wherein the indentation is internally threaded and has a flat bottom surface;  
 a bimetal element having a flat surface and extension projecting away from the flat surface wherein the bimetal element is inserted into the indentation of the probe so that the flat surface of the bimetal element matches the bottom flat surface of the indentation;  
 a mating shell which screws into the indentation of the probe securing the bimetal element in the indentation, wherein the mating shell has a switch contact projecting into an open space created by the indentation of the probe and the

mating shell, the switch contact being electrically insulated from the mating shell;



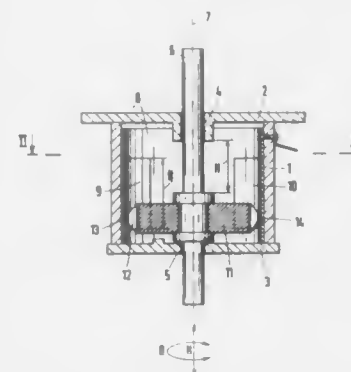
wherein the bimetal element deforms and makes contact with the switch contact when the temperature of the bimetal element reaches a predetermined value.

**4,954,803**  
**MAGNETIC-RESISTOR SENSOR AND A MAGNETIC ENCODER USING SUCH A SENSOR**  
 Kenzaburo Iijima, and Yoshinori Hayashi, both of Shizuoka, Japan, assignors to Yamaha Corporation, Japan  
 Filed Mar. 15, 1989, Ser. No. 324,391  
 Claims priority, application Japan, Mar. 18, 1988, 63-65379; Apr. 26, 1988, 63-102902  
 Int. Cl.<sup>5</sup> H01L 43/00  
 U.S. Cl. 338—32 R 6 Claims



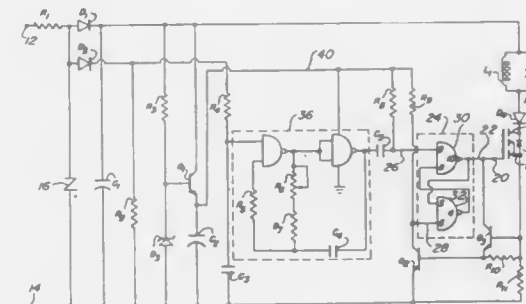
1. An improved magnetic-resistor sensor, comprising:  
 a base; and  
 a plurality of juxtaposed comb-like patterns formed on said base plate;  
 each said comb-like pattern including a plurality of juxtaposed sensor sections spaced from each other by a distance fixed depending on the pitch of a respective magnetic information pattern stored on a magnetic scale, usable in combination with said resistor sensor and a plurality of connector portions intervening between said sensor sections; and  
 said distance being different from pattern to pattern.

**4,954,804**  
**ROTARY POTENTIOMETER**  
 Gottfried Berthold, Reutlingen; Rudolf Limpert, Salz, and Friedrich Fehr, Lauter, all of Fed. Rep. of Germany, assignors to Preh-Werke GmbH & Co. KG, Saale, Fed. Rep. of Germany  
 Filed Mar. 3, 1989, Ser. No. 318,333  
 Claims priority, application Fed. Rep. of Germany, Mar. 4, 1988, 3807005  
 Int. Cl.<sup>5</sup> H01C 10/32  
 U.S. Cl. 338—162 10 Claims



1. Rotary potentiometer comprising a cylindric or partially cylindric resistance track having two edges parallel to the axis of a cylinder corresponding to the resistance track which are provided with at least one first pair of electrodes applying voltage to the resistance track, and comprising a tap which engages the resistance track and which is fixed to an adjusting component rotatable around the cylinder axis, wherein the adjusting component is axially movable by a stroke axial to the cylinder axis relative to the resistance track, wherein the axial breadth of the resistance track is substantially equal to the stroke of the adjusting component, and wherein at the resistance track's two edges running in circumferential direction of the cylinder at least one second electrode pair is provided for mutually connecting with respective voltage sources.

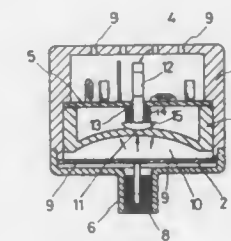
**4,954,805**  
**PIEZO ELECTRONIC HORN**  
 William P. Buyak, New Hartford, Conn., assignor to General Signal Corporation, Stamford, Conn.  
 Filed Feb. 6, 1990, Ser. No. 475,541  
 Int. Cl.<sup>5</sup> G08B 3/00  
 U.S. Cl. 340—384 E 9 Claims



8. An electronic horn for alarm circuits of the type in which a d.c. power supply of particular polarity indicates an alarm condition, comprising:  
 a pair of power supply terminals connected to said d.c. power supply;  
 a piezo sounder connected across said supply terminals;

an inductor connected in parallel circuit with said piezo sounder to form a tank circuit; and  
 current control means inserted in series circuit with said parallel circuit and said power supply terminals and operable during said alarm condition to become periodically conductive so as to allow a current flow from said supply through said parallel circuit for a period corresponding to the period required to charge the capacitance of said sounder and to bring the current flow through said inductor to a predetermined value and to become nonconductive so as to cut off said current flow when the current through said inductor reaches said predetermined value to allow said tank circuit to go into decaying oscillation at its natural frequency until the beginning of the next period when said control means again becomes conductive.

**4,954,806**  
**WARNING DEVICE FOR THE INADEQUATE TIRE AIR PRESSURE**  
 Feng-Lin Hwang, No. 21, Pa Te Rd., Chi Ta District, Keelung City, Taiwan  
 Filed Jan. 17, 1990, Ser. No. 466,191  
 Int. Cl.<sup>5</sup> B60C 23/00  
 U.S. Cl. 340—442 1 Claim



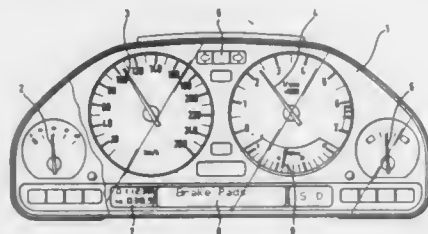
1. A warning device for the inadequate tire air pressure comprises:  
 an outer shell, which is a hollow barrel with one end of a threaded tube to screw to a tire's air valve and with the other end where a plurality of pores are provided, wherein an operating needle plate, a resilient hood, a switch bar and a PC board are placed in an order from the threaded tube toward the outer shell interior;  
 an operating needle plate, which is a circular sheet with a few small holes thereon and an operating needle at the center thereof extending perpendicular to the plate's plane, can push aside a tire's air stopper to allow air communication from the tire to an air chamber just in front of resilient hood when screwed to a tire valve;  
 a resilient hood, which has appropriate resilience and closely contacts the inner wall of said outer shell to be airtight, and has a concave means in the central part thereof for insertion by the tail part of switch bar;  
 a switch bar which is a screw bolt but has no thread and made by insulating material, and has a conductible portion in some suitable area of the bar body upper part to pass PC board's central opening where conductive circles are installed; the switch bar being placed on a concave means of resilient hood with its tail part securely connected thereto by means of a spring connection between the PC board and concave means;  
 a PC board, which is circular of shape and has an opening in the center thereof where conductive circles are installed for said switch bar to pass to contact or separate from them in switch control of the PC board circuit; with the above-described elements, this device if screwed to a tire valve is expected to send warning sounds and lights when the tire air pressure happens to reduce below the regulated standard.



**4,954,807**  
**COMBINATION INSTRUMENT FOR AUTOMOTIVE VEHICLES**

Helmut Fleischer, Niddatal; Ernst-Ulrich Simon, Oberursel, and Günter Schmitt, Kelkheim, all of Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 13, 1988, Ser. No. 257,988  
Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 3736761; Jan. 12, 1988, 3800572  
Int. Cl.<sup>5</sup> B60Q 3/04  
U.S. Cl. 340—459 5 Claims



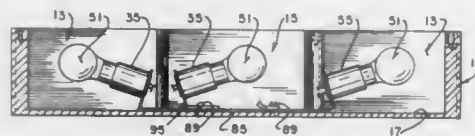
1. In a combination instrument for automotive vehicles in which different indicating instruments, indicating fields and control and warning lights are arranged in a common housing and covered by a common transparent glass, the improvement wherein the instrument further comprises

an inner housing, a display computer, and a circuit board, the computer being disposed on the circuit board within the inner housing, the inner housing being substantially impervious to high frequencies, the inner housing being located within said common housing;  
a lower part of a multiple-plug-type connector fastened on at least one outer surface of said inner housing;  
electrical contacts which are formed by elongated conductors which extend in one piece from said circuit board through a wall of said inner housing into said plug-type connector; and  
a ferrite core disposed in said inner housing; and wherein the elongated conductors are led at least once through the ferrite core.

**4,954,808**  
**EYE LEVEL REAR MOUNTED LIGHTED TURN AND STOP SIGNAL FOR VEHICLES**

Manfred F. Duerkob, Franklin, Mo., assignor to Dorothy I. Duerkob, Pacific, Mo.

Filed Aug. 7, 1989, Ser. No. 390,197  
Int. Cl.<sup>5</sup> B60Q 1/38  
U.S. Cl. 340—475 13 Claims



4,954,813

## PORTABLE WARNING DEVICE

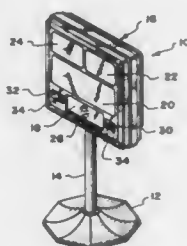
Alfred A. August, Sr., Concord, and Anthony M. Jackson, San Jose, both of Calif., assignors to Safety by Design, Inc., Santa Clara, Calif.

Filed Aug. 9, 1989, Ser. No. 391,086

Int. Cl.<sup>5</sup> G08B 13/14

U.S. Cl. 340—571

5 Claims



## 1. A portable warning device comprising:

a stanchion having an upper end and a lower end, said lower end adapted to be located on a supportive surface, said upper end being spaced from the supportive surface, said stanchion having a plurality of side walls each, said side wall being planar with the arrangement of said side walls being polygonal;

light means located at said upper end, said light means being readily visually observable by a human being when coming into close proximity with said stanchion;

antitheft alarm means connected to said stanchion, said antitheft alarm means to activate an annunciator upon said stanchion being moved from its established location;

human voice recording means connected to said stanchion, said recording means being activatable to record a particular message;

sensor means connected to said stanchion, said sensor means being activated upon a human being moving within a certain distance of said stanchion, said sensor means being wireless and detecting heat of the human being, said sensor means comprising a pair of sensor, switch means associated with said stanchion, said switch means for selecting either one said sensor or both said sensors, one said sensor being mounted within one said side wall, the remaining said sensor being mounted within another said side wall, said sensors functioning to be sensitive to the entire three hundred sixty degree arc directly about said stanchion; and

sound reproduction means connected to said stanchion, said message being reproduced and transmitted upon activation of said sensor means.

4,954,814

## TAG AND METHOD OF MAKING SAME

S. Eugene Benge, Middletown, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Continuation of Ser. No. 269,504, Nov. 14, 1988, abandoned, which is a continuation-in-part of Ser. No. 114,792, Oct. 28, 1987, Pat. No. 4,818,312. This application Sep. 11, 1989, Ser. No. 405,596

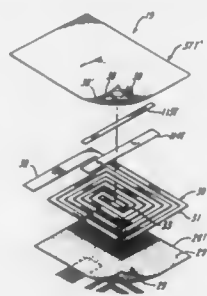
Int. Cl.<sup>5</sup> G08B 13/24

U.S. Cl. 340—572

16 Claims

1. Method of making tags for use in an electronic article surveillance system, comprising the steps of: providing a detectable resonant circuit, forming a deactivator for deactivating the resonant circuit, wherein the forming step includes providing a composite strip having a conductive layer, a normally non-conductive layer adhered to the conductive layer and a coating surrounding the adhered layers, and positioning the composite strip in proximity to the resonant circuit so that

when excess energy is applied to the deactivator the normally non-conductive layer becomes conductive and the coating is



rendered ineffective whereby the resonant circuit is deactivated.

4,954,815

## HEAD POSITIONING SYSTEM

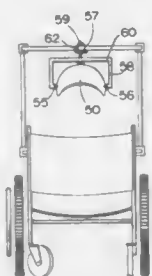
Jeffrey C. Delmonte, 553 Second St., Hermosa Beach, Calif. 90254

Filed Jun. 17, 1988, Ser. No. 208,368

Int. Cl.<sup>5</sup> G08B 21/00

U.S. Cl. 340—686

12 Claims



1. A head positioning system for physically impaired persons including positioning means having x, y and z axes for placing the head in a controlled position which provides support for the head including means for preventing uncontrolled motion transitional of the head with respect to said system along the x axis and along the y and z axes after adjustment along the y and z axes,

x axis pivot means connected to said positioning means for allowing enhanced, free flowing, non-resistive motion about said x axis.

4,954,816

## DECORATIVE SMOKE DETECTOR CONSTRUCTION

Lawrence A. Mattison, 388 N. Ellicott Creek Rd., Tonawanda, N.Y. 14150

Filed Feb. 16, 1989, Ser. No. 311,704

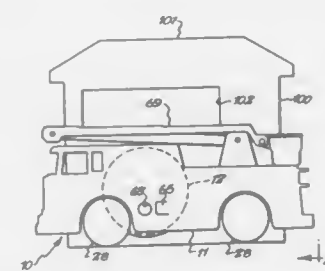
Int. Cl.<sup>5</sup> G08B 23/00

U.S. Cl. 340—693

36 Claims

29. A decorative smoke detector construction for mounting relative to a room surface comprising a first decorative plaque for mounting proximate a room surface, a second decorative plaque spaced from said first decorative plaque in a direction away from said room surface, a smoke detector including a smoke detector housing, and means mounting said smoke detector housing relative to said first and second decorative

plaques and behind said second decorative plaque, said first and second decorative plaques extending laterally outwardly



beyond said smoke detector housing in a direction lengthwise of said room surface.

4,954,817

## FINGER WORN GRAPHIC INTERFACE DEVICE

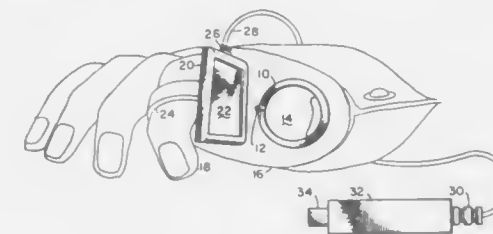
Neil A. Levioe, 841 Oeste Dr., Davis, Calif. 95616

Filed May 2, 1988, Ser. No. 189,185

Int. Cl.<sup>5</sup> G09G 3/09

U.S. Cl. 340—706

19 Claims



16. A method for information transfer to a receiver the steps including: wearing a digitizing means on one finger, wearing a stylus means on another finger, coupling the digitizing means to a receiver, and activating said digitizing means with said stylus means, thereby effectuating locational information transferred to the receiver.

4,954,818

## MULTI-WINDOW DISPLAY CONTROL SYSTEM

Ketichi Nakane; Tadashi Kuwabara; Naoya Ikeda; Hiroyuki Koreeda; Hiroaki Aotsu, all of Yokohama; Masaki Kawase, Katsuta; Yujiro Tatsuno, Hitachi; Naomichi Nonaka, and Kazunari Suzuki, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Microsoftware Systems, Inc., Yokohama, both of Japan

Filed Oct. 20, 1986, Ser. No. 920,425

Claims priority, application Japan, Oct. 18, 1985, 60-231191; May 19, 1986, 61-112632; Sep. 19, 1986, 61-219633

Int. Cl.<sup>5</sup> G06F 3/14

U.S. Cl. 340—721

15 Claims

1. A multi-window display control system which is composed of a central processing unit, a main memory, a shared memory, an external memory, an input means, a display means and a display memory for storing a plurality of display data being overlapped and displayed, said system comprising:

a display processing means for performing display processing of a plurality of display data;

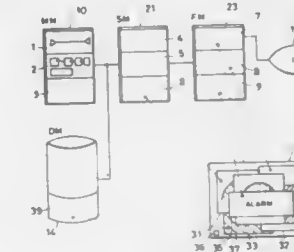
a first save area installed on the display memory for temporarily saving overlapped data of the plurality of display data;

a second save area installed on the shared memory for temporarily saving overlapped data of the display data;

a third save area installed on the external memory for tempo-

rarily saving overlapped data of the plurality of display data;

a first control table installed on the main memory for controlling display position, mutual priority for display, and a save area during overlap, regarding each of a plurality of display data stored in the display memory,



wherein said display processing means controls display of the plurality of display data using the first control table, the first, second and third save areas, and the display memory.

4,954,819

## COMPUTER GRAPHICS WINDOWING SYSTEM FOR THE DISPLAY OF MULTIPLE DYNAMIC IMAGES

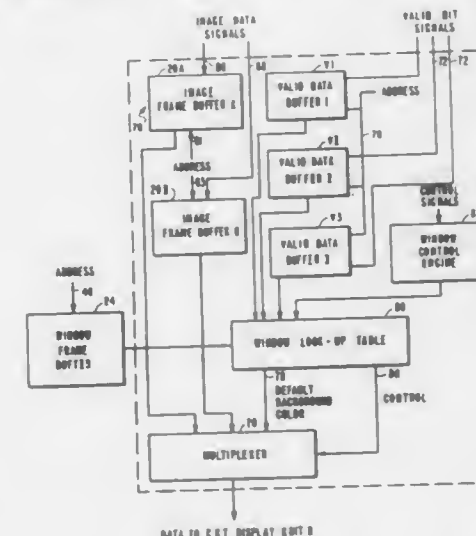
Gary S. Watkins, Salt Lake City, Utah, assignor to Evans & Sutherland Computer Corp., Salt Lake City, Utah

Continuation of Ser. No. 68,287, Jun. 29, 1987, abandoned, which is a continuation of Ser. No. 734,923, May 16, 1985, abandoned. This application Oct. 11, 1988, Ser. No. 256,335

Int. Cl.<sup>5</sup> G09G 1/28

U.S. Cl. 340—721

13 Claims



1. A dynamic window control system for use with a computer graphics apparatus, providing image data and control signals for a scan-pattern display, comprising:

an image frame buffer means for storing pixel area image data for said scan-pattern display;

a window frame buffer for defining a plurality of windows of said display;

a plurality of valid data buffers, each for storing a binary validity signal to designate select data pixels as stored in said image frame buffer; and

means for supplying image data from said image frame buffer to said scan-pattern display in the sequence of said scan-pattern selectively under control of said window frame buffer and one of said valid data buffers.



4,954,820

## TRANSMITTER FOR RADIO CONTROL SYSTEM

Naoichi Kohno; Masahiro Arai; Akira Aneha, and Michio Fujisaki, all of Mobara, Japan, assignors to Futaba Denshi Kogyo Kabushiki Kaisha, Mobara, Japan

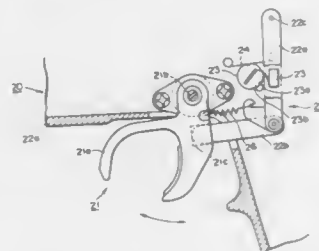
Filed Mar. 23, 1989, Ser. No. 327,611

Claims priority, application Japan, Mar. 24, 1988, 63-039447

Int. Cl.<sup>5</sup> H04B 7/00

U.S. Cl. 340—825.69

7 Claims



1. A transmitter for a radio control system comprising:  
a plurality of main control elements which are controllable in directions relative to each other about a neutral point and control basic operation of a controlled unit;  
an auxiliary control element for selecting control characteristics of said main control elements;  
control of said main control elements and auxiliary control element causing a radio wave to be output from said transmitter and then received as an input signal by a receiver loaded on said controlled unit, resulting in an actuation section being actuated depending on said input signal to carry out remote control of said controlled unit;  
a first changeover element for changing over a mechanically neutral of said main control elements; and  
a second changeover element operated when specific control characteristics of said main control elements are selected by said auxiliary control element, resulting in setting an electrically neutral point of said actuation section depending on the mechanically neutral point of said main control elements;  
operation of said first changeover element causing said second changeover element to be changed over in association therewith.

4,954,821

## METHOD OF ESTABLISHING TRANSMISSION GROUP NUMBERS FOR NETWORK LINKS

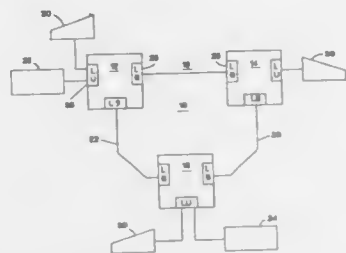
James P. Gray, Chapel Hill; Jeffrey G. Knauth, Raleigh; Diane P. Pozefsky, Chapel Hill, and Lee M. Rafalow, Durham, all of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 15, 1988, Ser. No. 168,286

Int. Cl.<sup>5</sup> H04Q 1/00

U.S. Cl. 340—825.52

5 Claims



1. In a communications network wherein selected pairs of nodes may be selectively, directly connected by transmission

groups, each transmission group being uniquely identified as a function of the names of the paired nodes in combination with an assigned transmission group number, a method for allowing one of the nodes to assign the transmission group number, said method being performed at each of the two nodes during initialization of the connection and comprising the steps of:  
sending an exchange identification message from a first node to a second node, said message including a proposed non-zero transmission group number if one had been previously determined at the first node or a zero transmission group number if no non-zero transmission group number had been previously determined;  
determining at the first node the value of the transmission group number contained in an exchange identification message received from the second node;  
setting the final transmission group number equal to the proposed non-zero transmission group number sent by one of the first and second nodes where the other of the nodes originally sent a zero transmission group number;  
comparing the relative significance of the first and second node names according to predetermined criteria where both nodes send either zero transmission group numbers or proposed non-zero transmission group numbers;  
selecting the node having the more significant node name according to the predetermined criteria;  
causing the selected node to assign a final non-zero transmission group number where both nodes originally sent zero transmission group numbers or where both nodes originally sent proposed non-zero transmission group numbers.

4,954,822

## TRAFFIC SIGNAL USING LIGHT-EMITTING DIODES

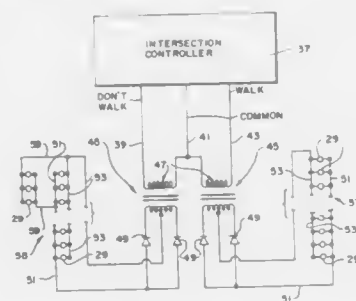
Arnold Borenstein, 2818 W. Chase, Chicago, Ill. 60645

Filed Sep. 2, 1988, Ser. No. 240,072

Int. Cl.<sup>5</sup> G08G 1/07

U.S. Cl. 340—925

26 Claims



23. A street traffic signal device for providing a high resolution signal to vehicular and pedestrian traffic comprising:  
a display support structure including a non-reflective panel member which is substantially flat;  
a set of signal elements supported on said panel in a configuration corresponding to a traffic control symbol;  
each of the signal elements comprising a high intensity light emitting diode element having an angle of dispersion about a central axis which is substantially perpendicular to said panel member, each diode in the set being connected in electrical parallel with every other diode in the set; and  
power supply means for supplying electrical power being connected with said light emitting diode elements, and light emitting diode elements generating light responsive to power being applied thereto, whereby the traffic control symbol formed by illuminated diodes is only perceived by traffic when the diodes are illuminated.

4,954,823

## TOUCH KEYBOARD SYSTEMS

Ronald P. Binstead, 15 Seely Road, Radford, Nottingham, England

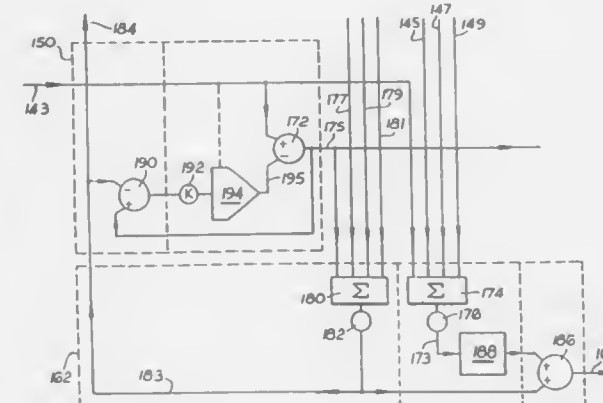
Continuation-of Ser. No. 160,707, Feb. 26, 1988, abandoned, which is a continuation-in-part of Ser. No. 21,639, Mar. 4, 1987, abandoned, which is a continuation-in-part of Ser. No. 828,326, Jan. 28, 1986, abandoned. This application Mar. 9, 1989, Ser. No. 323,251

Claims priority, application PCT Int'l Appl., Apr. 16, 1985, PCT/GB85/00168

Int. Cl.<sup>5</sup> G06F 3/14

U.S. Cl. 341—26

19 Claims



1. A touch operated key apparatus including a sheet of glass, a keyboard comprising a plurality of keypads, means for attaching the keyboard to the sheet of glass to operate the keypads through the sheet of glass, means for displaying data and for controlling processes selectable by the keyboard, said apparatus further including processing circuitry for processing signals from the keypads of the keyboard and interrogation means for interrogating the output signals from at least one of the keypads, sensing means associated with the keyboard for detecting and for processing the outputs of the at least one of the keypads, said sensing means including a plurality of signal processing circuits for receiving a respective signal from a respective keypad, a long term drift compensation circuit connected to receive respective signals from several of the keypads for generating a drift compensation signal value and a store for storing the drift compensation signal value, comparison means for comparing the output of the respective signal processing circuits of the keypad being interrogated with the output of said signal processing circuit of at least one other keypad and with the stored drift compensation signal to determine as a result of the comparisons whether the keypad being interrogated has been touched, average change generation means for continually generating an average change signal representative of the average of the last changes in at least two of the keypads, an integration circuit for generating a summation of previous average change signals, each of said signal processing circuits including an average signal comparator for comparing the output signal from a respective keypad with the summation signal generated by said integration circuit, means for modifying the output signal of said respective signal processing circuits by the output signal of said average signal comparator in proportion to the difference between the change in output signal for the respective keypad and the average change for all of the interrogated keypads, said comparison means being operative for comparing the differences between the change in output signal for each respective keypad and the average change for all interrogated keypads instead of the absolute value of the output of each respective keypad.

4,954,824

## SAMPLE RATE CONVERSION SYSTEM HAVING INTERPOLATION FUNCTION WITH PHASE LOCKED CLOCK

Masahiro Yamada, Kawasaki, and Kiyoyuki Kawai, Yokosuka, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

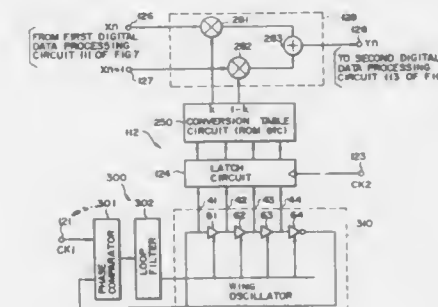
Filed Sep. 15, 1988, Ser. No. 244,295

Claims priority, application Japan, Sep. 18, 1987, 62-233947

Int. Cl.<sup>5</sup> H03M 7/00

U.S. Cl. 341—61

17 Claims



1. A sample rate conversion circuit for converting first digital data processed by a first clock signal having a first frequency into digital data processed by a second clock signal having a second frequency, comprising:  
ring oscillator means, having a predetermined number of voltage-controlled gate delay elements connected to each other in the form of a loop, for outputting polyphase delay clock signals and a predetermined self-excited oscillation signal;  
phase-locking means for applying a control voltage corresponding to a phase difference between the first clock signal and the self-excited oscillation signal to each of said voltage-controlled gate delay elements so as to phase-lock the first clock signal with the self-excited oscillation signal output from said ring oscillator means;  
latch means for latching the polyphase delay clock signals output from said ring oscillator means in accordance with the second clock signal;  
interpolation coefficient generating means for generating an interpolation coefficient corresponding to a phase data between the first and second clock signals in accordance with the polyphase delay clock signals latched by said latch means; and  
interpolating means for interpolating two adjacent data of the first digital data by using the interpolation coefficient generated by said interpolation coefficient generating means and outputting the interpolated data as the second digital data.

4,954,825

## SELF CLOCKING BINARY DATA ENCODING/DECODING METHOD

Chao S. Chi, San Diego, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 22, 1989, Ser. No. 327,073

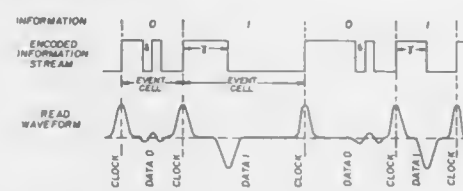
Int. Cl.<sup>5</sup> H03M 5/06

U.S. Cl. 341—64

14 Claims

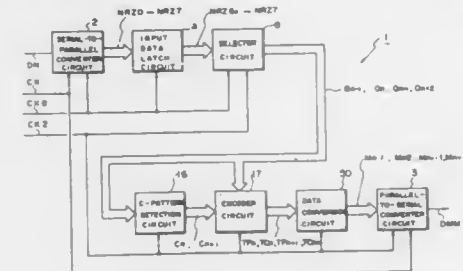
1. A method for modulating binary data comprising first and second information, the method comprising:  
(a) defining within a medium an event-cell as the time between two adjacent clock transitions, the clock transitions each having a similar, unique characteristic; and  
(b) selectively writing to the medium the information within the event-cell at an arbitrary time, by  
(i) generating a first transitional event and a corresponding first read signal, in response to the first information; or

- (ii) generating a second transitional event and a corresponding second read signal, in response to the second information; and



- (c) wherein said first transitional event and said second transitional event differ in the number of transitions per event-cell.

**4,954,826**  
**DIGITAL CODE CONVERSION APPARATUS**  
 Masaaki Isozaki, and Kazuhiro Takano, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan  
 Filed Dec. 22, 1987, Ser. No. 136,368  
 Claims priority, application Japan, Dec. 27, 1986, 61-311604; Feb. 17, 1987, 62-033897  
 Int. Cl.<sup>5</sup> H03M 9/00  
 U.S. Cl. 341-100 14 Claims

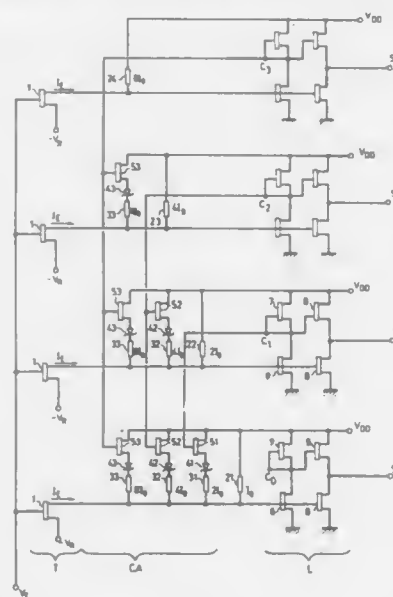


1. A digital code conversion apparatus comprising:  
 serial-to-parallel converter means for receiving input data formed of serial data and for converting said input data at a first clock rate into parallel data which are shifted one after another by a first number of bits to thereby output parallel data in which a plurality of the parallel data output at the preceding and the following clock periods have a second number of bits of overlapped data;  
 code conversion means for detecting said second number of bits of overlapped data of said plurality of parallel data and converting said plurality of parallel data into a plurality of converted data in a conversion rule; and  
 parallel-to-serial conversion circuit means for converting said plurality of converted data obtained through said code conversion means into serial converted data.

**4,954,827**  
**ANALOG DIGITAL CASCADE CONVERTER**  
 Pham N. Tung, Paris, France, assignor to Thomson Hybrides et Microondes, Paris, France  
 Filed Nov. 9, 1988, Ser. No. 269,011  
 Claims priority, application France, Nov. 10, 1987, 87 15535  
 Int. Cl.<sup>5</sup> H03M 1/36 9 Claims

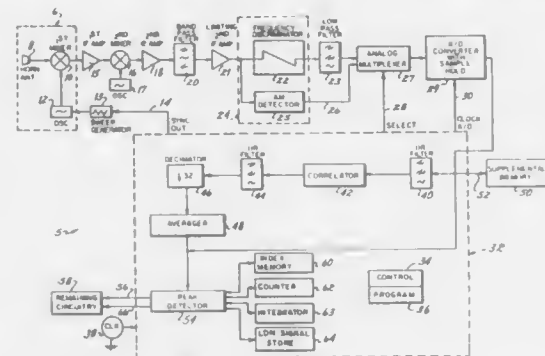
1. An analog-digital converter converting an input analog signal into an output digital signal formed by several bits, wherein the input signal is addressed in parallel to one and the same set of several bit level circuits connected with one another in cascade, each level being formed by:  
 a transducer stage which converts the input voltage into a current which is proportionate to it,  
 an analog comparator stage which compares said current with a calibrated current given by several elementary current sources,

a logic circuit stage, a first output of which gives a control signal applied to the elementary current sources of the less



significant bit levels, and a second output which delivers a bit of the digital signal.

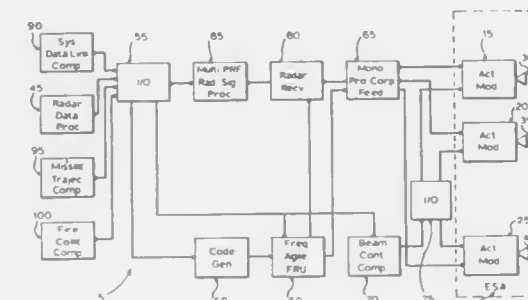
**4,954,828**  
**LONG RANGE POLICE RADAR WARNING RECEIVER**  
 Steven K. Orr, Loveland, Ohio, assignor to Cincinnati Microwave, Inc., Cincinnati, Ohio  
 Continuation-in-part of Ser. No. 421,525, Oct. 13, 1989. This application Feb. 20, 1990, Ser. No. 481,509  
 Int. Cl.<sup>5</sup> G01S 7/40; H04B 17/00  
 U.S. Cl. 342-20 20 Claims



1. A police radar warning receiver comprising:  
 IF signal means for producing an IF sweep pattern as an oscillator signal is swept in frequency between a first frequency and a second frequency in response to mixing of received RF signals in at least one band of police radar signal frequencies with said swept oscillator signal;  
 FM discriminator means responsive to said IF signal means for producing an FM sweep pattern corresponding to FM demodulation of said IF sweep pattern as said IF sweep pattern is produced;  
 sampler means for repeatedly sampling at sample intervals said FM sweep pattern as it is produced whereby to produce a series of digital sample words each associated with a respective sample interval;  
 correlator means for correlating each digital sample word as it is produced with a plurality of proceeding said digital sample words and a complex correlator function whereby

to provide a series of complex digital correlator words each associated with a respective sample interval;  
 averager means for accumulating for each of at least a plurality of said sample intervals, an average of the complex digital correlator word produced each sweep and associated with a said sample interval over a plurality of sweeps of the oscillator signal whereby to produce a series of averager words each associated with a respective one of said plurality of sample intervals;  
 substitution means for replacing in said series of averager words an averager word associated with a selected sample interval with a substitute averager word corresponding to the correlator word from that sample interval;  
 threshold means for providing after a given sweep of the oscillator signal a dynamic threshold word corresponding to the magnitude of said series of averager words; and  
 peak detector means for providing an alarm enable after said given sweep if an averager word has a magnitude greater than said dynamic threshold word whereby to indicate receipt of a police radar signal.

**4,954,829**  
**DATA LINK USING ELECTRONICALLY STEERABLE BEAM**  
 William H. Fiden, Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
 Filed Mar. 28, 1989, Ser. No. 329,459  
 Int. Cl.<sup>5</sup> G01S 13/86 28 Claims



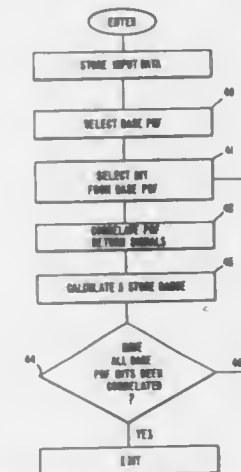
1. A missile data link comprising:  
 radar transmitter means mounted in a first vehicle for providing a radar signal;  
 data transmitter means mounted in said first vehicle for providing a first radar data signal;  
 array antenna means mounted in said first vehicle for electronically steering an output beam containing said radar signal and said first radar data signal;  
 radiating element means mounted on said first vehicle for receiving a second radar data signal;  
 data receiving means mounted in a second vehicle for receiving said output beam and processing said radar data signal; and  
 monopulse processor means mounted in said first vehicle for collecting said second radar data signal received by said radiating element means.

**4,954,830**  
**RANGE RESOLVING METHOD**  
 Kapriel V. Krikorian; Robert A. Rosen, both of Los Angeles, and Frank K. Li, Rancho Palos Verdes, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.  
 Filed Sep. 14, 1979, Ser. No. 74,578  
 Int. Cl.<sup>5</sup> G01S 13/12 17 Claims

1. A method of determining the range of a target for use in a radar system employing multiple pulse repetition frequencies (PRFs) and providing digitized signals indicative of target

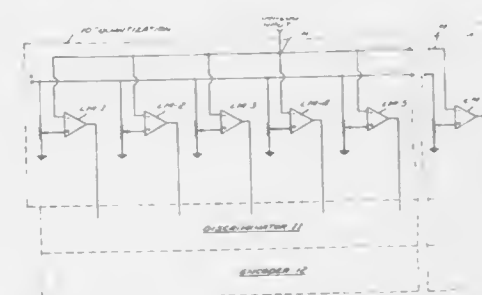
return signals from a plurality of range intervals, said method comprising the steps of:

- (1) selecting one of said PRFs as a base PRF;
- (2) selecting a second PRF and extending its number of range intervals by an amount equal to the difference in range intervals between said base and second PRFs times the number of PRF ambiguities that corresponds to the maximum target detection range;
- (3) selecting a range interval having a digitized target return signal therein from the signals associated with said base PRF;



- (4) correlating the range intervals associated with the second PRF by selecting range intervals of said remaining PRFs, based upon the differences between the number of range intervals in any particular PRF and that of the base PRF, to determine if target signals are present therein which satisfy a first predetermined relationship therebetween;
- (5) calculating the range of the target, based on a second predetermined relationship and the information obtained in steps 1, 2, 3 and 4 above; and
- (6) repeating steps 4 and 5 for each of the remaining range intervals of said base PRF having digitized target return signals therein.

**4,954,831**  
**ANALOG-TO-DIGITAL CONVERTER**  
 Robin K. Elkins, Elkins; Robin K., Fort Lauderdale, Fla. 33312  
 Continuation of Ser. No. 875,550, Jan. 18, 1986, abandoned.  
 This application Dec. 13, 1988, Ser. No. 284,798  
 Int. Cl.<sup>5</sup> H03M 1/36 28 Claims



1. An analog-to-digital converter which does not require a clock and which requires the three following stages, namely:  
 (a) A separate, discrete, quantization stage including an analog signal input terminal,  
 a plurality of output terminals corresponding individually to different analog input signal magnitudes on said input terminal,



and means connected between said input terminals and said output terminals for producing a first binary logic state on only those output terminals which correspond to signal magnitudes not greater than the instantaneous analog input signal magnitude and for producing the opposite binary logic signal state on all the other output terminals of the quantization stage;

- (b) A separate, discrete, discriminator stage having a plurality of output terminals, means connected between the output terminals of the quantization stage and the output terminals of the discriminator stage for producing an output signal of one binary logic state on the output terminal of the discriminator stage which corresponds to a particular magnitude range of the analog input signal on said analog signal input terminal of the quantization stage and for producing output signals of the opposite binary logic state on all the other output terminals of the discriminator stage; and means for providing several digital data output terminals; and
- (c) a separate, discrete, encoder stage operatively connected between said output terminals of the discriminator stage and said digital data output terminals to provide different possible combinations of binary logic states on said digital data output terminals, depending upon which one of said output terminals of the discriminator stage has the output signal of said one binary logic state.

4,954,832

#### APPARATUS FOR SIMULTANEOUSLY ROTATING A PLURALITY OF PARALLEL SHAFTS

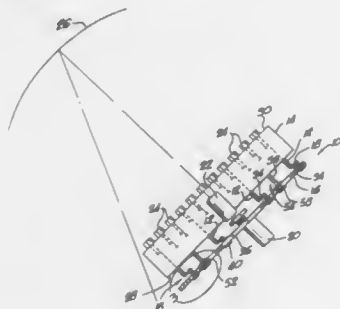
Richard W. Grant, Manhattan Beach, and Allen G. Storassli, Hermosa Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jan. 23, 1985, Ser. No. 693,954

Int. Cl.<sup>5</sup> F16H 33/00

U.S. Cl. 342—352

10 Claims



1. An apparatus for simultaneously rotating a plurality of substantially parallel shafts, comprising:
- a substrate to which said shafts are rotatably connected;
  - a drive plate;
  - means for coupling the plate to the shafts;
  - a first motor secured to the plate; and
  - a second motor secured to the substrate and drivingly coupled to the first motor, such that actuation of either motor orbits the plate in the prescribed fashion.

4,954,833

#### METHOD FOR DETERMINING ASTRONOMIC AZIMUTH

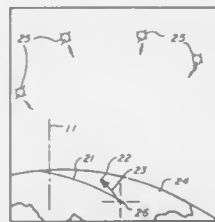
Alan G. Evans, LaPlata, Md., and William L. Stein, Fredericksburg, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 5, 1989, Ser. No. 376,278

Int. Cl.<sup>5</sup> G01S 5/02

U.S. Cl. 342—357

7 Claims



1. A method for determining astronomic azimuth between a fixed site and a target comprising the steps of:

- determining geodetic azimuth,  $\alpha$ , from the fixed site where geodetic azimuth is defined as the angle from true north (mean polar axis of the earth) to the target in a plane normal to an ellipsoidal model of the gravity vector;
- determining at the fixed site a gravity deflection of the vertical, comprising  $\eta$  the east component and  $\xi$  the north component which when combined is the angular difference between an actual gravity vector direction and the ellipsoidal model gravity vector direction; and
- calculating astronomic azimuth,  $A$ , defined as the angle from true north to the target in a plane normal to the actual gravity vector, from geodetic azimuth using relationships derived from gravity vertical deflections:  $A = \alpha + \eta \tan \phi + (\xi \sin \alpha - \eta \cos \alpha) \cot z$  where  $\phi$  = geodetic latitude at the fixed site  $z$  = geodetic zenith distance (generally,  $z \approx 90^\circ$  and  $\cot z \approx 0$ )

4,954,834

#### MOVABLE OPTICAL FIBER SYSTEM FOR DIRECTING MICROWAVES

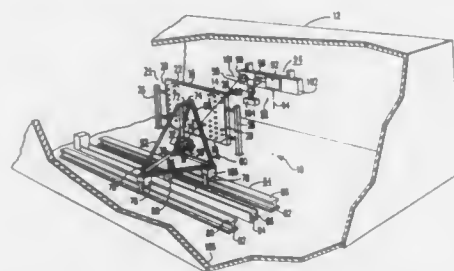
Daniel C. Buck, Hanover, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 5, 1988, Ser. No. 215,117

Int. Cl.<sup>5</sup> H01Q 3/00; G01S 7/40; G01R 35/00

U.S. Cl. 342—360

7 Claims



1. A movable optical fiber system comprising:
- means for generating microwave modulated optic signals of preselected phase;
  - photodiode means for receiving said optic signals and converting said optic signals to microwave signals;
  - a waveguide connected with said photodiode means for receiving said microwave signals, said waveguide having an open front portion through which said microwave signals are discharged;
  - fiber-optic means having an end portion connected with said optic signal generating means and an opposite end portion

connected with said photodiode means, said optic signals being passed through said fiber-optic means from said optic signal generating means to said photodiode means; said photodiode means and said waveguide being adapted for linear movement by a motion device in a plane parallel with a phased array antenna face having a plurality of transmit-receive modules secured thereon to pass said waveguide open front portion in proximity to said plurality of modules;

said transmit-receive modules successively receiving said microwave signals discharged through said waveguide open front portion,

a motion device adapted to be positioned adjacent said phased array antenna face;

a support member connected with said motion device and having said photodiode means and said waveguide connected thereto;

said motion device being operable to move said support member with said photodiode means and said waveguide connected thereto in a preselected horizontal and vertical path parallel with said antenna face;

pulley means secured to said support member in proximity with said photodiode means and movable with said photodiode means and said waveguide;

said pulley means having a peripheral groove of preselected diameter for receiving a portion of said fiber-optic means adjacent said fiber-optic means opposite end portion; and said peripheral groove diameter being selected to provide that said portion of said fiber-optic means in contact with said groove is flexed by less than a preselected maximum degree as said pulley is moved by said motion device to prevent a change in phase of said optic signal passed through said fiberoptic means.

4,954,835

#### RADIODIRECTION FINDING METHOD AND APPARATUS USING DOPPLER EFFECT FREQUENCY MODULATION

Jacques Lanciaux, Pibrac, France, assignor to Rockwell-Collins France, Blagnac, France

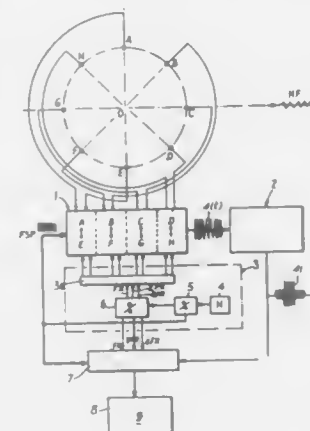
Continuation of Ser. No. 19,232, Feb. 26, 1987, abandoned. This application Nov. 15, 1988, Ser. No. 271,625

Claims priority, application France, Aug. 4, 1986, 86 11279

Int. Cl.<sup>5</sup> G01S 3/52, 5/04, 1/44

U.S. Cl. 342—418

18 Claims



1. A radiodirection finding method using Doppler effect frequency modulation for measuring the bearing of a source transmitting a high frequency signal, including a pair of real antennas, one of said antennas functioning as a reception antenna and the other of said antennas functioning as a transmission antenna, each of said antennas including several antenna strands, and said antenna strands being used in pairs diametrically spaced from each other and spaced evenly apart angu-

larly about a circumference, and a fictitious mobile antenna having a periodic linear alternative movement between each pair of said pair of real antennas and a sampling of directions following a rotary cycle, and comprising the steps of:

- selectively energizing each next adjacent pair of the diametrically spaced antenna strands sequentially in said rotary cycle in pairs of diametrically opposite strands; and
- energizing the different selective pairs of diametrically opposite antenna strands successively in a angularly rotating sequence in said rotary cycle from said first pair of antenna strands energized, wherein a selection to a next direction occurs when said fictitious antenna crosses a center of a circle for avoiding any tangential movement.

4,954,836

#### FOLLOW-UP SYSTEM FOR MOVING BODIES

Sasumu Sakuma, 16-7, Uetomino 3-chome, Kokurakita-ku, Kitakyushu-shi, Fukuoka-ken, Japan

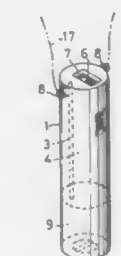
Filed Nov. 17, 1987, Ser. No. 121,430

Claims priority, application Japan, Sep. 8, 1987, 62-224708; Oct. 27, 1987, 62-270557

Int. Cl.<sup>5</sup> G01S 3/02

U.S. Cl. 342—450

2 Claims



1. A system for locating a moving body within a predetermined area, said moving body being accompanied by a radio signal transmitter, said transmitter having a predetermined range of transmission and transmitting a signal of predetermined frequency, said system comprising

a first antenna network and a second antenna network, said first antenna network comprising a plurality of non-directional antennae located at points disposed substantially evenly over said predetermined area, said second antennae network comprising a plurality of directional antennae located at predetermined points disposed within said predetermined area;

said non-directional antennae being located such that one or more of said non-directional antennae is always within the range of transmission of said transmitter;

each of said directional antennae being provided with means for rotation and means for measuring the strength of signals received by said directional antennae;

controlling means activated by said signal of predetermined frequency received by one or more of said non-directional antennae;

said controlling means, when activated, directing rotation of said rotation means of two of said directional antennae until the strength of signals received by said directional antennae is maximized;

said controlling means indicating the relative rotation of directional antennae rotation;

said moving body being locatable by triangulation of the relative rotation of said directional antennae;

said controlling means comprising associating pairs of directional antennae with individual non-directional antennae and said controlling means associating location points with said antennae; whereby when said controlling means is activated, said controlling means can automatically locate the moving body relative to the antennae networks

and relative to points of location of said antennae in said predetermined area; and  
map information means, said controlling means associating said antennae locations with map information from said map information means regarding said predetermined area, whereby, when said controlling means associates locations of said antennae and relative rotation of said directional antennae is associated with the map information, said moving body is located.

4,954,837

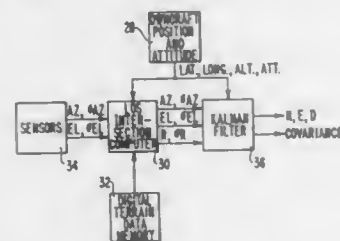
**TERRAIN AIDED PASSIVE RANGE ESTIMATION**  
Charles A. Baird, and Noel Collins, both of Melbourne Beach, Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Jul. 20, 1989, Ser. No. 382,197

Int. Cl.<sup>3</sup> G01S 3/02; G01C 21/00

U.S. Cl. 342-458

12 Claims



1. A method of estimating the range from a sensor platform to a ground-based target, said method comprising:
  - (a) acquiring navigational data indicating the platform longitude, latitude, and elevation above the earth's mean sea level;
  - (b) determining the elevation angle and the azimuth angle of a line of sight from the platform to the target;
  - (c) acquiring terrain data indicating the height of the earth's surface above mean sea level at each of a plurality of terrain data points in an area of terrain including the target location and the line of sight;
  - (d) calculating a test target height for a test data point located on the earth's surface and on the line of sight;
  - (e) comparing the calculated test target height with the height of the earth's surface at the tested terrain data point, as indicated in the terrain data;
  - (f) when the calculated test target height is greater than the height of the earth's surface at the tested terrain data point, selecting another test terrain data point further from the platform than the tested terrain data point and repeating steps (d) and (e) for said another test terrain data point;
  - (g) when the calculated test target height is not greater than the height of the earth's surface at the tested terrain data point, calculating an estimated range from the platform to the target; and
  - (h) applying the elevation angle, the azimuth angle, and the estimated range to a Kalman filter to provide an improved estimated range from the platform to the target.

4,954,838

**PHOTOSENSITIVE MATERIAL PROCESSING APPARATUS**

Takashi Nakamura, and Kaoru Uchiyama, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 24, 1989, Ser. No. 328,261

Claims priority, application Japan, Apr. 11, 1988, 63-88554; Feb. 21, 1989, 1-41172

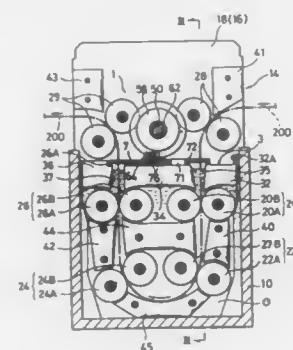
Int. Cl.<sup>3</sup> G03D 3/08

U.S. Cl. 354-320

7 Claims

1. A photosensitive material processing apparatus adaptable for occasional operation, comprising

a processing tank which has an opening at the top and is filled with processing solution, and  
means for controlling access to said processing tank through its opening such that the openness S/V during photosensitive material processing periods is in the range of from



$1 \times 10^{-4}$  to  $1 \times 10^{-1}$ /cm and the openness S/V during quiescent periods is up to 70% of the openness S/V during photosensitive material processing periods wherein V is the volume of the processing solution in the tank and S is the area of a portion of the processing solution surface which is open to the ambient atmosphere.

4,954,839

**SELF-ALIGNING PRINT HEAD ASSEMBLY WITH ADVANCED SHIELDING CHARACTERISTICS**

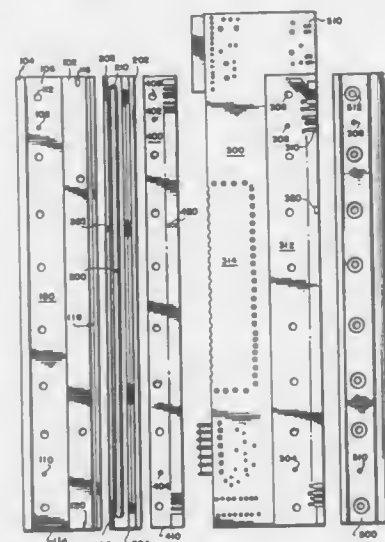
Steven A. Rogers, Leesburg; George Bockelmann, Vienna, and Gary Hester, Sterling, all of Va., assignors to Cryptek, Inc., Herndon, Va.

Filed Jul. 24, 1989, Ser. No. 383,436

Int. Cl.<sup>3</sup> G01D 15/10; H05B 1/00; B41J 3/02

U.S. Cl. 346-76 PH

27 Claims



1. A self-aligning print head assembly carrying a thermal print head with a connector having a plurality of connector elements thereon, comprising:

a base, having:

- (a) means for aligning said thermal print head at a precise position thereon; and
  - (b) at least two registry means, each comprising an element extending above a top plane formed by a top surface of said base;
- input/output circuitry means, having a connector with a plurality of connector elements on one side and formed

with inner surfaces that mate with said registry means to hold said input/output means in self-alignment on said base, with said connector of said input/output means aligned adjacent the connector of said thermal print head; and

cover and interface means, tightly connected against both of said print head connector and said input/output means connector, including:

- (a) interface means, aligned using said registry means, for connecting at least one connector element of said print head to at least one corresponding connector element of said input/output means; and
- (b) cover means, insulated from said interface means, for tightly holding said interface means against said connector of said input/output circuitry means and of said print head.

4,954,840

**AUTOMATIC TICKET DISPENSER**

John R. Maud, and Allan S. Cooper, both of Pietermaritzburg, South Africa, assignors to Latilla Holdings (Guernsey) Limited, Guernsey, Channel Islands

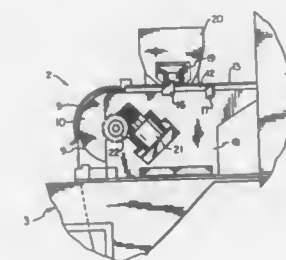
Continuation-in-part of Ser. No. 7,236,644, Aug. 25, 1988, Pat. No. 4,931,884. This application Jan. 23, 1990, Ser. No. 468,916

Claims priority, application South Africa, Aug. 27, 1987, 87/6389

Int. Cl.<sup>3</sup> G01D 15/20; G06K 15/00

U.S. Cl. 346-93

13 Claims



1. An automatic ticket dispenser comprising ticket feed means including a rotatable sprocket drum co-operant with prepunched holes in a substantially continuous chain of tickets for dispensing tickets in a path, a print head assembly in the path of movement of tickets dispensed by the dispenser, a time clock, control circuitry connected to the time clock and print head, and a sensor co-operant with formations on the sprocket drum to control the ticket feed means through the control circuitry, the arrangement being operative to print required information concerning time, as reflected by the time clock, onto a leading ticket of a chain thereof as it is dispensed through the feed means by the sprocket drum, and wherein rotation of the sprocket drum is controlled by the control circuitry in co-operation with the sensor.

4,954,841

**OPTICAL RECORDING MEDIUM AND METHOD OF MANUFACTURING THE SAME**

Katsutarou Ichihara, Tokyo; Norio Ozawa, Kawasaki, and Nobuaki Yasuda, Zushi, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 22, 1987, Ser. No. 111,067

Claims priority, application Japan, Oct. 25, 1986, 61-254276; Nov. 10, 1986, 61-265456; Nov. 10, 1986, 61-265457

Int. Cl.<sup>3</sup> G01D 9/00

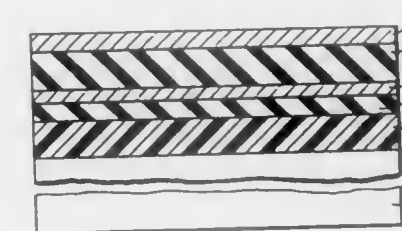
U.S. Cl. 346-135.1

5 Claims

1. An optical recording medium, comprising:

a transparent resin substrate;  
a transparent protective layer;  
transparent adhesive layer means between the resin substrate and the protective layer, including a combination of inor-

ganic and hydrocarbon compounds for bonding the protective layer to the resin substrate and for substantially



preventing moisture from penetrating between the protective layer and the substrate; and  
optical recording layer on the transparent protective layer.

4,954,842

**DIAMOND PEN TYPE MARKING DEVICE FOR SUBSTRATES**

Isao Hashimoto, and Tsuyoshi Hidehira, both of Ibari, Japan, assignors to Taxmo Co., Ltd., Japan

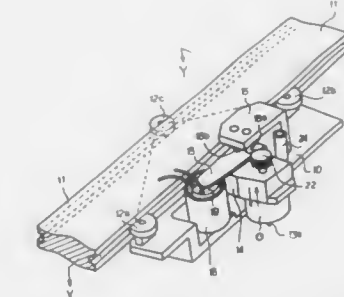
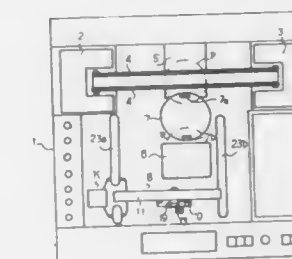
Filed Jul. 11, 1988, Ser. No. 220,182

Claims priority, application Japan, Jul. 11, 1987, 62-173535

Int. Cl.<sup>3</sup> G01D 15/16, 15/04

U.S. Cl. 346-139 R

2 Claims



1. A diamond type marking device comprising:
  - i. an alignment stage provided on a substrate conveying passage which carries a substrate from a loading station to an unloading station, the alignment stage aligning position of a substrate carried by the passage;
  - ii. a main stage located beside said alignment stage of said substrate conveying passage;
  - iii. a rotary absorption disk disposed between said alignment stage and said main stage, having a pair of absorption through-holes at opposite sides of an outer periphery of the disk for vacuum suction, wherein a through-hole fixes a substrate at the alignment stage and the other through-hole fixes a substrate at the main stage at the same time, and means for intermittently rotating the disk by 180



degrees, wherein the substrates fixed by a pair of through-holes are moved to opposite sides respectively, positions of the substrates being exchanged with each other;

iv. the main stage having a pen means and a pen carrying means for carrying the pen means to draw an identification mark on a substrate at the main stage;

v. said pen means being provided with a diamond pen which is supported in a pen supporting cylinder, and said pen supporting cylinder can allow pen pressure and pen drop speed to be freely and automatically changed by electric control circuit according to material or substrates to be marked.

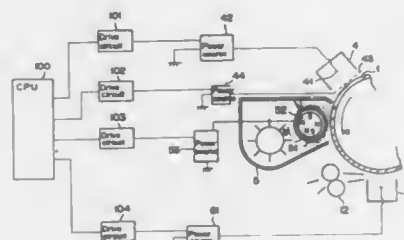
**4,954,843**  
**ELECTROPHOTOGRAPHIC IMAGE FORMING APPARATUS**

Tateki Oka; Naoki Toyoshi, and Kunio Toda, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 23, 1989, Ser. No. 355,690  
Claims priority, application Japan, May 24, 1988, 63-127797; May 24, 1988, 63-127798; Apr. 11, 1989, 64-92483; Apr. 11, 1989, 64-42696[U]

Int. Cl.<sup>5</sup> G03G 15/06, 15/02  
U.S. Cl. 355—210

30 Claims

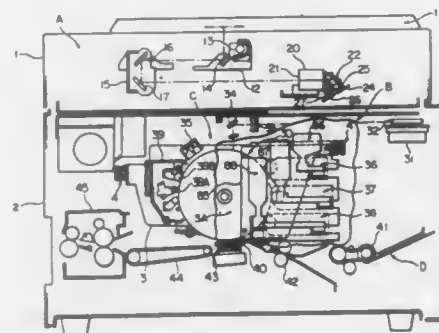


1. An image forming apparatus comprising:  
an electrostatic latent image bearing member which is arranged to rotate in one direction;  
charging means for charging the surface of said electrostatic latent image bearing member with specified surface potential and polarity;  
latent image forming means for forming a negative electrostatic latent image, which consists of non-imaged portions with the potential equal to the specified surface potential and imaged portions with substantially lower surface potential, on the surface of said electrostatic latent image bearing member which was charged with the specified surface potential by said charging means;  
a scorotron charger for charging the surface of said electrostatic latent image bearing member on which an electrostatic latent image has just been formed with the polarity opposite to that charged by said charging means in order to reduce the surface potential of said non-imaged portions, with its grid impressed with a voltage with the same polarity as that charged by said charging means and a value lower than that of the surface potential of the non-imaged portions; and  
developing means for performing reversal development of the electrostatic latent image which passed through said scorotron charger, with use of toner charged with the same polarity as that charged by said charging means, with its developing electrode impressed with a developing bias voltage with the same polarity as that charged by said charging means and a value lower than that of the surface potential of the non-imaged portions but higher than a developing threshold value.

**4,954,844**  
**MULTICOLOR IMAGE DEVELOPING DEVICE**  
Shizao Morita; Toru Matsumoto; Masayuki Kamegami; Kazuaki Hayakawa; Noboru Hatakeyama; Shunji Matsuo, and Masakazu Fukuchi, all of Tokyo, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Dec. 13, 1988, Ser. No. 283,607  
Claims priority, application Japan, Dec. 17, 1987, 62-320596; Dec. 17, 1987, 62-320597; Dec. 26, 1987, 62-331227  
Int. Cl.<sup>5</sup> G03G 15/01, 15/08  
U.S. Cl. 355—260

10 Claims



1. An apparatus for forming a color image on an image carrier which is rotatable about its axis in a rotation direction, said apparatus comprising,  
an exposure device adapted to form a latent image on said image carrier,  
a plurality of developing devices, each of said plurality of developing devices adapted to form a color toner image and having a toner replenishing device,  
a transfer device for transferring said color toner image from said image carrier to a copy paper,  
a housing member for housing at least said image carrier, said plurality of developing devices and said replenishing devices as a single unit, and  
a guide member for guiding said housing member whereby said housing member is movable in a direction parallel to said axis, thereby permitting attachment and detachment of said unit to and from said apparatus, wherein said toner replenishing devices are mounted at one end of said housing member.

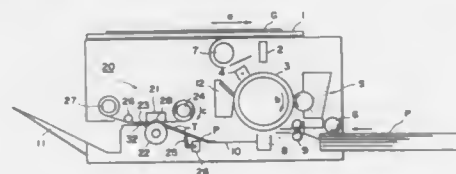
**4,954,845**  
**IMAGE FIXING DEVICE AND IMAGE FORMING APPARATUS WITH SAME**

Kanji Yano; Yasutsugu Saijo; Kensaku Kusaka, all of Kawasaki, and Hiromitsu Hirabayashi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 1, 1989, Ser. No. 387,970  
Claims priority, application Japan, Aug. 2, 1988, 63-193263; Sep. 16, 1988, 63-231629; Sep. 16, 1988, 63-231631; Sep. 26, 1988, 63-240398; Oct. 13, 1988, 63-259193; Dec. 19, 1988, 63-320009

Int. Cl.<sup>5</sup> G03G 15/20, 15/08, 15/21  
U.S. Cl. 355—290

42 Claims



1. An image fixing apparatus, comprising:

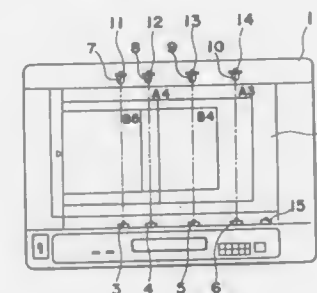
heating means;  
a non-endless film movable together with a toner image supporting medium supporting a toner image, wherein the toner image on the supporting medium is heated by said heating means through said film;  
rewinding means for rewinding said film in a direction opposite to a movement direction of said toner image supporting medium;  
pressing means for press-contacting said film to said heating means and to said image supporting medium;  
wherein said rewinding means rewinds said film while said pressing means does not perform its pressing operation.

**4,954,846**  
**DETECTING DEVICE FOR DETECTING THE SIZE AND/OR PRESENCE OF AN ORIGINAL DOCUMENT**  
Toshihisa Matsuo, Yamatokooryama, and Toshio Yamagishi, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 22, 1989, Ser. No. 440,268  
Claims priority, application Japan, Nov. 22, 1988, 63-294966; Nov. 24, 1988, 63-296752

Int. Cl.<sup>5</sup> G03G 21/00  
U.S. Cl. 355—311

9 Claims



1. An original document detecting device for detecting whether an original document is present or absent, comprising:  
at least one pair of elements that includes a light emitting element and a light receiving element oppositely disposed to each other on both sides of an original placing platform which is used for placing an original document thereon,  
detecting means for detecting whether the light beam emitted from said light emitting element is received by said light receiving element or interrupted by an original document, thereby detecting the presence or absence of the original document in dependence on the output value of said light receiving element,  
sensor means for detecting a quantity of disturbance light around the detecting device,  
control means for controlling the quantity of the light beam to be emitted from said light emitting element dependent on the output value of said sensor means.

**4,954,847**  
**RECIRCULATING AUTOMATIC DOCUMENT FEEDER**  
Kazuhige Murata, and Mitsuru Nagoshi, both of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

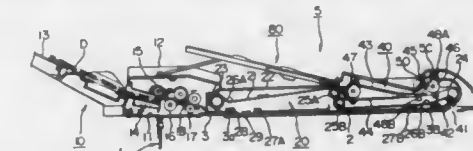
Filed May 19, 1988, Ser. No. 196,122  
Claims priority, application Japan, May 22, 1987, 62-126751; May 22, 1987, 62-126756; May 22, 1987, 62-126757; May 22, 1987, 62-126762; May 22, 1987, 62-77788

Int. Cl.<sup>5</sup> G03G 15/00

14 Claims

1. A sheet conveyance apparatus for conveying an original document sheet onto a platen glass through which the sheet is irradiated by light source to obtain an image light, said sheet conveyance apparatus having a one side mode for irradiating one side of said document sheet and a both side mode for

irradiating both sides of said document sheet, said conveyance apparatus comprising:  
cover means for covering the platen glass, said cover means including a unit housing pivotally mounted on said platen glass so that the bottom surface of said unit housing covers said platen glass;  
conveyor means, disposed on the bottom surface of said unit housing, for loading the sheet onto said platen glass and discharging the sheet from said platen glass;  
a delivery tray for receiving the irradiated sheet thereon;  
a first passage including a path connecting said platen glass and said delivery tray so that through said first passage the



sheet is loaded on said platen glass and is discharged to said delivery tray;  
a second passage for reversing document sheets to be irradiated on both sides;  
switching means for selecting said first passage or said second passage in accordance with the irradiation mode;  
said second passage, being disposed between said conveyor means and the top surface of said unit housing, forming a loop passage and having an inversion roller so that through said second passage the sheet discharged from the platen glass is reversed and loaded again on the platen glass.

**4,954,848**  
**CONTROL APPARATUS FOR A TWO-SIDED/MULTIPLE COPY CONVEYING UNIT**  
Tatsunori Arima, Sagamihara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 18, 1989, Ser. No. 353,554  
Claims priority, application Japan, May 18, 1988, 63-119207

Int. Cl.<sup>5</sup> G03G 21/00

U.S. Cl. 355—319

7 Claims

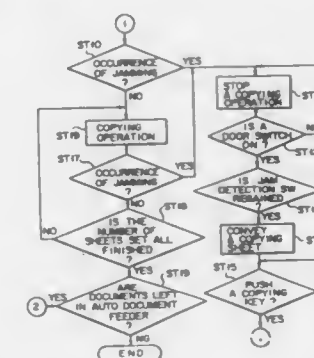


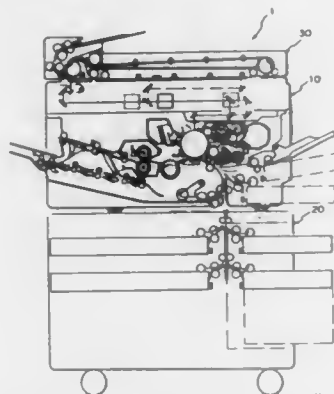
image forming means forms a further image on the sheet when the second detecting means detects removal of the abnormality.

**4,954,849**  
**COPYING APPARATUS OPERABLE IN A TWO-SIDE COPY MODE**

Tadao Koike; Koichi Noguchi, both of Tokyo; Hiroshi Takahashi, Kawasaki, and Koichi Tsunoda, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan  
Filed Jun. 22, 1989, Ser. No. 370,187  
Claims priority, application Japan, Jun. 23, 1988, 63-153609  
Int. Cl.<sup>3</sup> G03G 21/00

U.S. Cl. 355—319

2 Claims



1. A copying apparatus having a two-side copying function which reproduces an image representative of an original document on one side of a paper sheet by image forming means and image fixing means, stacks the resulting one-sided paper sheet temporarily on a refeed tray, refeeds said one-sided paper sheet in response to a refeed command while turning over said paper sheet, and reproduces an image representative of an original document on the other side of said paper sheet by said image forming means and said image fixing means, said apparatus comprising:

- a first switchback transport path located in close proximity to and downstream of the image fixing means for transporting paper sheets of comparatively small sizes to said refeed tray;
- a second switchback transport path located downstream of said first switchback transport path for transporting paper sheets of comparatively large sizes to said refeed tray; and
- guide means positioned on said second switchback transport path tray for selecting either one of said first and second switchback transport paths and guiding the paper sheets to said selected switchback transport path.

**4,954,850**  
**VARIABLE-CAPACITANCE DIODE DEVICE**  
Takeshi Kasahara, Saitama, Japan, assignor to Toko, Inc., Tokyo, Japan

Filed Aug. 12, 1988, Ser. No. 231,714

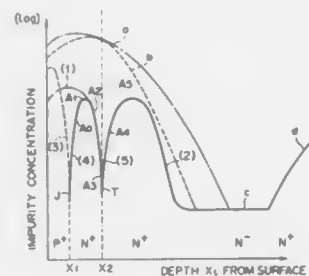
Claims priority, application Japan, Aug. 25, 1987, 62-210852  
Int. Cl.<sup>3</sup> H01L 29/93

U.S. Cl. 357—14

1 Claim

1. A variable-capacitance diode device including a PN junction, and a semiconductor layer of a first conductivity type, the impurity concentration of which decreases with increasing depth from the PN junction, characterized in that except in the vicinity of the PN junction, said semiconductor layer of the first conductivity type formed through superimposition of first and second conductivity type impurity elements includes at least one point where said first conductivity type impurity element is close in concentration to said second conductivity

$$A_i \leq A_{i+1} \quad (i=1, 2, \dots, n)$$



where  $A_i$  represents impurity concentration of said semiconductor layer of the first conductivity type at a distance  $X_i$  as viewed depth-wise of the PN junction.

**4,954,851**  
**SCHOTTKY BARRIER ON INDIUM GALLIUM ARSENIDE**

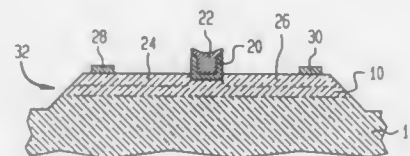
Winston K. Chan, Fair Haven, N.J., assignor to Bell Communications Research Inc., Livingston, N.J.

Filed May 26, 1988, Ser. No. 199,171

Int. Cl.<sup>3</sup> H01L 29/48

U.S. Cl. 357—15

3 Claims



1. A semiconductor device comprising a substrate comprising indium gallium arsenide, a cadmium-containing layer on said substrate, and a conductive layer overlying said cadmium-containing layer to form a Schottky-barrier contact with said substrate, wherein said substrate comprises an epitaxial layer of  $\text{In}_{0.53}\text{Ga}_{0.47}\text{As}$ , wherein said epitaxial layer of  $\text{In}_{0.53}\text{Ga}_{0.47}\text{As}$  overlies an epitaxial layer comprising indium phosphide, and wherein said cadmium-containing layer constitutes a dielectric selected from the group consisting of oxides and carbonates of cadmium.

**4,954,852**  
**SPUTTERED METALLIC SILICIDE GATE FOR GAAS INTEGRATED CIRCUITS**

Zachary Lemnios, Colorado Springs, Colo., assignor to Ford Microelectronics, Inc., Colorado Springs, Colo.

Filed Dec. 24, 1987, Ser. No. 138,504

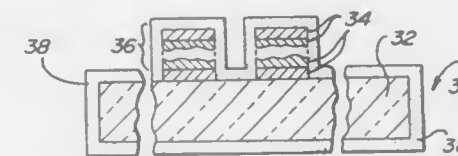
Int. Cl.<sup>3</sup> H01L 29/78

U.S. Cl. 357—15

11 Claims

1. A GaAs integrated circuit structure, comprising a GaAs substrate and a metallic silicide gate formed of at least three sequentially sputtered, multiple layers of silicon and a metal

deposited onto the GaAs substrate, said multiple layers including a first layer and having at least two subsequent layers

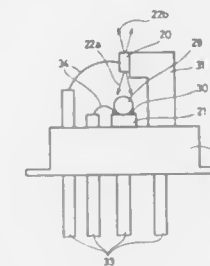


sputtered thereon, wherein said multiple layers have an individual thickness of from about 50 to 100 angstroms each.

**4,954,853**  
**OPTICAL SEMICONDUCTOR DEVICE**  
Kazuomi Yoshida; Hideo Higuchi; Hitooshi Mizuochi, and Yousuke Yamamoto, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 7,013, Jan. 27, 1987, abandoned. This application Jul. 14, 1988, Ser. No. 220,338  
Claims priority, application Japan, Jan. 24, 1986, 61-14081  
Int. Cl.<sup>3</sup> H01L 33/00

U.S. Cl. 357—17

10 Claims



1. In an optical semiconductor device including a light emitting element and a light receiving photo-electric conversion element for monitoring the condition of emission of said light emitting element, the improvement comprising:

- preventing means for preventing light emitted by said light emitting element from returning to said light emitting element, and
- mounting means for mounting said preventing means on said light receiving photo-electric conversion element independently of angular constraints therefor, wherein said photo-electric conversion element is mounted having a surface substantially parallel to a light emitting surface of said light emitting element.

**4,954,854**  
**CROSS-POINT LIGHTLY-DOPED DRAIN-SOURCE TRENCH TRANSISTOR AND FABRICATION PROCESS THEREFOR**

Sang H. Dhong, Mahopac; Wei Hwang, Armonk, and Nicky Chau-Chun Lu, Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 22, 1989, Ser. No. 355,232

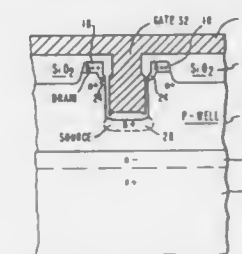
Int. Cl.<sup>3</sup> H01L 29/78, 29/06, 27/10

U.S. Cl. 357—23.4

3 Claims

1. A self-aligned, slightly-doped drain/source field effect trench transistor device comprising:  
a substrate having a lower portion of heavily doped n+ conductivity semiconductor material, the upper portion of said substrate being lightly doped n— conductivity epitaxial semiconductor material, said upper lightly doped portion being less conductive than said heavily doped lower portion,  
a well region formed with p-type dopants disposed in said upper portion of said substrate,  
at least one polysilicon filled trench extending from the

surface of said well region and into said well region, said trench being electrically isolated from said well region by a layer of gate oxide insulation on the bottom and side-walls of said trench between the well region and said polysilicon in said trench,  
a source junction region located in said well region beneath the bottom surface of said trench,  
a diffusion region forming a first drain junction region disposed in said well region, said first drain junction region



being heavily doped with n+ type dopants, said first drain junction region being located on the surface of said well region surrounding said trench,  
a second lightly-doped drain junction region lightly doped with n+ type dopants in said well region proximate said first drain junction region and being self-aligned with the upper portion of said sidewalls of said trench, and  
a polysilicon word line element disposed over said polysilicon filled trench.

**4,954,855**  
**THIN FILM TRANSISTOR FORMED ON INSULATING SUBSTRATE**

Akio Mimura, Katsuta; Yoshikazu Hosokawa, Hitachiota; Takaya Suzuki, Katsuta; Takashi Aoyama, Ibaraki; Nobutake Konishi, Hitachiota; Yutaka Mitsuwa, and Kenji Miyata, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

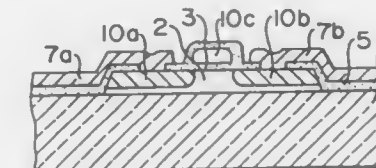
Continuation of Ser. No. 848,474, Apr. 7, 1986, abandoned. This application Oct. 28, 1987, Ser. No. 113,360

Claims priority, application Japan, Apr. 8, 1985, 60-72636; Jun. 3, 1985, 60-118811

Int. Cl.<sup>3</sup> H01L 29/78

U.S. Cl. 357—23.7

22 Claims



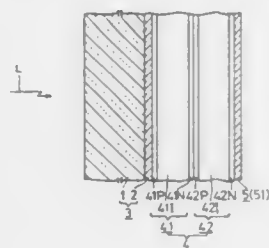
1. A coplanar thin film transistor formed on an insulating substrate, comprising:

- a glass substrate;
- a thin semiconductor film formed on said glass substrate and having the form of an island, said thin semiconductor film being in one of a polycrystalline state and an amorphous state and including silicon;
- a gate structure formed on part of the thin semiconductor film, the gate structure including a gate insulating film and a gate electrode formed on the gate insulating film and made of platinum silicide, said gate insulating film being formed on said thin semiconductor film; and
- a pair of intermetallic compound layers formed in said thin semiconductor film at such locations that a portion of said



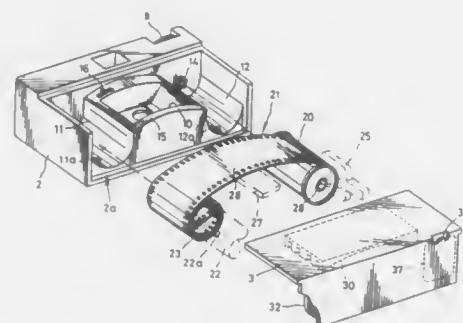
thin semiconductor film which exists beneath said gate insulating film is sandwiched between said intermetallic compound layers, each of the intermetallic compound layers being formed of a metal silicide, the pair of intermetallic compound layers respectively constituting a source region and a drain region of the transistor, and said portion of said thin semiconductor film being a channel between the source and drain regions, and each of said intermetallic compound layers being insulated from said gate electrode by said gate insulating film, the metal silicide of each of said intermetallic compound layers being formed of a metal and silicon forming said thin semiconductor film.

**4,954,856**  
SEMICONDUCTOR PHOTOELECTRIC CONVERSION DEVICE AND METHOD OF MAKING THE SAME  
Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan  
Continuation of Ser. No. 45,225, Apr. 30, 1987, abandoned, which is a continuation of Ser. No. 733,738, May 14, 1985, abandoned. This application Apr. 10, 1989, Ser. No. 336,550  
Claims priority, application Japan, May 15, 1984, 59-097318; May 15, 1984, 59-097319; May 15, 1984, 59-097320  
Int. Cl.<sup>3</sup> H01L 27/14, 31/00  
U.S. Cl. 357-30 4 Claims



1. A tandem photoelectric conversion device comprising:
  - a first photoelectric conversion device incorporating a PIN junction where at least the portions of the I layer adjacent the P and N layers are crystallized where the degree of said crystallization of said portions of the I layer is greater than that of the P and N layers;
  - a second photoelectric conversion device directly formed on said first device;
  - at least one of the P-type semiconductor layer and the N-type semiconductor layer which constitute a PN junction between said first and second device being made of silicon carbide; and
  - where said I layer is photoannealed and contains one atom % or less oxygen.

**4,954,857**  
PHOTOGRAPHIC FILM PACKAGE AND METHOD OF MAKING THE SAME  
Mitsuyoshi Mochida, Tokyo; Tokuo Maekawa, Kanagawa; Hisashi Takel, Kanagawa; Yasuo Matsumoto, Kanagawa; Hiroshi Ohmura, Tokyo; Shigeru Sugimoto, Kanagawa; Seimei Ushiro, Tokyo; Seiji Asano, Saitama, and Toshio Yoshida, Ibaragi, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Division of Ser. No. 87,388, Aug. 20, 1987, Pat. No. 4,884,087.  
This application Sep. 19, 1989, Ser. No. 409,420  
Claims priority, application Japan, Aug. 20, 1986, 61-126942; Oct. 17, 1986, 61-246977; Oct. 17, 1986, 61-246978; Jan. 19, 1987, 62-5694; Jan. 19, 1987, 62-5698; Feb. 14, 1987, 62-32185  
Int. Cl.<sup>3</sup> G03B 1/10, 1/66, 17/02, 17/28  
U.S. Cl. 354-75 30 Claims

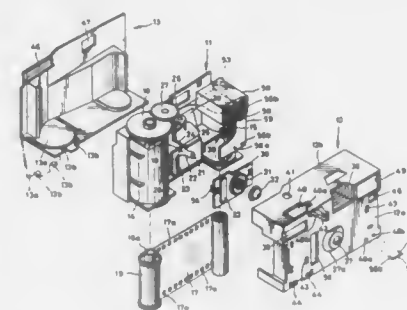


1. A lens-fitted photographic film package having an externally operable member for effecting an exposure, comprising:
  - a light-tight casing having an opening through which said exposure is made when said externally operable member is operated;
  - a roller unexposed film disposed on one side of said opening in an unexposed film roll receiving chamber in said light-tight casing with its outermost turn exposed to side walls of said chamber and its innermost turn surrounding an empty space;
  - a removable light-tight film container having a film winding spool therein disposed on the opposite side of said opening in said light-tight casing from said rolled film, one end of said rolled film being attached to said film winding spool; means for winding said rolled film into said light-tight film container and around said film winding spool; and
  - means defining a film passage in said light-tight casing, wherein said light-tight casing must be destroyed to expose said film passage.

**4,954,858**  
LENS-FITTED PHOTOGRAPHIC FILM PACKAGE  
Hiroshi Ohmura, Takuya Arai, Akira Haishi, Katsuya Kozai; Hiroshi Hara, all of Tokyo; Takashi Tobloka, Saitama; Seiji Asano, Saitama, and Junichi Takagi, Saitama, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Feb. 22, 1989, Ser. No. 314,214  
Claims priority, application Japan, Feb. 22, 1988, 63-21932[U]; Feb. 22, 1988, 63-21935[U]; Feb. 22, 1988, 63-21936[U]  
Int. Cl.<sup>3</sup> G03B 15/05, 17/02  
U.S. Cl. 354-145.1 21 Claims

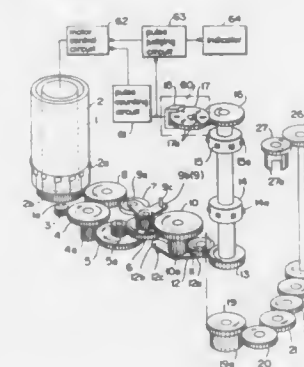
1. A lens-fitted photographic film package having at least a roll of unexposed photographic film, a taking lens, shutter means and film transporting means, said lens-fitted photographic film package comprising:
  - a main case section which is open at its front, said main case section mounting at least said shutter means and said film transporting means and containing light-tightly said roll of unexposed photographic film;
  - a front cover section which is attached to said main case

section and closes said open front of said main case section to cover the majority of said taking lens and said shutter means and said film transporting means, said front cover section being formed with at least one opening for partly



receiving therein a member of one of said means, which member projects forwardly beyond surfaces of said main case section which are in contact with an inner surface of said front cover section when said front cover section is securely attached to said main case section.

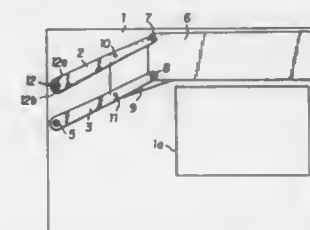
**4,954,859**  
MOTOR DRIVEN CAMERA  
Toshiyuki Kitazawa, Tokyo, Japan, assignor to Asahi Kogaku Kogyo K.K., Tokyo, Japan  
Filed Jan. 25, 1989, Ser. No. 301,362  
Claims priority, application Japan, Jan. 28, 1988, 63-17609; Jan. 28, 1988, 63-17610  
Int. Cl.<sup>3</sup> G03B 1/12  
U.S. Cl. 354-173.11 27 Claims



1. A motor driven camera having a motor for winding a film, said camera comprising a pulse generator which generates one pulse for every predetermined number of perforations of the film in association with feeding of the film, means for counting the number of pulses generated by said pulse generator, and a motor control circuit which stops said motor when said pulse counting means counts a predetermined number of pulses.

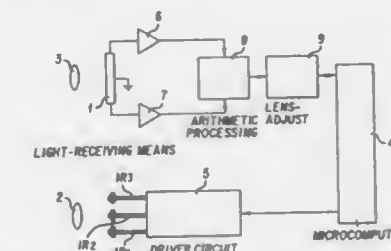
**4,954,860**  
FOCAL-PLANE SHUTTER  
Tadashi Nakagawa; Takahito Otoro, and Ichiro Nemoto, all of Chiba, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan  
Filed May 2, 1989, Ser. No. 346,100  
Claims priority, application Japan, May 11, 1988, 63-61939[U]  
Int. Cl.<sup>3</sup> G03B 9/40 14 Claims  
U.S. Cl. 354-246 1. A focal-plane shutter comprising a base member having an aperture, shutter blades for opening and closing said aperture,

and pivotal support means on said base member operable in a parallelogrammatic configuration to move said blades between open and closed positions to thereby open and close said aperture, said pivotal support means having adjusting means for



adjusting the tilt of said blades relative to said aperture to provide for parallel movement of said blades and uniformity of exposure of said aperture during opening and closing of said aperture by said blades.

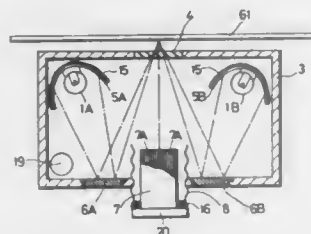
**4,954,861**  
METHOD OF DRIVING MULTIPLE FLASH RANGEFINDER  
Shinji Nagaoka; Michio Kawai, and Koji Sato, all of Chiba, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan  
Filed May 22, 1989, Ser. No. 355,596  
Claims priority, application Japan, May 25, 1988, 63-127520  
Int. Cl.<sup>3</sup> G03B 3/00; G01C 3/08  
U.S. Cl. 354-403 6 Claims



1. A method of operating a multiple flash rangefinder of the type having light-emitting means for emitting light to a subject, a light-receiving means receiving the light reflected from the subject and an arithmetic processing unit that receives an output signal from the light-receiving means and calculates the distance to a subject, the method comprising the steps of emitting flashes of light from a plurality of light-emitting means in successive order one at a time, repeating a plurality of times said step of emitting said flashes of light from said plurality of light-emitting means in successive order one at a time and utilizing said light-receiving means and said arithmetic processing unit to calculate the distance for each successive and repeated light emission, whereby the repeated emissions provide for minimizing the heat generated by said light-emitting means.

**4,954,862**  
EXPOSURE APPARATUS FOR COLOR IMAGING SYSTEM  
Sungmuk Lee, Miamisburg, Ohio, and Shigemi Misono, Tokyo, Japan, assignors to The Mead Corporation and Seiko Instruments Inc., Japan  
Filed Jan. 6, 1988, Ser. No. 203,007  
Claims priority, application Japan, Jun. 5, 1987, 62-141277  
Int. Cl.<sup>3</sup> G03B 27/00, 27/72 15 Claims  
U.S. Cl. 355-1 1. An exposure apparatus for exposing a photosensitive sheet comprising:

- a light source for providing irradiating light to an original image;
- a cold mirror for reflecting visible light from said light source toward said original image and for allowing infrared rays and a portion of the visible light nonrepresenta-



tive of the original image to pass therethrough, said portion of visible light passing through said cold mirror being incident on the photosensitive sheet; and optical members for focusing light representative of the original image reflected from said original image onto said photosensitive sheet.

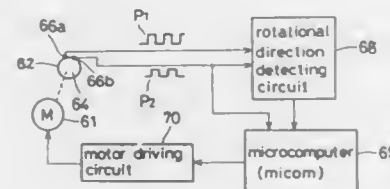
4,954,863

## IMAGE FORMING APPARATUS

Hiroyuki Harada, Sakai, and Tetsuji Kajitani, Kawanishi, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan  
Filed Nov. 15, 1988, Ser. No. 271,316

Claims priority, application Japan, Nov. 19, 1987, 62-292844; Nov. 19, 1987, 62-292845; Nov. 19, 1987, 62-292846  
Int. Cl.<sup>5</sup> G03B 27/34

U.S. Cl. 355—51



1. An image forming apparatus comprising:
- a movable optical system for reading an original image,
  - a motor having a shaft for driving said movable optical system,
  - a motor driving circuit,
  - an encoder which generates signals indicative of velocities of said motor shaft, and
  - a control circuit which controls said motor driving circuit to drive said motor to move said movable optical system from a home position to a predetermined point and from said point to return to said home position, said control circuit controlling said motor driving circuit to brake said motor as said movable optical system approaches said home position, said control circuit comprising timing deciding means, responsive to shaft velocity signals from said encoder, for calculating an acceleration of said motor shaft as said motor accelerates said optical system from said home position toward said predetermined point and for deciding timing for braking said motor based upon said calculated acceleration.

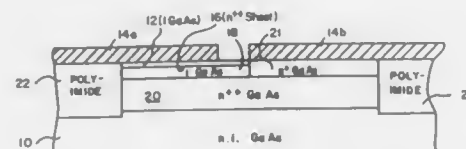
4,954,864  
MILLIMETER-WAVE MONOLITHIC DIODE-GRID  
FREQUENCY MULTIPLIER

Joseph Maserjian, La Crescenta, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 13, 1988, Ser. No. 283,673  
Int. Cl.<sup>5</sup> H01L 27/14

U.S. Cl. 357—30

13 Claims



1. A semiconductor diode structure useful for harmonic generation of millimeter or submillimeter wave radiation from a fundamental input wave comprising
- a substrate,
  - a n++ doped layer of semiconductor material on said substrate,
  - a layer of intrinsic semiconductor material on said n++ doped layer,
  - a sheet of positive charge formed by surface n++ doping said intrinsic layer on the surface thereof opposite said n++ doped layer, and,
  - a Moti-type barrier formed over said sheet of n++ doping by a layer of material electrically insulating said sheet from at least one of a pair of surface metal contacts, at least one of said surface contacts being deposited over said layer of electrically insulating material with a gap between said surface contacts.

4,954,865

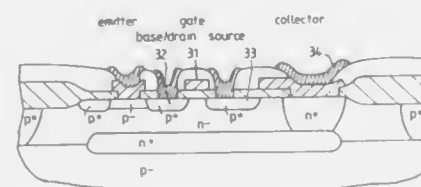
## INTEGRATED CIRCUITS

George H. S. Rokos, Bishop's Stortford, Great Britain, assignor to STC PLC, London, England

Filed May 5, 1989, Ser. No. 348,258  
Claims priority, application United Kingdom, May 10, 1988, 8810973

U.S. Cl. 357—43

2 Claims



1. An integrated circuit structure adapted to provide a desired circuit function having a structure forming an element of any array of similar structures, the structure comprising a silicon semiconductor p-type substrate, an n-type epitaxial layer disposed on a major surface of the substrate, an n++-type layer disposed between the epitaxial layer and the substrate and providing a buried layer below the epitaxial layer, an n++-type sinker extending from the free surface of the epitaxial layer through that layer and providing electrical contact to the buried layer, a region of p-type material formed in the free surface of the epitaxial layer and spaced from said sinker, an insulating layer extending over the free surface of the epitaxial layer and having first and second openings in register with the p-type region and the sinker respectively, and a layer of polycrystalline silicon (polysilicon) applied to the surface of

the structure and contacting the sinker via said openings, the structure being such that it is configurable by subsequent patterning of the polysilicon layer to define a polysilicon emitter body over the p-type region and a gate electrode on the oxide layer in a region between the emitter body and the sinker, said emitter body and gate electrode providing ion implementation masks for the fabrication of a polysilicon emitter transistor and a field effect transistor respectively.

4,954,866

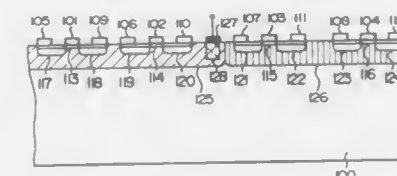
SEMICONDUCTOR INTEGRATED CIRCUIT MEMORY  
Hirotsoshi Tanaka, Yamanashi; Hiroki Yamashita, Hachioji; Noboru Masuda, Kokubunji; Junji Shigeta, Fuchu; Yasunari Umemoto, Tokorozawa, and Osamu Kagaya, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Sep. 21, 1988, Ser. No. 247,250

Claims priority, application Japan, Sep. 24, 1987, 62-237130  
Int. Cl.<sup>5</sup> H01L 27/10, 29/80, 27/04

U.S. Cl. 357—45

25 Claims

MEMORY CELL ARRAY PART — PERIPHERAL CIRCUIT PART



1. A semiconductor integrated circuit memory comprising:
- a memory cell array part having a plurality of memory cells arranged in the form of a matrix;
  - a peripheral circuit part for selecting a desired one of the memory cells to perform read and write operations for the desired memory cell; and
  - an impurity-doped layer formed under and between circuit elements making up the memory cell array part and the peripheral circuit part, the impurity-doped layer being opposite in conductivity type to another impurity-doped layer for making the circuit elements, the impurity-doped layer formed under and between the circuit elements of the memory cell array part being different in impurity concentration from the impurity-doped layer formed under and between the circuit elements of the peripheral circuit part.

4,954,867

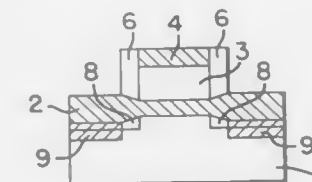
SEMICONDUCTOR DEVICE WITH SILICON  
OXYNITRIDE OVER REFRACTORY METAL GATE  
ELECTRODE IN LDD STRUCTURE

Takashi Hosaka, Tokyo, Japan, assignor to Seiko Instruments Inc., Japan

Filed Jun. 1, 1988, Ser. No. 201,052  
Claims priority, application Japan, Jun. 18, 1987, 62-152236  
Int. Cl.<sup>5</sup> H01L 29/78, 21/94

U.S. Cl. 357—52

10 Claims



1. A semiconductor device comprising: a silicon substrate; an insulation layer formed on said silicon substrate; a gate electrode composed of high melting point metal provided on

said insulation layer; first source and drain regions provided in said substrate and spaced apart by a first channel region defined substantially by the width of said gate electrode; at least one layer of silicon oxynitride covering the top and each side of said gate electrode; and second source and drain regions provided in said substrate and spaced apart by a second channel region defined substantially by the combined widths of said gate electrode and said silicon oxynitride layer.

4,954,868

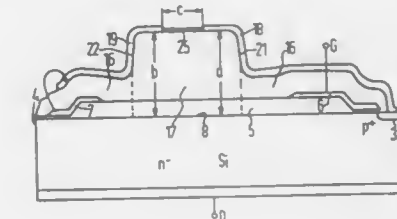
MOS SEMICONDUCTOR DEVICE WHICH HAS HIGH  
BLOCKING VOLTAGE

Rainer Bergmann, Rohrbach, and Josef-Matthias Gantlior, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
Filed Apr. 20, 1989, Ser. No. 341,044

Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816257

Int. Cl.<sup>5</sup> H01L 29/40, 29/78  
U.S. Cl. 357—53

5 Claims



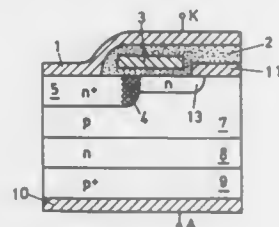
1. A semiconductor component which has a semiconductor body comprising:
- (a) at least one planar zone (2) embedded in a surface (8) of the semiconductor body, said one planar zone forming a pn-junction with the adjacent portion of the semiconductor body;
  - (b) a first insulating layer (5) on the surface (8) of the semiconductor body;
  - (c) a channel stopper electrode (7) formed on the first insulating layer (5) at the edge (4) of the semiconductor body;
  - (d) an electrode (6) formed over the pn-junction (3) adjoining the planar zone (2) and formed on the first insulating layer;
  - (e) said electrode (6) and said channel stopper electrode (7) covered by a second insulating layer (16);
  - (f) a channel stopper field plate (19) formed on the second insulating layer (16) and said channel stopper field plate covering the channel stopper electrode (7) at least at that side facing away from the edge (4) of the semiconductor body and electrically connected to the channel stopper electrode;
  - (g) an anode field plate (18) formed on the second insulating layer (16) and said anode field plate covering the electrode (6) at least at that side facing away from the planar zone (2) and electrically connected to the planar zone (2);
  - (h) a space (c) between said channel stopper field plate (19) and said anode field plate (18);
  - (i) said second insulating layer (16) has a region (17) between said electrode (6) and said channel stopper electrode (7) which is thicker than the region over said electrodes;
  - (j) the end of the anode field plate facing toward the edge of the semiconductor body and the end of the channel stopper field plate facing away from the edge of the semiconductor body lie on said region (17) of greater thickness, and wherein the region (17) of greater thickness is covered with an insulating passivation layer (25) between the field plates (6, 7).



4,954,869  
**MOS-CONTROLLED THYRISTOR (MCT)**  
 Friedhelm Bauer, Würenlingen, Switzerland, assignor to Asea Brown Boveri Ltd., Baden, Switzerland  
 Filed Mar. 2, 1989, Ser. No. 318,154  
 Claims priority, application Switzerland, Mar. 10, 1988, 903/88

Int. Cl.<sup>5</sup> H01L 29/74  
 U.S. Cl. 357—38

4 Claims



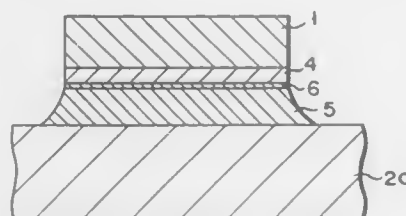
1. An MOS-controlled thyristor (MCT) with an anode and a cathode, comprising:

- a sequence of alternatively doped layers comprising a p-type emitter layer, an n-type base layer, a p-type base layer and an n-type emitter layer provided between said anode and said cathode;
- a plurality of channel shorts which can be controlled via a MOSFET structure provided on the side of said cathode, said MOSFET structure having a source region and a combined channel-drain region having a channel and a drain portion, all being n-type, and an insulated gate electrode covering said channel portion, said MOSFET structure short-circuiting said p-type base layer to a cathode contact in the switched-on state; wherein said p-type base layer is connected to said drain portion via a drain contact, said source region is a part of said n-type emitter layer which is connected to said cathode contact, said channel portion and said drain portion have the same depth and doping concentration, and said combined region is disposed between said source region and said drain contact.

4,954,870  
**SEMICONDUCTOR DEVICE**  
 Momoko Takemura, Tokyo; Michihiko Inaba, Yokohama; Toshio Tetsuya, Hyogo, and Mitsuo Kobayashi, Aioi, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 5, 1985, Ser. No. 804,617  
 Claims priority, application Japan, Dec. 28, 1984, 59-276075; Dec. 28, 1984, 59-276077; Dec. 28, 1984, 59-276104  
 Int. Cl.<sup>5</sup> H01L 23/54, 23/48  
 U.S. Cl. 357—67

14 Claims



1. A semiconductor device in which a semiconductor chip is fixed to a base by a solder material layer made of an alloy containing tin and copper, wherein a first metal layer consisting of a member selected from the

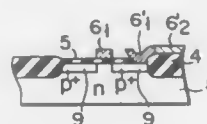
group consisting of titanium, chromium, vanadium, zirconium, niobium, and an alloy containing not less than 75 atomic % of at least one thereof is interposed between said solder material and said semiconductor chip so as to have a thickness falling within a range between 2,000 Å to 3 μm.

4,954,871  
**SEMICONDUCTOR DEVICE WITH COMPOSITE ELECTRODE**

Yoshihisa Mizutani, 2-11-23, Minamikugahara, Oota-ku, Tokyo, and Minoru Kimura, 666-4, Komaoka-cho, Tsurumi-ku, Yokohama-shi, both of Japan  
 Continuation of Ser. No. 778,777, Sep. 24, 1985, abandoned, which is a continuation of Ser. No. 390,030, Jun. 18, 1982, abandoned. This application Jan. 21, 1988, Ser. No. 147,107  
 Claims priority, application Japan, Jun. 26, 1981, 56-99357

Int. Cl.<sup>5</sup> H01L 23/48  
 U.S. Cl. 357—67

7 Claims

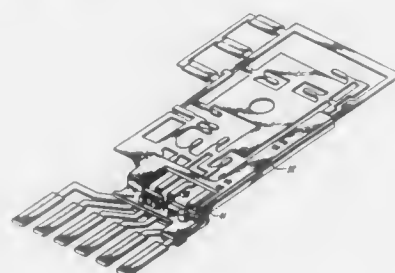


1. A semiconductor device comprising:  
 a field effect transistor having a source, a drain, and a channel region of a first semiconductor material; and  
 a single continuous wiring layer extending in a wiring layer plane, said wiring layer comprising an electrode portion made of a second semiconductor material coupled to said channel region to form a gate electrode, and an interconnection portion made of a metal compound of said second semiconductor material adapted for connection to associated circuitry, said wiring layer having, at all positions, a substantially homogeneous composition in a direction perpendicular to said wiring layer plane.

4,954,872  
**ELECTRICAL CONTACT STABILIZER ASSEMBLY**  
 Richard W. Peterson, Utica, and Charles J. Malo, Frazer, both of Mich., assignors to Altair International, Inc., Mt. Clemens, Mich.

Filed Apr. 29, 1988, Ser. No. 188,373  
 Int. Cl.<sup>5</sup> H01L 23/48, 23/50  
 U.S. Cl. 357—70

13 Claims

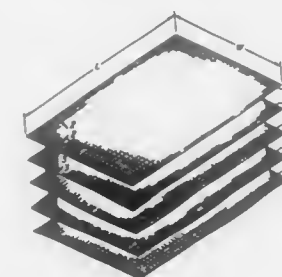


1. An electrical contact assembly comprising:  
 a leadframe having at least one plurality of leads disposed in spaced relationship each terminating at one end in a respective contact, and terminating at an opposite end in a plurality of contact fingers at a site for mounting an electronic circuit to which the leads are connected;  
 a first integral member of electrically insulative material including:  
 an end section;

a stabilizer extending from said end section; and  
 at least one connecting element  
 a second integral member of electrically insulative material including:  
 an end section;  
 a stabilizer extending from said end section;  
 at least one integrally formed raised element extending from said end section and dimensioned for insertion between selected adjacent ones of said plurality of leads;  
 an integrally formed ridge extending substantially the length of said stabilizer and dimensioned for insertion between selected adjacent ones of said plurality of leads; and  
 at least one connecting element cooperative with said at least one connecting element of said first integral member to interconnect said first and second integral members with said leadframe sandwiched therebetween.

4,954,873  
**ELECTRICAL CONNECTOR FOR SURFACE MOUNTING**  
 James Lee, Los Altos Hills; Richard Beck, Cupertino; Chune Lee, San Francisco, and Edward Hu, Sunnyvale, all of Calif., assignors to Digital Equipment Corporation, Maynard, Mass.  
 Division of Ser. No. 757,600, Jul. 22, 1985, Pat. No. 4,729,166.  
 This application Jan. 25, 1988, Ser. No. 147,779  
 Int. Cl.<sup>5</sup> H01L 23/12, 23/14  
 U.S. Cl. 357—72

11 Claims



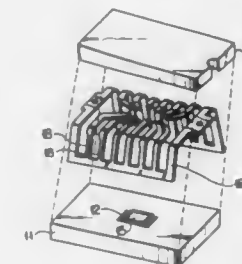
1. An anisotropic elastomeric conductor, comprising a plurality of metal fibers in a matrix, wherein said metal conductors are oriented parallel to each other and said matrix includes both a fiber component and an elastomeric resin component, said anisotropic elastomeric conductor having peripheral dimensions in the range from 0.5 to 10 cm and a thickness in the range from 0.02 to 0.4 cm, wherein said thickness is defined by the direction of the metal fibers.

4,954,874  
**PACKAGE SEMICONDUCTOR DEVICE USING CHALCOGENIDE GLASS SEALING**  
 Yasuaki Miura, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan  
 Continuation of Ser. No. 212,452, Dec. 3, 1980, abandoned. This application Sep. 8, 1983, Ser. No. 529,936  
 Claims priority, application Japan, Dec. 12, 1979, 54-160245  
 Int. Cl.<sup>5</sup> H01L 45/00, 23/30, 23/02, 39/02  
 U.S. Cl. 357—74

6 Claims

1. A packaged semiconductor device comprising: a ceramic base body of a package;  
 a semiconductor element mounted on said ceramic base body;  
 a ceramic lid body of said package for sealing said semiconductor element;  
 a layer of a bonding agent hermetically sealing said ceramic base body and said ceramic lid body, said bonding agent consisting of a chalcogenide glass selected from the group consisting of Si-As-Te, Si-As-Se, Ge-As-Se and Ge-As-Te glasses, said chalcogenide glass including oxide glass components in an amount of 1 mol percentage to 20 mol per-

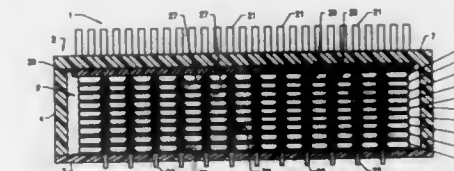
centage and having been heated up to, but not above, 300° C.; and



leads, each having one end connected to electrodes of said semiconductor element and the other end extending outside said package.

4,954,875  
**SEMICONDUCTOR WAFER ARRAY WITH ELECTRICALLY CONDUCTIVE COMPLIANT MATERIAL**  
 Ken Clements, Santa Cruz, Calif., assignor to Laser Dynamics, Inc., Scotts Valley, Calif.  
 Continuation-in-part of Ser. No. 6/887,129, Jul. 17, 1986, Pat. No. 4,897,708. This application Oct. 28, 1987, Ser. No. 414,633  
 Int. Cl.<sup>5</sup> H01L 23/16  
 U.S. Cl. 357—75

21 Claims



1. A semiconductor wafer array comprising:  
 a plurality of wafers of semiconductor material which are stacked one on top of another, each of said plurality of wafers having  
 (a) a via which is in registration with a via in an adjacent wafer, said via in each of said plurality of wafers having a first end terminated by a first hole in a first surface of each of said wafers, a second end terminated by a second and relatively larger hole in a second and opposite surface of each of said wafers, and an inwardly directed wall surface in at least a portion of the wall between said first and said second ends;  
 (b) means for electrically insulating an exposed surface of said via in each of said plurality of wafers between said first and said second ends;  
 (c) an electrically conductive pad surrounding said first hole of said via in each of said plurality of wafers for making an electrical connection to electrical circuits located on said first surface of each of said plurality of wafers; and  
 (d) an electrically conductive compliant material which is located in said via in each of said plurality of wafers which, when not compressed, extends outwardly beyond respective planes of said first and said second holes of said via in each of said plurality of wafers; and  
 means for stacking a first one of said plurality of wafers on top of a second one of said plurality of wafers such that the compliant material which extends beyond said second hole of said via in said first one of said plurality of wafers will make an electrical contact with said electrically conductive pad surrounding said first hole of said via in said second one of said plurality of wafers and said compliant

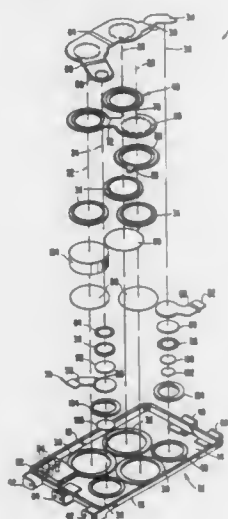
material which extends from said first hole of said via in said second one of said plurality of wafers.

**4,954,876**  
**HERMETICALLY SEALED COMPRESSION BONDED CIRCUIT ASSEMBLY HAVING FLEXIBLE WALLS AT POINTS OF APPLICATION OF PRESSURE FOR COMPRESSION BONDING CIRCUIT ELEMENTS**  
Lawrence E. Crowe, Lindenwood, and Thomas A. Sutrina, Rockford, both of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Aug. 1, 1988, Ser. No. 226,741  
Int. Cl.<sup>5</sup> H01L 23/32

U.S. Cl. 357—76

45 Claims



1. A hermetically sealed circuit assembly containing a plurality of circuit elements which are to be compression bonded upon application of a force applied through opposed first and second walls of a hermetically sealed chamber containing the circuit elements to be compression bonded comprising:

a plurality of circular corrugations within the first wall of the chamber in a spatial configuration with each corrugation determining a spatial location within the circuit assembly for placing a circuit element to be compression bonded;

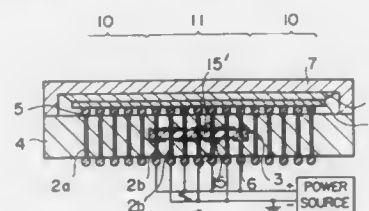
each of the circuit elements to be compression bonded being axially aligned with a different corrugation in the first wall; and

a plurality of circular corrugations within the second wall of the chamber in a spatial configuration identical to the spatial configuration of the corrugations in the first wall, each corrugation of the second wall respectively being opposed to a corrugation in the first wall, with each pair of opposed corrugations in the first and second walls defining a column with each circuit element to be compression bonded being disposed in a separate column to which the force is to be applied; and the corrugations of the first and second walls permitting a portion of the wall within each corrugation to flex.

**4,954,877**  
**CHIP CARRIER**  
Keiichiro Nakanishi, Kokubunji; Minoru Yamada, Hanno; Masakazu Yamamoto, Kodaira; Satoru Ogihara; Hiroshi Shinohara, both of Hitachi, and Hideo Suzuki, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Aug. 2, 1989, Ser. No. 388,071  
Claims priority, application Japan, Sep. 7, 1988, 63-222316  
Int. Cl.<sup>5</sup> H01L 39/02

U.S. Cl. 357—80

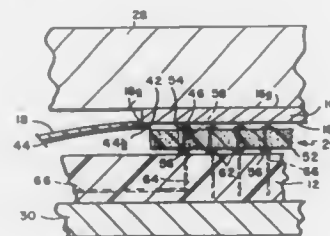
11 Claims



1. A chip carrier comprising:  
a subboard;  
at least one LSI chip disposed on said subboard;  
signal through-holes disposed only on a first region of said subboard for inputting/outputting signals in/from said chip;  
power through-holes disposed only on a second region of said subboard for supplying electric power to said chip; and  
high dielectric constant material disposed on said second region and having a specific dielectric constant higher than that of the material constituting said subboard.

**4,954,878**  
**METHOD OF PACKAGING AND POWERING INTEGRATED CIRCUIT CHIPS AND THE CHIP ASSEMBLY FORMED THEREBY**  
Leslie R. Fox, Foxborough; Paul C. Wade, Shirley, and William L. Schmidt, Acton, all of Mass., assignors to Digital Equipment Corp., Maynard, Mass.  
Filed Jun. 29, 1989, Ser. No. 373,960  
Int. Cl.<sup>5</sup> H01L 23/02, 23/48, 23/42, 39/02  
U.S. Cl. 357—81

24 Claims



1. An IC chip assembly comprising  
a chip having an array of exposed contacts at a face thereof;  
a substrate having an array of exposed contacts at a face thereof;  
interposer means positioned between said chip and substrate, said interposer means including electrically insulating compliant means for providing compliance between said chip and said substrate, said compliant means having first and second opposite surfaces which face said chip and substrate respectively, first exposed contacts at said first surface of the compliant means which engage the contacts on the chip, and second exposed contacts at said second surface of the compliant means which engage the contacts of the substrate;

connecting means electrically connecting said first and second contacts;  
thermal transfer means engaging the face of said chip opposite said first face thereof; and  
compressing means for compressing said interposer means between said substrate and said thermal transfer means, said interposer means thereby simultaneously providing compliance between said chip and substrate, establishing relatively low inductance electrical connections between the array of chip contacts and the array of substrate contacts and good thermal contact between said chip and said thermal transfer means.

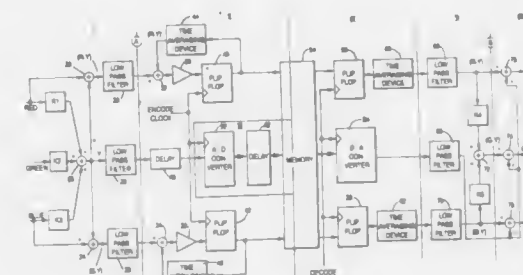
**4,954,879**  
**APPARATUS AND METHOD FOR COMPRESSING A VIDEO SIGNAL**

Neil W. Heckt, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 20, 1988, Ser. No. 287,211  
Int. Cl.<sup>5</sup> H04N 7/13

U.S. Cl. 358—13

4 Claims



1. An apparatus for compressing a video signal that includes red, green and blue color video signals comprising:  
brightness signal generating means, operating in response to the red, green and blue color video signals, for generating a brightness signal according to a first predetermined formula;  
difference signal generating means, operating in response to the red, green and blue color video signals and said brightness signal, for generating at least two color difference signals according to a second predetermined formula;  
first encoding means for encoding said brightness signal using pulse code modulation;  
second encoding means for encoding said at least two color difference signals using differential pulse code modulation;  
storage means for storing said encoded brightness signal and said at least two encoded color difference signals;  
decoding means for decoding said encoded brightness signals and said at least two encoded color difference signals to produce a decoded brightness signal and decoded color difference signals; and  
combining means for combining said decoded brightness signal and said decoded difference signals to form an approximation of the original color video signals.

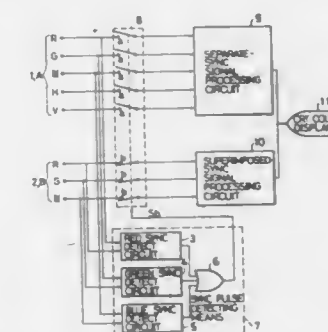
**4,954,880**  
**COLOR DISPLAY APPARATUS**  
Akihiro Tanimizu, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Jun. 22, 1988, Ser. No. 209,832  
Claims priority, application Japan, Jun. 25, 1987, 62-97716[U]  
Int. Cl.<sup>5</sup> H04N 5/04

U.S. Cl. 358—17

9 Claims

1. A color display apparatus comprising:  
a first set of a plurality of input terminals for receiving a first set of video signals comprising red, green, and blue video signals, each of said video signals of said first set being

applied to a distinct terminal of said first set of input terminals, and for receiving horizontal and vertical synchronizing signals, each of said horizontal and said vertical synchronizing signals being applied to a distinct one of said first set of input terminals, and a second set of a plurality of input terminals for receiving a second set of video signals comprising red, green, and blue video signals, each of said video signals being applied to a distinct terminal of said second set of input terminals, one or more of said video signals of said second set being superimposed with horizontal and vertical synchronizing signals,  
a separate-sync signal processing circuit for processing the signals on said first set of input terminals,  
a superimposed-sync signal processing circuit for processing said signals on said second set of input terminals,



a detecting means for detecting the presence or absence of superimposed horizontal and vertical synchronizing signals on at least one of said second set of video signals and generating a switching signal,  
a switching means for receiving said switching signal and selecting one of said separate-sync signal processing circuit and said superimposed-sync signal processing circuit for processing either said first set of video signals or said second set of video signals, respectively, and  
a color display for receiving said first set of video signals or said second set of video signals from either said separate-sync signal processing circuit or said superimposed-sync signal processing circuit, respectively, and displaying an image.

**4,954,881**  
**METHOD AND APPARATUS FOR CORRECTING VIDEO COLOR SIGNALS**  
Michael C. Kaye, Agoura Hills, Calif., assignor to Eacore Video, Inc., Hollywood, Calif.

Continuation-in-part of Ser. No. 904,692, Sep. 8, 1986, abandoned. This application Dec. 15, 1987, Ser. No. 159,587  
Int. Cl.<sup>5</sup> H04N 9/75, 9/68

U.S. Cl. 358—22

32 Claims

1. A component color correction system for manipulating color signals consisting at least of two color difference signals representing hue and saturation as angle and magnitude in polar coordinates in a chrominance plane, the system comprising:

input means for providing two color difference signals;  
color selection means for receiving said two color difference signals, a signal representing a selected hue angle, and a signal representing a selected hue spread, and producing a selected signal proportional to the saturation of the color difference signals in the hue region selected by the hue angle and spread signals;  
color correction means receiving the selected signal output from the color selection means and correction factors corresponding to each color difference signal independent



comprising:

- input terminal means for receiving a composite video signal;
- an output terminal;
- delay means, operatively connected to said input means, for delaying the composite color television signal;
- first filter means, responsive to said composite video signal

sixth detecting means for comparing the non-correlated energy in the horizontal direction with a third predetermined value and for comparing the energy of the high frequency luminance signal in the vertical direction with a fourth predetermined value.

said sixth detecting means determining a presence of the correlation in the horizontal direction when said non-correlated energy in the horizontal direction is smaller than said third predetermined value and when the energy of the high frequency luminance signal in the vertical direction is greater than said fourth predetermined value.

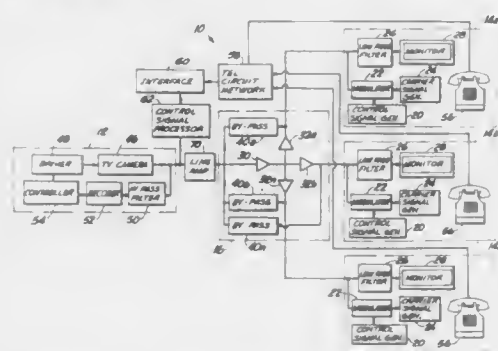
**4,954,886**  
**CLOSED CIRCUIT TELEVISION APPARATUS WITH A**  
**REMOTE CONTROL TELEVISION CAMERA**

David Elberbaum, Tokyo, Japan, assignor to Elbex Video, Ltd., Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 270,576  
Claims priority, application Japan, Mar. 17, 1988, 63-62042  
Int. Cl.<sup>5</sup> H04N 7/10, 7/18

U.S. Cl. 358-86

## 10 Claims



1. A closed circuit television apparatus comprising:
- a remote-controllable television camera including an image pick-up device for generating a video signal;
  - a plurality of controlling devices each including an operating means for generating a plurality of control signals to control said television camera, and a displaying means for receiving the video signal and displaying a picture corresponding to the received video signal; and
  - a distributing device for connecting said displaying means of the respective controlling devices to the television camera to distribute the video signal outputted from said television camera to the respective controlling devices;
- said operating means including a circuit for generating a plurality of composite signals each composed of two signals having different frequencies commensurate with the kind of control, a circuit for generating a carrier signal having a frequency higher than the frequency of the video signal, and a circuit for modulating the carrier signal by the composite signal, and outputting the control signals to a circuit portion connecting said distributing device to said displaying means;
- said television camera further including a driving means for receiving the control signals, said driving means including a filter for extracting a modulated carrier signal outputted from said driving means, a decoder for demodulating the composite signal from the extracted signal and for outputting a signal corresponding to a demodulated signal, a driver for actuating said television camera, and a controller for controlling said driver based on the signal outputted from said decoder;
- said distributing device including a main circuit portion connected to a transmission line, a plurality of branching circuit portions branching off from said main circuit portion and individually connected to said displaying means, at least one processing circuit having input and output terminals and disposed in one of said main circuit portion

and said branching circuit portions, so that the input and output terminals of said processing circuit are disposed at a television camera side and a controlling device side, respectively, said processing circuit outputting the video signal and preventing the control signals from being outputted therefrom, and a plurality of bypass circuits having input and output terminals and connecting across said main circuit portion and said branching circuit portions so as to bypass said processing circuit, so that the input and output terminals of said bypass circuits are disposed at each of the television camera side and the controlling device side, respectively, said bypass circuits outputting the control signals and preventing the video signal from being outputted therefrom.

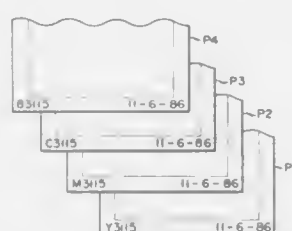
4,954,887  
APPARATUS FOR FORMING COLOR GRAPHIC ARTS  
FILMS FOR AN ORIGINAL PLATE

Kenichi Ono, Kawasaki, Japan, assignor to Kabushiki Kaisha  
Toshiba, Kawasaki, Japan

Continuation of Ser. No. 318,505, Feb. 28, 1989, abandoned, which is a continuation of Ser. No. 73,227, Jul. 14, 1987, abandoned. This application Jul. 19, 1989, Ser. No. 382,022 Claims priority, application Japan, Jul. 22, 1986, 61-172256

U.S. Cl. 358-75

10 Claims



1. An apparatus for forming color graphic arts films for an original plate, said apparatus comprising:
  - means for outputting image forming signals of different colors corresponding to an original image;
  - means for designating a plurality of pieces of color information corresponding to the image forming signals outputted by said outputting means;
  - means for feeding a color transfer member having a color agent corresponding to at least one of the pieces of color information designated by said designating means;
  - means for supplying a predetermined number of plastic films;
  - means for inputting control information so as to control by identification color graphic arts films, said control information including at least color information of each of the colors corresponding to said plurality of pieces of color information designated by said designating means; and
  - means for forming the color graphic art films, each having the original image which is formed on the basis of one of the image forming signals of different colors outputted by said outputting means and a control image which is formed on the basis of the control information inputted by said inputting means, by transferring the color agent of said color transfer member fed by said feeding means onto the plastic films supplied by said supplying means in accordance with the designation of said designating means, the control image being formed at a predetermined position on each of the plastic films at the same time as the original image is formed on each of the plastic films.

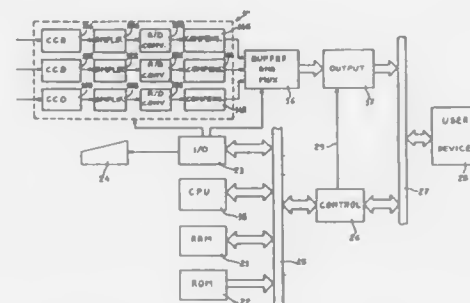
4,954,888  
APPARATUS FOR READING AND DIGITAL  
PROCESSING OF COLOR IMAGES

Giuseppe Fogaroli, Ivrea; Giuseppe Coli, Chiaverano; Giorgio Tadini, Corso Giovanni Pascoli, and Giampiero Meazza, Ivrea, all of Italy, assigns to Ing. C. Olivetti & C., S. p. A., Ivrea, Italy

Filed Feb. 6, 1989, Ser. No. 309,085  
Claims priority, application Italy, Mar. 18, 1988, 67232 A/88  
Int. Cl.<sup>5</sup> H04N 1/46

U.S. Cl. 358-75

## 12 Claims



1. An apparatus for reading and digital processing of colour images comprising a group of pluralities of elements (11G, 11R, 11B) for reading the individual pixels associated with the primary colours of the image for generating corresponding reading signals, and comprising reading mode selection means (36, C) for selection for monochrome output the reading signal generated by a predetermined one (11G) of said pluralities of elements characterised in that the group of pluralities of elements (11G, 11R, 11B) is operable to control a colour indication circuit (47) for indicating the presence of any colour in the image, the selection means (36) being capable of enabling that circuit to output the colour indication in association with the reading signal generated by the predetermined one plurality of elements (11G).

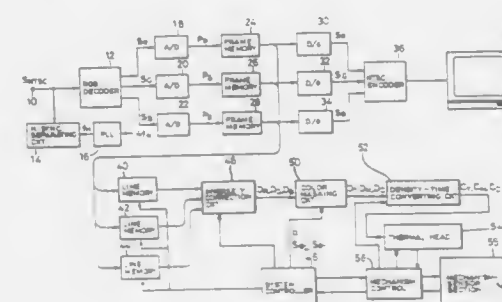
4,954,889  
COLOR MASKING CIRCUIT AND COLOR VIDEO  
PRINTER USING THE SAME

Kunio Endo, and Tadashi Katsukawa, both of Osaka, Japan,  
assignors to NEC Home Electronics Ltd., Osaka, Japan  
Continuation of Ser. No. 188,464, Apr. 29, 1988, abandoned.  
This application Nov. 30, 1989, Ser. No. 443,880

Claims priority, application Japan, Apr 30, 1987, 62-106940;  
Jun. 30, 1987, 62-162643

U.S. Cl. 358—80

#### 4 Claims



2. A color masking circuit in a color printer for performing color masking processing upon density data indicating the density of color picture elements, comprising:

input means for receiving density data in the form of parallel input data:

at least one look-up table in which matrix operation values for masking according to possible values of said density data are stored at predetermined addresses, said matrix operation values compensating for colors of color materials used in said color printer; and

output means for outputting a selected matrix operation value as desired output density data corresponding to said density data, said density data being used as an address to said at least one look-up table to select said selected matrix operation value.

4,954,890  
DRIVING METHOD FOR 3-D HIGH LUMINANCE LCD  
PROJECTOR

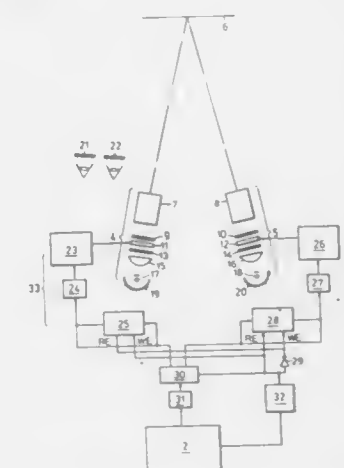
Hong C. Park, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Rep. of Korea

Filed Oct. 27, 1988, Ser. No. 263,639  
Claims priority, application Rep. of Korea, Oct. 31, 1987,  
1987/12246

Int. Cl.<sup>5</sup> H04N 15/00

U.S. Cl. 358-88

## 11 Claims



1. In a 3-D image system employing a signal source for sequentially generating signals and alternately directing the sequentially generated signals to left and right image systems respectively, said image systems comprising left and right LCD projectors respectively for projecting images corresponding to the signals received onto a screen, a driving method for achieving high luminance 3-D with said projectors, said method comprising the steps of: projecting an image corresponding to a generated signal received by a selected one of the left and right image systems; memorizing the signal received by the selected image system; projecting by the other of said left and right image systems an image corresponding to the next sequentially generated signal and simultaneously projecting by the previously selected image system an image corresponding to the memorized signal such that one of the left and right image systems gives a present image signal, while the other of the left and right image systems gives again the memorized image just prior displayed, onto the screen by means of two respective light sources to upgrade the luminance of the 3-D image on the screen.



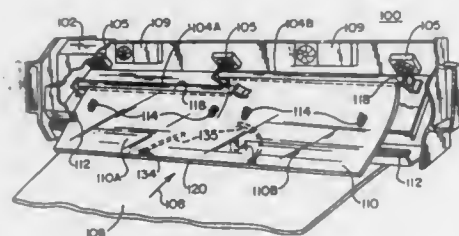
4,954,891

**LIGHT GUIDED ILLUMINATING/SECTIONING DEVICE FOR SHEET INSPECTION SYSTEM**  
 Gary-N. Burk, Columbus; Thomas O. McCanney, Sunbury, and Paul Williams, Columbus, all of Ohio, assignors to Process Automation Business, Inc., Columbus, Ohio

Continuation-in-part of Ser. No. 217,395, Jul. 11, 1988, abandoned. This application Jan. 23, 1989, Ser. No. 300,089  
 Int. Cl.<sup>5</sup> H04N 7/18

U.S. Cl. 358—101

25 Claims



1. A light source module for use with a multi-camera array in inspecting a moving sheet of material, said light source module comprising:

- first light emitter means for emitting light in response to applied power, said first light emitter means extending lengthwise across the entire width of a sheet to be inspected as measured in a direction transverse to the direction of sheet movement;
- housing means supporting said first light emitter means which is secured thereto, said housing means extending lengthwise across a distance greater than the entire width of a sheet to be inspected; and
- light guide means secured to said housing means for receiving light from said first light emitter means and for guiding the received light toward a sheet to be inspected such that the sheet is illuminated over a portion thereof extending across its entire width, said light guide means having a light receiving surface facing said first light emitter means for direct reception of light therefrom and a light ejecting surface facing the sheet.

4,954,892

**BUFFER CONTROLLED PICTURE SIGNAL ENCODING AND DECODING SYSTEM**

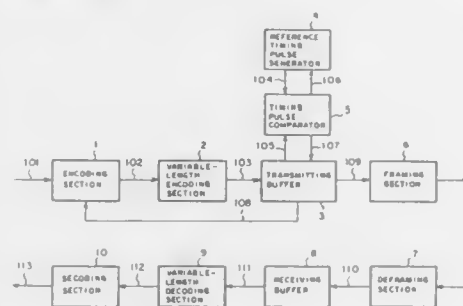
Kohtaro Asai, Tokumichi Murakami, and Kazuhiro Matsuzaki, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1989, Ser. No. 416,984  
 Claims priority, application Japan, Feb. 14, 1989, 64-34344; Feb. 14, 1989, 64-34345

U.S. Cl. 358—133

Int. Cl.<sup>5</sup> H04N 7/12

2 Claims



1. A picture signal encoding and decoding apparatus having an encoding section for converting a series of picture elements whose number is predetermined (one picture frame or one line

etc.) of a digitized picture signal series to a variable-length code-word series for transmission; and a decoding section for receiving a transmitted encoded signal and converting the signal to a fixed-length signal and after that decoding the signal to a digital picture signal series;

- said picture signal encoding and decoding apparatus comprising:
  - a transmitting buffer for performing speed conversion by storing data temporarily in order to transmit a sequence of said variable-length code-word series at a constant transmission rate;
  - a reference timing pulse generator being able to create reference timing pulses having an adjustable fixed period; and
  - a timing comparing and adjusting section for sensing the timing of head timing pulses positioned at the head of each of said variable-length coded-word series corresponding to said series of picture elements whose number is predetermined which are read from said transmitting buffer and for determining the time difference between said head timing pulses and said reference timing pulses, and if said reference timing pulse is found to occur later than said head timing pulse, the magnitude of the time difference between said reference timing pulse and said head timing pulse is determined, and if the magnitude of said time difference is larger than a predetermined threshold value, the reading from said transmitting buffer is stopped and, after the insertion of dummy data, is then resumed to compensate for said time difference, and if said reference timing pulse is found to occur earlier than said head timing pulse, said reference pulse generator is reset to effect time adjustment to correct for the time difference between said reference timing pulse and head timing pulse whereby encoded-data series to be transmitted can be adjusted time-serially based on the reference timing given by said reference timing generator.

4,954,893

**REFERENCE SIGNAL PRODUCING CIRCUIT FOR PHASE SERVO CONTROL**

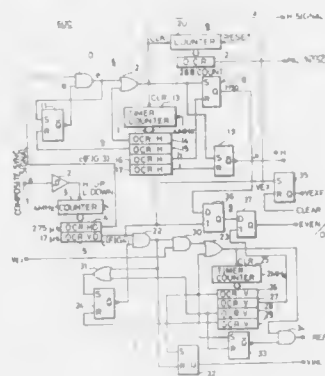
Toyozo Urakami, Hyogo, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Sep. 7, 1989, Ser. No. 404,015  
 Claims priority, application Japan, Sep. 7, 1988, 63-224037; Jan. 31, 1989, 1-22941

U.S. Cl. 358—148

Int. Cl.<sup>5</sup> H04N 5/04, 5/10

16 Claims



- 1. A reference signal producing circuit for producing a reference signal based on a composite synchronizing signal externally supplied, comprising:
  - means (3, 5) for separating a synchronizing signal from said composite synchronizing signal;
  - first timer means (25) reset by said reference signal;
  - first compensation signal producing means (26) for comparing an output of said first timer means with a variable set

4,954,895

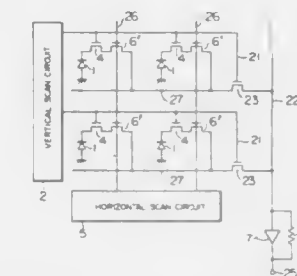
**SOLID-STATE IMAGING DEVICE INCLUDING PHOTOELECTRIC CONVERSION ELEMENTS INTEGRATED AT A SURFACE OF A SEMICONDUCTOR SUBSTRATE**

Hajime Akimoto, Hachioji, and Shinya Ohba, Kanagawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 2, 1988, Ser. No. 278,844  
 Claims priority, application Japan, Dec. 4, 1987, 62-305637  
 Int. Cl.<sup>5</sup> H04N 3/14

U.S. Cl. 358—213.11

13 Claims



- 1. A solid state imaging device comprising:
  - a plurality of photoelectric conversion elements disposed at a surface of a semiconductor substrate of a first conductivity type in a matrix configuration, for storing signal charges corresponding to incident light;
  - first signal lines for transferring said signal charges on said photoelectric conversion elements aligned in a predetermined direction line, along said predetermined direction;
  - first switch means for transferring said signal charges stored in said photoelectric conversion elements to said first signal line, the first switch means having at least one MOS type transistor formed substantially in a transmission path of said incident light to an associated photoelectric conversion element;
  - a second signal line for transmitting said signal charges from said first signal lines to an output terminal;
  - second switch means for transferring said signal charges on said first signal lines to said second signal line; and
  - scan means for scanning said first and second switch means in a predetermined order.

4,954,896

**ELECTRONIC PROJECTOR SYSTEM SUCH AS A HIGH DEFINITION TELEVISION (HDTV) PROJECTION TELEVISION SYSTEM OR THE LIKE HAVING A FLUID THEREIN WITH INCREASED RESISTANCE TO DAMAGE FROM PROJECTION SYSTEM RADIATION**  
 Stefan Mayer, and Susanne Schmidt, both of Berlin, Fed. Rep. of Germany, assignors to Heinrich-Hertz-Institut für Nachrichtentechnik Berlin GmbH, Berlin, Fed. Rep. of Germany

Filed Feb. 1, 1990, Ser. No. 473,314  
 Claims priority, application Fed. Rep. of Germany, Feb. 8, 1989, 3904264

U.S. Cl. 358—234

Int. Cl.<sup>5</sup> H04M 5/74

21 Claims

- 1. A television (HDTV) projection system or the like, said system comprising:
  - a container;
  - said container having a coating disposed therein;
  - said coating having an electrostatically deformable dimension;
  - electron beam means for producing an electrical charge on at least said coating as a function of an applied electrical signal and cooperating with said interior to subject said coating to a deforming force to produce deformations in said coating;
  - a source of radiant energy;

value and producing a first compensation signal having a variable period;  
 reference signal output means (23) for supplying as said reference signal an output of said synchronizing signal separating means or an output of said first compensation signal producing means; and  
 means for changing said set value of said first compensation signal producing means such that the period of said first compensation signal is normally set to a value larger than the value of a synchronizing signal period while being set to a value equal to the synchronizing signal period in the case that a predetermined number of or more of the synchronizing signal pulses within said composite synchronizing signal lack successively.

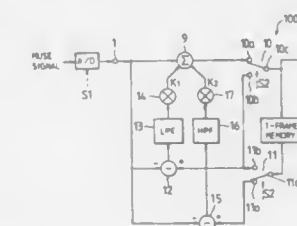
4,954,894

**RECURSIVE NOISE-REDUCER**  
 Masahiro Kitaura, Nagareyama, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Mar. 13, 1989, Ser. No. 322,483  
 Claims priority, application Japan, Mar. 14, 1988, 63-60116  
 Int. Cl.<sup>5</sup> H04N 5/21

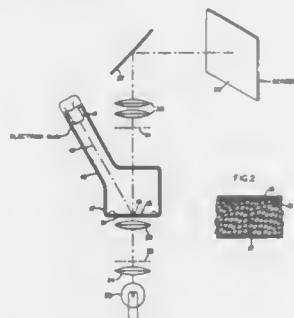
U.S. Cl. 358—167

4 Claims



- 1. A recursive noise-reducer comprising:
    - first switch means for performing an interframe interpolation process on an input digital signal to thereby convert the input digital signal into an interpolated signal;
    - memory means having a capacity equal to one frame of the interpolated signal;
    - second switch means for outputting from the memory means a one-frame-preceding interpolated signal component of the input digital signal and a two-frame-preceding interpolated signal component of the input digital signal;
    - first subtracting means for deriving a difference between the input digital signal and the one-frame-preceding interpolated signal component;
    - a first filter means for filtering an output signal from the first subtracting means and for passing a signal component having a recursion with a period corresponding to one frame;
    - a first multiplier means for multiplying an output signal from the first filter means by a predetermined first coefficient;
    - second subtracting means for deriving a difference between the input digital signal and the two-frame-preceding interpolated signal component;
    - a second filter means for filtering an output signal from the second subtracting means and for passing a signal component having a recursion with a period corresponding to two frames;
    - a second multiplier means for multiplying an output signal from the second filter means by a predetermined second coefficient; and
    - an adder for adding the input digital signal, and output signal from the first multiplier means and an output signal from the second multiplier means;
- wherein the first switch means alternately selects an output signal from the adder and the one-frame-preceding interpolated signal component to thereby generate the interpolated signal with reduced noise components.

said source of radiant energy being disposed to provide radiant energy to said coating;  
an optical system for projecting radiant energy from said source of radiant energy as a function of the deformations in said coating;  
said optical system being disposed for projecting radiant energy from said source of radiant energy to said coating;



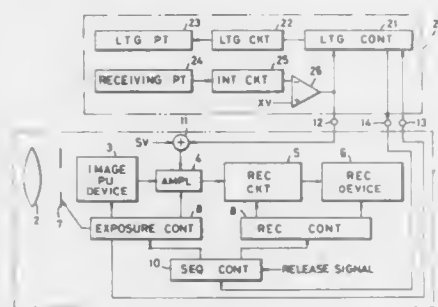
said coating comprising a fluid containing an organic basic material and at least one organic additive;  
said fluid being at least a part of said dielectric coating with said electrostatically deformable dimension;  
said at least one additive comprising an oligo(phenylenemethylene) resorcinol; and  
said optical system for projecting radiant energy for forming an image.

4,954,897

**ELECTRONIC STILL CAMERA SYSTEM WITH AUTOMATIC GAIN CONTROL OF IMAGE SIGNAL AMPLIFIER BEFORE IMAGE SIGNAL RECORDING**  
Satoshi Ejima, Tokyo, and Tetsuya Yamamoto, Hasuda, both of Japan, assignors to Nikon Corporation, Tokyo, Japan  
Continuation of Ser. No. 194,897, May 17, 1988, abandoned.  
This application Sep. 13, 1989, Ser. No. 406,865  
Claims priority, application Japan, May 22, 1987, 62-125641  
Int. Cl.<sup>5</sup> H04N 5/238

U.S. Cl. 358—228

7 Claims



1. An electronic still camera comprising:  
an optical system for forming an image of an object from light from the object;  
image pickup means for accumulating charges corresponding to the image of the object and thereby producing an image signal;  
amplifier means for amplifying said image signal;  
recording means for recording said image signal from said amplifier means on a recording medium;  
flash means for emitting a flash of light toward the object substantially simultaneously with the start of charge accumulation of said image pickup means;

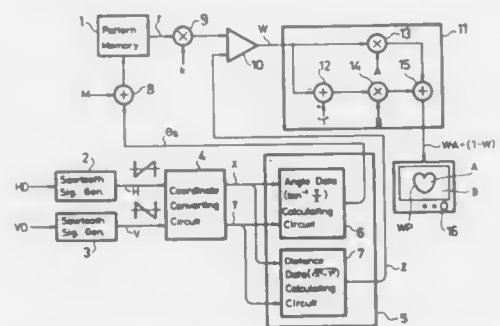
generating means for generating a photoelectric signal corresponding to the intensity of light from said object;  
integration means for integrating said photoelectric signal and producing an integration signal corresponding to the result of said integration, said integration means initiating the integration of said photoelectric signal substantially simultaneously with the start of charge accumulation of said image pickup means;  
comparator means for comparing the value of said integration signal with a reference value and producing a comparison signal corresponding to the difference between the value of said integration signal and said reference value; and  
gain adjusting means, dependent upon said comparison signal, for adjusting the gain of said amplifier means substantially upon termination of charge accumulation of said image pickup means before recording said image signal on the recording medium.

4,954,898

**WIPE PATTERN GENERATOR**

Tetsuro Nakata, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan  
Filed May 1, 1989, Ser. No. 345,229  
Claims priority, application Japan, May 7, 1988, 63-110743; May 17, 1988, 63-120234; Jun. 14, 1988, 63-146211  
Int. Cl.<sup>5</sup> H04N 5/272, 7/01, 9/64  
U.S. Cl. 358—183

14 Claims



1. A wipe pattern generator for generating a wipe pattern signal on the basis of stored wipe pattern data for displaying video signals on a display screen, comprising:  
(a) memory means for storing data expressed in polar coordinates to indicate a contour of a wipe pattern;  
(b) pixel position designating means for generating angle data and distance data indicating a position of each pixel of said display screen in a polar coordinate system; and  
(c) means for forming a wipe pattern signal on the basis of data indicating a contour of said wipe pattern derived from said memory means based on said angle data and said distance data.

4,954,899

**RECEPTION CONTROL APPARATUS FOR A TELEVISION RECEIVER**

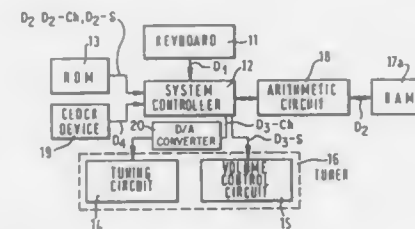
Toshiyuki Tanabe, and Seiji Senoo, both of Saitama, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan  
Filed Jun. 1, 1988, Ser. No. 200,970  
Claims priority, application Japan, Jun. 2, 1987, 62-139303  
Int. Cl.<sup>5</sup> H04N 5/50; H04B 1/16

U.S. Cl. 358—191.1

8 Claims

1. A channel selection apparatus used for a television receiver, comprising:  
power means for providing power to the channel selection apparatus;  
input means for receiving channel selection data corresponding to a channel which the television receiver is currently

receiving, and for outputting reception control data in accordance with the channel selection data;  
clock means for generating successive current time data;  
memory means for storing said reception control data supplied from the input means for a predetermined period together with a first one of said current time data corresponding to the predetermined period and to the reception control data to be stored;  
means for controlling the memory means for writing said



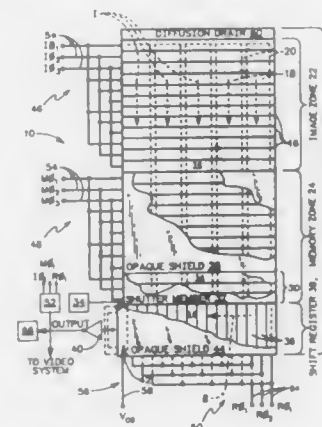
reception control data and said corresponding time data to the memory means and for reading out from the memory means reception control data and time data corresponding to a second one of said current time data, said clock means generating the second current time data at a time when said power means begins to provide power to the channel selection apparatus; and  
output means responsive to the controlling means for receiving the reception control data read out from the memory means.

4,954,900

**IMAGING AND WIDE SECTOR SEARCHING APPARATUS**

Wayne W. Frame, Longmont, Colo., assignor to Ball Corporation, Muncie, Ind.  
Filed Jan. 6, 1989, Ser. No. 294,195  
Int. Cl.<sup>5</sup> H04N 3/15  
U.S. Cl. 358—213.26

20 Claims



1. An apparatus comprising:  
first means for receiving radiation and generating first output as a function of the amount of radiation received during a predetermined time period;  
second means for receiving and storing said first output from said first means during a first mode of operation, and for receiving radiation and generating a second output as a function of the amount of radiation received during a second mode of operation; and  
third means for transmitting one of said first output and said second output for processing.

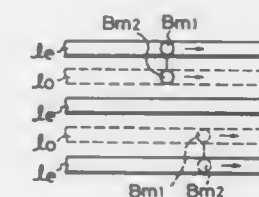
4,954,901

**TELEVISION RECEIVER WITH TWO ELECTRON BEAMS SIMULTANEOUSLY SCANNING ALONG RESPECTIVE VERTICALLY SPACED APART LINES**  
Takashi Okada, Kanagawa, and Atsushi Matsuzaki, Yokohama, both of Japan, assignors to Sony Corporation, Tokyo, Japan  
Filed Feb. 13, 1984, Ser. No. 579,561  
Claims priority, application Japan, Feb. 15, 1983, 58-23168; Feb. 16, 1983, 58-23998

Int. Cl.<sup>5</sup> H04N 5/68, 9/20

U.S. Cl. 358—242

10 Claims



1. A television receiver for providing a non-interlaced display of a received television signal intended for interlaced display comprising:  
a cathode ray tube having first and second cathodes, control grids and a fluorescent screen;  
means responsive to the received television signal for applying a first video signal to said first cathode such that said first cathode emits a first electron beam in response to said first video signal;  
means responsive to said first video signal for applying to said second cathode a second video signal determined at least in part by said first video signal such that said second cathode emits a second electron beam in response to said second video signal simultaneously with the emanation of said first electron beam from said first cathode;  
deflection means for horizontally and vertically deflecting said first and second electron beams from said first and second cathodes simultaneously so that each of said beams scans said screen along a respective pattern of vertically spaced, substantially horizontal scanning lines; and  
deflection compensating means provided between said first and second cathodes and said fluorescent screen for making said second electron beam impinge upon said fluorescent screen between said scanning lines of said first electron beam such that said second electron beam forms a visual display spaced  $\frac{1}{2}$  line interval apart from a visual display simultaneously formed by said first electron beam.

4,954,902

**TRACKING CONTROL METHOD AND DEVICE IN ROTARY HEAD TYPE MAGNETIC RECORDING AND REPRODUCING APPARATUS**

Takashi Furubata, and Kenji Satoh, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Continuation of Ser. No. 932,377, Nov. 20, 1986, abandoned.  
This application Apr. 10, 1989, Ser. No. 336,620  
Claims priority, application Japan, Nov. 20, 1985, 60-258528  
Int. Cl.<sup>5</sup> G11B 15/00

U.S. Cl. 360—10.2

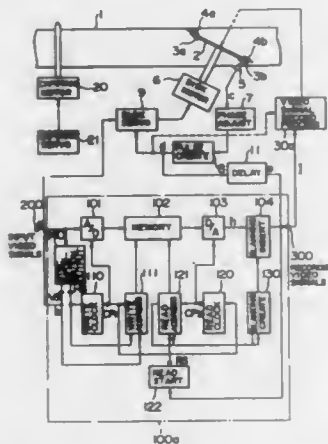
15 Claims

1. A tracking control device for use in a rotary head magnetic recording/reproducing apparatus in which information signals are recorded on a magnetic tape and reproduced therefrom by rotary magnetic head means comprising:  
pulse generator means for generating pulse signals in synchronism with the rotation of said magnetic heads;  
a memory with a predetermined storage capacity for temporarily storing said information signal;  
means for successively writing said information signals in the memory;  
means for successively reading said information signals



written in the memory in synchronism with the pulse signals from said pulse generator means and outputting them together with predetermined synchronizing information to successively record them on the slanting tracks of said magnetic tape by said magnetic head means;

a synchronizing information output circuit for separating said synchronizing information from the signals reproduced by scanning the recording tracks of said magnetic tape by said magnetic head means, thereby outputting pulses;

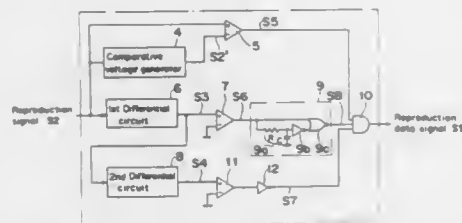


reference pulse creation means for creating reference pulses in synchronism with the pulse signals from said pulse generator means;

phase comparator means for phase-comparing the output pulses from said synchronizing information output circuit with the output pulses from said reference pulse creation means to output signals in accordance with the phase difference therebetween; and

control means for controlling said magnetic head means, in response to the outputs from said phase comparator means, so that said magnetic head means can properly scan the recording tracks.

**4,954,903**  
**DIGITAL SIGNAL REPRODUCTION APPARATUS FOR READING MAGNETO-OPTICAL DISKS**  
Hiroshi Fujii; Takeshi Yamaguchi; Kunio Kojima; Toshihisa Deguchi; Shigeo Terashima, and Tsuneo Fujiwara, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
Filed Sep. 19, 1988, Ser. No. 245,771  
Claims priority, application Japan, Sep. 21, 1987, 62-236757; Oct. 27, 1987, 62-270607  
Int. Cl.<sup>5</sup> G11B 5/09  
U.S. Cl. 360—46  
3 Claims



1. A digital signal reproduction apparatus for reproducing data from a magneto-optical disk, comprising:  
comparative voltage generating means for generating a comparative voltage according to a reproduction signal reproduced from the magneto-optical disk;  
first comparing means, operatively connected to said comparative voltage generating means, for comparing said

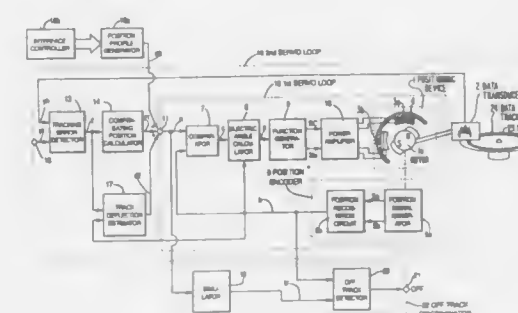
reproduction signal with said comparative voltage and for outputting a first window signal according to the comparison;  
first differential means, operatively connected to said first comparing means, for differentiating said reproduction signal and outputting a first order differential signal;  
second differential means, operatively connected to said first differential means, for differentiating said first order differential signal and outputting a second order differential signal;  
second comparing means, operatively connected to said second differential means, for comparing said second order differential signal with a predetermined level and outputting a second window signal according to the comparison;  
peak detecting means, operatively connected to said first differential means, for detecting a zero-cross point in said first order differential signal and outputting a peak detecting signal; and  
gate means, operatively connected to said peak detecting means and said first and second comparing means, for gating said peak detecting signal with said first and second window signals and outputting a reproduction data signal substantially without influence from noise.

**4,954,904**  
**METHOD AND APPARATUS FOR PREVENTING HEAD CRASHES IN A DISK SYSTEM**  
Dan Goor, Colorado Springs, Colo., assignor to Goor Associates, Inc., Colorado Springs, Colo.  
Division of Ser. No. 125,000, Nov. 24, 1987, Pat. No. 4,814,907.  
This application Dec. 13, 1988, Ser. No. 283,838  
The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> G11B 21/21  
U.S. Cl. 360—75  
6 Claims



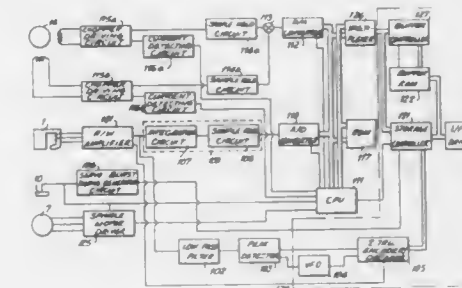
1. A disk system including means for preventing the corruption of stored information comprising:  
a platter having a substantially planar first surface;  
a layer of material disposed on said platter first surface for storage of data, said layer having an inner surface adjacent said platter first surface and an outer surface;  
means for reading data stored on said layer, said reading means having a lower surface;  
means for supporting said reading means such that said reading means lower surface is adjacent said layer outer surface;  
first means associated with said reading means for providing a magnetic field of a preselected polarity substantially perpendicular to said platter first surface;  
second means associated with said platter for providing a magnetic field substantially perpendicular to said platter first surface, said second means opposing said first means and having its polarity selected such that said first means exerts a repelling force on said second means; and  
said first and second means for providing a magnetic field being cooperative to prevent the lower surface of said reading means from contacting said layer outer surface via magnetic repulsion.

**4,954,905**  
**DATA TRANSDUCER POSITION CONTROL SYSTEM FOR DISK STORAGE DRIVE SYSTEM**  
Noriaki Wakabashi, Hirakata; Shuichi Yoshida, Osaka; Toshio Inaji, Minon; Hiromi Onodera, Nara; Tsukasa Yoshitake, Katano, and Hiroshi Mitani, Daito, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Filed Dec. 27, 1988, Ser. No. 290,187  
Claims priority, application Japan, Dec. 24, 1987, 62-328535; Mar. 29, 1988, 63-75460  
Int. Cl.<sup>5</sup> G11B 5/596  
U.S. Cl. 360—77.03  
53 Claims



1. A data transducer position control system for data disk storage drive system having a data transducer adapted to write and/or read information data to and/or from a plurality of data tracks provided on the surface of a data disk, comprising:  
a positioning device for moving the data transducer on the disk surface;  
position encoder means for producing a current position signal indicating the current position of the positioning device upon detecting the displacement of movement of the same;  
comparator means for producing a deviation signal in correspondence with the deviation of the current position signal supplied from the position encoder from a reference position signal;  
electric angle calculator means for calculating an electric angle signal in relation to the deviation for input power to the positioning device;  
function generator means for producing plural phase signals, which are different from each other in phase, in accordance with the electric angle signal;  
a power amplifier for feeding an electric current to each of plural windings in the positioning device after amplifying their respective plural phase signals;  
first servo loop means including the positioning device, position encoder, comparator means, electric angle calculator means, and power amplifier so as to constitute a closed loop servo system;  
tracking error detector means for producing a tracking error signal upon detecting the position error occurring between the data transducer and the data track;  
compensating position calculator means for calculating the reference position signal in relation to the tracking error signal; and  
second servo loop means including the tracking error detector means and compensating position calculator means so as to constitute a closed loop servo system.

**4,954,906**  
**POSITION CONTROL SYSTEM FOR A MAGNETIC STORAGE DEVICE USING A SMALL SIZED DISK**  
Yoshihiro Nakamura; Kazuya Takahashi; Atsuki Ichinose, and Testuya Mino, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan  
PCT No. PCT/JP87/00132, § 371 Date Nov. 4, 1987, § 102(e) Date Nov. 4, 1987  
PCT Filed Mar. 3, 1987, Ser. No. 116,293  
Claims priority, application Japan, Mar. 4, 1986, 61-46713; Apr. 1, 1986, 61-74796; Apr. 1, 1986, 61-74800; Apr. 30, 1986, 61-100164  
Int. Cl.<sup>5</sup> G11B 5/596, 21/10  
U.S. Cl. 360—77.08  
11 Claims



6. A position control system for a magnetic storage device having at least one magnetic disk, comprising at least one magnetic head for writing data on or reading data from said disk, a spindle, said disk being mounted on said spindle, a spindle motor for rotating said disk, an actuator for moving said magnetic head in a radial direction of said disk, comprising:  
a step motor for moving said actuator;  
a constant current driving means for outputting a current which corresponds to an input voltage for exciting each phase of said step motor;  
a current detecting means for detecting the driving current output by said constant current driving means and producing an output in response thereto;  
a D/A converter for applying the voltage input to said constant current driving means in response to a digital input;  
a means for detecting the beginning of the current flowing in said constant current driving means in accordance with the output of said current detecting means and increasing the value of said D/A converter from zero by increments of one to produce a digital offset value, further maintaining the resulting digital offset value when current flows in said constant current driving means; and  
an amendment means for outputting the voltage obtained by adding said digital offset value of said D/A converter to said driving means.

**4,954,907**  
**HEAD POSITIONING CONTROL METHOD AND SYSTEM**  
Kazuyuki Takita, Hachioji, Japan, assignor to International Business Machines Corporation, Armonk, N.Y.  
Filed Aug. 2, 1988, Ser. No. 227,588  
Claims priority, application Japan, Aug. 6, 1987, 62-195436  
Int. Cl.<sup>5</sup> G11B 5/55  
U.S. Cl. 360—78.07  
5 Claims

1. A head positioning control system for use in a data recording disk file of the type wherein a head is connected to a current-driven head driving means and wherein servo information on the disk is sampled to provide head position information, the system comprising:  
a velocity means for measuring the velocity of a head;  
a position means for detecting the position of the head;

1. An image reading apparatus comprising:



reading means for reading an image line by line and outputting image data;  
 first moving means for repeatedly moving a reading position of said reading means in a main scanning direction a plurality of times;  
 second moving means for moving the reading position of said reading means in a subscanning direction every time the reading position of said reading means is moved in the main scanning direction;  
 detection means for detecting a difference between image data outputted from said reading means during a preceding movement of the reading position in the main scanning direction and image data outputted from said reading means during a current movement of the reading position in the main scanning direction; and  
 correction means for correcting the image data outputted from said reading means based on the difference detected by said detection means.

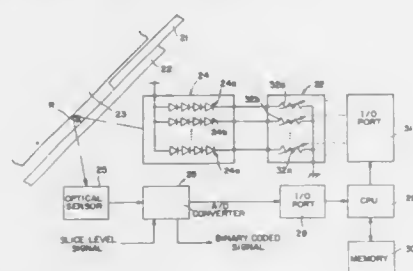
4,954,914

## APPARATUS FOR READING AN IMAGE

Toshiaki Karita, Sakurai, and Takashi Watanabe, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
 Filed Dec. 2, 1988, Ser. No. 279,420  
 Claims priority, application Japan, Dec. 2, 1987, 62-306645  
 Int. Cl.<sup>5</sup> H04N 1/04

U.S. Cl. 358—475

7 Claims



1. An apparatus for reading an image from a document, comprising:  
 a light emitting means which has a plurality of light emitting devices;  
 a back plate disposed in the vicinity of a region in which the document is to be irradiated;  
 an optical sensor means which produces output signals, the level of each of which corresponds to the level of light beams which have been reflected from said document or back plate and are incident on said optical sensor means;  
 an adjust means which changes the output level of each of or each group of said light emitting devices; and  
 a control means which controls said adjust means in such a manner that the output levels of said light emitting devices are substantially equal to each other, in response to said output signals of said optical sensor means which are obtained from light beams reflected from said back plate when no document is in said region.

4,954,915

## AUTOMATIC CASSETTE CHANGER

Atrushi Koda, Shinji Okuda, and Wataru Nonaka, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 16, 1988, Ser. No. 232,804  
 Claims priority, application Japan, Aug. 18, 1987, 62-125258[U] Aug. 26, 1987, 62-129848[U]  
 Int. Cl.<sup>5</sup> G11B 15/68

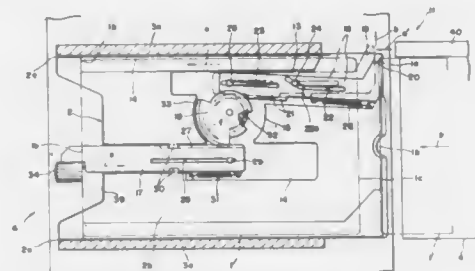
U.S. Cl. 360—92

7 Claims

1. An automatic cassette changer which includes a plurality of cassette storing racks each for storing a cassette therein and a cassette transporting means for transporting a cassette to a

recording or reproducing device, said cassette transporting means including a pushing means and each of said cassette storing racks including

- a sliding member disposed to be pushed by said pushing means provided on said cassette transporting means to move in a direction away from said cassette transporting means and
- a cassette pressing member connected with said sliding member and disposed to be moved in response to move-



ment of said sliding member in a direction toward said cassette transporting means by a distance proportional to the amount of movement of said sliding member, said cassette pressing member having an end portion thereof remote from said cassette transporting means, and said end portion being formed with an abutting portion for abutting a face of the cassette stored in the cassette storing rack for ejecting said cassette from said rack in a direction toward said cassette transporting means.

4,954,916

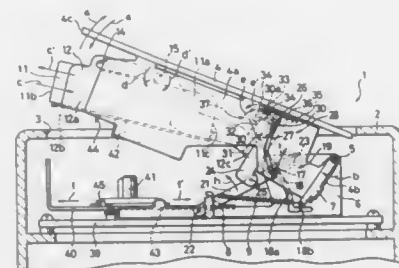
## CASSETTE LOADING APPARATUS WITH IMPROVED ACCESS

Noriaki Tobimatsu, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 7, 1988, Ser. No. 280,976  
 Claims priority, application Japan, Dec. 15, 1987, 62-190221  
 Int. Cl.<sup>5</sup> G11B 15/675

U.S. Cl. 360—96.5

3 Claims



1. A cassette recording-medium recording and/or reproducing apparatus comprising:  
 a cabinet;  
 cover means moveable between a closed position and an open position for covering and uncovering an opening provided in said cabinet;  
 cassette holding means slidably engaged inside said cover means so as to be located in a cassette receiving position that is outside said opening when said cover means is moved to its open position to uncover said opening and to be located in a cassette loading position that is within said cabinet when said cover means is moved to its closed position to cover said opening;  
 a chassis mounted within said cabinet;  
 driving means fixed to said chassis for driving a recording-medium accommodated in a cassette that has been

brought to said cassette loading position by said cassette holding means after being inserted into said cassette holding means in said cassette receiving position; and  
 guide means connected to said cassette holding means for causing said cassette holding means to slide with respect to said cover means in a direction substantially the same as a direction in which said cassette is withdrawn from said cassette holding means, when said cassette holding means is moved from said cassette loading position to said cassette receiving position,  
 said guide means comprising support plate means fixed with respect to said cabinet, and cam means and cam follower means each connected to one of said cassette holding means and support plate means, said cam follower means engaging said cam means to cause relative sliding movement between said cassette holding means and said cover when said cover is moved between said closed position and said open position.

4,954,917

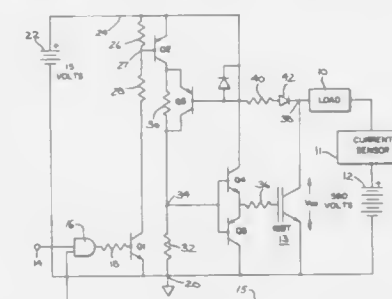
## POWER TRANSISTOR DRIVE CIRCUIT WITH IMPROVED SHORT CIRCUIT PROTECTION

William F. Wirth, Sullivan, Wis., assignor to General Electric Company, Milwaukee, Wis.

Filed Apr. 12, 1989, Ser. No. 336,931  
 Int. Cl.<sup>5</sup> H02H 3/087

U.S. Cl. 361—98

9 Claims



1. A circuit for controlling the application of electricity to a load comprising:  
 an insulated gate bipolar transistor having a gate, an emitter and a collector with the emitter-collector conduction path coupling the load to a source of electricity;  
 means for sensing the voltage across the collector and emitter of said transistor;  
 means for driving the gate of said transistor at a first voltage level in response to said means for sensing indicating that the voltage across the collector and emitter is below a given threshold level, or at a second voltage level in response to said means for sensing indicating that the voltage across the collector and emitter is above the given threshold, the first voltage level producing a greater emitter-collector conductivity than the conductivity produced by the second voltage level; wherein said means for driving comprises a voltage divider formed by a pair of resistors connected in series by an intermediate node with the voltage at the intermediate node determining a voltage level at the gate of the insulated gate bipolar transistor.

4,954,918

## CASSETTE TRANSFER APPARATUS

Masao Shiosaki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 15, 1989, Ser. No. 323,692  
 Claims priority, application Japan, Mar. 17, 1988, 63-64055  
 Int. Cl.<sup>5</sup> G11B 5/012, 15/68

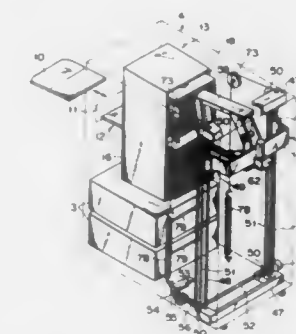
U.S. Cl. 360—98.06

11 Claims

1. A cassette transfer apparatus for transferring to a desired

location a cassette having a plurality of engagement portions, the transfer apparatus comprising:

- means for holding the cassette, said holding means including an entry and exit port for admitting the cassette into holding means and ejecting the cassette from the holding means; and
- means for delivering the cassette to the holding means, said delivery means including:  
 a plurality of first guide rollers attached to the holding means adjacent the entry and exit port;  
 a plurality of second guide rollers attached to the holding means and spaced from said first guide rollers;  
 a plurality of belts, each said belt extending between a respective first and second guide roller and including a linear portion extending along the holding means, the linear portions of each said belt facing each other at a distance substantially equal to the width of the cassette;  
 a plurality of engaging members disposed in engagement with the respective portions of cassette and attached to a respective belt for movement therewith, each of the engaging members including a guide pin;  
 means for driving each of the belts in a forward direction for producing a forward movement of the belt to deliver the cassette to the holding means and for driving each of the belts in a reverse direction for producing a reverse movement of the belt to deliver the cassette from the holding means, said first and second guide rollers and said belts being arranged so that during the



forward movement of the belts, the engaging members are rotated to engage the engagement portions of the cassettes while passing around the respective first guide rollers and move while engaging the engagement portions of the cassette as the engaging member passes along the linear portions of each said belt, and during the reverse movement of the belts, the engaging members move while engaging the engagement portions of the cassette as the engaging member passes along the linear portions of each said belt and rotate and disengage from the engagement portions of the cassette while passing around the first guide rollers; and  
 means for guiding each said guide pin when the engaging members move along the linear portions of the belts, so as to prevent rotation of the engaging members.

2. A cassette transfer apparatus for transferring to a desired location a cassette having an engagement portion, said transfer apparatus comprising:  
 means for holding the cassette, said holding means having a cassette entry and exit port for admitting the cassette into the holding means and for ejecting the cassette from the holding means; and  
 means for delivering the cassette to the holding means, the delivery means including:  
 a first guide roller attached to the holding means adjacent the entry and exit port;  
 a second guide roller attached to the holding means and spaced from the first guide roller;

a belt extending between the first and second guide rollers including a linear portion extending along the holding means;

an engaging member disposed in engagement with the engagement portion of the cassette and attached to the belt for movement therewith, the engaging member including a guide pin, the first and second guide rollers and the belt being arranged so that said engaging member is rotated to engage the engagement portion of the cassette as the engaging member passes around the first guide roller and moves while engaging the engagement portion of the cassette as the engaging member passes along the linear portion of said belt;

means for driving the belt to cause the engaging member to engage the cassette and to deliver the cassette into the holding means; and

means for guiding the guide pin while the engaging member, together with the cassette, moves along the linear portion of the belt so as to prevent rotation of the engaging member.

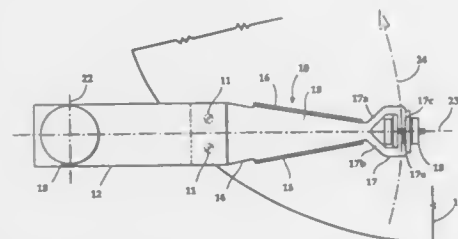
**4,954,919**  
**ROTARY SEEK MAGNETIC HEAD ASSEMBLY HAVING A LOOPED LOAD BEAM END TO ACHIEVE HIGH SPEED ACCESS**

Tadaharu Yamada, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 21, 1989, Ser. No. 382,882  
Claims priority, application Japan, Jul. 25, 1988, 63-186231; Jul. 26, 1988, 63-187109

Int. Cl.<sup>5</sup> G11B 5/48  
U.S. Cl. 360—104

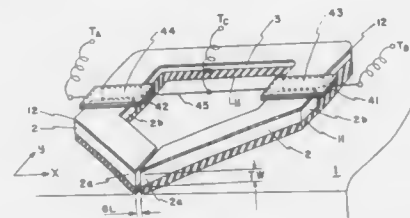
6 Claims



1. A magnetic head assembly comprising:
  - a rigid arm section mounted at one end thereof on a rotary shaft;
  - a load beam element joined to the other end of said rigid arm section, said element having a portion substantially resilient adjacent to said rigid arm section and a looped load bearing section, said element being substantially rigid between said resilient portion and said looped load bearing section to present a loading force on said looped load bearing section, said looped load bearing section having arms extending from said element to a cross leg which runs substantially parallel to the direction of rotation of said rotary shaft;
  - a gimbal spring of rectangular configuration, said gimbal spring having a pair of outer flexible fingers joined at their first ends to one of said arms of said looped load bearing section and joined at their second ends by a cross leg, and a central finger extending from the last-mentioned cross leg, said outer fingers and said central finger running substantially parallel to the direction of rotation of said rotary shaft;
  - means for providing a point contact between said central finger and the cross leg of said looped load bearing section; and
  - an air bearing slider fastened to said central finger of said gimbal spring.

**4,954,920**  
**THIN FILM MAGNETIC HEAD**  
Kazuhiro Yamada, and Takao Maruyama, both of Tokyo, Japan, assignors to NEC Corporation, Japan  
Filed Nov. 30, 1987, Ser. No. 126,577  
Claims priority, application Japan, Nov. 28, 1986, 61-284784; Nov. 28, 1986, 61-284785; Nov. 28, 1986, 61-284787  
Int. Cl.<sup>5</sup> G11B 5/127, 5/33  
U.S. Cl. 360—113

1 Claim



1. A thin film magnetic head for reading recorded information from a magnetic recording medium which is moving in a first direction relative to said thin film magnetic head, said thin film magnetic head comprising:

a pair of yokes made of a magnetically permeable film having a predetermined thickness, said pair of yokes being formed on a substrate and covered by a first insulative layer, said thickness of said yokes defining a track width of said thin film magnetic head, a space between first ends of said pair of yokes defining a magnetic gap of said thin film magnetic head, second ends of said pair of yokes being spaced apart from each other, a magnetic anisotropy of said pair of yokes being directed in substantially said first direction;

a pair of magneto-resistive elements magnetically connected to said second ends of said pair of yokes, respectively, said pair of magneto-resistive elements being formed on said first insulative layer and covered by a second layer,

a return path made of a magnetically permeable film, a coil surrounding said return path for supplying recording current, said return path magnetically connecting said pair of magneto-resistive elements, a magnetic anisotropy of said return path being directed in a second direction which is substantially perpendicular to said first direction, said coil including lower and upper coil patterns, said lower coil pattern being formed on said second insulative layer and covered by a third insulative layer, said return path being formed on said third insulative layer and covered by a fourth insulative layer, said upper coil pattern being formed on said fourth insulative layer, and both ends of said upper coil pattern being connected to both ends of said lower coil pattern at positions where said third and fourth insulative layers are removed.

**4,954,921**  
**MAGNETIC TRANSDUCER HEAD STRUCTURE WITH REDUCED LEAKAGE BETWEEN CORE CIRCUITS**  
Michael L. Bolt, Ann Arbor, Mich., assignor to Irwin Magnetic Systems, Inc., Ann Arbor, Mich.  
Continuation of Ser. No. 915,734, Oct. 6, 1986, Pat. No. 4,819,107, which is a continuation-in-part of Ser. No. 645,436, Aug. 29, 1984, abandoned. This application Sep. 6, 1988, Ser. No. 241,090  
Int. Cl.<sup>5</sup> G11B 5/265  
U.S. Cl. 360—121

9 Claims

1. A magnetic core structure for a transducer head particularly adapted for use in digital data storage devices, comprising:
  - a magnetic circuit formed by magnetic core elements, said circuit having at least one gap defined by two opposing sides where magnetic flux in such circuit may access magnetically-recordable data storage media;

means forming a first magnetic pole structure for said circuit and defining one side of said gap, and means forming a second magnetic pole structure for said circuit and defining the other side of said gap, generally opposite said first pole structure;

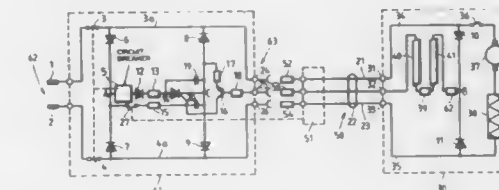
at least said first magnetic pole structure having a laminar structure comprising at least one strata and at least one flanking strata, each comprising magnetic and having a predetermined magnetic reluctance;

said flanking strata being disposed in adjacent overlapping relationship with portions of said medial strata along said gap to thereby define an included area of overlap whose magnitude is determined by the length and width of that portion of the flanking strata overlying said medial strata at the gap, said medial strata having a thickness at said gap measured in a direction along said gap which is less than the thickness of said second pole structure disposed across said gap, to thereby access a narrower recorded band on said media than that accessed by said second pole structure;

isolation means comprising at least one layer of non-magnetic material disposed between said medial strata and said

tive system housed in a main connection plug or in an adapter connectable to a main power source, said electronic protective system being comprised of:

- (a) A probe contained in the apparatus, which probe exhibits a change of its electrical impedance in the presence of a liquid;
- (b) An automatically controlled electronic switching circuit powered by the main power source, said switching circuit having connected to its input a signal line leading from the probe via the shielding of the power cord, wherewith said switching circuit is triggered if the impedance of the probe changes by a prescribed amount; and

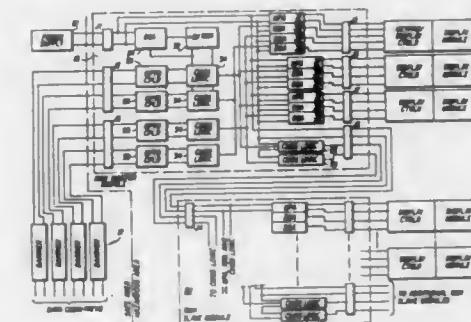


- (c) A protective switch inserted in the leads of the plug or adapter, which protective switch is triggered by electrical current occurring when the switching circuit is triggered; characterized by a control current loop being provided which is formed from the switching circuit to the protected apparatus and the probe of the apparatus, and returning via the shielding of the power cord back to the electronic circuit, which control current loop carries a direct current regardless of the operating state of the protected apparatus, and wherewith, as long as the current through said loop is between a lower and an upper limit value, the electronic circuit is not triggered.

**4,954,923**  
**INTRINSIC SAFETY MODULE INTERFACE**  
John C. Hoeflich, Austin, and David W. Curry, Cedar Park, both of Tex., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Aug. 19, 1988, Ser. No. 234,037  
Int. Cl.<sup>5</sup> H02H 3/20  
U.S. Cl. 361—111

12 Claims



1. An interface system interconnecting a common power source and a plurality of data communications paths located in a safe environment to a plurality of load devices located in a flammable atmosphere which share said common power source, said interface system comprising first attenuating means in said flammable atmosphere for attenuating the electrical power supplied by said power source to said plurality of load devices to a first predetermined power level, second attenuating means in said flammable atmosphere for attenuating the electrical power delivered by said data communications paths to said plurality of load devices to a second predetermined power level, said first and second attenuating means

flanking strata at said included area of overlap, for magnetically separating at least said portions of said medial strata from the overlapping portions of the flanking strata; said flanking strata serving to magnetically shunt portions of said magnetic circuit formed by said medial strata by extending alongside and into magnetic communication with said medial strata at a point along said magnetic circuit which is spaced from said first pole structure in the direction of said second pole structure, to thereby provide a parallel magnetic return;

said isolation means layer being thin in relation to said flanking strata and having a thickness less than one-half that of the adjacent flanking strata;

and said included area of overlap between said medial strata and said flanking strata at said first pole structure having a magnitude which makes the effective magnetic reluctance of said isolation means layer disposed therebetween sufficiently large with respect to the magnetic reluctance of said flanking strata that the transfer of magnetic flux from the flanking strata to the medial strata across the non-magnetic isolation means at said included area is limited to less than about ten percent of the total magnetic flux present in said magnetic circuit.

**4,954,922**  
**PROTECTIVE SYSTEM FOR PORTABLE ELECTRICALLY POWERED APPARATUS**  
Harry Gaus, Schwanheimer Str. 93, Bensheim, Fed. Rep. of Germany D-6140; Hagen Gross, Am Zollstock 29, Bad Homburg, Fed. Rep. of Germany D-6380, and Günter Schliebs, Claudiusweg 17A, Darmstadt, Fed. Rep. of Germany D-6100  
Filed Sep. 30, 1988, Ser. No. 252,515  
Claims priority, application Fed. Rep. of Germany, Apr. 23, 1988, 3813796  
Int. Cl.<sup>5</sup> H02H 5/04  
U.S. Cl. 361—42

21 Claims

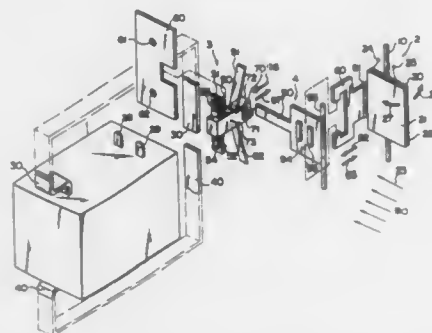
1. An electrically powered apparatus having a flexible shielded two conductor power cord and an electronic protec-



increasing the total electrical power transferred from said common power supply to said load devices such that the sum of storage capacities of said load devices is greater than an allowable storage capacity for a single load device consisting of any of said load devices, and coupling means for segregating said power source from said data communications paths to and from said safe environment.

**4,954,924**  
**SWITCH FOR HIGH MAGNETIC FIELD**  
Motoji Haragashira, Tochigi, and Yoshimi Maekawa, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 16, 1988, Ser. No. 271,833  
Claims priority, application Japan, Nov. 18, 1987, 62-289402  
Int. Cl.<sup>3</sup> H01H 9/00  
U.S. Cl. 361—187 13 Claims



1. A switch for use in a high magnetic field induced in a high magnetic field generator, including at least one circuit to be switched, comprising:

- driving means, including at least a coil and a non-magnetic element, which are reversibly movable under a mutual electromagnetic atmosphere obtained by flowing electric current in the coil and the high magnetic field;
  - opening/closing means having a movable contact and a fixed contact, for closing the circuit by connecting the movable contact to the fixed contact, and opening the circuit by separating the movable contact from the fixed contact; and
  - transmitting means located between said driving means and said opening/closing means for transmitting a driving force of said driving means to said opening/closing means to latch the movable and fixed contacts;
- wherein said driving means comprises a rotation shaft mounted within a housing made of non-magnetic material and a coil mounted relative to the rotation shaft which, upon the flow of electric current through the coil, excites said coil under a mutual electromagnetic atmosphere of electric current in the coil and high magnetic force created by said magnetic field generator.

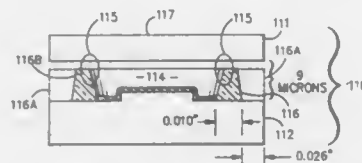
**4,954,925**  
**CAPACITIVE SENSOR WITH MINIMIZED DIELECTRIC DRIFT**

Robert H. Bullis, Avon; James L. Swindal, East Hampton; Walter J. Wiegand, Jr., Glastonbury; Charles B. Brahm, Ellington, and Harold D. Meyer, South Windsor, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 30, 1988, Ser. No. 292,282  
Int. Cl.<sup>3</sup> G01L 9/12

U.S. Cl. 361—283 16 Claims  
1. A capacitive sensor of the silicon-dielectric-silicon type used to sense physical changes, such as, for example, pressure changes, comprising:

a conductive silicon substrate;  
a conductive, elastic, flexible silicon diaphragm having an exterior side, said diaphragm being capable of flexing movement due to physical changes being sensed; and  
a non-conductive, dielectric wall spacer layer between said silicon substrate and said silicon diaphragm, said layer providing peripheral wall(s) extending substantially above said silicon substrate and joining said silicon substrate and said silicon diaphragm together; an evacuated, closed, hermetically sealed chamber being formed between said



silicon substrate and said silicon diaphragm and being closed off at the sides above said substrate by said wall(s) formed by said dielectric layer between said silicon substrate and said silicon diaphragm; the flexing movement of said silicon diaphragm due to the physical changes being sensed causing the capacitance of the sensor to vary; the capacitance contribution of said dielectric layer to the total capacitance of the sensor being no more than about twenty-to-twenty-five percent of the total capacitance of the sensor.

**4,954,926**  
**THICK FILM CONDUCTOR COMPOSITION**  
John G. Pepin, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 28, 1989, Ser. No. 385,309  
Int. Cl.<sup>3</sup> H01G 1/015, 4/10

U.S. Cl. 361—304 10 Claims

1. A thick film conductor composition suitable for use for electrodes in multilayer capacitors comprising

- (a) finely divided particles of electrically conductive metal selected from Pd, Ag, Pt, Au, Cu, Ni, oxide precursors and alloys of the aforesaid conductive metals, and mixtures thereof, dispersed in
- (b) an organic medium comprising
  - (1) an organometallic compound, the metal or metal oxide moiety of which is insoluble in the electrically conductive metal and/or the oxide(s) of the metal moiety are non-reducing in the presence of the electrically conductive metal, the organometallic compound being dissolved in;
  - (2) a solution of polymeric binder and volatilizable solvent, the amount of organometallic compound being such that the metal moiety thereof constitutes at least 0.05% by weight of the total composition.

**4,954,927**  
**DOUBLE CAPACITOR AND MANUFACTURING METHOD THEREOF**

Han-su Park, Yulchon, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Rep. of Korea

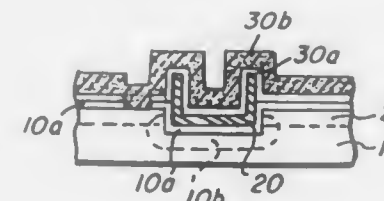
Filed May 31, 1989, Ser. No. 359,771  
Claims priority, application Rep. of Korea, Sep. 16, 1988, 88-12002[U]

Int. Cl.<sup>3</sup> H01G 4/38, 7/00; H01L 27/02  
U.S. Cl. 361—328 17 Claims

1. A double capacitor for a semiconductor integrated circuit capable of being connected to another circuit element comprising:

- a first capacitor comprising:
  - a first conductor formed in a substrate below and along-side a recess formed on one side of said substrate,

a first non-conductor disposed over said first conductor, and  
a common ground conductor having a "U" shape disposed over said first non-conductor and within said recess and having free ends extending beyond said recess; and



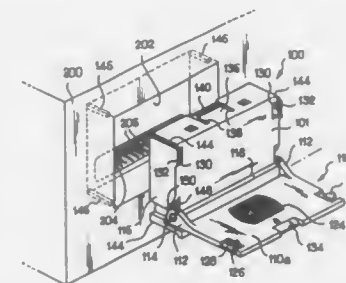
a second capacitor comprising:  
said common ground conductor,  
a second generally M-shaped non-conductor disposed over said common ground conductor, and  
a second conductor disposed over said second non-conductor.

**4,954,928**  
**MEMORY CARTRIDGE FOR ELECTRONIC EQUIPMENT, AND ELECTRONIC EQUIPMENT PROVIDED WITH SUCH CARTRIDGES**

Claude Jullien, Sartoux, France, assignor to La Telemecanique Electrique, France

Filed Sep. 16, 1988, Ser. No. 245,257  
Claims priority, application France, Sep. 18, 1987, 87 12974  
Int. Cl.<sup>3</sup> H05K 7/14

U.S. Cl. 361—391 17 Claims



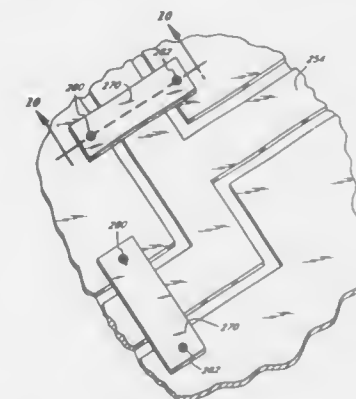
1. A removable memory cartridge for electronic equipment such as a programmable automaton, said cartridge being of the type comprising: a box, a memory unit mounted in said box, and an elongate connector fixed to said box and enabling said memory unit to be interconnected with electronic equipment, said connector mechanically fixing the cartridge in said electronic equipment, said box having grasping means to enable said cartridge to be extracted by separating the connector, the grasping means having a flat member hinged about an axis lying approximately in the midplane of the connector, said flat member occupying a first position against said box without substantially increasing the size thereof, and occupying a second position away from the box in which said flat member is graspable in order to exert an extraction force on the box acting substantially level with the connector.

**4,954,929**  
**MULTI-LAYER CIRCUIT BOARD THAT SUPPRESSES RADIO FREQUENCY INTERFERENCE FROM HIGH FREQUENCY SIGNALS**

Jozef B. Baran, Moreno Valley, Calif., assignor to AST Research, Inc., Irvine, Calif.

Filed Aug. 22, 1989, Ser. No. 396,956  
Int. Cl.<sup>3</sup> H05K 9/00

U.S. Cl. 361—414 9 Claims



1. A multi-layer printed circuit board connectable to first and second voltage reference sources, said printed circuit board suppressing radio frequency interference generated by high frequency signals present in electronic circuitry on said printed circuit board, said printed circuit board comprising:

- a first interconnection layer comprising electrically conductive material formed into a plurality of electrically conductive paths to interconnect said electronic circuitry on said circuit board;
- a first voltage reference layer connectable to the first voltage reference source, said first voltage reference layer positioned in parallel with said layer of electrically conductive material;
- a second voltage reference layer connectable to the second voltage reference source, said second voltage reference layer positioned in parallel with said first voltage reference layer;
- means for selectively connecting said first voltage reference layer to said electronic circuitry;
- means for selectively connecting said second voltage reference layer to said electronic circuitry; and
- at least one signal line formed on said first voltage reference layer, said signal line electrically isolated from the first voltage reference source, said signal line surrounded on both sides by portions of said first voltage reference layer connected to the first voltage reference source, said signal line shielded by said first voltage reference layer and said second voltage reference layer to suppress radio frequency interference between a signal on said signal line and signals on said conductive paths on said first interconnection layer.

**4,954,930**  
**ILLUMINATION LIGHT GUIDE**

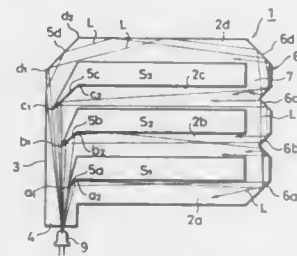
Mamoru Maegawa, and Fumio Sakamoto, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Sep. 25, 1989, Ser. No. 412,071  
Claims priority, application Japan, Sep. 27, 1988, 63-125146[U]

Int. Cl.<sup>3</sup> F21V 8/00  
U.S. Cl. 362—26 3 Claims

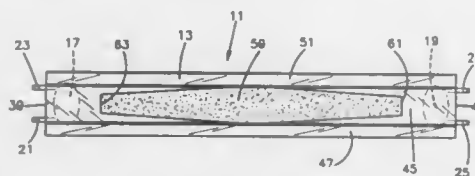
1. An illumination light guide comprising:  
a plurality of elongated illuminating portions;  
a light guiding path portion connecting one end of each of said illuminating portions;

- a light receiving portion formed in said light guiding path portion;
- a plurality of light distributing/reflecting portions formed in said light guiding path portion so as to correspond to said illuminating portions and having different lengths such that the longer a distance from said light receiving portion to one of said light distributing/reflecting portions, the



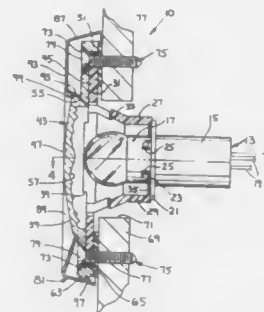
- longer a length of the one of said light distributing/reflecting portions;
- a plurality of light reflecting portions formed at the other ends of said illuminating portions, respectively; and
- a plurality of slant surfaces for reflecting light upwardly, a single one of said slant surfaces formed at the bottom of each of said illuminating portions.

**4,954,931**  
**LINEAR DIFFUSE LIGHT SOURCE**  
 William L. Hassler, Jr., El Toro, Calif., assignor to Parker Hannifin Corporation, Cleveland, Ohio  
 Filed Jul. 8, 1988, Ser. No. 216,750  
 Int. Cl.<sup>5</sup> F21V 8/00  
 U.S. Cl. 362—32 3 Claims



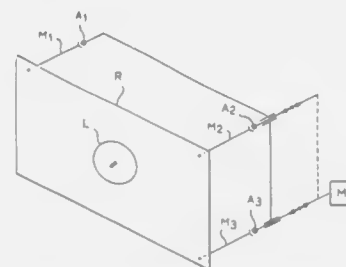
1. A light source for producing a relatively uniform dispersed light emission along a length portion thereof, comprising:
- a prism having two ends, an emission face and a plurality of optically reflective planar faces, formed of optionally transparent material having a relatively high index of refraction and shaped to capture light emitted longitudinally therein said emission face and said reflective planar faces forming a hexagonal cross-section and said reflective faces forming right angle prism sides adjacent said emission face;
- light emitting diodes disposed at the ends of said prisms to emit light longitudinally in said prism so as to be captured therein; and
- said prism having an optically transparent and light dispersing frosted window formed in said emission face along a length of the emission face thereof, said window linearly narrowing toward the ends of said prism so as to emit through said window light captured in said prism as it is emitted from said light emitting means in a dispersed, longitudinally uniform way.

**4,954,932**  
**TRANSOM LIGHT**  
 Steve Isenga, Zeeland, Mich., assignor to ITC Incorporated, Zeeland, Mich.  
 Filed Nov. 22, 1989, Ser. No. 441,035  
 Int. Cl.<sup>5</sup> B60Q 1/00  
 U.S. Cl. 362—61 20 Claims



1. A flush mount lamp assembly for mounting on the hull of a watercraft, comprising:
- means for defining a support for a light source, a lens carried on said support means, fastening members extending through said lens and adapted to affix into the hull, bezel means for preventing visual observation of and physical access to said fastening members, and means coaxing between said lens and said bezel means for releasably fixing said bezel means on said lens.

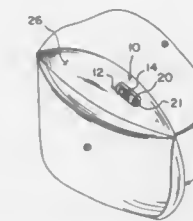
**4,954,933**  
**DEVICE FOR ADJUSTING THE AIMING DIRECTION OF A MOTOR VEHICLE HEADLIGHT**  
 Charles Wassen, Bobigny, France, assignor to Valeo Vision, Bobigny, France  
 Filed Sep. 18, 1989, Ser. No. 409,020  
 Claims priority, application France, Sep. 22, 1988, 88 12370  
 Int. Cl.<sup>5</sup> B60Q 1/00  
 U.S. Cl. 362—66 9 Claims



1. A device for adjusting the aiming direction of a motor vehicle headlight reflector, said device comprising three essentially localized bearing points to support said reflector against a relatively fixed structure, the three bearing points being placed at the three apexes of a triangle having one horizontal side, one of said points being fixed and the other two points being adjustable through shifting in a direction that is essentially perpendicular to the plane of said triangle, to cause heightwise and lateral variation in the aiming direction of the reflector, and further comprising driving means capable of moving at least one of the two adjustable points, wherein:
- the two adjustable bearing points are located on one and the same lateral side of the headlight, opposite the fixed support;
- the driving means include a single driving member, and means are provided for selectively connecting the driving

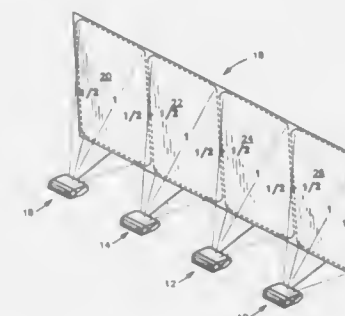
member to a first adjustable bearing point, which is horizontally aligned with the fixed bearing point, or fixing in position said adjustable bearing point, while said driving member is permanently connected to the second adjustable bearing point so as to determine the two modes of adjustment.

**4,954,934**  
**PURSE LIGHT**  
 Stephen E. Kidder, P.O. Box 479, Roswell, N. Mex. 88201, and George Spector, 233 Broadway Rm. 3815, New York, N.Y. 10007  
 Filed Feb. 16, 1989, Ser. No. 311,056  
 Int. Cl.<sup>5</sup> A45C 15/06  
 U.S. Cl. 362—156 3 Claims



1. A purse light which comprises:
- (a) an elongated dome lens having a pair of parallel grooves running along interior of open rear end thereof;
- (b) a slideable base plate to fit as a tongue into said grooves;
- (c) a battery carried on one end of said base plate;
- (d) a light bulb carried in middle of said base plate and electrically connected to said battery;
- (e) a toggle switch carried on other end of said base plate and electrically connected between said battery and said light bulb for turning said light bulb on and off; and
- (f) means on rear of said dome lens for removably securing said dome lens to interior of a purse so that when said toggle switch is in an on position said light bulb will illuminate the interior of the purse through said dome lens.

**4,954,935**  
**LIGHTING SYSTEM FOR ILLUMINATING BILLBOARDS AND THE LIKE**  
 Douglas S. Hammond, and Herbert A. Odle, both of Newark, Ohio, assignors to Holophane Company, Inc., Newark, Ohio  
 Filed Feb. 8, 1989, Ser. No. 308,166  
 Int. Cl.<sup>5</sup> F21V 5/00  
 U.S. Cl. 362—245 8 Claims



1. A lighting system for illuminating a sign having one or more panels, each of said panels having its vertical height greater than its horizontal width, said lighting system comprising, a luminaire for each panel, each of said luminaires including a lamp positioned below and away from the central portion of its respective panel in such a manner as to provide a maxi-

mum amount of luminance directly from the lamp to said panel, reflector means for reflecting luminance directly to the panel, and refractor means for redirecting direct light to illuminate the panel whereby the central portion of each panel receives twice the illumination than the sides of the panel so that overlapping light from adjacent sign panels will cumulatively provide the adjacent sides of sign panels with the same amount of light as the center of each sign panel.

**4,954,936**  
**ASEISMATIC STRUCTURE OF AN INDICATING LAMP**  
 Masaaki Kawabata, Toyonaka, and Tokio Kawashima, Osaka, both of Japan, assignors to Sasaki Electric Corporation, Osaka, Japan  
 Filed Dec. 13, 1989, Ser. No. 450,259  
 Claims priority, application Japan, May 17, 1989, 64-56828  
 Int. Cl.<sup>5</sup> F21V 21/00  
 U.S. Cl. 362—249 6 Claims



1. An indicating lamp, comprising:
- an internal chassis having means for fixing an electric lamp and an electric control board thereto, said internal chassis including a fixing plate, said fixing plate having through-holes formed therein;
- an indicating lamp cover means covering said internal chassis and having through-holes formed therein;
- a fixture for attaching the indicating lamp to an external structure;
- a boss fitted to said fixture and having a flange portion, said flange portion having a first side, a second side opposite said first side, and through-holes formed therein;
- an insulating member disposed between said fixing plate and said cover means, said insulating member abutting at least one of said first and second sides of said flange portion and having through-holes formed therein;
- clamping means, including clamping members extending through the through-holes of said cover means, said insulating member, said flange portion and said fixing plate, for clamping said insulating member, said flange portion, and said indicating lamp cover means to said fixing plate; and
- means, including cylindrical spacers fitted through the through-holes of said insulating member and said flange and each having a predetermined length, for limiting to a predetermined spacing a distance between said fixing plate and said indicating lamp cover means, said clamping members extending through said spacers, each of said spacers having an internal diameter permitting said clamping members to be freely withdrawn from and inserted into said spacers.



4,954,937

## LIGHTING LAMP

Yasuo Kobayashi; Naoki Hagiwara; Taisuke Hirota; Churyo Kodama; Yasuo Hirasawa; Katsumi Miyazaki; Fumio Kawamura; Takao Higashi, all of Tokyo; Masami Yanagisawa, and Akinori Sei, both of Shizuoka, all of Japan, assignors to Tomoe-gawa Paper Co., Ltd. and Hitachi Ltd., both of Tokyo, Japan

Filed Sep. 8, 1989, Ser. No. 404,657

Claims priority, application Japan, Sep. 8, 1988, 63-223615; Sep. 8, 1988, 63-223616; Jul. 26, 1989, 1-191390

Int. Cl.<sup>3</sup> F21M 3/14

U.S. Cl. 362—255

14 Claims



1. A lighting lamp comprising a lamp having laminated on the surface of a bulb thereof a display sheet, said display sheet comprising a support having thereon an active layer containing a pigment which is faded by the action of an active light and an active light-adjusting layer.

4,954,938

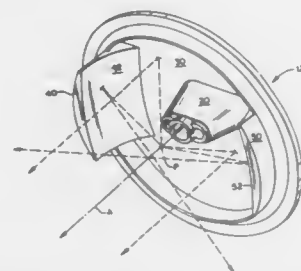
LIGHT WITH WIDE ANGLE RADIATION PATTERN  
H. Wayne Lyons, Killingsworth, Conn., assignor to Whelen Technologies, Inc., Chester, Conn.

Filed Feb. 21, 1989, Ser. No. 312,479

Int. Cl.<sup>3</sup> F21V 7/00, 33/00

U.S. Cl. 362—298

22 Claims



1. A light assembly comprising: body means for forming an integral rigid base structure, said body means comprising: first reflector means for defining a dish-like parabolic reflector surface which is symmetrical about a central axis, said first reflector means defined parabolic surface having a focal point and a vertex which lie on said central axis; mounting means projecting from said first reflector means parabolic surface for mounting a light emitter, said central axis extending through said mounting means; and first and second wing means extending from said first reflector means for forming a pair of generally axially projecting wing-like extensions, said first and second wing means being located at equidistantly spaced diametral positions relative to said central axis, said wing means each defining a parabolic reflector surface, the paraboloids of revolution which include said wing means reflector surfaces each having a vertex and a focal point which define an axis, said wing means reflector surface paraboloidal axes being angularly oriented relative to a plane in which said central axis lies, said plane being substantially equidistantly spaced from said first and second wing means, the focal points of said wing means paraboloids of revolution being

substantially coincident with said first reflector means focal point; and light emitter means supported by said mounting means for emitting light upon energization thereof, said light emitter means being at least in part positioned at said focal point.

4,954,939

## ADJUSTABLE AND REMOVABLE CHANDELIER CHAIN COVER

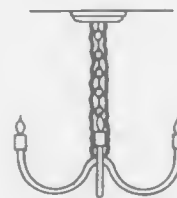
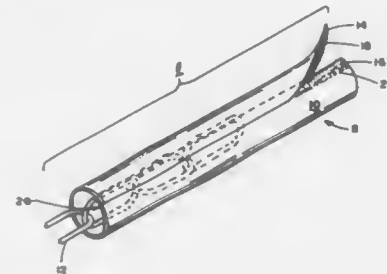
Brenda Q. Hutchins, P.O. Box 5008, Winston-Salem, N.C. 27113-5008

Filed Feb. 13, 1989, Ser. No. 309,186

Int. Cl.<sup>3</sup> F21S 3/06

U.S. Cl. 362—406

6 Claims



1. In a chandelier fixture affixed to a supporting ceiling having a chandelier, a chain with first and second ends, the first end secured to said chandelier and the second end secured to the ceiling, a light carried by said chandelier, and electrical conductors cooperatively extending along said chain, the improvement comprising: an adjustable and removable chandelier chain cover encircling said chandelier chain and said cooperating electrical conductors and extending from the ceiling to said chandelier, a longitudinal portion of fabric material encircling the chandelier chain having a predetermined length sufficient to cover entirely the chain and conductors cooperating therewith and first and second engaging edges, fastening means fixedly secured to one of said portion-engaging edges, and a strip of fastening material secured to the other of said portion-engaging edges whereby the strips of fastening material engage each other when the edges are joined and the portion of fabric material encircles the chandelier chain and conductors to form a tubular cover having a circular cross-section and a connecting and flexible joint.

4,954,940

## PLUG IN POWER CONVERTER STRUCTURE

Bill B. Chandler, 965 Broadview Pl., Colorado Springs, Colo. 80904, and Ramona Z. Olson, 920 N. Cedar St., Colorado Springs, Colo. 80903

Filed Oct. 14, 1988, Ser. No. 257,541

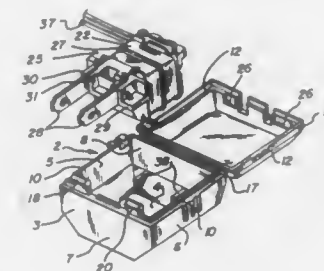
Int. Cl.<sup>3</sup> H02M 1/00

U.S. Cl. 363—146

3 Claims

1. An electrical plug comprising: a split housing forming top, bottom and wall members, latch means disposed internally of the housing for fastening the top and bottom members of the housing together, an electrical component disposed, at least partially, within

said housing and having rigid substructure means making contact with the latch means and an opposing wall mem-



ber of the housing, forming a compression brace to prevent unlocking movement of the latch means.

4,954,941

## METHOD AND APPARATUS FOR PROGRAM UPDATING

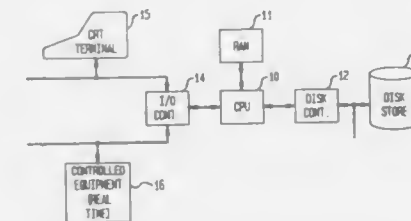
Brian E. Redman, Chatham, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Filed Aug. 31, 1988, Ser. No. 238,485

Int. Cl.<sup>3</sup> G06F 9/44

U.S. Cl. 364—200

12 Claims



1. A system for updating a programmed process in a computer comprising means for replacing the stored object code of a programmed process in the internal memory of a computer without terminating the execution of said process, and means for enabling said means for replacing said stored object code from a source outside of said process with updated object code.

4,954,942

## SOFTWARE DEBUGGING SYSTEM FOR WRITING A LOGICAL ADDRESS CONVERSION DATA INTO A TRACE MEMORY OF AN EMULATOR

Satoshi Masuda, Sayama; Ikuya Kawasaki, Tokyo, and Shigezumi Matsui, Kodaira, all of Japan, assignors to Hitachi Ltd., Tokyo, Japan

Filed Nov. 17, 1988, Ser. No. 272,757

Claims priority, application Japan, Nov. 20, 1987, 62-293809

Int. Cl.<sup>3</sup> G06F 9/455, 12/10, 11/28

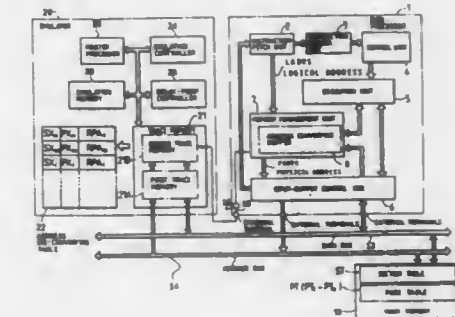
U.S. Cl. 364—200

1 Claim

1. A data processing system for debugging software, the system comprising:  
a main memory for receiving logical and physical address data;  
a data bus;  
a data processor in communication with the main memory through the data bus, said data processor including:  
(i) a memory management unit for converting logical address data to physical address data,  
(ii) a means for generating an indication signal representing an access of the main memory by the data processor

wherein, said indication signal is generated upon detection that selected logical address data is absent from the memory management unit; and an emulator in communication with an address bus, said emulator including:

- a means for storing address conversion information from the data bus,
- a means for converting physical address data to logical address data; and



an electrode means for directly transmitting the indication signal from the memory management unit of the data processor to the emulator, the indication signal enabling the emulator to access the physical address data from the address bus and permitting the storage of newly generated address conversion information in the address conversion information storing means for conversion of physical address data to logical address data by the converting means of the emulator.

4,954,943

## DATA PROCESSING SYSTEM

Ikuya Kawasaki, Kodaira; Keiichi Kurakawa, Tachikawa, and Hideo Maejima, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

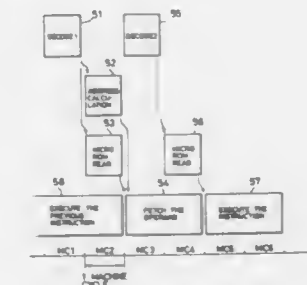
Continuation of Ser. No. 15,016, Feb. 17, 1987. This application Oct. 2, 1989, Ser. No. 415,722

Claims priority, application Japan, Feb. 26, 1986, 61-39192

Int. Cl.<sup>3</sup> G06F 9/34

U.S. Cl. 364—200

16 Claims



1. A method of controlling processing in a microprocessor having decode means for decoding at least two words of a plurality of words forming an instruction including a first word having first information for specifying an address of an operand and size information for specifying the size of said operand and a second word having an operation code, execution means for performing an operation designated by said operation code on said operand, and control means for controlling said execution means in accordance with an output of said decode means, comprising the steps of:  
(a) decoding said first information, using said decode means;

- (b) providing said operand on the basis of said size information and the decoded result produced in said step (a);  
 (c) decoding said second word, using said decode means, after said step (a) to determine an operation to be performed; and  
 (d) processing said operand using said execution means in accordance with the operation determined in said step (c).

4,954,944

# CACHE CONTROL CIRCUIT IN CACHE MEMORY UNIT WITH UNIT FOR ENABLING TO REDUCE A READ ACCESS TIME FOR CACHE MEMORY

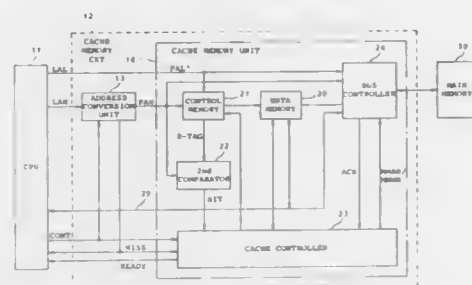
Sadanobu Ikeda, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Apr. 22, 1988, Ser. No. 184,912

Claims priority, application Japan, Apr. 23, 1987, 62-98564  
 Int. Cl.<sup>5</sup> G06F 13/00

U.S. Cl. 364-200

5 Claims



1. In a cache control circuit in a cache memory unit for use in cooperation with a main memory, a request source, and an address conversion unit, said request source producing a control signal comprising a read/write request together with a logical address comprising a first logical address portion and a second logical address portion,

said address conversion unit converting said first logical address portion into a first physical address portion corresponding to said first logical address portion to produce said first physical address portion as a converted address signal at an output terminal when said address conversion unit has said first physical address portion corresponding to said first logical address portion,

said address conversion unit producing a mismatch signal when said address conversion unit has no first physical address portion corresponding to said first logical address portion,

said mismatch signal being delivered to said cache control circuit and said request source at a predetermined time duration after reception of said control signal,

said request source deciding that said read/write request is invalid upon reception of said mismatch signal, said second logical address portion being directly applied to said cache memory unit as a second physical address portion without conversion,

said cache memory unit comprising data memory means for temporarily holding a data block of data in said main memory which is currently used by said request source, control memory means for holding pairs of address tags and data memory addresses of said data block held in said data memory means, said control memory means being responsive to said second physical address portion producing one pair of said pairs of said address tags and said data memory addresses which correspond to said second physical address portion as a read address tag and a read data memory address, and comparing means coupled with said output terminal of said address conversion unit for comparing said read address tag with said converted output signal at said output terminal to deliver a hit signal to said cache control circuit when said read address tag is in conformity with said converted output signal, said cache control circuit receiving said control signal, said

cache control circuit producing a read access signal for carrying out a read operation for said data memory means with use of said read data memory address when said read/write request of said control signal is a read request, said cache control circuit comprising:

decoding means responsive to said control signal for decoding said control signal to extract said read request to produce a read request signal, said decoding means producing a start signal on reception of said control signal;

timing generator means coupled to said decoding means and responsive to said start signal for sequentially generating timing signals at predetermined intervals; and means coupled with said decoding means and said timing generator means for producing said read access signal to said data memory means upon reception of both of said read request signal and a first one of said timing signals which is initially produced from said timing generator means, whereby a read operation for said data memory means starts without relation to said hit signal and said mismatch signal.

4,954,945

# PROCESSOR-SELECTION SYSTEM

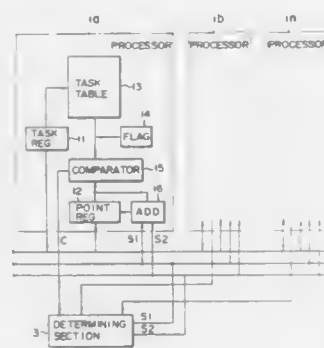
Atsushi Inoue, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 5, 1987, Ser. No. 22,087

Claims priority, application Japan, Mar. 29, 1986, 61-72110  
 Int. Cl.<sup>5</sup> G06F 15/16, 9/40

U.S. Cl. 364-200

3 Claims



1. A processor-selection system comprising:

a plurality of processors connected to each other via bus lines, and capable of processing various tasks, said plurality of processors each having a predetermined performance level, generating a task-processing request together with the performance level to the other processors, and responsive to the other task-processing request from the other processors, to output a task-enable signal; and

processor determining means connected to the processors, for receiving the task-enable signal and determining which one of said processors is available for executing a requested task in accordance with the performance level, in response to the task-enable signal from at least one of said processors, and for outputting a level-changing signal for changing a requested task-processing performance level, in response to said processing-enable signal which is selectively output from said processor; and said processing includes means for changing said task-processing performance level, in response to said level-changing signal and wherein said processor-determining means is comprised of means for determining whether or not the number of available processors is 1, 0, or more than 2, by way of a processing-enable signal from the processor, and for outputting a corresponding determining signal; and said level-changing means has a function of lowering the

processing performance level for the requested task, in response to the determining signal representing "0", and of raising the processing performance level for the requested task, in response to the determining signal representing more than 2; and

wherein said processors each comprise means for outputting information representing a type of a task to be processed and the performance level; a task table for storing information representing various types of tasks and performance levels required for task processing; flag-storing means for storing a flag showing whether or not the task is now being processed; and means for determining, from the information of said task table and said flag, whether or not a task requested can be performed by another processor, and for outputting, when said task can be performed by another processor, a corresponding processing-enable signal to said processor-determining means;

4,954,946

# APPARATUS AND METHOD FOR PROVIDING DISTRIBUTION CONTROL IN A MAIN MEMORY UNIT OF A DATA PROCESSING SYSTEM

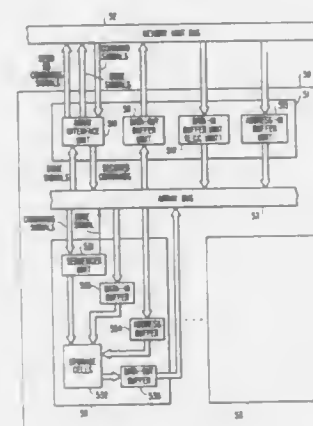
Paul J. Natmach, Westford; Eugene L. Yu, Groton; David C. Senerchia, Shrewsbury, and John F. Henry, Jr., deceased, late of Townsend, all of Mass. (by Beverly A. Henry, administratrix), assignors to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 823,687, Jan. 26, 1986, abandoned. This application Dec. 21, 1989, Ser. No. 453,088

Int. Cl.<sup>5</sup> G06F 13/00

U.S. Cl. 364-200

7 Claims



1. A memory board for use in a memory subsystem of a data processing system, said memory subsystem performing memory operations, such as reading and writing, and including a memory unit bus coupled to said memory board and to at least one additional memory board, and said memory board comprising:

a plurality of storage cell array means for storing data signal groups;

array bus means, coupled to each of said storage cell array means, for transferring signals with each of said storage cell array means;

a plurality of sequencer means, each being coupled to said array bus means and to a corresponding one of said storage cell array means, for controlling the memory operations of the corresponding one of said storage cell array means and for placing onto said array bus means done signals indicating the impending completion of a current one of said memory operations; and

interface means, coupled to said array bus means, for combining said done signals from said plurality of sequencer means into a ready/done signal prior to the time when said storage cell array means have completed their current memory operations and for applying said ready/done

signal and a second signal to said memory unit bus, said second signal indicating that said memory board can process no commands.

4,954,947

# INSTRUCTION PROCESSOR FOR PROCESSING BRANCH INSTRUCTION AT HIGH SPEED

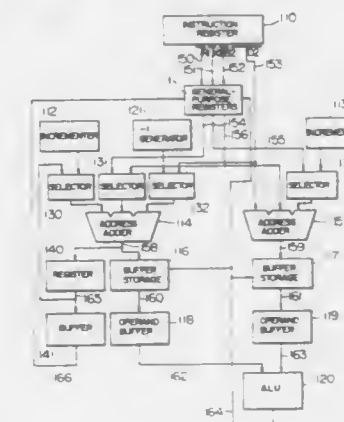
Kazumori Kuriyama, Kokubunji; Kenichi Wada, Sagami, and Akira Yamashita, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 859,901, May 5, 1986, abandoned. This application Mar. 21, 1989, Ser. No. 336,741

Claims priority, application Japan, May 7, 1985, 60-95444  
 Int. Cl.<sup>5</sup> G06F 9/30, 9/32, 9/38, 9/42

U.S. Cl. 364-200

9 Claims



3. An instruction processor for processing instructions, comprising:

(a) an instruction register for sequentially holding instructions to be processed, including operation instructions and branch instructions;

(b) a plurality of registers coupled to said instruction register for storing data;

(c) first address adder means, coupled to said instruction register and said plurality of registers and responsive to an operation instruction in the instruction register, which operation instruction requires execution of an operation on a storage operand, for adding a first group of plural data so as to generate a storage address for the storage operand, wherein the first group of plural data includes at least data provided by one of said plurality of registers designated by the operation instruction and wherein addition of the plural data is performed during a first processing stage for the operation instruction among plural processing stages into which processing of each instruction is divided;

(d) first buffer storage means coupled to said first address adder means for holding storage operands and for providing one of the storage operands required by an operation instruction in response to receipt of a generated storage address from said first address adder means during a second processing stage following said first processing stage for the operation instruction;

(e) operation means connected to receive a storage operand from said first buffer storage means for performing an arithmetic or logical operation on the storage operand during a third processing stage following said second processing stage for the operation instruction;

(f) second address adder means, coupled to said instruction register and said plurality of registers and responsive to a branch instruction in the instruction register, which branch instruction requires execution of an addition operation on data held by a first one of said plurality of registers designated by the branch instruction and fetching of a



target instruction, for adding a second group of plural data so as to generate a storage address for the target instruction, wherein the second group of plural data includes at least data provided by a second one of said plurality of registers designated by the branch instruction and wherein addition of the second group of plural data is performed in said first processing stage for the branch instruction;

- (g) second buffer storage means coupled to said second address adder means for holding instructions and for providing the target instruction in response to the storage address generated by said second address adder means, the target instruction being provided in the second processing stage of the processing of the branch instruction; and
- (h) wherein said first address adder means includes means for adding a third group of plural data including the data held by said first one of said plurality of registers designated by a branch instruction, during the first processing stage for the branch instruction simultaneously with operation of said second address adder means to generate said storage address for the target instruction and for storing data resulting from said adding in one of said plurality of registers designated by the branch instruction.

4,954,948

**MICROPROCESSOR OPERATING SYSTEM FOR SEQUENTIALLY EXECUTING SUBTASKS**

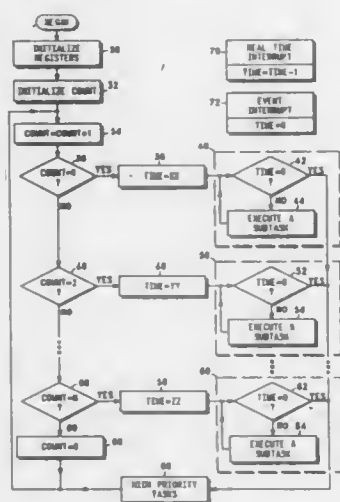
Gerald M. Hira, Chicago; Dana M. Sheahan, Deerfield; Pamela L. Wilson, Waukegan, and Michael P. Nolan, Elk Grove Village, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 947,118, Dec. 29, 1986, abandoned. This application Sep. 20, 1988, Ser. No. 246,222

Int. Cl.<sup>3</sup> G06F 9/46

U.S. Cl. 364—200

12 Claims



1. In a computing system having a program which includes N tasks, where N is two or more, each requiring periodic execution by the computer system, wherein each of the N tasks is comprised of a plurality of associated subtasks, a method for executing the tasks in an orderly fashion, comprising the steps of:

- (a) subdividing each of the n tasks into a plurality of associated subtasks and providing a time variable which is periodically updated to represent a measurement of time and providing respective predetermined time periods for the n tasks during which periods the respective tasks are designated to be executed;
- (b) setting the time variable to the predetermined time period for a first selected task;
- (c) examining the time variable to determine whether or not

the predetermined time period associated with the selected task has lapsed;

- (d) if the predetermined time period has not lapsed, executing at least one of the subtasks associated with the selected task and then proceeding to step c; and
- (e) if the predetermined time period has lapsed, executing a portion of the program other than that which is part of the N tasks, wherein said portion of program has a higher priority than each of the n tasks and then setting the time variable to the predetermined time period for another selected task;
- (f) repeating steps c through e once for each of the N-1 remaining tasks; and
- (g) thereafter, repeating steps b through f, thereby continually executing subtasks associated with each of the n tasks.

4,954,949

**UNIVERSAL CONNECTOR DEVICE FOR BUS NETWORKS IN HOST COMPUTER/CO-PROCESSOR COMPUTER SYSTEM**

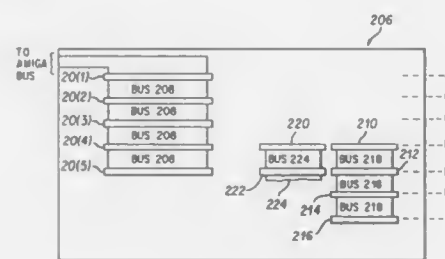
Henri Rublin, King of Prussia, Pa., assignor to Commodore-Amiga, Inc., West Chester, Pa.

Continuation of Ser. No. 152,954, Feb. 5, 1988, abandoned. This application Oct. 2, 1989, Ser. No. 415,469

Int. Cl.<sup>3</sup> G06F 13/00

U.S. Cl. 364—200

6 Claims



1. A connector device for use in communication of data between the central processing unit (CPU) bus of a host computer system which bus consists of a plurality of continuous electrical conductors and the CPU bus of a first or a second co-processor computer system which bus consists of a plurality of continuous electrical conductors, between the CPU bus of the host computer system and one or more expansion cards used with the host computer system, and between the CPU bus of the first or second co-processor computer system and one or more expansion cards used with the first or second co-processor computer system using a bridge card having a host computer system CPU bus connector and a co-processor computer system CPU bus connector, the connector device comprising:

- a plurality of host computer system expansion slots electrically coupled to the continuous electrical conductors of the CPU bus of the host computer system, each of the host computer system expansion slots extending along a first direction and being spaced from each other along a second direction;
- a first plurality of co-processor computer system expansion slots electrically coupled to the continuous electrical conductors of the CPU bus of the first co-processor computer system, each of the first plurality of co-processor computer system expansion slots extending along the first direction and being spaced from each other along the second direction, wherein the plurality of host computer system expansion slots and the first plurality of co-processor computer system expansion slots are spaced from each other in the first direction and partially offset from each other in the second direction to form an in-line pair in the first direction from at least one of the plurality of host computer system expansion slots and at least one of the first plurality of co-processor computer system expansion

slots to accept simultaneously (1) the host computer system CPU bus connector and the co-processor computer system CPU bus connector of the bridge card in the in-line pair, (2) a host computer system expansion card in a host computer system expansion slot, and (3) a co-processor computer system expansion card in a co-processor computer system expansion slot; and

- a second plurality of co-processor computer system expansion slots spaced from the first plurality of co-processor computer system expansion slots and electrically coupled to continuous electrical conductors of a CPU bus of the second co-processor computer system when used with the first plurality of co-processor computer system expansion slots wherein at least one of the plurality of host computer system expansion slots, at least one of the first plurality of co-processor computer system expansion slots, and at least one of the second plurality of co-processor computer system expansion slots form an in-line configuration in the first direction.

4,954,950

**TERMINAL COMMUNICATIONS CIRCUIT**

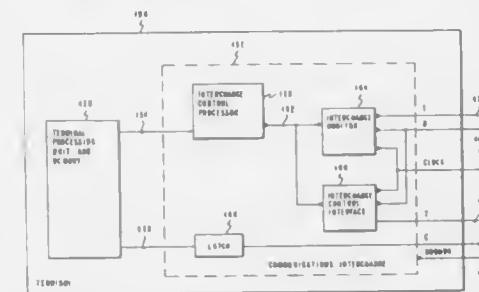
William A. Freeman, Austin; James S. Pogorzelski, Georgetown; Darryl W. Solle, and Jacqueline H. Wilson, both of Austin, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 17, 1986, Ser. No. 908,532

Int. Cl.<sup>3</sup> G06F 13/14, 13/42; H04J 3/12

U.S. Cl. 364—200

15 Claims



8. In a communications network including a network bus interconnecting a plurality of terminals, each terminal including terminal communications circuitry providing communications through a bus interface circuit to the network bus in accordance with a predetermined communications procedure including a series of communications states to be traversed for establishing communications between terminals for making outgoing or receiving incoming calls on the network bus, the terminal communications circuitry comprising:

- communications interchange means for exchanging protocol signals with said bus interface circuit, and including:
- an electrical interchange means for exchanging protocol signals on a plurality of lines of a single communications channel with the bus interface circuit and exchanging protocol control information with a physical interface means, and
- said physical interface means for interpreting said protocol control information received from said electrical interchange means to provide communications state change information to a signal state controller means, and including means for receiving a command from the signal state controller means and providing, in response thereto, an exchange of a sequence of protocol signal patterns to said electrical interchange means for traversing a plurality of said communication states; and
- said signal state controller means for executing one of a plurality of program states to control communications over said network bus in accordance with the predetermined communications procedure by providing commands to the communications interchange means in accordance with which program state the signal state controller means is currently executing in response to a request from the terminal for making an outgoing call and for changing the program state in response to communications state change information from said communications interchange means in response to incoming calls.

4,954,951

**SYSTEM AND METHOD FOR INCREASING MEMORY PERFORMANCE**

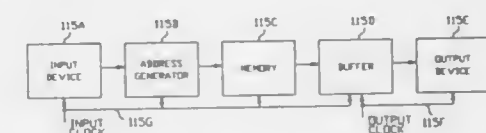
Gilbert P. Hyatt, 7841 Jennifer Cir., La Palma, Calif. 90623

Continuation of Ser. No. 279,592, Dec. 2, 1988, and a continuation-in-part of Ser. No. 848,017, Apr. 13, 1986, and Ser. No. 661,649, Oct. 17, 1984, abandoned, said Ser. No. 279,592, is a continuation-in-part of Ser. No. 849,243, Apr. 17, 1986, which is a continuation-in-part of Ser. No. 849,733, Nov. 9, 1977, abandoned, and a continuation-in-part of Ser. No. 425,731, Sep. 28, 1982, Pat. No. 4,581,715, said Ser. No. 848,017, is a continuation-in-part of Ser. No. 425,731, which is a continuation-in-part of Ser. No. 160,872, Jan. 19, 1980, Pat. No. 4,491,930, Ser. No. 860,257, Dec. 14, 1977, Pat. No. 4,371,923, Ser. No. 101,881, Dec. 28, 1970, abandoned, Ser. No. 134,958, Apr. 19, 1971, Ser. No. 135,040, Apr. 19, 1971, Ser. No. 229,213, Apr. 13, 1972, Pat. No. 3,280,894, Ser. No. 230,872, Mar. 1, 1972, Pat. No. 4,531,182, Ser. No. 232,459, Mar. 7, 1972, Pat. No. 4,370,720, Ser. No. 246,867, Apr. 24, 1972, Pat. No. 4,310,878, Ser. No. 288,247, Sep. 11, 1972, Pat. No. 4,121,284, Ser. No. 291,394, Sep. 22, 1972, Pat. No. 4,396,976, Ser. No. 302,771, Nov. 1, 1972, Ser. No. 325,933, Jan. 22, 1973, Pat. No. 4,016,540, Ser. No. 325,941, Jan. 22, 1973, Pat. No. 4,060,848, Ser. No. 366,714, Jan. 4, 1973, Pat. No. 3,986,922, Ser. No. 339,817, Mar. 9, 1973, Pat. No. 4,034,276, Ser. No. 402,520, Oct. 1, 1973, Pat. No. 4,825,364, Ser. No. 490,816, Jul. 22, 1974, Pat. No. 4,029,853, Ser. No. 476,743, Jun. 5, 1974, Pat. No. 4,364,110, Ser. No. 522,559, Nov. 11, 1974, Pat. No. 4,209,852, Ser. No. 550,231, Feb. 14, 1975, Pat. No. 4,209,843, Ser. No. 727,330, Sep. 27, 1976, abandoned, Ser. No. 730,756, Oct. 7, 1976, abandoned, Ser. No. 754,660, Dec. 27, 1986, Pat. No. 4,486,850. This application Dec. 13, 1988, Ser. No. 283,661

Int. Cl.<sup>3</sup> G06F 12/00

U.S. Cl. 364—200

96 Claims



1. A memory system comprising:

- a memory storing data;
- an address generator circuit generating an address having less significant bits and more significant bits;
- an accessing circuit coupled to the memory and to the address generator circuit and accessing data stored by the memory in response to the address;
- a processor coupled to the accessing circuit and processing data accessed by the accessing circuit;
- a detector circuit coupled to the address generator circuit and generating a detector signal in response to detection of a change in the more significant bits of the address generated by the address generator circuit; and
- a delaying circuit coupled to the address generator circuit and to the detector circuit and delaying generating of the address by the address generator circuit in response to the detector signal.

4,954,952

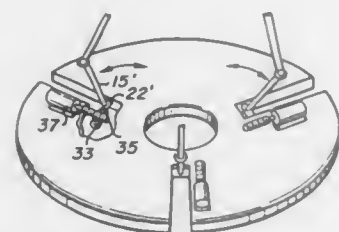
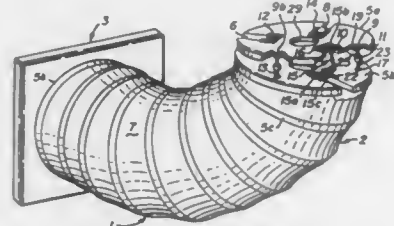
## ROBOTIC ARM SYSTEMS

Shivadev K. Ubhayakar, and Robert D. Baker, both of Rancho Palos Verdes, Calif., assignors to TRW Inc., Redondo Beach, Calif.

Division of Ser. No. 156,388, Feb. 16, 1988. This application Oct. 2, 1989, Ser. No. 401,338  
Int. Cl. A61F 1/00

U.S. Cl. 364-513

5 Claims



1. In a robotic arm system containing at least one multisection robotic arm each of which arms contain a plurality of spaced platforms and in which at least three actuators are carried between each pair of platforms for positioning one platform relative to the paired platform, whereby the positioning of arm section is selectively changed through energization of the actuators, and control means for selectively energizing said actuators, the improvement comprising in combination therewith:

programmed processor means;  
input means for inputting information into said processor means;  
said processor means for receiving position information from said input means, calculating actuator displacements to achieve a position for said arm represented by said input information and generating a control signal for causing the actuator to attain the calculated position.

4,954,953

MACHINE PROCESS FOR CONVERTING ONE REPRESENTATION OF AN ELECTRONIC INTEGRATED CIRCUIT INTO ANOTHER REPRESENTATION  
Steve Bush, Mountain View, Calif., assignor to VLSI Technology, Inc., San Jose, Calif.

Filed Apr. 7, 1988, Ser. No. 178,574

Int. Cl. G06F 15/20, 15/60

U.S. Cl. 364-578

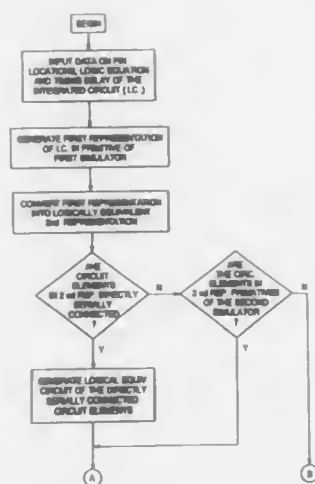
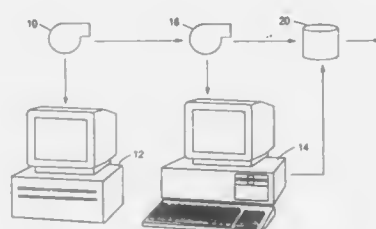
6 Claims

MICROFICHE APPENDIX INCLUDED  
(2 Microfiche, 196 Pages)

1. A machine process for converting a behavioral representation of an electronic integrated circuit from one form to another form; said behavioral representation of the electronic integrated circuit, in one form, has a plurality of inputs and a plurality of outputs, and a plurality of nodes interconnecting a plurality of logical elements, which are in the primitives of a first simulator; said behavioral representation in another form is generated for further processing by a second simulator and is in the primitives and in the syntax of the second simulator; said

machine process being implemented by the use of a programmed digital computer having stored therein a program; said method comprising the steps of:

- inputting data on pin locations, logic equation and timing delays from said inputs to said outputs of said electronic integrated circuit, into said program;
- generating a first representation of said electronic integrated circuit based upon said data on said pin locations, logic equation and timing delays, said first representation having a plurality of nodes interconnecting a plurality of first electronic logic circuit elements, each of said elements is a primitive of said first simulator;
- converting said first representation into a second representation, which is a logical equivalent of said first representation, in accordance with the rules of boolean algebra, and in accordance with the following:



- changing representations of all directly serially connected first electronic logic circuit elements into a representation of a second electronic logic circuit element;
- changing said first electronic logic circuit elements into electronic logic circuit elements of said second representation, which are primitives of said second simulation program, but which are not directly serially connected primitives;
- determining the timing delay for each electronic logic circuit element of said second representation;
- converting said second representation into a third representation by converting all of the electronic logic circuit elements of said second representation into primitives of said second simulation program; and
- generating said third representation in the syntax of said second simulation program for further processing by said second simulation program.

4,954,954

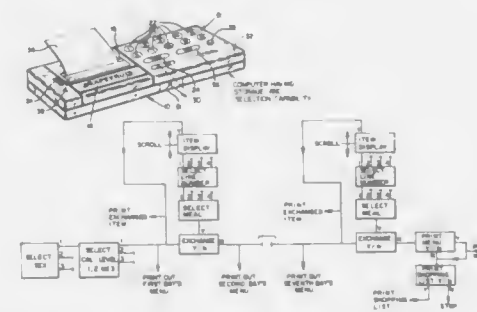
## APPARATUS FOR GENERATING A BALANCED CALORICALLY LIMITED MENU

Lamar R. Madsen, 1570 East Ave., Vernonia, Oreg. 97064, and Maki Myoga, 7610 SW. Lealie St., Portland, Oreg. 97223  
Filed Aug. 26, 1985, Ser. No. 769,353

Int. Cl. G06F 9/00

U.S. Cl. 364-413.29

3 Claims



- An electronic digital computer for preparing a balanced calorically limited diet, said calculator comprising:
  - a memory from which data can be retrieved, said memory having stored therein a list of food items, the caloric content of each of said items, in which of a selected number of food groups each of said items resides and the applicability of each of said items for a particular meal;
  - means for generating a daily menu for a selected period of time from said items in said list with each meal in said menu only having foods which are applicable for the meal, which are from particular predetermined ones of said food groups and which have particular caloric content; and
  - means for replacing items in each meal on said menu, with each replacement item being applicable to the same meal, being in the same food group, and having the same caloric content as the item it replaced.

4,954,955

## MEANS AND METHOD FOR ELECTRONIC CODING OF IDEOGRAPHIC CHARACTERS

Andrew Chiu, Scarborough, Canada, assignor to Brushwriter Corporation PTE Ltd., Scarborough, Canada

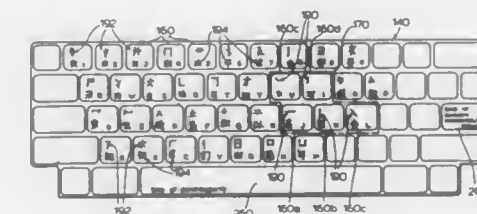
Filed Jul. 14, 1987, Ser. No. 74,999

Claims priority, application Canada, Aug. 18, 1986, 516180

Int. Cl. B41J 5/10

U.S. Cl. 364-419

54 Claims



- An input apparatus for entering ideographic characters of an ideographic written language into a system, each ideographic character being formed by certain basic written strokes and/or certain written radicals themselves composed of said strokes, said apparatus comprising:  
keyboard means having a plurality of entry keys thereon, for representing stroke identification indicia, radicals and complete ideographic characters each said key being operable to produce a unique signal according to the actuation thereof,

in a first form, said signal representing one of the group of:  
a. one of a plurality of stroke identification indicia; and  
b. one of a plurality of radicals frequently used in said language;

and, in a second form, said signal representing a complete ideographic character frequently used in said language; said strokes being divided into a plurality of distinct groups with each group assigned one of said stroke identification indicia whereby a given stroke is represented by the assigned stroke identification index, said stroke identification indicia being present in sufficient number and variety to allow any ideographic character to be represented by a series of stroke identification indicia;  
said keyboard means also having a first selection key operable to produce a unique signal to identify a series of entry key actuations as being in said first form representing a complete ideographic character, and a second selection key operable to produce a unique signal to identify an entry key actuation as being in said second form representing a complete ideographic character; and,  
interpreter means connected to receive said signals from said keyboard means, said interpreter means being responsive to sequential actuation of said entry keys and said first and second selection keys to generate code signals representing said ideographic characters to be entered.

4,954,956

## DATA PROCESSING APPARATUS HAVING FUNCTION OF PROVIDING HELPFUL INFORMATION AFTER EXCESSIVE TIME LAPSE FROM LAST INPUT OPERATION

Kiyoshi Yamakawa, Gifu; Yoshio Suglura, Aichi, and Satoru Tsuraki, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

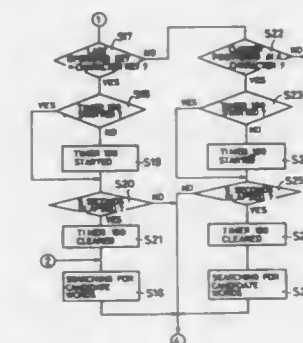
Filed Dec. 10, 1987, Ser. No. 131,405

Claims priority, application Japan, Dec. 13, 1986, 61-297013

Int. Cl. G06F 9/00

U.S. Cl. 364-419

18 Claims



- A data processing apparatus comprising:  
a dictionary memory storing word data representative of a multiplicity of words;  
input means including an input device which is capable of entering document data including word data representative of a plurality of words each consisting of at least one character and word separation data indicative of termination of entry of each of said plurality of words;  
time-measuring means connected to said input means, for measuring a predetermined time duration during which a data entry operation through said input means is interrupted, said time-measuring means measuring said predetermined time duration while said data entry operation through said input means is possible; and  
informing means responsive to said time-measuring means, for providing related word or character information associated with said data entry operation interrupted and



helpful in resuming the interrupted data entry operation, without an operation through said input means by an operator, when said time-measuring means has measured said predetermined time duration.

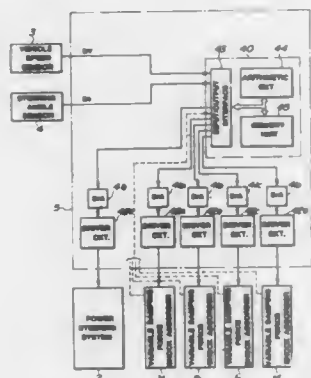
**4,954,957**  
**CONTROL SYSTEM FOR ADAPTING SUSPENSION CHARACTERISTICS AND STEERING CHARACTERISTICS TO VEHICLE DRIVING CONDITION**

Kenji Kawagoe; Hideo Ito, and Masatsugu Yokote, all of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Jan. 23, 1989, Ser. No. 301,526  
Claims priority, application Japan, Jan. 25, 1988, 63-14127  
Int. Cl.<sup>3</sup> B60G 17/00; B62D 5/00

U.S. Cl. 364-424.05

8 Claims



1. A control system for controlling an automotive suspension system and a power steering system in combination, comprising:

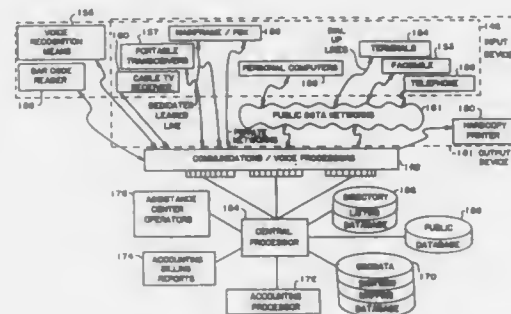
- first sensor means for monitoring a vehicular speed for producing a vehicular speed signal;
- second sensor means for monitoring steering angular displacement for producing a steering angle signal indicative of offset from a neutral position;
- third means, associated with said suspension system for controlling suspension characteristics at least between a first softer suspension mode and a second harder suspension mode on the basis of said vehicle speed signal and said steering angle signal, said third means alters said suspension control characteristics at least between a first suspension control characteristics mode having lower responsive characteristics and a second suspension control characteristics mode having higher response characteristics;
- fourth means, associated with said power steering system, for controlling assisting force to be distributed in said power steering system at least between a first smaller assisting force mode and a second greater assisting force mode on the basis of said vehicle speed signal, said fourth means alters the assisting force control characteristics at least between a first assisting force control characteristics mode having lower responsive characteristics and a second assisting force control characteristics mode having higher response characteristics;
- fifth means for detecting steering operation pattern matching with a preset reference pattern and counting up the occurrence of the steering operation pattern matching said preset pattern; and
- sixth means, periodically operable, for detecting vehicular driving condition on the basis of said vehicle speed signal, said counted value of said fifth means representative of frequency of occurrence of steering behaviour matching with said preset pattern, for setting one of said control

characteristics modes correspond to said third and fourth means depending upon said vehicle driving condition.

**4,954,958**  
**DIRECTIONAL INFORMATION SYSTEM**  
Charles Savage, Chester; Frank G. Barone, Jr., Florida; Gregory Demetrious, Chester, all of N.Y., and Vincent Volpe, Hawthorth, N.J., assignors to Hacowie Corporation, Monroe, N.Y.  
Filed Aug. 19, 1988, Ser. No. 234,264  
Int. Cl.<sup>3</sup> G06F 15/50

U.S. Cl. 364-444

15 Claims



1. A system for providing routing directions for travel between locations, comprising:

- data entry means for supplying first identification number data corresponding to a first location and for entering request data comprising a request for directions, said request data including second identification number data corresponding to a second location;
- a data processing system, for receiving data from said data entry means, said system including:
  - (a) a first data base comprising data correlating identification numbers to geographic locations;
  - (b) a second data base comprising geographic location data and route data;
  - (c) a direction generating program for generating routing data using supplied location data and said second data base and
  - (d) an operating program for obtaining location data corresponding to said first and second identification numbers from said first data base, for supplying said location data to said direction generating program and for obtaining said routing data;
- and routing direction output means for supplying user understandable routing directions in response to said routing data.

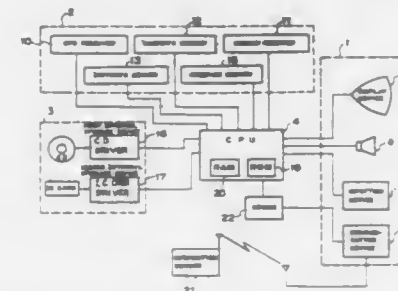
**4,954,959**  
**NAVIGATION SYSTEM**  
Shuzo Moroto; Masao Kawai; Shoji Yokoyama; Koji Kobayashi, and Koji Sumiya, all of Anjo, Japan, assignors to Aisin A W Co. Ltd., Anjo and Kabushiki Kaisha Shinsangyokaihatu, Toyko, both of Japan  
Filed Dec. 27, 1988, Ser. No. 290,204  
Claims priority, application Japan, Mar. 2, 1988, 63-49965  
Int. Cl.<sup>3</sup> G06F 15/50

U.S. Cl. 364-449

17 Claims

- 15. A navigation system for a vehicle comprising:
  - input means for inputting a starting point and destination;
  - a present position means for determining a present position of said vehicle;
  - a first external storage means for storing first guidance data including road and intersection data;
  - a second external storage means for storing second guidance data; said second guidance data being linked to said first guidance data and including more detailed road and inter-

section data associated with a smaller geographic area when compared to said guidance data; output means for outputting guidance information, including a display means for displaying visual information; and CPU means for receiving said first and second guidance data



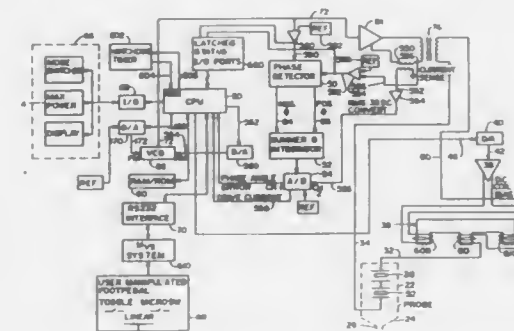
from said first and second external storage means, setting a guide route based on said starting point and said destination including supplementing said first guidance data by said second guidance data, and outputting said guide route as said guidance information together with said present position data via said output means.

**4,954,960**  
**LINEAR POWER CONTROL FOR ULTRASONIC PROBE WITH TUNED REACTANCE**  
Ying-Ching Lo, Fremont; Samuel Zambre, Palo Alto, and Tolentino Escorcia, San Leandro, all of Calif., assignors to Alcon Laboratories, Fort Worth, Tex.

Continuation-in-part of Ser. No. 928,235, Nov. 7, 1986. This application Apr. 6, 1987, Ser. No. 35,128  
Int. Cl.<sup>3</sup> G01H 13/00, 15/00

U.S. Cl. 364-484

7 Claims



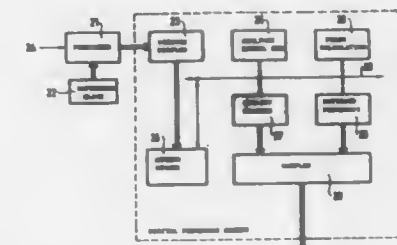
- 1. A method of driving an ultrasonically driven probe having an electronically tunable reactance coupled to said probe comprising the steps of:
  - generating a driving signal having a frequency within a band of frequencies encompassing the mechanical resonance frequency of said probe;
  - measuring the relative amount of drive current to said probe resulting from said drive signal at said frequency;
  - comparing said drive current to a variable which is updated to store the value of the highest drive current at any other drive frequency in said band of frequencies;
  - if said drive current is higher than said variable, updating the value of said variable with the value of said drive current and recording the frequency of said driving signal that resulted in said new highest drive current;
  - adjusting the frequency of said driving signal to a new frequency in the band of frequencies and repeating the above steps for the new frequency; and
  - repeating the step next above until all frequencies in the band

of frequencies have been generated and the resulting drive currents measured; setting the frequency of said driving signal to the frequency in said band of frequencies which resulted in the highest drive current; measuring the phase angle between said drive current and the driving signal voltage at said frequency which resulted in said highest drive current and comparing said phase angle to a selected margin defining a range of acceptable phase angles; if said phase angle is outside the range of acceptable phase angles, electronically tuning said reactance to a new value and measuring said phase angle again and comparing said phase angle to said acceptable range of phase angles; repeating the step next above until said phase angle is within said acceptable range.

**4,954,961**  
**METHOD OF DIGITALLY EVALUATING THE FREQUENCY AND THE PHASE OF SIGNALS, AND A DEVICE FOR IMPLEMENTING SUCH A METHOD**  
Sylvain Fontanes, Chatou; Patrice Birot, Courbevoie; André Marguinand, Palaiseau, France; Thierry Quigou, Nanterre, and Brigitte Romann, Boulogne Billancourt, all of France, assignors to Alcatel Espace, Courbevoie, France  
Filed May 23, 1988, Ser. No. 197,251  
Claims priority, application France, May 21, 1987, 87 07130  
Int. Cl.<sup>3</sup> G01R 23/00

U.S. Cl. 364-484

4 Claims



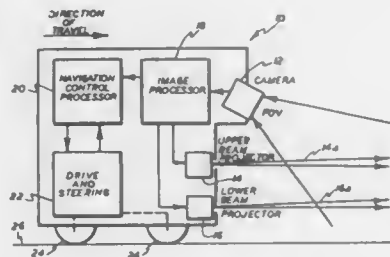
- 1. A method of digitally evaluating at least one desired parameter of an input signal, said input signal being in the form of digitized samples having sample values, wherein the method comprises the steps of:
  - deriving an analytic signal from said sample values, said analytic signal having a real portion which coincides with said digitized samples;
  - calculating, in accordance with said sample values, phase values corresponding to the phase of said input signal;
  - estimating said desired parameter by operating on said phase values without using any operator of the Fourier transform type or any hypothesis test either separately or simultaneously; and
  - estimating the differences between the real signal as taken in this way and the signal obtained from the estimated parameter, thereby making it possible to deliver data in digital form relating to the quality of the analyzed signal and to the reliability of the estimated values.

4,954,962

VISUAL NAVIGATION AND OBSTACLE AVOIDANCE  
STRUCTURED LIGHT SYSTEMJohn M. Evans, Jr., Brookfield; Carl F. R. Weiman, Westport,  
and Steven J. King, Woodbury, all of Conn., assignors to  
Transitions Research Corporation, Danbury, Conn.  
Filed Sep. 6, 1988, Ser. No. 241,059  
Int. Cl.<sup>3</sup> G06F 15/00

U.S. Cl. 364—513

33 Claims



1. Object detection apparatus carried by a vehicle which moves over a surface, comprising:  
means for emitting at least one structured, substantially planar beam of light in a direction of travel of the vehicle, the beam being oriented for forming a substantially stripe-like pattern upon a surface disposed generally in the direction of travel of the vehicle;  
means for imaging at least a portion of the planar beam of light which is reflected from at least one surface disposed within a region through which the vehicle is to travel;  
means for associating the imaged reflection of the beam of light with at least a range and a bearing, relative to the vehicle, of the surface reflecting the planar beam of light; and  
means, coupled to an output of said associating means, for determining vehicle navigation-related information as a function of the range and bearing to the surface.

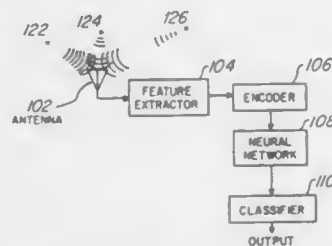
4,954,963

## NEURAL NETWORK AND SYSTEM

Perry A. Penz, and Michael T. Gately, both of Richardson, Tex.,  
assignors to Texas Instruments Incorporated, Dallas, Tex.  
Filed Mar. 2, 1989, Ser. No. 318,038  
Int. Cl.<sup>3</sup> G06F 15/18

U.S. Cl. 364—513

7 Claims



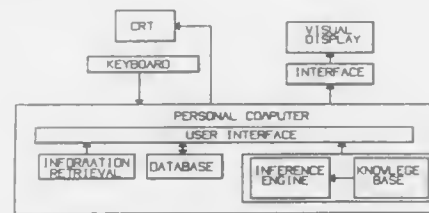
1. An information processor, comprising:  
(a) an encoder, said encoder encoding input information into a closeness code format and providing an output in response thereto; and  
(b) a clustering neural network providing an output therefrom, said clustering neural network having an input receiving said output of said encoder and said output of said clustering neural network, said clustering neural network clustering said input thereto with thresholded analog neurons in conjunction with a learning rule and a recall rule to preserve analog aspects.

4,954,964

APPARATUS AND METHOD FOR EXPERT ANALYSIS  
OF METAL FAILURE WITH AUTOMATED VISUAL  
AIDEGurvinder P. Singh, 9303 Lockridge, San Antonio, Tex. 78250  
Filed Nov. 9, 1988, Ser. No. 268,846  
Int. Cl.<sup>3</sup> G06F 15/18

U.S. Cl. 364—513

13 Claims



1. A digital processing system with expert system metal failure analysis, said system comprising  
a digital data processing device;  
data storage means an electrical communication with said digital data processing device;  
knowledge base means carried on said data storage means for identifying a possible mode of failure;  
input means in an electrical communication with the digital data processing device;  
output means in electrical communication with said digital data processing device;  
visual display means for displaying macroscopic or microscopic views of selected metal failures, said visual display means being in electrical communication with said digital data processing device;  
expert system means controlling the digital data processing device for requesting and receiving information from a user while displaying at least one of said selected views on the visual display means, said view being associated with at least some of the requests for information;  
program means for receiving responses from the user through the input device;  
inference engine means for logically correlating said received information with said knowledge base to isolate possible failure modes; and  
incident file means carried on said storage means for retaining a record of the information requested and received from the user.

4,954,965

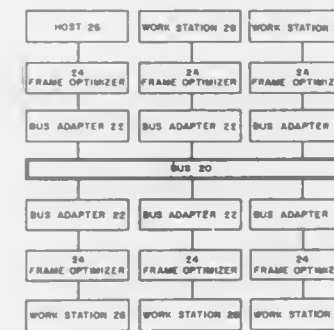
ENHANCED FRAME UTILIZATION FOR CSMA/CD  
COMMUNICATION PROTOCOLJohn M. Johnson, Byron; James A. Locke, Rochester, both of Minn., and Divakara K. R. Udupa, Durham, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.  
Filed Feb. 9, 1989, Ser. No. 308,852  
Int. Cl.<sup>3</sup> G06K 15/00; H04L 11/00

U.S. Cl. 364—514

11 Claims

1. A device for transferring data between nodes coupled to a network having a carrier sense multiple access/collision detect protocol for such data transfer, the device at each node comprising:  
means for identifying data records to be transferred to another node;  
means coupled to the identifying means for generating frames containing data from the data records to be transmitted;  
means coupled to the frame generating means for determining when data from a single record is put into more than one different frame to be transmitted;  
means coupled to the frame generating means for inserting in

said frames indications to identify the different frames which contain data from the single record;  
means coupled to said frame generating means for inserting



in said frames indications to differentiate between data records contained in the same frame; and  
means coupled to the identifying means for transmitting said frames to the other node.

4,954,966

TERMINAL WITH VIEWPORTS, AUXILIARY DEVICE  
ATTACHMENT, AND HOST-TERMINAL FAN  
CONTROL

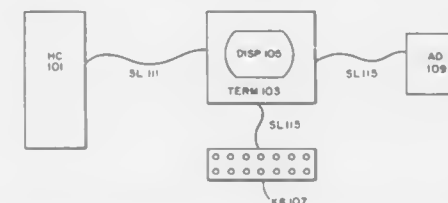
Robery C. Mooney, Melrose, and Richard J. Peirent, Tewksbury, both of Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.

Filed Sep. 12, 1986, Ser. No. 907,294

Int. Cl.<sup>3</sup> G06F 3/037

U.S. Cl. 364—518

33 Claims



4. In display apparatus having both a display memory divisible into display positions and an output device for outputting a display divisible into display lines,  
means for defining the display comprising:  
means for defining a page, the page including a specified set of the display positions;  
means for defining a viewport on the output device, the viewport including a specified set of the display lines;  
correspondence establishing means for establishing a correspondence between a member of the set of display positions and a member of the set of display lines; and  
means for outputting on each display line the contents of any corresponding display positions and when the correspondence establishing means has established no correspondence between any member of the set of display positions and a given member of the set of display lines, outputting certain display data on the given display line, whereby no correspondence is required between a set of display positions and a member of the set of display lines, permitting the page and the viewport to be defined independently of each other.

4,954,967

## INFORMATION PROCESSING APPARATUS

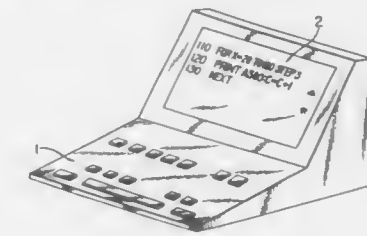
Hiroshi Takahashi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 20, 1989, Ser. No. 455,908

Claims priority, application Japan, Sep. 21, 1983, 58-173155  
Int. Cl.<sup>3</sup> G06F 15/40

U.S. Cl. 364—518

19 Claims



1. An electronic apparatus comprising:  
display means having a display screen for displaying data;  
scrolling means for scrolling said data displayed on said display means in a predetermined direction;  
transparent coordinate input means superimposed on said display screen of said display means for receiving input data;  
determination means, responsive to actuation of a predetermined position on said transparent coordinate input means, for determining a direction of movement of the data to be scrolled by said scrolling means and for determining a distance of movement of the data to be scrolled by said scrolling means based upon the input data received by said transparent coordinate input means in accordance with variation of the coordinate corresponding to actuation of the position on said coordinate input means; and  
control means for inhibiting said scrolling means from scrolling when the scroll direction determined by said determination means is different from said predetermined direction.

4,954,968

## INTERFACE SYSTEM FOR PRINT SYSTEM

Ikunori Yamaguchi; Kiyoshi Emori, and Takashi Morikawa, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 15, 1989, Ser. No. 322,933

Claims priority, application Japan, Mar. 16, 1988, 63-62244; Mar. 17, 1988, 63-64886

Int. Cl.<sup>3</sup> G06F 7/00

U.S. Cl. 364—519

31 Claims

1. In an interface system for receiving from a host computer a series of dot data as print information, and converting the received data to dot information and for providing the same to a printing system, said interface system comprising:  
first memory means for storing dot information as column vectors obtained by matrix-transposing row vectors of several series of dot data in advance;  
second memory means for storing dot information to be printed over a predetermined print area;



31. A system for testing the tightness of a fluid tank having

a fill pipe to determine the rate of leakage therefrom, said system including:

- (a) means to circulate a fluid in said tank to equalize the temperature thereof;
- (b) means to stabilize the shape of said tank;
- (c) means to measure the change in temperature of the fluid in said tank;
- (d) means to determine the coefficient of expansion of the fluid in said tank;
- (e) means to determine if any fluid has leaked from said tank to provide the rate of leakage;
- (f) said means to stabilize the shape of the tank includes means to establish and maintain a constant static fluid head in communication with the fluid in said tank;
- (g) said means to establish and maintain a constant static fluid head includes:
  - (1) a standtube in fluid communication with said tank;
  - (2) means to measure the fluid added to or removed from said standtube to maintain said static fluid head constant; and,
  - (3) a small granduated cylinder in fluid communication with said standtube;
- (h) said means to circulate a fluid in said tank includes:
  - (1) a probe assembly insertable into said tank through the fill pipe thereof;
  - (2) a pump connected to said probe assembly; and,
  - (3) said pump having an inlet and an outlet connected to said probe assembly;
- (i) said probe assembly includes:
  - (1) an inlet tube; and,
  - (2) a discharge tube disposed coaxially inside said inlet tube;
- (j) said discharge tube is disposed proximate the bottom of said tank and has a discharge nozzle proximate the end thereof, directed at approximately a 45 degree angle from the bottom of the tank to be tested;
- (k) said probe assembly has a seal adaptor disposed proximate the top thereof to seal the probe assembly into said fill pipe;
- (l) a system controller;
- (m) a power supply connected to said system controller;
- (n) a metering system connected to said power supply and said system controller;
- (o) a level sensor system connected to said system controller;
- (p) a temperature sensor system connected to said system controller;
- (q) said system controller further includes:
  - (1) a microprocessor and an analog-to-digital converter connected to said power supply;
  - (2) a level detector connected to said power supply;
  - (3) a human interface connected to said power supply; and,
  - (4) a printer interface and printer mechanism connected to said power supply;
- (r) said power supply further includes:
  - (1) a first power supply and a second power supply connected to said microprocessor and analog-to-digital converter;
  - (2) a third power supply connected to said level detector;
  - (3) a fourth power supply connected to said human interface;
  - (4) a fifth power supply connected to said metering system;
  - (5) a sixth power supply connected to said printer interface and printer mechanism; and
  - (6) a seventh power supply connected to said level detector;
- (s) said means to establish and maintain a constant static fluid head includes:
  - (1) the metering system connected to said level detector and said fifth power supply; and,
  - (2) the level sensor system connected to said level detector;

- (t) said microprocessor and analog-to-digital converter further includes:
  - (1) a control bus;
  - (2) a data bus;
  - (3) a microcontroller connected to said data bus; and,
  - (4) a 17-bit analog-to-digital converter connected to said microcontroller, said control bus and said data bus;
- (u) said level sensor means further includes:
  - (1) an upper level sensor; and,
  - (2) a lower level sensor; and,
- (v) said level sensor means further includes:
  - (1) a sine wave oscillator having an output, said output connected to said upper level sensor and said lower level sensor;
  - (2) a test phase switch having at least a third position and a fourth position, said third position being connected to said upper level sensor and said fourth position being connected to said level sensor;
  - (3) a sensor operational amplifier being connected to a center tap of said test phase switch;
  - (4) a phase discriminator having inputs and a high and lower output, the inputs of said phase discriminator being connected to said sensor operational amplifier and said sine wave oscillator;
  - (5) a first noise reduction circuit connected to the high output of said phase discriminator;
  - (6) a first operation amplifier connected to said first noise reduction circuit;
  - (7) a second noise reduction circuit connected to the low output of said phase discriminator; and,
  - (8) a second operational amplifier connected to said second noise reduction circuit.

4,954,974

## TURBINE ENGINE FAN SPEED MONITOR

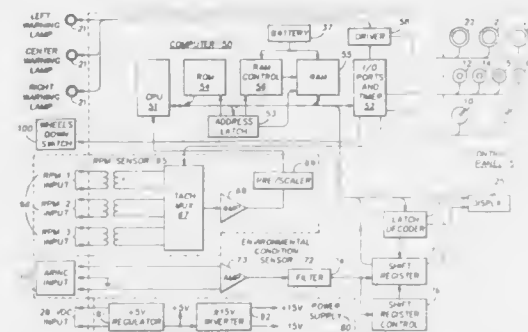
John S. Howell, IV, Warson Woods, Mo.; Kenneth P. Widner, and Gary D. Guenther, both of Fort Worth, Tex., assignors to Howell Instruments, Inc., Fort Worth, Tex.

Filed Dec. 15, 1988, Ser. No. 284,710

Int. Cl.<sup>5</sup> G08B 21/00

U.S. Cl. 364—551.01

15 Claims



1. A turbine fan speed monitor for use with at least one aircraft engine having a rotating turbine fan with a variable overspeed limit value comprising:
  - an RPM sensor for continually detecting actual fan rotational speeds of at least one aircraft engine;
  - an environmental condition sensor for continually detecting environmental data defining at least total air temperature, pressure altitude and altitude rate; and
  - a computer, electrically connected to the RPM sensor and the environmental condition sensor, for recording the actual fan speeds, for recording the environmental data, for determining overspeed limit values for each monitored aircraft engine as a function of the environmental data, and for comparing the overspeed limit values with the actual fan rotation speeds, the computer including memory means for recording at least the frequency of the

actual fan speeds exceeding the overspeed limit values for each monitored engine.

4,954,975

## WEIGH FEEDING SYSTEM WITH SELF-TUNING STOCHASTIC CONTROL AND WEIGHT AND ACTUATOR MEASUREMENTS

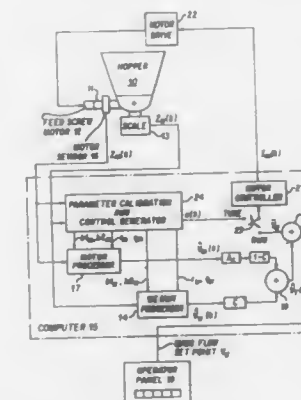
Paul R. Kalata, Cherry Hill, N.J., assignor to K-Tron International, Inc., Pitman, N.J.

Filed Aug. 10, 1988, Ser. No. 230,415

Int. Cl.<sup>5</sup> G01G 13/00; B67D 5/14

U.S. Cl. 364—567

10 Claims



2. A weigh feeding apparatus comprising:
  - means for storing a quantity of material;
  - means for discharging material from said means for storing, including a material discharge actuator;
  - means for sensing a weight of said quantity of material or a weight of material being discharged;
  - means for detecting a position or a velocity of said material discharge actuator;
  - means, including a model of at least one noise process which causes said sensed weight to differ from an actual weight of stored material or an actual weight of material being discharged, for estimating a first rate of material being discharged according to said sensed weight;
  - means, including a model of at least one noise process which causes said detected position or velocity to differ from an actual position or velocity of said material discharge actuator, for estimating a second rate of material being discharged, according to said detected position or velocity of said material discharge actuator;
  - means for combining said first and second rates to produce an estimated total rate of material being discharged; and
  - means for controlling said material discharge actuator in accordance with said estimated total rate of material being discharged, to discharge material from said means for storing at a desired material discharge rate.

4,954,976

## METHOD FOR SIMULATING DYED FABRIC

Kevin K. Noonan, Kortrijk, Belgium, assignor to Sophts Systems N.V., Kortrijk, Belgium

Filed Aug. 8, 1988, Ser. No. 229,469

Claims priority, application Netherlands, Aug. 6, 1987, 8701858

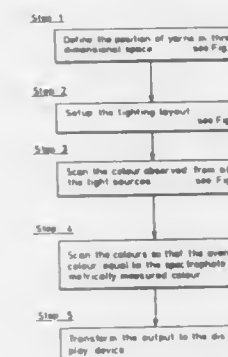
Int. Cl.<sup>5</sup> G06F 15/70

U.S. Cl. 364—578

6 Claims

1. Method for simulating a dyed fabric having dyed yarns woven into each other and each comprising interrupted pieces of particular yarn shape at a surface perceptible to the eye, comprising simulating a position and an illumination condition for said yarn shapes, forming a visual representation of colors visible at points on the surface of said yarn shapes, spectrophoto-

metrically measuring a color of an actual yarn shape to be simulated, summing and correcting values representative of colors in said visual representation such that each simulated



yarn shape has an average color approximately the same as the spectrophotometrically measured color of the actual yarn shape, and displaying an image of the simulated dye fabric on a display device.

4,954,977

## PEDAGOGIC CALCULATING MACHINE FOR ARITHMETIC INSTRUCTION

Hubert Colombat, Villeneuve-Loubet, France, assignor to Texas Instruments Incorporated, Dallas, Tex.

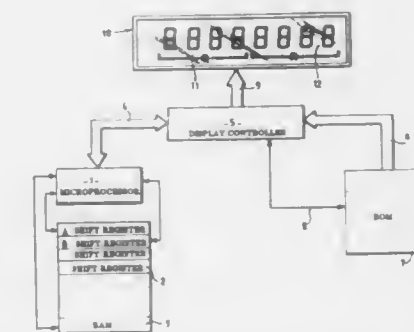
Filed Aug. 12, 1988, Ser. No. 231,733

Claims priority, application France, Sep. 13, 1987, 87 11552

Int. Cl.<sup>5</sup> G06F 15/20

U.S. Cl. 364—710.03

7 Claims



1. An electronic data processing apparatus for providing educational instruction in arithmetical operations, said electronic data processing apparatus comprising:
  - first memory means for receiving data representative of respective numerals on which selected arithmetic operations involving the numerals are to be carried out;
  - processor means operably connected to said first memory means for controlling the arithmetic operations carried out with respect to data representative of respective numerals stored in said first memory means;
  - data input means operably connected to said first memory means and to said processor means for entering data into said first memory means to include respective numerals and to select an arithmetic operation involving the entered numerals to be carried out by said processor means;
  - display means providing a display screen subject to variable background visual representations respectively corresponding to one of a plurality of mathematical procedure modes;



said display screen in a first one of said plurality of mathematical procedure modes having at least first and second independent zones thereon, said first zone being adapted to display the quotient integer of an arithmetic Euclidean division problem, and said second zone being adapted to display the remainder number of the arithmetic Euclidean division problem;

display controller means operably interposed between said display means and said processor means and respectively connected thereto for regulating the operation of said display means in providing a visual representation on said display screen;

second memory means containing program instructions and being operably connected to said display controller means;

said data input means including a plurality of mathematical procedure mode keys for selective actuation to designate to said processor means the selected arithmetic operation to be carried out by said apparatus;

said display controller means having a plurality of alternative display sequence means for respectively imparting to said display screen variable mathematical procedure background graphics in response to program instructions from said second memory means and to command signals from said processor means dependent upon the data entered by said data input means; and

said display controller means having at least a first alternative display sequence means for imparting to said display screen said at least first and second independent zones thereon in a mathematical procedure mode corresponding to the display of an arithmetic Euclidean division problem.

4,954,978

## PRIORITY ORDER DECOMPOSING APPARATUS

Hideyuki Terane, and Shinichi Nakagawa, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

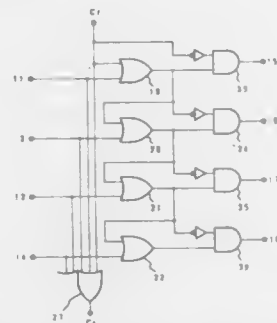
Filed May 25, 1988, Ser. No. 198,415

Claims priority, application Japan, Jan. 12, 1988, 63-5294

Int. Cl.<sup>3</sup> G06F 7/38

U.S. Cl. 364-715.1

4 Claims



1. A priority order decomposing apparatus for processing input data having a plurality of logic circuits comprising: m number of first inclusive-or circuits respectively receiving one bit of a m-bit word as a first input, m number of exclusive-or circuits respectively receiving outputs of said first inclusive-or circuits, and a second inclusive-or circuit receiving m number of said first input and a one-bit second input as inputs thereof, wherein the first inclusive-or circuit and the exclusive-or circuit of the highest-order bit receive the second input as the other input, and the other first inclusive-or circuits and exclusive-or circuits receive the output of the first inclusive-or circuit of the high-order-bit side as the other input thereof, the logic circuits being connected in a cascade manner with

the output of the second inclusive-or circuit received as the second input of the logic circuit of the low-order-bit side and the first input of the logic circuit of the highest-order-bit side set to a predetermined potential, and the input data is received as the first input, and the output of said exclusive-or circuit is transmitted as a processed output.

4,954,979

## PERSONAL COMPUTER WITH MULTIPLE INDEPENDENT CRT DISPLAYS OF IDEOGRAPHIC AND/OR ASCII CHARACTERS HAVING LOADABLE FONT MEMORY FOR STORING DIGITAL REPRESENTATIONS OF SUBSET OR SPECIAL CHARACTERS

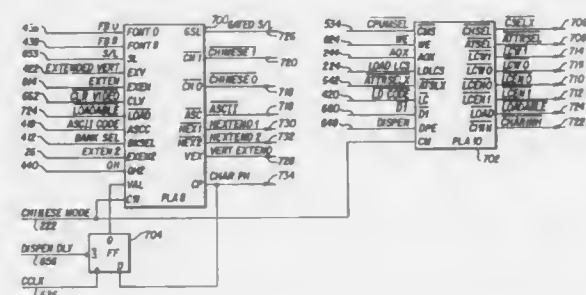
Jules A. Eibner, Drescher, and Jean-Pol Zandel, Berwyn, both of Pa., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Aug. 22, 1985, Ser. No. 767,399

Int. Cl.<sup>3</sup> G06F 12/02

U.S. Cl. 364-900

12 Claims



1. In a display system including a font memory for storing the digital video representations of the characters comprising a font of standard characters, a character memory for storing a subset of characters which is to be displayed, means responsive to said character memory for addressing said font memory to read therefrom the digital video representations of the subset, and display means responsive to said font memory for displaying said subset, the improvement comprising:

a loadable font memory for storing the digital video representations of special characters, said loadable font memory having an output connected to said display means; means responsive to said character memory for addressing said loadable font memory whereby digital video representations of special characters are applied to said display means; and, computer means and means responsive to said computer means for addressing said loadable font memory and applying data signals corresponding to said digital video representations thereto.

4,954,980

## HIGH SPEED INPUT/OUTPUT MODULE AND PROGRAMMABLE LOGIC CONTROL DEVICE

Takashi Yamauchi, Minamitsuru, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP88/00789, § 371 Date Mar. 17, 1989, § 102(e) Date Mar. 17, 1989, PCT Pub. No. WO89/01656, PCT Pub. Date Feb. 23, 1989

PCT Filed Aug. 10, 1988, Ser. No. 330,088

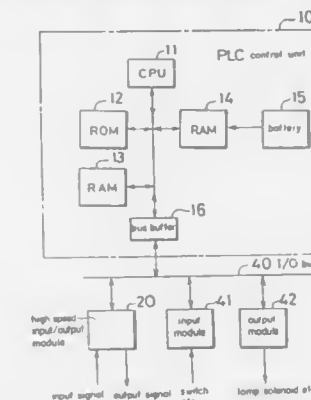
Claims priority, application Japan, Aug. 12, 1987, 62-201597 Int. Cl.<sup>3</sup> G06F 3/00

U.S. Cl. 364-900

5 Claims

1. A high speed input/output module for a programmable logical control (PLC) device and a numerical control apparatus, comprising: programmable logic control means; a programmable logical operation element, operatively connected to said programmable logic control means, for

executing a logical operation at high speed in response to an external input signal and an output from said programmable logic control means, for externally outputting a result of the logical operation, and for inputting a result to said programmable logic control means;



at least one input module, operatively connected to said programmable logic control means, for receiving signals which must not be executed at high speed; and at least one output module, operatively connected to said programmable logic control means, for outputting signals at low speed from said programmable logic control means.

4,954,981

## METHOD AND APPARATUS FOR ACCESSING AND MANIPULATING TIME SERIES

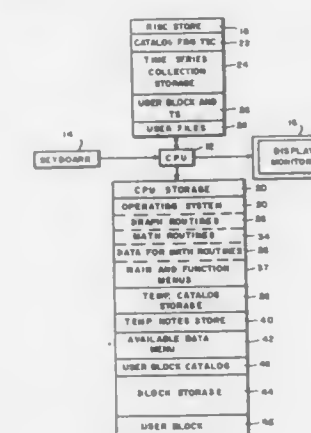
Charles V. Dehner, Jr., Lenexa, Kans., and Theodore E. Kihm, Kansas City, Mo., assignors to CoWorks, Kansas City, Mo.

Filed Sep. 16, 1988, Ser. No. 245,908

Int. Cl.<sup>3</sup> G06F 15/401

U.S. Cl. 364-900

76 Claims



1. A system for facilitating a user accessing and manipulating time series comprising: first means for storing a plurality of blocks of time series each of which blocks contains a number of time series; means for cataloging said time series in a hierarchical multi-level menu form by subject matter, means responsive to a user access request for providing the user a first subject matter menu from said cataloging means; means response to a user selection from the first and each successive subject matter menu for providing the user a successive level of subject matter menu; means responsive to a user selection from a predetermined

menu level for providing the user with time series identifications for a block stored in said first storing means; second means for storing a plurality of time series, a predetermined area of said second storing means having capacity to store a number of time series and being designated as a user area; means responsive to a user selection from the time series identifications for a block for transferring selected time series from the first storing means to the second storing means; means responsive to user requests for performing predetermined functions on one or more time series stored in said second storing means; means for storing the results of each function performed in said user area; means for cataloging time series stored in said user area; and means for selectively transferring time series stored in said user area to said first storing means.

4,954,982

## METHOD AND CIRCUIT FOR CHECKING STORAGE PROTECTION BY PRE-CHECKING AN ACCESS REQUEST KEY

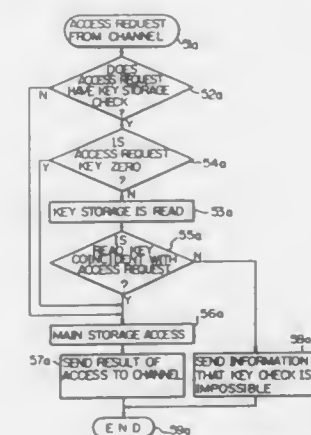
Terutaka Tateishi; Minoru Koshino, both of Kanagawa, and Kazuyuki Shimizu, Tokyo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 75,258, Jul. 16, 1987, abandoned, which is a continuation of Ser. No. 533,988, Sep. 20, 1983, abandoned. This application Feb. 24, 1989, Ser. No. 315,213

Claims priority, application Japan, Sep. 29, 1982, 57-170080 Int. Cl.<sup>3</sup> G06F 12/14

U.S. Cl. 364-900

9 Claims



1. A method for checking storage protection in a system having a channel processor, a CPU, an access control unit, which receives access requests, each one of the access requests having an access key, from both the channel processor and the CPU, a main storage control unit operatively connected to a main storage having storage regions, a storage-protection key control circuit operatively connected to a key storage, and a storage-protection check circuit, the key storage storing storage keys, each one of the storage keys corresponding to a unit area of a storage region, said method comprising the steps of: (a) pre-checking, using the storage-protection check circuit, value of the access key by which access is requested following an access request before accessing the main storage and the key storage; (b) accessing the main storage directly without using the storage protection key control circuit and without accessing the key storage when the storage-protection check circuit determines that the access key has a predetermined value; (c) accessing the key storage to obtain one of the storage





4,954,988

MEMORY DEVICE WHEREIN A SHADOW REGISTER  
CORRESPONDS TO EACH MEMORY CELL

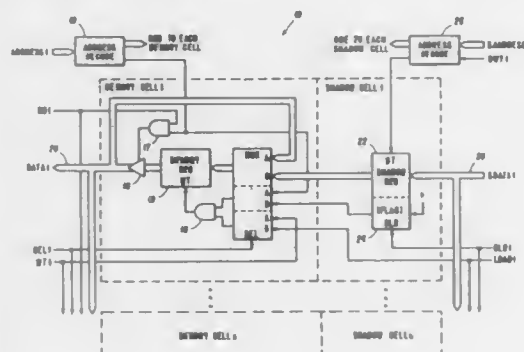
James R. Robb, Marion, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 28, 1988, Ser. No. 264,465

Int. Cl.<sup>5</sup> G11C 19/00

U.S. Cl. 365—189.02

15 Claims



1. A data storage device for use with a data bus, comprising:
  - a plurality of memory cells;
  - a plurality of shadow registers, each of said shadow registers connected to a corresponding one of said memory cells; and
  - a plurality of multiplexers connected between corresponding ones of said memory cells and shadow registers into said corresponding memory cells, each of said multiplexers having a first channel connected to the data bus and a second channel connected to said corresponding shadow register, said second channel for loading data from said shadow register into said memory cell.

4,954,989

MIS TYPE STATIC MEMORY CELL AND MEMORY AND  
STORAGE PROCESS

André-Jacques Auberton-Herve, St Egreve, and Benoît Giffard, Grenoble, both of France, assignors to Commissariat à l'Energie Atomique, France

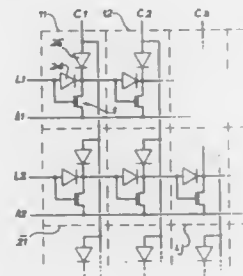
Filed Apr. 10, 1989, Ser. No. 335,732

Claims priority, application France, Apr. 12, 1988, 88 04815

Int. Cl.<sup>5</sup> G11C 11/40

U.S. Cl. 365—177

8 Claims



1. Static memory cell comprising:
  - (A) a bistable flip-flop (1) essentially formed by a MOS transistor (20) and a parasitic bipolar transistor (22) formed by the structure of a MIS transistor, a source (8) and drain (12) of the MIS transistor respectively constituting the emitter and the collector of the bipolar transistor, the region of the p-channel (10) of the MIS transistor between the source and drain serving as the base for the

bipolar transistor, said base being electrically isolated from the direct connection to exterior of the memory cell, a gate electrode (16) of the MIS transistor being electrically isolated from the channel (10) region and

- (B) an addressing circuit (23,25) for the flip-flop in order to apply with respect to the source (8) raised to a reference potential:

- (a) to the gate electrode (16) a voltage VG1 below a first threshold voltage VBi for triggering the bipolar transistor by the MIS transistor (20) and to the drain a voltage VD1 above a second threshold voltage VD0 for maintaining the bipolar transistor (22) in the triggered state in order to maintain a state with value of "0" or "1",
- (b) to the drain (12) the voltage VD1 and to the gate electrode (16) a voltage VG2 higher than VBi or a pulse of illuminating white light, having a power of magnitude  $1 \mu\text{W}/\mu\text{m}^2$  adequate for triggering the MIS and bipolar transistors, in order to write the state "1", followed by the voltage VG1,
- (c) to the gate electrode (16) the voltage VG1 and to the drain (12) a voltage VD2 lower than VD0, in order to write the state "0" and then the voltage VD1.

4,954,990

PROGRAMMING VOLTAGE CONTROL CIRCUIT FOR  
EPROMS

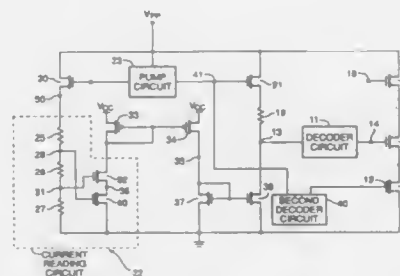
Dov-Ami Vider, Sunnyvale, Calif., assignor to Cypress Semiconductor Corp., San Jose, Calif.

Filed May 30, 1989, Ser. No. 358,558

Int. Cl.<sup>5</sup> G11C 11/40

U.S. Cl. 365—185

6 Claims



1. Apparatus for controlling the programming voltage of an EPROM array having a plurality of programmable floating gate MOS cells, comprising:

an additional floating gate MOS cell fabricated on the same chip in the same manner as said plurality of programmable floating gate cells, said additional cell not being connected for programming during normal programming of said array;

means for applying a voltage to said additional cell in order to generate a drain current through said additional cell; feedback means coupled to a source of programming voltage for said array which uses the amplitude of said drain current in said additional cell to control the magnitude of said programming voltage in such a manner that when said drain current increases, said programming voltage proportionately decreases.

4,954,991

SEMICONDUCTOR MEMORY WITH P-CHANNEL  
LOAD TRANSISTOR

Yukihiko Saeki, and Toshimasa Nakamura, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

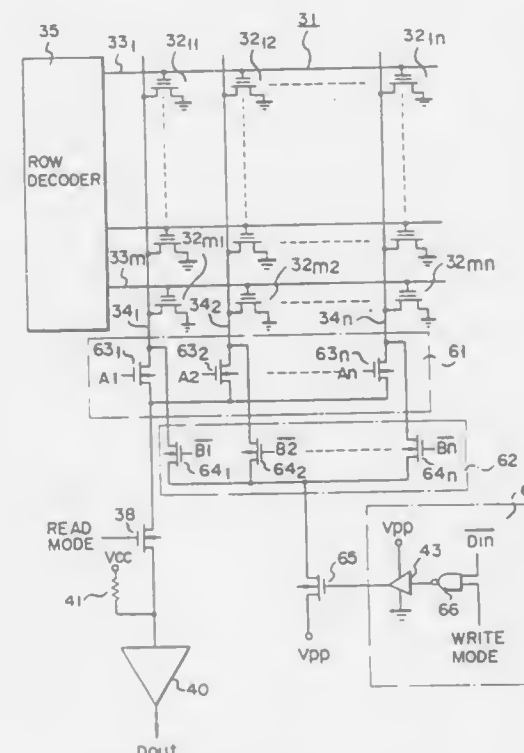
Continuation of Ser. No. 94,706, Sep. 9, 1987. This application Dec. 7, 1989, Ser. No. 447,391

Claims priority, application Japan, Sep. 30, 1986, 61-231721; Sep. 30, 1986, 61-231803

Int. Cl.<sup>5</sup> G11C 7/00, 11/409, 16/06

U.S. Cl. 365—189.01

6 Claims



1. A semiconductor memory device comprising:
  - a cell matrix comprising a plurality of floating gate, MOS transistors arranged in rows and columns, and used as memory cells;
  - a plurality of row lines equal in number to the rows of memory cells, one row line being connected to the gate of each of the memory cells of the corresponding row;
  - a plurality of column lines equal in number to the columns of memory cells, one column line being connected to the drain of each of the memory cells of the corresponding column;
  - a data-writing, column-selecting circuit including a plurality of p-channel MOS transistors connected at one end to said column lines, respectively, and controlled by data-writing, column-decode signals;
  - a data-reading, column-selecting circuit including a plurality of n-channel MOS transistors connected at one end to said column lines, respectively, and controlled by data-reading, column-decode signals; and
  - a data-writing, p-channel MOS transistor connected to the other ends of the p-channel MOS transistors of said data-writing, column-selecting circuit, for applying a high voltage to those memory cells selected and turned on when the semiconductor memory is set in level "0" data-writing mode.

4,954,992

RANDOM ACCESS MEMORY HAVING SEPARATE  
READ OUT AND WRITE IN BUS LINES FOR REDUCED  
ACCESS TIME AND OPERATING METHOD THEREFOR

Masaki Kumanoya; Hirofumi Shinohara; Katsumi Dosaka; Yasuhiro Konishi; Takahiro Komatsu, and Hiroyuki Yamasaki, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 8, 1988, Ser. No. 269,757

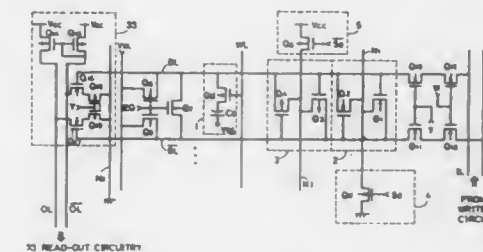
Claims priority, application Japan, Dec. 24, 1987, 62-327940;

Jan. 20, 1988, 63-11257; Feb. 3, 1988, 63-24284

Int. Cl.<sup>5</sup> G11C 7/00, 11/40

U.S. Cl. 365—207

13 Claims



1. A semiconductor memory device having a memory cell array of a plurality of memory cells arranged in rows and in columns, a plurality of word lines for selecting a row out of said memory cell array, and a plurality of pairs of bit lines for selecting a column out of said memory cell array, comprising:
    - row address input means for receiving an externally applied row address,
    - row selection means for selecting a row out of said memory cell array in response to the row address from said row address input means,
    - column address input means for receiving an externally applied column address,
    - column selection means for selecting a bit line pair for selecting a column out of said memory cell array in response to the column address from said column address input means,
    - a pair of write-in data transferring bus lines connected to a bit line pair designated by said column address in response to an output of said column selection means in writing operation, for transferring data to be written in a memory cell selected by said row address and said column address,
    - a pair of read-out transferring bus lines provided separately from said pair of write-in data transferring buses, for transferring data on the bit line pair selected by said column address in reading operation, and
    - amplifier means corresponding to each bit line pair and responsive to the output of said column selection means for driving said read-out data transferring bus lines in accordance with data on said selected bit line pair, said amplifier means comprising:
      - (a) means for directly receiving and detecting a voltage difference of said selected bit line pair;
      - (b) first and second voltage amplification means for amplifying respectively, voltages on the bit lines of said selected bit line pair;
      - (c) means for establishing a positive feedback signal flow path between said first and second voltage amplification means, to increase a rate of voltage change of said first and second voltage amplification means;
      - (d) means responsive to said first and second voltage amplification means for controlling first and second currents;
      - (e) means for converting said first and second currents to a voltage difference;
      - (f) means for applying said voltage difference to said read-out data transferring bus lines;
- flip-flop type sense amplifiers provided for the respective bit line pairs, for differentially amplifying a potential difference on the corresponding bit line pair, and

means for activating said amplifier means before the corresponding one of said flip-flop type sense amplifiers is activated.

4,954,993

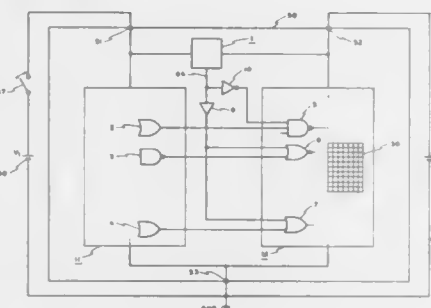
# SEMICONDUCTOR INTEGRATED CIRCUIT HAVING A PLURALITY OF CIRCUIT BLOCKS RESPECTIVELY SUPPLIED WITH POWER FROM DIFFERENT POWER SOURCES

Masaya Yamaguchi, and Takamasa Suzuki, both of Tokyo, Japan, assignors to NEC Corporation, Japan  
Filed Jul. 1, 1988, Ser. No. 214,189

Claims priority, application Japan, Jul. 2, 1987, 62-166320  
Int. Cl.<sup>3</sup> G11C 7/00

U.S. Cl. 365—226

6 Claims



1. A semiconductor integrated circuit comprising:
  - a first power terminal for receiving a first power having a first voltage;
  - a second power terminal for receiving a second power having a second voltage;
  - a first circuit block energized exclusively by said first power, said first circuit block having a plurality of input gates;
  - a second circuit block energized exclusively by said second power, said second circuit block producing output signals which are supplied to said input gates of said first circuit block;
  - detection circuit means for detecting a deenergization of said second circuit block in order to produce a detection signal; and
  - means for controlling said input gates to produce predetermined output level signals in response to said detection signal, each of said input gates being logical gates for processing a binary logic signal, and each of said predetermined output level signals having one signal level of said binary logic signal, wherein said controlling means has a circuit for receiving said detection signal to produce first and second control signals, said first control signal having a non-inverted relationship with respect to said detection signal and said second control signal having an inverted relationship with respect to said detection signal, wherein each of said input gates receives a selected one of said first and second control signals together with one of said output signals from said second circuit block, said selected one of said first and second control signals causing a predetermined output level signal from said input gates.

4,954,994

# FIFO MEMORY CAPABLE OF SIMULTANEOUSLY SELECTING A PLURALITY OF WORD LINES

Masahi Hashimoto, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 16, 1988, Ser. No. 245,833

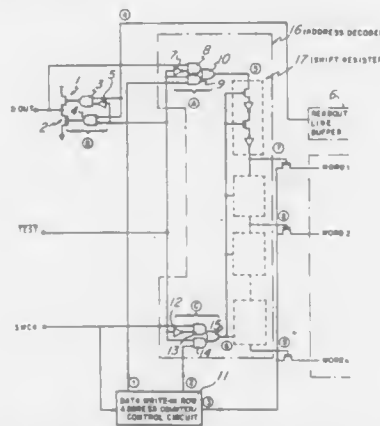
Claims priority, application Japan, Sep. 18, 1987, 62-234523  
Int. Cl.<sup>3</sup> G11C 8/00

U.S. Cl. 365—230.06

5 Claims

1. A semiconductor memory device comprising:
  - a plurality of word lines;

a readout line buffer;  
an output buffer connected to said readout line buffer for receiving the output therefrom;  
control circuit means including a data write-in row address counter and having a plurality of outputs, one of which is connected to each of said plurality of word lines;  
at least one address decoder including  
shift register having a plurality of successive shift register positions respectively connected to corresponding individual word lines,  
first selector means connected between one of the outputs of said control circuit means and the initial shift register position of said shift register for receiving a first control signal from said control circuit means, and  
second selector means connected between another output of said control circuit and each of the plurality of shift register positions arranged in parallel for receiving a second control signal from said control circuit means;



binary data as applied to said shift register being successively shifted through each of said plurality of shift register positions in response to said first control signal activating said first selector means to provide a series of output signals as binary data in one of two binary logic states for storage in the initial shift register position and in each of the remaining shift register positions;  
one of the two binary logic states if stored in a respective shift register position designating the selection of the word line corresponding thereto, and the other of the two binary logic states if stored in a respective shift register position designating the non-selection of the word line corresponding thereto; and  
each of shift plurality of word lines corresponding to a respective shift register position having said one binary logic state stored therein being selected so as to be conductive in response to said second control signal activating said second selector means to provide an output signal to each of said shift register positions simultaneously.

4,954,995

# DEVICE AND METHOD FOR PREPARING BITUMINOUS PRODUCTS

Guy Marconnet, Rive de Gier, France, assignor to Erment C. M., Lorette, France

Filed May 11, 1989, Ser. No. 350,437

Claims priority, application France, May 13, 1988, 88 06474  
Int. Cl.<sup>3</sup> B28C 5/14, 5/20; F27B 7/16, 7/34

U.S. Cl. 366—7

4 Claims

4. Method for preparing bituminous coated products from virgin aggregates, recycled bituminous mixes and liquid bitumen, said method comprising the steps of

- (a) drying and heating said virgin aggregates by circulating hot gases in a direction opposite to a direction of movement of said virgin aggregates;

4,954,997

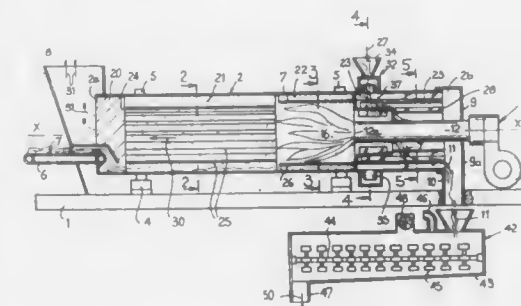
# SENSOR DEVICE USING LAMB ELASTIC WAVES FOR DETECTING THE PRESENCE OF A LIQUID AT A PREDETERMINED LEVEL

Eugène J. Dieulesaint, Saint-Maur; Daniel R. Royer, Sainte-Genevieve des Bois, and Olivier R. Legras, Meaux, all of France, assignors to Materiel et Auxiliaire de Signalisation et de Controle Pour L'Automatisme, Courbevoie, France  
Filed Mar. 3, 1989, Ser. No. 318,603

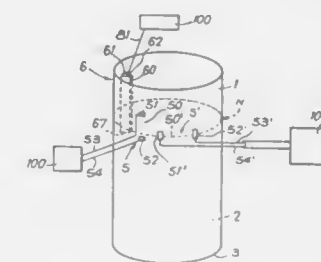
Claims priority, application France, Mar. 8, 1988, 88 02962  
Int. Cl.<sup>3</sup> G08B 21/00

U.S. Cl. 367—13

9 Claims



- (b) heating said recycled bituminous mix in granular form by bringing it into contact with said dried and heated virgin aggregates;
- (c) mixing said virgin aggregates and recycled bituminous mix so as to pre-coat said virgin aggregates;
- (d) introducing the mixture of recycled bituminous mix and hot pre-coated virgin aggregates into a mixer; and
- (e) mixing said pre-coated virgin aggregates and recycled bituminous mix with liquid bitumen.



1. A sensor using Lamb elastic waves for detecting the presence or absence of a liquid at a predetermined level N in a tank defined by a wall having a thickness e, comprising:

- (a) transmitter transducer means located on an external face of a portion of the wall defining the tank, which wall portion comprises a detection plate having an internal face that may come into contact with the liquid, said transmitter transducer means for locally generating Lamb waves in said wall portion;
- (b) receiver transducer means located on said external face of said wall portion of the tank proximate the predetermined level N, said receiver transducer means for detecting the presence or absence of Lamb waves transmitted along said wall portion;
- (c) electronic signal processing means for processing signals applied to said transmitter transducer means and received by said receiver transducer means, said electronic signal processing means including a high gain amplifier, an input of which is connected to said receiver transducer means, and an output of which is connected to said transmitter transducer means to, thereby, form a closed loop, a filter for allowing said closed loop to oscillate only at an excitation frequency of said transmitter transducer means, and means for detecting the presence of oscillations at said excitation frequency f when liquid in the tank remains below the predetermined level N;
- (d) means for adjusting said electronic signal processing means to excite said transmitter transducer means to generate first symmetrical mode So of Lamb waves in said wall portion and to excite that mode only; and
- (e) a prism-shaped member mounting each of said transmitter transducer means and said receiver transducer means, said prism-shaped members being attached to said wall portion to dispose said transmitter transducer means and said receiver transducer means at an angle  $\theta$  to said external face of said wall portion such that  $\sin \theta = v_{\text{prism}}/v_{\text{plate}}$ , wherein v prism and v plate represent the phase velocities, respectively, of longitudinal waves created in said prism-shaped members and Lamb waves created in said wall portion;
- (f) wherein said excitation frequency of said transmitter transducer means is determined as a function of the thickness e of said wall portion in such a manner so that the group velocity of said first symmetrical mode So of the Lamb waves is minimized.

4,954,996

# NAVIGATION SONAR SYSTEM DOCKSIDE SIMULATOR

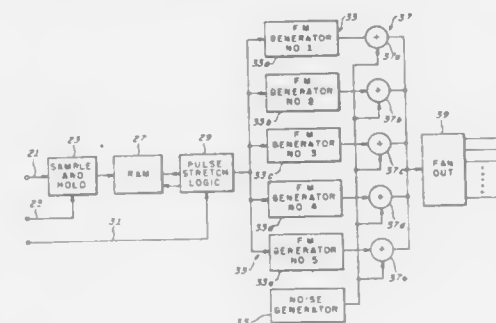
Luciano Fazzolari, New Hyde Park; Frank P. Giattini, West Hempstead; Anthony L. Scoca, Hicksville, and Eugene C. Zavacki, Levittown, all of N.Y., assignors to Unisys Corporation, Blue Bell, Pa.

Filed May 15, 1989, Ser. No. 352,224

Int. Cl.<sup>3</sup> H04B 17/00

U.S. Cl. 367—13

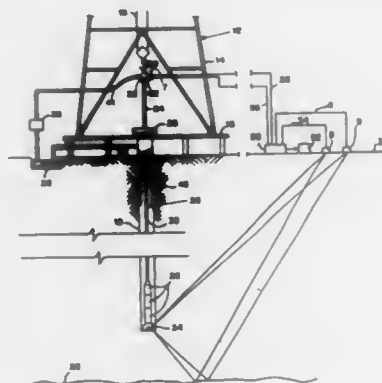
6 Claims



1. An apparatus for simulating sonar signals for a sonar navigation system on board a ship comprising:
  - means for providing pulses simulating returned transmitted sonar pulses stretched in accordance with water bottom scattering;
  - means coupled to said sonar pulses means for providing phase shifts to said sonar pulses that are respectively representative of a predetermined velocity of said ship, thereby providing pulses phase shifted sonar signals; and
  - means for coupling said pulsed phase shifted sonar signals to processing channels of said sonar navigation system.



4,954,998  
**METHOD FOR REDUCING NOISE IN DRILL STRING SIGNALS**  
 James W. Rector, Menlo Park, Calif., assignor to Western Atlas International, Inc., Houston, Tex.  
 Filed Jan. 23, 1989, Ser. No. 300,315  
 Int. Cl.<sup>5</sup> G01V 1/40  
 U.S. Cl. 367—82 31 Claims

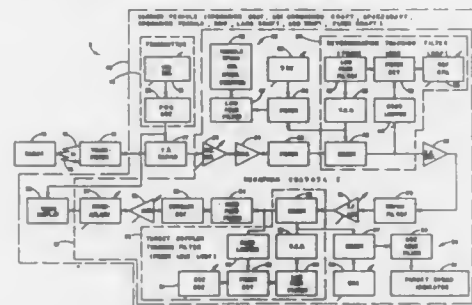


17. A method of determining the location of subsurface interfaces in the region of the earth around a wellbore comprising:  
 generating energy having a detectable pattern at the lower end of a drill string utilized for drilling said wellbore;  
 detecting with a sensor at the upper end of said drill string adapted to sense vertical motion the energy generated at the lower end of said drill string to generate a pilot signal;  
 detecting horizontal motion at the upper end of said drill string to generate a noise signal;  
 detecting seismic energy emanating from said source at least one location at the earth's surface displaced from said wellbore to generate a field signal;  
 determining a frequency band within said pilot signal and said noise signal in which there is high coherence in the amplitude of noise energy;  
 weighting said noise signal within at least said frequency band in proportion to the average ratio within said frequency band of the noise energy in said pilot signal to the noise energy within said noise signal to generate a weighted noise signal;  
 subtracting the weighted noise signal within at least said frequency band from said pilot signal to generate a noise reduced pilot signal; and  
 correlating said noise reduced pilot signal with said field signal to determine the location of subsurface interfaces.

4,954,999  
**DOUBLE PHASE-LOCK-LOOP SONAR**  
 Willis A. Teel, and James T. Christoff, both of Panama City, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
 Filed Aug. 28, 1975, Ser. No. 609,453  
 Int. Cl.<sup>5</sup> G01S 15/00  
 U.S. Cl. 367—97 18 Claims

1. An echo-ranging-search system adapted for being mounted on a carrier vehicle that is capable of moving in a predetermined environmental medium, comprising in combination:  
 means for broadcasting a predetermined target search signal within the aforesaid predetermined environmental medium;  
 receiving and converting means effectively synchronized with said broadcasting means for receiving the aforesaid predetermined target search signal after it has been reflected as an echo signal from a target located within said

predetermined environmental medium and for converting it into a first electrical signal that is proportional thereto;  
 first mixing means connected to the output of said receiving and converting means for mixing said first electrical signal with a second electrical signal supplied thereto, so as to produce a third electrical signal at the output thereof;  
 notch filter means effectively connected to the output of said first mixing means for filtering said third electrical signal in such manner as to pass a predetermined band of frequencies therethrough;  
 second mixing means having a pair of inputs and an output, with one of the inputs thereof effectively connected to the output of said notch filter means;  
 a narrow band pass filter means connected to the output of said second mixing means;  
 detector means connected to the output of said narrow bandpass filter means;

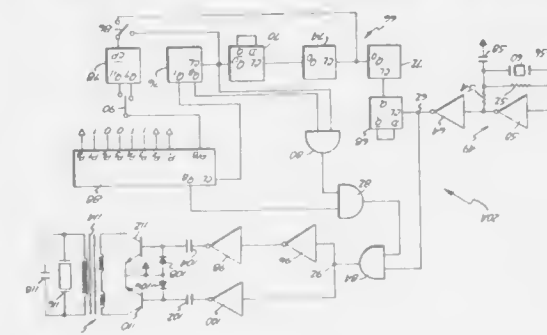


means effectively connected to the output of said detector means for reading out a predetermined level of the output signal therefrom in terms of the targets from which the aforesaid echo signal is reflected;  
 means connected to the output and the other input of said first mixing means for adjusting the frequency of said second electrical signal supplied to the other input thereof in such manner as to compensate for reverberations received from within the aforesaid environmental medium within said echo signals;  
 and means connected between the output and the other input of said second mixing means for adjusting the output signal therefrom in such manner as to compensate for any doppler effects that occur therein due to any relative movement between the aforesaid receiving and converting means and said target.

4,955,000  
**ULTRASONIC PERSONNEL LOCATION IDENTIFICATION SYSTEM**  
 Harvey J. Nastro, Shoreview, Minn., assignor to NAC Engineering and Marketing, Inc., Shoreview, Minn.  
 Continuation of Ser. No. 887,071, Jul. 17, 1986, abandoned. This application Jun. 16, 1989, Ser. No. 368,054  
 Int. Cl.<sup>5</sup> G01S 15/88  
 U.S. Cl. 367—117 15 Claims

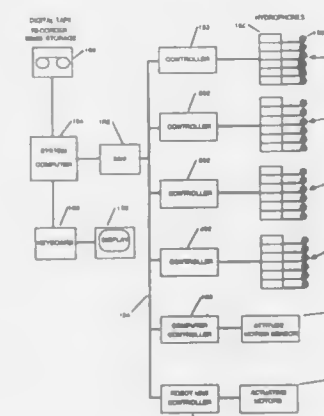
1. An ultrasonic system for identifying the location of personnel within a multiple room complex including:  
 at least one ultrasonic transmitter adapted to be transported by a person, for periodically transmitting ultrasonic transmitter signals formed by pulse code modulated (PCM) portions representative of a digital code sequence characteristic of a person and separated from one another by transmitter signal periods, the PCM portions formed by a predetermined number of bit positions representative of a digital value and separated from one another by predetermined bit spacing periods;  
 a plurality of ultrasonic receivers, each adapted to be positioned in a room of the complex, for receiving the transmitter signals and providing receiver signals as a function thereof, each ultrasonic receiver including a timer for

timing detector window periods separated from one another by window spacing periods corresponding to the bit spacing periods of the PCM portions of the transmitter signals, and a detector for determining the code sequence



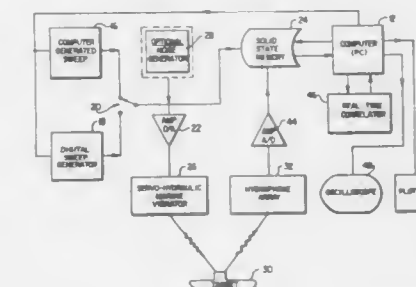
of the received transmitter signal by detecting digital values only during the timed window periods; and  
 a central station coupled to the receivers to receive the receiver signals, for providing an indication of the room in which the person transporting the receiver is located.

4,955,001  
**AREAL SOUND INTENSITY RECEIVER**  
 Jacques Y. Guigné, St. John's, Canada, assignor to Nordco Limited, St. John's, Canada  
 Filed Feb. 20, 1990, Ser. No. 481,433  
 Int. Cl.<sup>5</sup> G01S 3/80; G01H 3/12  
 U.S. Cl. 367—118 9 Claims



1. A device for measuring the intensity of sound from an acoustic source in a medium comprising:  
 (a) at least three microphone arrays spaced from each other, each of said microphone arrays comprising six microphones configured as three orthogonal pairs of microphones;  
 (b) means for simultaneously sensing the output from each of said microphones in order to determine a real-time sound intensity vector at each of said microphone arrays; and  
 (c) means for providing an indication of the areal intensity of sound through a notional plane bounded by at least three of said at least three microphone arrays.

4,955,002  
**VIBRATORY, TIME VARIANT, PSEUDORANDOM SONAR SYSTEM**  
 Donald R. Campbell, Houston, Tex., assignor to Camex, Houston, Tex.  
 Filed Jul. 31, 1989, Ser. No. 387,713  
 Int. Cl.<sup>5</sup> G01J 15/00  
 U.S. Cl. 367—99 12 Claims



1. A vibratory, time variant, pseudorandom sonar system comprising:  
 first means for converting an electrical signal into a corresponding acoustic signal for injection into a fluid body for reflection by a target;  
 second means including a plurality of detectors selectively spaced for detecting incoming acoustic waves;  
 third means for correlating the electrical signals corresponding to the acoustic wave of the first means and the incoming acoustic waves of the second means and generating a signature pulse indicative of the target;  
 fourth means for storing the electrical signals and signature pulse generated by the first through the third means;  
 fifth means for determining the lapsed times between the injection of the acoustic wave by the first means, and detection of the reflected acoustic wave by the plurality of detectors of the second means;  
 sixth means for communicating information to the user; and  
 seventh means connected to the: first, fourth, and fifth means, respectively, for activating the first means for injecting the acoustic wave into the fluid body, storing the acoustic wave, and starting the fifth means; second, fourth and fifth means, respectively, for receiving the incoming acoustic waves, storing the incoming acoustic waves detected by the plurality of detectors of the second means, and stopping the fifth means for determining and storing the elapsed times between injection of the acoustic wave and detections of the reflected acoustic waves; fourth and third means, respectively, for fetching the injected acoustic wave and reflected acoustic waves for correlation and generating target signature signals; fourth means for fetching the elapsed time signals for producing bearing and range information; and sixth means for communicating the signature signal together with the bearing and range information.

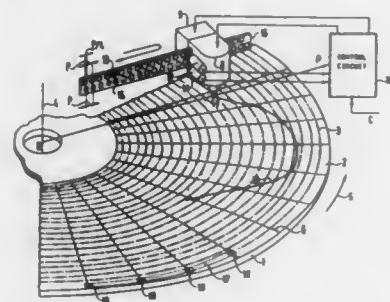
4,955,003  
**PHASE ACCUMULATOR-BEARING TRACKER**  
 Warren A. Goldman, Fitchville, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
 Filed Jun. 4, 1984, Ser. No. 617,282  
 Int. Cl.<sup>5</sup> G01S 3/80  
 U.S. Cl. 367—125 4 Claims

1. A tracking apparatus for passively determining the bearing of a remote source, comprising:  
 a first transducer means, for receiving an impinging acoustic signal from said remote source and converting said acoustic signal into a first proportional electrical signal;  
 a second transducer means, spatially displaced from said first





surface, respective curved axes of said adjacent track element, prewritten patterns on said axes, areas reserved for storing data on said axes alternating with said prewritten patterns, a common rotation center of said curved axes, a first set of N radii issuing from said common rotation center on which said patterns lie, equi-angularly separated and each defining with said axes sites of intersection, synchronization patterns occupying said sites of intersection, at least one other set of radii P, issuing from said common rotation center with a predetermined circumferential offset relative to said N radii, said P radii being provided with a graduation scale including a radial arrangement of specific patterns, said method comprising the steps of:



scanning, with a focussed reading light spot, of said reference surface in a direction transverse to said tracks; determination of an amplitude and of a sign of radial displacement of said spot within said set of adjacent track elements when said spot interacts optically and repeatedly with said graduation scale, and determination of an instantaneous position of said spot relative to said graduation scale when said spot scans said radial arrangement, said determinations being used to calculate the position of the spot in order to access a track.

4,955,009

## OPTICAL DISK DRIVE APPARATUS HAVING COUNTER DISABLE AT SEEK START-UP

Keiji Nakatsu, and Masaharu Ogawa, both of Amagasaki, Japan, assigns to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

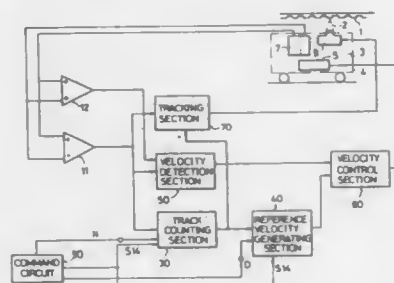
Filed Apr. 22, 1988, Ser. No. 184,985

Claims priority, application Japan, Apr. 30, 1987, 62-109330

Int. Cl.<sup>5</sup> G11B 19/02

U.S. Cl. 369—32

12 Claims



1. An optical disk drive apparatus for driving an optical disk having tracks for recording information, comprising: an optical head for focusing a light beam onto a spot on a track on the optical disk; an actuator for moving the optical head, thereby causing the spot of the light beam to move from its current track to a target track in order to access the target track; command means providing information on the number of tracks to be moved for the access to a target track;

means for counting the tracks moved by the spot of the light beam; and means for disabling the counting of tracks for an interval at the start of each track access operation to make false indicators of a track count that may occur at said start of each track access operation.

4,955,010

## CONSTANT VELOCITY TRACK JUMP SERVO SYSTEM FOR DISC PLAYERS

Daiki Nabeshima, and Hiroshi Nakane, both of Yokohama, Japan, assigns to Kabushiki Kaisha Toshiba, Kawasaki, Japan

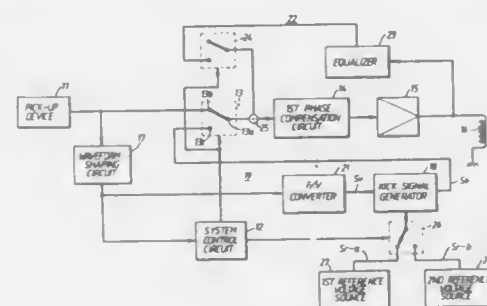
Continuation of Ser. No. 885,711, Jul. 15, 1986, abandoned. This application Aug. 3, 1988, Ser. No. 228,844

Claims priority, application Japan, Jul. 18, 1985, 60-159125

Int. Cl.<sup>5</sup> G11B 21/08, 7/085, 21/10

U.S. Cl. 369—32

17 Claims



1. A record disc reproducing apparatus comprising: a pick-up device for reading data from a disc; means for moving said pick-up device radially across said disc, said moving means including a first phase compensation circuit with a first phase compensation characteristic for stabilizing the pick-up device in a reproducing mode; means for producing a velocity signal corresponding to a moving velocity of said pick-up device; kick signal generating means for comparing said velocity signal to a reference velocity signal and generating a kick signal used to control said moving means so as to cause said velocity signal to approach a value of said reference velocity signal; a second phase compensation circuit having a second characteristic different from said first characteristic, said second phase compensation circuit being responsive to said kick signal and having an output which is connected to an input of said first phase compensation circuit in a search mode, so as to eliminate an effect of the phase compensation of said first phase compensation circuit when the pick-up device is in said search mode; and control means for selectively applying said kick signal to said moving means during said search mode to cause said pick-up device to move at a velocity corresponding to said reference velocity signal.

4,955,011

## INFORMATION RECORDING/REPRODUCING APPARATUS WITH CONTROL DEVICE FOR MAINTAINING HEAD VELOCITY BELOW A CRITICAL VELOCITY

Hisatoshi Baba, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

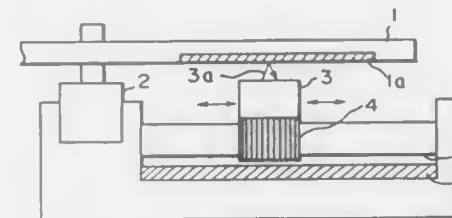
Continuation of Ser. No. 35,771, Apr. 8, 1987, abandoned. This application May 23, 1989, Ser. No. 356,662

Claims priority, application Japan, Apr. 10, 1986, 61-81103; Jun. 16, 1986, 61-138345

Int. Cl.<sup>5</sup> G11B 7/085

U.S. Cl. 369—54

11 Claims



1. An information recording and/or reproducing apparatus, comprising: a head for performing at least one of information recording for recording information on an information recording medium and information reproducing for reproducing recorded information from the recorded medium; moving means for moving said head relative to the recording medium, said moving means comprising means for applying a force including a braking force to said head; velocity detecting means for detecting velocity of said head; and control means comprising means for comparing the moving velocity detected by said velocity detecting means with a predetermined critical velocity for said head for controlling said moving means to apply the braking force to said head by said moving means for stopping said head when the moving velocity detected by said velocity detecting means exceeds the predetermined critical velocity.

4,955,012

## SEISMIC STREAMER CABLE

Steven W. Bledsoe, and Alan D. McMurtry, both of Friendswood, Tex., assigns to Western Atlas International, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 121,271, Nov. 16, 1987, Pat. No. 4,809,243, which is a continuation of Ser. No. 915,060, Oct. 3, 1986, abandoned. This application Dec. 9, 1988, Ser. No. 281,858

The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

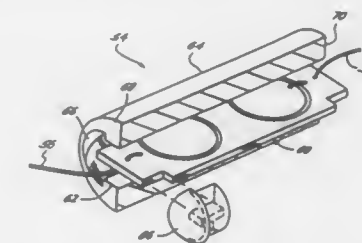
Int. Cl.<sup>5</sup> G01V 1/38

U.S. Cl. 367—154

14 Claims

1. A streamer-cable assembly, comprising: (a) a streamer cable jacket having a first and a second end; (b) first and second means disposed within said cable jacket for providing buoyancy to the streamer-cable assembly; (c) first and second means disposed within the jacket for damping internally-propagating tube waves, the second means comprising a resilient tubular capsule axially disposed within the first means; (d) means disposed within the jacket and adjacent the damping means for reducing lateral movement of the streamer-cable; (e) a first and a second connector sealing the first and second end of the cable jacket and each connected to the means for reducing lateral movement of the streamer cable;

(f) means for detecting transient pressure pulses disposed within the damping means at predetermined intervals; and



(g) means extending through the damping means and interconnecting the first and second connector for operably coupling the detecting means to a recording and control unit.

4,955,013

## OPERATING A MULTIPLE-ACCESS OPTICAL NETWORK

Peter Healey, Ipswich, England, assignor to British Telecommunications plc, London, England

PCT No. PCT/GB86/00741, § 371 Date Jul. 27, 1987, § 102(e) Date Jul. 27, 1987, PCT Pub. No. WO87/03761, PCT Pub. Date Jun. 18, 1987

PCT Filed Dec. 5, 1986, Ser. No. 95,173

Claims priority, application United Kingdom, Dec. 6, 1985, 8530087

Int. Cl.<sup>5</sup> H04B 9/00

U.S. Cl. 370—1

13 Claims

$$\begin{bmatrix} P_1 \\ P_3 \\ P_5 \end{bmatrix} = \frac{1}{(N-1)} \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix} \cdot \begin{bmatrix} P_2 \\ P_4 \\ P_6 \end{bmatrix}$$

1. A method of operating a multiple-access optical network having at least three communication stations, the stations being physically coupled together by optical waveguides arranged such that each station can transmit signals to plural of the other stations over information transfer channels based on a multiple-access technique but cannot receive signals it has itself transmitted, the method comprising:

causing one station to transmit information using a selected information transfer channel to a receiving station; and causing the receiving station to transmit simultaneously a signal using the same information transfer channel whereby other stations also receiving on the same information transfer channel receive a confusing mixture of transmissions from said one station and from said receiving station.

4,955,014

**BROADBAND OPTICAL COMMUNICATION SYSTEM, PARTICULARLY IN THE SUBSCRIBER AREA**

Dieter Kupperts, Stuttgart; Klaus Herse, Weil der Stadt; Kate Hiepe-Wohlleben, Leonberg; Manfred Kaiser, Hemmingen; Friedemann Mohr, Renningen, and Horst Ohnsorge, Freiburg/N., all of Fed. Rep. of Germany, assignors to Alcatel N. V., Amsterdam, Netherlands

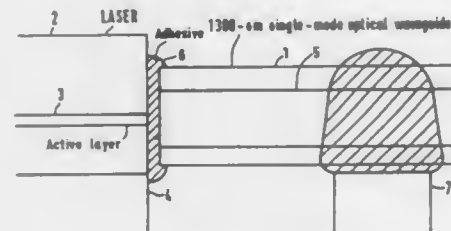
Filed Oct. 30, 1987, Ser. No. 115,254

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1986, 3637097; Mar. 24, 1987, 3709678

Int. Cl.<sup>3</sup> H04J 14/04, 16/24

U.S. Cl. 370—3

11 Claims



1. A broadband optical communication system comprising an optical waveguide having an associated cutoff wavelength below which a fundamental mode and at least one higher order mode can propagate throughout the waveguide, a first semiconductor laser having a light emitting surface at a first end of said waveguide for transmitting a first optical signal in a fundamental mode at a first operating wavelength which is clearly below said predetermined cutoff wavelength, and a first semiconductor photodiode at a second end of said waveguide for receiving said fundamental mode of said first optical signal at said first operating wavelength, and means for positioning said first semiconductor laser relative to said first end of the optical waveguide such that only said fundamental mode is excited in any portion of the waveguide in response to said first semiconductor laser transmitting said first optical signal.

4,955,015

**SELF-CONTROLLED CONCENTRATOR OPERATING PACKET-SYNCHRONIZED FOR FAST DATA PACKET SWITCHING NETWORKS**

Manfred Lobjinski; Michael Horn, and Andreas Reppekus, all of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

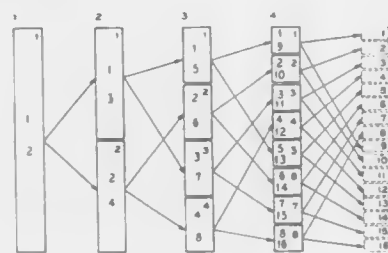
Filed Aug. 8, 1988, Ser. No. 229,295

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1987, 3732824

Int. Cl.<sup>3</sup> H04L 12/56

U.S. Cl. 370—56

6 Claims



1. A self-controlled concentrator operating packet-synchronized for fast data packet switching networks, wherein the first

bits of each of the totality of data packets acts on the totality of the switch elements of the concentrator in accordance with the switch positions of such switch elements, characterized in that the switch elements are beta elements ( $\beta$ ) having two inputs and two outputs, whereby a plurality of stages each having  $n/2$  beta elements ( $\beta$ ) are provided, whereby  $n$  is the number of inputs and  $n$  is the number of outputs of the concentrator; a connecting structure connected between adjacent stages, said connecting structure constituting a perfect shuffle; the stages are subdivided into blocks such that the plurality of blocks increases according to a power of 2 ascending from stage to stage, whereby the number of blocks in the first stage is  $2^0$ , the number of blocks in the second stage is  $2^1$ , etc., whereby there are  $n/2$  blocks in the last stage, to form a binary tree structure; and at least one beta element ( $\beta$ ) in each block selectively switching connections from its two inputs to its two outputs, in response to the signals supplied to the inputs of an adjacent beta element in said block, whereby a concentration of the bits having a prescribed binary value at the outputs of the concentrator is produced at the last stage of the concentrator to produce the concentration of the said data packets.

4,955,016

**INTERCONNECT FABRIC PROVIDING CONNECTIVITY BETWEEN AN INPUT AND ARBITRARY OUTPUT(S) OF A GROUP OF OUTLETS**

Kai Y. Eng, Eatontown; Mark J. Karol, Fair Haven, and Yu S. Yeh, Freehold, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

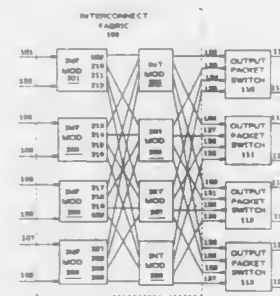
Filed Aug. 29, 1989, Ser. No. 400,184

The portion of the term of this patent subsequent to Sep. 4, 2007, has been disclaimed.

Int. Cl.<sup>3</sup> H04Q 11/04

U.S. Cl. 370—60

7 Claims



5. In an interconnect fabric comprising a plurality of interconnect fabric input ports, each input port being arranged for receiving data packets concurrent with data packets being received at others of the plurality of interconnect fabric input ports, and a plurality of groups of output ports, each group comprising a separate number of output ports, where the separate number of output ports comprised in a group of output ports may be the same as or different from the number of output ports comprised in other groups of output ports, at least one group of output ports comprising a plurality of output ports, a method of conveying each packet received at an interconnect fabric input port to an available interconnect fabric output port of a group of output ports for which the packet is destined, comprising the steps of:

- (a) mapping each received data packet to a destined group of output ports;
- (b) establishing a separate communications path from each separate input port at which a data packet is received to a separate available output port of the destined group of output ports to which the data packet is mapped;

- (c) transmitting each data packet over the separate established communications path; and
- (d) discarding, or storing until a later time slot, packets received during a given time slot in excess of the separate number of output ports comprised in a group of output ports to which the excess packets are mapped.

4,955,017

**GROWABLE PACKET SWITCH ARCHITECTURE**

Kai Y. Eng, Eatontown; Mark J. Karol, Fair Haven, and Yu S. Yeh, Freehold, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

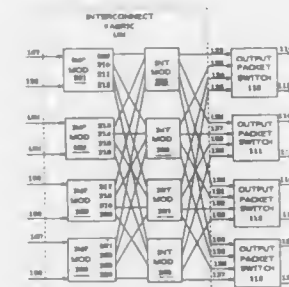
Filed Aug. 29, 1989, Ser. No. 400,183

The portion of the term of this patent subsequent to Sep. 4, 2007, has been disclaimed.

Int. Cl.<sup>3</sup> H04Q 11/04

U.S. Cl. 370—60

3 Claims



1. A packet switching arrangement comprising:

- (i) an interconnect fabric comprising: a plurality of input ports for receiving data packets, a plurality of groups of output ports, each group of output ports comprising a separate number of output ports, where the separate number of output ports comprised in a group of output ports may be the same as or different from the number of output ports comprised in other groups of output ports, at least one group of output ports comprising a plurality of output ports, means for mapping each received data packet to a group of output ports; means for discarding, or storing until a subsequent time slot, those packets received during a given time slot and in excess of the number of output ports comprised in a group of output ports to which those packets are mapped; and
- (ii) a plurality of output packet switches, each output packet switch being arranged to receive data packets from a separate group of interconnect fabric output ports and route the data packets to one or more destinations.

4,955,018

**PROTOCOL FOR NETWORK HAVING PLURALITY OF INTELLIGENT CELLS**

William B. Twitty, Santa Cruz, and Wendell B. Sander, Los Gatos, both of Calif., assignors to Echelon Systems Corporation, Palo Alto, Calif.

Division of Ser. No. 119,382, Nov. 10, 1987, abandoned. This application Nov. 8, 1988, Ser. No. 268,942

Int. Cl.<sup>3</sup> H04J 3/26

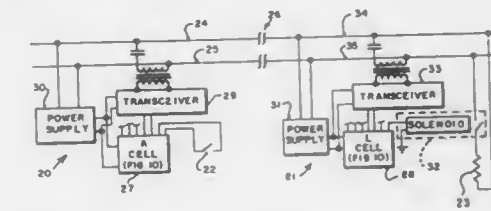
U.S. Cl. 370—85.1

8 Claims

1. In a network for sensing, communicating and controlling where said network includes at least a first and a second media, an improvement comprising:

- a first plurality of cells coupled to said first media;
- a second plurality of cells coupled to said second media;
- a third cell coupled to both said first and second media;
- at least one of said first cells and one of said second cells having a common group identification number and being assigned a group function for said group, said group function being a common task for sensing, communicating and

controlling carried out by said cells in said group identified by said common group identification number; said third cell having said common group identification



number for repeating messages broadcast between said cells having said common group identification number; whereby sensing and control over a network having a plurality of media is achieved.

4,955,019

**MULTIMEDIA INFORMATION EXCHANGING SYSTEM AND EQUIPMENT THEREFOR**

Noboru Mizuhara, Kawasaki; Hoshi Tohru, Yokohama, and Takashi Morita, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

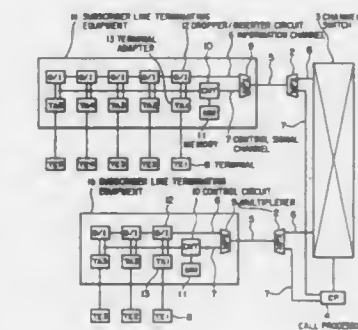
Continuation of Ser. No. 150,170, Jan. 29, 1988, abandoned. This application Oct. 25, 1989, Ser. No. 427,957

Claims priority, application Japan, Mar. 2, 1987, 62-63994

Int. Cl.<sup>3</sup> H04J 3/02

U.S. Cl. 370—85.7

21 Claims



1. A method of exchanging information in a digital network having a plurality of subscriber lines, a plurality of subscriber line terminating equipments connected to said subscriber lines at the subscriber side to accommodate a plurality of terminal devices, respectively, and an exchange system to which said subscriber lines are connected, for selectively establishing a channel between two of said subscriber line terminating equipments, said channel being divided into a plurality of subchannels for parallel communication among a plurality of pairs of terminal devices accommodated in two of said subscriber line terminating equipments, comprising the steps of:

- sending a call setup information from a first one of said subscriber line terminating equipments to the other one according to a request from a first terminal device accommodated in said first one of said subscriber line terminating equipments, said call setup information indicating at least one of the subchannels available for use in said channel established between two of said subscriber line terminating equipments; and
- connecting said subchannel indicated by said call setup information to said first terminal device and a second terminal device accommodated in the other one of two of said subscriber line terminating equipments by means of the control operation of two of said subscriber line terminating equipments during the period which said first or second terminal device require.



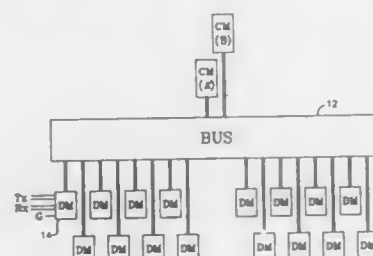
# 4,955,020

## BUS ARCHITECTURE FOR DIGITAL COMMUNICATIONS

William H. Stone, Somerdale, and William E. Boyer, Marlton, both of N.J., assignors to Infotron Systems Corporation, Cherry Hill, N.J.

Filed Jun. 29, 1989, Ser. No. 374,086  
Int. Cl.<sup>5</sup> H04L 7/08, 12/40, 29/04  
U.S. Cl. 370—85.9

31 Claims



1. A digital communications apparatus comprising at least three modules and interconnecting means for providing communication paths between the modules, wherein the interconnecting means comprises a separate data bus for each of said modules, the data bus for each module being connected to conduct only data transmitted by its own module and to deliver the data so transmitted to every other one of said modules, in which said modules are arranged in an array with a first module at one end of the array, a last module at an opposite end of the array, and a plurality of intermediate modules situated between the first and last modules, and in which the data bus for each of the intermediate modules comprises a first section connected directly to the intermediate module by a first connection to conduct data transmitted by the intermediate module and to deliver the data so transmitted to the first module and to all of the modules between the intermediate module and the first module, and a second section connected directly to the intermediate module, by a second connection independent of the first connection, to conduct data transmitted by the same intermediate module and to deliver the data so transmitted to the last module and to all of the modules between the intermediate module and the last module.

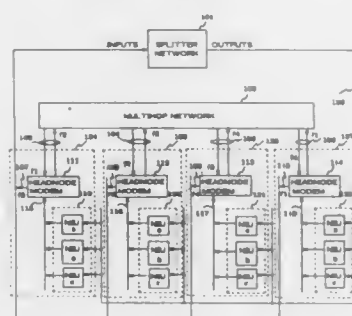
# 4,955,021

## EFFICIENT CONNECTION ARRANGEMENTS FOR MULTIHOP NETWORKS

Lee-Fang Wei, Lincroft, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 3, 1989, Ser. No. 374,895  
Int. Cl.<sup>5</sup> H04J 1/00  
U.S. Cl. 370—124

11 Claims



1. A communications network comprising (i) at least one communications media, and (ii) a plurality of NIUs, each NIU being arranged to receive data from at least one of the commu-

nications media on a first separate set of one or more frequencies and to transmit data onto at least one of the communications media on a second separate set of one or more frequencies and to add frequencies to, or subtract frequencies from, the first set of frequencies, and wherein data, transmitted from an NIU on a transmitting frequency which is not included in the first set of frequencies of an NIU to which the data is destined, is transmitted through one or more intermediate NIUs until reaching an intermediate NIU which transmits the data on a frequency which is included in the first set of frequencies of the NIU to which the data is destined.

# 4,955,022

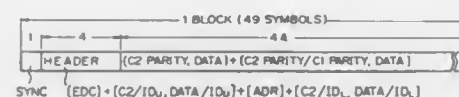
## ENCODING APPARATUS AND METHOD FOR ERROR CORRECTION

Kentaro Odaka, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Sep. 30, 1988, Ser. No. 252,807  
Claims priority, application Japan, Oct. 6, 1987, 62-251908  
Int. Cl.<sup>5</sup> G06F 11/10

U.S. Cl. 371—37.4

20 Claims



11. A data encoding method for error correction of the type in which encoding is performed such that information symbols are respectively included in different first and second error correction code series, and one block of data is formed by header data, including at least a block address for discrimination of a data block, and a main data portion which does not include said address, said encoding method comprising the steps of:

- (A) forming said first error correction code series (C1) including first parity data for a set of symbols in which a plurality of said blocks are arranged with respect to all of the symbols included in said blocks;
- (B) mixing a part of said main data into said header data; and
- (C) forming said second error correction code series (C2) including second parity data with regard to a part of the header data in Step (B) and all of said main data portion.

# 4,955,023

## ERROR CORRECTION CONTROL SYSTEM FOR CONTROL MEMORY

Kenzo Tanimoto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Mar. 4, 1988, Ser. No. 164,021  
Claims priority, application Japan, Mar. 4, 1987, 62-47707; Mar. 4, 1987, 62-47708

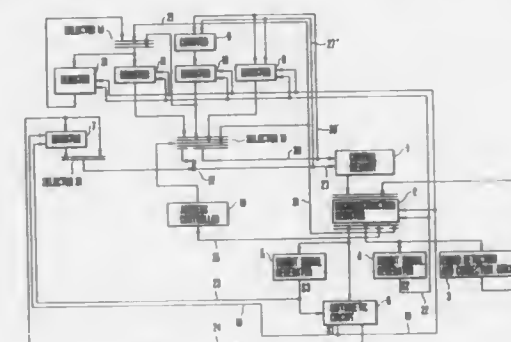
Int. Cl.<sup>5</sup> G06F 11/00

U.S. Cl. 371—40.1

3 Claims

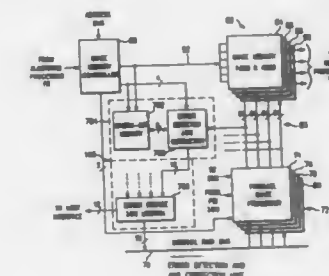
2. An error correction control system for a control memory in a microprogram-controlled data processor, comprising: a control memory for storing microinstructions; a microinstruction register in which data read out from said control memory is set; an arithmetic circuit, operating in accordance with the contents of said microinstruction register; a control circuit for determining an address of a microinstruction to be executed next in accordance with the microinstruction in said microinstruction register; an error detection and correction circuit for adding error correction codes to the microinstructions and storing them in said control memory, detecting and correcting an error of the microinstruction set in said microinstruction register, and setting the corrected microinstruction in said microinstruction register;

inhibit signal generating means for, when a correctable error is detected by said error detection and correction circuit, generating a second inhibit signal for inhibiting updating said microinstruction register and a third inhibit signal for inhibiting an operation of said arithmetic circuit; an address save register in which an address corresponding to the microinstruction set in said microinstruction register is set; and a branch address save register in which branch information supplied from said arithmetic circuit is set, wherein when a correctable error in a field containing next address information and an error correction code of the microinstruction is detected at the same time a first inhibit signal caused by said arithmetic circuit is generated, an



error correction sequence is inhibited by the first inhibit signal, the second inhibit signal is generated in a clock period in which the error is detected, the error correction sequence is begun at the same time the first inhibit signal is disabled, the third inhibit signal is generated at a timing one clock period after the second inhibit signal is generated, the second inhibit signal is disabled, and said microinstruction register is updated in accordance with the contents of said address save register and said branch address save register after the error correction sequence is completed, and then the third inhibit signal is disabled at a timing one clock period after the second inhibit signal is disabled, thereby restarting the operation of said arithmetic circuit.

monitoring data transferred between said memory planes and said data processor circuits; and



circuitry for preventing said data processor circuits from processing image data found to be in error by said data error detector circuit.

# 4,955,025

## FIBRE-OPTIC LASERS AND AMPLIFIERS

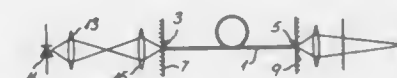
Robert J. Mearz, 34 Thorold Road, Bitterne Park, Southampton, Hampshire SO2 4JB; Laurence Reekie, 117 Oaktree Road, Bitterne Park, Southampton, Hampshire SO2 4PJ; Simon B. Poole, 18 Union Road, Northam, Southampton, Hampshire SO2 0PU, and David N. Payne, 12 Redcroft Lane, Lowford, Bursledon, Southampton, Hampshire SO2 5NH, all of England

Continuation of Ser. No. 211,093, Jun. 10, 1988, abandoned, which is a continuation of Ser. No. 56,997, Apr. 9, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 326,458  
Claims priority, application United Kingdom, Aug. 13, 1985, 8520300; Aug. 13, 1985, 8520301

Int. Cl.<sup>5</sup> H01S 3/30

U.S. Cl. 372—6

6 Claims



# 4,955,024

## HIGH SPEED IMAGE PROCESSING COMPUTER WITH ERROR CORRECTION AND LOGGING

David M. Pfeiffer, Plano; David T. Stoner, McKinney; John P. Norworthy, Carrollton; Dwight D. Dipert, Richardson; Jay A. Thompson; James A. Fontaine, both of Plano, and Michael K. Corry, Dallas, all of Tex., assignors to Visual Information Technologies, Inc., Plano, Tex.

Division of Ser. No. 97,664, Sep. 14, 1987. This application Jan. 24, 1989, Ser. No. 301,372

Int. Cl.<sup>5</sup> G06F 11/10

U.S. Cl. 371—40.1

7 Claims

1. An image processing system comprising: a plurality of planes of image memory for storing image data; circuitry for addressing said memory planes for accessing said image data; data processor circuits connected to respective memory planes by data lines; a data error detector circuit coupled to said data lines for

1. A fibre-optic laser comprising: a resonant cavity including a length of silica glass optical fibre having a core and cladding, and incorporating active dopant ions in the core thereof; and a diode laser optical pump source coupled to said resonant cavity to inject continuous optical pumping radiation to propagate along said resonant cavity to stimulate continuous wave mode emission therefrom, wherein the fibre is of a length of at least 5 cm, and of single-mode geometry and is of a type capable of sustaining single transverse mode propagation at emission wavelength; and, the active dopant ions, ions of a rare-earth or a transition metal, are incorporated in the fibre at a low-level uniform concentration (<900 ppm) the fibre providing an ultra-low loss (<40dB/km) holst therefor.

1. A semiconductor device comprising:
  - (a) a substrate;
  - (b) a monocrystalline double heterostructure stack deposited on said substrate (D), said stack comprising active layers (CA) having different compositions and having light radiating properties, each of said layers being sandwiched between two confinement layers (CC) having a microcrystal lattice size adjacent to that of the active layers, with all of said layers having the same conductivity type;
  - (c) selective etching on the top of the stack in parallel strips

Diagram illustrating the structure of a GaAs Schottky diode. The layers are labeled as follows:

- Barrier Metal
- CVD oxide (thick)
- Insulator (120-100 Å)
- Active Layer n-ZnSe
- n-ZnS<sub>3</sub>Se<sub>1-x</sub> (x=0.12-0.20)
- ZnSe buffer layer
- n-ZnSe substrate
- ohmic contact

(f) an electrical contact on said substrate, thereby a potential applied across said top metal layer and substrate causes the barrier metal to inject minority holes into said active layer to produce photons from the recombination electrons and holes in said active layer, said photons being reflected from said confining layer and metal stripe of said top layer along the length thereof and being discharged from said active layer at an end of said layer.



1. A low-power RF receiver, comprising:
  - a battery;
  - at least two antenna circuits, tuned to a predetermined reception frequency;
  - at least two comparators, each having a respective pair of inputs directly connected to receive a low-level analog signal at said predetermined frequency from a respective one of said antenna circuits;
  - at least one digital logic stage, connected to be driven by the output of a selected one of said comparators and to provide a full digital output corresponding to the voltage received at said selected comparator;
  - said comparators and said logic stage being connected to be powered by said battery.

4,955,039

## QUADRATURE RECEIVER

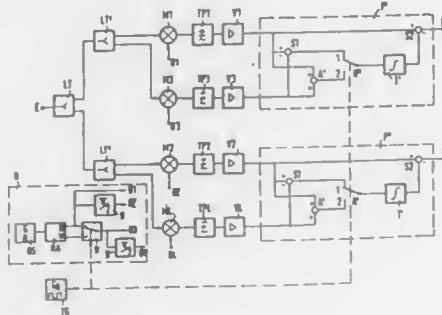
Dietrich Rother, Tamm; Bernd Ripka, Tiefenbrunn-Mühlhausen, and Rainer Berger, Albstadt, all of Fed. Rep. of Germany, assignors to Alcatel N.V., Amsterdam, Netherlands  
Filed May 3, 1989, Ser. No. 346,780

Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815055

Int. Cl.<sup>5</sup> H03D 1/22

U.S. Cl. 375—75

8 Claims



1. A quadrature receiver comprising:  
oscillator means for producing:

- a first oscillator signal,
- a second oscillator signal which differs in phase by 90° from the first oscillator signal,
- a third oscillator signal alternately in phase with and in phase opposition to the first oscillator signal, and
- a fourth oscillator signal alternately in phase with and in phase opposition to the second oscillator signal;
- a first mixer for mixing a received signal with the first oscillator signal;
- a second mixer for mixing the received signal with the second oscillator signal;
- a third mixer for mixing the received signal with the third oscillator signal;
- a fourth mixer for mixing the received signal with the fourth oscillator signal;
- first circuit means having a first input coupled to an output from the first mixer and a second input coupled to an output of the third mixer for providing an in-phase signal; and
- second circuit means having a first input coupled to an output of the second mixer and a second input coupled to an output of the fourth mixer for providing a quadrature signal.

4,955,040

## METHOD AND APPARATUS FOR GENERATING A CORRECTION SIGNAL IN A DIGITAL CLOCK RECOVERY DEVICE

Imre Sarkoezi, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 14, 1988, Ser. No. 257,559

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1987, 3736351

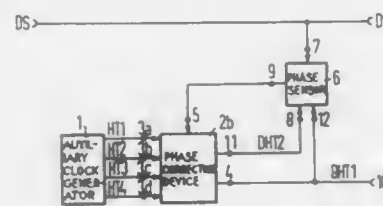
Int. Cl.<sup>5</sup> H03D 3/24

U.S. Cl. 375—119

10 Claims

1. A method for generating a correction signal K when a defined phase interval occurs between a digital signal DS and a first auxiliary data clock signal DHT1 which is the recovered clock of the digital signal DS, which has been selected and, which has a phase relationship which changes relative to one of several auxiliary clocks HT1-HTm which are shifted equal phase angles relative to each other where m is an integral number, comprising, the steps of generating a second auxiliary data clock DHT2 which has the same frequency as said first

auxiliary data clock signal and which is shifted in phase by a fraction n/m from the first auxiliary data clock DHT1, measuring the phase angle between the first edges of the pulses of said digital signal DS and said second auxiliary data clock DHT2



where n = integral number,  $n \leq m$  and producing the correction signal K as an output if no phase angle is detected and shifting from one clock signal to the other in response to the correction signal K.

4,955,041

## ELECTRONIC PULSE COUNTER FOR SIMULTANEOUS DOWNWARD AND UPWARD COUNTING

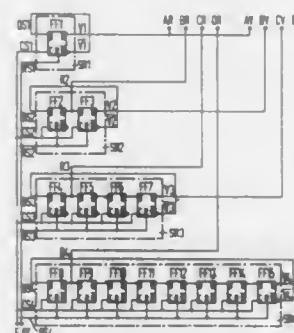
Josef Hoolze, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany  
Filed Jan. 30, 1989, Ser. No. 304,190

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 3802530

Int. Cl.<sup>5</sup> H03K 21/12, 23/86

U.S. Cl. 377—54

5 Claims



1. Electronic pulse counter, comprising a given number of shift registers each having a different number of memory elements, an input, an output and a clocking line; each of said shift registers being counter-coupled by means of a negation between said input and said output thereof; a pulse counter input formed by interconnection of said clocking lines of all of said shift registers; and pulse counter outputs formed by said outputs of said shift registers, wherein said memory elements of each of said shift registers include a first memory element, said outputs of said first memory elements of each of said shift registers form further pulse counter outputs, said given number of memory elements of said shift registers is equal to powers of 2, beginning with the power 0, said first outputs form an upward counter, and said further outputs form a downward counter, whereby simultaneous downward and upward counting are provided.

4,955,042

## DENTAL RADIOGRAPHIC APPARATUS FOR PHOTOGRAPHING ENTIRE JAWS

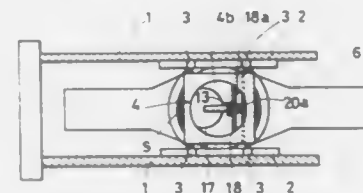
Kazuo Nishikawa, Kyoto, Japan, assignor to Kabushiki Kaisha Morita Seisakusha, Kyoto, Japan

Continuation of Ser. No. 235,776, Aug. 23, 1988, abandoned, which is a continuation of Ser. No. 940,947, Dec. 12, 1986, abandoned, which is a division of Ser. No. 667,769, Nov. 2, 1984, abandoned. This application Jan. 5, 1989, Ser. No. 363,422  
Claims priority, application Japan, Nov. 12, 1983, 58-212992  
The portion of the term of this patent subsequent to Apr. 28, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> G03B 41/16

U.S. Cl. 378—39

2 Claims



1. A dental radiographic apparatus for photographing the entire jaws in which the apparatus includes a rotary arm having an X-ray source at one end and an X-ray film cassette at the other end thereof and a means for sequentially shifting the center of rotation of the X-ray beam irradiated from the X-ray source upon the X-ray film cassette such that a path of movement of said X-ray beam with respect to a substantially elliptical locus of a dental arch describes a symmetrically extending approximately triangular envelop projecting toward the front tooth region of the substantially elliptical dental arch, said apparatus being characterized in that it comprises a means for changing a straight-line distance on a medial line of the human body between an apex of said triangular envelop and a line joining receding points of limit of the triangular envelop to change a major axis of the elliptical locus of the dental arch, said means for changing the straight-line distance varies the position of the apex of the triangular envelop without changing a minor axis of the approximately elliptical locus of the dental arch and the position of the line joining the receding points of limit of the triangular envelop.

4,955,043

## X-RAY DIAGNOSTICS INSTALLATION

Anton Nekovar, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 14, 1988, Ser. No. 244,153

Claims priority, application Fed. Rep. of Germany, Sep. 28, 1987, 3732634

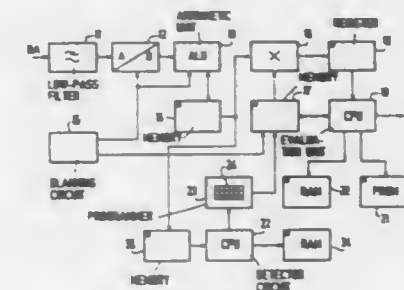
Int. Cl.<sup>5</sup> H05G 1/44

U.S. Cl. 378—108

6 Claims

1. An x-ray diagnostics installation for examining a subject comprising:  
means for exposing an examination subject to an x-ray dose;  
means for generating an x-ray image from x-radiation attenuated by said subject;  
means for generating video signals comprising a video image from said x-ray image;  
a processing circuit, connected to said means for generating video signals, to which said video signals are directly supplied, including weighting means for assigning respectively different weighting factors to video signals corresponding to different regions of said video image to form weighted image regions, and means for combining said weighted image regions to form an actual value signal, said processing circuit connected to said means for expos-

ing so as to supply said actual value signal thereto to control said x-ray dose; and  
said video image consisting of a plurality of picture elements, and said processing circuit further including data reduc-



tion means for combining respective portions of video signals corresponding to said plurality of picture elements to form said image regions, said data reduction means preceding said weighting means in said processing circuit.

4,955,044

## LIGHTED DISPLAY CASE

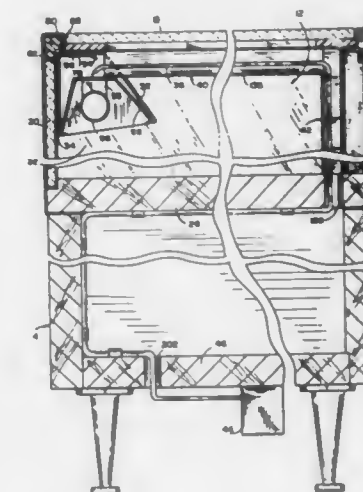
Douglas D. Amstutz, Muskegon, and Ronald A. Vanderboegh, Twin Lakes, both of Mich., assignors to Amstore Corporation, Muskegon, Mich.

Filed Dec. 2, 1988, Ser. No. 279,591

Int. Cl.<sup>5</sup> A47F 11/10

U.S. Cl. 362—125

28 Claims



1. A display case comprising:

- a framework;
- a plurality of panels supported by said framework and defining therewith an enclosure;
- a light fixture for illuminating the enclosure said light fixture including a housing defining at least one opening there-through; and
- mounting means for applying a biasing force to said light fixture and engaging and resiliently urging said light fixture against a portion of said case to thereby releasably attach said light fixture thereto, said mounting means extending through said opening for releasably mounting said light fixture, said biasing force applied by said mounting means being easily overcome by manual pressure so that said mounting means can be resiliently moved away from said portion of said case when said light fixture is removed from and attached to said framework.



4,955,045

**PLASMA X-RAY TUBE, IN PARTICULAR FOR X-RAY PREIONIZATION OF GAS LASERS AND METHOD FOR PRODUCING X-RADIATION WITH SUCH AN X-RAY TUBE**

Dirk Friede, Herzogenaurach; Hans-Juergen Cirkel, Uttenreuth; Rudolf Baumgartl, Alzenau-Hörstein, and Matthias Schmetzler, Aschaffenburg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

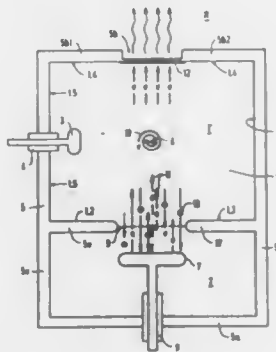
Filed Apr. 10, 1989, Ser. No. 335,700

Claims priority, application Fed. Rep. of Germany, Apr. 8, 1988, 3811818; Feb. 14, 1989, 3904417

Int. Cl.<sup>5</sup> H01J 35/00

U.S. Cl. 378-122

18 Claims



15. Method for generating X-radiation, in a plasma X-ray tube with high electron current densities including a plasma chamber formed of a metal hollow cathode with an X-ray target and a metal acceleration grid, an ignition electrode and an anode in the plasma chamber, an acceleration chamber, and an acceleration cathode in the acceleration chamber, which comprises varying acceleration voltage and current by varying current in the hollow cathode and gas pressure, without changing their electrical excitation data.

4,955,046

**C-ARM FOR X-RAY DIAGNOSTIC EXAMINATION**

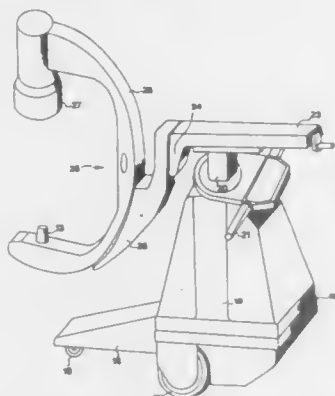
Aldona A. Siczek, and Bernard W. Siczek, both of 1252 Chinook Way, Boulder, Colo. 80303

Filed Apr. 17, 1989, Ser. No. 338,945

Int. Cl.<sup>5</sup> H05G 1/02

U.S. Cl. 378-197

13 Claims



1. A C-arm X-ray apparatus for use in diagnostic examinations comprising: a C-arm being an arc-shaped member having an image source and an image receptor mounted on opposite ends thereof, a vertical structure for supporting said C-arm,

wherein said structure is moveably mounted on a base means and connected to a drive means for vertical displacement, a counter-balancing means for a vertical movement comprising a torsion spring connected to a first drum, said torsion spring and said first drum mounted on a first shaft secured on opposite ends to said base means, a second drum mounted on a second shaft secured to said base means and connected to said first drive means and further coupled to said first drum so that the rotation of said second drum causes the rotation of said first drum and further causes said torsion spring to store the rotation energy while the C-arm is being lowered and to release that stored energy when said C-arm is being raised.

4,955,047

**AUTOMATED ATTENDANT WITH DIRECT INWARD SYSTEM ACCESS**

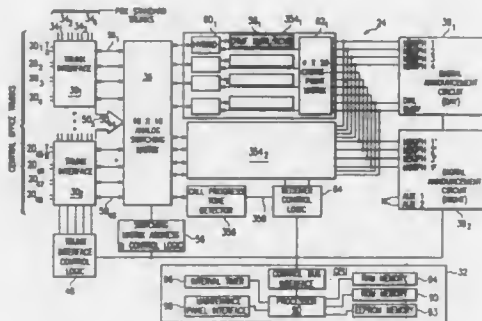
Sanford J. Morganstein, Elgin; Ron H. Bindl, Downers Grove; Mark D. Klecka, Kekalb; Herbert B. Krakau, Elmhurst, and Thomas M. Dawson, Lisle, all of Ill., assignors to Dytel Corporation, Schaumburg, Ill.

Continuation-in-part of Ser. No. 99,388, Sep. 21, 1987, which is a continuation of Ser. No. 593,526, Mar. 26, 1984, Pat. No. 4,696,028. This application May 2, 1989, Ser. No. 346,167

Int. Cl.<sup>5</sup> H04M 3/38, 3/50, 15/12

U.S. Cl. 379-112

8 Claims



1. Apparatus for connecting an outside caller to an extension of a local exchange having a direct inward system access (DISA) feature, comprising:

- a processor;
- a memory coupled to said processor storing at least one predetermined security code;
- a dialing information receiver controlled by said processor for receiving dialing information including a group code input from an outside caller;
- a memory coupled to said processor and said receiver for storing said dialing information, and storing second dialing information including the extension number of said extension, said processor operable to correlate said dialing information with said second dialing information; and
- a transmitter coupled to said processor and said local exchange for transmitting said security code and second dialing information to said local exchange.

4,955,048

**MULTIPLEX TRANSMISSION OF AUDIO SIGNAL AND VIDEO SIGNAL THROUGH INHOUSE CABLE**

Soichi Iwamura, Fuchu; Satoshi Murakami, Nagareyama, and Tadashi Isumi, Kashiwa, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 43,757, Apr. 29, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,197

Claims priority, application Japan, Apr. 30, 1986, 61-100185; Apr. 30, 1986, 61-100187

Int. Cl.<sup>5</sup> H04M 11/00; H04N 7/14

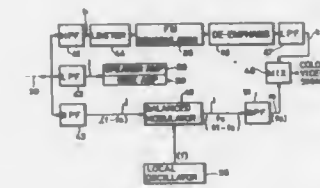
U.S. Cl. 379-53

15 Claims

1. A method for transmitting and receiving multiplexed

audio-video signals between two sets of transmitters/receivers, one transmitter/receiver set at each of a first and second station, by a pair of telephone communication cables, by multiplexing baseband audio signals and video signals, the baseband audio signals being bidirectional, comprising the steps of:

- (a) frequency modulating the video signals at said first station with a first low frequency carrier;
- (b) multiplexing the frequency-modulated video signals of step (a) with the baseband audio signals at said first station;
- (c) frequency modulating the video signals of said second station with a second low frequency carrier, different from said first low frequency carrier;
- (d) multiplexing the frequency-modulated video signal of



- step (c) with baseband audio signals at said second station such that said multiplexed signals at each of said first and second stations both operate at different frequencies;
- (e) simultaneously transmitting each of the multiplexed signals of steps (b) and (d) through the pair of telephone communication cables in a bidirectional manner;
- (f) separating the multiplexed signals of step (d) and (b) into audio signals and frequency-modulated video signals at each of said first and second stations respectively;
- (g) removing an amplitude component from each of the separated frequency-modulated video signals of step (f);
- (h) frequency demodulating each of the frequency modulated video signals of step (g), thereby allowing bidirectional transmission of the audio and video signals.

4,955,049

**METHOD OF SUPERVISING MOBILE TELEPHONE SUBSCRIPTIONS IN A MOBILE TELEPHONE SYSTEM**

Walter Ghisler, Upplands Väsby, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

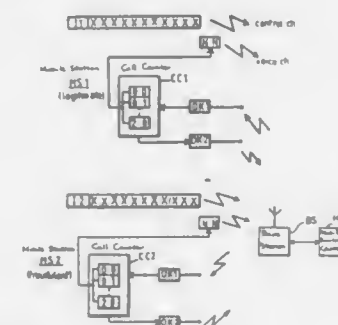
Filed Sep. 8, 1989, Ser. No. 404,572

Claims priority, application Sweden, Aug. 11, 1989, 8902715

Int. Cl.<sup>5</sup> H04Q 7/04

U.S. Cl. 379-58

3 Claims



1. A method of supervising mobile telephone subscriptions in a mobile telephone system including a number of mobile

stations (MS1, MS2) and at least one fixed station (MSC), characterized in

- assigning to each mobile station (MS1) a first predetermined sequence of numbers and numbering the calls chargeable to a particular subscription by said first sequence of numbers;
- signalling these numbers from the mobile station (MS1) to the fixed station (MSC) in a second predetermined sequence (NN), one number for each paying call when a call is made;
- recording said second predetermined sequence (NN) of numbers together with the subscription number and a certain point of time.

4,955,050

**SYSTEM CONFIGURATION OF WIRELESS PBX AND COMMUNICATION METHOD THEREFOR**

Yukiji Yamauchi, Kokubunji, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

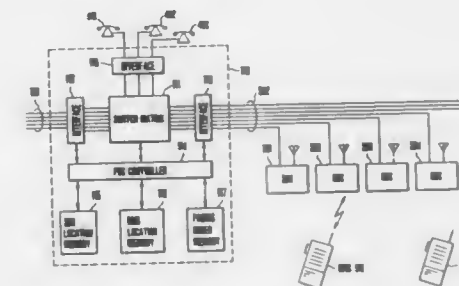
Filed Mar. 31, 1989, Ser. No. 331,298

Claims priority, application Japan, Apr. 1, 1988, 63-78008

Int. Cl.<sup>5</sup> H04Q 7/04

U.S. Cl. 379-59

8 Claims



1. A system configuration of wireless PBX comprising: a plurality of portable radio mobile means;
- a plurality of radio base means connectable via radio channels to said portable radio mobile means for linking communications between said portable mobile means;
- a private branch exchange connected via wire lines to said radio base means for supervising a relationship of interconnections among said portable radio mobile means;
- each of said radio mobile means including means for generating a signal at a predetermined time interval, said signal containing a first identification number specifically assigned beforehand to each of said radio mobile means;
- each of said radio base means including means for forming a packet upon reception of said signal and sending said packet to said private branch exchange, said packet being composed of said first identification number contained in said signal and a second identification number specifically assigned to each of said radio base means; and
- said private branch exchange including a first memory for storing said first and second identification numbers contained in said packet received from said radio base means, while retaining a correspondence between said first and second identification numbers;
- wherein when a subscriber to a first radio mobile means requests a communication by designating a second radio mobile means, said private branch exchange refers to said first memory and connects said first radio mobile means to said second mobile means via a radio base means in correspondence with said second radio mobile means; and
- when said subscriber to said first radio mobile means requests a communication by designating an arbitrary radio base means, said private branch exchange refers to said first memory and connects said first radio mobile means to a specified radio mobile means in correspondence with said specified radio base means.

4,955,051

# **DICTATING APPARATUS WHICH IS REMOTELY CONTROLLED UTILIZING A PUSH-BUTTON TELEPHONE**

Masaki Sato, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Japan

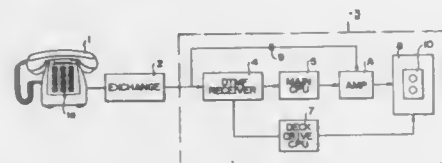
Filed Sep. 22, 1987, Ser. No. 99,473

Claims priority, application Japan, Sep. 24, 1986, 61-225213

Int. Cl.<sup>5</sup> H04M 1/65, 11/10; G11B 15/18

U.S. Cl. 379—75

12 Claims



1. A telephone dictating apparatus operable in record, playback, stop and rewind modes, said apparatus comprising: a hand held control device having a control switch movable into record, playback, stop and rewind positions having a predetermined spatial relationship; control means for switching said dictating apparatus between said modes as a function of the position of said control switch; and telephone signal receiving means responsive to four DTMF signals generated by a telephone and transmitted to said dictating apparatus over telephone lines, said telephone having a plurality of push-buttons arranged in a spatial relationship, said telephone generating respective DTMF signals in response to the depression of respective ones of said push-buttons, said four DTMF signals being generated in response to the depression of four respective ones of said push-button of said telephone, said four respective push-buttons having a spatial relationship with respect to one another which is substantially the same as the spatial relationship of the record, playback, stop and rewind positions of said control switch; said telephone signal receiving means causing said control means to switch said dictating apparatus between said record, playback, stop and rewind modes in response to the receipt of a respective one of said four DTMF signals generated by the depression of the one of said push buttons in a spatial position corresponding to the spatial position of the control switch of the hand held control device which activates the desired mode, such that there is a one-to-one spatial correspondence between the functions of said four respective push buttons of said telephone and the functions of said four respective positions of said control switch of said hand held control device.

4,955,052

# **PAY PHONE SYSTEM AND APPARATUS**

Syed Hussain, 1920 Shipway Ave., Long Beach, Calif. 90815

Filed Jul. 27, 1989, Ser. No. 385,407

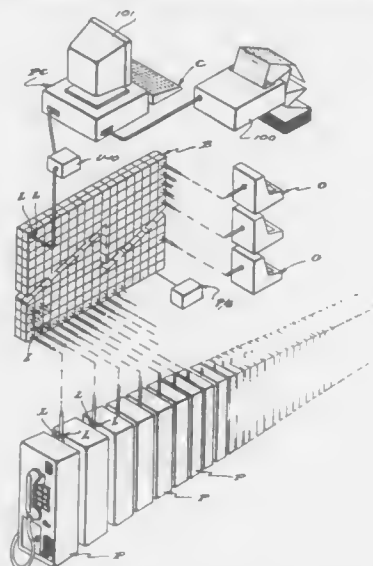
Int. Cl.<sup>5</sup> H04M 17/02, 11/00

U.S. Cl. 379—94

9 Claims

9. In a coin-operated pay phone that is connected with a related central switching device on a related central switching board by a pair of telephone lines and wherein a normally open loop circuit through the pay phone, switching device and telephone lines is closed to put the pay phone in operation and enable it to be connected with another telephone by a normally open hook-switch in the pay phone that closes when a user of the pay phone manipulates a part thereof that operates to close the hook-switch; the pay phone next includes a coin counting device connected with parts in the pay phone and that includes a microcomputer that receives and stores in its memory data pertaining to the coinage deposited in and handled by the pay phone and that operates to impose the data stored thereby on the operating voltage on the telephone lines in response to

command signals directed to it by a monitoring computer connected with the switching board while the hook-switch remains open, the monitoring computer operates to connect with the pay phone by first causing the switching device thereof to direct intermittent ring signals to the pay phone, the coin counting device includes a pair of extension lines each connected with one of the telephone lines and a normally open



4,955,053

# **SOLID STATE RINGING SWITCH**

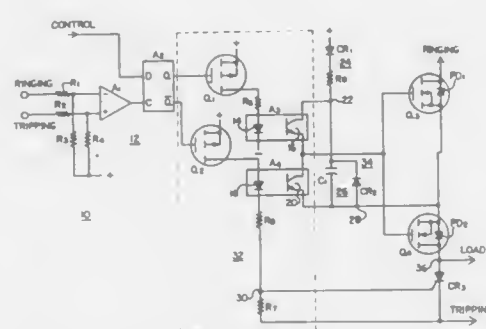
Gary G. Slegmund, Elyria, Ohio, assignor to Reliance Comm/Tec Corporation, Chicago, Ill.

Filed Mar. 16, 1990, Ser. No. 496,068

Int. Cl.<sup>5</sup> H04M 3/02

U.S. Cl. 379—253

15 Claims



12. A switch for alternately providing to a load a signal from a ringing generator for a predetermined time interval and a tripping signal for a predetermined time interval, said switch comprising:

- (a) means for determining when said ringing signal crosses said tripping signal in a predetermined direction and generating a signal indicative thereof;
- (b) means for synchronizing said indicative signal to a periodic control signal representative of said predetermined

ringing time interval and generating a first output signal when said indicative signal occurs in said predetermined ringing time interval;

- (c) first power output switching means having a closed state which places a substantially constant and low impedance in series with said ringing generator for providing said ringing signal to said load;
- (d) second power output switching means having a closed state for providing said tripping signal to said load; and
- (e) means responsive to said synchronizing means first output signal for generating from said ringing signal without introducing any perceptible distortion therein a signal for driving said first power output means into said closed state.

4,955,054

# **INTEGRATED TELECOMMUNICATION SYSTEM WITH IMPROVED DIGITAL VOICE RESPONSE**

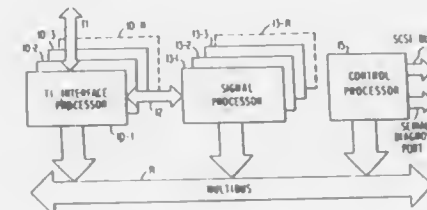
Ferrell W. Boyd, Jr., Clearwater; Michael Murdock, Pinellas Park; Michael McCormack, Tampa, all of Fla., and Paul Darbee, Santa Ana, Calif., assignors to Precision Software Incorporated, Clearwater, Fla.

Filed Oct. 5, 1988, Ser. No. 253,470

Int. Cl.<sup>5</sup> H04M 3/50; H04Q 11/04

U.S. Cl. 379—269

5 Claims



1. An integrated telecommunication system for multiple telephone line response and processing comprising:

- a plurality of interface processor circuits, each of which is adapted to control the physical connection to a plurality of telephone line channels and control communication on a group of said telephone line channels connected thereto. each said interface circuit including a high speed interface control microprocessor and a first data storage associated therewith,

a plurality of signal processor circuit means, each said signal processor circuit means including crosspoint switch means for receiving multiple line multiple channel inputs and producing corresponding multiple line multiple channel outputs, and a high speed digital signal microprocessor for analyzing the incoming signals and compressing the data therein, and a second data storage associated therewith, for controlling one or more telecommunication function circuits,

- a main system control microprocessor,
- a first bus system for connecting said plurality of interface processor circuits to said plurality of signal processor circuit means, and
- a second bus system for connecting each of said plurality of interface processor circuits to each of said plurality of signal processor circuit means and to said main system control microprocessor,

whereby the high speed processing requirements of each said group of telephone lines is performed by said interface processor circuits and said digital signal microprocessor and said main system control microprocessor controls the storage of data in said first and second data storages and intercommunication functions between said plurality of interface processor circuits and said plurality of signal processor circuit means and said one or more telecommunication function circuits controlled thereby.

4,955,055

# **LOUDSPEAKING TELEPHONE WITH A FREQUENCY SHIFTING CIRCUIT**

Hisashi Fujisaki, and Keiko Shimada, both of Tokyo, Japan, assignors to NEC Corporation, Japan

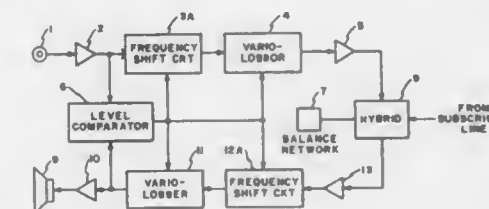
Filed Mar. 8, 1988, Ser. No. 165,629

Claims priority, application Japan, Mar. 12, 1987, 62-55129

Int. Cl.<sup>5</sup> H04M 9/08

U.S. Cl. 379—390

4 Claims



1. A voice switched type loudspeaking telephone comprises: means for comparing the levels of a sending voice signal and a receiving voice signal to produce a level comparison between said levels;

first frequency shifting means in a transmitting path responsive to said level comparison for frequency-shifting a signal in said transmitting path;

second frequency shifting means in a receiving path responsive to said level comparison for frequency-shifting a signal in said receiving path;

first level control means in said transmitting path responsive to said level comparison for level-controlling a signal in said transmitting path; and

second level control means in said receiving path responsive to said level comparison for level-controlling a signal in said receiving path.

4,955,056

# **PATTERN RECOGNITION SYSTEM**

Frederick W. M. Stentford, Woodbridge, England, assignor to British Telecommunications public company limited, London, England

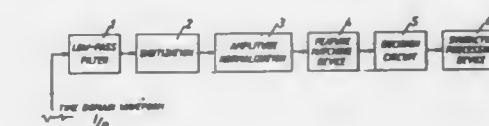
Filed Jul. 16, 1986, Ser. No. 886,072

Claims priority, application United Kingdom, Jul. 16, 1985, 8517918

Int. Cl.<sup>5</sup> G10L 5/06

U.S. Cl. 381—43

16 Claims



1. Speech recognition apparatus comprising:

(a) input means for receiving, in successive overlapping temporal portions, an electrical signal containing speech data;

(b) a feature detection device responsive to said electrical signal over a temporal portion thereof for detecting the presence of a plurality of predetermined features within said portion; and

(c) decision means for indicating recognition of elements of speech, each said element corresponding to the presence of a predetermined combination of said detected features, the said decision means including:

(i) assignment means for assigning a label corresponding to one of said elements of speech to each said portion in dependence on the features detected therein, together with a corresponding confidence measure indicating the



code data,  
wherein said encoding circuit means includes

- (i) first detecting circuit means for detecting transition points where the value of said input image data changes from one to another of said first and second binary values,
- (ii) counter means for generating addresses of said transition points of said input image data,
- (iii) second detecting circuit means for detecting if the value of said input image data does not change during a time period exceeding a predetermined period,
- (iv) control means for controlling said counter means so as to count at a faster than normal speed until a predetermined number is reached during each predetermined period when the value of the input image data does not change during a period exceeding the predetermined period, and
- (v) encoder means for encoding said input image data by using said addresses of said transition points of said input image data.

4,955,062

**PATTERN DETECTING METHOD AND APPARATUS**  
Hiroshi Terui, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

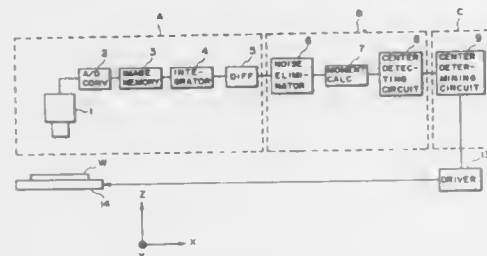
Continuation of Ser. No. 130,449, Dec. 9, 1987, abandoned. This application Jul. 18, 1989, Ser. No. 362,037

Claims priority, application Japan, Dec. 10, 1986, 61-294362; Dec. 10, 1986, 61-294363

Int. Cl.<sup>5</sup> G06K 9/03, 9/20

U.S. Cl. 382—8

2 Claims



2. A method of detecting the position of a linearly extending pattern, with respect to a predetermined direction perpendicular to the lengthwise direction of the pattern, said method comprising the steps of:

- irradiating the pattern with a radiation beam;
- forming on an image pickup surface of an image pickup device an image of the pattern by using the beam irradiated from the pattern;
- setting a plurality of different windows to the image pickup surface;
- processing image data in each window to detect, in each of the different windows, a center of the pattern with respect to the predetermined direction; and
- determining the position of the pattern with respect to the predetermined direction, on the basis of results obtained by data processing made in relation to the different windows.

4,955,063

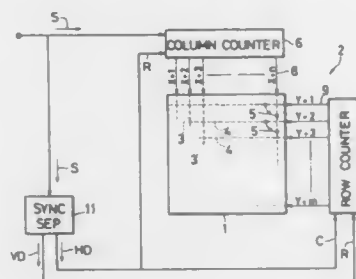
**VECTOR DISPLAY APPARATUS**  
Gerald A. Pierce, Redwood City, Calif., assignor to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Mar. 30, 1989, Ser. No. 332,420

Int. Cl.<sup>5</sup> G06K 9/46

U.S. Cl. 382—18

7 Claims



1. A vector display apparatus for displaying vectors as an optical pattern used in an image recognition system, each of said vectors having components which represent an intensity distribution of the projection obtained by projecting an image to be recognized onto an imaginary axis, said apparatus comprising:

- a two-dimensional display panel including light-emitting elements arranged in a matrix form;
- driving means for driving said light-emitting elements to

turn on ones of said light-emitting elements located at positions corresponding to the magnitudes of the components of each of said vectors with an area assigned to the vector in said display panel.

4,955,064

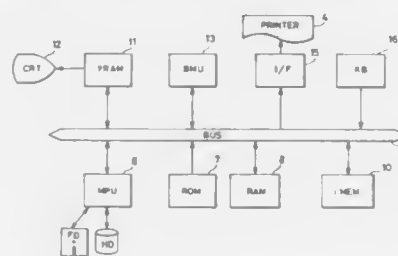
**GRAPHIC EDGE EXTRACTING APPARATUS**  
Akifumi Shirasaka, Yokohama; Kundo Seto, Inagi; Masaki Hamada, Tokyo, and Yukari Shibuya, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 2, 1987, Ser. No. 103,596

Claims priority, application Japan, Oct. 20, 1986, 61-250366; Int. Cl.<sup>5</sup> G06K 9/00

U.S. Cl. 382—22

9 Claims



1. A graphic edge extracting apparatus comprising: memory means for storing graphic image data; and graphic edge pixel extracting means for developing the graphic image data on a bit plane in a bit map memory of said memory means and executing a plurality of bitblt (bit block transfer: synthesis during drawing) processes, the bitblt processes including shifting of the relative position of the graphic image data as a whole, to extract inner edge pixels of the graphic image.

4,955,065

**SYSTEM FOR PRODUCING DITHERED IMAGES FROM CONTINUOUS-TONE IMAGE DATA**

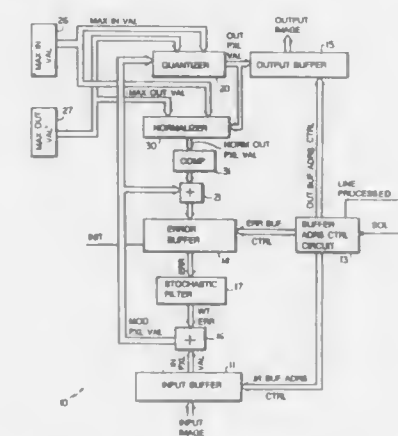
Robert A. Ulichney, Cambridge, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 26,588, Mar. 17, 1987, abandoned. This application Oct. 10, 1989, Ser. No. 441,331

Int. Cl.<sup>5</sup> G06K 9/38

U.S. Cl. 382—50

16 Claims



1. An image processing system for processing continuous tone pixel image values from a data source representing an image, the image being represented by a plurality of lines of pixels, with each line including a plurality of pixels, to produce output pixel values, said data source iteratively presenting to

4,955,067

**RADIATION IMAGE READ-OUT APPARATUS**  
Kazuo Shimura, Kanagawa, Japan, assignor to Fuji Photo Clin Co., Ltd., Kanagawa, Japan

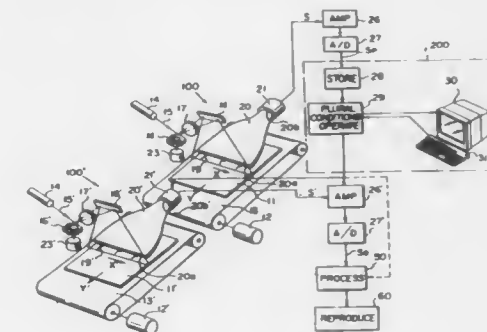
Filed Mar. 17, 1989, Ser. No. 325,275

Claims priority, application Japan, Mar. 18, 1988, 63-64919; Aug. 26, 1988, 63-212231

Int. Cl.<sup>5</sup> G06K 9/00

U.S. Cl. 382—62

15 Claims



1. A radiation image read-out apparatus comprising:

- (i) a preliminary read-out means for scanning a stimulative phosphor sheet, on which a radiation image has been stored, with a light beam in order to release part of the energy stored during exposure to radiation as light emitted from said stimulative phosphor sheet, detecting the light emitted by said stimulative phosphor sheet, and obtaining a preliminary read-out image signal which approximately represents said radiation image;
- (ii) a final read-out means for scanning said stimulative phosphor sheet with a light beam having an energy intensity higher than that of said light beam used in said preliminary read-out means, detecting light emitted by said stimulative phosphor sheet when it is thus scanned, and obtaining a final read-out image signal which represents said radiation image;
- (iii) an image processing means for receiving said final read-out image signal and carrying out image processing of said final read-out image signal; and
- (iv) a condition adjusting means for receiving said preliminary read-out image signal, adjusting a read-out condition for use in obtaining said final read-out image signal and/or an image processing condition for use in carrying out image processing, said adjustment being effected on the basis of information carried by said preliminary read-out image signal, and feeding said read-out condition into said final read-out means and/or feeding said image processing condition into said image processing means,

wherein said condition adjusting means is constituted of:

- (a) a storage section for storing said preliminary read-out image signal;
- (b) a plural conditions operating section for reading said preliminary read-out image signal from said storage section, carrying out a plurality of condition adjustment operating processes based on said preliminary read-out image signal in order to calculate a plurality of read-out conditions to be used in obtaining a final read-out image signal and/or a plurality of image processing conditions to be used in carrying out image processing of the final read-out image signal, and carrying out a plurality of image reproduction operating processes based on said preliminary read-out image signal so as to obtain images corresponding to the images each of which would be reproduced if the final read-out image signal were obtained by using each of a plurality of said read-out conditions thus calculated and/or the final read-out image sig-

4,955,066

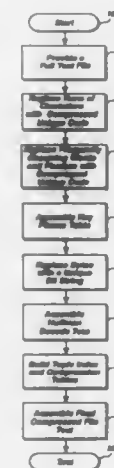
**COMPRESSING AND DECOMPRESSING TEXT FILES**  
Leo A. Notenboom, Woodinville, Wash., assignor to Microsoft Corporation, Redmond, Wash.

Filed Oct. 13, 1989, Ser. No. 421,466

Int. Cl.<sup>5</sup> G06K 9/00

U.S. Cl. 382—56

12 Claims



1. A method of compressing a text file stored in a computer memory in digital form, comprising:

- generating a full text file having characters formed into phrases, said characters being digitally represented by bytes;
- generating a first level compressed text file from said text full file by replacing runs of identical characters with a run flag, the character and a repetition count;
- generating a second level compressed text file from said first level compressed text file by replacing frequently occurring phrases in said first level compressed text file with a key phrase flag byte and an index byte; and
- generating a third level compressed text file from said second level compressed text file by replacing frequently occurring bytes in said second level compressed text file with a unique string of bits.

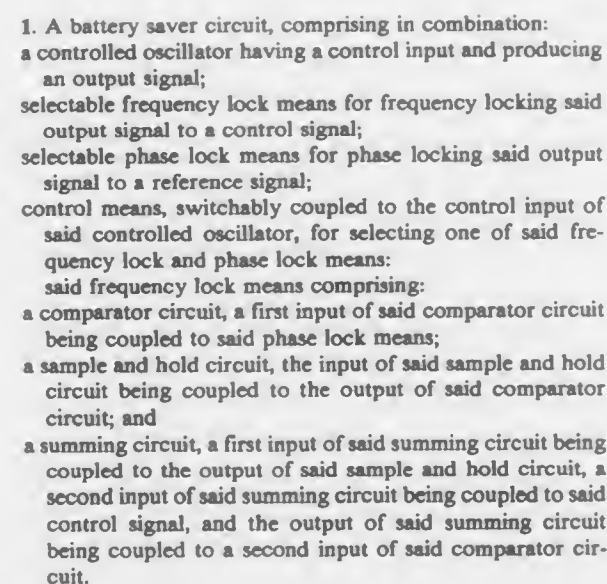




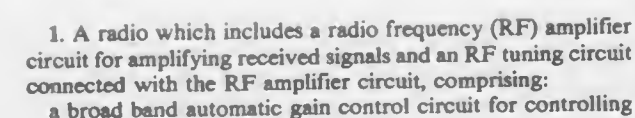
## 6 Claims



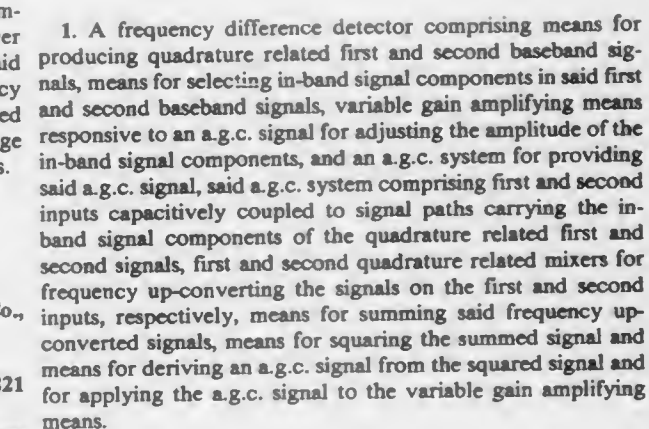
## 9 Claims



#### 4 Claims



U.S. Cl. 455-244



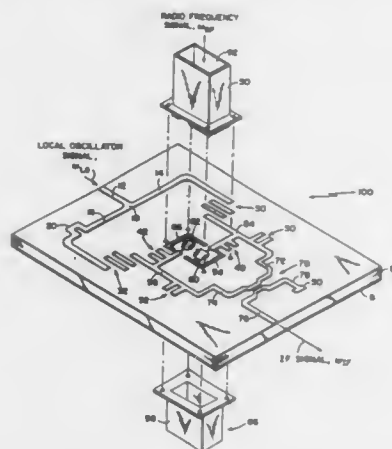
U.S. Cl. 455—325 9 Claims

1. In microstrip circuitry wherein a ground plane is formed on one surface of a slab fabricated from a dielectric material and printed circuitry is formed on a second opposing surface of the slab to define signal paths for a local oscillator and for beat frequency signals including desired IF signals, the printed circuitry being disposed to form a heterodyning arrangement



responsive to coupled RF signals and to the LO signal to produce the desired IF signals, such circuitry comprising:

- (a) a 3 dB divider having an input port for receiving the LO signal and a first and a second output arm dimensioned to produce a first and a second LO signal with a phase difference of 45° between such signals;
- (b) a first pair of diodes, each having an anode and a cathode, connected between the first output arm of the 3 dB divider and the ground plane, the anode of each one of the diodes being connected to the cathode of the other one of the diodes, the first pair of diodes also being optically coupled to RF signals, to produce a first spectrum of IF signals including a first portion of the desired IF signals;
- (c) a second pair of diodes, similar to the first pair of diodes,



connected between the second output arm of the 3 dB divider and the ground plane, the second pair of diodes also being optically coupled to RF signals, to produce a second spectrum of IF signals including a second portion of the desired IF signals in quadrature with the first portion of desired IF signals from the first pair of diodes; and

- (d) a quadrature hybrid having a first and a second input port and a first and a second output port, said first input port being responsive to the first portion of the desired IF signals from the first pair of diodes and said second input port being responsive to the second portion of the IF signals from the second pair of diodes with said first portion and said second portion of the desired IF signals being substantially in phase at the first output port and substantially 180° out-of-phase at the second output port.

4,955,080

## SELECTIVELY CALLED RECEIVER

Kiyoshi Wagai, Hino, and Makoto Mural, Hachioji, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 25, 1988, Ser. No. 223,983

Claims priority, application Japan, Jul. 29, 1987, 62-189955

Int. Cl.<sup>5</sup> H04B 1/16

U.S. Cl. 455—343

6 Claims

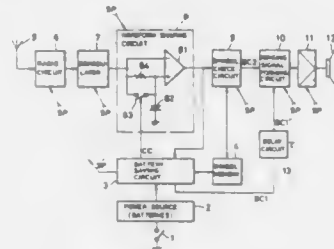
1. A selectively called receiver, comprising:
  - means for receiving and demodulating a frame signal transmitted through radio communication, the frame signal including call information;
  - means, enabled in response to a charge control signal, for forming a reference level signal based on an average level of at least a portion of the demodulated frame signal;
  - means, responsive to a comparison in level between the reference level signal and the demodulated frame signal, for binarizing and shaping the demodulated frame signal into a shaped pulse signal including the call information;
  - means, responsive to the shaped pulse signal, for detecting whether the call information indicates the presence of a

call to the receiver and for outputting a ringing signal output command if a call to the receiver is detected;

means, enabled in response to the ringing signal output command and a ringing control signal, for generating a predetermined ringing tone;

means, responsive to a turning on of a power source switch, for supplying power to the demodulating means, reference level signal forming means, binarizing and shaping means, detecting means, and ringing tone generating means;

first control means, responsive to the turning on of the



power source switch, for monitoring the power source voltage and for outputting the ringing control signal when the power source voltage is above a predetermined value;

second control means, responsive to the turning on of the power source switch, for outputting the charge control signal; and

third control means, responsive to a receipt of at least one of the charge control and ringing control signals, for preventing simultaneous enabling of the reference level signal forming means in response to the charge control signal and the ringing tone generating means in response to the ringing control signal.

4,955,081

## LIGHT COMMUNICATION SYSTEM

Hiroshi Takahashi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 939,309, Dec. 5, 1986, abandoned,

which is a continuation of Ser. No. 570,811, Jan. 16, 1984,

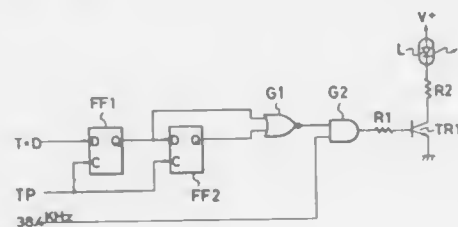
abandoned. This application Sep. 6, 1988, Ser. No. 240,489

Claims priority, application Japan, Jan. 25, 1983, 58-9376

Int. Cl.<sup>5</sup> H04B 10/04

U.S. Cl. 455—608

11 Claims



1. A communication system comprising:
  - generating means for generating a signal train that includes an information portion represented by digital pulses;
  - shortening means connected to said generating means for shortening a width of a digital pulse of the signal train by a predetermined constant width, the width of the shortened pulse corresponding to the width of the digital pulse of the signal train minus the predetermined constant width;
  - transmission means connected to said shortening means for

transmitting a signal train based on the shortened signal width from said shortening means; and

reception means for receiving the signal train transmitted by said transmission means.

4,955,082

## MOBILE COMMUNICATION SYSTEM

Seiji Hattori; Akihide Kasukawa, both of Tokyo; Yoshizo Shibano, Osaka; Yoshinobu Kobayashi, Osaka, and Shinji Suzuki, Osaka, all of Japan, assignors to The Tokyo Electric Power Company Ltd., Tokyo and Sumitomo Electric Industries, Ltd., Osaka, both of Japan

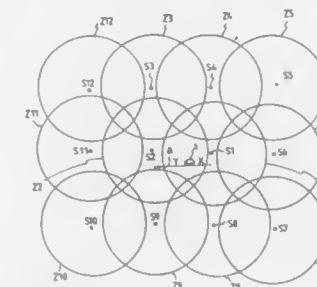
Filed Jan. 11, 1989, Ser. No. 295,764

Claims priority, application Japan, Jan. 14, 1988, 63-6555

Int. Cl.<sup>5</sup> H04Q 7/00; H04J 3/16

U.S. Cl. 455—33

1 Claim



1. A mobile communication system of the TDMA type for use with a mobile station and a mobile station receiver, comprising:

- a plurality of fixed signal transmitting and receiving signposts, each said signpost comprising at least one communicating zone, said zone of each said signpost overlapping a communicating zone of an adjacent signpost;
- a signal transmitted from said signposts comprising a frame, said frame including at least one controlling channel, a plurality of voice channels, and at least one positioning channel, said controlling channel and said voice channels comprising a predetermined frequency that is assigned to each said signpost; and
- means for setting said positioning channel such that said predetermined frequencies assigned to said signposts are switched every said frame, whereby, said mobile station receiver monitors each said positioning channel, detects a position of said mobile station based on each said positioning channel, and performs a zone switching operation between adjacent signposts based on the detected position of the mobile station.

4,955,083

## DUAL MODE RADIO TRANSCEIVER FOR AN SSB COMMUNICATION SYSTEM

Sharon E. T. Phillips, Lake In The Hills, and Bruce C. Eastmond, Downers Grove, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 926,285, Oct. 10, 1986, abandoned.

This application Nov. 13, 1989, Ser. No. 434,562

Int. Cl.<sup>5</sup> H04B 1/68, 1/02

U.S. Cl. 455—47

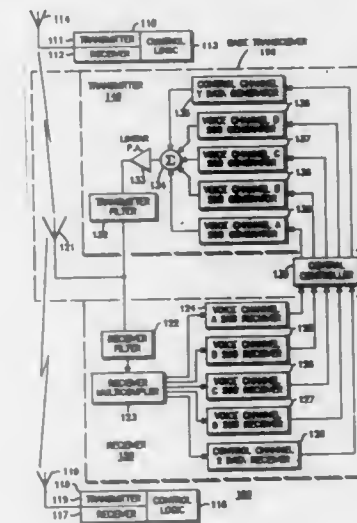
40 Claims

1. A dual-mode remote radio station for use in a radio communication system, having a primary station and at least one remote station, said primary and remote stations capable of operating on a plurality of radio frequency channels, said remote station comprising:

- a receiver means for receiving signals including:
  - means for selectively receiving one of either:
    - (a) voice messages transmitted on a first type of modulation within a first channel of said plurality of channels, said

first channel having a predetermined channel bandwidth; or

- (b) a first set of data messages carrying information from said primary station to said remote stations identifying said first channel of said plurality of channels, said first set of data messages transmitted continuously by a second type of modulation within a second channel of said plurality of



channels, said second channel having a predetermined channel bandwidth being no wider than said first channel bandwidth; and

control means for automatically controlling said receiver means such that said voice messages are received from said first channel in response to information derived from said first set of data messages received from said second channel.

4,955,084

## PAGING RECEIVER WITH METALLIC DISPLAY FRAME STRUCTURE INCREASING ANTENNA GAIN

Shinjiro Umetsu, and Toshihiro Mori, both of Tokyo, Japan, assignors to NEC Corporation, Japan

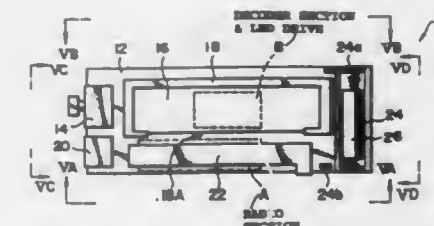
Filed Mar. 2, 1989, Ser. No. 317,748

Claims priority, application Japan, Mar. 4, 1988, 63-52175

Int. Cl.<sup>5</sup> H04B 1/08, 1/10

U.S. Cl. 455—278

4 Claims



1. A receiver comprising:

- a loop antenna;
- a plurality of elements for processing a signal received by said antenna; and
- a metallic member for structurally supporting at least one of said elements, said metallic member having a generally-rectilinear portion located generally in parallel with a longitudinal axis of said loop antenna;
- said metallic member further having a portion adjacent to said loop antenna, said adjacent portion including a gap of

sufficient size to substantially prevent loss of gain of said antenna resulting from mirror current in said metallic member induced by current in said antenna.

4,955,085

## SERIES RF/PARALLEL IF MIXER ARRAY

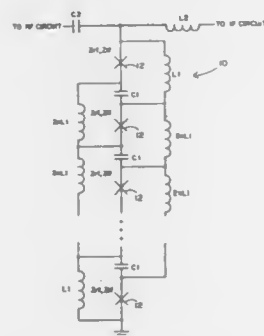
David P. Woody, Bishop, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Mar. 7, 1988, Ser. No. 164,933

Int. Cl.<sup>5</sup> H04B 1/26

U.S. Cl. 455—330

14 Claims



1. A mixer circuit for use in a heterodyne receiver for converting a radio frequency (RF) signal to an intermediate frequency (IF) signal, the circuit having a plurality of mixing elements each having an impedance  $Z_{if}$  which is higher at the IF frequency than its impedance  $Z_{rf}$  is at the RF frequency; the circuit comprising;

a series interconnection of said elements;

a plurality of capacitors connected in said series interconnection, at least one such capacitor connected serially between each pair of said elements;

a plurality of inductors, at least one such inductor connected in parallel with each combination of element and adjacent capacitor;

said capacitor being selected to substantially block signals at the IF frequency and pass signals at the RF frequency and said inductors being selected to substantially block signals at the RF frequency and pass signals at the IF frequency,

whereby said elements are connected in series at the RF frequency and are connected in parallel at the IF frequency and the net impedance of the circuit at said IF frequency is  $Z_{if}$  divided by the number of said mixing elements and the net impedance of the circuit at said RF frequency is  $Z_{rf}$  multiplied by the number of said mixing elements.

4,955,086

## REFLECTION TRANSMITTER AND RECEIVER MEANS FOR A BIDIRECTIONAL LIGHT WAVEGUIDE COMMUNICATIONS SYSTEM

Stefan Kindt, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

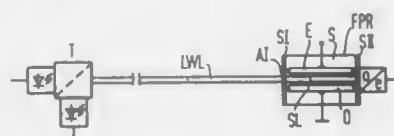
Filed Dec. 15, 1988, Ser. No. 284,728

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1987, 3742504

Int. Cl.<sup>5</sup> H04B 10/24

U.S. Cl. 455—605

4 Claims



1. In a reflection transmitter and receiver means for a bidirectional light waveguide communications system comprising a light waveguide having a first and second end, a light source preferably formed by a laser at only the first end of said light waveguide, and an electro-optical transducer being coupled to the second end to receive light leaving said second end, the improvement comprising an electrically controllable integrated-optical Fabry-Perot resonator having first and second partially reflecting mirrors and control electrodes, said resonator being connected to the second end of the waveguide with the first partially reflecting mirror forming an input/output for the waveguide, said electrodes being connected to a transmission signal source and said transducer being positioned to receive light passing through the second partial reflective mirror.

## DESIGN PATENTS

GRANTED SEP. 4, 1990

## ERRATA

For	See
CLASS	PATENT NO.
D02-029 .....	310,286
D99-017 .....	310,286



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## DESIGNS

SEPTEMBER 4, 1990

310,285

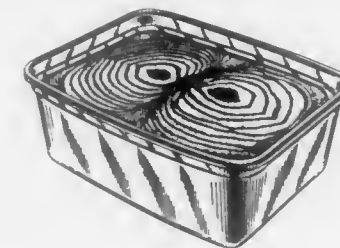
COMBINED FROZEN CONFECTION AND CONTAINER  
Kevin P. Hillman, Cheltenham, and Ian Butcher, Guildford, both  
of Great Britain, assignors to Thomas J. Lipton, Inc., Engle-  
wood Cliffs, N.J.

Filed Oct. 21, 1987, Ser. No. 112,142

Claims priority, application United Kingdom, Apr. 21, 1987, U.S. Cl. D2—211  
1041672

Term of patent 14 years

U.S. Cl. D1—102



310,288

NURSING GARMENT

Rebecca L. Larsch, 5099 W. Seven Mile Rd., Northville, Mich.  
48167

Filed Nov. 25, 1988, Ser. No. 275,800  
Term of patent 14 years



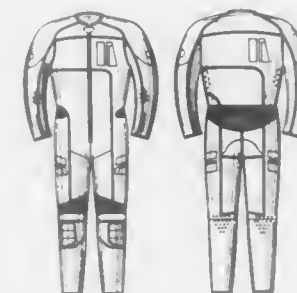
310,286

COVERALL FOR MOTORCYCLISTS OR THE LIKE  
Hisashi Kushitani, No. 9-14, 4-chome, Yoga, Setagaya-Ku, Tokyo,  
Japan

Filed Dec. 21, 1987, Ser. No. 135,622

Term of patent 14 years

U.S. Cl. D2—29



310,287

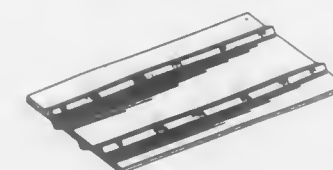
FETTUCINI

Joseph P. Pellegrino, North Andover, Mass. 01845, assignor to  
The Prince Company, Inc., Columbus, Ohio

Filed May 1, 1987, Ser. No. 45,050

Term of patent 14 years

U.S. Cl. D1—126



310,289

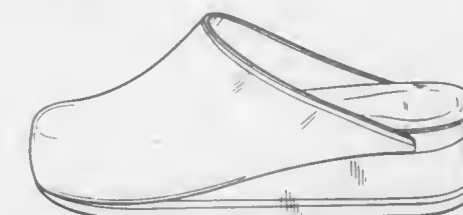
SLIP-ON SHOE

Piero Farina, Via Privata Letizia 6, 20144 Milano, Italy

Filed Apr. 23, 1987, Ser. No. 41,757

Claims priority, application Italy, Oct. 29, 1986, 23520/86[U]  
Term of patent 14 years

U.S. Cl. D2—283



310,290

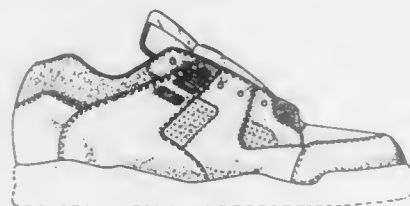
## SHOE UPPER

Judith Ringel, Milton, Mass., assignor to Reebok International Ltd., Stoughton, Mass.

Filed Jun. 23, 1989, Ser. No. 370,016

Term of patent 14 years

U.S. Cl. D2—314



310,292

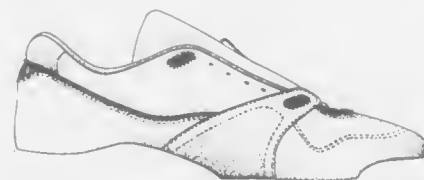
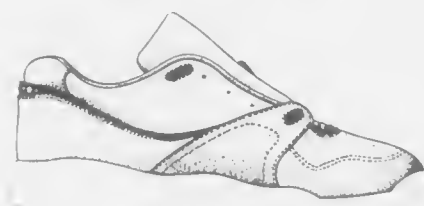
## SHOE UPPER

Lawrence Selbiger, Portland, Oreg., assignor to Avia Group International, Inc., Portland, Oreg.

Filed Jun. 22, 1989, Ser. No. 370,303

Term of patent 14 years

U.S. Cl. D2—314



310,293

## SHOE UPPER

Ralph Serna, and Paul D. Brown, both of Hingham, Mass., assignors to Reebok International Ltd., Stoughton, Mass.

Filed Jun. 26, 1989, Ser. No. 371,025

Term of patent 14 years

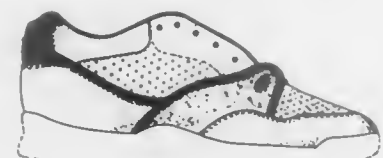
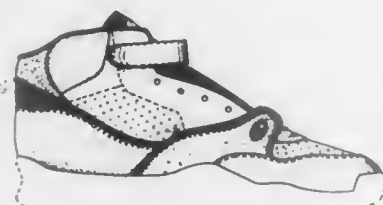
U.S. Cl. D2—314

310,291  
SHOE UPPER  
Lawrence Selbiger, Portland, Oreg., assignor to Avia Group International, Inc., Portland, Oreg.

Filed Jun. 22, 1989, Ser. No. 370,298

Term of patent 14 years

U.S. Cl. D2—314



310,294

## GOLF SHOE BOTTOM

William R. Peterson, Braintree, Mass., assignor to Tretorn AB, Ronnowsgatan, Sweden

Filed Dec. 30, 1987, Ser. No. 139,714

Term of patent 14 years

U.S. Cl. D2—317



310,295

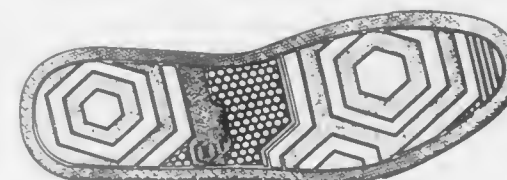
## SHOE SOLE

Pamela B. Boucher, Brighton, and Paul D. Brown, Hingham, both of Mass., assignors to Reebok International Ltd., Stoughton, Mass.

Filed Jun. 23, 1989, Ser. No. 373,071

Term of patent 14 years

U.S. Cl. D2—320



310,296

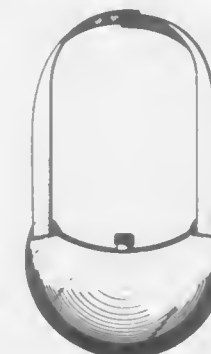
## PORTABLE DRINK CONTAINER

Ronald E. Janus, Oak Lawn, Ill., assignor to JI-SCO-NI Enterprises, Inc., Chicago, Ill.

Filed Oct. 3, 1986, Ser. No. 915,334

Term of patent 14 years

U.S. Cl. D3—301



310,297

## PARTITION FOR A CAMERA BAG

George L. Howitt, River Edge, N.J., assignor to Charles Beeler Company, Florham Park, N.J.

Filed Jan. 28, 1987, Ser. No. 7,917

Term of patent 14 years

U.S. Cl. D3—33



310,298

## CAMERA CASE

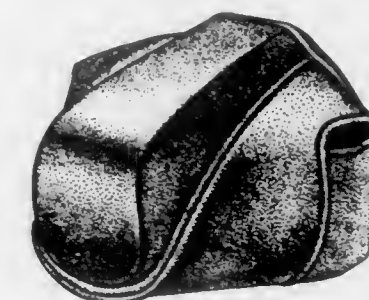
Hiroyuki Fukushima, Hoya, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 2, 1987, Ser. No. 69,578

Claims priority, application Japan, Jan. 7, 1987, 62-326

Term of patent 14 years

U.S. Cl. D3—33



310,299

## CAMERA CASE

Hitomi Ito, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 2, 1988, Ser. No. 201,461

Claims priority, application Japan, Dec. 7, 1987, 62-50226

Term of patent 14 years

U.S. Cl. D3—33





310,300

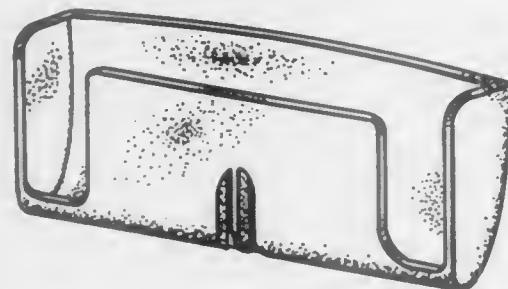
## REINFORCING INSERT FOR A SPECTACLE CASE

Robert J. Marks, Las Vegas, Nev., and William L. Eaken, San Jose, Calif., assignors to California Optical Leather, Inc., San Leandro, Calif.

Filed Dec. 14, 1987, Ser. No. 132,855

Term of patent 14 years

U.S. Cl. D3—34



310,301

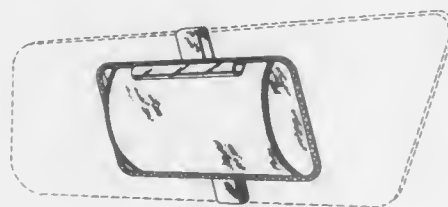
## EYEGLASS HOLDER

Tommy J. Burrow, 1021 NE. JIB Court, Unit C, P.O. Box 549, Lee's Summit, Mo. 64064

Filed Aug. 17, 1988, Ser. No. 233,140

Term of patent 14 years

U.S. Cl. D3—34



310,302

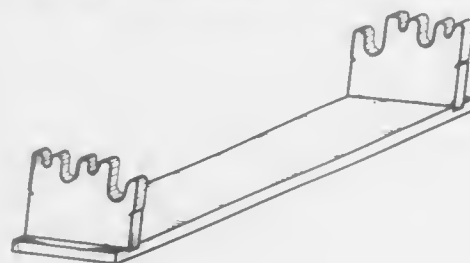
## GUN SUPPORT CRADLE

Robert C. Southard, Box 94, Locust Grove, Ark. 72550

Filed Aug. 21, 1987, Ser. No. 87,755

Term of patent 14 years

U.S. Cl. D3—38



310,303

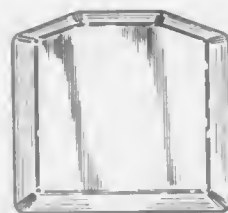
## CAR SEAT TRAY

Peter Colletti, 510 Maple, Prospect Heights, Ill.

Filed Dec. 24, 1986, Ser. No. 946,299

Term of patent 14 years

U.S. Cl. D3—40



310,304

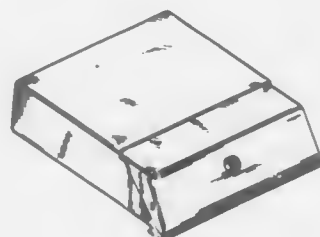
## SECURITY BOX FOR VEHICLES AND THE LIKE

William H. Carmichael, 1944 S. Kearney Way, Denver, Colo. 80224

Continuation-in-part of Ser. No. 78,881, Jul. 28, 1987, which is a continuation-in-part of Ser. No. 36,966, Apr. 10, 1987. This application Jan. 5, 1988, Ser. No. 140,814

Term of patent 14 years

U.S. Cl. D3—40



310,305

## KEY RING

Frank Scognamiglio, 2331 Oak Hill Dr., Lisle, Ill. 60532, and Jay C. Covington, 1203 Lisle Pl., both of Lisle, Ill. 60532

Filed Oct. 23, 1986, Ser. No. 922,545

Term of patent 14 years

U.S. Cl. D3—61



310,306

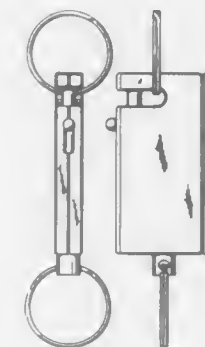
## KEY HOLDER

Sumner B. MacDonald, 39 Sea Breeze Ln., Bristol, R.I. 02809

Filed Sep. 12, 1988, Ser. No. 243,023

Term of patent 14 years

U.S. Cl. D3—61



310,307

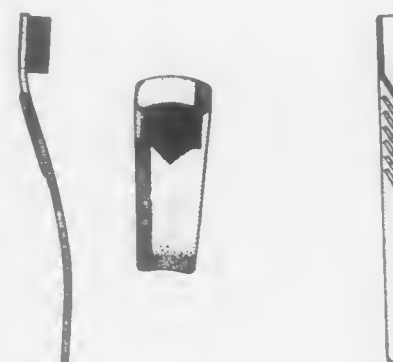
## TOOTHBRUSH

Carlos J. Moglianese, Whittier, Calif.; Mark Falco, Lavallette, and Leslie Peoples, Trenton, both of N.J., assignors to Contour, Inc., Trenton, N.J.

Filed Jan. 4, 1988, Ser. No. 140,424

Term of patent 14 years

U.S. Cl. D4—104



310,308

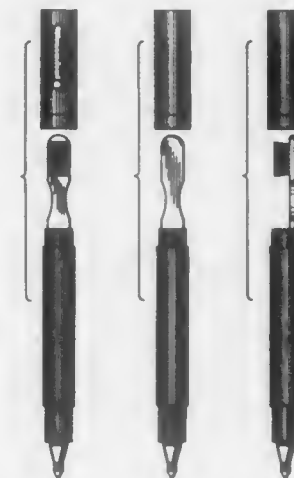
## COMBINED TOOTHBRUSH AND PEN

Paul Wolsey, Box 132, Stirling, Alberta, Canada T0K 2E0

Filed Mar. 7, 1988, Ser. No. 164,650

Term of patent 14 years

U.S. Cl. D4—108



310,309

## HEADER FOR A MERCHANDISING DISPLAY STAND OR THE LIKE

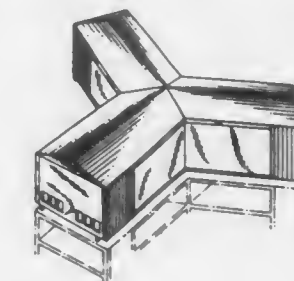
William Prendergast, Park Ridge, N.J., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Dec. 5, 1986, Ser. No. 938,781

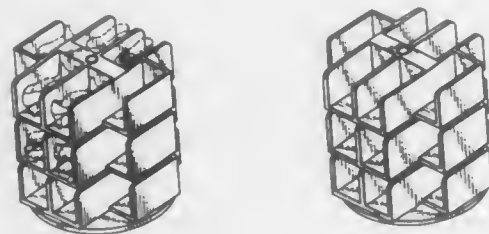
The portion of the term of this patent subsequent to Jul. 31, 2004, has been disclaimed.

Term of patent 14 years

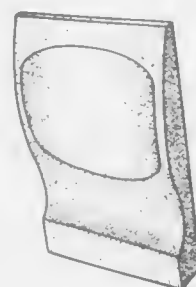
U.S. Cl. D6—455



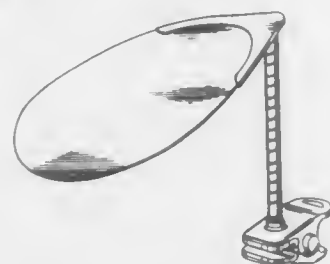
310,310  
SHOE CAROUSEL  
Larry J. Martinez, 3714 S. 4565 W., West Valley, Utah 84120  
Filed May 5, 1987, Ser. No. 46,304  
Term of patent 14 years  
U.S. Cl. D6—457



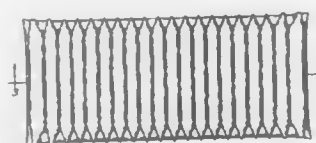
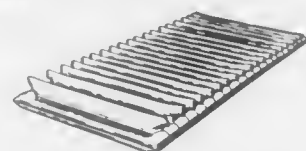
310,312  
BACK SUPPORT CUSHION  
Richard G. Wong, 807 Fourth St., Santa Rosa, Calif. 95401, and  
Donald V. Pabros, 503 Buena Vista Dr., Santa Rosa, Calif.  
95404  
Filed Jun. 6, 1988, Ser. No. 202,434  
Term of patent 14 years  
U.S. Cl. D6—596



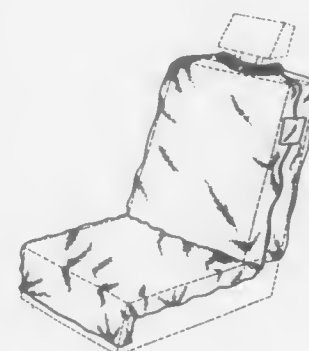
310,311  
SUNSHADE ATTACHMENT FOR A CHAIR OR SIMILAR  
ARTICLE  
Melody A. Bergen, and David A. Bergen, both of 14101 La Mesa  
Ct., Tampa, Fla. 33625  
Filed May 7, 1987, Ser. No. 47,253  
Term of patent 14 years  
U.S. Cl. D6—500



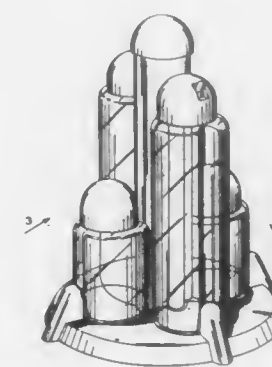
310,313  
AIR MATTRESS  
Levon Afeyan, Hampstead, Canada, assignor to Afeyan Indus-  
tries Inc., Montreal, Canada  
Filed Nov. 10, 1988, Ser. No. 269,559  
Claims priority, application Canada, Sep. 15, 1988, 15-09-88-1  
Term of patent 14 years  
U.S. Cl. D6—604



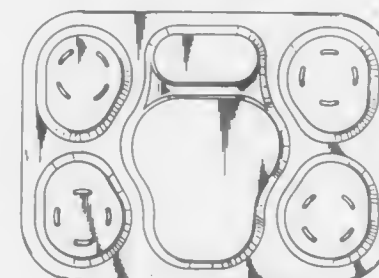
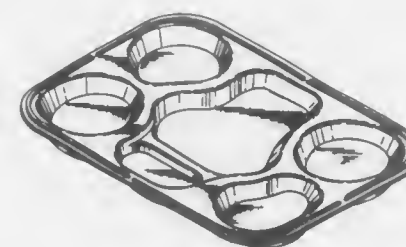
310,314  
CAR SEAT COVER  
Richard J. Caron, 1570 Madruga Ave., Penthouse 6, Coral  
Gables, Fla. 33146  
Filed Sep. 8, 1987, Ser. No. 93,981  
Term of patent 14 years  
U.S. Cl. D6—611



310,316  
CONDIMENT SET  
Ambrogio Rossari, Milan, Italy, assignor to Fratelli Guzzini  
S.p.A., Recanati, Italy  
Filed Aug. 3, 1987, Ser. No. 81,281  
Claims priority, application Italy, Feb. 4, 1987, 20732/87[U]  
Term of patent 14 years  
U.S. Cl. D7—590



310,315  
FOOD SERVICE TRAY  
Vincent J. Bitel, Rockfall, Conn., assignor to The Rogers Mann-  
facturing Company, Rockfall, Conn.  
Filed Dec. 29, 1987, Ser. No. 139,271  
Term of patent 14 years  
U.S. Cl. D7—554



310,317  
THREE COMPARTMENT PASTRY BAG  
James M. Broderick, 4618 S. Caynon Rd., Rapid City, S. Dak.  
57702, and E. Leonard Lewis, Pouch 340065, Prudhoe Bay,  
Ak. 99734  
Filed Jan. 14, 1988, Ser. No. 143,685  
Term of patent 14 years  
U.S. Cl. D7—700





310,318

## HAND SAW

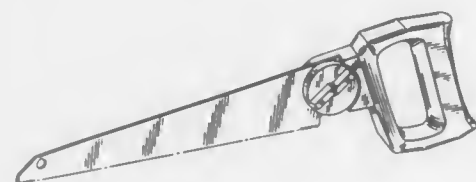
Sture Backman, Bollnäs, Sweden, assignor to Sandvik Aktiebolag, Sandviken, Sweden

Filed Apr. 26, 1988, Ser. No. 186,214

Claims priority, application Sweden, Oct. 26, 1987, 87-2431

Term of patent 14 years

U.S. Cl. D8—95



310,320

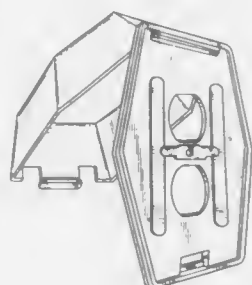
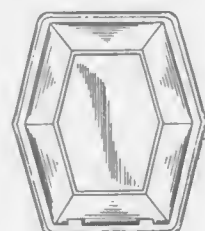
## PROTECTIVE COVER FOR ELECTRICAL OUTLET

Anthony F. Domian, 1222 Old Concord Rd., Monroeville, Pa. 15146

Continuation of Ser. No. 45,662, May 1, 1987, abandoned. This application Jun. 29, 1987, Ser. No. 67,091

Term of patent 14 years

U.S. Cl. D8—350



310,319

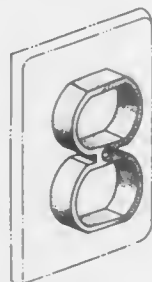
## WALL OUTLET GUARD

Larry W. Brookman, 1380 Farrington Rd., Philadelphia, Pa. 19151

Filed Dec. 12, 1986, Ser. No. 941,263

Term of patent 14 years

U.S. Cl. D8—350



310,321

## GASOLINE PUMP NOZZLE HANDLE HOLDER

Broc Glover, 1219 S. Athena Way, #3, Anaheim, Calif. 92806

Filed Nov. 10, 1988, Ser. No. 269,979

Term of patent 14 years

U.S. Cl. D8—354



310,322

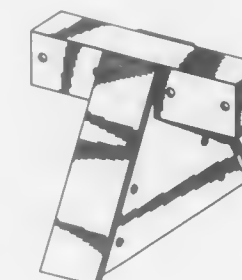
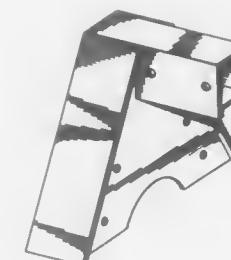
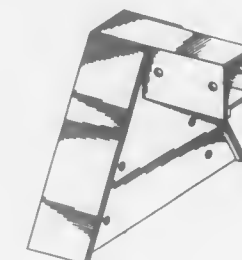
## SUPPORT FOR A FRAME OF AN OUTDOOR PLAY DEVICE OR THE LIKE

Joseph A. Powell, Uniontown, Ohio, assignor to Rainbow Fabrications, Incorporated, Uniontown, Ohio

Filed Jun. 22, 1987, Ser. No. 64,799

Term of patent 14 years

U.S. Cl. D8—382



310,323

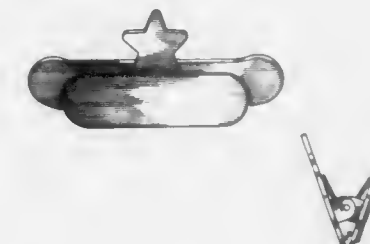
## SPRING CLIP

Jerrilyn C. Kiyokane, Seal Beach, Calif., assignor to Namkung Promotions, Inc., Costa Mesa, Calif.

Filed Nov. 7, 1988, Ser. No. 267,770

Term of patent 14 years

U.S. Cl. D8—395



310,324

## ROOF FASTENING PLATE

Peter J. Bernacchi, LaPorte, Ind., and Larry G. Barrett, Niles, Mich., assignors to Insul-Mark, Midwest, Inc., LaPorte, Ind.

Filed Mar. 2, 1987, Ser. No. 20,683

Term of patent 14 years

U.S. Cl. D8—399



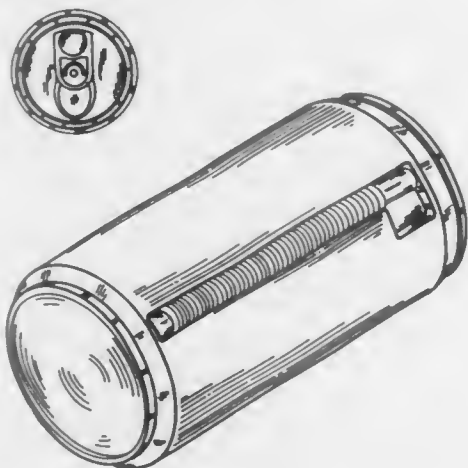
310,325  
CONTAINER  
Luciano Moglia, Borgaro Torinese, Italy, assignor to Viset S.p.A., Milan, Italy  
Filed Apr. 22, 1987, Ser. No. 43,680  
Term of patent 14 years  
U.S. Cl. D9—336



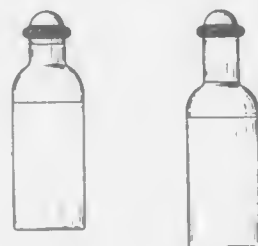
310,327  
POP CAN STORAGE DEVICE  
Richard A. Rinke, 737 Charlesina St., Rochester, Mich. 48064  
Filed Feb. 22, 1988, Ser. No. 158,167  
Term of patent 14 years  
U.S. Cl. D9—341



310,326  
COMBINED CONTAINER AND DRINKING STRAW  
Edgar O. Carlson, 5681 Bayshore Rd. N., Ft. Myers, Fla. 33917  
Filed Dec. 7, 1987, Ser. No. 130,331  
Term of patent 14 years  
U.S. Cl. D9—337



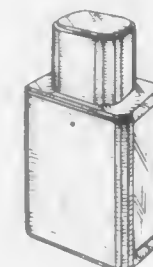
310,328  
COSMETIC BOTTLE  
Pierre Dinand, Levallois Perret, France, assignor to Euroitalia S.R.L., Monza, Italy  
Filed Mar. 27, 1987, Ser. No. 32,083  
Claims priority, application Italy, Nov. 27, 1986, 23863/86[U]  
Term of patent 14 years  
U.S. Cl. D9—385



310,329  
BOTTLE WITH CAP  
Peter Schmidt, Hamburg, Fed. Rep. of Germany, assignor to Margaret Aston AG, Mainz-Rhein, Fed. Rep. of Germany  
Filed Aug. 10, 1988, Ser. No. 230,561  
Claims priority, application Fed. Rep. of Germany, Feb. 12, 1988, 5612  
Term of patent 14 years  
U.S. Cl. D9—409



310,330  
FRAGRANCE BOTTLE  
Oleg L. Cassini, New York, N.Y., assignor to Oleg Cassini, Inc., New York, N.Y.  
Filed Apr. 22, 1987, Ser. No. 41,317  
Term of patent 14 years  
U.S. Cl. D9—410



310,331  
COMBINED WATCH AND BAND  
Michel P. Ratajski, Bienne, Switzerland, assignor to Severin Montres AG, Zug, Switzerland  
Filed Apr. 27, 1987, Ser. No. 43,238  
Claims priority, application Int'l Pat. Institute, Oct. 31, 1986, DMA/000547  
Term of patent 14 years  
U.S. Cl. D10—32



310,332  
COMBINED WATCH AND STRAP  
Pik L. Wong, Kowloon, Hong Kong, assignor to Justen International (H.K.) Co., Hong Kong, Hong Kong  
Filed Apr. 6, 1987, Ser. No. 35,142  
Claims priority, application United Kingdom, Oct. 13, 1986, 1037351  
Term of patent 14 years  
U.S. Cl. D10—32



310,333  
WATCH  
Wa N. Fong, Hong Kong, Hong Kong, assignor to DesignTime Company Limited, North Point, Hong Kong  
Filed Jun. 3, 1987, Ser. No. 56,976  
Term of patent 14 years  
U.S. Cl. D10—32



310,334  
WRISTWATCH  
Shapour Jahan, Geneva, Switzerland, assignor to Sater S.A., Geneva, Switzerland  
Filed Jun. 2, 1987, Ser. No. 57,437  
Claims priority, application Int'l Pat. Institute, Dec. 2, 1986, DMA/000556  
Term of patent 14 years  
U.S. Cl. D10—32





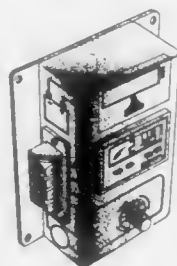
310,335

COMBINED WRISTWATCH AND BRACELET  
Severin S. Wunderman, Laguna Beach, Calif., assignor to Severin Montres AG, Zug, Switzerland  
Filed Jun. 4, 1987, Ser. No. 57,950  
Term of patent 14 years  
U.S. Cl. D10—32



310,338

TIMER MECHANISM FOR A WILDLIFE FEEDER MOTOR  
Earl E. Cureton, 358 Fenwick Dr., San Antonio, Tex. 78239  
Filed Jan. 14, 1987, Ser. No. 3,185  
Term of patent 14 years  
U.S. Cl. D10—40



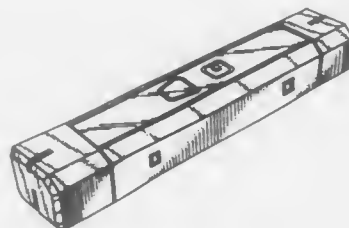
310,336

COMBINED WRISTWATCH AND BRACELET  
Severin S. Wunderman, Laguna Beach, Calif., assignor to Severin Montres AG, Zug, Switzerland  
Filed Jun. 4, 1987, Ser. No. 57,976  
Claims priority, application Int'l Pat. Institute, Dec. 8, 1986, DMA/000559  
Term of patent 14 years  
U.S. Cl. D10—32



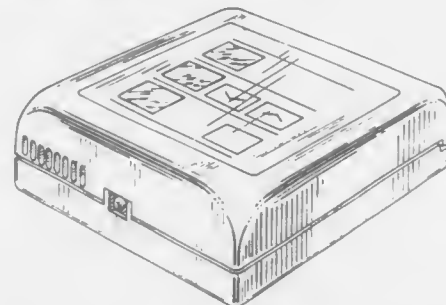
310,339

POINT LOCATION DEVICE  
S. David Tofte, Mankato, and Jeffry M. Irish, Nicolet, both of Minn., assignors to Micro-Trak Systems, Inc., Mankato, Minn.  
Filed Apr. 8, 1988, Ser. No. 179,140  
Term of patent 14 years  
U.S. Cl. D10—46



310,340

LOCAL ROOM THERMOSTAT  
Seiji Wada; Nobuo Otsuka, both of Kamakura; Toyohiro Kobayashi, Shizuoka, all of Japan, and Peter Thompson, Cypress, Calif., assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Sep. 21, 1987, Ser. No. 98,681  
Term of patent 14 years  
U.S. Cl. D10—50



310,337

WRIST WATCH AND BAND  
Michel P. Ratajski, Bienne, Switzerland, assignor to Severin Montres AG, Zug, Switzerland  
Filed Apr. 27, 1987, Ser. No. 43,239  
Claims priority, application Int'l Pat. Institute, Apr. 30, 1987, DMA/000547  
Term of patent 14 years  
U.S. Cl. D10—39



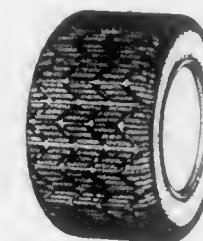
310,341

TAPE MEASURE  
Shintaro Tsuji, Tokyo, Japan, assignor to Sanrio Company, Ltd., Tokyo, Japan  
Filed Apr. 16, 1987, Ser. No. 39,595  
Claims priority, application Japan, Oct. 18, 1986, 61-41133  
Term of patent 14 years  
U.S. Cl. D10—71



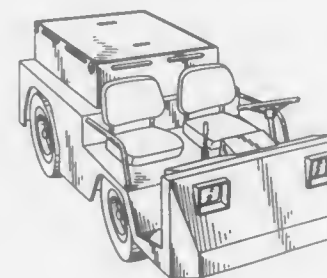
310,344

VEHICLE TIRE  
Masami Shinomiya, Osaka, Japan, assignor to The Obitsu Tire & Rubber Co., Ltd., Osaka, Japan  
Filed Dec. 22, 1987, Ser. No. 137,318  
Claims priority, application Japan, Jul. 2, 1987, 62-27098  
Term of patent 14 years  
U.S. Cl. D12—148



310,342

TOW TRACTOR  
Joaquin F. Formoso, Madrid, Spain, assignor to FMC Corporation, Chicago, Ill.  
Filed Jun. 8, 1987, Ser. No. 59,684  
Term of patent 14 years  
U.S. Cl. D12—14



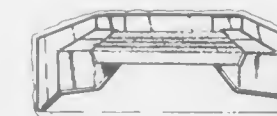
310,345

AUTOMOBILE FENDER SPOILER GUARD  
Pierre Charet; Duke Kraai, both of Miami, Fla., assignor to Rally Manufacturing Inc., Miami, Fla.  
Filed Jan. 6, 1988, Ser. No. 141,342  
Term of patent 14 years  
U.S. Cl. D12—185



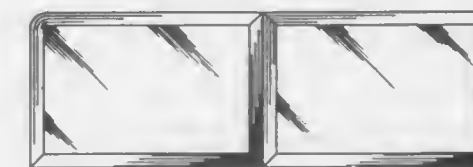
310,343

COMBINATION TRUCK BED LINER AND CONVERTIBLE CUSHION UNIT  
Michael Angerer, 26666 Rosehill, Farmington Hills, Mich. 48018  
Filed Feb. 26, 1987, Ser. No. 19,343  
Term of patent 14 years  
U.S. Cl. D12—98



310,346

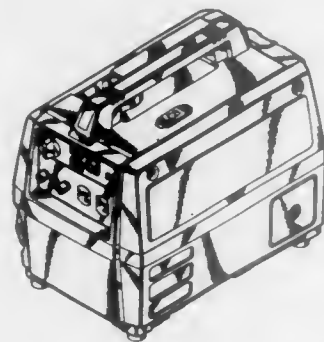
LENSE COVER FOR INSERTION IN THE RECESSED AREAS OF THE DASHBOARD INSTRUMENT PANEL FOR PREVENTION OF DUST AND DIRT BUILDUP  
Darrin D. Allred, Star Rte. #2, Box 67, Altonah, Utah 84002  
Filed Jul. 31, 1987, Ser. No. 79,902  
Term of patent 14 years  
U.S. Cl. D12—192



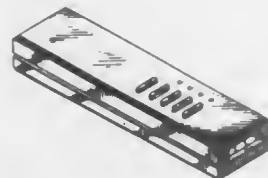
310,347  
**LICENSE PLATE FRAME**  
 Paul Spencer, 2908 Oregon Ct., Ste. I-1, Torrance, Calif. 90503  
 Filed Feb. 16, 1988, Ser. No. 156,087  
 Term of patent 14 years  
 U.S. Cl. D12—193



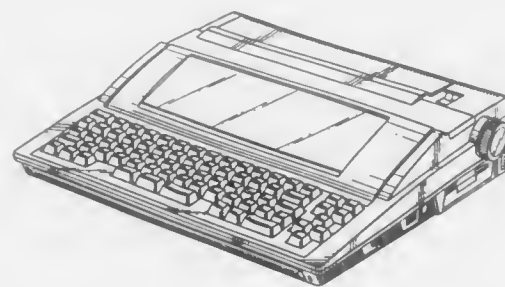
310,348  
**ENGINE GENERATOR**  
 Masaaki Higuchi, Koshigaya; Masaru Atsnumi, Saitama; Yasuo Otake, Ohmiya, and Yukinori Itoh, Kawagoe, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Oct. 20, 1987, Ser. No. 110,682  
 Claims priority, application Japan, Apr. 22, 1987, 62-015977  
 The portion of the term of this patent subsequent to Jul. 31, 2004, has been disclaimed.  
 Term of patent 14 years  
 U.S. Cl. D13—114



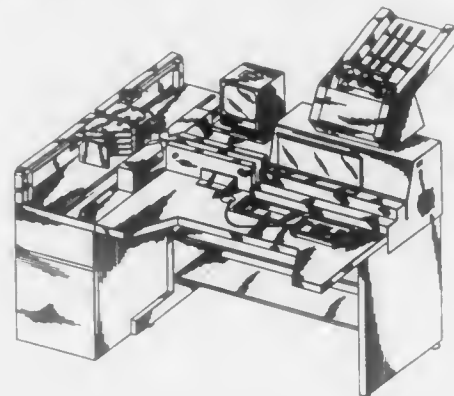
310,349  
**WIRELESS TRANSMITTER FOR SELECTABLE LIGHT LEVEL CONTROL SWITCH**  
 Michael J. Rowen, Center Valley, Pa., assignor to Lutron Electronics Co., Inc., Coopersburg, Pa.  
 Filed Sep. 26, 1988, Ser. No. 249,465  
 Term of patent 14 years  
 U.S. Cl. D13—168



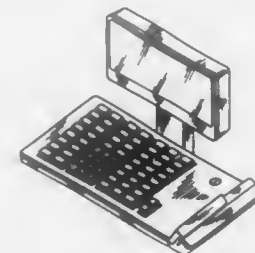
310,350  
**COMBINED WORD PROCESSOR AND COMPUTER**  
 Hideyuki Horie, Chiba; Masahiko Tabuchi, and Yoshihiko Sugano, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan  
 Filed Dec. 10, 1987, Ser. No. 131,387  
 Claims priority, application Japan, Jul. 6, 1987, 62-27197  
 Term of patent 14 years  
 U.S. Cl. D14—100



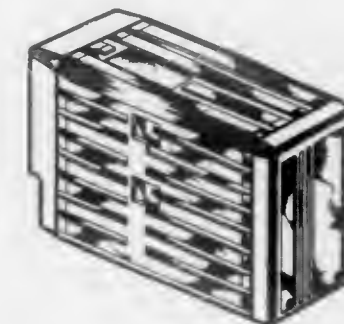
310,351  
**CHARACTER INDICIA ENCODING DESK FOR MAIL**  
 Charles E. Bain, West Dundee, Ill., assignor to Bell & Howell Company, Chicago, Ill.  
 Filed Apr. 30, 1987, Ser. No. 44,459  
 Term of patent 14 years  
 U.S. Cl. D14—103



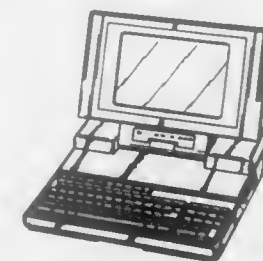
310,352  
**COMBINED DATA INPUT/OUTPUT TERMINAL AND CARD READER**  
 Shuzo Kato; Yasushi Nakamura, both of Hiratsuka, and Junnosuke Takeda, Ninomiya, all of Japan, assignors to NCR Corporation, Dayton, Ohio  
 Filed Sep. 25, 1987, Ser. No. 101,349  
 Claims priority, application Japan, Mar. 30, 1987, 62-11678  
 Term of patent 14 years  
 U.S. Cl. D14—105



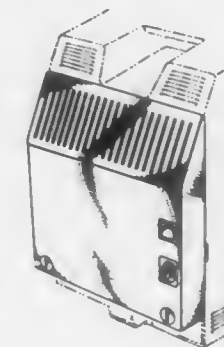
310,354  
**HARD DISK DRIVE MODULE**  
 David P. Moriconi, Ben Lomond, and Andrew G. Austin, Santa Cruz, both of Calif., assignors to Tandon Corporation, Moorpark, Calif.  
 Filed Feb. 26, 1987, Ser. No. 19,551  
 Term of patent 14 years  
 U.S. Cl. D14—109



310,353  
**ELECTRONIC COMPUTER**  
 Yoshihiko Sugano, and Masahiko Tabuchi, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan  
 Filed Dec. 10, 1987, Ser. No. 131,388  
 Claims priority, application Japan, Jun. 17, 1987, 62-24428  
 Term of patent 14 years  
 U.S. Cl. D14—106



310,355  
**HARD DISK DRIVE FOR MOUNTING ON THE REAR OF A COMPUTER**  
 Dennis Trager, 542 Marine World Pkwy. #4203, Redwood City, Calif. 94065  
 Filed Aug. 3, 1987, Ser. No. 980,689  
 Term of patent 14 years  
 U.S. Cl. D14—109





310,356

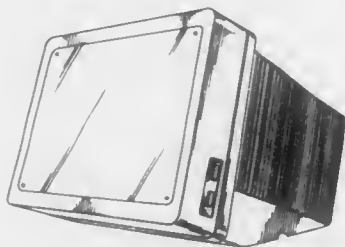
## VIDEO MONITOR

Peter B. Barroa, Leominster, Mass.; Allan Weaver, and Margaret A. Mass, both of Hollis, N.H., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Feb. 25, 1988, Ser. No. 160,492

Term of patent 14 years

U.S. Cl. D14—113



310,357

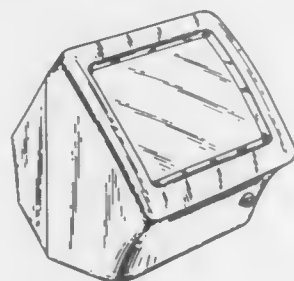
## CATHODE RAY TUBE MONITOR

Paul E. Brefka, Southborough; David L. Adriaansen, Arlington, and Steven E. Greystone, Boston, all of Mass., assignors to Computer Sports Systems, Inc., Cambridge, Mass.

Filed Jul. 28, 1988, Ser. No. 225,508

Term of patent 14 years

U.S. Cl. D14—113



310,358

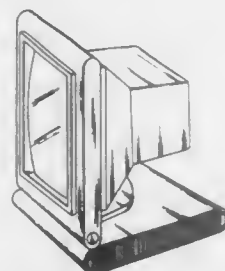
## COMBINED MONITOR AND PROCESS OR FOR COMPUTER WORK STATION OR SIMILAR ARTICLE

Michael J. Nuttall, Palo Alto, and Nelson S. Au, Foster City, both of Calif., assignors to Bell & Howell Publication Systems Company, Skokie, Ill.

Filed Sep. 7, 1988, Ser. No. 241,547

Term of patent 14 years

U.S. Cl. D14—113



310,359

## IMAGE DISPLAY TERMINAL

Yoshinori Inukai, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 21, 1988, Ser. No. 260,489

Claims priority, application Japan, Apr. 25, 1988, 63-17021

Term of patent 14 years

U.S. Cl. D14—113



310,360

## TELEVISION SET

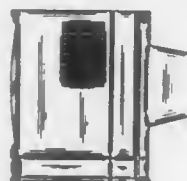
Ryunosuke Kitagawa, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan

Filed Feb. 6, 1987, Ser. No. 12,218

Claims priority, application Japan, Aug. 8, 1986, 61-31272

Term of patent 14 years

U.S. Cl. D14—126



310,361

## TELEVISION RECEIVER

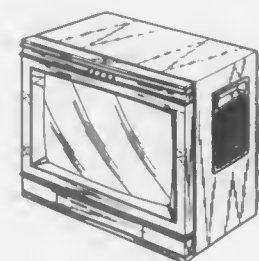
Tae B. Kim, Seoul, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea

Filed Oct. 14, 1987, Ser. No. 108,805

Claims priority, application Rep. of Korea, Jun. 10, 1987, 87-8733

Term of patent 14 years

U.S. Cl. D14—126



310,362

## PORTABLE TELEVISION RECEIVER/MONITOR

Matthew Davis, Vandalia, Ohio, assignor to North American Philips Corp., New York, N.Y.

Filed Oct. 13, 1988, Ser. No. 257,233

Term of patent 14 years

U.S. Cl. D14—126



310,365

## COMBINATION HANDSET TELEPHONE AND STAND

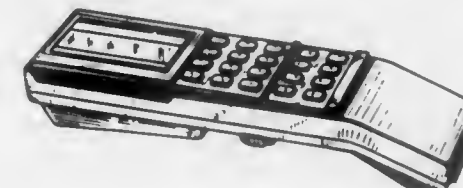
Gunder W. Eriksson, Tabby, and Kjell Nordenskjöld, Lidingö, both of Sweden, assignors to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

Filed Feb. 29, 1988, Ser. No. 162,360

Claims priority, application Sweden, Aug. 28, 1987, 87-1887

Term of patent 14 years

U.S. Cl. D14—138



310,363

## COMBINED TELEVISION AND VIDEO RECORDER

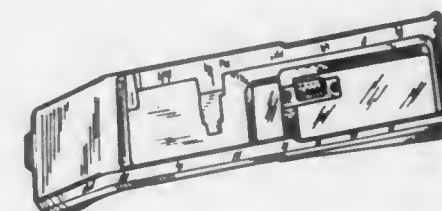
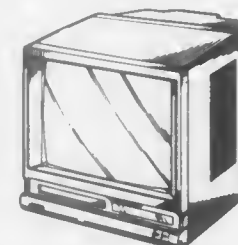
Kue S. Shim, Seoul, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea

Filed Feb. 24, 1988, Ser. No. 159,704

Claims priority, application Rep. of Korea, Sep. 16, 1987, 14066

Term of patent 14 years

U.S. Cl. D14—129



310,366

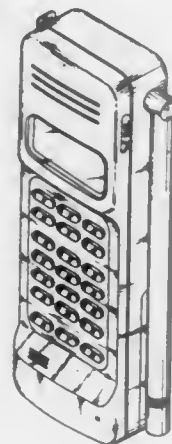
## PORTABLE RADIO TELEPHONE

Kazuo Akaike; Masahiko Kobayashi, both of Hamura; Osamu Utsunomiya, Hino; Ryuichi Takahashi, Akishima, and Tetsufumi Takayasu, Chofu, all of Japan, assignors to Kokusai Electric Co., Ltd., Tokyo, Japan

Filed Jun. 21, 1989, Ser. No. 369,666

Claims priority, application Japan, Dec. 27, 1988, 63-51080  
Term of patent 14 years

U.S. Cl. D14—138



310,368

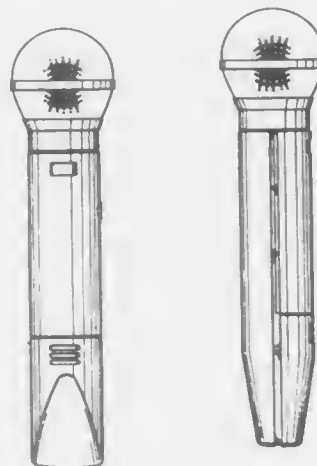
## WIRELESS MICROPHONE

Robert L. Derhaag, San Marcos, and Donald A. Kutz, Del Mar, both of Calif., assignors to H.M. Electronics, Inc., San Diego, Calif.

Filed Mar. 27, 1987, Ser. No. 31,682

Term of patent 14 years

U.S. Cl. D14—228



310,369

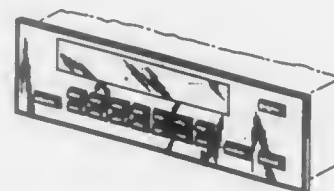
## FRONT PANEL FOR A GRAPHIC EQUALIZER OR SIMILAR ARTICLE

David F. Kolenda, Livonia, and Thomas J. Kane, Dearborn, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed May 18, 1987, Ser. No. 51,115

Term of patent 14 years

U.S. Cl. D14—258



310,370

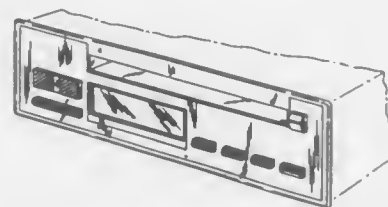
## FRONT PANEL FOR A COMPACT DISC PLAYER

Carol M. Repasky, Ypsilanti, and Mark A. Dobies, Dearborn Heights, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 28, 1987, Ser. No. 138,522

Term of patent 14 years

U.S. Cl. D14—258



310,367

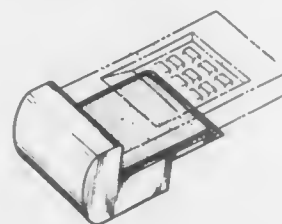
## REMOTE CONTROL ADAPTER

Devan Dockery, Rte. 8, Box 14, DeFuniak Springs, Fla. 32433

Filed Jul. 29, 1988, Ser. No. 225,941

Term of patent 14 years

U.S. Cl. D14—217



310,371

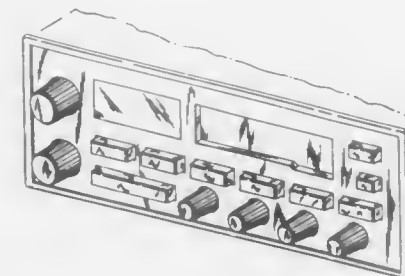
## FRONT CONTROL PANEL FOR A COMBINED VEHICULAR CASSETTE PLAYER AND RADIO RECEIVER

Robert P. Scott, Dearborn, and Kenneth H. Bloom, Birmingham, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 28, 1987, Ser. No. 138,523

Term of patent 14 years

U.S. Cl. D14—258

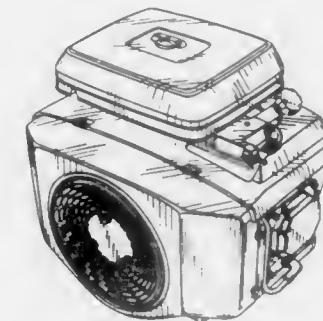
310,373  
ENGINE

Keisuke Ishii; Hitooshi Taguchi, and Kiyohide Sumi, all of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 7, 1988, Ser. No. 256,010

Claims priority, application Japan, Apr. 9, 1988, 63-014326  
Term of patent 14 years

U.S. Cl. D15—1



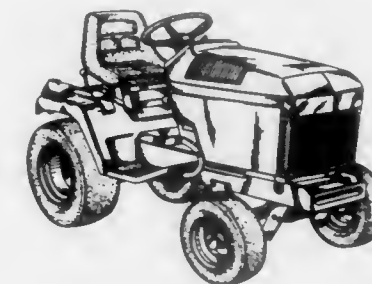
310,374

TRACTOR FOR LAWN, GARDENS, OR THE LIKE  
David A. Westmayer, Horicon, Wis.; William E. Crookes, Waldwick, N.J., and Daniel R. Nickles, Monroe, N.Y., assignors to Deere & Company, Moline, Ill.

Filed Mar. 31, 1988, Ser. No. 176,139

Term of patent 14 years

U.S. Cl. D15—15



310,375

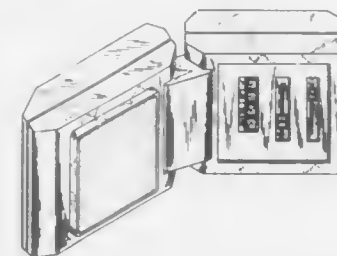
## MOTORIZED SAW UNIT

Mark S. Kimbrough, Wichita, Kans., and Craig S. Potter, Wake Forest, N.C., assignors to Marpac Corporation, Wilmington, N.C.

Filed May 20, 1987, Ser. No. 52,562

Term of patent 14 years

U.S. Cl. D14—299

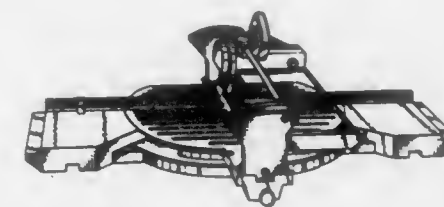


Louis C. Brickner; Michael P. McKee; Raymond L. Wilson, all of Pittsburgh, and David N. Hollinger, Jr., Glenshaw, all of Pa., assignors to Delta International Machinery Corp., Pittsburgh, Pa.

Filed Jul. 12, 1988, Ser. No. 217,819

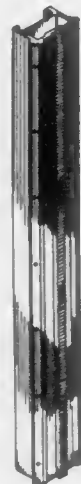
Term of patent 14 years

U.S. Cl. D15—133

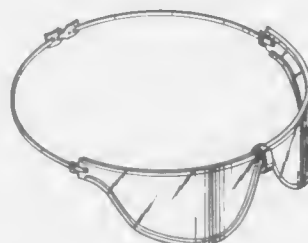




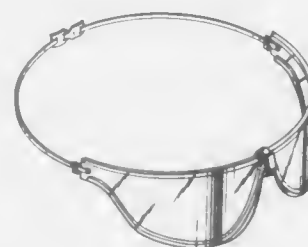
310,376  
RAIL FOR GUIDING AND CARRYING A SAW TOOL OR  
THE LIKE  
Anders Johnsen, Svetsgränd 1, 781 34 Borlänge, Sweden  
Filed Oct. 2, 1986, Ser. No. 914,761  
Claims priority, application Sweden, Apr. 8, 1986, 86-0838  
Term of patent 14 years  
U.S. Cl. D15-140



310,378  
EYESHIELD  
John P. Russell, 1000 Main St., Gardendale, Ala. 35071  
Filed Jul. 28, 1987, Ser. No. 78,543  
The portion of the term of this patent subsequent to Sep. 4, 2004,  
has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D16-107



310,379  
EYESHIELD  
John P. Russell, 1000 Main St., Gardendale, Ala. 35071  
Filed Jun. 14, 1988, Ser. No. 206,691  
The portion of the term of this patent subsequent to Sep. 4, 2004,  
has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D17-107



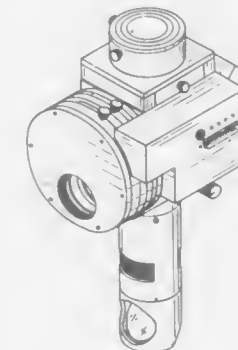
310,377  
BIFOCAL LENS OR SIMILAR ARTICLE  
Min Y. Wang-Lee, No. 473, Jong Shan S. Road, Yung Kang  
Hsiang, Tainan Hsien, Taiwan  
Filed Jul. 27, 1987, Ser. No. 78,066  
Term of patent 14 years  
U.S. Cl. D16-101



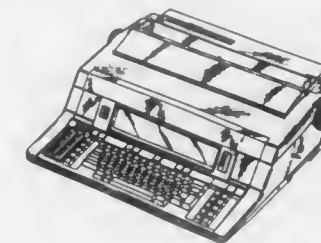
310,380  
CONTACT LENS REMOVER  
Robert C. England, Nashport, Ohio, assignor to DMV Corpora-  
tion, Zanesville, Ohio  
Filed Jun. 22, 1987, Ser. No. 65,207  
Term of patent 14 years  
U.S. Cl. D16-124



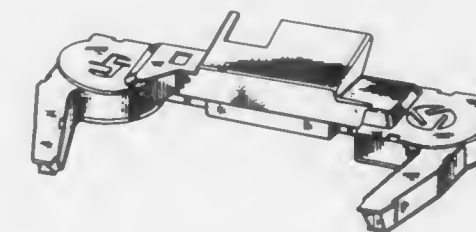
310,381  
MULTIPLE FUNCTION IMAGE SWITCHING  
ATTACHMENT FOR A TELESCOPE OR SIMILAR  
ARTICLE  
Jeffrey R. Charles, 10461 Winger Cir., San City, Ariz. 85351  
Filed May 8, 1989, Ser. No. 348,650  
Term of patent 14 years  
U.S. Cl. D16-136



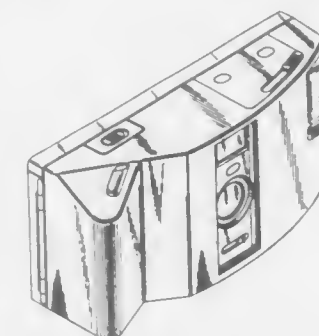
310,383  
ELECTRONIC TYPEWRITER  
Seiichi Omino, Tokyo, and Takuma Kanno, Hachioji, both of  
Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Aug. 4, 1987, Ser. No. 81,163  
Claims priority, application Japan, Feb. 9, 1987, 62-4938  
Term of patent 14 years  
U.S. Cl. D18-1



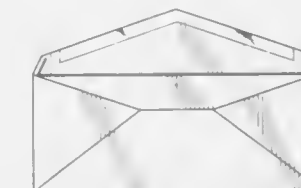
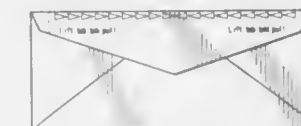
310,384  
RIBBON CASSETTE  
Hans W. Mueller, and Kenneth D. Vought, both of Cortland,  
N.Y., assignors to Smith Corona Corporation  
Continuation-in-part of Ser. No. 127,002, Nov. 30, 1987. This  
application Apr. 19, 1988, Ser. No. 185,768  
The portion of the term of this patent subsequent to May 22,  
2004, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D18-12



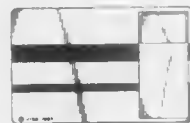
310,382  
STILL CAMERA  
Barry Wingate, San Jose, and Hartmut H. Esslinger, Los Gatos,  
both of Calif., assignors to Eastman Kodak Company, Roches-  
ter, N.Y.  
Filed Jun. 2, 1987, Ser. No. 56,840  
The portion of the term of this patent subsequent to Jul. 31,  
2004, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D16-209



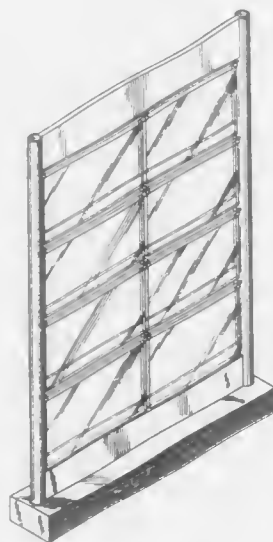
310,385  
ENVELOPE  
Art Thomson, P.O. Box 1321, Stanton, Calif. 90680  
Filed Nov. 9, 1987, Ser. No. 118,867  
Term of patent 14 years  
U.S. Cl. D19-3



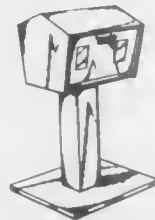
310,386  
TRANSACTION CARD  
Catherine L. Michels, and Stephen A. Watson, both of San Francisco, Calif., assignors to Visa International Service Association, San Mateo, Calif.  
Filed Aug. 7, 1987, Ser. No. 82,811  
Term of patent 14 years  
U.S. Cl. D19—10



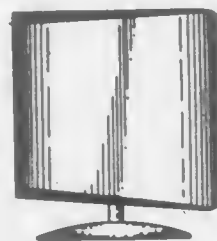
310,388  
HOLDER FOR DISPLAY SIGNS OR THE LIKE  
Dennis Crawford, Carrollton, and Barry Rutherford, Dallas, both of Tex., assignors to Chippenhook, Inc., Lewisville, Tex.  
Filed Jun. 3, 1988, Ser. No. 202,938  
Term of patent 14 years  
U.S. Cl. D20—10



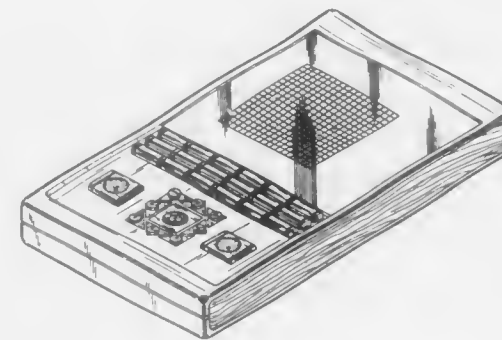
310,387  
PUBLICATION VENDING MACHINE  
Tom K. Scardino, Dekalb County, Ga., assignor to Haas Publishing Companies, Inc., Norcross, Ga.  
Filed May 22, 1987, Ser. No. 53,421  
Term of patent 14 years  
U.S. Cl. D20—6



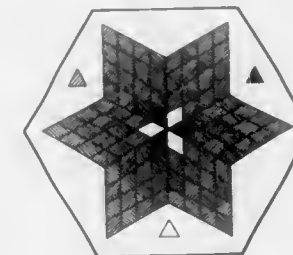
310,389  
SIGN  
Neville R. Trewarn, 4 Obion Close, Willetton, Western Australia, 6155, Australia  
Filed Oct. 8, 1986, Ser. No. 916,852  
Term of patent 14 years  
U.S. Cl. D20—41



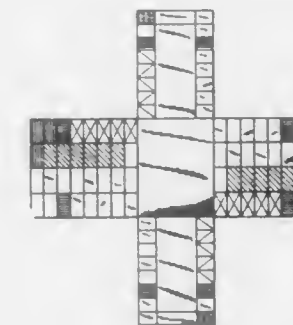
310,390  
ELECTRONIC GAME  
Joseph C. Besacie, Memomonee Falls, Wis., assignor to Toyogo, Inc., Lexington, Mass.  
Filed Feb. 1, 1988, Ser. No. 151,329  
Term of patent 14 years  
U.S. Cl. D21—13



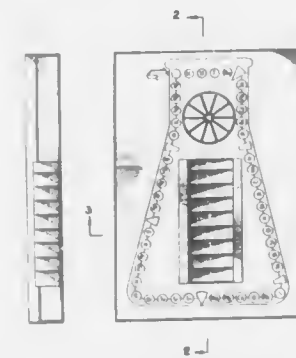
310,392  
GAME BOARD  
Merlin D. Grimes, 715 Vernon St., Nelson, British Columbia, Canada V1L 4G3  
Filed Oct. 28, 1987, Ser. No. 113,724  
Claims priority, application Canada, May 28, 1987, 28-05-87-11  
Term of patent 14 years  
U.S. Cl. D21—24



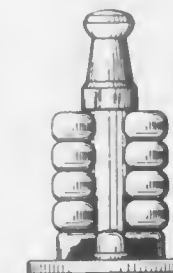
310,393  
GAME BOARD  
Salem A. S. Al-Heyari, P.O. Box 927192, Amman, Jordan  
Filed Jan. 27, 1987, Ser. No. 7,448  
Term of patent 14 years  
U.S. Cl. D21—32



310,391  
GAME BOARD  
France Leblanc, Lachenaie, Canada, assignor to College Marie-Victorin, Montréal Nord, Canada  
Filed Nov. 9, 1987, Ser. No. 120,500  
Claims priority, application Canada, Jul. 22, 1987, 22-07-87-9  
Term of patent 14 years  
U.S. Cl. D21—17



310,394  
STACKING TOY  
David C. Roy, and Marjorie E. C. Roy, both of Stafford Springs, Conn., assignors to The Quaker Oats Company, Chicago, Ill.  
Filed Sep. 29, 1987, Ser. No. 102,091  
Term of patent 14 years  
U.S. Cl. D21—59





310,395

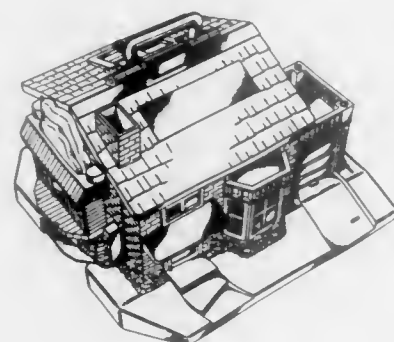
## COMBINED TOY HOUSE AND GARAGE

William J. Maloney, II, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Oct. 11, 1988, Ser. No. 256,361

Term of patent 14 years

U.S. Cl. D21—114



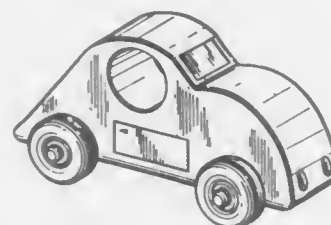
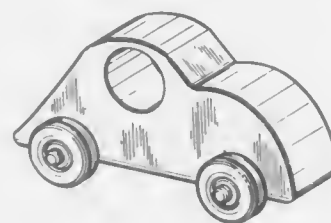
310,397

## TOY AUTOMOBILE

Paul E. Myers, 719 Vine St., Clyde, Ohio 43410  
Filed Dec. 21, 1987, Ser. No. 135,636

Term of patent 14 years

U.S. Cl. D21—128



310,398

## TOY BOAT

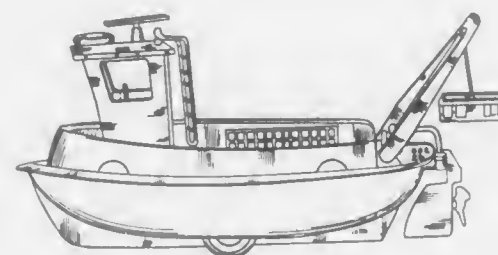
Gerhard Thieser, Paris, France, assignor to Borden France S.A., Paris, France

Filed Jan. 30, 1987, Ser. No. 9,401

Claims priority, application France, Jul. 31, 1986, 86 4170

Term of patent 14 years

U.S. Cl. D21—130



310,396

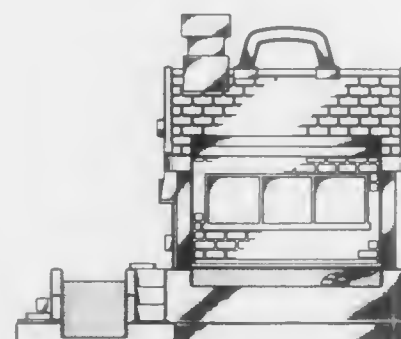
## TOY SCHOOL HOUSE

Craig J. McElhaney, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Oct. 25, 1988, Ser. No. 262,341

Term of patent 14 years

U.S. Cl. D21—114



310,399

## TOY TRAILER HITCH ELEMENT

Erling T. Dideriksen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland

Filed Nov. 29, 1988, Ser. No. 278,148

Term of patent 14 years

U.S. Cl. D21—141



310,400

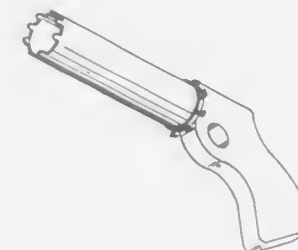
## TOY GUN

Arthur Guilbeaux, Jr., 3012 South Dr., Groves, Tex. 77619

Filed Apr. 21, 1988, Ser. No. 184,177

Term of patent 14 years

U.S. Cl. D21—148



310,401

## DOLL

Victoria Woods, 835 W. Nopal, Mesa, Ariz. 85202, assignor to Victoria Woods; Christine C. Gerst and Janice M. Grienke  
Filed Sep. 25, 1987, Ser. No. 101,156

Term of patent 14 years

U.S. Cl. D21—174



310,402

## INSECT TRAP

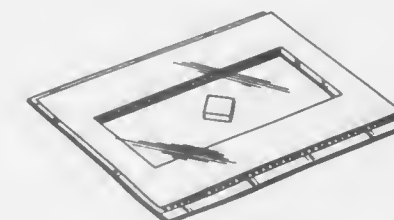
Tristram D. Wyatt, and Owen T. Jones, both of Cardiff, United Kingdom, assignors to University College Cardiff Consultants Limited, Cardiff and Biological Control Systems Ltd., Mid Glamorgan, both of, England

Filed Jul. 19, 1988, Ser. No. 221,378

Claims priority, application United Kingdom, Jan. 20, 1988, 1047809

Term of patent 14 years

U.S. Cl. D22—122



310,403

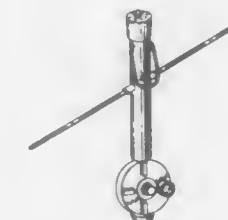
## ICE FISHING INSTRUMENT

John L. Masters, 8522 Old Mesabe Rd., Iron, Minn. 55751

Filed Oct. 30, 1987, Ser. No. 114,379

Term of patent 14 years

U.S. Cl. D22—134



310,404

## COMBINED REVERSIBLE SPRINKLER NOZZLE AND SUPPORT RING

Robert W. Hengesbach, 7886 Munson Rd., Mentor, Ohio 44060  
Division of Ser. No. 224,249, Jul. 26, 1988, which is a continuation of Ser. No. 20,684, Mar. 2, 1987, which is a continuation-in-part of Ser. No. 674,272, Nov. 23, 1984, which is a continuation-in-part of Ser. No. 461,874, Jan. 28, 1983, Pat. No. D. 282,392. This application Sep. 28, 1989, Ser. No. 414,065

Term of patent 14 years

U.S. Cl. D23—213



310,405

COMBINED HOSE-ATTACHED TELESCOPING  
PRESSURE SPRAYER AND CONNECTOR FOR  
ATTACHMENT TO AN ADDITIVE FLUID DISPENSER  
Rudy R. Proctor, Costa Mesa, and Fred M. Reinstein, Encino,  
both of Calif., assignors to Turbo Tek Enterprises, Inc., Los  
Angeles, Calif.

Division of Ser. No. 77,787, Jul. 27, 1987, Pat. No. Des. 300,453.

This application Jan. 13, 1989, Ser. No. 296,684

Term of patent 14 years

U.S. Cl. D23—226



310,406

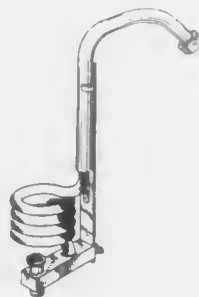
ADJUSTABLE UNIT FOR A HAND SHOWER OR THE  
LIKE

Rocco Cifaldi, 18 Blackthorn Crescent, London, Ontario, Can-  
ada N6B 2V6

Filed Nov. 3, 1986, Ser. No. 926,263

Term of patent 14 years

U.S. Cl. D23—263



310,407

WATER CLOSET OR THE LIKE

Henry M. Stairs, Jr., Neshanic, N.J., assignor to American  
Standard Inc., New York, N.Y.

Filed Dec. 1, 1987, Ser. No. 128,534

Term of patent 14 years

U.S. Cl. D23—301



310,408

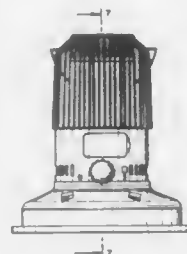
OIL FIRED SPACE HEATER

Yoshio Mito, Gifu, Japan, assignor to Toyotomi Kogyo Co.,  
Ltd., Nagoya, Japan

Filed Feb. 18, 1988, Ser. No. 157,339

Term of patent 14 years

U.S. Cl. D23—348



310,409

AIR CONDITIONING UNIT

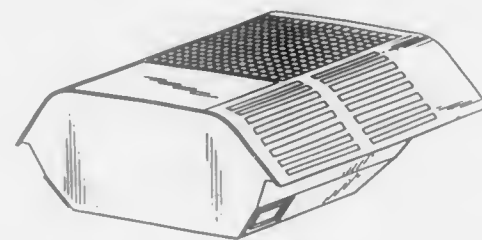
Keith R. Allen, Moorebank; Jeffrey Crawford, Drummoyn, and  
Geoffrey Rule, St. Clair, all of Australia, assignors to Sigma  
Air Conditioning Pty, Limited, New South Wales, Australia

Filed Oct. 15, 1987, Ser. No. 109,691

Claims priority, application Australia, Apr. 16, 1987, 1303/87

Term of patent 14 years

U.S. Cl. D23—351



310,410

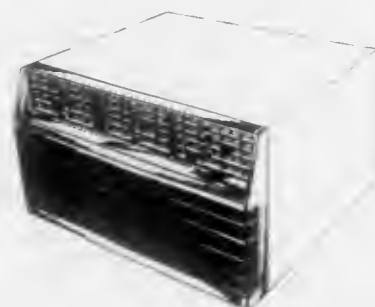
ROOM AIR CONDITIONER GRILL

David M. Lapychak, San Antonio, Tex.; James D. Alsup, Jr.;  
James B. Watson, both of Conyers, Ga., and Edwin G. Gullet,  
Fayetteville, Ga., assignors to Friedrich Air Conditioning &  
Refrigeration Co., San Antonio, Tex.

Filed Sep. 21, 1988, Ser. No. 247,302

Term of patent 14 years

U.S. Cl. D23—354



310,411

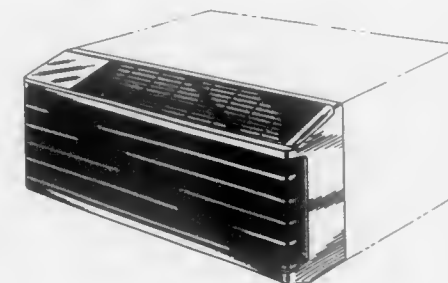
ROOM AIR CONDITIONER GRILL

David M. Lapychak, San Antonio, Tex.; James D. Alsup, Jr.;  
James B. Watson, both of Conyers, Ga., and Edwin G. Gullet,  
Fayetteville, Ga., assignors to Friedrich Air Conditioning &  
Refrigeration Co., San Antonio, Tex.

Filed Sep. 21, 1988, Ser. No. 247,307

Term of patent 14 years

U.S. Cl. D23—354



310,413

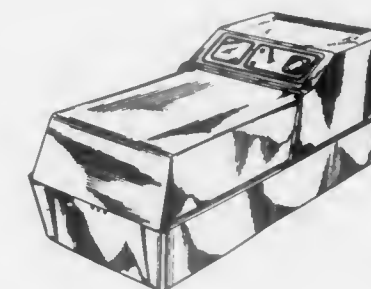
SAMPLE PROCESSOR

William E. Bigler; Michael S. Cherepak; Kenneth D. Collister,  
and Cynthia S. Postma, all of Elkhart, Ind., assignors to Miles  
Inc., Elkhart, Ind.

Filed Dec. 17, 1987, Ser. No. 133,993

Term of patent 14 years

U.S. Cl. D24—17



310,412

DEHUMIDIFIER

Toru Fukumoto, and Shusuke Yamazaki, both of Yokohama,  
Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki,  
Japan

Filed Jan. 28, 1988, Ser. No. 149,617

Claims priority, application Japan, Aug. 18, 1987, 62-33332

Term of patent 14 years

U.S. Cl. D23—359



310,414

TAPE RETAINER FOR ENDOTRACHEAL TUBE

Stephen W. Briggs, III, 6807 Hickory Ave., Orangevale, Calif.  
95662

Filed Oct. 26, 1987, Ser. No. 112,773

Term of patent 14 years

U.S. Cl. D24—34



310,415

## SPA STEP UNIT

Ralph D'Innocente, Pittsburg, and James R. Pauls, Concord, both of Calif., assignors to Jacuzzi Whirlpool Bath, Walnut Creek, Calif.

Filed Sep. 4, 1987, Ser. No. 93,386

Term of patent 14 years

U.S. Cl. D24—38



310,417

## DISPOSABLE NURSER BOTTLE HOLDER

Donald W. Herritz, Reedsburg, Wis., assignor to Gerber Products Company, Fremont, Mich.

Filed Dec. 7, 1987, Ser. No. 130,332

Term of patent 14 years

U.S. Cl. D24—48



310,418

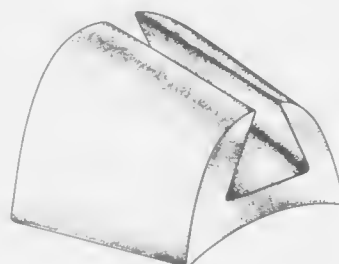
## BABY BOTTLE HOLDER

Leslie L. Tribolet, 5655 Paseo de la Tirada, Tucson, Ariz. 85715

Filed Jul. 6, 1988, Ser. No. 215,943

Term of patent 14 years

U.S. Cl. D24—48



310,419

## PERMANENT PHOTOGRAPHIC MEMORIAL MARKER

Artie J. Morvant, 309 Amis St., Thibodaux, La. 70203

Filed Jun. 22, 1987, Ser. No. 64,458

Term of patent 14 years

U.S. Cl. D99—17



310,416

## PORTABLE MASSAGER

Yoshiaki Yamasaki, Osaka, Japan, assignor to Kabushiki Kaisha Fuji Iryoki, Osaka, Japan

Filed Jun. 30, 1987, Ser. No. 68,853

Term of patent 14 years

U.S. Cl. D24—40



310,420

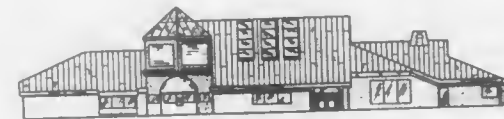
## BUILDING

Robert E. Beaman, and Willis F. Clark, both of Indianapolis, Ind., assignors to Laughner Brothers, Inc., Indianapolis, Ind.

Filed Sep. 21, 1987, Ser. No. 99,211

Term of patent 14 years

U.S. Cl. D25—22



310,421

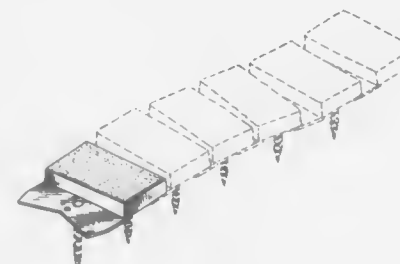
## FLAT BRICK BORDER SECTION

Laverne Nauseda, Antioch, Ill., and Hayden Lession, Humacao, P.R., assignors to Filtertek, Inc., Hebron, Ill.

Filed Aug. 5, 1987, Ser. No. 82,251

Term of patent 14 years

U.S. Cl. D25—113



310,422

## LIGHT BULB

John D. Shupe, P.O. Box 1716, Natchez, Miss. 39120

Filed Dec. 26, 1985, Ser. No. 813,578

Term of patent 14 years

U.S. Cl. D26—4



310,423

## TWIN BEAM QUARTZ-HALOGEN OFF ROAD AUTOMOBILE HEADLIGHT

Marc R. Iscovelli, Miami, Fla., assignor to Rally Accessories Inc., Miami, Fla.

Filed Dec. 29, 1986, Ser. No. 947,583

Term of patent 14 years

U.S. Cl. D26—35



310,424

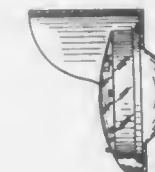
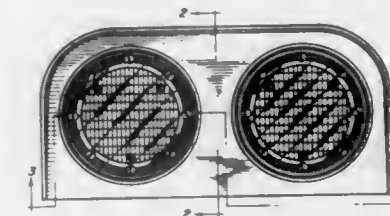
## AUXILIARY VEHICLE DUAL WARNING LIGHT

Joseph E. Bander, 333 Holiday Dr., Springfield, Ohio 45505

Filed Oct. 21, 1987, Ser. No. 110,803

Term of patent 14 years

U.S. Cl. D26—35



310,425

## FLASHLIGHT

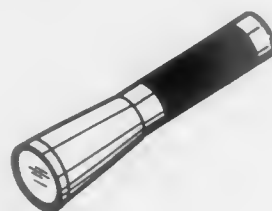
Raymond L. Sharrah, Collegeville, Pa., assignor to Streamlight, Inc., Norristown, Pa.

Filed May 6, 1987, Ser. No. 46,948

The portion of the term of this patent subsequent to Apr. 24, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D26—49



310,426

## TRIPOD LANTERN SUPPORT

Earl T. Rook, HC67, Box 180, Ash Flat, Ark. 72513

Filed Jan. 27, 1987, Ser. No. 7,444

Term of patent 14 years

U.S. Cl. D26—138



310,427

## CIGARETTE LIGHTER

Tomio Nitta, Yokohama, Japan, assignor to Tokai Corporation, Yokohama, Japan

Filed May 9, 1988, Ser. No. 191,661

Claims priority, application Japan, Nov. 19, 1987, 62-47101

Term of patent 14 years

U.S. Cl. D27—154



310,428

## PIVOTAL SAFETY RAZOR

Paul Gerardiello, 106 Eyland Ave., Succa Sunna, N.J. 07876

Filed Dec. 9, 1988, Ser. No. 288,101

Term of patent 14 years

U.S. Cl. D28—48



310,429

## ELECTRIC SHAVER

Willem Anema, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 7, 1988, Ser. No. 216,740

Claims priority, application Benelux, Jan. 22, 1988, 62908-00

Term of patent 14 years

U.S. Cl. D28—51



310,430

## ELECTRIC SHAVER

Hsin-Chen Shih, Changhua, Taiwan, assignor to Benz Electronic Co., Ltd., Changhua, Taiwan

Filed Nov. 7, 1988, Ser. No. 268,541

Term of patent 14 years

U.S. Cl. D28—49



310,431

## GAS DELIVERY MASK

Howard G. Bellm, The Priory, Great Britain, assignor to Life-line Limited, Vale, Channel Islands

Filed Jul. 24, 1987, Ser. No. 77,180

Claims priority, application United Kingdom, Jan. 30, 1987, 1039627

Term of patent 14 years

U.S. Cl. D29—8



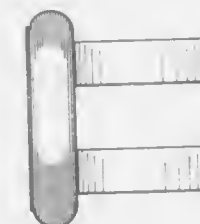
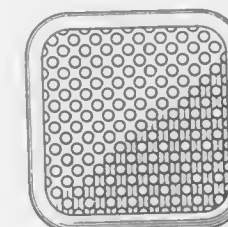
310,433

## FLOATATION KNEE PAD

Michael L. Zierke, 321 W. Madison St., Belvidere, Ill. 61008

Filed Sep. 2, 1988, Ser. No. 240,116

Term of patent 14 years



310,432

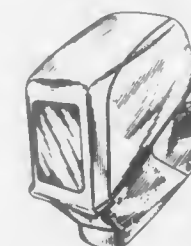
## WELDING HELMET

E. L. Boochard, Kent City, Mich., assignor to Jackson Products, Inc., Belmont, Mich.

Filed Mar. 18, 1988, Ser. No. 169,752

Term of patent 14 years

U.S. Cl. D29—9



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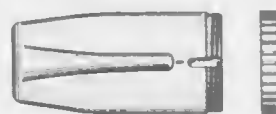
310,434  
**MOTORCYCLE HELMET WITH LIGHT**  
 William N. Breece, 2524 N. Tamiami Trail #301, North Fort  
 Meyers, Fla. 33917  
 Filed Nov. 9, 1987, Ser. No. 118,802  
 Term of patent 14 years  
 U.S. Cl. D29—13



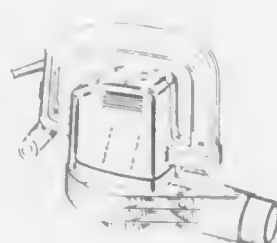
310,435  
**DOG HANDLER**  
 Floyd M. Cleveland, Lantana, Fla., assignor to Virgo Industries,  
 Inc., Lake Worth, Fla.  
 Filed Feb. 13, 1989, Ser. No. 272,867  
 Term of patent 14 years  
 U.S. Cl. D30—152



310,436  
**COMBINED PET WASTE CONTAINER AND COVER THEREFOR**  
 Rodney A. Krauth, 2607 Monroe St., Madison, Wis. 53711  
 Filed Jul. 21, 1988, Ser. No. 222,731  
 Term of patent 14 years  
 U.S. Cl. D30—161



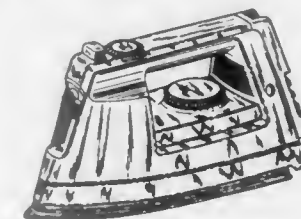
310,437  
**COMBINED PORTABLE POWER VACUUM AND BLOWER**  
 Martin P. Gierke, and Robert P. Straub, both of Baltimore, Md.,  
 assignors to Black & Decker Inc., Newark, Del.  
 Filed Nov. 9, 1987, Ser. No. 118,835  
 Term of patent 14 years  
 U.S. Cl. D32—15



310,438  
**VACUUM CLEANER**  
 Stephen R. Burns, Duluth, Ga., assignor to Ryobi Motor Products Corp., Pickens, S.C.  
 Filed Aug. 17, 1987, Ser. No. 85,930  
 Term of patent 14 years  
 U.S. Cl. D32—22



310,439  
**ELECTRIC IRON**  
 Jan Klok, Hoogezand, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.  
 Filed Jan. 11, 1988, Ser. No. 142,768  
 Claims priority, application United Kingdom, Jul. 15, 1987, 1043495  
 Term of patent 14 years  
 U.S. Cl. D32—70



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## LIST OF PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 4TH DAY OF SEPTEMBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name  
(in accordance with city and telephone directory practice).

- A. Ahlstrom: See—  
Erkki, Kiiskila; and Rolf, Ryham, 4,953,607, Cl. 159-13.300.
- A. B. Dick Company: See—  
Potzler, J. Edward; and Strahan, Daryl J., 4,955,032, Cl. 364-525.000.
- A. O. Smith Corporation: See—  
Akkala, Marc W.; and Walther, Kenneth R., 4,953,510, Cl. 122-17.000.  
Houle, Timothy H.; and Schurter, Robert M., 4,954,172, Cl. 204-197.000.  
Houle, Timothy H.; and Schurter, Robert M., 4,954,233, Cl. 204-197.000.
- AB Sandvik Coromant: See—  
Faber, Kurt H. A. E.; Faber, Ute M. I.; Faber, Knut; Faber, Inken A. H.; and Faber, Andrea J., 4,954,004, Cl. 403-13.000.
- Abbott Laboratories: See—  
Giuliani, David; and Vurek, Gerald G., 4,954,129, Cl. 604-53.000.  
Yost, David A.; Russell, John C.; and Yang, Heechung, 4,954,452, Cl. 436-524.000.
- ABC/Sebrn TechCorp.: See—  
Shannon, Joseph W., 4,953,751, Cl. 222-14.000.
- Abe, Hideaki: See—  
Kawamoto, Tetsuo; Motohashi, Ryo; Sakamoto, Toshihiro; Suzuki, Yasuo; and Abe, Hideaki, 4,954,736, Cl. 316-156.000.
- Abe, Kouichi: See—  
Yamatsu, Isao; Inai, Yuichi; Abe, Shinya; Suzuki, Takeshi; Suzuki, Yoshikazu; Tagaya, Osamu; Suzuki, Kouichi; Abe, Kouichi; and Yamada, Kouji, 4,954,525, Cl. 514-549.000.
- Abe, Kunihiro, to Fuji Jukogyo Kabushiki Kaisha. Crank angle detector for an engine. 4,953,531, Cl. 123-414.000.
- Abe, Masanori: See—  
Mackawa, Junichi; Abe, Masanori; Ienaga, Hirofumi; and Hashimoto, Shigeaki, 4,953,910, Cl. 296-223.000.
- Abe, Osamu: See—  
Sasaki, Masahiro; Abe, Osamu; and Ishikawa, Hideaki, 4,953,513, Cl. 123-489.000.
- Abe, Shinya: See—  
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,954,523, Cl. 514-521.000.
- Yamatsu, Isao; Inai, Yuichi; Abe, Shinya; Suzuki, Takeshi; Suzuki, Yoshikazu; Tagaya, Osamu; Suzuki, Kouichi; Abe, Kouichi; and Yamada, Kouji, 4,954,525, Cl. 514-549.000.
- Abe, Tadashi; Manabe, Mitsuyoshi; Deguchi, Koji; Uhara, Hiroyuki; and Aoki, Yukio, to Sumitomo Chemical Company, Ltd.; and Nippon Shokubai Kagaku Kogyo Co., Ltd. Method for production of methacrylic acid. 4,954,650, Cl. 562-534.000.
- Abe, Takao: See—  
Koshizuka, Kunihiro; and Abe, Takao, 4,954,390, Cl. 428-212.000.
- Abe, Teruyoshi: See—  
Takajo, Shigeaki; Furukimi, Osamu; Ogura, Kuniaki; Maruta, Keiichi; Abe, Teruyoshi; and Sakurada, Ichio, 4,954,171, Cl. 75-246.000.
- Abeler, Gerd; and Sander, Hans J., to Ciba-Geigy Corporation. PVC resin blend compositions stabilized with lauryl tin compounds. 4,954,546, Cl. 524-180.000.
- Abernathy, Frank W. Dispensing method for a variable volume disposable carbonated beverage container. 4,953,750, Cl. 222-1.000.
- Abodishah, Hani A. M.; Wahlquist, Randy W.; and Lopez, Dale A., to Westinghouse Electric Corp. Production of sponge metal from sponge metal fines. 4,954,166, Cl. 419-38.000.
- Acharya, Ramadas U.; and Hill, Lawrence I., to Uniroyal Plastics Company, Inc. Multi-layer electrically conductive article. 4,954,389, Cl. 428-212.000.
- Acustar, Inc.: See—  
Markow, Paul A.; and Nolle, William, 4,953,797, Cl. 242-7.110.
- Adachi, Naomichi: See—  
Nakao, Toshiyuki; and Adachi, Naomichi, 4,954,122, Cl. 475-160.000.
- Adair, Paul C.; and Gottschalk, Peter, to Mead Corporation. The photosensitive composition containing a transition metal coordination complex cation and a borate anion and photosensitive materials employing the same. 4,954,414, Cl. 430-138.000.
- Aderhold, James L., Jr.: See—  
Kukea, Simon G.; Henaley, Albert L., Jr.; Kelterborn, Jeffrey C.; and Aderhold, James L., Jr., 4,954,241, Cl. 208-59.000.
- ADIR et Cie: See—  
Vincent, Michel; Baliarda, Jean; Marchand, Bernard; and Remond, Georges, 4,954,640, Cl. 548-490.000.
- Adkins, Keith W. Ski pole clip. 4,953,892, Cl. 280-814.000.
- Adler, David: See—  
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- Adler-Golden, Steven; Goldstein, Neil; and Bien, Fritz, to Spectral Sciences, Inc. Gas species monitor system. 4,953,976, Cl. 356-301.000.
- Advanced Cardiovascular Systems, Inc.: See—  
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- Advanced Micro Devices: See—  
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- Advanced Micro Devices, Inc.: See—  
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- Agawa, Jiro, to Mitsubishi Jukogyo Kabushiki Kaisha. Joining device for cord-reinforced belt-shaped materials. 4,954,205, Cl. 156-502.000.
- Agfa-Gevaert AG: See—  
Vedder, Hans J., 4,953,927, Cl. 350-6.800.
- Agfa-Gevaert Aktiengesellschaft: See—  
Rauh, Hans-Jurgen, 4,953,805, Cl. 242-58.600.
- Ahrens, Kurt-Henning: See—  
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- Aigner, Rudolf; Muller, Gunther; Muller, Rainer; and Reuner, Horst, to Hoechst Aktiengesellschaft. Process for the preparation of sulfated alkanol oxethylates or alkylphenol oxethylates having a lowered content of 1,4-dioxane. 4,954,646, Cl. 558-31.000.
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- Air Products and Chemicals, Inc.: See—  
Burgoyne, William F., Jr.; Langsam, Michael; and Fowlkes, Robert L., 4,954,144, Cl. 55-16.000.
- Fioravanti, Kenneth J.; Zelson, Larry S.; and Bankal, Charles E., Jr., 4,954,076, Cl. 431-116.000.
- Airmaster Fan Company: See—  
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- Aisin A W Co. Ltd.: See—  
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- Aisin Seiki Kabushiki Kaisha: See—  
Nakao, Toshiyuki; and Adachi, Naomichi, 4,954,122, Cl. 475-160.000.
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- Takagi, Kiyoharu; Tanikawa, Naoya; and Ikeda, Minoru, 4,953,591, Cl. 137-568.000.
- Aisin Seiko Co. Ltd.: See—  
Yamada, Yukifumi; Terada, Takami; and Hibino, Keiichi, 4,953,676, Cl. 192-8.00C.
- Akao, Shinichi: See—  
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- Akasaka, Kozo: See—  
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- Akerfeldt, Dan, to C. R. Bard, Inc. Tissue sampling device. 4,953,558, Cl. 128-751.000.
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Hellman, Stig, 4,953,343, Cl. 53-500.000.
- Akemon, Rune; and Pegoraro, Giuliano, to Nestec S.A. Stabilizing and weighing device. 4,953,644, Cl. 177-145.000.
- Akimoto, Hajime; and Ohba, Shinya, to Hitachi, Ltd. Solid-state imaging device including photoelectric conversion elements integrated at a surface of a semiconductor substrate. 4,954,895, Cl. 358-213.110.
- Akitaawa, Taiji, to Fuji Photo Film Co., Ltd. Roll surface cleaning device. 4,953,252, Cl. 15-308.000.
- Akkala, Marc W.; and Walther, Kenneth R., to A. O. Smith Corporation. Apparatus and method for heating water. 4,953,510, Cl. 122-17.000.

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Albert Handtmann, Maschinenfabrik GmbH & Co. KG: See—Zinser, Georg, 4,953,262, Cl. 17-1.00R.

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Albertini, Peter: See—Weihe, Clyde; Maroti, Lewis; and Albertini, Peter, 4,954,250, Cl. 209-629.000.

Albrecht, Charles W., to Cool Pet Industries, Inc. Evaporative air cooler. 4,953,831, Cl. 261-102.000.

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Alexandre, Stephane; Thellier, Michel; and Vincent, Jean-Claude, to Centre National de la Recherche Scientifique - Cnrs. Method for extracting compounds having a high added value from complex solutions and membrane device for implementing such method. 4,954,261, Cl. 210-638.000.

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Fecher, Douglas A.; and Dodd, Thomas E., 4,953,446, Cl. 91-369.300.

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Alpegiani, Marco; Perrone, Ettore; Orezza, Piergiuseppe; Carminati, Paolo; and Cassinelli, Giuseppe, to Farmitalia Carlo Erba S.r.l. 6-substituted penem esters as anti-inflammatory and anti-degenerative agents. 4,954,493, Cl. 514-195.000.

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Alps Electric Co., Ltd.: See—Maegawa, Mamoru; and Sakamoto, Fumio, 4,954,930, Cl. 362-26.000.

Altair International, Inc.: See—Peterson, Richard W.; and Malo, Charles J., 4,954,872, Cl. 357-70.000.

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Alza Corporation: See—Gale, Robert M., 4,954,344, Cl. 424-448.000.

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Ambasz, Emilio. Expandable luggage. 4,953,673, Cl. 190-103.000.

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Amedco Health Care, Inc.: See—Birkmann, Kenneth R., 4,953,243, Cl. 5-60.000.

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Gripp, Anna A.; and Metzler, Gottfried, III, 4,954,337, Cl. 424-73.000.

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Riefler, R. Scott; and Powers, John W., 4,954,382, Cl. 428-116.000.

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Ames, Marc L. Pool cue bridge. 4,953,860, Cl. 273-23.000.

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Lee, Min-Hsiun; and Pendergraft, Paul T., 4,954,331, Cl. 423-574.00R.

Miller, Jeffrey T.; and Shum, Victor K., 4,954,245, Cl. 208-138.000.

AMP Incorporated: See—McCleery, Earl W., 4,954,100, Cl. 439-492.000.

AMPAFRANCE: See—Bigo, Jean, 4,953,667, Cl. 188-31.000.

Ampe, Frank: See—Van Bogaert, Philippe; and Ampe, Frank, 4,953,597, Cl. 139-452.000.

AMSTED Industries Incorporated: See—Wronkiewicz, Robert D.; and Moehling, Charles, 4,953,471, Cl. 105-198.400.

Amstore Corporation: See—Amstutz, Douglas D.; and Vanderboegh, Ronald A., 4,955,044, Cl. 362-125.000.

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Andersen, Jom W., to Ball Corporation. Tandem molding of plastic containers. 4,954,310, Cl. 264-520.000.

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Anderson, Clark L.: See—Fanger, Michael W.; Guyre, Paul M.; and Anderson, Clark L., 4,954,617, Cl. 530-387.000.

Anderson, George C., to Motorola, Inc. Battery saver circuit for a frequency synthesizer. 4,955,075, Cl. 455-182.000.

Anderson, Howard A., to Mobay Corporation. Bar support for concrete. 4,953,340, Cl. 52-684.000.

Anderson, Janeen D. W.; and Mead, Carver A., to Synaptics Inc. MOS device for long-term learning. 4,953,928, Cl. 357-23.500.

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Anderson, Mark, to American Colloid Company. Water absorbent resins. 4,954,562, Cl. 524-779.000.

Anderson, Milton M.; and Petruschka, Orni, to Bell Communications Research Inc. Apparatus and methods for recovering alignment from a non-ideally encoded multi-bit digital signal. 4,955,037, Cl. 375-27.000.

Ando, Ichiro: See—Toyoshima, Nobuyuki; Shibata, Takanori; Hirashima, Atsushi; Ando, Ichiro; Iwata, Noriko; Yoshioka, Hiroshi; Itagaki, Akinari; and Yamazaki, Toshio, 4,954,586, Cl. 526-245.000.

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Anthony, Thomas R.; DeVries, Robert C.; Engler, Richard A.; Ettinger, Robert H.; and Fleischer, James F., to General Electric Company. Apparatus for synthetic diamond deposition including curved filaments and substrate cooling means. 4,953,499, Cl. 118-724.000.

Antwi, Samuel. Traffic board game. 4,953,871, Cl. 273-252.000.

Anver: See—Ortiz, Robert; and Gras, Elie, 4,954,073, Cl. 425-547.000.

Anzai, Hisao: See—Sasaki, Isao; Nishida, Kozi; and Anzai, Hisao, 4,954,575, Cl. 525-330.500.

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Aoki, Kazutsugu; Fuse, Noboru; and Sakamoto, Yoshio, to Tel Sagami Limited. Vertical type heat-treating apparatus and heat-treating method. 4,954,684, Cl. 219-390.000.

Aoki, Masaki; Torii, Hideo; Kuribayashi, Kiyoshi; Monji, Hideto; Umetani, Makoto; and Fujii, Eiji, to Matsushita Electric Industrial Co., Ltd. Information storage stamper and method of manufacturing disks using the same. 4,953,385, Cl. 72-462.000.

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Aoki, Yukio: See—Abe, Tadashi; Manabe, Mitsuyoshi; Deguchi, Koji; Uhara, Hiroyuki; and Aoki, Yukio, 4,954,650, Cl. 562-534.000.

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Arai, Takuya: See—Ohmura, Hiroshi; Arai, Takuya; Haishi, Akira; Kozai, Katsuya; Hara, Hiroshi; Tobioke, Takashi; Asano, Seiji; and Takagi, Junichi, 4,954,858, Cl. 354-145.100.

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Araki, Nobuo; Tabata, Kazufumi; Yokoi, Kiyomi; and Ashidate Tadami, to Nippon Steel Welding Products & Engineering Co., Ltd. Method for inserting thread into tube. 4,953,827, Cl. 254-134.400.

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Arbouw, Willem D., to Aluat Aluminum B.V. Ventilation device. 4,953,451, Cl. 98-98.000.

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Arisaka, Tomokichi; and Yamaguchi, Mitsuyoshi, to Kabushiki Kaisha ALPS TOOL. Apparatus for rotatably supporting and feeding elongated rod member. 4,953,429, Cl. 82-127.000.

Armbruster, Joseph M. Air circulation device. 4,954,049, Cl. 417-234.000.

Armitage, Albert, to Westinghouse Electric Corp. Fuel metering bin level control. 4,953,474, Cl. 110-101.0CD.

Arnold, Brian K.: See—Sare, Ian R.; Henderson, Ian; Heijkoop, Teunis; Bosworth, Michael R.; Aspin, Ronald E.; and Arnold, Brian K., 4,953,612, Cl. 164-102.000.

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Aron, Jerome, to Kuhn S.A. Tractor driven farm machine. 4,953,346, Cl. 56-11.100.

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Asahi Glass Company Ltd.: See—Aoki, Yoshiharu; and Hamano, Toshikatsu, 4,954,262, Cl. 210-638.000.

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Asca Brown Boveri Ltd.: See—Bauer, Friedhelm, 4,954,869, Cl. 357-38.000.

Loutan, Dominique, 4,953,726, Cl. 213-1.300.

Asca Brown Boveri Ltd.: See—Tomljenovic, Nenad, 4,955,072, Cl. 455-108.000.

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Ashidate Tadami: See—Araki, Nobuo; Tabata, Kazufumi; Yokoi, Kiyomi; and Ashidate Tadami, 4,953,827, Cl. 254-134.400.

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Asmar, Romel F., to Boeing Company, The. Optical encoder reading device. 4,953,933, Cl. 350-96.150.

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Eng, Kai Y.; Karol, Mark J.; and Yeh, Yu S., 4,955,016, Cl. 370-60.000.

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Atlas Powder Company: See—Reiss, Peter F., 4,953,464, Cl. 102-312.000.

Atochem: See—Emily, Jean Y., 4,953,482, Cl. 111-144.000.

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- Baba, Hisatoshi, to Canon Kabushiki Kaisha. Information recording/reproducing apparatus with control device for maintaining head velocity below a critical velocity. 4,955,011, Cl. 369-54.000.
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- Bagley, Jerome R.; and Spencer, H. Kenneth, to BOC, Inc. N-heterocyclic-N-(4-piperidinyl)amides and pharmaceutical compositions and methods employing such compounds. 4,954,506, Cl. 514-272.000.
- Bagrodia, Shiram; and Phillips, Bobby M., to Eastman Kodak Company. Modified grooved polyester fibers and process for production thereof. 4,954,398, Cl. 428-400.000.
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- Baird, Charles A.; and Collins, Noel, to Harris Corporation. Terrain aided passive range estimation. 4,954,837, Cl. 342-458.000.
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- Ross, Richard J.; and Roddy, Jim H., 4,953,617, Cl. 166-187.000.
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- Baldecchi, Sauro S.; and Bourgin, Patrick. Apparatus for practicing a pneumatic suction process permitting drawing cables through sheaths. 4,953,828, Cl. 254-134.400.
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- Barber, Richard G., to Avantek, Inc. Enhanced coupled, even mode terminated baluns, and mixers and modulators constructed therefrom. 4,954,790, Cl. 332-164.000.
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- Basten, Aaron K.; and Claassen, Robert W., to Vector Corporation. Filter system for a fluid bed granulator/dryer. 4,953,308, Cl. 34-82.000.
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- Beck, Anton K.; Withy, Raymond M.; Zabrecky, James R.; and Masiello, Nicholas C., to Integrated Genetics, Inc. Cell encoding recombinant human erythropoietin. 4,954,437, Cl. 435-69.400.
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- Becton, Dickinson and Company: See—  
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- Beery, Jack; and Joiner, Charles W., Jr., to Mead Corporation. The Method and apparatus for forming a matte finish on resin-coated webs or sheets. 4,954,297, Cl. 264-1.300.
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- Berthelsen, Wendy A., to Medtronic, Inc. Screw-in drug eluting lead. 4,953,564, Cl. 128-784.000.
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- Bielefeldt, Dietmar; Marhold, Albrecht; and Negele, Michael, to Bayer Aktiengesellschaft. Process for preparing fluorinated C<sub>4</sub> to C<sub>6</sub> hydrocarbons and novel cyclic fluorinated hydrocarbons and their use as propellant gas and working fluid for heat pump systems. 4,954,666, Cl. 570-132.000.
- Biemiller, Raymond H.: See—  
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- Cousin, Michel: See—  
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- Custom Plastics, Inc.: See—  
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- Daleus, Regine, legal representative: See—  
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- Dallas, William J., to U.S. Philips Corporation. Device for forming a picture. 4,953,949, Cl. 350-130.000.
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- Darbee, Paul: See—  
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- Darras, John R.: See—  
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- Davis, Dale C. Adjustable support clamp apparatus and method. 4,953,819, Cl. 248-230.000.
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- Davis, Larry: See—  
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- Davis, Paul D.; Schuster, Gary B.; Truini, Jacqueline G.; and Fentiman, Al, to Mead Corporation. The. Photoinitiator compositions containing O-acylthiohydroxamate or an N-alkoxyppyridinethione and photo-hardenable compositions containing the same. 4,954,415, Cl. 430-138.000.
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- Dawson, John: See—  
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- Dawson, Thomas M.: See—  
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- Deaver, Gerald A.: See—  
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- Debus, Jürgen: See—  
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- Dechow, Frederick J.: See—  
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- Degen, Peter J.; Rothman, Isaac; and Gsell, Thomas C., to Pall Corporation. Hydrophobic membranes. 4,954,256, Cl. 210-490.000.
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- De Hoff, Ronald L. Process for curing epoxy resin anhydride blends at moderately elevated temperatures. 4,954,196, Cl. 156-169.000.
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- Delmonte, Jeffrey C. Head positioning system. 4,954,815, Cl. 340-686.000.
- Delony, Timothy E.: See—  
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- Delsey S.A.: See—  
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- DeMarzo, Arthur P. Blood glucose monitoring system. 4,953,552, Cl. 128-635.000.
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- Densen, Mark S. Reversible foldable container and closure therefor. 4,953,779, Cl. 229-23.00R.
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- Detroit Diesel Corporation: See—  
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- Klein, Manfred, 4,953,509, Cl. 122-6.00A.
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- Dickhudt, Eugene A.: See—  
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- Diebold, Incorporated: See—  
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- Diehl GmbH & Co.: See—  
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- DiNovi, Michael J.: See—  
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- Dipert, Dwight D.: See—  
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- Diversified Fastening Systems, Inc.: See—  
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- Dixon, Robert C.; Deaver, Gerald A.; Panches, James R.; Singleton, Guy E.; Erbes, John G.; and Offer, Henry P., to General Electric Company. Control rod housing alignment. 4,954,311, Cl. 376-258.000.
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- Dr. Ing. h.c.F. Porsche AG: See—  
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- Dr. Lo. Zambelletti S.p.A.: See—  
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- Dodd, Thomas E.: See—  
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- Doddato, Carmine M.: See—  
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- Dohse, Hans-Peter, to Andreas Stihl. Portable handheld tool having a drive shaft rotatably journaled in a protective tube. 4,953,294, Cl. 30-276.000.
- Doi, Tetsuo; and Funabashi, Takeshi, to Sony Corporation. Method and apparatus for processing an image signal. 4,955,061, Cl. 382-56.000.
- Dolan, Donald T.: See—  
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- Dondlinger, Jerry A. Louvered headache rack. 4,953,908, Cl. 296-97.400.
- Donohue, Patrick T. Punching bag and support. 4,953,852, Cl. 272-78.000.
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- Dormish, Jeffrey F.: See—  
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- Dornier System GmbH: See—  
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- Dosaka, Katsumi: See—  
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- Doteuchi, Masami: See—  
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- Dotson, Jimmy R., to Vandigriff, John E. Glass repair method and apparatus. 4,954,300, Cl. 264-36.000.
- Dougherty, James A.: See—  
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- Moore, Eugene R.; and Wessel, Tom E., 4,954,303, Cl. 264-101.000.
- Thill, Bruce P.; and King, Bruce A., 4,954,579, Cl. 525-467.000.
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Bunge, David J., 4,954,554, Cl. 528-388.000.
- King, Russell K., 4,954,601, Cl. 528-45.000.
- Liles, Donald T., 4,954,565, Cl. 524-860.000.
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- Ward, Andrew H., 4,954,333, Cl. 424-66.000.
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- Drägerwerk Aktiengesellschaft: See—  
Mattheissen, Hans, 4,954,718, Cl. 250-493.100.
- Drambarean, Viorel: See—  
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- Dresser Industries, Inc.: See—  
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- Dreyfus, Larry M.: See—  
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- Driessen, Leonardus M. H. E.; and Janse, Cornelis P., to U.S. Philips Corporation. Method and apparatus for storing digital data representing a topological network. 4,954,986, Cl. 365-189.010.
- Drivon, Gilles: See—  
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- Drushel, Ronald H.: See—  
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- Du Pont Canada, Inc.: See—  
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- Dubner, Joseph: See—  
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- Dubots, Patrick; and Legat, Denis, to Societe Anonyme dite: Alstom. Composite superconducting strand having a high critical temperature, and method of manufacture. 4,954,479, Cl. 505-1.000.
- Dubreuille, Ursule, legal representative: See—  
Daleus, Camille, deceased; Dubreuille, Ursule, legal representative; and Daleus, Regine, legal representative, 4,954,117, Cl. 446-280.000.
- Duerkob, Dorothy I.: See—  
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- Duerkob, Manfred F., to Duerkob, Dorothy I. Eye level rear mounted lighted turn and stop signal for vehicles. 4,954,808, Cl. 340-475.000.
- Duffy, Bryan, to FMC Corporation. Water supporting and propulsion systems. 4,953,492, Cl. 114-282.000.
- Dugrand, Louis: See—  
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- Duh, Gabri C. B. Apparatus of heat preventer of a car. 4,953,448, Cl. 98-2.020.
- Dukai, Jozsef: See—  
Besenyey, Gabor; Nemeth, Sandor; Simandi, Laszlo; Belak, Maria; Szabo, Maria; Dukai, Jozsef; Nagy, Lajos; Tomordi, Elemer; Soptei, Csaba; and Dioszegine, Erzsebet E., 4,954,628, Cl. 544-211.000.
- Dullien, Francis A.; Chatzis, Ioannis; and Macdonald, Ian F., to University of Waterloo. Enhanced oil recovery process. 4,953,619, Cl. 166-265.000.
- Dumoulin, Michel M.: See—  
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- Dunlap, Richard L., to Plastipak Packaging, Inc. In-mold label dispenser having single actuator for dispensing head and label carrier. 4,954,070, Cl. 425-503.000.
- Dunn, Richard P., to Charles Machine Works, Inc., The. Method of and apparatus for drilling a horizontal controlled borehole in the earth. 4,953,638, Cl. 175-61.000.
- Dunne, Matthew C.: See—  
Coombs, Donald W.; and Anderson, Andrew A., 4,953,865, Cl. 273-176.00F.
- Dunsee, Wayne K., to Minnesota Mining and Manufacturing Company. Chemical thermal pack having an outer pouch provided with capillaries. 4,953,550, Cl. 128-403.000.
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- Dunwald, Willi; Schlegel, Hans; Halpaap, Reinhard; and Pedain, Josef, to Bayer Aktiengesellschaft. Lacquer binders, coating compositions and wire enamels based on polyamideimides and isocyanates carrying carbodiimide and/or urethane imine groups. 4,954,577, Cl. 525-420.000.
- Du Pont de Nemours, E. I., and Company: See—  
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- Den Hartog, Herman C.; Konsza, Eileen E.; Matthews, James F.; and Werner, Ervin R., Jr., 4,954,559, Cl. 524-507.000.
- Dorai, Suriyanarayanan; and Ernst, Richard E., 4,954,658, Cl. 568-617.000.
- Eveleigh, John William d.; and Kobos, Robert K., 4,954,444, Cl. 435-181.000.
- Pepin, John G., 4,954,926, Cl. 361-304.000.
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- Simmons, Walter J., 4,954,052, Cl. 417-331.000.
- Thomassen, Egidius T. R., 4,954,104, Cl. 439-751.000.
- Ziegenhain, William C., 4,954,330, Cl. 423-484.000.
- Dupree, Leonard J.: See—  
Kierum, Chandler T.; and Dupree, Leonard J., 4,953,763, Cl. 222-644.000.
- Durante, Joseph L., to Zurn Industries, Inc. Vibratory fuel feeder for furnaces. 4,954,034, Cl. 414-156.000.
- Durda, Joseph A., to Aeration Industries, Inc. Propeller aerator with peripheral injection of fluid and method of using the aerator. 4,954,295, Cl. 261-16.000.
- Durham, Samuel: See—  
Edwards, William A.; and Durham, Samuel, 4,953,593, Cl. 137-606.000.
- Durkin, Robert O. Removable chassis front pin and front bolster end assembly. 4,954,029, Cl. 410-80.000.
- Duro Industries, Inc.: See—  
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- Durr, Larry J.: See—  
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- Durr, Larry L.; Clay, B. Jan; and Durr, Larry J. Dry cleaning solvent filtration and recovery system with filter rinsing apparatus. 4,954,222, Cl. 202-176.000.
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- Dutzmann, Stefan: See—  
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- Dyckerhoff & Widmann Aktiengesellschaft: See—  
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- Dynamics Research Corporation: See—  
Bakewell, Joseph J., 4,954,225, Cl. 204-111.000.
- Dynamit Nobel Aktiengesellschaft: See—  
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- Dynavector, Inc.: See—  
Tominari, Noboru, 4,955,057, Cl. 381-63.000.
- Dynobel A/S: See—  
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- Dytel Corporation: See—  
Morganstein, Sanford J.; Bindl, Ron H.; Klecka, Mark D.; Krakau, Herbert B.; and Dawson, Thomas M., 4,955,047, Cl. 379-112.000.
- Dziekian, John T., to Pristine Products. Process for applying identification to objects made of porous material. 4,954,192, Cl. 156-154.000.
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- East, Anthony J., to Hoechst Celanese Corp. Side chain liquid crystalline polymers exhibiting nonlinear optical response. 4,954,288, Cl. 252-299.010.
- Eastman Christensen Company: See—  
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- Eastman Kodak Company: See—  
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- Chi, Chao S., 4,954,825, Cl. 341-64.000.
- Fry, Slaton E.; Magouyrk, David W.; Blankenship, Allen J.; Greene, Paul J.; and Johnson, Larry K., 4,954,573, Cl. 525-327.600.
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- Eaton Corporation: See—  
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- Ebara, Katsuya: See—  
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- Ebbing, Peter; and Birang, Manoocher, to Applied Materials, Inc. Method and apparatus for endpoint detection in a semiconductor wafer etching system. 4,953,982, Cl. 356-357.000.
- Ebert, Wolfram; Handrich, Eberhard; Hafen, Martin; and Ryrko, Bruno, to Litef GmbH. Pendulum with bending spring joint. 4,953,834, Cl. 267-160.000.
- Echelon Systems Corporation: See—  
Twitty, William B.; and Sander, Wendell B., 4,955,018, Cl. 370-85.100.
- Eckhardt, Volker: See—  
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- Edgar, Duane: See—  
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- Edington, Bruce L., to Halliburton Geophysical Services, Inc. Time delay source coding. 4,953,657, Cl. 181-111.000.
- Edwards, Cyril K. Method and apparatus for hydroponic cultivation. 4,953,322, Cl. 47-64.000.
- Edwards, John, to Waters, William P. Catheter/heparin lock and method of using same. 4,954,130, Cl. 604-169.000.
- Edwards, William A.; and Durham, Samuel. Fluid mixing apparatus for producing variably carbonated water. 4,953,593, Cl. 137-606.000.
- EEV Limited: See—  
Maitland, Arthur; and Livingstone, Ewan S., 4,955,033, Cl. 372-56.000.
- Weatherup, Clifford R., 4,954,748, Cl. 313-153.000.
- EFG Foods, Inc.: See—  
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- Efner, Howard F., to Phillips Petroleum Company. Process for the preparation of secondary and tertiary amines. 4,954,654, Cl. 564-446.000.
- Ehr, Robert J.: See—  
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Schreck, Daniel J.; and Ehrmann, Ronald G., 4,953,289, Cl. 29-863.000.

- Eibner, Jules A.; and Zundel, Jean-Pol, to Unisys Corporation. Personal computer with multiple independent CRT displays of ideographic and/or ASCII characters having loadable font memory for storing digital representations of subset or special characters. 4,954,979, Cl. 364-900.000.
- Eichner, Fred N.: See—  
Miller, Steven D.; McDonald, Joseph C.; Eichner, Fred N.; and Tomeraasen, Paul L., 4,954,707, Cl. 250-337.000.
- Eidai Industry Co., Ltd.: See—  
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- Eidt, Clarence M., Jr.; Aldridge, Clyde L.; and Bearden, Roby, Jr., to Exxon Research & Engineering Company. Combination coking and hydroconversion process. 4,954,240, Cl. 208-50.000.
- Eisai Co., Ltd.: See—  
Miyamoto, Tsutomu; Igarashi, Hisanaga; and Hidenori, Sugiyama, 4,954,530, Cl. 514-718.000.
- Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,954,523, Cl. 514-521.000.
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- Eisen, Yossef: See—  
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- Eisenbarth, Rudolf: See—  
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- Eisenstein, Gadi: See—  
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- Ejima, Satoshi; and Yamamoto, Tetsuya, to Nikon Corporation. Electronic still camera system with automatic gain control of image signal amplifier before image signal recording. 4,954,897, Cl. 358-228.000.
- Ekins, Robin K. Analog-to-digital converter. 4,954,831, Cl. 341-159.000.
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- Elberbaum, David, to Elbex Video, Ltd. Closed circuit television apparatus with a remote control television camera. 4,954,886, Cl. 358-86.000.
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- Eldon Industries, Inc.: See—  
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- Electro-Optics Technology, Inc.: See—  
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- Ellion, Dolores D.; and Ellion, M. Edmund. Powder dispensing and measuring device. 4,953,643, Cl. 177-123.000.
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- Elliott, David L.; Christiano, Steven P.; Lang, David J.; and Sisco, Rosemary M., to Lever Brothers Company. Machine dishwashing composition. 4,954,280, Cl. 252-90.000.
- Elliott, Thomas J.; and Dutton, Susan, to Beecham Group p.l.c. Cosmetic formulation. 4,954,532, Cl. 514-846.000.
- Elmaleh, Samuel; and Grasmick, Alain, to Mornex Limited. Process for the treatment and purification of water by the flocculation of suspended particles in a fluidized bed. 4,954,259, Cl. 210-617.000.
- Elrod, Jimmie L.; and Lee, Robert G., to Tennessee Valley Authority. Sonic gelling of clay in suspension fertilizers. 4,954,155, Cl. 71-28.000.
- Elscent Ltd.: See—  
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- Emert, Jacob; and Lundberg, Robert D., to Exxon Chemical Patents Inc. Dispersant additives prepared from monoepoxy alcohols. 4,954,572, Cl. 525-285.000.
- Emhart Industries, Inc.: See—  
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- Richmond, James W., 4,954,775, Cl. 324-174.000.
- Wooge, Christian; and Speisebecher, Joachim, 4,953,739, Cl. 220-93.000.
- Emily, Jean Y., to Atochem. Mulching and seeding apparatus and method with film severing and covering. 4,953,482, Cl. 111-144.000.

- Emori, Kiyoshi: See—  
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- Emory University: See—  
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- Encore Video, Inc.: See—  
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- Endo, Keiichi; Shinbo, Yasushi; Kageyama, Akira; Katsuya, Yasuo; Kato, Chihiro; Fukasawa, Masato; and Sekine, Makoto, to Hitachi Chemical Company, Ltd. Electrophotographic plate including an undercoating layer having a smooth surface. 4,954,406, Cl. 430-60.000.
- Endo, Kunio; and Katsukawa, Tadashi, to NEC Home Electronics Ltd. Color masking circuit and color video printer using the same. 4,954,889, Cl. 358-80.000.
- Energy Conversion Devices, Inc.: See—  
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- Eng, Kai Y.; Karol, Mark J.; and Yeh, Yu S., to AT&T Bell Laboratories. Interconnect fabric providing connectivity between an input and arbitrary output(s) of a group of outlets. 4,955,016, Cl. 370-60.000.
- Eng, Kai Y.; Karol, Mark J.; and Yeh, Yu S., to AT&T Bell Laboratories. Growable packet switch architecture. 4,955,017, Cl. 370-60.000.
- Engel, Michael; Pepping, Karl-Heinz; and Gebhardt, Gunther, to Diehl GmbH & Co. Power-transmission joint. 4,953,421, Cl. 74-523.000.
- Engelson, Gary S.: See—  
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- Engineering & Research Associates, Inc.: See—  
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- England, Thomas R.: See—  
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- Engler, Heidrun: See—  
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- Engler, Richard A.: See—  
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- Enichem Anic S.p.A.: See—  
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- Enichem Sintesi S.p.A.: See—  
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- Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, to Sumitomo Chemical Company, Limited. Tetrahydroindazole-benzoxazines, their production and use. 4,954,626, Cl. 544-105.000.
- Enomoto, Ryo: See—  
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- Enomoto, Tsugio: See—  
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- Enviro-Gro Technologies: See—  
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- Environmental Recovery Systems, Inc.: See—  
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- Environmental Research Institute of Michigan: See—  
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- Epworth, Richard E., to STC PLC. Optical fibre transmission systems. 4,953,939, Cl. 350-96.190.
- Equipment Development Company, Inc.: See—  
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- Erber, Anton; Hoff, Heinz; Reuchlein, Gunter; Schaaf, Hanno; and Schiessl, Gerhard, to MAN Technologie GmbH. Thermally insulated stirring engine-hot gas heater system combination. 4,953,354, Cl. 60-517.000.
- Erbes, John G.: See—  
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- Erickson, Laurence R.; Behr, R. Douglas; and Vrooman, Roger D., to Dow Chemical Company. The Stand-up plastic bag and method of making same. 4,954,124, Cl. 493-195.000.
- Erickson, Robert W., Jr.: See—  
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- Eriasson, Sylve J. D., to Svecia Silkscreen Maskiner AB. Method for positioning material in a plurality of printing positions for multi-color silkscreen printing. 4,953,459, Cl. 101-115.000.
- Erkki, Kiiskila; and Rolf, Ryham, to A. Ahlstrom. Multistage evaporating system. 4,953,607, Cl. 159-13.300.
- Erman, Marko: See—  
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- Ermont C. M.: See—  
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- Ernst, Richard E.: See—  
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- Ernst Siegling, Firma: See—  
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- Ersek, Tibor: See—  
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- ESAB Welding Products, Inc.: See—  
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- Esaki, Seiji: See—  
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- Escorcio, Tolentino: See—  
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- Eskelinen, Pekka; Raatikainen, Pentti; Karlsson, Markku; and Virta, Raimo, to Valmet Paper Machinery Inc. Method of and device for pocket ventilation in the drying section of a paper machine, in particular for high-speed paper machines. 4,953,297, Cl. 34-23.000.
- Esposito, Antonio: See—  
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- Essiz, Munir: See—  
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- Fowlkes, Robert L.: See—  
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- Frankenreiter, Michael; Rometsch, Rainer; and Seher, Jens-Peter, to Hewlett-Packard Company. Blood pressure monitor. 4,953,557, Cl. 128-677.000.
- Franninge, Thomas K. Method and apparatus for cleaning a pipe system provided for the operation of baths. 4,954,179, Cl. 134-22.120.
- Fransson, Rolf G.; Jansson, Bertil E., deceased; and Jansson, Magnus, Administrator, to Victor Hasselblad Aktiebolag. Electrical contact unit. 4,954,092, Cl. 439-152.000.
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- Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: See—  
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- Fritz, William J., to McDonnell Douglas Corporation. Optical measurement of thin films. 4,953,974, Cl. 356-128.000.
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- Fujii, Takahiro: See—  
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- Fujitara Ltd.: See—  
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- Fujimori, Tooru: See—  
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- Fujioka, Junzo: See—  
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- Fujisaki, Hisashi; and Shimada, Keiko, to NEC Corporation. Loudspeaking telephone with a frequency shifting circuit. 4,955,055, Cl. 379-390.000.
- Fujisaki, Michio: See—  
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- Fujisawa Pharmaceutical Company, Ltd.: See—  
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- Fujita, Tadasu: See—  
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- Fujita, Yatsuka: See—  
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- Fujitsu Limited: See—  
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- Imanaka, Yoshihiko; Machi, Takato; Yamanaka, Kazunori; Yokoyama, Hiromitsu; Kamehara, Nobuo; and Niwa, Koichi, 4,954,480, Cl. 505-1.000.
- Sakamoto, Kiichi; Yasuda, Hiroshi; Yamada, Akio; and Kudou, Jinko, 4,954,717, Cl. 250-492.300.
- Sasaki, Kazuya, 4,953,942, Cl. 350-96.230.
- Tateishi, Terutaka; Koshino, Minoru; and Shimizu, Kazuyuki, 4,954,982, Cl. 364-900.000.
- Fujiwara, Tsuneo: See—  
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- Fujizaki, Tsutomu; and Shibata, Minoru, to Matsushita Electric Works, Ltd. Socket for mounting an IC chip package on a printed circuit board. 4,954,088, Cl. 439-73.000.
- Fukao, Hiroaki; Ohkita, Teruhiko; Nagasaka, Nobusuke; and Ueno, Taneo, to Brother Kogyo Kabushiki Kaisha. Overedge sewing machine for cutting the edge of a fabric while sewing an overedge stitch. 4,953,484, Cl. 112-162.000.
- Fukao, Masami: See—  
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- Fukasawa, Masato: See—  
Endo, Keiichi; Shinbo, Yasushi; Kageyama, Akira; Katsuya, Yasuo; Kato, Chihiro; Fukasawa, Masato; and Sekine, Makoto, 4,954,406, Cl. 430-60.000.
- Fukuchi, Masakazu: See—  
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- Fukuda, Hiroshi: See—  
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- Fukuda, Norisuke; and Shimada, Yuji, to Kabushiki Kaisha Toshiba. Canister vacuum cleaner with automatic operation control. 4,953,253, Cl. 15-319.000.
- Fukushima, Nobuhiro; and Sawaki, Ippei, to Fujitsu Limited. Floating type magneto-optic disk reading head system having external semiconductor laser resonator operating at orthogonal two mode oscillations. 4,955,006, Cl. 369-13.000.
- Fullermann, James S., to Merlin Instrument Company. Injection septum. 4,954,149, Cl. 55-386.000.
- Funabashi, Takeshi: See—  
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- Funakoshi, Haruo, to Mitsubishi Denki Kabushiki Kaisha. Test method of an electrostatic breakdown of a semiconductor device and an apparatus therefor. 4,954,772, Cl. 324-158.00R.
- Funakoshi, Yasutomo: See—  
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- Funatsu, Eiji: See—  
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- Furuhata, Takashi; and Satoh, Kenji, to Hitachi, Ltd. Tracking control method and device in rotary head type magnetic recording and reproducing apparatus. 4,954,902, Cl. 360-10.200.
- Furukawa, Kazunari, to Yamaha Corporation. Acoustic apparatus. 4,953,655, Cl. 181-160.000.
- Furukimi, Osamu: See—  
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- Furuta, Yoshikazu. Fishhook and producing method of the same. 4,953,321, Cl. 43-43.160.
- Furutsu, Eisuro; and Izukawa, Kazuhiro, to Canon Kabushiki Kaisha. Control circuit for a vibration wave motor. 4,954,741, Cl. 310-316.000.
- Furuzawa, Richard: See—  
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- Fuse, Noboru: See—  
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- Fusion Systems Corporation: See—  
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- Wood, Charles H.; and Mosher, David, 4,954,756, Cl. 315-39.000.
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- G. D. Searle & Co.: See—  
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- Gaag, Norbert; and Ruchel, Peter, to Diehl GmbH & Co. Precipitates copper-zinc alloy with nickel silicide. 4,954,187, Cl. 148-413.000.
- Gabauer, Dale: See—  
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- Gabriel, Calvin T.; and Nulty, James E., to VLSI Technology, Inc. Endpoint detection system and method for plasma etching. 4,954,212, Cl. 156-627.000.
- Gabrielsson, Per E. G.: See—  
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- Gadsby, Harold S. Inflatable pool cover. 4,953,239, Cl. 4-499.000.
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- GAF Chemicals Corporation: See—  
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- Liu, Kou-Chang; and Taylor, Paul D., 4,954,582, Cl. 525-502.000.
- Merianos, John J.; and Garelick, Paul, 4,954,636, Cl. 548-519.000.
- Gaffney, John M.; Gelinas, Wilfred R.; Hern, Joel C.; and Krouse, Charles L., to Harris Graphics Corporation. System for continuously rotating plate a blanket cylinders at relatively different surface speeds. 4,953,461, Cl. 101-142.000.
- Gaines, Lee R.; and Spector, George. Collar protector. 4,953,232, Cl. 2-60.000.
- Galasko, Philip E.; and Kruger, Frans J., to Galasko, Philip Elliot. Transducer. 4,953,393, Cl. 73-146.500.
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- Gale, Robert M., to Alza Corporation. Method for treating nocturnal angina. 4,954,344, Cl. 424-448.000.
- Galgon, Randy A., to Hazleton Environmental Products, Inc. Water conditioning apparatus and method. 4,954,147, Cl. 55-53.000.
- Galloway, Craig D. Masonry structure system. 4,953,332, Cl. 52-228.000.
- Gamlen, Michael J. D.: See—  
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- Gangloff, Richard: See—  
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- Gantioler, Josef-Matthias: See—  
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- Garcia, Evaristo, Jr.: See—  
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- Garren, Lloyd R. Body wrap for use in diagnostic procedure. 4,953,566, Cl. 128-849.000.
- Garrett, Michael E.; and Weltmer, William R., Jr., to BOC Group plc. The separation of gaseous mixtures. 4,954,146, Cl. 55-25.000.
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- Gaskill, D. Kurt: See—  
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- Gately, Michael T.: See—  
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- Gatsis, John G., to UOP. Method of preparing a catalyst for the hydroconversion of asphaltene-containing hydrocarbonaceous charge stocks. 4,954,473, Cl. 502-171.000.
- Gaudenzi, Gene J., to International Business Machines Corporation. Current source technology. 4,954,738, Cl. 307-454.000.

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- Gaus, Harry; Gross, Hagen; and Schliebs, Gunter. Protective system for portable electrically powered apparatus. 4,954,922, Cl. 361-42.000.
- Gautney, Joe; Worley, Shelby D.; and Ash, Doris H., to Tennessee Valley Authority; and Auburn University. N,N-dihalo-2-imidazolidinones and N-halo-2-oxazolidinones as urease and nitrification inhibitors. 4,954,156, Cl. 71-28.000.
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- Gebhardt, Gunther: See—  
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- Geek, Joseph S., III. Tie rail constructions. 4,954,031, Cl. 410-110.000.
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- Geirhos, Josef: See—  
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- Gelinas, Wilfred R.: See—  
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- Genz, Joachim; Dicke, Hans-Rudolf; Eckhardt, Volker; and Kleiner, Frank, to Bayer Aktiengesellschaft. Process for the production of aromatic polyether ketones. 4,954,604, Cl. 528-125.000.
- Genz, Joachim: See—  
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- Gerber Products Company: See—  
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- Gergen, William P.: See—  
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- Gerkin, Richard M.; Jorgenson, Michael W.; and Leuzzi, Paul W., II, to Union Carbide Chemicals and Plastics Company Inc. Stable polymer/polyols made without macromonomer. 4,954,560, Cl. 524-714.000.
- Gerkin, Richard M.; and Timberlake, John F., to Union Carbide Chemicals and Plastics Company Inc. Stabilizers for polymer/polyols. 4,954,561, Cl. 524-728.000.
- Gero, William; and Paskowski, Frank, to Beloit Corporation. Wave screen plate. 4,954,249, Cl. 209-273.000.
- Gerwick, Ben C., III: See—  
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- Gevas, James C. Wheeled vehicle tire wheel mounting aid. 4,953,272, Cl. 29-273.000.
- Ghandehari, Mohammad H., to Union Oil Company of California. Rear earth-iron-boron permanent magnets containing aluminum. 4,954,186, Cl. 148-302.000.
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- Giattini, Frank P.: See—  
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- Gille, Henrick K.: See—  
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- Gilman, Robert E.: See—  
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- Giroux, D. William. Method and apparatus for installation and alignment of a series of posts. 4,953,837, Cl. 269-43.000.
- Giroux, D. William. Method and apparatus for lining a canal. 4,954,019, Cl. 405-268.000.
- Girsh, Leonard S., to Immunopath Profile, Inc. Hypoallergenic milk products and process of making. 4,954,361, Cl. 426-580.000.
- Gittos, Maurice W.: See—  
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- Giuliani, David; and Vurek, Gerald G., to Abbott Laboratories. Hydrodynamic clot flushing. 4,954,129, Cl. 604-53.000.
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- Gleason, John G.; Hall, Ralph F.; and Smallbeer, Joanne, to SmithKline Beecham Corporation. Leukotriene antagonists. 4,954,513, Cl. 514-381.000.



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- Gloersen, Stig, to Beloit Corporation. Method for transfer of ferrous materials transport by liquids. 4,954,219, Cl. 162-41.000.
- Glorioso, John D., to Enviro-Gro Technologies. Odor control for a sludge treatment process. 4,953,478, Cl. 110-215.000.
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- Goebel, Gerd: See—  
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- Goldman, Warren A., to United States of America, Navy. Phase accumulator-bearing tracker. 4,955,003, Cl. 367-125.000.
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- Park, Hong C., 4,954,890, Cl. 358-88.000.
- Goldstein, Neil: See—  
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- Golomb, Gary L. Educational marble board game. 4,953,874, Cl. 273-355.000.
- Goodman, Allan L. Repair kit for shower curtain and the like. 4,954,378, Cl. 428-63.000.
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- Goor Associates, Inc.: See—  
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- Gorski, Robert A.: See—  
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- Goto, Shinji: See—  
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- Goto, Shuichi: See—  
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- Goto, Yozo, to Ohbayashi Corporation. Seismic isolator. 4,953,658, Cl. 181-207.000.
- Gotsmann, Guenther: See—  
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- Gottschalk, Peter: See—  
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- Gough, Paul: See—  
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- Gould, Russell P. Intelligent archery sighting device. 4,953,302, Cl. 33-265.000.
- Goussios, Theodore, to Inspiration Markets, Inc. Dual purpose lottery ticket and boarding pass. 4,953,895, Cl. 283-102.000.
- Govan, Donald T. Line cutter for marine propellers. 4,954,108, Cl. 440-73.000.
- Gowan, John W., Jr., to Westvaco Corporation. Preparation of polymers with pendant organic moieties bound thereto via ester and/or amide bridges. 4,954,566, Cl. 525-61.000.
- Grabenherr, Heinz-Bernd: See—  
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- Gracie, Michael D., Sr.: See—  
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- Grabe, Robert H. Contoured seat base. 4,953,913, Cl. 297-459.000.
- Graff, Charles J.: See—  
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- Graff, James C.; and Robertson, Frederick K., to Austin, Paul B.; and Graff, Charles J. Clothes hanging assembly. 4,953,718, Cl. 211-123.000.
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- Granqvist, Claes Goran, to HB Radicool Research & Development. Web material for camouflage against electromagnetic radiation. 4,953,922, Cl. 350-1.700.
- Grant, Fred W. Mobile stretcher support. 4,953,886, Cl. 280-640.000.
- Grant, Richard W.; and Storaasli, Allen G., to Hughes Aircraft Company. Apparatus for simultaneously rotating a plurality of parallel shafts. 4,954,832, Cl. 342-352.000.
- Gras, Elie: See—  
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- Gras, Jeffrey D.: See—  
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- Green, Raymond W., to Tag Investments, Inc. Non-toxic fire extinguishant. 4,954,271, Cl. 252-8.000.
- Green, Steven R.; De Muro, David M.; Moutrie, Michael F.; Sokola, Raymond L.; and Gordon, Phillip J., to Motorola, Inc. Multiple resonator dielectric filter. 4,954,796, Cl. 333-206.000.
- Greenberg, Bernard; and Sulner, Andrew, to Environmental Recovery Systems, Inc. Method of processing spent electroless bath and bath for use therein. 4,954,265, Cl. 210-710.000.
- Greene, Alan P.: See—  
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- Grigsby, David A.: See—  
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- Grim, Tracy E.; and Haines, Jeffrey R., to Royce Medical Company. Cruciate ligament leg brace. 4,953,543, Cl. 128-80.00C.
- Grimshaw, Michael N., to Cincinnati Milacron Inc. Presser member for contoured surfaces. 4,954,204, Cl. 156-361.000.
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- Grohmann, Paul, to Messer Griesheim GmbH. Cooling device for liquefied gas. 4,953,358, Cl. 62-50.700.
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- Markow, Edward G., 4,953,291, Cl. 29-894.351.
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- Gsell, Thomas C.: See—  
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- GSW Inc.: See—  
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- GTE Laboratories Incorporated: See—  
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- GTE Products Corporation: See—  
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- Gulf Canada Corporation: See—  
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- Gullett, Bradley T.: See—  
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- Gullick Dobson Limited: See—  
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- Guth, Paul S., to Tulane Educational Fund. Furosemide as tinnitus suppressant. 4,954,486, Cl. 514-158.000.
- Guthrie, William L.: See—  
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- Guttler, Hermann: See—  
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- Gutzeit, Horst: See—  
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- Haas, Franz, Jr.: See—  
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- Haas, Johann: See—  
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- Haberle, Friedrich: See—  
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- Habicht, Helmut. Method for aligning, lifting and tilting a container relative to a vertical aperture. 4,954,037, Cl. 414-389.000.
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- Hafner, Hans-Ulrich: See—  
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- Haga, Toru: See—  
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- Hagan, Grant E. Flue control device. 4,953,535, Cl. 126-307.00R.
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- Hagiwara, Toshihiko: See—  
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- Hagiya, Koji: See—  
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- Haishi, Akira: See—  
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- Halbert, Thomas R.; Wei, Liwen; and Stiefel, Edward I., to Exxon Research and Engineering Company. Dithioacid rhodium sulfide dimer compositions. 4,954,645, Cl. 556-45.000.
- Hales, Walter L., to United States of America, Army. Lateral-shearing electro-optic field sensor. 4,953,981, Cl. 356-353.000.
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- Hallden-Abbott, Michael P.; Bortnick, Newman M.; Cohen, Leslie A.; Freed, William T.; and Fromuth, Harry C., to Rohm and Haas Company. Imide polymers. 4,954,574, Cl. 525-327.600.
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- Halpern, Marjorie A., administratrix: See—  
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- Hamada, Masaki: See—  
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- Hamanaka, Toshiyuki: See—  
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- Hamano, Toshikatsu: See—  
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- Hambright, Perry N. Handicraft for producing simulated needlepoint. 4,953,370, Cl. 68-213.000.
- Hamid, Syed; Lucas, Jackie K.; and Lockman, Russell R., to Haliburton Company. Injection manifold and method. 4,953,618, Cl. 166-250.000.
- Hamisch, Paul H., Jr.; and Makley, James A., to Monarch Marking Systems, Inc. Hand-held labeller. 4,954,208, Cl. 156-577.000.
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- Hamner, Jeffrey W.; and Schivley, George P., Jr., to Ingersoll-Rand Company. Closed loop hydraulic drill feed system. 4,953,639, Cl. 175-203.000.
- Hamuro, Mitsuro: See—  
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- Hanabusa, Kazuhito: See—  
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- Hanagan, Michael W., to Corbin Pacific. Convertible seat for motorcycle. 4,953,911, Cl. 297-195.000.



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Hara, Kazuhiko; Takahashi, Toshiaki; and Nagura, Masato, to Canon Kabushiki Kaisha. Ultrasonic measuring apparatus for measuring a predetermined boundary surface inside an object, 4,953,405, Cl. 73-602.000.  
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Harada, Koukichi: See—  
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Harmony, Daniel C.; Gummere, John B.; and Minney, Stephen C., to Engineering & Research Associates, Inc. Annular RF sealer and method, 4,954,678, Cl. 219-10.430.  
Harms, Frank M.; Tripp, Victor; and Wells, Thomas B., to Lifeblood Advanced Blood Bank Systems, Inc. Method for the rapid thawing of cryopreserved blood, blood components, and tissue, 4,954,679, Cl. 219-10.55M.  
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Harris, Holton E., to Harrel, Inc. Sheet thickness gauging method and system with auto calibration, 4,954,719, Cl. 250-560.000.  
Harrison, Cecil P.; and Tittle, Cullen G., to Tennessee Valley Authority. Agglomeration of gypsum, limestone, or gypsum-limestone mix, 4,954,134, Cl. 23-313.00R.  
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Hasbro, Inc.: See—  
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Hasegawa, Yoshio: See—  
Okamura, Kiyohito; Sato, Mitsuhiro; Hasegawa, Yoshio; Seguchi, Tadao; and Kawanishi, Shunichi, 4,954,461, Cl. 501-95.000.  
Hashida, Koichi; and Kohno, Teruhisa, to Sumitomo Electric Industries Ltd. Modulator for use in an anti-lock brake control system, 4,953,918, Cl. 303-115.000.  
Hashimoto, Isao; and Hidehira, Tsuyoshi, to Taxmo Co., Ltd. Diamond pen type marking device for substrates, 4,954,842, Cl. 346-139.00R.  
Hashimoto, Kenji: See—  
Osumi, Toru; Ito, Shoji; and Hashimoto, Kenji, 4,953,825, Cl. 251-129.170.  
Hashimoto, Masahi, to Texas Instruments Incorporated. FIFO memory capable of simultaneously selecting a plurality of word lines, 4,954,994, Cl. 365-230.060.  
Hashimoto, Masashi: See—  
Oku, Tetsuo; Kasahara, Ciyoshi; Ohkawa, Takehiko; and Hashimoto, Masashi, 4,954,496, Cl. 514-231.500.  
Hashimoto, Shigeaki: See—  
Maekawa, Junichi; Abe, Masanori; Ienaga, Hirofumi; and Hashimoto, Shigeaki, 4,953,910, Cl. 296-223.000.  
Hashimoto, Yasushi: See—  
Sasaki, Akira; Esaki, Seiji; Hashimoto, Yasushi; and Kurita, Shigeo, 4,954,119, Cl. 464-111.000.  
Hashizume, Atsushi, to Mitsubishi Denki Kabushiki Kaisha. Ignition apparatus of internal combustion engine, 4,953,520, Cl. 123-631.000.  
Hashizume, Junichiro; Takei, Tetsuya; Iida, Shigehira; Saitoh, Keishi; and Arai, Takayoshi, to Canon Kabushiki Kaisha. Microwave plasma CVD apparatus having substrate shielding member, 4,953,498, Cl. 118-719.000.  
Hashizume, Nobuyuki: See—  
Oguro, Katsunori; Nojima, Hiroshi; Hashizume, Nobuyuki; Ohno, Norio; and Naito, Taketoshi, 4,954,512, Cl. 514-352.000.  
Haskell, Jacob D.: See—  
Avanzino, Steven C.; and Haskell, Jacob D., 4,954,459, Cl. 437-228.000.  
Hassler, William L., Jr., to Parker Hannifin Corporation. Linear diffuse light source, 4,954,931, Cl. 362-32.000.  
Hasty, Charles E. Air-operated body support device, 4,953,247, Cl. 5-453.000.  
Hatakeyama, Noboru: See—  
Morita, Shizuo; Matsumoto, Toru; Kamegamori, Masayuki; Hayakawa, Kazushi; Hatakeyama, Noboru; Matsuo, Shunji; and Fukuchi, Masakazu, 4,954,844, Cl. 355-260.000.  
Hatayama, Tadahiro: See—  
Ohmi, Tadahiro; Kanno, Yohichi; Satoh, Kazuhiko; and Hatayama, Tadahiro, 4,953,826, Cl. 251-331.000.  
Hatch, Bruce O., to Thermal Dynamics Corporation. Plasma arc gouger, 4,954,683, Cl. 219-121.500.  
Hattori, Seiji; Kasukawa, Akihiko; Shibano, Yoshizo; Kobayashi, Yoshinobu; and Suzuki, Shinji, to Tokyo Electric Power Company Ltd., The; and Sumitomo Electric Industries, Ltd. Mobile communication system, 4,955,082, Cl. 455-33.000.  
Haug, Fritz: See—  
Klopfer, Walter; Haug, Fritz; Gabauer, Dale; and Workley, James, 4,954,777, Cl. 324-232.000.  
Haug, Richard J. Shock absorbant heel, 4,953,310, Cl. 36-38.000.  
Hayakawa, Kazunobu: See—  
Matsuyama, Hideo; Koike, Kazuyuki; and Hayakawa, Kazunobu, 4,954,770, Cl. 324-71.300.  
Hayakawa, Kazushi: See—  
Morita, Shizuo; Matsumoto, Toru; Kamegamori, Masayuki; Hayakawa, Kazushi; Hatakeyama, Noboru; Matsuo, Shunji; and Fukuchi, Masakazu, 4,954,844, Cl. 355-260.000.  
Hayashi, Hideharu: See—  
Ozaki, Keiichi; Manabe, Naoki; Shibata, Tatsumi; Hayashi, Hideharu; Muramatsu, Yukio; and Yamamoto, Masaki, 4,954,102, Cl. 439-535.000.  
Hayashi, Kenji: See—  
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,954,523, Cl. 514-521.000.  
Hayashi, Kiyoshi: See—  
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Hayashi, Munekazu: See—  
Ohtake, Toshikazu; Hayashi, Munekazu; Idemura, Satoshi; Ohi, Kazumi; and Kunitake, Yuji, 4,954,304, Cl. 264-137.000.  
Hayashi, Nobuatsu; Takahashi, Sankichi; Ebara, Katsuya; Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; and

Yoda, Hiroaki, to Hitachi, Ltd. Distilling apparatus, 4,953,694, Cl. 202-180.000.  
Hayashi, Ryutaro: See—  
Ishikawa, Kanzo; Hayashi, Ryutaro; and Yoshimoto, Akira, 4,954,681, Cl. 219-10.55A.  
Hayashi, Yoshinori: See—  
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Hayes, Edward C.: See—  
Young, Robert N.; Rokach, Joshua; and Hayes, Edward C., 4,954,638, Cl. 548-546.000.  
Hazleton Environmental Products, Inc.: See—  
Galgon, Randy A., 4,954,147, Cl. 55-53.000.  
HB Radcooil Research & Development: See—  
Granqvist, Claes Goran, 4,953,922, Cl. 350-1.700.  
Healey, Peter, to British Telecommunications plc. Operating a multiple-access optical network, 4,955,013, Cl. 370-1.000.  
Heath Consultants Incorporated: See—  
Jacob, Allan S.; and Zawadzki, Andrzej, 4,954,973, Cl. 364-551.010.  
Heckt, Neil W., to Boeing Company, The. Apparatus and method for compressing a video signal, 4,954,879, Cl. 358-13.000.  
Hedman, Jonathan W.: See—  
Blackmer, Richard H.; and Hedman, Jonathan W., 4,953,546, Cl. 128-203.160.  
Hegdahl, Randy A. High security keeper and reinforcement bar for entry door, 4,953,901, Cl. 292-340.000.  
Hehn, Ronald L.: See—  
Chapman, William L.; Marner, Charles F.; Schotter, Daniel K.; and Hehn, Ronald L., 4,953,422, Cl. 74-526.000.  
Heidmann, Heinrich. Boat carousel, 4,953,488, Cl. 114-44.000.  
Heijkoop, Teunis: See—  
Sare, Ian R.; Henderson, Ian; Heijkoop, Teunis; Bosworth, Michael R.; Aspin, Ronald E.; and Arnold, Brian K., 4,953,612, Cl. 164-102.000.  
Heil Co., The: See—  
Smith, Fred T.; and Smith, Fred P., 4,954,020, Cl. 406-38.000.  
Smith, Fred T.; and Smith, Fred P., 4,954,040, Cl. 414-513.000.  
Heinemann, Joachim: See—  
Beicht, Bernd; Tinz, Reinhard; and Heinemann, Joachim, 4,953,514, Cl. 123-520.000.  
Heinrich-Hertz-Institut für Nachrichtentechnik Berlin GmbH: See—  
Mayer, Stefan; and Schmidt, Susanne, 4,954,896, Cl. 358-234.000.  
Heinrich, Peter; and Moerkel, Theophile, to Ciba-Geigy Corporation. Process for the selective N-acylation of aminohydroxamic acid derivatives and starting materials used therein, 4,954,634, Cl. 548-341.000.  
Heise, Hartmut; and Hintzmann, Manfred, to Hoechst Aktiengesellschaft. Process for the preparation of o-nitrophenetole, 4,954,657, Cl. 568-584.000.  
Heki, Tatsuo: See—  
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Helbawi, Salah. Automatic reverse vending machine for aluminum can recycling, 4,953,682, Cl. 194-208.000.  
Helena Laboratories: See—  
Sarrine, Robert J.; Garsee, Henry A.; Kelley, Charles D.; and Guadagno, Philip A., 4,954,237, Cl. 204-299.00R.  
Helene Curtis, Inc.: See—  
Janichprapongvej, Ben, 4,954,335, Cl. 424-070.000.  
Helie, Simon. Truck trailer hitch, 4,953,883, Cl. 280-477.000.  
Helmman, Stig, to Akerlund & Rausing Licens Aktiebolag. Machine for packaging flat, unsymmetrical objects, 4,953,343, Cl. 53-500.000.  
Helm, P. Ralph: See—  
Becker, Thomas K.; Casavant, Terry S.; Helm, P. Ralph; Petzold, Terry L.; Wanek, Michael J.; and Zuehlke, Art G., 4,953,722, Cl. 212-156.000.  
Helsley, Grover C.; Davis, Larry; and Olsen, Gordon E., to Hoechst-Roussel Pharmaceuticals Inc. 4-pentafluorophenoxypiperidines, 4,954,511, Cl. 514-327.000.  
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Hendricks, Donald M.: See—  
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Hendy, Brian N.: See—  
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Schmid, Karl H.; Meffert, Alfred; Schenker, Gilbert; Asbeck, Adolf; and Scharf, Rolf, 4,954,283, Cl. 252-135.000.  
Hennessey, Robert: See—  
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Hennessey, J. P.: See—  
Spainhour, Phillip A., 4,953,296, Cl. 33-203.180.  
Henry, Beverly A., administratrix: See—  
Natusch, Paul J.; Yu, Eugene L.; Senerchia, David C.; and Henry, John F., Jr., deceased, 4,954,946, Cl. 364-200.000.

Henry, John F., Jr., deceased: See—  
Natusch, Paul J.; Yu, Eugene L.; Senerchia, David C.; and Henry, John F., Jr., deceased, 4,954,946, Cl. 364-200.000.  
Hensley, Albert L., Jr.: See—  
Kukes, Simon G.; Hensley, Albert L., Jr.; Kelterborn, Jeffrey C.; and Aderhold, James L., Jr., 4,954,241, Cl. 208-59.000.  
Heptig, John P.: See—  
Lee, Robert D.; Mounger, Robert W.; and Heptig, John P., 4,955,038, Cl. 375-35.000.  
Herdies, Julien. Transformable tool-box, 4,953,601, Cl. 144-285.000.  
Hermann Pfauter GmbH & Co.: See—  
Faulstich, Ingo, 4,954,027, Cl. 409-26.000.  
Hermans, Willem F., to Stork Amsterdam B.V. Apparatus for keeping at a determined temperature a product mixture consisting of a liquid containing solid pieces, 4,953,633, Cl. 165-109.100.  
Hern, Joel C.: See—  
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Herrell, Dennis J.: See—  
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Herrmann, Karl H., to Nova-Tech Engineering, Inc. Personnel door for a RF shielded room, 4,953,324, Cl. 49-255.000.  
Herrmann, Rupert: See—  
Klein, Christian; Batz, Hans-Georg; and Herrmann, Rupert, 4,954,630, Cl. 544-102.000.  
Herse, Klaus: See—  
Kuppers, Dieter; Herse, Klaus; Hiepe-Wohlleben, Kate; Kaiser, Manfred; Mohr, Friedemann; and Ohnsorge, Horst, 4,955,014, Cl. 370-3.000.  
Herter, Rolf; Morsdorf, Peter; Pfahler, Volker; Engler, Heidrun; Schickaneder, Helmut; and Ahrens, Kurt-Henning, to Heumann Pharma GmbH & Co. Piperazine substituted 6-phenylidihydro-3(2H)-pyridazinones, and pharmaceutical preparations containing these, 4,954,501, Cl. 514-252.000.  
Herzke, Harry, to Ernst Siegling, Firma. Conveyor with slippage stops on the conveyor surface, 4,953,690, Cl. 198-690.200.  
Hesse, Alfons: See—  
Puttmann, Franz-Josef; and Hesse, Alfons, 4,953,626, Cl. 173-91.000.  
Hesselink, Lambertus: See—  
Redfield Stephen R.; and Hesselink, Lambertus, 4,953,924, Cl. 350-3.640.  
Hester, Gary: See—  
Rogers, Steven A.; Bockelmann, George; and Hester, Gary, 4,954,839, Cl. 346-76.0PH.  
Hester, Troy L., to United States of America, Army. Active lag angle device, 4,953,804, Cl. 242-47.000.  
Hettich, Gerhard: See—  
Alberter, Gunther; Deeg, Helmut; Hettich, Gerhard; Neidhard, Klaus; Schmid, Hans-Dieter; and Schrupf, Hans, 4,954,677, Cl. 200-834.000.  
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Herter, Rolf; Morsdorf, Peter; Pfahler, Volker; Engler, Heidrun; Schickaneder, Helmut; and Ahrens, Kurt-Henning, 4,954,501, Cl. 514-252.000.  
Hewlett-Packard Company: See—  
Frankenreiter, Michael; Rometsch, Rainer; and Seher, Jens-Peter, 4,953,557, Cl. 128-677.000.  
Koenig, Mary K., 4,954,791, Cl. 332-164.000.  
West, William J.; Taub, Howard H.; and Miller, Robert J., 4,953,287, Cl. 29-611.000.  
Hibert, Marcel; and Gittos, Maurice W., to Merrell Dow Pharmaceuticals Inc. Aromatic 2-aminoalkyl-1,2-benzisothiazol-3(2H)-one-1,1-dioxide derivatives, 4,954,500, Cl. 514-249.000.  
Hibino, Keiichi: See—  
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Hickey, Deirdre M. B.: See—  
Jaxa-Chamiec, Albert A.; and Hickey, Deirdre M. B., 4,954,339, Cl. 424-78.000.  
Hickmann, Gerd: See—  
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Hidehira, Tsuyoshi: See—  
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Hidenori, Sugiyama: See—  
Miyamoto, Tsutomu; Igarashi, Hisanaga; and Hidenori, Sugiyama, 4,954,530, Cl. 514-718.000.  
Hiepe-Wohlleben, Kate: See—  
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Higashi, Takao: See—  
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Higeta, Akira: See—  
Azeta, Takahiro; Kameyama, Toru; Sekiya, Harukazu; Moritani, Toshifumi; Higeta, Akira; Baba, Kenji; Matoba, Takeshi; Goto, Shinji; and Kubota, Kazuyuki, 4,953,846, Cl. 271-251.000.  
Highfill, Robert R. Interactive image projection apparatus, 4,953,971, Cl. 353-122.000.

- Hightower, Ralph E., to United States of America, Navy. Flexible mine case. 4,953,465, Cl. 102-406.000.
- Higuchi, Hideyo: See—  
Yoshida, Kazuomi; Higuchi, Hideyo; Mizuochi, Hitoshi; and Yamamoto, Yousuke, 4,954,853, Cl. 357-17.000.
- Higuchi, Hirokazu; and Hamuro, Mitsuro, to Murata Manufacturing Co., Ltd. Apparatus for automatically taping electronic components. 4,954,207, Cl. 156-552.000.
- Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, to Sanden Corporation. Wobble plate type compressor with variable displacement mechanism. 4,954,050, Cl. 417-269.000.
- Higuchi, Yoshiki: See—  
Suyama, Shuji; and Higuchi, Yoshiki, 4,954,656, Cl. 568-567.000.
- Higuma, Masahiko: See—  
Hasegawa, Kenji; Mori, Takahiro; and Higuma, Masahiko, 4,954,395, Cl. 428-318.400.
- Hihaisuto Seiko Kabushiki Kaisha: See—  
Hirose, Kazuya, 4,953,418, Cl. 74-424.80A.
- Hijikata, Kenji: See—  
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- Nakane, Toshio; Kageyama, Yukihiko; Konuma, Hiroaki; and Hijikata, Kenji, 4,954,541, Cl. 524-86.000.
- Hijuelos, Humberto A.: See—  
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- Hikone, Makoto: See—  
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- Hilal, Mohamed A., to General Dynamics Corp., Space Systems Division. Hybrid transformer current zero switch. 4,954,727, Cl. 307-112.000.
- Hill, Edward W. D.; Buckley, William P.; and Hennessey, Robert, to Burndy Corporation. Float/guide member for card edge connector. 4,954,086, Cl. 439-65.000.
- Hill, Godfrey R.; Smith, David W.; and Hunkin, David J., to British Telecommunications public limited company. Frequency locking radiation beam. 4,955,026, Cl. 372-18.000.
- Hill, Lawrence I.: See—  
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- Hill-Rom Company, Inc.: See—  
Koerber, Clement J., Sr.; and Boyd, Howard J., 4,953,244, Cl. 5-60.000.
- Hill, William E.: See—  
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- Hiltiyon, Allan R.; and Mathews, Phillip. Ladder attachment. 4,953,661, Cl. 182-120.000.
- Himmele, Walter: See—  
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- Hino, Haruki: See—  
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- Hintzmann, Manfred: See—  
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- Hira, Gerald M.; Sheahen, Dana M.; Wilson, Pamela L.; and Nolan, Michael P., to Motorola, Inc. Microprocessor operating system for sequentially executing subtasks. 4,954,948, Cl. 364-200.000.
- Hirabayashi, Hiromitsu: See—  
Yano, Kanji; Saijo, Yasutsugu; Kusaka, Kensaku; and Hirabayashi, Hiromitsu, 4,954,845, Cl. 355-290.000.
- Hirai, Nobuyuki: See—  
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- Hirako, Shinichi, to Omron Tateisi Electronics Company. Optical system for signal light detection in a flow particle analysis apparatus. 4,953,979, Cl. 356-338.000.
- Hirano, Nagayoshi: See—  
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- Hirano, Shigeo: See—  
Inoue, Noriyuki; Kojima, Tetsuro; Heki, Tatsuo; and Hirano, Shigeo, 4,954,427, Cl. 430-409.000.
- Hirano, Tsumoru: See—  
Nakamura, Taku; Hirano, Tsumoru; Funatsu, Eiji; and Ishikawa, Shunichi, 4,954,417, Cl. 430-138.000.
- Hirasawa, Masahide, to Canon Kabushiki Kaisha. Reproducing apparatus having a mechanism for compensating time-base fluctuations. 4,954,911, Cl. 358-323.000.
- Hirasawa, Yasuo: See—  
Kobayashi, Yasuo; Hagiwara, Naoki; Hirota, Taisuke; Kodama, Churyo; Hirasawa, Yasuo; Miyazaki, Katsumi; Kawamura, Fumio; Higashi, Takao; Yanagisawa, Masami; and Sei, Akinori, 4,954,937, Cl. 362-255.000.
- Hirashima, Atsushi: See—  
Toyoshima, Nobuyuki; Shibata, Takanori; Hirashima, Atsushi; Ando, Ichiro; Iwata, Noriko; Yoshioka, Hiroshi; Itagaki, Akinari; and Yamazaki, Toshio, 4,954,586, Cl. 526-245.000.

- Hirata, Haruhiko, to Kabushiki Kaisha Toshiba. Nuclear magnetic resonance imaging apparatus with reduced acoustic noise. 4,954,781, Cl. 324-318.000.
- Hironaka, Yoshiaki; Matsubayashi, Tatsuhiko; Kamata, Yoshikiyo; and Tasaki, Takanobu, to Kioritz Corporation. Portable work machine. 4,953,526, Cl. 123-182.000.
- Hirose, Kazuya, to Hihaisuto Seiko Kabushiki Kaisha. Linear feed mechanism. 4,953,418, Cl. 74-424.80A.
- Hirota, Taisuke: See—  
Kobayashi, Yasuo; Hagiwara, Naoki; Hirota, Taisuke; Kodama, Churyo; Hirasawa, Yasuo; Miyazaki, Katsumi; Kawamura, Fumio; Higashi, Takao; Yanagisawa, Masami; and Sei, Akinori, 4,954,937, Cl. 362-255.000.
- Hirota, Takao: See—  
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- Hirota, Takato: See—  
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- Hirotsu, Tohru: See—  
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- Hitachi Automotive Engineering, Inc.: See—  
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- Hitachi Cable, Ltd.: See—  
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- Hitachi Chemical Company, Ltd.: See—  
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- Nomura, Yoshihiro; Hanabusa, Kazuhito; Minamisawa, Hiroshi; Morinaga, Takashi; Sakata, Toichi; Mukoyama, Yoshiyuki; Nishizawa, Hiroshi; and Miyajima, Hiromu, 4,954,612, Cl. 528-353.000.
- Hitachi Keiyo Engineering Co., Ltd.: See—  
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- Hitachi, Ltd.: See—  
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- Furuhata, Takashi; and Satoh, Kenji, 4,954,902, Cl. 360-10.200.
- Hayashi, Nobuatsu; Takahashi, Sankichi; Ebara, Katsuya; Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; and Yoda, Hiroaki, 4,953,694, Cl. 202-180.000.
- Imoto, Katsuyuki; Sano, Hirohisa; Miyazaki, Masaru; Matsuoka, Naoyuki; and Uetsuka, Hisato, 4,953,934, Cl. 350-96.150.
- Kajima, Ryota; Ihara, Hirokazu; Nitta, Yoshihiko; and Kaji, Hiroyuki, 4,954,984, Cl. 364-900.000.
- Kawasaki, Ikuya; Kurakazu, Keiichi; and Maejima, Hideo, 4,954,943, Cl. 364-200.000.
- Kawashima, Masae; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, 4,954,465, Cl. 502-5.000.
- Kobayashi, Yasuo; Hagiwara, Naoki; Hirota, Taisuke; Kodama, Churyo; Hirasawa, Yasuo; Miyazaki, Katsumi; Kawamura, Fumio; Higashi, Takao; Yanagisawa, Masami; and Sei, Akinori, 4,954,937, Cl. 362-255.000.
- Kuriyama, Kazunori; Wada, Kenichi; and Yamaoka, Akira, 4,954,947, Cl. 364-200.000.
- Manaka, Toshio; and Shida, Masami, 4,953,530, Cl. 123-399.000.
- Masuda, Satoshi; Kawasaki, Ikuya; and Matsui, Shigezumi, 4,954,942, Cl. 364-200.000.
- Matsuyama, Hideo; Koike, Kazuyuki; and Hayakawa, Kazunobu, 4,954,770, Cl. 324-71.300.
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- Hofle, Gerhard: See—  
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- Hollingsworth, John D.; and Pinto, Akiva, to John D. Hollingsworth on Wheels, Inc. Metallic wire used with textile fiber processing elements, in particular, with cleaning rollers. 4,953,264, Cl. 19-114.000.
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Riley, Gilbert N.; Holodnak, Richard S.; Malin, Richard A.; and Muller, Arno, 4,953,996, Cl. 400-162.200.
- Holophone Company, Inc.: See—  
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Okano, Tadashi; and Honda, Tadayoshi, 4,953,720, Cl. 212-176.000.
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- Hoover, Judith L. Three-dimensional maze pet toy. 4,953,502, Cl. 119-29.000.
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- Horbach, Rainier: See—  
Knaack, Karl; and Horbach, Rainier, 4,953,829, Cl. 254-333.000.
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- Hosokawa, Yoshikazu: See—  
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- Houston, James L. Erosion retarder for refractory corners. 4,954,402, Cl. 428-597.000.
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Tribert, Claude; and Grat, Felix R., 4,953,600, Cl. 141-1.000.
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- Hsu, Hui-Pin; and Jang, Soon, to Hughes Aircraft Company. High strength optical fiber splice. 4,954,152, Cl. 65-3.100.
- Hsu, Sheng H., to Nestec S.A. Apparatus for agglomeration. 4,954,060, Cl. 425-85.000.
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Lee, James; Beck, Richard; Lee, Chun; and Hu, Edward, 4,954,873, Cl. 357-72.000.
- Hu, Long-Hai. Fully automatic phase controller for a non-coil armature type generator. 4,954,765, Cl. 323-217.000.
- Huang, Johnny: See—  
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- Huang, Pao-Ter: See—  
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- Hubbell Incorporated: See—  
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- Jorgensen, Robert W.; and Schnell, Kenneth R., 4,954,667, Cl. 174-53.000.
- Huc, Alain: See—  
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- Hudson, Barry, to BP Chemicals Limited. Catalytic preparation of polycarbonate from dialkyl carbonate and bis phenol dicarboxylate. 4,954,613, Cl. 528-371.000.
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- LeCompte, George W., 4,953,803, Cl. 242-47.000.
- Mihich, Alexander, 4,953,932, Cl. 350-96.150.
- Moulin, Norbert L., 4,953,944, Cl. 350-96.210.
- Parker, Merle D., 4,953,925, Cl. 350-6.100.
- Wrede, John E., 4,953,923, Cl. 350-3.610.
- Hughes Tool Company: See—  
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- Hui, Henry K.: See—  
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- Hull, Michael; and Scowen, Reginald V., to Lever Brothers Co. Detergent composition containing PVP and process of using same. 4,954,292, Cl. 252-542.000.
- Humphrey, James C., to GTE Products Corporation. Sliding gimbal connector. 4,954,094, Cl. 439-247.000.
- Hums, Erich, to Siemens Aktiengesellschaft. Method of making catalysts from titanium oxide. 4,954,476, Cl. 502-350.000.
- Hung, William M.; and Su, Kai C., to Ciba-Geigy Corporation. Tinted contact lens and method of tinting with reactive dye and quaternary ammonium salt. 4,954,132, Cl. 8-507.000.
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- Hunt, Alan W.: See—  
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- Hunter, Gerald D.: See—  
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- Hunter, Paul; and Schewe, Leonard J., to United States of America, Navy. Process of making thin film vector magnetometer. 4,954,216, Cl. 156-634.000.
- Hurter, Rudolf, to Ciba-Geigy Corporation. Monoazo dyes containing sulfoindole coupling components. 4,954,563, Cl. 534-783.000.
- Hurworth, Samuel G., to Delhur Industries, Inc. Adjustable, pivotable blade for bulldozers and the like. 4,953,625, Cl. 172-305.000.
- Husher, Stephen, to Penny & Giles Controls Limited. Linear displacement transducers utilizing voltage component in phase with current that varies linearly with core displacement. 4,954,776, Cl. 324-20716.000.
- Hussain, Syed. Pay phone system and apparatus. 4,955,052, Cl. 379-94.000.
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- Iida, Shigehira: See—  
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- Iijima, Kenzaburo; and Hayashi, Yoshinori, to Yamaha Corporation. Magnetic-resistor sensor and a magnetic encoder using such a sensor. 4,954,803, Cl. 338-32.00R.
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- Ikari, Ichiro: See—  
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- Iked, Minoru: See—  
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- Ikuta, Hironori: See—  
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- Iico Unican Inc.: See—  
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- Illinois Tool Works, Inc.: See—  
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- ILVA S.p.A.: See—  
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- Imai, Yoshio: See—  
Kumagai, Hiromi; Sato, Kaoru; and Imai, Yoshio, 4,954,685, Cl. 319-390.000.
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- Immunopath Profile, Inc.: See—  
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- Schofield, John D., 4,954,177, Cl. 106-499.000.
- Scott, Graham W.; Gough, Paul; Hendy, Brian N.; and Cinderey, Michael B., 4,954,143, Cl. 55-16.000.
- Winterton, Neil; and Carey, John G., 4,954,287, Cl. 252-182.260.
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- Inaba, Shizue: See—  
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- Industrial Insulations of Texas, Inc.: See—  
Price, Donald; Price, Frank; and Nelson, Charles M., 4,954,202, Cl. 156-353.000.
- Infotron Systems Corporation: See—  
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- Ingleton, Robert A.: See—  
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- Inner Solar Roof System, Inc.: See—  
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- Inouye, Shigeharu: See—  
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- Inspiration Markets, Inc.: See—  
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- Intermedica, Inc.: See—  
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- Dhong, Sang H.; Hwang, Wei; and Lu, Nicky C., 4,954,731, Cl. 307-482.000.
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- Fink, Hans-Werner; Morin, Roger; Schmid, Heinz; and Stocker, Werner, 4,954,711, Cl. 250-423.00R.
- Freeman, William A.; Pogorzelski, James S.; Solie, Darryl W.; and Wilson, Jacqueline H., 4,954,950, Cl. 364-200.000.
- Gaudenzi, Gene J., 4,954,738, Cl. 307-454.000.
- Gray, James P.; Knauth, Jeffrey G.; Pozefsky, Diane P.; and Rafalow, Lee M., 4,954,821, Cl. 340-825.520.
- Jambotkar, Chakrapani G., 4,954,457, Cl. 437-31.000.
- Johnson, John M.; Rocke, James A.; and Udupa, Divakara K. R., 4,954,965, Cl. 364-514.000.
- Mahmoud, Issa S., 4,954,226, Cl. 204-15.000.
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- Ree, Moonhor; Swanson, Sally A.; Volksen, Willi; and Yoon, Do Y., 4,954,578, Cl. 525-432.000.
- Takita, Kazuyuki, 4,954,907, Cl. 360-78.070.
- International Fuel Cells Corporation: See—  
Lipman, Kenneth; and Young, Douglas G., 4,954,726, Cl. 307-46.000.
- Inventio AG: See—  
Rulke, Gerhart, 4,953,686, Cl. 198-332.000.
- Ionescu, Adrian F. A.C. power controller with short circuit and overload protection. 4,955,069, Cl. 388-811.000.
- Irvin, Ronald D.; Burkett, David; Kaplan, David E.; and Harvey, Ronald J., to IMED Corporation. Peristaltic pump with mechanism for maintaining linear flow. 4,954,046, Cl. 417-53.000.
- Irwin Magnetic Systems, Inc.: See—  
Bolt, Michael L., 4,954,921, Cl. 360-121.000.
- Isenga, Steve, to ITC Incorporated. Transom light. 4,954,932, Cl. 362-61.000.
- Ishida, Shuji: See—  
Yoshioka, Hidetoshi; Kojima, Eiji; Ishida, Shuji; Yoshioka, Hiroyuki; and Murakami, Kunichika, 4,954,485, Cl. 514-49.000.
- Ishigaki, Kunio; and Naoi, Takashi, to Fuji Photo Film Co., Ltd. Silver halide photographic element with polyester base. 4,954,430, Cl. 430-534.000.
- Ishii, Kazunori; Terakado, Seishi; Funakoshi, Yasutomo; and Sakurai, Tadashi, to Matsushita Electric Industrial Co., Ltd. Self-regulating heating article having electrodes directly connected to a PTC layer. 4,954,696, Cl. 219-548.000.
- Ishii, Kazuo: See—  
Kato, Eiichi; and Ishii, Kazuo, 4,954,407, Cl. 430-96.000.
- Ishii, Shigetaka: See—  
Sato, Yoshikazu; Watabe, Hiroomi; Ishii, Shigetaka; Nakazawa, Tadashi; Shomura, Takashi; Sezaki, Masaji; and Kondo, Shinichi, 4,954,641, Cl. 549-384.000.
- Ishikawa, Hideaki: See—  
Sasaki, Masahiro; Abe, Osamu; and Ishikawa, Hideaki, 4,953,513, Cl. 123-489.000.
- Ishikawa, Kanzo; Hayaishi, Ryutaro; and Yoshimoto, Akira, to Kawata Co., Ltd. Drying and crystallizing apparatus for granules, which employs a microwave device. 4,954,681, Cl. 219-10.55A.
- Ishikawa, Shuichi; and Kuwano, Hiromichi, to Texas Instruments Incorporated. Power supply circuit and semiconductor integrated circuit device using it. 4,954,766, Cl. 323-272.000.
- Ishikawa, Shunichi: See—  
Nakamura, Taku; Hirano, Tsumoru; Funatsu, Eiji; and Ishikawa, Shunichi, 4,954,417, Cl. 430-138.000.
- Ishikawa, Takatoshi, to Fuji Photo Film Co., Ltd. Methods for processing silver halide color photographic light-sensitive materials. 4,954,426, Cl. 430-386.000.
- Ishikawa Tekko Kabushiki Kaisha: See—  
Suzuki, Kazumasa; Yamada, Masahiro; and Suzuki, Keiichi, 4,954,006, Cl. 403-135.000.
- Ishiwata, Hiroshi; Ikegame, Tetsuo; and Ikari, Ichiro, to Olympus Optical Co., Ltd. Objective lens for optical disks. 4,953,959, Cl. 350-432.000.
- Ishizaka, Hideo: See—  
Koizumi, Takashi; and Ishizaka, Hideo, 4,954,319, Cl. 422-67.000.
- Isobe, Tadashi: See—  
Minohara, Taketoshi; Takagi, Yoshio; Isobe, Tadashi; and Suzuki, Keita, 4,954,176, Cl. 106-417.000.



Isozaki, Masaaki; and Takano, Kazuhiro, to Sony Corporation. Digital code conversion apparatus. 4,954,826, Cl. 341-100.000.

Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha. Coaxial starter. 4,954,733, Cl. 310-71.000.

Israelsohn, Cedric; and Read, Andrew J. Water heating apparatus. 4,953,536, Cl. 126-374.000.

Itagaki, Akinari: See—  
Toyoshima, Nobuyuki; Shibata, Takanori; Hirashima, Atsushi; Ando, Ichiro; Iwata, Noriko; Yoshioka, Hiroshi; Itagaki, Akinari; and Yamazaki, Toshio, 4,954,586, Cl. 526-245.000.

Italiano, Pietro, to GRIV S.r.l. Methane catalytic combustion boiler for obtaining hot water for house-hold and industrial uses. 4,953,512, Cl. 122-4.000.

ITC Incorporated: See—  
Isenga, Steve, 4,954,932, Cl. 362-61.000.

Ito, Akira; and Okada, Mizuo, to Mitsubishi Rayon Co., Ltd. Rear projection screen. 4,953,948, Cl. 350-128.000.

Ito, Hideo: See—  
Kawagoe, Kenji; Ito, Hideo; and Yokote, Masatsugu, 4,954,957, Cl. 364-424.050.

Ito, Hiroshi; Handa, Junichi; Takagi, Yoshio; and Minohara, Taketoshi, to Toyota Jidosha Kabushiki Kaisha. Pigment. 4,954,175, Cl. 106-417.000.

Ito, Hiroshi; Kasezawa, Tadashi; and Yao, Masaharu, to Mitsubishi Denki Kabushiki Kaisha. Filter for separating luminance and chrominance signals from composite color television signal. 4,954,885, Cl. 358-31.000.

Ito, Katsumi: See—  
Sugihara, Hirosada; Nishikawa, Kohei; and Ito, Katsumi, 4,954,625, Cl. 540-500.000.

Ito, Michiaki, to Kabushiki Kaisha Toshiba. Washing machine. 4,953,369, Cl. 68-23.700.

Ito, Norifumi: See—  
Iwamoto, Mune; Ito, Norifumi; Sugazaki, Kazuo; Matsubara, Tet-suyuki; and Ando, Toshihiko, 4,954,571, Cl. 525-205.000.

Ito, Shoji: See—  
Osuni, Toru; Ito, Shoji; and Hashimoto, Kenji, 4,953,825, Cl. 251-129.170.

Ito, Toshiakazu; Harada, Takashi; and Hamanaka, Toshiyuki, to NGK Insulators, Ltd. Ceramic heat exchangers and production thereof. 4,953,627, Cl. 165-8.000.

Ito, Wataru: See—  
Hasegawa, Kazumi; Ikeda, Hiroshi; and Ito, Wataru, 4,953,997, Cl. 400-616.300.

Ito, Yusuke: See—  
Hosaka, Yoshifumi; Otsuka, Saburo; Kinoshita, Takashi; and Ito, Yusuke, 4,954,343, Cl. 424-448.000.

Itoh, Masahiko: See—  
Nagai, Takeshi; Fukuda, Hiroshi; Itoh, Masahiko; and Shitaya, Takao, 4,954,694, Cl. 219-413.000.

Itsumi, Tadashi: See—  
Iwamura, Soichi; Murakami, Satoshi; and Itsumi, Tadashi, 4,955,048, Cl. 379-53.000.

ITT Corporation: See—  
Nieman, Gerald R.; Clyatt, Clarence L., III; Paulus, Eric J.; Zeh-rung, Scott A.; Ragl, Albert; and Moore, John R., 4,954,794, Cl. 333-182.000.

Iwaki, Yoshihisa: See—  
Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; Shimada, Hiroyuki; Kikuchi, Kimihiko; and Nakayama, Hiroshi, 4,953,677, Cl. 192-3.300.

Iwamoto, Mune; Ito, Norifumi; Sugazaki, Kazuo; Matsubara, Tet-suyuki; and Ando, Toshihiko, to Mitsui Toatsu Chemicals, Incorporated. Rubber dispersed copolymer resin. 4,954,571, Cl. 525-205.000.

Iwamoto, Norihiro, to Toshiba Kikai Kabushiki Kaisha. Injection pressure control apparatus for a die cast machine and an injection mold machine. 4,954,063, Cl. 425-149.000.

Iwamura, Soichi; Murakami, Satoshi; and Itsumi, Tadashi, to Sharp Kabushiki Kaisha. Multiplex transmission of audio signal and video signal through inhouse cable. 4,955,048, Cl. 379-53.000.

Iwanami, Teruo; Miyata, Shigeo; and Moriyama, Takamasa, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha; and Kyowa Kogyo Kabu-shiki Kaisha. Process for preparing molded article. 4,954,557, Cl. 524-399.000.

Iwano, Haruhiko, to Fuji Photo Film Co., Ltd. Method for forming intensified color image. 4,954,425, Cl. 430-373.000.

Iwasaki, Yasuji: See—  
Oka, Masahiko; Uemoto, Hiroshi; and Iwasaki, Yasuji, 4,954,588, Cl. 526-247.000.

Iwasawa, Yoshihiro: See—  
Suzuki, Fumio; Iwasawa, Yoshihiro; Sato, Toshiaki; Ikai, Takasi; and Oguti, Toshihiko, 4,954,164, Cl. 71-92.000.

Iwase, Akira; and Suzuki, Akira, to Toshiba Machine Company, Ltd. High-accuracy traveling table apparatus. 4,953,965, Cl. 350-632.000.

Iwata, Koji; Okuma, Shigeru; Kimura, Yoshimasa; Konata, Yoshihiro; and Kaneko, Kiyoshi, to Canon Kabushiki Kaisha. Driving device having a vibrator. 4,953,413, Cl. 74-1.055.

Iwata, Masayoshi; Muto, Tohiya; Morikawa, Minoru; Kozawa, Satoshi; Takase, Akihiko; and Terano, Naoki, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Switch operation indicator. 4,954,675, Cl. 200-317.000.

Iwata, Noriko: See—  
Toyoshima, Nobuyuki; Shibata, Takanori; Hirashima, Atsushi; Ando, Ichiro; Iwata, Noriko; Yoshioka, Hiroshi; Itagaki, Akinari; and Yamazaki, Toshio, 4,954,586, Cl. 526-245.000.

Iwata, Yasuhiro; and Uchigasaki, Yuzi, to Kabushiki Kaisha Toshiba. Paper supply device with a function of automatically sensing the life of feed rollers. 4,953,844, Cl. 271-9.000.

Iyer, Natraj C.: See—  
Fey, Maurice G.; Iyer, Natraj C.; Male, Alan T.; and Lovic, Wil-liam R., 4,954,170, Cl. 75-229.000.

Izukawa, Kazuhiro, to Canon Kabushiki Kaisha. Vibratory-wave motor device. 4,954,742, Cl. 310-316.000.

Izukawa, Kazuhiro: See—  
Furutsu, Etsuro; and Izukawa, Kazuhiro, 4,954,741, Cl. 310-316.000.

Izume, Takatomo, to Kabushiki Kaisha Toshiba. High speed RMS control apparatus for resistance welders and high speed RMS control method thereof. 4,954,686, Cl. 219-110.000.

Izuoka, Yuki: See—  
Suzuki, Takahiro; Izuoka, Yuki; and Aoki, Noboru, 4,954,743, Cl. 313-120.000.

J. M. Huber Corporation: See—  
Wason, Satish K., 4,954,468, Cl. 502-63.000.

Jabs, Alfred, to MTU Motoren- und Turbinen-Union Munchen GmbH. Method of connecting heat exchange tubes to a fluid conveying duct. 4,953,290, Cl. 29-89.0043.

Jackman, Dennis E.; and Morgan, John G., to Mobay Corporation. Process for desulfurization of isothioureas and isothioamides. 4,954,627, Cl. 544-182.000.

Jackson, Anthony M.: See—  
August, Alfred A., Sr.; and Jackson, Anthony M., 4,954,813, Cl. 340-571.000.

Jackson, Ernest E. Filtered positive ventilation system for vehicle. 4,953,449, Cl. 98-2.110.

Jackson, Richard L.: See—  
Mao, Simon J. T.; and Jackson, Richard L., 4,954,528, Cl. 514-712.000.

Jacob, Allan S.; and Zawadzki, Andrzej, to Heath Consultants Incorporated. Microprocessor based tank test management system. 4,954,973, Cl. 364-551.010.

Jacob, Ingolf: See—  
Wellenhofer, Herbert; Jacob, Ingolf; and Geirhos, Josef, 4,953,271, Cl. 28-272.000.

Jacobson, Michael R. Method of and means for playing a sports game of chance. 4,953,873, Cl. 273-274.000.

Jacquet, Jean-Pierre: See—  
Weber, Abraham; Bouzard, Daniel; Essiz, Munir; Di Cesare, Pierre; Jacquet, Jean-Pierre; and Remuzon, Philippe, 4,954,507, Cl. 514-300.000.

Jager, Andreas, to Arnold Jager. Revolving, inextensible band, particu-larly a track for vehicles. 4,953,920, Cl. 305-35.0EB.

Jaguar Cars Limited: See—  
Parsons, Bryan N. V., 4,954,735, Cl. 310-82.000.

Jain, Faquir C., to University of Connecticut. Metal insulator semicon-ductor heterostructure lasers. 4,955,031, Cl. 372-45.000.

Jambotkar, Chakrapani G., to International Business Machines Corpo-ration. Method of making heterojunction bipolar transistors. 4,954,457, Cl. 437-31.000.

Jamet, Bernard, to Saint-Gobain Vitrage. Method and device for the manufacture of a sheet of polyvinylbutyral. 4,954,306, Cl. 264-210.200.

Janchipraponveji, Ben, to Helene Curtis, Inc. Clear conditioning com-position and method to impart improved properties to the hair. 4,954,335, Cl. 424-070.000.

Jang, Soon: See—  
Hsu, Hui-Pin; and Jang, Soon, 4,954,152, Cl. 65-3.100.

Jansson, Magnus, Administrator: See—  
Fransson, Rolf G.; Jansson, Bertil E., deceased; and Jansson, Magnus, Administrator, 4,954,092, Cl. 439-152.000.

Janse, Cornelis P.: See—  
Driessen, Leonardus M. H. E.; and Janse, Cornelis P., 4,954,986, Cl. 365-189.010.

Jansson, Bertil E., deceased: See—  
Fransson, Rolf G.; Jansson, Bertil E., deceased; and Jansson, Magnus, Administrator, 4,954,092, Cl. 439-152.000.

Jansson, Per-Olof: See—  
Raitmaa, Raimo; and Jansson, Per-Olof, 4,953,304, Cl. 33-355.00R.

Janzen, Wolfgang, to Flexon Holland, B.V. Conveyor chain and attach-ments therefor. 4,953,691, Cl. 198-803.010.

Jaoo, Tze C.; Morton, Nancy A.; and Erickson, Robert W., Jr., to Motor-ola, Inc. Process for preparing overbased calcium sulfonates. 4,954,272, Cl. 252-25.000.

Japan Atomic Energy Research Institute: See—  
Okamura, Kiyohito; Sato, Mitsuhiro; Hasegawa, Yoshio; Seguchi, Tadao; and Kawanishi, Shunichi, 4,954,461, Cl. 501-95.000.

Japan Synthetic Rubber Company, Ltd.: See—  
Ono, Hisao; Sato, Ryuji; and Miyachi, Takumi, 4,954,125, Cl. 526-138.000.

Jard, James E. Tire pressure indicator. 4,953,395, Cl. 73-146.800.

Jarvik, Murray E.: See—  
Rose, Jed E.; Jarvik, Murray E.; and Rose, Karce D., 4,953,572, Cl. 131-270.000.

Jasser, Manfred; and Lipinski, Thomas, to Metec, Inc. Roof fall separa-ting and removing apparatus and method for use in thin seam highwall mining. 4,953,915, Cl. 299-18.000.

Jaza-Chamiec, Albert A.; and Hickey, Deirdre M. B., to SmithKline & French Laboratories Limited. Novel polystyrene anion exchange polymers. 4,954,339, Cl. 424-78.000.

Jean Walterscheid GmbH: See—  
Coenen, Karl; Flanhardt, Michael; and Langen, Hans-Jurgen, 4,953,411, Cl. 73-862.330.

Jedlicka, Josef E.; LeBlanc, Ewart O.; and Masseth, Judith A., to Xerox Corporation. Process for assembling smaller arrays together to form a longer array. 4,954,197, Cl. 156-273.700.

Jeffs, David H.: See—  
Jessop, Paul M.; and Jeffs, David H., 4,953,741, Cl. 220-273.000.

Jenkins, Allan D.: See—  
Dahlquist, E. Arthur; Jenkins, Allan D.; Truehart, David C.; and Baxter, Richard B., 4,954,041, Cl. 414-718.000.

Jenkins, Overton S. Portable hot ash vacuum. 4,953,255, Cl. 15-327.020.

Jensen, Ronald H., to Scott Jensen Industries, Inc. Method and appara-tus for ozone generation. 4,954,321, Cl. 422-186.190.

Jensen, Michael L.; Nolf, Jean-Marie E.; Vansant, Jan; and Mendes, Luiz N., to Raychem Corporation. Cable splice case. 4,954,670, Cl. 174-92.000.

Jensen, Ned L., to William Seroy Group, The. Synthetic GTF chro-mium material for decreasing blood lipid levels and process therefor. 4,954,492, Cl. 514-188.000.

Jensen, Thomas H., to PPG Industries, Inc. Metering apparatus and method for the measurement of a fixed length of continuous strand. 4,954,720, Cl. 250-561.000.

Jensen, William T.; Brown, Vincent B.; Edgerton, Cathy J.; and Mas-terson, Robert W., to Methode Electronics, Inc. Terminator assembly for interconnecting computer devices. 4,954,089, Cl. 439-76.000.

Jernigan, Thomas K.: See—  
Brower, David; and Jernigan, Thomas K., 4,953,483, Cl. 112-119.000.

Brower, David; and Jernigan, Thomas K., 4,953,485, Cl. 112-262.300.

Jessop, Paul M.; and Jeffs, David H., to Multi-Technology Inc. Medical fail safe releasable locks and/or seals for capped disposable centrifuge containers, cryogenic vials and the like. 4,953,741, Cl. 220-273.000.

Jewell, Raymond S., Jr.; and Hill, William E., to Tennessee Gas Pipe-line Company. Muffler with two part housing and flow tubes. 4,953,660, Cl. 181-282.000.

Jewell, Ricky S. Deck bracket for of attaching a deck to a building. 4,953,339, Cl. 52-729.000.

Jim Walter Resources, Inc.: See—  
Gauna, Michael, 4,954,018, Cl. 405-259.000.

Jodo, Osamu: See—  
Yoshimoto, Akihiro; Jodo, Osamu; Watanabe, Yoshio; Okamoto, Rokuro; and Takeuchi, Tomio, 4,954,438, Cl. 435-78.000.

Joffre, Francis: See—  
Champonnois, Francois; David, Bernard; and Joffre, Francis, 4,954,778, Cl. 324-233.000.

Johal, Sarjit S.; and Cash, Howard A., to Standard Oil Company, The. Production of polysaccharides from filamentous fungi. 4,954,440, Cl. 435-101.000.

Johansson, Johan G. I.: See—  
Reinhall, Rolf B.; Johansson, Johan G. I.; and Mokvist, Anders V., 4,954,221, Cl. 162-261.000.

John D. Hollingsworth on Wheels, Inc.: See—  
Hollingsworth, John D.; and Pinto, Akiva, 4,953,264, Cl. 19-114.000.

Johns Hopkins University: See—  
Zerhouni, Elias; and Parish, David M., 4,953,554, Cl. 128-653.00A.

Johnson, Alan W., to Sauer-Sundstrand Company. Housing support for hydraulic displacement unit swashplate. 4,953,426, Cl. 74-606.00R.

Johnson, Christy L.; Schwann, Johannes; and Wise, Kensall D., to University of Michigan, The Regents of the. Ultrathin-film gas detec-tor. 4,953,387, Cl. 73-25.030.

Johnson, Donald S.: See—  
Crittin, Thomas J.; Johnson, Donald S.; Pukalo, Walter P.; and Yorio, Ralph, 4,953,778, Cl. 228-173.600.

Johnson, Gerald, to Otis Elevator Company. Step chain for curved escalator. 4,953,685, Cl. 198-328.000.

Johnson, John M.; Rocke, James A.; and Udupa, Divakara K. R., to International Business Machines Corporation. Enhanced frame utili-zation for CSMA/CD communication protocol. 4,954,965, Cl. 364-514.000.

Johnson, Larry K.: See—  
Fry, Slaton E.; Magouyrk, David W.; Blankenship, Allen J.; Greene, Paul J.; and Johnson, Larry K., 4,954,573, Cl. 525-327.600.

Johnson, Marvin M.; and Tabler, Donald C., to Phillips Petroleum Company. Passivation of metal contaminated cracking catalysts using aqueous suspensions of antimony oxide. 4,954,467, Cl. 502-26.000.

Johnson, Robert N.; and Colon, Ismael, to Union Carbide Chemicals and Plastics Company Inc. Modified waterborne phenoxys resins. 4,954,553, Cl. 524-376.000.

Johnson Service Company: See—  
Kautz, Thomas O., 4,953,578, Cl. 137-14.000.

Johnson, Stephen C.: See—  
Chuang, Jui-Chang; Walls, Edward, Jr.; Johnson, Stephen C.; and Tazi, Mohammed, 4,954,336, Cl. 424-71.000.

Johnston, Geoffrey D.: See—  
Prime, Marilyn L.; Warren, Peter F.; Johnston, Geoffrey D.; and Babidge, John C., 4,953,730, Cl. 217-4.000.

Johnston, J. O'Neal, to Merrell Dow Pharmaceuticals Inc. Method of treating hyperaldosteronism using 17 $\beta$ -cyclopropylaminoandrostene derivatives. 4,954,488, Cl. 514-177.000.

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Beery, Jack; and Joiner, Charles W., Jr., 4,954,297, Cl. 264-1.300.

Jokisch, Friedrich; Linke, Adolf; and Pohl, Hans-Christoph, to Krupp Koppers GmbH. Method of cooling hot product gas with adhesive or fusible particles. 4,954,136, Cl. 48-197.00R.

Jolly, James G.: See—  
Zaweski, Edward F.; and Jolly, James G., 4,954,274, Cl. 252-45.000.

Jones, Harry P.; Mackey, Robert J.; and Gamlen, Michael J. D., to Burroughs Wellcome Co. Pharmaceutical formulations containing acrivastine. 4,954,350, Cl. 424-493.000.

Jones, John E.: See—  
Wexler, Stuart K.; Jones, John E.; and Jones, Paul A., 4,953,326, Cl. 52-33.000.

Jones, Mark A., to Courtaulds Films & Packaging (Holdings) Ltd. Polymeric films. 4,954,393, Cl. 428-288.000.

Jones, Paul A.: See—  
Wexler, Stuart K.; Jones, John E.; and Jones, Paul A., 4,953,326, Cl. 52-33.000.

Jones, Richard L., to Conoco Inc. Fibrous substrates containing hot melt coatings made from a novel petroleum wax. 4,954,373, Cl. 427-389.900.

Joos, Bob. Spacers for laying tile and method of use. 4,953,341, Cl. 52-747.000.

Jorgensen, Robert W.; Young, Vance W., Jr.; and Misenar, Scott L., to Hubbell Incorporated. Mechanical fastener for plastic conduits. 4,953,898, Cl. 285-340.000.

Jorgensen, Robert W.; and Schnell, Kenneth R., to Hubbell Incorporated. Electrical box with coupling members. 4,954,667, Cl. 174-53.000.

Jorgenson, Michael W.: See—  
Gerkin, Richard M.; Jorgenson, Michael W.; and Leuzzi, Paul W., II, 4,954,560, Cl. 524-714.000.

Jos, Doucet; and Neves, Mendes L., to Raychem Corporation. Wrap-around recoverable sleeve. 4,954,213, Cl. 156-49.000.

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Desmurs, Jean-Roger; Besson, Bernard; and Jouve, Isabelle, 4,954,662, Cl. 568-779.000.

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Rock, Erich, 4,953,991, Cl. 384-19.000.

Jung, Hans. Device for moving patients who are confined to bed. 4,953,245, Cl. 5-81.00B.

Junino, Alex: See—  
Bugaut, Andree; and Junino, Alex, 4,954,131, Cl. 8-421.000.

Juridical Foundation The Chemo-Sero-Therapeutic Research Institute: See—  
Maeda, Haruhisa; Tsujikawa, Akira; and Susumi, Sadao, 4,954,340, Cl. 424-92.000.

Just, Guenther; and Wuest, Willi. Process for removing cellulose ethers from a cellulose ether suspension. 4,954,268, Cl. 210-772.000.

Juy, Henri, to Simplex, S.A. Rear derailleur for bicycles or similar vehicles. 4,954,121, Cl. 474-82.000.

K-Tron International, Inc.: See—  
Kalata, Paul R., 4,954,975, Cl. 364-567.000.

Kabushiki Kaisha ALPS TOOL: See—  
Arisaka, Tomokichi; and Yamaguchi, Mitsuoyoshi, 4,953,429, Cl. 82-127.000.

Kabushiki Kaisha Kobe Seiko Sho: See—  
Koizumi, Yukio, 4,953,724, Cl. 212-188.000.

Miyoshi, Tsuyoshi, 4,953,984, Cl. 366-76.000.

Saotome, Yoshimi; Kuchiki, Kiyotsuna; and Katada, Tsuyoshi, 4,953,723, Cl. 212-159.000.

Kabushiki Kaisha Morita Seisakusho: See—  
Nishikawa, Kazuo, 4,955,042, Cl. 378-39.000.

Kabushiki Kaisha Nishimura Jig: See—  
Nishimura, Akira, 4,953,840, Cl. 269-282.000.

Kabushiki Kaisha Shinsangyokaiatsu: See—  
Moroto, Shuzo; Kawai, Masao; Yokoyama, Shoji; Kobayashi, Koji; and Sumiya, Koji, 4,954,959, Cl. 364-449.000.

Kabushiki Kaisha Sigel: See—  
Nakanishi, Motoyasu, 4,953,861, Cl. 273-73.00J.

Kabushiki Kaisha Tokai Rika Denki Seisakusho: See—  
Iwata, Masayoshi; Muto, Tohiya; Morikawa, Minoru; Kozawa, Satoshi; Takase, Akihiko; and Terano, Naoki, 4,954,675, Cl. 200-317.000.

Kabushiki Kaisha Toshiba: See—  
Arima, Tatsunori, 4,954,848, Cl. 355-319.000.

Fukuda, Norisuke; and Shimada, Yuji, 4,953,253, Cl. 15-319.000.

Haragashira, Motoji; and Maekawa, Yoshimi, 4,954,924, Cl. 361-187.000.

Hirata, Haruhiko, 4,954,781, Cl. 324-318.000.

Ichihara, Katsutarou; Ozawa, Norio; and Yasuda, Nobuaki, 4,954,841, Cl. 346-135.100.

Inoue, Atsushi, 4,954,945, Cl. 364-200.000.

Ito, Michiaki, 4,953,369, Cl. 68-23.700.

Iwata, Yasuhiro; and Uchigasaki, Yuzi, 4,953,844, Cl. 271-9.000.

Izume, Takatomo, 4,954,686, Cl. 219-110.000.

Kamemoto, Kazuhiro, 4,954,882, Cl. 358-22.000.

Koike, Norio, 4,954,418, Cl. 430-175.000.

Mizunoya, Nobuyuki; Komorita, Hiroshi; Tanaka, Tadashi; and Matsumura, Kazuo, 4,954,386, Cl. 428-137.000.

Nabeshima, Daiki; and Nakane, Hiroshi, 4,955,010, Cl. 369-32.000.



Okumura, Katsuya; Watanabe, Tohru; and Watase, Masami, 4,954,218, Cl. 156-643.000.  
 Ono, Kenichi, 4,954,887, Cl. 358-75.000.  
 Sacki, Yukihiko; and Nakamura, Toshimasa, 4,954,991, Cl. 365-189.010.  
 Shiosaki, Masao, 4,954,918, Cl. 360-98.060.  
 Takemura, Momoko; Inaba, Michihiko; Tetsuya, Toshio; and Kobayashi, Mitsuo, 4,954,870, Cl. 357-67.000.  
 Takenouchi, Shinji, 4,954,680, Cl. 219-10.55E.  
 Tanabe, Toshiyuki; and Senoo, Seiji, 4,954,899, Cl. 358-191.100.  
 Wagai, Kiyoshi; and Murai, Makoto, 4,955,080, Cl. 455-343.000.  
 Yamada, Masahiro; and Kawai, Kiyoyuki, 4,954,824, Cl. 341-61.000.  
 Yamakawa, Hideaki; Suzuki, Nobuo; and Ozeki, Takeshi, 4,954,786, Cl. 330-4.300.  
 Yasufuku, Hitoshi; and Ogata, Toshikazu, 4,953,784, Cl. 236-44.00A.  
 Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo: See—  
 Ueno, Ryuzo; Fujita, Yatsuka; Yamamoto, Munemitsu; and Koza-kai, Hiroshi, 4,954,358, Cl. 426-331.000.  
 Kachi, Tatsushi: See—  
 Tanemura, Fumikazu; Honda, Tohru; Ohta, Shigetoshi; Kajita, Yoshiharu; and Kachi, Tatsushi, 4,954,460, Cl. 501-80.000.  
 Kagaya, Asuka: See—  
 Yoshihama, Yoshio; Kagaya, Asuka; Matsui, Susumu; and Obaya-shi, Akira, 4,954,445, Cl. 435-191.000.  
 Kagaya, Osamu: See—  
 Tanaka, Hiroto; Yamashita, Hiroki; Masuda, Noboru; Shigeta, Junji; Umamoto, Yasunari; and Kagaya, Osamu, 4,954,866, Cl. 357-45.000.  
 Kageyama, Akira: See—  
 Endo, Keiichi; Shinbo, Yasushi; Kageyama, Akira; Katsuya, Yasuo; Kato, Chihiro; Fukasawa, Masato; and Sekine, Makoto, 4,954,406, Cl. 430-60.000.  
 Kageyama, Yukihiko: See—  
 Nakane, Toshio; Hijikata, Kenji; Kageyama, Yukihiko; and Naka, Michiro, 4,954,540, Cl. 524-86.000.  
 Nakare, Toshio; Kageyama, Yukihiko; Konuma, Hiroaki; and Hijikata, Kenji, 4,954,541, Cl. 524-86.000.  
 Kahn, Paul: See—  
 Barnes, Bruce E.; Furuzawa, Richard; and Kahn, Paul, 4,954,251, Cl. 210-806.000.  
 Kai, Katsunori: See—  
 Kawaguchi, Shiro; and Kai, Katsunori, 4,953,335, Cl. 52-384.000.  
 Kaijima, Ryota; Ihara, Hirokazu; Nitta, Yoshihiko; and Kaji, Hiroyuki, 4,954,540, Cl. 524-86.000.  
 Hitachi, Ltd. Method and apparatus for supplementing translation information in machine translation. 4,954,984, Cl. 364-900.000.  
 Kain, William S.: See—  
 Staker, Doanld D.; and Kain, William S., 4,954,363, Cl. 426-636.000.  
 Kaiser, Howard; and Kaiser, Laurie A. C. Protective disposable sheath for muscle monitor. 4,953,563, Cl. 128-778.000.  
 Kaiser, Laurie A. C.: See—  
 Kaiser, Howard; and Kaiser, Laurie A. C., 4,953,563, Cl. 128-778.000.  
 Kaiser, Manfred: See—  
 Kuppers, Dieter; Herse, Klaus; Hiepe-Wohlleben, Kate; Kaiser, Manfred; Mohr, Friedemann; and Ohnsorge, Horst, 4,955,014, Cl. 370-3.000.  
 Kaiser, Stanislav; to Alpina Tovarna Obutve N.Sol.O. Warming foot-wear. 4,953,309, Cl. 36-2.600.  
 Kaji, Hiroyuki: See—  
 Kaijima, Ryota; Ihara, Hirokazu; Nitta, Yoshihiko; and Kaji, Hiroyuki, 4,954,984, Cl. 364-900.000.  
 Kajita, Koji; to Canon Kabushiki Kaisha. Image reading apparatus. 4,954,913, Cl. 358-474.000.  
 Kajita, Yoshiharu: See—  
 Tanemura, Fumikazu; Honda, Tohru; Ohta, Shigetoshi; Kajita, Yoshiharu; and Kachi, Tatsushi, 4,954,460, Cl. 501-80.000.  
 Kajitani, Tetsuji: See—  
 Harada, Hiroyuki; and Kajitani, Tetsuji, 4,954,863, Cl. 355-51.000.  
 Kakinuma, Toshifumi; and Hayashi, Kiyoshi, to Tokyo Keiki Company Ltd. Electromagnetic directional control valve. 4,953,590, Cl. 137-554.000.  
 Kakuta, Takuya: See—  
 Baba, Masatoshi; Kakuta, Takuya; Tanaka, Norio; Oya, Eiichi; Ikai, Takashi; Nawamaki, Tsutomu; Watanabe, Shigeomi; and Suzuki, Koichi, 4,954,165, Cl. 71-103.000.  
 Kalata, Paul R., to K-Tron International, Inc. Weigh feeding system with self-tuning stochastic control and weight and actuator measurements. 4,954,975, Cl. 364-567.000.  
 Kalthoff, Timothy V., to Burr-Brown Corporation. CMOS voltage reference and buffer circuit. 4,954,769, Cl. 323-313.000.  
 Kam, Chih-Min: See—  
 Powers, James C.; Kam, Chih-Min; Owelda, Steven W.; and Ku, David N., 4,954,519, Cl. 514-456.000.  
 Kamarehi, Mohammad: See—  
 Lynch, Donald; Kamarehi, Mohammad; Ury, Michael G.; and Wood, Charles H., 4,954,755, Cl. 315-248.000.  
 Kamata, Yoshiaki: See—  
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 Kameda, Miyakichi: See—  
 Kawashima, Masae; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, 4,954,465, Cl. 502-5.000.

Kamegamori, Masayuki: See—  
 Morita, Shizuo; Matsumoto, Toru; Kamegamori, Masayuki; Hayakawa, Kazushi; Hatakeyama, Noboru; Matsuo, Shunji; and Fukuchi, Masakazu, 4,954,844, Cl. 355-260.000.  
 Kamehara, Nobuo: See—  
 Imanaka, Yoshihiko; Machi, Takato; Yamanaka, Kazunori; Yokoyama, Hiromitsu; Kamehara, Nobuo; and Niwa, Koichi, 4,954,480, Cl. 505-1.000.  
 Kamemoto, Kazuhiro, to Kabushiki Kaisha Toshiba. Color television set having a teletext receiver built-in. 4,954,882, Cl. 358-22.000.  
 Kameyama, Shuichi: See—  
 Kobushi, Kazuhiro; Kameyama, Shuichi; and Komeda, Tadao, 4,954,454, Cl. 437-21.000.  
 Kameyama, Toru: See—  
 Azeta, Takahiro; Kameyama, Toru; Sekiya, Harukazu; Moritani, Toshifumi; Higeta, Akira; Baba, Kenji; Matoba, Takeshi; Goto, Shinji; and Kubota, Kazuyuki, 4,953,846, Cl. 271-251.000.  
 Kamikado, Toshiya; Kando, Yasuyuki; Matsuura, Kazuho; and Yamada, Junji, to Takeda Chemical Industries, Ltd. Acrylic acid morpholides and fungicidal compositions. 4,954,497, Cl. 514-235.500.  
 Kamimura, Shoichi, to Mazda Motor Corporation. Suspension apparatus of a vehicle. 4,953,890, Cl. 280-707.000.  
 Kamiyama, Michinari: See—  
 Nishiura, Masaharu; Ichimura, Takeshige; and Kamiyama, Michinari, 4,954,181, Cl. 136-244.000.  
 Kanade, Pradeep G.: See—  
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 Kando, Yasuyuki: See—  
 Kamikado, Toshiya; Kando, Yasuyuki; Matsuura, Kazuho; and Yamada, Junji, 4,954,497, Cl. 514-235.500.  
 Kane, James: See—  
 Tuenge, Richard T.; and Kane, James, 4,954,747, Cl. 313-506.000.  
 Kaneda, Aizo: See—  
 Saeki, Junichi; Kaneda, Aizo; and Nishi, Kunihiko, 4,954,301, Cl. 264-40.100.  
 Kanegafuchi Kagaku Kogyo Kabushiki: See—  
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 Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: See—  
 Kira, Kazuaki, 4,954,127, Cl. 600-36.000.  
 Kaneko, Hiroyuki: See—  
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 Kaneko, Kiyoshi: See—  
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 Kaneko, Toshio: See—  
 Maeda, Shuichi; Kaneko, Toshio; Kurose, Yutaka; Kimura, Michio; Yoshida, Hidemi; Uchino, Kenichi; and Inaba, Shizue, 4,954,420, Cl. 430-270.000.  
 Kanno, Yohichi: See—  
 Ohmi, Tadahi; Kanno, Yohichi; Satoh, Kazuhiko; and Hatayama, Tadahi, 4,953,826, Cl. 251-331.000.  
 Kanome, Osamu; and Tsutsumi, Takayoshi, to Canon Kabushiki Kaisha. Optical recording medium and process for production thereof. 4,954,380, Cl. 428-64.000.  
 Kanou, Shoji: See—  
 Kubota, Shigeru; Kanou, Shoji; and Kubo, Masahiro, 4,953,749, Cl. 221-168.000.  
 Kanzaki Paper Mfg. Co., Ltd.: See—  
 Shuku, Shigekazu; Mukoyoshi, Shunichiro; Yuasa, Eiji; and Yamori, Tsunefumi, 4,954,477, Cl. 503-226.000.  
 Kanzaki Seishi Co., Ltd.: See—  
 Matsumoto, Mitsuo, 4,954,203, Cl. 156-361.000.  
 Kaplan, David E.: See—  
 Irvin, Ronald D.; Burkett, David; Kaplan, David E.; and Harvey, Ronald J., 4,954,046, Cl. 417-53.000.  
 Kapoor, Mohan L.: See—  
 Young, Edward L.; and Kapoor, Mohan L., 4,954,752, Cl. 315-169.300.  
 Kappes, Kenneth C., to Milprint, Inc. Ovenable package for bacon and the like. 4,954,356, Cl. 426-107.000.  
 Karita, Toshiaki; and Watanabe, Takashi, to Sharp Kabushiki Kaisha. Apparatus for reading an image. 4,954,914, Cl. 358-475.000.  
 Karlsson, Kurt; and Pettersson, Birger, to Svenska Rotor Maskiner AB. Pack of heat transfer plates. 4,953,629, Cl. 165-10.000.  
 Karlsson, Markku: See—  
 Eskelinen, Pekka; Raatikainen, Pentti; Karlsson, Markku; and Virta, Raimo, 4,953,297, Cl. 34-23.000.  
 Karol, Mark J.: See—  
 Eng, Kai Y.; Karol, Mark J.; and Yeh, Yu S., 4,955,016, Cl. 370-60.000.  
 Eng, Kai Y.; Karol, Mark J.; and Yeh, Yu S., 4,955,017, Cl. 370-60.000.  
 Kasahara, Ciyoshi: See—  
 Oku, Teruo; Kasahara, Ciyoshi; Ohkawa, Takehiko; and Hashimoto, Masashi, 4,954,496, Cl. 514-231.500.  
 Kasahara, Mitsuharu; Kogawa, Kuniyuki; and Hirota, Takato, to Fuji Electric Co., Ltd. Device for coupling reversible electromagnetic contactors to each other with an interlock unit. 4,954,798, Cl. 335-161.000.  
 Kasahara, Takeshi, to Toko, Inc. Variable-capacitance diode device. 4,954,850, Cl. 357-14.000.  
 Kaschig, Jurgen, to Ciba-Geigy Corporation. Optically active styrene derivatives, polymers obtained from these, complexes with iridium(II) and their use. 4,954,592, Cl. 526-265.000.

Kasezawa, Tadashi: See—  
 Ito, Hiroshi; Kasezawa, Tadashi; and Yao, Masaharu, 4,954,885, Cl. 358-31.000.  
 Kashiwabuchi, Masaaki: See—  
 Kawashima, Masae; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, 4,954,465, Cl. 502-5.000.  
 Kasori, Yukio: See—  
 Masaoka, Kazuhiko; and Kasori, Yukio, 4,954,621, Cl. 536-119.000.  
 Kasper, John M.; Perley, Maurice K., Jr.; and Gullett, Bradley T. Multi-attractant fish bait. 4,953,319, Cl. 43-42.060.  
 Kasukawa, Akihito: See—  
 Hattori, Seiji; Kasukawa, Akihito; Shibano, Yoshizo; Kobayashi, Yoshinobu; and Suzuki, Shinji, 4,955,082, Cl. 455-33.000.  
 Katada, Tsuyoshi: See—  
 Saotome, Yoshimi; Kuchiki, Kiyotsuna; and Katada, Tsuyoshi, 4,953,723, Cl. 212-159.000.  
 Kato, Chihiro: See—  
 Endo, Keiichi; Shinbo, Yasushi; Kageyama, Akira; Katsuya, Yasuo; Kato, Chihiro; Fukasawa, Masato; and Sekine, Makoto, 4,954,406, Cl. 430-60.000.  
 Kato, Eiichi; and Ishii, Kazuo, to Fuji Photo Film Co., Ltd. Electro-photographic photoreceptor comprising binder resin containing acidic groups. 4,954,407, Cl. 430-96.000.  
 Kato, Hiroshi; and Torikai, Eiichi. Moisture-sensing hygrometer element. 4,954,238, Cl. 204-430.000.  
 Kato, Hitoshi: See—  
 Takahashi, Takehiko; and Kato, Hitoshi, 4,953,887, Cl. 280-647.000.  
 Kato, Kanami, to Signode Corporation. Method of gripping a strap for bonding the strap end portions to each other. 4,953,599, Cl. 140-93.400.  
 Kato, Masaru: See—  
 Kawai, Yoshikazu; Sato, Chosuke; and Kato, Masaru, 4,953,649, Cl. 180-79.100.  
 Kato, Toshikazu: See—  
 Mohri, Akira; and Kato, Toshikazu, 4,953,699, Cl. 206-330.000.  
 Katsukawa, Tadashi: See—  
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 Katsuki, Kazuo; Peppers, Norman A.; Young, James R.; Pierce, Gerald A.; and Nishi, Hisami, to Nippon Sheet Glass Co., Ltd. Image recognition apparatus. 4,955,060, Cl. 382-32.000.  
 Katsuma, Toshiaki; and Hirano, Nagayoshi, to Fuji Photo Optical Co., Ltd. Variable magnification duplicator lens system. 4,953,958, Cl. 350-425.000.  
 Katsumata, Ryoichi; Mizukami, Toru; and Oka, Tetsuo, to Kyowa Hakko Kogyo Co. Ltd. Process for producing L-lysine. 4,954,441, Cl. 435-115.000.  
 Katsuya, Yasuo: See—  
 Endo, Keiichi; Shinbo, Yasushi; Kageyama, Akira; Katsuya, Yasuo; Kato, Chihiro; Fukasawa, Masato; and Sekine, Makoto, 4,954,406, Cl. 430-60.000.  
 Katsuyoshi, Iino: See—  
 Shoji, Takeuchi; Katsuyoshi, Iino; and Ryoichi, Takahashi, 4,953,362, Cl. 62-246.000.  
 Katz, Daniel. Method and apparatus for chance controlled formation of a symbol. 4,953,864, Cl. 273-161.000.  
 Kaufman, Frank B.: See—  
 Carr, Jeffrey W.; David, Lawrence D.; Guthrie, William L.; Kaufman, Frank B.; Patrick, William J.; Rodbell, Kenneth P.; Pasco, Robert W.; and Nenadic, Anton, 4,954,142, Cl. 51-309.000.  
 Kaufman, Harold R.; and Robinson, Raymond S. Radio frequency hollow cathode. 4,954,751, Cl. 315-111.810.  
 Kaufmann GmbH: See—  
 Kaufmann, Hans, 4,953,709, Cl. 209-44.000.  
 Kaufmann, Hans, to Kaufmann GmbH. Multi-stage means for sorting mixtures of solid materials. 4,953,709, Cl. 209-44.000.  
 Kausch, Marvin L.: See—  
 Walker, James T.; and Kausch, Marvin L., 4,954,970, Cl. 364-521.000.  
 Kautz, Thomas O., to Johnson Service Company. Dual mode pneumatic control system. 4,953,578, Cl. 137-14.000.  
 Kawabata, Masaaki; and Kawashima, Tokio, to Sasaki Electric Corporation. Aseismic structure of an indicating lamp. 4,954,936, Cl. 362-249.000.  
 Kawabata, Shoichi; Tsuge, Hisanao; and Wakatsuki, Hiromichi, to Murata Manufacturing Co., Ltd. Method of handling electronic component chips. 4,953,283, Cl. 29-593.000.  
 Kawada, Yukihiro: See—  
 Nakayama, Yoshiaki; Saito, Kenji; and Kawada, Yukihiro, 4,954,884, Cl. 358-29.000.  
 Kawagoe, Kenji; Ito, Hideo; and Yokote, Masatsugu, to Nissan Motor Company, Limited. Control system for adapting suspension characteristics and steering characteristics to vehicle driving condition. 4,954,957, Cl. 364-424.050.  
 Kawaguchi, Shiro; and Kai, Katsunori, to Eidai Industry Co., Ltd. Decorative board having hot-melt resin joints. 4,953,335, Cl. 52-384.000.  
 Kawai, Kiyoyuki: See—  
 Yamada, Masahiro; and Kawai, Kiyoyuki, 4,954,824, Cl. 341-61.000.  
 Kawai, Masanori: See—  
 Kurogama, Tatsuji; Kawai, Masanori; Matsushima, Koji; and Watanabe, Mitsuru, 4,954,702, Cl. 250-201.200.  
 Kawai, Masao: See—  
 Moroto, Shuzo; Kawai, Masao; Yokoyama, Shoji; Kobayashi, Koji; and Sumiya, Koji, 4,954,959, Cl. 364-449.000.

Kawai, Michio: See—  
 Nagaoka, Shinji; Kawai, Michio; and Sato, Koji, 4,954,861, Cl. 354-403.000.  
 Kawai, Yoshikazu; Sato, Chosuke; and Kato, Masaru, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Four-wheel steering device for an automobile. 4,953,649, Cl. 180-79.100.  
 Kawakami, Osamu: See—  
 Kawasaki, Takuya; and Kawakami, Osamu, 4,953,368, Cl. 18-5.00C.  
 Kawamoto, Tetsuo; Motohashi, Ryo; Sakamoto, Toshihiro; Suzuki, Yasuo; and Abe, Hideaki, to Matsushita Electric Works, Ltd. Permanent magnet rotor with magnets secured by synthetic resin. 4,954,736, Cl. 316-156.000.  
 Kawamura, Fumio: See—  
 Kobayashi, Yasuo; Hagiwara, Naoki; Hirota, Taisuke; Kodama, Churyo; Hirasawa, Yasuo; Miyazaki, Katsumi; Kawamura, Fumio; Higashi, Takao; Yanagisawa, Masami; and Sei, Akinori, 4,954,937, Cl. 362-255.000.  
 Kawamura, Kazuhiko; and Sato, Kazuo, to Sumitomo Rubber Industries, Ltd. Reinforcing structure for bead portion of radial tire for heavy load. 4,953,605, Cl. 152-541.000.  
 Kawanishi, Shunichi: See—  
 Okamura, Kiyohito; Sato, Mitsuhiro; Hasegawa, Yoshio; Seguchi, Tadao; and Kawanishi, Shunichi, 4,954,461, Cl. 501-95.000.  
 Kawano, Kazuhiko: See—  
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 Kawasaka, Ikuya; Kurakazu, Keiichi; and Maejima, Hideo, to Hitachi, Ltd. Data processing system. 4,954,943, Cl. 364-200.000.  
 Kawasaka, Ikuya: See—  
 Masuda, Satoshi; Kawasaki, Ikuya; and Matsui, Shigezumi, 4,954,942, Cl. 364-200.000.  
 Kawasaki Jukogyo Kabushiki Kaisha: See—  
 Nishiyama, Yukio; Fujioka, Junzo; Hino, Haruki; Matsuzaki, Yuji; Sakiyama, Masayuki; and Yokoyama, Minoru, 4,954,314, Cl. 419-45.000.  
 Kawasaki Steel Corp.: See—  
 Takajo, Shigeaki; Furukimi, Osamu; Ogura, Kuniaki; Maruta, Keiichi; Abe, Teruyoshi; and Sakurada, Ichio, 4,954,171, Cl. 75-246.000.  
 Kawasaki, Takuya; and Kawakami, Osamu, to Nikko Industry Co., Ltd. Method of and apparatus for heat-treating bobbins of yarn. 4,953,368, Cl. 18-5.00C.  
 Kawase, Masaki: See—  
 Nakane, Keiichi; Kuwabara, Tadashi; Ikeda, Naoya; Koreeda, Hiroyuki; Aotsu, Hiroaki; Kawase, Masaki; Tatsuno, Yujiro; Nonaka, Naomichi; and Suzuki, Kazunari, 4,954,818, Cl. 340-721.000.  
 Kawashima, Atuko. Combination toy with a cover and inner members. 4,954,114, Cl. 446-75.000.  
 Kawashima, Masae; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, to Hitachi, Ltd. Apparatus for removing stink. 4,954,465, Cl. 502-5.000.  
 Kawashima, Norimichi; and Orii, Kazuya, to Tokyo Magnetic Printing Co., Ltd. Abrasives, abrasive tools, and grinding method. 4,954,140, Cl. 51-295.000.  
 Kawashima, Tokio: See—  
 Kawabata, Masaaki; and Kawashima, Tokio, 4,954,936, Cl. 362-249.000.  
 Kawata Co., Ltd.: See—  
 Ishikawa, Kanzo; Hayashi, Ryutaru; and Yoshimoto, Akira, 4,954,681, Cl. 219-10.55A.  
 Kaye, Michael C., to Encore Video, Inc. Method and apparatus for correcting video color signals. 4,954,881, Cl. 358-22.000.  
 Kcefer, Larry K., to United States of America, Health and Human Services. Stabilized nitric oxide - primary amine complexes useful as cardiovascular agents. 4,954,526, Cl. 514-611.000.  
 Keith, Harold D.: See—  
 Davis, Robert L.; and Keith, Harold D., 4,954,017, Cl. 405-259.000.  
 Keller, Leonard J.; and Stanton, Austin N. Methacetal integrated combined cycle power plants. 4,953,479, Cl. 110-233.000.  
 Kelley, Charles D.: See—  
 Sarrine, Robert J.; Garsee, Henry A.; Kelley, Charles D.; and Guadagno, Philip A., 4,954,237, Cl. 204-299.00R.  
 Kelley, Rusty L.: See—  
 Annin, David R.; and Kelley, Rusty L., 4,953,609, Cl. 160-24.000.  
 Kellison, Roger C. Road barrier systems and methods. 4,954,009, Cl. 404-6.000.  
 Kelly, John S.; and Gille, Henrick K., to Unitek Corporation; and Ceradync, Inc. Ceramic orthodontic appliance. 4,954,080, Cl. 433-8.000.  
 Kelly, Martha J., to Rohm and Haas Company. Preparation of alkylhydrazines. 4,954,655, Cl. 564-464.000.  
 Kelm, James S.: See—  
 Corsmeier, Robert J.; and Kelm, James S., 4,953,282, Cl. 29-451.000.  
 Kelterborn, Jeffrey C.: See—  
 Kukes, Simon G.; Hensley, Albert L., Jr.; Kelterborn, Jeffrey C.; and Aderhold, James L., Jr., 4,954,241, Cl. 208-59.000.  
 Kennedy, Lawrence C., to Detroit Diesel Corporation. Combined pressure regulator and relief valve having a single biasing means. 4,953,582, Cl. 137-115.000.  
 Kensrue, Milo M. Modular welding gun. 4,954,690, Cl. 219-137.310.



Kern, Manfred: See—  
Koch, Volker; Schnatterer, Stefan; Bonin, Werner; Kern, Manfred; Knauf, Werner; and Waltersdorfer, Anna, 4,954,529, Cl. 514-594.000.

Kervagoret, Gilbert; and Tanguy, Christian, to Bendix France. Control device with failure detection centering for a double-acting hydraulic jack. 4,953,445, Cl. 91-358.00A.

Keska, Tadeusz, to Hasbro, Inc. Track assembly for toy vehicle. 4,953,785, Cl. 238-10.60A.

Kessler, Hans, to Leybold Aktiengesellschaft. Apparatus for coating continuous webs. 4,953,497, Cl. 118-718.000.

Keystone International Holdings Corp.: See—  
Kusmer, Daniel P.; and Yohner, Paul A., 4,953,276, Cl. 29-235.000.

Khuddus, Mohammed A.: See—  
Schleifstein, Robert A.; and Khuddus, Mohammed A., 4,954,551, Cl. 524-327.000.

Kidder, Stephen E.; and Spector, George. Purse light. 4,954,934, Cl. 362-156.000.

Kiefer, Dieter; and Grommes, Helmut, to Deutsche Babcock Werke Aktiengesellschaft. Bowl-and-roller mill. 4,953,793, Cl. 241-119.000.

Kieli, Michael: See—  
Lanzetta, Carmen, Jr.; Kieli, Michael; Schindler, Guenter; and Williams, Russell H., 4,953,940, Cl. 350-96.200.

Kiene, Wilfried: See—  
Appel, Eggert; Kiene, Wilfried; Kuchemann, Rudi; Meier, Dieter; and Nissen, Peter, 4,953,408, Cl. 73-861.160.

Kierum, Chandler T.; and Dupree, Leonard J. Animal scent dispensing apparatus. 4,953,763, Cl. 222-644.000.

Kihm, Theodore E.: See—  
Dehner, Charles V., Jr.; and Kihm, Theodore E., 4,954,981, Cl. 364-900.000.

Kikuchi, Akira; and Ono, Katsuya, to Olympus Optical Co., Ltd. Illumination optical system. 4,953,937, Cl. 350-96.180.

Kikuchi, Kimihiko: See—  
Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; Shimada, Hiroyuki; Kikuchi, Kimihiko; and Nakayama, Hiroshi, 4,953,677, Cl. 192-3.300.

Kikuchi, Sei: See—  
Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 4,954,050, Cl. 417-269.000.

Kikui, Hitoshi: See—  
Okumura, Takuzo; Okada, Toyokazu; Kikui, Hitoshi; and Nakata, Kazuo, 4,953,952, Cl. 350-337.000.

Kilby, Frank: See—  
Sharber, Jerry; and Kilby, Frank, 4,953,822, Cl. 248-281.100.

Killion, Robert F.; and Wolfe, Michael J., to Tomco Incorporated. Exhaust gas recirculation valve. 4,953,518, Cl. 123-568.000.

Kim, Byung-Hong; Kim, Tae-Sung; and Kim, Hae-Young, to Korea Advanced Institute of Science and Technology. Bioelectrochemical desulfurization of petroleum. 4,954,229, Cl. 204-130.000.

Kim, Chang H. Electronic drive propulsion device for motor vehicles. 4,953,646, Cl. 180-65.400.

Kim, Hae-Young: See—  
Kim, Byung-Hong; Kim, Tae-Sung; and Kim, Hae-Young, 4,954,229, Cl. 204-130.000.

Kim, Hongkyu: See—  
Collins, George L.; Kim, Hongkyu; and Pleban, William M., 4,954,400, Cl. 428-414.000.

Kim, Jong S.; Lee, Ki T.; and Shu, Dong B., to Korea Steel Chemical Co., Ltd. Process for drying carboxyl containing polymers of vinylidene monomers. 4,954,615, Cl. 528-501.000.

Kim, Jung-Soo, to Samsung Electronic Co., Ltd. Circuit and method for power efficiency improvement of induction motors. 4,954,764, Cl. 318-798.000.

Kim, Kwang S.; Chai, Sang Hun; Koo, Young S.; Kim, Yeo H.; and Lee, Jin H., to Electronics and Telecommunications Research Institute. Fabrication method for high speed and high packing density semiconductor device (BiCMOS). 4,954,456, Cl. 437-31.000.

Kim, Tae-Sung: See—  
Kim, Byung-Hong; Kim, Tae-Sung; and Kim, Hae-Young, 4,954,229, Cl. 204-130.000.

Kim, Yeo H.: See—  
Kim, Kwang S.; Chai, Sang Hun; Koo, Young S.; Kim, Yeo H.; and Lee, Jin H., 4,954,456, Cl. 437-31.000.

Kim, Young G. Light bulb having a multicolored design and method of manufacturing thereof. 4,954,113, Cl. 445-58.000.

Kim, Young J.: See—  
Lee, Chang H.; and Kim, Young J., 4,953,236, Cl. 4-194.000.

Kimura, Fumikazu, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Radiator device of motorcycle. 4,953,631, Cl. 165-41.000.

Kimura, Michio: See—  
Maeda, Shuichi; Kaneko, Toshio; Kurose, Yutaka; Kimura, Michio; Yoshida, Hidemi; Uchino, Kenichi; and Inaba, Shizue, 4,954,420, Cl. 430-270.000.

Kimura, Minoru: See—  
Mizutani, Yoshihisa; and Kimura, Minoru, 4,954,871, Cl. 357-67.000.

Kimura, Takeshi: See—  
Mochiji, Kozo; Oizumi, Hiroaki; Soda, Yasunari; Ogawa, Taro; and Kimura, Takeshi, 4,954,424, Cl. 430-323.000.

Kimura, Yoshimasa: See—  
Iwata, Koji; Okuma, Shigeru; Kimura, Yoshimasa; Konata, Yoshihiro; and Kaneko, Kiyoshi, 4,953,413, Cl. 74-1.05S.

Kimura, Yutaka; Okumura, Hiroshi; Mihara, Hirokazu; and Yoshida, Mitsutoshi, to Mitsubishi Jukogyo K. K. Control system of an industrial robot. 4,954,761, Cl. 318-568.100.

Kindig, Alan L.: See—  
Frye, Dale J.; Lindberg, Kenneth M.; Kindig, Alan L.; Stander, Robert J.; Buonodono, Joseph B.; Gras, Jeffrey D.; and Ozio, David A., 4,953,259, Cl. 16-225.000.

Kindt, Stefan, to Siemens Aktiengesellschaft. Reflection transmitter and receiver means for a bidirectional light waveguide communications system. 4,955,086, Cl. 455-605.000.

King, Bruce A.: See—  
Thill, Bruce P.; and King, Bruce A., 4,954,579, Cl. 525-467.000.

King, Robert N.; and Behling, Gerald R., to Southwall Technologies, Inc. Perforated glue through films. 4,954,383, Cl. 428-131.000.

King, Russell K., to Dow Corning Corporation. Polyimide precursors and method for preparing crosslinked polyimides using said precursors. 4,954,601, Cl. 528-45.000.

King, Steven J.: See—  
Evans, John M., Jr.; Weiman, Carl F. R.; and King, Steven J., 4,954,962, Cl. 364-513.000.

Kingston Technologies: See—  
Thakore, Yatin B.; and Stoy, Vladimir, 4,954,145, Cl. 55-16.000.

Kinoshita, Takashi: See—  
Hosaka, Yoshifumi; Otsuka, Saburo; Kinoshita, Takashi; and Ito, Yusuke, 4,954,343, Cl. 424-448.000.

Kioritz Corporation: See—  
Hironaka, Yoshiaki; Matsubayashi, Tatsuhiko; Kamata, Yoshiaki; and Tasaki, Takanobu, 4,953,526, Cl. 123-182.000.

Kira, Kazuaki, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Process for preparing an artificial vessel. 4,954,127, Cl. 600-36.000.

Kirby, Alan J.: See—  
Arsenault, Duane R., 4,953,786, Cl. 238-10.00B.

Kirch, Rudolf, to Dornier System GmbH. Decontamination of waste water. 4,954,230, Cl. 204-149.000.

Kiriake, Masaharu: See—  
Tone, Shoichi; and Kiriake, Masaharu, 4,953,798, Cl. 242-35.50R.

Kita, Toru; Narumiya, Shuh; Narisada, Masayuki; Watanabe, Fumihiko; Doteuchi, Masami; and Mizui, Takuji, to Shionogi & Co., Ltd. (Di-tert-butylhydroxyphenyl)thio derivatives and antiarteriosclerosis compositions thereof. 4,954,514, Cl. 514-381.000.

Kitahara, Satoshi: See—  
Shiozaki, Tsugio; Kitahara, Satoshi; Koizumi, Osamu; and Sugiura, Ikuzo, 4,953,994, Cl. 400-120.000.

Kitamura, Takashi: See—  
Imuro, Shigeru; Morimoto, Yoshio; and Kitamura, Takashi, 4,954,661, Cl. 568-727.000.

Kitamura, Tsutomu, to Matsushita Electric Industrial Co., Ltd. Phase adjustment circuit. 4,954,784, Cl. 328-155.000.

Kitaura, Masahiro, to Victor Company of Japan, Ltd. Recursive noise-reducer. 4,954,894, Cl. 358-167.000.

Kitazawa, Toshiyuki, to Asahi Kogaku Kogyo K.K. Motor driven camera. 4,954,859, Cl. 354-173.110.

Kite, Gary W.: See—  
Beymer, Norman; and Kite, Gary W., 4,953,815, Cl. 248-97.000.

Kitzmiller, James K., to Gifford-Hill & Company, Inc. Method of manufacturing prestressed concrete culverts. 4,953,280, Cl. 29-412.000.

Klecka, Mark D.: See—  
Morganstein, Sanford J.; Bindl, Ron H.; Klecka, Mark D.; Krakau, Herbert B.; and Dawson, Thomas M., 4,955,047, Cl. 379-112.000.

Klein, Christian; Batz, Hans-Georg; and Herrmann, Rupert, to Boehringer Mannheim GmbH. Resorufin derivatives. 4,954,630, Cl. 544-102.000.

Klein, Manfred, to Deutsche Babcock Werke Aktiengesellschaft. Forced-circulation steam generator. 4,953,509, Cl. 122-6.00A.

Kleiner, Frank: See—  
Genz, Joachim; Dicke, Hans-Rudolf; Eckhardt, Volker; and Kleiner, Frank, 4,954,604, Cl. 528-125.000.

Kleinschmit, Peter: See—  
Panster, Peter; and Kleinschmit, Peter, 4,954,599, Cl. 528-38.000.

Kleschik, William A.; Ehr, Robert J.; Costales, Mark J.; Gerwick, Ben C., III; Meikle, Richard W., deceased (by Meikle, Diane); Monte, William T.; and Pearson, Norman R., to Dow Chemical Company. The substituted 1,2,4-triazolo[1,5-a]pyrimidine-2-sulfonamides, compositions containing them, and their utility as herbicides. 4,954,163, Cl. 71-92.000.

Klingensmith, George B., to Shell Oil Company. Ethylene-carbon monoxide copolymer stabilization. 4,954,548, Cl. 524-258.000.

Klingman, Kayla R., to Tektronix, Inc. Data driver for multiple mode buffered processor-peripheral data transfer with selective return of data to processor. 4,954,983, Cl. 364-900.000.

Klober, Johannes. Vent pipe coupling. 4,953,897, Cl. 285-226.000.

Kloosterhouse, George. Sanitation shield for water cooler bottle. 4,953,729, Cl. 215-255.000.

Klopfer, Walter; Haug, Fritz; Gabauer, Dale; and Workley, James, to Institut Dr. Friedrich Forster Prüfgeratebau GmbH & Co. K.G. Device for defect testing of non-ferromagnetic test samples and for ferromagnetic inclusions. 4,954,777, Cl. 324-232.000.

Klossner, Botho; and Lortscher, Paul, to Schweizerische Eidgenossenschaft. Process and apparatus for preparation of finely grained lead azide. 4,954,329, Cl. 423-410.000.

Klosterhaus, Edwin G., to TRW Inc. Fluid power assist rack and pinion steering gear with end-take-off. 4,953,653, Cl. 180-148.000.

Knaack, Karl; and Horbach, Rainier, to Mannesmann AG. Fastening a cable or a drum. 4,953,829, Cl. 254-333.000.

Knsel, Harold E.; and Grigsby, David A., to Process Equipment Company. Safety coupling device for robotic tooling. 4,954,005, Cl. 403-57.000.

Knauf, Werner: See—  
Koch, Volker; Schnatterer, Stefan; Bonin, Werner; Kern, Manfred; Knauf, Werner; and Waltersdorfer, Anna, 4,954,529, Cl. 514-594.000.

Knauss, Richard J., to Dresser Industries, Inc. Magnesium aluminate spinel refractory. 4,954,463, Cl. 501-120.000.

Knauth, Jeffrey G.: See—  
Gray, James P.; Knauth, Jeffrey G.; Pozefsky, Diane P.; and Rafalow, Lee M., 4,954,821, Cl. 340-825.520.

Kneeshaw, Paul G.: See—  
Pidksalny, Ronald S.; and Kneeshaw, Paul G., 4,954,161, Cl. 71-88.000.

Knoche, Karl F.; Stehmeier, Dieter; and Grabenhenrich, Heinz-Bernd. Process for the operation of a generator absorption heat pump heating installation for space heating, water heating, etc. and generator absorption heat pump heating installation. 4,953,361, Cl. 62-79.000.

Knoespel, Willard R. W.: See—  
Brothersen, Carl F.; and Knoespel, Willard R. W., 4,954,450, Cl. 435-252.400.

Kobari, Yuji: See—  
Imaseki, Takashi; and Kobari, Yuji, 4,953,654, Cl. 180-197.000.

Kobayashi, Hideto: See—  
Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 4,954,050, Cl. 417-269.000.

Kobayashi, Kazuyuki, to Toyota Jidosha Kabushiki Kaisha. Slidable constant velocity joint. 4,954,120, Cl. 464-141.000.

Kobayashi, Koji: See—  
Moroto, Shuzo; Kawai, Masao; Yokoyama, Shoji; Kobayashi, Koji; and Sumiya, Koji, 4,954,959, Cl. 364-449.000.

Kobayashi, Mitsuo: See—  
Takemura, Momoko; Inaba, Michihiko; Tetsuya, Toshio; and Kobayashi, Mitsuo, 4,954,870, Cl. 357-67.000.

Kobayashi, Toshiaki; and Motomatsu, Keiko, to New Japan Chemical Co., Ltd. Crystalline resin compositions. 4,954,291, Cl. 252-315.100.

Kobayashi, Yasuo; Hagiwara, Naoki; Hirota, Taisuke; Kodama, Churyo; Hirasawa, Yasuo; Miyazaki, Katsumi; Kawamura, Fumio; Higashi, Takao; Yanagisawa, Masami; and Sei, Akinori, to Tomoe-gawa Paper Co., Ltd.; and Hitachi Ltd. Lighting lamp. 4,954,937, Cl. 362-255.000.

Kobayashi, Yoshinobu: See—  
Hattori, Seiji; Kasukawa, Akihito; Shibano, Yoshizo; Kobayashi, Yoshinobu; and Suzuki, Shinji, 4,955,082, Cl. 455-33.000.

Kobayashi, Yuko, to Olympus Optical Co., Ltd. Zoom lens system. 4,953,957, Cl. 350-423.000.

Kobos, Robert K.: See—  
Eveleigh, John William d.; and Kobos, Robert K., 4,954,444, Cl. 435-181.000.

Kobushi, Kazuhiro; Kameyama, Shuichi; and Komeda, Tadao, to Matsushita Electric Industrial Co., Ltd. Method for fabricating a polycrystalline silicon resistor. 4,954,454, Cl. 437-21.000.

Koch, Frederick W.: See—  
Denis, Richard A.; and Koch, Frederick W., 4,954,273, Cl. 252-39.000.

Koch, Volker; Schnatterer, Stefan; Bonin, Werner; Kern, Manfred; Knauf, Werner; and Waltersdorfer, Anna, to Hoechst Aktiengesellschaft. (Thio)benzoylureas and functional derivatives thereof, processes for their preparation, agents containing them and their use as agents for combating pests. 4,954,529, Cl. 514-594.000.

Koda, Atsushi; Okuda, Shinji; and Nonaka, Wataru, to Sony Corporation. Automatic cassette changer. 4,954,915, Cl. 360-92.000.

Koda, Hideo H.; and Yoshida, Bill. Optical fuel gauge for vehicles. 4,954,724, Cl. 250-577.000.

Koda, Walter, to Mobil Oil Corporation. Wastebasket having lid hinge and actuating mechanism protector. 4,953,740, Cl. 220-263.000.

Kodama, Churyo: See—  
Kobayashi, Yasuo; Hagiwara, Naoki; Hirota, Taisuke; Kodama, Churyo; Hirasawa, Yasuo; Miyazaki, Katsumi; Kawamura, Fumio; Higashi, Takao; Yanagisawa, Masami; and Sei, Akinori, 4,954,937, Cl. 362-255.000.

Koenig, Mary K., to Hewlett-Packard Company. Non-commensurate line length rf modulator. 4,954,791, Cl. 332-164.000.

Koerber, Clement J., Sr.; and Boyd, Howard J., to Hill-Rom Company, Inc. Hospital bed for weighing patients. 4,953,244, Cl. 5-60.000.

Koerner, James E.: See—  
Shepler, Peter R.; Gammon, Nathan A.; Hopkins, William M.; Koerner, James E.; and Schmalix, Charles K., 4,953,604, Cl. 152-209.00A.

Kogawa, Kuniyuki: See—  
Kasahara, Mitsuharu; Kogawa, Kuniyuki; and Hirota, Takato, 4,954,798, Cl. 335-161.000.

Kogoh, Kazuhiko: See—  
Tani, Sumio; Kogoh, Kazuhiko; Nozaki, Yuri; and Oshima, Kunihiro, 4,954,399, Cl. 428-402.000.

Koguchi, Minoru: See—  
Obitsu, Takeo; Ohnishi, Yutaka; Yoshinaka, Shinji; Koguchi, Minoru; Yanagita, Mitsuhiro; and Hirai, Nobuyuki, 4,954,631, Cl. 546-15.000.

Kohara, Tadashi: See—  
Okubo, Tadashiko; Takagi, Jun; and Kohara, Tadashi, 4,953,800, Cl. 242-45.000.

Kohl, Albert; and Schunter, Roland, to Henkel Kommanditgesellschaft auf Aktien. Spray extractor. 4,953,254, Cl. 15-320.000.

Kohm, Thomas S., to Kollmorgen Corporation. Method of applying adherent coating on copper. 4,954,185, Cl. 148-282.000.

Kohno, Naohichi; Arai, Masahiro; Aneha, Akira; and Fujisaki, Michio, to Futaba Denshi Kogyo Kabushiki Kaisha. Transmitter for radio control system. 4,954,820, Cl. 340-825.690.

Kohno, Teruhisa: See—  
Hashida, Koichi; and Kohno, Teruhisa, 4,953,918, Cl. 303-115.000.

Koike, Kazuyuki: See—  
Matsuyama, Hideo; Koike, Kazuyuki; and Hayakawa, Kazunobu, 4,954,770, Cl. 324-71.300.

Koike, Norio, to Kabushiki Kaisha Toshiba. Formation method and photoresist composition for phosphor screens of color picture tubes. 4,954,418, Cl. 430-175.000.

Koike, Tadao; Noguchi, Koichi; Takahashi, Hiroshi; and Tsunoda, Koichi, to Ricoh Company, Ltd. Copying apparatus operable in a two-side copy mode. 4,954,849, Cl. 355-319.000.

Koizumi, Osamu: See—  
Shiozaki, Tsugio; Kitahara, Satoshi; Koizumi, Osamu; and Sugiura, Ikuzo, 4,953,994, Cl. 400-120.000.

Koizumi, Takashi; and Ishizaka, Hideo, to Fuji Photo Film Co., Ltd. Mechanism for supplying analytical tape for biochemical analysis by predetermined length. 4,954,319, Cl. 422-67.000.

Koizumi, Yukio, to Kabushiki Kaisha Kobe Seiko Sho. Jib stretching and folding device. 4,953,724, Cl. 212-188.000.

Kojima, Akira: See—  
Otani, Sugio; Kojima, Akira; and Ota, Michiya, 4,954,607, Cl. 528-230.000.

Kojima, Eiji: See—  
Yoshioka, Hidetoshi; Kojima, Eiji; Ishida, Shuji; Yoshioka, Hiroyuki; and Murakami, Kunichika, 4,954,485, Cl. 514-49.000.

Kojima, Kunio: See—  
Fuji, Hiroshi; Yamaguchi, Takeshi; Kojima, Kunio; Deguchi, Toshihisa; Terashima, Shigeo; and Fujiwara, Tsuneo, 4,954,903, Cl. 360-46.000.

Kojima, Tetsuro: See—  
Inoue, Noriyuki; Kojima, Tetsuro; Heki, Tatsuo; and Hirano, Shigeo, 4,954,427, Cl. 430-409.000.

Kojima, Youichi: See—  
Takeshima, Eiki; Takatsu, Kiyoshi; Kojima, Youichi; and Fujii, Takahiro, 4,954,235, Cl. 204-273.000.

Kokubun, Yoshikazu; Kurosawa, Akihito; Ushikubo, Kohei; and Todokoro, Shinji, to Sanden Corporation. Vending apparatus for self-service store. 4,954,697, Cl. 235-381.000.

Kollmorgen Corporation: See—  
Kohm, Thomas S., 4,954,185, Cl. 148-282.000.

Schultz, Roy D.; England, Thomas R.; and Altizer, A. Clark, 4,954,739, Cl. 310-156.000.

Komatsu, Katsuji: See—  
Yabe, Isao; Komatsu, Katsuji; and Kaneko, Hiroyuki, 4,954,308, Cl. 264-272.170.

Komatsu, Koichi, to Atsugi Motor Parts Company Limited. Power steering valve with two spools of different size to compensate unbalanced cylinder. 4,953,416, Cl. 74-388.0PS.

Komatsu, Takahiro: See—  
Kumanoya, Masaki; Shinohara, Hirofumi; Dosaka, Katsumi; Konishi, Yasuhiro; Komatsu, Takahiro; and Yamasaki, Hiroyuki, 4,954,992, Cl. 365-207.000.

Komeda, Tadao: See—  
Kobushi, Kazuhiro; Kameyama, Shuichi; and Komeda, Tadao, 4,954,454, Cl. 437-21.000.

Komlev, Alexei M.: See—  
Urvantsev, Anatoly I.; Elantsev, Jury S.; Komlev, Alexei M.; Kusembaev, Saliman K.; Stepanov, Jury I.; and Vasiliev, Viktor P., 4,954,248, Cl. 209-127.100.

Komori, Teruyuki; Miyake, Shingo; and Senoo, Yoshio, to Tokico Ltd. Brake-friction material. 4,954,536, Cl. 523-149.000.

Komorita, Hiroshi: See—  
Mizunoya, Nobuyuki; Komorita, Hiroshi; Tanaka, Tadashi; and Matsumura, Kazuo, 4,954,386, Cl. 428-137.000.

Konata, Yoshihiro: See—  
Iwata, Koji; Okuma, Shigeru; Kimura, Yoshimasa; Konata, Yoshihiro; and Kaneko, Kiyoshi, 4,953,413, Cl. 74-1.05S.

Kondo, Hiroshi; and Okada, Tadao, to Yamaha Hatsudoki Kabushiki Kaisha. Offset drive for balloon tired motorcycle. 4,953,656, Cl. 180-226.000.

Kondo, Shinichi: See—  
Sato, Yoshikazu; Watabe, Hiroom; Ishii, Shigetaka; Nakazawa, Tadashi; Shomura, Takashi; Sezaki, Masaji; and Kondo, Shinichi, 4,954,641, Cl. 549-384.000.

Tsuroka, Haruo; Inouye, Shigeharu; and Kondo, Shinichi, 4,954,510, Cl. 514-315.000.

Konica Corporation: See—  
Koshizuka, Kunihiro; and Abe, Takao, 4,954,390, Cl. 428-212.000.

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Morita, Shizuo; Matsumoto, Toru; Kamegamori, Masayuki; Hayakawa, Kazushi; Hatakeyama, Noboru; Matsuo, Shunji; and Fukuchi, Masakazu, 4,954,844, Cl. 355-260.000.

Murata, Kazushige; and Nagoshi, Mitsuru, 4,954,847, Cl. 355-318.000.

Nishijima, Toyoki; and Tanji, Masaki, 4,954,431, Cl. 430-546.000.

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- Konishi, Yasuhiro: See—  
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- Konsza, Eileen E.: See—  
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- Konuma, Hiroaki: See—  
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- Koo, Young S.: See—  
Kim, Kwang S.; Chai, Sang Hun; Koo, Young S.; Kim, Yeo H.; and Lee, Jin H., 4,954,456, Cl. 437-31.000.
- Korbashov, Jury M.: See—  
Spirin, Jury L.; Korbashov, Jury M.; Semin, Konstantin V.; and Sigov, Alexandr S., 4,954,771, Cl. 324-158.00R.
- Korber, Hans W.; Koster, Reinhard; Linse, Ewald; and Simmat, Dieter, to Ortopedia GmbH. Electric wheel-chair, 4,953,645, Cl. 180-6.500.
- Korea Steel Chemical Co., Ltd.: See—  
Kim, Jong S.; Lee, Ki T.; and Shu, Dong B., 4,954,615, Cl. 528-501.000.
- Koreeda, Hiroyuki: See—  
Nakane, Keichi; Kuwabara, Tadashi; Ikeda, Naoya; Koreeda, Hiroyuki; Aotsu, Hiroaki; Kawase, Masaki; Tatsuno, Yujiro; Nonaka, Naomichi; and Suzuki, Kazunari, 4,954,818, Cl. 340-721.000.
- Koren, Uziel: See—  
Allerness, Rodney C.; Eisenstein, Gadi; Koren, Uziel; Tien, Ping K.; Tucker, Rodney S.; and Whalen, Matthew S., 4,955,028, Cl. 372-20.000.
- Korea Advanced Institute of Science and Technology: See—  
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- Kosaka, Hideyuki: See—  
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- Koseki, Yasuo: See—  
Hayashi, Nobuatsu; Takahashi, Sankichi; Ebara, Katsuya; Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; and Yoda, Hiroaki, 4,953,694, Cl. 202-180.000.
- Koshida, Hitoshi: See—  
Takuma, Keisuke; Ohya, Tsukasa; Ghoda, Isamu; Mikoda, Tamio; Koshida, Hitoshi; and Igata, Akitoshi, 4,954,410, Cl. 430-109.000.
- Koshino, Minoru: See—  
Tateishi, Terutaka; Koshino, Minoru; and Shimizu, Kazuyuki, 4,954,982, Cl. 364-900.000.
- Koshizuka, Kunihiko; and Abe, Takao, to Konica Corporation. Thermal transfer recording medium, 4,954,390, Cl. 428-212.000.
- Koster, Reinhard: See—  
Korber, Hans W.; Koster, Reinhard; Linse, Ewald; and Simmat, Dieter, 4,953,645, Cl. 180-6.500.
- Kotani, Terumitsu; Taka, Toshio; and Saito, Yoshimasa, to Showa Denko Kabushiki Kaisha. High density polyethylene type transparent film and process for production thereof, 4,954,391, Cl. 428-220.000.
- Kotlyar, Oleg, to Eastman Christensen Company. Mud pulse valve and method of valving in a mud flow for sharper rise and fall times, faster data pulse rates, and longer lifetime of the mud pulse valve, 4,953,595, Cl. 137-624.130.
- Kotsch, Gary D.; Giles, Philip M., Jr.; and Biemiller, Raymond H., to Bethlehem Steel Corporation. Apparatus for the controlled cooling of hot rolled steel samples, 4,953,832, Cl. 266-82.000.
- Kovacs, Mark S. Container system for managing nails, screws and the like, 4,953,764, Cl. 224-151.000.
- Koven, Herbert: See—  
Griffith, Glenn E.; Bustamante, Joaquin; Scheel, Michael D.; and Koven, Herbert, 4,953,777, Cl. 228-119.000.
- Koyama, Kunio. Mobile refuse container, 4,953,744, Cl. 220-404.000.
- Kozai, Katsuya: See—  
Ohmura, Hiroshi; Arai, Takuya; Haishi, Akira; Kozai, Katsuya; Hara, Hiroshi; Tobioke, Takashi; Asano, Seiji; and Takagi, Junichi, 4,954,858, Cl. 354-145.100.
- Kozakai, Hiroshi: See—  
Ueno, Ryuzo; Fujita, Yatsuka; Yamamoto, Munemitsu; and Kozakai, Hiroshi, 4,954,358, Cl. 426-331.000.
- Kozakiewicz, Joseph J.: See—  
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- Kozawa, Satoshi: See—  
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- Krakau, Herbert B.: See—  
Morganstein, Sanford J.; Bindl, Ron H.; Klecka, Mark D.; Krakau, Herbert B.; and Dawson, Thomas M., 4,955,047, Cl. 379-112.000.
- Kraus, Willibald, to TRW United Carr GmbH & Co. KG. Plastic sealing cover, 4,953,742, Cl. 220-367.000.
- Krause, Walter O.: See—  
Griffin, Gary E.; and Krause, Walter O., 4,954,252, Cl. 210-136.000.
- Krauth, Gary H., to Becton, Dickinson and Company. Indirect colorimetric detection of an analyte in a sample using ratio of light signals, 4,954,435, Cl. 435-7.000.
- Krempl, Peter W.; Schindler, Wolfgang; and Schiefer, Erich J., to AVL Gesellschaft fur Verbrennungskraftmaschinen und Messtechnik M.B.H. Prof.Dr.h.c Hans List. Method and a device for measuring the air/fuel ratio of an internal combustion engine, 4,953,390, Cl. 73-116.000.
- Kress, Dieter; and Haberle, Friedrich, to Mapal Fabrik fur Praezisionsswerkzeuge Dr. Kress K.G. Precision boring tool, 4,954,024, Cl. 408-153.000.
- Krikorian, Kapriel V.; Rosen, Robert A.; and Li, Frank K., to Hughes Aircraft Company. Range resolving method, 4,954,830, Cl. 342-137.000.
- Krishnakumar, Suppayan M.; Nahill, Thomas E.; Schmidt, Steven L.; and Collette, Wayne N., to Continental Pet Technologies, Inc. Two material three/five layer preform, 4,954,376, Cl. 428-35.700.
- Kristen, Edward B.; and Guerrero, Juan R., to BASF K & F Corp. Long lasting composition of propafenone and quinidine for treatment of cardiac conditions, 4,954,347, Cl. 424-456.000.
- Krober, Ulrich, to Man Roland Druckmaschinen AG. Bearing for rotary press cylinders, 4,953,462, Cl. 101-216.000.
- Kross, James R., to Anheuser-Busch Companies, Inc. Conveyor with article alignment, 4,953,688, Cl. 198-434.000.
- Krouse, Charles L.: See—  
Gaffney, John M.; Gelinas, Wilfred R.; Hern, Joel C.; and Krouse, Charles L., 4,953,461, Cl. 101-142.000.
- Krubsack, Larry J.; Lawton, John G.; and Handy, Allen L., to Clum Manufacturing Company, Inc. Key lock apparatus, 4,953,420, Cl. 70-366.000.
- Kruger, Frans J.: See—  
Galasko, Philip E.; and Kruger, Frans J., 4,953,393, Cl. 73-146.500.
- Krupp Koppers GmbH: See—  
Jokisch, Friedrich; Linke, Adolf; and Pohl, Hans-Christoph, 4,954,136, Cl. 48-197.00R.
- Ku, David N.: See—  
Powers, James C.; Kam, Chih-Min; Oweida, Steven W.; and Ku, David N., 4,954,519, Cl. 514-456.000.
- Kubo, Masahiro: See—  
Kubota, Shigeru; Kanou, Shoji; and Kubo, Masahiro, 4,953,749, Cl. 221-168.000.
- Kubo, Yoichiro; and Ohura, Kiyomori, to Nippon Zeon Co., Ltd. Process for hydrogenating conjugated diene polymers, 4,954,576, Cl. 525-339.000.
- Kubota, Kazuyuki: See—  
Azeta, Takahiro; Kameyama, Toru; Sekiya, Harukazu; Moritani, Toshifumi; Higeta, Akira; Baba, Kenji; Matoba, Takeshi; Goto, Shinji; and Kubota, Kazuyuki, 4,953,846, Cl. 271-251.000.
- Kubota Ltd.: See—  
Ushiro, Kenzo, 4,953,427, Cl. 74-872.000.
- Kubota, Shigeru; Kanou, Shoji; and Kubo, Masahiro, to Nitto Kogyo Kabushiki Kaisha. Chip separation and alignment apparatus, 4,953,749, Cl. 221-168.000.
- Kuchemann, Rudi: See—  
Appel, Eggert; Kiene, Wilfried; Kuchemann, Rudi; Meier, Dieter; and Nissen, Peter, 4,953,408, Cl. 73-861.160.
- Kuchiki, Kiyotsuna: See—  
Saotome, Yoshimi; Kuchiki, Kiyotsuna; and Katada, Tsuyoshi, 4,953,723, Cl. 212-159.000.
- Kuchta, Richard; Billings, Larry; Evenson, Vladimir; and Bristow, Donald, to Gerber Garment Technology, Inc. Selectively positionable variable height workstation and method of use, 4,953,469, Cl. 104-127.000.
- Kudou, Jinko: See—  
Sakamoto, Kiichi; Yasuda, Hiroshi; Yamada, Akio; and Kudou, Jinko, 4,954,717, Cl. 250-492.300.
- Kuehl, Guenter H.; and Rosinski, Edward J., to Mobil Oil Corporation. Catalytic cracking with framework aluminum extracted zeolite, 4,954,243, Cl. 208-120.000.
- Kuhla, Donald E.; Campbell, Henry F.; Studt, William L.; and Faith, William C., to Rorer Pharmaceutical Corporation. Pyridyl-pyridazine and pyridyl-pyrazolinone compounds and their use in the treatment of congestive heart failure, 4,954,494, Cl. 514-210.000.
- Kuhn, Falk: See—  
Memminger, Gustav; Fabschitz, Heinz; and Kuhn, Falk, 4,953,367, Cl. 66-132.00R.
- Kuhn S.A.: See—  
Aron, Jerome, 4,953,346, Cl. 56-11.100.
- Kukes, Simon G.; Hensley, Albert L., Jr.; Kelterborn, Jeffrey C.; and Aderhold, James L., Jr., to Amoco Corporation. Two stage hydrocarbon conversion process, 4,954,241, Cl. 208-59.000.
- Kumagai, Hiromi; Sato, Kaoru; and Imai, Yoshio, to Tokyo Electron Limited. Heating furnace for semiconductor wafers, 4,954,685, Cl. 319-390.000.
- Kumanoya, Masaki; Shinohara, Hirofumi; Dosaka, Katsumi; Konishi, Yasuhiro; Komatsu, Takahiro; and Yamasaki, Hiroyuki, to Mitsubishi Denki Kabushiki Kaisha. Random access memory having separate read out and write in bus lines for reduced access time and operating method therefor, 4,954,992, Cl. 365-207.000.
- Kumar, Shalabh; and Edgar, Duane, to Micro Fast Controls, Inc. Resolver analog to digital input module for use in a programmable controller system, 4,954,763, Cl. 318-605.000.
- Kumar, Viraraghavan S., to Puritan-Bennett Corporation. Proportional electropneumatic solenoid-controlled valve, 4,954,799, Cl. 335-236.000.
- Kumiai Chemical Industry Co., Ltd.: See—  
Miyazawa, Takeshige; and Kawano, Kazuhiko, 4,954,157, Cl. 71-86.000.
- Kummer, Ludwig: See—  
Esswein, Karlheinz; and Kummer, Ludwig, 4,953,962, Cl. 350-507.000.

- Kumobayashi, Hidenori: See—  
Sayo, Noboru; Takemasa, Toshio; and Kumobayashi, Hidenori, 4,954,644, Cl. 556-14.000.
- Kunitake, Yuji: See—  
Ohtake, Toshikazu; Hayashi, Munekazu; Idemura, Satoshi; Ohi, Kazumi; and Kunitake, Yuji, 4,954,304, Cl. 264-137.000.
- Kupper, Wilhelm, to W. Schlafhorst & Co. Cutting apparatus for severing trailing yarns on spinning bobbins, 4,953,799, Cl. 242-35.60E.
- Kuppers, Dieter; Herse, Klaus; Hiepe-Wohlleben, Kate; Kaiser, Manfred; Mohr, Friedemann; and Ohnsorge, Horst, to Alcatel N.V. Broadband optical communication system, particularly in the subscriber area, 4,955,014, Cl. 370-3.000.
- Kurakazu, Keiichi: See—  
Kawasaki, Ikuya; Kurakazu, Keiichi; and Maejima, Hideo, 4,954,943, Cl. 364-200.000.
- Kurashiki Boseki Kabushiki Kaisha: See—  
Tani, Sumio; Kogoh, Kazuhiko; Nozaki, Yuri; and Oshima, Kunihiko, 4,954,399, Cl. 428-402.000.
- Kurashima, Toshiaki: See—  
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- Kuratani, Fumiyasu: See—  
Onimaru, Sadahiro; Kuratani, Fumiyasu; and Yoshino, Hiroyoshi, 4,953,672, Cl. 188-378.000.
- Kuribayashi, Kiyoshi: See—  
Aoki, Masaki; Torii, Hideo; Kuribayashi, Kiyoshi; Monji, Hideto; Umetani, Makoto; and Fujii, Eiji, 4,953,385, Cl. 72-462.000.
- Kurita, Shigeo: See—  
Sasaki, Akira; Esaki, Seiji; Hashimoto, Yasushi; and Kurita, Shigeo, 4,954,119, Cl. 464-111.000.
- Kuriyama, Kazunori; Wada, Kenichi; and Yamaoka, Akira, to Hitachi, Ltd. Instruction processor for processing branch instruction at high speed, 4,954,947, Cl. 364-200.000.
- Kurogama, Tatsuji; Kawai, Masanori; Matsushima, Koji; and Watanabe, Mitsuru, to Konica Corporation. Process for detecting a focal point in an optical head, 4,954,702, Cl. 250-201.200.
- Kurokawa, Hideaki: See—  
Hayashi, Nobuatsu; Takahashi, Sankichi; Ebara, Katsuya; Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; and Yoda, Hiroaki, 4,953,694, Cl. 202-180.000.
- Kurokawa, Hideo: See—  
Nakamura, Sigemi; Kurokawa, Hideo; and Mitamura, Jouji, 4,954,341, Cl. 424-70.000.
- Kurosaki Refractories Co., Ltd.: See—  
Harada, Tsutomu; and Shikano, Hiroshi, 4,954,535, Cl. 523-139.000.
- Kurosawa, Akihito: See—  
Kokubun, Yoshikazu; Kurosawa, Akihito; Ushikubo, Kohei; and Todokoro, Shinji, 4,954,697, Cl. 235-381.000.
- Kurose, Yutaka: See—  
Maeda, Shuichi; Kaneko, Toshio; Kurose, Yutaka; Kimura, Michio; Yoshida, Hidemi; Uchino, Kenichi; and Inaba, Shizue, 4,954,420, Cl. 430-270.000.
- Kurt, Ewald H. Quick detach bit, 4,953,640, Cl. 175-320.000.
- Kurywczak, Eugene. Radial helix drive horse power amplifier, 4,954,123, Cl. 475-179.000.
- Kusaka, Kensaku: See—  
Yano, Kanji; Saijo, Yasutsugu; Kusaka, Kensaku; and Hirabayashi, Hiromitsu, 4,954,845, Cl. 355-290.000.
- Kusembaev, Saliman K.: See—  
Urvantsev, Anatoly I.; Elantsev, Jury S.; Komlev, Alexei M.; Kusembaev, Saliman K.; Stepanov, Yuri I.; and Vasiliev, Viktor P., 4,954,248, Cl. 209-127.100.
- Kushner, Gregory; and Delony, Timothy E., to Bio-Rad Laboratories, Inc. Apparatus and method for gel casting and electrophoresis in a single enclosure, 4,954,236, Cl. 204-299.00R.
- Kusner, Daniel P.; and Yohner, Paul A., to Keystone International Holdings Corp. Apparatus for inserting valve seats in valve bodies, 4,953,276, Cl. 29-235.000.
- Kuwabara, Tadashi: See—  
Nakane, Keichi; Kuwabara, Tadashi; Ikeda, Naoya; Koreeda, Hiroyuki; Aotsu, Hiroaki; Kawase, Masaki; Tatsuno, Yujiro; Nonaka, Naomichi; and Suzuki, Kazunari, 4,954,818, Cl. 340-721.000.
- Kuwano, Hiromichi: See—  
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- Kyocera Corporation: See—  
Yamada, Takashi; Arimune, Hisao; and Maeda, Takashi, 4,954,232, Cl. 204-192.230.
- Kyowa Hakkō Kogyo Co. Ltd.: See—  
Katsumata, Ryoichi; Mizukami, Toru; and Oka, Tetsuo, 4,954,441, Cl. 435-115.000.
- Kyowa Kogyo Kabushiki Kaisha: See—  
Iwanami, Teruo; Miyata, Shigeo; and Moriyama, Takamasa, 4,954,557, Cl. 524-399.000.
- La Telemeccanique Electrique: See—  
Claude, Julien, 4,954,928, Cl. 361-391.000.
- Labinal: See—  
Nadin, Leonard, 4,954,093, Cl. 439-188.000.
- Labsystems Oy: See—  
Tervamaki, Jukka, 4,953,575, Cl. 134-57.00R.
- Ladang, Michel: See—  
Comert, Ahmet; Ladang, Michel; and Petit, Dominique, 4,953,885, Cl. 280-610.000.
- Ladd, Joseph M., Jr.: See—  
Wierenga, Thomas J.; Ladd, Joseph M., Jr.; Merz, Russell J.; and Nicholson, Alyce E., 4,954,285, Cl. 252-174.110.
- Lai, Motor, to Regstar Power Tools Co., Ltd. Electric stapling gun with auto-reset, energy-saving and shock-absorbing functions, 4,953,774, Cl. 227-131.000.
- Laiho, Kalevi: See—  
Haarasilta, Asko; Vuorenlinna, Leo; and Laiho, Kalevi, 4,954,355, Cl. 426-61.000.
- Lamberton, Bruce A., to Lamberton, Jacquelyn. Means and method for stabilizing shorelines, 4,954,013, Cl. 405-25.000.
- Lamberton, Jacquelyn: See—  
Lamberton, Bruce A., 4,954,013, Cl. 405-25.000.
- Lambooy, Elbert, to Stichting Instituut Voor Veeteeltkundig Onderzoek "Schoonoord". Process for stunning livestock, 4,953,263, Cl. 17-1.00E.
- Lamprecht, Josef; Ley, Gregor; Werner, Arend; and Barzynski, Helmut, to BASF Aktiengesellschaft. Recording material containing a layer of polymer particles and a superimposed metallic layer, 4,954,422, Cl. 430-275.000.
- Lancaster, Patrick R., III; and Lancaster, William G., to Lantech, Inc. High tensile wrapping apparatus, 4,953,336, Cl. 53-556.000.
- Lancaster, William G.: See—  
Lancaster, Patrick R., III; and Lancaster, William G., 4,953,336, Cl. 53-556.000.
- Lanciaux, Jacques, to Rockwell-Collins France. Radiodirection finding method and apparatus using doppler effect frequency modulation, 4,954,835, Cl. 342-418.000.
- Lande, Goran, to Norabel AB. Method of effecting a single joint between two pipes, 4,953,775, Cl. 228-107.000.
- Landes, Scott D. Garment bag apparatus, 4,953,674, Cl. 190-108.000.
- Lang, David J.: See—  
Elliott, David L.; Christiano, Steven P.; Lang, David J.; and Sisco, Rosemary M., 4,954,280, Cl. 252-90.000.
- Lang, Gary D.; Finan, Donald S.; and Rhoades, George D., to Liquid Carbonic Corporation. Helical conveyor freezer, 4,953,365, Cl. 62-381.000.
- Lang, Gunther; Maresch, Gerhard; and Lenz, Hans-Rudi, to Wella Aktiengesellschaft. O-benzyl-N-hydroxyalkyl derivatives of chitosan and nail polish containing the same, 4,954,619, Cl. 536-20.000.
- Langen, Hans-Jurgen: See—  
Coenen, Karl; Flanhardt, Michael; and Langen, Hans-Jurgen, 4,953,411, Cl. 73-862.330.
- Langford, Frederic E., to Phoenix Engineering, Inc. Track suspension system, 4,953,919, Cl. 305-31.000.
- Langsam, Michael: See—  
Burgoyne, William F., Jr.; Langsam, Michael; and Fowlkes, Robert L., 4,954,144, Cl. 55-16.000.
- Langsdorf, John W.; and Outlaw, Tina O., to General Mills, Inc. Leak detector for containers, 4,953,396, Cl. 73-49.300.
- Lantech, Inc.: See—  
Lancaster, Patrick R., III; and Lancaster, William G., 4,953,336, Cl. 53-556.000.
- Lanzetta, Carmen, Jr.; Kieli, Michael; Schindler, Guenter; and Williams, Russell H., to Thomas & Betts Corporation. Optical fiber termination device having cutting means, 4,953,940, Cl. 350-96.200.
- Larsson, Nils H. I., to Nomafa AB. Safety device, particularly for roll-up doors, 4,953,608, Cl. 160-1.000.
- Laser Dynamics, Inc.: See—  
Clements, Ken, 4,954,875, Cl. 357-75.000.
- Latilla Holdings (Guernsey) Limited: See—  
Maud, John R.; and Cooper, Allan S., 4,954,840, Cl. 346-93.000.
- Lattanzi, Filippo; and Vanni, Riccardo, to Sclavo S.p.A. Pharmaceutical composition for intrarectal administration of a calcitonin and unit dosage forms prepared therefrom, 4,954,342, Cl. 424-436.000.
- Latz, Rudolf; and Martens, Thomas, to Leybold Aktiengesellschaft. Apparatus for etching substrates with a luminous discharge, 4,954,201, Cl. 156-345.000.
- Lauks, Imants R.; and Zelin, Michael P., to I-Stat Corporation. Static-free interrogating connector for electric components, 4,954,087, Cl. 439-71.000.
- Laurer, Erwin: See—  
Schabert, Hans-Peter; Strickroth, Erich; and Laurer, Erwin, 4,953,580, Cl. 285-23.000.
- Lawrence, Bruce J.: See—  
Leis, Michael; Engelson, Gary S.; and Lawrence, Bruce J., 4,954,788, Cl. 331-16.000.
- Lawton, John G.: See—  
Krubsack, Larry J.; Lawton, John G.; and Handy, Allen L., 4,953,420, Cl. 70-366.000.
- Lazzari, Jean-Pierre, to Commissariat a l'Energie Atomique. Device for communicating between two media separated by a slotted wall, 4,953,424, Cl. 74-566.000.
- Le, Hanh T., to Conco Inc. Oil compositions containing terpolymers of alkyl acrylates or methacrylates, an olefinically unsaturated homo or heterocyclic-nitrogen compound and allyl acrylates or methacrylates, 4,954,135, Cl. 44-62.000.
- Leary, Joseph E.; and Parr, Edward L. Distillation apparatus, 4,954,223, Cl. 203-1.000.
- Leary, Lynn; and Schumann, Ronald C., to Cincinnati Milacron Inc. Thermoforming and conveyor chain guide apparatus, 4,954,066, Cl. 425-388.000.
- Leatherhead Shop, Inc.: See—  
Boone, Raymond N., 4,953,345, Cl. 54-6.00R.
- LeBeque, Maurice K., to Baker Hughes Incorporated. Mining machine with roof bolting apparatus, 4,953,914, Cl. 299-11.000.

- LeBlanc, Ewart O.: See—  
Jedlicka, Josef E.; LeBlanc, Ewart O.; and Masseth, Judith A., 4,954,197, Cl. 156-273.700.
- Leboime, Pierre, to Zone Industrielle d'Epluches. Transmission systems for high-speed track-laying vehicles or vehicles with non-steerable wheels. 4,953,647, Cl. 180-9.100.
- Le Bris, Jean; Erman, Marko; and Gillardin, Gerard, to U.S. Philips Corporation. Device for characterizing semiconductor samples by photoluminescence with high spatial resolution and at low temperature. 4,954,713, Cl. 250-458.100.
- Lebron, Fernando C., to London Health Association. Magnetic field alarm indicator. 4,954,812, Cl. 340-551.000.
- LeCompte, George W., to Hughes Aircraft Company. Filament winding apparatus. 4,953,803, Cl. 242-47.000.
- Lecocq, Pierre; and Wilbrod, Jean-Hubert. Process and device for regulating the light power of laser diodes. 4,955,029, Cl. 372-31.000.
- Lederman, Frederick E., to General Motors Corporation. Roller clutch for stator assembly. 4,953,353, Cl. 60-345.000.
- Lee, Chang H.; and Kim, Young J. Automatic mixing faucet. 4,953,236, Cl. 4-194.000.
- Lee, Chune: See—  
Lee, James; Beck, Richard; Lee, Chune; and Hu, Edward, 4,954,873, Cl. 357-72.000.
- Lee, Fu M.: See—  
Brown, Ronald E.; and Lee, Fu M., 4,954,224, Cl. 203-51.000.
- Lee, James; Beck, Richard; Lee, Chune; and Hu, Edward, to Digital Equipment Corporation. Electrical connector for surface mounting. 4,954,873, Cl. 357-72.000.
- Lee, Jay; and Mauro, Alex, to Robotic Vision Systems, Inc. Sealant bead profile control. 4,954,059, Cl. 425-72.100.
- Lee, Jin H.: See—  
Kim, Kwang S.; Chai, Sang Hun; Koo, Young S.; Kim, Yeo H.; and Lee, Jin H., 4,954,456, Cl. 437-31.000.
- Lee, Ki T.: See—  
Kim, Jong S.; Lee, Ki T.; and Shu, Dong B., 4,954,615, Cl. 528-501.000.
- Lee, Min-Hsiun; and Pendergraft, Paul T., to Amoco Corporation. Sulfur recovery process using metal oxide absorbent. 4,954,331, Cl. 423-574.00R.
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- Lee, Robert G.: See—  
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Maitland, Arthur; and Livingstone, Ewan S., to EEV Limited. Metal vapor laser apparatus, 4,955,033, Cl. 372-56.000.  
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Malaczynski, Gerard W.; and Schroeder, Thaddeus, to General Motors Corporation. Ion-drag flowmeter, 4,953,407, Cl. 73-861.090.  
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Fey, Maurice G.; Iyer, Natraj C.; Male, Alan T.; and Lovic, William R., 4,954,170, Cl. 75-229.000.  
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Mallinckrodt, Inc.: See—  
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Mallouk, Robert S.; Branca, Phillip A.; and Perry, Randal L. Fabric reinforced composite membrane, 4,954,388, Cl. 428-198.000.  
Malloy, James C., to Malloy, James Christopher. Method for cleaning spinnerettes, 4,954,180, Cl. 134-22.130.  
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Man Roland Druckmaschinen AG: See—  
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Manely-Illinois, Inc.: See—  
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- Mannesmann Rexroth GmbH: See—  
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Mao, Simon J. T.; and Jackson, Richard L., to Merrell Dow Pharmaceuticals Inc. Hypocholesterolemic use of bis(3,5-di-tertiary-butyl-4-hydroxyphenylthio)methane, 4,954,528, Cl. 514-712.000.  
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Marble, Steven C.; and Marble, Gary D. Convertible ground safety plug, 4,954,091, Cl. 439-103.000.  
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Marchildon, Ernest K. A.; Muzyka, Douglas W.; and Dumoulin, Michel M., to Du Pont Canada, Inc. Process for controlling quality of yarns, 4,954,302, Cl. 264-40.100.  
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Marino, John G.; and Toppoto, Michael. Male element for heavy duty snap fastener, 4,953,267, Cl. 24-682.000.  
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Markow, Edward G., to Grumman Aerospace Corporation. Tire interior support system, 4,953,291, Cl. 29-894.351.  
Markow, Paul A.; and Nolle, William, to Acustar, Inc. Woven cross-coil winding system, 4,953,797, Cl. 242-7.110.  
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Martin GmbH fur Umwelt- und Engerie-Technik: See—  
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Martin, Johannes J. E., to Martin GmbH fur Umwelt- und Engerie-Technik. Method and apparatus for regulating the furnace output of incineration plants, 4,953,477, Cl. 110-190.000.  
Martin, Richard A.: See—  
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Maserjian, Joseph, to United States of America, National Aeronautics and Space Administration. Millimeter-wave monolithic diode-grid frequency multiplier, 4,954,864, Cl. 357-30.000.

- Mashiko, Kouichi: See—  
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Materiel et Auxiliaire de Signalisation et de Controle pour l'Automaton: See—  
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Ishii, Kazunori; Terakado, Seishi; Funakoshi, Yasutomo; and Sakai, Tadashi, 4,954,696, Cl. 219-548.000.  
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- Murakami, Mutsuaki; Nishiki, Naomi; Yoshimura, Susumu; and Watanabe, Kazuhiro, 4,954,193, Cl. 156-155.000.
- Nagai, Takeshi; Fukuda, Hiroshi; Itoh, Masahiko; and Shitaya, Takao, 4,954,694, Cl. 219-413.000.
- Omoto, Noriaki, 4,955,074, Cl. 455-182.000.
- Taguchi, Nobuyoshi; Imai, Akihiro; Murata, Yukichi; and Hirota, Takao, 4,954,478, Cl. 503-227.000.
- Wakabashi, Noriaki; Yoshida, Shuichi; Inaji, Toshio; Onodera, Hiromi; Yoshiura, Tsukasa; and Mitani, Hiroshi, 4,954,905, Cl. 360-77.030.
- Yamashita, Kazuo, 4,953,628, Cl. 165-10.000.
- Matsushita Electric Works, Ltd.: See—
- Fujizaki, Tsutomu; and Shibata, Minoru, 4,954,088, Cl. 439-73.000.
- Kawamoto, Tetsuo; Motohashi, Ryo; Sakamoto, Toshihiro; Suzuki, Yasuo; and Abe, Hideaki, 4,954,736, Cl. 316-156.000.
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- Matsuura, Kazuo: See—
- Kamikado, Toshiya; Kando, Yasuyuki; Matsuura, Kazuo; and Yamada, Junji, 4,954,497, Cl. 514-235.500.
- Matsuyama, Hideo; Koike, Kazuyuki; and Hayakawa, Kazunobu, to Hitachi, Ltd. Spin-polarization detector, 4,954,770, Cl. 324-71.300.
- Matsuzaki, Atsushi: See—
- Okada, Takashi; and Matsuzaki, Atsushi, 4,954,901, Cl. 358-242.000.
- Matsuzaki, Harumi: See—
- Hayashi, Nobuatsu; Takahashi, Sankichi; Ebara, Katsuya; Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; and Yoda, Hiroaki, 4,953,694, Cl. 202-180.000.
- Matsuzaki, Kazuhiro: See—
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- Matsuzaki, Kunimitsu: See—
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- Matsuzaki, Yuji: See—
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- Mattheissen, Hans, to Dragerwerk Aktiengesellschaft. Circuit arrangement for driving a pulse-modulated infrared-radiation source, 4,954,718, Cl. 250-493.100.
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- Matthews, James F.: See—
- Den Hartog, Herman C.; Kossza, Eileen E.; Matthews, James F.; and Werner, Ervin R., Jr., 4,954,559, Cl. 524-507.000.
- Matthews, O. H. Cubicle bed, 4,953,246, Cl. 5-424.000.
- Mattison, Lawrence A. Decorative smoke detector construction, 4,954,816, Cl. 340-693.000.
- Mattox, John R., to Rohm and Haas Company. Microbicidal micro-emulsion, 4,954,338, Cl. 424-78.000.
- Mattson, Ronald J.: See—
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- Maud, John R., and Cooper, Allan S., to Latilla Holdings (Guernsey) Limited. Automatic ticket dispenser, 4,954,840, Cl. 346-93.000.
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- Maxwell, Thomas P.: See—
- Yafuso, Masao; Yan, Cheng F.; Hacker, Thomas G.; Hui, Henry K.; Maxwell, Thomas P.; and Miller, William W., 4,954,318, Cl. 422-59.000.
- Mayer, Stefan; and Schmidt, Susanne, to Heinrich-Hertz-Institut für Nachrichtentechnik Berlin GmbH. Electronic projector system such as a high definition television (HDTV) projection television system or the like having a fluid therein with increased resistance to damage from projection system radiation, 4,954,896, Cl. 358-234.000.
- Mayne, Clive: See—
- MacDonald, Lindsay; Mayne, Clive; and Rassool, Reza P., 4,954,912, Cl. 358-448.000.
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- Mazda Motor Corporation: See—
- Kamimura, Shoichi, 4,953,890, Cl. 280-707.000.
- Ohmura, Hiroshi, 4,953,648, Cl. 180-79.100.
- Ohmura, Hiroshi; Nakashima, Takashi; and Murai, Takeshi, 4,953,652, Cl. 180-140.000.
- Okino, Yoshinori, 4,953,679, Cl. 192-0.096.
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- McCartherens, Stone W. Polishing glove apparatus, 4,953,998, Cl. 401-7.000.
- McCarty, Jerry. Disposable respiratory medication dispersion chamber, 4,953,545, Cl. 128-200.230.
- McCavey, William M. Wire tying tool for concrete reinforcing steel, 4,953,598, Cl. 140-57.000.
- McCleerey, Earl W., to AMP Incorporated. Ribbon crossover cable assembly and method, 4,954,100, Cl. 439-492.000.
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- McGovern, Kevin M.; and Schoenhals, Robert C., to Eaton Corporation. Torsion damping mechanism for a supercharger, 4,953,517, Cl. 123-559.100.
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- McMann, Ronald E.; Garcia, Evaristo, Jr.; Welch, Michael T.; and Thompson, Stephen W., to Texas Instruments Incorporated. Planar metal interconnection for a VLSI device, 4,954,423, Cl. 430-316.000.
- McMorris, Lee W., IV, to Brunswick Corporation. Water pickup insert, 4,954,109, Cl. 440-78.000.
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- McWilliams, John P.: See—
- Marler, David O.; and McWilliams, John P., 4,954,663, Cl. 568-791.000.
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- Mead Corporation, The: See—
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- Beery, Jack; and Joiner, Charles W., Jr., 4,954,297, Cl. 264-1.300.
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- Spamer, William S., 4,953,719, Cl. 211-188.000.
- Mears, Robert J.; Reekie, Laurence; Poole, Simon B.; and Payne, David N. Fibre-optic lasers and amplifiers, 4,955,025, Cl. 372-6.000.
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- Mehra, Rahul; and Combs, William, 4,953,551, Cl. 128-419.00D.
- Meek, John R. Tamper proof bottle, 4,953,728, Cl. 215-250.000.
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- Meiji Seika Kaisha, Ltd.: See—
- Sato, Yoshikazu; Watabe, Hiroomi; Ishii, Shigetaka; Nakazawa, Tadashi; Shomura, Takashi; Sezaki, Masaji; and Kondo, Shinichi, 4,954,641, Cl. 549-384.000.
- Tachibana, Shunro; and Shibata, Uichi, 4,953,565, Cl. 128-798.000.
- Tsuroka, Takashi; Nakabayashi, Satoru; Matsuhashi, Yuji; Yamamoto, Haruo; Inouye, Shigeharu; and Kondo, Shinichi, 4,954,510, Cl. 514-315.000.
- Meikle, Diane: See—
- Kleschik, William A.; Ehr, Robert J.; Costales, Mark J.; Gerwick, Ben C., III; Meikle, Richard W., deceased; Monte, William T.; and Pearson, Norman R., 4,954,163, Cl. 71-92.000.
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- Meinke, Joseph S.: See—
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- Memminger, Gustav; Fabschitz, Heinz; and Kuhn, Falk, to Memminger Iro GmbH. System for controlling supply of yarn to a yarn utilization apparatus, particularly multi-feed circular knitting machine, 4,953,367, Cl. 66-132.00R.
- Memminger Iro GmbH: See—
- Memminger, Gustav; Fabschitz, Heinz; and Kuhn, Falk, 4,953,367, Cl. 66-132.00R.

- Mendes, Luiz N.: See—
- Jensen, Michael L.; Nolf, Jean-Marie E.; Vansant, Jan; and Mendes, Luiz N., 4,954,670, Cl. 174-92.000.
- Menicon Co., Ltd.: See—
- Toyoshima, Nobuyuki; Shibata, Takanori; Hirashima, Atsushi; Ando, Ichiro; Iwata, Noriko; Yoshioka, Hiroshi; Itagaki, Akinari; and Yamazaki, Takanori, 4,954,586, Cl. 526-245.000.
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- Mennuto, Anthony R., to Metal Industries, Inc. Balancing arrangement for double hung windows, 4,953,258, Cl. 16-197.000.
- Mensing, Michael C.: See—
- Punwani, Dharamvir; and Mensinger, Michael C., 4,954,246, Cl. 208-402.000.
- Merck & Co., Inc.: See—
- Young, Robert N.; Rokach, Joshua; and Hayes, Edward C., 4,954,638, Cl. 548-546.000.
- Merck Frosst Canada, Inc.: See—
- Young, Robert N.; Rokach, Joshua; and Hayes, Edward C., 4,954,638, Cl. 548-546.000.
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- Prucher, Helmut, 4,954,499, Cl. 514-247.000.
- Merianos, John J.; and Garelick, Paul, to GAF Chemicals Corporation. Antimicrobial polymeric bisbiguanides, 4,954,636, Cl. 548-519.000.
- Merlin Instrument Company: See—
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- Merlone, John C. Metal spinning process and apparatus and product made thereby, 4,953,376, Cl. 72-57.000.
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- Hibert, Marcel; and Gittos, Maurice W., 4,954,500, Cl. 514-249.000.
- Johnston, J. O'Neal, 4,954,488, Cl. 514-177.000.
- Johnston, J. O'Neal; and Holbert, Gene W., 4,954,491, Cl. 514-174.000.
- Mao, Simon J. T.; and Jackson, Richard L., 4,954,528, Cl. 514-712.000.
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- Merz, Russell J.: See—
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- Mesa Diagnostics, Inc.: See—
- DeVolk, Burton; Allen, Fritz; Newman, Cathy D.; and Fraatz, Robert J., 4,953,980, Cl. 356-338.000.
- Mesnier, Emile: See—
- Bouteille, Christian; Blaise, Pascal; Bosson, Gabriel; Mesnier, Emile; and Vuillemin, Pierre, 4,953,404, Cl. 73-387.000.
- Messer Griesheim GmbH: See—
- Grohmann, Paul, 4,953,358, Cl. 62-50.700.
- Messerschmitt-Boelkow-Blohm GmbH: See—
- Baumgarten, Klaus; and Schloeglmann, Kurt, 4,953,417, Cl. 74-409.000.
- Messerschmitt-Bolkow Blohm GmbH: See—
- Surauer, Michael; and Bittner, Helmut, 4,954,732, Cl. 307-520.000.
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- Guichard, Jean, 4,954,737, Cl. 310-168.000.
- Messina, Giuseppe; Nurra, Carmelo; Cappellazzo, Oscar; Viridis, Angelo; and Lorenzoni, Lorenzo, to Enichem Anic S.p.A. Process for the direct hydration of linear olefins, 4,954,660, Cl. 568-697.000.
- Mesur-Matic Electronics Corp.: See—
- Newell, Harold R., 4,953,439, Cl. 84-655.000.
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- Metaleurop S.A.: See—
- DeMarthe, Jean-Michel, 4,954,322, Cl. 423-95.000.
- Metcalf, Brian W.: See—
- Holt, Dennis A.; Levy, Mark A.; and Metcalf, Brian W., 4,954,446, Cl. 435-184.000.
- Metec, Inc.: See—
- Jasser, Manfred; and Lipinski, Thomas, 4,953,915, Cl. 299-18.000.
- Methode Electronics, Inc.: See—
- Jensen, William T.; Brown, Vincent B.; Edgerton, Cathy J.; and Masterson, Robert W., 4,954,089, Cl. 439-76.000.
- Metiva, Dru G. Game call, 4,954,115, Cl. 446-204.000.
- Metzler, Gottfried, III: See—
- Gripp, Anna A.; and Metzler, Gottfried, III, 4,954,337, Cl. 424-73.000.
- Meyer, Harold D.: See—
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- Meyer, Nicolas: See—
- Boinot, Francois; Cousin, Michel; Hochin, Andre; and Meyer, Nicolas, 4,954,394, Cl. 428-289.000.
- Meyers, Kenneth A., to Gerber Products Company. Self-righting vessel, 4,953,737, Cl. 250-70.000.
- MG Industries: See—
- Brahmbhatt, Sudhir R., 4,954,315, Cl. 422-31.000.
- Micko, George: See—
- Figueras, Rosalino; and Micko, George, 4,953,455, Cl. 99-450.600.
- Micro Fast Controls, Inc.: See—
- Kumar, Shalabh; and Edgar, Duane, 4,954,763, Cl. 318-605.000.
- Microelectronics and Computer Technology Corporation: See—
- Nelson, Richard D.; and Herrell, Dennis J., 4,953,634, Cl. 165-147.000.
- Redfield Stephen R.; and Hesselink, Lambertus, 4,953,924, Cl. 350-3.640.
- Micromax S.p.A.: See—
- Giannelli, Giuseppe, 4,953,508, Cl. 122-7.00R.
- Microsoft Corporation: See—
- Notenboom, Leo A., 4,955,066, Cl. 382-56.000.
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- Mihich, Alexander, to Hughes Aircraft Company. Optical slip ring, 4,953,932, Cl. 330-96.150.
- Mikoda, Tamio: See—
- Takuma, Keisuke; Ohyama, Tsukasa; Ghoda, Isamu; Mikoda, Tamio; Koshida, Hitoshi; and Igata, Akitoshi, 4,954,410, Cl. 430-109.000.
- Mikuni Kokogyo Co., Ltd.: See—
- Okuyama, Nobuhisa; Goto, Shuichi; and Enomoto, Tsugio, 4,954,047, Cl. 417-203.000.
- Miles Inc.: See—
- Albarella, James P.; and Yip, Mietak T., 4,954,451, Cl. 436-175.000.
- Barnes, Bruce E.; Furuzawa, Richard; and Kahn, Paul, 4,954,251, Cl. 210-806.000.
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- Miller, Alan K. Aviator's night vision system, 4,953,963, Cl. 350-547.000.
- Miller Edge, Inc.: See—
- Miller, Norman K., 4,954,673, Cl. 200-61.430.
- Miller, Jeffrey T.; and Shum, Victor K., to Amoco Corporation. Catalyst and process for high selectivity reforming with Pt/Re on Ba-K-L zeolite, 4,954,245, Cl. 208-138.000.
- Miller, Keith R.: See—
- Tonn, Howard E.; Davidson, Robert; Shultz, David B.; and Miller, Keith R., 4,953,727, Cl. 213-8.000.
- Miller, Norman K., to Miller Edge, Inc. Highly sensitive switch for actuation of a device upon force being applied thereto, 4,954,673, Cl. 200-61.430.
- Miller, Robert J.: See—
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- Miller, Ronald B.: See—
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- Miller, William A., to Fluid Management Limited Partnership. Mixing structure for paint colorant in a dispensing apparatus, 4,953,985, Cl. 366-244.000.
- Miller, William W.: See—
- Yafuso, Masao; Yan, Cheng F.; Hacker, Thomas G.; Hui, Henry K.; Maxwell, Thomas P.; and Miller, William W., 4,954,318, Cl. 422-59.000.
- Milliken Research Corporation: See—
- Gilpatrick, Michael W., 4,953,270, Cl. 28-163.000.
- Mills, Ronald L. Method and apparatus for constructing a masonry structure, 4,953,337, Cl. 52-385.000.
- Milprint, Inc.: See—
- Kappes, Kenneth C., 4,954,356, Cl. 426-107.000.
- Mimura, Akio; Hosokawa, Yoshikazu; Suzuki, Takaya; Aoyama, Takashi; Konishi, Nobutake; Misawa, Yutaka; and Miyata, Kenji, to Hitachi, Ltd. Thin film transistor formed on insulating substrate, 4,954,855, Cl. 357-23.700.
- Minamisawa, Hiroshi: See—
- Nomura, Yoshihiro; Hanabusa, Kazuhito; Minamisawa, Hiroshi; Morinaga, Takashi; Sakata, Toichi; Mukoyama, Yoshiyuki; Nishizawa, Hiroshi; and Miyajima, Hiromu, 4,954,612, Cl. 528-353.000.
- Minnesota Mining and Manufacturing Company: See—
- Dennison, Richard L., 4,953,755, Cl. 222-146.500.
- Dunshee, Wayne K., 4,953,550, Cl. 128-403.000.
- Hansen, Paul E.; Insley, Thomas I.; and Libbey, Christopher J., 4,953,544, Cl. 128-156.000.
- Hollingsworth, Elmont E.; and Schlaeger, Gary W., 4,954,098, Cl. 439-404.000.
- Wood, Thomas E.; and Wilson, David M., 4,954,462, Cl. 501-95.000.
- Wright, Bradford B.; and DeVoe, Robert J., 4,954,416, Cl. 430-281.000.
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- Minney, Stephen C.: See—
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- Mino, Testuya: See—
- Nakamura, Yoshihiro; Takahashi, Kazuya; Ichinose, Atsuki; and Mino, Testuya, 4,954,906, Cl. 360-77.080.
- Mino Yogyo Co., Ltd.: See—
- Tanemura, Fumikazu; Honda, Tohru; Ohta, Shigetoshi; Kajita, Yoshiharu; and Kachi, Tatsushi, 4,954,460, Cl. 501-80.000.



- Minohara, Taketoshi; Takagi, Yoshio; Isobe, Tadashi; and Suzuki, Keita, to Toyota Jidosha Kabushiki Kaisha. Pigment. 4,954,176, Cl. 106-417.000.
- Minohara, Taketoshi: See—  
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- Minolta Camera Kabushiki Kaisha: See—  
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- Yamaguchi, Ikunori; Emori, Kiyoshi; and Morikawa, Takashi, 4,954,968, Cl. 364-519.000.
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- Miscnar, Scott L.: See—  
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- Misu, Koichiro; Wadaka, Shusou; and Nagatsuka, Tsutomu, to Mitsubishi Denki Kabushiki Kaisha. Filter bank. 4,954,793, Cl. 333-133.000.
- Mita Industrial Co., Ltd.: See—  
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- Mitamura, Jouji: See—  
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- Mitani, Hiroshi: See—  
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- Mitsubishi Denki Kabushiki Kaisha: See—  
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- Funakoshi, Haruo, 4,954,772, Cl. 324-158.00R.
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- Iguchi, Kazuyoshi; Tashima, Masatoshi; Tazi, Ryoichi; Yoshino, Soichi; and Yagi, Motoo, 4,954,734, Cl. 310-71.000.
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- Nakatsu, Keiji; and Ogawa, Masaharu, 4,955,009, Cl. 369-32.000.
- Sako, Yuji, 4,954,668, Cl. 200-314.000.
- Satou, Hiroshi; Utsui, Yoshihiko; Toneyoshi, Kiyotugu; Taniguchi, Takashi; Haraga, Kousuke; and Tsukui, Keitarou, 4,954,215, Cl. 156-630.000.
- Sengoku, Masaharu, 4,954,908, Cl. 360-78.040.
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- Shindo, Koji; and Tsuchihashi, Masaru, 4,954,065, Cl. 425-175.000.
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- Terane, Hideyuki; and Nakagawa, Shinichi, 4,954,978, Cl. 364-715.100.
- Uchikawa, Fusaoki; and Nomura, Kenji, 4,954,413, Cl. 430-135.000.
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- Mitsubishi Jukogyo K. K.: See—  
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- Mitsubishi Kasei Corporation: See—  
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- Taguchi, Nobuyoshi; Imai, Akihiro; Murata, Yukichi; and Hirota, Takao, 4,954,478, Cl. 503-227.000.
- Mitsubishi Metal Corporation: See—  
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- Mitsubishi Rayon Co., Ltd.: See—  
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- Sasaki, Isao; Nishida, Kozu; and Anzai, Hisao, 4,954,575, Cl. 525-330.500.
- Mitsubishi Kasei Corporation: See—  
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- Mitsuhashi, Kenhachi; and Suga, Shigeru, to Suga Test Instruments Co., Ltd.; and Yokohama Rubber Co., Ltd., The. Ventilation regulated hot air supplied constant temperature oven. 4,954,693, Cl. 219-400.000.
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- Mitsui Petrochemical Industries, Ltd.: See—  
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- Mitsui Toatsu Chemicals, Inc.: See—  
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- Iwamoto, Mune; Ito, Norifumi; Sugazaki, Kazuo; Matsubara, Tetsuyuki; and Ando, Toshihiko, 4,954,571, Cl. 525-205.000.
- Takuma, Keisuke; Ohya, Tsukasa; Ghoda, Isamu; Mikoda, Tamio; Koshida, Hitoshi; and Igata, Akitoshi, 4,954,410, Cl. 430-109.000.
- Miura, Yasuaki, to Tokyo Shibaura Denki Kabushiki Kaisha. Package semiconductor device using chalcogenide glass sealing. 4,954,874, Cl. 357-74.000.
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- Miyajima, Hiromu: See—  
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- Miyake, Norihisa; Sumita, Masaki; and Sarugaku, Shinichi, to Hitachi, Ltd.; and Hitachi Keiyo Engineering Co., Ltd. Method and apparatus for controlling tracking path of working point of industrial robot. 4,954,762, Cl. 318-568.190.
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- Miyamoto, Mitsuaki: See—  
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- Miyamoto, Tsutomu; Igarashi, Hisanaga; and Hidenori, Sugiyama, to Eisai Co., Ltd. Preventing agent for human immunodeficiency virus infection comprising menfegol. 4,954,530, Cl. 514-718.000.
- Miyata, Kenji: See—  
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- Miyata, Shigeo: See—  
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- Miyazaki, Katsumi: See—  
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- Miyazaki, Masaru: See—  
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- Miyazaki, Yasumitsu; Enomoto, Ryo; and Yamada, Masaya, to Iben Co., Ltd. Second harmonic wave generating device. 4,953,931, Cl. 350-96.120.
- Miyazaki, Yasumitsu; Enomoto, Ryo; and Yamada, Masaya, to Iben Co., Ltd. Second harmonic wave generating device. 4,953,943, Cl. 350-96.120.
- Miyazawa, Takeshige; and Kawano, Kazuhiko, to Kumiai Chemical Industry Co., Ltd. Plant growth regulating composition and method for regulating growth of a plant. 4,954,157, Cl. 71-86.000.
- Miyoshi, Tsuyoshi, to Kabushiki Kaisha Kobe Seiko Sho. Overload preventing system for kneading machine. 4,953,984, Cl. 366-76.000.
- Mizuhashi, Noboru; Tohru, Hoshi; and Morita, Takashi, to Hitachi, Ltd. Multimedia information exchanging system and equipment therefor. 4,955,019, Cl. 370-85.700.
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- Mizukami, Toru: See—  
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- Mizuno, Kenichi: See—  
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- Mizunoya, Nobuyuki; Komori, Hiroshi; Tanaka, Tadashi; and Matsumura, Kazuo, to Kabushiki Kaisha Toshiba. Joined ceramic-metal composite substrate and method for production thereof. 4,954,386, Cl. 428-137.000.
- Mizuochi, Hitoshi: See—  
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- Mizutani, Yoshihisa; and Kimura, Minoru. Semiconductor device with composite electrode. 4,954,871, Cl. 357-67.000.

- Mobay Corporation: See—  
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- Jackman, Dennis E.; and Morgan, John G., 4,954,627, Cl. 544-182.000.
- Rains, Randall C.; Dormish, Jeffrey F.; Stanton, Susan A.; and Rieck, James N., 4,954,199, Cl. 156-331.700.
- Sanns, Frank, Jr., 4,954,537, Cl. 521-157.000.
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- Kuehl, Guenter H.; and Rosinski, Edward J., 4,954,243, Cl. 208-120.000.
- Marler, David O.; and McWilliams, John P., 4,954,663, Cl. 568-791.000.
- Nowlin, Thomas E.; and Schurzy, Kenneth G., 4,954,470, Cl. 502-107.000.
- Rubin, Mae K.; and Chu, Pochen, 4,954,325, Cl. 423-328.000.
- Mochida, Mitsuyoshi; Maekawa, Tokuo; Takei, Hisashi; Matsumoto, Yasuo; Ohmura, Hiroshi; Sugimoto, Shigeru; Ushiro, Seimei; Asano, Seiji; and Yoshida, Toshio, to Fuji Photo Film Co., Ltd. Photographic film package and method of making the same. 4,954,857, Cl. 354-75.000.
- Mochiji, Kozo; Oizumi, Hiroaki; Soda, Yasunari; Ogawa, Taro; and Kimura, Takeshi, to Hitachi, Ltd. Pattern fabrication by radiation-induced graft copolymerization. 4,954,424, Cl. 430-323.000.
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- Modic, Frank J.; and Striker, Richard A., to General Electric Company. Low viscosity silicone foam compositions. 4,954,533, Cl. 521-82.000.
- Modum Stiger a.s.: See—  
Lia, Peder, 4,953,505, Cl. 119-57.200.
- Moehling, Charles: See—  
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- Moerker, Theophile: See—  
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- Mohn, Frank, to Framo Developments (UK) Limited. Electrical conductor arrangements for pipe system. 4,953,636, Cl. 166-65.100.
- Mohr, Friedemann: See—  
Kuppers, Dieter; Herse, Klaus; Hiepe-Wohlleben, Kate; Kaiser, Manfred; Mohr, Friedemann; and Ohnsorge, Horst, 4,955,014, Cl. 370-3.000.
- Mohri, Akira; and Kato, Toshikazu, to Murata Manufacturing Co., Ltd. Tape structure provided with electronic components. 4,953,699, Cl. 206-330.000.
- Mokvist, Anders V.: See—  
Reinhall, Rolf B.; Johansson, Johan G. I.; and Mokvist, Anders V., 4,954,221, Cl. 162-261.000.
- Molins plc: See—  
Cahill, Michael J.; and Dawson, John, 4,953,573, Cl. 131-280.000.
- Monarch Marking Systems, Inc.: See—  
Benge, S. Eugene, 4,954,814, Cl. 340-572.000.
- Hamisch, Paul H., Jr.; and Makley, James A., 4,954,208, Cl. 156-577.000.
- Monell Chemical Senses Center: See—  
Friedman, Mark I.; Tordoff, Michael G.; DiNovi, Michael J.; and Rakfa, Robert J., 4,954,531, Cl. 514-738.000.
- Monji, Hideto: See—  
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- Monsanto Company: See—  
Weissenfeld, Robert B., 4,954,466, Cl. 502-24.000.
- Monsorno, Richard V.: See—  
Insetta, Victor D.; Monsorno, Richard V.; and Dorrian, John F., 4,953,273, Cl. 29-25.420.
- Monte, William T.: See—  
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- Montgomery, Darryl R.; and Raber, David C. Transverse-mounted slurry sealant box assembly. 4,954,010, Cl. 404-96.000.
- Monty, Lawrence P.: See—  
Uke, Alan K.; and Monty, Lawrence P., 4,953,862, Cl. 273-75.000.
- Mooney, Robery C.; and Peirent, Richard J., to Wang Laboratories, Inc. Terminal with viewports, auxiliary device attachment, and host-terminal flange control. 4,954,966, Cl. 364-518.000.
- Moore, Eugene R.; and Wessel, Tom E., to Dow Chemical Company, The. Apparatus and process for devolatilization of high viscosity polymers. 4,954,303, Cl. 264-101.000.
- Moore, John R.: See—  
Nieman, Gerald R.; Clyatt, Clarence L., III; Paulus, Eric J.; Zehring, Scott A.; Ragl, Albert; and Moore, John R., 4,954,794, Cl. 333-182.000.
- Moore, Robert R.: See—  
Birmingham, Joseph G.; and Moore, Robert R., 4,954,320, Cl. 422-186.040.
- Moore, T. Charles: See—  
Borden, Louis H.; and Moore, T. Charles, 4,953,616, Cl. 166-66.400.
- Moorman Manufacturing Company: See—  
Taylor, Ian A., 4,953,504, Cl. 119-54.000.
- Moos, Wolfgang: See—  
Rothenpfeiler, Manfred; and Moos, Wolfgang, 4,953,806, Cl. 242-72.100.
- Morales, Victor H., to Windfred M. Berg, Inc. Anti-backlash nut. 4,954,032, Cl. 411-289.000.
- Mordhorst, Hans-Jurgen: See—  
Weckenmann, Albert; and Mordhorst, Hans-Jurgen, 4,953,306, Cl. 33-503.000.
- Moreau, Pierre A., to BCM Manufacturing Ltd. Flooring unit. 4,953,501, Cl. 119-28.000.
- Morflex Chemical Company, Inc.: See—  
Hull, Ezekiel H.; and Frappier, Edward P., 4,954,649, Cl. 560-180.000.
- Morgan, John G.: See—  
Jackman, Dennis E.; and Morgan, John G., 4,954,627, Cl. 544-182.000.
- Morganstein, Sanford J.; Bindl, Ron H.; Klecka, Mark D.; Krakau, Herbert B.; and Dawson, Thomas M., to Dytel Corporation. Automated attendant with direct inward system access. 4,955,047, Cl. 379-112.000.
- Mori, Hiroshi. Process for manufacturing alloy wheels for vehicle tires. 4,953,275, Cl. 29-894.324.
- Mori, Kei. Light radiator. 4,953,549, Cl. 128-398.000.
- Mori, Takahiro: See—  
Hasegawa, Kenji; Mori, Takahiro; and Higuma, Masahiko, 4,954,395, Cl. 428-318.400.
- Mori, Toshihiro: See—  
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- Morikane, Hiroyuki: See—  
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- Morikawa, Minoru: See—  
Iwata, Masayoshi; Muto, Toahya; Morikawa, Minoru; Kozawa, Satoshi; Takase, Akihiko; and Terano, Naoki, 4,954,675, Cl. 200-317.000.
- Morikawa, Takashi: See—  
Yamaguchi, Ikunori; Emori, Kiyoshi; and Morikawa, Takashi, 4,954,968, Cl. 364-519.000.
- Morimoto, Akira, to Asahi Kogaku Kogyo Kabushiki Kaisha. Scanning optical system for use in laser beam printer. 4,953,926, Cl. 350-6.800.
- Morimoto, Yoshio: See—  
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- Morin, Roger: See—  
Fink, Hans-Werner; Morin, Roger; Schmid, Heinz; and Stocker, Werner, 4,954,711, Cl. 250-423.00R.
- Morinaga, Takashi: See—  
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- Morita, Kouichi: See—  
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- Morita, Kuniki: See—  
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- Morita, Shizuo; Matsumoto, Toru; Kamegamori, Masayuki; Hayakawa, Kazushi; Hatakeyama, Noboru; Matsuo, Shunji; and Fukuchi, Masakazu, to Konica Corporation. Multicolor image developing device. 4,954,844, Cl. 355-260.000.
- Morita, Takashi: See—  
Mizuhara, Noboru; Tohru, Hoshi; and Morita, Takashi, 4,955,019, Cl. 370-85.700.
- Moritani, Toshifumi: See—  
Azeta, Takahiro; Kameyama, Toru; Sekiya, Harukazu; Moritani, Toshifumi; Higeta, Akira; Baba, Kenji; Matoba, Takeshi; Goto, Shinji; and Kubota, Kazuyuki, 4,953,846, Cl. 271-251.000.
- Moriyama, Takamasa: See—  
Iwanami, Teruo; Miyata, Shigeo; and Moriyama, Takamasa, 4,954,557, Cl. 524-399.000.
- Mormex Limited: See—  
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- Moroto, Shuzo; Kawai, Masao; Yokoyama, Shoji; Kobayashi, Koji; and Sumiya, Koji, to Aisin A W Co., Ltd.; and Kabushiki Kaisha Shinsangyokaiatsu. Navigation system. 4,954,959, Cl. 364-449.000.
- Moroz, Chaya. Isoferritin as a marker for pathological pregnancy. 4,954,434, Cl. 435-7.000.
- Morrow, William K.: See—  
Raible, Donald A.; and Morrow, William K., 4,954,055, Cl. 417-477.000.
- Morsdorf, Peter: See—  
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- Morton, Mary E.: See—  
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- Morton, Nancy A.: See—  
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- Moscrip, William M., to United States of America, Navy. Liquid monopropellant gun. 4,953,440, Cl. 89-7.000.
- Mosher, David: See—  
Wood, Charles H.; and Mosher, David, 4,954,756, Cl. 315-39.000.
- Moshier, David R. Brassiere strap retainer. 4,953,233, Cl. 2-268.000.
- Mosteller, Peter. Chain link fence hanger. 4,953,817, Cl. 248-222.200.
- Motohashi, Ryo: See—  
Kawamoto, Tetsuo; Motohashi, Ryo; Sakamoto, Toshihiro; Suzuki, Yasuo; and Abe, Hideaki, 4,954,736, Cl. 316-156.000.

- Motomatsu, Keiko: See—  
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- Motorola, Inc.: See—  
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Hira, Gerald M.; Sheahen, Dana M.; Wilson, Pamela L.; and Nolan, Michael P., 4,954,948, Cl. 364-200.000.  
Jao, Tze C.; Morton, Nancy A.; and Erickson, Robert W., Jr., 4,954,272, Cl. 252-25.000.  
Mech, Harold W., 4,955,059, Cl. 381-116.000.  
Phillips, Sharon E. T.; and Eastmond, Bruce C., 4,955,083, Cl. 455-47.000.  
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- Motoyama Eng. Works, Ltd.: See—  
Ohmi, Tadashi; Kanno, Yohichi; Satoh, Kazuhiko; and Hatayama, Tadashi, 4,953,826, Cl. 251-331.000.
- Motyka, Linda A.: See—  
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- Motz, Karl; and Diehl, Markus; to Man Technologie GmbH. Combustion control, 4,953,351, Cl. 60-285.000.
- Moulin, Norbert L.; to Hughes Aircraft Company. Multi-channel hermaproditic lens type fiber optic connector, 4,953,944, Cl. 350-96.210.
- Moulton, Herbert F. Inert gas lighting system and means therefor, 4,953,314, Cl. 40-545.000.
- Mounger, Robert W.: See—  
Lee, Robert D.; Mounger, Robert W.; and Heptig, John P., 4,955,038, Cl. 375-35.000.
- Moutrie, Michael F.: See—  
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- Mozar, Albrecht; to Alcatel N.V. Semiconductor arrangement for producing a periodic refractive index distribution and/or a periodic gain distribution, 4,955,036, Cl. 372-96.000.
- MTU Motoren- und Turbinen-Union Munchen GmbH: See—  
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Sikorski, Seigfried, 4,954,387, Cl. 428-138.000.
- Mueller Co.: See—  
Sands, Robert E., 4,953,588, Cl. 137-512.300.
- Mueller, Karl F.; to Ciba-Geigy Corporation. Dimethylacrylamide-copolymer hydrogels with high oxygen permeability, 4,954,587, Cl. 526-245.000.
- Mueller, Louis H. Prefilled catheter tip syringe kit, 4,954,239, Cl. 206-571.000.
- Muhammad, Annie. Learning game, 4,953,869, Cl. 273-236.000.
- Mukoyama, Yoshiyuki: See—  
Nomura, Yoshihiro; Hanabusa, Kazuhito; Minamisawa, Hiroshi; Morinaga, Takashi; Sakata, Toichi; Mukoyama, Yoshiyuki; Nishizawa, Hiroshi; and Miyajima, Hiromu, 4,954,612, Cl. 528-353.000.
- Mukoyoshi, Shunichiro: See—  
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- Muller, Arno: See—  
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- Muller, Eberhard: See—  
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- Muller, Gunther: See—  
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- Muller, Heinz K.; to Busak & Luyken GmbH & Co. Sealing ring structure, 4,953,876, Cl. 277-165.000.
- Muller, Josef; to Rohm Pharma GmbH. Dermal acting pharmaceutical preparation with liposomes as vehicle means, 4,954,345, Cl. 424-450.000.
- Muller, Rainer: See—  
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- Muller, Roger; and Bee, Giancarlo; to S.F. Muller & Partner. Filtering apparatus with pleated filtering material, 4,954,255, Cl. 210-437.000.
- Multi-Technology Inc.: See—  
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- Munach, Arnold S.; and Nguyen, John Q., to United States of America, Navy. Safety-arming system for launched projectiles, 4,953,475, Cl. 102-229.000.
- Munemura, Masahiro; and Takahashi, Kenji; to Fuji Jukogyo Kabushiki Kaisha. Structure of a blind panel window for an automobile, 4,953,912, Cl. 296-191.000.
- Murai, Makoto: See—  
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- Murai, Takeshi: See—  
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- Murakami, Eiji: See—  
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- Murakami, Kunichika: See—  
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- Murakami, Mutsaki; Nishiki, Naomi; Yoshimura, Susumu; and Watanabe, Kazuhiro; to Matsushita Electric Industrial Co., Ltd.; and Research Development Corporation of Japan. Method for making a graphite film or sheet, 4,954,193, Cl. 156-155.000.
- Murakami, Satoshi: See—  
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- Murakami, Tokumichi: See—  
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- Muramatsu, Yukio: See—  
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- Murata Hatsujo Co. Ltd.: See—  
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- Murata, Kazushige; and Nagoshi, Mitsuru; to Konica Corporation. Recirculating automatic document feeder, 4,954,847, Cl. 355-318.000.
- Murata Kikai Kabushiki Kaisha: See—  
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- Murata Manufacturing Co., Ltd.: See—  
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- Kawabata, Shoichi; Tsuge, Hisanao; and Wakatsuki, Hiromichi, 4,953,283, Cl. 29-593.000.
- Mohri, Akira; and Kato, Toshikazu, 4,953,699, Cl. 206-330.000.
- Shikama, Takashi; Wakabayashi, Asami; and Torii, Kiyofumi, 4,954,692, Cl. 219-365.000.
- Tabota, Jun, 4,953,410, Cl. 73-862.040.
- Murata, Yukichi: See—  
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- Murdock, Michael: See—  
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- Musch, Rudiger: See—  
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- Muse, Clarence W. Golf bag rain cover, 4,953,768, Cl. 224-205.000.
- Muta, Yoshifumi; and Fujii, Kozaburo; to Mitsubishi Denki Kabushiki Kaisha. Scroll machine with pin coupling, 4,954,056, Cl. 418-55.300.
- Muto, Toahiya: See—  
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- Muzyka, Douglas W.: See—  
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- Mylari, Banavara L.; and Zembrowski, William J., to Pfizer Inc. Process and intermediates for the preparation of ophthalmic acetic acids and analogs thereof, 4,954,629, Cl. 544-237.000.
- Myoga, Maki: See—  
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- Nabeshima, Daiki; and Nakane, Hiroshi; to Kabushiki Kaisha Toshiba. Constant velocity track jump servo system for disc players, 4,955,010, Cl. 369-32.000.
- NAC Engineering and Marketing, Inc.: See—  
Nastrom, Harvey J., 4,955,000, Cl. 367-117.000.
- Nadin, Leonard; to Labinal. Shunt connection device for electrical connectors, 4,954,093, Cl. 439-188.000.
- Nagai, Takeshi; Fukuda, Hiroshi; Itoh, Masahiko; and Shitaya, Takao; to Matsushita Electric Industrial Co., Ltd. Cooking oven having function to automatically clean soils attached to inner walls thereof, 4,954,694, Cl. 219-413.000.
- Nagaki, Hideyoshi: See—  
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- Nagano, Eiki: See—  
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- Nagano, Masami; and Atago, Takeshi; to Hitachi, Ltd. Ignition timing control unit for internal combustion engine, 4,953,532, Cl. 123-419.000.
- Nagaoka, Shinji; Kawai, Michio; and Sato, Koji; to Seikosha Co., Ltd. Method of driving multiple flash rangefinder, 4,954,861, Cl. 354-403.000.
- Nagarajan, Ramakrishnan; to Eli Lilly and Company. Recovery of difluoro sugar, 4,954,623, Cl. 536-127.000.
- Nagasaka, Nobusuke: See—  
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- Nagatsuka, Tsutomu: See—  
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- Nagoshi, Mitsuru: See—  
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- Nagura, Masato: See—  
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- Nagy, Lajos: See—  
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- Nahill, Thomas E.: See—  
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- Naito, Taketoshi: See—  
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- Naka, Michio: See—  
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- Naka, Reishi: See—  
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- Nakabayashi, Satoru: See—  
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- Nakagawa, Shinichi: See—  
Terane, Hideyuki; and Nakagawa, Shinichi, 4,954,978, Cl. 364-715.100.
- Nakagawa, Tadashi; Otoro, Takahito; and Nemoto, Ichiro; to Seikosha Co., Ltd. Focal-plane shutter, 4,954,860, Cl. 354-246.000.
- Nakamichi Corporation: See—  
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- Nakamoto, Kouji: See—  
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,954,523, Cl. 514-521.000.
- Nakamura, Hisashi; to Diesel Kiki Co., Ltd. Sealing device of delivery valve for fuel injection units, 4,953,589, Cl. 137-543.230.
- Nakamura, Kazunari; Hagiwara, Toshihiko; and Takano, Akira; to Olympus Optical Co., Ltd. Endoscope apparatus, 4,953,539, Cl. 128-6.000.
- Nakamura, Sigemi; Kurokawa, Hideo; and Mitamura, Jouji; to Lion Corporation. Hair cosmetic composition, 4,954,341, Cl. 424-70.000.
- Nakamura, Takashi; and Uchiyama, Kaoru; to Fuji Photo Film Co., Ltd. Photosensitive material processing apparatus, 4,954,838, Cl. 354-320.000.
- Nakamura, Taku; Hirano, Tsumoru; Funatsu, Eiji; and Ishikawa, Shunichi; to Fuji Photo Film Co., Ltd. Light-sensitive microcapsule containing polymerizable compound and silver halide, and light-sensitive material employing the same, 4,954,417, Cl. 430-138.000.
- Nakamura, Toru: See—  
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- Nakamura, Toshihide: See—  
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- Nakamura, Toshimasa: See—  
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- Nakamura, Yoshihiro; Takahashi, Kazuya; Ichinose, Atsuki; and Mino, Testuya; to Seiko Epson Corporation. Position control system for a magnetic storage device using a small sized disk, 4,954,906, Cl. 360-77.080.
- Nakane, Hiroshi: See—  
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- Nakane, Keichi; Kuwabara, Tadashi; Ikeda, Naoya; Koreeda, Hiroyuki; Aotsu, Hiroaki; Kawase, Masaki; Tatsuno, Yujiro; Nonaka, Naomichi; and Suzuki, Kazunari; to Hitachi, Ltd.; and Hitachi Microsoftware Systems, Inc. Multi-window display control system, 4,954,818, Cl. 340-721.000.
- Nakane, Toshio; Hijikata, Kenji; Kageyama, Yukihiko; and Naka, Michio; to Polyplastics Co., Ltd. Halogen-contained polyester resin composite and electric wire, 4,954,540, Cl. 524-86.000.
- Nakane, Toshio; Kageyama, Yukihiko; Konuma, Hiroaki; and Hijikata, Kenji; to Polyplastics Co., Ltd. Flame-retardant resin composition and electric wire, 4,954,541, Cl. 524-86.000.
- Nakanishi, Keiichiro; Yamada, Minoru; Yamamoto, Masakazu; Ogihara, Satoru; Shinohara, Hiroichi; and Suzuki, Hideo; to Hitachi, Ltd. Chip carrier, 4,954,877, Cl. 357-80.000.
- Nakanishi, Motoyasu; to Kabushiki Kaisha Sigel. Ball hitting sports tool, 4,953,861, Cl. 273-73.003.
- Nakano, Hideharu: See—  
Tsuiji, Eiji; and Nakano, Hideharu, 4,953,574, Cl. 132-232.000.
- Nakao, Toshiyuki; and Adachi, Naomichi; to Aisin Seiki Kabushiki Kaisha. Differential gear apparatus with worm gears, 4,954,122, Cl. 475-160.000.
- Nakashima, Naohisa: See—  
Oikawa, Hiroshi; Nakashima, Naohisa; Matsuhisa, Tadaaki; and Ozawa, Tadao, 4,953,528, Cl. 123-276.000.
- Nakashima, Takashi: See—  
Ohmura, Hiroshi; Nakashima, Takashi; and Murai, Takeshi, 4,953,652, Cl. 180-140.000.
- Nakasuiji, Masaaki: See—  
Nishimura, Akira; and Nakasuiji, Masaaki, 4,953,945, Cl. 350-96.230.
- Nekata, Kazuo: See—  
Okumura, Takuzo; Okada, Toyokazu; Kikui, Hitoshi; and Nakata, Kazuo, 4,953,952, Cl. 350-337.000.
- Nakata, Tetsuro; to Sony Corporation. Wipe pattern generator, 4,954,898, Cl. 358-183.000.
- Nakatsu, Keiji; and Ogawa, Masaharu; to Mitsubishi Denki Kabushiki Kaisha. Optical disk drive apparatus having counter disable at seek start-up, 4,955,009, Cl. 369-32.000.
- Nakayama, Hiroshi: See—  
Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; Shimada, Hiroyuki; Kikuchi, Kimihiko; and Nakayama, Hiroshi, 4,953,677, Cl. 192-3.300.
- Nakayama, Yoshiaki; Saito, Kenji; and Kawada, Yukihiko; to Fuji Photo Film Co., Ltd. Method and apparatus for automatically adjusting white balance, 4,954,884, Cl. 358-29.000.
- Nakazawa, Tadashi: See—  
Sato, Yoshikazu; Watabe, Hiroomi; Ishii, Shigetaka; Nakazawa, Tadashi; Shomura, Takashi; Sezaki, Masaji; and Kondo, Shinichi, 4,954,641, Cl. 549-384.000.
- Nalco Chemical Company: See—  
Branning, Merle L., 4,954,547, Cl. 524-232.000.
- Naoli, Takashi: See—  
Ishigaki, Kunio; and Naoli, Takashi, 4,954,430, Cl. 430-534.000.
- Narisada, Masayuki: See—  
Kita, Toru; Narumiya, Shuh; Narisada, Masayuki; Watanabe, Fumrhu; Doteuchi, Masami; and Mizui, Takuji, 4,954,514, Cl. 514-381.000.
- Narita, Kazuhisa: See—  
Tatce, Toshiro; Takahira, Takashi; Yamashita, Kouwa; Sakurai, Masao; Shiozawa, Akira; and Narita, Kazuhisa, 4,954,642, Cl. 549-389.000.
- Narumiya, Shuh: See—  
Kita, Toru; Narumiya, Shuh; Narisada, Masayuki; Watanabe, Fumrhu; Doteuchi, Masami; and Mizui, Takuji, 4,954,514, Cl. 514-381.000.
- Nastrom, Harvey J., to NAC Engineering and Marketing, Inc. Ultrasonic personnel location identification system, 4,955,000, Cl. 367-117.000.
- NaTec Resources, Inc.: See—  
Hooper, Richard G., 4,954,324, Cl. 423-239.000.
- Nathans, Robert L.: See—  
Lovell, Walter C.; and Nathans, Robert L., 4,953,372, Cl. 70-89.000.
- National Seating Company: See—  
Smith, Rod; Oliphant, Timothy L.; and Stephens, Charles E., 4,954,051, Cl. 417-305.000.
- Natusch, Paul J.; Yu, Eugene L.; Senerchia, David C.; and Henry, John F., Jr., deceased (by Henry, Beverly A., administratrix), to Digital Equipment Corporation. Apparatus and method for providing distribution control in a main memory unit of a data processing system, 4,954,946, Cl. 364-200.000.
- Nauchno-Tekhnicheskoe Obiedinenie Akademii Nauk SSSR: See—  
Alexandrov, Maxim L.; Shevkunov, Vsevolod V.; and Pavlov, Alexandr J., 4,954,253, Cl. 210-198.200.
- Nawamaki, Tsutomu: See—  
Baba, Masatoshi; Kakuta, Takuya; Tanaka, Norio; Oya, Eiichi; Ikai, Takashi; Nawamaki, Tsutomu; Watanabe, Shigeomi; and Suzuki, Koichi, 4,954,165, Cl. 71-103.000.
- NEC Corporation: See—  
Fujiaki, Hisashi; and Shimada, Keiko, 4,955,055, Cl. 379-390.000.
- Ikeda, Sadanobu, 4,954,944, Cl. 364-200.000.
- Tanimoto, Kenzo, 4,955,023, Cl. 371-40.100.
- Umetsu, Shinjiro; and Mori, Toshihiro, 4,955,084, Cl. 455-278.000.
- Urai, Takahiko, 4,954,729, Cl. 307-443.000.
- Yamada, Kazuhiko; and Maruyama, Takao, 4,954,920, Cl. 360-113.000.
- Yamada, Tadaharu, 4,954,919, Cl. 360-104.000.
- Yamaguchi, Masaya; and Suzuki, Takamasa, 4,954,993, Cl. 365-226.000.
- NEC Home Electronics Ltd.: See—  
Endo, Kunio; and Katsukawa, Tadashi, 4,954,889, Cl. 358-80.000.
- Necam B.V.: See—  
van der Weide, Jouke; and Hoogbeem, Adrianus J. T., 4,953,516, Cl. 123-527.000.
- Negele, Michael: See—  
Bielefeldt, Dietmar; Marhold, Albrecht; and Negele, Michael, 4,954,666, Cl. 570-132.000.
- Negrini, Giovanni; and Chiola, Roberto. Flipper for flipper swimming, 4,954,112, Cl. 441-64.000.
- Nehyo, Takeshi: See—  
Brackmann, Warren A.; Snaird, Stanislav M.; Nehyo, Takeshi; and Sheahan, Michael H., 4,953,570, Cl. 131-109.100.
- Neidhard, Klaus: See—  
Alberter, Gunther; Deeg, Helmut; Hettich, Gerhard; Neidhard, Klaus; Schmid, Hans-Dieter; and Schruppf, Hans, 4,954,677, Cl. 200-834.000.
- Neifeld, Richard A., to United States of America, Army. Method of preparing a thin diamond film, 4,954,365, Cl. 427-53.100.
- Neil, Daniel C.: See—  
Banning, Harmon W.; and Neil, Daniel C., 4,954,669, Cl. 174-75.000.
- Nekoosa Packaging Corporation: See—  
Noland, Carl M., 4,953,782, Cl. 229-157.000.
- Nekovar, Anton; to Siemens Aktiengesellschaft. X-ray diagnostics installation, 4,955,043, Cl. 378-108.000.
- Nelson, Charles M.: See—  
Price, Donald; Price, Frank; and Nelson, Charles M., 4,954,202, Cl. 156-353.000.
- Nelson Industries, Inc.: See—  
Printiss, Frederick H., Sr., 4,953,899, Cl. 285-420.000.



- Nelson, John M., to Newell Companies, Inc. Spark igniter system. 4,954,078, Cl. 431-255.000.
- Nelson, Lawrence L. Heated cockroach trap. 4,953,320, Cl. 43-121.000.
- Nelson, Neal. Improved cable for coupling between data terminals and data sets. 4,954,101, Cl. 439-502.000.
- Nelson Research & Development Company. See—  
Wiegand, Karl E.; and Rude, Robert K., 4,954,448, Cl. 435-232.000.
- Nelson, Richard D.; and Herrell, Dennis J., to Microelectronics and Computer Technology Corporation. Low pressure high heat transfer fluid heat exchanger. 4,953,634, Cl. 165-147.000.
- Nemeth, Sandor. See—  
Besenyi, Gabor; Nemeth, Sandor; Simandi, Laszlo; Belak, Maria; Szabo, Maria; Dukai, Jozsef; Nagy, Lajos; Tomordi, Elemer; Soptei, Csaba; and Dioszegine, Erzsebet E., 4,954,628, Cl. 544-211.000.
- Nemoto, Ichiro. See—  
Nakagawa, Tadashi; Otoro, Takahito; and Nemoto, Ichiro, 4,954,860, Cl. 354-246.000.
- Nenadic, Anton. See—  
Carr, Jeffrey W.; David, Lawrence D.; Guthrie, William L.; Kaufman, Frank B.; Patrick, William J.; Rodbell, Kenneth P.; Pasco, Robert W.; and Nenadic, Anton, 4,954,142, Cl. 51-309.000.
- Nestec S.A. See—  
Akesson, Rune; and Pegoraro, Giuliano, 4,953,644, Cl. 177-145.000.
- Hsu, Sheng H., 4,954,060, Cl. 425-85.000.
- Neves, Mendes L. See—  
Jos, Doucet; and Neves, Mendes L., 4,954,213, Cl. 156-49.000.
- Nevins, Donald J.; and Nishitani, Kazuhiko, to University of California, The Regents of the. Ferroxanase, a highly specific enzyme for hydrolysis of complex polysaccharides. 4,954,447, Cl. 435-200.000.
- New Japan Chemical Co., Ltd. See—  
Kobayashi, Toshiaki; and Motomatsu, Keiko, 4,954,291, Cl. 252-315.100.
- Neward, Theodore C. Hand-held vacuum and pressure pump. 4,954,054, Cl. 417-440.000.
- Newell Companies, Inc. See—  
Nelson, John M., 4,954,078, Cl. 431-255.000.
- Newell, Harold R., to Mesur-Matic Electronics Corp. Electronic musical instrument with quantized resistance strings. 4,953,439, Cl. 84-655.000.
- Newman, Cathy D. See—  
DeVolk, Burton; Allen, Fritz; Newman, Cathy D.; and Fraatz, Robert J., 4,953,980, Cl. 356-338.000.
- Ng, Cher Y. See—  
Wong, Soon F.; Leong, Chee S.; and Ng, Cher Y., 4,955,071, Cl. 455-90.000.
- NGK Insulators, Ltd. See—  
Ito, Toshikazu; Harada, Takashi; and Hamanaka, Toshiyuki, 4,953,627, Cl. 165-8.000.
- Oikawa, Hiroshi; Nakashima, Naohisa; Matsuhisa, Tadaaki; and Ozawa, Tadao, 4,953,528, Cl. 123-276.000.
- NGK Spark Plug Co., Ltd. See—  
Suzuki, Takahiro; Izuoka, Yuki; and Aoki, Noboru, 4,954,743, Cl. 313-120.000.
- Nguyen, John Q. See—  
Munach, Arnold S.; and Nguyen, John Q., 4,953,475, Cl. 102-229.000.
- Nicholson, Alys E. See—  
Wierenga, Thomas J.; Ladd, Joseph M., Jr.; Merz, Russell J.; and Nicholson, Alys E., 4,954,285, Cl. 252-174.110.
- Niedzwiecki, Joseph L. See—  
Lipkin, Gregory M.; and Niedzwiecki, Joseph L., 4,954,247, Cl. 208-355.000.
- Nieman, Gerald R.; Clyatt, Clarence L., III; Paulus, Eric J.; Zehring, Scott A.; Ragl, Albert; and Moore, John R., to ITT Corporation. Filter contact. 4,954,794, Cl. 333-182.000.
- Nifco Inc. See—  
Sugita, Tooru, 4,953,907, Cl. 296-93.000.
- Nihon Parkerizing Co., Ltd. See—  
Sako, Ryohsuke; Hasebe, Akihiko; Nishihara, Akira; and Okita, Hiroshi, 4,954,372, Cl. 427-388.200.
- Nikken Chemical Laboratory Co., Ltd. See—  
Yoshida, Hajime, 4,954,173, Cl. 106-2.000.
- Nikku Industry Co., Ltd. See—  
Kawasaki, Takuya; and Kawakami, Osamu, 4,953,368, Cl. 18-5.000.
- Nikon Corporation. See—  
Ejima, Satoshi; and Yamamoto, Tetsuya, 4,954,897, Cl. 358-228.000.
- Nilsen, Ole K. Controlled electronic ballast. 4,954,754, Cl. 315-219.000.
- Nimlok Limited. See—  
Wilson, Mervyn; Gibbons, Martin; and Perutz, Simon, 4,953,338, Cl. 52-586.000.
- Nippon Cable System, Inc. See—  
Onimaru, Sadahiro; Kuratani, Fumiyasu; and Yoshino, Hiroyoshi, 4,953,672, Cl. 188-378.000.
- Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. See—  
Iwanami, Teruo; Miyata, Shigeo; and Moniyama, Takamasa, 4,954,557, Cl. 524-399.000.
- Oishi, Tsukasa; and Okuda, Tomohisa, 4,954,567, Cl. 525-62.000.
- Nippon Kayaku Kabushiki Kaisha. See—  
Suzuki, Shintaro; Yanagisawa, Noriaki; and Ohkuma, Taka'aki, 4,954,522, Cl. 514-492.000.
- Tate, Tochiyo; Takahira, Takashi; Yamashita, Kouwa; Sakurai, Masao; Shiozawa, Akira; and Narita, Kazuhisa, 4,954,642, Cl. 549-389.000.
- Nippon Oil and Fats Company, Limited. See—  
Suyama, Shuji; and Higuchi, Yoshiki, 4,954,656, Cl. 568-567.000.
- Nippon Seiko Kabushiki Kaisha. See—  
Tsukada, Toru, 4,953,988, Cl. 384-8.000.
- Nippon Seimitsu Kogyo Kabushiki Kaisha. See—  
Azeta, Takahiro; Kameyama, Toru; Sekiya, Harukazu; Moritani, Toshifumi; Higeta, Akira; Baba, Kenji; Matoba, Takeshi; Goto, Shinji; and Kubota, Kazuyuki, 4,953,846, Cl. 271-251.000.
- Nippon Sheet Glass Co., Ltd. See—  
Katsuki, Kazuo; Peppers, Norman A.; Young, James R.; Pierce, Gerald A.; and Nishi, Hisami, 4,955,060, Cl. 382-32.000.
- Pierce, Gerald A., 4,955,063, Cl. 382-18.000.
- Nippon Shokubai Kagaku Kogyo Co., Ltd. See—  
Abe, Tadashi; Manabe, Mitsuyoshi; Deguchi, Koji; Uhara, Hiroyuki; and Aoki, Yukio, 4,954,650, Cl. 562-534.000.
- Nippon Steel Welding Products & Engineering Co., Ltd. See—  
Araki, Nobuo; Tabata, Kazufumi; Yokoi, Kiyomi; and Ashidate Tadami, 4,953,827, Cl. 254-134.400.
- Nippon Zeon Co., Ltd. See—  
Kubo, Yoichiro; and Ohura, Kiyomori, 4,954,576, Cl. 525-339.000.
- Nishi, Hisami. See—  
Katsuki, Kazuo; Peppers, Norman A.; Young, James R.; Pierce, Gerald A.; and Nishi, Hisami, 4,955,060, Cl. 382-32.000.
- Nishi, Kunihiro. See—  
Saeiki, Junichi; Kaneda, Aizo; and Nishi, Kunihiro, 4,954,301, Cl. 264-40.100.
- Nishibayashi, Katsumi; and Teshima, Takashi, to Mita Industrial Co., Ltd. Static latent image development toner. 4,954,411, Cl. 430-111.000.
- Nishida, Kozi. See—  
Sasaki, Isao; Nishida, Kozi; and Anzai, Hisao, 4,954,575, Cl. 525-330.500.
- Nishida, Tetsuya; Terao, Motoyasu; Miyauchi, Yasushi; and Horigome, Shinkichi; to Hitachi, Ltd. Information recording thin film and method for recording information. 4,954,379, Cl. 428-64.000.
- Nishihara, Akira. See—  
Sako, Ryohsuke; Hasebe, Akihiko; Nishihara, Akira; and Okita, Hiroshi, 4,954,372, Cl. 427-388.200.
- Nishijima, Toyoki; and Tanji, Masaki, to Konica Corporation. Silver halide photographic light-sensitive material. 4,954,431, Cl. 430-546.000.
- Nishijima, Toyoki, to Konica Corporation. Photographic material with solvent having dielectric constant of 6 or less and yellow coupler. 4,954,432, Cl. 430-546.000.
- Nishikawa, Kazuo, to Kabushiki Kaisha Morita Seisakusho. Dental radiographic apparatus for photographing entire jaws. 4,955,042, Cl. 378-39.000.
- Nishikawa, Kazuya. See—  
Shinnai, Masao; Nishikawa, Kazuya; Tsukada, Tokio; and Hirotsu, Tohru, 4,954,797, Cl. 343-704.000.
- Nishikawa, Kohei. See—  
Sugihara, Hirosada; Nishikawa, Kohei; and Ito, Katsumi, 4,954,625, Cl. 540-500.000.
- Nishiki, Naomi. See—  
Murakami, Mutsuaki; Nishiki, Naomi; Yoshimura, Susumu; and Watanabe, Kazuhiro, 4,954,193, Cl. 156-155.000.
- Nishimura, Akira, to Kabushiki Kaisha Nishimura Jig. Vice jig. 4,953,840, Cl. 269-282.000.
- Nishimura, Akira; and Nakasui, Masaaki, to Sumitomo Electric Industries, Ltd. Transmission protective coated optical fiber tape. 4,953,945, Cl. 350-96.230.
- Nishitani, Kazuhiko. See—  
Nevins, Donald J.; and Nishitani, Kazuhiko, 4,954,447, Cl. 435-200.000.
- Nishiura, Masaharu; Ichimura, Takeshige; and Kamiyama, Michinari, to Fuji Electric Company Ltd.; and Fuji Electric Corporate Research and Development Ltd. Solar cell module and method of manufacture. 4,954,181, Cl. 136-244.000.
- Nishiyama, Yukio; Fujioka, Junzo; Hino, Haruki; Matsuzaki, Yuji; Sakiyama, Masayuki; and Yokoyama, Minoru, to Kawasaki Jukogyo Kabushiki Kaisha. Method and apparatus for manufacturing synthetic products. 4,954,314, Cl. 419-45.000.
- Nishizawa, Hiroshi. See—  
Nomura, Yoshihiro; Hanabusa, Kazuhito; Minamisawa, Hiroshi; Morinaga, Takashi; Sakata, Toichi; Mukoyama, Yoshiyuki; Nishizawa, Hiroshi; and Miyajima, Hiromu, 4,954,612, Cl. 528-353.000.
- Nissan Chemical Industries Ltd. See—  
Baba, Masatoshi; Kakuta, Takuya; Tanaka, Norio; Oya, Eiichi; Ikai, Takashi; Nawamaki, Tsutomu; Watanabe, Shigeomi; and Suzuki, Koichi, 4,954,165, Cl. 71-103.000.
- Suzuki, Fumio; Iwasawa, Yoshihiro; Sato, Toshiaki; Ikai, Takasi; and Oguti, Toshihiko, 4,954,164, Cl. 71-92.000.
- Nissan Motor Co., Ltd. See—  
Imaseki, Takashi; and Kobari, Yuji, 4,953,654, Cl. 180-197.000.
- Kawagoe, Kenji; Ito, Hideo; and Yokote, Masatsugu, 4,954,957, Cl. 364-424.050.
- Maeda, Kouzo; Yoshioka, Masanobu; and Hikone, Makoto, 4,953,423, Cl. 74-552.000.
- Maekawa, Junichi; Abe, Masanori; Ienaga, Hirofumi; and Hashimoto, Shigeaki, 4,953,910, Cl. 296-223.000.
- Nissen, Peter. See—  
Appel, Eggert; Kiene, Wilfried; Kuchemann, Rudi; Meier, Dieter; and Nissen, Peter, 4,953,408, Cl. 73-861.160.
- Nisshin Oil Mills, LTD., to: See—  
Yamada, Osamu; and Fujita, Tadasu, 4,954,443, Cl. 435-178.000.

- Nisshin Steel Co., Ltd. See—  
Takeshima, Eiiki; Takatsu, Kiyoshi; Kojima, Youichi; and Fujii, Takahiro, 4,954,235, Cl. 204-273.000.
- Nitecki, Danute E.; and Aldwin, Lois, to Cetus Corporation. Certain maleimide-N-alkylenecarboxylate-ortho-nitrobenzenesulfonic acid esters and derivatives useful for coupling biological materials. 4,954,637, Cl. 548-546.000.
- Nitrokaelepek. See—  
Besenyi, Gabor; Nemeth, Sandor; Simandi, Laszlo; Belak, Maria; Szabo, Maria; Dukai, Jozsef; Nagy, Lajos; Tomordi, Elemer; Soptei, Csaba; and Dioszegine, Erzsebet E., 4,954,628, Cl. 544-211.000.
- Nitta, Yoshihiko. See—  
Kajima, Ryota; Ihara, Hirokazu; Nitta, Yoshihiko; and Kaji, Hiroyuki, 4,954,984, Cl. 364-900.000.
- Nitto Electric Industrial Co., Ltd. See—  
Hosaka, Yoshifumi; Otsuka, Saburo; Kinoshita, Takashi; and Ito, Yusuke, 4,954,343, Cl. 424-448.000.
- Nitto Kogyo Kabushiki Kaisha. See—  
Kubota, Shigeru; Kanou, Shoji; and Kubo, Masahiro, 4,953,749, Cl. 221-168.000.
- Niwa, Koichi. See—  
Imanaka, Yoshihiko; Machi, Takato; Yamanaka, Kazunori; Yokoyama, Hiromitsu; Kamehara, Nobuo; and Niwa, Koichi, 4,954,480, Cl. 505-1.000.
- Noboru, Mitsuhiro, to Sharp Kabushiki Kaisha. Low noise converter. 4,955,076, Cl. 455-188.000.
- Noguchi, Koichi. See—  
Koike, Tadao; Noguchi, Koichi; Takahashi, Hiroshi; and Tsunoda, Koichi, 4,954,849, Cl. 355-319.000.
- Noguchi, Yoshihiro, to Nakamichi Corporation. Stationary tape guide for a magnetic tape recorder. 4,953,807, Cl. 242-76.000.
- Noji, Toshiyuki; Yoshida, Hidetoshi; Tatsumi, Eiji; Akao, Shinichi; and Kosaka, Hideyuki, to Mitsui Kensetsu Kabushiki Kaisha. Damping device in a structure and damping construction and damping method using those devices. 4,953,330, Cl. 52-167.0DF.
- Nojima, Hiroshi. See—  
Oguro, Katsunori; Nojima, Hiroshi; Hashizume, Nobuyuki; Ohno, Norio; and Naito, Taketoshi, 4,954,512, Cl. 514-352.000.
- Nolan, Michael P. See—  
Hira, Gerald M.; Sheahan, Dana M.; Wilson, Pamela L.; and Nolan, Michael P., 4,954,948, Cl. 364-200.000.
- Noland, Carl M., to Nekoosa Packaging Corporation. Fresh produce shipping container with self-locking top. 4,953,782, Cl. 229-157.000.
- Nolf, Jean-Marie E. See—  
Jensen, Michael L.; Nolf, Jean-Marie E.; Vansant, Jan; and Mendes, Luiz N., 4,954,670, Cl. 174-92.000.
- Nolle, William. See—  
Markow, Paul A.; and Nolle, William, 4,953,797, Cl. 242-7.110.
- Nomafa AB. See—  
Larsson, Nils H. I., 4,953,608, Cl. 160-1.000.
- Nomura, Ichiro. See—  
Suzuki, Hidetoshi; and Nomura, Ichiro, 4,954,744, Cl. 313-336.000.
- Nomura, Kenji. See—  
Uchikawa, Fusaoki; and Nomura, Kenji, 4,954,413, Cl. 430-135.000.
- Nomura, Yoshihiro; Hanabusa, Kazuhito; Minamisawa, Hiroshi; Morinaga, Takashi; Sakata, Toichi; Mukoyama, Yoshiyuki; Nishizawa, Hiroshi; and Miyajima, Hiromu, to Hitachi Chemical Co., Ltd. Solvent-soluble polyimide and production thereof. 4,954,612, Cl. 528-353.000.
- Nonaka, Naomichi. See—  
Nakane, Keiichi; Kuwabara, Tadashi; Ikeda, Naoya; Koreeda, Hiroyuki; Aotsu, Hiroaki; Kawase, Masaki; Tatsuno, Yujiro; Nonaka, Naomichi; and Suzuki, Kazunari, 4,954,818, Cl. 340-721.000.
- Nonaka, Wataru. See—  
Koda, Atsushi; Okuda, Shinji; and Nonaka, Wataru, 4,954,915, Cl. 360-92.000.
- Noonan, Kevin K., to Sophis Systems N.V. Method for simulating dyed fabric. 4,954,976, Cl. 364-578.000.
- Norabel AB. See—  
Lande, Goran, 4,953,775, Cl. 228-107.000.
- Nordco Limited. See—  
Guigne, Jacques Y., 4,955,001, Cl. 367-118.000.
- Norman Company, The. See—  
Gortz, Norman, 4,953,753, Cl. 222-105.000.
- Norman, Richard; Norman, Sonja; and Chamberlain, David, to Profitable Entertainment Products, Inc. Tossable strategy-type game with tri-dimensional playing surface. 4,953,870, Cl. 273-241.000.
- Norman, Sonja. See—  
Norman, Richard; Norman, Sonja; and Chamberlain, David, 4,953,870, Cl. 273-241.000.
- Norris, Thomas R. Fluid blow-off muffler. 4,953,659, Cl. 181-257.000.
- Norsolor. See—  
Boinot, Francois; Cousin, Michel; Hochin, Andre; and Meyer, Nicolas, 4,954,394, Cl. 428-289.000.
- Norsworthy, John P. See—  
Pfeiffer, David M.; Stoner, David T.; Norsworthy, John P.; Dipert, Dwight D.; Thompson, Jay A.; Fontaine, James A.; and Corry, Michael K., 4,955,024, Cl. 371-40.100.
- North American Philips Corporation. See—  
Crawford, Joseph A., 4,954,749, Cl. 315-97.000.
- Northern Telecom Limited. See—  
Ho, Vu Quoc, 4,954,214, Cl. 156-628.000.
- Norton Company. See—  
Butcher, Kenneth R.; Doddato, Carmine M.; and Stough, Donna M., 4,954,138, Cl. 51-293.000.
- Comert, Ahmet; Ladang, Michel; and Petit, Dominique, 4,953,885, Cl. 280-610.000.
- Notari, Bruno. See—  
Bellussi, Giuseppe; Buonomo, Franco; Esposito, Antonio; Clerici, Mario; Romano, Ugo; and Notari, Bruno, 4,954,653, Cl. 564-223.000.
- Notenboom, Leo A., to Microsoft Corporation. Compressing and decompressing text files. 4,955,066, Cl. 382-56.000.
- Nova-Tech Engineering, Inc. See—  
Herrmann, Karl H., 4,953,324, Cl. 49-255.000.
- Nowlin, Thomas E.; and Schurky, Kenneth G., to Mobil Oil Corporation. Chlorinated alcohol-containing catalyst composition for polymerizing alpha-olefins. 4,954,470, Cl. 502-107.000.
- Nozaki, Yuri. See—  
Tani, Sumio; Kogoh, Kazuhiko; Nozaki, Yuri; and Oshima, Kunihiro, 4,954,399, Cl. 428-402.000.
- NPD Research, Inc. See—  
Coffey, Steve; and Weber, William, 4,954,699, Cl. 235-462.000.
- Nu-Jer Electronics & Mfg. Inc. See—  
Willing, Jere J., 4,954,062, Cl. 425-135.000.
- Nulty, James E. See—  
Gabriel, Calvin T.; and Nulty, James E., 4,954,212, Cl. 156-627.000.
- Nuova Sanac S.p.A. See—  
Foglio, Salvatore, 4,953,760, Cl. 222-600.000.
- Nurra, Carmelo. See—  
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- N.V. Bekart S.A. See—  
DeWitte, Marc, 4,954,183, Cl. 148-15.000.
- O. M. Scott & Sons Company, The. See—  
Goertz, Harvey M., 4,954,154, Cl. 71-3.000.
- Obayashi, Akira. See—  
Yoshihama, Yoshio; Kagaya, Asuka; Matsui, Susumu; and Obayashi, Akira, 4,954,445, Cl. 435-191.000.
- Obitsu, Takeo; Ohnishi, Yutaka; Yoshinaka, Shinji; Koguchi, Minoru; Yanagita, Mitsuhiro; and Hirai, Nobuyuki, to Shin Nisso Kako Co., Ltd. Fluorane compounds and color forming recording materials using same. 4,954,631, Cl. 546-15.000.
- Obrecht, Werner; Wendling, Peter; Musch, Rudiger; and Muller, Eberhard, to Bayer Aktiengesellschaft. Process for the production of sulfur-modified polychloroprene. 4,954,585, Cl. 526-220.000.
- O'Brien, John J. See—  
Phillips, William R.; Bush, Blaine A.; O'Brien, John J.; and Thakken, Charles R., 4,953,610, Cl. 160-84.100.
- Occidental Chemical Corporation. See—  
Fertel, Lawrence B.; and O'Reilly, Neil J., 4,954,639, Cl. 548-475.000.
- Oda, Tatsuharu. See—  
Arata, Yoshiaki; and Oda, Tatsuharu, 4,953,950, Cl. 350-174.000.
- Odaka, Kentaro, to Sony Corporation. Encoding apparatus and method for error correction. 4,955,022, Cl. 371-37.400.
- Odle, Herbert A. See—  
Hammond, Douglas S.; and Odle, Herbert A., 4,954,935, Cl. 362-245.000.
- Offer, Henry P. See—  
Dixon, Robert C.; Deaver, Gerald A.; Panches, James R.; Singleton, Guy E.; Erbes, John G.; and Offer, Henry P., 4,954,311, Cl. 376-258.000.
- Ofting, Alfred; Tschang, Chung-Ji; Winkler, Ekhard; Gotsmann, Guenther; and Glaser, Klaus, to BASF Aktiengesellschaft. Chemical deposition of copper from alkaline aqueous baths. 4,954,369, Cl. 427-430.100.
- Ogata, Toshikazu. See—  
Yasufuku, Hitoshi; and Ogata, Toshikazu, 4,953,784, Cl. 236-44.00A.
- Ogawa, Masaharu. See—  
Nakatsu, Keiji; and Ogawa, Masaharu, 4,955,009, Cl. 369-32.000.
- Ogawa, Syozo. See—  
Kawashima, Masae; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Kosuke, 4,954,465, Cl. 502-5.000.
- Ogawa, Taro. See—  
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- Ogawa, Yasuaki. See—  
Yamamoto, Masaki; Takada, Shigeyuki; and Ogawa, Yasuaki, 4,954,298, Cl. 264-4.600.
- Ogihara, Satoru. See—  
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- Ogura, Kuniaki. See—  
Takajo, Shigeaki; Furukimi, Osamu; Ogura, Kuniaki; Maruta, Keiichi; Abe, Teruyoshi; and Sakurada, Ichio, 4,954,171, Cl. 75-246.000.
- Ogura, Takashi. See—  
Taniguchi, Kouji; Ogura, Takashi; and Tanaka, Koichi, 4,954,746, Cl. 313-506.000.
- Oguro, Katsunori; Nojima, Hiroshi; Hashizume, Nobuyuki; Ohno, Norio; and Naito, Taketoshi, to Okamoto, Shosuke; and Showa Denko Kabushiki Kaisha. Anti-ulcer composition. 4,954,512, Cl. 514-352.000.

- Oguti, Toshihiko: See—  
Suzuki, Fumio; Iwasawa, Yoshihiro; Sato, Toshiaki; Ikai, Takasi; and Oguti, Toshihiko, 4,954,164, Cl. 71-92.000.
- Ohba, Shinya: See—  
Akimoto, Hajime; and Ohba, Shinya, 4,954,895, Cl. 358-213.110.
- Ohbayashi Corporation: See—  
Goto, Yozo, 4,953,658, Cl. 181-207.000.
- Ohi, Kazumi: See—  
Ohtake, Toshiyazu; Hayashi, Munekazu; Idemura, Satoshi; Ohi, Kazumi; and Kunitake, Yuji, 4,954,304, Cl. 264-137.000.
- Ohi Seisakusho Co., Ltd.: See—  
Mackawa, Junichi; Abe, Masanori; Ienaga, Hirofumi; and Hashimoto, Shigeaki, 4,953,910, Cl. 296-223.000.
- Ohkawa, Takehiko: See—  
Oku, Teruo; Kasahara, Ciyoshi; Ohkawa, Takehiko; and Hashimoto, Masashi, 4,954,496, Cl. 514-231.500.
- Ohkita, Teruhiko: See—  
Fukao, Hiroaki; Ohkita, Teruhiko; Nagasaka, Nobusuke; and Ueno, Tateo, 4,953,484, Cl. 112-162.000.
- Ohkuma, Taka'aki: See—  
Suzuki, Shintaro; Yanagisawa, Noriaki; and Ohkuma, Taka'aki, 4,954,522, Cl. 514-492.000.
- Ohmi, Tadashi: See—  
Kanno, Yohichi; Satoh, Kazuhiko; and Hatayama, Tadashi, to Motoyama Eng. Works, Ltd. Metal diaphragm valve, 4,953,826, Cl. 251-331.000.
- Ohmura, Hiroshi: See—  
Mazda Motor Corporation. Rear wheel steering apparatus, 4,953,648, Cl. 180-79.100.
- Ohmura, Hiroshi: See—  
Mazda Motor Company. Rear wheel steering control system, 4,953,650, Cl. 180-79.100.
- Ohmura, Hiroshi; Nakashima, Takashi; and Murai, Takeshi, to Mazda Motor Corporation. Four-wheel steering system for motor vehicle, 4,953,652, Cl. 180-140.000.
- Ohmura, Hiroshi; Arai, Takuya; Haishi, Akira; Kozai, Katsuya; Hara, Hiroshi; Tobika, Takashi; Asano, Seiji; and Takagi, Junichi, to Fuji Photo Film Co., Ltd. Lens-fitted photographic film package, 4,954,858, Cl. 354-145.100.
- Ohmura, Hiroshi: See—  
Mochida, Mitsuyoshi; Maekawa, Tokuo; Takei, Hisashi; Matsumoto, Yasuo; Ohmura, Hiroshi; Sugimoto, Shigeru; Ushiro, Seimei; Asano, Seiji; and Yoshida, Toshio, 4,954,857, Cl. 354-75.000.
- Ohnishi, Yutaka: See—  
Obitsu, Takeo; Ohnishi, Yutaka; Yoshinaka, Shinji; Koguchi, Minoru; Yanagita, Mitsuhiro; and Hirai, Nobuyuki, 4,954,631, Cl. 546-15.000.
- Ohno, Norio: See—  
Oguro, Katsunori; Nojima, Hiroshi; Hashizume, Nobuyuki; Ohno, Norio; and Naito, Taketoshi, 4,954,512, Cl. 514-352.000.
- Ohnsorge, Horst: See—  
Kuppers, Dieter; Herse, Klaus; Hiepe-Wohlleben, Kate; Kaiser, Manfred; Mohr, Friedemann; and Ohnsorge, Horst, 4,955,014, Cl. 370-3.000.
- Ohr, Dirk, to Rendamax BV. Process and device for conveying boilable liquids, 4,954,048, Cl. 417-209.000.
- Ohta, Shigetoshi: See—  
Tanemura, Fumikazu; Honda, Tohru; Ohta, Shigetoshi; Kajita, Yoshiharu; and Kachi, Tatsushi, 4,954,460, Cl. 501-80.000.
- Ohtaka, Keiji: See—  
Suzuki, Kenji; Ohtaka, Keiji; and Suda, Yasuo, 4,954,101, Cl. 250-201.800.
- Ohtake, Toshiyazu; Hayashi, Munekazu; Idemura, Satoshi; Ohi, Kazumi; and Kunitake, Yuji, to Dainippon Ink and Chemical, Inc. Process for producing prepreg and laminated sheet, 4,954,304, Cl. 264-137.000.
- Ohtsuka, Naoki, to Canon Kabushiki Kaisha. Magnet and method of manufacturing the same, 4,954,800, Cl. 335-284.000.
- Ohura, Kiyomori: See—  
Kubo, Yoichiro; and Ohura, Kiyomori, 4,954,576, Cl. 525-339.000.
- Ohyama, Tsukasa: See—  
Takuma, Keisuke; Ohyama, Tsukasa; Ghoda, Isamu; Mikoda, Tamio; Koshida, Hitoshi; and Igata, Akitoshi, 4,954,410, Cl. 430-109.000.
- Ohzu, Hayao, to Canon Kabushiki Kaisha. Color line sensor apparatus, 4,954,703, Cl. 250-208.100.
- Oikawa, Hiroshi; Nakashima, Naohisa; Matsuhisa, Tadaaki; and Ozawa, Tadao, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha; and NGK Insulators, Ltd. Direct injection-type diesel engines, 4,953,528, Cl. 123-276.000.
- Oikawa, Ryetsu, to Yazaki Corporation. Clip, 4,953,801, Cl. 248-65.000.
- Oikawa, Toru: See—  
Shinagawa, Yukio; Oikawa, Toru; Yamanouchi, Junichi; and Shiratsuchi, Kentaro, 4,954,419, Cl. 430-215.000.
- Oishi, Tsukasa; and Okuda, Tomohisa, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Process for preparing polyvinyl alcohol having high degree of polymerization, 4,954,567, Cl. 525-62.000.
- Oizumi, Hiroaki: See—  
Mochiji, Kozo; Oizumi, Hiroaki; Soda, Yasunari; Ogawa, Taro; and Kimura, Takeshi, 4,954,424, Cl. 430-323.000.
- Oka, Masahiko; Uemoto, Hiroshi; and Iwasaki, Yasuji, to Daikin Industries Ltd. Novel fluorine-containing non-crystalline copolymer, 4,954,588, Cl. 526-247.000.
- Oka, Tateki; Toyoshi, Naoki; and Toda, Kunio, to Minolta Camera Kabushiki Kaisha. Electrophotographic image forming apparatus, 4,954,843, Cl. 355-210.000.
- Oka, Tetsuo: See—  
Katsumata, Ryoichi; Mizukami, Toru; and Oka, Tetsuo, 4,954,441, Cl. 435-115.000.
- Okada, Mizuo: See—  
Ito, Akira; and Okada, Mizuo, 4,953,948, Cl. 350-128.000.
- Okada, Tadao: See—  
Kondo, Hiroshi; and Okada, Tadao, 4,953,656, Cl. 180-226.000.
- Okada, Takashi; and Matsuzaki, Atsushi, to Sony Corporation. Television receiver with two electron beams simultaneously scanning along respective vertically spaced apart lines, 4,954,901, Cl. 358-242.000.
- Okada, Toyokazu: See—  
Okumura, Takuzo; Okada, Toyokazu; Kikui, Hitoshi; and Nakata, Kazuo, 4,953,952, Cl. 350-337.000.
- Okado, Kenji: See—  
Inoue, Masahiro; Tajima, Hatsuo; Sakemi, Yuji; and Okado, Kenji, 4,954,404, Cl. 430-45.000.
- Okajima, Kenichi: See—  
Takahashi, Tetsuhiko; Okajima, Kenichi; and Takeuchi, Hiroshi, 4,954,706, Cl. 250-327.200.
- Okamoto, Rokuro: See—  
Yoshimoto, Akihiro; Jodo, Osamu; Watanabe, Yoshio; Okamoto, Rokuro; and Takeuchi, Tomio, 4,954,438, Cl. 435-78.000.
- Okamoto, Shosuke: See—  
Oguro, Katsunori; Nojima, Hiroshi; Hashizume, Nobuyuki; Ohno, Norio; and Naito, Taketoshi, 4,954,512, Cl. 514-352.000.
- Okamura, Kenji: See—  
Segoshi, Kazuo; Okuda, Toshiyuki; Okamura, Kenji; and Yoshida, Mizuo, 4,953,966, Cl. 351-41.000.
- Okamura, Kiyohito; Sato, Mitsuhiro; Hasegawa, Yoshio; Seguchi, Tadao; and Kawanishi, Shunichi, to Japan Atomic Energy Research Institute. High purity and high strength inorganic silicon nitride continuous fiber, 4,954,461, Cl. 501-95.000.
- Okamura, Ryuji: See—  
Amada, Hiroshi; Aoi, Kei; Tatsuyuki, Yoshino; Takehito; and Okamura, Ryuji, 4,954,397, Cl. 430-58.000.
- Okamura, Shinobu: See—  
Akutagawa, Ichiro; Yamaguchi, Tsutomu; Hanamori, Toshihiro; Matsuzaki, Kunimitsu; and Okamura, Shinobu, 4,954,602, Cl. 528-93.000.
- Okano, Kazuo: See—  
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,954,523, Cl. 514-521.000.
- Okano, Tadashi; and Honda, Tadayoshi, to Shimizu Construction Co., Ltd. Crane and method for using crane, 4,953,720, Cl. 212-176.000.
- Okiai, Ryuichi: See—  
Sakaya, Masuji; Okiai, Ryuichi; Mochizuki, Masataka; and Mashiko, Kouichi, 4,953,632, Cl. 165-104.260.
- Okino, Yoshinori, to Mazda Motor Corporation. Slip control system for lock-up clutch of automatic transmission, 4,953,679, Cl. 192-0.096.
- Okita, Hiroshi: See—  
Sako, Ryohsuke; Hasebe, Akihiko; Nishihara, Akira; and Okita, Hiroshi, 4,954,372, Cl. 427-388.200.
- Oku, Teruo; Kasahara, Ciyoshi; Ohkawa, Takehiko; and Hashimoto, Masashi, to Fujisawa Pharmaceutical Company, Ltd. Cyclohexane derivatives and pharmaceutical compositions, 4,954,496, Cl. 514-231.500.
- Okubo, Tadahiko; Takagi, Jun; and Kohara, Tadashi, to Toray Engineering Co., Ltd. Yarn winding device, 4,953,800, Cl. 242-45.000.
- Okuda, Shinji: See—  
Koda, Atsushi; Okuda, Shinji; and Nonaka, Wataru, 4,954,915, Cl. 360-92.000.
- Okuda, Tomohisa: See—  
Oishi, Tsukasa; and Okuda, Tomohisa, 4,954,567, Cl. 525-62.000.
- Okuda, Toshiyuki: See—  
Segoshi, Kazuo; Okuda, Toshiyuki; Okamura, Kenji; and Yoshida, Mizuo, 4,953,966, Cl. 351-41.000.
- Okuma, Shigeru: See—  
Iwata, Koji; Okuma, Shigeru; Kimura, Yoshimasa; Konata, Yoshihiro; and Kaneko, Kiyoshi, 4,953,413, Cl. 74-1.055.
- Okumura, Hiroshi: See—  
Kimura, Yutaka; Okumura, Hiroshi; Mihara, Hirokazu; and Yoshida, Mitsutoshi, 4,954,761, Cl. 318-568.100.
- Yoshida, Mitsutoshi; Tsubota, Toshio; and Okumura, Hiroshi, 4,954,043, Cl. 414-719.000.
- Okumura, Katsuya; Watanabe, Tohru; and Watake, Masami, to Kabushiki Kaisha Toshiba. Method for etching a pattern, 4,954,218, Cl. 156-643.000.
- Okumura, Takuzo; Okada, Toyokazu; Kikui, Hitoshi; and Nakata, Kazuo, to Sumitomo Chemical Company, Ltd. Color liquid crystal displaying panels, 4,953,952, Cl. 350-337.000.
- Okuyama, Nobuhisa; Goto, Shuichi; and Enomoto, Tsugio, to Toyo Engineering Corporation; and Mikuni Jukogyo Co., Ltd. Evacuation apparatus, 4,954,047, Cl. 417-203.000.
- Olin Corporation: See—  
Ashok, Sankaranarayanan; Cheski, Harvey P.; and Shapiro, Eugene, 4,953,382, Cl. 72-262.000.
- Lewis, Brian G., 4,953,487, Cl. 118-620.000.
- Schiesl, Henry W.; and Manke, Steven A., 4,954,614, Cl. 528-483.000.
- Oliphant, Timothy L.: See—  
Smith, Rod; Oliphant, Timothy L.; and Stephens, Charles E., 4,954,051, Cl. 417-305.000.

- Olsen, Gordon E.: See—  
Helsley, Grover C.; Davis, Larry; and Olsen, Gordon E., 4,954,511, Cl. 514-327.000.
- Olson, Jack R.; Hitner, Herbert V.; Paulus, Richard A.; and Anderson, Kenneth D., to United States of America, Navy. Air/sea temperature probe, 4,953,986, Cl. 374-136.000.
- Olson, Kurt G.: See—  
Bull, Larry J.; Sieradzki, Raymond; and Olson, Kurt G., 4,954,556, Cl. 524-378.000.
- Olson, Ramona Z.: See—  
Chandler, Bill B.; and Olson, Ramona Z., 4,954,940, Cl. 363-146.000.
- Olympus Optical Co., Ltd.: See—  
Ishiwata, Hiroshi; Ikegame, Tetsuo; and Ikari, Ichiro, 4,953,959, Cl. 350-432.000.
- Kikuchi, Akira; and Ono, Katsuya, 4,953,937, Cl. 350-96.180.
- Kobayashi, Yuko, 4,953,957, Cl. 350-423.000.
- Nakamura, Kazunari; Hagiwara, Toshihiko; and Takano, Akira, 4,953,539, Cl. 128-6.000.
- Sato, Masaaki, 4,955,051, Cl. 379-75.000.
- Omoto, Noriaki, to Matsushita Electric Industrial Co., Ltd. AFC apparatus with selection between average value mode and keyed mode, 4,955,074, Cl. 455-182.000.
- Omron Tateisi Electronics Company: See—  
Hirako, Shinichi, 4,953,979, Cl. 356-338.000.
- Onimaru, Sadahiro; Kuratani, Fumiyasu; and Yoshino, Hiroyoshi, to Nippon Cable System, Inc. Control cable system with device for reducing vibration, 4,953,672, Cl. 188-378.000.
- Ono, Hisao; Sato, Ryuji; and Miyachi, Takumi, to Japan Synthetic Rubber Company, Ltd. Catalyst for polymerization of conjugated diene and process for producing conjugated diene polymer, 4,954,125, Cl. 526-138.000.
- Ono, Katsuya: See—  
Kikuchi, Akira; and Ono, Katsuya, 4,953,937, Cl. 350-96.180.
- Ono, Kenichi, to Kabushiki Kaisha Toshiba. Apparatus for forming color graphic arts films for an original plate, 4,954,887, Cl. 358-75.000.
- Onodera, Hiromi: See—  
Wakabashi, Noriaki; Yoshida, Shuichi; Inaji, Toshio; Onodera, Hiromi; Yoshiura, Tsukasa; and Mitani, Hiroshi, 4,954,905, Cl. 360-77.030.
- Onodera, Tamio; Sakai, Tokuji; Yamasaki, Yasuo; and Sumitani, Koji, to Teijin Petrochemical Industries, Ltd. Preparation of crystalline aluminosilicate zeolite, and its product, 4,954,326, Cl. 423-328.000.
- Oppliger, Max, to Sandoz Ltd. Mixtures of a 1:1 copper or nickel complex of a stilbene-azo or stilbene-azoxy compound having two 4,4'-(2,2'-disulfostilbenylene) radicals and a 1:1 copper or nickel complex of a stilbene-azo or stilbene-azoxy compound having one such radical, 4,954,133, Cl. 8-681.000.
- Opschoor, Jan; van der Poel, Carolus J.; and van 't Blik, Henri F. J., to U.S. Philips Corp. Bidimensional laser array with two groups of active regions, 4,954,971, Cl. 372-50.000.
- O'Reilly, Neil J.: See—  
Fertel, Lawrence B.; and O'Reilly, Neil J., 4,954,639, Cl. 548-475.000.
- Orezzi, Piergiuseppe: See—  
Alpegiani, Marco; Perrone, Ettore; Orezzi, Piergiuseppe; Carminati, Paolo; and Cassinelli, Giuseppe, 4,954,493, Cl. 514-195.000.
- Oricz, Robert; and Gras, Elie, to Anver. Apparatus for high frequency molding of liquid plastic material, 4,954,073, Cl. 425-547.000.
- Orii, Akira: See—  
Sano, Yasuro; Orii, Akira; and Murakami, Eiji, 4,953,486, Cl. 112-447.000.
- Orii, Kazuya: See—  
Kawashima, Norimichi; and Orii, Kazuya, 4,954,140, Cl. 51-295.000.
- Oros, Gyula: See—  
Strumpf, Thomas; Lyr, Horst; Zanke, Dieter; Zollfrank nee Baumann, Gerlinde; Oros, Gyula; Viranyi, Ferenc; and Ersek, Tibor, 4,954,495, Cl. 514-231.200.
- Orr, Steven K., to Cincinnati Microwave, Inc. Long range police radar warning receiver, 4,954,828, Cl. 342-20.000.
- Ortopedia GmbH: See—  
Korber, Hans W.; Koster, Reinhard; Linse, Ewald; and Simmat, Dieter, 4,953,645, Cl. 180-6.500.
- Oshima, Kunihiko: See—  
Tani, Sumio; Kogoh, Kazuhiko; Nozaki, Yuri; and Oshima, Kunihiko, 4,954,399, Cl. 428-402.000.
- Osmer, Frederick S.: See—  
Rys, Karla J.; Greene, Alan P.; Osmer, Frederick S.; and Podgorsky, Joseph J., 4,954,282, Cl. 252-117.000.
- Osumi, Toru; Ito, Shoji; and Hashimoto, Kenji, to Aisin Seiki Kabushiki Kaisha. Electro-magnetic proportional flow control valve, 4,953,825, Cl. 251-129.170.
- Oswald, Johannes R.; and Guggenberger, Eduard, to Voest-Alpine Maschinenbau Gesellschaft m.b.H. Railway switch comprising a frog having a movable main point and auxiliary point, 4,953,814, Cl. 246-382.000.
- Ota, Michiya: See—  
Otani, Sugio; Kojima, Akira; and Ota, Michiya, 4,954,607, Cl. 528-230.000.
- Otani, Mikio: See—  
Sugawara, Kiyomi; Tsutsumi, Kentaro; and Otani, Mikio, 4,954,589, Cl. 526-255.000.
- Otani, Sugio; Kojima, Akira; and Ota, Michiya, to Gunma University. Ferromagnetic organic substance having triaryl methane structure and process for manufacturing the same, 4,954,607, Cl. 528-230.000.
- Otis Elevator Company: See—  
Johnson, Gerald, 4,953,685, Cl. 198-328.000.
- Otara, Takahito: See—  
Nakagawa, Tadashi; Otara, Takahito; and Nemoto, Ichiro, 4,954,860, Cl. 354-246.000.
- Otsap, Ben A.: See—  
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- Otsuka, Kazuhisa: See—  
Torii, Nobutoshi; and Otsuka, Kazuhisa, 4,953,992, Cl. 384-607.000.
- Otsuka, Saburo: See—  
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- Ott, Rita: See—  
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- Ott, Wilfried, to Ott, Rita. Gas injection equipment, 4,954,296, Cl. 261-122.000.
- Oude Maatman, Anthonius J. H. M.: See—  
Serro, Jan M.; Cuypers, Martinus H.; and Oude Maatman, Anthonius J. H. M., 4,954,028, Cl. 409-26.000.
- Outlaw, Tina O.: See—  
Langsdorf, John W.; and Outlaw, Tina O., 4,953,396, Cl. 73-49.300.
- Output Technology Corporation: See—  
Sims, Louis; LeFric, Fred; Dubner, Joseph; and Peavey, Brian, 4,953,995, Cl. 400-121.000.
- Ovshinsky, Stanford R.; and Adler, David, to Energy Conversion Devices, Inc. Multiple cell photoresponsive amorphous photo voltaic devices including graded band gaps, 4,954,182, Cl. 136-249.000.
- Oweida, Steven W.: See—  
Powers, James C.; Kam, Chih-Min; Oweida, Steven W.; and Ku, David N., 4,954,519, Cl. 514-456.000.
- Oy Master Instruments Ltd.: See—  
Raitmaa, Raimo; and Jansson, Per-Olof, 4,953,304, Cl. 33-355.00R.
- Oy Wik & Högland AG: See—  
Storgard, Christer, 4,954,016, Cl. 405-184.000.
- Oya, Eiichi: See—  
Baba, Masatoshi; Kakuta, Takuya; Tanaka, Norio; Oya, Eiichi; Ikai, Takashi; Nawamaki, Tsutomu; Watanabe, Shigeomi; and Suzuki, Koichi, 4,954,165, Cl. 71-103.000.
- Ozaki, Keiichi; Manabe, Naoki; Shibata, Tatsumi; Hayashi, Hideharu; Muramatsu, Yukio; and Yamamoto, Masaki, to Yazaki Corporation. Wiring connection apparatus, 4,954,102, Cl. 439-535.000.
- Ozawa, Kazuhiro: See—  
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- Ozawa, Norio: See—  
Ichihara, Katsutarou; Ozawa, Norio; and Yasuda, Nobuaki, 4,954,841, Cl. 346-135.100.
- Ozawa, Tadao: See—  
Oikawa, Hiroshi; Nakashima, Naohisa; Matsuhisa, Tadaaki; and Ozawa, Tadao, 4,953,528, Cl. 123-276.000.
- Ozeki, Takeshi: See—  
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- Ozios, David A.: See—  
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- Page, Ronald C.; and Hunt, Alan W., to Massey-Ferguson Services N.V. Clutch actuation system, 4,953,678, Cl. 192-67.00R.
- Pall Corporation: See—  
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- Park, Hong C., to Goldstar Co., Ltd. Driving method for 3-D high luminance LCD projector, 4,954,890, Cl. 358-88.000.
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- Hassler, William L., Jr., 4,954,931, Cl. 362-32.000.
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- Quisenberry, Terry. One way animal gate. 4,953,323, Cl. 49-58.000.
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- Rafalow, Lee M.: See—  
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- Raible, Donald A., to Baxter International, Inc. Blood oxygenator. 4,954,317, Cl. 422-46.000.
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- Rassool, Reza P.: See—  
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- Rauh, Hans-Jurgen, to Agfa-Gevaert Aktiengesellschaft. Method of and apparatus for delivering webs of photosensitive material to a printer. 4,953,805, Cl. 242-58.600.
- Ray, Charles D.; and Dickhudt, Eugene A., to Surgical Dynamics, Inc. Framework for supporting surgical instruments at a surgical wound. 4,953,540, Cl. 128-20.000.
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- Jos, Doucet; and Neves, Mendes L., 4,954,213, Cl. 156-49.000.
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- Rector, James W., to Western Atlas International, Inc. Method for reducing noise in drill string signals. 4,954,998, Cl. 367-82.000.
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- Redman, Brian E., to Bell Communications Research, Inc. Method and apparatus for program updating. 4,954,941, Cl. 364-200.000.
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- Reel, Jerry R.: See—  
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- Regitar Power Tools Co., Ltd.: See—  
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- Rehage, Gerhard; Staeger, Manfred; and Grunkemeier, Hans W., to Gildemeister Aktiengesellschaft. Machine tool with two workpiece spindles. 4,953,274, Cl. 29-27.00C.
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- Reiss, Peter F., to Atlas Powder Company. Multi-directional signal transmission in a blast initiation system. 4,953,464, Cl. 102-312.000.
- Reist, Walter, to Ferag AG. Method of, and apparatus for, loading a singling installation for printed products. 4,953,843, Cl. 271-3.100.
- Reliance Comm/Tec Corporation: See—  
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- Richmond, James W., to Emhart Industries, Inc. Rattle resistant gear-shift position indicator. 4,953,493, Cl. 116-28.100.

- Richmond, James W., to Emhart Industries Inc. Automotive wheel speed sensor assembly with multipole rotor mounted on wheel bearing spindle. 4,954,775, Cl. 324-174.000.
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Rubin, Henri, to Commodore-Amiga, Inc. Universal connector device for bus networks in host computer/co-processor computer system, 4,954,949, Cl. 364-200.000.  
Rubin, Mae K.; and Chu, Pochen, to Mobil Oil Corp. Composition of synthetic porous crystalline material, its synthesis and use, 4,954,325, Cl. 423-328.000.  
Rubinet Brass Canada Limited: See—  
Rollini, Pietro; and Luisi, Domenic, 4,953,585, Cl. 137-218.000.  
Rubino, John. Hand-spinnable top and kit therefor, 4,954,116, Cl. 446-256.000.  
Ruchel, James E. Nonfreezing fishing apparatus, 4,953,317, Cl. 43-17.000.  
Ruchel, Peter: See—  
Gaag, Norbert; and Ruchel, Peter, 4,954,187, Cl. 148-413.000.  
Rudd, David: See—  
Swofford, Howard W.; Rice, Sandra W.; Farrar, Grover L.; and Rudd, David, 4,954,396, Cl. 428-340.000.  
Ruddock, John C.: See—  
Maeda, Hiroshi; Tonic, Junsuke; Ruddock, John C.; and Holdom, Kelvin S., 4,954,482, Cl. 514-8.000.  
Rude, Robert K.: See—  
Wiegand, Karl E.; and Rude, Robert K., 4,954,448, Cl. 435-232.000.  
Rudenaer, Werner: See—  
Postler, Gunter; Bock, Erich; von Entress-Furstenneck, Wolfgang; and Rudenaer, Werner, 4,953,813, Cl. 244-147.000.  
Ruehl, William E., to Illinois Tool Works, Inc. Ground start key switch, 4,954,672, Cl. 200-51.090.  
Ruggiero, Paolo; and Petracca, Roberto, to Sclavo S.p.A. Method for the immunolocalization of antigens with the use of antibodies directed against epitopes of non-glucidic nature, 4,954,433, Cl. 435-7.000.  
Rulke, Gerhart, to Inventio AG. Balustrade for a transportation apparatus especially an escalator or a passenger walkway, 4,953,686, Cl. 198-332.000.  
Rumbaugh, Duane M.: See—  
Savage-Rumbaugh, E. Sue; Rumbaugh, Duane M.; Smith, Samuel O.; and Smith, Michael B., 4,953,500, Cl. 119-17.000.  
Rushmere, John D., to Du Pont de Nemours, E. I., and Company. Polysilicate microgels as retention/drainage aids in papermaking, 4,954,220, Cl. 162-168.300.  
Rusk, George R., to Xcel Corporation (Computron Display Systems Division). Power source circuit, 4,954,758, Cl. 315-411.000.  
Russell, John C.: See—  
Yost, David A.; Russell, John C.; and Yang, Heechung, 4,954,452, Cl. 436-524.000.  
Ryoichi, Takahashi: See—  
Shoji, Takeuchi; Katsuyoshi, Iino; and Ryoichi, Takahashi, 4,953,362, Cl. 62-246.000.  
Ryrko, Bruno: See—  
Ebert, Wolfram; Handrich, Eberhard; Hafen, Martin; and Ryrko, Bruno, 4,953,834, Cl. 267-160.000.  
Rys, Karla J.; Greene, Alan P.; Osmer, Frederick S.; and Podgorsky, Joseph J., to Lever Brothers Company. Acyl isethionate skin cleansing compositions, 4,954,282, Cl. 252-117.000.  
Rzechula, Michael J., to Slick Ice Limited. Additive for treating water used to form ice, 4,953,360, Cl. 62-66.000.  
S. A. Day Manufacturing Co., Inc.: See—  
Conn, Paul J., 4,954,184, Cl. 148-24.000.  
S. C. Johnson & Son, Inc.: See—  
Tsaur, Sheng-Liang, 4,954,558, Cl. 525-460.000.  
S.F. Muller & Partner: See—  
Muller, Roger; and Bee, Giancarlo, 4,954,255, Cl. 210-437.000.  
SAB Nife AB: See—  
Severinsson, Lars M., 4,953,669, Cl. 188-171.000.  
SAB Nordic AB: See—  
Severinsson, Lars M., 4,953,668, Cl. 188-158.000.  
Sackler, Mortimer D.; Miller, Ronald B.; Pinter, Erwig O.; Rackur, Helmut E. W.; Sackler, Raymond R.; Sackler, Richard S.; and Halpern, Alfred, deceased (by Halpern, Marjorie A., administratrix), to Euroceltique S.A. Method of producing standardized povidone iodine preparations and such preparations, 4,954,351, Cl. 424-667.000.  
Sackler, Raymond R.: See—  
Sackler, Mortimer D.; Miller, Ronald B.; Pinter, Erwig O.; Rackur, Helmut E. W.; Sackler, Raymond R.; Sackler, Richard S.; and Halpern, Alfred, deceased, 4,954,351, Cl. 424-667.000.  
Sackler, Richard S.: See—  
Sackler, Mortimer D.; Miller, Ronald B.; Pinter, Erwig O.; Rackur, Helmut E. W.; Sackler, Raymond R.; Sackler, Richard S.; and Halpern, Alfred, deceased, 4,954,351, Cl. 424-667.000.  
Sacripante, Guerino: See—  
Breton, Marcel P.; Deslandes, Yves; and Sacripante, Guerino, 4,954,412, Cl. 430-137.000.  
Saeki, Junichi; Kaneda, Aizo; and Nishi, Kunihiro, to Hitachi, Ltd. Transfer molding process and an apparatus for the same, 4,954,301, Cl. 264-40.100.  
Saeki, Yukihiro; and Nakamura, Toshimasa, to Kabushiki Kaisha Toshiba. Semiconductor memory with p-channel load transistor, 4,954,991, Cl. 365-189.010.  
Safety by Design, Inc.: See—  
August, Alfred A., Sr.; and Jackson, Anthony M., 4,954,813, Cl. 340-571.000.  
Safron, Inc.: See—  
Weaver, James R., III, 4,953,830, Cl. 256-65.000.

- Saida, Yoshihiro: See—  
Yoshida, Haruo; Uotani, Nobuo; and Saida, Yoshihiro, 4,954,590, Cl. 526-259.000.  
Saijo, Yasutsugu: See—  
Yano, Kanji; Saijo, Yasutsugu; Kusaka, Kensaku; and Hirabayashi, Hiromitsu, 4,954,845, Cl. 355-290.000.  
Saint-Gobain Vitrage: See—  
Jamet, Bernard, 4,954,306, Cl. 264-210.200.  
Saito, Horiyuki: See—  
Matsumoto, Yukio; Saito, Horiyuki; and Morita, Kuniki, 4,953,835, Cl. 267-180.000.  
Saito, Kenji: See—  
Nakayama, Yoshiaki; Saito, Kenji; and Kawada, Yukihiro, 4,954,884, Cl. 358-29.000.  
Saito, Takayoshi: See—  
Tsujimura, Osamu; Arai, Tatsuo; and Saito, Takayoshi, 4,954,021, Cl. 407-35.000.  
Saito, Yoshimasa: See—  
Kotani, Terumitsu; Taka, Toshio; and Saito, Yoshimasa, 4,954,391, Cl. 428-220.000.  
Saitoh, Keishi: See—  
Hashizume, Junichiro; Takei, Tetsuya; Jida, Shigehira; Saitoh, Keishi; and Arai, Takayoshi, 4,953,498, Cl. 118-719.000.  
Sakai, Tokuji: See—  
Onodera, Tamio; Sakai, Tokuji; Yamasaki, Yasuo; and Sumitani, Koji, 4,954,326, Cl. 423-328.000.  
Sakairi, Tadashi: See—  
Ishii, Kazunori; Terakado, Seishi; Funakoshi, Yasutomo; and Sakairi, Tadashi, 4,954,696, Cl. 219-548.000.  
Sakamoto, Fumio: See—  
Maegawa, Mamoru; and Sakamoto, Fumio, 4,954,930, Cl. 362-26.000.  
Sakamoto, Kiichi; Yasuda, Hiroshi; Yamada, Akio; and Kudou, Jinko, to Fujitsu Limited. Photoelectron mask and photo cathode image projection method using the same, 4,954,717, Cl. 250-492.300.  
Sakamoto, Toshihiro: See—  
Kawamoto, Tetsuo; Motohashi, Ryo; Sakamoto, Toshihiro; Suzuki, Yasuo; and Abe, Hideaki, 4,954,736, Cl. 316-156.000.  
Sakamoto, Yoshio: See—  
Aoki, Kazutsugu; Fuse, Noboru; and Sakamoto, Yoshio, 4,954,684, Cl. 219-390.000.  
Sakata, Toichi: See—  
Nomura, Yoshihiro; Hanabusa, Kazuhito; Minamisawa, Hiroshi; Morinaga, Takashi; Sakata, Toichi; Mukoyama, Yoshiyuki; Nishizawa, Hiroshi; and Miyajima, Hiromu, 4,954,612, Cl. 528-353.000.  
Sakaya, Masuji; Okiai, Ryuichi; Mochizuki, Masataka; and Mashiko, Kouichi, to Fujiura Ltd. Heat pipe and method of manufacturing the same, 4,953,632, Cl. 165-104.260.  
Sakayori, Hiroyuki: See—  
Yamazaki, Shunpei; Mase, Akira; and Sakayori, Hiroyuki, 4,954,217, Cl. 156-643.000.  
Sakemi, Yuji: See—  
Inoue, Masahiro; Tajima, Hatsuo; Sakemi, Yuji; and Okado, Kenji, 4,954,404, Cl. 430-45.000.  
Sakito, Yoji: See—  
Suzukamo, Gohfu; Sakito, Yoji; Fukao, Masami; and Hagiya, Koji, 4,954,651, Cl. 562-856.000.  
Sakiyama, Masayuki: See—  
Nishiyama, Yukio; Fujioka, Junzo; Hino, Haruki; Matsuzaki, Yuji; Sakiyama, Masayuki; and Yokoyama, Minoru, 4,954,314, Cl. 419-45.000.  
Sako, Ryohsuke; Hasebe, Akihiko; Nishihara, Akira; and Okita, Hiroshi, to Nihon Parkerizing Co., Ltd. Metal surface hydrophilicizing process and composition, 4,954,372, Cl. 427-388.200.  
Sako, Yuji, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for resetting appliance, 4,954,668, Cl. 200-314.000.  
Sakuma, Susumu. Follow-up system for moving bodies, 4,954,836, Cl. 342-450.000.  
Sakura Color Products Corporation: See—  
Imagawa, Kiyotaka, 4,954,174, Cl. 106-27.000.  
Sakurada, Ichio: See—  
Takajo, Shigeaki; Furukimi, Osamu; Ogura, Kuniaki; Maruta, Keiichi; Abe, Teruyoshi; and Sakurada, Ichio, 4,954,171, Cl. 75-246.000.  
Sakurai, Hiromi, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Wheel presetting apparatus, 4,953,288, Cl. 29-704.000.  
Sakurai, Kenichi; and Takano, Yoshitake, to Yamaha Hatsudoki Kabushiki Kaisha. Cooling system for V type engine, 4,953,525, Cl. 123-41.280.  
Sakurai, Masao: See—  
Tate, Tochi; Takahira, Takashi; Yamashita, Kouwa; Sakurai, Masao; Shiozawa, Akira; and Narita, Kazuhisa, 4,954,642, Cl. 549-389.000.  
Salerno, Jorge A., to Consiglio Nazionale Delle Ricerche. Catheter for endocardial biopsy, which can also be used for identifying the point of origin of ventricular arrhythmia, 4,953,559, Cl. 128-751.000.  
Salisbury, Richard, to Blodgett & Blodgett. Article coating system, 4,953,495, Cl. 118-70.000.  
Salmela, Gordon O.; and Pizzarella, Michael L., to Raytheon Company. Counterbalance mechanism, 4,953,256, Cl. 16-1.000.  
Salomon S.A.: See—  
Diard, Jean-Luc; and Guers, Francois, 4,953,884, Cl. 280-609.000.  
Salzer, Donald E.; and Maassen, Nevil Q., to Santa Barbara Research Center. Low distortion focal plane platform, 4,954,708, Cl. 250-352.000.  
Salzmann, Ferdinand F.: See—  
Wenkman, Gregory J.; and Salzmann, Ferdinand F., 4,953,747, Cl. 221-45.000.  
Samann, Heinz, to Haarkosmetik und Parfumerien. Carton pad, 4,954,385, Cl. 428-131.000.  
Sampell, Jeffrey B., to Texas Instruments Incorporated. Spatial light modulator, 4,954,789, Cl. 330-4.300.  
SamSung Electronic Co., Ltd.: See—  
Kim, Jung-Soo, 4,954,764, Cl. 318-798.000.  
Samsung Electronics Co., Ltd.: See—  
Choi, Young H., 4,954,795, Cl. 333-194.000.  
Lee, Shin H., 4,953,364, Cl. 62-285.000.  
Park, Han-su, 4,954,927, Cl. 361-328.000.  
Samuels, Bernard. Apparatus, method, and test kit for diagnosis of vaginal yeast infections, 4,953,560, Cl. 128-759.000.  
Sander Corporation: See—  
Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 4,954,050, Cl. 417-269.000.  
Kokubun, Yoshikazu; Kurosawa, Akihito; Ushikubo, Kohei; and Todokoro, Shinji, 4,954,697, Cl. 235-381.000.  
Shoji, Takeuchi; Katsuyoshi, Iino; and Ryoichi, Takahashi, 4,953,362, Cl. 62-246.000.  
Sander, Hans J.: See—  
Abeler, Gerd; and Sander, Hans J., 4,954,546, Cl. 524-180.000.  
Sander, Wendell B.: See—  
Twitty, William B.; and Sander, Wendell B., 4,955,018, Cl. 370-85.100.  
Sanders, Daniel T. Feed bowl for animals, 4,953,506, Cl. 119-61.000.  
Sanders, Raymond H., to Unico, Inc. Transfer mechanism for conveyor, 4,954,033, Cl. 414-27.000.  
Sandoz Ltd.: See—  
Oppliger, Max, 4,954,133, Cl. 8-681.000.  
Prager, Bernhard C., 4,954,624, Cl. 540-225.000.  
Sands, Robert E., to Mueller Co. Dual check valve, 4,953,588, Cl. 137-512.300.  
Sanken Electric Co., Ltd.: See—  
Yokoyama, Takaaki, 4,954,307, Cl. 264-272.150.  
Sanns, Frank, Jr., to Mobay Corporation. Internal mold release agent for use in polyurea rim systems, 4,954,537, Cl. 521-157.000.  
Sano, Hirohisa: See—  
Imoto, Katsuyuki; Sano, Hirohisa; Miyazaki, Masaru; Matsuoka, Naoyuki; and Uetsuka, Hisato, 4,953,934, Cl. 350-96.150.  
Sano, Yasuo; Orii, Akira; and Murakami, Eiji. Electronic zigzag sewing machine, 4,953,486, Cl. 112-447.000.  
Sanraku Incorporated: See—  
Yoshimoto, Akihiro; Jodo, Osamu; Watanabe, Yoshio; Okamoto, Rokuro; and Takeuchi, Tomio, 4,954,438, Cl. 435-78.000.  
Sanshin Kogyo Kabushiki Kaisha: See—  
Sumigawa, Yukio, 4,954,107, Cl. 440-61.000.  
Santa Barbara Research Center: See—  
Salzer, Donald E.; and Maassen, Nevil Q., 4,954,708, Cl. 250-352.000.  
Sanyo Electric Co., Ltd.: See—  
Sugayama, Sakae, 4,955,073, Cl. 455-161.000.  
Sugayama, Sakae, 4,955,077, Cl. 455-197.000.  
Urakami, Toyozo, 4,954,893, Cl. 358-148.000.  
Sanyo Kiki Kabushiki Kaisha: See—  
Takahashi, Hiroyuki; and Kurashima, Toshiaki, 4,953,592, Cl. 137-599.100.  
Sanyo-Kokusaku Pulp Co., Ltd.: See—  
Yoshioka, Hidetoshi; Kojima, Eiji; Ishida, Shuji; Yoshioka, Hiroyuki; and Murakami, Kunichika, 4,954,485, Cl. 514-49.000.  
Sato, Yoshimi; Kuchiki, Kiyotuna; and Katada, Tsuyoshi, to Kabushiki Kaisha Kobe Seiko Sho. Apparatus for suppressing quaky movements of mobile cranes, 4,953,723, Cl. 212-159.000.  
Saratoga Spa & Bath Company: See—  
Gardener, John, 4,953,240, Cl. 4-542.000.  
Sare, Ian R.; Henderson, Ian; Heijkoop, Teunis; Bosworth, Michael R.; Aspin, Ronald E.; and Arnold, Brian K., to Commonwealth Scientific & Industrial Research Organization; and Vida-Weld Pty. Limited. Composite metal articles, 4,953,612, Cl. 164-102.000.  
Sarkoezi, Imre, to Siemens Aktiengesellschaft. Method and apparatus for generating a correction signal in a digital clock recovery device, 4,955,040, Cl. 375-119.000.  
Sarrine, Robert J.; Garsee, Henry A.; Kelley, Charles D.; and Guadagno, Philip A., to Helena Laboratories. Automatic electrophoresis apparatus, 4,954,237, Cl. 204-299.000.  
Sarugaku, Shinichi: See—  
Miyake, Norihisa; Sumita, Masaki; and Sarugaku, Shinichi, 4,954,762, Cl. 318-568.190.  
Sasaki, Akira; Esaki, Seiji; Hashimoto, Yasushi; and Kurita, Shigeo, to Honda Giken Kogyo Kabushiki Kaisha. Sliding universal joint having cylindrical holder positioning means, 4,954,119, Cl. 464-111.000.  
Sasaki Electric Corporation: See—  
Kawabata, Masaaki; and Kawashima, Tokio, 4,954,936, Cl. 362-249.000.  
Sasaki, Isao; Nishida, Kozi; and Anzai, Hisao, to Mitsubishi Rayon Company, Limited. Methacrylimide containing polymer, 4,954,575, Cl. 525-330.500.  
Sasaki, Kazuya, to Fujitsu Limited. Optical fiber cable and method of making the same, 4,953,942, Cl. 350-96.230.  
Sasaki, Masahiro; Abe, Osamu; and Ishikawa, Hideaki, to Hitachi, Ltd.; and Hitachi Automotive Engineering, Inc. Engine control apparatus, 4,953,513, Cl. 123-489.000.

- Sato, Akira: See—  
Tsurumi, Kazunori; Nakamura, Toshihide; and Sato, Akira, 4,954,474, Cl. 502-185.000.
- Sato, Chosuke: See—  
Kawai, Yoshikazu; Sato, Chosuke; and Kato, Masaru, 4,953,649, Cl. 180-79.100.
- Sato, Kaoru: See—  
Kumagai, Hiromi; Sato, Kaoru; and Imai, Yoshio, 4,954,685, Cl. 319-390.000.
- Sato, Kazuo: See—  
Kawamura, Kazuhiko; and Sato, Kazuo, 4,953,605, Cl. 152-541.000.
- Sato, Koji: See—  
Nagaoka, Shinji; Kawai, Michio; and Sato, Koji, 4,954,861, Cl. 354-403.000.
- Sato, Masaaki: See—  
Sato, Masaaki, to Olympus Optical Co., Ltd. Dictating apparatus which is remotely controlled utilizing a push-button telephone, 4,955,051, Cl. 379-75.000.
- Sato, Mitsuhiro: See—  
Okamura, Kiyohito; Sato, Mitsuhiro; Hasegawa, Yoshio; Seguchi, Tadao; and Kawanishi, Shunichi, 4,954,461, Cl. 501-95.000.
- Sato, Ryo: See—  
Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,954,626, Cl. 544-105.000.
- Sato, Ryuji: See—  
Ono, Hisao; Sato, Ryuji; and Miyachi, Takumi, 4,954,125, Cl. 526-138.000.
- Sato, Toshiaki: See—  
Suzuki, Fumio; Iwasawa, Yoshihiro; Sato, Toshiaki; Ikai, Takasi; and Oguti, Toshihiko, 4,954,164, Cl. 71-92.000.
- Sato, Yoshikazu: See—  
Watabe, Hiroomi; Ishii, Shigetaka; Nakazawa, Tadashi; Shomura, Takashi; Sezaki, Masaji; and Kondo, Shinichi, to Meiji Seika Kaisha, Ltd. Novel antitumor antibiotic substance and a method for production thereof, 4,954,641, Cl. 549-384.000.
- Satoh, Kazuhiko: See—  
Ohmi, Tadahiro; Kanno, Yohichi; Satoh, Kazuhiko; and Hatayama, Tadahiro, 4,953,826, Cl. 251-331.000.
- Satoh, Kenji: See—  
Furuhata, Takashi; and Satoh, Kenji, 4,954,902, Cl. 360-10.200.
- Satou, Hiroshi: See—  
Utsui, Yoshihiko; Toneyoshi, Kiyotugu; Taniguchi, Takashi; Haraga, Kousuke; and Tsukui, Keitarou, to Mitsubishi Denki Kabushiki Kaisha. Method for manufacture stress detector, 4,954,215, Cl. 156-630.000.
- Sattinger, Stanley S.; Lu, Leo K. H.; and Smerecky, Jerry R., to Westinghouse Electric Corp. Vibration damping apparatus, 4,954,375, Cl. 428-34.100.
- Sauer-Sundstrand Company: See—  
Johnson, Alan W., 4,953,426, Cl. 74-606.00R.
- Sauerbier, Charles E.; and Lochtefeld, Thomas J., to Lochtefeld, Thomas J. Surfing-wave generators, 4,954,014, Cl. 405-79.000.
- Saunders, Kenwyn D.: See—  
Butterworth, Robert M.; and Saunders, Kenwyn D., 4,954,270, Cl. 252-8.800.
- Savage, Charles; Barone, Frank G., Jr.; Demetrious, Gregory; and Volpe, Vincent, to Hachow Corporation. Directional information system, 4,954,958, Cl. 364-444.000.
- Savage-Rumbaugh, E. Sue; Rumbaugh, Duane M.; Smith, Samuel O.; and Smith, Michael B., to Emory University. Door system for large primate caging, 4,953,500, Cl. 119-17.000.
- Sawaki, Ipeei: See—  
Fukushima, Nobuhiro; and Sawaki, Ipeei, 4,955,006, Cl. 369-13.000.
- Sawyer, Philip N.; and Freeman, Leon D. Methods for administering anti-thrombotic compounds, 4,954,521, Cl. 514-474.000.
- Sayles, David C. Siloxane-based elastomeric interceptor motor insulation, 4,953,476, Cl. 102-289.000.
- Sayo, Noboru; Takemasa, Toshiro; and Kumobayashi, Hidenori, to Takasago International Corporation. Ruthenium-phosphine complex, 4,954,644, Cl. 556-14.000.
- Sbragia, Frank J. Collapsible cart, 4,953,878, Cl. 280-30.000.
- Scerbak, David G., to Electro-Optics Technology, Inc. Planar solid state laser resonator, 4,955,034, Cl. 372-94.000.
- Schaff, Hanno: See—  
Erber, Anton; Hoff, Heinz; Reuchlein, Gunter; Schaff, Hanno; and Schiessl, Gerhard, 4,953,354, Cl. 60-517.000.
- Schabert, Hans-Peter; Strickroth, Erich; and Laurer, Erwin, to Siemens Aktiengesellschaft; and Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH. Bolted pipe joint releasable by remote control and combination tool therefor, 4,953,580, Cl. 285-23.000.
- Schafer, Klaus: See—  
Marchewka, Werner; Rackebandt, Karl-Heinz; Schafer, Klaus; and Seebode, Albert, 4,953,409, Cl. 73-861.170.
- Scharf, Rolf: See—  
Schmid, Karl H.; Meffert, Alfred; Schenker, Gilbert; Asbeck, Adolf; and Scharf, Rolf, 4,954,283, Cl. 252-135.000.
- Schaub, Norbert: See—  
Schober, Karl; and Schaub, Norbert, 4,953,391, Cl. 73-117.000.
- Schardt Maschinenbau GmbH: See—  
Vetter, Ulrich, 4,953,522, Cl. 125-11.010.
- Scheel, Michael D.: See—  
Griffith, Glenn E.; Bustamante, Joaquin; Scheel, Michael D.; and Koven, Herbert, 4,953,777, Cl. 228-119.000.
- Scheinhardt, Hans-Jürgen, to Gebrüder Loepfe AG. Device for detecting neps in carded, textile fiber material, 4,953,265, Cl. 19-297.000.
- Schenfele, Robert D.: See—  
Lewis, David F.; and Schenfele, Robert D., 4,954,428, Cl. 430-495.000.
- Lewis, David F.; and Schenfele, Robert D., 4,954,543, Cl. 524-104.000.
- Schenker, Gilbert: See—  
Schmid, Karl H.; Meffert, Alfred; Schenker, Gilbert; Asbeck, Adolf; and Scharf, Rolf, 4,954,283, Cl. 252-135.000.
- Schering Aktiengesellschaft: See—  
Skuballa, Werner; Raduechel, Bernd; Vorbrueggen, Helmut; Casals-Stenzel, Jorge; Mannesmann, Gerda; Schillinger, Ekkehard; and Town, Michael H., 4,954,524, Cl. 514-530.000.
- Schickaneder, Helmut: See—  
Herter, Rolf; Morsdorf, Peter; Pfahler, Volker; Engler, Heidrun; Schickaneder, Helmut; and Ahrens, Kurt-Henning, 4,954,501, Cl. 514-252.000.
- Schiefer, Erich J.: See—  
Krempf, Peter W.; Schindler, Wolfgang; and Schiefer, Erich J., 4,953,390, Cl. 73-116.000.
- Schiessl, Gerhard: See—  
Erber, Anton; Hoff, Heinz; Reuchlein, Gunter; Schaff, Hanno; and Schiessl, Gerhard, 4,953,354, Cl. 60-517.000.
- Schiessl, Henry W.; and Manke, Steven A., to Olin Corporation. Process for minimizing residual hydrazine in polymer latices, 4,954,614, Cl. 528-483.000.
- Schillinger, Ekkehard: See—  
Skuballa, Werner; Raduechel, Bernd; Vorbrueggen, Helmut; Casals-Stenzel, Jorge; Mannesmann, Gerda; Schillinger, Ekkehard; and Town, Michael H., 4,954,524, Cl. 514-530.000.
- Schindler, Guenter: See—  
Lanzetta, Carmen, Jr.; Kieli, Michael; Schindler, Guenter; and Williams, Russell H., 4,953,940, Cl. 350-96.200.
- Schindler, Wolfgang: See—  
Krempf, Peter W.; Schindler, Wolfgang; and Schiefer, Erich J., 4,953,390, Cl. 73-116.000.
- Schivley, George P., Jr.: See—  
Hamner, Jeffrey W.; and Schivley, George P., Jr., 4,953,639, Cl. 175-203.000.
- Schlaeger, Gary W.: See—  
Hollingsworth, Elmont E.; and Schlaeger, Gary W., 4,954,098, Cl. 439-404.000.
- Schlegel, Hans: See—  
Dunwald, Willi; Schlegel, Hans; Halpaap, Reinhard; and Pedain, Josef, 4,954,577, Cl. 525-420.000.
- Schleifstein, Robert A.; and Khuddus, Mohammed A., to Ethyl Corporation. Halogen-containing organometallic compounds, 4,954,551, Cl. 524-327.000.
- Schlenker, Theodore R., to Dana Corporation. Ball screw return system, 4,953,419, Cl. 74-459.000.
- Schliebs, Gunter: See—  
Gaus, Harry; Gross, Hagen; and Schliebs, Gunter, 4,954,922, Cl. 361-42.000.
- Schloeglmann, Kurt: See—  
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- Schlumberger Technology Corp.: See—  
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- Schmalix, Charles K.: See—  
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- Schmid, Hans-Dieter: See—  
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- Schmid, Hans-Jorg: See—  
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- Schmid, Heinz: See—  
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- Schmid, Karl H.; Meffert, Alfred; Schenker, Gilbert; Asbeck, Adolf; and Scharf, Rolf, to Henkel Kommanditgesellschaft auf Aktien. Polyethylene glycol ether low temperature foam suppressing agents in low-foam cleaning agents, 4,954,283, Cl. 252-135.000.
- Schmidt, Albert L.: See—  
Sherwin, Gary W.; Hanes, Lewis F.; and Schmidt, Albert L., 4,953,968, Cl. 351-211.000.
- Schmidt, Hans, to Siemens Aktiengesellschaft. Connectible switching device, 4,954,671, Cl. 200-50.00C.
- Schmidt, Kurt; and Waloszyk, Detlef, to Boge AG. Hydraulically damping elastic bearing, 4,953,833, Cl. 267-140.100.
- Schmidt, Steven L.: See—  
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- Schmidt, Susanne: See—  
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- Schmidt, William J., to Vernay Laboratories, Inc. Metering valve for dispensing aerosols, 4,953,759, Cl. 222-402.200.
- Schmidt, William L.: See—  
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- Schmitt, Gunter: See—  
Fleischer, Helmut; Simon, Ernst-Ulrich; and Schmitt, Gunter, 4,954,807, Cl. 340-459.000.
- Schmitt, Joseph M.: See—  
Dauplaise, David L.; Kozakiewicz, Joseph J.; and Schmitt, Joseph M., 4,954,538, Cl. 523-223.000.

- Schmutzler, Matthias: See—  
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- Schnatterer, Stefan: See—  
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- Schneeberger, Ruedi: See—  
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- Schneider, Bernard: See—  
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- Schneider, Claus: See—  
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- Schneider, Gottfried: See—  
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- Schnell, Kenneth R.: See—  
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- Schnitzler, Dieter: See—  
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- Schober, Karl; and Schaub, Norbert, to Daimler-Benz Aktiengesellschaft. Flat-track unit for motor vehicle test beds, 4,953,391, Cl. 73-117.000.
- Schoch, Stephen A.: See—  
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- Schoenhals, Robert C.: See—  
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- Schofield, John D., to Imperial Chemical Industries PLC. Dispersion, 4,954,177, Cl. 106-499.000.
- Scholz, Joachim: See—  
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- Schomburg, Richard: See—  
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- Schotter, Daniel K.: See—  
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- Schreck, Daniel J.; and Ehrmann, Ronald G., to Pyle Overseas B.V. Conductor terminating method, 4,953,289, Cl. 29-863.000.
- Schroeder, Thaddeus: See—  
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- Schrumpf, Hans: See—  
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- Schukei, Glen E.: See—  
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- Schulte Schlagbaum Aktiengesellschaft: See—  
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- Schultz, Gerald C. Transportation industry game, 4,953,872, Cl. 273-254.000.
- Schultz, Roy D.; England, Thomas R.; and Altizer, A. Clark, to Kollmorgen Corporation. Servo motor with high energy product magnets, 4,954,739, Cl. 310-156.000.
- Schulz, Gunter; Probst, Frieder; and Guttler, Hermann, to Zinser Textilmaschinen GmbH. Funnel for a funnel spinning apparatus on a textile machine, 4,953,350, Cl. 57-354.000.
- Schumacher, Hartmut: See—  
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- Schumann, Ronald C.: See—  
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- Schunter, Roland: See—  
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- Schurich, Samuel, to University of Calgary. Captive bubble surface tensiometer, 4,953,389, Cl. 73-64.400.
- Schurter, Robert M.: See—  
Houle, Timothy H.; and Schurter, Robert M., 4,954,172, Cl. 204-197.000.
- Houle, Timothy H.; and Schurter, Robert M., 4,954,233, Cl. 204-197.000.
- Schurzky, Kenneth G.: See—  
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- Schuster, Gary B.: See—  
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- Schwank, Johannes: See—  
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- Schwarz, Robert C.: See—  
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- Schwarzenbach, Kurt: See—  
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- Schwee, Leonard J.: See—  
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- Schweizerische Eidgenossenschaft: See—  
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- Scavo S.p.A.: See—  
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- Ruggiero, Paolo; and Petracca, Roberto, 4,954,433, Cl. 435-7.000.
- Scoca, Anthony L.: See—  
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- Scott, Graham W.; Gough, Paul; Hendy, Brian N.; and Cinderey, Michael B., to Imperial Chemical Industries PLC. Gas separation, 4,954,143, Cl. 55-16.000.
- Scott Jensen Industries, Inc.: See—  
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- Scott, Keith W.; and Willoughby, Bryan G., to Rapra Technology Limited. Temperature activated catalysts for liquid polymer cures, 4,954,472, Cl. 502-152.000.
- Scott, Michael J., to Allflex New Zealand Limited. Ear tag for animals, 4,953,313, Cl. 40-301.000.
- Scott Tech International, Inc.: See—  
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- Scowen, Reginald V.: See—  
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- Seebode, Albert: See—  
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- Seewer AG: See—  
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- Segaram, Para, to Sundstrand Corporation. Auto tracking notch filter using switched capacitors to measure harmonic distortion and noise contained in a signal source, 4,954,785, Cl. 328-167.000.
- Segoshi, Kazuo; Okuda, Toshiyuki; Okamura, Kenji; and Yoshida, Mizuo, to Sigma Co., Ltd. Spectacle frame, 4,953,966, Cl. 351-41.000.
- Seguchi, Tadao: See—  
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- Seher, Jens-Peter: See—  
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- Sei, Akinori: See—  
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- Seibel, Stephen M.: See—  
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- Seiko Epson Corporation: See—  
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- Seiko Instruments Inc.: See—  
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- Lee, Sungmuk; and Misono, Shigemi, 4,954,862, Cl. 355-1.000.
- Seikoh Giken Co., Ltd.: See—  
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- Seikosha Co., Ltd.: See—  
Nagaoka, Shinji; Kawai, Michio; and Sato, Koji, 4,954,861, Cl. 354-403.000.
- Nakagawa, Tadashi; Otsu, Takahito; and Nemoto, Ichiro, 4,954,860, Cl. 354-246.000.
- Sekiguchi, Shigemi, to Hosiden Electronics Co. Ltd. Connector plug with locking mechanism, 4,954,097, Cl. 439-352.000.
- Sekine, Makoto: See—  
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- Sekiya, Harukazu: See—  
Azeta, Takahiro; Kameyama, Toru; Sekiya, Harukazu; Moritani, Toshifumi; Higeta, Akira; Baba, Kenji; Matoba, Takeshi; Goto, Shinji; and Kubota, Kazuyuki, 4,953,846, Cl. 271-251.000.
- Semiconductor Energy Laboratory Co., Ltd.: See—  
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- Yamazaki, Shunpei, 4,954,856, Cl. 357-30.000.
- Yamazaki, Shunpei, 4,954,985, Cl. 365-108.000.
- Semin, Konstantin V.: See—  
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- Senerchia, David C.: See—  
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- Sengoku, Masaharu, to Mitsubishi Denki Kabushiki Kaisha. Record medium control apparatus, 4,954,908, Cl. 360-78.040.



Sengoku, Masaharu, to Mitsubishi Denki Kabushiki Kaisha. Data memorizing device which determines the movement of the recording head. 4,954,909, Cl. 360-78.040.

Senoo, Seiji: See—  
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Senoo, Yoshio: See—  
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Sepulveda, Ralph R.; and Lynn, Jesse L., Jr., to Lever Brothers Company. Fabric pretreatment cleaning compositions. 4,954,286, Cl. 252-174.220.

Seroo, Jan M.; Cuypers, Martinus H.; and Oude Maatman, Anthonius J. H. M., to Hankamp B.V. Process for making, finishing crown wheels. 4,954,028, Cl. 409-26.000.

Servos, Michael: See—  
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Seto, Kunio: See—  
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Severinsson, Lars M., to SAB Nordic AB. Actuator. 4,953,668, Cl. 188-158.000.

Severinsson, Lars M., to SAB Nife AB. Electro-mechanical brake unit, preferably for a rail vehicle. 4,953,669, Cl. 188-171.000.

Sewell, George H., 4,954,071, Cl. 425-531.000.

Sewell, Scott R.; and Fleming, Diane. Air conditioning compressor sectionalized cover. 4,953,328, Cl. 52-79.100.

Seynhaeve, Andre G., to Delsey S.A. Caster wheel. 4,953,257, Cl. 16-45.000.

Sezaki, Masaji: See—  
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Batt, James A.; Richard, Robert G.; Shankland, Ian R.; and Wilson, David P., 4,954,284, Cl. 252-170.000.

Shannon, Joseph W., to ABC/Sebm TechCorp. Overflow prevention for soft drink dispensers. 4,953,751, Cl. 222-14.000.

Shapiro, Eugene: See—  
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Sharber, Jerry; and Kilby, Frank, to Eldon Industries, Inc. Adjustable arm structures. 4,953,822, Cl. 248-281.100.

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Iwamura, Soichi; Murakami, Satoshi; and Itsumi, Tadashi, 4,955,048, Cl. 379-53.000.

Karita, Toshiaki; and Watanabe, Takashi, 4,954,914, Cl. 358-475.000.

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Noboru, Mitsuhiro, 4,955,076, Cl. 455-188.000.

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Shea, Patrick A. Coupon organizer. 4,954,003, Cl. 402-079.000.

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Sheahan, Michael H.: See—  
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Sheahan, Thomas H. Two-tier storage rack for vehicles. 4,954,038, Cl. 414-482.000.

Sheahan, Dana M.: See—  
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Shelby Paper Box Company, The: See—  
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Shell Internationale Research Maatschappij, B.V.: See—  
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Shell Oil Company: See—  
Bannon, Robert P., 4,954,294, Cl. 261-114.100.

Gelles, Richard; Willis, Carl L.; Lutz, Robert G.; and Gergen, William P., 4,954,568, Cl. 525-92.000.

Klingensmith, George B., 4,954,548, Cl. 524-258.000.

Potter, Michael W., 4,954,137, Cl. 48-210.000.

Smutny, Edgar J., 4,954,552, Cl. 524-356.000.

Smutny, Edgar J.; and Lutz, Robert G., 4,954,555, Cl. 524-399.000.

Smutny, Edgar J., 4,954,570, Cl. 525-185.000.

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Wang, Pen-Chung, 4,954,584, Cl. 525-507.000.

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Shepler, Peter R.; Gammon, Nathan A.; Hopkins, William M.; Koerner, James E.; and Schmalix, Charles K., to Goodyear Tire & Rubber Company, The. Tread for a unidirectional pneumatic tire. 4,953,604, Cl. 152-209.00A.

Sherlock, Lila A.; and Finn, Maryann P. Safety mobilizer walker. 4,953,851, Cl. 272-70.300.

Sherwin, Gary W.; Hanes, Lewis F.; and Schmidt, Albert L., to Westinghouse Electric Corp. Automated visual assessment system with steady visual evoked potential stimulator and product detector. 4,953,968, Cl. 351-211.000.

Sheth, Pravir B.; and Dechow, Frederick J., to Ciba-Geigy Corporation. Oral magnesium and potassium compositions and use. 4,954,349, Cl. 424-461.000.

Shevkunov, Vsevolod V.: See—  
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Shibata, Takanori: See—  
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Shibata, Tatsumi: See—  
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Shibata, Uichi: See—  
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Shibukawa, Takeo, to Yamaha Corporation. Automatic performance apparatus storing and editing performance information. 4,953,438, Cl. 84-609.000.

Shibuya, Yukari: See—  
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Shida, Masami: See—  
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Shields, William D. Method and apparatus for variable proportional weight lifting exercises. 4,953,855, Cl. 272-118.000.

Shifferly, John P. Sanitizing spray seat for toilet. 4,953,238, Cl. 4-220.200.

Shigeta, Junji: See—  
Tanaka, Hiroto; Yamashita, Hiroki; Masuda, Noboru; Shigeta, Junji; Umamoto, Yasunari; and Kagaya, Osamu, 4,954,866, Cl. 357-45.000.

Shikama, Takashi; Wakabayashi, Asami; and Torii, Kiyofumi, to Murata Manufacturing Co., Ltd. Positive temperature coefficient thermistor device for a heating apparatus. 4,954,692, Cl. 219-365.000.

Shikano, Hiroshi: See—  
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Shim-A-Line, Inc.: See—  
Specktor, Gerald A.; and Specktor, John, 4,953,278, Cl. 29-402.060.

Shimada, Hiroyuki: See—  
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Shimada, Keiko: See—  
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Shimada, Yuji: See—  
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Shimazaki, Toru, to Yokogawa Medical Systems, Limited. Scan controller for NMR imaging device. 4,954,780, Cl. 324-318.000.

Shimizu Construction Co., Ltd.: See—  
Okano, Tadashi; and Honda, Tadayoshi, 4,953,720, Cl. 212-176.000.

Shimizu, Kazuyuki: See—  
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Shimochi, Eiji, to Yazaki Corporation. Electric connection box. 4,954,090, Cl. 439-76.000.

Shimotori, Tomoya: See—  
Takano, Shuntaro; Yoshida, Chosaku; Inaba, Takihiro; Tanaka, Keiichi; Takeno, Ryuko; Nagaki, Hideyoshi; Shimotori, Tomoya; and Makino, Shinji, 4,954,518, Cl. 514-456.000.

Shimura, Kazuo, to Fuji Photo Film Co., Ltd. Radiation image read-out apparatus. 4,955,067, Cl. 382-62.000.

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Chizaki, Isao, 4,954,044, Cl. 414-754.000.

Shin-Etsu Chemical Co., Ltd.: See—  
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Shin-Etsu Chemical Co., Ltd.: See—  
Amano, Tadashi; and Hoshida, Shigeiro, 4,954,595, Cl. 526-344.200.

Toyoshima, Nobuyuki; Shibata, Takanori; Hirashima, Atsushi; Ando, Ichiro; Iwata, Noriko; Yoshioka, Hiroshi; Itagaki, Akinari; and Yamazaki, Toshio, 4,954,586, Cl. 526-245.000.

Shin Nisso Kako Co., Ltd.: See—  
Obitsu, Takeo; Ohnishi, Yutaka; Yoshinaka, Shinji; Koguchi, Minoru; Yanagita, Mitsuhiro; and Hirai, Nobuyuki, 4,954,631, Cl. 546-15.000.

Shinagawa, Yukio; Oikawa, Toru; Yamanouchi, Junichi; and Shiratsuchi, Kentaro, to Fuji Photo Film Co., Ltd. Diffusion transfer photographic film unit. 4,954,419, Cl. 430-215.000.

Shinbo, Yasushi: See—  
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Shindo, Koji; and Tsuchihashi, Masaru, to Mitsubishi Denki Kabushiki Kaisha. Master disk. 4,954,065, Cl. 425-175.000.

Shinnai, Masao; Nishikawa, Kazuya; Tsukada, Tokio; and Hirotsu, Tohru, to Central Glass Company, Limited. Vehicle window glass antenna coupled with defogging heater. 4,954,797, Cl. 343-704.000.

Shinnar, Reuel: See—  
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Shinohara, Hirofumi: See—  
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Shinohara, Hiroichi: See—  
Nakanishi, Keiichiro; Yamada, Minoru; Yamamoto, Masakazu; Ogihara, Satoru; Shinohara, Hiroichi; and Suzuki, Hideo, 4,954,877, Cl. 357-80.000.

Shionogi & Co., Ltd.: See—  
Kita, Toru; Narumiya, Shuh; Narisada, Masayuki; Watanabe, Fumihio; Doteuchi, Masami; and Mizui, Takuji, 4,954,514, Cl. 514-381.000.

Shiosaki, Masao, to Kabushiki Kaisha Toshiba. Cassette transfer apparatus. 4,954,918, Cl. 360-98.060.

Shiozaki, Tsugio; Kitahara, Satoshi; Koizumi, Osamu; and Sugiura, Ikuro, to Tokyo Electric Co., Ltd. Thermal printer with reciprocal paper feed control. 4,953,994, Cl. 400-120.000.

Shiozawa, Akira: See—  
Tate, Tochiro; Takahira, Takashi; Yamashita, Kouwa; Sakurai, Masao; Shiozawa, Akira; and Narita, Kazuhisa, 4,954,642, Cl. 549-389.000.

Shiozawa, Kenichiro: See—  
Takiyama, Masahiro; Miyazaki, Kunihiro; and Shiozawa, Kenichiro, 4,954,141, Cl. 51-296.000.

Shirasaka, Akifumi; Seto, Kunio; Hamada, Masaki; and Shibuya, Yukari, to Canon Kabushiki Kaisha. Graphic edge extracting apparatus. 4,955,064, Cl. 382-22.000.

Shiratsuchi, Kentaro: See—  
Shinagawa, Yukio; Oikawa, Toru; Yamanouchi, Junichi; and Shiratsuchi, Kentaro, 4,954,419, Cl. 430-215.000.

Shirley, Everett E.: See—  
Bush, Arden W.; and Shirley, Everett E., 4,954,687, Cl. 219-119.000.

Shitaya, Takao: See—  
Nagai, Takeshi; Fukuda, Hiroshi; Itoh, Masahiko; and Shitaya, Takao, 4,954,694, Cl. 219-413.000.

Shoji, Takeuchi; Katsuyoshi, Iino; and Ryoichi, Takahashi, to Sanden Corporation. Refrigerator-freezer unit. 4,953,362, Cl. 62-246.000.

Shomura, Takashi: See—  
Sato, Yoshikazu; Watabe, Hiroomi; Ishii, Shigetaka; Nakazawa, Tadashi; Shomura, Takashi; Sezaki, Masaji; and Kondo, Shinichi, 4,954,641, Cl. 549-384.000.

Showa Denko Kabushiki Kaisha: See—  
Kotani, Terumitsu; Taka, Toshio; and Saito, Yoshimasa, 4,954,391, Cl. 428-220.000.

Oguro, Katsunori; Nojima, Hiroshi; Hashizume, Nobuyuki; Ohno, Norio; and Naito, Taketoshi, 4,954,512, Cl. 514-352.000.

Takiyama, Masahiro; Miyazaki, Kunihiro; and Shiozawa, Kenichiro, 4,954,141, Cl. 51-296.000.

Yoshida, Haruo; Uotani, Nobuo; and Saida, Yoshihiro, 4,954,590, Cl. 526-259.000.

Shu, Dong B.: See—  
Kim, Jong S.; Lee, Ki T.; and Shu, Dong B., 4,954,615, Cl. 528-501.000.

Shuh-Chin, Lin. Aquatic sports device. 4,954,106, Cl. 440-21.000.

Shuku, Shigekazu; Mukoyoshi, Shunichiro; Yusa, Eiji; and Yamori, Tsunefumi, to Kanzaki Paper Mfg. Co., Ltd. Heat-sensitive recording materials. 4,954,477, Cl. 503-226.000.

Shultz, David B.: See—  
Tonn, Howard E.; Davidson, Robert; Shultz, David B.; and Miller, Keith R., 4,953,727, Cl. 213-8.000.

Shum, Victor K.: See—  
Miller, Jeffrey T.; and Shum, Victor K., 4,954,245, Cl. 208-138.000.

Sibley, Howard W.: See—  
Boah, John K.; Cooney, Charles T., Jr.; Schoch, Stephen A.; and Sibley, Howard W., 4,953,511, Cl. 122-18.000.

Siczek, Aldona A.; and Siczek, Bernard W. C-arm for X-ray diagnostic examination. 4,955,046, Cl. 378-197.000.

Siczek, Bernard W.: See—  
Siczek, Aldona A.; and Siczek, Bernard W., 4,955,046, Cl. 378-197.000.

Siegenthaler, Peter, to Seewer AG. Apparatus for winding sheets of dough on a dough reel and dough sheeter equipped with a dough sheet winder. 4,954,064, Cl. 425-162.000.

Siegfried, Todd R. Gardening tool. 4,953,347, Cl. 56-400.120.

Siegmund, Gary G., to Reliance Comm/Tec Corporation. Solid state ringing switch. 4,955,053, Cl. 379-253.000.

Siemens Aktiengesellschaft: See—  
Bergmann, Rainer; and Gantlior, Josef-Matthias, 4,954,868, Cl. 357-53.000.

Brunner, Matthias; and Lischke, Burkhard, 4,954,705, Cl. 250-310.000.

Brust, Hans D., 4,954,773, Cl. 324-158.00R.

Friede, Dirk; Cirkel, Hans-Juergen; Baumgartl, Rudolf; and Schmutzler, Matthias, 4,955,045, Cl. 378-122.000.

Hoelzle, Josef, 4,955,041, Cl. 377-54.000.

Hums, Erich, 4,954,476, Cl. 502-350.000.

Kindt, Stefan, 4,955,086, Cl. 455-605.000.

Liebich, Ernst; and Longueville, Jacques, 4,954,103, Cl. 439-751.000.

Lobjinski, Manfred; Horn, Michael; and Reppekus, Andreas, 4,955,015, Cl. 370-56.000.

Nekovar, Anton, 4,955,043, Cl. 378-108.000.

Sarkoezi, Imre, 4,955,040, Cl. 375-119.000.

Schabert, Hans-Peter; Strickroth, Erich; and Laurer, Erwin, 4,953,580, Cl. 285-23.000.

Schmidt, Hans, 4,954,671, Cl. 200-50.00C.

Sieradzki, Raymond: See—  
Bull, Larry J.; Sieradzki, Raymond; and Olson, Kurt G., 4,954,556, Cl. 524-378.000.

Sigma Co., Ltd.: See—  
Segoshi, Kazuo; Okuda, Toshiyuki; Okamura, Kenji; and Yoshida, Mizuo, 4,953,966, Cl. 351-41.000.

Signode Corporation: See—  
Kato, Kanami, 4,953,599, Cl. 140-93.400.

Sigov, Alexandr S.: See—  
Spirin, Jury L.; Korbashov, Jury M.; Semin, Konstantin V.; and Sigov, Alexandr S., 4,954,771, Cl. 324-158.00R.

Sikora, Scott T., to Tomar Electronics, Inc. Strobe flash lamp power supply with input voltage feedthrough afterflow prevention circuit. 4,954,753, Cl. 315-219.000.

Sikorski, Siegfried, to MTU Motoren-und Turbinen-Union Munchen GmbH. Composite material of metal and plastic. 4,954,387, Cl. 428-138.000.

Simandi, Laszlo: See—  
Besenyi, Gabor; Nemeth, Sandor; Simandi, Laszlo; Belak, Maria; Szabo, Maria; Dukai, Jozsef; Nagy, Lajos; Tomordi, Elemer; Sopci, Csaba; and Dioszegine, Erzsébet E., 4,954,628, Cl. 544-211.000.

Simmat, Dieter: See—  
Korber, Hans W.; Koster, Reinhard; Linse, Ewald; and Simmat, Dieter, 4,953,645, Cl. 180-6.500.

Simmons, Walter J., to Du Pont de Nemours, E. I., and Company. Wave powered pump. 4,954,052, Cl. 417-331.000.

Simon, Ernst-Ulrich: See—  
Fleischer, Helmut; Simon, Ernst-Ulrich; and Schmitt, Gunter, 4,954,807, Cl. 340-459.000.

Simplex, S.A.: See—  
Juy, Henri, 4,954,121, Cl. 474-82.000.

Sims, Louis; LeFric, Fred; Dubner, Joseph; and Peavey, Brian, to Output Technology Corporation. Dot matrix printer and method for printing multiple lines at different line spacings. 4,953,995, Cl. 400-121.000.

Singh, Gurdinder P. Apparatus and method for expert analysis of metal failure with automated visual aide. 4,954,964, Cl. 364-513.000.

Singleton, Guy E.: See—  
Dixon, Robert C.; Deaver, Gerald A.; Panches, James R.; Singleton, Guy E.; Erbes, John G.; and Offer, Henry P., 4,954,311, Cl. 376-258.000.

Sinha, Ashok K.: See—  
Fertl, Walter H.; and Sinha, Ashok K., 4,953,399, Cl. 73-152.000.

Sisco, Rosemary M.: See—  
Elliott, David L.; Christiano, Steven P.; Lang, David J.; and Sisco, Rosemary M., 4,954,280, Cl. 252-90.000.

Skaggs, Roger D. Rock drill bit. 4,953,642, Cl. 175-393.000.

Skuballa, Werner; Raduechel, Bernd; Vorbrueggen, Helmut; Casals-Stenzel, Jorge; Mannesmann, Gerda; Schillinger, Ekkehard; and Town, Michael H., to Schering Aktiengesellschaft. Novel carbacyclins, their preparation and use as medicinal agents. 4,954,524, Cl. 514-530.000.

Slachta, Gene; and Stemler, Kim F. Fluid actuated chuck. 4,953,877, Cl. 279-2.00A.

Slaymaker, Philip A.: See—  
Anafi, David; and Slaymaker, Philip A., 4,953,964, Cl. 350-557.000.

Slick Ice Limited: See—  
Rzechula, Michael J., 4,953,360, Cl. 62-66.000.

Slowski, Darrel: See—  
Slowski, Wasyli; Slowski, Darrel; and Slowski, David, 4,954,099, Cl. 439-244.000.

Slowski, David: See—  
Slowski, Wasyli; Slowski, Darrel; and Slowski, David, 4,954,099, Cl. 439-244.000.

Slowski, Wasyli; Slowski, Darrel; and Slowski, David, to Williams Sign Supplies Ltd. Electrode receptacle. 4,954,099, Cl. 439-244.000.

Smallheer, Joanne: See—  
Gleason, John G.; Hall, Ralph F.; and Smallheer, Joanne, 4,954,513, Cl. 514-381.000.

Smeltz, Kenneth C.: See—  
Putzig, Donald E.; and Smeltz, Kenneth C., 4,953,621, Cl. 166-308.000.

Smerecky, Jerry R.: See—  
Sattinger, Stanley S.; Lu, Leo K. H.; and Smerecky, Jerry R., 4,954,375, Cl. 428-34.100.

Smith, Bert J., to United States of America, Army. Self-driving helicopter tail rotor. 4,953,811, Cl. 244-17.190.

Smith, Chalmers O. Welding unit. 4,954,689, Cl. 219-125.100.

Smith, David W.; Yocca, Frank D.; Yevich, Joseph P.; and Mattson, Ronald J., to Bristol-Myers Squibb Company. 1-indolylalkyl-4-(substituted-pyridinyl)piperazines. 4,954,502, Cl. 514-253.000.

Smith, David W.: See—  
Hill, Godfrey R.; Smith, David W.; and Hunkin, David J., 4,955,026, Cl. 372-18.000.

Smith, Fred P.: See—  
Smith, Fred T.; and Smith, Fred P., 4,954,020, Cl. 406-38.000.



Smith, Fred T.; and Smith, Fred P., 4,954,040, Cl. 414-513.000.  
Smith, Fred T.; and Smith, Fred P., to Heil Co., The. Apparatus for loading materials into a storage compartment. 4,954,020, Cl. 406-38.000.  
Smith, Fred T.; and Smith, Fred P., to Heil Co., The. Refuse truck body having load carrying ejector assembly. 4,954,040, Cl. 414-513.000.  
Smith-Johannsen, Robert; and Walker, Jack M., to Raychem Corporation. Self-limiting conductive extrudates and methods therefor. 4,954,695, Cl. 219-548.000.  
Smith, Leslie, Jr.: See—  
Johnston, William T.; Smith, Leslie, Jr.; and Barker, David K., 4,954,039, Cl. 414-500.000.  
Smith, Lynn H. Apparatus and associated methods for forming curved wooden hand rails for spiral staircases and the like. 4,953,602, Cl. 144-349.000.  
Smith, Michael B.: See—  
Savage-Rumbaugh, E. Sue; Rumbaugh, Duane M.; Smith, Samuel O.; and Smith, Michael B., 4,953,500, Cl. 119-17.000.  
Smith, Peter R.: See—  
Chatigny, Joseph V.; and Smith, Peter R., 4,954,811, Cl. 340-550.000.  
Smith, Rod; Oliphant, Timothy L.; and Stephens, Charles E., to National Seating Company. Air spring seat and air pump. 4,954,051, Cl. 417-305.000.  
Smith, Samuel O.: See—  
Savage-Rumbaugh, E. Sue; Rumbaugh, Duane M.; Smith, Samuel O.; and Smith, Michael B., 4,953,500, Cl. 119-17.000.  
Smith, Ward C., to Becton-Dickinson and Company. Apparatus for separating mononuclear cells from blood and method of manufacturing and using the same. 4,954,264, Cl. 210-782.000.  
Smith, Winston J., to Smith, Winston J. Wave operated boat pump. 4,953,490, Cl. 114-183.00A.  
SmithKline Beecham Corporation: See—  
Dagger, Raymond E.; and Motyka, Linda A., 4,954,632, Cl. 546-194.000.  
Gleason, John G.; Hall, Ralph F.; and Smallheer, Joanne, 4,954,513, Cl. 514-381.000.  
Holt, Dennis A.; Levy, Mark A.; and Metcalf, Brian W., 4,954,446, Cl. 435-184.000.  
SmithKline & French Laboratories Limited: See—  
Jaza-Chamiec, Albert A.; and Hickey, Deirdre M. B., 4,954,339, Cl. 424-78.000.  
Smolders, Jo: See—  
Ubanski, Patrick; and Smolders, Jo, 4,954,801, Cl. 336-90.000.  
SMS Schloemann-Siemag Aktiengesellschaft: See—  
Rothenpieler, Manfred; and Moos, Wolfgang, 4,953,806, Cl. 242-72.100.  
Svagr, Alexander, 4,953,380, Cl. 72-250.000.  
Smutny, Edgar J., to Shell Oil Company. Stabilized carbon monoxide-olefin copolymer compositions. 4,954,552, Cl. 524-356.000.  
Smutny, Edgar J.; and Lutz, Robert G., to Shell Oil Company. Stabilized carbon monoxide-olefin copolymer compositions. 4,954,555, Cl. 524-399.000.  
Smutny, Edgar J., to Shell Oil Company. Polyketone polymer blend. 4,954,570, Cl. 525-185.000.  
Snajdr, Stanislav M.: See—  
Brackmann, Warren A.; Snajdr, Stanislav M.; Nehyo, Takeshi; and Sheahan, Michael H., 4,953,370, Cl. 131-109.100.  
Societe Anonyme, Bioetica: See—  
Gimeno, Rene; Hue, Alain; and DeVictor, Pierre, 4,953,299, Cl. 34-92.000.  
Societe Anonyme dite:Alstom: See—  
Dubots, Patrick; and Legat, Denis, 4,954,479, Cl. 505-1.000.  
Societe Atotechm: See—  
Correia, Yves; Drivon, Gilles; and Lesparre, Jean, 4,954,231, Cl. 204-157.600.  
Societe Chimique des Charbonnages S.A.: See—  
Sorg, Kurt, 4,954,550, Cl. 524-271.000.  
Societe Inel: See—  
Comparat, Vincent; Ballon, Jean; Carrechio, Pierre; and Pelissier, Alain, 4,954,710, Cl. 250-385.100.  
Socoll, Edward J., to Standard Oil Company, The. AOG incinerator NO<sub>x</sub> emission control via NH<sub>3</sub> injection. 4,954,323, Cl. 423-235.000.  
Soda, Yasunari: See—  
Mochiji, Kozo; Oizumi, Hiroaki; Soda, Yasunari; Ogawa, Taro; and Kimura, Takeshi, 4,954,424, Cl. 430-323.000.  
Sokola, Raymond L.: See—  
Green, Steven R.; De Muro, David M.; Moutrie, Michael F.; Sokola, Raymond L.; and Gordon, Phillip J., 4,954,796, Cl. 333-206.000.  
Solarex Corporation: See—  
Marshall, Jack, 4,953,577, Cl. 136-251.000.  
Solie, Darryl W.: See—  
Freeman, William A.; Pogorzelski, James S.; Solie, Darryl W.; and Wilson, Jacqueline H., 4,954,950, Cl. 364-200.000.  
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Somar Corporation: See—  
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Somerville, Walter D. Nasion-secured sport glasses. 4,953,967, Cl. 351-136.000.

Sonoco Products Company: See—  
Vrooman, Carl D.; and Taylor, Dennis R., 4,953,664, Cl. 186-59.000.  
Sony Corporation: See—  
Aratani, Katsuhisa; and Tanaka, Tomiji, 4,955,007, Cl. 369-13.000.  
Doi, Tetsuo; and Funabashi, Takeshi, 4,955,061, Cl. 382-56.000.  
Izozaki, Masaaki; and Takano, Kazuhiro, 4,954,826, Cl. 341-100.000.  
Koda, Atsushi; Okuda, Shinji; and Nonaka, Wataru, 4,954,915, Cl. 360-92.000.  
Nakata, Tetsuro, 4,954,898, Cl. 358-183.000.  
Odaka, Kentaro, 4,955,022, Cl. 371-37.400.  
Okada, Takashi; and Matsuzaki, Atsushi, 4,954,901, Cl. 358-242.000.  
Tobimatsu, Noriaki, 4,954,916, Cl. 360-96.500.  
Soo-Hoo, Randall; and Benz, August D., to Bechtel Group, Inc. Geothermal reboiler apparatus and method. 4,953,356, Cl. 60-641.500.  
Sopis Systems N.V.: See—  
Noonan, Kevin K., 4,954,976, Cl. 364-578.000.  
Soptei, Csaba: See—  
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Sorg, Kurt, to Societe Chimique des Charbonnages S.A. System for thermoplastic cross-linking adhesives, their preparation and a corresponding method of gluing. 4,954,550, Cl. 524-271.000.  
Soubrier, Jean-Marie: See—  
Buisson, Jean-Michel; and Soubrier, Jean-Marie, 4,954,767, Cl. 323-283.000.  
Sourdillon-Airindex: See—  
De Gouville, Jean-Bernard L.; and Dane, Bernard, 4,953,534, Cl. 126-39.00H.  
Southwall Technologies, Inc.: See—  
King, Robert N.; and Behling, Gerald R., 4,954,383, Cl. 428-131.000.  
Sovak, Milos; and Ranganathan, Ramachandran, to Cook Imaging Corporation. Non-ionic polyol contrast media from ionic contrast media. 4,954,348, Cl. 424-5.000.  
Spainhour, Phillip A., to Hennessy, J. P. Method and apparatus for providing runout compensation. 4,953,296, Cl. 33-203.180.  
Spamer, William S., to Mead Corporation, The. Article organizer display unit. 4,953,719, Cl. 211-188.000.  
Span Tech Corporation: See—  
Draebel, Jorgen, 4,953,693, Cl. 198-853.000.  
Sparta, Gregory, to Ciba-Geigy Corporation. Orally administrable nifedipine solution in a solid light resistant dosage form. 4,954,346, Cl. 424-456.000.  
Specktor, Gerald A.; and Specktor, John, to Shim-A-Line, Inc. Method for adjusting alignment of a wheel. 4,953,278, Cl. 29-402.060.  
Specktor, John: See—  
Specktor, Gerald A.; and Specktor, John, 4,953,278, Cl. 29-402.060.  
Spector, George: See—  
Gaines, Lee R.; and Spector, George, 4,953,232, Cl. 2-60.000.  
Kidder, Stephen E.; and Spector, George, 4,954,934, Cl. 362-156.000.  
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Spectrum Control, Inc.: See—  
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Speisebecher, Joachim: See—  
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Spencer, H. Kenneth: See—  
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Spirax Corporation: See—  
Colby, Paul N., 4,953,279, Cl. 29-402.060.  
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Carter, John L.; Sprague, Michael M.; Stone, Crosby; and Felshim, James A., 4,953,298, Cl. 34-44.000.  
Springer, Carl M., to Binks Manufacturing Company. Positive displacement flushable flow meter. 4,953,403, Cl. 73-198.000.  
Spry, Robert H. Apparatus and method for testing moisture of ear corn. 4,954,783, Cl. 324-696.000.  
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SSMC Inc.: See—  
Davidson, Donald R.; Huang, Pao-Ter; and Rogers, H. David, 4,953,300, Cl. 38-36.000.  
Stachulski, Andrew V.: See—  
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Stadig, Allen L. Holder and dispenser for a coiled article. 4,953,810, Cl. 242-129.000.  
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Rehage, Oerhard; Staeger, Manfred; and Grunkemeier, Hans W., 4,953,274, Cl. 29-27.00C.  
Staker, Doanld D.; and Kain, William S., to Henkel Corporation. Compositions and process for alfalfa drying. 4,954,363, Cl. 426-636.000.

Stakvat Pty. Ltd.: See—  
Prime, Martlyn L.; Warren, Peter F.; Johnston, Geoffrey D.; and Babidge, John C., 4,953,730, Cl. 217-4.000.  
Stammer, Charles H., to University of Georgia Research Foundation, Inc. 2,3-methanoproline. 4,954,158, Cl. 71-76.000.  
Standard Elektrik Lorenz Aktiengesellschaft: See—  
Regner, Rolf; and Scholz, Joachim, 4,953,936, Cl. 350-96.170.  
Standard Oil Company, The: See—  
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Stander, Robert J.: See—  
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Stanley, Jack M. Self-retaining golf bag cover employing plain sleeve. 4,953,697, Cl. 206-315.400.  
Stant Inc.: See—  
Szlagza, Emil, 4,953,583, Cl. 137-118.000.  
Stanton, Austin N.: See—  
Keller, Leonard J.; and Stanton, Austin N., 4,953,479, Cl. 110-233.000.  
Stanton, Susan A.: See—  
Rains, Randall C.; Dormish, Jeffrey F.; Stanton, Susan A.; and Rieck, James N., 4,954,199, Cl. 156-331.700.  
Starck, Mark. Work holder apparatus. 4,953,836, Cl. 269-17.000.  
Starkey, David T., to Guilbransen Incorporated. Method and apparatus for digitally generating musical notes. 4,953,437, Cl. 84-603.000.  
Starr, Robert C.; and Ingleton, Robert A., to University of Waterloo. Apparatus for recovering ground soil samples. 4,953,637, Cl. 175-20.000.  
Stava, Elliott K.: See—  
Parks, John M.; and Stava, Elliott K., 4,954,691, Cl. 219-137.0PS.  
STC PLC: See—  
Epworth, Richard E., 4,953,939, Cl. 350-96.190.  
Rokos, George H. S., 4,954,865, Cl. 357-43.000.  
Stebco Products Corporation: See—  
Stein, Edward B., 4,953,888, Cl. 280-654.000.  
Stechert, Roland: See—  
Rauben, Gerhard; and Stechert, Roland, 4,954,505, Cl. 514-267.000.  
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Stehmeier, Dieter: See—  
Knoche, Karl F.; Stehmeier, Dieter; and Grabenhenrich, Heinz-Bernard, 4,953,361, Cl. 62-79.000.  
Stein, Edward B., to Stebco Products Corporation. Luggage cart. 4,953,888, Cl. 280-654.000.  
Stein, Judith; Leonard, Tracey M.; and Desorcie, James L., to General Electric Company. Method for coating substrates with UV curable epoxysilicone compositions. 4,954,364, Cl. 427-54.100.  
Stein, William L.: See—  
Evans, Alan G.; and Stein, William L., 4,954,833, Cl. 342-357.000.  
Stemler, Kim F.: See—  
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Stenson, Samuel H. Powered method and apparatus for lifting a boat. 4,954,011, Cl. 405-3.000.  
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Stepanov, Jury I.: See—  
Urvantsev, Anatoly I.; Elantsev, Jury S.; Komlev, Alexei M.; Kusumbaev, Saliman K.; Stepanov, Jury I.; and Vasiliev, Viktor P., 4,954,248, Cl. 209-127.100.  
Stephens, Charles E.: See—  
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Sterlacci, Dennis J. Electrician's utility knife. 4,953,293, Cl. 30-124.000.  
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Stevens, James R.; and Stevens, Jodi, 4,953,757, Cl. 224-310.000.  
Stewart Warner Instrument Corporation: See—  
Wasserstrom, Henry; and Drambarean, Viorel, 4,954,802, Cl. 337-380.000.  
Stichting Instituut Voor Veeteeltkundig Onderzoek "Schoonoord": See—  
Lambooy, Elbert, 4,953,263, Cl. 17-1.00E.  
Stiefel, Edward I.: See—  
Halbert, Thomas R.; Wei, Liwen; and Stiefel, Edward I., 4,954,645, Cl. 556-45.000.  
Stirbis, James S. One piece can body with domed bottom. 4,953,738, Cl. 220-606.000.  
Stiver, C. Edward; Teti, George J.; Pearson, Charles S.; and Brown, Kenneth R., to Dayco Products, Inc. Crimping device, adjusting ring therefor. 4,953,383, Cl. 72-402.000.  
Stocker, Werner: See—  
Fink, Hans-Werner; Morin, Roger; Schmid, Heinz; and Stocker, Werner, 4,954,711, Cl. 250-423.00R.  
Stoddard, Philip V.; and Bell, Craig J., to Mallinckrodt, Inc. Laser resistant ventilating device with locking ferrule. 4,953,548, Cl. 128-207.140.  
Stohr, Albert. Cabin-like cover especially for covering a machine. 4,953,734, Cl. 220-4.020.

Stone, Crosby: See—  
Carter, John L.; Sprague, Michael M.; Stone, Crosby; and Felshim, James A., 4,953,298, Cl. 34-44.000.  
Stone, William H.; and Boyer, William E., to Infotron Systems Corporation. Bus architecture for digital communications. 4,955,020, Cl. 370-85.900.  
Stoner, David T.: See—  
Pfeiffer, David M.; Stoner, David T.; Norsworthy, John P.; Dipert, Dwight D.; Thompson, Jay A.; Fontaine, James A.; and Corry, Michael K., 4,955,024, Cl. 371-40.100.  
Stoppani, Brian R.; and Cummings, Norman, to Gullick Dobson Limited. Drive frame for a scraper chain conveyor. 4,953,692, Cl. 198-834.000.  
Storaasli, Allen G.: See—  
Grant, Richard W.; and Storaasli, Allen G., 4,954,832, Cl. 342-352.000.  
Storgard, Christer, to Oy Wiik & Høglund A.G. Sewer pipe relining method. 4,954,016, Cl. 405-184.000.  
Stork Amsterdam B.V.: See—  
Hermans, Willem F., 4,953,633, Cl. 165-109.100.  
Stough, Donna M.: See—  
Butcher, Kenneth R.; Doddato, Carmine M.; and Stough, Donna M., 4,954,138, Cl. 51-293.000.  
Stowe, George R., III, to Chevron Research Company. Method for improving the steam splits in a multiple steam injection process. 4,953,635, Cl. 166-303.000.  
Stoy, Vladimir: See—  
Thakore, Yatin B.; and Stoy, Vladimir, 4,954,145, Cl. 55-16.000.  
Strahan, Daryl J.: See—  
Potzler, J. Edward; and Strahan, Daryl J., 4,955,032, Cl. 364-525.000.  
Strato-Lift, Inc.: See—  
Ridings, James, 4,953,666, Cl. 187-9.00R.  
Strazzolini, Paolo: See—  
Malabarba, Adriano; Strazzolini, Paolo; Trani, Aldo; Magni, Ambrogio; and Cavalleri, Bruno, 4,954,483, Cl. 514-9.000.  
Strebel, Hannes. Vehicle park for parking vehicles below a water surface. 4,954,035, Cl. 414-228.000.  
Strein, Klaus: See—  
Mertens, Alfred; von der Saal, Wolfgang; Boehm, Erwin; and Strein, Klaus, 4,954,498, Cl. 514-254.000.  
Strickroth, Erich: See—  
Schabert, Hans-Peter; Strickroth, Erich; and Laurer, Erwin, 4,953,580, Cl. 285-23.000.  
Striker, Richard A.: See—  
Modic, Frank J.; and Striker, Richard A., 4,954,533, Cl. 521-82.000.  
Strobl, Wolfgang; Peschka, Walter; and Schneider, Gottfried, to Bayerische Motoren Werke A.G. Arrangement for the metered supply of a fuel, especially into the combustion space of an internal combustion engine. 4,953,789, Cl. 239-132.500.  
Stroech, Klaus; Beilefeldt, Dietmar; Brandes, Wilhelm; and Dutzmann, Stefan, to Bayer Aktiengesellschaft. Azolymethyl-cyclopropyl carbonyl derivatives. 4,954,162, Cl. 71-92.000.  
Struik, Mattheus: See—  
Wesdorp, Leendert H.; and Struik, Mattheus, 4,954,362, Cl. 426-602.000.  
Strumpf, Thomas; Lyr, Horst; Zanke, Dieter; Zollfrank nee Baumann, Gerlinde; Oros, Gyula; Viranyi, Ferenc; and Ersek, Tibor, to Chinoit Gyogyszer es Vegyszeti Termekiek Gyara R.T. Fungicides and plant-growth controlling agents. 4,954,495, Cl. 514-231.200.  
Strupczewski, Joseph T.; and Bordeaux, Kenneth J., to Hoechst-Roussel Pharmaceuticals, Inc. 3-(1-substituted-4-piperazinyl)-1H-indazoles. 4,954,503, Cl. 514-254.000.  
Studt, William L.: See—  
Kuhla, Donald E.; Campbell, Henry F.; Studt, William L.; and Faith, William C., 4,954,494, Cl. 514-210.000.  
Su, Kai C.: See—  
Hung, William M.; and Su, Kai C., 4,954,132, Cl. 8-507.000.  
Suchoski, Paul G., Jr.; Findakly, Talai K.; and Leonberger, Frederick J., to United Technologies Corporation. Integrated optic star coupler. 4,953,935, Cl. 350-96.160.  
Suda, Yasuo: See—  
Suzuki, Kenji; Ohtaka, Keiji; and Suda, Yasuo, 4,954,701, Cl. 250-201.800.  
Sudakoff, Carl E.; and Matthews, Billie D., to Tandem Mfg., Inc. Jogging stroller. 4,953,880, Cl. 280-47.380.  
Sudit, Moises. Electrically shorting target. 4,953,875, Cl. 273-373.000.  
Suenaga, Nobuyoshi: See—  
Kawashima, Masaki; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, 4,954,465, Cl. 502-5.000.  
Suga, Shigeru: See—  
Mitsuhashi, Kenhachi; and Suga, Shigeru, 4,954,693, Cl. 219-400.000.  
Suga Test Instruments Co., Ltd.: See—  
Mitsuhashi, Kenhachi; and Suga, Shigeru, 4,954,693, Cl. 219-400.000.  
Sugata, Yoshinobu; Furusho, Noboru; and Tanaka, Tomomi, to Fuji Electric Co., Ltd. Photoconductor for electrophotography comprising squarylum containing generator layer and hydrazone containing transport layer. 4,954,405, Cl. 430-58.000.  
Sugawara, Kiyomi; Tsutsumi, Kentaro; and Otani, Mikio, to Central Glass Company, Limited. Soluble and curable fluorine-containing copolymer suitable as paint vehicle. 4,954,589, Cl. 526-255.000.  
Sugayama, Sakae, to Sanyo Electric Co., Ltd. Automatic search tuner. 4,955,073, Cl. 455-161.000.



Sugayama, Sakae, to Sanyo Electric Co., Ltd. Radio with broad band automatic gain control circuit. 4,955,077, Cl. 455-197.000.

Sugazaki, Kazuo: See—  
Iwamoto, Mune; Ito, Norifumi; Sugazaki, Kazuo; Matsubara, Tet-suyuki; and Ando, Toshihiko, 4,954,571, Cl. 525-205.000.

Sugden, Kenneth B., to Sundstrand Corporation. Oil supply for integrated drive generator. 4,953,663, Cl. 184-6.120.

Sugihara, Hirotsada; Nishikawa, Kohei; and Ito, Katsumi, to Takeda Chemical Industries, Ltd. Piperidine derivatives, their production and use. 4,954,625, Cl. 540-500.000.

Sugimoto, Shigeru: See—  
Mochida, Mitsuyoshi; Maekawa, Tokuo; Takei, Hisashi; Matsumoto, Yasuo; Ohmura, Hiroshi; Sugimoto, Shigeru; Ushiro, Seimei; Asano, Seiji; and Yoshida, Toshio, 4,954,857, Cl. 354-75.000.

Sugita, Tooru, to Nifco Inc. Molding for car windowpane. 4,953,907, Cl. 296-93.000.

Sugiura, Ikuzo: See—  
Shiozaki, Tsugio; Kitahara, Satoshi; Koizumi, Osamu; and Sugiura, Ikuzo, 4,953,994, Cl. 400-120.000.

Sugiura, Yoshio: See—  
Yamakawa, Kiyoshi; Sugiura, Yoshio; and Tsuruki, Satoru, 4,954,956, Cl. 364-419.000.

Sullivan, Charles T., to Honeywell Inc. Color signature sensor. 4,954,972, Cl. 364-526.000.

Sullivan, Donald F., to M&T Chemicals Inc. Photoflashing a liquid polymer layer on a phototool surface exposed to air. 4,954,421, Cl. 430-271.000.

Sullivan, Patrick M.: See—  
Flotow, Richard A.; and Sullivan, Patrick M., 4,953,680, Cl. 192-111.00B.

Sulner, Andrew: See—  
Greenberg, Bernard; and Sulner, Andrew, 4,954,265, Cl. 210-710.000.

Sumigawa, Yukio, to Sanshin Kogyo Kabushiki Kaisha. Tilt cylinder device. 4,954,107, Cl. 440-61.000.

Sumita, Masaki: See—  
Miyake, Norihisa; Sumita, Masaki; and Sarugaku, Shinichi, 4,954,762, Cl. 318-568.190.

Sumitani, Koji: See—  
Onodera, Tamio; Sakai, Tokuji; Yamasaki, Yasuo; and Sumitani, Koji, 4,954,326, Cl. 423-328.000.

Sumitomo Chemical Company, Ltd.: See—  
Abe, Tadashi; Manabe, Mitsuyoshi; Deguchi, Koji; Uhara, Hiroyuki; and Aoki, Yukio, 4,954,650, Cl. 562-534.000.

Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,954,626, Cl. 544-105.000.

Okumura, Takuzo; Okada, Toyokazu; Kikui, Hitoshi; and Nakata, Kazuo, 4,953,952, Cl. 350-337.000.

Suzukamo, Gohfu; Sakito, Yoji; Fukao, Masami; and Hagiya, Koji, 4,954,651, Cl. 562-856.000.

Sumitomo Electric Industries Ltd.: See—  
Hashida, Koichi; and Kohno, Teruhisa, 4,953,918, Cl. 303-115.000.

Hattori, Seiji; Kasukawa, Akihito; Shibano, Yoshizo; Kobayashi, Yoshinobu; and Suzuki, Shinji, 4,955,082, Cl. 455-33.000.

Nishimura, Akira; and Nakasugi, Masaaki, 4,953,945, Cl. 350-96.230.

Yasunaga, Yoshitake; and Nakamura, Toru, 4,954,698, Cl. 235-454.000.

Sumitomo Rubber Industries, Limited: See—  
Barson, Clifford W., 4,953,392, Cl. 73-146.000.

Kawamura, Kazuhiko; and Sato, Kazuo, 4,953,605, Cl. 152-541.000.

Sumiya, Koji: See—  
Moroto, Shuzo; Kawai, Masao; Yokoyama, Shoji; Kobayashi, Koji; and Sumiya, Koji, 4,954,959, Cl. 364-449.000.

Sun-Tec Co., Ltd.: See—  
Matsumoto, Mitsuo, 4,954,203, Cl. 156-361.000.

Sunda Defibrator Aktiebolag: See—  
Reinhall, Rolf B.; Johansson, Johan G. I.; and Mokvist, Anders V., 4,954,221, Cl. 162-261.000.

Virving, Nils, 4,953,796, Cl. 241-298.000.

Sundstrand Corporation: See—  
Aldrich, Allyn M., 4,953,675, Cl. 192-8.00R.

Crowe, Lawrence E.; and Sutrina, Thomas A., 4,954,876, Cl. 357-76.000.

Segaram, Para, 4,954,785, Cl. 328-167.000.

Sugden, Kenneth B., 4,953,663, Cl. 184-6.120.

Superior Electric Company, The: See—  
Brigham, Robert N., 4,954,740, Cl. 310-185.000.

Surauer, Michael; and Bittner, Helmut, to Messerschmitt-Bolkow Blohm GmbH. Adaptive nonlinear frequency domain filter with low phase loss. 4,954,732, Cl. 307-520.000.

Surgical Dynamics, Inc.: See—  
Ray, Charles D.; and Dickhudt, Eugene A., 4,953,540, Cl. 128-20.000.

Susumi, Sadao: See—  
Maeda, Haruhisa; Tsujikawa, Akira; and Susumi, Sadao, 4,954,340, Cl. 424-92.000.

Suto, Mark J., to Warner-Lambert Company. Haloalkylaminomethyl-2-nitro-1H-imidazoles. 4,954,515, Cl. 514-398.000.

Sutrina, Thomas A.: See—  
Crowe, Lawrence E.; and Sutrina, Thomas A., 4,954,376, Cl. 357-76.000.

Sutter, Marius; Bohlenhoff, Bettina; Bedorf, Norbert; and Hofle, Gerhard, to Oesellschaft für Biotechnologische Forschung mbH; and Ciba-Geigy Corporation. Microicides. 4,954,517, Cl. 514-450.000.

Suyama, Shuji; and Higuchi, Yoshiaki, to Nippon Oil and Fats Company, Limited. Ester-type polymeric peroxides. 4,954,656, Cl. 568-567.000.

Suzukamo, Gohfu; Sakito, Yoji; Fukao, Masami; and Hagiya, Koji, to Sumitomo Chemical Company, Limited. Process for preparing trans-2,2-dimethyl-3-(2,2-dihalovinyl)-cyclopropane carboxylic acid halide. 4,954,651, Cl. 562-856.000.

Suzuki, Akira: See—  
Iwase, Akira; and Suzuki, Akira, 4,953,965, Cl. 350-632.000.

Suzuki, Fujio, to Tel Sagami Limited. Apparatus for detecting an array of wafers. 4,954,721, Cl. 250-561.000.

Suzuki, Fumio; Iwasawa, Yoshihiro; Sato, Toshiaki; Ikai, Takasi; and Oguti, Toshihiko, to Nissan Chemical Industries, Ltd. Pyrazolesulfonylurea derivatives, preparation thereof, herbicide containing said derivative as active ingredient and herbicidal method by use thereof. 4,954,164, Cl. 71-92.000.

Suzuki, Hideo: See—  
Nakanishi, Keiichiro; Yamada, Minoru; Yamamoto, Masakazu; Ogihara, Satoru; Shinohara, Hiroichi; and Suzuki, Hideo, 4,954,877, Cl. 357-80.000.

Suzuki, Hidetoshi; and Nomura, Ichiro, to Canon Kabushiki Kaisha. Electron-emitting device and electron-beam generator making use. 4,954,744, Cl. 313-336.000.

Suzuki Jidosha Kogyo Kabushiki Kaisha: See—  
Kawai, Yoshikazu; Sato, Chosuke; and Kato, Masaru, 4,953,649, Cl. 180-79.100.

Kimura, Fumikazu, 4,953,631, Cl. 165-41.000.

Suzuki, Kazumasa; Yamada, Masahiro; and Suzuki, Keiichiro, to Ishikawa Tekko Kabushiki Kaisha. Ball joint. 4,954,006, Cl. 403-135.000.

Suzuki, Kazunari: See—  
Nakane, Keiichi; Kuwabara, Tadashi; Ikeda, Naoya; Koreeda, Hiroyuki; Aotsu, Hiroaki; Kawase, Masaki; Tatsuno, Yujiro; Nonaka, Naomichi; and Suzuki, Kazunari, 4,954,818, Cl. 340-721.000.

Suzuki, Keiichiro: See—  
Suzuki, Kazumasa; Yamada, Masahiro; and Suzuki, Keiichiro, 4,954,006, Cl. 403-135.000.

Suzuki, Keita: See—  
Minohara, Taketoshi; Takagi, Yoshio; Isobe, Tadashi; and Suzuki, Keita, 4,954,176, Cl. 106-417.000.

Suzuki, Kenji; Ohtaka, Keiji; and Suda, Yasuo, to Canon Kabushiki Kaisha. Focus detecting apparatus provided with a plurality of detecting fields. 4,954,701, Cl. 250-201.800.

Suzuki, Koichi: See—  
Baba, Masatoshi; Kakuta, Takuya; Tanaka, Norio; Oya, Eiichi; Ikai, Takashi; Nawamaki, Tsutomu; Watanabe, Shigeomi; and Suzuki, Koichi, 4,954,165, Cl. 71-103.000.

Suzuki, Kouichi: See—  
Yamatsu, Isao; Inai, Yuichi; Abe, Shinya; Suzuki, Takeshi; Suzuki, Yoshikazu; Tagaya, Osamu; Suzuki, Kouichi; Abe, Kouichi; and Yamada, Kouji, 4,954,525, Cl. 514-549.000.

Suzuki, Nobuo: See—  
Yamakawa, Hideaki; Suzuki, Nobuo; and Ozeki, Takeshi, 4,954,786, Cl. 330-4.300.

Suzuki, Shinji: See—  
Hattori, Seiji; Kasukawa, Akihito; Shibano, Yoshizo; Kobayashi, Yoshinobu; and Suzuki, Shinji, 4,955,082, Cl. 455-33.000.

Suzuki, Shintaro; Yanagisawa, Noriaki; and Ohkuma, Taka'aki, to Nippon Kayaku Kabushiki Kaisha. Lyophilized preparation of platinum compound. 4,954,522, Cl. 514-492.000.

Suzuki, Takahiro; Izuoka, Yuki; and Aoki, Noboru, to NGK Spark Plug Co., Ltd. Igniter plug structure having semicircular grooves. 4,954,743, Cl. 313-120.000.

Suzuki, Takamasa: See—  
Yamaguchi, Masaya; and Suzuki, Takamasa, 4,954,993, Cl. 365-226.000.

Suzuki, Takaya: See—  
Mimura, Akio; Hosokawa, Yoshikazu; Suzuki, Takaya; Aoyama, Takashi; Konishi, Nobutake; Misawa, Yutaka; and Miyata, Kenji, 4,954,855, Cl. 357-23.700.

Suzuki, Takeshi: See—  
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Kouichi; and Yamatsu, Isao, 4,954,523, Cl. 514-521.000.

Yamatsu, Isao; Inai, Yuichi; Abe, Shinya; Suzuki, Takeshi; Suzuki, Yoshikazu; Tagaya, Osamu; Suzuki, Kouichi; Abe, Kouichi; and Yamada, Kouji, 4,954,525, Cl. 514-549.000.

Suzuki, Yasuo: See—  
Kawamoto, Tetsuo; Motohashi, Ryo; Sakamoto, Toshihiro; Suzuki, Yasuo; and Abe, Hideaki, 4,954,736, Cl. 316-156.000.

Suzuki, Yoshikazu: See—  
Yamatsu, Isao; Inai, Yuichi; Abe, Shinya; Suzuki, Takeshi; Suzuki, Yoshikazu; Tagaya, Osamu; Suzuki, Kouichi; Abe, Kouichi; and Yamada, Kouji, 4,954,525, Cl. 514-549.000.

Svagr, Alexander, to SMS Schloemann-Siemag Aktiengesellschaft. Device for guiding rolling material in a rolling mill stand of a structural mill. 4,953,380, Cl. 72-250.000.

Svecia Silkscreen Maskiner AB: See—  
Ericsson, Sylve J. D., 4,953,459, Cl. 101-115.000.

Svenska Rotor Maskiner AB: See—  
Karlsson, Kurt; and Pettersson, Birger, 4,953,629, Cl. 165-10.000.

Swan, Leo, to Equipment Development Company, Inc. Quick release mechanism for the tool of a concrete/asphalt abrader. 4,953,523, Cl. 125-14.000.

Swanson, Sally A.: See—  
Ree, Moonhor; Swanson, Sally A.; Volksen, Willi; and Yoon, Do Y., 4,954,578, Cl. 525-432.000.

Swift, Gregory W.; Martin, Richard A.; and Radebaugh, Ray, to United States of America, Energy. Acoustic cryocooler. 4,953,366, Cl. 62-467.000.

Swindal, James L.: See—  
Bullis, Robert H.; Swindal, James L.; Wiegand, Walter J., Jr.; Brahm, Charles B.; and Meyer, Harold D., 4,954,925, Cl. 361-283.000.

Swinderman, Robert T.: See—  
Peterson, Edwin H.; Stetson, Harold M.; and Swinderman, Robert T., 4,953,689, Cl. 198-497.000.

Switchcraft, Inc.: See—  
Frank, John J., 4,954,096, Cl. 439-346.000.

Swofford, Howard W.; Rice, Sandra W.; Farrar, Grover L.; and Rudd, David, to Hoechst Celanese Corporation. Polyester film coated in-line with an silane. 4,954,396, Cl. 428-340.000.

Synaptics Inc.: See—  
Anderson, Janeen D. W.; and Mead, Carver A., 4,953,928, Cl. 357-23.500.

Szabo, Maria: See—  
Besenyi, Gabor; Nemeth, Sandor; Simandi, Laszlo; Belak, Maria; Szabo, Maria; Dukai, Jozsef; Nagy, Lajos; Tomordi, Elemer; Soptei, Csaba; and Dioszegine, Erzsébet E., 4,954,628, Cl. 544-211.000.

Szlag, Emil, to Stant Inc. Tank pressure control valve. 4,953,583, Cl. 137-118.000.

Szucs, Robert M.; and Bright, Roy L. Load hauler. 4,954,030, Cl. 410-96.000.

T. D. Williamson, Inc.: See—  
Rosenberg, Jeffrey S.; and Lockyear, Kevin W., 4,953,412, Cl. 73-865.800.

T. K. Valve Limited: See—  
Steele, John, 4,953,587, Cl. 137-315.000.

Tabata, Kazufumi: See—  
Araki, Nobuo; Tabata, Kazufumi; Yokoi, Kiyomi; and Ashidate, Tadami, 4,953,827, Cl. 254-134.400.

Tabatabaei, Emad: See—  
Fishman, Oleg; Prabhu, Satyen N.; Burk, John P.; and Tabatabaei, Emad, 4,953,761, Cl. 222-602.000.

Tabler, Donald C.: See—  
Johnson, Marvin M.; and Tabler, Donald C., 4,954,467, Cl. 502-26.000.

Tabota, Jun, to Murata Manufacturing Co., Ltd. Pressure distribution detecting device. 4,953,410, Cl. 73-862.040.

Tachibana, Shunro; and Shibata, Uichi, to Tachibana, Shunro; and Meiji Seika Kaisha, Ltd. Endermic application kits for external medicines. 4,953,565, Cl. 128-798.000.

Tada, Atsushi. Manually operated trigger type dispenser, method of assembling the same, and a spinner for use in the dispenser. 4,953,791, Cl. 239-333.000.

Tadini, Giorgio: See—  
Fogaroli, Giuseppe; Coli, Giuseppe; Tadini, Giorgio; and Meazza, Giampiero, 4,954,888, Cl. 358-75.000.

Taeckens, Sandra D. Method and means for supplying and using artificial fingernail material. 4,954,190, Cl. 156-61.000.

Tag Investments, Inc.: See—  
Green, Raymond W., 4,954,271, Cl. 252-8.000.

Tagaya, Osamu: See—  
Yamatsu, Isao; Inai, Yuichi; Abe, Shinya; Suzuki, Takeshi; Suzuki, Yoshikazu; Tagaya, Osamu; Suzuki, Kouichi; Abe, Kouichi; and Yamada, Kouji, 4,954,525, Cl. 514-549.000.

Taguchi, Nobuyoshi; Inai, Akihiro; Murata, Yukichi; and Hirota, Takao, to Matsushita Electric Industrial Co. Ltd.; and Mitsubishi Kasei Corporation. Thermal dye transfer sheet. 4,954,478, Cl. 503-227.000.

Tajima, Hatsu: See—  
Inoue, Masahiro; Tajima, Hatsu; Sakemi, Yuji; and Okado, Kenji, 4,954,404, Cl. 430-45.000.

Taka, Toshio: See—  
Kotani, Terumitsu; Taka, Toshio; and Saito, Yoshimasa, 4,954,391, Cl. 428-220.000.

Takada, Shigeyuki: See—  
Yamamoto, Masaki; Takada, Shigeyuki; and Ogawa, Yasuaki, 4,954,298, Cl. 264-4.600.

Takagi, Jun: See—  
Okubo, Tadahiko; Takagi, Jun; and Kohara, Tadashi, 4,953,800, Cl. 242-45.000.

Takagi, Junichi: See—  
Ohmura, Hiroshi; Arai, Takuya; Haishi, Akira; Kozai, Katsuya; Hara, Hiroshi; Tobioka, Takashi; Asano, Seiji; and Takagi, Junichi, 4,954,858, Cl. 354-145.100.

Takagi, Kiyoharu; Tanikawa, Nanya; and Ikeda, Minoru, to Aisin Seiki Kabushiki Kaisha. Hydraulic accumulator. 4,953,591, Cl. 137-568.000.

Takagi, Yoshio: See—  
Ito, Hiroshi; Handa, Junichi; Takagi, Yoshio; and Minohara, Taketoshi, 4,954,175, Cl. 106-417.000.

Minohara, Taketoshi; Takagi, Yoshio; Isobe, Tadashi; and Suzuki, Keita, 4,954,176, Cl. 106-417.000.

Takahashi, Hiroshi, to Canon Kabushiki Kaisha. Information processing apparatus. 4,954,967, Cl. 364-518.000.

Takahashi, Hiroshi, to Canon Kabushiki Kaisha. Light communication system. 4,955,081, Cl. 455-608.000.

Takahashi, Hiroshi: See—  
Koike, Tadao; Noguchi, Koichi; Takahashi, Hiroshi; and Tsunoda, Koichi, 4,954,849, Cl. 355-319.000.

Takahashi, Hiroyuki; and Kurashima, Toshiaki, to Sanyo Kiki Kabushiki Kaisha; and Yokohama Aeroquip. Self-sealing coupling with bypass for hydraulic circuit. 4,953,592, Cl. 137-599.100.

Takahashi, Ippei; and Wakita, Takeshi, to Fuji Photo Film Co., Ltd. Disk surface inspection method and apparatus therefor. 4,954,723, Cl. 250-572.000.

Takahashi, Kazuya: See—  
Nakamura, Yoshihiro; Takahashi, Kazuya; Ichinose, Atsuki; and Mino, Testuya, 4,954,906, Cl. 360-77.080.

Takahashi, Kenji: See—  
Munemura, Masahiro; and Takahashi, Kenji, 4,953,912, Cl. 296-191.000.

Takahashi, Mitsuo, to Seikoh Giken Co., Ltd. Optical fiber connecting device. 4,953,941, Cl. 350-96.200.

Takahashi, Sankichi: See—  
Hayashi, Nobuatsu; Takahashi, Sankichi; Ebara, Katsuya; Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; and Yoda, Hiroaki, 4,953,694, Cl. 202-180.000.

Takahashi, Takehiko; and Kato, Hitoshi, to Combi Co., Ltd. Baby carriage capable of serving as shopping car. 4,953,887, Cl. 280-647.000.

Takahashi, Tetsuhiko; Okajima, Kenichi; and Takeuchi, Hiroshi, to Hitachi, Ltd. Radiographic image pickup apparatus. 4,954,706, Cl. 250-327.200.

Takahashi, Toshiaki: See—  
Hara, Kazuhiko; Takahashi, Toshiaki; and Nagura, Masato, 4,953,405, Cl. 73-602.000.

Takahira, Takashi: See—  
Tate, Tochiro; Takahira, Takashi; Yamashita, Kouwa; Sakurai, Masao; Shiozawa, Akira; and Narita, Kazuhisa, 4,954,642, Cl. 549-389.000.

Takai, Kazuhiko: See—  
Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 4,954,050, Cl. 417-269.000.

Takajo, Shigeaki; Furukimi, Osamu; Ogura, Kuniaki; Maruta, Keiichi; Abe, Teruyoshi; and Sakurada, Ichio, to Kawasaki Steel Corp. Composite alloy steel powder and sintered alloy steel. 4,954,171, Cl. 75-246.000.

Takamizawa, Minoru: See—  
Takeda, Yoshifumi; Takamizawa, Minoru; and Takeno, Tsutomu, 4,954,596, Cl. 528-14.000.

Takano, Akira: See—  
Nakamura, Kazunari; Hagiwara, Toshihiko; and Takano, Akira, 4,953,539, Cl. 128-6.000.

Takano, Kazuhiro: See—  
Isozaki, Masaaki; and Takano, Kazuhiro, 4,954,826, Cl. 341-100.000.

Takano, Shuntaro; Yoshida, Chosaku; Inaba, Takihiro; Tanaka, Keichi; Takeno, Ryuko; Nagaki, Hideyoshi; Shimotori, Tomoya; and Makino, Shinji, to Toyama Chemical Company, Ltd. 4H-1-benzopyran-4-one derivative or its salt, process for producing the same and pharmaceutical composition comprising the same as active ingredient. 4,954,518, Cl. 514-456.000.

Takano, Yoshihide: See—  
Sakurai, Kenichi; and Takano, Yoshihide, 4,953,525, Cl. 123-41.280.

Takara Shuzo Co., Ltd.: See—  
Yoshihama, Yoshio; Kagaya, Asuka; Matsui, Susumu; and Obayashi, Akira, 4,954,445, Cl. 435-191.000.

Takasago International Corporation: See—  
Sayo, Noboru; Takemasa, Toshiro; and Kumobayashi, Hidenori, 4,954,644, Cl. 556-14.000.

Takase, Akihiko: See—  
Iwata, Masayoshi; Muto, Toahiya; Morikawa, Minoru; Kozawa, Satoshi; Takase, Akihiko; and Terano, Naoki, 4,954,675, Cl. 200-317.000.

Takata, Toshimasa; and Mizuno, Kenichi, to Mitsui Petrochemical Industries, Ltd. Epoxy resin. 4,954,603, Cl. 528-98.000.

Takatsu, Kiyoshi: See—  
Takeshima, Eiki; Takatsu, Kiyoshi; Kojima, Youichi; and Fujii, Takahiro, 4,954,235, Cl. 204-273.000.

Takeda Chemical Industries, Ltd.: See—  
Kamikado, Toshiya; Kando, Yasuyuki; Matsura, Kazuho; and Yamada, Junji, 4,954,497, Cl. 514-235.500.

Sugihara, Hirotsada; Nishikawa, Kohei; and Ito, Katsumi, 4,954,625, Cl. 540-500.000.

Yamamoto, Masaki; Takada, Shigeyuki; and Ogawa, Yasuaki, 4,954,298, Cl. 264-4.600.

Takeda, Masayuki: See—  
Aoki, Takayoshi; and Takeda, Masayuki, 4,954,409, Cl. 430-108.000.

Takeda, Yoshifumi; Takamizawa, Minoru; and Takeno, Tsutomu, to Shin-Etsu Chemical Co., Ltd. Process for manufacturing organic silazane polymers and ceramics therefrom. 4,954,596, Cl. 528-14.000.

Takagawa, Yujiro, to Tsudakoma Kogyo Kabushiki Kaisha. Picking period setting device for a loom. 4,953,596, Cl. 139-435.100.

Takei, Hisashi: See—  
Mochida, Mitsuyoshi; Maekawa, Tokuo; Takei, Hisashi; Matsumoto, Yasuo; Ohmura, Hiroshi; Sugimoto, Shigeru; Ushiro, Seimei; Asano, Seiji; and Yoshida, Toshio, 4,954,857, Cl. 354-75.000.

Takei, Tetsuya: See—  
Hashizume, Junichiro; Takei, Tetsuya; Iida, Shigehira; Saitoh, Keishi; and Arai, Takayoshi, 4,953,498, Cl. 118-719.000.



- Takemasa, Toshiro: See—  
Sayo, Noboru; Takemasa, Toshiro; and Kumobayashi, Hidenori, 4,954,644, Cl. 556-14.000.
- Takemura, Momoko; Inaba, Michihiko; Tetsuya, Toshio; and Kobayashi, Mitsuo, to Kabushiki Kaisha Toshiba. Semiconductor device. 4,954,870, Cl. 357-67.000.
- Takeno, Ryuko: See—  
Takano, Shuntaro; Yoshida, Chosaku; Inaba, Takihiro; Tanaka, Keiichi; Takeno, Ryuko; Nagaki, Hideyoshi; Shimotori, Tomoya; and Makino, Shinji, 4,954,518, Cl. 514-456.000.
- Takeno, Tsutomu: See—  
Takeda, Yoshifumi; Takamizawa, Minoru; and Takeno, Tsutomu, 4,954,596, Cl. 528-14.000.
- Takenouchi, Shinji, to Kabushiki Kaisha Toshiba. High frequency heating apparatus having sealable and detachable mounting rock. 4,954,680, Cl. 219-10.55E.
- Takeshima, Eiki; Takatsu, Kiyoshi; Kojima, Youichi; and Fujii, Takahiro, to Nishin Steel Co., Ltd. Electroplating of fine particles with metal. 4,954,235, Cl. 204-273.000.
- Takeuchi, Hiroshi: See—  
Takahashi, Tetsuhiko; Okajima, Kenichi; and Takeuchi, Hiroshi, 4,954,706, Cl. 230-327.200.
- Takeuchi, Tomio: See—  
Yoshimoto, Akihiro; Jodo, Osamu; Watanabe, Yoshio; Okamoto, Rokuro; and Takeuchi, Tomio, 4,954,438, Cl. 435-78.000.
- Takita, Kazuyuki, to International Business Machines Corporation. Head positioning control method and system. 4,954,907, Cl. 360-78.070.
- Takiyama, Masahiro; Miyazaki, Kunihiro; and Shiozawa, Kenichiro, to Showa Denko Kabushiki Kaisha; and Chiyoda Kaushiki Kaisha. Polishing pad for semiconductor wafers. 4,954,141, Cl. 51-296.000.
- Takuma, Keisuke; Ohya, Tsukasa; Ghoda, Isamu; Mikoda, Tamio; Koshida, Hitoshi; and Igata, Akitoshi, to Mitsui Toatsu Chemicals, Incorporated. Color toner composition. 4,954,410, Cl. 430-109.000.
- Tallman, Brett C. Protective cover for eyeglasses. 4,953,695, Cl. 206-5.000.
- Tamm, Rolf, to Bodenseewerk Perkin-Elmer & Co., GmbH. Electrothermal atomization furnace. 4,953,977, Cl. 356-312.000.
- Tamura, Takemi. Gas lighter. 4,954,077, Cl. 431-145.000.
- Tanabe, Toshiyuki; and Senoo, Seiji, to Kabushiki Kaisha Toshiba. Reception control apparatus for a television receiver. 4,954,899, Cl. 358-191.100.
- Tanaka, Hiroto; Yamashita, Hiroki; Masuda, Noboru; Shigeta, Junji; Umemoto, Yasunari; and Kagaya, Osamu, to Hitachi, Ltd. Semiconductor integrated circuit memory. 4,954,866, Cl. 357-45.000.
- Tanaka, Keiichi: See—  
Takano, Shuntaro; Yoshida, Chosaku; Inaba, Takihiro; Tanaka, Keiichi; Takeno, Ryuko; Nagaki, Hideyoshi; Shimotori, Tomoya; and Makino, Shinji, 4,954,518, Cl. 514-456.000.
- Tanaka Kikinzoku Kogyo K.K.: See—  
Tsurumi, Kazunori; Nakamura, Toshihide; and Sato, Akira, 4,954,474, Cl. 502-185.000.
- Tanaka, Koichi: See—  
Taniguchi, Kouji; Ogura, Takashi; and Tanaka, Koichi, 4,954,746, Cl. 313-506.000.
- Tanaka, Kosuke: See—  
Kawashima, Masae; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Kosuke, 4,954,465, Cl. 502-5.000.
- Tanaka, Norio: See—  
Baba, Masatoshi; Kakuta, Takuya; Tanaka, Norio; Oya, Eiichi; Ikai, Takashi; Nawamaki, Tsutomu; Watanabe, Shigeomi; and Suzuki, Koichi, 4,954,165, Cl. 71-103.000.
- Tanaka, Tadashi: See—  
Mizunoya, Nobuyuki; Komorita, Hiroshi; Tanaka, Tadashi; and Matsumura, Kazuo, 4,954,386, Cl. 428-137.000.
- Tanaka, Tomiji: See—  
Aratani, Katsuhisa; and Tanaka, Tomiji, 4,955,007, Cl. 369-13.000.
- Tanaka, Tomomi: See—  
Sugata, Yoshinobu; Furusho, Noboru; and Tanaka, Tomomi, 4,954,405, Cl. 430-58.000.
- Tandem Mfg., Inc.: See—  
Sudakoff, Carle H.; and Matthews, Billie D., 4,953,880, Cl. 280-47.380.
- Tanemura, Fumikazu; Honda, Tohru; Ohta, Shigetoshi; Kajita, Yoshiharu; and Kachi, Tatsushi, to Mino Yogyo Co., Ltd. Water-permeable ceramic material. 4,954,460, Cl. 501-80.000.
- Tanguy, Christian: See—  
Kervagoret, Gilbert; and Tanguy, Christian, 4,953,445, Cl. 91-358.00A.
- Tani, Sumio; Kogoh, Kazuhiko; Nozaki, Yuri; and Oshima, Kunihiro, to Kurashiki Boseki Kabushiki Kaisha. Porous polymer particles and preparation method thereof. 4,954,399, Cl. 428-402.000.
- Taniguchi, Kouji; Ogura, Takashi; and Tanaka, Koichi, to Sharp Kabushiki Kaisha. Thin film electroluminescence displaying apparatus. 4,954,746, Cl. 313-506.000.
- Taniguchi, Takashi: See—  
Satou, Hiroshi; Utsui, Yoshihiko; Tuneyoshi, Kiyotugu; Taniguchi, Takashi; Haraga, Kousuke; and Tsukui, Keitarou, 4,954,215, Cl. 156-630.000.
- Tanikawa, Naoya: See—  
Takagi, Kiyoharu; Tanikawa, Naoya; and Ikeda, Minoru, 4,953,591, Cl. 137-568.000.
- Tanimizu, Akihiro, to Mitsubishi Denki Kabushiki Kaisha. Color display apparatus. 4,954,880, Cl. 358-17.000.
- Tanimoto, Kenzo, to NEC Corporation. Error correction control system for control memory. 4,955,023, Cl. 371-40.100.
- Tanji, Masaki: See—  
Nishijima, Toyoki; and Tanji, Masaki, 4,954,431, Cl. 430-546.000.
- Tarlow, Kenneth A. Collapsible steamer basket. 4,953,452, Cl. 99-344.000.
- Tasaki, Takanobu: See—  
Hironaka, Yoshiaki; Matsubayashi, Tatsuhiko; Kamata, Yoshikiyo; and Tasaki, Takanobu, 4,953,526, Cl. 123-182.000.
- Tashima, Masatoshi: See—  
Iguchi, Kazuyoshi; Tashima, Masatoshi; Tazi, Ryoichi; Yoshino, Soichi; and Yagi, Motoo, 4,954,734, Cl. 310-71.000.
- Tatee, Tochi; Takahira, Takashi; Yamashita, Kouwa; Sakurai, Masao; Shiozawa, Akira; and Narita, Kazuhisa, to Nippon Kayaku Kabushiki Kaisha. Forskolol compounds. 4,954,642, Cl. 549-389.000.
- Tateishi, Terutaka; Koshino, Minoru; and Shimizu, Kazuyuki, to Fujitsu Limited. Method and circuit for checking storage protection by pre-checking an access request key. 4,954,982, Cl. 364-900.000.
- Tatsumi, Eiji: See—  
Noji, Toshiyuki; Yoshida, Hidetoshi; Tatsumi, Eiji; Akao, Shinichi; and Kosaka, Hideyuki, 4,953,330, Cl. 52-167.0DF.
- Tatsuno, Yujiro: See—  
Nakane, Keiichi; Kuwabara, Tadashi; Ikeda, Naoya; Koreeda, Hiroyuki; Aotsu, Hiroaki; Kawase, Masaki; Tatsuno, Yujiro; Nonaka, Naomichi; and Suzuki, Kazunari, 4,954,818, Cl. 340-721.000.
- Taub, Howard H.: See—  
West, William J.; Taub, Howard H.; and Miller, Robert J., 4,953,287, Cl. 29-611.000.
- Taxmo Co., Ltd.: See—  
Hashimoto, Isao; and Hidehira, Tsuyoshi, 4,954,842, Cl. 346-139.00R.
- Taylor, David W.: See—  
Hartridge, Leonard S. G.; Taylor, David W.; and Waters, Roger L., 4,954,368, Cl. 427-256.000.
- Taylor, Dennis R.: See—  
Vrooman, Carl D.; and Taylor, Dennis R., 4,953,664, Cl. 186-59.000.
- Taylor, Jan A., to Moorman Manufacturing Company. Animal feeder. 4,953,504, Cl. 119-54.000.
- Taylor, Paul D.: See—  
Liu, Kou-Chang; and Taylor, Paul D., 4,954,582, Cl. 525-502.000.
- Taylor, Sidney A.; and Rogala, Stanley J., to CRC-Evans Pipeline International, Inc. High pressure water jet cleaner and coating applicator. 4,953,496, Cl. 118-72.000.
- Tazi, Mohammed: See—  
Chuang, Jui-Chang; Walls, Edward, Jr.; Johnson, Stephen C.; and Tazi, Mohammed, 4,954,336, Cl. 424-71.000.
- Tazi, Ryoichi: See—  
Iguchi, Kazuyoshi; Tashima, Masatoshi; Tazi, Ryoichi; Yoshino, Soichi; and Yagi, Motoo, 4,954,734, Cl. 310-71.000.
- TD Quilting Machinery: See—  
Brower, David; and Jernigan, Thomas K., 4,953,483, Cl. 112-119.000.
- Brower, David; and Jernigan, Thomas K., 4,953,485, Cl. 112-262.300.
- Tech/Ops Landauer, Inc.: See—  
Wheeler, Robert V., 4,954,716, Cl. 250-482.100.
- Tecon GmbH: See—  
Vogelpohl, Alfons; and Rabiger, Norbert, 4,954,257, Cl. 210-607.000.
- Teel, Willis A.; and Christoff, James T., to United States of America, Navy. Double phase-lock-loop sonar. 4,954,999, Cl. 367-97.000.
- Teijin Petrochemical Industries, Ltd.: See—  
Onodera, Tamio; Sakai, Tokuji; Yamasaki, Yasuo; and Sumitani, Koji, 4,954,326, Cl. 423-328.000.
- Tektronix, Inc.: See—  
Klingman, Kayla R., 4,954,983, Cl. 364-900.000.
- Vancil, Bernard K., 4,954,745, Cl. 313-446.000.
- Tel Sagami Limited: See—  
Aoki, Kazutsugu; Fuse, Noboru; and Sakamoto, Yoshio, 4,954,684, Cl. 219-390.000.
- Suzuki, Fujio, 4,954,721, Cl. 250-561.000.
- Yamaga, Kenichi, 4,954,079, Cl. 432-6.000.
- Telchin, Arthur. Self examination device. 4,953,970, Cl. 351-223.000.
- Telefonaktiebolaget L M Ericsson: See—  
Ghisler, Walter, 4,955,049, Cl. 379-58.000.
- Roos, Sture G., 4,954,674, Cl. 200-175.000.
- Telkes, Maria: See—  
MacCracken, Calvin D.; and Telkes, Maria, 4,954,278, Cl. 252-70.000.
- Tennessee Gas Pipeline Company: See—  
Jewell, Raymond S., Jr.; and Hill, William E., 4,953,660, Cl. 181-282.000.
- Tennessee Valley Authority: See—  
Elrod, Jimmie L.; and Lee, Robert G., 4,954,155, Cl. 71-28.000.
- Gautney, Joe; Worley, Shelby D.; and Ash, Dennis H., 4,954,156, Cl. 71-28.000.
- Harrison, Cecil P.; and Tittle, Cullen G., 4,954,134, Cl. 23-313.00R.
- Tennihan, Robert. Leaf disposal bag. 4,955,068, Cl. 383-4.000.
- Terada, Takami: See—  
Yamada, Yukifumi; Terada, Takami; and Hibino, Keiichi, 4,953,676, Cl. 192-8.00C.
- Terakado, Seishi: See—  
Ishii, Kazunori; Terakado, Seishi; Funakoshi, Yasutomo; and Sakairi, Tadashi, 4,954,696, Cl. 219-548.000.

- Terano, Hideyuki; and Nakagawa, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Priority order decomposing apparatus. 4,954,978, Cl. 364-715.100.
- Terano, Naoki: See—  
Iwata, Masayosi; Muto, Toahya; Morikawa, Minoru; Kozawa, Satoshi; Takase, Akihiro; and Terano, Naoki, 4,954,675, Cl. 200-317.000.
- Terao, Motoyasu: See—  
Nishida, Tetsuya; Terao, Motoyasu; Miyauchi, Yasushi; and Horigome, Shinkichi, 4,954,379, Cl. 428-64.000.
- Terashima, Shigeo: See—  
Fuji, Hiroshi; Yamaguchi, Takeshi; Kojima, Kunio; Deguchi, Toshihisa; Terashima, Shigeo; and Fujiwara, Tsuneo, 4,954,903, Cl. 360-46.000.
- Terauchi, Kiyoshi: See—  
Higuchi, Teruo; Terauchi, Kiyoshi; Takai, Kazuhiko; Kikuchi, Sei; and Kobayashi, Hideto, 4,954,050, Cl. 417-269.000.
- Terayama, Satoshi: See—  
Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; Shimada, Hiroyuki; Kikuchi, Kimihiko; and Nakayama, Hiroshi, 4,953,677, Cl. 192-3.300.
- Tersiev, Valentin S., to TK "Orgtehnika". Wind measuring system (anemometer). 4,953,402, Cl. 73-189.000.
- Terui, Hiroshi, to Canon Kabushiki Kaisha. Pattern detecting method and apparatus. 4,955,062, Cl. 382-8.000.
- Tervamaki, Jukka, to Labsystems Oy. Washing device. 4,953,575, Cl. 134-57.00R.
- Teshima, Takashi: See—  
Nishibayashi, Katsumi; and Teshima, Takashi, 4,954,411, Cl. 430-111.000.
- Teti, George J.: See—  
Stiver, C. Edward; Teti, George J.; Pearson, Charles S.; and Brown, Kenneth R., 4,953,383, Cl. 72-402.000.
- Tetsuya, Toshio: See—  
Takemura, Momoko; Inaba, Michihiko; Tetsuya, Toshio; and Kobayashi, Mitsuo, 4,954,870, Cl. 357-67.000.
- Texas Instruments Incorporated: See—  
Colombat, Hubert, 4,954,977, Cl. 364-710.030.
- Hashimoto, Masahi, 4,954,994, Cl. 365-230.060.
- Ishikawa, Shuichi; and Kuwano, Hiromichi, 4,954,766, Cl. 323-272.000.
- McMann, Ronald E.; Garcia, Evaristo, Jr.; Welch, Michael T.; and Thompson, Stephen W., 4,954,423, Cl. 430-316.000.
- Penz, Perry A.; and Gately, Michael T., 4,954,963, Cl. 364-513.000.
- Reid, Lee R., 4,954,458, Cl. 437-51.000.
- Sampson, Jeffrey B., 4,954,789, Cl. 330-4.300.
- Thakore, Yatin B.; and Stoy, Vladimir, to Kingston Technologies. Filled membranes for separation of polar from non-polar gases. 4,954,145, Cl. 55-16.000.
- Thalken, Charles R.: See—  
Phillips, William R.; Bush, Blaine A.; O'Brien, John J.; and Thalken, Charles R., 4,953,610, Cl. 160-84.100.
- Theisler, Charles W. Adjustable thumb brace. 4,953,568, Cl. 128-878.000.
- Thellier, Michel: See—  
Alexandre, Stephane; Thellier, Michel; and Vincent, Jean-Claude, 4,954,261, Cl. 210-638.000.
- Theobald, Hans; Becker, Rainer; and Himmele, Walter, to BASF Aktiengesellschaft. Isoxazolines as intermediates to furans. 4,954,633, Cl. 548-240.000.
- Theodoridis, George, to FMC Corporation. Phosphorylaminophenyl-tetrahydrophthalimide herbicides. 4,954,159, Cl. 71-86.000.
- Thermal Dynamics Corporation: See—  
Hatch, Bruce O., 4,954,683, Cl. 219-121.500.
- Theurer, Josef, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Track surfacing machine with track stabilization. 4,953,467, Cl. 104-7.100.
- Thill, Bruce P.; and King, Bruce A., to Dow Chemical Company. The Polyalkyloxazoline-polycarbonate-polyalkyloxazoline triblock copolymer compatibilizer for polycarbonate/polyamide blends. 4,954,579, Cl. 525-467.000.
- Thomas & Betts Corporation: See—  
Lanzetta, Carmen, Jr.; Kiehl, Michael; Schindler, Guenter; and Williams, Russell H., 4,953,940, Cl. 350-96.200.
- Thomas Regout N.V.: See—  
Wojcik, Hendrigus T., 4,953,990, Cl. 384-18.000.
- Thomassen, Egidius T. R., to Du Pont de Nemours, E. I., and Company. Press-fit electrical terminal. 4,954,104, Cl. 439-751.000.
- Thomassen, Thomas, to Cheminvest A.S. Drum electrolysis. 4,954,234, Cl. 204-212.000.
- Thompson, Glen F.: See—  
Litton, Ernest C., Sr.; and Thompson, Glen F., 4,953,316, Cl. 42-90.000.
- Thompson, Jay A.: See—  
Pfeiffer, David M.; Stoner, David T.; Norworthy, John P.; Dipert, Dwight D.; Thompson, Jay A.; Fontaine, James A.; and Corry, Michael K., 4,955,024, Cl. 371-40.100.
- Thompson, Stanley C.; and Fredericks, Elmer R. Golf swing training device. 4,953,868, Cl. 273-186.00A.
- Thompson, Stephen W.: See—  
McMann, Ronald E.; Garcia, Evaristo, Jr.; Welch, Michael T.; and Thompson, Stephen W., 4,954,423, Cl. 430-316.000.
- Thompson, Winnie C.: See—  
Wright, Amy E.; Thompson, Winnie C.; and Lui, May S., 4,954,527, Cl. 514-675.000.
- Thomson-CSF: See—  
Buisson, Jean-Michel; and Soubrier, Jean-Marie, 4,954,767, Cl. 323-283.000.
- Warnan, Francois, 4,954,110, Cl. 441-22.000.
- Thomson Hybrides et Microondes: See—  
Tung, Pham N., 4,954,827, Cl. 341-159.000.
- Thorell, Lennart, to Boxholm Produktion AB. Method and apparatus for cutting and deburring tubes. 4,953,377, Cl. 72-70.000.
- Thornton, Allison A.: See—  
Thornton, Michael R.; and Thornton, Allison A., 4,953,731, Cl. 217-56.000.
- Thornton, Michael R.; and Thornton, Allison A. Keyless locking apparatus for selectively securing a lid to a box. 4,953,731, Cl. 217-56.000.
- Thyssen Edelstahlwerke AG: See—  
Schumers, Werner, 4,953,613, Cl. 164-416.000.
- Tien, Ping K.: See—  
Alferness, Rodney C.; Eisenstein, Gadi; Koren, Uziel; Tien, Ping K.; Tucker, Rodney S.; and Whalen, Matthew S., 4,955,028, Cl. 372-20.000.
- Timberlake, John F.: See—  
Gerkin, Richard M.; and Timberlake, John F., 4,954,561, Cl. 524-728.000.
- Tinz, Reinhard: See—  
Beicht, Bernd; Tinz, Reinhard; and Heinemann, Joachim, 4,953,514, Cl. 123-520.000.
- Tisbo, Cosmo N.; and Mack, Robert J., to Custom Plastics, Inc. Container movable from flat to channel-shaped configuration. 4,953,735, Cl. 220-6.000.
- Tittle, Cullen G.: See—  
Harrison, Cecil P.; and Tittle, Cullen G., 4,954,134, Cl. 23-313.00R.
- TK "Orgtehnika": See—  
Tersiev, Valentin S., 4,953,402, Cl. 73-189.000.
- Tobey, Billy D. Hand-holdable tube cutting device. 4,953,292, Cl. 30-97.000.
- Tobimatsu, Noriaki, to Sony Corporation. Cassette loading apparatus with improved access. 4,954,916, Cl. 360-96.500.
- Tobioka, Takashi: See—  
Ohmura, Hiroshi; Arai, Takuya; Haishi, Akira; Kozai, Katsuya; Hara, Hiroshi; Tobioka, Takashi; Asano, Seiji; and Takagi, Junichi, 4,954,858, Cl. 354-145.100.
- Toda, Kunio: See—  
Oka, Tateki; Toyoshi, Naoki; and Toda, Kunio, 4,954,843, Cl. 355-210.000.
- Todokoro, Shinji: See—  
Kokubun, Yoshikazu; Kurosawa, Akihito; Ushikubo, Kohei; and Todokoro, Shinji, 4,954,697, Cl. 235-381.000.
- Tohru, Hoshi: See—  
Mizuhara, Noboru; Tohru, Hoshi; and Morita, Takashi, 4,955,019, Cl. 370-85.700.
- Tokico Ltd.: See—  
Imazumi, Tomio, 4,953,671, Cl. 188-299.000.
- Komori, Teruyuki; Miyake, Shingo; and Senoo, Yoshio, 4,954,536, Cl. 523-149.000.
- Toko, Inc.: See—  
Kasahara, Takeshi, 4,954,850, Cl. 357-14.000.
- Tokyo Electric Co., Ltd.: See—  
Shiozaki, Tsugio; Kitahara, Satoshi; Koizumi, Osamu; and Sugiyama, Ikuzo, 4,953,994, Cl. 400-120.000.
- Tokyo Electric Power Company Ltd., The: See—  
Hattori, Seiji; Kasukawa, Akihito; Shibano, Yoshizo; Kobayashi, Yoshinobu; and Suzuki, Shinji, 4,955,082, Cl. 455-33.000.
- Tokyo Electron Limited: See—  
Kumagai, Hiromi; Sato, Kaoru; and Imai, Yoshio, 4,954,685, Cl. 319-390.000.
- Tokyo Keiki Company Ltd.: See—  
Kakinuma, Toshifumi; and Hayashi, Kiyoshi, 4,953,590, Cl. 137-554.000.
- Tokyo Magnetic Printing Co., Ltd.: See—  
Kawashima, Norimichi; and Orii, Kazuya, 4,954,140, Cl. 51-295.000.
- Tokyo Shibaura Denki Kabushiki Kaisha: See—  
Miura, Yasuaki, 4,954,874, Cl. 357-74.000.
- Toledano, Abraham, to Ilico Unican Inc. Key removable core body. 4,953,373, Cl. 70-369.000.
- Toimie, Robert J., Jr.; and Dolan, Donald T., to Pitney Bowes Inc. Mail thickness measuring apparatus. 4,953,842, Cl. 271-2.000.
- Tomaka, Leonard P.; and Dreyfus, Larry M. Combination serving tray, bed tray and bathtub tray. 4,953,473, Cl. 108-132.000.
- Tomar Electronics, Inc.: See—  
Sikora, Scott T., 4,954,753, Cl. 315-219.000.
- Tomco Incorporated: See—  
Killion, Robert F.; and Wolfe, Michael J., 4,953,518, Cl. 123-568.000.
- Tomeraasen, Paul L.: See—  
Miller, Steven D.; McDonald, Joseph C.; Eichner, Fred N.; and Tomeraasen, Paul L., 4,954,707, Cl. 250-337.000.
- Tominari, Noboru, to Dynavector, Inc. Reverb generator. 4,955,057, Cl. 381-63.000.
- Tomljenovic, Nenad, to Asea Brown Boveri Ltd. Method of generating an amplitude-modulated ISB transmission signal and apparatus for carrying out the method. 4,955,072, Cl. 455-108.000.



Tomoegawa Paper Co., Ltd.: See—  
Kobayashi, Yasuo; Hagiwara, Naoki; Hirota, Taisuke; Kodama, Churyo; Hirasawa, Yasuo; Miyazaki, Katsumi; Kawamura, Fumio; Higashi, Takao; Yanagisawa, Masami; and Sei, Akinori, 4,954,937, Cl. 362-255.000.

Tomordi, Elemer: See—  
Besenyi, Gabor; Nemeti, Sandor; Simandi, Laszlo; Belak, Maria; Szabo, Maria; Dukai, Jozsef; Nagy, Lajos; Tomordi, Elemer; Soptei, Csaba; and Dioszegine, Erzsebet E., 4,954,628, Cl. 544-211.000.

Tone, Junsuke: See—  
Maeda, Hiroshi; Tone, Junsuke; Ruddock, John C.; and Holdom, Kelvin S., 4,954,482, Cl. 514-8.000.

Tone, Shoichi; and Kiriake, Masaharu, to Murata Kikai Kabushiki Kaisha. Winding unit, 4,953,798, Cl. 242-35.50R.

Tonn, Howard E.; Davidson, Robert; Shultz, David B.; and Miller, Keith R., to Co-Ordinated Railway Services, Inc. Piston and shaft assembly of railroad end-of-car cushioning devices and method of repairing same, 4,953,727, Cl. 213-8.000.

Toppato, Michael: See—  
Marino, John G.; and Toppato, Michael, 4,953,267, Cl. 24-682.000.

Toray Engineering Co., Ltd.: See—  
Okubo, Tadahiko; Takagi, Jun; and Kohara, Tadashi, 4,953,800, Cl. 242-45.000.

Tordoff, Michael G.: See—  
Friedman, Mark I.; Tordoff, Michael G.; DiNovi, Michael J.; and Rakfa, Robert J., 4,954,531, Cl. 514-738.000.

Torii, Hideo: See—  
Aoki, Masaki; Torii, Hideo; Kuribayashi, Kiyoshi; Monji, Hideto; Umetani, Makoto; and Fujii, Eiji, 4,953,385, Cl. 72-462.000.

Torii, Kiyofumi: See—  
Shikama, Takashi; Wakabayashi, Asami; and Torii, Kiyofumi, 4,954,692, Cl. 219-365.000.

Torii, Nobutoshi; and Otsuka, Kazuhisa, to Fanuc Ltd. Industrial robot swivel shaft apparatus, 4,953,992, Cl. 384-607.000.

Torikai, Eiichi: See—  
Kato, Hiroshi; and Torikai, Eiichi, 4,954,238, Cl. 204-430.000.

Toshiba Kikai Kabushiki Kaisha: See—  
Iwamoto, Norihiro, 4,954,063, Cl. 425-149.000.

Toshiba Machine Company, Ltd.: See—  
Iwase, Akira; and Suzuki, Akira, 4,953,965, Cl. 350-632.000.

Tousignant, James W.: See—  
Tousignant, Robert C.; Tousignant, James W.; and Tousignant, Richard L., 4,953,752, Cl. 222-23.000.

Tousignant, Richard L.: See—  
Tousignant, Robert C.; Tousignant, James W.; and Tousignant, Richard L., 4,953,752, Cl. 222-23.000.

Tousignant, Robert C.; Tousignant, James W.; and Tousignant, Richard L., to E-Con-Mega Mix. Concrete and mortar distribution process and apparatus, 4,953,752, Cl. 222-23.000.

Town, Michael H.: See—  
Skuballa, Werner; Raduechel, Bernd; Vorbrueggen, Helmut; Casals-Stenzel, Jorge; Mannesmann, Gerda; Schillinger, Ekkehard; and Town, Michael H., 4,954,524, Cl. 514-530.000.

Toyama Chemical Company, Ltd.: See—  
Takano, Shuntaro; Yoshida, Chosaku; Inaba, Takihiro; Tanaka, Keiichi; Takeno, Ryuko; Nagaki, Hideyoshi; Shimotori, Tomoya; and Makino, Shinji, 4,954,518, Cl. 514-456.000.

Toyo Engineering Corporation: See—  
Okuyama, Nobuhisa; Goto, Shiuichi; and Enomoto, Tsugio, 4,954,047, Cl. 417-203.000.

Toyoshi, Naoki: See—  
Oka, Tateki; Toyoshi, Naoki; and Toda, Kunio, 4,954,843, Cl. 355-210.000.

Toyoshima, Nobuyuki; Shibata, Takanori; Hirashima, Atsushi; Ando, Ichiro; Iwata, Noriko; Yoshioka, Hiroshi; Itagaki, Akinari; and Yamazaki, Toshio, to Menicon Co., Ltd. and Shin-Etsu Chemical Co., Ltd. Soft ocular lens material, 4,954,586, Cl. 526-245.000.

Toyota Jidosha Kabushiki Kaisha: See—  
Ito, Hiroshi; Handa, Junichi; Takagi, Yoshio; and Minohara, Taketoshi, 4,954,175, Cl. 106-417.000.

Kobayashi, Katsuyuki, 4,954,120, Cl. 464-141.000.

Minohara, Taketoshi; Takagi, Yoshio; Isobe, Tadashi; and Suzuki, Keita, 4,954,176, Cl. 106-417.000.

Trailstar Mfg. Corp.: See—  
Johnston, William T.; Smith, Leslie, Jr.; and Barker, David K., 4,954,039, Cl. 414-500.000.

Trani, Aldo: See—  
Malabarba, Adriano; Strazzolini, Paolo; Trani, Aldo; Magni, Ambrogio; and Cavalleri, Bruno, 4,954,483, Cl. 514-9.000.

Transitions Research Corporation: See—  
Evans, John M., Jr.; Weiman, Carl F. R.; and King, Steven J., 4,954,962, Cl. 364-513.000.

Transpirator Technologies, Inc.: See—  
Blackmer, Richard H.; and Hedman, Jonathan W., 4,953,546, Cl. 128-203.160.

Tremblay, Raymond, to Les Entrepts Dupont et Lanctot Inc. Ash trays, 4,953,571, Cl. 131-231.000.

Tremulis, William S., to Advanced Cardiovascular Systems, Inc. Pressure monitoring guidewire with a flexible distal portion, 4,953,553, Cl. 128-637.000.

Trevelas, Chris A.: See—  
Fandrich, Darrell G.; and Trevelas, Chris A., 4,953,433, Cl. 84-239.000.

Trewiler, Carl E., to General Electric Company. The. Method of making drill back-up material for small bore drilling of circuit boards, 4,954,200, Cl. 156-344.000.

Tribert, Claude; and Grat, Felix R., to Howden Food Equipment, Inc. Method and apparatus for transferring a predetermined portion to a container, 4,953,600, Cl. 141-1.000.

Tridon Limited: See—  
Chow, Simon S. M., 4,953,251, Cl. 15-250.320.

Trinkaus, Karl, to Wella Aktiengesellschaft. One-piece plastic clip, 4,953,266, Cl. 24-499.000.

Tripp, Victor: See—  
Harms, Frank M.; Tripp, Victor; and Wells, Thomas B., 4,954,679, Cl. 219-10.55M.

Trombetta, Thomas L. Electrician's compound tool, 4,953,248, Cl. 7-107.000.

Troncoso, Vincent F.; and Gangloff, Richard, to Golden Key-Futura, Inc. Archery bow assembly, 4,953,521, Cl. 124-24.100.

Trozpek, Ludd A., to Rockwell International Corporation. Pathlength control system with deformable mirror having liquid-filled housing, 4,954,700, Cl. 250-201.900.

Truchart, David C.: See—  
Dahlquist, E. Arthur; Jenkins, Allan D.; Truchart, David C.; and Baxter, Richard B., 4,954,041, Cl. 414-718.000.

Truini, Jacqueline G.: See—  
Davis, Paul D.; Schuster, Gary B.; Truini, Jacqueline G.; and Fentiman, Al, 4,954,415, Cl. 430-138.000.

TRW Ehrenreich GmbH & Co. KG: See—  
Broszat, Lothar; Servos, Michael; and Schnitzler, Dieter, 4,953,894, Cl. 280-846.000.

TRW Inc.: See—  
Klosterhaus, Edwin G., 4,953,653, Cl. 180-148.000.

Ubhayakar, Shivadev K., 4,953,961, Cl. 350-486.000.

Ubhayakar, Shivadev K.; and Baker, Robert D., 4,954,952, Cl. 364-513.000.

TRW United Carr GmbH & Co. KG: See—  
Kraus, Willibald, 4,953,742, Cl. 220-367.000.

TS AGRO Products IM-Export B.V.: See—  
Meester, Jacobus, 4,953,712, Cl. 209-669.000.

Tsaur, Sheng-Liang, to S. C. Johnson & Son, Inc. Resin-fortified emulsion polymers and methods of preparing the same, 4,954,558, Cl. 525-460.000.

Tsay, Yung-Hsing: See—  
Chen, Chung-Mei; Yang, Jenn Fu; Lee, Weng-Jay; Lin, Tsai-Sheng; and Tsay, Yung-Hsing, 4,953,710, Cl. 209-518.000.

Tschang, Chung-Ji: See—  
Oftring, Alfred; Tschang, Chung-Ji; Winkler, Ekhard; Gotsmann, Guenther; and Glaser, Klaus, 4,954,369, Cl. 427-430.100.

Tsirjulnikov, Moisei V.; and Zusmanovsky, Zinoviy A. Device for treatment of sexual impotence in human males, 4,953,542, Cl. 128-79.000.

Tsubota, Toshio: See—  
Yoshida, Mitsutoshi; Tsubota, Toshio; and Okumura, Hiroshi, 4,954,043, Cl. 414-719.000.

Tsuchihashi, Masaru: See—  
Shindo, Koji; and Tsuchihashi, Masaru, 4,954,065, Cl. 425-175.000.

Tsudakoma Kogyo Kabushiki Kaisha: See—  
Takegawa, Yujiro, 4,953,596, Cl. 139-435.100.

Tsuge, Hisanao: See—  
Kawabata, Shoichi; Tsuge, Hisanao; and Wakatsuki, Hiromichi, 4,953,283, Cl. 29-593.000.

Tsuji, Eiji; and Nakano, Hideharu, to Matsushita Electric Works, Ltd. Hair curler with a clamping member, 4,953,574, Cl. 132-232.000.

Tsujikawa, Akira: See—  
Maeda, Haruhisa; Tsujikawa, Akira; and Susumi, Sadao, 4,954,340, Cl. 424-92.000.

Tsujimura, Osamu; Arai, Tatsuo; and Saito, Takayoshi, to Mitsubishi Metal Corporation. Inserted rotary cutter, 4,954,021, Cl. 407-35.000.

Tsukada, Tokio: See—  
Shinnai, Masao; Nishikawa, Kazuya; Tsukada, Tokio; and Hirotsu, Tohru, 4,954,797, Cl. 343-704.000.

Tsukada, Toru, to Nippon Seiko Kabushiki Kaisha. Linear guide apparatus with clamp device, 4,953,988, Cl. 384-8.000.

Tsukui, Keitarou: See—  
Satou, Hiroshi; Utsui, Yoshihiko; Tuneyoshi, Kiyotugu; Taniguchi, Takashi; Haraga, Kousuke; and Tsukui, Keitarou, 4,954,215, Cl. 156-630.000.

Tsumura, Tomoki, to PFU Limited. System for processing various types of information in easily usable form, 4,954,969, Cl. 364-521.000.

Tsunoda, Koichi: See—  
Koike, Tadao; Noguchi, Koichi; Takahashi, Hiroshi; and Tsunoda, Koichi, 4,954,849, Cl. 355-319.000.

Tsunoda, Teruo: See—  
Kawashima, Masae; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Kousuke, 4,954,465, Cl. 502-5.000.

Tsuroka, Takashi; Nakabayashi, Satoru; Matsuhashi, Yuji; Yamamoto, Haruo; Inouye, Shigeharu; and Kondo, Shinichi, to Meiji Seika Kaisha, Ltd. Antiviral agent containing lactam compound, 4,954,510, Cl. 514-315.000.

Tsuruki, Satoru: See—  
Yamakawa, Kiyoshi; Sugiura, Yoshio; and Tsuruki, Satoru, 4,954,956, Cl. 364-419.000.

Tsurumi, Kazunori; Nakamura, Toshihide; and Sato, Akira, to Tanaka Kikinzoku Kogyo K.K. Process for preparing catalysts by alloying metals on supports, 4,954,474, Cl. 502-185.000.

Tsutsumi, Kentaro: See—  
Sugawara, Kiyomi; Tsutsumi, Kentaro; and Otani, Miko, 4,954,589, Cl. 526-255.000.

Tsutsumi, Takayoshi: See—  
Kanome, Osamu; and Tsutsumi, Takayoshi, 4,954,380, Cl. 428-64.000.

Tucker, Rodney S.: See—  
Allferness, Rodney C.; Eisenstein, Gadi; Koren, Uziel; Tien, Ping K.; Tucker, Rodney S.; and Whalen, Matthew S., 4,955,028, Cl. 372-20.000.

Tuenge, Richard T.; and Kane, James. Multi-colored thin-film electroluminescent display with filter, 4,954,747, Cl. 313-506.000.

Tulane Educational Fund: See—  
Guth, Paul S., 4,954,486, Cl. 514-158.000.

Tumlin, Ricky W.: See—  
Underwood, James L.; Williams, Floyd K.; and Tumlin, Ricky W., 4,954,022, Cl. 408-1.00R.

Tuneyoshi, Kiyotugu: See—  
Satou, Hiroshi; Utsui, Yoshihiko; Tuneyoshi, Kiyotugu; Taniguchi, Takashi; Haraga, Kousuke; and Tsukui, Keitarou, 4,954,215, Cl. 156-630.000.

Tung, Pham N., to Thomson Hybrides et Microondes. Analog digital cascade converter, 4,954,827, Cl. 341-159.000.

Tunturi Oy: See—  
Lehtonen, Kari, 4,953,415, Cl. 74-141.000.

Turner, Mark L., to Convenience Marine Products, Inc. Cylinder pressure switch for automatic fire protection systems, 4,953,624, Cl. 169-60.000.

Turpin, Russell L., to Lockheed Corporation. Production of thermoset composites containing thermoplastic fillers, 4,954,195, Cl. 156-242.000.

Tutzer, Peter, to Von Roll Transportsysteme AG. Rail vehicle, particularly monorail, 4,953,472, Cl. 105-4.300.

Twitty, William B.; and Sander, Wendell B., to Echelon Systems Corporation. Protocol for network having plurality of intelligent cells, 4,955,018, Cl. 370-85.100.

Tzou, Kae M. Electronically self-latching cylinder lock, 4,953,375, Cl. 70-441.000.

Ubanski, Patrick; and Smolders, Jo, to Bristol Babcock S.A. Electric coil and in particular electromagnet arrangement comprising a coil spool and a coil casing, 4,954,801, Cl. 336-90.000.

Ubhayakar, Shivadev K., to TRW Inc. Light beam positioner, 4,953,961, Cl. 350-486.000.

Ubhayakar, Shivadev K.; and Baker, Robert D., to TRW Inc. Robotic arm systems, 4,954,952, Cl. 364-513.000.

Uchigasaki, Yuzi: See—  
Iwata, Yasuhiro; and Uchigasaki, Yuzi, 4,953,844, Cl. 271-9.000.

Uchikawa, Fusaoki; and Nomura, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Method of making photoconductive particles, 4,954,413, Cl. 430-135.000.

Uchino, Kenichi: See—  
Maeda, Shuichi; Kaneko, Toshio; Kurose, Yutaka; Kimura, Michio; Yoshida, Hidemi; Uchino, Kenichi; and Inaba, Shizue, 4,954,420, Cl. 430-270.000.

Uchiyama, Kaoru: See—  
Nakamura, Takashi; and Uchiyama, Kaoru, 4,954,838, Cl. 354-320.000.

Udupa, Divakara K. R.: See—  
Johnson, John M.; Locke, James A.; and Udupa, Divakara K. R., 4,954,965, Cl. 364-514.000.

Uekita, Masakazu; and Awaji, Hiroshi, to Kanegafuchi Kagaku Kogyo Kabushiki. Copolymerized polyamic acid salts and process of producing them, 4,954,608, Cl. 528-350.000.

Uemoto, Hiroshi: See—  
Oka, Masahiko; Uemoto, Hiroshi; and Iwasaki, Yasuji, 4,954,588, Cl. 526-247.000.

Ueno, Hirokazu; and Morikane, Hiroyuki, to Mitsubishi Denki Kabushiki Kaisha. Overhang-type starter, 4,953,414, Cl. 74-6.000.

Ueno, Ryuzo; Fujita, Yatsuka; Yamamoto, Munemitsu; and Kozakai, Hiroshi, to Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo. Multiplication inhibitor for *Bacillus cereus*, 4,954,358, Cl. 426-331.000.

Ueno, Tateo: See—  
Fukao, Hiroaki; Ohkita, Teruhiko; Nagasaka, Nobusuke; and Ueno, Tateo, 4,953,484, Cl. 112-162.000.

Ueno, Yasuhide, to Canon Kabushiki Kaisha. Recorder displaying recording sheet quantity available on remaining web sheet supply, 4,954,910, Cl. 358-296.000.

Uetsuka, Hisato: See—  
Imoto, Katsuyuki; Sano, Hirohisa; Miyazaki, Masaru; Matsuoka, Naoyuki; and Uetsuka, Hisato, 4,953,934, Cl. 350-96.150.

Uhara, Hiroyuki: See—  
Abe, Tadashi; Manabe, Mitsuyoshi; Deguchi, Koji; Uhara, Hiroyuki; and Aoki, Yukio, 4,954,650, Cl. 562-534.000.

Uhrin, Robert: See—  
Belt, Roger F.; and Uhrin, Robert, 4,954,211, Cl. 156-617.100.

Uke, Alan K.; and Monty, Lawrence P. Hand grip for sporting equipment or tools, 4,953,862, Cl. 273-75.000.

Ulichney, Robert A., to Digital Equipment Corporation. System for producing dithered images from continuous-tone image data, 4,955,065, Cl. 382-50.000.

Ultimate Window Coverings, Inc.: See—  
Phillips, William R.; Bush, Blaine A.; O'Brien, John J.; and Thalken, Charles R., 4,953,610, Cl. 160-84.100.

Umemoto, Yasunari: See—  
Tanaka, Hiroto; Yamashita, Hiroki; Masuda, Noboru; Shigeta, Junji; Umemoto, Yasunari; and Kagaya, Osamu, 4,954,866, Cl. 357-45.000.

Umetani, Makoto: See—  
Aoki, Masaki; Torii, Hideo; Kuribayashi, Kiyoshi; Monji, Hideto; Umetani, Makoto; and Fujii, Eiji, 4,953,385, Cl. 72-462.000.

Umetsu, Shinjiro; and Mori, Toshihiro, to NEC Corporation. Paging receiver with metallic display frame structure increasing antenna gain, 4,955,084, Cl. 455-278.000.

Underwood, James L.; Williams, Floyd K.; and Tumlin, Ricky W., to Underwood Mold Co., Inc. Method for machining multiple cuts in a workpiece to a uniform depth, 4,954,022, Cl. 408-1.00R.

Underwood Mold Co., Inc.: See—  
Underwood, James L.; Williams, Floyd K.; and Tumlin, Ricky W., 4,954,022, Cl. 408-1.00R.

Unico, Inc.: See—  
Sanders, Raymond H., 4,954,033, Cl. 414-27.000.

Union Carbide Chemicals and Plastics Company Inc.: See—  
Gerkin, Richard M.; Jorgenson, Michael W.; and Leuzzi, Paul W., II, 4,954,560, Cl. 524-714.000.

Gerkin, Richard M.; and Timberlake, John F., 4,954,561, Cl. 524-728.000.

Huybrechts, Serge, 4,953,946, Cl. 350-96.230.

Johnson, Robert N.; and Colon, Ismael, 4,954,553, Cl. 524-376.000.

Vidal, Jose' L., 4,954,665, Cl. 568-902.200.

Union Carbide Corporation: See—  
Ma, Frank; and Comeau, Daniel, 4,954,279, Cl. 252-70.000.

Union Oil Company of California: See—  
Ghandehari, Mohammad H., 4,954,186, Cl. 148-302.000.

Uniroyal Plastics Company, Inc.: See—  
Acharya, Ramadas U.; and Hill, Lawrence I., 4,954,389, Cl. 428-212.000.

Unisys Corporation: See—  
Eibner, Jules A.; and Zundel, Jean-Pol, 4,954,979, Cl. 364-900.000.

Fazzolari, Luciano; Giattini, Frank P.; Socca, Anthony L.; and Zavacki, Eugene C., 4,954,996, Cl. 367-13.000.

United States of America: See—  
Birmingham, Joseph G.; and Moore, Robert R., 4,954,320, Cl. 422-186.040.

Hales, Walter L., 4,953,981, Cl. 356-353.000.

Hester, Troy L., 4,953,804, Cl. 242-47.000.

Hunter, Kenneth W.; and Fischer, Gerald W., 4,954,449, Cl. 435-240.270.

Leupold, Herbert A.; and Potenziani, Ernest, II, 4,953,555, Cl. 128-653.00A.

Neifeld, Richard A., 4,954,365, Cl. 427-53.100.

Plichta, Edward J.; and Behl, Wishvender K., 4,954,403, Cl. 429-103.000.

Smith, Bert J., 4,953,811, Cl. 244-17.190.

Commerce: See—  
DeReggi, Aime S.; Chiang, Chwan-Kang; and Davis, George T., 4,954,481, Cl. 505-1.000.

Fine, Joseph; and Marton, Denes, 4,954,722, Cl. 250-571.000.

Energy: See—  
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Health and Human Services: See—  
Keefer, Larry K., 4,954,526, Cl. 514-611.000.

National Aeronautics and Space Administration: See—  
Maserjian, Joseph, 4,954,864, Cl. 357-30.000.

Navy: See—  
Barradas, Scott; Farber, Bruce; and Luther, William B., 4,953,295, Cl. 30-380.000.

Evans, Alan G.; and Stein, William L., 4,954,833, Cl. 342-357.000.

Fischer, Eugene C.; and Crane, Roger M., 4,954,377, Cl. 428-36.100.

Gilbreath, Gail C.; and Clement, Anne E., 4,953,951, Cl. 350-320.000.

Goldman, Warren A., 4,955,003, Cl. 367-125.000.

Hightower, Ralph E., 4,953,465, Cl. 102-406.000.

Hunter, Paul; and Schweet, Leonard J., 4,954,216, Cl. 156-634.000.

Moscrip, William M., 4,953,440, Cl. 89-7.000.

Munach, Arnold S.; and Nguyen, John Q., 4,953,475, Cl. 102-229.000.

Olson, Jack R.; Hitney, Herbert V.; Paulus, Richard A.; and Anderson, Kenneth D., 4,953,986, Cl. 374-136.000.

Teel, Willis A.; and Christoff, James T., 4,954,999, Cl. 367-97.000.

Wagaman, Kerry L., 4,954,328, Cl. 423-386.000.

U.S. Philips Corporation: See—  
Binet, Michel, 4,954,774, Cl. 324-158.00F.

Chung, Kah-Seng, 4,955,078, Cl. 455-244.000.

Dallas, William J., 4,953,949, Cl. 350-130.000.

Driessen, Leonardus M. H. E.; and Janse, Cornelis P., 4,954,986, Cl. 365-189.010.

Le Bris, Jean; Erman, Marko; and Gillardin, Gerard, 4,954,713, Cl. 250-458.100.

Opschoor, Jan; van der Poel, Carolus J.; and van 't Blik, Henri F. J., 4,954,971, Cl. 372-50.000.

Patron, Christian S. A. E., 4,954,792, Cl. 331-169.000.

United Technologies Corporation: See—  
Anafi, David; and Slaymaker, Philip A., 4,953,964, Cl. 350-557.000.

- Bullis, Robert H.; Swindal, James L.; Wiegand, Walter J., Jr.; Brahm, Charles B.; and Meyer, Harold D., 4,954,925, Cl. 361-283.000.
- Suchoski, Paul G., Jr.; Findakly, Talal K.; and Leonberger, Frederick J., 4,953,935, Cl. 350-96.160.
- Young, Edward L.; and Kapoor, Mohan L., 4,954,752, Cl. 315-169.300.
- Unitex Corporation: See—  
Kelly, John S.; and Gille, Henrick K., 4,954,080, Cl. 433-8.000.
- Universal Consolidated Methods, Inc.: See—  
Yoder, Ronald L., 4,953,820, Cl. 248-231.500.
- University of Calgary: See—  
Schurch, Samuel, 4,953,389, Cl. 73-64.400.
- University of California, The Regents of the: See—  
Nevens, Donald J.; and Nishitani, Kazuhiko, 4,954,447, Cl. 435-200.000.
- University of Connecticut: See—  
Jain, Faquir C., 4,955,031, Cl. 372-45.000.
- University of Georgia Research Foundation, Inc.: See—  
Stammer, Charles H., 4,954,158, Cl. 71-76.000.
- University of Michigan, The Regents of the: See—  
Johnson, Christy L.; Schwank, Johannes; and Wise, Kensall D., 4,953,387, Cl. 73-25.030.
- University of Missouri, The Curators of the: See—  
Davis, Robert L.; and Keith, Harold D., 4,954,017, Cl. 405-259.000.
- University of Waterloo: See—  
Dullien, Francis A.; Chatzis, Ioannis; and Macdonald, Ian F., 4,953,619, Cl. 166-265.000.
- Starr, Robert C.; and Ingleton, Robert A., 4,953,637, Cl. 175-20.000.
- Unser, Edwin W., to Grumman Aerospace Corporation. Thread grinding attachment, 4,953,325, Cl. 51-95.0TG.
- UOP: See—  
Gatsis, John G., 4,954,473, Cl. 502-171.000.
- Gruia, Adrian J., 4,954,242, Cl. 208-99.000.
- Uotani, Nobuo: See—  
Yoshida, Haruo; Uotani, Nobuo; and Saida, Yoshihiro, 4,954,590, Cl. 526-259.000.
- Urai, Takahiko, to NEC Corporation. Output buffer circuit used for stable voltage source, 4,954,729, Cl. 307-443.000.
- Urakami, Toyozo, to Sanyo Electric Co., Ltd. Reference signal producing circuit for phase servo control, 4,954,893, Cl. 358-148.000.
- Urata, Yukihide, to Fuji Photo Film Co., Ltd. Silver halide color photographic material for laser recording, 4,954,429, Cl. 430-503.000.
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- Uremovich, Michael J. Hydrocarbon reclaimer system, 4,954,267, Cl. 210-771.000.
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"Wetenschappelijk en Technisch Centrum van de Belgische Textielnijverheid", afgekort tot "Centexbel": See—  
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- Yamada, Akio: See—  
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- Yamada, Akira: See—  
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- Yamada, Junji: See—  
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- Yamada, Kazuhiko; and Maruyama, Takao, to NEC Corporation. Thin film magnetic head, 4,954,920, Cl. 360-113.000.
- Yamada, Kouji: See—  
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- Yamada, Masahiro; and Kawai, Kiyoyuki, to Kabushiki Kaisha Toshiba. Sample rate conversion system having interpolation function with phase locked clock, 4,954,824, Cl. 341-61.000.
- Yamada, Masahiro: See—  
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- Yamada, Minoru: See—  
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- Yamada, Osamu; and Fujita, Tadasu, to Nishin Oil Mills, LTD., The. Method of immobilizing biochemically active substance with xanthan gum, 4,954,443, Cl. 435-178.000.
- Yamada, Tadaharu, to NEC Corporation. Rotary seek magnetic head assembly having a looped load beam end to achieve high speed access, 4,954,919, Cl. 360-104.000.
- Yamada, Takashi; Arimura, Hisao; and Maeda, Takashi, to Kyocera Corporation. Magneto-optical recording element and method for fabrication thereof, 4,954,232, Cl. 204-192.230.
- Yamada, Yukifumi; Terada, Takami; and Hibino, Keiichi, to Aisin Seiko Co. Ltd. Spring coupler, 4,953,676, Cl. 192-8.00C.
- Yamaga, Kenichi, to Tel Sagami Limited. Heat-treating apparatus and a method for the same, 4,954,079, Cl. 432-6.000.
- Yamagishi, Toshio: See—  
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- Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, to Eisai Co., Ltd. Benzophenone oxime ether compounds, pharmaceutical compositions and treatment methods, 4,954,523, Cl. 514-521.000.
- Yamaguchi, Hitoshi, to Fuji Electric Co., Ltd. Attraction type magnetic levitation vehicle system, 4,953,470, Cl. 104-282.000.
- Yamaguchi, Ikunori; Emori, Kiyoshi; and Morikawa, Takashi, to Minolta Camera Kabushiki Kaisha. Interface system for print system, 4,954,968, Cl. 364-519.000.
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- Yamaguchi, Mitsuoyoshi: See—  
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- Iijima, Kenzaburo; and Hayashi, Yoshinori, 4,954,803, Cl. 338-32.00R.
- Shibukawa, Takeo, 4,953,438, Cl. 84-609.000.
- Yamaha Hatsudoki Kabushiki Kaisha: See—  
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- Yamaha Hatsudoki Kabushiki Kaisha: See—  
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- Yamakawa, Hideaki; Suzuki, Nobuo; and Ozeki, Takeshi, to Kabushiki Kaisha Toshiba. Optical amplifying device, 4,954,786, Cl. 330-4.300.
- Yamakawa, Kiyoshi; Sugiura, Yoshio; and Tsuruki, Satoru, to Brother Kogyo Kabushiki Kaisha. Data processing apparatus having function of providing helpful information after excessive time lapse from last input operation, 4,954,956, Cl. 364-419.000.
- Yamamoto, Haruo: See—  
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- Yamamoto, Masakazu: See—  
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- Yamamoto, Masaki; Takada, Shigeyuki; and Ogawa, Yasuaki, to Takeda Chemical Industries, Ltd. Method for producing microcapsule, 4,954,298, Cl. 264-4.600.
- Yamamoto, Masaki: See—  
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- Yamamoto, Munemitsu: See—  
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- Yamamoto, Tetsuya: See—  
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- Yamamoto, Yousuke: See—  
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- Yamanaka, Kazunori: See—  
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- Yamaoka, Akira: See—  
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- Yamasaki, Hiroyuki: See—  
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- Yamasaki, Yasuo: See—  
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- Yamashita, Hiroki: See—  
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- Yamashita, Kouwa: See—  
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- Yamatsu, Isao: See—  
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- Yamauchi, Takashi, to Fanuc Ltd. High speed input/output module and programmable logic control device, 4,954,980, Cl. 364-900.000.
- Yamauchi, Yukiji, to Hitachi, Ltd. System configuration of wireless PBX and communication method therefor, 4,955,050, Cl. 379-59.000.
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- Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Semiconductor photoelectric conversion device and method of making the same, 4,954,856, Cl. 357-30.000.
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- Yamazaki, Toshio: See—  
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- Yamori, Tsunefumi: See—  
Shuku, Shigekazu; Mukoyoshi, Shunichiro; Yuasa, Eiji; and Yamori, Tsunefumi, 4,954,477, Cl. 503-226.000.
- Yan, Cheng F.: See—  
Yafuso, Masao; Yan, Cheng F.; Hacker, Thomas G.; Hui, Henry K.; Maxwell, Thomas P.; and Miller, William W., 4,954,318, Cl. 422-59.000.
- Yanagisawa, Masami: See—  
Kobayashi, Yasuo; Hagiwara, Naoki; Hirota, Taisuke; Kodama, Churyo; Hirasawa, Yasuo; Miyazaki, Katsumi; Kawamura, Fumio; Higashi, Takao; Yanagisawa, Masami; and Sei, Akinori, 4,954,937, Cl. 362-255.000.
- Yanagisawa, Noriaki: See—  
Suzuki, Shintaro; Yanagisawa, Noriaki; and Ohkuma, Taka'aki, 4,954,522, Cl. 514-492.000.
- Yanagita, Mitsuhiro: See—  
Obitsu, Takeo; Ohnishi, Yutaka; Yoshinaka, Shinji; Koguchi, Minoru; Yanagita, Mitsuhiro; and Hirai, Nobuyuki, 4,954,631, Cl. 546-15.000.

- Yang, Heechung: See—  
Yost, David A.; Russell, John C.; and Yang, Heechung, 4,954,452, Cl. 436-524.000.
- Yang, Jenn Fu: See—  
Chen, Chung-Mei; Yang, Jenn Fu; Lee, Weng-Jay; Lin, Tsai-Sheng; and Tsay, Yung-Haing, 4,953,710, Cl. 209-518.000.
- Yano, Kanji; Saijo, Yasutsugu; Kusaka, Kensaku; and Hirabayashi, Hiromitsu, to Canon Kabushiki Kaisha. Image fixing device and image forming apparatus with same, 4,954,845, Cl. 355-290.000.
- Yao, Masaharu: See—  
Ito, Hiroshi; Kasezawa, Tadashi; and Yao, Masaharu, 4,954,885, Cl. 358-31.000.
- Yasuda, Hiroshi: See—  
Sakamoto, Kiichi; Yasuda, Hiroshi; Yamada, Akio; and Kudou, Jinko, 4,954,717, Cl. 250-492.300.
- Yasuda, Nobuaki: See—  
Ichihara, Katsutarou; Ozawa, Norio; and Yasuda, Nobuaki, 4,954,841, Cl. 346-135.100.
- Yasufuku, Hitoshi; and Ogata, Toshikazu, to Kabushiki Kaisha Toshiba. Ventilator drive system, 4,953,784, Cl. 236-44.00A.
- Yasunaga, Yoshitaka; and Nakamura, Toru, to Sumitomo Electric Industries, Ltd. Sensor aligning means for optical reading apparatus, 4,954,698, Cl. 235-454.000.
- Yazaki Corporation: See—  
Oikawa, Ryutsu, 4,953,801, Cl. 248-65.000.
- Ozaki, Keiichi; Manabe, Naoki; Shibata, Tatsumi; Hayashi, Hideharu; Muramatsu, Yukio; and Yamamoto, Masaki, 4,954,102, Cl. 439-535.000.
- Shimochi, Eiji, 4,954,090, Cl. 439-76.000.
- Yeh, Yu S.: See—  
Eng, Kai Y.; Karol, Mark J.; and Yeh, Yu S., 4,955,016, Cl. 370-60.000.
- Eng, Kai Y.; Karol, Mark J.; and Yeh, Yu S., 4,955,017, Cl. 370-60.000.
- Yevich, Joseph P.: See—  
Smith, David W.; Yocca, Frank D.; Yevich, Joseph P.; and Mattson, Ronald J., 4,954,502, Cl. 514-253.000.
- Yializis, Angelo, to Spectrum Control, Inc. Flash evaporation of monomer fluids, 4,954,371, Cl. 427-44.000.
- Yip, Mietak T.: See—  
Albarella, James P.; and Yip, Mietak T., 4,954,451, Cl. 436-175.000.
- Yocca, Frank D.: See—  
Smith, David W.; Yocca, Frank D.; Yevich, Joseph P.; and Mattson, Ronald J., 4,954,502, Cl. 514-253.000.
- Yoda, Hiroaki: See—  
Hayashi, Nobuatsu; Takahashi, Sankichi; Ebara, Katsuya; Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; and Yoda, Hiroaki, 4,953,694, Cl. 202-180.000.
- Yoder, Ronald L., to Universal Consolidated Methods, Inc. Lamp with retaining ring, 4,953,820, Cl. 248-231.500.
- Yoh, Kanji, to Leland Stanford Junior University, The Board of Trustees of the Complementary FET circuit having merged enhancement/depletion FET output, 4,954,730, Cl. 307-451.000.
- Yohner, Paul A.: See—  
Kusmer, Daniel P.; and Yohner, Paul A., 4,953,276, Cl. 29-235.000.
- Yokogawa Medical Systems, Limited: See—  
Shimazaki, Toru, 4,954,780, Cl. 324-318.000.
- Yokohama Aeroquip: See—  
Takahashi, Hiroyuki; and Kurashima, Toshiaki, 4,953,592, Cl. 137-599.100.
- Yokohama Rubber Co., Ltd., The: See—  
Mitsuhashi, Kenhachi; and Suga, Shigeru, 4,954,693, Cl. 219-400.000.
- Yokoi, Kiyomi: See—  
Araki, Nobuo; Tabata, Kazufumi; Yokoi, Kiyomi; and Ashidate Tadami, 4,953,827, Cl. 254-134.400.
- Yokote, Masatsugu: See—  
Kawagoe, Kenji; Ito, Hideo; and Yokote, Masatsugu, 4,954,957, Cl. 364-424.050.
- Yokoyama, Hiromitsu: See—  
Imanaka, Yoshihiko; Machi, Takato; Yamanaka, Kazunori; Yokoyama, Hiromitsu; Kamehara, Nobuo; and Niwa, Koichi, 4,954,480, Cl. 505-1.000.
- Yokoyama, Minoru: See—  
Nishiyama, Yukio; Fujioka, Junzo; Hino, Haruki; Matsuzaki, Yuji; Sakiyama, Masayuki; and Yokoyama, Minoru, 4,954,314, Cl. 419-45.000.
- Yokoyama, Shoji: See—  
Moroto, Shuzo; Kawai, Masao; Yokoyama, Shoji; Kobayashi, Koji; and Sumiya, Koji, 4,954,959, Cl. 364-449.000.
- Yokoyama, Takaaki, to Sanken Electric Co., Ltd. Method for manufacturing plastic encapsulated electronic semiconductor devices, 4,954,307, Cl. 264-272.150.
- Yoon, Do Y.: See—  
Ree, Moonhor; Swanson, Sally A.; Volksen, Willi; and Yoon, Do Y., 4,954,578, Cl. 525-432.000.
- Yorio, Ralph: See—  
Critton, Thomas J.; Johnson, Donald S.; Pukalo, Walter P.; and Yorio, Ralph, 4,953,778, Cl. 228-173.600.
- Yoshida, Bill: See—  
Koda, Hideo H.; and Yoshida, Bill, 4,954,724, Cl. 250-577.000.
- Yoshida, Chosaku: See—  
Takano, Shuntaro; Yoshida, Chosaku; Inaba, Takihiro; Tanaka, Keiichi; Takeno, Ryuko; Nagaki, Hideyoshi; Shimotori, Tomoya; and Makino, Shinji, 4,954,518, Cl. 514-456.000.
- Yoshida, Hajime, to Nikken Chemical Laboratory Co., Ltd. Lipo-phobicating solution for electrophotographic plates for offset printing, 4,954,173, Cl. 106-2.000.
- Yoshida, Haruo; Uotani, Nobuo; and Saida, Yoshihiro, to Showa Denko Kabushiki Kaisha. Preparation of polymer having isoindole structures, 4,954,590, Cl. 526-259.000.
- Yoshida, Hidemi: See—  
Maeda, Shuichi; Kaneko, Toshio; Kurose, Yutaka; Kimura, Michio; Yoshida, Hidemi; Uchino, Kenichi; and Inaba, Shizue, 4,954,420, Cl. 430-270.000.
- Yoshida, Hidetoshi: See—  
Noji, Toshiyuki; Yoshida, Hidetoshi; Tatsumi, Eiji; Akao, Shinichi; and Kosaka, Hideyuki, 4,953,330, Cl. 52-167.0DF.
- Yoshida, Kazuomi; Higuchi, Hideyo; Mizuochi, Hitoshi; and Yamamoto, Yousuke, to Mitsubishi Denki Kabushiki Kaisha. Optical semiconductor device, 4,954,853, Cl. 357-17.000.
- Yoshida, Mitsutoshi; Tsubota, Toshio; and Okumura, Hiroshi, to Mitsubishi Jukogyo K.K. Balance mechanism of an industrial robot, 4,954,043, Cl. 414-719.000.
- Yoshida, Mitsutoshi: See—  
Kimura, Yutaka; Okumura, Hiroshi; Mihara, Hirokazu; and Yoshida, Mitsutoshi, 4,954,761, Cl. 318-568.100.
- Yoshida, Mizuo: See—  
Segoshi, Kazuo; Okuda, Toshiyuki; Okamura, Kenji; and Yoshida, Mizuo, 4,953,966, Cl. 351-41.000.
- Yoshida, Shuichi: See—  
Wakabashi, Noriaki; Yoshida, Shuichi; Inaji, Toshio; Onodera, Hiromi; Yoshiura, Tsukasa; and Mitani, Hiroshi, 4,954,905, Cl. 360-77.030.
- Yoshida, Toshio: See—  
Mochida, Mitsuoyoshi; Maekawa, Tokuo; Takei, Hisashi; Matsumoto, Yasuo; Ohmura, Hiroshi; Sugimoto, Shigeru; Ushiro, Seimei; Asano, Seiji; and Yoshida, Toshio, 4,954,857, Cl. 354-75.000.
- Yoshihama, Yoshio; Kagaya, Asuka; Matsui, Susumu; and Obayashi, Akira, to Takara Shuzo Co., Ltd. Novel NAD(PH) oxidase, 4,954,445, Cl. 435-191.000.
- Yoshimoto, Akihiro; Jodo, Osamu; Watanabe, Yoshio; Okamoto, Rokuro; and Takeuchi, Tomio, to Sanraku Incorporated. Process for preparing antibiotics D788-7, 4,954,438, Cl. 435-78.000.
- Yoshimoto, Akira: See—  
Ishikawa, Kanzo; Hayashi, Ryutaro; and Yoshimoto, Akira, 4,954,681, Cl. 219-10.55A.
- Yoshimura, Hiroyuki: See—  
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,954,523, Cl. 514-521.000.
- Yoshimura, Susumu: See—  
Murakami, Mutsuaki; Nishiki, Naomi; Yoshimura, Susumu; and Watanabe, Kazuhiro, 4,954,193, Cl. 156-155.000.
- Yoshinaka, Shinji: See—  
Obitsu, Takeo; Ohnishi, Yutaka; Yoshinaka, Shinji; Koguchi, Minoru; Yanagita, Mitsuhiro; and Hirai, Nobuyuki, 4,954,631, Cl. 546-15.000.
- Yoshino, Hiroyoshi: See—  
Onimaru, Sadahiro; Kuratani, Fumiyasu; and Yoshino, Hiroyoshi, 4,953,672, Cl. 188-378.000.
- Yoshino, Soichi: See—  
Iguchi, Kazuyoshi; Tashima, Masatoshi; Tazi, Ryoichi; Yoshino, Soichi; and Yagi, Motoo, 4,954,734, Cl. 310-71.000.
- Yoshino, Takehito: See—  
Amada, Hiroshi; Aoi, Tatsuyuki; Yoshino, Takehito; and Okamura, Ryuji, 4,954,397, Cl. 430-58.000.
- Yoshioka, Hidetoshi; Kojima, Eiji; Ishida, Shuji; Yoshioka, Hiroyuki; and Murakami, Kunichika, to Sanyo-Kokusaku Pulp Co., Ltd. 2',3'-dideoxy-4-thio-uridine derivatives, process for their preparation and antivirus agents using them, 4,954,485, Cl. 514-49.000.
- Yoshioka, Hiroshi: See—  
Toyoshima, Nobuyuki; Shibata, Takanori; Hirashima, Atsushi; Ando, Ichiro; Iwata, Noriko; Yoshioka, Hiroshi; Itagaki, Akinari; and Yamazaki, Toshio, 4,954,586, Cl. 526-245.000.
- Yoshioka, Hiroyuki: See—  
Yoshioka, Hidetoshi; Kojima, Eiji; Ishida, Shuji; Yoshioka, Hiroyuki; and Murakami, Kunichika, 4,954,485, Cl. 514-49.000.
- Yoshioka, Masanobu: See—  
Maeda, Kouzo; Yoshioka, Masanobu; and Hikone, Makoto, 4,953,423, Cl. 74-552.000.
- Yoshiura, Tsukasa: See—  
Wakabashi, Noriaki; Yoshida, Shuichi; Inaji, Toshio; Onodera, Hiromi; Yoshiura, Tsukasa; and Mitani, Hiroshi, 4,954,905, Cl. 360-77.030.
- Yost, David A.; Russell, John C.; and Yang, Heechung, to Abbott Laboratories. Non-metal colloidal particle immunoassay, 4,954,452, Cl. 436-524.000.
- Young, Douglas G.: See—  
Lipman, Kenneth; and Young, Douglas G., 4,954,726, Cl. 307-46.000.
- Young, Edward L.; and Kapoor, Mohan L., to United Technologies Corporation. Row driver for EL panels and the like with transformer coupling, 4,954,752, Cl. 315-169.300.
- Young, James R.: See—  
Katsuki, Kazuo; Peppers, Norman A.; Young, James R.; Pierce, Gerald A.; and Nishi, Hisami, 4,955,060, Cl. 382-32.000.



- Young, Robert N.; Rokach, Joshua; and Hayes, Edward C., to Merck Frosst Canada, Inc.; and Merck & Co., Inc. Leukotriene by amides and hydrazides. 4,954,638, Cl. 548-546.000.
- Young, Vance W., Jr.: See—  
Jorgensen, Robert W.; Young, Vance W., Jr.; and Misenar, Scott L., 4,953,898, Cl. 285-340.000.
- Yu, Eugene L.: See—  
Natusch, Paul J.; Yu, Eugene L.; Senerchia, David C.; and Henry, John F., Jr., deceased, 4,954,946, Cl. 364-200.000.
- Yuasa, Eiji: See—  
Shuku, Shigekazu; Mukoyoshi, Shunichiro; Yuasa, Eiji; and Yamori, Tsunefumi, 4,954,477, Cl. 503-226.000.
- Zabrecky, James R.: See—  
Beck, Anton K.; Withy, Raymond M.; Zabrecky, James R.; and Masiello, Nicholas C., 4,954,437, Cl. 435-69.400.
- Zahir, Sheikh A., to Ciba-Geigy Corporation. Epoxysiloxanes. 4,954,580, Cl. 525-476.000.
- Zaitoun, Hanna. Temporary, reusable, movable hull patch for a damaged oil tanker. 4,953,491, Cl. 114-229.000.
- Zambre, Samuel: See—  
Lo, Ying-Ching; Zambre, Samuel; and Escorcio, Tolentino, 4,954,960, Cl. 364-484.000.
- Zanke, Dieter: See—  
Strumpf, Thomas; Lyr, Horst; Zanke, Dieter; Zollfrank nee Baumann, Gerlinde; Oros, Gyula; Viranyi, Ferenc; and Ersek, Tibor, 4,954,495, Cl. 514-231.200.
- Zantinge, Johan M., to Wewler N.V. Connecting structure for connecting a spring axle suspension to a vehicle chassis. 4,953,891, Cl. 280-788.000.
- Zavacki, Eugene C.: See—  
Fazzolari, Luciano; Giattini, Frank P.; Scoca, Anthony L.; and Zavacki, Eugene C., 4,954,996, Cl. 367-13.000.
- Zawadzki, Andrzej: See—  
Jacob, Allan S.; and Zawadzki, Andrzej, 4,954,973, Cl. 364-551.010.
- Zaweski, Edward F.; and Jolly, James G. Sulfurized olefin extreme pressure additives. 4,954,274, Cl. 252-45.000.
- Zehring, Scott A.: See—  
Nieman, Gerald R.; Clyatt, Clarence L., III; Paulus, Eric J.; Zehring, Scott A.; Ragl, Albert; and Moore, John R., 4,954,794, Cl. 333-182.000.
- Zeidler, Dennis E.: See—  
Zeidler, Douglas D.; and Zeidler, Dennis E., 4,953,863, Cl. 273-113.000.
- Zeidler, Douglas D.; and Zeidler, Dennis E. Game assembly. 4,953,863, Cl. 273-113.000.
- Zelin, Michael P.: See—  
Lauks, Imants R.; and Zelin, Michael P., 4,954,087, Cl. 439-71.000.
- Zelli, Joseph M., to Breston, Michael P., a part interest. Sloping rotatable exerciser. 4,953,858, Cl. 272-146.000.
- Zelson, Larry S.: See—  
Fioravanti, Kenneth J.; Zelson, Larry S.; and Baukal, Charles E., Jr., 4,954,076, Cl. 431-116.000.
- Zembrowski, William J.: See—  
Mylari, Banavara L.; and Zembrowski, William J., 4,954,629, Cl. 544-237.000.
- Zerhouni, Elias; and Parish, David M., to Resonex, Inc.; and Johns Hopkins University. Magnetic resonance imaging method. 4,953,554, Cl. 128-653.00A.
- Ziegenhain, William C., to Du Pont de Nemours, E. I., and Company. Process for purifying hydrogen fluoride. 4,954,330, Cl. 423-484.000.
- Ziegler, Hermann; Handte, Horst; Braun, Walter; and Gutzeit, Horst, to Dr. Ing. h.c.F. Porsche AG. Stationary window arrangement at a motor vehicle door. 4,953,331, Cl. 52-208.000.
- Zigler, Arie; Eisen, Yossef; and Eisen, Yossef, to Apti, Inc. High resolution directional gamma ray detector. 4,954,709, Cl. 250-385.100.
- Zimmerman, Wolfgang. Electrically heated pin-point gate. 4,954,072, Cl. 425-549.000.
- Zinser, Georg, to Albert Handtmann, Maschinenfabrik GmbH & Co. KG. Machine for processing meat. 4,953,262, Cl. 17-1.00R.
- Zinser Textilmaschinen GmbH: See—  
Schulz, Gunter; Probst, Frieder; and Guttler, Hermann, 4,953,350, Cl. 57-354.000.
- Zoller, Wilhelm: See—  
Payer, Wolfgang; Buhnen, Heinz D.; and Zoller, Wilhelm, 4,954,594, Cl. 526-320.000.
- Zollfrank nee Baumann, Gerlinde: See—  
Strumpf, Thomas; Lyr, Horst; Zanke, Dieter; Zollfrank nee Baumann, Gerlinde; Oros, Gyula; Viranyi, Ferenc; and Ersek, Tibor, 4,954,495, Cl. 514-231.200.
- Zone Industrielle d'Epluchages: See—  
Leboime, Pierre, 4,953,647, Cl. 180-9.100.
- Zouzoulas, John, to Mars Incorporated. Compact, low power gate apparatus for coin operated machines. 4,953,681, Cl. 194-346.000.
- Zsold, Tibor. Method and apparatus for an optimized multiparameter flow-through particle and cell analyzer. 4,954,715, Cl. 250-461.100.
- Zuehlke, Art G.: See—  
Becker, Thomas K.; Casavant, Terry S.; Helm, P. Ralph; Petzold, Terry L.; Wanek, Michael J.; and Zuehlke, Art G., 4,953,722, Cl. 212-156.000.
- Zuk, David M., to Environmental Research Institute of Michigan. Range dispersion sensor. 4,953,972, Cl. 356-4.000.
- Zulehner, Werner: See—  
Hahn, Peter; Piontek, Hubert; Schnegg, Anton; and Zulehner, Werner, 4,954,189, Cl. 148-33.200.
- Zundel, Jean-Pol: See—  
Eibner, Jules A.; and Zundel, Jean-Pol, 4,954,979, Cl. 364-900.000.
- Zur, Yuval, to Elscint Ltd. Correction for eddy current caused phase degradation. 4,954,779, Cl. 324-306.000.
- Zurn Industries, Inc.: See—  
Durante, Joseph L., 4,954,034, Cl. 414-156.000.
- Zurwelle, Donald W., to Black & Decker, Inc. Screwdriver bit and chuck key retainer. 4,954,026, Cl. 408-241.00R.
- Zusmanovsky, Zinovy A.: See—  
Tsirjulnikov, Moisei V.; and Zusmanovsky, Zinovy A., 4,953,542, Cl. 128-79.000.

## LIST OF REISSUE PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 4TH DAY OF SEPTEMBER, 1990

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- Beckman, John: See—  
Sills, David; and Beckman, John, Re. 33,322, Cl. 464-162.000.
- Dana Corporation: See—  
Sills, David; and Beckman, John, Re. 33,322, Cl. 464-162.000.
- Diener, Horst, to Vita Zahnfabrik H. Rauter GmbH & Co. Dispenser for pasty compositions. Re. 33,319, Cl. 220-253.000.
- Edwards, Harper, McNew & Co.: See—  
Edwards, John W.; Harper, Daniel R.; and McNew, Quinton B., Re. 33,324, Cl. 305-35.00R.
- Edwards, John W.; Harper, Daniel R.; and McNew, Quinton B., to Edwards, Harper, McNew & Co. Endless drive system. Re. 33,324, Cl. 305-35.00R.
- Exxon Research & Engineering Company: See—  
Roarty, John C.; and Nadler, Murray, Re. 33,323, Cl. 208-79.000.
- Hareng, Michel: See—  
Magarino, Jose; Szydio, Nicholas; Hareng, Michel; and Landouar, Pierre, Re. 33,321, Cl. 350-333.000.
- Harper, Daniel R.: See—  
Edwards, John W.; Harper, Daniel R.; and McNew, Quinton B., Re. 33,324, Cl. 305-35.00R.
- Kondo, Hideya: See—  
Yokoyama, Yoichi; and Kondo, Hideya, Re. 33,325, Cl. 335-14.000.
- Landouar, Pierre: See—  
Magarino, Jose; Szydio, Nicholas; Hareng, Michel; and Landouar, Pierre, Re. 33,321, Cl. 350-333.000.
- Magarino, Jose; Szydio, Nicholas; Hareng, Michel; and Landouar, Pierre. Process for the production of a substrate for an electrically controlled device and display screen produced from such a substrate. Re. 33,321, Cl. 350-333.000.
- Matsushita Electric Works, Ltd.: See—  
Yokoyama, Yoichi; and Kondo, Hideya, Re. 33,325, Cl. 335-14.000.
- McNew, Quinton B.: See—  
Edwards, John W.; Harper, Daniel R.; and McNew, Quinton B., Re. 33,324, Cl. 305-35.00R.
- Nadler, Murray: See—  
Roarty, John C.; and Nadler, Murray, Re. 33,323, Cl. 208-79.000.
- Roarty, John C.; and Nadler, Murray, to Exxon Research & Engineering Company. Reforming process for enhanced benzene yield. Re. 33,323, Cl. 208-79.000.
- Sills, David; and Beckman, John, to Dana Corporation. Drive line slip joint assembly. Re. 33,322, Cl. 464-162.000.
- Szydio, Nicholas: See—  
Magarino, Jose; Szydio, Nicholas; Hareng, Michel; and Landouar, Pierre, Re. 33,321, Cl. 350-333.000.
- Vita Zahnfabrik H. Rauter GmbH & Co.: See—  
Diener, Horst, Re. 33,319, Cl. 220-253.000.
- Yokoyama, Yoichi; and Kondo, Hideya, to Matsushita Electric Works, Ltd. Remotely controllable circuit breaker. Re. 33,325, Cl. 335-14.000.

## LIST OF REEXAMINATION PATENTEEES

TO WHOM

CERTIFICATES WERE ISSUED

- Byrd, Kerry, to University Vectors Corporation. Work-saving system for preventing loss in a computer due to power interruption. B1 4,763,333, 9-4-90, Cl. 371-66.000.
- Davies, Joseph R. Roller electrodes for electric-resistance welding machine. B1 4,780,589, 9-4-90, Cl. 219-84.000.
- Eckerle, Joseph S. High efficiency electrical power conditioner. B1 4,042,890, 9-4-90, Cl. 330-207.00A.
- Gamer-Gray, Peter F., to Lever Brothers Company. Solid detergent composition containing sodium perborate monohydrate having specified surface area. B1 4,539,131, 9-4-90, Cl. 252-99.000.
- Lever Brothers Company: See—  
Garner-Gray, Peter F., B1 4,539,131, Cl. 252-99.000.
- University Vectors Corporation: See—  
Byrd, Kerry, B1 4,763,333, Cl. 371-66.000.

## LIST OF DESIGN PATENTEEES

- Adriaansen, David L.: See—  
Brefka, Paul E.; Adriaansen, David L.; and Greystone, Steven E., 310,357, Cl. D14-113.000.
- Afeyan Industries Inc.: See—  
Afeyan, Levon, 310,313, Cl. D6-604.000.
- Afeyan, Levon, to Afeyan Industries Inc. Air mattress. 310,313, 9-4-90, Cl. D6-604.000.
- Akaike, Kazuo; Kobayashi, Masahiko; Utsunomiya, Osamu; Takahashi, Ryuichi; and Takayasu, Tetsufumi, to Kokusai Electric Co., Ltd. Portable radio telephone. 310,366, 9-4-90, Cl. D14-138.000.
- Al-Heyari, Salem A. S. Game board. 310,393, 9-4-90, Cl. D21-32.000.
- Allen, Keith R.; Crawford, Jeffrey; and Rule, Geoffrey, to Sigma Air Conditioning Pty, Limited. Air conditioning unit. 310,409, 9-4-90, Cl. D23-351.000.
- Allred, Darrin D. Lense cover for insertion in the recessed areas of the dashboard instrument panel for prevention of dust and dirt buildup. 310,346, 9-4-90, Cl. D12-192.000.
- Alsup, James D., Jr.: See—  
Lapychak, David M.; Alsup, James D., Jr.; Watson, James B.; and Gullet, Edwin G., 310,410, Cl. D23-354.000.
- Lapychak, David M.; Alsup, James D., Jr.; Watson, James B.; and Gullet, Edwin G., 310,411, Cl. D23-354.000.
- American Standard Inc.: See—  
Stairs, Henry M., Jr., 310,407, Cl. D23-301.000.
- Anema, Willem, to U.S. Philips Corporation. Electric shaver. 310,429, 9-4-90, Cl. D28-51.000.
- Angerer, Michael. Combination truck bed liner and convertible cushion unit. 310,343, 9-4-90, Cl. D12-98.000.
- Atsuumi, Masaru: See—  
Higuchi, Masaaki; Atsuumi, Masaru; Otake, Yasuo; and Itoh, Yukinori, 310,348, Cl. D13-114.000.
- Au, Nelson S.: See—  
Nuttall, Michael J.; and Au, Nelson S., 310,358, Cl. D14-113.000.
- Austin, Andrew G.: See—  
Moriconi, David P.; and Austin, Andrew G., 310,354, Cl. D14-109.000.
- Avia Group International, Inc.: See—  
Selbiger, Lawrence, 310,291, Cl. D2-314.000.
- Selbiger, Lawrence, 310,292, Cl. D2-314.000.
- Baader, Joseph E. Auxiliary vehicle dual warning light. 310,424, 9-4-90, Cl. D26-35.000.
- Backman, Sture, to Sandvik Aktiebolag. Hand saw. 310,318, 9-4-90, Cl. D8-95.000.

- Bain, Charles E., to Bell & Howell Company. Character indicia encoding desk for mail. 310,351, 9-4-90, Cl. D14-103.000.  
Barrett, Larry G.: See—  
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Broderick, James M.; and Lewis, E. Leonard. Three compartment pastry bag. 310,317, 9-4-90, Cl. D7-700.000.  
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Carron, Richard J. Car seat cover. 310,314, 9-4-90, Cl. D6-611.000.  
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Omino, Seichi; and Kanno, Takuma, to Canon Kabushiki Kaisha. Electronic typewriter. 310,383, 9-4-90, Cl. D18-1,000.

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Peterson, William R., to Tretorn AB. Golf shoe bottom. 310,294, 9-4-90, Cl. D2-317,000.

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Prendergast, William, to Philip Morris Incorporated. Header for a merchandising display stand or the like. 310,309, 9-4-90, Cl. D6-455,000.

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Ratajski, Michel P., to Severin Montres AG. Combined watch and band. 310,331, 9-4-90, Cl. D10-32,000.

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Rinke, Richard A. Pop can storage device. 310,327, 9-4-90, Cl. D9-341,000.

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Scott, Robert P.; and Bloom, Kenneth H., to Ford Motor Company. Front control panel for a combined vehicular cassette player and radio receiver. 310,371, 9-4-90, Cl. D14-258,000.

Selbiger, Lawrence, to Avia Group International, Inc. Shoe upper. 310,291, 9-4-90, Cl. D2-314,000.

Selbiger, Lawrence, to Avia Group International, Inc. Shoe upper. 310,292, 9-4-90, Cl. D2-314,000.

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Westmayer, David A.; Crookes, William E.; and Nickles, Daniel R., to Deere & Company. Tractor for lawns, gardens, or the like. 310,374, 9-4-90, Cl. D15-15,000.

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Wolsey, Paul. Combined toothbrush and pen. 310,308, 9-4-90, Cl. D4-108,000.

Wong, Pik L., to Justen International (H.K.) Co. Combined watch and strap. 310,332, 9-4-90, Cl. D10-32,000.

Wong, Richard G.; and Pabros, Donald V. Back support cushion. 310,312, 9-4-90, Cl. D6-596,000.

Woods, Victoria, to Woods, Victoria; Gerst, Christine C.; and Grienke, Janice M. Doll. 310,401, 9-4-90, Cl. D21-174,000.

Wunderman, Severin S., to Severin Montres AG. Combined wrist-watch and bracelet. 310,335, 9-4-90, Cl. D10-32,000.

Wunderman, Severin S., to Severin Montres AG. Combined wrist-watch and bracelet. 310,336, 9-4-90, Cl. D10-32,000.

Wyatt, Tristram D.; and Jones, Owen T., to University College Cardiff Consultants Limited; and Biological Control Systems Ltd. Insect trap. 310,402, 9-4-90, Cl. D22-122,000.

Yamasaki, Yoshiaki, to Kabushiki Kaisha Fuji Iryoki. Portable massager. 310,416, 9-4-90, Cl. D24-40,000.

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Yuletide, 7,316, 9-4-90, Cl. 86.000.Frazer, Edwin J., to Hartman Plant Laboratories, Inc. Dieffenbachia  
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Segers, Th A., to Twyford Plant Laboratories, Inc. Gerbera plant  
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Twyford Plant Laboratories, Inc.: See—

Segers, Th A., 7,318, Cl. 68.000.

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LIST OF  
STATUTORY INVENTION REGISTRATIONS

APPLICANTS TO WHOM

STATUTORY INVENTION REGISTRATIONS WERE ISSUED ON THE  
4TH DAY OF SEPTEMBER, 1990

Agarwal, Pawan K.: See—

Wagensommer, Joseph; Agarwal, Pawan K.; and Duvdevani, Ilan,  
H818, Cl. 525-333.900.

Arismendi, Andy M., Jr.: See—

Willis, Carl L.; and Arismendi, Andy M., Jr., H815, Cl. 252-49.600.

Barr, Dallas N.: See—

Nettleton, John E.; and Barr, Dallas N., H822, Cl. 330-4.300.

Carder, James H.; Le, Anh H.; and Dacres, Chester M., to United States  
of America, Navy. Stibine filter and antimonial lead acid batteries.  
H816, 9-4-90, Cl. 429-86.000.

Dacres, Chester M.: See—

Carder, James H.; Le, Anh H.; and Dacres, Chester M., H816, Cl.  
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Duvdevani, Ilan: See—

Wagensommer, Joseph; Agarwal, Pawan K.; and Duvdevani, Ilan,  
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Exxon Research &amp; Engineering Co.: See—

Wagensommer, Joseph; Agarwal, Pawan K.; and Duvdevani, Ilan,  
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Fawwaz, Rashid A.: See—

Srivastava, Suresh C.; Fawwaz, Rashid A.; and Ferrone, Soldano,  
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Ferrone, Soldano: See—

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Fuji Photo Film Co., Ltd.: See—

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Halley, Lawrence C., Jr.: See—

Hatfield, Michael O.; and Halley, Lawrence C., Jr., H821, Cl.  
324-627.000.Hatfield, Michael O.; and Halley, Lawrence C., Jr., to United States of  
America, Navy. Means and method for performing shielding effec-  
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Koya, Keizo: See—

Toruichi, Masaharu; and Koya, Keizo, H817, Cl. 430-544.000.

Le, Anh H.: See—

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429-86.000.Nettleton, John E.; and Barr, Dallas N. Method of amplitude modulat-  
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504.00R.Srivastava, Suresh C.; Fawwaz, Rashid A.; and Ferrone, Soldano, to  
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Photographic light-sensitive material. H817, 9-4-90, Cl. 430-544.000.United States of America  
Energy: See—

Sherrell, Dennis L., H814, Cl. 277-34.300.

Srivastava, Suresh C.; Fawwaz, Rashid A.; and Ferrone, Sol-  
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Carder, James H.; Le, Anh H.; and Dacres, Chester M., H816, Cl.  
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324-627.000.Wagensommer, Joseph; Agarwal, Pawan K.; and Duvdevani, Ilan, to  
Exxon Research & Engineering Co. Elastomeric compositions (C-  
1911). H818, 9-4-90, Cl. 525-333.900.Willis, Carl L.; and Arismendi, Andy M., Jr. Lubricant composition  
containing a viscosity index improver having dispersant properties.  
H815, 9-4-90, Cl. 252-49.600.

## CLASSIFICATION OF PATENTS

ISSUED SEPTEMBER 4, 1990

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2	894.351	4,953,291	CLASS 55	146.5	4,953,393	425	4,953,463	527	4,953,516		
13	4,953,231	CLASS 30	16	4,954,143	4,953,394	CLASS 102	559.1	4,953,517			
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268	4,953,233	124	4,954,145	4,953,398	289	4,953,476	622	4,953,519			
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CLASS 15	104.94	301	79	4,953,361	552	4,953,424	215	4,953,478	156	4,953,544	
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320	4,953,253	90	467	4,953,365	CLASS 75	4,953,428	CLASS 112	4,953,482	207.14	4,953,549	
327.02	4,953,254	CLASS 43	532	4,954,151	228	4,954,169	144	4,953,483	398	4,953,550	
CLASS 16	17	17	3.1	4,954,152	229	4,954,170	119	4,953,484	403	4,953,551	
1 C	4,953,256	21.2	60.53	4,954,153	246	4,954,171	262.3	4,953,485	419 D	4,953,552	
45	4,953,257	42.06	CLASS 66	132 R	708	4,954,167	447	4,953,486	635 A	4,953,553	
197	4,953,258	43.16	CLASS 68	23.7	CLASS 81	9.4	4,953,428	119	4,953,483	671	4,953,554
225	4,953,259	121	CLASS 70	4,953,369	CLASS 82	127	4,953,429	162	4,953,484	677	4,953,555
308	4,953,260	62	213	4,953,370	CLASS 83	155	4,953,430	262.3	4,953,485	751	4,953,556
354	4,953,261	CLASS 44	32	4,953,371	CLASS 84	781	4,953,431	447	4,953,486	759	4,953,557
CLASS 17	1 E	64	89	4,953,372	CLASS 85	239	4,953,433	44	4,953,488	771	4,953,558
1 R	4,953,262	CLASS 47	366	4,953,373	CLASS 86	263	4,953,434	103	4,953,489	778	4,953,559
CLASS 18	197 R	CLASS 48	369	4,953,374	CLASS 87	293	4,953,435	183.00 A	4,953,490	784	4,953,560
5 C	4,953,368	210	416	4,953,375	CLASS 88	376 A	4,953,436	229	4,953,491	788	4,953,561
CLASS 19	114	CLASS 49	441	4,953,376	CLASS 89	603	4,953,437	282	4,953,492	798	4,953,562
297	4,953,264	58	CLASS 71	3	CLASS 90	609	4,953,438	357	4,953,493	798	4,953,563
CLASS 20	4,953,265	255	CLASS 72	28	CLASS 91	655	4,953,439	70	4,953,495	849	4,953,564
CLASS 21	313 R	95 TG	76	4,954,155	CLASS 92	7	4,953,440	72	4,953,496	851	4,953,565
CLASS 22	499	293	86	4,954,156	CLASS 93	36.02	4,953,442	778	4,953,497	878	4,953,566
CLASS 23	682	295	88	4,954,157	CLASS 94	41.02	4,953,443	784	4,953,498	882	4,953,567
CLASS 24	694	296	92	4,954,158	CLASS 95	1	4,953,444	798	4,953,499	109.1	4,953,570
CLASS 25	704.1	309	103	4,954,159	CLASS 96	358 A	4,953,445	798	4,953,499	231	4,953,571
CLASS 26	163	CLASS 52	57	4,954,160	CLASS 97	369.3	4,953,446	798	4,953,499	270	4,953,572
CLASS 27	272	33	70	4,954,161	CLASS 98	514	4,953,447	798	4,953,499	280	4,953,573
CLASS 28	25.42	36	76	4,954,162	CLASS 99	2.02	4,953,448	798	4,953,499	CLASS 131	
CLASS 29	27 C	79.1	86	4,954,163	CLASS 100	2.11	4,953,449	798	4,953,499	CLASS 132	
CLASS 30	235	81	88	4,954,164	CLASS 101	33.1	4,953,450	798	4,953,499	CLASS 133	
CLASS 31	273	167 DF	103	4,954,165	CLASS 102	38.1	4,953,451	798	4,953,499	CLASS 134	
CLASS 32	402.06	208	103	4,953,326	CLASS 103	41.02	4,953,452	798	4,953,499	CLASS 135	
CLASS 33	407	228	57	4,953,327	CLASS 104	344	4,953,453	798	4,953,499	CLASS 136	
CLASS 34	412	281	70	4,953,328	CLASS 105	373	4,953,454	798	4,953,499	CLASS 137	
CLASS 35	438	309.4	76	4,953,329	CLASS 106	426	4,953,455	798	4,953,499	14	4,953,578
CLASS 36	451	384	88	4,953,330	CLASS 107	450.6	4,953,456	798	4,953,499	106	4,953,579
CLASS 37	593	385	92	4,953,331	CLASS 108	533	4,953,457	798	4,953,499	107	4,953,580
CLASS 38	596	385	103	4,953,332	CLASS 109	344	4,953,458	798	4,953,499	108	4,953,581
CLASS 39	606	385	103	4,953,333	CLASS 110	373	4,953,459	798	4,953,499	109	4,953,582
CLASS 40	611	385	103	4,953,334	CLASS 111	426	4,953,460	798	4,953,499	110	4,953,583
CLASS 41	704	385	103	4,953,335	CLASS 112	450.6	4,953,461	798	4,953,499	111	4,953,584
CLASS 42	863	385	103	4,953,336	CLASS 113	533	4,953,462	798	4,953,499	112	4,953,585
CLASS 43	890.043	385	103	4,953,337	CLASS 114	37	4,953,463	798	4,953,499	113	4,953,586
CLASS 44	894.324	385	103	4,953,338	CLASS 115	269 R	4,953,464	798	4,953,499	114	4,953,587
		385	103	4,953,339	CLASS 116	115	4,953,465	798	4,953,499	115	4,953,588
		385	103	4,953,340	CLASS 117	129	4,953,466	798	4,953,499	116	4,953,589
		385	103	4,953,341	CLASS 118	142	4,953,467	798	4,953,499	117	4,953,590
		385	103	4,953,342	CLASS 119	216	4,953,468	798	4,953,499	118	4,953,591
		385	103	4,953,343	CLASS 120	146	4,953,469	798	4,953,499	119	4,953,592
		385	103	4,953,344	CLASS 121	146	4,953,470	798	4,953,499	120	4,953,593
		385	103	4,953,345	CLASS 122	146	4,953,471	798	4,953,499	121	4,953,594
		385	103	4,953,346	CLASS 123	146	4,953,472	798	4,953,499	122	4,953,595
		385	103	4,953,347	CLASS 124	146	4,953,473	798	4,953,499	123	4,953,596
		385	103	4,953,348	CLASS 125	146	4,953,474	798	4,953,499	124	4,953,597
		385	103	4,953,349	CLASS 126	146	4,953,475	798	4,953,499	125	4,953,598
		385	103	4,953,350	CLASS 127	146	4,953,476	798	4,953,499	126	4,953,599
		385	103	4,953,351	CLASS 128	146	4,953,477	798	4,953,499	127	4,953,600
		385	103	4,953,352	CLASS 129	146	4,953,478	798	4,953,499	128	4,953,601
		385	103	4,953,353	CLASS 130	146	4,953,479	798	4,953,499	129	4,953,602
		385	103	4,953,354	CLASS 131	146	4,953,480	798	4,953,499	130	4,953,603
		385	103	4,953,355	CLASS 132	146	4,953,481	798	4,953,499	131	4,953,604
		385	103	4,953,356	CLASS 133	146	4,953,482	798	4,953,499	132	4,953,605
		385	103	4,953,357	CLASS 134	146	4,953,483	798	4,953,499	133	4,953,606
		385	103	4,953,358	CLASS 135	146	4,953,484	798	4,953,499	134	4,953,607
		385	103	4,953,359	CLASS 136	146	4,953,485	798	4,953,499	135	4,953,608
		385	103	4,953,360	CLASS 137	146	4,953,486	798	4,953,499	136	4,953,609
		385	103	4,953,361	CLASS 138	146	4,953,487	798	4,953,499	137	4,953,610
		385	103	4,953,362	CLASS 139	146	4,953,488	798	4,953,499	138	4,953,611
		385	103	4,953,363	CLASS 140	146	4,953,489	798	4,953,499	139	4,953,612
		385	103	4,953,364	CLASS 141	146	4,953,490	798	4,953,499	140	4,953,613
		385	103	4,953,365	CLASS 142	146	4,953,491	798	4,953,499	141	4,953,614
		385	103	4,953,366	CLASS 143	146	4,953,492	798	4,953,499	142	4,953,615
		385	103	4,953,367	CLASS 144	146	4,953,493	798	4,953,499	143	4,953,616
		385	103	4,953,368	CLASS 145	146	4,953,494	798	4,953,499	144	4,953,617
		385	103	4,953,369	CLASS 146	146	4,953,495	798	4,953,499	145	4,953,618
		385	103	4,953,370	CLASS 147	146	4,953,496	798	4,953,499	146	4,953,619
		385	103	4,953,371	CLASS 148	146	4,953,497	798	4,953,499	147	4,953,620
		385									



647	4,953,887		CLASS 319		CLASS 346	45	4,954,866		4,954,962		CLASS 377
654	4,953,888				76 PH	52	4,954,867		4,954,963		
661	4,953,889	390	4,954,685		93	53	4,954,868		4,954,964	54	4,955,041
707	4,953,890		CLASS 323		135.1	60	4,954,871		4,954,965		CLASS 378
788	4,953,891	217	4,954,765		139 R	77	4,954,872	514	4,954,966	39	4,955,042
814	4,953,892	272	4,954,766			72	4,954,873	518	4,954,967	108	4,955,043
	4,953,893	283	4,954,767		CLASS 350	74	4,954,874	519	4,954,968	122	4,955,045
	4,953,894	300	4,954,768			75	4,954,875	521	4,954,969	197	4,955,046
102	4,953,895	313	4,954,769			76	4,954,876	525	4,955,032		CLASS 379
	CLASS 283		CLASS 324			80	4,954,877	526	4,954,972	53	4,955,048
	CLASS 285					81	4,954,878	511.01	4,954,973	58	4,955,049
23	4,953,887	71.3	4,954,770						4,954,974	59	4,955,050
197	4,953,896	158 F	4,954,774			CLASS 358			4,954,975	75	4,955,051
226	4,953,897	158 R	4,954,771	96.11	4,953,930	13	4,954,879	567	4,954,976	94	4,955,052
340	4,953,898		4,954,772	96.12	4,953,931	17	4,954,880	578	4,954,977	112	4,955,047
420	4,953,899		4,954,773		4,953,943	22	4,954,881	710.03	4,954,978	253	4,955,053
	CLASS 292		4,954,775	96.15	4,953,932		4,954,882	900	4,954,979	390	4,955,055
307 R	4,953,900	174	4,954,777		4,953,933	29	4,954,883		4,954,980		CLASS 381
340	4,953,901	232	4,954,778	96.16	4,953,934	31	4,954,884		4,954,981	43	4,955,056
	CLASS 294	306	4,954,779	96.17	4,953,935	21	4,954,885		4,954,982	63	4,955,057
1.1	4,953,902	318	4,954,780	96.18	4,953,936	75	4,954,886		4,954,983	103	4,955,058
15	4,953,903	538	4,954,782		4,953,937		4,954,887		4,954,984	116	4,955,059
19.1	4,953,904	696	4,954,783		4,953,938		4,954,888				
19.2	4,953,905	716	4,954,784	96.2	4,953,939	80	4,954,889				
	4,953,906		4,954,776	96.20	4,953,940	88	4,954,890				
	CLASS 296		CLASS 328		4,953,941	101	4,954,891	108	4,954,985		CLASS 382
93	4,953,907	155	4,954,784	96.21	4,953,944	133	4,954,892	177	4,954,989	8	4,955,062
97.4	4,953,908	167	4,954,785	96.23	4,953,942	148	4,954,893	185	4,954,990	18	4,955,063
136	4,953,909		CLASS 330		4,953,945	167	4,954,894	189.01	4,954,986	22	4,955,064
191	4,953,912	4.3	4,954,786	96.33	4,953,946	183	4,954,898		4,954,991	32	4,955,065
223	4,953,910		4,954,789	128	4,953,947	191.1	4,954,899	189.02	4,954,987	50	4,955,066
	CLASS 297		4,954,787	130	4,953,948	213.11	4,954,895		4,954,988	56	4,955,067
195	4,953,911	149	4,954,788	170	4,953,949	228	4,954,897	207	4,954,992	62	4,955,068
459	4,953,913	207 A	4,954,789	320	4,953,950	234	4,954,896	226	4,954,993		CLASS 383
	CLASS 299		CLASS 331		Re.33.325	242	4,954,901	230.06	4,954,994		4,955,069
11	4,953,914	16	4,954,788	333	4,953,952	296	4,954,910			4	4,955,068
18	4,953,915	169	4,954,789	337	4,953,953	323	4,954,911	7	4,954,995	67	4,953,987
76	4,953,916		4,954,792	339 F	4,953,954	348	4,954,912	76	4,953,984		CLASS 384
	CLASS 303		CLASS 332		4,953,955	475	4,954,913	244	4,953,985	8	4,953,988
115	4,953,917	164	4,954,790	419	4,953,956		4,954,914			12	4,953,989
961	4,953,918		4,954,791	423	4,953,957					18	4,953,990
	CLASS 305		CLASS 333		4,953,958	10.2	4,954,902	13	4,954,996	19	4,953,991
31	4,953,919	133	4,954,793	432	4,953,959	46	4,954,903	82	4,954,998	607	4,953,992
35 EB	4,953,920	182	4,954,794	486	4,953,961	75	4,954,904	97	4,954,999	623	4,953,993
35 R	4,953,921	194	4,954,795	507	4,953,962	77.03	4,954,905	99	4,955,002		CLASS 388
	Re.33.324	206	4,954,796	547	4,953,963	77.08	4,954,906	117	4,955,000	811	4,955,069
10.1	4,954,725		CLASS 335		4,953,964	78.04	4,954,908	118	4,955,001		CLASS 400
46	4,954,726	14	Re.33.325	632	4,953,965		4,954,909	125	4,955,003		4,953,994
112	4,954,727	161	4,954,798		CLASS 351		4,954,915	137	4,955,004	120	4,953,995
296.8	4,954,728	236	4,954,799	41	4,953,966	96.5	4,954,916	139	4,955,005	121	4,953,996
443	4,954,729	284	4,954,800	131	4,953,967	98.06	4,954,918	154	4,955,012	162.2	4,953,997
451	4,954,730		CLASS 336		4,953,968		4,954,919			616.3	4,953,997
454	4,954,738	90	4,954,801	211	4,953,969	104	4,954,920	13	4,955,006		CLASS 401
482	4,954,731		CLASS 337		4,953,970	113	4,954,921	32	4,955,007	7	4,953,998
520	4,954,732	380	4,954,802	223	4,953,971	121			4,955,008	9	4,953,999
	CLASS 310		CLASS 338		4,953,972		4,954,922	42	4,955,009	68	4,954,000
71	4,954,733		4,954,803	122	4,953,973	98	4,954,923	48	4,955,010	139	4,954,001
82	4,954,734	32 R	4,954,804		CLASS 354	111	4,954,924	54	4,955,011	217	4,954,002
156	4,954,735	162		75	4,954,857	187	4,954,925				CLASS 402
168	4,954,737		CLASS 340		4,954,858	283	4,954,926				4,954,003
185	4,954,740	384 E	4,954,805	145.1	4,954,859	304	4,954,927	1	4,955,013	079	4,954,004
316	4,954,742		4,954,806	173.11	4,954,859	383	4,954,928	3	4,955,014		CLASS 403
			4,954,807	246	4,954,860	328	4,954,929	56	4,955,015	13	4,954,005
120	4,954,743		4,954,808	403	4,954,861	414		60	4,955,016	24	4,954,006
153	4,954,748		4,954,809		CLASS 335		4,954,930	85.1	4,955,017	57	4,954,007
336	4,954,744		4,954,810	1	4,954,862	26	4,954,931	85.7	4,955,019	135	4,954,008
446	4,954,745		4,954,811	51	4,954,863	32	4,954,932	85.9	4,955,020	172	4,954,009
506	4,954,746		4,954,812	260	4,954,864	61	4,954,933	124	4,955,021		CLASS 404
	4,954,747		4,954,813	290	4,954,865	66	4,954,933				4,954,010
	CLASS 313		4,954,814	125	4,954,866	125	4,955,044				4,954,011
71	4,954,743		4,954,815	156	4,954,867	156	4,955,045	37.4	4,955,022	6	4,954,012
82	4,954,734		4,954,816	166	4,954,868	245	4,955,046	40.1	4,955,023	9	4,954,013
156	4,954,735		4,954,817	319	4,954,869	249	4,955,047		4,955,024	3	4,954,014
168	4,954,737		4,954,818		4,954,870	255	4,955,048	66	4,763,333	23	4,954,015
185	4,954,740		4,954,819		4,954,871	298	4,955,049			25	4,954,016
316	4,954,742		4,954,820		4,954,872	406	4,955,050			184	4,954,017
	CLASS 317		4,954,821		CLASS 356		4,955,051			259	4,954,018
120	4,954,743		4,954,822	4	4,953,972		4,955,052	6	4,955,025	121	4,954,019
153	4,954,748		4,954,823	32	4,953,973		4,955,053	18	4,955,026	184	4,954,020
336	4,954,744		4,954,824	128	4,953,974	146	4,954,940			259	4,954,021
446	4,954,745		4,954,825	246	4,953,975		CLASS 364			268	4,954,022
506	4,954,746		4,954,826	301	4,953,976		4,954,941	20	4,955,027		CLASS 406
	4,954,747		4,954,827	312	4,953,977	200	4,954,942	31	4,955,028	38	4,955,023
	CLASS 315		4,954,828	336	4,953,978		4,954,943	44	4,955,029		4,955,024
97	4,954,756		4,954,829	353	4,953,979		4,954,944	45	4,955,030		CLASS 407
39	4,954,749		4,954,830	358	4,953,980		4,954,945	56	4,955,031	35	4,954,021
111.81	4,954,751		4,954,831	385	4,953,981		4,954,946	69	4,955,032		CLASS 408
169.3	4,954,752		4,954,832	445	4,953,982		4,954,947	94	4,955,033		4,954,022
219	4,954,753		4,954,833	457	4,953,983		4,954,948	96	4,955,034		4,954,023
248	4,954,754		4,954,834		CLASS 357		4,954,949				4,954,024
403	4,954,755		4,954,835		4,954,850		4,954,950				4,954,025
411	4,954,758		4,954,836		4,954,851		4,954,951				4,954,026
	CLASS 316		4,954,837		4,954,852		4,954,952				4,954,027
156	4,954,736		4,954,838		4,954,853		4,954,953				4,954,028
	CLASS 318		4,954,839		4,954,854		4,954,954				4,954,029
375	4,954,759		4,954,840		4,954,855		4,954,955				4,954,030
480	4,954,760		4,954,841		4,954,856		4,954,956				4,954,031
568.1	4,954,761		4,954,842		4,954,857		4,954,957				4,954,032
568.19	4,954,762		4,954,843		4,954,858		4,954,958				4,954,033
605	4,954,763		4,954,844		4,954,859		4,954,959				4,954,034
798	4,954,764		4,954,845		4,954,860		4,954,960				4,954,035
	CLASS 319		4,954,846		4,954,861		4,954,961				4,954,036
	CLASS 320		4,954,847		4,954,862		4,954,962				4,954,037
	CLASS 321		4,954,848		4,954,863		4,954,963				4,954,038
	CLASS 322		4,954,849		4,954,864		4,954,964				4,954,039

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## CLASSIFICATION OF PATENTS

96	4,954,030	453	4,954,069	116	4,954,076	82	4,955,074	521	4,954,523		4,954,610
110	4,954,031	503	4,954,070	145	4,954,077		4,955,075	530	4,954,524	353	4,954,609
	CLASS 411	531	4,954,071	255	4,954,078	188	4,955,076	549	4,954,525		4,954,611
289	4,954,032	547	4,954,073		CLASS 432	197	4,955,077	594	4,954,529		4,954,612
	CLASS 414	549	4,954,072	6	4,954,079	244	4,955,078	611	4,954,526	371	4,954,613
		556	4,954,074		CLASS 433	278	4,955,084	675	4,954,527	388	4,954,554
27	4,954,033		CLASS 426		CLASS 434	325	4,955,079	712	4,954,528	483	4,954,614
156	4,954,034	5	4,954,353	8	4,954,080	330	4,955,085	718	4,954,530	501	4,954,615
228	4,954,035	8	4,954,354	53	4,954,081	343	4,955,080	738	4,954,531		
295	4,954,036	61	4,954,355	80	4,954,082	605	4,955,086	846	4,954,532		
389	4,954,037	107	4,954,356		CLASS 435		4,955,081		CLASS 521	333	4,954,616
482	4,954,038	302	4,954,357	112	4,954,083		CLASS 464	82	4,954,533	387	4,954,617
500	4,954,039	331	4,954,358		CLASS 436	111	4,954,119	157	4,954,537		CLASS 534
513	4,954,040	557	4,954,359		CLASS 437	141	4,954,120		CLASS 522		
718	4,954,041	565	4,954,360	7	4,954,433	162	Re.33,322	28	4,954,534	783	4,954,563
	4,954,042	580	4,954,361		CLASS 438		CLASS 474		CLASS 523		CLASS 536
719	4,954,043	602	4,954,362		CLASS 439	82	4,954,121	139	4,954,535	20	4,954,619
754	4,954,044	636	4,954,363	69.4	4,954,437		CLASS 475	149	4,954,536	56	4,954,620
792.7	4,954,045		CLASS 427	78	4,954,438	160	4,954,122	223	4,954,538	119	4,954,621
	CLASS 417	44	4,954,371	101	4,954,439	179	4,954,123		CLASS 524	127	4,954,622
53	4,954,046	53.1	4,954,365		4,954,440		CLASS 493	27	4,954,539		4,954,623
203	4,954,047	54.1	4,954,366	115	4,954,441		CLASS 494	86	4,954,540		CLASS 540
209	4,954,048	68	4,954,367	172.3	4,954,442	195	4,954,124		4,954,541	225	4,954,624
234	4,954,049	109	4,954,368	178	4,954,443		CLASS 501	89	4,954,542	500	4,954,625
269	4,954,050	256	4,954,369	184	4,954,444		4,954,460	104	4,954,543		CLASS 544
305	4,954,051	388.2	4,954,372	187	4,954,445	80	4,954,461	111	4,954,544		4,954,630
331	4,954,052	389.9	4,954,373	191	4,954,446	95	4,954,462	158	4,954,545	102	4,954,631
379	4,954,053	438	4,954,370	200	4,954,447		4,954,463	180	4,954,546	105	4,954,632
440	4,954,054		CLASS 428	232	4,954,448	120	4,954,464	232	4,954,547	182	4,954,627
477	4,954,055		CLASS 429	240.27	4,954,449	134	4,954,465	258	4,954,548	211	4,954,628
	CLASS 418	34.1	4,954,374	252.4	4,954,450		CLASS 502	264	4,954,549	237	4,954,629
55.3	4,954,056		4,954,375		CLASS 436	5	4,954,465	271	4,954,550		CLASS 546
55.6	4,954,057	35.7	4,954,376	175	4,954,451	24	4,954,466	327	4,954,551	15	4,954,631
	CLASS 419	36.1	4,954,377	524	4,954,452	26	4,954,467	356	4,954,552	194	4,954,632
9	4,954,313	63	4,954,378		CLASS 437	63	4,954,468	376	4,954,553		CLASS 548
18	4,954,058	64	4,954,379		4,954,453	80	4,954,469	378	4,954,554		4,954,633
38	4,954,166	100	4,954,380	8	4,954,454	107	4,954,470	399	4,954,555	240	4,954,634
45	4,954,314	116	4,954,381	21	4,954,455	110	4,954,471		4,954,556	341	4,954,635
	CLASS 422		4,954,382	31	4,954,456	152	4,954,472	507	4,954,557	354	4,954,636
31	4,954,315	131	4,954,383		4,954,457	171	4,954,473	714	4,954,558	379	4,954,637
37	4,954,316	137	4,954,384	51	4,954,458	185	4,954,474	728	4,954,559	490	4,954,638
46	4,954,317	138	4,954,385	228	4,954,459	343	4,954,475	779	4,954,560	475	4,954,639
59	4,954,318	198	4,954,386		CLASS 439	350	4,954,476	813	4,954,561	519	4,954,640
67	4,954,319	212	4,954,387		4,954,458		CLASS 503	860	4,954,562	546	4,954,636
186.04	4,954,320		4,954,388	29	4,954,084	226	4,954,477		CLASS 525		CLASS 549
186.19	4,954,321	220	4,954,389	34	4,954,085	227	4,954,478	61	4,954,566	384	4,954,641
	CLASS 423	244	4,954,390	65	4,954,086		CLASS 505	62	4,954,567	389	4,954,642
55	4,954,168	288	4,954,391	71	4,954,087		4,954,479	92	4,954,568	531	4,954,643
95	4,954,322	289	4,954,392	73	4,954,088	1	4,954,480	146	4,954,569		CLASS 556
235	4,954,323	318.4	4,954,393	76	4,954,089		4,954,481	185	4,954,570		4,954,644
239	4,954,324	340	4,954,394	103	4,954,090		4,954,482	205	4,954,571	14	4,954,645
328	4,954,325	400	4,954,395	152	4,954,091		CLASS 514	285	4,954,572	45	
	4,954,326	402	4,954,396	188	4,954,092	8	4,954,482	327.6	4,954,573		CLASS 558
338	4,954,327	412	4,954,401	244	4,954,093	9	4,954,483		4,954,574		4,954,646
386	4,954,328	414	4,954,402	247	4,954,094	30	4,954,484	330.5	4,954,575	31	4,954,647
410	4,954,329	597	4,954,403	284	4,954,095	49	4,954,485	339	4,954,576	46	4,954,648
484	4,954,330		CLASS 429	346	4,954,096	158	4,954,486	420	4,954,577	425	
574 R	4,954,331	103	4,954,404	352	4,954,097	159	4,954,487	432	4,954,578		CLASS 560
	CLASS 424		CLASS 430	404	4,954,098	174	4,954,491	460	4,954,579	180	4,954,649
5	4,954,348	45	4,954,405	492	4,954,099	176	4,954,492	467	4,954,580		CLASS 562
59	4,954,332	58	4,954,406	502	4,954,101	177	4,954,493	476	4,954,581		4,954,650
66	4,954,333		4,954,407	535	4,954,102	188	4,954,494	497	4,954,582	534	4,954,651
68	4,954,334	60	4,954,408	751	4,954,103	195	4,954,495	502	4,954,583	856	
70	4,954,341	96	4,954,409	864	4,954,104		4,954,496	507	4,954,584		CLASS 564
71	4,954,336	108	4,954,410		4,954,105	210	4,954,497		CLASS 526	223	4,954,652
73	4,954,337		4,954,411		CLASS 440	231.2	4,954,498		4,954,585		4,954,653
78	4,954,338	21	4,954,412		4,954,106	231.5	4,954,499	138	4,954,586	446	4,954,654
	4,954,339	61	4,954,413		4,954,107	235.5	4,954,500	220	4,954,587	464	4,954,655
92	4,954,340	73	4,954,414		4,954,108	247	4,954,501	245	4,954,588		CLASS 568
070	4,954,341	109	4,954,415		4,954,109	249	4,954,502		4,954,589		4,954,656
436	4,954,342	111	4,954,416		CLASS 441	252	4,954,503	247	4,954,590	567	4,954,657
448	4,954,343	135	4,954,417		4,954,110	253	4,954,504	255	4,954,591	584	4,954,658
	4,954,344	137	4,954,418		4,954,111	254	4,954,505	259	4,954,592	617	4,954,659
450	4,954,345	138	4,954,419		4,954,112	265	4,954,506	264	4,954,593	651	4,954,660
456	4,954,346		4,954,420		CLASS 442	267	4,954,507	270	4,954,594	697	4,954,661
	4,954,347	175	4,954,421		4,954,113	272	4,954,508	320	4,954,595	727	4,954,662
461	4,954,349	215	4,954,422		CLASS 443	300	4,954,509	344.2	4,954,596	779	4,954,663
493	4,954,350	270	4,954,423		CLASS 444	303	4,954,510		4,954,597	791	4,954,664
667	4,954,351	271	4,954,424		4,954,114	307	4,954,511		4,954,598	864	4,954,665
	CLASS 425	281	4,954,425		4,954,115	315	4,954,512	14	4,954,599	902.2	
72.1	4,954,059	316	4,954,426		4,954,116	327	4,954,513	15	4,954,600		CLASS 570
85	4,954,060	323	4,954,427		4,954,117	352	4,954,514	22	4,954,601	132	4,954,666
131.1	4,954,061	373	4,954,428		4,954,118	381	4,954,515	38	4,954,602		CLASS 600
135	4,954,062	409	4,954,429		CLASS 445	398	4,954,516	45	4,954,603	36	4,954,126
149	4,954,063	495	4,954,430		4,954,119	424	4,954,517	89	4,954,604		4,954,127
162	4,954,064	503	4,954,431		4,954,120	450	4,954,518	93	4,954,605		CLASS 604
175	4,										



## GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama .....	1	Kentucky .....	21	Oregon .....	41
Alaska .....	2	Louisiana .....	22	Pennsylvania .....	42
American Samoa .....	3	Maine .....	23	Puerto Rico .....	43
Arizona .....	4	Maryland .....	24	Rhode Island .....	44
Arkansas .....	5	Massachusetts .....	25	South Carolina .....	45
California .....	6	Michigan .....	26	South Dakota .....	46
Canal Zone .....	7	Minnesota .....	27	Tennessee .....	47
Colorado .....	8	Mississippi .....	28	Texas .....	48
Connecticut .....	9	Missouri .....	29	Utah .....	49
Delaware .....	10	Montana .....	30	Vermont .....	50
District of Columbia .....	11	Nebraska .....	31	Virginia .....	51
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Georgia .....	13	New Hampshire .....	33	Washington .....	53
Guam .....	14	New Jersey .....	34	West Virginia .....	54
Hawaii .....	15	New Mexico .....	35	Wisconsin .....	55
Idaho .....	16	New York .....	36	Wyoming .....	56
Illinois .....	17	North Carolina .....	37	U.S. Air Force .....	57
Indiana .....	18	North Dakota .....	38	U.S. Army .....	58
Iowa .....	19	Ohio .....	39	U.S. Navy .....	59
Kansas .....	20	Oklahoma .....	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

### PATENTS

01	4,953,320	4,953,643	4,954,251	4,955,063	4,954,809	4,953,506
	4,953,476	4,953,659	4,954,309	4,955,085	4,954,925	4,953,567
	4,953,797	4,953,665	4,954,311	4,955,089	4,954,938	4,953,598
	4,953,804	4,953,697	4,954,317	Re 33,322	4,954,962	4,953,719
	4,953,981	4,953,704	4,954,317	4,953,357	4,955,003	4,953,754
	4,954,018	4,953,707	4,954,318	4,953,371	4,955,031	4,953,886
	4,954,134	4,953,731	4,954,327	4,953,425	4,953,998	4,953,998
	4,954,155	4,953,753	4,954,344	4,953,521	4,954,135	4,954,022
	4,954,156	4,953,815	4,954,348	4,953,610	4,954,220	4,954,071
02	4,953,766	4,953,819	4,954,383	4,953,738	4,954,289	4,954,081
04	4,953,314	4,953,822	4,954,447	4,953,836	4,954,290	4,954,132
	4,953,316	4,953,838	4,954,455	4,953,956	4,954,444	4,954,158
	4,953,422	4,953,853	4,954,459	4,954,194	4,954,468	4,954,274
	4,953,780	4,953,857	4,954,492	4,954,324	4,954,519	4,954,519
	4,953,803	4,953,862	4,954,591	4,954,346	4,954,556	4,954,448
	4,953,823	4,953,868	4,954,637	4,954,751	4,954,679	4,953,706
	4,953,865	4,953,880	4,954,690	4,954,852	Re 33,324	4,953,752
	4,953,882	4,953,909	4,954,695	4,954,900	4,953,323	4,953,755
	4,953,902	4,953,911	4,954,700	4,954,904	4,953,328	4,953,901
	4,953,904	4,953,923	4,954,704	4,954,940	4,953,303	4,953,911
	4,953,949	4,953,925	4,954,708	4,955,046	4,953,327	4,953,326
	4,954,075	4,953,928	4,954,724	4,953,376	4,953,342	4,954,295
	4,954,371	4,953,932	4,954,750	4,953,382	4,953,383	4,954,416
	4,954,378	4,953,944	4,954,757	4,953,388	4,953,478	4,953,365
	4,954,435	4,953,953	4,954,785	4,953,469	4,953,537	4,953,403
	4,954,437	4,953,954	4,954,787	4,953,487	4,953,547	4,953,455
	4,954,452	4,953,955	4,954,790	4,953,489	4,953,569	4,953,471
	4,954,483	4,953,961	4,954,791	4,953,685	4,953,729	4,953,473
05	4,954,794	4,953,967	4,954,810	4,953,714	4,953,770	4,953,504
06	4,953,494	4,953,982	4,954,813	4,953,740	4,953,782	4,953,552
	4,953,573	4,953,986	4,954,815	4,953,816	4,953,792	4,953,588
	4,953,232	4,954,007	4,954,816	4,953,842	4,953,830	4,953,663
	4,953,233	4,954,014	4,954,825	4,953,849	4,953,855	4,953,675
	4,953,248	4,954,020	4,954,829	4,953,869	4,953,874	4,953,689
	4,953,275	4,954,033	4,954,830	4,953,871	4,953,895	4,953,727
	4,953,287	4,954,046	4,954,832	4,953,935	4,953,903	4,953,733
	4,953,295	4,954,054	4,954,864	4,953,960	4,953,935	4,953,735
	4,953,347	4,954,055	4,954,873	4,953,975	4,954,049	4,953,744
	4,953,352	4,954,080	4,954,881	4,953,996	4,954,108	4,953,794
	4,953,356	4,954,128	4,954,892	4,954,312	4,954,239	4,953,841
	4,953,370	4,954,130	4,954,931	4,954,258	4,954,272	4,953,878
	4,953,435	4,954,149	4,954,951	4,954,428	4,954,527	4,953,888
	4,953,437	4,954,151	4,954,952	4,954,502	4,954,799	4,953,913
	4,953,452	4,954,152	4,954,953	4,954,538	4,954,831	4,953,985
	4,953,483	4,954,163	4,954,960	4,954,543	4,954,837	4,954,008
	4,953,492	4,954,186	4,954,970	4,954,614	4,954,999	4,954,042
	4,953,495	4,954,190	4,954,987	4,954,629	4,955,004	4,954,058
	4,953,519	4,954,195	4,954,990	4,954,647	4,955,054	4,954,061
	4,953,553	4,954,209	4,954,998	4,954,719	4,955,075	4,954,062
	4,953,562	4,954,212	4,955,018	4,954,726	4,955,235	4,954,089
	4,953,572	4,954,223	4,955,034	4,954,740	4,955,246	4,954,096
	4,953,579	4,954,236	4,955,052	4,954,752	4,955,337	4,954,101
	4,953,616			4,954,805	4,953,500	4,954,241
	4,953,635					

4,954,242	4,953,999	4,953,527	4,954,316	4,953,609	4,953,906
4,954,245	4,954,225	4,953,555	4,954,360	4,953,757	4,953,908
4,954,246	4,954,249	4,953,600	4,954,364	4,953,795	4,953,924
4,954,267	4,954,250	4,953,623	4,954,381	4,953,852	4,954,098
4,954,335	4,954,437	4,953,779	4,954,457	4,954,745	4,954,105
4,954,384	4,954,788	4,953,817	4,954,475	4,954,747	4,954,137
4,954,452	4,954,878	4,953,860	4,954,521	4,954,954	4,954,202
4,954,469	4,954,946	4,953,905	4,954,533	4,954,983	4,954,226
4,954,473	4,954,966	4,954,009	4,954,549	4,955,058	4,954,227
4,954,520	4,955,065	4,954,037	4,954,572	4,953,279	4,954,237
4,954,547	4,955,068	4,954,123	4,954,578	4,953,289	4,954,294
4,954,562	4,955,079	4,954,145	4,954,587	4,953,302	4,954,300
4,954,672	4,953,259	4,954,159	4,954,639	4,953,340	4,954,323
4,954,682	4,953,261	4,954,196	4,954,658	4,953,442	4,954,370
4,954,716	4,953,305	4,954,211	4,954,699	4,953,464	4,954,423
4,954,749	4,953,378	4,954,240	4,954,731	4,953,480	4,954,439
4,954,754	4,953,381	4,954,243	4,954,738	4,953,577	4,954,458
4,954,758	4,953,387	4,954,247	4,954,816	4,953,603	4,954,471
4,954,763	4,953,407	4,954,264	4,954,854	4,953,614	4,954,548
4,954,783	4,953,419	4,954,276	4,954,883	4,953,666	4,954,552
4,954,796	4,953,450	4,954,277	4,954,958	4,953,681	4,954,555
4,954,802	4,953,490	4,954,278	4,954,996	4,953,684	4,954,568
4,954,822	4,953,517	4,954,280	4,955,069	4,953,708	4,954,570
4,954,876	4,953,533	4,954,281	4,953,541	4,953,761	4,954,583
4,954,948	4,953,564	4,954,282	4,953,662	4,953,773	4,954,584
4,955,032	4,953,582	4,954,288	4,953,767	4,953,790	4,954,652
4,955,047	4,953,624	4,954,336	4,954,138	4,953,832	4,954,789
4,955,083	4,953,653	4,954,337	4,954,490	4,953,854	4,954,923
4,780,589	4,953,660	4,954,347	4,954,649	4,953,866	4,954,950
4,953,244	4,953,698	4,954,349	4,954,821	4,953,940	4,954,963
4,953,285	4,953,743	4,954,353	4,954,939	4,953,968	4,954,964
4,953,446	4,953,745	4,954,365	4,953,281	4,954,034	4,954,994
4,953,449	4,953,771	4,954,400	4,953,282	4,954,076	4,955,002
4,953,493	4,953,877	4,954,403	4,953,284	4,954,087	4,955,012
4,953,583	4,953,879	4,954,453	4,953,319	4,954,094	4,955,024
4,953,584	4,953,898	4,954,470	4,953,353	4,954,100	4,955,038
4,953,670	4,953,972	4,954,503	4,953,363	4,954,144	4,953,269
4,953,680	4,954,115	4,954,504	4,953,406	4,954,147	4,953,332
4,953,728	4,954,124	4,954,506	4,953,502	4,954,153	4,953,341
4,953,820	4,954,180	4,954,511	4,953,568	4,954,170	4,953,381
4,953,863	4,954,182	4,954,553	4,953,576	4,954,188	4,953,595
4,954,222	4,954,269	4,954,582	4,953,604	4,954,199	4,953,741
4,954,310	4,954,303	4,954,593	4,953,700	4,954,210	4,954,003
4,954,389	4,954,333	4,954,605	4,953,748	4,954,315	4,954,166
4,954,442	4,954,401	4,954,609	4,953,750	4,954,325	4,954,435
4,954,451	4,954,515	4,954,610	4,953,751	4,954,338	4,954,450
4,954,623	4,954,554	4,954,611	4,953,759	4,954,361	4,954,819
4,954,687	4,954,559	4,954,636	4,953,781	4,954,367	4,953,538
4,954,725	4,954,565	4,954,645	4,953,787	4,954,375	4,954,116
4,954,775	4,954,579	4,954,663	4,953,808	4,954,378	4,954,116
4,953,308	4,954,597	4,954,851	4,953,848	4,954,388	4,953,235
4,953,426	4,954,598	4,954,941	4,953,900	4,954,421	4,953,334
4,954,025	4,954,601	4,954,975	4,954,005	4,954,446	4,953,395
4,954,178	4,954,667	4,955,016	4,954,010	4,954,463	4,953,397
4,954,688	4,954,689	4,955,017	4,954,013	4,954,494	4,953,434
4,954,988	4,954,739	4,955,020	4,954,039	4,954,513	4,953,440
4,953,301	4,954,872	4,955,021	4,954,057	4,954,531	4,953,640
4,954,627	4,954,921	4,955,028	4,954,060	4,954,537	4,953,718
4,954,981	4,954,932	4,955,037	4,954,066	4,954,542	4,953,736
4,953,336	4,954,973	4,953,366	4,954,070	4,954,574	4,953,811
4,953,345	4,955,044	4,953,765	4,954,074	4,954,632	4,954,574
4,953,915	4,955,078	4,953,980	4,954,095	4,954,655	4,953,963
Re 33,323	4,953,333	4,954,023	4,954,139	4,954,673	4,953,983
4,953,560	4,953,386	4,954,934	4,954,154	4,954,720	4,954,148
4,953,763	4,953,396	4,955,059	4,954,167	4,954,768	4,954,839
4,953,987	4,953,481	4,953,240	4,954,200	4,954,811	4,954,839
4,954,012	4,953,540	4,953,241	4,954,204	4,954,811	4,954,839
4,954,031	4,953,544	4,953,242	4,954,208	4,954,979	4,954,949
4,954,168	4,953,550	4,953,267	4,954,273	4,953,433	4,954,999
4,954,274	4,953,551	4,953,291	4,954,285	4,953,488	4,953,433
4,954,352	4,953,674	4,953,307	4,954,297	4,953,293	4,953,478
4,954,448	4,953,702	4,953,317	4,954,332	4,953,785	4,953,586
4,954,486	4,953,706	4,953,325	4,954,363	4,953,785	4,953,623
4,954,551	4,953,752	4,953,491	4,954,414	4,954,392	4,953,768
4,954,760	4,953,755	4,953,499	4,954,415	4,954,392	4,953,768
4,953,339	4,953,901	4,953,503	4,954,440	4,953,264	4,953,812
4,953,458	4,954,011	4,953,511	4,954,487	4,953,270	4,953,837
4,953,461	4,954,041	4,953,546	4,954,488	4,953,664	4,953,892
4,953,810	4,954,295	4,953,548	4,954,491	4,953,764	4,953,919
4,953,465	4,954,416	4,953,563	4,954,528	4,953,856	4,953,919
4,953,475	4,954,462	4,953,673	4,954,564	4,954,396	4,953,993
4,953,523	4,954,965	4,953,716	4,954,635	4,953,454	4,954,019
4,953,554	4,954,972	4,953,758	4,954,691	4,953,296	4,954,125
4,953,561	4,955,000	4,953,778	4,954,712	4,953,971	4,954,084
4,953,566	4,953,243	4,953,809	4,954,718	4,954,036	4,954,125
4,953,713	4,953,518	4,953,851	4,954,814	4,954,051	4,954,782
4,953,951	4,953,642	4,953,864	4,954,828	4,954,398	4,954,875
4,954,026	4,953,688	4,953,875	4,954,862	4,953,239	4,954,875
4,954,216	4,953,695	4,953,929	4,954,891	4,953,276	4,955,066
4,954,320	4,953,974	4,953,947	4,954,935	4,953,247	4,953,914
4,954,328	4,954,017	4,953,970	4,955,005	4,953,276	4,954,052
4,954,377	4,954,091	4,953,973	4,955,053	4,953,318	4,954,566
4,954,382	4,954,466	4,954,030	4,953,231	4,953,398	4,954,566
4,954,449	4,954,808	4,954,032	4,953,292	4,953,399	4,953,250
4,954,481	4,953,872	4,954,059	4,953,412	4,953,441	4,953,420
4,954,526	4,953,772	4,954,069	4,953,543	4,953,479	4,953,510
4,954,618	4,954,659	4,954,078	4,953,618	4,953,496	4,953,578
4,954,669	4,953,310	4,954,082	4,953,859	4,953,545	4,953,721
4,954,722	4,953,439	4,954,114	4,954,109	4,953,593	4,953,722
4,954,755	4,953,824	4,954,142	4,954,224	4,953,602	4,953,733
4,954,756	4,954,376	4,954,184	4,954,244	4,953,662	4,953,747
4,954,833	4,954,436	4,954,185	4,954,330	4,953,620	4,953,747
4,954,834	4,954,617	4,954,197	4,954,354	4,953,602	4,953,899
4,953,256	4,954,683	4,954,252	4,954,373	4,953,634	4,954,083
4,953,286	4,953,234	4,954,256	4,954,402	4,953,638	4,954,172
4,953,372	4,953,236	4,954,265	4,954,467	4,953,639	4,954,192
4,953,786	4,953,258	4,954,266	4,954,545	4,953,641	4,954,233
4,953,938	4,953,272	4,954,272	4,954,545	4,953,657	4,954,356
4,953,976	4,953,300	4,954,284	4,954,558	4,953,777	4,954,558
4,953,978	4,953,460	4,954,286	4,953,298	4,953,783	4,954,722
		4,953,315	4,953,315	4,953,858	4,954,917
				4,953,867	4,953,931

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04 : 310,381	310,385	310,438	310,294	310,407	310,375
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310,418	310,405	310,303	310,356	36 : 310,330	310,306
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310,335	310,314	310,420	310,432	310,397	310,410
310,336	310,326	310,372	310,339	310,404	49 : 310,310
310,347	310,345	310,288	310,403	310,424	310,346
310,354	310,367	310,419	310,422	41 : 310,291	310,374
310,355	310,423	310,437	310,301	310,292	310,390
310,358	310,434	310,287	32 : 310,300	42 : 310,319	310,417
					310,436

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06 : 7,315	13 : 7,314	39 : 7,316			
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STATUTORY INVENTION REGISTRATIONS

24 : H816	36 : H819	H815			
34 : H818	48 : H813	H820	H821	H822	53 : H814

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U.S. DEPARTMENT OF COMMERCE  
Robert A. Mosbacher, *Secretary*  
PATENT AND TRADEMARK OFFICE  
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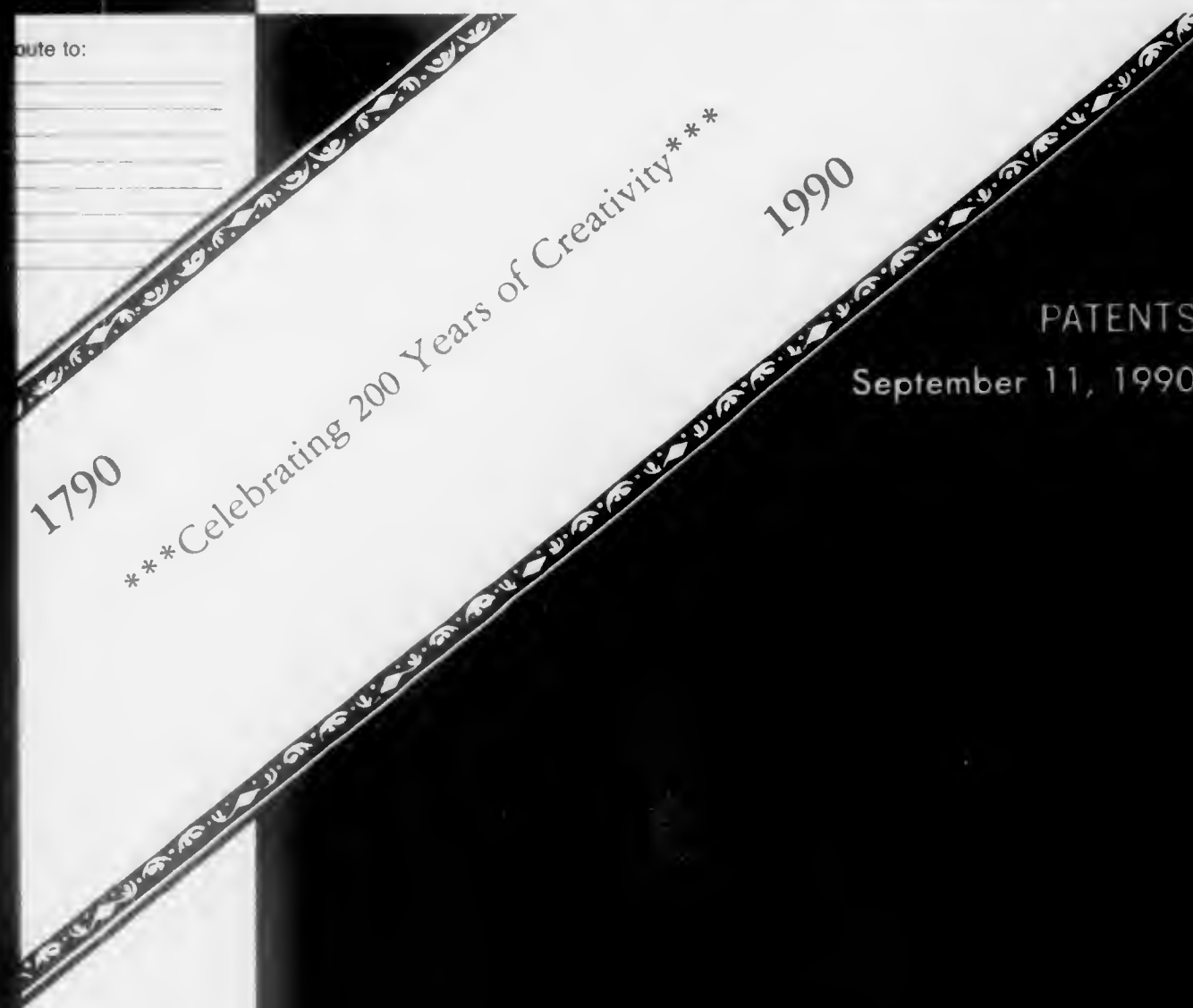
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## PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1118 O.G. 14 on Sept. 11, 1990.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on September 1, 1990, due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss Franc and were announced in the *Official Gazette* at 1116 O.G. 32 on July 17, 1990.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee: .....	170.00	
Search Fee		
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)		
—No corresponding prior U.S. national application filed .....	550.00	
—Corresponding prior U.S. national application filed .....	380.00	
—Supplemental search fee, per additional invention .....	150.00	
European Patent Office as ISA .....	1242.00	
Preliminary examination fee		
USPTO as International Preliminary Examining Authority (IPEA)		
—Search fee paid to USPTO as ISA .....	400.00	
—Additional examination fee, per additional invention .....	130.00	
—ISA not the USPTO .....	600.00	
—Additional examination fee, per additional invention .....	200.00	
International fees		
Basic fee .....	502.00	
Basic Supplemental fee (for each page over 30) .....	10.00	
Designation fee per country or region for the first 10 national or regional offices .....	122.00	
Designation fee for 11th and subsequent designations .....	No Charge	
Handling fee .....	154.00	
U.S. National Stage fees		
	Small Entity	Regular
USPTO was IPEA .....	165.00	330.00
USPTO was ISA but not IPEA .....	185.00	370.00

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USPTO was neither ISA nor IPEA .....	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) .....	25.00	50.00
—For each independent claim in excess of 3 .....	18.00	36.00
—For each claim in excess of 20 .....	6.00	12.00
—For each application containing a multiple dependent claim .....	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1) .....	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1) .....	30.00	30.00

Aug. 16, 1990

HARRY F. MANBECK, Jr.  
Assistant Secretary and Commissioner  
of Patents and Trademarks.

Patent Cooperation Treaty (PCT) Update  
Withdrawal of Chapter II Declaration  
by Republic of Korea

On June 1, 1990, the Republic of Korea (South Korea) notified the International Bureau under PCT Article 64(6)(b) of the withdrawal of its declaration under PCT Article 64(1)(a) that it shall not be bound under the provisions of Chapter II of the PCT. Therefore, the Republic of Korea will be bound by the provisions of Chapter II of the PCT as of September 1, 1990.

The withdrawal of the said declaration by the Republic of Korea has the effect that, beginning on September 1, 1990:

(a) nationals and residents of the Republic of Korea may submit demands for international preliminary examination of international applications filed by them;

(b) the Republic of Korea may be elected in demands for international preliminary examination or in later elections submitted in respect of international applications in which the Republic of Korea is a designated State;

(c) paragraphs (a) and (b) apply irrespective of whether the international application designating the Republic of Korea was or will be filed before, on, or after September 1, 1990.

August 16, 1990

HARRY F. MANBECK, Jr.  
Assistant Secretary and Commissioner  
of Patents and Trademarks

Patent Cooperation Treaty Update  
Accession by Greece

The United States Patent and Trademark Office has received notification from the World Intellectual Property Organization that Greece deposited its instrument of accession to the Patent Cooperation Treaty (PCT) on 09 July 1990. Therefore, according to PCT article 63(2), Greece may be designated in international applications filed on and after 09 October 1990.

The instrument of accession contains a declaration that Greece will not be bound by Chapter II (concerning international preliminary examination) of the PCT. This means that Greece may not be elected for international preliminary examination; however, if Greece is designated in the international application

for a European patent together with at least one other State party to the European Patent Convention which is bound by Chapter II of the PCT, the 30-month time limit for entry into the regional

phase before the European Patent Office under PCT Article 39(1) applies also with respect to Greece, if the other State has been elected prior to 19 months from the priority date.

## Listing of PCT Member Countries

Country	Ratification or Accession	Date of Ratification or Accession	Effective Date
(1)Central African Republic*	Accession.....	15 September 1971.....	01 June 1978
(2)Senegal*	Ratification.....	08 March 1972.....	01 June 1978
(3)Madagascar .....	Ratification.....	27 March 1972.....	01 June 1978
(4)Malawi .....	Accession.....	16 May 1972.....	01 June 1978
(5)Cameroon*	Accession.....	15 March 1973.....	01 June 1978
(6)Chad*	Accession.....	12 February 1974.....	01 June 1978
(7)Togo*	Ratification.....	28 January 1975.....	01 June 1978
(8)Gabon*	Accession.....	06 March 1975.....	01 June 1978
(9)United States of America .....	Ratification.....	26 November 1975.....	01 June 1978
(10)Germany, Federal Republic of** .....	Ratification.....	19 July 1976.....	01 June 1978
(11)Congo*	Accession.....	08 August 1977.....	01 June 1978
(12)Switzerland** .....	Ratification.....	14 September 1977.....	01 June 1978
(13)United Kingdom** .....	Ratification.....	24 October 1977.....	01 June 1978
(14)France** .....	Ratification.....	25 November 1977.....	01 June 1978
(15)Soviet Union .....	Ratification.....	29 December 1977.....	01 June 1978
(16)Brazil .....	Ratification.....	09 January 1978.....	01 June 1978
(17)Luxembourg** .....	Ratification.....	31 January 1978.....	01 June 1978
(18)Sweden** .....	Ratification.....	17 February 1978.....	01 June 1978
(19)Japan .....	Ratification.....	01 July 1978.....	01 October 1978
(20)Denmark** .....	Ratification.....	01 September 1978.....	01 December 1978
(21)Austria** .....	Ratification.....	23 January 1979.....	23 April 1979
(22)Monaco .....	Ratification.....	22 March 1979.....	22 June 1979
(23)Netherlands** .....	Ratification.....	10 April 1979.....	10 July 1979
(24)Romania .....	Accession.....	23 April 1979.....	23 July 1979
(25)Norway .....	Ratification.....	01 October 1979.....	01 January 1980
(26)Liechtenstein** .....	Accession.....	19 December 1979.....	19 March 1980
(27)Australia .....	Accession.....	31 December 1979.....	31 March 1980
(28)Hungary .....	Ratification.....	27 March 1980.....	27 June 1980
(29)Democratic People's Republic of Korea (North Korea) .....	Accession.....	08 April 1980.....	08 July 1980
(30)Finland .....	Ratification.....	01 July 1980.....	01 October 1980
(31)Belgium** .....	Ratification.....	14 September 1981.....	14 December 1981
(32)Sri Lanka .....	Accession.....	26 November 1981.....	26 February 1982
(33)Mauritania* .....	Accession.....	13 January 1983.....	13 April 1983
(34)Sudan .....	Accession.....	16 January 1984.....	16 April 1984
(35)Bulgaria .....	Accession.....	21 February 1984.....	21 May 1984
(36)Republic of Korea (South Korea).....	Accession.....	10 May 1984.....	10 August 1984
(37)Mali* .....	Accession.....	19 July 1984.....	19 October 1984
(38)Barbados .....	Accession.....	12 December 1984.....	12 March 1985
(39)Italy** .....	Ratification.....	28 December 1984.....	28 March 1985
(40)Benin* .....	Accession.....	26 November 1986.....	26 February 1987
(41)Burkina Faso* .....	Accession.....	21 December 1988.....	21 March 1989
(42)Spain** .....	Accession.....	16 August 1989.....	16 November 1989
(43)Canada .....	Ratification .....	02 October 1989 .....	02 January 1990
(44)Greece** .....	Accession .....	09 July 1990 .....	09 October 1990

\*Members of African Intellectual Property Organization (OAPI) regional patent system. Only regional patent protection is available for OAPI countries. A designation of any country is an indication that all OAPI countries have been designated. Only one designation fee is due regardless of the number of OAPI countries designated.

\*\*Member of European Patent Convention (EPC) regional patent system. Either national or European patents for member countries are available through PCT, except for France, Belgium and Italy, for which only European patents are available if PCT is used. Note: Only one PCT designation fee is due if European regional patent protection is sought for one, several or all EPC member countries under the PCT.

August 16, 1990

HARRY F. MANBECK, JR.  
Assistant Commissioner and Commissioner  
of Patents and Trademarks

## Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An ad-

ditional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.



Attention is drawn to the patents which were issued on September 8, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,691,387 through 4,692,945  
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on September 6, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,402,091 through 4,403,352  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....\$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....\$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§ 1.9(f)).....\$245.00  
By other than a small entity.....\$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§ 1.9(f)).....\$495.00  
By other than a small entity.....\$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982.....\$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six

months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§ 1.9(f)).....\$60.00  
By other than a small entity.....\$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....\$550.00"

Notice of Expiration of Patents  
Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED JULY 1, 1990  
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,336,629	06/226,418	6/29/82
4,336,630	06/234,246	6/29/82
4,336,668	06/229,545	6/29/82
4,336,669	06/219,844	6/29/82
4,336,769	06/249,565	6/29/82
4,336,837	06/233,365	6/29/82
4,336,838	06/275,399	6/29/82
4,336,877	06/233,150	6/29/82
4,336,902	06/282,403	6/29/82
4,336,916	06/259,989	6/29/82
4,336,932	06/226,673	6/29/82
4,337,000	06/270,401	6/29/82
4,337,019	06/243,667	6/29/82
4,337,032	06/229,252	6/29/82
4,337,037	06/256,961	6/29/82
4,337,049	06/223,847	6/29/82
4,337,060	06/275,108	6/29/82
4,337,073	06/221,486	6/29/82
4,337,082	06/233,178	6/29/82
4,337,124	06/292,976	6/29/82
4,337,138	06/242,028	6/29/82
4,337,184	06/220,617	6/29/82
4,337,187	06/220,955	6/29/82
4,337,206	06/258,730	6/29/82
4,337,212	06/305,470	6/29/82
4,337,223	06/212,972	6/29/82
4,337,224	06/237,211	6/29/82
4,337,253	06/243,472	6/29/82
4,337,265	06/295,178	6/29/82
4,337,286	06/225,612	6/29/82
4,337,304	06/234,983	6/29/82
4,337,332	06/252,294	6/29/82
4,337,334	06/233,225	6/29/82
4,337,354	06/236,079	6/29/82
4,337,402	06/254,021	6/29/82
4,337,447	06/242,853	6/29/82
4,597,116	06/578,671	7/01/86
4,597,117	06/689,298	7/01/86
4,597,119	06/682,253	7/01/86
4,597,124	06/686,419	7/01/86
4,597,125	06/732,469	7/01/86

Patent Number	Serial Number	Issue Date	4,597,497	06/331,151	7/01/86
4,597,129	06/684,713	7/01/86	5,597,500	06/705,664	7/01/86
4,597,135	06/582,011	7/01/86	4,597,502	06/636,798	7/01/86
4,597,137	06/649,749	7/01/86	4,597,520	06/647,820	7/01/86
4,597,144	06/756,965	7/01/86	4,597,521	06/703,580	7/01/86
4,597,152	06/653,181	7/01/86	4,597,524	06/705,042	7/01/86
4,597,154	06/591,506	7/01/86	4,597,539	06/752,984	7/01/86
4,597,178	06/617,757	7/01/86	4,597,542	06/756,736	7/01/86
4,597,179	06/703,040	7/01/86	4,597,549	06/655,521	7/01/86
4,597,182	06/714,926	7/01/86	4,597,550	06/738,246	7/01/86
4,597,186	06/764,609	7/01/86	4,597,553	06/695,090	7/01/86
4,597,189	06/556,574	7/01/86	4,597,561	06/510,189	7/01/86
4,597,191	06/659,177	7/01/86	4,597,563	06/649,593	7/01/86
4,597,197	06/762,243	7/01/86	4,597,568	06/603,489	7/01/86
4,597,201	06/721,049	7/01/86	4,597,569	06/688,011	7/01/86
4,597,203	06/764,712	7/01/86	4,597,572	06/649,381	7/01/86
4,597,211	06/523,331	7/01/86	4,597,573	06/699,277	7/01/86
4,597,214	06/669,296	7/01/86	4,597,575	06/283,225	7/01/86
4,597,215	06/613,298	7/01/86	4,597,576	06/628,993	7/01/86
4,597,222	06/655,503	7/01/86	4,597,579	06/729,187	7/01/86
4,597,230	06/603,307	7/01/86	4,597,580	06/432,969	7/01/86
4,597,231	06/663,409	7/01/86	4,597,585	06/673,363	7/01/86
4,597,237	06/569,592	7/01/86	4,597,589	06/590,148	7/01/86
4,597,239	06/659,256	7/01/86	4,597,590	06/689,061	7/01/86
4,597,270	06/665,544	7/01/86	4,597,595	06/705,778	7/01/86
4,597,272	06/563,200	7/01/86	4,597,597	06/475,317	7/01/86
4,597,273	06/609,850	7/01/86	4,597,602	06/707,814	7/01/86
4,597,277	06/653,562	7/01/86	4,597,603	06/730,817	7/01/86
4,597,281	06/653,122	7/01/86	4,597,604	06/567,231	7/01/86
4,597,289	06/749,247	7/01/86	4,597,605	06/667,961	7/01/86
4,597,296	06/649,318	7/01/86	4,597,608	06/762,436	7/01/86
4,597,299	06/709,233	7/01/86	4,597,609	06/680,622	7/01/86
4,597,302	06/311,733	7/01/86	4,597,624	06/717,507	7/01/86
4,597,313	06/523,937	7/01/86	4,597,626	06/654,887	7/01/86
4,597,317	06/565,466	7/01/86	4,597,628	06/778,446	7/01/86
4,597,322	06/662,967	7/01/86	4,597,645	06/353,958	7/01/86
4,597,335	06/563,993	7/01/86	4,597,655	06/730,062	7/01/86
4,597,336	06/558,008	7/01/86	4,597,656	06/655,028	7/01/86
4,597,337	06/614,741	7/01/86	4,597,682	06/670,987	7/01/86
4,597,349	06/504,962	7/01/86	4,597,684	06/623,320	7/01/86
4,597,352	06/526,537	7/01/86	4,597,689	06/647,720	7/01/86
4,597,359	06/691,395	7/01/86	4,597,694	06/604,465	7/01/86
4,597,363	06/472,987	7/01/86	4,597,698	06/612,479	7/01/86
4,597,366	06/758,317	7/01/86	4,597,703	06/619,222	7/01/86
4,597,383	06/727,400	7/01/86	4,597,705	06/623,383	7/01/86
4,597,386	06/581,710	7/01/86	4,597,716	06/623,577	7/01/86
4,597,387	06/544,987	7/01/86	4,597,720	06/287,060	7/01/86
4,597,388	06/561,894	7/01/86	4,597,722	06/715,228	7/01/86
4,597,395	06/768,704	7/01/86	4,597,736	06/729,911	7/01/86
4,597,397	06/663,199	7/01/86	4,597,739	06/736,362	7/01/86
4,597,398	06/702,246	7/01/86	4,597,743	06/724,776	7/01/86
4,597,408	06/746,746	7/01/86	4,597,744	06/579,144	7/01/86
4,597,414	06/738,768	7/01/86	4,597,749	06/748,699	7/01/86
4,597,423	06/716,106	7/01/86	4,597,751	06/648,746	7/01/86
4,597,429	06/681,239	7/01/86	4,597,757	06/757,381	7/01/86
4,597,430	06/576,906	7/01/86	4,597,762	06/319,882	7/01/86
4,597,437	06/600,540	7/01/86	4,597,767	06/438,571	7/01/86
4,597,438	06/537,870	7/01/86	4,597,769	06/710,220	7/01/86
4,597,443	06/551,435	7/01/86	4,597,780	06/365,429	7/01/86
4,597,449	06/602,547	7/01/86	4,597,781	06/673,725	7/01/86
4,597,454	06/619,866	7/01/86	4,597,784	06/697,328	7/01/86
4,597,469	06/714,487	7/01/86	4,597,798	06/686,376	7/01/86
4,597,474	06/518,420	7/01/86	4,597,802	06/598,917	7/01/86
4,597,477	06/601,039	7/01/86	4,597,811	06/751,702	7/01/86
4,597,480	06/685,471	7/01/86	4,597,815	06/325,054	7/01/86
4,597,485	06/637,901	7/01/86	4,597,817	06/655,430	7/01/86
4,597,490	06/699,616	7/01/86	4,597,828	06/715,618	7/01/86
4,597,491	06/597,141	7/01/86	4,597,840	06/705,415	7/01/86
4,597,495	06/727,352	7/01/86	4,597,857	06/721,022	7/01/86
			4,597,860	06/730,950	7/01/86

Patent Number	Serial Number	Issue Date	4,598,210	06/609,318	7/01/86
4,597,867	06/705,355	7/01/86	4,598,213	06/653,613	7/01/86
4,597,876	06/522,637	7/01/86	4,598,223	06/685,120	7/01/86
4,597,899	06/737,058	7/01/86	4,598,226	06/682,215	7/01/86
4,597,900	06/525,356	7/01/86	4,598,229	06/633,477	7/01/86
4,597,923	06/645,342	7/01/86	4,598,246	06/416,005	7/01/86
4,597,924	06/789,598	7/01/86	4,598,260	06/601,430	7/01/86
4,597,940	06/698,411	7/01/86	4,598,271	06/582,018	7/01/86
4,597,947	06/703,978	7/01/86	4,598,279	06/541,686	7/01/86
4,597,973	06/761,873	7/01/86	4,598,280	06/642,302	7/01/86
4,597,977	06/742,551	7/01/86	4,598,288	06/563,878	7/01/86
4,597,981	06/742,540	7/01/86	4,598,289	06/510,092	7/01/86
4,597,987	06/622,342	7/01/86	4,598,291	06/607,380	7/01/86
4,597,998	06/670,648	7/01/86	4,598,293	06/737,905	7/01/86
4,598,002	06/604,961	7/01/86	4,598,297	06/544,285	7/01/86
4,598,041	06/687,285	7/01/86	4,598,299	06/550,289	7/01/86
4,598,047	06/624,285	7/01/86	4,598,312	06/593,975	7/01/86
4,598,065	06/279,153	7/01/86	4,598,314	06/576,613	7/01/86
4,598,070	06/631,997	7/01/86	4,598,325	06/738,862	7/01/86
4,598,073	06/518,672	7/01/86	4,598,326	06/542,943	7/01/86
4,598,074	06/490,441	7/01/86	4,598,329	06/476,062	7/01/86
4,598,076	06/691,026	7/01/86	4,598,334	06/699,377	7/01/86
4,598,083	06/623,133	7/01/86	4,598,336	06/538,750	7/01/86
4,598,086	06/639,323	7/01/86	4,598,338	06/564,107	7/01/86
4,598,092	06/553,049	7/01/86	4,598,341	06/723,892	7/01/86
4,598,093	06/609,083	7/01/86	4,598,345	06/741,947	7/01/86
4,598,097	06/622,590	7/01/86	4,598,352	06/605,710	7/01/86
4,598,151	06/441,982	7/01/86	4,598,353	06/669,143	7/01/86
4,598,157	06/716,924	7/01/86	4,598,374	06/535,485	7/01/86
4,598,175	06/555,624	7/01/86	4,598,386	06/601,510	7/01/86
4,598,176	06/619,042	7/01/86	4,598,401	06/606,746	7/01/86
4,598,177	06/692,068	7/01/86	4,598,409	06/583,026	7/01/86
4,598,178	06/562,281	7/01/86	4,598,411	06/631,660	7/01/86
4,598,193	06/615,921	7/01/86	4,598,419	06/418,359	7/01/86
4,598,194	05/754,689	7/01/86	4,598,420	06/559,406	7/01/86

#### NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below is considered as not having expired but is subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fee which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,514,949	06/492,132	5/07/85	5/06/83	3/23/90

#### REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**4,751,895**, Re. S. N. 07/539,785, Filed June 18, 1990, Cl. 118/128, DOOR CLOSURE APPARATUS FOR ENCAPSULATING A WAFER PADDLE, Cleon R. Yates, Owner of Record: *Inventor*, Attorney or Agent: Hugh D. Jaeger, Ex. Gp.: 152

**4,760,025**, Re. S. N. 07/556,918, Filed July 20, 1990, Cl. 435/222, MODIFIED ENZYMES AND METHODS FOR MAKING SAME, David A. Estelle, et al., Owner of Record: *Genecor, Inc.*, South San Francisco, Calif., Attorney or Agent: James G. Passe, Ex. Gp.: 185

**4,760,906**, Re. S. N. 07/559,686, Filed July 30, 1990, Cl. 192/70.25, INTERNAL ASSISTED CLUTCH, Richard A. Flowtow, et al., Owner of Record: *Dana Corp.*, Toledo, Ohio, Attorney or Agent: Richard S. Mac Millian, Ex. Gp.: 352

**4,803,488**, Re. S. N. 07/552,555, Filed July 16, 1990, Cl. 340/904, DRIVER ALERTING DEVICE, Anthony E. Dombrowski, Owner of Record: *Bruce Schreiner*, Grand Island, Nebr., Attorney or Agent: Alan Holler, Ex. Gp.: 268

**4,809,659**, Re. S. N. 07/559,060, Filed July 30, 1990, Cl. 123/399, MOTORDRIVEN THROTTLE VALVE ASSEMBLY, Sigeo Tamaki, et al., Owner of Record: *Hitachi, Ltd.*, Tokyo, Japan, Attorney or Agent: Donald R. Antonelli, Ex. Gp.: 342

**4,839,079**, Re. S. N. 07/547,772, Filed July 3, 1990, Cl. 252/104, HYPOCHLORITE: TERTIARY ALCOHOL DISINFEC-

TANTS WITH REDUCED OFFENSIVE ODOR, Mark A. Wainberg, et al., Owner of Record: *Kam Scientific Inc.*, Winnipeg, Canada, Attorney or Agent: Dianne E. Reed, Ex. Gp.: 115

**4,848,556**, Re. S. N. 07/514,507, Filed April 25, 1990, Cl. 194/212, LOW POWER COIN DISCRIMINATION APPARATUS, Govind Shah, et al., Owner of Record: *Inventor*, Attorney or Agent: James P. Ryther, Ex. Gp.: 317

**4,874,259**, Re. S. N. 07/561,729, Filed Aug. 1, 1990, Cl. 384/445, BEARING DEVICE ASSEMBLY, Isao Sato, et al., Owner of Record: *Nippon Seiko Kabushiki Kaisha*, Tokyo, Japan, Attorney or Agent: Julia F. Church, Ex. Gp.: 245

**4,875,813**, Re. S. N. 07/529,891, Filed May 29, 1990, Cl. 410/9, WHEEL CHOCK, Donald L. Moyer, et al., Owner of Record: *Inventor*, Attorney or Agent: John A. Beehner, Ex. Gp.: 317

**4,880,487**, Re. S. N. 07/558,954, Filed July 27, 1990, Cl. 156/327, HOT MELT ADHESIVES CONTAINING POLY (P-HYDROXYSTYRENE) HOMOPOLYMERS AND COPOLYMERS AND COPOLYMERS AND BONDING METHODS EMPLOYING SAME, Michael T. Sheenen, et al., Owner of Record: *Hoechst Celanese Corp.*, Somerville, N.J., Attorney or Agent: Richard S. Roberts, Ex. Gp.: 131

**4,891,530**, Re. S. N. 07/467,605, Filed Jan. 19, 1990, Cl. 250/572, TESTING OR INSPECTING APPARATUS AND METHOD FOR DETECTING DIFFERENTLY SHAPED SURACES OF OBJECTS, Guenter H. Hatji, Owner of Record: *Inventor*, Attorney or Agent: Leo Stranger, Ex. Gp.: 255

#### REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee then-for established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**3,713,100**, Reexam. No. 90/002,099, Requested July 31, 1990, Cl. 382/34, METHOD AND APPARATUS FOR IDENTIFYING LETTERS, CHARACTERS, SYMBOLS AND THE LIKE, Harold S. Hemstreet, Owner of Record: *Inventor*, Wilton, Conn., Attorney or Agent: Edward Manzo, Ex. Gp.: 260, Requester: Davis, Hoxie, Faithful & Hapgood, New York, N. Y.

**4,697,972**, Reexam. No. 90/002,098, Requested July 30, 1990, Cl. 413/6, METHOD FOR SEAMING END CLOSURES TO A CONTAINER BODY, Lucien F. LeBret, et al., Owner of Record: *Gallay S.A.*, Paris, France, Attorney or Agent: Cooper & Dunham, Ex. Gp.: 320, Requester: Kane, Dalsimer, Sullivan, Kuracz, et al., New York, N. Y.

**4,720,292**, Reexam. No. 90/002,095, Requested July 23, 1990, Cl. 55/337, CYLINDRICAL AIR FILTER WITH LIGHT-WEIGHT HOUSING AND RADICALLY DIRECTED SEAL, Donald F. Engel, et al., Owner of Record: *Donaldson Co., Inc.*, Bloomington, Minn., Attorney or Agent: Merchant, Gould, Smith, Edell, Welter, et al., Ex. Gp.: 130, Requester: Owner

**4,727,470**, Reexam. No. 90/002,097, Requested July 27, 1990, Cl. 363/132, RESONANT INVERTER HAVING CREST FACTOR CONTROL, Ole K. Nilssen, Owner of Record: *Inven-*

*tor*, Barrington, Ill., Attorney or Agent: None, Ex. Gp.: 210, Requester: Paul F. Willie, Phoenix, Ariz.

**4,763,099**, Reexam. No. 90/002,096, Requested July 27, 1990, Cl. 338/22R, TEMPERATURE SENSITIVE DEVICE, Simon N. Balderson, Owner of Record: *Thorn EMI Plc.*, London, England, Attorney or Agent: Fleit, Jacobson, Cohn, Price, et al., Ex. Gp.: 210, Requester: Owner

**4,780,009**, Reexam. No. 90/002,094, Requested July 25, 1990, Cl. 400/118, STEAM GENERATOR TUBE SHEET AUTOMATIC STAMPING DEVICE, David L. Crick, Owner of Record: *Combustion Engineering*, Windsor, Conn., Attorney or Agent: Chilton, Alix & Van Kirk, Ex. Gp.: 330, Requester: Owner

**4,916,004**, Reexam. No. 90/002,100, Requested Aug. 1, 1990, Cl. 428/192, CEMENT BOARD HAVING REINFORCED EDGES, Robert P. Ensminger, et al., Owner of Record: *US Gypsum Co.*, Chicago, Ill., Attorney or Agent: Kirk M. Dikrick, Ex. Gp.: 150, Requester: Owner

#### Interferences—Preliminary Motions for Judgment

When a party files a preliminary motion for judgment [37 CFR § 1.633(a)] against an opponent in an interference on the ground that the claim(s) corresponding to a count are unpatentable over prior art, *and*, based upon the effective filing date(s) of the application(s)/patent(s) involved in the interference, the prior art would also be applicable to the moving party, the following will apply:

1. The mere filing of the motion will *not* be construed as an admission by the moving party [See Commissioner's Notice of May 23, 1990, 1115 Off. Gaz. Pat. Office 31 (June 19, 1990), discussing *Winkler v. Guglielmino*, Appeal No. 89-1571 (Fed. Cir. May 9, 1990) (unpublished)].

2. The Examiner-in-Chief (EIC) will determine (i) whether the date(s) of the cited prior art are such that it would on its face appear to apply to the moving party, *and* (ii) if so, whether the motion includes an explanation as to why the prior art would not be applicable to the movant. If the motion does not contain an explanation, the EIC will send a letter to the moving party. The letter must: (a) inform the movant that the prior art appears to be applicable against the movant; (b) set a time period to provide an explanation as to why the prior art does not apply to the movant; (c) state that unless a sufficient explanation (and evidence, if appropriate, e.g., Rule 132 affidavit) is filled within the time set, the movant will not be permitted to rely on any such explanation (and evidence) in response to or in any subsequent action in the interference.

3. If the movant provides no explanation, or an insufficient explanation, as to why the cited prior art would not apply to the movant, the EIC will determine whether or not the prior art cited in support of the motion renders the count (claims corresponding to the count) unpatentable to the moving party as well as each of the other parties. If the EIC concludes that the claims are unpatentable, the EIC will issue an Order to Show Cause under 37 CFR § 1.640 against *all* parties to whom the prior art is applicable without regard to the dates alleged in the preliminary statements.<sup>1</sup> Note that if the moving party expressly admits that the prior art renders his corresponding claims unpatentable, the EIC must still determine whether the corresponding claims of the other parties are unpatentable over that art.

4. In response to the Order to Show Cause, the parties have the options set forth in the Commissioner's Notice of December 8, 1986, 1074 Off. Gaz. Pat. Office 4 (January 6, 1987), and/or may move under 37 CFR § 1.651(c)(4) for a testimony period, if appropriate. However, the following should be noted:



A. If the party who filed the motion for judgment is under the Order to Show Cause, the party's showing and/or request for testimony in response to the Order may *not* be based upon any reasons which could have been, but were not, given in explanation of why the cited prior art would not apply to the party.

B. If the prior art is not a statutory bar to a party and the allegations in that party's preliminary statement, if proven, would antedate the effective date(s) of the prior art, an appropriate response to the Order to Show Cause would be a request to take testimony to antedate the prior art, as well as to prove priority of invention. *If applicable, this option may be specified in the Order to Show Cause.*

C. A request for a testimony period to remove the prior art based upon other reasons, e.g., inoperativeness of a reference, unexpected results, etc., must meet the criteria set forth in *Hanagan v. Kimura*, Interference No. 102,150 USPQ2d (Comm'r. Pat. Apr. 5, 1990) (LEXIS, Patcop library, Omni file).

D. Even assuming corroboration, the evidence necessary to antedate a reference is not necessarily the same as that required to prove priority of invention. *Cf. Anderson v. Norman*, 185 USPQ 371 (Comm'r Pat. 1968). Therefore, depending on the circumstances, a request to take priority testimony may not be adequate to cover taking testimony to antedate the reference, and vice versa.

August 10, 1990

SAUL SEROTA  
Chairman,  
Board of Patent  
Appeals and Interferences

*I. Goutzoulis v. Athale*, 15 USPQ2d 1461 (Comm'r Pat.) suggests that a preliminary statement might be considered to determine whether an Order to Show Cause should be issued. In view of the procedure outlined herein, that suggestion will not be followed.

#### Errata

"All reference to Patent No. 4,944,440 to Eugene J. Fortman of Minn. for 'DISPOSABLE DENTAL FLOSS CASSETTE DISPENSER SYSTEM' appearing in the Official Gazette of July 31, 1990 should be deleted since no patent was granted."

"All reference to Patent No. D. 309,668 to Jules Schneider of N. Y. for 'SHOE SOLE' appearing in the Official Gazette of August 7, 1990 should be deleted since no patent was granted."

#### Patents Available for Licensing or Sale

- 4,265,857 METHOD AND APPARATUS FOR MEASURING CYANIDE, Richard Lanyon, District of Greater Chicago, 100 E. Erie St., Chicago, Ill. 60611  
4,744,310 BALE TIE BLANKET, Hal Whisnant, 501 Manning Dr., Charlotte, N. C. 28209  
D.308,218 MUSICAL COMPOSER, Joseph R. Sinkler, Jr., C/O Waters, Morse & Harrington, P.C., 940 Calder Plaza Building, Grand Rapids, Mich. 49503  
4,951,615 FOUR-STROKE OSCILLATING PISTON INTERNAL COMBUSTION ENGINE, Nikolaos S. Pahiis, 8 Alpert Dr., Vernon, Conn. 06066  
07/362,590 CONSUMER COLOR REFERENCE, Joseph P. Burke, 4050 Benefield Dr., Kettering, Ohio 45429

#### U. S. DEPARTMENT OF COMMERCE

AGENCY: Patent and Trademark Office.

ACTION: Notice.

SUMMARY: In accordance with Section 10(a)(2) of the Federal Advisory Committee Act (Public Law 92-463), announcement is made of the open meeting of the Public Advisory Committee for Trademark Affairs.

DATE: The Public Advisory Committee for Trademark Affairs will meet from 10:00 a.m. until 4:00 p.m. on September 25, 1990, and from 9:30 a.m. until 12:00 p.m. on September 26, 1990.

PLACE: U. S. Patent and Trademark Office, 2121 Crystal Drive, Crystal Park 2, Room 912, Arlington, Virginia.

STATUS: The meeting will be open to public observation; seating will be available for the public on a first-come-first-served basis. Members of the public will be permitted to make oral comments of three(3) minutes each. Written comments and suggestions will be accepted before or after the meeting on any of the matters discussed. Copies of the minutes will be available upon request.

MATTERS TO BE CONSIDERED: The agenda for the first day of the meeting is as follows:

- (1) Finance
- (2) Automation
- (3) Strategic Planning
- (4) Current Trademark Office Practice Issues

The agenda for the second day of the meeting is as follows:

- (1) The Federal Advisory Committee Act
- (2) Ethics and Conflicts of Interest

CONTACT PERSON FOR MORE INFORMATION: For further information, contact Lynn Beresford, Office of the Assistant Commissioner for Trademarks, Room CPK2-910, Patent and Trademark Office, Washington, D.C. 20231. Telephone: (703) 557-7464.

HARRY F. MANBECK, Jr.  
Assistant Secretary and Commissioner  
of Patents and Trademarks

#### Service by Publication

A petition to cancel the registrations identified below having been filed, and the notice of such proceedings sent by registered mail to registrants at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Joan E. Springle, Tallahassee, Fla., Reg. No. 973,659, for the mark "LEARNING TO READ", Canc. No. 18,603.

Roman Cheese Products Ltd., Niagara Falls, Ontario, Canada, Reg. No. 644,262, for the mark "ROMAN" and design, Canc. No. 18,740.

Hoi Trung, Inc., Los Angeles, Calif., Reg. No. 1,293,700, for the mark "HOI TRUNG", Canc. No. 18,543.

JEAN BROWN  
Administrator, Trademark  
Trial and Appeal Board  
For JEFFERY M. SAMUELS  
Assistant Commissioner  
for Trademarks

## PATENT NOTICES

### Certificates of Correction For Week of September 11, 1990

B14,512,098	4,831,605	4,858,760	4,866,567
D. 300,452	4,833,028	4,858,777	4,866,898
Re. 32,305	4,833,221	4,859,360	4,867,609
3,781,329	4,834,798	4,859,589	4,867,888
4,313,843	4,834,920	4,859,684	4,867,975
4,383,085	4,835,194	4,859,690	4,868,167
4,444,194	4,835,316	4,859,779	4,868,467
4,451,366	4,835,618	4,860,281	4,868,495
4,702,112	4,837,052	4,860,738	4,869,458
4,716,093	4,838,165	4,860,976	4,869,594
4,716,819	4,840,240	4,861,074	4,869,600
4,721,867	4,841,952	4,861,417	4,870,309
4,748,167	4,844,445	4,861,433	4,870,532
4,750,177	4,846,596	4,861,546	4,870,638
4,757,026	4,848,823	4,861,569	4,870,667
4,761,414	4,848,905	4,861,814	4,871,013
4,761,426	4,850,581	4,861,828	4,871,178
4,763,530	4,851,527	4,861,878	4,871,256
4,773,430	4,851,707	4,861,879	4,871,307
4,775,719	4,851,903	4,861,892	4,871,808
4,780,013	4,852,084	4,861,963	4,872,066
4,785,938	4,852,809	4,862,290	4,872,089
4,791,492	4,854,302	4,862,357	4,872,151
4,792,525	4,854,387	4,862,861	4,872,912
4,803,087	4,855,187	4,862,947	4,873,591
4,804,639	4,855,202	4,863,043	4,874,016
4,806,309	4,855,762	4,864,840	4,875,015
4,806,977	4,855,765	4,865,230	4,875,026
4,808,724	4,855,777	4,865,282	4,877,290
4,817,386	4,856,053	4,865,610	4,879,745
4,818,899	4,857,350	4,865,705	4,880,450
4,820,797	4,857,400	4,865,809	4,880,650
4,821,306	4,857,758	4,865,868	4,884,671
4,824,218	4,857,821	4,866,056	4,916,013
4,830,053	4,857,909	4,866,060	4,919,528
4,830,214	4,857,914	4,866,081	4,924,238
4,830,239	4,858,721	4,866,414	4,936,587

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The following special boxes should be used only for their specified purpose. Address mail as follows:

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Washington, D.C. 20231

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Box 13	Mail for the Employee and Labor Relations Division.
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Box FWC	Requests for File Wrapper Continuation Applications.
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Box Issue Fee	All communications following the receipt of a PTOL-85, "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments are the exception. Assignments should be submitted in a separate envelope and not be sent to Box Issue.
Box ITU	All Intent to Use documents excluding the initial application and amendments to allege use.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non Fee	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection.)
Box OED	Mail for the Office of Enrollment and Discipline.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to Reexamination.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent application prior to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.
Box Assignments	All assignment documents except those filed in new patent applications.
Box SEQUENCE	All application papers, computer readable forms and fees related to applications containing nucleotide sequence and/or amino acid sequence disclosures in accordance with 37 CFR §§ 1.821 through 1.825.

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The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effective access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	Name of Library	Telephone Contact
Alabama	Auburn University Libraries .....	(205) 844-1747
	Birmingham Public Library .....	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library .....	(907) 261-2916
Arizona	Tempe: Noble Library, Arizona State University .....	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library .....	(501) 682-2053
California	Los Angeles Public Library .....	(213) 612-3273
	Sacramento: California State Library .....	(916) 322-4572
	San Diego Public Library .....	(619) 236-5813
	Sunnyvale Patent Clearinghouse .....	(408) 730-7290
Colorado	Denver Public Library .....	(303) 640-8847
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Dist. of Columbia	Washington: Howard University Libraries .....	(202) 636-5060
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	Miami-Dade Public Library .....	(305) 375-2665
	Orlando: University of Central Florida Libraries .....	(407) 275-2562
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Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology .....	(404) 894-4508
Hawaii	Honolulu: Hawaii State Public Library System .....	Not Yet Operational
Idaho	Moscow: University of Idaho Library .....	(208) 885-6235
Illinois	Chicago Public Library .....	(312) 269-2865
	Springfield: Illinois State Library .....	(217) 782-5659
Indiana	Indianapolis-Marion County Public Library .....	(317) 269-1741
Iowa	Des Moines: State Library of Iowa .....	(515) 281-4118
Kentucky	Louisville Free Public Library .....	(502) 561-8617
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Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan .....	(313) 764-7494
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	St. Louis Public Library .....	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library .....	(406) 496-4281
Nebraska	Lincoln: Engineering Library, University of Nebraska-Lincoln .....	(402) 472-3411
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New Jersey	Newark Public Library .....	(201) 733-7782
	Piscataway: Library of Science and Medicine, Rutgers University .....	(201) 932-2895
New Mexico	Albuquerque: University of New Mexico General Library .....	(505) 277-4412
New York	Albany: New York State Library .....	(518) 473-4636
	Buffalo and Erie County Public Library .....	(716) 858-7101
	New York Public Library (The Research Libraries) .....	(212) 714-8529
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North Dakota	Grand Forks: Chester Fritz Library, University of North Dakota .....	Not Yet Operational
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	Columbus: Ohio State University Libraries .....	(614) 292-6175
	Toledo/Lucas County Public Library .....	(419) 259-5212
Oklahoma	Stillwater: Oklahoma State University Library .....	(405) 744-7086
Oregon	Salem: Oregon State Library .....	(503) 378-4239
Pennsylvania	Philadelphia, The Free Library of .....	(215) 686-5331
	Pittsburgh, Carnegie Library of .....	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University .....	(814) 865-4861
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Texas	Austin: McKinney Engineering Library, University of Texas at Austin	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
	Richmond: James Branch Cabell Library, Virginia Commonwealth University	(804) 367-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

## PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner  
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner  
CONDITION OF PATENT APPLICATIONS AS OF July 28, 1990

## PATENT EXAMINING GROUPS

Actual Filing Date of Oldest  
New Case Awaiting Action

## CHEMICAL EXAMINING GROUPS

GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	7-7-87
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director	11-21-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP—130	
BARRY S. RICHMAN, Director	5-12-88
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	8-3-88
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-28-87

## ELECTRICAL EXAMINING GROUPS

INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director	8-15-88
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	3-8-88
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	12-22-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	8-29-88
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP—260	
STEWART LEVY, Acting Director	4-22-88
DESIGN, GROUP 290—ROBERT E. GARRETT, Director	1-21-87

## MECHANICAL EXAMINING GROUPS

HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	7-3-89
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	6-23-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	10-25-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	3-16-89
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	8-15-89

Expiration of patents: The patents within the range of numbers indicated below expire during July 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents	Numbers 3,742,517 to 3,750,191 inclusive
Plant Patents	3,370 to 3,384 inclusive

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## REEXAMINATIONS

SEPTEMBER 11, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

**B1 4,511,488 (1350th)**  
**D-LIMONENE BASED AQUEOUS CLEANING**  
**COMPOSITIONS**

Grant B. Matta, Dover, N.J., assignor to Penetone Corp., Tenafly, N.J.

Reexamination Request No. 90/001,808, Jul. 10, 1989.  
 Reexamination Certificate for Patent No. 4,511,488, issued Apr. 16, 1985, Ser. No. 558,040, Dec. 5, 1983.

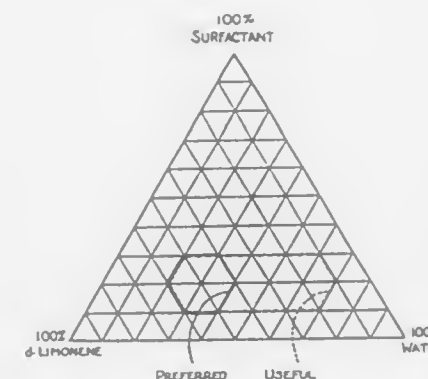
Int. Cl.<sup>3</sup> C11D 7/24, 3/18  
 U.S. Cl. 252—162

**B1 4,729,706 (1351st)**  
**FASTENER CLIP**

Francis C. Peterson, Woodbury, and Phillip D. Becker, Southbury, both of Conn., assignors to Buell Industries, Inc., Waterbury, Conn.

Reexamination Request No. 90/001,803, Jun. 28, 1989.  
 Reexamination Certificate for Patent No. 4,729,706, issued Mar. 8, 1988, Ser. No. 33,175, Apr. 1, 1987.

Reexamination Certificate B0 4,729,706, issued .  
 Int. Cl.<sup>3</sup> F16B 37/02, 37/04  
 U.S. Cl. 411—175

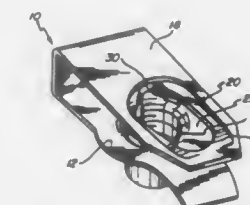


AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-17 is confirmed.

New claim 18 is added and determined to be patentable.

1. A d-limonene based liquid cleaning composition for cleaning hard or flexible substrates, said composition, per 100 parts by weight, comprising 78 to 96 parts by weight of a d-limonene/surfactant/water mixture containing by weight 10-60% stabilized d-limonene, 10-30% surfactant and 20-70% water, 2-10 parts of coupling agent, and 2-12 parts of additives adapting the composition to particular uses, said composition being characterized as being free of petroleum derived or chlorinated hydrocarbon solvents, as having a flash point not lower than 160° F. (C.O.C.), and as being a stable, flowable, clear, homogeneous liquid composition.



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1-6 are cancelled.

[1. In a fastener assembly of the type where a clip having two legs is adapted to be pushed onto an edge of a sheet material, said clip having a tongue formed on a first leg for frictionally engaging said sheet material and having on a second leg an internally threaded barrel, the improvement wherein said tongue comprises: a U-shaped elongated tongue formation, with an oblong aperture therein, attached to said first leg at two points at the tips of said U-shape.]

**B1 4,866,110 (1352nd)**  
**THERMOPLASTIC COMPOSITIONS RESIN MOLDED**  
**PRODUCT FOR VEHICLE LINING AND METHOD FOR**  
**MANUFACTURING THE SAME**

Chang Y. Lee, Busan, Rep. of Korea, assignor to Han Il E'wha, Seoul, Rep. of Korea

Reexamination Request No. 90/001,889, Nov. 9, 1989.  
 Reexamination Certificate for Patent No. 4,866,110, issued Sep. 12, 1989, Ser. No. 71,743, Jul. 9, 1987.

Claims priority, application Rep. of Korea, Jul. 9, 1986, 5524/1986

Int. Cl.<sup>3</sup> C08K 5/54, 3/34; C08L 35/00  
 U.S. Cl. 524—11

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-10 is confirmed.

[1. A thermoplastic composition for use in molding a vehicle lining or the like comprising a mixture of about 50 to about 60 weight percent of polypropylene, about 30 to about 35 weight percent wood flour, about 2 to about 3 weight percent defatted rice bran powder, about 2 to about 3 weight percent asbestos, about 1.7 to about 4.0 weight percent glass fiber and about 0.8 to about 1.2 weight percent calcined diatomaceous earth.]



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## REISSUES

SEPTEMBER 11, 1990

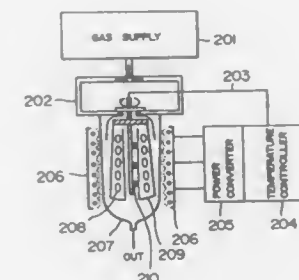
Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,326  
SEMICONDUCTOR VAPOR PHASE GROWING APPARATUS

Hitoshi Ebata, Mishima, and Shigetugu Matunaga, Gotenba, both of Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan  
Original No. 4,430,959, dated Feb. 14, 1984, Ser. No. 461,231, Jan. 26, 1983. Application for reissue Jun. 9, 1988, Ser. No. 204,364  
Claims priority, application Japan, Jan. 28, 1982, 57-11997  
Int. Cl.<sup>3</sup> B05C 11/00

U.S. Cl. 118—697

11 Claims



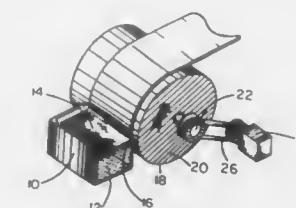
12. Semiconductor vapor growing apparatus comprising:  
a reaction furnace for vapor phase growing a semiconductor on a semiconductor substrate;  
heating means for heating said substrate;  
sources of various gases necessary for vapor phase growth;  
a pipeline network for interconnecting said reaction furnace and said source;  
valve means connected to said pipeline network for supplying predetermined quantities of said gases to said reaction furnace; and  
control means for supplying control signals to said valve means and said heating means,  
said control means including:  
at least one process program group, each said process program group comprising a plurality of process programs individually defining a series of process sequences of the process program group and constituting one complete cycle of vapor growth in said reaction furnace.  
a first memory means for storing the at least one process program group and having a memory region for storing process parameter information regarding the time and temperature in said reaction furnace, at least one gas used in said process sequence, and the flow rates thereof,  
key input means,  
display means for displaying in response to said key input means the contents of each of said process program,  
a system program comprising an instruction decoding program for decoding said process programs for producing said control signals and an instruction modifying program for modifying a process sequence defined by a particular process program in response to input signals from said key input means and  
a second memory means for storing the system program.

Re. 33,327  
MELT OVERFLOW SYSTEM FOR PRODUCING FILAMENTARY AND FILM PRODUCTS DIRECTLY FROM MOLTEN MATERIALS

Lloyd E. Hackman, Worthington, Ohio; James Dickson, Stirling, N.J.; David L. Dualap, Gahanna, and Mark E. Handshy, Columbus, both of Ohio, assignors to Ribbon Technology Corporation, Gahanna, Ohio  
Original No. 4,813,472, dated Mar. 21, 1989, Ser. No. 89,544, Aug. 26, 1987. Continuation-in-part of Ser. No. 819,474, Jan. 16, 1986, abandoned, which is a continuation of Ser. No. 561,309, Dec. 14, 1983, abandoned. Application for reissue Sep. 13, 1989, Ser. No. 406,590  
Int. Cl.<sup>3</sup> B22D 11/06

U.S. Cl. 164—463

7 Claims



1. An improved method for producing filaments from a molten material held in a receptacle, said method being the type wherein a layer of the molten material is solidified on a heat extracting substrate by moving a surface of the substrate past a region of contact with the molten material, cooling the molten material and removing it from the substrate, wherein the improvement comprises:

- forming adjacent helical ridges surrounding the outer surface of a symmetrical, heat extracting substrate;
- forming an opening through a side wall of the receptacle, the opening extending from above the level of the free surface of the molten material in the receptacle downwardly to a lower edge at the bottom of the opening;
- positioning the heat extracting substrate laterally disposed of the receptacle and adjacent the edge;
- raising the level of the free surface of the molten material in the receptacle above the edge of said opening to cause the molten material to overflow over said edge and against the substrate to form a melt front at the interface of the molten material and the substrate, the level of the free surface being maintained sufficiently above the edge that the melt front interfacing against the substrate extends downwardly from the free surface of the molten material farther than the root depth of the ridges on the substrate and sufficiently far that the molten material cannot form and hold a meniscus by surface tension between the edge and the level of the free surface, but instead is confined by the substrate; the height of the molten material overflow being greater than the height of the molten material which can be maintained at the lip by surface tension so that the molten material would flow into the root of the ridges if the substrate were stationary; and
- rotating the substrate to move the substrate surface past the melt front and migrating the helical ridges substantially horizontally across the melt front to prevent the molten material from filling into the bottom of the valleys between the helical ridges, the migration being effected by the rotating of the substrate and the resulting wave like migration of the ridges along the edge.

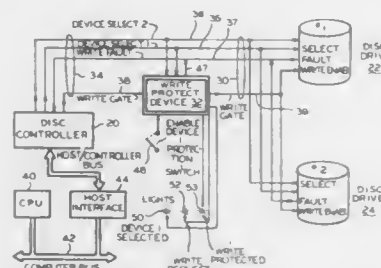
3. An apparatus for producing filament or fiber from a molten material, the apparatus comprising:

- (a) a receptacle for containing a pool of molten material at a selected horizontal level for the free surface of the pool, the receptacle having an opening extending from above the free surface level to a bottom edge of the opening, the bottom edge being sufficiently below the free surface level that the molten material cannot form and hold a meniscus by surface tension between the edge and the level of the free surface;
- (b) a heat extracting substrate laterally disposed with respect to the receptacle, the substrate having adjacent helical ridges which have a pitch ranging from about two times as many ridges per longitudinal inch than is possible with ridges in melt extraction to a pitch of about 40 ridges per inch, the ridges formed about a generally horizontal axis on the outer surface of a symmetrical, heat extracting substrate which is positioned adjacent the edge and the opening for confining the molten material and preventing it from overflowing downwardly out of the receptacle, the substrate also spaced from the edge and mounted to be contacted by the overflowed molten material substantially at the level of the upper surface of the molten material, the positioning of the substrate relative to the edge further being sufficiently high to make fiber and filaments and not ribbon or sheet; and
- (c) drive means drivingly connected to the substrate for continuously moving the surface of the substrate upwardly past the edge and past a melt front formed at the interface of the molten material and the substrate surface, and for moving the helical ridges in a substantially horizontal migration along the edge to prevent the molten material from filling into the bottom of the valleys between the helical ridges, the migration being effected by the rotation of the substrate and the resulting wave-like migration of the ridges along the edge.

Re. 33,328  
WRITE PROTECT CONTROL CIRCUIT FOR COMPUTER  
HARD DISC SYSTEMS

Dennis Director, 2720 Hawthorne La., Wilmette, Ill. 60091  
Original No. 4,734,851, dated Mar. 29, 1988, Ser. No. 723,880,  
Apr. 17, 1985. Application for reissue Feb. 2, 1989, Ser. No.  
305,851

Int. Cl.<sup>5</sup> G06F 13/12  
U.S. Cl. 364—200



1. A write protect system comprising:  
a computer having at least one memory means, said memory means including a hard disc drive,  
a controller coupled to said hard disc drive by at least one information transfer bus and at least one control data bus, means for selecting said hard disc drive for operation by sending a signal from said controller to said hard disc drive on a first wire in said control data bus,  
means for enabling said hard disc drive to erase data in said hard disc drive by sending a signal from said controller to said hard disc drive on a second wire in said control data bus,  
circuit means coupled to said control data bus for monitoring signals transmitted on said first wire in said control data bus,  
guard means for selectively interrupting the signal from said

enabling means on the second wire to prevent said hard [disk] drive from being enabled to erase data thereby preventing data from being [accidentally] accidentally erased from said hard disc [drive] drives, said guard means including a plurality of logic devices, at least one of said logic devices having an output coupled to said hard disc drive and at least one of said logic devices having an input coupled to said enabling means by connection to said second wire, and a manual switch coupled to said logic devices for controlling the logic states of said logic devices to enable gating of the signal from the enabling means responsive to the manual switch, whereby data cannot be erased from said hard disc drive when said manual switch is in a selected write protect state.

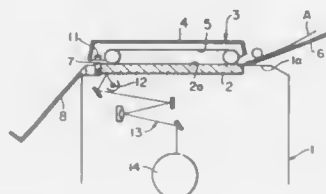
Re. 33,329  
AUTOMATIC FEEDING DEVICE FOR COPYING  
MACHINES

Shoichi Ishii, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Original No. 4,334,674, dated Jun. 15, 1982, Ser. No. 181,557,  
Aug. 27, 1980. Application for reissue Feb. 21, 1984, Ser. No.  
525,775

Claims priority, application Japan, Sep. 11, 1979, 54-115721  
Int. Cl.<sup>5</sup> B65H 9/04

U.S. Cl. 271—245 14 Claims



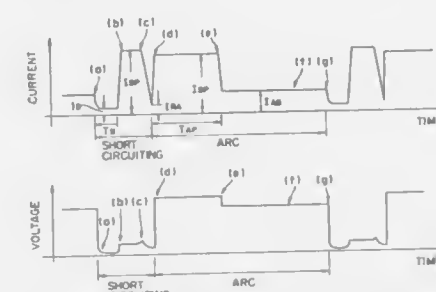
1. A registration device for an automatic feeding device for original documents comprising: an elongated registration member disposed adjacent one edge of a platen member for supporting an original document in a copying position, a leading edge of said original document abutting an upper portion of said registration member in said copying position, said registration member comprising a permanent magnet extending substantially the length thereof; guide means disposed along at least one edge of said registration member wherein said registration member is movable between an upper position with said upper portion extending above the upper edge of said platen and a lower position below said upper surface of said platen; spring means for biasing said registration member toward said upper position; cover means disposed above said platen and registration member; and electromagnet means, said electromagnet means extending substantially the length of said registration member, said electromagnet means producing a magnetic field in response to an exciting signal applied thereto for urging said registration member to move to a position below said upper surface of said platen.

5. A registration device for an automatic feeding device for original documents comprising: a registration member disposed adjacent one edge of a platen member for registering an original document in a copying position with one edge of an original document abutting an upper portion of said registration member, wherein said registration member is movable between an upper position with said upper portion extending above the upper surface of said platen and a lower position not extending above said upper surface of said platen; biasing means for biasing said registration member toward said upper position; cover means disposable above said platen and said registration member; and magnetic means in said cover means for urging said registration member into said lower position.

Re. 33,330  
OUTPUT CONTROL OF SHORT CIRCUIT WELDING  
POWER SOURCE

Takaaki Ogasawara; Tokuji Maruyama, both of Yokohama;  
Masaharu Sato, Kanagawa; Yukio Hida, Kanagawa, and  
Takashi Saito, Kanagawa, all of Japan, assignors to Kabushiki  
Kaisha Kobe Seiko Sho, Kobe, Japan  
Original No. 4,546,234, dated Oct. 8, 1985, Ser. No. 596,686,  
Apr. 4, 1984. Application for reissue Aug. 13, 1986, Ser. No.  
896,104

Int. Cl.<sup>5</sup> B23K 9/09  
U.S. Cl. 219—137 PS 14 Claims



1. A method for controlling the output of a power source in consumable electrode arc welding in which a short circuiting phase and an arcing phase alternately take place between a consumable electrode and a workpiece in a shielding gas atmosphere, which comprises:

- a first stage of maintaining the output welding current at a first value at a relatively low level upon establishment of a short circuit across a gap between said consumable electrode and said workpiece;  
a second stage of maintaining the welding current at a second value at a relatively high level subsequent to the first stage;  
a third stage of lowering the welding current to a third value at a low level upon detection of necking as a premonition of rupture of short circuiting molten metal between said electrode and said workpiece;  
a fourth stage of, upon generation of an arc across said gap between said electrode and workpiece subsequent to the third stage, maintaining the welding current at a fourth value at a relatively high level exceeding the value of average welding current and controlling the [duration] value of said high level current as a function of the feed rate of said consumable electrode; and  
a fifth stage of maintaining the welding current at a fifth value at a relatively low level until said gap between said electrode and workpiece is short-circuited, under control of substantially constant current characteristics so as to feed current of a constant level irrespective of variations in arc length.

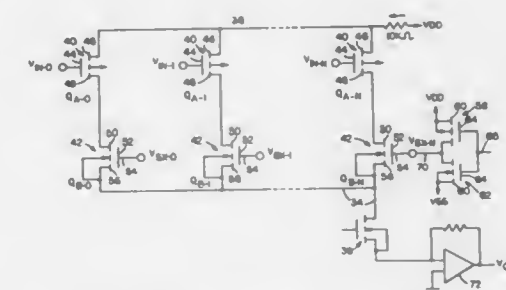
Re. 33,331  
MULTIPLEXER CIRCUITRY FOR HIGH DENSITY  
ANALOG SIGNALS

Randolph S. Carlson, Carson City, Nev., assignor to Irvine  
Sensors Corporation, Costa Mesa, Calif.  
Original No. 4,490,626, dated Dec. 25, 1984, Ser. No. 403,004,  
Jul. 29, 1982. Application for reissue Apr. 10, 1989, Ser. No.  
336,017

Int. Cl.<sup>5</sup> H03K 17/687  
U.S. Cl. 307—243 20 Claims

1. A multiplexer, for use with an array of independent analog voltage signal sources, comprising:  
a plurality of separate signal-carrying branches, each having an input from a different analog voltage signal source, and all connected to a common output line which carries multiplexed current signals, said branches being coupled in

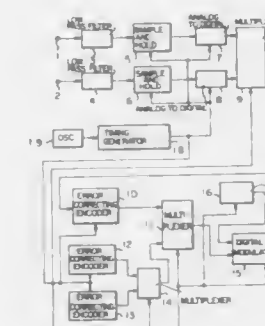
parallel between a reference terminal and the common output line;  
each branch including an amplifier which causes a high power gain of its analog voltage input when enabled, but which has substantially no power dissipation when disabled, and a respective actuating means for enabling or disabling the individual branch;



the amplifier in each branch being an insulated gate field effect transistor which receives the voltage input signal on its gate and outputs an analog signal as its source-to-drain current when its respective branch is enabled by its actuating means; and  
sequencing means for causing each actuating means to enable its respective branch only when all the others in the multiplexer are disabled.

Re. 33,332  
APPARATUS FOR CORRECTING ERRORS  
Tsuneo Furuya, Yokohama, and Katsuya Hori, Kawasaki, both  
of Japan, assignors to Sony Corporation, Tokyo, Japan  
Original No. 4,644,544, dated Feb. 17, 1987, Ser. No. 672,267,  
Mar. 12, 1984. Application for reissue Nov. 14, 1988, Ser. No.  
270,051

Int. Cl.<sup>5</sup> G06F 11/10  
U.S. Cl. 371—37.4 8 Claims



1. An apparatus for correcting errors in data which has, as a unit,  $(n+k+m+1)$  symbols subjected to processing for error correction coding when data consisting of  $n$  symbols and  $m$  symbols having different kinds of information and 1 parity symbols is transmitted as a unit, said processing consisting of an encoding process with respect to a first error detection code or an error correction code for generating a redundancy code of  $k$  symbols regarding said  $n$  symbols, and an encoding process with respect to a second error correction code for generating a redundancy code of  $[one symbol] 1$  symbols regarding  $(n+k+m)$  symbols, wherein said error correcting apparatus comprising:  
a first decoder with respect to said first error detection code or said error correction code to which said redundancy code of  $(n+k)$  symbols is supplied and which generates a first flag signal indicative of the error state by at least



performing the error detection wherein said first flag signal is the signal indicating the number (including 0) of error symbols with respect to the  $(n+k)$  symbols; and a second [decoder] decoder with respect to said second error correction code to which  $(n+k)$  symbols corrected by said first decoder and  $(m+1)$  symbols received are supplied and which generates a second flag signal representing the error state by performing the error detection, wherein said second flag signal is the signal representing the number (including 0) of error symbols before the error correction by said second decoder with respect to the  $(n+k+m+1)$  symbols, and performs the error correction by comparing said first and second flag signals and the error correction processing by said second decoder is controlled in accordance with the result of said comparison.

6. An error correcting apparatus according to claim 1, wherein 1 equals four parity symbols.

Re. 33,333

# DIGITAL AUDIO AMPLIFIER HAVING A HIGH POWER OUTPUT LEVEL AND LOW DISTORTION

Wilson E. Taylor, Jr., and Larry E. Hand, both of Meridian, Miss., assignors to Peavey Electronics Corporation, Meridian, Miss.

Original No. 4,600,891, dated Jul. 15, 1986, Ser. No. 643,315, Aug. 21, 1984. Application for reissue Mar. 11, 1988, Ser. No. 211,217

Int. Cl.<sup>5</sup> H03F 3/38

U.S. Cl. 330—10

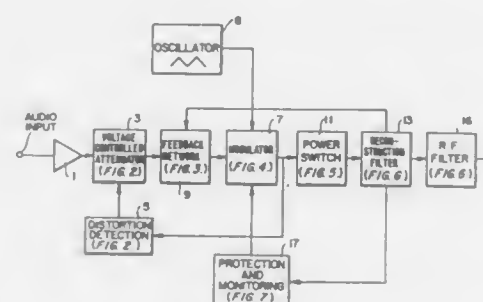
41 Claims

36. A digital energy conversion audio amplifier, comprising: a feedback network responsive to an analog signal to be amplified;

a modulator responsive to said analog signal for converting said analog signals to pulse width-modulated trains of pulses and

including first and second switching devices coupled together in a non-saturating common terminal differential amplifier configuration and responsive to said analog signals and a serrated waveform controlling the pulse width modulation of said analog signals, and power amplifier means for amplifying said pulse width-modulated trains of pulses;

reconstruction filter means responsive to the amplified trains of pulses for recovering the analog signals;



means for coupling a signal from said reconstruction filter means to said feedback network to eliminate closed loop distortion; and

further comprising voltage controlled attenuator means responsive to an analog signal to be amplified and providing an analog output representative thereof and distortion detection means responsive to the pulse width-modulated trains of pulses to detect pulses missing therefrom and controlling said voltage controlled attenuator to attenuate the analog signal to be amplified.

## PLANT PATENTS

GRANTED SEPTEMBER 11, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,319

### ROSE PLANT MACMINMO

Sam McGredy, Auckland, New Zealand, assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Feb. 17, 1989, Ser. No. 312,963

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—1

1. A new and distinct variety of rose plant of the Shrub class substantially as herein shown and described, characterized particularly as to novelty by the unique combination of red and white striped flowers, glossy green foliage, arching habit of growth and above average disease resistance.

7,322

### VARIETY OF GERANIUM NAMED JUDY

Douglas Holden, Solvang, Calif., assignor to Bodger Seeds, Ltd., El Monte, Calif.

Filed Apr. 28, 1989, Ser. No. 346,136

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—68

1. A new and distinct variety of geranium plant substantially as herein shown and described and characterized by its floriferousness, light salmon color, compact habit, lateral and procumbent growth habit, heat tolerance, better cutting producer when compared to other ivy Geranium varieties, full growth and dark zoning.

7,323

### AFRICAN VIOLET PLANT NAMED LITTLE MOONSTONE

Reinhold Holtkamp, Sr., Blumenstrasse 28, D 4242 Rees-Haffen, Fed. Rep. of Germany

Filed Jun. 8, 1989, Ser. No. 363,465

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—69

1. A new and distinct cultivar of African violet named Little Moonstone, as described and illustrated, and particularly characterized by its miniature growth habit; double white flowers with light blue touch in the center, strong stems which curve toward the center to form a compact bouquet above the leaves; profuse and continuous flowering; bright green, serrated, round leaves; flowering 10–11 weeks after planting of unrooted shoot, and by its long lasting and non-dropping flowers.

7,320

### CHERRY TREE 'CRAIG'S CRIMSON'

Chris F. Zaiger, 537 Rosemore Ave., Leith M. Gardner, 1207 Grimes Ave., Gary N. Zaiger, 1907 Elm Ave., and Grant G. Zaiger, 2121 Elm Ave., all of Modesto, Calif. 95351

Filed Aug. 28, 1989, Ser. No. 401,661

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—37

1. A new and distinct variety of cherry tree, substantially as illustrated and described, characterized by its semi-dwarf size, 10 to 14 feet at maturity, its semi-spreading growth, self fertility and being a regular and productive bearer of medium to large size fruit with an attractive dark red skin color and having good flavor and eating quality.

7,324

### CHRYSANTHEMUM PLANT NAMED ORINDA

Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Apr. 13, 1989, Ser. No. 337,463

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—74

1. A new and distinct Chrysanthemum plant named Orinda, as described and illustrated.

7,321

### VARIETY OF GERANIUM NAMED GRACE

Douglas Holden, Solvang, Calif., assignor to Bodger Seeds, Ltd., El Monte, Calif.

Filed Apr. 28, 1989, Ser. No. 345,626

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—68

1. A new and distinct variety of Geranium plant substantially as herein shown and described and characterized by lateral and procumbent mound and cascading growth habit, compactness, the presence of zoning, the pale pink inflorescence, the use of either hanging basket or ground bed, its heat tolerance, and a much better cutting producer when compared with available ivy geranium varieties.

7,325

### CHRYSANTHEMUM PLANT NAMED DAVIS

Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Aug. 2, 1989, Ser. No. 388,894

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—74

1. A new and distinct Chrysanthemum plant named Davis, as described and illustrated.

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## PATENTS

GRANTED SEP. 11, 1990

### ERRATA

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## PATENTS

GRANTED SEPTEMBER 11, 1990

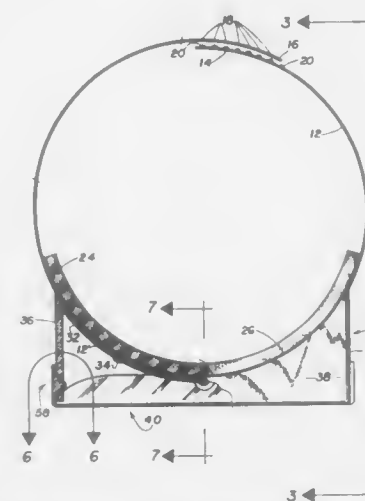
## GENERAL AND MECHANICAL

4,955,087

**COMBINED VISOR AND SUNGLASSES ASSEMBLY**  
 Richard Perez, 11201 SW. 55 St., Miramar, Fla. 33025, and Jose  
 F. Delda, 381 W. 14 St., Hialeah, Fla. 33010  
 Filed Sep. 15, 1988, Ser. No. 244,838  
 Int. Cl.<sup>5</sup> A61F 9/00

U.S. Cl. 2-12

15 Claims



1. A combination sun visor and sunglasses assembly designed to be worn on the head of a person, said assembly comprising:
  - a. a mounting means structured for removable attachment in surrounding relation to a head of a wearer,
  - b. a bracket structure secured to a front portion of the mounting means and disposed above the eyes of the wearer,
  - c. a lens structure having an elongated configuration terminating at two opposite ends and formed of a darkened, transparent material and pivotally mounted on a leading portion of the bracket structure and selectively positionable between a viewing position and a shading position,
  - d. said viewing position defined by substantially depending, transverse relation of said lens structure to said mounting means and an overlying disposition to the eyes of the wearer, whereby the wearer views through said lens structure,
  - e. said shading position defined by an outwardly disposed substantially aligned and continuing extension of said lens structure with said mounting means, said shading position of said lens structure being disposed above and in shading relation to the eyes of the wearer,
  - f. positioning means mounted in part on both said bracket structure and said lens structure and configured to removably maintain the lens structure in either said viewing position or said shading position, and
  - g. said positioning means being disposed in part on each of said two opposite ends of said lens structure and in mating engagement with a remainder of said positioning means mounted on a correspondingly positioned opposite side of said bracket structure and in registry therewith.

4,955,088

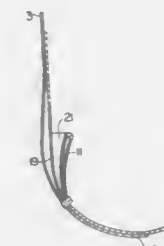
**UNDERWEAR STRUCTURE**  
 John W. Terjesen, Rte. 1, Box 261A, Brevard, N.C. 28712  
 Filed Feb. 6, 1989, Ser. No. 306,048  
 Int. Cl.<sup>5</sup> A41B 9/02

U.S. Cl. 2-403

3 Claims

1. In a man's support type undergarment having a front panel, a waistband at the top of the garment, thigh encircling

leg portions at the bottom of the garment and a crotch portion between said leg portions, the improvement comprising:  
 a generally rectangular section of fabric stitched behind said front panel along said leg portions and across the bottom thereof above said crotch portion with a top of said rect-



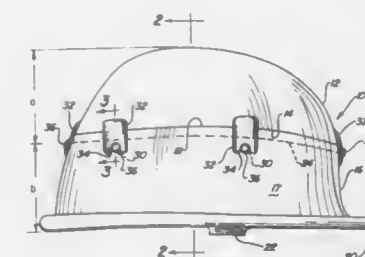
angular section being unstitched to the undergarment and defining a ledge extending between said leg portion and above said crotch whereby the male sex organ is rested upon said ledge and generally isolated from the remaining interior of the undergarment.

4,955,089

**TWO-PIECE HARD HAT**  
 Jeremy H. Beale, 8084 Beacon La., Northville, Mich. 48167,  
 assignor to Jeremy H. Beale, Northville, Mich.  
 Filed Feb. 13, 1989, Ser. No. 309,168  
 Int. Cl.<sup>5</sup> A42B 3/32

U.S. Cl. 2-410

3 Claims

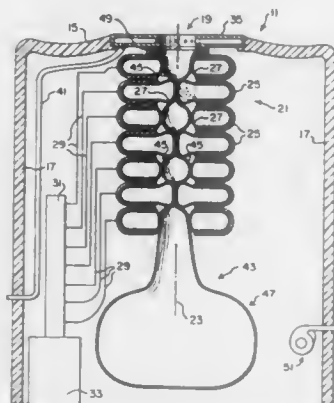


1. A protective hard hat assembly comprising:
  - an upper crown member being generally dome shaped and having a generally annular periphery;
  - a lower ring skirt member having a generally upright wall portion with an upper end of a shape and size corresponding to the periphery of said crown member and a lower end forming a brim; and
  - means for detachably securing said crown member to said skirt member with the periphery of said crown member engaging the upper end of said skirt member to form said hard hat assembly, said securing means includes coacting means on said crown member periphery and said skirt member upper end forming a tongue and groove joint between said crown member and said skirt member, said crown and skirt members secured to one another at a location approximately midway of the vertical height of said hard hat assembly such that when detached, the height of each member is approximately half the height of the assembled hard hat, and
  - a sealing ring disposed in the bottom of said groove and



sealing the connection between said upper and lower members to prevent liquid from leaking into said hard hat.

4,955,090  
**ZERO GRAVITY TOILET**  
 Alexander Stefan, 216 E. Arby Ave., Las Vegas, Nev. 89119  
 Filed Nov. 13, 1989, Ser. No. 436,314  
 Int. Cl.<sup>5</sup> B64D 11/02  
 U.S. Cl. 4—316

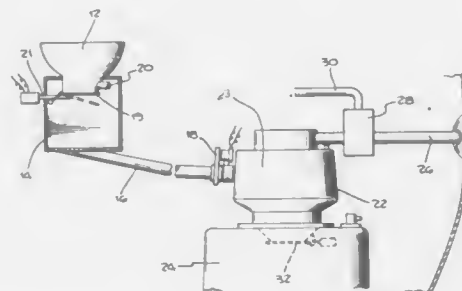


1. Toilet for use in zero gravity conditions, comprising:
- a support housing including an upper wall with a central opening therein adapted to receive therethrough solid and liquid waste material;
  - a flexible bag adapted for receiving and holding said waste material, the walls of said bag being permeable to gases and impermeable to solid and liquid waste material and having an open end that is releasably mounted about the inside periphery of said central opening, and said bag having an elongated neck portion and a lower portion adapted for receiving and collecting said waste materials;
  - a plurality of toroidal-shaped elements in a closely stacked, coaxial array and extending from a position adjacent said central opening and perpendicularly into said housing, the central portion of said array embracing the neck portion of said bag, each of said toroidal elements having a radially inner portion that is radially extendable and contractible, said inner portion having a contracted position in which it defines an opening and being pneumatically extendable to close said opening;
  - means, in pneumatic communication with each of said toroidal elements for inflating and deflating said inner portions, so as to radially extend and contract said portions;
  - means for generating a relative negative air pressure about the exterior of said bag, so that a flow of air is generated to flow in the bag opening and out of said bag by way of its gas-permeable walls;
  - liquid spray means including spray manifold mounted adjacent said central opening with a plurality of jets aligned about the periphery of said opening for spraying liquid inwardly; and
  - control means for said inflating and deflating means, whereby said elements compress and release adjacent annular portions of said bag neck portion, according to a pre-determined sequence by which a peristaltic-like wave is generated across said neck portion in an axially inward direction.

4,955,091  
**METHOD AND APPARATUS FOR A VACUUM ASSISTED TOILET SYSTEM**  
 Lawrence M. Grills, Vlejo, and Eugene F. Colditz, Huntington Beach, both of Calif., assignors to Kaiser Aerospace and Electronics Corporation, Foster City, Calif.  
 Filed Aug. 12, 1988, Ser. No. 231,445  
 Int. Cl.<sup>5</sup> E03D 1/00

U.S. Cl. 4—321

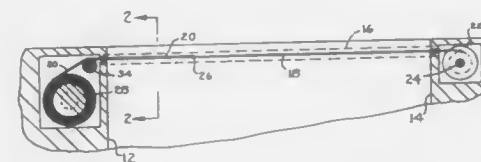
9 Claims



1. A vacuum assisted, non-recirculating toilet system adapted for use with a source of flushing liquid comprising in combination:
- a bowl for receiving waste matter wherein said bowl has a curved interior surface and includes:
    - a first exit port at the bottom of said bowl;
    - a gravity operated flapper valve coupling said bowl to said interim holding tank;
    - locking means for disabling said flapper valve in the closed position;
    - a second exit port adjacent said first exit port but extending substantially tangentially to said curved interior surface for introducing waste matter into said interim holding tank with tangential velocity when assisted by a vacuum;
  - an interim holding tank coupled to said bowl for temporarily storing flushed waste matter;
  - vacuum assisted separator means;
  - waste drain means coupling said interim holding tank to said separator means for conveying waste matter thereto;
  - a main waste tank coupled to said separator means and adapted to receive waste matter therefrom whenever said waste tank and said separator means are at pressure equilibrium;
  - pressure resistant shut off valve means interposed in said waste drain means between said interim holding tank and said separator means;
  - flushing means coupled to the source of flushing liquid for applying a predetermined limited amount of flushing liquid to said bowl for transferring any waste matter to said interim holding tank; and
  - means adapted to be connected to the external environment for creating a partial vacuum in said separator means whenever the exterior environmental air pressure is substantially lower than the air pressure in the vicinity of said bowl,
- whereby opening said shut off valve means permits waste matter accumulated in said waste drain means and said interim holding tank to flow therethrough under a pressure differential from said holding tank to said separator means, and whereby said locking means are employed whenever a vacuum assist is used to transfer waste matter from said bowl so that the waste matter acquires sufficient velocity to resist dispersion in directions lateral to the direction of flow.

4,955,092  
**SWIMMING POOL COVER**  
 Thomas F. Hagan, 85-66 - 6th Ave., Rego Park, N.Y. 11374  
 Filed Nov. 16, 1989, Ser. No. 437,111  
 Int. Cl.<sup>5</sup> E04H 3/19  
 U.S. Cl. 4—502

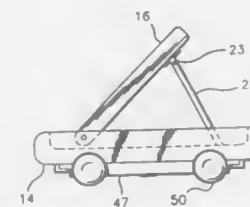
2 Claims



1. A flexible cover structure for a swimming pool comprising two parallel horizontal tracks extending along opposite sides of a swimming pool; a flexible cable running within each track; a flexible cover extending across the space between the cables; a rotary drum at one end of the pool; two spaced pulleys at the other end of the pool; said cables extending within the tracks and around the pulleys; said flexible cover having one end thereof wrapped around the drum, and the other end thereof movable between opposite ends of the pool, a first cover-opener motor at said one end of the pool for operating said drum, and a second cover-closer motor at the other end of the pool for operating the spaced pulleys, a safety device incorporated into said other end of the flexible cover comprising an electrical carrying cable extending across said other end and carrying an electrical current not harmful to humans, for responding to physical engagement between a person or object and said other end of the cover when said second motor is in the process of closing the cover, said safety device including appropriate circuitry to convey said current to said cable and to respond to said engagement by stopping said second motor and starting said first motor.

4,955,093  
**COMBINATION BATH TUB SHELF AND BENCH**  
 Lorraine J. Klassen, 2430 Vineyard, Escondido, Calif. 92025  
 Filed Jul. 13, 1988, Ser. No. 218,580  
 Int. Cl.<sup>5</sup> A47K 3/022  
 U.S. Cl. 4—579

3 Claims



1. A combination bathtub shelf and bench comprising:
- an elongated shelf member having a front edge, a rear edge and laterally spaced side edges, said shelf member having a flat top surface, a flat bottom surface and a predetermined length that spans the width of a bathtub;
  - a raised lip structure formed integrally with said shelf member and it extends upwardly from the top surface of said shelf member around its entire perimeter;
  - a reading easel having a front edge, a rear edge and laterally spaced side edges, said reading easel also having a top surface and a bottom surface;
  - the top surface of said shelf member has a recess formed therein in the configuration of said reading easel so that in its stored position the top surface of said easel is flush with the top surface of said shelf member;
  - a hinge member pivotally securing the front edge of said reading easel to the top surface of said shelf member

adjacent its front edge, said hinge member being located in the recess that receives said reading easel;

a support leg having its top end pivotally hinged to the rear surface of said reading easel;

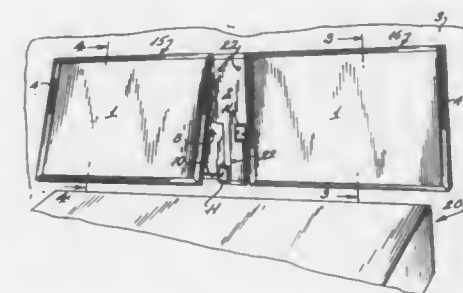
means cooperating with a bottom end of said support leg for securing said reading easel at various angles of inclination to the top surface of said shelf member;

means on the bottom surface of said shelf member for detachably securing said combination bathtub shelf and bench to the lateral side walls of a bathtub so that said shelf will not slide longitudinally along the length of the bathtub, said means comprising two position securing assemblies, one position securing assembly is mounted adjacent one side edge of said shelf member and the other position securing assembly is mounted adjacent the other side edge of said shelf member, two pairs of laterally spaced L-shaped side tracks are mounted on the bottom surface of said shelf member adjacent its respective side edges and they slidably receive said respective position securing assemblies, said position securing assemblies each being formed of a spacer bar having a slide tab extending laterally from its respective ends that slide in said respective pairs of L-shaped side tracks; and

means on the bottom surface of said shelf member for structurally reinforcing said shelf so that it may function as a bench on which a person can sit in a bathtub while bathing, said reinforcing means comprising an integrally formed grid like reinforcing frame having a front wall, a rear wall, laterally spaced end walls and a pair of diagonally extending intersecting gussets.

4,955,094  
**HEAD-BOARD RECLINER USING THE ONLY ONE HINGE**  
 Peirce J. Mullaly, 28871 Hogan, San City, Calif. 92381  
 Filed Dec. 12, 1988, Ser. No. 282,605  
 Int. Cl.<sup>5</sup> A47C 20/00  
 U.S. Cl. 5—433

4 Claims



1. A headboard recliner for use with a bed, said recliner including:
- a mounting board having upper and lower ends and with means for securing to a supporting structure;
  - an adjustable recliner means having upper and lower ends;
  - a first hinge means interconnecting the upper end of said mounting board and the upper end of said adjustable recliner means;
  - a leg means attached to the lower end of said recliner means by a second hinge at one end;
  - a sliding pad with a slotted guide means mounted to the lower end of said mounting board and receiving the other end of leg means;
  - said leg means being adjustably moveable within said slotted guide means to thereby allow pivoting of said recliner relative to said mounting board from first substantially vertical position wherein the leg is at an upper end of said slot, to a second inclined position wherein the leg is at the lower end of said slot.

4,955,095

## REMOVABLE PILLOW TOP FOR MATTRESS

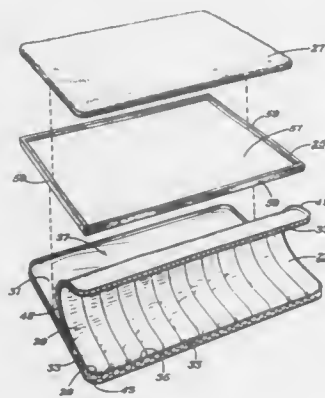
Jack M. Gerrick, Fort Worth, Tex., assignor to International Bedding Corporation, Fort Lauderdale, Fla.

Filed Mar. 3, 1989, Ser. No. 318,650

Int. Cl.<sup>5</sup> A47C 20/02

U.S. Cl. 5-446

15 Claims



1. A pillow top device for use with a bed mattress, comprising:

- (a) a cover having first and second walls positioned adjacent to each other so as to be generally parallel, said first and second walls having edges which are coupled together so as to form an interior space between said first and second walls, said cover having an opening that allows access from said interior space from the exterior of said cover, said cover having means for opening and closing said opening;
- (b) cushion means for providing a cushion, said cushion means being locatable in said interior space via said opening, wherein said closure means allows the removal of said cushion means;
- (c) support means for providing support of said cover and said cushion means, said support means having a bottom wall and side walls coupled to the edges of said bottom wall, said side walls extending transversely from said bottom wall so as to form a shallow cavity, said cushion means being received by said shallow cavity, said support means being locatable in said cover interior space via said opening such that said bottom wall is interposed between said cushion means and one of said walls of said cover and such that said cushion means is surrounded by said support member side walls;
- (d) fastener means adapted for removably fastening said cover to a bed mattress, said fastener means being on the exterior of said second wall.

4,955,096

## ANATOMICALLY CONTOURED CONVULATED FOAM PAD

Keith Gilroy, Upland; Gary T. Limon, San Dimas, and David F. Bachicchio, Glendora, all of Calif., assignors to Bio Clinic Corporation, Rancho Cucamonga, Calif.

Filed Jun. 28, 1989, Ser. No. 372,911

Int. Cl.<sup>5</sup> A47C 27/14

U.S. Cl. 5-464

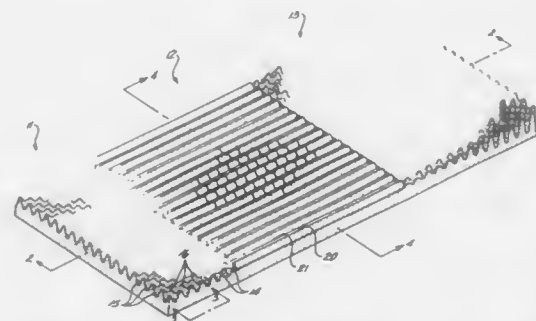
10 Claims

1. An anatomically contoured pad of a size sufficient for a human body on a bed, pad being el between two pad ends and having a and lower surface, the upper surface comprising:

- a head supporting section, and a foot and leg supporting section, each adjacent to one of the two pad ends and each having a convoluted supporting surface of adjacent rows of peaks separated by depressions, the rows of peaks extending transversely across the width of each section and longitudinally along the length of each section with alternate rows of peaks being staggered in both the transverse

and longitudinal directions to form a checkerboard pattern; and

a torso supporting section intermediate the head and foot supporting sections comprising a ribbed convoluted supporting surface having substantially continuous and parallel ribs separated by substantially continuous and parallel valleys extending longitudinally between the head and foot supporting sections, and a plurality of slits in said



ribbed convoluted supporting surface wherein the slits are perpendicular to the ribs, with the depth of the center slit being greatest and the relative depth of each of the remaining slits being progressively shallower towards the head and foot ends of the pad and with the depth of each slit being greatest for that portion of the slit in the center portion of the pad and the depth of each slit being progressively shallower towards the edges of the pad.

4,955,097

## BELT BUCKLE WRENCH

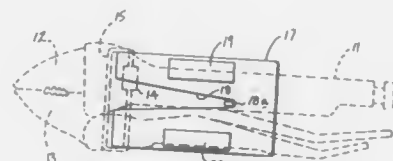
Thomas C. Roderer, 308 Washington Ave., Downingtown, Pa. 19335

Filed Nov. 6, 1989, Ser. No. 432,372

Int. Cl.<sup>5</sup> B25F 1/00

U.S. Cl. 7-138

2 Claims



1. A belt buckle wrench for use with a belt that includes a fixed end and a free end, wherein the free end includes a series of apertures, the apparatus comprising, a wrench member including a fixed jaw mounted at a forward terminal end of a handle, and a movable jaw mounted for cooperation with a fixed jaw for securement of a workpiece therebetween, and

a first means pivotally mounted on the handle for securement of the fixed end of the belt thereto, and a second belt mounting means mounted on the handle rearwardly of the first means and of the fixed jaw for directing through one of said apertures of the free end of the belt to secure the front of the belt relative to the wrench member, and

the first means includes a hinged loop integrally mounted to the rear surface of the handle and arranged orthogonally relative to the handle and pivotally mounting a continuous belt securement loop therethrough in a pivotal movable relationship relative to the hinged loop, and the second means includes an "L" shaped hook, the "L" shaped hook fixedly mounted on the rear surface of the handle with the free end of the hook aligned with the handle and directed towards the hinged loop and belt securement loop, and

further including a support plate, the support plate defined by a predetermined length less than that of the wrench, and formed with an elongated slot oriented medially of the plate and terminating at a mid portion of the plate for receiving the "L" shaped hook therethrough.

4,955,098

## POT-SHAPED SUPPORT FOR STRUCTURES, ESPECIALLY BRIDGE STRUCTURES

deceased Bayer, late of Grosserlach (by Gloria Bayer, executor), and Hans Beutler, Munich, both of Fed. Rep. of Germany, assignors to Schwäbische Hüttenwerke GmbH, Aalen-Wasseralfingen, Fed. Rep. of Germany

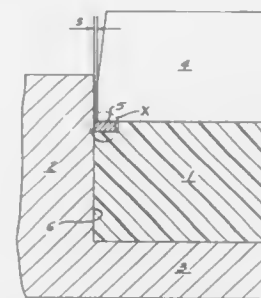
Filed Mar. 21, 1989, Ser. No. 326,386

Claims priority, application European Pat. Off., Mar. 21, 1988, 88104510.8

Int. Cl.<sup>5</sup> E01D 19/00

U.S. Cl. 14-16.1

7 Claims



1. In a pot-shaped or bowl-shaped support for structures, especially bridge structures, including a pot having a pot wall, the pot receiving a pressure pad of elastomer upon which a lid rests which transmits the load of the structure or the bridge resting upon it to a foundation, abutment or a pillar, and in which an annular gap defined between the lid and the pot wall is sealed by means of an annular seal, the improvement comprising the annular seal (5) being an open, single part, compact ring of rectangular cross-section, the ring being of a PTFE-material of amorphous consistency filled with a powdery substrate.

4,955,099

## MOVABLE SUPPORT

Carl F. W. Supra, Transvaal, South Africa, assignor to Liberty Pool Products S. A., Geneva, Switzerland

Filed Feb. 7, 1989, Ser. No. 307,048

Claims priority, application South Africa, Apr. 13, 1988, 88/2572

Int. Cl.<sup>5</sup> B60B 37/00

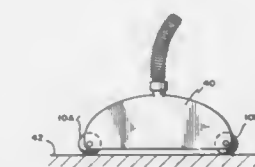
U.S. Cl. 15-1.7

4 Claims

1. A swimming pool cleaner useable to clean a submerged

swimming pool surface, said swimming pool cleaner comprising:

- a suction head movably supported spaced from the pool surface to be cleaned; and
- a plurality of movable supports affixed to, and movably supporting said suction head, each of said movable supports having a first axle rotatably supported by said suction head, and first and second stub axles, said first and second stub axles being attached to said first axle and



extending in opposing directions generally perpendicular to, and away from, said first axle, said first and second stub axles rotatably supporting first and second hemispherical members for independent rotation of said first and second stub axles on opposing sides of said first axle, each of said movable supports being affixed to said suction head to position a surface portion of one of said first and second hemispherical members projecting beyond an outer peripheral surface portion of said suction head.

4,955,100

## APPARATUS FOR CLEANING PIPELINES FOR BEVERAGES AND THE LIKE

Friedrich Bersch, Industriestrasse 18, D-5401 Halsenbach, Fed. Rep. of Germany

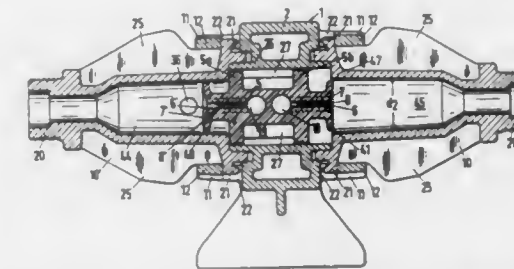
Filed Jul. 21, 1989, Ser. No. 384,208

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1988, 3824860; Jul. 21, 1988, 3824873

Int. Cl.<sup>5</sup> B08B 9/02; F15B 13/02

U.S. Cl. 15-3.51

24 Claims



1. Apparatus for cleaning pipelines of the type having a finite length and serving to convey beverages and the like with a liquid cleaning agent which contains at least one cleaning element, comprising a shuttle valve including a body having inlet means and outlet means for, cleaning agent, a sleeve integral with said body and having a cylindrical internal surface of constant diameter, a first end and a second end, and a channeled shuttle installed in said sleeve and including two sealing members spaced apart from each other in the axial direction of and in sealing contact with said internal surface, said shuttle further including a portion disposed between said sealing members and defining with said surface a chamber; first hollow coupling means for conveying cleaning agent between



the first end of said sleeve and one end of a pipeline to be cleaned; and second hollow coupling means for conveying cleaning agent between the second end of said sleeve and the other end of the pipeline to be cleaned, said shuttle being movable in said sleeve by cleaning agent between a first position in which the shuttle establishes communication between said inlet means and said first coupling means as well as between said second coupling means and said outlet means by way of said chamber, and a second position in which the shuttle establishes communication between said inlet means and said second coupling means as well as between said first coupling means and said outlet means by way of said chamber.

4,955,101

## BODY SCRUBBING BRUSH APPARATUS

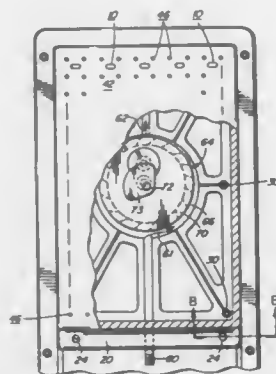
Martin J. King, Surrey, Canada, assignor to Hope Technologies Corp. and Columbia Technology Corp., both of Vancouver, Canada

Filed Jul. 18, 1989, Ser. No. 381,367

Int. Cl.<sup>5</sup> A46B 13/06

U.S. Cl. 15—21.1

7 Claims



1. A body scrubbing brush apparatus, comprising:
  - (a) a base support;
  - (b) a brush panel having a front brushing surface, said panel being connected to said base support for non-rotational movement in an orbital path relative to an axis extending perpendicular to said base support; the area described within said orbit path being substantially less than the area of said brushing surface and,
  - (c) an hydraulic driving means mounted to said base support, said driving means including:
    - (i) a water inlet for receiving a flow of water under pressure from a source of pressurized water;
    - (ii) a water outlet for discharging water so received; and,
    - (iii) a transmission operatively connected between said inlet, said outlet, and said panel for moving said panel in said orbital path in response to the flow of water from said inlet to said outlet.

4,955,102

## VACUUM CLEANER BEATER BRUSH WITH A BIASED BRISTLE STRIP

Walter K. Cousins, Lexington, Ky., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Nov. 9, 1988, Ser. No. 269,075

Int. Cl.<sup>5</sup> A46B 9/08

U.S. Cl. 15—182

19 Claims

1. A vacuum cleaner beater brush comprising:
  - a cylindrical dowel having at least one groove helically disposed in the outer periphery of said dowel for receiving a bristle strip, said groove having a pair of side walls with a channel formed in each of said side walls; and
  - a bristle strip having a bristle support section and beater bar integrally formed with a hinge disposed therebetween, said bristle support section having bristle tufts extending

upwardly therefrom, a first shoulder extending outwardly from one side of said bristle support section along the length thereof so as to be slidably received in a channel of said groove and a mating surface extending outwardly from an opposite side of said bristle support section along the length thereof,

said beater bar having a mating surface extending along the length thereof for mating with the mating surface of said



bristle support section and having a projection extending along the length of said beater bar, said projection abutting said bristle tufts when the mating surfaces of said bristle support section and beater bar mate, and said hinge having an outer surface forming a shoulder adapted to be slidably received in a channel of said groove when the mating surface of said bristle support section and beater bar mate.

4,955,103

## VACUUM CLEANER WITH SUCTION INDICATOR

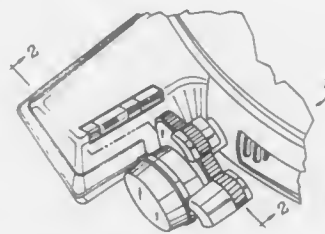
Ernest R. Scott, Mayfield Heights, and James C. Murphy, Broadview Heights, both of Ohio, assignors to The Scott Fetzer Company, Westlake, Ohio

Filed Dec. 9, 1988, Ser. No. 282,466

Int. Cl.<sup>5</sup> A47L 9/28

U.S. Cl. 15—319

21 Claims



1. A vacuum cleaner having a suction nozzle inlet for cooperation with a surface to be cleaned, comprising in combination:

means for variably adjusting the height of the nozzle relative to a surface to be cleaned;

means to sense a differential air pressure between that of the atmosphere and that within the nozzle of the operating vacuum cleaner;

an electrical switch actuated in response to said differential pressure sensing means sensing a predetermined level of differential pressure;

a voltage source including terminals on the nozzle; and

indicator means connected electrically to said voltage source terminals through said switch whereby said indicator indicates to the operator that the height adjustment of the nozzle is proper due to the magnitude of the differential pressure a suction for most effective cleaning.

4,955,104

## LIQUID DISPENSING AND SUCTIONING SYSTEM FOR SURFACE CLEANING

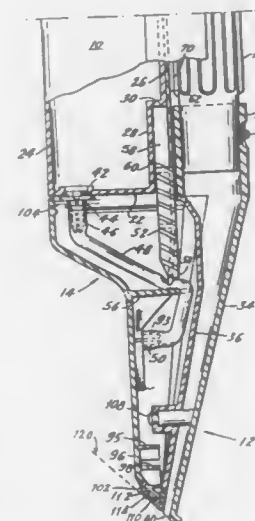
Jonathan Miller, Teaneck, N.J., assignor to Shop-Vac Corporation, Williamsport, Pa.

Filed Jan. 13, 1989, Ser. No. 365,479

Int. Cl.<sup>5</sup> A47L 7/00

U.S. Cl. 15—322

11 Claims



1. A liquid dispensing and suctioning system, comprising a tubular wand having a suction intake end and an exit end connectable for communicating with a suction source; an attachment to said wand for dispensing liquid to a surface to be cleaned and for suctioning liquid from the surface, said attachment comprising:
  - said attachment having a bottom;
  - a suction nozzle having an inlet at said bottom of said attachment and positionable adjacent the surface to be cleaned for intake of liquid and having an outlet fitting attached to said intake end of said wand; said suction nozzle inlet having a first periphery including a first front side and an opposite first rear side spaced from said first front side and between them defining an inlet opening for said suction nozzle inlet, said first front and rear sides of said suction nozzle inlet extending across said attachment;
  - a dispenser for selectively dispensing liquid to the surface to be cleaned, said dispenser including a dispenser inlet communicating with a supply of liquid, a dispenser outlet for delivery of liquid to the surface to be cleaned and a dispenser conduit between said dispenser inlet and said dispenser outlet;
  - said dispenser outlet having a second periphery at said bottom of said attachment and including a second front side that is closer toward said first rear side of said suction nozzle inlet and a second rear side that is further from said suction nozzle inlet, said second front and rear sides extending across said attachment;
  - a liquid transmission surface at said bottom of said attachment and between said suction nozzle inlet first rear side and said dispenser outlet second front side, said transmission surface being so shaped and being of such height below said attachment, said first front and rear sides of said suction nozzle inlet being of such height below said attachment and said second front and rear sides of said dispenser outlet being of such height below said first attachment that with said liquid transmission surface disposed at the surface to be cleaned and with said first front surface of said suction nozzle disposed at the surface to be cleaned, said second front and rear surfaces of said dispenser outlet are upraised off the surface to be cleaned, whereby with said liquid transmission surface being in

contact with the surface to be cleaned during dispensing of liquid by said dispenser, said liquid dispensed through said dispenser outlet travels past said liquid transmission surface for preventing direct migration of liquid from said dispenser outlet to said suction nozzle inlet without first passing around said liquid transmission surface.

4,955,105

## VACUUM CLEANER

Masao Sunagawa, Fumio Jyoraku, Yoshitaro Ishii, all of Hitachi, and Susuma Satoo, Takahagi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

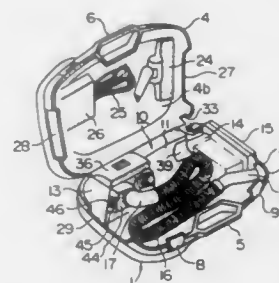
Filed Mar. 2, 1988, Ser. No. 163,377

Claims priority, application Japan, Mar. 6, 1987, 62-50066; Mar. 6, 1987, 62-50072; Mar. 20, 1987, 62-63880; Mar. 20, 1987, 62-63883

Int. Cl.<sup>5</sup> A47L 9/00

U.S. Cl. 15—323

30 Claims



1. A vacuum cleaner comprising a vacuum cleaner body and an accommodating case for accommodating said vacuum cleaner body and attachments of the vacuum cleaner, said vacuum cleaner body comprising at least a dust collecting chamber, an electric blower chamber, and an exhaust chamber, said dust collecting chamber, said electric blower chamber and said exhaust chamber forming a unitary structure arranged in said accommodating case such that an outer profile of the exhaust chamber is in a confronting relationship with an exhaust opening of the accommodating case, wherein at least a suction opening communicating with said dust collecting chamber and the exhaust opening communicating with said exhaust chamber are formed in said accommodating case, and wherein said accommodating case includes a body case for accommodating at least said vacuum cleaner body and a cover case for accommodating said attachments of the vacuum cleaner, said cover case being adapted to close an opening of said body case forming the opening of said accommodating case.

4,955,106

## UPRIGHT VACUUM CLEANER

Klaus Stein, and Heinz Kaulig, both of Velbert, Fed. Rep. of Germany, assignors to Stein & Co. GmbH, Velbert, Fed. Rep. of Germany

Filed Jan. 17, 1990, Ser. No. 466,032

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1989, 3909408

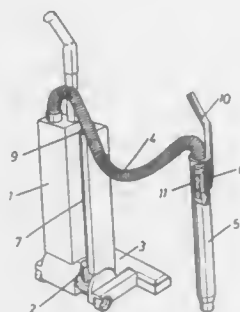
Int. Cl.<sup>5</sup> A47L 5/32

U.S. Cl. 15—335

9 Claims

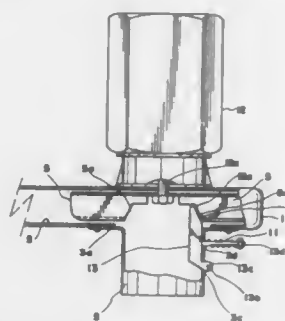
1. An upright vacuum cleaner for movement along a floor comprising:
  - a housing having suction producing means:
  - said housing having a lower end;
  - said housing having a floor suction component at said lower end thereof;
  - said housing having an upper end remote from said lower end;
  - said housing having an operating handle at said upper end;

said floor suction component having wheel means for movement of said housing along the floor;  
 said floor suction component including rotating brush means for dislodging dirt and the like from the floor;  
 a hose having a first end which is for being connected to said housing at said upper end thereof for transporting air to said suction producing means;  
 a removable tube for being selectively mounted on said housing;



said removable tube having a first end for selective connection to said floor suction component when said removable tube is mounted on said housing;  
 said removable tube having a second end which is disposed at said upper end of said housing when said removable tube is mounted thereon; and  
 said hose having a substantial portion including a second end thereof which is remote from said first end for being received within said removable tube when said removable tube is mounted on said housing.

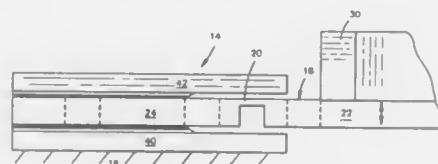
**4,955,107**  
**SUCTION CLEANER**  
 Yuzo Kawai, Nara, Japan, assignor to Kabushiki Kaisha Suiden, Osaka, Japan  
 Filed Jul. 22, 1988, Ser. No. 222,748  
 Claims priority, application Japan, Mar. 2, 1988, 63-50152  
 Int. Cl.<sup>3</sup> A47L 5/24  
 U.S. Cl. 15—339 5 Claims



1. A suction cleaner for use in sucking relatively large refuse, the cleaner comprising:  
 a dust chamber;  
 a suction chamber communicating with the dust chamber;  
 an outlet duct tangentially connected to the dust chamber for letting the refuse out of the dust chamber;  
 a plurality of edged impellers mounted in the dust chamber for producing suction with the suction chamber, the impellers being fixed to a rotating shaft protruding into the dust chamber;  
 first blades provided at an inner side of at least one of the impellers;  
 a second blade formed in a shank provided in the suction

chamber, the shank being retainable at one of an operative position at which the second blade is juxtaposed to the first blades with such a gap as to shred the refuse therebetween, and an inoperative position at which the second blade is kept away from the first blades; and  
 drive means for rotating the impellers through the rotating shaft and producing suction within the suction chamber.

**4,955,108**  
**PROTECTED HINGE ASSEMBLY FOR MECHANICAL ACCELEROMETER**  
 Nicholas F. Pier, Thousand Oaks, Calif., assignor to Litton Systems, Inc., Alameda, Calif.  
 Filed Jul. 14, 1989, Ser. No. 380,135  
 Int. Cl.<sup>3</sup> E05D 1/02; B23K 31/02  
 U.S. Cl. 16—226 106 Claims

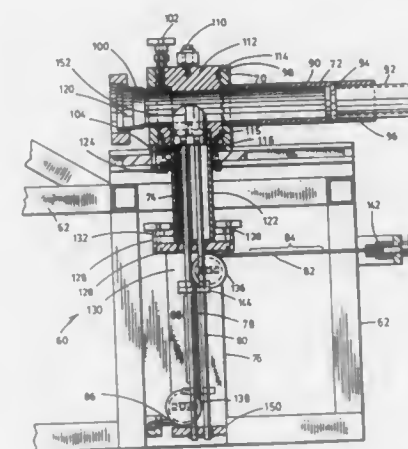


1. A protected hinge assembly comprising:  
 a hinge frame having first and second parts which have substantially flat opposite surfaces each having first and second juxtaposed regions near first and second substantially opposite side edges thereof, said first regions of said first and second parts being connected by a flexible hinge having a hinge line directed in a predetermined first direction;  
 first and second stops, substantially rigidly attached along second and third lines to opposite surfaces, in said second regions near and substantially parallel to the outer edges of said second parts of said surfaces and being substantially perpendicular to said hinge line;  
 said stops being tilted substantially about said second and third lines relative to said surfaces to allow slight movement of the first regions of said second part relative to said stops.

**4,955,109**  
**PIVOTING HORN**  
 Alfred J. Evans; Raymond H. Mianer, both of Raleigh, and Dennis J. May, Pittsboro, all of N.C., assignors to Delaware Capital Formation, Inc., Apex, N.C.  
 Filed Sep. 20, 1989, Ser. No. 410,085  
 Int. Cl.<sup>3</sup> A22C 11/02  
 U.S. Cl. 17—41 10 Claims

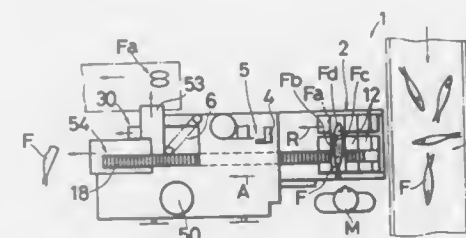
1. For chub packaging machinery, utilized to produce chub products by stuffing of casing with comminuted material, a stuffing horn mechanism comprising:  
 a telescoping stuffing horn, the horn being variable in volume during telescoping;

a comminuted material reservoir in communication with the stuffing horn; and



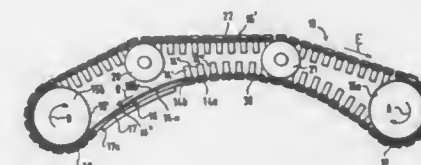
means operatively connected to the stuffing horn, for varying the volume of the reservoir in inverse relation to the volume of the stuffing horn during telescoping.

**4,955,110**  
**APPARATUS FOR COLLECTING ROE**  
 Yutaka Ogawa, Ibaraki, Japan, assignor to Nippon Fillestar Co., Ltd., Osaka, Japan  
 Filed Jul. 7, 1989, Ser. No. 376,596  
 Claims priority, application Japan, May 12, 1989, 1-120174  
 Int. Cl.<sup>3</sup> A22C 25/14  
 U.S. Cl. 17—53 6 Claims



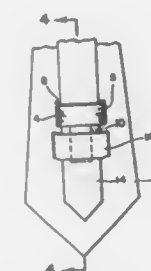
1. An apparatus for collecting roe, comprising:  
 conveying means for gripping and conveying decapitated fish bodies in a lying position, with the tails of the fish bodies extending in a common direction and with the abdomens of the fish bodies facing downstream with respect to the direction of conveyance of said conveying means for gripping and conveying, said conveying means for gripping and conveying comprising stopping means for holding the fish bodies stationary in said lying position; and  
 collecting means for collecting roe from the fish bodies conveyed by said conveying means, said collecting means comprising a collecting member for abutment against the abdomens of the fish bodies, said collecting member being rotatable about a rotation axis extending across the direction of the conveyance of said conveying means, and said collecting member being elastically biased upstream with respect to said direction of conveyance.

**4,955,111**  
**TRAVELLING FLATS ASSEMBLY FOR A CARDING MACHINE**  
 Peter Jagst, Mönchengladbach, Fed. Rep. of Germany, assignor to Trümmel GmbH & Co. KG, Mönchen-Gladbach, Fed. Rep. of Germany  
 Filed Sep. 25, 1989, Ser. No. 411,362  
 Claims priority, application Fed. Rep. of Germany, Sep. 24, 1988, 3832484; Mar. 8, 1989, 3907396  
 Int. Cl.<sup>3</sup> D01G 15/08  
 U.S. Cl. 19—102 24 Claims



1. A travelling flats assembly for a carding machine, comprising:  
 (a) two end rollers;  
 (b) an endless flexible belt trained about the end rollers for a circulating travel and having a lower, working flight and an upper, return flight; said endless flexible belt further having an outwardly-oriented face and an inwardly-oriented face;  
 (c) a plurality of clothed flat bars arranged to be entrained by said endless flexible belt for circulating travel therewith; each said flat bar having a head forming a longitudinal end of the flat bar;  
 (d) a stationary slide guide extending between said end rollers along said lower flight and slidably engaging and supporting the flat bars when entrained for travel by said lower flight; and  
 (e) form-fitting connecting means for coupling the head of each flat bar to said outwardly-oriented face of said endless belt; said form-fitting connecting means allowing unobstructed freedom of motion of each flat bar in a direction generally perpendicular away from and towards said outwardly-oriented face, whereby said flat bars are freely removable from and placed in an operative position onto the outwardly-oriented face of the upper flight of said endless belt.

**4,955,112**  
**TIE CLIP**  
 Joseph B. Forter, 20 Meadow Ln., Albany, N.Y. 12208  
 Filed Nov. 8, 1989, Ser. No. 433,326  
 Int. Cl.<sup>3</sup> A41D 25/04  
 U.S. Cl. 24—49 C 18 Claims

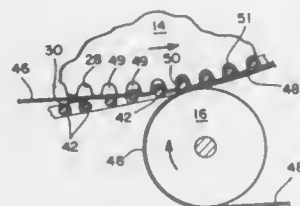


1. A necktie retainer comprising:  
 a first portion having a shape whereby it can extend into a tie loop and be free to vertically move therein; and  
 a second portion attached to said first portion, said second portion including means for grasping a portion of a shirt



wherein said grasping means includes a member which is shaped to fit inbetween overlapping shirt layers.

**4,955,113**  
**FASTENING MEANS, APPARATUS, AND METHODS**  
 Gregory J. Rajala, and Lon M. King, both of Neenah, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.  
 Division of Ser. No. 118,120, Nov. 4, 1987, Pat. No. 4,861,399.  
 This application Apr. 25, 1989, Ser. No. 343,961  
 Int. Cl.<sup>5</sup> A44B 18/00  
 U.S. Cl. 24—448 7 Claims

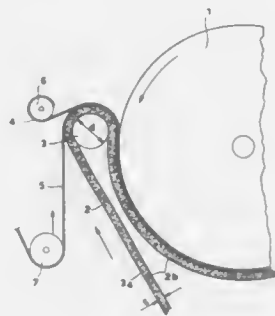


1. A fastening material, comprising:
  - (a) a backing material comprising a thermoplastic surface layer, said thermoplastic surface layer forming an outer surface of said backing material; and
  - (b) an array of flexible, generally U-shaped filament segments, each said filament segment including a bight portion bonded to said thermoplastic surface layer and covering a portion of said outer surface of said backing material, and two stem portions extending from opposite ends of said bight portion and projecting in a direction generally away from said thermoplastic surface layer, at least one of said stem portions having a terminal fastening member,
  - (c) said U-shapes in said filament segments being formed by pins urging first portions of said filament segments into grooves on a forming wheel, said bight portions corresponding to second portions of said filament segments, said second portions being between corresponding first portions of said filament segments, the configuration of said bight portions being formed from said filament segments by land zones on said forming wheel between said grooves, said bight portions being bonded to said outer surface of said backing material in formation of said bight portions,
  - (d) said U-shaped filament segments being intermittently spaced, and corresponding to intermittent spacing of said land zones, and corresponding extending ones of said grooves, on said forming wheel.

**4,955,114**  
**APPARATUS FOR CAUSING THE SHRINKING OF A CLOTH**  
 Franco Bertoldo, Brogliano, Italy, assignor to Sperotto Rimar S.p.A., Thiene, Italy  
 Filed Oct. 5, 1989, Ser. No. 417,582  
 Claims priority, application Italy, Oct. 14, 1988, 22304 A/88  
 Int. Cl.<sup>5</sup> D06C 21/00  
 U.S. Cl. 26—18.6 3 Claims

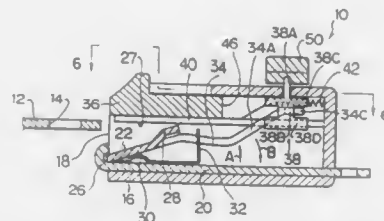
1. Apparatus for causing the shrinking of a cloth, comprising a drum revolving around its own longitudinal axis, an endless-loop belt made from a textile material of the type of needled felts wound with a first one of its faces around said revolving drum, a return roller for said belt so positioned as to cause said first face of said endless belt to adhere to said drum, a flexible sheer partially winding around said first face of said belt in the region in which the belt, with its second face, is wound around the return roller, and which subsequently extends entering a portion in which said belt is wound around said drum, and guide means for guiding the cloth to be processed and deposit it onto said first face of said belt immediately before said belt is wound by said flexible sheet around the belt return roller, so as

to cause the cloth to enter the room existing between said flexible sheet and the first face of said belt, characterized in that



the ratio of the diameter of said return roller to the thickness of the belt is lower than 5.5.

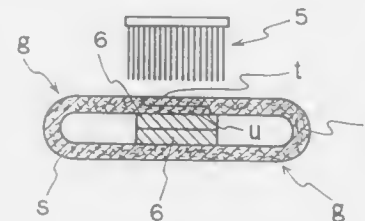
**4,955,115**  
**BUCKLE DEVICE**  
 Kohbun Tanaka, Niwa, Japan, assignor to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Aichi, Japan  
 Filed Jul. 11, 1989, Ser. No. 378,045  
 Claims priority, application Japan, Jul. 11, 1988, 63-91758; Jul. 13, 1988, 63-92940  
 Int. Cl.<sup>5</sup> A44B 11/25  
 U.S. Cl. 24—641 19 Claims



1. A buckle device capable of locking a tongue plate inserted into the buckle device and capable of allowing said tongue plate to be drawn out by releasing said tongue plate from the locked state, said buckle device comprising:
  - a lock member capable of swinging between a first position at which it engages with said tongue plate in a path for insertion of said tongue plate to lock the same, and a second position at which it is displaced out of said tongue plate insertion path to allow said tongue plate to be drawn out;
  - an urging means for urging said lock member toward said first position;
  - an operation member for displacing, by moving operation, said lock member against the urging force of said urging means from said first position to said second position to disengage said tongue plate and said lock member from each other;
  - a first stopper member selectively moved relative to said operation member between a third position at which it allows said moving operation of said operation member and a fourth position at which it inhibits said moving operation of said operation member; and
  - a second stopper member moved relative to said lock member in a linked relationship with said first stopper member, said second stopper member being positioned out of a path for swinging of said lock member to enable said lock member to swing from said first position to said second position when said first stopper member is placed at said third position, said second stopper member being posi-

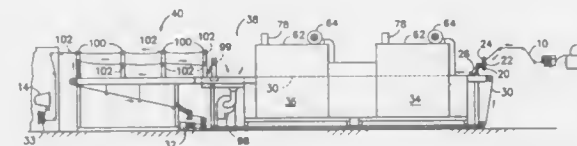
tioned in the swinging path of said lock member to inhibit said lock member from swinging from said first position to said second position when said first stopper member is placed at said fourth position.

**4,955,116**  
**METHOD FOR PRODUCING TUBULAR NEEDLE PUNCHED FELT**  
 Katsuyoshi Hayamizu, Moriyama; Masakatsu Nakajima, Kusatsu, and Hiroyuki Ogawa, Kashiwa, all of Japan, assignors to Japan Vlene Company, Ltd., Tokyo, Japan  
 Filed Sep. 6, 1989, Ser. No. 403,422  
 Int. Cl.<sup>5</sup> D04H 1/46  
 U.S. Cl. 28—110 3 Claims



1. A method for producing a tubular needle punched felt, comprising the steps of:
  - (a) overlapping not less than two long sheets comprising a web to form thin layer portions at both side edges of the overlapped sheets and a thick layer portion at the central portion of the overlapped sheets by dislocating the sheets in width direction;
  - (b) needle punching one part or whole of said central thick layer portion of the overlapped sheets to form a lapped sheet;
  - (c) rolling the lapped sheet and transforming the lapped sheet into a tubular lapped sheet and overlapping said thin layer portions with each other; and
  - (d) needle punching said overlapped thin layer portions to make the thin layer portions one body.

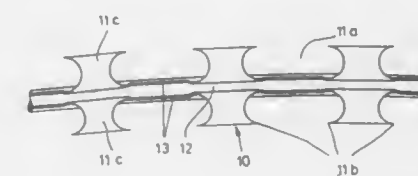
**4,955,117**  
**APPARATUS FOR HOT AIR BULKING OF SYNTHETIC YARN**  
 Edward L. Crenshaw, Inman, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.  
 Division of Ser. No. 26,656, Mar. 17, 1987, abandoned. This application Sep. 4, 1987, Ser. No. 78,058  
 Int. Cl.<sup>5</sup> D02J 1/02  
 U.S. Cl. 28—281 6 Claims



1. Apparatus to provide a bulked, synthetic yarn comprising: a perforated endless conveyor, a first means to supply a synthetic yarn onto said conveyor in coiled form to form loops therein, a bulking oven, a heat setting oven, a loop removal station, means to drive said endless conveyor sequentially through said bulking oven and said heat setting oven to said loop removal station, means to supply a dry gaseous fluid into said bulking oven to bulk the yarn on said endless conveyor, means to supply a dry gaseous fluid into said heating setting oven to heat set the yarn on said endless conveyor and means operably associated with said apparatus to take up the bulked yarn after the loops have been pulled out at the loop removal

station, said bulking oven having a means to bypass the heated gaseous fluid from contact with the synthetic yarn when said endless conveyor is stopped and a means to supply cool air onto said endless conveyor when said endless conveyor is stopped.

**4,955,118**  
**METHOD OF MANUFACTURING A ROLL OF COILED, CLAMPED BARBED WIRE**  
 Gerhard Lange, Reutlingen, Fed. Rep. of Germany, assignor to WAFIOS Maschinenfabrik GmbH & Co. Kommanditgesellschaft, Fed. Rep. of Germany  
 Division of Ser. No. 213,763, Jun. 30, 1988. This application May 5, 1989, Ser. No. 348,899  
 Claims priority, application Fed. Rep. of Germany, Jan. 30, 1987, 3721466  
 Int. Cl.<sup>5</sup> B21F 25/00  
 U.S. Cl. 29—7.1 4 Claims

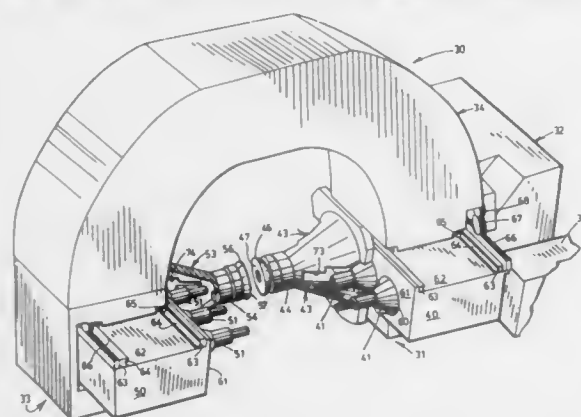


1. A method for the manufacture of a circular roll of coiled barbed strap having loops, the loops of which are provided in pairs with clamps in an uneven number of at least three per loop and can be separated from each other in the axial direction of the roll in such a manner that each strap loop pivots about a screw-type line, in which the barbed strap is coiled, in which clamps are placed at a location on every two adjacent loops according to the number of clamps per loop, and after which, the barbed strap is cut; said method comprising:
  - producing barbed strap loops without a core;
  - coiling the barbed strap corresponding to the number of clamps per loop, interrupting said coiling at predetermined intervals and then placing a clamp when the strap is stationary; and
  - synchronously guiding the two loops of the barbed strap to be clamped, outside of the interruption intervals, through the location where the clamps are placed.

**4,955,119**  
**MULTI-TASK END EFFECTOR FOR ROBOTIC MACHINING CENTER**  
 Giovanni B. Bonomi, and Battistino Oldani, both of Rockford, Ill., assignors to Imta, Rockford, Ill.  
 Filed Jul. 11, 1989, Ser. No. 378,019  
 Int. Cl.<sup>5</sup> B23B 29/00  
 U.S. Cl. 29—50 11 Claims

1. An end effector attachable to the mobile head of a computer controlled robotic machining center operable to move the mobile head along multiple linear and about multiple rotational axes comprising: a master tool head, a slave tool head, attachment means for connecting said master head to the mobile head of said robotic machining center for multi axis movement with the latter, a substantially U-shaped hollow yoke rigidly fixed at one end to said master head and attached at its other end to said slave head such that the two heads are disposed in coaxial, opposing, spaced relationship; power console means on said attachment means for connecting said master head and slave head to common pneumatic, hydraulic and electrical power supply means carried by the machining cen-

ter, and plural power driven tool drivers mounted on each said head and adapted to be selectively energized by said power



supply means for driving selected tools mounted on said drivers.

4,955,120

## HYDROSTATICALLY SUPPORTED ROLL

Bernhard Brendel, Gregath; Klaus Kubik, Tönisvorst, and Karl-Heinz Küsters, Krefeld, all of Fed. Rep. of Germany, assignors to Eduard Küsters Maschinenfabrik GmbH & Co. KG, Krefeld, Fed. Rep. of Germany

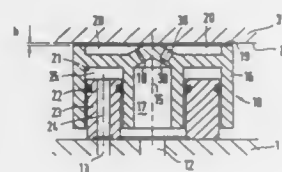
Filed Apr. 13, 1989, Ser. No. 337,254

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813598

Int. Cl. B21B 13/02

U.S. Cl. 29—113.2

9 Claims



1. A hydrostatically supported roll comprising:

- (a) a rotating hollow roll having an outer working roll circumference;
- (b) a stationary crosshead extending through the hollow roll to form surrounding clearance space with an inner circumference of the hollow roll;
- (c) a plurality of hydrostatic elements supported by the crosshead and arranged in at least one row along the crosshead for supporting the inner circumference of the hollow roll, each hydrostatic element having,
  - (i) support pockets formed in an outer contact surface of the hydrostatic element, said pockets being open toward the inner circumference of the hollow roll and bounded by a surrounding edge spaced from the inner circumference when a first pressurized liquid conducted to the support pockets flows over the surrounding edge to form a liquid film transmitting contact pressure to the inner circumference of the hollow roll for supporting same;
  - (ii) a pressure chamber to which a second pressurized liquid is conducted for pressing the hydrostatic element against the inner circumference of the hollow roll with a predetermined force, with the pressure chamber of at least one of the hydrostatic elements being separate from its support pockets; and
  - (iii) means for adjusting the predetermined force indepen-

dently of the other hydrostatic elements by adjusting the pressure in the pressure chamber;

- (d) a first temperature control device for controlling the temperature of the first pressurized liquid, which transmits heat to the hollow roll as the first pressurized liquid flows over the surrounding edges of the support pockets; and
- (e) a flow control device connected to the support pockets controlling the flow of first pressurized liquid to provide a constant flow of the first pressurized liquid over the surrounding edges of the support pockets.

4,955,121

## METHOD FOR PRODUCING A ROCKER ARM FOR USE IN AN INTERNAL COMBUSTION ENGINE

Masakazu Sato, Tochigi; Seiichi Koike, Saitama; Toshihiro Oikawa, and Katsuke Ban, both of Tochigi, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

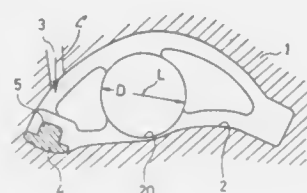
Filed Jul. 9, 1987, Ser. No. 71,652

Claims priority, application Japan, Jul. 9, 1986, 61-161737; Jul. 9, 1986, 61-161738

Int. Cl. B21K 1/24

U.S. Cl. 29—888.2

2 Claims



1. A method for producing a rocker made of light alloy for use in an overhead cam shaft type valve operating mechanism of an internal combustion engine, which rocker arm includes a thick-walled bearing section elongated along an axis to contain a rocker arm shaft hole for fitting with a rocker arm shaft, comprising the steps of:

- injecting molten metal under pressure into a cavity of a metallic mold for casting the rocker arm,
- exerting a secondary pressurizing force upon said bearing section just before the molten metal solidifies by advancing a pressurizing rod into said cavity to form a hole in said bearing section during casting substantially concentric with a locus for the rocker arm shaft hole by displacing molten metal in said cavity in a radial direction from said pressurizing rod, said pressurizing rod having an outer diameter  $d=0.17D$  to  $0.60D$ , wherein  $D$  equals an outer diameter of the bearing section and  $d$  is smaller than the rocker arm shaft diameter, and
- machine finishing said rocker arm shaft hole after casting.

4,955,122

LOCK UNIT FOR A FLUID COUPLING APPARATUS  
Noboru Ootsuki; Katsumi Tomioka, both of Kobe, and Toshihiko Oonishi, Kakogawa, all of Japan, assignors to Nippon Air Brake Co., Ltd., Kobe, Japan

Filed Sep. 27, 1989, Ser. No. 413,139

Int. Cl. B23P 19/04

U.S. Cl. 29—237

2 Claims

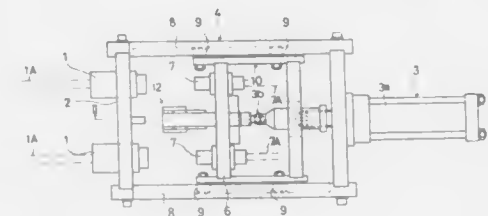
1. A lock unit for a fluid connecting and disconnecting apparatus of a construction in which one fluid coupling is held stationary and a second fluid coupling is moved into connection with said one fluid coupling comprising:

- a main body,
- a first connecting member stationary on said main body, said first connecting member having a first connection opening and means for holding said one fluid coupling,
- a second connecting member opposing said first connecting

member and movably mounted on said main body for movement toward and away from said first connecting member, said second connecting member having a second connection opening and means for holding said second fluid coupling,

an actuator cylinder mounted to said main body and having a piston rod for moving said second connecting member, a flange provided in said second connection opening, a lock lever, said lock lever having one end provided between said flange and said second connection opening, and being rotatable relative to said second connection opening, a second end of said lever having a hook for detachably locking said lever to said first connecting member,

a pin mounted to said lever and a toggle link connecting said second end of said lever to an end of said piston rod projecting through said second connection opening, a dog provided between said flange and said toggle link connection with said piston rod,



said dog being biased toward said toggle link connection, a slot in said dog and receiving said pin, said slot having a first portion extending in a longitudinal direction of said lever and a second portion normal to said first portion, said pin riding in said first portion of said slot and preventing outward movement of said second end of said lever as said dog is biased toward said toggle link connection and said piston rod is moved to move said second connecting member toward said first connecting member and said pin is movable into said second portion of said slot as said dog contacts said first connecting member and displaces the means biasing said dog to permit outward movement of said second end of said lever to engage said hook with said first connecting member and detachably lock said second connecting member with said first connecting member with said second fluid coupling connected to said one fluid coupling.

4,955,123

## PRODUCTION OF A SHAPED FILAMENTARY STRUCTURE

Peter G. Lawton, West Hadlow, Albert Promenade, Halifax, West Yorkshire, England HX2 6AD, and Norman Smith, 5 Badby Leys, Rugby, Warwickshire, England CV22 5RB

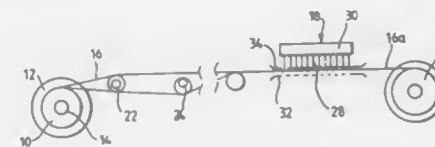
Filed Jan. 27, 1987, Ser. No. 6,899

Claims priority, application United Kingdom, Jan. 28, 1986, 8602003

Int. Cl. B23P 17/00

U.S. Cl. 29—419.1

15 Claims



1. A method of producing a shaped filamentary structure comprising the steps of: subjecting uni-directional layers of filaments to a needle punching action to give a degree of dimensional stability to the layers adequate to allow severing and manipulation of the layers; cutting a plurality of segments from

the layers; assembling at least two of the segments in side-by-side contiguous relationship to produce a first filamentary layer of the required structural shape; superimposing at least one of the similarly formed filamentary layers on the first layer and needle punching the assembled layers to produce cross linking of the layers by filaments displaced out of the layers and extending in a direction generally perpendicular to the faces of the layers.

4,955,124

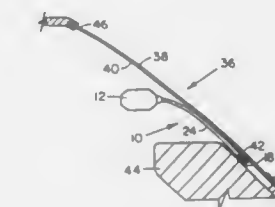
## SHEATHED CUTTING MEANS APPARATUS AND METHOD

Ray Asbery, 1401 Mesa Park Dr., Round Rock, Tex. 78664  
Continuation of Ser. No. 118,060, Nov. 9, 1987, abandoned. This application Aug. 15, 1989, Ser. No. 394,273

Int. Cl. B26B 7/00, 29/00

U.S. Cl. 29—426.4

8 Claims



1. A method for cutting the seal positioned around a vehicle window between the inside surface of the window and the vehicle structure, said method comprising the steps of:

- (a) providing a flexible elongated power transmission member having a first end and a second end, the second end including a cutting portion adapted for cutting the seal between the window and the vehicle structure;
- (b) completely encasing the power transmission member with a slightly curved sheath over substantially its entire length, the sheath having an open end through which the cutting portion of the power transmission member is adapted to extend a desired cutting distance;
- (c) inserting the open end of the sheath, along with the substantially covered power, transmission member into the space between the inner surface of the window and the vehicle structure to the seal; and
- (d) reciprocating the power transmission member in the sheath so that the cutting portion of power transmission member reciprocates back and forth out of the open end of the sheath to the desired cutting distance to cut the seal without substantially damaging the vehicle structure adjacent the window.

4,955,125

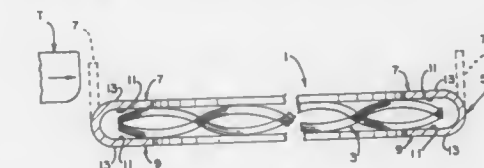
## METHOD OF FORMING A PIZZA GRILL

Gerald W. Steinman, 417 Runnymede, St. Louis, Mo. 63141  
Filed Dec. 26, 1989, Ser. No. 456,461

Int. Cl. B21D 39/02; A47J 27/00, 36/00; A21B 3/13

U.S. Cl. 29—509

8 Claims



1. The method of forming a pizza supporting and baking grid structure with a circumferentially continuous supporting rim, comprising the steps of:



forming a one-piece generally flat annular rim section with an integral generally upstanding annular rim section, forming a complementary configured self-supporting metal screen having a pre-configured outer periphery for complementary association relative to said generally flat and upstanding annular rim sections, assembling said screen relative to said annular rim sections with its outer periphery resting upon the generally flat annular rim section, and thereafter re-shaping by spin processing said upstanding annular rim section into generally opposed and parallel relationship to said generally flat rim section so as to capture said screen therebetween.

4,955,126

# PROCESS FOR FUSING STEEL SLABS IN LONGITUDINAL DIRECTION THEREOF

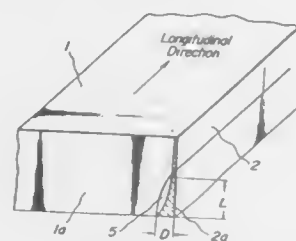
Masaru Shibata; Masayuki Onishi; Hltoshi Ohsugi; Shigeru Ogura; Masaru Washio; Hideo Kuguminato, and Yoshiaki Hara, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Filed Apr. 20, 1989, Ser. No. 341,142

Claims priority, application Japan, Apr. 26, 1988, 63-101467  
Int. Cl.<sup>5</sup> B23P 17/00

U.S. Cl. 29—527.6

4 Claims



1. A process for cutting a steel slab being continuously cast, comprising the steps of:

- (1) maintaining said slab at a temperature more than 500° C.,
- (2) torch cutting the slab in a longitudinal direction at a speed more than 300 mm/minute such that at least a surface portion is fused, and
- (3) removing at least a lower portion of the longitudinally cut fused surface portion of the slab.

4,955,127

# AUTOMATIC TOOL EXCHANGING DEVICE FOR A MACHINE TOOL

Nobuyuki Suda; Akihiko Fujimoto, and Ryuji Suzuki, all of Yamanashi, Japan, assignors to Fanuc Ltd., Yamanashi, Japan

PCT No. PCT/JP88/00784, § 371 Date Apr. 6, 1989, § 102(e)  
Date Apr. 6, 1989, PCT Pub. No. WO89/01387, PCT Pub.  
Date Feb. 23, 1989

PCT Filed Aug. 8, 1988, Ser. No. 360,915

Claims priority, application Japan, Oct. 8, 1987, 62-198284  
Int. Cl.<sup>5</sup> B23Q 3/157

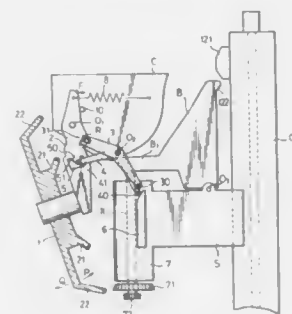
U.S. Cl. 29—568

5 Claims

1. An automatic tool exchanging device for a machine tool, comprising:

- a magazine supporting member (2) supporting a magazine (1) at the lower end thereof and pivotally mounted to a support by means permitting the magazine supporting member (2) to swing back and forth;
- an elastic member (8) having one end attached to the upper end of the magazine supporting member (2) and pulling the upper end of the magazine supporting member (2) in one direction;
- a stopper block (5, 5') attached to the magazine supporting member (2); and

a stopper (4, 4', 11) engaging with the stopper block (5, 5', 11) upon arrival of the magazine (1) at a standby position



from a tool exchanging position, to prevent vibration of the magazine (1).

4,955,128

# METHOD FOR INSERTING ROTOR OF ELECTRIC MOTOR

Masatoyo Sogabe, and Kazushi Kumagai, both of Yamanashi, Japan, assignors to Fanuc Ltd., Yamanashi, Japan

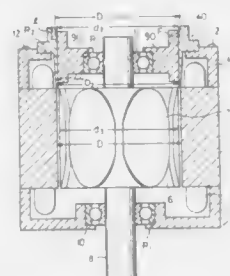
PCT No. PCT/JP88/00100, § 371 Date Oct. 3, 1988, § 102(e)  
Date Oct. 3, 1988, PCT Pub. No. WO88/06373, PCT Pub.  
Date Aug. 25, 1988

PCT Filed Feb. 4, 1988, Ser. No. 265,866

Claims priority, application Japan, Feb. 17, 1987, 62-032479  
Int. Cl.<sup>5</sup> H02K 15/16

U.S. Cl. 29—596

2 Claims



1. A method for inserting a rotor, having a rotor shaft, of an electric motor into a stator from a first end portion to a second end portion of said stator, comprising the steps of:

- centering and guiding a first end portion of said rotor by a first guide tool having an inclined face which is in turn attached to said first end portion of said stator cooperating with a second guide tool attached to a rear end portion of said rotor shaft during initial insertion of said rotor into said stator, said rotor having a magnet which is easily chipped and being arranged on a peripheral face of said rotor to thereby prevent said first end portion of said rotor from being damaged by said first end portion of said stator;
- guiding a second end portion of said rotor within said stator by guiding a front end portion of a rotor shaft by a front bearing attached to said second end portion of said stator, and by guiding a rear end portion of said rotor shaft by said first guide tool attached to said first end portion of said stator cooperating with said second guide tool attached to a rear end portion of said rotor to thereby prevent said first end portion of said rotor from being damaged by the inner surface of said stator and to thereby prevent said rotor peripheral face from being damaged by said first end portion of said stator; and
- removing said first and second guide tools from said first end

portion of the stator and said rear end portion of the rotor shaft, respectively.

4,955,129

# METHOD OF MAKING AN INTEGRAL HEATER FOR COMPOSITE STRUCTURE

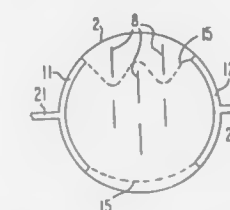
Donald D. McCauley, Los Altos Hills, and John D. Bayless, Jr., Cupertino, both of Calif., assignors to Ford Aerospace Corporation, Newport Beach, Calif.

Division of Ser. No. 303,071, Jan. 30, 1989, which is a continuation of Ser. No. 92,844, Sep. 3, 1987, abandoned. This application Jul. 24, 1989, Ser. No. 384,196

Int. Cl.<sup>5</sup> H05B 3/00

U.S. Cl. 29—611

1 Claim



1. A method for making a heater for a composite structure comprising a layer of a multitude of lossy electrically conductive elongated fibers embedded in an electrically nonconductive matrix, said fibers and said matrix synergistically contributing to the strength of said composite structure, said heater comprising:

- means for injecting an electrical current through multiple paths of the conductive fibers, whereby the fibers convert the electrical current to heat energy; wherein the fibers are from the group of materials comprising felt mats and closely woven fabrics;
  - the fibers provide structural support to the composite structure by virtue of being an integral part thereof, as well as act as heat converters; and
  - said heater is designed to provide nonuniform heating to the composite structure;
- said method comprising the performance of at least one of the following two steps:
- increasing the thickness of the layer of conductive fibers in regions where it is desired to produce more heating; and
  - cutting slits into the composite structure in order to make nonuniform the current densities through the multiple paths, whereby the presence of slits results in a decrease in the amount of heat produced.

4,955,130

# FEEDER BLADE REPLACEMENT APPARATUS FOR COIL INSERTER TOOLING

Cedric L. Bricker, Fort Wayne; Timothy K. Pease, Kendallville, and Donald L. Kammeyer, Woodburn, all of Ind., assignors to Pease Windomatic Systems, Inc., Fort Wayne, Ind.

Filed Jan. 29, 1990, Ser. No. 471,641

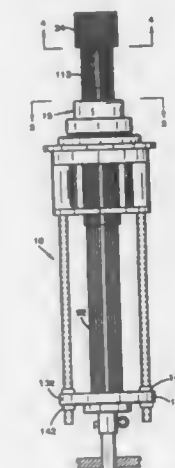
Int. Cl.<sup>5</sup> H02K 15/10

U.S. Cl. 29—734

5 Claims

1. In an apparatus for inserting coil side portions and coil side retaining wedges into axially extending slots of a magnetic core and including a circular array of coil turn feeder blades for receiving a plurality of electrical coils into said slots, stripper means for moving said coils from said coil blades into said core in positions with side turn portions thereof disposed in said slots, a circular array of wedge guide blades for guiding a plurality of slot wedges into said slots to cover said side turn portions in said slots, each slot wedge being guided between circumferentially adjacent wedge guide blades and each coil turn feeder blade being radially inwardly of and in face-to-face radial apposition with its own one of said wedge guide blades in said circular array, in combination therewith the improve-

ment comprising support ring means including detent means for retaining each feeder blade against axial movement relative to said support ring means when said feeder blade is in an operating position, means for retaining each wedge guide blade in said face-to-face radial apposition with its own one of said coil turn feeder blades to thereby prevent disengagement of said detent means, said means for retaining including means for supporting and restraining one end of each wedge guide blade against radial displacement and including collet means having a first surface for restraining an intermediate portion of each wedge guide blade against axial and radial displacement, said



collet means having a second surface facing and spaced from each wedge guide blade and defining a clearance zone, releasable fastening means holding said first surface of said collet means in contact with said intermediate portion, whereby said feeder blades and said guide blades may be removed and replaced by releasing said fastening means, moving said first surface of said collet means out of contact with said intermediate portion, axially and then radially displacing said one end of a wedge guide blade within said clearance zone, radially displacing a feeder blade to release said detent means from its axially retaining condition and axially removing the said feeder blade from said circular array of feeder blades.

4,955,131

# METHOD OF BUILDING A VARIETY OF COMPLEX HIGH PERFORMANCE IC DEVICES

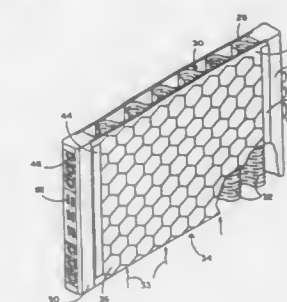
Louis Edmond Chall, Jr., Costa Mesa, Calif., assignor to Ford Aerospace Corporation, Newport Beach, Calif.

Division of Ser. No. 118,362, Nov. 6, 1987, Pat. No. 4,858,072.  
This application May 30, 1989, Ser. No. 358,316

Int. Cl.<sup>5</sup> H05K 3/36

U.S. Cl. 29—830

3 Claims



1. A method of building a variety of complex high-perfor-

mance integrated circuit devices from a small selection of standardizable components, comprising the steps of:

- (a) assembling plurality of substantially identical chip carriers adjacent to each other onto a common substrate to form a mosaic; wherein each of said carriers comprises: connection pads so arranged on the periphery of said carrier that each connection pad, except for those connection pads on the periphery of the mosaic, is immediately adjacent to a corresponding connection pad of another carrier of the mosaic; and a software-configurable integrated circuit chip mounted on said carrier; wherein:
- said chips, carriers, and mosaic are so configured as to allow each chip to selectively transmit and receive data through said connection pads to and from a chip on any adjacent carrier in said mosaic; and
- immediately adjacent ones of said connection pads are electrically connected to each other without the use of intervening wires or leads; and
- (b) configuring said chips by electronic signals to form a very large scale integrated circuit.

4,955,132

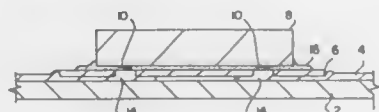
**METHOD FOR MOUNTING A SEMICONDUCTOR CHIP**  
Kazuhito Ozawa, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 15, 1988, Ser. No. 271,256

Claims priority, application Japan, Nov. 16, 1987, 62-288788  
Int. Cl.<sup>5</sup> H05K 3/34

U.S. Cl. 29—840

8 Claims



1. A method for mounting a semiconductor chip on a circuit board, which comprises:

- forming a wiring pattern, which is to be connected with electrodes of the semiconductor chip, on the circuit board;
- attaching an insulating film, which has at least one hole that fits the shape of said electrodes of the semiconductor chip, to the top of said wiring pattern and the exposed portion of said circuit board;
- filling said hole formed in said insulating film with a conductor; and
- placing said semiconductor chip on said insulating film and connecting electrodes of the semiconductor chip electrically with said wiring pattern on the circuit board through said conductor by use of a conductive adhesive agent.

4,955,133

**METHOD OF MAKING PULLEYS WITH PLURAL V-SHAPED GROOVES**

Haruma Tanaka, Fujimi, Japan, assignor to Sanaka Press Industry Company, Ltd., Tokyo, Japan

Division of Ser. No. 198,109, May 24, 1988, abandoned. This application Mar. 10, 1989, Ser. No. 321,859

Claims priority, application Japan, May 28, 1987, 130032/87  
Int. Cl.<sup>5</sup> B21K 1/42

U.S. Cl. 29—892.3

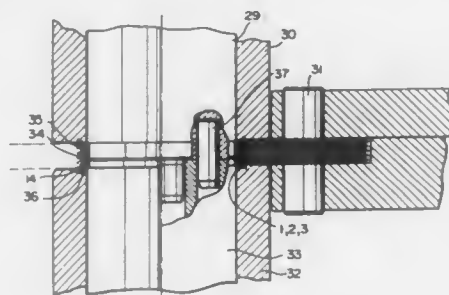
1 Claim

1. A method of making a pulley with a plurality of V-shaped grooves, wherein the pulley has a rim including one or more rim formations fixed to a core, comprising the steps of

- (a) punching a core blank to form a core member having a selected core shape including a generally cylindrical outer surface having serrations facing outwardly therefrom,
- (b) processing a rim blank having a smooth outer surface and inner surface to form a rim member having a rim formation formed therein, wherein the rim formation has an

inner surface including rim serrations and an outer surface,

- (c) rolling a roll against the rim formation to form a plurality of outwardly facing V-shaped grooves on the outer surface of the rim formation; and



- (d) simultaneously with said rolling step, fixing the rim member to the core member by interfitting the serrations on the core member with the rim serrations of the rim formation under the action of the force used in said rolling step.

4,955,134

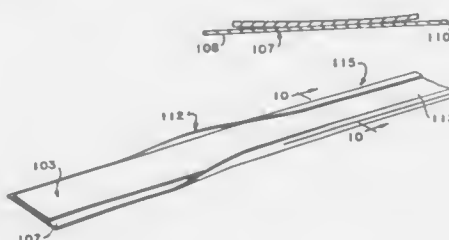
**METHOD OF FORMING A SPRING-LIKE FIRE STRIP**  
William J. Platt, Aston, Pa., assignor to National Rolling Mills, Inc., Frazer, Pa.

Division of Ser. No. 375,567, Jul. 3, 1989, Pat. No. 4,916,877, which is a continuation-in-part of Ser. No. 269,921, Nov. 10, 1988, Pat. No. 4,864,791. This application Oct. 30, 1989, Ser. No. 429,115

Int. Cl.<sup>5</sup> B23P 19/04

U.S. Cl. 29—897.312

4 Claims



1. The method of making a fire strip, including a strip body, having an under side and an upper side, and first and second ends, for a grid ceiling for supporting panels, and having

- (a) an inner web of spring steel on the upper side of the strip and having a preformed arcuate cross section extending concavely upwardly, and having a top, a bottom, and side edges,
  - (b) an outer web of soft steel disposed at said bottom of the inner web on the under side of the strip and having edge portions wrapped around the side edges of the inner web and bent to lie along the top of the inner web,
  - (c) end portions at both ends of the strip bent upwardly substantially normal to the strip body, and
  - (d) fastening means on said end portions for securing the ends of the strip to grid members;
- wherein the body of the strip has an upwardly extending, spring-like, yieldable arch; comprising
- (a) continuously forming the inner web from a flat and rectangular cross section into said arcuate cross section,
  - (b) continuously wrapping and bending the outer web around the inner web thereby forming a continuous strip,
  - (c) cutting the resultant continuous strip into given strip lengths, and

- (d) bending portions of the strip lengths at both ends normal to the strip to form an upwardly extending, yieldable, spring-like arch.

4,955,135

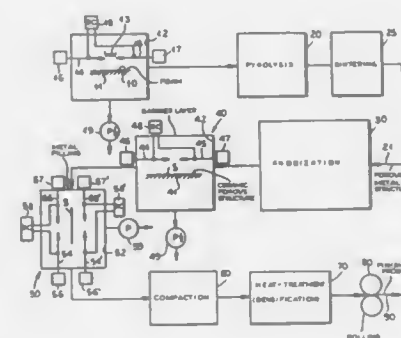
**METHOD OF MAKING MATRIX COMPOSITES**  
Eduard Pinkhasov, Eastchester, N.Y., assignor to Vapor Technologies Inc., Mt. Vernon, N.Y.

Filed Nov. 16, 1988, Ser. No. 272,557

Int. Cl.<sup>5</sup> B23P 17/00

U.S. Cl. 29—527.2

18 Claims



1. A method of making a matrix composite which comprises the steps of:

- (a) coating interstitial and external walls of a synthetic resin foam: material with a first substance resistant to heat so as to form a body with a continuous network from said first substance;
- (b) pyrolyzing said synthetic resin foam material of said body to substantially completely remove said synthetic resin material to leave a porous structure substantially free from interfaces between strands of said structure and constituted by said network;
- (c) depositing a second substance in pores of said structure to substantially fill the same and form a matrix phase in which said porous structure is embedded; and
- (d) compacting the structure filled with the matrix phase to form the matrix composite.

4,955,136

**SHAVING APPARATUS**

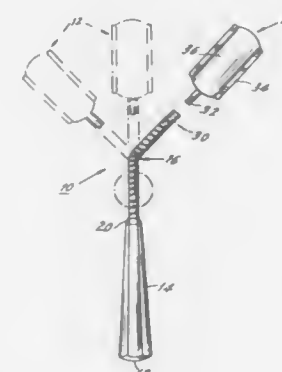
Jose E. Diaz-Rivera, Calle Anapola, 75 La Ponderosa, Rio Grande, P.R. 00745

Filed Oct. 24, 1988, Ser. No. 261,566

Int. Cl.<sup>5</sup> B26B 21/00

U.S. Cl. 30—32

15 Claims



1. A shaving apparatus comprising:

- a handle;
- a bendable, nonresilient section connected at one end to the handle, said bendable section comprising a plurality of interlocking, circular elements each having an S-shaped cross-sectional wall; and
- a blade unit connected to another end of the bendable section, the bendable section being bendable by the user of the shaving apparatus to cause the blade unit to be oriented at a desired angle with respect to the handle thereby providing a desired handle angle for the user.

4,955,137

**MECHANISM FOR ADJUSTING DEPTH OF CUT ON WIRE AND CABLE JACKETS**

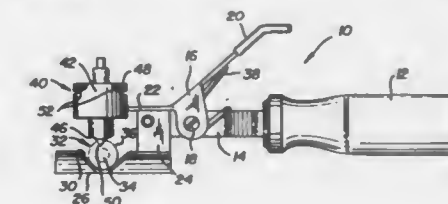
James J. Matthews, East Haddam, Conn., assignor to Ripley Company, Inc., Cromwell, Conn.

Filed Mar. 6, 1989, Ser. No. 320,278

Int. Cl.<sup>5</sup> B21F 13/00; B26B 27/00

U.S. Cl. 30—90.1

26 Claims



1. A tool for stripping jacket from cable comprising: means for holding a portion of said cable; and means for clamping said cable against said holding means and cutting said jackets, said clamping and cutting means including a surface for bearing against the exterior of the jacket on said cable and a cutter member for cutting said jacket, said cutter member being secured on a central member extending above an adjustment knob and adjustable by rotation of said knob toward and away from said cable to vary the depth of cut of the jacket of the cable held in the holding means, said central member being removably secured by screw means for replacement of said cutter member.

4,955,138

**UTILITY BLADE SCRAPER**

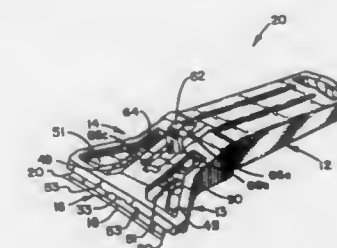
David R. Henke, Maple Grove, and Steven L. Thompson, Buffalo, both of Minn., assignors to Warner Manufacturing Company, Minneapolis, Minn.

Filed Jan. 13, 1989, Ser. No. 297,414

Int. Cl.<sup>5</sup> A47L 13/04; B26B 29/02

U.S. Cl. 30—169

16 Claims



1. A blade scraping tool used with a utility knife blade, comprising:

- (a) a handle having top and bottom surfaces and including a blade housing portion having top, bottom and side surfaces, the blade housing portion being proximate a front end of the blade scraping tool and being adapted to re-



ceive a utility knife blade, the blade housing portion including diverging inner side surfaces diverging away from each other toward a front end of the blade housing portion;

(b) trigger means slidably mounted in the blade housing portion intermediate of the top and bottom surfaces of the blade housing portion for slidably moving a utility knife blade into and out of the front end of the blade housing portion of the handle, a utility knife blade being mountable on the trigger means and slidably movable therewith, the utility knife blade being mounted on the trigger means with its scraping edge extending substantially perpendicular to a longitudinal axis of the blade scraping tool, the trigger means including:

(i) lever means accessible from outside the blade housing portion cooperating with the blade housing portion for locking the trigger means in at least three different locking positions and for slidably moving the trigger means into and out of the locking positions, the locking positions including a storage position in which the scraping edge of the utility knife blade is contained within the blade housing portion, a blade scraping position in which the scraping edge of the utility knife blade is exposed, and a blade changing position in which the utility knife blade may be removed from the trigger means;

(ii) a blade mounting surface area in front of the lever means adapted to receive a utility knife blade, the blade mounting surface area including projection means for preventing forward or backward movement of the utility knife blade relative to the blade mounting surface;

(c) wherein the blade housing portion includes at least one track means for supporting the trigger means while it is slidably mounted in the blade housing portion.

4,955,139

## CUTTING TOOLS HAVING A PLASTIC HANDLE

Wilfried Clotten, Langenfeld, and Rainer Feige, Wermelskirchen, both of Fed. Rep. of Germany, assignors to J. A. Henckels Zwillingswerk Aktiengesellschaft, Solingen, Fed. Rep. of Germany

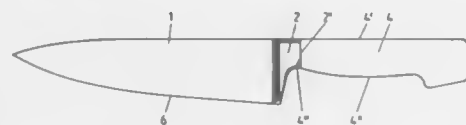
Filed Apr. 25, 1988, Ser. No. 185,531

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1987, 3713958

Int. Cl.<sup>5</sup> B25G 1/00

U.S. Cl. 30—340

6 Claims



1. A cutting tool, particularly a knife, comprising a handle;

blade means, the blade means including an attachment section rearward of the blade means; and wherein the handle includes an insertion shaft for receiving the attachment section with a snug connection between said blade means and said handle, the insertion shaft being configured with a cross-section of wide and narrow sides, and having cross-sectional widenings, extending longitudinally on opposite wide sides of the shaft, inner surfaces of said widenings being spaced from said attachment section;

the handle comprises, on an end surface facing the blade means, freestanding lugs located in registration with corresponding cross-sectional widenings, the lugs converging towards each other in a generally forward direction of the

attachment section and being inclined relative to a longitudinal axis of the handle; and wherein

an inside distance between ends of the lugs is at least as great as a width of the attachment section, the length of each lug being greater than a spacing between the attachment section and an inner surface of the insertion shaft; and a forward end of said attachment section extends in width beyond said inside distance for engagement with said lugs to increase convergence of said lugs into locking engagement with said attachment section upon insertion of said attachment section into said shaft, said locking engagement bending said lugs in a direction perpendicular to said attachment section and introducing a longitudinal compression to each lug for a tight grip between said attachment section and said handle.

4,955,140

## DEVICE FOR MEASURING THREAD MINOR DIAMETER

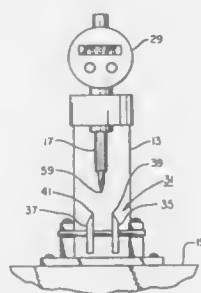
Joe E. Greenslade, 4311 Pheasant Walk, Fort Worth, Tex. 76133

Filed Oct. 26, 1989, Ser. No. 427,455

Int. Cl.<sup>5</sup> G01B 3/40

U.S. Cl. 33—199 R

7 Claims



1. A device for measuring the minor diameter of a screw thread on a screw having a longitudinal axis, the device comprising:

a frame;

first locator means carried by the frame for engaging a thread root at a first axial location along the screw;

second cooperating locator means arranged on the frame oppositely to the first locator means for holding the screw therebetween, the second cooperating locator means having a pair of engagement elements which engage the screw thread root at spaced locations along the longitudinal axis of the screw;

mounting means for mounting the second cooperating locator means on the frame, whereby the engagement elements thereof are independently movable along an axis generally parallel to the longitudinal axis of the screw, indicating means for determining a relative distance between the first and second locator means when the screw is held therebetween; and

wherein the mounting means is a shaft fixed on the frame generally parallel to the screw longitudinal axis, the engagement elements being freely slidable along the shaft.

4,955,141

## ADJUSTABLE PIVOT ANGLE SQUARE INVENTION

Richard E. Welch, 12 Centre Ave., Rockland, Mass. 02370

Filed Sep. 20, 1988, Ser. No. 246,988

Int. Cl.<sup>5</sup> B43L 7/00; G01C 9/00

U.S. Cl. 33—418

5 Claims

1. An adjustable pivot angle square comprising a base blade, a travel blade and an angle blade wherein:

A. said base blades, said travel blade and said angle blade are

separate, flat, elongated, rectangular members, pivotally interconnected by a rotating means;

B. said travel blade has a top end and an lower end oppositely disposed from said top end;

C. said angle blade has a lower end and an upper end oppositely disposed from said lower end;

D. said base blade has a straight end and an angled end oppositely disposed from said straight end;

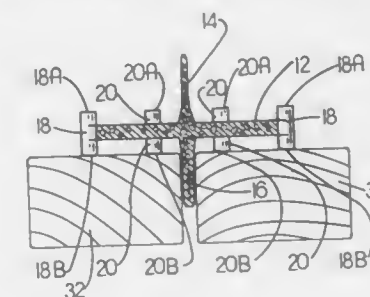
E. a pivotal means connects said travel blade lower end to said base blade at said base blade angled end in a pivotal relationship;

F. said travel blade has a travel slot extending through the center of said travel blade substantially the length of said travel blade elongation allowing full rotation of said travel blade;

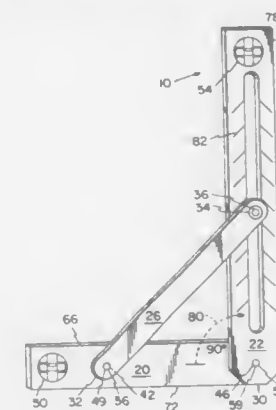
G. a movable means slidably connects said angle blade upper end to said travel slot;

H. a rotatable means connects said angle blade lower end to said base blade at a point disposed closer to said base blade straight end than said base blade angled end;

arms, integral with and extending from opposite sides of the base of said blades, each stabilizing arm having at least one spacing member on each of its flat surfaces for placement on



the top surface of the deck boards so as to provide means to facilitate removal of said hand tool and assure vertical orientation of the blade between adjacent boards.



I. a movable means connects said travel blade upper end to said travel slot by a combination of a travel blade lock bolt mechanism and a travel slot pivot pin mechanism cooperating together;

J. a slidable means rotatably connects said angle blade upper end and travel blade slot;

K. a pivotal means allows said angle blade lower end to rotate on said base blade allowing said angle blade pivotal movement necessary for said travel blade to rotate smoothly clockwise or counter clockwise;

L. said travel blade lock bolt mechanism and said travel slot pivot pin mechanism control said base blade movement and said travel blade movement;

M. said travel blade lock bolt mechanism turns to release and to lock said travel blade, said angle blade and said base blade by pressure adjustment to the said travel slot pivot pin mechanism, whereby, the user by releasing said travel blade lock bolt mechanism, can pivot or rotate the adjustable pivot angle square to a full 360 (three hundred and sixty) degrees.

4,955,142

## DECK SPACING TOOL

Kenneth J. Rieck, 7 Olde Orchard Ln., Fairport, N.Y. 14450

Filed Sep. 6, 1989, Ser. No. 403,476

Int. Cl.<sup>5</sup> G01B 3/30, 3/32

U.S. Cl. 33—526

11 Claims

1. A hand tool for use in placing deck boards on a support structure, said tool being in the form of a unitized main body portion which comprises a pair of oppositely extending vertical blades suitable for placement between adjacent deck boards so as to maintain a uniform space prior to permanently fixing said deck boards in place, said blades being integrally connected to the main body portion at a base section, a pair of substantially flat generally horizontally extending stabilizing

4,955,143  
APPARATUS AND METHOD FOR CONTROLLING AND ADJUSTING THE GEOMETRIC RELATIONSHIP BETWEEN ELECTRODE TIPS OF AN UNDERWATER SPARK DEVICE

Ulrich Hagelauer, Bottighofen, Switzerland, assignor to Storz Medical AG, Kreuzlingen, Switzerland

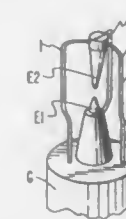
Filed Apr. 20, 1989, Ser. No. 340,796

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1989, 3904049

Int. Cl.<sup>5</sup> G01B 3/30

U.S. Cl. 33—652

14 Claims



1. A method for controlling and adjusting the relative position of electrodes of a spark gap device, one electrode being mounted by at least one electrode holder to a base plate, the method comprising the steps of:

engaging the at least one electrode holder; and

positioning the at least one electrode holder about an electrode axis extending between the electrodes to a nominal position at which the electrodes are properly positioned with respect to at least one of an alignment, angularity and electrode distance of tips of the electrodes, the positioning step being accomplished by bending of the at least one electrode holder.

# 4,955,144 COMPATIBLE INTERMODAL ROAD/RAIL TRANSPORTATION SYSTEM

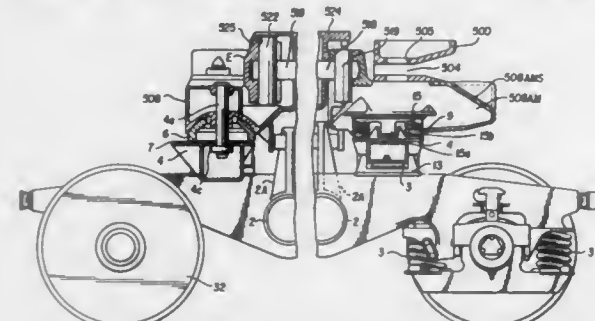
Jean Lienard, Ferriere la Petite; Francis Haesebrouck, Versailles, both of France; Sol Katz, New Hope, Pa.; Andrew Abolins, Langhorne, Pa., and George Schmidt, Langhorne, Pa., assignors to Strick Corporation, Langhorne, Pa. and Usines et Acleries de Sambre et Meuse, Paris la Defense, France

Continuation-in-part of Ser. No. 147,361, Jan. 27, 1988, Pat. No. 4,922,832. This application Jun. 14, 1988, Ser. No. 207,109

Int. Cl.<sup>5</sup> B61D 17/20

U.S. Cl. 105—4.2

5 Claims



1. A bogie intended to be placed between the ends of two road trailers at least one of which has a drawbar extending from a longitudinal end thereof, the bogie including a rigid chassis having first and second ends mounted on rail wheels, said first and second ends of said chassis having first and second supports, respectively, to accommodate an end of a supported member, said first support supporting a first supported member and said second support supporting a second supported member, said first support including means to attach said supported member to said support in a removable manner, said first supported member comprising a freight container and said second supported member comprising an adapter bolster, said adapter bolster comprising a drawbar receiving opening and means for retaining the drawbar of the road trailer in said opening and each of said first and second supports being connected to the chassis by fastening means allowing a predetermined freedom of movement of the supports with respect to the chassis around the following three axes: the axis perpendicular to the horizontal plane of the chassis, the axis parallel to the longitudinal axis of the chassis and the axis perpendicular to the vertical longitudinal plane of symmetry of the chassis.

# 4,955,145 HAIR DRYER ATTACHMENT

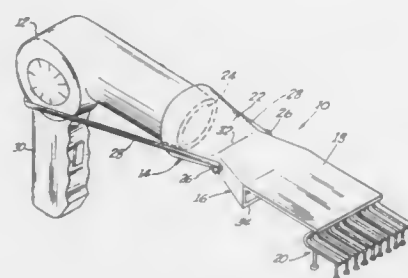
Joseph C. Scivoletto, Coral Springs, Fla., assignor to Lisa Maria Scivoletto, Coral Springs, Fla.

Filed Sep. 11, 1986, Ser. No. 906,171

Int. Cl.<sup>5</sup> F26B 21/06

U.S. Cl. 132—271

20 Claims



1. An attachment for a blow dryer comprising:

a plurality of picks, each extending from said attachment and having an end remote from said attachment;  
hair catching means having one end thereof attached to said remote end of each of said picks, said hair catching means having a hair catching surface facing away from the other end thereof;  
means for directing air emitted by said blow dryer towards said hair catching means; and  
means for attaching said attachment to said blow dryer.

# 4,955,146

## LUMBER DRYING KILN

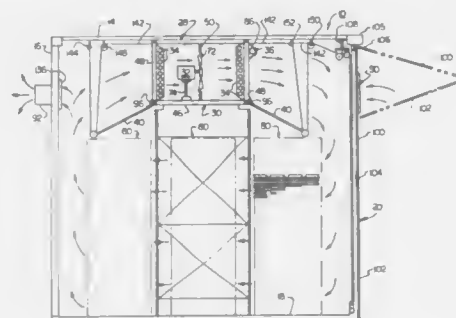
Howard E. Bollinger, Lenoir, N.C., assignor to Boldesigns, Inc., Lenoir, N.C.

Filed Sep. 1, 1988, Ser. No. 239,549

Int. Cl.<sup>5</sup> F26B 21/06

U.S. Cl. 34—191

2 Claims



1. A kiln for seasoning lumber, comprising:  
(a) a housing defining a drying chamber and having opposed side walls;  
(b) a top wall forming a roof;  
(c) an end wall;  
(d) closure means opposite said end wall for permitting lumber to be inserted within and removed from said chamber;  
(e) an air treatment and circulating assembly adjacent said top wall, said air treatment and circulating assembly including a series of fan assemblies for circulating air to the lumber stacked within said chamber and means for heating air within said chamber;  
(f) a power-operated exhaust venting system located on the downstream side of the airflow from the lumber stack and on the upstream side of said air treatment and circulating assembly, said exhaust venting system being operable to exhaust moisture-laden wet air prior to the air passing through said air treatment and circulating system; and  
(g) an intake air vent located downstream of the air flow from said air treatment and circulating assembly and upstream of the stacked lumber, said air vent being operable to add additional outside air to make up that portion of air which is exhausted through said exhaust venting system, whereby the flow of air circulated through the lumber stacked within said chamber remains substantially constant, wherein said air treatment and circulating assembly and said power-operated venting system are reversible, whereby said power-operated venting system is operable to add additional outside air and said air vent is operable to exhaust the moisture-laden air prior to the air passing through said air treatment and circulating assembly.

# 4,955,147

## SHOE, SANDAL OR SIMILAR FOOTWEAR

Louis Bos, Hogewerf 108, 1082 NG Amsterdam, Netherlands

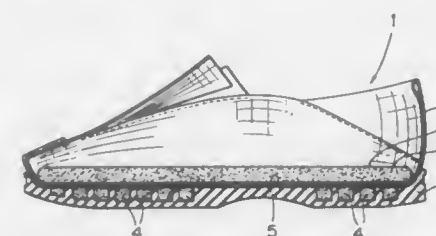
Filed Dec. 16, 1988, Ser. No. 285,760

Claims priority, application Netherlands, Dec. 29, 1987, 8703146

Int. Cl.<sup>5</sup> A43B 3/12

U.S. Cl. 36—11.5

5 Claims



1. Footwear provided with a sole having a wear layer, and with means for binding to the foot, characterized in that the side of the sole facing the foot is flat, and is provided with an also flat layer of highly springy elastic material, said highly springy elastic material being characterized by a high elastic recovery capacity such that said layer of said highly springy elastic material provides increasing support as said layer is depressed further by the weight of said foot and wherein said layer of said highly springy elastic material instantaneously returns to a flat layer upon removal of the weight of said foot wherein said flat layer of said highly springy elastic material is further characterized by not being pre-shaped along a vertical plane to conform to the plantar surface of said foot.

# 4,955,148

## FOOT SUPPORT ASSEMBLY

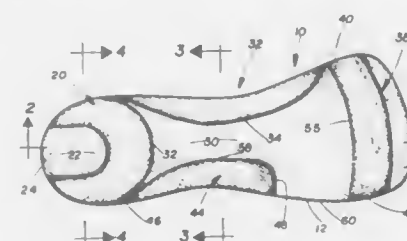
Rigoberto Padilla, 801 W. 48th St., Hialeah, Fla. 33012

Filed Apr. 14, 1989, Ser. No. 338,187

Int. Cl.<sup>5</sup> A43B 13/38; A61F 5/14

U.S. Cl. 36—44

6 Claims



1. Any foot support assembly designed for placement within a shoe in supporting engagement with the bottom of a foot, said assembly comprising:  
a. a support platform formed of a resilient cushion material and having a first main face and a second main face, said first main face structured and configured to engage predetermined portions of the undersides of the foot;  
b. a heel support formed on a posterior end of said first main face and having an elongated substantially curvilinear horse shoe configuration extending along its length in surrounding relation to a recessed central elongated channel having an open end disposed adjacent to said posterior end, said heel support positioned beneath an engaging relation to the heel of the foot;  
c. an arch support formed on an inner edge of said first main face having a curved configuration in substantial conformance with an arc portion of the foot and having sufficient length to extend along at least a major portion of the length of the arch of the foot;  
d. an external side support formed on an outer edge of said first main face having an elongated configuration oppositely disposed relative to said arch support and extending along an external side portion of the foot in supporting, engaging relation thereto;  
e. a metatarsal support formed on an upper end of said first main face opposite to said heel support and having an elongated arcuate configuration of substantially uniform width extending transversely across said first main face in supporting relation to the metatarsal region of the foot, said metatarsal foot having opposite ends thereof disposed adjacent to correspondingly positioned opposite sides of the support platform;  
f. a recessed portion on said first main face interconnecting and extending between said supports, and  
g. said supports extending above said recessed portion to a sufficiently greater height to accomplish supporting engagement with a corresponding under surface portion of the foot.

first main face having an elongated configuration oppositely disposed relative to said arch support and extending along an external side portion of the foot in supporting, engaging relation thereto;

e. a metatarsal support formed on an upper end of said first main face opposite to said heel support and having an elongated arcuate configuration of substantially uniform width extending transversely across said first main face in supporting relation to the metatarsal region of the foot, said metatarsal foot having opposite ends thereof disposed adjacent to correspondingly positioned opposite sides of the support platform;  
f. a recessed portion on said first main face interconnecting and extending between said supports, and  
g. said supports extending above said recessed portion to a sufficiently greater height to accomplish supporting engagement with a corresponding under surface portion of the foot.

# 4,955,149

## SKI BOOT WITH ANKLE SUPPORT

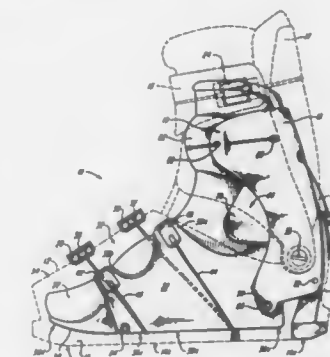
Marco T. Ottieri, 15 W. 53rd St., Apt. 15C, New York, N.Y. 10019

Filed Nov. 22, 1988, Ser. No. 275,117

Int. Cl.<sup>5</sup> A43B 5/04, 7/20

U.S. Cl. 36—119

13 Claims



1. A ski boot comprising  
a substantially rigid outer shell,  
a heel spoiler for selectively engaging and supporting the back of the wearer's lower leg and hingedly connected to the outer shell to facilitate pivotal movement of the spoiler between open and closed positions;  
a boot liner disposed within said outer shell for comfortably seating a wearer's foot within the boot,  
selectively operable closure means for securing the boot to a wearer's foot, and  
ankle support means, disposed substantially interior of the outer shell, for supportingly engaging the front of wearer's foot above the malleolus to maintain the wearer's foot supportingly engaged within the boot when the boot is in the closed position.

# 4,955,150

## IDENTIFICATION SYSTEM FOR FOOTWEAR

Nancy L. Fagan, Joy Ave., Stonington, Conn. 06378

Filed Aug. 18, 1989, Ser. No. 395,781

Int. Cl.<sup>5</sup> A43B 23/24; A44C 3/00

U.S. Cl. 36—136

11 Claims

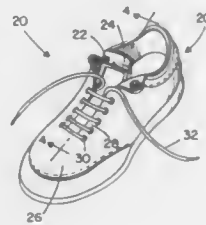
1. The combination comprising:  
footwear of the type having a tongue and means selectively overlying said tongue for releasably fastening said footwear to the wearer;  
an identification system for placement on said footwear including:



elongated tubular member of pliable, liquid impermeable material defining an internal compartment capable of receiving and holding items of importance to the wearer of said footwear;

entry means at one end of said tubular member for providing access to the internal compartment;

closure means for selectively sealing said entry means to isolate the internal compartment from ambient conditions



and substantially prevent entry therein of water and other substances; and

primary pressure sensitive mounting means for releasably attaching said tubular member to said tongue;

said tubular member being intimately positioned intermediate said tongue and said fastening means of said footwear thereby preventing unintended removal thereof when said footwear is in its operative condition.

4,955,151

# BUCKET WHEEL WITH OVERHEAD DISCHARGE

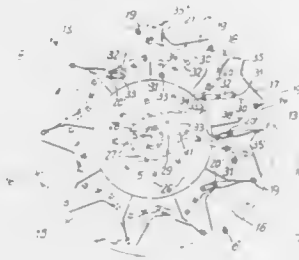
John F. Bryan, Dallas, Tex., assignor to Krupp Industrietechnik GmbH, Duisburg, Fed. Rep. of Germany

Filed Mar. 23, 1989, Ser. No. 327,713

Int. Cl.<sup>5</sup> E02F 3/24

U.S. Cl. 37—190

12 Claims



1. In an excavating bucket wheel having a rotary axis; an outer periphery; a plurality of radially outwardly open bucket chambers disposed in a circular array about the rotary axis; during rotation of the bucket wheel each chamber assuming a material receiving position and a material dumping position circumferentially spaced along said periphery from said material receiving position; each bucket chamber being defined by a cutting plate supported at said periphery and having a trailing edge as viewed in the direction of rotation; two axially spaced, parallel side walls, a rear wall extending axially between the side walls; said rear wall having an inner edge and an outer edge; said inner edge being closer to the rotary axis than said outer edge; the outer edge being situated adjacent said cutting plate; and a bottom wall extending axially between the side walls and being supported for pivotal motion about an axis oriented parallel to said rotary axis of said bucket wheel and being situated adjacent said outer periphery; said bottom wall having a first pivotal position for receiving material and a second pivotal position for dumping material; said bottom wall further having an outer terminal edge; and first actuating means for pivoting said bottom wall; the improvement comprising pivot means for pivotally supporting each said rear

wall, at the inner edge thereof, about an axis oriented parallel with the rotary axis of said bucket wheel; and second actuating means for urging each said rear wall into contact with the outer terminal edge of a respective said bottom wall.

4,955,152

# STEAM IRONING PRESS

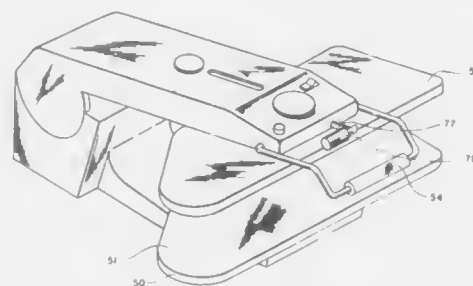
Donald R. Davidson, Chatham; Pao-Ter Huang, Edison, and H. David Rogers, Fanwood, all of N.J., assignors to SSMC Inc., Edison, N.J.

Filed Jul. 31, 1989, Ser. No. 388,125

Int. Cl.<sup>5</sup> D06F 71/34

U.S. Cl. 38—36

5 Claims



1. A steam iron press adapted to press an article of fabric and comprising:

first and second generally horizontal members, the first member being fixed in position and having an exposed upper surface, the second member having an exposed lower surface and being movable toward and away from the first member so that the exposed lower surface is moved toward and away from the exposed upper surface, the second member including a first heat conducting flat horizontal plate containing spaced orifices and having at least one opening for receiving water, the first plate having at least one cut out channel connected between said opening and said orifices, the second member also including a second flat conducting plate aligned with and disposed below the first plate and containing orifices which are aligned with the orifices in the first plate, the lower surface of the second plate constituting the lower surface of the second member;

the pressing action ensuing when the second member is moved toward the first member until the article is squeezed between the two exposed surfaces;

a manually operated mechanism connected to the second member for moving the second member to any position between a position of maximum separation and a position of minimum separation with respect to the first member; first means in the second member for heating water supplied through said opening in the first plate for heating such water into steam, the steam being expelled through said orifices, said means also heating said exposed lower surface so that when said article is squeezed, it is pressed using heat and steam;

a water reservoir containing water;

a pump connected between the reservoir and the opening in the first plate to supply water thereto when actuated, the water flow into said opening being discontinued when the pump is deactivated; and

second means responsive to said mechanism to actuate and deactivate said pump.

4,955,153

# DISPLAY SIGN HOLDER AND DISPLAY SIGN THEREFOR

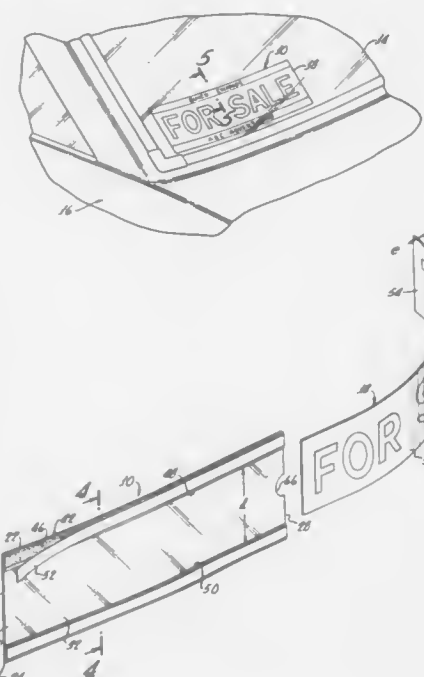
Leonard N. Albrecht, Irvine, and Steven R. Burke, Huntington Beach, both of Calif., assignors to Bruce G. McLeod, Anaheim and Allan R. Fowler, Palm Desert, both of Calif., a part interest

Continuation of Ser. No. 73,925, Jul. 15, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 338,469

Int. Cl.<sup>5</sup> G09F 3/18

U.S. Cl. 40—661

9 Claims



1. A semi-rigid, sleeve-type display sign holder adapted to conform and adhere to a planar or gently curved supporting surface for holding and displaying an elongated display sign removably inserted longitudinally between said holder and the supporting surface, said display sign holder comprising:

(a) a semi-rigid substantially flat sheet of optically clear plastic material of substantial thickness, said sheet having an elongated rectangular configuration, with top and bottom elongated edges extending generally parallel along the length thereof and with opposite ends edges extending transverse to the length thereof; and, said sheet also having opposite sides and upper and lower marginal areas extending longitudinally for the full length of said sheet along one side thereof respectively adjacent said top and bottom edges;

(b) means defining substantially flat, elongated upper and lower spacing structures extending respectively along said upper and lower marginal areas for the full length thereof on said one side of the sheet, said spacing structures each having an outer base surface and having a substantial thickness corresponding approximately to the thickness of said sheet, and thereby so spacing the sheet portion therebetween from any supporting surface against which the outer base surfaces of said spacing structures are placed and defining an elongated open channel of uniform depth corresponding approximately to the thickness of said flat spacing structures into which an elongated display sign may be freely inserted and retained against said supporting surface;

(c) an upper and lower layer of adhesive extending respectively along the outer base surface of the upper and lower

spacing structure for adhering the holder to a supporting surface; and

(d) upper and lower elongated strips of protective material respectively covering said upper and lower adhesive layers, said protective strips being manually removable to expose the adhesive layers in order to adhere the holder to a supporting surface.

4,955,154

# ANTI-THEFT IDENTIFICATION DETERRENT FASTENER

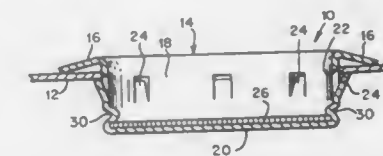
Nathan S. Moss, 98 Silver Lake Rd., Staten Island, N.Y. 10301

Filed Jul. 20, 1989, Ser. No. 382,387

Int. Cl.<sup>5</sup> G09F 3/08

U.S. Cl. 40—663

4 Claims



1. An anti-theft identification deterrent fastener for a part which comprises:

(a) a housing having a raised flange there about, a side wall and bottom wall which will fit into the part having a corresponding cutout area;

(b) means on said side wall for locking said flange of said housing onto the cutout area of the part to prevent tampering of said housing, wherein said locking means includes a plurality of spring projections formed on a side of said sidewall and outwardly extending from said side wall below said flange so that said housing can snap into the cutout area of the part with said spring projections preventing easy removal therefrom;

(c) an identification label affixed to said bottom wall; and

(d) means between said side wall and said bottom wall for securing said label thereto to prevent tampering of said label.

4,955,155

# PIVOTING TRIGGER GROUP ASSEMBLY

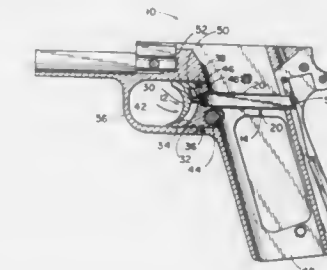
Benton L. Jones, 2102 24th St. SE., Ruskin, Fla. 33570

Filed Jan. 1, 1989, Ser. No. 339,510

Int. Cl.<sup>5</sup> F41A 19/10

U.S. Cl. 42—69.01

1 Claim



1. In a semi-automatic pistol having a frame, trigger frame rails, and a spring-loaded hammer, a trigger mechanism comprising a lever system including:

- (1) a trigger,
- (2) a pin,
- (3) a support shoe,
- (4) a set screw, and
- (5) a stirrup,

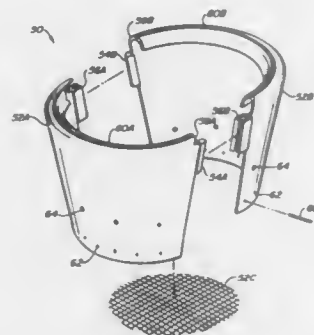
wherein said trigger being hingedly secured to said support

shoe by said pin, said support shoe being securely fastened within said frame of said pistol by said set screw, said stirrup slidably located within said trigger frame rails, said trigger contacting said stirrup to produce a camming action resulting in a mechanical advantage requiring minimal force and trigger travel to actuate said hammer.

**4,955,156**  
**PLANT WATERING AND ROOT PROTECTION DEVICE**  
James P. Williams, One Laurel Ave., Belvedere, Calif. 94920  
Filed Mar. 3, 1989, Ser. No. 318,667  
Int. Cl.<sup>5</sup> A01G 17/00

U.S. Cl. 47-25

7 Claims



1. A plant watering and protecting assembly adapted for protecting roots from underground rodents and for containing overhead water in a circumferential area above said roots for drainage into said roots, comprising a plurality of interlocking pieces adapted to removably interlock with one another to form a continuous annular sheath for underground encircling of said plant root system; each of said pieces accommodating securing means to which a solid chemical stick can be secured wherein each of said pieces is a single-molded form comprising a vertically-elongated sheet of stiff material, the upper edge of said piece comprising a curled lip wherein the degree of curling of said lip is sufficient to form an upper curvilinear edge to said piece and said curvilinear edge is adapted with a continuous groove extending along the entire length of said curvilinear edge, said curvilinear edge forming a berm for surrounding the base of a plant above ground in order to confine standing water within confines of said berm; the two vertical edges of said piece being of sufficient length to extend to an underground depth beneath the entire, or a major portion of, said root system; each of said vertical edges being adapted with interlocking engaging means for engaging and interlocking with a corresponding interlocking engaging means on a vertical edge of another of said pieces.

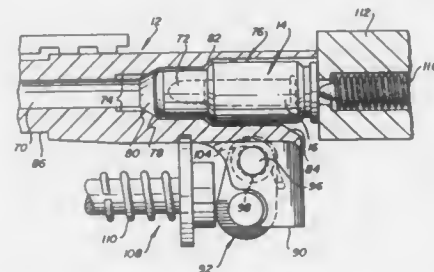
**4,955,157**  
**SMALL CALIBER AMMO CONVERSION KIT**  
Rich W. Brighton, 5015 S. Barton Pl., Seattle, Wash. 98118, and Paul Safr, 1657 Dale St., London, Ontario, Canada N5V 1Y3  
Filed Jun. 22, 1989, Ser. No. 370,027  
Int. Cl.<sup>5</sup> F41C 27/00

U.S. Cl. 42-77

20 Claims

1. A conversion kit for converting a large caliber gun to fire smaller caliber ammo, said kit comprising an adapter barrel for replacing an original barrel of the larger caliber gun and at least one separate small caliber shell adapter for carrying small caliber ammo, said barrel having a small caliber bore terminating in a rear breech for receiving the small caliber shell adapter carrying a small caliber ammo whereby the small caliber shell

adapter is insertable and removable from said breech, and there being between said breech and said small caliber bore cham-

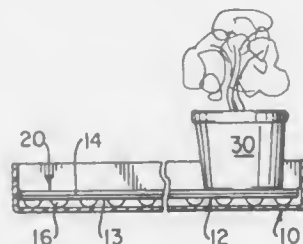


bering for preventing chambering of originally intended large caliber ammo.

**4,955,158**  
**PLANT WATERING MAT**  
William E. Lyon, Westbury, N.Y., assignor to Plant Tech., Horticultural Products Inc., Westbury, N.Y.  
Filed Mar. 9, 1988, Ser. No. 167,001  
Int. Cl.<sup>5</sup> A01G 25/00

U.S. Cl. 47-81

10 Claims



1. A plant watering mat for use in a tray comprising: a first piece of waterproof material having upper and lower surfaces, a second piece of waterproof sheet material having a plurality of holes therein disposed principally unbounded over said upper surface of said first piece, said lower surface of said first piece formed with a plurality of spaced apart downwardly projecting air cells adopted to rest on the bottom of the tray to provide with said tray a reservoir space for liquid between the cells and a support for an object placed on said second piece when the air cells of said lower surface of said first piece rest on said tray, the liquid from the reservoir travelling in the unbounded space between the upper surface of said first piece and the lower surface of said second piece to exit through the holes to said object located on the upper surface of said second piece.

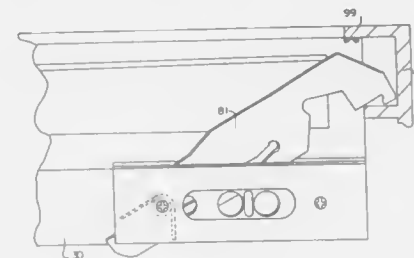
**4,955,159**  
**RETAINING CATCH FOR TIP-OUT SASH**  
Tracy G. Rogers, Rochester, N.Y., assignor to Schlegel Corporation, Rochester, N.Y.  
Filed Jul. 12, 1989, Ser. No. 378,969  
Int. Cl.<sup>5</sup> E05D 15/22

U.S. Cl. 49-161

30 Claims

1. A tip-out window apparatus for a sash slidable in a jamb, comprising: at least two spaced protruding parts for mounting along an edge abutting the jamb at a slot in the jamb for receiving the protruding parts, whereby the sash is slidable in the jamb in a first, normal mode to open and close the window as the sash is maintained in a same plane with the jamb,

one of the protruding parts being a releasable latch means, the sash being released and rendered rotatable around the other of the protruding parts and out of said plane when the latch means is retracted in a second, tip-out mode; and, a catch arm having a hook at a distal end of the catch arm, the hook being engageable in the jamb and being pivota-

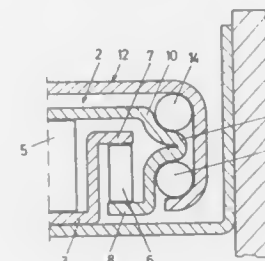


bly connected relative to the sash at a proximal end of the catch arm, the catch arm defining a maximum displacement between the jamb and the edge of the sash when the sash is released from the plane of the jamb in said tip-out mode, and the catch arm being fully releasable from the jamb by pivoting free the hook.

**4,955,160**  
**GUIDE WALL ASSEMBLY FOR DRAWERS**  
Erich Röck, Höchst, Austria, assignor to Julius Blum Gesellschaft m.b.H., Höchst, Austria  
Filed Aug. 11, 1989, Ser. No. 392,285  
Claims priority, application Austria, Sep. 15, 1988, 2265/88  
Int. Cl.<sup>5</sup> E04F 11/24

U.S. Cl. 312-340

11 Claims



1. A guide rail assembly for use on each of opposite sides of a drawer for guiding movement of the drawer into and out of an article of furniture, said assembly comprising:

a supporting rail to be mounted on a side of the article of furniture, said supporting rail having a U-shaped guide flange defining a U-shaped channel and having outwardly projecting horizontal marginal flanges on each of opposite sides thereof; a generally C-shaped pull-out rail embracing said guide flange of said supporting rail, said pull-out rail having on each of opposite sides thereof a generally vertical flange, a lower horizontal flange extending inwardly from a lower end of said vertical flange, and a horizontal running flange extending outwardly from said vertical flange at a position between said lower end thereof and an upper end thereof; carriage means supporting a plurality of rolling means substantially in a horizontal plane for enabling sliding movement between said pull-out rail and said supporting rail, said rolling means comprising central rolling means located in said U-shaped channel and rolling on said U-shaped guide flange and said pull-out rail and lateral rolling means, on each of opposite sides of said central rolling means, and rolling on a respective said lower horizontal flange of said

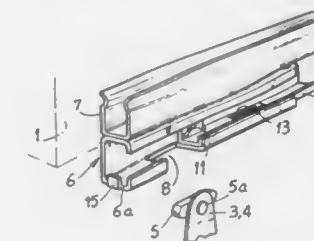
pull-out rail and a respective said horizontal marginal running flange of said guide flange of said supporting rail; and a drawer rail to be mounted on a drawer and guided for sliding movement relative to said pull-out rail by means of guide means located at each of opposite sides of said drawer rail and slidably engaging both upper and lower surfaces a respective said horizontal running flange at a respective said side of said pull-out rail; whereby the load of the drawer is transmitted from said drawer rail to said pull-out rail by said guide means and from said pull-out rail to said supporting rail by said rolling means.

**4,955,161**  
**CONNECTING DEVICE BETWEEN A WINDOW AND A WINDOW-RAISER ARM IN A VEHICLE DOOR**  
Carlo Bertolini, Paris, France, assignor to Rockwell-CIM, France

Filed Sep. 21, 1989, Ser. No. 410,215  
Claims priority, application France, Sep. 26, 1988, 88 12541  
Int. Cl.<sup>5</sup> E05F 11/44

U.S. Cl. 49-351

7 Claims



1. A connecting device between a window and a window raiser arm (3, 4) of a door in a vehicle, the window raiser arm having a follower element (5) attached thereto, said device comprising: (a) at least one track section (6) fixed to the lower edge of the window; (b) means in said track defining an orifice (8) for introduction of the follower element (5) into said track; (c) first locking means (12, 14) spaced longitudinally apart along the length of said track; and, (d) an elongate slideway (9) disposed with said track, said slideway (9) including second locking means (11, 13), which cooperate with said first locking means (12, 14) to permit a single translational movement of said slideway (9) with respect to said track section (6) by the follower element (5) acting against said second locking means to thereby cause said first and second locking means to interact and lock said slideway in fixed position closing said orifice (8).

**4,955,162**  
**PORTABLE GEM FACETING KIT**  
Clifford Jackson, P.O. Box 646, Burley, Id. 83318  
Filed May 19, 1989, Ser. No. 354,630  
Int. Cl.<sup>5</sup> B24B 7/14

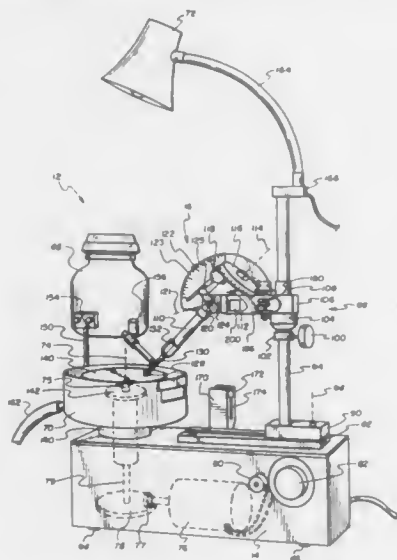
U.S. Cl. 51-125.5

15 Claims

1. A gem faceting kit comprising: a case having associating members adapted to operate between a closed position to constitute an enclosed and portable container carrying and storing a gem faceting machine having a removable mast and faceting head and a plurality of lap wheels, a plurality of dop sticks and a plurality of containers for grinding compounds, and an open position to constitute a rack for convenient retrieval and use of said stored items; a gem faceting machine, including: a housing, an arbor mounted in said housing to spin about a vertical axis,



a drive unit mounted in said housing and mechanically linked to said arbor to rotate said arbor, an upright mast and faceting head removably connected to said housing to extend upward from said housing, a keyway having an open end attached to said housing for removably connecting said mast to said housing in an upright position, mast storage means attached to said housing for securing said mast to said housing in a storage position reoriented from its upright position, wherein said mast and faceting head are configured and adapted to be reoriented with respect to said housing in a compact storage position;



a plurality of lap wheels configured to be connected to said arbor;  
a plurality of dop sticks formed to be fastened to a gem and connected to said faceting head;  
a plurality of containers for grinding compounds;  
wherein said gem faceting machine in said storage position has said mast removed from its upright position and secured to said housing in a reoriented position, said lap wheels, said dop sticks, and said containers for grinding compounds are sized, configured and adapted to be stored in said case; and  
wherein said case has a plurality of storage compartments for items of said kit stored in said case.

4,955,163

#### METHOD FOR PRODUCTION OF INVOLUTE GEAR TOOTH FLANKS

Gerd R. Sommer, Dietikon, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Bührle AG, Zurich, Switzerland  
Filed Jun. 27, 1988, Ser. No. 212,212

Claims priority, application Switzerland, Nov. 3, 1984, 5520/84

Int. Cl.<sup>5</sup> B24B 19/00

U.S. Cl. 51—287

17 Claims

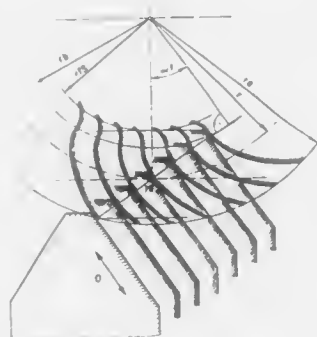
1. A method of fabricating involute gear tooth flanks on a machine having at least one machining tool and in which method machining motions entailing stroke and operating speed of the at least one machining tool, feed motions entailing relative movements between a gear blank and the at least one machining tool for producing at least one predeterminate involute gear tooth flank, and traversing motions entailing further relative movements between the gear blank and the at least one machining tool for producing a predetermined tooth flank profile and cutting depth, between the machining tool and a gear blank are performed, comprising the steps of:

confining machining contact between said at least one machining tool and said gear blank at least to the immediate

vicinity of a selectable single machining point on said at least one machining tool;

performing said feed motions such that said selectable single machining point is guided substantially along a selectable predeterminate machining line lying at least approximately on a tooth flank surface of a gear tooth of a gear being fabricated from said gear blank for generating a gear tooth flank generatrix envelope;

said step of confining machining contact entailing the step of confining said selectable single machining point within a predeterminate machining region of said at least one machining tool during machining by means of a supplementary feed motion;



said supplementary feed motion entailing the step of moving said at least one machining tool in the direction of said gear tooth flank of said gear tooth of said gear being fabricated and thereby compensating for migration of said selectable single machining point in said predeterminate machining region of said at least one machining tool during said step of performing said feed motions and during a predetermined stroke of said at least one machining tool; and  
during said supplementary feed motion of said at least one machining tool, guiding said selectable single machining point substantially in tangential contact with said tooth flank surface of said gear being fabricated from said gear blank.

4,955,164

#### METHOD AND APPARATUS FOR DRILLING SMALL DIAMETER HOLES IN FRAGILE MATERIAL WITH HIGH VELOCITY LIQUID JET

Mohamed Hashish, Kent, and Steve Craigen, Auburn, both of Wash., assignors to Flow Research, Inc., Kent, Wash.

Filed Jun. 15, 1989, Ser. No. 367,422

Int. Cl.<sup>5</sup> B24B 1/00; B24C 9/00

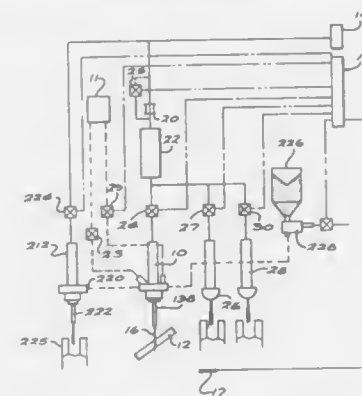
U.S. Cl. 51—321

23 Claims

1. A method for drilling a small diameter hole in a workpiece having at least one layer of material which tends to crack when impacted upon by a coherent high velocity jet of liquid, said material having front and back surfaces, the method comprising the steps of:

coupling a source of high pressure liquid to a jet-forming

orifice of a nozzle assembly to form a coherent, high velocity drilling jet;  
discharging the jet at the workpiece; and



varying the pressure at at least one rate during at least a substantial portion of the drilling operation through the material.

4,955,165

#### PIPE TAPERING DEVICE

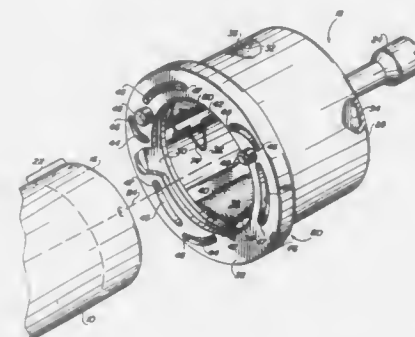
Harvey L. Brooks, 1302 NW, 14th St., and Tommy W. Cathey, HC 75, Box 2750-5, both of, Andrews, Tex. 79714

Filed May 4, 1989, Ser. No. 347,500

Int. Cl.<sup>5</sup> B24B 9/02

U.S. Cl. 51—331

9 Claims



1. Apparatus for tapering the outer surface of a marginal end of a length of tubing, comprising:

an outwardly opening enclosure having a free depending end through which a tubing end can be received and an opposed end that terminates in a rear bulkhead to which a drive means can be attached; said enclosure is formed by a skirt member that is fixed to said rear bulkhead and extends therefrom and forms said outwardly opening enclosure;

a flange means rotatably mounted at said free depending end of said skirt member; cam means supported adjacent said flange means, a cam follower engaging said cam means; a plurality of circumferentially spaced grinders; means pivotally mounting each said grinder within said enclosure for pivotal movement towards and away from the central axis of said skirt member;

means connecting said cam means and said follower whereby rotation of said flange means in one direction relative to said skirt member moves said grinders towards the central axis of said skirt member; said grinders each are a segment of a cylinder and have a curved abrasive surface that can be pivotally moved into engagement with the end of a tubing that lies along the central axis of

the skirt member to thereby grind the tubing marginal end into the form of a taper.

4,955,166

#### TORNADO UNDERGROUND SHELTER

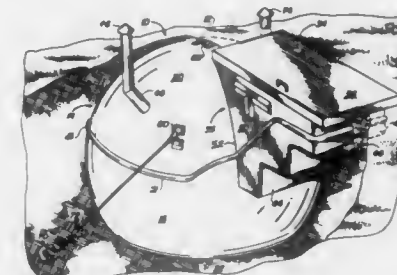
Steve M. Qualline, P.O. Box 1812, Odessa, Tex. 79760, and Louis R. Dannam, 1209 W. Cuthbert, Midland, Tex. 79701

Filed Nov. 15, 1988, Ser. No. 271,530

Int. Cl.<sup>5</sup> E02D 27/00

U.S. Cl. 52—169.6

13 Claims



1. A generally spherical shelter for safely housing and protecting people and things underground comprising an enclosure in the form of a truncated globe formed from a curved sidewall having a vertical central axis that passes through a top and bottom surface, with there being an equatorial plane passing through the major diameter of the globe at right angles to the central axis, the bottom surface being flat and lying in a horizontal plane that is parallel to the equatorial plane and forms a floor, a seat extends about the interior of said shelter and is attached to the sidewall and to the floor and thereby forms a structural member that rigidifies said globe;

a generally rectangular entrance is formed eccentrically relative to the central axis and has opposed longitudinally extending sides extending radially through the sidewall at a location commencing near the top and extending circumferentially along the sidewall and toward the bottom; a closure member forming a door for said entrance, a plurality of steps leading from said entrance down to said floor by which a person can conveniently walk through the entrance and down the steps into and up the steps from the shelter;

wherein said rectangular entrance is formed from vertical wall members which include said longitudinal extending sides, said vertical wall members having opposed sides that terminate in opposed upper and lower edges, the lower edge is curved into attached relationship relative to said sidewall and the opposed upper edge is spaced from said sidewall to terminate in a member that defines said rectangular entrance and abuttingly receives said closure member thereagainst and thereby defines a doorway into the shelter;

the vent means attached to the top that communicates with ambient by which fresh air can be introduced into the shelter.

4,955,167

#### ROOF VENT PIPE

Johannes Holtgreve, Schwelm, Fed. Rep. of Germany, assignor to Hans Klöber AG, Essen, Fed. Rep. of Germany

Filed Apr. 14, 1989, Ser. No. 338,875

Claims priority, application Fed. Rep. of Germany, May 7, 1988, 8806101

Int. Cl.<sup>5</sup> E04H 12/28

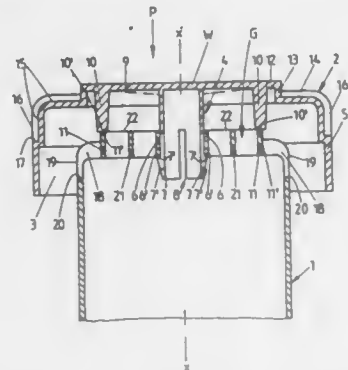
U.S. Cl. 52—199

12 Claims

1. A roof vent pipe comprising

a pipe having at an upper end thereof, formed in one piece therewith, a mouth-side rib structure formed at least in part of annular spokes; and

a cover cap disposed above the spokes; and wherein the cover cap comprises a central portion with downward directed projections, the projections including a central projection extending from the central portion and supporting fingers extending from the central portion; the cover cap is locked via said central projection to the upper pipe with said central projection of the cover cap



forming a detent member detent engaging in form-locked manner into an inside of one of said annular spokes of said rib structure; and said supporting fingers rest on at least one further outward of said annular spokes of said rib structure and are arranged concentrically projecting from a bottom of the cover cap at said central portion.

4,955,168

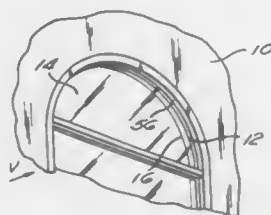
#### MOUNTING STRUCTURE FOR ARCuate WINDOW FRAMES

Michael Barry, Santa Ana, Calif., assignor to Daniel A. Nelhold, Orange, Calif.

Continuation of Ser. No. 365,957, Jun. 14, 1989, abandoned, which is a continuation of Ser. No. 320,756, Mar. 8, 1989, abandoned, which is a continuation of Ser. No. 183,762, Apr. 20, 1988, abandoned. This application Oct. 6, 1989, Ser. No. 418,986 Int. Cl.<sup>5</sup> E06B 1/04

U.S. Cl. 52—210

6 Claims



1. A device positionable of a framed wall opening to form an arcuate window jamb between a window frame mounted about the exterior of said framed wall opening and a wall board mounted about the interior of said framed wall opening, said device comprising:

an arcuate member having first and second longitudinal ends, an arcuate upper surface, an arcuate undersurface, an outer edge, and an inner edge; and the width between the outer edge and the inner edge of the member being such that, when said member is positioned within said framed wall opening, the outer edge of the member will abut the arcuate window frame, the inner edge of the member will abut the wall board, and the arcuate undersurface of the member will form an arcuate

jamb surface extending between said window frame and said wall board.

4,955,169

#### HARDBOARD SIDING

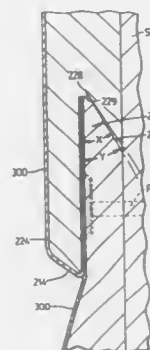
Walter S. Shisko, Corbell, Canada, assignor to MacMillan Bloedel Building Materials Limited, Weston, Canada

Continuation-in-part of Ser. No. 148,003, Jan. 25, 1988, abandoned, which is a continuation-in-part of Ser. No. 8,257, Jan. 29, 1987, abandoned. This application Jun. 14, 1989, Ser. No. 365,777

Int. Cl.<sup>5</sup> E04D 1/00

U.S. Cl. 52—536

16 Claims



1. A siding panel for selective attachment to an underlying support surface comprising: a unitary body of hardboard material having a front face, a back face, an upper edge and a lower edge, and upper and lower marginal edge portions extending inwardly from said upper and lower edges respectively, said upper edge of said body being bevelled to provide a V-shaped locking tongue, said bevelled upper edge extending downwardly and rearwardly from adjacent said front face of the panel to said back face to thereby form a line contact which engages the underlying support surface when said body is selectively attached to the support surface, a locking seat in the form of a notch formed in the back face of said body and extending upwardly from said lower edge to underlay said lower marginal edge portion, said body having a uniform thickness between said upper and lower marginal edge portions which is in the range of about 0.375 to 0.5 inch, said bevelled upper edge being bevelled with respect to said front face of said body at a first acute angle and said notch being defined by a second acute angle wherein said second acute angle is greater than said first acute angle, said second acute angle being approximately 35° to 40° with said first acute angle being approximately 5° to 10° less than said second acute angle and said notch having a depth measured from said back face which is not greater than that which reduces the thickness of the lower marginal even portion to about 0.1875 inch such that when the locking tongue of one panel is seated in the locking seat of a second panel when adjacent panels are arranged with their marginal edge portions overlapping one another on the support surface, the greater thickness of said upper marginal edge will serve to space a substantial portion of said back face of said second panel from the support surface to create a drying air gap therebetween with the line contact of said one panel being adjacent said lower edge of said second panel.

4,955,170

#### STRUCTURES FOR ROOFS MADE OF TILES OR THE LIKE

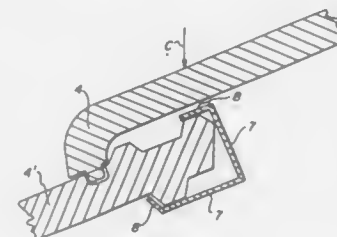
Roberto G. C. Dannemann, Alsina 971 1°, "10"-Capital Federal, Argentina

Continuation-in-part of Ser. No. 181,317, Apr. 13, 1988. This application Jul. 7, 1989, Ser. No. 376,568

Claims priority, application Argentina, Apr. 29, 1987, 307426 Int. Cl.<sup>5</sup> E04D 1/34

U.S. Cl. 52—547

8 Claims



1. A roof structure, comprising:  
a plurality of L-shaped purlins positioned longitudinally across the slope of a roof, said purlins having first and second legs forming said L-shape, each of said first and second legs including a respective first and second depending flange portion on a free end thereof, said first and second respective depending flange portions of each of said first and second legs defining a space therebetween; and,  
a plurality of tiles each having a first and second face and an upper edge and an emerging rib located along each upper edge of each tile on said first face thereof, and a protruding tooth located on said second face of said tile, also along said upper edge thereof; wherein,  
said upper edge of said tile is inserted in said space defined by said first and second depending flange portioned, and said emerging rib and protruding tooth engage said first and second depending flanges respectively, and thereby restrict removal of said tile from said L-shaped purlin.

4,955,171

#### BUILDING PANEL CONSTRUCTED IN LAYERS

Gert Kossatz, Brunswick; Wolfgang Heine, Osterode/Harz; Karsten Lempfer, and Heinz Sattler, both of Brunswick, all of Fed. Rep. of Germany, assignors to Fraunhofer Gesellschaft zur Förderung der Angewandten Forschung E.V., Munich, Fed. Rep. of Germany

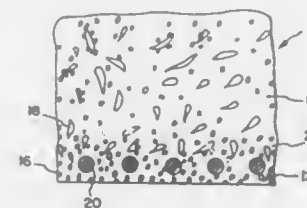
Continuation of Ser. No. 88,430, Aug. 24, 1987, abandoned. This application Jul. 10, 1989, Ser. No. 377,777

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1986, 3629223

Int. Cl.<sup>5</sup> E04B 5/04

U.S. Cl. 52—612

16 Claims



1. A building panel comprising:  
a first layer comprising a mixture of a hydrated binder and porous particles of a reinforcing additive capable of taking up, storing and releasing water;  
a second layer comprising a reinforcing mat embedded in a hydrated binder of the same type as said first layer, said

second layer being substantially without porous reinforcing additive; and  
a transition layer therebetween containing hydrated binder and porous reinforcing additive of the same types, respectively, as said first layer, said transition layer forming a gradual and continuous transition in composition between said first layer containing porous reinforcing additive and said second layer substantially without porous reinforcing additive, said transition layer being formed by migration of water between one of said first and second layers poured with an excess of water for hydrating said binder and the other of said first and second layers poured with a deficiency of water for hydrating said binder; said first layer being thicker than said second layer and said transition layer being thinner than said second layer.

4,955,172

#### VENEER ANCHOR

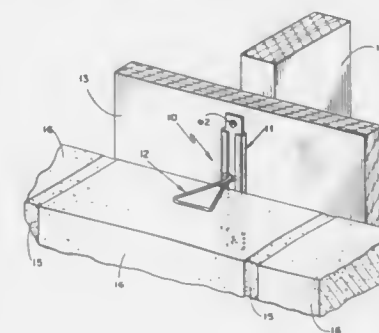
Neil W. Pierson, 221 N. 7th St., Apt. 7, Mora, Minn. 55051

Filed Sep. 14, 1989, Ser. No. 407,209

Int. Cl.<sup>5</sup> E04B 1/38

U.S. Cl. 52—710

2 Claims



1. A veneer anchor for securing masonry veneer to the exterior surface of a wall and a stud behind the wall, the veneer anchor comprising:

a rectangular integral plate with a solid backing, upper and lower portions, and side portions, each of the upper and lower portions including a pin receiving aperture formed therein, the solid backing including a front face, the solid backing bearable against the exterior surface of the wall,  
a pair of pin connectors, each of the pin connectors cooperating with one of the pin receiving apertures for securing the plate to the exterior surface of the wall and the stud behind the wall,  
a pair of longitudinally extending angle irons integrally connected to the side portions of the plate and extending inwardly therefrom, the angle irons disposed between the upper and lower portions of the plate so as to be spaced from the pin receiving apertures, each of the angle irons including a longitudinal inner edge, the inner edges forming a longitudinally extending slot, the slot being aligned with the pin receiving apertures, each of the angle irons further including a transverse inner face, and a lateral inner face which form a channel with the front face of the solid backing, and  
an integral rigid tie including a triangular rod portion for being set in the masonry veneer, a pair of noncompressible transverse rod portions bearing against each other for their entire lengths, and a pair of lateral rod portions extending away from each other, each of the lateral rod portions having an end, the combined width of the transverse rod portions being substantially equal to the width of the slot so that lateral movement between the transverse rod portion and slot is minimized, the distance between the ends of the lateral rod portions being substan-



tially equal to the distance between the transverse inner faces so that lateral movement between the lateral rod portions and transverse inner faces is minimized, the diameter of the lateral rod portions being substantially equal to the distance between the lateral inner faces of the angle irons and the front face of the solid backing so that transverse movement of the lateral rod portions relative to the angle irons is minimized whereby lateral and transverse movement of the tie relative the plate is minimized.

4,955,173

**STRUCTURAL STEEL CORROSION PROTECTION BY INERT GAS**

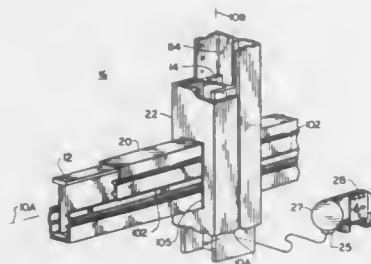
John K. Czechowski, 18111 Jolly St., Apt. 106, Huntington Beach, Calif. 92648

Filed Sep. 21, 1989, Ser. No. 410,304

Int. Cl.<sup>5</sup> E04C 1/40, 2/34

U.S. Cl. 52—727

8 Claims



1. Apparatus, for use in protecting an elongated structural steel member from corrosion, comprising:  
an elongated rigid envelope extending along a length direction of said structural member and surrounding said structural member, said envelope being gas tight; and  
a quantity of inert gas inside said envelope, said inert gas being at a pressure greater than that of the environment around said envelope.

4,955,174

**EXPANDABLE BUILDING WITH MODULAR ROOF SYSTEM**

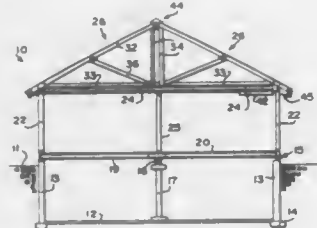
Daniel J. Valente, and Elizabeth M. Valente, both of 60 Sweet Rd., Glens Falls, N.Y. 12801

Filed Jan. 17, 1990, Ser. No. 464,856

Int. Cl.<sup>5</sup> E04G 21/00

U.S. Cl. 52—745

13 Claims



1. A method of constructing a one-story building that is expandable to include a second story, comprising the steps of:  
(a) constructing a one-story building frame including a plurality of side walls, and a plurality of upper joists extending at the tops of the side walls;  
(b) constructing a roof, including pitched roofing sections, and ceiling joists connected at the bottom of the pitched roofing sections;  
(c) lifting the constructed roof onto the top of the one-story building frame after construction thereof; and  
(d) connecting the roof to the one-story building frame, so

that the ceiling joists and upper joists are adjacent each other, with readily releasable fasteners.

4,955,175

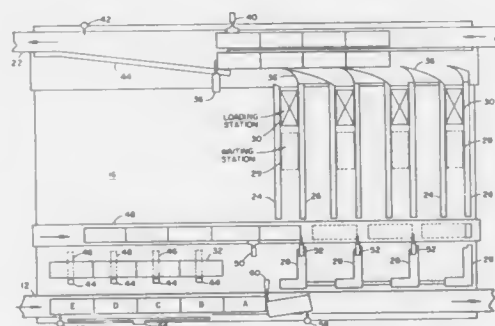
**TWO-STAGE BOX PUSHER FOR CARTON INDEXER**  
Fox J. Herrington, Holcomb, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 6, 1989, Ser. No. 306,015

Int. Cl.<sup>5</sup> B65B 43/42

U.S. Cl. 53—67

14 Claims



1. In an apparatus for the loading of a plurality of box-like cartons with articles including at least one indexing table for delivering cartons to and from a loading machine, the improvement comprising: a first conveyor for transporting empty boxes across said indexing table; a separating conveyor for transporting empty containers to a loading machine for said table; an intermediate station for said cartons between said first conveyor and said separating conveyor; first pusher means for pushing said cartons from said first conveyor to said intermediate station; second pusher means for pushing said cartons from said intermediate station onto said separating conveyor; an indexer for aligning said boxes at said loading machine; a second conveyor for transporting loaded boxes from said loading machine across said table; and means for merging loaded boxes from the machine on said table with a line of loaded boxes on said second conveyor.

4,955,176

**VACANT PACKAGE-PROOFING CONTROL DEVICE FOR PACKAGING MACHINE**

Kiyoshi Seko; Masato Hatano, and Shigeki Suzuki, all of Nagoya, Japan, assignors to Fuji Machinery Company Ltd., Aichi, Japan

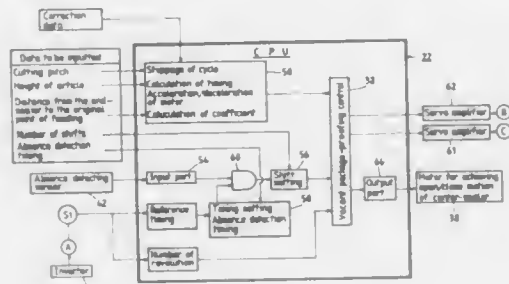
Filed Nov. 7, 1988, Ser. No. 267,944

Claims priority, application Japan, Apr. 7, 1988, 63-86583

Int. Cl.<sup>5</sup> B65B 57/10, 11/10

U.S. Cl. 53—73

8 Claims



1. A vacant package-proofing control system for a packaging machine, comprising:

- a first motor for driving a conveyor for feeding articles to be packaged with a predetermined space defined therebetween into a packaging material which is to be formed into a tube;  
a second motor for driving a plurality of rolls which deliver said packaging material formed into said tube at a position disposed downstream of said conveyor;  
a third motor for driving a pair of sealers for achieving end-sealing of said packaging material formed into said tube in a crosswise direction relative to the line of feed of said articles to be packaged;  
an absence detecting sensor disposed at a predetermined position upstream of a location at which said articles to be packaged are transferred from said conveyor to said tubular packaging material for detecting any absence of a packaging article being transported upon said conveyor with a predetermined amount of space defined between said articles, and for generating a signal in response to detection of said absence of said packaging article;  
reference timing pulse generating means for generating predetermined reference timing pulse signals with respect to said feeding of said packaging articles by said conveyor; means for determining the coincidence of said absence detection signal from said absence detecting sensor and a reference timing pulse signal from said reference timing pulse generating means; and  
means for stopping said second motor for feeding said packaging material and said third motor for achieving said end-sealing of said packaging material under gradual deceleration conditions in response to a determination of said coincidence of said absence detection signal from said absence detecting sensor and a reference timing pulse signal from said reference timing pulse generating means by said coincidence determining means, and after a predetermined duration of time during which said second and third motors are stopped for a predetermined number of cycles corresponding to the number of absent packaging articles, for starting said second and third motors under gradual acceleration conditions until the speeds and phases of said second and third motors are synchronized with those of said first motor for driving said conveyor.

4,955,177

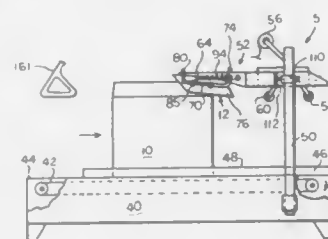
**CARTON FLAP FOLDING APPARATUS**  
Joseph S. Lerner, and David Krukas, both of Kings Park, N.Y., assignors to The Lovesaw Corporation, Ronkonkoma, N.Y.

Filed Oct. 27, 1989, Ser. No. 428,346

Int. Cl.<sup>5</sup> B65B 7/20, 51/06

U.S. Cl. 53—137

8 Claims



1. In a carton taping machine including a conveyor which defines a path of carton forward travel along which a rectangular shipping carton can be transported from a conveyor entrance end to a conveyor discharge end, said carton having opposed carton side walls joined at opposite ends of each with respective carton front and rear walls, juncture of said carton side and front and rear walls presenting carton top and bottom corner structure at each side of the carton, said carton further having side flaps extending upwardly from the carton side walls, said machine including carton tape sealing mechanism downstream from the conveyor entrance end, apparatus for folding down and inward the upwardly extending side flaps to

closed lateral positions, said apparatus being upstream the tape sealing mechanism and comprising  
head beam structure including support means supporting the head beam structure above the conveyor,  
a pair of flap folding plates rotatably mounted on the head beam structure for pivoting of each about a respective one of an associated pair of axes which axes extend obliquely down in the carton forward travel direction and converge toward each other, and  
bias means connected to said plates and operable to normally maintain said plates disposed in upright orientation, the mounting of the plates being such that when in upright orientation a first part of each plate extends above its associated pivot axis and a second part below said associated axis, the plates in upright orientation disposing such that front edges of the upwardly extending carton side flaps of a forwardly travelling carton can engage with said plates, the second parts of said plates when said plates are in upright orientation extending below their associated pivot axes to an extent that the top corner structures at the sides of the front of said forwardly travelling carton engage said second plate parts thereby initiating a counter bias pivoting movement of said plates moving the plate first parts in a rearward direction against the carton side flaps for folding said flaps to a closed lateral disposition relative to the carton side walls.

4,955,178

**ALIGNMENT APPARATUS WITH GATED OUTPUT FOR IMPACT ALIGNMENT OF WEIGHED BATCHES OF ELONGATED OBJECTS**

David Shroyer, Richland, Wash., assignor to Lamb-Weston, Inc., Richland, Wash.

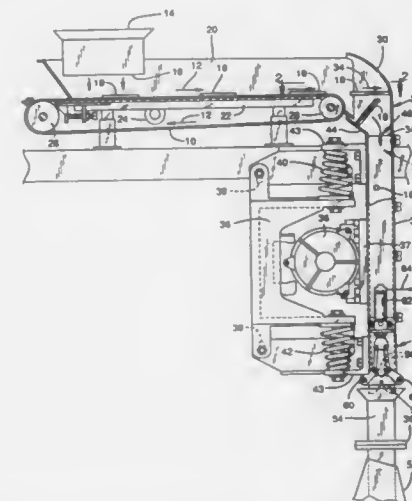
Filed Aug. 22, 1989, Ser. No. 397,008

The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B65B 1/22, 35/32, 65/08; B65G 47/14

U.S. Cl. 53—148

19 Claims

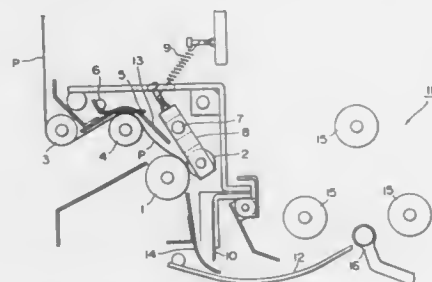


10. Alignment apparatus for impact alignment of elongated objects, comprising:  
alignment means for aligning said elongated objects, including an alignment container means with a first container means having an inlet opening, an outlet opening, and a vertically-curved deflector wall, a second container means having a supply inlet aligned with the outlet opening of said first container means and having a discharge outlet;  
gate means for closing said discharge outlet when said second container means is being filled with said elongated

objects and for opening said discharge outlet to empty said second container means; and conveyor means for conveying elongated objects and for projecting said objects from said conveyor through the inlet opening of the alignment container in a direction which is substantially perpendicular to the curved deflector wall to cause said objects to strike said curved wall and to be deflected by the impact and discharged from said outlet opening.

**4,955,179**  
**COIN WRAPPING PAPER FEEDING APPARATUS FOR COIN WRAPPING MACHINE**  
Hideki Kimura, Matsudo, and Shoichi Uda, Tokyo, both of Japan, assignors to Laurel Bank Machines Co., Ltd., Tokyo, Japan

Filed Aug. 22, 1989, Ser. No. 396,646  
Claims priority, application Japan, Aug. 24, 1988, 63-111025(U); Aug. 9, 1989, 1-206015  
Int. Cl.<sup>5</sup> B65B 11/04  
U.S. Cl. 53—212 4 Claims



1. A coin wrapping paper feeding apparatus for a coin wrapping machine in which coin wrapping paper fed out from a coin wrapping paper storing section is cut by cutter means to a predetermined length and the coin wrapping paper is wound around stacked coins by wrapping roller means, thereby to wrap the stacked coins, said coin wrapping paper feeding apparatus comprising

feed roller means disposed between said coin wrapping paper storing section and said cutter means for feeding the coin wrapping paper to said cutter means along a path of travel,

motor means for rotating said feed roller means,

wrapping paper holding means disposed between said coin wrapping paper storing section and said feed roller means along the path of travel with said wrapping paper holding means being located upstream from said feed roller means and said wrapping paper holding means being adapted to hold the coin wrapping paper,

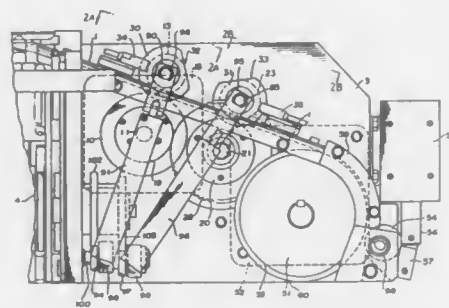
rotation number detecting means for detecting the number of rotations of said feed roller means,

preparatory operation start detecting means for detecting start of a preparatory operation for a coin wrapping operation and outputting a start signal, and

control means for enabling said motor means to start the rotation of said feed roller means and enabling said rotation number detecting means to start the detection of the number of rotations of said feed roller means when receiving the start signal, and enabling the motor means to stop the rotation of said feed roller means when said control means judges that the number of rotations of the feed roller means input from said rotation number detecting means has reached a predetermined value.

**4,955,180**  
**METHOD AND APPARATUS FOR FEEDING AND TIGHTENING A BAND IN STRAPPING MACHINE**  
Yasunori Sakaki, Tokyo, and Tautoma Tagomori, Yokohama, both of Japan, assignors to Strapack Corporation, Tokyo, Japan

Filed Jun. 16, 1988, Ser. No. 207,584  
Claims priority, application Japan, Jun. 18, 1987, 62-150206; Jun. 18, 1987, 62-150207  
Int. Cl.<sup>5</sup> B65B 13/08, 13/22, 13/32  
U.S. Cl. 53—399 17 Claims



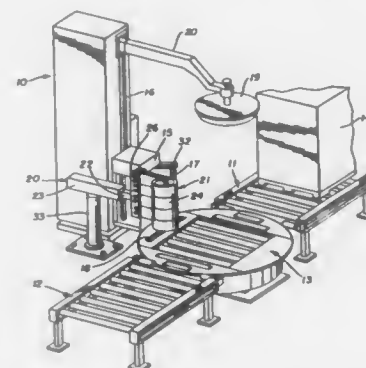
1. A method for feeding and tightening a band in a strapping machine, comprising the steps of:  
feeding said band in a forward direction, so as to encircle an article to be strapped, by means of a forward rotating driving roller and a forward rotation touch roller,  
detecting a decrease in rotational speed of said forward rotation touch roller as may result from said band encountering an obstacle along its feeding path during said feeding of said band in said forward direction while encircling said article to be strapped;  
generating a control signal in response to said detection of said decrease in rotational speed of said forward rotation touch roller;  
actuating a reverse rotation driving roller and a reverse rotation touch roller in response to said control signal so as to retract said fed band away from said obstacle in a reverse direction along said feeding path; and  
deactuating said reverse rotation driving roller and said reverse rotation touch roller after a predetermined period of time so as to permit said forward rotation driving roller and said forward rotation touch roller to again feed said band in said forward direction.

**4,955,181**  
**WIPE DOWN APPARATUS FOR STRETCH WRAPPING DEVICES**  
Larry Casteel, Homerville, Ohio, assignor to Liberty Industries, Girard, Ohio

Filed Oct. 27, 1989, Ser. No. 427,502  
Int. Cl.<sup>5</sup> B65B 11/04  
U.S. Cl. 53—556 7 Claims

1. A wipe down apparatus for use with stretch wrapping device for wrapping a load with a film web, the wipe down apparatus comprises a wiper support, an engagement arm telescopically extendible from said support, a wiper element secured to said free end of said engagement arm, said wiper element comprising at least one wiper including a pair of unequal length strips, one of said strips double back on a portion of itself forming a loop in spaced relation to the engagement arm, means for securing the unequal free ends of said strip to each other and to one of said strips inwardly from its secured

free end, means for securing the abutting ends of said strips to said engagement arm, means for moving said engagement arm



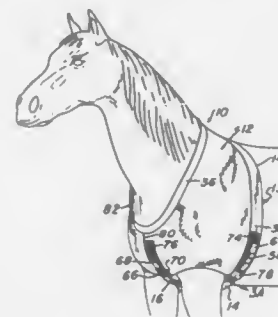
and said wiper support in relation to said load and means for cutting said film web within a film plane path.

**4,955,182**  
**ANTI-RUB DEVICE AND METHOD FOR PROTECTING A HORSE'S COAT FROM DAMAGE FROM A HORSE BLANKET**

Marlene Newman, 1072 St. Mathews Rd., Chester Springs, Pa. 19425

PCT No. PCT/US89/01713, § 371 Date Mar. 8, 1990, § 102(e) Date Mar. 8, 1990, PCT Pub. No. WO89/10325, PCT Pub. Date Nov. 2, 1989

PCT Filed Apr. 21, 1989, Ser. No. 487,990  
Int. Cl.<sup>5</sup> B68C 5/00  
U.S. Cl. 54—79 27 Claims



1. An anti-rub device for protecting the coat of a horse at the points of the shoulders of the horse's front legs, said device being securable about a horse for use under a horse blanket and including:

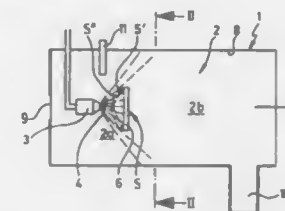
- a main body portion including a stretchable fabric which is stretchable in both the warp and weft directions, said stretchable fabric having a low friction surface adapted to support a portion of a horse blanket thereon and a low friction surface for engaging the coat of the horse, said main body portion having a passage for surrounding the neck of the horse, and, being attached to said horse in a stretched condition so that said main body portion is in tight conformity with the horse in regions overlying the withers, overlying the chest of the horse in the region forward of the front legs and overlying the points of the shoulders of the horse's front legs; and
- securement means for securing the main body portion in a stretched condition into tight conformity with the torso of the horse in regions overlying the withers, overlying the chest of the horse in a region forward of the front legs, and overlying the points of the shoulders of the horse's front legs, whereby said low friction surfaces of said stretchable

fabric and the tight conformity of the main body portion with the horse protect the coat of the horse at the points of the shoulders of the horse's front legs against chafing when a horse blanket is disposed over said anti-rub device.

**4,955,183**  
**BURNER FOR DIFFICULT TO COMBUST GAS MIXTURES**

Rainer Kolodzie, Munich; Dieter Goerlich, Emmering, and Roland Fiola, Graefelfing, all of Fed. Rep. of Germany, assignors to Webasto AG Fahrzeugtechnik, Fed. Rep. of Germany

Filed Feb. 15, 1989, Ser. No. 310,588  
Claims priority, application Fed. Rep. of Germany, Mar. 9, 1988, 3807632.2; Aug. 19, 1988, 3828256  
Int. Cl.<sup>5</sup> F01N 3/26  
U.S. Cl. 60—303 11 Claims



1. Burner for difficult to combust gas mixtures, such as exhaust gases of an internal combustion engine, comprising a combustion chamber, a baffle barrier dividing said combustion chamber into a first, pilot flame zone and a second, main fuel combustion zone at opposite sides thereof, means for supplying fuel and combustion air to said pilot flame zone, means for supplying exhaust gases to said fuel combustion zone, and ignition means in said pilot flame zone for creating a pilot flame thereat; wherein said fuel supply is provided by a fuel injection nozzle in the form of a fuel jet; wherein said baffle barrier is disposed in a position causing a first portion of the fuel jet supplied to the pilot flame zone to impinge thereon, and a second portion of said fuel jet to pass through the baffle barrier into the main fuel combustion zone; and wherein the pilot flame created by said ignition means forms a means for igniting said second portion of the fuel jet in said main combustion zone utilizing the exhaust gases supplied thereto as an oxygen supply for combustion thereof.

**4,955,184**  
**METHOD AND EQUIPMENT FOR FORMING MULTIPLE PACKS OF PRODUCTS, PARTICULARLY FOOD PRODUCTS**

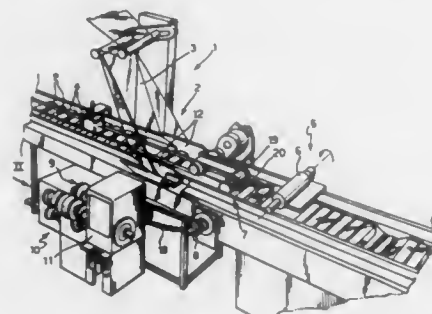
Renzo Francioni, Prato Sesia, Italy, assignor to Cavanna S.p.A., Italy

Filed Jun. 19, 1989, Ser. No. 367,877  
Claims priority, application Italy, Feb. 13, 1989, 67083 A/89  
Int. Cl.<sup>5</sup> B65B 9/06, 35/40; B65G 47/24  
U.S. Cl. 53—448 15 Claims

1. A method of forming, from a flow of products, multiple packs each including a group constituted by a given number of said products collected in a tubular wrapper which is closed at its ends by welding, in which it includes the steps of forming the wrapper in a predetermined zone and closing the wrapper by the welding of its ends in a closure zone situated downstream of the predetermined zone in the direction of flow of the products, said closure zone having a given length in that direction, wherein the method further includes the steps of: continuously advancing the flow of products towards the predetermined zone while maintaining a uniform distance between successive products in the flow in a first zone, the



distance being determined by the ratio between the given length and the given number of products; continuously advancing the flow of products toward the predetermined zone along a second zone; substantially stopping the movement of one of the given number of products while the one product is in the second zone, so as to cause the formation of a group of products by the products being advanced in the second zone in a spaced relationship until their advancement is stopped by abutment up against the one stopped products or a product stopped by abutment with stopped products abutting



the one stopped product, until the number of stopped products equals the number of products for the group; then releasing the one stopped products so that the group of stopped products are again continuously moved, in unison packed together, toward the closure zone as a group of products; wherein the releasing of the one stopped product to allow the continuous advancing to be resumed, provides successive groups of products each including the given number of products and separated by a gap substantially equal in length to the given length of the closure zone.

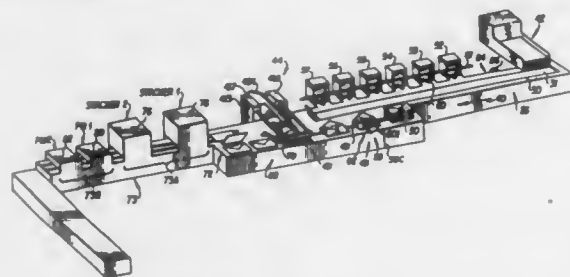
4,955,185

## INSERTION MACHINE

Dave Haas, Schaumburg; Gary VanderSyde, Naperville; Paul Beatty, and Ren Roxas, both of Chicago, all of Ill., assignors to Bell & Howell Company, Chicago, Ill.  
Division of Ser. No. 30,015, Mar. 25, 1987, Pat. No. 4,798,040.  
This application Nov. 15, 1988, Ser. No. 271,258  
Int. Cl.<sup>5</sup> B65B 25/14

U.S. Cl. 53-460

32 Claims



1. An insertion machine comprising:  
an envelope opening station;  
means for positioning an envelope in said envelope opening station;  
an insertion station positioned proximate said envelope opening station for inserting at least one item into an at least partially opened envelope, said insertion station including a carriage which reciprocates in a direction toward said envelope opening station and in a direction away from said envelope opening station, said carriage having at least one finger movably mounted with respect to said carriage for movement to a finger first orientation

whereat said finger is usable for inserting an item into an envelope and for movement to a finger second orientation; error detection means for detecting an error condition at said insertion station;  
control means responsive to said error detecting means for controlling whether said finger moves to said finger first orientation or to said finger second orientation; and,  
means for transporting at least one item to said insertion station.

4,955,186

## ENVELOPE TRANSPORT MEANS

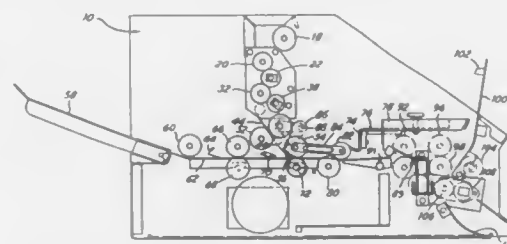
Rex M. K. Gough, Cambridge, United Kingdom, assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Apr. 7, 1989, Ser. No. 335,176

Claims priority, application United Kingdom, Apr. 8, 1988, 8808313; May 6, 1988, 8810698  
Int. Cl.<sup>5</sup> B65B 43/52

U.S. Cl. 53-569

6 Claims



1. Envelope transport means for driving an envelope in an inserter apparatus, said transport means including a driven roller, an idler roller mounted for relative movement into and out of engagement with said driven roller, clamp means for clamping the envelope against movement, and actuator means for effecting engagement and disengagement of said rollers and clamping and unclamping of the clamp means, said actuator being movable between a transport position in which said rollers are engaged and said clamp means is unclamped and an insert position in which said rollers are disengaged and said clamp means is clamped.

4,955,187

## MOWING MACHINE

Cornelis van der Lely, 7 Brüschenrain, Zug, Switzerland  
Division of Ser. No. 18,287, Feb. 24, 1987, Pat. No. 4,827,703.

This application Apr. 14, 1989, Ser. No. 338,148

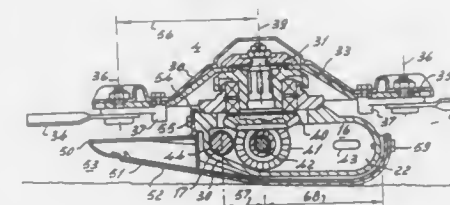
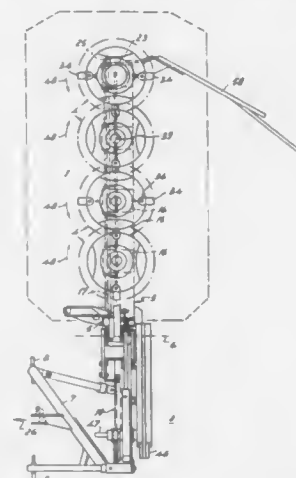
Claims priority, application Netherlands, Feb. 24, 1986, 8600452; May 30, 1986, 8601394  
Int. Cl.<sup>5</sup> A01D 34/66

U.S. Cl. 56-13.6

63 Claims

1. A mowing machine comprising a mowing bar, said mowing bar further comprising at least two mowing units, each of said mowing units having a mowing member and a partly hollow supporting housing, at least two partly hollow spacers; one said mowing member being connected to each said supporting housing capable of rotation about an essentially vertical axis of rotation and said supporting housings and said spac-

ers being alternately interconnected by a first and second detachable tensile means, said two tensile means extending



through the cavities provided within said supporting housings and spacers.

4,955,188

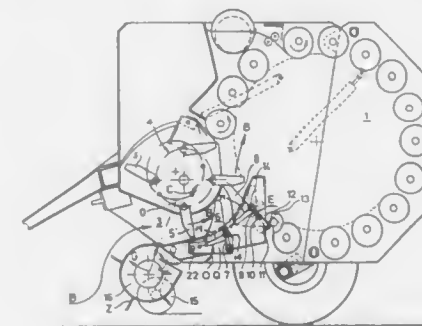
## ROUND BALER

Wilhelm von Allwörden, Gailingen, Fed. Rep. of Germany, assignor to Greenland GmbH & Co. KG, Fed. Rep. of Germany  
Filed May 10, 1989, Ser. No. 349,659

Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816204  
Int. Cl.<sup>5</sup> A01D 39/00; B30B 15/08

U.S. Cl. 56-341

12 Claims



1. A round baler for cut stalk crops comprising a hinge-type pressing chamber including an inlet opening for said stalk crops and a tying arrangement for the completed bale, a pick-up device for said stalk crops, a feed drum which is disposed between said pick-up device and said inlet opening and whose length corresponds to the length of the bale to be formed, a cutting device provided in a feed channel, wherein said cutting device includes a plurality of pivotally-supported knives which in their cutting position project into said feed channel and are arranged in at least one row, and which are held in their cut-

ting position by means of spring-loaded knife levers and adapted to be pivoted against the spring load up to a position in which they have no cutting effect on said stalk crops, and wherein a sensor for sensing the internal pressure of said round bale is provided, said sensor controlling a pivoting device for said cutting device for pivoting said knives out of said feed channel when a predetermined value of said pressure is sensed.

4,955,189

## WORSTED YARN-LIKE FALSE-TWISTED YARN

Masaaki Yanagihara, Ehime; Katsutoshi Taniguchi, and Munenaki Awata, both of Matsuyama, all of Japan, assignors to Telfin Limited, Osaka, Japan

PCT No. PCT/JP88/01142, § 371 Date Jul. 5, 1989, § 102(e)  
Date Jul. 5, 1989, PCT Pub. No. WO89/04389, PCT Pub. Date May 18, 1989

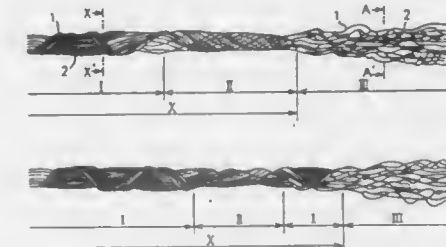
PCT Filed Nov. 11, 1988, Ser. No. 381,731

Claims priority, application Japan, Nov. 12, 1987, 62-284362

Int. Cl.<sup>5</sup> D02G 3/24, 1/02, 3/26, 3/34

U.S. Cl. 57-207

10 Claims



1. A worsted yarn-like false-twisted yarn composed of at least two kinds of multi-filaments differing in denier, which filaments simultaneously satisfy (i) the requirement that the thickness of the large-denier filaments should be a least 4 de and (ii) the requirement that the thickness of the small-denier filaments should be 0.7 to 2 de, in which yarn bundled portions consisting of alternately twisted yarn-like wrapped portions and entangled portions, and open portions are alternately arranged along the longitudinal direction of the yarn, and wherein (A) in the alternately twisted yarn-like wrapped portions, a covering composed mainly of the small-denier filaments is wrapped substantially in a bundle form on a core portion composed mainly of the large-denier filaments, (B) in the open portions, a covering composed mainly of the small-denier filaments which are opened to one another covers a core composed mainly of the large-denier filaments substantially in parallel to the yarn axis in the successively reversed form, (C) the length (L1) of the open portions is at least 1/4 of the length (L2) of the bundled portions, and (D) in the unit length of the false-twisted yarn, the small-denier filaments are longer than the large-denier filaments and the difference in the length between the small-denier filaments and the large-denier filaments is 13 to 25% based on the length of the large-denier filaments.

4,955,190

## METHOD FOR DRIVING A GAS TURBINE UTILIZING A HEXAGONAL PRESSURIZED FLUIDIZED BED REACTOR

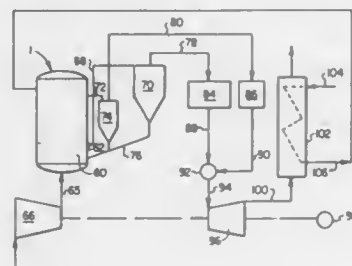
Archibald S. Robertson, Jr., Whitehouse Station, N.J., assignor to Foster Wheeler Development Corporation, Livingston, N.J.  
Division of Ser. No. 166,573, Mar. 10, 1988, abandoned. This application Nov. 14, 1989, Ser. No. 437,056  
Int. Cl.<sup>5</sup> F02C 3/28

U.S. Cl. 60-39.02

5 Claims

1. A method of operating a gas turbine comprising the steps of forming three separate combustion cells in a single vessel, forming a bed of particulate material including fuel in each of said cells, passing air through each of said beds, the quantity of air passed through two of said cells being sufficient to fluidize

said particulate material in their respective beds and promote the combustion of said fuel, and the quantity of said air passed to the other of said cells being insufficient for complete combustion of said fuel but sufficient to generate a combustible off-gas, the flue gases from the combustion in said two cells passing through the length of said two cells and entraining a



portion of said particulate material before discharging from an outlet in said vessel; discharging said off-gas from another outlet of said vessel, separating the entrained particulate material from said flue gases and from said off-gas, burning said separated off-gas in the presence of said flue gases to raise their temperature, and passing said high temperature gases to a turbine.

4,955,191

## COMBUSTOR FOR GAS TURBINE

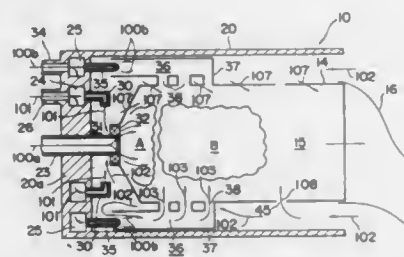
Hiroaki Okamoto; Takeshi Takahara, both of Yokohama, and Fukuo Maeda, Machida, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 26, 1988, Ser. No. 262,982

Claims priority, application Japan, Oct. 27, 1987, 62-270576  
Int. Cl.<sup>3</sup> F02C 3/14, 3/30

U.S. Cl. 60—39.3

9 Claims



1. A gas turbine combustor for a gas turbine plant comprising:

- an outer casing having an end plate closing one end of said outer casing;
- an inner cylinder constituting a combustor liner coaxially located with said outer casing, an interior of said combustor liner being divided into a first stage of combustion area which is disposed on an upstream side near said end plate and in which a first stage fuel and air are mixed and burned and a second stage of combustion area which is disposed on a downstream side of said first stage combustion area and in which a premixture of a second stage fuel diluted by air is supplied, said combustor liner being provided with a port means through which said premixture is supplied thereto;
- a first supply means including nozzle means for supplying water or vapor into said first stage of combustion area;
- a second supply means for supplying the second stage fuel into said second stage combustion area; and
- means for stabilizing the combustion in said first stage of

combustion area and holding a flame in said first stage of combustion area;

wherein the water or water vapor is mixed with first stage fuel at a high load operation period of a gas turbine so as to form a stabilized flame having no locally highly heated area in said first stage of combustion area by said stabilizing and holding means and the second stage fuel is burned with the premixture in said second stage of combustion area.

4,955,192

## CONTAINMENT RING FOR RADIAL INFLOW TURBINE

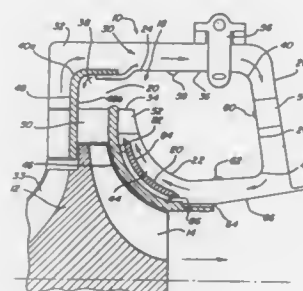
Jack R. Shekleton, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Continuation-in-part of Ser. No. 291,041, Dec. 28, 1988. This application Dec. 12, 1988, Ser. No. 283,079

Int. Cl.<sup>3</sup> F23R 3/00

U.S. Cl. 60—39.36

12 Claims



1. A gas turbine, comprising:

- a rotor including a radial inflow turbine wheel having blades and a nozzle outwardly of said turbine blades, said nozzle being adapted to direct hot gases at said turbine blades to cause rotation of said rotor;
- an annular combustor about said rotor and having an outlet to said nozzle, said annular combustor having spaced inner and outer walls, said inner and outer walls being connected by a generally radially extending wall;
- a housing substantially surrounding said annular combustor in spaced relation to said inner, outer and radially extending walls thereof, said housing defining a dilution air flow path including a radially outer compressed air inlet in communication with a compressor supplying dilution air at one end thereof and a radially inner dilution air outlet in communication with said annular combustor adjacent said outlet at the other end thereof, said dilution air flow path extending substantially entirely about said annular combustor to cool said inner, outer and radially extending walls thereof; and
- a containment ring at least partially about said turbine wheel and on or abutting said dilution air flow path just upstream of said dilution air outlet.

4,955,193

## ADJUSTABLE SHIELD FOR MOTORCYCLE EXHAUST PIPE

Herbert W. Hoepfner, III, Morgan Hill, Calif., assignor to Custom Chrome, Inc., Morgan Hill, Calif.

Filed Jul. 17, 1989, Ser. No. 380,535

Int. Cl.<sup>3</sup> B60K 13/04

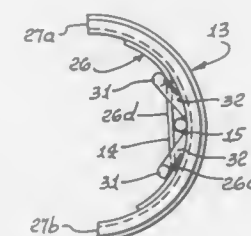
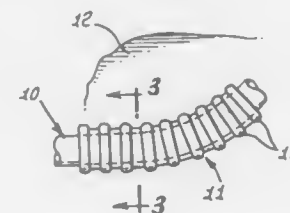
U.S. Cl. 60—320

8 Claims

1. Heat shield structure for a motorcycle exhaust pipe having an outer side, comprising:

- (a) a series of telescopically interfitting shield members defining a lengthwise axially elongated shield sized to fit over the outer side of the exhaust pipe, the members having a c-shape about said axis,

- (b) and a rod extending adjacent the members and connected thereto,
- (c) the rod being bendable, accompanied by relative angular adjustment of the members, to conform to a bend in the exhaust pipe, said members having mid-points and the rod located at approximately said mid-points of the members,
- (d) and means attached to the shield for attaching the shield



- to the exhaust pipe, to extend lengthwise thereof and at the outer side thereof, said means including a strap, and a holder retained by the rod, said member shaving inner sides and said rod is located at said inner sides of said members, the strap entrained by the holder,
- (e) the holder having a shallow V-shape relative to said axis, and extending in a loop, with arms entrained by the strap, said arms extending generally parallel to the rod.

4,955,194

## DAMPING ARRANGEMENT FOR DAMPING THE OSCILLATIONS OF VALVE CONTROLLED BY PRESSURE FLUID

Thorikild Christensen, Sonderborg; Svend E. Thomsen, Nordborg, both of Denmark, and Siegfried Zenker, Kirchseeon, Fed. Rep. of Germany, assignors to Danfoss A/S, Nordborg, Denmark and Danfoss A/S, Nordborg, Denmark

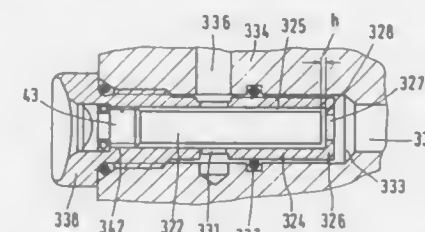
Continuation of Ser. No. 248,924, abandoned. This application Oct. 10, 1989, Ser. No. 418,969

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1987, 3733740

Int. Cl.<sup>3</sup> F16D 31/06; G05D 23/00

U.S. Cl. 60—329

6 Claims



- 1. A damping arrangement for damping oscillations in a valve assembly that includes a source of pressurized fluid, a fluid operated motor, a supply line for connecting the source to the fluid operated motor, at least one pressure controlled valve connected in the supply line that has a control pressure input

port and a control pressure output port, a main valve connected in the supply line downstream of the pressure controlled valve, a first pressure control line connected between the input port and supply line, and a second pressure control line connected between the output port and supply line, comprising throttle means in at least one of the control lines for at least partially eliminating hydraulic resistance changes resulting from temperature changes damping oscillations of valves, the throttle means including a housing having a first end portion, an axially opposite second end portion defining an interior end face, and an intermediate sleeve portion extending between the housing end portions and having annular wall means defining an axially elongated bore that opens to the housing end face and to the first end portion, the first end portion being joined to the sleeve portion axially opposite the housing end face to form a sleeve portion closure, the housing second end portion having a central hole that provides an inlet port opening through the housing end face to the bore to provide a first fluid connection to the respective control line, the housing end face being planar radially from the wall means to the hole, and an axial elongated rod located in the bore to provide an annular clearance space from the rod to the wall means that is structurally free from the housing first portion to the housing end face, the rod having a first end portion mounted in fixed relationship to the housing first end portion and a second end portion defining an end face axially spaced from the housing end face by a gap height  $h$  to provide an annular throttle gap, the housing intermediate portion having an output port to provide a second pressure connection to the respective control pressure line and opening to the clearance space, the housing and rod being made of materials having different coefficients of expansion to vary  $h$  oppositely of the variation of the temperature of the pressurized fluid to at least partially compensate for changes in temperature, the length of the faces, the height  $h$  and the rod and housing materials are selected so that the rectilinear characteristic graph  $h_1$  of the gap height against temperature in the temperature operating range twice intersects a corresponding curve  $h_2$  for a constant hydraulic resistance.

4,955,195

## FLUID CONTROL CIRCUIT AND METHOD OF OPERATING PRESSURE RESPONSIVE EQUIPMENT

Marvin R. Jones, Houston, and Joseph L. LeMoine, Brookshire, both of Tex., assignors to Stewart & Stevenson Services, Inc., Houston, Tex.

Filed Dec. 20, 1988, Ser. No. 287,180

Int. Cl.<sup>3</sup> F16D 31/02

U.S. Cl. 60—405

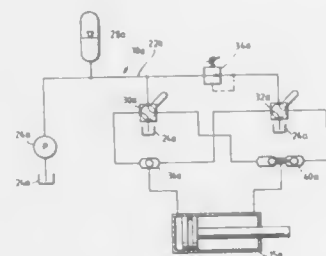
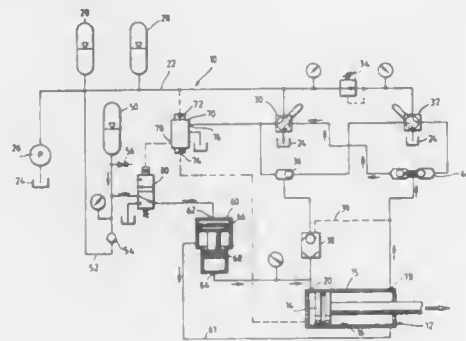
18 Claims

1. A control circuit for supplying fluids to a pressure responsive valve operator having a double acting piston and cylinder assembly comprising,

- a fluid supply,
- a first control valve connected between the fluid supply and both sides of the piston and cylinder assembly,
- a pressure regulator connected to the fluid supply,
- a second control valve connected between the pressure regulator and both sides of the piston and cylinder assembly,
- a first selector check valve connected between one side of

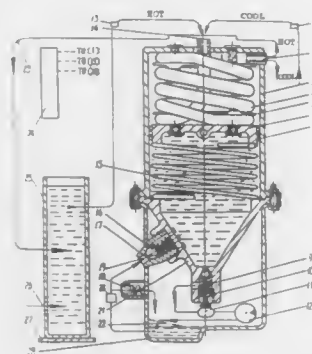


the assembly and each of said first and second control valves, and



a second selector check valve connected between the second side of the assembly and each of the first and second control valves.

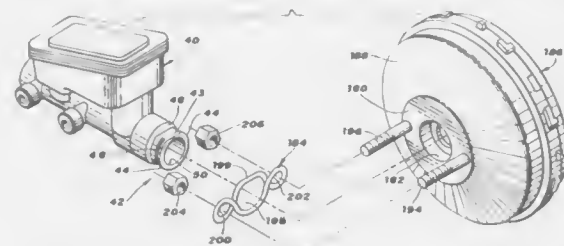
**4,955,196**  
**INTERNAL ENERGY ENGINE (IEE)**  
Zhichun Lin, 7-26, Weixing Road, and Dongsheng Wang, both of Changchun, China, assignors to Zhichun Lin, China  
Filed Oct. 11, 1989, Ser. No. 419,900  
Claims priority, application China, Oct. 17, 1988, 88107240.0  
Int. Cl.<sup>5</sup> F03G 7/06  
U.S. Cl. 60—527 13 Claims



1. In an internal energy engine, the combination comprising cylinder means, said cylinder means comprising an upper end and a lower end, piston means fitted for reciprocating position within said cylinder means, temperature responsive means consisting essentially of SMA means fitted in said cylinder means between said upper end of said cylinder means and the upper end of said piston means, means to supply hot fluid to said cylinder means, means to supply cool fluid to said cylinder means, means to expose said SMA means to said hot and said cool fluids supplied to said cylinder means alternately, means

to define a compressed working medium chamber in said cylinder means below said piston means and above said lower end of said cylinder means, means defining a working medium sump in the lower end of said cylinder means below said working medium chamber, check type admission valve means in said chamber defining means, working medium pump means arranged to pump working medium from said sump into said chamber via said admission valve means, said chamber defining means also comprising high pressure working medium outlet valve means, tank means for receiving the high pressure working medium from said outlet valve means; and means to flow said high pressure working medium from said tank means to a point of use of said high pressure working medium and thence back to said sump means.

**4,955,197**  
**MASTER CYLINDER ATTACHMENT ADAPTER**  
John R. Coleman, Dayton, and Malvin L. Schubert, Kettering, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.  
Filed Sep. 11, 1989, Ser. No. 405,502  
Int. Cl.<sup>5</sup> B60T 13/00  
U.S. Cl. 60—547.1 7 Claims

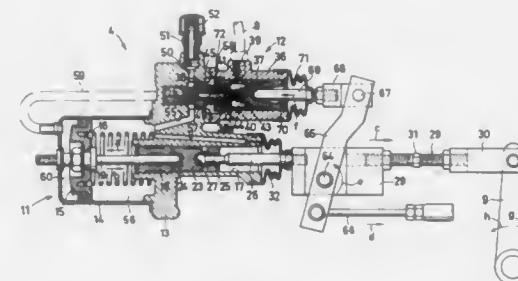


1. Apparatus for connecting a master cylinder to a brake booster of the type having a shell with a planar front surface having a pushrod projecting from a bore therein and a plurality of threaded studs displayed about the bore and projecting from the planar front surface, comprising:  
a master cylinder having an end portion facing the booster; retaining means carried by the end portion of the master cylinder;  
adapter means adapted to engage with the retaining means carried by the end portion of the master cylinder and having a plurality of apertures which register with the plurality of threaded studs;  
and a plurality of threaded nuts installed on the threaded studs to retain the adapter means in engagement with the planar surface of the booster shell.

**4,955,198**  
**CLUTCH BOOSTER**  
Ichiro Yanagawa, and Hirohisa Hara, both of Higashimatsuyama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan  
Filed May 15, 1985, Ser. No. 734,102  
Claims priority, application Japan, May 24, 1984, 59-105572  
Int. Cl.<sup>5</sup> B60T 13/20  
U.S. Cl. 60—551 7 Claims

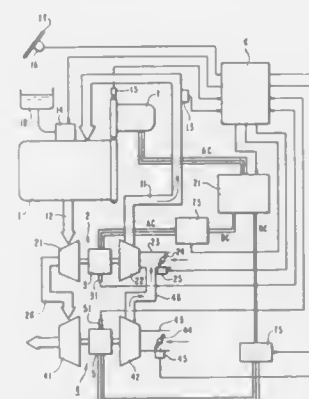
1. A clutch booster for amplifying the manual force upon a clutch control device to be relayed to a clutch engaging lever comprising, in combination:  
(a) power piston means connected operatively through an output rod to said clutch engaging lever and driven in longitudinal reciprocating motion under the operating fluid pressure supplied from an external source of pressure, said power piston means being aligned with said output rod in a substantially straight line;  
(b) control valve means disposed on route of passage means for said operating fluid pressure to be supplied to said power piston means;

(c) pivot lever means mounted pivotally at the middle portion thereof on said output rod;  
(d) linkage or cable means connected operatively at one end thereof of said clutch control device and at the opposite end to one end of said pivot lever means, and extending along in the directions of reciprocating motion of said output rod;  
(e) relay piston means operatively connected to said power piston means and to said output rod, said relay piston



means includes a movable connector joint operatively connected to one end of said output rod for permitting a swinging motion of said output rod as motion is imparted thereto through said pivot lever means; and  
(f) connector means connecting operatively said control valve means to the opposite end of said pivot lever means, and adapted to operate said control valve means when said linkage or cable means are pushed or pulled in the direction of forward stroke motion of said output rod means.

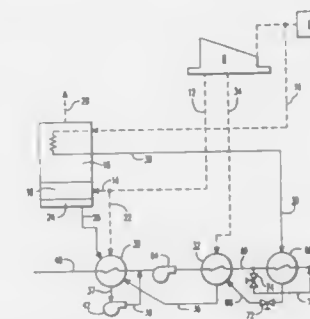
**4,955,199**  
**DRIVE SYSTEM FOR TURBOCHARGERS WITH ROTARY ELECTRIC MACHINES**  
Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Ceramics Research Institute Co., Ltd., Fujisawa, Japan  
Filed Jul. 18, 1989, Ser. No. 381,320  
Claims priority, application Japan, Jul. 18, 1988, 63-178723  
Int. Cl.<sup>5</sup> F02B 37/04  
U.S. Cl. 60—608 11 Claims



1. A turbocharger drive system combined with an internal combustion engine, comprising:  
a turbocharger assembly having a rotatable shaft;  
a first rotary electric machine mounted on said rotatable shaft;  
means for detecting a load on the internal combustion engine;  
means for detecting a rotational speed of the internal combustion engine;  
means for supplying fuel to the internal combustion engine;

a second rotary electric machine operatively coupled to an output shaft of the internal combustion engine;  
means for driving said first rotary electric machine as an electric motor when it is determined from signals from said means for detecting the load and said means for detecting the rotational speed that the internal combustion engine rotates at a low speed and under a high load;  
means for operating said second rotary electric machine as an electric generator;  
means for supplying electric power generated by said electric generator to said electric motor; and  
means for delaying a timing to supply fuel from said fuel supplying means to the internal combustion engine when at least one of an increase in the load and a reduction in the rotational speed is detected by said means for detecting the load and said means for detecting the rotational speed.

**4,955,200**  
**REHEATER PIPING AND DRAIN COOLER SYSTEM**  
Paul W. Viscovich, Longwood, and George J. Silvestri, Jr., Winter Park, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed May 17, 1989, Ser. No. 353,364  
Int. Cl.<sup>5</sup> F01K 7/40  
U.S. Cl. 60—667 13 Claims



1. A method for heat rate improvement in a steam turbine thermal cycle employing a steam-to-steam reheating system having a high pressure moisture-separator-reheater (MSR) with a reheater drain for fluid, a plurality of feedwater heaters connected in series to heat feedwater at increasing pressure, each of the feedwater heaters having an inlet, an outlet for feedwater, and a heat exchanger connecting in heat exchange relationship with feedwater exiting the highest pressure feedwater heater, the system utilizing scavenging steam to prevent moisture buildup, a method of improving heat rate comprising the following steps:  
connecting the MSR reheater drain directly to the heat exchanger for passing the drain fluid in heat exchange relationship with outlet feedwater from the feedwater heater having the highest pressure;  
drawing the drain fluid from the heat exchanger and directing it into the feedwater heater having the highest pressure; and  
adjusting the mass of outlet feedwater from the highest pressure feedwater heater passing through the heat exchanger to control the heat exchange capability of the heat exchanger in a manner to set the amount of scavenging steam within the system to optimally adjusted values for varying load conditions.

4,955,201

**FUEL INJECTORS FOR TURBINE ENGINES**

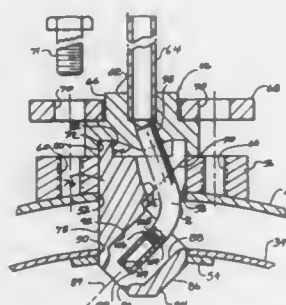
Jack R. Shekleton, San Diego, and John P. Archibald, La Jolla, both of Calif., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 14, 1987, Ser. No. 133,491

Int. Cl.<sup>5</sup> F23R 3/16

U.S. Cl. 60—738

5 Claims



1. A turbine engine comprising:
  - a rotatable turbine wheel;
  - a rotary compressor coupled to said turbine wheel;
  - an annular combustor for receiving compressed air from said compressor and fuel from a fuel source and burning the same to provide gasses of combustion to drive said turbine wheel, said combustor including a radially inner annular combustion zone surrounded by a radially outer annular compressed air manifold defined by spaced inner and outer walls with said inner wall defining the outer extremity of said combustion zone;
  - a plurality of angularly spaced injector assemblies mounted on said outer wall and extending through said inner wall into said combustion zone, each said injector assembly including an elongated body located generally on a radius of said combustion zone having a hollow interior with a port at one end opening into said combustor zone generally tangentially thereto, said body further having at least one inlet to said hollow interior located in a side of said body between said inner and outer walls, and a fuel injecting somewhat J-shaped, tube within said hollow interior and terminating within said hollow interior adjacent said port in an open end in alignment therewith and generally tangential to said combustion zone; and
  - a venturi surface just inwardly of said port, said open end of said tube being located as close to said venturi surface as is possible without said tube increasing the resistance to the flow of air from said hollow interior through said port.

4,955,202

**HOT GAS GENERATOR**

Jack R. Shekleton, San Diego, and Robert W. Smith, Lakeside, both of Calif., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Mar. 12, 1989, Ser. No. 324,806

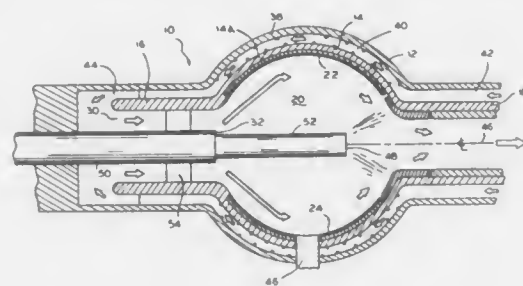
Int. Cl.<sup>5</sup> F23R 3/42

U.S. Cl. 60—753

12 Claims

1. A hot gas generator, comprising:
  - a vessel having a wall defining narrow, spaced apart inlet and outlet ends interconnected by a relatively wide, generally spherical combustion chamber;
  - a pair of smooth hemispherical liners loosely positioned within said wall so as to be disposed about said combustion chamber, said hemispherical liners normally having a groove at an interface therebetween and being formed of a material adapted to thermally expand radially and circumferentially under heat, said hemispherical liners expanding to close said groove at said interface in a manner producing relatively little stress thereon;
  - the portion of said wall defining said combustion chamber including a generally spherical recess sized to loosely

receive said hemispherical liners so as to accommodate radial and circumferential thermal expansion relative thereto;



an oxidant inlet port at said inlet end of said wall; and a fuel discharge port for directing fuel into said combustion chamber.

4,955,203

**AIR CONDITIONER FOR PARKED AUTOMOTIVE VEHICLE**

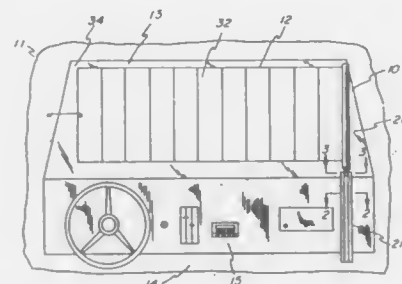
Shaam P. Sandhar, 87 Juniper Ave., Westerville, Ohio 43081

Filed Aug. 16, 1989, Ser. No. 394,447

Int. Cl.<sup>5</sup> F25B 21/02

U.S. Cl. 62—361

17 Claims



1. An air conditioner for an automotive vehicle comprising a cooling unit, said cooling unit located in the trunk of said automotive vehicle, said cooling unit comprising a cooling chamber having at least one insulated wall, said cooling chamber including a cooling fan, said insulated wall having on opposing sides thereof a heat sink and a cooling block, said cooling block being located in said cooling chamber, said heat sink and cooling block having therebetween a thermoelectric chip, said cooling unit also comprising a hot air chamber, said hot air chamber including an exhaust fan,
  - an air intake conduit connected to said cooling unit,
  - a cool air conduit connected to said cooling chamber,
  - an exhaust conduit connected to said hot air chamber, and
  - means for supplying power to said cooling unit, said means for supplying power to said cooling unit is by at least one solar panel positioned interiorly near the front window of said automotive vehicle, said means for supplying power movably mounted in said automotive vehicle, said means for supplying power secured to mounting means, said mounting means mounted in a retention means which includes a C-shaped channel.

4,955,204

**CRYOSTAT INCLUDING HEATER TO HEAT A TARGET**

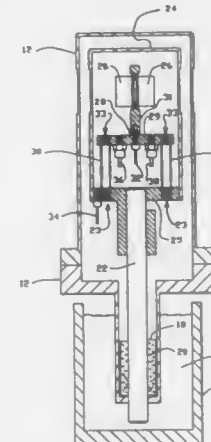
Richard H. Pehl, Berkeley; Norman W. Madden, Livermore, and Donald F. Malone, Oakland, all of Calif., assignors to The Regents of the University of California, Oakland, Calif.

Filed Nov. 9, 1989, Ser. No. 434,249

Int. Cl.<sup>5</sup> F25B 19/00

U.S. Cl. 62—51.1

28 Claims



1. A cryostat comprising:
  - a vacuum vessel;
  - a target disposed within said vacuum vessel;
  - heat sink means disposed within said vacuum vessel for absorbing heat from said target;
  - cooling means for cooling said heat sink means;
  - cryoabsorption means for cryoabsorbing residual gas within said vacuum vessel; and
  - heater means for maintaining said target above a temperature at which the residual gas is cryoabsorbed in the course of cryoabsorption of the residual gas by said cryoabsorption means.

4,955,205

**METHOD OF CONDITIONING BUILDING AIR**

William H. Wilkinson, Columbus, Ohio, assignor to Gas Research Institute, Chicago, Ill.

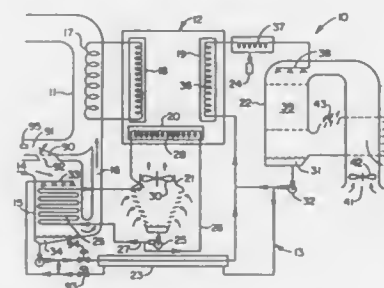
Division of Ser. No. 302,428, Jan. 27, 1989, Pat. No. 4,905,479.

This application Dec. 4, 1989, Ser. No. 445,987

Int. Cl.<sup>5</sup> F25D 17/08

U.S. Cl. 62—94

4 Claims



2. In a method of operating a hybrid air conditioning system comprised of a refrigeration subsystem and a liquid desiccant dehumidification subsystem having dehumidifier, cooling tower, desiccant regenerator, and air-to-air recuperative heat exchanger components, the steps comprising:
  - a. flowing a controlled mixture of relatively dilute desiccant solution and relatively concentrated desiccant solution to said dehumidifier component, and
  - b. controlling the mixing of said desiccant mixed solution in

response to a relative humidity condition detected in a building enclosed space receiving air conditioned by the hybrid air conditioning system.

4,955,206

**LIQUID CRYOGEN FREEZER WITH IMPROVED VAPOR BALANCE CONTROL**

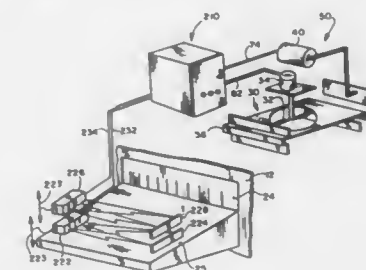
Gary D. Lang, Naperville, and Benjamin Zyer, Orland Park, both of Ill., assignors to Liquid Carbonic Corporation, Chicago, Ill.

Filed Nov. 30, 1989, Ser. No. 443,903

Int. Cl.<sup>5</sup> F17D 17/00

U.S. Cl. 62—186

21 Claims

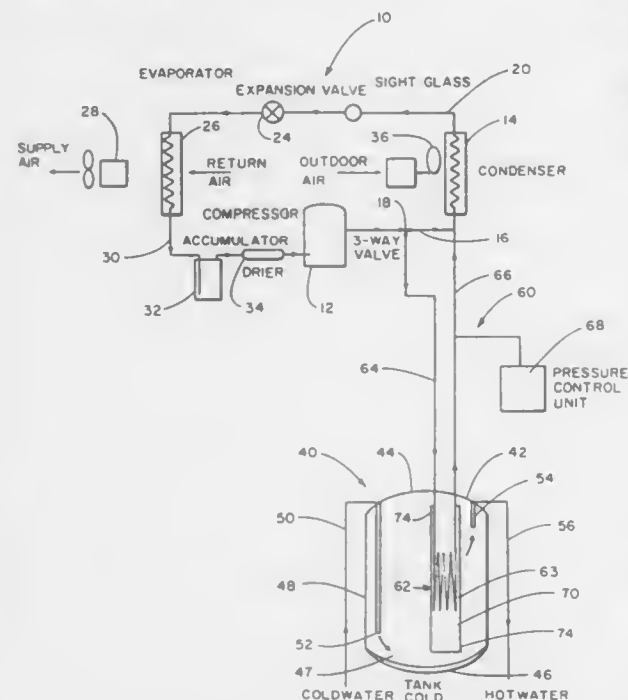


1. A cryogenic freezer apparatus for food products, comprising:
  - a thermally insulated enclosure having at least an entrance opening and an exit opening;
  - conveyor means for conveying products through said enclosure, from said entrance opening to said exit opening;
  - cryogen means in said enclosure for producing cryogen vapor near one of said enclosure openings;
  - blower means associated with said enclosure and selectively operable in response to a blower control signal to selectively apply different levels of suction adjacent said one enclosure opening to direct differing amounts of cryogen vapor away therefrom;
  - photocell means outside said enclosure, generally adjacent said one enclosure opening for detecting cryogen vapor exiting said one enclosure opening and for generating at least one sensor output signal in response thereto, said at least one sensor output signal being indicative of the amount of cryogen vapor flowing out of said one opening; and
  - blower control means coupled to said photocell means and to said blower means for generating a blower control signal in response to said at least one sensor output signal, so that, with increasing vapor detected outside said one opening of said enclosure, the blower means increases suction of cryogen vapor away from said enclosure opening, so as to limit the outflow of cryogen vapor passing through said one enclosure opening to about a preselected amount needed to prevent intrusion of the ambient environment through said one enclosure opening, despite increasing volume of cryogen vapor generated in said enclosure, and so that output of the blower means is decreased with decreasing cryogen injection to ensure that at least about the preselected cryogen outflow is maintained at said one opening to prevent intrusion of the ambient environment therethrough.



**4,955,207**  
**COMBINATION HOT WATER  
 HEATER-REFRIGERATION ASSEMBLY**  
 Clark B. Mink, 648 Alameda Ct. No., St. Petersburg, Fla. 33702  
 Filed Sep. 26, 1989, Ser. No. 412,347  
 Int. Cl.<sup>3</sup> F28D 15/02; F24D 17/02  
 U.S. Cl. 62—238.6

1 Claim



1. A combination hot water heater-refrigeration assembly comprising:

- (A) a hot water heater unit which includes
  - (1) a tank for containing water to be heated, said tank having a bottom and a top with a cold water inlet located adjacent to said bottom and a hot water outlet located adjacent to said top, and
  - (2) heater means for heating the water contained in the tank;
- (B) a refrigeration system which includes
  - (1) a compressor for compressing fluid, such as Freon,
  - (2) a condenser fluidically connected to said compressor and receiving compressed fluid therefrom,
  - (3) a three-way valve fluidically connecting said compressor to said condenser; and
- (C) a water heating heat transfer system which includes
  - (1) a heat exchange element in said hot water heater unit tank,
  - (2) an inlet fluid line fluidically connecting said three-way valve to said heat exchange element and conducting fluid from said compressor to said heat exchange element,
  - (3) an outlet fluid line fluidically connecting said heat exchange element to said condenser and conducting fluid from said heat exchange element to said condenser,
  - (4) a heat pipe in said tank and having a heat absorber at one end in heat transferring association with said heat exchange element, said heat pipe having a heat releaser at another end in heat transferring association with water located adjacent to the bottom of the tank,
  - (5) said heat exchange unit including a sleeve located inside said heat pipe, and
  - (6) a pressure control unit connected to said outlet fluid line.

**4,955,208**  
**REFRIGERATING APPARATUS HAVING A STINK  
 REMOVING DEVICE**  
 Masaei Kawashima; Reishi Naka; Tetsuo Tsunoda, all of Tochigi; Nobuyoshi Suenaga, Oyama; Syozo Ogawa; Masaaki Kashiwabuchi, both of Tochigi; Miyakichi Kameda, Sano, and Kousuke Tanaka, Tochigi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

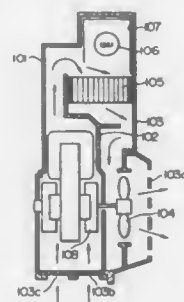
Division of Ser. No. 295,754, Jan. 11, 1989. This application Jan. 8, 1990, Ser. No. 461,928

Claims priority, application Japan, Jan. 22, 1988, 63-10601; Jan. 22, 1988, 63-10602

Int. Cl.<sup>3</sup> F25D 23/00

U.S. Cl. 62—264

6 Claims



1. A refrigerating apparatus comprising means for constituting a refrigerating space, cooling means for cooling air in said refrigerating space, and stink removing means for removing stink ingredient in said air comprising absorbent, a layer of photocatalyst provided on a surface of said absorbent and excited by light and a light source for exciting said photocatalyst disposed in a flow passage for said air.

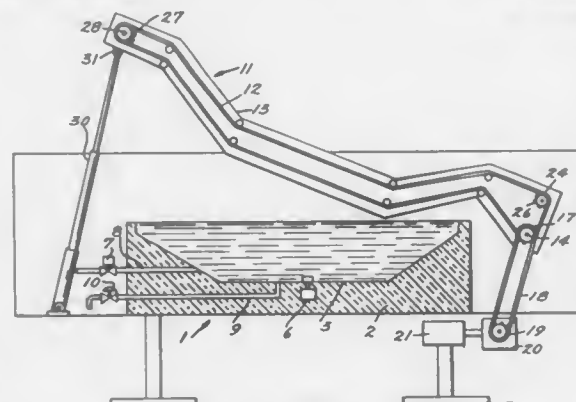
**4,955,209**  
**CRYOGENIC BATH FREEZER WITH PIVOTED  
 CONVEYOR BELT**  
 Bryan K. Smith, Huntington Beach, Calif., assignor to Cryo-Chem Inc., Carson, Calif.

Filed Nov. 1, 1989, Ser. No. 430,005

Int. Cl.<sup>3</sup> F25D 25/04

U.S. Cl. 62—380

18 Claims



1. A cryogenic freezer comprising a thermally insulated cabinet interiorly shaped to provide a vessel having a bottom and at least two sloping sides, a cryogenic bath maintained at a predetermined level in said vessel, a conveyor assembly having first and second end support sections and a medial section having a bottom section and at least two sloping side sections matching the profile of said bottom and at least two sloping sides of said vessel, said conveyor assembly being supported with said medial section immersed in said bath, said first sup-

port end section of said conveyor assembly being pivotally mounted in said cabinet, and power means to rotate said conveyor assembly around said pivotally mounted end section to raise said medial section above said bath level.

**4,955,210**  
**CAPILLARY TUBE ASSEMBLY AND METHOD OF  
 MANUFACTURE**

William G. Hansen, Clarksville, Tenn., assignor to American Standard Inc., New York, N.Y.

Filed Aug. 25, 1989, Ser. No. 398,811

Int. Cl.<sup>3</sup> F25B 41/06

U.S. Cl. 62—511

10 Claims



1. A refrigeration system comprised of: a compressor having a suction port and a discharge port; a condenser in flow connection with said discharge port; a capillary tube assembly including a plurality of preformed substantially identical capillary tubes having capillary tube inlets and capillary tube outlets, a tube end cap defining a plurality of apertures for sealingly accepting said capillary tubes therethrough, and a tube assembly body defining an interior having a portion of said preformed capillary tubes therein, said tube assembly body having a first aperture defining an inlet and a second aperture defining an outlet having said tube end cap sealingly secured thereacross, said inlet in flow connection with said condenser; an evaporator having a plurality of spaced apart evaporator inlets and an evaporator outlet, each said evaporator inlet in flow connection with one of said capillary tube outlets, said evaporator outlet in flow connection with said compressor suction port.

**4,955,211**  
**CIRCULAR KNITTING MACHINE FOR PRODUCING  
 SINGLE FACE PLUSH ARTICLES**

Paul Neher, Meersstetten, Fed. Rep. of Germany, assignor to Sipra Patententwicklungs- und Beteiligungsgesellschaft mbH, Albstadt, Fed. Rep. of Germany

Filed Aug. 17, 1988, Ser. No. 233,274

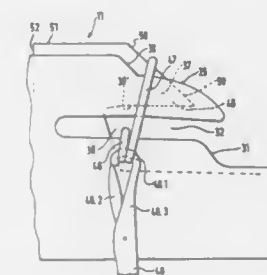
Claims priority, application Fed. Rep. of Germany, Aug. 17, 1987, 3727318

Int. Cl.<sup>3</sup> D04B 9/12, 15/06

U.S. Cl. 66—9 R

3 Claims

1. A circular knitting machine for producing a single face plush article of base threads and plush threads, comprising a needle cylinder provided with a plurality of needles; a plate ring provided with separately controlled and differently shaped plates including a first plate which has a slot for receiving a base thread and a stepped ridge for applying a plush thread, and a second plate provided with a recess in the region of said slot of said first plate, said second plate having a plate



tip formed above said recess and being provided for a plaiting with a plush thread pressing edge which is formed on said plate tip and extends in an inclined manner relative to said slot

**4,955,212**  
**APPARATUS FOR TREATING A TEXTILE WEB WITH A  
 LIQUID**

Johannes Kutz, Tübingen, and Günter von Harten, Kaarst-Büttgen, both of Fed. Rep. of Germany, assignors to Eduard Küsters Maschinenfabrik GmbH & Co. KG, Krefeld, Fed. Rep. of Germany

Continuation of Ser. No. 919,223, Oct. 15, 1986, abandoned.

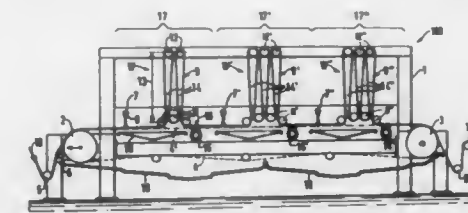
This application Jul. 14, 1988, Ser. No. 219,802

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1985, 3536912; Sep. 9, 1986, 3630592

Int. Cl.<sup>3</sup> D06B 1/02, 15/04

U.S. Cl. 68—9

10 Claims



1. An apparatus for washing or rinsing a dyed or printed textile web with a wash or rinse liquid, comprising: conveyor means including an endless sieve belt for transporting said textile web along a predetermined substantially horizontal path; applicator means disposed at a first station along said path for applying said wash or rinse liquid to said web during motion thereof along said path; suction means disposed at a second station along said path at a point downstream of said first station for removing said wash or rinse liquid from said web by a suction process during motion of said web along said path, said suction means extending transversely to said belt and said web; and dwell stretch means, disposed between said applicator means and said suction means, for conducting said textile web in a spread out condition and in a single layer through at least one dwell loop thereby increasing the time period said wash or rinse liquid acts upon said web, said dwell loop extending a substantial distance away from said path in a direction substantially perpendicular thereto.

4,955,213

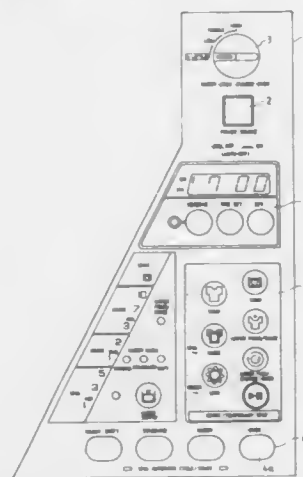
**FULL AUTOMATIC ELECTRIC WASHING MACHINE HAVING AN AUTO-OFF POWER SOURCE STRUCTURE**  
Hiroshi Ohsugi; Hiroyuki Toshimitsu; Toohiyasu Kamano, all of Hitachi; Tamotu Shikamori, Juon, and Masayoshi Hirayama, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Feb. 13, 1989, Ser. No. 309,356

Claims priority, application Japan, Feb. 19, 1988, 63-35266

Int. Cl.<sup>3</sup> D06F 33/02

U.S. Cl. 68—12 R

25 Claims



18. A full automatic electric washing machine having an auto-off power source structure comprising an auto-off power source switch provided on a panel control portion of a main body of said full automatic electric washing machine, means for controlling said auto-off power source switch, a first outside operation portion comprising buttons for indicating a plurality of full automatic cycles, and a second outside operation portion comprising buttons for indicating a plurality of washings and for displaying degrees of said plurality of washings, wherein when a washing process has been finished, said means for controlling controls said auto-off power source switch to present the off-condition, wherein said means for controlling further controls said auto-off power switch such that when an abnormal washing condition occurs during said washing process, said second outside operation portion displays the abnormal washing condition and said auto-off power source switch is controlled to present an off condition after a first predetermined shelf time, and further after the washing process has been finished said auto-off power source switch is controlled to present the off condition after a second predetermined shelf time.

4,955,214

**RAM PRESS FOR PRESSING LIQUID OUT OF MATERIAL BEING PRESSED**

Friedrich Geiger, Heilbronn-Frankenbach, Fed. Rep. of Germany, assignor to Passat-Maschinenbau GmbH, Fed. Rep. of Germany

Filed May 10, 1989, Ser. No. 350,698

Claims priority, application Fed. Rep. of Germany, May 13, 1988, 3816372

Int. Cl.<sup>3</sup> D06F 47/06

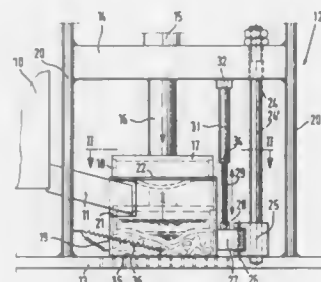
U.S. Cl. 68—242

16 Claims

14. A ram press for pressing liquid out of a material comprising:

a container for the material having an open top;  
a perforated base means associated with said container;  
pressing means having a central vertical axis;  
first mounting means for mounting said pressing means above said open top of said container for a movement along a path parallel to said vertical axis;  
second mounting means for mounting said container for a

movement with two degrees of freedom substantially perpendicularly to said vertical axis of said pressing means between a position in which said open top of said container is not aligned with said pressing means and an aligned position in which said open top of said container is aligned with said pressing means so that said pressing means can be introduced through said open top into said container; and



first driving means for driving said pressing means between a position in which said pressing means is out of said container and a position in which said pressing means penetrates said container when said open top of said container is aligned with said compressing means to compress material in said container between said pressing means and said perforated base means.

4,955,215

**ANTI-THEFT STEERING COLUMN CUFF DEVICE FOR AUTOMOBILES AND THE LIKE**

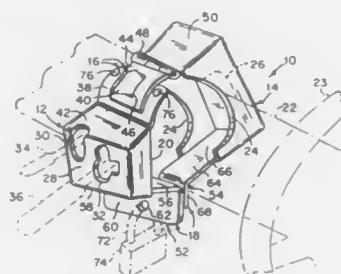
Nunzio Eremita, 2 Radcliff Rd., Staten Island, N.Y. 10305

Filed Oct. 16, 1989, Ser. No. 422,036

Int. Cl.<sup>3</sup> E05B 17/14

U.S. Cl. 70—18

2 Claims



1. An anti-theft cuff device for a motor vehicle having a steering wheel and a steering column with an ignition switch, said device comprising:

- (a) a first box shaped casing having an open side to fit against one side of the steering column;
- (b) a second box shaped casing having a curved open side to fit against opposite side of the steering column so as to cover and protect the ignition switch;
- (c) a hasp member extending between said first box shaped casing and said second box shaped casing so as to removably connect said first box shaped casing to said second box shaped casing on the steering column, wherein said hasp member includes:
  - (i) a curved plate having a hooked projection thereon, said curved plate being attached to and extending away from an end wall at said open side of said first box shaped casing; and
  - (ii) a curved strap having a slot therethrough and hinged to an end wall at said open side of said second box

4,955,217

**WIRE COILING ARRANGEMENT**

Erich Guggenberger, Geneva, Switzerland, and Ede Hódén, Mariefred, Sweden, assignors to Sands Defibrator AB, Sundsvall, Sweden

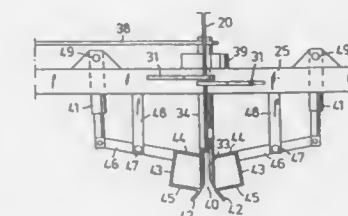
PCT No. PCT/SE88/00319, § 371 Date Jan. 17, 1990, § 102(e) Date Jan. 17, 1990, PCT Pub. No. WO88/09763, PCT Pub. Date Dec. 15, 1988

PCT Filed Jun. 13, 1988, Ser. No. 438,475

Claims priority, application Sweden, Jan. 12, 1987, 8702461-8 Int. Cl.<sup>3</sup> B21F 3/04

U.S. Cl. 72—134

7 Claims



4,955,216  
**METHOD AND APPARATUS FOR AUTOMATICALLY ADJUSTING SOLUBLE OIL FLOW RATES TO CONTROL METALLURGICAL PROPERTIES OF CONTINUOUSLY ROLLED ROD**

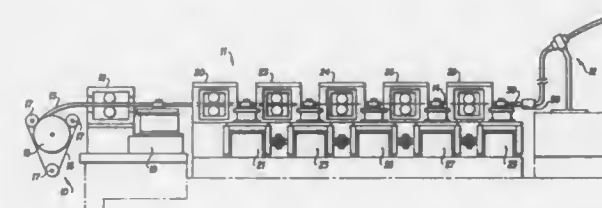
George W. Barker; Michael G. Crumpler, both of Carroll County, Ga.; James W. Peters, Perry County, Ind., and Delmar R. Haghey, Davies County, Ky., assignors to Southwire Company, Carrollton, Ga.

Filed Jan. 29, 1988, Ser. No. 150,216

Int. Cl.<sup>3</sup> B21B 37/00, 45/02

U.S. Cl. 72—10

41 Claims



1. In continuous metal rod rolling apparatus for hot-forming having multiple rolling stands, a metallurgical property control system comprising:

- means for supplying a flow of cooling and lubricating fluid to the rod;
- nozzle means for spraying the fluid onto said rod;
- valve means connected between said supplying means and said nozzle means for regulating the flow rate of fluid sprayed onto said rod;
- positioning means coupled to said valve means to positionally control the adjustment of said valve means;
- at least one historical data base having stored therein product specifications and historical process parameters associated with the product specifications;
- computer means (i) for communicating control parameters to said positioning means, (ii) for receiving rod sample property values, (iii) for maintaining said historical data base, and (iv) for performing off-line simulations to determine whether process and control parameter changes will bring the rod within product specifications; and
- historical data generating means communicating with said computer means for providing said computer means with information reflecting at least a value of one metallurgical property of said rod so that said computer means can correctly position said valve means to obtain a desired predetermined value of said metallurgical property.

4,955,218

**METHOD OF MANUFACTURING A HIGH TEMPERATURE COMPOSITE GASKET INCLUDING A STRIP SEGMENT OF NON-WOVEN FIBROUS REFRACTORY MATERIAL**

Louis Brandener, Poissy, France, assignor to Jacques Dubois, Barentin, France

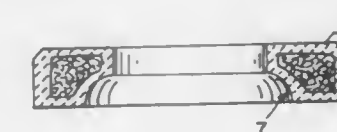
Filed May 27, 1987, Ser. No. 55,557

Claims priority, application France, Jun. 2, 1986, 86 07878

Int. Cl.<sup>3</sup> B29C 53/56; B32B 31/06; F16J 15/12

U.S. Cl. 72—146

5 Claims



1. A method of manufacturing an annular resilient high temperature composite gasket comprising the steps of forming a strip of composite material comprising at least one flexible strip of refractory material superposed on at least one strip of knitted metal, making a blank by winding the strip of composite material into a winding comprising at least one turn, the flexible strip of refractory material including at least one strip segment comprised of refractory fibers formed into a non-woven material with said non-woven material occupying at least one turn of the winding, and at least one strip segment of non-fibrous refractory material forming at least one turn of the



winding, and compressing the winding in an axial direction thereof so as to form an annular gasket wherein, in axial cross section, said flexible strip of refractory material forms a fibrous refractory portion which is at least partially surrounded by a non-fibrous refractory portion and the winding is compressed to a degree sufficient to enable dry frictional movement between fibers of the fibrous refractory portion while the knitted metal remains resilient and at least partially surrounds the refractory portions.

#### 4,955,219 ROCK BOLT

Moshe Josef, Bruma, and David Wiesenfeld, Givatim, both of South Africa, assignors to Videx-Wire Products (Proprietary) Limited, Transvaal, South Africa  
Continuation-in-part of Ser. No. 119,441, Nov. 12, 1987, abandoned. This application Aug. 8, 1989, Ser. No. 390,904  
Claims priority, application South Africa, Nov. 14, 1986, 86/8649; Sep. 11, 1987, 87/6810

Int. Cl.<sup>5</sup> B21H 8/02

U.S. Cl. 72—187

6 Claims



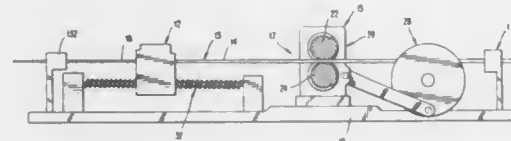
1. A method of making a rock bolt with a thread on a section thereof comprising the steps of:  
providing a metal bar of circular or near circular cross-section having a diameter which is substantially equal to the pitch diameter of the thread to be provided thereon;  
passing the bar in a single pass between a pair of rolls to pinch the bar at intervals to cold form protrusions spaced from one another in staggered formation on opposite sides of the bar along a selected section thereof;  
displacing one or more of said rolls away from the other at a selected time to ensure that said protrusions are formed only on said selected section of bar;  
straightening the bar in its cold condition; and  
cold rolling a thread with the said pitch diameter on a further selected section of the bar which is free of the said protrusions.

4,955,220  
LOW INERTIA MECHANISM FOR REPOSITIONING A WORKPIECE IN A ROCKER MILL  
Anthony A. Duerring, Kennewick, Wash., assignor to Sandvik Special Metals Corporation, Kennewick, Wash.  
Filed Nov. 22, 1989, Ser. No. 440,101

Int. Cl.<sup>5</sup> B21B 21/04

U.S. Cl. 72—214

7 Claims



1. In a rocker mill including a rollstand and repositioning means for repositioning a longitudinally elongated member which includes a workpiece extending through said rollstand, said supporting means comprising:

- a stationary feedscrew oriented in a longitudinal direction, guide means oriented in said longitudinal direction,
- a carriage mounted on said guide means for movement in said longitudinal direction toward said rollstand,
- a first hollow-shafted electric motor mounted on said carriage and including a first hollow open-ended rotor through which said stationary feedscrew passes,
- a threaded nut through which said stationary feedscrew

passes, said threaded nut being connected to said first hollow-shafted electric motor to be rotated thereby relative to said feedscrew in order to move said carriage longitudinally along said guide means,

a second hollow-shafted electric motor mounted on said carriage and including a second hollow open-ended rotor through which the elongated member is adapted to pass, a clamp through which the elongated member is adapted to pass, said clamp including displaceable clamp jaws connected to said second rotor for rotation therewith, and clamp actuating means mounted on said carriage and operably connected to said clamp jaws for displacing said clamp jaws into clamping engagement with the elongated member for transmitting rotary movement thereto from said second rotor and for transmitting longitudinal movement thereto from said threaded nut.

#### 4,955,221

#### ROLLING MILL FOR MAKING A ROLLED PRODUCT, ESPECIALLY ROLLED STRIP

Hugo Feldmann, Alsdorf-Warden; Tilmann Schultes, Sollingen, and Gerd Beisemann, Düsseldorf, all of Fed. Rep. of Germany, assignors to SMS Schloemann-Siemag Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

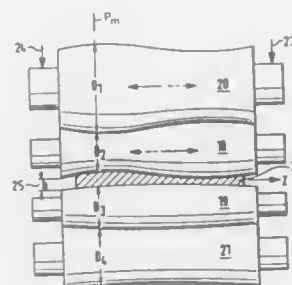
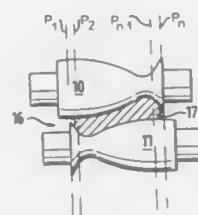
Continuation-in-part of Ser. No. 62,740, Jun. 15, 1987, Pat. No. 4,800,742. This application Nov. 2, 1988, Ser. No. 266,094  
Claims priority, application Fed. Rep. of Germany, Jun. 16, 1986, 3620197

The portion of the term of this patent subsequent to Jan. 31, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B21B 27/02, 31/18, 29/00

U.S. Cl. 72—247

19 Claims



1. A rolling mill for rolling flat stock comprising a plurality of rolls including a pair of working rolls defining a rolling gap between them, at least one of said rolls being axially shiftable relative to another of said rolls to control the shape of said gap and having a roll body which is continuously curved over an entire length thereof, all of said rolls having roll bodies rotatable about respective axes and said roll bodies having diameters in common planes perpendicular to said axes forming respective sums, the shapes of said roll bodies being such that said sums as determined axially along said roll bodies deviate from a constant value in all relative axial positions of said

bodies in accordance with a nonlinear mathematical function different from zero.

#### 4,955,222

#### DEFORMING PANELS HAVING RIBS

Helmut Reccius, Munich, Fed. Rep. of Germany, assignor to Dornier Luftfahrt GmbH, Friedrichshafen, Fed. Rep. of Germany

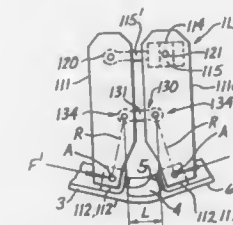
Filed Mar. 16, 1989, Ser. No. 324,548

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1988, 3808763

Int. Cl.<sup>5</sup> B21D 11/20

U.S. Cl. 72—295

16 Claims



1. Device for the bending and deformation of panels for covering cells of vehicles in the aerospace industry, said having inwardly directed stiffening ribs which intersect in nodes, the device having first and second deforming members being capable of engaging said panels in points adjacent to nodes under consideration of length changes obtained by some of the ribs; the improvement comprising:

- said deforming members carrying clamping bracket pairs for engagement of adjacent nodes, said clamping bracket pairs being freely pivotable under utilization of pivot pins arranged transversely to the plane of pivoting;
- means connected to said device for applying forces to the deforming members so that the deforming members are enabled to obtain the bending and deformation of the respective panel; and
- means for independently adjusting the orientation of said two deforming members in relation to each other such that the deforming forces respectively provided into the respective panel to be deformed are oriented in the area of the nodes transversely or nearly transversely to those ribs which extend transversely to the curvature to be obtained and consistently tangentially to the panel in the direction of curvature and following change of curvature on account of bending; and
- means for varying the direction of force action as provided by said deforming members into the panel such that these forces as provided by said two deforming members do not have to act coaxially in relation to each other.

#### 4,955,223

#### METHOD AND APPARATUS FOR FORMING A CAN SHELL

Ralph P. Stodd, Dayton, and Harry D. Stewart, Tipp City, both of Ohio, assignors to Formatec Tooling Systems, Inc., Dayton, Ohio

Continuation-in-part of Ser. No. 296,951, Jan. 17, 1989, abandoned. This application Nov. 15, 1989, Ser. No. 436,724

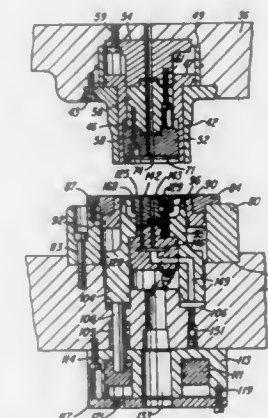
Int. Cl.<sup>5</sup> B21D 51/44

U.S. Cl. 72—336

21 Claims

1. A method of forming a cup-shaped can end wall or shell from a flat metal sheet, the shell including a center panel portion having a peripheral panel radius and connected by a panel wall portion to a countersink portion having a countersink radius and with the countersink portion connected to a crown portion by a chuck wall portion, the method comprising the steps of blanking a disk from the sheet, gripping a peripheral portion of the disk, moving the peripheral portion axially in

one direction relative to a center portion of the disk supported by a center panel punch to define the center panel portion and the panel wall portion with the panel wall portion connected by an inverted chuck wall portion to the peripheral portion,



deforming the peripheral portion to define the crown portion, and moving the center panel punch and the center panel portion axially in the same direction and relative to the crown portion to reverse form the inverted chuck wall portion into the chuck wall portion and the countersink portion.

#### 4,955,224

#### ADJUSTABLE HEIGHT VEHICLE FRAME STRAIGHTENING APPARATUS

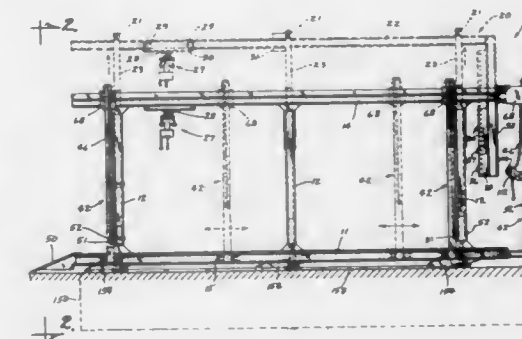
Carl R. Field, Treasure Island, Fla., assignor to Daz Mor, Inc., Des Moines, Iowa

Filed Jul. 13, 1989, Ser. No. 379,334

Int. Cl.<sup>5</sup> B21D 11/12

U.S. Cl. 72—457

5 Claims



1. Vehicle repair apparatus comprising:  
vehicle supporting means for supporting the wheels of a vehicle to be repaired;  
at least one tower means for pulling on parts of a vehicle disposed on said vehicle supporting means, said tower means having an upper end and a lower end;  
a lower tower support disposed around a portion of said vehicle supporting means;  
an upper tower support disposed upwardly from said vehicle supporting means and at approximately the same height as the upper end of said tower means;  
upwardly extending members rigidly attached at the bottom thereof to said vehicle supporting means and at the top thereof to said upper tower support;  
means for selectively attaching the upper end of said tower means to said upper tower support;  
means for permitting said upper end of said tower means to

move in a horizontal direction with respect to said upper tower support;  
 means attached to the lower end of said tower means and engaging said lower support for permitting said lower end of said tower means to move horizontally with respect to said lower tower support;  
 an upper framework;  
 downwardly extending members operably connected to said upper framework, said downwardly extending members being disposed in a sliding relationship with said upwardly extending members for permitting said upper framework to be lowered for transporting said vehicle repair apparatus from place to place; and  
 means associated with said downwardly extending members for holding said upper framework in an upper working position so as to provide adequate clearance for relatively high vehicles to be disposed on said vehicle supporting means.

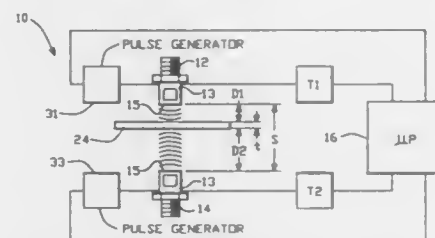
#### 4,955,225 AUTOMATIC CALIBRATION METHOD FOR THICKNESS GAUGES

James N. Knies, Edmonds, and Dean D. Campbell, Seattle, both of Wash., assignors to Ultrasonic Arrays, Inc., Woodinville, Wash.

Continuation of Ser. No. 104,420, Oct. 2, 1987, Pat. No. 4,823,590. This application Apr. 11, 1989, Ser. No. 298,482  
 Int. Cl.<sup>5</sup> G01N 29/00

U.S. Cl. 73-1 J

4 Claims



1. A device for measuring a dimension of objects traveling along a path comprising:  
 a pair of spaced apart probes located on opposite sides of the path and each having an ultrasonic transducer;  
 pulse generator means connected to the transducer in each of said probes for causing said transducers to selectively emit ultrasonic signals;  
 controller means connected to the pulse generator means for instructing the pulse generator means to initiate transmission of signals from the probes and for measuring the time period between emission and reception of each signal generated to determine the separation between the probes, said controller means including means for determining if an object is present, and if an object is present calculating the thickness of the object, and if an object is not present determining the separation between said probes by calculating the distances traveled by the signals from the probes to provide an updated separation between the probes.

4,955,226  
 METHOD AND APPARATUS FOR AUTOMATICALLY DETECTING THE PRESENCE OF HOLES IN FILLED AND SEALED PACKED PLASTIC BAGS  
 Dennis W. Beatty, Arlington, and C. Brooks Shafer, Dallas, both of Tex., assignors to Frito-Lay, Inc., Dallas, Tex.  
 Filed Dec. 26, 1984, Ser. No. 686,549  
 Int. Cl.<sup>5</sup> G01M 3/36

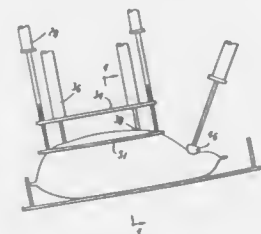
U.S. Cl. 73-49.3

3 Claims

1. An in line apparatus for detecting the presence or absence

of holes in sealed plastic bags filled with product and gas, the apparatus comprising:

- (a) a sensing member carrier carrying one or more displaceable sensing members;
- (b) means for positioning a filled and sealed bag to be inspected accurately with respect to the sensing members;
- (c) fluffing means for contacting the bag and applying positive pressure to the bag;
- (d) means for moving the sensing member carrier towards a surface of the bag to a predetermined position to place the sensing members in contact with the bag under uniform pressure for a predetermined time;
- (e) means for detecting the amount of displacement of the sensing members upon movement of the carrier to said predetermined position so as to provide a test value for

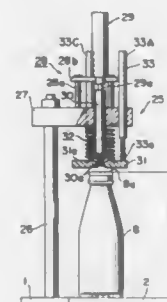


said amount of displacement, the detecting means further detecting change in displacement over time of the sensing members over a predetermined period of time while the sensing member carrier is at said predetermined position so as to provide a test value for said change of displacement over time; and  
 (f) means for comparing the test value for the amount of displacement and the test value for the change in displacement over time of the sensing members to predetermined corresponding values obtained with control bags, the comparing means being programmed to reject bags with which the sensing members are displaced less than a predetermined amount, said comparing means further being programmed to reject bags with which the change in displacement over time of the sensing members exceeds a predetermined rate.

4,955,227  
 APPARATUS FOR INSPECTING GLASS BOTTLES  
 Toshiki Fujita, Tokyo; Hirokazu Kimura, and Yoshihiro Yamato, both of Yokohama, Japan, assignors to Toyo Garasu Kabushiki Kaisha, Tokyo, Japan  
 Filed May 25, 1988, Ser. No. 209,952  
 Claims priority, application Japan, May 27, 1987, 62-130475; Aug. 20, 1987, 62-205214; Aug. 27, 1987, 62-214082  
 Int. Cl.<sup>5</sup> B07C 5/34

U.S. Cl. 73-104

5 Claims



3. An apparatus for inspecting a down sealing surface of a glass bottle, comprising:  
 an inspecting operation table;

a support column extending vertically upward from said operation table;  
 a support member extending horizontally from an upper portion of said support column;  
 a piston-cylinder assembly having a vertically reciprocable piston rod;  
 a measuring plate swingably supported on the outer end of said piston rod;  
 a coil spring disposed between said measuring plate and said support member; and  
 a plurality of linear gauges mounted on said support member, said gauges equally circumferentially spaced in a circle, and said gauges having gauge probes for contacting a back surface of said measuring plate to measure the distance from a reference point to said back surface.

#### 4,955,228 DEVICE FOR DETECTING ROTATION OF STEERING WHEEL FOR AUTOMOBILES

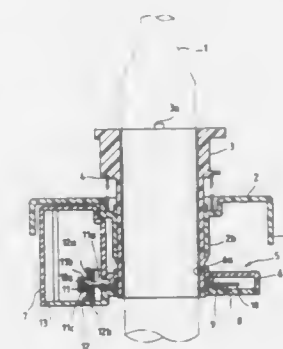
Hiroaki Hirose, and Kazuo Kono, both of Aichi, Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Continuation of Ser. No. 397,369, Aug. 23, 1989, abandoned, which is a continuation of Ser. No. 278,916, Dec. 2, 1988, abandoned. This application Nov. 14, 1989, Ser. No. 436,947  
 Claims priority, application Japan, Dec. 3, 1987, 62-184633[U]

Int. Cl.<sup>5</sup> G01M 19/00

U.S. Cl. 73-118.1

6 Claims



1. A device for detecting rotation of a steering wheel and steering shaft for motor vehicles, comprising:  
 a cylindrical connecting member rotatable with the steering wheel and having a projection for engagement with the steering shaft and a radially extending lip;  
 an encoding member rotatable together with the steering shaft and the steering wheel and having markers at predetermined positions;  
 a sensor disposed adjacent a locus of rotation of said markers;  
 signal generating means for receiving information from said sensor and for generating pulse signals representative of information on the rotation of said encoding member each time said encoding member is rotated past said sensor;  
 a base having an inner cylindrical wall concentric with both said connecting member and the steering shaft and an outer cylindrical wall spaced a predetermined distance from said inner wall, said connecting member and the steering shaft being rotatable within said base;  
 a storing interposed between said base and said radially extending lip of said connecting member;  
 a first casing for housing said encoding member, said encoding member being rotatable at least partially within said first casing;  
 a second casing for housing and holding said signal generating means, said second casing being integrally formed with said first casing, said second casing having a lower

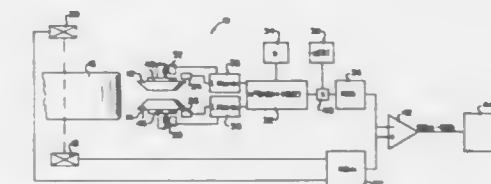
portion and an upper portion and being disposed beneath said base between said inner and outer walls thereof; and an arm mounted within said second casing on said lower portion, said arm having a substantially u-shaped central area extending about the edge of said encoding member, said sensor being disposed on said arm adjacent to a locus of rotation of said markers.

4,955,229  
 METHOD AND APPARATUS FOR DETERMINING THE UNIFORMITY OF PNEUMATIC TIRES  
 Günther Himmeler, Darmstadt, Fed. Rep. of Germany, assignor to Gebr. Hofmann GmbH & Co. KG Maschinenfabrik, Pfungstadt, Fed. Rep. of Germany  
 Filed Oct. 20, 1989, Ser. No. 424,107  
 Claims priority, application Fed. Rep. of Germany, Oct. 21, 1988, 3835985

Int. Cl.<sup>5</sup> G01M 17/02

U.S. Cl. 73-146

19 Claims



10. An apparatus for determining the uniformity of pneumatic tires comprising:  
 a measuring rim, on which a pneumatic tire to be tested can be mounted;  
 a measuring system for measuring force fluctuations that result when the tire is rolled on a contact surface of a testing apparatus and emitting a corresponding measurement signal;  
 a measuring rim scanner for scanning the measuring rim, the scanner furnishing preliminary error signals corresponding to the eccentricities of the measuring rim;  
 a signal processing system using the preliminary error signals to calculate a resultant error signal and then multiplying the resultant error signal by a value corresponding to a rigidity of the tire to attain a correction signal;  
 means for receiving both the measurement signal and the correction signal and for subtracting the correction signal from the measurement signal; and  
 an evaluation system operatively connected to said subtracting means which evaluates the subtracted measurement signal furnished by the subtracting means to determine tire uniformity.

4,955,230  
 ELIMINATION OF TURBULENCE FOR SILICON MICROMACHINED AIRFLOW SENSOR  
 Bryan C. Hall, Newport News, Va., assignor to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.  
 Filed Aug. 7, 1989, Ser. No. 390,597  
 Int. Cl.<sup>5</sup> G01F 1/68

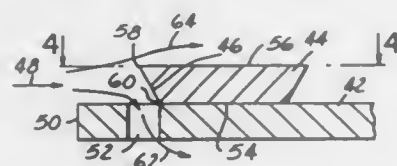
U.S. Cl. 73-204.21

5 Claims

1. In a solid-state mass airflow sensor comprising a substrate having a surface containing a semi-conductor sensing element, said semi-conductor sensing element having a leading edge surface in the direction of airflow and a flat exposed sensing surface extending downstream from said leading edge, the improvement which comprises a slot through said substrate just forward of and generally parallel with said leading edge surface so that a portion of the airflow toward said leading



edge surface is caused to pass through said slot and thereby promote smooth flow over said exposed sensing surface to



enhance the accuracy of the sensing element in measuring mass air flow.

**4,955,231**  
**LIQUID FLOAT GAGE ASSEMBLY**  
Christopher J. Mahoney, Birch Run, Mich., assignor to General Motors Corporation, Detroit, Mich.  
Filed May 12, 1989, Ser. No. 351,105  
Int. Cl.<sup>5</sup> G01F 23/72  
U.S. Cl. 73—313 3 Claims

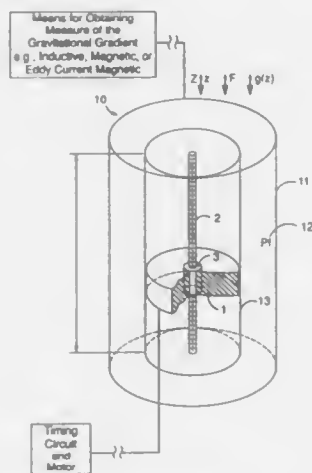


1. In a liquid float gage assembly for a vehicle mounted liquid reservoir comprising a vertical tube open at the bottom for liquid communication with the reservoir so that the liquid level in the tube varies with that in the reservoir, a plurality of horizontally aligned magnetically responsive sensors disposed in vertically spaced arrangement adjacent the tube and a level therein, the float being capsule shaped with an extended round cylindrical portion having rounded axial ends and comprising a magnet sensed by the nearest of the magnetically responsive sensors and attracted thereto so as to bias the float to an inner surface of the tube adjacent the sensors, the improvement comprising:

the tube having a horizontally cross-sectional shape substantially matching and just larger than an axial section of the float so that the float has a stable floating orientation with a single horizontal axis and is capable of rolling against the inner surface of the tube adjacent the sensors with minimal friction during vertical movement within the tube due to changes in liquid level; and

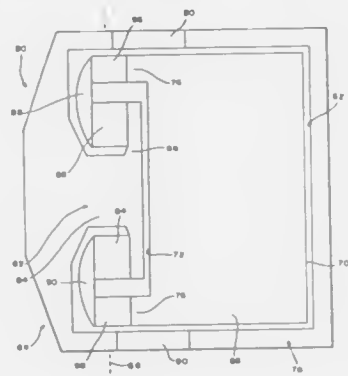
the magnet being annular about the axis of the float and having poles at axially opposing ends thereof and further having a circumferentially consistent spacing relative to the outer surface of the float so as to provide a substantially non-varying magnetic field strength and orientation relative to the horizontally aligned magnetically responsive sensors as the float rolls.

**4,955,232**  
**FLOATED GRAVITY GRADIOMETER AND METHOD**  
Theodore V. Lautzenhiser, Tulsa, Okla., and Melvin Eisner, Houston, Tex., assignors to Amoco Corporation, Chicago, Ill.  
Filed May 31, 1989, Ser. No. 359,454  
Int. Cl.<sup>5</sup> G01V 7/02  
U.S. Cl. 73—382 G 6 Claims



1. A gravity gradiometer, comprising:  
a housing containing a fluid;  
a float buoyantly supported within the fluid;  
means for varying the metacentric height of the float; and  
means for obtaining a measure of the gravitational gradient acting on the float resulting from varying the metacentric height.

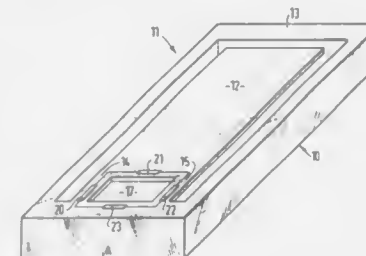
**4,955,233**  
**PENDULOUS ASSEMBLY FOR USE IN AN ACCELEROMETER**  
Richard A. Hanson, 21220 NE 156th St., Woodinville, Wash. 98072  
Continuation-in-part of Ser. No. 899,975, Aug. 25, 1986, abandoned. This application Jul. 19, 1988, Ser. No. 221,116  
Int. Cl.<sup>5</sup> G01P 15/08  
U.S. Cl. 73—497 29 Claims



1. A pendulous assembly for use in an accelerometer or other such device including an arrangement for sensing forces acting on the device in a particular direction, said assembly comprising:  
(a) a proofmass;  
(b) means forming part of said sensing arrangement and carried by or in direct engagement with said proofmass

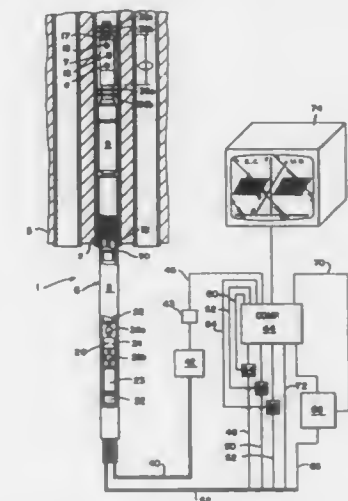
for specifically sensing said forces acting on said proofmass; and  
(c) means supporting one end of said proofmass for pivotal movement about a given axis back and forth through a resting plane which contains said proofmass when the proofmass is at rest in the absence of any of said forces, said supporting means including  
(i) a frame and means for mounting the frame to a main support forming part of the force sensing device;  
(ii) an isolation bridge;  
(iii) isolation bridge flexure means connecting said isolation bridge with a section of said frame for pivotal movement of said isolation bridge means back and forth about a given axis; and  
(iv) proofmass flexure means separate from and substantially unconnected with said isolation bridge flexure means, said proofmass flexure means connecting said proofmass with said isolation bridge means for pivotal movement of said proofmass back and forth about a given axis;  
(d) said isolation bridge flexure means and the proofmass flexure means being connected to one side of said isolation bridge such that the other side thereof is free-floating; and  
(e) said isolation bridge means including two spaced-apart, laterally aligned isolation bridges, said isolation bridge flexure means connecting one of said isolation bridges with said frame section and a second isolation bridge flexure means connecting the other isolation bridge with the frame section, and said proofmass flexure means including a first proofmass flexure connecting said one isolation bridge with said proofmass and a second proofmass flexure means connecting the other isolation bridge with said proofmass.

**4,955,234**  
**SENSOR**  
Jiri Marek, Reutlingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
Filed Mar. 24, 1989, Ser. No. 328,936  
Claims priority, application Fed. Rep. of Germany, May 3, 1988, 3814952  
Int. Cl.<sup>5</sup> G01P 15/12  
U.S. Cl. 73—517 R 9 Claims



1. A sensor for measuring acceleration of a vehicle and generating a control signal in response to deviation of the vehicle from a permissible course of movement for automatic release of vehicle occupant protective means, said sensor comprising a support formed as a silicium plate; a pendulum with a seismic mass; two spaced bending bars for supporting said pendulum on said support; two resistances arranged on said bending bars, respectively; and two further resistances arranged on said pendulum and said support, respectively, in a region between said two bending bars, said two resistances and said two further resistances being connected in a Wheatstone bridge.

**4,955,235**  
**APPARATUS AND METHOD FOR PROVIDING A COMBINED ULTRASONIC AND EDDY CURRENT INSPECTION OF A METALLIC BODY**  
Michael J. Metals; William G. Clark, Jr., both of Murrysville; Warren R. Junker, Monroeville; Lee W. Burtner, Elizabeth Township, Allegheny County; Thomas E. Arzenti, Greensburg; Harold P. Johnson, Verona; Robert P. Vestovich, Monroeville, and Bruce W. Bevilacqua, Irwin, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
Division of Ser. No. 79,860, Jul. 30, 1987, Pat. No. 4,856,337.  
This application Jan. 23, 1989, Ser. No. 369,725  
The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> G01N 29/00 34 Claims



1. An apparatus for inspecting the walls of a metallic body having an elongated opening therein with both ultrasound and eddy currents, comprising:  
a. a housing assembly insertable within said elongated opening, and  
b. a probe carrier rotatably connected to the housing assembly, including at least three ultrasonic probes for transmitting ultrasonic beams that are directly oriented radially, chordally and axially with respect to the longitudinal axis of the opening, and an eddy current probe for simultaneously generating eddy currents in the walls of the metallic body while the probe carrier is rotated.

**4,955,236**  
**METHOD FOR OBSERVATION OF VIBRATION MODE**  
Kenji Yokoyama, and Hidehiko Saizyo, both of Tokyo, Japan, assignors to NEC Environment Engineering Ltd., Tokyo, Japan  
Filed Nov. 20, 1989, Ser. No. 439,292  
Claims priority, application Japan, Nov. 22, 1988, 63-295389; Jul. 31, 1989, 1-198870  
Int. Cl.<sup>5</sup> G01D 05/28; G01H 13/00  
U.S. Cl. 73—655 7 Claims

1. A method for observation of vibration mode comprising the steps of:  
applying treatment for preventing diffusion of heat generated on at least one face of a substance to be observed, vibrating the substance to convert from vibrating energy to thermal energy,  
detecting distribution of temperature on the surface of the

substance from the thermal radiant energy emitted on each part of said substance, and



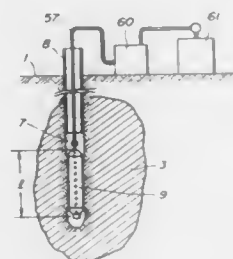
displaying change of temperature distribution on each part of the substance corresponding to shape of the vibration mode as thermal imagery.

#### 4,955,237 METHOD AND APPARATUS FOR MEASUREMENT OF IN-SITU HORIZONTAL STRESS BY FREEZING OF THE GROUND IN-SITU

Yoshio Suzuki, Munenori Hatanaka, Junryou Ohara, and Yorio Makihara, all of Tokyo, Japan, assignors to Takenaka Corp and Tokyo Soil Research Co., Ltd., Tokyo, Japan  
Filed Jan. 7, 1989, Ser. No. 362,867  
Int. Cl.<sup>5</sup> G01B 5/00

U.S. Cl. 73—784

14 Claims



1. A device for indicating the in-situ stress in cohesionless soil, said device comprising

first means including a flexible member for being placed adjacent a respective surface of a frozen sample, and for establishing an initial contact at positive pressure between said flexible member and said respective surface of said frozen sample,

second means for controlling said positive pressure between said flexible member and said respective surface of said sample as said sample thaws, in a manner that counteracts and prevents displacement of said flexible member while said sample thaws,

wherein change of dimension of said sample during said thawing, as indicated by attempted displacement of said respective surface of said sample in a direction normal to the adjacent part of said flexible member as said sample thaws, is prevented by change in said positive pressure during said thawing, and the final value of said positive pressure after said sample is completely thawed is related to the in-situ stress in the soil.

#### 4,955,238 OPTICAL SENSOR

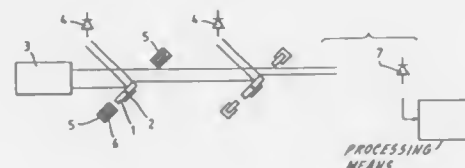
Roger E. Jones, Cambridge; Peter G. Hale, Chelmsford, and Jolyon P. Willson, Cambridge, all of Great Britain, assignors to STC PLC, London, England

Continuation-in-part of Ser. No. 33,067, Mar. 31, 1987, abandoned. This application Feb. 21, 1989, Ser. No. 313,391  
Claims priority, application United Kingdom, Jul. 12, 1986, 8617030

Int. Cl.<sup>5</sup> G01L 1/24

U.S. Cl. 73—800

9 Claims



1. An opto-electrical sensor which includes:  
a plate-like member of thin silicon which has a light-reflective surface and a magnetically soft layer on one of its surfaces;  
torsion supports for said plate-like member so arranged that the plate-like member is capable of oscillation;  
a coil which embraces said plate-like member and can be energised by an electrical current;  
a light source from which a light beam is obtained, the light-reflective surface of the plate-like member being at least partially in the path of the light beam;  
a photo-detector so located that when the reflective surface of the plate-like member is in the path of said light beam that light beam is reflected from the reflective surface on to the photo-detector; and  
connections from the photo-detector to the coil whereby the coil is energised in response to the production of a current output from the photo-detector due to light reflected from said plate-like member reaching the photo-detector;  
wherein the current thus applied to the coil applies a magnetic force to the plate-like member in such a way as to rotate that member out of the light beam;  
wherein a parameter to be sensed and measured influences the plate-like member in such a way as to rotate the plate-like member into the beam; and  
wherein the action of the photo-detector thus causes feedback to be applied magnetically to the plate-like member in such a way as to rotate it out of the beam, whereby the plate-like member is caused to oscillate at a rate dependent on the magnitude of the parameter to be sensed and measured, so that, due to the oscillation of the plate-like member the lightbeam is modulated in accordance with the magnitude of the parameter to be sensed and measured.

#### 4,955,239 APPARATUS FOR ELECTRICALLY INTERCONNECTING VIBRATING STRUCTURES

Donald R. Cage, Longmont, and Dean E. Lowe, Boulder, both of Colo., assignors to Micro Motion, Inc., Boulder, Colo.  
Continuation of Ser. No. 272,209, Nov. 17, 1988, abandoned, which is a continuation of Ser. No. 865,715, May 22, 1986, abandoned. This application Jul. 10, 1989, Ser. No. 377,324

Int. Cl.<sup>5</sup> G01F 1/84

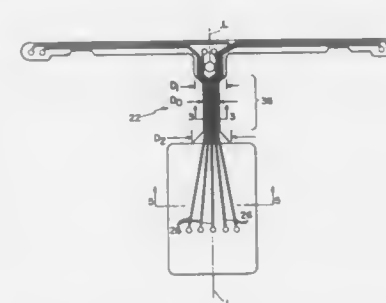
U.S. Cl. 73—861.38

10 Claims

1. In a Coriolis mass flow meter which comprises a flow tube, mounting means for said flow tube, means for vibrating said flow tube with respect to said mounting means and means for sensing the deflection of said flow tube caused by fluid flow through said flow tube and for producing a signal representative of said deflection, support structure means mounted adjacent said flow tube for supporting said means for vibrating and said means for sensing;

a flexible circuit device attached to said support structure means and said mounting means and including affixed multiple electrical conductors for electrically interconnecting said means for vibrating and said means for sensing between said support structure means and said mounting means, which device further comprises:

(a) flexible insulating means affixed to said multiple electrical conductors for maintaining them in essentially parallel relationships in a plane over a first distance along the length of said electrical conductors, which



first distance is greater than the rectilinear distance between said mounting means and said support structure means; and

(b) stiffening means affixed to said insulating means at each end of said first distance and extending essentially to each of the locations where said device is attached to said mounting means and said support structure, which stiffening means act to maintain said first distance of said flexible circuit device in essentially a half-loop shape after said device is attached to said mounting means and said support structure.

#### 4,955,240 VIBRATION TYPE FORCE DETECTOR

Akira Komoto, Fujio Okumachi, Japan, assignor to Shimadzu Corporation, Japan

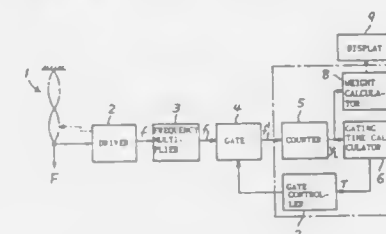
Filed Sep. 26, 1989, Ser. No. 412,428

Claims priority, application Japan, Sep. 30, 1988, 63-248879

Int. Cl.<sup>5</sup> G01L 1/10; G01G 3/16

U.S. Cl. 73—862.59

3 Claims



1. A vibration type force detector comprising: a string to which a force to be measured is applied in the direction in which the string is tensioned; a driver for causing said string to vibrate at its natural frequency and simultaneously producing a series of pulses at a frequency in synchronism with the vibration of said string; a gate to which said series of pulses are applied; a counter for counting said series of pulses that have passed through said gate; means for providing a gating time determined in accordance with the result of the counting of said counter; and a controller for controlling said gate in accordance with said gating time; said gating time providing means being so arranged that as the vibration frequency of said string increases, said gating time lengthens.

#### 4,955,241 MAGNETOELASTIC FORCE-MEASURING DEVICE

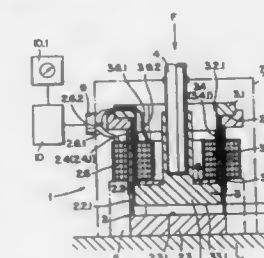
Edmund Schiesale, Schorndorf, and Khaldoun Alasaifi, Schwabach Grund, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany  
Filed Jan. 5, 1989, Ser. No. 361,317

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1988, 3819083

Int. Cl.<sup>5</sup> G01L 1/12

U.S. Cl. 73—862.69

15 Claims



1. Magnetoelastic force-measuring device comprising a metallic annular thrust body of low elastomechanical hysteresis with magnetostrictive properties, which has mutually parallel end faces subjectable to the force to be measured, and bears a coaxially arranged exciting and measuring winding, wherein a metallic sleeved tension body is arranged to fit coaxially in the annular thrust body, here said sleeved tension body being likewise of low elastomechanical hysteresis and with magnetostrictive properties and being supported at its one end with an annular flange on the free end face of the annular thrust body which is not supported against an abutment, the other free end being provided with a receiver for introducing the force (F), wherein the magnetostrictive properties are formed by a thin, homogeneous, uniform, soft-magnetic measuring film which is applied, on the one hand, to the outer lateral surface of the annular thrust body and, on the other hand, to the inner lateral surface of the sleeved tension body, wherein the exciting and measuring winding of the annular thrust body is constructed as a ring coil and is arranged on the measuring film on the outer lateral surface of the annular thrust body, and wherein, in its interior, the sleeved tension body likewise bears a ring coil constructed as an exciting and measuring winding, which ring coil is arranged on the measuring film on the inner lateral surface of the sleeved tension body, the two ring coils being connected up to make an inductive half-bridge and being capable of being connected to an electronic apparatus for exciting and evaluating the differential inductance.

#### 4,955,242 CONVEYOR BELT CROSS-STREAM SAMPLING SYSTEM AND ASSOCIATED METHOD

John B. Long, 421 Heron Hill Dr., Louisville, Tenn. 37777

Continuation of Ser. No. 363,544, Jun. 6, 1989, Pat. No. 4,919,000. This application Dec. 15, 1989, Ser. No. 452,113

The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> G01N 1/12

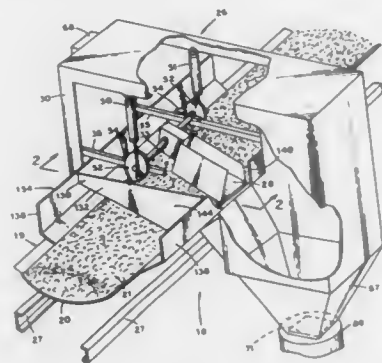
U.S. Cl. 73—863.91

8 Claims

1. In a system for taking a sample of material carried on a moving conveyor belt wherein the sample is taken at a sampling location by passing a sampler across the belt through the moving material from an entry side of the belt to an exit side of the belt, the improvement which comprises means located upstream of the sampling location for limiting build-up of material against the sampler caused by the presence of the sampler within the flow of material so that only a predetermined

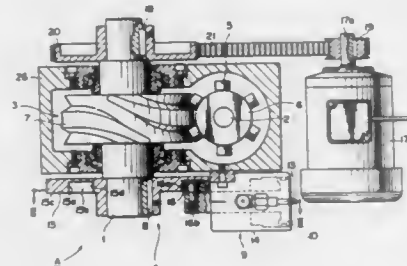


mined build-up of material against the sampler is permitted to thereby limit the thrust force exerted against the sampler by



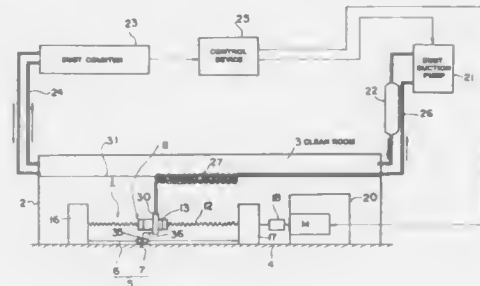
the moving material in excess of that exerted when said predetermined build-up of material against the sampler is reached.

**4,955,243**  
**MOTION TRANSFORMING APPARATUS**  
Heizaburo Kato, Shizuoka, and Masao Nishioka, Fukuroi, both of Japan, assignors to Sankyo Manufacturing Company, Ltd., Tokyo, Japan  
Filed May 3, 1989, Ser. No. 346,679  
Int. Cl.<sup>5</sup> F16H 27/04  
U.S. Cl. 74—84 R 10 Claims



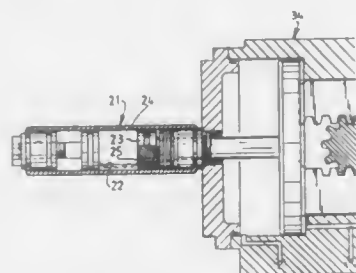
1. A motion transforming apparatus for transforming a continuous rotary motion of an input shaft into a motion of a predetermined type of an output shaft through a motion transmitting cam means, comprising:  
torque compensating cam means including a cam connected to said input shaft and cam follower means, and  
pneumatic cylinder means for applying load on said torque compensating cam means,  
said pneumatic cylinder means including a cylinder into which gas is introduced, and piston means accommodated in said cylinder and connected with said cam follower means, said piston means being adapted to be pushed by the pressure of said gas introduced into the cylinder in such a direction as to maintain said cam follower means in contact with a cam surface of said cam and being movable reciprocally in the cylinder for compressing and expanding said introduced gas, and  
wherein a fluctuating torque applied on said input shaft by the operation of said torque compensating cam means and the accompanying reciprocal motion of the piston in the cylinder compensate a fluctuating torque loaded on the input shaft by said motion transmitting cam means when the motion of the input shaft is transformed into the motion of the output shaft through the motion transmitting cam means.

**4,955,244**  
**OPERATING APPARATUS FOR CLEAN ROOM**  
Masayuki Katahira, Maebashi, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan  
Filed Jul. 10, 1989, Ser. No. 377,597  
Claims priority, application Japan, Jul. 14, 1988, 63-175843  
Int. Cl.<sup>5</sup> F16H 25/22; B01D 53/30  
U.S. Cl. 74—89.15 3 Claims



1. In an operating apparatus for a clean room including a ball screw apparatus having a nut which is engaged with a driving rotary shaft of the ball screw apparatus for linearly moving a member to be operated in a clean environment, and means for sucking and removing dust produced in said ball screw apparatus, the improvement comprising:  
a feed oil bore formed in the nut;  
said sucking and removing means including a suction pipe connected to the feed oil bore; and wherein  
grease plating is applied to the rotary shaft of said ball screw apparatus by dipping the rotary shaft into a solution of a volatile solvent containing a very small amount of grease dissolved therein and by drying the rotary shaft after removing the rotary shaft from the solution to thereby form a very thin coating of the grease on the surface of the rotary shaft.

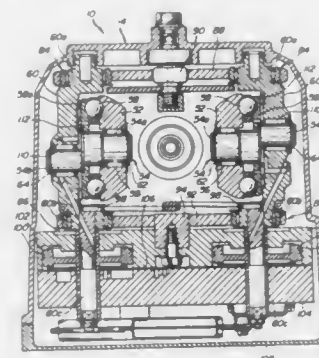
**4,955,245**  
**GAS SPRING FOR ACTUATOR**  
Hendrikus C. J. G. Janssen, Hengelo, and Joseph H. M. Tiehuis, Delden, both of Netherlands, assignors to Holland Hellas Holding B.V., Netherlands  
Filed Feb. 10, 1989, Ser. No. 308,448  
Claims priority, application Netherlands, Feb. 11, 1988, 8800340  
Int. Cl.<sup>5</sup> F15B 15/06  
U.S. Cl. 74—109 11 Claims



1. Actuator, comprising:  
a cylinder,  
two pistons reciprocally movable in the cylinder,  
two racks, each carried by a respective piston,  
a pinion coupled to the racks, the racks diametrically opposed to each other relative to the pinion,  
an output connecting part coupled to the pinion for connecting a device for driving thereto,

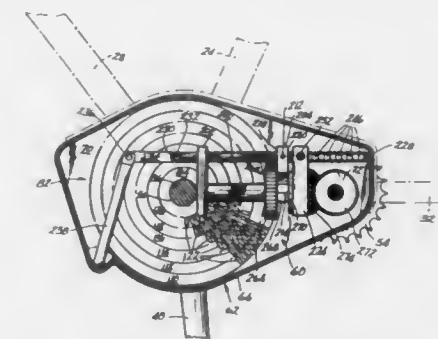
means for communicating a medium under pressure to the pistons for causing the pistons simultaneously to move away from or move towards one another, thereby causing the performing of a corresponding pivoting movement of said output connecting part, and  
resetting spring means for forcing said pistons to a terminal rest position,  
wherein said resetting spring means comprises at least one gas spring which is connected to each piston, wherein the gas spring is filled partly with gas under pressure and partly with a non-compressible medium, such as oil, so that the piston performs a slowed movement at the end of its stroke directed towards the rest position of the gas spring.

**4,955,246**  
**CONTINUOUSLY VARIABLE TRACTION ROLLER TRANSMISSION**  
Masaki Nakano, Kawasaki, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan  
Filed May 26, 1989, Ser. No. 357,192  
Claims priority, application Japan, May 27, 1988, 63-69293  
Int. Cl.<sup>5</sup> F16H 15/38; F16C 19/30, 19/48  
U.S. Cl. 74—200 2 Claims



1. A continuously variable traction roller transmission comprising:  
input and output traction discs having opposite toric surfaces;  
two traction rollers arranged in engagement with said toric surfaces of said input and output discs for the transmission of movement therebetween;  
two shafts having pivot base portions and pivotal portions eccentric with said pivot base portions;  
said traction rollers being rotatably supported on said pivotal portions of said shafts;  
two roller support members rotatably supporting thereon said pivot base portions of said shafts and having rotatable shaft portions;  
said roller support members being rotatable about and axially slidable on said rotatable shaft portions;  
two thrust bearings arranged concentric with said pivotal portions of said shafts and between said traction rollers and said roller support members, respectively;  
said thrust bearings having collars on the sides of said roller support members; and  
two needle bearings interposed between said collars of said thrust bearings and said roller support members, respectively;  
said needle bearings being arranged concentrically with the pivot base portions of said shafts.

**4,955,247**  
**TRANSMISSION**  
Ernest H. Marshall, 30 Saulters Rd., Manchester, Conn. 06040  
Filed Nov. 21, 1988, Ser. No. 273,474  
Int. Cl.<sup>5</sup> F16H 3/22  
U.S. Cl. 74—347 9 Claims

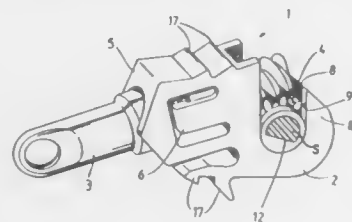


1. A transmission for transmitting rotary motion from an input shaft to an output location, said transmission comprising an output shaft at the output location, a compound face gear assembly including a back plate having an axis and mountable for rotation with the input shaft, said back plate having radially inner and outer arcuate openings therethrough centered on said axis, radially innermost and outer circumferentially continuous gear rings providing a first gear and a second gear, respectively, said radially outer gear ring surrounding and contiguous with said innermost gear ring, each said gear ring having on one face a plurality of closely spaced radial gear teeth and on an opposite face a lug, all of said gear teeth having a pitch that is the same for all said gear teeth, and said lugs of said innermost and outer gear rings extending through said inner and outer arcuate openings, respectively, each said gear ring being independently rotatable a limited circumferential distance relative to said back plate as determined by the circumferential extent of its said lug as compared to the circumferential extent of its associated arcuate opening, means for transmitting rotation from the input shaft to said gear teeth of a selected one of said gear rings and thence to said output shaft, means for changing the selected one of said gear rings engaged by said means for transmitting rotation, and means for resiliently urging each said lug toward a neutral position spaced from each end of its associated said arcuate opening, wherein said rotation transmitting means includes a sliding pinion having external gear teeth engageable with said gear teeth of any of said gear rings, a spline shaft perpendicular to said output shaft and on which said sliding pinion is slidably mounted, so that said sliding pinion and said spline shaft are rotatable by whatever said gear ring is in engagement with said sliding pinion, and a first bevel gear mounted on an end of said spline shaft and meshing with a second bevel gear which is mounted on said output shaft.

**4,955,248**  
**ANGULAR GEAR FOR VENETIAN BLINDS**  
Vincent Lindstrom, Bankeryd, Sweden, assignor to AB Perma System, Sweden  
Filed Feb. 24, 1989, Ser. No. 315,282  
Claims priority, application Sweden, Mar. 1, 1988, 8800720-8  
Int. Cl.<sup>5</sup> F16H 1/18 3 Claims

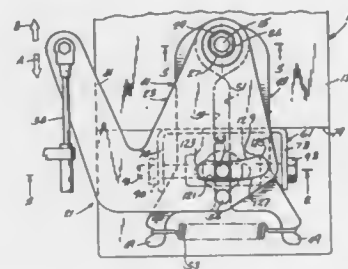
1. An angular gear comprising a gear housing, a helical gear extending from a shaft extending into said gear housing, and a pinion meshing with said helical gear for transmitting turning of said shaft of said helical gear to a turning rod extended through and rotatably fixed to said pinion for rotation of said rod, said shaft being provided with two axially spaced bearing portions of circular cross section and said gear housing having complementary bearing portions, a neck portion being pro-

vided between said two axially spaced bearing portions, said neck portion having a diameter which is less than the diameter of any of said two axially spaced bearing portions, and at least one resilient tongue integral with said gear housing and having



a free end thereof comprising a hook-like means arranged for cooperation with said neck portion, said hook-like means resiliently protruding into said neck portion and locking said shaft in an axial position in said gear housing.

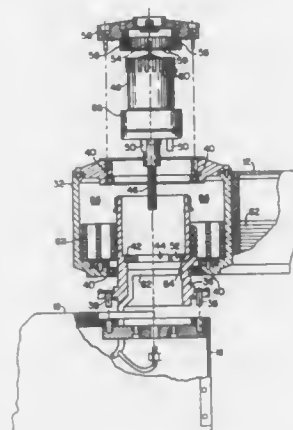
**4,955,249**  
**CONTROL MECHANISM FOR HYDROSTATIC TRANSMISSION**  
Clyde R. Wetor, Cascade, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.  
Filed Jun. 26, 1989, Ser. No. 371,268  
Int. Cl.<sup>5</sup> G05G 9/12, 5/04  
U.S. Cl. 74—473 R 17 Claims



1. A control for a hydrostatic transmission having an operating member rotatable about a fixed pivot axis between a range of forward drive positions, a neutral position, and a range of reverse drive positions, said control comprising an actuating member adapted to be fixed to the operating member for common movement therewith about the pivot axis and having a portion adapted to be connected to an actuating link to effect pivotal movement of said actuating member about the pivot axis, a first return member mounted for pivotal movement about the pivot axis and independently of pivotal movement of said actuating member, a second return member mounted for pivotal movement about the pivot axis and independently of pivotal movement of said actuating member and of said first return member and located in facing relation to said first return member, a pin fixed on said actuating member and extending between said first and second return members, means engaging said return members for biasing said return members toward each other and into engagement with said pin, a neutral adjustment member, and means located in fixed relation to the pivot axis for locating said neutral adjustment member between said first and second return members and for adjustably moving said neutral adjustment member along a fixed path.

**4,955,250**  
**MULTIPLE FOREARM ROBOTIC ELBOW CONFIGURATION**

John J. Fisher, Wilmington, Del., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
Filed Jun. 8, 1989, Ser. No. 363,031  
Int. Cl.<sup>5</sup> B25J 17/00, 18/00, 9/12  
U.S. Cl. 74—479 2 Claims

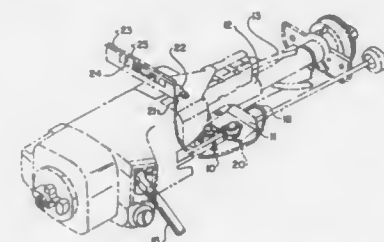


1. A robotic elbow configuration apparatus comprising:  
a main arm having a first side and an opposing side;  
an upper forearm rotatably attached for support to said first side of said main arm and adapted to rotate coplanarly with said main arm;  
a lower forearm rotatably attached to said opposing side of said main arm and adapted to rotate coplanarly with said main arm and said upper forearm, said lower forearm capable of movement and operating independent of said upper forearm;  
a first modular actuator assembly carried by said upper forearm for moving said upper forearm; and  
a second modular actuator assembly having the same structure as said first modular actuator assembly carried by said lower forearm for moving said lower forearm;  
each of said first and second modular actuator assemblies comprising:  
an actuator canister within said modular actuator assembly having  
a motor means;  
a shaft means turned by said motor means;  
a gearing means in operative connection with said shaft means;  
a position referencing means in operative connection with said shaft means for determining position;  
a spindle within said modular actuator assembly for receiving said actuator canister having a bearing means on which bearing means said actuator assembly rotates; and  
an output hub means in operative connection with said gearing means for moving a forearm attached to said actuator assembly.

**4,955,251**  
**ADJUSTING DEVICE FOR THE POINTER ELEMENT OF A DRIVE RANGE INDICATING DISPLAY**  
Karl A. Rehnert, and Gary W. Alcorn, both of Saginaw, Mich., assignors to General Motors Corporation, Detroit, Mich.  
Filed Dec. 5, 1989, Ser. No. 446,344  
Int. Cl.<sup>5</sup> F16C 1/10; G01D 5/04  
U.S. Cl. 74—501.5 R 4 Claims

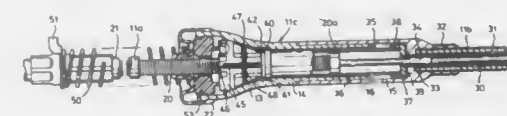
1. In combination, a device for adjusting the effective length of a control cable having a sheath and core, the control cable being employed to interconnect the pointer element of a vehicle drive range indicator assembly with the drive range select-

ing lever in order to coordinate the designation presented by the indicator assembly with respect to the position of the drive range selecting lever, said device comprising: a frame structure; a block mounted on said frame structure for reciprocating movement; means to secure the control cable sheath to said



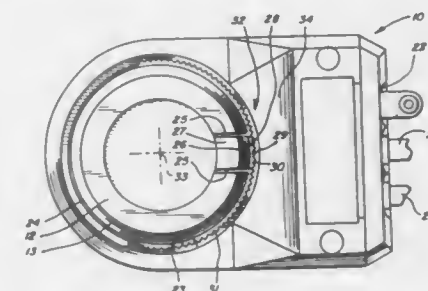
block; an operating lever being pivotally mounted on said frame structure; said operating lever being operatively connected to said block such that rotation of said operating lever effects selected reciprocation of said block; and, locking means operatively effective between said operating lever and said frame structure to secure the selected location of said block.

**4,955,252**  
**CABLE-AND-SLEEVE CONNECTIONS**  
Peter A. G. Clissett, Stourport-on-Severn, and Roger A. Lacey, Shrawley, both of Great Britain, assignors to Acco Cable Controls Limited, Worcestershire, United Kingdom  
Filed Aug. 15, 1986, Ser. No. 896,953  
Claims priority, application United Kingdom, Aug. 16, 1985, 8520612  
Int. Cl.<sup>5</sup> F16C 1/10  
U.S. Cl. 74—502.4 5 Claims



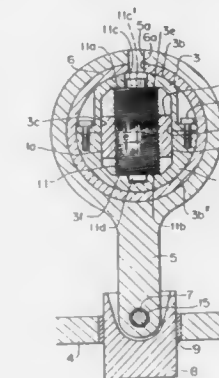
1. A cable-and-sleeve connector in which a cable extends through a sleeve the ends of the sleeve lie at positions which are fixed and the sleeve extends in a curved deformable path between its ends, the sleeve comprising a housing and first and second parts that extend one from each end of and are connected together by said housing, said first part being fixed to the housing and said second part being connected at an end portion to the housing by means of a clutch disposed within the housing and operable between a position in which it holds the end portion of said second part fixed relatively to the housing and a position in which said second part is released, the end portion of said second part then being free to reciprocate axially within said housing, resilient means acting on the clutch to urge the clutch into engagement with the sleeve, an actuating member extending around the cable within the housing on the side of the clutch remote from the second part of the sleeve and movable axially between an operative position in which it holds the clutch in the position in which the second part is released and an inoperative position in which it permits the clutch to hold the second part fixed, and a striker fixed to the cable such that, by reciprocation of the cable within the sleeve, the striker can move between a position in which it abuts the actuating member to hold it in its operative position and a position in which it lies withdrawn into the first part of the sleeve and permits the actuating member to move to its inoperative position.

**4,955,253**  
**SELF-LOCKING KNOB FOR ADJUSTABLE CONTROL MECHANISM**  
Yoshio Sakai, Ueda, and Takeshi Yamada, Saka, both of Japan, assignors to HTC Co., Ltd and Totoku Electric Co., Ltd., both of Japan  
Continuation of Ser. No. 620,759, Jun. 14, 1984, abandoned.  
This application Aug. 26, 1986, Ser. No. 902,045  
Claims priority, application Japan, Apr. 28, 1984, 59-63648  
Int. Cl.<sup>5</sup> G05G 1/10 7 Claims



1. In a mechanism having an adjustable control, and movable means for adjusting the control, the improvement comprising: manipulating means connected to said movable means and defining a graspable portion for effecting manual movement of said movable means;  
resiliently outwardly biased locking means associated with said graspable portion of the manipulating means for locking said manipulating means against manual movement; and  
means responsive solely to grasping of said graspable portion of the manipulating means with sufficient inward grasping force to overcome the biasing of said locking means for concurrently releasing said locking means and permitting movement of said manipulating means to adjust said control, said biasing means comprising means for automatically relocking the manipulating means upon removal of said grasping force with the control retained in the adjusted disposition.

**4,955,254**  
**ECCENTRICITY CONTROL DEVICE**  
Heizaburo Kato, Shizuoka, Japan, assignor to Sankyo Manufacturing Company, Ltd., Tokyo, Japan  
Filed Dec. 28, 1988, Ser. No. 291,165  
Claims priority, application Japan, Dec. 29, 1987, 62-333164  
Int. Cl.<sup>5</sup> G05G 1/00; B30B 5/00, 1/06  
U.S. Cl. 74—603 1 Claim



1. An eccentricity control device comprising:



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graph TD
    Start([START]) --> BSW{BRIDGE SWITCH ON}
    BSW -- NO --> BSW
    BSW -- YES --> VSW{VACUUM SWITCH ON}
    VSW -- NO --> BSW
    VSW -- YES --> EPR{ENGINE SPEED EXCEEDS  
PRESET PLANNED VALUE}
    EPR -- NO --> BSW
    EPR -- YES --> Shift[SHIFT TO R-RANGE]
    Shift --> End([END])
  
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[illegible]

output, said device comprising:

- (a) a sensor for detecting the number of revolutions input to said transmission;
- (b) a sensor for detecting the number of revolutions output from said transmission or a car speed sensor;
- (c) means for calculating an actual gear ratio in accordance with said detected number of input revolutions and said number of detected output revolutions;
- (d) means for obtaining a formal gear ratio responsive to shift lever position;
- (e) comparison means for determining a failure in the me-

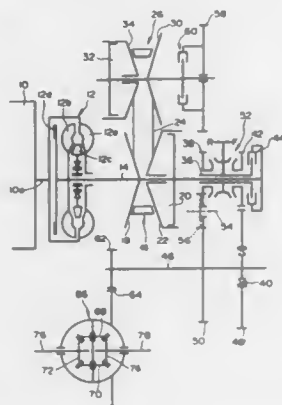
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graph TD
    Start([Begin]) --> IsI1{Is i = 1?}
    IsI1 --> CalcLi1[Calc. Li for i = 1  
Li = Li + Li + Li  
Li = Li + Li + Li  
Li = Li + Li + Li]
    IsI1 --> IsIn1{Is i = n?}
    IsIn1 --> IsIn2{Is i < n?}
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said control circuit including circuit means which is responsive to engine load and vehicle speed for determining a need to induce a shift between gears of said transmission and for conditioning said transmission in a manner which induces said shift to occur, said control circuit being further responsive to said engine load indicating means for: when said engine load indicating means indicates that a load on the engine exists, selecting said first and second sets of power on duty cycle control data and for sequentially using said first and second sets of power on duty cycle data one after the other to control the operation of said line pressure control solenoid during the time the shift between gears is occurring, and for

when said engine load indicating means indicates that a load on the engine is absent, selecting said first and second sets of power off duty cycle control data and for sequentially using said first and second sets of power off duty cycle data to control the operation of said line pressure control solenoid during the time the shift between gears is occurring.

**4,955,260**  
**HYDRAULIC CONTROL SYSTEM FOR TRANSMISSION**  
 Toshikazu Oshidari, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan  
 Filed Mar. 31, 1989, Ser. No. 330,919  
 Claims priority, application Japan, Mar. 31, 1988, 63-75974  
 Int. Cl.<sup>3</sup> B60K 41/14; F16H 11/04  
 U.S. Cl. 74—868 5 Claims

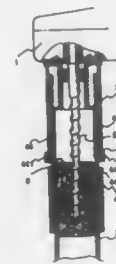
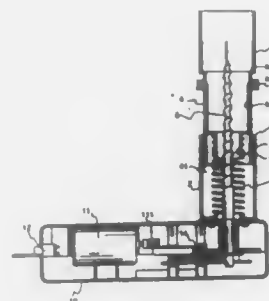


1. A hydraulic control system for a transmission of the type wherein a gearing mechanism is combined with a V-belt type continuously variable transmission mechanism, the hydraulic control system comprising:  
 a hydraulic arrangement wherein a hydraulic fluid pressure is supplied to a pulley cylinder chamber which the tension on the V-belt is variable with;  
 means for increasing the level of said hydraulic fluid pressure in response to a shifting from transmission of torque through the gearing mechanism to the transmission of torque through the V-belt type continuously variable transmission mechanism.

**4,955,261**  
**AUTOMATIC CORKSCREW**  
 Yung-Tung Chiang, Chung Ho, Taiwan, assignor to Chyuan How Enterprise Co., Ltd., Taipei Hsien, Taiwan  
 Filed Mar. 19, 1990, Ser. No. 495,724  
 Int. Cl.<sup>3</sup> B67B 7/04  
 U.S. Cl. 81—3.2 1 Claim

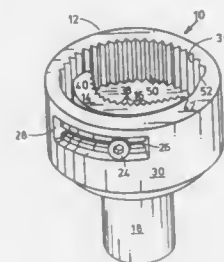
1. An automatic corkscrew comprising:  
 a body having a motor, a power source connected with the motor, a conversion switch electrically connected with the motor, a gear assembly engaged with an output shaft of the motor, a power switch for controlling the power source and a worm fixed connected with an output end of the gear assembly;  
 a tubular member fixedly engaged at one end with said body;  
 a ferrule put into the other end of said tubular member with flanges in contact with the edge thereof;  
 a drawing tube inserted into said ferrule and having collets at the inner end, said collet having a flange in contact with inner edge of said ferrule, and a central cylindrical portion at the inner end, said drawing tube being cut along the length to form resilient plates provided with a protuber-

ance and a plurality of longitudinal projections at the inner sides; and



a spring disposed between said tubular member and the central cylindrical portion of said drawing tube.

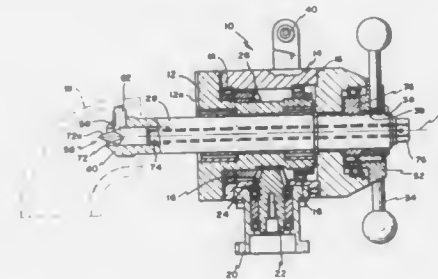
**4,955,262**  
**SOCKET PIPE WRENCH**  
 Kent Womack, Rte. 2, Box 52, Chillicothe, Tex. 79225, and Tony Hise, Box 211, Dumas, Tex. 79029  
 Continuation-in-part of Ser. No. 323,167, Mar. 15, 1989, Pat. No. 4,920,834, which is a continuation of Ser. No. 98,278, Sep. 18, 1987, abandoned. This application May 9, 1989, Ser. No. 349,574  
 Int. Cl.<sup>3</sup> B25B 13/16  
 U.S. Cl. 81—165 12 Claims



1. An apparatus for tightening and loosening a threaded member, comprising:  
 a socket member having a circular cavity therein defining an inner annular surface for receiving a portion of said threaded member, said inner annular surface having teeth and a cam lobe;  
 jaw means attached to said socket member and located within said circular cavity, whereby rotation of said socket member causes said jaw means to forcibly impinge upon said portion of said threaded member, said portion of said threaded member being grasped between said jaw means and a part of said teeth of said annular surface, thereby exerting rotational torque on said threaded member; wherein said jaw means includes:

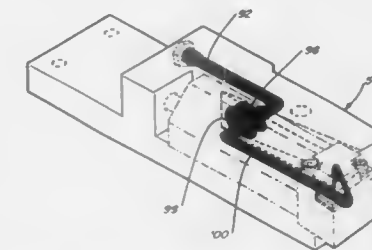
a crescent-shaped member having inner and outer peripheries, said outer periphery having a curvature essentially identical to curvature of said inner annular surface of said cavity, said inner periphery having teeth for grasping said portion of said threaded member, said crescent-shaped threaded member having distal and proximate ends with said distal end being wider than said proximate end, said distal end being adapted to be complementary with said teeth of said inner annular surface, said distal end being separated from said proximate end by an angular distance of an arc of a circle, said arc including a substantial position of said circle; said cam lobe is a cam wall attached to and integral with said inner annular surface of said circular cavity, said cam wall having a thickness such that said wall has a first position thereof located radially closer to an axis of rotation through said socket member and has a second position thereof located radially further from the axis than said first position, said first position located near said proximate end of said crescent shaped member whereby, as said crescent shaped member slides toward said first position of said cam wall said proximate end of said crescent shaped member is forced toward the center of said circular cavity; and means for attaching said crescent-shaped member to said socket member.

**4,955,263**  
**PIPE END PREPARATION TOOL HAVING IMPROVED TORQUE REACTING AND CLAMPING CAPABILITIES**  
 Jerald VanderPol, Eldorado Hills; Mark A. Marshall, Sacramento, and Warren V. Wheeler, Placerville, all of Calif., assignors to Tri Tool Inc., Rancho Cordova, Calif.  
 Filed Jun. 30, 1989, Ser. No. 373,517  
 Int. Cl.<sup>3</sup> B23B 3/00, 7/00  
 U.S. Cl. 82—118 14 Claims



1. A portable lathe comprising:  
 (a) a mandrel having a longitudinal axis;  
 (b) means to clamp the mandrel to a pipe adjacent an end of the pipe;  
 (c) a power unit having a rotating tool portion and a non-rotating portion mounted on the mandrel;  
 (d) a groove defined by the mandrel, the groove having outwardly diverging opposite sides defining an angle  $\alpha$  therebetween;  
 (e) a torque reacting key having an end portion with converging opposite sides defining an angle therebetween approximately equal to angle  $\alpha$ ;  
 (f) means to adjustably mount the torque reacting key in the non-rotating portion of the power unit such that at least a portion of the converging sides of the torque reacting key contact at least a portion of the diverging sides of the groove to react torque forces imposed upon the non-rotating portion of the power unit acting generally perpendicular to the contacting sides and such that the position of the torque reacting key relative to the mandrel may be adjusted to compensate for wear of the contacting sides.

**4,955,264**  
**TOOL ASSEMBLY WITH A HYDRAULIC CHIP-BREAKING FLUID SYSTEM**  
 William D. Armbrust, Cary, N.C., assignor to Kennametal Inc., Latrobe, Pa.  
 Filed May 30, 1989, Ser. No. 358,922  
 Int. Cl.<sup>3</sup> B23B 27/22  
 U.S. Cl. 82—158 9 Claims



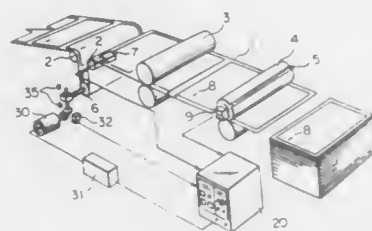
1. A high-pressure fluid chip breaking tool assembly having a tool holder axially adjustable within a mounting block and the capability of routing high pressure chip breaking fluid through both the mounting block and tool holder, comprising:  
 (a) a tool block formed with a generally cylindrical tool shank bore extending along a longitudinal axis;  
 (b) a fluid delivery passage formed in the tool block which extends from an inlet to an outlet;  
 (c) a tool holder having a head for mounting a cutting insert adapted to engage a workpiece and remove a chip therefrom, and a generally cylindrical tool shank extending rearwardly from the head and adapted to be inserted into the tool shank bore;  
 (d) a fluid passage formed in the tool holder which extends from an inlet in the shank to a discharge orifice in the head wherein said discharge orifice is positioned to direct a fluid jet at the chip removed from the workpiece to break it into small segments;  
 (e) an annular recess having front and rear walls formed in the shank of the tool holder and extending circumferentially around the shank, wherein the annular recess defines a fluid path for directing the flow of high-pressure chip breaking fluid from the outlet of the delivery passage formed in the tool block to the inlet of the fluid passage in the tool holder;  
 (f) adjustment means for adjusting the axial position of the tool holder along the longitudinal axis of the tool block through a selected axial adjustment range; and  
 (g) wherein the annular recess is so dimensioned to allow axial movement of the tool holder with respect to the tool block throughout the selected axial adjustment range while maintaining fluid communication between the outlet of the delivery passage formed in the tool block and the inlet of the fluid passage in the tool holder.

**4,955,265**  
**WEB CUTTING POSITION CONTROL SYSTEM**  
 Hiroshi Nakagawa, Yokohama; Shizuo Tokiwa, Zushi, and Kunio Takeuchi, Yokohama, all of Japan, assignors to Tokyo Kikai Seisakusho Ltd., Tokyo, Japan  
 Continuation-in-part of Ser. No. 97,804, Sep. 16, 1987, abandoned. This application Feb. 1, 1989, Ser. No. 305,281  
 Claims priority, application Japan, Oct. 10, 1986, 61-242659  
 Int. Cl.<sup>3</sup> B23Q 15/12; B26D 5/20  
 U.S. Cl. 83—74 6 Claims

1. A web cutting position control system comprising: cutting means for cutting a web that is running continuously including a rotating cutting cylinder arrangement;  
 phase detecting means associated with said cutting means for outputting pulses corresponding to the rotational angle of the cutting cylinder arrangement;



a compensating roller operatively engaged with the web and movable between a first position and a second position for changing the path length of the web relative to said cutting means;  
 movement detecting means for detecting the movement and position of said compensating roller;  
 synchronizing mark detecting means, installed downstream of said compensating roller for detecting each of a plurality of synchronizing marks provided on said web;  
 counting means connected to said synchronizing mark detecting means and connected to said phase detecting means for counting the pulse output of said phase detecting means until said synchronizing mark detecting means detects one of said synchronizing marks on said web and outputting a signal representing the number of pulses counted;



reference value memory means for storing in advance a reference value representing a number of pulses output by said phase detecting mean up to the sensing of one of said plurality of synchronizing marks for a predetermined preferred positional relationship between said cutting means and the web;  
 comparing means for receiving said reference value and said count signal from said counting means and outputting a signal representing the value of the difference between said reference value signal and said count signal; and,  
 controlling means for receiving said difference signal and for controlling the direction and amount of movement of said compensating roller dependent upon the value of said difference signal.

4,955,266

# APPARATUS FOR DETECTING THE DENSITY OR THICKNESS AND VARIATIONS THEREOF OF FIBER MATERIAL AT THE INFEEED OF A TEXTILE MACHINE AS WELL AS FOR EVENING THE DENSITY OF THICKNESS VARIATIONS OF FIBER MATERIAL AT THE INFEEED OF A TEXTILE MACHINE

Paul Stübli, Wilen b. Wil; Robert Demuth, Nürensdorf, and Peter Fritzsche, Winterthur, all of Switzerland, assignors to Rieter Machine Works Ltd., Winterthur, Switzerland  
 Division of Ser. No. 132,204, Dec. 10, 1987, Pat. No. 4,860,406.  
 This application Oct. 11, 1988, Ser. No. 256,302

Claims priority, application Switzerland, Dec. 12, 1986, 04950868

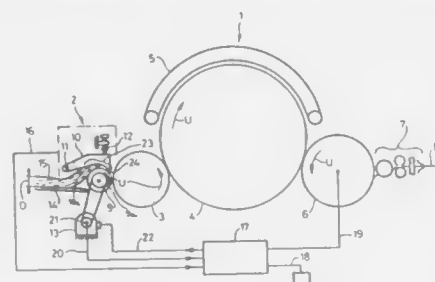
Int. Cl.<sup>5</sup> D01G 15/36

U.S. Cl. 19—105

28 Claims

1. An apparatus for determining the instantaneous thickness of fiber material, comprising:  
 fiber infeed means for infeeding a mass of fiber material and defining a nipping zone;  
 said nipping zone having a predeterminate substantially constant size which is invariable during determination of the instantaneous thickness of the infed mass of fiber material passing through said nipping zone; and  
 means cooperating with said fiber infeed means for deriving from passage of the infed mass of fiber material through the nipping zone having said predeterminate substantially

constant size, at least one signal representative of the instantaneous thickness of at least a predeterminate part of



the infed mass of fiber material passing through the nipping zone having said predeterminate substantially size.

4,955,267

# METHOD OF MAKING A PTC CONDUCTIVE POLYMER ELECTRICAL DEVICE

Stephen M. Jacobs, Cupertino; Mary S. McTavish, Fremont, and Frank A. Doljack, Pleasanton, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

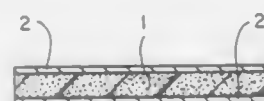
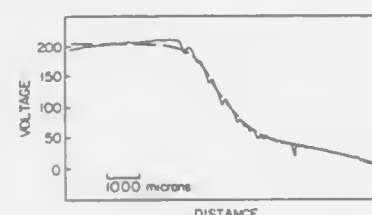
Continuation of Ser. No. 656,046, Sep. 28, 1984, abandoned, which is a continuation of Ser. No. 364,179, Apr. 1, 1982, abandoned, which is a continuation-in-part of Ser. No. 250,491, Apr. 2, 1981, abandoned. This application Jan. 21, 1988, Ser. No. 146,654

The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> H05B 3/00

U.S. Cl. 29—611

19 Claims



1. A process for the preparation of an electrical device which comprises

- (1) melt-extruding a radiation cross-linkable PTC conductive polymer composition to form a laminar PTC element which does not contain an electrode;
- (2) cross-linking the conductive polymer by irradiating substantially the whole of the PTC element to a dosage of at least 50 Mrads; and
- (3) securing metal foil electrodes to the irradiated PTC element.

4,955,268

# APPARATUS CONTAINING A WORK SURFACE HEATED WITH A HEAT CARRIER MEDIUM

Georg Ickinger; Willibald Fermüller, both of Graz; Anton Pangger, St. Marein, and Reinhard Pinter, Graz, all of Austria, assignors to Sulzer-Escher Wyss GmbH, Ravensburg, Fed. Rep. of Germany

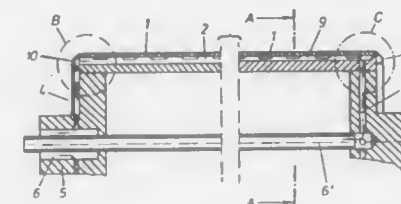
Filed Jun. 13, 1988, Ser. No. 205,705

Claims priority, application Austria, Jan. 15, 1987, 1512/87

Int. Cl.<sup>5</sup> B21B 27/00

U.S. Cl. 29—130

79 Claims



1. An apparatus containing a work surface heated by a heat carrier medium, comprising:

- a heat-conducting surface layer;
- said work surface being located upon said heat-conducting surface layer;
- a metallic base body;
- said heat-conducting surface layer being carried by said metallic base body and having a surface confronting said metallic base body;
- said metallic base body having a surface confronting said heat-conducting surface layer;
- said surface of said heat-conducting surface layer and said surface of said metallic base body defining two mutually confronting surfaces;
- at least one of said two mutually confronting surfaces being provided with a plurality of lengthwise grooves extending lengthwise of the associated one of the two mutually confronting surfaces;
- each one of said lengthwise grooves having an inlet region for infeeding said heat carrier medium;
- said at least one surface further containing heat transfer reducing means in the region of said inlet region of said lengthwise grooves for reducing heat transfer in said inlet region of said lengthwise grooves;
- said heat carrier medium heating said work surface by throughflow of said heat carrier medium through said plurality of lengthwise grooves; and
- said plurality of lengthwise grooves and said heat damping means constituting control means for regulating heat conduction from said metallic base body to said heat-conducting surface layer and from said heat carrier medium guided in said plurality of lengthwise grooves to at least one of said two confronting surfaces.

4,955,269

# TURBINE BLADE FATIGUE MONITOR

Robert P. Kendig, Monroeville; Roger A. Lucheta, Murrysville, and Francis S. McKendree, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 152,266, Feb. 4, 1988, abandoned. This application Apr. 5, 1989, Ser. No. 333,718

Int. Cl.<sup>5</sup> G01M 3/00

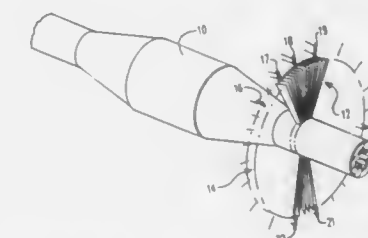
U.S. Cl. 73—577

12 Claims

1. A vibratory fatigue measuring apparatus for measuring fatigue in equipment including a turbine rotor having a plurality of turbine blades, comprising:

- sensor means for generating a displacement signal indicating displacement of the turbine blades caused by vibration generated during normal operation of the equipment, said

sensor means including at least two sensors positioned outside a path taken by the turbine blades; and



fatigue accumulation means for calculating fatigue usage in the turbine rotor in dependence upon the displacement signal.

4,955,270

# DRY FLOW SENSOR

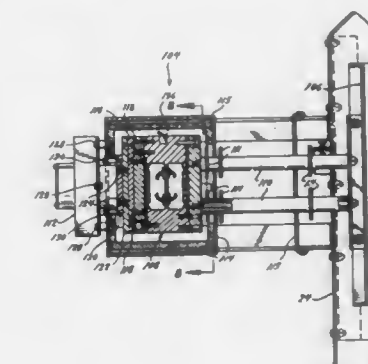
Joseph A. Volk, Jr., Creve Coeur, Mo., assignor to Beta Raven Inc., Earth City, Mo.

Continuation of Ser. No. 98,799, Sep. 21, 1987, abandoned. This application May 30, 1989, Ser. No. 361,795

Int. Cl.<sup>5</sup> G01F 1/30

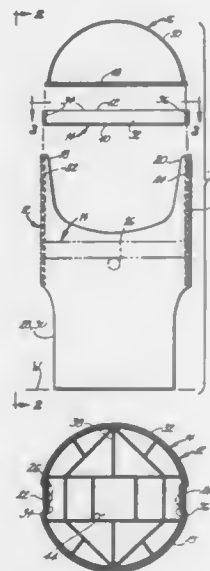
U.S. Cl. 73—861.71

32 Claims



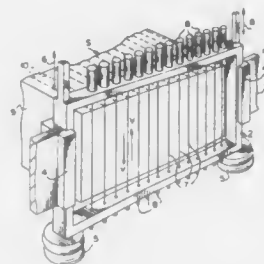
1. A device for measuring the flow rate of a stream of granular material comprising a force transducer, a surface, means to mount said surface directly from said force transducer in a cantilever fashion for generally horizontal movement, said surface mounting means having no generally vertical bearing surfaces so that as the stream impacts the surface substantially all of the horizontal component of the force from said impacting stream is transmitted to the force transducer, said force transducer including a movable member, said surface mounting means comprising a pair of rods extending between the movable member and the surface, each rod being secured to the movable member at one end and the surface at the other end, a tubular member surrounding each rod, said tubular members being held in place by compression between the surface and the movable member, and means to mount said force transducer from a support wherein said surface is deflected by the stream of granular material to thereby produce an output of the force transducer corresponding to the flow rate of the granular material.

**4,955,271**  
**LETTUCE AND VEGETABLE CUTTING DEVICE**  
 Paige L. Z. Boutin-Lester, 8205 62nd Street Ct. East #1602,  
 Sarasota, Fla. 34243  
 Filed Oct. 31, 1989, Ser. No. 429,698  
 Int. Cl.<sup>5</sup> B26D 3/26  
 U.S. Cl. 83—404.3



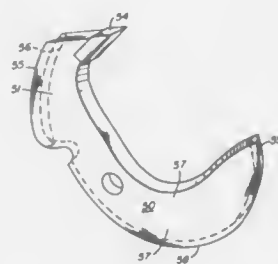
1. A lettuce and vegetable cutting device comprising:
  - an upright generally cylindrical, very thin-walled tubular frame supportable atop a horizontal working surface, said frame having opposing upwardly extending support portions;
  - a cutting grid formed as a single member positioned horizontally at a mid point within said frame above the working surface for supportively receiving the head of lettuce, said grid having a plurality of connected cutting blades each having upwardly facing cutting edges which collectively define a first plane;
  - said cutting blades arranged within said grid to define a plurality of non-uniform apertures;
  - said support portions structured having opposing openings downwardly extending from the upper margin of said frame to laterally support and contain the head of lettuce therebetween and spaced for easy hand clearance and access to the head of lettuce atop said cutting grid;
  - a separate ram having a handle connected to a horizontal plate with a lower surface, said plate sized to slidably fit within said frame and to mate atop said cutting grid wherein said lower surface is against said cutting edges;
  - said rim manually forcing the head of lettuce downwardly through said apertures whereby the head of lettuce is sectioned into a plurality of non-uniform elongated segments;
  - said plate lower surface including a recess grid which collectively defines a second plane and formed of a plurality of grooves having a shallow depth in relation to the height of said cutting blades in alignment and registry with said cutting edges wherein said cutting edges are positioned within said grooves when said lower surface is atop and against said cutting edges;
  - said apertures in plan view being rectangular, triangular and polygonal in shape.

**4,955,272**  
**DEVICE FOR CUTTING GAS CONCRETE**  
 Willem J. Schreuders, Staphorst, Netherlands, assignor to  
 Durox Gasbeton B.V., Netherlands  
 Filed Jan. 28, 1988, Ser. No. 149,677  
 Claims priority, application Netherlands, Feb. 4, 1987,  
 8 Claims 8700271  
 Int. Cl.<sup>5</sup> B28B 11/14  
 U.S. Cl. 83—425.2 14 Claims



1. Apparatus for cutting material such as gas concrete and like plastic material at a velocity S which is greater than 4.5 meters per minute, which comprises the combination of a vertically extending cutter structure presenting an opening through which the material being cut may be passed, means for passing the material to be cut through the opening at a material carrying velocity S, a plurality of cutting wires stretched across the opening in the path of material to be cut, and means for reciprocating the wires independently from one another to impart an average velocity V to the cutting wires which is at least six times the velocity S, wherein the cutter structure comprises a pair of frames, each reciprocally guiding a plurality of wire end holders in which opposite ends of the cutting wires are held, the means for reciprocating the wires simultaneously driving the wire end holders so that each wire reciprocates relative to said pair of frames.

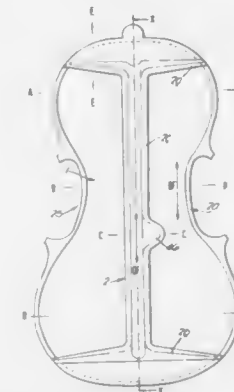
**4,955,273**  
**ONE PIECE INSERTED SAW TOOTH**  
 Anthony J. Pawlosky, R.D. 1, Hickory, Pa. 15340  
 Filed Jun. 2, 1989, Ser. No. 360,600  
 Int. Cl.<sup>5</sup> B23D 59/00  
 U.S. Cl. 83—845 12 Claims



1. A one piece saw tooth insert for use in combination with a circular saw blade of the circular inserted bit type having a plurality of circumferentially spaced sockets formed in the outer periphery, said sockets having a first generally circular edge surface of a first given radius and a first given center of radius and adapted to receive a saw tooth bit insert, and having a second generally circular edge surface of a second given radius and a second given center of radius and adapted to receive a shank insert such that said shank will hold and lock said bit in place, the length of the first given radius being different from the length of the second given radius; said one piece saw tooth insert comprising a bit portion with a cutting

edge thereon and a shank portion, said shank portion having a generally circular outer edge surface with a radius and a center of radius substantially equal to said second given radius and said second given center of radius respectively and adapted to be rotated into and received by said second generally circular edge surface of said socket without substantial deformation of said shank portion, said bit portion having a generally circular outer edge surface with a radius substantially equal to said first given radius but having a center of radius sufficiently off-set from said first given center of radius such that said generally circular outer edge surface of said bit portion is tipped with respect to the first generally circular edge surface of said socket so that the bit portion can be rotated into and received by said first generally circular edge surface of said socket with said bit portion being elastically bent to fit within said first generally circular edge surface of said socket with the cutting edge pivoted against the cutting direction, so that said bit portion is tightly biased against said first generally circular edge surface of said socket, to thereby lock said one piece insert into said socket.

**4,955,274**  
**VIOLINS**  
 Joseph H. Stephens, Coker Court, The Tudor Wing, East Coker,  
 Yeovil, Somerset BA22 9JW, England  
 Filed Oct. 26, 1988, Ser. No. 263,028  
 Int. Cl.<sup>5</sup> G10D 1/02  
 U.S. Cl. 84—275 11 Claims

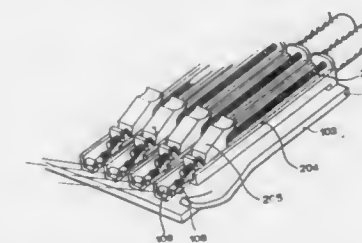


1. A violin manufactured by fabricating an acoustic box from components comprising a front plate, a back plate, and side pieces, joining the front plate to the back plate, and, mounting within the acoustic box, a bass bar, characterized in that all of these components are fabricated from sheet material composed essentially of substantially unidirectionally oriented man-made fibers set in a matrix of resin, the alignment of the fibers being substantially parallel to the central, longitudinal axis of the acoustic box.

**4,955,275**  
**ADJUSTABLE TREMOLO TAIL PIECE**  
 Dennis R. Gunn, Tashiro-So East rm.1 1st Fl., Kami Ochiai 2 -  
 9 - 2, Shinjuku-Ku, Tokyo, Japan  
 Filed Jan. 25, 1988, Ser. No. 147,486  
 Claims priority, application Japan, Sep. 17, 1986, 61-141470  
 Int. Cl.<sup>5</sup> G10D 3/00 16 Claims  
 U.S. Cl. 84—313

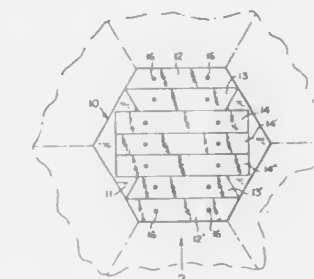
1. A string mounting member pivotably mounted on a stringed instrument comprising:
  - a first member pivotably mounted with respect to the main body of said instrument for pivoting relative to a bridge saddle mounted on said body over which a string of said instrument passes; and
  - a plurality of tuners provided on said first member for adjusting the tension of the strings of said instrument

wherein at least one of said tuners comprises a section having a lower surface by which a string path of a string of said instrument is defined, the position of which section relative to the pivoting axis of said first member being



adjustable independently of that of the other tuners of said instrument, and wherein actuation of said tuner for adjusting the tension of said string does not affect the positional relationship between said section and said pivoting axis.

**4,955,276**  
**DANCE PERCUSSION PLATFORM**  
 Anita Feldman, 73 Carlton ave., Port Washington, N.Y. 11050,  
 and Daniel Schmidt, Berkeley, Calif., assignors to Anita Feldman, Port Washington, N.Y.  
 Filed Jun. 23, 1989, Ser. No. 370,602  
 Int. Cl.<sup>5</sup> G10D 13/08  
 U.S. Cl. 84—403 10 Claims

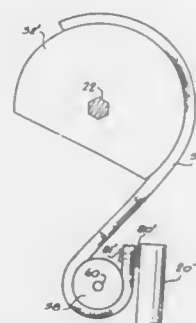


1. A tap dance platform, to be placed on the ground or a floor surface, for producing pitched sounds in response to energy imparted onto a surface of the platform comprising:
  - a planar flat base surface supported by the ground or floor surface;
  - parallel, spaced-apart supports mounted on said base surface and having resilient insulating strips disposed on their top surface;
  - sidewalls joined to the periphery of said base surface to form a partially closed container thereof, said sidewalls including apertures therethrough for permitting sound to escape from within the platform;
  - a plurality of flat, elongated spaced apart keys demountably secured to the strips of said supports, which contact the entire width of each key for the purpose of stability, to define a sound chamber between the base and a bottom of the keys, said supports being spaced apart to engage each key at its two nodal points of a fundamental vibrational mode; and
  - a top surface mounted on said side walls and partially surrounding the ends of said keys, said top surface being level with a surface of said keys, said keys, said top and side walls, and said flat base surface defining a resonant sound chamber within and forming a substantially flat dance platform suitable for precise placement of feet without limitation over entire surface of instrument;
  - said keys being closely spaced apart to define a small air gap



between the individual keys, themselves, and the top surface of the platform, said air gap being just sufficiently wide enough so that the keys are free to vibrate independent of one another, and independent of the top surface.

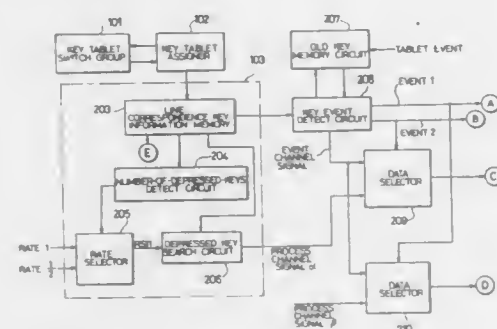
**4,955,277**  
**DRUM PEDAL**  
Karl R. Carlson, 412 - 5th Ave., Fairbanks, Ak. 99701  
Continuation-in-part of Ser. No. 148,034, Jan. 25, 1988, Pat. No. 4,890,532. This application Sep. 28, 1989, Ser. No. 414,179  
Int. Cl.<sup>3</sup> G10D 13/02  
U.S. Cl. 84—422.1 9 Claims



1. A drum pedal having a foot pedal pivotally mounted to a base, a mallet head and handle attached to a crossarm mounted for rotation about an axis within a pair of bearings supported upon a pair of uprights arising from said base, such that a toe end of said foot pedal lies generally between said uprights and below said crossarm, and a flexible member connected at one end to a curved lever attached to said crossarm, said drum pedal comprising:

a wheel mounted in said toe end for rotation about an axis substantially parallel to the axis of said crossarm; wherein said flexible member is further wrapped from said curved lever, under said wheel, and then upwardly for attachment to a mounting point connected to said base.

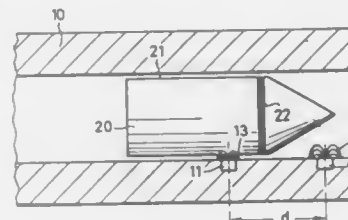
**4,955,278**  
**OPTIMIZATION OF WAVEFORM OPERATION IN ELECTRONIC MUSICAL INSTRUMENT**  
Kiyomi Takanji, Shizuoka, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Japan  
Continuation of Ser. No. 92,220, Sep. 2, 1987, abandoned. This application Feb. 15, 1989, Ser. No. 311,235  
Claims priority, application Japan, Sep. 19, 1986, 61-221647  
Int. Cl.<sup>3</sup> G10H 1/18, 7/04  
U.S. Cl. 84—605 5 Claims



4. An electronic musical instrument comprising: a plurality of keys; tone generator means, associated with said plurality of keys,

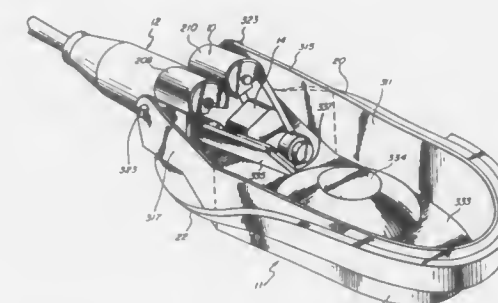
for generating a plurality of synthesized waveforms determined by the combination and number of said plurality of keys being depressed; a plurality of note memories capable of storing said plurality of synthesized waveforms; operation cycle means, associated with said plurality of note memories, for sequentially addressing each of said plurality of note memories over a period of time; detector means, associated with said plurality of keys, for detecting the number of said plurality of keys being depressed; rate selector means, associated with said operation cycle means and said detector means, for reducing said period of time when said number of said plurality of keys being depressed is reduced; and generator means, associated with said plurality of note memories, for producing a sound; whereby when heard the feeling of discontinuity in the temporal variation of the resulting musical waveform is reduced.

**4,955,279**  
**APPARATUS FOR SETTING A PROJECTILE TIME FUZE**  
Klaus H. Nahrwold, Hermannsburg, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany  
Filed Sep. 8, 1989, Ser. No. 404,524  
Claims priority, application Fed. Rep. of Germany, Sep. 8, 1988, 3830518  
Int. Cl.<sup>3</sup> F42C 17/00  
U.S. Cl. 89—6.5 14 Claims



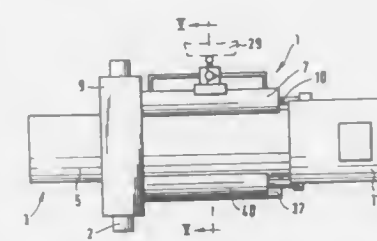
1. Apparatus for setting a time fuze in a projectile after firing from a gun barrel comprising: first and second magnetic field generators disposed in said gun barrel adjacent its muzzle and at a known axial distance from one another; magnetic field sensor means, mounted on the projectile, for sensing the respective magnetic fields generated by said first and second magnetic field generators as the projectile passes same after firing and for producing respective first and second output pulses; and circuit means, disposed in said projectile and responsive to said first and second output pulses, for correcting the fuze time setting in accordance with the muzzle velocity of the projectile; and wherein said circuit means includes a source of clock pulses, a start/stop counter means, connected to said magnetic field sensor means via an amplifier, for beginning counting of clock pulses from said clock pulse source upon receipt of said first output pulse and for stopping counting of said clock pulses upon receipt of said second output pulse to provide a final count which is a measure of the muzzle velocity of the projectile, and further circuit means, responsive to the final count in said start/stop counter means, for correcting the time fuze setting.

**4,955,280**  
**AMMUNITION TRANSFER APPARATUS**  
William C. Baldwin, Costa Mesa, Calif., assignor to North American Dynamics, Tustin, Calif.  
Filed Sep. 6, 1989, Ser. No. 403,619  
Int. Cl.<sup>3</sup> F41A 9/31, 9/37  
U.S. Cl. 89—33.04 17 Claims



1. Automatic weapon apparatus comprising: an M242 gun having a dual feed apparatus, including first and second ammunition feed sprockets having respective receptacles for receiving rounds of ammunition; turret means for mounting said gun with said dual feed apparatus rotated substantially vertical, said turret means including first and second sides and first and second mounting arms extending from said first and second sides, respectively; dual ammunition feed means synchronized with said dual feed apparatus for receiving first and second supplies of linked rounds fed generally upwardly on either side of said gun, respectively, and for rotating said rounds substantially 180 degrees to enter the vertical dual feed apparatus from either side of said gun and for guiding each round into a respective receptacle, thereby positively controlling feeding of ammunition into said dual feed apparatus; and first and second flex chutes connected to said ammunition feed means for supplying said linked rounds, each said flex chute being wrapped around a respective said side of said turret means and extending upwardly within one of said arms to connect to said ammunition feed means.

**4,955,281**  
**COUNTERRECOIL BLOCKING DEVICE**  
Josef Metz, Neuss, and Hans Hülsewig, Ratingen, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany  
Filed Aug. 7, 1989, Ser. No. 390,393  
Claims priority, application Fed. Rep. of Germany, Aug. 5, 1988, 3826652  
Int. Cl.<sup>3</sup> F41A 25/02  
U.S. Cl. 89—43.01 8 Claims



1. In a gun including a barrel arranged to execute a recoil and a counterrecoil after a shot is fired; a trunnion about which the barrel is pivotal in a vertical plane to assume an index

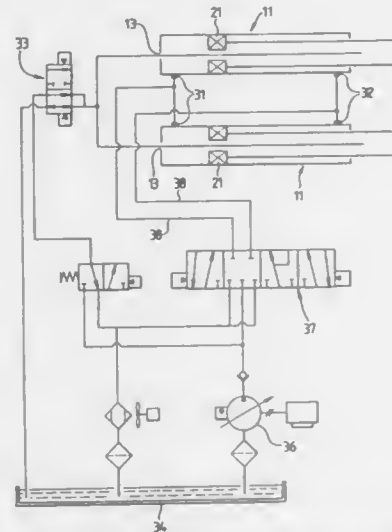
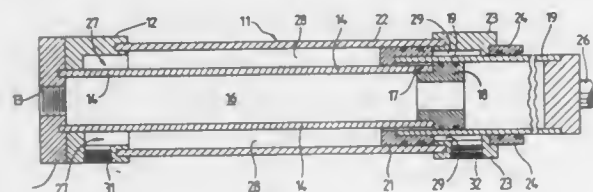
position and firing positions situated at an angle to the index position; a case ejector for ejecting a case from the barrel during counterrecoil; the improvement comprising a counterrecoil blocking means for interrupting the counterrecoil as long as the barrel is in a firing position other than said index position and for allowing the counterrecoil to resume when the barrel assumes the index position, whereby case ejection by the case ejector is effected in the index position; said counterrecoil blocking means comprising

- a stationary cylinder containing hydraulic fluid;
- a piston rod received in said cylinder and being secured at least indirectly to said barrel to move therewith as a unit during recoil and counterrecoil;
- a piston axially slidably received in said cylinder and being secured to said piston rod for axial movement therewith as a unit; said piston dividing said cylinder into adjacent first and second cylinder chambers; said piston having an opening for effecting hydraulic communication between said first and second cylinder chambers;
- a first valve means mounted on said piston and having a first position blocking said opening for preventing hydraulic communication between said first and second cylinder chambers; said first valve means having a second position unblocking said opening for allowing hydraulic communication between said first and second cylinder chambers;
- means for placing said first valve means into said second position during said recoil for allowing hydraulic fluid to pass from one of the cylinder chambers into the other, whereby recoil is permitted to proceed;
- means for placing said first valve means into said first position during said counterrecoil for preventing hydraulic fluid from passing between the cylinder chambers, whereby counterrecoil is interrupted;
- a bypass conduit connecting said first and second cylinder chambers with one another;
- a second valve means arranged in said bypass conduit and having closed and open positions for respectively blocking and unblocking said bypass conduit during counterrecoil; and
- valve actuating means cooperating with said second valve means for placing said second valve means from the closed position into the open position when the barrel assumes said index position for allowing hydraulic fluid to pass from one of the cylinder chambers to the other through said bypass conduit, whereby counterrecoil is allowed to resume in the index position.

**4,955,282**  
**UNIFORM FLOW HYDRAULIC SYSTEM**  
Ronald W. Ranson, 125 Merrimont Dr., Hueytown, Ala. 35023  
Filed Mar. 27, 1989, Ser. No. 328,876  
Int. Cl.<sup>3</sup> F15B 11/08, 13/04  
U.S. Cl. 91—436 6 Claims

1. A hydraulic compression system comprising:
- a blind end head affixed to a stationary inner rod tube and a stationary outer rod tube, said inner and outer rod tubes being concentric and spaced apart and said blind end head having an axial port communicating with the interior of said inner rod tube and a radial port communicating with a first annular region between said inner and outer rod tubes;
  - a hollow piston rod mounted for linear reciprocal motion within said first annular region and extending therefrom;
  - a piston carried on the inner end of said hollow piston rod in sliding sealed engagement with the inner surface of said outer rod tube such that an annular return chamber is formed between said piston rod and said outer rod tube;
  - an annular seal carried by said inner rod tube providing a sliding seal between said inner rod tube and the inside of said piston rod such that an annular travel chamber is formed between said inner rod tube and said outer rod tube;
  - a rod end head having an axial bore through which said

piston rod may retract and extend while maintaining a sliding seal therewith, said rod end head having a radial port communicating with said travel chamber between said hollow piston rod and said outer rod tube; and  
(f) a hydraulic system including a reservoir, at ambient pressure, a single pump having a pressurized output, and valve means for selectively applying high pressure fluid



only in said travel chamber while aspirating fluid from said reservoir through said axial port in an extension mode, applying high pressure fluid to said travel chamber and said axial port in a compression mode, and applying high pressure fluid only to said return chamber in a retraction mode whereby the flow rate from said pump remains approximately uniform for each mode.

4,955,283

## HYDRAULIC CIRCUIT FOR CYLINDER

Sachio Hidaka, Kakogawa; Hiroshi Shibata, Kobe, and Hideaki Yoshimatsu, Akashi, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Feb. 27, 1989, Ser. No. 316,131

Claims priority, application Japan, Mar. 3, 1988, 63-28563[U]  
Int. Cl.<sup>5</sup> F15B 11/08

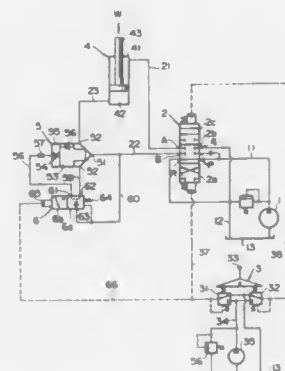
U.S. Cl. 91—447

4 Claims

1. A hydraulic circuit for a cylinder in a hydraulic power transmission for controlling pressurized oil flow to and from two oil chambers including a load holding oil chamber and a load lowering oil chamber in the cylinder, comprising:

- a directional control valve in communication with a pressurized oil source and connected between said pressurized oil source and said two oil chambers
- a logic valve connected between said directional control valve and said load-holding oil chamber in said cylinder, said logic valve having first and second ports connected to said directional control valve and to said load-holding oil chamber, respectively;
- a selector valve having means for communicating a spring chamber of said logic valve with a conduit between said first port and said directional control valve when said directional control valve is switched to a position wherein pressurized oil is supplied to said load lowering chamber of said cylinder and having means for communicating said

spring chamber with said second port in at least one other operational phase, including a pilot operating valve wherein said selector valve and said directional control valve comprise pilot change-over valves switchable by



pilot pressure from a pilot operating valve, wherein the pilot pressure sufficient for switching said selector valve is preset at a level lower than the pilot pressure sufficient for switching said directional control valve.

4,955,284

## PISTON HAVING CERAMIC PARTS

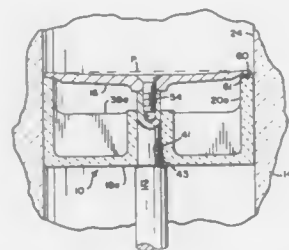
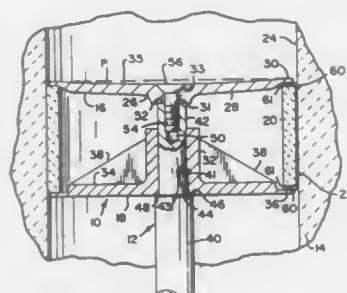
Henry B. Faulkner, Dover, Mass., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Feb. 27, 1989, Ser. No. 315,977

Int. Cl.<sup>5</sup> F16J 9/00

U.S. Cl. 92—248

12 Claims



1. A piston having ceramic parts, comprising:
  - a first endwall, said first endwall being free of ribs and of a first stiffness;
  - a second endwall, said second endwall having a hub and being reinforced by ribs extending radially outwardly from the hub, said second endwall being of a second stiffness greater than the first stiffness;

means for limiting rotation of the hub relative to an associated piston rod;  
a tubular sidewall extending between and forming a closed cylinder with the first and second endwalls, the sidewall being of ceramic material, the piston being free of a piston ring and at least the first endwall is of metal; and  
means for limiting rotation of the endwalls relative to the sidewall.

4,955,285

## SYSTEM FOR COVERING THE ENERGY REQUIREMENT OF A ROOM

Peter Gellinger, Winterthur, and Bruno Keller, Zurich, both of Switzerland, assignors to Gellinger AG, Wiesendangen, Switzerland

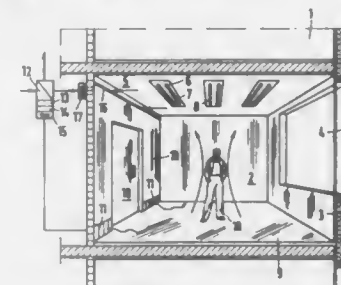
Continuation of Ser. No. 878,373, Jun. 4, 1986, abandoned. This application Sep. 23, 1988, Ser. No. 250,964

Claims priority, application European Pat. Off., Oct. 8, 1984, 84810486.5

Int. Cl.<sup>5</sup> F24F 3/02

U.S. Cl. 98—39.1

10 Claims



1. The combination of
  - a building having at least one room with a floor and an outside wall including a window having a heat transfer number of at most 1 W/m<sup>2</sup> K and an opaque wall part having a heat transfer number of at most 1 W/m<sup>2</sup> K; and
  - a ventilating system for feeding air into said room over a width of at least one wall of said room and adjacent said floor, said ventilating system including a blower for blowing the air into said room at a velocity below a predetermined comfort velocity for an occupant in said room.

4,955,286

## TURBULENCE OUTLET

Gottfried Müller, and Paul Hipp, both of Kolbingen, Fed. Rep. of Germany, assignors to Schako Metallwarenfabrik Ferdinand Schäd AG, Kolbingen, Fed. Rep. of Germany

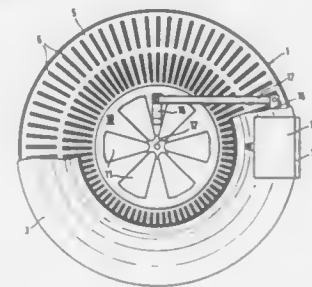
Filed Jan. 12, 1989, Ser. No. 364,176

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1988, 3822283

Int. Cl.<sup>5</sup> F24F 13/068

U.S. Cl. 98—40.11

9 Claims



1. Turbulence outlet to be connected to a pipe connection of an air conduit having a turbulence plate which has a plurality

of slots formed with inclined lamellae on an edge of the slots wherein the turbulence plate exhibits somewhat centrally at least one aperture and closable means being associated with said one aperture.

4,955,287

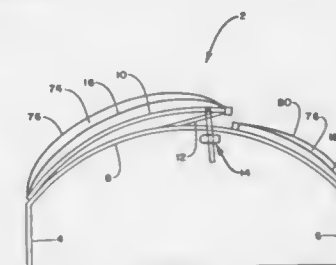
## SELF-VENTILATED GREENHOUSE

Daniel L. Dupont, 22-B Talbot Rd., Plaquemine, La. 70764  
Continuation-in-part of Ser. No. 184,360, Apr. 21, 1988, Pat. No. 4,815,365. This application Mar. 22, 1989, Ser. No. 327,320  
The portion of the term of this patent subsequent to Mar. 28, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> F24F 7/02

U.S. Cl. 98—42.2

9 Claims



1. A self-ventilated greenhouse, comprising:
  - (a) a frame including first and second parallel rows of rigid, elongated, vertical members; a first set of elongated frame members, a first end of each frame member of the first set secured to the upper end of one of the members comprising the first row of vertical members, the second end of each frame member of the first set secured to the upper end of one of the members comprising the second row of vertical members; a second set of elongated frame members disposed above the first set of frame members, shorter than the first set of frame members, and partially overlapping the first set of frame members, a first end of each frame member of the second set secured to the upper end of one of the members comprising the first row of vertical members; a plurality of cross-members hingedly connecting the second end of each frame member of the second set to a frame member of the first set, at a point lying between the ends of the frame member of the second set, to guide the frame members of the second set as they are separated from and reunited with the frame members of the first set to provide intermittent ventilation for the greenhouse; and means for separating and reuniting the first and second sets of frame members;
  - (b) a first translucent sheet disposed above and supported by the second set of elongated frame members; and
  - (c) a second translucent sheet disposed above and supported by that portion of each of the frame members of the second set extending from the upper end of the second vertical member to the junction of the frame member of the second set with the cross-member, the first and second translucent sheets thereby forming a self-ventilated roof for the greenhouse.

4,955,288

## CAKE MANUFACTURING MACHINE

Tsai-An Chen, 201, Sec.3, BA-DAR Road, Taipei, Taiwan

Filed Aug. 23, 1988, Ser. No. 235,275

Int. Cl.<sup>5</sup> A47J 37/00, 44/00

U.S. Cl. 99—348

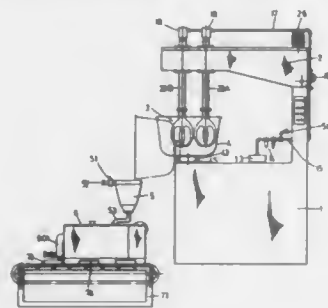
9 Claims

1. A cake manufacturing machine for partially baking cakes prior to insert of said partially baked cakes into a baking oven, comprising:

- (a) a main frame;
- (b) a support frame rotatably secured to said main frame;
- (c) churning means for agitating ingredients contained therein, said churning means including a churning vessel



- rotatably coupled to said main frame for tilting said churning vessel through a predetermined angle to allow flow of agitated ingredients into a funnel member by gravity assist;
- (d) a heating device defined by a box heated by hot air for partially baking said agitated ingredients, and heating device in aligned communication with said funnel member;
- (e) means for extruding said partially baked ingredients from

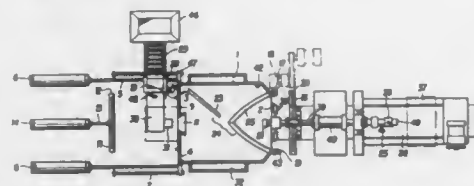


- said heating device, said extruding means including an extrusion cylinder for transporting said partially baked ingredients through said heating device; and,
- (f) conveying means located below said extrusion cylinder for containing and transporting cake plate members into alignment with said extrusion cylinder for extruding said partially baked ingredients into said cake plate member for transport into said baking oven.

**4,955,289**  
**TEA LEAVES FIRING EQUIPMENT**  
 Shohei Eguchi, Kho 4397-banchi, Ozu-Shimojuku, Ureshino-machi, Fujitsu-gun, Saga-ken 843-03, Japan  
 Filed Mar. 20, 1989, Ser. No. 325,702  
 Int. Cl.<sup>5</sup> A23F 3/16

U.S. Cl. 99-483

8 Claims



1. An apparatus for processing raw tea leaves comprising a cylindrical chamber means for firing raw tea leaves, said chamber means having an open side, a second side opposite said open side having a netted surface, and a tea leaves collecting plate means arranged in said chamber means for discharging fired tea leaves from said chamber means through said open side; control means for rotating said chamber means in a first direction and in a second direction opposite to said first direction; heating means arranged about said chamber means for heating raw tea leaves in said chamber means; round disk means having a netted surface and means defining a central opening in said netted surface; first hydraulic means for moving said round disk means horizontally into and out of engagement with said open side of said chamber means; first air-tight cover means adapted to engage said round disk means to cover said open side of said chamber means when said round disk means is engaged with said open side; second hydraulic means for moving said first air-tight cover horizontally into and out of engagement with said round disk means; second air-tight cover means adapted to engage said netted surface of said second side of said chamber means to cover said second side; third hydraulic means for moving said second air-tight cover horizontally into and out of engagement with said netted surface of said second side of said chamber means; and transfer means for

supplying raw tea leaves to said chamber means through said central opening in said round disk means, said transfer means comprising port means adapted to engage said central opening in said netted surface of said round disk means and retractable chute means connected to said port means, arranged above said first air-tight cover and said round disk means and adapted to move said port means down and into engagement with said central opening of said round disk means when said round disk means is engaged with said open side of said chamber means and said first air-tight cover is not engaged with said round disk means.

**4,955,290**  
**ELECTRONIC MULTIMACHINE OPERATING SYSTEM FOR REMOTELY CONTROLLING PRINTING MACHINES**

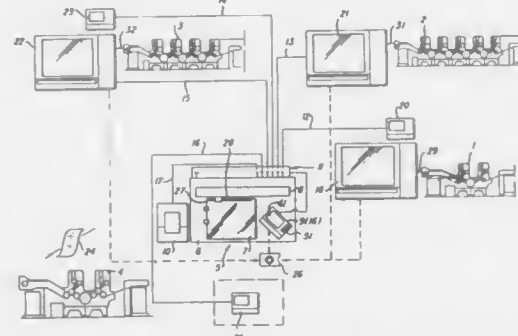
Helmut Kipphan, Schwetzingen, and Gerhard Löffler, Walldorf, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany  
 Continuation-in-part of Ser. No. 902,526, Sep. 2, 1986, abandoned, which is a continuation-in-part of Ser. No. 705,369, Feb. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 500,776, Jun. 3, 1983, abandoned. This application Jul. 11, 1988, Ser. No. 217,541

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1982, 3220803

Int. Cl.<sup>5</sup> B41F 5/05, 33/16

U.S. Cl. 101-183

8 Claims



1. A combination comprising a plurality of printing machines and an operation system for operating said plurality of printing machines, at least one of said machines having machine characteristics that are different from the machine characteristics of the remaining machines, said operating system including a central ink density measuring installation for measuring ink density data of a printed product; at least one viewing screen terminal associated with each respective one of said machines for showing said ink density data; at least one control desk coupled with each respective one of said printing machines, electrical coupling means for electrically coupling said ink density data from said measuring installation to said viewing screen terminal; and visual coupling means for visually coupling said ink density data from said viewing screen terminal to each said printing machine; assignment means for assigning a printed product to a respective one of said printing machines, said assignment means including at least one identification field on the printed product, and measuring means included in said central ink density measuring installation for measuring said identification field for automatically identifying said identification field; including a printing control strip printed on said printed product, said printing control strip including said at least one identification field measurable by said central ink density measuring installation; computing means and means responsive to said computing means for performing a positioning and a recognition procedure on said central ink density measuring installation for declaring said identification field as identifying an assignment of said printed product to said respective one of said printing machines; said

electrical coupling means including a multi-data-channel transmitter, an output of said ink density measuring installation being connected to said multi-data-channel transmitter for transmitting said ink density data to said viewing screen terminals from said ink density measuring installation; and means for selectively assigning a channel of said multi-data-channel transmitter to each respective one of said printing machines.

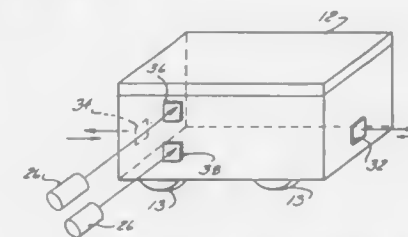
**4,955,291**  
**CONVEYOR WITH SELF PROPELLED VEHICLES EACH HAVING AN ON BOARD CONTROL**  
 David M. Dillon, Grand Ledge; Michael R. Boyer, and James F. Foster, both of Lansing, all of Mich., assignors to Roberts Sinto, Lansing, Mich.

Filed Jul. 14, 1988, Ser. No. 219,014

Int. Cl.<sup>5</sup> B61L 23/24

U.S. Cl. 104-299

7 Claims



1. A conveyor (10) of the type including a plurality of vehicles (12) propelled around a track (14), each of said vehicles (12) being driven by a D.C. motor (54) and an on-board battery (52), said vehicles (12) having means for sensing the approach to a next ahead vehicle (32, 34) and on-board control means (40) for stopping said vehicle (12) to queue said vehicle (12) therebehind, the improvement comprising: photosensor means (32, 34) located at the forward end of each of said vehicles (12), triggered only upon the approach to a next ahead vehicle (12) at a distance on the order of several inches, to generate a signal in response to said approach to said next ahead vehicle and triggering of said photosensor means; and, an on-board control (40) responsive to said signal generated upon triggering of said photosensor means to progressively reduce the power to said D.C. motor (54) to zero and thereby gradually decelerate said vehicle (12) to a stop immediately behind said next ahead vehicle.

**4,955,292**  
**DUAL-MODE RAIL-HIGHWAY SEMI-TRAILER WITH SEPARABLE BOGIE**

Christopher A. Cripe, Coatesville, Pa., assignor to The Chamberlain Group, Inc., Elmhurst, Ill.

Filed Nov. 18, 1983, Ser. No. 553,042

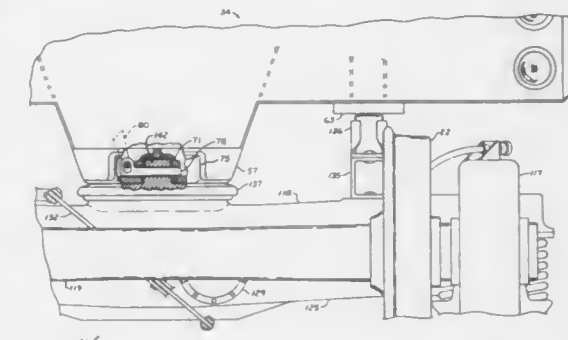
Int. Cl.<sup>5</sup> B61F 3/12, 5/16; B61G 1/28

U.S. Cl. 105-4.2

22 Claims

1. A dual-mode rail-highway semi-trailer comprising: a semi-trailer body, a highway wheel-set axle unit, air spring means supporting said body on said highway wheel-set axle unit, means to selectively raise said highway wheel-set axle unit to an inoperative position and to lower the same into a ground-engaging operative position for over-the-road highway travel; the semi-trailer body including a rear underframe structure which includes a receiver member with a downwardly opening pocket forming a component of means to releasably lock a railroad bogie to said body, said underframe including transversely spaced supporting members adapted to bear upon a railroad bogie to support said body in roll; a track-engaging railroad bogie including side frame members supporting dual wheel-set axle units and a central

transverse bolster joining said side frame members, said means to releasably lock said railroad bogie to said body further including a bowl located centrally in said bolster, an adapter having a disc plate including a downwardly extending pin rotatably retained in said bolster bowl, said disc plate being disposed on top of said bolster, a lug extending upwardly from said disc plate and extendable into said receiver member pocket and means to releasably lock said upward lug in said receiver member to thereby releasably lock said railroad bogie to said semi-trailer body to the rear of said highway wheel-set axle unit; and



- a female member opening horizontally at the rear end of said body for coupling to a male member at the front end of a similar body to couple the similar bodies end-to-end to form a train operable on tracks with said highway wheel-set axle units in their raised inoperative positions, and when said bodies are uncoupled, said highway wheel-set axle units are lowered to ground-engaging positions and said railroad bogie is detached from said body, said bodies being adaptable for connection to tractors for over-the-road highway travel.

**4,955,293**  
**SLIDER**  
 Rolf Kramer, Siegen; Alfred Lohmann, Siegen-Eisern; Guido Bleker, Kirchhundem, and Herbert Bodenbender, Netphen, all of Fed. Rep. of Germany, assignors to Waggon Union GmbH, Siegen, Fed. Rep. of Germany

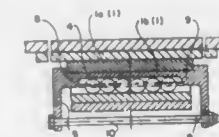
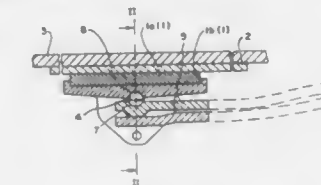
Filed Mar. 1, 1989, Ser. No. 317,675

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1988, 3807547

Int. Cl.<sup>5</sup> B61F 5/14

U.S. Cl. 105-199.3

10 Claims



5. A slider arrangement, in particular for track vehicles allowing for horizontal relative movement in longitudinal and

in latitudinal directions between a vehicle superstructure and a running gear arrangement, comprising: a slide plate fixedly connected to the vehicle superstructure, a slider friction element fixedly connected to a slider friction element support, said slider friction element having an upper friction sliding surface engaging a lower surface of said slide plate; vertically acting springs connected to the running gear; and, coupling means coupling said vertically acting springs and said slider friction element support and for substantially eliminating friction between the vertically acting springs and the slider friction element support in one of the two horizontal directions, said coupling means including coupling elements which allow nearly unrestricted sliding of the slider friction element support with respect to the running gear in one horizontal direction and which fixes immovably the slider friction element support with respect to the running gear in the other of the two horizontal directions.

#### 4,955,294 FOLDABLE TABLE

Taizo Abe, Ichikawa, Japan, assignor to Okamura Corporation, Japan

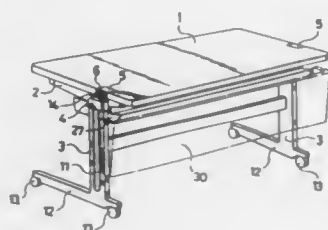
Filed Aug. 23, 1989, Ser. No. 397,580

Claims priority, application Japan, Dec. 28, 1988, 63-170335[U]

Int. Cl.<sup>3</sup> A47F 5/12

U.S. Cl. 108-6

2 Claims



#### 1. A foldable table comprising:

- a table top;
- a frame member attached respectively to opposed side portions of a bottom surface of the table top and having a protruding piece adjacent each side portion projecting in a direction opposite to the table top;
- a lock pin mounted on and projecting from an outer wall surface of each protruding piece;
- a lock releasing lever rotatably attached to a bottom surface of the table top and disposed adjacent one of the protruding pieces;
- a pair of legs, one being located adjacent each protruding piece;
- a housing mounted on a top portion of each of the legs, each housing having a pivot pin projecting from an inner wall surface thereof and connected with the protruding piece of the frame member adjacent thereto in such a manner as to allow the protruding pieces to pivot about the pivot pins;
- first click means rotatably housed within each housing and being adapted to be rotated in a direction to release a locking engagement when it is engaged by the lock releasing lever;
- a first spring means energizing the first click means in a locking direction;
- second click means rotatably housed in each housing and being adapted to be rotated in a direction to release a locking engagement when it is engaged by the first click means;
- a second spring means energizing the second click means in a locking direction;
- a locking disc rotatably housed in each housing and provided with a lock pin-engaging recess adapted to be de-

tachable engaged with the lock pin, a pair of first engaging recesses adapted to be detachably engaged with the first click means to provide the locking engagement of the first click means, and a pair of second engaging recesses adapted to be detachably engaged with the second click means to provide the locking engagement of the second click means, the lock pin-engaging recess, the pair of first engaging recesses and the pair of second engaging recesses being located about the periphery of the locking disc for engagement with the first click means, the second click means and the locking pin, respectively;

a lock pin spring means energizing the locking disc in a direction to force it to disengage from the lock pin; and connecting means interconnecting the first click means housed within each housing; wherein a horizontal state of the table top is secured by engagement of the first and second click means with a first recess of the pair of first and second engaging recesses, respectively, and by a locking action of the lock pin engaged with the lock pin-engaging recess; a slanted state of the table top is secured by engagement of the first and second click means with a second recess of the pair of the first and second engaging recesses, respectively, and by a locking action of the lock pin engaged with the lock pin-engaging recess; and the table top is folded by releasing the locking engagement of the first and the second click means with the pair of first and second engaging recesses, respectively, thereby allowing the table top to be pivoted about the pivot pins to an erect position.

#### 4,955,295 METHOD AND SYSTEM FOR CONTROLLING THE BACKFLOW SEALING EFFICIENCY AND RECYCLE RATE IN FLUIDIZED BED REACTORS

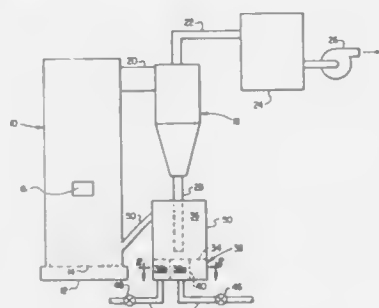
Iqbal F. Abdulally, Randolph, N.J., assignor to Foster Wheeler Energy Corporation, Clinton, N.J.

Filed Aug. 18, 1989, Ser. No. 395,864

Int. Cl.<sup>3</sup> F23D 1/00

U.S. Cl. 110-263

6 Claims



1. A fluidized bed combustion system including separating means for receiving a mixture of flue gases and entrained particulate material from fluidized bed and separating said entrained particulate material from said flue gases, means for passing said separated flue gases from said separating means to a heat recovery unit, a seal vessel, a dipleg for passing said separated material from said separating means to said seal vessel, means for passing said separated material from said seal vessel back to said fluidized bed, and means for introducing air or gas to said seal vessel for fluidizing the separated material in said seal vessel to seal against the backflow of said separated material from said fluidized bed, through said dipleg and back to said separating means, said air introducing means comprises a first conduit for introducing air or gas into said seal vessel in a path aligned with the flow path of said separated material from said dipleg, and a second conduit for introducing air or

gas into an area of said seal vessel surrounding the flow path of air or gas from said first conduit.

#### 4,955,296 INCINERATOR GRATE ASSEMBLY

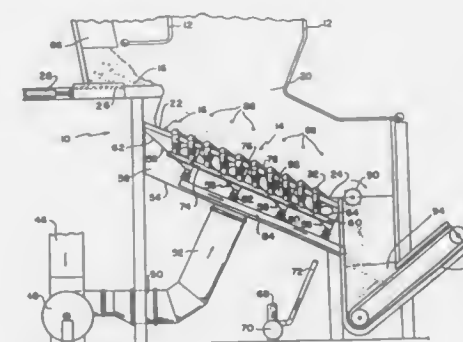
James L. Barlow, 2618 Somerville Ct., Ft. Collins, Colo. 80526

Filed Dec. 1, 1988, Ser. No. 278,183

Int. Cl.<sup>3</sup> F23H 3/00

U.S. Cl. 110-300

10 Claims



1. An inclined grate assembly for the incineration of a feed material comprising:  
a plurality of adjacent grate segments including at least one gas delivery tube having a plurality of apertures there-through and wherein said gas delivery tube includes an upper surface with at least certain of said apertures projecting upstream of said inclined grate assembly, a downwardly inclined grate plate extending from said tube and including a plurality of openings therethrough, gas supply means joined to said gas delivery tubes and adapted to admit gas into said tubes and thence through said apertures, and said gas supply means including adjustable control means operable to regulate the volume of gas through said tube apertures, whereby upon manipulation of said control means, the effectiveness of the movement and burn of feed material atop said grate assembly may be maximized.

#### 4,955,297 SEEDING PLANTER SHOE FOR AGRICULTURAL PLANTERS

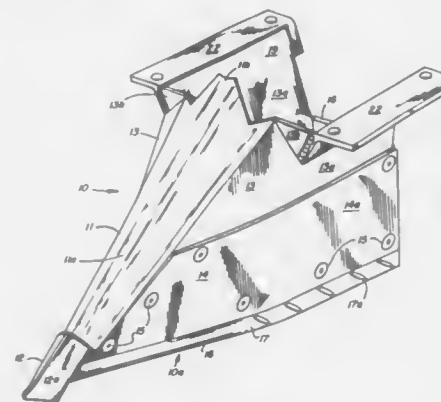
Masa Tsukamoto, 99 W. 1000 North, Blackfoot, Id. 83221

Filed Sep. 5, 1989, Ser. No. 402,892

Int. Cl.<sup>3</sup> A01C 5/06; A01B 15/00

U.S. Cl. 111-152

6 Claims



1. A seed planter shoe comprising a prow piece of substantially V-shape in cross section sloping and diverging back-

wardly and upwardly of the shoe for parting the soil along a lower, furrowing portion and with minimum lateral compression thereof to provide a furrow below an upper trash and soil lifting portion thereof; a shoe proper extending rearwardly from said prow piece and having a pair of side walls diverging upwardly and backwardly with said prow piece for from about one-half to about three-quarters of the length of the shoe; furrowing portions of said side walls continuing on longitudinally of the shoe substantially in parallel for the remainder of the length of the shoe, said side walls being rigidly connected at their forward ends to said prow piece inwardly of and at the side edge margins thereof and extending upwardly from adjacent to the bottom thereof to substantially the upper end thereof so as to be essentially integral therewith, furrowing portions of said side walls that are located backwardly of the upper end of said prow piece extending only partly to such upper end of said prow piece; a pair of relatively widely divergent side wall extensions rising from the upper ends of said furrowing portions of the side walls to substantially the top of the shoe but below the upper end of the prow piece, the bottom of said shoe proper being substantially planar and the apex of said prow piece sloping backwardly at an angle to said bottom of from about forty-five to about fifty degrees, so soil and trash will be lifted by and along said prow piece up and out of the furrow provided by said furrowing portions of said side walls; a pair of trash-diverting forwardly facing wall portions joining rearward edges of said forward portions of the side walls with forward edges of said outwardly divergent side wall extensions; and a toe piece fastened to said prow piece and depending therefrom below the bottom of said shoe proper.

#### 4,955,298 ROLLER DOCTOR OR SQUEEGEE APPARATUS FOR APPLYING FLUID MATERIAL TO A SUBSTRATE

Johannes Zimmer, Ebentaler Strasse 133, 9020 Klagenfurt; Franz Güttler, Klagenfurt, and Engelbert Mörtl, Rottenmann, all of Austria, assignors to Johannes Zimmer, Klagenfurt, Austria

PCT No. PCT/EP88/00493, § 371 Date Mar. 15, 1989, § 102(e)

Date Mar. 15, 1989, PCT Pub. No. WO88/09725, PCT Pub. Date Dec. 15, 1988

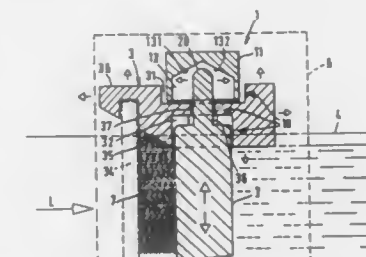
PCT Filed Jan. 3, 1988, Ser. No. 328,081

Claims priority, application Fed. Rep. of Germany, Jan. 3, 1987, 8708044; Jun. 30, 1987, 8709029

Int. Cl.<sup>3</sup> B41F 15/44

U.S. Cl. 101-120

28 Claims



1. A roller doctor apparatus (1) for applying fluid material over an application area on a substrate with at least one doctor roller (2) magnetically attracted into engagement with the substrate for exerting pressure thereagainst, said roller extending in the longitudinal direction of the apparatus; roller supporting and guiding members (11) arranged laterally on the apparatus, said doctor roller (2) being held at its ends between said members (11) for rotation and for limited movement relative thereto, wherein the doctor apparatus (1) comprises at least one roller fixing part (3) with an indentation on each side thereof, said part fitted loosely onto one end of the doctor roller (2) and trapped between the roller and the roller sup-



porting and guiding member, and wherein the member (11) projects into one of said indentations with the roller projecting into the other indentation to form a plug connection (10).

4,955,299

# WEB PRINTING PRESS WITH REPLACEABLE PRINT UNIT

Hirotake Ohta, Kanagawa, Japan, assignor to Taiyo Kikai Ltd., Tokyo, Japan

Continuation of Ser. No. 182,348, Apr. 18, 1988, abandoned.

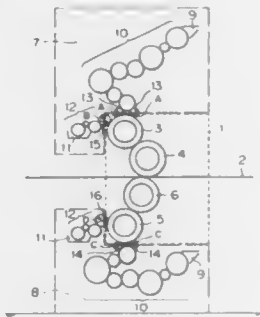
This application Nov. 20, 1989, Ser. No. 438,243

Claims priority, application Japan, Sep. 9, 1987, 62-224059

Int. Cl.<sup>3</sup> B41F 7/04, 7/12, 31/30

U.S. Cl. 101-143

10 Claims



1. A web printing press comprising:

a first printing unit disposed between an upper ink feeding unit and a lower ink feeding unit in a vertical arrangement so that said upper and lower ink feeding units face each other;

said first printing unit including upper and lower blanket cylinders for rotatably contacting a horizontally disposed web therebetween for printing on opposite surfaces of said web, and upper and lower plated cylinders being rotatably in contact with said upper and lower blanket cylinders, respectively;

said upper ink feeding unit including an ink fountain, a water fountain and associated ink and water transfer rollers for feeding ink and water respectively to said upper plated cylinder, said ink fountain and said water fountain of said upper ink feeding unit each being disposed in horizontal planes parallel to said web to provide a predetermined vertical distance between said ink fountain and said water fountain of said upper ink feeding unit;

said lower ink feeding unit including an ink fountain, a water fountain and associated ink and water transfer rollers for feeding ink and water respectively to said lower plated cylinder, said ink fountain and said water fountain of said lower ink feeding unit each being disposed in horizontal planes parallel to said web to provide a predetermined vertical distance between said ink fountain and said water fountain of said lower ink feeding unit;

said ink fountain of said upper ink feeding unit being in vertical alignment with said ink fountain of said lower ink feeding unit;

said water fountain of said upper ink feeding unit being in vertical alignment with said water fountain of said lower ink feeding unit;

said blanket cylinders and said plated cylinders each having a diameter of a predetermined size;

said upper plated cylinder being disposed above said upper blanket cylinder, and said lower plated cylinder being disposed below said lower blanket cylinder so that said first printing unit has a predetermined maximum vertical dimension;

first means to permit said first printing unit to be replaced by at least a second printing unit having a predetermined maximum vertical dimension larger than said predeter-

mined maximum vertical dimension of said first printing unit;

said second printing unit including upper and lower blanket cylinders and upper and lower plated cylinders arranged in the same manner as said blanket cylinders and said plated cylinders of said first printing unit;

said blanket cylinders and said plated cylinders of said second printing unit each having a diameter of a predetermined size which is larger than said diameter of each of said blanket cylinders and said plated cylinders of said first printing unit;

second means vertically moving at least one of said ink feeding units from a first position to a second position to provide a larger vertical space between said ink feeding units for receiving said second printing unit between said upper and lower ink feeding units so that said upper and lower ink feeding units continue to face each other in said second position;

said at least one ink feeding unit having the same predetermined vertical distance between said horizontal planes of said ink fountain and said water fountain thereof in both said first and second positions;

said ink fountain of said at least one ink feeding unit moving in a vertical direction from said first position to said second position to maintain said vertical alignment with said ink fountain of the other ink feeding unit when in said second position;

said water fountain of said at least one ink feeding unit moving in a vertical direction from said first position to said second position to maintain said vertical alignment with said water fountain of the other ink feeding unit when in said second position; and

said second means vertically moving said at least one ink feeding unit back to said first position for receiving said first printing unit between said upper and lower ink feeding units when replacing said second printing unit;

whereby said web printing press can separately use, one at a time, a plurality of printing units each having a different predetermined maximum vertical dimension.

4,955,300

# ADAPTIVE CARTRIDGE FOR A SUBCALIBER BARREL SYSTEM

Roland Bertiller, Schramberg, and Roland Maier, Staig-Altheim, both of Fed. Rep. of Germany, assignors to Mauser-Werke Oberndorf GmbH, Oberndorf, Fed. Rep. of Germany

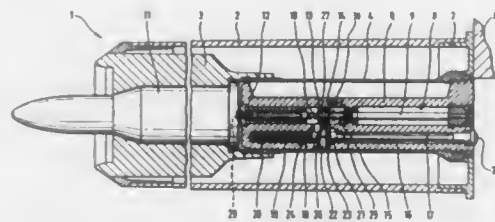
Filed Oct. 27, 1989, Ser. No. 428,196

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1988, 3836529

Int. Cl.<sup>3</sup> F42B 8/10; F41A 21/10

U.S. Cl. 102-446

5 Claims



1. An adaptive barrel of a subcaliber barrel system for firing subcaliber ammunition out of a large caliber weapon barrel, comprising:

a tubular casing;

a centrally disposed cartridge bearing connected to said tubular casing and defining a central cavity for positioning subcaliber ammunition cartridge within the adaptive barrel;

a firing pin case positioned adjacent said cartridge bearing, coaxial therewith, said firing pin case being positively

connected to said cartridge bearing at a lock side of said cartridge bearing;

a firing pin having an end bordering a weapon breech mechanism with an axial extension adjacent a cap of a cartridge, said firing pin disposed in an axial bore defined by said firing pin case;

a safety rod disposed in a safety rod axial bore defined by said firing pin case, said firing pin case defining a radial bore connecting said firing pin axial bore and said safety rod axial bore;

a guide member disposed in said firing pin axial bore connected to said firing pin axial extension; and, a slide member connected to said safety rod and connected to said guide member for moving said slide member and said guide member and in turn for moving said axial extension into and out of contact with the cap of said cartridge upon movement of said safety rod, said firing pin axial extension receiving electrical energy from the weapon via said firing pin.

4,955,301

# TIE EXCHANGE MACHINE

Josef Theurer, Vienna; Johann Hansmann, Klosterneuburg, and Herbert Wörgötter, Linz, all of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

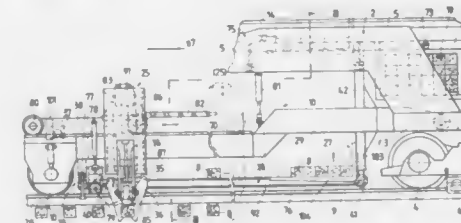
Continuation of Ser. No. 165,512, Mar. 8, 1988, abandoned. This application Jun. 30, 1989, Ser. No. 374,576

Claims priority, application Austria, Jul. 23, 1987, 1873/87

Int. Cl.<sup>3</sup> E01B 29/10

U.S. Cl. 104-7.2

21 Claims



1. A machine for exchanging a group of at least one old tie for a group of at least one new tie in a railroad track consisting of two rails fastened to ties, which comprises

(a) a self-propelled standard railroad vehicle comprising

(1) a bridge-like machine frame,

(2) undercarriages supporting the machine frame for mobility on the railroad track, the machine frame defining an upwardly recessed portion between the undercarriages,

(3) a drive for advancing the vehicle in an operating direction, and

(4) an operator's cab,

(b) a tie exchanging device connected to the machine frame and arranged within sight of the operator's cab, the tie exchanging device being operable for withdrawing the old ties and inserting the new ties and comprising

(1) a longitudinally adjustable tie gripping means including a tie clamp for gripping an end of the ties laterally projecting from the track,

(2) a drive for longitudinally adjusting the tie gripping means for respectively moving the old ties laterally out of, and inserting the new ties laterally into, the track, and

(3) respective drives for vertically adjusting and for operating the tie clamp between tie engaging and tie releasing positions.

(c) a drive connected to the tie exchanging device for longitudinally displacing the device in the operating direction with respect to the machine frame,

4,955,302

# MOBILE TIE GANG APPARATUS

Josef Theurer, Vienna, and Johann Hansmann, Klosterneuburg, both of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Continuation of Ser. No. 165,511, Mar. 8, 1988, abandoned. This application Jul. 13, 1989, Ser. No. 380,703

Claims priority, application Austria, Jul. 23, 1987, 1871/87

Int. Cl.<sup>3</sup> E01B 29/10

U.S. Cl. 104-7.2

4 Claims



4. The mobile apparatus for sequentially exchanging selected consecutive groups of old ties in an existing railroad track for groups of new ties while retaining groups of old ties therebetween to support the mobile apparatus on the track, which comprises

(a) a succession of bridge-like work vehicles coupled together to form a train including a first, second, third and fourth work vehicle, each work vehicle having

(1) a frame defining an upwardly recessed portion between respective ends thereof,

(b) swivel trucks supporting the work vehicle frame ends on the railroad track,

(1) the third work vehicle having the respective frame ends thereof supported on a rear one of the swivel trucks of the second work vehicle and a front one of the swivel trucks of the fourth vehicle,

(c) a continuous guide track extending atop the work vehicle frames,

(d) a power-driven crane movable along the guide track for transporting the ties,

(e) a drive for the continuous advancement of the train on the railroad track in an operating direction,

(f) a succession of individual devices operative to effectuate different sequential operations for exchanging the selected old ties for the new ties, the tie exchanging devices being mounted for longitudinal displacement and including

(1) first and second tie pulling and inserting devices mounted within view of an operator's accommodation in the recessed frame portion of the second and fourth work vehicle, respectively, and having tie gripping means for gripping an end of the ties laterally projecting from the track, the first device pulling the selected old ties laterally out of the track and the second device inserting the new ties laterally into the track,

- (2) a track-bound spike puller mounted in the recessed frame portion of the first work vehicle,
- (3) a tie plate transporting device mounted in the recessed frame portion of the second work vehicle, the tie plate transporting device including drive means for lifting respective ones of the tie plates,
- (g) a respective drive for displacing each tie exchanging device with respect to the respective work vehicle frame along a displacement path extending in the direction of the longitudinal extension of the work vehicle frame,
- (h) a respective vertical tie conveyor associated with each of the first and second tie pulling and inserting devices,
- (i) a track-bound spike collecting device arranged in the recessed frame portion of the first work vehicle to receive spikes pulled by the spike puller,
- (j) a track-bound self-propelled ballast clearing device longitudinally displaceably mounted in the recessed frame portion of the first work vehicle, the ballast clearing device including an operator's cab, a tie tractor and a track lifting mechanism,
- (k) a self-propelled tie tamping device longitudinally displaceably mounted in the recessed frame portion of the fourth bridge-like work vehicle and succeeding the tie inserting device, the tie tamping device comprising a ballast sweeping brush,
- (l) a further operator's cab on the fourth bridge-like work vehicle, the tie tamping device preceding the further operator's cab,
- (m) a self-propelled device for clearing and planing ballast serving to support the new ties and filling cribs therebetween, the ballast clearing and planing device being mounted on the third work vehicle, and
- (n) a storage space for the selected old ties and the new ties respectively above the rear and front swivel trucks.

4,955,303

## LINEAR MOTOR FEEDER SYSTEM

Haruo Ikeda, Musashino, Japan, assignor to Railway Technical Research Institute, Tokyo, Japan

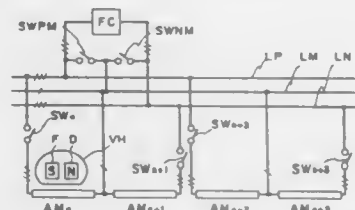
Filed Mar. 10, 1989, Ser. No. 321,801

Claims priority, application Japan, Mar. 30, 1988, 63-74492

Int. Cl.<sup>5</sup> B60L 13/00; H02K 41/00

U.S. Cl. 104-292

3 Claims



1. A feeder system for a linear motor having field electrodes disposed on a vehicle and a plurality of stationary armature coils, comprising:

- first, second and third feeder lines in parallel with one another;
- a frequency converter connected across said first and second feeder lines for supplying electricity to the armature coils, wherein said armature coils are serially connected two-by-two to form sets of said armature coils such that a junction between two armature coils of each set is connected to said third feeder line, and such that opposing ends of each set, remote from said junction, are respectively connected to said first and second feeder lines through respective switches corresponding to the armature coils of said set;
- a first short-circuiting switch disposed between said first and third feeder lines; and
- a second short-circuiting switch disposed between said second and third feeder lines.

4,955,304

## REMOTE LOCOMOTIVE SPOTTER CONTROL

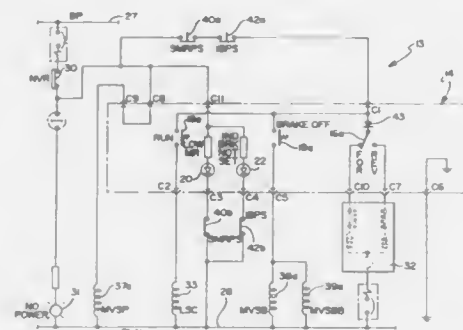
Robert E. Spenk, Des Plaines; Pesi A. Vazifdar, Bolingbrook, and John A. Janowski, Jr., Western Springs, all of Ill., assignors to General Motors Corporation, Detroit, Mich.

Filed May 25, 1989, Ser. No. 357,131

Int. Cl.<sup>5</sup> B60L 15/42

U.S. Cl. 104-296

16 Claims



8. A remote spotter for a self powered rail locomotive having an engine drivably connected to an electric power main generator, a traction motor for driving the locomotive when supplied with power from the main generator, air brakes for stopping the locomotive and an on board battery for auxiliary electric power, said spotter comprising:

- auxiliary drive means for connecting the battery to the traction motor for driving the locomotive,
- auxiliary brake means for applying the air brakes to stop the locomotive, and
- a remote unit connectable with said locomotive auxiliary drive and brake means and normally operative upon such connection to actuate the auxiliary brake means to apply the brakes, said remote unit having first and second manually actuated self released control means, said first control means being normally operative upon actuation to release the brakes and said second control means being normally operative upon actuation to actuate the auxiliary drive means to move the locomotive.

4,955,305

## MODULAR SYSTEM FOR USE WITH X-Y PERIPHERALS

Steven F. Garnier, Denver; Robert B. Ton; Vernon S. Turner, both of Arvada; James K. Pilarski, Northglenn; Mark R. Magill, Arvada, and Allen J. Murphy, Denver, all of Colo., assignors to Melco Industries, Inc., Denver, Colo.

Filed Sep. 23, 1988, Ser. No. 249,426

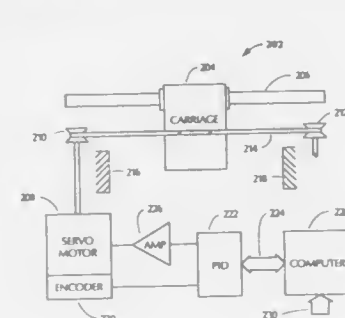
Int. Cl.<sup>5</sup> D05B 21/00

U.S. Cl. 112-121.11

7 Claims

1. A method for moving a carriage in a sewing machine from a random position to a reference position relative to a stationary body, comprising:
- moving a carriage in a first direction from a random position towards a known position;

using a signal to determine when said carriage reaches said known position; and



moving said carriage in a second direction a known distance to a reference position.

4,955,306

## SEWING MACHINE

Tadashi Sato, Hirakata, and Shigeo Neki, Osaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jul. 12, 1988, Ser. No. 218,008

Claims priority, application Japan, Jul. 14, 1987, 62-175179

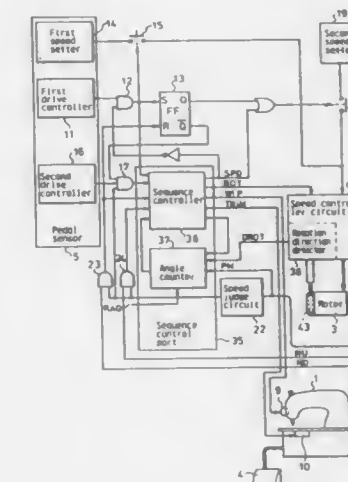
Int. Cl.<sup>5</sup> D05B 69/18, 69/22

U.S. Cl. 112-275

4 Claims

1. A sewing machine comprising:
- a sewing mechanism including a thread trimmer,
- an electric motor for driving said sewing mechanism,
- a speed detector for detecting rotation speed of said sewing mechanism by issuing a predetermined number of speed signal pulses during one sewing period,
- a needle position detector for detecting the position of a sewing needle,
- a speed controller circuit for controlling rotation speed and stopping position of said sewing mechanism,
- a sequence control part for controlling sequential operation of said sewing machine, including
- a sequence controller for controlling at least said thread trimmer,
- an angle counter for counting the angle of rotation of said

sewing mechanism by counting said speed signal pulses, and



reverse rotation means for making reverse rotation of said motor for a predetermined angle after completion of thread trimming by said thread trimmer.

4,955,307

## DEVICE ON SEWING MACHINES FOR THE TRANSPORT OF WORK PIECES

Wolfgang Kolb, Sippersfeld, and Ernst Albrecht, Hochspeyer, both of Fed. Rep. of Germany, assignors to Pfaff Industriemaschinen GmbH, Kaiserslautern, Fed. Rep. of Germany

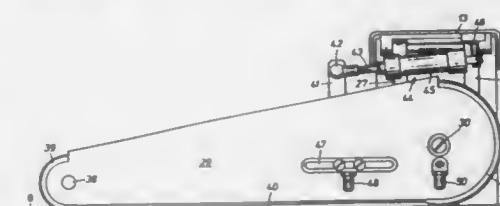
Filed Jun. 2, 1989, Ser. No. 360,260

Claims priority, application Fed. Rep. of Germany, Jun. 6, 1988, 3819262

Int. Cl.<sup>5</sup> D05B 33/00

U.S. Cl. 112-304

11 Claims



1. A workpiece transport device for sewing machines, comprising:

- a table top extending from a sewing area to a transfer area;
- a pivotal arm;
- a deflection disc connected to a first end of said pivotal arm;
- a drive disc connected to a second end of said pivotal arm;
- a conveyor belt looping around said deflection disc and said drive disc; and
- swivel carrier means connected to a swivel carrier actuator and connected to said pivotal arm, said swivel carrier means for pressing said pivotal arm onto a workpiece on said table top with a predetermined force and pressing said pivotal arm onto the workpiece with a force less than said predetermined force, depending upon the position of the workpiece relative to the conveyor belt when the arm is in a swivelled-up position.



4,955,308

## FLOATING BOAT LIFT

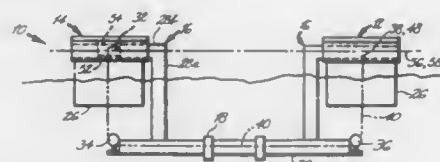
Gary D. Craddock, 4942 Commonwealth Dr., Sarasota, Fla. 34242

Filed Jan. 30, 1990, Ser. No. 472,098

Int. Cl.<sup>5</sup> B63B 35/34

U.S. Cl. 114—45

10 Claims



1. A floating boat lift for lifting and supporting a boat above the surface of a body of water comprising: a first and second elongated buoyant pontoons;

first and second generally U-shaped, spaced apart, rigid transverse supports each having a lower generally horizontal elongated mid portion, side portions upwardly extending from each end of said mid portion, and upper horizontal end bearing portions coaxial one to another about a first and second transverse axis and outwardly extending from the upper ends of each said side portion; each said mid portion connected to a boat cradle atop which the boat is supportable;

two of said end bearing portions on one side of said mid portions held for rotation about spaced apart parallel said first and second axes within said first pontoon, the other two said end bearing portions on the other side of said mid portions also held for rotation about said first and second axes within said second pontoon whereby said first and second pontoons are held in spaced apart relationship on either side of said first and second transverse supports;

said first and second transverse supports pivotable by rotation about said end bearing portions within said first and second pontoons between a first position wherein said cradles are elevated above the surface of the water and a second position wherein said cradles are submerged and wherein movement of each mid portion is along an arch having a radius generally equal to the length of said side portions;

cable means connected between a winch and each said mid portion for moving said transverse supports in unison between said first and second positions.

4,955,309

## YIELDABLE LINE ASSEMBLY AND IN LINE SHOCK ABSORBER

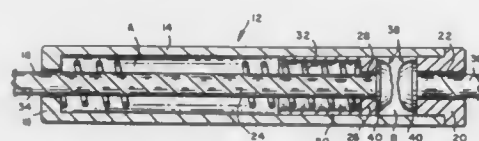
Frank E. Ciccone, Center Harbor, N.H., assignor to International Nautical Supplies, Inc., Boston, Mass.

Filed May 8, 1989, Ser. No. 348,946

Int. Cl.<sup>5</sup> B63B 21/00

U.S. Cl. 114—230

4 Claims



1. A yieldable line assembly of the type employed to moor boats, to tie sails and canvasses, etc. comprising:

an elongated tubular housing having opposite ends closed by first and second walls respectively provided with axially aligned first and second openings extending therethrough; a plunger member contained within said housing for axial movement therein, said plunger member having a third wall with a third opening extending therethrough and

aligned axially with said first and second openings, said third wall being configured and dimensioned to subdivide the interior of said housing into first and second chambers; a resilient coiled compression spring confined in said first chamber between said first and third walls; a first flexible line, extending through said first opening and said coiled spring and said third opening, with an end of said first line being located in said second chamber; a second flexible line extending through said second opening, with an end of said second line also being located in said second chamber; and anchoring means for preventing the ends of said first and second lines from being withdrawn from said second chamber respectively through said third and second openings, whereupon tensioning said lines will cause said spring to be compressed between said first and third walls as said first line is withdrawn from said first chamber.

4,955,310

## BEARING ARRANGEMENT FOR SINGLE POINT TERMINAL

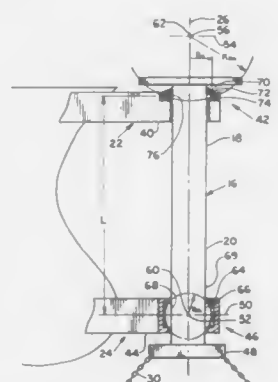
Jack Pollack, 23901 Calabasas Rd., #2090, Calabasas, Calif. 91302

Filed Dec. 8, 1988, Ser. No. 282,020

Int. Cl.<sup>5</sup> B63B 21/50

U.S. Cl. 114—230

14 Claims



1. In a mooring arrangement which includes a vessel that floats at the surface of a sea and that can drift and weathervane, a turret, and vertically spaced upper and lower mounts mounting vertically spaced upper and lower portions of the turret to the vessel to enable relative rotation of the vessel and turret about a largely vertical axis, and wherein the turret has a lower end anchored by at least one mooring line or the like extending down toward the sea floor and applying a largely downward force to the lower end of the turret, the improvement wherein: said lower mount includes a lower bearing arrangement that limits radial movement of said turret with respect to said axis while allowing pivoting of said lower turret portion about lower horizontal axes;

said upper mount includes an upper bearing arrangement that limits both radial and downward movement of said turret with respect to said axis while allowing a substantial amount of pivoting of said upper turret portion about upper horizontal axes.

4,955,311

## FOLD-AWAY FLOATING DOCK

William B. Barber, 9613 Woodlawn Dr., Portage, Mich. 49002

Filed Nov. 18, 1988, Ser. No. 273,195

Int. Cl.<sup>5</sup> B63C 1/00

U.S. Cl. 114—263

15 Claims

1. A foldaway floating dock for use on a body of water, comprising:

4,955,313

## HEIGHT-ADJUSTABLE ROOF FOR A PILOT HOUSE/HELM STATION

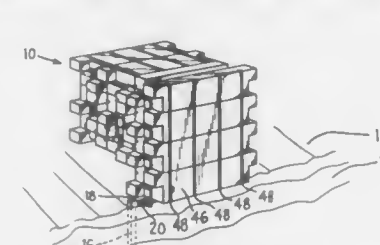
Alfred E. Terry, III, 79th St. Boat Basin, New York, N.Y. 10024

Filed Jul. 3, 1989, Ser. No. 374,878

Int. Cl.<sup>5</sup> B63B 29/02

U.S. Cl. 114—361

19 Claims



said mutually adjacent dock section, said frame further including second means for facilitating pivotal movement of each said dock section relative to a respective said mutually adjacent dock section and operable only when said dock section is in said second position to thereby effect a folding of said dock section upon said respective mutually adjacent dock section.

4,955,312

## CONTROLLED GEOMETRY HYDROFOIL BOAT

Alfredo Magazzu', Palermo, Italy, assignor to Rodriguez S.p.A., Messina, Italy

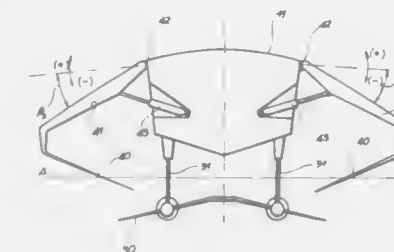
Continuation of Ser. No. 26,957, Mar. 17, 1987, abandoned. This application Nov. 30, 1988, Ser. No. 279,284

Claims priority, application Italy, Apr. 4, 1986, 12456 A/86

Int. Cl.<sup>5</sup> B63B 1/22

U.S. Cl. 114—280

2 Claims



1. In a variable geometry hydrofoil boat having a hull and hydrofoils for operating hullborne and foilborne, the improvement comprising, secant foils operable to a fully raised position outside of the hull and out of the water for operating hullborne or foilborne and to variable lowered positions in which the secant foils are foilborne, means comprising a pair of arms articulated on said hull for movement relative to corresponding opposite sides thereof for each pivotally mounting a corresponding secant foil on the hull and fixed relative to the corresponding arm, means for moving the arms angularly relative to the corresponding opposite sides of the hull for alternatively moving the corresponding secant foil to said fully raised position in which the secant foils are in a non-operative condition relative to lifting of the hull but ready to intervene, and to said variable lowered position in which the secant foils contribute dynamically to lifting the hull, said means for moving said arms comprising hydraulic jacks each connected to a corresponding arm for variably angularly moving the arm relative to the hull, and said jacks are connected to the pair of arms for independently angularly moving the arms for selective independent positioning of each secant foil in variably selected raised and lowered positions.

4,955,314

## WATER SPORT BOARD SAFETY TIP WITH ATTACHMENT FACILITATING EXTENSIONS

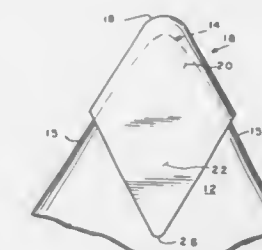
David Skeddeski, and Eric Arakawa, both of Aiea, HI., assignors to Surfco of Hawaii, Aiea, HI.

Filed Jul. 18, 1989, Ser. No. 381,204

Int. Cl.<sup>5</sup> A63C 15/05

U.S. Cl. 114—219

20 Claims



1. In combination with a water sport board of the type having a sharply angled forward tip portion, including a top, bottom, and tapered sides; means for affording protection to the user of the board from injury upon contact with said tip portion while not adversely altering the performance characteristics of the board, said means comprising: an integral relatively soft, resilient, plastic tip cover, having a rounded exterior nose portion;

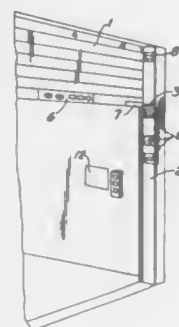
a main body portion engaging said tip, bottom, and tapered sides; and  
upper and lower extension portions extending rearwardly from said body portion, past the rearwardmost point of said main body portion, and engaging only said top and bottom; said tip cover being fixedly secured to said tip portion of said board.

**4,955,315**  
**LARGE VEHICLE ENTRANCE DOOR SAFETY SYSTEM AND METHOD**

James F. Lee, 218-12 43rd Ave., Bayside, N.Y. 11361  
Filed May 4, 1989, Ser. No. 347,520  
Int. Cl.<sup>5</sup> B60T 13/00

U.S. Cl. 116—28 R

11 Claims



10. A large vehicle entry door safety system for a vertical sliding entry door having a bottom edge, a door frame perpendicular to said door and an outer side wall parallel to said door which comprises:

- a plurality of ruled marks positioned on said door frame and on said outer wall;
- at least one symbol visually indicating a specific vehicle type positioned at a clearance height associated with said vehicle on said door frame and said side wall;
- a position indicating means comprising a rod attached to said door edge and parallel to said door frame and bent at an end so as to be parallel to said side wall and associated with said marks so as to visually indicate by alignment with said marks and symbol said clearance height to a vehicle operator or door operator or both;
- a warning mark attached to said door and to any vehicle using said door, said warning mark directing attention to said position indicating means;
- a door height control means;
- instructions positioned near said door height control means indicating to align said position indicating means with said marks and symbol.

**4,955,316**  
**DEVELOPING DEVICE**  
Masato Asanuma, Masatoshi Kaneshige, and Toyoka Aimoto, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 20, 1989, Ser. No. 382,868  
Claims priority, application Japan, Aug. 3, 1988, 63-198526; Aug. 8, 1988, 63-198527

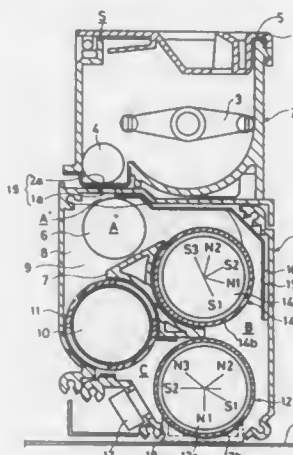
Int. Cl.<sup>5</sup> G03G 15/09

U.S. Cl. 118—657

11 Claims

1. A developing device comprising:
  - A. a developing magnet roller for feeding developer onto a photoreceptor;
  - B. a shutter mechanism for switching from feeding developer to the developing magnet roller to suspending the above feed of developer, or vice versa;
  - C. a delivery magnet roller for receiving developer from the

developing magnet roller and conveying it to a path leading to the shutter mechanism;  
D. a toner feed path for interconnecting a toner hopper disposed at the upper end of a main body of the develop-



ing device and the space above the shutter mechanism; and  
E. an interconnecting path for interconnecting the space in the vicinity of the toner feed path within the main body and a different space existing within the main body.

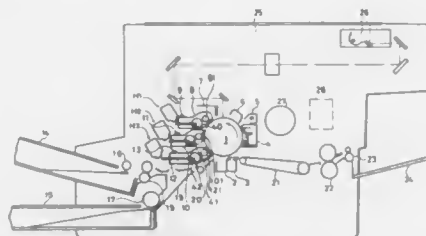
**4,955,317**  
**IMAGE FORMING APPARATUS HAVING A PLURALITY OF DEVELOPING UNITS EACH CONTAINING TWO-COMPONENT DEVELOPER**

Naoyoshi Kinoshita, and Yoshihiko Hatta, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 25, 1989, Ser. No. 357,894  
Int. Cl.<sup>5</sup> G03G 15/08

U.S. Cl. 118—689

22 Claims



1. An electrophotographic image forming apparatus employing a two-component developer including toner and carrier, comprising:

- a developing unit containing the two-component developer;
- a toner concentration sensor provided on said developing unit for detecting concentration of the toner included in the developer;
- comparing means for comparing a value detected by said toner concentration sensor with a prescribed concentration reference value;
- supplying means for supplying toner to said developing unit;
- controlling means for controlling supply of toner by said supplying means based on a result of comparison by said comparing means; and
- detecting means for detecting whether or not a detachable member, whose presence/absence influences detection of said toner concentration sensor, is attached near said developing unit; wherein

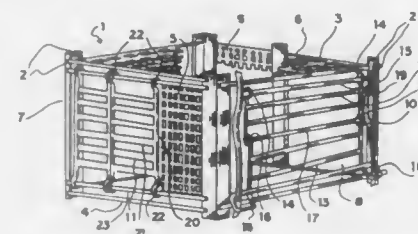
said controlling means changes an amount of toner supplied by said supplying means based on the value detected by said toner concentration sensor in response to a detection output from said detecting means.

**4,955,318**  
**TRANSPORTABLE POULTRY PLANT CART**  
John W. Melhorn, and J. Michael Melhorn, both of Box 258, Mount Joy, Pa. 17552

Filed Jan. 27, 1989, Ser. No. 302,415  
Int. Cl.<sup>5</sup> A01K 31/07

U.S. Cl. 119—17

4 Claims



1. A method of transporting and unloading animals including the following steps:

- providing a plurality of animal cages having four vertical sides and a top and bottom for carrying individual animals, each said cage having first and second separate closable entrances for placing and removing animals, said closable entrances being disposed on adjacent vertical sides of said cage;
- stacking said plurality of cages in a vertical manner upon a wheeled cart;
- placing animals inside each said cage through said first entrance;
- transporting said cages and animals upon said wheeled cart to a destination;
- tilting said stack of cages until they lie in a generally horizontal disposition with said second entrances facing vertically upwards;
- removing said animals through said second entrances; whereby
- a person removing said animals through said second entrances can quickly remove the animals from the cages without having to change levels and the animals and cages are transportable in a standard vertically stacked manner.

**4,955,319**  
**BIRD FEEDER**  
Robert J. Brucker, Bernardsville, N.J., assignor to Seal Spout Corporation, Liberty Corner, N.J.

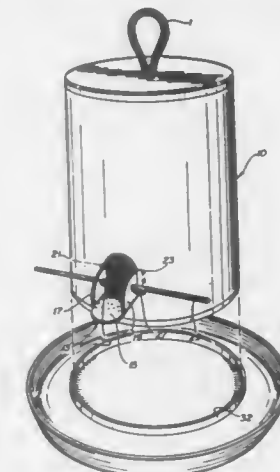
Filed Oct. 12, 1988, Ser. No. 256,742  
Int. Cl.<sup>5</sup> A01K 39/014

U.S. Cl. 119—52.2

10 Claims

1. A container comprising:
  - a body having closed bottom surface, top and side walls;
  - spout means formed in said side walls;
  - said spout means having apertures formed therein for supporting a perch means therein;
  - feeding trough means attached to said bottom surface, said

trough means comprising a feeding surface, internal rim means formed on said feeding surface for overfitting said



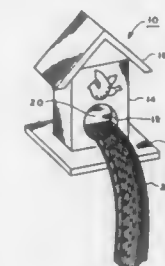
bottom surface and external rim means formed on said feeding surface spaced from said internal rim means.

**4,955,320**  
**DISPENSER FOR STRING FOR BIRD NESTS**  
Samuel G. Zaccane, 1315 North 13th Avenue, Melrose Park, Ill. 60160

Filed Feb. 27, 1989, Ser. No. 315,494  
Int. Cl.<sup>5</sup> A01D 29/00

U.S. Cl. 119—57.8

4 Claims



1. In combination
  - a bundle of pre-cut lengths of string,
  - a housing including an exterior wall having an opening therein,
  - said bundle extending into said opening in a direction transverse to said wall,
  - vertically disposed guide means in said housing, and
  - string retention means slidably carried in said guide means for vertical movement at least partially across said opening to engage said bundle and press same against a portion of said housing defining said opening.

**4,955,321**  
**COLLECTION TRAY FOR AN ANIMAL FEEDER**  
Joseph A. Waldner, Lauder, Canada, assignor to J & R Livestock Consultants Ltd., Winnipeg, Canada

Filed Aug. 30, 1989, Ser. No. 400,539  
Int. Cl.<sup>5</sup> A01K 1/10

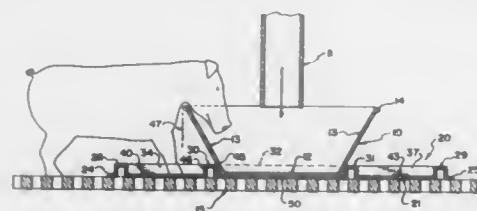
U.S. Cl. 119—61

3 Claims

1. A feed system for animals comprising a feeder having a trough including a base wall onto which the feed can rest and a front wall inclined upwardly and forwardly from a front edge of the base wall to a front edge of the front wall over which the animal reaches for taking feed from the base wall of



the trough and means for supplying feed into the trough, a perforated floor on which the animal stands at the feeder and a tray member separate from the feeder positioned between the feeder and the floor on which the feeder rests with a portion of the tray member extending outwardly from said front edge of the base all, the tray member having substantially flat horizontal surface for resting on the floor underneath the side edge and a plurality of upstanding ribs projecting upwardly from the flat horizontal surface thereof defining at least one compartment on the tray member into which feed dropped by the animal can



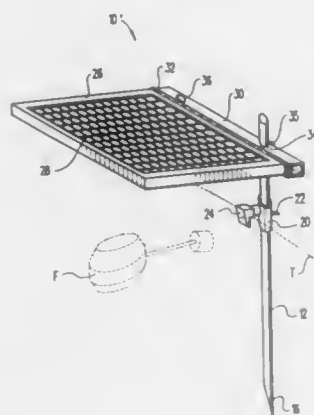
fall for collection, the ribs including a first elongate rib arranged so as to extend parallel to the front edge of the base wall of the feed trough with a rear edge of the first rib substantially in contact with the full length of the front wall at a position adjacent the base wall and a front edge of the first rib spaced rearwardly of a vertical plane containing the front edge of the front wall, a second elongate rib along substantially a front edge of the tray member parallel to and spaced from the first rib and a plurality of transverse ribs extending from said second rib to said first rib thus dividing the space between into separate compartments.

#### 4,955,322 FLOAT GUARD FOR A LIVESTOCK WATERING TROUGH

Frank N. Rodriguez, 801 N. 9th St., Alpine, Tex. 79830  
Filed Mar. 29, 1989, Ser. No. 330,064  
Int. Cl.<sup>3</sup> A01K 7/00

U.S. Cl. 119—78

1 Claim



1. A float guard for a livestock watering trough, comprising:  
a rigid frame;  
a wire mesh covering said frame;  
a mounting bar pivotally secured to said frame;  
at least one ground insertion spike perpendicularly received through an aperture in said mounting bar;  
said frame mounted for pivotal movement on said mounting bar for movement about an axis perpendicular to said ground insertion spike;  
a set screw in threaded engagement with said mounting bar and moveable into clamping engagement with said ground

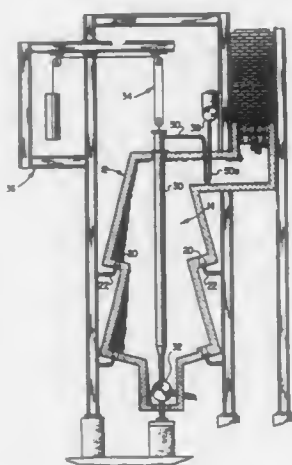
insertion spike for securing said mounting bar at a selected position along said ground insertion spike;  
at least one vertically adjustable trough clamp, said trough clamp having a threaded clamping jaw for frictionally engaging a side wall of a watering trough; and  
clamping means adjustably securing said trough clamp at a selected adjusted position on said ground insertion spike.

#### 4,955,323 FIRED HEATER

Janusz B. Ziemianek, Washington Crossing, Pa., assignor to Foster Wheeler USA Corporation, Clinton, N.J.  
Division of Ser. No. 71,825, Jul. 10, 1987, abandoned. This application Feb. 6, 1989, Ser. No. 307,021  
Int. Cl.<sup>3</sup> F22B 1/02

U.S. Cl. 122—4 D

3 Claims



1. A fired heater comprising an enclosure defining a chamber, at least one catalyst-filled tube having a first portion extending in said chamber and a second portion extending externally of said enclosure, means disposed externally of said enclosure for receiving fluid, a conduit having a first end portion connected to said means for receiving fluid, a second end portion connected to said second portion of said tube, and an intermediate portion extending in said chamber, and means for applying heat to said chamber for preheating the fluid in said intermediate portion of said conduit and heating said fluid in said first tube portion.

#### 4,955,324 PULSE COMBUSTION UNIT FOR LIQUID HEATING APPARATUS

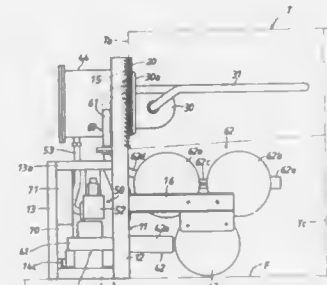
Susumu Ejiri, Toyooka, Japan, assignor to Paloma Kogyo Kabushiki Kaisha, Aichi, Japan  
Filed Jan. 10, 1990, Ser. No. 463,330  
Claims priority, application Japan, Jan. 11, 1989, 1-4298  
Int. Cl.<sup>3</sup> F22B 37/24

U.S. Cl. 122—510

3 Claims

1. A pulse combustion unit for a liquid heating apparatus having a liquid vessel arranged to store an amount of liquid to be heated, comprising:  
an upright support structure mounted on a floor;  
a base plate mounted to an upper portion of said support structure;  
a pulse combustion burner assembly including a pulse combustion chamber secured to one surface of said base plate and a curved tailpipe having an inner end connected to an exhaust port of said combustion chamber and outer end connected to said base plate;  
an air-fuel mixer head secured to the other surface of said base plate and being in open communication with the

interior of said combustion chamber through a central opening of said base plate;  
an air supply part mounted within a lower portion of said support structure, said air supply part including an air intake pipe in communication with said mixer head for supplying fresh air into said mixer head;  
a fuel supply part mounted within the lower portion of said support structure adjacent said air supply part, said fuel supply part including a fuel supply conduit in communica-



tion with said mixer head for supplying gaseous fuel into said mixer head; and  
an exhaust part mounted on said support structure at a position located below said combustion chamber, said exhaust part including an exhaust pipe connected to the outer end of said tailpipe to exhaust combustion products from said tailpipe, wherein said liquid vessel is coupled at a side wall thereof with said base plate in such a manner that said combustion chamber and tailpipe are arranged in said vessel.

#### 4,955,325 ACETABULAR CUP COMPONENT CEMENT SPACER SYSTEM

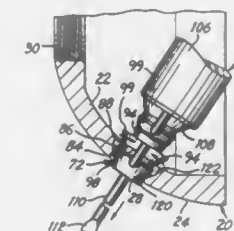
Alfred J. Zarnowski, North Plainfield, and Robert C. Cohen, Rockaway Township, Morris County, both of N.J., assignors to Osteonics Corp., Allendale, N.J.

Filed Jun. 14, 1989, Ser. No. 365,791

Int. Cl.<sup>3</sup> A61F 2/34

U.S. Cl. 623—22

9 Claims



1. A cement spacer system for use in combination with an acetabular cup component of the type which includes a shell-like wall having a given wall thickness and an outer affixation surface adapted for direct affixation of the acetabular cup component to the acetabulum and apertures passing through the wall at spaced locations along the outer affixation surface, each aperture defining an inner rim of predetermined inside diameter, for enabling selective interoperative conversion of the acetabular cup component for cemented affixation of the acetabular cup component to the acetabulum, the cement spacer system comprising:

a plurality of cement spacers, each cement spacer including a bore extending axially therethrough, and a spacer head having an axial spacing length, and confronting locking shoulders adjacent the spacer head and having an overall diameter greater than the inside diameter of the rim of a respective aperture in the wall of the acetabular cup com-

ponent, a generally annular groove essentially complementary to the inside diameter of the rim of the corresponding aperture and interposed between the confronting locking shoulders, and resilient deflection means for enabling lateral resilient deflection of the locking shoulders to admit the rim of the corresponding aperture between the confronting locking shoulders in response to axial insertion of the cement spacer into the respective aperture; and

a spacer inserted for use in the selective insertion of the cement spacers into the wall of the acetabular cup component, the spacer inserter including a gripping handle, a locator rod extending axially from the handle and having a rod diameter complementary to the axial bore of each cement spacer such that the cement spacers may be disposed along the locator rod, a lateral pushing surface interposed between the handle and the locator rod and adapted for engaging the confronting adjacent cement spacer disposed along the locator rod whereby axial pushing of the handle transmit axial force to the cement spacers disposed along the locator rod, allowing selective insertion and securement of each cement spacer within a corresponding aperture in the wall of the acetabular cup component.

#### 4,955,326 LOW EMISSION DUAL FUEL ENGINE AND METHOD OF OPERATING SAME

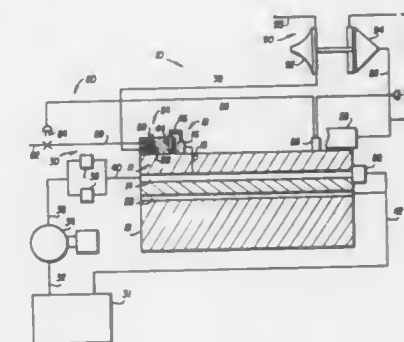
Melvin J. Helmich, Grove City, Pa., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Apr. 12, 1989, Ser. No. 336,789

Int. Cl.<sup>3</sup> F02B 3/00

U.S. Cl. 123—27 GE

26 Claims



1. A low emission dual fuel engine system comprising:  
a dual fuel engine having a combustion chamber;  
a fuel oil supply connected to said engine;  
a fuel gas supply connected to said engine; and  
means connected between said fuel oil supply and said engine for injecting fuel oil into said engine, said means connected between said engine and fuel oil supply limiting the injection of fuel oil to the combustion chamber to pilot ignition quantities only, wherein said limiting means includes means for limiting the injection of fuel oil such that the exhaust emission of NO<sub>x</sub> is at an emission rate of less than 1 GM/PH-HR, whereby the exhaust emission performance of the dual fuel engine is enhanced.

4,955,327

**PARTIAL-BOIL COOLING APPARATUS FOR ENGINE**  
 Taizo Kitada, Okazaki; Takehiko Katsumoto; Osamu Hirako, both of Kyoto; Masatoshi Nisoyu, Okazaki; Yasuyuki Makigawa, Amagasaki; Gorou Yamanaka, Amagasaki, and Masao Fujii, Amagasaki, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha and Mitsubishi Denki Kabushiki Kaisha, both of Tokyo, Japan

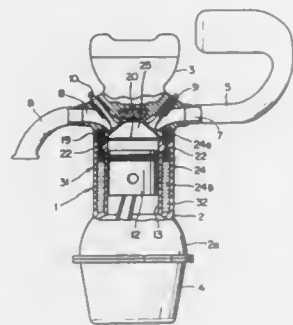
Filed Oct. 17, 1989, Ser. No. 422,393

Claims priority, application Japan, Oct. 17, 1988, 63-261045

Int. Cl.<sup>3</sup> F01P 3/00

U.S. Cl. 123—41.42

4 Claims



1. A partial-boil cooling apparatus for an engine, comprising: a water jacket including (i) a forcible circulation part located chiefly round a cylinder head of the engine for forcibly circulating a cooling water in said water jacket by a water pump, and (ii) a natural convection part located chiefly round a liner of a cylinder block of the engine for allowing a combined coolant composed of said cooling water and a cooling medium different therefrom in said natural convection part to move by natural convection with restraining said coolant from forcible circulation by said water pump; and said natural convection part being filled at its upper space with said cooling water and at its lower space with said cooling medium having a boiling point around a temperature zone to cool said liner, said cooling medium having a specific gravity larger than that of said cooling water and immiscible with antipathic to said cooling water.

4,955,328

**LEADING PISTON ENGINE WITH TWO CYLINDERS INTERCONNECTED THROUGH A TRANSFER PORT**  
 Rafal A. Sobotowski, Bay Village, Ohio, assignor to Standard Oil Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 234,561, Aug. 19, 1988, Pat. No. 4,876,922. This application Oct. 31, 1989, Ser. No. 429,700

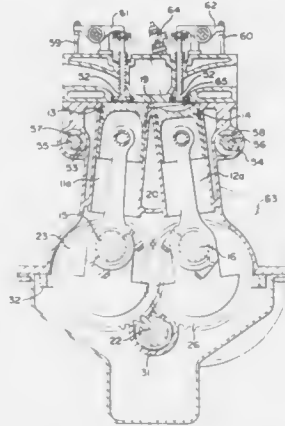
Int. Cl.<sup>3</sup> F02B 25/08

U.S. Cl. 123—51 R

1 Claim

1. In a compression ignition internal combustion engine having at least one pair of cylinders, said at least one pair of cylinders consisting of a leading cylinder and a trailing cylinder, a leading piston operating in the leading cylinder and a trailing piston operating in the trailing cylinder, the leading cylinder interconnected with the trailing cylinder through a transfer port to permit the transfer of gases therebetween irrespective of the axial position of pistons operating therein, the cross-sectional area of said transfer port being substantially smaller than the cross-sectional area of either cylinder interconnected thereby, means to control the phase relation between the leading piston and the trailing piston for the purpose of varying compression ratio, fuel injection into the leading cylinder by means of a multi-hole fuel injector situated in a generally central position in said leading cylinder, the clearance volume of the trailing cylinder at the top dead center

position of the trailing piston being at a practical minimum value, characterized by:  
 a combustion bowl in the leading cylinder;



said leading piston having a top surface;  
 said combustion bowl in the leading cylinder extending over substantially the whole top surface of said leading piston.

4,955,329

**VALVE UNIT FOR AN INTERNAL COMBUSTION ENGINE INTAKE DUCT, COMPRISING NON-RETURN FLAP VALVES**

Domenico D'Angelo, Monza, and Marco Visconti, Bollate, both of Italy, assignors to Alfa Lancia Industriale S.p.A., Arese, Italy

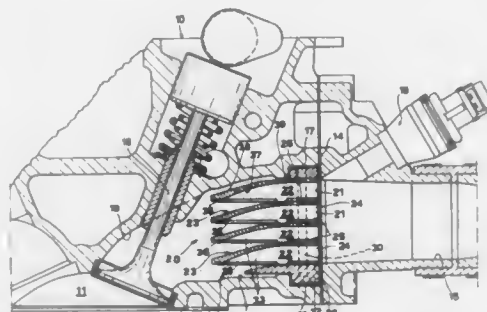
Filed Mar. 10, 1989, Ser. No. 321,868

Claims priority, application Italy, Mar. 14, 1988, 19766 A/88

Int. Cl.<sup>3</sup> F02M 35/00

U.S. Cl. 123—52 MF

5 Claims



1. A valve unit for an intake duct feeding an internal combustion engine cylinder, said valve unit comprising a plurality of longitudinal channels assembled into superposed modules, each channel having a substantially arcuate base wall and an elastically flexible flap for the purpose of opening and closing a respective channel whereby said valve unit consists of non-return valve means in series with an intake valve of the internal combustion engine, each channel having an inlet section and an outlet section, the inlet section comprising a ledge and a support surface which are clamped with a fixing tab when the modules are formed, each fixing tab being provided on one of said flaps, each base wall having an increasing thickness extending towards the outlet section of the respective channel, each base wall having an inner face and an outer face, the inner and outer faces each having a bending radius, the inner face having a different bending radius than the bending radius of the outer face thereby providing a gradual slight reduction of the respective chamber towards the outlet section of the respective chamber, each base wall being provided with a slot, each slot

housing a tight sealing gasket material, and each slot extending through a portion of the base wall.

4,955,330

**CAM DRIVE MECHANISM FOR INTERNAL COMBUSTION ENGINE**

Christian Fabi, and Antoine Fabi, both of 209 Belvedere Nord, Sherbrooke, Quebec, Canada J1H 4A7

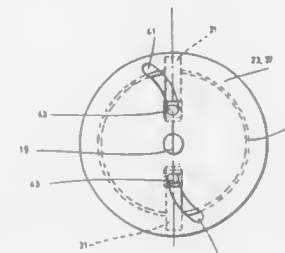
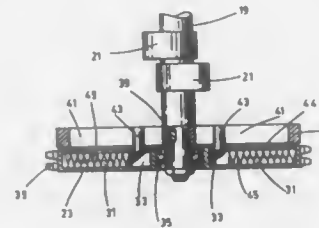
Filed Dec. 20, 1989, Ser. No. 454,725

Claims priority, application Canada, Dec. 28, 1988, 587071

Int. Cl.<sup>3</sup> F01L 1/34; F02P 5/00

U.S. Cl. 123—90.17

9 Claims



1. A mechanism for use in an internal combustion engine comprising a crank shaft and at least one cam shaft, said mechanism being designed to progressively vary the angular relationship of said at least one cam shaft relative to said crank shaft, and comprising

a first disk provided with two radially extending cavities aligned with respect to each other, each of said cavities containing a spring-biased small weight slidably mounted therein, said spring urging said small weight towards the center of said first disk;

means for connecting said first disk to said crank shaft to cause said first disk to be driven by said crank shaft;

a second disk coaxially mounted with respect to said first disk, said second disk being provided with two arcuated slots of identical curvatures, said slots being symmetrical with respect to the center of said second disk and extending from a short distance away from said center towards the periphery of said second disk in opposite directions;

means for connecting said second disk to said at least one cam shaft to cause said cam shaft to rotate at the same speed as said second disk; and

connecting pins integral with said small weights, said pins being engaged into the arcuated slots and free to move therein so as to drive into rotation said second disk when the first disk rotates;

wherein, when the rotation speed of the crank shaft varies, the small weights radially sliding in the cavities of the first disk under the action of the centrifugal force, and cause the pins connected thereto to move along the arcuated slots of the second disk and thus to progressively vary the angular relationship of the second disk with respect to the first disk.

4,955,331

**PROCESS FOR THE OPERATION OF AN OTTO ENGINE**  
 Dieter Hohl, Wesel; August-Wilhelm Preuss; Kurt-Peter Schug, both of Dorsten, and Helmut Riegel, Gelsenkirchen, all of Fed. Rep. of Germany, assignors to Veba Oel Aktiengesellschaft, Gelsenkirchen, Fed. Rep. of Germany

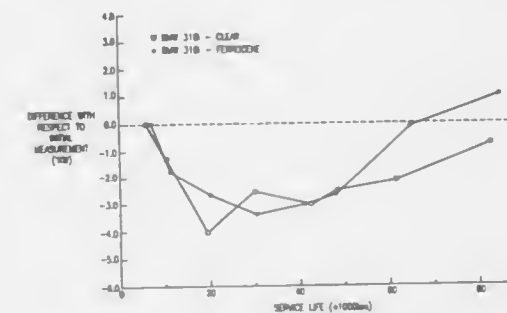
Filed Jan. 23, 1989, Ser. No. 300,129

Claims priority, application Fed. Rep. of Germany, Jan. 23, 1988, 3801947

Int. Cl.<sup>3</sup> F02B 75/12; C10L 10/00

U.S. Cl. 123—1 A

6 Claims



1. A method for operating an engine, comprising: operating an Otto engine equipped with an exhaust gas catalyst system for secondary combustion of exhaust gas, with a non-leaded liquid fuel containing 1 to 100 ppm by weight of ferrocene.

4,955,332

**METHOD OF IMPROVING FUEL COMBUSTION EFFICIENCY**

William L. Talbert, York, Pa., assignor to Talbert Fuel Systems, Inc., Allentown, Pa.

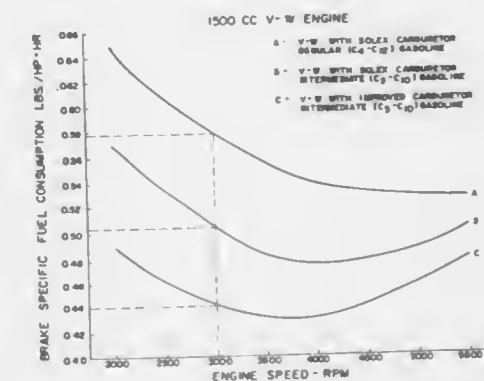
Division of Ser. No. 236,162, Aug. 25, 1988,

Continuation-in-part of Ser. No. 941,833, Dec. 15, 1986, abandoned, which is a continuation of Ser. No. 833,038, Feb. 26, 1986, abandoned, which is a continuation of Ser. No. 638,069, Aug. 6, 1984, abandoned, which is a continuation of Ser. No. 463,251, Feb. 2, 1983, abandoned, which is a continuation of Ser. No. 70,683, Aug. 29, 1979, abandoned. This application May 5, 1989, Ser. No. 347,753

Int. Cl.<sup>3</sup> F02B 75/12

U.S. Cl. 123—1 A

12 Claims



1. A method of operating an internal combustion engine which comprises vaporizing a gasoline-alcohol fuel mixture by heating it in a chamber to above the final boiling point of the gasoline at one atmosphere pressure in the absence of air to form a vaporized gasoline-alcohol fuel mixture and immediately mixing the vaporized gasoline-alcohol fuel mixture with



1. A high compression internal combustion engine comprising an engine block having at least one cylinder bore formed therein, said bore having one end terminating at an exterior surface of said block; a cylinder liner disposed within the bore and having an end thereof proximate said block exterior surface; a cylinder head overlying said block exterior surface, said head having an exterior surface complementary to and in registry with said block surface; gasket means interposed between said complementary exterior surfaces; first fastening means engaging said head and the one end of said cylinder liner and securing in sealed relation said one end of said liner to said head surface upon a first predetermined external tightening force being applied to said first fastening means; and second fastening means engaging said head and said block and secur-

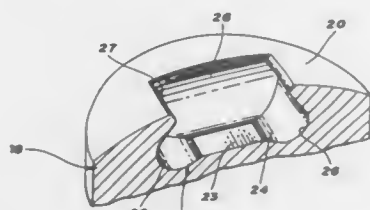
ing in scaled relation said complementary exterior surfaces together upon a second predetermined external tightening force being applied to said second fastening means.

4,955,338  
ENGINE AND HIGH TURBULENCE PISTON  
THEREFOR

Ramachandra Diwakar, Sterling Heights; Roger B. Krieger, Birmingham; Keith Meintjes, Grosse Pointe Farms, and Edward G. Groff, Troy, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

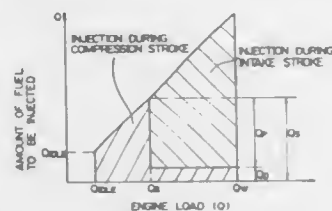
Filed Jun. 16, 1988, Ser. No. 208,301  
Int. Cl.<sup>5</sup> F02B 23/06

U.S. Cl. 123-276



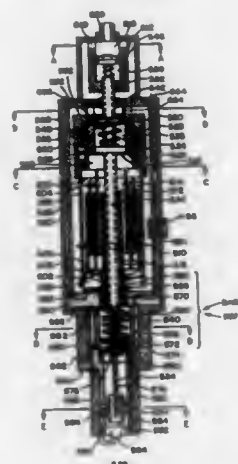
1. An internal combustion engine comprising a cylinder closed at one end, a piston reciprocable in the cylinder and having a head end opposing the cylinder closed end, the piston defining with the cylinder a variable volume working chamber, said piston having a reentrant polygon shaped combustion chamber bowl having a bottom with an outer portion that joins with essentially U-shaped side walls smoothly and exclusively connecting the bottom of the polygonal bowl with a polygonal lip located in the head end and defining an opening toward the cylinder closed end, and direct fuel injection means mounted in the cylinder closed end opposite the combustion chamber bowl and adapted to direct a fuel spray into the open combustion chamber.

4,955,339  
INTERNAL COMBUSTION ENGINE  
Shizuo Sasaki, Susuo, and Yoshiyuki Tamaki, Mishima, both of  
Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan  
Filed Nov. 17, 1989, Ser. No. 438,698  
Claims priority, application Japan, Nov. 18, 1988, 63-290200;  
Dec. 23, 1988, 63-323604  
Int. Cl.<sup>2</sup> F02B 17/00; F02D 4/40; F02M 51/00  
U.S. Cl. 123-295 31 Claims



1. An internal combustion engine having a piston introduced into a cylinder and a spark plug arranged in a cylinder head, said engine comprising:
- a fuel injector for injecting fuel directly into the cylinder;
  - detecting means for detecting an engine operating state;
  - calculating means for calculating a calculated amount of fuel to be injected on the basis of said engine operating state detected by said detecting means; and
  - a control means for controlling said fuel injector to inject all of said calculated amount of fuel during a compression

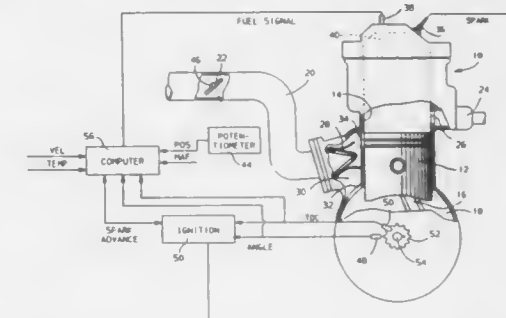
**4,955,340**  
**ELECTRONIC CONTROLLER FOR**  
**COMPRESSION-ACTUATED FUEL INJECTOR SYSTEM**  
George D. Elliott, 14902 Clovercrest Dr., Huntville, Ala. 35803  
Continuation-in-part of Ser. No. 104,847, Oct. 5, 1967, Pat. No. 4,911,123, which is a continuation-in-part of Ser. No. 904,378, Sep. 8, 1986, Pat. No. 4,700,678. This application Mar. 28, 1989,  
Ser. No. 329,519



1. In an internal combustion type engine having engine piston means and a combustion chamber and a fuel injector with said fuel injector comprising:
- a first outer shell containing a fuel supply cavity positioned at the top end of said fuel injector and having an inner high pressure cavity with a valve for receiving and storing fuel;
  - a rod having one end thereof closed and with a first port extending through the side of the rod near its closed end and extending substantially from said fuel supply cavity along the entire length thereof and having a piston formed thereon and with an internal bore therethrough for carrying fuel from said fuel supply cavity to said combustion chamber in response to the state of the engine piston stroke and the pressure generated thereby in the engine piston combustion chamber;
  - a base for supporting said rod in said fuel injector and responsive to a pressure increase in said combustion chamber to cause said rod to rise within said first outer shell and into said fuel supply cavity, to close said valve to prevent further fuel from entering said fuel supply cavity and to expose said first port to said fuel supply cavity to receive fuel and, by virtue of the force created by said rod further entering said fuel supply cavity, forcing said fuel down said bore and into said combustion chamber;
  - a movable control body assembly positioned under said fuel supply cavity;
  - a plurality of substantially concentric and open ended cylinders with alternate open ended cylinders being secured at a first end in the bottom of said control body assembly and

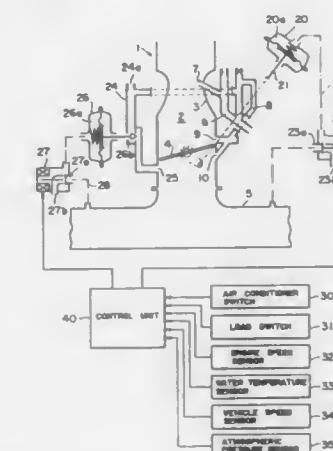
## SEPTEMBER 11, 1990

the first ends of the other open ended cylinders being secured to said base; means for supplying a voltage to selected open ended cylinders at predeterminable time intervals; and an electro-rheological mixture filling that portion of said fuel injector between said fuel supply cavity and said base and responsive to said voltage being supplied to selected open ended cylinders to become solidified in between adjacent open ended cylinders and said rod only; said control body assembly comprising:



can be achieved in response to a relatively small change in cylinder fuel injection timing.

4,955,342  
IDLE REVOLUTION NUMBER CONTROL APPARATUS  
FOR CARBURETER  
Masato Tohmiya, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Oct. 13, 1989, Ser. No. 421,054  
Claims priority, application Japan, Oct. 19, 1988, 63-263355  
Int. Cl.<sup>5</sup> F02M 3/07



1. An idling engine speed control apparatus for an engine with a carburetor having a main fuel passage for supplying fuel to the engine and a slow fuel passage for supplying fuel to the engine in accordance with an opening degree of a throttle valve mounted within the carburetor comprising:  
throttle opener means for opening said throttle valve to a predetermined opening degree;  
bypass means for selectively supplying fuel to the downstream of said throttle valve;  
load detector means for detecting a plurality of load conditions of said engine and producing load signals;  
engine operating condition detector means for detecting an engine operating condition and producing an engine operating condition signal; and  
control means responsive to the load signals and to the engine operating condition signal for determining an idling condition and for actuating one or both of said throttle opener means and bypass means.

4,955,341

**IDLE CONTROL SYSTEM FOR A CRANKCASE  
SCAVENGED TWO-STROKE ENGINE**

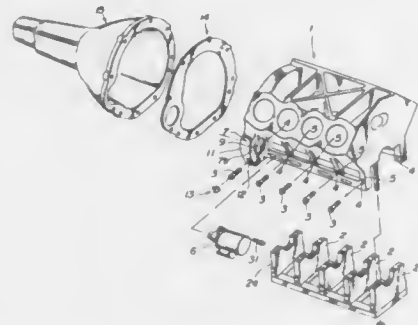
Douglas E. Trombley, Warren, and Kenneth J. Buslepp, Utica,  
both of Mich., assignors to General Motors Corporation,  
Detroit, Mich.

Filed Sep. 18, 1989, Ser. No. 408,868  
Int. Cl.<sup>5</sup> F02M 3/00; F02B 33/04

**U.S. Cl. 123—339** **14 Claims**  
 1. In a direct cylinder fuel injected, scavenged two-stroke engine, the improvement comprising means for controlling the idle speed of the engine by regulating the timing of the start of cylinder fuel injection during the engine cycle, as a function of the difference between the actual idle speed and a desired



4,955,343  
**CYLINDER BLOCK**  
Etsuo Ogami, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan  
Filed Dec. 14, 1989, Ser. No. 450,699  
Claims priority, application Japan, Dec. 24, 1988, 63-167146[U]  
Int. Cl.<sup>5</sup> F02F 7/00  
U.S. Cl. 123—195 R 9 Claims

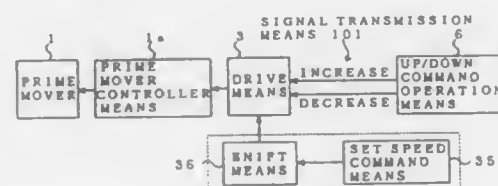


1. In an internal combustion engine:  
a cylinder block having a predetermined end surface;  
a plurality of main bearing caps including a predetermined main bearing cap, said plurality of main bearing caps being secured to said cylinder block at a plurality of portions including a predetermined portion, said predetermined main bearing cap being secured to said cylinder block at said predetermined portion;  
a flange integral with said cylinder block, said flange having first and second end walls extending from said cylinder block and spaced from each other, and a peripheral wall which interconnects said first and second end walls, said first, second and peripheral walls cooperating with said predetermined portion of said cylinder block to define a chamber, said first end wall being disposed adjacent said predetermined end surface of said cylinder block, said second end wall being disposed less adjacent said predetermined end surface of said cylinder block,  
said peripheral wall being formed with an opening communicating with said chamber, said opening and said chamber serving as an access to said predetermined portion;  
means for closing said opening;  
a starter motor mounted on said flange.

4,955,344  
**APPARATUS FOR CONTROLLING ROTATIONAL SPEED OF PRIME MOVER OF CONSTRUCTION MACHINE**  
Akira Tatsumi, Chiba; Toichi Hirata, Ibaragi; Masaki Egashira, Ibaragi; Osamu Tomikawa, Ibaragi, and Hiroshi Watanabe, Ibaragi, all of Japan, assignors to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan  
Filed Jul. 3, 1989, Ser. No. 374,836  
Claims priority, application Japan, Jul. 4, 1988, 63-166317  
Int. Cl.<sup>5</sup> F02M 39/00 33 Claims

1. An apparatus for controlling the rotational speed of a prime mover of a construction machine, comprising:  
prime mover controller means for controlling the rotational speed of the prime mover;  
drive means for driving said prime mover controller means;  
up/down command operation means operated between an up position at which it outputs an up signal for increasing the rotational speed of the prime mover and a down position at which it outputs a down signal for reducing the rotational speed of the prime mover; and

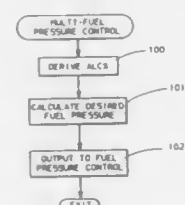
signal transmission means for supplying a drive signal to said drive means whereby the prime mover rotational speed is



increased on the basis of said up signal and is reduced on the basis of said down signal.

4,955,345  
**MULTI-FUEL ENGINE CONTROL WITH FUEL COMPOSITION RESPONSIVE FUEL VISCOSITY CORRECTION**  
David B. Brown, and Eugene V. Gonze, both of Sterling Heights, Mich., assignors to General Motors Corporation, Detroit, Mich.  
Continuation of Ser. No. 367,155, Jun. 16, 1989, abandoned.  
This application Dec. 21, 1989, Ser. No. 453,120  
Int. Cl.<sup>5</sup> F02D 7/00 9 Claims

U.S. Cl. 123—381

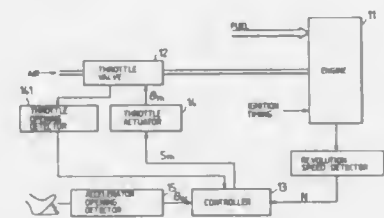


1. A vehicle engine fuel control comprising a fuel conduit, means for providing a liquid fuel mixture of first and second combustible fuels, having different volumetric heat contents and viscosities, through the fuel conduit at a predetermined pressure, a fuel composition sensor in the fuel conduit responsive to a physical parameter of the fuel mixture to generate a fuel composition signal indicative of the relative proportions of the first and second combustible fuels, and fuel injection apparatus comprising a fuel injector in the conduit and control means for opening the fuel injector for predetermined pulse durations to deliver pulses of fuel to the engine, the fuel injection apparatus determining the pulse durations in response to the fuel composition signal for a predetermined amount of fuel calibrated for flow characteristics of the injector and the viscosity of the first fuel,

the fuel injection apparatus being further responsive to the fuel composition signal to vary the predetermined pulse durations in compensation for the varying viscosity of the fuel mixture so as to provide the predetermined amounts of fuel in the fuel pulses as the viscosity of the fuel mixture varies with the composition thereof.

4,955,346  
**THROTTLE CONTROL APPARATUS OF INTERNAL COMBUSTION ENGINE**  
Masayoshi Kaneyasu, Hitachi, and Nobuo Kurihara, Hitachi-ohta, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Jun. 1, 1989, Ser. No. 360,237  
Claims priority, application Japan, Jun. 3, 1988, 63-135605  
Int. Cl.<sup>5</sup> F02D 11/10 12 Claims

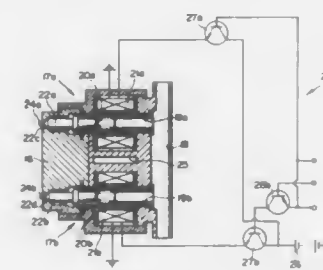
U.S. Cl. 123—399



1. A throttle control apparatus of an internal combustion engine including an accelerator opening detector for detecting an accelerator depression, an engine revolution speed detector, a throttle actuating means for actuating a throttle valve and a control unit for outputting a driving signal for driving said throttle actuating means, wherein said control unit comprises a device for determining a throttle opening on the basis of an accelerator depression amount from said accelerator opening, an accelerator depression speed and the engine revolution speed from said engine revolution speed detector and for outputting a driving signal for the determined throttle opening to said throttle actuating means, wherein said driving signal outputted by said control unit actuates said throttle actuating means to rapidly operate said throttle valve upon a rapid change of an accelerator depression to a throttle opening more than that determined according to an accelerator depression quantity thereby to obtain desired longitudinal acceleration, and to open said throttle valve to a slightly larger opening than that determined according to the acceleration depression quantity after completion of the throttle operation for the desired longitudinal acceleration and after a certain time lapsed from the starting of the rapid change in the accelerator depression, whereby longitudinal vibration due to the desired acceleration is eliminated.

4,955,347  
**FUEL INJECTOR ASSEMBLY FOR FUEL-INJECTED ENGINE**  
Yasuhiro Toyota, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Apr. 12, 1989, Ser. No. 337,012  
Claims priority, application Japan, Apr. 12, 1988, 63-89726  
Int. Cl.<sup>5</sup> F02M 39/00 3 Claims

U.S. Cl. 123—472

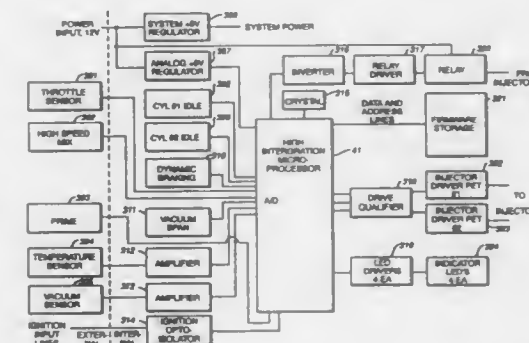


1. A fuel injection assembly in an engine having a plurality of cylinders and intake passages opening respectively to the cylinders, comprising:

a single injection body mounted in each of said intake passages;  
a pair of solenoid-operated fuel injection valve means connected to a fuel supply source for injecting fuel through the intake passage into each of the cylinders; and  
said pair of solenoid-operated fuel injection valve means being accommodated in said injection body and each having a hole defined in said injection body, a needle valve axially movably disposed in said hole, and a solenoid for axially moving said needle valve in said hole,  
said single injection body having a magnetic shield layer between said fuel injection valve means, said magnetic shield layer having a width not less than the width of said solenoids.

4,955,348  
**FUEL INJECTION CONVERSION SYSTEM FOR V-TWIN MOTORCYCLE ENGINES**  
William A. Budde, 1128 Gilbert St., Hayward, Calif. 94541, and Floyd Khapp, Mountain View, Calif., assignors to William A. Budde, Hayward, Calif.  
Filed Nov. 8, 1989, Ser. No. 434,436  
Int. Cl.<sup>5</sup> F02D 41/24, 41/02 13 Claims

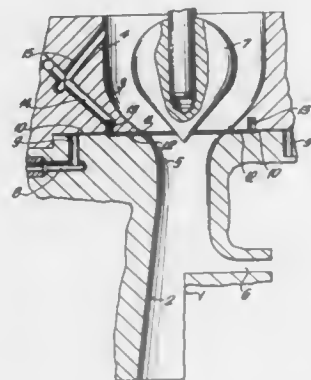
U.S. Cl. 123—478



1. A fuel injection conversion system for V-twin motorcycle engines having two cylinders, an ignition system, and a fuel source, comprising  
an intake manifold providing separate ducts for delivering a fuel and air mixture separately to each cylinder,  
a pair of fuel injectors mounted in a fuel injector and throttle body secured to said intake manifold,  
a fuel distributor for delivering an individual pressurized fuel flow to each of said injectors,  
a fuel pump for delivering a pressurized fuel flow from the fuel source to the fuel distributor,  
a fuel flow pressure regulator for controlling the pressure of the fuel flow delivered by the distributor to said injectors,  
an electronic sensing means for determining when the ignition system of the engine delivers an electronic pulse to fire each spark plug of the cylinders and producing an electronic signal in response thereto,  
a throttle potentiometer for sensing the position of the throttle and producing an electronic signal in response thereto,  
a status sensing means for measuring a combination of air intake and engine temperature, and vacuum in the intake manifold and producing electronic signals therefrom, and  
a control unit which discriminates which spark plug of the engine is firing a fuel-air mixture charged cylinder of the engine from the asymmetrical spark plug firing order related electronic signal from said electronic sensing means, said control unit electronically integrating the electronic signals from the throttle potentiometer, the electronic sensing means, and the status sensing means to generate electronic signals which control the fuel injectors and operate them at the proper time and for the

calculated duration to deliver the proper amount of fuel to said cylinders for the engine operating conditions by timed injection.

**4,955,349**  
**DEVICE FOR PREPARATION OF A FUEL-AIR MIXTURE FOR INTERNAL COMBUSTION ENGINES**  
Martin Feldinger, Königstein, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt, Fed. Rep. of Germany  
Filed Jul. 15, 1988, Ser. No. 219,313  
Int. Cl.<sup>5</sup> F02M 39/00  
U.S. Cl. 123—531 7 Claims

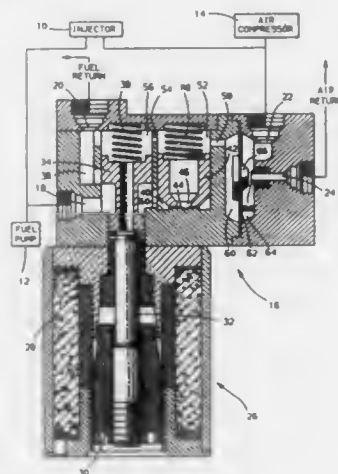


1. A fuel-air mixture preparation device for internal combustion engines, the device comprising
  - a nozzle body of rotational symmetry and a throttle element of rotational symmetry which is displaceably mounted within the body, the nozzle body and the throttle element forming a convergent-divergent nozzle which is configured for debouching into an intake tube of the internal combustion engine;
  - at least one fuel feed line which opens into said nozzle along-side the narrowest nozzle cross section;
  - a fuel-air slot which circumscribes said convergent-divergent nozzle and has a slot opening encircling said nozzle, the fuel-air slot opening into the nozzle;
  - a fuel slot and an air feed which are disposed in said nozzle body circumferentially around said nozzle to define a transition point in said nozzle, said air-fuel slot being in communication at the transition point with said circumferential fuel slot and said circumferential air feed, said fuel-air slot extending radially with uniform thickness from said slot opening to said transition point, there being approximately ambient air pressure at said air feed to enable fuel premixed with air to be injected from said fuel-air slot opening into said nozzle approximately transversely to the direction of main air mass flow; and
  - an annular fuel channel disposed in said nozzle body in front of said fuel-air slot, said fuel-air slot cooperating with said fuel channel to form said throttle element as a laminar throttle.

**4,955,350**  
**FUEL INJECTION**  
William C. Albertson, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.  
Filed Jun. 21, 1989, Ser. No. 369,503  
Int. Cl.<sup>5</sup> F02M 67/02; G05D 16/20  
U.S. Cl. 123—533 1 Claim

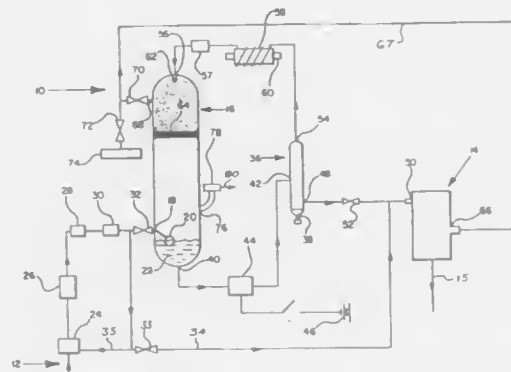
1. A pressure regulator comprising a body having a fuel inlet, a fuel outlet, an air inlet, an air outlet, a spill passage connecting the fuel inlet to the fuel outlet, a spool valve controlling flow through the spill passage, a linear motor having a coil and an armature, a stem connecting the armature to the valve to position the valve to control flow through the spill

passage and thereby to control the fuel pressure in the inlet as a function of the current in the coil, a piston subjected to the pressure in the fuel inlet, the piston defining a variable orifice adapted to create a reference pressure at a desired differential from the pressure in the fuel inlet, a diaphragm subjected to the



reference pressure and the pressure in the air inlet, and a valve positioned by the diaphragm to control flow from the air inlet to the air outlet whereby the pressure in the air inlet is maintained at a desired differential below the pressure in the fuel inlet.

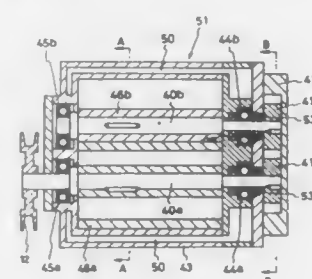
**4,955,351**  
**VAPOR-ACCELERATED COMBUSTION FUEL SYSTEM**  
Alfred M. Lewis, 3541 Delgany Dr., Charlotte, N.C. 28215, and James W. Cox, 309 Cooper St., Asheboro, N.C. 27204  
Filed Feb. 2, 1989, Ser. No. 305,956  
Int. Cl.<sup>5</sup> F02M 31/02  
U.S. Cl. 123—557 17 Claims



1. Apparatus for delivering vaporized and unvaporized fuel from a fuel source into a fuel delivery mechanism, comprising:
  - (a) a container for holding vaporized and unvaporized fuel positioned between said fuel source and said fuel delivery mechanism;
  - (b) means for furnishing said container with a reservoir of unvaporized fuel from said fuel source;
  - (c) means for externally supplying said container and said fuel delivery mechanism, concurrently, with heated unvaporized fuel and unheated unvaporized fuel, respectively, drawn from said reservoir;
  - (d) means for vaporizing heated unvaporized fuel within said container; and

- (e) means for providing said fuel delivery mechanism with vaporized fuel from said container.
17. Method for delivering vaporized and unvaporized fuel from a fuel source into a fuel delivery mechanism, comprising:
  - (a) holding vaporized and unvaporized fuel within a container positioned between said fuel source and said fuel delivery mechanism;
  - (b) furnishing said container from said fuel source with a reservoir of unvaporized fuel;
  - (c) externally supplying said container and said fuel delivery mechanism, concurrently, with heated unvaporized fuel and unheated unvaporized fuel, respectively, drawn from said reservoir;
  - (d) vaporizing heated unvaporized fuel within said container; and
  - (e) providing said fuel delivery mechanism with vaporized fuel from said container.

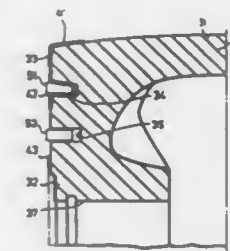
**4,955,352**  
**COMBINED SUPERCHARGER AND SUPERCHARGER COOLANT PUMP FOR AN INTERNAL COMBUSTION ENGINE**  
Toshio Takeda, Nagoya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan  
Filed Feb. 15, 1989, Ser. No. 310,586  
Claims priority, application Japan, Feb. 26, 1986, 63-023785; Feb. 26, 1988, 63-023784  
Int. Cl.<sup>5</sup> F02B 33/38; F04C 29/04  
U.S. Cl. 123—559.1 5 Claims



1. A combined supercharger compressor and pump for an internal combustion engine, comprising:
  - a housing having a compressible fluid inlet and a compressible fluid outlet connected to an internal combustion engine;
  - two parallel shafts journaled in said housing;
  - rotors mounted on each of said shafts and cooperating for compressing a fluid from said compressible fluid inlet;
  - means for supplying a rotational drive force from said engine to one of said shafts;
  - meshing gears in said housing and mounted on said shafts for transmitting rotational drive force from said one of said shafts to the other of said shafts;
  - an internal incompressible coolant fluid circuit in said housing, said meshing gears being positioned in said internal incompressible coolant fluid circuit, wherein said meshing gears comprise a gear pump for circulating an incompressible coolant fluid in said internal incompressible coolant fluid circuit, wherein said internal incompressible coolant fluid circuit is independent of a coolant circuit of said internal combustion engine and includes a coolant jacket in said housing and at least partially surrounding said rotors, whereby the compressed fluid is cooled by an incompressible coolant fluid in said jacket;
  - an external incompressible coolant fluid circuit communicating with said coolant jacket for circulating an incompressible coolant fluid in a closed loop with said internal incompressible coolant fluid circuit; and
  - a heat exchanger in said external incompressible coolant

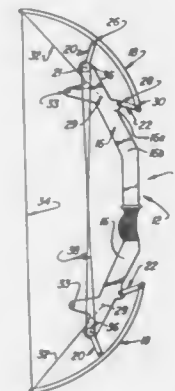
fluid circuit for cooling an incompressible coolant fluid therein, whereby the compressor can be sufficiently cooled to cool the compressible fluid being compressed thereby.

**4,955,353**  
**PISTON FOR INTERNAL COMBUSTION ENGINE**  
Atsushi Amatake, Kazumitsu Koshida, both of Tokyo; Koji Nakajima, and Hitoshi Yamamoto, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Sep. 2, 1988, Ser. No. 239,763  
Claims priority, application Japan, Sep. 11, 1987, 62-227788  
Int. Cl.<sup>5</sup> F02B 75/08  
U.S. Cl. 123—668 12 Claims



1. A piston head for operation in a combustion chamber of an internal combustion engine, which combustion chamber is formed to define a squish area in cooperation with said piston head, the cooperating region of said piston head being subject to generation of surface roughness due to excessive thermal conditions and in which said piston head is formed of a generally cylindrical skirt portion, a top surface containing said squish area at one end and a conically tapered annular surface intermediate said skirt portion and said top surface, and in which a heat resisting treated layer is applied only to the surface of said piston head that cooperates with said combustion chamber to form said squish area.

**4,955,354**  
**ARCHERY DEVICE WITH CONSTRAINED FOUR-BAR LINKAGE**  
John W. Bozek, 6093 Waterfront Dr., Waterford, Mich. 48095  
Filed Mar. 9, 1989, Ser. No. 321,104  
Int. Cl.<sup>5</sup> F41B 5/00  
U.S. Cl. 124—23.1 15 Claims

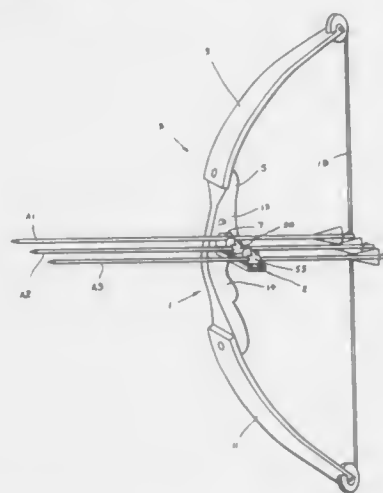


1. An archery device comprising:
  - an elongated limb holder member having an end portion at either end thereof;
  - a handle on said holder member;



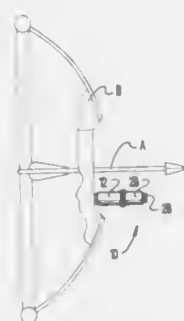
a pair of elongated bendable limbs each having opposite ends;  
 mounting means mounting each of said limbs to a respective end portion of said holder member, said mounting means including two pairs of pivoted swing arms each pair drivingly connected to a respective limb and a respective end portion of said holder member, each of said two pairs of swing arms and portions of said limbs and holder member forming four bar linkage systems;  
 said swing arms each pivotably supported at one end on one said end portion of said holder member and at the other end pivotably mounted to a respective limb;  
 a drawstring tautly connecting outboard ends of said limbs; and  
 load cable means connected to the outboard end of each limb and including means restraining movement of each limb outboard end relative to said limb holder member, whereby as said drawstring is drawn, said limbs are caused to be swung to the rear, and said load cables causing flexing of said limbs as said limbs are swung to the rear by said constraining of said outboard ends thereof.

**4,955,355**  
**ARROW HOLDING AND LOADING DEVICE FOR ARCHERY BOWS**  
 Gregory E. Pugh, 13635 Leroy, Southgate, Mich. 48195  
 Continuation-in-part of Ser. No. 76,798, Jul. 23, 1987, Pat. No. 4,823,762. This application Apr. 10, 1989, Ser. No. 336,016  
 Int. Cl.<sup>3</sup> F41B 5/00, 5/02, 5/06  
 U.S. Cl. 124—52 34 Claims



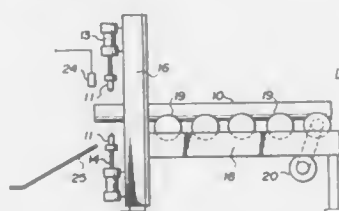
9. An arrow holder and loader for an archery bow having a bow string and a shooting position for an arrow in which the arrow is axially aligned with the bow string, said loader comprising a frame and having a first means for supporting a first arrow in said shooting position, a carriage mounted on the frame for movement transverse to the shooting position and having a second means for releasably supporting a follow-up arrow in a pre-shooting position parallel to said shooting position and to said first arrow, said first means for supporting a first arrow being isolated from said transverse movement of said carriage and third means for moving the carriage on the frame to carry the follow-up arrow along a path of sidewise movement of the follow-up arrow from said pre-shooting position into said shooting position wherein the follow-up arrow is axially aligned with the bow string.

**4,955,356**  
**ARCHERY BOW STABILIZER AND TRACKER**  
 Michael L. Pike, 5145 Keyes Dr., and William A. McCormick, 5113 E. D. E Ave., both of Kalamazoo, Mich. 49004  
 Filed Nov. 15, 1990, Ser. No. 436,694  
 Int. Cl.<sup>3</sup> F41B 5/00  
 U.S. Cl. 124—89 11 Claims



6. An archery bow stabilizer and tracker, comprising:  
 a first body member;  
 a first central cylindrical bore formed in said first body member;  
 means at a first end of said first body member for engagement with an archery bow;  
 a second body member;  
 a second central cylindrical bore formed in said second body member;  
 abutting first and second radial flanges on said first and second body members;  
 and  
 means for securing said second body member to a second end of said first body member, opposite said first end.

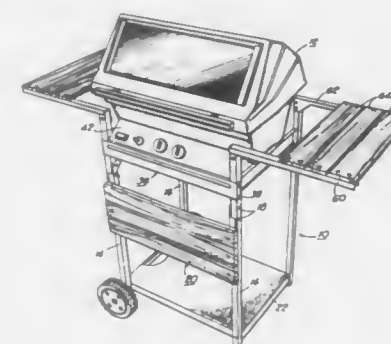
**4,955,357**  
**METHOD AND APPARATUS FOR CUTTING POLYCRYSTALLINE SILICON RODS**  
 Masakatsu Takeguchi, Suzuka; Takashi Yamamoto, and Mamoru Nakano, both of Yokkaichi, all of Japan, assignors to Hi-Silicon Co., Ltd., Japan  
 Filed Jan. 22, 1988, Ser. No. 147,213  
 Int. Cl.<sup>3</sup> B28D 5/04  
 U.S. Cl. 125—23.01 11 Claims



1. A method of cutting a polycrystalline silicon rod comprising:  
 A. placing the silicon rod on a roller conveyor;  
 B. feeding the silicon rod to a position adjacent to at least three cutting edges, each cutting edge having an angle of between 60° and 120°, said cutting edges being arranged in a plane perpendicular to, and angularly disposed about and equidistantly positioned about said rod;  
 C. applying a first hydraulic force to each of said at least three cutting edges to bring said edges into engagement with said rod; and  
 D. applying a second hydraulic force greater than the first force to each of said at least three cutting edges to instan-

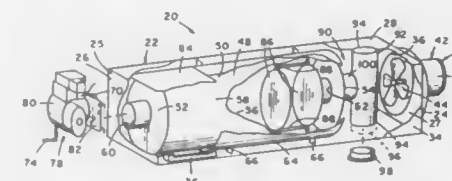
taneously sever the rod by brittle fracture along a direction of the pressing forces and in a direction parallel to a circumference of the rod.

**4,955,358**  
**BARBECUE GRILL CART ASSEMBLY**  
 Rodney G. Harris, Salem; John Seal, Auburn, both of Ala.; Robert L. Johnston, and Marvin R. Windham, both of Columbus, Ga., assignors to W. C. Bradley Company, Columbus, Ga.  
 Filed Aug. 11, 1989, Ser. No. 392,790  
 Int. Cl.<sup>3</sup> F24D 3/00  
 U.S. Cl. 126—25 R 9 Claims



1. A barbecue grill cart assembly comprising a plurality of generally vertical leg members with spaced, opposing, generally horizontal strut means connected to said leg members for providing a generally horizontal frame structure, said strut means having an upper flange portion for receiving a barbecue grill and a laterally extended flange means at each end thereof, each for engaging a selected one of said leg members with said leg members being received between said flange means and said upper flange portion for providing a plurality of contact points to prevent twisting and swaying of said leg member, and securing means disposed through said flange means and said leg members for fastening said assembly together.

**4,955,359**  
**FURNACE WITH COUNTERFLOW HEAT EXCHANGE MEANS**  
 Eugene C. Briggs, Bowling Green, Ky., and Myron T. Cooper, North Royalton, Ohio, assignors to Robert Sun Company, Nashville, Tenn.  
 Filed Aug. 8, 1989, Ser. No. 391,101  
 Int. Cl.<sup>3</sup> F24H 3/00  
 U.S. Cl. 126—110 R 17 Claims

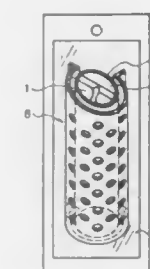


1. A furnace comprising:  
 substantially enclosed housing means having opposite first and second ends, sidewalls extending between said first and second ends, an air intake associated with said first end, and an air discharge vent associated with said second end;  
 means for moving air from said air intake to said air discharge vent so that air moved by said air-moving means moves air from said first end to said second end and generally axially along said housing means;  
 a heat exchanger including an elongated hollow body having two opposite ends and defining inner and outer sur-

faces, one of said hollow body ends providing an outlet end for said body and the other of said hollow body ends providing an inlet end for said body, said heat exchanger being supported within so as to extend axially along said housing means and so that air flowing from said air intake to said air discharge vent passes along the outer surface of the heat exchanger body from said one body end to the other body end;

a fuel burner assembly associated with said inlet end of said heat exchanger for directing a flame and attending combustion products directly into the heat exchanger body at said inlet end so that the inner surface of the heat exchanger absorbs heat generated by the flame and combustion products and so that the flame is directed by the fuel burner assembly generally axially of the heat exchanger toward the outlet end thereof;  
 means associated with the heat exchanger for delivering air to the burner assembly for combustion purposes and so that combustion products discharged from said burner assembly move toward and through the outlet end of the heat exchanger; and  
 a flue discharge conduit supported within said housing means adjacent said first end thereof and operatively connected in flow communication with said heat exchanger body at the outlet end thereof so that combustion products moving through the outlet end of said heat exchanger body are routed by said flue discharge conduit out of said housing means; and  
 said inlet end of said heat exchanger body is tapered in shape so that the transverse cross-sectional area of said heat exchanger body increases in size as a path is traced axially through said heat exchanger body toward said outlet end thereof.

**4,955,360**  
**HEAT-GENERATING MATERIAL FOR PORTABLE HAIR CURLER**  
 Yoshihiro Ogawa; Hiroo Takahashi, and Yoshinori Kikuchi, all of Kamaishi, Japan, assignors to Nippon Steel Corporation and Finetec Co., Ltd., both of Tokyo, Japan  
 Continuation-in-part of Ser. No. 179,221, Apr. 8, 1988, abandoned. This application Feb. 28, 1989, Ser. No. 316,965  
 Claims priority, application Japan, Apr. 10, 1987, 62-53478; Jul. 16, 1987, 62-108285  
 Int. Cl.<sup>3</sup> F24J 1/00  
 U.S. Cl. 126—263 3 Claims



1. A heat generator for a portable hair curler, which comprises (1) a heat-generating agent comprising 62.7±3.0% of an iron powder, 0.6±0.2% of NaOH, 21.5±4.0% of zeolite, 1.8±1.2% of an active carbon, 3.1±2.0% of NaCl, and 10.3±3.0% of water, the total amount being 100.0%, and (2) a bag for containing said heat-generating agent, which bag has vent pores for diffusing steam generated from the heat-generating agent to the outside to bring the hair into contact with said steam, and which bag has an air permeability of 60 to 1000 seconds as determined according to JIS P-8117.

4,955,361

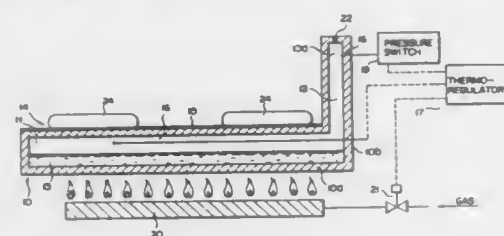
## HOT PLATE

Junji Sotani, and Chiyoaki Sasaki, both of Yokohama, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan  
Filed Feb. 16, 1989, Ser. No. 312,035

Claims priority, application Japan, Oct. 31, 1986, 61-259762  
Int. Cl.<sup>3</sup> F28D 21/00

U.S. Cl. 126—374

22 Claims



## 1. A hot plate, comprising:

a heat pipe including a heating plate means for receiving a piece to be heated thereon, means defining a heating chamber located under said heating plate means and including a lower section, an upper section extending upward from said lower section and having said chamber therein, and an upper surface having said heating plate means thereon, means defining a gas chamber having a non-condensed gas receiving space located above said heating chamber outside said heating plate means, and means defining a path for communicating said heating chamber with said non-condensed gas receiving space, and wherein said heating plate means comprises plural plates made of different materials and placed one upon the other on said upper surface which serves as a heating surface;

a liquid contained in said heating chamber, the upper level of said liquid being located under and spaced from said heating plate means so as to define an evaporation space between said upper liquid level and said heating plate means; and

heating means for heating said liquid in said heating chamber to evaporate said liquid to generate evaporated gas in said evaporation space for heating said heating plate means; said path defining means communicating said evaporation space with said gas receiving space for transferring non-condensed gas generated from said heated liquid from said evaporation space to said gas receiving space.

4,955,362

## LINER FOR FIREPLACE GRATE

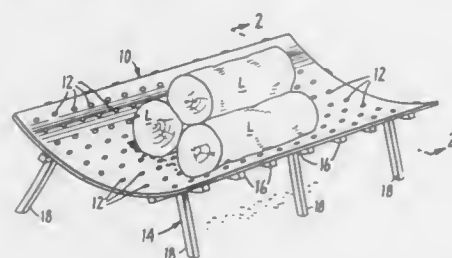
Ronald W. Underdown, 735 So. Fairway, Fresno, Calif. 93727, assignor to Ronald W. Underdown, Fresno, Calif.

Filed Sep. 21, 1988, Ser. No. 247,071

Int. Cl.<sup>3</sup> F23H 13/00

U.S. Cl. 126—540

4 Claims



## 1. A fireplace grate liner for enhancing the combustion of wooden logs and like fuel intended for burning on a fireplace grate consisting:

a single sheet of mild steel having a thickness sufficient to

impart rigidity thereto, and length and width of generally rectangular shape approximating the upper surface of a fireplace grate, operable to be supported by that upper surface of a fireplace grate, said sheet having an upward face of concave shape along the length thereof, said upward face being substantially free of protrusions;

said steel sheet having draft control means for directing airflow through said steel sheet, said draft control means defined by a plurality of uniformly spaced apertures extending through the thickness and entirely placed within the outer edges thereof;

each of said apertures being of uniform diameter and providing even flow of combustion gases through steel sheet to insure efficient burning of said fuel;

and said steel sheet having a ratio of a top surface area of solid metal to open surface area, as provided by said apertures, ranging from about 5 percent perforated area and 95 percent solid surface area to about 18 percent perforated area and 82 percent solid surface area.

4,955,363

## PROCESS OF RECOVERING LACTOSE FROM WHEY

Matti E. Harju, Nummela, and Heikki O. Heikkilä, Espoo, both of Finland, assignors to Valio Meijerit Keuhkosuomalaiset, Helsinki, Finland

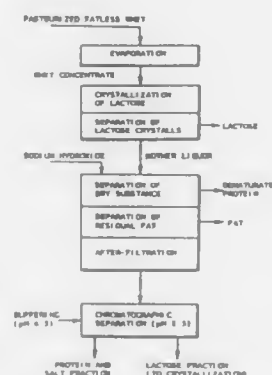
Filed Oct. 12, 1988, Ser. No. 256,600

Claims priority, application Finland, Oct. 14, 1987, 874535

Int. Cl.<sup>3</sup> C13F 1/04, 1/12; C13D 3/14, 3/16

U.S. Cl. 127—46.1

6 Claims



## 1. A method of recovering lactose from milk whey or cheese whey comprising the steps of

- concentrating the whey;
  - crystallizing part of the lactose in the whey;
  - separating the resulting lactose crystals from the resulting mother liquor;
  - drying the lactose crystals;
  - adjusting the pH of the mother liquor to about 5.8 to 7.9;
  - heating the pH-adjusted mother liquor to about 60 to 70° C. whereby a precipitate is formed;
  - removing the precipitate by centrifuging the heated mother liquor and decanting the resulting supernatant to recover a purified mother liquor;
  - chromatographically fractionating the purified mother liquor at a temperature of about 50 to 75° C., and a pH of about 5.5 to 7 using sulphonated polystyrene resin which is in sodium ion form and cross-linked by a 3-6% by weight divinylbenzene and which is even-grained, the average grain size being about 0.2 to 1 mm; the flow rate of the purified mother liquor being about 0.4 to 1.5 m<sup>3</sup>/h, whereafter elution is carried out with water; and
- recovering at least the following fractions;
  - a protein fraction, fractions;

- an intermediate fraction comprising lactose and other impurities which is recirculated to the fractionating step (h), and
- a lactose fraction which is passed to the crystallization step (b).

4,955,364

## FRUCTOSE SYRUPS AND SWEETENED BEVERAGES

Dorothy C. White, Argenta, and Carl W. Niekamp, Forsyth, both of Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.

Filed Mar. 25, 1988, Ser. No. 173,404

Int. Cl.<sup>3</sup> C13F 1/14, 1/04

U.S. Cl. 127—63

14 Claims

1. A method of preparing a fructose syrup sweetener comprising:

- dissolving an amount of a crystalline saccharide composition comprised of crystalline fructose sufficient to obtain a potable liquid comprised of water and from about 70% by weight to about 80% by weight dry saccharide solids, at least about 98% by weight of said dry saccharide solids being fructose, and
- storing said liquid for a period of at least one day at a pH of from 3.5 to 5.5.

4,955,365

## LOCALIZATION AND THERAPY SYSTEM FOR TREATMENT OF SPATIALLY ORIENTED FOCAL DISEASE

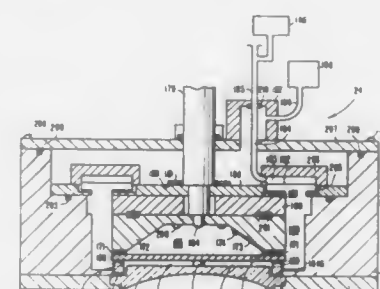
Francis J. Fry, and Narendra T. Sanghvi, both of Indianapolis, Ind., assignors to Laboratory Equipment, Corp., Mooresville, Ind.

Continuation of Ser. No. 163,259, Mar. 2, 1988. This application Jun. 22, 1989, Ser. No. 370,272

Int. Cl.<sup>3</sup> A61B 17/22

U.S. Cl. 128—24 A

7 Claims



## 1. An ultrasound treatment transducer assembly for directing a focused beam at an anatomical site, said transducer assembly comprising:

- an acoustic focusing lens having a concave front surface and a substantially flat back surface;
- a substantially flat piezoelectric transducer plate disposed in spaced relation to said focusing lens and having a rear surface and a front surface which is disposed at a fixed distance of separation with respect to the back surface of said acoustic focusing lens;
- an acoustic coupling medium disposed between the back surface of said focusing lens and the front surface of said transducer plate;
- first pressurizing means cooperatively arranged with said acoustic coupling medium for maintaining said acoustic coupling medium between said transducer plate and said focusing lens at a desired pressure; and
- air pressure means cooperatively arranged relative to the rear surface of said transducer plate and adapted to apply air pressure against said rear surface, wherein the pressure applied against said rear surface by said air pressure means

is higher than the pressure on the front surface of said transducer plate due to said acoustic coupling medium.

4,955,366

## ULTRASONIC THERAPEUTICAL APPARATUS

Naoki Uchiyama; Syuichi Takayama, both of Hachioji; Masakazu Gotanda, Sagami; Tetsumaru Kubota, Hachioji; Takashi Tsukaya, Hachioji; Kouichiro Ishihara, Hachioji; Kuniaki Kami, Hachioji; Naomi Sekino, Hachioji; Akira Murata, Hachioji, and Masaki Hayashi, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

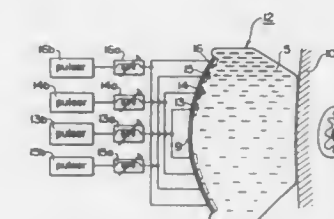
Filed Nov. 15, 1988, Ser. No. 271,662

Claims priority, application Japan, Nov. 27, 1987, 62-296989; Jun. 15, 1988, 63-149037; Jun. 15, 1988, 63-149038

Int. Cl.<sup>3</sup> G01N 29/00; A61B 8/00

U.S. Cl. 128—24 A

25 Claims



## 1. An ultrasonic therapeutic apparatus for treating a target area to be treated within a body by directing and focusing externally generated ultrasonic waves thereto comprising:

- an ultrasonic wave generator including a plurality of ultrasonic vibrators for directing and focussing generated ultrasonic waves upon a target to be treated;
- said plurality of ultrasonic vibrators being divided into at least two groups of vibrators, with each of said groups having a different driving frequency;
- control means for controlling the phase of the ultrasonic wave generated by each of said groups of ultrasonic vibrators so that ultrasonic waves generated by each of said groups are focussed at the same point at which ultrasonic wave pressure becomes maximum;
- said control means also controlling the driving frequencies so that fundamental frequencies of the ultrasonic vibrators of each of said groups have a multiple relation with each other.

4,955,367

## CAM-OPERATED OSCILLATOR SYSTEM FOR THE MANDIBLE

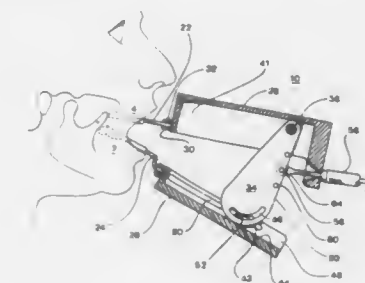
Charles A. Homsy, Houston, Tex., assignor to Dynamax, Ltd., Tortola, British Virgin Islands.

Filed Jan. 19, 1989, Ser. No. 299,197

Int. Cl.<sup>3</sup> A61H 1/02

U.S. Cl. 128—25 R

4 Claims



## 1. In a fully-involuntary mandible oscillator system adapted to forcefully impose on the use rhythmic mandibular move-



ments, an upper splint having a first portion adapted to be releasably secured to the user's upper jaw and having a second portion which extends extraorally, and a lower splint having a third portion adapted to be releasably secured to the user's lower jaw and having a fourth portion which extends extraorally; said system comprising:

an appliance coupled to said second and fourth portions; and extraoral, cam-operated oscillating means coupled to said appliance for forcibly oscillating the lower jaw within a predetermined angular range between a start position and an end position, whereby during one-half cycle of oscillation the lower jaw is forced to move away from the upper jaw, and during the other half-cycle the lower jaw is forced to move toward the upper jaw.

4,955,368

## CERVICAL COLLAR

Dieter Heimann, Koenigsberger Ring 99, D-2340 Kappeln, Fed. Rep. of Germany

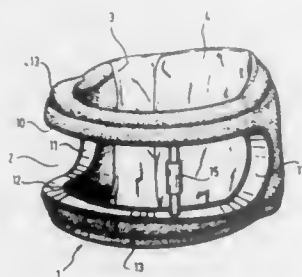
Filed Jul. 19, 1988, Ser. No. 221,077

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1987, 3724885

Int. Cl.<sup>5</sup> A61F 5/00

U.S. Cl. 128—75

16 Claims



1. A cervical collar to immobilize the cervical vertebral column, comprising:

a padded collar member for closure about a patient's neck having a cervical support (1) in the front of said collar member, said cervical support comprising a one piece flexible frame of continuous flat material having upper and lower segments (10, 12) interconnected by a pair of arcuate segments (11), wherein a clearance (2) is defined between the upper segment, the lower segment, the arcuate segments in said front of said collar member, said padded collar member encompasses said cervical support, a single supporting spacing means mounted between said upper and lower segments whereby said support is substantially rigid in the region of said single supporting spacing means adapted to support the head of a patient and is elastically deforming in other regions where said single supporting spacing means is not present.

4,955,369

## DYNAMICALLY SHIFTABLE COUNTER SHEAR FORCE KNEE BRACE

Gary R. Bledsoe, 316 Clayton, Grand Prairie, Tex. 75052, and Brett O. Bledsoe, 2509 Corkwood Pl., Arlington, Tex. 76017

Filed Oct. 27, 1988, Ser. No. 263,065

Int. Cl.<sup>5</sup> A61F 5/04

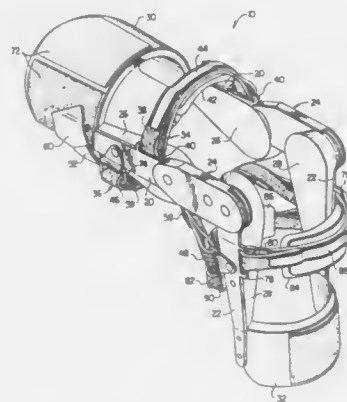
U.S. Cl. 128—80 C

18 Claims

1. A knee brace, connectable to a human leg having thigh, knee and calf portions, for compensating for loss of or damage to the anterior cruciate ligament of the leg by creating a counteractive anterior-posterior shear force across the knee which opposes an oppositely directed anterior-posterior shear force across the knee generated by the quadriceps muscle of the leg during leg extension, and tending to cause an anterior shift of the tibia relative to the femur, said knee brace comprising: first and second elongated rigid thigh support members

positionable to longitudinally extend lengthwise along the lateral and medial sides of the thigh with inner end portions of the thigh support members positioned adjacent the knee;

first and second elongated rigid calf support members positionable to longitudinally extend lengthwise along the lateral and medial sides of the calf with inner end portions of the calf support members positioned adjacent the knee; attachment means for firmly attaching said thigh and calf support members to the thigh and calf, respectively, for movement therewith, and for transmitting to the thigh and



calf anteriorly and posteriorly directed forces imposed on said thigh and calf support members; and first and second hinge means, each having a plurality of pivot axes, said first and second hinge means being positionable on opposite sides of the knee for pivotally connecting said inner end portions of said thigh support members to said inner end portions of said calf support members, said first and second hinge means being operative to create a relative anterior-posterior shift between said thigh and calf support members, in response to extension of the leg, in a manner causing said attachment means to generate said counteractive shear force.

4,955,370

## ACHILLES TENDON REHABILITATION BRACE AND METHOD FOR ITS MANUFACTURE

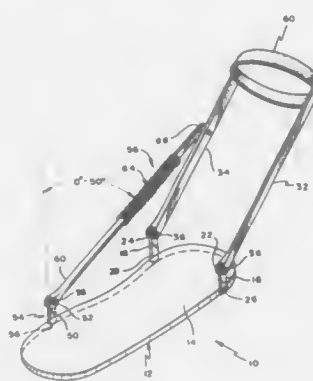
Kenneth A. Pettine, 201 Threadneedle Rd., East, Augusta, Ga. 30907

Filed Apr. 4, 1989, Ser. No. 332,895

Int. Cl.<sup>5</sup> A61F 3/00

U.S. Cl. 128—80 E

8 Claims



1. An Achilles tendon rehabilitation brace attachable to a shoe for protecting motion that may be imposed on a

repaired Achilles tendon following surgical anastomosis comprising

a rugged slip resistant sole means, medial and lateral uprights, a flexible spring resilient strap, an extensible link means, means for footwear to be received and secured upon an edge of the rugged slip resistant sole means, side arms having upper and lower extremities vertically disposed proximate an ankle of the user, the lower extremities being securely attached to the sole means, the upper extremities being pivotally securely attached to a lower terminus of the corresponding medial and lateral uprights, the upper terminus of the medial and lateral uprights being coupled to said flexible, spring resilient strap for engaging upon a calf area of a user's leg, toe arm means having upper and lower extreme ends generally vertically disposed proximate the instep side of the shoe, the lower extreme end being securely attached to the sole means, the upper extreme end being pivotally and securely attached to a lower terminus of said extensible link means, an upper terminus of the link means being coupled to an instep side of the strap, and tension adjustable spring means included within the link means to urge and extend a user's ankle into plantar flexion.

4,955,371

## DISPOSABLE INHALATION ACTIVATED, AEROSOL DEVICE FOR PULMONARY MEDICINE

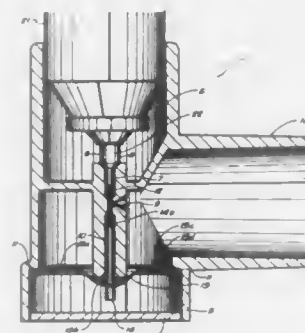
Gene Zamba, Brooklyn, Conn., and Stephen C. Glazier, New York, N.Y., assignors to Transtech Scientific, Inc., New York, N.Y.

Filed May 8, 1989, Ser. No. 348,424

Int. Cl.<sup>5</sup> A61M 16/00

U.S. Cl. 128—200.18

21 Claims



1. An inhalation device for dispensing a medicament to a patient from a dispenser comprising:

a body having an outwardly extending nozzle; a receptacle formed within said body for receiving said dispenser; an activator means positioned within said body, said activator means being mechanically interactive with the inhalation of said patient, said activator means for causing said dispenser to pass said medicament outwardly through said nozzle, said activator means being responsive to a change in air pressure within said nozzle, said activator means causing said dispenser to release said medicament upon the reduction in air pressure, said activator means comprising a diaphragm within said body, said diaphragm being deformable upon a reduction in air pressure within said nozzle; and a vent formed in said body for carbureting air into said nozzle upon the inhalation by said patient.

4,955,372

## METHOD AND APPARATUS FOR PULMONARY AND CARDIOVASCULAR CONDITIONING OF RACEHORSES AND COMPETITION ANIMALS

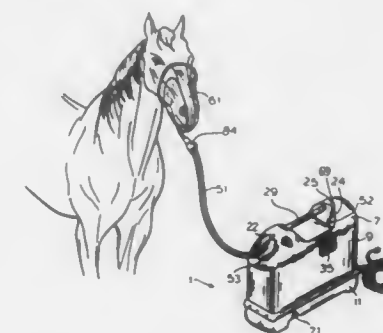
Richard H. Blackmer, Scotia, and Jonathan W. Hedman, Burnt Hills, both of N.Y., assignors to Transpirator Technologies, Inc., Somerset, N.J.

Continuation of Ser. No. 841,300, Mar. 19, 1986, abandoned, which is a continuation-in-part of Ser. No. 755,562, Jul. 16, 1985, Pat. No. 4,722,334. This application Nov. 13, 1989, Ser. No. 436,085

Int. Cl.<sup>5</sup> A61M 15/00

U.S. Cl. 128—203.16

23 Claims



1. A veterinary method useful for the therapeutic treatment of an animal respiratory tract comprising the step of delivering to the animal's respiratory tract a substantially sterile humidified vapor-phase stream of gas at a dew point temperature which is greater than the normal body temperature of the animal at a rate in excess of 60 liters per minute to condition the animal's respiratory, pulmonary and cardiovascular system.

12. An apparatus for delivering to a veterinary animal's respiratory tract a humidified stream of gas at a dew point temperature greater than the ambient dew point temperature and also at a temperature greater than the normal body temperature of the animal so as to deposit water on the walls of the respiratory tract comprising:

a container for storing a reservoir of water; means for heating the water in the reservoir to cause vapor to form in said container at a dew point temperature greater than the ambient dew point temperature and also at a temperature greater than the normal body temperature; a blower means for providing a stream of gas in excess of 60 liters per minute; and a conduit means for conveying the stream of gas into contact with the vapor used and for conveying the stream of humidified gas to the respiratory tract of the animal.

4,955,373

## AIR BREATHING ASSEMBLY AND AIR FILTER ATTACHMENT THEREIN

John N. Maguire, III, 149 Cabana Rd., Myrtle Beach, S.C. 29572

Filed Oct. 16, 1989, Ser. No. 421,970

Int. Cl.<sup>5</sup> A62B 7/10

U.S. Cl. 128—205.27

7 Claims

1. An air filter attachment comprising:

a fitting having attachment means thereon for manually connectable and releasable attachment to an air filter in substantially air-tight fashion, said fitting having an air passageway therein for passing air from the filter; fastener means on said fitting for manually connectable and releasable attachment to a person's clothing; a hose extending up from said fitting and communicating with said air passageway on the fitting; and a breathing device on the upper end of said hose; said attachment means on said fitting bring an annular neck

for slidable reception in a complementary opening in the air filter, said neck having outwardly projecting tabs thereon for engagement with the air filter at said opening therein;



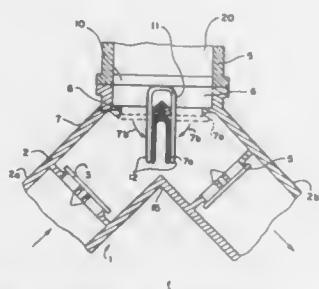
and said fitting having an annular sealing gasket thereon extending around said neck and sealingly engageable with the air filter behind said opening therein.

**4,955,374**  
**CLOSED CYCLE GAS MASK AND BREATHING EQUIPMENT FOR OPERATION UNDER PRESSURE HAVING A SEVERANCE-OPERATED CONNECTION SHUT-OFF FOR THE BREATHING EQUIPMENT**  
Adalbert Pasternack, Bad Schwartau, Fed. Rep. of Germany, assignor to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

Filed May 17, 1989, Ser. No. 353,400  
Claims priority, application Fed. Rep. of Germany, Jul. 9, 1988, 3823383

Int. Cl.<sup>5</sup> A62B 18/10  
U.S. Cl. 128—207.12

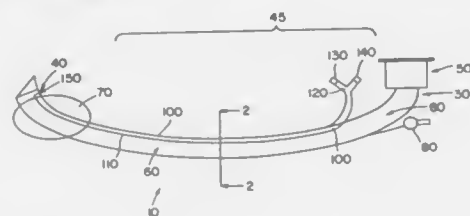
6 Claims



1. A gas mask construction comprising a tubular breathing gas connection, a detector actuator mounted on said breathing gas connection, a breathing gas fitting engageable with said breathing gas connection, and valved passage means carried by one of said breathing gas connection and said breathing gas fitting and opening said valve passage means when they are interconnected and closing said breathing gas fitting upon severance of the connection between said breathing gas fitting and said breathing gas connection.

**4,955,375**  
**ENDOTRACHEAL TUBE WITH CHANNEL FOR DELIVERING DRUGS**  
Ricardo Martinez, 21 Needleridge Ct., San Mateo, Calif. 94402  
Filed Jan. 23, 1989, Ser. No. 300,968  
Int. Cl.<sup>5</sup> A61M 16/00  
U.S. Cl. 128—207.15

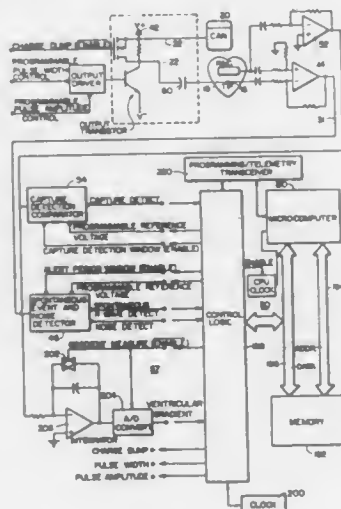
15 Claims



7. An endotracheal tube, comprising:  
a proximal end;  
a distal end;  
a central body having a first wall defining a first lumen; and  
a second wall attached to said first wall within said first lumen, forming a second lumen between said first and second walls, said second wall being formed from a distensible, elastic material;  
wherein said first wall includes an opening connected to said second lumen for introduction of medications there-through into said second lumen, and wherein said second wall has a first side forming at least a portion of said first lumen and a second side forming at least a portion of said second lumen, such that pressure within said first lumen is transmitted through said second wall to said second lumen for propelling said medication towards said distal end.

**4,955,376**  
**PACEMAKER WITH IMPROVED AUTOMATIC OUTPUT REGULATION**  
Francis J. Callaghan, Miami, and William Vollmann, Lauderhill, both of Fla., assignors to Teletronics N.V., Curacao, Netherlands Antilles  
Division of Ser. No. 173,566, Mar. 25, 1988, Pat. No. 4,878,497.  
This application Aug. 7, 1989, Ser. No. 390,532  
Int. Cl.<sup>5</sup> A61N 1/00  
U.S. Cl. 128—419 PG

3 Claims



1. A pacemaker comprising means for generating pacing pulses; means for sensing an evoked potential in response to the generation of a pacing pulse; means responsive to the failure to sense an evoked potential following the generation of a pacing

pulse for increasing the pacing rate so that if said failure was due to a fusion beat, then the next pacing pulse is more likely to result in heart capture; means for controlling the generation of a back-up pacing pulse responsive to the failure to sense an evoked potential; means responsive to the failure to sense an evoked potential following the generation of a back-up pacing pulse for determining that the preceding pacing pulse resulted in a fusion beat; and means responsive to the sensing of an evoked potential following the generation of a back-up pulse for determining that the preceding pacing pulse resulted in a heart capture failure.

**4,955,377**  
**DEVICE AND METHOD FOR HEATING TISSUE IN A PATIENT'S BODY**

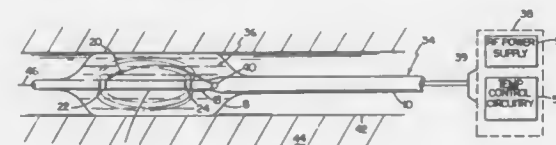
Charles D. Lennox, 75 Ledgebrook Hills Dr., Nashua, N.H. 03062; Richard A. Noddin, 1390 Washington St., Holliston, Mass. 01746, and Ronald Sahatjian, 29 Saddle Club Rd., Lexington, Mass. 02173

Filed Oct. 28, 1988, Ser. No. 263,815

Int. Cl.<sup>5</sup> A61F 7/12

U.S. Cl. 128—401

27 Claims



1. Device for heating tissue, comprising  
a chamber constructed for insertion into a patient's body, an electrically conductive fluid preselected for resistive heating for filling the chamber,  
a plurality of spaced electrical contacts enclosed within the chamber and a corresponding plurality of conductors for connecting the electrical contacts to a power supply for applying a radio frequency electrical potential between the contacts, said contacts being exposed to the fluid-containing space of said chamber so that said radio frequency electrical potential can cause current to flow through fluid between the contacts, said chamber and said contacts being cooperatively constructed and arranged to cause said current to be confined to said fluid within the chamber,  
whereby on the basis of  $I^2R$  losses of said radio frequency electric current flowing between the electrical contacts, the fluid can be heated and the fluid in turn can heat the surrounding tissue by thermal conduction through a wall of the chamber.

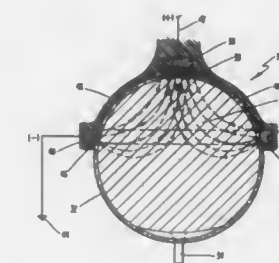
**4,955,378**  
**APPARATUS AND METHODS FOR PERFORMING ELECTROFUSION AT SPECIFIC ANATOMICAL SITES**  
Robert J. Grasso, Tampa, Fla., assignor to University of South Florida, Tampa, Fla.  
Continuation-in-part of Ser. No. 189,206, May 2, 1988. This application Jan. 17, 1989, Ser. No. 297,218  
Int. Cl.<sup>5</sup> A61N 1/32

U.S. Cl. 128—421

11 Claims

1. A device for confining flow of electrons through living tissue to a preselected area of said tissue, comprising:  
a first electrode means adapted to be disposed in abutting relation to a first preselected area of tissue;  
a second electrode means, generally annular in configuration, adapted to be disposed in abutting relation to a second preselected area of tissue having a generally spherical shape, said second preselected area of tissue being in closely spaced proximity to said first preselected area of tissue;  
a source of electrical power;

means for electrically coupling said source of electrical power to said first electrode means; and  
means for grounding said second electrode means;



whereby in vivo electrofusion occurs at the interface of said first preselected area of tissue and said first electrode means.

**4,955,379**  
**MOTION ARTEFACT REJECTION SYSTEM FOR PULSE OXIMETERS**

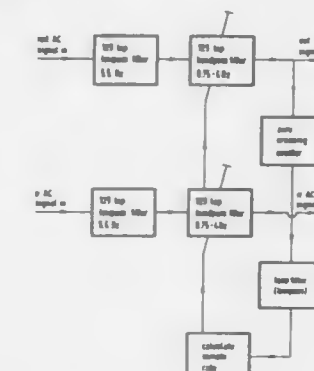
Peter R. Hall, Dyfed, United Kingdom, assignor to National Research Development Corporation, London, England  
Filed Aug. 8, 1988, Ser. No. 229,692

Claims priority, application United Kingdom, Aug. 14, 1987, 8719333

Int. Cl.<sup>5</sup> A61B 5/00

U.S. Cl. 128—633

6 Claims



1. In a pulse oximeter for making a measurement of blood oxygen saturation which produces pulsatile signals in response to a patient's pulsating arterial blood flow in a first variable range of frequencies and motion artefact signals at frequencies outside of said first variable range of frequencies, apparatus for minimizing the effect of said motion artefact signals on said measurement of blood oxygen saturation comprising  
a tunable bandpass filter having an input to which said pulsatile signals and said motion artefact signals are applied;  
a frequency determining means connected to the output of said tunable bandpass filter for determining the frequency of the pulsatile signals at the output of said tunable bandpass filter;  
and a tuning means operatively connected to said frequency determining means and said tunable bandpass filter for tuning said tunable bandpass filter in response to said determined frequency to align the pass band of said bandpass filter with the determined frequency of said pulsatile signals whereby motion artefact signals are attenuated.



4,955,380

## FLEXIBLE MEASUREMENT PROBES

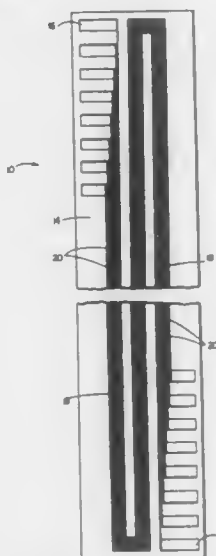
David J. Edell, Lexington, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Dec. 15, 1988, Ser. No. 285,010

Int. Cl.<sup>5</sup> A61B 5/00

U.S. Cl. 128—635

7 Claims



1. Apparatus for measuring temperature and perfusion comprising two lead assemblies, each lead assembly comprising a flexible substrate, an electrical conductor photolithographically patterned on said substrate, and insulation covering said conductor except for a small, exposed contact area, and a thermal sensor bonded between said small contact areas on said two lead assemblies, wherein a voltage drop across said thermal sensor is correlated with temperature, and wherein a voltage drop of heat dissipation from said thermal sensor is correlated with perfusion.

4,955,381

## MULTI-PAD, MULTI-FUNCTION ELECTRODE

Tim J. Way, Carlsbad, and L. Allan Butler, Oceanside, both of Calif., assignors to Cardiotronics, Inc., Carlsbad, Calif.

Filed Aug. 26, 1988, Ser. No. 237,513

Int. Cl.<sup>5</sup> A61B 5/402; A61N 1/04

U.S. Cl. 128—640

9 Claims



1. An electrode for stimulating and monitoring a patient's heart at or about the same time comprising: a stimulating conductive polymer pad having a first surface for contacting a patient and delivering stimulating electrical

- cal impulses to that patient's heart, and having a second surface;
- a monitoring conductive polymer pad having a first surface smaller in area than said stimulating pad first surface for contacting that patient and receiving electrical impulses from that patient's heart at or about the same time that said stimulating electrical impulses are being delivered, and having a second surface;
- a peelable cover substantially covering said first polymer pad surfaces when the electrode is not in use;
- a metal foil cover having substantially the same shape as the stimulating conductive polymer pad and having a front surface substantially covering the second surface thereof, and having a back surface;
- a metal foil cover having substantially the same shape as the monitoring conductive polymer pad and having a front surface substantially covering the second surface thereof, and having a back surface;
- a plastic foam cover adhered against the back surfaces of the metal foil covers and having two holes exposing apart of each metal foil cover;
- two insulated wires having exposed ends which are respectively inserted into the two holes in the plastic foam cover and electrically coupled to the exposed part of the metal foil covers; and
- a wire retainer placed over the holes in the plastic foam cover after the wires have been inserted, which adheres to the plastic foam cover.

4,955,382

## APPARATUS AND METHOD FOR RECORDING MONOPHASIC ACTION POTENTIALS FROM AN IN VIVO HEART

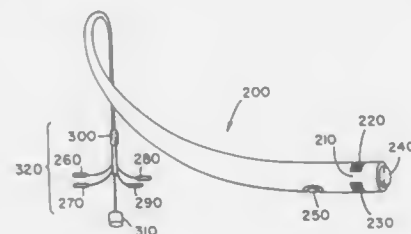
Michael Franz, Palo Alto, and Ingemar Lundquist, Pebble Beach, both of Calif., assignors to EP Technologies, Mountain View, Calif.

Division of Ser. No. 225,043, Jul. 27, 1988, which is a continuation-in-part of Ser. No. 38,974, Apr. 16, 1987, abandoned, which is a division of Ser. No. 586,697, Mar. 6, 1984, Pat. No. 4,682,603. This application Apr. 3, 1989, Ser. No. 332,875

Int. Cl.<sup>5</sup> A61B 5/04

U.S. Cl. 128—642

9 Claims



1. An apparatus for detecting monophasic action potential in an in vivo heart of a patient, comprising: a catheter having a proximal end, a distal end having a terminal tip, and an exterior surface, said catheter being adapted for insertion into a patient for detecting said potentials;
- a first electrode carried at said distal tip for contacting surface tissue of the heart of the patient for measuring potentials at said surface tissue;
- a second electrode carried on said catheter and spaced from said first electrode for supplying a reference potential signal;
- means carried by said catheter for maintaining said distal end in a substantially perpendicular configuration with respect to said surface tissue and with a substantially constant force against said surface tissue, for depolarizing heart

- cells in a vicinity of said first electrode while avoiding injury to said cells;
- first electrical means coupled to said first and second electrodes for generating signals representing said action potentials;
- a third electrode carried on said catheter at a first distance from said first electrode;
- a fourth electrode carried on said catheter at a second distance from said third electrode; and
- second electrical means for providing a cardiac pacing signal to said third and fourth electrodes; wherein said third and fourth electrodes comprise pacing electrodes for pacing the heart.

4,955,383

## DISCRIMINANT FUNCTION ANALYSIS METHOD AND APPARATUS FOR DISEASE DIAGNOSIS AND SCREENING

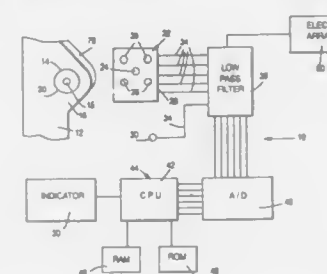
Mark L. Faupel, Conyers, Ga., assignor to Biofield Corporation, New York, N.Y.

Filed Dec. 22, 1988, Ser. No. 288,572

Int. Cl.<sup>5</sup> A61B 5/05

U.S. Cl. 128—653 R

35 Claims



18. An apparatus for disease screening or diagnosis at a potential disease site on a human or animal subject by measuring the electrical potentials which are a function of the electromagnetic field present in the subject on the skin surface of the subject in an area of said potential disease site comprising reference electrode means adapted for contacting the skin surface of the subject at a reference location, a plurality of test electrode means adapted for contact with the skin surface of the subject at spaced locations in the area of the potential disease site, each said test electrode means operating with said reference electrode means define a test-reference electrode means combination for to detecting electrical potential of the electromagnetic field present between said reference electrode means and said test electrode means during a test period and to provide a test potential as a function thereof, analog-to-digital converter means connected to separately receive each said test potential and to provide a separate digital test signal indicative of each said test potential obtained during said test period, and processing means connected to separately receive each said separate digital test signal, said processing means operating to compare said digital test signals obtained during said test period to identify potential relationships therebetween indicative of the presence of a disease condition.

4,955,384

## GUIDING MEMBER FOR VASCULAR CATHETERS WITH A FLEXIBLE LINK DISTAL SECTION

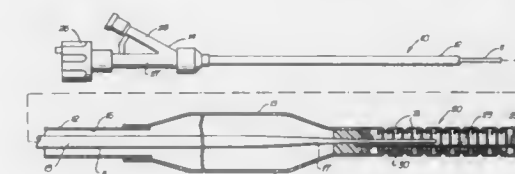
Charles S. Taylor, San Francisco, and Hilary J. Hampton, Santa Clara, both of Calif., assignors to Advanced Cardiovascular Systems, Inc., Santa Clara, Calif.

Filed May 11, 1989, Ser. No. 350,580

Int. Cl.<sup>5</sup> A61B 6/00

U.S. Cl. 128—657

16 Claims



1. An elongated guiding member for a vascular catheter comprising: (a) an elongated core member having a tapered distal portion; (b) a flexible length of interfitting links, each link having a base with an aperture and a plurality of arms which extend from the base and which have means to engage an adjacent link, with the distal portion of the core member extending through the apertures provided in the bases; and (c) means to secure at least one end of the flexible length of interfitting links to the core member.

4,955,385

## ULTRASOUND TARGETING SYSTEM FOR SHOCKWAVE LITHOTRIPSY

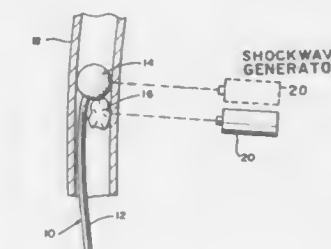
Michael L. Kvalo, Oxford, Ga., and Calley C. Carson, Durham, N.C., assignors to C. R. Bard, Inc., Murray Hill, N.J.

Filed Feb. 6, 1989, Ser. No. 306,549

Int. Cl.<sup>5</sup> A61B 17/22

U.S. Cl. 128—660.03

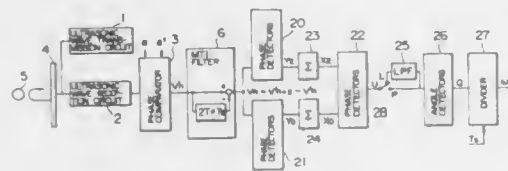
14 Claims



13. A method of targeting a stone within a body cavity by ultrasound for treatment of the stone by shockwave lithotripsy comprising the steps of: introducing an ultrasound target within the body cavity, positioning the target immediately adjacent the stone, locating the target using ultrasound and focusing a shockwave generator relative to the target, whereby a focused shockwave is directed to the stone, said stone having a distal side and said target having a proximal side; and wherein the step of positioning said target further comprises positioning said target on the distal side of the stone, whereby said stone is in a known position relative to the target, said step of focusing the shockwave generator further comprises focusing to the proximal side of the target. cm 14. A method of targeting a stone within a body cavity by ultrasound for treatment of the stone by shockwave lithotripsy comprising the steps of: providing a catheter including a leading end with an ultrasound target thereat, introducing the leading end of the catheter and the target into the body cavity, positioning the target immediately adjacent the stone, ultrasonically locating

the target and focusing a non-invasive shockwave lithotripter relative to the located target and on the stone to target the stone for emitted shockwaves, thereby enabling treatment of the stone.

**4,955,386**  
**PULSE DOPPLER FLOW SPEED METER**  
 Hisashi Nishiyama; Kageyoshi Katakura, both of Tokyo; Shizuo Ishikawa, Kanagawa, and Toshio Ogawa, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Continuation of Ser. No. 277,543, Nov. 29, 1988, abandoned.  
 This application Dec. 27, 1989, Ser. No. 456,608  
 Claims priority, application Japan, Nov. 27, 1987, 62-297573; Dec. 11, 1987, 62-311951; May 20, 1988, 63-121716  
 Int. Cl.<sup>5</sup> A61B 8/00  
 U.S. Cl. 128—661.09 9 Claims

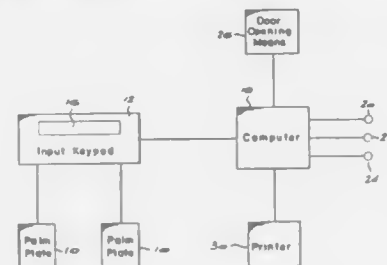


1. A pulse doppler flow speed meter comprising: a sound wave transmission means for transmitting, a pulsed continued ultrasonic sound wave at at least a first and second transmission intervals iteratively toward an object; sound wave reception means for detecting, a sound wave signal reflected by said object; phase detection means for detecting, a phase signal in the reflected signal by mixing the reflected signal at each reception with a reference signal; an MTI filter which performs filtering with the same filtering characteristics for phase signals corresponding to said first transmission interval and phase signals corresponding to said second transmission interval among the phase signals provided sequentially by said phase detection means by employing an unchanged delay time on respective filtering operations; first phase difference detecting means for detecting, sequentially a phase difference between a phase signal at the present time point and a phase signal at a preceding time point among phase signals passing sequentially through said MTI filter; second phase difference detection means for detecting, a phase difference between a first phase difference ascribed to said first transmission interval and a second phase difference ascribed to said second transmission interval among phase differences detected sequentially by said first phase difference detection means; and means for transforming the output of said second phase difference detection means into the speed of said object.

**4,955,387**  
**METHOD AND APPARATUS FOR GUILT DETECTION**  
 Paolo Simonutti, 1 Tony St., Harmelia, 1406, and John O. Speedy, 11 Rietbok Rd., Robinhills, Randburg, both of Transvaal, South Africa  
 Filed May 28, 1985, Ser. No. 738,215  
 Claims priority, application South Africa, May 28, 1984, 84/4033  
 Int. Cl.<sup>5</sup> A61B 5/024 13 Claims

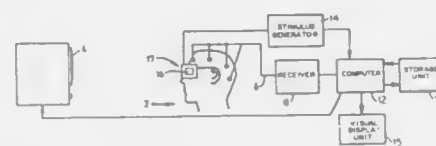
1. Apparatus for use in combatting theft from a premises, comprising a pulse rate detector having detector plates adapted to be contacted by the palms of a person leaving the premises and means responsive to the pulses detected by the plates to compute an instantaneous pulse rate reading, means for comparing the instantaneous pulse rate with a predetermined

mined pulse rate, means for producing a discernible signal at least when the instantaneous pulse rate exceeds the predetermined pulse rate, said means for comparing including means for comparing the instantaneous pulse rate with a stored average pulse rate computed from a history of pulse rate measurements conducted in respect of that person, and means for updating the stored average pulse rate with the instantaneous pulse rate, but only when the instantaneous pulse rate does not exceed the stored averaged pulse rate by more than a predetermined amount.



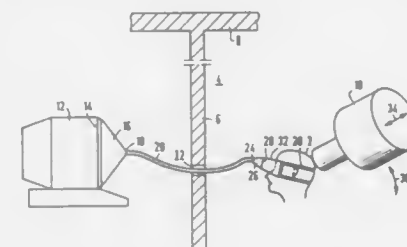
ments conducted in respect of that person, and means for updating the stored average pulse rate with the instantaneous pulse rate, but only when the instantaneous pulse rate does not exceed the stored averaged pulse rate by more than a predetermined amount.

**4,955,388**  
**ELECTROENCEPHALOGRAPHIC ATTENTION MONITOR**  
 Richard B. Silberstein, Victoria, Australia, assignor to Swinburne Limited, Victoria, Australia  
 PCT No. PCT/AU86/00215, § 371 Date Mar. 30, 1987, § 102(e) Date Mar. 30, 1987, PCT Pub. No. WO87/00746, PCT Pub. Date Feb. 12, 1987  
 PCT Filed Jul. 28, 1986, Ser. No. 35,610  
 Claims priority, application Australia, Jul. 30, 1985, 01702/85  
 Int. Cl.<sup>5</sup> A61B 5/0484 20 Claims  
 U.S. Cl. 128—731



1. A method of assessing the interest of a subject in a visual stimulus, by means of application of a control signal is combination with said visual stimulus, which control signal produces a distinguishable response in the subject, and measurement of said interest by reference to a change in said response, said method comprising the steps of displaying a periodic visual control signal having a preselected frequency, obtaining an electroencephalographic (EEG) signal from the subject whilst said visual control signal is being viewed, and analysing the EEG signal to determine the magnitude of that component of the EEG signal which corresponds in frequency to said control signal, wherein said method further comprises the steps of displaying said control signal and the visual stimulus simultaneously to the subject, obtaining and analysing the EEG signal to determine the magnitude of said component during said simultaneous display, determining the change in the magnitude of said component of the EEG signal, and assessing the interest of the subject in said visual stimulus in accordance with said change.

**4,955,389**  
**APPARATUS FOR STIMULATION WITH OPTICAL STIMULI**  
 Siegfried Schneider, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich  
 Filed Jul. 22, 1988, Ser. No. 223,026  
 Claims priority, application Fed. Rep. of Germany, Jul. 27, 1987, 3724842  
 Int. Cl.<sup>5</sup> A61B 5/04 2 Claims  
 U.S. Cl. 128—731

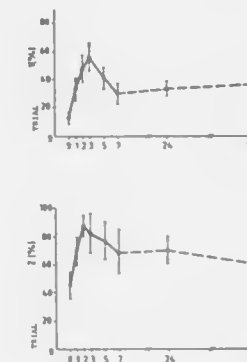


1. In an apparatus for creating an optical stimulation in a patient who is positioned in chamber means for shielding the patient against outer magnetic fields, said chamber means including a SQUID-magnetometer means being mounted for movement relative to the patient for measuring of magnetic fields originating from the patient due to optically invoked potentials, the improvements comprising a glass fiber light waveguide having a first end face and a second end face, said glass fiber waveguide extending through a wall of said chamber means with the second end face being disposed within said chamber means, generator means for creating stimulation signals being arranged outside of the chamber means, said generator means having a first image plane where the stimulation signals are optically projectable, a first lens means being arranged adjacent said plane for projecting the stimulation signals of said image plane onto said first end face of the glass fiber light waveguide, a second image plane, a second lens means being arranged at the second end face of the glass fiber light waveguide within said chamber for transferring the optical stimulation signals received from said second end face onto said second image plane, mounting means for positioning the second end face of the light waveguide, the second lens means and the second image plane on a head of the patient so that the patient can perceive a picture that appears on the second image plane, and any structure disposed in said chamber means including the second lens means, the mounting means, and the light waveguide being composed of a non-magnetic material.

**4,955,390**  
**PROCESS FOR THE DETERMINATION OF THE PRESENCE OF A PSYCHEDELIC STATE**  
 Hinderk M. Emrich, Theodolindenstrasse 6, D-8000 München 90, Fed. Rep. of Germany  
 Filed Feb. 24, 1989, Ser. No. 315,467  
 Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 3805983  
 Int. Cl.<sup>5</sup> A61B 13/00 3 Claims  
 U.S. Cl. 128—745

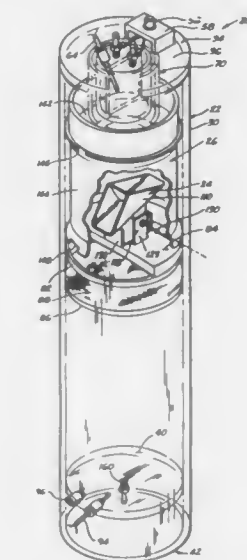
1. A process for the determination of the presence of a psychedelic state in a test subject comprising:

presenting the test subject with a three-dimensional, stereoscopically inverted image of an object, and



determining whether said test subject sees this image convexly or concavely within a predetermined period of time by means of a signal from the test subject.

**4,955,391**  
**FLUID MONITORING APPARATUS**  
 Robert L. Parker, and Charles G. Reed, both of Oklahoma City, Okla., assignors to Invenomed, Inc., Oklahoma City, Okla.  
 Continuation-in-part of Ser. No. 78,792, Jul. 27, 1987, abandoned. This application Apr. 5, 1989, Ser. No. 333,468  
 Int. Cl.<sup>5</sup> A61B 5/00 10 Claims  
 U.S. Cl. 128—771



1. A fluid monitoring apparatus comprising: a canister having a tubular body portion with an upper end and a lower end; a cover plate extending across the upper end of the tubular body portion of the canister, the cover plate having an entry port for introduction of liquid into the tubular body portion and a suction port so that air pressure within the tubular body portion can be lowered for drawing fluid into the entry port; a floor plate extending across the lower portion of the tubular body portion of the canister; volume indicator means disposed within the tubular body portion of the canister below the entry port for receiving the fluid introduced into the tubular body portion and providing an electrically sensible indication for each of a



series of selected volume increments of fluid introduced into the tubular body portion of the canister; flow rate control means disposed between the entry port and the volume indicator means for limiting the flow rate of flow of fluid into the volume indicator means; and a fluid separator mounted on the cover plate so as to be disposed within the tubular body portion of the canister, the fluid separator comprising: a perforated cylindrical cup secured to the cover plate so as to extend about the entry and suction ports; and a partition plate extending diametrically across the perforated cylindrical cup between the entry port and the suction port so as to divide the perforated cylindrical cup into non-communicating entry and suction chambers.

4,955,392

## CONDOM OF THERMOPLASTIC ELASTOMER AND POLYOLEFIN FILM

Reuben Sorkin, 4721 University Dr., Coral Gables, Fla. 33146  
Continuation-in-part of Ser. No. 148,724, Jan. 25, 1988, Pat. No. 4,808,174, which is a continuation-in-part of Ser. No. 93,933, Sep. 8, 1987. This application Mar. 23, 1989, Ser. No. 327,796  
Int. Cl.<sup>5</sup> A61F 6/00

U.S. Cl. 128—844

7 Claims



1. A condom of rubbery film material comprising a sleeve having an open proximal end and a closed end and being sized to receive an erect penis, said material comprising a blend of polyolefin material and thermoplastic elastomer material; said film material comprising an olefinic vulcanized blend of thermoplastic elastomer and low modulus polyolefin.

4,955,393

## MOUTHGUARD WITH CONFORMABLE ARCH LINERS

Loren S. Adell, Dallas, Tex., assignor to Trident Laboratories, Inc., Sunnyvale, Tex.

Filed Mar. 30, 1988, Ser. No. 176,046

Int. Cl.<sup>5</sup> A61F 5/56

U.S. Cl. 128—859

10 Claims



1. A mouthguard preform comprising a body having at least one trough for an arch, liner material disposed in said trough for securing an impression of the teeth of the arch when deformed by said teeth and thereby conforming the mouthguard to the teeth of the arch when the preform subsequently becomes a usable mouthguard; and joining means joining the liner material to said body comprising mechanical interlocking means for mechanically interlocking the liner to the body, in which said interlocking means is disposed at the occlusal wall of the trough and comprises material integral with said liner which extends through one or more apertures through said

occlusal wall and interlocks with the side of the occlusal wall opposite the side containing said trough both before and after the teeth of the arch are impressed in said liner material, said joining means further comprising the liner material being directly molded onto said body and extending through said apertures and engaging the opposite side of said occlusal wall while in its undeformed state.

4,955,394

## PROTECTIVE FACE SHIELD

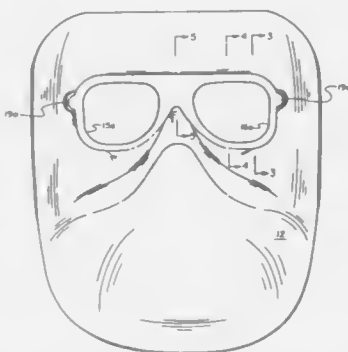
Glen R. Dean, 2525 N. 8th St., Suite 109, Grand Junction, Colo. 81501

Filed Jan. 9, 1989, Ser. No. 294,395

Int. Cl.<sup>5</sup> A62B 18/08

U.S. Cl. 128—863

12 Claims



1. A full-face protective shield comprising a very light-weight plastic full-face shield formed from a thin substantially continuous sheet of plastic having a pair of spectacle socket apertures, said shield having facial contours with a concave recess in the rear surface for the nose and curved peripheral edges flared to the rear to fit under the chin and to follow the contour of the forehead and cheeks, said pair of spectacle socket openings in said shield being adjacent the upper portion of the nose recess and sized to fit entirely around the lens rim portion of a spectacle frame to support the shield and to form a substantial seal between the shield and the spectacles so that the shield in conjunction with the lenses of the spectacles covers the eyes, nose, forehead, cheeks, mouth and chin of the wearer with a substantially continuous surface.

4,955,395

## TISSUE EXPANDER AND METHOD OF TREATING MALE TEMPLE BALDNESS

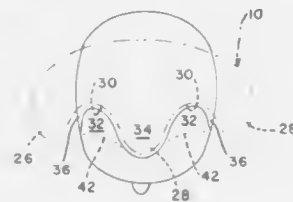
Ernest K. Manders, 1 Timberline Pl., Hummelstown, Pa. 17036

Filed Mar. 8, 1990, Ser. No. 488,165

Int. Cl.<sup>5</sup> A61B 19/00; A61F 2/02

U.S. Cl. 128—898

15 Claims



1. A tissue expander including a base, an expandable cover overlying the base and joined to the peripheral edge of the base to define an interior chamber, and port means for inflating the chamber, the base including three spaced arms separated by two recesses.

4,955,396

## METHOD FOR TAGGING MACRO-ORGANISMS

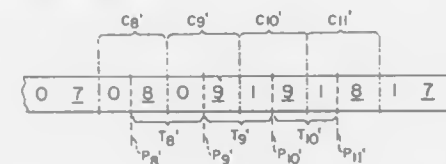
Richard D. Fralick, East Sound, and Phillip A. Ekstrom, Shaw Island, both of Wash., assignors to Northwest Marine Technology, Inc., Shaw Island, Wash.

Filed Feb. 5, 1988, Ser. No. 152,458

Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 128—898

16 Claims



1. A method for tagging members of a large group of macro-organisms so that each member of the group is assigned to a respective subgroup, comprising the steps of:

- providing a continuous length of wire;
- indelibly marking said wire along the length thereof with a sequence of separate and distinct identification codes, each of said codes including a respective multidigit numeral with individual digits disposed in a linear array extending in a longitudinal direction along the length of said wire, said identification codes being greater in number than an algebraic number base of the multidigit numerals, each of the multidigit numerals being flanked on opposite sides in the longitudinal direction by a first multidigit numeral of a first one of said identification codes and by a second multidigit numeral of a second one of said identification codes and having exactly one digit differing in value from a corresponding digit of said first multidigit numeral and exactly one digit differing in value from a corresponding digit of said second multidigit numeral;
- successively severing substantially equal length segments from said wire at one end thereof;
- storing, for later reference in identifying a macro-organism, a first one of said segments upon a severing thereof from said wire;
- implanting at least a subsequent one of said segments in a respective one of said macro-organisms upon a severing of said subsequent one of said segments from said wire subsequent to the severing of said first one of said segments; and
- storing another one of said segments upon a severing thereof from said wire subsequently to the severing of said subsequent one of said segment.

4,955,397

## CIGARETTE

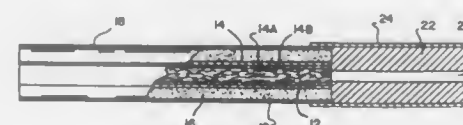
Robert R. Johnson, and Jiunn-Yann Tang, both of Louisville, Ky., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Jul. 10, 1989, Ser. No. 378,351

Int. Cl.<sup>5</sup> A24D 3/04; A24B 15/00

U.S. Cl. 131—194

10 Claims



1. A cigarette comprising:  
a tobacco rod;  
a metallic wrapper circumscribing the tobacco rod;  
a cylinder of carbon fuel surrounding the metallic wrapped tobacco rod;

an air permeable wrapper circumscribing the cylinder of carbon fuel; and,  
a filter plug coaxially located at one end of the tobacco rod and surrounding cylinder of carbon fuel, the filter plug having a cylindrical passageway therethrough in longitudinal alignment with the tobacco rod, said carbon fuel in flow communication with said filter plug.

4,955,398

## RELATING TO THE MONITORING OF ROD-LIKE ARTICLES

John K. Milner, Horton, and Roger B. Dagnall, Milford-on-Sea, both of England, assignors to British-American Tobacco Company Limited, London, England

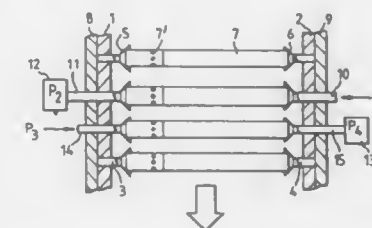
Filed May 4, 1982, Ser. No. 374,634

Claims priority, application United Kingdom, May 13, 1981, 8114553

Int. Cl.<sup>5</sup> A24B 5/60

U.S. Cl. 131—280

11 Claims



1. A method of monitoring a succession of rod-like articles, wherein one or more flow regimes is established in each rod-like article in order to determine the relationship which the upstream and downstream equivalent gas flow resistances of the article bear to each other, and detection is made of variations in the relationship indicative of the position of out-of-specification gas flows.

4,955,399

## SMOKING ARTICLE

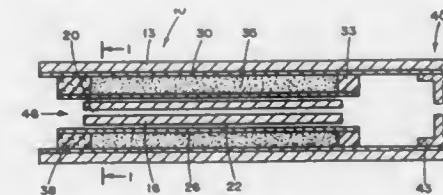
Dennis L. Potter, Kernersville; Mark L. Raker, Clemmons; Henry T. Ridings, Lewisville; Andrew J. Sensabaugh, Jr., Winston-Salem; Amos E. Westmoreland, Winston-Salem; Woods, Donna K., Winston-Salem, and Chandra K. Banerjee, Pfafftown, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Nov. 30, 1988, Ser. No. 277,730

Int. Cl.<sup>5</sup> A24D 1/00, 1/02, 1/18

U.S. Cl. 131—359

84 Claims



1. A cigarette which does not burn tobacco comprising: (a) tobacco; and  
(b) a physically separate, non-combustion heat source for heating but not burning the tobacco, and including  
(i) a first chemical agent capable of interacting exothermically with a second chemical agent, and a third chemical agent capable of interacting exothermically with the first chemical agent, and  
(ii) a dispersing agent for the first agent.

4,955,400  
WIGS

Masakatsu Takahashi, 4-6, Narihira-cho, Ashiya-shi, Hyogo-ken, Japan

Continuation of Ser. No. 52,599, May 19, 1987, abandoned. This application Oct. 19, 1989, Ser. No. 423,733

Claims priority, application Japan, May 19, 1986, 61-115731  
Int. Cl.<sup>5</sup> A41G 5/00

U.S. Cl. 132—56

8 Claims

1. A wig characterized in that said wig is constructed by forming fiber filaments by coating fibers selected from the group consisting of synthetic fibers, natural fibers, natural hair and regenerated fibers with a powder of inorganic substance with excellent heat releasing characteristics during the manufacturing process of said fibers and then composing said fiber filaments into an artificial scalp portion and artificial hair as components of said wig.

4,955,402

CONSTANT BATH SYSTEM WITH WEIR

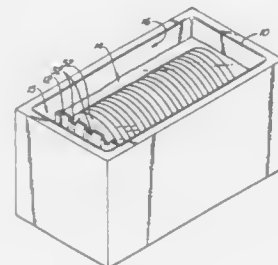
Henry R. Miranda, Milpitas, Calif., assignor to P.C.T. Systems, Inc., Milpitas, Calif.

Filed Mar. 13, 1989, Ser. No. 322,586

Int. Cl.<sup>5</sup> B08B 3/04

U.S. Cl. 134—107

14 Claims



1. A system for bathing at least one object in a liquid at a constant temperature comprising:  
a rectangular container for holding said liquid, said container having an open top side;  
a removable dividing means comprises a flat plate having edges shaped for engaging the sides of said container and separating said container into first and second regions, said first region receiving said object in said liquid and said second region receiving said liquid from said first region, said dividing means having a scalloped top edge;  
means for removing said liquid from said second region and filling said first region with said removed liquid;  
means for filtering said removed liquid;  
means for heating said liquid to maintain said liquid at a constant temperature;  
whereby said liquid overflows said dividing means top edge from said first region into said second region when said system is in operation.

4,955,403

CLOSED LOOP SYSTEM AND METHOD FOR CLEANING ARTICLES WITH A VOLATILE CLEANING SOLVENT

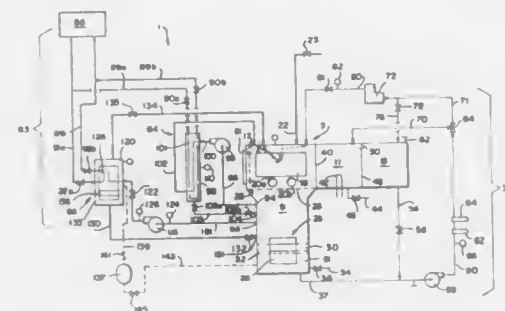
Donald E. Zappa, Pittsburgh, Pa., and James J. Cascone, Voorhees, N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 30, 1988, Ser. No. 277,847

Int. Cl.<sup>5</sup> B08B 3/10

U.S. Cl. 134—109

24 Claims



11. A closed system for cleaning articles by means of a volatile cleaning solvent, comprising:  
a cleaning chamber having a doorway means for allowing access to the interior of the chamber and for sealing the chamber interior from the ambient atmosphere;  
a nozzle means disposed within said chamber for selectively



1. A hair curler, comprising:  
a rod having first and second ends and a length along which plural radially projecting cylindrical posts of uniform length are positioned alternately on opposite sides of the rod, the posts along each of the opposite sides of the rod being spaced apart by a uniform distance such that a post on one side of the rod bisects the rod distance between an adjacent pair of posts on the opposite side of the rod;  
an eyelet positioned at the first end of the rod and formed by a substantially elliptical loop defined by a major axis that is substantially perpendicular to the length of the rod, the loop being closed on one side of the rod and having a flexible finger on an opposite side of the rod to form an inlet for receiving a base end of a strand of hair to be wrapped around the curler; and  
clip means positioned at the second end of the rod for securing to the curler a distal end of the strand of hair, the clip means including second and third opposed flexible fingers that extend along the longitudinal axis.

discharging vaporized and atomized volatile cleaning solvent on an article within said chamber incident to a cleaning operation;

a closed loop solvent condenser system for liquefying vaporized and atomized cleaning solvent at the same rate that said nozzle means discharges said vaporized and atomized solvent including a vaporized solvent condenser assembly having a heat exchanger, a housing that encloses the heat exchanger and serves as an air reservoir, inlet and outlet conduits connected between said housing and said chamber, and a vacuum pump means for circulating the air within said cleaning chamber through said heat exchanger in order to remove vaporized solvent therefrom and for creating a negative pressure in said chamber and a positive pressure in said housing when said nozzle means discharges solvent, and

a solvent sump for collecting liquid solvent from said cleaning chamber, wherein said sump includes a quantity of isolating fluid for forming a film over the top surface of the collected solvent that isolates the collected solvent from the ambient atmosphere when said chamber doorway means is opened.

4,955,405

PREFABRICATED CAR WASH DISTRIBUTION AND DELIVERY SYSTEM AND METHOD

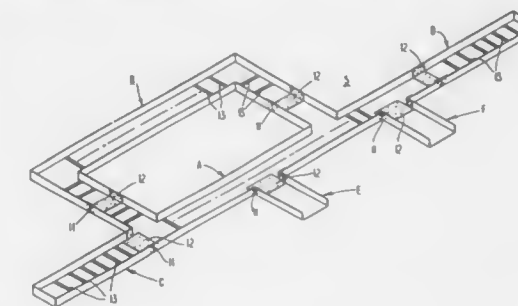
Dennis Glick, Media; Nicholas Vale, Exton; Michael McDade, Oxford, and Richard Vogel, West Grove, all of Pa., assignors to White Glove, Inc., Radnor, Pa.

Continuation of Ser. No. 213,850, Jun. 30, 1988. This application Jan. 26, 1990, Ser. No. 471,049

Int. Cl.<sup>5</sup> B60S 3/04; F16L 5/00

U.S. Cl. 137—234.6

13 Claims



1. A system for the distribution and delivery of supplies to car wash equipment through delivery lines in a car wash tunnel comprising:

a raceway carrying said delivery lines;  
means for mounting said raceway in the tunnel;  
a distribution rack mounted in a separate mechanical room;  
an opening between said tunnel and said mechanical room for receiving supply lines between said raceway and rack;  
means for coupling supply lines to said equipment and rack to deliver substantially all desired supplies to said car wash equipment;  
said delivery lines being connected to said car wash equipment.

4,955,404

METHOD AND APPARATUS FOR SEALING LEAKING VALVES ON COMPRESSED GAS TANKS

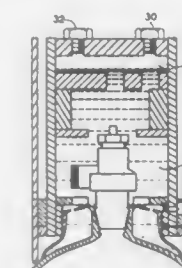
Terry Pitzen, La Mesa, Calif., assignor to Gaslock Corporation, La Mesa, Calif.

Filed Jan. 24, 1990, Ser. No. 469,189

Int. Cl.<sup>5</sup> F16K 13/10, 51/00

U.S. Cl. 137—15

15 Claims



1. A method of sealing a leaking valve on a compressed gas tank for safe transport of the tank and valve to a repair depot, comprising the steps of:

placing a cap over the valve and attaching the cap to the tank,  
filling the cap through a fill opening with a fusible substance in liquified form,  
venting the cap via a vent opening during filling,  
sealing off the fill and vent openings,  
causing the fusible substance to solidify within the cap and around the valve to encapsulate the valve in the solidified fusible substance,  
transporting the tank and valve with the associated cap and solidified fusible substance to a repair depot,  
at the repair depot, liquifying the fusible substance and draining it from the cap, and  
removing the cap from the tank to accommodate access to and servicing of the valve.

4,955,406

CONNECTOR FOR WATER PIPES

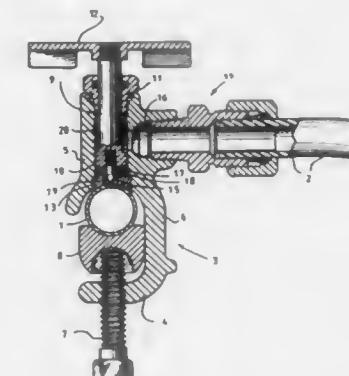
Frank Antouliello, Commack, N.Y., assignor to I.W. Industries, New York, N.Y.

Filed Apr. 20, 1989, Ser. No. 340,792

Int. Cl.<sup>5</sup> F16K 43/00, 31/50; F16L 55/10

U.S. Cl. 137—318

1 Claim



1. A connector for establishing a communication between an existing water pipe and an additional water conduit, the connector comprising:

a C-shaped clamp valve housing member arranged to clamp an existing water pipe and an adjustable clamping means cooperating with said clamp housing;  
a valve arranged to pierce the said water pipe and to establish a communication between the latter and an additional water conduit.



water conduit, said valve including a valving piercing means cooperating with said valve housing, said clamp housing and said valve housing being formed integrally of one piece with one another so as to form an integral one piece housing unit;

a seal guide means disposed on said valving means for threadably plugging in upper portion of said valve housing and sealably guiding said valving means therein to control the piercing of said water pipe;

said housing having a bottom portion, said adjustable means including a threaded element received in said bottom portion;

an upstanding wall portion extending from said bottom portion to said upper portion of said valve housing on one side thereof and a downwardly projecting wall portion that protrudes over a portion of said water pipe to retain said water pipe and leaving an open portion between the bottom portion and the wall protrusion, said open portion permitting easy access for removal of said water pipe without disassembling said valve housing and said valve piercing member;

said adjustable clamping means including a threaded element received in said bottom portion, a support element disposed within said housing for supporting said water pipe, said support element having a recess for receiving said threaded element for adjustably moving said support element toward said piercing means and to adapt to different water pipe sizes.

4,955,407

## CHECK VALVE INSERTABLE INTO A HOSE

Yoshimichi Inoue, Saitama, Japan, assignor to Jidosha Kiki Co., Ltd., Tokyo, Japan

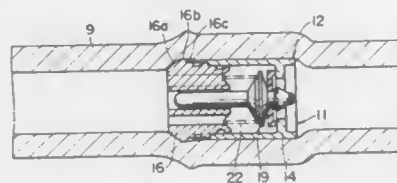
Filed Feb. 24, 1989, Ser. No. 315,445

Claims priority, application Japan, Mar. 8, 1988, 63-30698[U]; Mar. 25, 1988, 63-39365[U]

Int. Cl.<sup>5</sup> F16K 15/06

U.S. Cl. 137-454.2

1 Claim



1. A check valve assembly insertable into the interior of a flexible hose, comprising: a valve body portion having one of an inlet port and an outlet port; and, a valve end piece having a port other than said one of an inlet port and an outlet port of said valve body portion, said valve body portion and said valve end piece being joined together to embody said valve body means, said valve body portion having an internal surface with an internal large-diameter portion and an internal small-diameter portion forming a step or shouldered portion between said internal large-diameter portion and internal small-diameter portion, said valve end piece having an external large-diameter portion and an external small-diameter portion forming a valve end piece shouldered portion between said external large-diameter portion and external small-diameter portion, each of said external large-diameter portion and said external small-diameter portion and said external small-diameter portion of said valve body portion, respectively, each of said shoulder portions defining a joint surface, said valve end piece having grooves formed at each side of said joint surface extending in a circumferential direction providing a reduction in the external diameter of said external large-diameter portion and said external small-diameter portion.

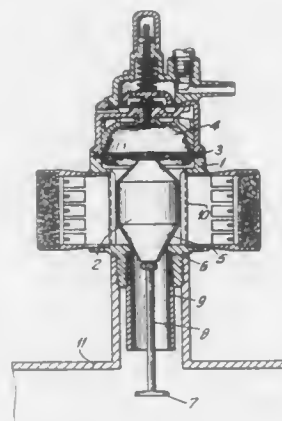
4,955,408  
VACUUM-CONTROL VALVE FOR MILKING SYSTEMS  
Theodor Meermoller, Oelde, Fed. Rep. of Germany, assignor to Westfalia Separator AG, Oelde, Fed. Rep. of Germany  
Filed Aug. 4, 1989, Ser. No. 389,458

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 3827368

Int. Cl.<sup>5</sup> G05D 16/06

U.S. Cl. 137-470

9 Claims



1. In a vacuum-control valve for milking systems, comprising an upright valve body having a conical projection extending into an air-intake, wherein the valve body is mounted for axial movement from a lower position wherein the air-intake is closed and an upper position wherein the air-intake communicates with a vacuumized line and wherein the valve-body cross-section changes as it moves axially, the improvement comprising a rod extending below the valve body, an aerodynamic structure connected to the rod under the valve body and positioned to effect a downward force on the valve body in response to air entering the air-intake and an air-channeling tube downstream of the air-intake, wherein the air-channeling tube terminates above the aerodynamic structure.

4,955,409

## FUEL SUPPLY SYSTEM

Teruhiko Tokuda, Kosai; Koji Ishihara, Hamamatsu; Masahiko Maruyama, and Manabu Wada, both of Kamimura, all of Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Japan

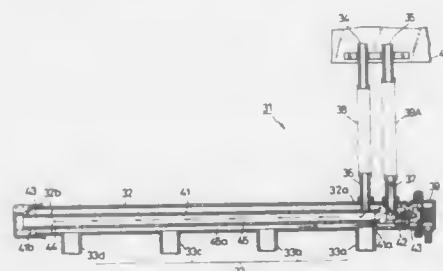
Filed Apr. 18, 1989, Ser. No. 339,653

Claims priority, application Japan, Apr. 18, 1988, 63-95024

Int. Cl.<sup>5</sup> F02M 55/02

U.S. Cl. 137-561 A

2 Claims



1. A fuel supply system comprising: a fuel delivery pipe for distributing fuels to injectors corresponding to respective cylinders, an inner pipe inserted fixedly into said fuel delivery pipe to constitute part of a fuel passageway, a fuel feed pipe connected to a proximal portion of said inner pipe, a fuel feedback pipe connected to a proximal portion of said fuel

delivery pipe and disposed closely adjacent to said fuel feed pipe and to the proximal portion of the inner pipe, and at least one opening disposed on the end portion of the inner pipe opposite to the proximal portion thereof to communicate with the fuel delivery pipe, whereby the closely adjacent spacing of said fuel feed pipe and said fuel feedback pipe at the proximal portion of said inner pipe and said fuel delivery pipe minimizes obstacles to the flow of fuel within said fuel delivery pipe and shortens the connections between said fuel feed and feedback pipes and fuel pipes connected to the fuel tank.

4,955,410

## METHOD AND MEANS FOR REPLACING A MALFUNCTIONING AIR FILTRATION UNIT

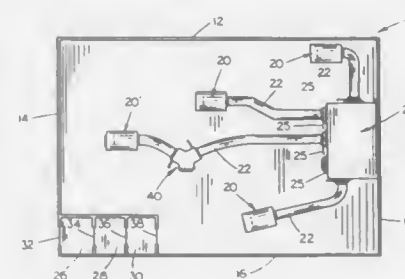
Steven C. Griffiths, 2929 Avenue D, Council Bluffs, Iowa 51501  
Division of Ser. No. 308,749, Feb. 10, 1989, Pat. No. 4,859,221.

This application Jun. 5, 1989, Ser. No. 361,999

Int. Cl.<sup>5</sup> F16K 11/10

U.S. Cl. 139-883

4 Claims



1. In combination, a malfunctioning air filtration unit located in a contaminated area and having its exhaust normally connected to a first air conduit which extends to a selectively closable air exhaust means, a Y-shaped air diverter box means having an interior compartment and at least first, second and third openings communicating therewith, said first opening being selectively connected to said first air conduit, a second air conduit for selective connection to said second opening, a third air conduit for selective connection to said third opening, said box means having a selectively movable valve member imposed in each of said first, second and third openings whereby air from said first, second or third conduits may be selectively introduced into the interior of said box means or passed outwardly therethrough.

4,955,411

## HOSE HAVING INDEX MARK

Roy W. Olsen, and Curtis H. Bell, both of Lincoln, Nebr., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 543,583, Oct. 19, 1983, abandoned, which is a division of Ser. No. 299,286, Sep. 4, 1981, Pat. No. 4,435,352. This application Sep. 9, 1985, Ser. No. 774,175

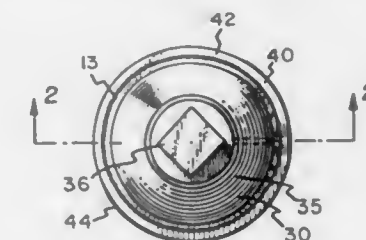
Int. Cl.<sup>5</sup> F16L 35/00

U.S. Cl. 138-109

1 Claim

1. An axially elongated hose, for connecting a nipple on an automotive engine to a nipple on a radiator, including a composite wall having at least one layer of elastomer material and an embedded reinforcement layer of filamentary material extending throughout the length and circumference of the hose, said wall having its at least one layer of elastomer material cured with its axis in a plurally curved formation, said wall having a single small hole extending through said cured at least

one layer of elastomer material and said embedded reinforcement layer at or adjacent to end of the hose into which a nipple



having an index mark is to be inserted with the mark registering with the hole.

4,955,412

## APPARATUS FOR INJECTING CONFETTI INTO A BALLOON

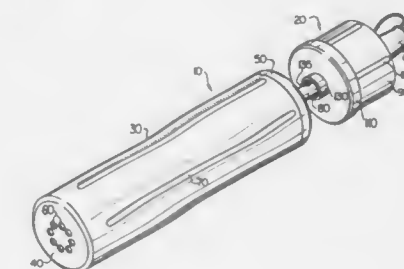
Donna Younts, and Eileen Yeung, both of Hong Kong, Hong Kong, assignors to Continental American Corporation, Wichita, Kans.

Filed Mar. 29, 1989, Ser. No. 330,109

Int. Cl.<sup>5</sup> B65B 3/16

U.S. Cl. 141-114

10 Claims



1. An apparatus for simultaneously injecting confetti and air into a balloon comprising: an air pump for providing a flow of air; a container for storing confetti; inlet means on said container for securing the container to the air pump for receiving the flow of air therefrom outlet means on said container for attaching a balloon to the container; and said container including air flow guide means for guiding a mixture of air and confetti into said balloon.

4,955,413

## AL ALLOY PRODUCT CONTAINING LI, RESISTANCE TO CORROSION UNDER STRESS, AND PROCESS TO OBTAIN SAID PRODUCT

Philippe Meyer, Volron, and Bruno Dubost, St. Egrève, both of France, assignors to Cegedur Societe de Transformation de l'Aluminium Pechiney, Paris, France

Filed Feb. 17, 1988, Ser. No. 156,595

Claims priority, application France, Feb. 18, 1987, 87 02719; Jan. 20, 1988, 88 01005

Int. Cl.<sup>5</sup> C22F 1/04

U.S. Cl. 148-12.7 A

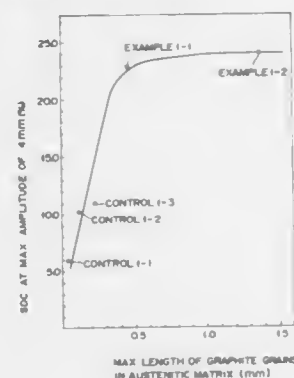
18 Claims

10. Process for the manufacture of Al alloys containing Li and optionally Cu, Mg, Zn, Zr, Mn, Cr, Nb, Ni, Fe and Si, allowing them to be sensitized to corrosion under stress comprising the steps of hot shaping of a cast or wrought product, optionally cold-working, incompletely solution annealing, quenching, optionally controlled cold-working and tempering,

wherein the incomplete solution annealing is carried out in a temperature range of between 460° C. and  $T_M$  (°

C.) = 474 + 18.2(% Li) - 2(% Cu) (% Cu - 1.7) + (% Mg) (-17.6 + 3.6(% Li) + 4.3(% Cu)) - 3(% Zn).

**4,955,414**  
**BEARING HAVING A VALVE SEAT FOR A ROTARY COMPRESSOR**  
Eiichiro Fujii, Fuji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed May 10, 1989, Ser. No. 349,858  
Claims priority, application Japan, May 24, 1988, 63-126511  
Int. Cl.<sup>5</sup> C22C 38/36  
U.S. Cl. 148—324 2 Claims



1. A bearing having a valve seat, for a rotary compressor which is made of austenitic cast iron with graphite crystallized in an austenite matrix in the form of an A type, C type, or A/C combined type under the ISO classification, the crystallized graphite having a maximum length of 1.4 mm, that portion having a length of 0.45 to 1.4 mm comprising 15 to 30% by volume of the crystallized graphite.

**4,955,415**  
**PNEUMATIC RADIAL TIRE WITH GROOVE PLATFORMS TO PREVENT STONE ENTRAPMENT**  
Akihiro Takeuchi, and Toshio Koyama, both of Kobe, Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan  
Continuation-in-part of Ser. No. 905,153, Sep. 9, 1986, abandoned. This application May 13, 1988, Ser. No. 193,762  
Claims priority, application Japan, Sep. 10, 1985, 60-201401  
Int. Cl.<sup>5</sup> B60C 11/06  
U.S. Cl. 152—209 R 2 Claims

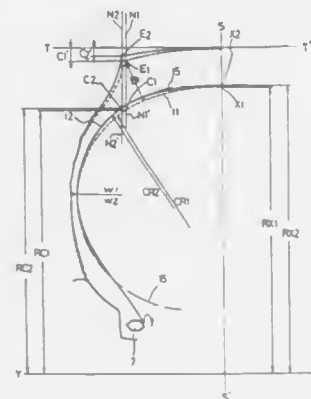
1. A pneumatic radial tire having a tread provided with a central longitudinal groove on the central part thereof, side longitudinal grooves disposed on both sides of said central longitudinal groove, and lateral grooves connecting the central longitudinal groove with said side longitudinal grooves; said central longitudinal groove extending continuously zigzag in the circumferential direction of the tire along the equator of the tire to form a plurality of zigzag angled portions of the central longitudinal groove, each angled

portion of the central longitudinal groove provided with a platform formed on only one side of the groove sidewalls at the protruding point of the zigzag angled portion, said lateral grooves connecting the other side of the groove sidewalls of the central longitudinal groove opposite said platform with said side longitudinal grooves;



the depth of the platform from the tread surface to the platform being in a range of 40 to 80% of the depth of the central longitudinal groove; the circumferential length of the platform being in a range of 15 to 40% of the zigzag pitch of the central longitudinal groove; and the width of the platform being in a range of 5 to 20% of the width of the central longitudinal groove.

**4,955,416**  
**PNEUMATIC RADIAL TIRE CARCASS PROFILE**  
Akihiro Takeuchi, Kobe; Kouichi Horiuchi, Akashi; Kiyoshi Ochiai, and Hideaki Yoshikawa, both of Kobe, all of Japan, assignors to Sumitomo Rubber Industries, Ltd., Japan  
Continuation-in-part of Ser. No. 835,783, Mar. 3, 1986, abandoned. This application Apr. 18, 1988, Ser. No. 185,273  
Int. Cl.<sup>5</sup> B60C 3/00  
U.S. Cl. 152—454 10 Claims



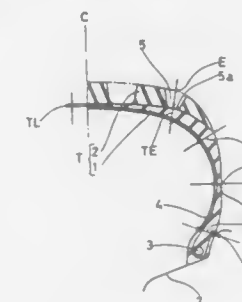
1. A pneumatic radial tire constructed to increase tread lateral stiffness, comprising:  
a tread with a radially outer profile curved in a plane including the tire axis;  
a carcass reinforced by at least one carcass ply of substantially radially arranged unstretchable parallel cords, and said carcass having carcass shoulders radially inside both ends of said tread;  
a belt, disposed between the carcass and the tread, and comprising at least two plies of parallel cords arranged at a comparatively small degree of angle with respect to the circumferential direction of the tire to cross the cords of each ply with the cords of the next ply so that when the tire is mounted on a rim officially specified for use with said tire and inflated to specified maximum pressure, said

carcass shoulders move radially outwardly and a carcass center therebetween does not move substantially; in which said tread profile increases in radius of curvature by the outward movement of the carcass shoulders upon increase in the air pressure, and the radius of curvature of said tread profile satisfies the following relation:

$$1.2 \leq TR2/TR1 \leq 1.5$$

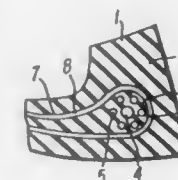
where TR1 is the radius of curvature when the tire is inflated to 5% pressure of the specified maximum pressure, and TR2 is the radius of curvature when inflated to the specified maximum pressure, whereby a compressive strain in the axial direction of the tire is caused to occur in the tread and its lateral stiffness is increased.

**4,955,417**  
**LOW PRESSURE TIRE**  
Yasuo Igarashi, Kawanishi, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan  
Filed Jan. 21, 1988, Ser. No. 210,413  
Claims priority, application Japan, Jan. 23, 1987, 62-156988  
Int. Cl.<sup>5</sup> B60C 3/00  
U.S. Cl. 152—454 2 Claims



1. A low pressure tire comprising:  
a rubber main body comprising a pair of bead portions having a bead core, a crown portion and a pair of sidewall portions extending therebetween;  
a rubber tread disposed on the crown portion of the rubber main body, said rubber tread having tread grooves; and  
a carcass of cords provided on an inner surface of the rubber main body and extending between the bead portions, thickness of rubber in the tire being defined as a distance from the carcass ply to a level of the tread groove bottom in a range in which said rubber tread is disposed on the rubber main body and defined, in the remaining range, as a distance from the carcass ply to the outer surface of the main body, the thickness being a maximum of 4 to 9 mm at a point between a tread edge and a maximum tire width section, the rubber thickness being gradually decreased from the maximum rubber thickness points toward the tire equator and towards the respective maximum tire width section, the rubber thickness at the tread edge being 1/1.3 to 1/3.5 times the maximum rubber thickness, the rubber thickness at the maximum tire width section being 1/1.1 to 1/2.5 times the maximum rubber thickness.

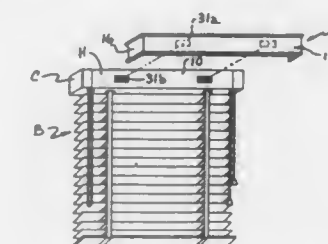
**4,955,418**  
**PNEUMATIC VEHICLE TIRE**  
Johannes J. Baumböfer, Aachen, Fed. Rep. of Germany, assignor to Uniroyal Englebert Reifen GmbH, Aachen, Fed. Rep. of Germany  
Filed Mar. 10, 1989, Ser. No. 321,953  
Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 8803348[U]  
Int. Cl.<sup>5</sup> B60C 15/00  
U.S. Cl. 152—539 3 Claims



1. In a pneumatic vehicle tire having tire beads comprising a rubber mixture respectively elastomeric material, with each bead being provided with a bead ring that is resistant to pressure and bending and said bead ring is in the form of a steel cable comprised of a cable core wire and a plurality of cable sheathing-wires that impart a circular shape to said bead ring cable, and said bead ring cable is able to pivot slightly in said bead, and with said tire including a carcass that is anchored in said bead on said bead ring cable and said carcass is provided with a coating of elastomeric material, the improvement wherein:

each of said cable sheathing-wires of said bead ring cable has an outer surface that is in contact with elastomeric material in said tire bead, with each of said cable sheathing-wires of said bead ring cable being pivotable in relation to said elastomeric material when the same is vulcanized so that positioning thereof is fixed prior to and during vulcanization of the tire during mounting of which on a rim consequently a necessary slight ability of the bead ring to pivot is assured due to both torsional resilience of the steel cable and also the elastomeric material in contact with the outer surface of each of said cable sheathing-wires is substantially unbonded to said bead ring cable.

**4,955,419**  
**FOLDABLE VALANCE**  
John F. Morris, Lake Mills, Wis., assignor to Graber Industries, Inc., Middleton, Wis.  
Filed Sep. 22, 1989, Ser. No. 410,839  
Int. Cl.<sup>5</sup> E06B 9/00  
U.S. Cl. 160—38 8 Claims



1. A foldable valance for a headrail having a front and ends, the valance including an elongated front panel and at least one return panel, the front panel and return panels each having an inner and an outer side face and end faces adapted to abut when the inner side face of the return panel extends generally perpendicular to the inner side face of the front panel, a one-piece hinge formed of flexible plastic and including first and



second plate portions and an integral hinge portion flexibly connecting the first and second plate portions, means attaching the first plate portion to the inner side face of the front panel and means attaching the second plate portion to the inner side face of the return panel to hingedly connect the front and return panels for movement between a folded position in which the inner side face of the return panel extends alongside the inner side face of the front panel and an erected position in which the inner side face of the return panel extends transverse to the inner side face of the front panel, the one-piece hinge including a tab integral with the second plate portion of the hinge and bendable from a normal position disposed generally in the plane of the second plate portion to a position extending transverse to the second plate portion for retaining the return panel in the erected position with the end faces of the front and return panels in abutting relation.

4,955,420

## CORD LOCKING MECHANISM

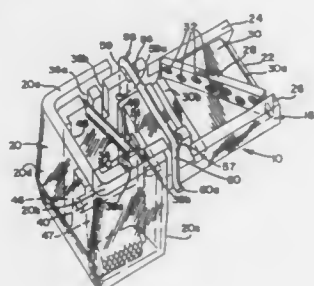
Florin Marinescu, Tega Cay, S.C.; Bakulesh N. Patel, Charlotte, N.C., and William M. Hammond, Irvine, Calif., assignors to CHF Industries, Inc., Charlotte, N.C.

Filed Oct. 17, 1989, Ser. No. 422,524

Int. Cl.<sup>5</sup> E06B 9/324

U.S. Cl. 160—178.2

12 Claims



1. A locking mechanism for a plurality of cords of a window blind or the like and into which the cords extend in a substantially horizontal direction and from which the cords extend in a substantially vertical direction, said mechanism comprising cord separating means for separating the cords substantially horizontally as they enter said mechanism, said cord separating means including an obliquely disposed separation member having an integral base and upper portion, said upper portion having a plurality of separate holes therethrough, each hole for accommodating a single cord, oblique guide means positioned outwardly from said cord separating means and over which the cords extend substantially horizontally and from which the cords extend substantially vertically, cord gripping means positioned below said guide means and including first and second gripping members for receiving the cords therebetween, at least one of said gripping members being selectively movable toward the other gripping member to grip the cords and prevent vertical upward movement of the cords therebetween and movable away from the other gripping member to release the cords and permit vertical upward movement of the cords therebetween.

4,955,421

## CONTINUOUS CORD ROLL UP BLIND

Anthony Torti, Warwick, R.I., assignor to Kenney Manufacturing Company, Warwick, R.I.

Filed Aug. 31, 1989, Ser. No. 401,083

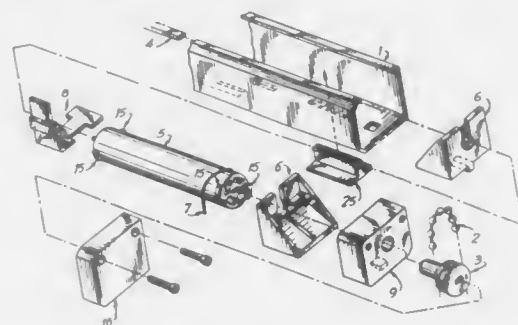
Int. Cl.<sup>5</sup> A47H 1/00

U.S. Cl. 160—243

8 Claims

1. A continuous cord roll up apparatus comprising:  
a headrail;  
a sprocket rotatably connected at one end of said headrail;

an endless cord in engagement with said sprocket for rotating said sprocket;  
a take up spool rotatably connected to said sprocket and comprising a tab portion associated therewith;  
a take up cord connected at one end to said take up spool and extending below said headrail and back up to and connected to said headrail; and



a generally L-shaped take up cord guide having a generally horizontal leg and a generally vertical leg slidably located between said take up spool and said headrail for interacting with said tab portion of said take up spool to prevent further rotation of said take up spool in one direction when said generally L-shaped take up cord guide is adjacent one end of said take up spool.

4,955,422

## SHOWER CURTAIN OPERATOR

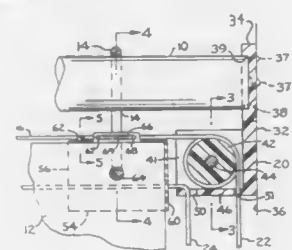
Guillermo Irizarry, 910 Briarcliff Dr., Valrico, Fla. 33594

Filed Jul. 13, 1989, Ser. No. 379,263

Int. Cl.<sup>5</sup> A47H 5/00

U.S. Cl. 160—344

3 Claims



1. In combination with a shower curtain assembly that includes a horizontal rod, a flexible shower curtain located below said rod, and a series of suspension rings extending over the rod and through openings in the curtain, to thereby suspend the curtain from the rod;

the improvement comprising means for opening and closing the curtain without manual gripment of the curtain material; said opening-closing means comprising a flexible pull cord having horizontal cord sections running along the upper edge of the flexible curtain, means at each end of the horizontal rod for guiding and redirecting the pull cord, and means for attaching said cord to an upper corner of the curtain;

each said guiding-redirecting means comprising a bracket structure adapted to seat against a bathroom wall surface between said surface and the associated end of the shower curtain rod, and a horizontal axis pulley rotatably mounted on each said bracket structure directly below the curtain rod;

said cord-attaching means comprising a U-shaped plate structure formed entirely of plastic; said U-shaped plate structure comprising two spaced parallel vertical

plates having upper edges thereof elevated slightly above the upper edge of the shower curtain, and a resilient integral hook extending from one plate across the upper edge of the other plate to maintain the two plates clamped against opposite faces of the curtain; said cord-attaching means further including a horizontally elongated apertured lug projecting upwardly from the U-shaped plate structure, said lug having two cord-receiver apertures extending therethrough to attach the plate structure to the cord; said cord-receiver apertures being horizontally spaced along the upper edge of the curtain so that the attached cord section maintains a horizontal orientation along the curtain upper edge.

4,955,423

## METHOD OF MAKING A TURBINE ENGINE COMPONENT

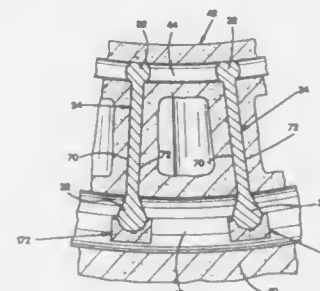
William S. Blazek, Valley City, Ohio, assignor to PCC Airfoils, Inc., Cleveland, Ohio

Filed Jan. 25, 1989, Ser. No. 301,867

Int. Cl.<sup>5</sup> B22C 9/04

U.S. Cl. 164—35

82 Claims



1. A method of making a turbine engine component having a plurality of airfoils disposed in an annular array between shroud rings, said method comprising the steps of positioning a plurality of airfoils in an annular array with end portions of the airfoils at least partially enclosed in a shroud ring pattern and with core material disposed at end portions of the airfoils, the core material being at least partially enclosed by material of the shroud ring pattern, at least partially covering the shroud ring pattern and core material with ceramic mold material to form a mold, removing the shroud ring pattern from the mold to leave a shroud ring mold cavity, the end portions of the airfoils and the core material being at least partially disposed in the shroud ring mold cavity, filling the shroud ring mold cavity with molten metal, said step of filling the shroud ring mold cavity with molten metal including the steps of at least partially enclosing the end portions of the airfoils and the core material with a body of molten metal having a configuration corresponding to the configuration of the shroud ring, solidifying the molten metal in the shroud ring mold cavity to form the shroud ring, said step of solidifying the molten metal including solidifying the molten metal in the shroud ring mold cavity with the core material at least partially disposed in the shroud ring mold cavity, and removing the core material from the shroud ring to leave space in the shroud ring to accommodate thermal expansion of the airfoils.

4,955,424

## DIE-CASTING METHOD AND DEVICE

Fumitaka Takehisa, Anjo; Fumio Kondoh, Nagoya, and Mitsuyoshi Yokoi, Takahama, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Continuation of Ser. No. 160,987, Feb. 26, 1988, abandoned.

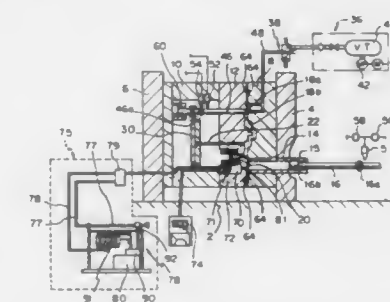
This application Aug. 9, 1989, Ser. No. 391,393

Claims priority, application Japan, Feb. 28, 1987, 62-45824; Dec. 23, 1987, 62-326560; Jan. 20, 1988, 63-11582

Int. Cl.<sup>5</sup> B22D 17/00

U.S. Cl. 164—72

23 Claims



1. A die-casting method using a first mold having a mold cavity surface, a second mold having a mold cavity surface and brought into contact with said first mold so that said mold cavity surfaces of said first and second molds define a mold cavity, means for injecting a molten metal into said mold cavity, means for ejecting from said mold cavity a solidified article made by allowing said molten metal to solidify, and a heating device heating a lubricant, said method comprising the steps of:

forming said mold cavity by bringing said second mold into contact with said first mold;

heating said lubricant to a temperature higher than a temperature of said mold cavity surfaces of said first and second molds before said molten metal is injected into said mold cavity, so that said lubricant is decomposed; then introducing said decomposed lubricant into said mold cavity so that said lubricant is condensed and applied on said mold cavity surfaces of said first and second molds; injecting said molten metal into said mold cavity; allowing said molten metal to solidify in said mold cavity; separating said second mold from said first mold; and ejecting the solidified article from said mold cavity.

4,955,425

## CASTING HANDLING APPARATUS

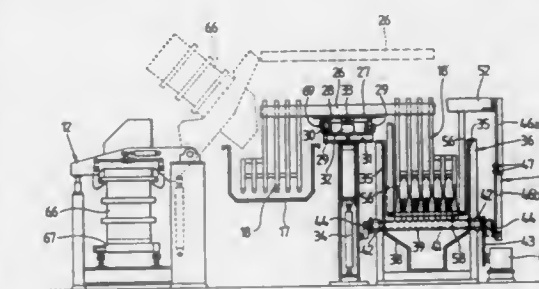
James F. McKenna, 2605 Chandalor Ln., Pelham, Ala. 35124

Filed Sep. 19, 1988, Ser. No. 245,504

Int. Cl.<sup>5</sup> B22D 29/00

U.S. Cl. 164—269

23 Claims



1. Apparatus for handling hot foundry castings discharged from sand molds, without damage thereto comprising:  
(a) means for receiving a foundry casting and a quantity of

encasing sand from an associated sand mold including means pervious to said encasing sand for supporting said foundry casting;

(b) means for vertically moving said means for supporting such that said means for supporting segregates said foundry casting from said sand;

(c) means for translating said means for supporting such that said means for supporting is displaced laterally to a predetermined position including a turntable which is mounted for rotation about a vertical axis with a means for driving said turntable to precise angular positions and also with an elongated beam member affixed to said turntable and extending radially therefrom and having a distal end which is permanently attached to said supporting means; and

(d) means subjacent said displaced position capable of interstitial engagement with said supporting means for removing said foundry casting from said means for supporting.

4,955,426

**PRESSING MECHANISM FOR CASTING APPARATUS**  
Haruo Akimoto, Yamaguchi, and Kunio Takeya, Tokyo, both of Japan, assignors to Ube Industries, Ltd., Japan

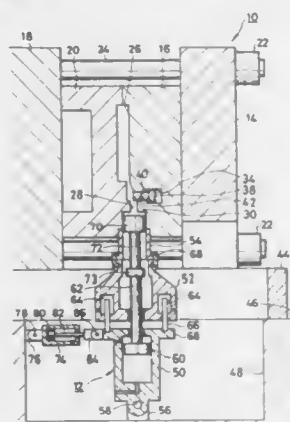
Filed Jul. 11, 1989, Ser. No. 378,164

Claims priority, application Japan, Jul. 26, 1988, 63-184515

Int. Cl.<sup>5</sup> B22D 18/02, 27/11

U.S. Cl. 164—314

17 Claims



1. A pressing mechanism for a casting apparatus, comprising,

a mold including a cavity for solidifying molten metal therein, a runner portion and a biscuit portion for introducing molten metal to the cavity through the runner portion, said runner and biscuit portions being arranged vertically to prevent slag in the molten metal from entering into the runner,

means for supplying molten metal into said cavity, said means having a sleeve for storing molten metal and communicating with said biscuit portion, and a plunger tip situated in said sleeve, said plunger tip being able to protrude from said sleeve so that the molten metal is fed into the mold after the sleeve communicates with the biscuit portion, and

means for feeding molten metal and having a feeding rod disposed in the mold for protruding into the runner portion and means for reciprocating the feeding rod, wherein the runner has a size of  $S_3 \leq P_A/P_B \cdot S_1$ , in which  $S_3$  is a sectional area of the runner,  $P_A$  is injection pressure by the plunger tip,  $P_B$  is feeding pressure by the feeding rod, and  $S_1$  is a sectional area of the plunger tip.

4,955,427

**PLACEMENT OF PARTICULATES ONTO REFRACTORY FILTERS FOR LIQUID METALS**

Jay R. Hitchings, Downingtown, Pa., assignor to Amenex Associates, Inc., West Chester, Pa.

Filed May 15, 1989, Ser. No. 351,662

Int. Cl.<sup>5</sup> B22C 9/08

U.S. Cl. 164—358

2 Claims

1. In a casting mold, a filter for metallurgically filtering and treating molten metal with particulate additives comprising:

1. a hard fired ceramic or refractory cloth filter, with particulate additives placed on the surface of the filter and encapsulated in a char forming carbonaceous resin coating.

4,955,428

**DEVICE FOR CONTINUOUS CASTING OF SLABS**

Hans Schrewe, Duesseldorf, Fed. Rep. of Germany, assignor to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

PCT No. PCT/DE87/00370, § 371 Date Feb. 21, 1989, § 102(e) Date Feb. 21, 1989, PCT Pub. No. WO88/01209, PCT Pub. Date Feb. 25, 1988

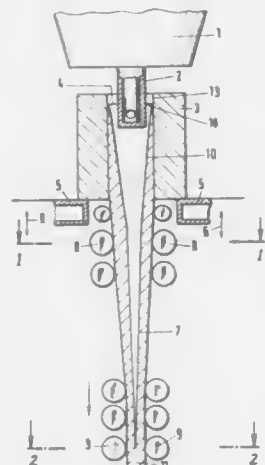
PCT Filed Aug. 17, 1987, Ser. No. 331,530

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1986, 3627991

Int. Cl.<sup>5</sup> B22D 11/04, 11/12

U.S. Cl. 164—417

2 Claims



1. Apparatus for continuous casting of slabs with considerably larger width than thickness, particularly of steel slabs with a thickness below 80 mm, including a casting pipe and spout for pouring molten material from a casting vessel into a mold, the mold having a charge and pour-in cross-section, whose middle portion deviates from the desired casting contour in a cross-section increasing fashion, the edge zones of the mold corresponding to the desired casting format the cross-sectional format at the charge and pour-in end of the mold is maintained over the entire mold length, and the casting skin as emerging from the mold is to be deformed in the middle portion by means of guide and support means being arranged directly downstream from the mold such that following passage through the deforming path, the surfaces of the entire casting are situated in the surfaces of the edge zone; the improvement comprising:

the cross-section of the mold in the middle portion of the casting being outwardly uniformly bulged, but a bulge being smaller in a discharge and exit end from the mold, as compared with a larger bulge cross-section at the pour-in and charge end whereby geometric lines delineating a transition from the plane slab surface of the mold to the bulging surface of the mold has a downwardly oriented narrowing tapering and conicity in longitudinal direction

matching a cross-sectional and conicity increase of the bulging portion, but to be not more than 1.2%, a spacing and distance from an outer periphery of the casting pipe and spout and an apex point of said bulge at the pour-in and charge end in a surface level of the molten material is at least 20 mm;

at least one roll of at least one pair of rolls of the guide and support means downstream from the mold being provided with sizing dimension matching an emerging casting; and a distance between the rolls of a roller pair from roller pair to roller pair reduces in the direction of casting by at least 0.5 mm, but not more than 25 mm, such that any deformation at the front of solidification does not exceed a value of 0.5%.

4,955,429

**APPARATUS FOR AND PROCESS OF DIRECT CASTING OF METAL STRIP**

LeRoy Honeycutt, III; James C. Key, and Herbert Moody, III, all of Salisbury, N.C., assignors to Reynolds Metal Company, Richmond, Va.

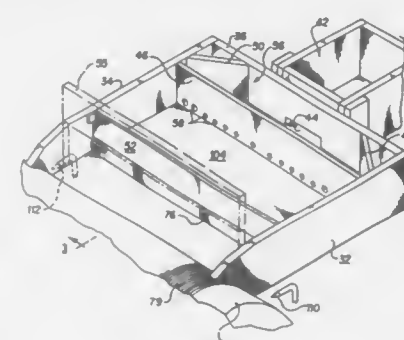
Continuation-in-part of Ser. No. 179,536, Apr. 8, 1988, Pat. No. 4,828,012. This application Mar. 14, 1989, Ser. No. 323,018

The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B22D 11/06

U.S. Cl. 164—479

23 Claims



1. In a process for direct casting of molten metal to form strip by solidification of molten metal on a moving chill surface using a vessel having a floor, spaced sidewalls, an inlet, and an outlet opposite the inlet and extending between the sidewalls for supplying molten metal to the chill surface, the improvement comprising the steps of:

positioning the vessel with the outlet adjacent the chill surface;

providing a source of molten metal to be cast;

withdrawing at least one inlet stream of molten metal from the source and flowing the inlet stream into the vessel through the inlet;

providing a flow obstruction in the vessel in the path of the inlet stream;

utilizing the flow obstruction to divert and distribute the inlet stream to provide a substantially uniform rate of flow of liquid metal through the vessel across its full width downstream of said obstruction means; and

diffusing the molten metal flowing through the vessel downstream of the flow obstruction to provide molten metal at a substantially uniform temperature at the vessel outlet across the full width of the outlet.

10. In a tundish for use in direct casting of metal strip by solidification of molten metal on a moving chill surface, said tundish including a floor, an end wall, a pair of laterally spaced sidewalls, an outlet opposite said end wall and having a transverse discharge surface extending between said sidewalls for flowing a stream of molten metal onto the moving chill surface, means providing a source of molten metal to be cast, and

an inlet in said end wall communicating with said source for directing a flow of molten metal from the source into the tundish in a direction toward said outlet, said inlet being located at a level below the level of molten metal in the tundish during casting, the improvement comprising

flow obstructing wall means extending transversely of said tundish between said sidewalls at a location downstream of said end wall,

flow distribution opening means extending through said flow obstructing wall means at a location below the level of molten metal during casting whereby said flow obstructing wall means acts as a skimmer for impurities floating on the molten metal during casting, said opening means being located and dimensioned to provide a submerged flow path for molten metal through said flow distributing wall means at a substantially uniform rate across the width of said tundish between said sidewalls downstream of said flow obstructing wall means, and

flow diffusing means in said tundish downstream of said flow obstructing means, said diffusing means extending upwardly from said bottom wall across the full width of said tundish between said sidewalls and providing a substantially uniform array of openings across the full width of the tundish, said array of openings being dimensioned and located to diffuse the flow of molten metal to provide molten metal at a substantially uniform temperature at the tundish outlet across the full width of the tundish.

4,955,430

**CONTINUOUS LEAD-FLOAT CASTING OF STEEL**  
William L. Sherwood, 7249 Cypress Street, Vancouver B.C., Canada V6P 5M2

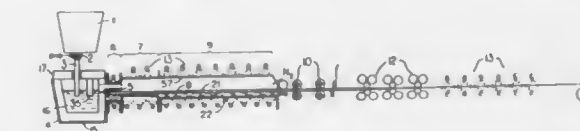
Continuation of Ser. No. 21,749, Mar. 4, 1987, abandoned. This application Feb. 13, 1989, Ser. No. 309,124

Claims priority, application Canada, Sep. 29, 1986, 519252

Int. Cl.<sup>5</sup> B22D 11/124

U.S. Cl. 164—485

25 Claims



1. A method for the continuous casting of steel comprising: maintaining a molten lead pool in a lead-holding tray having an entry end, an exit end and an enclosed cover;

maintaining a feed reservoir of liquid steel adjacent said entry end, separated from said molten lead pool by a barrier dam spaced transversely across said entry end separating said pool from said reservoir; allowing continual flow of liquid steel by gravity from said feed reservoir and uniformly distributed between said edge dams by way of at least one passage across said barrier dam to form a top layer of liquid steel floating on the surface of said molten lead pool;

confining either side of said layer of liquid steel between lateral edge dams immersed in said pool and intersecting with said barrier dam, adapted to limit the width of said layer of steel;

continually removing heat from said pool and layer of steel by means of cooling media directly applied to the bottom of said tray; maintaining a solidification front of cohesive solidified steel at a transition between all liquid steel and partially solidified steel slab spanning the width of said pool between said lateral edge dams, by increasing the heat flux from the steel through the lead pool to the tray and cooling media by means of a substantial decrease of molten lead pool depth; continually removing heat from the top of said layer of steel by means of cooling media directly applied to said enclosed cover which, combined



with said cooling of said tray, thereby forms a solidified steel slab by progressive freezing of said layer of steel as it passes from said entry end towards said exit end; continually replenishing said feed reservoir with infed of new liquid steel; and continually withdrawing said slab away from the exit end of said molten lead pool to make space for additional liquid steel at said entry end thereby maintaining a continuous layer of progressively solidifying steel moving from said entry towards said exit end of said molten lead pool during the course of casting.

12. An apparatus for continuous casting of steel comprising: lead-holding tray means having an entry end and an exit end adapted for holding a molten lead pool and allowing a layer of steel to float on the surface of the lead; edge dam means immersed longitudinally in said pool at least to the maximum depth of said steel adapted to limit the width of said layer of steel;

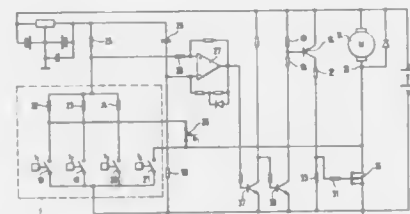
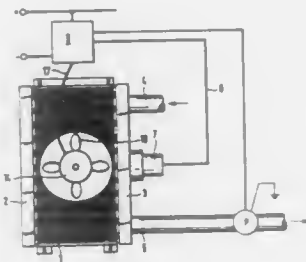
a width distributor launder at said entry end adapted for maintaining a continually replenished reservoir of liquid steel ready for casting; dividing dam means separating said reservoir and said molten lead pool extending transversely across the pool to connect with the entry end of said edge dam means, and adapted for feeding of liquid steel directly into said layer without direct impingement of liquid steel upon said molten lead pool during said feeding.

cover means enclosing the top of said lead-holding tray; heat removal means by direct cooling applied to the bottom surface of said tray means and top surface of said cover means, adapted for extracting heat from said pool and layer of steel and effecting solidification of said steel intermediate said entry and exit end to form a steel slab having at least its entire surface perimeter solidified; slab withdrawal means adapted for continually withdrawing said steel slab from said exit end;

said lead-holding tray comprises three principal areas:

- (1) a feed settling area at the entry end subjected to moderate and restrained heat removal adapted to provide a non-turbulent layer of floating liquid steel across the casting width;
- (2) an intermediate liquid-solid solidification front area subjected to intense cooling adapted for rapidly effecting a solidification front of cohesive solidified steel shell spanning between said edge dams, with sharply reduced lead pool depth;
- (3) a partially-solid slab cooling and solidification area subjected to moderate cooling adapted to substantially complete the interior solidification of the steel slab with moderate pool depth.

speeds allocated in steps to respective switching thresholds, and



bypassing said power semiconductor device to drive said electric motor when a last switching contact closes by connecting said electric motor directly to said last switching contact.

#### 4,955,432 HOT GAS FLUE PIPE

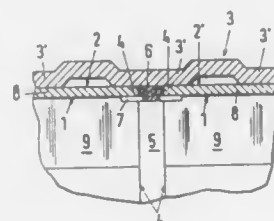
Hans Viessmann, Im Hain, D-3559 Battenberg/Eder, Fed. Rep. of Germany

Filed Apr. 25, 1989, Ser. No. 331,631

Int. Cl.<sup>5</sup> F28F 21/08

U.S. Cl. 165—81

8 Claims



1. A hot gas flue pipe assembly suitable for installation inside a heating boiler, said hot gas flue pipe assembly comprising an outer pipe and an inner pipe, said outer pipe having heat transfer contact points said outer pipe being in contact with said inner pipe over at least a portion of its length and further in contact in at least in sub-zones thereof by means of circumferential contact deformations so as to facilitate heat transfer, said inner pipe comprising at least one section, said inner pipe delimiting with the opposing ends of its sections a circumferential gap that is filled with an elastic, heat-resistant and moisture-resistant cement.

#### 4,955,431 COOLING DEVICE FOR AN INTERNAL COMBUSTION ENGINE AND METHOD FOR CONTROLLING SUCH A COOLING DEVICE

Roland Saur, Stuttgart, and Rolf Schaper, Ditzingen, both of Fed. Rep. of Germany, assignors to Behr-Thomson Dehnstoffregler GmbH, Kornwestheim, Fed. Rep. of Germany

Filed Feb. 11, 1988, Ser. No. 155,118

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1987, 3711392

Int. Cl.<sup>5</sup> F01P 7/04; G05D 23/02, 23/24

U.S. Cl. 165—1

18 Claims

15. A method for controlling a cooling device for an internal combustion engine, said method comprising the steps of: successively switching contacts of a temperature sensitive sensor of a control circuit for said cooling device when predetermined switching thresholds are reached to change an input parameter to a non-inverting input of an operational amplifier provided in said control circuit; driving a power semiconductor device included in said control circuit with an output of said operational amplifier in such a manner that an electric motor connected to said semiconductor device coupled to at least one of a fan and cooling water pump is operated at certain rotational

#### 4,955,433 HEATING OR COOLING ROLLER

Heinz-Michael Zaoralek, Königsbrunn, Fed. Rep. of Germany, assignor to Schwäbische Hüttenwerke GmbH, Aalen-Wasseralfingen, Fed. Rep. of Germany

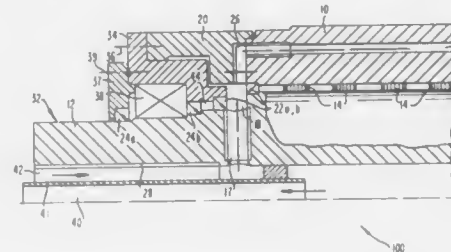
Filed Nov. 14, 1989, Ser. No. 435,899

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1988, 3838726

Int. Cl.<sup>5</sup> F28F 5/02

U.S. Cl. 165—89

7 Claims



1. A heating or cooling roller comprising a stationary axle, at least one hydrostatic or hydrodynamic bearing element to support a rotary roller shell on the stationary axle, and a heatable or coolable heat transfer medium which flows through an annular gap between the stationary axle and the rotary roller shell, wherein the roller shell has peripheral, axially parallel orifices for the heat transfer medium, and the heat transfer medium is supplied and removed through at least one radial channel in the stationary axle and via at least one annular space between the roller shell and the stationary axle.

#### 4,955,434 RADIATOR ASSEMBLY AND A COWL ASSEMBLY THEREFOR

Henry C. Price, Carmarthen, United Kingdom, assignor to Llanelli Radiators Limited, United Kingdom

PCT No. PCT/GB88/00607, § 371 Date Jun. 19, 1989, § 102(c)

Date Jun. 19, 1989, PCT Pub. No. WO89/00931, PCT Pub. Date Feb. 9, 1989

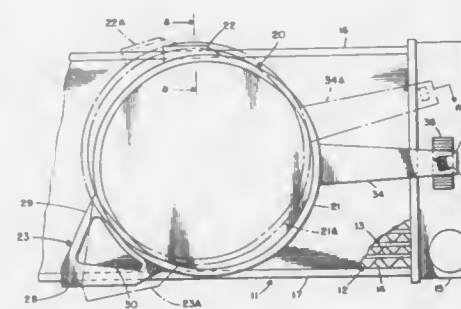
PCT Filed Jul. 25, 1988, Ser. No. 377,842

Claims priority, application United Kingdom, Jul. 24, 1987, 8717649

Int. Cl.<sup>5</sup> F01P 11/10

U.S. Cl. 165—122

20 Claims



9. A cowl assembly for a radiator comprising a duct portion to direct cooling air towards or away from a fan and at least two securing means on one end of said duct portion to secure said cowl assembly to a radiator by co-operation with opposite ends thereof, the arrangement being such that in a first unlocked position the cowl assembly can be removed from the radiator and in a second locked position separation of the cowl assembly from the radiator is prevented, the transition from

said first position to said second position being achieved by rotation of said cowl assembly relative to said radiator.

#### 4,955,435 HEAT EXCHANGER FABRICATED FROM POLYMER COMPOSITIONS

Jerry P. Shuster, Oakville, and Anthony J. Cesaroni, Agincourt, both of Canada, assignors to Du Pont Canada, Inc., Mississauga, Canada

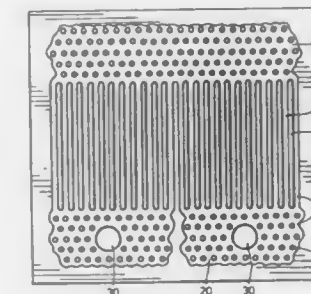
Filed Apr. 6, 1988, Ser. No. 178,387

Claims priority, application United Kingdom, Apr. 8, 1987, 8708384; Apr. 8, 1987, 8708385

Int. Cl.<sup>5</sup> F28F 3/14

U.S. Cl. 165—170

3 Claims



1. A panel heat exchanger comprising a generally planar panel having a pair of unitary outer walls of a thickness in the range of 0.12-0.50 mm and formed from a composition of aliphatic polyamide, said unitary outer walls being circumferentially bonded together and further said unitary outer walls being bonded together to define inlet and outlet header areas and a labyrinth of fluid passages extending between the inlet and outlet header areas, said fluid passages occupying a substantial proportion of the area of the panel.

#### 4,955,436 SEAL APPARATUS

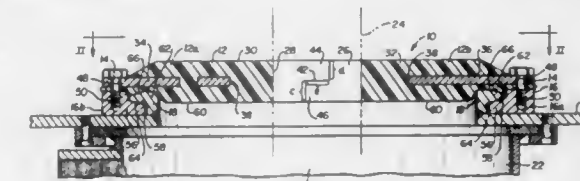
Vaughn R. Johnston, 240 Kelley Rd., Washington, Pa. 15301

Filed Dec. 18, 1989, Ser. No. 451,608

Int. Cl.<sup>5</sup> E21B 33/02

U.S. Cl. 166—82

10 Claims



1. A resiliently flexible seal assembly adapted to be mounted with respect to a seal mounting portion of a drilling rig to enclose the circumferential periphery of an elongated drilling apparatus comprising:

a pair of resiliently flexible members; said resiliently flexible members having respective first sealing surface portions which are mutually engageable and second sealing surface portions which are mutually cooperable to enclose the circumferential periphery of such a drilling apparatus when said first sealing surface portions are mutually engaged;

a pair of rigid support members affixed with respect to said resiliently flexible members, respectively, to support said resiliently flexible members with said first sealing surface portions in mutually confronting relation and to selectively move said first sealing surface portions into said mutual engagement and said second sealing surface portions

tions into said enclosing relation about the circumferential periphery of such a drilling apparatus; said first sealing surface portions being cooperable upon movement thereof into said mutual engagement to maintain mutually sealed interengagement therebetween with said second sealing surface portions in enclosing relation about the circumferential periphery of such a drilling apparatus and; each said rigid support member including a surface means which is cooperable with such a seal mounting portion of a drilling rig to move portions of said resiliently flexible members into sealing engagement with such a seal mounting portion upon said moving of said first sealing surface portions into said mutual engagement.

4,955,437

### UNDERGROUND ELECTROMAGNETIC TILLAGE DEPTH SENSOR

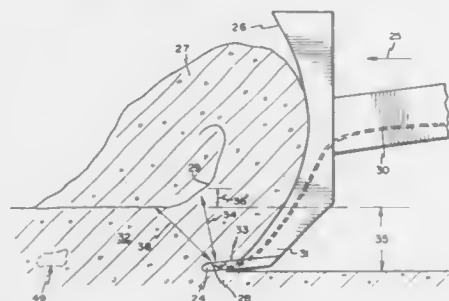
Carl E. Bohman, New Holland, Pa., assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Jan. 9, 1990, Ser. No. 463,257

Int. Cl.<sup>5</sup> E02F 9/20; A01B 63/111

U.S. Cl. 172—1

23 Claims



1. A device for determining the depth below the ground surface of a working member of an earth moving equipment, said device comprising:

- (a) sensor means for transmitting an electromagnetic signal from underneath and toward the ground surface and for receiving a portion of the signal reflected from the ground surface;
- (b) means for positioning said sensor means underneath the ground surface in fixed spatial relationship to the working member such that said sensor means is under the ground surface when at least a portion of the working member is under the ground surface; and
- (c) means connected to said sensor means for processing the received reflected signal and for indicating the depth under the ground surface of the working member portion, whereby the time of travel of the signal and the reflected signal between said sensor means and the ground surface is proportional to the depth.

4,955,438

### CORE DRILLING TOOL

Rainer Juergens, Celle, and Axel Sperber, Edemissen, both of Fed. Rep. of Germany, assignors to Eastman Christensen Company, Salt Lake City, Utah

Filed Apr. 21, 1989, Ser. No. 341,928

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813508

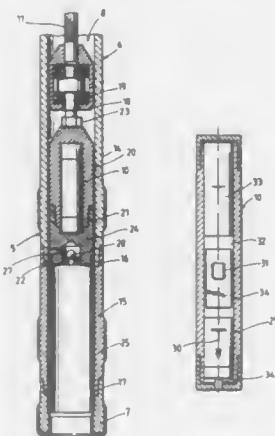
Int. Cl.<sup>5</sup> E21B 25/02, 47/022, 47/06, 47/12

U.S. Cl. 175—40

11 Claims

1. Core drilling tool for drilling rock in underground soil formations with an outside pipe that can be connected by means of connecting devices at its upper end to the lower end of a drill column that can be rotated by means of a drive and can be connected at its lower end to a core drilling crown, and with an inside pipe that forms a separate component that can be

conveyed to the surface and a supporting part which is supported in the outside pipe and is co-rotational with the latter as well as a core pipe part suspended on the carrying part by means of a bearing so it will not twist relative to the outside pipe and can receive a core cut by the drilling process, wherein the core pipe part comprises a measurement unit located in its



upper area for onsite acquisition, processing and storage of data that form parameters for the borehole, the drilling core and/or drilling process, and a traction device which can be connected to the inside pipe by means of a gripping device, said traction device comprising a line for transmission of measurement data to the surface.

4,955,439

### SELF-PROPELLED SUBSOIL PENETRATING TOOL SYSTEM

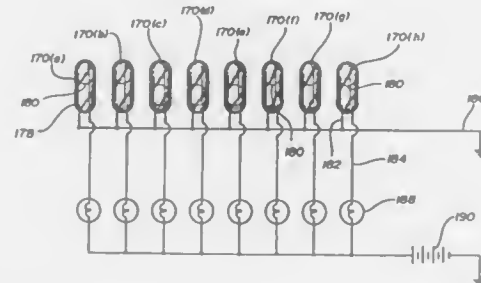
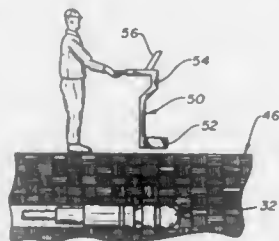
Frank R. Kinnan, Camas Valley, Oreg., assignor to Underground Technologies, Parsippany, N.J.

Division of Ser. No. 115,987, Nov. 2, 1987. This application Jun. 2, 1988, Ser. No. 201,198

Int. Cl.<sup>5</sup> E21B 47/022, 7/06

U.S. Cl. 175—45

5 Claims



1. A device for determining the orientation of a fluid oper-

4,955,441

### LOAD CELL MOUNTING FOR ROTATIONAL CONTROL

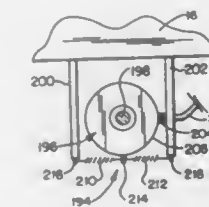
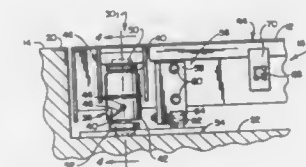
Nigel G. Mills, Worthington; Larry C. Heckendorn, Columbus; Curtis W. Long, Worthington, and Richard T. Smigel, Westerville, all of Ohio, assignors to Toledo Scale Corporation, Worthington, Ohio

Filed Sep. 26, 1989, Ser. No. 412,835

Int. Cl.<sup>5</sup> G01G 21/24, 19/02

U.S. Cl. 177—255

32 Claims



ated self-propelled subsoil penetrating tool with respect to a known reference comprising: mounting means fastened to said tool and rotatable therewith, said mounting means having a plurality of radially extending grooves extending extending outwardly from a central aperture; a plurality of mercury switches, one for each groove and mounted in such groove for rotation with said mounting means; said mercury switches arranged to open and close in dependence upon the degree of rotation of said tool with respect to such known reference; a remotely-located display panel; a plurality of indicator lights, one for each mercury switch, mounted upon said remote panel in a circular array arranged to be lit or extinguished depending upon the state of the mercury switch closure; a plurality of coupling means coupled to a mercury switch and its associated indicator light; and a reference indicator on said panel whereby the adjustment of the reference indicator in response to the indicator lights lit shows the angular orientation of the tool with respect to said known reference.

4,955,440

### ROTARY DRILL BITS WITH PLURAL SEALING SYSTEMS

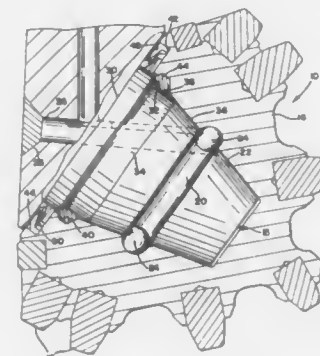
Javier Chavez, Edo, Venezuela, assignor to Intevp, S.A., Caracas, Venezuela

Filed Jul. 19, 1989, Ser. No. 382,559

Int. Cl.<sup>5</sup> F16C 33/76; F21B 10/22

U.S. Cl. 175—371

9 Claims



1. An earth boring rotary bit comprising:
  - a bearing shaft defining a bearing surface having a substantially frusto-conical configuration and terminating at its proximal end in a pedestal having an outside diameter larger than the diameter of the bearing shaft;
  - a cutter cone secured for rotation about the bearing shaft and having a bearing surface complementary to that of the bearing shaft;
  - a plurality of axially spaced sealing assemblies between the bearing shaft and the cone, one of said sealing assemblies defining a primary seal about the bearing shaft for said complementary bearing surfaces and another of said sealing assemblies being mounted on said pedestal and defining a secondary seal that prevents fluid access to the bearing surfaces and provides a force vector substantially along the longitudinal axis of the bearing shaft, each of said sealing assemblies providing sealing action while coacting to stabilize rotation of the cone about the bearing shaft.

4,955,442

### STEERING MECHANISM FOR A VEHICLE

Elmer R. Crabb, Aurora, and William J. Spivey, Joliet, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed May 16, 1989, Ser. No. 353,302

Int. Cl.<sup>5</sup> B62D 1/12, 11/18

U.S. Cl. 180—6.44

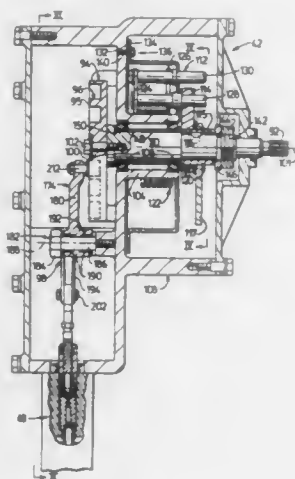
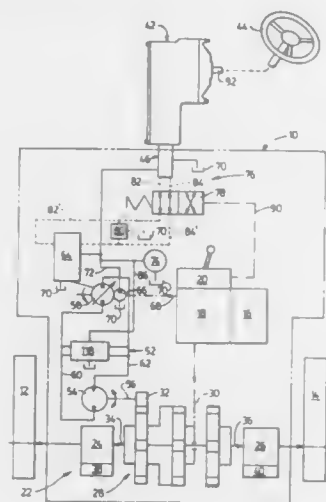
15 Claims

1. A steering mechanism of a vehicle for converting the rotational movement of a steering input control member to the controlled displacement of a left turn control valve and a right turn control valve, comprising:

- an input shaft;
- a single actuating cam connected to the input shaft for joint rotation about a central axis in either direction away from a central position in response to rotation of the steering input control member, the actuating cam defining a single profiled guide slot having a central transition portion and



a pair of end surfaces disposed oppositely away from the central transition portion; and



cam follower means for controllably displacing the left and right turn control valves and including a cam follower element received in the single profiled guide slot.

4,955,443

**MOTOR VEHICLE WITH ALL-WHEEL STEERING**  
Paul Bausch, Hattenheim, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 1, 1989, Ser. No. 305,322

Claims priority, application Fed. Rep. of Germany, Feb. 5, 1988, 3803466

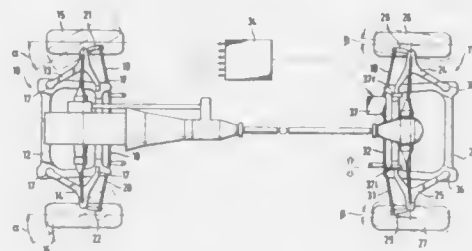
Int. Cl.<sup>5</sup> B62D 7/14

U.S. Cl. 180—79.1

2 Claims

1. A method of steering a vehicle, said vehicle including:
  - a steering wheel rotatable by a driver through a plurality of steering wheel angles,
  - a front steering system connected to said steering wheel, and
  - a rear steering system including
- a first rear steering means for steering a pair of rear wheels of said vehicle only in unison in the same direction by an electric motor operated actuator of said first rear steering means, and
- a second rear steering means for steering each rear wheel of said pair of rear wheels independently of the other rear wheel of said pair of rear wheels and independently of said first rear steering means,

said method comprising the steps of:  
sensing the velocity of said vehicle,  
sensing said steering wheel angle,  
steering said pair of rear wheels only by said first steering means in opposite phase relative to said front steering system when vehicle velocity is less than a predetermined velocity and steering wheel angle exceeds a predetermined steering wheel angle,  
steering each rear wheel of said pair of rear wheels only by



said second steering means when vehicle velocity exceeds said predetermined velocity and said steering wheel angle is less than said predetermined steering wheel angle, and  
sensing the actuation of a braking system of said vehicle, and oppositely steering each rear wheel of said pair of rear wheels by said second steering means so that each rear wheel of said pair of rear wheels toes-in when said braking system is actuated at vehicle velocities exceeding said predetermined velocity and at steering wheel angles less than said predetermined steering wheel angle.

4,955,444

**HYDROSTATIC STEERING DEVICE**

Jens K. Petersen, and Ole V. Sorensen, both of Nordborg, Denmark, assignors to Danfoss A/S, Nordborg, Denmark

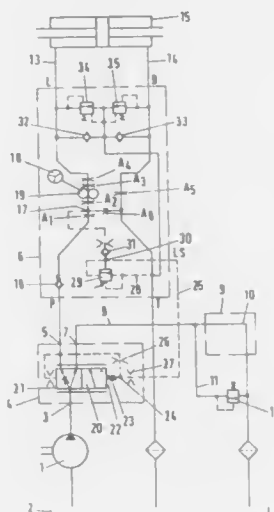
Filed Apr. 10, 1989, Ser. No. 335,957

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814508

Int. Cl.<sup>5</sup> B62D 5/08

U.S. Cl. 180—132

7 Claims



1. A hydrostatic steering device that is controlled by a steering element for controlling the flow of pressurized fluid from the pressurized outlet port of a pump to a fluid steering motor having first and second ports and the return of fluid to a container, comprising a priority valve having first and second outlets, and a slide member movable in a first direction and a

4,955,446

**HYDRAULIC POWER STEERING APPARATUS**

Hiroshi Ooishi, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan

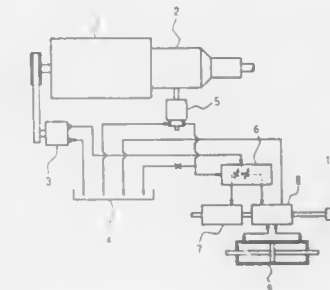
Filed Jan. 10, 1989, Ser. No. 295,640

Claims priority, application Japan, Jan. 26, 1988, 63-15228

Int. Cl.<sup>5</sup> B62D 5/08

U.S. Cl. 180—143

8 Claims



second direction, a tapping opening to the slide member for conducting fluid under pressure to urge the slide member to move in one of the first and second directions, a first fluid conduit fluidly connected to the first outlet of the priority valve, a control device for controlling fluid flow from the priority valve to the steering motor and from the steering motor to the container, the control device having a first junction, a first fluid connection, a second fluid connection fluidly connected to the steering motor first port, a third fluid connection fluidly connected to the steering motor second port, a first supply throttle, a flow meter, and a second supply throttle fluidly connected between the first junction and the meter, and a first check valve that opens toward the meter, is connected in series with the first supply throttle and is connected between the first junction and one of the first connection and the first conduit, first load means for providing a dynamic load pressure to operate the slide member between its positions, the first load means including a first pressure distributing throttle fluidly connected between the tapping and the first conduit, a second pressure distributing throttle fluidly connected to the tapping, and first conduit means fluidly connecting the second pressure distributing throttle to the first junction, the first conduit means including a second check valve that opens toward the first junction, second conduit means fluidly connected between the third connection and the container, the second conduit means including a return flow throttle and third conduit means fluidly connecting the return flow throttle to the container, and a withdrawal throttle fluidly connected to the first junction and to the second conduit means between the return throttle and the container, the withdrawal and return throttles forming a part of the control device, the withdrawal throttle having a neutral open position for conducting fluid from the first junction to the second conduit means.

1. A power steering apparatus comprising:
  - a hydraulic cylinder for generating a force assisting a steering force,
  - a directional control valve having a casing and a valve body rotating relatively according to steering operation, and switching the feeding direction of pressured oil to said hydraulic cylinder responsive to the direction of relative rotation,
  - a constraining device operated by pressured oil and applying a constraining force between said casing and valve body to constrain said relative rotation responsive to the oil pressure,
  - a vehicle speed sensor pump rotated at a speed proportional to the vehicle speed and developing oil pressure corresponding to the rotational speed,
  - an oil pressure control valve for controlling the oil pressure fed to said directional control valve and constraining device responsive to oil pressure developed by said vehicle speed sensor pump,
  - said oil pressure control valve comprises a cylindrical casing provided with first and second communicating ports communicating separately with said constraining device, and said oil pressure control valve controls said oil pressure fed to said constraining device by forming first and second variable throttles communicating separately with said first and second communicating ports.

4,955,445

**HYDROSTATIC AUXILIARY POWER STEERING MECHANISM FOR MOTOR VEHICLES**

Wolfgang Kauss, Lohr-Wombach, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr/Main, Fed. Rep. of Germany

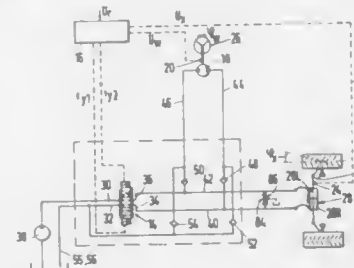
Filed Nov. 9, 1988, Ser. No. 268,777

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1987, 3738047

Int. Cl.<sup>5</sup> B62D 5/08

U.S. Cl. 180—133

11 Claims



1. A hydrostatic auxiliary power steering mechanism for motor vehicles comprising a steering cylinder having a power output controlled by a hydraulic servo mechanism, control loop means being provided for controlling and regulating a quantity of servo hydraulic fluid as a function of turning of a steering wheel of the vehicle, the fluid being supplied by a pump, wherein a hand pump is connected in parallel to the control loop means and is driven by the steering wheel.

4,955,447

**COMPOUND TYPE GUIDING METHOD AND APPARATUS FOR GUIDING MOVEMENT OF A VEHICLE**

Haruo Hashimoto, Kamakura, and Toyochi Ono, Isehara, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Japan

PCT No. PCT/JP86/00567, § 371 Date Nov. 30, 1987, § 102(e) Date Nov. 30, 1987, PCT Pub. No. WO88/03674, PCT Pub. Date May 19, 1988

PCT Filed Nov. 7, 1986, Ser. No. 143,999

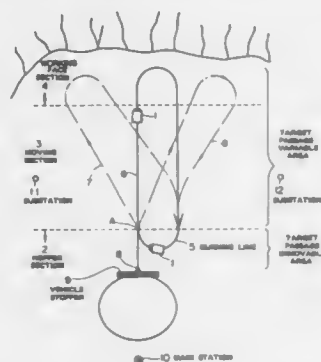
Int. Cl.<sup>5</sup> B60T 7/16

U.S. Cl. 180—168

3 Claims

1. A compound guiding apparatus for guiding the movement of a vehicle, characterized in that said apparatus comprises a guiding line for generating a magnetic field for the purpose of guiding movement of said vehicle, said guiding line being laid in a target passage immovable area where a high guiding accuracy is required, a main station for emitting radio wave for the purpose of measurement with the use of radio wave, two substations for emitting radio wave for the purpose of measurement with the use of radio wave, said main station and said two substations being located in a predetermined positional rela-

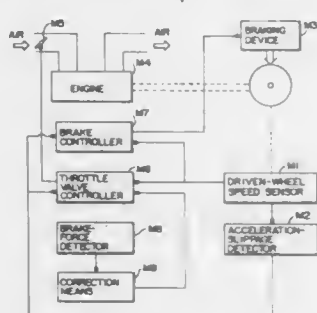
tion, a plurality of pickup coils for detecting a magnetic field for the purpose of guiding movement of the vehicle, said magnetic field being generated by means of a guiding line, said pickup coils being mounted on the vehicle, first steering command generating means for generating a steering command for the purpose of steering the vehicle in response to an output from the pickup coils, receiving means for receiving radio wave emitted from the main station and the two substations, said receiving means being mounted on the vehicle, vehicle position detecting means for detecting the existent position of the vehicle with reference to a difference in time when each receiving means receives radio wave, storing means for storing



moving passages along which the vehicle leaves the guiding line and returns to the same, second steering command generating means for generating a steering command for the purpose of steering the vehicle with reference to the existent position of the vehicle which is read out by said vehicle position detecting means and the moving passage which is read from said storing means, selecting means for selecting either one of a steering command issued from said first steering command generating means and a steering command issued from said second steering command generating means and steering means for steering the vehicle in accordance with a steering command which is selected by said selecting means.

#### 4,955,448 CONTROLLER FOR REDUCING ACCELERATION SLIPPAGE OF A DRIVEN WHEEL

Kiyotaka Ise, and Kozo Fujita, both of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan  
Filed Feb. 22, 1989, Ser. No. 313,453  
Claims priority, application Japan, Feb. 29, 1988, 63-46364  
Int. Cl.<sup>5</sup> B60K 31/00; B60L 3/10; B60T 8/32  
U.S. Cl. 180—197 7 Claims

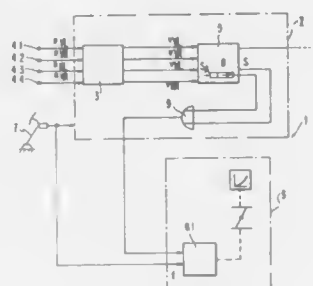


1. A controller for reducing acceleration slippage at a driven wheel of an automobile having an internal combustion engine, the controller comprising:

a driven-wheel speed sensor for sensing a speed of the driven wheel;  
an acceleration-slipage detector for calculating slippage at the driven wheel based on the sensed driven-wheel speed when the automobile is accelerating;  
a throttle-valve controller for adjusting an opening of a throttle valve of the engine according to a control amount to control the slippage;  
a brake controller for adjusting a brake force on the driven wheel to control the slippage;  
a brake-force detector for detecting the brake force on the driven-wheel; and  
a correcting means for correcting the control amount such that the throttle valve is biased towards the closed position when the brake-force detector detects that the brake force on the driven wheel is increasing.

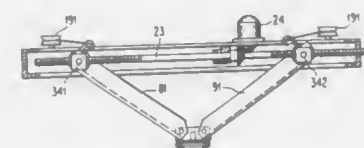
#### 4,955,449 WHEEL SLIP CONTROL SYSTEM FOR MOTOR VEHICLES

Walter Hilburger, Nürtingen, and Siegfried Ochs, Remshalden, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany  
Filed Sep. 6, 1989, Ser. No. 403,314  
Claims priority, application Fed. Rep. of Germany, Sep. 13, 1988, 3831105  
Int. Cl.<sup>5</sup> B60K 31/00  
U.S. Cl. 180—197 6 Claims



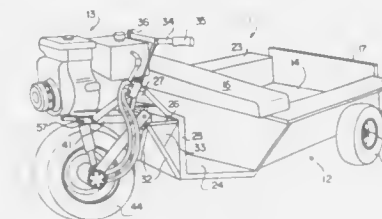
1. A wheel slip control system for motor vehicles having: an engine, a driver operated gas pedal, driven and non-driven wheels and axles, and a control means for braking a driven vehicle wheel when it spins; wherein when both driven wheels spin, the control means additionally reduces engine power; wherein a spinning of the driven wheels is sensed by rotational speed sensors feeding an electronic control unit which creates a slip signal at a time when a differential speed threshold value between the driven and the non-driven vehicle axle is exceeded; wherein engine power is a control element means of the electronic control unit during the time that the slip signal is created; wherein when the slip signal drops out, the electronic control unit permits engine power to be controlled upward to a desired gas pedal value set by the driver; wherein a time function element means is provided which can be activated by the electronic control unit; and wherein the electronic control unit generates an output signal when slip signals occur at repeated intervals within a certain limit time to cause the time function element means to prolong the activating of the downward-controlling control element means beyond a duration of time of the last slip signal.

4,955,450  
LIFTING DEVICE FOR MOTOR VEHICLES  
Hans Deinlein-Kalb, Georg-Stefan-Str. 31, and Monika Festl, Georg-Stefan-Str. 35a, both of D-8500 Nürnberg 60, Fed. Rep. of Germany  
PCT No. PCT/EP87/00196, § 371 Date Oct. 6, 1988, § 102(e) Date Oct. 6, 1988, PCT Pub. No. WO87/06548, PCT Pub. Date Nov. 5, 1987  
PCT Filed Apr. 10, 1987, Ser. No. 272,832  
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1986, 3613495  
Int. Cl.<sup>5</sup> B60S 9/00  
U.S. Cl. 180—199 9 Claims



1. Lifting equipment for the turning on the spot of a four-wheeled motor vehicle with at least front-wheel drive, wherein the lifting equipment is provided with one of mechanical, pneumatic, hydraulic and electrical drive, is firmly mounted at an underside of the vehicle, and on actuation bears on the roadway such that two vehicle wheels are raised off from the roadway, characterised by: a supporting point (2) of the lifting equipment (4) being offset from the gravitational centre (3) and on the longitudinal center line of the vehicle such that, on actuation, the two rear wheels are raised off from the roadway and both front driving wheels are partially relieved with the lifting equipment bearing 60% to 80% of the vehicle weight and the partially relieved front wheels are loaded bearing the remaining vehicle weight, wherein the vehicle may then be turned about the support point by turning the front wheels and applying drive thereto.

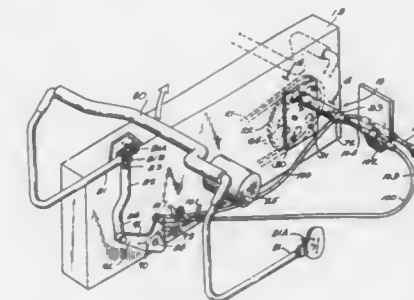
4,955,451  
UTILITY VEHICLE  
Stephen H. Schaefer, 1728 Missouri St., San Diego, Calif. 92109  
Filed Oct. 17, 1988, Ser. No. 259,273  
Int. Cl.<sup>5</sup> B62D 61/08; B60K 17/00  
U.S. Cl. 180—213 5 Claims



1. A utility vehicle comprising:  
a trailer head comprising:  
a container bed-body;  
a pair of wheels; and  
first pivotable coupling means at the forward end thereof;  
and a power head comprising:  
a frame;  
second pivotable coupling means for detachably connecting said power head to said first pivotable coupling means;  
wheel means;  
power source means mounted to said frame;  
steering means connected to said frame for steering said wheel means;  
variable speed pump means coupled to said power source means;

reversible fluid motor means mounted to said wheel means and fluid coupled to said pump means;  
control means coupled to said variable speed pump means for controlling the speed and direction of rotation of said reversible fluid motor means; and  
suspension means coupling said wheel means to said frame, said suspension means comprising:  
an arm pivotably coupled at one end to said frame, said arm having said motor means mounted to the opposite end thereof, said motor means being mounted to said wheel means; and  
shock absorber means connected between said frame and said opposite end of said arm.

4,955,452  
LOCKING APPARATUS FOR SKID STEER LOADER  
John C. Simonz, Germantown, Wis., assignor to Trak International, Inc., Port Washington, Wis.  
Filed Apr. 20, 1989, Ser. No. 341,116  
Int. Cl.<sup>5</sup> B60R 21/02  
U.S. Cl. 180—271 14 Claims



1. A skid steer loader comprising:  
a frame;  
wheels for supporting the frame for movement;  
a drive motor supported by the frame;  
means for drivingly connecting the drive motor to at least one of the wheels for driving the wheel, the means for drivingly connecting including a rotatable member supported for rotation about an axis and having at least one aperture radially spaced from the axis of rotation of the rotatable member;  
an operator restraint bar moveable between an operator restraining position and a retracted position;  
means for locking at least one of the wheels when the operator restraint bar is moved to the retracted position, the means for locking including a locking member moveable between a retracted position and a locking position, and wherein in the locking position a portion of the locking member is housed in the aperture formed in the rotatable member;  
means connected to the operator restraint bar for moving the locking member to the locking position when the restraint bar is in the retracted position; and  
means for biasing the locking member toward the retracted position when the operator restraint bar is positioned in the operator restraining position.



4,955,453

## PREVENTION AGAINST CAR BURGLAR

Keiichi Nishioka, Kawasaki, and Atsushi Hirako, Yokohama, both of Japan, assignors to Isuzu Motors Limited, Tokyo, Japan

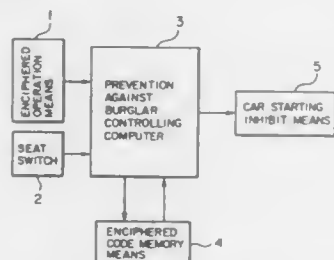
Filed Sep. 22, 1989, Ser. No. 410,873

Claims priority, application Japan, Oct. 6, 1988, 63-252424; Aug. 11, 1989, 1-208558

Int. Cl.<sup>5</sup> B60R 25/00

U.S. Cl. 180—287

16 Claims



1. A prevention against car burglar comprising enciphered operation means capable of generating an electrical signal, a seat switch, enciphered code memory means, car starting inhibit means utilizing equipment other than an engine starting system, an engine rotation sensor, prevention against burglar controlling computer, which is characterized in that said car starting inhibit means is kept operating when a driver gets off as an engine idling, an operation of said car starting inhibit means it released when an enciphered operation signal generated by said enciphered operation means is identified with an enciphered code of said enciphered code memory means.

4,955,454

## MODULAR BOLT ASSEMBLY FOR STEERING SHAFT LOCK

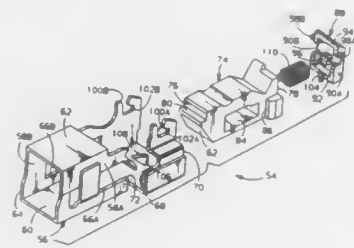
Karl A. Reinert, and Edmund L. Reddon, Jr., both of Saginaw, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 13, 1989, Ser. No. 366,092

Int. Cl.<sup>5</sup> B60R 25/02

U.S. Cl. 180—287

4 Claims



1. In a modular bolt assembly in an anti-theft steering shaft lock on an automotive steering column, said modular bolt assembly including a support tube adapted for rigid attachment to a stationary part of said steering column and having a generally rectangular cross section, a bolt disposed in said support tube for radial bodily shiftable movement relative to a longitudinal axis of said steering column between an extended position engaging a keeper on a steering shaft of said steering column and restricting rotation thereof and a retracted position remote from said keeper,

a generally rectangular flat retainer in an open end of said support tube, and a spring seated on said retainer and on said bolt and biasing said bolt in a first direction toward said extended position and said retainer in an opposite second direction, the improvement comprising: means on one of said retainer and said support tube defining a plurality of at least three trunnions disposed in a plane perpendicular to the direction of movement of said bolt and arrayed symmetrically around said spring, and means on the other of said retainer and said support tube defining a corresponding plurality of at least three slots for receiving respective ones of said trunnions and each including a closed-ended portion extending parallel to the direction of movement of said bolt to a closed end, said spring moving said retainer in said second direction until each of said trunnions engages said closed end of the corresponding one of said closed-ended slots and biasing said trunnions against said closed ends to maintain said retainer on said support tube.

4,955,455

## METHOD FOR ASSEMBLING A SKID STEER LOADER

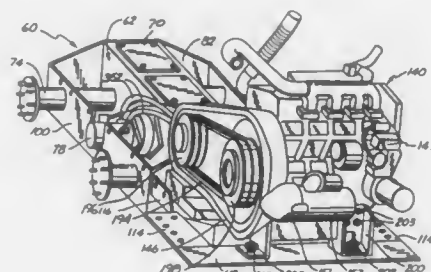
Larry E. Albright, Gwinner; Joseph M. Mather; Orlan J. Loraas, both of Lisbon, and Carman Lynnes, Leonard, all of N. Dak., assignors to Clark Equipment Company, South Bend, Ind.

Continuation of Ser. No. 108,128, Oct. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 87,900, Aug. 21, 1987, Pat. No. 4,815,550. This application Jul. 27, 1989, Ser. No. 388,298

Int. Cl.<sup>5</sup> B60K 5/12

U.S. Cl. 180—291

18 Claims



1. A method for assembling a skid steer loader, including: fabricating a lower frame assembly including a front end, and a back end having an integral engine mounting structure; providing an engine; fabricating a main frame assembly having laterally spaced side members adapted to be mounted to the engine mount-

ing structure of the lower frame assembly and form side walls of an engine compartment; mounting the engine to the engine mounting structure at the back end of the lower frame assembly; and mounting the main frame assembly to the lower frame assembly after the engine has been mounted to the engine mounting structure at the back end of the lower frame assembly.

4,955,456

## HUNTING VEST WITH ATTACHED ROPE

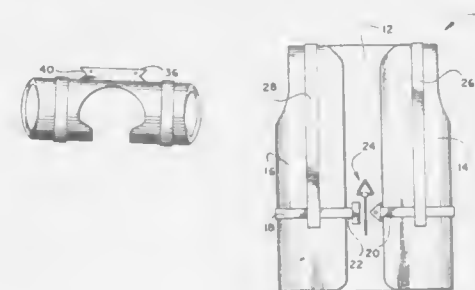
Dennis Mulkey, 272 S. Road Number 3 SW., Cartersville, Ga. 30120

Filed Jul. 18, 1989, Ser. No. 382,083

Int. Cl.<sup>5</sup> A62B 35/00; A41D 1/04

U.S. Cl. 182—3

3 Claims



1. A hunting garment for the upper torso of a human body, comprising: a vest having a back panel, a left front panel and a right front panel; a reinforced waistband having left and right end portions and being attached to said left, right and back panels of said vest with a loop formed by a portion of said reinforced waistband adjacent said back panel free of attachment to said back panel; means for securely fastening said end portions of said reinforced waistband one to the other; a left panel reinforcing band attached to said left front panel, said back panel and said reinforced waistband; a right panel reinforcing band attached to said right front panel, said back panel and said reinforced waistband; means for attaching a rope to said loop; and a pouch attached to said back panel of said vest with said loop being positioned inside said pouch.

4,955,457

## ARRANGEMENT FOR THE DEMOLITION OF SMOKESTACKS

Reinhold Pohl; Manfred Dresselmann, both of Ruhr, and Hans-Wilhelm Hessmann, Gelsenkirchen, all of Fed. Rep. of Germany, assignors to Robota GmbH Feuerungs- und Schornsteinbau, Mülheim a.d. Ruhr, Fed. Rep. of Germany

Filed Nov. 22, 1989, Ser. No. 440,900

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1988, 3839677

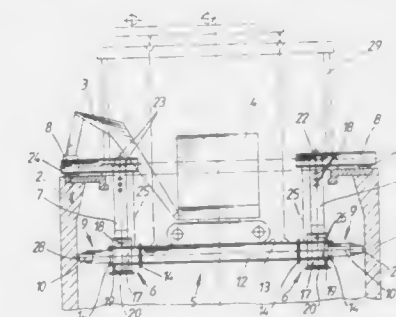
Int. Cl.<sup>5</sup> E04G 3/10, 23/08; E04H 12/34

U.S. Cl. 182—128

23 Claims

1. In an arrangement for the demolition of a smokestack, the smokestack having a wall forming a shaft, a smokestack head and a smokestack base, the arrangement including a demolition tool for successively demolishing the smokestack shaft from the head to the base of the smokestack, the improvement comprising a work platform to be placed into the smokestack shaft at the head thereof, the work platform having a circumference, the work platform including a plurality of suspension devices which are distributed over the circumference of the work platform, each suspension device including at least one lowering piston, means for vertically guiding and locking the lower-

ing piston, the lowering piston having an upper end, the suspension device further including a suspension arm, the suspension arm being mounted at the upper end of the lowering



4,955,458

## BLIND ASSEMBLY OF PARKING BRAKE CABLE TO PARKING BRAKE LEVER

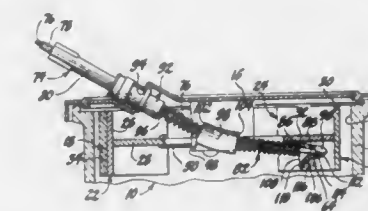
Ronald L. Shellhouse, Vandalia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 117,120, Nov. 4, 1987, abandoned. This application Apr. 20, 1989, Ser. No. 342,604

Int. Cl.<sup>5</sup> F16D 51/00

U.S. Cl. 188—2 D

1 Claim



1. In an enclosed drum brake having a parking brake actuating lever and a flexible parking brake cable having no bent preformed shape, one end of said cable being connected to said lever with said enclosed drum brake for exerting tension parking brake actuating forces thereon to move said lever pivotally to actuate the drum brake, means including guiding means providing a blind assembly connection of said cable one end to said lever within said enclosed drum brake where an assembler has no access thereto to make such a connection, said last named means comprising:

an enlarged button on one said end of said cable shaped to provide a sliding cam action when slidably engaging a camming surface along which said button is movable; a cable return spring surrounding said cable near said button and acting as a cable guide and cantilever-like support during the process of assembly connection; a guide and retention member on said lever; and means for guiding at least said cable and said button in substantially axial movement from a point of entry of said cable and said button into said enclosed drum brake to said guide and retention member, flexibility of said cable permitting said cable and said button to follow the guiding direction of said guiding means and the guiding direction of said guide and retention member; said guide and retention member having a retention member surface and a camming guide surface positioned for camming engagement with said button as said cable and said

button are first moved substantially axially from a first position spaced from said guide and retention member to a second position defined by the point of initial camming engagement of said button with said camming guide surface;

said camming guide surface being a non-linear ramp to provide non-linear contact with said button of said cable and said camming guide, and said camming guide surface receiving said spring in a non-attached manner allowing for translational movement of said spring, and said camming guide surface being shaped to guide and force said button and the adjacent portions of said cable and said spring translationally in a cantilever manner out of the axial movement path line of such first movement to side load said spring and said cable as said cable and button are further moved from said second position to a third position wherein said button is beyond said camming surface and out of engagement therewith, removing the camming surface action thereon;

said spring and cable thus having the side load removed therefrom and moving said cable, said spring and said button translationally back into said axial movement path line of said first movement and said button into tension retention engagement with said member retention surface, connecting said cable to said lever.

4,955,459

## STRAPLESS WHEEL CHOCKING ASSEMBLY

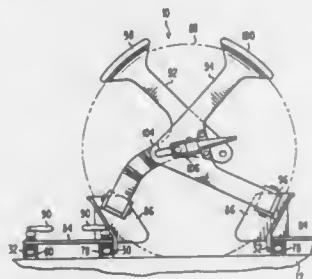
Wayne H. Murphy, Pottstown, Pa., assignor to Consolidated Rail Corporation, Philadelphia, Pa.

Filed Feb. 28, 1989, Ser. No. 317,009

Int. Cl.<sup>5</sup> B60T 3/00; B60P 7/08

U.S. Cl. 188—32

12 Claims



1. Apparatus for securing a vehicle to a deck comprising:
  - a track secured to and extending along said deck;
  - a pair of chocking wedges mounted on said track for movement along said track to position the wedges on opposite sides of a vehicle wheel, said wedges being hingedly mounted on said track for swinging movement between a position on said deck where they can be positioned on opposite sides of the wheel and a position away from the deck to provide a clear deck for movement of the vehicle along the deck;
  - a separate arm hingedly mounted at one end on each of said wedges for swinging movement along the side of the wheel, each of said arms having a shoe on its other end adapted to extend across the periphery of the wheel; and means for releasably securing the arms together with the shoes engaging the peripheral surface of the wheel to hold the wheel between the wedges and the shoes.

4,955,460

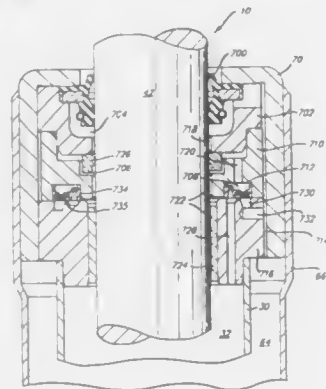
## CONTROL VALVE FOR SHOCK ABSORBERS

Magnus B. Lizell, Stockholm, Sweden, and Albert E. Vanroye, Bogloon, Belgium, assignors to Monroe Auto Equipment Company, Monroe, Mich.

Continuation-in-part of Ser. No. 227,113, Aug. 1, 1988, abandoned. This application Mar. 13, 1989, Ser. No. 322,542  
Int. Cl.<sup>5</sup> F16F 9/50, 9/36

U.S. Cl. 188—281

8 Claims



1. A shock absorber comprising:
  - a pressure tube symmetrically disposed about an axis, said pressure tube forming a working chamber having upper and lower portions;
  - a piston slidably disposed between and separating said upper and lower portions of said working chamber, said piston allowing restricted flow of hydraulic fluid between said upper and lower portions of said working chamber;
  - an elongated piston rod having first and second ends, said first end being attached to said piston, said second end of said elongated piston rod extending along the axis of said pressure tube through said upper portion of said working chamber and out one end of said pressure tube;
  - a fluid reservoir tube for storing hydraulic fluid, said reservoir tube disposed concentric to and radially extended from said pressure tube and having a closed end and an open end;
  - first valve means for allowing the flow of hydraulic fluid from said upper portion of said working chamber into said reservoir tube and for preventing flow of fluid from said reservoir tube into said upper portion of said working chamber through said first valve means, said first valve means disposed between said upper portion of said working chamber and said reservoir tube, said first valve means including seal retainer means adapted for positioning a seal with respect to said piston rod;
  - first passage means for enabling fluid to pass into said seal retainer means from said reservoir tube;
  - guide rod means for guiding said piston rod along the axis of said pressure tube;
  - second passage means for enabling fluid to pass into said guide rod means from said pressure tube out into said reservoir tube;
  - a valve for enabling fluid flow from said upper portion of said working chamber into said reservoir tube and for preventing flow of fluid from said reservoir tube into said upper portion of said working chamber, said valve being positioned in fluid communication with both said first and second passage means;
  - control means for controlling force on said valve for enabling opening and closing of said valve, said control means controlling force on said valve such that during a compression stroke of said piston, force on said valve is such that force of fluid within said upper portion of said working chamber opens said valve enabling fluid to pass from said upper portion of said working chamber into said

tube reservoir and said control means controlling force on said valve such that during rebound of said piston force on said valve is such that said valve is closed preventing fluid from exiting said upper portion of said working chamber into said reservoir; and

second valve means for allowing flow of said hydraulic fluid from said reservoir tube into said lower portion of said working chamber and for preventing flow of said fluid from said lower portion into said reservoir tube through said second valve means, said second valve means being disposed between said lower portion of said working chamber and said reservoir tube.

4,955,461

## VALVE SYSTEM FOR PREVENTING UNCONTROLLED DESCENT IN FORK LIFT TRUCKS

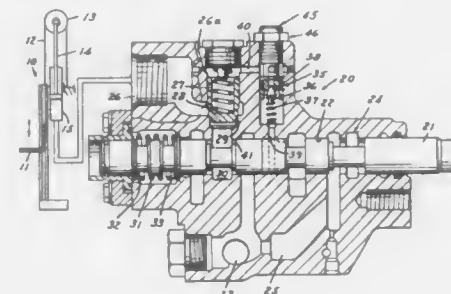
John B. Keir, Rochester Hills, Mich., assignor to Vickers, Incorporated, Troy, Mich.

Filed Oct. 31, 1988, Ser. No. 265,235

Int. Cl.<sup>5</sup> B66B 9/20

U.S. Cl. 187—9 R

6 Claims



1. A hydraulic lift valve system for fork lift trucks comprising:
  - a fork movably mounted for vertical movement on a fork lift truck,
  - an actuator on said truck having a movable member,
  - a flexible connector connecting said fork and said movable member of said actuator,
  - a three-way valve including a bore, a spool in said bore having a first neutral position, a second lift position and a third lower position,
  - a poppet valve hydraulically connected to said cylinder for controlling flow to and from said actuator,
  - a pilot pressure valve hydraulically connected to said poppet valve,
  - said spool functioning in said second position to apply flow from a source to said actuator for lifting the fork of the truck only after the pressure exceeds a first predetermined value,
  - said spool functioning in said third position to permit exhaust of the fluid in the actuator cylinder and therefore lowering the fork only after a second predetermined pressure is established by said pilot pressure valve to cause said poppet valve to open, thereby insuring that the fork of the lift truck is not lowered unless there is a predetermined load on the fork thereby preventing uncontrolled descent of the fork when the fork inadvertently engages an obstacle which prevents descent.

4,955,462

## POLYMER CONCRETE CONVEYOR ROLLER

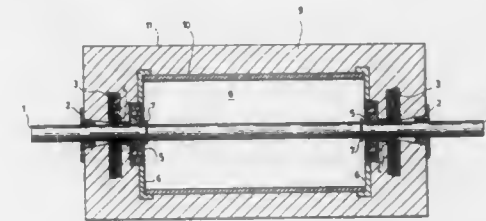
Marcel J. Bilodeau, St. Etienne; André Dube, Beauport, and André-Paul Quémel, St. Jean Chrysostome, all of Canada, assignors to Produits Carmin Inc., Quebec, Canada

Filed Sep. 5, 1989, Ser. No. 403,116

Int. Cl.<sup>5</sup> B65G 13/00

U.S. Cl. 193—37

19 Claims



1. In a conveyor roller comprising a shaft, a plurality of bearings provided on said shaft, and a roller body having an exterior cylindrical wall and two exterior end walls, said body being fixed to said bearings, and being rotatable on said shaft; the improvements wherein:
  - said roller body is made with a moldable polymer concrete material, and contains encapsulated labyrinth seal means which are connected to said shaft and are provided inside each end of said roller body between said bearings and each said exterior end wall; and
  - a spacer ring at each end of said roller body connects a housing of said labyrinth seal means to a housing of said bearings, said ring having a diameter which is smaller than both a diameter of the housing of said bearings and a diameter of the housing of said labyrinth seal means, so that said material of said body defines at each end of said roller body a wall between said bearings and said labyrinth seal means.

4,955,463

## WORK SUPPLYING SYSTEM TO MACHINE TOOLS

Eiichi Honma; Masakazu Hironaka; Masaki Miyazaki; Yutaka Ito; Kuniaki Ookuma, and Yoshiteru Kamiyama, all of Sayama, Japan, assignors to Hoeda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

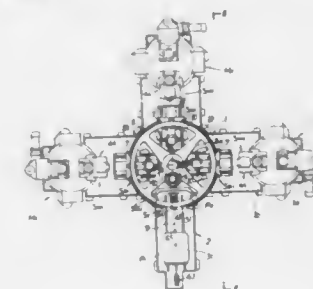
Filed May 8, 1989, Ser. No. 348,919

Claims priority, application Japan, May 12, 1988, 63-115703; May 12, 1988, 63-62566[U]

Int. Cl.<sup>5</sup> B65G 47/00

U.S. Cl. 198—346.1

13 Claims



1. A work supplying system for supplying work pieces to machine tools, said work supplying system comprising a work piece conveyor for sequentially conveying a work piece attached to a pallet to a plurality of machine tools disposed around an imaginary center line at intervals in a circumferential direction, and a work piece conveying and delivery unit for conveying said work piece to said work piece conveyor and



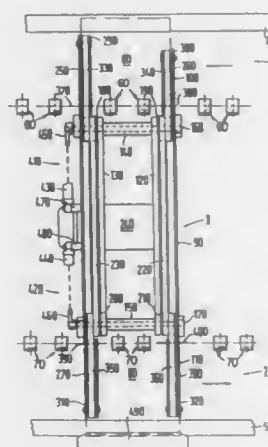
delivery said work piece from said work piece conveyor, wherein a conveying and delivering station for conveying and delivering said work piece attached to said pallet, and a plurality of releasable stations are disposed around said imaginary circle which has a center on said imaginary center line, said releasable stations corresponding, respectively, to machining stations corresponding to machine tools for machining said work piece, and being located on linear lines connecting said imaginary center line to said respective machining stations, said work conveyor comprising a post stand with an axis thereof aligned with said imaginary center line, slide units each reciprocally movable between an associated of said releasable and machining stations, a plurality of stationary guide rails extending in circular-arc shape along said imaginary circle at portions of said imaginary circle except portions at said conveying and delivering station and said releasable stations, movable guide rails disposed on said slide units and extending in a circular-arc shape at portions corresponding to said conveying and delivering station and said respective releasable stations and connectable to said stationary guide rails to form, cooperatively with said stationary guide rails, annular guide rails for guiding an angular displacement of said pallet around said post, an index arm supported on said post and angularly displaceably for releasable connection to a pallet on said annular guide rails, guide rods laid on stationary bases for guiding said slide units disposed between the associated releasing station and machining station, a pallet supporting plate having said movable guide rails and supported rotatably on said each of said slide units around an axis parallel to said guide rods, and a rotation driving motor for rotatably driving said pallet supporting plate.

#### 4,955,464 CONVEYOR DEVICE FOR TRANSPORTING WORKPIECES

Karl-Heinz Burger, Bühl-Vimbach; Rosemarie Collmer, Walb-lingen; Walter Fimpel, Bühl-Oberweiler; Klaus Gieseler, Villingen-Schwenningen-Obereschach; Heinrich Kochendörfer, Kernen-Rommelshausen, and Helmut Stegmüller, Affalterbach, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
Filed Dec. 15, 1987, Ser. No. 146,368  
Claims priority, application Fed. Rep. of Germany, May 3, 1986, 3615064

Int. Cl.<sup>5</sup> B65G 37/00  
U.S. Cl. 198—463.3

8 Claims



1. Conveyor device for transporting workpieces, comprising two parallel transport ways each including an outer conveyor belt and an inner roller system extending at a distance parallel to the outer conveyor belt; a transverse conveyor having a stationary support frame provided between the two transport ways and supporting an immovably arranged central conveyor section and two pivotably mounted end conveyor sections; each of said end conveyor sections intersecting the inner roller

system of a transport way and bridging the space between the roller system and the corresponding outer conveyor belt; and device for pivoting respective end conveyor sections into predetermined vertical positions relative to the associated transport ways.

#### 4,955,465 ENDLESS FLEXIBLE CONVEYOR BELT AND STACKER PLATES THEREFOR

Michael R. Straight, and Jack R. Raum, both of Winchester, Va., assignors to Ashworth Bros., Inc., Fall River, Mass.  
Continuation-in-part of Ser. No. 224,696, Jul. 27, 1988, which is a continuation-in-part of Ser. No. 171,390, Mar. 21, 1988, Pat. No. 4,867,301, which is a continuation-in-part of Ser. No. 83,272, Aug. 10, 1987, abandoned, and a continuation-in-part of Ser. No. 213,171, Jun. 29, 1988, which is a continuation-in-part of Ser. No. 171,390, Mar. 21, 1988, Pat. No. 4,867,301, and a continuation-in-part of Ser. No. 83,272, Aug. 10, 1987, abandoned. This application Sep. 12, 1989, Ser. No. 406,348

Int. Cl.<sup>5</sup> B65G 21/18

U.S. Cl. 198—778

4 Claims



1. An endless conveyor belt comprising:  
a plurality of transverse rods having rod ends;  
a plurality of links connected to said rods; and  
stacker plates between said links, said plates including a longitudinal portion having upper and lower sections, a pair of tab portions extending in opposite transverse directions from upper ends of said upper section, said lower section including a member extending generally out from the plane of said upper section and defining a C-shape in a member plane perpendicular to said plane of said upper section, and said C-shape member having a pair of arms through which a pair of through holes pass and through which said rod ends pass.

#### 4,955,466 BELT CONVEYOR WITH BELT REINFORCING MEMBER

Horst-Dieter Almes, Hildesheim, and Bernd Grutza, Sarstedt, both of Fed. Rep. of Germany, assignors to Transnorm System GmbH, Harsum, Fed. Rep. of Germany  
Filed Jul. 6, 1989, Ser. No. 376,296

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1988, 3822824

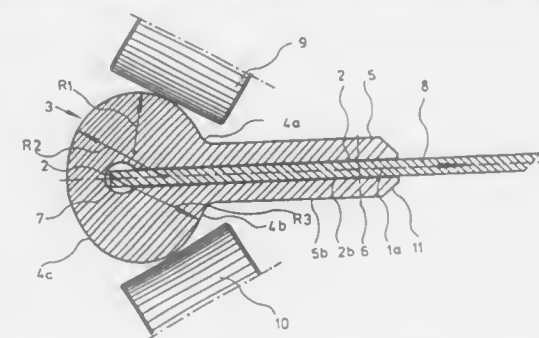
Int. Cl.<sup>5</sup> B65G 15/02

U.S. Cl. 198—831

20 Claims

1. In a belt conveyor, an elongated belt comprising a convexly curved outer marginal portion having two lateral surfaces and a peripheral surface between said lateral surfaces, each of said lateral surfaces having a first portion adjacent and a second portion remote from said peripheral surface; a reinforcing member having a slot receiving said marginal portion of said belt and said member including a bead surrounding said peripheral surface and overlying the first portions of said lateral surfaces, and two lips overlying the second portion of one of said lateral surfaces; and guide means for said reinforcing

member, comprising rolling elements engaging said bead and including a first rolling element adjacent one of said lips and a second rolling element adjacent the other of said lips, each of



said first and second elements being rotatable about an axis making an acute angle with and sloping toward the respective lip in a direction away from said peripheral surface.

#### 4,955,467 ENERGY DAMPING DEVICE

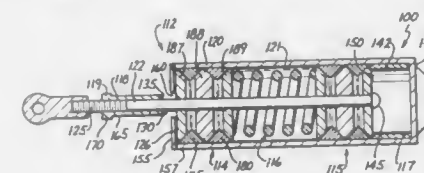
Ralph Kallenbach, Elgin, Ill., assignor to Fluor Corporation, Irvine, Calif.

Continuation of Ser. No. 119,084, Nov. 10, 1987, abandoned.  
This application Dec. 21, 1988, Ser. No. 289,362

Int. Cl.<sup>5</sup> F16F 13/00, 7/00; B60T 7/12

U.S. Cl. 188—381

16 Claims



1. An energy damping device, comprising:  
a piston cylinder assembly including a hollow cylinder and a piston mounted at least partially within said hollow cylinder;  
a friction assembly acting forcibly between said cylinder and said piston for developing resistive frictional forces therebetween to dissipate large loads exerted axially on said cylinder and said piston relative to one another;  
means for mounting said piston and said cylinder to be freely movable axially relative to one another independently of said friction assembly to permit small loads to move said cylinder and said piston relative to one another axially during normal operation;  
wherein said means for mounting includes means defining an opening extending axially within said friction assembly for receiving freely and uninhibitedly said piston;  
said piston including an enlarged portion extending radially therefrom at a position external of said friction assembly; means for limiting the free axial relative movement of said cylinder and said piston relative to one another by engaging said enlarged portion of said piston;  
means cooperating with said mounting means and said limiting means for defining a space;  
said space permitting the limited substantially free relative travel of said piston prior to engaging said friction assembly without developing substantial resistive frictional forces under small loads during said normal operation; and  
spring means acting against said friction assembly to urge it resistively for permitting said limited substantially free relative travel without causing substantial resistive frictional forces by said friction assembly responsive to said small loads only, and for biasing said friction assembly to

cause said frictional forces to be developed responsive to said large loads only.

#### 4,955,468 SEPARATION OF HYDROCARBON MIXTURES

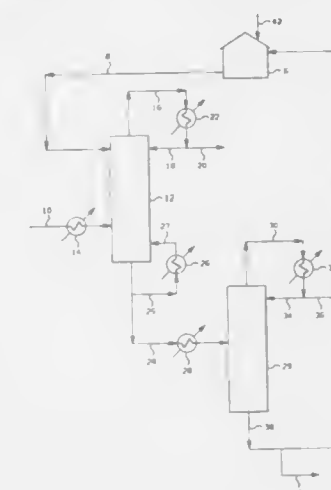
Fu M. Lee, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 8, 1989, Ser. No. 404,799

Int. Cl.<sup>5</sup> B01D 3/40

U.S. Cl. 203—53

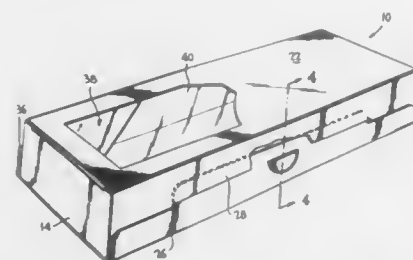
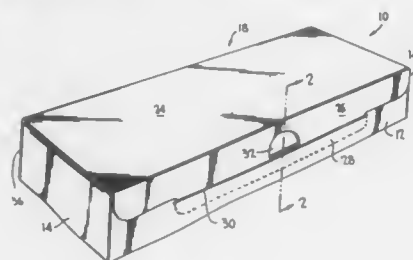
28 Claims



1. In a process for separating at least one cycloalkane containing 5–10 carbon atoms per molecule from at least one close-boiling alkane by extractive distillation of a feed consisting essentially of said at least one cycloalkane and said at least one alkane, the improvement which comprises employing a solvent consisting essentially of at least one N-mercaptoalkyl-2-pyrrolidone alone or in admixture with about 0.1–10 weight-% water, wherein the mercaptoalkyl group in said N-mercaptoalkyl-2-pyrrolidone contains 1–5 carbon atoms;  
wherein said extractive distillation process produces (i) an overhead distillate product which contains a smaller volume percentage of said at least one cycloalkane and a larger volume percentage of said at least one alkane than said feed, and (ii) a bottom product which contains said solvent and a larger volume percentage of said at least one cycloalkane and a smaller volume percentage of said at least one alkane than said feed; and wherein said at least one cycloalkane is separated from said solvent and recovered from said bottoms product.

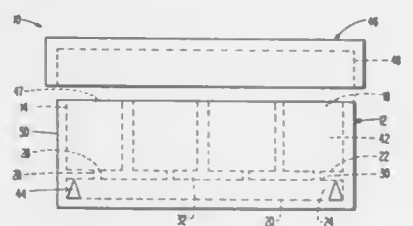
15. In a process for separating at least one aromatic hydrocarbon containing 6–18 carbon atoms per molecule from at least one alkane containing 5–20 carbon atoms per molecule by liquid-liquid extraction of a feed consisting essentially of said at least one aromatic hydrocarbon and said at least one alkane, the improvement which comprises employing a solvent consisting essentially of at least one N-mercaptoalkyl-2-pyrrolidone alone or in admixture with about 0.1–10 weight-% water, wherein the mercaptoalkyl group in said N-mercaptoalkyl-2-pyrrolidone contains 1–5 carbon atoms per molecule;  
wherein an extract phase is formed which comprises said solvent and at least a portion of said at least one aromatic hydrocarbon, and a raffinate phase is formed in which the concentration of said at least one aromatic hydrocarbon is lower than in said feed.

4,955,469  
**CONVERTIBLE CONTAINER**  
 Derick Hudspeth, New York, N.Y., assignor to R. G. Barry Corporation, Pickerington, Ohio  
 Filed Sep. 6, 1989, Ser. No. 403,398  
 Int. Cl.<sup>5</sup> B65D 5/52  
 U.S. Cl. 206—45.23 3 Claims



1. A packaging container comprising a front wall, a back wall, a top wall, a bottom wall and two end walls joined to each other to form an enclosure of a generally rectangular configuration, said top wall having an opening therein for display of articles contained within the enclosure, the container further including a closure panel secured to the back wall and capable of being extended over the opening in the top wall as well as being capable of being folded about the back wall to reveal the opening, the closure panel having one mean for securing the closure panel to the front wall when the closure panel is folded about the back wall and when the closure panel is extended over the opening, wherein the closure panel is hinged along a line about equidistant from the top wall and the bottom wall.

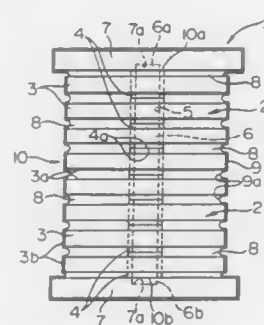
4,955,470  
**PERSONAL UTILITY CONTAINER**  
 Douglas M. Hamel, and Linda J. Peralto, both of 34202 Del Obispo #49, Dana Point, Calif. 92629  
 Filed Aug. 10, 1989, Ser. No. 392,018  
 Int. Cl.<sup>5</sup> B65D 81/18 3 Claims



1. A flexible false bottom personal utility container, comprising:  
 a generally rectangular false bottom box fabricated from a strong, light material and having interior walls defining a rectangular cross section in two dimensions interior, and

having a first bottom surface forming a true interior bottom;  
 a thin removable generally rigid rectangular planar false bottom divider comprising two parallel planar surfaces disposed a short distance apart and said planar surfaces having dimensions incrementally smaller than the interior length and width dimensions of the box a short distance above the true bottom of the box and having interior surfaces defining a selected plurality of small holes there-through by means of which holes a small amount of air can flow to and from the volume between the false bottom divider and the true bottom and that portion of the interior of the box above the false bottom;  
 support means capable of supporting the planar false bottom divider a selected short distance above the true bottom surface;  
 a generally rectangular cover capable of removeably coupling to the exterior surface of the top of the box in a tight generally air tight coupling;  
 at least two identical generally rectangular shaped longitudinal dividers comprising identical planar generally planar surfaces of length incrementally less than the interior length of the box and of height approximately equal to the height of the interior of the box above the false bottom, each having interior surfaces defining slits parallel to the ends thereof, the slits of width substantially equal to the thickness of the dividers and the slits of length at least half and approximately half the height of the longitudinal dividers; and  
 at least two identical generally rectangular shaped width dividers comprising parallel planar rectangular surfaces of length incrementally less than the interior width of the box, and of height substantially equal to the height of the interior of the box above the false bottom, each having interior surfaces defining slits parallel to the ends thereof, the slits being of width substantially equal to the thickness of the width dividers which is equal to the width of the longitudinal dividers and the slits of length at least half and approximately half the height of the width dividers.

4,955,471  
**PACKAGING STRUCTURE FOR A RING-SHAPED PRODUCT**  
 Kimimoto Hirose, and Tsutomu Hiramoto, both of Tamaho, Japan, assignors to Konica Corporation, Tokyo, Japan  
 Filed Aug. 29, 1988, Ser. No. 238,031  
 Claims priority, application Japan, Sep. 5, 1987, 62-136105[U]; Nov. 17, 1987, 62-175158[U]  
 Int. Cl.<sup>5</sup> B65D 85/62, 85/671 10 Claims



1. An apparatus packaging a plurality of rolls of tape wound around angular stacked flangeless hubs, said apparatus comprising:  
 a core means passing through said stacked hubs of said plurality of rolls so that said hubs and rolls are aligned in a common axial direction,  
 a pair of end plate members sandwiching the stacked hubs therebetween, and

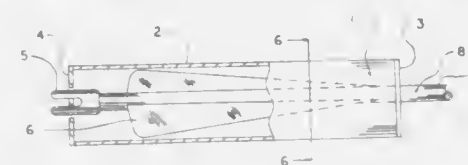
fixing means pressing said pair of end plate members axially toward said stacked hubs to fix the position of said hubs, said fixing means including a shrinkable film pressing the circumferential surface of said rolls of tape.

4,955,472  
**GOLF BAG WITH A CLUB SECURING DEVICE**  
 Wataru Yamazoe, No. 17-14, 4-chome, Todoroki, Setagaya-ku, Tokyo, Japan, assignor to Wataru Yamazoe, Tokyo; Takahiro Yamazoe, Toyohashi; Makiko Yamazoe and Yuriko Yamazoe, both of Tokyo, all of, Japan, a part interest to each  
 Filed Jul. 6, 1989, Ser. No. 376,308  
 Claims priority, application Japan, May 26, 1989, 1-61076[U]  
 Int. Cl.<sup>5</sup> A63B 55/00 15 Claims



1. Device for holding a golf club in a golf bag, comprising two partition frames mounted upon a golf bag in an opening thereof to define a space therebetween, and means for partitioning said space defined between said two partition frames to define an inlet or compartment for receiving a golf club,  
 said partitioning means comprising a third partition frame partitioning said space and mounted upon said two partition frames to define said inlet or compartment,  
 and additionally comprising  
 a covering mounted upon at least one of the golf bag and said partition frames and shaped and positioned to extend from one end of said inlet or compartment to an opposite end thereof and over a head of the golf club to protect the head of the golf club when the club is inserted into said inlet or compartment, and  
 means for detachably mounting said covering upon an inner surface of the golf bag,  
 whereby the golf club, when inserted into said inlet or compartment, is protected from damage by any other clubs that might be inserted into the golf bag opening outside of said inlet or compartment.

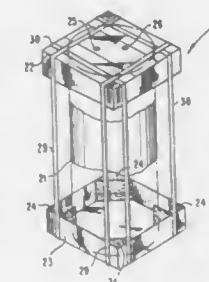
4,955,473  
**PROTECTIVE ENCLOSURE FOR FLETCHING ON ARROWS**  
 James E. Van Hout, 676 Briarvale Dr., Auburn Hills, Mich. 48057, and John M. Van Hout, 1425 W. South Blvd., Troy, Mich. 48098  
 Filed Sep. 20, 1989, Ser. No. 409,817  
 Int. Cl.<sup>5</sup> F41B 5/06; B65D 85/00 18 Claims



1. A protective device for an arrow fletching comprising an enclosure having a front member and a rear member, said

enclosure being of a size to encompass the fletching of an arrow;  
 said front member having an opening extending there-through and a series of slot like extensions projecting radially outwardly from said opening and through said front member;  
 each of said extensions being of a size to enable a radially extending element of a fletching of an arrow to pass there-through;  
 said central opening forming a means for positioning an arrow shaft within said front member and for entrance of an arrow into said enclosure;  
 means within said enclosure for attaching an arrow to said enclosure with the arrow fletching within said enclosure and in alignment with said extensions of said opening.

4,955,474  
**WATER HEATER PACKAGE CONSTRUCTION**  
 Bruce W. Mattingly, Louisville, and Roger J. Coates, Cox's Creek, both of Ky., assignors to Soltech, Inc., Shelbyville, Ky.  
 Continuation of Ser. No. 307,322, Feb. 6, 1989. This application Jun. 19, 1989, Ser. No. 367,764  
 The portion of the term of this patent subsequent to Nov. 21, 2006, has been disclaimed.  
 Int. Cl.<sup>5</sup> B65D 85/30 5 Claims



1. A composite package for appliances and the like comprising:  
 a top support including a first member having a reinforcing panel and a second member having a reinforcing panel, said reinforcing panels being of a material which is stiffer than the material of the remainder of the corresponding members, said reinforcing panels arranged in an overlapping relationship to each other;  
 a bottom support including a first member having a reinforcing panel and a second member having a reinforcing panel, said reinforcing panels being of a material which is stiffer than the material of the remainder of the corresponding members, said reinforcing panels arranged in an overlapping relationship to each other;  
 attachment means for attaching said top support to the appliance received within said composite package; and  
 securement means for securing together in a stacked relationship said top and bottom supports with said appliance therebetween.

4,955,475  
**CONTINUOUS FASTENER STOCK**  
 Francis T. McCarthy, Lowell, and Roger J. Archambault, Blackstone, both of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.  
 Filed Sep. 15, 1989, Ser. No. 407,628  
 Int. Cl.<sup>5</sup> B65D 85/24 18 Claims

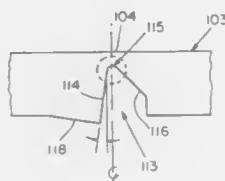
1. Improved fastener stock of the type comprising two continuous and elongated plastic side members that are cross-coupled by a plurality of filaments, the stock being proportioned to



be fed as a unit to a position where individual fasteners are separated therefrom within a machine, one of said side members being proportioned so that each separated fastener includes an end-bar formed from a portion of said side member and configured for feeding through a bore of a hollow needle having a longitudinal slot for passage of the associated filament;

the improvement adapted for dispensing individual fasteners from said fastener stock by severing the end fastener, advancing the fastener adjacent the rear portion of a needle bore with its end-bar transversely disposed thereto; and contacting the end of the end-bar with a plunger to force it through said needle bore; said improvement comprising fastener stock wherein adjacent end-bars are connected end-to-end by means of a severable connector defined by an indentation in said side member, said indentation comprising an outwardly diverging steep surface and a more obliquely sloped surface, which surfaces converge at an apex region of said indentation, the outer wall of the end-bar adjacent said steep surface having a truncated shape.

7. Improved fastener stock of the type comprising two continuous and elongated plastic side members that are cross-coupled by a plurality of filaments, the stock being proportioned to be fed as a unit to a position where individual fasteners are separated therefrom within a machine, one of said side members being proportioned so that each separated fastener includes an end-bar formed from a portion of said side member and configured for feeding through a bore of a hollow needle having a longitudinal slot for passage of the associated filament;



the improvement adapted for dispensing individual fasteners from said fastener stock by severing the end fastener, advancing the fastener adjacent the rear portion of a needle bore with its end-bar transversely disposed thereto; and contacting the end of the end-bar with a plunger to force it through said needle bore; said improvement comprising fastener stock wherein adjacent end-bars are connected end-to-end by means of a severable connector defined by an indentation in said side member, said indentation comprising an outwardly diverging steep surface which is oriented at a slight angle from a perpendicular to a longitudinal axis of said end bar, and a more obliquely sloped surface, said surfaces converging at a radiused apex region of said indentation.

13. Improved fastener stock of the type comprising two continuous and elongated plastic side members that are cross-coupled by a plurality of filaments, the stock being proportioned to be fed as a unit to a position where individual fasteners are separated therefrom within a machine, one of said side members being proportioned so that each separated fastener includes an end-bar formed from a portion of said side member and configured for feeding through a bore of a hollow needle having a longitudinal slot for passage of the associated filament;

the improvement adapted for dispensing individual fasteners from said fastener stock by severing the end fastener, advancing the fastener adjacent the rear portion of a needle bore with its end-bar transversely disposed thereto; and contacting the end of the end-bar with a plunger to force it through said needle bore; said improvement comprising fastener stock wherein adjacent end-bars are connected end-to-end by means of a severable connector

defined by an indentation in said side member, said indentation comprising a surface which is oriented substantially perpendicular to a longitudinal axis of said end-bar, and a more obliquely sloped surface, said surfaces converging at a radiused apex region of said indentation.

#### 4,955,476 FASTENER CARRIER FOR THE SUPPORT OF SCREW MEMBERS

Akio Nakata; Masahiro Yoshida, and Koshiro Nakajima, all of Hirakata, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 136,636, Dec. 22, 1987, abandoned.

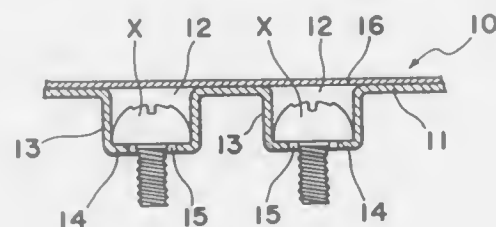
This application Sep. 1, 1989, Ser. No. 403,057

Claims priority, application Japan, Dec. 25, 1986, 61-311354; Dec. 29, 1986, 61-311011; Jan. 12, 1987, 62-4345; Jan. 12, 1987, 62-4346; Jan. 16, 1987, 62-8490

Int. Cl.<sup>3</sup> B65D 85/24

U.S. Cl. 206-346

11 Claims



1. A fastener carrier comprising a carrier strip having a plurality of apertures extending therethrough, and screw members supported on said carrier strip, each of said screw members having head and a threaded stem integral with the head, a portion of each said threaded stem extending through a respective one of said apertures and having a cross-sectional area that is less than the cross-sectional area of said respective one of said apertures, a space being defined between said portion of the threaded stem and a peripheral portion of the carrier strip that directly surrounds the respective one of said apertures, and each said head having an outer diameter that is larger than the diameter of the aperture through which the stem integral therewith extends, and each said head resting on said respective peripheral portion of said strip that directly surrounds the aperture through which the stem integral with said head extends, said carrier strip being free of structure that is both non-removable therefrom and extends above each said respective peripheral portion and over the head of each of said screw members wherein the head of each of said screw members is unobstructed by said carrier strip so that each of said screw members is removable from said carrier strip by an automatic screwdriver having a vacuum sleeve under the vacuum created within such a vacuum sleeve.

#### 4,955,477 RECEPTACLE FOR STORAGE AND DISPOSAL OF POTENTIALLY INJURIOUS IMPLEMENTS SUCH AS USED SCALPEL BLADES, HYPODERMIC NEEDLES AND THE LIKE

John Bruno, 77-83 Second Ave., Paterson, N.J. 07514

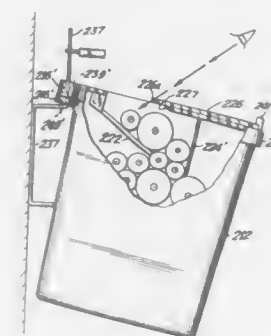
Continuation of Ser. No. 384,879, Jul. 24, 1989, abandoned, which is a continuation of Ser. No. 311,429, Feb. 14, 1989, abandoned, which is a continuation of Ser. No. 898,973, Aug. 22, 1986, abandoned, which is a continuation-in-part of Ser. No. 833,335, Feb. 15, 1986, abandoned, which is a

continuation-in-part of Ser. No. 826,288, Feb. 5, 1986, abandoned. This application Dec. 22, 1989, Ser. No. 455,983

Int. Cl.<sup>3</sup> B65D 25/00

U.S. Cl. 206-366

8 Claims



1. A self-contained receptacle for safely storing potentially dangerous implements such as hypodermic needles, scalpel blades and the like, comprising:

a containment member proportioned to retain a plurality of implements; and

a top member adapted to be attached to said containment member,

said top member including an opening proportioned to receive a desired size of implements, a guide member extending generally angularly downwardly into said receptacle from said top member generally along one edge of said opening and a back-drop/stop member extending downwardly from said top member adjacent the side of said opening opposite the side adjacent to which said guide member is mounted, said back-drop/stop and guide members having distal edges which form a slot-like gap for allowing implements to drop into said receptacle, said back-drop/stop member including jagged edging facing said guide member, and said back-drop/stop member and said guide member being positioned and proportioned relative to each other to cause at least a momentary slowing of travel of implements along said guide member to ensure that each implement assumes a generally horizontal orientation before actually dropping into said containment member such that implements inserted through said opening are aligned in a generally horizontal orientation by cooperation between said guide and back-drop/stop members at said slot-like gap, thereafter to drop into said containment member for side-by-side stacking with other implements deposited therein and said jagged edging helping to deter hand entry into said receptacle.

#### 4,955,478 FLIP-TOP DRILL-BIT STORAGE AND DISPLAY BOX Georg Rau, Glengen-Hohenhemmingen; Werner Hitzler, Herbrechtingen, and Gerhard Riess, Bachhagel-Burghagel, all of Fed. Rep. of Germany, assignors to Firma Georg Knoblauch, Brenz, Fed. Rep. of Germany

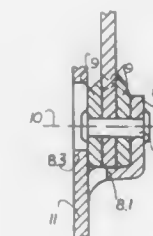
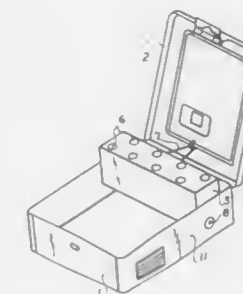
Filed Nov. 3, 1989, Ser. No. 431,609

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1988, 3837829

Int. Cl.<sup>3</sup> B65D 85/28

U.S. Cl. 206-379

10 Claims



1. A storage/display box for elongated objects, the box comprising:

a body having a pair of generally parallel side walls spaced apart along an axis;

a cover pivoted on the body and engageable therewith to close same;

an insert engageable within the body and beneath the cover, the insert being connected to the cover for pivoting therewith and adapted to hold the objects;

a respective body tab projecting from each of the side walls generally at the axis and formed with

an inner part of part-cylindrical shape, centered on the axis and having an inner end connected to the respective side wall and an outer end, the inner part forming

between its ends a part-cylindrical seat, and

an outer part projecting generally perpendicular to and crossing the axis;

a respective insert tab formed on the insert adjacent each side wall at the axis, each insert tab having a part-cylindrical outer edge complementary to and fitting within the inner part of the respective body tab; and

a pivot axle passing through each body tab and the respective insert tab at the axis, whereby on pivoting of the insert on the body each outer edge rides on the seat of the respective inner part.

4,955,479

**PACKAGE WITH PEELABLE PORTION FOR LIGHT SENSITIVE MATERIALS**

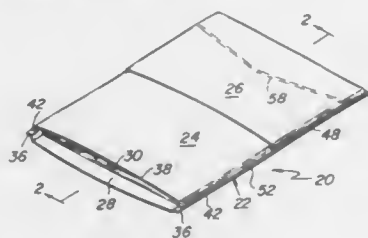
Jeffrey S. Beer, Perkiomenville, and Michael D. Gracie, Sr., Keanett Square, both of Pa., assignors to Fres-co System USA, Inc., Telford, Pa.

Filed Aug. 24, 1989, Ser. No. 398,207

Int. Cl.<sup>5</sup> B65D 65/40

U.S. Cl. 206—455

30 Claims



1. In an open package adapted for receiving light sensitive sheet materials therein and for being sealed to hold and protect said materials from ambient light, said package after being filled with said sheet materials and sealed being arranged for insertion into apparatus where said package may be readily opened to provide direct access to said materials so that said materials can be removed directly therefrom for processing, said package comprising a lower panel, a first upper panel, and a second upper panel, each of said panels being formed of a web of flexible, light-blocking material secured together to form an internal chamber for holding said materials therein, the improvement comprising first mouth means in said package through which said materials are introduced into said chamber and which is sealable to enclose said materials therein to prevent light from reaching said materials, and second mouth means which is sealed but readily openable by peeling to provide access to said materials in said chamber, said second mouth means directly communicating with the interior of said chamber and said sheet materials inserted therein, said lower panel having a leading edge, a trailing edge, and a pair of side edges, said first upper panel having a leading edge, a trailing edge, and a pair of side edges, said second upper panel having a leading edge, a trailing edge, and a pair of side edges, said first upper panel being secured to said lower panel by permanent seals extending adjacent their respective side edges, said leading edge of said lower panel and said leading edge of said first upper panel forming said first mouth means therebetween, with said leading edge of said lower panel and said leading edge of said first upper panel being sealable but not sealed to enable said materials to be readily inserted through said first mouth means directly into said chamber, said second upper panel being completely releasably secured to said lower panel by readily peelable seals extending adjacent their respective trailing and side edges, while also being completely releasably secured to said first upper panel by a readily peelable seal extending adjacent said leading edge of said second upper panel and said trailing edge of said first upper panel to form said second mouth means.

4,955,480

**PORTABLE INSULATED CARRIER**

Wilson C. Sexton, 18621 State Rte. 31, North Fort Myers, Fla. 33917

Filed Jan. 21, 1989, Ser. No. 383,933

Int. Cl.<sup>5</sup> B65D 81/18

U.S. Cl. 206—528

3 Claims

1. A portable carrier for transporting pharmaceutical preparations while protecting those preparations from degradation by ambient temperature conditions, which carrier comprises a first block of expanded polystyrene foam shaped as a rectangular parallelepiped, which block has a cylindrical bore extending vertically through the first block,

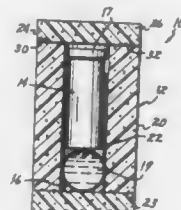
a base block of expanded polystyrene foam fixedly secured

to the bottom of said first block, said base block being operative to permanently close a bottom end of said cylindrical bore,

a closure lid of expanded polystyrene foam located on the top of said first block, said closure lid being hingedly connected along one side to one side of said first block so as, when closed, to cover a top end of said cylindrical bore,

contact adhesive applied to a top surface of said first block and a bottom surface of said lip for releasably sealing said lid in a closed position relative to said first block, and a closed and sealed hollow plastic ball containing a refreezable liquid, said ball being located within said cylindrical bore, said ball being slightly smaller in diameter than the diameter of said cylindrical bore.

2. A portable carrier for transporting pharmaceutical preparations while protecting those preparations from degradation by ambient temperature conditions, which carrier comprises a first block of expanded polystyrene foam, which block has a bore extending vertically through the first block,



a base block of expanded polystyrene foam fixedly secured to the bottom of said first block, said base block being operative to permanently close a bottom end of said cylindrical bore,

a closure lid of expanded polystyrene foam located on the top of said first block, said closure lid being operative, when closed, to cover a top end of said cylindrical bore, contact adhesive applied to a top surface of said first block and a bottom surface of said lip for releasably sealing said lid in a closed position relative to said first block,

a closed and sealed hollow plastic container of refreezable liquid located within said bore,

a plastic vial located within said bore, said vial being adapted to receive a container of temperature-sensitive pharmaceutical preparation, and

said hollow plastic container being generally spherical in shape and slightly smaller in diameter than the diameter of said cylindrical bore.

4,955,481

**TABLET PACKAGE HAVING ALTERNATIVE INDICATORS AND METHOD OF USE**

Michael V. Novinski, and Thomas J. Patton, both of West Chester, Pa., assignors to American Home Products Corp., New York, N.Y.

Filed Jul. 3, 1986, Ser. No. 882,128

Claims priority, application United Kingdom, Jul. 25, 1985, 8518828

Int. Cl.<sup>5</sup> B65D 83/04; B42D 15/00

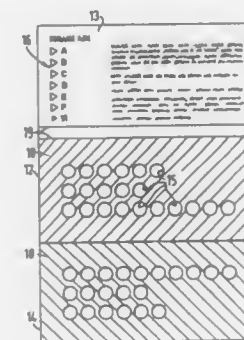
U.S. Cl. 206—534

15 Claims

1. Packaging for a course of pharmaceutical tablets and comprising a folder having a base to incorporate a blister pack of tablets and a cover hinged to the base, a plurality of rub-off indicators being provided on the inner surface of said folder each indicator being associated with one of a range of alternatives of the course.

11. A method of indicating one of a range of alternatives in a course of pharmaceutical treatment, the method comprising

the steps of providing packaging for the course of treatment, said packaging having thereon a range of alternatives and a



rub-off indicator for each alternative; and rubbing off one only of said indicators to indicate a desired alternative.

4,955,482

**SCREEN CLEANING IN CIL & CIP SYSTEMS**

Carl L. Elmore, and Phillip Mitchell, both of Glens Falls, N.Y., assignors to Kamy, Inc., Glens Falls, N.Y.

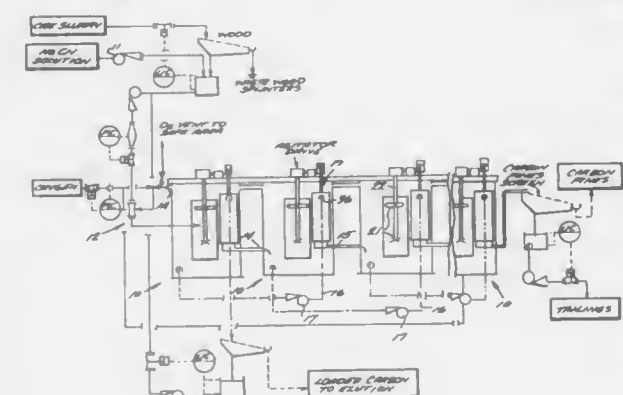
Division of Ser. No. 778,265, Sep. 20, 1985, Pat. No. 4,900,430.

This application Sep. 20, 1989, Ser. No. 410,052

Int. Cl.<sup>5</sup> B01D 33/00

U.S. Cl. 209—17

10 Claims



1. In the recovery a metal from a slurry of ore containing the metal, utilizing a tank having a slurry outlet, and a screen disposed in operative association with the slurry outlet for the prevention of solid material adsorbing particles therethrough, the process comprising the steps of: (a) leaching the metal from the ore, to dissolve the metal, utilizing a basic cyanide solution; (b) recovering the leached metal in solution by contracting the slurry with the solid material particles for adsorbing the metal from the solution; (c) screening the slurry flowing into the outlet to permit slurry to flow into the slurry outlet, the screen having screen openings dimensioned so as to prevent the passage of a significant number of particles therethrough; and (d) periodically linearly reciprocating the screen so as to provide a back flushing, self cleaning action thereto so as to keep it free and clear so that it will not clog and prevent the passage of slurry to the slurry outlet.

4,955,483

**MAIL HANDLING MACHINE WITH MIS-SEALED ENVELOPE DETECTOR**

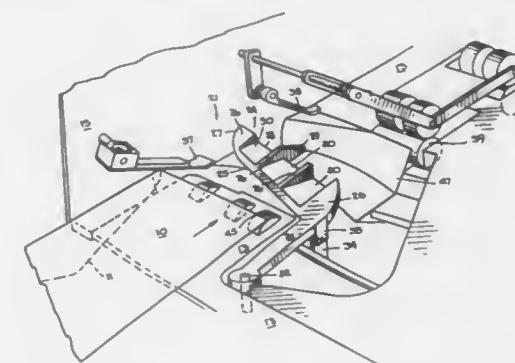
Kevin J. O'Dea, Sandy Hook, and Francis E. McDermott, Watertown, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 28, 1988, Ser. No. 291,099

Int. Cl.<sup>5</sup> B07C 5/00

U.S. Cl. 209—548

19 Claims



1. In a mail handling machine having means for serially transporting along a main path sealed and unsealed close-flapped and open-flapped envelopes some of which may be mis-sealed envelopes and means along the main path for moistening the flaps of the unsealed envelopes, the improvement comprising detection means upstream of the moistening means for detecting mis-sealed envelopes, said detecting means having means positioned to be engaged and moved by the mis-sealed flap of a sealed envelope, and signal means for generating a signal indicative of the detection of a mis-sealed envelope, said signal means responsive to the moved movable means.

4,955,484

**DEVICE FOR SEPARATING HARD OBJECTS, SUCH AS STONES, FROM A STREAM OF WOOD**

Kari Rintala, Helsinki; Jyrki Paarma, Soramaki, and Mikko Siisala, Hyvinkaa, all of Finland, assignors to Kone Oy, Finland

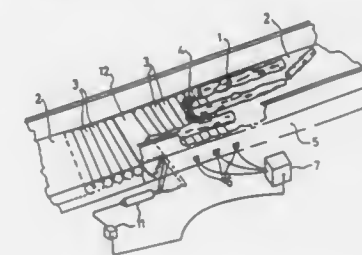
Filed Feb. 23, 1989, Ser. No. 314,541

Claims priority, application Finland, Feb. 29, 1988, 880930

Int. Cl.<sup>5</sup> B07C 5/34

U.S. Cl. 209—599

13 Claims



1. A device for separating hard objects from a continuous stream of logs and/or blocks of wood in an apparatus for the continuous conveyance of logs and/or blocks of wood, which device comprises:

a. metal conveyor section comprised of metal rollers for conveying said wood stream and a metal support structure for said metal rollers;

b. at least one vibration sensitive transducer in conductive



contact with the metal conveyor section for registering vibrations;

- c. means operatively connected to said at least one vibration sensitive transducer for distinguishing between signals generated by at least one said transducer in response to impact of logs and/or blocks of wood and signals generated on impact of hard objects on said conveyor section, including means for distinguishing between the frequencies of vibration caused respectively by logs and/or blocks of wood and by hard objects;
- d. a control unit which incorporates said distinguishing means, for generating a control signal by which hard objects conveyed along with the wood stream can be detected on the basis of the vibration signals as they generate; and
- e. actuator means which upon receipt of a control signal from said control unit, activates an exit gear, said exit gear being controlled by said control unit through said actuator means, so that said hard objects fall out from a wood stream passing through the apparatus.

4,955,485

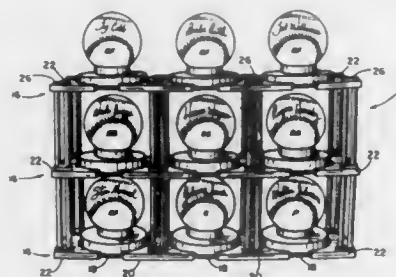
## DISPLAY DEVICE

Forrest W. Alton, 24503 E. 111th, Broken Arrow, Okla. 74014  
Filed Dec. 30, 1988, Ser. No. 291,963

Int. Cl.<sup>3</sup> A47F 7/00

U.S. Cl. 211-14

5 Claims



1. A display device comprising:

- (a) a plurality of circular disc means for engaging adjacent center shelf means and end shelf means such that the assembly forms a display shelf;
- (b) a plurality of center shelf means slidably engaging adjacent circular disc means such as to pivot about the center of said adjacent circular disc means;
- (c) a plurality of end shelf means slidably engaging adjacent circular disc means such as to pivot about the center of said adjacent circular disc means; and
- (d) a plurality of vertical structural means engaging the top of a first assembly of circular disc means, center shelf means and end shelf means forming a lower display shelf and engaging the bottom of a second assembly of circular disc means, center shelf means, and end shelf means forming an upper display shelf thus supporting the second upper display shelf, whereby the display shelves may be pivoted about said center shelf means so that the display device can be adjusted to form various arrangements.

4,955,486

## GRAVITY FEED SHELF

Robert J. Trulasko, Sr., Frontenac, Mo., assignor to True Manufacturing Co., Inc., O'Fallon, Mo.

Continuation-in-part of Ser. No. 215,571, Jul. 6, 1988, Pat. No. 4,890,746. This application Oct. 3, 1989, Ser. No. 416,393

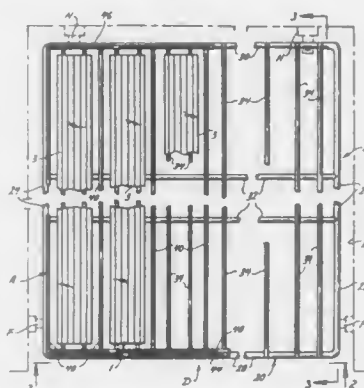
Int. Cl.<sup>3</sup> A47F 7/00

U.S. Cl. 211-59.2

5 Claims

1. In a gravity feed container dispenser, the dispenser having a rack on which the containers are placed with the rack comprising a series of longitudinally extending rails which are parallel to each other and spaced apart a distance less than the

diameter of the containers, the rack being adapted for installation so as to slope from rear to front when installed and having at least two guide bars extending longitudinally of the rack and positioned above the rails, the guide bars being spaced apart a distance at least slightly greater than the diameter of the containers so the containers are formed in rows when placed on the rack, and a stop means extending transversely of the rail across the forward end thereof and positioned above the rails so as to block forward movement of the containers when the forwardmost container in a row is removed and the other



containers in the row feed forward, the improvement comprising friction reducing means to facilitate forward feeding of the containers, the friction reducing means including a removable overlay placeable over the rails and having integrally formed attachment means for securing the overlay to the rack, the attachment means comprising a pair of longitudinal fingers extending from the underside of the overlay and snap-fitting onto two of the rails, the fingers being spaced apart to be closely adjacent the sides of each of said two rails and having turned ends overlapping said rails.

4,955,487

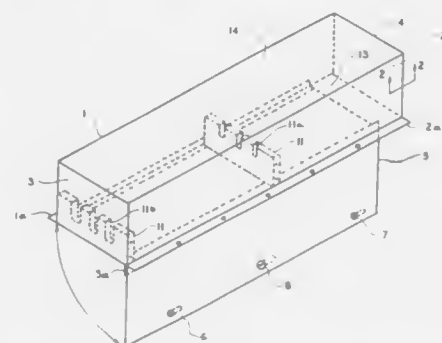
## RAFTER GUN RACK

Robert J. Quallich, 3001 Hazelhurst Ave., Pittsburgh, Pa. 15227  
Filed Jun. 5, 1989, Ser. No. 361,505

Int. Cl.<sup>3</sup> A47F 5/00

U.S. Cl. 211-64

2 Claims



1. A gun case in combination with a pair of rafters of an attic, for concealment, said gun case comprising a casing including a pair of side walls and a pair of notched partitions spaced longitudinally and extending laterally between said side walls in the case, a pair of outwardly turned ledges extending from the bottom of said side walls of said gun case, said ledges being perforated to be screwed tightly against the exposed edges of said door including locking means for locking the door to the

other of said ledges when pivotally moved at right angles to said sides to form the base of said casing.

4,955,488

## CLUSTER BIN SYSTEM

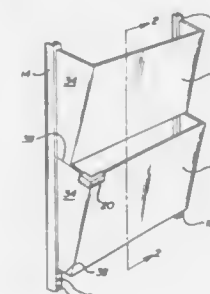
James D. Nicoll, 829 Randall, Troy, Mich. 48098

Filed Apr. 24, 1989, Ser. No. 341,839

Int. Cl.<sup>3</sup> A47F 5/00

U.S. Cl. 211-88

12 Claims



1. A cluster bin system including a unitary, planar member configured to be folded into a bin and attached to a wall, said planar member including a first, a second, and a third generally linear, hinge disposed so as to divide the planar member into four regions;

said first region having a length defined by said second and third hinges and a base width defined by the separation of the second and third hinges proximate the first hinge, said first region configured to form the front surface of the bin when the planar member is folded along the hinges;

said second and third regions being separated from the first region by the second and third hinges respectively, said second and third regions being approximate mirror images of one another and having a base which is generally linearly aligned with the first hinge, said second and third regions configured to form the sides of the bin when the planar member is folded along the hinges, said second and third regions each having attachment means associated therewith for fastening the bin to the wall; and

said fourth region being separated from the first region by the first hinge and having a width which is no greater than the base width of the first region and a length which is greater than the length of the base of the second and third regions, said fourth region configured to form the bottom of the bin when the planar member is folded along the hinges and attached to the wall by said attachment means associated with the second and third regions, said bottom being planar and having a length greater than the distance from the first hinge to the wall, whereby said planar bottom is retained and supported by the wall without attachment thereto, and further wherein no means for connection is provided between the fourth region and the second or third regions.

4,955,489

## STORAGE RACK SYSTEM

Donald R. Allen, Frechtown, N.J., assignor to Frazier Industrial Company, Long Valley, N.J.

Filed Aug. 12, 1988, Ser. No. 233,122

Int. Cl.<sup>3</sup> A47F 5/00

U.S. Cl. 211-151

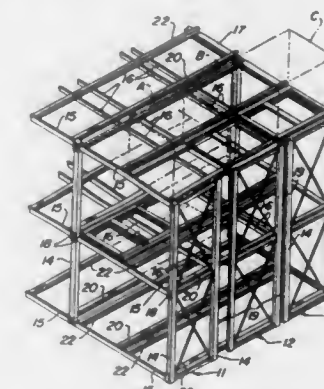
14 Claims

1. In a storage rack system for pallet loads having a framework providing a plurality of storage bays each of which is defined by a plurality of vertical uprights and horizontal shelf beams,

each of said storage bays comprising  
a pair of track means extending from front to back along the

depth of said storage bay and being spaced apart across the width of said storage bay,

a lower cart movable along said track means between a forward position and a back position and including  
a frame providing support from a loaded pallet, said lower cart frame having a pair of sides made of a structural member having a straight undeformed vertical leg, a pair of wheel assemblies on each side of said lower cart frame, and means for supporting each of said lower cart wheel assemblies on said vertical leg of one of said sides of said lower cart frame so that the pair of lower cart wheel assemblies on one side of said lower cart frame are guided by and make good rolling contact with a first guide means of one of said track means as said lower cart moves along the depth of the storage bay between said forward and back positions thereof and so that said pair of lower cart wheel assemblies on the other side of said lower cart frame are guided by and make good rolling contact with a first guide means of the other of said track means as said lower cart moves along the depth of the storage bay between said forward and back positions thereof, each of said lower cart wheel assembly supporting means being fixedly secured directly to said vertical leg of said lower cart frame structural member so that the load transmitted to each of said lower cart wheel assemblies from said lower cart frame is directed in a vertical direction through said vertical leg, and



an upper cart movable along said track means between a forward position and back position and including  
a frame providing support for a loaded pallet, said upper cart frame having a pair of sides made of a structural member having a straight undeformed vertical leg, a pair of wheel assemblies on each side of said upper cart frame, and means for supporting each of said upper cart wheel assemblies on said vertical leg of one of said sides of said upper cart frame so that the pair of upper cart wheel assemblies on one side of said upper cart frame are guided by and make good rolling contact with a second guide means of said one track means as said upper cart moves along the depth of the storage bay between said forward and back positions thereof, said vertical leg of said side of said upper cart frame having a straight undeformed vertical extension, each of said upper cart wheel assembly supporting means being fixedly secured directly to said vertical extension so that the load transmitted to each of said upper cart wheel assemblies from said upper cart frame is directed in a vertical direction through said vertical extension, said forward positions of both said lower cart and said upper cart being located at the entry end of the storage bay, said back position of said lower cart being located two pallets deep from the entry end of the storage bay, and said back position of said upper cart being located three pallets deep from the entry end of the storage bay,  
said pair of track means being mounted on said storage bay framework, so as to be inclined toward the entry end of

said storage bay so that said lower cart and said upper cart are supported so that they tend to roll along said track means toward the entry end of said storage bay, each of said track means comprising a channel means defining a first channel providing said first guide means arranged so that said first guide means of each track means face inwardly toward one another, and channel means defining a second channel providing said second guide means so that the second guide means of each track means face outwardly away from one another, said channel means of each track means comprising a channel member having an I-shaped cross-section including a vertically extending web portion, a horizontally extending lower flange portion and a horizontally extending upper flange portion, said lower flange portion of each of said channel members including a first tapered portion forming part of said first channel and arranged to provide an upwardly facing rolling surface which is inclined at a small angle to the horizontal and a second tapered portion forming part of said second channel and arranged to provide an upwardly facing rolling surface which is inclined at a small angle to the horizontal.

4,955,490

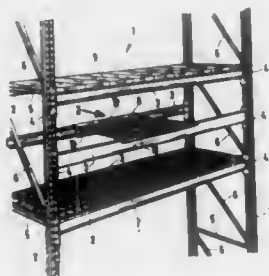
## SHELF SYSTEM, PARTICULARLY PALLET SHELF SYSTEM

Gerhard Schäfer, Neunkirchen-Salchendorf, Fed. Rep. of Germany, assignor to Fritz Schäfer Gesellschaft mit beschränkter Haftung, Neunkirchen, Fed. Rep. of Germany  
Filed Dec. 29, 1987, Ser. No. 139,012  
Claims priority, application Fed. Rep. of Germany, Dec. 30, 1986, 3644692

Int. Cl. A47B 47/00

U.S. Cl. 211—187

19 Claims



1. A shelf system comprising upright posts and longitudinal girders and transverse girders fastened between the upright posts, wherein at least the longitudinal girders are support elements and are suspended from the upright posts, and wherein at least the longitudinal girders are sectional rails, further comprising laterally projecting sectional portions each defining a support bracket for auxiliary support elements of the shelf system, wherein the auxiliary support elements are selected from the group consisting of crossbeams, yokes, shelf boards, separating rods and separating walls, the laterally projecting sectional portions each being part of auxiliary or additional girders, the auxiliary or additional girders extending parallel to the longitudinal direction of the longitudinal girders and being releasably hooked to the longitudinal girders, the auxiliary or additional girders each having an upper hooking portion and a lower abutment portion, each longitudinal girder having a top and a bottom, the auxiliary and additional girders being connectible merely with the upper hooking portion to the longitudinal girder at the top thereof by means of a hooking connection and being connectible with the lower abutment portion to the bottom of the longitudinal girder by means of a hooking connection, the support brackets being part of the auxiliary or additional girders extending between the upper hooking portion and the lower abutment portion.

4,955,491

## PLASTIC CONTAINER WITH REINFORCING RING IN THE BASE

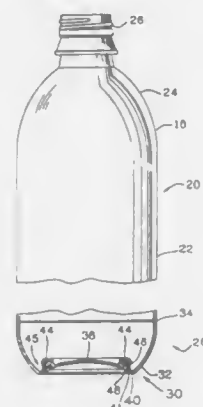
Dennis L. Marshall, Wauwatosa, Wis.; Dale H. Behm, Ann Arbor, Mich.; Theodore F. Eberle, Saline, Mich., and Thomas F. Powers, Ypsilanti, Mich., assignors to Hoover Universal, Inc., Ann Arbor, Mich.

Filed May 1, 1989, Ser. No. 345,294

Int. Cl. B65D 25/24

U.S. Cl. 215—12.1

20 Claims



1. A plastic container for carbonated liquid having a tubular side wall and a base structure merging with a lower end portion of the side wall, said base structure comprising: a bottom wall extending downwardly from said side wall and closing said container, said bottom wall having a raised center portion forming an annular heel portion at the periphery of said center portion; said center portion having an upwardly extending annular recess adjacent to and radially inwardly of said heel portion; and an annular reinforcing ring seated in said recess, said recess being configured to engage and encapsulate a portion of said ring, said bottom wall being flexible so that when said container is filled with said carbonated liquid, the bottom wall forming said recess is forced against said ring to secure said ring to said bottom wall, said ring strengthening said bottom wall to resist eversion of said raised center portion.

4,955,492

## PLASTIC BOTTLE WITH REINFORCING RING ENCIRCLING THE BOTTLE BASE

Dale H. Behm, Ann Arbor; Theodore F. Eberle, Saline, and Thomas F. Powers, Ypsilanti, all of Mich., assignors to Hoover Universal, Inc., Ann Arbor, Mich.

Filed May 17, 1989, Ser. No. 353,003

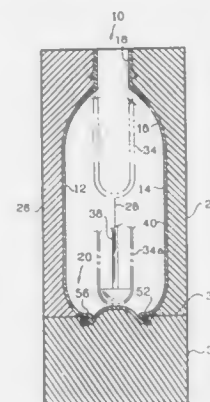
Int. Cl. B65D 1/02, 25/24

U.S. Cl. 215—12.1

13 Claims

1. A plastic container for carbonated beverages comprising: a tubular body having an upright sidewall and a base structure extending downwardly from said sidewall so as to close the lower end of said tubular body, said base structure including an upwardly concave bottom wall at the center of said base structure, a shoulder extending generally upwardly from the periphery of said concave bottom wall and an outer wall extending upwardly and outwardly from said shoulder to connect said shoulder to said sidewall; and an annular reinforcing ring extending about said shoulder and being of a size to engage said shoulder, carbonation pressure in said container exerting a downward force on said concave bottom wall forcing said shoulder radially outwardly against ring to secure said ring on said shoulder.

der, said outward force creating tension in said ring and said ring being of a rigid material whereby said ring resists so that in use the suction cup holds the base upon expansion of said hollow article.



said outward force preventing eversion of said concave bottom wall.

4,955,493

## COLLAPSIBLE EXPANSIBLE PLASTIC HOLLOW ARTICLES IN A LATCHABLE CONFIGURATION

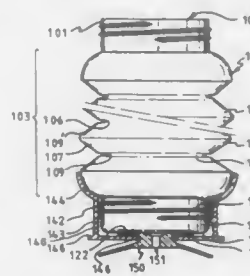
William N. Touzani, Wilhelminastrat 11, 2595 Em Den Haag, Netherlands

Filed Aug. 15, 1989, Ser. No. 394,352

Int. Cl. B65D 23/00

U.S. Cl. 215—100 R

17 Claims



1. A collapsible and expandable plastic hollow article comprising: a top (101) and a base (102) joined by a substantially cylindrical side wall (103) having an axis and being integral with said top and said base and an aperture (104) in the top (101), said side wall comprising a plurality of substantially circular bellows (105, 105') formed by conical sections (106, 107) integrally joined to create at least a portion of said side wall (103), the conical sections (106, 107) comprising alternating short portions (107) and long portions (106), said short portions being at a greater angle to said axis than said long portions, said short portions joining with said long portions to form alternately junctures of greater and lesser diameters, the lesser diameter junctures (108) of the long portions (106) joining with the short portions (107) being formed to create fold rings (109, 109') for the substantially circular bellows; and connecting means for connecting a suction cup to said base, said connecting means being adapted for transferring an axially upwardly force exerted on said hollow article to said suction cup, so that in use the suction cup holds the base upon expansion of said hollow article.

10. A device for use with a collapsible, expandable, plastic hollow article having a substantially cylindrical side comprising a plurality of substantially circular bellows, said hollow article having a base provided with a first connecting means, the device comprising a suction cup and being provided with a second connecting means being adapted for cooperation with said first connecting means for transferring an axially upwardly force exerted on said hollow article to said suction cup.

4,955,494

## FUEL CONTAINMENT MODULE

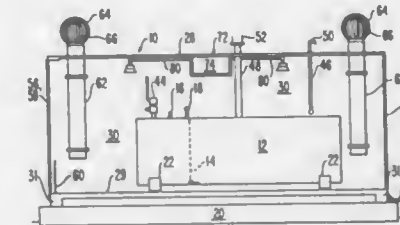
James D. Angelone, 5222 NW, 92 La., Coral Springs, Fla. 33067

Filed Jul. 6, 1989, Ser. No. 375,906

Int. Cl. B65D 88/74

U.S. Cl. 220—587

18 Claims



1. An above-ground storage device for volatile liquid, the device comprising: a tank for storing volatile liquid; base means for disposal beneath said tank; enclosure means including walls disposed on and above said base means for encasing said tank, said enclosure means defining air space between said tank and said walls and including a door opening and door means disposed in said door opening for providing access to said tank; air space ventilation means for ventilating said air space; tank vent means including at least one duct extending from said tank through one of said walls for ventilating said tank; and fire retaining means for retaining a tank fire within said enclosure.

14. An above-ground storage device for volatile liquids, the device comprising: a concrete base; a tank disposed above said base; a tank enclosure having walls surrounding and enclosing the tank and defining an air space between said walls and said tank, the enclosure including a door opening; at least one door mounted in said door opening; a liquid containment plate disposed across said door opening for retaining liquid within said enclosure in the event of a tank leak; at least one relief duct extending from said tank through a wall of said enclosure to vent said tank; at least one ventilation duct extending from said air space through said enclosure, said duct including a turbine for drawing air from said air space to outside said enclosure; at least one duct extending from said tank through a wall of said enclosure for conveying liquid between said tank and an area exterior to said enclosure; and at least one electrical connector electrically connecting said tank and said enclosure to an electrical ground.

4,955,495

## HAZARDOUS WASTE CONTAINER WITH INTEGRAL HOLD-DOWN MECHANISM

George B. Ruebesam, Rte. 1, Box 29, Readsboro, Vt. 05350

Filed Feb. 8, 1990, Ser. No. 476,884

Int. Cl. B65D 21/00

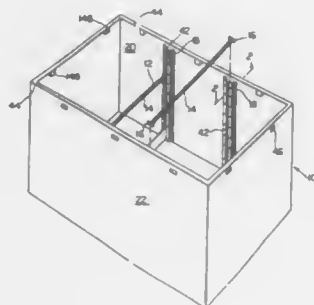
U.S. Cl. 220—545

10 Claims

1. A container for use with a hazardous waste compactor comprising: a generally rectangular bottom panel having two parallel side edges and two parallel end edges, two parallel side panels extending vertically upward from said side edges of said bottom panel, each said side panel having an inner face and an outer face,

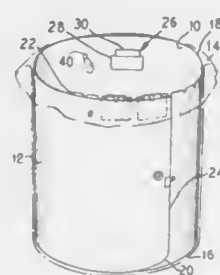


two parallel end panels extending vertically upward from said end edges of said bottom panel, each said end panel having an inner face and an outer face, at least one pair of opposed locking rails, one of said locking rails being attached to said inner face of each said side panel and extending vertically along said inner face, each said locking rail having a plurality of discrete positions, at least one hold-down bar extending between said at least one pair of opposed locking rails,



said at least one hold-down bar having two ends, and resilient means on each of said two ends for cooperatively engaging one of said pair of opposed locking rails for permitting only downward vertical movement of said hold-down bar between said plurality of discrete positions along said locking rails as pressure is applied on said at least one hold-down bar.

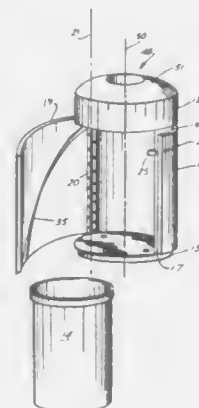
**4,955,496**  
**REFUSE BAG STABILIZER**  
Stanford C. Nelson, 8 S. Merrill Ave., Park Ridge, Ill. 60068  
Filed Jul. 28, 1989, Ser. No. 386,347  
Int. Cl.<sup>5</sup> A65D 25/14  
U.S. Cl. 220—1 T  
18 Claims



1. A liner for a bag, comprising:  
(a) a panel member adapted to be rolled up to form a cylinder having a top end and a bottom end, the panel member including an overlapped portion within an interior of the cylinder and an overlapping portion on an exterior of the cylinder, the cylinder adapted to be inserted within the bag; and  
(b) means for releasably securing the overlapped and overlapping portions together, said means for releasably securing comprising a clip attached to a top end edge of one of the overlapped or overlapping portions, said clip being formed to be substantially U-shaped in cross-section and to include two clasp members resiliently urged together, the clip further including a protruding member positioned substantially between the clasp members, the other of the overlapped or overlapping portions being received within and between the clasp members and including a catch that cooperates with the protruding

member so as to receive the protruding member therein to prevent relative movement between the overlapped and overlapping portions, the clasp members clasp together between the other of the overlapped or overlapping portions.

**4,955,497**  
**LITTER CONTAINER**  
Joseph D. Winden, 7382 Treeline Dr., SE., Grand Rapids, Mich. 49506, and John A. VerBerkmoes, Nunica, Mich., assignors to Joseph D. Winden, Grand Rapids, Mich.  
Filed Feb. 14, 1989, Ser. No. 318,063  
Int. Cl.<sup>5</sup> B65D 51/00  
U.S. Cl. 220—408  
20 Claims

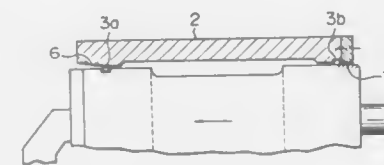


1. A litter container for use in an urban environment comprising:  
a cylindrical body;  
fastener means for mounting said cylindrical body on a support surface and resisting overturning moments of the type generated by a heavy cantilevered structure, said fastener means being disposed under said cylindrical body to prevent tampering;  
an arcuate door disposed in said cylindrical body, said door comprising substantially a 180 degree arcuate section of said cylindrical body;  
hinge means for pivotally mounting and cantilevering said door about a substantially vertical axis disposed on a first end of said door;  
latch means for locking said door in a closed position upon closing of said door, said latch means being disposed on a second end of said door opposite said first end; and  
a substantially helical-shaped stiffener disposed on the interior of said door; said helical stiffener extending from the top of said first end of said door to the bottom of said second end of said door.

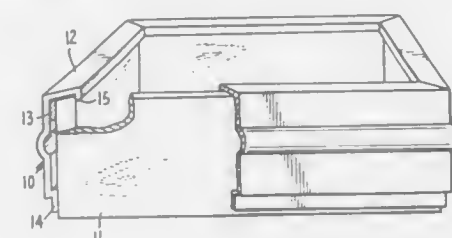
**4,955,498**  
**SEALING STRUCTURE OF PRESSURE CONTAINER**  
Eiichi Hiraoka, Tokyo, and Junji Onaka, Iruma, both of Japan, assignors to Sumitomo Heavy Industries, Ltd., Tokyo, Japan  
Filed Jul. 12, 1989, Ser. No. 378,679  
Claims priority, application Japan, Jul. 15, 1988, 63-92995[U]  
Int. Cl.<sup>5</sup> F16J 15/16  
U.S. Cl. 220—3  
1 Claim

1. A pressure container and sealing structure therefor comprising a cylindrical body having open portions at the front and rear ends and an inner body having a front end wall portion, a rear end wall portion, a connection portion for connecting said two wall portions and a space for receiving a sample, said inner body being forwardly pushed out of said cylindrical body in the axial direction when said sample is discharged from or received in said pressure container, said structure being char-

acterized in that, in order to make a seal between said two wall portions and said cylindrical body, a front packing is provided disposed in a groove on said front wall portion and a rear packing is provided disposed in a groove on a portion of said cylindrical body which opposes said rear end wall portion, said



**4,955,499**  
**RECEPTACLE UPDATE DEVICE**  
Petty, Byron, San Carlos, Calif., assignor to Fiberlite, San Carlos, Calif.  
Filed Nov. 21, 1988, Ser. No. 274,424  
Int. Cl.<sup>5</sup> B65D 6/24, 90/06; A01G 9/02  
U.S. Cl. 220—4 E  
8 Claims



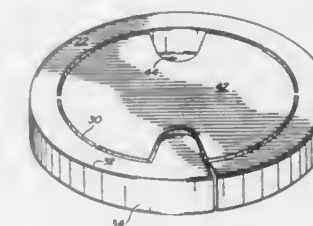
1. An updated architectural receptacle comprising in combination an architectural receptacle and a receptacle update device for restoring or changing the external appearance of said receptacle, said receptacle having a substantially vertical wall defining its original shape, an upper horizontal surface at the top of the vertical wall with an opening in said horizontal surface, the update device being affixed to the external surface of said receptacle and comprising two joined substantially rigid composite sheet sections, each of said sections corresponding substantially to half the perimeter of said receptacle said sections having an outer surface, an inner surface and a top lip, the sheet sections being sized so that the inner surface substantially conforms in dimension to the vertical wall of the receptacle with the top lip extending over the upper horizontal surface into said opening, said two sheet sections, as joined, substantially surrounding and enclosing the vertical wall and horizontal surface of said receptacle.

**4,955,500**  
**SEALING GROOVE COVER**  
John R. Rhoads, 23431 W. Peters Rd., Casa Grande, Ariz. 85222  
Filed Jul. 28, 1989, Ser. No. 386,121  
Int. Cl.<sup>5</sup> B65D 43/06  
U.S. Cl. 220—212  
20 Claims

1. A sealing groove cover for a cylindrical container having a center, an open top, a bottom, a vertically oriented cylindrical side wall with inner and outer surfaces, the container further including a continuous circular female groove disposed within the container side wall and having an outer perimeter coupled to the top of the side wall and an inner perimeter, the female groove serving to secure and seal a removable lid hav-

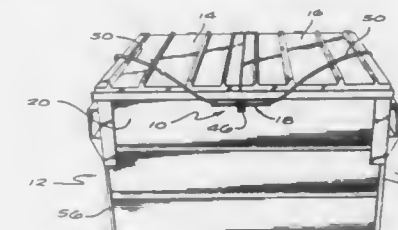
ing a complementary circular male element to the top of the container, the sealing groove cover comprising:

- a circular body fabricated from a bendable material and having a first end, a second end terminating in proximity to the first end and defining a gap between the first and second ends, the circular body further including an inner perimeter edge and an outer perimeter edge;
- a circular outer sealing member fabricated from bendable material and coupled to the circular body along the outer perimeter edge, the outer sealing member being dimensioned to snugly contact the outer surface of the container side wall;
- a circular inner sealing member fabricated from bendable material and coupled to the circular body along the inner perimeter edge, the inner sealing member being dimen-



- sioned to snugly contact the inner perimeter of the female groove; and  
d. a circular male element fabricated from a bendable material and projecting outward from the circular body at a radial distance between the inner and outer sealing members in alignment with the female groove of the container for forming an interference fit between the sealing groove cover and the container female groove, the body, the inner and outer sealing members and the male element deflecting without breaking as the first and second ends of the circular body are displaced relative to each other by upward lifting forces and whereby the sealing groove cover prevents contaminating fluids or particulate matter from entering the female groove of the container when the lid is removed from the container.

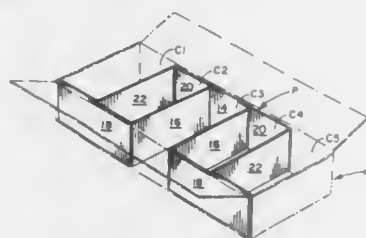
**4,955,501**  
**TRASH BIN LID-LOCKING DEVICE**  
Allan M. Hodge, P.O. Box 202005, San Diego, Calif. 92120-0925  
Filed Jan. 5, 1989, Ser. No. 293,939  
Int. Cl.<sup>5</sup> B65D 45/00  
U.S. Cl. 220—315  
17 Claims



1. A trash bin lid-locking device used to secure the lids of a trash bin, each of said lids having front corners, said device comprising:  
two flexible cables, each of said cables having first and second ends;  
means mounted on front of said trash bin and engaged to said first ends of said cables for selectively securing said lids shut and for selectively allowing said lids to be opened by providing slack in said cables allowing said cables to be (1) removably placed over said front corners of said lids

preventing opening of said lids, and (2) subsequently removed from on top of said front corners allowing said lids to be opened; and  
first bracket means attached to sides of said trash bin for selectively engaging said second ends of said cables.

**4,955,502**  
**FIVE CELL PARTITION**  
Anthony L. Sorci, Springfield, Mo., assignor to Container Corporation of America, Clayton, Mo.  
Filed Sep. 25, 1989, Ser. No. 411,447  
Int. Cl.<sup>3</sup> B65D 5/48  
U.S. Cl. 220—22 **4 Claims**



1. A collapsible partition structure formed from a unitary blank of foldable sheet material, such as paperboard, and adapted, when placed within an outer container having opposed first and second side walls and opposed first and second end walls, to provide five separate adjacent cells aligned in a row, said partition structure comprising:

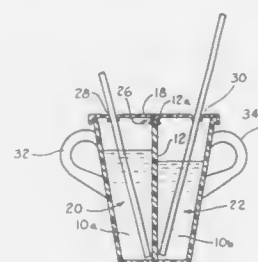
- (a) a first side outer panel adapted to lie against a container first side wall with opposed ends of said first side outer panel being spaced inboardly from respective container end walls;
- (b) a first side inner panel having a length less than that of said first side outer panel and disposed against an inner surface of said first side outer panel intermediate said opposed ends of said first side outer panel;
- (c) a pair of second side outer panels disposed to lie against a container second side wall;
- (d) said second side outer panels being spaced from each other and having corresponding outboard ends disposed adjacent respective container end walls;
- (e) a pair of second side inner panels, each having a length less than that of either of said second side outer panels, disposed against inner surfaces of respective second side outer panels;
- (f) a pair of intermediate panels having corresponding first ends foldably joined to opposed ends of said first side inner panel and having corresponding second ends foldably joined to corresponding inboard ends of respective second side outer panels;
- (g) a pair of end panels having corresponding first ends foldably joined to opposed ends of said first side outer panel and having corresponding second ends foldably joined to corresponding inboard ends of respective second side inner panels;
- (h) means interconnecting adjacent upper edges of said first side panels to each other and means interconnecting upper edges of said second side panels to each other.

**4,955,503**  
**PARTITIONED DRINKING CUP**  
Michael L. Propes, 83 Sandra Ave., Greenville, S.C. 29611  
Filed Feb. 2, 1989, Ser. No. 305,079  
Int. Cl.<sup>3</sup> A47G 19/00  
U.S. Cl. 220—526 **7 Claims**

1. A partitioned personal drinking cup for simultaneously dispensing two different beverages to first and second persons without co-mingling comprising:  
an open top container;  
a partitioned wall dividing said container into a first drinking

compartment for containing a first drink, and a second drinking compartment for containing a second drink;  
a removable lid fitted over said open top of said container;  
a first personal drink dispensing opening formed in a first part of said removable lid near a rim of said lid, and a second personal dispensing opening formed in a second part of said drinking lid near said rim of said lid;  
said first and second dispensing openings being formed in said lid so that said first dispensing opening overlies said first drinking compartment in a centralized location and said second dispensing opening overlies said second drinking compartment in a centralized location when fitted over said open top of said container so that said first drink may be consumed directly by a first person and said second drink may be consumed directly by a second person; and

seal means for forming a seal between said lid and an upper edge of said partition to prevent liquids from mixing between said first and second drinking compartments which includes a first part carried by said lid and a second part



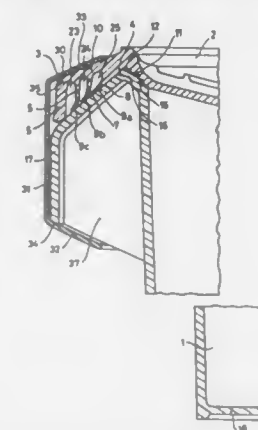
carried by said partition wall, and said first part and said second parts interfit together to provide an alignment means which prevents rotational motion between said lid and said cup so that said lid is secured over said open top of said cup in a correct position properly aligning said first and second dispensing openings over said first and second drinking compartments;

a first handle to be held by said first person while drinking from said first compartment of said cup, and a second handle held by said second person while drinking from said second drinking compartment of said cup; and  
said first dispensing opening being associated with said first handle and said second dispensing opening being associated with said second handle whereby placement of said lid on said cup may be had in a proper position by referencing said first and second dispensing openings to said first and second handles facilitating proper placement of said seal means and said alignment means and centralized location of said dispensing openings relative to said drinking compartments.

**4,955,504**  
**INJECTION-MOULDED PLASTIC LID FOR A CONTAINER AND A CONTAINER HAVING SUCH AN INJECTION-MOULDED PLASTIC LID**  
Bernardus A. Lesscher, Mariaparochie, Netherlands, assignor to Wavin B.V., Netherlands  
Filed Oct. 5, 1989, Ser. No. 417,547  
Claims priority, application Netherlands, Oct. 6, 1988, 8802456  
Int. Cl.<sup>3</sup> B65D 43/08  
U.S. Cl. 220—352 **8 Claims**

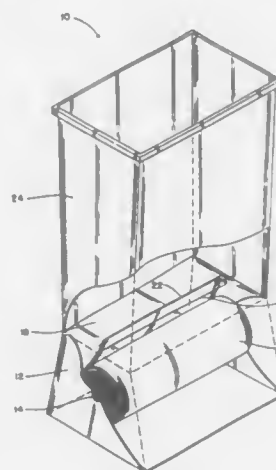
1. Injection-molded plastic lid for a container having a first container upper rim part (15) which divergently adjoins the inner wall and which adjoins, via a sharp upper rim (28), an outwardly directed, downwardly sloping second container upper rim part (16) terminating in a downwardly directed apron (17) situated at a distance from the container wall, said

plastic lid (2) comprising a first lid inside rim part (11) being capable of engaging said first container upper rim part, which first lid inside rim part merges, via a lid top inside rim (12) into a downwardly sloping second lid inside rim part (4) being capable of engaging said second container upper rim part (16), and also a circumferential chamber (29) provided in said second lid inside rim part (4) and sealing means capable of engag-



ing the second container upper rim part to form a seal, wherein said sealing means, being integral with the plastic lid, comprise at least two circumferential thin flaps, at least the bases of said flaps (6, 7, 8) being firmly attached to the wall of the chamber (29) to form a subchamber (23, 24, 25) situated next to each flap and the free lower ends of the flaps extending past an imaginary conical surface (26) forming a continuation of the second lid inside rim part (4).

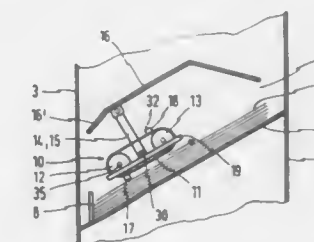
**4,955,505**  
**TRASH RECEPTACLE LINING SYSTEM**  
Michael A. Battaglia, 7609 W. Lake St., St. Louis Park, Minn. 55426  
Filed Jun. 23, 1989, Ser. No. 370,179  
Int. Cl.<sup>3</sup> B65D 25/16  
U.S. Cl. 220—407 **5 Claims**



1. A trash receptacle lining system, comprising:  
a receptacle having open top and bottom ends separated by an intermediate transverse partition;  
a slot formed through said partition;  
a spindle mounted transversely within said receptacle, between said partition and said bottom end;  
a roll of perforated trash bags mounted for rotation on said spindle; and

brake means for selectively securing said roll against rotation.

**4,955,506**  
**DEVICE FOR THE INDIVIDUAL WITHDRAWAL OF SHEET-TYPE PRINTED PRODUCTS, IN PARTICULAR NEWSPAPERS**  
Frazz Schwellberer, Kleanzstrasse 105, D-8000 Munich 5, Fed. Rep. of Germany  
Continuation of Ser. No. 168,854, Mar. 16, 1988, abandoned.  
This application May 1, 1989, Ser. No. 346,263  
Claims priority, application Fed. Rep. of Germany, Mar. 23, 1987, 3709506  
Int. Cl.<sup>3</sup> B65H 3/22  
U.S. Cl. 221—213 **4 Claims**



1. A device for the individual withdrawal of sheet-like printed products, such as newspapers, arranged in an inclined stack in a housing, comprising a carriage assembly movably positionable above said stack, said carriage assembly having a pair of aligned, spaced-apart gears pivotally mounted thereto; an endless conveyor connected about said gears, said conveyor having spaced-apart gripper rods affixed thereto; means for rotating said gears and thereby moving said conveyor and said gripper rods along said inclined stack; said gripper rods being affixed to said endless conveyor transverse to the direction of movement of said conveyor, each of said gripper rods having a plurality of gripper fingers; a guard plate supported above said carriage assembly in said housing and having substantially identical dimensions as the sheets to be withdrawn, and for covering said stack; and a withdrawal slot in said housing proximate the upper end of said inclined stack, formed between said guard plate and said housing, to receive products therethrough.

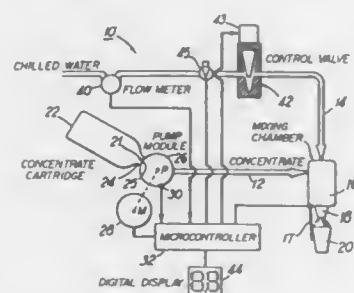
**4,955,507**  
**ORANGE JUICE DISPENSING SYSTEM**  
Jonathan Kirschner; Kenneth G. Smazik, both of Marietta, and Gary V. Paisley, Lilburn, all of Ga., assignors to The Coca-Cola Company, Atlanta, Ga.  
Continuation-in-part of Ser. No. 924,379, Oct. 29, 1980, abandoned. This application Sep. 18, 1989, Ser. No. 408,813  
Int. Cl.<sup>3</sup> B67D 5/36  
U.S. Cl. 222—65 **7 Claims**

1. Apparatus for reconstituting and dispensing juice comprising:

- (a) a pump having a variable speed drive motor connected thereto and having an inlet port for receiving juice concentrate;
- (b) a mixing chamber for mixing water and concentrate and for dispensing the mixture therefrom as a beverage;
- (c) a concentrate conduit extending from said pump directly to said mixing chamber with no control valve or flow meter therein;
- (d) a water line connected to said mixing chamber and a motorized, variable flow, control valve in said water line;
- (e) first means for sensing the water flow rate and second means for sensing the speed of the pump and thus the concentrate flow rate; and
- (f) a microcontroller for controlling the mixture ratio of the



beverage dispensed from said mixing chamber, said microcontroller being connected to said first and second sensing means for receiving signals therefrom, to said



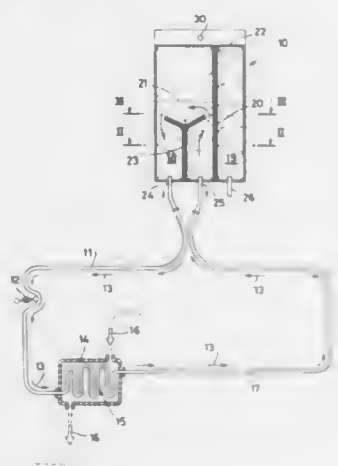
motor for controlling the speed thereof and therefore the concentrate flow rate through said pump, and to said motorized, variable flow control valve in said water line for controlling the water flow therethrough.

**4,955,508**  
**CONTAINER AND METHOD FOR WASHING AND EFFECTIVELY COMPLEMENTING THE OPERATION OF DIALYSIS CIRCUITS AND FILTERS**  
Dario Capanna, Milan; Alfredo Romeo, Segrate, and Luigi Mesia, Sondrio, all of Italy, assignors to Pierrel Hospital Spa, Sondrio, Italy

Filed Jun. 12, 1985, Ser. No. 743,823  
Claims priority, application Italy, Jun. 25, 1984, 21580 A/84  
Int. Cl.<sup>5</sup> B65D 35/22

U.S. Cl. 222—94

5 Claims



1. A container for washing and operational completion of the extracorporeal blood circuit and filter of dialysis apparatus comprising a first fluid-tight chamber containing a first predetermined quantity of sterile physiological saline solution and a second fluid-tight chamber containing a second predetermined quantity of sterile physiological saline solution, said first and second chambers being independent of one another and fluidically non-communicating; said first chamber being equipped with two fittings, fluidically connectable to said extracorporeal blood circuit, for inlet to and discharge from said first chamber; said second chamber being equipped with a single fitting, fluidically connectable to said extracorporeal blood circuit, for inlet to and discharge from said second chamber.

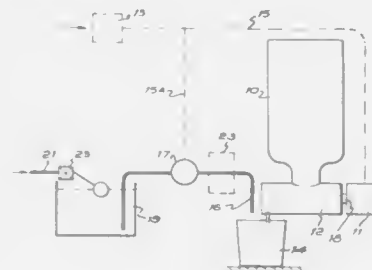
**4,955,509**  
**DISPENSING OF LIQUIDS**  
David C. E. Nevill, Northwood, England, assignor to Cadbury Schweppes plc, London, England  
Filed Apr. 4, 1989, Ser. No. 333,493

Claims priority, application United Kingdom, Apr. 8, 1988, 8808193

Int. Cl.<sup>5</sup> B67D 5/56

U.S. Cl. 222—129.4

3 Claims



1. A container for dispensing metered doses of liquid comprising:

- a container body for holding a bulk supply of liquid which has an outlet at the top thereof and which is for use in an inverted position;
- valve means integral with the container body;
- a dispensing outlet in said valve means;
- said valve means comprising a cylindrical outer sleeve which lies with its axis horizontal when the container is in use;
- a sleeve inlet in said sleeve in communication with said outlet from said container body;
- a cylindrical valve barrel rotatably positioned in said sleeve;
- a partition in said cylindrical valve barrel, which splits said barrel into first and second metering chambers;
- first and second inlet ports in said valve barrel located in a first vertical plane with said sleeve inlet, said first and second ports extending circumferentially of the valve barrel such that ends thereof lie closely adjacent the partition and such that the circumferential spacing between adjacent ends of said ports is less than the circumferential extent of the sleeve inlet;
- first and second chamber outlets in said valve barrel which are in a second vertical plane spaced axially of the sleeve from said first vertical plane;
- a sleeve outlet lying in said vertical plane;
- first and second venting outlets in said valve barrel in a third vertical plane axially spaced from the first and second vertical planes, for venting of air from said chambers;
- a venting outlet in said sleeve in said third vertical plane; and
- the container being adapted for use so that the valve barrel can be turned in the sleeve so as to have three operational positions, including a first position in which two adjacent ends of the valve barrel inlet ports communicate with the sleeve inlet and the interior of the container body for filling of the first and second chambers simultaneously, in which position the venting outlet in the sleeve and the sleeve outlet are blocked; a second position in which the inlet port of the first chamber communicates with the sleeve inlet and the interior of the container body for filling of the first chamber with liquid, the second venting outlet which is associated with the second chamber being in communication with the venting outlet of the sleeve, while the second chamber outlet is in communication with the sleeve outlet for the discharge of the contents of the second chamber from the valve means; and a third position which is similar to the second position

except that the second chamber fills while the first chamber drains, the container body and valve means therefore providing that at all times the bulk supply of liquid is in communication with and is always filling at least one of the first and second chambers.

**4,955,510**  
**BEAN AND GROUND COFFEE CARRIER MEMBER FOR USE IN COFFEE SYSTEMS**

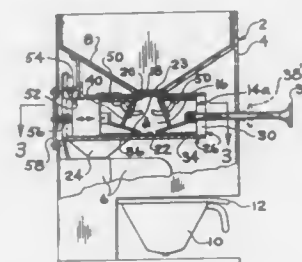
Brian D. Newman, Louisville, Ky., assignor to Grindmaster Corporation, Louisville, Ky.

Filed Apr. 20, 1989, Ser. No. 342,247

Int. Cl.<sup>5</sup> B65D 88/54

U.S. Cl. 222—305

30 Claims



1. Coffee bean proportioning means for a coffee grinder assembly comprising

- a housing,
- a motorized grinder disposed in said housing and defining an inlet port for receiving whole beans to be ground,
- a bean hopper mounted on said housing and defining an outlet port,
- a bean carrier member defining a chamber for storing a predetermined volume of beans, said member having an inlet aperture and an outlet aperture and being disposed in said housing for linear movement between a first position wherein said chamber communicates with said hopper through said inlet aperture and is isolated from said grinder, and a second position wherein said chamber communicates with said grinder inlet port through said outlet aperture and is isolated from said hopper, said member further comprising
  - a box partially defining said chamber, said box having upper and lower surfaces defining said inlet and outlet apertures, respectively, and a pair of sidewalls, and
  - a floor formed in said box and sloping downwardly toward defining edge portions of said second aperture, said sloping floor having a negative angle relative to horizontal which is greater than the angle of repose of coffee beans to promote the flow of beans from said chamber through said second aperture to said grinder when said chamber is in communication with said grinder,
  - a pair of end walls pivotally attached to one of said sidewalls and disposed in said member over said floor to define end walls of said chamber on opposite sides of said inlet and outlet apertures, one of said sidewalls containing a pair of circular, arc-shaped slots therein, and
  - an adjustment pin connected to each of said end walls, each of said pins projecting through a corresponding one of said slots for being moved along said slots to tilt said end walls and thereby adjust the volume of said chamber, and means for moving said member between said first and second positions.

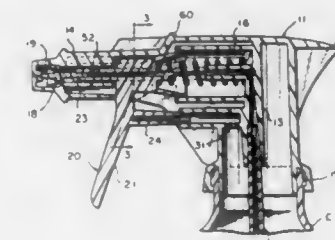
**4,955,511**  
**TRIGGER ACTUATED PUMP AND METHOD OF MAKING SAME**

William S. Blake, 14 Georgetown Ct., Linwood, N.J. 08221  
Continuation-in-part of Ser. No. 248,418, Sep. 23, 1988. This application Dec. 19, 1988, Ser. No. 286,072

Int. Cl.<sup>5</sup> B67D 5/00

U.S. Cl. 222—321

19 Claims



1. A trigger actuated pump for attachment to a container for dispensing fluid, comprising:

- a shroud with a housing defining a pump chamber;
- a trigger actuated pump means for pumping the fluid to be dispensed and including a primary piston reciprocable in the pump chamber;
- a nose piece integrally molded with said shroud and defining a cylinder and nozzle means having a bore therethrough for passage of said pumped fluid;
- a secondary piston rigidly connected with said primary piston, and reciprocable in said cylinder; and
- nose valve means in the cylinder for controlling flow of said fluid through said bore in the nozzle means responsive to the fluid pressures produced by the trigger actuated pump means, wherein said integrally molded shroud and nose section reduces the number of parts that need to be inventoried and simplifies assembly of the pump, thereby reducing the cost of the pump.

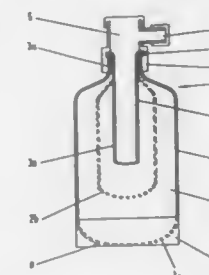
**4,955,512**  
**LIQUID CONTAINER AND DISPENSER FOR CONTROLLED LIQUID DISPENSATION**  
Leonard Sharples, Scarborough, England, assignor to Splicerite Limited, West Yorkshire, England

Continuation of Ser. No. 147,257, Jan. 22, 1988, abandoned, which is a continuation-in-part of Ser. No. 78,178, Apr. 16, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 301,158  
Claims priority, application United Kingdom, Jan. 22, 1987, 8701390; Jul. 24, 1987, 8717605

Int. Cl.<sup>5</sup> B67D 5/42

U.S. Cl. 222—386.5

10 Claims



1. A liquid container which comprises:

- a housing;
- a charging and discharging opening provided on the housing for the liquid content of the container;
- a flexible and open-ended bag arranged in the housing to contain the liquid.

communicate with said housing opening and defining an internal space within the container between the exterior of the bag and an internal wall of the housing; and,

(i) the bag being made of an elastomeric material and being of sufficient wall strength: to expand without rupture within the confines of the housing from a relaxed contracted state upon charging of the bag with liquid, and be returnable to its contracted state by its own inherent resilience in order to discharge its liquid content;

(d) valve means for controlling the charging and discharging of the liquid content of the bag via said opening; and,

(e) a pressure control valve communicating with the internal space defined between the exterior of the bag and the internal wall of the housing, said control valve allowing ingress of ambient air to the internal space as the bag contracts during liquid discharge, said control valve comprising an outer body having a restricted outlet for flow of air therethrough to atmosphere, a valve element positioned within said outer body immediately adjacent said restricted outlet, and spring means positioned in engagement with said valve element remote from said restricted opening and resiliently urging said valve element outwardly into sealing relation to said restricted opening whereby upon a predetermined negative pressure being created in the internal space defined between the exterior of the bag and the internal wall of the housing as the bag contracts during liquid discharge, said valve element will be moved to a non sealing position by atmospheric pressure thereon overriding said spring means.

4,955,513

## DISPENSING CLOSURE WITH FLAP RETENTION

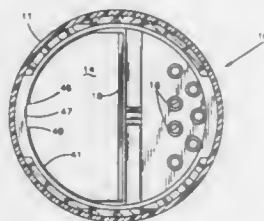
Kurt K. Bennett, Cuyahoga Falls, Ohio, assignor to Weatherchem Corporation, Twinsburg, Ohio

Filed Jan. 16, 1990, Ser. No. 464,981

Int. Cl.<sup>5</sup> B67D 3/00; A47G 19/24

U.S. Cl. 222—480

5 Claims



1. A dispensing cap for containers comprising an injection-molded plastic one-piece body providing a circular end wall and a cylindrical skirt extending from one side of said end wall, said end wall providing at least one opening through which contents from an associated container can be removed without removing said cap from said associated container, said body providing a flap connected to said end wall by hinge means, said flap being pivotable from an open position in which said opening provides access to said associated container and a closed position closing said opening, said end wall providing an inwardly extending lip bordering said opening along portions thereof spaced from said hinge means and providing an inwardly facing inner first surface, said lip being interrupted along a recessed central portion to provide a central radially extending recess, said flap providing an outwardly facing second surface positioned in close face-to-face adjacency with said first surface when said flap is in said closed position and cooperating therewith to provide a seal preventing passage of contents of said associated container, and a radially extending latch adjacent said second surface which extends under said lip to releasably lock said flap in said closed position, said latch extending uninterrupted past said recessed central portion, whereby said latch is substantially unaffected by shrinkage of

the plastic forming said cap and variations in tightness of said cap on a container.

4,955,514

## SEALLESS DISPENSING MECHANISM

Ewald F. Dickau, Glastenbury, Conn., assignor to Loctite Corporation, Newington, Conn.

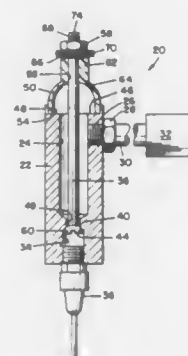
Continuation of Ser. No. 274,666, Nov. 21, 1988, abandoned, which is a continuation of Ser. No. 57,614, Jul. 6, 1987,

abandoned. This application Sep. 19, 1989, Ser. No. 409,278

Int. Cl.<sup>5</sup> B67D 3/00, 5/06

U.S. Cl. 222—518

19 Claims



1. Apparatus for dispensing precise quantities of a broad range of fluid products, including adhesives and sealants, regardless of orientation, comprising:

(1) a wand-like dispenser portion, capable of dispensing the fluid product in a drop-wise or stream-like fashion, comprising a generally cylindrical housing defining a fluid reservoir and having a continuously open inlet for delivery of pressurized fluid product to the reservoir for continuously maintaining a filled reservoir and for maintaining pressure in said reservoir even when flow of fluid out of said reservoir may have been terminated and including a valve seat defining an outlet for dispensing the fluid product from the reservoir, said housing being open at an end opposite said valve seat and terminating thereat at a continuous annular end surface; and

a deformable resilient fluid tight closure member overlying the open end of said housing, said closure member having a central opening and an outer peripheral surface terminating in a continuous rim, said rim being sealingly engageable with said end surface; and

an elongated stem member extending through the outlet and including a gate member at one end, said gate member having a rounded surface for sealing engagement with said valve seat, said stem member being fittingly received in and extending through said central opening of said closure member and being fixedly and sealingly attached thereto distant from said gate member; and

said stem member and said closure member being responsive to an external force acting upon said stem member in the direction of the valve seat to thereby cause sufficient movement of said stem member in said direction, along the axis thereof, and deformation of said closure member to concurrently cause said gate member to move from a first position in sealing engagement with said valve seat to a second position disengaged from said valve seat thereby allowing the fluid product to be dispensed from said reservoir through said outlet; and

said stem member and said closure member being responsive to the removal of said external force such that the stem member returns to its original position and the closure member is restored to its original shape and, concurrently, said gate member moves from said second position to said

first position thereby terminating the dispensing of the fluid product; and

nozzle means attached to said housing such that said nozzle means and said valve seat define a dispensing chamber in which said valve gate reciprocates between said first and second positions and wherein when said valve gate moves from said second position to said first position said movement, and the concurrent movement of the stem member and the reformation of the closure member, cause the fluid being dispensed from the nozzle to rapidly reverse direction thereby causing the fluid to be drawn back into the nozzle so as to eliminate drippage;

(2) a pressurized source of the fluid product; and

(3) conduit means for supplying to said reservoir fluid product under pressure, said conduit means connected at one end to said pressurized source and at its other end to the inlet opening in said housing; wherein, in operation, said pressurized source and said conduit means operate to keep said reservoir filled with fluid product under pressure.

4,955,515

## MAGNETIC THIMBLE

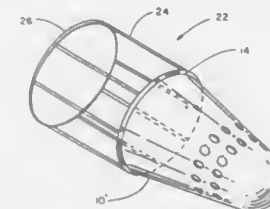
Kenneth J. Brull, 507 Dry Creek Cove, Round Rock, Tex. 78681

Filed Jun. 12, 1989, Ser. No. 369,520

Int. Cl.<sup>5</sup> D05B 91/04

U.S. Cl. 223—101

6 Claims



1. A thimble comprising:

(A) a flexible outer body having an inner surface; and  
(B) a magnetic liner attached to said outer body on said inner surface, said liner covering essentially the entire area of said inner surface.

4,955,516

## PORTABLE BEVERAGE CARRIER

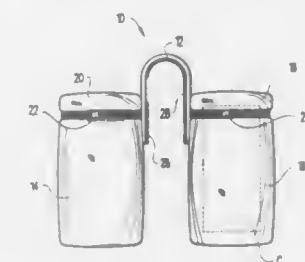
Gary T. Satterfield, 659 E. 8th St., Upland, Calif. 91786

Filed Jul. 19, 1989, Ser. No. 381,806

Int. Cl.<sup>5</sup> B62J 9/00

U.S. Cl. 224—35

1 Claim



1. In combination with a bicycle having a horizontal top frame tube, a portable beverage carrier adapted for removable mounting on said horizontal top frame tube, comprising:

a pair of insulated receptacles, each dimensioned to receive a standard beverage container;  
a selectively openable cover for each of said receptacles;  
a zipper for selectively closing each of said covers;

an elongated strap having opposite ends secured to each of said receptacles;

first cooperating hook and loop fastening members on a central portion of said strap and on said bicycle top frame tube for securing said strap to said bicycle top frame tube;  
second cooperating hook and loop fastening members on facing portions of said opposite ends of said strap for securing said strap around said bicycle top frame tube;  
a gel refrigerant material received in each of said receptacles;

and  
each of said receptacles and said covers formed from a fabric material lined with a gel refrigerant encapsulated within a water proof liner.

4,955,517

## COMBINATION BACKPACK AND CHAISE

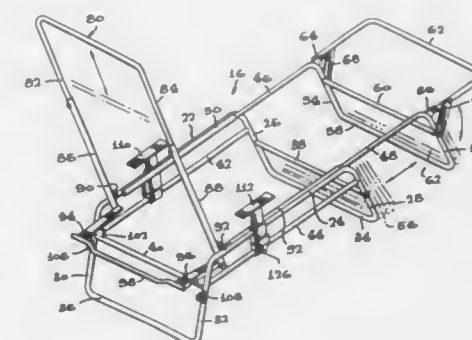
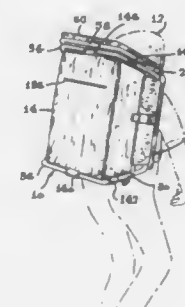
Carlo P. Maresca, 2220 Monte Vista Dr., Vista, Calif. 92084

Filed Jul. 17, 1989, Ser. No. 380,292

Int. Cl.<sup>5</sup> A45F 4/02

U.S. Cl. 224—155

20 Claims



1. A combination pack and chaise comprising:

a main frame, side rails on said main frame, four legs on said main frame including left and right front legs and left and right rear legs;  
a pack secured to said main frame and mounted below said side rails of said main frame and between said legs of said main frame;  
a leg rest slidably mounted with respect to said frame, said leg rest having a left leg and a right leg, said leg rest being slidably mounted so that said leg rest legs can be moved from a position adjacent said front legs of said main frame to a position away from said front legs of said main frame;  
a backrest, said backrest being pivoted on said main frame so as to move from a folded position where it lies parallel to said frame to a position where it is raised with respect to said frame to serve as a backrest main frame;  
a chaise cover removably mounted on said backrest frame, mounted on said main frame and above said pack and said



leg rest so that the frame of said chaise can support a person while said pack serves as storage while said chaise supports a person and said cover can be removed from said frame, stored in said pack so that said combination pack and chaise can be carried on the back.

4,955,518

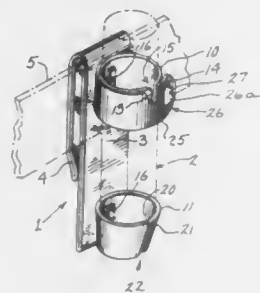
## BATON CLIP FOR EXPANDABLE BATONS

Kevin L. Parsons, 16 Wagon Wheel Dr., Appleton, Wis. 54915; Gary M. Grundy, 921 E. Hamilton St., Milwaukee, Wis. 53201, and Jacqueline M. Dunstan, 604 Aspen St., South Milwaukee, Wis. 53172

Filed Mar. 31, 1989, Ser. No. 332,299  
Int. Cl.<sup>5</sup> A45F 5/00

U.S. Cl. 224-247

4 Claims



1. A baton clip for an expandable baton of the type including a handle and at least one telescoping member, the telescoping member being movable between a retracted position in which the telescoping member is contained substantially within a hollow interior of the handle and an extended position in which the telescoping member issues from an open end of the handle, the baton clip comprising:

- a base member;
- retaining means attached to the base member, the retaining means including;
- upper guide means formed of a resilient material having a first neutral shape which is adapted to slidably receive the handle of the expandable baton, and to provide a first resistance to lateral movement of the handle, the upper guide means including a first longitudinal break whereby the first resistance to lateral movement may be overcome by an application of a lateral force on the handle to temporarily deform the upper guide means and break the expandable baton out through the first longitudinal break, whereupon after the break out of the expandable baton, the upper guide means restores to said first neutral shape;
- lower guide means formed of a resilient material having a second neutral shape which is adapted to receive the open end of the expandable baton handle, the lower guide means being mated to the open end of the handle such that when the open end of the handle is in contact with the lower guide means, the lower guide means provides both a second resistance to lateral movement of the handle and a third resistance to downward movement of the handle, the lower guide means including an aperture which allows the telescoping member to pass downward through the aperture when the telescoping member is in the extended position, and the lower guide means including a second longitudinal break whereby the second resistance to lateral movement is also overcome by the application of the lateral force on the handle to temporarily deform the lower guide means and break the expandable baton out through the second longitudinal break, whereupon after the break out of the expandable baton, the lower guide means restores to said second neutral shape;
- wherein the baton clip is adapted to both hold, and allow the lateral break out, of the expandable baton with the ex-

pandable baton in both the retracted position and the extended position.

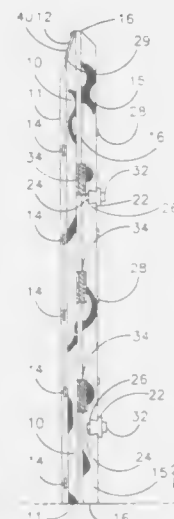
4,955,519

## SKI CASE SLED

Keith E. Forrester, 38 Brookside Dr., Stratham, N.H. 03885  
Filed Mar. 24, 1989, Ser. No. 328,242  
Int. Cl.<sup>5</sup> B60R 9/04

U.S. Cl. 224-319

4 Claims



1. In combination, a slim low-pressure drag container for transporting skis and ski poles or other materials in combination with at least one male dovetail guide of a roof-top of a vehicle, said container formed with at least one female channel to be connected to the at least one male dovetail guide; said at least one male dovetail guide and said at least one female channel being equal in number, said container comprising a top, a bottom, two side walls, and two end walls; said top including solid sled runners to allow the container to function as a sled; each said at least one male dovetail guide having (a) stop end bars cooperating with at least one of the at least one female channel to limit movement of the container when connected to the at least one male dovetail guide, (b) spacing bars, to securely retain the container on the at least one male dovetail guides, and (c) a locking bar, to lock the container to the at least one male dovetail guide; said end bars, said spacing bars and the locking bar, acting to secure the container onto a vehicle roof-top.

4,955,520

## WEB FEED DEVICE HAVING AN IMPROVED LID MECHANISM

Gregory A. Ferguson, New Bedford, Mass., assignor to Precision Handling Devices, Inc., Fall River, Mass.

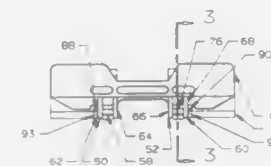
Filed Mar. 24, 1989, Ser. No. 328,424  
Int. Cl.<sup>5</sup> B65H 20/20

U.S. Cl. 226-74

22 Claims

1. A lid mechanism for a web feed device having a frame which has a wall, which lid mechanism comprises a lid member, a block extending from said lid member, said block having side faces angularly disposed to each other, a hinge pivotally connecting said lid and said wall for movement between open position where one of said side faces bears against said wall and closed position where another of said side faces bears against said wall, a spring mounted on said wall and bearing against said block to bias said faces of said block against said wall thereby applying compressive forces against said block, said hinge having parts extending from said wall and from said block including a portion of said hinge which is connected to

said block, means providing for the movement of said portion of said hinge towards and away from said wall to a position



where it is relieved of load, due to the bias from said spring on said block, when said lid is in said open position and when said lid is in said closed position.

4,955,521

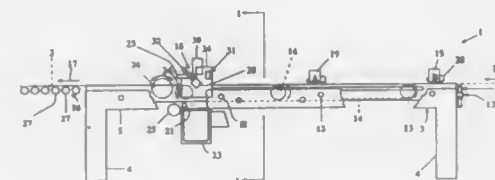
## DOOR JAMB ASSEMBLY MACHINE WITH AUTOMATIC ALIGNMENT AND FEED

James V. Michael, Hayward, Calif., assignor to Senco Products, Inc., Cincinnati, Ohio

Filed Sep. 27, 1988, Ser. No. 249,726  
Int. Cl.<sup>5</sup> B25C 7/09

U.S. Cl. 227-3

17 Claims



1. An apparatus for constructing a door jamb assembly consisting of a jamb member, a pair of side members, and a stop member, comprising:

- means for supporting the jamb member;
- means for positioning the side members in the proper position relative to the jamb member;
- means for aligning the stop member in the proper position relative to the jamb member;
- fastening means containing a plurality of fasteners;
- means for conveying the jamb member, side members, and stop members past said fastening means; and
- means for actuating said fastening means to permanently fasten the jamb member, side members, and stop member into a door jamb assembly.

4,955,522

## PROCESS FOR THE LEAKPROOF JOINING OF CERAMIC SEALING DISKS TO METALLIC ATTACHMENTS

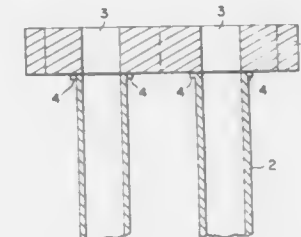
Helmut Stuhler, Röttenbach, Fed. Rep. of Germany, assignor to Hoechst CeramTec Aktiengesellschaft, Selb, Fed. Rep. of Germany

Filed Mar. 23, 1989, Ser. No. 327,707  
Claims priority, application Fed. Rep. of Germany, Mar. 25, 1988, 3810190

Int. Cl.<sup>5</sup> B23K 103/16

U.S. Cl. 228-122

17 Claims



1. A process for the leakproof joining of a ceramic sealing disk having at least one opening with at least one metallic pipe having an opening, comprising the steps of:

- (A) contacting together with solder the metallic pipe and a first face of the roughly finished sealing disk such that the opening of the metallic pipe corresponds to the opening in the sealing disk; then
- (B) heating the pipe, disk and solder to the melting temperature of the solder; and
- (C) thereafter producing by grinding, lapping or polishing a sliding and sealing second face on the sealing disk opposite the first face contacting the pipe.

4,955,523

## INTERCONNECTION OF ELECTRONIC COMPONENTS

William D. Carlomagnano, Redwood City; Dennis E. Cummings, Placerville, and Alexandru S. Gliga, San Jose, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.  
Continuation-in-part of Ser. No. 942,665, Dec. 17, 1986, abandoned, and a continuation-in-part of Ser. No. 942,667, Dec. 17, 1986, abandoned, and a continuation-in-part of Ser. No. 15,550, Feb. 13, 1987, abandoned. This application Feb. 1, 1988, Ser. No. 151,131

Int. Cl.<sup>5</sup> H01L 21/60, 21/603; B23K 101/40

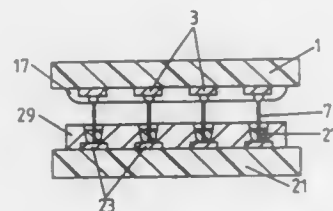
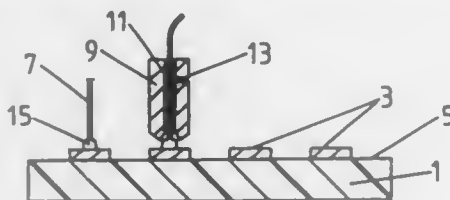
U.S. Cl. 228-179

14 Claims

1. A method of interconnecting contacts on first and second electronic components, comprising:

- (a) forming individual interconnection wires on each contact on the first component by:
    - (i) bonding a wire to the contact without the use of a material other than the materials of the contact and the wire, and
    - (ii) severing the wire to leave an interconnection wire bonded to the contact and having a free end, the length of the interconnection wire, measured from the contact or, if a portion of the interconnection wire is broadened in the vicinity of the contact, from a point immediately above any such broadening, being from about 2d to about 20d where d is the diameter of the wire;
  - (b) positioning the components so that the second component is in face-to-face relationship with the first component; and
  - (c) bonding the free end of each interconnection wire to a respective contact on the second component.
8. A method of forming an interconnection wire on a contact on an electronic component, comprising:
- (a) bonding a wire to the contact without the use of a material other than the materials of the contact and the wire,

- the wire being supplied through a bonding head on a wire bonder;
- (b) weakening the wire at a point within the bonding head;
- (c) severing the weakened wire to leave an interconnection wire bonded to the contact and having a free end, the



length of the interconnection wire, measured from the contact or, if a portion of the interconnection wire is broadened in the vicinity of the contact, from a point immediately above any such broadening, being from about 2d to about 20d where d is the diameter of the interconnection wire.

#### 4,955,524 EXTRUSION DIE CONSTRUCTION AND ITS METHOD OF MANUFACTURE

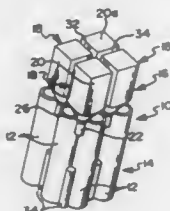
Terrance Way, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 24, 1989, Ser. No. 399,184

Int. Cl.<sup>3</sup> B23K 31/02

U.S. Cl. 228—182

3 Claims



1. A method of making an extrusion die for extruding honeycomb structure, the die having a plurality of feed holes, an extrusion slot pattern and a transition path for directing extrudable material from the feed holes through the extrusion slot to form the shape of a honeycombed body comprising the steps of:

- stacking a plurality of individual tubes in spaced parallelism and bonding the outer surfaces of the tubes together to form a tube stack having a plurality of spaced parallel extrudable material inlet openings and a plurality of reference holes;
- locating individual shaping teeth in each of said reference holes to define an extrusion slot pattern having intersecting rows corresponding to the shape of the honeycombed body formed as extrudable material is forced through the intersecting rows from the flow openings in the bonded individual tubes; and
- bonding the individual shaping teeth to the tube stack to

form a precision extrusion slot pattern with respect to the inlet openings.

#### 4,955,525 HEAT EXCHANGER AND METHOD OF PRODUCING SAME

Hajime Kudo; Masami Asano, both of Susonoshi; Ken Toma, Mishimashi, and Yo Takeuchi, Susonoshi, all of Japan, assignors to Mitsubishi Aluminum Co., Ltd., Tokyo, Japan

Division of Ser. No. 34,835, Apr. 6, 1987, Pat. No. 4,842,185.

This application Feb. 27, 1989, Ser. No. 316,223

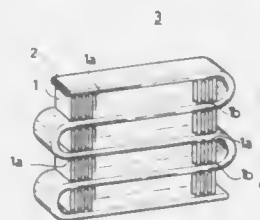
Claims priority, application Japan, Apr. 25, 1986, 61-94637

The portion of the term of this patent subsequent to Jul. 27, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> F28F 19/02

U.S. Cl. 228—183

17 Claims



1. A heat exchanger composed of an aluminum tube and aluminum fins abutted to said tube, the joints of said tube and said fins having been soldered by zinc deposited by a reaction soldering using a flux containing 10-50 weight % of zinc halide and 10-60 weight % of Zn powder in an inert gas atmosphere.

#### 4,955,526 BUSINESS FORM SUCH AS AN ENVELOPE

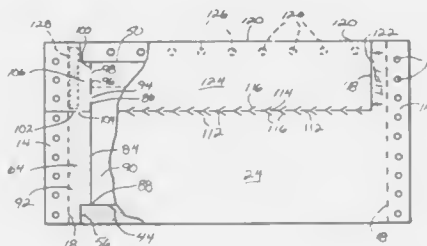
Roger L. Haase, Arlington Hts., and Gary W. Fitzgibbons, Prairie View, both of Ill., assignors to Uarco Inc., Barrington, Ill.

Filed Mar. 1, 1989, Ser. No. 317,464

Int. Cl.<sup>3</sup> B65D 27/10, 27/34

U.S. Cl. 229—69

9 Claims



1. A continuous business form envelope assembly comprising top and bottom elongated plies defining fronts and backs of a series of connected envelopes;

- at least one intermediate elongated ply between said top and bottom plies defining insert material within each of the series of connected envelopes, said intermediate ply being die cut at intervals along its length to define openings through which adhesive may extend to join said top and bottom plies and define upper and lower individual envelope edges;
- one longitudinal marginal edge of said intermediate ply being adhered to said top and bottom plies along corresponding longitudinal marginal edges thereof;
- at least one line of perforation extending across the bottom ply to define a tear strip that may be removed to partly

expose said intermediate ply, one end of said tear strip being adhered to one side of part of said one longitudinal marginal edge of said intermediate ply, the other side of said part being adhered to the top ply via a less porous material on the latter;

said parts being separated from the remainder of said one longitudinal marginal edge by a line of weakening and connected to the remainder of said intermediate ply by one or more frangible connections which serve to register said remainder between said top and bottom plies; said remainder of said intermediate ply otherwise being free of connection to said one longitudinal marginal edge; whereby removal of said tear strip from an envelope will remove said part by reason of it being adhered to said tear strip and only weakly adhered to said top ply because of said less porous material, and thereby will rupture said frangible connection and expose and free said insert material within the envelope for extraction therefrom.

4,955,527

#### CLAMSHELL STYLE CARTON

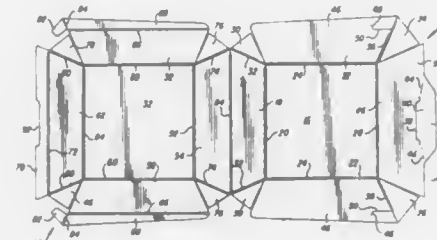
Stephen M. Blackman, Westmont, and Douglas L. Neale, Libertyville, both of Ill., assignors to Federal Paper Board Co., Inc., Montvale, N.J.

Filed Feb. 15, 1989, Ser. No. 310,666

Int. Cl.<sup>3</sup> B65D 5/20

U.S. Cl. 229—114

17 Claims



1. A carton blank comprising first and second units including bottom and top units each including a base and front, rear and side panels connected to said base along fold lines, said units being hingedly joined together along a fold line joining together said rear panels, said first unit side panels being of a greater width than said first unit rear panel to form seats, and said second unit side panels carrying along fold lines disposed remote from said first unit base reversible seat members for seating on said seats, stop means being formed in each first unit side panel seat adjacent a front end portion of said seat.

4,955,528

#### CONTAINER FOR FOOD AND CONDIMENTS

Patricia A. Schlackebler, 88496 Partridge Ln., Springfield, Oreg. 97478

Filed Apr. 7, 1989, Ser. No. 334,893

Int. Cl.<sup>3</sup> B65D 5/48

U.S. Cl. 229—120.18

4 Claims

1. A container formed from a one piece paperboard blank: the blank having a first member, a second member, and a third member; the first member having a central portion with a top edge, a bottom edge, and a first flap and a second flap; the bottom edge of the central portion of the first member attached to the second member; the first member of the blank having the first flap attached to a first side of the first member and the second flap attached to a second side of the first member; the third member having a central portion and a top edge, a bottom edge, and a first flap having a top and a second flap having a tab;

the bottom edge of the central portion of the third member attached to the second member; the first flap of the first member being folded behind the first member and glued to the bottom of the central portion of the first member; the second flap of the first member being folded behind the first member and glued to the bottom of the central portion of the first member and to the first flap of the first member; the second member being folded to bring the central portion of the third member coincidental to the central portion of the first member;



the first flap tab of the third member portion being folded behind the first flap of the first member and glued to the first flap of the first member; the second flap tab of the third member being folded behind the second flap of the first member and glued to the second flap of the first member; the central portion of the third member, the central portion of the first member and the second member forming a container receptacle for food; and the central portion of the first member and the first and second flaps of the first member forming a container receptacle for containing condiments.

4,955,529

#### PRODUCE DISPENSER

William D. Barnhart, 629 Ransom St., Ripon, Wis. 54971

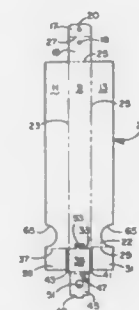
Division of Ser. No. 947,287, Dec. 29, 1986, Pat. No. 4,801,045.

This application Sep. 19, 1988, Ser. No. 247,430

Int. Cl.<sup>3</sup> B65D 5/38

U.S. Cl. 229—122.1

2 Claims



1. A blank of material foldable into a receptacle, the blank comprising:

- a. first and second elongated generally rectangular side walls having respective first and second ends and predetermined widths;
- b. a generally rectangular back wall having first and second ends and a predetermined width, the back wall being interposed between and coextensive in length with the side walls, the back wall being separated from the first and second side walls by respective fold lines;



- c. a first flap joined to the second end of the first side wall by a third fold line, the first flap having a length approximately equal to the width of the back wall;
- d. a bottom panel joined to the second end of the back wall by a fourth fold line and having a length approximately equal to the width of the side walls;
- e. a bottom end flap joined to the bottom panel along a fifth fold line parallel to the fourth fold line, wherein the bottom end flap defines a generally circular opening there-through; and
- f. a second flap joined to the second end of the second side wall by a sixth fold line, the second flap having a length approximately equal to the width of the back wall, so that the first and second side walls can be folded along the first and second fold lines, respectively, to be perpendicular to the back wall, the first and second flaps can be folded along the third and sixth fold lines, respectively, the bottom panel can be folded along the fourth fold line to be perpendicular to the back wall and underlying the first and second flaps, and the bottom end flap can be folded back over along the fifth fold line to overlie the first and second flaps to thereby create a receptacle having three sides and a bottom platform, and the opening in the bottom end flap retains a generally spherical item supported by the bottom platform of the open sided receptacle.

4,955,530

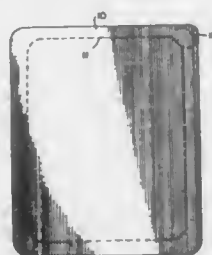
**EASY OPENING LID FOR OVENABLE CARTON**  
William R. Rigby, Newark, Del., and Louis C. Woyce, Jr., Downingtown, Pa., assignors to Westvaco Corporation, New York, N.Y.

Filed Mar. 28, 1990, Ser. No. 500,203

Int. Cl.<sup>5</sup> B65D 5/54

U.S. Cl. 229—123.2

6 Claims



1. In combination, a paperboard lid having at least two adjacent side edges which meet at a ninety degree corner, an upper face and a lower face, and a tray having outwardly extending upper flanges to which the lid is adhered, the improvement comprising:

- (a) a first continuous weakened score line extending around the periphery of the lid and located in the lower surface of the lid at a distance from the side edges thereof that is equal to or greater than the width of the flange of the tray to which the lid is adhered; and
- (b) a second weakened score line formed in the lower surface of the lid at the ninety degree corner of the lid and located between the outer peripheral edge of the lid and the outer edge of the flange of the tray to which the lid is adhered.

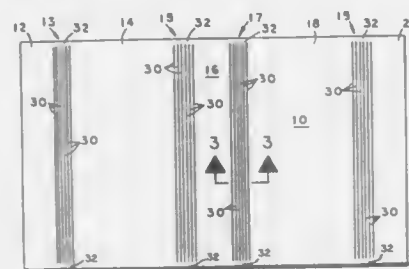
4,955,531  
**BLANK FOR USE IN FORMING A CONTAINER HAVING A ROUNDED EDGE**  
Herman Graboyes, Timberlake Apts., Apt. B-506, Norristown, Pa. 19401

Filed Feb. 21, 1989, Ser. No. 312,860

Int. Cl.<sup>5</sup> B65D 5/04

U.S. Cl. 229—182.1

3 Claims



1. A blank for use in forming a container having a curved edge with a longitudinal axis comprising:
- a plurality of longitudinal, substantially parallel, laterally spaced score lines for forming the edge, each of said score lines having a longitudinal axis which is substantially parallel to the longitudinal axis of said edge so that when said blank is bent about said longitudinal edge axis, said blank bends at each score line and the edge is therefore curved by virtue of the bending deflection being distributed over said plurality of score lines, the lateral spacing between adjacent score lines being varied to distribute the bending deflection unevenly for providing a curved edge having a variable radius of curvature.

4,955,532

**AUTOMATIC TOLL COLLECTOR FOR A TOLL ROAD**  
Koichi Kanehara; Kazumi Fukuda; Masashi Sato, and Toshiaki Shimeno, all of Hyogo, Japan, assignors to Mitsubishi Jinko-gyo K.K., Tokyo, Japan

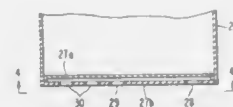
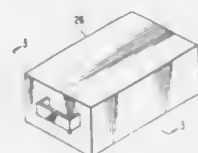
Filed Jul. 13, 1989, Ser. No. 379,423

Claims priority, application Japan, Sep. 24, 1988, 63-239339

Int. Cl.<sup>5</sup> G07B 15/00

U.S. Cl. 232—7

3 Claims



1. An automatic toll collector for a toll road comprising a cashbox inserted into a body of the toll collector for receiving coins thrown into a toll receiving inlet, a series of holes for an identification number formed in a bottom surface of the cashbox in a direction of inserting the cashbox to represent the identification number which identifies the cashbox, a series of holes for digit numbers disposed in a direction perpendicular to a direction of inserting the cashbox to represent a digit number of the identification number as a binary signal, a trigger hole

for generating a trigger signal for reading the digit number to obtain a value of the digit of the identification number, a proximity sensor for the identification number disposed at a portion facing the bottom of the cashbox of the body of the toll collector for detecting a presence of the holes for the identification number, a proximity sensor for digit numbers for detecting a presence of the holes for digit numbers to read the digit number, and a proximity sensor for trigger to detect a presence of the trigger hole and generate a trigger signal, which are disposed in a line in a direction perpendicular to the direction of inserting the cashbox whereby when the cashbox is inserted into the body or is pulled out from the body, the digit number and the value of the identification number corresponding to the digit are read each time the presence of the trigger holes is detected so that the identification number of the cashbox is read.

4,955,533

**SUPPORT AND PROTECTIVE STRUCTURE FOR A MAIL BOX**

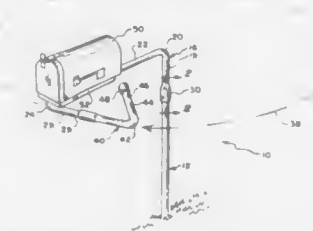
Gordon Merkel, Eagle River, Wis., assignor to Boot Lake Industries, Inc., Arlington Heights, Ill.

Filed Sep. 5, 1989, Ser. No. 403,163

Int. Cl.<sup>5</sup> B65D 91/00

U.S. Cl. 232—39

11 Claims



1. A support and protective structure for a mailbox or other similar structure, comprising a first pipe adapted to be driven into or implanted in the ground and having means at the upper end for rotatably mounting the lower end of a second pipe, a second pipe having a first pipe portion having a lower end which is adapted to be journaled to the upper end of said first pipe, said first pipe portion being adapted to extend generally upwardly from the upper end of said first pipe to a first elbow, a second pipe portion extending laterally outwardly from said first elbow in a generally horizontal direction generally laterally outwardly from said first pipe portion to an outer second elbow, and a third pipe portion extending laterally to the side from said second elbow and said second pipe portion to a third elbow, and a fourth pipe portion extending angularly from said third elbow in a direction toward said second pipe portion, said third elbow and said fourth pipe portion forming a protective shield for protecting the mailbox, at least said second pipe portion providing a support for mounting a mailbox.

4,955,534

SWIVEL MAIL BOX

Fred A. Raible, 10283 Kasubowski Rd., Posen, Mich. 49776

Filed May 11, 1989, Ser. No. 350,752

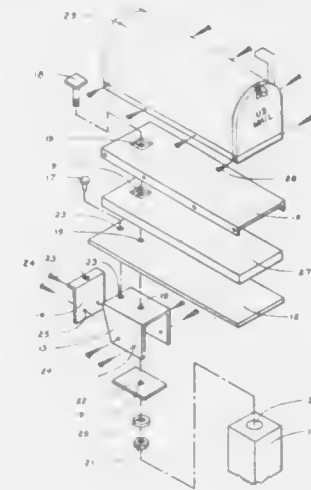
Int. Cl.<sup>5</sup> B65D 91/00

U.S. Cl. 232—39

2 Claims

1. A swiveable mailbox support comprising: a horizontal base plate for mounting on the top surface of a mailbox support post, said base plate including a substantially centrally located first aperture and a second aperture offset therefrom, an elongated, laminated, flat mailbox mounting plate having front and rear portions, and having a third aperture located proximate the rear portion of said mounting plate and a fourth aperture offset therefrom, pivot means passing between said first and third apertures and a shearable pin seated within said second

and fourth apertures, whereby when said support is mounted on the top of a mailbox support post said shearable pin will be



broken by the application of a predetermined force to the end of the mounting plate opposite the shearable pin.

4,955,535

**AUTOMATICALLY OPERATING VALVE FOR REGULATING WATER FLOW AND FAUCET PROVIDED WITH SAID VALVE**

Osamu Tsutsui; Hisato Haraga; Kinya Arita; Atsuo Makita; Hirofumi Takeuchi, and Ryotchi Tsukada, all of Chigasaki, Japan, assignors to Toto Ltd., Fukuoka, Japan

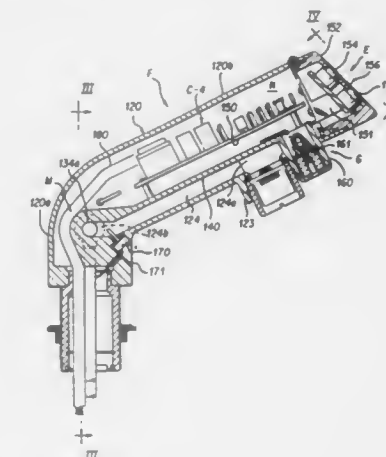
Division of Ser. No. 246,461, Sep. 19, 1988. This application Sep. 20, 1989, Ser. No. 409,918

Claims priority, application Japan, Sep. 30, 1987, 62-248944; Feb. 6, 1988, 63-26169; Feb. 23, 1988, 63-41094; Mar. 17, 1988, 63-65277

Int. Cl.<sup>5</sup> F16K 11/22, 11/24

U.S. Cl. 236—12.12

5 Claims



1. A faucet comprising
- (a) a faucet body having a proximal end adapted to receive liquid supply means, a distal end having a tap opening for liquid discharge and a water outflow passage communicating between said proximal end and said distal end,
- (b) a power-operated mixing and flow regulating valve, said valve being mounted on the proximal end of said faucet body, said valve being provided with an inflow passage to

which a cold water supply pipe and a hot water supply pipe are connected, said inflow passage communicating between said supply pipes and said water outflow passage by way of a pair of respective valve openings, opening degree of said valve openings being regulated by the reciprocation of a pair of respective valve elements,

(c) a pair of piezoelectric actuators, each independently and operably connected with a respective one of said valves, and

(d) a control device comprising a printed circuit disposed in said faucet body, said control device controlling the operation of said valve so as to effect automatic temperature control and flow rate control of mixed cold and hot water passing through said water outflow passage.

4,955,536

## THERMALLY CONTROLLED VALVE

Werner Foller, Stuhl, and Holm Klann, Bremen, both of Fed. Rep. of Germany, assignors to Gestra Aktiengesellschaft, Bremen, Fed. Rep. of Germany

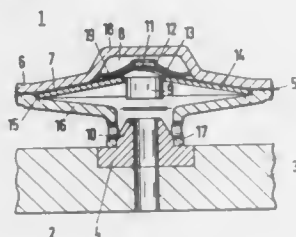
Filed Sep. 7, 1989, Ser. No. 404,278

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1988, 3831474; Jul. 28, 1989, 3925032

Int. Cl.<sup>5</sup> G05D 23/10; F16T 1/10

U.S. Cl. 236—48 R

17 Claims



8. A thermally controlled valve, in particular, a condensate drain valve, comprising:

- a valve seat;
  - a closure valve cooperating with said valve seat;
  - a diaphragm capsule having a rigid wall part and a diaphragm component actuating said closure valve, said wall part and said diaphragm component being joined with each other along their outer edges and forming a reservoir therebetween for an evaporation medium;
  - a plate spring; and
  - an abutment for said plate spring;
- said plate spring being supported on said abutment along its outer edge and resting against the face side of said diaphragm component which is averted from the wall part of said diaphragm capsule, the inner edge of said plate spring engaging said closure valve so as to act thereon in the opening direction;
- said plate spring being a first plate spring and which further comprises:
- a second plate spring resting against the face side of said diaphragm component facing the wall part of said diaphragm capsule; and
  - an abutment for the outer edge of said second plate spring.

4,955,537

## MODEL RAILROAD TRACK HAVING A TRACK BED

Matjaz Bratovz, Salzburg, Austria, assignor to Elfriede Rössler, Salzburg, Austria

Filed Jan. 30, 1989, Ser. No. 303,462

Claims priority, application Fed. Rep. of Germany, Dec. 5, 1988, 3840952

Int. Cl.<sup>5</sup> E01B 23/00

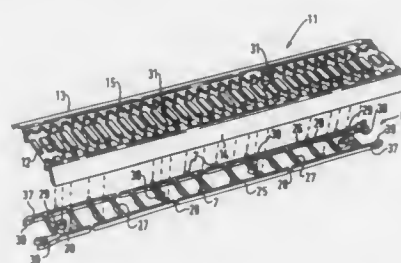
U.S. Cl. 238—10 B

23 Claims

1. A model railroad system having a track bed which simu-

lates a railroad superstructure of the type provided with a ballast bed, which comprises:

- an elongated track bed section constructed of a deformable material,
- an elongated support member extending along each side of said bed section and inclined downwardly and away from said bed section to provide support therefor, said support members being substantially equal in length such that said track bed has substantially an isosceles trapezoidal cross-sectional configuration less the closing longer side,
- a plurality of recesses provided in the upper surface of said track bed section,



a track grate having a plurality of tracks and ties configured, dimensioned and arranged to complement said plurality of recesses provided in said track bed section so as to be positionable thereon and inserted into said recesses a depth corresponding substantially to the thickness of the track ties,

stiffener means having a ladder-like configuration and positioned on the bottom surface of said bed section, said stiffener means having a stiffness greater than the stiffness of said bed section,

a plurality of receptacles provided on the bottom surface of said bed section for reception of at least portions of said stiffener means to facilitate attachment of said stiffener means to said bed section.

4,955,538

## APPLICATOR AND METHOD FOR THE DELIVERY OF GRANULAR AND LIQUID PRODUCTS TO TURF AREAS

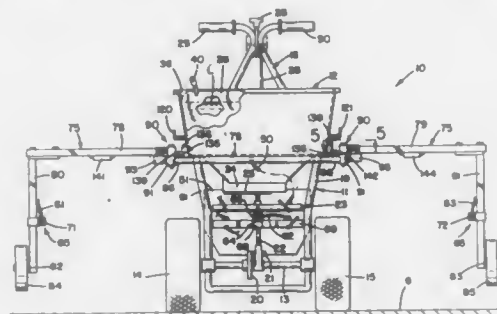
Mark E. Laube, Copley, and J. Martin Erbaugh, Hudson, both of Ohio, assignors to Erbaugh Corporation, Hudson, Ohio

Filed Oct. 4, 1989, Ser. No. 416,917

Int. Cl.<sup>5</sup> A01C 15/00, 19/04; B05B 1/20

U.S. Cl. 239—1

25 Claims



21. A method for the uniform and simultaneous delivery of dry and liquid materials to turf areas employing an applicator having a hopper for said dry materials and a sealed reservoir for said liquid materials; means for broadcasting said dry materials from said hopper and first and second nozzle means for the application of said liquid materials directly to the ground,

said second nozzle means being mounted to extendible boom means, said method comprising the steps of:

- filling the hopper with desired dry materials and the reservoir with desired liquid materials;
- moving said second nozzle means laterally away from the hopper and to the front of the applicator;
- activating a lever to commence delivery of the dry materials and the liquid materials simultaneously;
- selectively controlling the application of the liquid materials by moving a first switch means from a first position, in which the liquid materials are delivered continuously with the dry materials, to a second position in which delivery of the liquid materials is prohibited; and
- selectively activating a second switch means between on and off positions, when said first switch means is in said second position, thereby providing spot spraying of the liquid materials through said first and second nozzle means.

4,955,539

## METHOD AND APPARATUS FOR CONVERTING PRESSURIZED LOW CONTINUOUS FLOW TO HIGH FLOW IN PULSES

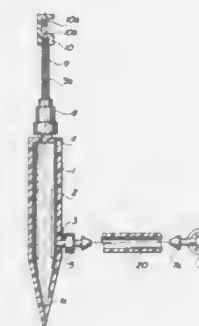
Gideon Ruttenberg, 81465 Date Palm Dr., Indio, Calif. 92201

Filed May 1, 1989, Ser. No. 345,661

Int. Cl.<sup>5</sup> B05B 1/08

U.S. Cl. 239—1

29 Claims



1. Apparatus for converting pressurized low continuous liquid flow to a high intermittent pulsating flow which comprises a pressure container having a low elasticity, means for supplying a continuous flow of liquid thereto at a controlled low flow rate and thereby establishing a pressurized body of liquid within said container, a pre-set normally closed check valve connected to an outlet from said container, said check valve remaining closed and preventing a liquid from flowing out of the pressure container at a lower pressure and opening at a pre-set higher pressure at which liquid flows out of the container and closes itself at said lower pressure, whereby the outlet from the pressure container will remain closed until liquid flowing into the container causes pressure within the container to increase and the pre-set check valve to re-open thus allowing for a volume of the liquid that was accumulated in the container when pressure was increased, to be ejected through the container outlet and the pre-set check valve, conduit means connected to the outlet of said pre-set valve, means associated with said conduit means providing sufficient resistance to liquid flow to force said pre-set check valve, when it opens, to become widely open, thus allowing for liquid at a high rate of flow to be ejected from said container thereby causing the volume and pressure of the liquid within the container to decrease and said pre-set check valve to close, said pre-set check valve having a quick response as a result of said resistance whereby a "Water Hammer" effect is created thus causing the liquid to be ejected at a higher pressure and velocity than that of the incoming liquid flow.

4,955,540

## WATER DISPLAYS

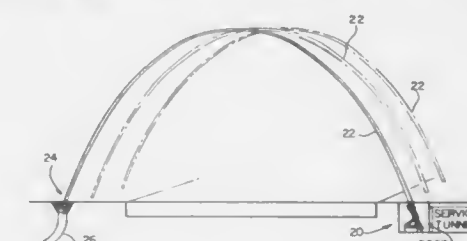
Mark W. Fuller, Studio City, and Alan S. Robinson, El Monte, both of Calif., assignors to WET Enterprises, Inc., Universal City, Calif.

Filed Feb. 26, 1988, Ser. No. 160,720

Int. Cl.<sup>5</sup> B05B 17/08

U.S. Cl. 239—20

13 Claims



1. A water display comprising:

- a source of water under pressure;
- a laminar flow nozzle disposed to direct a laminar flow stream of water therefrom in a trajectory for viewing by observers of the water display; and,
- control means for controllably varying the trajectory of the stream of water by varying the position of said laminar flow nozzle simultaneously with the variation of the angular elevation thereof, whereby the laminar flow stream will pass approximately through a first fixed point in space spaced from said laminar flow nozzle outlet independent of the reasonable variation of the local angular elevation of the laminar flow stream, whereby a dynamic water display is created.

4,955,541

## TWO DIMENSIONAL NOZZLE FOR A TURBOJET ENGINE

Olivier Carteron, Maisse, and Gérard E. A. Jourdain, Corbeil Essonnes, both of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation S.N.E.C.-M.A., Paris, France

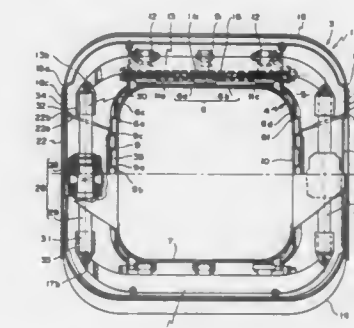
Filed Sep. 15, 1989, Ser. No. 407,908

Claims priority, application France, Sep. 28, 1988, 88 12648

Int. Cl.<sup>5</sup> F02K 1/12

U.S. Cl. 239—127.1

9 Claims



1. A two dimensional nozzle for a turbojet engine having a gas exhaust duct with a downstream end comprising:

- (a) a pair of stationary, opposite lateral wall structures, defining the lateral boundaries of the nozzle, each having an interior wall and an exterior wall defining a space therebetween;
- (b) a pair of movable, opposite flap assemblies extending between the lateral wall structures to define the upper and lower boundaries of the nozzle.



lower boundaries of the nozzle, each movable flap assembly comprising:

- (i) an interior flap pivotally attached to the downstream end of the exhaust duct;
  - (ii) an exterior flap located outwardly of the interior flap and pivotally connected to the downstream end of the exhaust duct; and
  - (iii) a rocking lever connected to the downstream end of the exhaust duct; and
  - (iv) connecting means connecting the rocking lever to the interior and exterior flaps; and,
- (c) jack screw actuators interconnecting the rocking levers to form a rigid frame around the nozzle such that movement of the jack screw means causes generally transverse movement of the rocking levers to vary the angular orientation of the interior and exterior flaps.

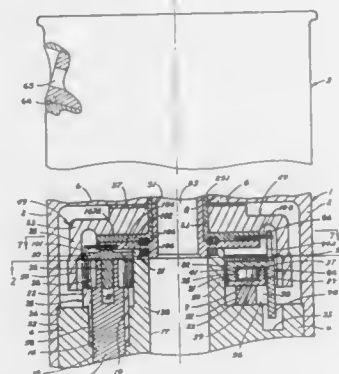
**4,955,542**  
**REVERSING TRANSMISSION FOR OSCILLATING SPRINKLERS**

Carl L. C. Kah, Jr., 778 Lakeside Dr., North Palm Beach, Fla. 33408

Filed Sep. 15, 1988, Ser. No. 245,126  
Int. Cl.<sup>5</sup> B05B 3/16

U.S. Cl. 239—242

19 Claims



1. An oscillating transmission for use with an oscillating sprinkler head having an output gear, a gear cage means with two drive gears, a first drive gear and a second drive gear for alternately driving said output gear to oscillate it, means mounting said gear cage means for movement, reversing toggle means mounted for movement adjacent said gear cage means, a single interacting overcenter biasing means mounted between said reversing toggle means and said gear cage means for biasing said gear cage means and said reversing toggle means in the same direction on opposite sides of a center position for driving said output gear by said gear cage means, means for moving said reversing toggle means to move it over its center position to bias said gear cage means and said reversing toggle means in the opposite direction, said means for moving said reversing toggle means being connected to said output gear.

**4,955,543**  
**VEHICLE PANE WASHING APPARATUS, PARTICULARLY FOR HEADLIGHT DIFFUSING LENSES**

Peter Orth, and Ulrich Witt, both of Lippstadt, Fed. Rep. of Germany, assignors to Hella KG Hueck & Co., Lippstadt, Fed. Rep. of Germany

Filed Aug. 14, 1989, Ser. No. 394,063  
Claims priority, application Fed. Rep. of Germany, Aug. 26, 1988, 3828999

Int. Cl.<sup>5</sup> B60S 1/48, 1/56

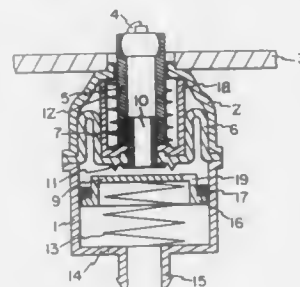
U.S. Cl. 239—284.2

10 Claims

1. In a pane washing apparatus for vehicles including in

particular a spraying type apparatus of the type comprising a jet nozzle which is driven against spring force from a pulled-back rest position to a deployed position by means of a jet-nozzle carrier which is acted upon by pressurized cleaning fluid, said spraying type apparatus further comprising a valve that is only opened once the jet-nozzle carrier is in the deployed position;

the improvement wherein:  
the jet-nozzle carrier defines therein a passage opening leading to the jet nozzle;



the said valve includes a cap for being pressed against the jet nozzle carrier to close said passage opening, said cap following the movement of the jet-nozzle carrier toward a deployed position; and  
a stop means for contacting said cap shortly before said jet nozzle reaches said deployed position to open said passage opening and thereby allow flow of pressurized cleaning fluid to said jet nozzle.

**4,955,544**  
**DOSAGE GUN**

Volker Kopp, Esslingen, Switzerland, assignor to C. Ehrensperger AG, Erlenbach, Switzerland

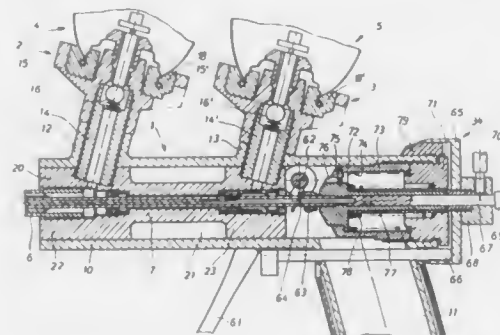
Filed Apr. 14, 1988, Ser. No. 181,653

Claims priority, application Switzerland, Apr. 16, 1987, 1501/87

Int. Cl.<sup>5</sup> B05B 7/12

U.S. Cl. 239—304

18 Claims



14. A dosage gun for producing a multi-component material, comprising:

- a housing having a longitudinal bore therein which terminates at one end in an emission nozzle;
- at least two pressure tanks, each containing one component of the multi-component material, each tank being selectively connectable to said housing, wherein each tank has a discharge valve for selectively discharging its component into said housing longitudinal bore; and,
- a dosage device held in said housing longitudinal bore for dispensing the components in a predetermined proportion by volume, said dosage device comprising at least one

hollow needle which is movably mounted in relation to said emission nozzle so that the components of the material are fed along an exterior periphery and through an interior bore, respectively, of said at least one hollow needle and wherein the components are dispensed at said emission nozzle as co-axial streams which flow into each other and a dosage needle arranged within said hollow needle, said dosage needle being movable in relation to said hollow needle in order to feed the components of the material to said emission nozzle, and wherein said dosage needle is rotatable in relation to said hollow needle in order to adjust the rate of feed to said emission nozzle; and,

first and second set back mechanisms which each include a spring that sets back a respective one of said hollow needle and said dosage needle into the rest position.

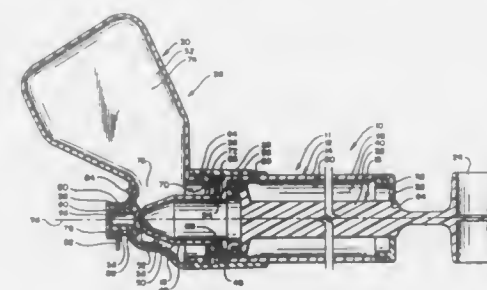
**4,955,545**  
**MANUALLY ADJUSTABLE SPRAY APPLICATOR**  
Donald J. Stern; Jeff S. Heaton, both of Bellingham; James A. Tryon, Seattle, and Brett A. Bartholmey, Bellingham, all of Wash., assignors to DJS&T Limited Partnership, Bellingham, Wash.

Filed Mar. 10, 1989, Ser. No. 321,759

Int. Cl.<sup>5</sup> B05B 7/24

U.S. Cl. 239—320

14 Claims



1. A spray applicator to discharge a fluid material in a spray pattern by means of pressurized air, said applicator comprising:

- a. a housing structure having a longitudinal axis and comprising:
  - i. an air pressurizing section defining an air chamber;
  - ii. an air nozzle section connected to a forward end of said air pressurizing section and providing an air nozzle aligned with said longitudinal axis and arranged to receive pressurized air from said air chamber and discharge said air forwardly;
- b. a manually operated piston member mounted in said air chamber for reciprocating motion to provide pressurized air in said air chamber;
- c. a fluid discharge structure comprising:
  - i. a fluid nozzle section providing a fluid discharge nozzle positioned on said longitudinal axis forwardly of said air nozzle and arranged to receive an air jet from said air nozzle and discharge fluid and air in a forward direction;
  - ii. a mounting section to which said fluid nozzle section is mounted and which is in turn rotatably mounted to said housing structure in a manner that said fluid discharge structure and said housing structure are primarily positioned and supported relative to one another by said mounting section, and also interconnected by helical guide means so as to be movable axially by relative rotation therebetween between a forward position where said fluid nozzle is spaced a further distance forwardly of the air nozzle and through intermediate positions to a rear position where said fluid discharge nozzle is closely adjacent to said air nozzle;
- d. a fluid containing means mounted to said fluid discharge structure and adapted to contain said fluid material for

entry through a fluid discharge region adjacent to said fluid discharge nozzle.

e. said housing structure and said mounting section each having exterior manually engagable surface portions by which said housing structure and said mounting section can be manually rotated to move said nozzle toward and away from one another.

**4,955,546**

**WATER JET GUN**

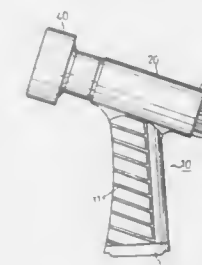
Maw-Shinn Liaw, 69-2, Sec. 2, Chien-Kuo Rd., Min-Hsiang Hsiang, Chia-yi Hsien, Taiwan

Filed Aug. 4, 1989, Ser. No. 389,573

Int. Cl.<sup>5</sup> B05B 1/30

U.S. Cl. 239—440

3 Claims



1. A water jet gun comprising:

- a gun-like body having a handle portion with an inlet end and a tubular housing portion transverse to said handle portion, said tubular housing portion having a front end, a rear end, and a tubular wall with a first opening which is communicated with the interior of said handle portion;
- a hollow plug movably received in said tubular housing portion and having a front outlet end which extends out of said front end of said tubular housing portion, a rear end which extends out of said rear end of said tubular housing portion, and a tubular wall which is in contact with said tubular wall of said tubular housing portion and which has a second opening, said hollow plug being operable to rotate relative to said tubular housing portion between a first position in which said first and second openings communicate with one another to form a flow passage and a second position in which said first and second openings do not intercommunicate, said second opening being tapered in an annular direction of said hollow plug from one end of said second opening to another opposite end thereof so that the dimension of said flow passage is variable upon rotation of said hollow plug;
- a sealing means provided around said hollow plug;
- a spout connected to said front outlet end of said hollow plug;
- a spout housing having a first enlarged front hollow portion which has a foremost second enlarged hollow portion broader than said first enlarged hollow portion, said first enlarged hollow portion having an outer periphery which is provided with a first screw thread, said second enlarged hollow portion having an inner periphery provided with a plurality of grooves, said spout further having a restricted rear hollow portion which is connected to said front outlet end of said hollow plug, said restricted hollow portion having a nozzle member extending therefrom into said first enlarged hollow portion, said nozzle member having a tube wall provided with a plurality of annularly spaced peripheral openings and a front outlet end,
- a hollow head movably provided in said first enlarged hollow portion, having an outer annular wall, an inner annular wall within said outer annular wall, a perforated cover plate which is connected to the front ends of said outer and inner annular wall and which has a central first open-

ing and a plurality of second openings around said central opening, and a first annular flange which projects forwardly and flares outwardly from said front end of said outer annular wall and extends outwardly of said first enlarged hollow portion, said first annular flange having a plurality of third openings around said perforated cover plate, said first enlarged hollow portion, said perforated plate, said outer annular wall and said inner annular wall confining a pressure chamber anterior to said restricted hollow portion, said nozzle member extending into said inner annular wall passing through said pressure chamber, a first sealing ring provided between said inner annular wall and said nozzle member, a second sealing ring provided around said outer annular wall of said head, an adjustment ring member provided around said first enlarged hollow portion and having a second screw thread to engage with said first screw thread, said adjustment ring member being cooperatively associated with said first annular flange and capable of moving said head relative to said spout housing when said adjustment ring member is turned relative to said spout housing, the position of said second sealing ring being changeable between a first position, in which said second sealing ring is in an annular space between said second enlarged hollow portion and said outer annular wall, permitting a fluid flow between said annular space and said pressure chamber, and a second position, in which said second sealing ring is in between said first enlarged hollow portion and said outer annular wall, interrupting the communication between said annular space and said pressure chamber, the position of said inner annular wall relative to said nozzle member being changeable between a third position in which said first sealing ring of said inner annular wall is anterior to said peripheral openings of said nozzle member, sealing off the fluid communication between said peripheral openings and said inner annular wall and a fourth position in which said inner annular wall surrounds said peripheral openings.

4,955,547

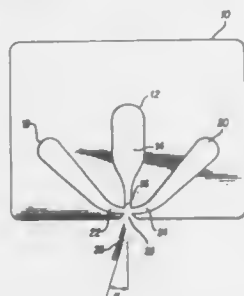
## FLUIDIC OSCILLATING NOZZLE

Robert L. Woods, Arlington, Tex., assignor to Spectra Technologies, Inc., Arlington, Tex.

Continuation of Ser. No. 92,186, Sep. 2, 1987, Pat. No. 4,905,909. This application Aug. 24, 1989, Ser. No. 398,374 Int. Cl.<sup>5</sup> B05B 1/08

U.S. Cl. 239—589.1

1 Claim



1. A fluidic oscillating nozzle for generating a zero-degree jet through a first nozzle means without the need for a feed-back passage downstream of the nozzle, comprising:  
a supply port operatively connected to a first fluid flow passage converging to a first throat portion;  
first nozzle means for generating a zero-degree jet of fluid, said first nozzle means located downstream of said first fluid flow passage and said first throat portion; and  
control means including a first control nozzle for projecting a first jet of fluid substantially transverse to and substantially in the same plane as the flow of said zero-degree jet

and a second control nozzle for projecting a second jet of fluid substantially transverse to and substantially in the same plane as the flow of said zero-degree jet, said first and second control nozzles positioned one on either side of said first throat portion whereby said control nozzles allow proportional deflection of said zero degree jet and whereby there is no wall attachment of the zero degree jet downstream of said first nozzle means.

4,955,548

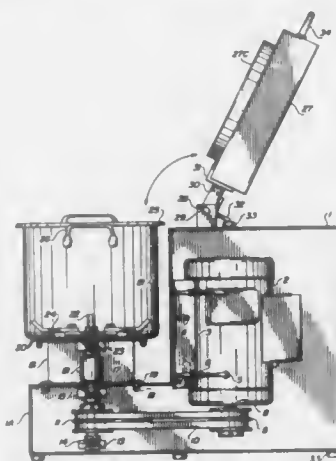
## METHOD AND APPARATUS FOR COMMUNUTING CREMATION REMAINS

Paul F. Rahill, Longwood, Fla., assignor to Industrial Equipment & Engineering Company, Orlando, Fla.

Filed Oct. 13, 1989, Ser. No. 421,524 Int. Cl.<sup>5</sup> B02C 13/26

U.S. Cl. 241—30

15 Claims



1. A method for comminuting cremation remains comprising the steps of:  
providing a unitary processing drum having a comminuting blade therein;  
initially cremating the remains and then placing the cremated remains within the processing drum;  
providing a remains ashpan having an opening with dimensions greater than the processing drum and fitted over the drum opening;  
placing the remains in the ashpan after the initial cremation;  
transferring the remains into the drum from the ashpan;  
rotating the comminuting blade within the drum to comminute the remains; and then  
removing the remains from the drum.

4,955,549

## APPARATUS FOR TREATMENT OF FIBRE SUSPENSIONS

Rolf B. Reinhall, Bellevue, Wash., assignor to Sunds Defibrator Aktiebolag, Sweden

PCT No. PCT/SE87/00341, § 371 Date Jan. 23, 1989, § 102(e) Date Jan. 23, 1989, PCT Pub. No. WO88/00992, PCT Pub. Date Feb. 11, 1988

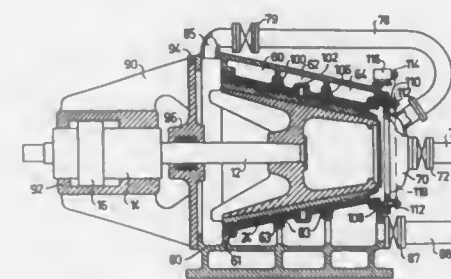
PCT Filed Jul. 20, 1987, Ser. No. 303,665 Claims priority, application Sweden, Aug. 7, 1986, 8603346 Int. Cl.<sup>5</sup> B02C 19/00

U.S. Cl. 241—80

15 Claims

1. An apparatus for treating a fibre suspension comprising a housing having an inlet and an outlet, a rotor having an outer surface arranged within said housing, a first plurality of treating members arranged over the outer surface of said rotor, a stator having an inner surface surrounding said rotor within

said housing, a second plurality of treating members arranged over the inner surface of said stator, the inner surface of said stator cooperating with the outer surface of said rotor to define a refining gap therebetween for the treatment of fibre suspension being supplied thereto by the cooperation of the first and second plurality of treating members, a portion of said stator including a plurality of screening apertures therein to permit the outward passage therethrough of at least a portion of the fibre suspension being treated within said refining gap for



discharge from said apparatus through said outlet of said housing, said plurality of screening apertures being at least co-extensive with said first plurality of treating members arranged over the outer surface of said rotor, said refining gap providing a first treating zone having an inlet and a second treating zone having an outlet arranged along a portion of the length of said rotor, and adjusting means for adjusting the width of the refining gap within the first treating zone independently of the width of the refining gap within the second treating zone.

4,955,550

## QUANTITATIVE FEEDING APPARATUS USABLE FOR PULVERIZED AND/OR GRANULAR MATERIAL AND BATCH TYPE MULTI-COLORED AUTOMATIC FEEDING APPARATUS

Hideo Satake, Toyota; Hideo Shimizu, and Hozumi Tanaka, both of Tokyo, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi and Toyo Ink Mfg. Co., Ltd., Tokyo, both of Japan

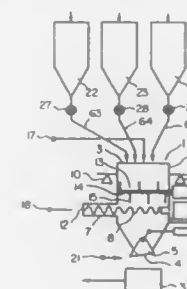
Filed Nov. 3, 1988, Ser. No. 266,906

Claims priority, application Japan, Nov. 7, 1987, 62-281773; Jun. 13, 1988, 63-145063

Int. Cl.<sup>5</sup> B02C 19/00

U.S. Cl. 241—101.4

1 Claim



1. A master batch type multi-colored automatic feeding apparatus comprising a quantitative feeding apparatus, an amount of master batch to be supplemented to a barrel portion of said quantitative feeding apparatus being automatically controlled by measuring a predetermined amount of master batch stored in a plurality of master batch storage hoppers, said quantitative feeding apparatus comprising a feeder for mechanically feeding said predetermined amount of master batch from said barrel portion through a feeding portion out of said barrel portion, said master batch type multi-colored automatic feeding apparatus further comprising a pneumatic conveyor for

conveying the master batch fed from said feeding portion to a molding machine, a separator disposed above said molding machine to separate air from solid material, a mixer including a raw material feeding portion for said molding machine in which the master batch which has fallen down after completion of separation of air from solid material is mixed with a natural resin, and selecting and returning means for selecting the kind of master batch discharged from a discharging portion on the bottom part of the quantitative feeding apparatus to be returned to the same kind of hopper among said plurality of storage hoppers and then returning it thereto, wherein a supplementing port through which the master batch is supplemented is provided on the upper end of said barrel portion, said feeding portion through which the master batch is fed is provided at an intermediate part of the barrel portion and wherein a plurality of cleaning nozzles are provided for washing said supplementing port, said feeding portion and said discharging portion.

4,955,551

## INTERMITTENT EPICYCLIC MILL

Vitaly V. Jurisov, Tsvetnoy proezd, 17, kv. 40, Novosibirsk, U.S.S.R.

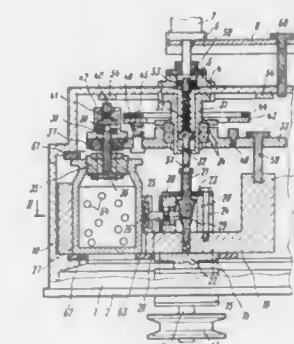
PCT No. PCT/SU88/00161, § 371 Date Apr. 20, 1989, § 102(e) Date Apr. 20, 1989, PCT Pub. No. WO89/01363, PCT Pub. Date Feb. 23, 1989

PCT Filed Aug. 19, 1988, Ser. No. 348,007

Claims priority, application U.S.S.R., Aug. 20, 1987, 4296981 Int. Cl.<sup>5</sup> B02C 17/08

U.S. Cl. 241—175

11 Claims



1. An intermittent epicyclic mill incorporating a housing (1) with a cover (3) which is supported by a baseplate (2) and wherein located in said housing are barrels (27) closed by lids and containing each a load of pebbles (64), the barrels (27) resting on an electrically-driven carrier (18) and revolving both about their own axes and an axis of the mill, characterized in that a rigid mount (10) is immovably located in the housing (1) in a coaxial position with the carrier (18) so as to form a clearance with the housing (1) and restrict the barrels (27) which are pressed against the rigid mount (10) by load-bearing elements fitted to the carrier (18), and a revolving jib crane (9) is secured to the baseplate (2), the jib crane carrying a ram (7) suspended therefrom in a coaxial position with the mill, the ram having a piston rod (6) rigidly attached to the cover (3) of the housing (1), the inside of the cover having a spindle (31) rigidly fastened thereto so as to give support to a lower disc (33) and an upper disc (43) installed in bearings (34) one above the other, the lower disc (33) is fitted with provision for revolving integrally with the lids of the barrels (27), and the upper disc (43) is installed with provision for an axial displacement with respect to the lower disc (33) and has spring-loaded pins (45) passing through holes in the lower disc (33) so as to come abutting against top end faces of the barrels (27), and rams (46) are fitted to the cover (3) of the housing (1) with provision for interacting with the upper disc (43) when the



cover (3) of the housing (1) is being lifted by the ram (7) of the revolving jib crane (9).

4,955,552

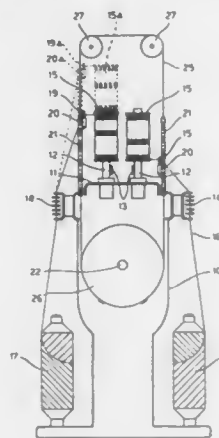
## YARN WINDING MACHINE

Carlo Menegatto, Via Spreafico No. 3, Monza, Milano, Italy  
Filed Nov. 27, 1989, Ser. No. 441,256

Claims priority, application Italy, Oct. 25, 1989, 22130 A/89  
Int. Cl.<sup>5</sup> B65H 54/20, 54/30

U.S. Cl. 242—35.5 R

8 Claims



1. A yarn winding machine of the type comprising a spindle-holding frame for at least a first set of spindles rotatably supported and longitudinally aligned on said frame, the winding machine also comprising movable yarn guide members for the yarn to be wound onto at least one bobbin associated with each single spindle, and drive means for reciprocating said yarn guide members, each yarn guide member being provided on a respective slidable support element, a separate guide means for each said slidable support element, each said guide means being arranged parallel to and on one side of a respective spindle and a reciprocable drive means operatively connected to each yarn guide support element.

4,955,553

## COILING REEL

Oskar Noé, Rolf Noé, Andreas Noé, and Herbert Lux, all of Mülheim, Fed. Rep. of Germany, assignors to BWG Bergwerk- und Walzwerk-Maschinenbau GmbH, Duisberg, Fed. Rep. of Germany

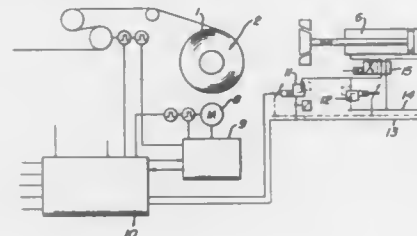
Filed Aug. 14, 1989, Ser. No. 393,587

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 3827429

Int. Cl.<sup>5</sup> B65H 75/24

U.S. Cl. 242—63

3 Claims



1. In a reel for coiling and uncoiling strips, the reel including an expanding mandrel for the coil to be received, the expanding mandrel having at least shell-like spreading members, a spreader rod and spreading elements arranged between the spreading members and the spreader rod, a spreader cylinder

being connected to the spreader rod, the expanding mandrel being driven by a drive motor with a control and computer unit for maintaining a predetermined winding pull and for determining the outer diameter of the coil at any given moment, the improvement comprising the control and computing unit comprising a microprocessor for determining at least the initial spreading pressure for the expanding mandrel and the winding pull to be maintained in dependence upon introduced parameters which are specific to the strips being coiled, the microprocessor including means for introducing the winding pull into the control and computing unit and for receiving from the control and computing unit the outer diameter of the coil at any given time and for determining the spreading pressure required at any given time in dependence upon the outer diameter of the coil, a pressure regulating valve controlled by the microprocessor for continuously readjusting the spreading pressure in the spreading cylinder, such that the spreading pressure in the spreading cylinder is the same as the spreading pressure continuously determined by the microprocessor.

4,955,554

## FILM WINDER

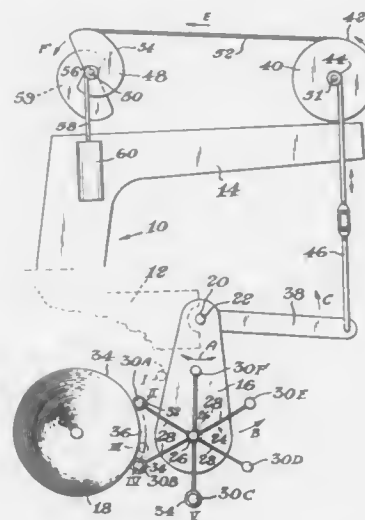
William E. LeBoeuf, and H. V. Wait, Jr., both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 12, 1988, Ser. No. 242,590

Int. Cl.<sup>5</sup> B65H 18/16

U.S. Cl. 242—65

10 Claims



1. Film winding apparatus comprising a bed roll, a turret carrying indexing mandrels for containing rolls of film, means adjustably pivoting said turret such that said mandrels and their contents engage said bed roll along a winding path, adjustable means connecting said turret so that when it is rotated about its pivot forces incident thereto are transmitted to a ratio multiplying means, said ratio multiplying means being linked with a balancing cam having a varying radius, said cam carrying a counterforce mechanism whereby engagement of one of said mandrels with the bed roll transmits the incident forces to the ratio multiplier and balancing cam such that the incident forces between the bed roll and each mandrel and its contents are minimized during the operation of the winding apparatus.

4,955,555

## LEADER-RETRACTING FILM MAGAZINE AND METHOD FOR ENCLOSING FILM

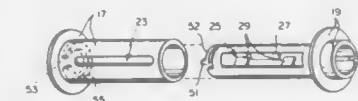
Charles W. Pierson, Rochester, and Frederick F. Tome, Holley, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 31, 1983, Ser. No. 547,310

Int. Cl.<sup>5</sup> B65H 75/28

U.S. Cl. 242—74

10 Claims



1. A magazine for light-sensitive film, said magazine comprising:  
a casing having a light-tight slot through which film may exit said casing;  
a spool rotatably mounted in said casing;  
a leader extending through said slot, said leader having a first end inside said casing attached to at least a portion of said spool and a second end outside said casing adapted to be attached outside said casing by a splice to the film so that rotation of said spool portion relative to said casing winds said leader about said spool portion, whereby the splice is retracted into said casing; and  
means for retaining said leader wound about said spool portion to inhibit pulling the splice out of said casing, whereby said leader is inhibited from being withdrawn from within said casing.

4,955,556

## SHOULDER HARNESS REEL ASSEMBLY WITH AUTOMATIC REEL LOCK

Don L. Frisk, Yorba Linda, Calif., assignor to PZF, Inc., Yorba Linda, Calif.

Division of Ser. No. 103,414, Oct. 1, 1987, Pat. No. 4,801,105.

This application Jan. 30, 1989, Ser. No. 304,342

Int. Cl.<sup>5</sup> B60R 22/38; G05G 1/00

U.S. Cl. 242—107.4 B

2 Claims



1. An improved dog of the type used with a ratchet, which ratchet is subject to rapid withdrawal, said dog having a pivot point at its base and a ratchet contacting face at the tip thereof and a ratchet directed face extending generally in the direction of the pivot point from the edge of the ratchet contacting face, said dog including biasing means urging said dog in the direction that causes said ratchet contacting face to contact a ratchet wherein the improvement including means to reduce or eliminate the tendency of the tip to bounce along the teeth of the ratchet when it is rapidly turning, said improvement comprising:  
a biased probe extending outwardly from the ratchet contacting face, said biased probe having a ratchet directed edge closest to the ratchet and the ratchet directed edge being aligned with the ratchet directed face of the dog and said biased probe being inwardly movable into said dog so that its tip is in line with the ratchet contacting face whereby a timed entry of the dog into contact with a ratchet occurs in that if the dog has time to make a com-

plete engagement with a ratchet tooth, it is allowed to drop but if it does not, the dog is held up by said probe until the next tooth comes around.

4,955,557

## HANDCRAFT YARN DISPENSER

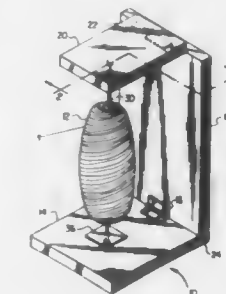
Virgil L. Sewell, and Martha A. Sewell, both of 1150 N. Canterbury Ct., Dallas, Tex. 75208

Filed Feb. 9, 1990, Ser. No. 477,570

Int. Cl.<sup>5</sup> B65H 49/30, 49/32

U.S. Cl. 242—134

4 Claims



1. A handcraft device for dispensing yarn, thread and the like from a skein, comprising:  
a base having a recess therein to be positioned opening upward;  
an upright, attached to one side of the base, to be positioned extending vertically, upwards of the base;  
means for fixing the position of the upright with respect to the base;  
a spindle support having a recess therein to be positioned opening downward;  
a spindle sufficiently slender to pass through the skein;  
means for attaching the spindle support at one side thereof to the upright near the top thereof and for providing rotation of the spindle support in a vertical plane to a position wherein the spindle support recess is above the base recess so that the spindle can be mounted with one end thereof in the spindle support recess and the other end thereof in the base recess, said provided rotation including rotation of the spindle support upwards from said one end of the spindle sufficiently to allow the spindle to be inserted and removed from said recesses; and  
a spacer means attached to the spindle near said other end thereof for spacing the skein from the base.

4,955,558

## REACTION CONTROL SYSTEM

Anthony Machell, and Peter G. Foulsham, both of Stevenage, England, assignors to British Aerospace Public Limited Company, London, England

Filed Feb. 10, 1989, Ser. No. 308,460

Claims priority, application United Kingdom, Feb. 11, 1988, 8803164

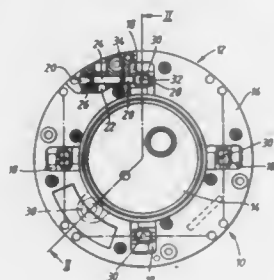
Int. Cl.<sup>5</sup> F42B 10/66

U.S. Cl. 244—3.22

9 Claims

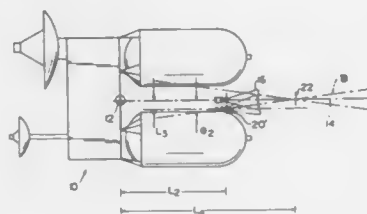
1. A projectile including a reaction control system, said system including at least one nozzle assembly, said at least one nozzle assembly comprising a housing defining a nozzle outlet means and a bore adjacent said outlet, a piston means located in said bore and movable to open or to close said nozzle outlet

means, drive means for moving said piston means and passage means extending through said piston means whereby the pres-



sure at one end of said piston and means is transmitted to the other end thereof.

**4,955,559**  
**THRUST VECTOR CONTROL SYSTEM FOR AEROSPACE VEHICLES**  
Rimvykas A. Kaminskas, Palos Verdes Estates, Calif., assignor to TRW Inc., Redondo Beach, Calif.  
Filed Jan. 26, 1988, Ser. No. 143,563  
Int. Cl.<sup>5</sup> B64L 15/12  
U.S. Cl. 244—52 10 Claims

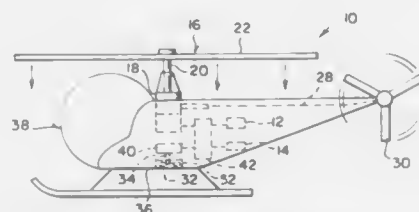


1. A thrust vector control system for an aerospace vehicle propelled by a reaction motor, comprising:  
means for simultaneously rotating and laterally translating the reaction motor with respect to an axis of the vehicle to provide increased control moments over simple rotation or translation of the reaction motor for improved steering and controlling of the vehicle.

**4,955,560**  
**ELECTRO MOTOR HELICOPTER**  
Edward T. Nishina, 78-6401 Mamalahoa Hwy., Holualoa, HI. 96725, and George Spector, 233 Broadway Rm 3815, New York, N.Y. 10007  
Filed Mar. 30, 1989, Ser. No. 330,646  
Int. Cl.<sup>5</sup> B64D 37/00  
U.S. Cl. 244—53 R 4 Claims

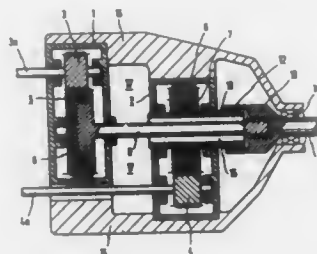
1. An electromotor helicopter having a fuselage and drive assembly further comprising:  
(a) a pair of batteries in which said first battery is used as a

source of electrical energy to supply power to said drive assembly of the helicopter while said second battery is held in reserve to be recharged;  
(b) a propeller having a drive shaft rotatably mounted on said fuselage;  
(c) a generator mechanically connected to said drive shaft and electrically connected to said second battery so that a



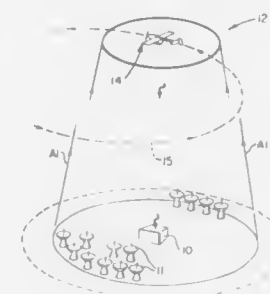
downward maneuvering of the helicopter will cause said propeller to turn said drive shaft to operate said generator for recharging said second battery; and  
(d) means for changing the electrical positions of said batteries so that said second battery can now be electrically connected to the drive assembly while said first battery can now be placed in reserve to be recharged by said generator.

**4,955,561**  
**COGWHEEL DRIVE MECHANISM FOR AIRCRAFT**  
U. C. Seefloth, Dornburg, Fed. Rep. of Germany, assignor to U. Christian Seefloth, Dornburg, Fed. Rep. of Germany  
Filed Aug. 31, 1987, Ser. No. 91,273  
Claims priority, application Fed. Rep. of Germany, Sep. 2, 1986, 3629867  
Int. Cl.<sup>5</sup> B64D 35/08  
U.S. Cl. 244—60 15 Claims



1. A gear drive arrangement for driving one aircraft propeller or helicopter rotor comprising: two transmissions with two laterally displaced drive shafts and at least one driven shaft connected to a propeller shaft or rotor shaft; said two transmissions comprising two spatially separated individual drive mechanisms; a separate housing for each of said drive mechanisms and housing sections of said driven shaft; each of said drive mechanisms having one of said two drive shafts so that the propeller or rotor is assuredly always driven by one of said drive shafts, all said shafts having longitudinal axes, said two driven shafts and said propeller or rotor shaft being arranged one behind the other in predetermined sequence along said longitudinal axes.

**4,955,562**  
**MICROWAVE POWERED AIRCRAFT**  
John E. Martin, Ottawa; James D. DeLaurier, Concord; George W. Jull, and Arne Lillemark, both of Nepean, all of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of Communications, Ottawa, Canada  
Filed Nov. 16, 1988, Ser. No. 272,015  
Claims priority, application Canada, Nov. 24, 1987, 552664  
Int. Cl.<sup>5</sup> B64C 39/02  
U.S. Cl. 244—62 16 Claims



1. A microwave-powered aircraft, comprising:  
means for propelling the aircraft;  
means defining lifting surfaces on the aircraft for exerting lifting forces on the aircraft in response to the propulsion of the aircraft;  
means for receiving and rectifying microwave energy transmitted to the aircraft from a location remote from the aircraft;  
the means for propelling the aircraft being operable in response to the microwave energy received by the microwave energy receiving and rectifying means; and  
the microwave energy receiving and rectifying means comprising a rigid body of substantially circular plan form attached to the aircraft, the horizontal dimensions of the body being a substantial fraction of the aircraft wingspan and the body being relatively shallow with a periphery which is vertically curved so as to reduce turbulence in the airstream over the body during flight, and the body being separate from the lifting means and shaped to at least substantially avoid the generation of lifting forces by the body;  
a plurality of downwardly-facing microwave antennas and associated rectifying elements at the underside of the body; and  
microwave reflector means provided in the body above said microwave antenna for shielding a space located above said microwave reflector means and within the body from microwave radiation.

**4,955,563**  
**APPARATUS AND METHOD FOR CONTROLLED SIMULTANEOUS OPENING OF CLUSTERED PARACHUTES**  
Calvin K. Lee, Needham, and James E. Sadeck, East Freetown, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.  
Filed Aug. 25, 1989, Ser. No. 401,192  
Int. Cl.<sup>5</sup> B64D 17/36  
U.S. Cl. 244—152 8 Claims



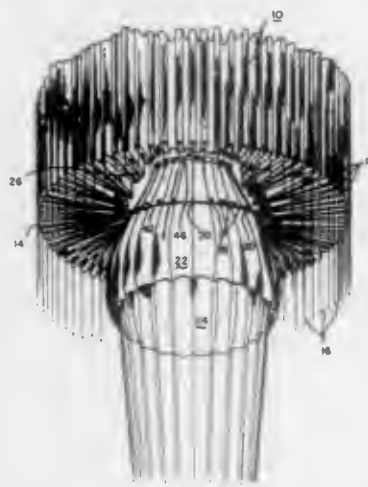
1. A parachute assembly for the controlled airdrop of a payload, comprising:  
a. a cluster of parachutes, each of said parachutes comprising:  
(i) a canopy with a skirt portion located at the peripheral edge of said canopy,  
(ii) a plurality of reefing control rings that are attached at points of attachment that are substantially equidistant from each other on said skirt portion, and  
(iii) a plurality of suspension lines that are each attached to said skirt portion at one end and attachable to a payload at the other end; and  
b. a control means common to the canopy of each said parachute for releasably connecting each said parachute to each other parachute, wherein said control means comprises:  
(i) a common member disposed between and intermediate each said skirt portion of said parachute cluster,  
(ii) a plurality of control lines that are attached to said common member at points of attachment that are substantially equidistant from each other on said common member, each of said control lines being threaded through a plurality of said reefing rings on confronting skirt portions of each of two adjacent parachutes, each of said control lines extending along a substantial portion of the periphery of each of said confronting portions of said adjacent parachutes not above about 50 percent of the said periphery, and  
(iii) at least one control member that is breakable under tension forces generated at the skirt portion during canopy opening, and that is attached to each of said control lines at a point remote from said common member, each said control member being threaded through at least one reefing ring on each of two adjacent parachutes.



**4,955,564**  
**MAIN PARACHUTE APPARATUS WITH SECONDARY PARACHUTE FOR AIDING INITIAL INFLATION THEREOF**

James D. Reuter, Manchester, Conn., assignor to Pioneer Aerospace Corporation, South Windsor, Conn.

Filed Jun. 1, 1989, Ser. No. 359,599  
Int. Cl.<sup>3</sup> B64D 17/04, 17/18, 17/58, 17/74  
U.S. Cl. 244-149 22 Claims



22. A main parachute apparatus with secondary parachute for aiding initial inflation thereof being particularly useful for large parachutes comprising:

- (a) a main canopy means including a plurality of vertically extending main panels, said main canopy means defining a main inlet opening in the lower portion thereof;
- (b) a plurality of suspension lines of kevlar material fixedly secured with respect to said main panels of said main canopy means and extending downwardly therefrom;
- (c) load carrying means secured to the lower portion of each of said suspension lines to retain a load as desired;
- (d) a plurality of main loop means attached with respect to said panels of said main canopy means;
- (e) a secondary canopy means positioned within said main inlet opening of said main canopy means, said secondary canopy means including a secondary inlet opening in the lower portion thereof to facilitate inflation of said secondary canopy means and including a main inflation opening in the upper portion thereof adapted to supply air from within said secondary canopy to said main canopy means to facilitate initial inflation thereof;
- (f) a plurality of secondary loop means attached peripherally with respect to said secondary canopy means at the approximate vertical midpoint of said secondary panels;
- (g) a retaining cord extending through said secondary loop means and said main loop means to be movable with respect thereto and to retain said main canopy means attached with respect to said secondary canopy means during the initial period of inflation of said main canopy means, said retaining cord maintaining said main inlet opening in a generally circular shape to facilitate full inflation thereof, said retaining cord maintaining said main panels and said suspension lines symmetrically distributed about said secondary canopy means;
- (h) a retaining cord pyrotechnic cutting means for releasing of said main loop means with respect to said secondary loop means to allow full inflation of said main canopy means during the final period of inflation thereof;
- (i) time delay actuation means for controlling activation of said pyrotechnic cutting means;
- (j) stay lines extending between said main canopy means and said secondary canopy means to retain said secondary

- canopy means in position after full inflation of said main canopy means;
- (k) supplementary reefing means secured vertically along at least some of said main panels of said main canopy means to retain sections of reefed panels collapsed until actuation of said retaining cord pyrotechnic cutting means, said reefed panel sections being equally and symmetrically spaced about said main canopy means, said main panels defining eyelets extending therethrough, said supplementary reefing means further including lacing means extending through said eyelets and about said retaining cord to facilitate retaining of said main canopy means prior to release of said retaining cord cutting means and to facilitate release of said supplementary reefing means after actuation thereof;
- (l) secondary reefing means adapted to retain said main inflation opening of said secondary canopy means closed prior to full inflation of said secondary canopy means; and
- (m) fabric scoop means positioned on the outer surface of said main canopy means to facilitate inflation thereof.

**4,955,565**  
**LOW DRAG SURFACE**  
John F. Coplin, Derby, England, assignor to Rolls-Royce plc., London, England  
Filed Sep. 20, 1984, Ser. No. 662,983  
Int. Cl.<sup>3</sup> B64C 1/38  
U.S. Cl. 244-199 9 Claims

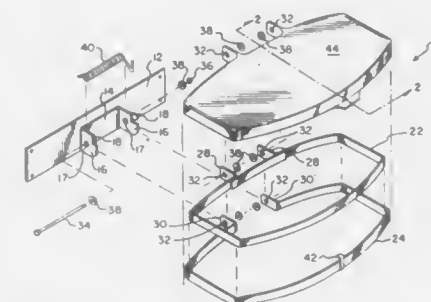


1. A low drag surface having a flow of fluid across it and comprising:  
an intermittent linear vortex producing means at its upstream edge extending transverse to the direction of said flow and producing a succession of rolling vortices extending transverse to said flow, said intermittent vortex producing means comprises a portion of said surface movable with respect to the remainder of said surface to produce a discontinuity which produces said vortex, said movable surface having two states, one in which it produces the vortex and the other in which it frees the vortex to move with the flow of fluid.

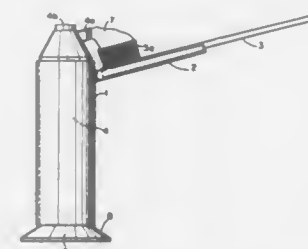
**4,955,566**  
**BAG HOLDING SYSTEM**  
Donald L. Bolich, 1136 Birdie Rd., Broomfield, Colo. 80020  
Filed Oct. 13, 1989, Ser. No. 420,911  
Int. Cl.<sup>3</sup> B65B 67/04  
U.S. Cl. 248-101 16 Claims

1. A system adapted to support a container and its contents on a support structure above the floor comprising:  
a mounting element;  
means for holding and receiving a container;  
hinge means for pivotally connecting said holding and receiving means to said mounting element;  
a hinge pin, said hinge pin being included as a portion of said hinge means, and  
a coil spring for biasing said holding and receiving means into a first normal substantially horizontal position, said coil spring being wrapped around said hinge pin, said coil spring having a first end and a second end, said first end of said coil spring being connected to said mounting element, and said second end of said coil spring being connected to said means for holding and receiving a container, said coil spring having a given load bearing capacity, said coil spring being adapted to be overcome when the load of a

holding and receiving means and a container and its contents exceed the given load bearing capacity of said coil spring, to thereby allow said supporting and holding



**4,955,567**  
**TOOTHBRUSH HOLDER FOR UPRIGHT TOOTHPASTE DISPENSER**  
Frank J. Longhurst, 127 N. Highland Rd., Springfield, Pa. 19064  
Filed Jan. 12, 1989, Ser. No. 295,986  
Int. Cl.<sup>3</sup> B65D 35/56  
U.S. Cl. 248-108 9 Claims

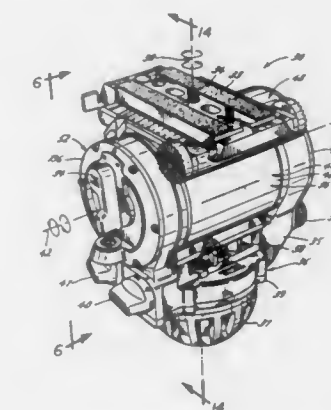


1. An apparatus enabling easier loading of a toothbrush with toothpaste, which comprises:  
(a) means for grasping an upright toothpaste dispenser; and  
(b) means for holding a toothbrush, wherein said toothbrush holding means are rigidly attached to an edge of said dispenser grasping means and extend radially outward from said dispenser grasping means, so that a toothbrush placed in said toothbrush holding means may receive toothpaste from the nozzle of the upright toothpaste dispenser.

**4,955,568**  
**PANHEAD FOR CAMERA**  
Chadwell O'Connor, and Joel W. Johnson, both of Newport Beach, Calif., assignors to Q-CO Industries, Inc., New York, N.Y.  
Filed Oct. 20, 1989, Ser. No. 424,495  
Int. Cl.<sup>3</sup> F16M 11/12  
U.S. Cl. 248-183 20 Claims

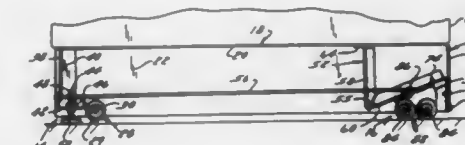
5. A counterbalance mechanism for a panhead comprising, in combination,  
a tilt drum mounted for rotation about a substantially horizontal tilt axis,  
at least two springs mounted in perpendicular planes to said tilt axis,  
first means for mounting one end of each said spring along a

common horizontal axis, said common axis lying in a vertical plane containing said tilt axis,  
second means for mounting the opposite end of each said spring at an equal angle to said vertical plane on opposite sides of said plane,



- means for securing against rotation relative to said tilt axis one end of each said spring having the same type means for mounting,  
means for coupling the opposite ends of each said spring to said tilt drum for rotation therewith, such that said springs exert a restoring torque on the tilt drum when said tilt axis and said common axis do not coincide.

**4,955,569**  
**REFRIGERATOR LEVELING SYSTEM**  
Philip F. Hottmann, Cross Plains, Wis., assignor to Sub-Zero Freezer Company, Inc., Madison, Wis.  
Filed Jul. 18, 1989, Ser. No. 381,531  
Int. Cl.<sup>3</sup> F16M 11/00  
U.S. Cl. 248-188.2 13 Claims



1. A leveling apparatus for a refrigerator, said apparatus comprising:  
a pair of leveling assemblies mounted on each side of the bottom of the refrigerator;  
each leveling assembly including a housing having a front and back, means in the front of said housing for stabilizing and leveling the front of the refrigerator, means in the back of said housing for leveling the back of the refrigerator wherein said back leveling means comprises a bracket mounted in the back of said housing, said bracket having a ramp sloped upwardly toward the back of said housing and a roller bracket assembly operably positioned to engage said ramp whereby on movement of said bracket assembly toward the front of said housing, the refrigerator will be raised and if moved toward the back of said housing, the refrigerator will be lowered; and  
adjusting means in the front of said housing operatively connected to said leveling means in the back of said housing for adjusting the position of said back leveling means with respect to said housing to level the back of the refrigerator.

4,955,570

## CLOSED HOLLOW SUPPORT

Erwin Benz, Gochingen; Wolfgang Rau, Renningen; Rainer Bauer, Wildberg, and Gerd Willy, Weil-Newweller, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

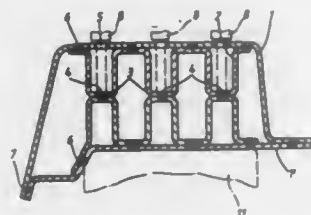
Filed Jul. 12, 1989, Ser. No. 379,171

Claims priority, application Fed. Rep. of Germany, Jul. 12, 1988, 3823522; May 6, 1989, 3914960

Int. Cl.<sup>5</sup> F16M 3/00

U.S. Cl. 248—300

8 Claims



1. A closed hollow support includes two sheet metal support sections that are welded together in the area of their longitudinal edges to define a hollow space between themselves; two stiffening sections for reinforcing the hollow support are arranged in the hollow space of the hollow support; these stiffening sections extend along a longitudinal direction of the hollow support and are welded to the hollow support; each of the two support sections is welded to a respective stiffening section; the stiffening sections have a meandering shape in cross-section at least in areas thereof; the stiffening sections are arranged approximately mirror-invertedly with one another in the hollow space and have opposed mutual contact surface means extending in longitudinal direction of the hollow support for connection of these stiffening sections; and wherein hole means are provided in at least one support section in the area of these contact surfaces for passage of connecting tools for connecting the two stiffening sections together after the respective stiffening sections have each have welded to the support sections and the mutual contact surface means are aligned for connection.

4,955,571

## DUAL ACTION CUPHOLDER

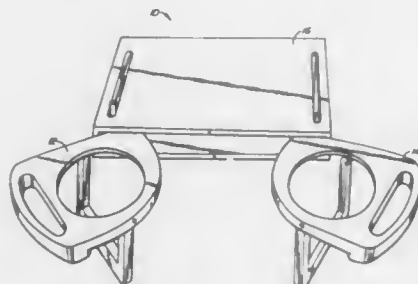
Brian S. Lorence, Warren, and Richard A. Phelps, Ferndale, both of Mich., assignors to Chivas Products Limited, Sterling Heights, Mich.

Filed Nov. 21, 1989, Ser. No. 437,252

Int. Cl.<sup>5</sup> A47K 1/09

U.S. Cl. 248—311.2

16 Claims



1. A container holder comprising:

a housing having a top surface and a bottom surface and a front and a back; and  
a first shelf having holder means for supporting a container disposed therein, the holder means having a central axis, the shelf further having means for movably mounting the shelf within the housing, the means for movably mounting comprising  
sliding mount means for permitting the shelf to move axially from a first position substantially at the back of the housing to a second position substantially at the front of the housing, and pivoting mount means for permitting the shelf to rotate about an axis other than the holder means central axis.

4,955,572

## SPORTS BOTTLE SUPPORTING DEVICE

Norman Simmons, 10 Notch Ct., Dix Hills, N.Y. 11746

Filed Jun. 15, 1989, Ser. No. 366,440

Int. Cl.<sup>5</sup> A47F 1/00

U.S. Cl. 248—312

5 Claims



1. An improved sports bottle comprising an integrally formed plastic liquid container, said container having a base end surface, a neck end surface and a cylindrical side surface, said cylindrical side surface situated between said neck end surface and said base end surface, said container having an inside and an outside, said cylindrical side surface having an outside diameter, said container having an integrally formed threaded neck, said threaded neck having a first attached end and a second fill end, said threaded neck having a maximum external diameter smaller than said outside diameter, said neck end surface situated between said cylindrical side surface and said first attached end of said neck, said neck end surface essentially parallel to said base end surface of said container, said fill end of said neck communicating with said inside of said bottle through said neck, said sports bottle including a threaded cap fitting said neck, wherein the improvement comprises:

(a) a supporting member having a hole, said supporting member mounted on said neck through said hole, said supporting member secured against vertical movement by said cap, said supporting member having an elongated mounting tab, said mounting tab having a fixed end integral with said supporting member at said neck end surface on the outside of said container, said elongated mounting tab also having a free end, said elongated mounting tab extending essentially parallel to and on said outside of said cylindrical side surface of said container in a direction from said neck end surface of said container to said base end surface of said container, said free end not extending beyond said base end surface of said container.

4,955,573

## WATER HEATER SAFETY FASTENER

George Horvath, 17608 Los Alamos, Granada Hills, Calif. 91344

Filed Dec. 18, 1989, Ser. No. 452,049

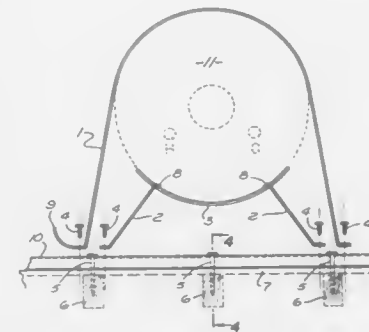
Int. Cl.<sup>5</sup> A47K 1/08

U.S. Cl. 248—313

15 Claims

1. A support system for a holding tank positioned near a wall comprising a rigid support collar, rigid support legs removably

attached to said support collar at one end; each said support leg adapted to be attached at an angle to the wall at the other end,



a flexible binding strap adapted to fit around said tank and further adapted to be attached to said wall.

4,955,574  
PIPE CLIP

Fred Freler, Baretswil, Switzerland, assignor to Egli, Fischer & Co. AG, Zurich, Switzerland

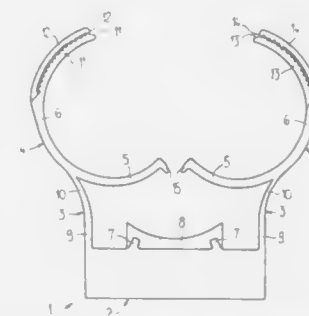
Filed Jul. 17, 1989, Ser. No. 379,796

Claims priority, application Switzerland, Jul. 18, 1988, 02739/88

Int. Cl.<sup>5</sup> F16L 3/08

U.S. Cl. 248—316.5

8 Claims



1. A pipe clip comprising a base plate, a pair of opposed arcuate-shaped strap segments, a pair of relatively flexible connecting-struts connected between the base plate and the outer side of each strap segment at a point intermediate their ends to divide the strap segment into a lower end portion and an upper end portion, said connecting struts being rigidly connected to the baseplate and being rigidly connected to the upper end portions of the strap segments to lock the straps in place around a pipe, said struts maintaining the straps segments in disengaged position with their lower end portions adjacent each other and their upper end portions apart to permit the insertion of a pipe into the clip, whereby the force of inserting a pipe into the clip against the lower end portions of the strap segments bends the connecting struts inwardly and brings the upper end portions of the straps together and the closure means into engagement.

4,955,575

## TILTING/REMOVABLE SEAT MOUNTING ASSEMBLY

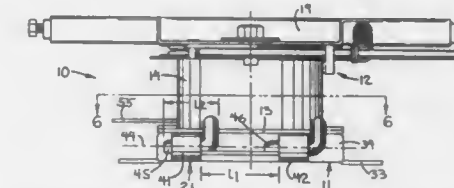
Daniel S. Moore, Elkhart, Ind., assignor to Boss Manufacturing & Distributing Inc., Elkhart, Ind.

Filed Jun. 2, 1989, Ser. No. 360,400

Int. Cl.<sup>5</sup> A47D 19/04

U.S. Cl. 248—398

15 Claims



1. A pedestal-type mounting assembly for a vehicle seat to permit the seat to be both tilted relative to the vehicle floor and easily removed from the vehicle without use of tools, said mounting assembly comprising:

a base plate structure having front and rear edges and being adapted for fixed attachment to a vehicle floor;  
a pedestal assembly positioned on and projecting upwardly from said base plate structure, said pedestal assembly having means associated with an upper end thereof for attachment to a vehicle seat, and said pedestal assembly having a support structure adjacent the lower end thereof adapted for supportive bearing engagement with said base plate structure;

releasable hinge means operably connected between said support structure and said base plate structure adjacent one of said edges for defining a generally horizontally and sidewardly extending hinge axis;

manually-releasable lock means cooperating between said support structure and said base plate structure adjacent the other edge thereof for fixedly but releasably connecting said pedestal assembly and said base plate structure together;

said manually-releasable lock means including a lock portion stationarily secured relative to said base plate structure and a lock member movably supported on said support structure for releasable engagement with said lock portion when the support structure is supportably engaged with said base plate structure, said lock means also including a manually-engageable handle connected to said lock member for effecting movement thereof, said handle being readily accessible and supported for swinging movement relative to the pedestal assembly between locked and unlocked positions;

said hinge means including a hinge tube fixed to one of said support and base plate structures and defining therein a generally horizontally and sidewardly extending cylindrical opening whose axis defines said hinge axis, and said hinge means including a generally horizontally elongated and sidewardly extending hinge pin fixed to the other of said support and base plate structures, said hinge pin being of a horizontally and sidewardly projected cantilevered structure having a free end so as to be slidably insertable into or out of the opening in said hinge tube, said hinge pin adjacent the other end thereof being permanently fixedly secured relative to the other of said support and base plate structures;

whereby said pedestal assembly and a seat attached thereto can be tilted about the hinge axis when the lock means is released, and whereby the pedestal assembly and attached vehicle seat can be totally disconnected from the floor plate structure when in the tilted position merely by horizontally sidewardly displacing the pedestal assembly relative to the floor plate structure to slidably withdraw the cantilevered hinge pin from the hinge tube.



4,955,576

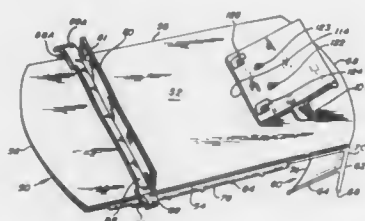
## VERSATILE WRITING BOARD

Michael K. Moberg, 584 S. 1st St., Carrington, N. Dak. 58421  
Continuation of Ser. No. 375,184, Jun. 30, 1989, abandoned,  
which is a continuation-in-part of Ser. No. 216,366, Jul. 7, 1988,  
abandoned, which is a continuation-in-part of Ser. No. 483,774,  
Apr. 11, 1983, abandoned. This application May 1, 1990, Ser.  
No. 517,498

Int. Cl.<sup>5</sup> A47B 19/00

U.S. Cl. 248—449

46 Claims



1. A portable writing board mountable for use on a steering wheel of a vehicle and also entirely stable for writing use when rested upon any flat surface, comprising a platform member having substantially parallel side edges, a lower edge, and a curved upper edge approximating the curvature of the outer diameter of a vehicle steering wheel, and a single continuous retaining collar depending from said curved upper edge and unified thereto, there being no other structure extending downwardly from said platform, the distance between said parallel side edges being less than the distance between said lower edge and said curved upper edge, said retaining collar consisting essentially of a depending skirt portion and a flange-like portion directed radially inwardly from the bottom edge of said skirt portion to thereby form a recess capable of accommodating the rim of a vehicle steering wheel, said depending retaining collar being further characterized by the fact that its most depending portions form a bottom surface which extends continuously along the entire curvature of said retaining collar, which bottom surface lies in an imaginary plane intersecting said platform at an axis line perpendicular to said side edges of said platform and located at the lowermost bottom edge of said platform, whereby said bottom surface of said retaining collar provides continuous contact for underlying stable support of the entire curved upper edge of said writing board when the same is used on a flat surface.

4,955,577

## REMOVABLE MOUNTING ASSEMBLY FOR FOG LIGHTS AND FLAG POLES

Daw-Long Ching, No. 4-1, Lane 68, Chen Kung Road, Tainan City, Taiwan

Filed Jun. 9, 1989, Ser. No. 363,739

Int. Cl.<sup>5</sup> H01Q 1/12

U.S. Cl. 248—539

2 Claims



1. A detachable mounting assembly adapted for the location of a fog light and a flag pole having a light element disposed at the top end thereof, under the front bumper of an automobile, comprising:

- a mounting device screwed under the bumper by means of a screw-like protrusion disposed on the top surface thereof;
- a pair of base elements each of which is provided with a threaded end so as to permit the same to be secured under said mounting device, the other end thereof being defined

in an octagon shape with a hole disposed at the center thereof and a peripheral engagement groove being provided about the central exterior portion thereof;

a fog light having a first C-shaped mounting member fixed under the bottom thereof, which is provided with a pair of lugs; on each of the lug being disposed a central hole with a number of pores located adjacent to it;

a second C-shaped mounting member provided with a horizontal board and a pair of depending lugs having a central through hole disposed on the horizontal board thereof and the lugs thereof being provided with holes in correspondence with the central holes disposed on the lugs of said first mounting member so that the second mounting member can be pivotally engaged with said first mounting member by bolts and screws;

a double ended bolt with one threaded end thereof going through the central hole of said second mounting member and locked in place by a nut means;

a securing assembly including an elongate nut member the interior of the bottom end of which is defined in an octagon form and the top end thereof provided with internal threads, into which a washer, a fixing element, a ring member and a first spring are placed; and the other threaded end of said double ended bolt being engaged with the top threaded end of said elongate nut member in assembly; the lower end of said elongate nut member being provided with 4 symmetric bores in each of which a steel ball is movably disposed, and a second spring being disposed in encircling relation with the lower end of said nut member; and

a tubular cover being slidably attached to the lower end of said elongate nut member with said second spring disposed between the cover and said nut member; a C-shaped clip member being employed to support said tubular cover in place;

whereby the actuation of said tubular cover in one direction will permit said steel balls to move radially outward so as to enable said octagon-shaped end of said base element inserted into the correspondingly-shaped bottom end of said elongate nut member which is associated with a fog light, and the movement of said tubular cover in the opposite direction will force said steel balls to slide in a reverse direction and to engage with the peripheral engagement groove of said base element so that a fog light can be removably secured to said mounting device attached to the underside of the bumper of an automobile.

4,955,578

## RESILIENTLY FASTENED SUPPORT DEVICE FOR A MICROPHONE

Werner Fidi, Baden, Austria, assignor to AKG Akustische u. Kino-Gerate Gesellschaft m.b.H., Vienna, Austria

Filed Apr. 13, 1989, Ser. No. 337,737

Claims priority, application Austria, Apr. 13, 1988, 957/88

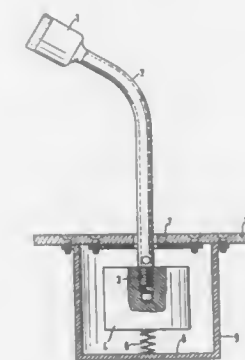
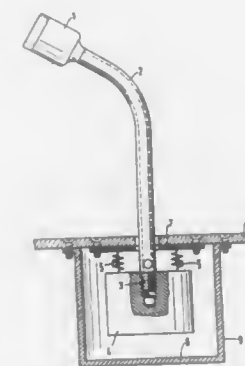
Int. Cl.<sup>5</sup> F16M 13/00

U.S. Cl. 248—559

10 Claims

1. In a resiliently fastened support device for supporting an arrangement carrying a microphone, wherein the support device is connected to an end of the arrangement which faces away from the microphone and the microphone is mounted on

the other end of the arrangement, wherein the improvement comprises that the support device has a mass which is a multi-



ple of the mass of the microphone and the arrangement carrying the microphone.

4,955,579

## CONCRETE FORMING DEVICE WITH CORNER FORMING ACCESSORY

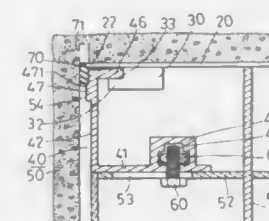
Yuan-Ho Lee, 851, Chong-San Rd., Nan-Pao Tsun, Kuei-Jen Hsian, Tainan Hsiang, Taiwan

Filed Jun. 23, 1989, Ser. No. 370,753

Int. Cl.<sup>5</sup> E04G 11/38, 17/16

U.S. Cl. 249—19

6 Claims



1. The forming device for forming a poured ceiling by which a neat corner is formed between the ceiling and an adjacent wall, said forming device comprising:

- a form panel having a portion which has an edge adjacent to the wall, a forming face and a back face;
- a plurality of engaging projections formed on said back face and having a flange extending from said projections in a direction substantially parallel to said back face, said

flange confining a groove with said back face which opens towards the wall;

a filler member to be placed between the wall and said edge of said form panel;

a form holding means having a portion substantially parallel to said form panel, and adjacent to, but not engaged with the wall;

a filler holding means having a first portion substantially parallel to said form panel and a second portion substantially perpendicular to said first portion, said first portion being slidably secured to said portion of said form holding means, said second portion extending upward adjacent to the wall, and having a depressing portion to depress said filler member against the wall and a mortise portion to engage with said groove of said form panel, said depressing portion and said mortise portion forming an angle therebetween, said mortise portion having an outer face opposing said back face of the said form panel, said outer face being slanted upward from said depressing portion to an end of said mortise portion forming an obtuse angle with said depressing portion; and

means for positioning said first portion of said filler holding means relative to said parallel portion of said form holding means when said filler holding means is in a proper position.

4,955,580

## CONTACT LENS MOLD

William E. Seden, Fareham; David W. J. Shepherd, Eastleigh, and Peter Henderson, Southampton, all of England, assignors to CooperVision Optics Limited, Southampton, England  
PCT No. PCT/GB87/00045, § 371 Date Nov. 4, 1987, § 102(c)  
Date Nov. 4, 1987, PCT Pub. No. WO87/04390, PCT Pub. Date Jul. 30, 1987

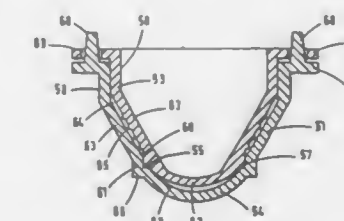
PCT Filed Jan. 27, 1987, Ser. No. 107,593

Claims priority, application United Kingdom, Jan. 28, 1986, 8601967

Int. Cl.<sup>5</sup> B29D 11/00

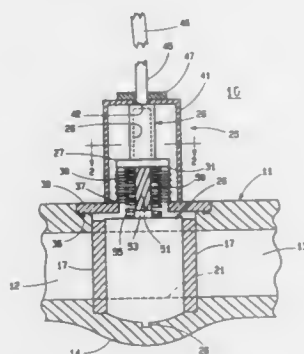
U.S. Cl. 249—82

9 Claims



1. A polyolefin mould for casting contact lenses from a polymerisable monomer composition which shrinks on polymerisation, said mould comprising (a) male and female mould halves each of which has a diaphragm portion which is shaped to provide a surface corresponding to a lenticular surface, said mould halves, when closed together, cooperating to define a mould cavity for receiving a volume of said monomer composition, (b) each of said mould halves having a non-flexible shoulder portion surrounding said cavity and shaped so that on closing the mould under a closing pressure said shoulder portions engage in an essentially line contact to form a liquid-tight seal of the cavity and to define an edge moulding portion of said cavity; and (c) the diaphragm portion of the male mould being more flexible than the female, whereby in use, the male diaphragm portion is deflected into said cavity under the forces generated in said mould by said monomer composition when polymerised in said closed cavity.

**4,955,581**  
**BELLOWS SEALED PLUG VALVE**  
 Stephen J. Dukas, Jr., Idaho Falls, Id., assignor to United States Department of Energy, Washington, D.C.  
 Filed Sep. 29, 1989, Ser. No. 414,359  
 Int. Cl.<sup>5</sup> F16K 41/10, 31/50, 31/54  
 U.S. Cl. 251—214 10 Claims



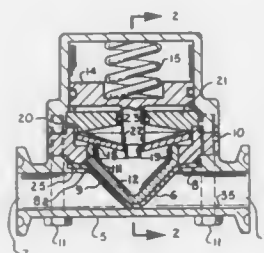
1. An improved 1/4 turn operator valve including a valve body having an inlet passage and an outlet passage, a valve chamber between said inlet and outlet passages, a valve plug having substantially the same shape as said valve chamber and being rotatably disposed therein, said valve plug having a flow passage disposed therethrough, said flow passage disposed such that with said valve plug in a first position said flow passage is in alignment with said inlet and said outlet passages and provides fluid communication therebetween, and with said valve plug in a second position said flow passage is out of alignment with said inlet and outlet passages and said valve plug interrupts fluid communication therebetween, a shaft connected to a valve actuator movable linearly in response to a signal from said valve actuator, wherein the improvement comprises:

a cap assembly, an actuator shaft passing through said cap assembly, a secondary sealing member encircling said actuator shaft, a collar assembly in contact with said actuator shaft and responsive to linear motion of said actuator shaft, an operator shaft adapted to receive a torsional force from said collar assembly, a bellows cooperating with said collar assembly and said cap assembly to form a primary sealing assembly isolating said valve chamber from said actuator shaft to prevent fluids from passing between said collar assembly and said bellows, a valve plug connected to said operator shaft and a return position spring encircling said operator shaft;  
 said collar assembly includes a cylindrical member encircling said operator shaft and a flange member attached to said cylindrical member and said bellows, and wherein said torsional force is provided by helical threads on said cylindrical member and said operator shaft causing rotation of said valve plug upon linear reciprocal movement of said actuator shaft; and  
 wherein said cap assembly includes sealing flange, and sealing means thereby effecting a fluid tight seal between said valve body and said sealing flange.

**4,955,582**  
**WEIRLESS DIAPHRAGM VALVE**  
 Hans D. Baumann, 32 Pine St., Rye, N.H. 03870  
 Filed Aug. 14, 1989, Ser. No. 393,393  
 Int. Cl.<sup>5</sup> F16K 7/17 3 Claims

1. Diaphragm valve comprised of a housing having inlet and outlet ports and a conical chamber having a cone angle of less than 120 degrees straddling said ports and terminating in an upper flanged surface, spacer means suitably attached to the

upper portion of said housing and having a lower flanged surface cooperating with and restraining and compressing between said upper flanged surface of the housing the outer rim of a non-convoluted elastomeric diaphragm capable of stretching and assuming the shape of said conical chamber during valve closure, and wherein said diaphragm in its undeformed



stage is essentially flat in shape, said spacer means having a central opening slidably engaging a conical element capable of moving said diaphragm towards engagement with the walls of said conical chamber thereby blocking fluid flow between said ports, and wherein said conical element is motivated by a suitable actuating device having a stem.

**4,955,583**  
**VALVE CONSTRUCTION AND METHOD OF MAKING THE SAME**

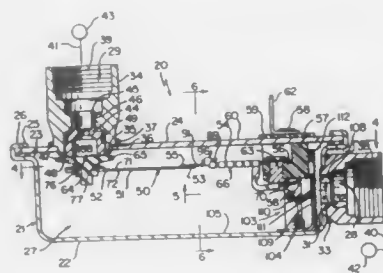
Harvey J. Shopsky, Latrobe, Pa., assignor to Robertshaw Controls Company, Richmond, Va.  
 Division of Ser. No. 192,838, May 11, 1988, Pat. No. 4,856,164, which is a division of Ser. No. 47,205, May 6, 1987, Pat. No. 4,769,887, which is a division of Ser. No. 870,363, Jun. 4, 1986, Pat. No. 4,685,652, which is a division of Ser. No. 794,742, Nov. 4, 1985, Pat. No. 4,651,968. This application Jun. 15, 1989, Ser. No. 366,522

The portion of the term of this patent subsequent to Aug. 11, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> F16K 31/70

U.S. Cl. 251—11

4 Claims



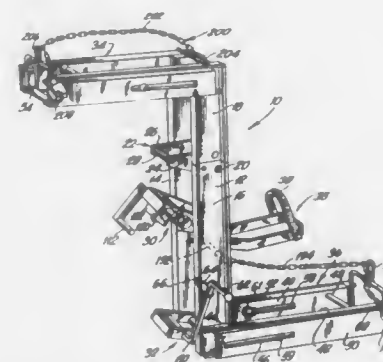
1. In a valve construction comprising a housing means provided with a chamber therein and with an inlet leading to said chamber and an outlet leading from said chamber, a valve seat carried by said housing means and leading to said outlet, a movable bimetallic lever means carried by said housing means and having an operating bimetallic part, a heater wire means disposed in coiled relation about said operating part to heat the same when an electrical current flows through said heater wire means, and a valve member carried by said bimetallic lever means for opening and closing said valve seat under the control of said operating part of said bimetallic lever means, said operating part of said bimetallic lever means having a fastening means operatively interconnected to said heater wire means to tend to hold said heater wire means in said coiled relation on said operating part of said bimetallic lever means, the improve-

ment wherein said heater wire means comprises a length of said wire means doubled upon itself to define a looped end and a pair of free ends adjacent each other with said looped end being said part of said heater wire means that is operatively interconnected to said fastening means of said bimetallic lever means.

**4,955,584**  
**PUMP JACK**  
 Carl Anderson, c/o Alum-A-Pole Corporation 2589 Richmond Terrace Industrial Bldgs, 9A&B, Staten Island, N.Y. 10303-0002  
 Filed Mar. 21, 1989, Ser. No. 326,326  
 Int. Cl.<sup>5</sup> A63B 27/00 29 Claims

U.S. Cl. 182—133

29 Claims



1. A pump jack arranged for traveling up and down a pole, comprising:

- a frame member having a support arm;
- a lower shackle member and an upper shackle member supported by said frame member;
- a pump arm pivotally connected to said frame member for causing, in conjunction with the support arm, said lower and upper shackle members to alternately grip the pole with the non-gripping shackle member being stepped upwardly along the pole;
- said upper shackle member and said lower shackle member each including a forward and a rearward gripping member for engaging a front and a rear surface, respectively, of the pole during alternating gripping the pole;
- said upper shackle member further including spacing means mounted on said upper shackle so as to be brought into and out of contact with the front surface of the pole and to thereby enable spacing of the forward gripping member of the upper shackle member from the front surface of the pole when said upper shackle member is non-gripping, to thereby facilitate upward stepping of the upper shackle member.

**4,955,585**  
**HYDRAULICALLY DRIVEN FAN SYSTEM FOR WATER COOLING TOWER**

John A. Dickerson, 15660 W. Hardy, Ste. 130, Houston, Tex. 77060

Filed Jun. 22, 1989, Ser. No. 369,814

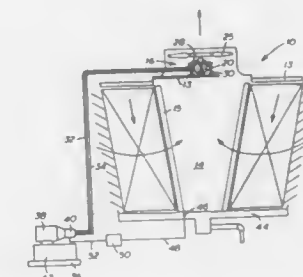
Int. Cl.<sup>5</sup> B01F 3/04

U.S. Cl. 261—26

21 Claims

- 1. A hydraulically energized fan system for water cooling towers and the like, comprising:
  - (a) a rotary fan being positioned at the upper portion of a water cooling tower;
  - (b) a hydraulic motor being positioned adjacent said rotary fan and having a driving connection with said rotary fan;
  - (c) a hydraulic pump mechanism being located at a position remote from said rotary fan;
  - (d) hydraulic supply and return lines interconnecting said

hydraulic pump and said hydraulic motor and forming a closed-loop hydraulic system incorporating said hydraulic pump and hydraulic motor; and



(e) means for reversing the flow of hydraulic fluid in said hydraulic supply and return lines to thus induce reversal of said hydraulic motor for rendering said rotary fan reversible.

**4,955,586**  
**APPARATUS FOR TREATING SLURRY BY GAS-LIQUID CONTACT METHOD**

Masakazu Onizuka, and Atsushi Tatani, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

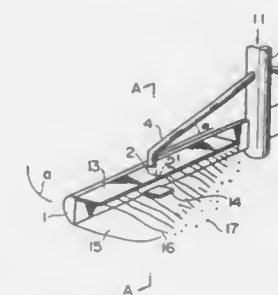
Filed Mar. 28, 1989, Ser. No. 329,430

Claims priority, application Japan, Apr. 8, 1988, 63-85324

Int. Cl.<sup>5</sup> B01F 3/04

U.S. Cl. 261—87

2 Claims



1. An apparatus for treating a slurry by gas-liquid contact, said apparatus comprising a hollow rotary shaft, stirring rods fixed to the lower end of said shaft, and gas supply pipes to supply a gas to the negative-pressure region which is formed behind the stirring rods as they rotate, said gas supply pipes having their openings fixed to the back of said stirring rods, and at least one of said stirring rods being provided on the top thereof with a plate to stabilize the negative-pressure region, said plate extending in the direction opposite to the rotating direction of the stirring rod.



4,955,587

# ARRANGEMENT FOR RECOVERING MOLTEN PIG IRON OR STEEL PRE-PRODUCTS FROM LUMPY IRON-OXIDE CONTAINING CHARGING SUBSTANCES

Horst Salzbacher, Leoben, Austria, and Markus Hubig, Aachen, Fed. Rep. of Germany, assignors to Korf Engineering GmbH, Dusseldorf, Fed. Rep. of Germany

Division of Ser. No. 221,876, Jul. 20, 1988, Pat. No. 4,895,593.

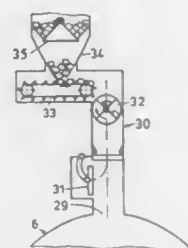
This application Aug. 28, 1989, Ser. No. 399,072

Claims priority, application Austria, Jul. 30, 1989, A1933/87

Int. Cl.<sup>5</sup> F27B 15/08

U.S. Cl. 266—156

7 Claims



1. An arrangement to be used for carrying out a process of recovering molten pig iron or steel pre-products from scrap containing organic impurities and/or at least one non-ferrous metallic element and having an apparent weight amounting to between 300 and 1,000 kg/m<sup>3</sup> and from lumpy iron-oxide containing charging substances by reducing said charging substances as to obtain a reduction product composed of sponge iron, smelting said sponge iron under supply of carbon carriers and oxygen-containing gas forming a coal fluidized bed, carbonizing and smelting said scrap in said coal fluidized bed and pyrolyzing organic impurities present in said scrap, and producing a CO and H<sub>2</sub> containing reduction gas and top gas, which arrangement comprises

- a direct reduction shaft furnace including a charging substance supply duct means for lumpy iron ore, a supply duct means for reduction gas, a discharge duct means for said reduction product formed in said direct reduction shaft furnace, and a top gas discharge duct means,
- a meltdown gasifier in communication with said discharge duct means of said direct reduction shaft furnace and adapted to receive said reduction product from said direct reduction shaft furnace, said meltdown gasifier including supply duct means for oxygen-containing gases and carbon carriers, a discharge duct means for discharging said reduction gas formed therein and supplying said reduction gas to said supply duct means of said direct reduction shaft furnace, and tap means for pig iron and slag, wherein said meltdown gasifier is adapted to form said coal fluidized bed therein, and
- a scrap charging means.

4,955,588

# BEARING FOR THE ELASTIC MOUNTING OF MACHINES, MACHINE PARTS AND/OR VEHICLE PARTS

Horst Renter, Oberbachem; Jörn-Rainer Quast, Bad Bodendorf, and Roland Schall, Villip, all of Fed. Rep. of Germany, assignors to Boge AG, Eitorf, Fed. Rep. of Germany

Filed May 9, 1989, Ser. No. 349,005

Claims priority, application Fed. Rep. of Germany, May 9, 1988, 3815817

Int. Cl.<sup>5</sup> F16F 5/00

U.S. Cl. 267—140.1

9 Claims

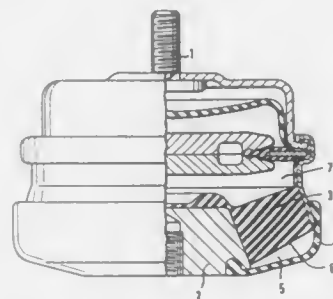
1. An elastic bearing for damping vibrations, said elastic bearing being for use in a deleterious ambient environment, said elastic bearing comprising:

- a first attachment member;
- a second attachment member;

an elastomeric member interposed between said first attachment member and said second attachment member;

cover member means for sealing at least a portion of said elastomeric member from the deleterious ambient environment;

said cover member means and said elastomeric element forming a chamber therebetween; and



a protective fluid disposed in said chamber, said protective fluid comprising at least one of an inert gas and an inert liquid;

said protective fluid being substantially noneffective in contributing to the damping characteristics of said elastic bearing.

4,955,589

# HYDRAULICALLY DAMPED MOUNTING DEVICE

John P. West, Devizes, United Kingdom, assignor to Avon Industrial Polymers Limited, Melksham, United Kingdom

Continuation of Ser. No. 288,675, Dec. 22, 1988, abandoned.

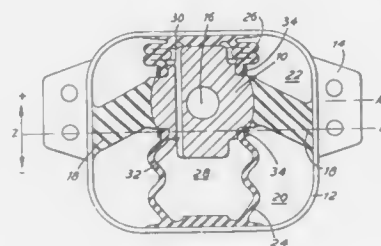
This application Feb. 23, 1990, Ser. No. 492,232

Claims priority, application United Kingdom, Dec. 23, 1987, 8730005

Int. Cl.<sup>5</sup> F16F 5/00

U.S. Cl. 267—140.1

11 Claims



1. A hydraulically damped mounting device, comprising:

- a first anchor part;
  - a second anchor part;
  - a first bellows wall interconnecting said first and second anchor parts;
  - a first chamber for hydraulic fluid at least partially defined by said first bellows wall;
  - a second bellows wall connected to said first anchor part;
  - a second chamber for hydraulic fluid at least partially defined by said second bellows wall;
  - a passageway interconnecting said first chamber and said second chamber; and
  - a resilient wall interconnecting said first and second anchor parts, said resilient wall being independent of said first and second bellows wall;
- whereby the volumes of the first and second chambers are changeable due to movement of the corresponding bellows wall with substantially no spring resistance applied to said hydraulic fluid by said bellows wall.

4,955,590

# PLATE-LIKE MEMBER RECEIVING APPARATUS

Masaki Narushima, and Itaru Takao, both of Yamanashi, Japan,

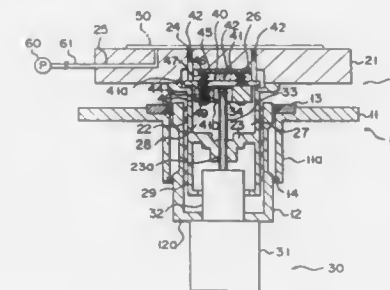
assignors to Tokyo Electron Limited, Tokyo, Japan

Filed Dec. 8, 1988, Ser. No. 281,224

Int. Cl.<sup>5</sup> B25B 11/00

U.S. Cl. 269—21

5 Claims



1. A plate-like member receiving apparatus for receiving a plate-like member comprising:

- a base unit;
- a table member having a supporting surface on which said plate-like member is supported and which is vertically movable with respect to said base unit;
- a receiving member having at least three receiving pins which project from said supporting surface and are concealed under said supporting surface upon vertical movement of said table member, movement of said receiving member relative to said base unit being eliminated when said plate-like member is supported on said table member; and
- drive means for vertically moving said table member, wherein said plate-like member is transferred onto said receiving pins while said receiving pins project, and is supported on said supporting surface of said table member while said pins are concealed.

4,955,591

# SINGLE PIECE WEDGE CLAMP

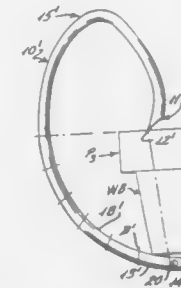
William Talley, Rte. 5, Box 567, Breau Bridge, La. 70517

Filed Sep. 18, 1989, Ser. No. 408,999

Int. Cl.<sup>5</sup> B25B 5/08

U.S. Cl. 269—217

9 Claims



1. A clamping device for clamping work pieces to a work support or adjacent work pieces comprising a first fixed jaw and an opposing fixed jaw, integrally formed handle means for connecting said first fixed jaw to said opposing fixed jaw, said handle means extending outwardly with respect to an axis taken between said first fixed and said opposing fixed jaws, said opposing fixed jaw having an outermost end and inner arcuately shaped clamping surface portion, said clamping surface portion of said opposing fixed jaw being defined by a continuous series of points extending from adjacent said outermost end toward said handle which points are continuously and progres-

sively in closer proximity to said first fixed jaw so that the straight line distance between said first fixed jaw and said clamping surface portion of said opposing fixed jaw is continuously decreased as said handle is pivoted about said first fixed jaw and toward a work piece being clamped between said first and said opposing fixed jaws, whereby, when said first fixed jaw is in contact with a first side of the work piece and said opposing fixed jaw is rotated relative to the opposite side of the work piece, said clamping surface portion of said opposing fixed jaw will be progressively brought closer to said first fixed jaw to thereby clamp the work piece therebetween.

4,955,592

# LIFTING AND POSITIONING DEVICE FOR CABINETS AND CONSTRUCTION PANELS

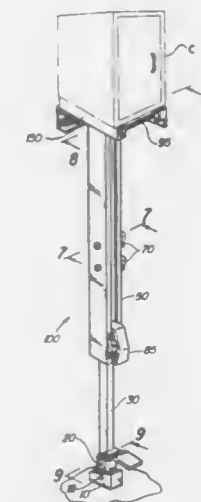
Richard Brennan, Sr., North Babylon, N.Y., assignor to Kim-Rick, Inc., Bayonne, N.J.

Filed Aug. 1, 1988, Ser. No. 226,851

Int. Cl.<sup>5</sup> E04G 21/14

U.S. Cl. 269—68

17 Claims



1. A panel support apparatus comprising:

- a longitudinal member having a workpiece holding end and an opposite end;
- means, between said workpiece holding end and said opposite end, for adjusting the length of said longitudinal member;
- means for locking the longitudinal member to a predetermined length;
- said locking means further comprising:
- a first cylindrical body having one end and an opposite end, said cylindrical body further having portions defining a first inner diameter adjacent to said one end, a second inner diameter extending from said opposite end, a shoulder portion between said first and second inner diameters and a flanged portion adjacent to said opposite end;
- a second cylindrical body adjacent to said first cylindrical body, said second cylindrical body having a first end, an opposite second end and portions defining a first threaded bore adjacent said first end;
- cam means rotatably mounted on said second cylindrical body;
- a fastener member threadably engaging said first threaded bore in said second cylindrical body and engaging said shoulder portion in said first cylindrical body to join said first and second bodies;
- whereby said flanged portion and said cam means frictionally engage in said longitudinal member when said cam means is rotated; and

means for folding said longitudinal member so that said workpiece holding end moves toward said opposite end.

4,955,593

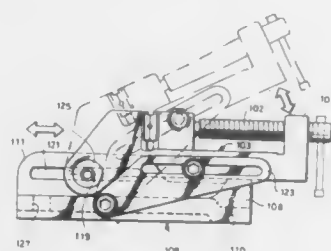
# POSITION AND ANGLE OF POLAR COORDINATE ADJUSTABLE VICE

Tai-Her Yang, 5-1 Talpin St., Si-Hu Town, Dzan-Hwa, Taiwan  
Filed Sep. 27, 1989, Ser. No. 413,297

Int. Cl.<sup>3</sup> B23Q 1/04

U.S. Cl. 269-71

4 Claims



1. An adjustable angle vise for clamping a workpiece, in combination, comprised of:

- a base frame having a pair of substantially parallel longitudinal trackways formed therein;
- an upper frame supported by the base frame, the upper frame including at least one pair of clamping faces, at least one of said clamping faces being movable toward the other for the selective clamping and unclamping of workpieces therebetween;
- a pair of sliding pivots being rotatably carried by the upper frame, such that the upper frame pivots about the sliding pivots for pivotal movement of the upper frame and the clamping faces carried thereby in a pivotal direction, each of the sliding pivots further being slidably received in respective trackways of the base frame, such that the upper frame is supported by the base frame, and further such that the upper frame and the clamping faces carried thereby are horizontally slidably movable for sliding movement of the upper frame and the clamping faces carried thereby in a first horizontal direction;
- a pair of lateral struts having respective first ends, the first ends of the struts being pivotally secured to the base frame at respective pivot points for pivotal movement of the struts about the pivot points relative to the base in the second plane in response to the pivotal movement of the upper frame including the clamping faces carried thereby, each of said lateral struts having a respective trackway formed therein;
- a pair of slides, each slide received through one of the respective trackways formed in the lateral struts and fixed to the upper frame, such that the slides freely slide in the trackways of the struts when the upper frame is pivoted, and further such that the slides aid in fixing and securing the upper frame in the pivoted position selected;
- the base frame further having a third longitudinal trackway formed therein;
- a foot plate for being received on and secured to the support;
- an upstanding rod having a vertical axis, said rod including a lower end and an opposite upper end having a rotatable lug carried thereon, the rod positioned with the lug being received in the third longitudinal trackway, so that the base frame and the upper frame are carried thereby, and further so that the base frame and the upper frame are horizontally slidably movable for further sliding movement of the upper frame and the clamping faces carried thereby in a second horizontal direction, the lower end of the rod being rotatably carried by the foot plate for rotational movement of the rod about the vertical axis, so that the base frame and the upper frame carried thereby are rotatably carried by the rod for rotational movement of

the upper frame including the first and second clamping faces carried thereby in a rotational direction.

4,955,594

# DROP FEED METERING HOPPER FOR MULTIPLE SECTION NEWSPAPERS AND THE LIKE

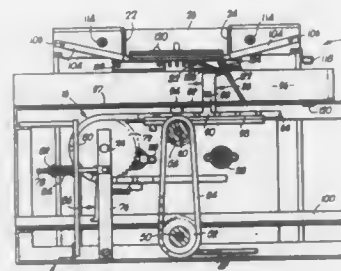
Charles N. Hannon, Olathe, Kans., assignor to Stepper, Inc., Olathe, Kans.

Filed Jun. 7, 1988, Ser. No. 203,332

Int. Cl.<sup>3</sup> B65H 39/02

U.S. Cl. 270-58

24 Claims



1. Newspaper section handling apparatus comprising: means defining an upright hopper for receiving at least one newspaper section in generally flat and substantially horizontal orientation, said hopper presenting a lower discharge outlet located in the bottom thereof, said at least one newspaper section presenting a lowermost face;
- means defining a conveyor for moving newspaper sections along a path of travel including a portion extending beneath said hopper;
- means defining a gate for said discharge outlet;
- means for shifting said gate means between a closed position closing said outlet and an open position opening said outlet;
- said gate means including means engageable with said lowermost face of said at least one newspaper section for supporting the latter in said hopper when said gate means is in said closed position;
- said gate means when in said open position enabling newspaper sections received in said hopper to drop through said outlet and onto said conveyor;
- means for selectively actuating said shifting means in order to shift said gate means toward said open position in timed relationship to the movement of said conveyor means;
- said means engageable with said lowermost face including a smooth upwardly facing surface slidably engageable with said lowermost face of said newspaper section during said shifting movement of said gate means; and
- a wiper element in sliding contact with said upwardly facing surface of said gate means during movement between said closed position and said open position for facilitating sliding motion of said upper surface relative to any newspaper sections supported thereon.

4,955,595

# DOCUMENT FEEDING APPARATUS

Minoru Kawano; Kazunobu Miura; Kazushige Murata, and Mitsuru Nagoshi, all of Tokyo, Japan, assignors to Konica Corporation, Tokyo, Japan

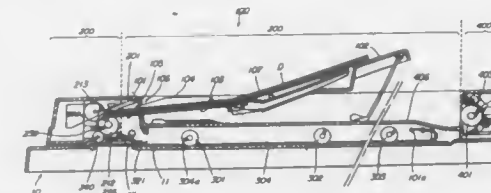
Filed Sep. 1, 1989, Ser. No. 401,788

Claims priority, application Japan, Sep. 7, 1988, 63-224009; Sep. 7, 1988, 63-117769

Int. Cl.<sup>3</sup> B65H 3/44

U.S. Cl. 271-9

2 Claims



1. In a document feeding apparatus having a document feed unit adapted to feed documents, which are placed on a document feed tray, sheet by sheet toward a document glass plate in an exposure unit, the improvement characterized in that an auxiliary document feed tray is turnably provided on a portion of the document setting surface of the document feed tray, the auxiliary document feed tray being housed in the document feed tray when stacked documents are to be fed automatically, and the auxiliary document feed tray being turned so as to project over the document feed tray when the documents are fed sheet by sheet by hand.

4,955,596

# METHOD AND APPARATUS FOR FEEDING AND STACKING ARTICLES

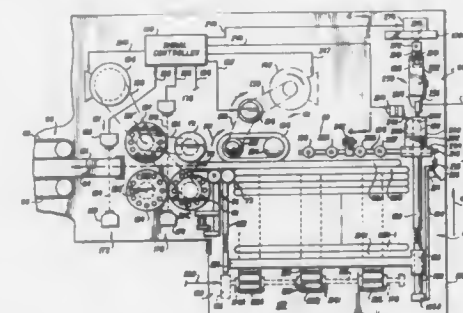
Mario Ricciardi, Glenview, Ill., assignor to Bell & Howell Philipsburg Company, Allentown, Pa.

Filed Jan. 18, 1989, Ser. No. 298,542

Int. Cl.<sup>3</sup> B65H 7/08

U.S. Cl. 271-110

27 Claims



1. Apparatus for feeding a plurality of flat articles on edge, said apparatus comprising: an input magazine wherein a plurality of flat articles are storable on edge in stacked configuration; singulation means for defining a gap through which a flat article must pass as said flat article is fed from said input magazine;
- feeding means for directing a leading flat article in said input magazine in a first direction toward said singulation means, said feeding means comprising means to contact a first flat side of said leading flat article and to impart to said flat article momentum toward said singulation means;
- transport means for transporting said plurality of on-edge flat articles in said input magazine in a second direction toward said feeding means, said second direction being essentially perpendicular to said first direction;
- feed assist means mounted on said input magazine for apply-

ing pressure against said first flat side of said leading flat article in said input magazine, said feed assist means being displaceable along said second direction;

feed interval detection means for detecting when an amount of time elapsed since a last flat article fed from said input magazine cleared said singulation means exceeds a predetermined time interval and for producing a signal indicative thereof; and,

displacement control means responsive to said signal of said detecting means for controlling the displacement of said feed assist means.

4,955,597

# COPYING APPARATUS HAVING A DEVICE FOR HOLDING SHEETS

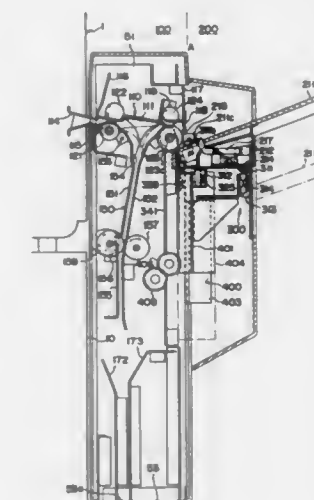
Akiyoshi Johdai; Keichi Kinoshita; Toshio Matsui, all of Toyokawa, and Hirokazu Yamada, Toyohashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan Division of Ser. No. 49,350, May 13, 1987, abandoned. This application Jan. 21, 1988, Ser. No. 211,124

Claims priority, application Japan, May 15, 1986, 61-112316; May 15, 1986, 61-73734[U]; May 15, 1986, 61-73732[U]; May 15, 1986, 61-73733[U]; Jan. 14, 1986, 61-138797

Int. Cl.<sup>3</sup> B65H 29/20

U.S. Cl. 271-215

3 Claims



1. A copying apparatus including image forming means for forming an image on a sheet, and sheet holding means for holding therein sheets each having an image formed thereon, said sheet holding means comprising: an inclined sheet holding plate, a sheet regulating member for regulating respective rear ends of sheets loaded on the sheet holding plate, means for lowering the sheet holding plate parallel with said regulating member in the vertical direction according to the volume of sheets loaded thereon, means for shifting the sheet holding plate on a horizontal plane each time a specified volume of sheets is loaded thereon, and means for moving the sheet regulating member in integral relation with a horizontal movement of the sheet holding plate.



4,955,598

## PAPER FEEDING APPARATUS

Ken Hiroshige, Kanagawa, and Sadayuki Ueha, No. 1793-635, Kanamori, Machida-shi, Tokyo, both of Japan, assignors to Fujl Xerox Co., Ltd. and Sadayuki Ueha, both of Tokyo, Japan

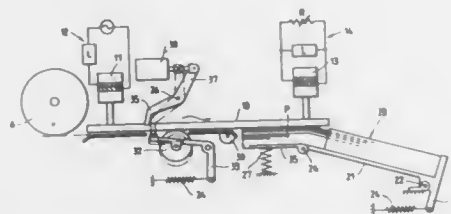
Filed Sep. 26, 1988, Ser. No. 248,856

Claims priority, application Japan, Sep. 28, 1987, 62-240779; Sep. 28, 1987, 62-240780

Int. Cl.<sup>5</sup> B65H 5/10

U.S. Cl. 271-267

18 Claims



## 1. A paper feeding apparatus comprising:

- a flexible vibrating body made of an elastic member and adapted to be excited with a resonant frequency to produce a progressive wave;
- a driving vibrator fixed to one end of said flexible vibrating body;
- a receiving vibrator fixed to the other end of said flexible vibrating body; and
- means for urging paper against said flexible vibrating body, whereby the paper is urged against said vibrating body so that the paper is conveyed when said flexible vibrating body is excited.

4,955,599

## EXERCISE CYCLE WITH GEAR DRIVE

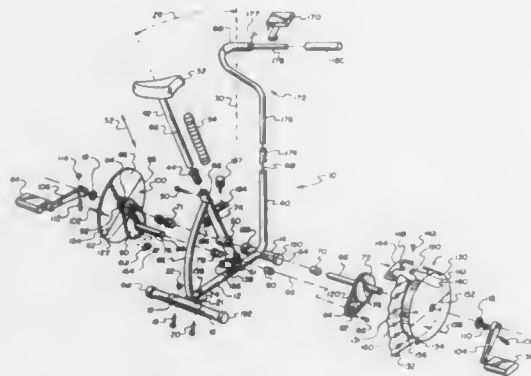
George Bersonnet, River Heights, and William T. Dalebout, Logan, both of Utah, assignors to Proform Fitness Products, Inc., Logan, Utah

Filed Jan. 19, 1989, Ser. No. 299,725

Int. Cl.<sup>5</sup> A63B 21/00

U.S. Cl. 272-73

5 Claims



## 5. An exercise cycle, comprising:

- a frame for positioning on a support surface, said frame including:
- a front support member,
- a rear support member,
- a base member extending between said front support member and said rear support member, and
- a central upright member extending upwardly from said base member at a preselected angle toward said rear support member;

seat means attached to said central upright member to support a user thereon;

a flywheel rotatably mounted to said central upright member above said base member to rotate about an axis transverse thereto, said flywheel being substantially circular in cross-section and having a rim at its perimeter configured and positioned to form a recess on the inside side of the flywheel proximate said central upright member;

drive means attached to said central upright member sized to be within said recess and drivingly interconnected to said flywheel to cause rotation thereof;

pedal means adapted to said drive means to operate the drive means to cause flywheel rotation, said pedal means having pedals positioned for operation by the feet of a user on the seat means; and

a cover attached to said frame and being substantially the same as said flywheel in cross-section and configured to extend substantially across said central upright member to define, in association with said flywheel, a thin cylinder with said central upright member extending therethrough.

4,955,600

## BICYCLE SUPPORT AND LOAD MECHANISM

Mark J. Hoffenberg, Laguna Niguel, and Robert A. Walpert, El Toro, both of Calif., assignors to Schwinn Bicycle Company, Chicago, Ill.

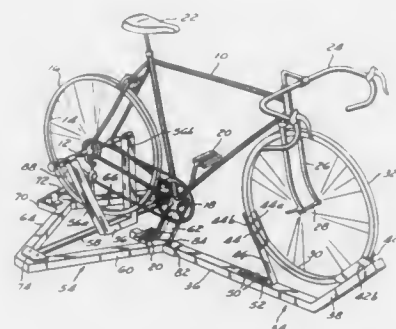
Continuation of Ser. No. 169,987, Mar. 17, 1988, Pat. No. 4,815,730. This application Nov. 29, 1988, Ser. No. 277,318

The portion of the term of this patent subsequent to Mar. 28, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A63B 21/00

U.S. Cl. 272-73

20 Claims



1. An apparatus for supporting a bicycle for accurately simulating the load and realistic feel of a bicycle during a bicycle race, said apparatus supporting the bicycle rear tire with respect to an electrically braked roller such that slippage does not occur between the rear wheel and the roller when the full weight of the rider is on the pedals to obtain maximum power, the bicycle having a frame to which are connected to seat, handlebars, pedals, and a rear tire rotatably mounted on a rear axle, the apparatus comprising:

- at least one roller having a rotational axis located in a plane substantially parallel to a substantially vertical plane containing the rear axle, the roller containing the rear tire when the bicycle is mounted on the apparatus;
- a rearwardly inclined pivoting support member pivoting about a pivot axis, the support member connecting to both ends of the rear axle so as to allow the rear axle to rotate about its longitudinal axis, while constraining the axle to pivot about the pivot axis during exercise use of said apparatus, the pivot axis being located forward of the roller, and on the opposite side of the vertical plane as the roller, where the forward direction is from the seat toward the handlebars; and
- force means cooperating with the front fork of the bicycle to exert a rearward force on the rear tire when the weight of

a rider shifts off the bicycle seat and toward the handlebars.

4,955,601

## ALL-OCCASION ROPE

Ming-Shean Ueng, P.O. Box 396, Phillipsburg, N.J. 08869

Filed Apr. 18, 1988, Ser. No. 182,835

Int. Cl.<sup>5</sup> A63B 5/20

U.S. Cl. 272-75

12 Claims



1. An all-occasion jumping rope comprising two handles, two freely rotatable holders inside said handles and retained in place by a retaining means, a flexible rope attached at each end of said rope to said holders by an attaching means, a flexible string freely slidable inside said rope also attached at its ends to said holders by an attaching means, and at least one of said holders comprising means to adjust the length of said flexible string held on said holders to thereby change the length of said flexible rope between said handles.

4,955,602

## METHOD AND APPARATUS FOR TRAINING IN THE MARTIAL ARTS

Gerard Rastelli, 3700 Smith St., Wantagh, N.Y. 11793

Filed Apr. 25, 1988, Ser. No. 185,612

Int. Cl.<sup>5</sup> A63B 69/34

U.S. Cl. 272-76

17 Claims

1. A martial arts training apparatus comprising:

screen means for display of martial arts drill commands;

said screen means having four block regions, each block region having means for rapidly and prominently displaying therein means for commanding the person to block;

an upper left block region disposed in an upper left portion of the screen means;

an upper right block region disposed in an upper right portion of the screen means;

a lower left block region disposed in a lower left portion of the screen means;

a lower right block region disposed in a lower right portion of the screen means;

an attack region, disposed upon the screen means intermediate said block regions, having means for rapidly and prominently displaying means for commanding the person to attack;

and means associated with the screen means for:

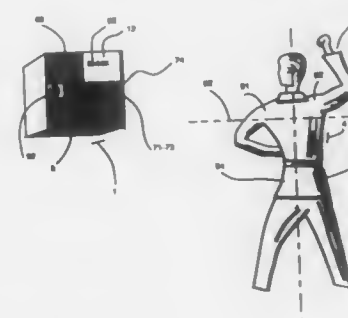
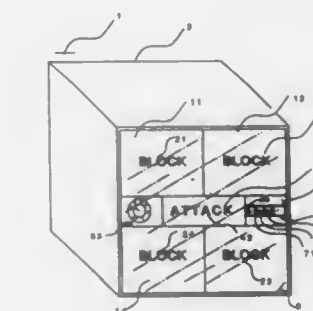
selecting a predetermined martial arts drill command sequence,

automatically displaying the means for commanding in each region for an interval,

automatically terminating said interval,

automatically displaying another means for commanding in sequence for another interval, and

automatically displaying and terminating the means for commanding without contact by the person.



4,955,603

## BARBELL WEIGHT LOCK

Hermann J. Becker, Theodor-Heuss-Allee 18, D-5500 Trier, Fed. Rep. of Germany

Filed May 5, 1989, Ser. No. 347,972

Claims priority, application Fed. Rep. of Germany, May 6, 1988, 3815524

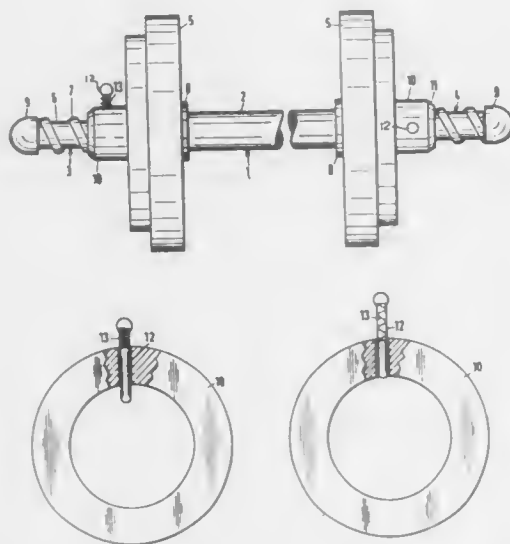
Int. Cl.<sup>5</sup> A63B 21/075

U.S. Cl. 272-123

16 Claims

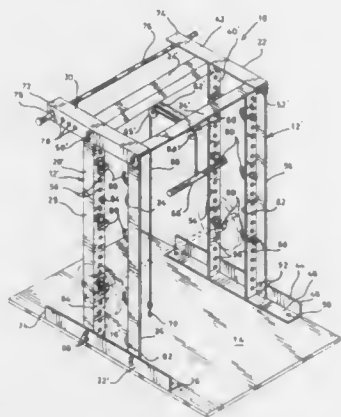
1. In a barbell having an elongated bar component including a central handle portion and opposite end portions, weights slidable onto the end portions of the bar component, and stops disposed, respectively, between the end portions of the bar component and the central handle portion for limiting inward sliding movement of the weights along the bar component end portions, each end portion of the bar component having an external screw thread, and locking sleeves fittable over and adjustable longitudinally along the externally threaded end portions of the bar component, the improvement comprising at least one of the locking sleeves having a locking pin including an inner portion slidable transversely of its bar component end portion between a first position fitted in the groove of the screw thread for tightening and loosening rotation of said sleeve and a second position removed from said groove permitting longitudinal sliding of said sleeve along its bar component end portion without rotation toward and away from the adja-

cent stop, said locking pin having an outer portion accessible from the exterior of the sleeve for selective manual movement



of the locking pin inner portion between its first and second positions.

**4,955,604**  
**WEIGHT LIFTING RACK**  
David C. Pogue, 140 Lake Hills Dr., Oak Ridge, Tenn. 37830  
Continuation-in-part of Ser. No. 249,340, Sep. 26, 1988,  
abandoned. This application Aug. 11, 1989, Ser. No. 392,780  
Int. Cl.<sup>5</sup> A63B 21/072  
U.S. Cl. 272—123 4 Claims



1. A demountable multi-function weight lifting rack for supporting barbell weights for performing weight lifting exercises and for facilitating the safe performance of said weight lifting exercises, said rack comprising:

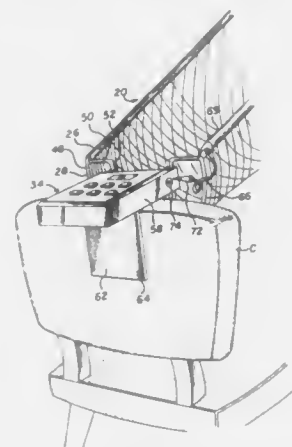
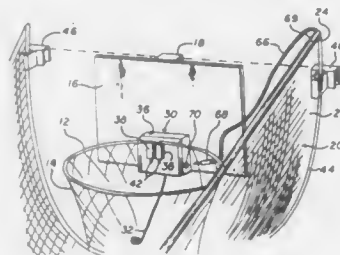
- a portable base defining a platform for performing said weight lifting exercises, said base further defining opposite side edges and opposite end portions;
- a frame releasably mounted on, and supported by, said base, said frame including first and second selectively spaced side portions, each said side portion defining a lower end portion releasably secured to said base proximate said opposite side edges, and an upper end portion releasably secured to first and second cross lintels joining said first and second side portions, each said side portion further

including first and second selectively spaced vertical support members, each said support member defining upper and lower end portions and being provided with a plurality of selectively spaced holes disposed along at least a portion of the length of said support member, said first and second support members of each of said side portions of said frame releasably joined at said upper end portions with a header, each of said headers having a cantilevered end portion extending in a common direction from said side portions of said frame, said cantilevered end portions provided with at least one transverse hole;

a pull-up bar having opposite end portions, said end portions engaged in said holes in said cantilevered end portions of said headers; and

at least one upwardly opening weight support hook operatively associated with each side portion of said frame for releasably engaging and supporting said barbell weights, each said weight support hook being provided with a threaded bolt member for passing through said holes of said support members and a nut member threadably engaged with said bolt member for securing said hook to one said support member of said frame whereby at least one said hook is disposed between said first and second support members of each said side portion of said frame.

**4,955,605**  
**HOME BASKETBALL APPARATUS**  
Adolph E. Goldfarb, 1432 S. Eastwind Cir., Westlake Village, Calif. 91361  
Filed Feb. 9, 1989, Ser. No. 308,648  
Int. Cl.<sup>5</sup> A63B 63/08  
U.S. Cl. 273—15 A 16 Claims



1. An inexpensive basketball play apparatus for use in the home in combination with a door and a household article such as a chair, said apparatus comprising:

- (a) a basketball hoop;
- (b) support means connected to the hoop and proportioned

and arranged to releasably connect to the top of a door to support the hoop adjacent to the top of the door; and  
(c) a return net assembly including:

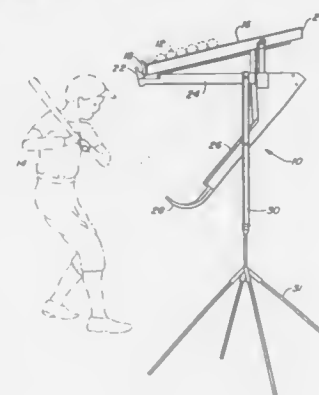
- i) an elongated net having a width defined by opposed side edges for catching a basketball after it is shot at the basket and returning it to the shooter,
- ii) a first net connector means attached to one end of the net and proportioned and arranged to releasably connect to the top of the door supporting the hoop to position that one end of the net so as to at least partially enclose the area around the basketball hoop, and
- iii) a second net connector means attached to the other end of the net and proportioned and arranged to releasably connect to a household article such as the top of a chairback to position that other end of the net spaced below and away from the basketball hoop,

said first net connector means comprising means for supporting the upper end of the return net at a plurality of points along its width so as to form that end in a generally trough-like configuration that extends above at both sides and also extends below the basketball hoop,

said second net connector means comprising means for holding the lower end of the return net at a plurality of points along its width so as to form that end in a generally trough-like configuration whereby the assembled return net provides a generally outwardly and downwardly extending channel for the basketball,

said second net connector means being constructed and arranged to be releasably clipped to the household article such as the top of a chairback, said second net connector means comprising a pair of opposed sections adapted to be positioned at opposite sides of the household article and to press inwardly against the household article to maintain the lower end of the return net in position.

**4,955,606**  
**BALL PITCHING DEVICE**  
Thomas Leps, 34 Wolfe Grade, Kentfield, Calif. 94904  
Filed Dec. 22, 1989, Ser. No. 455,999  
Int. Cl.<sup>5</sup> A63B 69/00  
U.S. Cl. 273—26 D 8 Claims

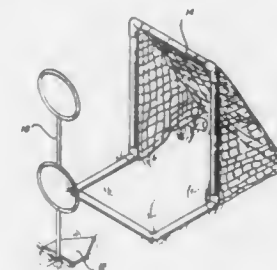


1. A ball pitching device comprising:

- a support stand structure;
- a ball capture cavity portion attached to said support stand structure, said ball capture cavity portion bearing a lip member, said lip member conditioned to capture and temporarily stabilize a ball placed in said ball capture cavity portion;
- an initial ramp portion connected to said ball capture cavity portion, said initial ramp portion extending downward and rearward away from said ball capture cavity portion;
- a final ramp portion connected to said initial ramp portion, said final ramp portion extending downward and forward

from said initial ramp portion in the longitudinal direction of said ball capture cavity; and  
an upwardly-curved launch ramp portion connected to said final ramp portion, said launch ramp portion extending generally beneath said ball capture cavity portion.

**4,955,607**  
**BASEBALL SPOT PITCHING PRACTICING DEVICE**  
Franklin Maye, 3143 Omega Ave., Simi Valley, Calif. 93063  
Filed Jul. 28, 1989, Ser. No. 386,271  
Int. Cl.<sup>5</sup> A63B 63/00  
U.S. Cl. 273—26 A 4 Claims



1. A baseball training device for practicing baseball pitching, said device comprising: a supporting base; a first elongated rod attached to and extending upwardly from said base; a first loop member attached to the upper end of said first elongated rod; a second elongated rod attached to and extending upwardly from said first loop member in axial alignment with said first elongated rod; and a second loop member attached to the upper end of said second elongated rod and facing in the same direction as said first loop member; said first elongated rod having a predetermined length so as to place said first loop at the lower end of a regulating baseball strike zone, and said second elongated rod having a predetermined length so as to place said second loop member at the upper end of said regulating baseball strike zone.

**4,955,608**  
**ATHLETIC MOVEMENT TRAINER**  
Dougherty Patrick F., and Chris A. Ashby, both of 2615 N. Causeway Blvd., Mandeville, La. 70448  
Filed Feb. 13, 1989, Ser. No. 310,299  
Int. Cl.<sup>5</sup> A63B 69/00  
U.S. Cl. 273—29 A 7 Claims



1. A device for aiding the training of an athlete comprising:  
a. first and second straps for placement about the ankles of an athlete;



greater than the transverse dimension of the elongated member for allowing unrestricted passage of the elongated member through the opening;  
d. means for positioning the receiving means at an athlete's waist near the center of an athlete's back; and  
the elongated member is received by the opening one end is connected to the first strap and the other end is connected to the second strap when the device is worn by an athlete.

**4,955,609**  
**GOLF CLUB WITH GREEN SURFACE REPAIR DEVICE**  
Albert D. Kassen, 4972 Barnstable La., Cincinnati, Ohio 45244  
Filed Sep. 1, 1989, Ser. No. 401,836  
Int. Cl.<sup>5</sup> A63B 53/00  
U.S. Cl. 273-162 F 8 Claims



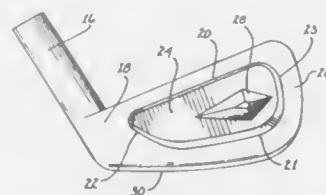
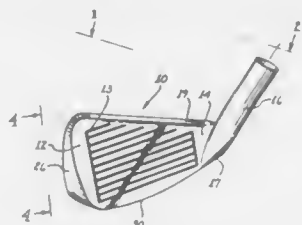
6. A golf club grip for converting a golf club having a shaft and ball striking head into a dual function implement including a golf club and a green surface repair tool, said grip comprising:

- an elongated grip tube having an opening therein for receiving the shaft of a golf club;
- a housing formed on said grip outside said opening;
- a selectively extensible green repair member disposed in said housing;
- means for extending and retracting said tool member with respect to said housing, said tool remaining secured to said grip when extended for repairing a green surface.

**4,955,610**  
**DRIVING IRON GOLF CLUB HEAD**  
William W. Creighton, 1845 S. Las Palmas Cir., Mesa, Ariz. 85202, and George T. Venetis, 508 E. Marlette Ave., Phoenix, Ariz. 85012  
Filed Feb. 27, 1989, Ser. No. 316,082  
Int. Cl.<sup>5</sup> A63B 53/04

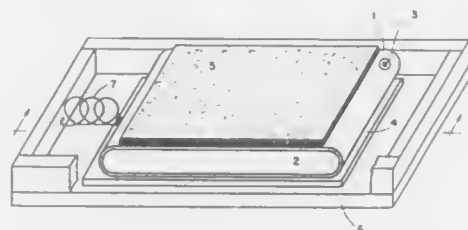
- U.S. Cl. 273-169 8 Claims
1. An iron golf club comprising:
    - a hosel having a shank end portion, said shank end portion having a front and back surface; and
    - a club head having a sole, a top, a toe, a heel, a rear fall, and a striking face, said striking face having a leading edge, and a trailing edge, said heel integrally formed with said shank end portion, said striking face having a configuration that contacts said back surface of said shank end

portion, said front surface of said shank end portion having a tapered portion, said tapered portion extending from



said leading edge of said striking face upward and away from said striking face for a predetermined distance.

**4,955,611**  
**GOLF PRACTICE DEVICE**  
Brynum W. Moller, P.O. Box 688, Kerrville, Tex. 78029  
Filed Oct. 21, 1988, Ser. No. 261,238  
Int. Cl.<sup>5</sup> A63B 69/36  
U.S. Cl. 273-195 A 7 Claims



1. A golf practice device comprising a fully enclosed, air filled, flexible cushion with the top and bottom parts being relatively flat and parallel, with the top surface of the top part including a mat of upstanding, grass-simulating bristles, and being sufficiently durable to withstand being struck by a golf club, with two pairs of relatively parallel sides, and with a rigid base piece to which the bottom surface of said cushion is attached the combination of said mat, cushion and rigid base defining an integral unit adapted to fit on a sub base which is shaped to receive said unit and allow it to move forward thereon as a unit when the mat is struck by a golf club.

**4,955,612**  
**GOLF SWING TRAINING AID**  
William K. Tai, E. 14725 Terra Verde Ct., Veradale, Wash. 99037  
Filed Dec. 29, 1989, Ser. No. 458,780  
Int. Cl.<sup>5</sup> A63B 69/36

- U.S. Cl. 273-200 B 11 Claims
9. A golf-swing practicing apparatus comprising:
    - a support base;
    - an elongated molded rigid radial support arm mounted to the support base for rotation relative thereto, the support arm having opposed longitudinal ends and respective external longitudinal end surfaces;

the support arm including a central rigid reinforcing rod embedded therein and extending in a longitudinal direction along a substantial longitudinal length of the arm; one of the opposing ends of the support arm comprising an integrally formed solid mass golf-ball sized object for hitting by a golfer; and



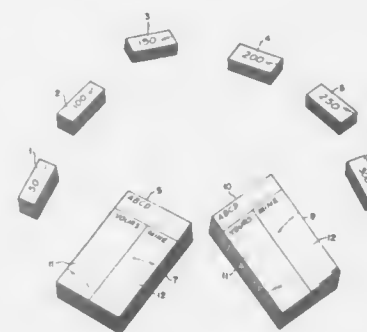
the central rigid reinforcing rod including a portion which extends longitudinally into the solid mass golf-ball sized object and to the one support arm longitudinal end to be flush with the external longitudinal end surface at the one longitudinal end, the portion including a section within the golf-ball sized object which is bent to extend transversally away from the longitudinal direction.

**4,955,613**  
**POLYBUTADIENE GOLF BALL PRODUCT**  
Paul M. Gendreau, Swansea, and Lauro C. Cadorniga, S. Dartmouth, both of Mass., assignors to Acushnet Company, New Bedford, Mass.  
Filed Mar. 6, 1989, Ser. No. 319,640  
Int. Cl.<sup>5</sup> A63B 37/00, 37/06, 37/12

- U.S. Cl. 273-218 10 Claims
1. A golf ball product comprising a mix of two polybutadienes, said mix comprising about 85 to about 15 phr of a nickel- or cobalt-catalyzed polybutadiene having a cis-1,4 content above about 40% and a Mooney viscosity of no greater than about 50 and about 15 to about 85 phr of a lanthanide-catalyzed polybutadiene having a cis-1,4 content above about 40% and a Mooney viscosity of no greater than about 50; a metal salt of an unsaturated carboxylic acid; and a free radical initiator.

**4,955,614**  
**WORD FORMING BY ELIMINATION GAME**  
Pualette Buda, 22 Sweet Briar La., Holmdel, N.J. 07733  
Filed Jan. 26, 1989, Ser. No. 302,182  
Int. Cl.<sup>5</sup> A63F 9/16

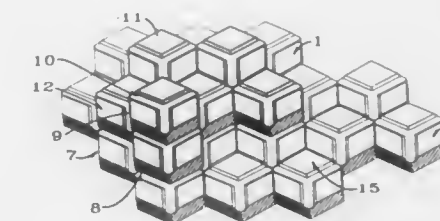
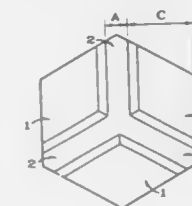
U.S. Cl. 273-240 1 Claim



1. A word-forming game played by a plurality of players comprising a plurality of pads, each of said pads having a plurality of sheets, each of said sheets containing the letters of the alphabet located thereon and being divided into equal and separate areas for notes and scoring of players, and a plurality of stacks of cards, each card comprising two sides, one of said sides containing at least three predetermined words thereon, each of said words comprising at least five letters, none of said words containing double letters, and located on the other side

of said cards point values set in increasing amounts according to the degree of difficulty associated with said words.

**4,955,615**  
**HEXAGONAL GAME TILES**  
Brian D. Eck, 10901 N. Florida, Oklahoma City, Okla. 73120, assignor to Brian Daniel Eck, Oklahoma City, Okla.  
Filed Aug. 2, 1989, Ser. No. 388,678  
Int. Cl.<sup>5</sup> A63F 3/00; A63H 33/08  
U.S. Cl. 273-241 2 Claims

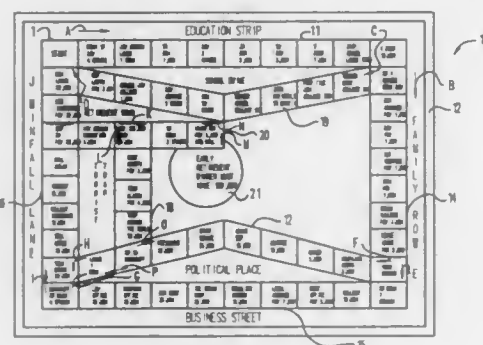


1. A game or amusement device consisting of a set of hexagonal playing pieces, which when arrayed side to side into a horizontal honeycomb patterned playing field, form the foundation for successive levels of interlocking play, said individual hexagonal pieces each have male protrusions on one surface, which match the female indentions on the opposite side of the piece, so that each tile interlocks with every other piece, said individual hexagonal pieces each have three male rhombic protrusions projecting up from three opposing corners on one surface, so that when the rhombic shapes of three adjoining pieces are together, they complete a single hexagonal male protrusion matching the hexagonal female indentation on the underside of every piece; thus a fourth piece may rest in an interlocking fashion equally atop the three pieces beneath it.

**4,955,616**  
**BOARD GAME**  
David E. Ingalls, 113 Tara Court Apt. D, Shepherd, Mich. 48883  
Filed Sep. 25, 1989, Ser. No. 411,693  
Int. Cl.<sup>5</sup> A63F 3/00

- U.S. Cl. 273-249 3 Claims
1. A method of playing a board game, comprising the steps of:
    - providing:
      - a rectangular game board, said game board having indicia designating a plurality of interconnected movement paths, each of said movement paths formed by a plurality of interconnected sequential spaces;
      - a first movement path extending along a first side edge of said game board and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with attainment of education;
      - a second movement path extending along a second side edge of said game board and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with family life;

- a third movement path extending along a third side edge of said game board and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with various business activities;
- a fourth movement path extending along a fourth side edge of said game board and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with various financial events;
- a start space at an intersection of said first and fourth movement path;
- a fifth movement path extending between said second and fourth movement paths and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with student summer activities;
- a sixth movement path extending between said second and fourth movement paths and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with political activities;
- a central finish zone on said game board;
- a seventh movement path extending between said fourth movement path and said finish zone and formed by a plurality of spaces each bearing indicia designating events and financial transactions associated with various retirement activities;
- an eighth movement path extending between said sixth and seventh movement paths and formed by a plurality of sequential spaces each bearing indicia designating events



- and financial transactions associated with various vacation activities;
- one numbered die;
- a plurality of game markers for movement around said movement paths;
- a plurality of score sheets, each of said score sheets having indicia for tabulating educational, family, political, business and financial activities of a game player associated with movement of a game marker around said movement paths;
- selecting an initial player from a plurality of players;
- said initial player rolling said die and moving a respective one of said game markers along said first movement path toward said second movement path in accordance with a number of spaces indicated by said die;
- play continuing in sequential fashion, with each player recording events and financial transactions on a respective score sheet in accordance with indicia designated on movement path spaces;
- each player's game marker restricted to movement on said first and fifth movement paths until a predetermined educational event has been achieved;
- each player's game marker allowed to move along said second movement path upon achieving said predetermined educational event;
- each player optionally moving a respective game marker along said third or said sixth movement paths upon reaching an end of said second movement path;
- each player's game marker restricted from movement on

- said fourth movement path until a predetermined financial total has been achieved;
- each player's game marker restricted for movement to said finish zone until a predetermined financial total has been achieved; and
- continuing play in sequential fashion until a player achieves said predetermined financial total and moves a respective game marker to said finish zone as indicated by an exact movement total on said die.

4,955,617

## KIT FOR BOARD GAMES

Stanley I. Mason, Jr., 61 River Rd., Weston, Conn. 06883; Elizabeth L. Fuller, 72 River Rd., both of Weston, Conn. 06883, and Roy E. Doty, 35 Grey Hollow Rd., Norwalk, Conn. 06850

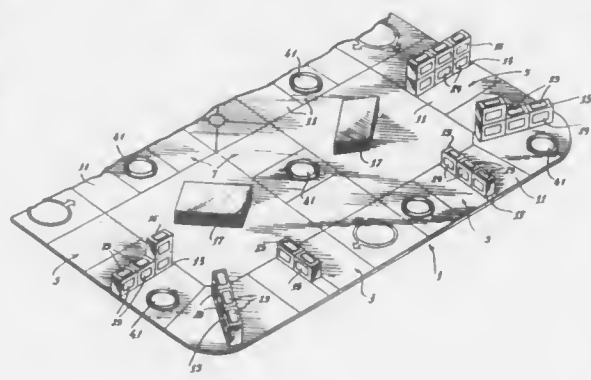
Continuation of Ser. No. 282,747, Dec. 12, 1988, abandoned.

This application Sep. 15, 1989, Ser. No. 407,556

Int. Cl.<sup>5</sup> A63F 3/00

U.S. Cl. 273—256

5 Claims



1. A board game kit including movable playing pieces, movable barriers, a game board, said board having a circumferential track thereon, said track including pluralities of sequential spaces to receive said movable pieces, as a player moves them around said track, said sequential spaces running the width of said track, and barrier spaces running across the width of said tracks to receive said movable barriers, said barrier spaces being positioned between pairs of said pluralities of sequential spaces, said board including at least one diametrical track interconnecting opposite sides of said circumferential tracks, said diametrical track being formed of additional said sequential spaces to receive said movable pieces, and said movable barriers being shaped such that said barriers may be secured to one another end to end or stacked one above another, whereby said one or more of said movable barriers can be positioned in a said barrier space thereby providing deterrents to moving said movable pieces in said circumferential track while playing said game.

4,955,618

## MOUNTAINEERING STRATEGY BOARD GAME

Joseph R. Growall, 518 W. Columbia St., Colorado Springs, Colo. 80907

Filed Jun. 19, 1989, Ser. No. 368,423

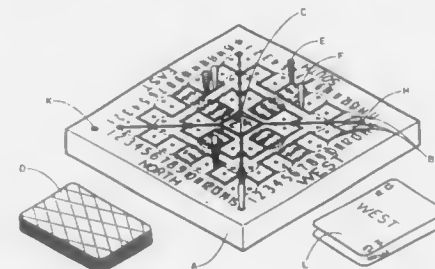
Int. Cl.<sup>5</sup> A63F 3/00

U.S. Cl. 273—258

10 Claims

1. A board game apparatus comprising:
  - a. a game board which bears upon the face thereof, a multiplicity of spaces arranged in a grid pattern with indicia

assigned to each column and row of the grid to form a coordinate system, boundary lines which divide said grid into labeled sections, each labeled section containing various segments of said columns and rows of grid spaces, said segments comprising section rows of grid spaces which are numbered so that the section rows within each section may be distinguished from one another, a route of movement and alternates thereof for each player to follow from spaces on the grid designated as start locations to a space on the grid designated as a finish location, wherein said route of movement and alternates thereof incorporate spaces which are located on the grid and which can be identified using said coordinate system, and a pyramidal extraplanar rotating device having the same number of sides adjoining its apex as the number of sections into



- which the grid has been divided, wherein each side of said device is numbered for regulating token movement in the section of the grid to which that particular side of said device corresponds,
- b. a deck of playing cards which correlates to said coordinate indicia and said section labels on said game board grid,
- c. a plurality of first playing tokens, each token representing a player's position as the player advances along said route of movement and alternates thereof,
- d. a plurality of second playing tokens, each second token marking the space on a player's route of movement to which said first playing token may return as the result of a setback imposed on said first playing token by an opponent.

4,955,619

## CARD GAME APPARATUS AND METHOD

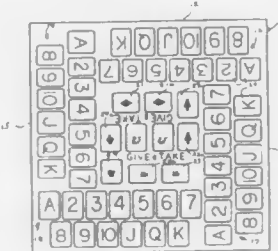
Robert R. Christman, 1135 N. Frederic St., Burbank, Calif. 91505

Filed Aug. 7, 1989, Ser. No. 390,973

Int. Cl.<sup>5</sup> A63F 3/06

U.S. Cl. 273—273

4 Claims



1. A method of playing a card game including a plurality of players comprising the steps of,

- (a) providing a game board and forming four player stations on said game board, and
  - (b) providing four decks of playing cards wherein each of said four decks each includes an equal first predetermined number of playing cards, and
  - (c) providing a fifth directional card deck of playing cards of a second predetermined number of playing cards contained wherein said second predetermined number is formed less than said first predetermined number, and
  - (d) directing each of said players to arrange said playing cards upon available spaces formed on said game board, and
- wherein (b) further includes the step of obtaining said four decks of playing cards to each included cards of the suits including diamonds, hearts, clubs, and spades, and further including the step of segregating each of said suits to form each of said decks of a single suit different from a subsequent deck of said four decks of playing cards, and additionally including the steps of adding four wild cards to each of said decks.

4,955,620

## AERIAL GAME PROJECTILE

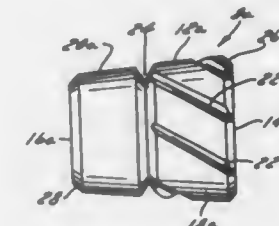
Thomas E. Reinke, 3975 North 71st St., Milwaukee, Wis. 53216

Filed Jul. 24, 1989, Ser. No. 384,506

Int. Cl.<sup>5</sup> A63B 65/00

U.S. Cl. 273—428

8 Claims



1. An aerial game projectile useful in batting and throwing games comprising a generally frusto conical body having closed ends and a side wall being formed externally with a plurality of flights extending generally longitudinally of the projectile on a portion thereof, said side wall defining a head portion and a base portion, said base portion having a diameter which is larger than said head portion, said flights being formed in said base portion only, and said side wall being provided with an annular groove separating said base portion from said head portion.

4,955,621  
GASKET

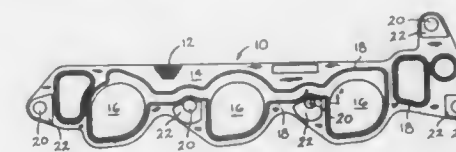
Robert R. Skrycki, Grosse Ile, Mich., assignor to JPI Transportation Products, Inc., Ann Arbor, Mich.

Filed Sep. 22, 1989, Ser. No. 410,877

Int. Cl.<sup>5</sup> F16J 15/12

U.S. Cl. 277—166

4 Claims



1. A gasket for sealing a joint between adjacent surfaces of mating mechanical components in order to prevent fluid leaks therebetween comprising:
  - a substantially flat planar gasket core having attachment bolt openings extending therethrough, and having fluid pas-



sage openings formed therein, said openings being arranged in a predetermined spaced relation, at least one seal member of predetermined width and being formed of a compressible material on said core arranged so as to circumscribe at least one of said fluid openings, said predetermined width being sufficiently narrow to enable displacement of the seal material in directions substantially parallel to the plane of said core, said seal member also being of a predetermined height in a direction perpendicular to the plane of said core;

- a compression limiter formed of the same compressible material as said seal member and being disposed upon said core in close proximity to said bolt openings but spaced from said seal member, said limiter being in a plane substantially parallel to the plane of said core and being of an area sufficiently great to be substantially incompressible in a direction parallel to the height of said seal member, the height of said limiter being less than said height of said seal member so that when said surfaces are moved toward each other said seal member will be compressed until said limiter is engaged between said surfaces.

4,955,622

## STOP APPARATUS FOR USE IN COLLETS

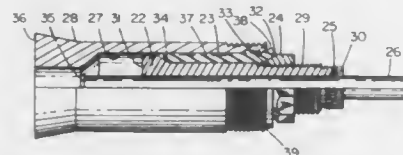
Donald M. Peterson, Bellevue, Wash., assignor to James A. Haggerty and Thomas E. Hawkes

Continuation-in-part of Ser. No. 180,183, Apr. 11, 1988. This application Oct. 11, 1988, Ser. No. 255,860

Int. Cl.<sup>5</sup> B23B 31/20

U.S. Cl. 279—15

1 Claim



1. The combination of stop apparatus for use in a collet and said collet, said collet having a collet bore, said apparatus being insertable a distance into said collet bore and comprising:

- a body having a body bore, an outer surface of revolution having an axis, a first end and a second end, said outer surface comprising in sequence a flange at said first end, a cylindrical portion, a threaded portion and a knurled portion, said flange having a first conical surface facing said cylindrical portion;
- a resilient sleeve surrounding said cylindrical portion and having an outside diameter, said sleeve being slotted longitudinally whereby said diameter may be varied, said sleeve having a sleeve bore, a first sleeve end and a second sleeve end, conical chamfers in said sleeve bore at said first and second sleeve ends and a radial flange at one of said sleeve ends;

a rod slidable in said body bore and having a stop face means for preventing said rod from sliding in said body bore, said apparatus further comprising a nut threadable on said threaded portion and having a second conical surface and being threaded onto said threaded portion with said second conical surface facing said cylindrical surface whereby when said nut is turned on said body such that said second conical surface approaches said first conical surface, said conical surfaces and said chamfers cooperate to cause said diameter to increase and vice versa, said knurled portion providing means for preventing said body from turning with said nut,

whereby with said sleeve installed on said body with said radial flange at said one of said sleeve ends next to said nut and said apparatus inserted into said collet bore, said distance is limited by contact between said radial flange and said collet, and further, whereby when said nut is turned such that said second conical surface approaches

said first conical surface, said diameter increases such that said sleeve engages said collet bore and holds said apparatus in place in said collet, and further whereby when said rod is slidably adjusted in said body bore and then prevented from sliding by said means for preventing it from sliding, said stop face is positioned with respect to said collet,

the improvements comprising, in combination: (1) location of said nut outside of said collet bore by the limitation of said distance by contact between said radial flange and said collet, said location of said nut rendering it readily accessible for adjustment for installation and removal of said apparatus and (2) location of said nut and said knurled portion outside of said collet, whereby both said body and said nut are accessible for adjustment of said apparatus.

4,955,623

## SELF-TIGHTENING AND LOCKABLE HAMMER-DRILL CHUCK

Günter H. Röhm, Heinrich-Röhm-Strasse 50, D-7927 Sontheim, Fed. Rep. of Germany

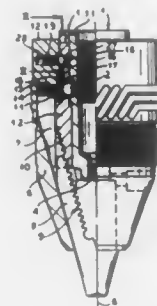
Filed Oct. 31, 1989, Ser. No. 429,843

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1989, 3914311

Int. Cl.<sup>5</sup> B23B 31/10

U.S. Cl. 279—60

11 Claims



1. A drill chuck for rotation about an axis of a drill spindle to rotate a drill bit about and reciprocate it along the axis, the chuck comprising:

- a chuck body securable to the spindle;
- a sleeve rotatable but axially nondisplaceable on the chuck body;
- a plurality of jaws engaged between the sleeve and chuck body;

means including angled guides and a screwthread formed on the body, sleeve, and jaws for radial displacement of the jaws toward each other on relative rotation of the sleeve and chuck body in a tightening direction and for radial displacement of the jaws away from one another on opposite relative rotation in a loosening direction;

- a locking-ring body axially displaceable between a rear unlocked position and a front locking position on the chuck body, the sleeve and locking-ring body having complementary axially open and projecting formations fittable within each other to inhibit substantial relative angular movement of the ring body and sleeve about the axis only in the front locking position, the formations being out of engagement with one another in the rear unlocked position; and

- a projection fixed in and extending radially from one of the bodies toward the other body and having predetermined angular and axial dimensions, the other body being formed with

an angularly extending slot having angularly opposed and spaced end surfaces spaced apart angularly by a distance greater than the angular dimension of the projec-

tion and axially opposed and spaced side surfaces spaced axially by a distance generally equal to the axial dimension of the projection, whereby when the projection is engaged in the slot same limits relative angular displacement of the bodies, and

an axially backwardly extending cutout opening axially forward into the slot adjacent one of the end surfaces thereof at a mouth having an angular dimension generally equal to the axial dimension of the projection, whereby the cutout only allows axial travel of the locking ring into its locked position when the projection is aligned axially with the cutout at the one end surface of the slot.

4,955,624

## WHEELCHAIR WITH HEIGHT ADJUSTABLE SEAT

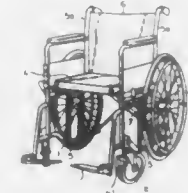
Guo Jeun-Long, 7th Fl. No. 118-4 Sec. 1 San-Minn Road, Taichung, Taiwan

Filed Apr. 26, 1989, Ser. No. 344,238

Int. Cl.<sup>5</sup> B62B 7/06; B62M 1/14

U.S. Cl. 280—42

2 Claims



1. A wheelchair with height-adjustable seat, said wheelchair comprising:

first and second side frames each having front and back ends and each comprising a vertically disposed rigid frame which includes a back-supporting frame element extending vertically from said back end of said frame, and a pair of spaced, vertically oriented guide rods positioned between the front and back ends of said frames, each having therein an elongated guide slot provided with a plurality of recesses extending laterally from and spaced along an edge thereof;

a foldable back element interconnecting said back-supporting frame elements;

a pair of crossed telescoping members interconnecting said side frames at the back end thereof for supporting said side frames in vertically disposed parallel relationship for movement toward and away from one another between a collapsed position and an open position;

first and second L-shaped seat support members, and securing means for releasably connecting said first and second seat support members between the spaced guide rods of said first and said second side frames, respectively, at an adjusted height selectable in increments corresponding to the spacing between said laterally extending recesses; and

a rectangular seat disposed forwardly of said back element and pivotally connected at one side to one of said seat support members and adapted to be supported horizontally and to be releasably secured at the opposite side to the other of said seat support members or, alternatively, to be moved to a vertically extending position for allowing movement of said side frames toward one another to said collapsed position.

4,955,625

## SWIVEL WHEEL WHEELBARROW

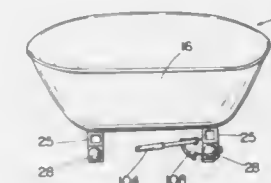
George W. Herndon, 806 N. Dawson St., Thomasville, Ga. 31792

Continuation-in-part of Ser. No. 185,486, Apr. 25, 1988, Pat. No. 4,854,601. This application Jan. 12, 1989, Ser. No. 364,891

Int. Cl.<sup>5</sup> B62B 1/18

U.S. Cl. 280—47.31

29 Claims



1. Support structure for a single-wheeled portable vehicle, comprising:

spaced beams;

a wheel fork having spaced legs defining a longitudinal axis and a post projecting from the legs, the post defining a longitudinal axis about which the wheel fork can pivot, the post including a lower portion adjacent the legs and an upper portion removed from the legs;

a lower yoke support rigidly connected to, and extending laterally between, the beams, the lower yoke support being connected to the lower portion of the post;

an upper yoke support spaced from the lower yoke support and connected to the upper portion of the post and the beams; and

means for selectively preventing the wheel fork from pivoting about the longitudinal axis of the post, said means including a first member connected to the lower yoke and a second member connected to the wheel fork, the first member being movable laterally toward and away from the wheel fork while being maintained in a stationary axial position, and the second member being maintained rigidly connected to the wheel fork for movement therewith, the first member being movable from a first position where the first and second members are engaged and pivoting of the wheel fork is prevented to a second position where the first and second members are disengaged and pivoting of the wheel fork is permitted.

4,955,626

## SKATEBOARDS

Eric O. M. Smith, James Fisher, and Simon King, all of P.O. Box 650228, Benmore, 2010, South Africa

Filed Jan. 25, 1989, Ser. No. 301,494

Claims priority, application South Africa, Jan. 28, 1988, 88/0576

Int. Cl.<sup>5</sup> A63C 17/01

U.S. Cl. 280—87.042

15 Claims



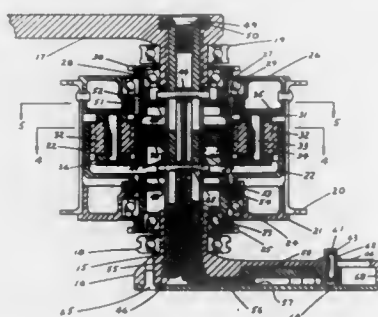
1. A skateboard comprising two footboards, each of the footboards including a foot platform and wheel-set which carries two wheels in axial alignment fixed to the underside of the platform, a spacer element for holding the footboards in a spaced relationship and a pivot arrangement having a vertical pivot axis connecting each footboard to the spacer element to enable both footboards to pivot about said vertical pivot axis

relatively to the spacer element thereby providing movement of said wheels which corresponds to the movement of said footboards.

**4,955,627**  
**FIVE SPEED CHAINLESS DRIVE FOR HEAVILY LOADED PEDAL POWERED TRICYCLES**  
Dirck T. Hartmann, 4121 Morning Star Dr., Huntington Beach, Calif. 92648

Filed Jun. 9, 1989, Ser. No. 363,874  
Int. Cl. B62M 1/08; F16H 3/44  
U.S. Cl. 280—236

6 Claims

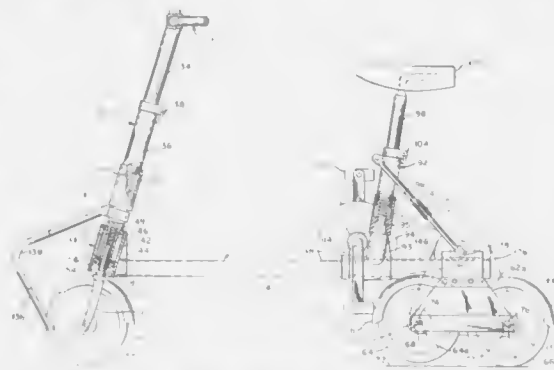


1. In a pedal powered tricycle including a frame, a driving wheel with a central hub, a pedal drive shaft on the axis of said wheel and mounted in bearings in said frame for concentric rotation with said hub, an improved five speed chainless drive located within said hub for concentric rotation therewith and comprising:

- an externally toothed sun gear rotatably mounted in a fixed axial position on said pedal drive shaft;
- external sun gear locking means operative for selectively locking said sun gear to said frame;
- a planet gear carrier rotatably mounted and axially moveable on said pedal drive shaft;
- multiple planet gears rotatably mounted on said planet gear carrier with each of said multiple planet gears in constant mesh with said sun gear;
- an internally toothed ring gear rotatably mounted in a fixed axial position on said pedal drive shaft with said ring gear in constant mesh with all of said multiple planet gears;
- external ring gear locking means operative for selectively locking said ring gear to said frame;
- drive means operative for alternating during either said sun gear or said ring gear or said planet gear carrier from said pedal drive shaft;
- a first one way clutch coupled between said ring gear and said hub for driving said hub from said ring gear with a means for rendering said first one way clutch inoperative through engagement of said drive means with said ring gear;
- a second one way clutch coupled between said sun gear and said hub for driving said hub from said sun gear with a means for rendering said second one way clutch inoperative through engagement of said drive means with said sun gear;
- a drive plate coupled between said planet gear carrier and said hub for driving said hub from said planet gear carrier with a means for decoupling said hub from said drive plate for independent rotation thereof when said drive means engages said planet gear carrier; and
- a pair of pedal crank arms fixed on opposite ends of said pedal drive shaft for rotation said outside frame.

**4,955,628**  
**MINI FOLDABLE CYCLE**  
David Chiu, 252 Indian Head Rd., Kings Park, N.Y. 11754-4804  
Division of Ser. No. 109,660, Oct. 19, 1987, Pat. No. 4,824,130.  
This application Feb. 16, 1989, Ser. No. 311,302  
Int. Cl. B62K 5/02  
U.S. Cl. 280—239

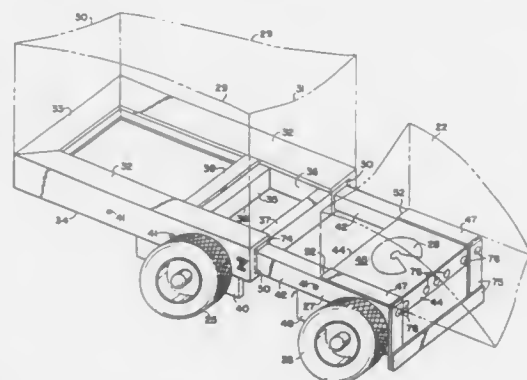
9 Claims



1. The method of assembling and propelling a vehicle on a pavement comprising the steps of mounting a steerable single wheel on the front of said vehicle, mounting two single wheels in tandem with each other at the rear of said vehicle and the front wheel in tandem being raised and fixed above the level of the level of the steerable wheel and the rear wheel in tandem so as not to make contact with a smooth pavement during use of said vehicle, and operating said vehicle by transferring drive from a source of power on said vehicle continuously to said rear wheels in unison.

**4,955,629**  
**COVERTIBLE CHASSIS FOR A SEMITRAILER**  
E. T. Todd, Jr., 13603 Sattler Rd., Jacksonville, Fla. 32226, and John R. Shivar, 2806 DuPone Ave., Jacksonville, Fla. 32217  
Filed Aug. 30, 1989, Ser. No. 400,386  
Int. Cl. B62D 53/08  
U.S. Cl. 280—407

20 Claims



1. Convertible chassis for a semitrailer having two sides, a front, and an openable rear for access to inside space, a forward pair of wheels and a rearward pair of wheels mounted in first spaced tandem relationship adjacent said rear when chassis is in a retracted position, said chassis comprising:

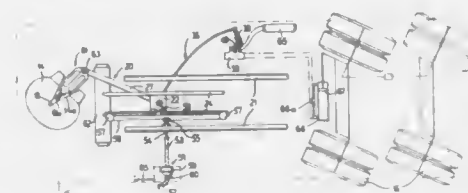
- (a) a main support section having a pair of parallel lengthwise main support beams positioned under and extending along said sides from said front to said back, and sufficient lateral main cross beams fastened to both said support beams to form a rigid main frame to support said semitrailer;
- (b) an intermediate dolly having a generally rectangular rigid support frame slidable lengthwise telescopically

within said main support beams and having attached thereto said forward pair of wheels, said dolly being slidable for a distance substantially equal to the distance between said forward pair of wheels and said rearward pair of wheels in said first spaced tandem relationship; with a first stop means to prevent said dolly from being slidable rearwardly beyond said rear of said main frame;

- (c) a connector carriage to which is attached said rearward pair of wheels, and carriage a fifth wheel connector plate facing upwardly from said generally aligned with said rearward pair of wheels and midway between them;
- (d) said connector carriage including a pair of parallel lengthwise carriage support beams slidable lengthwise telescopically within said dolly support frame and within said main support beams with a second stop means to permit said connector carriage to extend rearwardly of said rear of said main frame a distance suitable to permit attachment of a trailer to said semitrailer via said fifth wheel with a minimum of appropriate lengthwise spacing between said rear of said semitrailer and the forward portion of said trailer; and
- (e) means to selectively lock and unlock said main frame to said dolly and to said connector carriage to prevent or permit, respectively, mutual telescopic sliding movement thereamong.

**4,955,630**  
**FIFTH WHEEL ACTIVATED TRAILER STEERING**  
Axel E. Ogren, 855 S. 12th Ave., LeGrange, Ill. 60525  
Filed Jun. 5, 1989, Ser. No. 362,336  
Int. Cl. B62D 13/00  
U.S. Cl. 280—419

20 Claims



1. A power steering system for trailers of the type having steerable rear trailer wheels and a front coupling pin for coupling to and uncoupling from a tractor having a slotted fifth wheel with a slot receiving the coupling pin of the trailer which comprises, a slide mounted under the trailer for fore and aft movement, a link having a rear end pivotally mounted on said slide and a front end swingable laterally about the pivoted rear end, a tongue pivoted on the front end of the link shaped to fit the slot of the tractor fifth wheel, means driving the slide to move the tongue into and out of said slot of the fifth wheel, said tongue when seated in said slot of the fifth wheel swinging said link laterally as the tractor turns relative to the trailer, a power steering assembly on said trailer for said steerable rear trailer wheels, a power steering valve controlling said power steering assembly, and means connecting said link with said power steering valve to effect steering of said steerable rear trailer wheels with the tractor as the tractor is turned relative to the trailer.

**4,955,631**  
**FIFTH WHEEL COUPLING FOR ALLOWING AND CONTROLLING SIDE TO SIDE SWAY**  
Willard W. Meyer, 1380 Illinois St. SW., Huron, S. Dak. 57350  
Filed Apr. 17, 1989, Ser. No. 339,397  
Int. Cl. B62D 53/08  
U.S. Cl. 280—438.1

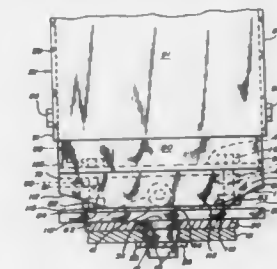
6 Claims

1. A fifth wheel hitch for connecting a frame of a pickup truck, comprising

- a rigid upright standard having an upper end connectable to

the frame of such a camper and protruding downwardly therefrom toward the fifth wheel mounting on the truck, a fifth wheel supporting plate underlying a lower end of the upright standard and having a connection pin depending therefrom to be supported on and connected to the fifth wheel mounting on the truck,

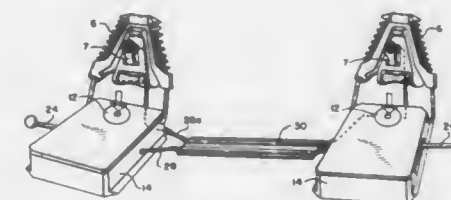
- a hinged connection between and affixed to said supporting plate and to the upright standard and oriented to tilt about



- a hinge axis extending longitudinally of the truck and mobile camper, and
- a pair of rigid stops adjacent the hinged connection and between the supporting plate and upright standard to limit the tilting of the standard and trailer relative to the supporting plate, each of the rigid stops being vertically adjustable to vary the amount of tilting of the standard and trailer relative to the supporting plate.

**4,955,632**  
**SAFETY FASTENINGS FOR "SURF" SNOWBOARDS**  
Adriano Prestipino Giarratta, Via Einaudi, 21/bis-10052 Bardonecchia Turin, and Fabrizio Robba, Frazione Les-Arnauds, 25-10052 Bardonecchia Turin, both of Italy  
Filed Mar. 29, 1989, Ser. No. 330,161  
Claims priority, application Italy, Mar. 30, 1988, 67286 A/88  
Int. Cl. A63C 5/00  
U.S. Cl. 280—607

3 Claims



1. Safety fastenings for snowboards having interdependent connecting means between twin devices on each fastening, which cause the automatic reciprocal opening and immediate release of either fastening should the other fastening release the corresponding ski boot each one of said devices comprising a flat boxed body which cooperates with a grip (4) for frontally fixing the ski boot and fastening means (5) which block the heel of the ski boot; said fastening means (5) being provided with a control lever (7) which activates a heel grip of the fastening means said lever (7) being mechanically connected to a movable section (25) which is part of the twin fastening devices, so that traction generated by said member (25) is transmitted to the lever (7) of the other fastening device.



4,955,633

**ADJUSTING DEVICE FOR A SKI BINDING**

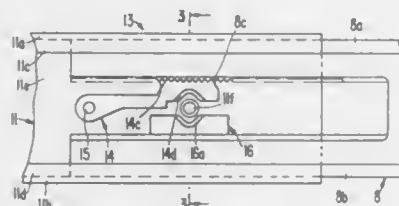
Karl Stritzl; Henry Freisinger, both of Vienna; Hubert Würthner, Hainburg/Donau, and Andreas Riegler, Vienna, all of Austria, assignors to TMC Corporation, Switzerland  
PCT No. PCT/EP87/00587, § 371 Date Jun. 10, 1988, § 102(e)  
Date Jun. 10, 1988, PCT Pub. No. WO88/04562, PCT Pub. Date Jun. 30, 1988

PCT Filed Oct. 8, 1987, Ser. No. 251,647

Claims priority, application Austria, Dec. 18, 1986, 3363/86  
Int. Cl.<sup>5</sup> A63C 9/00

U.S. Cl. 280—633

8 Claims



1. An adjustment device for a ski binding comprising: a slide mounted on a ski, the slide including a plurality of legs and a base extending between the legs; at least one locking member pivotably mounted on the base on a pivot axis, the locking member including a plurality of teeth; a guide plate for guiding the slide, the guide plate extending in a longitudinal direction of the ski and comprising a plurality of prongs and at least one strip including a plurality of teeth; and adjustment means for adjusting the slide relative to the guide plate, the adjustment means adapted to be actuated for bringing the teeth of the locking member into engagement with the teeth of the strip and for bringing one of the prongs of the guide plate into frictional engagement with one of the legs of the slide.

4,955,634

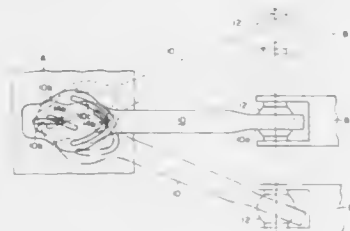
**WHEEL SUSPENSION LINKAGE**

Stephen L. Smith, 5406 Timber Pond, San Antonio, Tex. 78250  
Filed Jul. 24, 1989, Ser. No. 383,727

Int. Cl.<sup>5</sup> B62D 7/06; B60G 3/18

U.S. Cl. 280—675

10 Claims



1. A wheel suspension system for an automotive vehicle having a frame and a plurality of wheels, each wheel including a hub unit, the improvement comprising: a wishbone link for connecting the wheel hub to the frame; said wishbone link having a stem portion and two diverging arm portions; universal joint means for connecting the end of said stem portion to said wheel hub; the other end of each of said arm portions defining a curved slot in a vertical plane and a horizontal slot adjacent said curved slot; bracket means on said frame; a pair of horizontal pins fixedly mounted in transversely

spaced relationship to said frame and respectively engageable with said vertical curved slot and said horizontal slot; the curvature of said curved slot and the spacing of said pins being selected to cause the end of said stem portion of said wishbone link to move in a substantially vertical linear path relative to said frame.

4,955,635

**SUSPENSION OF VEHICLE HAVING LINKS ARRANGED TO INTERSECT A COMMON INBOARD PIVOT AXIS**

Tetsunori Haraguchi, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

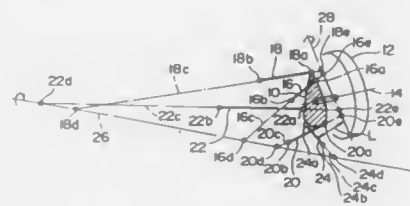
Filed Apr. 17, 1989, Ser. No. 339,251

Claims priority, application Japan, Apr. 19, 1988, 63-95999

Int. Cl.<sup>5</sup> B60G 3/26

U.S. Cl. 280—675

7 Claims



1. A suspension of a vehicle for mounting a wheel to a vehicle body in a manner of allowing bounding an rebounding and toe change movement of the wheel, comprising: a wheel supporting member for supporting the wheel to be rotatable about an axis of rotation, and a plurality of links each being pivotably connected at one end thereof with said wheel supporting member and at another end thereof with the vehicle body, said plurality of links including a first group of links comprising at least one upper link and at least one lower link for supporting said wheel supporting member from the vehicle body principally for bounding and rebounding movement of the wheel relative to the vehicle body regulated by an angular deformation of a quadrilateral formed of said upper and lower links and spanning portions of said wheel supporting member and the vehicle body extending between points thereof for pivotal connection with said upper and lower links and a second group of links for principally restricting toe change movement of the wheel relative to the vehicle body, wherein said first and second groups of links are so arranged that when said wheel supporting member is at a predetermined standard position between bounding and rebounding displacements thereof, a central axis of each said link intersects a first phantom straight line on an inboard side thereof.

4,955,636

**SAFETY INSTALLATION FOR CARRYING CHILDREN**

Jukka Sundberg, Helsingfors, and Bror Martin, Västerskog, both of Finland, assignors to Electrolux Autoliv AB, Stockholm, Sweden

Filed Apr. 12, 1989, Ser. No. 336,744

Claims priority, application Finland, May 6, 1988, 882120

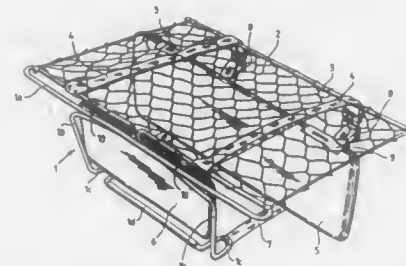
Int. Cl.<sup>5</sup> B60N 1/12; B60R 21/06, 22/10

U.S. Cl. 280—749

9 Claims

1. A safety installation for carrying children in a vehicle, which safety installation comprises: a framework to be detachable fastened to seat of the vehicle, a net structure connected at its first end to the framework, an edge portion arranged at a second end of the net structure and connected to said net structure, opposite to the framework,

at least one connecting element for connecting the edge portion to the framework, wherein the framework is a framing, an upper edge of which forms an oblong loop on a plane essentially perpendicular to a plane of side edges of the framing, whereby the side edges in the vicinity of the upper edge, from the middle



thereof, run essentially symmetrically outwards and thereafter make a sharp turn essentially symmetrically from the upper edge downwards and are joined through a lower edge of the framing, and that the upper edge of the framing is joined to the edge portion through at least one first shock absorbing element running parallel with the net structure.

4,955,637

**ANCHORING OF END POINTS OF SAFETY BELTS**

Guntram Huber, Aidingen, and Walter Jahn, Ehningen, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

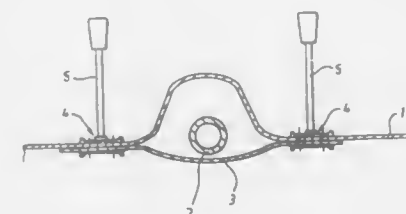
Filed Sep. 8, 1989, Ser. No. 404,412

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1988, 3831199

Int. Cl.<sup>5</sup> G60R 22/22

U.S. Cl. 280—801

3 Claims



1. Anchoring arrangement for end points of safety belts or safety belt buckle attachments for rear seats of motor vehicles with rear-wheel drive, in the vehicle floor region, wherein the end points, together with a bridge passing under a drive shaft at a close distance, are fixed to the vehicle floor on both sides of the drive shaft so that when the end points are greatly stressed the drive shaft is also used for load bearing.

4,955,638

**DECELERATION SENSOR HAVING SAFETY CATCH MEANS**

Yoshihiko Kinoshita; Hirashi Tabata; and Mitsuru Gota, all of Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 28, 1988, Ser. No. 250,782

Claims priority, application Japan, Sep. 29, 1987, 62-244873; Sep. 29, 1987, 62-244874; Sep. 29, 1987, 62-244875; Sep. 29, 1987, 62-148690[U]

Int. Cl.<sup>5</sup> B62R 22/36

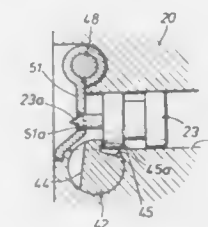
U.S. Cl. 280—806

9 Claims

1. A deceleration sensor for releasing energy stored in en-

ergy storage means upon detection of an acceleration or deceleration in excess of a certain threshold level, comprising: a firing pin urged by first spring means in a direction to thereby cause said energy storage means to release its energy;

a sensor mass which is urged by second spring means to a neutral state and guided to be moved against the spring force of said second spring means under its own inertial force upon detection of an acceleration or deceleration in excess of said threshold level; trigger means cooperating with said sensor mass for retaining said firing pin to its dormant state when said sensor



mass is at said neutral state and releasing said firing pin when said sensor mass is moved under its own inertial force; and safety catch means which includes stopper means for directly restraining a front end portion and a body portion of said firing pin and for directly preventing the propulsion of said firing pin under the spring force of said first spring means, said stopper means being adapted to be manually moved in a single stroke between a first position for substantially releasing said portions of said firing pin being restrained and for allowing the propulsion of said firing pin, and a second position for preventing the propulsion of said firing pin.

4,955,639

**STRUCTURE FOR MOUNTING A SLIP JOINT**

Toshimasa Yamamoto, Aichi, Japan, assignor to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Aichi, Japan

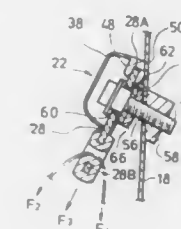
Filed Nov. 25, 1988, Ser. No. 276,132

Claims priority, application Japan, Nov. 27, 1987, 62-180637[U]

Int. Cl.<sup>5</sup> B60R 22/18

U.S. Cl. 280—808

7 Claims



1. A structure for pivotally mounting a slip joint on a vehicle body, comprising: a support member attached to said vehicle body; and a slip joint, said slip joint having a suspending portion for suspending a webbing movably along a length of said webbing to restrain an occupant of the vehicle, and a pivotal portion whereby said slip joint is pivotally supported by said support member through said pivotal support portion thereof so that an extension line of a resultant force acting on said suspending portion, of a webbing takeup force from a takeup means acting on said webbing from a first side of the suspending portion and a webbing

extension force acting on said webbing from a second side of the suspending portion to extend the webbing from the takeup means, passes through said pivotal support portion and crosses a longitudinal axis of said pivotal support portion substantially at right angles, said slip joint having an inclined surface formed in the vicinity of said pivotal support portion, for contact with the support member.

4,955,640

**Z-FOLDED PACKING LIST/INVOICE**

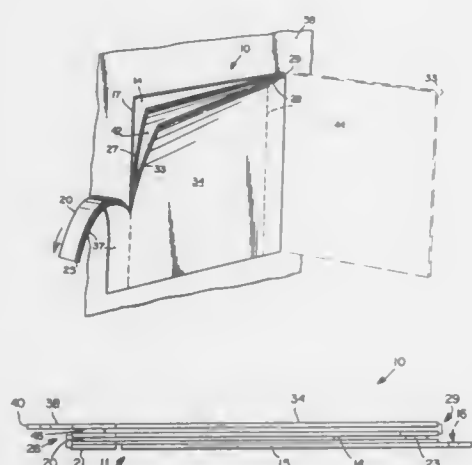
Michael W. Anderson, Erie, N.Y., assignor to Moore Business Forms, Inc., Grand Island, N.Y.

Filed Aug. 25, 1989, Ser. No. 398,642

Int. Cl.<sup>5</sup> B42D 1/00

U.S. Cl. 281—2

14 Claims



1. A business form suitable for use as a packing list or invoice attached to a package, and having a portion thereof serving as a shipping label to which variable address information may be applied, comprising:

- a label stock portion having first and second side edges and first and second major faces;
- a bond paper portion having first and second side edges and first and second major faces;
- the second edge of said label stock portion being overlapped with the second edge of the bond paper portion and fixed together at the overlapped portion;
- means defining tractor holes adjacent said label stock portion first edge and adjacent said bond stock portion first edge, for facilitating feeding of said form through printers; and
- said second face of said label stock essentially completely covered by adhesive.

4,955,641

**PIPE SEALS USED IN UNDERGROUND SEALED DISTRIBUTION SYSTEMS**

Larry G. Dent, 3312 West Side Hwy., Castlerock, Wash. 98611

Filed Feb. 27, 1989, Ser. No. 315,517

Int. Cl.<sup>5</sup> F16L 17/00

U.S. Cl. 285—96

2 Claims

1. A manhole adapter assembly to seal a pipe about the exterior of an inserted end thereof to the interior of an opening in the side of a manhole, comprising:

- (a) a cylindrical rigid sleeve, having one end of uniform thickness insertable into the opening in the side of said manhole, while leaving a surrounding clearance to receive a sealing subassembly, and having the other end extending out from the side of said

manhole, while providing at this other extending end an internal circular recess to receive an interior circular seal; (b) said sealing subassembly to be secured firmly about the exterior of the one end having a uniform thickness of the cylindrical rigid sleeve, wherein this sealing subassembly comprises: a circular positioner having a channel cross-sectional shape opening inwardly toward the side of said manhole, having a channel-base interior diameter sized to fit securely about the exterior of the one end of uniform thickness of this cylindrical rigid sleeve, and having the channel interior cross-sectional shape sized to fully receive a circumferential seal of a resilient sealing material, and having a valve fitting to receive a liquid and distribute the liquid about the interior of the channel interior cross-



sectional shape, having said circumferential seal of said resilient sealing material fitted within the channel interior cross-sectional shape of the circular positioner, and having the liquid for passing through the valve fitting and being distributed around the channel interior cross-sectional shaped and expanded to radially move the circumferential seal to bear against the manhole about the opening in the side of said manhole; and

- (c) said interior circular seal of resilient sealing material partially fitted into the interior circular recess at the other extending end of the cylindrical rigid sleeve and extending radially out of the interior circular recess a sufficient radial distance to firmly seal around an inserted end of said pipe.

4,955,642

**PIPE CONNECTOR, IN PARTICULAR FOR GASES**

Joseph Dugast, Rouvres, France, assignor to C.G.M.I. Composants Gaz Pour La Microelectronique Internationale, Pontchartrain, France

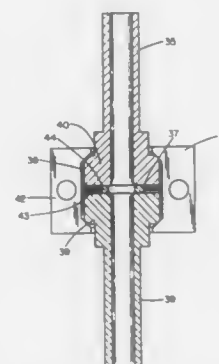
Filed Apr. 3, 1989, Ser. No. 332,747

Claims priority, application France, Apr. 8, 1988, 88 04721

Int. Cl.<sup>5</sup> F16L 35/00

U.S. Cl. 285—93

4 Claims



1. In a coupling system for pipes which comprises two tubu-

lar end pieces, said end pieces having an axis and end faces and each end piece having a coupling extremity terminating in a plane section perpendicular to said axis of said end pieces, said extremity having a shape and a seal located between said coupling extremities, means for connecting the two end pieces, said means being constituted by two half-shells adapted to be rigidly fixed together so as to produce a longitudinal locking action on said two end pieces, each half-shell having an internal chamfered portion which cooperates with the shape of the coupling extremity of each end piece whereby said half-shell is centered on the axis while at the same time a longitudinal clamping force is applied on the end pieces along the axis, the improvement wherein said seal has an outer annular portion of small thickness and an inner annular portion close to the internal diameter having a greater thickness than the outer annular portion, and an annular sleeve independent of said seal and engaging said extremities for holding said coupling extremities in line with each other, said annular sleeve having a circumferential opening which allows said sleeve to elastically expand and contract to engage said extremities whereby said annular sleeve ensures radial positioning of the seal between the end faces of the end pieces when said coupling extremities are connected one to each other.

4,955,643

**CONNECTION FOR FLUIDS**

Alfredo D. Bona, Abblategrasso, and Attilio Airaghi, Cornaredo, both of Italy, assignors to Murray Europe S.P.A., Milano, Italy

Filed Oct. 26, 1988, Ser. No. 262,999

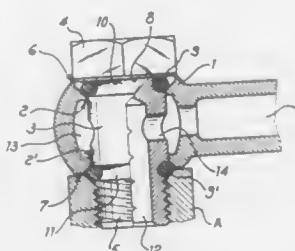
Claims priority, application Italy, Dec. 10, 1987, 22937 A/87

The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> F16L 41/00

U.S. Cl. 285—190

5 Claims



1. A fluid connector for a conduit (A) having a threaded opening and a surface at one end; comprising:

- (a) mobile joint (1) having opposite parallel faces (6,7), said joint being provided with an internal chamber (13), a lateral tubular duct (15) fixed to the joint and communicating with said chamber, two coaxial and opposite through-holes (2) and (2') having an inner surface of conical shape, the axis of said through-holes being substantially perpendicular to the axis of the tubular duct (15), said through-holes being formed on said opposite faces of said joint;
- (b) a clamping screw having a head (4) with a lower face (8) and threaded portion (5) for coaxing with said threaded opening, said screw having a shank (3), said shank being inserted in said through-holes (2) and (2') of the joint (1), said shank (3) being provided with a central duct (12) which is coaxial with said axis of said through-holes and communicating with said chamber (13) by means of at least one transversal hole (14) and two round parallel grooves (10) and (11), one groove (10) being formed in the proximity of said lower face (8) of said head (4), the other groove (11) being formed in the proximity of said threaded portion of said screw;
- (c) flexible round seal gaskets (9) and (9') inserted in said round grooves (10) and (11) of the clamping screw and the

gasket (9) being placed between said lower face (8) and the conical surface of one of said holes (2), the gasket (9') is placed between the conical surface of the other hole (2') and said surface at said one end of the conduit (A) to be coupled by threaded engagement with said clamping screw.

4,955,644

**DRILL PIPE COUPLING**

Gerd Pfeiffer, Mülheim; Erich Quadflieg, Krefeld; Friedrich Lenze, Ratingen; Krug, Gerhard, Duisburg, and Josef Slek-meyer, Ratingen, all of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Jul. 27, 1989, Ser. No. 386,786

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825995

Int. Cl.<sup>5</sup> F16L 25/00

U.S. Cl. 285—333

9 Claims



1. A drill pipe coupling comprising: a coupling member (2) comprising an unthreaded central section (13) having a cylindrical bore (26) therein and an outer portion having outer shoulders (11, 12) on each side thereof; and

- adjoining said shoulders axially extending respective conical external threads (3, 4);
- a drill pipe comprising an undeformed cylindrical bore (14) and connected thereto an internal correspondingly threaded upset head section formed as a bell element having end surfaces (9, 10), said drill pipe end surfaces (9, 10) sealingly abutting said outer shoulders (11, 12) of said central section (13) when joined together;
- said drill pipe further comprising an intermediate section (16) adjoining said cylindrical bore (14) and having an inside diameter which decreases in the direction toward said threaded section (5, 6);
- a cylindrical bore section (18) adjacent said intermediate section (16) extending to said threaded section (5, 6);
- a rounded transition between said cylindrical bore (14) of said undeformed pipe (8) and said intermediate section (16);
- an outside shoulder (33) opposite said cylindrical bore section (18), the outside diameter of said pipe in the upset region (23) of said shoulder (33) being at least equal to the outside diameter (21) of said undeformed pipe (8) and the length of said region (23) being greater than the length of said intermediate section (16);
- said external threads (3, 4) being radially inwardly thickened and having at the ends thereof a bevelled section pointing towards the inside of said coupling member (2); and
- the outside diameter (28) of said central section (13) of said coupling member (2) being greater than the diameter (31) of said bell elements abutting said shoulders (11, 12) of said coupling member (2).

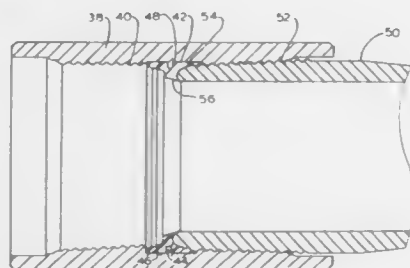


4,955,645

**GAUGING DEVICE AND METHOD FOR COUPLING  
THREADED, TUBULAR ARTICLES AND A COUPLING  
ASSEMBLY**Craig C. Weems, Houston, Tex., assignor to Tuboscope, Inc.,  
Houston, Tex.Division of Ser. No. 97,183, Sep. 16, 1987. This application Dec.  
6, 1988, Ser. No. 280,587  
Int. Cl.<sup>5</sup> F16L 17/00

U.S. Cl. 285—355

7 Claims



1. A coupling assembly comprising an annular coupling having internal threads adapted for threaded engagement with external threads of a tube inserted into said coupling, said coupling having an annular gasket of deformable material at an interior portion of said coupling intermediate the ends thereof, said gasket having a minimum diameter prior to deformation greater than the internal diameter of the inserted tube, said gasket having a radially inwardly extended portion thereof deformed by an end of said tube inserted into said coupling and having an integral extended portion for engaging and being deformed by said external threads of said tube inserted into said coupling, and engaging means, including a continuous, annular flange having a diameter less than the minimum diameter of said internal threads that projects radially inwardly from said interior portion of said coupling and into a mating, annular notch in said radially inwardly extended portion of said gasket for engaging said gasket to fixedly connect the same to said coupling, whereby longitudinal movement of the gasket relative to the coupling is restrained.

4,955,646

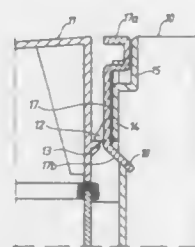
**LOCKING DEVICE, ESPECIALLY FOR A COVER OF A  
SUCTION CLEANER**Jan T. Jankevics, Vällingby, Sweden, assignor to Aktiebolaget  
Electrolux, Stockholm, Sweden

Filed Aug. 18, 1989, Ser. No. 395,905

Claims priority, application Sweden, Sep. 8, 1988, 8803164  
Int. Cl.<sup>5</sup> E05C 19/06

U.S. Cl. 292—85

2 Claims



1. In a locking device for a cover having at least one movable latch (12) adapted to releasably engage a corresponding step (13) on the cover (11), the improvement wherein the latch (12) is provided at a free end of a leaf spring (14) attached to a stationary portion of the locking device, a control means (17) being provided adjacent said leaf spring and movable parallel

to the leaf spring, said control means having a push button (17a) at one end above said latch, and an oblique guide surface (17b) at its other end, said guide surface engaging a corresponding inclined stationary supporting surface of the locking device below said latch and, when said control means is displaced axially due to actuation of said push button, providing a lateral movement of the control means which actuates said leaf spring to release the engagement of said latch with said step.

4,955,647

**LOG HANDLING TOOL**

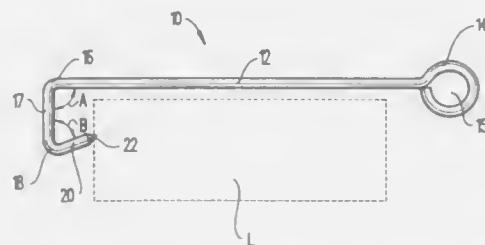
Henry Alfredson, 5-34th St., Stony Brook, N.Y. 11790

Filed Aug. 21, 1989, Ser. No. 396,063

Int. Cl.<sup>5</sup> A47J 49/00; B65G 7/12

U.S. Cl. 294—14

1 Claim



1. A log handling tool for manipulating logs in fireplaces and wood stoves, comprising:  
an elongated metal rod;  
a handle portion formed by an arcuate loop bend at an end of said rod;  
a first straight leg formed by a 90 degree bend at an end of said rod opposite said handle;  
a straight shank portion of said rod extending between said handle portion and said first leg;  
a second straight leg formed by a bend in an end portion of said first leg, said second leg forming an included angle between 60 and 75 degrees with said first leg and extending toward said shank portion;  
a pointed tip formed on a free end of said second leg;  
and  
said rod, said handle, said first leg and said second leg all lying in a common plane.

4,955,648

**DOOR SECURITY APPARATUS**

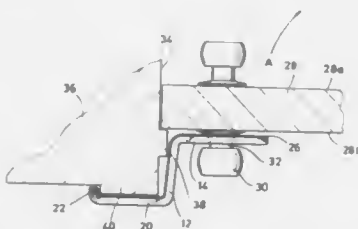
Harmon R. Miller, 16631 Cromarty Ct., Houston, Tex. 77084

Filed Jun. 7, 1989, Ser. No. 362,574

Int. Cl.<sup>5</sup> E05C 19/18

U.S. Cl. 292—258

10 Claims



1. A security apparatus for preventing opening of a hinged door from the inward swinging side, said door being received in a door frame having a door facing on the outward swinging side of said door frame, said door including a door knob extending from the outward swinging side, said door knob having a shaft portion, comprising:

a web portion having first and second, spaced ends;  
a first flange portion depending in a first direction from said first end of said web portion and generally transversely thereto;  
a second flange portion depending in a second direction from a second end of said web portion and generally transversely thereto, said second direction being substantially opposite to said first direction, said second flange portion having an inner surface, said inner surface facing in a direction toward an imaginary plane passing through said first flange portion transversely to said web portion;  
a lip portion depending from the end of said second flange portion distal said web portion, said lip portion extending in substantially the same direction as said web portion to thereby form a channel defined by said lip portion, said web portion and said second flange portion;  
engagement means on said first flange for selectively releasably engaging at least a portion of said door knob and selectively preventing substantial movement of said door knob away from said first flange whereby, when said door is closed and said engagement means engages said door knob on said outward swinging side, said door facing on said outward swinging side of said door frame is received in said channel, whereby pivoting of said apparatus relative to said shaft is restrained sufficiently to maintain said apparatus properly positioned with respect to said door and said door frame.

4,955,649

**APPARATUS FOR HOLDING PLATES**

Katsumi Ishii, Fujino, and Yasushi Sasaki, Atsugi, both of Japan, assignors to Tel Sagami Limited, Kanagawa, Japan

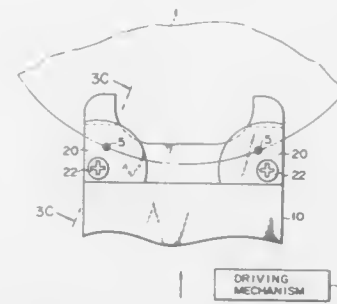
Filed Feb. 21, 1989, Ser. No. 312,603

Claims priority, application Japan, Feb. 29, 1988, 63-46482

Int. Cl.<sup>5</sup> A47F 13/06

U.S. Cl. 294—1.1

5 Claims



1. A holding apparatus for a plate-like member comprising:  
first holding means having a flat surface; and  
second holding means having an inclined surface which is spaced apart from said flat surface by a predetermined distance and cooperates with said flat surface to receive one end portion of the plate-like member, said inclined

surface being inclined such that a distance between said inclined surface and said flat surface is decreased in a plate insertion direction, thereby clamping said one end portion of the plate between said inclined surface and said flat surface; wherein said inclined surface of said second holding means has a pair of reaction points which are brought into contact with edge portions of the plate-like member and spaced apart from each other by a predetermined interval in a direction perpendicular to the plate insertion direction.

4,955,650

**CANNING RACK HANDLE**

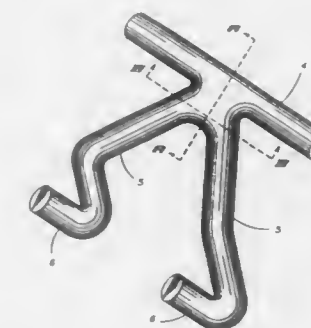
Dan E. Davey, E10424 5th St., Spokane, Wash. 99206

Filed Feb. 23, 1989, Ser. No. 314,080

Int. Cl.<sup>5</sup> A47J 45/10

U.S. Cl. 294—26

3 Claims



1. A hand hook comprising:  
an elongate handle;  
a pair of shafts extending from a point between the ends of the handle at angles other than ninety degrees to form three grips for a user's fingers; and a hook defined at the distal end of each shaft.

4,955,651

**HOOK LATCH ADAPTER**

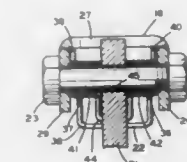
Donald E. Barber, Marathon, N.Y., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Dec. 11, 1989, Ser. No. 450,577

Int. Cl.<sup>5</sup> B66C 1/36

U.S. Cl. 294—82.19

5 Claims



1. For a hook having a throat and a flange adjacent said throat, said flange having a predetermined thickness and a hole therethrough for mounting a latch, a latch having two sides, said sides having aligned holes and having a predetermined spacing greater than said predetermined thickness, a latch

return spring, and fastening means extending through said side holes and said flange hole for securing said latch and said return spring on said flange with said latch sides located on opposite sides of said flange, a hook latch adapter comprising first and second spacers, said spacers defining holes for passing said fastener means, and a generally U-shaped wire loop connecting said spacers together with said spacer holes aligned and said spacers axially spaced apart by substantially the predetermined thickness, said spacers when positioned on opposite sides of a hook flange with said spacer holes aligned with the flange hole having a maximum axial dimension no greater than the predetermined latch side spacing.

4,955,652

# GRIPPING TOOL FOR A CABLE CONNECTOR PLUG FOR REMOTE MANIPULATION

Robert Brugere, Sauzet; Robert Faure, Pierrelatte; Yves Galmard, Orange, and Jacques Gerenton, Bourg Saint Andeol, all of France, assignors to Commissariat A L'Energie Atomique, Paris, France

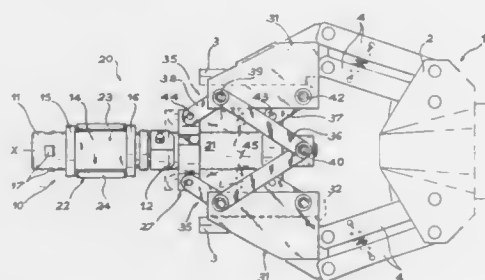
Filed Oct. 26, 1988, Ser. No. 262,620

Claims priority, application France, Oct. 27, 1987, 87 14836

Int. Cl.<sup>3</sup> B25B 5/14

U.S. Cl. 294—106

13 Claims



1. A gripping tool for gripping a movable part such as a cable connector plug having a surface (14), a bearing surface (12), a longitudinal axis (X), and a shoulder (16) transverse to said axis; said tool being of the type actuatable by a remote handling device that includes jaws (3) movable toward and away from each other, said tool comprising:

- a support body (21) having a longitudinal extent;
- a fork (22, 22') dimensioned to overlap said surface on opposite sides of said longitudinal axis and having a gripping portion contactable in use with said transverse shoulder of said movable part;
- a stop piece (27, 27') having a portion contactable with said bearing surface;
- said fork and said stop piece mounted on said support body for reciprocal movement toward and away from each other parallel to said axis;
- clamp means (31) having laterally spaced apart portions for receiving said support body therebetween, said clamp means being contactable by and movable toward each other from an open unclamped position to a clamped position by said jaws of said remote handling device during use; and motion transmitting mechanisms (35, 49, 65) connected between said clamp means, said body and said stop piece, to cause said stop piece and fork to move along said longitudinal extent of said support body toward each other, in response to said clamp means being moved to said clamped position during use, to cause said fork gripping portion to abut against said transverse shoulder and apply a compressive clamping force thereto parallel to said longitudinal axis of said movable part to enable said tool to grip and tightly hold said movable part between said fork gripping portion and said stop piece for multidirectional maneuvering.

4,955,653

# SPIRAL LEAD PLATEN ROBOTIC END EFFECTOR

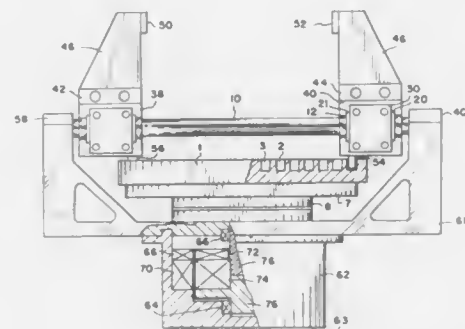
Beals, David C., Poquoson, Va., assignor to Administrator, National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 28, 1988, Ser. No. 250,662

Int. Cl.<sup>3</sup> B25J 15/08

U.S. Cl. 294—119.1

1 Claim



1. A Robotic End Effector for manipulating an object comprising:

- a platen in the shape of a disc with a flat upper surface and a flat lower surface and an axis of rotation perpendicular to said upper surface, said upper surface having two spiral leads in the form of a groove formed into said upper surface,
- said two spiral leads having walls perpendicular to the upper surface of the platen,
- said two spiral leads being concentric about the axis of rotation, said two spiral leads originating at points on opposite sides and equidistant from said axis of rotation,
- said two spiral leads diverging from said axis of rotation at substantially equal constant linear rates;
- means for rotating the platen about the axis of rotation, said means comprising:
- an electric motor adapted for repeated rotation to a predetermined position, and
- a gear drive mounted on the lower surface of the platen for transferring rotational force from the motor to the platen and for modifying the rate of rotation of the platen relative to that of the motor;
- first and second substantially similar moveable grippers, each of having a base and grasping means and each acting against each other to grasp the object being manipulated, each of said first and second moveable grippers being constrained to move in opposition to each other along a straight track,
- said straight track being located so as to form an intersection between the axis of rotation of the platen and to extend for an equal distance on both sides of said intersection,
- said straight track being parallel to the upper surface of the platen,
- said straight track being formed by a pair of parallel rails to which each of the first and second moveable grippers are attached by means of precision linear bearings;
- a means of engaging each of the first and second moveable grippers with a corresponding one of the two spiral leads in the platen, said means of engaging each of the first and second moveable grippers comprising:
- a bearing fitted to the base of each moveable gripper, and a round pin fitted to each bearing such that the pin is free to rotate, and
- the pin protrudes from the base of a moveable gripper and extends into the corresponding spiral lead,
- the pin bears against one perpendicular wall of the corresponding spiral lead, and
- a minimum clearance exists between the perpendicular wall

of the corresponding spiral lead against which the pin does not bear, and the pin; and positioning means for positioning the platen, the means for rotating the platen, the first moveable gripper, the means for engaging the first moveable gripper, and a member against which the first moveable gripper acts to apply grasping force to said object being manipulated, such positioning means including a mounting surface for attaching the robotic end effector to the means for rotating the platen.

4,955,655

# ROBOTIC END-OF-ARM TOOLING MULTIPLE WORKPIECE INTERNAL GRIPPER

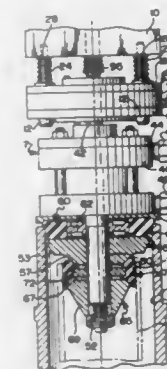
Anthony Caracciolo, Jr., Troy; Wayne R. Austin, Warren; Dante C. Zuccaro, Allenton, and Leonard P. Pomrehn, Mt. Clemens, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 1, 1988, Ser. No. 227,022

Int. Cl.<sup>3</sup> B25J 15/00; B66C 1/56

U.S. Cl. 294—93

2 Claims



4,955,654

# END EFFECTOR

Akira Tsuchihashi, Nagareyama; Naoki Noguchi, Yokohama, and Keisatoshi Kuraoka, Matsudo, all of Japan, assignors to National Space Development Agency of Japan, Tokyo, Japan

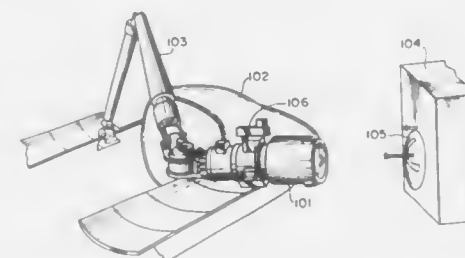
Filed Dec. 20, 1988, Ser. No. 286,866

Claims priority, application Japan, Dec. 21, 1987, 62-321298

Int. Cl.<sup>3</sup> B44G 4/00; B66C 1/12

U.S. Cl. 294—86.4

11 Claims



1. An end effector secured to a front end of a manipulator arm in a remote control system for clamping an object, comprising:

- capturing means for capturing said object, said capturing means including a centralizing means for guiding said object to a center of said capturing means, said centralizing means guiding said object through movement in at least three directions, and means for pulling said object into said capturing means once said object has been guided to said center of capturing means;
- driving means for generating power for driving said centralizing means;
- transmission means for transmitting said driving power generated by said driving means to said centralizing means;
- means for detecting at least one of a force and a torque applied to said centralizing means, said detecting means having at least three strain gauges provided respectively at three different positions on said centralizing means and a receiving/transmitting means for receiving signals indicative of at least one of said force and torque from said at least three strain gauges and for transmitting detection signals indicative of at least one of said force and torque being applied to said centralizing means; and
- means for controlling an output from said driving means, wherein said control means is continuously responsive to said detection signals so as to continuously control said output from said driving means, thereby restraining a force of said centralizing means acting upon said object.

2. A robot or like end-of-arm tool (EOAT) for gripping workpieces by cavities in said workpieces, said EOAT in combination comprising:

- means for connecting said EOAT with said robot or like;
- rod means having a generally flanged end opposite said robot being extendible with respect to said connecting means;
- at least one spacer encircling said rod means between said connecting means and said flanged end of said rod; and
- at least two elastomeric gripper portions encircling said rod means and capturing at least one spacer, said gripper portions having a first dimension when said rod means is extended whereby said gripper portions can be inserted into one of said workpieces' cavities and said gripper portions having a second dimension when said rod means is retracted whereby said gripper portions can engage with one of said workpieces' cavity to grip said workpiece and a section of one of said gripper portions facing said spacer is annular shaped and said spacer has a tapered end with a diameter smaller than an inside diameter of said gripper section.

4,955,656

# GRIPPING DEVICE FOR NAPPY MATERIALS

Johan Krogstrup, Kibæk; Henning Nohr, Kolding; Bruno Christensen, Egtved, and Frank Fosnaes, Kolding, all of Denmark, assignors to Tex-Matic ApS, Kibæk, Denmark

Filed Apr. 17, 1989, Ser. No. 339,146

Claims priority, application Denmark, Apr. 19, 1988, 2115/88; Dec. 15, 1988, 6959/88

Int. Cl.<sup>3</sup> B65H 3/22, 3/48

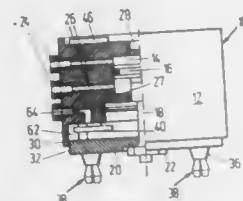
U.S. Cl. 294—100

5 Claims

1. Gripping device for nappy work-pieces comprising a base part, one or more gripping means, and a part slidable relative to the base part and provided with a squeeze means for each gripping means, the gripping means being shaped as elongate bodies which in an area close to their first ends adapted for contact with work-pieces are surrounded by the squeeze means and having slots along a longitudinal axis and at their second ends are fixed against translatory movements in a longitudinal direction relative to the base part and where the gripping means are squeezed by the movement of the slidable part towards the work-piece, characterized in that between the base part and the slidable part there is provided a substantially

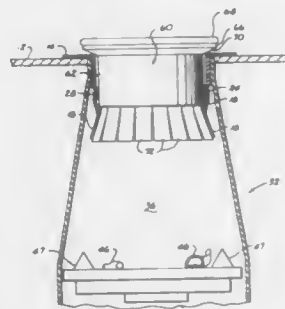


closed hollow to which pressurized gas may be supplied through the base part and that the slots, the squeeze means and the slidable part are shaped and relatively arranged in such a



manner that the pressurized gas in the hollow is discharged mainly through the section of the slots closest to the hollow to leave the slots by the first ends of the gripping means.

**4,955,657**  
**APPARATUS FOR REMOVAL OF FOREIGN MATERIAL FROM SINK DISPOSAL UNITS**  
John L. Ward, 1006 Barwell St., Columbia, S.C. 29201  
Continuation-in-part of Ser. No. 324,176, Mar. 16, 1989, Pat. No. 4,911,492. This application Feb. 26, 1990, Ser. No. 485,146  
Int. Cl.<sup>5</sup> B25B 7/00; F21V 33/00  
U.S. Cl. 294—118 20 Claims

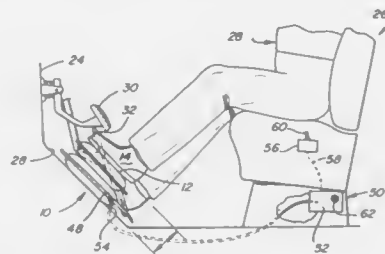


1. A device to aid in removal of foreign matter from a sink garbage disposal unit of the type having an interior refuse hopper and an elastomeric guard means adjacent an opening to such hopper, said device including an outer cylindrical member and an inner cylindrical member slidably retained and movable within said outer member for insertion into the hopper opening as a unit, with said inner member including means at one end thereof for providing access to the hopper by deflecting said elastomeric guard means so as to clear a pathway to such hopper, said inner member also defining an interior passageway therethrough which permits communication with such hopper, whereby improved access to and visibility of the hopper are provided so that foreign matter may readily be grasped and removed therefrom through said inner member passageway.

**4,955,658**  
**AUTOMOBILE FOOT REST**  
Lee K. Graves, Bloomfield Hills, Mich., assignor to Wickes Manufacturing Company, Southfield, Mich.  
Filed Aug. 28, 1989, Ser. No. 399,148  
Int. Cl.<sup>5</sup> B60N 3/06

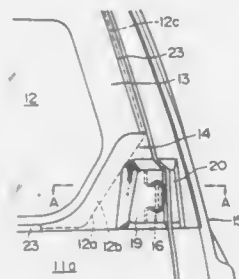
U.S. Cl. 296—75 15 Claims  
1. An adjustable foot rest for an occupant of an automobile which has a floor board, comprising an inflatable chamber

mounted on the floor board, a foot pad mounted on the chamber for engagement by a passenger's foot, and means for vari-



ably inflating the chamber to selectively position the foot pad relative to the floor board.

**4,955,659**  
**VEHICULAR BACK DOOR FITTING MECHANISM**  
Toshio Kosugi, Hamakita, Japan, assignor to Suzuki Motor Company Ltd., Shizuoka, Japan  
Filed Mar. 29, 1989, Ser. No. 330,126  
Claims priority, application Japan, May 13, 1988, 63-116072  
Int. Cl.<sup>5</sup> B60J 1/18 2 Claims

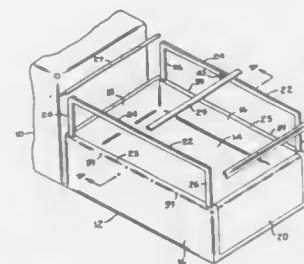


1. A vehicular back door arrangement, for fitting a back door to a vehicle rear pillar, comprising: a rear window glass positioned in a rear window glass opening of said back door, said rear window glass having a lower corner cut away slantwise, said rear window glass opening having a slanted lower corner corresponding to said window glass cutaway slantwise lower corner, said slanted lower corner of said back door window glass opening defining a hinge connection location, said hinge connection location being positioned adjacent said window glass cutaway corner; a top door hinge having a first hinge part connected to said hinge connection location of said back door and having a second hinge part connected to said vehicle rear pillar; and at least one lower hinge having a lower hinge first part connected to said back door at a lower hinge location, below said hinge connection location, and having a lower hinge second part connected to said vehicle rear pillar.

**4,955,660**  
**TEST STRUCTURE FOR PICKUP TRUCK**  
Viola A. Leonard, 301 W. Hancock, O'Neill, Nebr. 68763  
Filed Sep. 18, 1989, Ser. No. 408,694  
Int. Cl.<sup>5</sup> B60P 7/04

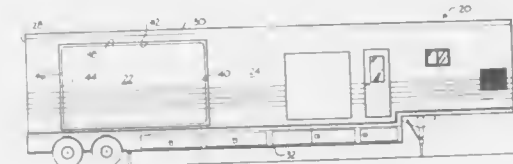
U.S. Cl. 296—165 2 Claims  
1. In combination with a pickup truck that includes a cargo box defined by two upstanding side walls, a front wall, and a tailgate, each side wall having stake reception sockets therein near the front and rear ends thereof; the tailgate and each said wall having an upper edge: the improvement comprising flexible tent means installable

on the cargo box to provide a temporary cover; said tent means including a retractable frame structure supported on the box side walls, and a flexible cover arranged to fit over said frame structure when said structure is pulled upwardly from a retracted position; said frame structure comprising a sleeve insertable into each stake socket to form a vertical guide, two similarly constructed side frame elements, and two detachable transverse bars adapted to interconnect said frame elements at their front and rear ends; each side frame element being a U-shaped member that includes a horizontal rail and downwardly-extending legs at each end of said rail; each U-shaped member having its downwardly extending legs slidably positioned in two of the guide sleeves at the front and rear ends of a box side wall, whereby each respective horizontal rail will have a retracted position extending along the upper edge of the cargo box side wall and a raised position spaced above the upper edge of the



box side wall; said transverse bars being attachable to the frame elements so as to span the zones above the box front wall and tailgate, respectively, when the side frame elements are in their raised positions; said flexible cover comprising a central rectangular top panel having four edges and a rectangular side panel (50, 52, 54, 56) hingedly connected to each edge of said central panel being adapted to assume a centralized position over the frame structure, with the four side panels hanging downwardly along the frame structure when the frame structure is in its raised position; and a manually-actuable latch means located within each side frame element for releasably retaining each said frame element in its raised position; each said latch means comprising a movable latch element mounted in each leg of the associated frame element, and a manual actuator mounted in the associated horizontal rail; each said actuator being operably connected to both associated latch elements, whereby a manual operating force on a given actuator operates both associated latch elements.

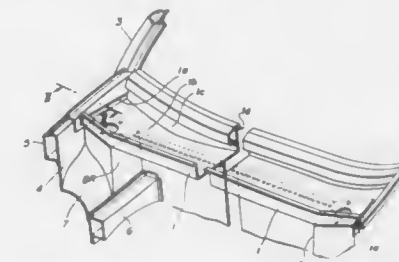
**4,955,661**  
**ENVIRONMENTALLY PROTECTED EXPANDABLE TRAILER**  
Richard E. Mattice, Oneonta, N.Y., assignor to Medical Coaches, Incorporated, Oneonta, N.Y.  
Filed Apr. 20, 1989, Ser. No. 340,695  
Int. Cl.<sup>5</sup> B62D 39/00 10 Claims  
U.S. Cl. 296—171



1. A transportable enclosure, comprising:

a transportable enclosure body including:  
a side having at least one opening at a predetermined location;  
a parallel side portion connected to the side and extending within the opening;  
at least one expandable section having a wall and being slidably engaged within the opening in a predetermined direction, the wall substantially facing the parallel side portion such that the wall and parallel side portion each extend in a plane substantially parallel to the direction of sliding of the expandable section; and  
an inflatable seal assembly, attached to one of the parallel side portion or the wall, including an inflatable seal capable of inflating toward and against the other of the parallel side portion or the wall.

**4,955,662**  
**VEHICLE BODY STRUCTURE REINFORCED BY COWL MEMBER**  
Michio Kudo, Yamato, Japan, assignor to Nissan Motor Co., Ltd., Japan  
Filed Sep. 15, 1988, Ser. No. 244,396  
Claims priority, application Japan, Sep. 18, 1987, 62-142694[U]  
Int. Cl.<sup>5</sup> B62D 25/08 1 Claim  
U.S. Cl. 296—192

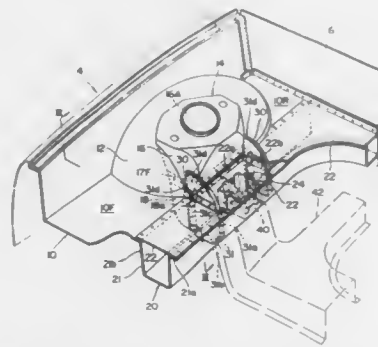


1. A body structure for a vehicle comprising:  
strut towers constructed and arranged to bear load from suspension units of the vehicle, said strut towers having upper ends, respectively, and  
a cowl member, in the form of a channel member having a bottom wall, said bottom wall extending between said strut towers and having end portions thereof secured directly to said strut towers on said upper ends thereof, respectively, thereby resisting inclination of said strut towers towards each other.

**4,955,663**  
**FRONT BODY CONSTRUCTION OF A VEHICLE**  
Yutaka Imura, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan  
Filed Jul. 29, 1988, Ser. No. 226,010  
Claims priority, application Japan, Aug. 1, 1987, 62-118587[U]  
Int. Cl.<sup>5</sup> B62D 27/00 11 Claims  
U.S. Cl. 296—194

1. A front body construction of a vehicle comprising:  
a front wheel apron forming part of a side wall of an engine compartment;  
a front side frame in a form of a U-shaped channel member, having an inner side wall, an outer side wall and a bottom wall, extending in a lengthwise direction from a front end to a rear end of said engine compartment and attached to said front wheel apron for supporting said front wheel apron;  
a suspension tower attached to said front wheel apron for supporting a front wheel suspension apparatus; and gussets, each including a base section and having an upper

part, said upper part being attached to said suspension tower, said base section having a lower part thereof disposed within said front side frame, said lower part being



attached to at least one of said inner side wall, said outer side wall and said bottom wall of said front side frame so that said lower part of said base section serves as a node member of said front side frame.

4,955,664

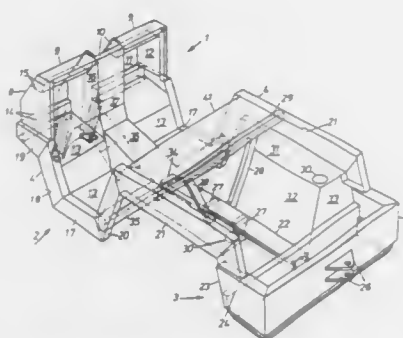
## VEHICLE, ESPECIALLY A LOADER

Karl Friedrich, Sipplingen, Fed. Rep. of Germany, assignor to Kramer-Werke GmbH, Bodensee, Fed. Rep. of Germany  
Filed Mar. 3, 1989, Ser. No. 318,665  
Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 3808314

Int. Cl.<sup>5</sup> B62D 21/07

U.S. Cl. 296—204

17 Claims

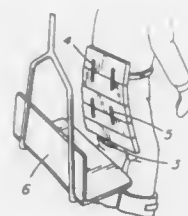


1. In a vehicle, especially a loader of the type having a loading boom linked to the front and a motor suspended at the rear of the vehicle, comprising a rigid frame including a plurality of longitudinal and transverse frame members, two longitudinal lateral frame members extending at two opposite sides of said frame and having arch portions extending over back wheels of the vehicle and in the area of a middle section of the vehicle running at a level of a vehicle floor adjoining a boarding step, the improvement comprising said two longitudinal lateral frame members each having a front section extending partially over a respective front wheel of the vehicle for supporting a front portion of the vehicle, said frame further including a central longitudinal frame member extending at about the level of the vehicle floor between axles of the wheels and rearwardly as far as a rear end of the vehicle, said central longitudinal frame member being joined to a plurality of transversal frame members and having a bottom on which axle flanges for fastening a rear axle are provided, said frame being additionally stiffened by inclusion of parts of a vehicle superstructure in the area of the rear end, front end and the boarding step of the vehicle.

4,955,665  
RETRACTABLE SEAT COVER  
Steven P. Richer, 417, Third Street E., Cornwall, Ont., Canada  
Filed Nov. 21, 1989, Ser. No. 439,806  
Int. Cl.<sup>5</sup> A47C 1/00

U.S. Cl. 297—4

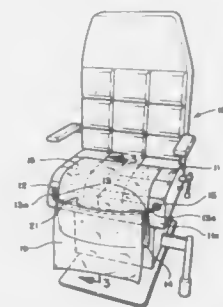
7 Claims



1. A seat covering device comprising:  
(a) a plurality of pad members each comprising a layer of flexible insulating material;  
(b) a cover for encasing said pad members and providing a flexible connection forming a fold area between adjacent pad members permitting adjacent ones of said pad members to be placed in juxtaposition with each other to form a folded article and, when unfolded about said fold area, a lay-flat article having first and second longitudinal ends; and  
(c) at least one elastic cord member secured at one end thereof to a pad member at a said first end of said lay flat article and at the other end thereof to a pad member at said second end of said lay flat article; said cord member extending freely through alternate opposed sides of each of said adjacent pad members intermediate the pad members at said first and second ends, whereby said pad members may be extended, against tension in said cord member to form said lay flat article and retract automatically to form said folded article upon release of said tension.

4,955,666  
SURGICAL CHAIR OR TABLE WITH  
DEBRIS-CATCHING FACILITY AND DISPOSABLE  
CATCH BAG THEREFOR  
Jeffrey H. Baker, Sandy, Utah, assignor to M-D, Inc., West Valley City, Utah  
Continuation-in-part of Ser. No. 332,333, Apr. 3, 1989, abandoned. This application May 19, 1989, Ser. No. 355,230  
Int. Cl.<sup>5</sup> A47D 15/00  
U.S. Cl. 297—182

20 Claims

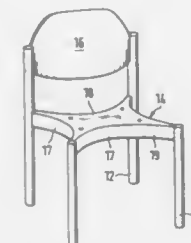


1. A disposable receptacle for use with a medical or surgical chair or table during examination of, or a surgical procedure on, a patient sitting or lying on the chair or table so as to protect the chair or table from soiling or contamination by liquids and debris used in or resulting from the examination or surgical procedure and to collect and retain such liquids and

debris for disposal; comprising a wide bag of disposable, liquid-imperious, flexible sheet material having a relatively narrow receiving opening extending from side-to-side of the bag; a flap of similar sheet material extending from and along one width margins of said opening for covering an adjacent portion of the seat of the chair or the top of the table that is likely to be soiled during said examination or surgical procedure when said bag is positioned at the front of said chair or table in open condition at or below the level of said seat of the chair or top of the table to be held in place under the weight of a patient sitting or lying on said flap; and means extending along another width margin of said opening for bowing outwardly of said opening in the forming of said opening to receive said liquids and debris.

4,955,667  
SEATING IN THE FORM OF A CHAIR OR SIMILAR  
PIECE OF FURNITURE  
Rolf Brunner, Rheinau-Helmlingen, Fed. Rep. of Germany, assignor to Brunner GmbH, Rheinau-Freistett, Fed. Rep. of Germany  
Filed Aug. 24, 1989, Ser. No. 398,245  
Claims priority, application Fed. Rep. of Germany, Aug. 25, 1988, 3828808  
Int. Cl.<sup>5</sup> A47C 1/12  
U.S. Cl. 297—446

9 Claims



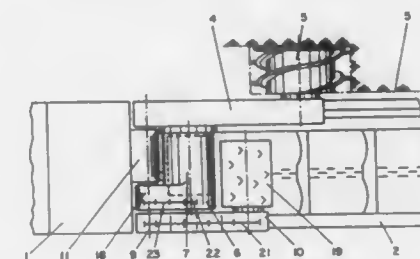
1. A seating arrangement comprising: a chair with at least three legs and a holding frame; said legs being attached to said holding frame; said holding frame being a support for a seat in vicinity of a seating plane; said holding frame comprising a box-shaped frame having a top plate member and a bottom plate member, spaced from said top plate member; and side members connecting fixedly edges of said top plate member and edges of said bottom plate member to prevent shifting of said top plate member and said bottom plate member relative to each other.

4,955,668  
DRUM CUTTER-LOADER EQUIPPED WITH AN  
AUXILIARY DRUM  
Herbert Schupphaus, Bochum, Fed. Rep. of Germany, assignor to Gebr. Eickhoff Maschinenfabrik u. Eisenteile mfg., Bochum, Fed. Rep. of Germany  
Filed Jan. 8, 1989, Ser. No. 363,625  
Claims priority, application Fed. Rep. of Germany, Jan. 24, 1988, 3821307  
Int. Cl.<sup>5</sup> E21C 25/08, 35/20  
U.S. Cl. 299—42

9 Claims

1. A drum cutter-loader mining machine comprising:  
a machine body carrying a support arm which rotatably supports a cutting drum, said support arm being pivotally attached to said machine body;  
a motor for driving said cutting drum, said motor being connected to said cutting drum by gearing;  
a jib carried by said machine body, said jib being pivotally attached to said machine body and rotatably supporting an auxiliary drum;

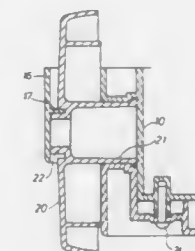
means for permitting independent pivoting of the support arm and the jib about a common pivot axis; and



gear means arranged coaxially with said common pivot axis for producing a geared communication between the auxiliary drum and the motor for driving the cutting drum.

4,955,669  
WHEEL BEARING ARRANGEMENT FOR SUCTION  
CLEANER  
Jan T. Jankevics, Vällingby, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden  
Filed May 3, 1989, Ser. No. 346,800  
Claims priority, application Sweden, May 20, 1988, 8801909  
Int. Cl.<sup>5</sup> B60B 19/00  
U.S. Cl. 301—1

3 Claims



1. Wheel bearing arrangement for a suction cleaner, in which a wheel (20), having an inside and an outside, has a shaft (21) made integral therewith on its inside, the suction cleaner comprising a first housing portion (10) provided with a first bearing member (11) having a first bearing surface (12) enclosing half the circumference of the shaft, and a second housing portion (15) provided with a second bearing member (13) having a second bearing surface (14) enclosing the remaining half circumference of the shaft, wherein the wheel (20) has a pivot (22) on its outside and that the first housing portion (10) comprises a supporting wall (16) extending along the outside of the wheel and having a third bearing member (17) cooperating with said pivot (22).

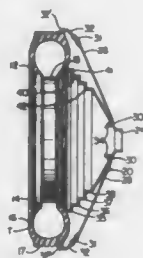
4,955,670  
SHIELD FOR DETAILING VEHICLE TIRES  
William R. Koller, 12235 W. 61st Ave., Arvada, Colo. 80004  
Filed Jun. 23, 1989, Ser. No. 370,822  
Int. Cl.<sup>5</sup> B60B 7/00; B05C 21/00  
U.S. Cl. 301—37 R

12 Claims

1. A motor vehicle detailing shield for releasably covering a vehicle wheel cover having an outer peripheral rim when a detailing solution is to be applied to the sidewall of a vehicle tire seated on the rim portion of said wheel cover, said shield comprising:  
a generally bowl-shaped body having an inclined wall terminating in an axially extending outer peripheral edge portion and a plurality of circumferentially extending markings in spaced concentric relation to one another and in



adjacent but spaced relation to said outer peripheral edge portion, said markings describing circumferential lines of separation along said inclined wall for selective removal of circumferential portions of said body disposed radially and outwardly of a selected one of said markings whereby



the diameter of said body will substantially conform to the diameter of said wheel cover; and securing means associated with said body for releasably positioning said body over said wheel cover when said solution is to be applied to the sidewall.

4,955,671

## ANTISKID CONTROL DEVICE

Hideaki Higashimura, Itami, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

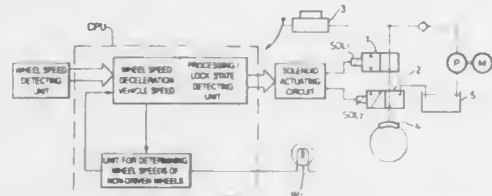
Filed Feb. 8, 1989, Ser. No. 310,829

Claims priority, application Japan, Feb. 10, 1988, 63-29745

Int. Cl.<sup>5</sup> B60T 8/10

U.S. Cl. 303—92

3 Claims



1. In an antiskid control device of an automotive vehicle, the antiskid control device having a processing/lock state detecting means for executing logical operations on the basis of wheel speed signal supplied from a wheel speed detecting unit to determine whether the wheels are entering into a locking state and whether the wheels are recovering from a locking state, and for transmitting signals to reduce, hold and increase a braking pressure on the basis of the thus executed logical operations, the antiskid control device further including solenoid activating means for actuating solenoids for pressure control valves in hydraulic circuits in response to the signals transmitted from the processing/lock state detecting means, the improvement comprising a malfunction detecting means for detecting a malfunction of the wheel speed detecting means, said malfunction detecting means comprising:

- means for detecting a first state in which a predetermined one of the driven wheels has reached a predetermined speed;
- means for detecting a second state in which a difference in wheel speed between said predetermined driven wheel and all of the non-driven wheels has exceeded a predetermined value during said first state;
- count timer means for increasing a count thereof during said second state; and
- malfunction indication means for indicating a malfunction of the wheel speed detecting means in response to said count of said count timer exceeding a predetermined value.

4,955,672

## DRAWER INTERLOCK

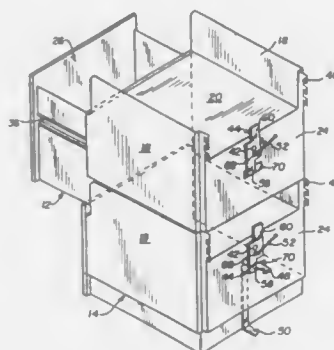
Dinh-Tuong Pham, Hudsonville, Mich., assignor to Herman Miller, Inc., Zeeland, Mich.

Filed May 16, 1989, Ser. No. 352,280

Int. Cl.<sup>5</sup> A47B 87/00

U.S. Cl. 312—107.5

19 Claims



1. In a drawer and cabinet assembly having a cabinet housing means with side walls, a back wall and an open front, upper and lower drawers, the upper and lower drawers, each having at least side walls and a back wall, are each mounted to the cabinet housing means in vertical juxtaposed position for horizontal sliding movement between a retracted position in the cabinet housing means and an extended position partially out of the front of the cabinet housing means, and an interlock assembly to prevent movement of more than one drawer out of the front of the cabinet housing means at one time;

the improvement in said interlock assembly comprising a latch pivotably mounted to the cabinet housing means back wall proximate to the back wall of the upper and lower drawers, said latch having an upstanding catch and a depending catch extending from a central portion in relative vertical juxtaposition;

a first retaining means mounted to the upper drawer and having a side edge in registry with the latch upstanding catch when the upper drawer is closed, said first retaining means further having an indented notch offset laterally of the side edge and rearwardly of the side edge, said offset notch adapted to engage the upstanding catch only when the latch rotates toward the upper retaining means from the side edge engaging orientation and the upper drawer is withdrawn slightly from the cabinet housing means;

a second retaining means mounted to the lower drawer and having a side edge in registry with the latch depending catch when the lower drawer is closed, said second retaining means having an indented notch offset laterally from the side edge of the lower retaining means and rearward of the same, said second retaining means offset notch adapted to engage the depending catch only when the latch rotates toward the lower retaining means from the side edge engaging orientation and the lower drawer is withdrawn slightly from the cabinet housing means;

means biasing the latch into engagement with the side edges of the upper and lower retaining means; whereby the upper and lower drawers are able to freely move into and out of the cabinet individually but are prevented from moving out of the cabinet in the event that the other of the two drawers has been moved out of the cabinet.

4,955,673

## ARRANGEMENT OF ELECTRONIC ANTISKID BRAKE SYSTEM

Mitsunobu Fukuda, Kawasaki, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

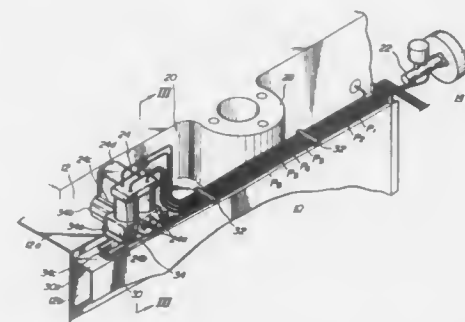
Filed Jan. 12, 1988, Ser. No. 143,091

Claims priority, application Japan, Jan. 13, 1987, 62-3435[U]

Int. Cl.<sup>5</sup> B60T 8/32

U.S. Cl. 303—113

10 Claims



1. In a motor vehicle having an engine room, hood ridges between which said engine room is defined, and an electrically controlled antiskid brake system, an arrangement comprising:

a side member secured to one of said hood ridges and extending along longitudinal axis of said vehicle;

an electric actuator which constitutes part of said antiskid brake system, said actuator being mounted on said side member;

a plurality of brake pipes which constitute part of said antiskid brake system and extend from said electric actuator, said brake pipes running along said side member and secured to the same;

said side member being a generally channel-like member which has an elongate flat track portion on which said electric actuator and said brake pipes are tightly disposed; and

a mounting device through which said electric actuator is connected to said track portion, said mounting device including a first holder portion which receives a first portion of said actuator and a second holder portion which receives a second portion of said actuator.

4,955,674

## ANTI-LOCKING HYDRAULIC BRAKE SYSTEM

Holger V. Hayn, Bad Vilbel, and Juergen Rauch, Eschborn/Ts., both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 13, 1989, Ser. No. 406,484

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1988, 3832538

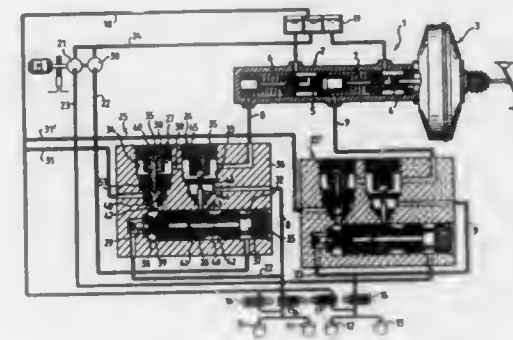
Int. Cl.<sup>5</sup> B60T 8/42

U.S. Cl. 303—114

10 Claims

1. An anti-locking hydraulic brake system comprising a master brake cylinder and an associated pressure fluid reservoir, wheel brakes and brake conduits connecting the wheel brakes with the master brake cylinder, a return conduit connecting the wheel brakes with the reservoir, inlet valves inserted into the brake conduits and outlet valves inserted into the return conduit, sensors for detecting the rotational pattern of the wheels and an electronic control unit for evaluating the wheel sensor signals and generating control signals for operating the inlet and outlet valves, at least one pump delivering fluid from the reservoir through pressure conduits into the brake conduits, a check valve arranged so as to be under the control of the pump pressure for interrupting the brake conduit, a control valve for adjusting the pressure in the pressure

conduits so that it is proportional to the pressure in the master cylinder, a diaphragm inserted into the pressure conduit and a piston located in the pressure conduit with a chamber on oppo-



site sides of the piston, the piston cooperating with a closure member associated with the check valve such that the brake conduit is interrupted upon a movement of the piston under the action of the dynamic pressure upstream of the diaphragm.

4,955,675

## HINGED PANELS WITH FOAMED-IN-PLACE INSULATION

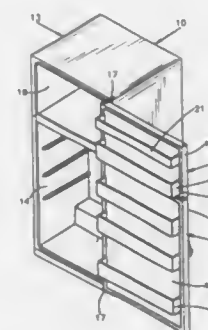
David J. Donaghy, Gowen, Mich., assignor to White Consolidated Industries, Inc., Cleveland, Ohio

Filed Apr. 17, 1989, Ser. No. 339,157

Int. Cl.<sup>5</sup> A47B 81/00

U.S. Cl. 312—214

11 Claims



1. An insulated hinge panel for thermal cabinets comprising a polygonal shell having corners and defining at least part of a cavity, hinge bearings mounted in said shell adjacent to said corners, said hinge bearings extending into said cavity and defining a generally cylindrical passage adapted to receive and journal a hinge pin, said cylindrical passage being open at an outer end exterior of said shell and substantially closed at its inner end by an inner end wall, and insulation foamed in place filling said cavity including said corners, said hinge bearings providing at least one vent opening through which gases within said cavity are vented while said insulation is foamed so that said foam substantially fills said corners, said at least one vent opening being sized and shaped to allow gases to vent while preventing said foam insulation from entering said cylindrical passage.

4,955,676

## REFRIGERATOR MULLION CONSTRUCTION

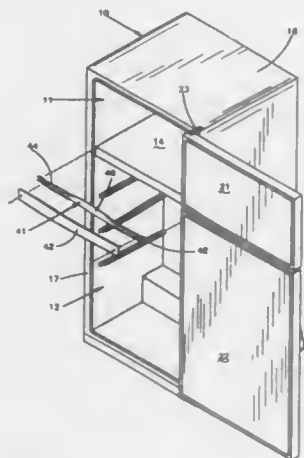
Douglas E. Weaver, and Harold S. Mawby, both of Greenville, Mich., assigns to White Consolidated Industries, Inc., Cleveland, Ohio

Filed Aug. 29, 1989, Ser. No. 400,284

Int. Cl.<sup>5</sup> A47B 81/00

U.S. Cl. 312—214

12 Claims



1. A refrigerator cabinet comprising a shell having side walls, a top wall, and a bottom wall, said walls defining an opening and having intumed edges defining a face around said opening, said edges including re-entrant and reversed flanges forming a groove between said flanges behind said face, a liner within said shell defining a chamber and having an outwardly extending flange received within said groove, a horizontal partition within said liner separating the interior of said liner into top and bottom compartments, a mullion cover on the front face of said partition extending between the edges of said side walls, a mullion strap behind said mullion cover having an end portion at each end and a center portion interconnecting said end portions, said center portion being flat and flexible, each of said end portions extending into the adjacent groove, each of said end portions being formed as a channel having an open side adjacent said mullion cover whereby said mullion cover and said mullion strap form a rectangular box at each end.

4,955,677

## SAND PAPER ORGANIZER AND DISPLAY RACK

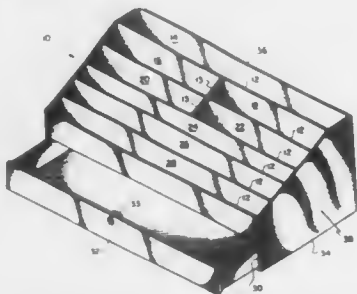
In W. Song, 6038 Santa Monica Blvd., Los Angeles, Calif. 90038

Filed Aug. 1, 1988, Ser. No. 227,061

Int. Cl.<sup>5</sup> A47B 81/00

U.S. Cl. 312—290

3 Claims



2. A two position cabinet for displaying articles in a vertical position or a horizontal position, a plurality of divider walls dividing the cabinet into a plurality of differently sized article

receiving slots so that when the cabinet is in one position the articles will be displayed in a vertical position and when the cabinet is in the other position the articles will be displayed in a horizontal position, said cabinet having at least one pair of identically sized drawer receiving slots, each said drawer receiving slot being defined by a width, length, and depth dimension, the corresponding width, length, and depth dimension of each drawer receiving slot being identical, the slots in each pair transverse to each other and sized to receive a drawer, said drawer receiving slots positioned so that regardless of whether the cabinet is in one position or in a transverse position, one of the drawer receiving slots is along a wall of the cabinet and the other drawer receiving slot is in a horizontal position adapted to receive a drawer.

4,955,678

## ENGAGING STRUCTURE FOR A MOUNTABLE/DISMOUNTABLE ELECTRONIC APPARATUS USED IN A VEHICLE

Shigeotshi Kobayashi, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

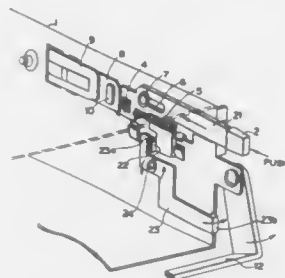
Filed Jun. 30, 1989, Ser. No. 375,244

Claims priority, application Japan, Jul. 4, 1988, 63-87968

Int. Cl.<sup>5</sup> A47B 88/00

U.S. Cl. 312—320

6 Claims



1. An apparatus comprising: first and second members, said first member being insertable into said second member in a first direction and being removable from said second member in a second direction opposite said first direction; engaging means operable when said first member is in said second member for releasably coupling said first and second members in a manner preventing movement of said first member in said second direction relative to said second member; a carrying handle supported on said first member for movement between retracted and carrying positions; a manually operable releasing part supported on said first member for movement between first and second positions; first means for causing said engaging means to interrupt said releasable coupling of said first and second members in response to movement of said releasing part from its first position to its second position; and second means for moving said carrying handle from its retracted position to its carrying position in response to movement of said releasing part from its first position to its second position.

4,955,679

## INFORMATION ORGANIZER

Herman F. Russell, P.O. Box 334, La Center, Ky. 42056, and Ray E. Lynn, Rte. 1, Box 218, Wickliffe, Ky. 42087

Filed Oct. 6, 1989, Ser. No. 417,908

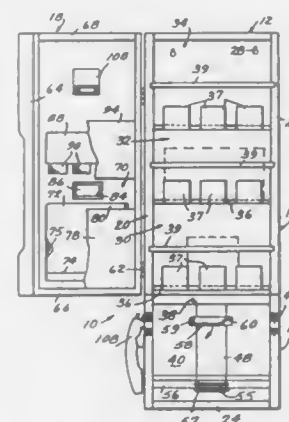
Int. Cl.<sup>5</sup> A47B 81/00

U.S. Cl. 312—321.5

5 Claims

1. An organizer comprising a vertically elongate housing with an open front, a mounting panel generally coextensive with said open front of the housing, means for pivotally mounting said mounting panel on said housing for selective movement outward relative to the housing to an open position remote from said open front, said mounting panel having a front face for display of a multiple information-providing

components, and a rear face, said information-providing components including clock means mounted on said panel and displayed on said front face, at least one display pocket, said at least one display pocket comprising a recess formed in the mounting panel through the rear face, said recess being of a depth to receive multiple stacked sheet-like information elements with display faces directed toward the front face of the mounting panel, and an opening through the front face of the



mounting panel generally aligned with said recess for display of a recess-received element, said recess extending laterally beyond said opening inward of said front face of said mounting panel for retention of said elements against unrestricted withdrawal through said opening, a backing panel engaged over the rear of the recess at the rear face of the mounting panel for retention of the elements, and multiple storage components mounted inward of said mounting panel for concealment within said housing.

4,955,680

## METHOD AND APPARATUS FOR AUTOMATICALLY ADJUSTING THE FOCUS OF CATHODE RAY TUBES

Ruediger Froese-Peeck, and Richard Poleschinski, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

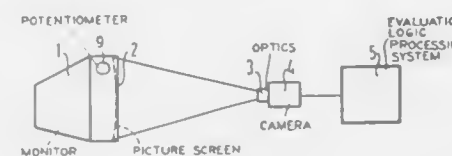
Filed Mar. 6, 1989, Ser. No. 318,830

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1988, 3809602

Int. Cl.<sup>5</sup> H01J 29/58

U.S. Cl. 315—382

6 Claims



1. A method for the automatic calculation of the image focus of a cathode ray tube which has a cathode beam which scans the screen of said tube with parallel scan lines which extend in a first direction and which has a focussing potentiometer, such as monochromatic and color monitors (1), comprising the steps of producing on the screen of the cathode ray tube (2) an image having an optimal number of black to white transitions, for example forming a fine checkerboard pattern or a fine line pattern, detecting said entire image with a first solid-state camera which includes a pickup tube which is scanned by a beam in parallel scan lines which extend in a second direction which is so mounted that said first direction is at right angles to said second direction and wherein said camera records with at least double resolution, acquiring with an image processing system (5) the fine point structure of the image with full resolu-

tion, calculating the image focus on the basis of a histogram calculation, and adjusting said focussing potentiometer in the deflection assembly of said cathode ray tube using the data from the histogram curve.

4,955,681

## IMAGE DISPLAY APPARATUS HAVING SHEET LIKE VERTICAL AND HORIZONTAL DEFLECTION ELECTRODES

Toshinobu Sekihara, Osaka; Mitsunori Yokomakura, Takatsuki; Yuichi Moriyama, Ibaraki; Michiaki Watanabe, Ibaraki; Tomohiro Sekiguchi, Ibaraki; Keiji Nagata, Hirakata, and Takatsugu Kurata, Ibaraki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

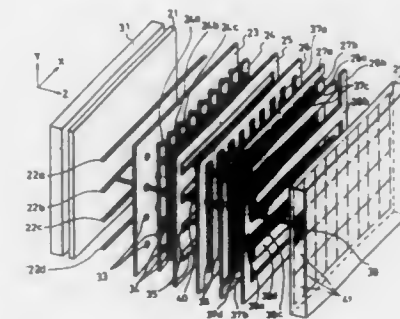
Filed Nov. 16, 1988, Ser. No. 271,821

Claims priority, application Japan, Nov. 16, 1987, 62-288762; Jul. 25, 1988, 63-184962

Int. Cl.<sup>5</sup> H01J 19/28, 29/74

U.S. Cl. 313—495

10 Claims



1. An image display apparatus comprising: a plurality of line cathodes which are extended in parallel with each other to emit electrons; an electron beam extraction electrode for extracting electron beams from said line cathodes; a control electrode for selectively controlling a passing amount of electron beams having passed through said electron beam extraction electrode; a first focusing electrode for electrostatically focusing electron beams having passed through said control electrode, said first focusing electrode being of a conductive sheet in which a plurality of oblong apertures elongated in an extended direction of said line cathodes are formed; a second focusing electrode which is disposed adjacent to said first focusing electrode and electrostatically focuses electron beams having passed through said first focusing electrode, said second focusing electrode being of a conductive sheet in which a plurality of oblong apertures elongated in a perpendicular direction to the extended direction of said line cathodes are formed; a deflection electrode for deflecting electron beams having passed through said second focusing electrode; and display means for emitting light by receiving electron beams having passed through said deflection electrode thereon.

4,955,682

## SCANNING OPTICAL SYSTEM

Katsumi Yamaguchi, Fuchu, and Nobuo Sakuma, Inagi, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 28, 1989, Ser. No. 386,256

Claims priority, application Japan, Aug. 1, 1988, 63-192344

Int. Cl.<sup>5</sup> G02B 26/10, 3/02

U.S. Cl. 350—6.8

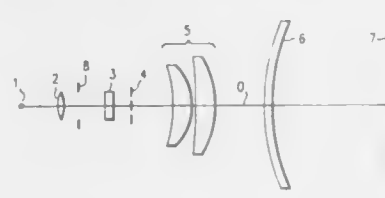
5 Claims

1. A scanning optical system for use in a light scanner including a light deflector for deflecting a light beam to scan a surface, said scanning optical system being adapted to be disposed



between the light deflector and the scanned surface for focusing the deflected light beam onto the scanned surface and for keeping the scanned surface and a light beam deflecting point in substantially conjugate relationship in an auxiliary scanning direction, said scanning optical system comprising:

a saddle-shaped convex toroidal surface having a radius of curvature in a cross section along the auxiliary scanning direction, said radius of curvature being progressively greater in a direction away from the optical axis of the scanning optical system; and



the scanning optical system satisfying the following condition:

$$d/f_M > 0.6$$

where  $f_M$  is the focal length of the scanning optical system in a main scanning plane and  $d$  is the distance on the optical axis between said saddle-shaped toroidal surface and the scanned surface.

4,955,683

#### APPARATUS AND A METHOD FOR COUPLING AN OPTICALLY OPERATIVE DEVICE WITH AN OPTICAL FIBER

Nobuo Shiga, Takeshi Sekiguchi, and Keigo Aga, all of Kanagawa, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

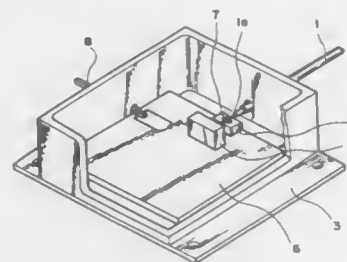
Filed Apr. 18, 1989, Ser. No. 339,799

Claims priority, application Japan, Apr. 22, 1988, 63-100927; Apr. 22, 1988, 63-100928

Int. Cl. G02B 6/36

U.S. Cl. 350-96.20

19 Claims



15. A method of fabricating a device for coupling an optically operative device with an optical fiber, said method comprising the steps of:

- affixing a saddle and an optically operative device on a single ceramic board;
- disposing said ceramic board in a metal package,
- placing a solder block having a bridge-like shape on said saddle,
- inserting a leading edge of an optical fiber through an opening provided in said metal package into said metal package so that said solder block bridges over said optical fiber; and,
- positioning said optical fiber in optical connection with said optically operative device and thereafter melting said solder block to affix said optical fiber on said saddle.

4,955,684

#### OPTICAL MODULE COUPLING DEVICE

Nobuo Shiga, Yokohama, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

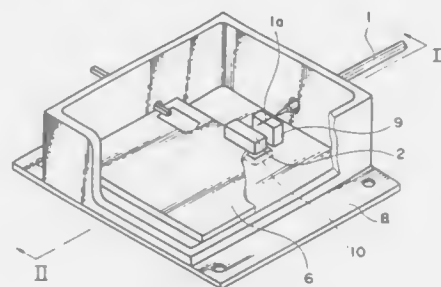
Filed Aug. 9, 1989, Ser. No. 391,050

Claims priority, application Japan, Aug. 24, 1988, 63-210119

Int. Cl. G02B 6/42

U.S. Cl. 350-96.20

10 Claims



9. An optical module coupling device comprising:

- a metallic package;
  - a substrate made of insulative material and provided on the bottom of said package, said substrate having a conductive land thereon; and
  - a chip carrier mounted on said substrate and having an optical unit to be optically coupled with an end of an optical fiber extending into said package;
- said bottom of said package having a recess at an area which is opposite to said land, and said device including a parallel plate capacitor formed by said land and said bottom of said package.

4,955,685

#### ACTIVE FIBER FOR OPTICAL SIGNAL TRANSMISSION

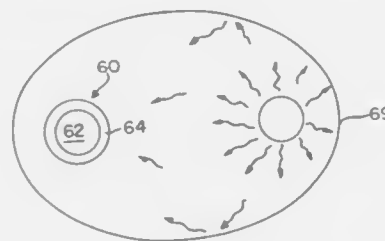
Jonathan D. Garman, Los Altos, Calif., assignor to Sun Microsystems, Inc., Mountain View, Calif.

Filed Feb. 21, 1989, Ser. No. 312,907

Int. Cl. G02B 6/10

U.S. Cl. 350-96.3

21 Claims



1. An improved optical fiber for carrying an optical signal comprising:

- an optically transparent core having a first index of refraction, said core being doped with a lasing material such that said core is doped having the greatest concentration of said dopant at the center of said core and said dopant is diffused outward from said center into said cladding;
  - an optically transparent cladding surrounding said core having a second index of refraction which is lower than said first index of refraction;
  - pumping means spatially disposed parallel to said cladding for providing light through said cladding and into said core, such that said lasing material lases at a desired wavelength and provides continuous gain for said optical signal;
- whereby said optical signal is provided gain by said lasing.

4,955,686

#### OPTICAL FIBER CROSSCONNECT SWITCH

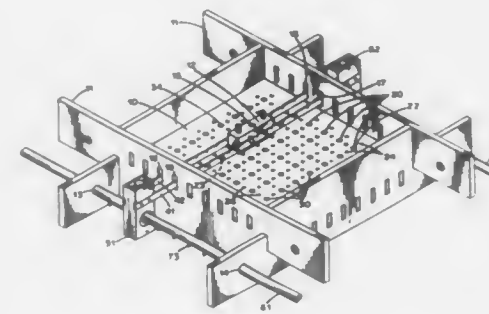
Carl F. Behrer, Framingham; W. John Carlson; Sarah S. Connors, both of Boston, and Alfred H. Bellows, Wayland, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Jun. 16, 1989, Ser. No. 367,909

Int. Cl. G02B 6/36

U.S. Cl. 350-96.20

16 Claims



9. An optical fiber crossconnect switch for the reconnection of  $n$  input optical fibers, each terminated in a standard connector device, with  $n$  output optical fibers, each terminated in a standard connector device, comprising:

- a plate having an  $n$ -by- $n$  array of optical fiber connector adapters;
  - $n$  input optical fiber connectors on a first side of said plate, each of which is repositionable along one row of said array to any of  $n$  positions each in a different column of said array;
  - $n$  output optical fiber connectors on a second side of said plate opposite to said first side, each of which is repositionable along one column of said array to any of  $n$  positions each in a different row of said array; and
  - repositioning means on each side of said plate, comprising:  $2n$  carriers, one carrier for each of said  $2n$  optical fiber connectors;
- means to mount one optical fiber connector in each of said carriers;
- each of said first  $n$  carriers being positioned over one of said  $n$  rows of adapters on said first side of said plate;
- each of said second  $n$  carriers being positioned over one of said  $n$  columns of adapters on said second side of said plate;
- means to raise each of said carriers to disengage said connector within said carrier and means to lower each of said carriers to engage said connector in an adjacent one of said adapters; and
- means to move said carrier linearly from one adapter position to another adapter position in the same row or column;
- whereby each of said  $2n$  optical fibers may be repositioned by withdrawing its connector from one of said adapters, translating said connector along a row or column and reinserting said connector into an adjacent adapter in the same row or column;
- such that any one of said  $n$  input optical fibers terminated in a standard connector on one side of said plate may be connected through one of said adapters to any one of said  $n$  output optical fibers terminated in a standard connector on said second side of said plate, whereby said output optical fiber will carry the same light that entered at the input optical fiber to which it is connected.

4,955,687

#### FIBER OPTIC TELESCOPE

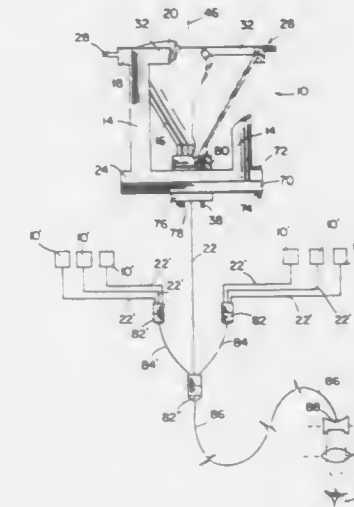
Thomas L. Pafford, 419 San Rise Ave., Cocoa Beach, Fla. 32931

Continuation-in-part of Ser. No. 889,223, Jul. 25, 1986, Pat. No. 4,828,348. This application Mar. 8, 1989, Ser. No. 320,528

Int. Cl. G02B 6/06

U.S. Cl. 350-96.25

14 Claims



1. A fiber optic telescope for delivering a coherent image, i.e., coherent electromagnetic radiation to a locus of useful application, comprising:

- (a) at least two collector cells for collecting the electromagnetic radiation;
- (b) first focussing means for focussing the coherent electromagnetic radiation collected by said at least two collector cells;
- (c) first fiber waveguide means having a collector cell end and a converging end and being in optical communication at its collector cell end with said at least two collector cells for receiving the coherent image, i.e., the coherent electromagnetic radiation from said at least two collector cells and in optical communication at its converging end with a converging means; and
- (d) a converging means for receiving the coherent electromagnetic radiation from said first waveguide means and focussing and converging the coherent image, i.e., the electromagnetic radiation and directing it to a locus of useful application.

4,955,688

#### OPTICAL FIBER PACKAGE AND METHODS OF MAKING

John T. Chapin, Alpharetta; Charles W. Jackson, Dunwoody; Thomas O. Mensah, Doraville, and Mickey R. Reynolds, Lawrenceville, all of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 27, 1989, Ser. No. 328,930

Int. Cl. G02B 6/02

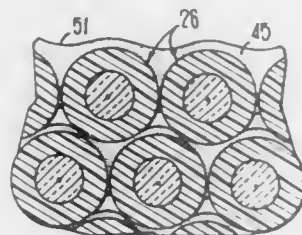
U.S. Cl. 350-96.29

13 Claims

1. A package of elongated optical transmitting medium from which the elongated optical transmitting medium may be payed out, said package comprising:

- a plurality of convolutions of an elongated optical transmitting medium which are disposed with adjacent convolutions being in engagement with one another; and
- an adhesive material which has been applied to said convolutions and which comprises a mixture which includes a silicone adhesive constituent having a modulus behavior

which is relatively stable with respect to time over a relatively wide range of temperature at payout speeds which may be at least as much as about 300 meters per second.



which may be at least as much as about 300 meters per second.

4,955,689

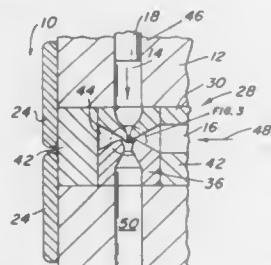
## IR TRANSMITTING OPTICAL FIBER

Terry A. Fuller, Highland Park; Vijay J. Nadkarni, Mundelein, and John R. Peschke, Woodstock, all of Ill., assignors to Fuller Research Corporation, Huntingdon Valley, Pa. Division of Ser. No. 134,276, Dec. 17, 1987. This application Oct. 24, 1988, Ser. No. 261,958

Int. Cl.<sup>5</sup> G02B 6/00

U.S. Cl. 350-96.34

12 Claims



## 1. An optical fiber comprising:

- (a) a halide core having a substantially single crystal of said halide across an axial face of said core, said single crystal extending axially along said core; and
- (b) a polycrystalline halide cladding surrounding said core, said core and said cladding having different indices of refraction from one another, said core being prepared by the extrusion of a first halide billet through a first die after said first billet was heated to a temperature just below its melting point, and said cladding being prepared by the extrusion of a second halide billet through a second extrusion die after said second billet was heated to a temperature just below its melting point.

4,955,690

## THIN CALIPER RETROREFLECTIVE TRANSFER

Chester A. Bacon, Jr., Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 24, 1989, Ser. No. 326,480

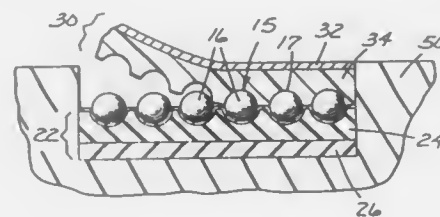
Int. Cl.<sup>5</sup> G02B 5/128, 5/134

U.S. Cl. 350-105

22 Claims

- 1. A retroreflective transfer comprising (a) support layer, at least the back stratum of which is a vulcanizable or curable elastomer, said support layer having an effective thickness of less than about 3 mils; (b) a monolayer of retroreflective elements partially embedded in and protruding from said support layer, at least some of said retroreflective elements being oriented such that the front surfaces of said retroreflective ele-

ments protrude from said support layer so as to permit light incident thereto to be retroreflected by said retroreflective



4,955,691

## OPTICAL PARALLEL PROCESSOR

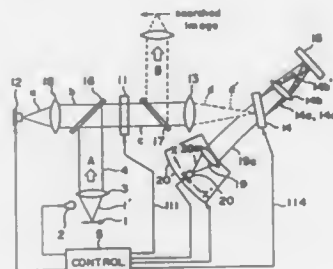
Hironobu Mifune; Toshio Inada; Aki Ueda, and Yukio Ogura, all of Yokohama, Japan, assignors to Ricoh Company, Ltd., Japan

Filed Jun. 13, 1989, Ser. No. 367,755

Int. Cl.<sup>5</sup> G02B 26/08, 27/42, 27/46

U.S. Cl. 350-162.13

8 Claims



## 1. An optical processing system comprising:

- first light source means for producing a first coherent optical beam;
- modulating means written with an input image for modulating said first coherent optical beam passing therethrough according to the input image, wherein said modulating means comprises a medium for allowing erasing and re-writing of information by a writing optical beam and is provided in an optical path of the first coherent optical beam;
- image input means for writing the input image on said modulating means by means of an incoherent optical beam;
- optical Fourier transform means provided in an optical path of the first coherent optical beam exited from the modulating means for producing a Fourier transform of the input image on its focal plane;
- optical memory means for storing a plurality of image informations in the form of a Fourier transform hologram at the focal plane of said optical Fourier transform means, wherein said optical memory means comprises a medium which allows erasing and re-writing of information by said modulated, first coherent optical beam and produces a number of second coherent optical beams which differ in angle from each other responsive to irradiation of the first coherent optical beam via said optical Fourier transform means;
- image detection/light source means for producing a third coherent optical beam in correspondence to the one of the second optical beams which has the maximum intensity along a path of said second coherent optical beam in an approximately reversed direction, said third coherent

optical beam producing a fourth coherent optical beam as an output beam upon incidence to the optical memory means such that the fourth coherent optical beam propagates in a direction opposite to that of the first coherent optical beam;

- second light source means provided so as to irradiate said optical memory means by a fifth coherent optical beam as a reference light for rewriting the information;
- image output means provided in an optical path of the fourth coherent optical beam for directing the fourth coherent optical beam to outside of the system; and
- a controller connected to said image input means, first light source means and second light source means for controlling energization of said image input means and said first and second light source means, said controller being further connected to said modulating means and optical memory means for clearing information written thereon.

4,955,692

## LASER SCANNER HAVING IMPROVED OPTICAL SCANNING WINDOW

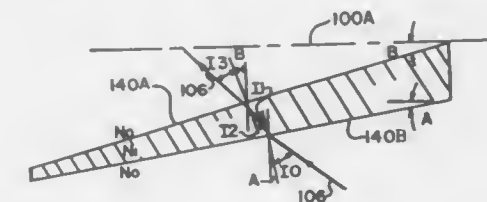
Mohan L. Bobba, Eugene, Oreg., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Jan. 9, 1989, Ser. No. 364,083

Int. Cl.<sup>5</sup> G02B 27/02; G06K 7/10

U.S. Cl. 350-319

17 Claims



## 8. A laser scanner comprising:

- a scanning face including an opening therein through which a laser beam is scanned to define a scanning pattern extending from said face;
- laser beam generating means for producing a laser beam;
- laser beam sweeping means for receiving said laser beam and sweeping said laser beam through said opening;
- window means formed of optical material and associated with said opening for protecting said laser scanner and passing said laser beam through said opening; and
- support means for supporting said window means such that at least one surface thereof is angularly oriented relative to said scanning face to improve the incidence angles of said laser beam on said window means and/or the refractive angles at said window means to increase an effective scan volume of said laser scanner.

4,955,692

## QUASI-PERIODIC LAYERED STRUCTURES

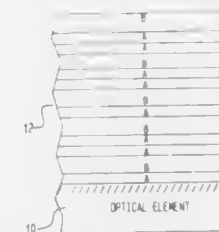
Roberto Merlin, and Roy Clarke, both Ann Arbor, Mich., assignors to The University of Michigan, Ann Arbor, Mich.

Filed Aug. 19, 1986, Ser. No. 898,015

Int. Cl.<sup>5</sup> G02B 1/10

U.S. Cl. 350-166

17 Claims



- 1. A process of making an optical coating for reflecting x-ray energy having a predetermined wavelength characteristic, the optical coating being formed of a respective plurality of each of n types of thin film layers, the process comprising the steps of:

- first defining the n types of thin film layers, where n is an integer having a value which is at least three, each of the n types of thin film layers being characterized by a respective predetermined thickness in the range of approximately between 5 Å and 5000 Å and corresponding substantially to the predetermined wavelength characteristic of the x-ray energy;
- second defining a selection matrix having n columns by n rows, said selection matrix having a non-zero determinant and a first element equal to unity, for determining a quasi-periodic sequence of said n types of layers; and
- applying a respective plurality of the n types of thin film layers, said application of said pluralities of said n types of the thin film layers being performed so that respective ones of the n types of the thin film layers are interleaved in accordance with a predetermined sequence of groupings of the thin film layers, each grouping in said predetermined sequence of groupings being configured in response to the configuration of a sequence of a prior grouping of the thin film layers, and in response to said selection matrix which defines the configuration of the sequence of each subsequent grouping.

4,955,694

## PROCESS FOR PRODUCING HOE'S FOR USE IN COMBINATION TO PRODUCE A TELECENTRIC BEAM

Beda Käser, Brügg, Switzerland, assignor to Zambach Electronic AG, Orpund, Switzerland

Division of Ser. No. 29,436, Mar. 23, 1987, Pat. No. 4,832,426.

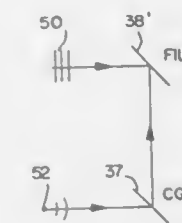
This application Oct. 27, 1988, Ser. No. 224,990

Claims priority, application Switzerland, Apr. 3, 1986, 1299/86

Int. Cl.<sup>5</sup> G03H 1/04; G02B 5/32

U.S. Cl. 350-320

3 Claims



- 1. A method of producing a first holographic optical element from a light sensitive material, that can be combined with a second holographic optical element to direct a telecentric light beam from the first holographic optical element in a plane in a telecentric direction, by diffraction of a light beam deflected through an angular range at a focal point of the combination of the first holographic optical element and the second holographic optical element, the method comprising the steps of: disposing a point light source, the second holographic optical element and the light sensitive material in successively spaced relation with the second holographic optical ele-



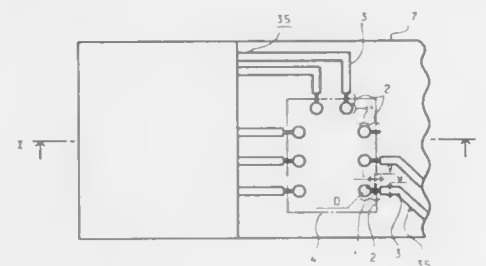
ment between the point light source and the light sensitive material, the point light source and the second holographic optical element being disposed at positions relative to the light sensitive material that are the same as the respective positions, in the combination, of the intended focal point of the combination and the second holographic optical element relative to the first holographic optical element to be produced;

illuminating the second holographic optical element with coherent wavefronts of radiation from the point light source;

directing the radiation from the second holographic optical element onto the light sensitive material such that the radiation impinges on the light sensitive element at respective positions which are spaced apart by respective distances measured in the plane in a direction perpendicular to the intended telecentric direction of the telecentric beam, the distances being linearly related to angles of the radiation relative to the point light source as it leaves the point light source; and

concurrently with said steps of illuminating and directing, illuminating the light sensitive material with wavefronts of coherent light from a plane wave running in the intended telecentric direction.

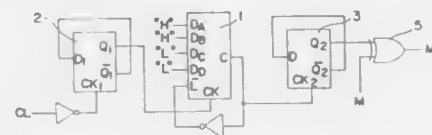
4,955,695  
**LIQUID CRYSTAL DISPLAY DEVICE**  
 Kiichiro Kubo, and Masamichi Moryia, both of Mobar, Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Nov. 22, 1988, Ser. No. 274,906  
 Claims priority, application Japan, Dec. 2, 1987, 62-303106  
 Int. Cl.<sup>5</sup> G02F 1/13  
 U.S. Cl. 350—331 R 6 Claims



1. A liquid crystal display device including two substrates which contain a liquid crystal therebetween, said liquid crystal display device further including:

means disposed on at least one of said two substrates for mounting an electronic part thereon, said mounting means comprising a plurality of solder-receiving sections where at least one terminal of said electronic part is soldered to said at least one substrate and wiring for connecting said plurality of solder-receiving sections to additional portions of said at least one substrate, wherein necks of a predetermined length are provided in said wiring at positions between said plurality of solder-receiving sections and a remaining portion of said wiring, said necks having a width which is less than that of said remaining portion of said wiring and which is less than a diameter of said solder-receiving sections.

4,955,696  
**LIQUID CRYSTAL DRIVING SYSTEM**  
 Koki Taniguchi, Osaka, and Tamaki Mashiba, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
 Continuation of Ser. No. 879,638, Jan. 27, 1986, abandoned.  
 This application Aug. 14, 1989, Ser. No. 394,158  
 Claims priority, application Japan, Jun. 28, 1985, 60-143570  
 Int. Cl.<sup>5</sup> G02F 1/13; G09G 1/14, 3/00, 3/36  
 U.S. Cl. 350—332 11 Claims



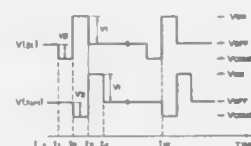
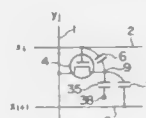
1. A system for driving a liquid crystal display having a plurality of segment electrodes and a plurality of common electrodes, picture elements being defined at intersections between said segment electrodes and said common electrodes, comprising:

means for providing data signals of a specific duty factor;

means for driving said common electrodes with said data signals; and

means for applying AC-converted signals to said picture elements at a frequency that is different from said specific duty factor and higher than a frame frequency at which said display is scanned, said means for applying AC-converted signals includes counter means which includes inputs set at predetermined logic high or low levels which selectively determine the frequency of the AC-converted signals and which variably alternates the AC-converted signals within each frame.

4,955,697  
**LIQUID CRYSTAL DISPLAY DEVICE AND METHOD OF DRIVING THE SAME**  
 Toshihisa Tsukada, Musashino; Yoshiyuki Kaneko, Kokubunji, and Akira Sasano, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Apr. 19, 1988, Ser. No. 183,141  
 Claims priority, application Japan, Apr. 20, 1987, 62-95125  
 Int. Cl.<sup>5</sup> G02F 1/13  
 U.S. Cl. 350—332 8 Claims



1. A liquid crystal display panel comprising:

a first substrate;

a second substrate having a transparent conductive film thereon;

a liquid crystal layer sandwiched between the first and the second substrates;

a plurality of pixel electrodes formed on the first substrate and associated with respective intersections of parallel

rows and parallel columns wherein the rows comprise a plurality of gate lines and the columns comprise a plurality of data lines;

a plurality of thin film transistors formed on the first substrate for driving the pixel electrodes, respectively, each transistor having a gate connected to an associated gate line and two electrodes one of which is connected to one of the plurality of pixel electrodes and another electrode is connected to an associated data line;

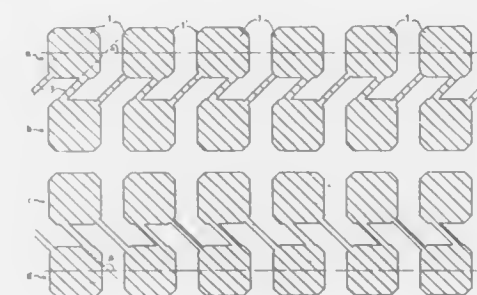
the plurality of gate lines being driven successively in a predetermined order for on-off control of the thin film transistors, each of the pixel electrodes in each one row being made to overlap the gate line in another row adjacent to the one row so as to provide capacitive coupling between the overlapping pixel electrode and the gate line; wherein the capacitive coupling between the overlapping pixel electrode and the gate line is represented by a capacitance  $C_{add}$  which satisfies the following formula:

$$C_{add} = (V_1/V_2)C_{gs}$$

where  $C_{gs}$  indicates a parasitic gate-source capacitance of the thin film transistor;

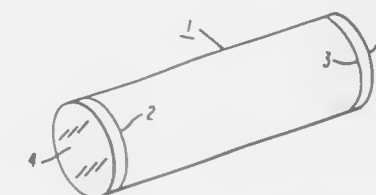
means for applying a driving voltage to each one of the plurality of gate lines, the driving voltage having a waveform which is at a voltage level  $V_{ON}$  when the thin film transistors connected to said one gate line are to be ON-state, at a voltage level  $V_{OFF}$  when said thin film transistors are to be OFF-state, and a voltage level  $V_{COMP}$  just before said driving voltage goes up to the voltage level  $V_{ON}$  and when the driving voltage applied to the preceding driven gate line is at the voltage level  $V_{ON}$ , where  $V_{ON} > V_{OFF} > V_{COMP}$ .

4,955,698  
**OPTO-ELECTRONIC INDICATING MATRIX, AND INDICATING DEVICE PROVIDED THEREWITH**  
 Peter Knoll, Ettlingen; Winfried König, Pfingst-Berghausen; Rüdiger Mock-Hecker, Karlsruhe, and Clemens Günther, Sexau, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
 Filed Mar. 3, 1989, Ser. No. 322,781  
 Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806843  
 Int. Cl.<sup>5</sup> G02F 1/13  
 U.S. Cl. 350—336 9 Claims



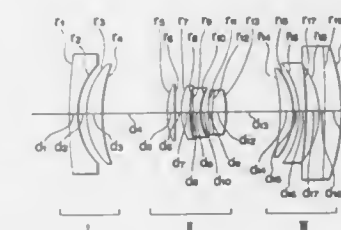
1. An opto-electronic indicating matrix comprising a plurality of display segments arranged in a plurality of rows and a plurality of columns, each of said plurality of display segments being spaced from an adjacent display segment in a respective row and a respective column by a same distance; and a plurality of conductors located in regions between pairs of rows of said display segments for connecting display segments in different rows, each of said conductors being arranged at an angle to a longitudinal axis of said rows.

4,955,699  
**PRECIOUS METAL DOPED CRYSTALS FOR HARDENING OF THE CRYSTALS**  
 Narsingh B. Singh, Murrysville; Tom Henningsen; Robert Mazelsky, both of Monroeville; Richard H. Hopkins, Murrysville, and Milton S. Gottlieb, Churchill Boro, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
 Continuation-in-part of Ser. No. 113,843, Oct. 28, 1987. This application Nov. 23, 1988, Ser. No. 276,093  
 Int. Cl.<sup>5</sup> G02F 1/01, 1/11, 1/33  
 U.S. Cl. 350—353 25 Claims



1. A crystalline structure selected from the group consisting of thallium arsenic selenide, thallium arsenic sulfide, thallium vanadium sulfide, thallium phosphorous selenide, lead halide, and mixtures thereof, where said crystalline structure is doped by a precious metal selected from the group consisting of copper, silver, gold and mixtures thereof, in an amount of about 25 ppm by weight up to about 3 ppm by weight.

4,955,700  
**SMALL-SIZE ZOOM LENS SYSTEM**  
 Takao Yamaguchi, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan  
 Filed Aug. 28, 1989, Ser. No. 398,915  
 Claims priority, application Japan, Aug. 30, 1988, 63-215967  
 Int. Cl.<sup>5</sup> G02B 15/15, 9/64  
 U.S. Cl. 350—423 8 Claims



1. A small-size zoom lens system comprising:

a first lens group, a second lens group, and a third lens group which are successively arranged from an object side to an image side;

said first, second, and third lens groups having negative, positive, and negative focal lengths, respectively;

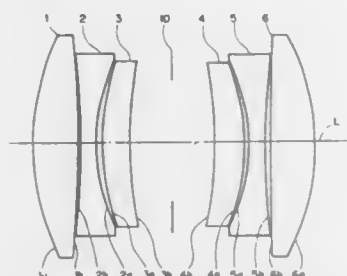
said first, second, and third lens groups being movable toward the object side for zooming movement from a wide angle end toward a telephoto end, while varying the distances between the first, second, and third lens groups; the focal length of the  $i$ th lens group ( $i=1, 2, 3$ ), and the focal length  $f_w$  of the entire zoom lens system at the wide angle end of zooming movement satisfying the following conditions:

$$0.3 < |f_3|/|f_1| < 1$$

$$1.2 < |f_1|/f_w < 2.3$$

$$0.9 < |f_3|/f_w < 1.4$$

4,955,701  
**APOCHROMAT OPTICAL SYSTEM**  
 Yoshikazu Katsuka; Zenji Wakimoto, both of Kyoto, and Takeshi Sugata, Hikone, all of Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan  
 Filed May 1, 1989, Ser. No. 345,482  
 Claims priority, application Japan, May 2, 1988, 63-109701  
 Int. Cl.<sup>3</sup> G02B 9/62  
 U.S. Cl. 350—481 4 Claims



1. An apochromat optical system, comprising:
    - a stop provided along the optical axis of the system;
    - a first lens group including: a first lens having a positive power, said first lens having a convex surface which is directed to the object side; a second lens made of Kuntz Flint glass having an Abbe's number within the range from 45.0 through 34.0, said second lens having a negative power and having a concave surface which is directed to the image side; and a third lens in the form of meniscus having a positive power, said third lens having a convex surface which is directed to the object side, said first through third lenses being successively disposed in order from the object side of the system; and
    - a second lens group including a set of lenses having substantially the same configuration as the lenses in the first lens group, the lenses of said first and second lens groups being approximately symmetrically disposed with respect to said stop;
- the lenses of said first lens group satisfying the following:

$$n_3 > n_2$$

$$1.08 > \{(n_1 + n_3)/2\}/n_2 > 1.01$$

$$v_1 > v_2$$

$$v_3 > v_2$$

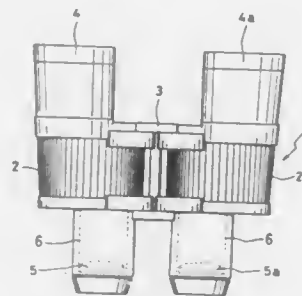
$$1.3 > \{(v_1 + v_3)/2\}/v_2 > 1.0$$

wherein  $n_1$ ,  $n_2$  and  $n_3$  represent the refractive index of the first, second and third lenses, respectively; and  $v_1$ ,  $v_2$  and  $v_3$  are the Abbe's numbers of the first, second and third lenses, respectively.

4,955,702  
**FIXED FOCUS BINOCULAR WITH VISUAL ACUITY COMPENSATING MECHANISM**  
 Masakazu Nakamura, 6-5, Maeno-cho, 6-chome, Itabashi-ku, Tokyo, Japan  
 Filed Dec. 19, 1988, Ser. No. 286,503  
 Int. Cl.<sup>3</sup> G02B 7/06, 25/00, 23/18  
 U.S. Cl. 350—556 3 Claims

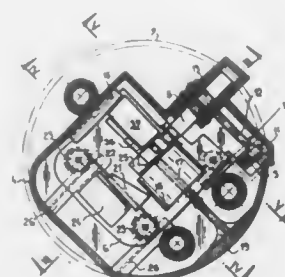
1. A binocular for viewing both near and distant objects at a constant focus presettable for the visual acuity of the view comprising: visual acuity compensating means for presetting the binocular focus to the visual acuity of a user prior to normal viewing including manually operated focussing means for

changing the spacing between an ocular lens and an objective lens of the binocular and means for preventing access to said



focussing means during normal viewing thereby to maintain the focus constant.

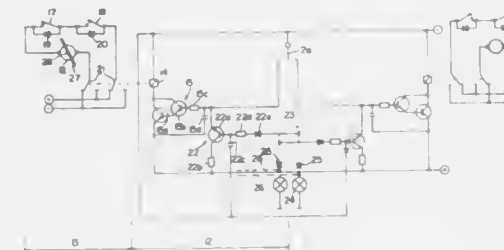
4,955,703  
**DEVICE FOR AN OUTSIDE MIRROR FOR MOTOR VEHICLES**  
 Mirosław Janowicz, Feurigstrasse 46, D-1000 Berlin 62, Fed. Rep. of Germany  
 Filed Feb. 17, 1989, Ser. No. 312,631  
 Claims priority, application Fed. Rep. of Germany, Feb. 18, 1988, 3805371  
 Int. Cl.<sup>3</sup> B60R 1/06  
 U.S. Cl. 350—637 16 Claims



16. Apparatus for an outside mirror for motor vehicles which is electrically slowly shiftable to adjust the mirror to an individual driver, and rapidly shiftable by switch means from the driver-adjusted position to a temporary blind-spot viewing position, comprising:

- a supplemental device mounted adjacent said mirror having
  - a first element mounted therein for oscillating movement with said mirror between two limit points defining the limit of movement of said mirror,
  - a second element releasably connected to said first element by locking means during the slow shifting of said mirror, said second element supporting a limit switch actuating element defining one of said limit points,
  - a limit switch mounted in said supplemental device adjacent said limit switch actuating element and connected to drive means for said mirror to stop or reverse the movement of said mirror when said actuating element is contacted by said first element,
  - said actuating element movably mounted on said second element for movement in response to the motion of said second element connected to said first element to alter the limit point defined thereby, and
  - a third element extending from said mirror into said supplemental device, said third element engaging said first element at one end and said mirror at the other end.

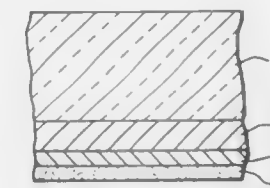
4,955,704  
**SHIFTABLE OUTSIDE REARVIEW MIRROR FOR USE ON VEHICLES**  
 Mirosław Janowicz, 1000 Berlin 62, Sch'uml/o/ neberg, 46, Feurigstrasse, Fed. Rep. of Germany  
 Continuation of Ser. No. 183,590, Apr. 19, 1988, abandoned, which is a continuation of Ser. No. 910,218, Aug. 20, 1986, Pat. No. 4,792,220. This application Jun. 12, 1989, Ser. No. 366,235  
 Claims priority, application Fed. Rep. of Germany, Mar. 8, 1985, 3508348; Oct. 3, 1985, 35359  
 The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.  
 Int. Cl.<sup>3</sup> G02B 5/08; H01H 3/16, 9/00  
 U.S. Cl. 350—637 20 Claims



14. A shiftable outside mirror for use on a vehicle having a turn signal lever arm and switch means operable to shift said mirror, wherein the improvement comprises:

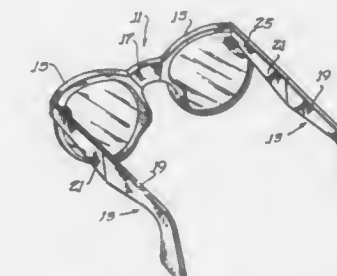
- said switch means being pivotally mounted on said turn signal lever arm, pivotal relative to said turn signal lever arm in a plane substantially parallel to the plane of motion of said turn signal lever arm from a rest position to an activated position in which the mirror is shifted;
- said switch means being movable with said turn signal lever arm when in said rest position such that only a turn signal is actuated;
- said switch means being movable with said turn signal lever arm when in said activated position such that said mirror is shifted and corresponding turn signal is actuated, said shiftable outside mirror having a planar mirror element and motor means for rotating said element about an essential vertical axis; wherein
- the longitudinal axis of said switch means in its rest position is essentially a continuation of the longitudinal axis of said turn signal lever arm, such that an end portion of said turn signal lever arm and an end portion of said switch means are interfittingly engaged by spring means engaging both of said end portions, said spring means comprising a U-shaped spring having two free ends and a base, the free ends engaging said end portion of said switch means, said base engaging said end portion of said turn signal lever arm.

4,955,705  
**MULTI-LAYERED BACK REFLECTING MIRROR**  
 Yuji Nakajima, Tokyo; Katsunori Ishida, Fussa, and Masashi Mochizuki, Hoya, all of Japan, assignors to Hoya Corporation, Tokyo, Japan  
 Filed Aug. 11, 1989, Ser. No. 392,590  
 Claims priority, application Japan, Aug. 31, 1988, 63-217291  
 Int. Cl.<sup>3</sup> G02B 5/08, 5/28  
 U.S. Cl. 350—642 12 Claims



1. A multi-layered back reflecting mirror comprising a substrate, a dielectric multi-layered film formed on one side of the substrate and a metal or semiconductor film formed on the dielectric multi-layered film, the dielectric multi-layered film comprising at least one high refractive index material layer having an optical thickness of  $\lambda_0/2$  ( $\lambda_0$  is the wavelength of a light used as the reference measurement for design purposes) and at least one low refractive index material layer having an optical thickness of  $0.05-0.4\lambda_0$ , the high refractive index material layer existing closer to the substrate relative to the low refractive index material layer, and the low refractive index material layer existing closer to the metal or semiconductor film relative to the high refractive index material layer.

4,955,706  
**COMPOSITE POLYMERIC SPECTACLE PARTS**  
 Johann J. Schmidthaler, and Ronald Zach, both of Linz, Austria, assignors to Optyl Eyewear Fashion International Corporation, Norwood, N.J.  
 Filed Sep. 30, 1988, Ser. No. 252,265  
 Int. Cl.<sup>3</sup> G02C 11/02  
 U.S. Cl. 351—41 3 Claims



1. A composite, integral polymeric spectacle part comprising a first polyamide member and a second polyamide member, said first polyamide member having a melting point of from about 160° C. to about 170° C. and said second polyamide member having a melting point of from about 175° C. to about 185° C., said second polyamide member having an injection molding temperature at least 40° C. higher than the melting point temperature of said first polyamide member and said second polyamide member having been heat fusion bonded to said first polyamide member to form said integral spectacle part.



4,955,707

## PIVOTING OPTICAL ACCESSORY FOR USE WITH SPECTACLES

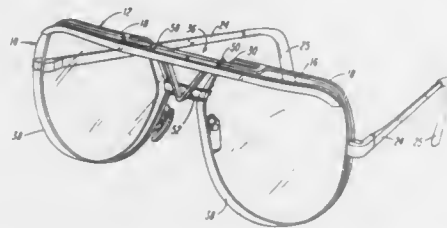
Albert E. Gazeley, San Po Kong, Hong Kong, assignor to Polaroid Corporation, Cambridge, Mass.

Filed Mar. 21, 1986, Ser. No. 842,640

Int. Cl.<sup>5</sup> G02C 9/00

U.S. Cl. 351—47

16 Claims



1. An optical accessory for use in combination with spectacles of the type including a pair of optical elements and means for holding the elements in spaced apart relationship and for defining accessory cooperating structure intermediate the elements, said intermediate structure including brow bar, nose bridge and side segments, said accessory comprising: a pair of optical members, means for connecting said members in space apart relationship, means for releasably attaching said accessory to the cooperating structure such that when said accessory is attached to the cooperating structure, movement of said accessory in substantially all directions in a generally vertical plane defined by the structure is inhibited, said accessory including top, bottom and side portions, said top and bottom portions yieldably engage the top of the brow bar and the bottom of the nose bridge, respectively, which inhibits up and down movement of said accessory, said side portions engage corresponding ones of the side segments which inhibits side-to-side movement of said accessory and means for pivotally mounting said releasably attaching means to said connecting means such that when said attaching means is attached to the structure said optical members can be pivoted between raised and lowered positions relative to the optical elements.

4,955,708

## SUNGLASSES HAVING ADJUSTABLE TEMPLES

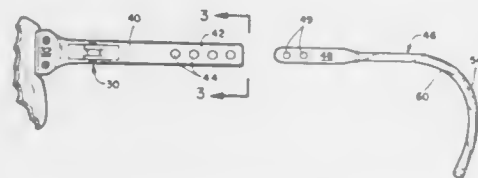
Alan Kahaney, 2212 Place Monaco, Del Mar, Calif. 92014

Filed Apr. 20, 1989, Ser. No. 340,700

Int. Cl.<sup>5</sup> G02C 7/10, 5/20

U.S. Cl. 351—44

3 Claims



1. Sunglasses having adjustable temple assemblies comprising:

- a sunglasses lens assembly having a right end and a left end;
- a pair of temple assemblies each having a front end and a rear end;
- means for attaching the front ends of the respective temple assemblies to the respective right and left ends of said sunglasses lens assembly;
- said temple assemblies each having means for adjusting their length to conform to different sized heads comprising each of said temple assemblies having an elongated member having a front end and a rear end, the rear end of said elongated member having a sleeve portion that also has an inner surface, a plurality of apertures in said inner surface

at longitudinally spaced intervals, a leg member having a head portion and an ear engagement portion, said head portion having an inner surface having a plurality of protrusions that are matingly received in the apertures of said sleeve portion; and

said temple assemblies each having means for adjusting the manner in which they engage the wearer's ears comprising said ear engagement portion having a front end and a rear end, said ear engagement portion of said leg having a bendable cylindrical wire core extending longitudinally throughout its length from its front end to its rear end and being surrounded by a sleeve of bendable material having an outside surface with a plurality of longitudinally spaced annular grooves formed therein, these annular grooves provide points for bending said ear engagement portion into a configuration that grips the ears of the wearer.

4,955,709

## SUN SCREENING DISPLAY AND ADVERTISING DEVICE

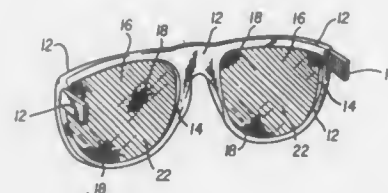
Anton K. Smith, 610 E. 6th St., Little Rock, Ark. 72202

Filed Apr. 24, 1987, Ser. No. 42,037

Int. Cl.<sup>5</sup> G02C 7/16, 7/10

U.S. Cl. 351—46

7 Claims



1. An advertising or ornamental display device in the form of spectacles comprising:

- a conventional eyeglass frame for supporting lenses before the eyes of the wearer;
- opaque, perforated, sheet-material lenses disposed in said eyeglass frame, said lenses are made of a clear plastic material and opacity is provided by adhering opaque film coating on the exterior surface, said lenses having a plurality of equi-distant openings therethrough disposed throughout the entire extent of said lenses, said openings having a major dimension of between 0.01-0.10 inches and permitting substantially uninhibited vision by the wearer throughout the entire extent of said opaque lenses while providing to persons other than the wearer, an outer surface on said lenses defining an apparent uninterrupted and continuous appearance, and
- a design or message indicia on said outer surface of said lenses whereby, said lenses provide protection for the eyes of the wearer while allowing substantially unrestricted vision on the part of the wearer and presenting a clear display of said indicia to persons other than the wearer.

4,955,710

## ADJUSTABLE HEADBAND ASSEMBLY ATTACHED TO SPECTACLES FRAME STEMS

William R. Meistrell, Manhattan Beach, Calif., assignor to Dive N'Surf, Inc., Hermosa Beach, Calif.

Filed Sep. 18, 1989, Ser. No. 408,667

Int. Cl.<sup>5</sup> G02C 3/00

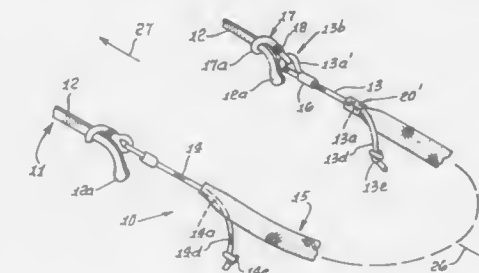
U.S. Cl. 351—156

15 Claims

1. An adjustable retainer for a spectacles frame, comprising, in combination:

- (a) an elongated band assembly including multiple bands, the assembly being generally U-shaped,

- (b) at least two of the bands having adjustable, lengthwise, relatively slidable interfit,
- (c) whereby the overall length of the U shaped assembly may be quickly adjusted to fit the wearer's head,
- (d) said assembly including first, second and third bands, end portions of the first and second bands having said adjust-



able, lengthwise, relatively slidable interfit, and other band end portions also having adjustable, lengthwise, relatively slidable interfit,

- (e) the first band having a free end portion that dangles and can be pulled to adjust the interfit of the first and second bands.

4,955,711

## CONTACT LENSES FOR ANIMALS

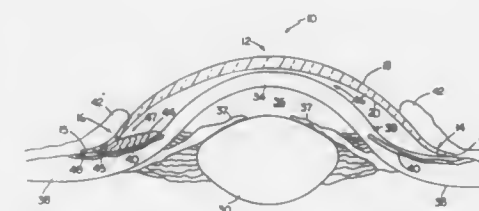
Randall E. Wise, Wellesley, Mass., and Alvah T. Leighton, Jr., Blacksburg, Va., assignors to Animalens, Inc., Wellesley, Mass.

Filed Nov. 30, 1987, Ser. No. 126,551

Int. Cl.<sup>5</sup> G02C 7/04; A01K 37/00

U.S. Cl. 351—160 R

31 Claims



- 1. A contact lens for an eye of an animal having a nictitating membrane, said contact lens comprising a curved central region adapted to be spaced from the eye tissue to provide a chamber for said nictitating membrane, and a peripheral region having a curvature opposite to that of said curved central region, said peripheral region contacting and supporting the contact lens on the eye tissue.

4,955,712

## MULTIFOCAL LENS

Rudolf Barth, Vierkirchen; Günther Guillino, Munich, and Dieter Kalder, Mörfelden, all of Fed. Rep. of Germany, assignors to Optische werke G. Rodenstock, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 876,855, Apr. 9, 1986, abandoned. This application Jul. 18, 1989, Ser. No. 380,781

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1984, 3430334

Int. Cl.<sup>5</sup> G02C 7/06

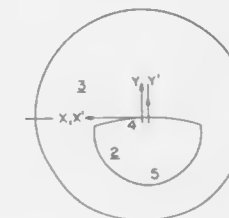
U.S. Cl. 351—169

8 Claims

- 1. A multifocal ophthalmological lens comprising a front surface facing away from the eye and a rear surface facing toward the eye, the lens having a main portion designed for distance vision and an added portion constituting a near segment designed for near vision, at least one surface of the added

portion being composed of a progressive zone having at least one progressive surface in which the refractive power increases, the main portion and the near segment are separated by transition lines, on which transition lines the surface is not twice continuously differentiable, the lens having a main meridian and further comprising the following features:

- the refractive power of the main portion being constant except for possible aspheric corrections of peripheral aberrations, and



the progressive surface of the added portion being formed in such manner that, for the progressive surface in which the refractive power increases, the radius of curvature of the intersecting lines of planes orthogonal to the main meridian in the entire portion of the surface decreases, with increasing distance from the main meridian at least in a region surrounding the main meridian, if the progressive surface is the front surface of the lens, or increases, with increasing distance from the main meridian at least in a region surrounding the main meridian, if the progressive surface is the rear surface of the lens.

4,955,713

## SPECTACLES FOR IMPROVING BINOCULAR VISION

Mohammad T. Naderi, Isabellaland 896 2591 ST, The Hague, Netherlands

Continuation-in-part of Ser. No. 73,644, Jul. 15, 1987, abandoned. This application Oct. 20, 1988, Ser. No. 260,272

Int. Cl.<sup>5</sup> A61B 3/00

U.S. Cl. 351—200

3 Claims

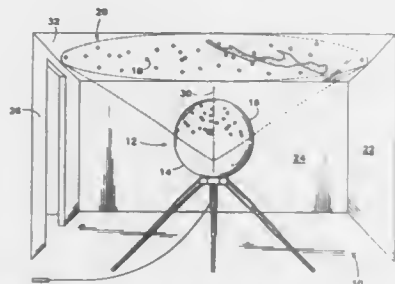


- 1. A spectacle which divides a screen between the eyes of an observer comprising a spectacle frame and two viewing lenses, said spectacle further comprising a socket centrally mounted on the outer part of said spectacle frame, a rectangular plate member defined by two elongated sides and two short edges, a bar member extending from one of said short edges of said rectangular plate member and a ball member fixed at the end of said bar member, said ball member being disposed within said socket, said rectangular plate member being deflectable toward the left lens and the right lens by said bar member and said ball member.

**4,955,714**  
**SYSTEM FOR SIMULATING THE APPEARANCE OF THE NIGHT SKY INSIDE A ROOM**  
 James G. Stotler, 16 SE. 50th Ave., Portland, Oreg. 97215, and  
 Dennis G. Lowe, 3610 NE. 113th, Portland, Oreg. 97220  
 Filed Jun. 26, 1986, Ser. No. 879,155  
 Int. Cl.<sup>3</sup> G03B 21/00

U.S. Cl. 353-62

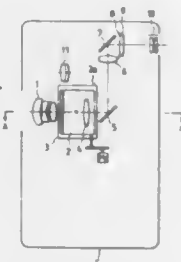
10 Claims



1. Apparatus for projecting an adjustable pattern of light spots on interior surfaces of a substantially conventional room, so that the interior surfaces can be painted with spots of paint at the location of said light spots, said apparatus comprising:
  - a light source;
  - a container surrounding said light source, said container having a substantially vertical central axis and being perforated with apertures such that when said container is placed within the room, light from said light source passes through said apertures and creates a pattern of light spots on the interior surfaces of the room, said apertures being arranged such that said pattern of light spots resembles an arrangement of stars in a known stellar constellation;
  - means for adjustably positioning said light source within said container to alter said pattern of light spots; and
  - a stand supporting said container and having a plurality of legs of independently adjustable length such that said container can be tilted to adjustable position said pattern of light spots on the interior surfaces of the room, wherein said light source comprises a light bulb having a filament of length short enough so that said apertures are substantially as wide in shortest dimension as said filament length.

**4,955,715**  
**PSUEDO FORMAT CAMERA**  
 Nozomu Kitagishi, Hachioji, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
 Filed Oct. 31, 1989, Ser. No. 429,559  
 Claims priority, application Japan, Oct. 31, 1988, 63-276876;  
 Oct. 31, 1988, 63-267877  
 Int. Cl.<sup>3</sup> G03B 19/12, 13/10  
 U.S. Cl. 354-155

14 Claims



1. A single-lens reflex camera comprising:
  - objective lens means;

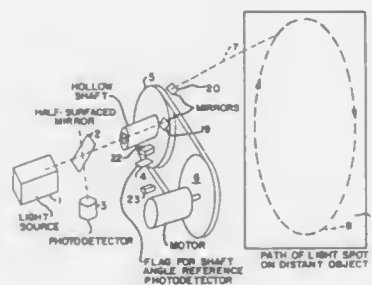
viewfinder means including a plurality of lenses; switching means for switching the optical path of a light beam from said objective lens means between one leading to a focusing plane and one leading to said viewfinder means; auxiliary lens means inserted to be on the image side of said objective lens means in an interlocked relation to the switching of said switching means; and switching means for shifting said objective lens means and at least one of said auxiliary lens means and said viewfinder means to increase magnification of the viewfinder.

**4,955,716**  
**METHOD AND DEVICE TO DETERMINE A RELATIVE REFERENCE POSITION FOR AN ANGLE MEASUREMENT OF AN OBJECT**  
 Robert J. Martin, Lynchburg, Va., assignor to Hofmann Werkstatt-Technik GmbH, Pfungstadt, Fed. Rep. of Germany  
 Filed Jan. 5, 1989, Ser. No. 293,899  
 Claims priority, application Fed. Rep. of Germany, Jan. 5, 1988, 3800121

U.S. Cl. 356-152

Int. Cl.<sup>3</sup> G01B 11/26

22 Claims



1. A method to determine the relative reference position for angle measurement of an object within an angle scale covering the entire rotation of the object and divided into several incremental angles of equal size, by which a relative reference position is determined from a reference signal generated by the rotation of the object, comprising the steps of:
  - generating a reference signal by energy exposure of a target area on the object to be measured;
  - calculating a significant deviation from the reference signal at least one point during rotation of the object, this deviation being representative of an angle value of the angle scale;
  - determining the relative reference position of the object to be measured from said reference signal to said significant deviation; and
  - dividing the round angle of the object into incremental angles, beginning with the relative reference position of the object to be measured.

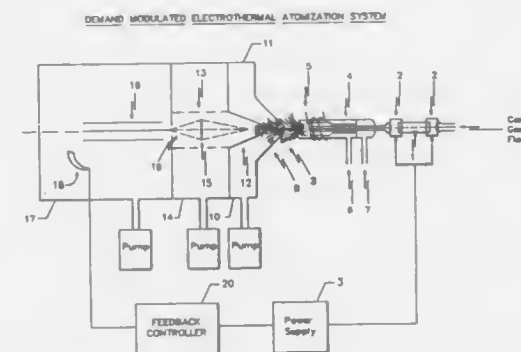
**4,955,717**  
**DEMAND MODULATED ATOMIZATION APPARATUS AND METHOD FOR PLASMA SPECTROSCOPY**  
 William B. Henderson, Torrance, Calif., assignor to Geochemical Services, Inc., Torrance, Calif.  
 Continuation of Ser. No. 178,896, Mar. 31, 1988, abandoned, which is a continuation-in-part of Ser. No. 936,837, Dec. 2, 1986, abandoned. This application Jan. 29, 1988, Ser. No. 376,228  
 Int. Cl.<sup>3</sup> G01N 21/73

U.S. Cl. 356-316

19 Claims

1. A demand modulated atomization system for use in a spectral analysis system having an analyte measurement means for measuring desired spectral characteristics of an analyte in a plasma, the system comprising:

- a thermal atomization means for thermally atomizing the analyte;
- a plasma generation means coupled to the output of the thermal atomization means, for creating a plasma containing the analyte;
- a spectral detection means for measuring the content of the atomized analyte; and



- a feedback means coupled to the spectral detection means and the thermal atomization of analyte to a preset limit, and controlling the thermal atomization means to regulate the rate of analyte atomization so as to cause the measured content of analyte to obtain an approximately fixed relationship to the preset limit.

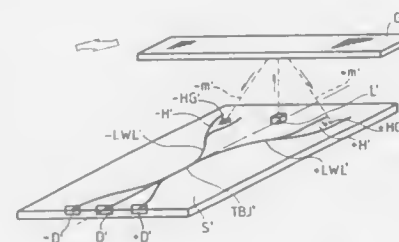
**4,955,718**  
**PHOTOELECTRIC MEASURING SYSTEM WITH INTEGRATED OPTICAL CIRCUIT INCLUDING AND ILLUMINATING SYSTEM**  
 Dieter Michel, Traunstein, Fed. Rep. of Germany, assignor to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany

Filed Jan. 26, 1988, Ser. No. 148,556  
 Claims priority, application Fed. Rep. of Germany, Jan. 27, 1987, 3702314

U.S. Cl. 356-356

Int. Cl.<sup>3</sup> G01B 9/02

6 Claims

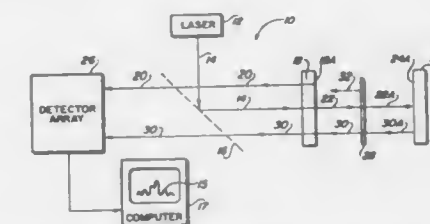


1. In a photoelectric measuring system of the type which comprises a substrate, an integrated optical circuit on the substrate, and at least one diffraction grid shiftable with respect to the substrate in a direction transverse to a beam axis, wherein the integrated optical circuit comprises: at least two optical waveguides, coupling-in elements each configured to couple a respective diffracted component beam from the diffraction grid to a respective one of the optical waveguides, a coupler configured to receive the diffracted partial beams from the optical waveguides and to bring the diffracted component beams into interference to form a combined beam, and at least one detector positioned to respond to the combined beam and to generate at least one electrical signal in response to the combined beam; the improvement comprising:
  - an illuminating system comprising means for generating an optical beam and means for directing the optical beam along the beam axis at the at least one diffraction grid, said

generating and directing means formed as a part of the integrated optical circuit on the substrate.

**4,955,719**  
**INTERFEROMETER WITH THIN ABSORBING BEAM EQUALIZING PELLICLE**  
 John B. Hayes, Tucson, Ariz., assignor to Wyko Corporation, Tucson, Ariz.  
 Filed Dec. 9, 1988, Ser. No. 282,473  
 Int. Cl.<sup>3</sup> G01B 9/02, 5/22  
 U.S. Cl. 356-359

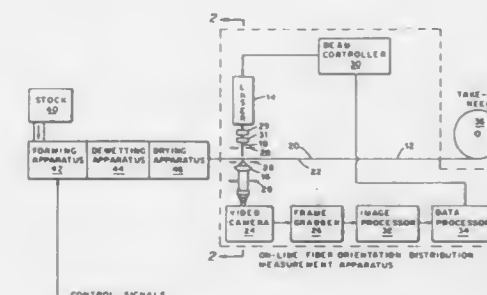
14 Claims



1. An interferometer, comprising in combination:
  - (a) means for producing an initial beam;
  - (b) means for separating said initial beam into a reference beam and a test beam;
  - (c) a test element which reflects said test beam;
  - (d) a thin, absorbing attenuator located in said test beam, said attenuator reflecting less than about ten percent of said test beam and attenuating said test beam so that its intensity is approximately equal to the intensity of said reference beam, said attenuator including a dyed pellicle;
  - (e) means for interfering said reference beam and said attenuated test beam to produce a fringe pattern representing differences between said test beam and said reference beam.

**4,955,720**  
**ON-LINE FIBER ORIENTATION DISTRIBUTION MEASUREMENT**  
 William E. Blecha, Cornwall-on-Hudson, and Henry J. Kent, Bloomingburg, both of N.Y., assignors to International Paper Company, Tuxedo, N.Y.  
 Filed Jan. 5, 1989, Ser. No. 293,688  
 Int. Cl.<sup>3</sup> G01N 21/86  
 U.S. Cl. 356-429

21 Claims



1. An on-line fiber orientation measurement system for measuring the orientation of fibers in a translucent sheet at least in part composed of fibers, said sheet having a first surface and a second surface, said system comprising:
  - a source of coherent light for producing and directing a first light pattern onto said first surface of said sheet, said first light pattern having an intensity sufficient to transmit light through said sheet and form a second light pattern on the second surface, the shape of the second light pattern being



dependent at least in part on the fiber orientation in the sheet;

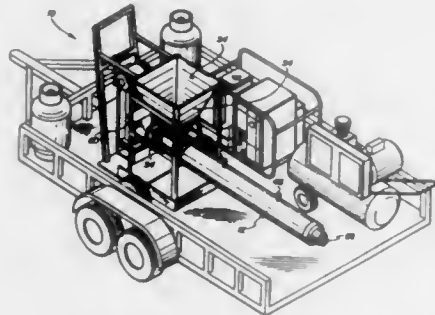
a sensor for sensing said second pattern displayed on said second surface, said sensor further comprising video camera means for producing an image signal corresponding to an image of said second pattern and having a field of view that is substantially larger than the second pattern whereby relative movement of the source and sensor within a predetermined range will move the second light pattern through a range that is totally within the field of view of said camera;

means for producing a freeze frame of said image signal, said freeze frame being representative of the image of said second pattern during a period of time that is sufficiently long to allow the camera to produce an image signal and is sufficiently short to freeze the image of the second light pattern when it is moving at or below a predetermined velocity within the field of view; and

means for analyzing the shape of the second light pattern in the freeze frame to determine the orientation of fibers.

**4,955,721**  
**APPARATUS FOR APPLYING A SULPHUR-BASED STRUCTURAL MATERIAL TO PAVED SURFACES**  
 Lloyd T. Clark, 503 St. Charles St., Arlington, Tex. 76013, and James W. Marshall, 4206 Newton St., #104, Dallas, Tex. 75219

Filed Sep. 28, 1987, Ser. No. 101,838  
 Int. Cl.<sup>5</sup> B28C 5/46; B01F 15/02, 15/06  
 U.S. Cl. 366—24 3 Claims



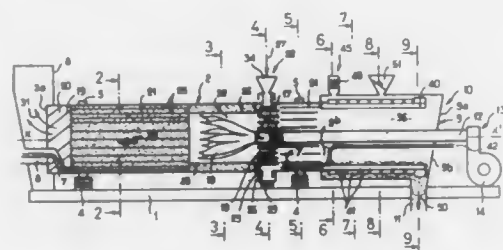
1. Apparatus for preparing a sulphur-based thermoplastic material for use in patching chuck holes in a paved surface and the like, comprising:
- a first assembly that includes
- a tube having first and second ends and being adapted to receive ambient material at its first end and expel heated material at its second end, said tube being generally linear and having a length in excess of about five feet;
  - a receptacle for receiving a thermoplastic material in granular form and directing such material into a first heating station within the tube;
  - an auger mounted for rotation within the tube, said auger including a spirally wrapped blade whose diameter is slightly less than the inner diameter of the tube, and the auger having a central supporting shaft which is supported by at least one bearing that is concentric with the tube;
  - means for heating the exterior wall of the tube so as to bring the initially granular material in the tube to at least a semi-plastic state;
  - drive means for rotating the auger at a controlled and relatively slow rate so as to progressively transport thermoplastic material through the tube; and
  - means for adjusting operation of the heating means so as to achieve a temperature of at least 305° Fahrenheit within the tube and to maintain said temperature for

about three minutes, whereby a sulphur-based material may be passed through the heating tube and reach the melting point of sulphur during said passage;

and further including

(g) a wheeled vehicle for supporting and transporting the first assembly over a paved surface to a work site, and further including auxiliary wheel means for rendering the first assembly mobile when it is separated from the wheeled vehicle, whereby the first assembly may be selectively separated from the wheeled vehicle and manually rolled to a desired location near the wheeled vehicle where the repair of chuck holes is required.

**4,955,722**  
**APPLIANCE FOR THE PREPARATION OF BITUMINOUS COATED PRODUCTS WITH A STATIONARY MIXER**  
 Guy Marconnet, Rive de Gier, France, assignor to Ermont, C.M., Lorette, France  
 Filed Jan. 13, 1989, Ser. No. 365,381  
 Claims priority, application France, Jan. 13, 1988, 88 07857  
 Int. Cl.<sup>5</sup> B28C 5/14, 5/20  
 U.S. Cl. 366—25 5 Claims

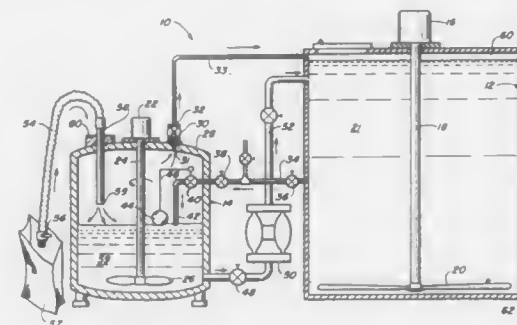


1. Apparatus for the preparation of bituminous coated products from virgin aggregate, liquid bitumen and recycled bituminous coatings, said apparatus comprising a cylindrical drum mounted for rotation about an axis of said drum and inclined slightly relative to a horizontal plane, a device for feeding cold and wet aggregates via an upper inlet end of said drum, a burner projecting into said drum at a lower outlet end of said drum, in such a way that hot gases coming from a flame of said burner and said virgin aggregates circulate in opposite directions, and comprising inside said drum, in sequence from its inlet end to its outlet end;
- an introduction zone where an inner surface of said drum is equipped with projecting blades arranged along helices coaxial with said drum;
  - a drying zone in which said inner surface of said drum is equipped with lifting blades;
  - a flame zone in which said inner surface of said drum is equipped with blades for retaining materials against said inner surface of said drum and into which opens an end of an elongate body of said burner;
  - a zone for the introduction of recycled materials located in the vicinity of the end of said body of said burner form which a flame is generated, in which zone said drum is surrounded by a recycling ring and, in an inner part of said drum, is attached to a small drum coaxial with said drum and equipped on an inside of said small drum with lifting blades; and
  - a zone for reheating recycled aggregates and blending said virgin aggregates and said recycled aggregates;
  - the apparatus further comprising a mixer consisting of a stationary casing into which opens an outlet end of said drum and which is equipped with a means for injecting liquid bitumen and with a device for the removal of coatings, and mixing means fastened to said drum and extending said drum axially in the direction of its outlet so as to enter said casing of said mixer, mixing being ensured by

rotation of said mixing means during rotation of said drum;

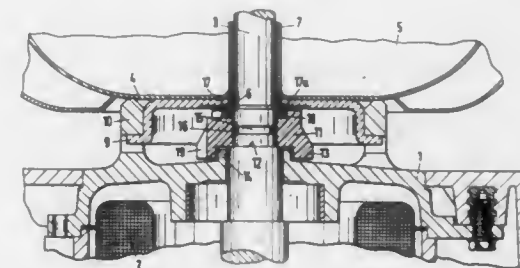
(g) said casing of said mixer delimiting around said body of said burner a mixing zone separated from said flame zone by said zone of introduction of recycled materials and by said zone for reheating said recycled aggregate and blending said virgin and recycled aggregates.

**4,955,723**  
**SLURRY MIXING APPARATUS WITH DRY POWDER CONVEYER**  
 John R. Schnelder, 26 Cove Rd., Belvedere, Calif. 94920  
 Filed Jan. 16, 1990, Ser. No. 465,432  
 Int. Cl.<sup>5</sup> B01F 15/02  
 U.S. Cl. 366—136 5 Claims



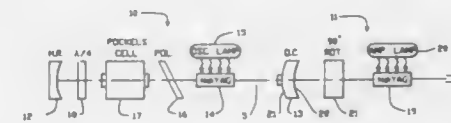
1. An apparatus for combining powdered and liquid constituents to form a slurry, comprising:
- a first tank for initially holding a quantity of liquid;
- a second tank having an upper and a lower end;
- a motor driven agitator within said second tank;
- a first conduit extending from said first tank into said second tank;
- valve means in said first conduit;
- control means responsive to the liquid level in said second tank for closing said valve means when the liquid in said second tank reaches a predetermined maximum level, said maximum level being in said lower end of said second tank at a level which is substantially lower than its full volumetric capacity so that an open chamber is formed in said upper end above said maximum liquid level;
- an opening in the upper end of said second tank;
- a vacuum pump having an inlet attached to said opening and an outlet attached to the upper end of said first tank;
- a third conduit connected from the lower end of said second tank to said first tank and a pump in said third conduit; and
- powder conveying conduit means extending through said upper end of said second tank, said conveying conduit having a movable exterior section with an outer end opening and a fixed interior section within said second tank having an outlet extending slightly above said maximum liquid level; whereby a low pressure condition created within said open chamber above the maximum liquid level in said second tank causes an airstream in said conveying conduit which enables powdered material to be sucked into said second tank as mixing occurs with liquid therein to form a slurry.

**4,955,724**  
**FOOD PROCESSING MACHINE**  
 Friedrich Otto, Hameln, Fed. Rep. of Germany, assignor to A. Stephan u. Soehne GmbH & Co., Hameln, Fed. Rep. of Germany  
 Filed Jul. 31, 1989, Ser. No. 387,494  
 Claims priority, application Fed. Rep. of Germany, Aug. 2, 1988, 8809812[U]  
 Int. Cl.<sup>5</sup> B01F 7/16  
 U.S. Cl. 366—314 4 Claims



1. A machine for the processing of foodstuffs or for the preparation of liquid or pasty pharmaceutical and chemical products comprising:
- a bowl with a bottom having a shaft passage passing therethrough;
- a motor having a motor shaft with a free end, a shoulder and an annular groove adjacent to said shoulder and located between said free end and said shoulder, wherein said motor shaft protrudes through said shaft passage perpendicularly to said bottom of said bowl;
- a housing ring enclosing said motor shaft;
- an O-ring disposed around said motor shaft within said annular groove;
- a cap-shaped seal support with an upper section having a recess therein and a lower peripheral cap rim engaging in labyrinth fashion at a clear distance said housing ring; and
- a V-ring seated in said recess in tight contact with said motor shaft and having an upper V-member and a lower V-member, wherein said seal support is fitted around said motor shaft under said bowl such that said seal support surrounds said annular groove, rests on said shoulder and contacts said O-ring, and wherein said upper V-member of said V-ring encloses said shaft passage in said bottom of said bowl and fits against the underside of said bottom of said bowl under axial stress.

**4,955,725**  
**LASER OSCILLATOR/AMPLIFIER WITH COMPENSATION FOR STRESS BIREFRINGENCE**  
 Bertram C. Johnson, Sunnyvale, and Richard L. Herbst, Palo Alto, both of Calif., assignors to Spectra Physics, San Jose, Calif.  
 Continuation-in-part of Ser. No. 312,734, Feb. 17, 1989, abandoned. This application May 26, 1989, Ser. No. 358,714  
 Int. Cl.<sup>5</sup> H01S 3/10  
 U.S. Cl. 372—22 23 Claims



1. An apparatus for generating a laser beam, comprising: means for reflecting incident light along an optical path;

an oscillator gain medium characterized by a distribution of stress birefringence, mounted along the optical path for generating an oscillator beam along the optical path, the oscillator beam having a polarization distribution affected by the stress birefringence in the oscillator gain medium; an output coupler mounted along the optical path so that the means for reflecting, the oscillator gain medium and the output coupler form a laser oscillator transmitting a component of the oscillator beam; amplifying means, mounted along the optical path so that the output coupler is between the oscillator gain medium and the amplifying means, for amplifying light on the optical path to generate the laser beam, the amplifying means characterized by a distribution of stress birefringence; and means, mounted along the optical path between the oscillator gain medium and the amplifying means, for rotating the polarization distribution in at least the component of the oscillator beam so that compensation for the effect of the stress birefringence in the oscillator gain medium is accomplished by the stress birefringence in the amplifying means.

4,955,726

# PERFLUOROPOLYETHERS USED AS FLUIDS FOR TESTING IN ELECTRONIC FIELD

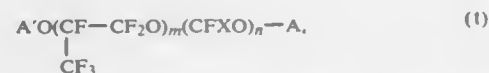
Gianangelo Bargigia, Gerardo Caporiccio, Claudio Tonelli, Luciano Flabbi, and Giuseppe Marchionni, all of Milan, Italy, assignors to Montedison S.p.A., Milan, Italy  
Continuation of Ser. No. 854,785, Apr. 23, 1986, abandoned.  
This application May 16, 1988, Ser. No. 195,356  
Claims priority, application Italy, Apr. 24, 1985, 20477 A/85  
Int. Cl.<sup>5</sup> G01N 25/00

U.S. Cl. 374—57

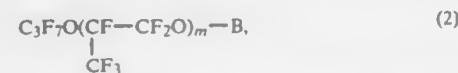
1 Claim

1. Method for carrying out Thermal Shock Tests which comprises:

(A) dipping the sample into a liquid perfluoropolyether having a molecular weight of at least 390, at a temperature between  $-75^{\circ}$  and  $-55^{\circ}$  C., and wherein said liquid is selected from the group consisting of the following seven classes:



wherein X is equal to  $-\text{F}$  or  $-\text{CF}_3$ ; A and A', equal to or different from each other, are  $-\text{CF}_3$ ,  $-\text{C}_2\text{F}_5$  or  $-\text{C}_3\text{F}_7$ ; the units  $\text{CF}(\text{CF}_3)\text{CF}_2\text{O}$  and  $\text{CFXO}$  are randomly distributed along the perfluoropolyether chain, m and n are integers, n being 0 or greater, and the m/n ratio being 2 when  $n \neq 0$ ;



wherein B is  $-\text{C}_2\text{F}_5$  or  $-\text{C}_3\text{F}_7$ , and m is a positive integer;



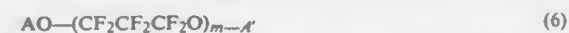
wherein m is a positive integer



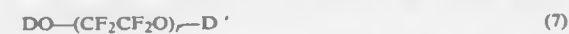
wherein A and A', equal to or different from each other, are  $-\text{CF}_3$ ,  $-\text{C}_2\text{F}_5$  or  $-\text{C}_3\text{F}_7$ ; X is  $-\text{F}$  or  $\text{CF}_3$ ; and m, n and q are integers;



wherein p and q are integers equal to or different from each other, wherein the p/q ratio is between 0.5 and 2;



wherein A and A', equal to or different from each other, are  $-\text{CF}_3$ ,  $-\text{C}_2\text{F}_5$  or  $-\text{C}_3\text{F}_7$ , and m is an integer; and



wherein D and D', equal to or different from each other, are  $-\text{CF}_3$  or  $\text{C}_2\text{F}_5$ , and r is an integer; said perfluoropolyether when



units are present show a kinematic viscosity lower than 8.5 cSt at  $20^{\circ}$  C. and a distillation loss not higher than 10% by weight of the total at  $140^{\circ}$  C. under atmospheric pressure and at least 90% at  $260^{\circ}$  C., whereas when



units are absent show a kinematic viscosity lower than 18 cSt and a distillation loss not higher than 10% at  $140^{\circ}$  C. and at least 90% at  $280^{\circ}$  C.

(B) extracting the sample from the perfluoropolyether of operation (A) and dipping it into a second liquid consisting of the same perfluoropolyether as in operation (A) at a temperature between  $125^{\circ}$  and  $210^{\circ}$  C.

4,955,727

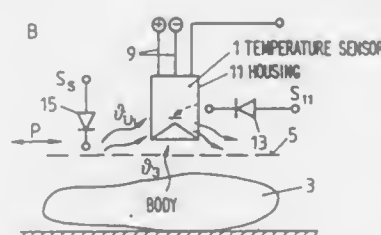
# METHOD AND APPARATUS FOR A NON-CONTACT MEASURING OF A TEMPERATURE OF A BODY

Hardy P. Weiss, Hütten, Switzerland, assignor to Martin Lehmann, Wohlen, Switzerland  
Continuation of Ser. No. 64,464, Jun. 22, 1987, Pat. No. 4,887,229. This application Aug. 22, 1989, Ser. No. 396,913  
Claims priority, application Switzerland, Jun. 20, 1986, 2503/86

Int. Cl.<sup>5</sup> G01J 5/24, 5/62

U.S. Cl. 374—124

23 Claims



1. A temperature measuring apparatus for a non-contact measurement of a temperature of a body, said apparatus comprising:

- a first temperature sensor means, having an input for receiving heat radiation, for generating an output signal dependent on heat radiation received from a direction towards said body;
- a heat radiation chopper means, disposed in front of said heat radiation receiving input of said first temperature sensor means located between said body and said first for chopping said heat radiation; and
- at least one second temperature sensor means arranged in an area adjacent said heat radiation chopper means and said

first temperature sensor means, said area being disposed on a same side of said chopper means as said first temperature sensor means;

wherein said second temperature sensor means generates a signal dependent on a temperature in said area; and

wherein said output signal generated by said first temperature sensor is dependent on a temperature of said body and said signal generated by said second temperature sensor means is used for influencing said output signal to reduce its dependency on said temperature in said area.

4,955,728

# METHOD AND APPARATUS OF DISTINGUISHING BETWEEN LIVE AND DEAD POULTRY EGGS

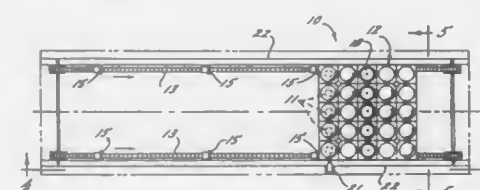
John H. Hebrank, Durham, N.C., assignor to Embrex, Inc., Research Triangle Park, N.C.

Filed Jan. 23, 1990, Ser. No. 468,924

Int. Cl.<sup>5</sup> G01K 13/06, 7/02, 7/22; G01J 5/00

U.S. Cl. 374—124

7 Claims



1. An apparatus for using infrared radiation to distinguish between live and dead poultry eggs, and comprising:

- a plurality of infrared radiation sensors;
- means for moving a fixed array of eggs to a predetermined aligned position with respect to the infrared sensor;
- means for recording the infrared radiation emitted by each egg in the fixed array;
- means for calculating a threshold temperature from the individual temperatures for which 70 percent of the eggs measured in the fixed array are cooled; and
- means for removing dead eggs from the fixed array which are identified as having temperatures more than one degree Fahrenheit cooler than the threshold temperature.

4,955,729

# HEARING AID WHICH CUTS ON/OFF DURING REMOVAL AND ATTACHMENT TO THE USER

Günter Marx, G.-Caracciola-Strasse 10, 8035, Gauting, Fed. Rep. of Germany

Filed Mar. 29, 1988, Ser. No. 174,689

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1987, 8704763[U]; May 14, 1987, 3716162[U]; Dec. 16, 1987, 3742529

Int. Cl.<sup>5</sup> H04R 25/00

U.S. Cl. 381—68

24 Claims



1. A hearing aid, comprising:

- amplifying means including an amplifier for boosting an incoming signal;
- a power source operatively electrically connected to said amplifier; and
- switching means for automatically controlling the electrical

connection between said amplifier and said power source by automatically providing the electrical connection upon attachment of the hearing aid to the user and by automatically breaking the electrical connection when the hearing aid is detached from the user, said switching means including a switch responsive to a change of temperature and being arranged on the hearing aid at a location which is subjected to the change of temperature, said switch being a temperature-sensitive switch in heat-conducting connection with the skin of the user at said location when the hearing aid is mounted to the user.

4,955,730

# OIL-PRESSURE BEARING APPARATUS

Mitsuhiro Kashima, and Kensei Suzuki, both of Kani, Japan, assignors to Kayaba Kogyo Kabushiki Kaisha, Tokyo, Japan

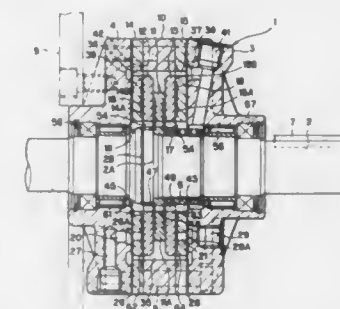
Filed Dec. 1, 1989, Ser. No. 444,590

Claims priority, application Japan, Dec. 5, 1988, 63-158199; Dec. 5, 1988, 63-158200; Aug. 22, 1989, 1-215613

Int. Cl.<sup>5</sup> F16C 32/06

U.S. Cl. 384—101

7 Claims



1. An oil-pressure bearing apparatus comprising:

- a rotating shaft which receives thrust loads
- a pair of bearing housings which support said rotating shaft;
- a pair of floating discs which are installed on said rotating shaft;
- a plurality of rolling components which are installed between said pair of floating discs;
- a plurality of pressurized chambers and clearances formed between external surfaces of said pair of floating discs and said pair of bearing housings so that said pressurized chambers and clearances can be positioned in the periphery of said rotating shaft;
- an oil-supply passage which links said pressurized chambers to an oil-pressurizing source; and
- an oil-feedback passage which links said pressurized clearances to an oil tank.

4,955,731

# BEARING EQUIPMENT FOR VACUUM DEVICES

Akira Yamamura, Tokyo, Japan, assignor to Nippon Ferrofluidics Corporation, Tokyo, Japan

Filed Apr. 27, 1989, Ser. No. 344,651

Int. Cl.<sup>5</sup> F16C 17/10

U.S. Cl. 384—133

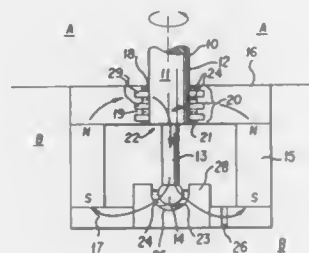
2 Claims

1. A bearing device for a vacuum device comprising:

- first and second generally annular pole pieces;
- a permanent magnet member having an annular shape fitted between said first and second annular pole pieces;
- said first annular pole piece having a plurality of ring members formed on an inner surface thereof and an aperture formed centrally therein;
- said second annular pole piece having a portion thereof formed into a concave spherical shape;
- a rotatable shaft member having first and second portions;

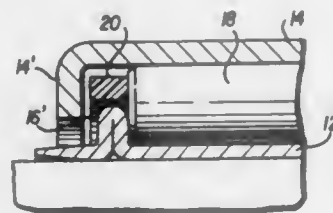


said first portion having a larger diameter for fitting through the aperture formed in the first annular pole piece  
said second portion having an end part formed into a partially spherical shape to mate with the concave spherical shape formed in second annular pole piece;



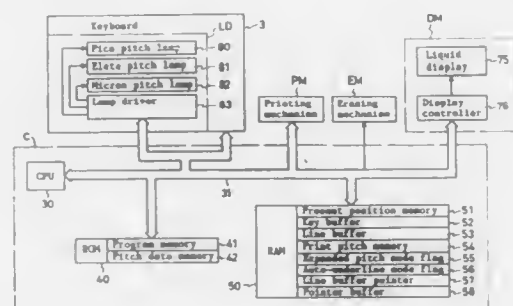
magnetic fluid means disposed intermediate the said mated spherical shapes and opposite said ring portions of said first annular pole piece.

**4,955,732**  
**UNITARY, AXIALLY SELF-LOCATING NEEDLE BEARING**  
Mark B. Behrens, Charlotte, N.C., assignor to INA Bearing Company, Fort Mill, S.C.  
Filed Apr. 12, 1989, Ser. No. 336,790  
Int. Cl.<sup>5</sup> F16C 33/58  
U.S. Cl. 384—484 16 Claims



1. A drawn shell, axially self-locating needle bearing comprising:
  - a drawn inner race having a flange projecting radially outwardly from said inner race;
  - a drawn outer race having a flange projecting radially inwardly at either end of said outer race;
  - a plurality of needle rollers held in a cage contained between said drawn inner race and said drawn outer race; and
  - means for axially locating said inner race with respect to said outer race, said axial locating means comprising said radially outwardly projecting flange of said inner race positioned between one end of said needle rollers, and one of said inwardly projecting flanges of said outer race, and the other inwardly projecting flange of said outer race positioned at the other end of said needle rollers, wherein said inner race is drawn from sheet stock and said flange on said inner race is a crimped portion of said sheet stock.

**4,955,733**  
**PRINTING APPARATUS WITH EXPANDED PITCH MODE AND UNDERLINING**  
Tsutomu Ukon, Kuwana, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan  
Filed Mar. 7, 1989, Ser. No. 319,701  
Claims priority, application Japan, Mar. 14, 1988, 63-61336  
Int. Cl.<sup>5</sup> B41J 29/26  
U.S. Cl. 400—17 7 Claims



1. A printing apparatus comprising:
  - an entering means for entering data of characters and various command signals,
  - a line buffer for storing data entered from said entering means,
  - a printing means for printing characters along a print line corresponding to data entered into said line buffer on a printing medium,
  - an underline mode setting means for setting an underline mode in which said characters are printed with underlines,
  - a pitch setting means for setting one of plural print pitches,
  - an expanded pitch setting means for setting an expanded pitch mode in which an expanded space is provided between entered neighboring characters in said print line so that the pitch between neighboring characters is an integer multiple greater than 1 of said print pitch set by said pitch setting means, and
  - an underline print control means for controlling said printing means to print one or more underlines in said expanded space between a preceding printed characters and a succeeding character to be printed before printing of said succeeding character when the data of said succeeding character is entered, when both said underline mode and said expanded pitch mode are set.

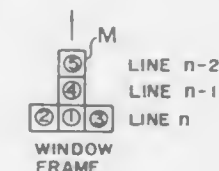
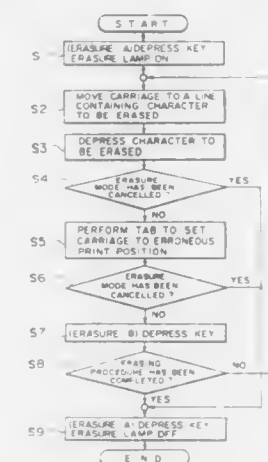
**4,955,734**  
**INFORMATION PROCESSING APPARATUS**  
Shinichiro Nakazawa, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 185,276, Apr. 18, 1988, abandoned, which is a continuation of Ser. No. 902,108, Aug. 29, 1986, abandoned, which is a continuation of Ser. No. 640,742, Aug. 14, 1984, abandoned. This application Jan. 17, 1990, Ser. No. 463,821  
Claims priority, application Japan, Aug. 18, 1983, 58-149676  
Int. Cl.<sup>5</sup> B41J 5/30 10 Claims

1. An information processing apparatus comprising:
  - input means for entering a plurality of character strings including a character string to be corrected;
  - memory means connected to said input means for storing

therein the plurality of character strings entered by said input means;  
printing means for printing the character string stored in said memory means;  
search instruction means for instructing a search of the character string to be corrected;  
search means for searching in said memory means for a

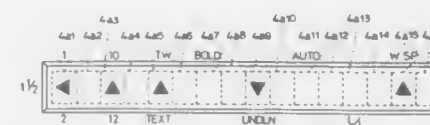
by displaying an indication character in display segments adjacent to the marks corresponding to the operating modes to be displayed, each indication character selectively pointing to one of the marks corresponding to a currently selected operating mode.

**4,955,736**  
**METHOD AND APPARATUS FOR ENERGIZING THERMAL HEAD IN ACCORDANCE WITH DOT PATTERN COINCIDENCE TABLES**  
Satoshi Iwata, Akikazu Tolda, and Fumio Takahashi, all of Ise, Japan, assignors to Shinko Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Feb. 14, 1989, Ser. No. 310,157  
Claims priority, application Japan, Feb. 15, 1988, 63-30769; Feb. 23, 1988, 63-38668  
Int. Cl.<sup>5</sup> B41J 3/20 5 Claims



character string which is the same as the character string input by said input means and to be corrected, in response to an instruction of said search instruction means;  
tab position set means for setting a tab to a position of the character string searched by said search means; and  
control means for positioning said printing means at a tab position set by said tab position set means so as to be capable of printing a new character string.

**4,955,735**  
**PRINTER WITH COMBINED DATA AND OPERATING-MODE DISPLAY**  
Shoji Sakuragi, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan  
Filed Mar. 7, 1989, Ser. No. 319,702  
Claims priority, application Japan, Mar. 17, 1988, 63-64083  
Int. Cl.<sup>5</sup> B41J 3/46 8 Claims



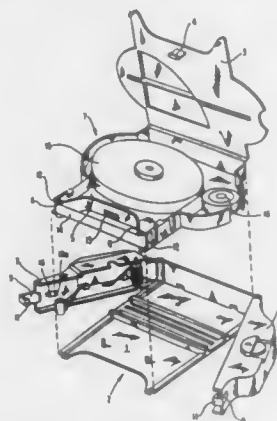
1. A printer having input-display means for displaying data from a keyboard on a display panel and mode-executing means for executing at least one mode chosen from a set of many operating modes, the printer comprising:
    - the display panel having a single line of discrete display segments;
    - marks arranged above, below, and/or on at least one side of the display panel and placed adjacent to one of the discrete display segments, each mark representing a different operating mode; and
    - mode-displaying means for overriding the input display means so that no input data is displayed on said single line of discrete display segments and for displaying only operating modes on the display panel by indicating marks corresponding to currently selected operating modes executed by the mode-executing means when a dedicated key on the keyboard is pressed;
- wherein the mode-display means displays operating modes

1. A method for energizing a thermal head of a thermal printer comprising the steps of:  
storing a plurality of lines of dots of printing data supplied from an external equipment in a plural line buffer;  
extracting a predetermined number of dots on said plurality of lines in accordance with a window frame of a predetermined shape by scanning the printing data sequentially;  
generating an address representing the predetermined number of dots extracted by said window frame;  
determining whether the address corresponds to a predetermined window frame pattern or not;  
converting both the address corresponding to said predetermined window frame and the address not corresponding thereto into intermediate codes by an intermediate code table, said intermediate codes respectively representing different amounts of heating energy to be supplied to a corresponding heating element of said heating unit depending on whether the address represents a printing area or non-printing area in the case the coincidence with said predetermined window pattern is determined, and whether the address represents a printing area or a non-printing area in the case the coincidence with the predetermined window pattern is not determined; and  
energizing the heating element of the heating unit in response to the intermediate code for the number of times to reach the amount of heating energy designated by the intermediate code.

**4,955,737**  
**HOLDER FOR A RIBBON FOR TYPEWRITERS OR SIMILAR MACHINES**  
Johannes Haftmann, Schwabach, and Werner Haczek, Furth, both of Fed. Rep. of Germany, assignors to Ta Triumph Adler Aktiengesellschaft, Nuremberg, Fed. Rep. of Germany  
Filed Dec. 6, 1988, Ser. No. 280,486  
Claims priority, application Fed. Rep. of Germany, Dec. 7, 1987, 37413635  
Int. Cl.<sup>5</sup> B41J 32/00 2 Claims

1. A holder for a ribbon for typewriters or similar machines where the holder is insertable into a receptacle, comprising a

slider having a hook on a free end thereof, the slider being disposed on each one of two pivotable side elements of the



receptacle, and which, in its operational position, hooks the holder to the receptacle.

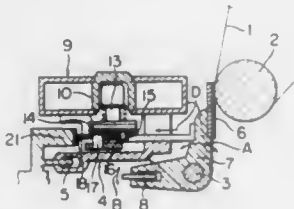
4,955,738

**PRINTER WITH DISENGAGEABLE RIBBON FEED**  
Yoshio Uchikata; Mineo Nozaki, both of Kawasaki; Osamu Asakura, Tokyo, and Masasumi Nagashima, Yokosaka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 880,111, Jun. 30, 1986, abandoned, which is a continuation of Ser. No. 630,187, Jul. 12, 1984, abandoned. This application Jun. 6, 1988, Ser. No. 203,503  
Claims priority, application Japan, Jul. 20, 1983, 58-130981; Jul. 20, 1983, 58-130983

Int. Cl.<sup>5</sup> B41J 33/04

U.S. Cl. 400—229

13 Claims



1. A printer for effecting image recording on a recording medium by using an ink ribbon moved by a winding portion, the printer comprising:

- a platen;
- a carriage movable along a conveyance route of the recording medium and having a mounting portion for mounting the ink ribbon thereon;
- a mounting portion, coupled to said carriage, for mounting the ink ribbon;
- a thermal head on said carriage, said thermal head being movable relative to said carriage and relative to said mounting portion between a record position for effecting image recording on the recording medium and a withdrawn position displaced from the record position;
- an engaging member disposed along the path of said carriage;
- a rotary member for engaging said engaging member to obtain a drive force for moving the ink ribbon as said carriage moves along said platen;
- transmission means for transmitting the drive force to the winding portion to move the ink ribbon; and
- displacing means for moving said engaging member between an engaging position, wherein said engaging member engages said rotary member, and a withdrawn position,

wherein said engaging member is withdrawn from the engaging position.

4,955,739

**MECHANICAL PENCIL HAVING SIDE PUSH BUTTON ACTUATED LEAD ADVANCE**

Hidehei Kageyama; Yoshihide Mitsuya, and Youichi Nakazato, all of Kawagoe, Japan, assignors to Kotobuki & Co., Ltd., Kyoto, Japan

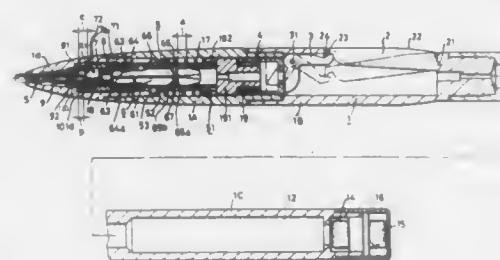
Filed Oct. 21, 1988, Ser. No. 261,244

Claims priority, application Japan, Oct. 23, 1987, 62-266630

Int. Cl.<sup>5</sup> B43K 27/16

U.S. Cl. 401—65

4 Claims



1. A mechanical pencil comprising:
- an outer cylinder having upper and lower ends and including means for housing a plurality of leads;
  - an outer sleeve disposed within said outer cylinder;
  - lead move-out means, disposed within said outer cylinder and in contact with said outer sleeve, for feeding one of said plurality of leads out through said lower end of said outer cylinder upon downward movement of said outer sleeve;
  - a side pushing hole formed in a side of said outer cylinder;
  - a pushing member positioned within said side pushing hole and having upper and lower ends, said lower end of said pushing member being slidable in said side pushing hole between first and second positions, said upper end of said pushing member including a pivot point about which said pushing member pivots when said lower end of said pushing member is moved between said first position and said second position; and
  - lever means, pivotally mounted within said outer cylinder and in contact with said lower end of said pushing member and with said outer sleeve, for pressing said outer sleeve downwardly upon movement of said lower end of said pushing member from said first position to said second position, said lever means including a first leg which contacts said lower end of said pushing member and a second leg which contacts said outer sleeve, said second leg being bifurcated so as to form a passage through which leads can pass,
- wherein said pushing member and said lever means are disposed longitudinally between said lead move-out means and said lead housing means and are adapted to cooperate with each other for changing movement of said pushing member into movement of said outer sleeve.

4,955,740

**WELDED JOINT BETWEEN PLASTIC PARTS**

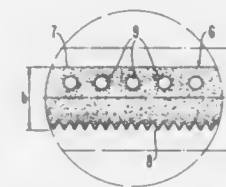
Rainer Reaz, Stuttgart, and Karl-Heinz Ilzhoefer, Reichenbach-/Fils, both of Fed. Rep. of Germany, assignors to Daimler Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany  
Filed Jan. 4, 1988, Ser. No. 140,588

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1987, 3700465

Int. Cl.<sup>5</sup> B25G 3/00; F16B 1/00

U.S. Cl. 403—27

29 Claims



1. Welded joint between plastic parts, wherein at least one of the plastic parts to be welded together is provided with a jointly weldable coating of an X-ray contrast medium containing coloring pigments based on heavy metals, and having a sharply set-off outer contour and a specific outline shape, said coating being disposed in the region of the surface in contact with the other plastic part at the welded joint.

4,955,741

**UNIVERSAL JOINT**

Nobuo Komeyama, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan

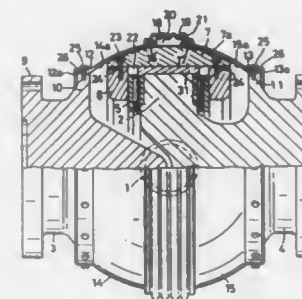
Filed Mar. 28, 1989, Ser. No. 329,740

Claims priority, application Japan, Mar. 30, 1988, 63-43437

Int. Cl.<sup>5</sup> F16B 7/10, 3/00

U.S. Cl. 403—57

8 Claims



1. A universal joint including a pair of yokes each having two trunnions projecting radially thereof, and an annular intermediate ring having bearings arranged on two diametrical lines thereof intersecting each other at right angles for supporting the respective trunnions of the yokes, the universal joint comprising an annular central cover fixedly intimately fitted around the intermediate ring and having a spherical outer surface, a collar formed on each of the yokes and positioned between the intermediate ring and a connecting flange at the outer end of the yoke, a pair of annular side covers each having an outer end portion of horizontal section fixed to the periphery of the collar in intimate contact therewith and a spherical inner surface slidable in contact with the spherical outer surface of the central cover, and an annular seal member provided at the inner end portion of each of the side covers and in intimate contact with the outer surface of the central cover, the inner ends of the pair of side covers being spaced apart from each other by a clearance required for the sliding movement of

4,955,742

**ERECTABLE STRUCTURE TRUSS ATTACHMENT JOINT**

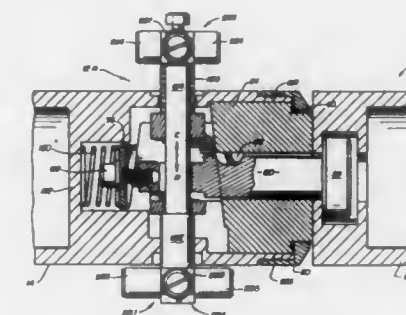
Geoff Marks, Santa Barbara, Calif., assignor to Astro Aerospace Corp., Carpinteria, Calif.

Continuation of Ser. No. 52,237, May 19, 1987, abandoned. This application Nov. 22, 1989, Ser. No. 441,232

Int. Cl.<sup>5</sup> B15G 3/00

U.S. Cl. 403—246

42 Claims



41. A joint for joining first and second members comprising:

- a wall carried by the first member;
- a piston carried by the second member and having a wall-abutting face and a shoulder;
- a flange mounted to the second member and having a shoulder-abutting surface; and
- means for applying a preload between the wall and the wall-abutting face of the piston and between the shoulder of the piston and the shoulder-abutting surface of the flange.

4,955,743

**RACK BEAM LATCH**

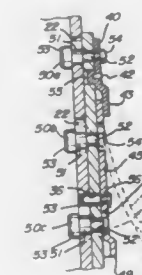
John R. King, West Bloomfield, Mich., assignor to S&K Enterprises, Inc., Detroit, Mich.

Filed Nov. 3, 1989, Ser. No. 431,388

Int. Cl.<sup>5</sup> B25G 3/00; F16B 9/00

U.S. Cl. 403—254

11 Claims



1. A rack beam latch for securing the end of a generally horizontally arranged beam to a vertical support post having a series of similar, vertically aligned, pin receiving openings formed therein, with the beam end having an end plate which overlaps some of the openings, and with pins formed on the end plate and extending into said openings for connecting the beam to, and for supporting the beam upon, the support post, and with the pin receiving openings being vertically elongated and having upper portions that are widened relative to their lower, narrowed portions and the pins being formed to loosely fit through the opening upper portions for insertion and re-



moval therefrom, but formed to be closely fitted and held within the lower portions of the openings to prevent removal therefrom; said latch comprising:

- an upper, sheet-like cover member positioned upon said end plate and having an upper portion fastened to the end plate and an integral lower portion bent a short distance from and arranged parallel to the end plate to form a space therebetween, so as to have said cover member in its entirety immovable relative to the plate;
- a lower sheet-like spring member overlapping the plate and having an upper part snugly fitted within said space and an integral lower part extending below the upper cover member, and including means for positioning the spring member to the plate;
- a latching protuberance provided on the lower part of the spring member and extended through a latching hole formed in the plate for extending into one of the support post pin receiving openings above a pin received in that opening, to prevent movement of that pin from the narrowed portion to the widened portion of the opening;
- the lower part of said spring member being manually resiliently bendable away from the portion of the plate which it overlaps for moving the latching protuberance endwise out of said post opening for allowing the pin in that post opening, as well as other pins on the plate which are fitted in adjacent openings, to be manually removed upwardly into the widened portions of their respective openings for endwise removal therefrom, but otherwise the latching protuberance restrains the pins from movement out of the narrowed portions of their openings.

4,955,744

#### CLAMPING FIXTURE FOR AXIALLY CLAMPING A TOOL IN PLACE, IN PARTICULAR A DISC

Walter Barth, Friedrich Häusslein, Winfried Helm, and Manfred Stäbler, all of Leinfelden-Echterdingen, Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

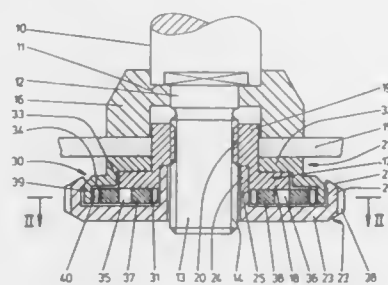
Filed Jun. 14, 1989, Ser. No. 372,350

Claims priority, application Fed. Rep. of Germany, Jan. 15, 1987, 3700968

Int. Cl.<sup>3</sup> B25G 3/00

U.S. Cl. 403—259

34 Claims



1. A clamping fixture for axially clamping a tool, in particular a disc tool, on a flange of a driven spindle having an end portion with an outer thread, said clamping fixture comprising a clamping nut having an internal thread to be screwed on the end portion with an outer thread of the driven spindle; a clamping member arranged between the tool and said clamping nut for transmitting an axial clamping force to the tool upon tightening of said clamping nut; a manually operable adjusting member freely rotatable relative to the end portion of the driven spindle; and a gearing for gear-coupling said adjusting member to said clamping nut and gear-coupling said adjusting member to said clamping member, said gearing being arranged between said adjusting member and said clamping member and being formed as a planetary gear.

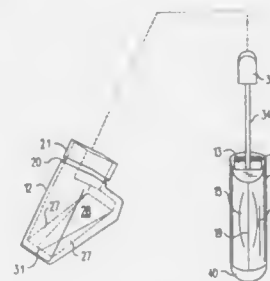
4,955,745  
BOTTLE WITH APPLICATOR  
Jeri A. Vanquelin, 1742 S. Bentley Ave., #302, Los Angeles, Calif. 90025

Filed Oct. 5, 1989, Ser. No. 417,434

Int. Cl.<sup>3</sup> A45D 34/00; A46B 11/00

U.S. Cl. 401—119

20 Claims



1. A new and improved bottle with applicator for use with nail polish, comprising:
  - a bottle;
  - said bottle having an inclined exterior front wall;
  - a flat exterior bottom surface;
  - said exterior front wall forming an angle of about 45 degrees with said exterior bottom surface;
  - an interior front wall extending parallel to said exterior front wall;
  - an interior bottom surface inclined downwardly toward said interior front wall and forming an angle with said exterior bottom surface;
  - said interior bottom surface formed from three intersecting inclined planar surfaces, two of said inclined planar surfaces inclined downwardly and inwardly toward said interior front wall;
  - an exterior back wall surface obliquely angled with respect to said exterior front wall surface and forming an acute angle with said exterior bottom surface;
  - a generally rectangular top wall portion connected to said exterior front wall and said exterior back wall;
  - first sealing means on said top wall portion;
  - a cap having second sealing means for cooperating with said first sealing means; and
  - an applicator attached to said cap.

4,955,746

#### PORTABLE CLEANING DEVICE FOR GOLF CLUBS

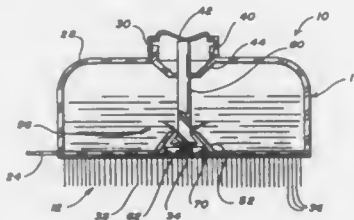
Joseph M. Craigmille, 1003 N. Cooper, Columbia, Mo. 65203

Filed Aug. 3, 1989, Ser. No. 389,176

Int. Cl.<sup>3</sup> A46B 11/04

U.S. Cl. 401—131

8 Claims



1. A portable cleaning device for golf clubs adapted to be held in a palm of a user's hand comprising a reservoir for containing cleaning fluid, a scrubbing brush means attached to the bottom of the reservoir and a valve means for controlling the flow of the cleaning fluid into the scrubbing brush means, said reservoir having a base, sidewalls and a generally rigid

closed top with an opening closed with a removable cap which is resiliently biased in a direction away from the base but which is flexible such that it can be flexed in a direction towards the base by the user, said valve means having means for discharging the cleaning fluid in a substantially undivided stream and comprising a valve housing flowably connected with an opening formed in the base of the reservoir with a valve seat above the opening into which is seated a valve head, said valve head having a valve stem and a resilient biasing means positioned on the opposite side thereof, said valve stem having one end secured to the valve head and the other end juxtaposed relative to the cap such that the valve stem is displaced in the direction of the base when the removable cap is flexed displacing the valve head from the valve seat and allowing cleaning fluid to flow from the reservoir into the scrubbing means and said resilient biasing means bearing against the valve head such that the valve head is normally seated in the valve seat stopping the flow of cleaning fluid from the reservoir.

4,955,747

#### APPLICATOR AND POLISHING DEVICE

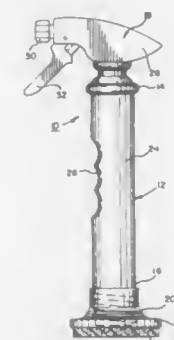
Matthew A. Tarver, 341 S. Wolf Rd., Des Plaines, Ill. 60016

Filed Nov. 27, 1989, Ser. No. 441,280

Int. Cl.<sup>3</sup> A47L 13/30

U.S. Cl. 401—139

32 Claims



1. A hand-held device for removably holding a working pad comprising:
  - (a) a container for holding a fluid having at least one open upper end, a closed lower end and a gripping portion;
  - (b) means for dispensing the fluid on a surface, the dispensing means being removably secured to the upper end of the container in communication with the fluid in the container; and
  - (c) means for removably securing the working pad about the lower end of the container so that only the working pad contacts the surface when the working pad is compressed against the surface, the lower end of the container including an externally threaded portion adapted to threadably engage the securing means, the securing means including a threaded portion defined thereon, whereby the gripping portion permits the user to hold the container comfortably during operation of the dispensing means or the working pad.

4,955,748

#### DUSTLESS DRYWALL FINISHER

Robert Krumholz, 138 Park Ave., Garden City Park, N.Y. 11040

Filed Jul. 26, 1989, Ser. No. 385,200

Int. Cl.<sup>3</sup> A46B 11/00; B43K 5/00

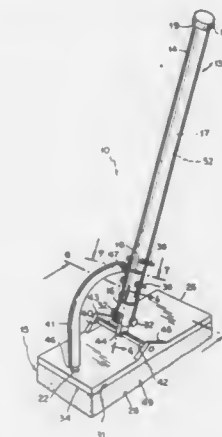
U.S. Cl. 401—140

3 Claims

1. A dustless drywall finisher, comprising:
  - (a) a rigid handle portion containing a liquid, a hollow free end, a fixed end, a plastic plug, and a rubber cap disposed at said free end, said liquid being water, and said rigid handle portion having said plug mounted to said fixed end of said rigid handle portion, said plug consisting of a body

being substantially cylindrical in shape and containing a pair of extensions emanating therefrom, said pair of extensions containing a pair of diametrically opposed holes containing a pair of bolts, respectively, said rigid handle portion containing a rigidly affixed internal valve, said internal valve being internally attached within said rigid handle portion;

- (b) a sponge portion support on a platform head is pivotally mounted to said rigid handle portion and said rigid handle portion contains a rigid tube that is made of aluminum so that said rigid handle portion will not oxidize;
- (c) means for transporting said liquid from said rigid handle portion to said sponge portion so that said sponge portion and said rigid handle portion still remain mutually pivot-



4,955,749

#### SWIVEL CONNECTOR

Vlatko Panovic, Suite 2404, 4221 Mayberry St., Burnaby, British Columbia, Canada V5H 4E8

Filed Jun. 19, 1989, Ser. No. 367,629

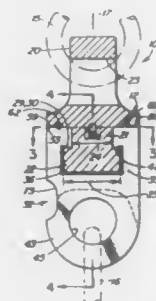
Int. Cl.<sup>3</sup> B25G 3/00

U.S. Cl. 403—11

14 Claims

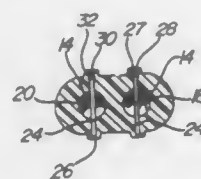
1. A swivel connector comprising:
  - (a) a plug connector portion having a first body member having an outer portion, a neck portion and a head portion, the outer portion having an eye to receive a first link, the neck portion having a diameter less than the head portion and being concentric therewith about a longitudinal axis to provide a shoulder having a first bearing surface,
  - (b) a socket connector portion having second and third body members, each body member having a longitudinally aligned main face having a recess which is generally complementary to one half of the neck and head portions of the first body member to accept the said one half therein, each recess having a semi-annular bearing surface positioned to engage a corresponding half of the first bearing

surface of the first body member when the main faces of the second and third body members are abutted to form a unit to enclose the neck and head portions of the first body member, the second and third body members each having a respective outer portion with a respective eye so that when the second and third body portions cooperate with each other as the said unit, the eyes thereof are aligned with each other to receive a second link passed there-through,



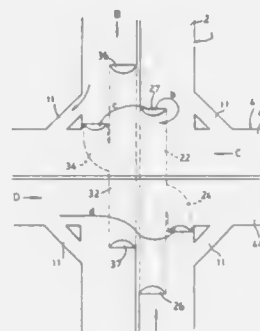
- (c) force generating means on at least one bearing surface for generating an inwards force on the second and third body members, which force is directed towards the longitudinal axis and tends to hold the second and third body members together;
- (d) resilient means for applying an initiating force between the connector portions so as to force the complementary bearing surfaces into engagement with each other to generate the said inwards force.

**4,955,750**  
**ROPE FASTENER**  
Leo Goran, P.O. Box 1074, Punta Gorda, Fla. 33951-1074  
Filed Sep. 5, 1989, Ser. No. 402,542  
Int. Cl.<sup>5</sup> B25G 3/00; F16B 7/10  
U.S. Cl. 403—306 14 Claims



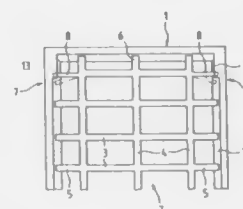
1. A rope fastener comprising:  
a body portion of a resilient material;  
said body portion having at least one passage of a size to receive a rope therein, said passage extending longitudinally through said body portion;  
said body portion having at least one nail receiving hole transverse to said at least one passage and extending diametrically across said passage and through said body on opposite sides of said passage; and  
at least one nail for insertion into said at least one nail hole to extend diametrically through the rope in said at least one passage to retain said rope in said passage, said nail extending into said body portion on the opposite side of said body portion from where said nail is inserted into said body portion, said nail and said nail receiving hole being sized so that said resilient body portion is deformed by said nail to retain said nail therein.

**4,955,751**  
**CROSSROAD WITHOUT TRAFFIC LIGHTS**  
John Tsai, No. 3, Lane 541, Fu Hsing Rd., Hsi Tsa Chu, Taichung City, Taiwan  
Filed Aug. 22, 1989, Ser. No. 396,861  
Int. Cl.<sup>5</sup> E01C 1/00 4 Claims



1. A crossroad comprising:  
a first road being substantially level and straight;  
a second road intersected with said first road;  
a first pair of second dimensional passages being provided on said second road, each of said first passages having a bypass merging into one side thereof;  
each of said first passages having a first entrance at one end and a first exit at the other end;  
each of said first entrances being spaced further from said first road than said first exit on the same side of said first road;  
each of said bypasses having an inlet adjacent to said first road and closer to said first road than said first exit on the same side of said first road;  
wherein a vehicle driving into said first entrance and out of said first exit of one of said first passages is movable over said first entrance of the other said first passage for making a left turn, and movable into said inlet of said bypass of the other said first passage for making a U-turn.

**4,955,752**  
**COVER ASSEMBLY WITH A LOCKING MECHANISM**  
Derek Ferns, Gwent, Great Britain, assignor to Van Roll AG, Gerlafingen, Switzerland  
Continuation of Ser. No. 149,752, Jan. 29, 1988, Pat. No. 4,909,660. This application Oct. 16, 1989, Ser. No. 421,818  
Claims priority, application United Kingdom, Feb. 2, 1987, 87 02221; Feb. 5, 1987, 87 02585  
Int. Cl.<sup>5</sup> E01C 11/22 9 Claims



1. A cover assembly for closing an opening, comprising a dimensionally stable and rigid frame; a substantially rigid covering mounted in said frame in a non-prestressed position; and locking means arranged on said frame and said covering for detachably-securing said covering against displacement or removal from said frame, said locking means including at least

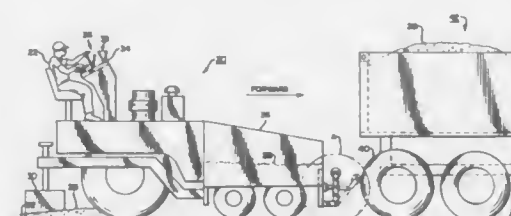
one elastically deformable closing member made integrally with said covering so as to form a one-piece covering and extending substantially in a plane thereof, and at least one rigid retaining member formed on said frame, said closing member including an elastically deformable rod-like web having a closing finger elastically bendable in the plane of said covering, said retaining member being provided with a groove engaging said closing finger for a positive securing of said covering to said frame.

**4,955,753**  
**ROADWAY BARRIER SYSTEM**  
Alan R. McKay, 1126 Hilltop Dr., Lafayette, Calif. 94549  
Continuation-in-part of Ser. No. 220,926, Jul. 18, 1988, Pat. No. 4,881,845, which is a continuation of Ser. No. 815,456, Jan. 2, 1986, abandoned. This application Nov. 17, 1989, Ser. No. 438,763  
Int. Cl.<sup>5</sup> E01F 13/00 16 Claims



1. A roadway barrier system which provides a safe separation between opposing lanes of vehicular traffic and is capable of being moved across a lane to change the direction of traffic flow in the lane, comprising: a plurality of elongated barrier sections positioned end-to-end along one side of the lane, a vehicle which travels along the lane having a transfer beam in the form of a closed loop with a portion of the beam extending diagonally across the lane, and a plurality of trolleys mounted on the transfer beam for movement around the loop and into lifting engagement with successive ones of the barrier sections for carrying the barrier sections across the diagonally extending portion of the beam from one side of the lane to the other as the vehicle travels along the lane.

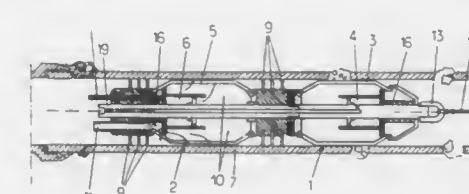
**4,955,754**  
**SHOCK ABSORBING DEVICE FOR A PAVING MACHINE**  
Donald W. Smith, Aurora, Ill., assignor to Barber-Greene Company, DeKalb, Ill.  
Filed Jan. 19, 1990, Ser. No. 467,640  
Int. Cl.<sup>5</sup> E01C 19/18 24 Claims



1. A device for cushioning a contact between a travelling self-propelled paving machine equipped with a hopper for receiving paving material and a truck carrying paving material to be deposited in the hopper, the truck being equipped with a tire, the device comprising:  
A. contacting means, connected to the paving machine, for contacting the truck and for applying to the truck a force tending to move the truck in a direction in which the paving machine is travelling, the contacting means movable between an extended position for initially contacting the truck and a retracted position;  
B. cushioning means, connected to the contacting means and

to the paving machine, for cushioning the force applied to the truck and the force applied to the paving machine by the contact between the contacting means and the truck;  
C. latch means, connected to one of the paving machine and the contacting means, for latching the contacting means in the retracted position, the latch means having a latched state and an unlatched state; and  
D. restoring means, connected to the contacting means and to the paving machine, for restoring the contacting means to the extended position.

**4,955,755**  
**DEVICE FOR THE IN SITU REPAIR OF A PIPE**  
André F. Frey, 295 Rue du Général LeClerc, 57560 Abreschviller, France  
Filed Jun. 9, 1989, Ser. No. 364,821  
Claims priority, application France, Jun. 10, 1988, 88 07973  
Int. Cl.<sup>5</sup> F16L 55/16 12 Claims



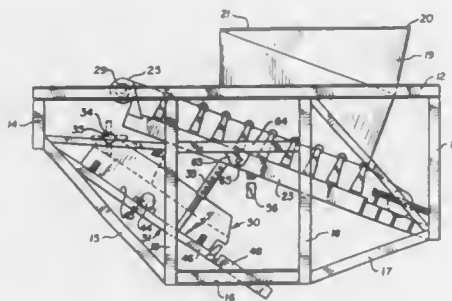
1. A device for the in situ repair of a pipe by the injection under pressure of a sealing product, which device comprises a front module and a rear module and wherein:  
each module includes radially displaceable arms and hydraulic displacement means, connectable to an hydraulic pump at surface level, for displacing the arms;  
the arms are displaceable between an inoperative, radially retracted position and an operative, radially distended position, whereby the front module, through pressure exerted by its arms on the damaged inside walls of the pipe, can act both as a widener and as a guide, to restore the pipe to its original diameter and to facilitate passage along the pipe of the rear module;  
the rear module includes, at each opposite end thereof, sealing means which, in conjunction with the pipe, define a chamber into which leads at least one passage for feeding sealing product, the passage being connectable to a pump for sealing product at surface level; and said radially displaceable arms of the rear module being disposed between the sealing means.

**4,955,756**  
**PIPELINE PADDING SYSTEM**  
Ed Klamar, 320 N. 7th St., Indiana, Pa. 15701  
Continuation-in-part of Ser. No. 200,743, May 31, 1988. This application Aug. 11, 1989, Ser. No. 392,503  
Int. Cl.<sup>5</sup> E02F 5/22 9 Claims

- U.S. Cl. 405—179  
1. Apparatus for covering pipe laid in a trench comprising an elongated chassis adapted to be mounted on carriage means movable along the trench, a backfill hopper supported by said chassis at one end, a conveyor adapted to carry backfill from said hopper discharge to an elevation above said hopper discharge at the other end of the chassis, a vibrating screen receiving backfill material discharged from said conveyor and delivering backfill material of padding size at said other end of said chassis to said pipe in said trench, a hitch attachable to said carriage means, said chassis being pivotally mounted midway of its length on said hitch for cantilevering said chassis over a trench, an auxiliary power source mounted on said hitch for said conveyor and said screen, means for varying the attitude of said chassis about said pivot mounting during movement of



said chassis along said trench, and means for varying the speed of said conveyor, whereby backfill from said hopper is delivered to said pipe in said trench at a uniform rate during said movement of said chassis along said trench.

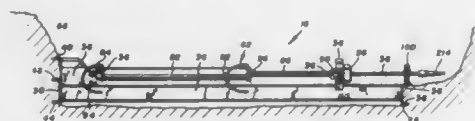


#### 4,955,757 HYDRAULIC APPARATUS FOR INSTALLING PIPING BELOW GROUND

Curtis Balling, 405 Belmont St., Lakefield, Minn. 56150  
Filed Jun. 29, 1989, Ser. No. 372,584  
Int. Cl.<sup>5</sup> E21B 9/00

U.S. Cl. 405—184

21 Claims



1. An apparatus for installing pipe under ground including:
  - a frame means having a guide surface and an anchoring means for securing said frame means integrally to the ground;
  - a carriage supported on said guide surface for reciprocating travel in longitudinal forward and rearward directions relative to the frame means;
  - a pair of opposed gripping members mounted pivotally to said carriage for movement about respective transverse pivot axes into and away from a closure position about and frictionally engaged with a longitudinally extended pipe section whereby said pipe travels with said carriage and gripping members, said gripping means when pivoted away from the closure position releasing said pipe section for longitudinal travel relative to the gripping means and the carriage;
  - a drive means mounted to the frame means and to the carriage for reciprocating said carriage in the forward and rearward directions between forward and rearward locations along the guide surface, said drive means acting upon said carriage to maintain the gripping members in the closure position about the pipe section when moving the carriage forward, and to release the pipe section when moving the carriage rearward;
  - a stabilizing means mounted to said carriage and slidable with respect to said frame means, for maintaining a longitudinal alignment of said gripping members; and
  - a biasing means mounted to said frame means and positioned to engage said gripping members when said carriage, moving rearwardly, reaches a predetermined location proximate the rearward location, said biasing means, responsive to further rearward movement of the carriage beyond said predetermined location pivoting said gripping members into the closure position about the pipe section.

#### 4,955,758 REINFORCING METHOD AND MEANS

Leo J. Hyde, New South Wales, Australia, assignor to Du Pont (Australia) Ltd., New South Wales, Australia  
Filed Jul. 30, 1987, Ser. No. 79,537  
Int. Cl.<sup>5</sup> E21D 21/02

U.S. Cl. 405—261

9 Claims



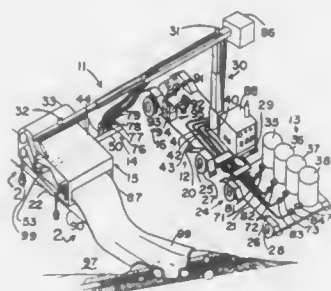
1. A tensionable dowel for reinforcing walls and/or roofs in excavations comprising an elongate member of fibre reinforced engineering plastic having a first end adapted to bond to an anchoring resin and a threaded portion at or adjacent the other end for engaging a nut of corresponding thread, the thread of the nut and the thread on the dowel having different strengths which are selected to cause the hold between said threads to fail at a preselected load to provide an indication that a tension equal to or greater than a preselected value is present in the roof or wall.

#### 4,955,759 DITCH LINING APPARATUS AND METHOD AND PRODUCT THEREFROM

Le Roy Payne, 3300 Nicholas Ln., Molt, Mont. 59057  
Division of Ser. No. 235,205, Aug. 23, 1988, Pat. No. 4,872,784.  
This application Aug. 7, 1989, Ser. No. 389,960  
Int. Cl.<sup>5</sup> E02B 3/12

U.S. Cl. 405—270

10 Claims



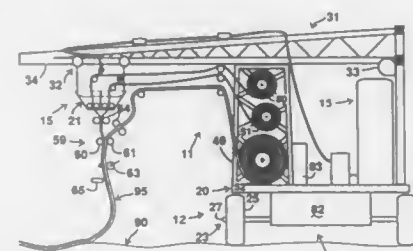
1. A method of continuously forming a ditch liner including the steps of flowing continuously a solidifiable liquid mixture uniformly simultaneously into an entire width of a continuously moving porous blanket, applying pressure against said liquid mixture and said blanket, working said liquid mixture into said blanket to form a continuous matrix within said blanket, monitoring the rate of advance of said blanket, coordinating said rate of advance with the flow rate of said liquid mixture into said blanket and the pressure applied thereto, laying the resulting liner into a ditch base continuously while deformable and said matrix is adhesive, conforming said liner to said ditch base, bonding said liner to said ditch base and setting said liner in the configuration thereof.

#### 4,955,760 LAMINATE FORMING AND APPLYING APPARATUS AND METHOD AND PRODUCT THEREFROM

Le Roy Payne, 3300 Nicholas Ln., Molt, Mont. 59057  
Continuation-in-part of Ser. No. 235,205, Aug. 23, 1988, Pat. No. 4,872,784. This application Oct. 5, 1989, Ser. No. 417,501  
Int. Cl.<sup>5</sup> E02B 3/12; E01C 23/03

U.S. Cl. 405—270

7 Claims



1. Mobile continuous structural laminate forming and applying apparatus including a support portion, a raw material supplying portion, a mixing portion, a matrix forming portion and a control portion; said support portion including at least two base sections, carriage means depending from a first base section including a plurality of spaced transverse axle assemblies, wheels mounted on free ends of each axle assembly, a boom section extending from said first base section, transfer means selectively moving a second base section along said boom section, said raw material supplying portion including a plurality of reservoirs disposed on said first base section, said reservoirs being connected independently with said mixing portion through conduit means, blanket support means disposed on said first base section; said mixing portion including a chamber disposed adjacent said second base section and movable therewith, a plurality of deflector sections within said mixing chamber spaced along the length thereof; said matrix forming portion including polymeric mixture delivery means disposed closely adjacent said mixing portion and said second base section and movable therewith, blanket combining means adjacent said mixture delivery means; said control portion including blanket advance monitoring means, means coordinating said rate of advance with the flow rate of liquid polymeric mixture thereon; whereby a solidifiable liquid polymeric mixture is applied to a porous blanket as it passes through said matrix forming portion, the blanket is compressed and immediately deposited on and conformed to a surface while the laminate is deformable so it will be set in the configuration thereof.

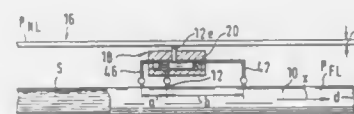
#### 4,955,761 PROCESS FOR PNEUMATICALLY CONVEYING MATERIAL AND APPARATUS FOR CONTROLLING THE FEED OF AIR THEREFOR

Bernd Federhen, Slegen, and Manfred May, Niederfischbach, both of Fed. Rep. of Germany, assignors to Alb. Klein GmbH & Co. KG, Niederfischbach, Fed. Rep. of Germany  
Filed Apr. 24, 1989, Ser. No. 342,245  
Claims priority, application Fed. Rep. of Germany, Jan. 27, 1989, 3902388

U.S. Cl. 406—12

Int. Cl.<sup>5</sup> B65G 53/66

20 Claims



1. An apparatus for pneumatically conveying material comprising a conveyor conduit for conveying said material, sec-

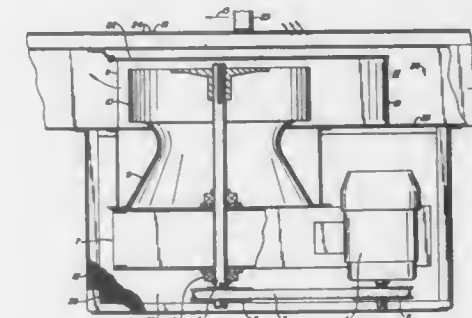
ondary conduit means for supplying gas under pressure to said conveyor conduit, at least one connecting conduit means for feeding gas under pressure from said secondary conduit to said conveyor conduit, valve means provided in said connecting conduit and selectively movable between a closed position and an open position for controlling the flow of gas under pressure to said conveyor conduit, first sensing means associated with said valve means for sensing the pressure in said conveyor conduit upstream of said connecting conduit (P<sub>1</sub>) and second sensing means associated with said valve means for sensing the pressure in said conveyor conduit downstream of said connecting conduit (P<sub>2</sub>) such that said valve means moves from its closed position to its open position when pressure P<sub>1</sub> rises and P<sub>1</sub> is greater than P<sub>2</sub>.

#### 4,955,762 PLENUM FAN ASSEMBLY

Allen D. Hardman, Hollister, Calif., assignor to Raymond Production Systems Corporation, Hollister, Calif.  
Continuation-in-part of Ser. No. 256,059, Oct. 11, 1988, abandoned. This application Jun. 14, 1989, Ser. No. 380,686  
Int. Cl.<sup>5</sup> B65G 51/02

U.S. Cl. 406—88

3 Claims



1. An air conveyor assembly comprising an elongated plenum having side walls, a bottom wall and a top deck surface, said top deck surface being characterized as possessing an array of slit openings for the directional discharge of air from the interior of said elongated plenum for the movement of objects along said top deck surface, the improvement comprising providing means for pressurizing the elongated plenum comprising:
  - a high performance wheel fan member for pressurizing said plenum which is entirely enclosed within said plenum member;
  - a substantially circular air-supply inlet located below said wheel fan member and through said plenum bottom wall;
  - a substantially vertical shaft for supporting said wheel fan member and extending through said air-supply inlet;
  - a motor for turning said vertical shaft and, in turn, said wheel fan; and
  - a filter housing appended to said plenum bottom wall being characterized as having one or more open side walls having positioned therein filter members through which air is drawn to the interior of said elongated plenum by said wheel fan member and said housing being further characterized as completely enclosing said motor, vertical shaft and air-supply inlet.

4,955,763

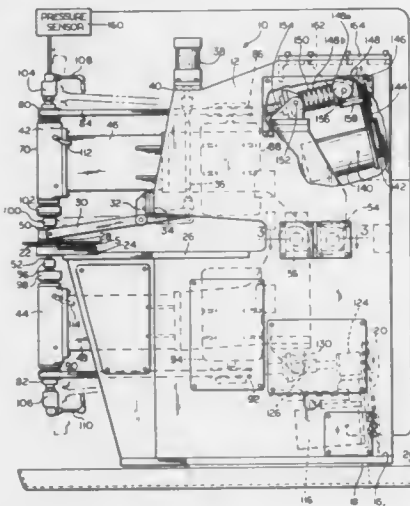
## GLASS DRILLING MACHINE

Ken A. Delventhal, and Keith E. Grosjean, both of Genoa, Ohio, assignors to Toledo Automated Concepts, Inc., Oregon, Ohio

Filed Feb. 10, 1989, Ser. No. 309,837  
Int. Cl.<sup>5</sup> B23B 39/22

U.S. Cl. 408—40

32 Claims



1. A machine for drilling a hole in a sheet of a relatively brittle planar material, said machine comprising: support means for positioning the sheet at a drilling location; first rotary drilling means for drilling a first hole into the sheet from one side of the sheet, the first hole extending partly through the thickness of the sheet; secondary rotary drilling means for drilling a second hole into the sheet from the other side of the sheet, the second hole being substantially aligned with the first hole and forming a complete hole with the first hole, the complete hole extending through the sheet; a first arm having a first end and a second end, said first rotary drilling means being secured to said first arm at a location adjacent said first end of said first arm; means mounting said first arm for pivot movement relative to said support means, the pivot movement of said first arm being in a plane extending generally transversely through the drilling location and being about a first axis extending through said first arm at a location adjacent said second end of said first arm, whereby said first rotary drilling means can be moved toward and away from the drilling location; a second arm having a first end and a second end, said second rotary drilling means being secured to said second arm at a location adjacent said first end of said second arm; means mounting said second arm for pivot movement relative to said support means, the pivot movement of said second arm being in a plane extending generally transversely through said drilling location and being about a second axis extending through said second arm at a location adjacent said second end of said second arm, whereby said second rotary drilling means can be moved toward and away from the drilling location, said second axis being spaced from said first axis; first adjusting means for adjusting the position of said first arm and said first rotary drilling means along an axis extending longitudinally of said arm; and second adjusting means for adjusting the position of said second arm and said second rotary drilling means along said second axis whereby to permit the adjustment of the position of the first rotary drilling means relative to the position of the second rotary drilling means.

4,955,764

## BORING TOOL COOLED FROM WITHIN MADE OF A TOOL SPIRAL AND A CLAMPING CYLINDER

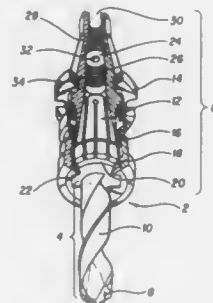
Josef Reimann, Sigmaringen, Fed. Rep. of Germany, assignor to Gottlieb Guhring KG, Ebingen, Fed. Rep. of Germany  
Continuation of Ser. No. 167,147, Mar. 11, 1988, abandoned.  
This application May 1, 1989, Ser. No. 346,290

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1987, 8704477[U]

U.S. Cl. 408—59

Int. Cl.<sup>5</sup> B23B 27/10

15 Claims



1. A boring tool comprising:

- (a) a tool spiral containing at least one inner coolant channel and
- (b) a clamping cylinder comprising a spring chuck and a chuck body, wherein:
- (c) said tool spiral is received in said spring chuck, which carries, on the side facing away from said clamping cylinder, a drive disk that engages interlockingly in clamping slots in said chuck body;
- (d) said chuck body has a central internal thread in which an adjusting screw provided with a central recess is threadably engaged;
- (e) said tool spiral can be pressed sealingly against said adjusting screw; and
- (f) said at least one inner coolant channel in said tool spiral is in fluid communication with said central recess in said adjusting screw when said tool spiral is pressed sealingly against said adjusting screw.

4,955,765

## MACHINE TOOL TABLE HAVING DISPOSABLE WOODEN TABLE SECTION MECHANISM

Ronald C. Laird, 405 Picone Dr., Harahan, La. 70123  
Filed Aug. 2, 1989, Ser. No. 389,311

Int. Cl.<sup>5</sup> B23Q 3/10

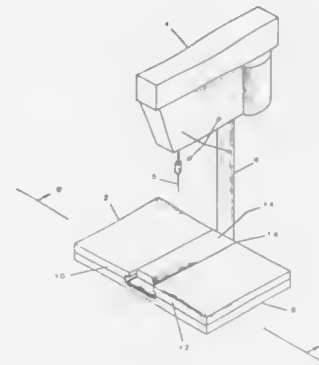
U.S. Cl. 408—87

9 Claims

1. A machine tool table, comprising:

- a supporting structure;
- a first table wing;
- a second table wing;
- a disposable wooden table section, said disposable wooden table section being unattached so that it is freely moveable by an operator, comprised of common lumber; and
- attaching means for attaching said first table wing and said second table wing upon said supporting structure so spaced to allow said disposable wooden table section to be positioned loosely upon said supporting structure between the table wings whereby the table wings can thereby counteract the forces of a tool upon said disposable

wooden table section while permitting the disposable table section to be easily moved or replaced by an operator as



needed to compensate for wear and use of different tools upon the table section.

4,955,766

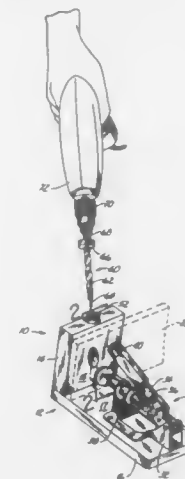
## HOLDING FIXTURE FOR DRILLING POCKET JOINTS

Craig A. Sommerfeld, Rte. 1, Kelley, Iowa 50134  
Filed Nov. 6, 1989, Ser. No. 432,157

Int. Cl.<sup>5</sup> B23B 47/28

U.S. Cl. 408—87

3 Claims



1. The combination of a holding fixture and a drill bit for use in drilling pocket joints in a workpiece with a drill bit, wherein said combination consists of:

- a stop collar attached to said drill bit at a point positioned at a first predetermined distance from the free end thereof;
- an L-shaped body member including a stationary guide portion and a stationary clamp portion disposed normal thereto to form a 90° junction;
- said guide portion including a planar surface for matingly receiving one surface of said workpiece;
- said clamp portion including a surface for receiving another surface of said workpiece;
- moveable and adjustable means for clamping said workpiece in contact with both the guide portion and the clamp portion to secure the workpiece flush against the planar surface of the guide portion; wherein said moveable and adjustable means are disposed on said surface of the clamp portion for receiving said another surface of the workpiece; and,
- a channel formed in said guide portion and being disposed at an angle with respect to said guide portion planar surface such that the channel terminates at an opening in the guide

portion planar surface at a point spaced above the 90° junction, said channel having an upper stop flange positioned at a second predetermined distance above the planar surface of said clamp portion wherein said second predetermined distance is greater than said first predetermined distance; whereby, said stop collar on said drill bit engages the stop flange on said channel and a pocket is formed in the workpiece such that the pocket does not extend through the workpiece.

4,955,767

## BORING ATTACHMENT

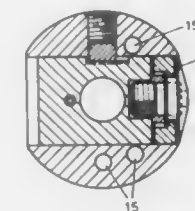
Heinz Kaiser, Wallisellen, and Rudolf Stadelmann, Niederuzwil, both of Switzerland, assignors to Heinz Kaiser AG, Rumlang, Switzerland

Filed Jul. 7, 1988, Ser. No. 216,143  
Claims priority, application Switzerland, Jul. 20, 1987, 2736/87

Int. Cl.<sup>5</sup> B23B 27/00

U.S. Cl. 408—146

7 Claims



1. In a boring attachment with an adjustable boring width, comprising a working head having a support surface abutting against a connecting portion and a connecting shaft axially receivable within said connecting portion, and including a transversely displaceable slide for receiving a cutter holding means and including a recess having a diameter sufficient for receiving the cutter holding means, the improvement wherein: the recess for receiving the cutter holding means extends fully through the transversely displaceable slide so that the cutter holding means is longitudinally displaceable within the recess by an amount equaling at least twice the diameter of the recess; the boring head is balanced such that loading is substantially eliminated when the cutter holding means is in a transversely displaced position which is within a prescribed operating range for the boring head; the boring head has a diameter, and an overall height which is approximately equal to or less than the diameter of the boring head; and the boring head is balanced by one or more bores formed therein.

4,955,768

## FIXTURE FOR MAKING A GEAR

John H. Crankshaw, Erie, Pa., assignor to Dynetics, Inc., Erie, Pa.

Division of Ser. No. 211,865, Jun. 27, 1988, Pat. No. 4,872,791.  
This application Sep. 5, 1989, Ser. No. 389,769

Int. Cl.<sup>5</sup> B23F 9/00

U.S. Cl. 409—10

5 Claims

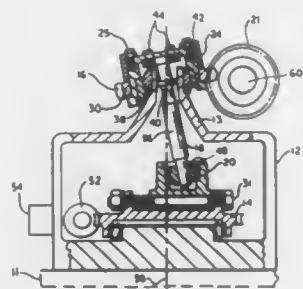
1. A fixture for a gear cutting machine having a frame and a rotatable cutter shaped to simulate a first gear of a flexible gear coupling designed to operate with a second gear at a predetermined angle of misalignment relative to one another comprising:

- a control shaft having a first end, a second end, and an axis of rotation,
- said first end supported on said fixture,
- support means supporting a gear blank on said control shaft at a position adjacent said first end of said control shaft,



said gear blank having a center and said axis of rotation of said control shaft passing through said center of said gear blank,

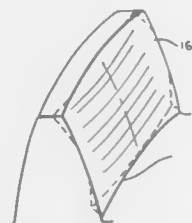
first guide means having an external spherical surface supported on said frame, and having a center of curvature, a second guide means having an internal spherical surface supported on said first end of said control shaft and engaging said external spherical surface and having a second center of curvature, said centers of curvature of said first guide means and said second gear being coextensive with one another and coex-



tensive with the center of said gear blank and disposed on said axis of rotation of said control shaft, drive means connected to said control shaft to swing said second end of said control shaft in a circular path whereby said control shaft is swung in a conical path having an apex at said center of said gear blank, cutting means on said machine for cutting gear teeth on said blank whereby gear teeth are formed on said gear blank operable with said first gear with substantially no interference between the teeth of said second gear when said central axis of said first gear is inclined at a predetermined angle to the central axis of said second gear.

#### 4,955,769 GEAR COUPLING AND HUB

John H. Crankshaw, Erie, Pa., assignor to Dynetics, Inc., Erie, Pa.  
Division of Ser. No. 211,865, Jun. 27, 1988, Pat. No. 4,872,791.  
This application Aug. 4, 1989, Ser. No. 389,527  
Int. Cl.<sup>5</sup> B23F 1/00; F16D 3/18  
U.S. Cl. 409—12

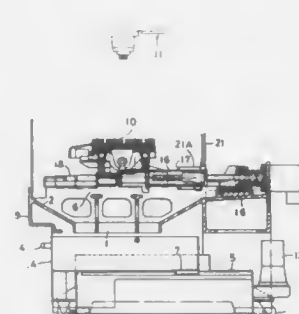


1. A gear coupling for connecting two shafts adapted to be operated at a maximum angle of misalignment to one another comprising a sleeve with internal teeth and a hub with external teeth hub, said hub teeth being meshed with said sleeve teeth, said hub teeth having been shaped by a cutting tool simulating said sleeve teeth, said hub having a center and said center of said hub having been held in a fixed position relative to said cutting tool throughout the shaping thereof and the central axis of said hub having been moved relative to said cutting tool while being shaped relative to the central axis of said sleeve

through all maximum angles of misalignment that said hub is intended to encounter in service.

#### 4,955,770 BED FOR A MACHINE TOOL

Koichiro Kitamura, Toyama, Japan, assignor to Kitamura Machinery Co., Ltd., Takaoka, Japan  
Continuation of Ser. No. 239,171, Aug. 31, 1988, abandoned.  
This application Sep. 29, 1989, Ser. No. 415,405  
Int. Cl.<sup>5</sup> B23C 9/00; B23Q 11/08  
U.S. Cl. 409—137



1. A machine tool comprising a feed shaft for moving a working stage on a bed of a machine tool relative to said bed, a stage movement guide for guiding the movement of said working stage, a cover means for covering an upper surface of said stage movement guide, a plurality of chip scraping wipers provided on said feed shaft and said cover, and means for collecting matter, wherein said bed has a first hole arranged above said collecting means and an inclined top surface for guiding matter which has fallen on said bed from said working stage toward said first hole, said stage movement guide comprises first and second guideways for supporting the upper surface of said working stage and guiding the movement of said working stage, said cover means comprises first and second stage guide covers for separately covering upper surfaces of said first and second guideways respectively, each of said first and second stage guide covers having an upper surface with an inclined portion, and said plurality of chip scraping wipers comprises first and second wipers for covering said first and second stage guide covers respectively and a third wiper for covering said feed shaft, whereby said first, second and third wipers wipe upper surfaces of said first and second stage guide covers and said feed shaft respectively through motion of said covers and said feed shaft relative to said bed.

#### 4,955,771 CARGO RESTRAINT SYSTEM

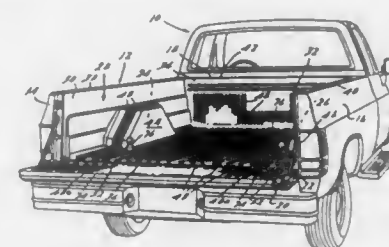
John A. Bott, 931 Lakeshore Dr., Grosse Pointe Shores, Mich. 48236  
Continuation of Ser. No. 119,533, Nov. 12, 1987, abandoned, which is a continuation of Ser. No. 815,563, Jan. 2, 1986, Pat. No. 4,717,298, which is a continuation-in-part of Ser. No. 745,587, Jun. 17, 1985, abandoned, which is a continuation of Ser. No. 483,227, Apr. 8, 1983, abandoned. This application Apr. 18, 1989, Ser. No. 341,279  
Int. Cl.<sup>5</sup> B60D 45/00

U.S. Cl. 410—94

11 Claims

7. A cargo restraint system for the bed of a truck comprising: a liner for the truck bed; a pair of slats having an upward facing channel extending longitudinally therealong and clamping surfaces extending longitudinally within the channel and toward each other and upper cargo supporting surfaces; at least one cargo restraining member disposed transversely between said slats and having a bracket at each end thereof to support said cargo restraining member above said slats, said bracket having means engageable and disengageable with said

clamping surfaces and guide means spaced from said means and projecting into said channel, said guide means having a width greater than a width of an opening of said channel,



wherein said bracket is restricted in removability to be required to be rotated in only one plane from its position of clamping engagement in order to be removed.

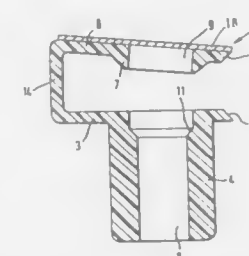
#### 4,955,772 CONNECTING ELEMENT

Bernhard Reck, Achenbach, Fed. Rep. of Germany, assignor to EJOT Eberhard Jaeger GmbH & Co. KG, Bad Laasphe, Fed. Rep. of Germany  
Filed Jul. 28, 1989, Ser. No. 386,736  
Claims priority, application Fed. Rep. of Germany, Jul. 30, 1988, 8809756[U]

Int. Cl.<sup>5</sup> F16B 37/02

U.S. Cl. 411—175

8 Claims



1. In a one-piece plastic fastener clip comprising first and second legs connected together at a common end by a connecting leg to form a substantially U-shaped clamping part adapted to be mounted onto a plate-shaped carrier having means defining a fastener receiving hole therethrough, an elongated sleeve portion, with a centrally located first bore extending therethrough, provided on said first leg of said clamping part, said second leg having a fastener element guiding second bore therethrough generally coaxial with said first bore when said first and second legs extend parallel to one another, the improvement wherein said first bore has a smooth wall surface and is adapted to receive therein a thread-forming fastening element, wherein an annular centering shoulder is provided on said second leg and extends in an encircling relation with said second bore and on a side of said second leg facing said first leg, said annular centering shoulder being of a uniform height dimension around its entire perimeter, and wherein said first bore has a countersunk portion at an end adjacent said second leg tapering through a chamfer at a juncture between said countersunk portion and the remaining portion of said first bore.

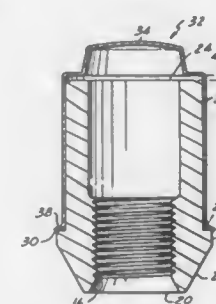
#### 4,955,773 DECORATIVE CAPPED WHEEL NUT AND METHOD OF MAKING SAME

John A. Toth, Orchard Lake, Mich., assignor to Key Manufacturing Group, Inc., Southfield, Mich.  
Continuation of Ser. No. 225,293, Jul. 27, 1988, Pat. No. 4,850,776, which is a continuation of Ser. No. 25,030, Mar. 12, 1987, Pat. No. 4,775,272. This application Mar. 31, 1989, Ser. No. 331,374

The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.  
Int. Cl.<sup>5</sup> F16B 37/14

U.S. Cl. 411—429

31 Claims



3. A decorative capped wheel nut for holding a wheel on a motor vehicle and being of the type exposed to view on the wheel, comprising:

- a nut insert having a central threaded aperture, polygonal sides, a first end adapted to engage said wheel and a second end opposite said first end, said nut insert including a shoulder and including a generally longitudinally extending surface adjacent said first end, said generally longitudinally extending surface intersecting said shoulder to form essentially a projection between said polygonal sides and said first end; and
- a cap for said nut insert, said cap having a side section extending over the polygonal sides of said nut insert and an end section covering the second end of said nut insert, said cap including a free end overlying said projection, only said free end being welded to said nut insert at said projection the free end being defined as the portion of the cap most remote from the end section of the cap.

#### 4,955,774 MODULAR BALE ACCUMULATOR

Roger H. Van Eecke, Blankenberge, and Adrianus Naaktgeboren, Zedelgem, both of Belgium, assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Jul. 11, 1989, Ser. No. 378,748

Claims priority, application European Pat. Off., Jul. 12, 1988, 88201479.8

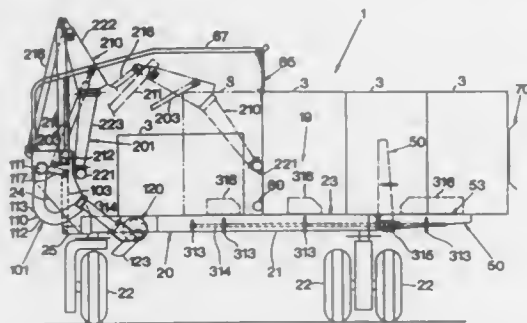
Int. Cl.<sup>5</sup> A01D 87/12

U.S. Cl. 414—111

12 Claims

- 1. An agricultural bale accumulator comprising: a base module having a substantially planar table for receiving a plurality of bales thereon; a bale transfer module for individually turning each bale received on said table through substantially 90° about its longitudinal axis, wherein each bale remains on said table but is reoriented 90° from its initial position; a bale transfer module for laterally shifting the reoriented

bales across said table so as to accumulate the bales into a parcel thereof; and



said bale transfer module and bale turning module being independently attachable to and detachable from said base module.

4,955,775

**SEMICONDUCTOR WAFER TREATING APPARATUS**  
Wataru Ohkase, Sagami, and Seishiro Satō, Machida, both of Japan, assignors to Tel Sagami Limited, Kanagawa, Japan

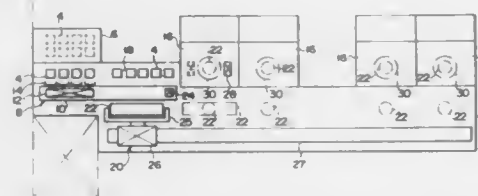
Filed Dec. 9, 1988, Ser. No. 281,756

Claims priority, application Japan, Dec. 12, 1987, 62-314925

Int. Cl. 5 F27D 3/00

U.S. Cl. 414-152

5 Claims



5. A semiconductor wafer treating apparatus comprising: exchange means for allowing an exchange of the semiconductor wafers between a wafer container and a wafer vessel for heat treatment, in a predetermined exchange position; a plurality of vertical type heat treatment furnaces; transfer means for allowing the wafer vessel which holds the semiconductor wafers thereon to be conveyed between said exchange position and each of said vertical type heat treatment furnaces, and for allowing transfer of the vessel between the transfer means and the heat treatment furnaces, said wafer vessel being transferred while held in a vertical orientation; a handler mounted on said transfer means for allowing said wafer vessel to be oriented in vertical and horizontal directions, by rotating said wafer vessel around its center; and elevator means provided within each heat treatment furnace to take the wafer vessel from the transfer means and load the vessel into a vertically oriented process tube and unload the vessel out of the process tube.

4,955,776

**APPARATUS FOR CHARGING SOLIDS UNDER COMPRESSION INTO A RECEPTACLE**

Ingemar Dahlin, Blomstermåla, Sweden, assignor to Norba AB, Sweden

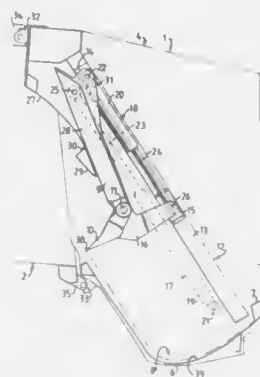
Filed Feb. 9, 1989, Ser. No. 308,723

Claims priority, application Sweden, Feb. 15, 1988, 8800493

Int. Cl. 5 B65F 3/14

U.S. Cl. 414-525.2

5 Claims



1. Apparatus for charging solids under compression into a receptacle from a hopper, comprising a guiding means, a charging unit reciprocally movable along said guiding means, said charging unit comprising two plates pivotally mounted around a common axis, one of said plates constituting a transport plate and the other plate constituting a press plate which is pivotable around said common axis between an inner and an outer position, first driving means for moving said charging unit between an upper and a lower end position, second driving means for moving said charging unit whereby said press plate is movable by said second driving means in an outwardly pivoting movement when the charging unit is in its upper end position and in an inwardly pivoting movement towards the receptacle and generally following the form of a bottom surface of the hopper when the charging unit is in its lower end position, an upper end of said transport plate being guided by said guiding means, and said press plate being also guided by said guiding means by means of a lever arm, and wherein said first driving means is attached to an upper end of said transport plate in order to achieve said reciprocal movement of the charging unit and to secure said upper end of the transport plate against a movement along said guiding means during a substantial part of the pivoting movement of the press plate, said transport plate, when in its lower position, being pivotally movable around a pivoting center, mainly without movement of the latter, in a direction towards a wall part of the hopper for performing a first compression of solids against said wall part, and wherein said second driving means is operable to effect said inwardly pivoting movement of said press plate by means of a downwardly directed movement along said guiding means of said lever arm to cause said pivoting movement of the press plate about said common axis, said lever arm being guided by the guiding means by means of guideable means which is movable along the guiding means during the pivoting movement of the press plate, whereby the pivoting point of the press plate is caused to move in a direction towards and away from the guiding means respectively.

4,955,777

**AIRCRAFT GROUND HANDLING TRACTOR**

Malcolm P. Ineson, Cheltenham, Great Britain, assignor to M L Douglas Equipment Ltd, Cheltenham, Great Britain

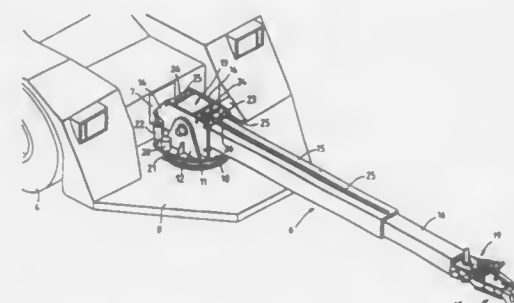
Filed Mar. 24, 1989, Ser. No. 328,540

Claims priority, application United Kingdom, Mar. 29, 1988, 8807492

Int. Cl. 5 B64F 1/22; B60P 1/54; B60D 7/00

U.S. Cl. 414-426

15 Claims



1. In an aircraft ground handling tractor, a manoeuvrable boom having a free end and being mounted on said tractor, a connector means, capable of being connected to an aircraft nosewheel assembly being provided at said free end of said manoeuvrable boom for enabling said tractor to pull or push said aircraft in a substantially horizontal plane, the improvement wherein said manoeuvrable boom is retractable completely within outer limits of said tractor whereby when said tractor is not pulling said aircraft said manoeuvrable boom is retractable wholly within said outer limits of said tractor and is protected from damage.

4,955,778

**BOAT TRAILER PIVOTAL ROLLER KEEL SUPPORT ASSEMBLY**

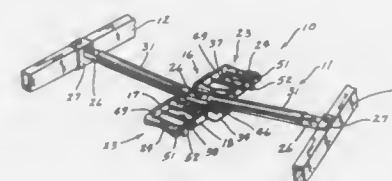
Byron L. Godbersen, Lake LaJure Estates, Ida Grove, Iowa 51455

Filed May 15, 1989, Ser. No. 351,928

Int. Cl. 5 B60P 3/10

U.S. Cl. 414-534

4 Claims



1. In a boat trailer, for transporting a boat, the trailer including a pair of laterally spaced frame members and a cross member connected to and disposed transversely between the frame members, an assembly mounted intermediate the cross member for movably supporting the central keel of a boat comprising: bracket means including a pair of transversely connected and spaced brackets each of which has front and rear flanges disposed in a common plane; means mounting said bracket means to the cross member for pivotal movement in a vertical plane about a transverse normally horizontal axis, said brackets spaced equidistantly on opposite sides of the centerline of the trailer and with said front and rear flanges spaced equidistantly fore and aft of the cross member and wherein the central keel of a boat can rest on the cross member; and a roller unit pivotally mounted to each of said flanges, and

with one or more rollers rotatably mounted on each roller unit, and with the longitudinal axis of each roller extended transversely between the frame members, and further wherein said brackets are U-shaped, and with said means mounting said bracket means to the cross member at a pivot point below the cross member.

4,955,779

**CONNECTOR**

Jack S. Knackstedt, London, United Kingdom, assignor to Jaromir Vaclav Drazil, Little Chalfont, United Kingdom

PCT No. PCT/GB87/00760, § 371 Date Aug. 3, 1988, § 102(e) Date Aug. 3, 1988, PCT Pub. No. WO88/03198, PCT Pub. Date May 5, 1988

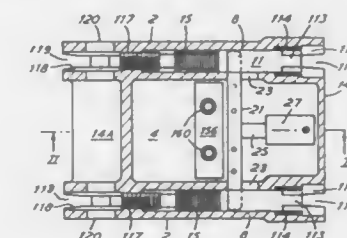
PCT Filed Oct. 27, 1987, Ser. No. 215,066

Claims priority, application United Kingdom, Oct. 28, 1986, 8625778

Int. Cl. 5 B66C 23/00; E02F 3/96

U.S. Cl. 414-723

19 Claims



1. A connector for attaching a tool or an attachment to a machine, comprising a carrier adapted for fitment to said machine, and a holder adapted for fitment to said tool or attachment, the carrier comprising first and second elongate hollow members having first and second slides situated displaceably therein, a chamber within said carrier which chamber is situated between the hollow members, and displacement means connected to said slides for displacement of the slides, the connector further comprising connection means disposed on said carrier and said holder for the interconnection and disconnection of the carrier and holder, the connection means including two first connection members on the holder engageable with two first connection elements on the carrier, and two second connection members on the holder engageable with two second connection elements attached to the slides, wherein the chamber is substantially closed, and each said hollow member has a portion which communicates, via a slot, with the chamber, whereby a substantially closed cavity is defined in the carrier, and the displacement means include spring means, biasing the slides to a position in which the second connection elements are interlocked with the second connection members, and a displacer situated in the chamber and associated with a link member which extends from the chamber through the slots into the hollow members and interconnects said slides such that the slides are, via the link member, simultaneously displaceable against the force of the spring means.

4,955,780

**WAFER POSITIONING APPARATUS**

Kazuo Shimane, Kawasaki; Nobuo Iijima, Tama, and Tatsuro Kawabata, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Oct. 13, 1988, Ser. No. 257,321

Claims priority, application Japan, Oct. 20, 1987, 62-262736

Int. Cl. 5 B25J 13/08

U.S. Cl. 414-744.2

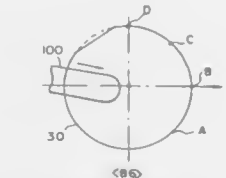
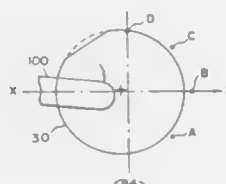
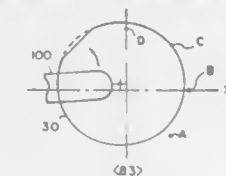
12 Claims

6. A wafer positioning apparatus for a wafer having a circumference defined by a first circle of a first predetermined diameter and the center of the first circle defining the center of the wafer, comprising:



a set of at least three optical position detectors positioned at angularly spaced locations on the circumference of a second circle having a diameter equal to the diameter of the first circle, the set of detectors comprising at least two outer detectors and at least one intermediate detector angularly spaced therebetween, the angularly spaced locations of the respective detectors being fixed on the circumference of the second circle relatively to a predetermined axis passing through the center and along a diameter of the second circle;

transportation means for holding a wafer in a plane parallel to the plane of the second circle and for moving the wafer, so held, relatively to the set of detectors, selectively in a linear direction and in rotation about an axis of rotation



transverse to the predetermined axis and exterior to the circumference of the second circle; each said detector having first and second states and producing corresponding output signals responsive to the presence or absence of detection of the wafer thereby; and control means responsive to the output signals of said detectors for controlling the transportation means for moving the wafer relatively to said set of detectors, selectively in rotation and translation, to position the center of the wafer on the predetermined axis and then by translation along the predetermined axis until at least three of the detectors of the set thereof simultaneously detect corresponding positions on the circumference of the wafer thereby to alignment of the center of the wafer with the center of the second circle.

4,955,781

## VARIABLE RATE BOAT LOADING METHOD

Brice R. Holladay, 9732 SW. Sluslaw, Tualatin, Ore. 97062  
Division of Ser. No. 288,075, Dec. 21, 1988, Pat. No. 4,907,934.  
This application Nov. 27, 1989, Ser. No. 442,839

Int. Cl.<sup>3</sup> B60P 3/10

U.S. Cl. 414—786

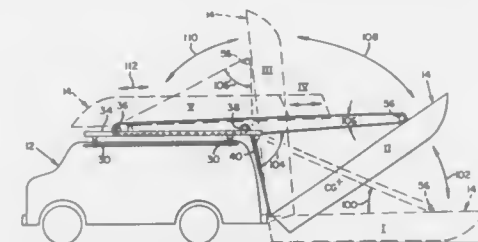
6 Claims

1. A method of loading a boat onto the top of a vehicle, wherein the boat has a first end and a second end defining a length greater than the height of the vehicle and a center of gravity located closer to the second end than to the first end, the loading method comprising:

mounting a winch means to the top of the vehicle;  
attaching a pulley to the boat at a position between the first end of the boat and the center of gravity thereof;  
positioning the boat in an initial, unloaded position such that the boat is upright and has the first end thereof located at a distance spaced apart from an end of the vehicle and a second end thereof located adjacent to the vehicle;  
connecting a first end of a winch line to said winch means

and extending the winch line from the top of the vehicle lengthwise of the boat through said pulley and back to the top and end of the vehicle;

supporting the second end of the boat from the top and end of the vehicle via a second end portion of the winch line;



pulling said winch line by said winch means to cause the first end of the boat to rise while the second end pivots about a connection to the second end portion of the winch line, said winch line exerting a doubled mechanical advantage when lifting the boat to a point that the pulley reaches a height level with of the top of the vehicle.

4,955,782

## DEVICE TO PALLETIZE YARN PACKAGES

Armando D'agnolo, Porcia, Italy, assignor to Matic SrL, Pordenone, Italy

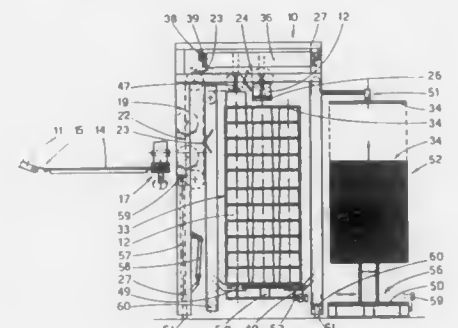
Filed Mar. 23, 1989, Ser. No. 327,786

Claims priority, application Italy, Apr. 18, 1988, 83366 A/88

Int. Cl.<sup>3</sup> B65G 61/00, 57/04, 57/24

U.S. Cl. 414—789.5

21 Claims



1. Device to palletize yarn packages, which is suitable for installation downstream of yarn package production machines, the yarn packages being taken substantially at the outlet of the production machine and loaded in an orderly manner on pallets suitable to form pallet loads, the device comprising in working relationship on a frame:

a substantially horizontal conveyor to transfer yarn packages, which extends lengthwise parallel to the lengthwise axis of the production machine and cooperates with the package discharge of the production machine;  
a delivery head substantially in line with the transfer conveyor and suitable to orient and transfer the yarn packages;  
an elevator to take the yarn packages to a required vertical level above the horizontal plane on which the transfer conveyor lies;  
an overturning means cooperating with the elevator and suitable to orient and transfer the yarn packages;  
a substantially horizontal positioner conveyor for the yarn packages, which extends lengthwise at a right angle to the

lengthwise axis of the production machine and forms the lengthwise coordinate for depositing the yarn packages on the pallet;

a movable trolley which is solidly fixed to the positioner conveyor and comprises at least one head to deposit yarn packages on the pallet, the trolley forming the transverse coordinate for depositing the yarn packages on the pallet; and

means to engage, handle and position cartons and the pallets within the frame, the frame being able to move in a direction substantially at a right angle to the lengthwise axis of the yarn package production machines.

4,955,783

## DEVICE FOR FORMING A PILE OF BLISTER PACKS IN AN UPWARD DIRECTION

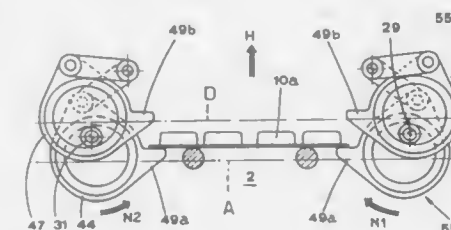
Alessandro Grazia, Crevalcore, Italy, assignor to I.M.A. Industria Macchine Automatiche S.p.A., Ozzano Emilia, Italy  
Filed Mar. 13, 1989, Ser. No. 322,425

Claims priority, application Italy, Apr. 13, 1988, 3410 A/88

Int. Cl.<sup>3</sup> B65G 57/30

U.S. Cl. 414—795

9 Claims



1. A device for forming a pile of blister packs and moving said pile in an upward direction, said device comprising: a support structure; a feed line for blister packs; a station for collecting said blister packs, said station being formed by two facing vertical side walls, and a vertical back wall, with said side and back walls mounted on said structure and with said line ending between said vertical side walls; first means for supporting and stacking said blister packs, said first means being located inside said vertical side walls; facing first and second pairs of eccentric means, each pair of said eccentric means being identical in construction and reciprocally staggered by an equal number of degrees, with an axis of each pair of said eccentric means being parallel to the direction by which said blister packs enter said station; a ring for each one of said eccentric means mounted thereon; each ring defining a tooth; an eccentric means from each of said first and second pairs of eccentric means forming facing first and second groups, said first and second groups alternating cyclically with one another following a series of positions located at different levels from one another, in a first stage said teeth of said first group protruding in an upward direction so as to engage with the edges of a blister pack located in said station and raise said blister pack while said teeth belonging to said second group move in a downward direction, and in a second stage said teeth belonging to said first group moving in a downward direction thus causing said blister pack to be released upon a second blister pack picked up from said line and supported by said teeth of said second group, with said teeth of said second group projecting in an upward direction, or else, if there is no blister on said teeth of said second group, said blister pack is directly released upon said teeth of said second group.

4,955,784  
APPARATUS FOR UNSTACKING CROSS-NESTED ARTICLES

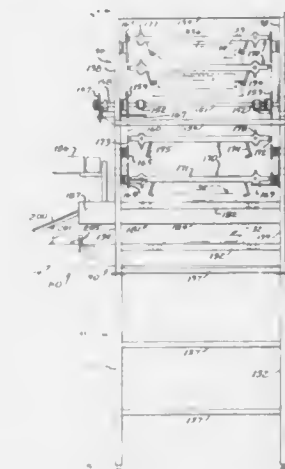
Edward T. Staszewski, Chicago Ridge; Steve J. Reynolds, Tinley Park; Richard C. Vinyard, Burbank, and Bennie E. Galloway, Plano, all of Ill., assignors to Advanced Palver Systems, Inc., Chicago Ridge, Ill.

Filed Jul. 29, 1988, Ser. No. 225,965

Int. Cl.<sup>3</sup> B65G 59/10

U.S. Cl. 414—796.4

15 Claims



1. Apparatus for unstacking elongated articles from a stack of articles in which each article has the longitudinal axis thereof disposed perpendicularly to the longitudinal axis of adjacent articles in the stack, said apparatus comprising: transfer means for removing the top two articles from the stack simultaneously and conveying them to a discharge station, means at the discharge station for separating the two removed articles, means for reorienting one of the separated articles so that its longitudinal axis extends in substantially the same direction as that of the other separated article, and discharge means for carrying the two articles sequentially from the discharge station.

4,955,785

## FAN STRUCTURE WITH FLOW RESPONSIVE SWITCH MECHANISM

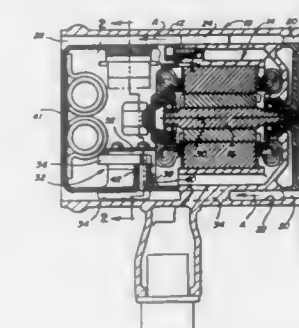
Mordechai Cohen, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 5, 1988, Ser. No. 279,869

Int. Cl.<sup>3</sup> F01D 21/14

U.S. Cl. 415—26

7 Claims



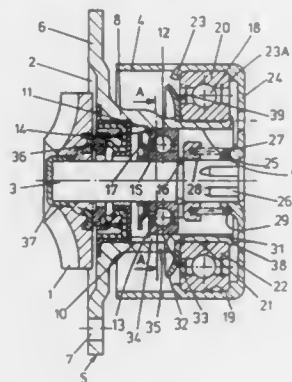
1. In a fan structure, a flow responsive switch mechanism, comprising in combination:

housing means including a first part defining a motor compartment for housing a motor means with an axis and a second part connected to the first part and defining an annular fan involute outside the motor compartment; impeller means in the housing means and coupled to the motor means for forcing air substantially axially of the motor axis through the fan involute defined by the first and second housing means parts; a vane disposed in the fan involute and rotatably mounted on the housing means for rotation in response to air flow through the fan involute; and electrical switch means mounted on the housing means and operatively associated with the vane for altering the state of the switch means in response to air flow through the fan involute from the impeller means.

**4,955,786**  
**DRIVE DEVICE FOR PUMPS**  
Heinrich Kunkel, Schweinfurt; Heinz Kiener, Waigolshausen, and Armin Olschewski, Schweinfurt, all of Fed. Rep. of Germany, assignors to SKF Kugellagerfabriken GmbH, Fed. Rep. of Germany

Filed Aug. 16, 1989, Ser. No. 394,531  
Claims priority, application Fed. Rep. of Germany, Aug. 20, 1988, 3716098

Int. Cl.<sup>5</sup> F04D 29/04  
U.S. Cl. 415—110



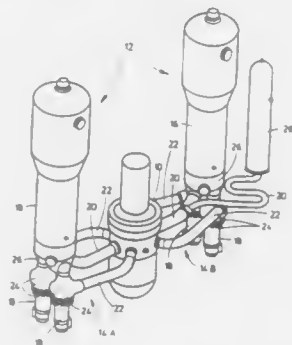
1. Drive device for pumps consisting of a pump rotor mounted in a pump chamber; a pump cover covering the pump chamber with a projecting neck provided with a housing bore passing all the way from the pump chamber to the outside; and a shaft which passes through said housing bore and which is connected at its inner end to the pump rotor and at its outer end to a drive pulley; means rotatably supporting the shaft comprising an inner bearing seated in the housing bore and the drive pulley on an outer bearing seated on a lateral surface of the neck; a cover disk with an outer edge, covering the outer bearing and the neck of the pump cover laterally from the outside and is connected to the drive pulley, and a center section connected to the shaft, adjusting means for the automatic play-eliminating adjustment of the radial and axial load-supporting outer and inner bearing including means acting in an elastic manner to move the cover disk either inward toward the pump chamber or outward away from the pump chamber with respect to the pump cover, the neck (8) of the pump cover (5) being defined by thin wall and in that an inner bearing ring (22) of the outer bearing (18) is seated firmly on a cylindrical section (21) of the lateral surface of the neck (8); and in that this neck (8) has plastically formed, axially oriented bulges (30) projecting radially from the lateral surface section (21), each bulge (30) having on the end which faces away from the pump chamber (2) a shoulder surface section (31) for limited periph-

eral support of an opposing end surface of the bearing inner ring (22).

**4,955,787**  
**ASSEMBLY FOR FACILITATING INSERVICE INSPECTION OF A REACTOR COOLANT PUMP ROTOR**  
Luciano Veronesi, O'Hara Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 12, 1989, Ser. No. 364,953  
Int. Cl.<sup>5</sup> B01D 25/00  
U.S. Cl. 415—118

19 Claims



1. In a pump having an outer casing and a rotor rotatably mounted in said casing, an assembly for facilitating in-service inspection of said pump rotor, comprising:  
(a) means defining a cylindrical bore through said casing in axial alignment with an end of said pump rotor;  
(b) an extension on said rotor end and rotatable therewith, said extension including a cylindrical coupler member extending into said bore and having an outer end with an element configured to receive a tool for performance of in-service rotor inspection;  
(c) a hollow cylindrical member disposed in said bore and surrounding said coupler member, said cylindrical member being slidably movable relative to said coupler member along said bore between a retracted position wherein said cylindrical member is stored for normal pump operation and an extended position wherein said cylindrical member is extended for permitting in-service rotor inspection; and  
(d) a cover member sealably attached to said casing across said bore for closing said bore and retaining said cylindrical member at its retracted position for normal pump operation, said cover member being detachable from said casing for opening said bore and allowing movement of the cylindrical member to its extended position to permit in-service rotor inspection.

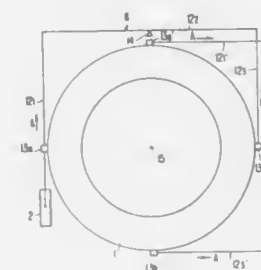
**4,955,788**  
**DRIVING LINKAGE DEVICE**  
Masanori Kimura; Shigetoshi Narisue; Hiroshi Nakatomi, and Eito Matsuo, all of Nagasaki, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 16, 1988, Ser. No. 194,284  
Int. Cl.<sup>5</sup> F01D 17/14  
U.S. Cl. 415—150

10 Claims

1. A driving linkage device comprising:  
a driving ring of a device such as a variable nozzle or a variable diffuser;  
means rotatably supporting said ring in a bearing-free state with a center point of said ring maintained in one position when said ring is rotated about said center point, said means for supporting said ring including two sets of adjusting links, each said set including two spaced substan-

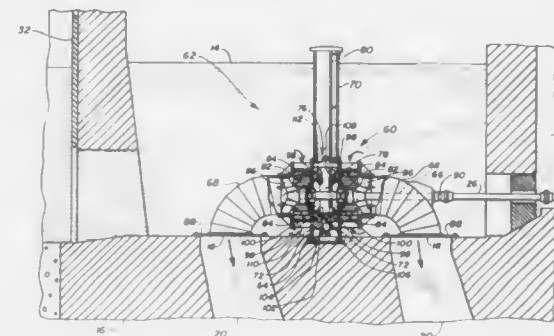
tially parallel levers and a third lever directly pivotally connected to said two levers at respective locations spaced along said third lever, said two levers extending in the same direction towards, and directly pivotally connected



**4,955,789**  
**DUPLEX TURBINE REPLACEMENT UNIT AND METHOD**  
Selim A. Chacour, and William H. Colwill, both of York, Pa., assignors to American Hydro Corporation, York, Pa.

Filed Apr. 24, 1989, Ser. No. 342,961  
Int. Cl.<sup>5</sup> F04D 29/60  
U.S. Cl. 415—201

6 Claims

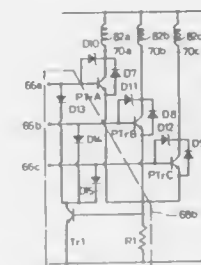


1. A duplex turbine replacement unit adapted for horizontally submersible installation within a headwater chamber of a hydroelectric power plant and comprising in combination; a turbine casing supported by a foundation recess to receive a single pedestal support therefor and adapted to provide a protective air chamber and therewithin mounting a spaced set of aligned bearings to in turn laterally support a turbine drive shaft extending outwardly either side of said casing, a spaced set of runners axially mounting upon said drive shaft either side of said casing and outward of said bearings and profiled in a back-to-back configuration to discharge turbine water respectively therefrom in opposing directions and thereby provide a balanced hydraulic thrust condition upon turbine water flow operation thereof, outwardly projecting and connectably communicating with said casing a radial array of regularly spaced stayvanes for each of said runners each in turn enclosing and being cooperative in directing and controlling turbine water flow with a corresponding radially arrayed set of adjustable wicket gate blades respectively rotatably adjustable on their own axes and having a cooperative wicket gate adjustment means and a drive therefor housed inside said turbine protective air chamber, and a coupling means to connectably join said turbine drive shaft to a generator drive shaft to operationally drive an electrical generator within said hydroelectric power plant.

**4,955,790**  
**CURRENT LIMITING CIRCUIT FOR FUEL PUMP MOTOR**  
Shingo Nakanishi, Obu, and Susumu Yamamoto, Kawasaki, both of Japan, assignors to Aisan Kogyo Kabushiki Kaisha, Obu and Fuji Electric Co., Ltd., Kawasaki, both of Japan

Filed Dec. 14, 1988, Ser. No. 284,408  
Claims priority, application Japan, Dec. 28, 1987, 62-200368  
Int. Cl.<sup>5</sup> F04B 17/00, 35/04  
U.S. Cl. 417—45

5 Claims



1. A motor-driven fuel pump comprising a pumping unit, a brushless electric motor having a plurality of stator coils, and a control circuit for controlling power supplied to said brushless motor for driving said pumping unit, said power being a starting amperage for initially starting said pumping unit and a running amperage for operating said pumping unit with said starting amperage being significantly higher than said running amperage; wherein the improvement comprising:

a current adjusting circuit forming part of said control circuit and including:  
a plurality of power transistors with a base, each said power transistor connected in series to one of said plurality of stator coils;  
a resistor connected in series to said each stator coil;  
a threshold transistor having a base connected to said resistor, an emitter and a collector; and  
a plurality of signal conductors, each connected to said collector of said threshold transistor and each respectively connected to said corresponding base of each said power transistor;  
said current adjusting circuit initially receiving said power and determining said starting amperage which has a tendency to exceed a predetermined amperage, said predetermined amperage being slightly higher than said running amperage and defined by said resistor and said threshold transistor, said current adjusting circuit resisting said starting amperage from exceeding said predetermined amperage by causing a voltage between the base and emitter of said threshold transistor to increase and a resistance between the collector and the emitter of said threshold transistor to decrease causing a resistance at said power transistors to increase and said starting amperage decreasing to said predetermined amperage.



4,955,791

## SMALL SIZE FAN

Günter Wrobel, Villingen-Schwenningen, Fed. Rep. of Germany, assignor to Papet-Motoren & Co. GmbH, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 137,945, Dec. 28, 1987, Pat. No. 4,801,252, which is a continuation of Ser. No. 731,880, May 8, 1985, Pat. No. 4,743,173, and a continuation-in-part of Ser. No. 930,421, Nov. 14, 1986, Pat. No. 4,737,673. This application Sep. 21, 1988, Ser. No. 247,336

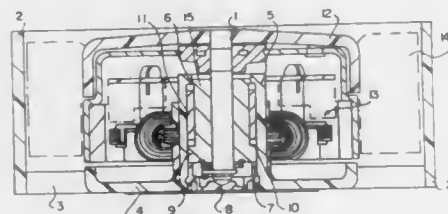
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1987, 3731710; Mar. 19, 1988, 3809277

The portion of the term of this patent subsequent to Apr. 12, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> F04D 29/00; F16C 27/00

U.S. Cl. 417—354

35 Claims



1. A bearing arrangement for the shaft of an axial flow small compact sized fan comprising:
  - a central driving motor for the fan which has a shaft which drives an impeller of the fan;
  - a bearing unit means for said shaft;
  - said bearing unit means contacting and supporting said shaft in a radial direction as concerns the rotation of the shaft;
  - a bearing support tube means located radially outward of the bearing unit means and supporting said bearing unit means in a radial direction as concerns the rotation axis of the shaft;
  - a flow duct surrounding the impeller and having a flange means extending inwardly from adjacent the outer edge of the flow duct;
  - the bearing support tube means having a first shoulder portion;
  - a closure means having a second shoulder portion;
  - the bearing unit means being braced between the first and second shoulder portions; and
  - the closure means being supported by said flange means.

4,955,792

## DRIVE FOR A LUBRICATION PUMP

Günter Skarupa, Pegnitz/Bavaria, Fed. Rep. of Germany, assignor to Baier & Koppel GmbH & Co, Präzisionsapparate, Pegnitz/Bavaria, Fed. Rep. of Germany

Filed May 1, 1989, Ser. No. 345,781

Claims priority, application Fed. Rep. of Germany, May 5, 1988, 3815233

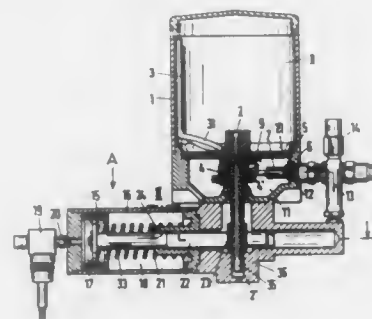
Int. Cl.<sup>5</sup> F04B 17/04

U.S. Cl. 417—399

14 Claims

1. In a drive for a lubrication pump for a centralized lubrication system of utility vehicles, including trailers, semi-trailers, special vehicles and the like, the lubrication pump being used for lubricants which are difficult to press and have a high penetration, the lubrication pump including an agitator mounted in a lubricant container, a delivery piston for transporting the lubricant, and an eccentric member for driving the delivery piston, the agitator and the eccentric member being

mounted on a common drive shaft, the improvement comprising the drive for the lubrication pump being a pneumatic drive,



the drive further comprising an explosion-protected magnetic valve for controlling the drive.

4,955,793

## TURBOPUMP AND SIMILAR OPERATING MACHINE WITH SEALING CONNECTION STRUCTURE TO THE MOTOR

Bruno Caoduro, Montecchio Magg., Italy, assignor to NOWAX s.r.l., Vicenza, Italy

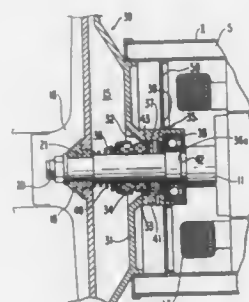
Filed Feb. 14, 1989, Ser. No. 310,677

Claims priority, application Italy, Aug. 17, 1988, 85628 A/88

Int. Cl.<sup>5</sup> F04D 17/08, 29/04

U.S. Cl. 417—423.11

7 Claims



1. An electrically operated turbopump or similar turbomachine comprising:
  - an electric motor assembly including a tubular motor casing having a first and second ends, a cover closing said first end of motor casing, and a drive shaft rotatably mounted within said motor casing by a first bearing supported by said cover and by a second bearing adjacent said second end of said motor casing and prevented from axial displacement relative to said motor casing;
  - a pump assembly including a pump casing, an impeller housed within said pump casing drivingly connected to said drive shaft, a sealing structure including a movable first annular sealing element mounted on said drive shaft at a position adjacent said second bearing, a fixed second annular sealing element stationarily positioned about said drive shaft at a location between said second bearing and said movable first annular sealing element, and spring means urging said movable first annular sealing element toward said fixed second annular sealing element to thereby achieve a seal therebetween; and
  - a coupling structure rigidly connecting said motor assembly to said pump assembly, said coupling structure comprising a single coupling flange including:
    - a peripheral portion extending generally radially of said drive shaft and connecting said pump casing to said second end of said motor casing, said peripheral portion

comprising the only partition separating said pump casing and said motor casing;

a central portion of substantially cylindrical configuration extending axially from said peripheral portion about said drive shaft;

first supporting means rigid with said central portion and stationarily supporting said fixed second annular sealing element;

second supporting means rigid with said central portion and stationarily supporting said second bearing; and

said first and second supporting means being located at fixed positions spaced axially of said central portion; whereby during operation relative distances between said second bearing, said movable first annular sealing element and said fixed second annular sealing element are maintained substantially constant by said first and second supporting means, thereby maintaining said seal, under conditions tending to reduce the biasing force of said spring means and to cause said movable first annular sealing element to move axially of said fixed second annular sealing element.

4,955,794

## APPARATUS FOR FORMING AND CONVEYING GROUPS OF FLAT STACKED ITEMS

René Fluck, Schleitheim, Switzerland, assignor to SIG Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

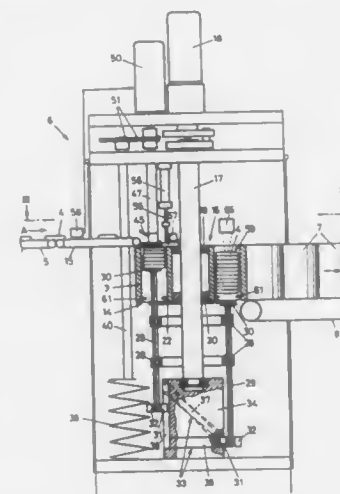
Filed Oct. 7, 1988, Ser. No. 254,681

Claims priority, application Switzerland, Oct. 15, 1987, 4045/87

Int. Cl.<sup>5</sup> B65G 57/03

U.S. Cl. 414—790.4

9 Claims



1. A stacking apparatus for forming groups of face-to-face contacting flat items, comprising
  - (a) a supply conveyor means for advancing a column of serially arranged, flat-lying items;
  - (b) a stack-forming unit situated in a charging station and arranged for sequentially receiving the items from said supply conveyor means;
  - (c) a plurality of stacking containers each having an inner volume for accommodating a stack of the items and having at least one open end face;
  - (d) means for positioning an empty one of said stacking containers in said charging station such that the open end face of said stacking container adjoins said stack-forming unit;
  - (e) a stop means arranged in said charging station for arresting each item in said stack-forming unit upon delivery by said supply conveyor means;
  - (f) intermittent actuating means for causing said stack-form-

ing unit to cyclically deposit an item in said stacking container to form an article stack therein; said intermittent actuating means including

- (1) a sensor means for generating a signal indicating a presence of an item to be deposited by said stack-forming unit; said sensor means being situated upstream of said stack-forming unit as viewed in a direction of advance of the articles on said supply conveyor means; and
- (2) moving means connected to said sensor means and said stack-forming unit for causing said stack-forming unit to perform an item depositing step upon receiving said signal from said sensor means;
- (g) a removal conveyor means for moving away filled stacking containers from said stack-forming unit;
- (h) means for transferring a filled stacking container from the charging station to said removal conveyor means;
- (i) a rotary platform including means for supporting a plurality of stacking containers in a circular array; said charging station being situated adjacent said rotary platform;
- (j) a loading station situated adjacent said rotary platform;
- (k) means for placing an empty stacking container into said rotary platform in said loading station;
- (l) an unloading station situated adjacent said rotary platform; said means for transferring a filled stacking container being situated in said unloading station;
- (m) indexing means for stepwise turning said rotary platform to successively move the stacking containers from the loading station to the charging station and from the charging station to the unloading station;
- (n) a plurality of pickup bases;
- (o) means for supporting each said pickup base for vertical reciprocation;
- (p) means for moving said pickup bases a unit in synchronism with said rotary platform; each said pickup base being arranged to be in alignment with a respective said stacking container positioned in said rotary platform;
- (q) a follower means secured to each said pickup base;
- (r) means defining a first guide track extending helically from said loading station to said charging station for receiving each said follower and for shifting each pickup base upwardly into a respective stacking container as the stacking container moves from the loading station into the charging station;
- (s) means defining a second guide track extending vertically in said charging station for receiving each said follower and for guiding the pickup base downwardly into a lowermost position out of the stacking container in said charging station;
- (t) means defining a third guide track extending generally horizontally and receiving each said follower for maintaining each pickup base in the lowermost position as the stacking container moves from the charging situation to the unloading station; and
- (u) means for stepwise lowering the pickup base in said charging station within the stacking container dwelling in said charging station, in synchronism with the performance of each depositing step of said stack-forming unit.

4,955,795

## SCROLL APPARATUS CONTROL

Russell W. Griffith, Troy, Ohio, assignor to Copeland Corporation, Sidney, Ohio

Filed Dec. 21, 1988, Ser. No. 287,912

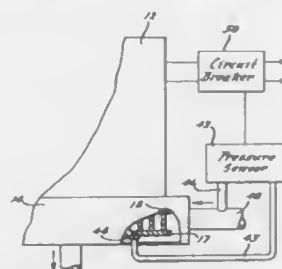
Int. Cl.<sup>5</sup> F04B 49/02

U.S. Cl. 417—44

12 Claims

1. A scroll machine, comprising:
  - (a) a scroll assembly comprising a pair of scroll members, each including an end plate and an upstanding spiral wrap, said spiral wraps intermeshing with one another so as to define a plurality of packets whereby orbiting of one scroll member with respect to the other scroll member will cause said packets to progressively change in volume;

- (b) means defining an inlet chamber for supplying inlet fluid to said scroll assembly;
- (c) drive means for causing one of said scroll members to orbit with respect to the other scroll member; and
- (d) control means responsive to a control pressure for deen-



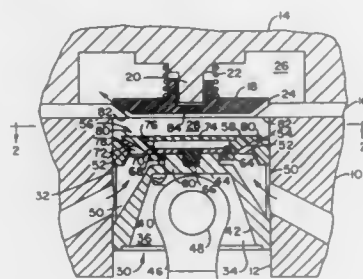
energizing said drive means when said pressure is of a value indicating an undesirable machine condition, said control pressure being the pressure of fluid in one of said pockets, said control pressure being sensed at a point on a scroll member which is more than 360° from the outer end of the wrap which defines the outside of said one of said pockets.

**4,955,796**  
**REFRIGERANT GAS COMPRESSOR CONSTRUCTION**  
 Gerald L. Terwilliger, Bristol, Va., assignor to Bristol Compressors, Inc., Bristol, Va.

Filed Sep. 21, 1988, Ser. No. 247,395  
 Int. Cl. 5 F04B 39/08

U.S. Cl. 417—547

17 Claims



1. In a refrigerant compressor having cylinder means, piston means mounted for reciprocation in said cylinder means and having a substantially planar top, cylinder head means mounted over the end of said cylinder means to provide a compression chamber, and refrigerant discharge valve means in said cylinder head means adapted to open a discharge passage for pressurized refrigerant on the compression stroke of said piston means and to close said discharge passage on the suction stroke of said piston means,

- first suction gas inlet passage means through the wall of said cylinder means at a position remote from said cylinder head means,
- second suction gas inlet passage means in said piston means extending through the outer wall thereof and in communication with said first passage means over at least a substantial portion of the travel of said piston means,
- suction gas port means through the top of said piston means and adapted for communication with said second passage means,
- said port means comprising a substantially circular aperture encompassing a major area of the top of said piston and surrounded and defined by a substantially annular, beveled valve seat means,
- a substantially circular, beveled outer periphery, substantially planar top, valve disc means mounted on the top of

said piston means for limited axial, essentially frictionless floating movement,

the beveled surfaces of said valve seat means and of said valve disc means being adapted to form a fluid seal on the compression stroke of said piston means to close off said second passage means from said compression chamber,

said floating movement of said valve disc means functioning to provide said suction gas port means with suitable open dimensions to allow a high volume flow of low-pressure refrigerant gas into said compression chamber during the suction stroke of said piston means,

said valve seat means and said valve disc means being dimensioned to allow the top of said piston means and the top of said valve disc means to lie in substantially the same plane on the compression stroke.

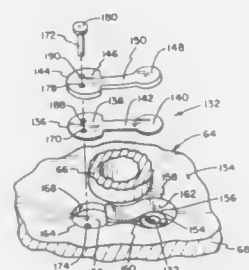
**4,955,797**  
**VALVE INDEXING FOR A COMPRESSOR**  
 Russell A. Cowen, Brooklyn, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Feb. 15, 1989, Ser. No. 311,108

Int. Cl. 5 F04C 29/08

U.S. Cl. 418—15

20 Claims



1. In a compressor assembly including a crankcase, a compression chamber within said crankcase, means for compressing fluid within said compression chamber, and at least one port in fluid communication with said compression chamber and extending through said crankcase, said port having an opening on a valve-supporting surface of said crankcase wherein a portion of said surface surrounding said opening comprises a valve seat, a valve assembly for promoting fluid flow through said port in a direction exiting said opening, said valve assembly comprising:

- a reed valve including a substantially round mounting end portion having an outer peripheral edge, an opposite free end portion configured to be capable of operably covering said valve seat, and an elongated intermediate portion extending generally along a central longitudinal axis of said valve;
- a substantially round well in said valve-supporting surface having a bottom surface and a side surface, the diameter of said mounting end portion being slightly less than the diameter of said well such that said mounting end portion is received within said well, said well being spaced from said opening a distance such that when the longitudinal axis of said valve is properly oriented said free end portion is operably situated over said valve seat; and
- indexing means for properly orienting said mounting end portion within said well such that said free end portion is maintained operably situated over said valve seat, said indexing means comprising an eccentrically located aperture in said mounting end portion and a retainer pin member extending from said well bottom surface, said retainer pin member being received through said aperture when said mounting end portion is properly oriented, and said mounting end portion being limited in any pivotal movement about said retainer pin member by stopping engage-

ment of said outer peripheral edge with said side surface of said well.

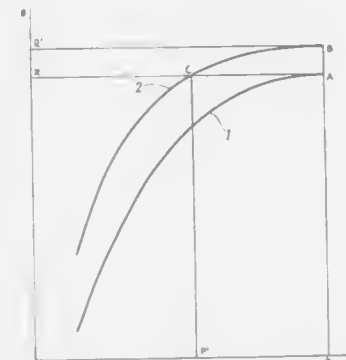
**4,955,798**  
**PROCESS FOR PRETREATING METAL IN PREPARATION FOR COMPACTING OPERATIONS**  
 Vincenzo Musella, and Mario D'Angelo, both of Arzano, Italy, assignors to Nuova Merisinter S.P.A., Italy

Filed Sep. 27, 1989, Ser. No. 413,376

Claims priority, application Italy, Oct. 28, 1988, 48510 A/88  
 Int. Cl. 5 B22F 1/00

U.S. Cl. 419—31

10 Claims



1. A process for pretreating metallurgical powders in preparation for compacting or densifying comprising the steps of mixing said metallurgical powders with a solid lubricant to form a mixture heating said mixture prior to compacting or densifying to a temperature above room temperature and below the softening temperature of the solid lubricant.

**4,955,799**  
**METAL MOLD CENTERING AND CLAMPING DEVICE IN A TIRE VULCANIZING MACHINE**

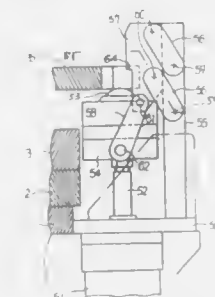
Hideaki Katayama; Toshifumi Murakami, both of Nagasaki; Koji Soeda, Kobe; Yoshiya Kubota; Shoji Okamoto, both of Toyota; Akinori Kubota, Kobe; Michihito Kobayashi, Toyota; Masaaki Ijiri, Aichi; Susumu Ozawa, Hekinan, and Kiyoshi Tomosada, Toyota, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo and Sumitomo Rubber Industries, Ltd., Hyogo, both of Japan

Filed Nov. 9, 1989, Ser. No. 433,775

Claims priority, application Japan, Nov. 11, 1988, 63-283801  
 Int. Cl. 5 B29G 33/00

U.S. Cl. 425—47

4 Claims



1. In a tire vulcanizing machine having a vulcanizing machine frame and a metal tire mold formed of upper and lower metal molds supportable on the frame, a metal mold centering device for centering the mold in the machine, said device comprising: a plurality of hydraulic cylinders each

having a piston rod equipped with a non-directional bearing at its top portion, said cylinders mounted on the vulcanizing machine frame close to an outer circumference of the metal mold when the mold is supported on the frame; and a centering member connected, at a radially outer portion thereof, to the vulcanizing machine frame via parallel links and at a bottom portion thereof, to said piston rod via a link; said centering member defining a centering surface at a radially inner portion thereof and the lower metal mold defining a centering surface at the outer circumference thereof, said centering surfaces opposed to each other so as to be engageable with one another to effect centering of the mold when the lower metal mold is disposed on said non-directional bearing and said piston rod is lowered.

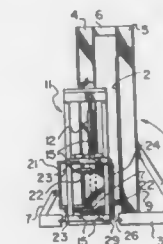
**4,955,800**  
**APPARATUS FOR PRODUCING PREFABRICATED FOAM-INSULATED WALLS**

Terrence M. Rothwell, Morrefield, and George P. Rothwell, Mount Forest, both of Canada, assignors to Tampa-Hall Limited, Ontario, Canada

Continuation-in-part of Ser. No. 86,459, Aug. 18, 1987, abandoned. This application Feb. 23, 1989, Ser. No. 315,056  
 Claims priority, application Canada, Aug. 14, 1987, 544,621  
 Int. Cl. 5 B29C 29/10

U.S. Cl. 425—63

5 Claims



1. For filling a sheathing-backed, one-side-open stud wall with foam, a machine comprising: a main frame, including a substantially vertical backplate against which the sheathing bears; a dam parallel to the backplate, moveable towards and away from and vertically with respect to the backplate; means for holding the dam against the stud wall when the stud wall is positioned with its sheathing against the backplate, said means comprising hydraulic cylinders connected between the dam and the main frame, and wherein said hydraulic cylinders have adjustable end mounts whereby they may be set to reach their full extension with the dam at a distance from the backplate corresponding to the stud wall and sheathing thickness; and means for moving the dam vertically while it is so held against the stud wall; one side of said machine between the backplate and the dam defining an opening constituting a stud wall entrance area, and the other side of said machine between the backplate and the dam defining another opening constituting a stud wall exit area; whereby a stud wall may be introduced at the entrance area and positioned between the backplate and the dam, the dam may then be moved against a bottom portion of the open side of the stud wall and held there, foam may then be introduced between the backplate and the dam to fill the stud wall therebetween, the dam may then be moved upwardly, additional foam may then be introduced to fill a higher portion of the stud wall, and so on to completion of filling, whereupon the dam may then be moved away from the backplate, and the filled portion of the stud wall may then be advanced towards the exit area.



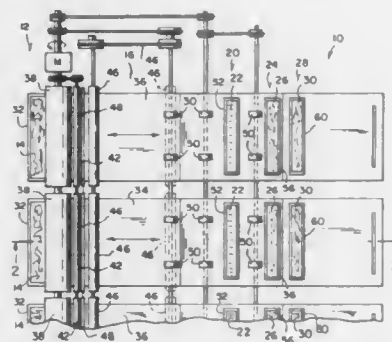
4,955,801

**AUTOMATIC APPARATUS FOR MAKING STRUDEL TYPE PASTRY**

Herb Kessler, 173 W. 78 St., New York City, N.Y. 10024, and George Spector, 233 Broadway, Rm. 3815, New York, N.Y. 10007

Filed Jan. 23, 1989, Ser. No. 300,313  
Int. Cl.<sup>5</sup> B29C 39/06; A21C 3/10, 11/10  
U.S. Cl. 425—92

5 Claims



1. An apparatus for forming thin pastry with a filling such as strudel prior to rolling, cutting and baking which comprises:
  - (a) a conveying platform;
  - (b) means for mixing ingredients together for making the dough and conveying said dough forward on to said platform;
  - (c) means for providing a carrying film for said dough;
  - (d) means for spreading a thin layer of dough upon said film;
  - (e) means for moving said spreading means forward;
  - (f) means for covering the dough with a film of oil, forward of said spreading means;
  - (g) means for moving said dough forward from said means for covering said dough with a film of oil;
  - (h) means for depositing the dough with other ingredients;
  - (i) means for depositing filling on said dough;
  - (j) means for moving said dough forward to receive said filling;
  - (k) means for synchronizing all said means for proper timing.

4,955,802

**BLOW-EXTRUDING A MULTILAYER SYNTHETIC-RESIN TUBE**

Hartmut Halter, Troisdorf, and Willi Schnell, Köln, both of Fed. Rep. of Germany, assignors to Reifenhauser GmbH &amp; Co. Maschinenfabrik, Troisdorf, Fed. Rep. of Germany

Filed Jun. 8, 1989, Ser. No. 363,188  
Claims priority, application Fed. Rep. of Germany, Jun. 16, 1988, 3820530Int. Cl.<sup>5</sup> B29C 55/28

U.S. Cl. 425—72.1

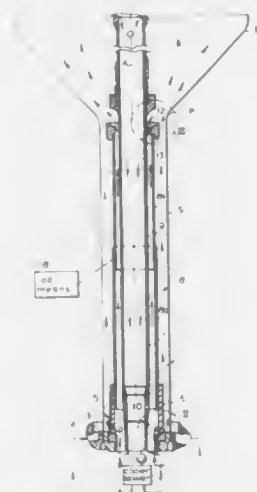
9 Claims

1. An apparatus for blow extruding a synthetic-resin tube, the apparatus comprising:
  - means including a nozzle having an annular nozzle mouth generally centered on a longitudinal axis for longitudinally outwardly extruding a tubular synthetic-resin strand;
  - an inner stabilizing tube extending longitudinally outward from the nozzle within the mouth thereof and having an outer end spaced a predetermined longitudinal distance from the nozzle mouth;
  - an outer stabilizing tube surrounding the inner tube and defining a longitudinal passage therewith, extending longitudinally outward from the nozzle within the mouth thereof, and having an outer end lying between the outer end of the inner tube and the nozzle mouth and defining with the inner tube an annular inner mouth, the passage opening outward at the inner mouth between the outer

ends, the tubes being radially closed between the nozzle mouth and their outer ends;

means for feeding cooling air to a space defined between the strand where it emerges from the nozzle mouth and the outer tube for flow of this cooling air longitudinally outward between the strand and the outer tube;

means for feeding cooling air to the passage at the nozzle mouth for flow from the inner mouth at the outer end of



the outer tube so as to mix and form turbulence with the air moving longitudinally outward between the strand and the outer tube and thereby expand the strand transversely at the annular inner mouth; and

means connected to the inner tube for withdrawing the cooling air from within the strand by drawing the cooling air into the outer end of the inner tube and longitudinally backward through the inner tube.

4,955,803

**APPARATUS FOR FORMING FIBER COMPOSITE MATERIALS**

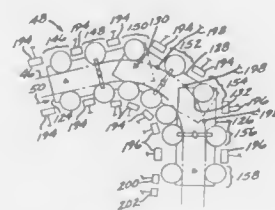
Alan K. Miller, Santa Cruz; Karthik Ramani, Stanford, and Micha M. Gur, Palo Alto, all of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Palo Alto, Calif.

Continuation-in-part of Ser. No. 825,337, Feb. 3, 1986, Pat. No. 4,777,005. This application Oct. 18, 1988, Ser. No. 259,256

Int. Cl.<sup>5</sup> B29C 53/04

U.S. Cl. 425—145

19 Claims



1. An apparatus for introducing and propagating bends in a composite material workpiece having a longitudinal direction and a transverse direction defined therefor, comprising:
  - deformation means for deforming the workpiece in the transverse direction, as the work piece is moved in the longitudinal direction, the deformation means including a pair of opposing compound disk rollers each rotatably mounted on an axle lying parallel to the longitudinal

4,955,805

**CHECK-VALVE MECHANISMS FOR A PULSE COMBUSTION APPARATUS**

Katsusuke Ishiguro, Nagoya; Tsuneyasu Hayakawa, Kani, and Nobuyoshi Yokoyama, Toyoake, all of Japan, assignors to Paloma Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Feb. 13, 1989, Ser. No. 310,335

Claims priority, application Japan, Jun. 4, 1988, 63-137963  
Int. Cl.<sup>5</sup> F23C 11/04

U.S. Cl. 431—1

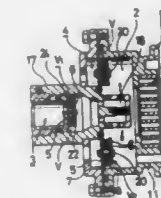
2 Claims

direction, and spaced apart so that the workpiece passes between the compound rollers and in contact therewith.

a first single compound disk roller rotatably mounted on an axle lying parallel to the longitudinal direction, the compound disk rollers permitting the workpiece to roll thereover in both the longitudinal direction and the transverse direction;

means for moving the workpiece between the pair of opposing compound rollers, both in the longitudinal direction and in the transverse direction; and

means for moving the axle of the first single compound disk roller in a circular arc whose center is at the axis of rotation of a first one of the pair of opposing compound disk rollers and whose radius is equal to the sum of the radius of the first one of the pair of opposing compound disk rollers plus the radius of the first single compound roller plus the thickness of the composite material workpiece.



4,955,804

**TOOL FOR MOLDING PLASTIC ARTICLES**

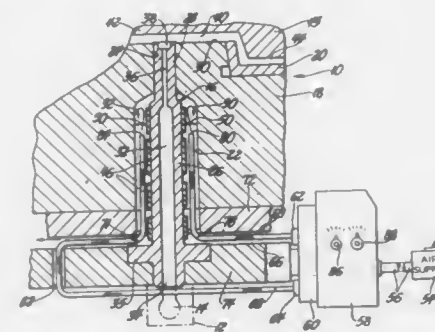
William A. Martell, Sterling Heights, Mich., and Colin R. Brown, Grange, Australia, assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 19, 1989, Ser. No. 367,916

Int. Cl.<sup>5</sup> B29C 45/20, 45/73

U.S. Cl. 425—548

5 Claims



1. A mold for molding objects from a heated charge of plastic material fed thereto comprising a mold body, one side of said mold body defining a mold face, a passage in said mold body extended into said face, said passage bounded by an internal wall within said body, a hot drop assembly operatively mounted within said passage, said hot drop assembly conducting and heating said charge of plastic material fed thereto for delivery to said face of said mold, said hot drop assembly having an elongated injector body being mounted within said passage and having an opening therethrough for said charge of plastic material, heater means associated with said injector body for further heating of the heated charge of plastic material within said hot drop assembly, said hot drop assembly being spaced at least in part from said internal wall and gas cooling means for forcing a flow of cooling gas directly between said hot drop assembly and said internal wall to effect internal cooling of said mold by transferring heat energy from said opening and from areas of said mold body surround said passage to an exhaust passage to thereby lower the operating temperature of said mold so that high heat energy will not be conducted by said mold to said face and damage an object being molded.

1. A check-valve mechanism of a pulse combustion apparatus for passing air into a mixing chamber, comprising
  - (i) a partition wall separating an air inlet chamber and said mixing chamber from each other,
  - (ii) a plurality of associated rear discs of relatively small diameters spaced apart from said partition wall and located inside said mixing chamber,
  - (iii) a plurality of associated front discs, or valve members, of substantially the same diameters as said rear discs which are located between said partition wall and said rear discs and are each formed of woven fabric of carbon fiber coated with fluorocarbon resin,
  - (iv) each said rear disc, the valve member associated therewith, and a circular portion of said partition wall which overlies the valve member as viewed from the side of said air inlet chamber each having a central opening and being joined together by bolt means which passes through the central openings thereof,
  - (v) the circular portions of said partition wall each having around the central openings thereof a plurality of radially-extended elongated openings for passing air from said air inlet chamber into said mixing chamber,
  - (vi) each said rear disc having around the central opening thereof a plurality of small circular openings which do not overlap the elongated openings of the circular portion of said partition wall corresponding to the rear disc as viewed from an axial direction, and
  - (vii) each said valve member being axially movable between said partition wall and the associated rear disc, thereby opening and closing said elongated openings of the associated circular portion of said partition wall.

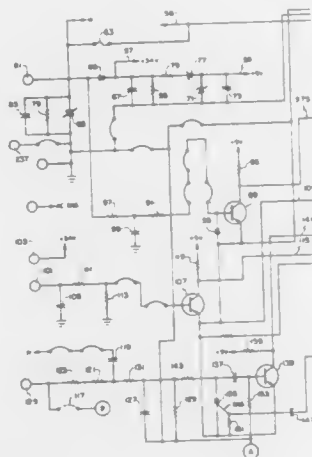
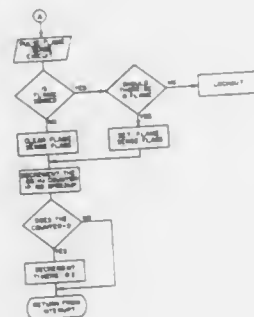
4,955,806

**INTEGRATED FURNACE CONTROL HAVING IGNITION SWITCH DIAGNOSTICS**

Michael T. Grunden; Stephen E. Yostz, and Eugene P. Mierzwinaki, all of Fort Wayne, Ind., assignors to Hamilton Standard Controls, Inc., Farmington, Conn.  
Division of Ser. No. 95,506, Sep. 10, 1987, Pat. No. 4,842,510.  
This application May 9, 1989, Ser. No. 349,296  
Int. Cl.<sup>5</sup> F23N 5/00

U.S. Cl. 431—24

4 Claims



1. An integrated digital electronics burner control for a gas burner of the type having at least one gas valve control relay operable upon command from the integrated burner control to open a gas valve and supply gas to a burner combustion chamber comprising:

a flame sensor for sensing for the presence of a flame in the combustion chamber; and  
means for sending a sequence of pulses to the flame sensor and for receiving back from the flame sensor the same sequence of pulses thereby normally indicating the presence of a flame.

4,955,807

**SPIRAL COIL CANDLE HOLDER FOR PUMPKINS AND OTHER SUBSTRATES**

Allen Chance, Mill Valley, and William Gray, Topanga, both of Calif., assignors to Concept Manufacturing, Topanga, Calif.  
Filed Dec. 2, 1988, Ser. No. 278,812  
Int. Cl.<sup>5</sup> F23D 3/16

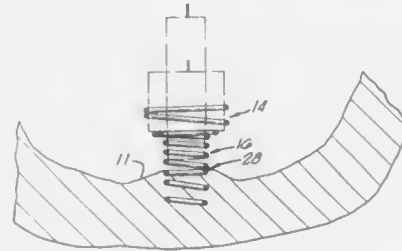
U.S. Cl. 431—296

9 Claims

1. A pumpkin candle holder made from a spiral coil comprising:

an upper spiral coil section having a diameter sized to receive votive candles having various diameters;  
a middle spiral coil section connected to said upper spiral

coil section and having a diameter smaller than the diameter of said upper spiral coil section, said middle spiral coil section sized to receive candles of varying diameters;  
a bottom spiral coil section connected to said middle spiral coil section for embedding said pumpkin candle holder into a pumpkin;



said spiral coil also including a closed coil stop for limiting the distance that said candle holder can be embedded into the pumpkin; and

a free end on the upper spiral coil section which turns inward towards the aperture created by said upper spiral coil section such that said free end protrudes into a candle placed in said candle holder, thereby further securing said candle in said candle holder.

4,955,808

**METHOD OF HEAT-PROCESSING OBJECTS AND DEVICE AND BOAT FOR THE SAME**

Kazuhisa Miyagawa, Shiroyama, Japan, assignor to Tel Sagami Limited, Kanagawa, Japan

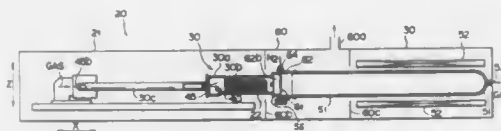
Filed Mar. 9, 1989, Ser. No. 321,267

Claims priority, application Japan, Mar. 9, 1988, 63-55730

Int. Cl.<sup>5</sup> F27D 3/00

U.S. Cl. 432—5

5 Claims



1. A method of heat-processing objects comprising:  
forming a purge tube means which encloses the objects by supporting a boat means, on which the plural objects are mounted, by a carrier arm means to define a space on the upper side of the objects while defining another space on the lower side of the objects when the boat means is to be loaded into and unloaded from a heat process furnace means by the moving carrier arm means or either when the boat means is to be loaded into the heat process furnace means or when it is to be unloaded from the heat process furnace means,  
moving the carrier arm means to communicate the purge tube means with the heat process furnace means,  
supplying non-oxidizable gas into both of the purge tube means and the heat process furnace means, keeping them connected to each other,  
pre-heating or cooling the objects to a predetermined temperature range, and  
loading the purge tube means into the heat process furnace means or unloading the purge tube means from the heat process furnace means.

4,955,809

**LINING ELEMENT AND STRUCTURE FOR HEAT TREATMENT FURNACES**

Raimo Viertola, Väinämöisenkatu 34 B, SF-33540 Tampere, Finland

PCT No. PCT/FI88/00080, § 371 Date Jan. 26, 1989, § 102(e)  
Date Jan. 26, 1989, PCT Pub. No. WO88/09472, PCT Pub. Date Dec. 1, 1988

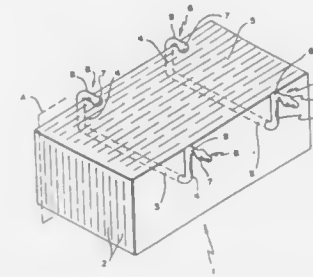
PCT Filed May 25, 1988, Ser. No. 306,019

Claims priority, application Finland, May 26, 1987, 872317

Int. Cl.<sup>5</sup> F27D 1/00

U.S. Cl. 432—247

12 Claims



1. Lining element for heat treatment furnaces, comprising lining material consisting of insulating material, an elongate supporting element for transversely piercing the lining material, elongate fastening means for attachment of the element to the interior furnace wall provided at both ends of the supporting element, the free ends of the fastening means being provided with projections extending transversely to the longitudinal direction of the fastening means at the height of a planar interior surface of the element, which surface will be closest to the interior furnace wall.

4,955,810

**DENTIN THICKNESS MONITOR**

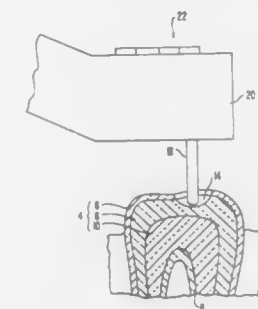
Guy Levy, 49, rue Croix de Regnier, 13004 Marseille, France  
Filed Feb. 13, 1989, Ser. No. 309,560

Claims priority, application France, Mar. 7, 1988, 88 03089

Int. Cl.<sup>5</sup> A61C 19/04

U.S. Cl. 433—72

14 Claims



1. A method for measuring the thickness of the dentin layer of a tooth in a patient, at a region where the dentin is exposed, during a dental treatment, comprising the steps of: establishing an electric voltage between the dentin at the region where it is exposed and a region of the patient's body spaced from the tooth to create an electric current flow through body tissue between those regions; monitoring the current flow to produce an indication of at least electrical resistance values above 0.5 MΩ between those regions; and converting the electrical resistance indication into an indication of the thickness of the dentin layer.

4,955,811

**NON-ROTATIONAL SINGLE-TOOTH PROSTHODONTIC RESTORATION**

Richard J. Lazzara, Lake Worth, and Keith D. Beaty, West Palm Beach, both of Fla., assignors to Implant Innovations, Inc., West Palm Beach, Fla.

Filed Jun. 23, 1988, Ser. No. 210,421

Int. Cl.<sup>5</sup> A61C 8/00

U.S. Cl. 433—173

15 Claims



1. A set of attachments for use in fabricating a prosthodontic restoration intended to be fitted non-rotationally on a dental implant fixture having a threaded bore axially disposed in it and opening centrally through its gingival end, said fixture having at said gingival end anti-rotation means to fix said restoration when fitted against rotation relative to said fixture around a longitudinal axis running successively through said bore and said restoration, said set of attachments comprising an elongated impression coping having at a first one of its ends anti-rotation means cooperative with said anti-rotation means of said fixture upon attaching said coping end-wise to said gingival end of said fixture so as to fix said coping against rotation around said axis relative to said fixture, said coping having a smooth bore extending through it from said first one of its ends to the second one of its ends concentric with and embracing said axis for passage of a bolt useful to attach said coping to said fixture via said threaded bore, said coping having index means to fix said coping against rotation around said axis when encased in resilient impression material, a laboratory analog of said fixture having at one end a replica of said anti-rotation means of said fixture and a body extending from said one end including means to fix said analog in a rigid dental model, and core means on which to fabricate said restoration, said core means having at one end a replica of said anti-rotation means of said impression coping, and extending between its ends a bore for passage of a bolt useful to attach said core means to said fixture via said threaded bore.

4,955,812

**VIDEO TARGET TRAINING APPARATUS FOR MARKSMEN, AND METHOD**

Banford R. Hill, 935 S.W. 19th Ave., Portland, Oreg. 97209  
Filed Aug. 4, 1988, Ser. No. 228,040

Int. Cl.<sup>5</sup> F41F 27/00

U.S. Cl. 434—16

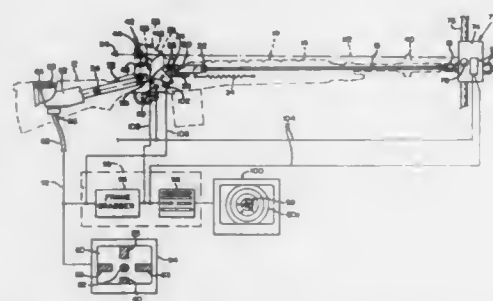
10 Claims

8. A video target training apparatus for marksmen comprising:

a gun-resembling member having a stock, a barrel-like portion on the stock having a forward end, trigger means for firing said gun-resembling member, a front sight on said barrel-like portion, a target immediately adjacent to and not more than two inches from the forward end of said barrel-like portion, an optical system on said gun-resembling member including a rear sight arranged to reflect a combined range of said target and said front sight when said gun resembling member is aimed at said target in said immediately adjacent position.



a video camera receiving said target and said front sight image,  
electric circuit,  
monitor means in said electric circuit for showing said combined image of said target and said front sight,  
display means in said electric circuit for receiving said target and front sight image from said camera and for causing said combiner image to be displayed visually on said monitor means,  
frame grabber means in said electric circuit arranged to hold several frames and display a single frame on said monitor means,



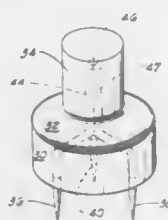
switch means in said electric circuit associated with said trigger means for activating said frame grabber means when said trigger means is pulled,  
and powered plunger means on said target which faces the forward end of said barrel-like portion and spaced in physically separate relation from said gun-resembling member and which is operated by said switch means and arranged to forcefully strike said forward end of said barrel-like portion when said trigger means is pulled, to provide a simulated recoil in said gun resembling member said power plunger means disposed under and immediately adjacent said target, whereby said plunger means provides said striking force against said barrel-like portion.

**4,955,813**  
**MULTI-PRONGED THUMB TACK**  
Stephen H. Fochler, 95 Greentree Rd., Chagrin Falls, Ohio 44022

Filed Sep. 21, 1989, Ser. No. 410,510  
Int. Cl.<sup>5</sup> F16B 15/00

U.S. Cl. 411—457

2 Claims



2. A thumbtack which comprises:  
a synthetic resin head comprising:  
a generally cylindrical base portion having a substantially monoplanar surface at one side thereof;  
a generally cylindrical neck portion of smaller diameter than said base portion projecting from the opposite side of said base portion from the side at which said monoplanar surface is located; and  
a shoulder between said neck portion and said base portion; and  
three metallic tines including three portions having substantially parallel axes projecting from said monoplanar side

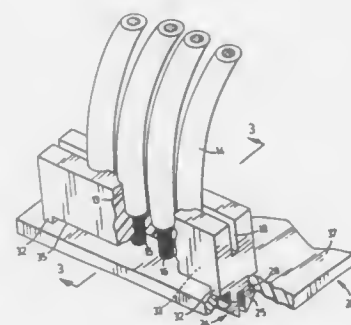
of the base portion of said head, and projecting in a direction which is substantially perpendicular to said monoplanar surface, each of said tines having a generally L-shaped portion embedded in said base portion of said synthetic resin head, and said tines collectively further including three centrally located contiguous shaft portions extending from said L-shaped portions and embedded in said generally cylindrical neck portion of said synthetic resin head.

**4,955,814**  
**ELECTRICAL CONNECTOR DEVICE**  
Craig Christie, Toronto, and Michael Nykoluk, King City, both of Canada, assignors to Electro Rubber Limited, Toronto, Canada

Filed Dec. 26, 1989, Ser. No. 456,961  
Int. Cl.<sup>5</sup> H01R 9/09

U.S. Cl. 439—77

8 Claims



1. A device for positioning wire conductors relative to a printed circuit board, comprising:  
a body of an electrically insulating material defining a plurality of apertures through it for receiving and holding a plurality of wire conductors so that bared ends of the wires extend through the body, each aperture having a first portion sized to receive an insulated wire conductor and a second portion of a smaller diameter being sized to receive a bared wire end, the body defining a longitudinal slot along which the apertures are centered and the depth of which slot does not extend to the second portions of the apertures; and  
means coacting with the body and circuit board for attaching the body to the board so that the wire ends are positioned relative to the board for attachment to it, the board having holes arranged for receiving the wire ends and attaching means.

**4,955,815**  
**CONNECTION SOCKET, IN PARTICULAR TO CONNECT COAXIAL PLUG, WITH FRONT MOUNTING**  
Hubert Gate, Tierce, and Dominique Huerre, Angers, both of France, assignors to Societe Electronique de la Region Pays de Loire, Paris, France

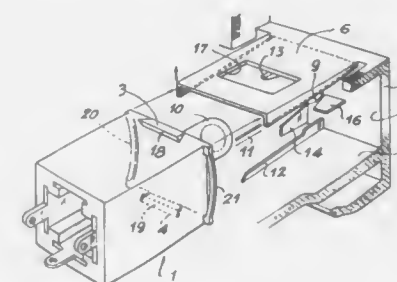
Filed Jun. 1, 1989, Ser. No. 360,144  
Claims priority, application France, Jun. 3, 1988, 8807406  
Int. Cl.<sup>5</sup> H01R 13/627

U.S. Cl. 439—350

3 Claims

1. A connection socket means for connection of a coaxial plug through an exterior wall of a structure by a hole in said structure wall, said means comprising:  
at least one plane wall formed on the interior surface of said structure wall and perpendicular to said structure wall, said at least one plane wall having a slot and said at least one plane wall being flexible in the zone of said slot;  
a connector socket having a body including at least one snap-fastened tappet cooperating with said at least one slot to retain said connection socket, said connection socket

further including a smooth sleeve extending along a first axis outward from said body;  
a guide means including a plurality of ribs formed on said interior surface of said structure wall in proximity to said



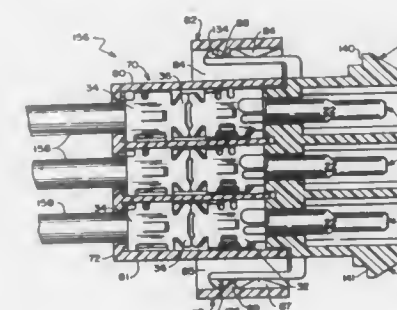
hole for aligning said smooth sleeve in conjunction with said hole and wherein said ribs are formed so that said smooth sleeve is fitted in said hole with one end of said smooth sleeve being substantially in the same plane as the exterior surface of said structure wall.

**4,955,816**  
**ELECTRICAL CONNECTOR SYSTEM AND INSULATION DISPLACEMENT TERMINALS THEREFOR**  
James T. Roberts, Oak Park, and Raymond A. Silbernagel, Naperville, both of Ill., assignors to Moiey Incorporated, Lisle, Ill.

Filed Apr. 20, 1989, Ser. No. 340,635  
Int. Cl.<sup>5</sup> H01R 4/24

U.S. Cl. 439—421

10 Claims



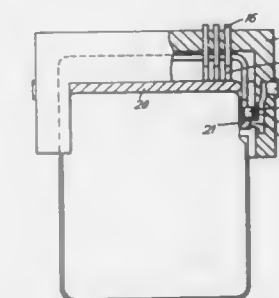
1. An electrical connector system including:  
a plurality of male terminals each having a forward mating end and a rearward wire mounting end;  
a plurality of female terminals each having a forward mating end to mate with the forward mating end of the male terminal and having a rear wire mounting end substantially identical to said wire mounting end of the male terminals;  
mating insulative receptacle housing means and plug housing means, each having a forward end, a rear end and at least one terminal receiving cavity extending therebetween, said cavities mounting at least one of said terminals therein;  
the improvement comprising:  
each of said receptacle and plug housing means including separate cooperating forward and rear housing members; said forward receptacle and plug housing members each including said forward end, a rear mounting end having a first locking structure and at least a portion of said terminal receiving cavity extending therebetween to mount the

forward mating ends of at least one of said female terminals and male terminals therein;  
said rear receptacle and plug housing members each being substantially identical and including identical second locking structures cooperating with said first locking structure so that the identical rear housing members are modular and are interchangeably mountable to the rear mounting end of either forward housing member;  
the rear wire mounting end of each said terminal comprises a forward wire engaging section, a rearward wire engaging section and a collapsible insulation displacement contact section disposed therebetween, said modular rear housing member being mounted for telescoping movement relative to said forward housing member for axially collapsing the insulation displacement contact sections into electrical contact with a wire inserted therein; and  
said modular rear housing member includes at least one wall having a generally planar external surface, at least one bridging wall disposed in spaced relationship to said planar surface and said second locking structure having first and second locking bosses extending from said bridging wall toward said generally planar surface, said first locking structure of the forward plug housing member having deflectable latches selectively and alternately engageable with the locking bosses extending from said bridging wall, whereby engagement of one of said latches with said first locking boss securely mounts a selected one of said front housing to said modular rear housing and retains at least one of the terminals therebetween, and whereby movement of the selected front housing into position for locking engagement of the latch with the second locking boss is operative to collapse the insulation displacement contact section of each said terminal therein.

**4,955,817**  
**CONSTRUCTION FOR REMOVING ELECTRONIC CHARGES IN CONNECTORS**  
Hiroshi Sugai, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan  
Filed Feb. 10, 1989, Ser. No. 308,870  
Claims priority, application Japan, Feb. 12, 1988, 63-17295[U]  
Int. Cl.<sup>5</sup> H01R 13/453; H05K 1/14

U.S. Cl. 439—60

7 Claims



1. In a construction for removing electrical charges generated in a data input device when the input device including input terminals connected to the circuitry of the input device is electrically coupled to a connector of an electronic apparatus including connector terminals connected to the electronic circuitry of the electronic apparatus, the improvement comprising:  
at least one electrically conductive contacting member for removing electric charges generated in the input device, said contacting member disposed in the connector for contacting an electrically conductive portion of the input device and the input device including a contact portion for cooperating with the contacting member prior to the input terminals of the input device being connected to the connector terminals of the connector, the input device

including a shutter member displaceable between a first closed position covering the input terminals and a second open position exposing the input terminals, the shutter adapted to be displaced to the second open position when inserted into the connector, the connector including an opening projection and the shutter including a shutter projection for cooperating with the opening projection to displace the shutter to the second open position when the input device is inserted into the connector.

4,955,818

## ELECTRICAL COMPONENT CONNECTOR

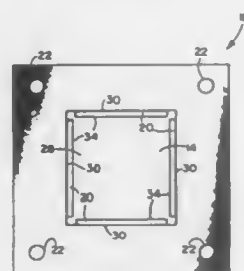
Andrew H. Strange, Eagleville, Pa., and William P. Sharpe, Newport, R.I., assignors to Elastomeric Technologies, Inc., Hatboro, Pa.

Filed Aug. 4, 1989, Ser. No. 389,529

Int. Cl.<sup>5</sup> H01R 23/72

U.S. Cl. 439—66

10 Claims



1. An electrical component connector comprising:  
a housing having;

(a) a recess adapted to receive an electrical component having contact leads, said recess defined by a base surface and a wall structure disposed perpendicular to said base surface, and

(b) at least one elongated passage extending through said housing from a first opening at said recess along said wall structure to a second opening at an external bottom surface of said housing, said second opening being wider than the top of said passage

a strip of elastomeric elements having a cross section corresponding to the cross-section of said elongated passage;

(a) fitted within said passage in said housing to present to said contact leads of said electrical component when inserted in said recess in said housing a contact surface which extends along said wall structure and is perpendicular to said base surface, and

(b) extending through said passage of said external surface of said housing.

4,955,819

## PLUG CONNECTOR HAVING BENT CONTACT POSTS FOR INSERTION INTO PRINTED CIRCUIT BOARD HOLES

Dietmar Harting, Espelkamp; Hans Nagel, Porta Westfalica, and Günter Pape, Bielefeld, all of Fed. Rep. of Germany, assignors to Harting Elektronik GmbH, Espelkamp, Fed. Rep. of Germany

Filed Mar. 13, 1989, Ser. No. 322,738

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1988, 3810471

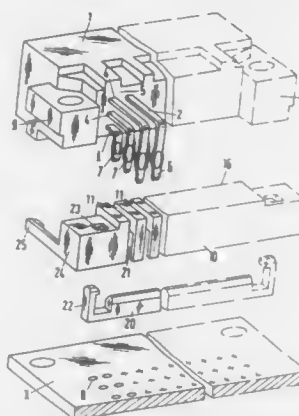
Int. Cl.<sup>5</sup> H01R 23/68

U.S. Cl. 439—79

11 Claims

1. A plug connector for connection to a printed circuit board comprising an insulating member, contact elements each having a first section extending from said insulating member in a first direction and each having a second section which is bent relative to said first section to extend in a second direction generally perpendicular to said first direction, a plurality of said first sections of said contact elements being spaced from

one another in a direction perpendicular to said first direction, each of said second sections having contact posts adapted to be inserted in openings in a printed circuit board, an insulating supplemental part formed separately of said insulating member, mounting means on said supplemental part and on said insulating member for mounting said supplemental part on said insulating member in an assembled position, said supplemental part having spaced slots which receive said contact elements when said supplemental part is in said assembled position, said



supplemental part having spaced crosspieces which extend across said slots and which support said first sections of each of said contact elements when said supplemental part is mounted in said assembled position on said insulating member, said crosspieces having a dimension in a direction perpendicular to said first direction corresponding to said space between said plurality of first sections of said contact elements to thereby provide support between said plurality of first sections of said contact elements to prevent deflection of said contact elements as said contact posts are inserted into said openings.

4,955,820

## T-LEG SMT CONTACT

Shoji Yamada, Tokyo, and Tomoo Yamada, Yokohama, both of Japan, assignors to Molex Incorporated, Lisle, Ill.

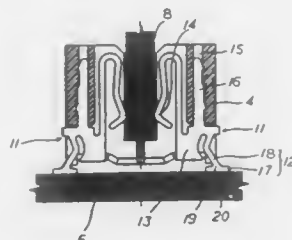
Filed Dec. 7, 1989, Ser. No. 447,350

Claims priority, application Japan, Dec. 9, 1988, 63-160024[U]

Int. Cl.<sup>5</sup> H01R 4/02, 9/09

U.S. Cl. 439—83

6 Claims



1. Surface-mounted component's contact having a soldering portion, which contact is to be mounted to the surface of a printed circuit board 6 and is to be electrically connected to a conductor, characterized in that said soldering portion 12 comprises a flat foot 17 and a leg 18, which is integrally connected to and rising from the midportion of said foot 17, generally shaped in the form of an inverted "T", said soldering portion 12 being a metal piece made by stamping a metal blank.

4,955,821

## METHOD FOR CONTROLLING CONNECTOR INSERTION OR EXTRACTION SEQUENCE ON POWER DISTRIBUTION PANEL

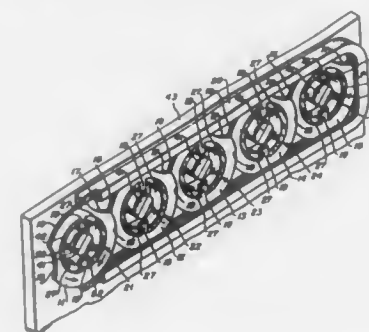
Allen J. Bernardini, Southbury, Conn., assignor to Litton Systems, Inc., Watertown, Conn.

Filed Jul. 10, 1989, Ser. No. 377,118

Int. Cl.<sup>5</sup> H01R 13/44

U.S. Cl. 439—133

20 Claims



1. A coupling guard which insures the coupling of a plurality of plugs and receptacles in a predetermined sequence in which the plugs must be rotated in one direction to complete an electrical connection to the receptacle and rotated in the opposite direction to break the electrical connection, the coupling guard comprising:

first and second receptacles;

first and second cam rings surrounding the first and second receptacles;

a first cam surface having a convex shape and a first clearance notch on the outer surface of the first cam ring;

a second cam surface and a locking notch on the outer surface of the second cam ring the locking notch having a concave shape which is complimentary to the shape of said first cam surface, wherein the cam surface of the first cam ring prevents rotation of the second cam ring when the first cam surface engages the locking notch of the second cam ring, and wherein the second cam ring is free to turn when the first clearance notch engages the second cam surface on the second cam ring; and

wherein the second cam surface engages the first clearance notch when the second cam ring rotates and prevents rotation of the first cam ring without first rotating the second cam ring to remove the second cam surface of the second cam ring from the clearance notch of the first cam ring.

4,955,822

## TWO WAY EXTENSION CORD

Robert O. Look, and Deborah M. Pittman, both of 624 Easy St., Holly Hill, Fla. 32117

Filed Jan. 8, 1990, Ser. No. 461,823

Int. Cl.<sup>5</sup> H01R 19/16

U.S. Cl. 439—505

5 Claims

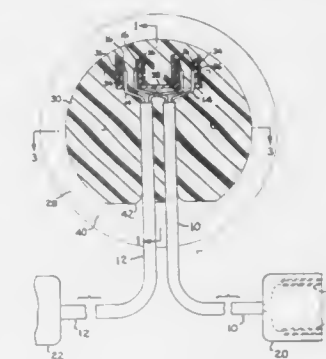
1. A two way electrical extension cord comprising: two flexible electrical cables, each having at least two insulated wires running internally therealong, the wires of one cable not being directly attached to the wires of the other cable; each cable having first and second ends; each wire having first and second ends located at the corresponding ends of the associated cable;

a female electrical plug attached to the first end of each cable, each plug comprising two insulated electrical socket elements electrically connected to the first ends of the wires in the associated cable;

a single male electrical plug comprising a dielectric housing and two insulated electrical prong elements extending therefrom;

said electrical cables having their second ends extending into

said dielectric housing; one wire in each cable having its second end electrically connected to one prong element, the other wire in each cable having its second end electri-



4,955,823

## 600-AMP HOT STICK-OPERABLE SCREW AND PIN-AND-SOCKET ASSEMBLED CONNECTOR SYSTEM

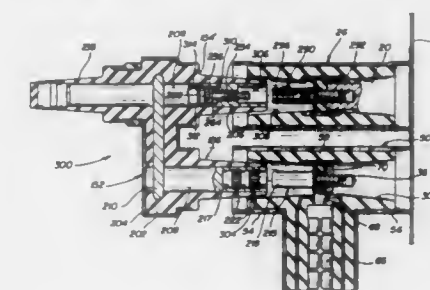
Glenn J. Luzzi, Mt. Bethel, Pa., assignor to Amerace Corporation, Parsippany, N.J.

Filed Oct. 10, 1989, Ser. No. 419,514

Int. Cl.<sup>5</sup> H01R 31/08

U.S. Cl. 439—507

9 Claims



1. A high voltage hot stick-operable screw and pin-and-socket assembled connector system for selectively coupling together a source of high voltage and a high voltage cable comprising:

a support member;

an apparatus bushing mounted upon said support member and electrically coupled to a source of high voltage;

a high voltage cable coupled to a connector mounted upon said support member;

selectively applicable pin-and-socket screw-operated link member when applied in a first arrangement joining said apparatus bushing to said cable to apply high voltage thereto or, when not applied between said apparatus bushing and said cable, providing a visible separation between said bushing and said cable;

said pin-and-socket, screw-operated link member comprising a first and a second housing assembly, one of said first and second housing assemblies containing a socket to mate with a pin in said apparatus bushing or said cable connector and the other assembly containing a screw-operated member to mate with the other of said apparatus bushing or said cable connector;

a conductive metallic buss coupling said socket and said



screw-operated member for electrically coupling same; and  
 a third housing assembly providing access to said screw-operated member for selectively applying said link member in said first arrangement and for withdrawing said link member from such arrangement.

4,955,824

## TWO PIN SHUNT

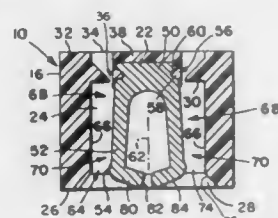
David A. Pretzel, 8549 Plank Rd., Mentor, Ohio 44064; Howard J. Venalek, 232 Wintergreen Hill, Painesville, Ohio 44077, and John T. Venalek, 2132 Chimney Ridge, Madison, Ohio 44057

Division of Ser. No. 38,228, Apr. 14, 1987, Pat. No. 4,795,602, and a continuation-in-part of Ser. No. 841,669, Mar. 19, 1986, abandoned. This application Nov. 10, 1988, Ser. No. 269,589

Int. Cl.<sup>5</sup> H01R 31/08

U.S. Cl. 439—510

11 Claims



1. An electrical shunt comprising contact means for electrically connecting plural electrical members, said contact means including a unitary contact body having a base portion and a pair of compliant contacting portions extending from said base portion for electrically connecting respectively to plural electrical members, and housing means for supporting said contact means in operative position for effecting such connecting function with respect to the plural electrical members inserted with respect to said housing means and compliant contacting portions, said housing means including a molded body of electrically nonconductive material having therein an open chamber in which at least one of said compliant contacting portions is movable and exposed for electrically connecting with a respective one of the plural electrical members inserted into said chamber through an open end of said chamber at one side of said molded body, and said molded body being molded to and about said base portion of said unitary contact body to anchor said unitary contact body in said molded body.

4,955,825

## ELECTRICAL FIXTURE

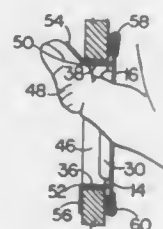
John E. Groth, Cleveland Heights; Martin F. Delmore, Seven Hills, and Raymond S. Laughlin, Cuyahoga Falls, all of Ohio, assignors to Erico International Corporation, Solon, Ohio

Filed Jan. 14, 1987, Ser. No. 3,451

Int. Cl.<sup>5</sup> H01R 13/60

U.S. Cl. 439—535

9 Claims



1. An electrical fixture for mounting a cover plate upon a wall over a wall opening located in the panel of such wall with

fasteners, comprising a plate having a front surface, a rear surface, a major opening and a pair of fastener openings extending from said front surface through to said rear surface, said major opening having top, bottom and side edges, and one of said fastener openings being located adjacent said top edge and the other of said fastener openings being located adjacent said bottom edge, said side edges of said major opening each including a protruding flange which serves to align and secure said electrical fixture within such wall opening, said top and bottom edges each including a deformable finger extending essentially normal thereto in the proximity of said respective fastener opening which is adapted for insertion and deformation within such wall opening, said deformable fingers each including a slot which upon deformation of the finger around such panel and within such wall opening aligns with said respective fastener opening through a range of thicknesses of such panel such that upon insertion and driving of such fasteners within said fastener openings such fasteners are not obstructed by said deformable fingers, said major opening being rectangular and said top and bottom edges of said major opening being narrow and said side edges of said major opening being longer, each of said deformable fingers including a reduced portion connecting said deformable fingers to the respective top or bottom edge which facilitates the bending thereof.

4,955,826

## CONNECTOR

Christopher M. Potter, Stevenage; George Hjelplis, Hitchin, and Paul Bunyan, Letchworth, all of United Kingdom, assignors to Marconi Instruments Limited, Hertfordshire, United Kingdom

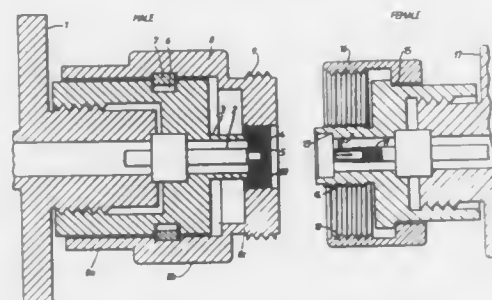
Filed Apr. 12, 1989, Ser. No. 337,216

Claims priority, application United Kingdom, May 6, 1988, 8810744

Int. Cl.<sup>5</sup> H01R 13/00

U.S. Cl. 439—578

8 Claims



1. Connection apparatus comprising:

a first connector including a first transmission line of predetermined impedance, a first engagement member retained relative to the first transmission line and having first and second radially separated attachment means; and

a second connector including a second transmission line of said predetermined impedance, adapted to co-operate in use with the first transmission line for the transmission of signals therebetween, and including first attachment means releasably attachable to said first attachment means on said first engagement member and a second engagement member retained relative to the second transmission line for longitudinal displacement relative to said second transmission line and including second attachment means releasably attachable to said second attachment means on said first engagement member sequentially with said first attachment means.

4,955,827

## DOUBLE-LOCKED SUBMINIATURE TERMINAL PIN WITH OPPOSED LOCKING OPENINGS

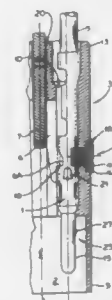
Dhirendra C. Roy, Canton, Mich., and George E. Hyde, Fort Wayne, Ind., assignors to United Technologies Automotive, Inc., Dearborn, Mich.

Filed Sep. 14, 1989, Ser. No. 407,486

Int. Cl.<sup>5</sup> H01R 13/40

U.S. Cl. 439—595

16 Claims



1. A terminal pin for a subminiature electrical connector having a body with at least one internal, elastically deformable finger with an outwardly directed pin locking tab and an opposed, inwardly directed pin locking tab, comprising:

a front, longitudinally extended, electrically conductive, male, pin end portion for being electrically interconnected into a female receptacle for providing electrical continuity between the pin and the female receptacle, said pin end portion including on its outer surface a spring member having two ends and being clamped at both ends, said spring member being formed between two parallel slits made in the surface of said pin end portion, said spring member having a center area and including an outwardly directed dimpled formed in the center area of said spring member,

a longitudinally extended, structurally strong, pin body connected to said pin end portion for attaching the pin to the connector body; said pin body having a rectilinear quadrilateral, lateral cross-section with two sets of opposed, exterior, side surfaces and having on one set of opposed, exterior, side surfaces two, open, female windows into which the outwardly and inwardly directed tabs are inserted for double locking of the pin to the connector body; and

a rear end portion including wire attachment means attached to said pin body at a portion of said pin body removed from its connection with said pin end portion.

4,955,828

## MULTIPLE CONTACT COAXIAL SHELL CONNECTOR

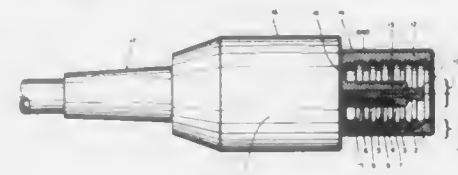
Eric Gruenberg, Soquel, Calif., assignor to Apple Computer, Inc., Cupertino, Calif.

Filed Nov. 9, 1989, Ser. No. 434,645

Int. Cl.<sup>5</sup> H01R 17/18

U.S. Cl. 439—668

19 Claims



1. A multiple contact coaxial shell connector comprising:  
 a post having multiple electrically conductive contact bands insulated from each other and longitudinally spaced along the length of said post;  
 a first shell coaxially encircling and spaced from said post,

said first shell having multiple electrically conductive contact rings insulated from each other and longitudinally spaced along the length of said first shell; with said post and said first shell being fixed in coaxial position and open at a rear end for access to said contact bands and rings, and mounted at a far end to a connector body.

4,955,829

## FANNING STRIP MEMBER AND TERMINAL BLOCK MEMBER ARRANGEMENT

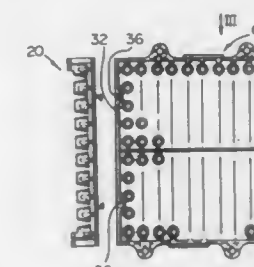
Robert J. Marks, Carpentersville, and Albert Kupferschmidt, Highland Park, both of Ill., assignors to Northern Telecom Limited, Montreal, Canada

Filed Aug. 23, 1989, Ser. No. 397,955

Int. Cl.<sup>5</sup> H01R 9/24

U.S. Cl. 439—719

10 Claims



1. A fanning strip member and terminal block member arrangement comprising a terminal block member having a first side with terminal mounting positions for electrical conductor wires, a second and opposite side for engagement with a terminal block support member, and a third side extending between the first and second sides, and a fanning strip member for location along the third side of the terminal block member, the fanning strip member and said third side having mutually engageable interlocking means for mounting the fanning strip member on said third side with the fanning strip member being detachable from the terminal block member solely by movement of the fanning strip member in the direction of the second side.

4,955,830

## CONNECTORS

Noriyoshi Fukumoto, 21-6, Sakuragaoka 2-Chome, Setagaya-ku, Tokyo, Japan

Continuation of Ser. No. 289,801, Dec. 27, 1988, abandoned.

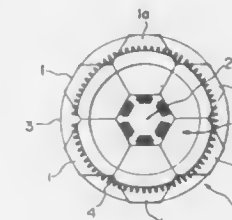
This application Sep. 29, 1989, Ser. No. 414,522

Claims priority, application Japan, Dec. 27, 1987, 62-198469; Feb. 10, 1988, 63-16667

Int. Cl.<sup>5</sup> H01R 4/48

U.S. Cl. 439—821

6 Claims



1. A connector comprising in combination:  
 (a) an assembly of six side-by-side segments each segment being made of electrically conductive material, each segment having a cross sectional portion comprising

- (1) an inner half composed of three sides corresponding to one half of a hexagon, and  
 (2) an outer half,  
 said inner halves of said six segments forming with their innermost sides a hexagonal-shaped opening that is adapted to accommodate a plug, and  
 (b) retaining means surrounding and pressing against the outer halves of said six segments, said retaining means including at least one resilient ring that exerts an inward force against said six segments and against any plug that is inserted into said hexagonal-shaped opening.

4,955,831

## IGNITION TIMING CONTROL SYSTEM FOR OUTBOARD ENGINE

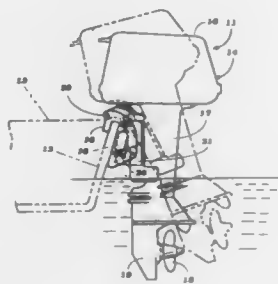
Selji Inoue, and Selichi Tanaka, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Mar. 17, 1989, Ser. No. 325,294

Claims priority, application Japan, Mar. 18, 1988, 63-65492  
 Int. Cl.<sup>5</sup> B63H 21/22

U.S. Cl. 440—1

5 Claims



1. In an engine control for an outboard motor including an engine and adapted to be mounted for trim adjustment of the position of the outboard motor, the improvement comprising means for sensing when a change in trim condition of the outboard motor effects a change in a running characteristic of the engine from normal running and means for adjusting the running characteristic of the engine by adjusting a running system of the engine in response to the sensed condition to maintain normal running of said engine even when the trim condition is changed.

4,955,832

## VEHICLE PROPULSION SYSTEM

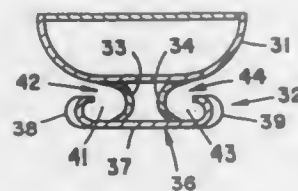
Ronald V. Hansch, P.O. Box 1964, San Francisco, Calif. 94101-1964

Filed Nov. 7, 1988, Ser. No. 268,216

Int. Cl.<sup>5</sup> B63H 19/02

U.S. Cl. 440—9

11 Claims



1. A propulsion unit comprising means defining an elongated chamber having a first closed end and a second open end axially of said chamber, means defining an elongated opening longitudinally of said chamber with the width of such opening decreasing as it progresses inwardly into said chamber, and said chamber having a curved inner wall in cross section

with said opening being tangentially aligned with said curved wall whereby fluid entering said chamber through said opening is redirected into a spiral path within the chamber to flow axially from the second end thereof for producing an axial propulsive force.

4,955,833

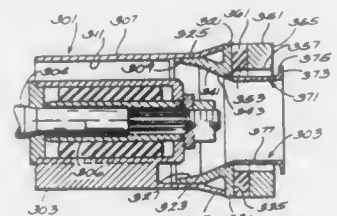
## DYNAMIC DAMPER ON MARINE PROPELLER OR PROPELLER SHAFT

Edward K. Lam, Waukegan, Ill., and Heinrich E. Luksch, Kenosha, Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.

Continuation of Ser. No. 145,106, Jan. 19, 1988, abandoned. This application Aug. 24, 1989, Ser. No. 398,325  
 Int. Cl.<sup>5</sup> F16F 15/12

U.S. Cl. 440—49

13 Claims



2. A propeller comprising an inner sleeve adapted to be mounted on a propeller shaft, an outer hub supporting a propeller blade and having a rearward end, and a resilient member connecting said sleeve to said outer hub, and a damper comprising a carrier secured to said rearward end of said outer hub and including a portion extending rearwardly of said propeller blade, a rigid annulus, and resilient means connecting said carrier portion and said annulus.

4,955,834

## RECESSED TROLLING MOTOR MOUNTING

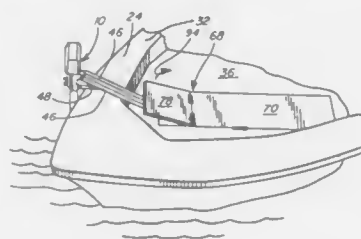
William A. Henderson, Tulsa, and Isaac H. Nelson, Owasso, both of Okla., assignors to Zebco Corporation, Tulsa, Okla.

Filed Aug. 12, 1988, Ser. No. 231,758

Int. Cl.<sup>5</sup> B63H 21/26

U.S. Cl. 440—63

5 Claims



1. In combination:  
 a boat having a hull defining an inside area to be occupied by a user of the boat;  
 an outboard motor having a drive propeller; and  
 means for mounting the outboard motor to the boat for movement relative to the boat between (a) an operative position wherein the propeller is submerged in a body of water on which the boat is buoyed and (b) a storage position wherein the outboard motor resides substantially entirely within the inside area of the hull,  
 wherein said boat has a floor and a recess beneath said floor and said outboard motor resides entirely within said recess and beneath said floor in said storage position,  
 wherein said floor has an opening communicating with the

recess and further including a cover and means mounting the cover to the boat so that the cover covers at least a part of the floor opening with the outboard motor in its operative position,

wherein with the outboard motor in its operative position the outboard motor mounting means extends through the floor opening and the cover has a first section to cover the part of the floor opening and a second section movable relative to the first cover section to selectively expose another part of the floor opening with the first cover section covering the part of the floor opening to thereby permit passage through the opening of the outboard motor mounting means with the outboard motor in its operative position.

4,955,835

## STORAGE CAPSULE FOR SURFBOARD OR THE LIKE

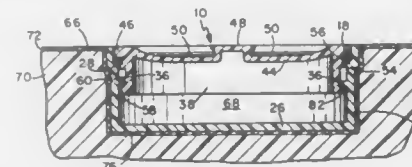
Dean E. Hollingsworth, 371 Andrew Ave., Encinitas, Calif. 92024

Filed Nov. 14, 1988, Ser. No. 270,097

Int. Cl.<sup>5</sup> B63B 19/00

U.S. Cl. 441—74

11 Claims



1. An apparatus for mounting in surfboard or a means for storing articles therein, comprising:

- a cylindrical housing having a closed end and an open end, said housing having at least one integral, mateable retaining rib formed on its inner surface, and an annular shoulder formed on its inner surface adjacent said open end;
- a cylindrical lid having a closed end and a cylindrical skirt portion depending from said closed end for close engagement in the upper open end of said housing, a handle member formed at the outer surface of said closed end and at least one integral mating locking rib formed on the outer surface of said skirt portion for mating, locking engagement with said mating retaining rib on the inner surface of said housing;
- a gasket member mounted upon the outer surface of said skirt portion adjacent said closed end of said lid for engaging said housing shoulder;
- said lid and housing being flush mounted within a board for surfing or sailing.

4,955,836

## OUTBOARD MOTOR

Tomonori Suzuki, Hamamatsu, and Makoto Toyohara, Hamana, both of Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Division of Ser. No. 663,334, Oct. 22, 1984, Pat. No. 4,613,310, which is a continuation of Ser. No. 405,916, Aug. 6, 1982, abandoned. This application Feb. 18, 1986, Ser. No. 830,444

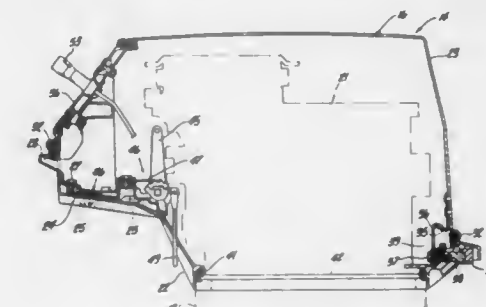
Int. Cl.<sup>5</sup> F02N 17/00

U.S. Cl. 440—77

11 Claims

1. In an outboard motor construction for use when the motor is suspended from an associated watercraft at a level below an operator in the watercraft, said outboard motor having a power head containing an internal combustion engine and a surrounding outer cowling and a drive shaft housing depending from said power head, clamping bracket means positioned beneath said power head for affixing said outboard motor to an outrigger of an associated watercraft so that said power head lies below the upper end of the transom of the watercraft, the improvement comprising said outer cowling having an inclined portion formed from a separate piece of cowling and

extending upwardly and rearwardly to form a face that may be seen by the operator from above, and an opening herein, a recoil starter for said engine located within said cowling a starter handle accessible from said inclined portion and connected to one end of a starter rope extending through said



opening, and said starter rope being connected at its other end to said recoil starter, and guide means for said starter rope for defining a path of movement of the starter rope that is perpendicular to the included portion of the cowling and generally in line with the operator and angularly disposed to said drive shaft housing.

4,955,837

## COOLING WATER FEED STRUCTURE FOR INBOARD/OUTBOARD ENGINE

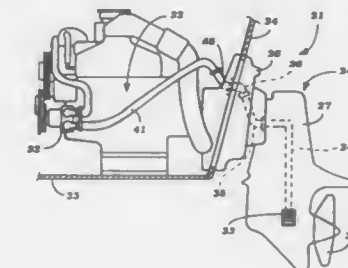
Tsuyoshi Yoshimura, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Dec. 27, 1988, Ser. No. 290,444

Claims priority, application Japan, Dec. 28, 1987, 62-329646  
 Int. Cl.<sup>5</sup> B63H 21/10

U.S. Cl. 440—88

4 Claims



1. In a cooling water system for a marine outboard drive comprised of an outboard drive unit adapted to be mounted on the transom of a watercraft and carrying a propulsion unit adapted to be driven by any one of a plurality of engines positioned within the hull of the associated watercraft, at least two of the engines having water connections at different locations relative to the transom when mounted therein, a water opening formed in said outboard drive unit, and a first conduit formed in said outboard drive unit and extending therethrough between said water opening and an end contiguous to said transom, the improvement comprising a second, rigid conduit communicating at one end with said first conduit transom end and means for mounting said rigid conduit for rotational movement of the other of its ends between at least two different angular positions for communicating with either selected one of the two different engine water connections with the one end thereof communicating with the transom end of said first conduit in either position.

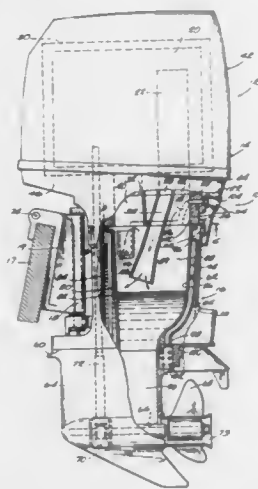


**4,955,838**  
**WATER JACKETED EXHAUST RELIEF SYSTEM FOR MARINE PROPULSION DEVICES**  
 Thomas D. Wenstadt, Mobile, Ala., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Jul. 12, 1985, Ser. No. 754,534  
 Int. Cl.<sup>5</sup> B63H 21/32

U.S. Cl. 440—89

17 Claims



5. An outboard motor comprising a propulsion unit including a power head having a lower end and including an internal combustion engine having an exhaust gas passage communicable with said engine, a lower unit having an upper end fixedly connected to said lower end of said power head and including a drive shaft housing and a gear case rotatably supporting a propeller, an engine cover mounted in covering relation to said power head and including an exhaust gas discharge port located above said upper end of said lower unit, and conduit means communicating between said exhaust gas passage and said exhaust gas discharge port, and means adapted for supporting said propulsion unit from a boat transom for vertical swinging movement about a horizontal tilt axis and for horizontal steering movement about a steering axis transverse to said tilt axis.

**4,955,839**  
**OAR FOR RACING SHELLS AND METHOD OF MAKING SAME**  
 Jürgen R. Kaschper, London, Canada, assignor to Big Creek Sports Ltd.

Filed Jan. 3, 1989, Ser. No. 292,892  
 Claims priority, application Canada, Jan. 25, 1988, 557414  
 Int. Cl.<sup>5</sup> B63H 16/04

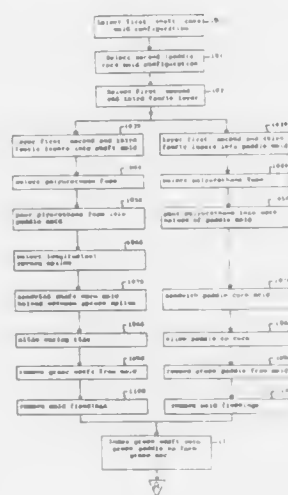
U.S. Cl. 440—101

21 Claims

1. A unitary oar including a paddle transforming into a shaped shaft that at its opposite end carries a handle portion the oar comprising a shaped paddle having a concave front surface and convex back that at its upper end smoothly merges with the shaft, said shaft having a thickness which increases from adjacent said paddle to the longitudinal center of said shaft, and then decreases in thickness from said longitudinal center to the distal end of said shaft to define the handle portion, said handle portion having a gripping surface thereover, the shaft in section, throughout the handle portion being a cylinder; the oar including:

- (a) a smooth outer skin of resin impregnated fiberglass tape and cloth and encircling graphite cloth, and;
- (b) an inner core of polyurethane foam that carries in the

longitudinal direction and coincident with the longitudinal axis of the paddle a rib member extending essentially



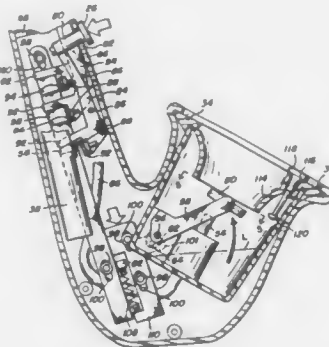
from the paddle throughout the extent of the shaft to the handle.

**4,955,840**  
**TOY SOUND-EMITTING AND BUBBLE-BLOWING SAXOPHONE**  
 David E. Moomaw, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Aug. 15, 1989, Ser. No. 394,014  
 Int. Cl.<sup>5</sup> A63H 33/28, 5/00

U.S. Cl. 446—17

5 Claims

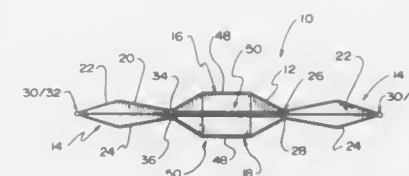
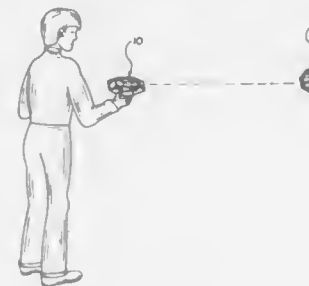


1. A toy sound-emitting and bubble-blowing saxophone comprising:  
 a mouthpiece;  
 sound-emitting means;  
 bubble-blowing means;  
 air passage means connecting the mouthpiece to the sound-emitting means and bubble-blowing means;  
 a manually depressible button; and  
 linkage means activated by the button for coupling the manually depressible button to the sound-emitting means and to the bubble-blowing means, whereby depressing the button while blowing into the mouthpiece changes the sound emitted from the sound-emitting means and enables bubbles to be blown from the bubble-blowing means.

**4,955,841**  
**DISC-SHAPED THROWING TOY**  
 Anthony Pastrano, 3131 W. Lambright, Tampa, Fla. 33614  
 Filed Nov. 3, 1989, Ser. No. 432,384  
 Int. Cl.<sup>5</sup> A63H 27/00, 33/18

U.S. Cl. 446—46

8 Claims



1. A throwing toy comprising a collapsible shell cooperatively formed by a plurality of segments coupled between a first and second center element and at least one elastic element coupled between at least two of the plurality of segments, each of said plurality of segments includes a first and second segment member operatively coupled together by a first outer hinge said first outer hinge comprises a cylindrical member formed on the end portion of said second segment member and a circular seat formed on the end portion of said first segment member to operatively receive said cylindrical member, wherein corresponding first and second segment members are selectively movable between a first or collapsed position and second or expanded position relative to each other such that as said throwing toy with corresponding first and second segment members in the first or collapsed position relative to each other is thrown the centrifugal force initially maintains the said throwing toy in a substantially flat configuration and as the rotational speed of the said throwing toy decreases said elastic element causes corresponding first and second segment members to move to said second or expanded position relative to each other whereby the said throwing toy forms a ball-like configuration.

**4,955,842**  
**FLYING DISK WITH RETRIEVING DEVICE**  
 Ettore Marcotti, 28 Cleveland Pl., Palisades Park, N.J. 07650  
 Filed Jan. 10, 1989, Ser. No. 295,446  
 Int. Cl.<sup>5</sup> A63H 27/00

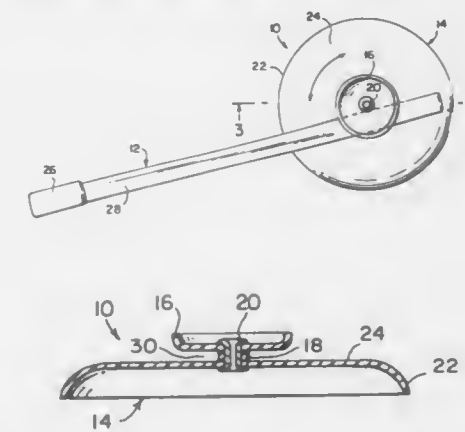
U.S. Cl. 446—46

8 Claims

1. A flying disk with handling device, comprising:  
 (a) a circular flying disk having a saucerlike generally convexly shaped outer surface;  
 (b) a saucer-like disk-shaped element having a generally convexly shaped outer surface, substantially smaller in diameter than said flying disk, co-axially fastened to said flying disk so that the generally convexly shaped outer surfaces thereof face each other and are spaced from each other to define a groove therebetween, the respective perimeters of said flying disk and said disk-shaped element being thus arranged to define between them an aperture

substantially greater than the dimension of said groove; and

(c) a sword-like handling device for retrieving said flying disk having a handle portion and an elongated flat blade portion, the blade portion of said handling device having a cross-sectional dimension smaller than the groove defined between said disk-shaped element and said flying disk, wherein said disk-shaped element and said flying disk are spaced apart from one another by an axially arranged bushing whose axial length is greater than the cross-section



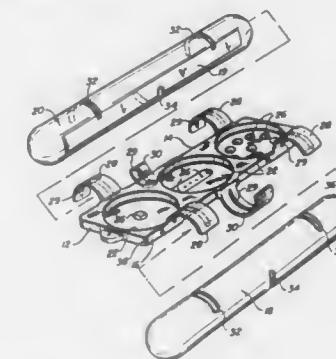
tional dimension of the flat blade portion of said handling device; and

whereby the size of the aperture defined between the perimeters of the flying disk and the disk-shaped element and the central planar portion of the flying disk facilitates the entry of said flat blade portion into the groove between the walls of the flying disk and the disk-shaped element so as to ease the retrieval of said flying disk, the flying disk riding or rolling on the flat blade portion as a wheel would ride or roll on a track.

**4,955,843**  
**BOAT TOY AND METHOD FOR MAKING SAME**  
 Henry Bolanos, Mountain Lake; John Piszko, Edison, both of N.J., and David M. Williams, New York, N.Y., assignors to Gruner + Jahr Printing and Publishing Co., New York, N.Y.  
 Continuation of Ser. No. 583,565, Feb. 27, 1984, abandoned.  
 This application Nov. 22, 1985, Ser. No. 800,883  
 Int. Cl.<sup>5</sup> A63H 23/02

U.S. Cl. 446—160

2 Claims



1. A method of assembling a floatable toy comprising a raft portion having longitudinally extending edges and two pontoons comprising floatable, generally cylindrically shaped bodies, each of said pontoons having a longitudinal axis and being defined in part by a cylindrical wall having a depression

therein and each to be affixed to the raft portion adjacent to and parallel with a longitudinal edge comprising:

- providing flexible arcuate brackets extending from each of said longitudinal edges, at least a portion of said brackets being adapted to cooperating with and interfit into said depressions in the cylindrical walls of the pontoons;
- axially aligning each pontoon along one longitudinal edge and in front of said raft portion in a position of rotation out of its intended position when finally assembled;
- sliding said pontoon into axial position parallel to and adjacent the longitudinal edge of the raft and past the brackets; and
- rotating said pontoon to align the depression with the bracket to seat the brackets into said depressions.

4,955,844

## SITTING DOLL WITH BENDABLE KNEES

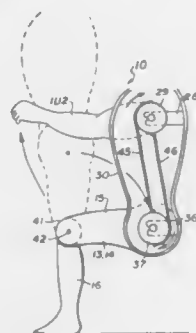
John B. Miller, Jr., 15415 W. Willowwind Cir., Houston, Tex. 77071

Filed Aug. 31, 1989, Ser. No. 400,950

Int. Cl. A63H 33/26

U.S. Cl. 446—330

11 Claims



## 1. A doll comprising:

a doll torso portion having hip, shoulder, and side regions a pair of legs pivotally connected to said torso portion in the hip region of said doll and each having an upper leg member and the lower leg member joined thereto at the knee joint and said upper and lower leg members movable relative to one another about the knee joint,

at least one arm member movably mounted to the torso and manually movable between a first position aligned generally vertically with said torso portion and a second raised position aligned generally perpendicular to said torso portion,

said arm member operatively connected to said pair of legs such that manually moving said arm from the first position to the second position causes simultaneous pivotal movement of said pair of legs about the hip region of said doll between a standing position with said legs aligned generally vertically with said torso portion and a sitting position with said legs aligned generally perpendicular to said torso portion.

4,955,845

## GAME CALLING DEVICE

Frank R. Piper, Delmont, Pa., assignor to Penn's Woods Products, Inc., Delmont, Pa.

Filed Dec. 24, 1987, Ser. No. 137,951

Int. Cl. A63H 5/00

U.S. Cl. 446—397

13 Claims

## 1. A game calling device comprising:

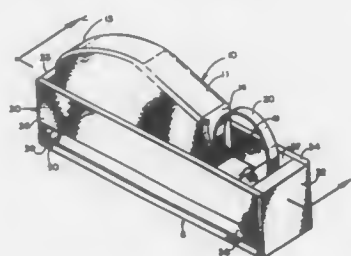
(a) a support having end walls, generally opposing parallel sidewalls and a generally flat bottom wall to provide trough means;

(b) a generally flat friction plate on the bottom wall;

(c) a manually actuatable handle positioned in the trough

means for actuating the game calling device to generate a desired game call, the trough means permitting the handle to be controllably and manually moved during actuation toward the friction plate and along a path of movement on the support between the end walls, said trough means guiding longitudinal movement of the handle along said path from a beginning position abutting one end wall toward the other end wall, the sidewalls containing lateral movement of the handle;

(d) a striker having an elongated wand portion protruding from the handle at a selected angle relative to the friction



plate, the wand portion protruding from the handle toward the friction plate on the bottom wall in position to frictionally engage the friction plate along the path of movement upon operative displacement of the handle from the beginning position; and

(e) a spring connected with the support and the handle for suspending said handle within the trough to return the handle back to the beginning position after operative displacement of the handle, said handle being supported relative to the support solely by said spring to enable movement of the handle toward the friction plate and along the path of movement between the end walls.

4,955,846

## BRASSIERE WITH SIZE AND CONFIGURATION ADJUSTMENT MECHANISM

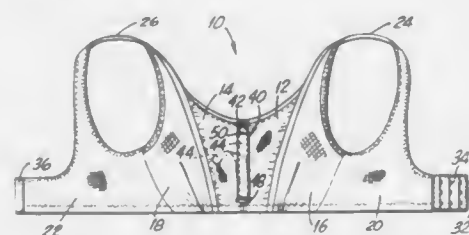
Bert Greenberg, 2030 S. Ocean Dr., Hallandale, Fla. 33009

Filed Sep. 11, 1989, Ser. No. 405,545

Int. Cl. A41C 3/00

U.S. Cl. 450—69

5 Claims



1. A brassiere having a flexible vertical centerline between two breast cups, and a size and configuration adjustment mechanism comprising:

a separable fastener having first and second linear elements; said first element being attached to said brassiere along said vertical centerline;

said second element having a fixed end and a free end, the fixed end being attached to an inner surface of said brassiere at a position along said centerline;

said brassiere having an opening along said centerline; the free end of said second element extending through said opening; and

said second element of said fastener being separably connectable at selected locations along said first element of

said fastener to affect the vertical height of said centerline of said brassiere.

4,955,847

## HOMOKINETIC TRANSMISSION JOINT HAVING A TRIPOD ELEMENT CONNECTED TO A HOUSING ELEMENT BY ROLLING ELEMENTS ON THE TRIPOD ELEMENT AND ROLLING TRACKS IN THE HOUSING ELEMENT

Michel A. Orain, Conflans Ste Honorine, France, assignor to Glaenger-Spicer, Poissy, France

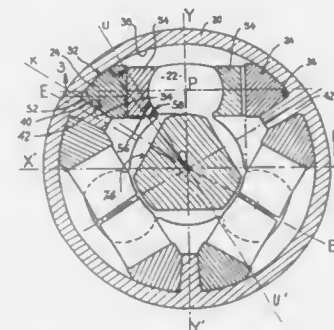
Filed Oct. 20, 1988, Ser. No. 260,515

Claims priority, application France, Oct. 27, 1987, 87 14856; Mar. 3, 1988, 88 02717; Mar. 3, 1988, 88 02718

Int. Cl. F16D 3/205

U.S. Cl. 464—111

30 Claims



## 1. A homokinetic transmission joint, comprising:

a tripod element for connection to a driving shaft, said tripod element having an axis of rotation and three radial arms having radial axes spaced 120° apart;

each said arm having two rolling elements mounted thereon on opposite sides thereof;

a housing element, for connection to a driven shaft, having an axis of rotation and a rolling track for cooperation with each said rolling element;

each said rolling track comprising two rolling track surfaces, a first said rolling track surface comprised of a first spherical surface defined on an inner wall of said housing element and having a center of curvature located on said axis of rotation of said housing element, and a second said rolling track surface comprised of a first conical surface defined by an inner web of said housing element, said inner web extending in a plane containing said axis of rotation of said housing element, and said first conical surface being a portion of a cone, said cone having an apex coincident with said center of curvature of said first spherical surface, said cone having an axis perpendicular to said axis of rotation of said housing element and perpendicular to an axial plane containing the radial axis of said arm cooperating with said rolling track with its respective said rolling elements, and said cone having an apex semi-angle substantially equal to 30°;

each said rolling element having a concave cylindrical surface for cooperation with a respective said arm to enable said rolling element to slide axially relative to said radial axis of said arm, and two adjacent rolling surfaces, said two adjacent rolling surfaces comprising a second spherical surface having a center of curvature located on the cylindrical axis of said concave cylindrical surface of said rolling element and a radius equal to the radius of said first spherical surface of the respective said rolling track, and a second conical surface, said second conical surface being a portion of a cone having an apex coincident with said center of curvature of said second spherical surface, said cone having an axis coincident with said cylindrical axis of said concave cylindrical surface of said rolling element,

and said cone having an apex semi-angle substantially equal to 60°; and

a means for pivotally mounting each said rolling element relative to its respective said arm.

4,955,848

## TRANSFER DEVICE OF FOUR-WHEEL-DRIVE VEHICLE

Takao Kotajima, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

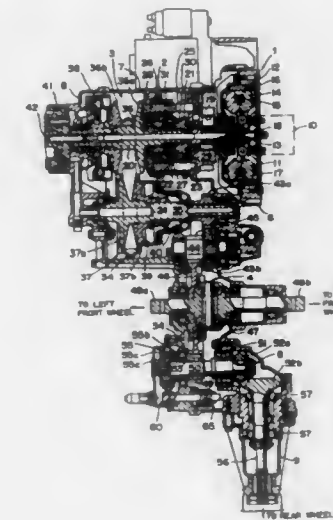
Filed Sep. 1, 1989, Ser. No. 402,449

Claims priority, application Japan, Sep. 21, 1988, 63-124215[U]

Int. Cl. F16H 11/02

U.S. Cl. 474—28

7 Claims



1. A transfer device of a part-time type of a four-wheel-drive vehicle driven by an engine in which driving power of the engine is transmitted directly to either of the front and rear wheels and is transmitted selectively to the other wheels by way of a transfer clutch of a transfer device, said device comprising:

a shiftable sleeve forming a member of said clutch;

a rail movable in reciprocating movement to shift said sleeve thereby to engage or disengage said clutch;

a hydraulic actuator for actuating said rail in said reciprocating movement;

hydraulic pressure supply means for supplying hydraulic pressure to said hydraulic actuator;

a changeover valve for controlling the hydraulic pressure to be applied to the hydraulic actuator;

a solenoid for controllably actuating said changeover valve; and

a four-wheel-drive switch for controlling said solenoid by supplying or cutting off energizing current to or from said solenoid.

4,955,849

## FRONT DERAILLEUR FOR USE IN BICYCLE

Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Co., Ltd., Osaka, Japan

Filed Jun. 28, 1989, Ser. No. 373,319

Claims priority, application Japan, Jun. 30, 1988, 63-87766[U]

Int. Cl. F16H 11/08

U.S. Cl. 474—80

10 Claims

1. A front derailleur for use in a bicycle, said front derailleur comprising:

a link mechanism (20) including a second line (22) fixedly secured to a bicycle frame (1), third and fourth links (23)



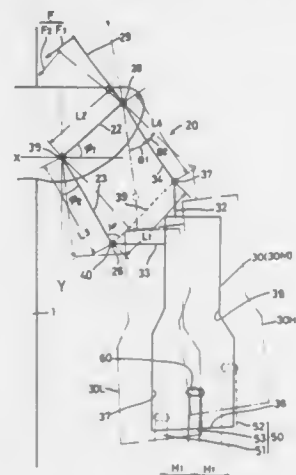
and (24) operatively connected with said second link (22) via pivots (25) and (28) respectively, and a first link (39) operatively connected with said third and fourth links (23) and (24) via pivots (26) and (27) respectively;

a chain guide (30) operatively connected to said first link (39) for moving a chain (60);

urging means (40) for urging said chain guide (30) towards said third link (23);

a control unit (29) operatively connected to said link mechanism (20) for transmitting a control force for pivoting said link mechanism (20);

said link mechanism (20) being pivoted with an input of control force to said control unit (29) to move said chain guide (30) against the urging force of said urging means (40) thereby selectively engaging said chain (60) with a first sprocket (51) positioned at an urging side end of said urging means (40), at least one middle sprocket (53) or



with a second sprocket (52) opposed to said first sprocket (51) across said middle sprocket (53);

wherein said link mechanism (20) operates to incline a posture of said chain guide (30) at its position corresponding to said middle sprocket (53) so as to move a leading end of said guide (30) towards the urging side with respect to a posture of said guide (30) at its position corresponding to said first sprocket (51), said link mechanism (20) alternatively operating to incline a posture of said chain guide (30) at its position corresponding to said second sprocket (52) so as to move the leading end of said guide (30) away from the urging side with respect to the posture of the same at its position corresponding to said middle sprocket (53); and

said third link (23) having an inter-pivot distance L3 which is longer than an inter-pivot distance L4 of said fourth link (24).

**4,955,850**  
**SPROCKET CHAIN CLEANING DERAILLEUR WHEEL**  
Glen Lee, 7777 W. 91st St. Unit E3146, Playa del Rey, Calif. 90293

Filed Oct. 10, 1989, Ser. No. 418,848  
Int. Cl. F16H 57/00

U.S. Cl. 474-92

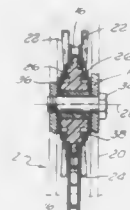
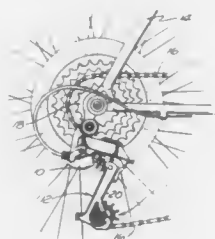
14 Claims

1. A derailleur wheel for use with a vehicle utilizing a sprocket chain derailing system, comprising:

(a) a derailleur wheel having a centrally disposed circular sprocket and first and second circular side faces located on each side of said circular sprocket, and

(b) a plurality of cleaning brushes secured to said side faces, said cleaning brushes being radially spaced apart and

extending in a radially outward direction, thereby resulting in the cleaning of the said sprocket chain by the brush-



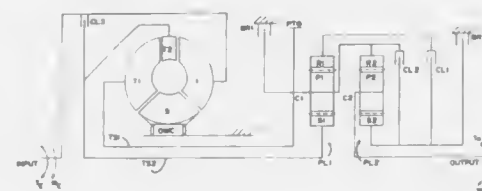
ing of said brushes against the sprocket chain during use of the vehicle.

**4,955,851**  
**TRANSMISSION AND METHOD OF OPERATION**  
John Arzoian, Dearborn; Shan Shih, Troy, and Edward G. Trachman, Birmingham, all of Mich., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Aug. 23, 1988, Ser. No. 235,140  
Int. Cl. F16H 47/08

U.S. Cl. 475-59

16 Claims



1. A planetary transmission apparatus comprising:

- a transmission housing;
- an input shaft;
- an output shaft;
- a first planetary gear set in said housing including a first sun gear, a first planet gear carrier, first planet gears mounted for rotation on said first planet gear carrier and in meshing engagement with said first sun gear, and a first ring gear in meshing engagement with said first planet gears, said first planetary gear set being arranged to be driven by said input shaft;
- a second planetary gear set in said housing operatively connected with said first planetary gear set and including a second sun gear, a second planet gear carrier, second planet gears mounted for rotation on said second planet gear carrier and in meshing engagement with said second sun gear, and a second ring gear in meshing engagement with said second planet gears, said second planetary gear set being arranged to drive said output shaft;
- a torque converter having an impeller operatively coupled to said input shaft and including a primary turbine operatively coupled to said first planet gear carrier, a secondary turbine operatively coupled to said first sun gear, and a stator operatively coupled by a one-way clutch to said transmission housing;
- first brake means operatively coupled to said transmission

housing and said primary turbine for selectively braking said primary turbine to said transmission housing;

said first planet gear carrier being operatively coupled to said first brake means for selectively braking said first planet gear carrier with said primary turbine relative to said transmission housing;

a second ring gear being operatively coupled to said first brake means for selectively braking said second ring gear, said first carrier and said primary turbine to said transmission housing;

a first, friction clutch operatively coupled to said first ring gear and said second sun gear for selectively coupling said first ring gear to said second sun gear; and

means for directly coupling said input shaft to said first planetary gear set.

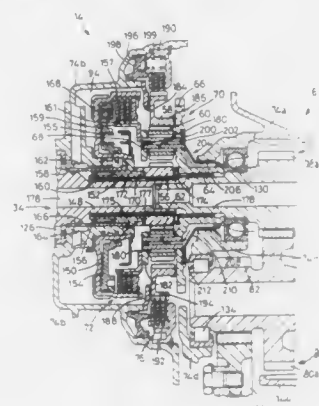
**4,955,852**  
**PLANETARY GEAR MECHANISM HAVING MEANS FOR ACCURATE ALIGNMENT OF SUN GEAR**  
Kunio Morisawa, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jun. 30, 1989, Ser. No. 374,144  
Claims priority, application Japan, Jul. 7, 1988, 63-169462; Apr. 21, 1989, 1-103046

Int. Cl. F16H 3/44

U.S. Cl. 475-146

8 Claims



- 1. A planetary gear mechanism comprising:
- a rotating shaft having a splined end portion;
- a sun gear splined at a free end of said splined end portion, for rotation with said rotating shaft;
- planetary gears engaging said sun gear;
- a carrier for rotatably supporting said planetary gears;
- a ring gear engaging said planetary gears;
- a clutch for connecting said rotating shaft and said carrier, said clutch including a first rotary member splined on said splined end portion of the rotating shaft, for rotation with said rotating shaft such that said first rotary member is adjacent to said sun gear at said free end, first friction means supported by and rotatable with said first rotary member, a second rotary member rotatable with said carrier, and second friction means supported by and rotatable with said second rotary member, said first and second friction means frictionally engaging each other to transmit power therebetween;
- a housing in which said rotating shaft, said sun gear, said planetary gears, said carrier, said ring gear and said clutch are accommodated, said housing rotatably supporting said first rotary member in a substantially radially fixed position for maintaining radial alignment of said first rotary member with a nominal axis of rotation of said rotating shaft; and
- said first rotary member supporting said sun gear, and said first rotary member and said sun gear including means for maintaining coaxial relation with each other, whereby

said sun gear is maintained in said substantially radially fixed position.

**4,955,853**  
**DIFFERENTIAL GEAR UNIT FOR MOTOR VEHICLE DRIVE AXLES**

Paul Bausch, Hattenhelm, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

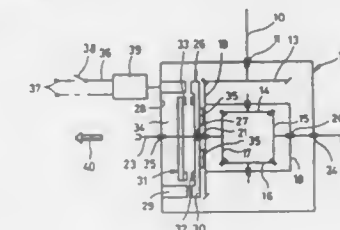
Filed Mar. 9, 1989, Ser. No. 321,135

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 3808402

Int. Cl. F16H 1/44; F16D 27/118, 23/10

U.S. Cl. 475-241

7 Claims



4. A differential gear unit for drive axles of motor vehicles, which has a differential housing and a differential lock comprising a jaw clutch which can be completely locked up and which includes a jaw clutch plate which is non-rotatably connected to a differential case for differential gears, but is axially displaceable relative thereto, a cooperating jaw clutch counterplate which is mounted non-rotatably and axially non-displaceably on a differential gear drive axle, wherein the jaw clutch plate also serves as an armature for an electromagnet constructed as a ring magnet which is energized to engage the jaw clutch plate with the jaw clutch counterplate, and wherein the jaw clutch plate can be released from the jaw clutch counterplate by spring means which are biased when the jaw clutch is engaged, characterized in that the ring magnet is fixed to the differential housing, and the jaw clutch counterplate is disposed within a space formed by the ring magnet.

**4,955,854**  
**APPARATUS FOR SUBDIVIDING STACKS OF SHEETS OF PAPER AND THE LIKE**

Oscar Roth, Reblandstrasse 17, CH-5622 Waltenschwil Schweiz, Switzerland

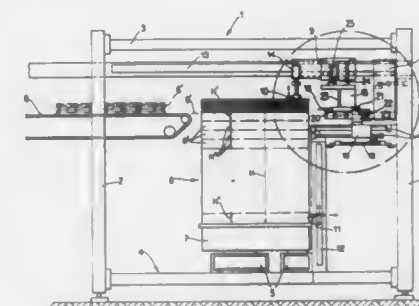
Filed Jul. 28, 1989, Ser. No. 387,163

Claims priority, application Switzerland, Aug. 1, 1988, 2905/88; Dec. 13, 1988, 4603/88

Int. Cl. B65H 35/10, 33/02

U.S. Cl. 225-103

35 Claims



1. Apparatus for subdividing stacks of overlapping discrete sheets of paper and the like into piles, comprising a stack-supporting elevator movable up and down along a substantially

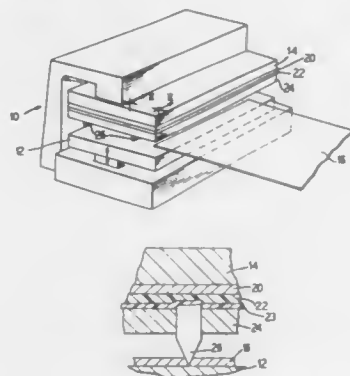
vertical path; and a conveyor adjacent one side of said path and having a substantially horizontal surface disposed at a predetermined level and arranged to receive piles from the stack on said elevator, said elevator being movable to positions in which a portion at least of the stack of sheets thereon extends above said level; and means for transferring piles of sheets from the top of the stack on said elevator onto said surface, including a pusher above said level, a substantially horizontal and substantially flat separating element disposed beneath said pusher at or above said level and extending beyond said pusher toward said conveyors and means for reciprocating said pusher and said element along a substantially horizontal path between a retracted position in which said pusher and said element are located at a first distance from said conveyor at the other side of said vertical path, and a second position in which said pusher and said element are located at a shorter second distance from said conveyor whereby said element penetrates into the stack on said elevator to separate a pile of sheets located above said element from sheets therebelow and the pusher thereupon transfers the thus formed pile element from said vertical path onto said surface during movement of said pusher and said element from said first to said second position.

**4,955,855**  
**DIE CUTTING APPARATUS WITH IMPRESSIBLE COATING**

Walter Saebeler, 30380 N. Darrell Rd., McHenry, Ill. 60050, and Michael Resnick, 9830 Huber La., Niles, Ill. 60648  
Filed Nov. 15, 1988, Ser. No. 271,629  
Int. Cl. B31B 1/20

U.S. Cl. 493-404

11 Claims



1. A method of die cutting a sheet into a blank using a machine having movable and stationary platens associated therewith, and a tool-carrying die assembly associated with one of said platens comprising the steps of:  
casting a liquid onto a plate;  
solidifying said liquid into a coating having the characteristics of being impressible so as to form an impression and hardenable so as to harden said coating and retain an impression;  
positioning said coated plate in said machine between the tool-carrying die assembly and the associated platen;  
impressing said coating with the back edge of a tool so as to adjust for any irregularities between the tool and platen and so as to assure uniform cutting of the sheet to a blank, by moving one of said platens toward the other so that the working end of the tool engages the other platen and the irregularities between the support end of the tool and the platen are adjusted for by the coating;  
removing the coated plate from the machine;  
hardening the coating;  
returning the hardened coating to said machine in substantially the initial position so as to permit the tools to fit within the original impression;

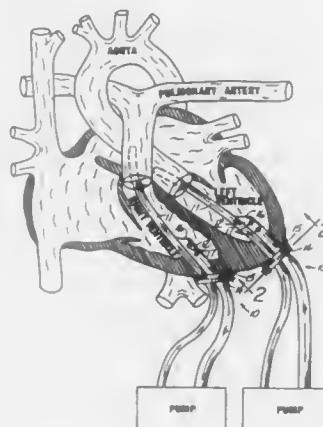
positioning an elastomeric sheet between the hardened coating and die assembly; and thereafter  
die cutting sheet stock into blanks.

**4,955,856**  
**METHOD AND APPARATUS FOR INSTALLING A VENTRICULAR ASSIST DEVICE CANNULAE**

Steven J. Phillips, 5300 Woodland, Des Moines, Iowa 50312  
Filed Jun. 30, 1989, Ser. No. 374,652  
Int. Cl. A61M 1/03

U.S. Cl. 600-16

3 Claims



1. A method of installing a ventricular assist device cannulae of a type including a blood drainage cannula tube having a first end and a second end and a blood inlet cannula tube having a first end and a second end, said method comprising:  
making a single opening in a heart;  
inserting the blood drainage cannula tube through said single opening whereby said first end thereof is disposed in a heart chamber;  
inserting the blood inlet cannula tube through said opening and through the aortic valve so that said first end thereof is disposed in said aorta;  
suturing said blood drainage cannula tube and said blood inlet cannula tube to said opening for sealing said opening and holding said cannula tubes in place;  
attaching said second end of said blood drainage cannula tube to the inlet port of a pump; and,  
attaching said second end of said blood inlet cannula tube to the outlet port of said pump whereby this design of cannula only a single opening into the heart is needed instead of two.

**4,955,857**  
**MULTI-ENZYME BIOREACTOR THERAPY FOR CANCER**

Udipi R. Shettigar, 1021 Medical Plz. South, Salt Lake City, Utah 84112

Continuation-in-part of Ser. No. 220,544, Jul. 18, 1988. This application Aug. 10, 1988, Ser. No. 231,133

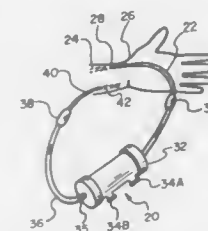
Int. Cl. A61M 37/00

U.S. Cl. 604-5

5 Claims

1. A method of simultaneously depleting essential amino acids, nonessential amino acids, and folate from a fluid comprising:

shunting said fluid through means for altering the chemical structure of the essential amino acids, nonessential amino



acids, and folates thus depleting said essential amino acids, nonessential amino acids, and folates from said fluid.

**4,955,858**  
**URETER DRAIN CATHETER RELEASABLY CLAMPED TO AN ADVANCING TUBE**

Kurt Drews, Oststeinbek, Fed. Rep. of Germany, assignor to Uromed Kurt Drews GmbH, Oststeinbek, Fed. Rep. of Germany

Filed Sep. 12, 1989, Ser. No. 406,231  
Claims priority, application Fed. Rep. of Germany, Nov. 2, 1988, 3837196

Int. Cl. A61M 25/01

U.S. Cl. 604-8

3 Claims



1. A ureter drain catheter and positioning assembly comprising  
a flexible ureter drain catheter having an open proximal end and inner and outer substantially cylindrical surfaces;  
an advancing tube having an open distal end terminating in a cross sectionally reduced neck with an outer diameter smaller than the inner diameter of said drain catheter so that said distal end is insertable into the proximal end of said ureter drain catheter, and  
a mandrin insertable through said advancing tube and into said neck, said mandrin having an outer diameter greater than the inner diameter of said neck such that neck is clamped between said mandrin and said inner surface of said drain catheter and said mandrin is substantially centrally positioned in said catheter without making contact with said inner surface of said catheter.

**4,955,859**  
**HIGH-FRICTION PROSTATIC STENT**  
Serge Zilber, Conyers, Ga., assignor to C. R. Bard, Inc., Murray Hill, N.J.

Filed Jul. 7, 1989, Ser. No. 376,822

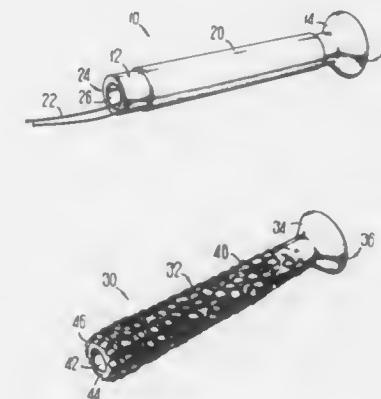
Int. Cl. A61M 5/00

U.S. Cl. 604-8

6 Claims

1. An apparatus for the nonsurgical management of bladder outlet obstruction, comprising:  
an elongated body having an exterior surface, said body having first and second ends and defining a passage there-through, said body being dimensioned to be received within a prostatic urethra and having a length sufficient to extend only from a bladder neck approximately to a verumontanum, and said body comprising an inner member of silicone rubber having a durometer hardness of about 80 on the Shore A scale and a concentric outer member of silicone rubber having a durometer hardness of about 40 on the Shore A scale, said outer member being bonded to

said inner member, and said concentric outer member having an exterior surface comprising said exterior surface of said body;  
said body being sufficiently flexible to accommodate an anatomical bend of said prostatic urethra and sufficiently stiff to maintain patency of said passage in response to accommodation of said anatomical bend of said prostatic urethra and in response to constrictive forces exerted by an enlarged prostate surrounding said prostatic urethra; and



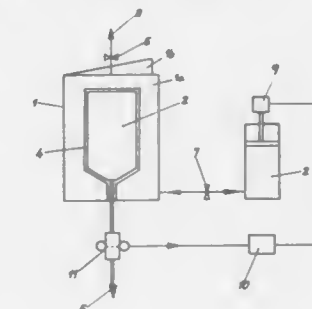
high friction means on said exterior surface of said body for frictionally engaging the walls of said prostatic urethra to prevent said apparatus from migrating proximally; whereby when said apparatus is positioned within said prostatic urethra with said first end disposed at said bladder neck and said body extending approximately to said verumontanum, said body provides support to said prostatic urethra to ensure patency thereof.

**4,955,860**  
**VOLUMETRIC PUMP FOR PARENTERAL PERFUSION**  
Miguel M. Ruano, c/o Dr. Moliner No. 2-10, Valencia, Spain 46010

Filed Apr. 11, 1988, Ser. No. 180,067  
Claims priority, application Spain, Apr. 9, 1987, 8701025  
Int. Cl. A61M 5/00

U.S. Cl. 604-67

3 Claims



1. Apparatus for parenteral perfusion of a liquid to a patient from a perfusion bag having an outlet tube, said apparatus comprising a rigid housing defining an interior chamber for receiving a perfusion bag in a gas-tight manner, a perfusion bag within said chamber so that said chamber defines an enclosed space surrounding said bag, said bag having an outlet tube extending from said chamber, suction means for evacuating



said space, a volumetric fluid pump, connection means between said pump and said housing for filling said space with pressurized fluid received from said pump for applying pressure on said bag to produce perfusion of liquid in said bag through said tube, means for controlling the rate of fluid flow from said pump into said space to control the perfusion rate, and sensor means for sensing the amount of liquid administered to the patient through the outlet tube and operatively connected to said means for controlling the rate of fluid flow from said pump into said space.

4,955,861

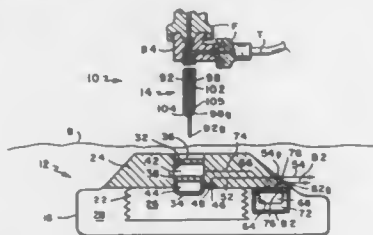
**DUAL ACCESS INFUSION AND MONITORING SYSTEM**  
Bradley J. Enegren, Norfolk; Gerald S. Melsky, Lexington, and Frank R. Prosl, Duxbury, all of Mass., assignors to Therox Corp., Walpole, Mass.

Filed Apr. 21, 1988, Ser. No. 184,352

Int. Cl. A61M 1/00

U.S. Cl. 604—141

11 Claims



1. A dual access infusion or monitoring system comprising in combination

A. implantable apparatus having

1. a biocompatible hermetically sealed housing,
2. an inlet passage extending into said housing from an exterior surface thereof, said passage having an outer end adjacent to said housing surface and an inner end located inside the housing,
3. needle stop means at the inner end of said passage;
4. a plurality of needle-penetrable, self-sealing septa mounted in said passage at selected different spacings from said needle stop thereby to divide said passage into a plurality of aligned segments; and
5. means defining separate fluid outlets from said passage segments,
6. an infusate pump inside the housing in fluid communication with one of said housing passage segment fluid outlets,
7. a catheter extending out of said housing, said catheter having at least one lumen for conducting fluid from said pump to an infusion site, and
8. a first fluid outlet in the housing for conducting fluid from said pump to said catheter, and

B. fluid injection means including

1. a plurality of tubes having proximal and distal ends and separate axial lumens therebetween, the number of tubes in the injection means corresponding to the number of passage segments in the implantable apparatus housing,
2. hub means mounted to the proximal ends of said tubes,
3. means defining separate fluid passages in said hub means extending from different surface locations on the hub means to the lumens of different ones of said tubes, and
4. means in said tubes defining outlets from said tube lumens, the axial spacings of said outlets along said injection means corresponding substantially to the spacings of said housing passage segments in said implantable apparatus so that when the injection means are inserted through said septa into said housing passage until the injection means bottom on said needle stop means, said tube outlets are positioned in different ones of said passage segments so that they are isolated from one another and from the atmosphere by at least one

septum whereby separate fluid-tight fluid paths exist between said hub means surface locations and said housing passage segment outlets.

4,955,862

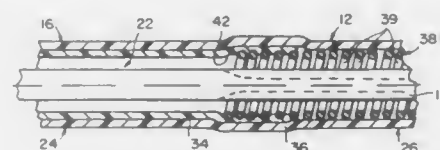
**CATHETER AND CATHETER/GUIDE WIRE DEVICE**  
Ivan Sepetka, Mountain View, Calif., assignor to Target Therapeutics, Inc., San Jose, Calif.

Filed May 22, 1989, Ser. No. 355,500

Int. Cl. A61M 25/01

U.S. Cl. 604—164

17 Claims



1. A catheter for use in combination with a guide wire for accessing a target site in an internal body tissue along a tortuous, small-vessel pathway within the tissue, said catheter comprising

an elongate tubular member having proximal and distal ends, and an inner lumen extending between these ends, with a diameter which is no greater than about 40 mils, said member including relatively flexible distal segment means at least about 5 cm long adapted for tracking the wire along such tortuous path, said distal segment means being composed of:

- (i) a flexible outer polymer tube, and
- (ii) flexible surface means embedded in the inner surface of the outer polymer tube providing a surface made up of disjoint, relatively non-deformable surface regions arranged to provide uninterrupted contact with a guide wire, as the distal segment of the catheter is advanced over a looped or bent region of a guide wire, allowing the distal segment to be advanced, by remote axial force, over a looped smooth-surfaced guide wire whose loop diameter is substantially smaller than that of the smallest loop over which a flexible polymer tubing having a smooth inner wall surface can be advanced by remote axial force.

4,955,863

**ADJUSTABLE CATHETER ASSEMBLY**

Jack M. Walker, Portola Valley, and Nell J. Sheehan, Palo Alto, both of Calif., assignors to Menlo Care, Inc., Palo Alto, Calif.

Continuation of Ser. No. 120,062, Nov. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 826,439, Feb. 5, 1986, Pat. No. 4,728,322. This application Jun. 12, 1989, Ser. No. 366,268

The portion of the term of this patent subsequent to Mar. 1, 2005, has been disclaimed.  
Int. Cl. A61M 5/00

U.S. Cl. 604—165

36 Claims



1. A catheter assembly, comprising:

a cannula having a distal end portion, a proximal end portion, and a longitudinal duct therethrough from the distal end portion to the proximal end portion;

a needle having a distal and a proximal end and having a

sharpened insertion tip at the distal end, the needle being positioned within the distal end portion of the longitudinal duct of the cannula with the insertion tip extending beyond the distal end of the cannula;

a catheter inserter having inserter distal and proximal ends and having a cannula guide channel extending from the inserter distal end to the inserter proximal end, the cannula being positioned in slidable relationship through the channel such that the distal end portion of the cannula extends beyond the distal end of the channel; and

a means for selectively restricting the cannula and needle from sliding relative to the channel;

material which when inserted into a body of a living subject and maintained therein:

- (a) softens with a softening ratio of at least about 2:1; and/or
- (ii) swells with a swelling ratio of at least about 1.3:1;
- (b) has a tensile energy to break of at least about 700 N-cm/cm<sup>2</sup>; and
- (c) has a 2.5% Secant modulus of less than about 7,000 N/cm<sup>2</sup>.

4,955,864

**TUBE HOLDING CLAMP**

James D. Hajduch, 1703 Caroline Ave., Whiting, Ind. 46394

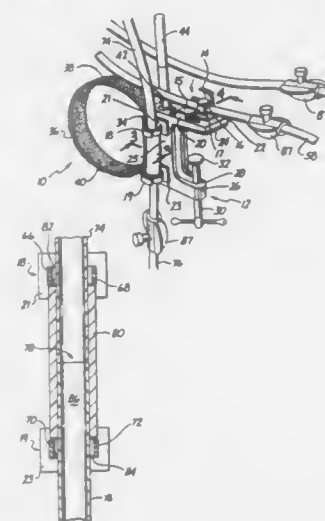
Continuation-in-part of Ser. No. 637,019, Aug. 2, 1984,

abandoned. This application Oct. 4, 1989, Ser. No. 416,876

Int. Cl. A61M 39/00

U.S. Cl. 604—174

20 Claims



1. An apparatus useful for holding a segment of hollow tubing comprising: clamp housing means; and clip means secured to said clamp housing means, said clip means being sized and adapted to be opened to accept a segment of hollow tubing and to be closed around the segment of hollow tubing without substantially changing the cross-sectional shape of the segment of hollow tubing and substantially without frictionally contacting the segment of hollow tubing.

4,955,865

**NEEDLE UNSHEATHING, RESHEATHING AND HANDLING APPARATUS**

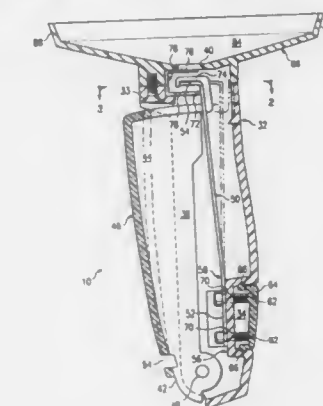
Erie L. Steimer, Denver, and Arthur J. Sable, Boulder, both of Colo., assignors to On-Gard Systems, Inc., Denver, Colo.

Filed Jan. 18, 1989, Ser. No. 298,619

Int. Cl. A61M 5/32

U.S. Cl. 604—192

18 Claims



1. An apparatus for selectively retaining a needle sheath comprising:

a housing;

a gripping portion at least partially defined by said housing and adapted to be gripped by the hand of a user; and retaining means positioned at least partially within said housing and comprising an external portion that partially defines said gripping portion and that is of a longitudinal length sufficient to allow at least the majority of a user's hand to apply pressure thereto for selectively engaging and disengaging a sheath when said gripping portion is gripped transversely by the user.

4,955,866

**HYPODERMIC NEEDLE RECAPPING DEVICE**

George A. Corey, Duluth, Minn., assignor to University of Florida, Gainesville, Fla.

Continuation-in-part of Ser. No. 259,894, Oct. 19, 1988,

abandoned. This application May 16, 1989, Ser. No. 352,198

Int. Cl. A61M 5/32

U.S. Cl. 604—192

29 Claims



1. A recapping device for use with a medical device including a needle or needle-like device having a proximal end secured to said medical device and a distal end terminating in a needle tip, said recapping device comprising shield means for shielding said distal needle end tip, said shield means comprising:

- a hollow sleeve adapted to encircle a portion of said needle, a distal end opening of said hollow sleeve having means for enclosing said opening in said hollow sleeve at said distal end, said enclosing means having an aperture therein adapted to permit the distal needle end tip to slide therethrough, said sleeve being freely slidably movable along said needle between a first position on said needle, said first position being characterized by said distal end tip of said needle projecting through said aperture at said distal end of said sleeve for a distance sufficient to enable use of said medical device and a second position on said needle being characterized by said distal needle end tip

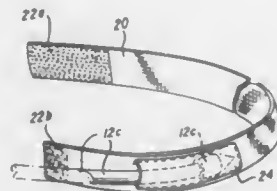
being enclosed within said sleeve and said enclosure means at said distal end of said hollow sleeve; and  
b. tether means for securing said sleeve to said medical device and for permitting substantially free slidable movement of said hollow sleeve along said needle from said first position to said second position, without said tether means exerting a biasing force on said sleeve toward either said first position or toward said second position.

**4,955,867**  
**PERITONEAL DIALYSIS CATHETER PROTECTOR BELT**

Walter Y. Endo, 3515 S. Wellington Rd., Los Angeles, Calif. 90016

Filed May 12, 1989, Ser. No. 350,774  
Int. Cl.<sup>5</sup> A61M 5/32  
U.S. Cl. 604—179

6 Claims



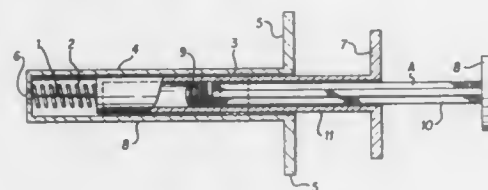
1. A article for retaining and protecting the protruding end of a peritoneal dialysis catheter comprising: a flexible belt adapted to extend around the waist of a patient having the end of a peritoneal dialysis catheter protruding from the abdomen, the belt being adapted to be positioned on the abdomen adjacent to the protruding end of the catheter, said belt having an inner side and an outer side; and a pouch affixed to the outer side of the belt and extending longitudinally along the belt, said pouch having an open end for receiving the protruding end of the catheter, and said pouch having a closed end, said pouch serving to retain the end of the catheter within the pouch.

**4,955,868**  
**DISPOSABLE SAFETY MEDICAL SYRINGE**  
Edward Klein, 2 Professional Dr. Ste. 232, Gaithersburg, Md. 20879

Continuation of Ser. No. 279,254, Nov. 28, 1988, abandoned, which is a continuation of Ser. No. 122,679, Nov. 19, 1987, abandoned. This application Oct. 4, 1989, Ser. No. 418,819  
Int. Cl.<sup>5</sup> A61M 5/32

U.S. Cl. 604—198

1 Claim



1. A shield for use with a conventional unitary hypodermic syringe having a tubular body, piston and needle comprising a unitary cylindrical jacket of fixed length for enclosing and holding said hypodermic syringe partially within said jacket, said jacket having a constricted opening at one end for passage of the hypodermic needle of said syringe in response to displacement of the syringe within said jacket and being open at its other end to permit emplacement of said syringe so that the syringe piston and the portion of the syringe body proximate thereto extend beyond said jacket and such that movement of said syringe piston in either direction within the tubular body

of the syringe is independent of either said jacket or movement of the syringe body within said jacket, resilient spring means disposed within said jacket proximate to said constricted opening and around said syringe needle for maintaining said syringe in a retracted position within said jacket but permitting said unrestricted longitudinal displacement of the syringe in either direction within the jacket to cause passage of the needle through said constricted opening in the unitary jacket.

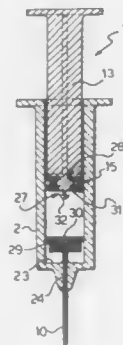
**4,955,869**  
**DISPOSABLE SAFETY SYRINGE WITH A HYPODERMIC NEEDLE**

Valter Bin, Bruino, Italy, assignor to Vabin International S.r.l., Cuneo, Italy

Filed Feb. 3, 1989, Ser. No. 305,925  
Claims priority, application Italy, Feb. 4, 1988, 67077 A/88  
Int. Cl.<sup>5</sup> A61M 5/32

U.S. Cl. 604—195

7 Claims



1. A disposable safety syringe, comprising:  
a syringe body;  
a plunger engageable with said body for sliding movement within said body;  
a hypodermic needle having an extended position outside said body and a retracted position within said body;  
an engagement peg formed at one end of said plunger;  
a supporting pad, for supporting said needle, arranged within said body for axial movement within said body, said pad having an engagement seat formed therein for engagement with said peg; and  
an elastically yielding seal mounted to said one end of said plunger;  
wherein said elastically yielding seal applies an elastic pressure to said needle when said needle is retracted into said body for biasing the needle out of alignment with the longitudinal axis of the needle when the needle is in an extended position.

**4,955,870**  
**HYPODERMIC SYRINGE WITH RETRACTABLE NEEDLE**

Kristen A. Ridderhelm, 8508 Gerig Rd., Leo, Ind. 46765; V. Widadi Sudharto, 6825-G Ramblewood Dr., Fort Wayne, Ind. 46835, and Alice F. Ridderhelm, 8508 Gerig Rd., Leo, Ind. 46765

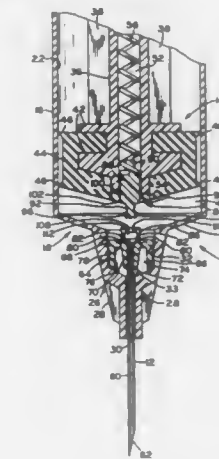
Filed Aug. 23, 1988, Ser. No. 235,437  
Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—195

33 Claims

1. A hypodermic syringe comprising:  
a barrel having a closed end, an open end, and an interior surface;  
a plunger reciprocally received in said barrel through said open end in sealing engagement with said interior surface of said barrel and forming a chamber;  
a hollow needle detachably attached to said barrel at said

closed end thereof providing communication between said chamber and the exterior of said barrel and where-through liquid in said chamber may be injected;  
means for forming a hole in said plunger for receiving said needle therethrough;



biasing means connected to said plunger and attachable to said needle for drawing said needle through said plunger hole when said needle is detached from said barrel; and, wherein said needle is detached from said barrel by a predetermined substantially longitudinal force.

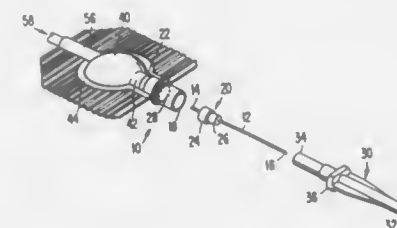
**4,955,871**  
**SINGLE-USE DISPOSABLE SYRINGE**  
Ronny D. Thomas, Bellevue, Wash., assignor to PATH, Seattle, Wash.

Continuation-in-part of Ser. No. 44,054, Apr. 29, 1987, abandoned, and a continuation-in-part of Ser. No. 199,612, May 27, 1988, Pat. No. 4,883,473. This application Jun. 1, 1989, Ser. No. 360,125

The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> A61M 5/18, 5/32

U.S. Cl. 604—217

24 Claims



1. A single-use disposable syringe for providing a medication for injection into a patient, the syringe comprising:  
needle assembly means for injecting the medication into the patient; and  
reservoir means for storing the medication and for expelling the medication into the needle assembly means, the reservoir means including two sheets of thermoplastic material, wherein each of the two thermoplastic sheets is comprised of an expanded central portion, an expanded injection neck portion, an expanded filling neck portion, and a substantially flat peripheral portion, in which the substantially flat peripheral portions of the two sheets of thermoplastic material are opposite and coextensive to each other and are sealed together face-

to-face, and the expanded central portions are opposite and coextensive to each other, to form a reservoir for storing the medication,

in which the expanded injection neck portions extend from the expanded central portions to a first end of each sheet, and are opposite and coextensive to each other, to form an injection port extending from the reservoir and connected to the needle assembly means for directing the medication from the reservoir to the needle assembly means, and

in which the expanded filling neck portions extend from the expanded central portions to a second end of each sheet, and are opposite and coextensive to each other, to form a filling port extending from the reservoir for filling the reservoir with the medication;

wherein the expanded central portions are compressible, and in response to complete compression of both of the central portions together, the reservoir substantially collapses to prevent the reservoir from being reformed and to expel the medication out of the reservoir;

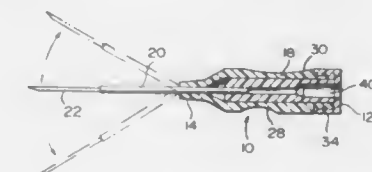
wherein in response to partial compression of both of the central portions together, the reservoir partially collapses to expel some of the medication out of the reservoir; and wherein the central portions, after partial compression of both of the central portions together and partial collapse of the reservoir, expand to reform the reservoir and to draw fluid into the reservoir, thereby aspirating the needle assembly means.

**4,955,872**  
**INTRAVENOUS NEEDLE AND HOLDER ASSEMBLY**  
James Callaway, 300 25th Ave. North, Nashville, Tenn. 37203

Continuation-in-part of Ser. No. 62,584, Jun. 16, 1987, abandoned. This application Feb. 24, 1989, Ser. No. 314,789  
Int. Cl.<sup>5</sup> B61M 5/158

U.S. Cl. 604—273

20 Claims



1. An intravenous needle and holder assembly having an outer case, an intravenous needle for receipt in the outer case with at least a part of the needle projecting from a forward end of the case, and adjustment means attached to a back end of the needle for selectively establishing an insertion orientation of the assembly having a substantially rigidified junction between the needle and the case effectively preventing lateral movement of the case, relative to the needle, and an administration orientation of the assembly having a flexible junction between the needle and the case allowing lateral movement of the case relative to the needle.

**4,955,873**  
**STABILIZING SUPPORT STAND**  
Jack Rajlevsky, Rego Park, N.Y., assignor to Pfizer Hospital Products Group, Inc., New York, N.Y.

Filed May 6, 1988, Ser. No. 190,795  
Int. Cl.<sup>5</sup> A61M 1/00

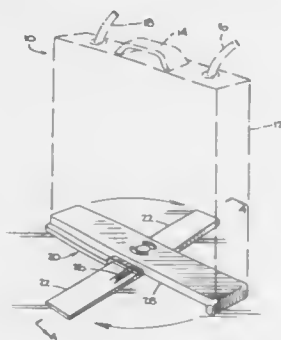
U.S. Cl. 604—322

14 Claims

1. A stand particularly suitable for use in stabilizing a drainage receptacle designed and configured to receive and collect fluids from a patient comprising a pedestal with means for nondetachable coupling to a box of said receptacle and adapted

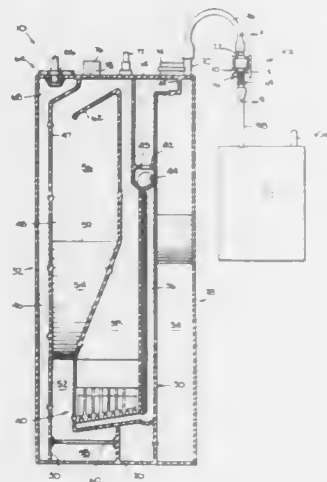


for deployment in a position for stabilizing said receptacle against upset, and means of unitary structure formed in a sur-



face of said pedestal for positively mechanically locking said pedestal at said receptacle stabilizing position.

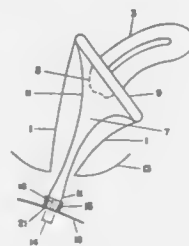
**4,955,874**  
**DRAINAGE DEVICE**  
Quinton J. Farrar; Frederick A. Everett, Jr., both of Lakeville, Mass., and Richard H. Heimann, Flushing, N.Y., assignors to Pfizer Hospital Products Group, Inc., New York, N.Y.  
Filed Sep. 27, 1988, Ser. No. 249,808  
Int. Cl.<sup>5</sup> A61M 1/00  
U.S. Cl. 604—319 40 Claims



1. A drainage device comprising
  - a housing;
  - at least one inlet in said housing adapted to be connected to a patient for draining fluids from said patient;
  - at least one outlet in said housing adapted to be connected to a source of suction;
  - at least one collection chamber formed within said housing for receiving said fluids; and
  - a suction control chamber formed within said housing and having a vertical longitudinal axis and adapted to receive a predetermined volume of liquid for regulating the degree of vacuum imposed in said collection chamber, means for connecting said suction control chamber with ambient, said suction control chamber being in fluid flow communication with said collection chamber and including
    - a minor arm portion;
    - a major arm portion; and
    - a passageway proximate a first end of said major arm portion connecting said arm portions and providing fluid flow

communication there between, with at least a segment of said major arm portion, having more than one upwardly diverging wall with respect to said axis and being downstream of said small arm, being designed and configured generally of funnel shape in full transverse sections along said axis.

**4,955,875**  
**CATAMENIAL APPLIANCE**  
Charlene G. Knowles, 1216 Pear Orchard Rd., Elizabethtown, Ky. 42701  
Continuation-in-part of Ser. No. 96,514, Sep. 11, 1987, Pat. No. 4,799,929, which is a continuation-in-part of Ser. No. 948,104, Dec. 31, 1986, abandoned, which is a continuation-in-part of Ser. No. 723,466, Apr. 15, 1985, abandoned. This application Jan. 23, 1989, Ser. No. 300,817  
Int. Cl.<sup>5</sup> A61F 5/44  
U.S. Cl. 604—331 4 Claims

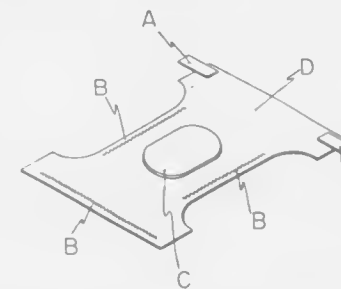


1. A Catamenial appliance comprising:
  - flexible ring means insertable into the vagina of a female and adaptable to surround the cervix of said female, said flexible ring means being biased to expand slightly outwardly after insertion over said cervix and having a relatively small cross-sectional area whereby contact with the vaginal walls of said female is limited to a generally narrow band of contact defined by the outer periphery of said small cross-sectional area of said flexible ring means, collecting sheath means attached to said flexible ring means and extending downwardly therefrom to contain and direct menstrual fluids downwardly from said cervix through said vagina of said female, said sheath means at its distal end including a radially extending small self-collector adapted to lie substantially within the vulvar space of said female.

**4,955,876**  
**BILI BOTTOM DIAPERS**  
Patricia M. Millner, Brainerd, Minn., assignor to The Pennsylvania Research Corporation, University Park, Pa.  
Filed Feb. 29, 1988, Ser. No. 138,879  
Int. Cl.<sup>5</sup> A61F 13/16  
U.S. Cl. 604—385.2 5 Claims

1. A disposable phototherapy diaper intended primarily to maximize the surface area of a newborn infant exposed to phototherapy light to counteract a condition known as hyperbilirubinemia comprising:
  - a sheet of flexible material permeable to an amount of biologically effective phototherapy light sufficient to reduce the concentration of bilirubin in the skin of the infant, which sheet of flexible material, when oriented in two planes prior to use, extends longitudinally between first and second ends, said first and second ends being relatively broad, extending, laterally, between left and right tabs, respectively, and having a laterally narrowed region intermediate said ends such that, when worn by the infant, said first end is contiguously receivable on the front of the infant, said second end is contiguously received on the back of the infant, and said narrowed region overlies the

crotch of the infant, said narrow region being defined between laterally opposed edges which are tapered convergently from said left and right tabs of said first end to said narrowed region then divergently from said narrowed region to said left and right tabs of said second end so as to closely conform to the shape of the infant; fastening means from joining said first and second tabs of



said first end, respectively, to said first and second tabs of said second end when said diaper is worn by the infant; and  
a pad of absorbent material having a size strictly coextensive with the crotch of the infant to receive and hold liquid, including urine, excretions, said flexible material in the narrowed region simultaneously serving to receive and hold bowel excretions from the infant.

**4,955,877**  
**AUTOTRANSFUSION BAG**  
Robert J. Kurtz, New York, and Joseph LiCausi, Port Jefferson Station, both of N.Y., assignors to BioResearch, Inc., Farmingdale, N.Y.  
Filed Oct. 6, 1989, Ser. No. 418,151  
Int. Cl.<sup>5</sup> A61M 5/00  
U.S. Cl. 604—408 4 Claims



1. An autotransfusion bag comprising a pair of semirigid substantially flat side wall shells having top, bottom and side edges, a flexible bag, outer surfaces of the bag being secured to inner surfaces of said semirigid sidewall shells, said flexible bag having a width substantially equal to the width of the semirigid sidewall shells so that the side edges of the pair of sidewalls are maintained in closely spaced relationship and the flexible bag having a length substantially greater than the length of the semirigid sidewall shells whereby when the semirigid sidewall shells are substantially flat, end portions of the flexible bag extend beyond the top and bottom edges of the

semirigid sidewalls, and means extending across at least one of said top and bottom edges of said semirigid sidewall shells for retaining said sidewall shells in an outwardly curved shape to expand said flexible bag with the end portions of the flexible bag disposed between the top and bottom edges of the semirigid sidewall shells and with the side edges of the pair of sidewall shells being in closely spaced relationship.

**4,955,878**  
**KIT FOR PREVENTING OR TREATING ARTERIAL DYSFUNCTION RESULTING FROM ANGIOPLASTY PROCEDURES**  
Jackie R. See, Fallerton, and William E. Shell, Los Angeles, both of Calif., assignors to Biotechnology, Inc., Los Angeles, Calif.  
Continuation-in-part of Ser. No. 848,233, Apr. 4, 1986, Pat. No. 4,820,732, which is a continuation-in-part of Ser. No. 784,160, Oct. 4, 1985, abandoned. This application Dec. 8, 1988, Ser. No. 281,430  
Int. Cl.<sup>5</sup> A61M 5/00 15 Claims

1. A kit containing a combination of components for preventing or treating arterial dysfunction resulting from angioplasty procedures, said kit containing:
  - (a) a first container comprising about 25 to about 200 nanograms of a prostaglandin E<sub>1</sub> or a prostaglandin pharmacologically equivalent thereto for bolus injection into an artery of a patient;
  - (b) a second container comprising a prostaglandin E<sub>1</sub> or a prostaglandin pharmacologically equivalent thereto for intravenous administration after said bolus injection sufficient to provide 10 to about 100 nanograms per kilogram of body weight per minute over at least a 6 hour period;
  - (c) a chart cross-referencing an amount of said prostaglandin from said second container to body weights to be admixed with a saline solution to prepare a dosage amount of about 10 nanograms to about 100 nanograms per kilogram of body weight per minute.

**4,955,879**  
**URINARY DRAINAGE DEVICE**  
Jeanne A. Mervine, Chicago, Ill., assignor to Rehabilitation Institute of Chicago, Chicago, Ill.  
Continuation-in-part of Ser. No. 28,350, Mar. 20, 1987, abandoned. This application Dec. 7, 1988, Ser. No. 281,909  
Int. Cl.<sup>5</sup> A61M 1/00 4 Claims



1. A urinary drainage device adapted for wear by male or female patients with indwelling or external catheters, said device comprising:
  - a flexible container having a first end and a second end connected along a transverse line, said container being foldable along said transverse line into a pair of chambers of substantially equal size along said transverse line; means for connecting said container to an indwelling or external catheter, said means being connected to said first

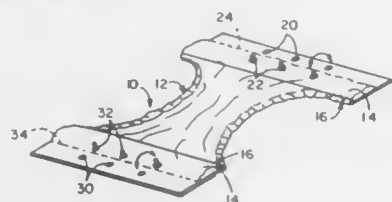
end on said container, said means being fluidwise connected to only one of said chambers when said container is folded along said transverse line; and means for draining said container, said means being fluidwise connected to only the same chamber as the means for connecting when said container is folded along said transverse line, wherein when folded and in use the first and second ends and the means for connecting are at an uppermost position and the means for draining is at a lowermost position.

**4,955,890**  
**REUSABLE DIAPER PANT WITH DISPOSABLE LINER**  
Renee L. Rodriguez, N. 11604 Howard Ct., Spokane, Wash. 99218

Filed Feb. 24, 1989, Ser. No. 314,785  
Int. Cl.<sup>5</sup> A61F 13/15

U.S. Cl. 604—393

2 Claims



1. A diaper, comprising:  
an impervious pant in the form of a sheet having elasticized leg side edges extending between opposed waistband ends and including opposed inside and outside surfaces extending along its complete length;  
the waistband ends each including a fold extending across the pant between its leg side edges, each fold including an outer section and an inner section separated from the outer section by a fold line;  
female snap members on the inside surface of the sheet at one of the inner or outer sections at each of the opposed waistband ends;  
male snap members on the inside surface of the pant at the remaining one of the inner or outer sections at each of the opposed waistband ends for engagement with the female snap members;  
an elongated absorbent liner having side edges extending between opposed transverse ends, each transverse end of the liner having openings formed through it for receiving the male snap members on the pant;  
the liner including adhesive means along one surface for securing the liner to the inside surface of the pant;  
whereby the outer sections of the pant are foldable over its inner sections to completely cover and sandwich the transverse ends of the liner between them with the female and male snap members engaging one another through the openings in the liner and with the engaged snap members covered by the folded outer and inner sections of the pant.

**4,955,881**  
**RUMINANT DISPENSING DEVICE**  
James B. Eckenhoff, Los Altos, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Division of Ser. No. 126,460, Nov. 27, 1987, Pat. No. 4,871,544, which is a division of Ser. No. 42,197, Apr. 24, 1987, and a continuation of Ser. No. 766,456, Aug. 16, 1985, Pat. No. 4,704,148. This application Jul. 25, 1989, Ser. No. 384,613 has been disclaimed.

Int. Cl.<sup>5</sup> A61K 9/22

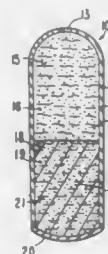
U.S. Cl. 604—890.1

9 Claims

1. A delivery system for delivering a beneficial agent formu-

lation to an environment of use, the delivery system comprising:

- (a) a wall surrounding and forming an internal compartment, the wall comprising in at least a part of composition permeable to the passage of fluid present in the environment of use;
- (b) a beneficial agent in the compartment, said beneficial agent a member selected from the group consisting of antihypertensive, anthelmintics, antibiotic, anti-infectious, antiparasitic, antimicrobial and anti-flea beneficial agents;



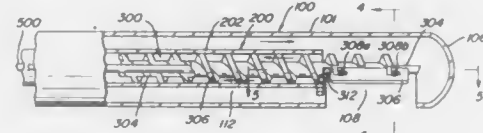
- (c) exit means in the wall for connecting the internal compartment with the exterior of the delivery system for delivering the beneficial agent to the environment of use;
- (d) means in the compartment for occupying an increasing amount of area in the compartment for urging the beneficial agent through the exit means in the wall for delivering the beneficial agent over time; and,
- (e) density means possessing a specific gravity greater than the specific gravity of fluid present in the environment of use present in means (d) for increasing the density of means (d).

**4,955,882**  
**LASER RESECTOSCOPE WITH MECHANICAL AND LASER CUTTING MEANS**  
Said I. Hakky, 8547 Merrimoor Blvd. East, Largo, Fla. 34647-3145

Filed Mar. 30, 1988, Ser. No. 175,014  
Int. Cl.<sup>5</sup> A61B 17/36

U.S. Cl. 606—14

17 Claims



1. A surgical apparatus for cutting organic tissue, said apparatus comprising:  
mechanical cutting means for cutting and removing said tissue;  
sheath means surrounding said mechanical cutting means for enclosing said mechanical cutting means therein; and  
laser means extending through said sheath means for cutting said organic tissue.

**4,955,883**  
**GLAUCOMA NEEDLE WITH A THERMAL HEAT BAND**  
Herbert J. Nevyas, Narberth, and Michael H. Loughnane, Philadelphia, both of Pa., assignors to Diversatronics, Broomall, Pa.

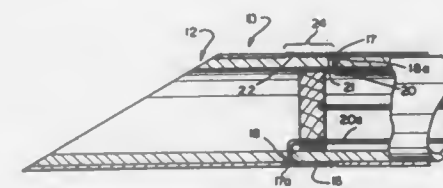
Filed Aug. 29, 1988, Ser. No. 237,798  
Int. Cl.<sup>5</sup> A61B 17/36

U.S. Cl. 606—28

18 Claims

1. A surgical glaucoma needle comprising:

an elongated needle having a sharp point at one end and an outer surface extending away from the one end; electrically actuated thermal means extending along only a portion of the outer surface proximal the one end for



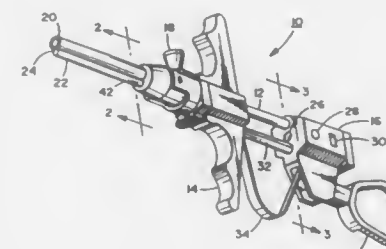
creating a discrete, thermal heat band on the outer surface of the needle proximal the one end; and electrical connectors for connecting said electrically actuated thermal means to a power supply.

**4,955,884**  
**SYSTEM FOR REDUCING DRAG ON THE MOVEMENT OF AN ELECTRODE IN A RESECTOSCOPE**  
Benedetto Grossi; Raymond Ainger, III, both of Stamford, Conn., and Richard P. Muller, Bronx, N.Y., assignors to Circon Corporation, Santa Barbara, Calif.

Filed Jun. 2, 1988, Ser. No. 201,667  
Int. Cl.<sup>5</sup> A61B 17/36

U.S. Cl. 606—46

18 Claims



1. A system for reducing resistance on the movement of an electrode having a distal end and a shaft in a resectoscope working element, the system comprising:  
electrode sheath means comprising a substantially enclosed tube having an open distal end and a proximal end for axial movement of the electrode therein, said distal end having a dimension which permits the electrode to be passed therethrough;  
means for substantially sealing said sheath means proximate said proximal end; and  
means positioned adjacent the path defined by axial movement of the shaft of the electrode for exiting fluids during axial movement of the shaft of the electrode thereacross, other than at said open distal end, from said electrode sheath.

**4,955,885**  
**SURGICAL SLIDER INSTRUMENT AND METHOD OF USING INSTRUMENT**  
John E. Meyers, Columbia City, Ind., assignor to Zimmer, Inc., Warsaw, Ind.

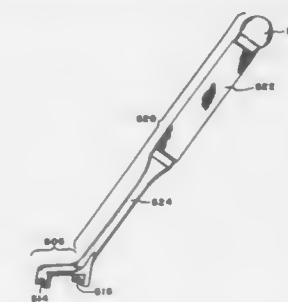
Filed Dec. 21, 1988, Ser. No. 287,244  
Int. Cl.<sup>5</sup> A61F 2/00

U.S. Cl. 606—53

10 Claims

1. A surgical instrument for maneuvering a slideable member along an elongated rod, the instrument including a distal tip and a single-membered, nonpivotal elongated handle extending therefrom, the tip including first and second extending members spaced apart from each other and rigidly connected by an

interconnecting portion therebetween, thus providing a cavity having fixed, nonadjustable spacing between the first and second extending members for receiving the slideable member,



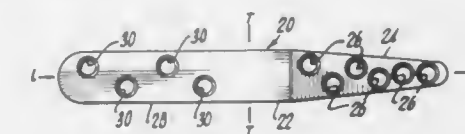
and wherein the first and second extending members each have a side which includes a recess extending into the extending member.

**4,955,886**  
**DUAL-TAPER, ASYMMETRIC HOLE PLACEMENT IN RECONSTRUCTION AND FRACTURE PLATES**  
Robert J. Pawluk, Montvale, N.J., assignor to The Trustees of Columbia University in the City of New York, New York, N.Y.

Filed Apr. 1, 1988, Ser. No. 176,651  
Int. Cl.<sup>5</sup> A61F 5/04

U.S. Cl. 606—69

9 Claims

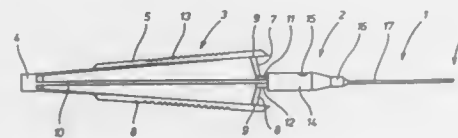


1. A reconstruction or fracture plate for bridging a discontinuity in a long bone of a patient comprising:  
a longitudinal axis for placement generally in alignment with a long axis of the long bone;  
a transversal axis perpendicular to the longitudinal axis;  
a central portion for placement over the bone discontinuity;  
a first end portion for abutting placement against the long bone on one side of the bone discontinuity, the first end portion having a dual-tapered width and thickness profile for decreasing plate cross section and increasing plate flexibility along the longitudinal axis away from the central portion and the first end portion defining a first plurality of screw holes for receipt of bone screws, each hole having a central axis; and  
a second end portion for abutting placement against the long bone on a second side of the bone discontinuity, defining a second plurality of screw holes for receipt of bone screws, each having a central axis;  
the first and second plurality of screw holes each having a central axis pattern oriented relative to the plate longitudinal and transversal axes with plate taper and the distribution and orientation of the screw holes chosen to maintain bone screw bending strain direction and magnitude within limitations which reduce the likelihood of screw failure during the patient's bone healing process.



**4,955,887**  
**OPTICAL SURGICAL INSTRUMENT**  
 Mathias Zirm, Innsbruck, Austria, assignor to Storz Instrument Company, St. Louis, Mo.  
 Filed May 11, 1989, Ser. No. 350,464  
 Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816059  
 Int. Cl.<sup>5</sup> A61B 17/32  
 U.S. Cl. 606—107

19 Claims

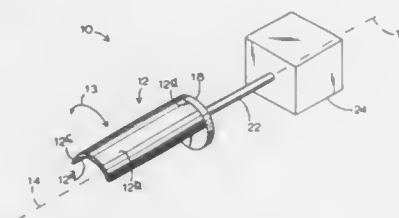


1. An instrument for removal of at least a portion of an intraocular lens from an eye, the intraocular lens having a lens body and at least one haptic member, said instrument comprising:

- a housing member;
- an elongated hollow probe portion connected to the housing member, said probe portion having an opening adjacent its outer end and a stop means;
- holder means positioned in said hollow probe portion and being movable to contact said stop means and to securely hold a haptic member positioned in said opening against said stop means; and
- cutter means positioned in said hollow probe portion and being movable toward said stop means, said cutter means being used to sever a haptic member positioned in said opening against said stop means.

**4,955,888**  
**BIRADIAL SAW**  
 D. Barclay Slocum, 241 Spy Glass Dr., Eugene, Oreg. 97401  
 Filed Jul. 24, 1989, Ser. No. 383,722  
 Int. Cl.<sup>5</sup> A61B 17/00; A61F 5/00  
 U.S. Cl. 606—82

11 Claims



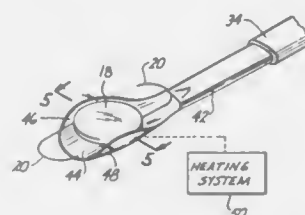
1. A biradial saw blade comprising an elongate, arcuate body having a cutting end, said body including inner and outer arcuate surfaces, each characterized by substantially the same radius of curvature, with each surface curving about an axis offset from the axis of the other surface, which axis substantially parallels the long axis of said body.

**4,955,889**  
**APPARATUS FOR INSERTING A LENS INTO AN EYE AND METHOD FOR USING SAME**  
 Stanley L. Van Gent, Sacramento, Calif., assignor to Allergan, Inc., Irvine, Calif.  
 Filed Feb. 6, 1989, Ser. No. 306,103  
 Int. Cl.<sup>5</sup> A61B 17/00  
 U.S. Cl. 606—107

15 Claims

1. An insertion apparatus for an intraocular lens comprising: an elongated member having opposite ends and including a carrying element at or adjacent one of said ends; said carrying element being adapted to hold an intraocular

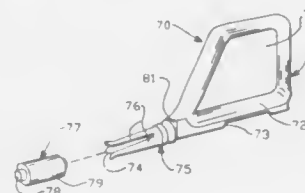
lens and sized and adapted for insertion through an incision into a human eye;  
 said carrying element being constructed of a shape memory material and having an original open configuration in which the carrying element is adapted to receive an intraocular lens;  
 said carrying element being deformable from said original configuration to a folded configuration in which the carrying element is adapted to capture the intraocular lens;



said carrying element returning to said original shape in response to a temperature change whereby inserting of the carrying element through the incision into the eye with the carrying element in said folded configuration and subjecting the carrying element to said temperature change causes the carrying element to return to said original configuration and release the intraocular lens into the eye.

**4,955,890**  
**SURGICAL SKIN INCISION DEVICE, PERCUTANEOUS INFECTION CONTROL KIT AND METHODS OF USE**  
 Ronald K. Yamamoto, and Stanley R. Conston, both of Redwood City, Calif., assignors to Vitaphore Corporation, Menlo Park, Calif.  
 Continuation-in-part of Ser. No. 819,550, Jan. 16, 1986, abandoned. This application Dec. 30, 1987, Ser. No. 139,505  
 Int. Cl.<sup>5</sup> A61B 17/32  
 U.S. Cl. 606—108

7 Claims



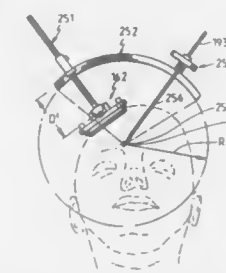
1. An antimicrobial cuff and introducer device for depositing the cuff subcutaneously along a catheter at a guidewire puncture location, comprising:

- (A) an anti-bacterial cuff assembly comprising (a) an anti-bacterial cuff formed of a generally tubular bio-degradable collagen matrix containing an antimicrobial agent and (b) an inner tube or sleeve of silicone elastomer material slidably supporting the antimicrobial cuff and having an inner diameter selected for applying radial compression to a catheter of selected size when inserted therein; and
- (B) a cuff introducer comprising (a) a generally flat, generally rectangular handle having a groove along one edge thereof for releasably threading a guidewire and selected catheter therethrough; and (b) an introducer tube extending from the handle and having (1) a bore therethrough aligned with and communicating with the groove for receiving a guidewire and selected catheter, and (2) an outer diameter selected for releasably mounting the antimicrobial cuff assembly thereon;
- (C) whereby (a) threading a catheter through the groove and introducer tube and antimicrobial cuff assembly; (b)

threading the catheter, introducer tube and antimicrobial cuff assembly along the guidewire and placing the antimicrobial cuff subcutaneously and (c) retracting the introducer leaves the antimicrobial cuff assembly in place on the catheter, allowing tissue in-growth into the antimicrobial cuff, and (d) subsequent removal of the catheter removes the inner tube therewith.

**4,955,891**  
**METHOD AND APPARATUS FOR PERFORMING STEREOTACTIC SURGERY**  
 Mark P. Carol, Tampa, Fla., assignor to Ohio Medical Instrument Company, Inc., Cincinnati, Ohio  
 Continuation-in-part of Ser. No. 751,213, Jul. 2, 1985, Pat. No. 4,805,815. This application Oct. 22, 1987, Ser. No. 111,987  
 Int. Cl.<sup>5</sup> A61B 19/00  
 U.S. Cl. 606—130

28 Claims



1. A method for performing stereotactic surgery with a medical instrument upon a target within a skull, comprising the steps of:

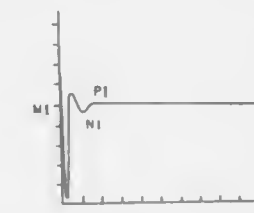
- (a) establishing a first, predetermined geometric relationship between a positioning fixture attached to both the skull and to a support surface upon which the skull is disposed;
- (b) scanning the skull to produce an image of the target within the skull with respect to the positioning fixture;
- (c) transferring at least a portion of the positioning fixture to a phantom fixture and disposing the portion of the positioning fixture from the positioning fixture with respect to the phantom fixture to establish a second, predetermined geometric relationship therebetween, which is identical to the first, predetermined geometric relationship, whereby the slope of the skull where the positioning fixture is attached to the skull is duplicated within the phantom fixture;
- (d) disposing a phantom target within the phantom fixture at a location which corresponds to the location of the target within the skull;
- (e) determining the trajectory and distance of a medical instrument extending from the positioning fixture portion to the phantom target;
- (f) attaching the portion of the positioning fixture upon the skull in the same location it was originally attached to the skull;
- (g) attaching a carrier member, arc member, and instrument guide member to the positioning fixture; and
- (h) inserting the medical instrument through the instrument guide member, whereby the medical instrument will intersect the target in the skull.

**4,955,892**  
**NEURAL CELL ADHESION PROTEIN NERVE PROSTHESIS**  
 Joanne K. Daniloff, Baton Rouge, La., assignor to Louisiana State University, Baton Rouge, La.  
 Filed Oct. 24, 1988, Ser. No. 261,891  
 Int. Cl.<sup>5</sup> A61F 2/02  
 U.S. Cl. 606—152

14 Claims

1. In a process wherein the severed ends of the peripheral nerve of a living mammal, the function of which is to serve a

muscle impaired by the break in the nerve, are directed via the use of an implanted prosthetic device to guide the proximate nerve end toward the distal nerve end to regenerate and repair the nerve the improvement comprising adding neural cell adhesion protein to the severed nerve ends held within said



implanted prosthetic device sufficient to increase the rate of growth of the nerve vis-a-vis an implant device otherwise similar except that it does not contain said neural cell adhesion protein, to regenerate the nerve, and provide greater restitution of the muscle served by the nerve.

**4,955,893**  
**PROSTHESIS FOR PROMOTION OF NERVE REGENERATION**  
 Ioannis V. Yannas, Newton; Dennis P. Orgill, Belmont; Howard M. Loree, II, Cambridge; James F. Kirk, Cambridge; Albert S. P. Chang, Foster City; Borivoje B. Mikić, Cambridge; Christian Krarup, Reading, and Thorkild V. Norregaard, Winchester, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.  
 Continuation-in-part of Ser. No. 191,415, May 9, 1988, abandoned. This application Mar. 23, 1989, Ser. No. 327,530  
 Int. Cl.<sup>5</sup> A61B 17/08; A61F 2/04  
 U.S. Cl. 606—154

34 Claims

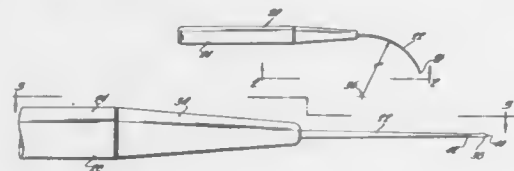
- 1. A prosthetic device for axonal regeneration of nerve tissue, said device comprising a porous, biodegradable template with preferentially oriented pores, made by a method comprising the steps of:
  - a. introducing an aqueous suspension of collagen-glycosaminoglycan into a tubular mold;
  - b. lowering the tube axially into a liquid cooling bath sufficient to freeze the suspension, the lowering being at a rate such that ice crystals oriented parallel to the axis are formed;
  - c. sectioning the mold to provide at least one prosthesis;
  - d. exposing the frozen material to a vacuum under conditions which cause the ice crystals to sublime, thereby forming a regeneration template with preferentially oriented pores having an average pore diameter sufficient for axonal regeneration; and
  - e. providing a means for maintaining contact between the regeneration template and a nerve end.

**4,955,894**  
**POSTERIOR CAPSULOTOMY KNIFE**  
 Wesley K. Herman, Dallas, Tex., assignor to Alcon Laboratories, Inc., Fort Worth, Tex.  
 Continuation of Ser. No. 171,234, Mar. 22, 1988, abandoned, which is a continuation of Ser. No. 32,989, Mar. 27, 1987, abandoned, which is a continuation of Ser. No. 874,798, Jun. 13, 1986, abandoned, which is a continuation of Ser. No. 666,558, Oct. 30, 1984, abandoned. This application Jan. 30, 1989, Ser. No. 303,016  
 Int. Cl.<sup>5</sup> A61F 17/32  
 U.S. Cl. 606—167

5 Claims

1. An ophthalmic surgical knife for performing dissection of the posterior capsule of a human eye, comprising: a curved shaft having a first end and a second end, said first end comprising a blade portion adapted for cutting the posterior capsule upon reciprocal rotation of said curved

shaft along its longitudinal axis, said blade portion including a flat, imperforate surface facing toward the center of curvature of the curved shaft and two opposed cutting edges which converge to form a sharp tip at said first end; and  
an elongated, cylindrical handle attached to the second end of said curved shaft such that the longitudinal axis of the



handle is disposed substantially tangentially with respect to the outer periphery of said curved shaft;  
wherein said curved shaft has a circular cross-section from said second end to said blade portion and is continuously tapered from said second end to said blade portion, thereby allowing the shaft to enter the eye in a self-sealing, fluid tight manner which limits the trauma to the eye and prevents the loss of vitreous fluids from the eye.

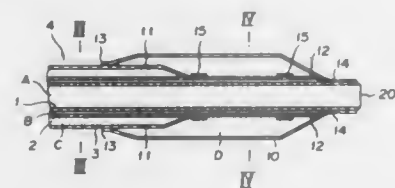
4,955,895

## VASODILATING CATHETER

Yoshiaki Sogiyama, and Kyuta Sagae, both of Fuji, Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan  
PCT No. PCT/JP87/01013, § 371 Date Jun. 22, 1989, § 102(e)  
Date Jun. 22, 1989, PCT Pub. No. WO88/04560, PCT Pub. Date Jun. 30, 1988  
PCT Filed Dec. 22, 1987, Ser. No. 382,781  
Claims priority, application Japan, Dec. 23, 1986, 61-305385  
Int. Cl.<sup>5</sup> A61M 29/00

U.S. Cl. 606—194

19 Claims

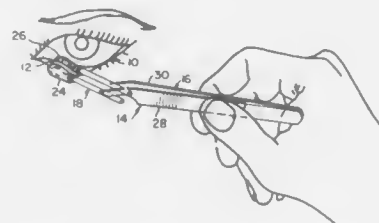


1. A vasodilating catheter, comprising:  
a triple-flow catheter tube having a leading end and a basal end, and comprising an inner tube opening at a leading end thereof and defining a first flow path, a middle tube encircling said inner tube and defining a second flow path jointly with said inner tube, and an outer tube encircling said middle tube and defining a third flow path jointly with said middle tube,  
an at least partially cylindrical foldable balloon attached to the outer periphery of said triple-flow catheter tube so as to enclose therewith openings of said second flow path and said third flow path in the proximity of the leading end of said triple-flow catheter tube and to form a space communicating with said second flow path and said third flow path, and  
three ports communicating with said three flow paths, attached to the basal end of said triple-flow catheter tube.

4,955,896  
UNIVERSAL MEDICAL FORCEP TOOL  
Jerre M. Freeman, 1509 Peabody, Memphis, Tenn. 38104  
Filed Sep. 27, 1985, Ser. No. 780,808  
Int. Cl.<sup>5</sup> A61B 17/28

U.S. Cl. 606—210

11 Claims



1. A universal medical forcep tool comprising:  
a main body portion,  
said main body portion having first and second arms joined at a first end and operably extend in variable relative position responsive to external control;  
a first replaceable grasping section connected to said first arm and having,  
a first support handle, and  
a first resilient grasping tip mounted on a distal end of said first support handle;  
a second replaceable grasping section connected to said second arm and having,  
a second support handle, and  
a second resilient grasping tip mounted on a distal end of said second support handle;  
said first replaceable grasping section operably working in cooperation with said second replaceable grasping section for gently engaging material between said first and second replaceable grasping tips;  
each said first and second arms includes an end structure remote from said first end for removably receiving said first and second support handle respectively and for operably holding said first and second resilient grasping tips in a mutually opposing posture; and  
said first and second resilient grasping tips operably move toward each other for gentle engagement of material between said grasping tips responsive to external manipulation of said first and second arms.

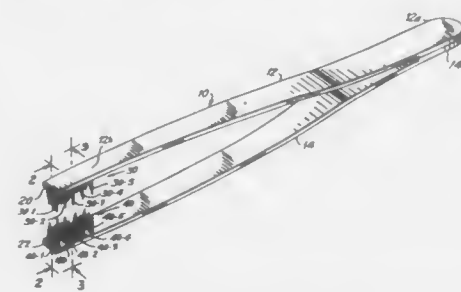
4,955,897

## TISSUE FORCEPS

Arthur G. Ship, 9 West Dr., Larchmont, N.Y. 10538  
Filed Aug. 22, 1988, Ser. No. 234,724  
Int. Cl.<sup>5</sup> A61B 17/28

U.S. Cl. 606—210

8 Claims



1. Tissue forceps for grasping tissue, comprising a first arm having first and second ends and a second arm having first and second ends, said first end of said first and second arms being coupled together, said second ends of said first and second arms forming opposing first and second jaws which are resiliently biased apart, said first and second jaws each including a

plurality of sharp, elongated teeth, each tooth on said first jaw directly opposing a tooth on said second jaw, some of said teeth extending perpendicularly from said jaws and other of said teeth extending at an acute angle from said jaws, said teeth penetrating into the tissue during use when tissue is captured between said first and second jaws by manual movement of said first jaw towards said second jaw.

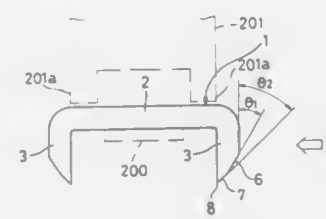
4,955,898

## SURGICAL STAPLE

Kanji Matsutani, Tochigi, and Masatoshi Fukuda, Utsunomiya, both of Japan, assignors to Matsutani Seisakusho Co., Ltd., Tochigi, Japan  
Filed Oct. 30, 1989, Ser. No. 429,079  
Claims priority, application Japan, Oct. 31, 1988, 63-275249  
Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 606—219

4 Claims



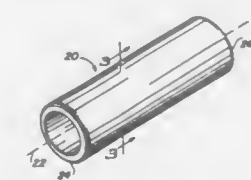
1. A surgical staple comprising a body having an elongated base portion and a pair of leg portions extending respectively from opposite ends of said base portion in intersecting relation to said base portion, each of said leg portions having a pair of first and second inclined surfaces at an outer periphery of a distal end portion of said leg portion remote from said base portion, said first and second inclined surfaces being inclined with respect to the axis of said leg portion, said first inclined surface being disposed intermediate the opposite ends of said leg portion, said second inclined surface extending between said first inclined surface and the distal end of said leg portion, the angle of said first inclined surface with respect to the axis of said leg portion being smaller than the angle of said second inclined surface with respect to the axis of said leg portion, said second inclined surface intersecting the outer peripheral surface of said leg portion at the distal end of said leg portion to form a sharp distal end edge.

4,955,899

LONGITUDINALLY COMPLIANT VASCULAR GRAFT  
Linda V. Della Corna, Glendale; Robert C. Farnan, Tucson; William M. Colone, Phoenix, and Rajagopal R. Kowligi, Tempe, all of Ariz., assignors to Impra, Inc., Tempe, Ariz.  
Filed May 26, 1989, Ser. No. 358,787  
Int. Cl.<sup>5</sup> A61F 2/06; A01N 1/02

U.S. Cl. 623—1

19 Claims



1. A longitudinally compliant vascular graft comprising in combination:  
a. a length of porous PTFE tubing having a micro-structure

characterized by nodes interconnected by fibrils, said PTFE tubing having a central longitudinal axis and including an outer cylindrical wall, at least a portion of said PTFE tubing having been compressed along the central longitudinal axis thereof following the production of said PTFE tubing; and  
b. a coating of a biocompatible elastomer covering the outer cylindrical wall of said PTFE tubing over at least said compressed portion of said PTFE tubing;  
c. said compressed portion of said PTFE tubing coated by said biocompatible elastomer being adapted to be stretched along the central longitudinal axis of said PTFE tubing.

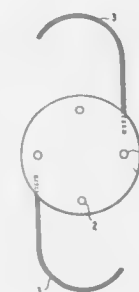
4,955,900

## INTRA-OCULAR LENS

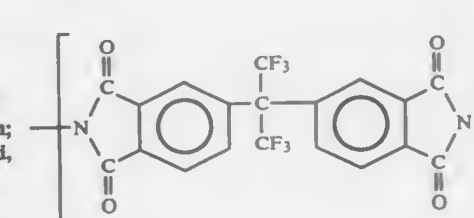
Kazumi Higashi, Toshio Nakajima, Atsushi Hino, and Sunao Inoue, all of Osaka, Japan, assignors to Nitto Denko Corporation, Osaka and Menicon Co., Ltd., Aichi, both of, Japan  
Filed Jun. 9, 1989, Ser. No. 363,694  
Claims priority, application Japan, Jun. 10, 1988, 63-144470  
Int. Cl.<sup>5</sup> A61F 2/16

U.S. Cl. 623—6

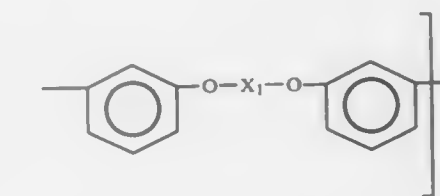
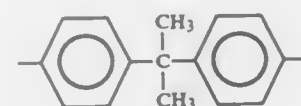
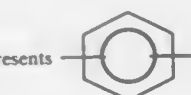
4 Claims



1. An intra-ocular lens comprising a lens part and a fixing part, said lens part comprising a colorless transparent polyimide consisting mainly of a repeating unit represented by formula (I):

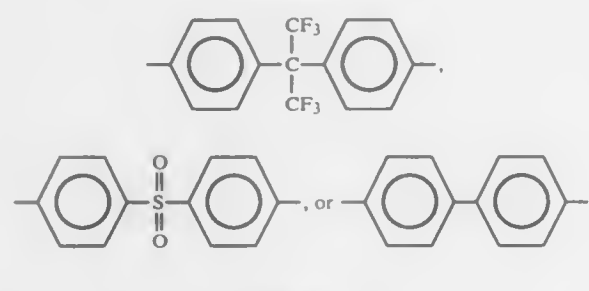


(I)

wherein X<sub>1</sub> represents



-continued



4,955,901

**INTRAOCCULAR IMPLANT HAVING COATING LAYER**  
Toshiji Nishiguchi, Kawasaki; Moriyuki Okamura, Sagami-hara, and Ikuo Nakajima, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

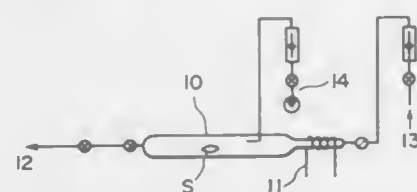
Filed May 30, 1989, Ser. No. 357,783

Claims priority, application Japan, May 31, 1988, 63-133156

Int. Cl.<sup>5</sup> A61F 2/16; A01N 1/02; B05D 3/06

U.S. Cl. 623-6

6 Claims



1. An intraocular implant, comprising a lens substrate having on the surface thereof a coating layer, wherein said coating layer is comprised of at least one compound selected from the group consisting of:

an amino compound represented by the general formula:  $R_1-NH_2$ , wherein  $R_1$  represents a hydrocarbon group having not more than 10 carbon atoms;

a cyan compound represented by the general formula:  $R_2-CN$ , wherein  $R_2$  represents a hydrocarbon group having not more than 10 carbon atoms;

an azo compound represented by the general formula:  $R_3-N=N-R_4$ , wherein  $R_3$  and  $R_4$  represent hydrocarbon groups having not more than 10 carbon atoms in total or hydrogen atoms; and

an amino acid represented by the general formula:  $R_5-CH(NH_2)COOH$ , wherein  $R_5$  represents a substituent constituted of C, H or N.

4,955,902

**DECENTERED INTRAOCCULAR LENS**

Charles D. Kelman, 721 Fifth Avenue, New York, N.Y. 10022

Filed Nov. 13, 1989, Ser. No. 436,300

Int. Cl.<sup>5</sup> A61F 2/16

U.S. Cl. 623-6

3 Claims

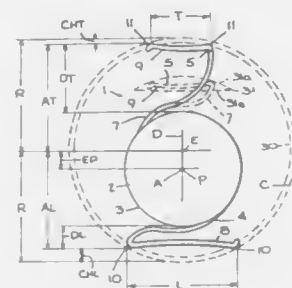
1. Decentered intraocular lens usable as an anterior chamber lens to correct high myopia of an intact natural lens in an eye having a decentered pupil relative to the eye optical axis, by insertion into the eye through a minimum size incision and implantation in the anterior chamber, comprising

a lens body having an optical axis, a thickened outer edge and a concave face to correct high myopia of the natural lens, and a diameter at least as large as the average diameter of the decentered pupil, and a pair of generally diametrically opposed resiliently deflectable position fixation haptics extending outwardly from the lens body,

the haptics constituting a leading haptic and a trailing haptic, each comprising a pliable strand having a stem portion attached to the lens body and a limb portion extending from the stem portion and terminating in a transverse edge portion disposed crosswise of a longitudinal diametric line

passing through the lens body and intersecting both transverse edge portions, each transverse edge portion having a pair of laterally spaced apart and outwardly projecting contact lobes at the corresponding transverse ends thereof to engage an adjacent eye tissue portion at a corresponding pair of spaced apart tissue points,

the trailing haptic transverse edge portion having a length of about 2-3 mm and being arranged at a predetermined longer distance from the lens body along the diametric line than that of the leading haptic transverse edge portion concordant to the decentering increment of the pupil axis relative to the eye optical axis, and the lens body diameter and leading haptic transverse edge portion each having a length substantially larger than about 2-3 mm, so that the



pairs of contact lobes lie in a circle having its center eccentrically spaced from the lens body optical axis a predetermined increment corresponding substantially to said decentering increment of the pupil axis, and form two generally diametrically opposed pairs of laterally spaced apart fixation points, to position the intraocular lens in the anterior chamber in spaced relation to the natural lens with the lens body optical axis correspondingly decentered relative to the circle and eye optical axis and substantially coincident to the axis of the decentered pupil, and with the lens body thickened outer edge substantially centered relative to the pupil and masked by the adjacent edge of the iris sufficiently to inhibit transmission thereof of entering edge glare causing light rays.

4,955,903

**SOFT INTRACAMERAL LENS**

Jiri Sulc; Zazana Krcova; Karel Smetana, and Sarka Pitrova, all of Prague, Czechoslovakia, assignors to Ceskoslovenska Akademie Ved, Prague, CSX

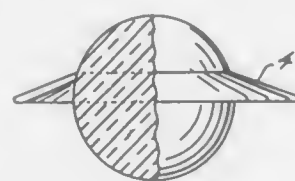
Division of Ser. No. 076 127, Jul. 21, 1987. This application Jul. 12, 1989, Ser. No. 379,575

Claims priority, application Czechoslovakia, Jul. 22, 1986, 5559-86

Int. Cl.<sup>5</sup> A61F 2/16

U.S. Cl. 623-6

1 Claim



1. A soft intracameral lens adapted for location in the posterior chamber of an eye wherein said lens has overall spherical shape comprising a front supporting and centering part which, after location of the lens in the posterior chamber of the eye, protrudes anteriorly from the posterior chamber, wherein said front part is adapted for laterally centering said lens in the eye,

and a rear supporting part which, after the location of said lens in the posterior chamber of the eye, is adapted for contacting a capsula or a membrane of the eye, and a retaining ring located on said front supporting part comprising an anterior surface, said anterior surface extending radially rearward from the surface of the said front supporting part, wherein the outward extension of the anterior surface of said ring ranges up to about 1.5 mm and the thickness of said lens ranges front about 1 mm to about 3.5 mm, said lens being self-centering and self-supporting after location in the posterior chamber of the eye without the need for additional supporting or centering means, all surface parts of the lens which contact eye tissue being formed from a soft hydrogel which does not wound eye tissue.

4,955,904

**MASKED INTRAOCCULAR LENS AND METHOD FOR TREATING A PATIENT WITH CATARACTS**

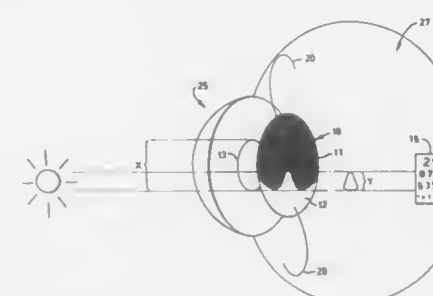
Neal Atebara, Boston, and David Miller, Brookline, both of Mass., assignors to The Beth Israel Hospital Association, Boston, Mass.

Filed Aug. 21, 1989, Ser. No. 396,558

Int. Cl.<sup>5</sup> A61F 2/16

U.S. Cl. 623-6

15 Claims



1. An intraocular lens comprising:

a transparent lens body adapted to be implanted in the human eye for focusing light rays on the retina of the eye and having means for attachment to the interior of the eye, said lens body having an opaque mask involving only a part of the lens body such that a small aperture results near the optical center of the lens body when the lens is implanted in the eye and the pupil of the eye is constricted such that when the pupil of the eye is constricted the mask on the lens body together with the constricted pupil only allows light to reach the retina through the small aperture to create a sharp image in bright light, said opaque mask also being configured so that a larger light path through the lens body is defined by the mask such that when the pupil is dilated in dim light, a greater percentage of the transparent portion of the lens is exposed to light.

4,955,905

**METHOD AND APPARATUS FOR MONITORING PRESSURE OF HUMAN TISSUE EXPANSION DEVICES**

Andrew M. Reed, 7370 Taft Ct., Arvada, Colo. 80005

Filed Jun. 26, 1989, Ser. No. 371,523

Int. Cl.<sup>5</sup> A61F 2/12

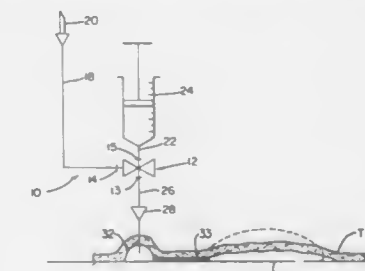
U.S. Cl. 623-8

12 Claims

1. In apparatus for the expansion of skin tissue wherein an inflatable envelope is implanted beneath the skin and tissue to be expanded and a liquid is injected into said envelope to cause expansion of said skin and tissue, the improvement comprising:

a fluid pressure monitoring device, and sensing means connected to said pressure monitoring device for sensing the internal pressure of liquid injected into said envelope whereby to provide a pressure reading of the liquid injected into said envelope, said sensing means including a

conduit extending between said pressure monitoring device and said liquid, and filter means in said conduit for



filtering any particulate matter or bacteria carried in said liquid.

4,955,906

**MAMMARY PROSTHESIS INJECTOR**

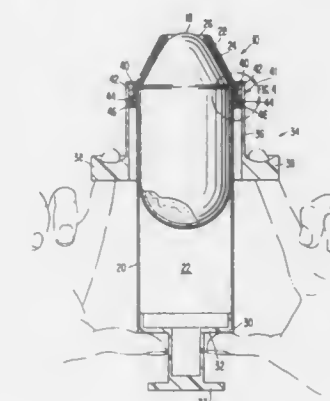
Peter R. Coggins, Suite B104-105, Greenville Center, Greenville, Del. 19807; Andrew L. Mitchell, 1880 Superfine Ln., Wilmington, Del. 19802; Paul Brothers, 112 Mill Brook Dr., Chadds Ford, Pa. 19317, and William L. Muir, 1295 W. Old Philadelphia Rd., Northeast, Md. 21901

Filed Jan. 12, 1989, Ser. No. 296,252

Int. Cl.<sup>5</sup> A61F 2/12

U.S. Cl. 623-8

14 Claims



1. A mammary prosthesis injector comprising:

a hollow rigid walled tube having an opening at one end of said tube, said tube including inner and outer surfaces and sized to receive an implantable mammary prosthesis; friction reducing means for reducing friction between the inner surface said hollow tube and the prosthesis, said friction reducing means including a bag at least partially located within said tube and interposed between the inner surface and mammary prosthesis, said bag sized to accommodate the mammary prosthesis within the hollow tube, and to reduce friction between said inner surface of said tube and the mammary prosthesis; and means operatively coupled to said tube for injecting the prosthesis through said opening from within said tube.

4,955,907

**IMPLANTABLE PROSTHETIC DEVICE**

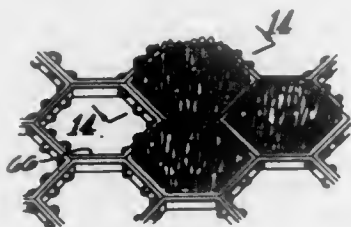
Walter J. Ledergerber, 29502 Anna Maria, Laguna Niguel, Calif. 92677

Division of Ser. No. 137,871, Dec. 22, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 325,881

Int. Cl.<sup>3</sup> A61F 2/12

U.S. Cl. 623—8

2 Claims



1. A biocompatible textured covering for an implant for implanting into the body comprising,  
a plurality of individual polygonal shaped PTFE cups, each of said cups having a bottom surface and raised side walls, said cups being disposed such that neighboring cups have adjacent side walls, and  
a biocompatible material disposed on the bottom surface of the PTFE cups whereby said material is capable of resisting the formation of spherical scar contracture about the implant.

4,955,908

**METALLIC INTERVERTEBRAL PROSTHESIS**

Otto Frey, Winterthur, and Rudolf Koch, Berlingen, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jan. 8, 1988, Ser. No. 203,950

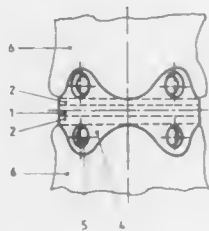
Claims priority, application Switzerland, Jul. 9, 1987, 2605/87

Int. Cl.<sup>3</sup> A61F 5/04, 2/30

U.S. Cl. 623—17

10 Claims

U.S. Cl. 623—13



1. A metallic intervertebral prosthesis for an arthodesis comprising a disk-like body having a width less than the height thereof and tapering conically from the ventral to dorsal for fitting between a pair of vertebrae to replace an intervertebral disk and having a plurality of fishplates extending from opposite sides thereof, each said fishplate having an opening for passage of a bone screw into an adjacent vertebrae.

4,955,909

**TEXTURED SILICONE IMPLANT PROSTHESIS**

Robert A. Ersek, Austin, Tex.; Arthur A. Beisang, Roseville, Minn., and Arthur A. Beisang, III, Des Moines, Iowa, assignors to Bioplasty, Inc., St. Paul, Minn.

Filed Jan. 31, 1989, Ser. No. 304,764

Int. Cl.<sup>3</sup> A61F 2/02, 2/12

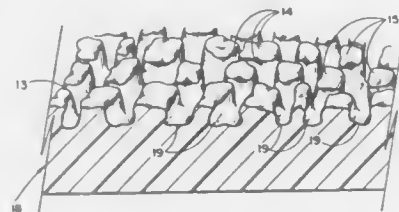
U.S. Cl. 623—11

5 Claims

1. In a soft, pliable three-dimensional prosthesis means for implantation in humans and comprising a three-dimensional solid with an outer layer of silicone rubber and having outer

surfaces of the silicone rubber layer treated for formation of host-prosthesis interface, the improvement comprising:

(a) interstices formed on said outer silicone rubber surfaces to produce a substantially continuous, textured surface and characterized by a net-like, three-dimensional grid structure with pores having multi-planar, random axis orientation to provide for mechanical ingrowth of host fibrous tissue into and around said surface pores and interstices;



(b) the said net-like surface grid structure of said silicone rubber layer including substantially randomly placed formed pillars of non-uniform length and area extending outwardly from a base plane and with valleys disposed between said pillars, said pillars further having irregular outer end surfaces with indentations formed therein; and  
(c) said pillars and indentations generally providing a textured surface which approximates a surface having average pore size ranging from between about 20 and 100 microns.

4,955,910

**FIXATION SYSTEM FOR AN ELONGATED PROSTHESIS**

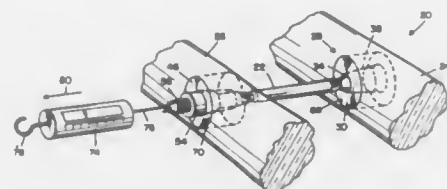
Richard C. Bolesky, Warsaw, Ind., assignor to Boehringer Mannheim Corporation, Indianapolis, Ind.

Filed Jul. 17, 1989, Ser. No. 380,998

Int. Cl.<sup>3</sup> A61F 2/08

U.S. Cl. 623—13

14 Claims



1. A prosthetic ligament assembly for connecting first and second spaced apart bones comprising:

first retention means fixed to the first bone having a first bore therethrough extending between a minor opening of reduced cross sectional area facing toward the second bone and a major opening of increased cross sectional area facing away from the second bone, the bore defining a first seating surface therein;

said first retention means including a first attachment member having a minor end of reduced cross sectional area and a major end of increased cross sectional area shaped similarly to said first seating surface for mating engagement therewith, said major end of said first attachment member being greater in magnitude than the minor opening in said first retention means;

second retention means fixed to the second bone having a second bore therethrough extending between a minor opening of reduced cross sectional area facing toward the first bone and a major opening of increased cross sectional area facing away from the first bone, the second bore defining a frusto-conical second seating surface;

an elongated prosthetic ligament extending between first and second ends and being attached at said first end to said first attachment member; and  
said second retention means including adjustable mounting means for selectively attaching said second end of said prosthetic ligament to said second retention means to achieve a predetermined tension therein.

4,955,911

**BONE IMPLANT**

Otto Frey, Winterthur, and Rudolf Koch, Berlingen, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

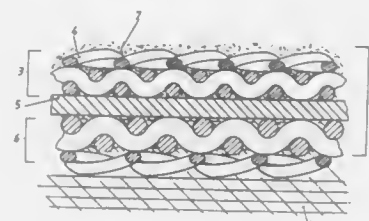
Filed Apr. 20, 1989, Ser. No. 341,149

Claims priority, application Switzerland, Apr. 21, 1988, 1480/88

Int. Cl.<sup>3</sup> A61F 2/28

U.S. Cl. 623—16

7 Claims



1. A bone implant comprising:

a plastic body;

at least two layers of wire mesh embedded in a surface of said plastic body, each layer being of equal thickness to the other and having pore sizes equal to the pore sizes of the other layer with a mesh size of 1 millimeter, each layer having a wire thickness of at least 0.5 millimeters;

a separating layer of non-porous material secured to one of said layers of wire mesh at said surface; and

a porous multi-layer wire fabric secured to said separating layer, said multi-layer wire fabric having pores in said layers thereof of increasing size from layer-to-layer in a direction away from said separating layer for ingrowth of bone tissue.

4,955,912

**JOINT PROSTHESIS**

Rütger Berchem, Essen, Fed. Rep. of Germany, assignor to Metallpraeis Berchem + Schaberg Gesellschaft für Metallformgebung mit Beschränkter Haftung, Gelsenkirchen-Uckendorf, Fed. Rep. of Germany

Filed Nov. 23, 1988, Ser. No. 276,187

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1987, 3740438

Int. Cl.<sup>3</sup> A61F 2/30

U.S. Cl. 623—18

6 Claims

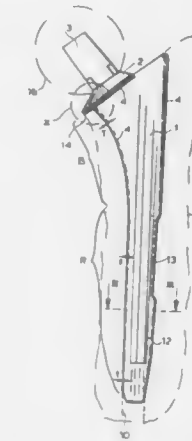
1. A metallic prosthesis, comprising: an elongated shaft having an outer bone engaging surface, said outer surface being divided into proximal and distal regions wherein respective regions terminate in opposite proximal and distal ends, said shaft adapted to be receivable in a marrow cavity at one end of a femur;

a collar disposed on a proximal end of said shaft and adapted to seat on a resected surface of the femur, said collar having a lower bone engaging surface extending radially outwardly of the shaft;

a ball-joint means disposed on a surface opposite said bone engaging surface, said ball-joint means adapted to pivotally engage an acetabular member; and

a layer of synthetic bone material coating said shaft, said layer having a greater thickness in the proximal region and a lesser thickness in the distal region of the shaft, said

lesser thickness being about 0.2 mm and said greater thickness being about 10–30 times greater than said lesser thickness.



ness wherein said bone material enables new bone tissues to grow into said layer along the length of the shaft.

4,955,913

**SURGICAL TIE**

Walter C. Robinson, 109 E. Kenilworth Dr., Greenville, S.C. 29615

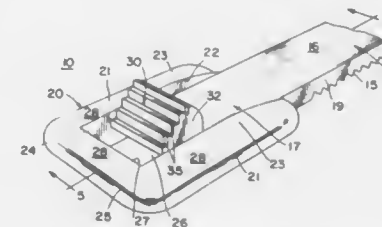
Continuation of Ser. No. 717,286, Mar. 28, 1985, abandoned.

This application Jul. 31, 1989, Ser. No. 387,409

Int. Cl.<sup>3</sup> A61L 17/00

U.S. Cl. 606—228

4 Claims



1. A surgical tie for use as a ligature in surgical procedures comprising:

an elongated flexible strap;

a frame integral with one end of said strap, said frame including a pair of longitudinally extending and spaced-apart side walls and an end wall joining the outer ends of said side walls and having a strap-receiving opening there-through;

a row of teeth disposed on one longitudinal surface of said strap and arranged transversely with respect thereto;

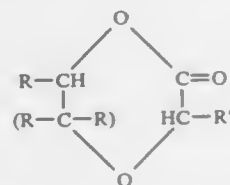
a pawl hingedly mounted on and integral with said frame and extending into said strap-receiving opening toward said end wall, said end wall having a strap-bearing surface disposed toward said pawl and said pawl having a strap-engaging surface disposed toward said end wall and defining therewith a strap-receiving channel;

a set of teeth disposed on said strap-engaging surface of said pawl and arranged transversely with respect thereto and shaped complementary to said row of teeth on said strap, said strap being deformable into a loop encircling a bundle of wires with the other end of said strap extending into said strap-receiving channel and through the opening in said frame and therebeyond, said set of teeth being disposed toward said row of teeth as said strap is tightened about living tissue to a tensioned condition, said set of teeth upon release of said tensioned strap sequentially



moving into firm engagement with and remaining in firm engagement with successive adjacent ones of said row of teeth, any force tending to withdraw said strap from within said strap-receiving channel in a strap-loosening direction serving to move said set of teeth into more firm engagement with the engaged ones of said row of teeth firmly to wedge said strap between said strap-bearing surface and said strap-engaging surface so as to form said surgical tie into a loop around living tissues and ligate same;

said elongated strap formed of a polymer having a general formula:



wherein R' and R are individually hydrogen, methyl or ethyl.

4,955,914

## TEETHING RAIL FOR SHOPPING CART

Lealie A. Caniglia, 11935 SW. 15 Ct., Davie, Fla. 33325, and Cathy S. Palicka, 53990 Steinersville, Powhattan Pt., Ohio 32942

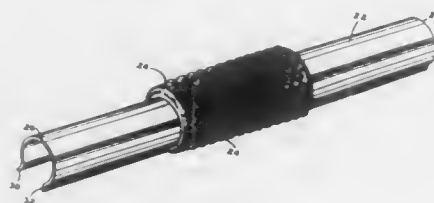
Continuation of Ser. No. 240,143, Aug. 26, 1988, abandoned.

This application Dec. 11, 1989, Ser. No. 449,433

Int. Cl.<sup>5</sup> A61J 17/00

U.S. Cl. 606—235

2 Claims



1. A teething rail for use on the tubular handle of a shopping cart comprising:

- a resilient split tube having a circular circumference greater than 180 degrees and less than 360 degrees such that the split tube has longitudinal edges spaced apart a distance less than the diameter of the handle of the shopping cart; said split tube being made of soft rubber and having an inner diameter slightly smaller than the diameter of the tubular handle of the shopping cart so that the teething rail can snap onto and off of the handle and will grip the handle;
- said split tube having integral smooth, semi-spherical, rounded convex protrusions on the outside for a baby to chew on;
- said protrusions having a height less than the diameter thereof for safety purposes.

4,955,915

## LUNATE IMPLANT AND METHOD OF STABILIZING SAME

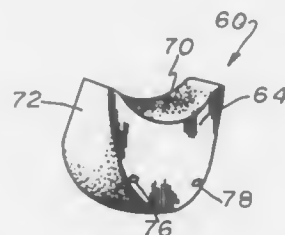
Alfred B. Swanson, 2945 Bonnell, S.E., Grand Rapids, Mich. 49506

Filed Jun. 2, 1989, Ser. No. 360,430

Int. Cl.<sup>5</sup> A61F 2/42

U.S. Cl. 623—21

7 Claims



1. A method of stabilizing an implant positioned within a carpal row of a wrist, the implant having opposed faces and defining a suture passage extending between and opening through said faces, said method comprising the steps of:
  - providing a first suture having an end;
  - stitching said first suture to a ligament;
  - passing said end of said first suture through said suture passage so that the end extends away from one of said faces;
  - providing a second suture having an end;
  - stitching said second suture to another ligament;
  - passing said end of said second suture through said suture passage so that its end extends away from said other face;
  - pulling the ends of said sutures to position said implant; and
  - tying the ends of said sutures to secure said implant.

4,955,916

## THUMB JOINT PROTHESIS

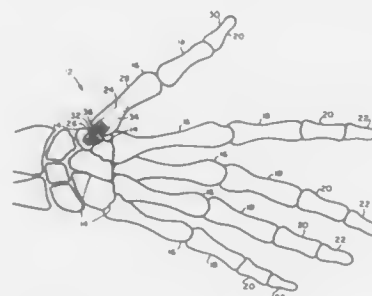
Roger G. Carignan, Thousand Oaks, Calif.; Stanley H. Nahigian, Hunting Valley, Ohio, and Clyde R. Pratt, Somis, Calif., assignors to Techmedica, Inc., Camarillo, Calif.

Filed May 1, 1989, Ser. No. 345,298

Int. Cl.<sup>5</sup> A61F 2/42

U.S. Cl. 623—21

7 Claims



1. An improved carpal-metacarpal thumb joint prosthesis comprising:

- a carpal component having a forward end and a rear end and having a tapered and threaded exterior and a generally U-shaped interior cavity;
- a metacarpal component having a forward end and a rear end and having a tapered and threaded exterior and an axial recess extending inwardly from the rear end thereof;
- an insert formed of ultrahigh molecular weight polyethylene mounted in said cavity of said carpal component, said insert having a recess with curved interior walls; and
- an intermediate member having a tapered forward end adapted to securely mate within said recess in said metacarpal component.

carpal component, a spherical rear end rotatably and captively mounted within said recess in said polyethylene insert in said carpal component and a neck portion connecting said forward end of said intermediate member to said rear end of said intermediate member.

4,955,917

## PROSTHETIC ACETABULUM

Kurt Karpf, Holderbank, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

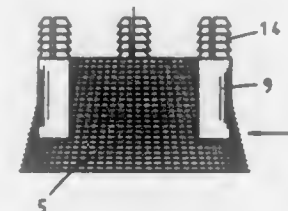
Filed Apr. 5, 1989, Ser. No. 333,347

Claims priority, application Switzerland, Apr. 11, 1988, 1322/88

Int. Cl.<sup>5</sup> A61F 2/34

U.S. Cl. 623—22

20 Claims



9. A prosthetic acetabulum comprising
  - a metal outer shell of frustum shape having a front surface and a peripheral wall extending from said front surface about a central axis;
  - at least three plugs extending from said shell at an outer periphery of said front surface, each said plug having a hollow radially expandable portion extending from said front surface on an axis parallel to said central axis;
  - a saw tooth circular toothing on an outer surface of said expandable portion of each respective plug; and
  - a plastic cup received in said shell to receive a femoral head.

4,955,918

## ARTIFICIAL DEXTEROUS HAND

Sukhan Lee, La Canada, Calif., assignor to University of Southern California, Los Angeles, Calif.

Filed May 30, 1989, Ser. No. 359,097

Int. Cl.<sup>5</sup> A61F 2/68

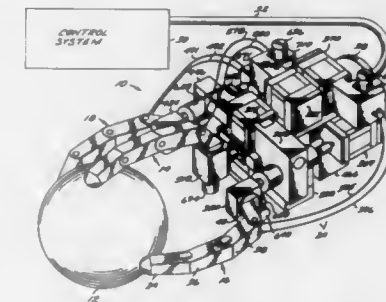
U.S. Cl. 623—24

56 Claims

1. An artificial dexterous hand for grasping and manipulating objects, comprising:

- a left thumb having a left thumb phalange means and a left thumb base, said left thumb base having a left base joint which operatively interconnects said left thumb phalange means to said left thumb base, said left thumb being associated with three separate left thumb axes, said left thumb axes corresponding to an independent left thumb pitch axis which extends axially through said left base joint and about which said left thumb phalange means pitches and mutually orthogonal, independent left thumb roll and yaw axes which run through said left thumb base and about which said left thumb rolls and yaws respectively;
- a right thumb having a right thumb phalange means and a right thumb base, said right thumb base having a right base joint which operatively interconnects said right thumb phalange means to said right thumb base, said right thumb being associated with three separate right thumb axes, said right thumb axes corresponding to an independent right thumb pitch axis which extends axially through said right base joint and about which said right thumb phalange means pitches and mutually orthogonal, independent right thumb roll and yaw axes which run through said right thumb base and about which said right thumb rolls and yaws respectively; and
- engagement assembly means, operatively connected to said

left and right thumbs at said left and right thumb bases respectively, for causing movement of said left and right thumbs, said engagement assembly means including, gear assembly means for causing rolling of said left and right thumbs about said left and right thumb roll axes respectively and yawing of said left and right thumbs about said



left and right thumb yaw axes respectively and pitching of said left and right thumb phalange means about said left and right thumb pitch axes respectively, and motor assembly means, operatively connected to said gear assembly means, for selectively actuating said gear assembly means.

4,955,919

## MULTI-COMPONENT JOINT PROTHESIS WITH INCREASED WALL FLEXIBILITY FACILITATING COMPONENT ASSEMBLY

Michael J. Pappas, 61 Gould Pl., Caldwell, N.J. 07006, and Frederick F. Buechel, 76 Crest Dr., South Orange, N.J. 07079

Continuation-in-part of Ser. No. 492,133, May 6, 1983,

abandoned. This application Mar. 15, 1985, Ser. No. 712,370

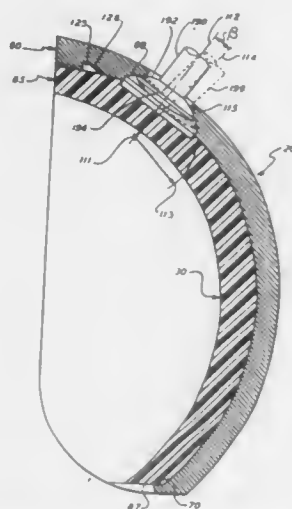
Int. Cl.<sup>5</sup> A61F 2/32

U.S. Cl. 623—22

25 Claims

1. A joint prosthesis comprising first and second cup-shaped components for being assembled together, the assembly of said components requiring the application thereto of assembly forces, said first component being a segmented open shell including a wall defining part spherical inner and outer surfaces, said segmented open shell has a face and a plane of symmetry; wherein the face of said segmented open shell is defined by: (i) a first planar surface substantially perpendicular to said plane of symmetry, (ii) a second planar surface substantially perpendicular to said plane of symmetry and angularly aligned to said first planar surface, and (iii) a first pair of curved surfaces on opposite sides of said plane of symmetry and defining portion of a cylinder aligned perpendicular to said plane of

symmetry and tangent to said first and second planar surfaces; wherein the alignment of said surfaces relative to one another



increases the flexibility of the wall and facilitates assembly of said components.

**4,955,920**  
**MOLDING FOR MANUFACTURING AN INNER CONICAL RECESS FOR RECEIVING AN AMPUTATED EXTREMITY AND PROCESS THEREFOR**  
Ulf Wellershaus, and Otto Frazinsky, both of Duderstadt, Fed. Rep. of Germany, assignors to Otto Bock Orthopaedische Industrie Besitz-und Verwaltungs-Kommanditgesellschaft, Duderstadt, Fed. Rep. of Germany  
Division of Ser. No. 867,955, May 29, 1986, Pat. No. 4,783,293.  
This application Aug. 25, 1988, Ser. No. 236,380  
Claims priority, application European Pat. Off., May 29, 1985, 85106563.1

Int. Cl.<sup>5</sup> A61F 2/80

U.S. Cl. 623—36

3 Claims



1. A molded part suitable for manufacturing an inner conical recess fitting which is attachable to a prosthesis for receiving a stump of an amputated extremity, comprising:  
a generally conically-shaped hollow molded part comprised of a polymer material which is selectively heat-shrinkable in response to application of an external effect, said molded part being open at its base and having at its base an outwardly curled lip portion, and said molded part having generally the shape of the stump which it is intended to receive and having a dimension in each direction except around the inner circumference of the lip portion which is larger than the stump which it is intended to receive.

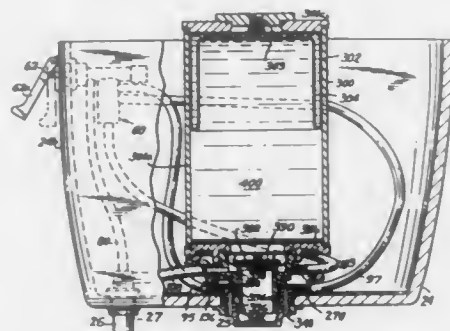
**4,955,921**  
**FLUSHING MECHANISM USING PHASE CHANGE FLUID**

Peter A. Basile, Lawrenceville; Ashvini K. Madan, Ocean; Fred E. Snyder, Princeton Junction, all of N.J., and Harold M. Stillman, Scarsdale, N.Y., assignors to American Standard Inc., New York, N.Y.

Continuation-in-part of Ser. No. 440,363, Nov. 30, 1989. This application Feb. 14, 1990, Ser. No. 479,891  
Int. Cl.<sup>5</sup> E03D 3/10

U.S. Cl. 4—354

18 Claims



1. A flushing mechanism for flushing a bowl with liquid comprising a containment vessel adapted to hold a predetermined amount of said liquid, collapsible bladder means supported in said containment vessel and a predetermined amount of a phase change fluid provided in said collapsible bladder means, inlet means for introducing said liquid under pressure into said containment vessel to collapse said bladder means while said phase change fluid converts to a liquified state, outlet means on said containment vessel coupleable to said bowl for releasing said liquid in said containment vessel into said bowl, sealing means for releaseably sealing said outlet means, and actuation means for selectively actuating said sealing means to open said outlet means to release liquid in said containment vessel into said bowl under the force exerted by said bladder means as it expands while the phase change fluid changes from a liquified state to a gaseous state.

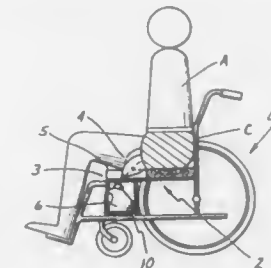
**4,955,922**  
**URINE-COLLECTING APPARATUS FOR WHEEL-CHAIR**  
Ryugo Terachi, 1019-359 Kuden-cho, Sakae-ku, Yokohama Kanagawa Pref., Japan  
Continuation of Ser. No. 287,717, Dec. 20, 1988, abandoned, which is a continuation of Ser. No. 183,001, Apr. 18, 1988, abandoned, which is a continuation of Ser. No. 863,112, Jul. 21, 1986, abandoned, which is a continuation of Ser. No. 644,313, Aug. 24, 1984, abandoned. This application Dec. 22, 1989, Ser. No. 455,302  
Int. Cl.<sup>5</sup> A47K 11/02

U.S. Cl. 4—480

6 Claims

1. A urine-collecting apparatus for a wheel-chair or a special purpose chair comprising:  
a seat-plate;  
said seat-plate having a pair of parallel spaced apart U-shaped rails for attaching said seat-plate to the frame of the wheel-chair or special purpose chair, said rails being spaced apart by an integrally connected flat plate having an upperside and an underside as well as a front and rear edge, said plate supporting an occupant thereon;  
said flat plate having a central front portion including a short generally U-shaped elongated cut-out intersecting said front edge, said cut-out being disposed forwardly and generally beneath the position of the genitals of an occupant seated on said plate;

a spongy air permeable cushion disposed on said flat plate for helping to cushion the buttocks of said occupant, said spongy cushion having a central front portion including a short generally U-shaped elongated cut-out disposed forwardly in overlying registration with said short cut-out in said flat plate;  
a urine-receiving part adapted to be attached at one end to the genital part of special-purpose underpants or drawers worn by a user of said wheel-chair or special-purpose chair and attached at its opposite end to one end of a relatively short tube, said tube being attached at its other end to a removable closed urinal tank;  
a urinal case attached on the underside of said flat plate under said flat plate cut-out for housing said removable closed urinal tank;

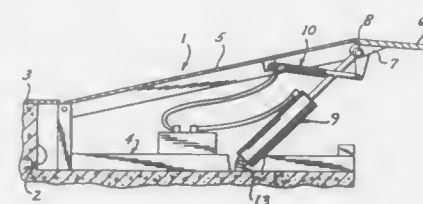


said urinal case including means defining an opening aligned with said cut-outs for enabling said tube to extend therethrough to provide fluid communication between said urine-receiving part and said urinal tank to permit urine to flow to the urinal tank under the force of gravity;  
said means defining placement of opening further enabling an said urinal tank inside said urinal case, and removal therefrom for disposing of said tank contents, in a convenient manner; and  
whereby said occupant can readily urinate into said urine-tank through said urine-receiving part, without disrobing and without assistance, while assuming a seated posture with the tube operationally attached between the urine-receiving part and the urinal tank by insertion of said tube through said U-shaped cut-outs and into said urinal tank.

**4,955,923**  
**HYDRAULICALLY OPERATED DOCKBOARD**  
Martin P. Hageman, Mequon, Wis., assignor to Kelley Company Inc., Milwaukee, Wis.  
Continuation-in-part of Ser. No. 276,241, Nov. 25, 1988, abandoned. This application Jan. 16, 1990, Ser. No. 466,054  
Int. Cl.<sup>5</sup> E01D 1/00

U.S. Cl. 14—71.7

10 Claims



1. A hydraulically operated dockboard, comprising a supporting structure, a ramp hinged at its rear edge to the supporting structure and movable between a generally horizontal position and an upwardly inclined position, a lip hinged to the forward edge of the ramp and movable between a downwardly hanging pendant position and outwardly extending position, hydraulic cylinder means interconnecting said ramp and said supporting structure and including a cylinder to contain a hydraulic fluid and a piston slidable in said cylinder, said piston having a longitudinal passage therethrough, a valve member

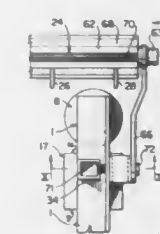
disposed in said passage and having an open and a closed position, means for biasing said valve member to said open position whereby said fluid can flow freely through said passage as the piston moves in said cylinder, and means responsive to a predetermined downward force being applied to the ramp for closing said valve member and preventing descent of the ramp.

5. A hydraulically operated dockboard, comprising a supporting structure, a ramp hinged at its rear edge to the supporting structure and movable between a generally horizontal position and an upwardly inclined position, a lip hinged to the forward edge of the ramp and movable between a downwardly hanging pendant position and outwardly extending position, a first hydraulic cylinder unit interconnecting the ramp and the supporting structure, a second hydraulic cylinder unit interconnecting the ramp and the lip, a hydraulic system for supplying hydraulic fluid to said first and second cylinder units and including a reservoir for hydraulic fluid, first conduit means interconnecting said reservoir and said first cylinder unit, pumping means for supplying hydraulic fluid under pressure through said first conduit means to said first cylinder unit to thereby actuate said first cylinder unit and raise the ramp, second conduit means connecting said first conduit means to said second cylinder unit, valve means connected in said second conduit means, means responsive to a first elevated fluid pressure in said system in excess of that required to raise the ramp for opening said valve means to thereby supply pressurized fluid to said second cylinder unit to extend said lip, means responsive to a decrease in fluid pressure from said first pressure to a second fluid pressure substantially beneath said first pressure for closing said valve means and returning fluid from said second cylinder unit to said reservoir, and adjusting means for selectively adjusting the magnitude of one of said pressures independently of the other of said pressures.

**4,955,924**  
**WINDOW GLAZE CLEANING**  
Daniel J. Gorman, 740 Lonsdale Rd., Ottawa, Ontario, Canada K1K 0K2  
Filed Jun. 13, 1989, Ser. No. 365,426  
Claims priority, application Canada, Jun. 14, 1988, 569468  
Int. Cl.<sup>5</sup> A47L 1/00

U.S. Cl. 15—103

5 Claims



1. A window glaze cleaning device, comprising:  
(a) an outer frame for, in operation, being placed on an outer, glazed surface of a window,  
(b) an inner frame for, in operation, being placed on an inner glazed surface of that window face-to-face with the outer frame,  
(c) at least three outer bearings attached to the outer frame for, in operation, holding the outer frame closely spaced from the outer glazed surface,  
(d) at least three inner bearings attached to the inner frame for, in operation, holding the inner frame closely spaced from the inner glazed surface,  
(e) first magnet means attached to the outer frame,  
(f) second magnet means attached to the inner frame and oriented to present opposite polarities when, in operation, placed face-to-face for magnetic attraction with the first magnet means, whereby the inner and outer frames will be



- held face-to-face, by the magnetic attraction, closely spaced from their respective glazed surfaces,
- (g) a wiper blade assembly attached to and extending across the outer frame for, in operation, wiping cleaning liquid from the outer glazed surface,
- (h) a nozzle means attached to the outer frame for, in operation, attachment to a source of cleaning liquid and directing that cleaning liquid into the path of the wiper blade assembly, and
- (i) a support assembly for, in operation, supporting the weight of the outer frame for movement of the outer frame relative to the outer glazed surface by the magnetic attraction between the first and second magnet means when the inner frame is moved from position on the inner glazed surface to another position thereon.

4,955,925

## RAKER TAKER I

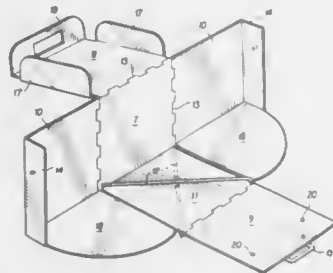
Rita J. Platti, 8041 Mariners Dr., Apt. #3810, Stockton, Calif. 95209

Filed Sep. 13, 1989, Ser. No. 406,454

Int. Cl.<sup>3</sup> A47L 13/52; B65D 5/00

U.S. Cl. 15—257.6

1 Claim



1. A leaf collecting device comprised of top, bottom, front, back, and two side walls; said bottom wall having upper and lower surfaces; each of said front, back and side walls including top, bottom and side edges; said top and bottom walls including front, back, and two side edges;
- first and second hinge means which enables the device to be placed in an open or closed position; said first hinge means hinges said back edge of said back wall to said back edge of said top wall and said side edges of said back wall to one of said side edges of said side walls and said second hinge means hinges said front edge of said bottom wall to said bottom edge of said front wall;
- flaps located at said bottom edge of each of said side walls and adapted to extend orthogonally therefrom;
- a first guide rail extending diagonally across said upper surface of said bottom wall;
- a second guide rail extending diagonally across said lower surface of said bottom wall; said guide rails being adapted to receive said flaps in order to secure said side walls to said bottom wall;
- side flanges located at the other of said side edges of said side walls adapted to extend orthogonally therefrom to overlap said front wall; each of said side flanges having a protruding pin thereon;
- holes in said front wall positioned to receive said pins when said flanges overlap said front wall;
- a handle located at the front wall;
- top flanges located on said front and side edges of said top wall and adapted to extend orthogonally therefrom to overlap said front and side walls; said top flange located at said front edge of said top wall includes a hole positioned to receive said handle when said flange overlaps said front wall.

4,955,926

# DEVICE FOR ADJUSTING ALIGNMENT OF A WHEEL

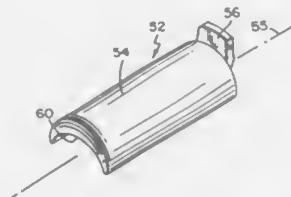
Gerald A. Spektor, St. Paul, and John Spektor, Golden Valley, both of Minn., assignors to Shim-A-Line, Inc., Minneapolis, Minn.

Continuation of Ser. No. 83,564, Aug. 7, 1987, abandoned. This application Jun. 8, 1989, Ser. No. 366,883

Int. Cl.<sup>3</sup> B25B 27/14

U.S. Cl. 29—271

5 Claims



1. A device for adjusting alignment of a wheel attached to a vehicle by a suspension system having a rod member affecting the caster of the wheel, a portion of the rod member being disposed within a bushing attached to the vehicle, the device comprising:

a longitudinal member having an arcuate cross section for insertion between the portion of the rod member disposed within the bushing and the bushing and further including stop means fixedly attached to the longitudinal member for selectively positioning the member longitudinally between the bushing and the rod member.

4,955,927

# METHOD OF OPERATING HARNESS MAKING MACHINE

Bruno Aiello, Alta, Italy, assignor to AMP Incorporated, Harrisburg, Pa.

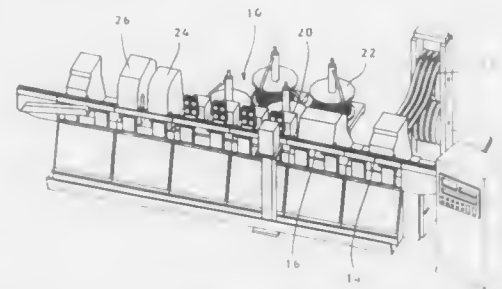
Filed Dec. 13, 1988, Ser. No. 283,698

Claims priority, application United Kingdom, Mar. 10, 1988, 8805474

Int. Cl.<sup>3</sup> H01R 43/04

U.S. Cl. 29—861

5 Claims



1. A method of operating an electrical harness making machine on which a variety of electrical connectors may be used with a common set of tooling, said machine operable to terminate a plurality of discrete wires to a pair of electrical connectors by causing said connectors to traverse a path extending through a plurality of operating zones, where said variety of electrical connectors comprises a family having a plurality of identical external dimensions normal to said path, and a plurality of different internal features to accommodate a different contact element for each member of said family, whereby said machine is operated by sensing only said identical dimensions of the electrical connectors as they traverse said path to produce an electrical harness consisting of a plurality of discrete wires terminated at respective opposite ends to a pair of electrical connectors, whereby the operating parameters for said machine are the same for each member of said family.

4,955,928

# TENSIONING CONNECTOR FOR RETAINING SIGN MEMBRANES

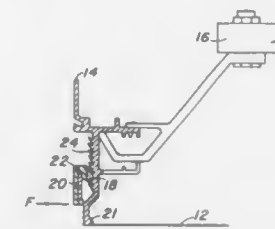
James A. Tanner, Westerville, Ohio, assignor to Signstrut, Ltd., Dublin, Ohio

Filed Apr. 18, 1989, Ser. No. 339,685

Int. Cl.<sup>3</sup> G09F 17/00

U.S. Cl. 40—603

19 Claims



1. An improved, manually releasable mechanical connector having two connecting components with generally interlocking surfaces for restraining one of its components against sliding translation in a selected direction relative to its other component and against rotation relative to its other component to tension a web, wherein the improvement comprises:

said interlocking surfaces having interengaging, mating, ridges with tips thereon and valleys therebetween, the cross section of the ridges having a generally sawtooth configuration with both of the surfaces of each sawtooth ridge making an acute angle with a plane of the ridge tips on the same side of a normal to said plane of the ridge tips, means for detachably connecting one of said components to a web, the other of said components including means for supporting the web in a web plane, the web plane extending at a non-zero angle to the plane of the ridge tips, said means for supporting the web including a tensioning edge on said other of said components which is spaced away from the ridges of said other of said components, around which the web is engageable with interlocking interengagement of the two connecting components, said one of said components which is detachably connected to the web having said interengaging ridges on one side only, an opposite side of said one of said components being free of ridges and being freely accessible and out of contact with said other of said component for movement of said one of said components along said other of said components.

4,955,929

# DEVICE FOR INTRODUCING MATERIAL INTO CONTAINERS

Hartmut Klapp, Kaarst, Fed. Rep. of Germany, assignor to Jagenberg Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Jan. 17, 1989, Ser. No. 298,083

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1988, 3801279

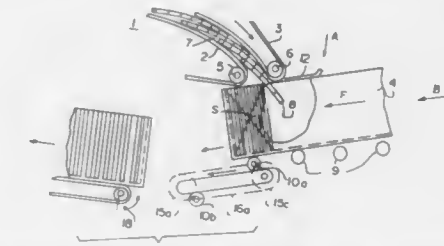
Int. Cl.<sup>3</sup> B65B 5/10, 39/00

U.S. Cl. 53—244

14 Claims

1. In a device for introducing material into containers with a material-release mechanism and with a supporting structure that supports a container below the material-release mechanism and that can advance the container past the material-release mechanism, the improvement wherein the supporting structure has a bearing on which the container pivots, whereby the point at which said bearing supports the container is displaced to the rear as the container travels forward such that the

displacement in the center of gravity of the container as it fills up both occasions an advance of the container in relation to the



material-release mechanism and brakes the container as it advances.

4,955,930

# VARIABLE WATER FLOW CONTROL FOR HEAT PUMP WATER HEATERS

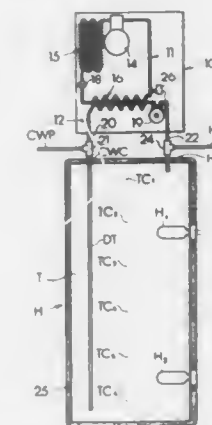
Glen P. Robinson, Jr., 1050 Mt. Paran Rd., SW., Atlanta, Ga. 30327

Filed Jul. 21, 1989, Ser. No. 384,148

Int. Cl.<sup>3</sup> F25B 7/00

U.S. Cl. 62—79

15 Claims



10. A method of heating water in a water tank to the normal predetermined tank temperature associated with water heaters using a heat pump with a condenser heat exchanger comprising the steps of:

- connecting the condenser heat exchanger between the upper and lower ends of the water tank;
- operating the heat pump when the tank temperature falls below the normal predetermined tank temperature;
- detecting the refrigerant pressure in the condenser heat exchanger;
- when the refrigerant pressure in the condenser heat exchanger exceeds a first prescribed pressure corresponding to a water temperature sufficient for immediate use but below the normal predetermined tank temperature, circulating the water from the lower end of the tank to the heat exchanger and from the heat exchanger to the upper end of the tank until the refrigerant pressure is lowered a prescribed amount;
- stopping the circulating of the water through the heat exchanger when the refrigerant pressure has been lowered said prescribed amount; and,
- repeating steps (d) and (e) until the normal predetermined tank temperature is reached.

4,955,931

**RESORPTIVE THERMAL CONVERSION APPARATUS**  
Vinko Mucic, Walldorf, Fed. Rep. of Germany, assignor to TCH Thermo-Consulting-Heidelberg GmbH, Heidelberg, Fed. Rep. of Germany

PCT No. PCT/EP88/00607, § 371 Date Feb. 27, 1989, § 102(e)  
Date Feb. 27, 1989, PCT Pub. No. WO89/00665, PCT Pub.  
Date Jan. 26, 1989

PCT Filed Jul. 7, 1988, Ser. No. 335,966

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1987, 3723938

Int. Cl. 5 F25B 27/00

U.S. Cl. 62—238.3

4 Claims



1. A heat pump comprising: circuit means operated with a binary working medium for converting thermal energy supplied by an external heat source to thermal energy at a different temperature level, said circuit means comprising a first solution circuit having a forward pass and a return pass and a first evaporator at a first pressure level, compressor means for raising the pressure of a gaseous component of said binary working medium from said first evaporator to a higher pressure level in a resorber, said circuit means also comprising a second solution circuit having a forward pass and a return pass and a second evaporator at a second pressure level higher than said first level, expansion means for lowering the pressure of a gaseous component of said binary working medium of said second evaporator to a lower pressure level in an absorber, means free of control means, for directly coupling said forward pass of said first solution circuit with said return pass of said second solution circuit and said return pass of said first solution circuit with said forward pass of said second solution circuit at a common medium pressure level representing the higher pressure level in said first solution circuit and the lower pressure level in said second solution circuit.

4,955,932

**PADLOCK**

Anatoly Kofman, 8 Tamar Street, Neve Monoson, Israel  
Filed Apr. 2, 1990, Ser. No. 502,890

Int. Cl. 5 E05B 67/22

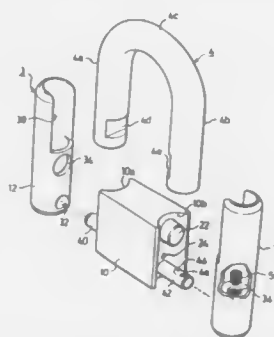
U.S. Cl. 70—39

13 Claims

1. A padlock, comprising: a housing formed with a pair of sockets, a shackle receivable in and removable from said sockets, and a pair of locking bolts projectable into said sockets for locking the shackle therein and retractable from said sockets to permit removal from the shackle therefrom;

characterized in that said housing includes a body member carrying said locking bolt, and a pair of sleeves defining said sockets;

said sleeves being removably attached to opposite sides of said body member by fasteners received in said sockets so



as not to be accessible when the shackle is locked within said sleeves.

4,955,933

**DEVICE FOR MEASURING THE FRICTION ON A SURFACE**

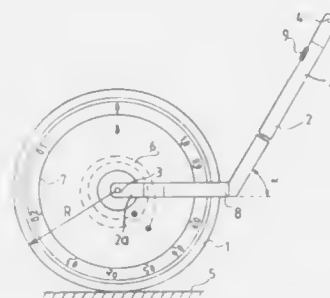
Matti Sistonen, Kalasääskentie 6 E 46, SF-02620 Espoo, Finland  
PCT No. PCT/FI87/00087, § 371 Date Jan. 3, 1989, § 102(e)  
Date Jan. 3, 1989, PCT Pub. No. WO88/00337, PCT Pub.  
Date Jan. 14, 1988

PCT Filed Jan. 25, 1987, Ser. No. 295,215

Claims priority, application Finland, Jul. 4, 1986, 862834  
Int. Cl. 5 G01N 19/02

U.S. Cl. 73—9

1 Claim



1. A device for measuring the friction on a surface, comprising a measuring wheel to ride on said surface, an axle to rotatably support said measuring wheel, a rigid arm, said arm including a first section having a first end secured to said axle and having a second end, said first section of the arm being disposed substantially horizontal, said arm also including a second section connected to the second end of said first section and extending upwardly from said first section at an obtuse angle, spring means attached between the measuring wheel and the axle for resisting rotation of the measuring wheel when said measuring wheel is moved on said surface, inclination indicator means secured to said arm for indicating the inclination of said arm, a handle secured to the upper end of said second section of the arm, said handle being rotatable on the upper end of said arm about an axis parallel to said axle, said first and second sections of said arm being unsupported from said surface except for the connection to said measuring wheel.

4,955,934

**MEASURING DEVICE WITH A TEST TAPE CASSETTE**  
Werner Stehr, Nordstetter Str. 26, 7240 Horb-Ahldorf, Fed. Rep. of Germany

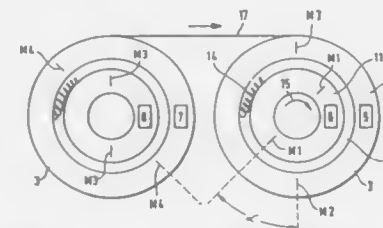
Filed May 3, 1989, Ser. No. 346,796

Claims priority, application Fed. Rep. of Germany, May 13, 1988, 3816353

Int. Cl. 5 G01L 3/14, 5/00

U.S. Cl. 73—862.340

8 Claims



1. Measuring device with a test tape cassette for measuring the torque occurring on the hubs of the two tape spools, in which the hubs are rotatable against the action of a spring with respect to the spool bodies and having markings on the hubs and spool bodies, wherein the rotation angle between the markings of a hub and the associated spool body is established by means of sensors as a measure for the torque, said sensors being connected by connecting means to a test circuit located outside the test tape cassette, wherein the sensors are positioned on a printed circuit board, which forms a surface of the test tape cassette.

4,955,935

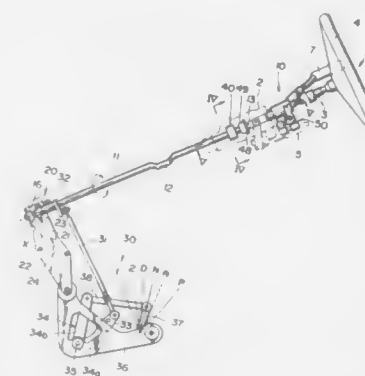
**GEAR SHIFT DEVICE FOR AUTOMOTIVE VEHICLE**  
Kazuo Katayama, Kure, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Dec. 27, 1988, Ser. No. 290,119

Claims priority, application Japan, Dec. 25, 1987, 62-330593  
Int. Cl. 5 B62D 1/18

U.S. Cl. 74—473 SW

33 Claims



1. An automotive vehicle transmission shift device of the type having a transmission shift control rod supported substantially in parallel with a steering column by a steering column supporting member and a transmission shift lever which is located on said transmission shift control rod and is movable to displace axially and rotationally said transmission shift control rod so as to place a transmission of an automotive vehicle in any desired range, said transmission shift device comprising: locking means supported by said supporting member for locking said transmission shift control rod moved to a range selecting position when placing said transmission in a predetermined range; and absorbing means disposed between said transmission shift

lever and said locking means for absorbing operating power applied from said transmission shift lever in said predetermined range to said locking means.

4,955,936

**SCREW DRIVER TIP**

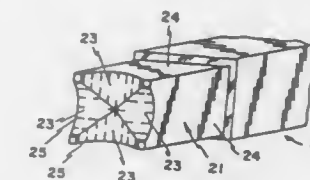
Harley W. Douglas, 4 Brickwood Boulevard, Ingersoll, Ontario, Canada N5C 3S1

Filed Aug. 16, 1989, Ser. No. 394,451

Int. Cl. 5 B25B 23/00

U.S. Cl. 81—441

1 Claim



1. A screw driver having a shank with a screw engaging tip for mating within a recess on the face of a screw, said recess having walls and a base:

said tip having side walls and a face for mating insertion within said recess and cutting edges on said tip defined between said side walls and said face and adapted to scrape debris from the walls of said recess during said mating insertion; said recess is substantially rectangular in configuration and said tip has four side walls and a recessed face; and said tip face comprises a recessed center extending outward in four concave arcuate surfaces to four flat facial corners with said sidewalls to define cutting edges between said corners and said side walls.

4,955,937

**METHOD OF MANUFACTURING A MASTER INTENDED FOR THE MANUFACTURE OF PROJECTION SCREENS AND TOOL FOR CARRYING OUT THE METHOD**

Marius J. J. Dona, and Johannes M. M. Swinkels, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 134,667, Dec. 18, 1987, abandoned.

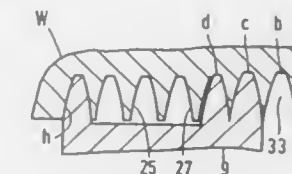
This application Jun. 22, 1989, Ser. No. 371,680

Claims priority, application Netherlands, Oct. 7, 1987, 8702384

Int. Cl. 5 B23B 5/00; G03B 21/60

U.S. Cl. 82—1.11

1 Claim



1. A method of manufacturing a master for the fabrication of projection screens, such screens comprising a substrate of transparent material provided on one side with a lens structure consisting of a pattern of parallel rectilinear lens elements which are separated by grooves, the method comprising forming a pattern of parallel rectilinear grooves and ribs corresponding to the lens structure on one side of a plate of machinable material by a tooling operation, characterized in that the grooves are formed by:

(a) precutting in successive steps grooves separated by a



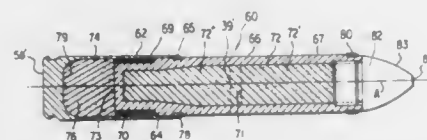
- pitch distance  $p$  by a first precutting operation using a first precutting chisel;
- (b) carrying out a second precutting operation in successive steps on each of the precut grooves, the operation consisting of deepening the bottom while simultaneously profiling only one of the flanks of each precut groove using the front edge and one side edge of a second precutting chisel;
- (c) carrying out a finishing operation in successive steps on each of the precut grooves, the operation consisting of simultaneously profiling the bottom and only the other flank of each of the precut grooves using the front edge and one side edge of a finishing chisel;
- the successive steps of the second precutting operation and the finishing operation being carried out simultaneously on adjacent flanks of adjacent grooves during at least a portion of the manufacture, whereby the ribs formed by the adjacent flanks are loaded substantially uniformly in the transverse direction during these operations.

**4,955,938**  
**AMMUNITION, PREFERABLY FOR USE IN HIGH-ANGLE FIRE**

Rudolf Romer, Kaarst; Wilfried Becker, Düsseldorf, and Bernhard Bisping, Ratingen, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany  
Continuation of Ser. No. 448,508, Dec. 9, 1982, abandoned. This application Nov. 29, 1988, Ser. No. 279,236

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1981, 3148829

Int. Cl.<sup>3</sup> F42B 5/00, 10/06, 10/32, 12/10  
U.S. Cl. 102—430 25 Claims



1. An ammunition unit for use in an automatic tubular weapon having a barrel that can be selectively oriented to effect flat trajectory or high-angle trajectory fire, said ammunition unit being constructed for one of flat trajectory fire and high-angle trajectory fire, and wherein:

said ammunition unit is a one-piece unit and comprises a propellant charge means, including at least a cylindrical member having a bottom face at one end, for providing a propellant charge, a ballistic payload projectile secured in said cylindrical member of said propellant charge means at the end thereof remote from said bottom face and having a bottom member which faces said propellant charge means and delimits the rear end of said projectile, and a payload disposed within said projectile;

said ammunition unit has a given length, outer diameter and external shape, with the portion of said projectile which projects out of said cylindrical member of said propellant charge means having substantially the same outer diameter as said cylindrical member, and with said projectile of said ammunition unit having a main cylindrical portion of constant diameter and a short ogival front end portion;

said propellant charge extends between said bottom face and said bottom member, with the quantity of said propellant charge being a function of the type of trajectory over which the ammunition is to be fired, and with the distance between said bottom member and said bottom face of said ammunition unit being greater for flat trajectory fire than for high-angle trajectory fire, and with said ammunition unit containing a greater quantity of propellant charge for flat trajectory fire than for high-angle trajectory fire;

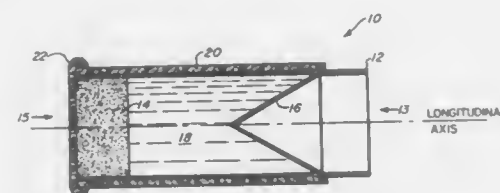
said projectile of said ammunition unit is shorter for flat trajectory fire than for high-angle trajectory fire; and said ammunition unit has a smaller quantity of payload for flat trajectory fire than for high angle trajectory fire.

**4,955,939**  
**SHAPED CHARGE WITH EXPLOSIVELY DRIVEN LIQUID FOLLOW THROUGH**

James A. Petrousky, Port Tobacco, Md.; Joseph E. Backofen, and Donald J. Butz, both of Columbus, Ohio, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 2, 1983, Ser. No. 471,381  
Int. Cl.<sup>3</sup> F42B 12/10

U.S. Cl. 102—476 1 Claim



1. An explosive device for perforating the wall of a target and ejecting a liquid through the perforation for disrupting structure behind the target wall, comprising:

a hollow case formed of plastic material having two opposing ends, an inner surface and an outer surface, said case adapted to be substantially consumed by burning and be free of fragmentation when the device is detonated;

a shaped charge liner formed of plastic material in fluid-tight attachment with said case inner surface adjacent one end thereof and facing in an outward direction for placement toward a target to be perforated;

a first explosive contained within said case at the second end thereof;

a shockwave transmitting liquid material located in the case between the shaped charge liner and the first explosive, whereby, upon detonation, the first explosive creates high pressure gases the shockwave of which is transmitted through the liquid material for collapsing the shaped charge liner and causing it to perforate the target wall and cause the liquid material to follow through the perforation; and

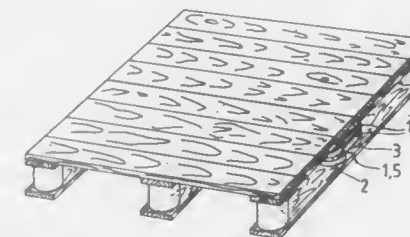
a second explosive in the form of a sheet completely covering the outer surface of the case and completely covering the second end of the case including the first explosive charge;

whereby, upon simultaneous detonation of the first and second explosives, forces exerted inwardly by the second explosive balance the outward forces of the first explosive to prevent their radial expansion and expansion toward second end to confine its forces in the direction of the shaped charge liner, thereby confining said liquid material to a well defined shape and causing substantially all of said material to pass through the wall perforation.

**4,955,940**  
**APPARATUS FOR CARRYING LOADS, PARTICULARLY FOR OR AT A PALLET**

Sven Welleman, Perstorp, S-540 30 Fagersanna (SE), Sweden  
PCT No. PCT/SE87/00567, § 371 Date May 18, 1989, § 102(e)  
Date May 18, 1989, PCT Pub. No. WO88/04263, PCT Pub. Date Jun. 16, 1988

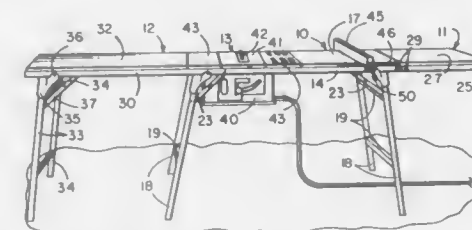
PCT Filed Nov. 30, 1987, Ser. No. 358,361  
Claims priority, application Fed. Rep. of Germany, Dec. 3, 1986, 8632080; Jun. 20, 1987, 8707837  
Int. Cl.<sup>3</sup> B65D 19/00  
U.S. Cl. 108—56.1 9 Claims



1. Apparatus for carrying loads, comprising a pair of laterally-adjacent load supports having coplanar upper platforms, lower runners along opposite side edges of said platforms to couple said laterally-adjacent load supports together with their platforms and runners co-planar and spacers having bodies between said platforms and said runners, at least one of said bodies in each support confronting one of said bodies in the laterally-adjacent support and being held together by severable holding means.

**4,955,941**  
**SUPPORT TABLE FOR BENCH SAW**  
Tony Rousseau, 1712 - 13th St., Clarkston, Wash. 99403  
Filed Jan. 23, 1989, Ser. No. 299,622  
Int. Cl.<sup>3</sup> A47B 1/00

U.S. Cl. 108—65 4 Claims



1. A foldably collapsible table, having a top structure to support a bench saw having a bench saw blade, said bench saw table being rectilinear said bench saw having an undersurface inwardly adjacent two opposed side edges for support within an orifice defined in the table top structure and said bench saw being supported at a spaced distance above a surface supporting said table, comprising, in combination:
- a table frame structure having similar elongate spaced coplanar rails with upper and lower surfaces,
- said rails being structurally joined in parallel relationship by at least three cross supports interconnected with the lower surfaces of the rails, with end cross supports substantially at each opposed end of the rails and at least one medial cross support,
- said rails extending a spaced distance above the cross supports and being spaced apart to receive therebetween said bench saw table to be supported in the table frame structure and
- one of said end cross supports and an adjacent medial

cross support positioned to support the undersurface of opposed side edges of said bench saw table to be supported in the table frame structure;

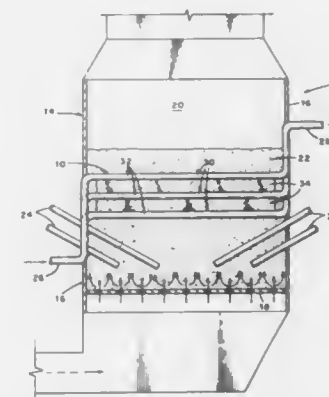
a table top element, supported in the table frame structure between the rails and on cross supports to form a table top element over the portion of the table frame structure not occupied by said bench saw table said bench saw table; and

opposed sets of pairs of similar legs spaced to communicate with each rail, one leg set pivotally carried substantially at each end of the spaced rails for folding motion relative to the rails and each said leg set having releasable means for maintaining a supportive mode.

**4,955,942**  
**IN-BED TUBE BANK FOR A FLUIDIZED-BED COMBUSTOR**

Lloyd F. Hemenway, Jr., Morgantown, W. Va., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 8, 1989, Ser. No. 390,849  
Int. Cl.<sup>3</sup> F22B 1/00  
U.S. Cl. 122—4 D 7 Claims



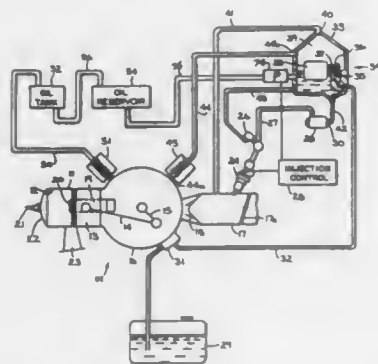
1. An in-bed tube bank for a fluidized-bed combustor, said tube bank comprising at least one boiler tube and a plurality of selectively spaced boiler tube sections for being immersed in the fluidized-bed of said combustor, and further comprising at least one support member for joining said tube sections, said support member engaging and extending substantially the length of said tube sections, and spanning said preselected space therebetween, whereby boiler tube wastage due to stress on said tubes from in-bed forces and due to vibration is mitigated.

**4,955,943**  
**METERING PUMP CONTROLLED OIL INJECTION SYSTEM FOR TWO CYCLE ENGINE**  
Robert J. Hensel, and William G. Fearich, both of Oshkosh, Wis., assignors to Brunswick Corporation, Skokie, Ill.  
Continuation-in-part of Ser. No. 176,698, Apr. 1, 1988, Pat. No. 4,887,559. This application Jul. 31, 1989, Ser. No. 388,016  
Int. Cl.<sup>3</sup> F01M 3/02

U.S. Cl. 123—73 AD 5 Claims

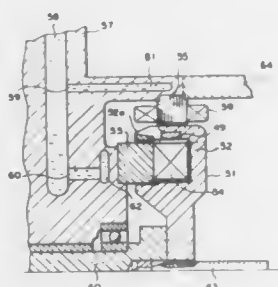
1. An oil injection system for a two cycle crankcase compression internal combustion engine having a fuel supply system supplying fuel to said engine, an oil supply system supplying oil to said fuel supply system, fuel supply control means controlling the amount of fuel supplied to said engine by said fuel supply means, a metering pump in said oil supply system controlling the amount of oil supplied to said fuel supply system by said oil supply system, said metering pump being controlled by said fuel supply control means to control the fuel-oil

ratio, wherein both said fuel supply system and said metering pump are controlled by said fuel supply control means to



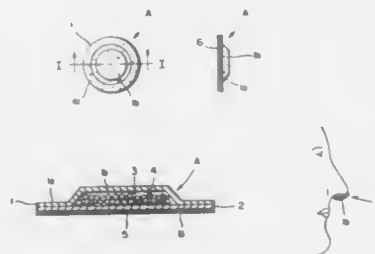
variably control the amount of fuel supplied to said engine and also the amount of oil supplied to said fuel supply system.

**4,955,944**  
**ROTATING ELECTRIC MACHINE**  
Hironaki Aso, and Yutaka Kitamura, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
PCT No. PCT/JP88/00125, § 371 Date Oct. 6, 1988, § 102(e) Date Oct. 6, 1988, PCT Pub. No. WO88/06366, PCT Pub. Date Aug. 25, 1988  
PCT Filed Feb. 9, 1988, Ser. No. 275,172  
Claims priority, application Japan, Feb. 10, 1987, 62-28627; Feb. 12, 1987, 62-30020; Feb. 12, 1987, 62-30021; Feb. 12, 1987, 62-30023; Feb. 12, 1987, 62-30024; Apr. 13, 1987, 62-91218; Apr. 13, 1987, 62-91220; Apr. 15, 1987, 62-93536  
Int. Cl.<sup>5</sup> F01P 3/20; H02K 9/00  
U.S. Cl. 123-41.31 26 Claims



1. A rotating electric machine, comprising: revolving-field poles which are driven by an engine and excited by supplying the electric current to field windings; an armature core mounted in an armature winding; field cores mounted in said field windings; and a cylinder block with said armature core and field cores directly mounted thereto, and with a coolant passageway on the field core side and a coolant circulation system of said engine.

**4,955,945**  
**DISPENSER FOR THE VAPORIZATION OF ACTIVE SUBSTANCES TO BE INHALED**  
Heinz H. Weick, 94, rue de la Servette, 1202 Geneva, Switzerland  
Filed Mar. 22, 1989, Ser. No. 327,128  
Claims priority, application Switzerland, Jul. 13, 1988, 02661/88; Sep. 19, 1988, 03483/88; Dec. 21, 1988, 04713/88  
Int. Cl.<sup>5</sup> A61M 15/00, 15/02  
U.S. Cl. 128-203.12 4 Claims



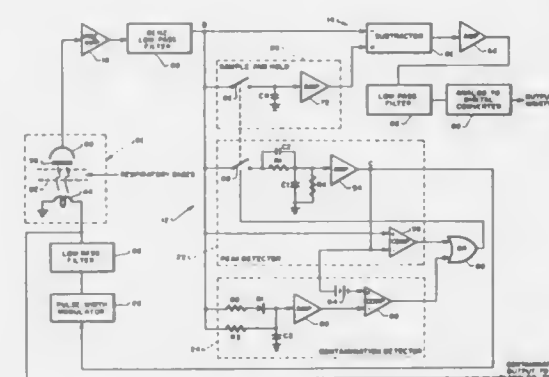
1. A dispenser for placement near the nostrils for vaporization of active substances of a medical, paramedical, and aromatic-therapeutic nature which are to be inhaled, said dispenser comprising:  
a hollow body having two sidewalls for containing an active substance located in a closed chamber,  
said hollow body including an absorbent evaporation side wall as one of said two sidewalls to transmit the active substance to the air for respiration as a vapor of the active substance moving along said absorbent evaporation side wall,  
said hollow body having a dish made of absorbent air-penetrable paper-like material and forming said absorbent evaporation side wall,  
a peripheral edge of said dish being covered by a pasted-on lid forming the other of said two side walls,  
said closed chamber being formed between said lid and a raised central portion of said dish located interiorally of said peripheral edge and being filled with micro-capsules containing the active substance, and  
said lid being provided on a side opposite to said closed chamber with adhesive layer means for point-like adhesive attachment to the nasal cartilage external of the nasal passages, said adhesive layer means having a smaller surface area than said lid and an entire peripheral area of said lid being free of said adhesive layer means, and  
said adhesive layer being protected by a peelable foil.

**4,955,946**  
**RESPIRATORY CO<sub>2</sub> DETECTOR CIRCUIT WITH HIGH QUALITY WAVEFORM**  
Bruce E. Mount, Diamond Bar, and Douglas P. Becker, Walnut, both of Calif., assignors to Marquette Gas Analysis, St. Louis, Mo.  
Continuation of Ser. No. 939,992, Dec. 11, 1986, abandoned.  
This application Feb. 2, 1989, Ser. No. 306,234  
Int. Cl.<sup>5</sup> A61B 5/087  
U.S. Cl. 128-719 7 Claims

1. A CO<sub>2</sub> detector for monitoring a patient's breath inhalation and exhalation directed through a cuvette, comprising,  
an infrared lamp having an input and responsive to a lamp voltage applied thereto,  
a circuit including a pulse-width modulator and a lowpass filter connected to said lamp input to provide said lamp input voltage,  
an infrared detector,  
a preamplifier having an input and an output, said input being connected to said infrared detector,

said lamp being positioned to provide an optical path through a cuvette and impinge on said infrared detector, said infrared detector and said preamplifier being constructed and arranged so that the output of the infrared detector and preamplifier will produce an electrical waveform representative of the quantity of CO<sub>2</sub> in said cuvette, said waveform having high voltage peaks representing low CO<sub>2</sub> and low voltage valleys representing high CO<sub>2</sub>, said infrared lamp being constructed and arranged to be responsive to the output of said pulse-width modulator and lowpass filter which causes the preamplifier to have a reference (baseline) DC level,

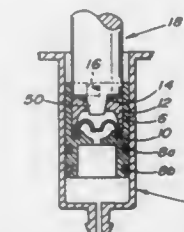
a peak detector including  
a first RC network having an input and an output, said first RC network having a predetermined discharge time constant,  
a first switch connected between said preamplifier and said first RC network so that when said first switch is closed the output of said preamplifier will charge said first RC network and when said first switch is open said first RC network will discharge, and  
a first comparator having an output connected to operate said switch and having a first input connected directly to the output of said preamplifier and having a second input connected to the output of said first RC network to compare the voltage level at the output of said pre-



amplifier with the voltage level at the output of said RC network so that said first switch will be opened or closed depending upon the compared voltages, wherein the output from said first RC network will apply a voltage so said pulse-width modulator and said lowpass filter to control the lamp input voltage,

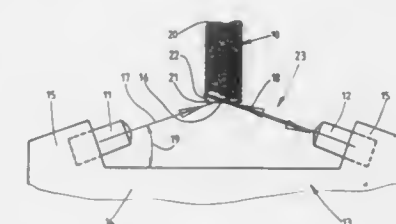
a contamination detector including  
a second comparator having an output and two inputs,  
a second RC network having an input connected to the output of said preamplifier and having an output connected to one input of said second comparator, said second RC network having a discharge time constant shorter than said discharge time constant of said first RC network,  
a DC voltage source having a positive terminal and a negative terminal, said negative terminal being connected to a second input of said second comparator and the positive terminal being connected to said second input of said first comparator, the output of said second comparator being connected to operate said first switch to connect the input of said first RC network with the preamplifier output at a preselected value of compared voltages,  
whereby said contamination detector will override the peak detector and raise the voltage on the lamp in the event of contamination of the cuvette.

**4,955,947**  
**PRESSURE SENSOR**  
Mohammed A. Hajianpour, Miami, Fla., assignor to Ace Orthopedic Manufacturing, Los Angeles, Calif.  
Filed May 14, 1987, Ser. No. 50,506  
Int. Cl.<sup>5</sup> A61B 5/00  
U.S. Cl. 128-748 1 Claim



1. In a tissue pressure measuring system which comprises a syringe having a cylindrical passage and means for connecting a tissue invasion device in fluid communication with the cylindrical passage, a plug in the cylindrical passage having a passage formed therethrough, means sealing the periphery of the plug in fluid tight moveable relationship with the interior of the cylindrical passage, a resilient pressure transmitting diaphragm sealing the passage through the plug and a cylindrical pressure measuring instrument connected to the plug for moving the plug in the cylindrical passage and for sensing pressure transmitted through the diaphragm, the improvement wherein the diaphragm is a membrane formed of inert resilient material fitted inside the interior of the plug, said diaphragm having a substantially flat center portion and an annular portion having a substantially arcuate cross-section around the center point.

**4,955,948**  
**PROCESS AND APPARATUS FOR THE CHECKING OF CIGARETTES**  
Heinz Focke, and Josef Schulte, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany  
Filed Jun. 29, 1989, Ser. No. 373,840  
Claims priority, application Fed. Rep. of Germany, Jul. 4, 1988, 3822520  
Int. Cl.<sup>5</sup> A24C 5/34  
U.S. Cl. 131-280 16 Claims



1. Process for the checking of cigarettes, in the form of tobacco wrapped in cigarette paper, for correct formation of the cigarettes at their ends by means of electrooptical sensors, which possess transmitters and receivers, and by means for directing test light beams onto at least one end face of the cigarettes and measuring reflecting light, said process being characterized by directing the test light beams (17, 18) onto the end face (16) of a cigarette (10) at an acute angle (19) of less than 45° and in such a way that, when tobacco (20) is missing in a region of the cigarette (10), light is reflected by the cigarette paper (22).

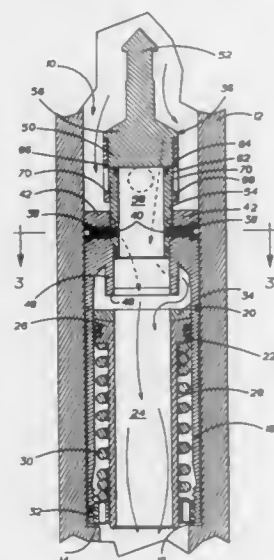


**4,955,949**  
**MUD SAVER VALVE WITH INCREASED FLOW CHECK VALVE**

Thomas F. Bailey, and Raymond A. Todd, Jr., both of Houston, Tex., assignors to Drillex Systems, Inc., Houston, Tex.  
Filed Feb. 1, 1989, Ser. No. 305,319  
Int. Cl.<sup>5</sup> F16K 17/40

U.S. Cl. 137—71

20 Claims



1. In a mud saver valve for retaining fluids within a drill string, the mud saver valve including a tubular body adapted to be disposed within the drill string and an axially movable piston having a fluid passageway and disposed within the tubular body, a closure plug mounted within the upper end of the mud saver valve, said closure plug comprising:

a removable spear body seated within the upper end of the mud saver valve, said spear body including a spear sleeve removably seated within the closure plug, a spear head telescopically receiving said spear sleeve, and check valve means;

the piston biased against the downhole flow of fluids to selectively engage said closure plug closing the fluid passageway, said spear head telescopically extending relative to said spear sleeve when fluid pressure downhole of said spear body exceeds a predetermined fluid pressure thereby opening said check valve means allowing fluid exceeding said predetermined fluid pressure to flow upwardly through said closure plug when the fluid passageway is closed, said spear sleeve including an outwardly disposed annular shoulder and said spear head including an inwardly disposed annular shoulder, telescoping extension of said spear head relative said spear sleeve limited by said cooperating shoulders formed on said spear head and said spear sleeve.

**4,955,950**  
**FUEL FILL TUBE FOR AUTOMOBILE**  
Takatsuka Seichi, and Sato Kyokuchi, both of Soja, Japan, assignors to OM Industrial Co., Ltd., Okayama, Japan  
Filed Dec. 8, 1988, Ser. No. 281,551  
Claims priority, application Japan, Dec. 9, 1987, 62-188170[U]

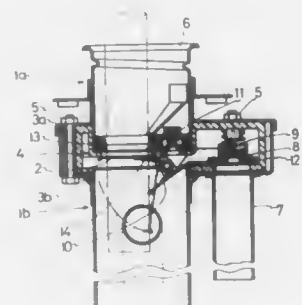
Int. Cl.<sup>5</sup> B65D 31/06

U.S. Cl. 141—46

1 Claim

1. A fuel fill tube for automobiles comprising:  
an upper fill tube attached to a fuel cap;  
an upper connecting flange provided at a lower end of said upper fill tube;  
a lower fill tube attached to a fuel tank;

a lower connecting flange in the form of a bowl-like casing provided at an upper end of said lower fill tube;  
a bolt and nut means for assembling said upper connecting flange and said lower connecting flange together, said lower connecting flange and upper connecting flange providing an accommodating space therebetween; and



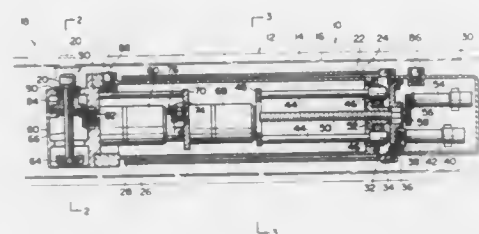
a vaporized gas recovery unit provided in said accommodating space, said vaporized gas recovery unit comprising a base and a leaded fuel restricting shutter and a vapor discharging or refueling vapor vent valve provided on said base.

**4,955,951**  
**BORING APPARATUS**  
Isao Nemoto, Narashino, and Yuji Yamaoka, Machida, both of Japan, assignors to Kabushiki Kaisha Iseki Kaihatsu Koki, Tokyo and Nemoto Kikaku Kogyo Kabushiki Kaisha, Yachiyo, both of Japan  
Filed Feb. 27, 1989, Ser. No. 316,298  
Claims priority, application Japan, Mar. 1, 1988, 63-45724

Int. Cl.<sup>5</sup> E03F 3/00

U.S. Cl. 166—55.7

19 Claims



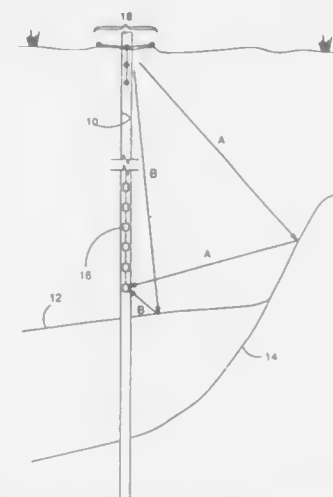
1. An apparatus for boring a hole in a first member to which a second member is attached, comprising:  
cutting means having a rotary axis extending in the direction intersecting a portion to be bored of said first member and a cutting profile smaller than said hole;  
first drive means for displacing said cutting means in the direction of an imaginary first line intersecting said rotary axis;  
second drive means for displacing said cutting means in the direction of an imaginary second line intersecting both said rotary axis and said first line;  
third drive means for rotating said cutting means about said rotary axis;  
detecting means for detecting a load acting on said cutting means and generating an output signal based thereon; and  
control means for controlling said first and second drive means on the basis of said output signal of said detecting means for correcting the position of said cutting means relative to a portion to be bored;  
wherein at least one of said first, second and third drive

means is provided with a rotary source consisting of an electric motor;  
wherein said detecting means detects the load acting on said cutting means on the basis of the power supplied to said electric motor; and  
wherein said control means controls, on the basis of said output signal, said first and second drive means so as to displace the position of said cutting means in the directions along said first and second lines to a position where no large load acts on said cutting means.

**4,955,952**  
**SEISMIC ENERGY SOURCE ARRAY**  
David E. Williams, Metairie, La., and Michael C. Kelly, Sand Springs, Okla., assignors to Amoco Corporation, Chicago, Ill.  
Filed Nov. 30, 1989, Ser. No. 443,767  
Int. Cl.<sup>5</sup> G01V 1/40

U.S. Cl. 181—111

8 Claims



1. A source array useful in vertical seismic profiling, comprising:  
a first set of source elements having horizontal extent spaced in at least a first direction and a second, nonparallel direction; and  
a second set of source elements having vertical extent and spaced linearly below the first set of source elements, wherein the spacing of the source elements in one of the sets is selected to be greater than or approximately  $\frac{1}{2}$  the dominant wave length of energy emitted by the source elements in the source array.

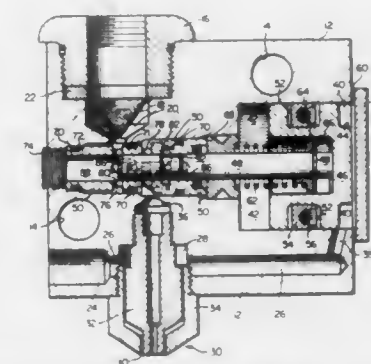
**4,955,953**  
**LUBRICATING DEVICE**  
John P. Kayser, Madison, Wis., assignor to KLS International Corporation, Madison, Wis.  
Filed Nov. 15, 1988, Ser. No. 271,524  
Int. Cl.<sup>5</sup> F16N 13/00

U.S. Cl. 184—42

2 Claims

1. A lubricating device for delivering a shot of lubricant to an area to be lubricated, said lubricating device having a piston assembly that includes a replaceable piston sleeve which can be easily replaced, said lubricating device comprising:  
a housing;  
a lubricant inlet port formed in said housing;  
an air inlet port formed in said housing;  
a lubricant outlet port;  
a piston assembly disposed in said housing, said piston assembly comprising:  
a first piston disposed in a piston chamber in said housing;  
a piston sleeve removably disposed in said housing, said piston sleeve having a first outer circumferential groove

located approximately adjacent said lubricant inlet port and a second outer circumferential groove located approximately adjacent said outlet port; a first set of circumferentially-spaced transverse bores being formed in said first circumferential groove in said piston sleeve and a second set of circumferentially-spaced transverse bores being formed in said second circumferential groove;  
said first set of circumferentially-spaced bores allowing lubricant to pass from said lubricant inlet port to a lubricant holding chamber formed in the interior of said piston sleeve when said piston assembly is in a first, non-actuated position, and  
said second set of circumferentially-spaced bores allowing the lubricant in said holding chamber to be forced from said holding chamber to said outlet port when said piston assembly is forced into a second, actuated position;  
a second piston disposed for reciprocating movement within said piston sleeve, said second piston being oper-



atively connected to said first piston whereby said second piston causes a shot of lubricant to be provided to said outlet port upon actuation of said first piston by compressed air from said air inlet port, a portion of the interior of said second piston being hollow, said second piston having an outer circumferential groove and a transverse bore formed in said groove; and  
a removable cover for making a fluid-tight seal with said housing whereby upon removal of said cover, said piston assembly can be removed from said housing, said piston sleeve can be replaced with a new piston sleeve, and said piston assembly can be reinserted into said housing with said new piston sleeve,  
wherein said housing includes an air passageway in fluid communication with said air inlet, said air passageway joining said piston chamber at a point on the circumference of said piston chamber, said piston chamber including an air chamber so that said first piston may be forced by air pressure from a first, non-actuated position in said piston chamber to a second, actuated position within said piston chamber.

**4,955,954**  
**MOTOR-DRIVEN CONTROL APPARATUS**  
Masayoshi Onishi, and Hiromasa Ozawa, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Jul. 3, 1989, Ser. No. 374,894  
Claims priority, application Japan, Jul. 4, 1988, 63-88941[U]; Jul. 4, 1988, 63-88942[U] Jul. 29, 1988, 63-101286[U]

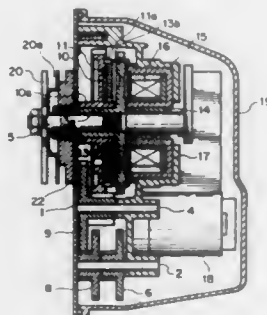
Int. Cl.<sup>5</sup> F16D 27/00

U.S. Cl. 192—0.02 R

4 Claims

1. A motor-driven control apparatus, comprising:  
a plurality of stepped gears (6-9) for transmitting the driving

force of a motor (18) to an output gear (10) rotatably mounted on an output shaft (5);  
 an electromagnetic clutch device including:  
 a first clutch plate (11) mounted to a side of the output gear through a return spring (12) so that the first clutch plate is urged toward the output gear;  
 a second clutch plate (13) rigidly secured to the output shaft through a guide sleeve portion (13a) thereof;  
 a second clutch plate being disposed opposite to the first clutch plate; and  
 a clutch yoke (15) externally supported by a casing (17), the clutch yoke containing a clutch coil (16), the clutch yoke being disposed such that an axially circumferential surface of a radially outermost portion thereof is axially opposed to a radially outer, axially circumferential surface of the



second clutch plate with an axially extending gap therebetween;  
 the electromagnetic clutch device being operated such that the first clutch plate is moved away from the second clutch plate by the return spring to idly rotate on the output shaft when the electromagnetic clutch device is off and, when it is on, the first clutch plate is attracted to the second clutch plate to rotatably drive the second clutch plate; and  
 a rotating lever (20) secured to one end of the output shaft, the rotating lever being adapted to drive an external load drive wire (21);  
 wherein foreign matter lodged in the axially extending gap between the second clutch plate and the clutch yoke is radially expelled from said gap by centrifugal force during the rotation of the second clutch plate.

4,955,955

## PORTABLE CONVEYOR ASSEMBLY

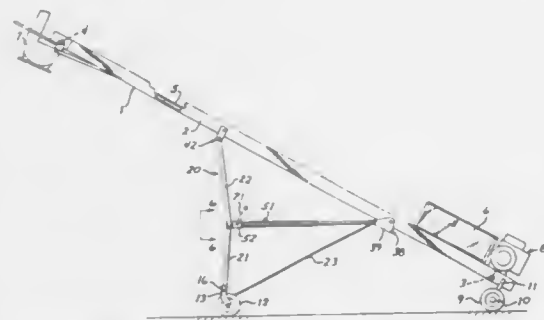
Joseph R. Driear, Thiensville, Wis., assignor to Robert D. Sawyer, Oak Creek, Wis.

Filed Jun. 5, 1989, Ser. No. 361,495

Int. Cl.<sup>5</sup> B65G 41/00

U.S. Cl. 198—318

13 Claims



1. A portable conveyor assembly, comprising an inclined conveyor having a lower end and an upper end, first wheel means to support the lower end, caster wheel means spaced

from said first wheel means and disposed beneath said conveyor, said caster wheel means being mounted for rotation about a vertical axis, an adjustable first linkage connected to said conveyor, a second linkage interconnecting said first linkage and said caster wheel means, and operating means for adjusting the first linkage to thereby vary the elevation of said conveyor, said second linkage being constructed and arranged to automatically maintain said axis in a vertical attitude as said first linkage is adjusted.

4,955,956

## TRANSPORT TANK

Helmut Gerhard, Weltefeld, Fed. Rep. of Germany, assignor to Westerwaelder Eisenwerk Gerhard GmbH, Fed. Rep. of Germany

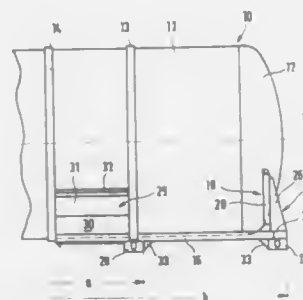
Filed Aug. 30, 1989, Ser. No. 400,682

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1988, 8811024

Int. Cl.<sup>5</sup> B65D 7/90

U.S. Cl. 220—562

8 Claims



1. A transport tank including  
 a cylindrical body defining a longitudinal tank axis, said body having curved end bottoms and a reinforcing ring surrounding said body,  
 a pair of frame portions each including a lower transverse beam provided with a pair of outer corner fittings, and two lower longitudinal beams extending over part of the tank length, each longitudinal beam being provided with an inner corner fitting and connected to said reinforcing ring,  
 a pair of end ring elements each formed as a partial ring extending through a range of about 90° to about 180° of the lower half of the end bottom, each end ring element having a radial flange and a flange extending parallel to said tank axis and being welded to a respective end bottom, and  
 saddle pieces each having a triangular wall portion extending transverse of said tank axis adjacent said tank and substantially tangentially of a respective end bottom, said triangular wall portion being connected to said radial flange of a respective end ring element, and a flange provided at an edge of the wall portion and connected to a respective transverse beam.

4,955,957

## PORTABLE COOLER

Hunter Homes, P.O. Box 1, Garoon Valley, Id. 83622

Filed Aug. 14, 1989, Ser. No. 393,627

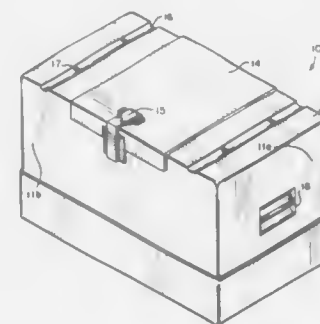
Int. Cl.<sup>5</sup> B65D 6/00, 43/16

U.S. Cl. 220—324

4 Claims

1. A portable cooler comprising a wall portion, a base and a top, said top having a surface defining an opening into the interior of the cooler to allow the placing of items into and withdrawing of items from the cooler, said opening being centered in and extending substantially the entire width of the top, said surface defining an area extending past said opening,

a pair of spaced grooves in the top, one groove being on each side of the opening, lashing means extending across the top in



said grooves without interfering with said opening so as to allow the securing of the cooler to a surface, and a lid for closing and exposing said opening.

4,955,958

## AIRCRAFT

Jürgen Dellinger, Achim, and Ulrich Krümer, Syke-Barrien, both of Fed. Rep. of Germany, assignors to MBB GmbH, Bremen, Fed. Rep. of Germany

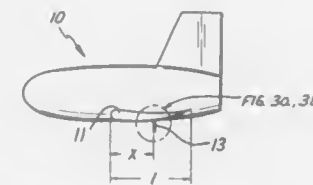
Filed Sep. 26, 1988, Ser. No. 249,441

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1987, 3732481

Int. Cl.<sup>5</sup> B64C 3/58, 9/32

U.S. Cl. 244—213

5 Claims



1. Aircraft with no separate elevators in the tail end of the fuselage and having wings, the improvement comprising a single flap means on the respective underside of the wings for extending down to a variable degree and being arranged at a point between 49 and 54% of the local chord depth as measured from the leading edge.

4,955,959

## LOCKING MECHANISM FOR A SURGICAL FASTENING APPARATUS

Thomas M. Tompkins, Trumbull, and Dominic F. Presty, Shelton, both of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.

Filed May 26, 1989, Ser. No. 358,421

Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 227—178

22 Claims

1. A surgical fastening apparatus including a single use locking mechanism to prevent reactivation of the surgical fastening apparatus, said surgical fastening apparatus comprising:

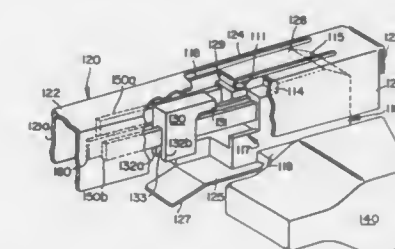
- (a) a frame;
- (b) a stationary carrier receivable into said frame;
- (c) a pusher assembly slidably mounted within said stationary carrier, said pusher assembly comprising at least one cam bar, a cam bar retainer for mounting the cam bar, said cam bar retainer having a locking notch, a thrust knob attached to the cam bar retainer, and optionally a knife mounted to the cam bar retainer;
- (d) a resilient locking clip fixed to the stationary carrier and

having a hook, said locking clip being adapted to be resiliently urged from a first position wherein said hook is non-engagable with said locking notch, to a second position wherein said hook is engagable with said locking notch; and,

(e) a blocking means adapted to be movable from a location wherein said blocking means holds said locking clip in the non-engagable first position, to a location wherein said blocking means does not hold said locking clip in the non-engagable first position.

12. A loading unit for a surgical fastening apparatus, said loading unit comprising:

- (a) a stationary carrier;
- (b) a pusher assembly slidably mounted within said stationary carrier, said pusher assembly comprising at least one



cam bar, a cam bar retainer for mounting the cam bar, said cam bar retainer having a locking notch, a thrust knob attached to the cam bar retainer, and optionally a knife mounted to the cam bar retainer;

(c) a resilient locking clip fixed to the stationary carrier and having a hook, said locking clip being adapted to be resiliently urged from a first position wherein said hook is non-engagable with said locking notch, to a second position wherein said hook is engagable with said locking notch; and,

(d) a blocking means adapted to be movable from a location wherein said blocking means holds said locking clip in the non-engagable first position, to a location wherein said blocking means does not hold said locking clip in the non-engagable first position.

4,955,960

## APPARATUS FOR COATING WORKPIECES ELECTROSTATICALLY

Hans Behr, Stuttgart; Kurt Vetter, Remseck; Rolf Schneider, Burgstetten, and Fred Luderer, Leutenbach, all of Fed. Rep. of Germany, assignors to Behr Industrieanlagen GmbH & Co., Fed. Rep. of Germany

Continuation of Ser. No. 166,193, Mar. 10, 1988, abandoned.

This application Sep. 22, 1989, Ser. No. 411,223

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1987, 3709508; Jul. 20, 1987, 8709948[U]

Int. Cl.<sup>5</sup> B05B 5/04

U.S. Cl. 239—3

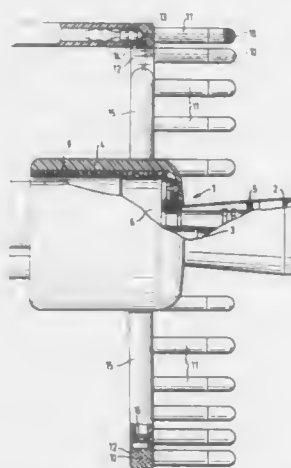
15 Claims

1. An apparatus for electrostatically coating workpieces with an electrically conductive coating material, said apparatus comprising: a spraying device having an atomizer (1), an internal housing (6) supporting said atomizer (1), said atomizer (1) including a spraying head (2) extending from said internal housing (6); a supply line (3) conducting the coating material from a storage-system to said spraying head (2), said supply line (3) and said spraying head (2) being at ground potential; charging electrodes (10) distributed about said spraying head (2) and connected to a high-voltage supply for charging the coating material and producing an electric field; an electrode-holding arrangement (11, 12, 15) made of an insulating material disposed about said internal housing (6); said apparatus characterized by including potential-control means having a surface interconnecting said internal housing (6) and said charging



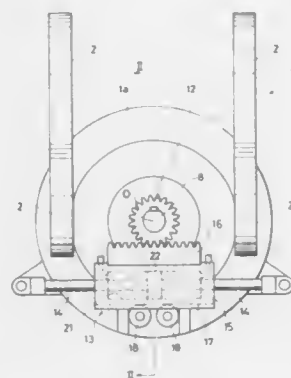
electrodes (10) for approximating the radial-potential pattern continuously over said surface of said potential control means to the radial-potential distribution of the coating material sprayed.

12. A method for electrostatically coating workpieces with an electrically conductive coating material, comprising the steps of: electrically grounding an atomizer (1); discharging the coating material from the atomizer (1) with a predominantly radial component of movement; supporting charging electrodes (10) from the atomizer (1) at a radially outward spacing;



electrically charging the coating material sprayed from the atomizer (1) by corona discharge to form a radial potential electrical charge distribution in the coating material having the highest electrical potential proximate the electrodes (10) and the lowest electrical potential proximate the grounded atomizer (1); and characterized by including the step of approximating the radial potential pattern over a continuous surface interconnecting the atomizer (1) and the electrodes (10) to the radial potential electrical charge distribution in the coating material sprayed.

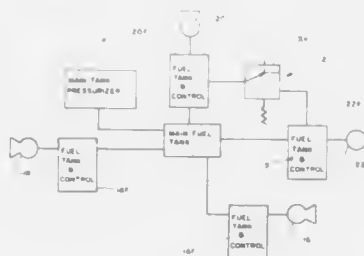
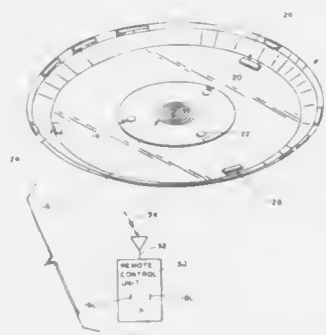
**4,955,961**  
**WORKING MACHINE**  
Itsuo Tagawa, Tokyo, Japan, assignor to Tagawakongyou Co. Ltd., Tokyo, Japan  
Filed Jun. 22, 1989, Ser. No. 369,967  
Int. Cl.<sup>3</sup> B02C 1/02  
U.S. Cl. 241—264 5 Claims



1. A working machine, comprising:  
a machine body;  
a pair of arms mounted on said machine body for relative

movement toward and away from each other in a plane that is variably oriented;  
a bracket mounted on said machine body, said machine body being arranged for rotation relative to said bracket about said axis;  
a hydraulic cylinder assembly having a single cylinder defining therein a hydraulic chamber, and a piston rod unit comprising a piston rod extending through said hydraulic chamber and a single piston fixedly mounted to said piston rod so as to divide the hydraulic chamber into a pair of chamber sections, said piston rod having opposite ends thereof which extend respectively from opposite ends of said hydraulic chamber, said opposite ends of said piston rod being fixedly connected to said bracket;  
a rack fixedly mounted to said cylinder of said hydraulic cylinder assembly; and  
a pinion mounted on said machine body and in mesh with said rack for rotation relative thereto about said axis, whereby said cylinder of said hydraulic cylinder assembly and said rack are moved relatively to said bracket in a direction perpendicular to said axis upon introduction of hydraulic fluid into said hydraulic chamber, so that said pinion and said machine body are rotated about said axis with the movement of said rack.

**4,955,962**  
**REMOTE CONTROLLED FLYING SAUCER**  
Christian Mell, 211 South St., Port Jefferson, N.Y. 11777  
Filed Feb. 2, 1989, Ser. No. 305,119  
Int. Cl.<sup>3</sup> B64C 29/00  
U.S. Cl. 244—23 C 4 Claims



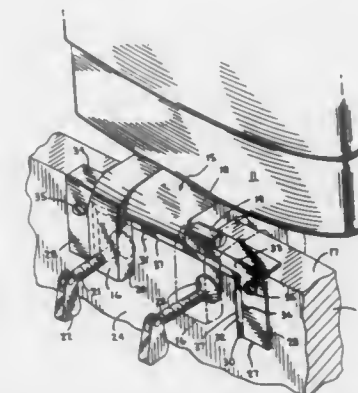
1. A remotely controlled flying saucer comprising:  
(A) a circular body having a top surface and a bottom surface;  
(B) a propulsion system which includes  
(1) a plurality of jet motors on said bottom surface,  
(2) a plurality of individual fuel tanks mounted on said body,  
(3) individual conduit means connecting each individual fuel tank of said plurality of fuel tanks to an individual jet motor of said plurality of jet motors,

(4) a main fuel tank mounted on said circular body,  
(5) individual fuel tank control means connected to each individual fuel tank,  
(6) main fuel tank conduit means fluidically connecting each individual fuel tank control means to said main fuel tank to fluidically connect each individual jet motor to said main fuel tank,  
(7) a valve connected to the control means of each individual tank to be operated to conduct fuel from said main fuel tank to said each individual tank when the control means associated with such each individual tank is activated,  
(8) individual fuel tank fluidic connection means connecting each individual fuel tank to another individual fuel tank and including  
(a) a normally closed diverter valve which establishes fluid communication between said each individual fuel tank and said another tank when said diverter valve is opened,  
(b) a fuel level sensor in each individual fuel tank which senses fuel level in said each individual fuel tank and generates a signal when said fuel level is below a predetermined level, and  
(c) control means for opening said diverter valve upon receiving a signal from said fuel level sensor;  
(C) a plurality of direction controlling guide flaps on said bottom surface;  
(D) motor control means on said body and connected to each jet motor for operating said each motor independently of all other jet motors;  
(E) guide flap control means on said body and connected to each guide flap for operating said each guide flap independently of all other guide flaps;  
(F) a signal receiving means connected to said guide flap control means, to said individual fuel tank control means, and to said motor control means for receiving over-the-air motor control signals and for receiving over-the-air flap control signals and for receiving over-the-air individual fuel tank control unit operating signals and operating said motors, said individual fuel tank control units and said flaps in response to receipt of such over-the-air signals; and  
(G) main control means which is adapted to be located remotely of said body and which includes motor control signal transmitting means which transmits motor control signals over-the-air to said signal receiving means, guide flap control signal transmitting means which transmits guide flap control signals over-the-air to said signal receiving means, and individual fuel tank control means signal generating means which transmits individual fuel tank control signals over-the-air to said individual fuel tank control means.

**4,955,963**  
**OUTBOARD MOTOR RETAINER**  
Richard H. Snyder, Oshkosh, Wis., assignor to Brunswick Corporation, Skokie, Ill.  
Filed Dec. 29, 1989, Ser. No. 458,581  
Int. Cl.<sup>3</sup> B63B 17/00  
U.S. Cl. 248—640 8 Claims

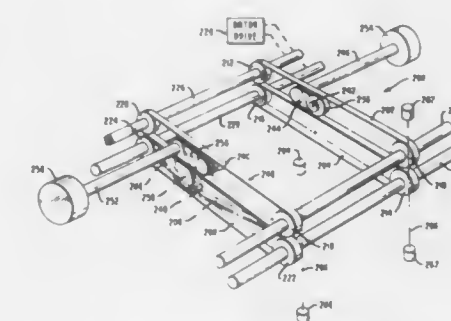
1. A retainer assembly for a transom-mounted outboard boat motor comprising, in combination:  
a boat transom;  
a motor transom bracket attached to the upper edge of the transom and having transom-engaging clamping members including a pair of laterally spaced thumb screws threadably attached to the transom bracket, each screw having a clamping pad on one end including a clamping face adapted to engage the transom, said clamping pads being adjustable between a normally clamped position in engagement with the transom and a fully open unclamped position disengaged from the transom;  
a retaining lip attached to the transom and substantially completely surrounding the upper and lateral regions of

normal engagement between the clamping pads and the transom;  
said retaining lip having a free edge spaced from the face of the transom by an amount greater than the maximum distance between said transom face and the clamping faces of said pads in the fully open unclamped position;



a mounting notch in said retaining lip adjacent the upper edge of the transom, said notch defining a recessed edge portion spaced from the face of the transom by an amount less than said maximum distance; and  
said recessed edge portion having a length greater than the maximum dimension of the face of said clamping pad.

**4,955,964**  
**SHEET HANDLING APPARATUS**  
David A. Hain, Dundee, Scotland, assignor to NCR Corporation, Dayton, Ohio  
Filed Dec. 12, 1988, Ser. No. 282,722  
Claims priority, application United Kingdom, Aug. 19, 1988, 8819768  
Int. Cl.<sup>3</sup> B65H 5/00  
U.S. Cl. 271—225 5 Claims



1. A sheet moving apparatus comprising:  
first and second belt means for moving a sheet along a path of movement from a first point to a second point in said apparatus;  
said first belt means including first and second belts, and said second belt means including first and second belts;  
said first belts of said first and second belt means having cooperating portions to enable said sheet to be moved therebetween;  
said second belts of said first and second belt means having cooperating portions to enable said sheet to be moved therebetween;  
sensing means to detect the leading edge of said sheet entering said apparatus and to provide an output indicative of

the orientation of said leading edge relative to said path of movement in said apparatus;  
said first and second belts of said first and second belt means being endless belts made of resilient stretchable material;  
first actuating means for stretching said cooperating portions of said first belts of said first and second belt means so as to change the lengths thereof; and  
second actuating means for stretching said cooperating portions of said second belts of said first and second belt means so as to change the lengths thereof; and  
control means for controlling the operation of said first and second actuating means so as to stretch, when necessary, said cooperating portions of said first and second belts of said first and second belt means in response to said output of said sensing means so as to align the leading edge of said sheet perpendicular to said path of movement as said sheet is moved from said first point to said second point.

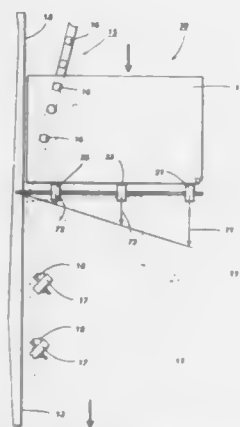
4,955,965

**POSITIVE DRIVE, PASSIVE, SHEET ROTATION DEVICE USING DIFFERENTIAL ROLL VELOCITIES**  
Barry P. Mandel, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 5, 1988, Ser. No. 280,078  
Int. Cl.<sup>5</sup> B65H 5/06

U.S. Cl. 271-225

11 Claims



1. A sheet turning mechanism for turning sheets 90° and registering them against a registration member is adapted for use with a folder apparatus and characterized by at least two pairs of crowned roller nips constantly rotating at their respective speeds, and wherein said at least two crowned roller nip pairs are driven such that their surface velocities create a rotation of the sheets about the lead corner of the sheets adjacent to said registration member and completes a 90° rotation of the sheets before leaving said nips.

4,955,966

**RUBBER COMPOSITION AND GOLF BALL COMPRISING IT**

Syoji Yuki, Osaka; Yasuyuki Tokui, Takatsuki; Kihachiro Nishitani, Tokushima; Kenichi Wada, Itano; Masayoshi Suzue, Tokushima, and Takuo Morimoto, Kyoto, all of Japan, assignors to Asics Corporation, Kobe and Otsuka Chemical Co., Ltd., Osaka, both of Japan

Filed Jun. 9, 1988, Ser. No. 204,310  
Claims priority, application Japan, Jun. 11, 1987, 62-146019; Jun. 12, 1987, 62-147218; Jun. 12, 1987, 62-147219; Jun. 12, 1987, 62-147220; Jun. 12, 1987, 62-147221

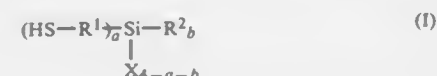
Int. Cl.<sup>5</sup> A63D 37/06; A63B 37/12

U.S. Cl. 273-218

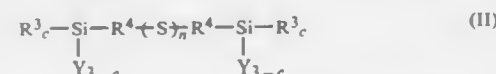
12 Claims

1. A golf ball comprising a rubber composition comprising 100 weight parts of at least one natural and/or synthetic rubber component(s), 10 to 50 weight parts of fine inorganic fibers

having an aspect ratio of 5 to 1000 and 0.1 to 15 weight parts of a non-sulfur type vulcanizing agent, the fine inorganic fibers being treated with a surface treating agent prior to mixing with said rubber component(s), said surface treating agent being selected from the group consisting of compounds represented by the formula I;



wherein each R<sup>1</sup> independently represents a substituted or unsubstituted divalent hydrocarbon group of 2 to 6 carbon atoms, each R<sup>2</sup> independently represents a substituted or unsubstituted monovalent hydrocarbon group, each X independently represents a hydrolyzable group, a is an integer of from 1 to 3, and b is an integer of from 0 to 2 with the proviso that 1 ≤ (a + b) ≤ 3; and compounds represented by the formula II;



wherein each R<sup>3</sup> independently represents a substituted or unsubstituted monovalent hydrocarbon group, each R<sup>4</sup> independently represents a substituted or unsubstituted hydrocarbon group of 2 to 4 carbon atoms, each Y independently represents a hydrolyzable group, c is an integer of from 0 to 2 and n is an integer of from 1 to 6.

4,955,967

**ELECTRONICALLY SCORED DART GAME WITH MISSED DART DETECTION SYSTEM**

John W. Houriet, Jr., Bensalem, and James A. Kavanagh, Warminster, both of Pa., assignors to Merit Industries, Inc., Bensalem, Pa.

Filed Jan. 16, 1990, Ser. No. 465,280

Int. Cl.<sup>5</sup> F41J 5/06

U.S. Cl. 273-372

10 Claims



6. In an electronically scored dart game having a housing, including a front surface, a target on the housing front surface, the target including means for receiving the tip of a dart, and electronic means for sensing the receipt of a dart tip by the target and for generating a score signal to determine a score in response thereto, the electronic means including display means for displaying a score, the improvement comprising:

detection means for detecting when a dart strikes the housing in the vicinity of the target, (a missed dart), the detection means comprising:

(a) first audio sensor means located proximate the target for detecting sounds created when a dart strikes either the target or the housing in the vicinity of the target and for generating an electrical signal upon the detection of such sounds,

(b) second audio sensor means located remote from the target for detecting sounds that simulate the sounds

created when a dart strikes either the target or the housing in the vicinity of the target and for generating an electrical signal upon the detection of such simulated sounds; and

(c) first comparison means communicating with the first and second audio sensor means for generating an electrical output signal indicative of a dart striking the target or the housing in the vicinity of the target only when an electrical signal is received from the first audio sensor means in the absence of an electrical signal from the second audio sensor means.

4,955,968

**PROTECTIVE COVER FOR A TRAILER HITCH**

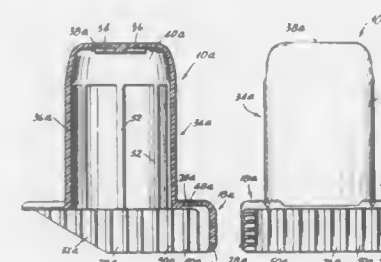
Frank S. Becker, Jr., 40 Dock Rd., Milford, Conn. 06460

Filed Oct. 17, 1988, Ser. No. 258,648

Int. Cl.<sup>5</sup> B60R 21/34; B65D 65/02

U.S. Cl. 280-507

11 Claims



1. A safety cover for a trailer hitch having a hitch bar with a hitch bar surface, comprising in combination:

(a) a one-piece molded, resilient box-like base portion having a horizontal top wall and depending side walls adapted to overlie the surface of the hitch bar, and having between its side walls a cavity which is open at the bottom and which has a side opening that extends substantially to said top wall, in which cavity the hitch bar can be received, and

(b) a plurality of inwardly projecting spaced-apart fins molded integral with and extending from the inner surface of at least one wall, thereby to maintain a clearance space between the said one wall and the adjacent surface of the hitch bar.

4,955,969

**FREE TECHNIQUE SKI POLE**

Rainer Jansson, Salem, Mass., and Aimo Pirttiho, Helsinki, Finland, assignors to Exel Oy, Helsinki, Finland

Continuation of Ser. No. 120,951, Nov. 16, 1987, abandoned.

This application May 1, 1989, Ser. No. 345,564

Claims priority, application Finland, Nov. 18, 1986, 874681

Int. Cl.<sup>5</sup> A63C 11/24

U.S. Cl. 280-824

11 Claims

1. A free technique ski pole stick and a plastic snow disk, a sleeve integral with said snow disk having an opening to receive said pole stick and secure the disk to the stick, said snow disk being asymmetrical in a fore and aft direction about said sleeve with said sleeve being at the forward edge of the disk as the disk and pole would be moved when in use, the lower end of said sleeve extending below the pole stick opening and forming a pin mounting hub, a pin mounted to said hub and projecting downwardly therefrom, said pin at the end of said hub being substantially centered about the central axis of said pole stick, the axis of the portion of the pin projecting beyond the hub being inclined at an angle toward one side of the disk with respect to the axis of the pole stick said one side being that which would be adjacent the user of the pole and the lower

edges of said snow disk which extend laterally and rearward from the opposite lateral sides of said sleeve being in a plane



laterally inclined to the axis of the pole so that they are substantially normal to the axis of the projecting portion of said pin.

4,955,970

**METHOD OF FORMING A JOINT BETWEEN A CONNECTING PIECE AND A PRODUCT FORMED OF COMPOSITE MATERIAL, SAID JOINT, AND SAID CONNECTING PIECE FOR FORMING SAID JOINT**

Ilkka Kivi, Helsinki; Tapio Manner, Vantaa; Kari Kuvaja, and Jorma Terävi, both of Tampere, all of Finland, assignors to Exel Oy and Rauma-Repol Oy, both of Finland

Filed Oct. 13, 1988, Ser. No. 257,435

Claims priority, application Finland, Oct. 16, 1987, 874576

Int. Cl.<sup>5</sup> F16L 39/00

U.S. Cl. 285-149

8 Claims



1. A method of forming a joint between a connecting piece and a product formed of composite material including a binding material matrix and reinforcing fibers extending through the matrix in a longitudinal direction, comprising the steps of: forming said connecting piece with a shoulder within a joint region thereof, placing said connecting piece in a location at which said product is being formed, forming said product, and during formation of said product, guiding said longitudinally extending reinforcing fibers of said composite material as continuous, unitary fibers in a first direction in a first path within said joint region of said connecting piece towards said shoulder thereof, to turn around said shoulder of said connecting piece, and then in a second direction substantially opposite to said first direction in a second path within said joint region of said connecting piece to return to said composite material of said product,



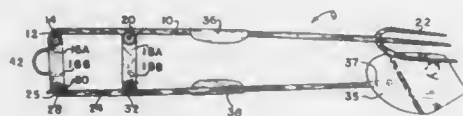
guiding at least some of said reinforcing fibers so that each crosses over itself at least once in said joint region, which includes said shoulder, of said connecting piece, whereby said joint formed between said connecting piece and said product comprises a self-tightening joint, and whereby both said product of said composite material and said joint between said product and said connecting piece are formed simultaneously.

4,955,971

**MULTI-PURPOSE TOOL UTILIZING ARMS WITH PARALLELOGRAM COUPLING AT PROXIMAL ENDS**  
Victor H. Goulter, 485 Molino Dr., San Francisco, Calif. 94127  
Filed Apr. 10, 1989, Ser. No. 335,738  
Int. Cl.<sup>5</sup> A47J 43/28

U.S. Cl. 294—7

11 Claims



1. A multi-purpose tool, comprising:

first and second elongated arms, each arm having a proximal end and a distal end at the end opposite said proximal end, each arm comprising first and second portions, said first portion being at said proximal end and said second portion comprising the rest of each arm, including said distal end thereof, said first portion being shorter than said second portion;

said distal end of each arm having a working implement thereat;

joinder means for joining said proximal ends of said arms together, said joinder means comprising first and second crossarms, each crossarm comprising a member having first and second ends;

said first ends of said crossarms being hingedly attached to said first arm at spaced locations thereon, said locations defining said first portion of said first arm, said second ends of said crossarms being hingedly attached to said second arm at spaced locations thereon, said locations defining said first portion of said second arm, said second locations corresponding, respectively, to the locations on said first arm where said first ends of said crossarms are attached, such that said crossarms and said first portions of said arms intermediate said locations where said ends of said crossarms are attached form an adjustable parallelogram at said proximal ends of said arms;

said second portions of said arms extending away from said parallelogram;

each arm being hingedly joined to each of said crossmembers at locations on each arm which are offset from each arm;

whereby said arms can be moved to and held in any one of the following three working relationships:

(a) said arms are adjacent and parallel to each other with said distal end of one arm projecting forward of said distal end of the other arm so that said working implement at said distal end of one arm can be used alone, and

(b) said arms are adjacent and parallel to each other with said distal end of said one arm projecting forward of said distal end of said other arm so that said working implement at said distal end of other arm can be used alone, and

(c) said arms are spaced from and parallel to each other with said distal end of one arm opposite said distal end of said other arm so that when said arms are grasped between said ends thereof and squeezed together, said working implements at said distal ends of said arms will

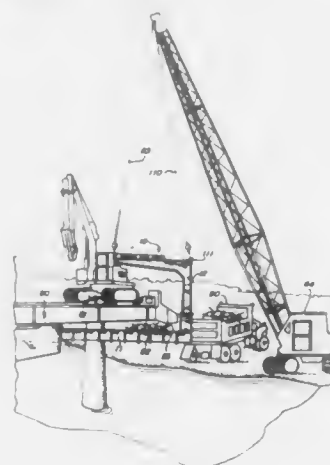
be brought together so that said working implements can be used together.

4,955,972

**CATCH BASIN FOR BRIDGE DECK DEMOLITION**  
Roy E. LaBounty, HC2, Box 105E, Two Harbors, Minn. 55616  
Filed Nov. 14, 1988, Ser. No. 270,213  
Int. Cl.<sup>5</sup> B65D 19/02; B66C 1/26

U.S. Cl. 294—68.26

1 Claim



1. An attachment for collecting broken pieces of concrete and the like for connection to a winch system of a mobile machine such as a crane and utilized in an operation such as a bridge deck demolition, comprising

a tray-like container for collecting falling debris such as crushed concrete and broken reinforcing bars and having a closed end and an open end, the tray-like container having an elongate portion for extending transversely across the span of a structure such as a bridge, the tray-like container including a lateral rib for bracing the elongate portion,

a support means for supporting the tray-like container and having an upright leg and a support arm, the upright leg mounted on the closed end of the tray-like container and being hinged so that the support means may be compacted for transportation and storage, the support arm affixed to an upper portion of the upright leg and extending inwardly over the tray-like container, the length of the support arm being approximately one-half the length of the tray-like container,

a suspending cable connected to an inner portion of the support arm for suspending the tray-like container below a structure such as a bridge deck for the collection of falling debris, the inner portion of the support arm defining a center of balance of the support means and tray-like container, and

a tilting cable connected to the closed end of the tray-like container, the tilting cable raising the closed end relative to the open end of the tray-like container so that the container is tilted and debris collected therein slides off the open end and into a vehicle such as a dump truck.

4,955,973

**CONVERTIBLE BENCH SEAT FOR VANS**  
Roland L. Provencher, 4406 SW. 66th Terr., Davie, Fla. 33314  
Filed Apr. 20, 1989, Ser. No. 340,897  
Int. Cl.<sup>5</sup> B60N 2/14, 2/30

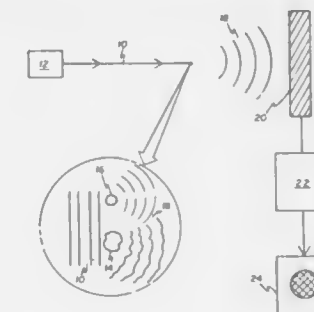
U.S. Cl. 296—65.1

13 Claims

1. A foldable seat for a vehicle having an essentially vertical wall and an essentially horizontal floor and constructed and arranged for pivoting said foldable seat about a first vertical

axis between a seat storage position against said wall and a seat operative position pivoted away from said wall comprising:

one longitudinal end portion of said seat,  
an opposite longitudinal end portion of said seat,  
a back portion for said foldable seat,  
a seat portion for said foldable seat pivotally connected to said back portion about an essentially horizontal axis for movement between a seat portion storage position against said back portion and a seat portion operative position unfolded from said back portion,  
a first vertical pivot rod adjacent said essentially vertical wall and constructed and arranged for pivotally supporting said one longitudinal end portion of said foldable seat for movement of said foldable seat about said first vertical axis,  
a second vertical pivot rod adjacent said essentially vertical wall in spaced relation to said first vertical pivot rod, and



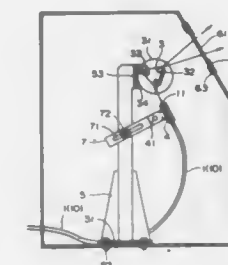
and by said spherical reference scatterer, and means for reconstructing the image of the sample.

4,955,975

**RAINBOW FORMING DEVICE**  
Kei Mori, 3-16-3-501, Kaminoge, Setagaya, Tokyo, Japan  
Filed Jul. 24, 1989, Ser. No. 384,356  
Claims priority, application Japan, Sep. 26, 1988, 63-239954; Mar. 29, 1989, 1-77343

Int. Cl.<sup>5</sup> G02B 6/34  
U.S. Cl. 350—96.19

18 Claims



16. An artificial rainbow forming device comprising an enclosure housing, an upright stand in said housing, a first and second mounting means on said upright stand, an elongated light guide means extending into said housing and having a longitudinal end portion terminating at a light emitting end, said longitudinal end portion of said light guide means having a longitudinal axis, said first mounting means mounting said longitudinal end portion of said light guide means on said upright stand such that the position of said longitudinal end portion of said light guide means is adjustable relative to said upright stand, an elongated prism disposed in said housing, said second mounting means mounting said prism on said upright stand, said elongated prism having a cross section in the form of a substantially equilateral triangle, said prism having first, second and third vertexes at each of first, second and third edges, said first mounting means mounting said longitudinal end portion of said light guide means such that said longitudinal end portion of said light guide means is juxtaposed to said first prism edge and said longitudinal axis of said longitudinal end portion of said light guide means is substantially perpendicular to said first prism edge, said light-emitting end of said light guide means emitting visible light rays to said prism to pass through said prism along a path from said first prism vertex to said second prism vertex and the light rays are split into colors of the spectrum which are emitted from said third prism vertex, a cover means on said housing, said cover means having a transparent part, said light rays emitted from said third prism vertex passing through said transparent part to form an artificial rainbow externally of said housing.

4,955,974

**APPARATUS FOR GENERATING X-RAY HOLOGRAMS AND METHOD FOR OBJECT RECONSTRUCTION**

Charles K. Rhodes, Chicago, Ill.; Keith Boyer; John Dale C. Solem, both of Los Alamos, N. Mex., and Waleed S. Haddad, Chicago, Ill., assignors to MCR Technology Corporation, Chicago, Ill.

Continuation of Ser. No. 234,328, Aug. 18, 1988, abandoned.  
This application Jan. 18, 1990, Ser. No. 470,991

Int. Cl.<sup>5</sup> G03H 1/10

U.S. Cl. 350—3.67

14 Claims

1. An apparatus for generating a hologram of a sample in the x-ray region of the electromagnetic spectrum, said apparatus comprising in combination: a spherical reference scatterer located in the vicinity of the sample under investigation, means for generating substantially monochromatic and substantially coherent x-radiation having sufficient size to simultaneously illuminate the sample and said spherical reference scatterer, means for detecting and recording spatial frequencies in the

4,955,976

## OPTICAL FIBER CONNECTOR

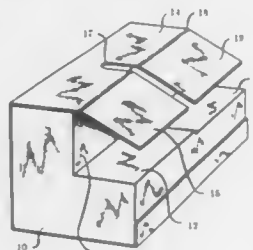
Lacius J. Freeman, Hartwell, and Paul F. Gagen, Duluth, both of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 232,516, Aug. 15, 1988, Pat. No. 4,856,866, which is a continuation of Ser. No. 912,021, Sep. 29, 1986, abandoned. This application Jan. 14, 1989, Ser. No. 335,318

Int. Cl.<sup>5</sup> G02B 6/38

U.S. Cl. 350—96.21

5 Claims



1. An optical fiber connector comprising
  - (a) a first and a second cylindrical plug, the first and second plug each having an outer diameter, an axis, a cylinder surface, an end face and a longitudinal bore adapted for receiving therein a portion of the first and second optical fiber, respectively, the fiber to be fixed in the respective bore, the bore having an axis that is essentially coincident with the axis of the respective plug;
  - (b) alignment means for maintaining the first and second plugs aligned such that the axis of the first plug is substantially collinear with the axis of the second plug, with opposed plug end faces, the alignment means contacting the first and second plug cylinder surfaces and comprising spring clip means having two (not necessarily identical) halves, wherein
    - (i) the alignment means comprise an alignment block having two arms and being of basically L-shaped cross section and adapted for receiving the plugs in the space defined by the arms; and
    - (ii) the spring clip means are adapted for urging the first and second plugs into the space defined by the two arms of the alignment block, and at least partially circumferentially surround at least a portion of the alignment block and extend over at least a part of the space defined by the two arms of the alignment block, and furthermore comprise a transverse slit that defines the two halves, with one half of the spring clip to urge the first plug and the other half to urge the second plug.

4,955,977

## NONLINEAR OPTICAL ARTICLE WITH IMPROVED BUFFER LAYER

Phat T. Dao; Michael Scozzafava; Jay S. Schildkraut, and Christopher B. Rider, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 11, 1989, Ser. No. 419,819

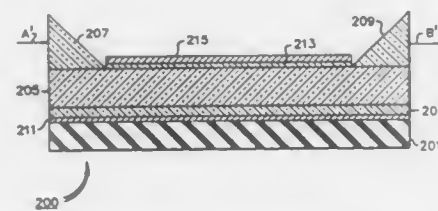
Int. Cl.<sup>5</sup> G02B 6/00; H03F 7/00; B32B 9/04; F21V 9/14

U.S. Cl. 350—96.34

16 Claims

1. An optical article for the propagation of electromagnetic radiation comprised of
  - an electrically conductive support,
  - a poled polymeric film located on said support exhibiting a glass transition temperature of at least 50° C. and a second order polarization susceptibility greater than 10<sup>-9</sup> electrostatic units, and
  - a transmission enhancement layer interposed between said conductive support and said polymeric film, characterized in that said transmission enhancement layer is an amorphous layer of at least 0.5 μm in thickness having a refractive

index less than that of said polymeric film and a resistance less than 10 times that of said polymeric film, said



transmission enhancement layer being comprised of a mixture of (a) at least one metal oxide or fluoride and (b) a low molecular weight aromatic compound.

4,955,978

## MICROSCOPE BASE ILLUMINATOR

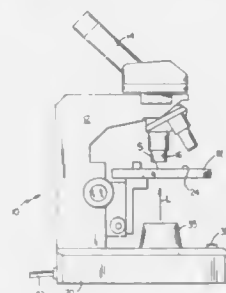
George Hayashi, San Jose, Calif., assignor to Swift Instruments, Inc., San Jose, Calif.

Filed May 17, 1989, Ser. No. 352,929

Int. Cl.<sup>5</sup> G02B 21/06

U.S. Cl. 350—523

12 Claims



1. A microscope illuminator base for use with a microscope comprising a microscope body, a specimen viewing platform and an eyepiece and viewing optics defining a microscope viewing axis through said eyepiece and viewing optics for visual inspection of a microscope specimen disposed upon said platform,

said microscope illuminator base disposed beneath said platform, relative to said viewing optics, for generation of light for illumination of a microscope specimen disposed upon said platform, said microscope illuminator base comprising a fluorescent lamp means for generation of illuminating light on said viewing axis, said fluorescent lamp means comprising at least two fluorescent lamp arms, each said lamp arm comprising a glass wall having an inner surface, with an active illuminating volume defined within said glass wall by said inner surface, said lamp arms disposed with the respective inner surfaces of said glass walls defining said active illuminating volumes disposed on opposite sides of and generally tangent to said microscope viewing axis, and a line intersecting said viewing axis and the axes of said lamp arms lying at an acute angle to said viewing axis.

4,955,979

## OPTICAL PYROMETER WITH AT LEAST ONE FIBRE

Yves Denayrolles, Le Vesinet, and Robert E. Pillon, Le Havre, both of France, assignors to Electricite De France - Service National, Paris, France

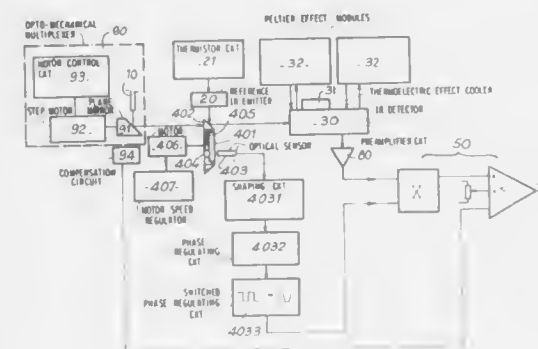
Filed May 31, 1989, Ser. No. 359,303

Claims priority, application France, Jun. 1, 1988, 88 07308

Int. Cl.<sup>5</sup> G01J 5/26, 5/54

U.S. Cl. 374—131

7 Claims



1. An optical pyrometer for measuring the temperature of a target object (C) having a temperature not greater than about 500° C. and producing IR radiations, said pyrometer comprising:
  - at least one optical fiber (10) transparent to IR, made of fluoride glass and having an entrance end, directed toward said target object (C) and positioned to receive at least a part of the IR radiation flux produced by said target object (C), and an exit end through which said part of the IR radiation flux received by said entrance and emerges: a reference emitter (20) for emitting a reference IR flux and which is located near said optical fiber exit end;
  - an infra-red detector (30), sensitive to impinging IR fluxes emerging from said optical fiber exit end and emitted by said reference emitter (20), and adapted to receive said fluxes and to produce an output signal commensurate with the impinging fluxes;
  - a mechanical modulator (40) positioned, in the direction of propagation of said fluxes from said optical fiber exit end and from said reference emitter, upstream of said detector, and adapted to periodically and successively interrupt the IR flux, emerging from said optical fiber exit end, and the IR flux originating from said reference emitter (20), and to produce a servocontrol signal;
  - electronic means (50), connected to both said detector (30) and said mechanical modulator (40), to receive their respective output and servocontrol signals to ensure a synchronous detection; and
  - a measuring apparatus (60), connected to said electronic means (50), for indicating the temperature of the target object (C) irradiating the optical fiber entrance end.

4,955,980

## THERMOMETER PROBE

Yoshihisa Masuo, Shiga, Japan, assignor to Omron Corporation, Kyoto, Japan

Continuation of Ser. No. 210,169, Jun. 21, 1988, abandoned,

which is a continuation of Ser. No. 914,254, Oct. 2, 1986,

abandoned. This application Mar. 20, 1989, Ser. No. 327,389

Claims priority, application Japan, Oct. 2, 1985, 60-149964[U]

Int. Cl.<sup>5</sup> G01K 7/16, 1/08

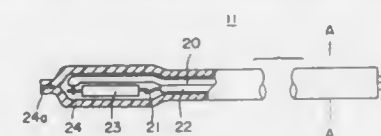
U.S. Cl. 374—185

4 Claims

1. A thermometer probe for sensing the temperature of a liquid, comprising:
  - a temperature sensing element for sensing the temperature of said liquid;
  - first and second elongated conductive members connected on opposing sides of the temperature sensing element for

communicating temperature information, wherein the first conductive member is shorter than the second conductive member, and wherein the first conductive member and the temperature sensing element when joined together form substantially the same length as the second conductive member;

first and second insulating members for coating the first and second conductive members, respectively; and an elongated water-resistant elastic sheath enclosing the



temperature sensing element, the first and second conductive members, and the first and second insulating members, wherein the water-resistant elastic sheath has a distal end which is welded closed, wherein the water-resistant elastic sheath extends continuously from said distal end a distance substantially equal to the length of the elongated conductive members to at least a point remote from the temperature sensing element where no exposure to said liquid occurs, and wherein the water-resistant elastic sheath directly abuts the insulating members.

4,955,981

## RECLOSABLE BAG HAVING HOOK AND LOOP SEALING STRIPS

George A. Provost, Litchfield, N.H., assignor to Velcro Industries B.V., Amsterdam, Netherlands

Continuation of Ser. No. 38,424, Apr. 10, 1987, abandoned,

which is a continuation of Ser. No. 790,966, Oct. 24, 1985,

abandoned. This application Apr. 1, 1988, Ser. No. 178,841

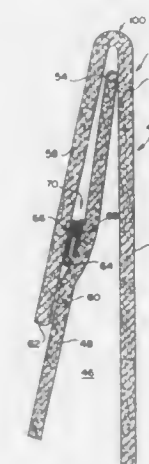
The portion of the term of this patent subsequent to Apr. 25,

2006, has been disclaimed.

Int. Cl.<sup>5</sup> B65D 33/24; A44B 18/00

U.S. Cl. 383—86

7 Claims



1. In a bag of flexible, frangible material including a bottom, opposed spaced sides, and opposed spaced front and rear pieces terminating at the top in front and rear edges respectively, the improvement to provide tamperproof resealability comprising:

- (a) a flap of the flexible, frangible material extending from the rear edge and descending from a fold-point downward over the front edge and down along the front piece;
- (b) a strip of adhesive disposed along the bottom edge of said flap to secure it to the front piece;



(c) first and second elongated strips of a hook and loop fastening system disposed between said flap and front piece above and adjacent to said strip of adhesive with said first strip adhesively attached across the full width thereof to said flap and said second strip adhesively attached across the full width thereof to the front piece, one of said first and second strips including an engaging area along its upper longitudinal edge portion which is sufficiently narrower than the width of the engaging area of the other of said first and second strips, the remaining area along the lower longitudinal edge of the one strip lacking the ability for that strip to form an attachment to the adjacent area of the other strip;

wherein said fold-point of said flap provides a means of placing said strips in substantial alignment with one another along their longitudinal edges so that one strip substantially overlies the other strip; and

(d) fracturing means disposed for fracturing and splitting said flap adjacent the bottom edge of said first and second strips whereby upon initial opening of said fracturing means said flap is fractured and separated along a line closely adjacent said lower edge of said strips and thereafter when said first strip engages and substantially overlies said second strip with said longitudinal edges substantially aligned, said flap and a sufficient portion adjacent the lower longitudinal edge of said first strip can be laterally rolled back away from said second strip, to be directly gripped by human fingers to laterally pull said first strip out of attachment with said second strip whereby the initial lateral separation forces of both strips are intermediate the longitudinal edges of the strips substantially along the boundary of said engaging area and said remaining area so that peeling of said lower longitudinal edges of the strips from said flap and said front piece is prevented thereby avoiding delamination of either strip from the member of the bag to which it is adhesively attached.

4,955,982

## RAISED DEPRESSIBLE PAVEMENT MARKER

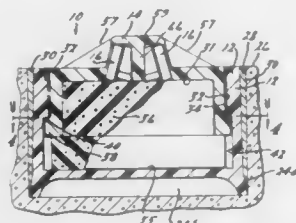
Harry D. Paulos, Columbus, Ohio, assignor to Olympic Machines, Inc., Columbus, Ohio

Filed Mar. 26, 1987, Ser. No. 30,089

Int. Cl.<sup>5</sup> E01F 9/06

U.S. Cl. 404—11

29 Claims



1. A depressible, reflective, pavement marker comprising:
  - a base receptacle adapted to be fixedly secured to the walls of a cavity formed within a pavement, said base receptacle having an upper end portion adapted to be positioned at or below the upper surface of said pavement whereby snow removal equipment may move thereacross without damaging said receptacle;
  - a piston assembly freely movable within said base and including a reflector, portions of said piston assembly normally protruding above the base and the pavement surface, said portions being depressible downwardly into said base;
  - said piston assembly including metal wear members associated with said protruding portions of said piston operative to resist abrasive wear resulting from foreign objects moving across said protruding portions; and
  - a resilient, compressible, substantially water impervious mass filling substantially all the space within said piston

assembly and within said base and biasing said piston assembly upwardly to protrude above said base, said mass minimizing void space in said piston assembly and said base to effectively inhibit accumulation of water there-within without requiring reliance upon sealing means operating between said piston and said receptacle whereby piston movement preventing ice formation within said chamber is effectively resisted and movability of said piston within said chamber is maintained without regard to ambient climatic conditions.

4,955,983

## SIDE LOADING VAULT SYSTEM AND METHOD FOR THE DISPOSAL OF RADIOACTIVE WASTE

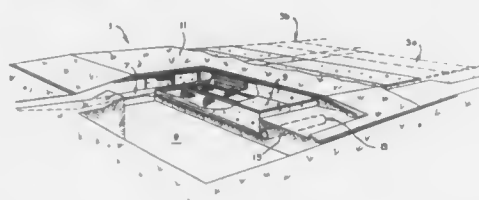
Daniel C. Meess, Murrysville; Bobby J. Jones, Pleasant Hills; Raymond M. Mello, Greensburg; Thomas G. Weiss, Jr., and James B. Wright, both of Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 31, 1989, Ser. No. 331,587

Int. Cl.<sup>5</sup> B09B 1/00; G21F 9/12

U.S. Cl. 405—128

28 Claims



1. A method for the disposal of hazardous radioactive waste, comprising by steps of:
  - a. constructing a floor slab in the earth;
  - b. constructing an elongated wall assembly over said floor slab having sidewalls and a front wall and a back wall at either end said side walls being longer than said front and back walls;
  - c. providing an accessway in said front wall;
  - d. constructing a ceiling slab over said wall assembly that is supported at least in part by said wall assembly to form a vault cell;
  - e. inspecting the vault cell for structural defects, and
  - f. introducing hazardous radioactive waste through the accessway in said front wall and loading said cell with said waste from the back wall to the front wall in rows, each of which is substantially parallel to said back wall to minimize radiation exposure to workers loading the cell, and
  - g. closing the accessway of the vault cell by constructing a removable wall structure within the accessway.

4,955,984

## SAFETY DEBRIS CATCHER

Levearn F. Cuevas, P.O. Box 479, Long Beach, Miss. 39560

Continuation-in-part of Ser. No. 21,087, Mar. 3, 1987,

abandoned. This application Jul. 7, 1989, Ser. No. 376,763

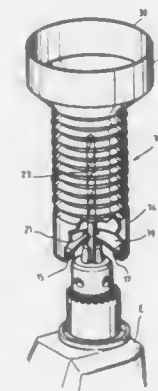
Int. Cl.<sup>5</sup> B23B 45/00

U.S. Cl. 408—67

4 Claims

1. A safety debris catcher for a drill, hammer drill, piston drive, and stud gun apparatus and the like having a working component, comprising
  - a resilient, tubular, sleeve-like bellows having a sleeve at its inner end and a debris collector at its outer end, the bellows being compressible axially and fitting around the working component of the apparatus,
  - the debris collector extending outwardly from the outer end of the bellows and having an outer seating surface adapted to seat against a surface of a wall, ceiling, floor, or construction member,
  - the debris collector extending beyond the working compo-

nent's outer end a distance so that it can be seated against the surface at a 45° angle to the surface, and a spinner disk adapted to be connected to the working component,



the sleeve and the disk having interfitting portions rotatably connecting the sleeve and the disk.

4,955,985

## VANE PUMP WITH ANNULAR RING FOR ENGAGING VANES AND DRIVE MEANS IN WHICH THE ROTOR DRIVES THE ANNULAR RING

Hiroshi Sakamaki; Yukio Horikoshi; Takeshi Jinnouchi, and Kenji Tanzawa, all of Sakado, Japan, assignors to Eagle Industry Co., Ltd., Tokyo, Japan

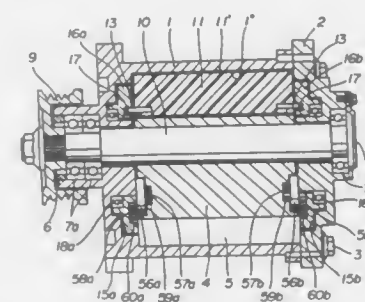
Division of Ser. No. 197,548, May 23, 1988, which is a continuation-in-part of Ser. No. 75,006, Jul. 17, 1987, abandoned, and Ser. No. 110,919, Oct. 21, 1987, abandoned, and Ser. No. 113,568, Oct. 26, 1987, abandoned, and Ser. No. 115,677, Oct. 30, 1987, abandoned. This application Aug. 16, 1989, Ser. No. 394,771

Claims priority, application Japan, Jul. 22, 1986, 61-170903; Jul. 22, 1986, 61-111490[U]; Oct. 23, 1986, 61-161610[U]; Oct. 23, 1986, 61-161609[U]; Nov. 4, 1986, 61-168147[U]; Nov. 4, 1986, 61-168145[U]; Nov. 14, 1986, 61-269961; Nov. 14, 1986, 61-269960[U]; Nov. 17, 1986, 61-271934; Nov. 21, 1986, 61-178288[U]; Nov. 21, 1986, 61-178287[U]; Nov. 21, 1986, 61-276689; Nov. 21, 1986, 61-276690; Dec. 3, 1986, 61-185571[U]

Int. Cl.<sup>5</sup> F04C 2/344

U.S. Cl. 418—257

22 Claims



1. A rotary machine comprising a housing means having a rotor chamber, said rotor chamber having an inner peripheral surface, a rotor means rotatably mounted in said rotor chamber, said inner peripheral surface having a central axis which is eccentrically disposed relative to the axis of rotation of said rotor means, said rotor means having a plurality of generally radially disposed vane slots, a plurality of vane means slidably mounted in said vane slots and operable to define variable

volume chambers as said rotor means rotates and said vane means move generally radially in and out of said vane slots, said vane means having longitudinal ends and projection means projecting from said longitudinal ends, said housing means having rotatable annular ring means coaxial with said peripheral surface of said rotor chamber, and drive means operatively interconnected between said rotor means and said ring means such that said rotor means rotatably drives said ring means, said ring means having engaging means engaged by said projection means of said vane means such that during rotation of said rotor means and said ring means, the resulting centrifugal force urges said vane means radially outwardly of the respective vane slot such that said projection means engages said engaging means to limit the extent of outward radial movement of said vane means from its respective vane slot.

4,955,986

## METHOD FOR THE HEAT TREATMENT OF FINELY GRANULAR MATERIAL

Hans-Dietmar Maury, Ahlen, and Wolfgang Baslowski, Ennigerloh, both of Fed. Rep. of Germany, assignors to O&K Orenstein & Koppel Aktiengesellschaft, Dortmund, Fed. Rep. of Germany

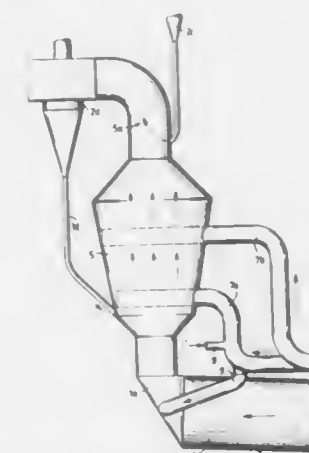
Filed May 28, 1986, Ser. No. 867,644

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1985, 3520058

Int. Cl.<sup>5</sup> F27B 15/00

U.S. Cl. 432—14

3 Claims



1. A method for the heat treatment of finely granular material, particularly for the production of cement, with a preferably multi-stage cyclone preheater, a rotary tubular kiln, a cooler as well as a single kiln off-gas line which is formed between rotary tubular kiln and cyclone preheater and is flow through substantially in upward direction by the off-gases of the rotary tubular kiln and to which tertiary air is fed in two partial streams for the combustion of an additional fuel from the cooler arranged behind the rotary tubular kiln on the material side, said streams being introduced at different heights into the kiln off-gas line; the method comprising the steps of:
  - feeding the additional fuel exclusively to the lower partial stream of the tertiary air to provide for sub-stoichiometric combustion in the off-gas line before the entrance of the second partial stream of tertiary air;
  - feeding the second partial stream of the tertiary air to affect a complete combustion of the additional fuel in the upper part of the kiln off-gas line; and
  - directing the material to be treated, after the conclusion of the complete combustion of the additional fuel, to the kiln off-gas line above the second partial stream of tertiary air.

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## CHEMICAL

4,955,987

PROCESS FOR THE PREPARATION OF  
CONCENTRATED AQUEOUS, SUBSTANTIALLY  
SALT-FREE SOLUTIONS OF AMINOTRIAZINYL  
REACTIVE DYES, AQUEOUS DYE SOLUTIONS  
PRODUCED THEREBY AND PROCESS OF DYEINGRoger Lacroix, Village-Neuf, and Edmond Ruhlmann, St. Louis,  
both of France, assignors to Ciba-Geigy Corporation, Ardaley,  
N.Y.

Filed Dec. 6, 1985, Ser. No. 805,601

Claims priority, application Switzerland, Dec. 7, 1984,  
5821/84Int. Cl.<sup>3</sup> C09B 62/08, 62/085; D06P 1/382, 3/66

U.S. Cl. 8—549 8 Claims

1. A process for the preparation of a concentrated aqueous,  
substantially salt-free solution of an aminotriazinyl reactive  
dye, which comprises

- (1) reacting cyanuric chloride with an azo dye containing 2  
to 5 sulfo groups which are at least partly in the form of an  
ammonium salt, and one or more radicals capable of reacting  
with cyanuric chloride, in the presence of lithium  
hydroxide, and
- (2) deionising and concentrating the salt-containing synthe-  
sis solution by hyperfiltration.

7. A process for dyeing or printing natural or regenerated  
cellulosic or nitrogen-containing fibre material, which com-  
prises applying to said fibre material an aqueous dye solution  
obtained by a process according to claim 1.

4,955,988

## GAS SAFETY VENT DEVICE

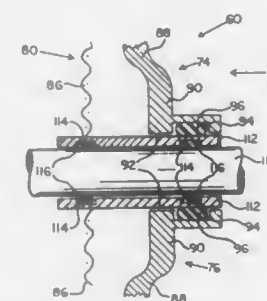
Richard F. Fadus, 225 Crescent Cir., Cheshire, Conn. 06410

Filed Apr. 24, 1987, Ser. No. 42,048

Int. Cl.<sup>3</sup> F17D 3/04

U.S. Cl. 48—193

5 Claims



1. A gas safety means kit having component parts capable of being assembled in the field in surrounding relationship with a pipe to prevent leaking gas from seeping along the exterior of the pipe and entering a building by venting the gas to the atmosphere, the pipe having an outside diameter of a greater magnitude or a lesser magnitude, said component parts comprising the combination of a gas safety vent device and adapter means, said gas safety vent device including an upper member, a chimney integral with said upper member, and a lower member joinable to said upper member with the pipe passing therebetween, each of said upper and lower members having a first internal cylindrical surface of about 180 degrees in arcuate extent and a second internal cylindrical surface of about 180 degrees in arcuate extent, said first and second cylindrical surfaces of said upper member being coaxial and said first and second cylindrical surfaces of said lower member being coaxial, said first surfaces being of equal diameter about the same as the diameter of greater magnitude and said second surfaces being of equal diameter substantially larger than the diameter of said first surfaces, said first and second surfaces of said upper and lower members being equally spaced from each other, and a first piece of wire mesh material having an outer periphery attached to said second surface of said upper member and an inner cylindrical periphery of about 180 degrees in

arcuate extent and spaced a predetermined distance from and coaxial with and of the same diameter as said first internal cylindrical surface of said upper member, and a second piece of wire mesh material having an outer periphery attached to said second surface of said lower member and an inner cylindrical periphery of about 180 degrees in arcuate extent and spaced said predetermined distance from and coaxial with and of the same diameter as said first internal cylindrical surface of said lower member, and said adapter means including a pair of identical semi-cylindrical sleeve halves each having an outside diameter adapted to lie within and conform to said first internal cylindrical surfaces of said upper and lower members and to lie within and conform to said inner cylindrical peripheries of said pieces of wire mesh material and an inside diameter substantially the same as the pipe diameter of lesser magnitude, whereby said upper and lower members are installable directly on a pipe of diameter of said greater magnitude, or are installable on a pipe of diameter of said lesser magnitude with said adapter means interposed between said members and said pipe of diameter of said lesser magnitude, in either case to form a chamber for collecting seeping gas and venting same to the atmosphere through said chimney.

4,955,989

## PROCESS FOR CONVEYING A PARTICULATE SOLID FUEL

Bernardus H. Mink, The Hague, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 726,949, Apr. 26, 1985, abandoned, which is a continuation of Ser. No. 487,531, Apr. 21, 1983, abandoned. This application Jan. 23, 1987, Ser. No. 8,099

Claims priority, application Netherlands, Jun. 23, 1982, 8202532

Int. Cl.<sup>3</sup> C10J 3/50

U.S.



izing gas at the level of a horizontal section of the pressure vessel having an upward velocity which is at least equal to the downward flow rate at which the fuel passes said section.

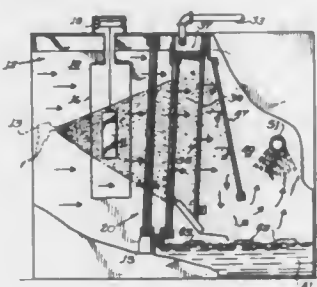
4,955,990

**DISPOSABLE BAFFLE SYSTEM AND METHOD**  
Stanley C. Napadow, Elgin, Ill., assignor to Protectaire Systems Co., Elgin, Ill.

Filed Dec. 22, 1988, Ser. No. 288,326  
Int. Cl.<sup>5</sup> B01D 47/00

U.S. Cl. 55—90

17 Claims



1. A method of operating a paint spray booth comprising the steps of:  
spraying articles with a paint spray and generating overspray paint overspray particulates,  
impinging at least a majority of the paint overspray particulates onto disposable baffles to coat the forward faces thereof with overspray particulates,  
flowing air in a substantially uniform manner through slots between adjacent disposable baffles,  
flowing the cleaner and the remaining overspray particulates through a water wash to wet overspray particulates leaving only a small percentage of overspray particulates for emission,  
collecting the wetted overspray particulates in a tank of water containing chemicals for agglomerating,  
discharging the cleaned air with reduced emissions because of the impinging of paint overspray particulates on the disposable baffles,  
accumulating paint on the disposable baffles until a thick coat of paint is accumulated thereon,  
removing the disposable baffles from the booth and disposing of the baffles with the paint thereon, and  
installing new disposable baffles in the booth to collect paint overspray particulates.

4,955,991

**ARRANGEMENT FOR GENERATING AN ELECTRIC CORONA DISCHARGE IN AIR**

Vilmos Török, Lidingö, and Andrezej Loreth, Akersberga, both of Sweden, assignors to Astra-Vent AB, Stockholm, Sweden  
PCT No. PCT/SE87/00183, § 371 Date Sep. 26, 1988, § 102(e)  
Date Sep. 26, 1988, PCT Pub. No. WO87/06501, PCT Pub. Date Nov. 5, 1987

PCT Filed Apr. 13, 1987, Ser. No. 252,362

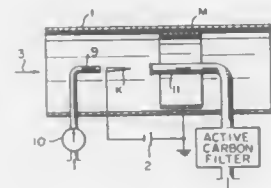
Claims priority, application Sweden, Apr. 21, 1986, 8601817  
Int. Cl.<sup>5</sup> B03C 3/00

U.S. Cl. 55—120

3 Claims

1. An arrangement for generating an electric corona discharge in an air flow path which is in communication with a human environment and continuously removing harmful gases produced as a consequence of the corona discharge from the air flow path comprising  
a duct having an air flow therethrough;  
a corona electrode, and a target electrode spaced from said corona electrode in said air flow of said duct;  
a d.c. voltage source having first and second terminals to which said corona electrode and said target electrode,

respectively, are connected, the voltage between said terminals of said voltage source capable of creating a corona discharge at said corona electrode;  
piping means to continuously remove harmful gases produced as consequence of said corona discharge, extending from inside said duct and out said duct, and having a first pipe with an orifice at one end of said first pipe;  
said orifice of said first pipe located in the vicinity of and



opening in the direction of said corona electrode, and said pipe over the remainder of its length being hermetically sealed relative to said air flow in said duct;  
a second pipe having an open end located axially opposite to and spaced from said orifice of said first pipe;  
air pumping means connected to said second pipe for generating a jet of air out through said open end of said second pipe closely past said corona electrode and into said orifice of said first pipe.

4,955,992

**LIQUID DEGASSING SYSTEM**

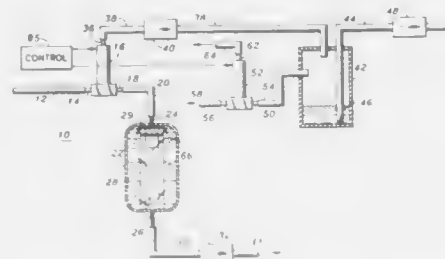
David L. Goodale, Anaheim, and Bradford K. Hess, Orange, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Continuation of Ser. No. 67,067, Jun. 26, 1987, abandoned. This application Aug. 9, 1988, Ser. No. 230,663

Int. Cl.<sup>5</sup> B01D 19/00

U.S. Cl. 55—160

23 Claims



1. A liquid degassing system comprising:  
(a) a liquid intake for receiving liquid from a supply;  
(b) a liquid discharge;  
(c) a liquid reservoir including:  
(i) inlet means for permitting liquid flow into the reservoir from the liquid intake; and  
(ii) outlet means for providing liquid flow out of the reservoir to the liquid discharge, the reservoir being located in line between the liquid intake and the liquid discharge such that substantially all liquid from the supply passes into the reservoir from the intake when travelling to the liquid discharge; and  
(d) degassification means including:  
(i) vacuum means for applying a vacuum to the reservoir for causing the formation of bubbles from gas present within liquid held by the reservoir;  
(ii) means connected to the vacuum means for removing the gas from the reservoir, having means for permitting the gas to travel from the reservoir through the inlet means;

(iii) means for preventing liquid from entering the inlet means while removing gas from the inlet means; and  
(iv) baffle means mounted within the reservoir, the baffle means including a filter element whereby liquid from the inlet means is adapted to pass through the filter when travelling to the liquid discharge, and whereby gas flow through the filter is inhibited.

4,955,993

**SEMI-PERMEABLE HOLLOW FIBER GAS SEPARATION MEMBRANES POSSESSING A NON-EXTERNAL DISCRIMINATING REGION**

Edgar S. Sanders, Jr., Pittsburg; John A. Jensvold; Daniel O. Clark, both of Benicia; Frederick L. Coan, Pittsburg; Henry N. Beck, Walnut Creek; William E. Mickols, Martinez; Peter K. Kim, Danville, and Wudneh Admassu, Concord, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 364,723, Jun. 9, 1989, abandoned, which is a continuation of Ser. No. 129,273, Dec. 7, 1987, Pat. No. 4,838,904. This application Jul. 31, 1989, Ser. No. 387,476

Int. Cl.<sup>5</sup> B01D 53/72, 71/50

U.S. Cl. 55—16

106 Claims

1. A semi-permeable hollow fiber membrane comprising a hydrophobic polymeric material, which possesses an equilibrium water content at about 25° C. of less than about 1 weight percent, said hollow fiber membrane having a thin non-external discriminating region and at least one generally porous region, wherein the discriminating region functions to selectively separate at least one gaseous component from other gaseous components in a gas mixture, wherein the discriminating region and porous region(s) are comprised of the same polymeric material.

28. A method for separating at least one gaseous component from other gaseous components of a gas mixture comprising:

(A) contacting the internal surface of a semi-permeable hollow fiber membrane with a feed gas mixture under pressure, wherein the hollow fiber membrane separates a higher pressure region inside the hollow fiber membrane from a lower pressure region outside of the hollow fiber membrane;  
(B) maintaining a pressure differential across the hollow fiber membrane under conditions such that at least one gaseous component in the feed gas mixture selectively permeates through the hollow fiber membrane from the inside higher pressure region to the outside lower pressure region;  
(C) removing from the outside lower pressure region of the hollow fiber membrane permeated gas which is enriched in at least one gaseous component; and  
(D) removing from the inside higher pressure region of the hollow fiber membrane nonpermeated gas which is depleted in at least one gaseous component;

wherein the hollow fiber membrane comprises a hydrophobic polymeric material, which possesses an equilibrium water content at about 25° C. of less than about 1 weight percent, said hollow fiber membrane possessing a thin non-external discriminating region and at least one generally porous region, wherein the discriminating region and porous region(s) are comprised of the same polymeric material.

4,955,994

**COMPRESSED GAS APPARATUS**

David J. Knight; James M. Kubik, both of Avon Lake, Ohio, and Brian P. Neal, Bristol, United Kingdom, assignors to Allied-Signal Inc., Morristown, N.J. and Bendix Limited, Bristol, England

Filed Jan. 29, 1988, Ser. No. 150,693

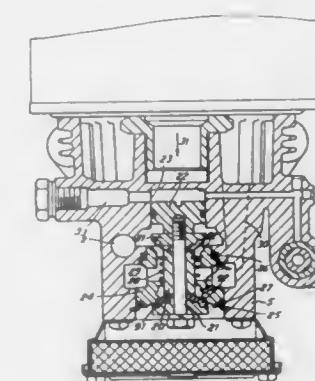
Int. Cl.<sup>5</sup> B01D 53/04

U.S. Cl. 55—163

5 Claims

1. Compressed gas treatment apparatus for connection in a compressed gas system between a gas compressor and a gas

storage reservoir comprising a housing having an inlet port and moisture removing means for removing moisture from the gas, said housing defining a flow path between said inlet port and the moisture removing means, said flow path including a cavity, first valve means between said inlet port and said cavity, a passage defined within said housing for venting said cavity, and second valve means in said housing for controlling said passage, said flow path defining a downwardly extending section through said first valve means interconnecting the inlet



4,955,995

**RANGE HOOD FILTER PAD**

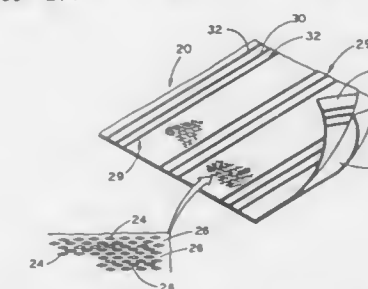
Jeffrey S. Pontius, Amanda, Ohio, assignor to Columbus Industries, Inc., Ashville, Ohio

Filed Jul. 28, 1989, Ser. No. 386,228

Int. Cl.<sup>5</sup> B01D 46/10, 50/00

U.S. Cl. 55—274

7 Claims



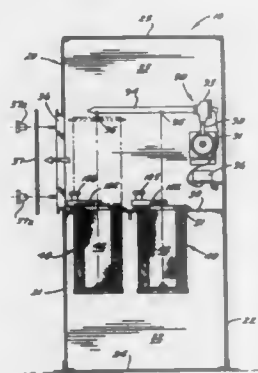
1. In combination with a range hood, a particulate filter comprising:

(a) a support structure;  
(b) a filter pad including a plurality of sheets of absorbent paper filter media of non-woven wood fibers, said sheets aligned in adjacent, parallel relationship to one another and supported in said support structure;  
(c) a plurality of slits in each sheet expanded to define multi-sided discrete openings for the passage of air and a tortuous path for air flow passing between adjacent sheets;  
(d) said support structure and filter pad mounted in said range hood and disposed in an air flow for entrapping particulate matter and organic fat and oil aerosols generated during cooking processes; and  
(e) visual indicating means disposed on an outermost sheet of

said filter pad comprising a plurality of sets of three parallel spaced lines formed by at least two oil soluble dye components, the center line of each of said sets of lines being a selected first color and the next adjacent lines to said center line being a selected second color different than said first color; said colors being selected to form a visually distinct third color different than said first and second colors upon mixing of said first and second colors at a selected location between said center line and the next adjacent lines in each of said sets.

**4,955,996**  
**TOP LOADING DUST COLLECTOR**  
Robert R. Edwards, Fort Mill, S.C., and William J. Klimczak, Pineville, N.C., assignors to Dustex Corporation, Charlotte, N.C.

Filed May 23, 1989, Ser. No. 355,772  
Int. Cl.<sup>5</sup> B01D 46/04  
U.S. Cl. 55—302 10 Claims



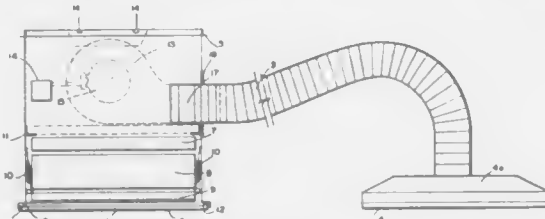
1. An apparatus for separating particulate matter from an air flow comprising:
  - a housing having a hollow interior space;
  - a dividing wall separating said hollow interior space into a first inlet chamber and a second outlet chamber, said dividing wall including at least one generally circular opening for the air flow to pass through from said inlet chamber to said outlet chamber;
  - inlet means communicating with said inlet chamber for directing the air flow into said housing;
  - outlet means communicating with said outlet chamber for exhausting the air flow from said housing;
  - filter cartridge means comprising a filter element of elongate hollow cylindrical configuration and defining a top end, an opposite bottom end, and an internal passageway extending longitudinally between said top and bottom ends, said filter cartridge means further comprising a bottom plate closing said bottom end of said filter element, and a top mounting plate secured to and overlying said top end of said filter element, said top mounting plate including a central opening aligned with said internal passageway so as to permit passage of air therethrough and further including an annular flange which extends radially beyond the outer periphery of said filter element,
  - said filter cartridge means being mounted in said one opening in said dividing wall, with said top mounting plate being disposed on the outlet chamber side of said opening, with said annular flange overlying the periphery of said opening, and with said filter element extending into said inlet chamber,
  - sealing means positioned between said annular flange of said top mounting plate and said dividing wall for surrounding said opening and sealing the interface between said top mounting plate and said dividing wall substantially airtight;
  - clamping means for releasably retaining said filter cartridge

means in said opening of said dividing wall and so as to compress said sealing means between said top mounting plate and said dividing wall; and

air pulse cleaning means for periodically separating accumulated particulate matter from the surface of said filter element within said inlet chamber and comprising an air delivery pipe positioned in said outlet chamber and including an outlet which is aligned with said one opening in said dividing wall, and means for periodically directing a pulse of pressurized air from said outlet and into said filter cartridge means, and with said pipe being spaced from said one opening in said dividing wall by a distance of at least about the longitudinal dimension of said filter cartridge means, whereby the filter cartridge means is freely and easily removable into said outlet chamber and replaceable without the disassembly of the air pulse cleaning means.

**4,955,997**  
**FLUSH MOUNTED CEILING AIR CLEANER**  
Elmer W. Robertson, III, 3209 Springwood Dr., Jonesboro, Ark. 72401

Filed May 10, 1989, Ser. No. 349,811  
Int. Cl.<sup>5</sup> B01D 50/00  
U.S. Cl. 55—316 17 Claims

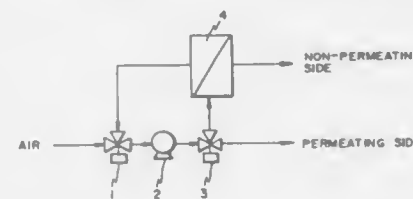


1. An air cleaner adapted for flush mounting in a suspended ceiling system comprising:
  - (a) a cabinet enclosing a blower, a blower motor and a plurality of filters, the cabinet having an attachment flange for securing the cabinet to a ceiling support structure, the cabinet including a return air grill located at an outermost end of an inlet side thereof upstream of said plurality of filters, and corresponding in size substantially to a first standard ceiling grid;
  - (b) at least one plenum chamber having a supply air grill at an outermost end of said plenum chamber and corresponding to in size, and adapted to be supported on, a second standard ceiling grid; and
  - (c) a flexible conduit connecting said cabinet and said supply air grill, said conduit connected to an outlet side of said cabinet downstream of said plurality of filters, and having a length sufficient to permit said cabinet and supply air grill to be located remote from each other.

**4,955,998**  
**PROCESS FOR SEPARATING GAS**  
Kanji Ueda, Ashiya; Kazuo Haruna, Kakogawa, and Masahiro Inoue, Shikama, all of Japan, assignors to Sumitomo Seika Chemicals Co., Ltd., Miyazaki, Japan  
Continuation-in-part of Ser. No. 233,600, Aug. 18, 1988, abandoned. This application Oct. 20, 1989, Ser. No. 424,933  
Claims priority, application Japan, Aug. 21, 1987, 62-208500  
Int. Cl.<sup>5</sup> B01D 53/22

- U.S. Cl. 55—16 4 Claims
1. A process for separating a specific component from air by feeding air to a gas separation membrane module, which comprises the steps of: alternately and repeatedly feeding air under pressure to a non-porous gas separation membrane of a module

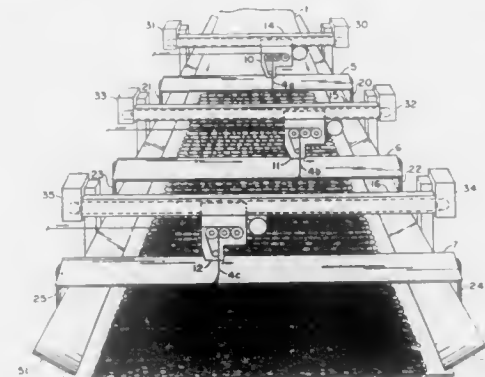
selected from the group consisting of a plate-and-frame module, a spiral module and a hollow fiber module; and suctioning



of a permeating gas under vacuum after feeding of air is stopped.

**4,955,999**  
**STATIONARY STRAND DEFLECTOR FOR CONTINUOUS STRAND MANUFACTURE**  
William L. Schaefer, Butler, and Walter J. Reese, North Huntingdon, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 6, 1989, Ser. No. 418,095  
Int. Cl.<sup>5</sup> C03B 37/02  
U.S. Cl. 65—4.4 6 Claims



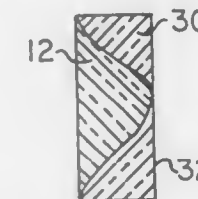
1. In the process of manufacturing continuous strand mat wherein strands of continuous fibers are deposited onto the surface of a moving conveyor and across the width thereof by feeding the strands downward from a plurality of feeders toward the surface of the conveyor and where the strands are interrupted in their downward passage before reaching the conveyor, the improvement comprising passing the strands in their downward path onto the surface of a deflector which is mounted independent of the feeder and which has an adjustable surface, said independently mounted deflector being rigidly affixed across the width of the conveyor surface on which the strands are to be deposited and having its surface angled toward the surface of the conveyor to thereby direct the strands downwardly therefrom onto the conveyor surface.

**4,956,000**  
**GRADIENT LENS FABRICATION**  
Robert R. Reeber, Rte. 7, Box 254A; Wei-Kan Chu, 6 Whisper Ln., both of Chapel Hill, N.C. 27514, and Salah M. Bedair, 1221 Briar Patch, Raleigh, N.C. 27615  
Filed Jun. 28, 1989, Ser. No. 374,111  
Int. Cl.<sup>5</sup> C03B 19/00; C23C 19/04  
U.S. Cl. 65—18.1 4 Claims

1. A method of making a lens having an axis and having a radially non-uniform but axially symmetrical distribution of lens material, which comprises the steps of:
  - positioning a first lens shaping element and a substrate upon which the lens is to be formed so that the first lens shaping

element is adjacent the substrate, the first lens shaping element defining an orifice which extends in an axial direction through the first lens shaping element and which has a non-uniform radial distribution about the lens axis; providing a relative rotation between the first lens shaping element and the substrate about the lens axis; vaporizing a first lens material; directing the vaporized first lens material towards the substrate through the orifice of the first lens shaping element; and

condensing the vaporized first lens material at the substrate; repositioning the first lens shaping element and the substrate to be spaced apart from one another; positioning a second lens shaping element and the substrate upon which the first lens material has been condensed so

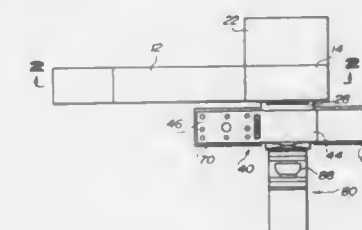


that the second lens shaping element is adjacent the substrate, the second lens shaping element having an orifice which extends in an axial direction through the second lens shaping element and which has a non-uniform radial distribution about the lens axis; providing a relative rotation between the second lens shaping element and the substrate about the lens axis; vaporizing a second lens material; directing the vaporized second lens material towards the substrate through the orifice of the second lens shaping element; and

condensing the vaporized second lens material at the substrate onto the condensed first lens material, to thus form a compound lens.

**4,956,001**  
**METHOD AND APPARATUS FOR BENDING AND ANNEALING GLASS SHEETS TO BE LAMINATED**  
Katsuhiko Kitagawa, and Takeshi Maeda, both of Matsuyama, Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Oct. 19, 1989, Ser. No. 424,125  
Claims priority, application Japan, Oct. 21, 1988, 63-137610[U]; Oct. 31, 1988, 63-275451  
Int. Cl.<sup>5</sup> C03B 23/02  
U.S. Cl. 65—107 12 Claims



1. A method of consecutively and similarly bending at least two glass sheets to be united into a curved laminated glass member and annealing the curved glass sheets obtained by bending, the method comprising the steps of:
  - (a) heating a first glass sheet to a shaping temperature suitable for bending of the glass sheet;
  - (b) in a shaping zone of a furnace bending the heated first glass sheet into a first curved glass sheet and holding the



- first curved glass sheet generally horizontally in a lifted position;
- (c) bringing a ring-like holder into said shaping zone and laying the first curved glass sheet on said holder;
- (d) transferring said holder with the first curved glass sheet laid thereon from said shaping zone into a high-temperature section of an auxiliary furnace which is located adjacent to said furnace, said high-temperature section being maintained at a predetermined temperature close to said shaping temperature;
- (e) heating a second glass sheet to said shaping temperature;
- (f) in said shaping zone bending the heated second glass sheet into a second curved glass sheet while the first curved glass sheet on said holder is kept in said high-temperature section of said auxiliary furnace and holding the second curved glass sheet generally horizontally in a lifted position;
- (g) bringing said holder with the first curved glass sheet laid thereon into said shaping zone and laying the second curved glass sheet on the first curved glass sheet lying on said holder; and
- (h) transferring said holder on which the curved glass sheets to be united into said laminated glass member are lying from said shaping zone into a low-temperature section of said auxiliary furnace; and
- (i) annealing the curved glass sheets lying on said holder in said low-temperature section.

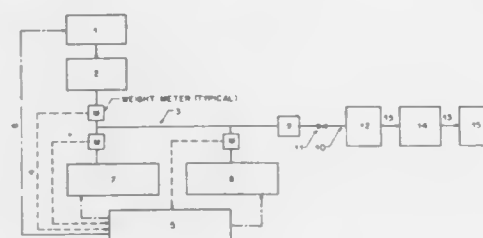
**4,956,002**  
**METHOD FOR THE COMPOSTING OF ORGANIC MATERIALS**

David J. Egarian, 129 Minnehaha Blvd., Lake Hiawatha, N.J. 07034

Filed Nov. 21, 1989, Ser. No. 439,828  
Int. Cl.<sup>5</sup> C05F 9/04, 9/02

U.S. Cl. 71—9

39 Claims



14. A method for composting organic waste materials comprising supplying predetermined amounts of said organic waste material to a plurality of modular containers including a first modular container and a plurality of second modular containers, holding said predetermined amount of said organic waste material which has been composting for a first period of time in said first modular container and holding said predetermined amounts of said organic waste material which have been composting for a plurality of second periods of time in said plurality of second modular containers, said second periods of time being progressively shorter than said first period of time, said predetermined amounts being selected so that a relatively uniform temperature profile may be maintained within each of said plurality of modular containers, circulating air through said predetermined amounts of said organic waste material in each of said first and said plurality of second modular containers, measuring the temperature in said first and said plurality of second modular containers, interconnecting said first modular container with a selected one of said plurality of second modular containers based upon the measured temperature of said selected one of said plurality of second modular containers being less than said measured temperature of said first modular container by a predetermined temperature difference, and circulation at least a portion of said air which has passed through said organic waste material in said first modular con-

tainer to said organic waste material in said selected one of said second modular containers, so as to accelerate the composting of said organic waste material in said selected one of said second modular containers.

**4,956,003**  
**CYCLOHEXANE-1,3-DIONE DERIVATIVES AND THEIR USE FOR CONTROLLING UNDESIRABLE PLANT GROWTH**

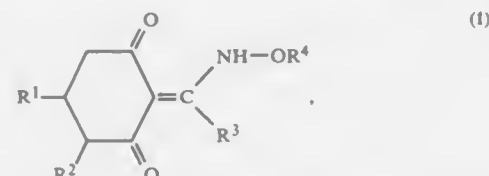
Dieter Jahn, Neckarhausen; Rainer Becker, Bad Dürkheim; Norbert Goetz, Worms, and Bruno Wuerzer, Otterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
Division of Ser. No. 13,180, Feb. 9, 1987, Pat. No. 4,851,032, which is a continuation of Ser. No. 612,632, May 21, 1984, abandoned, which is a continuation of Ser. No. 461,748, Jan. 28, 1983, abandoned, which is a continuation of Ser. No. 382,307, May 27, 1982, abandoned. This application Mar. 27, 1989, Ser. No. 328,573

Claims priority, application Fed. Rep. of Germany, May 29, 1981, 3121355; Jun. 12, 1981, 3123312  
Int. Cl.<sup>5</sup> A01N 43/36; C07D 207/323

U.S. Cl. 71—92

8 Claims

1. A cyclohexane-1,3-dione derivative of the formula



where R<sup>1</sup> is pyrazolyl group, and wherein said pyrazolyl group may also be substituted by one or two substituents from the group comprising alkyl of 1 to 3 carbons, halogen, or alkoxy of 1 or 2 carbons, R<sup>2</sup> is hydrogen, methoxycarbonyl or ethoxycarbonyl, R<sup>3</sup> is alkyl of 1 to 4 carbon atoms, and R<sup>4</sup> is alkyl of 1 to 3 carbon atoms, alkenyl of 3 or 4 carbon atoms, haloalkenyl of 3 or 4 carbon atoms and 1 to 3 halogen atoms, or propargyl, or a salt thereof.

8. A process for the control of unwanted plants, wherein the unwanted plants or the area to be kept free from unwanted plant growth is treated with a herbicidally effective amount of a cyclohexane-1,3-dione derivative of the formula I as defined in claim 1.

**4,956,004**  
**HERBICIDAL TRIAZINEDIONES**

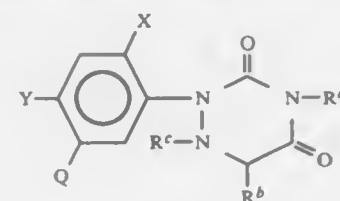
George Theodoridis, Princeton, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed May 10, 1989, Ser. No. 350,053  
Int. Cl.<sup>5</sup> C07D 253/70; A01N 43/707

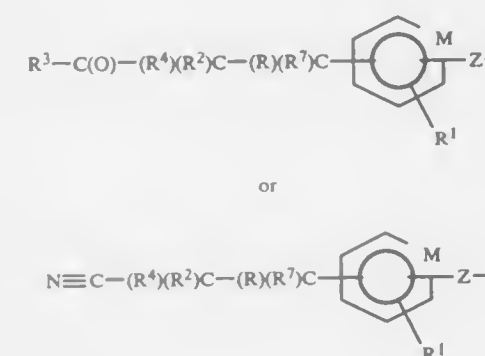
U.S. Cl. 71—93

30 Claims

1. A herbicidal compound of the formula



in which  
Q is



M is CH or N;

Z is O, S, NH or alkylamino;

R<sup>3</sup> is H, OH, alkoxy, alkenyloxy or alkynyloxy, alkoxyalkoxy, alkenyloxyalkoxy or alkynyloxyalkoxy, alkyl, haloalkyl, OZ<sup>2</sup> where Z<sup>2</sup> is of a salt-forming cation, amino, phenylamino, alkylamino, alkenylamino, alkoxyamino or —NHSO<sub>2</sub>R<sup>5</sup> where R<sup>5</sup> is alkyl, haloalkyl, phenyl, halo-phenyl or alkoxyphenyl;

R<sup>1</sup> is H, alkyl, halogen, haloalkyl, nitro, NH<sub>2</sub>, lower alkoxy, alkylthio or cyano;

R<sup>2</sup> is H, lower alkyl, lower alkenyl, lower alkynyl, halogen, CN, or COR<sup>3</sup>;

R is H, lower alkyl, halogen, or lower alkoxy; or R and R<sup>2</sup> together constitute a double bond;

R<sup>4</sup> is H, halogen, lower alkyl, lower alkenyl, or lower alkynyl;

R<sup>7</sup> is H or lower alkyl;

R<sup>6</sup> and R<sup>7</sup> are each H or together constitute a double bond; R<sup>6</sup> is lower alkyl or lower haloalkyl;

X is H, halogen, lower alkyl, haloalkyl or nitro;

Y is H, halogen, alkyl, alkoxy, alkylthio, haloalkyl, —SOCF<sub>3</sub> or halo lower alkoxy; and in which any alkyl, alkenyl, alkynyl, or alkylene moiety has up to about 6 carbon atoms.

**4,956,005**  
**HERBICIDAL ORTHOSULFONAMIDE BENZENE SULFONYLUREAS**

Donald J. Dumas, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

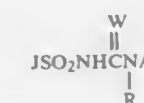
Division of Ser. No. 810,336, Dec. 23, 1985, Pat. No. 4,802,906, which is a continuation-in-part of Ser. No. 703,669, Feb. 21, 1985, abandoned. This application Nov. 14, 1988, Ser. No. 271,155

Int. Cl.<sup>5</sup> A01N 43/66, 43/68, 43/70; C07D 251/52

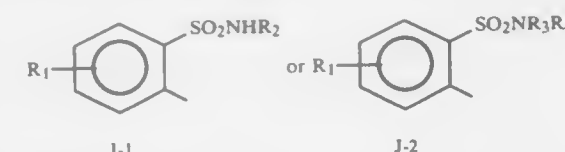
U.S. Cl. 71—93

33 Claims

1. A compound of the formula



and their agriculturally suitable salts, wherein:  
J is



W is O or S;

R is H or CH<sub>3</sub>;

R<sub>1</sub> is H, C<sub>1</sub> to C<sub>3</sub> alkyl, C<sub>1</sub> to C<sub>3</sub> haloalkyl, halogen, nitro, C<sub>1</sub> to C<sub>3</sub> alkoxy, SO<sub>2</sub>NR<sub>6</sub>R<sub>6</sub>, C<sub>1</sub> to C<sub>3</sub> alkylthio, C<sub>1</sub> to C<sub>3</sub> alkylsulfonyl, C<sub>1</sub> to C<sub>3</sub> alkylsulfonyl, CN, CO<sub>2</sub>R<sub>6</sub>, C<sub>1</sub> to C<sub>3</sub> haloalkoxy, C<sub>1</sub> to C<sub>3</sub> haloalkylthio, C<sub>2</sub> to C<sub>3</sub> alkoxyalkyl, C<sub>2</sub> to C<sub>3</sub> haloalkoxyalkyl, C<sub>2</sub> to C<sub>3</sub> alkylthioalkyl, C<sub>2</sub> to C<sub>3</sub> haloalkylthioalkyl, C<sub>2</sub> to C<sub>3</sub> cyanoalkyl or NR<sub>6</sub>R<sub>6</sub>;

R<sub>2</sub> is H, C<sub>1</sub> to C<sub>4</sub> alkyl, C<sub>2</sub> to C<sub>3</sub> cyanoalkyl, methoxy or ethoxy;

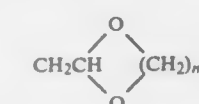
R<sub>3</sub> is H, C<sub>1</sub> to C<sub>4</sub> alkyl or C<sub>3</sub> to C<sub>4</sub> alkenyl; or

R<sub>4</sub> and R<sub>5</sub> can be taken together as —(CH<sub>2</sub>)<sub>3</sub>—, —(CH<sub>2</sub>)<sub>4</sub>—, —(CH<sub>2</sub>)<sub>5</sub>— or —CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>—;

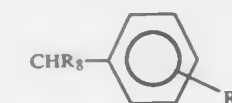
R<sub>6</sub> is C<sub>1</sub> to C<sub>4</sub> alkyl, C<sub>3</sub> to C<sub>4</sub> alkenyl, C<sub>3</sub> to C<sub>4</sub> alkynyl, C<sub>2</sub> to C<sub>4</sub> haloalkyl, C<sub>2</sub> to C<sub>3</sub> cyanoalkyl, C<sub>5</sub> to C<sub>6</sub> cycloalkyl, C<sub>4</sub> to C<sub>7</sub> cycloalkylalkyl or C<sub>2</sub> to C<sub>4</sub> alkoxyalkyl;

R<sub>7</sub> and R<sub>8</sub> are independently H or C<sub>1</sub> to C<sub>2</sub> alkyl;

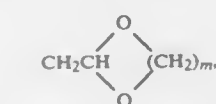
R<sub>9</sub> is C<sub>2</sub> to C<sub>6</sub> haloalkenyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl optionally substituted with 1 or 2 CH<sub>3</sub> groups, C<sub>4</sub> to C<sub>7</sub> cycloalkylalkyl, C<sub>5</sub> to C<sub>6</sub> cycloalkenyl, C<sub>3</sub> to C<sub>6</sub> epoxyalkyl, C<sub>2</sub> to C<sub>6</sub> haloalkyl, CH<sub>2</sub>CH(OR<sub>5</sub>)<sub>2</sub>.



phenyl which may be optionally substituted with R<sub>7</sub>,



CH<sub>2</sub>C(O)CH<sub>3</sub>, CN, OR<sub>6</sub>, C<sub>1</sub> to C<sub>6</sub> alkyl substituted with OR<sub>9</sub>, S(O)<sub>n</sub>R<sub>10</sub> or NR<sub>11</sub>R<sub>12</sub>, Q, CHR<sub>8</sub>Q or CH<sub>2</sub>CH<sub>2</sub>Q; R<sub>3</sub> is C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>3</sub> to C<sub>6</sub> alkenyl, C<sub>3</sub> to C<sub>6</sub> alkynyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl which can be optionally substituted with 1 or 2 CH<sub>3</sub> groups, C<sub>4</sub> to C<sub>7</sub> cycloalkylalkyl, C<sub>5</sub> to C<sub>6</sub> cycloalkenyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>1</sub> to C<sub>3</sub> alkoxy, C<sub>3</sub> to C<sub>6</sub> epoxyalkyl or C<sub>1</sub> to C<sub>6</sub> alkyl substituted with OR<sub>9</sub>, S(O)<sub>n</sub>R<sub>10</sub>, NR<sub>11</sub>R<sub>12</sub> or P(O)(OR<sub>5</sub>)<sub>2</sub>; R<sub>4</sub> is C<sub>1</sub> to C<sub>3</sub> alkyl substituted with 1–3 atoms of F, Cl or Br, C<sub>3</sub> to C<sub>4</sub> alkynyl, CH<sub>2</sub>CH(OR<sub>5</sub>)<sub>2</sub>.



C<sub>2</sub> to C<sub>6</sub> haloalkenyl, C<sub>3</sub> to C<sub>6</sub> epoxyalkyl, CH<sub>2</sub>C(O)CH<sub>3</sub>, CN, C<sub>1</sub> to C<sub>6</sub> alkyl substituted with OR<sub>9</sub>, S(O)<sub>n</sub>R<sub>10</sub> or NR<sub>11</sub>R<sub>12</sub>, Q, CHR<sub>8</sub>Q or CH<sub>2</sub>CH<sub>2</sub>Q;

R<sub>3</sub> and R<sub>4</sub> can be taken together with the sulfonamide nitrogen to form a saturated 5- or 6-membered ring substituted by one or more groups selected from L or a partially saturated 5- or 6-membered ring optionally substituted by one or more groups selected from L;

R<sub>5</sub> is C<sub>1</sub> to C<sub>3</sub> alkyl;

R<sub>6</sub> is C<sub>1</sub> to C<sub>3</sub> alkyl;

R<sub>7</sub> is H, C<sub>1</sub> to C<sub>3</sub> alkyl, halogen, NO<sub>2</sub>, CF<sub>3</sub>, CN or C<sub>1</sub> to C<sub>3</sub> alkoxy;

R<sub>8</sub> is H or CH<sub>3</sub>;

R<sub>9</sub> is H, SO<sub>2</sub>R<sub>5</sub>, C(O)R<sub>5</sub>, CO<sub>2</sub>R<sub>5</sub>, C(O)NR<sub>11</sub>R<sub>12</sub> or P(O)(OR<sub>5</sub>)<sub>2</sub>;

R<sub>10</sub> is C<sub>1</sub> to C<sub>3</sub> alkyl;

R<sub>11</sub> is H or C<sub>1</sub> to C<sub>3</sub> alkyl;

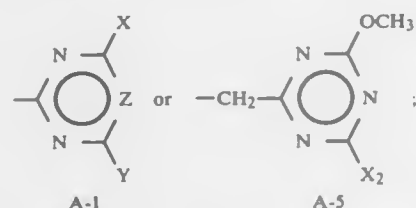
R<sub>12</sub> is H or C<sub>1</sub> to C<sub>3</sub> alkyl;

m is 2 or 3;

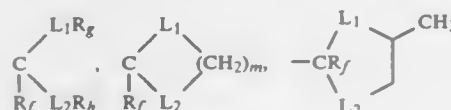
n is 0, 1 or 2;

Q is a heterocycle selected from the group pyrrolidine, pyrrole, dithiolane, tetrahydrofuran, dioxane, thiazole,

thiadiazole, pyrimidine and pyridine optionally substituted by one or more groups selected from L;  
L is C<sub>1</sub> to C<sub>4</sub> alkyl, C<sub>1</sub> to C<sub>3</sub> haloalkyl, halogen, C<sub>1</sub> to C<sub>3</sub> alkoxy, C<sub>1</sub> to C<sub>3</sub> alkylthio, C<sub>3</sub> to C<sub>4</sub> alkenyloxy, C<sub>3</sub> to C<sub>4</sub> alkenylthio, C<sub>1</sub> to C<sub>2</sub> haloalkoxy or C<sub>1</sub> to C<sub>2</sub> haloalkylthio;  
A is



X is H, C<sub>1</sub> to C<sub>4</sub> alkyl, C<sub>1</sub> to C<sub>4</sub> alkoxy, C<sub>1</sub> to C<sub>4</sub> haloalkoxy, C<sub>1</sub> to C<sub>4</sub> haloalkyl, C<sub>1</sub> to C<sub>4</sub> haloalkylthio, C<sub>1</sub> to C<sub>4</sub> alkylthio, C<sub>2</sub> to C<sub>5</sub> alkoxyalkyl, C<sub>2</sub> to C<sub>5</sub> alkoxyalkoxy, amino, C<sub>1</sub> to C<sub>3</sub> alkylamino or di(C<sub>1</sub> to C<sub>3</sub> alkyl)amino;  
Y is H, C<sub>1</sub> to C<sub>4</sub> alkyl, C<sub>1</sub> to C<sub>4</sub> alkoxy, C<sub>1</sub> to C<sub>4</sub> haloalkoxy, C<sub>1</sub> to C<sub>4</sub> haloalkylthio, C<sub>1</sub> to C<sub>4</sub> alkylthio, C<sub>2</sub> to C<sub>5</sub> alkoxyalkyl, C<sub>2</sub> to C<sub>5</sub> alkoxyalkoxy, amino, C<sub>1</sub> to C<sub>3</sub> alkylamino, di(C<sub>1</sub> to C<sub>3</sub> alkyl)amino, C<sub>3</sub> to C<sub>4</sub> alkenyloxy, C<sub>3</sub> to C<sub>4</sub> alkenylthio, C<sub>2</sub> to C<sub>5</sub> alkylthioalkyl, C<sub>1</sub> to C<sub>4</sub> haloalkyl, C<sub>3</sub> to C<sub>5</sub> cycloalkyl, C<sub>2</sub> to C<sub>4</sub> alkynyl, C(O)R<sub>f</sub>;



or N(OCH<sub>3</sub>)CH<sub>3</sub>;  
L<sub>1</sub> and L<sub>2</sub> are independently O or S;  
R<sub>f</sub> is H or CH<sub>3</sub>;  
R<sub>g</sub> and R<sub>h</sub> are independently C<sub>1</sub> to C<sub>2</sub> alkyl;  
Z is N; and  
X<sub>2</sub> is CH<sub>3</sub> or OCH<sub>3</sub>;

provided that:

- when A is A-1, then R<sub>2</sub> is other than CH<sub>2</sub>CF<sub>3</sub>;
- when R<sub>3</sub> or R<sub>4</sub> is CH<sub>2</sub>CF<sub>3</sub>, then the other is CHF<sub>2</sub>, CH<sub>2</sub>CH<sub>2</sub>F, CH<sub>2</sub>CH<sub>2</sub>Cl, CH<sub>2</sub>CH<sub>2</sub>Br or CH<sub>2</sub>CF<sub>3</sub>;
- when R<sub>4</sub> is CF<sub>2</sub>H, then R<sub>3</sub> is other than C<sub>1</sub> to C<sub>3</sub> alkyl;
- when R<sub>4</sub> is C<sub>3</sub> to C<sub>4</sub> alkynyl, then R<sub>3</sub> is CHF<sub>2</sub>, CH<sub>2</sub>CH<sub>2</sub>F, CH<sub>2</sub>CH<sub>2</sub>Cl, CH<sub>2</sub>CH<sub>2</sub>Br or C<sub>3</sub> to C<sub>4</sub> alkynyl;
- neither X nor Y is OCF<sub>2</sub>H; and
- when R<sub>1</sub> is H, then R<sub>2</sub> is other than OR<sub>g</sub>.

23. A method for the control of undesirable vegetation comprising applying to the locus of such vegetation an herbicidally effective amount of a compound of claim 1.

#### 4,956,006 SUBSTITUTED 1-PHENYL PYRROLIDONES AND THEIR USE AS HERBICIDES

Frank X. Woolard, Richmond, Calif., assignor to ICI Americas Inc., Wilmington, Del.

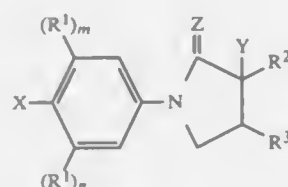
Filed Dec. 27, 1988, Ser. No. 291,081

Int. Cl.<sup>5</sup> C07D 207/26, 403/06; A01N 43/36

U.S. Cl. 71—95

54 Claims

37. A method of controlling undesirable vegetation comprising applying to said vegetation or to the locus thereof an herbicidally effective amount of a compound having the formula



in which:

R<sup>1</sup> is a member selected from the group consisting of halogen, trifluoromethyl, cyano, CH<sub>3</sub>, CF<sub>2</sub>CHF<sub>2</sub>, OCF<sub>2</sub>CHF<sub>2</sub>, OCHF<sub>2</sub>, OCF<sub>3</sub>, SCH<sub>3</sub>, S(O)CH<sub>3</sub>, SO<sub>2</sub>CH<sub>3</sub>, methoxyiminomethyl, methoxyimino-1-ethyl, benzoyloximinomethyl, benzoyloximinomethyl, pyridyloxy, and pyridyloxy substituted with one or more members of the group consisting of halogen and trifluoromethyl;

R<sup>2</sup> is a member selected from the group consisting of halogen, cyano, carboxy, carbalkoxy containing an alkyl group of 1 to 8 carbon atoms, and carbalkoxy containing an alkyl group of 1 to 8 carbon atoms substituted with a member selected from the group consisting of halogen, trifluoromethyl and phenyl;

R<sup>3</sup> is a member selected from the group consisting of C<sub>1</sub>—C<sub>4</sub> alkyl and C<sub>2</sub>—C<sub>4</sub> alkenyl;

X is a member selected from the group consisting of H and halogen;

Y is a member selected from the group consisting of H and halogen;

Z is a member selected from the group consisting of O and S; and

m and n are independently zero or 1.

#### 4,956,007 NITRAMINODIARYL SULFOXIDE DERIVATIVES, PROCESS FOR THEIR PREPARATION AND PHARMACEUTICAL AND PESTICIDAL COMPOSITIONS CONTAINING THEM

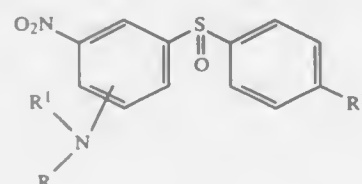
János Kredl; Péter Turcsányi; Béla Stefkó; Judit Mészáros née Brill, and Erika Bogesch, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyor Rt., Budapest, Hungary  
Filed Feb. 28, 1985, Ser. No. 706,705

Claims priority, application Hungary, Feb. 29, 1984, 814/84  
Int. Cl.<sup>5</sup> A01N 41/00; C07C 93/14

U.S. Cl. 71—103

8 Claims

1. An anthelmintic method of treatment which comprises the step of administering to a mammalian subject, a therapeutically effective amount of the compound of the Formula (I)



wherein

R and R<sup>1</sup> are hydrogen or C<sub>1</sub> to C<sub>6</sub> alkyl; and

R<sup>2</sup> is hydrogen, halogen, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> alkoxy, or phenyl or phenylthio both optionally substituted by at least one halogen or nitro substituent.

#### 4,956,008 APPARATUS FOR SUPERPLASTIC FORMING AND EJECTION OF A PART FROM A DIE

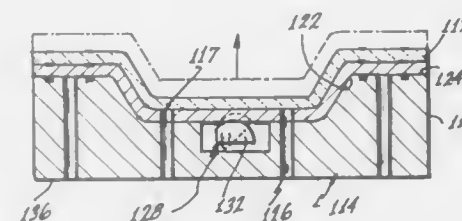
Frederick T. McQuilkin, Los Angeles, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 22, 1986, Ser. No. 909,545

Int. Cl.<sup>5</sup> B21D 45/02

U.S. Cl. 72—427

7 Claims



1. An apparatus for superplastic forming and ejection from its die of a metallic workpiece, comprising:

- a die, said die having a face at least a portion of which defines a cavity;
- a liner, said liner removably positioned in said cavity, said liner having a first surface positioned adjacent said face, the workpiece positioned to form against said liner on a second surface of said liner opposite said first surface; and
- ejecting means for ejecting the liner with the formed workpiece thereon from the cavity, said ejecting means including:
  - a rotary cam mounted in said die, said cam positioned proximal said first liner surface adjacent said die face so that a lobe of said cam movably contacts said liner to move the liner away from said die upon rotation of said cam;
  - means for rotating said cam, said means for rotating operably connected to said cam.

#### 4,956,009 CALCIUM ALLOY STEEL ADDITIVE AND METHOD THEREOF

James W. Robison, Jr., Wexford, Pa., assignor to Reactive Metals and Alloys Corporation, West Pittsburg, Pa.

Continuation-in-part of Ser. No. 232,968, Aug. 17, 1988, abandoned. This application Dec. 26, 1989, Ser. No. 456,530

Int. Cl.<sup>5</sup> C21C 7/06, 7/064

U.S. Cl. 75—307

10 Claims

1. A granular alloy additive for use in the treatment of molten steel comprising granules of alloyed calcium and aluminum having a ratio of not more than 2.85:1 nor less than 0.35:1 calcium to aluminum by weight, which granules during immersion in the steel will form a boundary layer adjacent their outer surface and wherein the granules are sized such that substantially all of the granule is consumed in the formation of the boundary layer, the granules being larger than 35 mesh.

#### 4,956,010 METHOD OF DESULPHURIZING PIG-IRON

Michel Douchy, Solesmes, France, assignor to Affinal, France  
Filed Apr. 12, 1989, Ser. No. 336,860

Claims priority, application France, Apr. 14, 1987, 88 04927

Int. Cl.<sup>5</sup> C21C 7/02

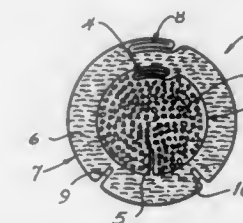
U.S. Cl. 75—304

18 Claims

1. A method of desulphurizing liquid pig-iron comprising the steps of:

- contacting the liquid pig-iron with a metal selected from the group consisting of Na, K, Mg, Ca and mixtures thereof, in a form selected from the group consisting of oxide, carbonate, carbide and mixtures thereof; and
- introducing a filled wire in the liquid pig-iron, the wire having an axial zone surrounded by an intermediate tubu-

lar metallic wall, the axial zone containing metallic magnesium in a form selected from the group consisting of alloyed metallic magnesium, unalloyed metallic magnesium, and mixtures thereof, the magnesium in alloyed or



unalloyed form comprising at least 40% of the mass of the material in the axial zone, the wire also containing an annular zone between the intermediate wall and an outer tubular metallic skin, the annular zone containing a second material.

#### 4,956,011 IRON-SILICON ALLOY POWDER MAGNETIC CORES AND METHOD OF MANUFACTURING THE SAME

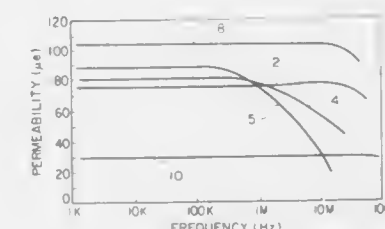
Tokuhiro Nishida, and Masao Yamamiya, both of Kawasaki, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Jan. 17, 1990, Ser. No. 466,605

Int. Cl.<sup>5</sup> C22C 29/00

U.S. Cl. 75—230

6 Claims



No. 2 and 8 ARE THE PRESENT INVENTION  
No. 4, 5, 9 AND 10 ARE FOR COMPARISON  
No. 3, 6, 7, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 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625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139,



after sintering, and the resulting composite exhibits hardness and toughness properties greater than the average of those



properties of the hard metal powder of the first grade and the hard metal powder of the second grade.

4,956,013

## REFRACTORY COATING COMPOSITION

Hideo Motoki, Ibaraki, Japan, assignor to Shikoku Kaken Kogyo Co., Ltd., Ibaraki, Japan

PCT No. PCT/JP87/00755, § 371 Date Jun. 7, 1988, § 102(e) Date Jun. 7, 1988, PCT Pub. No. WO88/02740, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 7, 1987, Ser. No. 221,830

Claims priority, application Japan, Oct. 7, 1986, 61-238703

Int. Cl.<sup>3</sup> C04B 7/02, 14/18, 14/20, 24/00

U.S. Cl. 106—675

5 Claims

1. A refractory coating composition consisting essentially of:
  - (i) 100 parts by weight of portland cement,
  - (ii) 3 to 50 parts by weight of a powdered re-emulsion resin,
  - (iii) 50 to 6000 parts by weight of a mixture of 15 to 85% by weight of aluminum hydroxide powder and 85 to 15% by weight of a carbonate decomposable at a temperature of 300° and 1000° C, and
  - (iv) 20 to 300 parts by weight of a lightweight aggregate having at least 50% open cells based on the total cells.

4,956,014

## ELECTROLESS COPPER PLATING SOLUTION

Koji Kondo, Chiryu; Katuhiko Murakawa, Obu; Kaoru Nomoto, Okazaki; Futoshi Ishikawa, Nagoya; Nobumasa Ishida, Chiryu, and Junji Ishikawa, Nagoya, all of Japan, assignors to Nippondenso Co. Ltd., Kariya, Japan

Continuation of Ser. No. 119,861, Nov. 13, 1987, Pat. No. 4,814,009. This application Mar. 20, 1989, Ser. No. 325,536

Claims priority, application Japan, Nov. 14, 1986, 61-269806;

Oct. 21, 1987, 62-264016

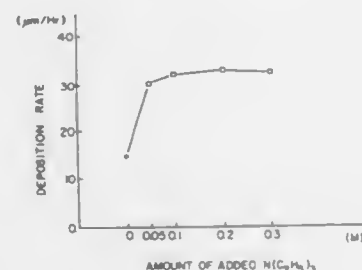
The portion of the term of this patent subsequent to Mar. 21,

2006, has been disclaimed.

Int. Cl.<sup>3</sup> C23C 18/40; B05D 1/18

U.S. Cl. 106—1.23

10 Claims



1. An electroless copper plating solution comprising a copper salt, a complexing agent for copper ion, a reducing agent, a pH-adjuster and an accelerator selected from the group consisting of trimethylamine, triethylamine, tripropylamine, tributylamine, dimethylethylamine, diethylmethylamine, diethylpropylamine, dipropylethylamine, trihexylamine, tris(4-bromophenyl)amine, tribenzylamine, N-ethylbenzylamine,

ethyldiethanolamine, diethylaminoethanol, N-methylpiperidine, N-methylmorpholine, N-ethylpiperidine, and N-ethylmorpholine.

4,956,015

## POLISHING COMPOSITION

Taizo Okajima, Kitakyushu; Kouichi Ootani, Nohgata, and Tsutomu Yamada, Machida, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Jan. 18, 1989, Ser. No. 298,048

Claims priority, application Japan, Jan. 19, 1988, 63-9385; Feb. 9, 1988, 63-27941

Int. Cl.<sup>3</sup> C09G 1/02

U.S. Cl. 106—3

24 Claims

1. A polishing composition comprising water,  $\alpha$ -alumina and boehmite wherein the  $\alpha$ -alumina is in an amount of from 1 to 30% by weight and the boehmite is in an amount of from 0.1 to 20% by weight, based on the total amount of the composition.

4,956,016

## ANTICORROSIVE AGENTS AND USE THEREOF

Reinhard Oplitz, Dueren, and Lutz Schellenberg, Koeln, both of Fed. Rep. of Germany, assignors to Gerhard Collardin GmbH, Koeln-Ehrenfeld, Fed. Rep. of Germany

Filed Feb. 28, 1989, Ser. No. 316,889

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1988, 3806675

Int. Cl.<sup>3</sup> C09D 5/08; C23F 11/18

U.S. Cl. 106—14.12

16 Claims

1. A process for inhibiting the corrosion of a metal surface by contact between said metal surface and an aqueous solution consisting essentially of:

- (a) a component selected from the group of water-soluble alkali metal tetraborate salts;
- (b) a component selected from the group of water-soluble alkali metal triphosphate salts; and
- (c) water; and, optionally,
- (d) a component of one or more surfactants.

4,956,017

## NON-VOLATILE 1,1,1-TRICHLOROETHANE INHIBITORS

Felipe A. Donate; George E. Hartwell, both of Midland, Mich.; Bruce D. DeBolt, Surfside, Tex.; James G. Papajesk, Bay City, Mich., and Mark V. Buzzard, Chicago, Ill., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 5, 1989, Ser. No. 348,246

Int. Cl.<sup>3</sup> C08K 5/02

U.S. Cl. 106—311

13 Claims

12. A solvent-based paint formulation comprising paint and from about 10 to about 90 volume percent 1,1,1-trichloroethane containing a stabilizing amount of a non-volatile polyether with an average molecular weight of at least about 550 and no greater than about 8500 and having at least one terminal moiety selected from the group consisting of hydroxy, amine, substituted amine, cyano, ether, ester and urethane.

13. The formulation of claim 12 wherein the stabilized 1,1,1-trichloroethane comprises from about 40 to about 60 percent of the formulation.

4,956,018

## PREPARATION OF STRONG AND SOFT-TEXTURED SURFACE COATING PIGMENTS

Joachim Kranz, Ludwigshafen, and Alois Wiesenberger, Lambshelm, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Dec. 2, 1988, Ser. No. 279,097

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1987, 3740977

Int. Cl.<sup>3</sup> C04B 14/00; C09B 67/50; C08K 5/00

U.S. Cl. 106—401

9 Claims

1. In a process for preparing a strong and soft-textured surface coating pigment by grinding the crude pigment together with an inorganic grinding aid in the presence of an organic liquid in a comminutor, the improvement comprising grinding in the presence of a phthalic diester of a C<sub>1</sub>-C<sub>15</sub>-alkanol or an alkoxyalkanol of from 3 to 15 carbon atoms in total, phenoxyethanol, 2-phenylethanol, a C<sub>1</sub>-C<sub>4</sub>-alkyl benzoate or a mixture thereof as the organic liquid.

4,956,019

## FLAKY COLOR PIGMENT AND PROCESS FOR PRODUCING THE SAME

Tamio Noguchi, Iwaki, and Takaji Watanabe, Omiya, both of Japan, assignors to Merck Patent Gesellschaft Mit Beschränkter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Aug. 13, 1987, Ser. No. 84,945

Claims priority, application Japan, Aug. 13, 1986, 61-188614

Int. Cl.<sup>3</sup> C09C 3/06, 1/04

U.S. Cl. 106—415

14 Claims

1. A flaky colored pigment comprising a flaky powder substrate with a layer of zinc oxide on the substrate surface and on said zinc oxide layer an inorganic colored pigment layer or comprising a flaky powder substrate with an inorganic colored pigment layer on the substrate surface and on said inorganic colored pigment layer a zinc oxide layer, in each case said inorganic colored pigment layer being deposited from a suspension of said inorganic colored pigment which has been added to said suspension in the form of already-formed pigment particles.

4,956,020

## INHIBITING POPCORN POLYMER GROWTH

Sadao Nakajima, Mie, Japan, assignor to Hakuto Chemical Co., Ltd., Tokyo, Japan

Filed Apr. 28, 1989, Ser. No. 345,124

Int. Cl.<sup>3</sup> B08B 9/00

U.S. Cl. 134—22.19

8 Claims

1. A method for the inhibition of popcorn polymer growth by treating a popcorn polymer on the inner surface of an olefin production apparatus with a popcorn polymer growth inhibitor in an amount of 0.5 to 10% by weight in a medium while the operation of the apparatus is suspended and olefins are substantially removed from the apparatus,

said popcorn polymer growth inhibitor comprising one compound selected from the group consisting of hydroquinone, 2,6-di-t-butyl-p-cresol, N,N'-di-sec-butyl-p-phenylenediamine, phenothiazine, 2-methyl-4-nitroso-phenol, N-nitrosophenyl hydroxylamine, p-nitroso phenyl, hydroxylamine, N,N-diethylhydroxylamine, hydrazine, monoethanol amine, ethylene diamine, octyl mercaptan and thioglycolic acid 2-ethylhexyl ester, said medium comprising one member selected from the group consisting of water, a water-soluble organic acid and a mineral oil.

4,956,021

## STAIN CLEANING METHOD

Joseph E. Kerze, 17446 Hatteras St., Encino, Calif. 91316

Filed Feb. 6, 1990, Ser. No. 475,447

Int. Cl.<sup>3</sup> B08B 7/04

U.S. Cl. 134—40

10 Claims

1. A method for cleaning hydrocarbon stains from a hard

surface comprising surrounding the stain on the surface with means to contain a liquid solvent, filling said containing means with an organic chemical solvent which is completely miscible with petroleum hydrocarbons which are liquid at ambient temperature and pressure, allowing the solvent to remain on the surface for a period of from 1 to 24 hours, removing the solvent and placing on the surface an absorbant material which does not dissolve in the solvent, allowing the absorbant material to remain on the surface from 1 to 24 hours, then removing the absorbant material and allowing the surface to air dry.

4,956,022

## CHEMICAL POLISHING OF ALUMINUM ALLOYS

Issa S. Mahmoud, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 145,806, Jan. 15, 1988,

abandoned. This application Jul. 12, 1989, Ser. No. 378,464

Int. Cl.<sup>3</sup> C23G 1/02

U.S. Cl. 134—41

12 Claims

1. A method of polishing aluminum alloys comprising the steps of:

immersing clean aluminum alloy workpieces in a solution consisting essentially of per liter from about 588 to about 940 milliliters phosphoric acid; 73 to 118 milliliters nitric acid; 30 to 48 grams sodium nitrate; 88 to 142 milliliters of water; for a period of about 0.8 to 3.2 minutes at a temperature in the range of about 80 to 90 degrees centigrade; and rinsing the workpieces in deionized water.

4,956,023

## INTEGRATED SOLAR CELL DEVICE

Kazunori Tsuge; Toshihito Endo; Kenji Kobayashi, and Yoshihisa Tawada, all of Kobe, Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

PCT No. PCT/JP88/00319, § 371 Date Jan. 27, 1989, § 102(e) Date Jan. 27, 1989, PCT Pub. No. WO88/07768, PCT Pub. Date Oct. 6, 1988

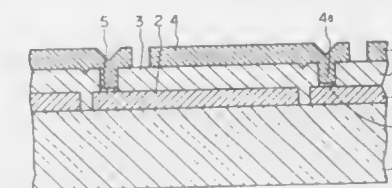
PCT Filed Mar. 30, 1988, Ser. No. 286,180

Claims priority, application Japan, Mar. 31, 1987, 62-80363

Int. Cl.<sup>3</sup> H01L 31/05

U.S. Cl. 136—244

14 Claims



1. An integrated solar cell device characterized in that a plurality of amorphous silicon solar cells, each having a transparent electrode on the light impinging side, an amorphous silicon layer, and a metal electrode on the side opposite the light impinging side, are placed on a transparent substrate, and the plurality of solar cells are connected in series or series-parallel using the transparent electrode and the metal electrode thereof, wherein a conductive anti-oxidation film made from a metal silicide is formed between the transparent electrode and the metal electrode at the series connection, and between the amorphous silicon layer and the metal electrode.

4,956,024

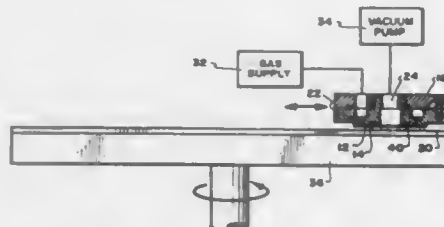
## NON-CONTACTING METHOD OF CLEANING SURFACES WITH A PLANOAR GAS BEARING

Robert L. Dean, Castro Valley; Lydia J. Young, Palo Alto, and Lee H. Veneklassen, Castro Valley, all of Calif., assignors to The Perkin Elmer Corporation, Norwalk, Conn.  
Continuation of Ser. No. 325,107, Mar. 17, 1989, abandoned, which is a continuation of Ser. No. 142,173, Jan. 11, 1988, abandoned. This application Aug. 7, 1989, Ser. No. 391,715

Int. Cl.<sup>5</sup> B08B 5/02

U.S. Cl. 134—37

20 Claims



1. A method of cleaning very small particulates, on the order of 1 or 2 microns, from a surface, comprising the steps of: forming a thin gas film on said surface between a cleaning device and said surface by impinging pressurized gas on said surface, said gas film being planar and having the thickness in the order of 20 to 30 microns and providing a high velocity gas flow between said cleaning device and said surface, and moving said film across said surface.

4,956,025

PROCESS FOR PRODUCING COLD-ROLLED HIGH STRENGTH STEEL SHEET HAVING EXCELLENT FORMABILITY AND CONVERSION-TREATABILITY  
Kazuo Koyama; Takatoshi Taira, both of Kimitsu; Kaoru Kawasaki, Kitakyushu; Atsushi Itami, and Nobuhiko Matsuza, both of Kimitsu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

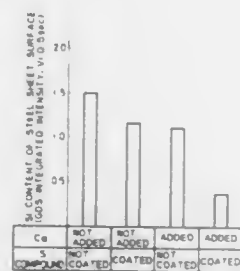
Filed Dec. 30, 1988, Ser. No. 292,120

Claims priority, application Japan, Jan. 14, 1988, 63-6193; Oct. 7, 1988, 63-252098

Int. Cl.<sup>5</sup> C21D 8/04

U.S. Cl. 148—12 C

14 Claims



1. A process for producing a cold-rolled high strength steel sheet having an excellent formability and conversion-treatability, comprising the steps of:

heating to a temperature of 1150° C. or lower a steel slab comprising

C: 0.005 wt % or less,

Si: 0.5–1.5 wt %,

Mn: 0.1–0.5 wt %,

Ti: 0.003–0.05 wt % and at least 3.4×N wt %,

Nb: 0.003–0.05 wt % and at least 7.8×C wt %,

Al: 0.01–0.1 wt %,  
P: 0.05–0.15 wt %,  
S: 0.010 wt % or less,  
N: 0.005 wt % or less,  
B: 0.0001–0.0050 wt %,

the balance consisting of Fe and unavoidable impurities, hot-rolling said steel slab with a finishing rolling temperature of the A<sub>3</sub> point of said steel or higher to obtain a hot-rolled steel sheet, cooling the hot-rolled steel sheet at a cooling rate of 10° C./sec or more in the stage between said finishing rolling and the following coiling step, with the provision that said cooling is started not later than 2 sec after said hot-rolling is finished and is continued for a duration of at least 3 sec, coiling the steel sheet at a temperature of 650° C. or higher, cold-rolling the steel sheet at an ordinary rolling draft, coating the surface of the cold-rolled steel sheet with one or more sulfur compounds in an amount such that after the following continuous-annealing step the surface of the continuous-annealed steel sheet has a sulfur content of from 0.01 to 1.0 wt %, and continuous-annealing said cold-rolled steel sheet at a heat-cycle of holding for 1 sec or longer at a temperature of 930° C. or lower to complete the recrystallization of said cold-rolled steel sheet.

4,956,026

## COATED ARTICLE HAVING A BASE OF AGE-HARDENED METAL

James A. E. Bell, Oakville, Canada, assignor to Inco Limited, Toronto, Canada

Division of Ser. No. 169,283, Mar. 27, 1985. This application May 8, 1989, Ser. No. 348,941

Claims priority, application Canada, Jul. 4, 1987, 534009  
Int. Cl.<sup>5</sup> C22F 1/08, 1/10, 1/14; C21D 9/00

U.S. Cl. 148—127

12 Claims

1. A process for producing an age-hardened article having on the surface thereof a layer of precious metal from the group consisting of gold and platinum group metals comprising:

(a) providing in a condition to be age-hardened a nickel and/or cobalt surfaced structure having a base of an alloy age-hardenable in the range of 300° to about 600° C.;

(b) depositing on at least part of the surface of said structure a layer of said precious metal correlated in thickness to the time and temperature of age-hardening such that after age-hardening said precious metal will have a surface nickel plus cobalt content of about 1% to about 10% by weight effective to increase the wear-resistance of said layer of precious metal; and

(c) thereafter age-hardening said structure having said base and said precious metal layer to thereby effect:

(1) interdiffusion of said precious metal and said nickel to enhance both the adhesion of said precious metal layer to said base and enhanced wear-resistance of said precious metal without destruction of the inherent qualities of said precious metal; and

(2) hardening of said base alloy.

4,956,027

## TREATMENT OF CHROMATE COATING

Kenichi Saeki, Kanagawa; Noriaki Yoshitake, Tokyo, and Takayuki Aoki, Kanagawa, all of Japan, assignors to Nihon Parkerizing Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 57,067, Jun. 1, 1987, abandoned. This application Feb. 21, 1989, Ser. No. 313,330

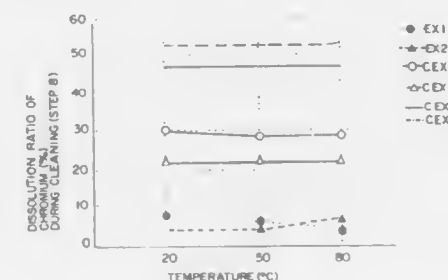
Claims priority, application Japan, Jun. 13, 1986, 61-136030  
Int. Cl.<sup>5</sup> C23C 22/30

U.S. Cl. 148—257

11 Claims

1. A process for producing a dissolution resistant protective coating containing chromate on a metallic surface, said process comprising the steps of:

(A) contacting the metal surface with an aqueous chromium containing solution;  
(B) drying the surface contacted in step (A); and



(C) contacting the dried surface from step (B) with an aqueous solution containing hydrazine in a reducing-effective amount under reducing-effective conditions.

4,956,028

## EXPLOSIVE COMPOSITIONS

John W. Forsberg, Mentor-on-the-Lake, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Continuation of Ser. No. 931,377, Nov. 14, 1986, Pat. No. 4,840,687. This application Jan. 16, 1989, Ser. No. 367,185

Int. Cl.<sup>5</sup> C06B 45/00

U.S. Cl. 149—2

53 Claims

1. An explosive composition comprising a discontinuous oxidizer phase comprising at least one oxygen-supplying component, a continuous organic phase comprising at least one water-immiscible organic liquid, and an emulsifying amount of at least one nitrogen-containing emulsifier derived from

(A) at least one carboxylic acylating agent,

(B) at least one polyamine, and

(C) at least one acid or acid producing compound capable of forming at least one salt with said polyamine, component (B) being bonded to component (C) through at least one salt linkage.

4,956,029

## ELECTRICALLY PRIMABLE IGNITER CHARGES FOR CASELESS AMMUNITION AND PROPELLANT CARTRIDGES

Rainer Hagel, Lichtenfels; Klaus Redecker, Nuremberg, and Horst Penner, Furth, all of Fed. Rep. of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

Filed Mar. 11, 1988, Ser. No. 166,985

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1987, 3707694

Int. Cl.<sup>5</sup> C06B 45/10; F42C 19/12

U.S. Cl. 149—19.8

8 Claims

1. An electrically primable igniter charge which comprises an oxidizing agent in a mixture with an initiating explosive, a conductive material and a binder, the charge containing 5 to 70% by weight of zinc peroxide as the oxidizing agent; as the initiating explosive, 20 to 70% by weight of an explosive which does not trigger a detonation in direct contact with a nitrocellulose propellant charge powder molding; 0.5 to 20% by weight of the conductive material consisting of electrically conductive fibers; and 1 to 30% by weight of the binder.

4,956,030

## METHOD OF FABRICATING SIMULATED STONE SURFACES AND IMPROVED SIMULATED STONE PRODUCTS

David Baskin, Duxbury, Mass., assignor to Academy of Applied Science, Concord, N.H.

Continuation-in-part of Ser. No. 235,702, Aug. 18, 1988, Pat. No. 4,877,656, and a continuation of Ser. No. 928,270, Nov. 6, 1987, abandoned. This application Oct. 5, 1989, Ser. No. 417,272

Int. Cl.<sup>5</sup> B32B 31/12; B44F 9/04

U.S. Cl. 156—61

11 Claims



1. A method of fabricating an artificial stone-like facing as for attachment to a substrate, that comprises, preparing a mixture of a wet, soft and uncured synthetic resin binder, color pigment and filler particles and curing agent for the resin, for ultimate attachment to a permanent substrate; applying the mixture to a temporary substrate, presenting a wet surface of irregular and uneven particles; successively and continuously pressing together by rolling pressure successive adjacent portions of the irregular and uneven surface of the wet, soft and uncured resin mixture against the temporary substrate into a flat surface and maintaining the mixture in a cooled condition, as by refrigeration, to inhibit curing and keeping the same soft and uncured until removed from such cooling for application to a permanent substrate.

2. A method as claimed in claim 1 and in which, upon removal from said cooling, the mixture is applied to the said permanent substrate, is rolled there against and thereafter permitted to cure by the action of said curing agent.

4,956,031

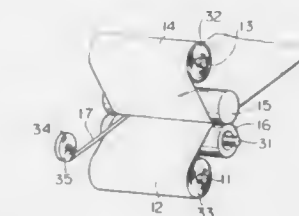
## METHOD OF MANUFACTURING AN ELONGATED ELECTROLUMINESCENCE ELEMENT

Kijia Mori, Tokyo, and Nobuhisa Kanemitsu, Kanagawa, both of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan  
Filed Feb. 23, 1989, Ser. No. 314,034

Claims priority, application Japan, Mar. 5, 1988, 63-52326  
Int. Cl.<sup>5</sup> B32B 31/08

U.S. Cl. 156—67

12 Claims



1. A method of manufacturing an elongated EL element, comprising the steps of:

preparing a substrate in the form of a continuous web having a back electrode, an insulating layer and a luminescent layer which are superimposed upon each other with said insulating layer positioned between said back electrode and said luminescent layer, a transparent conductive film in the form of a continuous web, and an auxiliary electrode having a width narrower than that of each of said substrate and said transparent conductive film, said auxiliary electrode being in the form of a continuous tape having and insulating film, an conductive metal layer and a conductive adhesion layer which are superimposed upon each other with said conductive metal layer positioned



between said insulating film and said conductive adhesive layer;

superimposing said substrate and said transparent conductive film one upon the other with their respective longitudinal axes extending parallel to each other, while sandwiching said auxiliary electrode between said substrate and said transparent conductive film such that said auxiliary electrode extends longitudinally of said substrate and said transparent conductive film, wherein said luminescent layer of said substrate is in contact with said transparent conductive film, and wherein said insulating film of said auxiliary electrode is in contact with said luminescent layer of said substrate, while said conductive adhesive layer of said auxiliary electrode is in contact with said transparent conductive film;

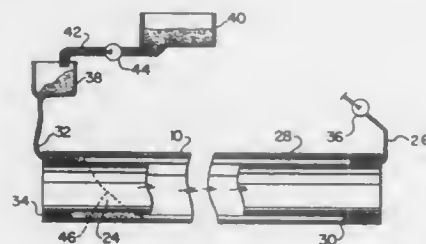
applying heat and pressure to the superimposed substrate and transparent conductive film with said auxiliary electrode sandwiched therebetween, to thermocompression-bond the superimposed substrate and transparent conductive film to each other and to bond said conductive adhesive layer of said auxiliary electrode to said transparent conductive film;

covering an assembly of said substrate, said transparent conductive film and said auxiliary electrode with damp-proof film material in a sealed fashion; and

cutting said assembly covered with said damp-proof film material, into predetermined length to form the elongated EL element.

4,956,032

**METHOD OF GROUTING USING A VACUUM**  
Paul Hahn, and James Allan, both of Collingwood, Canada, assignors to Keller Industries Ltd., Collingwood, Canada  
Filed Apr. 19, 1989, Ser. No. 340,494  
Claims priority, application Canada, Apr. 28, 1988, 565407  
Int. Cl.<sup>5</sup> B32B 31/06; 35/00; E03F 3/06; F16L 55/165  
U.S. Cl. 156—94 10 Claims



1. A method of filling an annular space between inner and outer coaxially arranged pipes while maintaining fluid flow through said inner pipe, wherein the outer pipe is an existing pipe and said inner pipe is a relatively thin walled pipe, comprising the steps of:

establishing said fluid flow through said inner pipe;

installing first and second seals at first and second ends, respectively, of said inner pipe between said inner pipe and said outer pipe to form said annular space;

inserting a first end of a vacuum tube into said annular space through said first seal at the high point in said first seal;

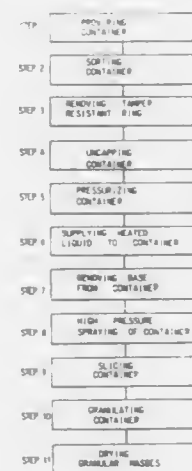
inserting a first end of a grout tube into said annular space through said second seal at the high point in said second seal;

applying a vacuum to a second end of said vacuum tube;

applying a grout mixture to a second end of said grout tube; and

maintaining sufficient vacuum within said annular space for such a time period to draw said grout mixture from said second end to said first end of said inner pipe to thereby completely fill said annular space with said grout mixture.

**4,956,033**  
**PROCESS FOR RECLAIMING PLASTIC CONTAINERS**  
Norman R. Martin, 54 Rose Brier Dr., Rochester Hills, Mich. 48309, and Barclay J. McMullen, Bloomfield Hills, Mich., assignors to Norman R. Martin, Rochester Hills, Mich.  
Filed May 22, 1989, Ser. No. 355,278  
Int. Cl.<sup>5</sup> B32B 35/00, 31/18  
U.S. Cl. 156—94 15 Claims



1. A process for reclaiming plastic containers, comprising the steps of:

(a) providing used containers or containers which do not pass quality control standards at manufacture having an adhesive composition affixed thereto;

(b) sorting said containers according to volume;

(c) removing a tamper resistant ring from said container, if required;

(d) uncapping said container, if required;

(e) internally pressurizing said container from about 18 pounds per square inch to about 40 pounds per square inch;

(f) adding at least one ounce of heated liquid into said container for liquefying residue within said container and for loosening an adhesive composition affixed to said container;

(g) allowing said container to depressurize;

(h) removing a base from said container, if required;

(i) removing a label from said container, if required, by external spraying;

(j) removing said liquid from said container;

(k) granulating said container thereby forming granular masses; and

(l) removing excess liquid from said granular masses.

**4,956,034**  
**METHOD AND APPARATUS FOR MANUFACTURING LAMINATED GLASS**  
Kazushi Shinozaki, and Shingo Seki, both of Osaka, Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan  
Filed Nov. 30, 1988, Ser. No. 278,951  
Claims priority, application Japan, Nov. 30, 1987, 62-303033; Nov. 30, 1987, 62-182422[U]; Jul. 8, 1988, 63-170097; Jul. 8, 1988, 63-170096  
Int. Cl.<sup>5</sup> B32B 31/12 21 Claims

U.S. Cl. 156—102

1. A method of manufacturing a laminated glass, comprising the steps of:

automatically removing intermediate films, one at a time, from an intermediate film stack successively from an uppermost intermediate film position on the intermediate film stack;

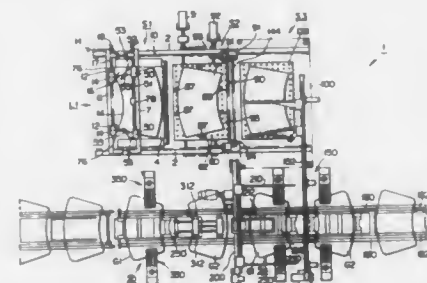
positioning the removed intermediate film;

cutting the positioned intermediate film to a prescribed shape;

positioning one of two curved glass sheets which has a convex side facing up;

transferring said intermediate film over the convex side of said positioned one of the curved glass sheets;

simultaneously positioning said one glass sheet over which said intermediate film has been transferred and the other



glass sheet of said two glass sheets, and superposing said glass sheets one on the other with the intermediate film interposed therebetween;

positioning said other glass sheet above said one glass sheet;

lifting said one glass sheet toward said other glass sheet; and

holding said one glass sheet against the lower surface of said other glass sheet with said intermediate film interposed therebetween, thereby superposing said glass sheets one on the other.

**4,956,035**  
**COMPOSITION AND PROCESS FOR PROMOTING ADHESION ON METAL SURFACES**  
Rudolf P. Sedlak, Palo Alto, Calif., assignor to RD Chemical Company, Mountain View, Calif.  
Filed Aug. 1, 1989, Ser. No. 388,337  
Int. Cl.<sup>5</sup> C23F 1/00; B44C 1/22; C03C 15/00, 25/06  
U.S. Cl. 156—664 10 Claims

8. A process for improving the adhesion of organic compounds to metal surfaces, said process comprising:

contacting said metal surface with a composition comprising an aqueous etching composition, an effective amount of a quaternary ammonium cationic surfactant, and a solubilizing amount of a secondary surfactant; and

rinsing said metal surface with water.

**4,956,036**  
**METHOD OF MAKING A POWER TRANSMISSION BELT INCLUDING MOISTURIZING AND GRINDING**  
Douglas R. Sedlacek, Englewood, Colo., assignor to The Gates Rubber Company, Denver, Colo.  
Division of Ser. No. 122,989, Nov. 19, 1987, Pat. No. 4,798,566.  
This application Sep. 15, 1988, Ser. No. 244,364  
Int. Cl.<sup>5</sup> B29C 67/14 6 Claims

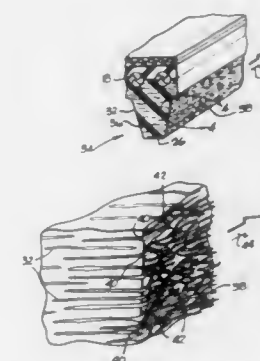
U.S. Cl. 156—137

1. In a method of making an elastomeric rubber-type power transmission belt with an embedded load carrying section and an elastomeric layer having dispersed discontinuous fiber oriented transversely of the belt by grinding the elastomeric layer and forming oppositely facing friction driving surfaces, the improvement comprising the steps of:

dispersing discontinuous fiber in the elastomeric layer to a fiber loading from about 1 to about 6 percent by volume, the fiber having a greige tensile modulus sufficient to inhibit the fiber from being severed during grinding;

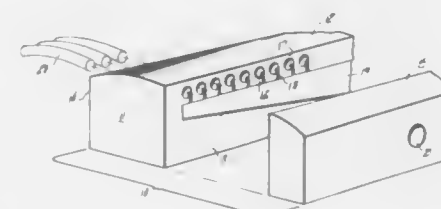
forming oppositely facing friction driving surfaces while moisturizing with a liquid and grinding elastomer away and leaving portions of fiber protruding from the oppositely facing driving surfaces;

said grinding bending a majority of protruding fiber portions and exposing lateral side portions of fiber; and establishing



part of the friction driving surfaces with the lateral side portions of fiber.

**4,956,037**  
**COOLED OPTICAL COMPONENT MANUFACTURE**  
Alexander M. Vivaldi, West Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.  
Filed Nov. 25, 1988, Ser. No. 275,838  
Int. Cl.<sup>5</sup> B32B 31/18 5 Claims



1. A method of manufacturing an optical component having a plurality of cooling channels in a surface region underlying an effective surface thereof, comprising the steps of

forming a precursor of the optical component consisting of a main body which carries the effective surface, and a plurality of solid fugitive material cores embedded in the main body at the desired locations of the cooling channels; and

converting the precursor into the optical component, including consolidating the main body, removing the cores from the cooling channels, and producing respective input and output manifolds at surface zones of the main body that are spaced from the effective surface and onto which respective input and output ends of the cooling channels open, including forming the input and output manifolds in the respective surface zones, and bonding at least one cover plate to the main body subsequently to said forming step such as to sealingly separate the input and output manifolds from the exterior of the optical component at the interface between the main body and the cover plate.

4,956,038

## METHOD FOR LINING PIPE LINES

Akio Morinaga, Fujisawa; Masakatsu Hyodo, Takatsuki; Tomiyo Nishimoto, Mishima; Hiroyuki Sakuragi, Kobe, and Shinji Oishi, Takarazaka, all of Japan, assignors to Tokyo Gas Kabushiki Kaisha, Tokyo and Ashimori Kogyo Kabushiki Kaisha, Osaka, both of Japan

Continuation of Ser. No. 110,706, Oct. 8, 1987, abandoned. This application Jun. 19, 1989, Ser. No. 368,908

Claims priority, application Japan, Feb. 12, 1986, 61-28158; Feb. 12, 1986, 61-28159; Feb. 12, 1986, 61-28160

Int. Cl.<sup>5</sup> B29C 63/36, 65/54

U.S. Cl. 156—156

2 Claims

1. A method for lining the inner surface of a pipe line laid in a body of water which comprises providing a pipe line to be lined in a body of water, providing a flexible tubular lining material to be evaginated into an interior space of said pipe line, pushing said flexible tubular lining material forward under a fluid pressure into said interior space of said pipe line evaginating said lining material and forming an evaginated inner surface, said tubular lining material being provided with a water-curable binder on said evaginated inner surface thereof, said binder having the property of being capable of reacting with water to initiate curing, advancing said flexible tubular lining material within said interior space of said pipe line continuously turning said lining material inside out under said fluid pressure creating a turning portion of said lining material as said lining material advances through said interior space of said pipe line, said pipe line in advance of said turning portion of said tubular lining material being continuously filled with water due to the immersion of said pipe line in said body of water, said binder reacting with said water within said pipe line to cure and bond said evaginated surface of said lining material onto said inner surface of said pipe line.

4,956,039

## METHOD OF MANUFACTURING A CABLE-LIKE PLASTIC COMPOSITE BODY

John Olesen, and Jorgen Jorgensen, both of Frederikshavn, Denmark, assignors to Roblon A/S, Frederikshavn, Denmark

Filed May 10, 1988, Ser. No. 192,356

Claims priority, application Fed. Rep. of Germany, May 11, 1987, 3715681

Int. Cl.<sup>5</sup> B29C 47/02; B32B 17/04; G02B 6/44

U.S. Cl. 156—180

10 Claims



1. A method of manufacturing a high strength cable-like plastic composite support body resistant to kinking, said support body having a longitudinal axis, the method comprising the steps of gathering together a plurality of substantially endless filaments of high modulus of elasticity into a core string so that said filaments in said core string extend parallel to one another in the direction of said longitudinal axis, impregnating said core string throughout its length with a hot melt adhesive which can be made liquid by heating and winding said core string impregnated with said hot melt adhesive with a high strength yarn while said hot melt adhesive is in a soft state to form a wound core string.

4,956,040

## METHOD OF ADHERING HOLOGRAMS TO TEXTILE WEARING APPAREL

David Fry, Creve Coeur, Md., assignor to Diversified Graphics, Ltd., Hazelwood, Mo.

Filed Jul. 1, 1988, Ser. No. 214,396

Int. Cl.<sup>5</sup> B32B 31/00; A47G 1/12

U.S. Cl. 156—267

4 Claims

1. A method for adhering holograms to textile wearing apparel comprising the steps of:

- laminating a precut hologram having an upper surface and a lower surface between a clear polyester coating on the upper surface of said hologram and an adhesive scrim backing on the lower surface of said hologram to envelope the hologram and protect it from moisture and scuffing, said polyester coating being sealed to said adhesive scrim backing around margins of said backing extending outwardly from said hologram and said adhesive scrim backing being adapted to adhere said hologram to textile wearing apparel;
- cutting said margins away from the resulting laminated hologram to form an enveloped hologram; and
- applying the enveloped hologram to textile wearing apparel at a temperature of approximately 270° F. to 300° F. and under a pressure of approximately 30 to 50 psi for a period of approximately 8 to 15 seconds whereby said hologram becomes firmly adhered to said textile wearing apparel.

4,956,041

## METHOD OF LINING BRANCH PIPE PORTION OF UNDERGROUND MAIN PIPE WITH RIGID PLASTICS TUBE

Yasuo Miyazaki, Osaka; Akira Kamide, Higashiosaka, and Shigeki Watari, Osaka, all of Japan, assignors to Osaka Bousai Construction Co., Ltd., Osaka, Japan

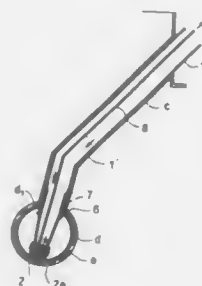
Filed Dec. 23, 1988, Ser. No. 288,832

Claims priority, application Japan, Dec. 28, 1987, 62-332471; Feb. 9, 1988, 63-28437

Int. Cl.<sup>5</sup> B29C 63/26

U.S. Cl. 156—267

4 Claims



1. A method of forming a plastic tube lining over an inner surface of a branch pipe connected to an underground main pipe at one end thereof with the other end open to the surface of the ground, the method comprising the steps of:

- preparing a rigid plastic tube to be used as a liner, the rigid plastic tube having a discharge means comprising a front plug at a distal end thereof for discharging a fluid there-through;
- inserting the rigid plastic tube equipped with the discharge means through said other end until at least the discharge means extends into the underground main pipe;
- feeding a heated and pressurized fluid continuously into the rigid plastic tube in order to radially expand the rigid plastic tube until the rigid plastic tube contacts the inside of the branch pipe while discharging the used fluid out of the rigid plastic tube through the discharge means; and

cutting off a part of the rigid plastic tube within the underground main pipe; wherein the front plug at said distal end of said rigid plastic tube has an elongated discharge pipe connected thereto and extending along the branch pipe from said front plug to said other end of said branch pipe.

4,956,042

## PROCESS AND APPARATUS FOR EMBRITTLING AND SUBSEQUENTLY REMOVING AN OUTER PROTECTIVE COATING OF A PIPE OR PIPELINE

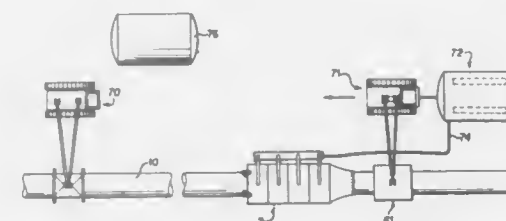
Jean-Luc Habert, Willowbrook, Ill.; Joseph M. Chitty, Lake Charles, and William A. Ellett, Monroe, both of La., assignors to Liquid Air Corporation, Walnut Creek, Calif.

Filed Nov. 1, 1988, Ser. No. 265,772

Int. Cl.<sup>5</sup> B32B 31/18, 31/22

U.S. Cl. 156—344

31 Claims



1. A process for embrittling and subsequently removing an outer protective coating of at least a pipe section of a transmission pipeline, comprising the steps of:

- enclosing a portion of the pipe in a tunnel means so as to define an annular space around said protective coating;
- expanding a pressurized liquid nitrogen cryogen into said space in such a way as to embrittle the protective coating by deposition of a layer of liquid nitrogen droplets onto the coated surface of the pipe; and
- maintaining said tunnel means in surrounding relationship to said portion of the pipe for a certain time sufficient for said portion of the pipe and the protective coating on said portion of the pipe to fall below an embrittlement temperature for the protective coating.

4,956,043

## DRY ETCHING APPARATUS

Masafumi Kanetomo, Suginami; Shinichi Tachi, Sayama; Kazunori Tsujimoto, Higashiyama; Kiichiro Mukai, Hachioji; Takahiro Daikoku, Ushiku; Shigekazu Kieda, Niihari; Keijiro Shindo, Musashimurayama, and Kenshiro Tamura, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 10, 1988, Ser. No. 192,178

Claims priority, application Japan, May 25, 1987, 62-125809; Aug. 10, 1987, 62-198080

Int. Cl.<sup>5</sup> B44C 1/22; H01L 21/306; C03C 15/00

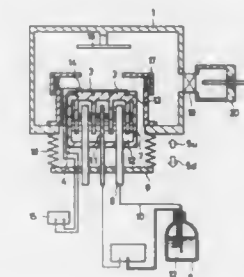
U.S. Cl. 156—345

22 Claims

1. A dry etching apparatus comprising:

- a reaction chamber;
- a means for introducing an etching gas into said reaction chamber;
- a means for discharging the gas from the interior of said reaction chamber to the outside thereof;
- a means for generating plasma of said etching gas in the interior of said reaction chamber;
- a wafer table on which an article to be etched is placed;
- a means for controlling the temperature of said article to a desired level, said means for controlling the temperature including means for cooling said article, said means for cooling being capable of cooling said article to at least as low as 0° C. and including a liquefied gas, said means for

controlling the temperature further including means for heating said wafer table; and



a means for regulating the height of said liquefied gas to a desired level in relation to said wafer table.

4,956,044

## TAB SURFACE-PROTECTIVE PAPER SEPARATING DEVICE

Takemi Watanabe, Toyonaka, and Noriyuki Shiba, Tokyo, both of Japan, assignors to Kabushiki Kaisha Kaneda Kikai Seisakusho, Osaka, Japan

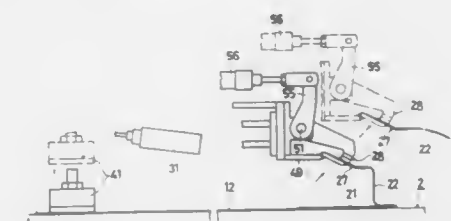
Filed Feb. 28, 1989, Ser. No. 316,904

Claims priority, application Japan, Mar. 3, 1988, 63-28658

Int. Cl.<sup>5</sup> B32B 31/18

U.S. Cl. 156—350

3 Claims



1. A device for separating a protective paper from a tab, said protective paper being adhesively attached to the tab except at non-adhesive regions along the edges of the tab, and said tab being attached to the leading web end of a paper roll said device comprising:

- a table board onto which said tab and leading web end of said paper roll are brought;
- a scraper having blade means;
- means for inserting said blade means between said protective paper and said tab at said non-adhesive regions;
- a gripping claw;
- means for moving said gripping claw in coordination with movement of said scraper to grip said protective paper between said gripping claw and said blade means while said blade means are inserted at said non-adhesive regions;
- means for moving said gripping claw and said scraper away from said table board while said protective paper is gripped between said gripping claw and said blade means, whereby said protective paper is removed from said tab;
- detection means operable as said gripping claw and said scraper are moved away from said table board for detecting that the protective paper is not gripped between the gripping claw and the blade means, and
- means responsive to said detection means for actuating said means for inserting said blade means and actuating said means for moving said gripping claw.



4,956,045

## HAND-HELD LABELER

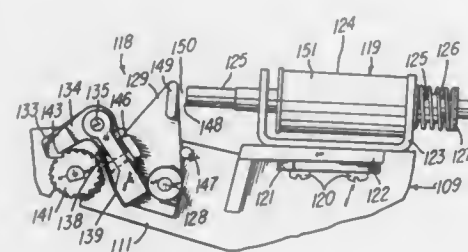
Brent E. Goodwin, Middletown; Donald L. Karn, Springboro; John D. Mistyurik, Tipp City; John R. Monteith, Dayton; Mark A. Seale, New Carlisle, and David R. Wisecup, Xenia, all of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Jun. 22, 1988, Ser. No. 209,759

Int. Cl.<sup>5</sup> B65C 11/02

U.S. Cl. 156—384

27 Claims



1. A hand-held labeler for printing and applying labels releasably secured to a carrier web of a composite label web, comprising: a housing having a handle, means for supporting a supply roll of a composite label web, a thermal print head, a platen roll cooperable with the print head for effecting printing on the labels, means for providing a path for the composite label web from the supply roll to between the print head and the platen roll, means for delaminating printed labels from the carrier web, means for applying printed labels means for advancing the carrier web to effect delamination of a printed label and to advance the printed label into label applying relationship with the label applying means, and brake means for exerting braking force on the platen roll during application of a printed label to prevent that printed label from pulling composite label web from the supply roll during application of a printed label to avoid misregistration of the next label with respect to the thermal print head and for removing the braking force from the platen roll to enable the carrier web to be advanced by the advancing means.

12. A hand-held labeler for printing and applying labels releasably secured to a carrier web of a composite label web, comprising: a housing having a handle, means on the housing for supporting a supply roll of a composite label web, a thermal print head for effecting printing on the labels, means for providing a path for the composite label web from the supply roll to the print head, means for delaminating printed labels from the carrier web, means for applying printed labels, means for advancing the carrier web to effect delamination of a printed label and to advance the printed label into label applying relationship with the label applying means, a web-contacting roll for contacting the composite label web, means for applying braking force to the web-contacting roll to prevent a printed label from pulling the composite label web from the label supply roll during application of a printed label to avoid misregistration of the next label with respect to the thermal print head, an electromagnetic device, and means operable by the electromagnetic device only after the electromagnetic device has been energized for a predetermined period of time during which the electromagnetic device develops momentum for disabling the braking force applying means to enable the advancing means to advance the carrier web, wherein the braking force applying means is disabled responsive to the momentum exerted by the electromagnet device.

4,956,046

## SEMICONDUCTOR SUBSTRATE TREATING METHOD

Michael A. McNeilly, Palo Alto, Calif., assignor to Advantage Production Technology, Inc., Sunnyvale, Calif.

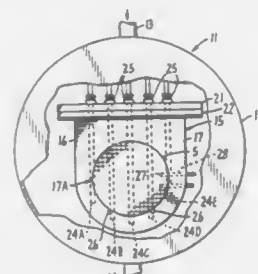
Division of Ser. No. 919,313, Oct. 15, 1986, Pat. No. 4,778,559.

This application Sep. 29, 1988, Ser. No. 251,108

Int. Cl.<sup>5</sup> C30B 23/02, 25/10; F24H 1/00

U.S. Cl. 156—613

1 Claim



1. A method of treating semiconductor substrates comprising the steps of:  
supporting a semiconductor substrate on the obverse surface of a high conductivity member;  
maintaining a low melting point, high boiling point metal medium in liquid phase in contact with an area of the reverse surface of the high conductivity member;  
heating the low melting point, high boiling point metal medium to a desired liquid temperature;  
conducting heat from the liquid metal medium through the high conductivity member to the substrate to heat the substrate to a predetermined temperature; and  
directing reactant materials to said semiconductor substrate.

4,956,047

## PROCESS OF MAKING HIGH QUALITY SINGLE QUARTZ CRYSTAL USING SILICA GLASS NUTRIENT

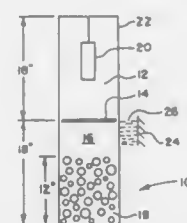
Meckle T. Harris, Nashua, N.H.; John J. Larkin, South Boston, Mass.; Alton F. Armington, Lexington, Mass., and John K. Kennedy, West Roxbury, Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 8, 1988, Ser. No. 229,686

Int. Cl.<sup>5</sup> C30B 7/10

U.S. Cl. 156—623 Q

12 Claims



1. A process of manufacturing ultra high purity quartz crystals, said process comprising the steps of:  
a. obtaining silica nutrient having very few impurities therein;  
b. providing at least one quartz seed;  
c. providing a sealable container having a positionable baffle therein and means for holding said at least one quartz seed, said container, said baffle and said holding means being made of a noble metal, said container being placable in a hydrothermal autoclave;  
d. placing the silica nutrient in a nutrient zone being a bottom section of the sealable container;

e. putting a baffle over the nutrient zone and below a seed zone;  
f. attaching the at least one seed in the seed zone being in a top section of the container;  
g. filling the container with a fluid;  
h. sealing the container;  
i. placing the sealed container in a chamber of the hydrothermal autoclave;  
j. filling the void between the sealed container and the autoclave with a fluid;  
k. sealing the autoclave;  
l. heating said nutrient zone in a controlled manner;  
m. heating said seed zone in a controlled manner, said nutrient zone having a negative temperature gradient to prevent convection transport with respect to said seed zone during an initial heating before crystal growth;  
n. growing quartz about the seed wherein the nutrient zone is at a higher temperature than said seed zone, said nutrient zone having a positive temperature gradient to encourage convection transport with respect to said seed zone;  
o. cooling the autoclave; and  
p. removing at least one quartz crystal from the autoclave.

4,956,048

## METHOD OF ALCOHOL WASHING BROWNSTOCK PULP PRIOR TO A CHLORINATION BLEACHING STAGE

Ronnie G. Hise, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.

Filed Apr. 17, 1989, Ser. No. 338,320

Int. Cl.<sup>5</sup> D21C 9/02, 9/12, 9/14

U.S. Cl. 162—60

4 Claims

1. An improved method of chemical pulping and bleaching comprising bleaching brownstock chemical pulp with a chlorination stage followed by a lignin extraction stage and producing an amount of chlorinated dioxins and furans as a by-product of the bleaching, wherein the improvement comprises reducing the amount of chlorinated dioxins and furans up to at least 80% by washing the pulp with alcohol prior to the chlorination bleaching stage, wherein the alcohol washing does not significantly change the Kappa No. of the chemical pulp.

4,956,049

## PROCESS FOR SIZING PAPER WITH ANIONIC HYDROPHOBIC SIZING AGENTS AND CATIONIC RETENTION AIDS

Michael Bernheim, Augsburg; Dieter Strasilla, Weil am Rhein, both of Fed. Rep. of Germany; Bernardo De Sousa, Riehen, and Peter Rohringer, Schönenbuch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 110,896, Oct. 21, 1989, abandoned,

which is a continuation of Ser. No. 760,865, Jul. 31, 1989,

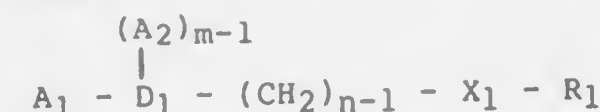
abandoned. This application Jun. 23, 1989, Ser. No. 372,217

Int. Cl.<sup>5</sup> D21H 17/14

U.S. Cl. 162—158

11 Claims

1. A process for sizing paper or cardboard which comprises treating the fibers thereof with (A) a sizing agent of the formula



wherein

A<sub>1</sub> and A<sub>2</sub> are each an anionic carboxyl, hydroxyl or sulfo group which is acidic or in salt form,

D<sub>1</sub> is phenylene, naphthylene, dihydronaphthylene or tetrahydronaphthylene, each of which is unsubstituted or substituted by halogen, nitro, amino or hydroxyl,

R<sub>1</sub> is alkyl or alkenyl, each of 5 to 22 carbon atoms,

X<sub>1</sub> is a bridge of the formula —O—CO—, wherein the terminal —CO— group of said bridge is attached to the alkyl or alkenyl radical R<sub>1</sub>, and

m and n are each 1 or 2, and

(B) a polyethyleneimine retention aid.—

4,956,050

## METHOD FOR ATTENUATION OF THE MACHINE DIRECTION PRESSURE PULSATIONS IN THE HEADBOX IN PAPER AND BOARD MACHINES

Olavi Mäkelä, Kyminiina, Finland, assignor to Velmet-Ahlstrom Inc., Karhula, Finland

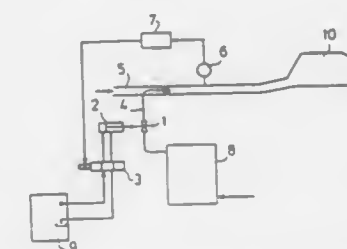
Filed Mar. 13, 1989, Ser. No. 322,697

Claims priority, application Finland, Mar. 28, 1988, 881453

Int. Cl.<sup>5</sup> D21F 1/06

U.S. Cl. 162—198

6 Claims



1. A method of attenuating machine direction pressure pulsations in stock fed into a headbox of a paper machine comprising the steps of:

- measuring machine direction pressure pulsations in the stock;
- feeding a water flow into the stock;
- varying said water flow relative to said pressure pulsations measured in step (a);
- controlling the available volume of stock flow by said varying water flow; and
- causing pressure variations by said volume variations in said stock flow, said pressure variations being in out-of-phase relation to said machine direction pressure pulsations measured in step (a), thereby attenuating said pulsations primarily in the frequency range of 1 to 50 Hz.

4,956,051

## DETACKIFICATION OF ADHESIVE MATERIALS CONTAINED IN SECONDARY FIBER USING POLYVINYL ALCOHOL

Robert D. Moreland, Jacksonville, Fla., assignor to Betz Paper-Chem, Inc., Jacksonville, Fla.

Division of Ser. No. 785,420, Oct. 8, 1985, Pat. No. 4,886,575.

This application Jul. 27, 1989, Ser. No. 386,543

The portion of the term of this patent subsequent to May 17, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> D21H 21/02

U.S. Cl. 162—199

6 Claims

1. A method of detackifying hot melt and/or pressure sensitive adhesive material contained in a fibrous paper sheet made from waste paper being processed on paper making equipment having felts, wires, and press rolls which are subjected to water sprays and showers which comprises adding to the water spray or shower for spraying onto the felts, wires and press rolls a

sufficient amount for the purpose and in the range of 0.5 to about 30 ppm of a polymer comprised of moieties of polyvinyl alcohol, which polymer contains at least some hydrophobic groups and is water soluble.

4,956,052

# PROCESS FOR SEPARATION USING SUPERCRITICAL FLUID

Mitsuo Hirata, Tokyo; Takeshi Ishikawa, Yokohama, and Hiroshi Shiraishi, Tokyo, all of Japan, assignors to Suntory Limited, Osaka, Japan

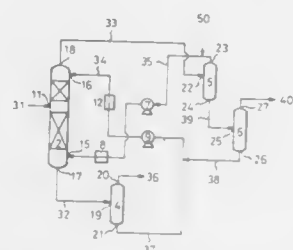
Continuation of Ser. No. 19,657, Feb. 27, 1987, abandoned. This application Sep. 13, 1989, Ser. No. 407,704

Claims priority, application Japan, Feb. 28, 1986, 61-41490

Int. Cl.<sup>5</sup> B01D 3/34, 11/00; C07C 29/86

U.S. Cl. 203-19

29 Claims



1. A process for separating a mixture of an organic compound and water, comprising the steps of: providing a supercritical fluid extractant which extracts the organic compound from the mixture, and an extraction aid having a stronger affinity for the water than for said organic compound; feeding said mixture, said extractant and said extraction aid into an extractor so as to bring said mixture into contact with said extractant and said extraction aid; extracting said organic compound with said extractant to separate said organic compound from said water mixed with said extraction aid; and separating said organic compound from said extractant.

4,956,053

# APPARATUS AND PROCESS FOR THE PRODUCTION OF MICRO-PORE FREE HIGH DUCTILITY METAL FOIL

Ned W. Polan, Madison; Raymond J. Smialek, Cheshire, and Paul Menkin, Branford, all of Conn., assignors to Olin Corporation, New Haven, Conn.

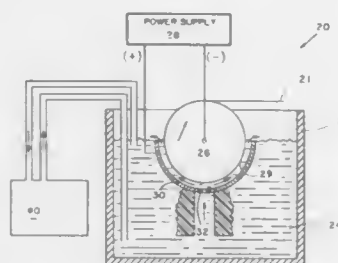
Continuation of Ser. No. 199,406, May 26, 1988, abandoned.

This application Sep. 21, 1989, Ser. No. 410,770

Int. Cl.<sup>5</sup> C25D 1/04

U.S. Cl. 204-13

16 Claims



1. An essentially micro-pore free and inclusion free electro-deposited copper foil characterized by having no more than one micro-pore having an area greater than or equal to about

$5 \times 10^{-8} \text{ mm}^2$  present in an area of  $1 \times 10^{-5} \text{ mm}^2$  when observed at a magnification of at least 6000x.

4,956,054

# METHOD AND APPARATUS FOR REMOVING CARBON ANODES IN ALUMINUM ELECTROLYSIS CELLS

Kjartan Dronnesund, Ardalstangen, and Heggo Stale, Ovre Ardal, both of Norway, assignors to Norsk Hydro a.s., Oslo, Norway

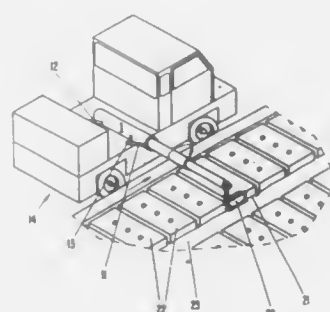
Filed Jan. 11, 1989, Ser. No. 295,791

Claims priority, application Norway, Jan. 12, 1988, 880100

Int. Cl.<sup>5</sup> C25C 3/06, 3/14

U.S. Cl. 204-67

20 Claims



16. A method for cutting crust about an anode in an aluminum production electrolysis cell, comprising the steps of: (A) providing a movable base, an elongated arm connected to said base near a first end of said arm and having a longitudinal axis extending essentially horizontally, said arm being extensible and contractable along said longitudinal axis, means connected to said arm for raising and lowering said arm with respect to said base within a substantially vertical plane, a fixed share mounted at a free second end of said arm for rotation with respect to said arm about a substantially vertical axis, and means for rotating said share with respect to said arm about said vertical axis; (B) moving said base to place said arm near a first longitudinal side of the anode; (C) rotating said share about said vertical axis until said cutting edge extends substantially perpendicular to said longitudinal axis, and extending said arm until said cutting edge is near a transverse side of the anode; (D) lowering said share until at least a portion of said cutting edge extends through the crust, whereby a transverse cut is formed, and thereafter raising said share until said cutting edge is above said crust; (E) rotating said share about said vertical axis until said cutting edge extends substantially parallel to said longitudinal axis; (F) lowering said arm until at least a portion of said cutting edge extends through the crust; (G) extending or retracting said arm as required to move said share from the current transverse side of the anode to the other transverse side of the anode, whereby a longitudinal cut is formed, and thereafter raising said arm until said cutting edge is above said crust; (H) rotating said share about said vertical axis until said cutting edge is substantially perpendicular to said longitudinal axis; (I) repeating step (D); (J) moving said base means to place said arm near a second longitudinal side of the anode; and (K) repeating steps (E)-(G).

4,956,055

# PREPARATION OF BIDENTATE LIGANDS

Thomas A. Puckette, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 118,573, Nov. 9, 1987, Pat. No. 4,879,008.

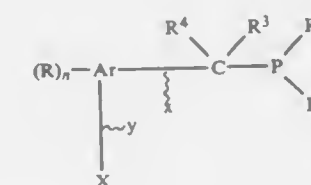
This application Jul. 24, 1989, Ser. No. 383,696

Int. Cl.<sup>5</sup> C25C 3/00

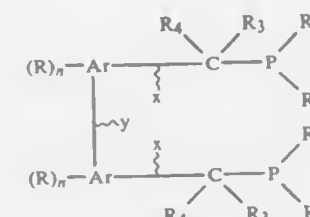
U.S. Cl. 204-72

13 Claims

1. A process for preparing a bidentate ligand of the formula:

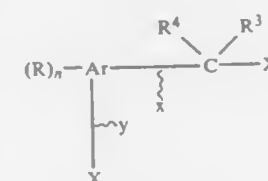


- then
- (ii) maintaining a redox reaction system comprising
  - (a) said reactant,
  - (b) a polar, aprotic solvent,
  - (c) a nickel compound, and
  - (d) a reducing agent, which has a sufficient reducing potential to promote the reduction of Ni(II) to Ni(O), at a temperature and for a time sufficient to form said ligand.
12. The process of claim 1 wherein the reducing agent is an electrolytic cell.

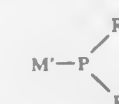


wherein:

- each Ar is independently selected from aromatic ring compounds having 6 up to 14 carbon atoms;
- the x bonds and the y bonds are attached to adjacent carbon atoms on the ring structures;
- each R, when present as a substituent, is independently selected from alkyl, alkoxy, aryloxy, aryl, aralkyl, alkaryl, alkoxyalkyl, cycloaliphatic, halogen, alkanoyl, alkanoyloxy, alkoxy carbonyl, carboxyl, cyano or formyl radicals;
- n is a whole number in the range of 0-4 where Ar is phenyl; 0-6 where Ar is naphthyl; and 0-8 where Ar is phenanthryl or anthracenyl;
- each R<sub>1</sub> and R<sub>2</sub> is independently selected from alkyl, aryl, aralkyl, alkaryl or cycloaliphatic radicals, or substituted derivatives thereof, wherein substituted derivatives are selected from ethers, amines, amides, sulfonic acids, esters, hydroxyl groups or alkoxy groups;
- each R<sub>3</sub> and R<sub>4</sub> is independently selected from hydrogen and the R<sub>1</sub> substituents;
- each of the above alkyl groups or moieties is a straight or branched chain of 1-20 carbons;
- each aryl group contains 6-10 ring carbons;
- each cycloaliphatic group contains from 4-8 ring carbons; and
- said process comprising:
  - (i) contacting an aromatic compound of the formula:



with a compound of the formula:



wherein X=halogen, X<sup>1</sup>=halogen or a suitable leaving group and M'=Li, Na, K, Mg, Ca, Zn or Cd under conditions suitable to form a reactant of the formula:

4,956,056

# METHOD OF ABRASIVE ELECTROEROSION GRINDING

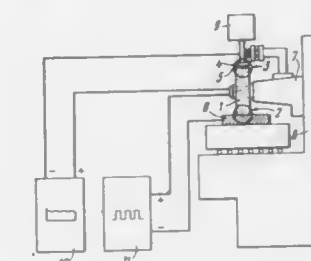
Lidia S. Zubatova, Ljubinskaya, 111, kv. 120; Eduard Y. Grodzinsky, ulitsa Maril Ulyanovoi, 11, kv. 117; Ivan V. Shelyagin, Volgo-gradsky prospekt, 147/5, Korpus 1, kv. 60, and Alexander A. Zaitsev, Ulitsa Rogozhsky val, 7/1, kv. 108, all of Moscow, U.S.S.R.

Filed Mar. 20, 1989, Ser. No. 326,882

Int. Cl.<sup>5</sup> B23H 5/04, 5/08, 7/12

U.S. Cl. 204-129.43

4 Claims

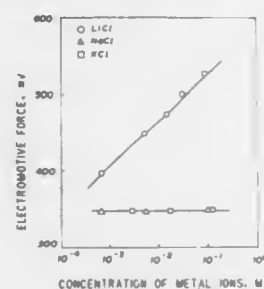


1. A method of abrasive electroerosion grinding with the aid of a metallic-bond abrasive wheel and a coolant having a conductivity of from  $2 \cdot 10^{-3}$  to  $2 \cdot 10^{-2} \text{ ohm}^{-1} \text{ cm}^{-1}$ , comprising the steps of: applying a pulse voltage to said wheel in a zone of grinding; arranging an electrode adapted to produce an additional electric effect on said wheel out of said zone of grinding of said workpiece; creating an interelectrode space between the electrode and wheel for a coolant to be supplied thereto; applying a rectified voltage having an amplitude and a ripple factor to said electrode and wheel, which ensures formation of an insulating oxide film on the surface of said wheel.



1. A method for the determination of the concentration of lithium ions in an aqueous medium, which consists essentially of the steps of:

(a) bringing an ion-selective electrode comprising a composite oxide of manganese and lithium having a chemical composition expressed by the formula  $\text{Li}_x\text{Mn}_2\text{O}_4$ , in which the subscript  $x$  is a positive number smaller than 1, and a reference electrode into contact with the aqueous medium containing lithium ions; and



(b) measuring the electromotive force generated between the reference electrode and the ion-selective electrode in said aqueous medium, said electromotive force being a function of said concentration of lithium ions.

4,956,063

## OZONE MEASURING METHOD

John M. Hale, Meiner, Switzerland, assignor to Orbisphere Laboratories (Inc.), Switzerland

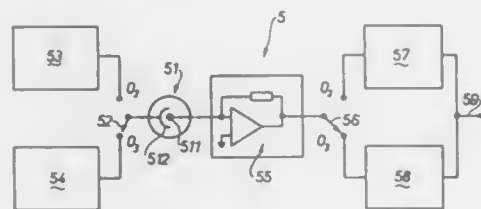
Filed Mar. 28, 1989, Ser. No. 329,679

Claims priority, application European Pat. Off., Mar. 31, 1988, 88810217.5

Int. Cl. 5 G01N 27/26

U.S. Cl. 204—153.17

4 Claims



1. An amperometric method for quantitative determination of ozone contained in a fluid; said method comprising the steps of:

- (A) providing an amperometric cell having a sensing electrode, a counter electrode, an aqueous electrolyte in contact with said sensing electrode and said counter electrode, and a membrane that is substantially impermeable to said electrolyte but permeable to said ozone for containing said electrolyte within said cell and for separating it from said fluid maintained external to said cell;
- (B) providing in said aqueous electrolyte a redox catalyst for chemically transforming said ozone upon its permeation through said membrane into an intermediary electroactive species capable of generating upon reaction with said sensing electrode an indicative electrical signal in proportion with a concentration of said ozone in said fluid;
- (C) calibrating said cell by
- (i) applying a first voltage to said cell and exposing it to an external calibration fluid that is substantially free of said ozone and contains a known concentration of an electroactive calibration species capable of permeating through said membrane and of reacting at said sensing electrode to obtain a first or calibration signal that is indicative of a first rate  $P^1$  of permeation of said electroactive calibration species into said cell; and
- (ii) invoking a factor derived from a previously determined permeation rate  $P^2$  of said ozone and from a

previously determined permeation rate  $P^3$  of said electroactive calibration species, both  $P^2$  and  $P^3$  being determined with a membrane having the same characteristics as said membrane used for obtaining said first or calibration signal;

- (D) applying a predetermined potential across said sensing electrode and said counter electrode;
- (E) measuring a cell current generated by reaction of said intermediary electroactive species with said sensing electrode;
- (i) effecting said measuring step by operating said cell while exposed to an external unknown sample at a second voltage capable of causing electrical reaction of said ozone or of said intermediary electroactive species to generate a second or measuring signal; and
- (ii) compensating said second signal for temperature effects and for correlation with said factor to obtain an output that is indicative of the concentration of said ozone in said external unknown sample.

3. A method of determining the concentration of a strongly oxidizing or strongly reducing chemical agent in a fluid by means of an amperometric cell comprising a sensing electrode and a counter electrode each having a surface exposed to an aqueous electrolyte which is separated from said fluid by a membrane that is permeable to said strongly oxidizing or strongly reducing agent in said fluid but is substantially impermeable to said aqueous electrolyte; said method comprising the steps of:

- (I) effecting a calibration step by applying a first voltage to said cell and exposing it to an external calibration fluid that is substantially free of said strongly oxidizing or strongly reducing chemical agent and contains a known concentration of an electroactive calibration species capable of permeating through said cell and of reacting at said sensing electrode to obtain a first or calibration signal that is indicative of a first rate  $P^1$  of permeation of said electroactive calibration species through said cell;
- (II) invoking a factor derived from a previously determined permeation rate  $P^2$  of said strongly oxidizing or strongly reducing chemical agent and from a previously determined permeation rate  $P^3$  of said electroactive calibration species, both  $P^2$  and  $P^3$  being determined with a membrane as used for obtaining said first or calibration signal;
- (III) effecting said measuring step by operating said cell while exposed to an external unknown sample at a second voltage capable of causing electrical reaction of said strongly oxidizing or strongly reducing agent, or of an intermediary electroactive species formed by chemical reaction of said agent with said electrolyte to generate a second or measuring signal; and
- (IV) compensating said second signal for temperature effects and for correlation with said factor to obtain an output that is indicative of the concentration of said strongly oxidizing or strongly reducing chemical agent in said external unknown sample.

4,956,064

## DEHALOGENATION OF HALOGENATED ORGANIC COMPOUNDS

Dennis Evers, Kenmore, and Robin Craig, Helensvale, both of Australia, assignors to Blotex Pty. Ltd., Australia

Continuation of Ser. No. 69,362, Jul. 2, 1987, abandoned. This application May 30, 1989, Ser. No. 358,466

Claims priority, application Australia, Jul. 2, 1986, PH6691; Mar. 4, 1987, P10658

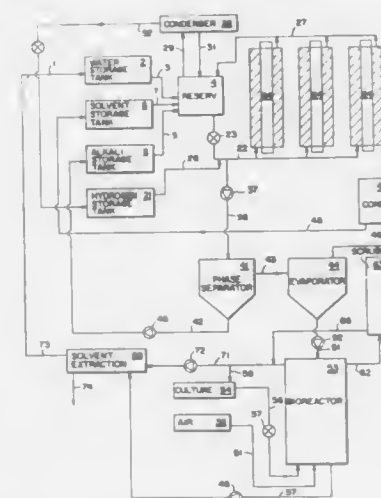
Int. Cl. 5 B01J 19/08; C12P 1/04

U.S. Cl. 204—157.94

19 Claims

1. A process for degradation of a polyhalogenated organic compound, comprising the steps of admixing an aqueous phase containing a water soluble alkaline material and an organic solvent phase, said solvent phase being miscible with water and containing a polyhalogenated organic compound, maintaining the concentration of said alkaline material at a value suffi-

ciently high to provide a two-phase system, subjecting the two-phase system to ultra-violet irradiation to produce a lesser



halogenated organic compound, and thereafter biologically degrading said lesser halogenated organic compound.

4,956,065

## METHOD AND APPARATUS FOR THREE DIMENSIONAL DYNAMIC DIELECTRIC LEVITATION

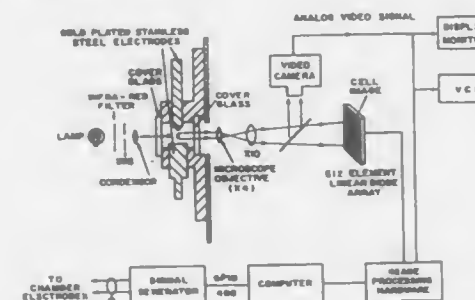
Karen V. I. S. Kaler, Dept. of Electrical Engineering, University of Calgary, 2500 University Drive, N. W., Calgary, Alberta, Canada T2N 1N4, and Thomas B. Jones, Dept. of Electrical Engineering, University of Rochester, Rochester, N.Y. 14627

Filed Nov. 3, 1988, Ser. No. 267,220

Int. Cl. 5 C12M 1/42; C12N 13/00

U.S. Cl. 204—183.1

8 Claims



1. A three-dimensional dynamic dielectrophoretic levitation method comprising:

- (i) providing a cell suspension in a levitation chamber of a dielectrophoresis apparatus containing an electrode system, said suspension being provided between the electrodes of the system;
- (ii) subjecting a cell from said suspension to a non-uniform electric field generated from voltage applied to the electrodes of said electrode system, wherein there is established a non-uniform gradient that is positive along the axis extending between the electrodes and negative in the radial direction, thereby reducing radial migration of the cell;
- (iii) dynamically levitating said cell in three-dimensions;
- (iv) monitoring the position of the cell; and
- (v) providing a focussed cell by maintaining or adjusting the position of the cell by controlling the voltage applied to the electrode system, wherein steps (iv) and (v) are carried out using an active feedback control means, said active feedback control means including an optical means to

monitor cell position comprising both a linear diode array and a video camera wherein the diode array is interfaced with a high speed A/D converter and the video camera is interfaced with real time image processing hardware.

4,956,066

## DEVICE FOR CARRYING OUT FIELD SUPPORTED ION EXCHANGE IN PLANE-PARALLEL PLATES

Edilbert A. K. Froning, Am Fohrenbühl 12, 7777 Salem, and Klaus A. Langner, Alte Dorfstrasse 61, 7777 Überlingen, both of Fed. Rep. of Germany

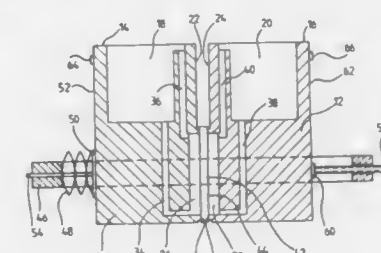
Filed Jan. 31, 1989, Ser. No. 304,496

Claims priority, application Fed. Rep. of Germany, Feb. 1, 1988, 3802837

Int. Cl. 5 C03C 21/00

U.S. Cl. 204—243 R

2 Claims



1. A device for achieving field-ion exchange between plane-parallel glass plates and molten salts in the process of making optical waveguides, comprising
- a pair of holding bodies of electrically conductive material having side faces facing each other, cavities in said side faces, and planar sealing surfaces surrounding said cavities, said holding bodies, in operation being arranged vertically to hold the plane-parallel glass plate therebetween with said sealing surfaces sealing engaging said glass plate on opposite sides thereof,
- each of said holding bodies having a substantially horizontal top face with a recess therein open to the top, said recesses being reservoirs adapted to accommodate molten salt, the bottom of said recess being located above the upper end of said cavity,
- a filling supply conduit for connecting said recess with said cavity, said filling supply conduit extending from the bottom of said recess to the lower end of said cavity, and a vent conduit extending from the upper end of said cavity to said top face of said holding body,
- said holding bodies being supported through electrically insulating means and being arranged to be connected to the negative and positive terminals, respectively of an electric power source.

4,956,067

## MULTI-ROTATING DISK ELECTRODE AND SOLID POLYMER ELECTROLYTE ELECTRODE TYPE ELECTROLYTIC BATH

Kyung S. Yun, and Byung W. Cho, both of Seoul, Rep. of Korea, assignors to Korea Institute of Science and Technology, Seoul, Rep. of Korea

Filed Jan. 4, 1990, Ser. No. 460,986

Claims priority, application Rep. of Korea, Sep. 6, 1989, 12904/1989[U]

Int. Cl. 5 C25B 9/00

U.S. Cl. 204—212

8 Claims

1. A multi-rotating disk electrode and solid polymer electrolyte electrode type electrolytic bath comprising:

a multi-rotating disk electrode (RDE) which is formed by stacking alternately large and small rotating disk electrodes; and



a solid polymer electrolyte (SPE) electrode in which conductive material such as metal is coupled in a single layer or multilayers on a solid polymer electrolyte, both of said multi-RDE and SPE electrode being provided simultaneously as a working electrode.

4,956,068

# NON-CONSUMABLE ANODE FOR MOLTEN SALT ELECTROLYSIS

Thinh Nguyen, Onex; Abdelkrim Lazouni, Geneva, and Kim S. Doan, Onex, all of Switzerland, assignors to MOLTECH Invent S.A., Luxembourg

PCT No. PCT/EP88/00787, § 371 Date Apr. 28, 1989, § 102(e) Date Apr. 28, 1989, PCT Pub. No. WO89/01994, PCT Pub. Date Mar. 9, 1989

PCT Filed Aug. 30, 1988, Ser. No. 350,477

Claims priority, application Austria, Sep. 2, 1987, 87810503 Int. Cl.<sup>5</sup> C25C 7/02

U.S. Cl. 204—242

12 Claims

1. An anode for electrowinning aluminum from molten salt electrolytes, and which, in use, is a substrate for a coating formed or maintained in-situ in the molten electrolyte, the anode comprising an oxide ceramic coating applied on a metal, alloy or cermet substrate, and an electronically-conductive oxygen barrier layer between the oxide ceramic coating and the substrate, the oxygen barrier layer containing chromium oxide, and the oxide ceramic coating which swerves as anchorage for said in-situ coating comprising copper oxide in solid solution with at least one further oxide; nickel ferrite; copper oxide and nickel ferrite; or doped, non-stoichiometric or partially substituted spinel.

4,956,069

# ELECTROLYTIC MEMBRANE CELLS FOR THE PRODUCTION OF ALKALIS

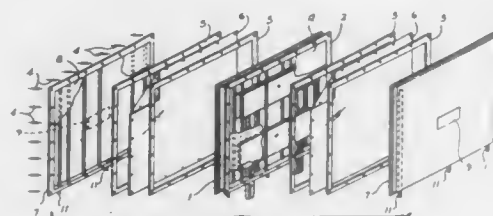
Hermilo Tamez Salazar, Ave. Lagrange 108 Fracc. Colonial Lagrange 66490, San Nicolas, De Los Garza, N. L., Mexico

Filed Mar. 10, 1989, Ser. No. 321,304

Int. Cl.<sup>5</sup> C25B 9/00, 11/03, 11/10

U.S. Cl. 204—257

2 Claims



1. An electrolytic membrane self contained sealed cell for the production of alkalis, comprising in combination, a central anode compartment located between two cathode compartments to form a monopolar cell structure, anode compartment structure providing two opposed sheets comprising titanium spread in a layer with reinforcing structure forming a compartment which defines in an upper part a space for accumulation of reaction gases, cathode compartment structures respectively comprising an outer perforated tin plate and a diaphragm disposed toward said anode sheets respectively, electrical current terminals respectively connected to the titanium sheets and tin plates, assembling means holding the sheets and plates in spaced relationship to define a sealed self combined electrolytic cell, and hydraulic pipe means for introducing raw materials into the cell and removing processed products.

4,956,070  
SPUTTERING APPARATUS  
Janji Nakada, and Hideaki Takeuchi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

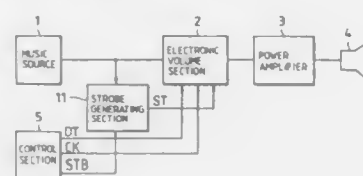
Filed Apr. 14, 1989, Ser. No. 338,078

Claims priority, application Japan, Apr. 20, 1988, 63-95430

Int. Cl.<sup>5</sup> C23C 14/35

U.S. Cl. 204—298.18

5 Claims



1. A sputtering apparatus comprising: at least two different kinds of targets; a substrate, onto which sputtering is performed, disposed in opposition to said targets; magnetic field generating means for producing magnetic fields substantially perpendicularly intersecting electric fields generated between said substrate and said targets near front sides of said targets, said magnetic field generating means comprising main magnets for generating said magnetic fields, and respective auxiliary electromagnets provided near said main magnets or combined therewith; and means for supplying electrical currents for exciting said electromagnets and controlling said electrical currents to change the intensity of said magnetic fields to regulate a sputtering discharge, said electrical currents having a sinusoidal waveform with a DC offset.

4,956,071

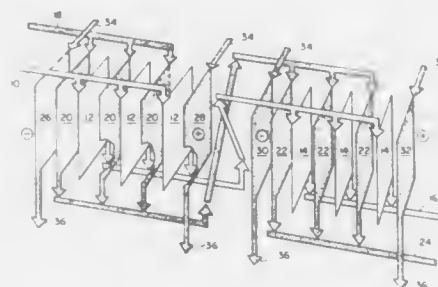
ELECTRODEIONIZATION APPARATUS AND MODULE  
Anthony J. Giuffrida, N. Andover; Gary C. Ganzl, Lexington, and Yoram Oren, Brookline, all of Mass., assignors to Millipore Corporation, Bedford, Mass.

Continuation-in-part of Ser. No. 908,913, Sep. 18, 1986, which is a division of Ser. No. 762,804, Aug. 2, 1985, Pat. No. 4,632,745, which is a continuation of Ser. No. 628,930, Jul. 9, 1984, abandoned. This application Jan. 18, 1989, Ser. No. 298,455

Int. Cl.<sup>5</sup> B01D 13/02

U.S. Cl. 204—301

14 Claims



1. Electrodeionization apparatus adapted to remove ions from a liquid which comprises:  
a first cathode compartment at a first end of said apparatus,  
a first anode compartment at an end of said apparatus that is opposite of said first end,  
a plurality of dual compartments comprising an ion depleting compartment, an ion concentrating compartment and an odd number of at least three ion permeable membranes, said ion permeable membranes comprising anion permeable membranes alternately positioned with respect to cation permeable membranes,

each of said ion depleting compartments and each of said ion concentrating compartments comprising a spacer and a plurality of ion depleting subcompartments and ion concentrating subcompartments,  
said subcompartments being formed by a plurality of ribs extending along the length of each of said ion depleting compartments and said ion concentrating compartments, each of said ion depleting subcompartments and said ion concentrating subcompartments containing a mixture of anion exchange resin and cation exchange resin,  
each of said ion depleting subcompartments and said ion concentrating subcompartments having a width defined by the distance between said ribs of between about 0.3 and 4 inches and a thickness between about 0.05 and 0.25 inches wherein the thickness of said subcompartments is defined by the distance between an anion permeable membrane adjacently positioned to a cation permeable membrane, said membranes being bonded to each of said ribs, along the length of said ribs, and to said spacer, such that the anion permeable membrane and cation permeable membrane are positioned alternatively along the length of said dual compartment,  
means for passing a first liquid to be purified through said ion depleting compartments,  
means for passing a second liquid for accepting ions from said first liquid through said ion concentrating compartments,  
means for supplying an electrical voltage between an anode in said anode compartment and a cathode within said cathode compartment,  
means for reversing polarity of said electrical voltage to convert said anode to a second cathode and to convert said cathode to a second anode and to convert said ion depleting compartments to second ion concentrating compartments and to convert said ion concentrating compartments to second ion depleting compartments and,  
means for recovering a liquid product having low conductivity continuously from said ion depleting, compartments and said second ion depleting compartments.

4,956,072

# OXYGEN SENSOR

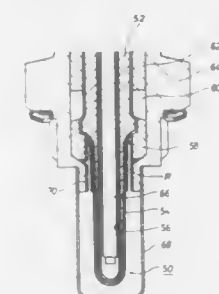
Takao Kojima, Nagoya, and Yasuhiro Ujita, Kasugai, both of Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Filed May 25, 1989, Ser. No. 356,918

Int. Cl.<sup>5</sup> G01N 27/47

U.S. Cl. 204—424

6 Claims



1. A solid electrolyte oxygen sensor comprising:  
a detection element comprising a solid electrolyte and inner and outer electrodes coupled to said solid electrolyte, at least one of which is exposed to the atmosphere, for detecting an oxygen partial pressure for the surrounding atmosphere;  
a metal member insulated from the outer electrode of the detection element for containing the detection element; an insulating spacer provided between the outer electrode of the detection element and the metal member for supporting the detecting element; and  
heat-stable insulating layer means covering the surface of a

recess defined between the detection element on one side and the metal member and the insulating spacer on the other side for preventing deterioration of insulation between said electrodes and said metal member.

4,956,073

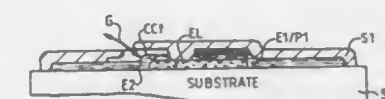
METHOD TO MAKE MICROCAVITIES AND ITS APPLICATION TO AN ELECTROCHEMICAL SENSOR  
Didier Pribat, Paris; Joël Perret, Plaisir; Jean-Claude Rouffy, Poissy, and Gonzalo Velasco, Paris, all of France, assignors to Thomson-CSF, Paris, France

Filed Sep. 19, 1988, Ser. No. 245,731

Claims priority, application France, Sep. 22, 1987, 87 13058 Int. Cl.<sup>5</sup> G01N 27

U.S. Cl. 204—426

7 Claims



1. A method for making an electrochemical sensor having a microcavity comprising the steps of:  
forming on a substrate at least one element made of solid electrolyte;  
partially covering said electrolyte element with a first electrode;  
partially covering said electrolyte element with a second electrode;  
making, on said second electrode, an element made of a material which is combustible and/or volatile at high temperature and which has the shape, thickness and position of said microcavity to be formed;  
making a sheath fully covering said first and second electrodes, said electrolyte element and said element made of combustible and/or volatile material, said sheath being made of an amorphous material which is impervious to a fluid mixture and, for making, in said sheath an axis hole to said element made of combustible and/or volatile materials;  
and heating at least said element made of combustible and/or volatile materials so as to cause its evaporation and/or consumption.  
6. An electrochemical sensor for the measurement of relative concentrations of species contained in a fluid mixture, made according to the method of claim 1, comprising:  
at least one solid electrolyte which is an ion conductor of one of the species of the fluid mixture or of an ion capable of reacting with this species;  
at least one first partial pressure internal reference electrode in contact, by one of its faces, entirely or partly, with the solid electrolyte;  
at least one second measuring electrode in contact, by one of its faces, entirely or partially, with the solid electrolyte and receiving the fluid mixture to be analyzed;  
a layer of an encapsulating material made of an inert material which is impervious to the species present in the fluid mixture, coating the first electrode, the second electrode and the solid electrolyte, and having one access hole enabling the fluid mixture to reach the second electrode;  
said electrochemical sensor comprising at least one microcavity partially covering the second measuring electrode in that zone which covers the electrolyte, said microcavity communicating through the access hole with the fluid mixture to be analyzed and having a thickness enabling a diffusion of a molecular type of fluid.

4,956,074

## MICROPROBE

Helmut Fischer, Industriestr. 21, 7032 Sindelfingen 6, Fed. Rep. of Germany

Filed Aug. 4, 1989, Ser. No. 390,238

Int. Cl.<sup>5</sup> G01N 27/26

U.S. Cl. 204—434

22 Claims

1. In an apparatus for a microprobe (3) for coulometric measurement of the thickness of metallic coatings (2), comprising

an outer casing (4) having at one end an outlet orifice (7) for an electrolyte used in coulometric measurement and a first connection (16) for a pressure medium,

an inner casing (6) in the outer casing (4),

a first chamber (11) between the outer casing (4) and the inner casing (6),

a second chamber (12) in the inner casing (6), in a region thereof facing away from the outlet orifice (7),

a second connection (14) for a pressure medium that communicates with the second chamber (12),

a nozzle pipe (8) that leads from the second chamber (12) to the outlet orifice (7) and has a debouchment (43) situated inside the first chamber (11) behind the outlet orifice (7),

first pump means (28, 17, 16) having a connecting coupling (17) connected to at least one of the connections (13, 14) by a pressure medium means (16), which first pump means produces at least indirectly at least one of two different operating pressures, P0 and P1, for at least one of the chambers of which at least one of the operating pressures is oscillating,

second pump means (28, 17, 22) for producing at least indirectly the second of the two different operating pressures P0 and P1 for the other chamber

the improvement wherein:

a valve apparatus (29, 31, 23, 24) is provided between the first and second pump means and the microprobe (3), wherein in a working position of the first and second pump means and the valve apparatus (29, 31, 23, 24) an underpressure P2, which is substantially lower than the maximum operating pressures of P0 and P1, is superimposed on at least one of the operating pressures.

4,956,075

## CATALYTIC CRACKING

Phillip J. Angevine, Woodbury; Robert G. Bundens, Mullica Hill; Joseph A. Herbst, Turnersville, all of N.J.; Albin Huss, Jr., Chadds Ford, Pa., and Sadi Mizrahi, Cherry Hill, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 22, 1988, Ser. No. 288,181

Int. Cl.<sup>5</sup> C10G 11/05

U.S. Cl. 208—120

36 Claims

1. In a catalytic cracking process, undertaken in the presence of a cracking catalyst free of manganese, in a catalytic cracking zone, to upgrade a heavy hydrocarbon feedstock to produce gasoline, during which upgrade, coke formation on the catalyst occurs, wherein the catalyst containing said coke during cracking is conveyed to a regenerator for regeneration and, after regeneration, is reduced in coke content and is conveyed to said zone, the improvement comprising

passing through said zone a heavy hydrocarbon feed, subjecting the feed to catalytic cracking conditions by passing to said zone a catalyst composition consisting essentially of manganese ultrastable Y and a matrix component, wherein the manganese content ranges from 0.1 to 10 weight percent of the catalyst composition with a Na content which is less than 0.5 weight percent, wherein catalytic cracking conditions include a temperature of about 850° F. to about 1500° F., a catalyst to feed ratio of 1:1 to about 50:1; and

recovering upgraded effluent with gasoline yields greater than that of the cracking catalyst free of manganese.

4,956,076

## METHOD OF SCAVENGING HYDROGEN HALIDES FROM LIQUID HYDROCARBONACEOUS MEDIUMS

Spencer S. Awbrey, Spring, Tex., assignor to Betz Laboratories, Inc., Trevose, Pa.

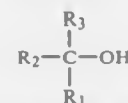
Filed Sep. 28, 1989, Ser. No. 414,049

Int. Cl.<sup>5</sup> C10G 7/10

U.S. Cl. 208—291

16 Claims

1. A method for scavenging hydrogen halide species from a liquid hydrocarbonaceous medium comprising an organic phase component and an aqueous phase component, said medium containing such hydrogen halide species, said method comprising adding an effective amount for the purpose of an active alcohol to said medium, said active alcohol reacting with said hydrogen halide species to yield an organic halide that partitions to said organic phase said active alcohol comprising a member selected from the group consisting of allyl alcohol, benzyl alcohol, and tertiary alcohols of the formula



wherein R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are the same or different and are chosen from C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkenyl, C<sub>1</sub>-C<sub>6</sub> alkynyl, and phenyl.

4,956,077

## FROTH FLOTATION OF MINERAL FINES

Christopher H. Barwise, Buddle Hill, assignor to Fospur Limited, Somercotes, England

Filed Oct. 21, 1988, Ser. No. 260,615

Claims priority, application United Kingdom, Nov. 17, 1987, 8726857

Int. Cl.<sup>5</sup> B03D 1/02

U.S. Cl. 209—166

16 Claims

1. In a froth flotation process for the beneficiation of mixed mineral particles containing a noncarbonaceous first mineral and a second mineral in which particles of said first mineral which it is desired to recover and particles of said second which it is not desired to recover in an aqueous slurry are treated with a collector for said first mineral prior to the addition of a frother and flotation of the mixed mineral particles in a froth flotation cell wherein the first mineral is selectively concentrated in the froth the improvement comprising adding to the slurry a collector which renders hydrophobic the surfaces of the first mineral particles which it is desired to recover, and then, after said collector addition and prior to the flotation, adding a predominantly hydrophobic non-water soluble polymeric flocculating agent which will selectively adsorb onto the hydrophobic surfaces of said first mineral particles so-formed and flocculate the particles of the first mineral together.

4,956,078

## FEED PRESTRATIFICATION ATTACHMENT FOR HIGH EFFICIENCY VIBRATORY SCREENING

Anthony J. Magerowski, Milwaukee; Vijia K. Karra, Greendale; Scott E. Szalanski, Oak Creek, and John A. Gleschen, West Allis, all of Wis., assignors to Nordberg Inc., Milwaukee, Wis.

Filed Jan. 30, 1989, Ser. No. 304,188

Int. Cl.<sup>5</sup> B07B 1/46

U.S. Cl. 209—254

14 Claims

1. A feed prestratification attachment for mounting to a vibrating screen unit having a self-induced vibrating action and vibrating at a specified operating frequency, a feed end and at least one generally planar screening surface rigidly secured to the unit, said attachment comprising:

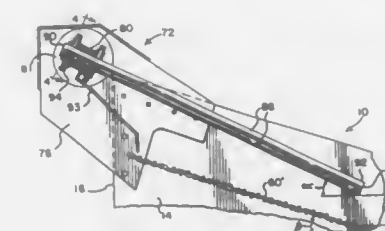
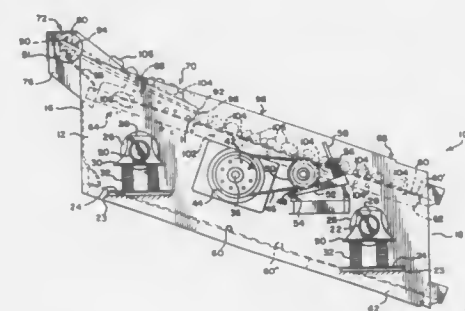
a pair of side adapter plates disposed in spaced parallel relationship to each other, each said plate having plate mounting means for mounting said attachment to the screen unit;

a single elongate member located between said adapter

plates on a generally horizontal plane substantially perpendicular to said plates, said member having rod mounting means; and

a plurality of elongate vibratable rods, each of which being provided with a mounting end and a discharge end, said mounting ends being configured to engage said mounting means so that said rods project in spaced parallel relationship from said elongate member, each of said rods having

the head, and a common drive means for synchronised movement of the transfer means, gripper means and indexing means,



a specified length and diameter, said rod length and diameter being specified so that upon the vibration of said rods, feed material deposited on said rods will be preliminarily stratified and distributed between said rods and from said discharge end evenly across the screening surface, said attachment having no means of inducing said vibration of said rods, said vibration being induced through the vibratory action of the screen unit.

4,956,079

## APPARATUS FOR TRANSPORTING OBJECTS

Alan Bailey, Cheadle, and David K. Yew, Great Sutton, both of England, assignors to British Nuclear Fuels plc, Warrington, England

Filed Feb. 13, 1989, Ser. No. 309,293

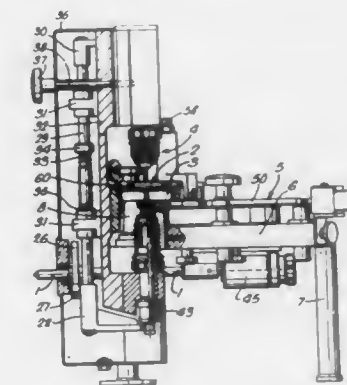
Claims priority, application United Kingdom, Feb. 29, 1988, 8804497

Int. Cl.<sup>5</sup> B07C 5/02, 5/08

U.S. Cl. 209—552

8 Claims

1. Apparatus for transporting objects through a measuring head comprising a transfer means for receiving objects individually from a supply and conveying the objects to one side of the measuring head, gripper means at the head for receiving the object from the transfer means and carrying the object through a passage through the head, and indexing means at the opposite side of the head to remove the object from the gripper means and to convey the object to an outlet selected in response to signals generated by the object in passing through



said transfer means comprising an arm pivotally mounted on a drive shaft.

4,956,080

## HIGH PRESSURE OXYGEN-SATURATED WATER TREATMENT APPARATUS

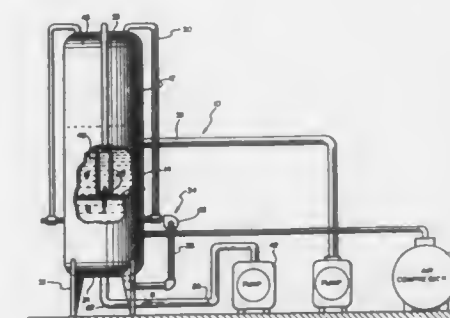
John Josefik, Berwyn, Ill., assignor to Microlift Systems, Incorporated, Sturgeon Bay, Wis.

Filed Aug. 3, 1987, Ser. No. 80,993

Int. Cl.<sup>5</sup> C02F 1/74

U.S. Cl. 210—109

44 Claims



1. An improved high pressure oxygen-saturated water treatment apparatus for providing super-saturated oxygen treatment to water, said apparatus comprising:

a pressurized treatment tank having a substantial longitudinal dimension and having a selected liquid level therein; chamber separation means disposed within said pressurized treatment tank and beneath the selected liquid level thereof for defining two connected liquid containing chambers therewithin, said chamber separation means including aperture means thereon for permitting the flow of water from a first chamber to a second chamber, wherein said first chamber of said pressurized treatment tank is disposed below said second chamber thereof; treatment water input means disposed on said pressurized treatment tank for input of a treatment water stream into said first chamber thereof;

recirculation water means disposed on said pressurized treatment tank for receiving a stream of recirculation water therefrom;

oxygen input means disposed on said pressurized treatment tank for providing oxygen-containing gas into said pressurized treatment tank and for maintaining said oxygen containing-gas under substantial pressure within said pressurized treatment tank;

oxygen output means disposed on said pressurized treatment



tank for receiving pressurized oxygen-containing gas therefrom to form a pressurized oxygen-containing stream;  
venturi means disposed on said pressurized treatment tank for receiving and combining said pressurized oxygen-containing stream with said recirculation water stream under pressure to form a combined injection stream of pressurized water which is super-saturated with oxygen for injection into the treatment tank;  
means for injecting the combined injection stream into said first chamber of said tank for substantial intersection with the treatment water stream from said treatment water input means; and  
treated water output means disposed on said pressurized treatment tank for output of treated water from said second chamber thereof.

4,956,081

## FUEL FILTER WITH DIAPHRAGM PUMP

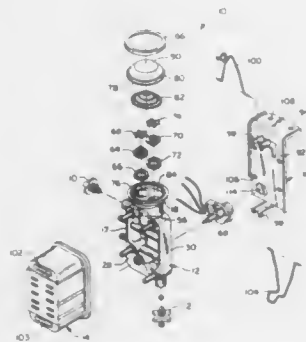
David H. Hodgkins, Granby, and M. Craig Maxwell, Colchester, both of Conn., assignors to Stanadyne Automotive Corp., Windsor, Conn.

Filed Sep. 30, 1988, Ser. No. 252,060

Int. Cl.<sup>5</sup> B01D 29/00

U.S. Cl. 210—136

7 Claims



1. A fuel conditioning unit for an internal combustion engine comprising:
  - a frame having a perimeter including top, bottom, front and rear walls, and having first and second sides;
  - a priming pump projecting upwardly from the top wall of the frame;
  - a housing connectable to one side of the frame and containing an internal chamber for receiving at least one fuel filter element;
  - flow passage means for directing a flow of fuel into an inlet port in the frame, through the priming pump, the chamber, and out of an outlet port in the frame;
  - wherein the prime pump comprises,
    - a basin having a suction opening for receiving fuel from the inlet port and a discharge opening for delivering fuel to the chamber,
    - suction valve means associated with the suction opening, for admitting fluid into the basin only when the fluid pressure in the basin is less than the fluid pressure in the inlet port,
    - discharge valve means associated with the discharge opening, for discharging fluid from the basin into the chamber only when the fluid pressure in the basin is greater than the fluid pressure in the chamber,
    - a diaphragm sealingly mounted to the basin and forming a dome thereover, and
    - means associated with the basin, for biasing the diaphragm convexly outwardly, such that the diaphragm provides a crown surface for manually actuating the priming pump;

a mounting bracket of material dissimilar to that of the frame connected to the other side of the frame; and  
clip means connected between the bracket and the housing, for holding the bracket, frame and housing together as an assembled unit.

4,956,082

## CENTRIFUGAL BIO-CONTACTOR APPARATUS

Sung Hul Chol, 615-20, Banghak-2-Dong, Dobong-ku, Seoul 132-022, Rep. of Korea

PCT No. PCT/KR88/00002, § 371 Date Sep. 16, 1988, § 102(e)

Date Sep. 16, 1988, PCT Pub. No. WO88/05764, PCT Pub.

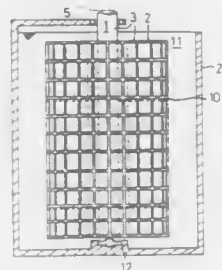
Date Aug. 11, 1988

PCT Filed Jan. 30, 1988, Ser. No. 249,925

Int. Cl.<sup>5</sup> C02F 3/08

U.S. Cl. 210—150

22 Claims



22. Apparatus for treating waste water comprising a reactor vessel containing said waste water, and a means for biologically contacting said waste water, said biological contacting means comprising a rotor means on which microorganisms are attached, said rotor means being disposed in said reactor vessel and fully submerged in said waste water in said reactor vessel, said rotor means having opposite spaced longitudinal ends, a rotor shaft rotatably supporting said rotor means for rotation in said reactor vessel about a rotor axis, said rotor means having an outer cylindrical boundary and an inner cylindrical boundary, said outer cylindrical boundary being spaced radially outwardly of said inner cylindrical boundary, said rotor means having an internal space between said outer and inner cylindrical boundaries, a plurality of spaced longitudinal ribs extending from said outer cylindrical boundary into said space between said outer and inner cylindrical boundaries, said longitudinal ribs extending longitudinally of said rotor means from one of said longitudinal ends to the other of said longitudinal ends, said longitudinal ribs each intersecting said outer cylindrical boundary at a point of intersection, each of said longitudinal ribs extending from its respective point of intersection at an acute angle relative to a tangent line which is tangential to said outer cylindrical boundary at said point of intersection, and a plurality of spaced transverse ribs disposed generally perpendicular to said longitudinal ribs and joined to two of said longitudinal ribs which are successively spaced such as to form waste water passages between successive spaced transverse ribs and successive spaced longitudinal ribs, said longitudinal ribs being operable to impart a centrifugal force to the waste water in said waste water passages as said submerged rotor means rotates in said reactor vessel.

4,956,083

## WATER PURIFICATION DEVICE

Domingo Tovar, 8530 Cedros Ave., #7, Panorama City, Calif. 91402

Filed Jun. 1, 1989, Ser. No. 359,607

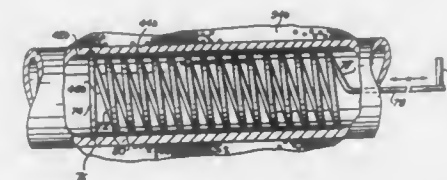
Int. Cl.<sup>5</sup> C02F 1/48

U.S. Cl. 210—222

3 Claims

3. A water purification device, said device comprising, in combination:
  - (a) a hollow casing split into a pair of mating sections releas-

- ably connected together, for easy access to the inside of said casing;
- (b) a water pipe disposed in said casing and extending out opposite ends thereof;
- (c) an electromagnetic coil disposed around said pipe in said casing;
- (d) a non-rotating, flexible and accordion-shaped water impeller secured longitudinally in said pipe, said impeller including a plurality of spaced accordion pleats;



- (e) means for moving said impeller between a collapsed position and an extended position to change the number and pitch of said accordion pleats within said coil so as to mix and control the residence time of water passing through said pipe; and
- (f) electrical means within said casing and extending out thereof for passing a current through said coil to energize said coil.

4,956,084

## SIMPLIFIED APPARATUS FOR INTENSIFIED MAGNETIC TREATMENT OF LIQUIDS

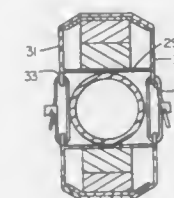
Jeffrey G. Stevens, 413 209th Ave., N. E., Redmond, Wash. 98053

Filed Aug. 21, 1989, Ser. No. 396,034

Int. Cl.<sup>5</sup> C02F 1/48

U.S. Cl. 210—222

5 Claims



3. Apparatus for magnetic treatment of liquid in a conduit made of non-magnetic material and having a first longitudinal axis, said apparatus comprising:
  - at least two permanent magnets each having a rectangular cross-sectional shape, a first length, a first width, a second longitudinal axis and first and second faces opposite each other, said magnets being polarized such that said first face is the north pole of each of said magnets and said second face is the south pole, said first width being transverse to said first and second faces,
  - two backing plates, each being planar, rectangular in plan-form and having a second length and a second width, said second length being equal to said first length, and said second width being greater than said first width,
  - two cover boxes made of non-magnetic material, each of said two boxes completely enclosing at least one of said magnets and one of said backing plates, each of said boxes further having a portion in contact with said second face of said at least one of said magnets and further having first and second outer sides and at least one tab extending from each of said first and second outer sides in a direction essentially perpendicular to said second face of said at least one magnet in said cover box, said backing plate being positioned symmetrically on said first face of said

magnet, each of said at least one tabs on said outer sides having a slot and

two tie straps for securing the cover boxes together, wherein one of said tie straps extends through the slots in the tabs on said first outer sides and the other of said tie straps extends through the slots in the tabs on said second outer sides,

whereby said apparatus is assembled on said conduit by positioning said cover boxes such that said magnets are opposite each other with at least one of said second faces separated from said conduit by said portion of said cover box in contact with said second face of said at least one of said magnets and said first and second longitudinal axes parallel and said outer sides in alignment and passing said tie straps through said slots in said tabs extending from said aligned outer sides and connecting and tightening said straps to hold said apparatus firmly in place on said conduit.

4,956,085

## FILTER PLATE, FILTER PLATE ELEMENT AND FILTER COMPRISING SAME

Henry B. Kopf, 108 Coatbridge Cir., Cary, N.C. 27511

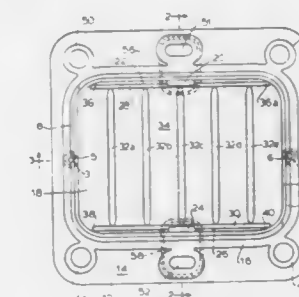
Division of Ser. No. 104,177, Oct. 2, 1987, Pat. No. 4,867,876.

This application Jul. 11, 1989, Ser. No. 378,032

Int. Cl.<sup>5</sup> B01D 25/12, 13/00

U.S. Cl. 210—231

6 Claims



1. A filter plate having a generally planar and rectangular shape with a substantially flat bottom surface, and a top surface with an upwardly extending wall circumscribingly bounding a flow channel of generally rectangular shape with said top surface bounded by said upwardly extending wall comprising a top surface bounded by said upwardly extending wall comprising a floor of said flow channel, with a liquid inlet port at a medial part of a first side of said flow channel and a liquid outlet port at a medial part of a second side of said flow channel opposite said first side thereof, said liquid inlet port being joined in liquid flow communication with a liquid feed trough extending transversely across said first side of said flow channel, and said liquid outlet port being joined in liquid flow communication with a liquid collection trough extending transversely across said second side of said flow channel, with a plurality of spaced-apart partitions extending upwardly from the floor of said flow channel between said liquid feed trough and liquid collection trough, said partitions being of lesser height than said wall circumscribing said flow channel and substantially parallel to one another to define a series of sub-channels extending longitudinally between said liquid feed trough and said liquid collection trough, said liquid feed trough being of progressively decreasing depth from its medial portion, in communication with said liquid inlet port, to its marginal extremities, and said liquid collection trough being of progressively decreasing depth from its medial portion, in communication with said liquid outlet port, to its marginal extremities.

4,956,086

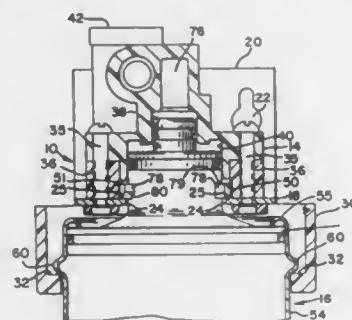
**FILTER CARTRIDGE WITH A LUGGED CONCENTRIC CLOSURE PORTION**

Jack W. Thomsen, LaGrange Park; Perialwar Regunathan, Wheaton, and John W. Tadlock, West Chicago, all of Ill., assignors to Everpure, Inc., Westmont, Ill.

Continuation-in-part of Ser. No. 257,338, Oct. 13, 1988, Pat. No. 4,857,189. This application Jun. 8, 1989, Ser. No. 363,630  
Int. Cl.<sup>5</sup> B01D 27/08

U.S. Cl. 210—232

5 Claims



1. A filter cartridge for insertion into a filter head having fluid inlet and outlet ports and adapted to be permanently mounted in a fluid conduit comprising:

- (a) a pressure vessel closed at one end and adapted to have a filter element disposed therein;
- (b) a closure member in sealed relationship with the open end of said pressure vessel,

said closure member being formed with inlet and outlet ports therein for communicating with inlet and outlet ports in a filter head with which the filter cartridge is adapted to be associated,

said closure member also being formed with a pair of unequal diameter concentrically disposed axially projecting tubular portions which define inlet and outlet ports to and from the pressure vessel, one of said tubular portions extending axially beyond the other;

- (c) a first pair of laterally extending oppositely disposed lug members formed on the outer surface of said pressure vessel;
- (d) a second pair of laterally extending oppositely disposed lug members formed on the outer surface of the tubular portion having the larger diameter; and

(e) means formed on said second pair of lug members for coacting with a portion of a filter head with which the filter cartridge is adapted to be associated, said means formed on said second pair of lug members being adapted to function in coaction with a filter head to restrict potential axial movement during operation and under pressure of said closure member relative to said pressure vessel.

4,956,087

**MODULE FOR RIGID CYLINDRICAL MEMBRANE ELEMENTS FOR SEPARATION, FILTRATION, OR CATALYTIC TRANSFORMATION**

Daniel Garcera, Tarbes, and Jacques Gillot, Laloubere, both of France, assignors to Societe Anonyme dite: Societe des Ceramiques Techniques, Bazet, France

Filed Jul. 7, 1989, Ser. No. 376,454

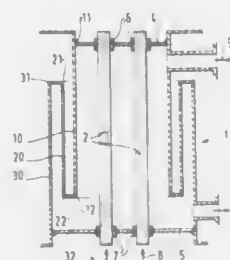
Claims priority, application France, Jul. 29, 1988, 88 10280  
Int. Cl.<sup>5</sup> B01D 63/04

U.S. Cl. 210—321.8

17 Claims

1. A module comprising rigid cylindrical membrane elements for separation, filtration, or catalytic transformation, a vessel receiving said elements having an exterior tubular wall about said elements and which is generally cylindrical and parallel to said elements, first and second end plates closing opposite ends of said exterior tubular wall of said vessel, opposite ends of said elements being fixed by means of seals to respective end plates, the improvement wherein said end plates are interconnected by at least one spacer constituted by at least

three juxtaposed oblong parts, said first part being fixed to said first end plate, the third part being fixed to said second end plate, and the second part being fixed to the free ends of said



first and third parts, and wherein the material of said three parts have individual thermal expansion coefficients such as to ensure that their overall axial thermal expansion is equal to the axial thermal expansion of said active elements.

4,956,088

**METHOD AND APPARATUS FOR PRESSURIZED DEWATERING**

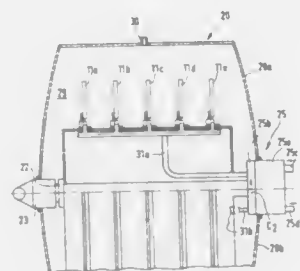
Rolf Hindström, Turku, Finland, assignor to Outokumpu Oy, Finland

Filed May 8, 1989, Ser. No. 348,961

Claims priority, application Finland, May 6, 1988, 882128  
Int. Cl.<sup>5</sup> B01D 29/00

U.S. Cl. 210—327

4 Claims



3. Apparatus for filtering, comprising

a plurality of filter plates each comprising a finely porous suction face having a pore size of about 0.05 to 2 microns arranged to be brought into contact with material to be filtered, saturated with liquid and hydraulically connected with liquid under negative pressure relative to the material to be filtered,

a pressure-tight cover surrounding each said filter plate and defining a space into which positive pressure can be introduced for accelerating removal of liquid out of the material to be filtered,

a shaft upon which said filter plates are circumferentially mounted,

a lower basin within said pressure tight cover into which said plates are arranged to pass along with rotation of said shaft, with the material to be filtered adhering to said faces of said plates by effect of said negative pressure and also rising along with rotation of said shaft and plates out of said basin, and into said pressure space within said cover above said basin by said negative pressure containing to be applied,

at least one doctor mounted to remove filtered material from said faces of said plates as each said plate further moves into contact with said at least one doctor

a conveyor arranged to receive the material removed by said at least one doctor which falls thereon by effect of gravity,

and to transfer the material out from an interior of said apparatus within said cover, said filter plate comprising several groups of filter plates, each group comprising several filter plates and being rotatably mounted upon said shaft, and several doctors, each said doctor being positioned to remove material from plates in a respective group thereof, means for generating said negative pressure which comprise a duct communicating with an interior of each said plate, and a valve mounted in said duct, said valve comprising a rotor part and a stator part, with said rotor part rotatably mounted to revolve along with said shaft and fitted inside said cover, and said stator part against which said rotor part is arranged to glide, being fitted in a stationary pressure-sealing position against said cover.

4,956,089

**FORMING AN END-CAP ON A FILTER CARTRIDGE**

Stephen Hurst, 52 The Street, West Horsley, Leatherhead, Surrey, United Kingdom KT24 6AX

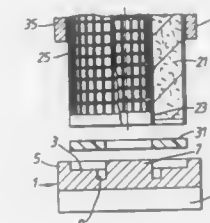
Continuation of Ser. No. 823,502, Jan. 8, 1986, abandoned. This application Apr. 21, 1987, Ser. No. 45,157

Claims priority, application United Kingdom, May 10, 1984, 8411912

Int. Cl.<sup>5</sup> B01D 27/08

U.S. Cl. 210—484

33 Claims



1. A method of forming an end-cap on a filter cartridge comprising a filter medium and at least one supporting member of thermoplastic plastics material extending the length of said cartridge adjacent said medium, which method comprises bringing an end of said cartridge into engagement with a heated die at a temperature high enough to melt said material of said supporting member or members, and forming with said molten material an end-cap having an end portion of said filter medium sealingly embedded in or fused to it, wherein the length of said filter cartridge measured to an axially outer face of said end-cap is less than the overall length of said cartridge before formation of said end-cap.

4,956,090

**HYDROCYCLONE DIVIDED INTO SECTIONS**

William Robinson, Täby, Sweden, assignor to Richard Berg Aktiebolag, Täby, Sweden

Filed Apr. 14, 1989, Ser. No. 338,970

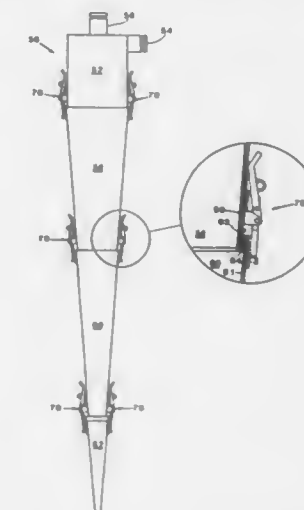
Claims priority, application Sweden, Apr. 29, 1988, 8801635  
Int. Cl.<sup>5</sup> B01D 17/038; B04C 5/08

U.S. Cl. 210—512.1

5 Claims

1. Hydrocyclone, suitable for the cleaning of fibre suspensions in pulp and paper factories, comprising an elongated conical housing comprising a number of sections of truncated conical form, which are connected to one another, the interior of which housing defines a conically tapering cyclone chamber into which is to flow the suspension to be cleaned along the inside of the housing from the widest part to the narrowest part of the chamber whilst rapidly circulating, wherein at least two of the truncated conical sections of the housing are situated one next to the other and are so dimensioned that the truncated conical lower end portion of one of the two sections projects

for a small distance in the direction of flow into the adjacent truncated conical upper end portion of the other section in the direction of flow, so as to form a joint in which the outside of the inward-projecting truncated conical lower end portion of the one section snugly radially opposes the inside of the truncated conical upper end portion of the other section in nested relation therewith, means actuatable to a locked condition for (1)



preventing separation of the two sections and (2) exerting a continuing force lengthwise of the two sections pulling the two sections into rigidly jammed nesting engagement, such means comprising at least two quick-action locks distributed circumferentially equally around the joint between the two sections, the two sections being releasably fixed together by said locks, said locks being actuatable to pull the two sections forcibly together.

4,956,091

**APPARATUS FOR SEPARATING SOLID PARTICLES FROM A FLUID**

Hendrikus E. A. Van Den Akker, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

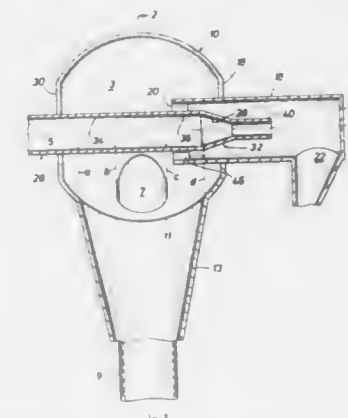
Filed Sep. 20, 1989, Ser. No. 409,896

Claims priority, application United Kingdom, Sep. 22, 1988, 8822350

Int. Cl.<sup>5</sup> B01D 21/26

U.S. Cl. 210—512.2

10 Claims



1. Apparatus for separating solid particles from a fluid, said apparatus comprising an upright enclosed swirl chamber hav-



ing a central longitudinal axis and a curved wall, a tangential inlet for a mixture of fluid and solid particles and a solids outlet, both said inlet and outlet extending perpendicularly to said central longitudinal axis of the swirl chamber and being in direct fluid communication with the swirl chamber, and a cyclone separator which includes a coaxial swirl tube extending through the wall of the swirl chamber and having an open end disposed in said swirl chamber and having a solids outlet opening disposed outside said swirl chamber, a coaxially disposed fluid outlet tube extending through the wall at the side of the swirl chamber opposite said cyclone separator, said outlet tube having an inlet part disposed in said swirl tube, and having swirl imparting means disposed in an annular space between said inner surface of the wall of said swirl tube and the outer surface of the wall of said fluid outlet tube, said swirl imparting means being so disposed that during operation of said apparatus, the direction of rotation in the swirl tube is the same as the direction in the swirl chamber.

4,956,092

## METHOD FOR CONCENTRATING/DEHYDRATING OF SEWAGE SLUDGE

Holger Blum, Parkallee 75, D-2000 Hamburg 13, Fed. Rep. of Germany

Filed Aug. 11, 1989, Ser. No. 392,366

Claims priority, application European Pat. Off., Aug. 23, 1988, EP88 113 720.2

Int. Cl.<sup>5</sup> C02F 11/14

U.S. Cl. 210—609

8 Claims

1. A method for concentrating/dehydrating sewage sludge including activated sludge in the presence of organic polyelectrolytes and/or inorganic flocculators, which comprises producing the activated sludge portion in an aerated biologic clarification step in the presence of at least one compound selected from the group consisting of folic acid, dihydrofolic acid and at least one salt thereof.

4,956,093

## WASTEWATER TREATMENT PROCESS

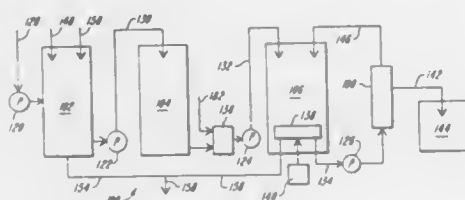
Massoud Pirbazari, 11634 Gorham Ave., #101, Los Angeles, Calif. 90089, and Jacob Shorr, 56 Liberty Ave., Lexington, Mass. 02173

Continuation-in-part of Ser. No. 899,416, Aug. 22, 1986, abandoned. This application Apr. 6, 1988, Ser. No. 178,189

Int. Cl.<sup>5</sup> C02F 3/08

U.S. Cl. 210—616

2 Claims



1. A process for treating wastewater including waste organic materials, said process comprising the steps of:

providing biologically active powdered activated carbon particles carrying on the outer surfaces thereof an active biological layer including bacteria that is biologically reactive with and biodegrades at least some of said organic compounds;

mixing said biologically active activated carbon with said wastewater in a tank having an outlet and a recirculation loop having an isotropic membrane filter arranged to retain said particulate material in the portion of said wastewater recirculated and turned to said tank, and to pass a filtered permeate, said loop connected to said outlet and arranged to withdraw liquid from said tank, pass said

liquid through said loop, and introduce at least a fraction of said withdrawn liquid back into said tank; and, circulating said wastewater and said biologically active activated carbon through said loop under turbulent flow conditions thereby to maintain said biological layers on said particles at mean thicknesses less than about 20 microns.

4,956,094

## ENHANCED PHOSPHATE REMOVAL FROM BOD-CONTAINING WASTEWATER

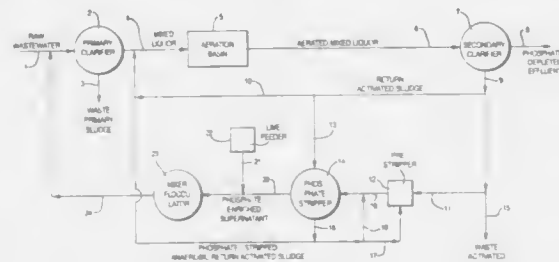
Gilbert V. Levin, Annapolis, and Ronald R. Wright, Parkville, both of Md., assignors to Biospherics Incorporated, Beltsville, Md.

Continuation-in-part of Ser. No. 291,419, Dec. 22, 1988, abandoned, which is a continuation of Ser. No. 169,145, Mar. 10, 1988, abandoned, which is a continuation of Ser. No. 833,110, Feb. 26, 1986, abandoned. This application Jul. 21, 1989, Ser. No. 374,137

Int. Cl.<sup>5</sup> C02F 3/30

U.S. Cl. 210—625

20 Claims



1. An activated sludge wastewater treatment process which comprises aerating a mixed liquor of phosphate-containing influent wastewater and activated sludge in an aeration or high-purity oxygen zone to reduce the BOD/COD content of said wastewater and to cause the microorganisms present to take up phosphate; separating a phosphate-enriched sludge, in which the phosphate is present in the sludge solids, from the mixed liquor to provide a substantially phosphate-free effluent; passing at least a portion of said phosphate-enriched sludge to a phosphate pre-stripping zone where BOD/COD-containing water containing at least 50 mg/L of BOD is added to poise the sludge organisms to begin enhanced release of phosphate; and thence passing said sludge to a phosphate stripping zone and settling, or partially settling, said sludge to form supernatant liquor; maintaining said settled, or partially settled, sludge under anaerobic conditions for a time sufficient to complete the release of the desired amount of phosphate from the sludge solids to the liquid phase; contacting at least a portion of the anaerobic sludge, which contains released phosphate in the liquid phase thereof in said phosphate stripping zone, with a lower soluble phosphate content aqueous medium to transfer the soluble phosphate in the anaerobic sludge liquid phase to said lower soluble phosphate content aqueous medium for conveying phosphate into the supernatant liquor, thereby enriching said stripping zone upper section; and recycling at least a portion of said anaerobic sludge from said phosphate stripping zone to said aeration or high-purity oxygen zone as said activated sludge.

4,956,095

## WATER OR GAS PURIFICATION BY BULK ABSORPTION

Lloyd M. Robeson, Macungie, and Michael Langsam, Allentown, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Dec. 29, 1989, Ser. No. 459,009

Int. Cl.<sup>5</sup> B01D 53/14; C02F 1/28

U.S. Cl. 210—670

6 Claims

1. A process for removing trace organic impurities from water or gas which comprises passing water or gas containing said impurities into a contact zone containing a fixed or moving bed of a bulk absorbent in particulate or granular form comprising solid insoluble polymer of a monomer having the general formula:



wherein each R is methyl or ethyl, contacting said water or gas with said absorbent, and removing purified water or gas from said zone.

4,956,096

## PROCESS FOR REMOVING FROM ELECTROCOATING BATHS IMPURITIES WHICH CAUSE SURFACE DEFECTS

Klaus Arlt, Senden; Theodora Dirking, Munster; Karl H. Josten, Munster, and Hans J. Streltberger, Munster, all of Fed. Rep. of Germany, assignors to BASF Lacke & Farben AKT, Munster, Fed. Rep. of Germany

Continuation of Ser. No. 74,483, Jun. 29, 1987, abandoned. This application Jul. 25, 1989, Ser. No. 384,915

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1985, 3540575

Int. Cl.<sup>5</sup> B01D 15/00

U.S. Cl. 210—692

4 Claims

1. A process for purifying an electrocoating bath contaminated with hydrophobic substances having a surface tension less than 35 mN/m, comprising passing, without pressure the contaminated electrocoating bath through an adsorbent volume of solid, fibrous or particulate homo or copolymer of ethylene, propylene, but-1-ene or but-2-ene to remove the hydrophobic substances by adsorption onto the solid, fibrous or particulate homo or copolymer.

4,956,097

## WASTE TREATMENT OF METAL CONTAINING SOLUTIONS

Constantine I. Courduvelis, Orange, Conn., assignor to Entbome, Incorporated, West Haven, Conn.

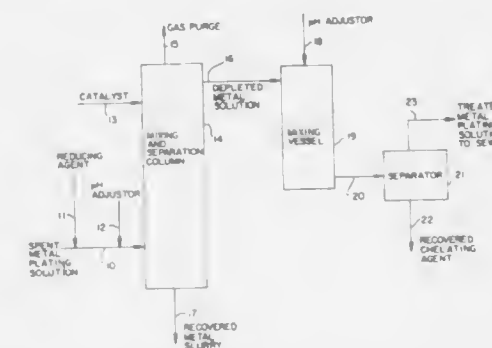
Continuation of Ser. No. 255,471, Oct. 11, 1988, abandoned.

This application Oct. 12, 1989, Ser. No. 425,493

Int. Cl.<sup>5</sup> C02F 1/62

U.S. Cl. 210—718

8 Claims



1. In a process for waste treating a metal and reducing agent

containing solution by loading the solution with a catalytic material which decomposes the solution and precipitates the metal and generates a gaseous reaction product, separating the precipitated metal and discharging the solution into a waste system, the improvement comprising:

performing the decomposition reaction in the substantial absence of air in a closed vessel from which the gaseous reaction product formed during the waste treatment process is purged.

4,956,098

## OXIDATION AND PHOTOOXIDATION PROCESS

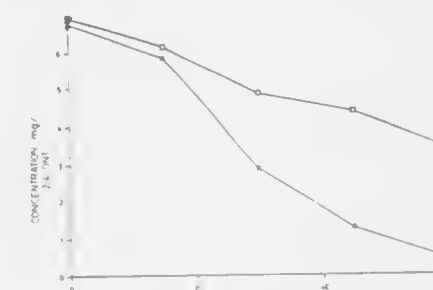
R. D. Samuel Stevens, Thornhill, and Stephen R. Carter, Willowdale, both of Canada, assignors to Solarchem Enterprises Inc., Toronto, Canada

Filed Aug. 19, 1988, Ser. No. 234,044

Int. Cl.<sup>5</sup> C02F 1/32, 1/58, 1/78

U.S. Cl. 210—748

14 Claims



1. A process for treating an aqueous stream containing an oxidizable contaminant that has at least one electron donating aromatic group comprising:

adding a sufficient amount of a compound selected from the group consisting of carbonate and bicarbonate to the stream to provide an aqueous stream having a stoichiometric excess amount of said compound to react with the contaminant and to increase the pH of the stream to a basic level; and,

subjecting the basic aqueous stream to an oxidation process to oxidize the oxidizable contaminant.

4,956,099

## METHODS FOR TREATING HYDROCARBON RECOVERY OPERATIONS AND INDUSTRIAL WATERS

Neil E. S. Thompson, Creve Coeur, and Robert G. Asperger, Des Peres, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Continuation-in-part of Ser. No. 208,627, Jun. 20, 1988, Pat. No. 4,864,075, which is a continuation-in-part of Ser. No. 7,701, Jan. 28, 1987, abandoned, which is a continuation-in-part of Ser. No. 645,740, Aug. 30, 1984, abandoned. This application Jan. 30, 1989, Ser. No. 374,899

Int. Cl.<sup>5</sup> C02F 1/50

U.S. Cl. 210—764

5 Claims

1. A method of inhibiting bacteria growth in water produced in the recovery of oil by a water flooding operation comprising adding thereto an effective bacteria growth inhibiting amount of a compound having the formula



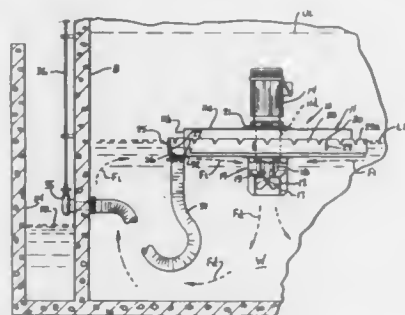
wherein R is a divalent, trivalent or tetravalent saturated hydrocarbon radical; R<sub>1</sub> is a C<sub>2</sub>-C<sub>4</sub> alkylene; X is an integer of 1 to about 30 n is an integer corresponding to the valence of R; R<sub>2</sub> is an alkali metal, alkaline earth metal or N(R<sub>3</sub>)<sub>4</sub> where R<sub>3</sub> is a lower alkyl.

4,956,100  
**METHOD AND APPARATUS FOR MIXING AND SURFACE SKIMMING WATER TREATMENT BASINS**  
 Kenneth A. Mikkelsen, Madison, Wis., assignor to Aqua-Aerobic Systems, Inc., Rockford, Ill.

Filed Jan. 13, 1989, Ser. No. 365,354  
 Int. Cl.<sup>5</sup> C02F 1/40

U.S. Cl. 210—717.6

8 Claims



1. A method for mixing liquid and suspendible solids or gases in a treatment basin and removing floating matter from a surface of the liquid comprising, supporting a propeller type pump apparatus having inlet and discharge sides on a floating support in a treatment basin with the inlet side of the pump apparatus in direct communication with the liquid in the basin at a level spaced below the surface thereof, providing a shield on the floating support above the inlet side of the pump apparatus and extending below the surface of the liquid in the basin to inhibit direct passage of liquid from the area of the basin above the shield to the inlet side of the pump apparatus and with the discharge side of the pump apparatus arranged to direct the liquid pumped thereby downwardly in the basin, supporting a collection trough having an upper weir edge defining a trough inlet on the floating support with the upper weir edge adjacent the surface of the liquid in the basin to receive matter floating on the surface of the basin, driving the pump apparatus to draw liquid into the inlet side of the pump apparatus from below the surface of the liquid in the basin and direct liquid from the discharge side of the pump apparatus downwardly in the basin at a velocity to mix the liquid and suspendible solids or gases in the basin, and discharging material from the collection trough.

4,956,101  
**LIQUID FILTRATION DEVICE AND METHOD USING WAVE MOTION**

Gleann Holmberg, Tyringe, Sweden, assignor to Handelsbolaget Sea-Parator, Halmstad, Sweden

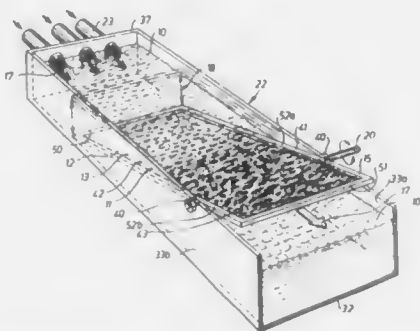
Continuation of Ser. No. 274,379, Nov. 21, 1988, abandoned, which is a continuation of Ser. No. 33,118, Feb. 4, 1987, abandoned. This application Nov. 2, 1989, Ser. No. 430,826  
 Claims priority, application Sweden, May 17, 1985, 8502442  
 Int. Cl.<sup>5</sup> B01D 33/00

U.S. Cl. 210—780

26 Claims

23. A method of separating bodies from a liquid comprising supplying liquid containing bodies to be separated therefrom into a channel member, reciprocally moving a filter member relative to the channel member such that liquid travels through the filter member in opposite directions, separating bodies from the liquid on the upper surface of the filter member during reciprocal movement of the filter member while the liquid travels in a main direction of flow through the filter member, separating the accumulated bodies from the upper surface of the filter member while the filter member moves in said main direction of flow of the liquid, and displacing said bodies, when separated from said filter member, towards a discharge end of the filter member, said filter member moving downwardly when the bodies are separated from the upper surface of the filter member and the liquid flowing upwardly through the

filter member to assist in the separation of the bodies from the upper surface of the filter member, said liquid which flows upwardly through the filter member being at a lower level than



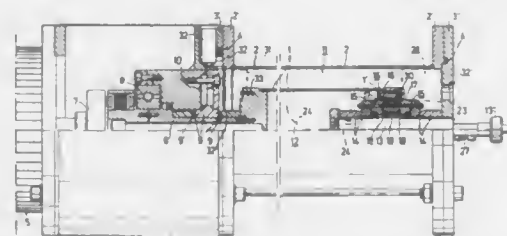
the remainder of the liquid in the channel member whereby a wave is formed which acts to displace the separated bodies towards said discharge end.

4,956,102  
**METHOD FOR OPERATING ROTATING CYLINDRICAL FILTERS AND A ROTATABLE CYLINDRICAL FILTER**  
 Karl J. Allsing, Nibblevägen 28, S-146 00 Tullinge, Sweden  
 PCT No. PCT/SE87/00403, § 371 Date Mar. 2, 1989, § 102(e)  
 Date Mar. 2, 1989, PCT Pub. No. WO88/01899, PCT Pub. Date Mar. 24, 1988

PCT Filed Sep. 8, 1987, Ser. No. 326,541  
 Claims priority, application Sweden, Sep. 8, 1986, 8603753  
 Int. Cl.<sup>5</sup> B01D 33/067, 33/48

U.S. Cl. 210—784

36 Claims



1. A method of operating rotating filters of the kind comprising a substantially cylindrical filter tube which is provided with a permeable wall and which is sealingly journaled at at least one locations, for rotation about its longitudinal axis in a filter jacket, in which method feed material to be filtered is supplied to a space located between the filter jacket and the filter tube, and in which filtered material, the filtrate, can be tapped from the interior of the filter tube, characterized by the step of sealing and journaled the filter tube (1) in a manner adapted to substantial temperature changes of the filter tube, seals and bearings being adapted to take up axial displacement movements and forces resulting essentially from changes in the temperature of the filter tube, by means of a journaled and sealing unit attached to the filter tube (1) and arranged adjacent at least one end (1') of the filter tube, said unit comprising two substantially cylindrical parts (15', 16'), one external (15') and one internal (16'), which are co-acting in a sealed and axially displaceable relationship.

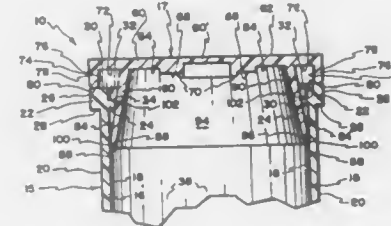
18. A filter of the rotating kind comprising a substantially cylindrical filter jacket, a substantially cylindrical filter tube which has a permeable wall and which is sealingly journaled by seals and bearings at least one axial locations, for rotation about its longitudinal axis in said filter jacket, the material to be filtered, the feed, being supplied to a first space located at one

end of and between the filter jacket and the filter tube, and the filtered material, the filtrate, being tapped from the interior of the filter tube, and wherein the seals (9, 14, 20, 21) and bearings of the filter tube (1) are sterilizably arranged and constructed so as to take up axial displacement movements and forces resulting essentially from changes in the temperature of the filter tube (1), seals and bearings comprising means including a journaled and sealing unit attached to said filter tube (1) and arranged adjacent said one end (1') of said filter tube (1), said unit comprising two substantially cylindrical parts (15', 16'), one external (15') and one internal (16'), which are arranged to co-act in a sealed and axially displaceable relationship, and wherein said seals (9, 14, 20, 21) and bearings are constructed to enable said seals and bearings to be sterilized and lubricated and cooled by means of a sterilizing media.

4,956,103  
**FAIL SAFE RELEASABLE LOCKS FOR CAPPED DISPOSABLE CENTRIFUGE CONTAINERS**  
 Paul M. Jessop, and David H. Jeffa, both of Salt Lake City, Utah, assignors to Multi-Technology Inc., Midvale, Utah  
 Division of Ser. No. 271,141, Nov. 14, 1988, which is a division of Ser. No. 191,518, May 9, 1988, Pat. No. 4,830,209. This application Apr. 26, 1989, Ser. No. 343,543  
 The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.  
 Int. Cl.<sup>5</sup> B65D 45/00

U.S. Cl. 210—787

8 Claims



6. A method of holding a capped liquid specimen container in a leak-free closed state during centrifuging, boiling and like processing in a specimen testing laboratory comprising the steps of:

manually closing the cap upon the opening of the container so that a male portion compressively engages the interior of the container;  
 manually forcing a releasable lock of synthetic resinous material over and under the closed cap and adjacent portion of the container contrary to the memory of the material of the lock to hold the closed cap and to the adjacent portion of the container prohibiting loss of any portion of the liquid specimen through the container opening and across the cap during boiling and centrifuging;  
 manually removing the releasable lock following processing of the liquid specimens in the container.

4,956,104  
**ORGANOPHILIC POLYMERS**  
 Jack C. Cowan, Lafayette, La.; Roy F. House, Houston, Tex., and Victor M. Granquist, Beaufort, S.C., assignors to Venture Chemicals, Inc., Lafayette, La.  
 Division of Ser. No. 161,478, Feb. 29, 1988, Pat. No. 4,863,980, which is a continuation-in-part of Ser. No. 887,360, Jul. 21, 1986, Pat. No. 4,737,295. This application Jun. 1, 1989, Ser. No. 360,020

Int. Cl.<sup>5</sup> C09K 7/06

U.S. Cl. 252—8.551

6 Claims

1. An oil base well working fluid comprising a major proportion of oil and a minor proportion but sufficient to decrease the fluid loss of said fluid of an organophilic polymer comprising

an adduct of a water soluble polymer and one or more phosphatides having the empirical formula



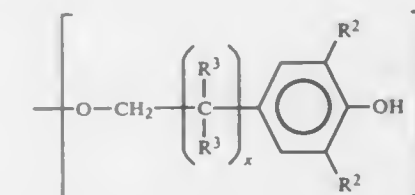
where:  $R_1$  is an aliphatic group containing from 8 to 29 carbon atoms;  $R_2$  is selected from the group consisting of H, OH,  $R_1COO$ , and  $OP(O)(O-zM^{a+})OZ$ ;  $Q$  is selected from the group consisting of  $R_1COO$  and  $OP(O)(O-zM^{a+})OZ$ ;  $Z$  is selected from the group consisting of  $xM^{a+}$ ,  $C_6H_5(OH)_5$ , and  $CH_2-CH(Y)-N(R_3)(R_4)(R_5)(A^{b-})$ ;  $Y$  is selected from the group consisting of H and  $COO(xM^{a+})$ ;  $R_3$ ,  $R_4$ , and  $R_5$  are independently selected from the group consisting of H, aliphatic groups containing from 1 to 30 carbon atoms, and  $R_6CO$ ;  $R_6$  is an aliphatic group containing from 1 to 29 carbon atoms;  $M$  is a cation selected from the group consisting of H, and alkali metal, an alkaline earth metal, ammonium, and mixtures thereof;  $A$  is an anion of valence  $b$ ;  $y=0$  or 1;  $w, x$ , and  $z=0$  or 1/a where  $a$  is the valence of  $M$ ;  $v=0$  or  $a/b$ ; and where  $Q$  is  $R_1COO$  only when  $R_2$  is  $OP(O)(O-zM^{a+})OZ$ .

2. The oil base well working fluid of claim 1 wherein said water soluble polymer is a cationic or anionic polysaccharide or derivative thereof selected from the group consisting of alginic acid, agar, carrageenan, cellulose, chitin, guar gum, gum arabic, gum ghatti, gum karaya, gum konjak, gum tamarind, gum tara, gum tragacanth, locust bean gum, pectins, starch, xanthan gum, and mixtures thereof.

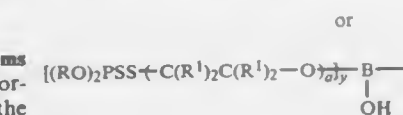
4,956,105  
**LUBRICANT COMPOSITION CONTAINING PHENOLIC/PHOSPHORODITHIOATE BORATES AS MULTIFUNCTIONAL ADDITIVES**  
 Liehpao O. Fung, Lawrenceville, and Andrew G. Horodysky, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 31, 1988, Ser. No. 200,345  
 Int. Cl.<sup>5</sup> C10M 105/12, 105/72, 105/74  
 U.S. Cl. 252—32.7 E

31 Claims  
 1. A lubricant composition comprising a major amount of an oil of lubricating viscosity or grease or other solid lubricant prepared therefrom and a minor effective multifunctional antioxidant and antiwear improving amount of an additive compound of a hindered phenolic phosphorodithioate-derived alcohol borate obtained by co-boronating said phosphorodithioate-derived alcohol with a hindered phenolic alcohol to form a mixture of borate esters at least a portion of which has one or more of the following general structures:

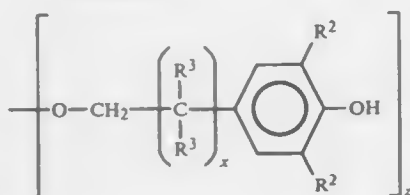


wherein  $a=1$  to 10 and where  $R$  is  $C_3$  to about  $C_{30}$  hydrocarbyl,  $R^1$  is hydrogen or  $C_1-C_{30}$  hydrocarbyl,  $R^2$  and  $R^3$  are each independently hydrogen, or  $C_1-C_{10}$  hydrocarbyl,  $x$  is 0 to 10,  $y$  and  $z$  are integers and  $y+z=3$  or





-continued



where  $a=1$  to 10 and where  $x, y, z, R, R^1, R^2$ , and  $R^3$  are as defined above and  $y+0$  integers the sum of which=2.

25. An additive product suitable for use in lubricant compositions having improved antioxidant and antiwear properties prepared by reacting a hindered phenol, a phosphorodithioic-derived alcohol and a boronating compound.

4,956,106

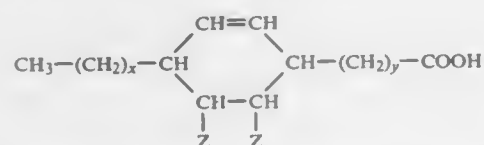
**LOW FOAMING RUST INHIBITING COMPOSITION**  
Fred E. Woodward, W. Palm Beach, and Alice P. Hudson, Lake Park, both of Fla., assignors to Westvaco Corporation, New York, N.Y.

Filed Mar. 15, 1988, Ser. No. 169,214  
Int. Cl.<sup>5</sup> C23F 11/10

U.S. Cl. 252-390

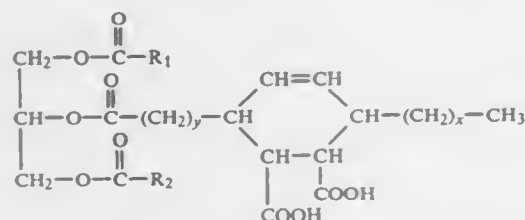
14 Claims

1. A water soluble rust inhibiting composition comprising:  
A. a rust inhibiting amount of a water soluble dicarboxylic acid of the formula:



where  $Z=\text{COOH}$  or  $\text{H}$ , and one of each is present, and  $x$  and  $y$  are from 3 to 9, with  $x+y=12$ ;

B. a foam inhibiting amount of a vegetable oil adduct of the formula:



wherein  $x$  and  $y$  are integers from 3 to 9,  $x$  and  $y$  together equal 12, and  $R_1$  and  $R_2$  are saturated/unsaturated hydrocarbon terminals of fatty acids;

C. a base to adjust the pH of the composition to about 6.5 to 10.5.

4,956,107

**AMIDE DISPERSANT ADDITIVES DERIVED FROM AMINO-AMINES**

Antonio Gutierrez, Mercerville, and Robert D. Lundberg, Bridgewater, both of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Continuation-in-part of Ser. No. 126,405, Nov. 30, 1987, Pat. No. 4,857,217. This application Nov. 10, 1988, Ser. No. 269,461  
Int. Cl.<sup>5</sup> C10M 105/72, 105/60

U.S. Cl. 252-47

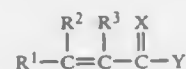
37 Claims

1. An oil soluble dispersant mixture useful as an oil additive comprising an adduct of:

(A) a polymer-substituted  $C_3$  to  $C_{10}$  monosaturated monocarboxylic acid producing material formed by reacting an

olefin polymer of  $C_2$  to  $C_{10}$  monoolefin having a number average molecular weight of about 300 to 10,000 and a  $C_3$  to  $C_{10}$  monounsaturated acid material, said acid producing material having an average of at least about 0.5 monocarboxylic acid producing moieties, per molecule of said olefin polymer present in the reaction mixture used to form said acid producing material; and

(B) an amido-amine or a thioamido-amine characterized by being a reaction product of at least a polyamine and an alpha, beta-unsaturated compound of the formula:

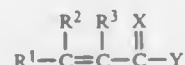


wherein  $X$  is sulfur or oxygen,  $Y$  is  $-\text{OR}^4$ ,  $-\text{SR}$ , or  $-\text{NR}^4(\text{R}^5)$ , and  $R^1, R^2, R^3, R^4$  and  $R^5$  are the same or different and are hydrogen or substituted or unsubstituted hydrocarbyl.

16. A process for producing a dispersant mixture useful as an oil additive which comprises:

(a) providing a hydrocarbyl substituted  $C_3$  to  $C_{10}$  monoolefin having a number average molecular weight of about 700 to 10,000 and a  $C_3$  to  $C_{10}$  monounsaturated acid material, said acid producing material having an average of at least about 0.5 monocarboxylic acid producing moieties, per molecule of said olefin polymer present in the reaction mixture used to form said acid producing material;

(b) providing an amido-amine compound having at least one primary amino group prepared by reacting at least one polyamine with at least one alpha, beta-unsaturated compound of the formula:



wherein  $X$  is sulfur or oxygen,  $Y$  is  $-\text{OR}^4$ ,  $-\text{SR}^4$ , or  $-\text{NR}^4(\text{R}^5)$ , and  $R^1, R^2, R^3, R^4$  and  $R^5$  are the same or different and are hydrogen or substituted or unsubstituted hydrocarbyl;

(c) contacting the said acid producing material with said amido-amine compound under conditions sufficient to effect reaction of at least a portion of the primary amino groups on said amido-amine compound with at least a portion of the acid-producing groups in said acid producing material, to form said dispersant mixture.

4,956,108

**COPPER SALTS OF THIODIPROPIONIC ACID DERIVATIVES AS ANTIOXIDANT ADDITIVES PROCESS OF MAKING THE SAME AND FUEL COMPOSITION THEREOF**

Liehpao O. Farag, Lawrenceville, and Andrew G. Horodysky, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 79,186, Jul. 29, 1987, Pat. No. 4,820,430.  
This application May 30, 1989, Ser. No. 358,920

Int. Cl.<sup>5</sup> C10M 105/72

U.S. Cl. 252-486

20 Claims

1. A process of preparing a copper salt of a thiodipropionic acid derivative comprising reacting molar quantities of  $\text{Cu}$  (I) or  $\text{Cu}$  (II) ions in an amount sufficient to make neutral, acidic or basic copper salts in accordance with the below-generalized reaction

4,956,109

LUBRICATING OIL

Keiichi Tanikawa, and Higaki Yuzo, both of Kanagawa, Japan, assignors to The Nisshin Oil Mills, Ltd. and Nippon Steel Corporation, both of Tokyo, Japan

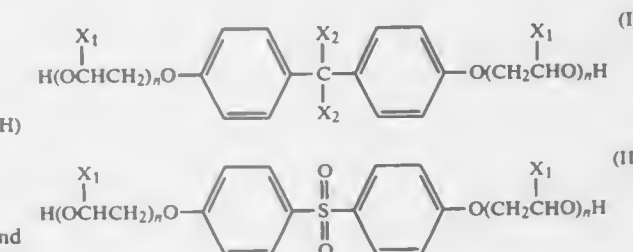
Filed May 26, 1989, Ser. No. 358,697

Claims priority, application Japan, May 30, 1988, 63-130449  
Int. Cl.<sup>5</sup> C10M 135/08, 129/70

U.S. Cl. 252-48.6

1 Claim

1. A lubricating oil comprising at least one member selected from the group consisting of esterified products obtained by reacting: (A) a compound selected from the group consisting of alcohols represented by the following general formula (I), alcohols represented by the following general formula (II) and hydrogenated derivatives thereof; with (B) a fatty acid having not less than 6 carbon atoms or a mixture of the fatty acid with a rosin selected from the group consisting of rosin, hydrogenated rosins, disproportionated rosins and polymerized rosins:



in the general formulas (I) and (II),  $X_1$  and  $X_2$  each independently represents a hydrogen atom or a methyl group and  $n$  is an integer ranging from 0 to 5.

4,956,110

AQUEOUS FLUID

Alain L. P. Lenack, Bonsecours, and Fernand J. Kech, Mont-Saint-Aignan, both of France, assignors to Exxon Chemical Patents Inc., Linden, N.J.

Continuation-in-part of Ser. No. 878,009, Jan. 24, 1986,

abandoned. This application Apr. 12, 1988, Ser. No. 180,436  
Claims priority, application United Kingdom, Jan. 27, 1985, 8516301; Sep. 16, 1985, 8522841

Int. Cl.<sup>5</sup> C10M 173/00, 129/36

U.S. Cl. 252-49.5

79 Claims

1. An oil and water microemulsion additive concentrate comprising water, oil, emulsifier, and water-soluble hydroxy di- or tri-carboxylic acid, with the proviso that the ratio of oil to emulsifier is no greater than about 2.5:1 by weight.

4,956,111

**METHACRYLATE POUR POINT DEPRESSANTS AND COMPOSITIONS**

Bruce E. Wilburn, and William J. Hellman, both of Houston, Tex., assignors to Pennzoil Products Company, The Woodlands, Tex.

Continuation-in-part of Ser. No. 257,175, Oct. 13, 1988, Pat. No. 4,844,829, which is a continuation of Ser. No. 87,035, Aug. 19, 1987, abandoned. This application Jan. 25, 1989, Ser. No. 301,397

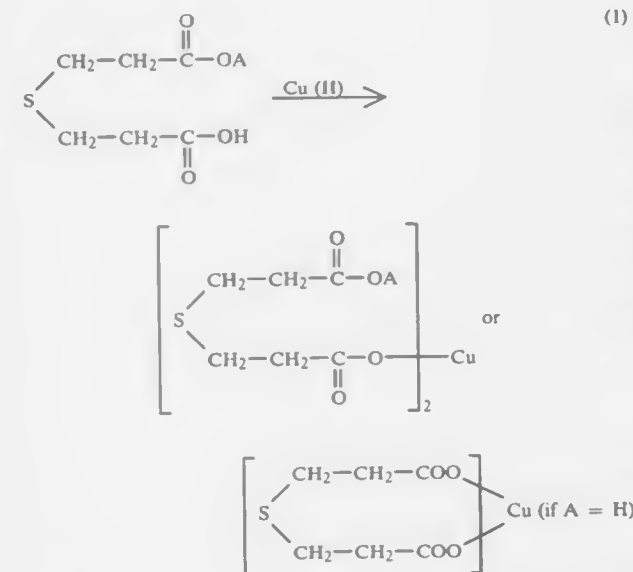
The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> G10M 105/22

U.S. Cl. 252-56 R

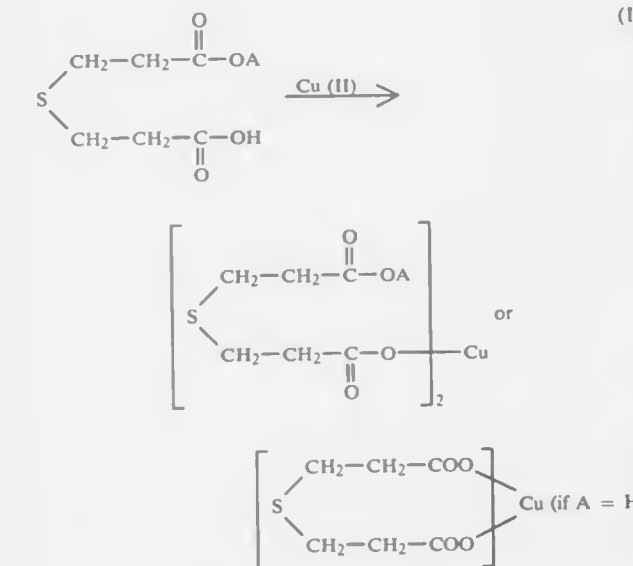
27 Claims

1. A pour point depressant for lubricating oils comprising a poly(methacrylate) polymer having the repeating unit

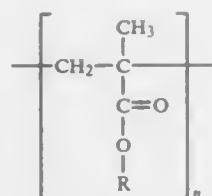
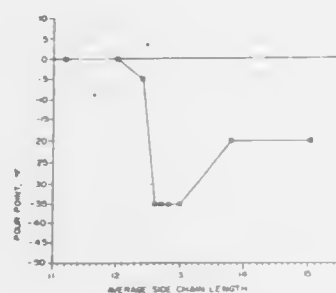


where  $A$  is hydrogen or  $C_1$  to about  $C_{30}$  hydrocarbyl, and where hydrocarbyl is selected from the group consisting of aralkyl, cycloalkyl, or hydrocarbyl containing unsaturated vinyl or acetylene or hetero groups containing nitrogen, oxygen or sulfur.

19. A product of reaction obtained by preparing a copper salt of a thiodipropionic acid derivative comprising reacting molar quantities of  $\text{Cu}$  (I) or  $\text{Cu}$  (II) ions in an amount sufficient to make neutral, acidic or basic copper salts in accordance with the below-generalized reaction

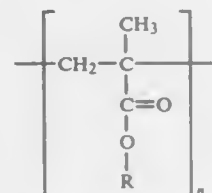


where  $A$  is hydrogen or  $C_1$  to about  $C_{30}$  hydrocarbyl, and where hydrocarbyl is selected from the group consisting of aralkyl, cycloalkyl, or hydrocarbyl containing unsaturated vinyl or acetylene or hetero groups containing nitrogen, oxygen or sulfur.

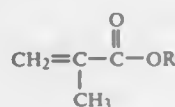


wherein R is an alkyl group having an average chain length in the polymer of 12.6 to 13.8, and n is an integer indicating the number of repeating units, the value of n being sufficient to provide a molecular weight of 10,000 to 300,000 for the polymer, said polymer being a polymer formed from the reaction of at least three but less than five methacrylate monomers with no individual monomer present in an amount of less than 10-15 wt. %.

20. A lubricating oil composition comprising a wax containing hydrocarbon lubricating oil and containing a sufficient amount of a pour point depressant to reduce the pour point to comply with the requirements of a 5W-30, 10W-30, 10W-40 or 15W-40 lubricating oil in combination with a viscosity index improver, said pour point component comprising an effective amount of a poly(methacrylate) polymer having the repeating unit



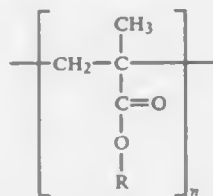
wherein R is an alkyl group having an average chain length in the polymer of 12.6 to 13.8, and n is an integer indicating the number of repeating units, the value of n being sufficient to provide a molecular weight of 10,000 to 300,000 for the polymer, the pour point depressant having been formed by reaction of at least three but less than five methacrylate monomers where each monomer is at least 10-15 wt. % of the mixture having the formula



wherein R is selected from the group consisting of C<sub>10</sub>-C<sub>16</sub> alkyl groups, the value of R being chosen so that the average chain length in the polymer of the R group is 12.6-13.8.

26. A method for depressing the pour point of a lubricating oil composition which comprises adding to the lubricating oil

a pour point depressing effective amount of a poly(methacrylate) polymer having the repeating unit



wherein R is an alkyl group having an average chain length in the polymer of 12.6 to 13.8, and n is an integer indicating the number of repeating units, the value of n being sufficient to provide a molecular weight of 10,000 to 300,000 for the polymer, said polymer being a polymer formed from the reaction of at least three but less than five methacrylate monomers with no individual monomer present in an amount of less than 10-15 wt. %.

4,956,112

#### COMPOSITION FOR SOFTENING FABRICS: CLAY SOFTENING AGENT AND NONIONIC SURFACTANT WITH 0°-15° C. CLOUDY PHASE

Ian R. Kenyon, Wirral, England, and Bryan C. Smith, Rotterdam, Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed Apr. 8, 1988, Ser. No. 179,092

Claims priority, application United Kingdom, Apr. 15, 1987, 8709057

Int. Cl.<sup>3</sup> C11D 1/66, 3/12; D06M 11/06  
U.S. Cl. 252-8.9

4 Claims

1. A particulate composition for softening fabrics from a wash liquor, said composition comprising a fabric softening clay material which is a three-layer swellable smectite clay of the montmorillonite type and a nonionic surfactant system which has a cloudy phase, at 1% concentration in water somewhere, within the temperature range of 0° C. to 15° C., the weight ratio of said clay material to said nonionic surfactant system being from about 2:3 to about 20:1 in which said nonionic surfactant system has an HLB of less than about 9.5.

4,956,113

#### PROCESS FOR PREPARING A MAGNETIC FLUID

Takao Kanno, Tokyo; Yutaka Koda, Yokohama, and Hirokazu Nagato, Fujisawa, all of Japan, assignors to NOK Corporation, Tokyo, Japan

Filed Feb. 14, 1989, Ser. No. 310,094

Claims priority, application Japan, Feb. 16, 1988, 63-31804; Mar. 8, 1988, 63-52755

Int. Cl.<sup>3</sup> H01F 1/28

29 Claims

1. A process for preparing a magnetic fluid which comprises: (a) dispersing particles of surfactant-adsorbed ferrite having particle sizes of about 50 Å to about 300 Å in a hydrocarbon solvent having a boiling point of about 60° C. to about 200° C. to thereby form a suspension, (b) admixing said suspension with a N-polyalkylenepolyamine-substituted alkenylsuccinimide, (c) heating the resulting mixture at a temperature of at least 70° C. to thereby remove said hydrocarbon solvent from said mixture, and recovering particles of N-polyalkylenepolyamine-substituted alkenylsuccinimide-coated ferrite; (d) admixing said recovered particles of ferrite with: (1) a base oil having a vapor pressure of not more than 0.1 mm Hg at 25° C., and (2) a dispersing agent selected from the group consisting of (i) N-polyalkylenepolyamine-substituted alkenyl succinimide,

- (ii) a phosphoric acid ester having a mono- or di-oxyalkylene substituent group, and
- (iii) a nonionic surfactant and
- (e) subjecting the mixture resulting from step (d) to a dispersion treatment.

4,956,114

#### SINTERED FERRITE BODY, CHIP INDUCTOR, AND COMPOSITE LC PART

Hideo Watanabe, Chiba; Yoichi Kanagawa, Tokyo; Takashi Suzuki, Ichikawa, and Takeshi Nomura, Matsudo, all of Japan, assignors to TDK Corporation, Tokyo, Japan

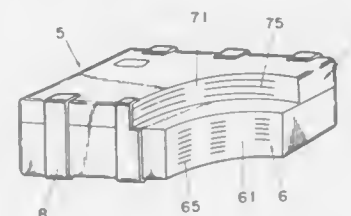
Filed Jun. 29, 1988, Ser. No. 213,225

Claims priority, application Japan, Jul. 1, 1987, 62-164961; Jul. 1, 1987, 62-164962; Nov. 16, 1987, 62-289095

Int. Cl.<sup>3</sup> C04B 35/26, 35/61; H01F 1/00

U.S. Cl. 252-62.58

7 Claims



1. A sintered ferrite body, consisting essentially of: a nickel based ferrite in combination with from about 15 to about 75% by weight of the body of a borosilicate glass, said borosilicate glass containing about 75 to about 90% by weight of silicon oxide, about 8 to about 20% by weight of boron oxide, 0 to about 5% by weight aluminum oxide, 0 to about 5% by weight of at least 1 oxide of a monovalent metal and 0 to about 5% by weight of at least 1 oxide of a divalent metal, said percentages based on the weight of borosilicate glass.

4,956,115

#### WATER BORNE SOLVENT STRIPPERS

Michael R. Van De Mark, Rolla, Mo., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed May 23, 1989, Ser. No. 355,508

Int. Cl.<sup>3</sup> C11D 7/50, 7/26, 3/43

U.S. Cl. 252-170

27 Claims

1. A stripping composition comprising from about 30 to about 70 wt. % water, from about 5 to about 30 wt. % trioxane, from about 5 to about 20 wt. % surfactant and no greater than about 30 wt. % of said organic cosolvent.

4,956,116

#### SURFACE-ACTIVE, SATURATED SULFOPHOSPHORIC ACID-(PARTIAL)-ALKYL ESTERS

Bernd Fabry, Korschbroich; Hans-Herbert Friese, Monheim; Friedrich Pieper, Langenfeld, and Guenter Uphues, Monheim, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Düsseldorf, Fed. Rep. of Germany

Filed Jan. 30, 1989, Ser. No. 304,398

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1988, 3812718

Int. Cl.<sup>3</sup> C11D 3/06, 3/065, 7/16, 11/04

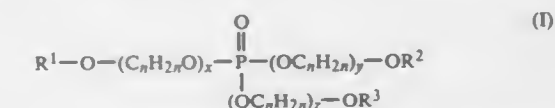
U.S. Cl. 252-174.16

11 Claims

1. A process for producing an aqueous solution of surface-active, saturated sulfophosphoric acid-(partial)-alkyl esters and their alkali metal, alkaline earth, ammonium and amine salts thereof comprising:

- (a) providing saturated alkyl, saturated alkyl/saturated alkylpolyoxyalkyl, and/or saturated alkylpolyoxyalkyl-

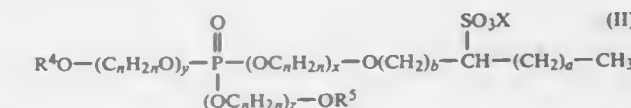
phosphates with iodine numbers between 0 and less than 10, which correspond to general formula I



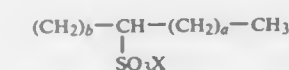
wherein R<sup>1</sup> represents an alkyl groups with 8 to 22 carbon atoms or a fatty alkyl group consisting predominantly of octyl, decyl, lauryl, myristyl, cetyl, stearyl or behenyl groups, the radicals R<sup>2</sup> and R<sup>3</sup> are the same or different and represent hydrogen, an alkyl group with 8 to 22 carbon atoms or a fatty alkyl group consisting predominantly of octyl, decyl, lauryl, myristyl, cetyl, stearyl or behenyl groups, n is a number from 2 to 4, the subscripts x, y and z are the same or different and represent a number between 0 and 30;

- (b) sulfonating the product of step (a) at a temperature of between about 60° C. and about 100° C.; and
- (c) hydrolyzing the sulfonation product of step (b) with a base.

11. An aqueous solution of a mixture of surface-active, saturated sulfophosphoric acid-(partial)-alkyl esters of general formula II



in which R<sup>4</sup> and R<sup>5</sup> are the same or different and represent hydrogen or



X represents hydrogen, an alkali metal ion, alkaline earth metal ion, ammonium ion or an amine radical, n represents a number from 2 to 4, the subscripts x, y and z are the same or different and represent a number from 0 to 30, a represents a number from 0 to 20 and b represents a number from 0 to 20 with the proviso that the sum for a+b is between about 6 and about 20, prepared by the process of claim 1.

4,956,117

#### PHENOXYACETATE PERACID PRECURSORS AND PERHYDROLYSIS SYSTEMS THEREWITH

Alfred G. Zielski, Pleasanton, and Ronald A. Fong, Modesto, both of Calif., assignors to The Clorox Company, Oakland, Calif.

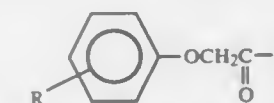
Division of Ser. No. 45,197, Apr. 30, 1987, Pat. No. 4,859,800, which is a continuation-in-part of Ser. No. 927,856, Nov. 6, 1986, abandoned. This application May 19, 1989, Ser. No. 353,970

Int. Cl.<sup>3</sup> C09K 3/00; C01B 15/03

U.S. Cl. 252-186.38

17 Claims

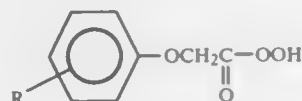
1. A perhydrolysis system for in situ generation of peroxyacid comprising: a peroxyacid precursor including at least one α-substituted carbonyl moiety with the structure



wherein R is hydrogen or an alkyl with not more than 5 car-

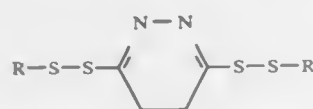


bons and L is a group whose conjugate acid has a pKa in aqueous solution of between about 5 to about 13; and a source of peroxygen which will react with the peroxyacid precursor in aqueous solution to form a peroxyacid having the structure



**4,956,118**  
**LUBRICATING COMPOSITION CONTAINING ANTI-WEAR/EXTREME PRESSURE ADDITIVES**  
Sean P. O'Connor, Beverley, England, assignor to BP Chemicals Limited, London, England  
Filed May 17, 1988, Ser. No. 195,099  
Claims priority, application United Kingdom, Jun. 2, 1987, 8712931

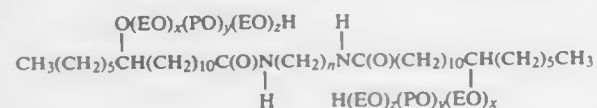
Int. Cl.<sup>5</sup> C10M 133/40  
U.S. Cl. 544-240  
1. Compounds suitable for use as extreme pressure (EP)/anti-wear (AW) agents in lubricating oil compositions, which are pyridazines having the formula:



wherein R is independently either hydrocarbyl or substituted hydrocarbyl.

**4,956,119**  
**PARTICULATE DEFOAMING COMPOSITIONS**  
Thomas C. Friel, Jr., P.O. Box 440, Riceboro, Ga. 31323, and Anthony J. O'Lenick, Jr., 4437 Park Dr., Norcross, Ga. 30093  
Filed Apr. 20, 1989, Ser. No. 340,752  
Int. Cl.<sup>5</sup> B01D 19/04; C09K 3/00

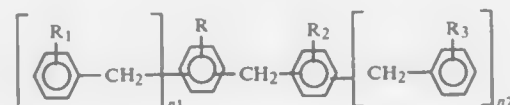
U.S. Cl. 252-358  
1. A defoaming composition containing an effective defoaming amount of a compound which conforms to the following structure;



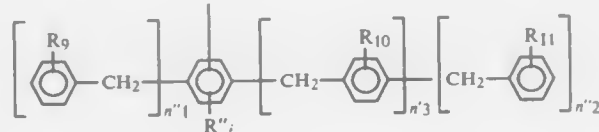
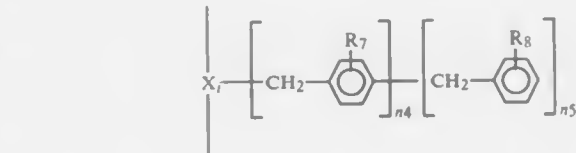
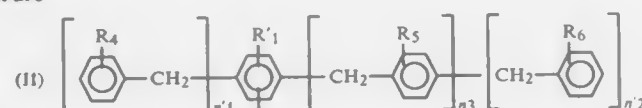
wherein:  
EO is ethylene oxide  
PO is propylene oxide  
n is an integer from 1 to 10  
each x, y, and z are integers from 0 to 20 with the proviso that x+y+z is greater than 0.

**4,956,120**  
**POLYARYLALKANE OLIGOMER COMPOSITIONS AND PROCESS FOR THEIR MANUFACTURE**  
Raymond Commandeur, Vizile, and Bernard Gurtner, Grenoble, both of France, assignors to Atochem, France  
Filed Jul. 1, 1988, Ser. No. 214,304  
Claims priority, application France, Jul. 16, 1987, 87 10067; Oct. 8, 1987, 87 13912

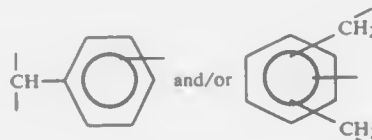
Int. Cl.<sup>5</sup> B01F 1/00  
U.S. Cl. 252-364  
11 Claims  
1. A polyarylalkane oligomer composition consisting essentially of the mixture of two oligomers, A and B, wherein:  
(a) the oligomer A is a mixture of isomers of formula:



in which:  
R is a linear or branched hydrocarbon chain containing n carbon atoms, and n is between 2 and 16,  
R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> are identical or different and from H or CH<sub>3</sub>, and  
n<sub>1</sub> and n<sub>2</sub> each = 0, 1 and 2, and n<sub>1</sub> + n<sub>1</sub> + n<sub>2</sub> ≤ 3;  
it being possible for each of the isomers A to have different substituents R, R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub>; and (b) the oligomer B is a mixture of isomers of formula:



in which:  
R' and R'' are identical or different and have the same meaning as R above,  
R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub>, R<sub>10</sub> and R<sub>11</sub> are identical or different and selected from H or CH<sub>3</sub>,  
n'<sub>1</sub>, n''<sub>1</sub> and n<sub>4</sub> = 0, 1, or 2,  
n'<sub>2</sub>, n''<sub>2</sub>, n<sub>3</sub>, and n'<sub>3</sub> and n<sub>5</sub> each = 0 or 1,  
n'<sub>1</sub> + n''<sub>1</sub> + n'<sub>2</sub> + n<sub>3</sub> + n'<sub>3</sub> + n<sub>4</sub> + n<sub>5</sub> ≤ 2,  
i has the value of 1 or 2,  
X<sub>i</sub> is a trivalent connecting group:



and in which the connections towards the groups



are provided by carbon atoms not forming part of the phenyl group of X<sub>i</sub>, each of the isomers B having the same or different substituents R'<sub>i</sub>, R''<sub>i</sub>, and R<sub>4</sub> to R<sub>11</sub>.

**4,956,121**  
**DIMETHYLACETAMIDE MICA AND VERMICULITE SUSPENSIONS**

Thomas M. Tymon, Millersville, Pa., and Albin F. Turbak, Sandy Springs, Ga., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Filed Jan. 17, 1989, Ser. No. 296,954  
Int. Cl.<sup>5</sup> C04B 33/02, 20/02  
U.S. Cl. 252-378 R  
18 Claims

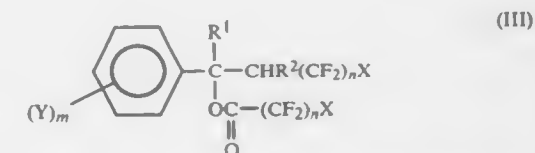
1. A composition comprising:  
a layered silicate selected from the group consisting of mica and vermiculite wherein the said layered silicate further has dimethylacetamidelithium chelation complexes at interlayer cationic sites.

**4,956,122**  
**LUBRICATING COMPOSITION**  
Raymond F. Watts, Califon, N.J.; Frederick C. Loveless, Cheshire, and Walter Nudenberg, Newtown, both of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.  
Continuation of Ser. No. 58,486, Jun. 5, 1987, abandoned, which is a continuation of Ser. No. 901,103, Aug. 28, 1986, abandoned, which is a continuation of Ser. No. 782,233, Sep. 30, 1985, abandoned, which is a continuation of Ser. No. 649,258, Sep. 10, 1984, abandoned, which is a continuation-in-part of Ser. No. 473,841, Mar. 9, 1983, abandoned, which is a continuation-in-part of Ser. No. 356,665, Mar. 10, 1982, abandoned. This application Dec. 23, 1988, Ser. No. 291,382  
Int. Cl.<sup>5</sup> C10M 107/10

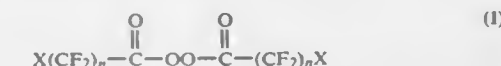
U.S. Cl. 252-565  
10 Claims  
1. A lubricating composition comprising:  
(a) between 1 and 99 weight percent, based on the weight of components (a), (b) and (c), of a polyalphaolefin having a viscosity of between 40 and 1000 centistokes at 100° C.;  
(b) between 0 and 99 weight percent, based on the weight of components (a), (b) and (c), of a synthetic hydrocarbon having a viscosity of between 1 and 10 centistokes at 100° C.;  
(c) between 0 and 99 weight percent, based on the weight of components (a), (b) and (c), of a carboxylic acid ester having a viscosity of between 1 and 10 centistokes at 100° C.; and  
(d) between 0 and 25 percent by weight of an additive package;  
wherein at least 1 weight percent, based on the weight of components (a), (b) and (c), of component (b) and/or (c) is present.

**4,956,123**  
**METHOD FOR MANUFACTURE OF FLUORINE-CONTAINING AROMATIC DERIVATIVES**  
Hideo Sawada, Aichi; Michio Kobayashi, and Masato Yoshida, both of Tokyo, all of Japan, assignors to Nippon Oils & Fats Company, Ltd., Tokyo, Japan  
Continuation of Ser. No. 818,811, Jan. 14, 1986, abandoned. This application Sep. 14, 1988, Ser. No. 246,017  
Claims priority, application Japan, Jan. 22, 1985, 60-8459  
Int. Cl.<sup>5</sup> C07C 67/00, 69/63

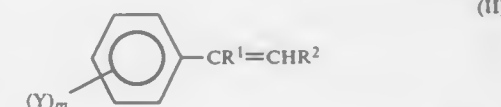
U.S. Cl. 260-408  
13 Claims  
1. A method for the manufacture of a fluorine-containing aromatic compound having the formula (III):



wherein X is selected from the group consisting of fluorine, chlorine and hydrogen, Y is selected from the group consisting of hydrogen, methyl, ethyl, propyl, acetyl, propionyl, acetyloxy, propionyloxy, methoxy, ethoxy, propoxy, vinyl, isopropenyl, nitro, and halogen; R<sup>1</sup> is selected from the group consisting of hydrogen, methyl, ethyl, propyl and butyl; R<sup>2</sup> is selected from the group consisting of hydrogen, methyl and phenyl; n is an integer of 1-10; and m is an integer of 1-5; which comprises reacting at a temperature of about 0°-50° C., a di(haloacyl)peroxide having the formula (I):



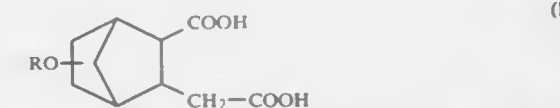
wherein X and n are as defined above in the formula (III) with an aromatic unsaturated monomer having the formula (II):



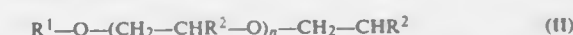
wherein Y, R<sup>1</sup>, R<sup>2</sup> and m are as defined in the formula (III).

**4,956,124**  
**BICYCLIC DECANEDIOIC ACIDS, A PROCESS FOR THEIR PRODUCTION, AND THEIR USE AS FLOTATION AIDS**  
Horst Elerdanz, Hilden; Paul Schulz, Wuppertal; Wolfgang von Rybinski, and Rita Koester, both of Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany  
Filed May 11, 1988, Ser. No. 193,304  
Claims priority, application Fed. Rep. of Germany, May 11, 1987, 3715613

Int. Cl.<sup>5</sup> B03C 1/02; C07C 61/13  
U.S. Cl. 260-410  
6 Claims  
1. A bicyclic decanedioic acid corresponding to the formula in which R is



(a) a linear or branched, saturated C<sub>1</sub>-C<sub>22</sub> alkyl radical, or  
(b) a linear or branched, saturated C<sub>3</sub>-C<sub>34</sub> alkylcarbonyl radical, or  
(c) a residue of a polyalkoxylated fatty alcohol corresponding to the formula



in which R<sup>1</sup> is a saturated C<sub>2</sub>-C<sub>22</sub> alkyl group, R<sup>2</sup> is hydrogen, methyl, or both, and n is a number of from 0 to 24.

4,956,125

**METHOD FOR EXTRACTING FATS AND OILS**  
Yoshio Kawamata, Katsuta, and Kiyoshi Iwai, Yokohama, both of Japan, assignors to Showa Sangyo Co., Ltd., Tokyo, Japan  
Division of Ser. No. 946,859, Dec. 24, 1986, Pat. No. 4,857,279.  
This application May 2, 1989, Ser. No. 348,030  
Claims priority, application Japan, Dec. 27, 1985, 60-293921  
Int. Cl.<sup>3</sup> C11B 1/10

U.S. Cl. 260—412.8

4 Claims

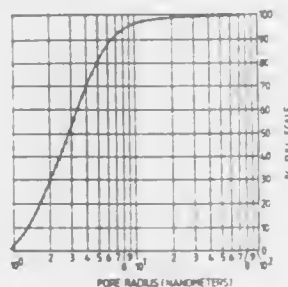
1. A method of extracting edible fats and oils from an oil bearing animal or vegetable raw material, comprising the steps of:

- loading the raw material onto an inlet end of a flat and fixed conveying surface having elongate slits therein;
- using scrapers attached to endless chain belts to convey the raw material in the direction of elongation of said slits from said inlet end to an outlet end of said conveying surface; and
- extracting oil from the raw material by the repeated steps of:
  - (a) spraying a distributed oil extracting solvent from a first spray means,
  - (b) flowing said solvent from said first spray means onto said material on said flat surface, whereby oil is extracted to produce miscella,
  - (c) collecting in at least one first hopper placed beneath said flat surface, the miscella which has flowed through said slits, and
  - (d) spraying said collected miscella from second spray means placed nearer to said inlet end than are said first spray means.

4,956,126

**METAL-OXIDE-SILICA ADSORBENT AND PROCESS FOR REFINING OIL USING THE SAME**  
Leendert H. Staal, Parkgate, Great Britain; Jan C. Vis, and Jan W. Groeneweg, both of Leyden, Netherlands, assignors to Unilever Patent Holdings B.V., Rotterdam, Netherlands  
Division of Ser. No. 124,864, Nov. 24, 1987, Pat. No. 4,812,436.  
This application Dec. 9, 1988, Ser. No. 282,057  
Claims priority, application United Kingdom, Nov. 24, 1986, 8628067; European Pat. Off., Jan. 16, 1987, 872000575  
Int. Cl.<sup>3</sup> C11B 3/00, 3/10  
U.S. Cl. 260—428

20 Claims



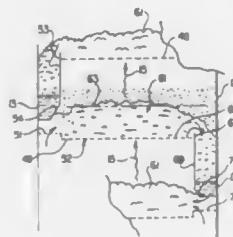
1. A process for refining fatty oil by treatment of the oil with a bleaching solid wherein the bleaching solid comprises an adsorbent which essentially consists of a synthetic calcined metal-oxide-silica, having a surface area at least 40% of which is contained in pores with radius of 2–4 nm and having a specific pore volume in pores with a radius in the range of 100–2000 nm of at least 0.5 ml/g.

4,956,127

**DOWNCOMER-TRAY ASSEMBLY AND METHOD**  
Michael J. Binkley, Glenn Heights; John T. Thorngren; Jorge A. Bonilla, both of Dallas, and Gary W. Gage, Grand Prairie, all of Tex., assignors to Glitsch, Inc., Dallas, Tex.  
Filed Mar. 8, 1989, Ser. No. 320,420  
Int. Cl.<sup>3</sup> B01F 3/04

U.S. Cl. 261—114.1

19 Claims



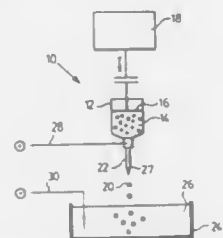
1. An improved downcomer-tray assembly for a process column of the type wherein liquid flows downwardly through the discharge area of a first downcomer onto a first tray and across the active area thereof through which vapor flows upwardly for interaction and mass transfer with the liquid before passing therefrom by a second downcomer, said improvement comprising a substantially uniformly raised active inlet area comprising upwardly extending portions of the tray itself and having gas flow openings disposed beneath said discharge area of said first downcomer for facilitating ascending vapor flow immediately beneath said discharge area of said downcomer by uniformly reducing the height of liquid thereabove relative to the height of liquid above the active area of said tray and injecting said ascending vapor into direct engagement with liquid being discharged from said downcomer.

4,956,128

**DROPLET GENERATION**  
Martin Hommel, Toronto; Anthony M. Sun, Willowdale, and Mattheus F. A. Goosen, Toronto, all of Canada, assignors to Connaught Laboratories Limited, Willowdale, Canada  
Division of Ser. No. 631,471, Jul. 16, 1984, Pat. No. 4,789,550.  
This application Nov. 13, 1986, Ser. No. 930,240  
Int. Cl.<sup>3</sup> B29B 9/10; C12N 11/04

U.S. Cl. 264—4

16 Claims



1. A method of forming spherical, smooth and uniform microcapsules containing living tissue or cells, which comprises: forming a suspension of living tissue or cells in a physiologically-compatible medium containing a water-soluble substance which can be reversibly gelled to provide a temporary protective environment for the living tissue or cells, extruding said suspension downwardly from a source at a first location comprising an axially downwardly directed electroconductive needle, charging the extruded material with a charge of one polarity, establishing a charge of opposite polarity at a second location spaced vertically below said first location,

providing a difference in voltage between the first location and second location cyclically in pulses of a magnitude from about 1 to about 25 kv at a frequency of about 10 to about 100 sec-1 for a pulse duration of about 1 to about 6 m. sec. to effect continuous production of droplets from the extruded material and to draw the droplets so-formed towards said second location, collecting said droplets in a recipient medium which is a hardening solution which reacts with said water-soluble substance and form discrete, spherical microcapsules from each of said droplets of diameter less than about 700 microns, and subsequently forming a permanent biocompatible semi-permeable membrane having a negatively-charged outer surface about each of said microcapsules which forms a core of the resulting spherical, smooth and uniform microcapsules, said membrane permitting nutrients and oxygen to flow to the core material and metabolic products to flow therefrom while retaining the core material within the microcapsule, said membrane comprising ionically-interacted biocompatible materials and having a thickness about 4 to about 6 microns, said resulting microcapsules being suitable for cardiovascular injection.

4,956,129

**MICROENCAPSULATION PROCESS**

Herbert B. Scher, Moraga, and Marius Rodson, El Cerrito, both of Calif., assignors to ICI Americas Inc., Wilmington, Del.  
Continuation-in-part of Ser. No. 595,136, Mar. 30, 1984, abandoned, which is a continuation-in-part of Ser. No. 499,973, Jun. 1, 1983, abandoned, which is a continuation-in-part of Ser. No. 201,686, Oct. 30, 1980, abandoned. This application Feb. 1, 1988, Ser. No. 151,048

Int. Cl.<sup>3</sup> A61K 9/50, 9/52; B01J 13/02

U.S. Cl. 264—4.7

18 Claims

1. A process for the microencapsulation of a substantially water-insoluble liquid material within a porous shell to effect a slow rate of release of said material through said shell which comprises

- (a) providing an organic solution comprising said liquid material and an etherified urea-formaldehyde prepolymer dissolved therein in which from about 50% to about 98% of the methylol groups of said prepolymer have been etherified with a C<sub>4</sub>–C<sub>10</sub> alcohol;
- (b) creating an emulsion of said organic solution in an aqueous phase aqueous solution comprising water and a surface-active agent, wherein said emulsion comprises discrete droplets of said organic solution dispersed in said continuous phase aqueous solution, there being formed thereby an interface between the discrete droplets of organic solution and the surrounding continuous phase aqueous solution; and
- (c) causing in situ self-condensation and curing of said urea-formaldehyde prepolymers in the organic phase of said discrete droplets adjacent to said interface by simultaneously heating said emulsion to a temperature between about 20° C. to about 100° C., and adding to said emulsion an acidifying agent and maintaining said emulsion at a pH of between about 0 to about 4 for a sufficient period of time to allow substantial completion of in situ condensation of said resin prepolymers to convert the liquid droplets of said organic solution to capsules consisting of solid permeable polymer shells enclosing said liquid material.

4,956,130

**METHOD OF MAKING DENTURES**

Lowell F. Sonner, 2100 Superior, Elkhart, Ind. 46516  
Filed Nov. 21, 1918, Ser. No. 272,851  
Int. Cl.<sup>3</sup> A61C 13/10

U.S. Cl. 264—18

7 Claims

3. A method of forming a denture comprising the steps of: (a) forming a plurality of false teeth and arranging said teeth

in a mold which defines a mold cavity approximating the configuration of a patient's gums and soft mouth tissue; (b) applying gingival tone dental polymer to said mold cavity at a surface thereof adjacent said false teeth; (c) characterizing said gingival tone polymer by applying a liquid self-polymerizing curing agent to the gingival tone polymer; (d) applying a light hued pink polymer to said mold cavity surface adjacent said gingival tone polymer; (e) characterizing said light hued pink polymer by applying said liquid self-polymerizing curing agent to said light hued pink polymer; (f) applying a dark pink hued polymer to said mold cavity surface adjacent said light pink hued polymer; (g) characterizing said dark pink hued polymer by applying said curing agent thereto; and (h) filling the remainder of the mold cavity with a mixture of said dark pink hued polymer and curing agent to form a base and curing said base.

4,956,131

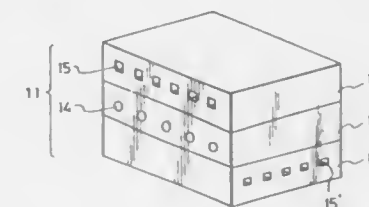
**FUEL CELL ELECTRODE SUBSTRATE INCORPORATING SEPARATOR AS AN INTERCOOLER AND PROCESS FOR PREPARATION THEREOF**

Masatomo Shigeta; Hiroyuki Fukuda; Hisatsugu Kaji, all of Iwaki, and Kuniyuki Saitoh, Abiko, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Japan  
Division of Ser. No. 718,380, Apr. 1, 1985, Pat. No. 4,664,988.  
This application Jan. 20, 1987, Ser. No. 4,612  
Claims priority, application Japan, Apr. 6, 1984, 59-69870; Jul. 6, 1984, 59-140251

Int. Cl.<sup>3</sup> H04M 4/96

U.S. Cl. 264—29.5

23 Claims



1. In a process for producing an electrode substrate for fuel cells comprising (1) two porous carbonaceous layers, each having a number of elongated holes for feeding reactant gases into a fuel cell which holes are defined near the center of the thickness thereof, and (2) a gas impermeable, carbonaceous separator interposed between said layers, which process comprises (i) supplying, into a mold having a proper configuration, (i) materials for porous layer each of which is a mixture comprising 10–50% by weight of a filler (A), 20–40% by weight of a binder (B) and 20–50% by weight of a pore regulator (C), (ii) a material for forming the elongated holes for feeding reactant gases and (iii) a material for the separator, (2) press molding the thus supplied materials at a temperature in the range of from 70° to 170° C. and a pressure in the range of from 5 to 100 kg/cm<sup>2</sup> for a time period in the range of from 10 to 60 minutes, (3) postcuring the press molded materials at the molding temperature for at least 2 hours and (4) calcining the postcured materials under an inert atmosphere at a temperature in the range of from 800° to 3,000° C., the filler (A) being selected from the group consisting of short carbon fibers and carbon particles, the short carbon fiber having a diameter in the range of from 5 to 30 μm, a length in the range of from 0.02 to 2 mm, and a linear carbonizing shrinkage in the range of not more than 3.0% when calcined at 2,000° C., the binder (B) being selected from the group consisting of phenol resins, epoxy resins, petroleum and/or coal pitches



and mixtures thereof, and having a carbonizing yield in the range of from 30 to 75% by weight, the pore regulator (C) comprising organic granules, 70% or more of which have a particle diameter in the range of from 30 to 300  $\mu$ m, the organic granule being selected from the group consisting of polyvinyl alcohols, polyvinyl chlorides, polyethylenes, polypropylenes, polystyrenes and mixtures thereof,

the material (ii) for forming elongated holes for feeding reactant gases being a polymer which does not evaporate nor melt-flow at 100° C., the polymer being selected from the group consisting of polyethylenes, polypropylenes, polystyrenes, polyvinyl alcohols and polyvinyl chlorides, having a carbonizing yield of 30% by weight or less and being (1) a textile fabric of the polymer comprising single strand or bundles of a number of strands which have been textured, the strand or the bundle having a diameter in the range of from 0.5 to 3.3 mm, the distance between two strands or bundles parallel to the gas flow direction being in the range of from 5 to 50 mm, or (2) a grating-like shaped article of the polymer prepared by extrusion molding of a melt of the polymer into a die or by press molding of pellets or powder of the polymer in a mold, the gratings having a diameter or equivalent diameter in the range of from 0.5 to 3.3 mm, the distance between two gratings parallel to the gas flow direction being in range of from 1.5 to 5 mm and the distance between two gratings perpendicular to the gas flow direction being in the range of from 5 to 50 mm,

the materials for forming elongated holes for feeding reactant gases being each supplied into the mold so that the elongated holes for feeding reactant gases are parallel to each other and to the electrode surface and one side surface of the electrode, are continuously elongated in the porous layer from one of the other side surfaces to another surface opposite thereto, and the elongated holes in the porous layer on one side of the separator and those in the porous layer on the other side of the separator have the directions perpendicular to one another, wherein the improvements comprise the process comprising the steps of:

(a) supplying, into the mold having a proper configuration, the material for separator, the material for forming elongated holes for feeding reactant gases which material is a polymer, and the material for separator, in this order and press molding, or further, after press molding, postcuring and calcining, the material for separator comprising (i) 50-90% by weight of a filler of carbon particles having a diameter of 50  $\mu$ m or less and (ii) 10-50% by weight of a thermosetting resin binder; and

(b) supplying, into the mold having a proper configuration, the material for porous layer, the material for forming elongated holes for feeding reactant gases, the material for porous layer, the shaped separator by press molding or the calcined separator prepared in the step (a), the material for porous layer, the material for forming elongated holes for feeding reactant gases, and the material for porous layer, in this order, press molding, postcuring, and calcining the postcured materials to integrate the materials as a whole body to obtain an electrode substrate provided with an intercooler,

where (1) said separator has a number of elongated holes for flowing coolant which are constructed from said separator and provided near the center of the thickness in the separator, and which holes are parallel to each other and to the electrode surface and one side surface of the electrode, are continuously elongated in the separator from one of the side surfaces to another side surface opposite thereto, and have a diameter or equivalent diameter in the range of from 2 to 10 mm, and

(2) said separator excluding the elongated holes for flowing coolant has an average bulk density of 1.2 g/cm<sup>3</sup> or more,

a specific gas permeability of  $1 \times 10^{11}$  cm<sup>2</sup>/hr.mmAq. or less, a thermal conductivity of 1 kcal/m.hr.°C. or more, and a volume resistivity of  $10 \times 10^{-3}$   $\Omega$ .cm or less.

4,956,132

# METHOD FOR APPLYING MOLD-RELEASING AGENT ONTO MOLD SURFACES USING A MOLD-RELEASING SHEET

Toshihiko Kitaura; Akio Nakamura; Masayuki Sakamoto; Kouichi Takashima; Kiyotaka Hirakawa; and Matsuo Mizota, all of Saga, Japan, assignors to Nitto Denko Corporation, Osaka, Japan

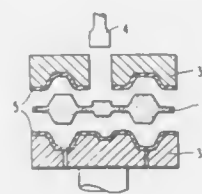
Division of Ser. No. 137,282, Dec. 23, 1987, abandoned. This application Nov. 7, 1988, Ser. No. 268,674

Claims priority, application Japan, Dec. 23, 1986, 61-313560; Mar. 16, 1987, 62-61478; Jul. 24, 1987, 62-186374

Int. Cl.<sup>5</sup> B29C 33/68

U.S. Cl. 264-39

1 Claim



1. A method of applying a mold-releasing agent to molding surfaces of a mold after cleaning said molding surfaces comprising the steps of:

- inserting a mold-releasing sheet between said molding surfaces, said mold-releasing sheet comprising a composition containing:
  - uncured rubber,
  - a curing agent, and
  - a mold releasing agent,
- coating said molding surfaces with said mold releasing agent by heating and pressing said mold-releasing sheet to mold and cure said mold releasing sheet in said mold such that said mold-releasing agent oozes from said mold-releasing sheet and forms a uniform layer on said molding surfaces, and
- removing the cured sheet from the molding surfaces of the mold, said uniform layer being sufficient to provide good mold-releasing property to said molding surfaces after said cleaning.

4,956,133

# CONTINUOUS MOLDING APPARATUS AND METHOD

Le Roy Payne, 3300 Nicholas La., Molt, Mont. 59057

Continuation-in-part of Ser. No. 202,267, Jun. 6, 1988, which is a continuation-in-part of Ser. No. 890,742, Jul. 30, 1986, Pat. No. 4,749,533, which is a division of Ser. No. 766,498, Aug. 19, 1985, Pat. No. 4,671,753. This application Nov. 16, 1988, Ser. No. 271,686

Int. Cl.<sup>5</sup> B29C 41/06, 41/52, 67/20

U.S. Cl. 264-39

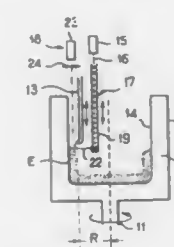
30 Claims

1. Continuous molding apparatus including a raw material supplying portion, a molding portion, a supporting portion, a mixing portion and a control portion; said raw material supplying portion including a plurality of reservoirs, said reservoirs being connected independently with said mixing portion through conduit means; said molding portion including a plurality of spaced enclosed mold assemblies, each of said mold assemblies including at least two separable mold sections and mold section orienting means; said supporting portion including a common rotatable frame section for a plurality of said spaced mold assemblies, support means spaced along said supporting portion for independent rotation of each mold

assembly about at least two axis in a preselected rotational profile, said raw material conduit means being disposed adjacent at least a part of said frame section and communicating with each mold assembly; said mixing portion including an elongated mixing chamber disposed adjacent each mold assembly, a plurality of deflector sections within each mixing chamber spaced along the length thereof; said control portion including pump means, valve means and flow monitoring means disposed along each raw material conduit means, independent drive means for each mold assembly, for said frame section therefor, and for said mold orienting means; programmable memory means and actuating means responsive thereto respectively controlling and activating said pump means, said valve means and said drive means.

20. A continuous molding method including the steps of providing a plurality of raw material reservoirs, continuously moving raw material from each reservoir independently to a plurality of spaced mixing chambers each of which is located

spot on said summit as the grains are deposited and modifying the height at which the grains are introduced and the height of



the trajectory of the luminous beam as a function of the radial position of the luminous spot on said summit.

4,956,135

# MOLDING APPARATUS AND METHOD

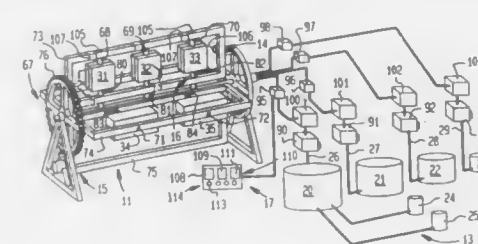
Le Roy Payne, 3300 Nicholas La., Molt, Mont. 59057

Continuation-in-part of Ser. No. 890,742, Jul. 30, 1986, Pat. No. 4,749,533, which is a division of Ser. No. 766,498, Aug. 19, 1985, Pat. No. 4,671,753. This application Jun. 6, 1988, Ser. No. 202,267

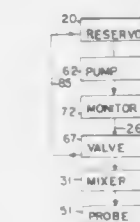
Int. Cl.<sup>5</sup> B29C 41/04, 41/52, 67/20

U.S. Cl. 264-40.7

26 Claims



adjacent to an individual enclosed mold assembly including separable mold sections, introducing raw materials into said mixing chambers, passing a freshly formed mixture flowing from each mixing chamber directly into an enclosed cavity of said adjacent mold assembly in a preselected flow rate profile, rotating each mold assembly about at least two intersecting axes in a preselected rotational profile, flowing said mixture over all surfaces of said mold cavity by said rotational movement, continuing said rotational movement of said mold assembly while said mixture forms a foam completely filling said cavity thereof; monitoring the delivery of raw materials to each mixing chamber, the resulting mixture flowing therefrom and the multiple axis rotation of each mold assembly, separating said mold sections of each mold assembly after said foam has formed within said mold cavity, removing a molded foamed product from said separated mold sections, closing said mold sections and repeating said steps to form a multiplicity of such molded products on a continuing basis.



# METHOD OF AND APPARATUS FOR CONTROLLING THE FILLING OF A MOLD WITH A PULVERULENT REFRACTORY MATERIAL

Jean-Claude Luc, Avon, France, assignor to Quartz et Silice, Courbevoie, France

Filed Nov. 22, 1988, Ser. No. 274,575

Int. Cl.<sup>5</sup> B29C 39/44; B29D 24/00

U.S. Cl. 264-40.2

14 Claims

1. A method of controlling the filling of a hollow mold of cylindrical shape with a pulverulent refractory material according to which method grains of material are introduced continuously into the mold, which rotates about its vertical axis, in which the grains are deposited on or near a lateral wall face of said mold in the form of a cylindrical layer having an internal radius R, said method comprising the steps of directing a beam of light in such a way as to form a luminous spot on the summit of the layer, observing the radial displacement of said

1. Continuous molding apparatus including a raw material supplying portion, a mixing portion, a molding portion, a mixture delivery portion, a supporting portion and a control portion; said raw material supplying portion including a plurality of reservoirs; said mixing portion including an elongated chamber, a plurality of spaced deflector sections disposed along the length of said elongated chamber, reservoirs of said raw material supplying portion being independently connected to inlets of said mixing portion through flexible connector means; said molding portion including a plurality of spaced enclosed mold assemblies, each of said mold assemblies including at least two retractable mold sections, and mold section orienting and interlocking means; said mixture delivery portion including a hollow probe member selectively connectable with an outlet of said mixing portion; said mixture delivery portion being selectively alignable with each enclosed mold assembly sequentially in a preselected repeating cycle; said supporting portion including indexing means providing said selective and repeating alignment between said mixture delivery portion and each of said mold assemblies, said supporting portion including support sections rotatably carrying each of said mold assemblies; said control portion including drive means moving said indexing means, said mold section orienting and interlocking means and the rotation of said mold assemblies in a preselected rotational profile, valve means and flow monitoring means disposed along the length of each of said connector means, programmable memory means controlling said drive means and valve means, and actuating means responsive to said memory means activating said drive means and said valve means.

21. A continuous molding method including the steps of positioning a plurality of separable section enclosed mold assemblies in a preselected arrangement with spacing therebetween, axially aligning sequentially a mixture delivery assem-

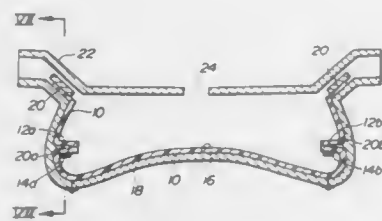
bly with each of said mold assemblies, during each alignment performing the steps of continuously rotating said aligned mold assembly in a preselected rotational profile, dispensing a freshly prepared foamable resin-forming liquid mixture through a probe member disposed in an enclosed cavity of said aligned mold assembly, withdrawing said probe member in a preselected rate profile while continuously dispensing said resin-forming mixture therefrom in a preselected flow rate profile, spreading said mixture within said cavity by centrifugal force, continuing said rotation of said mold assembly while said mixture forms a foam therein completely filling said mold cavity, displacing air in said cavity with said foam and exhausting said air along the outside of said probe member, monitoring the delivery of said liquid mixture into said mold cavity and coordinating same with the flow of raw materials, the mold assembly rotation and the withdrawal of said probe member, separating said mold sections of each mold assembly after said probe member is withdrawn completely therefrom, removing a molded foamed resin product from said separated mold sections, closing said mold sections, inserting said probe member therein and repeating said cycle to form a multiplicity of such molded products on a continuing basis.

#### 4,956,136 METHOD OF MOLDING SKIN-COVERED FOAMED PLASTIC ARTICLE

Hisayoshi Mizuno, and Fumio Nara, both of Kanagawa, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan  
Continuation-in-part of Ser. No. 123,472, Nov. 19, 1987, abandoned. This application May 18, 1989, Ser. No. 353,582  
Claims priority, application Japan, Nov. 21, 1986, 61-179323  
Int. Cl.<sup>3</sup> B29C 67/22

U.S. Cl. 264—46.6

12 Claims



1. A method of molding a skin-covered foamed plastic article which comprises the steps of

- preparing a mold which has a cavity formed therein, said cavity having at an inner wall at least one longitudinally curved elongate ridge which extends along the wall;
- preparing a bag-shaped skin member which has a stitched portion, said skin member further having at said stitched portion at least one elastically deformable belt connected to said skin member and extending along said stitched portion, said stitched portion sealed at end points of said skin member;
- putting said skin member in said cavity, while stretching said belt, in such a manner that said stitched portion of said skin member engages said elongate ridge while being pressed against said elongate ridge by a force produced due to said stretching; and holding said skin member in place against said elongate ridge by contraction of the stretched belt pulling said end points into contact with terminal points of said elongate ridge;
- placing a lid on said mold in a manner to close said cavity of the mold;
- pouring a liquid foamable material for foamed plastic into said bag-shaped skin member; and
- removing, upon sufficient curing of the material, said lid from said mold and taking out from said mold a hardened product of foamed plastic comprising said elastically deformable belt.

#### 4,956,137 POROUS CERAMIC COMPOSITE WITH DENSE SURFACE

Ramesh K. Dwivedi, Wilmington, Del., assignor to Lanxide Technology Company, LP, Newark, Del.  
Filed Sep. 16, 1986, Ser. No. 908,119  
Int. Cl.<sup>3</sup> C04B 35/71, 35/02

U.S. Cl. 264—60

28 Claims



1. A method for making a self-supporting ceramic composite article having a porous core bearing a dense surface layer formed integrally with said core, comprising the steps of:

- preparing a preform comprising a filler material and a parent metal distributed through said filler material and wherein the volume percent of parent metal is sufficient to form a volume of oxidation reaction product which exceeds the total spatial volume available within said preform;
- melting said parent metal in the presence of an oxidant and reacting the resultant molten parent metal on contact therewith to form an oxidation reaction product;
- transporting said molten parent metal within said oxidation reaction product towards said oxidant to continue forming oxidation reaction product within said preform thereby substantially filling said total spatial volume, and concurrently forming voids substantially throughout said preform which at least partially inversely replicate the geometry of said parent metal;
- continuing said reaction for a time sufficient to transport molten parent metal through said oxidation reaction product towards said oxidant and to at least one surface of said preform to form a dense surface layer of oxidation reaction product on said at least one surface, said dense surface layer being substantially free of voids and
- recovering said ceramic composite article.

#### 4,956,138 METHOD OF MANUFACTURING AN ELECTROFUSION COUPLER

Malcolm R. Barfield, Willenhall, United Kingdom, assignor to Glynwed Tubes and Fittings Limited, Connock, United Kingdom

Filed Aug. 12, 1988, Ser. No. 231,343

Int. Cl.<sup>3</sup> B29C 65/02, 65/06

U.S. Cl. 264—129

10 Claims



1. A method of forming an electrofusion coupler, the steps comprising, applying a heating wire to the outer surface of a tubular preform along its length in the form of a number of spaced apart loops,

covering each loop of the heating wire in thermoplastics material while said heating wire is supported by said support member to completely cover each loop of the wire in said material in a manner to prevent subsequent displacement of the wire relative to the material, and wherein the heating wire is at least partially embedded in said tubular preform due to the surface of the tubular preform becoming melted in the region where the heating wire contacts said tubular preform, and molding around the material, in thermoplastics material, an outer encapsulating jacket.

#### 4,956,139 METHOD OF PRODUCING AN EXPOSURE BLADE

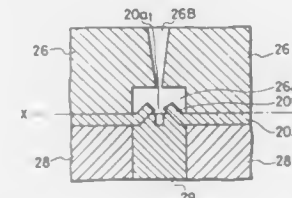
Hiroshi Koizumi, Hanno; Hideaki Kawata, Chichibu; Katsumi Arai, Saitama; Koji Miyamoto, Chichibu; Tadaaki Ichikawa, Saitama, and Koji Ogata, Saitama, all of Japan, assignors to Canon Denshi Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 6, 1987, Ser. No. 105,017

Int. Cl.<sup>3</sup> B29C 45/14, 45/36; B29L 31/0

U.S. Cl. 264—156

1 Claim



1. A method for forming a resin pin member on a blade of an exposure controlling apparatus, comprising the steps of: providing a mold, the mold including a fixed member having a cavity for injecting resin material into the mold and a movable member slidably supporting an ejector pin, the ejector pin having a projection portion having a slit on the top thereof; clamping the blade between the fixed member and the movable member of the mold, wherein the projecting portion penetrates the blade into the cavity during said clamping step; and injecting the resin material into the cavity, the injected resin material flowing through the penetrated portion of the blade and into the slit for embedding the penetrated portion of the blade, the injected resin material forming the resin pin member upon cooling to form the pin member on the blade.

#### 4,956,140 METHODS OF AND APPARATUS FOR PRODUCING BIAXIALLY ORIENTED POLYMER PRODUCT

Rolf Rolles, New Kensington, and Darrel V. Homphries, Allentown, both of Pa., assignors to Aluminum Company of America ALCOA Laboratories, Alcoa Center, Pa.

Continuation-in-part of Ser. No. 933,951, Nov. 24, 1986, Pat. No. 4,874,657, Continuation-in-part of Ser. No. 806,994, Dec. 9, 1985, Pat. No. 4,789,514. This application Nov. 8, 1988, Ser. No. 268,405

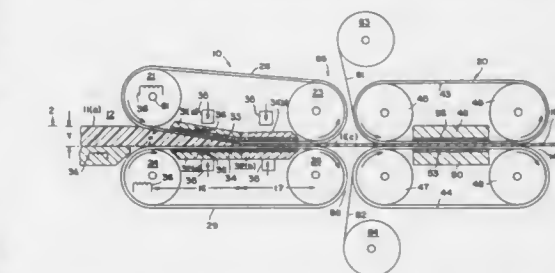
Int. Cl.<sup>3</sup> B29C 42/22, 55/16, 43/16, 43/48

U.S. Cl. 264—280

16 Claims

1. A method of producing biaxially oriented polymer product from solid polymer feedstock material comprising the steps of: biaxially orienting said polymer feedstock material by introducing the feedstock material between moving opposed isochorically supported belts which converge in a downstream direction, thereby simultaneously elongating the material in a longitudinal direction and spreading the material in a lateral direction while reducing the thickness of the material as the material advances with the converg-

ing opposed belts as the belts move in the longitudinal direction; annealing the material after the material has been reduced in thickness and has assumed its final configuration; and



restraining the material in an isobaric cooling region separate from the isochoric region, also by advancing the material between opposed parallel belts while withdrawing head from the material.

#### 4,956,141 MOLDING PROCESS UTILIZING A MOLD RELEASE MEMBRANE

Thomas E. Allen; James E. Matzinger, and William R. Weaver, all of Toledo, Ohio, assignors to Libbey-Owens-Ford Co., Toledo, Ohio

Filed Apr. 7, 1989, Ser. No. 335,183

Int. Cl.<sup>3</sup> B29C 33/62, 45/00

U.S. Cl. 264—297.2

17 Claims



2. A process for preparing a molded plastic article utilizing a mold release membrane comprising the steps of:

- providing a mold, including at least two cooperating mold sections, having a cavity therein for forming the molded plastic article, wherein at least a portion of the mold cavity defines a mold cavity surface to which a first surface of the mold release membrane is to adhere;
- disposing a mold release membrane across the mold cavity surface;
- closing the mold;
- injecting polymeric precursor materials into the mold cavity behind the membrane, wherein the polymeric precursor materials fill the mold cavity and simultaneously deform the mold release membrane to substantially conform to the mold cavity surface, the polymeric precursor materials reacting in situ adjacent a second surface of the mold release membrane opposite the first surface, to form the molded plastic article;
- parting the mold sections, wherein the molded plastic article parts away from the second surface of the mold release membrane, and the first surface of the mold release membrane remains adhered to the mold cavity surface;
- removing the molded plastic article from the mold;
- closing the mold;
- injecting polymeric precursor materials into the mold cavity, wherein the polymeric precursor materials react in situ to form the molded plastic article;
- parting the mold sections, wherein the molded plastic



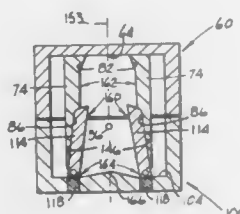
article parts away from the second surface of the mold release membrane, and the first surface of the mold release membrane remains adhered to the mold cavity surface; (J) removing the molded plastic article from the mold; and (K) repeating continually steps G, H, I, and J in sequential order, until the mold release membrane ceases to function as a mold release agent.

**4,956,142**  
**APPARATUS AND METHOD FOR MOLDING THREE DIMENSIONAL ARTICLES**  
Peter G. Mangone, Jr., 28600 Buchanan Dr., Evergreen, Colo. 80439

Filed May 8, 1989, Ser. No. 348,515  
Int. Cl.<sup>3</sup> B29C 45/36

U.S. Cl. 264—318

20 Claims



1. Method for forming a three dimensional injection molded article having at least one passageway extending therethrough and having at least one internal indentation formed therein using first and second mold parts each of which has an open ended cavity formed therein and having at least an end wall and a plurality of sidewalls comprising:  
mounting at least one fixed arm on said end wall of said first mold part and spaced from each of said sidewalls and having a portion thereof projecting out of said cavity and having at least one contoured surface;  
mounting at least one movable arm on said end wall of said second mold part for rotation about a fixed axis and having at least one contoured surface adapted to be moved into continuous contacting relationship with said at least one contoured surface of said at least one fixed arm;  
moving said first and second mold parts from an opened to a closed position;  
injecting material into the cavity formed by said closed first and second mold parts; then  
positioning said at least one movable member to form said continuous contacting relationship between said contoured surfaces and forming at least one protruding portion to form said internal indentation; then  
continuing said injecting of said material until said cavity formed by said first and second mold parts has been filled; curing said injected material to form said three dimensional article;  
forming said fixed arm so that it can be withdrawn from said cured three dimensional article;  
forming said movable arm so that it can cooperate with its rotational movement and be withdrawn from said cured three dimensional article.

**4,956,143**  
**METHOD AND APPARATUS FOR THE MULTI-UNIT PRODUCTION OF THIN-WALLED TUBULAR PRODUCTS UTILIZING AN INJECTION MOLDING TECHNIQUE**

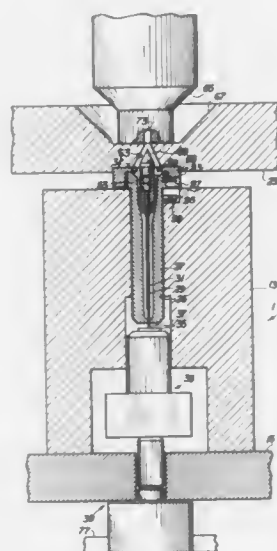
Richard H. McFarlane, Geneva, Ill., assignor to Taut, Inc., Geneva, Ill.

Continuation-in-part of Ser. No. 25,646, Mar. 13, 1987, which is a continuation-in-part of Ser. No. 496,979, May 23, 1983, abandoned, which is a division of Ser. No. 302,490, Sep. 16, 1981, abandoned. This application Nov. 16, 1988, Ser. No. 271,886 The portion of the term of this patent subsequent to Jun. 14, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> B29C 33/30

U.S. Cl. 264—334

12 Claims



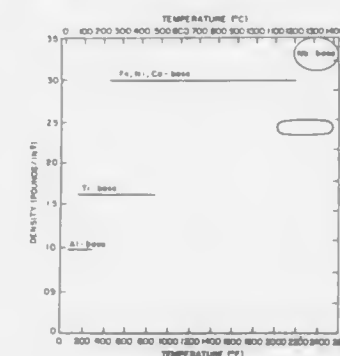
1. A method of transferring and processing a plurality of continuously produced molded tubular products formed by a mold cavity and a core pin combined in a specific cavity and core pin pair comprising the steps of:  
(a) transferring the combined formed product and cavity and core pin pair as a unit away from a molding site,  
(b) separating the mold cavity from the product and still combined core pin,  
(c) transferring the combined product and core pin from the locale of separation of the mold cavity therefrom to a locale for separation of the product and core pin,  
(d) separating the product from the core pin and subsequently transferring the product separated from the core pin and independently therefrom to a collection facility,  
(e) concurrently to independently transferring the product, independently transferring the mold cavity and the core pin in segregated relation to one another into a reunited cavity and core pin pair at least at the molding site,  
(f) adjusting each reunited cavity and core pin pair immediately prior to receipt of a hot plastic melt therein in accordance with preselected X-Y coordinates relative to the point of introduction of the hot melt into the cavity and core pin pair, and  
(g) preselecting a plurality of X-Y coordinates, each in association with individual ones of a plurality of cavity and core pin pairs and thereby regulating inflow and balance characteristics of the hot plastic melt to be injected into each of the plurality of cavities and core pin pairs.

**4,956,144**  
**HAFNIUM CONTAINING NB-TI-AL HIGH TEMPERATURE ALLOY**  
Melvin R. Jackson, Schenectady, and Shyh-Chin Huang, Latham, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 22, 1988, Ser. No. 288,394  
Int. Cl.<sup>3</sup> C22C 30/00, 27/02

U.S. Cl. 420—580

7 Claims



1. An alloy consisting essentially of the following ingredients and ingredient concentrations in atomic percent:

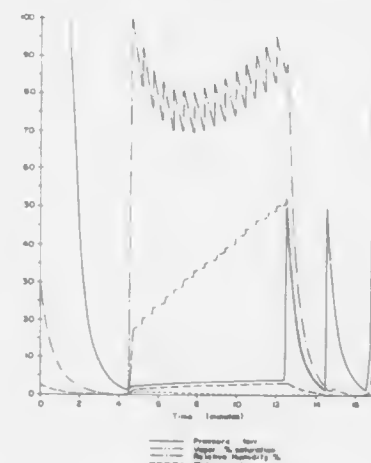
Ingredient	Concentration in Atom %	
	From	To
Niobium	balance essentially	
Titanium	32	45
Hafnium	8	15
Aluminum	3	18

**4,956,145**  
**OPTIMUM HYDROGEN PEROXIDE VAPOR STERILIZATION METHOD**  
Arthur L. Cummings, and Robert W. Childers, both of Erie, Pa., assignors to American Sterilizer Company, Erie, Pa.

Filed Dec. 30, 1987, Ser. No. 139,900  
Int. Cl.<sup>3</sup> A61L 2/20

U.S. Cl. 422—28

5 Claims



1. A sterilization method comprising:  
injecting a hydrogen peroxide and water vapor mixture into a closed sterilization chamber having a predetermined volume at a predetermined temperature in an initial amount approaching the saturation limit of said vapor

mixture in said chamber at said temperature and said volume; and,  
thereafter, injecting a plurality of intermittent make-up injections of said vapor mixture into said chamber, said make-up injections being at a rate and each said make-up injection being in a variable amount necessary to maintain the concentration of hydrogen peroxide vapor at a level effective for sterilization but less than that concentration of hydrogen peroxide vapor which would raise the concentration of said vapor mixture to the saturation limit which will be present in said chamber immediately following injection of such make-up injection at said temperature.

**4,956,146**  
**DRY ANALYTICAL ELEMENT AND PROCESS FOR PRODUCING THE SAME**  
Hirokazu Yuhki, Kazuhiko Fujiwara, Hiroshi Ohnishi, and Fuminori Arai, all of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

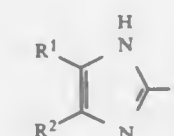
Filed Mar. 10, 1989, Ser. No. 321,978

Claims priority, application Japan, Mar. 14, 1988, 63-59921  
Int. Cl.<sup>3</sup> G01N 33/00, 21/77; C12Q 1/28

U.S. Cl. 422—56

20 Claims

1. In a dry analytical element for use in detecting a specific component contained in a liquid, which element comprises one or more water-permeable layers provided on a water-impermeable support, at least one layer of the water-permeable layers containing a composition capable of interacting with said specific component to produce a leuco dye having formula [I]



wherein R<sup>1</sup> represents an unsubstituted or substituted aryl group, R<sup>2</sup> represents an unsubstituted or substituted alkyl group, and R<sup>3</sup> represents an unsubstituted or substituted aryl group, the improvement wherein a dispersion containing said leuco dye is incorporated in said at least one layer containing said composition, said dispersion being formed by dissolving said leuco dye and an aliphatic higher alcohol in a hydrophobic solvent and dispersing the resulting solution in a hydrophilic medium.

**4,956,148**  
**LOCKING RACK AND DISPOSABLE SAMPLE CARTRIDGE**

Cass J. Grandone, Lake Forest, Ill., assignor to Abbott Laboratories, Abbott Park, Ill.

Continuation of Ser. No. 41,189, Apr. 22, 1987, abandoned. This application Aug. 28, 1989, Ser. No. 399,365

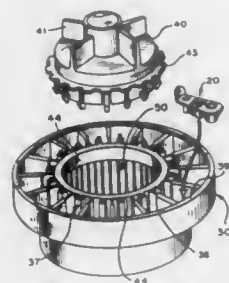
Int. Cl.<sup>3</sup> G01N 35/00; B65D 83/00

U.S. Cl. 422—64

11 Claims

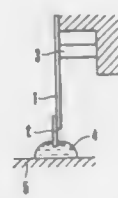
1. An apparatus for use in a biological sample analyzer comprising a plurality of cartridge means for holding fluids, said apparatus further comprising:  
indexing rack means having a plurality of openings each of said plurality of openings receiving a one of said plurality of cartridge means;  
alignment means in said each of said plurality of openings aligning said one of said plurality of cartridge means in a predetermined orientation in said each of said plurality of openings;  
securing means in said each of said plurality of cartridge means in said each of said plurality of openings and thereby securing said each of said plurality of cartridge means against movement from a predetermined position in

said each of said plurality of openings wherein said securing means includes substantially vertical rail means comprising a portion of a surface of said rack means at least partially defining said each of said plurality of openings and engaging at least a portion of the cartridge means in said opening to restrict lateral movement of the cartridge means in said each of said plurality of openings; and actu-



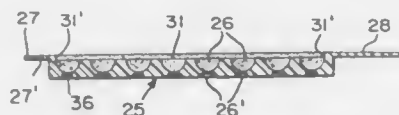
atable locking means mounted to said rack means and operative upon actuation to simultaneously engage said each of said plurality of cartridge means in said each of said plurality of openings and positioning and locking said each of said plurality of cartridge means in said each of said plurality of openings in said predetermined position in engagement with the securing means in said each of said plurality of openings.

**4,956,149**  
**BIOSENSOR DEVICE PROVIDED WITH AN AGITATOR**  
Yoshie Kawana, and Narushi Ito, both of Tokyo, Japan, assignors to NEC Corporation, Japan  
Filed Jun. 29, 1988, Ser. No. 213,076  
Claims priority, application Japan, Jul. 2, 1987, 62-166342  
Int. Cl.<sup>5</sup> G01N 27/00  
U.S. Cl. 422—68.1 2 Claims



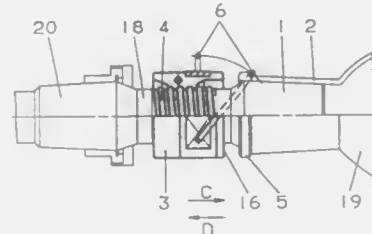
1. A biosensor comprising:  
an elastic substrate having two ends;  
an electrode-type concentration sensor mounted on one end of said substrate; and  
a piezoelectric actuator on the other end of said substrate to operate as a vibrator,  
said substrate and said piezoelectric actuator being connected so that when said sensor is inserted in a droplet of a solution which is to be measured, a change in the shape of an element of said piezoelectric actuator is amplified by said substrate and transmitted to said sensor, and said sensor measures the concentration of a chemical substance while said sensor agitates the droplet.

**4,956,150**  
**DISPOSABLE MICROTITER STICK**  
Wayne M. Henry, Scarborough, Me., assignor to Alerchek, Portland, Me.  
Continuation of Ser. No. 117,476, Nov. 5, 1987, abandoned, which is a continuation-in-part of Ser. No. 803,076, Nov. 27, 1985, abandoned. This application Nov. 15, 1989, Ser. No. 437,770  
Int. Cl.<sup>5</sup> G01N 1/10; B01L 3/00  
U.S. Cl. 422—102 9 Claims



1. A microtiter stick for use in performing immunochemical tests comprising:  
a solid plastic body having an upper surface and a row of shallow wells positioned and arranged in said upper surface,  
each of said wells being defined by a truncated hemisphere, the bottom of which is an optically clear, circular, transparent, concave surface,  
a circular, flat, clear, transparent surface in axial alignment with the concave lens surface of each well creating a planar-concave reducing lens therebetween,  
the remainder of the truncated hemisphere being stripped to render said remainder translucent thereby to diffuse light and reduce optical interference and to increase the effective contact surface area of the wells to enhance the ability of the wells to collect residue of the tests for observation.

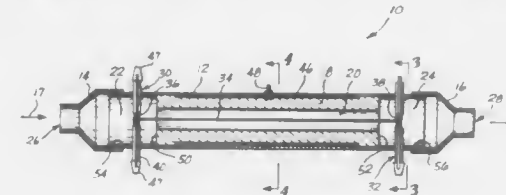
**4,956,151**  
**DEVICE FOR HOLDING TOGETHER AND RELEASING CONICAL JOINTS**  
Arnold Steck, Wattwil, Switzerland, assignor to Bachl Laboratoriums-Technik AG, Flawil, Switzerland  
Filed Oct. 3, 1988, Ser. No. 252,590  
Claims priority, application Fed. Rep. of Germany, Oct. 22, 1987, 8714124[U]  
Int. Cl.<sup>5</sup> B01L 11/00; F16L 49/00  
U.S. Cl. 422—103 7 Claims



1. A device for holding together and releasing conical joints, in particular on laboratory apparatus, comprising a conical pin (1) and conical sleeve (2) having a common central axis and a nut (3), which engages in an outer thread (4) on the conical pin (1), and a tension device disposed on the nut and engaging behind a continuous swelling (5) on the conical sleeve (2), the conical sleeve being pressable against the conical pin by said swelling when the nut is rotated, wherein the tension device is a shackle (6), said shackle being pivotably mounted on the nut (3) about an axis (7) transverse to and at a distance from the central axis, and wherein the nut (3) is divided into two halves in a plane approximately parallel to the central axis and is

surrounded on its exterior by a detachable clamping device (8), which holds the two halves together on the outer thread.

**4,956,152**  
**EMISSION CONTROL UNIT**  
James R. Keough, Edmonds; Arthur E. Miller, Renton, and Charles R. Schrader, Seattle, all of Wash., assignors to Electro Statics, Inc., Seattle, Wash.  
Filed May 10, 1989, Ser. No. 350,125  
Int. Cl.<sup>5</sup> F01N 3/15  
U.S. Cl. 422—181 14 Claims

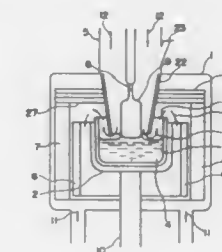


1. An emission control unit for use in removing certain pollutants, including SO<sub>x</sub> and NO<sub>x</sub>, from an exhaust gas produced by the combination of fossil fuels, comprising:  
a tubular housing having an inlet end portion for receiving said exhaust gas and an outlet end portion for permitting said gas to exit said housing;  
a sleeve made of a material including calcium carbonate, said sleeve being received in said housing, said sleeve having an axial opening extending through its length defining a gas flow passageway between said housing's inlet and outlet end portions;  
a corona wire axially extending through and substantially along the length of said opening in said sleeve, said corona wire being negatively charged in a manner so as to create an electric field for laterally repelling at least some of said pollutants into said material making up said sleeve;  
a positively charged electrode means, received in said housing, and substantially surrounding said sleeve, for attracting said pollutants laterally into said material making up said sleeve; and wherein  
said calcium carbonate in said sleeve material chemically reacts with and neutralizes said laterally displaced pollutants, said pollutants chemically altering said material into a substance that is environmentally safe for disposal.

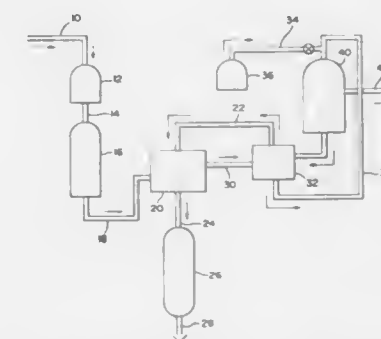
**4,956,153**  
**APPARATUS FOR CZOCHRALSKI SINGLE CRYSTAL GROWING**  
Hirotohi Yamagishi; Izumi Fusegawa; Shunji Yokota, and Takao Abe, all of Gunma, Japan, assignors to Shin-Etsu Handotai Co., Ltd., Tokyo, Japan  
Filed Sep. 9, 1988, Ser. No. 242,414  
Claims priority, application Japan, Sep. 11, 1987, 62-227922  
Int. Cl.<sup>5</sup> C30B 15/30, 15/20, 29/06, 35/00  
U.S. Cl. 422—249 6 Claims

1. An improved apparatus for growing a single crystal of semiconductor silicon by the Czochralski method, comprising:  
a graphite receptacle for holding a quartz glass crucible containing a melt of silicon;  
a shaft to rotate the graphite receptacle around a vertical axis;  
graphite heater elements disposed so as to surround the graphite receptacle;  
heat-insulating members surrounding the heater elements;  
a metal housing enclosing the receptacle, the rotating shaft, the heater elements and the heat-insulating members and having an opening in a top wall thereof;  
a conduit gas-tightly joined to the top wall of the housing to open into said opening and extending upwardly;  
a heat-resistant and heat-insulating covering board in direct contact with the upper ends of the heat-insulating mem-

bers and having a circular center opening and heat-insulating covering board having a multilayered structure of an uppermost layer and a lowermost layer of graphite and an interposed layer of a felt of graphite fibers sandwiched between the uppermost layer and the lowermost layer; and  
a heat-resistant and heat-insulating graphite cylindrical tube having an outer diameter approximately equal to the



**4,956,154**  
**SELECTIVE REMOVAL OF CHROMIUM, NICKEL, COBALT, COPPER AND LEAD CATIONS FROM AQUEOUS EFFLUENT SOLUTIONS**  
Alex Magdica, and Donald B. Stain, both of Lakeland, Fla., assignors to UNC Reclamation, Mulberry, Fla.  
Filed Mar. 9, 1988, Ser. No. 166,079  
Int. Cl.<sup>5</sup> C01G 31/14; B01D 11/04  
U.S. Cl. 423—54 10 Claims



1. A process for the selective recovery of hexavalent chromium, cobalt and nickel from an aqueous solution comprising extracting said aqueous solution with an aliphatic amine first extractant to extract hexavalent chromium into the first extractant to form a first pregnant extractant and a barren aqueous solution, stripping the first pregnant extractant with a first alkali metal or ammonium aqueous strip solution to strip hexavalent chromium into the first aqueous strip solution from the first pregnant extractant to form a first barren extractant and a first pregnant strip solution, treating said first pregnant strip solution to recover chromium therefrom, extracting the barren aqueous solution from the first extraction with di-2-ethylhexyl phosphoric acid second extractant so that cobalt and nickel are extracted from the barren aqueous solution to form a second pregnant extractant, stripping the second pregnant extractant



with a second mineral acid aqueous strip solution to form a second barren extractant and a second pregnant strip solution, recycling the second barren extractant to the second extraction, re-extracting the second pregnant strip solution at pH of about 5 to 6 with an organophosphinic acid first re-extractant to extract cobalt into the first re-extractant to form a first pregnant re-extractant and a first barren strip solution, scrubbing the first pregnant re-extractant with cobalt sulfate, stripping the scrubbed first pregnant re-extractant with a third mineral acid aqueous strip solution to recover cobalt, re-extracting the first barren strip solution from the first re-extraction at pH of about 6.5 to 7.5 with an organophosphinic acid second re-extractant to extract nickel into the second re-extractant to form a second pregnant re-extractant, scrubbing the second pregnant re-extractant with nickel sulfate, and stripping the scrubbed second pregnant re-extractant with a fourth mineral acid aqueous strip solution to recover nickel.

4,956,155

## METHOD AND APPARATUS FOR STERILIZING CONTACT LENSES

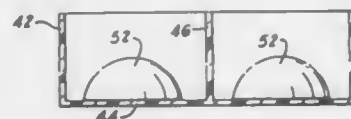
Michael D. Rohrer, Norman, and Ronald A. Bulard, Oklahoma City, both of Okla., assignors to The Board of Regents of the University of OK, Norman, Okla.

Continuation of Ser. No. 20,375, Mar. 2, 1987, which is a division of Ser. No. 730,381, May 3, 1983, Pat. No. 4,671,935, which is a continuation-in-part of Ser. No. 553,788, Nov. 21, 1983, Pat. No. 4,599,216. This application Mar. 29, 1989, Ser. No. 330,602

Int. Cl.<sup>3</sup> A61L 2/26

U.S. Cl. 422-297

2 Claims



1. An apparatus for sterilizing a contact lens in a microwave oven and rehydrating the contact lens with fluid, said apparatus being insertable into a microwave oven having a floor, comprising:

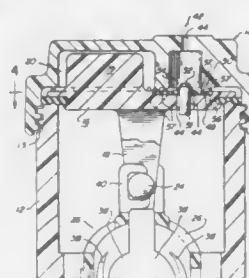
- a container constructed of a material which is transparent to microwaves having a bottom, a top, and at least one side wall wherein the bottom and the side wall cooperate to form a retaining space capable of retaining fluid;
- means for supporting a contact lens in the retaining space capable of permitting contact between the contact lens and the fluid and capable of preventing any portion of the contact lens from touching another portion of the contact lens;
- means for rehydrating the contact lens with fluid after radiating the contact lens with microwaves; and
- means for moving the container through various locations of microwave energy levels within the oven in spaced relation from the floor of the oven until the lens is sterilized comprising:
  - a turntable adapted to rest on the floor of the microwave oven; and
  - a support comprising an upright portion extending upwardly from the turntable and a transverse portion which extends transversely from the center of the turntable adapted to support the container in spaced relation from a vertical axis through the turntable.

4,956,156  
PRESSURE VENTING SYSTEM FOR LENS CASES  
Rowland W. Kanner, Guntersville, and Fred E. Williams, Jr., Arab, both of Ala., assignors to Ryder International Corporation, Arab, Ala.

Filed Nov. 7, 1988, Ser. No. 268,053  
Int. Cl.<sup>3</sup> A61L 2/18

U.S. Cl. 422-300

16 Claims



1. An appliance for disinfecting contact lenses or the like wherein said lenses are disposed within a lens disinfecting solution which produces a gas during the disinfecting action, said appliance comprising: a container having a body with means defining an open end; lens holder means for supporting a pair of contact lenses being disposed within said container body; a removable cap member for closing said container open end; means defining a bore in said cap member providing a passage from an inner surface of said cap member to an outer surface of said cap member; vent means for sealing said bore against entry of contaminants yet permitting escape of gases developed during the disinfecting action, said vent means comprising: a post member positioned in said bore such that said post member does not obstruct passage of gas from inside of said container, a resiliently deflectable apertured diaphragm covering said bore and securely held in place over and around said post member and through which said post member protrudes, with said post member protruding through said diaphragm aperture such that when gas accumulates in said container and when pressure inside the container is greater than a specified threshold pressure, said resiliently deflectable diaphragm resiliently deflects to unseat from said post member to open said vent means, thereby releasing the gas; and when the pressure is relieved such that pressure inside said container is less than a specified threshold pressure, said diaphragm resiliently deflects against said post member to seat thereon and to close said vent means.

4,956,157

## PROCESS FOR SEPARATING SALTS IN SEAWATER

Atsushi Nasu, 99 Katako, Yokai-chiba-shi, Chiba-ken, Japan  
Filed May 30, 1989, Ser. No. 358,158

Claims priority, application Japan, Feb. 20, 1989, 1-40092  
Int. Cl.<sup>3</sup> B01D 9/02

U.S. Cl. 423-104

7 Claims

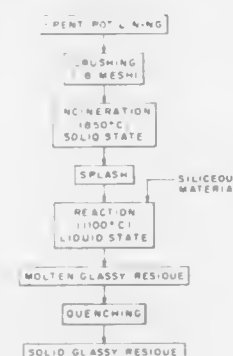
1. Process for separating metal salts from seawater comprising:
- (a) adding an acid containing sulphate and phosphate ions to the seawater in amount sufficient to lower the pH of the seawater to 2.0 or less;
  - (b) adding an alkaline agent to the seawater with lowered pH in an amount sufficient to raise the pH of the seawater to 13 or more, thereby forming a first precipitate of metal salts;
  - (c) separating said first precipitate from the seawater and collecting the remaining seawater as a first solution;
  - (d) concentrating and cooling said first solution to form a second precipitate of metal salts;
  - (e) separating the second precipitate and recovering the remaining solution as a second solution; and
  - (f) evaporating said second solution to dryness thereby forming a residue of metal salts.

4,956,158  
STABILIZATION OF FLUORIDES OF SPENT  
POTLINING BY CHEMICAL DISPERSION  
Quyen C. Nguyen, and Herman J. Hittner, both of Lower Merion, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Mar. 29, 1988, Ser. No. 174,863  
Int. Cl.<sup>3</sup> C01F 7/02

U.S. Cl. 423-111

9 Claims



1. A process for treating spent potlining from the electrolytic smelting of aluminum in cryolite comprising:
- (a) heating spent potlining to burn carbonaceous material at a temperature low enough to maintain a low fluorine vapor pressure and form an ash;
  - (b) admixing siliceous material either before or after said ash-forming step;
  - (c) heating said ash and siliceous material to form a glassy residue suitable for landfill; and
  - (d) cooling said residue rapidly.
8. A process for providing a spent potlining product characterized by a low leachability of fluorine in water comprising:
- (a) incinerating spent potlining at a temperature in the range of about 800-850° C. to form an ash;
  - (b) mixing said ash with siliceous material;
  - (c) heating to form a glassy residue suitable for landfill; and
  - (d) cooling said residue rapidly.

4,956,159

PROCESS FOR RECOVERING GALLIUM TRICHLORIDE FROM GALLIUM-CONTAINING WASTE  
Takeyoshi Shibasaki, Kagawa; Etsuji Kimura, Kasukabe, and Yutaka Nishiyama, Yoso, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Japan

Continuation of Ser. No. 131,117, Dec. 10, 1987, abandoned.  
This application Aug. 15, 1989, Ser. No. 394,275  
Claims priority, application Japan, Dec. 12, 1986, 61-294914  
Int. Cl.<sup>3</sup> C01G 15/00

U.S. Cl. 423-135

4 Claims

1. In a process of recovering gallium trichloride from gallium-containing waste comprising chlorination gallium-containing waste to form a chlorination product including elements of low-boiling-point chlorides contained in the gallium-containing waste, separating and collecting gallium trichloride from the chlorination product by fractional distillation, the improvement comprising carrying out said chlorination of gallium waste initially in the presence of gallium trichloride and simultaneously removing the produced low-boiling-point chlorides of elements contained in the gallium-containing waste.

4,956,160

## PROCESS FOR REMOVAL OF HYDROGEN SULPHIDE USING SPECIFIC IRON OXIDES

Günther Reichert, Cologne, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
Filed Jul. 25, 1989, Ser. No. 384,622

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1988, 3826373

Int. Cl.<sup>3</sup> C01B 17/16, 31/20; C02F 1/68

U.S. Cl. 423-231

6 Claims

1. A process for the removal of hydrogen sulphide comprising contacting the hydrogen sulphide with porous iron oxides, in which the iron oxide comprises to the extent of at least 80% by weight of Fe<sub>3</sub>O<sub>4</sub> and 20 to 75% of its pore volume is in the form of pores having diameters in the range from 2300 to 5000 Å.

4,956,161

## PROCESS FOR REMOVING SO FROM A GASEOUS MIXTURE (OP-3409)

Robert P. Cahn, Millburn, and Boyd E. Hurst, Long Valley, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Jan. 13, 1989, Ser. No. 296,635

Int. Cl.<sup>3</sup> C01B 21/00, 17/00

U.S. Cl. 423-235

23 Claims

1. A process for removing sulfur oxides from a gaseous mixture containing the same, which comprises contacting, in an absorption zone, at absorption conditions, said gaseous mixture with an aqueous composition comprising an ammonium salt selected from the group consisting of ammonium carbonate, ammonium bicarbonate, and mixtures thereof, in an amount such that the product of the partial pressures of said sulfur oxides and ammonia over said aqueous composition, measured at 140 degrees F., is not greater than about 5 (mm Hg)<sup>2</sup>, in said absorption zone, to produce a gaseous product having a decreased content of said sulfur oxides.

4,956,162

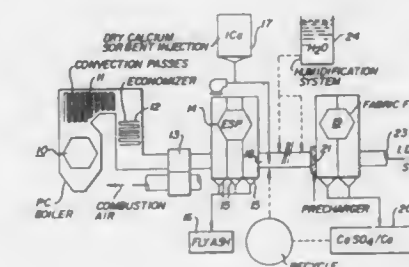
PROCESS FOR REMOVAL OF PARTICULATES AND SO<sub>2</sub> FROM COMBUSTION GASES

Wallace B. Smith, Trussville, Ala., and Dan V. Giovanni, Berkeley, Calif., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 874,706, Jun. 16, 1986, abandoned. This application Aug. 2, 1988, Ser. No. 227,269  
Int. Cl.<sup>3</sup> B01J 8/00; C01B 17/00, 45/00

U.S. Cl. 423-244

8 Claims



1. A process for removing pollutants, including particulates and SO<sub>2</sub>, from coal fired boiler flue gases, said process comprising:
- electrostatically removing particulates from the flue gas; thereafter reducing the temperature of the flue gas to a temperature approaching the temperature for moisture saturation of the flue gas and being less than 135°F. and thereafter injecting dry calcium based sulfur reacting sorbent material into the flue gas in an amount at least

sufficient to react with the SO<sub>2</sub> and SO<sub>3</sub> in the flue gas; and thereafter filtering the flue gas through a fabric filter to remove the reaction product of the sorbent material and SO<sub>2</sub>, as well as unreacted sorbent material, from the flue gas.

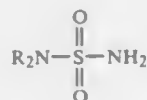
#### 4,956,163 METHOD OF FORMING AMIDOPHOSPHATES IN AQUEOUS SOLUTIONS

David R. Gard, Ballwin, Mo., assignor to Monsanto Company, St. Louis, Mo.

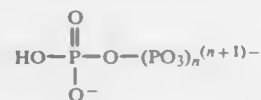
Filed Jan. 30, 1989, Ser. No. 374,103

Int. Cl.<sup>5</sup> C01B 21/06, 25/00, 15/16, 25/26

U.S. Cl. 423—302 11 Claims  
11. A method of forming an aqueous solution or suspension of amidophosphates comprising reacting together a sulfamide of the formula



where each R is independently selected from the group consisting of alkyl, aryl, substituted alkyl or substituted aryl, hydrogen or a combination thereof, and phosphate ions of the formula



where n is 1, in an aqueous polar solvent selected from the group consisting of water, mixtures of water and dimethylsulfoxide, mixtures of water and a ketone and mixtures of water and an alcohol, at a pH in the range of from about 8 to about 10, at a reaction temperature of from about 30° C. to about 100° C., and at a reaction time of from about 2 h to 300 h.

#### 4,956,164 QUINARY MOLECULAR SIEVE COMPOSITIONS

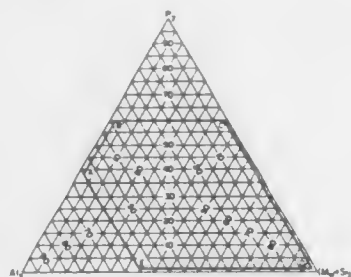
Brent M. T. Lok, New City; Bonita K. Marcus, Rye, and Edith M. Flanigen, White Plains, all of N.Y., assignors to UOP, Des Plaines, Ill.

Continuation of Ser. No. 600,168, Apr. 13, 1984, abandoned. This application Jun. 22, 1987, Ser. No. 63,791

Int. Cl.<sup>5</sup> C01B 33/28

U.S. Cl. 423—306

7 Claims



1. Crystalline molecular sieves having three-dimensional microporous framework structures of CoO<sub>2</sub>, MnO<sub>2</sub>, AlO<sub>2</sub>, PO<sub>2</sub> and SiO<sub>2</sub> tetrahedral units having an empirical chemical composition on an anhydrous basis expressed by the formula:



wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the amount of "R" present per mole of (Co<sub>x</sub>Mn<sub>y</sub>Al<sub>z</sub>P<sub>w</sub>Si<sub>v</sub>)<sub>2</sub>O<sub>2</sub> and has a value of from zero (0) to about 0.3; and "u", "v", "x", "y" and "z", represent the mole fractions of cobalt, manganese, aluminum, phosphorus and silicon, respectively, present as tetrahedral oxides; "w" is the sum of "u+v"; and "w", "x", "y" and "z" are within the pentagonal compositional area defined by points A, B, C, D and E of FIG. 1 and wherein "u", "v", "x", "y", and "z" are at least 0.01.

#### 4,956,165 MOLECULAR SIEVE COMPOSITIONS

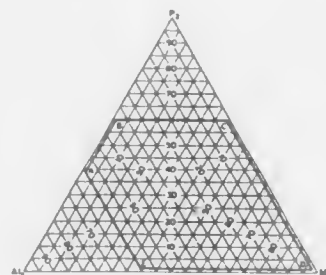
Brent M. T. Lok, New City; Bonita K. Marcus, Rye; Celeste A. Messina, Ossining; Stephen T. Wilson, Shrub Oak, and Edith M. Flanigen, White Plains, all of N.Y., assignors to UOP, Des Plaines, Ill.

Continuation of Ser. No. 902,020, Sep. 2, 1986, abandoned, which is a continuation of Ser. No. 599,810, Apr. 13, 1984, abandoned. This application May 20, 1988, Ser. No. 196,541

Int. Cl.<sup>5</sup> C01B 25/36

U.S. Cl. 423—306

12 Claims



1. A crystalline molecular sieve having a three-dimensional microporous framework structure of MO<sub>2</sub>, AlO<sub>2</sub> and PO<sub>2</sub> tetrahedral oxide units having an empirical chemical composition on an anhydrous basis expressed by the formula:



wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "M" represents: (1) titanium, or a mixture of titanium and iron; and (2) at least one element from the group consisting of cobalt, magnesium, manganese and zinc; "n" is 0, -1 or -2; "m" represents a molar amount of "R" present per mole of (M<sub>x</sub>Al<sub>y</sub>P<sub>z</sub>)<sub>2</sub>O<sub>2</sub> and has a value of zero (0) to about 0.3; and "x", "y" and "z" represent the mole fractions of "M", aluminum and phosphorus, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the pentagonal compositional area defined by points A, B, C, D and E of FIG. 1, said crystalline molecular sieve having a characteristic X-ray powder diffraction pattern which contains at least the d-spacings set forth in one of the following Tables O, Q, R, S and U.

TABLE O

(XAPO-37)		
2θ	D (Å)	Relative Intensity
6.1-6.3	14.49-14.03	vs
15.5-15.7	5.72-5.64	w-m
18.5-18.8	4.80-4.72	w-m
23.5-23.7	3.79-3.75	w-m
26.9-27.1	3.31-3.29	w-m

TABLE Q

(XAPO-40)		
2θ	D (Å)	Relative Intensity
7.5-7.7	11.79-11.48	vw-m
8.0-8.1	11.05-10.94	s-vs
12.4-12.5	7.14-7.08	w-vs
13.6-13.8	6.51-6.42	m-s
14.0-14.1	6.33-6.28	w-m
27.8-28.0	3.209-3.187	w-m

TABLE R

(XAPO-41)		
2θ	D (Å)	Relative Intensity
13.6-13.8	6.51-6.42	w-m
20.5-20.6	4.33-4.31	w-m
21.1-21.3	4.21-4.17	vs
22.1-22.3	4.02-3.99	m-s
22.8-23.0	3.90-3.86	m
23.1-23.4	3.82-3.80	w-m
25.5-25.9	3.493-3.440	w-m

TABLE S

(XAPO-42)		
2θ	D (Å)	Relative Intensity
7.15-7.4	12.36-11.95	m-vs
12.5-12.7	7.08-6.97	m-s
21.75-21.9	4.09-4.06	m-s
24.1-24.25	3.69-3.67	vs
27.25-27.4	3.273-3.255	s
30.05-30.25	2.974-2.955	m-s

TABLE U

(XAPO-46)		
2θ	D (Å)	Relative Intensity
7.2-8.1	12.3-10.9	vs
21.2-21.8	4.19-4.08	w-m
22.5-23.0	3.95-3.87	vw-m
26.6-27.2	3.351-3.278	vw-w
28.5-29.0	3.132-3.079	vw-w

#### 4,956,166 ZEOLITE L SYNTHESIS

Johannes P. Verduijn, Spijkenisse, Netherlands, assignor to Exxon Chemical Patents, Inc., Linden, N.J.

Filed Apr. 20, 1988, Ser. No. 184,546

Claims priority, application United Kingdom, Apr. 22, 1987, 8709506

Int. Cl.<sup>5</sup> C01B 33/28

U.S. Cl. 423—328

11 Claims

1. A process for the preparation of zeolite L, in which an alkaline reaction mixture comprising water, a source of alkali metal, a source of silicon and a source of aluminum is heated to a temperature of from at least 75° C. to form the zeolite L, characterized in that the reaction mixture comprises a source of copper and has a composition falling within the following molar ratios (expressed as oxides):

(M <sup>1</sup> <sub>2</sub> O + CuO)/SiO <sub>2</sub>	0.18-0.36
H <sub>2</sub> O/(M <sup>1</sup> <sub>2</sub> O + CuO)	25-90
SiO <sub>2</sub> /Al <sub>2</sub> O <sub>3</sub>	5-15
M <sup>1</sup> <sub>2</sub> O/(M <sup>1</sup> <sub>2</sub> O + CuO)	0.900-0.9999

(wherein M<sup>1</sup> is an alkali metal).

#### 4,956,167 SILICAS

Derek Aldcroft, South Wirral; John R. Newton, Cheshire; James P. Quinn, Birkenhead, and Peter W. Stanier, Cheshire, all of United Kingdom, assignors to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Continuation of Ser. No. 19,859, Feb. 27, 1987, abandoned. This application Mar. 22, 1989, Ser. No. 327,392

Claims priority, application United Kingdom, Feb. 28, 1986, 8604985

Int. Cl.<sup>5</sup> C01B 33/18; A01K 1/16

U.S. Cl. 423—339

2 Claims

1. A method of preparing an amorphous precipitated silica, suitable for use as a toothpaste abrasive, and having

(i) a BET surface area in the range from about 10 to about 450 m<sup>2</sup>/g,

(ii) a weight mean particle size in the range from about 3 to about 20 microns, and

(iii) a perspex abrasion value in the range from about 23 to about 35, which is produced by the reaction of sodium silicate, having a silica:Na<sub>2</sub>O ratio in the range from 1.8 to 3.5:1, with mineral acid at a temperature of about 95° C. to 100° C., with the concentration and volume of the reactants controlled to give a reaction in the pH range from about 10 to about 10.5, in the presence of a water soluble electrolyte comprising a cation selected from the group comprising aluminium, magnesium, calcium, sodium and potassium with an associated anion selected from the group comprising bromide, carbonate, chloride, nitrate, acetate and sulphate wherein the electrolyte:silica weight ratio is from about 0.1 to 1 to about 2 to 1, adding mineral acid to lower the pH to the range of 3.0-3.5, while at least maintaining the reaction temperature and thereafter filtering the resultant slurry and recovering the precipitated silica.

#### 4,956,168 SYNTHESIS OF HYDROXYLAMINE SALTS

Kerry L. Wagaman, Clinton, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 28, 1983, Ser. No. 470,814

Int. Cl.<sup>5</sup> C01B 21/14

U.S. Cl. 423—386

14 Claims

1. A method for preparing hydroxylamine acid salts which comprises:

preparing a slurry of hydroxylamine sulfate in an alcohol at a temperature not in excess of about 65° C.;

high-shear mixing ammonia with said slurry to form a hydroxylamine-alcohol solution and ammonium sulfate while maintaining the temperature of said slurry at or below 65° C.;

removing ammonium sulfate;

agitating said solution;

admixing an acid selected from the group consisting of nitric acid and perchloric acid with said solution at a temperature not in excess of about 50° C. to form said hydroxylamine acid salt; and

recovering said hydroxylamine acid salt.

#### 4,956,169 PRODUCTION PROCESS OF CHLORINE

Masanobu Ajloka, Yokohama; Shinji Takenaka; Hiroyuki Itoh, both of Omura; Masafumi Katsuta, Houya, and Yoshitsugu Kohno, Omura, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Mar. 18, 1988, Ser. No. 169,951

Claims priority, application Japan, Mar. 18, 1987, 62-61332

Int. Cl.<sup>5</sup> B01J 8/24; C01B 7/04

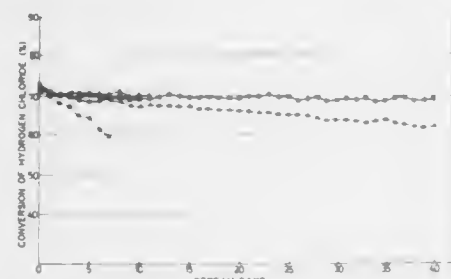
U.S. Cl. 423—502

11 Claims

1. A process for producing chlorine, which comprises reacting hydrogen chloride and oxygen in the presence of a chro-



mium oxide catalyst in a reactor having a catalyst-contacting part which is lined with alumina, and wherein the catalyst-con-



tacting part of the reactor has been thermally undersprayed with a nickel-chromium alloy and then thermally sprayed with alumina powder.

**4,956,170**  
**SKIN MOISTURIZING/CONDITIONING**  
**ANTIMICROBIAL ALCOHOLIC GELS**  
Andrew S. Lee, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Jun. 28, 1989, Ser. No. 372,723  
Int. Cl.<sup>5</sup> A61K 7/06

U.S. Cl. 424—81 12 Claims

1. A high alcohol content gel composition with skin moisturizing and conditioning properties comprising

- from about 60 to 75 weight percent of ethanol, isopropanol or mixtures thereof;
- from about 0.4 to 2 weight percent of a thickening agent which is an addition polymer of acrylic acid crosslinked with an unsaturated polyfunctional agent;
- a sufficient amount of a compatible neutralizing agent for thickening agent (b) to neutralize from about 15% to 100% of acrylic acid carboxyl units present in thickening agent (b), said neutralizing agent being selected from the group consisting of amines of the formula  $\text{HO}(\text{C}_m\text{H}_{2m})_2\text{NH}$  where m has a value of from 2 to 3, aminomethyl propanol, aminomethyl propanediol, and  $\text{H}(\text{OCH}_2\text{CH}_2)_x\text{RN}(\text{CH}_2\text{CH}_2\text{O})_y\text{H}$  where R is a hydrocarbon radical having from 10 to 18 carbon atoms and the sum of x + y has an average value of from about 5 to 25;
- from about 0.5 to 2.5 weight percent of at least one hydrocarbon emollient selected from the group consisting of petrolatum and mineral oil;
- from about 0.5 to 2 weight percent of at least one fatty ester emollient;
- from about 0.05 to 1 weight percent of at least one compatible surfactant to stabilize the composition;
- from about 0.5 to 3 weight percent of at least one fatty alcohol having from 12 to 22 carbon atoms;
- from about 1 to 6 weight percent of a humectant selected from the group consisting of water soluble polyhydric alcohols having from 2 to 3 hydroxyl groups; and
- the balance comprising water, there being at least about 20 weight percent water present and the gel composition has a viscosity of from about 10,000 centipoise to 100,000 centipoise at 25° C.

**4,956,171**  
**TRANSDERMAL DRUG DELIVERY USING A DUAL**  
**PERMEATION ENHANCER AND METHOD OF**  
**PERFORMING THE SAME**

Yunik Chang, Toms River, N.J., assignor to Paco Pharmaceutical Services, Inc., Lakewood, N.J.

Filed Jul. 21, 1989, Ser. No. 384,342  
Int. Cl.<sup>5</sup> A61K 9/24

U.S. Cl. 424—449

1. A unit dosage form for co-administering a drug, and a dual permeation enhancer comprising sucrose cocoate and methyl

laurate, to a predetermined area of a user's unbroken skin for a predetermined time period comprising a membrane reservoir device comprising:

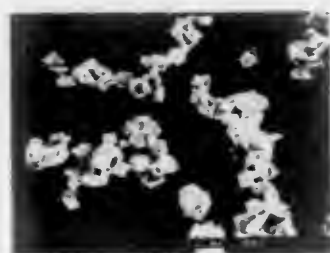
- a backing layer that is substantially impermeable to the passage of drug, sucrose cocoate and methyl laurate, one face of which defines the uppermost exterior surface of said body;
- a reservoir layer adjacent and below the opposite face that contains a supply of the drug, sucrose cocoate and methyl laurate said sucrose cocoate being present in an



amount from about 5% to 35% on a weight percentage basis and said methyl laurate being present in an amount from about 5% to 20% on a weight percentage basis;

- a microporous membrane adjacent and below the reservoir layer through which the drug and the dual permeation enhancer permeate;
- a strippable layer, adjacent and below the microporous membrane, that is substantially impermeable to the drug and the dual permeation enhancer; and
- means for attaching said unit dosage form to the user's skin.

**4,956,172**  
**AMMONIUM ALUMINUM PHOSPHATE**  
Chanakya Misra, Pittsburgh, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.  
Continuation-in-part of Ser. No. 143,179, Jan. 13, 1988, abandoned. This application Aug. 24, 1989, Ser. No. 398,066  
Int. Cl.<sup>5</sup> A61K 7/22; C01B 25/36, 25/45; C08K 3/32  
U.S. Cl. 424—54 15 Claims



1. Essentially equiaxed crystals of aluminum ammonium phosphate of chemical formula  $\text{Al}_2(\text{NH}_4)\text{OH}(\text{PO}_4)_2$  plus chemically combined water, having an X-ray diffraction pattern essentially as shown in the Table of Example 1.

8. A process for preparing a novel aluminum ammonium phosphate as claimed in claim 1, comprising reacting aluminum trihydroxide and an ammonium hydrogen phosphate of the formula:



wherein x and y are integers of 1 or 2 providing the total of x and y is 3, the reaction occurring at a temperature and pressure effective for producing said novel aluminum ammonium phosphate.

**4,956,173**  
**COMPOSITION AND USE OF ADEMETIONINE**  
**AGAINST AGEING OF THE SKIN**  
Gérard Le Fur, Montmorency; Michèle Bousquet, Bievres, both of France; Emilio Crisafulli, Milan, Italy, and Michel Sabadie, Bernay, France, assignors to Societe Anonyme: SANOFI, Paris, France

Filed Nov. 25, 1988, Ser. No. 275,834  
Claims priority, application France, Nov. 25, 1987, 87 16349  
Int. Cl.<sup>5</sup> A61K 7/48, 31/70

U.S. Cl. 424—63

1. A method of treating the skin of a living human to counteract aging, which comprises applying to the skin a cosmetic or pharmaceutical preparation containing an effective amount of ademetionine or a salt thereof dissolved or dispersed in a cosmetically or pharmaceutically acceptable vehicle for topical administration.

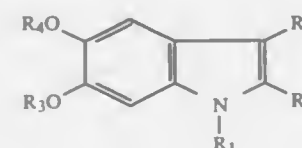
**4,956,174**  
**COMPOSITIONS FOR COLORING THE SKIN BASED ON**  
**INDOLE DERIVATIVES**

Gerard Lang, Saint-Gratien; Herve Richard; Madeleine Leduc, both of Paris, and Alex Junino, Livry-Gargan, all of France, assignors to L'Oréal, Paris, France

Filed Mar. 5, 1987, Ser. No. 21,931  
Claims priority, application Luxembourg, Mar. 6, 1986, 86347  
The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.

U.S. Cl. 424—63

1. A cosmetic composition for imparting to the skin a coloring which is substantially similar to the pigmentation resulting from natural tanning, said composition comprising, in a cosmetically acceptable medium suitable for topical application to the skin, a compound of the formula



wherein

- R<sub>1</sub> represents hydrogen, lower alkyl having 1-6 carbon atoms or —SiR<sub>9</sub>R<sub>10</sub>R<sub>11</sub>,  
R<sub>2</sub> and R<sub>3</sub>, each independently, represent hydrogen, lower alkyl having 1-6 carbon atoms, carboxyl, lower alkoxy carbonyl wherein the alkoxy moiety has 1-6 carbon atoms or —COOSiR<sub>9</sub>R<sub>10</sub>R<sub>11</sub>,  
R<sub>4</sub> and R<sub>5</sub>, each independently, represent hydrogen, linear or branched C<sub>1</sub>-C<sub>20</sub> alkyl, formyl, linear or branched C<sub>2</sub>-C<sub>20</sub> acyl, linear or branched C<sub>3</sub>-C<sub>20</sub> alkenoyl, R<sub>6</sub>OSO<sub>2</sub>—, —SiR<sub>9</sub>R<sub>10</sub>R<sub>11</sub>, —P(OR<sub>6</sub>)<sub>2</sub> or aralkyl, or alternatively,  
R<sub>4</sub> and R<sub>5</sub>, together with the oxygen atoms to which they are attached, form a ring optionally containing a carbonyl group when at least one of R<sub>1</sub>, R<sub>2</sub> or R<sub>3</sub> is other than hydrogen or alternatively a thiocarbonyl group, >P(OR<sub>6</sub>)<sub>2</sub> >CR<sub>7</sub>R<sub>8</sub> or methylene,  
R<sub>6</sub> represents hydrogen or lower alkyl having 1-6 carbon atoms,  
R<sub>7</sub> represents hydrogen or lower alkyl having 1-6 carbon atoms,  
R<sub>8</sub> represents lower alkoxy having 1-6 carbon atoms or mono- or dialkylamino, and  
R<sub>9</sub>, R<sub>10</sub>, and R<sub>11</sub>, each independently, represent linear or branched lower alkyl having 1-6 carbon atoms, with the proviso that at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> is other than hydrogen and  
with the further proviso that when R<sub>1</sub> represents hydrogen, R<sub>2</sub> and R<sub>3</sub>, each independently, represent hydrogen or lower alkyl having 1-6 carbon atoms and (1) at least one

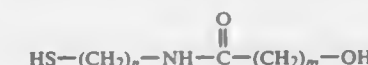
of R<sub>4</sub> and R<sub>5</sub> represents linear or branched C<sub>1</sub>-C<sub>20</sub> alkyl, linear or branched C<sub>2</sub>-C<sub>20</sub> acyl or linear or branched C<sub>3</sub>-C<sub>20</sub> alkenoyl with the other of R<sub>4</sub> and R<sub>5</sub> being hydrogen, or (2) R<sub>4</sub> and R<sub>5</sub>, simultaneously, represent —SiR<sub>9</sub>R<sub>10</sub>R<sub>11</sub> wherein R<sub>9</sub>, R<sub>10</sub> and R<sub>11</sub> have the meanings given above,

and with the further proviso that when R<sub>4</sub> and R<sub>5</sub> are simultaneously hydrogen, R<sub>1</sub> is other than lower alkyl and that when R<sub>2</sub> is carboxyl, R<sub>4</sub> and R<sub>5</sub> are not simultaneously linear or branched, C<sub>1</sub>-C<sub>20</sub> alkyl, and the corresponding salt with an alkali metal, an alkaline earth metal, ammonium or an amine.

**4,956,175**  
**N-(MERCAPTOALKYL)OMEGA-HYDROXYALKYLAMIDES AND THEIR USE AS A REDUCING AGENT IN A PROCESS FOR PERMANENTLY DEFORMING HAIR**  
Jean Maignan, Tremblay les Gonesses; Gerard Lang, Saint Gratien, and Gerard Malle, Villiers sur Morin, all of France, assignors to Societe Anonyme dite: L'Oréal, Paris, France  
Filed Aug. 2, 1989, Ser. No. 388,050  
Claims priority, application Luxembourg, Aug. 4, 1988, 87310  
Int. Cl.<sup>5</sup> A61K 1/09; C07C 235/06

U.S. Cl. 424—72

1. N-(mercaptoalkyl)ω-hydroxyalkylamide having the formula



wherein

n is 2 or 3, and  
m is 2 to 5 inclusive.

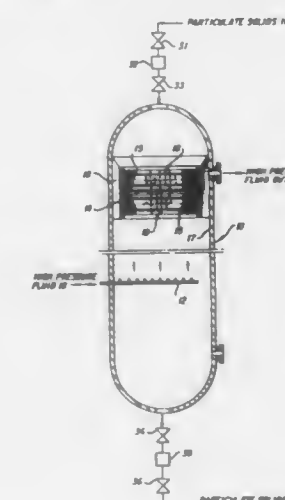
4. A cosmetic reducing composition for the first stage of a permanent deformation operation for hair, comprising in a cosmetically acceptable vehicle, as a reducing agent, at least one N-(mercaptoalkyl)ω-hydroxyalkylamide of claim 1.

**4,956,176**  
**SOLIDS-FLUID CONTACTING APPARATUS WITH**  
**SCREEN AT FLUID OUTLET**  
Charles T. Moorman, Harrington Park, N.J., assignor to Kraft General Foods, Inc., Glenview, Ill.

Filed Jun. 20, 1989, Ser. No. 368,714  
Int. Cl.<sup>5</sup> A23F 5/00; B01D 11/00

U.S. Cl. 426—478

16 Claims



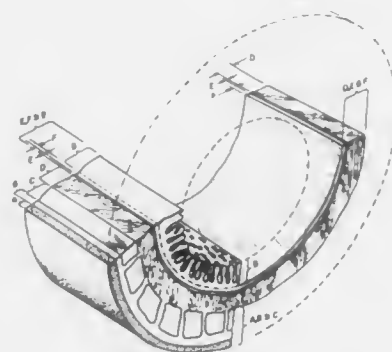
15. In a method of continuously treating particulate solids

with a treatment fluid under high pressure in a substantially vertical column through which a treatment fluid runs continuously upwardly through a bed of particulate solids in said column and then exits the column through a fluid outlet at the top of the column and through which column particulate solids are pulsed periodically downwardly therethrough, with fresh solids being periodically introduced into the top of the column and treated solids being discharged from the bottom of the column, the treatment fluid in the column being at said high pressure during operation of the column;

the improvement which comprises

mounting a screen in said column, said screen comprising a plurality of vertical screen wires, said screen being located within said column adjacent said fluid outlet and positioned such that all of the fluid passing through the column passes through said screen and thence through said fluid outlet, each pair of adjacent vertical screen wires defining a substantially vertical screen slot therebetween, the opening of each vertical screen slot at the surface of the screen which is upstream in the sense of a fluid flowing through the column and exiting through said outlet during operation of the column, having a width which is designed to screen solids from the exiting fluid and having a length which is several times in width at the upstream surface, whereby the screen is periodically cleaned by the periodic movement of said solids from the top of the column downwardly over the surface of the screen.

blooded vertebrate, said tunica submucosa, muscularis mucosa and stratum compactum being delaminated from the tunica



muscularis and the luminal portion of the tunica mucosa of said segment of intestinal tissue.

4,956,179

#### ANTIBACTERIAL COMBINATION OF PENICILLIN AND CEPHALOSPORIN

Peter Bamberg, Zürich, Switzerland; Bertil A. Ekström, Södertälje, Sweden; Ulf E. Forsgren, Södertälje, Sweden, and Berndt O. H. Sjöberg, Södertälje, Sweden, assignors to Astra Lakemedel Aktiebolag and Astra Pharmaceutical Products, Inc., both of Sweden

Continuation of Ser. No. 589,926, Mar. 15, 1984, abandoned, which is a continuation of Ser. No. 464,157, Apr. 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 302,423, Oct. 31, 1972, abandoned. This application Jul. 2, 1987, Ser. No. 69,787

Claims priority, application United Kingdom, Nov. 1, 1971, 50657/71

Int. Cl.<sup>5</sup> A61K 35/66

U.S. Cl. 424—114 8 Claims

1. An antibacterial combination consisting essentially of (1) a member selected from the group consisting of 6-(hexahydro-1H-azepin-1-yl)methylpenicillanic acid and its pharmaceutically acceptable easily hydrolyzable esters and pharmaceutically acceptable salts thereof and (2) a member selected from the group consisting of cephradine, cephalosporin, cephalotene and cephalaxine, and easily hydrolyzable pharmaceutically acceptable esters thereof and pharmaceutically acceptable salts thereof, said members being present in a synergistic combination in a weight ratio of from 10:1 to 1:10.

4,956,180

#### AB-006 ANTIBIOTICS AND PROCESS FOR THEIR PRODUCTION

Giorgio Cassani, Arluno; Giorgio Borgonovi, Milan; Dante Cidaria, Novara; Daniela Tolentino, Milan; Luigi Abis, Novara; Gianfranco Gugliemetti, Bogogno; Carlo Garavaglia, Cugiono; Giovanni Confalonieri, Monza, and Giorgio Pirall, Saronno, all of Italy, assignors to Presidenza Del Consiglio Dei Ministri, Rome, Italy

Continuation of Ser. No. 213,768, Jun. 30, 1988, abandoned.

This application Oct. 6, 1989, Ser. No. 418,928

Claims priority, application Italy, Jul. 8, 1987, 21217 A/87 Int. Cl.<sup>5</sup> A61K 35/74; C12P 1/06

U.S. Cl. 424—118 12 Claims

1. AB-006 Antibiotics obtainable by aerobic controlled culture of *Streptomyces* s.p. NCIB 12425, or of an equivalent mutant thereof, in an aqueous nutrient culture medium containing sources of carbon, nitrogen and inorganic salts until a

substantial antibiotic activity is obtained, and subsequent recovering said antibiotics having the following characteristics: ultraviolet maximum absorbance of 1.50 at 272 nm; infrared absorption maxima (cm<sup>-1</sup>): 3700-3060; 2970; 2930; 2980 (shoulder); 1685; 1635; 1570-1505; 1455; 1435 (shoulder); 1385; 1355-1310; 1255 (shoulder); 1235; 1100; 1085-1000; 975; 875; 850; 820; 750.

4,956,181

NITRATE THERAPY FOR ANGINA PECTORIS  
Gerald W. Bayer, Paul A. Diamantopoulos, both of Rochester; Hans W. Osterhoudt, Spencerport, and Paul F. Schmit, Rochester, all of N.Y., assignors to Eastman Kodak, Rochester, N.Y.

Continuation of Ser. No. 47,954, May 8, 1987, abandoned. This application Jun. 7, 1988, Ser. No. 203,774

Int. Cl.<sup>5</sup> A61F 13/40

U.S. Cl. 424—448

27 Claims



1. A transdermal patch for delivering a organic nitrate drug to a patient comprising, in combination:

- (i) an occlusive backing layer;
- (ii) a rupturable pod reservoir for containing an ointment composition;
- (iii) an ointment drug-containing composition disposed within said pod; said composition comprising said drug, a carrier for said drug and an activator liquid activator selected from the group consisting of ethanol, propanol, isopropanol, isobutanol, hexanol, octanol, decanol, dodecanol, ethylene glycol, propylene glycol, 1,3-propanediol, glycerin, ethyl, acetate, isopropyl myristate, lauryl myristate, decyl propionate, bis(2-ethylhexyl) phthalate, bis-(2-ethylhexyl) sebacate, di-n-butyl sebacate, diisopropyl adipate, mineral oil, bis(n-octyl) phthalate, cetyl alcohol, dibutyl phthalate, diethyl sebacate, ethyl lactate, ethyl phthalate, glycerol monostearate, glycerol distearate, glycerol tristearate, isopropyl palmitate, isopropyl stearate, N,N-bis(2-hydroxyethyl)dodecanamide, lauric myristic monoethanolamide, lauryl lactate, myristyl alcohol, n-decyl methylsulfoxide, N,N-dimethylacetamide, oleyl alcohol, phenylethyl alcohol, sodium lauryl sulfate, sodium stearate, stearyl alcohol, wood alcohols, 1,2,6-hexanetriol, water, and 2-amino-2-methyl-1-propanol;
- (iv) a barrier polymer film that is inherently resistant to the passage of said drug therethrough but becomes permeable to said drug by action of said activator liquid in said drug composition; and
- (v) a non-irritating pressure-sensitive adhesive layer that is permeable to said drug.

4,956,182

#### DIRECT COMPRESSION CHOLESTYRAMINE TABLET AND SOLVENT-FREE COATING THEREFOR

Robert J. Bequette, Bruce A. Bonenberger, both of Evansville; Claude E. Gallian, Newburgh, and John R. Reckelhoff, Evansville, all of Ind., assignors to Bristol-Myers Company, New York, N.Y.

Filed Mar. 16, 1989, Ser. No. 324,167

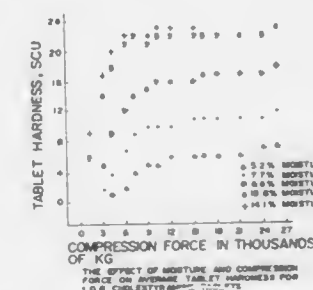
Int. Cl.<sup>5</sup> A61K 9/42

U.S. Cl. 424—476

8 Claims

1. A cholestyramine tablet comprising:  
(a) a directly compressed inner core of cholestyramine agglomerates, said agglomerates having a tapped bulk density of 0.45 to 0.5 g/mL and a moisture content of 8 to 14

percent and formed from many small irregularly-shaped, jagged-edge particles with relatively few large smooth or flat surfaces wherein said agglomerates when directly compressed provide an inner core having a hardness of 18 to 26 SCU; and



(b) an outer solvent-free coating containing from about 60 to 95 percent by weight of stearic acid, and from about 5 to 40 percent by weight of polyethylene glycol.

4,956,183

COMPOSITION COMPRISING COPPER COMPOUND  
Yoshiaki Miki, Yokohama, and Tetsuhisa Ueda, Zushi, both of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Aug. 6, 1987, Ser. No. 82,346

Claims priority, application Japan, Aug. 7, 1986, 61-186066 Int. Cl.<sup>5</sup> A21N 59/20

U.S. Cl. 424—630

13 Claims

1. A deodorant composition comprising a mixture of a copper compound selected from the group consisting of inorganic acid salts of copper and complexes of copper, and oxocarboxylic acid compound having from 2 to 8 carbon atoms and at least one aldehyde or keto group and at least one carboxyl group in the molecule, the amount of oxocarboxylic acid compound in said mixture being from 0.2 to 100 moles, per mole of the copper ion in the copper compound.

4,956,184

TOPICAL TREATMENT OF GENITAL HERPES LESIONS  
Robert D. Kross, Beilwore, N.Y., assignor to Alcide Corporation, Norwalk, Conn.

Continuation-in-part of Ser. No. 190,798, May 6, 1988, abandoned. This application Jun. 3, 1988, Ser. No. 202,758 Int. Cl.<sup>5</sup> A61K 31/19

U.S. Cl. 424—661

5 Claims

1. A method for the topical treatment of genital herpes lesions comprising topically applying to a patient having the condition a pharmaceutically effective amount of a composition comprising a mixture of a first solution, cream, or gel consisting essentially of a chlorine dioxide liberating compound and a second solution, cream or gel consisting essentially of a protic acid, wherein the pK of the protic acid is from about 2.8 to about 4.2.

4,956,185

INSTANT YOGURT COMPOSITION AND PROCESS  
Stanley Cailgas, Toms River, N.J., assignor to Milpak Inc., Pine Brook, N.J.

Filed Apr. 26, 1989, Ser. No. 344,361

Int. Cl.<sup>5</sup> A23C 9/13

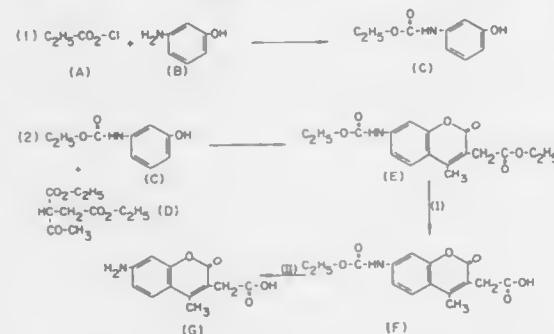
U.S. Cl. 426—43

8 Claims

1. A powdered yogurt formulation, which can be reconstituted into either a yogurt meal or a yogurt liquid drink, consisting essentially of:



about 10-45% by weight of dehydrated yogurt powder;  
about 0.001-1.0% by weight of a Lactobacillus culture;  
about 10-30% by weight of a whey; and



about 0.1-20% by weight of a mixture of locust bean gum  
and xanthan gum.

4,956,186

# PROCESS FOR THE PRODUCTION OF LOW CALORIE YOGURT

Paul J. Streiff, Camillus; David L. Hoyda, Baldwinsville, and  
Edward Epstein, Manlius, all of N.Y., assignors to Borden,  
Inc., Columbus, Ohio

Filed Oct. 25, 1989, Ser. No. 427,185

Int. Cl.<sup>5</sup> A23C 9/133, 9/137; A23L 1/236

U.S. Cl. 426-43

26 Claims

1. A process for preparing reduced calorie, essentially lactose free, artificially sweetened yogurt product comprising:

- concentrating skim milk by ultrafiltration whereby at least a portion of the lactose passes through into a permeate fraction and whereby the lactose level in a retentate fraction is decreased;
- adding a lactase enzyme to the retentate fraction of step (a);
- culturing the product of step (b) by adding a sufficient amount of a yogurt starter culture to the product, and allowing the mixture to incubate until the pH of the mixture is less than about 4.9;
- adding an artificial sweetener to the cultured mixture of step (c).

4,956,187

# PROCESS FOR PREPARING IRON ENRICHED FOOD PRODUCTS

Reisaburo Ishigaki, Numazu, Japan, assignor to Terumo Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP87/00249, § 371 Date Dec. 15, 1988, § 102(e)  
Date Dec. 15, 1988, PCT Pub. No. WO87/06103, PCT Pub.  
Date Oct. 22, 1987

PCT Filed Apr. 20, 1987, Ser. No. 269,179

Claims priority, application Japan, Apr. 19, 1986, 61-90899;  
Jan. 23, 1987, 62-13680

Int. Cl.<sup>5</sup> A23L 1/20, 1/214

U.S. Cl. 426-46

19 Claims

1. A process for the preparation of an iron enriched food product comprising the steps of:

- hydrolyzing a substrate comprising pulverized soybeans, pulverized carrots or a mixture thereof with an effective hydrolyzing amount of a saccharide decomposing enzyme at a temperature between 10° C. to 90° C. for a period between 10 minutes to 5 hours to form a hydrolyzate and
- inoculating said hydrolyzate with an effective amount of yeast for cultivation in the presence of an effective amount of an iron compound to enrich said food product at a temperature between 5° C. to 50° C. for a period between 30 minutes to 4 days to form a culture to prepare the desired food product.

# 4,956,188 COPPER COMPLEXES WITH ALPHA HYDROXY ORGANIC ACIDS AND THEIR USE AS NUTRITIONAL SUPPLEMENTS

Michael D. Anderson, Minnetonka, Minn., assignor to Zinpro Corporation, Chaska, Minn.

Division of Ser. No. 260,023, Oct. 20, 1988. This application  
Aug. 7, 1989, Ser. No. 390,404

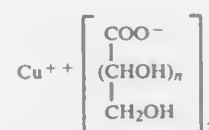
Int. Cl.<sup>5</sup> A23K 1/00

U.S. Cl. 426-74

2 Claims

1. A method of assuring adequate dietary requirement for growth and production of copper in a bioavailable form, comprising:

adding as a feed ration supplement to the animals' feed, a small but effective amount of a copper complex salt of the formula:



wherein n is from 1 to 5 to provide a dietary intake of copper of at least from about 0.2 parts per million to about 2.0 parts per million.

4,956,189

# POTATO CHIP PRECOOKING METHOD

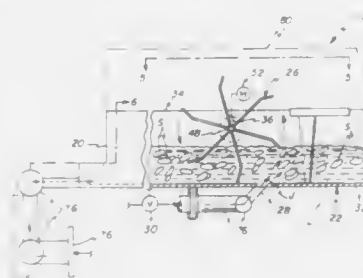
Norman B. Johnson, Dayton, Ohio, assignor to Mike-Sell's Potato Chip Co., Dayton, Ohio

Division of Ser. No. 164,934, Mar. 7, 1988, Pat. No. 4,867,049.  
This application Jan. 14, 1989, Ser. No. 366,563

Int. Cl.<sup>5</sup> A23L 1/217

U.S. Cl. 426-233

9 Claims



1. A method of precooking a food product, comprising the steps of:  
producing a moving stream of heated precooking liquid having a temperature within a desired range of 200 to 300 degrees F. at an upstream end of the stream;  
introducing thin slices of unwashed raw potatoes enveloped in natural starch coating into the upstream end of the precooking liquid stream;  
partially damming the precooking liquid stream and the potato slices carried therein by providing a plurality of paddle wheels rotatably mounted at multiple spaced apart sites along the stream in order to control the level of liquid therein and the degree of precooking of the slices therein; individually controlling the damming action of each of said paddle wheels by providing individual height adjustment of each paddle wheel relative to the level of the stream of liquid; and  
injecting heated precooking liquid into the stream adjacent to said spaced apart sites in order to maintain the temperature of said liquid within the desired range along the stream and concurrently to disperse and thereby prevent accumulation of the starch-coated potato slices at said

sites as a result of said partial damming of the stream at said sites.

4,956,190

# TEMPERING AND MILLING OF EDIBLE GRAINS AND LEGUMINOUS MATERIALS WITH REDUCING AGENTS AND METHODS OF MAKING ALIMENTARY PRODUCTS

Dhyaneswar B. Chawan, Liverpool; Carleton G. Merritt, Phoenix, both of N.Y., and Radwan H. Ibrahim, Crystal, Minn., assignors to Borden, Inc., Columbus, Ohio

Filed Apr. 24, 1989, Ser. No. 342,236

Int. Cl.<sup>5</sup> H23L 1/16, 1/272

U.S. Cl. 426-269

20 Claims

1. A method for producing an alimentary paste comprising:  
(a) tempering edible grains or leguminous material in the presence of a reducing agent selected from the group consisting of sulfhydryl substances, hydrogen sulfide, sulfur dioxide, cysteine, glutathione, and the alkali salts of sulfite, bisulfite, and metabisulfite; by contacting the grains or material with the reducing agent;
- (b) milling the tempered grains or material to produce a flour; and
- (c) mixing the flour with water to produce an alimentary paste.

4,956,191

# METHOD OF PREPARING A CARBONATED BEVERAGE CONTAINING ASPARTAME

Shinji Ueda, and Koichi Takizawa, both of Kawasaki, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Continuation of Ser. No. 30,386, Mar. 26, 1987, abandoned. This  
application Nov. 23, 1988, Ser. No. 275,603

Claims priority, application Japan, Apr. 1, 1986, 61-74834

Int. Cl.<sup>5</sup> A23L 2/40

U.S. Cl. 426-330.3

6 Claims

1. A method of retaining dissolved carbon dioxide gas in a packaged liquid carbonated beverage containing aspartame as a main sweetening component, the method comprising adding 5-50 mg/dl of a cold water-soluble natural gum selected from the group consisting of ghatti gum, gum arabic, guar gum, tamarind gum, xanthan gum, carrageenan gum and a combination thereof.

4,956,192

# PROCESS FOR OBTAINING NATURAL VANILLA FLAVOR BY TREATMENT OF GREEN VANILLA BEANS, AND THE FLAVOR OBTAINED

Gwenaele Ansaldi, Marseille; Gérard Gil, Aubagne, and Jean Le Petit, Allauch, all of France, assignors to Societe Nationale Elf Aquitaine, Courbevoie, France

Filed Aug. 3, 1989, Ser. No. 388,807

Claims priority, application France, Aug. 3, 1988, 88 10473

Int. Cl.<sup>5</sup> A23L 1/221

U.S. Cl. 426-425

3 Claims

1. A process for enhancing a natural vanilla flavor, comprising:  
freezing mature green vanilla beans at a temperature between -5° C. and -30° C.;  
thawing the frozen beans at a temperature from about 20° C. to about 60° C.; and then  
extracting the flavor constituents from the beans.

4,956,193

# EDIBLE PLASTIC DISPERSION

Frederick W. Cain, Voorburg, Netherlands; Allan H. Clark, Clampham, Great Britain; Patrick J. Dunphy, Wellingborough, Great Britain; Malcolm G. Jones, Stevington, Great Britain; Ian T. Norton, Rushden, Great Britain, and Simon B. Ross-Murphy, Bedford, Great Britain, assignors to Lever Brothers Company, New York, N.Y.

Filed Jul. 5, 1988, Ser. No. 215,009

Claims priority, application United Kingdom, Jul. 8, 1987,  
8716111

Int. Cl.<sup>5</sup> A23L 1/04

U.S. Cl. 426-573

15 Claims

1. Edible plastic dispersion not having a continuous fat phase, including at least condensed phases, at least one of which is continuous, which dispersion comprises

- 0.1 to 99 wt. % of gel forming composition (A) containing 1-8 times the critical concentration of a gelling agent (a) selected from the group consisting of gelatin, kappa-carrageenan, iota-carrageenan, alginate, agar, gellan, pectin and mixtures thereof; and
- 1-99.9 wt. % of gel-forming composition B containing 1-8 times the critical concentrations of a gelling agent (b) selected from the group consisting of gelling starch, denatured whey protein, denatured bovine serum protein, denatured soy protein, microcrystalline cellulose and mixture thereof.

4,956,194

# METHOD FOR ACCELERATING THE AGING OF DISTILLATES

Bart Gos, 43 Cass St., Springfield, Mass. 01104

Filed Feb. 21, 1990, Ser. No. 483,441

Int. Cl.<sup>5</sup> C12H 1/22

U.S. Cl. 426-592

16 Claims

1. A method of accelerating the aging of distillates in wooden barrels comprising the steps of:  
(a) adding a distillate to a wooden barrel;  
(b) adding an amount of tree bark in a sufficient quantity to accelerate the aging of said distillate; and  
(c) aging said mixture of distillate and oak bark for a period of time;  
(d) whereby said distillate after said aging step approximates the taste and quality of a distillate aged 10 to 12 years without an addition of a tree bark.

4,956,195

# HOP FLAVORS WHEREIN DELETERIOUS ODOR-FORMING IMPURITIES HAVE BEEN REMOVED

Paul H. Todd, Jr., James A. Guzinski, both of Kalamazoo, Mich., assignor to Kalamazoo Holdings, Inc., Kalamazoo, Mich.

Division of Ser. No. 34,917, Apr. 3, 1987, Pat. No. 4,778,691.

This application May 19, 1988, Ser. No. 196,145

Int. Cl.<sup>5</sup> C12C 9/02

U.S. Cl. 426-600

5 Claims

1. A flavoring agent selected from unreduced and reduced alpha acids and iso-alpha acids, which is essentially odor-causing-impurity free and which therefore has a more reproducible and acceptable flavor and aroma, produced by separation from an aqueous solution thereof containing undesirable odor-forming impurities at a pH above 4.

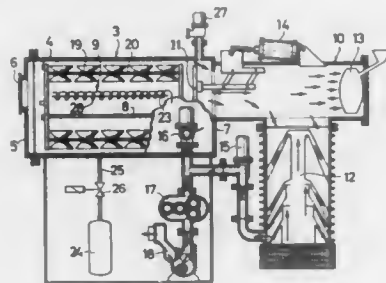
4,956,196  
METHOD FOR PRODUCING A  
CORROSION-RESISTANT COATING ON THE SURFACE  
OF LACQUERED WORKPIECES

Wolfgang Wagner, Neuberger, Klemens Ruebsam, Jossgrund; Helmut Kubik, Hesselroth; Stefan Heimrich, Bad Orb; Klaus Eckert, Hanau, and Werner Pflüger, Hammersbach, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany  
Continuation of Ser. No. 133,567, Dec. 16, 1987, abandoned.  
This application Jul. 14, 1989, Ser. No. 380,674  
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1987, 3731686

Int. Cl.<sup>5</sup> B05D 3/06

U.S. Cl. 427—38

4 Claims



1. A method for producing a corrosion-resistant coating of high reflectivity on the surface of a plastic reflector insert comprising placing in a vacuum chamber, which contains a flow discharge cathode and thermal evaporator, a plastic reflector insert, the exposed surface of which contains a first coat consisting of a protective lacquer which was applied prior to treatment in said vacuum chamber, evacuating said chamber and subjecting said exposed lacquered surface on said plastic reflector insert to an intensive glow discharge to physically clean the surface thereof and improve adhesion, applying a second coat of hexadimethylsilane polymer onto the lacquer surface comprising said first coat, said polymer being formed by means of a plasma formed by admitting monomer into said vacuum chamber from an external source, then further evacuating said chamber to a vacuum sufficient to achieve vapor deposition and thereupon, using said thermal evaporator, applying a third coat of aluminum metal onto the exposed surface of said hexadimethylsilane polymer second coat and thereafter applying a fourth coat of hexadimethylsilane polymer equal in composition to said second coating onto the surface of said aluminum metal third coat.

4,956,197  
PLASMA CONDITIONING OF A SUBSTRATE FOR  
ELECTROLESS PLATING

Suryadevara V. Babu, Potsdam, N.Y.; Neng-Hsing Lu, Berkeley Heights, N.J., and Gerald W. Jones, Johnson City, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 923,291, Oct. 27, 1986, abandoned.

This application Sep. 30, 1988, Ser. No. 253,321

Int. Cl.<sup>5</sup> C23C 18/04; B05D 3/06, 3/04

U.S. Cl. 427—39

15 Claims

1. A method for improving the retention of colloidal catalyst on at least one preconditioned surface having active sites of a dielectric substrate material for the electrodes plating of a conductive metal thereon wherein said dielectric substrate includes an epoxy having polar groups that are reactive with ammonia or amines which comprises exposing said preconditioned substrate to a gaseous plasma from a gas selected from the group of ammonia, organic amines, or mixtures thereof, and then activating the substrate by contacting it with a composition containing a colloidal catalyst to provide directly, or as a precursor leading to catalytic sites capable of electroless

plating, initiation of a conductive metal thereon whereby said exposing increases the retention of said colloidal catalytic sites on said at least one preconditioned surface.

4,956,198  
ULTRAVIOLET-CURABLE CATIONIC VINYL ETHER  
POLYURETHANE COATING COMPOSITIONS

Sami A. Shama, Hoffman Estates; Erwin S. Poklacki, Arlington Heights, and John M. Zimmerman, Hoffman Estates, all of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

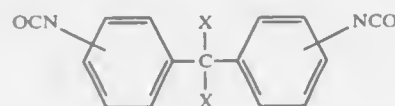
Filed Sep. 13, 1988, Ser. No. 243,794

Int. Cl.<sup>5</sup> B05D 3/06

U.S. Cl. 427—54.1

3 Claims

1. A method of coating a substrate comprising applying a film having a thickness of from 1 to 10 mils of a substantially hydroxy-free liquid, ultraviolet-curable composition comprising cationically polymerizable ethylenically unsaturated material including a vinyl ether terminated polyurethane which is the reaction product of a monohydric vinyl ether and an isocyanate-reactive polyol or polyamine selected from the group consisting of polycaprolactone glycol, poly(1,6-hexanediol carbonate), trimethylol propane and polyoxypropylene diamine and a diisocyanate having the formula:



in which X is an alkyl group containing from 1-4 carbon atoms or hydrogen and a cationic photoinitiator, and exposing said film to ultraviolet light to cure the same.

4,956,199  
METHOD OF MAKING ROOFING PLIES, INCLUDING  
METHOD OF APPLYING THE SAME TO A ROOF

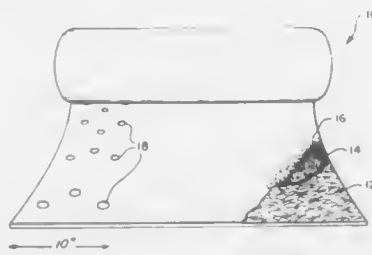
Santo J. Ruisi, 10 Dunton Ave., Deer Park, N.Y. 11729

Filed Sep. 7, 1989, Ser. No. 404,260

Int. Cl.<sup>5</sup> B05B 3/02

U.S. Cl. 427—173

7 Claims



1. A method for making a roofing sheet comprising providing a substantially endless length of fiberglass mat, feeding said mat through a punching die and punching a plurality of openings through said mat along the length of one side edge of said mat and extending toward the opposite side edge for about 1/4 of the width of the mat, saturating said mat with melted asphalt at a temperature of at least about 450 degrees F. while simultaneously mildly stretching said mat to impart an elastic memory to said mat, applying granular mineral material to said heated saturated mat, and cooling said saturated mat.

4,956,200  
TEXTURING A MOLD SURFACE

Paul Malkowski, Reisterstown, Md., assignor to The Burns & Russell Company, Baltimore, Md.

Filed Nov. 21, 1988, Ser. No. 273,921

Int. Cl.<sup>5</sup> B44D 1/20

U.S. Cl. 427—133

22 Claims

1. A method of making a mold with a textured mold surface comprising the steps of:  
coating a mold surface of the mold with a fusible inorganic enamel composition, then applying a particulate inorganic material to the unfused enamel composition coating, and heating the enamel composition to fix the particulate material in place thereon and to harden the enamel composition, then applying a second coating of inorganic enameling composition of thickness to the coated mold surface and particulate material so that the surface of the second coating reflects the texture of the hardened enamel composition with the particulate material fixed thereon.

4,956,201  
METHOD OF CREATING PASAGEWAYS IN NIOBIUM  
BY CVD OF NIOBIUM OVER SINTERED VANADIUM  
WHICH IS THEREAFTER LEACHED

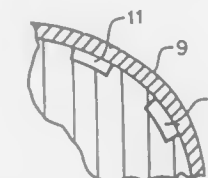
Vincent Frick, Sacramento, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 29, 1988, Ser. No. 213,065

Int. Cl.<sup>5</sup> B05D 7/22; C23C 16/06

U.S. Cl. 427—181

15 Claims



1. Method of producing a niobium component having passageways therein comprising the steps of:  
(a) providing a refractory metal niobium alloy member having slots formed within outer surface portions of said member;  
(b) inserting a paste of powdered vanadium into said slots;  
(c) sintering the powdered vanadium paste;  
(d) depositing by chemical vapor deposition a layer of niobium over the vanadium in said slots and over the outer surface portions of said member; and  
(e) removing the vanadium from said slots by leaching to produce said niobium component.

4,956,202  
FIRING AND MILLING METHOD FOR PRODUCING A  
MANGANESE ACTIVATED ZINC SILICATE PHOSPHOR

Anthony F. Kasenga, Towanda, Pa.; A. Gary Sigal, Lexington; Thomas E. Peters, Chelmsford, and Roger B. Hunt, Medfield, all of Mass., assignors to GTE Products Corporation, Danvers and GTE Laboratories Incorporated, Waltham, both of Mass.

Continuation-in-part of Ser. No. 288,660, Dec. 22, 1988, This application Oct. 27, 1989, Ser. No. 427,654

The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C09K 11/59

U.S. Cl. 427—215

14 Claims

1. A method for producing manganese activated zinc silicate phosphor particles wherein the individual phosphor particles are surrounded by a continuous, non-particulate, conformal aluminum oxide coating, said method comprising:  
dry blending a mixture of components consisting essentially of zinc oxide, silica acid, a source of manganese, ammo-

niun chloride, ammonium fluoride, tungstic oxide in an amount sufficient to improve phosphor maintenance in a fluorescent lamp, and silica, and having a Zn+Mn/Si mole ratio from about 1.95 to about 2.02, wherein said silica is colloidal and has a surface area of from about 50 to about 410 m<sup>2</sup> per gram, and wherein said colloidal silica makes up from about 0.01% to about 1.0% by weight of said mixture;

firing the resulting dry blend of components in a nitrogen atmosphere at a temperature of from about 1200° C. to about 1300° C. for a sufficient time to produce said phosphor particles;

milling the resulting phosphor particles for a period of time of from about 60 minutes to about 120 minutes;

firing the resulting milled phosphor particles in air at a temperature of from about 1175° C. to about 1275° C. for a sufficient time to diffuse the tungsten and manganese to the surfaces of the phosphor particles;

applying a continuous, non-particulate, conformal aluminum oxide coating to the outer surface of individual particles of the phosphor while said phosphor particles are suspended in a fluid bed having a midpoint temperature between 400° and 480° C., said aluminum oxide coating being formed by oxidation of trimethyl aluminum in a chemical vapor deposition reaction; and

annealing the aluminum oxide coated phosphor particles for a period of time from 4-16 hours at a temperature between 750° and 800° C.

4,956,203  
ELECTRICALLY CONDUCTIVE SILICONE  
COMPOSITIONS

Loretta N. Kronpa, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 221,841, Jul. 20, 1988, Pat. No. 4,929,391.

This application Nov. 20, 1989, Ser. No. 439,138

Int. Cl.<sup>5</sup> B05D 7/00

U.S. Cl. 427—221

7 Claims

1. A method of preparing an improved electrically conductive carbon particle comprising

(A) adding 100 parts by weight of inert solvent to a mixer, (B) admixing from 6 to 30 parts by weight per 100 parts by weight of the carbon particles of (C) of conductivity improver selected from the group consisting of disilazane of the formula (R<sub>3</sub>Si)<sub>2</sub>NH where R is a substituted or unsubstituted alkyl radical of from 1 to 6 carbon atoms, and hydroxyl endblocked polymethylphenylsiloxane having a viscosity of from 0.1 to 1.0 Pas at 25° C.,

(C) admixing from 3 to 40 parts by weight of conductive carbon particles, and

(D) drying and powdering the resulting hydrophobic carbon particles.

4,956,204  
PROCESS OF FORMING A FILM BY LOW PRESSURE  
CHEMICAL VAPOR DEPOSITION

Takao Amazawa, Atsugi, and Hiroaki Nakamura, Fujisawa, both of Japan, assignors to Nippon Telegraph and Telephone Corporation, Japan

Continuation of Ser. No. 84,513, Aug. 11, 1987, abandoned. This application Mar. 15, 1989, Ser. No. 324,983

Claims priority, application Japan, Aug. 15, 1986, 61-190494; May 15, 1987, 62-118147

Int. Cl.<sup>5</sup> C23C 16/00

U.S. Cl. 427—248.1

10 Claims

1. A chemical vapor deposition method comprising the steps of

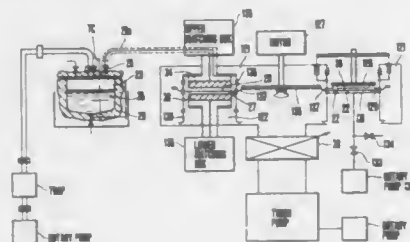
(a) spacing apart from a first heating block, but proximate to and in a closed space, a film deposition surface of a substrate, said heating block having a heating surface;

(b) maintaining the spacing of said deposition surface equi-



distant from the opposed surface of said first heating block;

(c) maintaining a temperature of said substrate within a temperature range higher than a deposition start temperature and lower than a temperature at which a thickness distribution occurs such that a thickness of a peripheral portion of said substrate is larger than that of a central portion of said substrate;



(d) guiding a source gas into said closed space and between said substrate and said heating surface; and

(e) depositing a thin film on said film deposition surface of said substrate by a thermal reaction of the source gas heated to a temperature higher than the temperature of said substrate.

4,956,205

#### METHOD OF IMPROVING WATER LUBRICITY OF CERAMICS

Yuji Enomoto, and Yuko Tsunai, both of Tsukuba, Japan, assignors to Agency of Industrial Science & Technology, Ministry of International Trade and Ministry of International Trade & Industry, both of Tokyo, Japan

Filed Mar. 28, 1989, Ser. No. 329,597

Claims priority, application Japan, May 19, 1988, 63-122850

Int. Cl.<sup>3</sup> B05D 3/12

U.S. Cl. 427—299 6 Claims

1. A method of improving the water lubricity of silicon nitride comprising the steps of:

causing friction of said silicon nitride in the presence of water, thereby forming silanol groups on surfaces undergoing the friction;

adding to said water a water-soluble silane coupling agent having alkoxy groups to hydrolyze said alkoxy groups into silanol groups; and

reacting said silanol groups produced by the hydrolysis of said alkoxy groups with said silanol groups formed on said surfaces, thereby forming a siloxane film having siloxane bonds on said surfaces.

4,956,206

#### RELEASE COMPOSITION

Nobuo Kaiya, and Shosaku Sasaki, both of Chiba, Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 311,314

Claims priority, application Japan, Feb. 18, 1988, 63-35569

Int. Cl.<sup>3</sup> B05D 3/02

U.S. Cl. 427—387 14 Claims

1. An adhesive release composition comprising:

(A) 100 weight parts of an oxyalkylene group-containing organopolysiloxane having at least 3 silicon-bonded alkenyl groups in each molecule, as expressed by the formula  $R^2(R^1R^3SiO)_x(R^1SiO)_ySiR^1_2R^2$ , wherein  $R^1$  is a monovalent hydrocarbon group;  $R^2$  is selected from the group consisting of the hydroxyl group, an  $R^1$  group, and an  $R^3$  group;  $R^3$  is a group having the formula  $-(R^4)_z-O-(R^5O)_nR^6$  wherein  $R^4$  and  $R^5$  are alkylene groups having 2 to 6 carbon atoms;  $R^6$  is the hydrogen atom or a monovalent organic group having 1 to 10 carbon atoms,  $a$  is one or zero,  $z$  has an average value of from 1 to 100; and  $x$  and  $y$  are greater than or equal to one,

with the provisos that  $y/x$  has an average value of 0.1 to 100 and  $(x+y)$  has an average value of at least 10;

(B) 0.5 to 20 weight parts of an organohydrogenpolysiloxane having at least 3 silicon-bonded hydrogen atoms in each molecule; and

(C) a catalytic quantity of a platinum group metal-containing catalyst.

4,956,207

#### BONDING METHOD EMPLOYING SPRAYABLE HOT MELT ADHESIVES FOR CASE AND CARTON SEALING

Thomas F. Kauffman, Easton, Pa., and Paul P. Puletti, Glen Gardner, N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Nov. 14, 1988, Ser. No. 270,151

Int. Cl.<sup>3</sup> B29D 22/00

U.S. Cl. 428—34.2 14 Claims

1. In a method for the bonding of a rigid cellulosic substrate to another rigid cellulosic substrate, the improvement which comprises utilizing as the adhesive therefore a sprayable hot melt adhesive composition comprising 25 to 50 weight percent of an isotactic thermoplastic polybutene-1/ethylene copolymer containing from about 5.5 to about 10% by weight ethylene; 20 to 60 percent of a tackifier; 15 to 30 percent of an amorphous diluent having a softening point greater than 90° C.; 0 to 2 percent antioxidant; and 0 to 10 percent wax or oil.

4,956,208

#### MANUFACTURE OF A QUARTZ GLASS VESSEL FOR THE GROWTH OF SINGLE CRYSTAL SEMICONDUCTOR

Akira Uchikawa; Atsushi Iwasaki, both of Takefu; Toshio Fukuoka, Sabae; Mitsuo Matsumura; Hiroshi Matsui, both of Takefu; Yasuhiko Sato, Annaka; Masaaki Aoyama, Kouriyama; Eiichi Shinomiya, Tokyo; Akira Fujinoki, Kouriyama, and Nobuyoshi Ogino, Musashino, all of Japan, assignors to Shin-Etsu Handotai Co., Ltd. and Shin-Etsu Quartz Products Co., Ltd., both of Tokyo, Japan

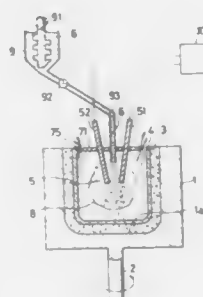
Division of Ser. No. 278,591, Dec. 1, 1988, Pat. No. 4,935,046

This application Jul. 6, 1989, Ser. No. 376,136

Claims priority, application Japan, Dec. 3, 1987, 62-304624; Dec. 3, 1987, 62-304625; Dec. 3, 1987, 62-304626

Int. Cl.<sup>3</sup> B32B 17/00, 17/06

U.S. Cl. 428—34.6 4 Claims



1. A quartz crucible including an opaque quartz glass outer layer containing bubbles of 20 to 250  $\mu$ m in diameter in a density not smaller than 20,000 per  $\text{cm}^2$ , and a transparent quartz glass inner layer of 0.3 mm to 3.0 mm in thickness which is integrally formed with said opaque layer and having a smooth inner surface, said transparent layer having no bubbles with a diameter greater than 50  $\mu$ m, and having less than 10 each per  $\text{cm}^2$  of bubbles with a diameter between 20 and 50  $\mu$ m.

4,956,209

#### ANTI-FOGGING MULTILAYERED FILM AND BAG PRODUCED THEREFROM FOR PACKAGING VEGETABLES AND FRUITS

Tsutomu Isaka, and Saburo Ohta, both of Inuyama, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 43,959, Apr. 29, 1987, Pat. No. 4,876,146.

This application Mar. 21, 1989, Ser. No. 326,892

Claims priority, application Japan, May 1, 1986, 61-101741; U.S. Cl. 428—36.5

Jul. 8, 1986, 61-160529; Jul. 8, 1986, 61-160530

Int. Cl.<sup>3</sup> B65D 30/02

U.S. Cl. 428—35.2

6 Claims



1. A bag for packaging vegetables and fruits, comprising front and rear walls formed of a biaxially oriented multi-layer anti-fogging film, the film comprising a base layer and at least one surface layer containing an anti-fogging agent, at least three peripheral sides of the front wall being connected to corresponding peripheral sides of the rear wall in such a manner that an anti-fogging heat sealable surface layer of the front wall faces an anti-fogging heat sealable surface layer of the rear wall, the film having a water vapor transmission of 15 to 200  $\text{g/m}^2 \cdot 24 \text{ hr} \cdot 40^\circ \text{C}$ , an oxygen permeability of 3,000 to 35,000  $\text{cc/m}^2 \cdot 24 \text{ hr} \cdot \text{atm} \cdot 20^\circ \text{C} \cdot 90\% \text{ RH}$ , and a carbon dioxide permeability of 12,000 to 130,000  $\text{cc/m}^2 \cdot 24 \text{ hr} \cdot \text{atm} \cdot 20^\circ \text{C} \cdot 90\% \text{ RH}$ , the anti-fogging surface layer having heat sealing properties such that the film shows a side welding seal strength of at least 3.0 kg-cm/15 mm when side welding is carried out at  $270^\circ \text{C}$ , and at least one surface of said film showing an anti-fogging property when exposed to two cycles of temperature rise and drop between  $20^\circ \text{C}$  and  $40^\circ \text{C}$ , the temperature rises and drops occurring at 6 hour intervals.

4,956,211

#### ELASTIC ROLLER AND A PROCESS FOR MANUFACTURING THE SAME

Shinji Saito, Shizuoka, Japan, assignor to Nitto Kogyo Co., Ltd., Tokyo, Japan

Filed Dec. 13, 1989, Ser. No. 450,189

Claims priority, application Japan, Dec. 20, 1988, 63-319575

Int. Cl.<sup>3</sup> B32B 3/26, 1/08

7 Claims



1. An elastic roller comprising: a roller core; and a foam silicone rubber layer wrapping around the roller core and having a skin layer fixedly coated with fine silicone resin powder.

4,956,212

#### PEELABLE BARRIER FILM FOR VACUUM SKIN PACKAGES AND THE LIKE

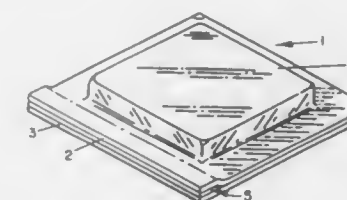
Solomon Bekele, Taylors, S.C., assignor to W. R. Grace & Co., Conn., Duncan, S.C.

Filed Nov. 17, 1988, Ser. No. 272,617

Int. Cl.<sup>3</sup> B32B 1/08

U.S. Cl. 428—36.6

6 Claims



1. A thermoformable web for vacuum skin packages and the like which is separable into permeable and impermeable films comprising:

(a) a sealant layer comprising a polymeric material selected from the group consisting of ULDPE, and ethylene vinyl acetate copolymer having a vinyl acetate content in the range of 4% to 15% by weight, said sealant layer being one surface layer;

(b) a core layer comprising a blend of ethylene vinyl acetate copolymer and ionomer, said core layer being adjacent to said sealant layer;

(c) an optical layer comprising ULDPE, said optical layer being adjacent said core layer;

(d) a first EVOH layer adjacent to said optical layer;

(e) a first tie layer comprising a modified polymeric adhesive, said tie layer being adjacent said first EVOH layer;

(f) a second EVOH layer adjacent said first tie layer;

(g) a second tie layer comprising a modified polymeric adhesive, said second tie layer being adjacent said second EVOH layer;

(h) a layer comprising a blend of EVA and ULDPE, said layer being adjacent said second tie layer; and

(i) a layer comprising HDPE adjacent said EVA layer, said layer being an outside layer.

4,956,210

#### FLEXIBLE FILM LAMINATES AND PACKAGING

John M. Hoyt, and Joseph Fischer, both of Cincinnati, Ohio, assignors to Quantum Chemical Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 856,084, Apr. 25, 1986,

abandoned, which is a continuation-in-part of Ser. No. 426,539,

Sep. 29, 1982, abandoned, which is a continuation of Ser. No.

140,510, Apr. 15, 1980, abandoned. This application Dec. 7,

1988, Ser. No. 281,115

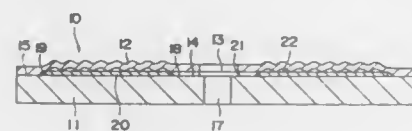
Int. Cl.<sup>3</sup> B29D 22/00; B32B 1/08

U.S. Cl. 428—35.3

14 Claims

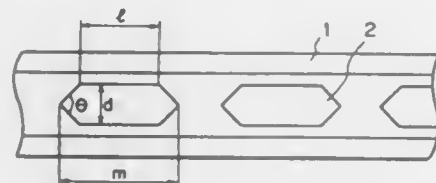
1. A flexible delamination-resistant structure which comprises at least an aluminum film adjacent a thermoplastic polymeric film having interposed therebetween an adhesive for said films consisting essentially of a partially hydrolyzed ethylene-vinyl acetate copolymer obtained from the hydrolysis of from about 60 to about 80 percent of the vinyl acetate groups of an ethylene-vinyl acetate copolymer containing from about 30 to about 60 percent by weight of interpolymerized vinyl acetate.

4,956,213  
INFORMATION RECORDING MEDIUM  
Toshiyuki Masuda, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Feb. 15, 1989, Ser. No. 310,937  
Claims priority, application Japan, Feb. 17, 1988, 63-34645; Feb. 22, 1988, 63-40354; Feb. 29, 1988, 63-46326  
Int. Cl.<sup>3</sup> B32B 3/02  
U.S. Cl. 428—64



1. An information recording medium comprising a disc-shaped resin substrate having a hole at its center, an inner-side non-recording zone around the periphery of said hole and an outer-side non-recording zone inside the outer periphery of the substrate, a recording layer which is provided on the substrate between the inner-side non-recording zone and the outer-side non-recording zone, and a disc-shaped flexible resin film which is arranged on the recording layer-side surface of the substrate, said resin film having a hole at its center and protruded and depressed portions on at least the surface facing the recording layer; wherein said substrate and said flexible resin film are joined to each other both on the outer-side non-recording zone and the inner-side non-recording zone through fusion by ultrasonic welding in such manner that at least one joining of the flexible resin film to the substrate on the outer-side non-recording zone and the inner-side non-recording zone is effected through a fused portion in the form of a discontinuous ring.

4,956,214  
INFORMATION RECORDING MEDIUM, PRODUCTION PROCESS AND MOLDING DIE FOR SUBSTRATE THEREFOR  
Hiroyuki Imataki, Mizuho Hiraoka, both of Kawasaki; Tomoyuki Tamura, Yokohama, and Tetsuya Satoh, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Jan. 25, 1989, Ser. No. 301,145  
Claims priority, application Japan, Jan. 25, 1988, 63-015237  
Int. Cl.<sup>3</sup> B32B 3/02  
U.S. Cl. 428—64



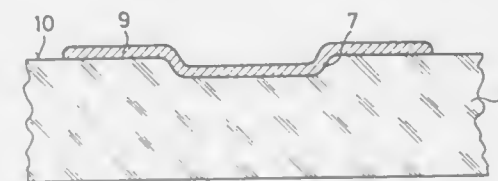
1. An information recording medium comprising a substrate having a prescribed unevenness pattern comprising a track and a plurality of information pits; said information pits having a planar shape of a polygon; and at least one diagonal of said polygon being substantially parallel to said track.

4,956,215  
OPTICAL RECORDING CARD AND METHOD OF PRODUCING THE SAME  
Minoru Fujita, and Yoichi Fukushima, both of Tokyo, Japan, assignors to Kyodo Printing Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 68,543, Jan. 29, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 302,039  
Claims priority, application Japan, Jul. 1, 1986, 61-154872; Jul. 1, 1986, 61-154873  
Int. Cl.<sup>3</sup> B32B 3/02  
U.S. Cl. 428—64



1. In an optical recording card including optical recording medium which is held between a card base and a light permeable protective layer, the improvement wherein said optical recording medium comprises a base film, an optical reflective film formed only on said base film and an optical information pattern layer having low optical reflectivity formed on said optical reflective film in direct surface contact, a locating of said reflective film between said base film and said pattern layer permitting use of a reading light beam incident upon said reflective film via said pattern layer; and wherein said card base is made of paper, a plate of synthetic resin selected from the group consisting of PVC, PET, polycarbonate or a plate of metallic material; said protective layer is constructed of plastic material having high light permeability selected from the group consisting of polycarbonate, acrylic resin, and epoxy resin; said base film is selected from the group consisting of polycarbonate, polyethyleneterephthalate, polyimide, polyamide, polysulfone, polyethersulfone, polyetherketone, polyetheretherketone or polyetherimide and has a thickness in the range of 5 microns to 1mm; said optical reflective film is constructed of a metallic material selected from the group consisting of Ni, Ti, Te, Bi, In, Pb, Sn, Sb, Zn, Se, Ga, Cd, Ag, Au, Cu, Cr, Al, or the like or their alloy material having a thickness in the range of 50 to 2000 Å or compound material comprising organic material and/or inorganic material selected from the group consisting of Te—C, Te—CS<sub>2</sub>, Bi—CS<sub>2</sub>, Te—telluride, Ag—gelatine or the like having a thickness in the range of 100 Å to 10 microns or multilayered film selected from the group consisting of Te—dyestuff, Te—nitrocellulose, metallic material film-dielectric material film having a thickness in the range of 100 Å to 10 microns or dyestuff film selected from the group consisting of cyanine dye, phthalocyanine dye, naphthoquinone dye having a thickness in the range of 100 Å to 10 microns or compound material comprising organic material selected from the group consisting of nitrocellulose, styrene, polyvinyl acetate (PVAc), gelatine and dyestuff or sub-oxide selected from the group consisting of TeOx, GeOx, SbOx, MoOx or layered material comprising metallic material and organic material selected from the group consisting of AuPt—(polystyrene, polymethylmethacrylate, polyvinylacetate), Al—teflon or the like or magnetic film material selected from the group consisting of MnCuBi, CdCo, TbCo, TbFe, GdTbFe, TbFeCo, having a thickness in the range of 100 Å to 5000 Å; and said optical information pattern layer is constructed of printing ink or coating material having lower light reflectivity than said optical reflective film, there being pits in said optical information pattern formed by etching or lift off.

4,956,216  
OPTICAL RECORDING MEDIUM  
Alfons Hausler, Obertshausen; Rainer Ludwig, Karlstein-Dettingen; Michael Geibler, Wächterbach, and Michael Jung, Kahl am Main, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany  
Filed Oct. 24, 1988, Ser. No. 261,766  
Claims priority, application Fed. Rep. of Germany, Jun. 3, 1988, 3818934  
Int. Cl.<sup>3</sup> B32B 3/00  
U.S. Cl. 428—64

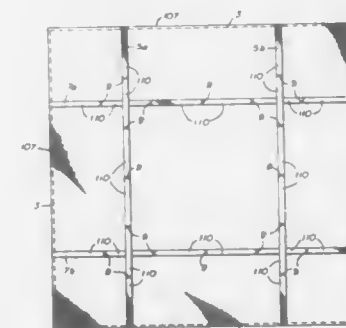


3. An optical recording medium comprising:  
a base material substrate having recording recesses on a surface thereof; and  
a light-reflecting layer adhering to said surface of the substrate and covering the recesses, said layer being formed of a combination of copper and beryllium and applied by means of cathode evaporation in a vacuum.

4,956,217  
SILICATE TREATED HONEYCOMB STRUCTURES  
Richard R. Heitkamp, Long Beach, Calif., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.  
Continuation of Ser. No. 901,355, Aug. 28, 1988, abandoned.  
This application Dec. 22, 1988, Ser. No. 290,820  
Int. Cl.<sup>3</sup> B32B 3/12  
U.S. Cl. 428—116

1. In a honeycomb-laminate composite structure comprising a cellular core and a facing sheet bonded to at least one face of the core, the improvement which provides flame retardant properties thereto comprising a cellular core substantially completely coated and/or impregnated with an effective fire retarding amount of a sodium silicate.

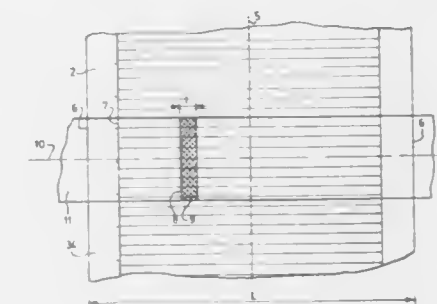
4,956,218  
FIRE PROTECTION BLANKET  
Michael L. Haining, 6731 Ashmore, Houston, Tex. 77069  
Filed Aug. 17, 1989, Ser. No. 395,075  
Int. Cl.<sup>3</sup> A62C 7/00  
U.S. Cl. 428—102



1. A fire protection structure comprising:  
(a) a flexible blanket of laminar construction having first and second fire resistant layers and a third insulating layer between said first and second layers;

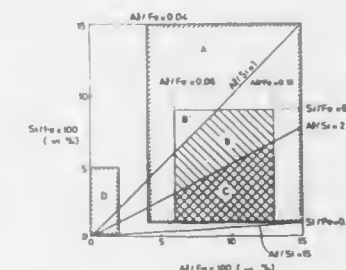
(b) first means for securing said layers together;  
(c) first and second pluralities of straps disposed in an array on at least one surface of said blanket; and  
(d) second means for securing each of said straps of said pluralities of straps to said surface.

4,956,219  
METHOD OF PRODUCING PERFORATIONS IN A SOLID MATERIAL IN SHEET FORM, AN IRRADIATION DEVICE FOR WORKING THE METHOD, AND THE RESULTING PERFORATED MATERIAL  
Roger Legras, Hannut, and Yves Jongen, Ohain, both of Belgium, assignors to Universite Catholique de Louvain, France  
PCT No. PCT/FR87/00089, § 371 Date Jan. 25, 1988, § 102(e) Date Jan. 25, 1988, PCT Pub. No. W087/05850, PCT Pub. Date Oct. 8, 1987  
PCT Filed Mar. 24, 1987, Ser. No. 130,223  
Claims priority, application France, Mar. 25, 1986, 86 04263  
Int. Cl.<sup>3</sup> B32B 3/00  
U.S. Cl. 428—137



1. A material comprising perforations produced by a method in which the material is first damaged through particle beam bombardment and after which damaged areas of the material are selectively attacked, the material comprising:  
a strip of thickness between a few microns and more than 100 microns; a width of between 5 cm and 150 cm; a perforation density of up to 10<sup>11</sup> per cm<sup>2</sup>; a perforation diameter of between 100 and 100,000 Angstroms.

4,956,220  
MAGNETIC RECORDING MEDIUM  
Toshinobu Sueyoshi, Kyoto; Seichi Asada, Osaka; Masahiro Amemiya, Takatsuki; Seigi Kawai, Ashiyashi, and Akira Miyake, Kyoto, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan  
Filed Mar. 20, 1987, Ser. No. 28,570  
Claims priority, application Japan, Mar. 20, 1986, 61-63169; Oct. 4, 1986, 61-236664  
Int. Cl.<sup>3</sup> G11B 23/00  
U.S. Cl. 428—141



1. A magnetic recording medium comprising a substrate and



a magnetic layer formed on said substrate, said magnetic layer including iron-containing magnetic powder dispersed in a binder, said powder comprising particles the surfaces of which are covered with both a compound containing aluminum and a compound containing silicon in such amounts that a weight ratio of silicon to iron is from 0.010:1 to 0.090:1, a weight ratio of aluminum to iron is from 0.060:1 to 0.130:1 and a weight ratio of aluminum to silicon is from 2:1 to 15:1.

4,956,221

# UV CURABLE CONFORMAL COATING WITH MOISTURE SHADOW CURE

Beth I. Gutek, Freeland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 118,086, Nov. 6, 1987, Pat. No. 4,824,875. This application Dec. 8, 1988, Ser. No. 281,304

Int. Cl.<sup>3</sup> B32B 3/10, 27/08; B05D 3/06

U.S. Cl. 428—142

3 Claims

1. In a method comprising coating a substrate populated with devices having geometry such that there are areas which are in shadows when light is directed onto the substrate, exposing the coated substrate with ultraviolet radiation and thereafter allowing the exposed substrate to further cure by the reaction of moisture at room temperature, where the improvement comprises using a coating of a composition comprising

(A) at least 20 weight percent based on the total weight of the composition of an acrylamide polydimethylsiloxane having acrylamide end groups bonded to silicon atoms through Si—C bonds and on the average at least 20 to less than 300 dimethylsiloxane units per molecule,

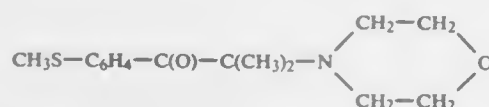
(B) at least 20 weight percent based on the total weight of the composition of a polydiorganosiloxane having end-groups containing both alkoxy groups and methacrylate groups where there are two alkoxy groups per endgroup bonded to silicon through an Si—O bond and one methacrylate group bonded to silicon through an Si—C bond and having on the average less than 350 diorganosiloxane units per molecule, said diorganosiloxane units being selected from dimethylsiloxane units, diphenylsiloxane units, and methylphenylsiloxane units wherein at least 50 percent of the organic groups of the diorganosiloxane units are methyl,

(C) at least 20 weight percent based on the total weight of the composition of a reactive diluent selected from the group consisting of isobornyl acrylate, cyclohexyl acrylate, and 2-ethylhexyl acrylate,

(D) from 0.5 to 10 weight percent based on the total weight of the composition of a photoinitiator combination in which there is at least 0.25 weight percent of based on the total weight of the composition



and at least 0.25 weight percent of based on the total weight of the composition



(E) from 0.1 to 2 weight percent based on the total weight of the composition of an amine selected from the group consisting of dimethylethanolamine and diisopropylethylamine, and

(F) from 0.05 to 1 weight percent based on the total weight of the composition of an organic titanate, where the composition has a viscosity at 25 degrees C. in the range of 0.07 to 0.2 Pa.s.

4,956,222

# FORMABLE VINYL CHLORIDE RESIN COMPOSITION FOR POWDER MOLDING AND METHOD FOR PRODUCING SAME

Isao Matsuura, Takatsuki; Akira Wakatsuki, Ibaraki, and Yuu Shida, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 27, 1988, Ser. No. 290,190

Claims priority, application Japan, Dec. 26, 1987, 62-331286 Int. Cl.<sup>3</sup> B05D 7/00; C08J 9/224

U.S. Cl. 428—212

4 Claims

1. A powdery foamable vinyl chloride resin composition for powder molding containing a foaming agent wherein said composition is produced by the following dry-blending method:

a first step wherein from 40 to 120 parts by weight of plasticizer is blended with 100 parts by weight of a granular vinyl chloride resin having an average particle diameter of from 50 to 200  $\mu\text{m}$  obtained by suspension polymerization or bulk polymerization to form first dry-blend particles; and after said first dry-blend particles have reached about 90° C. in the course of a temperature increase,

a second step wherein from 0.5 to 40 parts by weight of at least one polymer or copolymer having an active hydrogen in the molecule (component A) and from 0.1 to 10 parts by weight of a crosslinkable isocyanate compound (component B) are added and dry-blended to cover said first dry-blend particles with said components (A) and (B), thus forming second dry-blend particles; and while said second dry-blend particles are cooling after they have reached a maximum temperature,

a third step wherein from 3 to 25 parts by weight of a finely powdered vinyl chloride resin having an average unit particle diameter of 0.1 to 10  $\mu\text{m}$  and obtained by emulsion polymerization or micro-suspension polymerization is added to cover said second dry-blend particles, said foaming agent being added in said first step.

4,956,223

# RECORDING MEDIUM AND RECORDING METHOD UTILIZING THE SAME

Ryuichi Arai, Sagami-hara; Mamoru Sakaki, Atsugi, and Shin-ya Matsui, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

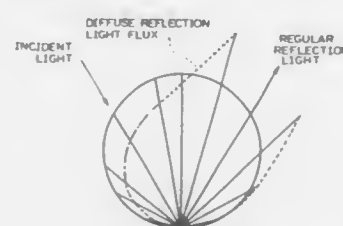
Continuation of Ser. No. 789,463, Oct. 21, 1985, abandoned.

This application Feb. 18, 1987, Ser. No. 17,035

Claims priority, application Japan, Oct. 23, 1984, 59-223715 Int. Cl.<sup>3</sup> B41M 5/00

U.S. Cl. 428—212

7 Claims



1. A recording medium having a directional diffuse reflection property comprising a substrate and an ink-receiving layer formed on the substrate, said directional diffuse reflection property resulting from said substrate being a film which contains a pigment causing directional diffuse reflection said pigment being selected from the group consisting of mica, pearl pigment and metal powder; said ink-receiving layer containing a pigment and resin at a ratio in the range from 0:1 to 1:10.

4,956,224

# ARTICLES PRODUCED FROM A LAMINATE AND PROCESS FOR THEIR MANUFACTURE

Jean-Paul Leca, Mantes la Jolie, France, assignor to Societe Chimique Des Charbonnages S.A., Paris, France  
PCT No. PCT/FR86/00373,  $\S$  371 Date Sep. 3, 1987,  $\S$  102(e)  
Date Sep. 3, 1987, PCT Pub. No. WO87/02622, PCT Pub. Date May 7, 1987

PCT Filed Nov. 4, 1986, Ser. No. 72,975

Claims priority, application France, Nov. 5, 1985, 85 16352

Int. Cl.<sup>3</sup> B32B 7/02

U.S. Cl. 428—213

13 Claims

1. A process for the manufacture of a complex shaped article comprising the steps of:

(a) hot coating a thermoplastic resin layer (A) with at least one adhesive layer (C), and

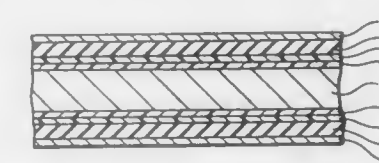
(b) subjecting the adhesive-coated layer (A) to a skeleton forming operation in a vacuum chamber using a complex-shaped layer (B) of fibre-reinforced heat-cured resin as a skeleton mould, the skeleton forming conditions being such that the ratio of the thickness of layer (B) to the thickness of layer (A) in the complex-shaped article produced is at least equal to 1.5.

2. An article produced from a laminate comprising:

at least one thermoplastic resin layer (A),  
at least one fibre-reinforced heat-cured resin layer (B), and  
at least one adhesive layer (C) intermediate between layers (A) and (B).

the article being of complex shape and having a ratio of the thickness of layer (B) to the thickness of layer (A) at least equal to 1.5 wherein said article is produced according to the process set forth in claim 1.

said rubber layer comprising nitrile rubber containing at least one of a flaky filler and an alkyl titanate; and  
a primer based on a phenolic resin bonding said rubber layer to said metal sheet.



2. A rubber-coated gasket as in claim 1, wherein said rubber layer has a thickness of 10–300 micrometers.

4,956,227

# LAMINATED STRUCTURE

Naoto Hirayama, Takarazuka; Yuichi Aoki, Ibaraki; Akio Takigawa, Nishinomiya; Motoaki Yoshida, Kawanishi, and Yasunori Shiraiishi, Kawasaki, all of Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Nov. 16, 1988, Ser. No. 271,889

Int. Cl.<sup>3</sup> B32B 27/36, 13/12, 27/38

U.S. Cl. 428—331

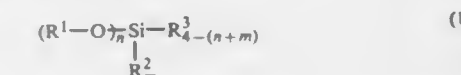
16 Claims

1. A laminated structure composed of  
(A) a layer comprising a polyester resin,  
(B) a layer comprising a cured (meth)acrylate polymer containing an epoxy group in the molecule, which is a copolymer of

(i) 1 to 100 mole % of an ester of an aliphatic alcohol having 1 to 6 carbon atoms and an epoxy group in the molecule, and (meth)acrylic acid, and

(ii) 99 to 0 mole % of an ester of an aliphatic alcohol having no epoxy group in the molecule and having 1 to 6 carbon atoms which may optionally have a substituent, and (meth)acrylic acid, and

(C) a layer comprising a cured organopolysiloxane compound and optionally particles of an inorganic compound, wherein the organopolysiloxane compound is a hydrolyzed and condensed product of a silicon compound represented by the formula



wherein  $\text{R}^1$  represents an alkyl or alkoxyalkyl group having 1 to 6 carbon atoms,  $\text{R}^2$  represents an alkyl group having 1 to 6 carbon atoms,  $\text{R}^3$  represents an alkyl group having 1 to 6 carbon atoms or a cycloalkyl group having 3 to 6 carbon atoms which may optionally be substituted by a substituent selected from the group consisting of an epoxy group, a glycidyloxy group, a (meth)acryloyl group, a vinyl group, an allyl group, a mercapto group, an epoxy-substituted cycloalkyl group, a halogen atom, an amino group and an amide group, n is 2, 3 or 4, and m is 0 or 1, provided that  $n+m \leq 4$ ; or a mixture of at least two of said hydrolyzed and condensed products, the layers (A), (B) and (C) being laminated in this sequence.

4,956,226

# RUBBER-COATED GASKET

Masaaki Ashizawa; Kazuo Nishimoto, both of Kanagawa, and Hiroshi Saito, Tokyo, all of Japan, assignors to Nichias Corporation, Tokyo, Japan

Filed Dec. 13, 1988, Ser. No. 283,867

Claims priority, application Japan, Dec. 14, 1987, 62-315643; Jul. 26, 1988, 63-185793

Int. Cl.<sup>3</sup> B32B 5/16, 15/08

U.S. Cl. 428—323

8 Claims

1. A rubber-coated gasket comprising:

a metal sheet;  
a rubber layer formed on at least one side of said metal sheet,

4,956,228

## DISMEMBERABLE ADHESIVE JUNCTION SYSTEM

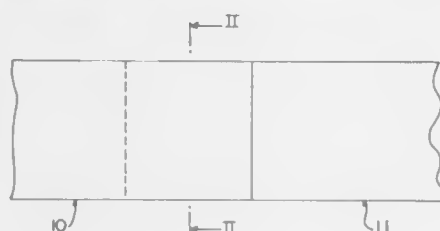
Piero R. Clerici, Milan, and Italo Casalegno, Merate, both of Italy, assignors to Ansonia S.p.A., Monza, Italy  
Continuation of Ser. No. 463,833, Feb. 4, 1983, Pat. No. 4,791,024. This application Oct. 25, 1988, Ser. No. 262,319  
Claims priority, application Italy, Feb. 4, 1982, 19444 A/82; Dec. 20, 1982, 24851 A/82

The portion of the term of this patent subsequent to Dec. 13, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> B32B 15/00

U.S. Cl. 428—336

26 Claims



1. In an adhesive fastening device in which two adhesive elements are provided for being repeatedly adhered together and releasably detached; an adhesive element comprising:

- (a) a carrier forming a base of the adhesive element;  
(b) an elastomeric material securely anchored to said carrier to form an adhesive layer having a face surface adherable only to a like face surface, said face surface having a relatively high adherence to said carrier and a relatively lower adherence to the like face surface of a like adhesive layer, whereby said adhesive layer releases from a like adhesive layer but not from said carrier upon detachment of the adhesive element from a like adhesive element, said detachment from a like adhesive element forming a renewed adhesive surface for subsequent readherence.

4,956,229

## MAGNETIC RECORDING MEDIUM

Tadashi Yasunaga; Akio Yanai; Koji Sasazawa, and Makoto Nagao, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

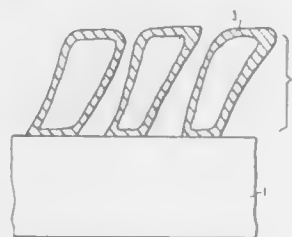
Filed Mar. 30, 1988, Ser. No. 175,466

Claims priority, application Japan, Mar. 30, 1987, 62-76589

Int. Cl.<sup>3</sup> G11B 23/00

U.S. Cl. 428—336

5 Claims



1. A durable, rust and scratch-resistant magnetic recording medium comprising a non-magnetic support having provided thereon a thin ferromagnetic film layer comprising iron oxide nitride, said thin ferromagnetic film being an aggregation of pillar particles of said iron oxide nitride and the content of nitrogen on the surface of each of said pillar particles being higher than that inside each of said pillar particles.

4,956,230

## INK RECEPTIVE TRANSPARENCY SHEET

Donald W. Edwards; Armin J. Paff, and Daniel C. Duan, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 37,528, Apr. 13, 1987, abandoned. This application Feb. 2, 1988, Ser. No. 153,486

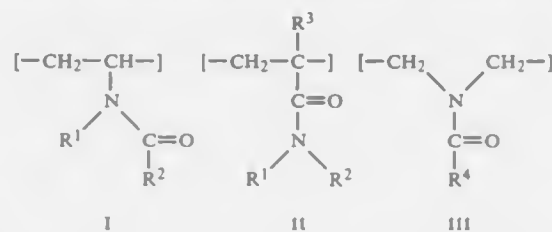
The portion of the term of this patent subsequent to Nov. 1, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> B41M 5/00

U.S. Cl. 428—341

19 Claims

1. Transparent sheet consisting of a polymeric backing bearing on at least one major surface thereof an ink receptive layer comprising a blend of at least one hydrophobic polymer substantially free of acidic functional groups, hydroxyl groups, >NH groups, and —NH<sub>2</sub> groups and at least one hydrophilic polymer containing carbonylamido groups, said carbonylamido groups selected from the group consisting of



where

R<sup>1</sup> and R<sup>2</sup> independently represent alkyl groups, or R<sup>1</sup> and R<sup>2</sup> together can be represented by (—CH<sub>2</sub>—)<sub>x</sub> where x is an integer from two to five, or R<sup>2</sup> can be hydrogen provided that it is bonded to a carbon atom, R<sup>3</sup> represents hydrogen or alkyl group having from one to six carbon atoms, and R<sup>4</sup> represents hydrogen or alkyl group, said layer capable of receiving aqueous-based inks.

4,956,231

## LAMINATED SHAPED ARTICLE/SILICONE TRANSFER ADHESIVE

Jacques Cavezzan, Villeurbanne, and Jean-Louis Di Martino, Saint-Jean de Bournay, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Aug. 12, 1988, Ser. No. 231,441

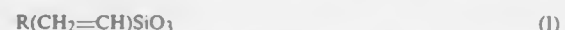
Claims priority, application France, Aug. 14, 1987, 87 11697

Int. Cl.<sup>3</sup> C09J 7/02; B32B 9/04, 9/06

U.S. Cl. 428—343

10 Claims

1. A peelable, laminated shaped article comprising (i) a flexible first substrate having a crosslinked nonstick silicone layer on at least one face surface thereof, which nonstick silicone layer comprises an organopolysiloxane composition crosslinked from an organic solvent solution thereof and said organopolysiloxane composition being free from MQ resin and (a) at least one organopolysiloxane comprising at least two SiVi groups per molecule, and (b) at least one organohydroxypolysiloxane comprising at least three SiH groups per molecule, with from 0.5 to 60% of the number SiVi groups in the composition being provided by a vinylated cyclotrisiloxane of the formula:



in which R is a C<sub>1</sub>–C<sub>4</sub> alkyl radical, a phenyl radical or a 3,3,3-trifluoropropyl radical, and (ii) a precured adhesive layer adhered onto at least one nonstick silicone layer, said adhesive comprising an organopolysiloxane devoid of organic peroxide and constituting the intercondensation product of an MQ resin with a polyalkylphenylsiloxane resin.

4,956,232

## MULTI-LAYER HEAT-SEALABLE POLYPROPYLENE FILMS

Ricardo Balloul, Fairport, N.Y.; Kevin M. Donovan, Milford, Conn., and Jay K. Keung, Macedon, N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 27, 1988, Ser. No. 290,131

Int. Cl.<sup>3</sup> C09J 7/02; B32B 27/08

U.S. Cl. 428—349

27 Claims

1. A heat-sealable multi-layer film structure consisting essentially of

- (A) an outer heat sealable layer coextensively adherent to the upper surface of core layer (B), said outer layer (A) being formed from a polymer composition (a) consisting essentially of heat sealable resin compounded with one or more slip additives which are incompatible with polypropylene,  
(B) a core layer derived from a polymer composition (b) consisting essentially of an isotactic polypropylene homopolymer compounded with one or more slip additives which are incompatible with polypropylene, and  
(C) an outer layer coextensively adherent to the lower surface of core layer (B), said outer layer (C) being formed from a polymer composition (c) consisting essentially of isotactic polypropylene homopolymer in the substantial absence of slip additives;

wherein the total amount of slip additive in said film structure is effective to provide the outer surface of outer layer (A) with a coefficient of friction sufficient for high speed heat sealing packaging operations but insufficient to cause substantial hazing of said structure.

4,956,233

## SLIP COATED THERMOPLASTIC FILMS

Shaw-Chang Chu, West Windsor, N.J.; Paul D. Heilman, Williamson, and Kevin A. Kirk, Macedon, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 292,138, Dec. 30, 1988. This

application Feb. 21, 1989, Ser. No. 312,271

Int. Cl.<sup>3</sup> C09J 7/02

U.S. Cl. 428—349

11 Claims

1. An oriented slip-coated film structure having a coefficient of friction varying from 0.15 to about 0.3 comprising a polypropylene film comprising (1) a relatively thin surface coating on at least one side of said film said coating being comprised of (a) an aqueous wax emulsion or dispersion (b) a minor amount of talc or, a synthetic amorphous silica gel, in an amount comprising from about 0 to about 1 weight percent based on the total weight of said wax, and (2) a relatively thick base layer of a thermoplastic resin selected from polypropylene homopolymer, polypropylene coextruded with ethylene-propylene copolymer on the uncoated side in single or multi-layer forms wherein said base layer has a melt index at 230° C. ranging from about 0.1 to 25, a crystalline melting point of about 160° C., a density ranging from about 0.90 to 0.91 and a number average Mw ranging from about 25,000 to 100,000.

4,956,234

## FOAMED PVC PNEUMATIC BALL

Jorge L. Morales, Guadalajara, Mexico, assignor to Industrias Salver, S.A. de C.V., Jalisco, Mexico

Filed Jan. 26, 1988, Ser. No. 148,529

Claims priority, application Mexico, Jan. 28, 1987, 5069

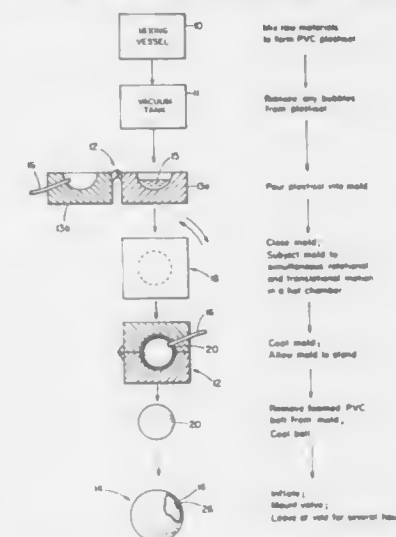
Int. Cl.<sup>3</sup> A63B 41/00; B29C 67/22

U.S. Cl. 428—36.5

4 Claims

1. A hollow, foamed PVC pneumatic ball, made in molds by a rotomolding process consisting of: pouring a PVC composition in the molds in an amount sufficient to obtain a finished ball with a suitable wall thickness; inserting in the molds, to provide for forming an opening intended for a valve, a PVC flexible hose; closing the molds and subjecting the same to a simultaneous rotational and translational movement within a hot chamber at a temperature of about 220° C. for about 4

minutes; cooling the molds to a temperature of about 75° C., and permitting them to stand for about 3 minutes; removing a foamed ball from the molds; inflating the foamed ball to a suitable air pressure to prevent deformation of the ball; and then permitting the ball to stand until the ball loses its elastic memory; the ball having a wall of uniform thickness with evenly distributed cells throughout the wall; the PVC composition comprising about 0.20 to 0.24% by weight of a foaming



agent; about 0.20 to 0.24% by weight of a zinc oxide; about 0.20 to 0.24% by weight of a dispersing and coloring agent; about 0.65 to 0.69% by weight of an epoxy resin; about 40.5% to 44.84% by weight of an emulsion resin; and about 50 to 57% by weight of a primary plasticizer; and the PVC composition being foamed simultaneously with the rotomolding process, the foaming being such that the ball has a soft and elastic consistency permitting inflation with the mouth using a straw inserted through a valve in the wall of the ball.

4,956,235

## CARBONACEOUS FIBER OR FIBER ASSEMBLY WITH INORGANIC COATING

Francis P. McCullough, Jr.; Steven L. Brewster, both of Lake Jackson; R. Vernon Snelgrove, Damon, all of Tex., and George C. Higgins, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

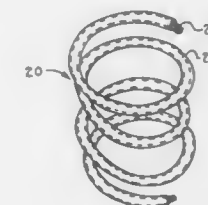
Division of Ser. No. 163,919, Mar. 4, 1988, Pat. No. 4,902,563.

This application Jan. 14, 1989, Ser. No. 366,809

Int. Cl.<sup>3</sup> B32B 9/00; D02G 3/00, 1/00

U.S. Cl. 428—368

10 Claims



1. An oxygen and thermally stable fiber or tow of fibers comprising a carbonaceous fiber or tow of fibers with a ceramic surface coating thereon, said carbonaceous fiber or tow of fibers comprising resilient shaped reforming elongatable non-linear non-flammable carbonaceous fiber or fibers, said fiber or fibers having a reversible deflection ratio of greater than 1.2:1 and an aspect ratio greater than 10:1.



4,956,236

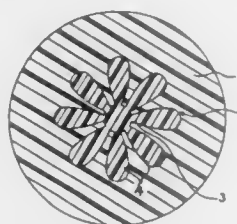
## UNORIENTED MONOFILAMENT WITH MULTILOBED CORE

Teh-Chuan Wang, Parkersburg, W. Va., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 92,386, Sep. 2, 1987, abandoned. This application Jul. 18, 1988, Ser. No. 220,221 Int. Cl.<sup>5</sup> D02G 3/00

U.S. Cl. 428—373

9 Claims



1. A coextruded, substantially unoriented, polymeric monofilament having a diameter of at least about 2.0 mm and having a sheath and a core, the sheath being in intimate contact with the core and having a substantially circular cross-section, and the core having a perimeter greater than that of the sheath, the core comprising a center and about from 4 to 14 lobes radiating from the center, the monofilament having a tensile strength of at least about 9,600 psi and a tensile modulus of at least about 85,000 at 80° C.

4,956,237

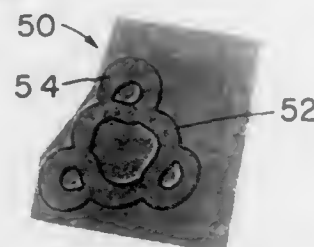
## HOLLOW FIBERS HAVING CURVED MEMBERS PROJECTING THEREFOR

Harry V. Samuelson, Chadds Ford, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 7/192,413, May 10, 1988, Pat. No. 4,850,847. This application Jan. 24, 1989, Ser. No. 300,910 Int. Cl.<sup>5</sup> D02G 3/00

U.S. Cl. 428—398

2 Claims



1. A hollow fiber having a plurality of spacing members projecting from its outer surface in curved directions therefrom.

2. The hollow fiber of claim 1 wherein said members project from a first location on the fiber surface in a curved direction to a second location on the fiber surface thereby forming additional hollow members on the surface of said hollow fiber.

4,956,238

## MANUFACTURE OF CUTTING STRUCTURES FOR ROTARY DRILL BITS

Nigel D. Griffin, Whitminster, England, assignor to Reed Tool Company Limited, Newtownabbey, Northern Ireland

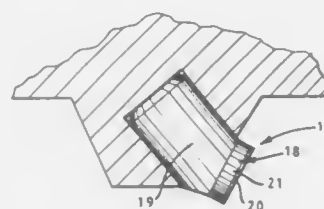
Filed Jun. 9, 1988, Ser. No. 204,688 Int. Cl.<sup>5</sup> B32B 9/00

U.S. Cl. 428—408

3 Claims

1. A cutting structure, for a rotary drill bit, comprising a preform cutting element having a front cutting face formed of superhard polycrystalline diamond material and a rear face bonded to a carbide carrier of less hard material, the cutting

element being bonded to the carrier by means of an alloy having the following composition:  
Ni about 30% to about 60%



Pd about 30% to about 62%  
Si about 3% to about 15%  
wherein % is weight percent.

4,956,239

## POLY-1,2-AZEPINE, METHOD OF PRODUCING A FILM OF SUCH A POLYMER ON A SUBSTRATE AND A SUBSTRATE PROVIDED WITH SUCH A POLYMER

Egbert W. Meijer; Franciscus C. B. M. Van Vroonhoven, and Jozef H. H. Nijhuis, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

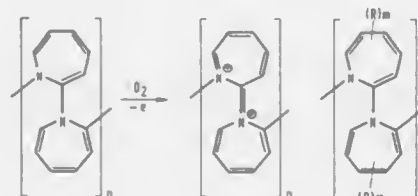
Filed Mar. 30, 1988, Ser. No. 175,070

Claims priority, application Netherlands, Apr. 27, 1987, 8700986

Int. Cl.<sup>5</sup> B05D 3/06; B32B 9/04

U.S. Cl. 428—411.1

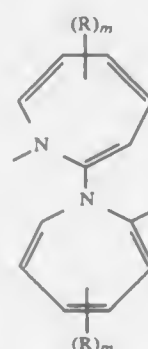
9 Claims



1. A method of producing a polymer film or a substrate which method comprises bringing a surface of a substrate into contact with a vapor of a substituted phenylazide substituted with from 1 to 4 substituents selected from the group consisting of alkyl, alkoxy, aryl, halogen and an electron-acceptor group, exposing said thus-coated substrate to UV light thereby causing said phenylazide to polymerize to form a film, of a corresponding poly-1,2-azepine.

6. A substrate provided with a polymer which is obtained by using a method as claimed in claim 1.

7. A poly-1,2-azepine having a repeating unit of the formula



wherein R is a substituent selected from the group consisting of

alkyl, alkoxy, aryl, halogen and an electron-acceptor group and m is 1, 2 or 3.

4,956,240

## USE OF POLYSILOXANES CONTAINING AMINO GROUPS AS ADDITIVES IN COATINGS FOR PLASTICS

John L. Williams; Reinhold Dederichs, both of Leverkusen; Ottfried Schlack, Cologne; Karl H. Käsler, Bergisch-Gladbach; Ulrich Grigo, Kempen, and Werner Nouvertne, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jan. 24, 1989, Ser. No. 301,205

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1988, 3803628

Int. Cl.<sup>5</sup> B32B 27/00

U.S. Cl. 428—423.7

22 Claims

1. A process for coating a plastic substrate which comprises applying to a plastic substrate a polyurethane coating composition comprising

- a polyurethane dissolved in an organic solvent and
- ii a polysiloxane containing amino groups in order to improve the levelling and wetting of said polyurethane coating composition on said plastic substrate.

4,956,241

## SLIP COATED THERMOPLASTIC FILMS

Shaw-Chang Chu, West Winsor, N.J.; Paul D. Heilman, Williamston, and Kevin A. Kirk, Macedon, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 30, 1988, Ser. No. 292,138

Int. Cl.<sup>5</sup> B32B 27/08

U.S. Cl. 428—516

14 Claims

1. An oriented slip-coated film structure comprising a polypropylene film comprising (1) a relatively thin surface coating on at least one side of said film composed of a slip coating consisting of (a) an aqueous wax emulsion or dispersion (b) an aqueous polymer emulsion or solution having a glass transition temperature between about 30°–100° C. and which comprises from about 0 to 50 weight percent based on the total weight of said wax emulsion and (c) a minor amount comprising from about 0 to about 1 weight percent based on the total weight of said wax of talc or synthetic amorphous silica gel, (2) a relatively thick base layer of a thermoplastic resin selected from polypropylene homopolymer, polypropylene coextruded with ethylene-propylene copolymer on the uncoated side or other suitable polyolefin in single or multi-layer forms wherein the base layer thereof has a melt index at 230° C. ranging from about 0.1 to 25, a crystalline melting point of about 160° C., a density ranging from about 0.90 to 0.91 and a number average Mw ranging from about 25,000 to 100,000.

4,956,242

## STEEL FOIL FOR DRAWING CONTAINER WITH ORGANIC FILM COAT

Keiichi Shimizu, Hikari; Junichi Tanabe, Yanai; Toshio Sugawara, Hikari; Tsuneo Ioui, Tokuyama, and Yoshikazu Kondo, Kudamatsu, all of Japan, assignors to Toyo Kohan Co., Ltd., Tokyo, Japan

Filed May 15, 1989, Ser. No. 352,007

Int. Cl.<sup>5</sup> C22C 38/04

U.S. Cl. 428—606

1 Claim

1. A steel foil for drawing a container with an organic film coat which is superior in drawability comprising:

- above 0.01% carbon and 0.06% and under carbon, 0.1 to 0.5% manganese, 0.01 to 0.10% aluminum and the balance of iron and inevitable impurities, and the foil having a crystal grain size which is 7.5 to 10 in grain size number (JIS G 0552) and the foil having a ratio of peak values of P(222) to P(200) in intensity of X-ray diffraction in a plane parallel to a sheet surface, i.e. a P(222)/P(200) ratio, which is larger than 0.6 and which has a yield strength of 20 to 45 kg/mm<sup>2</sup> and a thickness of 50 to 100 μm.

4,956,243

## OPTICAL MEMORY ELEMENT

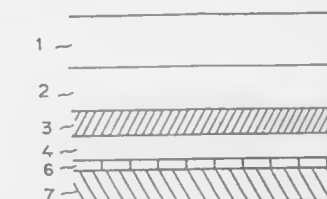
Tomoyuki Miyake, Tenri; Yoshiteru Murakami, Nishinomiyu; Hiroyuki Katayama, Ikoma; Akira Takahashi, and Kenji Ohta, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 30, 1987, Ser. No. 9,211

Claims priority, application Japan, Jan. 31, 1986, 61-20449 Int. Cl.<sup>5</sup> G11B 7/00

U.S. Cl. 428—694

13 Claims



1. A magneto-optical memory element comprising: a substrate; a magneto-optical recording medium film formed on said substrate; and a reflector film having first and second reflector layers, wherein said first reflector layer is formed on said recording medium and comprises a material of a higher optical reflectance in a relative sense than said second reflector layer, and wherein said second reflector layer is formed on said first reflector layer and comprises a material of a smaller thermal conductivity in a relative sense than said first reflector layer, and wherein said second reflector layer comprises a material of low thermal conductivity selected from the group consisting of Ni, Th, Ta, Pb, Zr, Bi, Te, Se and AlNi alloy.

4,956,244

## APPARATUS AND METHOD FOR REGENERATING ELECTROLYTE OF A REDOX FLOW BATTERY

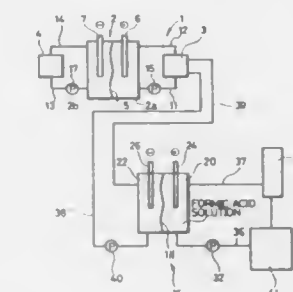
Masayuki Shimizu; Tsubuhiko Sakamoto, and Toshio Shigematsu, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd. and The Kansai Electric Power Co., Inc., both of Osaka, Japan

Filed Jun. 2, 1989, Ser. No. 360,321

Claims priority, application Japan, Jun. 3, 1988, 63-137674 Int. Cl.<sup>5</sup> H01M 8/06

U.S. Cl. 429—17

14 Claims



1. A battery system comprising a redox flow battery and a regenerating cell for regenerating an electrolyte of said redox flow battery, said regenerating cell (16), comprising: a negative electrolyte chamber (22) containing a positive electrolyte of said redox flow battery (1) introduced from a positive electrolyte tank (3) of said redox flow battery (1) through an inlet pipe, said negative electrolyte chamber (22) having a negative electrode (26) immersed in said positive electrolyte, a positive

electrolyte chamber (20) connected to said negative electrolyte chamber through a membrane (18), said positive electrolyte chamber containing a formic acid solution and having a positive electrode (24) immersed in said formic acid solution, voltage applying means for applying a voltage between said positive and negative electrodes (24, 26) to emit electrons from said formic acid solution for changing a portion of metal ions contained in said positive electrolyte and having a high valence state, to metal ions having a lower valence state, and an outlet pipe for returning, to said positive electrolyte tank, said positive electrolyte containing low valence state metal ions produced by an application of a voltage by said voltage applying means to said positive and negative electrodes (24, 26).

4,956,245

## FUEL CELL COOLING PLATE

Hiroshi Shimizu; Takashi Harada; Kaoru Kondoh, and Yoshiji Kobayashi, all of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

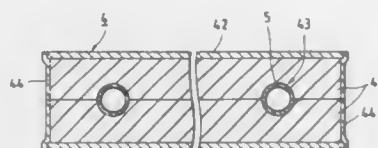
Filed Jan. 24, 1989, Ser. No. 300,983

Claims priority, application Japan, Feb. 4, 1988, 63-24801; Oct. 20, 1988, 63-264320

Int. Cl.<sup>5</sup> H01M 8/02

U.S. Cl. 429—26

4 Claims



1. A fuel cell cooling plate operative to eliminate waste heat generated by a fuel cell by permitting a cooling medium to flow therein, comprising:

an inner substrate layer, having top and bottom external planar surfaces substantially parallel to one another, and peripheral side surfaces between said top and bottom external surfaces, said inner substrate layer consisting of two plates of a plastic or low elastic first material with opposite parallel surfaces joined together, said first material including alternating adjacent sparse and dense regions, with a plurality of substantially parallel grooves chased into the sparse regions of the material therebetween;

outer substrate layers of a second material, connectably abutting said inner substrate layer at the top and bottom external surfaces, respectively;

a plurality of cylindrical hollow pipes disposed in said grooves with full circumferential contact between said pipes and the walls of said grooves, operative to carry said cooling medium; and

sealing means for enclosing the peripheral side surfaces of said inner substrate layer and preventing permeation of reacting gas into the inner substrate.

4,956,246

## ELECTROCHEMICAL STORAGE CELL

Alfred Kamuf, Walldorf, and Wolfgang Dörrscheidt, Helmstadt, both of Fed. Rep. of Germany, assignors to Asea Brown Boveri Aktiengesellschaft, Mannheim, Fed. Rep. of Germany

Filed Dec. 22, 1989, Ser. No. 455,305

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1988, 3843906

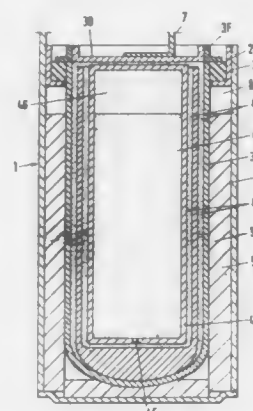
Int. Cl.<sup>5</sup> H01M 10/39

U.S. Cl. 429—104

5 Claims

1. Electrochemical storage cell based on sodium and sulphur, comprising an anode space, a cathode space, an alkali metal ion-conducting solid electrolyte separating said spaces from one another, a metallic housing at least regionally bounding said spaces, a sodium-filled cartridge being disposed in said

anode space and defining a sodium-filled gap between said cartridge and said solid electrolyte, and means for maintaining



a higher pressure level in said cathode space than in said anode space.

4,956,247

NONAQUEOUS ELECTROLYTE SECONDARY CELL  
Tadaaki Miyazaki, Higashiyama; Takao Ogino, and Takahiro Kawagoe, both of Tokorozawa, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

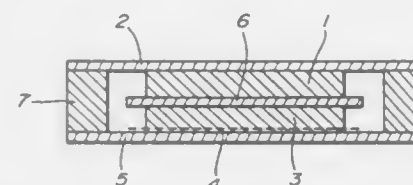
Filed Mar. 29, 1989, Ser. No. 330,268

Claims priority, application Japan, Apr. 7, 1988, 63-83996

Int. Cl.<sup>5</sup> H01M 10/40

U.S. Cl. 429—194

7 Claims



1. A nonaqueous electrolyte secondary cell comprising:  
a positive electrode of a metal oxide capable of occluding and releasing lithium ions,  
a negative electrode containing at least 80 mol% of metallic lithium, and  
a nonaqueous electrolyte solution containing lithium ions, wherein  
the positive electrode has a capacity per unit area of up to 7 mAh/cm², and a thickness of 50-250 microns.

4,956,248

## NON-AQUEOUS SECONDARY CELL

Nobuhiro Furukawa, Hirakata; Toshiyuki Nohma, Kadoma, and Yuji Yamamoto, Osaka, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Aug. 16, 1989, Ser. No. 394,442

Claims priority, application Japan, Aug. 25, 1988, 63-211933; Aug. 30, 1988, 63-215870

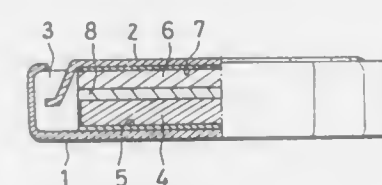
Int. Cl.<sup>5</sup> H01M 10/40, 4/50

U.S. Cl. 429—194

5 Claims

1. A non-aqueous secondary cell comprising a positive electrode, a negative electrode and a separator; characterized in

that an active material of the negative electrode is one of lithium and lithium alloy and that an active material of the



positive electrode is a compound obtained by heat-treating a mixture of manganese oxide, lithium salt and metal oxide.

4,956,249

## MASK STRUCTURE FOR LITHOGRAPHY

Hideo Kato; Hirohumi Shibata, both of Yokohama; Keiko Matsushita, Tokyo, and Osamu Takamatsu, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 910,309, Sep. 22, 1986, abandoned, which is a continuation of Ser. No. 652,190, Sep. 19, 1984, abandoned. This application Aug. 25, 1989, Ser. No. 398,309  
Claims priority, application Japan, Sep. 26, 1983, 58-177285; Sep. 26, 1983, 58-177286

Int. Cl.<sup>5</sup> G03F 1/00

U.S. Cl. 430—5

6 Claims



1. A mask structure for lithography comprising:  
(a) a base plate having a top flat end surface whose peripheral edge is non-planar so as to define a bonding surface; and  
(b) a masking-material-holding film spanning the top flat end surface and bonded only to the non-planar peripheral edge that defines the bonding surface, wherein said masking-material-holding film is formed from at least one material selected from the group consisting of silicon nitride, boron nitride and silicon oxide.

4,956,250

## AZULENIUM PHOTOCONDUCTOR FOR ELECTROPHOTOGRAPHY

Masami Kuroda; Yoshinobu Sugata, and Noboru Furusho, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

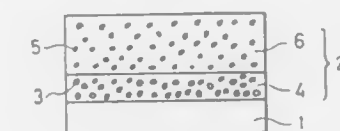
Filed Mar. 21, 1989, Ser. No. 326,800

Claims priority, application Japan, Mar. 23, 1988, 63-68907; Aug. 23, 1988, 63-209116

Int. Cl.<sup>5</sup> G03G 5/06, 5/14

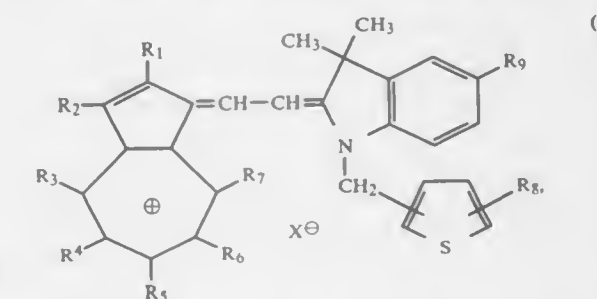
U.S. Cl. 430—58

9 Claims

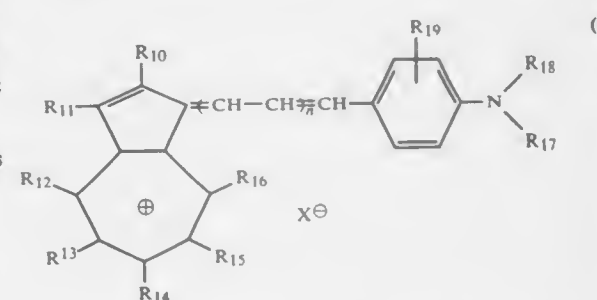


1. A photoconductor for electrophotography, comprising:  
an electroconductive substrate; and  
a photosensitive layer formed on said electroconductive substrate and including a charge generating substance and a charge transporting substance, said charge generating

substance comprising at least one azulonium compound represented by one of general formula (I) and (II):



wherein each of R<sub>1</sub> and R<sub>9</sub> is selected from the group consisting of a hydrogen atom, a halogen atom, an alkoxy group, a substituted or unsubstituted alkyl group, and a substituted or unsubstituted aryl group, and X<sup>⊖</sup> is an anion;



wherein each of R<sub>10</sub> to R<sub>16</sub> and R<sub>19</sub> is selected from the group consisting of a hydrogen atom, a halogen atom, an alkoxy group, and an alkyl group which may have a substituent(s), each of R<sub>17</sub> and R<sub>18</sub> is selected from the group consisting of an alkyl group, an aryl group, an alkenyl group, and an aralkyl group, each of which groups may have a substituent(s), and at least one of R<sub>17</sub> and R<sub>18</sub> is a phenyl group which may have a substituent(s), n is an integer and has a value of 0 or 1, and X<sup>⊖</sup> is an anion.

3. The photoconductor as claimed in claim 1, wherein said photosensitive layer comprises a laminate of a charge transporting layer, mainly composed of a charge transporting substance, and a charge generating layer including a compound selected from azulonium compounds represented by the general formula (I) or (II).

4,956,251

## MULTICOLOR HEAT-SENSITIVE RECORDING MATERIAL

Shintaro Washizu; Toshimasa Usami; Sumitaka Tatsuta, and Jun Yamaguchi, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 28, 1988, Ser. No. 174,306

Claims priority, application Japan, Mar. 27, 1987, 62-075409

Int. Cl.<sup>5</sup> G03C 7/00, 1/715, 1/52; B41M 5/34

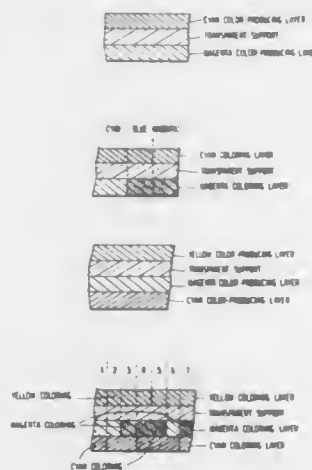
U.S. Cl. 430—138

6 Claims

1. A multicolor heat-sensitive recording material which comprises a transparent support having two or more of color-producing unit layers differing in hue of the produced color in such a situation that at least two of the unit layers of differing hue are provided on opposite sides of the support, wherein at least one color-producing layer is essentially transparent, the haze % as measured with HTR meter based on integral sphere method of each of said transparent color-producing layer is less than 40% and said transparent layer is prepared by coating a composition containing a combination of a photo-decomposable diazonium compound and a coupler or a combination of an electron donating dye precursor and a color developer as a



color former together with other additives; said combination being present in sufficient quantity within the respective layers to form a color image upon processing; at least said diazonium compound or electron donating dye precursor is enclosed in a microcapsule, on the other hand said coupler or color devel-



oper which exists in the composition with said microcapsule is dispersed in an emulsion obtained by dissolving said coupler or color developer into an organic solvent slightly soluble or insoluble in water then subjecting the resulting solution to an emulsifying dispersion treatment.

#### 4,956,252 AQUEOUS PROCESSIBLE PHOTOSENSITIVE COMPOSITIONS CONTAINING CORE SHELL MICROGELS

Michael Fryd, Moorestown, N.J.; Ernst Leberzammer, Glen Mills, Pa., and S. Andries R. Sebastian, East Windsor, N.J., assignors to E. I. duPont de Nemours and Company, Wilmington, Del.

Filed Aug. 30, 1988, Ser. No. 238,104  
Int. Cl.<sup>5</sup> G03C 1/68, 5/16

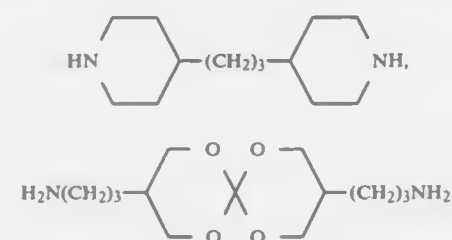
- U.S. Cl. 430—138 11 Claims
1. An aqueous processible solid photosensitive composition for relief printing plates comprising
    - (a) an addition photopolymerizable ethylenically unsaturated monomer;
    - (b) a photoinitiator or photoinitiating system activated by actinic light; and
    - (c) a core shell microgel binder; wherein the core shell microgel binder has two domains, a core having less than 10% crosslinking and an aqueous processible non-crosslinked outer shell consisting of an acid-modified copolymer, and further wherein the monomer partitions in the shell of the microgel.

4,956,253  
IMAGE-FORMING METHOD EMPLOYING  
IMAGE-RECEIVING MATERIAL  
Taku Nakamura, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Continuation-in-part of Ser. No. 165,060, Mar. 7, 1988, Pat. No. 4,885,227. This application Aug. 24, 1989, Ser. No. 397,928  
Claims priority, application Japan, Mar. 6, 1987, 62-51619  
The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> G03C 5/54

- U.S. Cl. 430—138 10 Claims
1. An image-forming method which comprises:
    - (a) image-wise exposing to light a light-sensitive material comprising a support and a light-sensitive layer containing a

photopolymerization initiator and a polymerizable compound; pressing the light-sensitive material on an image-receiving material comprising a support and an image-receiving layer to transfer the unpolymerized polymerizable compound to the image-receiving layer of the image-receiving material;

wherein the image-receiving layer contains a hardening agent being capable of polymerizing the polymerizable compound without necessity of external energy, said hardening agent being a compound selected from the group consisting of ethylenediamine, propylenediamine, 1,3-diamino-2-hydroxypropane, 1,3-trimethylenediamine, N,N'-dimethylethylenediamine, 1,4-diaminobutane, hexamethylenediamine, diethylenetriamine, triethylenetetraamine,



polyethylenimine, polyallylamine, poly-L-lysine, poly-L-ornithine, NaO<sub>2</sub>S—CH<sub>2</sub>CH=CHCH<sub>2</sub>SO<sub>2</sub>Na and an alkali metal salt of polyvinylbenzenesulfonic acid.

10. The image-forming method as claimed in claim 1, wherein the photopolymerization initiator and polymerizable compound are contained in microcapsules which are dispersed in the light-sensitive layer.

4,956,254  
IMAGE FORMING MATERIAL AND METHOD  
Shintaro Washizu, and Jun Yamaguchi, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Mar. 3, 1989, Ser. No. 318,301  
Claims priority, application Japan, Mar. 3, 1988, 63-50292  
Int. Cl.<sup>5</sup> G03C 1/727

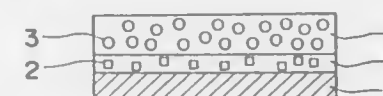
- U.S. Cl. 430—138 7 Claims
1. An image forming material comprising a support having thereon a microcapsule-containing layer, said layer consisting essentially of at least one organic boron compound anion salt of an organic cationic dye compound represented by formula (I):



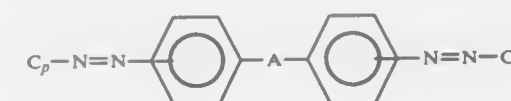
wherein D<sup>+</sup> represents a cationic dye and R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> each represents a group selected from an alkyl group, an aryl group, an aralkyl group, an alkaryl group, an alkenyl group, an alkynyl group, an alicyclic group, a heterocyclic group, an allyl group, and derivatives of these groups; or two or more of said R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> combine together to form a cyclic structure;

at least one compound capable of cleaving at least one carbon-boron bond; and a polymer to encapsulate a core material containing said organic boron compound anion salt of an organic cationic dye compounds, said organic boron compound anion salt being isolated from said compound capable of cleaving at least one carbon-boron bond by the walls of microcapsules, and said walls of the microcapsules being capable of increasing permeability thereof upon an increase in temperature.

4,956,255  
PHOTOSENSITIVE MEMBER  
Hildeaki Ueda, Azuchi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Filed Feb. 22, 1989, Ser. No. 313,469  
Claims priority, application Japan, Feb. 23, 1988, 63-40135  
Int. Cl.<sup>5</sup> G03G 5/047, 5/06  
U.S. Cl. 430—59 20 Claims



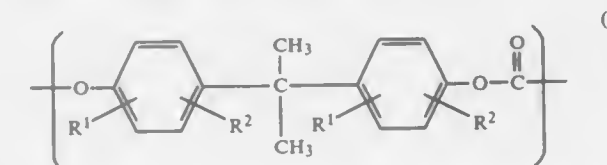
2. A photosensitive member with a photosensitive layer of function-divided type comprising a charge generating layer and a charge transporting layer on or over a electrically conductive substrate, wherein the charge generating layer comprises one or more than one of azo pigments represented by the general formula [I];



wherein A is a bivalent group selected from the group consisting of naphthalene ring, anthracene ring, fluorene ring, pyridine ring, pyridazine ring, quinoxaline ring, quinoline ring, phenanthrene ring, dihydroanthracene ring, pyrazine ring and pyrene ring wherein each of said rings may have a substituent; and Cp is a residual group of a coupler.

4,956,256  
PHOTOSENSITIVE MEMBER FOR  
ELECTROPHOTOGRAPHY  
Shigenori Ohtsuka, Omiya; Hiroshi Urabe, Kawasaki; Masahiro Nukui; Mamoru Nozomi, both of Machida, and Setsuko Sasakawa, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan  
Continuation-in-part of Ser. No. 23,708, Mar. 9, 1987, abandoned. This application Jun. 9, 1989, Ser. No. 364,251  
Claims priority, application Japan, Mar. 14, 1986, 61-56684; Dec. 12, 1986, 61-296184  
Int. Cl.<sup>5</sup> G03G 5/05 8 Claims

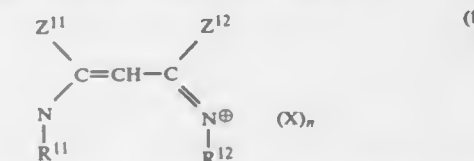
- U.S. Cl. 430—96 8 Claims
1. A photosensitive member for electrophotography comprising a photosensitive layer on a conductive substrate, said photosensitive layer containing as a binder resin a modified polycarbonate resin having the repeating structural unit represented by the following general formula (I):



wherein R<sup>1</sup> and R<sup>2</sup> are selected from a hydrogen atom, an alkyl group having 1-3 carbon atoms and a halogen atom, at least one of R<sup>1</sup> and R<sup>2</sup> being the alkyl group or the halogen atom.

4,956,257  
SILVER HALIDE PHOTOGRAPHIC MATERIAL AND  
METHOD FOR FORMING AN IMAGE  
Nobuaki Inoue, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Sep. 1, 1988, Ser. No. 239,377  
Claims priority, application Japan, Sep. 1, 1987, 62-218645  
Int. Cl.<sup>5</sup> G03C 1/16, 1/33 21 Claims

- U.S. Cl. 430—264 21 Claims
1. A negative silver halide photographic material comprising a support having thereon at least one chemically sensitized silver halide emulsion layer, at least one hydrophilic colloidal layer of the material containing a hydrazine derivative and a compound having substantially all absorption maxima outside the visible light region represented by formula (I):



wherein Z<sup>11</sup> and Z<sup>12</sup>, which may be the same or different, each represents a non-metallic atomic group necessary for completing a substituted or unsubstituted heterocyclic ring selected from benzoxazole, benzothiazole, benzoselenazole, naphthoxazole, naphthothiazole, naphthoselenazole, thiazole, thiazoline, oxazole, selenazole, selenazoline, pyridine, benzimidazole, and quinoline; R<sup>11</sup> and R<sup>12</sup>, which may be the same or different, each represents a substituted or unsubstituted alkyl group, provided that at least one of R<sup>11</sup> and R<sup>12</sup> is substituted with an acid group; X represents a counter ion required for charge balance; and n is 0 or 1.

4,956,258  
DRY TONER FOR DEVELOPING LATENT  
ELECTROSTATIC IMAGES WITH IMPROVED  
RESISTANCE TO TONER STAINING OF VINYL  
CHLORIDE PRODUCTS  
Yoichiro Watanabe, Fuji; Tetsuo Isoda, and Mitsuo Aoki, both of Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan  
Filed May 11, 1988, Ser. No. 192,724  
Claims priority, application Japan, May 13, 1987, 62-114721  
Int. Cl.<sup>5</sup> G03G 9/08, 9/10 3 Claims

- U.S. Cl. 430—109 3 Claims
1. A toner for developing latent electrostatic images comprising a coloring agent and a binder resin having a glass transition temperature of 50° C. to 70° C., said binder resin comprising a component selected from the group consisting of:
    - (a) ternary copolymers of styrene, methyl acrylate, and ethyl acrylate monomers or mixtures thereof;
    - (b) mixtures of a binary copolymer and a homopolymer or copolymer wherein the monomers of the binary copolymer and the monomer of the homopolymer or monomers of the copolymer are selected from the group consisting of styrene, methyl acrylate and ethyl acrylate monomers and wherein the monomer of the homopolymer or one monomer of the copolymer is different from the monomers of the binary copolymer; and
    - (c) mixtures of homopolymers of styrene, methyl acrylate and ethyl acrylate monomers.

4,956,259  
SPHERICAL ELECTROPHOTOGRAPHIC TONER  
PARTICLES COMPRISING CARBON AND  
PREPARATION THEREOF

Yoshitsugu Shirasaki, and Yoshiaki Torimoto, both of Waka-  
yama, Japan, assignors to Kao Corporation, Tokyo, Japan  
Filed Jul. 14, 1987, Ser. No. 73,266  
Claims priority, application Japan, Jul. 14, 1986, 61-165304  
Int. Cl.<sup>5</sup> G03G 9/08

U.S. Cl. 430—137

3 Claims

1. A process for preparing a toner composition containing substantially spherical particles, said spherical particles comprising a binder resin and, dispersed in said binder resin, carbon black having a number-average particle size of 20 to 500 millimicrons and a standard deviation of particle size distribution of 70 millimicrons or smaller, which comprises the steps of

- dispersing carbon black, a polymerization initiator, a charge controller and one or both of a hydrophobic dispersant and a binder resin in an unsaturated polymerizable monomer to obtain an oily phase,
- adding said resultant oily phase into water containing a dispersion stabilizer to obtain a dispersion,
- agitating the dispersion at a high rate,
- polymerizing the dispersion; and
- recovering the thus obtained toner particles.

4,956,260  
LIGHT-SENSITIVE MATERIAL CONTAINING SILVER  
HALIDE, REDUCING AGENT AND POLYMERIZABLE  
COMPOUND, AND IMAGE-FORMING METHOD  
EMPLOYING THE SAME

Kotchi Nakamura, Minami-ashigara, Japan, assignor to Fuji  
Photo Film Co., Ltd., Kanagawa, Japan  
Filed Dec. 29, 1986, Ser. No. 947,312

Claims priority, application Japan, Dec. 26, 1985, 60-294337;  
Dec. 26, 1985, 60-294338; Dec. 26, 1985, 60-294339; Dec. 26,  
1985, 60-294340

The portion of the term of this patent subsequent to May 23,  
2006, has been disclaimed.

Int. Cl.<sup>5</sup> G03C 1/68, 1/72

U.S. Cl. 430—138

19 Claims

1. A light-sensitive material comprising a light-sensitive layer provided on a support wherein the light-sensitive layer contains silver halide, a reducing agent, an ethylenically unsaturated polymerizable compound, and an additive compound selected from the group consisting of a 5- or 6-membered nitrogen-containing heterocyclic compound, thiourea, a thio-urea derivative, a thioether compound, polyethylene glycol and a polyethylene glycol derivative, wherein the silver halide, the polymerizable compound and the additive compound are present in the microcapsules which comprise a shell and a core and which are dispersed in the light-sensitive layer, the silver halide being in the shell of the microcapsules and the polymerizable compound and the additive compound being in the core of the microcapsules, and said polymerizable compound being present in an amount of 5 to 1.2×10<sup>5</sup> times by weight as much as the amount of the silver halide.

4,956,261  
PHOTOSENSITIVE DIAZO AND  
PHOTOPOLYMERIZABLE RECORDING MATERIAL  
WITH A PHOTOSENSITIVE DIAZO INTERMEDIATE  
LAYER

Georg Pawlowski, Wiesbaden, and Peter Lehmann, Kelkheim,  
both of Fed. Rep. of Germany, assignors to Hoechst Aktien-  
gesellschaft, Frankfurt am Main, Fed. Rep. of Germany  
Continuation of Ser. No. 135,311, Dec. 21, 1987, abandoned.

This application Sep. 6, 1989, Ser. No. 403,007

Claims priority, application Fed. Rep. of Germany, Dec. 23,  
1986, 3644160

Int. Cl.<sup>5</sup> G03F 7/021, 7/027; G03C 1/76

U.S. Cl. 430—156

17 Claims

1. A photosensitive copying material for use in a printing plate comprising:

- a layer base;
- a photosensitive intermediate layer on the layer base consisting essentially of an admixture of a photosensitive diazonium salt polycondensation product and a polymeric binder; and
- a photosensitive layer on the intermediate layer consisting essentially of an admixture of a photosensitive diazonium salt polycondensation product, a polymeric binder, a polymerization initiator which forms radicals when exposed to actinic radiation, and a polymerizable ethylenic unsaturated compound having a boiling point at atmospheric pressure of over 100° C.,

wherein the photosensitive diazonium salt polycondensation product in each said layer is present in said layer in an amount sufficient to substantially decrease the layer solubility on exposure to actinic radiation and comprises repeating A-N<sub>2</sub>Q and B units joined by intermediate links, which are derived from carbonyl compounds which can be condensed, and A comprises the radical of an aromatic diazonium compound which can be condensed with formaldehyde, Q is the anion of said diazonium compound, and B comprises the radical of a compound which is free of diazonium groups and can be condensed with formaldehyde,

wherein said polymeric binder is present in each said layer in an amount sufficient to improve the resistance of the exposed layers against printing wear and is insoluble in water and soluble or at least swellable in organic solvents and aqueous alkaline solvents,

wherein said photoinitiator is present in an amount sufficient to initiate polymerization of said polymerizable compound on exposure to actinic radiation, and wherein said polymerizable compound is present in an amount sufficient to form a polymerized product which decreases the solubility of said layers in combination with said photosensitive diazonium salt polycondensation product on exposure to actinic radiation.

4,956,262  
PHOTOSENSITIVE PRINTING PLATE FOR  
WATERLESS OFFSET PRINTING WITH  
PHOTOSENSITIVE LAYER OF DIAZONIUM SALT  
POLYCONDENSATION PRODUCT AND  
PHOTOPOLYMERIZABLE COMPOSITION AND  
OVERLYING SILICONE RUBBER LAYER

Hans-Joachim Schlosser, and Joachim Gersdorf, both of Wies-  
baden, Fed. Rep. of Germany, assignors to Hoechst Aktien-  
gesellschaft, Frankfurt am Main, Fed. Rep. of Germany  
Filed Nov. 14, 1988, Ser. No. 270,343

Claims priority, application Fed. Rep. of Germany, Nov. 16,  
1987, 3738863

Int. Cl.<sup>5</sup> G03F 7/021, 7/028, 7/032; G03C 1/76

U.S. Cl. 430—162

16 Claims

1. A photosensitive printing plate for waterless offset printing comprising:

- a support;
- a photosensitive layer comprising in admixture:

- a photosensitive diazonium salt polycondensation product comprising first recurring units and second recurring units that are linked by bivalent intermediate members derived from a carbonyl compound which is capable of condensation, said first recurring units being derived from aromatic diazonium salts which are capable of condensing with formaldehyde, and said second recurring units being derived from diazonium group-free compounds which are capable of condensing with formaldehyde, in an amount sufficient to substantially decrease the layer solubility on exposure to actinic radiation;
  - a free-radical polymerizable acrylate or methacrylate of a polyhydric alcohol in an amount sufficient to form a polymerized product which decreases the solubility of said layer in combination with said photosensitive diazonium salt polycondensation product on exposure to actinic radiation;
  - a polymerization initiator that forms free radicals under the action of actinic radiation in an amount sufficient to initiate polymerization of said polymerizable compound on exposure to said radiation; and
  - a polymeric binder in an amount sufficient to improve the resistance of the exposed layer against printing wear; and
- (c) an overlying, printing-ink repellent silicone rubber layer.

4,956,263  
SILVER HALIDE PHOTOGRAPHIC MATERIAL  
CONTAINING A COMPOUND CAPABLE OF  
RELEASING A DYE

Kunio Ishigaki, Kazunobu Katoh, Nobuaki Inoue, Hisashi  
Okada, Toshinao Ueki, Morio Yagihara, Yoshihiro Takagi,  
and Masakazu Yoneyama, all of Kanagawa, Japan, assignors  
to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Aug. 31, 1988, Ser. No. 238,796

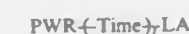
Claims priority, application Japan, Sep. 1, 1987, 62-218648;  
Sep. 4, 1987, 62-221283; Sep. 4, 1987, 62-221285; Dec. 18, 1987,  
62-320701; Jan. 18, 1988, 63-7856

Int. Cl.<sup>5</sup> G03C 1/10

U.S. Cl. 430—264

18 Claims

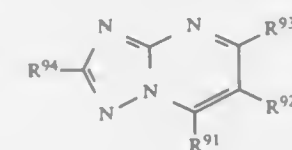
1. A silver halide photographic material comprising a support having thereon at least one silver halide emulsion layer, and containing in the silver halide emulsion layer or another hydrophilic colloid layer (i) a compound represented by formula (I)



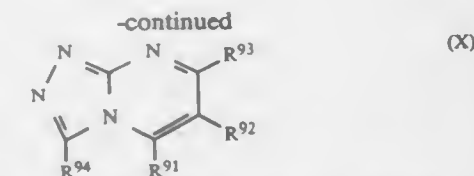
wherein PWR represents a group capable of releasing



upon being reduced; Time represents a group capable of releasing LA after being released from PWR, t is 0 or 1; and LA represents a group having an absorption maximum in the wavelength region longer than 310 nm, (ii) a hydrazine derivative, and (iii) at least one compound represented by formulae (IX) and (X)



(IX)



(X)

wherein R<sup>91</sup>, R<sup>92</sup>, R<sup>93</sup>, and R<sup>94</sup>, which may be the same or different, each represents hydrogen, an alkyl group, an aryl group, an amino group, a hydroxyl group, an alkoxy group, an alkylthio group, a carbamoyl group, a halogen atom, a cyano group, a carboxyl group, an alkoxycarbonyl group or a heterocyclic group and R<sup>91</sup> and R<sup>92</sup> or R<sup>92</sup> and R<sup>93</sup> may be linked to form a 5- or 6-membered ring; provided that at least one of R<sup>91</sup> and R<sup>93</sup> represents a hydroxyl group.

4,956,264  
RADIATION-POLYMERIZABLE MIXTURE  
Ulrich Geissler, Hochheim/Main; Hartmut Steppan, Wiesba-  
den, and Walter Herwig, Bad Soden am Taunus, all of Fed.  
Rep. of Germany, assignors to Hoechst Aktiengesellschaft,  
Frankfurt am Main, Fed. Rep. of Germany  
Filed Jan. 22, 1986, Ser. No. 820,782  
Claims priority, application Fed. Rep. of Germany, Nov. 15,  
1985, 3540480

Int. Cl.<sup>5</sup> G03C 1/16

U.S. Cl. 430—281

18 Claims

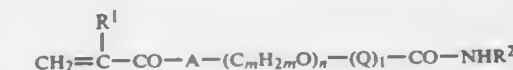
1. A radiation-polymerizable mixture, consisting essentially of:

- an amount of a polymeric binder selected from the group consisting of (i) a polymeric binder that is water-insoluble and soluble or at least swellable in aqueous-alkaline solutions, (ii) a polyacrylate and (iii) a polymethacrylate, said amount ranging from 25% to 75% by weight, based on the total weight of non-volatile constituents;
- from 25% to 75% by weight, based on the total weight of non-volatile constituents, of polymerizable material, comprising

- up to 95% by weight, based on the weight of polymerizable material, of a compound that is polymerizable by free radicals, that has a boiling point above 100° C. at atmospheric pressure, and that contains at least two ethylenically unsaturated polymerizable groups and
- from 5% to 100% by weight, based on the weight of polymerizable material, of an acrylic or alkacrylic acid derivative that is polymerizable by free radicals and that has a boiling point above about 100° C. at atmospheric pressure,

wherein the weight-percentages in (a) and (b) are based, respectively, on the total weight of non-volatile constituents; and

- from 0.01 to 10% by weight, based on the total weight of non-volatile constituents, of at least one initiator compound capable of initiating the polymerization of said acid derivative under the action of actinic radiation, wherein said acid derivative is represented by the formula:



wherein

A is O, NH, or N-alkyl,

Q is  $-\text{CO}-\text{C}_k\text{H}_{2k}-\text{Z}-$  or  $-\text{C}_k\text{H}_{2k}\text{O}-$ ,

Z is O or NH,

R<sup>1</sup> is H or alkyl,

R<sup>2</sup> is alkyl, alkenyl, cycloalkyl, aryl, aralkyl or SOT<sub>2</sub>R<sup>3</sup>,

R<sup>3</sup> is alkyl, alkenyl, cycloalkyl, aryl aralkyl or aryloxy,

k is a number from 3 to 20,

l is a number from 0 to 20,

m is a number from 2 to 20,

n is a number from 1 to 20, and



p is a number from 2 to 10.

4,956,265

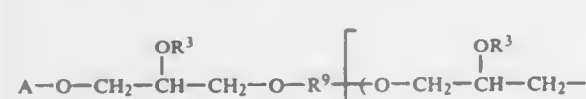
# RADIATION CROSSLINKABLE COMPOSITIONS

Thomas P. Klum, Aida F. Robbins, and M. Zaki Ali, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

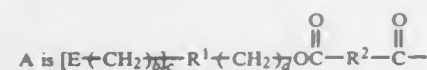
Division of Ser. No. 151,879, Feb. 3, 1988, Pat. No. 4,914,165. This application Jan. 22, 1990, Ser. No. 467,900

Int. Cl.<sup>5</sup> G03C 1/73; G03F 7/032; C08F 283/00; C08L 75/06 U.S. Cl. 430—283 16 Claims

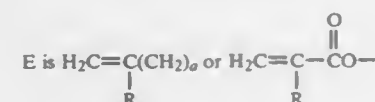
1. A photopolymerizable composition comprising  
1) a compound having a formula selected from the group consisting of Formulae I, III, IV, and V, wherein Formula I is:



wherein



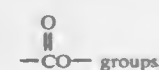
in which



in which

R is hydrogen, halogen, or methyl, and a is an integer of 1 to 6;

R<sup>1</sup> is a polyvalent aliphatic group having 1 to 15 carbon atoms and a valence of c+1, and optionally containing one or two catenary oxygen or



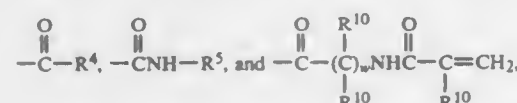
b is zero or an integer of 1 to 6,

c is an integer of 2 to 5,

d is zero or an integer of 1 to 6; and

R<sup>2</sup> is a divalent linear or branched saturated or unsaturated aliphatic group having 2 to 10 carbon atoms or a divalent arylene group having 6 to 10 carbon atoms;

R<sup>3</sup> is selected from the group consisting of hydrogen,



in which each R<sup>10</sup> is hydrogen or lower alkyl of 1 to 4 carbon atoms, and each R<sup>4</sup> and R<sup>5</sup> is independently an organic group selected from alkyl groups having 1 to 10 carbon atoms, ethylenically unsaturated groups having 2 to 10 carbon atoms, cycloalkyl groups having 5 to 7 ring carbon atoms and a total of 5 to 10 carbon atoms, and aryl groups having 6 to 10 carbon atoms, with the provision that 5 to 100 mole percent of all R<sup>3</sup> groups are



in which R<sup>4</sup> is substituted by

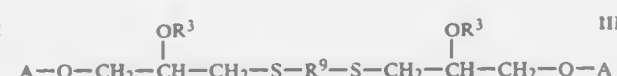


and w is 1 or 2;

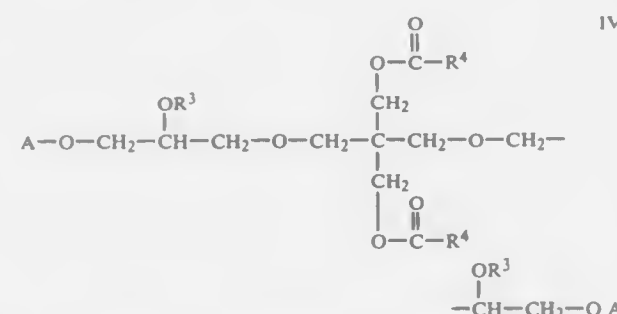
R<sup>6</sup> is a divalent organic group;

R<sup>9</sup> is R<sup>6</sup> or a polyvalent organic group having a valence of g+1, in which g is an integer having a value of 1 to 10, that is aliphatic, cycloaliphatic, or aromatic and having a weight average molecular weight of in the range of 28 to 1000, and

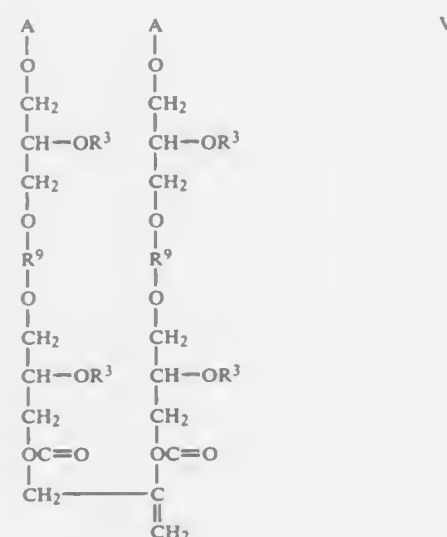
h is zero or a number having an average value of up to 20, with the proviso that when R<sup>9</sup> is not R<sup>6</sup>, then h is zero; Formula III is:



wherein A, R<sup>3</sup>, and R<sup>9</sup> are as previously defined; Formula IV is:



wherein A, R<sup>3</sup>, and R<sup>4</sup> are as previously defined; and Formula V is:



wherein A, R<sup>3</sup>, and R<sup>9</sup> are as previously defined,  
2) a binder resin, and  
3) a radiation sensitive system capable of initiating free radical polymerization.

4,956,266

# AROMATIC OLIGOMERS

Michael E. B. Jones, Chester, and John G. Carey, Appleton, both of England, assignors to Imperial Chemical Industries plc, London, England

Division of Ser. No. 733,920, May 14, 1985, Pat. No. 4,743,663. This application Feb. 5, 1988, Ser. No. 152,873

Claims priority, application United Kingdom, May 14, 1984, 8412264; Jan. 28, 1985, 8502040

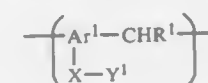
Int. Cl.<sup>5</sup> G03C 5/16, 5/00

U.S. Cl. 430—325 17 Claims

1. A process for the preparation of a photoresist which process comprises the steps of

(i) preparing a layer which comprises a composition comprising a photoinitiator system and an oligomer, which is linear or branched, which oligomer

(a) comprises on average at least one in-chain residue of the general formula



and;

(b) has one or more pendant and/or terminal acyloxymethyl groups, wherein the acyloxy group is derived from a polymerizable olefinically unsaturated carboxylic acid;

wherein Ar<sup>1</sup> is an aromatic group or a substituted aromatic group;

R<sup>1</sup> is hydrogen or a hydrocarbyl group;

X is a group which activates Ar<sup>1</sup> to electrophilic attack; and

Y<sup>1</sup> is an organic residue bearing a carboxyl substituent;

(ii) exposing the layer imagewise to suitable electromagnetic radiation; and

(iii) treating the layer with a dilute solution of base to remove the unexposed regions of the layer.

4,956,267

# METHOD FOR FORMING A DIRECT POSITIVE COLOR IMAGE

Shinji Ueda; Tatsuo Heki; Noriyuki Inoue; Takatoshi Ishikawa; Nobutaka Ohki; Morio Yagihara; Kiyoshi Morimoto; Hiroshi Fujimoto, and Kazuto Andoh, all of Minami-Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 172,818, Mar. 25, 1988, abandoned. This application May 31, 1988, Ser. No. 200,268

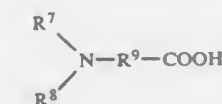
Claims priority, application Japan, Mar. 25, 1987, 62-71041; Mar. 26, 1987, 62-72573; Mar. 26, 1987, 62-72574

Int. Cl.<sup>5</sup> G03C 7/46

U.S. Cl. 430—372 10 Claims

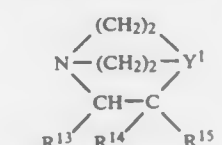
1. A method for forming a direct positive color image comprising image-wise exposing to light a light-sensitive material having at least one internal latent image type silver halide emulsion layer which is unfogged and at least one color image-forming coupler on a support; either (1) subjecting the resulting material to fogging exposure to light and/or processing it with a nucleating agent before development, and then developing the resulting material with a surface developing solution containing an aromatic primary amine type color developing agent, or (2) developing the material after the image-wise exposure with a surface developing solution containing an aromatic primary amine type color developing agent under fogging exposure and/or in the presence of a nucleating agent; and bleach-fixing the resulting material, wherein the color developing solution contains at least one compound selected from the group consisting of compounds represented by the following general formulae (III), (IV-a) and (IV-b) or a dimer or a polymer which are obtained by dimerizing or polymerizing the compound of the formulae (III), (IV-a) or (IV-b):

General formula (III)



wherein R<sup>7</sup> and R<sup>8</sup> each represent a hydrogen atom, or a substituted or unsubstituted alkyl group, R<sup>9</sup> represents a substituted or unsubstituted alkylene group, and sum of carbon number of R<sup>7</sup>, R<sup>8</sup> and R<sup>9</sup> is 3 or more;

General formula (IV-a)



wherein Y<sup>1</sup> represents —N or —CH, and R<sup>13</sup>, R<sup>14</sup> and R<sup>15</sup> each represent a hydrogen atom, a lower alkyl group, a hydroxy-substituted lower alkyl group, a hydroxyl group or an alkoxy group, and R<sup>14</sup> and R<sup>15</sup> may combine to form a carbonyl group; and

General formula (IV-b)



wherein Z<sup>1</sup> and Z<sup>2</sup> each represents a methylene chain having 2 to 8 carbon atoms necessary for forming a heterocycle, and Z<sup>1</sup> and Z<sup>2</sup> may each have one or more substituents thereon.

4,956,268

# BLEACH-FIXING SOLUTION CONCENTRATE COMPOSITION AND METHOD FOR PROCESSING SILVER HALIDE COLOR PHOTOGRAPHIC MATERIALS

Kiyoshi Nakazyo; Takatoshi Ishikawa, and Yoshikazu Fujita, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 26, 1989, Ser. No. 343,323

Claims priority, application Japan, Apr. 28, 1988, 63-105683

Int. Cl.<sup>5</sup> G03C 7/00, 7/02, 5/38

U.S. Cl. 430—393 14 Claims

1. A two-part bleach-fixing solution composition for a silver halide color photographic material comprising a first concentrate composition containing a reducing compound comprising a silver halide solvent and a preservative as main components; and a second concentrate composition having a pH of 1.5 or less, containing an oxidizing compound comprising a bleaching agent and an acid as main components.

4,956,269

# SILVER HALIDE COLOR PHOTOGRAPHIC MATERIALS

Hideo Ikeda, and Shigeru Ohno, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 27, 1989, Ser. No. 441,592

Claims priority, application Japan, Nov. 24, 1988, 63-296778

Int. Cl.<sup>5</sup> G03C 1/46

U.S. Cl. 430—505 10 Claims

1. A silver halide color photographic material comprising a support having thereon at least one red-sensitive silver halide emulsion layer, at least one green-sensitive silver halide emulsion layer and at least one blue-sensitive silver halide emulsion layer, wherein each of the green-sensitive silver halide emulsion layer, the red-sensitive silver halide emulsion layer and the

blue-sensitive silver halide emulsion layer contains at least one color image forming coupler, and wherein 50% or more of the total projected area of the silver halide grains in at least one of the emulsion layers comprises tabular silver halide grains having a thickness of less than 0.5  $\mu\text{m}$ , a diameter of 0.6  $\mu\text{m}$  or more and an average aspect ratio of 3 or more, and the red-sensitive emulsion layer and/or the green-sensitive emulsion layer contains a dye in an amount sufficient to reduce the sensitivity thereof by 20% or more based on the sensitivity of the red-sensitive emulsion layer and/or the green-sensitive emulsion layer containing no dye, the dry film thickness from the photosensitive emulsion layer that is farthest from the support to the photosensitive emulsion layer that is nearest the support is 16.0  $\mu\text{m}$  or less and the swelling ratio of the silver halide color photographic material, excluding the support and any hydrophilic layers coated on the support on the opposite side of the photosensitive silver halide emulsion layers, is 1.25 or more.

4,956,270

# SILVER HALIDE PHOTOGRAPHIC MATERIAL HAVING IMPROVED ANTISTATIC AND ANTIBLOCKING PROPERTIES

Noriki Tachibana; Eichi Ueda; Nobuaki Kagawa, and Hideo Ota, all of Tokyo, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 46,163, May 5, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 318,417

Claims priority, application Japan, May 6, 1986, 61-103534; May 7, 1986, 61-104371

Int. Cl.<sup>3</sup> G03C 1/94

U.S. Cl. 430—527

13 Claims

1. A silver halide photographic element comprising: a support; a silver halide emulsion layer on said support; and at least one hydrophilic colloidal layer hardened with a hardening agent on said silver halide emulsion layer,

wherein said hardening agent is present in an amount ranging from 0.0005 to 0.05 equivalents per 100 g of hydrophilic colloid, has a number average molecular weight of at least 3,000 and contains at least two hardening groups in the same molecule, said hardening groups selected from the group consisting of aldehyde, epoxy, active halide, active vinyl and active ester groups,

said colloidal layer comprising at least one of (i) an organic fluoro-compound present in an amount ranging from 0.1 to 2,000 mg/m<sup>2</sup> of the photographic element and (ii) a nonionic surfactant having at least one polyoxyethylene unit, said nonionic surfactant being present in an amount ranging from 1.0 to 1,000 mg/m<sup>2</sup> of the photographic element, and the ratio of organic fluoro-compound to nonionic surfactant, when used in combination, ranging from 0.001 to 1.0,

and wherein said hardening agent, said organic fluoro-compound and said nonionic surfactant are each different from each other.

4,956,271

# MATERIAL TREATMENT

Philip G. Milone, Burlington, Mass., assignor to Wolverine Corporation, Merrimac, Mass.

Filed Jul. 5, 1989, Ser. No. 375,814

Int. Cl.<sup>3</sup> F27B 9/28

U.S. Cl. 432—59

25 Claims

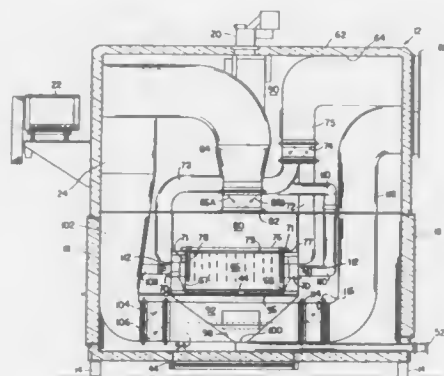
15. A multimode system for thermal treatment of particulate material comprising structure defining a series of particle treatment zones,

perforate conveyor structure for supporting the particulate material to be thermally treated disposed for movement through said series of treatment zones,

each said housing structure further including structure defining a first distribution plenum disposed above said treatment zone and an array of nozzle tubes extending downwardly from said first distribution plenum into said treatment zone to flow conditioned gas through said nozzle

tubes with substantial velocity into said treatment zone for thermal treatment of particulate material being transported by said conveyor structure through said treatment zone, and structure defining a second distribution plenum disposed below said treatment zone for pressurizing the region below said treatment zone and flowing conditioned gas upward through said conveyor structure for treating particulate material on said conveyor,

conditioning gas circuit structure connected to said first and second distribution plenum structures,



control structures in said conditioning gas circuit structure for controlling distribution of gas through said first and second distribution plenum structures and discharge therefrom into said treatment zone to selectively provide different modes of particulate product treatment in said series of treatment zones,

and

air blast structure and vacuum structure coupled to said second distribution plenum for removing debris from said conveyor and from said second distribution plenum.

4,956,272

# ORGANOGERMANIUM CONTAINING SOLUTION FOR WASHING AND STORING SEPARATED ORGANS

Norihiro Kakimoto, Machida; Kazuo Kumano, Yamato, and Kunie Nakamura, Sagamihara, all of Japan, assignors to Asai Germanium Research Institute Co., Ltd., Tokyo, Japan

Filed Oct. 24, 1988, Ser. No. 261,628

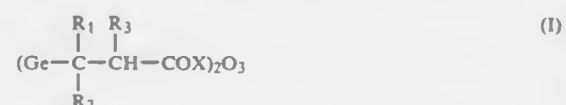
Claims priority, application Japan, Oct. 29, 1987, 62-273745

Int. Cl.<sup>3</sup> A01N 1/02

U.S. Cl. 435—1

16 Claims

1. A solution for washing and storing separated organs, said solution comprising a hypertonic electrolyte solution and an effective washing and storing amount of an organogermanium compound represented by the formula (I):



wherein R<sub>1</sub> to R<sub>3</sub> are each a hydrogen atom, a lower alkyl group which may be the same or different, or a substituted or unsubstituted phenyl group, and X is a hydroxyl group, an O-lower alkyl group, an amino group or O-Y<sup>+</sup> wherein Y is a metal or a basic group-containing compound.

4,956,273

# SYNTHETIC PEPTIDES AND METHOD OF USE FOR DIAGNOSIS AND VACCINATION FOR AIDS AND ARC

Ronald C. Kennedy, San Antonio; Gordon R. Dreesman, Helotes, both of Tex., and Myron Essex, N. Easton, Mass., assignors to Southwest Foundation For Biomedical Research, San Antonio, Tex. and President and Fellows of Harvard College, Cambridge, Mass.

Continuation of Ser. No. 203,609, Jun. 2, 1988, abandoned, which is a continuation of Ser. No. 790,830, Oct. 24, 1985, abandoned. This application Mar. 28, 1989, Ser. No. 331,052

Int. Cl.<sup>3</sup> G01N 33/569; A61K 39/12; C07K 7/08, 7/10

U.S. Cl. 435—5

8 Claims



1. A synthetic peptide having the following amino acid sequence: asn-a-thr-leu-b-gln-ile-c-d-lys-leu-arg-glu-gln-phe-gly-asn-asn-lys; where a is asn or ala; b is lys or glu; c is asp, val or ala; and d is ser or lys.

8. A method for the detection of antibodies against the viral causative agents of AIDS comprising contacting a synthetic peptide as claimed in any one of claims 1-5 with a sample suspected of containing said antibodies and using the binding affinity of the synthetic peptide to detect said antibodies.

4,956,274

# REAGENT STABILIZATION IN ENZYME-DONOR AND ACCEPTOR ASSAY

Pyare L. Khanna, Fremont; Robert Dworschack, Antioch, and Phillip Ruprecht, Albany, all of Calif., assignors to Microgenics Corporation, Concord, Calif.

Filed Apr. 6, 1987, Ser. No. 34,757

Int. Cl.<sup>3</sup> G01N 33/53; C12N 9/96

U.S. Cl. 435—7

10 Claims

1. In a specific binding assay for an analyte utilizing enzyme complementation, wherein a detectable signal is generated upon the reassociation of beta-galactosidase peptide fragments in a reaction mixture to form active enzymes wherein the improvement comprises:

(a) storing a beta-galactosidase peptide fragment in a storage medium containing an ionic surfactant or a surfactant derived from a sugar residue in an amount sufficient to stabilize said beta-galactosidase peptide fragment against storage loss of complementation activity; and

(b) adding a cyclodextrin to said storage medium in an amount sufficient to clathrate said ionic surfactant or said surfactant derived from a sugar residue after said storing but prior to using said fragments in said specific binding assay.

4,956,275

# MIGRATORY DETECTION IMMUNOASSAY

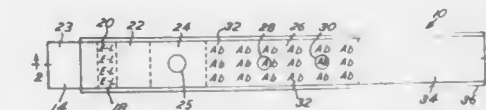
Robert F. Zak, Burlingame; Richard D. Armenta, Sunnyvale, and Jonathan Briggs, Los Altos Hills, all of Calif., assignors to Molecular Devices Corporation, Palo Alto, Calif.

Filed Apr. 14, 1987, Ser. No. 38,294

Int. Cl.<sup>3</sup> G01N 33/535, 33/538, 33/543; C12M 1/40

U.S. Cl. 435—7

30 Claims



1. A method for determining the presence of an analyte in a sample suspected of containing said analyte, said method employing a strip device capable of providing capillary transport and comprising at least four regions: in the direction of eluent migration (1) a reagent region displaced from a first end of said strip device, containing a reagent consisting of a labeled specific binding member diffusibly bound to said strip, (2) a first detection region comprising a bound complementary specific binding member of said labeled specific binding member, said complementary specific binding member being capable of specifically binding (3) a sample region for receiving said sample; and (4) a second detection region comprising the bound complementary specific binding member of said labeled specific binding member wherein said second detection region may extend from said reagent region into any reservoir region; with the proviso that said sample region and said second detection region may overlap, said method employing a signal producing system capable of producing a detectable signal at said second detection region and comprising said labeled specific binding member; said method comprising

adding said sample to said sample region; immersing said first end in an eluent to provide a moving liquid phase through said strip, whereby said eluent migrates through said strip carrying said labeled specific binding member and, when sample is outside said detection region, carrying sample into said detection region, and distributing said labeled specific binding member within at least one measurement site in said second detection region in relation to the amount of analyte in said sample, wherein there are at least two spatially separated measurement sites; and

determining the amount of bound labeled specific binding member by means of said signal producing system at said measurement sites as compared to a sample having a known amount of analyte, where the relationship between the amounts at the different sites is compared to the relationship obtained with a sample having a known amount of analyte.

4,956,276

# ANALYTICAL METHOD OF DETERMINING A REDUCED CO-ENZYME

Iqbal Siddiqi, Geneva, Switzerland, and Jean Brochet, Saint Julien en Genevois, France, assignors to Battelle Memorial Institute, Geneva, Switzerland

PCT No. PCT/CH86/00032, § 371 Date Nov. 13, 1986, § 102(e) Date Nov. 13, 1986, PCT Pub. No. WO86/05517, PCT Pub. Date Sep. 25, 1986

PCT Filed Mar. 10, 1986, Ser. No. 939,123

Claims priority, application Switzerland, Mar. 15, 1985, 1165/85

Int. Cl.<sup>3</sup> C12Q 1/58, 1/54, 1/32, 1/28

U.S. Cl. 435—12

10 Claims

1. An analytical method of determining a nicotinamide co-enzyme selected from the group consisting of NADH, NADPH and APADH wherein the co-enzyme is reacted in a reaction medium with a fluorinated-ring aromatic compound



selected from the group consisting of 2-, 3- and 4-fluorophenol, tetrafluorophenol, pentafluorophenol and 4-fluoro-aniline in the presence of oxygen and a substance having peroxidase activity, this reaction resulting in the formation of fluoride ions which are determined, the rate at which the ions are formed being quantitatively linked to the original quantity of co-enzyme to be determined.

4,956,277

**PHOTOCONDUCTOR COMPRISING CHARGE TRANSPORTING HYDRAZONE COMPOUNDS**  
Masami Kuroda; Youichi Nakamura, and Noboru Furusho, all of Kawasaki, Japan, assignors to Fujl Electric Co., Ltd., Kanagawa, Japan

Filed Dec. 7, 1988, Ser. No. 281,029

Claims priority, application Japan, Dec. 9, 1987, 62-311310; Dec. 16, 1987, 62-317770; Dec. 22, 1987, 62-326230; Dec. 22, 1987, 62-326228; Dec. 28, 1987, 62-332364; Dec. 28, 1987, 62-332370; Dec. 28, 1987, 62-332371

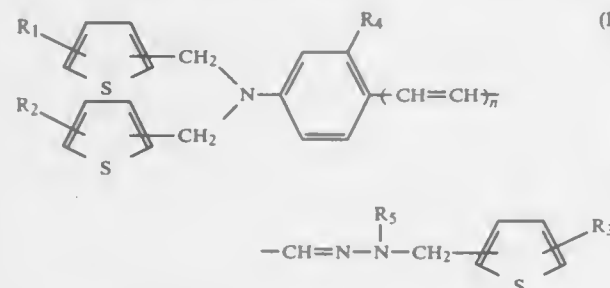
Int. Cl.<sup>5</sup> G03G 5/10

U.S. Cl. 430—58

21 Claims

1. An electrophotographically photosensitive material, comprising:

a photosensitive layer containing a charge transporting substance comprising at least one hydrogen compound represented by general formula (I):



wherein each of R<sub>1</sub>, and R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is selected from the group consisting of a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, a hydroxy group, an allyl group, a nitro group, an aryl group, and an amino group, both of which aryl group and amino group may have a substituent(s); R<sub>5</sub> is an aryl group which may have a substituent(s); and n is an integer and has a value of 0 or 1.

4,956,278

**ANAPLASMA MARGINALE ANTIGEN, ANTIGEN COMPOSITIONS, VACCINE AND PROCESS FOR THE PRODUCTION OF SAID ANTIGEN, ANTIGEN COMPOSITIONS AND VACCINE**

Lewis T. Hart; Donald G. Luther, and William J. Todd, all of Baton Rouge, La., assignors to Louisiana State University, Baton Rouge, La.

Filed Feb. 23, 1988, Ser. No. 159,394

Int. Cl.<sup>5</sup> C12Q 1/24; C12P 21/00; C12N 1/00; C07K 3/12  
U.S. Cl. 435—30

10 Claims

1. A process for obtaining from *Anaplasma marginale* infected erythrocytes, and leukocytes, *Anaplasma marginale* sufficiently pure for use in a vaccine which, on injection, is effective in protecting the vaccinee against anaplasmosis and does not induce neonatal isocerytholysis in offspring of the vaccinee which comprises

selectively lysing the erythrocytes of the *Anaplasma marginale* infected erythrocytes with a lysing agent, without lysing the leukocytes, concentrating the *Anaplasma marginale* and lysed erythrocytes, while separating leukocytes therefrom, subjecting the concentrate of *Anaplasma marginale* and erythrocytes, from which the leukocytes have been sepa-

rated, to fractionation under pressure to release therefrom *Anaplasma marginale* initial bodies, concentrating the *Anaplasma marginale* initial bodies by centrifugation over a density cushion so that the *Anaplasma marginale* initial bodies become concentrated in a band adjacent said density cushion, harvesting the *Anaplasma marginale* initial bodies, and washing the *Anaplasma marginale* initial bodies to obtain substantially pure *Anaplasma marginale*.

4,956,279

**BIOTRANSFORMATION OF L-TYROSINE AND L-PHENYLALANINE TO 2,5-DIHYDROXYPHENYLACETIC ACID**

Ramunas Bigelis, Elkhart, and Kathleen A. Black, Bristol, both of Ind., assignors to Miles Inc., Elkhart, Ind.

Continuation of Ser. No. 172,770, Mar. 28, 1988, Pat. No. 4,877,728. This application Jul. 19, 1989, Ser. No. 390,966  
Int. Cl.<sup>5</sup> C12R 1/645, 1/73; C12P 21/00, 39/00

U.S. Cl. 435—42

5 Claims

1. A biologically pure culture of *Yarrowia lipolytica* having the identifying characteristics of ATCC 20875 together with derivatives and mutants of said strain said culture being further characterized in that it is unable to grow on L-tyrosine and/or L-phenylalanine as the sole carbon source and when grown in a growth medium containing L-tyrosine, L-phenylalanine or a mixture thereof which medium contains a sub-optimal concentration of carbohydrate assimilable by the fungus, it produces recoverable quantities of homogentisic acid.

4,956,280

**BIPHASIC SHUTTLE VECTORS**

Jeffrey S. Buzby, Los Angeles, Calif.; Ronald D. Porter, and S. Edward Stevens, Jr., both of State College, Pa., assignors to Research Corporation, New York, N.Y.

Filed Nov. 6, 1986, Ser. No. 927,772

Int. Cl.<sup>5</sup> C12P 21/00, 19/34, 1/04; C12N 15/00; C07H 15/12  
U.S. Cl. 435—69.1

9 Claims

1. In a method for recombinant gene expression in *E. coli* and *A. quadruplicatum*, wherein a vector is employed to control gene expression the improvement which comprises employing as said vector a biphasic shuttle vector capable of replication and expression of a heterologous gene in *E. coli* and *A. quadruplicatum*, said vector comprising an *E. coli* replication origin and an *A. quadruplicatum* replication origin, at least two selectable markers and an *A. quadruplicatum* c-phycocyanin apo-protein promoter operably linked to said heterologous gene.

4,956,281

**DNA SEQUENCES, RECOMBINANT DNA MOLECULES AND PROCESSES FOR PRODUCING LYMPHOCYTE FUNCTION ASSOCIATED ANTIGEN-3**

Barbara P. Wallner, Cambridge; Timothy A. Springer, Newton; Catherine Hession, South Weymouth; Richard Tizard, Cambridge; Robert Mattaliano, Newton, and Michael L. Dustin, Boston, all of Mass., assignors to Biogen, Inc., Cambridge and Dana Farber Cancer Institute, Inc., Boston, both of, Mass.

Filed Jun. 3, 1987, Ser. No. 57,615

Int. Cl.<sup>5</sup> C12P 21/00; C12N 15/00, 1/20

U.S. Cl. 435—69.3

10 Claims

1. A DNA sequence selected from the group consisting of: (a) the DNA sequence which codes for the LFA-3 polypeptide carried in phage  $\lambda$ HT16; (b) DNA sequences which hybridize under conditions equivalent to about 20° to 27° C. below T<sub>m</sub> and 1 M sodium chloride to the LFA-3 DNA sequence of (a) and which code on expression for a polypeptide that binds to CD2, the receptor on the surface of T-lymphocytes; and (c) DNA sequences which code on expression for a polypeptide that binds to CD2 which is coded for on expression by any of the foregoing DNA sequences.

4,956,282

**MAMMALIAN PEPTIDE EXPRESSION IN PLANT CELLS**

Robert M. Goodman; Vic C. Knauf, both of Davis; Catherine M. Houck, Vacaville, and Luca Comal, Davis, all of Calif., assignors to Calgene, Inc., Davis, Calif.

Filed Jul. 29, 1985, Ser. No. 760,236

Int. Cl.<sup>5</sup> C12P 21/04; C12N 15/00; C07H 15/12

U.S. Cl. 435—69.51

3 Claims

1. A method for producing an interferon, which method comprises:

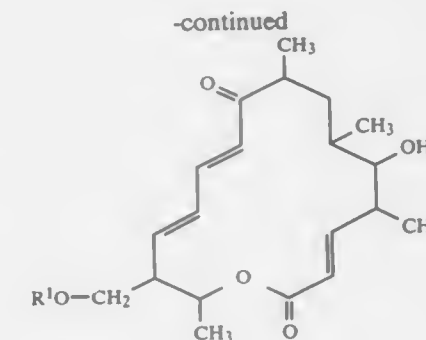
growing dicotyledonous plant cells containing an integrated sequence comprising a first expression cassette having in the direction of transcription

(1) a transcriptional and translational initiation region functional in said dicotyledonous plant cells and derived from a region which regulates expression of a T-DNA gene, (2) a structural gene coding for an interferon, and (3) a termination region functional in said dicotyledonous plant cells; and further comprising a second expression cassette having in the direction of transcription

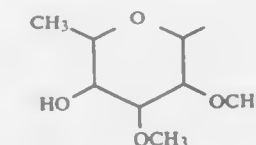
(1) a transcriptional and translational initiation region functional in said dicotyledonous plant cells,

(2) a structural gene coding for an enzyme which imparts antibiotic resistance, and

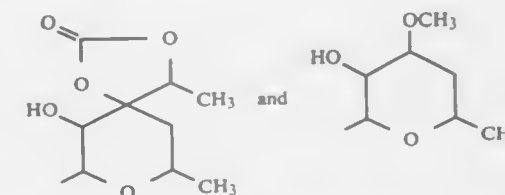
(3) a T-DNA boundary; whereby said structural gene is expressed to produce said interferon; and isolating said interferon substantially free of plant cell components.



wherein R<sup>1</sup> is the radical of the formula



and R<sup>2</sup> is a radical selected from the group consisting of



which comprises cultivating the microorganism *Streptomyces hirsutus* ATCC 53513 or a mutant thereof having the ability to produce a macrolide antibiotic compound selected from said group, in an aqueous culture medium containing assimilable sources of carbon, nitrogen and inorganic salts, under submerged, aerobic conditions, until a recoverable amount of a macrolide antibiotic compound selected from said group is obtained.

4,956,283

**PROCESS FOR PREPARING MACROLIDE ANTIBIOTICS BY CULTURING STREPTOMYCES HIRSUTUS ATCC 53513**

Walter P. Cullen; James R. Hauske; Hiroshi Maeda, and Jan-suke Tone, all of New York, N.Y., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 938,219, Dec. 5, 1986, Pat. No. 4,835,141.

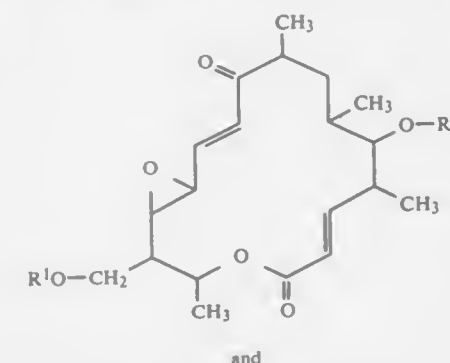
This application Mar. 10, 1989, Ser. No. 322,149

Int. Cl.<sup>5</sup> C12P 19/62

U.S. Cl. 435—76

4 Claims

1. A process for preparing a macrolide antibiotic compound selected from the group consisting of



4,956,284

**PROCESS FOR PRODUCING**

**4-(2-METHOXYETHYL)-PHENYL-GLYCIDYL ETHER AND/OR METOPROLOL**

Gareth T. Phillips; Brian W. Robertson, both of Kent, Great Britain; Mauro A. Bertola, Delft, Netherlands; Hein S. Koger, Spaarbdan, Netherlands; Arthur F. Marx, Delft, Netherlands, and Peter D. Watts, Kent, Great Britain, assignors to Gist-Brocades N.V., Delft, Netherlands

Continuation-in-part of Ser. No. 735,079, May 16, 1985, abandoned. This application Feb. 6, 1986, Ser. No. 826,791  
Claims priority, application Netherlands, Feb. 13, 1985, 8503666

Int. Cl.<sup>5</sup> C12P 17/02, 13/00; C12N 1/12; C12R 1/365  
U.S. Cl. 435—123

13 Claims

1. A process for the preparation of metoprolol in a stereospecific form or a non-toxic, pharmaceutically acceptable acid addition salt thereof and/or a stereospecific form of 4-(2-methoxyethyl)-phenyl glycidyl ether which comprises subjecting 4-(2-methoxyethyl)-phenyl allyl ether to the action of a microorganism selected from the group consisting of *Nocardia corallina* (ATCC 31338); *Rhodococcus* sp (NCIB 11277); *Mycobacterium rhodochrous* (NCIB 9703); *Rhodococcus equi* (NCIB 12035); *Pseudomonas aeruginosa* (NCIB 12036); *Pseudomonas oleovorans* (ATCC 29347); *Pseudomonas putida* (NCIB 9571) and *Pseudomonas aeruginosa* (NCIB 8704) having the ability for stereo-selective epoxidation of 4-(2-methoxyethyl)-phenyl allyl ether into 4-(2-methoxyethyl)-phenyl glycidyl

ether having at least 80% by weight the S configuration, at least partly separating 4-(2-methoxyethyl)-phenyl glycidyl ether with isopropylamine and at least partly separating metoprolol and/or converting metoprolol into the non-toxic, pharmaceutically acceptable acid addition salts.

4,956,285

# PROCESS FOR THE PREPARATION OF S-2,2-R<sub>1</sub>R<sub>2</sub>-1,3-DIOXOLANE-4-METHANOLS

Marie-José De Smet, Zeist, Netherlands, assignor to Gist-Brocades N.V., Delft, Netherlands

Filed Aug. 18, 1989, Ser. No. 396,927

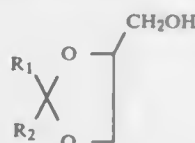
Claims priority, application European Pat. Off., Jun. 29, 1989, 89201733.6

Int. Cl.<sup>3</sup> C12P 17/04, 1/04; C07P 41/00

U.S. Cl. 435—126

12 Claims

1. A process for the preparation of an enriched S-isomer of a 2,2-R<sub>1</sub>R<sub>2</sub>-1,3-dioxolane-4-methanol of the formula



wherein R<sub>1</sub> and R<sub>2</sub> are individually selected from the group consisting of hydrogen and alkyl of 1 to 6 carbon atoms or taken together with the carbon atom to which they are attached form a carbocyclic ring of 3 to 6 carbon atoms comprising subjecting a mixture of R and S isomers of formula I to the action of a microorganism or an enzyme derived therefrom capable of stereoselective consumption of the R form of formula I for a period of time sufficient to consume the R-isomer to obtain an enriched S isomer of the compound of formula I.

4,956,286

# PROCESS FOR THE PREPARATION OF ESTERS

Alasdair R. Macrae, Bedford, Great Britain, assignor to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Filed Dec. 21, 1987, Ser. No. 135,355

Claims priority, application European Pat. Off., Dec. 19, 1986, 86202336.3

Int. Cl.<sup>3</sup> C12N 9/20; C12P 7/64

U.S. Cl. 435—134

11 Claims

1. In a process for preparing an ester from an alcohol and fatty acid or glyceride thereof by enzyme-catalyzed conversion, the improvement which comprises mixing the fatty acid or glyceride thereof with a lipase catalyst and adding the alcohol to said mixture at such a rate that the alcohol concentration in the reaction mixture is kept below a molar ratio of 0.5 moles of alcohol per mole of fatty acid/acyl group whereby the rate of ester formation is increased.

4,956,287

# PROCESS FOR PRODUCING OLEAGINOUS COMPOSITION

Kazuaki Suzuki, Shoji Maruzeni, Eiji Nakai, and Toru Nezu, all of Tokyo, Japan, assignors to Asahi Denka Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 14, 1987, Ser. No. 132,213

Claims priority, application Japan, Dec. 23, 1986, 61-307358; Nov. 9, 1987, 62-282646

Int. Cl.<sup>3</sup> C12N 9/20; C12P 7/64; C07H 13/02, 1/00

U.S. Cl. 435—134

11 Claims

1. A process for producing a high nutritive value oleaginous composition for confectionary fat or hard butter and combining high solid fat content and high meltability in the mouth which comprises transesterifying a fat containing polybasic unsaturated fatty acid(s) as constituting fatty acid(s) and a saturated fatty acid(s), a saturated fatty acid alcohol ester(s) or mixture thereof, with a lipase having a site-specificity thereby

to give an oleaginous composition comprising at least 40% of symmetric triglyceride(s) each having a polybasic unsaturated fatty acid group at the 2-position and at least 50% of completely saturated fatty acid(s) each having 16 or more carbon atoms.

4,956,288

# METHOD FOR PRODUCING CELLS CONTAINING STABLY INTEGRATED FOREIGN DNA AT A HIGH COPY NUMBER, THE CELLS PRODUCED BY THIS METHOD, AND THE USE OF THESE CELLS TO PRODUCE THE POLYPEPTIDES CODED FOR BY THE FOREIGN DNA

James G. Barsoum, Quincy, Mass., assignor to Biogen, Inc., Cambridge, Mass.

Filed Apr. 22, 1988, Ser. No. 185,212

Int. Cl.<sup>3</sup> C12N 15/00, 1/20; C12P 21/00

U.S. Cl. 435—172.3

20 Claims

1. A method for preparing recombinant host cells containing foreign DNA at a copy number of 50 or greater, said method comprising the following steps:
  - (a) subjecting a population of cells to electroporation in the presence of said foreign DNA, wherein said foreign DNA comprises:
    - (i) at least one protective gene coding for a protein capable of protecting said recombinant host cells against a toxic substance, wherein increasingly higher copy numbers of said protective gene are required for, and capable of, protecting said recombinant host cell against increasing concentrations of said toxic substance;
    - (ii) at least one product gene coding for a polypeptide whose production is desired, said genes being operably linked to regulatory sequences that are compatible with said recombinant host cells;
  - (b) culturing the cells produced in step (a) for a time sufficient to allow these cells to recover from the electroporation process;
  - (c) exposing the cells produced in step (b) to a sufficient concentration of said toxic substance to kill or severely retard the division of those cells with a copy number of less than 50.

4,956,289

# THIN FILM MEMBRANE ENZYME REACTOR AND METHOD OF USING SAME

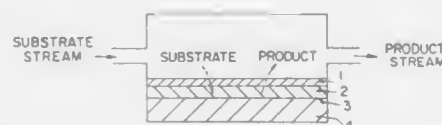
Wolfgang J. Wrasidlo, LaJolla, and Frieder K. Hofmann, Oceanside, both of Calif., assignors to Brunswick Corporation, Skokie, Ill.

Filed Mar. 16, 1987, Ser. No. 26,380

Int. Cl.<sup>3</sup> C12N 11/02, 11/08, 11/14

U.S. Cl. 435—180

28 Claims



1. An enzyme reactor consisting essentially of:
  - a support;
  - an enzyme hydrogel layer physically entrapped on said support; and
  - a porous thin film diffusion membrane on said enzyme hydrogel layer, wherein said thin film diffusion membrane has a thickness of from about 0.0012 to 0.2 microns and a pore size sufficient to permit diffusion of a substrate for said enzyme and of the product of a reaction of said substrate catalyzed by said enzyme, but which will not permit said enzyme to pass through said thin film diffusion mem-

brane, said thin film diffusion membrane adapted to direct exposure of a process stream.

4,956,290

# LARGE SCALE PROCESS FOR THE PURIFICATION OF ALCOHOL OXIDASE

Roger G. Harrison, Jr., Norman, and Lynn P. Nelles, Bartlesville, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 27, 1989, Ser. No. 331,220

Int. Cl.<sup>3</sup> C12N 9/04, 9/02; C12R 1/84; C12Q 1/26

U.S. Cl. 435—189

19 Claims

1. A process for the purification of alcohol oxidase from whole cells of *Pichia pastoris* grown on methanol comprising the steps of:
  - (a) forming an aqueous suspension of from about 0.8 to about 6 volume percent of an autolytic treating agent, and a quantity of said whole cells of *Pichia pastoris* containing alcohol oxidase, wherein said cells are present in an amount in the range of from about 85 to about 150 grams per liter of said aqueous suspension, in a manner whereby said whole cells release at least a portion of said alcohol oxidase thereby forming aqueous liquor;
  - (b) filtering said aqueous liquor by crossflow filtration to separate at least a portion of said alcohol oxidase from said aqueous liquor thereby forming an alcohol oxidase solution;
  - (c) ultrafiltering and desalting said alcohol oxidase solution to form an alcohol oxidase suspension; and
  - (d) recrystallizing alcohol oxidase from said alcohol oxidase suspension.

4,956,291

# METHOD FOR PRODUCTION OF CELLULOLYTIC ENZYMES AND METHOD FOR SACCHARIFICATION OF CELLULOSIC MATERIALS THEREWITH

Takeshi Yamanobe; Yasushi Mitsubishi, both of Ibaraki, and Yoshiyuki Takasaki, Chiba, all of Japan, assignors to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, both of Tokyo, Japan

Continuation of Ser. No. 720,416, Apr. 5, 1985, Pat. No. 4,742,005. This application Feb. 5, 1987, Ser. No. 11,043

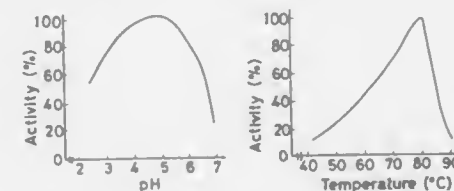
Claims priority, application Japan, Jan. 7, 1985, 60-581; Jan. 11, 1985, 60-3490

The portion of the term of this patent subsequent to Dec. 31, 2002, has been disclaimed.

Int. Cl.<sup>3</sup> C12N 9/24, 9/42; C12P 19/14

U.S. Cl. 435—200

1 Claim



1. A method for production of a cellulose/xylanase enzyme composite, which comprises: culturing *Acremonium cellulolyticus* BP-495 in a culture medium containing carbon and nitrogen sources and collecting said enzyme composite from the resultant culture broth.

4,956,292

# VIRAL STRAIN ISOLATED FROM CEREBROSPINAL FLUID OF AN HIV SEROPOSITIVE MAN HAVING ACUTE AND REGRESSIVE ENCEPHALOPATHY AND USE OF THE STRAIN IN AN IMMUNOASSAY

Jean-Claude Chermann, Elancourt; Blandine Rouquette; Françoise Rey, both of Paris, and Françoise Barre-Sinoussi, Issy Les Moulineaux, all of France, assignors to Institut Pasteur, Paris, France

Filed Oct. 29, 1987, Ser. No. 114,021

Int. Cl.<sup>3</sup> C12N 7/00, 15/00

U.S. Cl. 435—235

1 Claim

1. A substantially pure preparation of a retrovirus strain deposited under culture collection accession number CNCM 1-170.

4,956,293

# NOCARDIA SP. ATCC 53492, OR AN ANTIBIOTIC A 42867 PRODUCING MUTANT OR VARIANT THEREOF

Ernesto Riva; Maurizio Denaro, both of Milan; Enrico Selva, Gropello Cairoli; Giovanni Cassani, Pavia, and Francesco Parenti, Lainate, all of Italy, assignors to Gruppo Lepetit S.p.A., Italy

Continuation of Ser. No. 78,501, Jul. 28, 1987, Pat. No. 4,804,534. This application Nov. 14, 1988, Ser. No. 270,884

Claims priority, application United Kingdom, Jul. 29, 1986, 8618445

Int. Cl.<sup>3</sup> C12N 1/20; C12R 1/365

U.S. Cl. 435—253.2

2 Claims

1. A biologically pure culture of *Nocardia* sp. ATCC 53492 or an antibiotic A 42867 producing mutant or variant thereof, said culture being capable of producing antibiotic A 42867 in a recoverable amount in an aqueous nutrient medium containing assimilable sources of carbon, nitrogen and inorganic substances.

4,956,294

# CULTURE OF STREPTOVERTICILLIUM SYNROENSE FOR PRODUCING AN ANTIBACTERIAL

Sara A. Currie, Roselle; Thomas W. Miller, Cartoret; Eugene L. Dulaney, Summit; James P. Springer, Mountaintop; Mary E. Vallant, Plainfield; Sheldon B. Zimmerman, Springfield, all of N.J., and Sagrario M. Del Val, Madrid, Spain, assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 164,707, Mar. 7, 1988, abandoned. This application May 9, 1989, Ser. No. 349,181

Int. Cl.<sup>3</sup> C12N 1/20; C12R 1/625; C12P 1/04, 17/16

U.S. Cl. 435—252.1

3 Claims

1. A biologically pure culture capable of producing antibiotic L-654,040 in a recoverable amount in an aqueous nutrient medium containing assimilable sources of carbon, nitrogen and inorganic substances, having all of the identifying characteristics of the MA6011 strain of *Streptovericillium synroense* ATCC 53699 or any antibiotic L-654,040 producing mutant thereof.

4,956,295

# STABILIZATION OF DRIED BACTERIA EXTENDED IN PARTICULATE CARRIERS

A. Louis Sudoma, Milwaukee, Wis., assignor to Chr. Hansen's Laboratory, Inc., Milwaukee, Wis.

Continuation-in-part of Ser. No. 612,324, May 21, 1984, abandoned. This application Apr. 27, 1987, Ser. No. 43,105

Int. Cl.<sup>3</sup> C12N 1/20, 1/04; C12R 1/23, 1/25

U.S. Cl. 435—252.1

15 Claims

1. The method of forming a stabilized mixture of dried viable bacteria extended in a particulate carrier, comprising:
  - (a) preparing a blend by intermixing a major proportion of a carrier comprising particulate inorganic salt administrable to animals with a minor proportion of a silica gel adsorbent, said carrier salt being selected to have a water adsorbing capacity of less than one percent (1%) of its mois-



ture free weight when equilibrated in air of 50% relative humidity and being blended in at least 3 parts by weight per each part of said adsorbent, said silica gel adsorbent having a water adsorbing capacity of at least 20% of its moisture free weight when equilibrated in air at 50% relative humidity, said blend containing about 1 to 5% by weight of said adsorbent;

- (b) dispersing in said blend either during the intermixing of step (a) or subsequent thereto dried viable bacterial to form a highly diluted storable admixture thereof and
- (c) packaging said admixture in packaging material having a low vapor transmission rate.

4,956,296

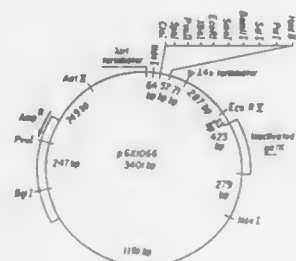
### CLONED STREPTOCOCCAL GENES ENCODING PROTEIN G AND THEIR USE TO CONSTRUCT RECOMBINANT MICROORGANISMS TO PRODUCE PROTEIN G

Stephen R. Fahnestock, Olney, Md., assignor to Genex Corporation, Gaithersburg, Md.

Continuation-in-part of Ser. No. 63,959, Jan. 19, 1987, which is a continuation-in-part of Ser. No. 329, Feb. 17, 1987, which is a continuation-in-part of Ser. No. 854,887, Apr. 23, 1986, abandoned, which is a continuation-in-part of Ser. No. 829,354, Feb. 14, 1986, abandoned. This application Jun. 20, 1988, Ser. No. 209,236

Int. Cl.<sup>5</sup> C12N 1/20, 15/00; C07H 15/12  
U.S. Cl. 435—252.33

13 Claims



1. A gene which encodes a Protein G variant, wherein said gene comprises the following DNA sequence:

10 ATGGATCCTG AAAGGCGAAA TACGCTAACG ACAGTTACTG TACAACTTG	20 CATTACCTAA CAACTACTGA ACAACGGTGT AAAAACCGA TTATTAATGG	30 GACTGACACT AGCTGTTGAT TGACGGTGAA AGTGATCGAT TAAACATTG
40 TACAAATTAA GCTGCTACTG TGGACTTACG GCGTCTGAAT AAAGGCGAAA	50 TCCTTAATGG CAGAAAAAGT ACGATGCGAC TAACACGAGC CAACTACTAA	60 TAAACATTG CTTCAACAA TAAGACCTTT CGTGACAAC AGCAGTAGAC
310 GCAGAACTG TGGACTTATG GTCGCTTCAA	320 CAGAAAAAGC ATGATGCGAC AACGTAAAGA	330 CTTCAACAA TAAGACCTTT AGACTAA
340 TACGCTAACG ACGGTAACTG	350 ACAACGGTGT AAATGTTTAC	360 TGATGGTGT AGAGGTTCCG

or a degenerate variant thereof.

4,956,297

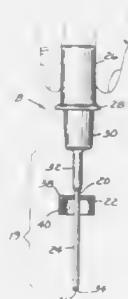
### DEVICE FOR OBTAINING PREDETERMINED AMOUNTS OF BACTERIA

John K. Hood, St. Paul; Marlys E. Lund, Eden Prairie, and Robert L. Nelson, Bloomington, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 13, 1989, Ser. No. 310,324  
Int. Cl.<sup>5</sup> C12M 1/26

U.S. Cl. 435—292

8 Claims



1. A wand assembly for picking up a predetermined quantity of bacteria from at least one growth colony of the bacteria, said assembly comprising:

- an elongate rod having an axis, opposite upper and lower ends, an upper portion adjacent said upper end adapted for manual engagement, an elongate tip portion adjacent said lower end, said tip portion having a peripheral surface and a generally uniform cross sectional shape along said axis, said tip portion having a groove opening through said lower end with said groove having a size adapted to ingest the predetermined quantity of bacteria by capillary action;
- a collar around said rod, said collar comprising a wiping portion adapted to move axially in close proximity along said peripheral surface of said tip portion to wipe unwanted bacteria from said peripheral surface; and
- means for releasably attaching said collar to said rod at a predetermined axial distance from said lower end with said wiping portion adjacent said peripheral surface.

4,956,298

### SEPARATION OR REACTION COLUMN UNIT

Stephan Diekmann, Wagensteg 5, D-3400 Goettingen, Fed. Rep. of Germany

Filed Jan. 13, 1989, Ser. No. 296,737

Claims priority, application Fed. Rep. of Germany, Jan. 13, 1988, 8800301; Dec. 23, 1988, 3843610

Int. Cl.<sup>5</sup> C12M 1/12

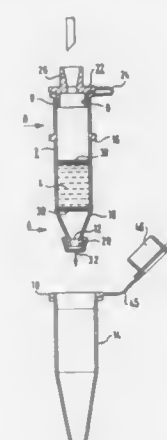
U.S. Cl. 430—311

25 Claims

1. A column unit for insertion in a centrifuge to separate or react a sample material, comprising:

- a first vessel including a feed opening at a first end of said first vessel, a discharge opening at a second end of said first vessel, a hollow cylinder between said first and second ends and column material located within a middle portion of said hollow cylinder, wherein a sample material may flow through said feed opening, said column material, and said discharge opening;
- a second vessel configured to fittingly receiving a portion of said first vessel comprising said discharge opening and said middle portion of said hollow cylinder, wherein the

sample material may flow through said discharge opening into said second vessel;



a feed cap which seals said feed opening of said first vessel; and

a means for attaching a syringe to said feed cap.

4,956,299

### COMPLEMENT STABILIZATION

Uri Piran, Sharon; Milos Stastny, Ashland, and Laura S. Uretsky, Milford, all of Mass., assignors to Ciba Corning Diagnostics Corp., Medfield, Mass.

Filed Dec. 31, 1986, Ser. No. 316  
Int. Cl.<sup>5</sup> G01N 33/54

U.S. Cl. 436—18

16 Claims

1. A stabilized aqueous complement solution comprising complement, water, and a buffering compound selected from the group consisting of morpholino buffering compounds, tris-hydroxymethyl buffering compounds, and a combination of morpholino and tris-hydroxymethyl buffering compounds, wherein the final concentration of the buffering compound in the stabilized aqueous complement solution is greater than about 0.01M and the final pH of the stabilized aqueous complement solution is between about 6.5 and about 8.5.

4,956,300

### AID FOR DETERMINING THE PRESENCE OF OCCULT BLOOD, METHOD OF MAKING THE AID, AND METHOD OF USING THE AID

Henry J. Wells, Beaumont, Tex., assignor to Helena Laboratories Corporation, Beaumont, Tex.

Continuation of Ser. No. 337,143, Jan. 5, 1982, abandoned. This application Oct. 16, 1984, Ser. No. 661,273

Int. Cl.<sup>5</sup> G01N 21/78, 33/72

U.S. Cl. 436—66

13 Claims

1. An essentially dry, one-step diagnostic aid for determining the presence of hemoglobin in fecal matter in an aqueous environment comprising:

- a dry adsorbent carrier having guaiac adsorbed thereon said carrier selected from the group consisting of adsorbed silica-based materials, calcium phosphate, and mixtures thereof, the carrier holding said guaiac readily available to react in the presence of hemoglobin and an oxidizing agent in an aqueous environment to yield to blue dye; and
- a dry oxidizing agent consisting essentially of a monopersulfate compound capable of oxidizing said guaiac to a blue dye in the presence of water and hemoglobin, said oxidizing agent in the absence of water being substantially non-reactive with said guaiac adsorbed onto said carrier; and
- a binder into which the carrier and oxidizing agent have been compressed to form a tablet.

4,956,301

### TEST DEVICE AND METHOD OF ASSAYING FOR FRUCTOSAMINES

Ibrahim A. Ismail, South Bend, and David W. Michaels, Elkhart, both of Ind., assignors to Miles Inc., Elkhart, Ind.  
Filed Nov. 2, 1989, Ser. No. 430,328  
Int. Cl.<sup>5</sup> G01N 33/00, 33/48, 33/49

U.S. Cl. 436—87

39 Claims

1. A composition capable of exhibiting a sufficient color transition upon contacting a fructosamine-containing liquid test sample to indicate the presence or concentration of fructosamine in the test sample comprising:

- (a) a chromogenic indicator dye capable of being reduced by a fructosamine;
- (b) a buffer to maintain the pH of the composition at a value of at least about 11; and
- (c) a reaction accelerator compound to enable the reaction between the fructosamine and the chromogenic indicator dye to proceed at ambient temperature.

4,956,302

### LATERAL FLOW CHROMATOGRAPHIC BINDING ASSAY DEVICE

Julian Gordon, Lake Bluff, Ill., and Charles S. G. Pugh, Kenosha, Wis., assignors to Abbott Laboratories, Abbott Park, Ill.  
Continuation of Ser. No. 95,801, Sep. 11, 1987, abandoned. This application May 15, 1989, Ser. No. 355,043  
Int. Cl.<sup>5</sup> G01N 33/38

U.S. Cl. 436—161

11 Claims



1. A test device for determining the presence or amount of an analyte substance in a sample by means of one or more specific binding reactions comprising:

- a chromatographic medium which extends throughout said device, defining a flowpath having capillarity and the capacity for chromatographic solvent transport of one or more reactive sample components and non-immobilized reagents; said chromatographic medium comprising (1) a prefiltering zone; (2) a reaction site disposed downstream from said prefiltering zone at which is present an immobilized reagent capable of binding a member from the group consisting of said analyte substance and a labelled specific binding material, and at which the presence or amount of immobilized labelled specific binding material may be detected; and (3) a downstream zone free of said immobilized reagent disposed downstream from said reaction site;
- a sample application means selected from the group consisting of a well and an absorbant pad located adjacent to and disposed in fluid contact with said prefiltering zone of said chromatographic medium and offset upstream from said reaction site; and
- a liquid absorption means consisting of a quantity of blotter material disposed in fluid contact with said downstream zone of said chromatographic medium and offset downstream from said reaction site.
7. A method for determining the presence or amount of an analyte substance in a sample which method utilizes a device comprising:
- a chromatographic medium which extends throughout said device, defining a flowpath having capillarity and the capacity for chromatographic solvent transport of one or more non-immobilized reagents and reactive sample components, said chromatographic medium comprising (1) a prefiltering zone; (2) a reaction site disposed downstream from said prefiltering zone at which is present an immobi-

lized reagent capable of binding a member from the group consisting of said analyte substance and a labelled specific binding material, and at which the presence or amount of immobilized labelled specific binding material may be detected and (3) downstream zone free of said immobilized reagent disposed downstream from said reaction site, a sample application means selected from the group consisting of a well and an absorbant pad located adjacent to and disposed in fluid contact with said prefiltering zone of said chromatographic material and offset upstream from said reaction site, and

a liquid absorption means consisting of a quantity of blotter disposed in fluid contact with said downstream zone of said chromatographic medium and offset downstream from said reaction site, said method comprising:

- applying a volume of said sample to said sample application means whereby said sample is transported onto said chromatographic medium at said prefiltering zone and along said chromatographic medium through said reaction site, and said downstream zone to said sample absorption means,
- contacting said labelled specific binding material to said reaction site, and
- determining the presence or amount of labelled specific binding material immobilized at said reaction site as an indication of the presence or amount of the analyte substance in the sample.

4,956,303

#### SECONDARY ANTIBODIES AGAINST COMPLEXES OF SMALL MOLECULES AND BINDING PARTNERS THEREFOR, THEIR PREPARATION, AND THEIR USE IN DIAGNOSTIC METHODS

Colin H. Self, London, United Kingdom, assignor to Antibody Technology Limited, United Kingdom

Filed Apr. 28, 1987, Ser. No. 43,377

Int. Cl.<sup>5</sup> G01N 33/537

U.S. Cl. 436—542

19 Claims

1. A secondary antibody capable of stabilizing the binding of a small molecule of molecular weight 100–1500 to its binding protein which secondary antibody is capable of binding said binding protein in the presence of and in the absence of the small molecule but is not capable of binding said small molecule in the absence of said binding protein.

4,956,304

#### BURIED JUNCTION INFRARED PHOTODETECTOR PROCESS

Charles A. Cockrum; Jeffrey B. Barton, both of Goleta, and Eric F. Schulte, Santa Barbara, all of Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Filed Apr. 7, 1988, Ser. No. 178,680

Int. Cl.<sup>5</sup> H01L 21/10, 21/329

U.S. Cl. 437—5

30 Claims

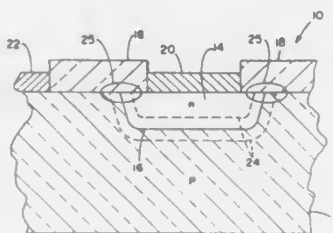
1. A method of fabricating an IR responsive photodiode or an array thereof comprising the steps of:

providing a substrate layer comprised of a Group II-IV semiconductor material having a first type of electrical conductivity and a characteristic energy bandgap; forming a passivation layer over a surface of the substrate layer, the passivation layer having a characteristic energy bandgap which is wider than the characteristic energy bandgap of the substrate layer;

depositing a first mask layer over the passivation layer, the first mask layer having one or more openings there-through for defining one or more individual photodiodes; selectively removing portions of the passivation layer exposed through the openings within the first mask layer thereby exposing portions of the underlying substrate layer, the step of selectively removing simultaneously converting a top surface region of the exposed portions of the substrate layer to an opposite type of electrical conductivity, thereby forming a p-n diode junction, the step

of selectively removing further simultaneously cleaning a top surface of the converted top surface region for preparing the exposed portions of the underlying substrate layer for a subsequent metallization step;

depositing a layer of metallization over exposed surfaces of the first mask layer, the passivation layer and the converted top surface regions of the substrate layer, the step



of depositing a layer of metallization occurring within a same processing chamber means as occurred the step of selectively removing, the step of depositing a layer of metallization further occurring before the substrate layer is removed from the processing chamber means; and removing the first mask layer and the associated overlying metallization layer for forming individual photodiodes having contact metallization deposited thereon.

4,956,305

#### PROCESS FOR FABRICATING AN INTEGRATED CIRCUIT

Jürgen Arndt, Dornberg, Fed. Rep. of Germany, assignor to Telefunken Electronik GmbH, Hellbronn, Fed. Rep. of Germany

Division of Ser. No. 46,534, May 6, 1987, Pat. No. 4,829,356.

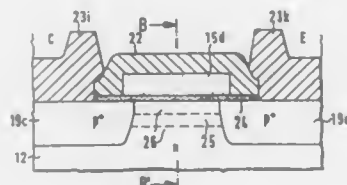
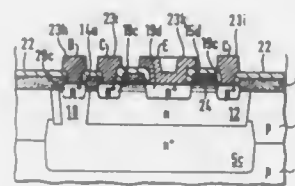
This application Apr. 14, 1989, Ser. No. 337,945

Claims priority, application Fed. Rep. of Germany, May 30, 1986, 3618155

Int. Cl.<sup>5</sup> H01L 21/265

U.S. Cl. 437—31

9 Claims



1. In a process for the manufacture of an integrated circuit including a lateral transistor arranged together with compli-

mentary vertical bipolar transistors and CMOS field-effect transistors in a semiconductor body which is common to all components, and wherein the lateral transistor is comprised of two spaced regions of a first conductivity type, which constitute the emitter region and the collector region, incorporated into the surface of a semiconductor region of a second conductivity type, with the portion of the semiconductor region of the conductivity type located between the emitter and collector regions constituting the active base region of the transistor and with the active base region including a buried semiconductor zone which is disposed below and spaced from the surface, which extends to the emitter and collector regions, and which contains additional counterdoping impurities relative to the conductivity of the remaining surrounding portions of the active base region, thus concentrating the minority charge carriers in the active base region at a distance from the semiconductor surface between the emitter region and the collector region; the improvement comprising: simultaneously forming the buried semiconductor zone in the active base region of the lateral transistor and setting the threshold voltage of the CMOS field-effect transistors by ion implantation of charge carriers through a gate passivation layer covering the semiconductor surface.

4,956,306

#### METHOD FOR FORMING COMPLEMENTARY PATTERNS IN A SEMICONDUCTOR MATERIAL WHILE USING A SINGLE MASKING STEP

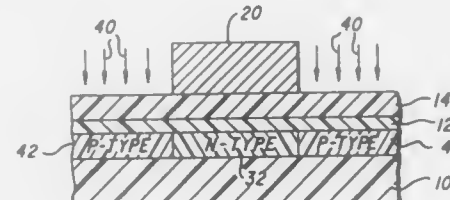
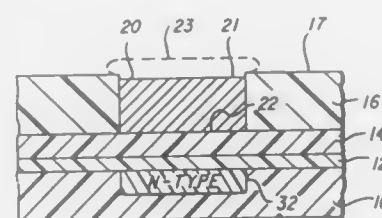
Robert T. Fuller, Durham; Joseph C. Teang, Raleigh, and William R. Richards, Jr., Cary, all of N.C., assignors to Harris Corporation, Melbourne, Fla.

Filed Nov. 3, 1988, Ser. No. 266,756

Int. Cl.<sup>5</sup> H01L 21/265

U.S. Cl. 437—34

19 Claims



1. A method for fabricating complementary regions in a semiconductor material while using a single masking step, comprising:

- forming a protective layer on a portion of the semiconductor material;
- forming an affinity layer on a portion of the protective layer, the affinity layer having an affinity for a second implant blocking material, the second implant blocking material comprising tungsten;
- forming a first implant blocking layer on a portion of the affinity layer;
- masking a predetermined portion of the first implant block-

ing layer for forming a first pattern of the unmasked portion of the first implant blocking layer; removing a part of the unmasked first implant blocking layer in the first pattern for exposing an underlying first part of the affinity layer; implanting a first dopant at the exposed first part of the affinity layer into the underlying semiconductor material; removing the masking for exposing a portion of the predetermined portion of the first implant blocking layer; forming a second implant blocking layer from the second implant blocking material over a portion of the exposed first part of the affinity layer; removing the first implant blocking layer for exposing an underlying second part of the affinity layer, the exposed second part of the affinity layer constituting a second pattern; and implanting a second dopant at the exposed second part of the affinity layer into the underlying semiconductor material.

4,956,307

#### THIN OXIDE SIDEWALL INSULATORS FOR SILICON-OVER-INSULATOR TRANSISTORS

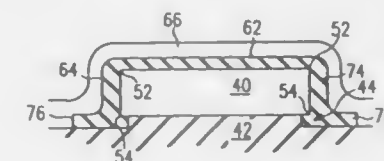
Gordon P. Pollack; Misha Matloobian, both of Dallas, and Ravishanker Sundaresan, Garland, all of Tex., assignors to Texas Instruments, Incorporated, Dallas, Tex.

Filed Nov. 10, 1988, Ser. No. 269,803

Int. Cl.<sup>5</sup> H01L 21/265

U.S. Cl. 437—40

16 Claims



1. A method of forming a radiation hard transistor comprising:

- forming a mesa from semiconductor material;
- forming an insulated region adjacent to said mesa;
- forming a conforming oxidizable layer on the sides of said insulator region;
- anisotropically etching said oxidizable layer; and
- oxidizing said oxidizable layer to create oxide sidewalls.

4,956,308

#### METHOD OF MAKING SELF-ALIGNED FIELD-EFFECT TRANSISTOR

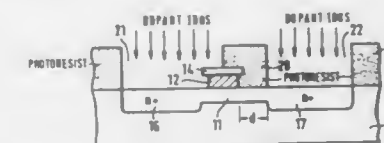
Edward L. Griffin; Robert A. Sadler, and Arthur E. Geissberger, all of Roanoke, Va., assignors to ITT Corporation, New York, N.Y.

Filed Jan. 20, 1987, Ser. No. 4,992

Int. Cl.<sup>5</sup> H01L 21/338

U.S. Cl. 437—41

1 Claim



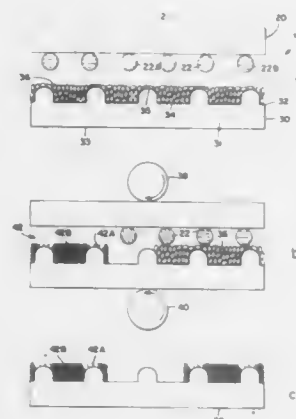
1. An improved GaAs FET manufacturing process including the ordered steps of:

- providing a substrate comprising a GaAs region on a first major surface of said substrate, said GaAs region including a channel region;



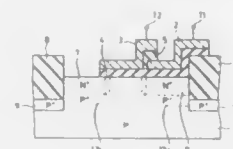
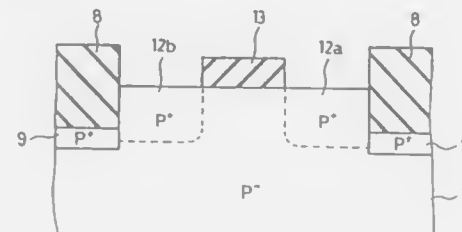
- (b) providing a gate over said channel region, said gate having a first lateral edge and a second lateral edge;
- (c) providing an implant mask extending laterally over said channel region beyond said second lateral edge of said gate, said mask having source and drain implant openings; and
- (d) introducing impurities via said implant openings into said GaAs region to form source and drain regions, said drain region laterally spaced from said second lateral edge of said gate as a result of said lateral extension of said mask wherein said step of providing an implant mask extending laterally over said channel region beyond said second lateral edge of said gate comprises:
- providing a layer of photoresist over said substrate; and patterning said photoresist such that said photoresist extends laterally over said channel region beyond said second lateral edge of said gate and does not extend laterally over said channel region beyond said first lateral edge of said gate.

**4,956,309**  
**MICROROUGHENED DEVELOPER SHEET FOR FORMING HIGH DENSITY IMAGES**  
 Paul C. Adair, Springboro, and Cheryl L. Moore, Springfield, both of Ohio, assignors to The Mead Corporation, Dayton, Ohio  
 Filed Dec. 6, 1988, Ser. No. 280,420  
 Int. Cl.<sup>3</sup> G03C 1/96, 1/68, 7/00  
 U.S. Cl. 430—138 12 Claims



1. A developer sheet useful in forming images having a high density comprising a support which comprises a transparent polymeric material or a polymer coated paper material having front and back surfaces wherein said transparent polymer material or polymer coated paper material is microroughened to provide a discontinuous texture having alternating regions of relatively high and relatively low sheet thickness wherein the space between adjacent high sheet thickness regions is between about 10 microns and about 40 microns; and a developer layer containing a particulate reactive material on said front surface, the majority of said particles being located between said adjacent high sheet thickness regions, said reactive material being capable of reacting with a substantially colorless chromogenic material upon contact and generating an image.

**4,956,310**  
**SEMICONDUCTOR MEMORY DEVICE AND FABRICATING METHOD THEREOF**  
 Akira Tokui; Shinichi Sato; Akira Kawai; Masayuki Nakajima; Hiroji Ozaki, and Masao Nagatomo, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
 Division of Ser. No. 931,584, Nov. 14, 1986, abandoned. This application Oct. 5, 1988, Ser. No. 195,672  
 Claims priority, application Japan, Dec. 16, 1985, 60-284628  
 Int. Cl.<sup>3</sup> H01L 21/32, 21/426  
 U.S. Cl. 437—52 4 Claims



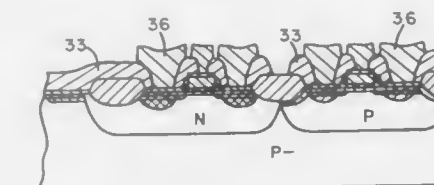
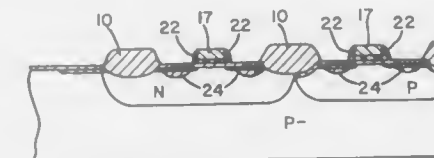
1. A method of forming a semiconductor memory device, comprising  
 preparing a semiconductor substrate of a first conductivity type;  
 forming a resist layer on said substrate and developing said layer to form a first resist pattern;  
 forming highly doped regions of the first conductivity type with said first resist pattern;  
 developing again said first resist pattern to form a second resist pattern; and  
 forming a charge storage region and a bit line region of a second conductivity type with said second resist pattern, said charge storage region and said bit line region being formed wider and shallower than said highly doped regions respectively.

**4,956,311**  
**DOUBLE-DIFFUSED DRAIN CMOS PROCESS USING A COUNTERDOPING TECHNIQUE**  
 Tian-I Liou, and Chih-Sieh Teng, both of San Jose, Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.  
 Filed Jun. 27, 1989, Ser. No. 371,788  
 Int. Cl.<sup>3</sup> H01L 21/336  
 U.S. Cl. 437—57 18 Claims

10. In a method of manufacturing a double-diffused drain CMOS device comprising a semiconductor substrate containing one impurity type into which an implant of the opposite polarity type is performed through the exposed area of a composite mask to form a plurality of wells; removing the mask

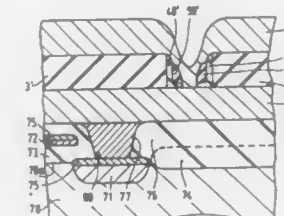
and performing an implant of the same polarity type as that in the substrate; defining a plurality of active regions within the n- and p-wells wherein the intended carrier charge of each active region is opposite in polarity to the well into which it is disposed; growing an isolating thermal oxide; performing a threshold voltage-determining implant and growing a gate oxide in the active regions; forming gate structures overlying portions of the active regions; forming contacts through a low temperature dielectric film deposited over the substrate by etching areas exposed by a contact mask; and forming a metal interconnect through which access to the device may be achieved;

the improvement which comprises:



performing a low energy blanket implant of a low dosage of a first type of n-type dopant following the formation of doped polysilicon features;  
 forming spacers adjacent to exposed edges of said gate structures;  
 performing a low energy blanket implant of a medium dosage of a second type of n-type dopant;  
 performing a medium energy, high dosage implant of p-type dopant into p-channel regions exposed by a p+ mask; and  
 forming a silicide in the p-channel and n-channel active regions by depositing a metal and exposing said substrate to a siliciding temperature treatment.

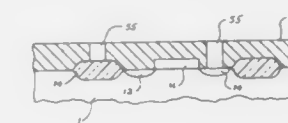
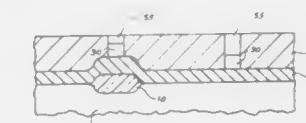
**4,956,312**  
**METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE**  
 Josephus M. F. G. Van Laarhoven, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.  
 Filed May 19, 1989, Ser. No. 354,001  
 Claims priority, application United Kingdom, Jan. 6, 1988, 8813303  
 Int. Cl.<sup>3</sup> H01L 21/88  
 U.S. Cl. 437—180 8 Claims



1. A method of manufacturing a semiconductor device comprising the steps of

- (a) providing a covering layer over an electrically conductive layer;
- (b) forming at least one opening in said covering layer to expose said electrically conductive layer;
- (c) forming a further layer on said covering layer and into said opening to cover said electrically conductive layer, said further layer comprising at least a first layer of one material, said first layer having a first thickness, and at least a second layer of a different material on said first layer, said second layer being of a second thickness;
- (d) anisotropically etching said further layer to etch said first layer and said second layer at different etching rates, said first layer being etched more slowly than said second layer;
- (e) continuing said anisotropic etching until said further layer is removed from said covering layer, and said further layer is removed at least partially from said electrically conductive layer in said opening, at least a first portion of said first layer and at least a second portion of said second layer remaining on side walls of said opening, said first portion of said first layer covering said side walls of said opening from said electrically conductive layer to a top of said covering layer, said second portion of said second layer extending from said electrically conductive layer to a distance less than a depth of said opening, said distance being related to said first thickness of said first layer and to the different rates of etching of said first layer and said second layer; and
- (f) providing another electrically conductive layer on said covering layer and into said opening to form an electrical contact with remaining exposed portions of said electrically conductive layer.

**4,956,313**  
**VIA-FILLING AND PLANARIZATION TECHNIQUE**  
 William J. Cote, Essex Junction; Carter W. Kaanta, Colchester; Michael A. Leach, Winoski, and James K. Paulsen, Jericho, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.  
 Continuation of Ser. No. 85,836, Aug. 17, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 257,117  
 Int. Cl.<sup>3</sup> H01L 21/321, 21/304  
 U.S. Cl. 437—203 10 Claims



1. A method of forming a plurality of conductive studs within an insulator layer disposed between a first series of conductive structures arranged on a substrate and a second series of conductive structures formed on an upper surface of the insulator layer, comprising the steps of:  
 forming the insulator layer on the substrate, the insulator layer having a non-planar upper surface;  
 defining vias through said non-planar upper surface of the insulator layer, so as to expose at least one of said plurality of first conductive structures disposed on the substrate;  
 depositing a conductive layer on said non-planar upper surface of the insulator layer, said conductive layer com-

pletely filling said vias to contact said one of said plurality of first conductive structures, said conductive layer having a non-planar upper surface that substantially follows the topology of said non-planar upper surface of the insulating layer; and then

subjecting both of said non-planar upper surface of said conductive layer and said non-planar upper surface of the insulator layer to a single polish etch step in the presence of an abrasive slurry, so as to remove portions of said conductive layer laying outside of said apertures in the insulator layer while simultaneously removing appreciable portions of said non-planar upper surface of the insulator layer so as to establish planarity in said upper surface of the insulator layer.

4,956,314

## DIFFERENTIAL ETCHING OF SILICON NITRIDE

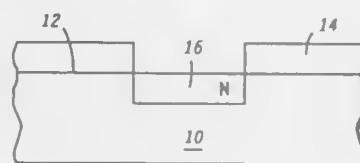
Gordon Tam, Chandler; Ronald N. Legge, Scottsdale, both of Ariz., and Wayne M. Paulson, Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 30, 1989, Ser. No. 357,844

Int. Cl.<sup>3</sup> H01L 21/311, 21/311.5

U.S. Cl. 437—241

17 Claims



1. A method for differentially etching silicon nitride comprising the steps of:  
forming a silicon nitride layer in an essentially hydrogen-free environment;  
implanting hydrogen into various regions of said silicon nitride layer; and  
differentially etching said silicon nitride layer.

4,956,315

## WHISKER REINFORCED CERAMICS AND A METHOD OF CLAD/HOT ISOSTATIC PRESSING SAME

Pankaj K. Mehrotra, Greensburg; Joyce L. Swiokla, Ligonier, and Elizabeth R. Billman, Pittsburgh, all of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Division of Ser. No. 92,118, Sep. 2, 1987, Pat. No. 4,820,663.

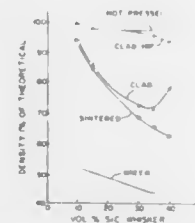
This application Nov. 16, 1988, Ser. No. 272,200

The portion of the term of this patent subsequent to Apr. 11, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> C04B 35/56, 35/62, 35/80

U.S. Cl. 501—87

29 Claims



1. A fired ceramic composition comprising a matrix phase and a carbide whisker phase, and a nitrogen containing phase formed as a reaction product of said carbide whisker phase with nitrogen, said carbide whisker phase forming 12.5 to 40 volume percent of said fired ceramic composition, the X-ray parameter of whisker orientation being within the range 0.66 to

1.5, and the density of the fired ceramic composition exceeding 95 percent theoretical.

11. A cutting tool comprising: a fired ceramic composition having a matrix phase, a ceramic whisker phase and a nitrogen containing phase formed as a reaction product of said ceramic whisker phase with nitrogen; said ceramic whisker phase forming 12.5 to 40 volume percent of said fired ceramic composition; and wherein the x-ray parameter of whisker orientation being within the range of 0.66 to 1.5; the density of said fired ceramic composition exceeding 95 percent theoretical; and said fired ceramic composition having a cutting edge at a junction of a rake face and a flank face.

4,956,316

## PROCESS FOR DISPERSING SILICON CARBIDE WHISKERS

Linda C. Sawyer, Chatham, N.J., assignor to Hoechst Celanese Corp., Somerville, N.J.

Filed Apr. 25, 1988, Ser. No. 185,676

Int. Cl.<sup>3</sup> C04B 35/56, 35/58, 35/76, 35/10

U.S. Cl. 501—88

50 Claims

18. In a method of forming a whisker-reinforced ceramic composite wherein said whiskers are selected from the group consisting of silicon carbide and silicon nitride and are mixed with ceramic powder and the mixture shaped to form a whisker-reinforced ceramic article and wherein the whiskers readily agglomerate rendering uniform mixing difficult, the improvement comprising: deagglomerating said whiskers prior to or simultaneous with said mixing by dispersing said whiskers in an aqueous silane dispersant comprising an effective amount of a silane, a cationic lubricant and sufficient acid to protonate said lubricant, said silane containing at least one nonreactive hydrocarbon group bonded to the silicon atom of said silane and at least one silicon-bonded group reactive with silicon.

39. A method of deagglomerating silicon-containing whiskers selected from the group consisting of silicon carbide and silicon nitride comprising mixing said whiskers with an aqueous silane dispersant comprising effective amounts of a silane, a cationic lubricant and sufficient acid to protonate said lubricant, said silane containing at least one nonreactive hydrocarbon group bonded to the silicon atom of said silane and at least one silicon-bonded group reactive with silicon.

4,956,317

## WHISKER-REINFORCED CERAMICS

Hitoshi Yokoi, Ama; Masakazu Watanabe, Nagoya; Akiyasu Okuno, Kanji, and Satoshi Ito, Konan, all of Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Filed Nov. 29, 1988, Ser. No. 277,374

Claims priority, application Japan, Dec. 1, 1987, 62-303829; May 25, 1988, 63-127687

Int. Cl.<sup>3</sup> C04B 35/58

U.S. Cl. 501—92

57 Claims

20. A whisker-reinforced ceramic consisting essentially of 5-40 weight % SiC including SiC whiskers, 1-30 weight % of alumina and optionally oxides of elements selected from the group consisting of Sc, Y and rare earth elements, and the balance being silicon oxynitride constituents, wherein said SiC whiskers are present in an amount of no less than 5 weight % of the total ceramic and wherein at least some of the alumina and silicon oxynitride constituents have reacted to form O'-silicon.

4,956,318

## CERAMIC CUTTING TOOL

David Moskowitz, Southfield, Mich., and Reuven Porat, Nahariya, Israel, assignors to Iscar Ceramics, Inc., Livonia, Mich.

Filed Nov. 20, 1989, Ser. No. 438,187

Int. Cl.<sup>3</sup> C04B 35/58

U.S. Cl. 501—96

5 Claims

3. In a method of cutting ferrous metal wherein a cutting tool is brought into contact with a ferrous metal workpiece and

the cutting tool and ferrous metal workpiece move relative to each other whereby metal is removed by the cutting tool from the metal workpiece, the improvement comprising using a hot pressed composite cutting tool consisting essentially of alpha alumina and 6 to 30 weight % aluminum nitride.

4,956,319

## COMPLIANT LAYER

Ratnes K. Dwivedi, Wilmington, and Virgil Irick, Jr., Hockessin, both of Del., assignors to Lanxide Technology Company, LP, Newark, Del.

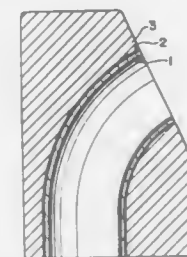
Division of Ser. No. 116,412, Nov. 3, 1987, Pat. No. 4,849,266.

This application Jan. 18, 1989, Ser. No. 298,613

Int. Cl.<sup>3</sup> C04B 35/02, 35/10, 35/16, 35/18

U.S. Cl. 301—127

23 Claims



1. A method of making a ceramic-metal composite body comprising:  
forming a ceramic article having an outer surface;  
adhering to at least a portion of the outer surface of said ceramic article a coating composition comprising plaster of paris and a filler material;  
casting molten metal around said ceramic article having said coating thereon; and  
solidifying said molten metal to yield a ceramic-metal composite body.

4,956,320

## POSITIVE TEMPERATURE COEFFICIENT SEMICONDUCTOR CERAMIC

Masahiro Asakura, and Akihiko Igawa, both of Kami, Japan, assignors to Kurabe Industrial Co., Ltd., Shizuoka, Japan

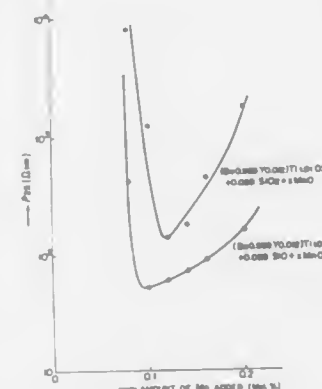
Filed Feb. 13, 1989, Ser. No. 309,657

Claims priority, application Japan, Mar. 1, 1988, 63-48417

Int. Cl.<sup>3</sup> C04B 35/46

U.S. Cl. 501—137

6 Claims



1. A positive temperature coefficient semiconductor ceramic, comprising:  
from 0.2 to 12 mole % of silicon monoxide added to a barium titanate semiconductor ceramic which has been made into

4,956,321

## SURFACE PACIFIED WOLLASTONITE

Jeffery L. Barrall, Lancaster, Pa., assignor to Armstrong World Industries, Inc., Lancaster, Pa.

Filed Jan. 16, 1988, Ser. No. 207,227

Int. Cl.<sup>3</sup> C04B 12/02, 33/02

U.S. Cl. 501—146

20 Claims

1. A method for pacifying wollastonite comprising the steps:  
(a) reacting the wollastonite in an aqueous acid medium to convert its surface by reaction with the acid further providing that the acid gives the wollastonite a displaceable anion without altering crystal structure, and  
(b) drying the wollastonite wherein, step (b) terminates the step (a) reaction, to provide a pacified product wherein 2% by weight or less of the total wollastonite is reacted.

4,956,322

## IMPROVEMENTS TO SOLID GRANULAR CATALYSTS, PROCESS FOR THEIR PREPARATION

Jean P. Gouard, Rueil-Malmaison, and Georges Szabo, Montvilliers, both of France, assignors to Compagnie de Raffinage et de Distribution Total France, Levallois-Perret, France

Filed Oct. 7, 1988, Ser. No. 255,709

Claims priority, application France, Oct. 7, 1987, 87 13846

Int. Cl.<sup>3</sup> B01J 29/06, 37/02

U.S. Cl. 502—62

12 Claims

2. A solid granular catalyst comprising catalyst granules coated with a continuous removable protective film of a material that is impermeable to gases and moisture and inert to the constituents of said catalyst, said protective film comprising a mixture of from 95% to 90% by weight of at least one saturated hydrocarbon having a melting point of 40° C. to 120° C. and from 5% to 10% by weight of a polyethylene wax having a molecular weight of 500 to 10,000.

7. A catalyst as defined in claim 2, comprising a support selected from the group consisting of alumina, silica, the aluminosilicates, the zeolites, magnesia zirconia, the oxides of gallium, titanium, thorium and boron, or a mixture of these oxides, and at least one active compound selected from the group consisting of Lewis acids, hydrolyzable metals, and pyrophoric sulfides.

4,956,323

## CATALYSTS PREPARED FROM TETRAKIS(DIALKYLAMIDE OR DIARYLAMIDE) DERIVATIVES OF TITANIUM AND POLYMERIZATION OF OLEFINS THEREWITH

John G. Hefner, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 295,855, Jan. 11, 1989, Pat. No. 4,892,914,

which is a continuation-in-part of Ser. No. 236,691, Aug. 25, 1988, abandoned, which is a continuation-in-part of Ser. No.

126,331, Nov. 30, 1987, abandoned. This application Sep. 8,

1989, Ser. No. 404,724

Int. Cl.<sup>3</sup> C08F 4/64

U.S. Cl. 502—113

8 Claims

1. A supported catalyst which comprises the product resulting from mixing in a suitable inert diluent or solvent

- (A) an inorganic support;
- (B) a metal-containing reducing agent;
- (C) a transition metal compound selected from the group consisting of a titanium tetrakis(dialkylamide) or titanium tetrakis(diarylamide) or a combination thereof; wherein in the preparation of the catalyst, all of components (A) and (B) are added prior to the addition of component (C) and the components are employed in quantities which provide an atomic ratio of Ms:Tm of from about 2:1 to about 160:1



an atomic ratio of Mr:Tm of from about 1:1 to about 64:1; and wherein Ms represents the metal atoms in the support material, Mr represents the metal atoms in the reducing agent and Tm represents the sum of the transition metal atoms in the transition metal component.

2. A supported catalyst of claim 1 wherein the components are employed in quantities which provide an atomic ratio of Ms:Tm of from about 8:1 to about 80:1 and an atomic ratio of Mr:Tm of from about 2:1 to about 32:1.

3. A supported catalyst of claim 2 wherein the components are employed in quantities which provide an atomic ratio of Ms:Tm of from about 11:1 to about 40:1 and an atomic ratio of Mr:Tm of from about 4:1 to about 16:1.

6. A supported catalyst of claim 1, 2 or 3 wherein the transition metal component (C) additionally contains at least one zirconium or hafnium compound selected from a zirconium tetrakis(dialkylamide), a zirconium tetrakis(diarylamide), a hafnium tetrakis(dialkylamide), a hafnium tetrakis(diarylamide), or any combination thereof; wherein the atomic ratio of (Zr+Hf) to (Ti+Zr+Hf) is from about <0:1 to about 0.9:1.

#### 4,956,324 CATALYST CONTAINING DIPOLAR COMPOUNDS USEFUL FOR SWEETENING A SOUR HYDROCARBON FRACTION

Sheila Pollastrini, Bloomington; Jeffery C. Bricker, Buffalo Grove, and Robert R. Frame, Glenview, all of Ill., assignors to UOP, Des Plaines, Ill.

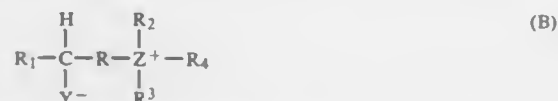
Continuation-in-part of Ser. No. 386,923, Jul. 31, 1989. This application Feb. 1, 1990, Ser. No. 473,512  
Int. Cl.<sup>5</sup> B01J 31/22

U.S. Cl. 502—163 18 Claims

1. A catalyst effective for oxidizing mercaptans present in a sour hydrocarbon fraction comprising a basic solution containing a metal chelate and a promoter which is a dipolar compound having the structural formula



where Z is nitrogen or phosphorus, R is a linear alkyl group having from one to about 18 carbon atoms, R<sub>1</sub> and R<sub>2</sub> are each individually hydrogen or a hydrocarbon group selected from the group consisting of alkyl, aryl, alkaryl, aralkyl and cycloalkyl, R<sub>3</sub> and R<sub>4</sub> are each individually a hydrocarbon group selected from the group consisting of alkyl, aryl, alkaryl, aralkyl and cycloalkyl, YH is an electronegative group selected from the group consisting of OH, SH, COOH, SO<sub>3</sub> H and NH<sub>2</sub>, the electronegative group characterized in that it is capable of being deprotonated in a basic solution, and X is an anion selected from the group consisting of the halogens and hydroxide; or the structural formula



where Y<sup>-</sup> is the deprotonated form of YH.

#### 4,956,325 METHOD OF IMPREGNATING A SUPPORT MATERIAL

Binh Ngoc Le, Humble, Tex., assignor to Merichem Company, Houston, Tex.

Filed Mar. 23, 1989, Ser. No. 327,557

Int. Cl.<sup>5</sup> B01J 31/12

U.S. Cl. 502—163 18 Claims

1. A process for impregnating a support material with a metal phthalocyanine oxidation catalyst which comprises: contacting said support material with an aqueous impregnat-

ing solution of said metal phthalocyanine dissolved in a monoalkanol amine.

#### 4,956,326 METHOD FOR DEHALOGENATION OF A HALIDE AND CATALYST USED THEREFOR

Noriyuki Yoneda; Toshiji Makabe; Jun Kaita; Munekazu Nakamura; Yoshiko Endoh; Hideo Kudo; and Shunji Higashi, all of Kanagawa, Japan, assignors to Chiyoda Chemical Engineering & Construction Co., Ltd., Kanagawa and Nippon Kokan Co., Ltd., Tokyo, both of Japan

Filed Jul. 10, 1987, Ser. No. 71,964

Claims priority, application Japan, Jul. 10, 1986, 61-160891; Jul. 10, 1986, 61-160892; Oct. 2, 1986, 61-233297

Int. Cl.<sup>5</sup> B01J 27/24

U.S. Cl. 502—178 10 Claims

1. A catalyst for dehalogenation of a halide comprising a corrosion-resistant ceramic or graphite having a surface area of 5.0 m<sup>2</sup>/g or less and, supported thereon, at least one member selected from the group consisting of a platinum group metal and a silicide thereof.

#### 4,956,327 MIXED BASIC METAL OXIDE/SULFIDE CATALYST

Erek J. Erekson, LaGrange; Anthony L. Lee, Glen Ellyn; S. Peter Barone, Hoffman Estates, and Irvine J. Solomon, Highland Park, all of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Filed May 31, 1989, Ser. No. 359,500

Int. Cl.<sup>5</sup> B01J 23/02, 23/04, 23/20

U.S. Cl. 502—216 21 Claims

1. A mixed basic metal oxide/sulfide catalyst having the formula:



wherein

A is an alkali metal selected from lithium, sodium, potassium, rubidium, cesium and mixtures thereof;  
B is a cation which has an ionization state 2 and 3 greater than the ionization state of C;  
C is selected from hafnium, tantalum, niobium, vanadium and mixtures thereof;  
D is selected from oxygen, sulfur and mixtures thereof;  
x and y are in mole fractions of z such that when z=1 then x=0.001 to 0.25, and y=0.001 to 0.25; and  
q is a number necessary to maintain charge balance with D.

#### 4,956,328 PROCESS FOR THE PREPARATION OF CATALYST COMPOSITIONS CONTAINING NICKEL, ALUMINA, AND ZIRCONIUM DIOXIDE AND CATALYSTS MADE THEREFROM

Carl D. Frohning, Wesel, and Gerhardt Horn, Oberhausen, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 20, 1989, Ser. No. 325,661

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 3811038

Int. Cl.<sup>5</sup> B01J 21/04, 21/06, 23/74

U.S. Cl. 502—242 70 Claims

1. A process for the preparation of a composition comprising precipitation from an aqueous starting solution of a mixture of nickel, aluminum, and zirconium salts by means of an aqueous precipitating solution containing an amount of a basic compound, said amount being in stoichiometric excess of that required for complete precipitation of said salts, said precipitation being carried out at a precipitation temperature of at least

60° C. and a precipitation pH of 7 to 10, and depositing said composition onto a support.

#### 4,956,329 HIGH SURFACE AREA CORDIERITE CATALYST SUPPORT STRUCTURES

Tai-Hsiang Chao, Mt. Prospect; Michael W. Schoonover, Arlington Heights, and Gerald T. Stranford, Palatine, all of Ill., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Nov. 28, 1988, Ser. No. 276,610

Int. Cl.<sup>5</sup> B01J 21/00, 32/00

U.S. Cl. 502—251 26 Claims

1. A catalyst support structure consisting essentially of a substantially polycrystalline cordierite phase having a chemical composition by weight of 6–15% MgO, 33–40% Al<sub>2</sub>O<sub>3</sub> and 45–56% SiO<sub>2</sub>, the structure characterized in that it has a surface area of at least 2.7 m<sup>2</sup>/g, a compressive strength of at least 31 MPa, a thermal expansion coefficient smaller than 5.2×10<sup>-6</sup> m/m/° C. over the temperature range 23°–800° C. and a porosity of at least 20%.

5. A method of preparing a catalyst support structure consisting essentially of:

- (a) coprecipitating salts of aluminum, magnesium and silicon in a basic medium to provide a homogeneous mixture of said salts;
- (b) treating the homogeneous mixture of salts to afford a dry mixture;
- (c) passing a moldable mass comprising the dry mixture and a binder through a die to give a shaped article; and
- (d) heating the shaped article at a temperature and for a time sufficient to provide a catalyst support structure comprising a polycrystalline cordierite phase having a surface area of at least 2.7 m<sup>2</sup>/g.

26. In a catalytic composite comprising at least one catalytic metal dispersed on a support, wherein the improvement comprises a support consisting essentially of a substantially polycrystalline cordierite phase having a chemical composition by weight of 6–15% MgO, 33–40% Al<sub>2</sub>O<sub>3</sub> and 45–56% SiO<sub>2</sub>, having a surface area of at least 2.7 m<sup>2</sup>/g, a compressive strength of at least 31 MPa, a thermal expansion coefficient smaller than 5.2×10<sup>-6</sup> m/m/° C. over the temperature range of 23°–800° C. and a porosity of at least 20%.

#### 4,956,330 CATALYST COMPOSITION FOR THE OXIDATION OF CARBON MONOXIDE

David J. Elliott, Bartlesville, and John H. Kolts, Ocheilata, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 19, 1989, Ser. No. 368,493

Int. Cl.<sup>5</sup> B01J 21/06, 23/78, 23/89

U.S. Cl. 502—326 23 Claims

1. A composition of matter consisting essentially of (a) a support material consisting essentially of titania, (b) platinum metal, (c) iron oxide, and (d) at least one compound of at least one alkali metal;

wherein said composition of matter is active as a catalyst for the oxidation of carbon monoxide with free oxygen to carbon dioxide at about 10°–50° C.; and said composition of matter contains components (b), (c) and (d) in amounts such that component (c) is a copromoter for component (b) on said support material in said oxidation at about 10°–50° C., and component (d) is a copromoter for the combination of components (b) and (c) on said support material in said oxidation at about 10°–50° C.

#### 4,956,331 PROCESS FOR PRODUCING METAL SUPPORTED CATALYST HAVING HIGH SURFACE AREA

Kazunori Tsurumi, Tokyo; Toshihide Nakamura, Funabashi, and Akira Sato, Misato, all of Japan, assignors to Tanaka Kikin-zoku Kogyo K.K., Japan

Filed Feb. 17, 1989, Ser. No. 312,702

Claims priority, application Japan, Feb. 18, 1988, 63-36249  
Int. Cl.<sup>5</sup> B01J 21/18, 23/42, 23/44

U.S. Cl. 502—339 4 Claims

1. A process for producing a metal supported catalyst having a large surface area comprising: reducing one or more metal containing ions in a solution to a corresponding metal or metals employing a solution of one or more reducing agents selected from the group consisting of sodium thiosulfate, potassium thiosulfate, ammonium thiosulfate, sodium metabisulfite, potassium metabisulfite and ammonium metabisulfite; the solution of reducing agent being initially added dropwise and all at once thereafter to assure the formation of nuclei for forming finely-divided catalyst particles; and supporting the reduced metal or metals having a large surface area onto supports.

#### 4,956,332 HEAT-SENSITIVE RECORDING MATERIAL

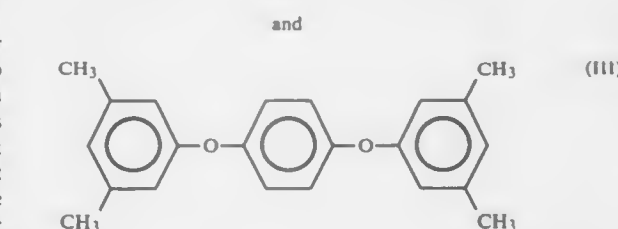
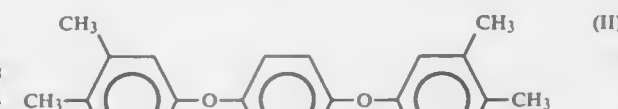
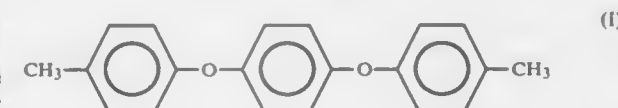
Yoshiyuki Takahashi, Kawasaki; Kunitaka Toyofuku, Sakura, and Akiko Iwasaki, Urawa, all of Japan, assignors to Oji Paper Co., Ltd., Tokyo, Japan

Filed Aug. 28, 1989, Ser. No. 399,054

Claims priority, application Japan, Nov. 2, 1988, 63-276186  
Int. Cl.<sup>5</sup> B41M 5/18

U.S. Cl. 503—209 4 Claims

1. A heat-sensitive recording material comprising: a substrate sheet; and a heat-sensitive color-developing layer formed on at least one surface of the substrate sheet and comprising a substantially colorless dye precursor, a color developing agent capable of reacting with the dye precursor under heating to develop a color, a binder, and a heat-fusible sensitizing agent consisting essentially of at least one member selected from the 1,4-bis(alkylphenoxy)benzenes of the formulae (I), (II) and (III):



4,956,333

## HEAT-SENSITIVE RECORDING MATERIAL

Kenichi Kawahara, Iwatsuki, Masaharu Nomura, Hasoda, Hiroaki Tsugawa, Matsudo, and Hirofumi Iwamoto, Omiya, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

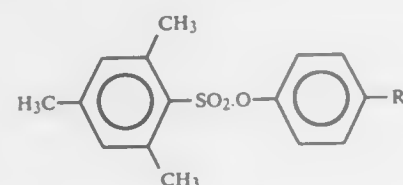
Filed Sep. 18, 1989, Ser. No. 409,043

Claims priority, application Japan, Sep. 19, 1988, 63-232642  
Int. Cl.<sup>3</sup> B41M 5/18

U.S. Cl. 503—209

1 Claim

1. A heat sensitive recording material which comprises a support and a heat sensitive color-developing layer containing a leuco dye, and an acidic substance and a compound represented by the formula (I),



wherein R represents a hydrogen atom or a methyl group, a leuco dye and an acidic substance on a support.

4,956,334

## METHOD FOR PREPARING A SINGLE CRYSTAL OF LANTHANUM CUPRATE

Kunihiko Oka, and Hiromi Unoki, both of Tsukuba, Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

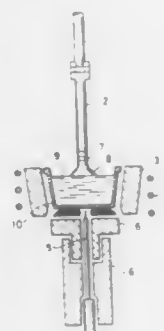
Filed Mar. 14, 1988, Ser. No. 168,021

Claims priority, application Japan, May 1, 1987, 62-109517;  
May 1, 1987, 62-109518; May 1, 1987, 62-109519

Int. Cl.<sup>3</sup> C30B 15/30

U.S. Cl. 505—1

5 Claims



1. A method for preparing a single crystal of lanthanum cuprate comprising the steps of:  
mixing 28.9 to 71.1 mole % of at least one of lanthanum oxide and lanthanum carbonate and 71.1 to 92.9 mole % of copper oxide;  
heating the mixture to form a melt;  
contacting a seed crystal to said melt; and  
slowly cooling said melt and pulling said seed crystal so that a crystallite deposits on said seed crystal and a single crystal of lanthanum cuprate having a composition represented by the formula  $\text{La}_2\text{CuO}_4$  grows from said crystallite.

4,956,335

## CONDUCTIVE ARTICLES AND PROCESSES FOR THEIR PREPARATION

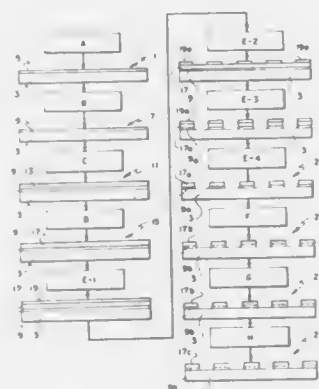
John A. Agostinelli, Rochester, and Gerrit Lubberts, Penfield, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 20, 1988, Ser. No. 208,706

Int. Cl.<sup>3</sup> B32B 3/00

U.S. Cl. 505—1

31 Claims



1. An article capable of forming on heating a superconducting thin film having a superconducting transition temperature of greater than 30° K. comprising a substrate capable of withstanding temperatures required to form said thin film and a mixed metal oxide layer capable of crystallizing to form said thin film on heating characterized in that a readily etchable, thin lift-off layer is interposed between said substrate and said mixed metal oxide layer and is selected from among copper, copper oxide and oxides and carbonates of alkaline earth metals which are components of said mixed metal oxide.

4,956,336

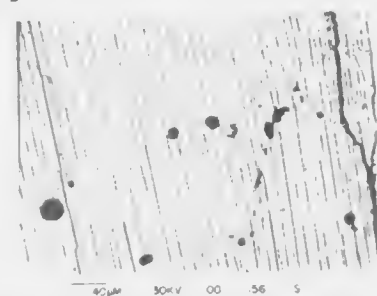
## ORIENTED GRAINED Y-Ba-Cu-O SUPERCONDUCTORS HAVING HIGH CRITICAL CURRENTS AND METHOD FOR PRODUCING SAME

Kamel Salama, and Venkatakrishnan Selvamani, both of Houston, Tex., assignors to University of Houston - University Park, Houston, Tex.

Filed Feb. 10, 1989, Ser. No. 309,382

Int. Cl.<sup>3</sup> C01B 13/14; C01F 11/02; C01G 3/02; C04B 35/60  
U.S. Cl. 505—1

7 Claims



1. A process for preparing a superconducting metal oxide complex comprising the steps of:  
(a) mixing solid compounds containing Y, Ba, Cu and O in amounts appropriate to yield the formula  $\text{Y}_1\text{Ba}_2\text{Cu}_3\text{O}_{6+\delta}$  wherein  $\delta$  has a number value of from about 0.1 to about 1.0;  
(b) heating the solid compounds in air to a temperature between about 920° C. to about 960° C. for a time sufficient to react the compounds in the solid state  
(c) quenching the solid state reaction product to ambient temperature in air;

- compacting the mixture into a solid mass by application of pressure from about 9,000 to about 11,000 psi;
- sintering the solid mass in air at a temperature between about 920° C. to about 960° C.;
- heating the solid mass in a preheated chamber to a temperature of from about 1,090° C. to 1,200° C. for a time sufficient to partially melt and decompose said mass;
- rapidly cooling the mass to a temperature between about 1,020° to about 1,040° C. and then cooling said mass to a steady temperature between about 20° C. to 40° C. below its melting point at a rate of approximately 1° C./hour;
- maintaining the mass at said steady temperature for a time sufficient for the entire mass to resolidify;
- cooling said resolidified mass in air from said steady temperature to approximately 550° C. to 650° C. at the rate of approximately 60° C. per hour;
- additionally cooling the resolidified mass to about 380° C. to about 420° C. at the rate of approximately 30° C. per hour in air; and
- annealing the resolidified mass in an oxygen containing atmosphere for a time sufficient for the requisite amount of oxygen to diffuse into the mass.

4,956,337

## NB-SI-AL-O SUPERCONDUCTORS WITH HIGH TRANSITION TEMPERATURES AND PROCESS FOR MANUFACTURING THE SAME

Tetsuya Ogushi, Kagoshima, Japan, assignor to Kagoshima University, Kagoshima, Japan  
Continuation-in-part of Ser. No. 262,181, Oct. 20, 1988, abandoned, which is a continuation of Ser. No. 943,518, Dec. 17, 1986, abandoned. This application Jun. 16, 1989, Ser. No. 367,060

Claims priority, application Japan, Jan. 22, 1986, 61-11728  
Int. Cl.<sup>3</sup> H01C 39/12; C23C 14/34; B05D 5/12

U.S. Cl. 505—1

11 Claims

1. A superconductive material with a superconducting critical temperature of at least 77° K., having a composition of 20 atomic % niobium (Nb), 10 atomic % silicon (Si), 10 atomic % aluminum (Al) and 60 atomic % oxygen (O), which comprises crystalline grains of intermetallic compound comprising Nb, Si, and Al and having an Nb/Si atomic ratio of 2/1, said superconductive material containing oxides of Nb, Si and Al in the boundaries of said crystalline grains.

4,956,338

## METHODS FOR FORMING COMPLEX OXIDATION REACTION PRODUCTS INCLUDING SUPERCONDUCTING ARTICLES

Robert A. Rapp, Columbus, Ohio; Andrew W. Urquhart, Newark; Alan S. Nagelberg, and Marc S. Newkirk, Newark, all of Del., assignors to Lanxide Technology Company, LP, Newark, Del.

Continuation of Ser. No. 119,760, Nov. 12, 1987, abandoned, which is a continuation-in-part of Ser. No. 69,731, Jul. 6, 1987, abandoned. This application Jul. 6, 1988, Ser. No. 217,105  
Int. Cl.<sup>3</sup> C04B 35/00

U.S. Cl. 505—1

47 Claims

1. A method for producing a complex oxidation reaction product of two or more metals in an oxidized state, which comprises:  
(a) positioning a parent metal source comprising at least one first metal of said two or more metals adjacent to a permeable mass comprising at least one metal-containing compound capable of reaction to form said complex oxidation reaction product in step (b) below, the metal component of said at least one metal-containing compound comprising at least a second of said two or more metals, and orienting said parent metal source and said permeable mass relative to each other so that formation of the complex oxidation reaction product will occur in a direction towards and into said permeable mass; and  
(b) heating said parent metal source in the presence of a

vapor-phase oxidant to a temperature region above its melting point to form a body of molten parent metal to permit infiltration and reaction of the molten parent metal into said permeable mass and with said vapor-phase oxidant and said at least one metal-containing compound to form said complex oxidation reaction product, without reduction of the metal component of said at least one metal-containing compound to elemental metal, and progressively drawing the molten parent metal source through the complex oxidation reaction product towards said vapor-phase oxidant and towards and into the adjacent permeable mass so that fresh complex oxidation reaction product continues to form within the permeable mass; and  
(c) recovering the resulting complex oxidation reaction product.

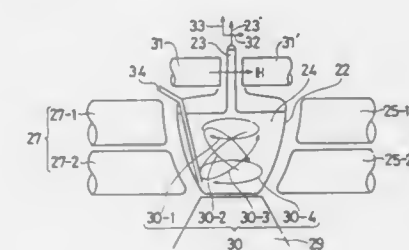
4,956,339

## METHOD FOR MANUFACTURING SUPERCONDUCTING CERAMICS IN A MAGNETIC FIELD

Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan  
Filed Sep. 20, 1988, Ser. No. 246,785  
Claims priority, application Japan, Sep. 21, 1987, 62-236961  
Int. Cl.<sup>3</sup> H01L 39/24

U.S. Cl. 505—1

9 Claims



1. A method of fabricating single crystals of superconducting ceramics comprising:  
melting a magnetic copper based oxide mixture conforming to a composition required for superconduction;  
applying a magnetic field to said molten oxide mixture in a fixed direction;  
freezing said molten mixture in said magnetic field and then forming a superconducting ceramic single crystal.

4,956,340

## PROCESS FOR PREPARING COMPOUND METAL OXIDES OF YTTRIUM, BARIUM AND COPPER

Etsuji Kimura, Kasukabe; Nozomu Hasegawa, Omiya, and Yutaka Nishiyama, Kagawa, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 227,234, Aug. 1, 1988, abandoned. This application Nov. 3, 1989, Ser. No. 432,316  
Claims priority, application Japan, Jul. 31, 1987, 62-190201  
Int. Cl.<sup>3</sup> C01F 11/02; C01G 3/02

U.S. Cl. 505—1

8 Claims

1. A process for preparing a compound oxide of yttrium, barium and copper, comprising preparing an aqueous solution containing said yttrium, barium and copper in a content ratio corresponding to the composition of said compound oxide, adding oxalic acid to said aqueous solution to obtain a precipitate, and adjusting the pH of said aqueous solution to a value of 1.5 to 2.0, wherein said oxalic acid is added in an amount such that 0.05M/l to 0.1M/l of oxalate ions remain after precipitation of said yttrium, barium, and copper, and wherein the ratio yttrium:barium:copper in said solution is about 1:2:3, and collecting and firing said precipitate to obtain a compound oxide



in which the ratio of yttrium, barium and copper, respectively, is about 1:2:3.

4,956,341

### 3-TERT-BUTYL-4-METHOXYCYCLOHEXYLMETHANOL, ITS PREPARATION AND ITS USE AS A SCENT

Dieter Degner, Dannstadt-Schauernheim; Walter Gramlich, Edingen-Neckarhausen, and Ludwig Schuster, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
Continuation of Ser. No. 151,609, Feb. 2, 1988, abandoned. This application Mar. 21, 1989, Ser. No. 326,403

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1987, 3705299

Int. Cl.<sup>5</sup> A61K 7/46

U.S. Cl. 512—23

2 Claims

1. 3-tert-butyl-4-methoxycyclohexylmethanol.
2. A fragrance composition, comprising:  
3-tert-butyl-4-methoxycyclohexylmethanol in combination with the other ingredients of a cosmetic, cleanser or polish formulation.

4,956,342

### ALKYLTETRAMETHYLCYCLOHEXANE DERIVATIVES AND THEIR USE AS PERFUMES

Phillip A. Christenson, Midland Park, and Brian J. Drake, Clifton, both of N.J., assignors to BASF K & F Corp., Parsippany, N.J.

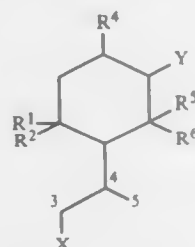
Division of Ser. No. 100,115, Sep. 23, 1987, Pat. No. 4,808,339. This application Mar. 23, 1989, Ser. No. 328,332

Int. Cl.<sup>5</sup> A61K 7/46

U.S. Cl. 512—24

10 Claims

1. A fragrance oil comprising an aromatic spirit and an alkyltetramethylcyclohexane derivative of the formula



wherein X is H, R<sup>1</sup>CO— or R<sup>1</sup>COH—;

Y is H or R<sup>1</sup>CO—;

R<sup>1</sup> is H or C<sub>1-4</sub> alkyl;

R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and R<sup>6</sup> are C<sub>1-4</sub> alkyl;

and — is a single or double bond;

provided that the carbon atom at position 4 can have only one double bond, that at least four of R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and R<sup>6</sup> are methyl, and that one but not both of X and Y is H.

4,956,343

### CONTROL OF INSECTS BY ROSEOTOXIN B

Patrick F. Dowd, Peoria, Ill., and Richard J. Cole, Albany, Ga., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 2, 1988, Ser. No. 188,993

Int. Cl.<sup>5</sup> A61K 37/02; C07K 11/02

U.S. Cl. 514—11

4 Claims

1. A method of controlling insects comprising applying to a locus of said insects an insecticidally effective amount of roseotoxin B.

4,956,344

### METHOD FOR TREATMENT OF LESIONS IN THE LARGE INTESTINAL EPITHELIUM WITH A TRIPEPTIDE

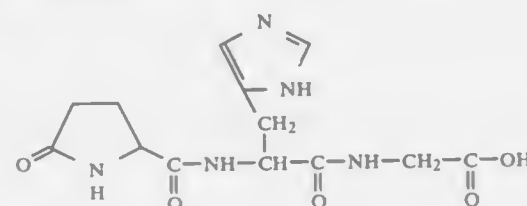
Tellef Fosli, Nissedal; Karl L. Reibelt; Oyvind Skraastad, both of Oslo, and Paul D. Edminson, Rykkinn, all of Norway, assignors to Hafslund Nycomed A/S, Oslo, Norway  
Continuation of Ser. No. 098,059, Sep. 17, 1987, abandoned. This application Feb. 1, 1989, Ser. No. 304,904

Int. Cl.<sup>5</sup> A61K 37/02

U.S. Cl. 514—18

1 Claim

1. A method for treatment of hyperproliferative benign or malignant lesions in the large intestinal epithelium which comprises administering to a subject having such lesions an effective amount to treat such lesions of the tripeptide L-pyroglyutamyl-L-histidylglycine of the formula:



wherein the pyroglutamyl and histidyl moieties are of the L-configuration.

4,956,345

### 2-ALKYNYLADENOSINES AS ANTIHYPERTENSIVE AGENTS

Tadashi Miyasaka, Yokohama; Akira Matsuda, Sapporo; Tetsu Abiru, Sawara, and Haruhiko Machida, Choshi, all of Japan, assignors to Yamasa Shoyu Kabushiki Kaisha, Chiba, Japan  
Continuation of Ser. No. 924,345, Oct. 24, 1986, abandoned.

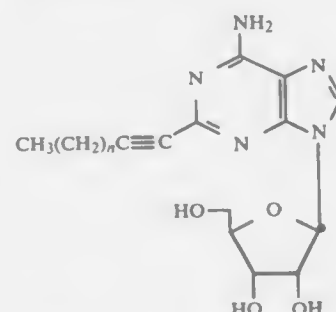
This application Dec. 12, 1988, Ser. No. 282,892

Claims priority, application Japan, Oct. 25, 1985, 60-240137  
Int. Cl.<sup>5</sup> A61K 31/70; C07H 19/167

U.S. Cl. 514—46

4 Claims

1. A method for treating hypertension in mammals suffering therefrom which comprises administering to such mammals an antihypertensive effective amount of a 2-alkynyladenosine represented by formula [I]:



wherein n is an integer of from 2 to 15, and a pharmaceutically acceptable carrier.

4,956,346

### PYRIMIDINE DERIVATIVES AS AN ANTIVIRAL AGENT

Robert W. Lambert, Welwyn; Joseph A. Martin, Harpenden, and Gareth J. Thomas, Welwyn, all of England, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 79,730, Jul. 30, 1987, Pat. No. 4,886,785.

This application Sep. 29, 1989, Ser. No. 414,784

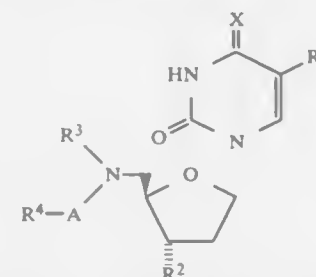
Claims priority, application United Kingdom, Aug. 12, 1986, 8619630

Int. Cl.<sup>5</sup> A61K 31/70

U.S. Cl. 514—50

3 Claims

1. A method of controlling or preventing viral infections which comprises administering to a warmblooded animal in need of thereof an antivirally effective amount of a compound of the formula



wherein A is C<sub>1-8</sub>-alkylene, R<sup>1</sup> is halogen, C<sub>1-4</sub>-alkyl or halo-(C<sub>1-4</sub>-alkyl), R<sup>2</sup> is hydrogen, hydroxy, C<sub>1-4</sub>-alkoxy, cyclopentylpropionyloxy, phenylacetoxy, or benzyloxy, R<sup>3</sup> is hydrogen or C<sub>1-4</sub>-alkyl, R<sup>4</sup> is unsubstituted phenyl or phenyl carrying one or more substituents selected from the group consisting of halogen, hydroxy, C<sub>1-4</sub>-alkyl, C<sub>1-4</sub>-alkoxy, trifluoromethyl, nitro and phenyl or an unsubstituted phenyloxy or phenyloxy carrying one or more substituents selected from the group consisting of halogen, hydroxy, C<sub>1-4</sub>-alkyl, C<sub>1-4</sub>-alkoxy, trifluoromethyl, nitro and phenyl and X is O or NH, or a tautomer thereof.

4,956,347

### USE OF SULFOMUCOPOLYSACCHARIDES IN THE TREATMENT OF ALZHEIMER-TYPE SENILE DEMENTIA

Thomas A. Ban, Nashville, Tenn., and Umberto Cornelli, Milan, Italy, assignors to Crinos Industria Farmacobiologica Spa, Como, Italy

Filed May 23, 1988, Ser. No. 197,419

Claims priority, application Italy, May 28, 1987, 20698 A/87

Int. Cl.<sup>5</sup> A61K 31/715; 31/725

U.S. Cl. 514—54

2 Claims

1. A method for the treatment of a patient suffering from Alzheimer-type senile dementia which comprises administering to the patient 250-500 LPU-RU of atoid per day to reduce the symptoms of said senile dementia.

4,956,348

### STIMULATION OF TEAR SECRETION WITH CYCLIC NUCLEOTIDES

Jeffrey P. Gilbard, Boston, and Darlene A. Dartt, Newton, both of Mass., assignors to Eye Research Institute of Retina Foundation, Boston, Mass.

Division of Ser. No. 830,997, Feb. 19, 1986, Pat. No. 4,753,945.

This application Jun. 27, 1988, Ser. No. 211,585

Int. Cl.<sup>5</sup> A61K 31/70

U.S. Cl. 514—47

4 Claims

1. A method of stimulating in vivo fluid secretion from human accessory lacrimal glands comprising the step of topical administration of the ocular surface of a therapeutically effective amount of a preparation which includes a compound selected from the group consisting of 8-bromo-3',5'-cyclic adenosine monophosphate and 8-bromo-3',5'-cyclic guanosine monophosphate which compound causes an increase in the

intracellular cyclic nucleotide levels in said accessory lacrimal glands.

4,956,349

### ANTI-INFLAMMATORY FACTOR, METHOD OF ISOLATION, AND USE

Lee R. Beck, Lebanon, Ohio, assignor to Stollie Research & Development Corporation, Lebanon, Ohio  
Continuation-in-part of Ser. No. 1,848, Jan. 9, 1987, Pat. No. 4,897,265, which is a continuation-in-part of Ser. No. 384,625, Jan. 3, 1982, abandoned, which is a division of Ser. No. 546,162, Oct. 27, 1983, Pat. No. 4,636,384, which is a division of Ser. No. 910,297, Sep. 17, 1986, which is a continuation of Ser. No. 576,001, Feb. 1, 1983, abandoned. This application Apr. 4, 1988, Ser. No. 177,223

Int. Cl.<sup>5</sup> A61K 31/715; 35/20; C08B 37/00

U.S. Cl. 514—54

23 Claims

1. An anti-inflammatory factor, in substantially pure form, produced by a process comprising:
  - (i) removing the fat from milk of a milk-producing animal to produce skimmed milk;
  - (ii) removing casein from said skimmed milk to produce whey;
  - (iii) removing from said whey macromolecules having a molecular weight greater than about 10,000 daltons;
  - (iv) fractionating the low-molecular weight product from the previous step by ion exchange chromatography;
  - (v) further purifying the anti-inflammatory factor from the previous step by molecular sieve chromatography; and
  - (vi) collecting said anti-inflammatory factor.

4,956,350

### WOUND FILLING COMPOSITIONS

Derald T. Mosbey, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 18, 1988, Ser. No. 233,560

Int. Cl.<sup>5</sup> A61K 31/00; C08B 37/00; C08L 5/00

U.S. Cl. 514—55

10 Claims

1. A method of treating a wound comprising applying to the wound a composition comprising:
  - (a) an amount of chitosan effective to promote healing or provide anti-microbial activity, or both,
  - (b) at least one compatible hydrocolloid material, other than chitosan, and
  - (c) water wherein said composition is a homogeneous gel having an initial viscosity suitable to allow it to be applied to and remain in said wound, yet said composition is neither formed by nor exhibits syneresis.

4,956,351

### ANTIVIRAL PHARMACEUTICAL COMPOSITIONS CONTAINING CYCLODEXTRINS

Jean L. Mesens, Wechelderzande, and Koenraad J. L. M. Andries, Beerse, both of Belgium, assignors to Janssen Pharmaceutica N.V., frame-543, Beerse, Belgium

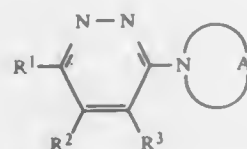
Continuation-in-part of Ser. No. 68,512, Jul. 1, 1987, abandoned. This application Jun. 23, 1988, Ser. No. 210,677

Int. Cl.<sup>5</sup> A61K 9/18; C08B 37/16

U.S. Cl. 514—58

36 Claims

1. A pharmaceutical composition for treating a rhino viral infection in a mammal which comprises a cyclodextrin and an anti-rhinoviral agent, with the proviso that if the cyclodextrin is a γ-cyclodextrin ether or mixed ether, wherein the ether substituents are C<sub>1-6</sub>-alkyl, hydroxyC<sub>1-6</sub>-alkyl, carboxyC<sub>1-6</sub>-alkyl or (C<sub>1-6</sub>-alkyloxycarbonyl)C<sub>1-6</sub>-alkyl, then said agent is not of the following formula:



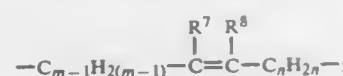
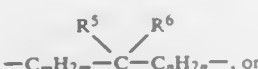
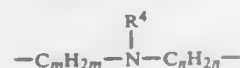
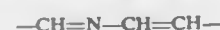
a pharmaceutically-acceptable acid-addition salt and/or a stereochemically isomeric form and/or a possible tautomeric form thereof,

wherein

R<sup>1</sup> is a member selected from the group consisting of hydrogen, halo, 1H-imidazol-1-yl, lower alkoxy, aryloxy, arylower alkoxy, lower alkylthio, arylthio, hydroxy, mercapto, amino, lower alkylsulfinyl, lower alkylsulfonyl, cyano, lower alkoxycarbonyl, lower alkylcarbonyl, and lower alkyl;

R<sup>2</sup> and R<sup>3</sup> are, each independently, members selected from the group consisting of hydrogen and lower alkyl, or R<sup>2</sup> and R<sup>3</sup> combined may form a bivalent radical of formula —CH=CH—CH=CH—;

A is a bivalent radical of formula:



wherein one of the hydrogen atoms within the radical C<sub>m</sub>H<sub>2m</sub>, C<sub>m</sub>-H<sub>2(m-1)</sub> or C<sub>n</sub>H<sub>2n</sub> may be replaced by lower alkyl or aryl; m and n are, each independently, integers of from 1 to 4 inclusive, the sum of m and n being 3, 4 or 5;

R<sup>4</sup> is a member selected from the group consisting of hydrogen; lower alkyl; aryl; thiazolyl; pyrimidinyl; quinolinyl; lower alkylcarbonyl; lower alkoxycarbonyl; arylower alkyl; diarylower alkyl; phenyl being substituted with arylcarbonyl; pyridinyl which may be substituted with cyano or lower alkyl; cyclohexenyl and cyclohexenyl both of which may be substituted with up to two substituents independently selected from the group consisting of cyano and aryl;

R<sup>5</sup> is hydrogen; lower alkyl; aryl; hydroxy; lower alkoxy; aryloxy; lower alkoxy being substituted with morpholine, pyrrolidine or piperidine; amino; (lower alkoxycarbonyl)amino; arylamino; (aryl)(lower alkyl)amino; (aryl-lower alkyl)amino; (aryllower alkenyl)amino; (aryllower alkenyl)(lower alkyl)amino; arylcarbonyloxy;

R<sup>6</sup> is hydrogen; aryl; lower alkyl; (lower alkylcarbonyl amino)lower alkyl, arylower alkyl; arylcarbonyllower alkyl; aminocarbonyl; arylcarbonyl; arylaminocarbonyl; (aryllower alkyl)carbonyl, lower alkoxycarbonyl; indolyl; or pyridinyl;

R<sup>7</sup> and R<sup>8</sup> are, each independently, members selected from the group consisting of hydrogen, lower alkyl, aryl, aryl-lower alkyl and pyridinyl;

wherein aryl is phenyl which may be substituted with up to 3 substituents, each independently selected from the group consisting of halo, lower alkyl, trifluoromethyl, nitro, amino, lower alkoxy, hydroxy and lower alkoxycarbonyl; thienyl; and naphthalenyl; lower alkyl comprises straight and branch chained saturated hydrocarbon radicals having from 1 to 6

carbon atoms; lower alkenyl comprises alkenyl radicals having from 2 to 6 carbon atoms.

4,956,352

### TRICYCLO COMPOUNDS, A PROCESS FOR THEIR PRODUCTION AND A PHARMACEUTICAL COMPOSITION CONTAINING THE SAME

Masakuni Okuhara; Hirokazu Tanaka; Toshio Goto, all of Ibaraki; Tohru Kino, Tsuchiura, and Hiroshi Hatanaka, Ibaraki, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

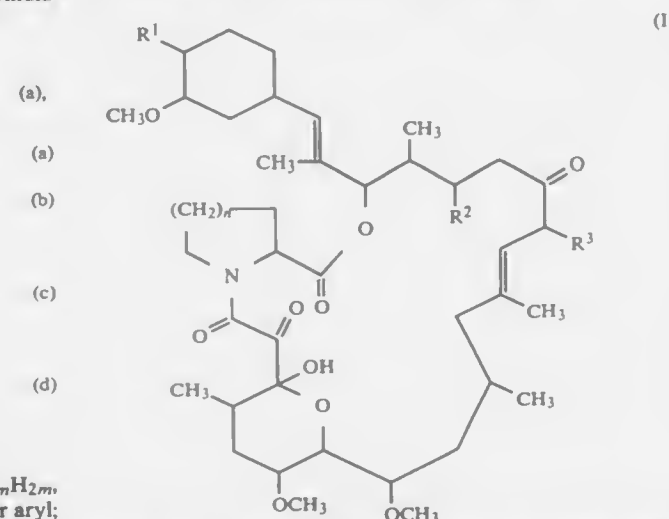
Division of Ser. No. 799,855, Nov. 20, 1985, Pat. No. 4,894,366. This application Aug. 17, 1989, Ser. No. 395,798

Claims priority, application United Kingdom, Dec. 3, 1984, 8430455; Feb. 5, 1985, 8502869; Apr. 1, 1985, 8508420 Int. Cl.<sup>5</sup> A61K 31/395, 31/695

U.S. Cl. 514—63

3 Claims

1. A method for treating resistance to transplantation which comprises administering to a subject in need of treatment an effective amount of a compound of the formula



wherein R<sup>1</sup> is hydroxy or protected hydroxy selected from 1-(lower alkylthio)(lower)alkoxy, tri(lower)alkylsilyloxy, lower alkyl-diphenylsilyloxy, organic carboxylic acyloxy and organic sulfonic acyloxy,

R<sup>2</sup> is hydrogen, hydroxy or lower alkanoyloxy,

R<sup>3</sup> is methyl, ethyl, propyl or allyl,

n is an integer of 1 or 2, and

the symbol of a line and dotted line is a single bond or a double bond, provided that when R<sup>1</sup> and R<sup>2</sup> are each hydroxy, n is an integer of 2 and the symbol of a line and dotted line is a single bond, then R<sup>3</sup> is methyl, propyl and allyl, or a pharmaceutically acceptable basic salt thereof.

4,956,353

### KOJIC ACID AND ESTERS AS INSECTICIDE SYNERGISTS

Patrick F. Dowd, Peoria, Ill., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jan. 16, 1988, Ser. No. 207,589

Int. Cl.<sup>5</sup> A01N 35/06, 37/18, 43/08, 43/16

U.S. Cl. 514—65

15 Claims

9. A method for controlling Lepidopteran insects comprising applying to the habitat of said insects an insecticidally effective amount of a composition comprising: (1) an insecticide selected from the group consisting of pyrethrins, pyrethroids, and carbamates; (2) a synergistically effective amount of kojic acid or an ester of kojic acid, wherein the kojic acid or kojic acid ester is present in the range of about 25 to 250 ppm; and (3) an agronomically acceptable carrier.

4,956,354

### THERAPEUTIC PREPARATION FOR USE ON SKIN

Gregoria Gutierrez, Ibagae, Colombia, assignor to Thomas G. Kottke and Mary L. Kottke, both of Marrysville, Pa.

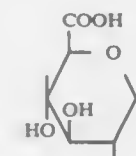
Filed Dec. 6, 1988, Ser. No. 280,384

Int. Cl.<sup>5</sup> A61K 31/635, 47/00

U.S. Cl. 514—157

4 Claims

1. A therapeutic composition for treating burns and other skin injuries, consisting of; almond oil, sulfathiazole, water and paraffin wax; wherein the proportions of each of 4 fluid ounces of almond oil, 2 grams of sulfathiazole, 0.3 fluid ounces of water and 5 grams of paraffin wax.



wherein the broken line represents an optical double bond, and the hydrogen atom at position 5 is present in the α-or β-configuration or a mixture of both configurations.

4,956,355

### PESTICIDAL 3-SUBSTITUTED

### 1-NITRO-2-IMINO-1,3-DIAZACYCLOALKANES

Hans-Joachim Diehr, Wuppertal, and Benedikt Becker, Mettmann, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 19, 1989, Ser. No. 354,645

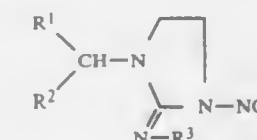
Claims priority, application Fed. Rep. of Germany, May 28, 1988, 3818163

Int. Cl.<sup>5</sup> C07D 401/06; A61K 31/44

U.S. Cl. 514—341

7 Claims

1. A 3-substituted 1-nitro-2-imino-1,3-imidazolidine of the formula



in which

R<sup>1</sup> stands for pyridyl which group is optionally substituted by at least one of fluorine, chlorine, bromine, iodine, cyano, nitro, C<sub>1</sub>-C<sub>4</sub>-alkyl (which is optionally substituted by at least one of fluorine and chlorine), C<sub>2</sub>-C<sub>4</sub>-alkenyl (which is optionally substituted by at least one of fluorine and chlorine), C<sub>2</sub>-C<sub>4</sub>-alkinyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy (which is optionally substituted by at least one of fluorine and chlorine), C<sub>3</sub>-C<sub>4</sub>-alkenyl (which is optionally substituted by at least one of fluorine and chlorine), C<sub>3</sub>-C<sub>4</sub>-alkylthio (which is optionally substituted by at least one of fluorine and chlorine), C<sub>3</sub>-C<sub>4</sub>-alkylsulphonyl (which is optionally substituted by at least one of fluorine and chlorine), C<sub>1</sub>-C<sub>4</sub>-alkylsulphonyl (which is optionally substituted by at least one of fluorine and chlorine), amino, C<sub>1</sub>-C<sub>4</sub>-alkylamino, di-(C<sub>1</sub>-C<sub>4</sub>-alkyl)-amino, phenyl, phenoxy, phenylthio, phenylamino, benzyl, formylamino, C<sub>1</sub>-C<sub>4</sub>-alkyl-carbonyl amino, formyl, carbamoyl, C<sub>1</sub>-C<sub>4</sub>-alkyl-carbonyl and C<sub>1</sub>-C<sub>4</sub>-alkoxy-carbonyl,

R<sup>2</sup> stands for hydrogen or C<sub>1</sub>-C<sub>3</sub>-alkyl and

R<sup>3</sup> stands for hydrogen or nitro.

4,956,357

### BIOLOGICAL METHODS UTILIZING

### DIHYDROTESTOSTERONE HEPTANOATE

Bruce S. Keenan, 3639 Tartan, Houston, Tex. 77025, and James T. Sparrow, 12119 Atwell, Houston, Tex. 77035

Filed Mar. 28, 1986, Ser. No. 842,346

Claims priority, application United Kingdom, Mar. 30, 1984, 8508404

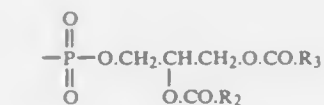
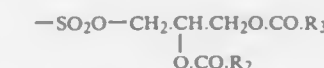
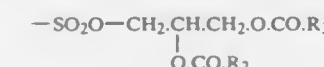
Int. Cl.<sup>5</sup> A61K 31/56

U.S. Cl. 514—178

15 Claims

1. A method of treating gynecomastia comprising, internally administering to a male patient a pharmacologically effective amount of dihydrotestosterone heptanoate.

in which R is selected from the group consisting of a hydrogen atom and a bromine atom, and R<sub>1</sub> is a chemical group selected from the group consisting of a hydrogen atom, an SO<sub>2</sub>OM group wherein M is selected from the group consisting of a hydrogen atom, a sodium atom, a sulphate group

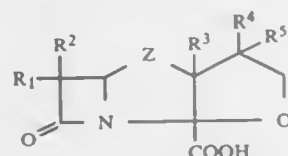


wherein each of R<sub>2</sub> and R<sub>3</sub>, which may be the same or different, is selected from the group consisting of straight and branched chain alkyl radicals of 1 to 14 carbon atoms, and a glucuronide group



4,956,358  
**TRICYCLIC CEPHAM COMPOUNDS AND USE**  
 Akira Morimoto, Noriyoshi Noguchi, and Nobuo Choh, all of Osaka, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

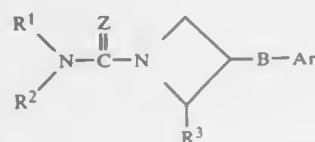
Filed Jul. 10, 1987, Ser. No. 72,144  
 Claims priority, application Japan, Jul. 15, 1986, 61-167283  
 Int. Cl.<sup>5</sup> C07D 501/20; A61K 31/545  
 U.S. Cl. 514—202 16 Claims  
 1. A compound of the formula



wherein R<sup>1</sup> represents an acylamino group wherein the acyl moiety is derived from a carboxylic acid and is an acyl group which is conventionally used as a substituent of the amino group at the 6-position of known penicillin derivatives or at the 7-position of cephalosporin derivatives; R<sup>2</sup> represents hydrogen, a methoxy group or a formylamino group; R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> independently represent hydrogen or an alkyl group; and Z represents a group represented by the formula —S—CH<sub>2</sub>— or —CH<sub>2</sub>—S—, its ester at the carboxyl group of the side chain at the 10-position or at the 2-carboxyl group, or its pharmacologically acceptable salt.

4,956,359  
**3-ARYLOXY AND 3-ARYLTHIOAZETIDINECARBOXAMIDES AS ANTICONVULSANTS AND ANTIEPILEPTICS**  
 Chandler R. Taylor, Jr., Albert D. Cale, Jr., both of Mechanicsville, and Harold F. Stauffer, Jr., Midlothian, all of Va., assignors to A. H. Robins Company, Inc., Richmond, Va.  
 Continuation-in-part of Ser. No. 706,621, Feb. 28, 1985, abandoned. This application Oct. 22, 1986, Ser. No. 921,466  
 Int. Cl.<sup>5</sup> A61K 31/395

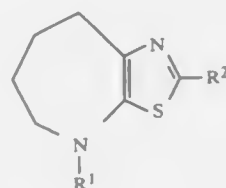
U.S. Cl. 514—210 94 Claims  
 1. A method of treatment for anticonvulsant effect which comprises administering to a mammal in need thereof an effective amount of a 3-aryloxyazetidinecarboxamide or 3-arylthioazetidinecarboxamide compound selected from the group having the formula:



wherein:  
 Ar is selected from pyridyl in any of its positions optionally substituted by halo, from phenyl or phenyl substituted by 1 or 2 groups selected from chloro, bromo, iodo, fluoro, loweralkyl, loweralkoxy, nitro, aminocarbonyl, or trifluoromethyl;  
 B is oxygen or sulfur;  
 Z is oxygen or sulfur;  
 R<sup>1</sup> and R<sup>2</sup> may be the same or different and are selected from hydrogen, loweralkyl, aryl, allyl, substituted allyl, propargyl, cycloalkyl (3-9C), lower alkylcycloalkyl, cycloalkyl-loweralkyl, aryl-loweralkyl, and diloweralkylaminoloweralkyl, and R<sup>1</sup> and R<sup>2</sup> when taken together with the adjacent nitrogen atom may form a heterocyclic amino group selected from azetidyl, pyrrolidinyl, piperidinyl, homopiperidinyl, imidazolyl, piperazinyl, (halophenyl)-piperidin-yl, phenyl-1,2,3,6-tetrahydropyridin-1-yl, phenyl-piperidin-1-yl, hydroxypiperidin-1-yl, 4-morpholino, 4-(3,5-

diloweralkyl)morpholino, 1,2,3,6-tetrahydropyridin-1-yl, (halophenyl)(hydroxy)piperidin-1-yl, 4-(2,6-diloweralkyl)-morpholino, pyrrolo[1,2-a]pyrazin-2-yl, homopiperazinyl, 4-substituted piperazinyl, and 4-substituted homopiperazinyl;  
 R<sup>3</sup> is selected from hydrogen, loweralkyl, aryl or aryl-loweralkyl; the geometrical isomers thereof, and the pharmaceutically acceptable acid addition salts thereof when R<sup>1</sup> and/or R<sup>2</sup> have one or more salt-forming basic amino components or when Ar is pyridyl, and the hydrates thereof, with the proviso that when R<sup>3</sup> is hydrogen, Z is oxygen, B is oxygen, and Ar is phenyl or phenyl substituted by trifluoromethyl, aminocarbonyl, dichloro, chloro, fluoro, bromo, or methyl, then R<sup>1</sup> and R<sup>2</sup> cannot be a combination of hydrogen and loweralkyl, or cannot both be hydrogen, methyl, or ethyl.

4,956,360  
**THIAZOLO (5,4-B)AZEPINE COMPOUNDS**  
 Tetsuya Aono, Nagaokakyo; Masahiro Suno, Kobe, and Go Kito, Yao, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan  
 Filed Jul. 21, 1989, Ser. No. 383,071  
 Claims priority, application Japan, Jul. 22, 1988, 63-184220; Apr. 5, 1989, 1-086536  
 Int. Cl.<sup>5</sup> C07D 513/02; A61K 31/55  
 U.S. Cl. 514—215 27 Claims  
 1. A compound of the formula (I)



wherein R<sup>1</sup> is  
 (1) a hydrogen atom;  
 (2) a straight, branched or cyclic C<sub>1-6</sub>alkyl or a straight or branched C<sub>2-6</sub>alkenyl or alkynyl, each of which is unsubstituted or substituted by one to three substituents selected from the group A consisting of hydroxy, C<sub>1-3</sub>alkoxy, phenoxy, naphthoxy, phenyl-C<sub>1-2</sub>alkoxy, mercapto, C<sub>1-3</sub>alkylthio, phenylthio, naphthylthio, phenyl-C<sub>1-2</sub>alkylthio, amino, mono or di-C<sub>1-3</sub>alkylamino, halogen, C<sub>2-4</sub>alkoxycarbonyl, benzyloxycarbonyl, C<sub>2-4</sub>alkoxycarbonyloxy, formyl, C<sub>2-3</sub>alkanoyl, benzoyl, C<sub>2-5</sub>alkanoyloxy, cyano, phthalimido, lower alkanoylamino, benzamido, C<sub>2-5</sub>alkoxycarbonylamino, phenyl-loweralkoxycarbonylamino, pyrrolidino, morpholino, carboxyl, and carbamoyl;  
 (3) a group of the formula R<sub>3</sub>CO— wherein R<sub>3</sub> is  
 (i) a straight, branched or cyclic C<sub>1-18</sub>alkyl or a straight or branched C<sub>2-6</sub>alkenyl or alkynyl, each of which is unsubstituted or substituted by one to three substituents selected from the group A as defined above;  
 (ii) a phenyl or a naphthyl, each of which is unsubstituted or substituted by one to three substituents selected from the group P consisting of halogen, nitro, amino (which is unsubstituted or substituted by one or two substituents selected from C<sub>1-3</sub>alkyl, C<sub>2-4</sub>alkenyl, C<sub>3-8</sub>cycloalkyl or phenyl), sulfo, mercapto, hydroxy, sulfoxo, sulfamoyl, C<sub>1-6</sub>alkyl (which is unsubstituted or substituted by amino, di-C<sub>1-3</sub>alkylamino, mono C<sub>1-3</sub>alkylamino, halogen, hydroxy, cyano or carboxy); C<sub>1-6</sub>alkoxy (which is unsubstituted or substituted by a C<sub>1-3</sub>alkylthio, benzyloxy, C<sub>1-3</sub>alkylsulfonylamino, amidino which is unsubstituted or substituted by C<sub>1-3</sub>alkyl or benzyl), methylenedioxy, alkoxy formimidoyl, C<sub>1-3</sub>alkylsulfonyl, C<sub>1-3</sub>alkylsulfonylamino, C<sub>2-4</sub>alkoxycar-

bonyl, benzyloxycarbonyl, formyl, C<sub>2-3</sub>alkanoyl, benzoyl, alkanoyloxy, cyano, phthalimido, alkanoylamino, benzamido, C<sub>2-4</sub>alkoxycarbonylamino, phenyl loweralkoxycarbonylamino, pyrrolidino, morpholino, carboxy, carbamoyl and phenyl which is unsubstituted or substituted by a halogen or a methoxy-C<sub>1-3</sub>alkyl; or  
 (iii) a 5- or 6-membered heterocyclic group B containing one to four heteroatoms selected from nitrogen, oxygen and sulfur atoms, or a condensed group D selected from indolyl, quinolyl, benzimidazolyl, imidazopyridyl and thiazolopyridyl, wherein the heterocyclic group B and the condensed group D are unsubstituted or substituted by one to three substituents selected from the group H consisting of amino (optionally having substituents selected from the C<sub>2-10</sub>alkanoyl, benzoyl, halogen substituted C<sub>2-4</sub>alkanoyl, phenyl and C<sub>1-3</sub>alkyl), halogen, nitro, sulfo, cyano, hydroxy, carboxy, oxo, C<sub>1-10</sub>alkyl (which may be substituted by phenyl, halogen, amino, hydroxy, carboxy, C<sub>1-3</sub>alkoxy, C<sub>1-3</sub>alkylsulfonyl and C<sub>1-3</sub>dialkylamino), C<sub>1-6</sub>cycloalkyl, C<sub>1-3</sub>alkoxy, C<sub>2-10</sub>alkanoyl, benzoyl, phenyl (which may be substituted by halogen, nitro, lower alkyl, lower alkoxy, amino, sulfo, hydroxy and cyano), oxo and C<sub>1-10</sub>alkylthio (which may be substituted by phenyl, halogen, amino, hydroxy, carboxy, C<sub>1-3</sub>alkoxy, C<sub>1-3</sub>alkylsulfonyl and di-C<sub>1-3</sub>alkylamino); or  
 (4) a C<sub>1-3</sub>alkylsulfonyl which is unsubstituted or substituted by one to three substituents selected from the group A as defined above or a phenylsulfonyl which is unsubstituted or substituted by one to three substituents selected from the group P as defined above;  
 and R<sup>2</sup> is  
 (1) a hydrogen atom;  
 (2) a straight, branched or cyclic C<sub>1-6</sub>alkyl which is unsubstituted or substituted by one to three substituents selected from the group A as defined above;  
 (3) a straight or branched C<sub>2-10</sub>alkenyl or alkynyl, each of which is unsubstituted or substituted by one to three substituents selected from  
 (i) the group A as defined above,  
 (ii) an oxo group;  
 (iii) a phenyl which is unsubstituted or substituted by one to three substituents selected from the group P as defined above, and  
 (iv) a heterocyclic group B or a condensed group D defined as above, each of which is unsubstituted or substituted by one to three substituents selected from the group H as defined above;  
 (4) a phenyl or a naphthyl, each of which is unsubstituted or substituted by one to three substituents selected from the group P as defined above; or  
 (5) a heterocyclic group B or a condensed group D defined as above, each of which is unsubstituted or substituted by one to three substituents selected from the group H as defined above,  
 or a pharmaceutically acceptable salt thereof.

4,956,361  
**NEW COMBINATION PRODUCTS HAVING AN ANTIDEPRESSANT ACTION**  
 Jorg Traber, Lohmar, and Harald Horstmann, Wuppertal, both of Fed. Rep. of Germany, assignors to Troponwerke GmbH & Co. KG, Cologne, Fed. Rep. of Germany  
 Continuation-in-part of Ser. No. 197,066, May 19, 1988, abandoned. This application Jun. 23, 1989, Ser. No. 370,425  
 Claims priority, application Fed. Rep. of Germany, Jun. 2, 1987, 3718398

Int. Cl.<sup>5</sup> A61K 31/55, 31/135, 31/435  
 U.S. Cl. 514—217 24 Claims  
 1. A method of potentiating antidepressant activity in a patient which comprises administering to such patient an antidepressant composition comprising 5 to 100 parts by weight of nifedipine and 10 to 200 parts by weight of an antidepressant

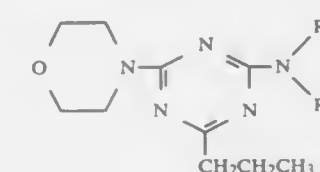
selected from the group consisting of imipramine, oxaprotiline, and desimipramine.

4,956,362  
**USE OF CARPIPRAMINE FOR THE TREATMENT OF ANXIETY AND SLEEP DISORDERS**  
 Sylvie Goni, Paris; Odile Piot, Choisy le Roi, and Jean-Luc Zandel, Paris, all of France, assignors to Rhone-Poulenc Sante, a French Body Corporate, France  
 Filed Dec. 13, 1989, Ser. No. 450,084  
 Claims priority, application France, Dec. 16, 1988, 88 16606  
 Int. Cl.<sup>5</sup> A61K 31/54

U.S. Cl. 514—217 2 Claims  
 1. Method of treating anxiety or a sleep disorder which comprises administering to a subject in need of such treatment an effective amount of carpipramine or a pharmaceutically acceptable salt thereof.

4,956,363  
**TREATMENT OF COGNITIVE AND BEHAVIORAL DISORDERS ASSOCIATED WITH AGING AND WITH DEMENTIA SYNDROMES**  
 Ernst Wulfert; Jean Gobert, and Eric Cossement, all of Brussels, Belgium, assignors to U C B S.A., Brussels, Belgium  
 Filed Aug. 8, 1989, Ser. No. 309,877  
 Claims priority, application United Kingdom, Aug. 16, 1988, 8819494

Int. Cl.<sup>5</sup> A61K 31/535 13 Claims  
 U.S. Cl. 514—232.2  
 1. A method for the treatment of cognitive and behavioral disorders associated with aging and with dementia syndromes in a patient in need thereof, which comprises administering to said patient an effective amount of a 2-amino-4-morpholino-6-propyl-1,3,5-triazine of the formula



wherein  
 R<sub>1</sub> represents a hydrogen atom, an alkyl, aralkyl or acetyl radical,  
 R<sub>2</sub> represents a hydrogen atom, a hydroxyl group, an alkyl hydroxyalkyl, alkoxyalkyl, dialkylamino, aryl-hydroxyalkyl, (hydroxy-cycloalkyl)alkyl, alkanoyloxyalkyl, benzyloxyalkyl, phenylacetoxyalkyl or aminocarbonyloxyalkyl radical, a COR<sub>3</sub> group, in which R<sub>3</sub> represents an alkyl, aryl, haloaryl, alkylaryl, alkoxyaryl, aralkyl or aryloxy radical, or a CONR<sub>4</sub>R<sub>5</sub> group, in which R<sub>4</sub> and R<sub>5</sub> represent a hydrogen atom or an alkyl radical, or  
 R<sub>1</sub> and R<sub>2</sub>, together with the nitrogen atom to which they are attached, represent an alkyleneimino radical substituted by a hydroxyalkyl radical, the alkyl, alkoxy and alkanoyloxy radicals having 1 to 4 carbon atoms and the cycloalkyl and alkyleneimino radicals having 4 to 6 carbon atoms,  
 with the proviso that when R<sub>1</sub> represents the acetyl radical, R<sub>2</sub> represents an acetoxyalkyl radical, or of a non-toxic pharmaceutically acceptable acid addition salt thereof.

4,956,364

## NOOTROPIC AGENT

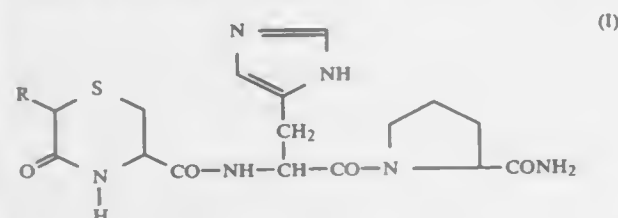
Kiyoshi Kimura, Takatsuki; Yojiro Ukai, Kusatsu; Takashi Ogasawara, Uji, and Yutaka Nakagawa, Otsu, all of Japan, assignors to Nippon Shinyaku Co., Ltd., Japan  
PCT No. PCT/JP88/00347, § 371 Date Dec. 6, 1988, § 102(e) Date Dec. 6, 1988, PCT Pub. No. WO88/07867, PCT Pub. Date Oct. 20, 1988

PCT Filed Apr. 7, 1988, Ser. No. 290,050  
Int. Cl.<sup>5</sup> A61K 31/535

U.S. Cl. 514—227.5

8 Claims

1. A method for effecting nootropic action in humans and animals which comprises administering to a human or animal in need thereof a therapeutically effective amount of a compound of the formula (I):



wherein R is lower alkyl, in combination with a pharmaceutically acceptable carrier.

4,956,365

## DECAHYDRO-8H-ISOQUINO(2,1-GX(1,6))NAPHTHYRIDINE DERIVATIVES AND RELATED COMPOUNDS

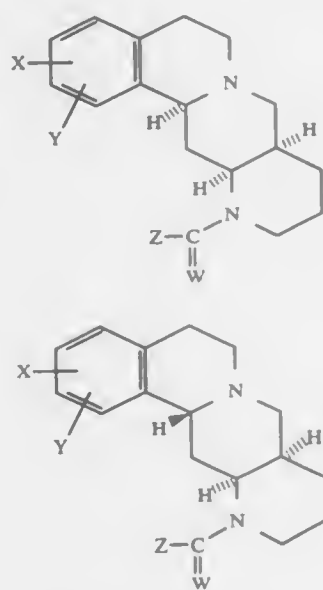
Robin D. Clark, Palo Alto, Calif.; Andrew T. Kilpatrick, Balerno, and Michael Spedding, Edinburgh, both of Scotland, assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.  
Continuation-in-part of Ser. No. 174,750, Mar. 29, 1988, Pat. No. 4,886,798, which is a continuation-in-part of Ser. No. 37,320, Apr. 13, 1987, Pat. No. 4,791,108. This application Oct. 12, 1988, Ser. No. 257,372

Int. Cl.<sup>5</sup> A61K 31/47; C07D 455/03

U.S. Cl. 514—233.2

38 Claims

1. A compound of the formula (1) or (2):



in which:

X and Y are independently hydrogen, hydroxy, lower alkyl of one to six carbon atoms, lower alkoxy of one to six

carbon atoms or halo, or X and Y when adjacent and taken together is methylenedioxy or ethylene-1,2 dioxo; W is oxygen or sulfur; and

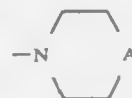
Z is —R<sup>1</sup>, —OR<sup>2</sup> or —NR<sup>3</sup>R<sup>4</sup>, wherein

R<sup>1</sup> is lower alkyl of one to six carbon atoms, lower haloalkyl of the formula V(CH<sub>2</sub>)<sub>n</sub>— in which V is bromo, chloro or fluoro and n is an integer of 1–6, cycloalkyl of 3–8 carbon atoms, heteroaryl, phenyl or phenyl lower alkyl in which any phenyl group may be optionally substituted by one or two substituents chosen from halo, lower alkyl of one to four carbon atoms and lower alkoxy of one to four carbon atoms;

R<sup>2</sup> is lower alkyl of one to six carbon atoms, phenyl or phenyl lower alkyl in which any phenyl group may be optionally substituted by one or two substituents chosen from halo, lower alkyl of one to four carbon atoms and lower alkoxy of one to four carbon atoms;

R<sup>3</sup> and R<sup>4</sup> are independently hydrogen, alkyl of one to eight carbon atoms, phenyl or phenyl lower alkyl in which any phenyl group may be optionally substituted by one or two substituents chosen from halo, lower alkyl of one to four carbon atoms and lower alkoxy of one to four carbon atoms; or

R<sup>3</sup> and R<sup>4</sup> taken together with the nitrogen to which they are attached represent a heterocycle of the formula:



wherein A is —(CH<sub>2</sub>)<sub>m</sub>—N(R<sup>5</sup>)— or oxygen, in which m is an integer of 0–2 and R<sup>5</sup> is hydrogen or lower alkyl; with the proviso that for the compound of formula (2) where X is 2-methoxy, Y is 3-methoxy and W is oxygen Z cannot be methyl;

or a pharmaceutically acceptable salt thereof.

4,956,366

SUBSTITUTED THIENOIMIDAZOLE DERIVATIVES, A PROCESS FOR THE PREPARATION THEREOF, PHARMACEUTICAL COMPOSITIONS CONTAINING THEM, AND THE USE THEREOF AS INHIBITORS OF GASTRIC ACID SECRETION, AS GASTROPROTECTIVES AND AS MEDICAMENTS FOR INTESTINAL INFLAMMATIONS

Hildegard Nimmesgern, Frankfurt am Main; Klaus Weldmann, Krosberg-Taunus; Hans-Jochen Lang; Robert Rippel, both of Hofheim am Taunus, and Andreas W. Herling, Bad Camberg, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany  
Filed Jul. 13, 1988, Ser. No. 218,386

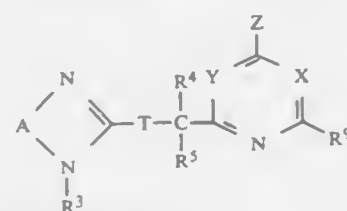
Claims priority, application Fed. Rep. of Germany, Jul. 15, 1987, 3723327

Int. Cl.<sup>5</sup> C07D 403/12; A61K 31/415

U.S. Cl. 514—235.8

8 Claims

1. A compound of the formula I



in which A represents

4,956,367

2-AMINO-4-MORPHOLINO-6-PROPYL-1,3,5-TRIAZINES  
Eric Cossement; Jean Gobert; Roland Boydens, and Jacques Mathieu, all of Brussels, Belgium, assignors to U C B S.A., Brussels, Belgium

Filed Aug. 8, 1989, Ser. No. 390,878

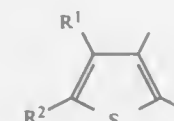
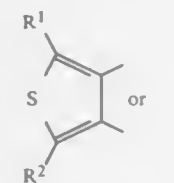
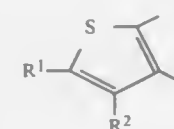
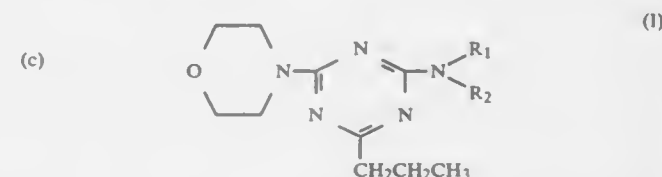
Claims priority, application United Kingdom, Aug. 16, 1988, 8819493

Int. Cl.<sup>5</sup> C07D 413/14, 413/04; A61K 31/53, 31/535

U.S. Cl. 514—236.2

12 Claims

1. A 2-amino-4-morpholino-6-propyl-1,3,5-triazine, including its optionally active isomers and racemic mixtures of the formula



T denotes —S—, —SO— or —SO<sub>2</sub>—,

R<sup>1</sup> and R<sup>2</sup> are identical or different and denote hydrogen, halogen, cyano, nitro, trifluoromethyl, (C<sub>1</sub>–C<sub>6</sub>)-alkyl, (C<sub>1</sub>–C<sub>6</sub>)-hydroxyalkyl, (C<sub>1</sub>–C<sub>6</sub>)-alkoxy, (C<sub>1</sub>–C<sub>4</sub>)-fluoroalkoxy, —O—CF<sub>2</sub>Cl—, —O—CF<sub>2</sub>—CHFCl, (C<sub>1</sub>–C<sub>6</sub>)-alkylmercapto, (C<sub>1</sub>–C<sub>6</sub>)-alkylsulfanyl, (C<sub>1</sub>–C<sub>6</sub>)-alkylsulfonyl, (C<sub>1</sub>–C<sub>6</sub>)-alkylcarbonyl, (C<sub>1</sub>–C<sub>6</sub>)-alkoxycarbonyl, carbamoyl, N-(C<sub>1</sub>–C<sub>4</sub>)-alkylcarbamoyl, N,N-di-(C<sub>1</sub>–C<sub>4</sub>)-alkylcarbamoyl, (C<sub>1</sub>–C<sub>6</sub>)-alkylcarbonyloxy, (C<sub>3</sub>–C<sub>8</sub>)-cycloalkyl, phenyl, benzyl, phenoxy, benzyloxy, anilino, N-methylanilino, phenylmercapto, phenylsulfonyl, phenylsulfanyl, sulfamoyl, N-(C<sub>1</sub>–C<sub>4</sub>)-alkylsulamoyl or N,N-di-(C<sub>1</sub>–C<sub>4</sub>)-alkylsulfamoyl, or, if A is defined as above under (a) or (c), can also together denote —(CH<sub>2</sub>)<sub>n</sub>— or —CH=CH—CH=CH—, with one CH<sub>2</sub> group optionally being replaced by O, S, SO or SO<sub>2</sub>.

R<sup>3</sup> denotes hydrogen, alkanoyl, (C<sub>1</sub>–C<sub>6</sub>)-alkylcarbamoyl or another physiologically tolerated protective group which can preferably be eliminated in an acid medium or under physiological conditions.

R<sup>4</sup> and R<sup>5</sup> are identical or different and denote hydrogen or (C<sub>1</sub>–C<sub>3</sub>)-alkyl.

X denotes nitrogen, and Y denotes CR<sup>6</sup>, or

X denotes CR<sup>6</sup>, and Y denotes nitrogen,

R<sup>6</sup> denotes hydrogen, halogen, (C<sub>1</sub>–C<sub>6</sub>)-alkyl, trifluoromethyl, (C<sub>1</sub>–C<sub>6</sub>)-alkoxy, —O—C<sub>p</sub>H(2p+1-q)F<sub>q</sub>, (C<sub>1</sub>–C<sub>6</sub>)-alkoxy-(C<sub>1</sub>–C<sub>6</sub>)-alkyl, (C<sub>6</sub>–C<sub>12</sub>)-aryl, (C<sub>6</sub>–C<sub>12</sub>)-aryl-(C<sub>1</sub>–C<sub>6</sub>)-alkoxy, thiophene, furan, pyrrole, imidazole, pyrazole, pyridine, tetrazole, pyrazine, pyrimidine, pyridazine, 1,2,4-triazole, thiazole, isothiazole, oxazole, isoxazole, benzothiazole, benzofuran, indole, inazole, benzimidazole, quinazoline, cinnoline, (C<sub>1</sub>–C<sub>6</sub>)-aryloxy, it being possible for the corresponding aryl moiety to be optionally substituted by halogen or trifluoromethyl, or denotes cyano, nitro, (C<sub>1</sub>–C<sub>6</sub>)-alkylamino, di-(C<sub>1</sub>–C<sub>6</sub>)-alkylamino or amino,

Z denotes NR<sup>7</sup>R<sup>8</sup>, OR<sup>10</sup> or SR<sup>10</sup>,

R<sup>7</sup> and R<sup>8</sup> are identical or different and denote hydrogen, (C<sub>1</sub>–C<sub>6</sub>)-alkyl, C<sub>6</sub>–C<sub>12</sub>-aryl, (C<sub>7</sub>–C<sub>13</sub>)-aralkyl or (C<sub>3</sub>–C<sub>6</sub>)-cycloalkyl, or represent, together with the nitrogen to which they are bonded, azetidino, pyrrolidino, piperidino, piperazino, morpholino or N-(C<sub>1</sub>–C<sub>4</sub>)-alkylpiperazino, each of which is optionally substituted by one or two identical or different (C<sub>1</sub>–C<sub>6</sub>)-alkyl groups.

R<sup>9</sup> denotes hydrogen, halogen, (C<sub>1</sub>–C<sub>3</sub>)-alkyl, (C<sub>1</sub>–C<sub>4</sub>)-alkoxy, benzyloxy or (C<sub>1</sub>–C<sub>7</sub>)-alkoxy-(C<sub>1</sub>–C<sub>3</sub>)-alkyl, R<sup>10</sup> denotes hydrogen, (C<sub>1</sub>–C<sub>4</sub>)-alkyl, (C<sub>7</sub>–C<sub>13</sub>)-aralkyl, (C<sub>6</sub>–C<sub>12</sub>)-aryl, vinyl, allyl or a substituted alkyl radical of the formula C<sub>p</sub>H(2p+1-q)F<sub>q</sub>.

n is 3 or 4,

p is 1, 2, 3 or 4, and

q is 1 to (2p+1), or its physiologically tolerated salt.

wherein

4,956,368

METABOLITES AND PRODRUG FORMULATIONS OF 8-[4-(1,2-BENZISOTHIAZOL-3-YL)-1-PIPERAZINYL]-BUTYL]-8-AZASPIRO[4.5]DECANE-7,9-DIONE

Joseph A. Cipollina, Middletown, Conn., and Edward H. Roediger, Greenfield Park, Canada, assignors to Bristol-Myers Company, New York, N.Y.

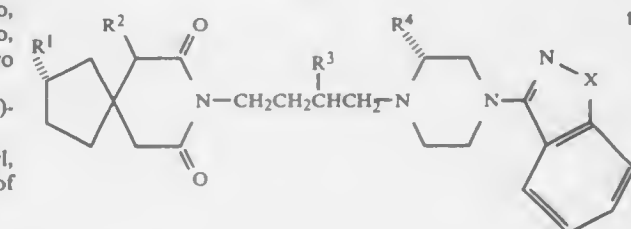
Filed Jul. 24, 1989, Ser. No. 383,475

Int. Cl.<sup>5</sup> A61K 31/495; C07D 401/14

U.S. Cl. 514—254

21 Claims

1. A compound of Formula I





R<sup>1</sup> is selected from the group consisting of hydrogen, hydroxyl, lower (C<sub>1</sub>-C<sub>4</sub>) alkoxy, higher (C<sub>5</sub>-C<sub>17</sub>) acyloxy, and oxo;

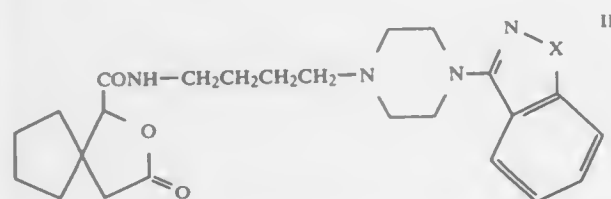
R<sup>2</sup> is selected from hydrogen, methyl, hydroxyl, lower (C<sub>1</sub>-C<sub>4</sub>) alkoxy, higher (C<sub>5</sub>-C<sub>17</sub>) acyloxy, and acetoxy;

R<sup>3</sup> is hydrogen, hydroxyl, and methoxy;

R<sup>4</sup> is hydrogen or oxo, with the proviso that R<sup>1</sup> and R<sup>2</sup> cannot be acyloxy simultaneously and further R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> cannot be hydrogen simultaneously; the solid and dotted lines refer to either a double covalent bond or a single covalent bond with another hydrogen atom covalently bonded to the carbon terminus end; and

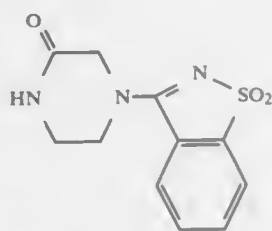
X is S or SO, or a pharmaceutically acceptable salt or solvate thereof.

2. A compound of Formula II

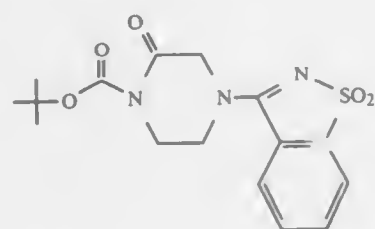


wherein X is selected from the group consisting of S, SO, and SO<sub>2</sub>; or a pharmaceutically acceptable acid addition salt and solvate thereof.

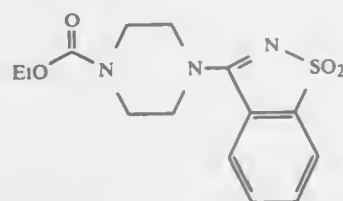
13. The compound 4-(1,2-benzisothiazol-1-yl)-2-oxo-1H-piperazine of the formula



14. The compound 1,1-dimethylethyl 4-(1,1-dioxo-1,2-benzisothiazol-3-yl)-1-piperazinecarboxylate of the formula



15. The compound ethyl 4-(1,1-dioxo-1,2-benzisothiazol-3-yl)-1-piperazinecarboxylate of the formula



#### 4,956,369 2-DITHIOALKYL-DIHYDROPYRIDINES AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

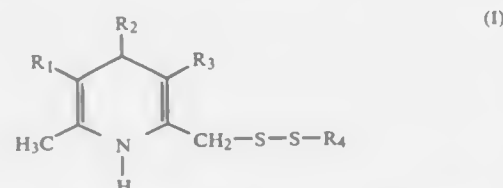
Marco Frigerio; Carmelo A. Gandolfi, and Sergio Tognella, all of Milan, Italy, assigns to Boehringer Blochemia Robin S.p.A., Milan, Italy

Continuation of Ser. No. 136,988, Dec. 23, 1987, abandoned. This application Apr. 6, 1989, Ser. No. 333,815

Claims priority, application Italy, Dec. 24, 1986, 22881 A/86 Int. Cl.<sup>5</sup> C07D 401/12; A61K 31/505

U.S. Cl. 514-274 5 Claims

1. A compound of formula I wherein



R<sub>1</sub> is acetyl, benzoyl, cyano, nitro, a COOR<sub>5</sub> or a CONR<sub>6</sub>R<sub>7</sub> group;

R<sub>2</sub> is selected from the group consisting of m-nitrophenyl, o-chlorophenyl, m-chlorophenyl, o-trifluoromethylphenyl, p-fluorophenyl, phenyl, o-methylthiophenyl, m-methylthiophenyl, pyridyl, and 2,3-dichlorophenyl;

R<sub>3</sub> is a COOR<sub>5</sub> group;

R<sub>4</sub> is selected from the groups C<sub>1</sub>-C<sub>12</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>2</sub>-C<sub>5</sub> alkynyl, phenyl heterocyclic moiety, phenyl-C<sub>1</sub>-C<sub>4</sub> alkyl, or C<sub>1</sub>-C<sub>4</sub> alkyl substituted by a heterocyclic moiety, said groups being optionally substituted by hydroxy; amino; monoalkylamino selected from the group consisting of ethylamino, isopropylamino and benzylamino; dialkylamino selected from the group consisting of dimethylamino, diethylamino, N-methyl-N-benzylamino, pyrrolidin-1-yl, piperidin-1-yl, piperazin-1-yl and morpholin-4-yl; C<sub>1</sub>-C<sub>4</sub> alkoxy; C<sub>2</sub>-C<sub>6</sub> acylamino; carboxy; C<sub>1</sub>-C<sub>4</sub> alkoxy carbonyl; nitro; cyano; C<sub>1</sub>-C<sub>3</sub> alkylthio; trifluoromethyl; and C<sub>1</sub>-C<sub>3</sub> alkyl, said heterocyclic moiety being selected from the group consisting of: (A) α-pyridyl; β-pyridyl; γ-pyridyl; tetrahydrofuryl; thienyl; α-pyridyl-N-oxide; 3-hydroxy-pyridyl; 2-pyrimidinyl; 4-pyrimidinyl; 1H-1,2,4-triazol-3-yl; 1H-1,2,4-triazol-5-yl; 2-thiazolyl; 1-methyl-tetrazol-5-yl; 2-methyl-1,3,4-triazol-5-yl; 5-amino-1,3,4-thiadiazol-2-yl; 2-amino-1,3,4-triazol-5-yl; 2-hydantoinyl; 2-imidazolyl; 4-methyl-imidazol-2-yl; 1-phenyl-1H-tetrazol-5-yl; 4,5-diphenyl-4-oxazolin-2-yl; 4-phenoxy-methyl-5-carboxymidazol-2-yl and esters thereof with C<sub>1</sub>-C<sub>4</sub> alcohols; 1,4,5,6-tetrahydro-pyrimidin-2-yl; pyrimidin-2-yl unsubstituted or substituted with methyl, amino, o.o and/or carboxy groups in positions 4 or 6 of the pyrimidine ring; pyrimidin-6-yl; 2,6-diamino-pyrimidin-4-yl; tetrahydropyran-2-yl; (3,4,5-triacetoxy-6-acetoxymethyl)-tetrahydropyran-2-yl; 5-carboxy-thoxy-4-oxo-pyrimidin-2-yl; 6-propyl-4-hydroxy-pyrimidin-2-yl; 6-propyl-4-amino-pyrimidin-2-yl;

(B) 4-(3H)-quinazolin-4-one-2-yl; 2-quinazolinyl; 4-aminopyrazol pyrimidin-2-yl; 6-puriny; 6,8-dihydroxy-2-puriny; benzothiazol-2-yl; benzoxazol-2-yl; benzimidazol-2-yl unsubstituted or substituted in the benzene ring with alkoxy or halogen substituents; quinolyn-2-yl; and 7-trifluoromethylquinolin-4-yl;

R<sub>5</sub> is a C<sub>1</sub>-C<sub>6</sub> alkyl chain, that may optionally be substituted by hydroxy; amino; monoalkylamino selected from the group consisting of methylamino, ethylamino, isopropylamino and benzylamino; dialkylamino selected from the group consisting of dimethylamino, diethylamino, N-methyl-N-benzylamino, pyrrolidin-1-yl, piperidin-1-yl, piperazin-1-yl and morpholin-4-yl; C<sub>1</sub>-C<sub>6</sub> alkoxy; C<sub>3</sub>-C<sub>6</sub> alkenyl; or phenyl;

R<sub>6</sub> and R<sub>7</sub>, which are the same or different, are hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, benzyl or phenyl, its enantiomer, diastereoisomer, or a pharmaceutically acceptable salt thereof.

#### 4,956,370 ANTIMYCOTICALLY ACTIVE SUBSTITUTED 2-AMINOTHIAZOLES

Joachim Ippen; Bernd Baasner; Albrecht Marhold, all of Leverkusen; Ernst Kyzela, Bergisch-Gladbach; Klaus Schaller, Wuppertal, and Miklos von Bittera, Leverkusen, all of Fed. Rep. of Germany, assigns to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

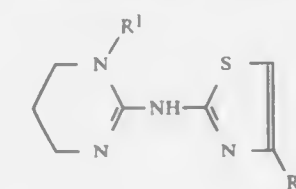
Filed Oct. 11, 1989, Ser. No. 419,981

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1988, 3836167; Nov. 25, 1988, 3839758

Int. Cl.<sup>5</sup> C07D 417/12; A61K 31/505

U.S. Cl. 514-275 6 Claims

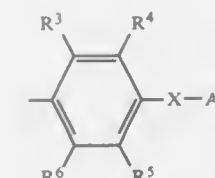
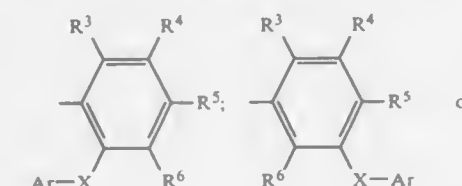
1. A 2-aminothiazole of the formula



in which

R<sup>1</sup> represents hydrogen or straight-chain or branched alkyl having 1 to 4 carbon atoms and

R<sup>2</sup> represents a radical of the formula



where

R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup> and R<sup>6</sup> independently of one another in each case represent hydrogen, fluorine, chlorine, bromine, iodine, nitro, in each case straight-chain or branched alkyl, alkoxy, alkoxy-carbonyl, dialkylamino, alkylthio, alkylsulphonyl or alkylsulphonyl each having 1 to 4 carbon atoms in the respective alkyl moieties, or in each case straight-chain or branched halogenoalkyl, halogenoalkoxy, halogenoalkylthio, halogenoalkylsulphonyl or halogenoalkylsulphonyl each having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms.

X represents oxygen, sulphur, sulphonyl or sulphonyl and Ar represents phenyl, α-naphthyl, β-naphthyl, tetrahydronaphthyl or indanyl which are in each case unsubstituted or substituted by identical or different substituents, suitable substituents in each case being: fluorine, chlorine, bromine, iodine, in each case straight-chain or branched alkyl, alkoxy, alkoxy-carbonyl, dialkylamino, alkylthio, alkylsulphonyl or alkylsulphonyl each having 1 to 8 carbon atoms in the respective alkyl moieties, in each case straight-chain or branched halogenoalkyl, halogenoalkoxy, halogenoalkylthio, halogenoalkylsulphonyl or halogenoalkylsulphonyl each having 1 to 4 carbon atoms and 1 to 9 identical or different halogen

atoms, cycloalkyl having 3 to 7 carbon atoms, phenylalkyl or phenoxyalkyl each having 1 to 4 carbon atoms in the straight-chain or branched alkyl moiety and also phenyl or phenoxy.

#### 4,956,371 SUBSTITUTED ISOQUINOLINES AND METHODS OF USING SAME

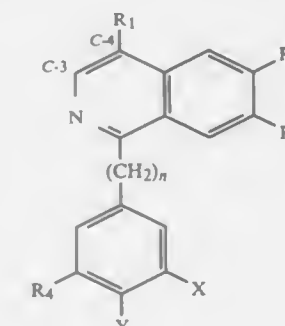
T. Scott Shoupe, Southbury, Conn.; Stephen M. Coutts, Rancho Santa Fe, Calif., and Lloyd J. Dolby, Eugene, Oreg., assigns to Euroceltique, S.A., Luxembourg, Luxembourg

Filed Sep. 19, 1989, Ser. No. 409,521

Int. Cl.<sup>5</sup> A01K 61/47; C07D 401/12

U.S. Cl. 514-307 17 Claims

1. A compound having the formula:



wherein

R<sub>1</sub> = H, OH, -OCH<sub>3</sub>, -C(=O)-CH<sub>3</sub>, -N(=O)-CH<sub>3</sub>, -C(=O)-CH<sub>3</sub>,

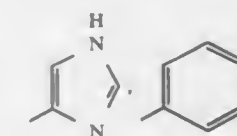
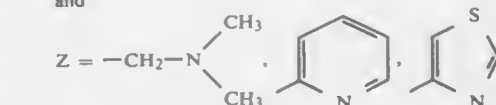
R<sub>2</sub> = H, -CH<sub>3</sub>, -O(CH<sub>2</sub>)<sub>m</sub>-Z, -(CH<sub>2</sub>)<sub>m</sub>-Z, branched alkyl, R<sub>3</sub> = H, -CH<sub>3</sub>, -O(CH<sub>2</sub>)<sub>m</sub>-Z, -(CH<sub>2</sub>)<sub>m</sub>-Z, branched alkyl,

where:

at least one of R<sub>2</sub>, R<sub>3</sub> is H

m = 1-3

and



R<sub>4</sub> = H, -OCH<sub>3</sub>, Halogen

n = 0-5

X = H, -OCH<sub>3</sub>, Halogen

Y = H, -OCH<sub>3</sub>, Halogen

C<sub>3</sub>-C<sub>4</sub> bond = saturated & unsaturated,

wherein at least one of R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, X and Y is other than hydrogen.

4,956,372

CYCLIC ANTHRANILIC ACID DERIVATIVES AND  
PROCESS FOR THEIR PREPARATIONEisuke Kojima, Koga; Shizuyoshi Fujimori, Ooaza-Marubaya-  
shi, and Katsuya Awano, Oyama, all of Japan, assignors to  
Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Sep. 27, 1988, Ser. No. 249,996

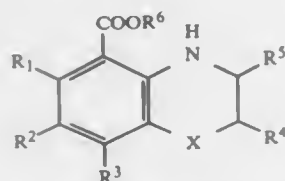
Claims priority, application Japan, Oct. 2, 1987, 62-249608;

Jan. 19, 1988, 63-8793

Int. Cl.<sup>5</sup> A61K 31/47; C07D 215/00, 215/02

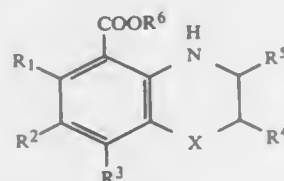
U.S. Cl. 514—311

2 Claims

1. Cyclic anthranilic acid derivative of the following for-  
mula (I),

wherein R<sup>1</sup>, R<sup>2</sup>, and R<sup>3</sup> each independently indicate a hydrogen atom, lower alkyl group having 1 to 3 carbon atoms, amino group, nitro group, hydroxy group, sulfonamide group, trifluoromethyl group, cyano group, carboxyl group, carbamoyl group, acetyl group, benzoylmethyl group which may be substituted by 1 to 3 substituents selected from the group consisting of halogen, C<sub>1</sub> to C<sub>3</sub> alkyl, C<sub>1</sub> to C<sub>3</sub> alkoxy and hydroxy, methylthio group, phenylethynyl group which may be substituted as defined above, ethynyl group which may be substituted as defined above, alkanoylamino group having 1 to 3 carbon atoms, benzoylamino group which may be substituted as defined above; R<sup>4</sup> and R<sup>5</sup> each independently indicate a hydrogen atom, lower alkyl group having 1 to 3 carbon atoms, cyano group, carboxyl group, hydroxymethyl group, phenyl group which may be substituted as defined above or benzyl group, provided that R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are not simultaneously hydrogen; R<sup>6</sup> indicates a hydrogen atom, lower alkyl group having 1 to 3 carbon atoms or benzyl group; X indicates a methylene group; the acid or alkali salts thereof.

2. An antirheumatoid and immunomodulatory pharmaceutical composition comprising a compound of the following formula (I),



wherein R<sup>1</sup>, R<sup>2</sup>, and R<sup>3</sup> each independently indicate a hydrogen atom, lower alkoxy group having 1 to 3 carbon atoms, amino group, nitro group, hydroxy group, sulfonamide group, trifluoromethyl group, cyano group, carboxyl group, carbamoyl group, acetyl group, benzoylmethyl group which may be substituted by 1 to 3 substituents selected from halogen, C<sub>1</sub> to C<sub>3</sub> alkyl, C<sub>1</sub> to C<sub>3</sub> alkoxy and hydroxy, methylthio group, phenylethynyl group which may be substituted as defined above, ethynyl group which may be substituted as defined above, alkanoylamino group having 1 to 3 carbon atoms or phenylsulfonlamino group which may be substituted as defined above; R<sup>4</sup> and R<sup>5</sup> each independently indicate a hydrogen atom, lower alkyl group having 1 to 3 carbon atoms, cyano group, carboxyl group, hydroxymethyl group, phenyl group which may be substituted as defined above or benzyl group, provided that R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are not simultaneously

hydrogen; R<sup>6</sup> indicates a hydrogen atom, lower alkyl group having 1 to 3 carbon atoms or benzyl group; X indicates a methylene group; the acid or alkali salts thereof; and an inert pharmaceutically acceptable carrier.

4,956,373

PHARMACEUTICAL COMPOSITION COMPRISING  
3-(N-PIPERIDINOMETHYL-AZINO)  
METHYLRIFAMYCIN S AS ACTIVE INGREDIENTGiovanni Franceschi; Sergio Vloglio, both of Milan, and Roberto  
Blanchini, Bergamo, all of Italy, assignors to Farmitalia Carlo  
Erba S.R.L., Milan, Italy

Continuation-in-part of Ser. No. 304,033, Jan. 31, 1989,

abandoned. This application May 18, 1989, Ser. No. 353,472

Int. Cl.<sup>5</sup> A61K 31/445

U.S. Cl. 514—321

1 Claim

1. A method of treating a patient with a bacterial infection, comprising orally administering an antibacterial effective amount of 3-(N-piperidinomethylazino)methylrifamycin S to said patient.

4,956,374

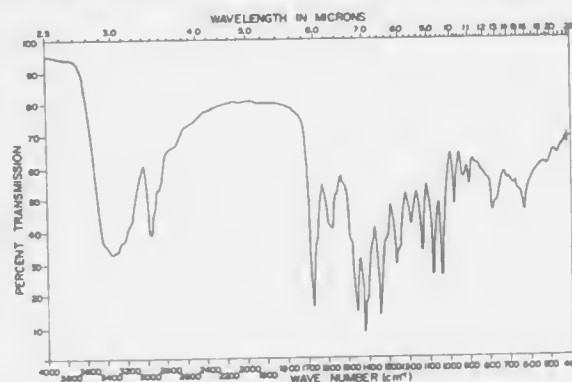
POLYSUBSTITUTED THIAZOLYPYRIDINE  
CARBOXYAMIDE ANTIFUNGAL ANTIBIOTICMaki Nishio, Tokyo; Shigeyuki Ando, Mitaka; Takeo Miyaki,  
Yokohama; Masataka Konishi, Kawasaki, and Toshikazu Oki,  
Yokohama, all of Japan, assignors to Bristol-Myers Company,  
New York, N.Y.

Filed Jul. 29, 1988, Ser. No. 226,016

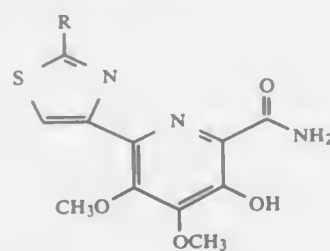
Int. Cl.<sup>5</sup> C07D 417/04; A01N 43/78

U.S. Cl. 514—342

8 Claims



1. The compound having formula



wherein R is selected from the group consisting of  
1, 4-dihydroxypentyl.

1,4-dihydroxy-4-methylpentyl,  
1,5-dihydroxy-5,5-dimethylpentyl,  
4-oxopentyl,  
4-hydroxypentyl,  
4-hydroxy-4-methylpentyl,  
3-hydroxypentyl,  
4-methyl-5-hydroxypentyl,  
3-methyl-4-hydroxypentyl,  
3-methyl-4-oxopentyl,

1-hydroxypentyl, and  
5-hydroxy-5,5-dimethylpentyl.

5. A method for therapeutically treating an animal host affected by a fungal infection sensitive to compound as recited in claim 1 which comprises administering to said host an effective antifungal dose of said compound.

4,956,375

N-INDANYL CARBOXAMIDE DERIVATIVE AND  
AGRICULTURAL/HORTICULTURAL FUNGICIDE  
CONTAINING THE DERIVATIVE AS ACTIVE  
INGREDIENTMasatsugu Oda; Toshiro Sakaki, both of Yokohama; Naoko  
Sasaki, Tokyo; Hirofumi Tomita, Tokyo, and Nobuyuki  
Nonaka, Yokohama, all of Japan, assignors to Mitsubishi  
Chemical Industries Limited, Tokyo, Japan

Division of Ser. No. 159,277, Feb. 23, 1988, Pat. No. 4,914,097.

This application Nov. 29, 1989, Ser. No. 442,614

Claims priority, application Japan, Feb. 25, 1987, 62-42136;

Apr. 16, 1987, 62-93799; Oct. 16, 1987, 62-261131; Oct. 16,

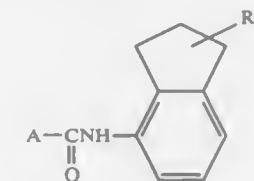
1987, 62-261132

Int. Cl.<sup>5</sup> A01N 43/74, 43/78, 43/82; C07D 285/06

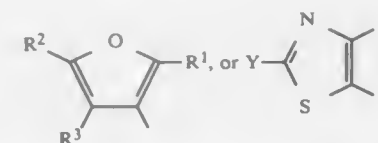
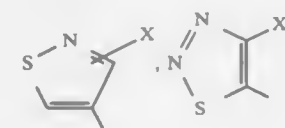
U.S. Cl. 514—361

8 Claims

1. An N-indanyl carboxamide compound represented by the following formula (I):

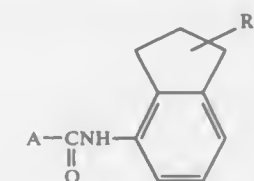


wherein A represents a group of the formula:

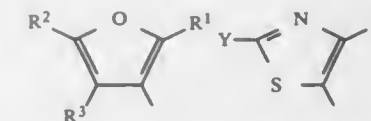
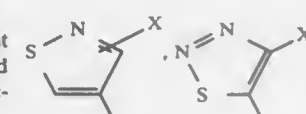


wherein X represents a halogen atom, a methyl group, or a trifluoromethyl group, Y represents a hydrogen atom, a halogen atom, a lower alkyl group, an amino group, a mercapto group, or a lower alkylthio group, R<sup>1</sup> represents a methyl group or a trifluoromethyl group, and R<sup>2</sup> and R<sup>3</sup> independently represent a hydrogen atom or a methyl group, R represents a lower alkyl group, and n is an integer of 1 to 6.

5. An agricultural/horticultural fungicidal composition, comprising as an active ingredient an effective amount of a N-indanyl carboxamide compound represented by the formula (I):



wherein A represents a group of the formula:



wherein X represents a halogen atom, a methyl group, or a trifluoromethyl group, Y represents a hydrogen atom, a halogen atom, a lower alkyl group, an amino group, a mercapto group, or a lower alkylthio group, R<sup>1</sup> represents a methyl group or a trifluoromethyl group, and R<sup>2</sup> and R<sup>3</sup> independently represent a hydrogen atom or a methyl group, R represents a lower alkyl group, and n represents an integer in the range of 1 to 6.

4,956,376

TETRAZOLE CARBOXYLIC ACIDS AND ESTERS AND  
INHIBITION OF BLOOD PLATELET AGGREGATION  
THEREWITH

Nicholas A. Meanwell, East Hampton, Conn., assignor to Bristol-Myers Squibb Company, New York, N.Y.

Filed Feb. 13, 1990, Ser. No. 479,559

Int. Cl.<sup>5</sup> A61K 31/41; C07D 257/04

U.S. Cl. 514—381

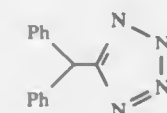
10 Claims

1. A compound of Formula I



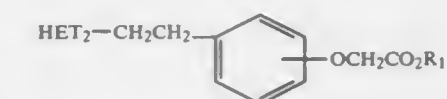
wherein

n is 6 to 9;

R is hydrogen or lower alkyl or an alkali metal ion; and  
HET<sub>1</sub> is the heterocyclic radical

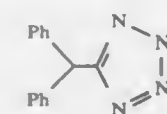
5-(diphenylmethyl)-2H-tetrazol-2-yl.

2. A compound of Formula II



(II)

wherein

R<sub>1</sub> is hydrogen, lower alkyl or an alkali metal ion, and the  
radical —OCH<sub>2</sub>CO<sub>2</sub>R<sub>1</sub> is attached in the 3 or 4 ring position;HET<sub>2</sub> is the heterocyclic radical

5-(diphenylmethyl)-2H-tetrazol-2-yl.

7. The method for inhibiting blood platelet aggregation in a mammal which comprises administering a therapeutically effective amount of a compound of claim 1.

9. The method for inhibiting blood platelet aggregation in



mammal which comprises administering a therapeutically effective amount of a compound of claim 2.

#### 4,956,377 USE OF

**BUTYL-4-DIPHENYL-1,2-PYRAZOLIDINE-DIONE-3,5 AS AN ANTIVIRAL AGENT IN HUMANS AND ANIMALS**  
Jean-Olivier Miesch, 2, place Jeanne d'Arc, Rambouillet, France

Continuation-in-part of Ser. No. 344,523, Apr. 25, 1989, abandoned, which is a continuation of Ser. No. 33,821, Apr. 3, 1987, abandoned. This application Feb. 21, 1990, Ser. No. 482,587

Int. Cl.<sup>5</sup> A61K 415

U.S. Cl. 514—404

6 Claims

1. A method for treating a patient infected with human immuno deficiency virus comprising administering to said patient an effective amount of a composition consisting essentially of butyl-4-diphenyl-1, 2-pyrazolidine-dione-3,5.

#### 4,956,378

##### 4,5-DIHYDRO PYRAZOLE COMPOUNDS

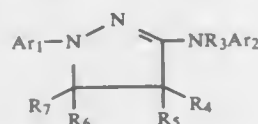
Sidney C. Burford, and David N. Hardern, both of Loughborough, England, assignors to Fisons plc, Leicestershire, England

Division of Ser. No. 606,867, May 3, 1984, Pat. No. 4,824,859. This application Feb. 10, 1989, Ser. No. 286,268  
Claims priority, application United Kingdom, May 21, 1983, 83/14111; Dec. 22, 1983, 83/34283

Int. Cl.<sup>5</sup> C07D 401/12, 231/06; A61K 31/44, 31/415  
U.S. Cl. 514—404

11 Claims

1. A compound of formula



in which Ar<sub>1</sub> and Ar<sub>2</sub>, which may be the same or different, each independently represent phenyl or pyridinyl, the phenyl or the pyridinyl each optionally being substituted by one or more of halogen; hydroxy; COOR<sub>12</sub>; trihalomethyl; alkoxy C<sub>1-6</sub>; alkyl C<sub>1-6</sub>; —NR<sub>1</sub>R<sub>2</sub>; alkoxy C<sub>1-6</sub> substituted by NR<sub>1</sub>R<sub>2</sub> or by phenyl; or alkyl C<sub>1-6</sub> substituted by NR<sub>1</sub>R<sub>2</sub> or by —COOR<sub>12</sub>;

R<sub>1</sub> and R<sub>2</sub>, which may be the same or different, each independently represent hydrogen or alkyl C<sub>1-6</sub>,  
R<sub>3</sub> represents hydrogen, alkyl C<sub>1-6</sub>, alkanoyl C<sub>1-6</sub>, or benzoyl,

R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub> and R<sub>7</sub>, which may be the same or different each independently represent hydrogen, alkyl C<sub>1-6</sub> or phenyl,  
R<sub>11</sub> represents alkyl C<sub>1-6</sub> or phenyl,  
R<sub>12</sub> represents hydrogen or alkyl C<sub>1-6</sub>,  
or a pharmaceutically acceptable acid addition salt, ester, amide, or prodrug thereof.

6. A composition for treating an inflammatory condition comprising an effective amount of a compound according to claim 1 in admixture with a pharmaceutically acceptable adjuvant, diluent or carrier.

#### 4,956,379

##### PYRAZOLE CARBOXYLIC ACIDS AND ESTERS AND INHIBITION OF BLOOD PLATELET AGGREGATION THEREWITH

Nicholas A. Meanwell, East Hampton, Conn., assignor to Bristol-Myers Squibb Company, New York, N.Y.

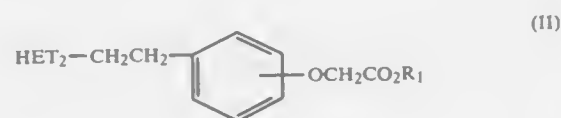
Filed Feb. 13, 1990, Ser. No. 479,505

Int. Cl.<sup>5</sup> C07D 231/04; A61K 31/41

U.S. Cl. 514—406

9 Claims

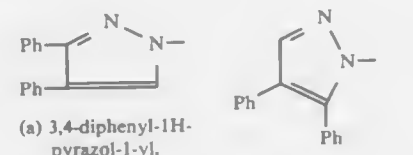
1. A compound of Formula II



wherein

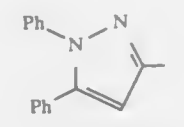
R<sub>1</sub> is hydrogen, lower alkyl or an alkali metal ion, and the radical —OCH<sub>2</sub>CO<sub>2</sub>R<sub>1</sub> is attached in the 3 or 4 ring position;

HET<sub>2</sub> is a heterocyclic radical selected from the group consisting of



(a) 3,4-diphenyl-1H-pyrazol-1-yl,

(b) 4,5-diphenyl-1H-pyrazol-1-yl, and



(c) 1,5-diphenyl-1H-pyrazol-3-yl.

8. The method for inhibiting blood platelet aggregation in a mammal which comprises administering a therapeutically effective amount of a compound of claim 1.

#### 4,956,380

##### PROLINAL COMPOUNDS USEFUL IN TREATING AMNESIA

Masaaki Toda, Osaka; Shuichi Ohuchida, Kyoto, and Hiroyuki Ohno, Shiga, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

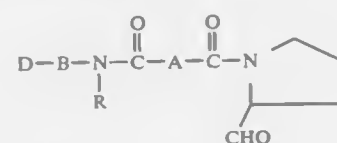
Filed Nov. 20, 1987, Ser. No. 123,410

Claims priority, application Japan, Nov. 20, 1986, 61-275375; Sep. 14, 1987, 62-228452

Int. Cl.<sup>5</sup> C07D 405/12; A61K 31/40  
U.S. Cl. 514—422

7 Claims

1. A novel prolinal derivative of the formula:



wherein

A represents an alkylene group of from 1 to 8 carbon atom(s) or alkenylene group of from 2 to 8 carbon atom(s) or a saturated hydrocarbon ring of from 3 to 7 carbon atoms, R represents hydrogen atom, phenyl group, benzyl group, alkyl group of from 1 to 8 carbon atom(s) or cycloalkyl group of from 3 to 7 carbon atoms,

B represents a single bond or an alkylene group of from 1 to 8 carbon atom(s) unsubstituted or substituted by a phenyl group or a benzyl group, or

D represents mono-, bi-, or tri-heterocyclic ring(s) containing not more than 15 ring members including carbon and one or more atom(s) selected from O and S which may be partially or fully saturated or aromatic, wherein said heterocyclic ring(s) represented by D are unsubstituted or substituted by from 1 to 3 of halogen atom, alkyl or alkoxy

group of from 1 to 4 carbon atom(s), nitro group or trifluoromethyl group.

#### 4,956,381

##### TREATING TISSUE CALCIUM DEPLETION OR DEGENERATIVE PROCESSES IN BONE OR CARTILAGE

Pietro Bollinger, Bottmingen; Hans U. Gubler, K niz, and J rg Schnyder, Berne, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed Oct. 25, 1988, Ser. No. 262,420

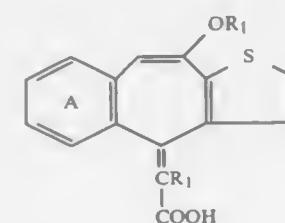
Claims priority, application United Kingdom, Oct. 26, 1987, 8725009; Feb. 19, 1988, 8803908; Aug. 26, 1988, 8820347

Int. Cl.<sup>5</sup> A61K 31/38

U.S. Cl. 514—443

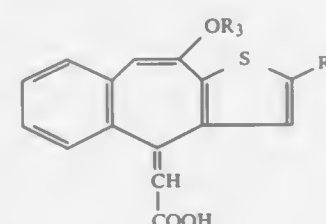
16 Claims

1. A method of treating tissue calcium depletion or degenerative processes in bone or cartilage in a subject in need of said treatment, which comprises administering to said subject an effective amount for the treatment of tissue calcium depletion or degenerative processes in bone or cartilage of an α-[b 10-oxy-4H-benzol[4,5]cyclohepta[1,2-b]thiophen-4-ylidene]-carboxylic acid of formula Ia



wherein:

R<sub>1</sub> is hydrogen or C<sub>1-2</sub> alkyl; and ring A is unsubstituted or halo- or hydroxy-substituted;  
or of formula Ib



wherein:

R<sub>3</sub> is C<sub>1-2</sub> alkyl and  
R<sub>4</sub> is halogen,  
or a physiologically hydrolysable and acceptable ester or a pharmaceutically acceptable salt thereof.

#### 4,956,382

##### SULFONAMIDE ANTI-ARRHYTHMIC AGENTS

John E. Arrowsmith, Deal; Peter E. Cross, Canterbury; Roger P. Dickinson, Dover, and Geoffrey N. Thomas, Sandwich, all of England, assignors to Pfizer Inc., New York, N.Y.

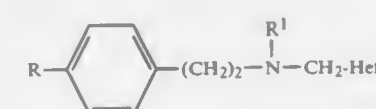
Filed Feb. 2, 1988, Ser. No. 151,390

Claims priority, application United Kingdom, Feb. 7, 1987, 8702789

Int. Cl.<sup>5</sup> A61K 31/34, 31/38; C07D 307/78, 333/52  
U.S. Cl. 514—443

8 Claims

1. An organic compound of the formula:

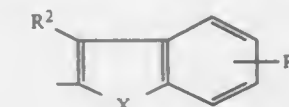


or a pharmaceutically acceptable salt thereof, wherein

R is —NHSO<sub>2</sub>(C<sub>1</sub>—C<sub>4</sub> alkyl);

R<sup>1</sup> is C<sub>1</sub>—C<sub>4</sub> alkyl; and

"Het" is a benzo-fused heterocyclic group of the formula:



wherein R<sup>2</sup> is hydrogen, methyl or ethyl; R<sup>3</sup> is —NHSO<sub>2</sub>(C<sub>1</sub>—C<sub>4</sub> alkyl), and X is oxygen or sulfur.

8. A method for preventing or reducing cardiac arrhythmias in the treatment of a mammalian subject afflicted with an impaired cardiac pump function, which comprises administering to said subject an effective antiarrhythmic amount of a compound as claimed in claim 1.

#### 4,956,383

##### ANTIFUNGAL TRIACETYLENIC DIOXOLONE FROM MICROBISPOA SP. SCC 1438, ATCC 53620

Mahesh G. Patel, Verona; Ann C. Horan, Summit; Joseph A. Marquez, Montclair, all of N.J., and J. Allan Waitz, Portola Valley, Calif., assignors to Schering Corporation, Kenilworth, N.J.

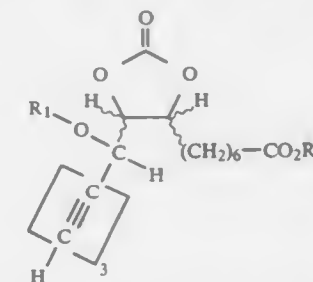
Filed Aug. 25, 1987, Ser. No. 89,278

Int. Cl.<sup>5</sup> A61K 31/365; C07D 317/36, 317/38

U.S. Cl. 514—467

12 Claims

1. A compound represented by the formula I



wherein R<sub>1</sub> is hydrogen or (C<sub>2</sub>—C<sub>8</sub>) alkanoyl and R<sub>2</sub> is hydrogen; lower alkyl or a pharmaceutically acceptable cation in racemic or optically active form.

#### 4,956,384

##### 1,4,3,6-DIANHYDROSORBITOL 2-MONONITRATE AND 5-MONONITRATE ESTERS AND PHARMACEUTICAL COMPOSITIONS THEREFROM

Paolo Chiesi, and Vittorino Serradio, both of Parma, Italy, assignors to Chiesi Farmaceutici S.p.A., Parma, Italy

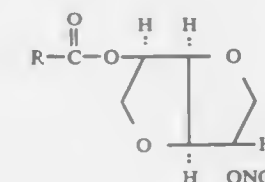
Filed May 4, 1988, Ser. No. 189,982

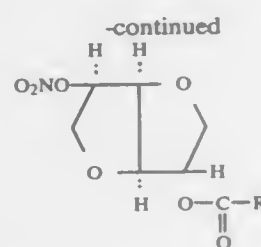
Claims priority, application Italy, May 8, 1987, 20438 A/87  
Int. Cl.<sup>5</sup> A61K 31/34; C07D 493/04

U.S. Cl. 514—470

12 Claims

1. 1,4,3,6-dianhydrosorbitol 2- or 5-mononitrate, of general formulae:





wherein R is:

- a C<sub>2</sub>-C<sub>5</sub> carboxyalkyl
- a (C<sub>1</sub>-C<sub>4</sub>)-alkoxycarbonyl (C<sub>1</sub>-C<sub>5</sub>)-alkyl;
- a 1,4,3,6-dianhydrosorbitol 2- (or 5)-nitrate-2 (or 5)-oxycarbonyl group;
- a phenylethenyl group, which is unsubstituted or substituted on the aromatic ring by one or more lower alkoxy groups, at any positions.

9. A pharmaceutical composition containing as the active ingredient 1-15% of one of the compounds as claimed in claim 1 and appropriate pharmaceutically acceptable excipients, for the treatment of angina attacks, myocardial ischemia and cardiac insufficiency conditions.

4,956,385

#### METHOD FOR REDUCING THE DURATION OF THE COMMON COLD

George A. Eby, III, 2109 Paramount St., Austin, Tex. 78704  
Continuation of Ser. No. 667,097, Nov. 1, 1984, abandoned, which is a continuation-in-part of Ser. No. 378,479, May 14, 1982, Pat. No. 4,503,070, which is a continuation-in-part of Ser. No. 288,750, Jul. 31, 1981, abandoned. This application Sep. 24, 1987, Ser. No. 102,750

Int. Cl.<sup>5</sup> A61K 9/10, 9/68, 31/315, 33/30  
U.S. Cl. 514-494 32 Claims

1. A method for treating the common cold comprising:
  - (a) applying an effective dosage of a pharmaceutically acceptable saliva soluble and ionizable zinc compound other than zinc gluconate to the oral mucosa of a human in need of treatment;
  - (b) permitting said zinc compound to remain in contact with the oral mucosa for a period of time necessary for the zinc thereof to saturate the oral mucosa; and
  - (c) applying additional dosages of such a zinc compound in like fashion until the cold has been treated.

4,956,386

#### PHARMACEUTICAL COMPOSITIONS AND PROCESS FOR THEIR PREPARATION

Christopher J. McLoughlin, Johannesburg, South Africa, and Ross B. Himstedt, Keamore, Australia, assignors to Gist-Brocades N.V., Delft, Netherlands

Continuation of Ser. No. 143,797, Apr. 25, 1980, abandoned, which is a continuation of Ser. No. 592,636, Jul. 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 543,862, Jan. 24, 1985, abandoned. This application Jul. 17, 1985, Ser. No. 756,555

Int. Cl.<sup>5</sup> A61K 31/29  
U.S. Cl. 514-503 28 Claims

1. Process for the preparation of a new solid, bismuth-containing pharmaceutical composition from an aqueous colloidal liquid composition, comprising at most 40% (w/v) of dissolved solids, at most 10% (w/v) bismuth citrate calculated as Bi<sub>2</sub>O<sub>3</sub>, ammonia in an amount at least sufficient to keep the bismuth salt in colloidal solution and at most 25% of a polyhydric alcohol selected from the group consisting of disaccharides, monosaccharides, hexitols and glycerol, said colloidal liquid composition having a pH between 8.5 and 11.3, which comprises spray drying said colloidal liquid composition to obtain a dry therapeutic active powder, capable of combining with

water to form a bismuth containing therapeutically active colloidal solution.

4,956,387

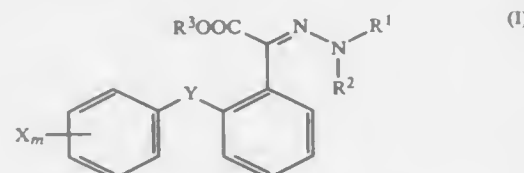
#### SUBSTITUTED HYDRAZONES AND FUNGICIDES CONTAINING THESE COMPOUNDS

Bernd Wenderoth, Lampertheim; Siegfert Brand, Weinheim; Franz Schuetz, Ludwigshafen; Hubert Sauter, Mannheim; Eberhard Ammermann, Ludwigshafen, and Gisela Lorenz, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
Filed Feb. 15, 1989, Ser. No. 310,651

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806874

Int. Cl.<sup>5</sup> A01N 37/00  
U.S. Cl. 514-522 8 Claims

1. Substituted hydrazones of the formula I



where

R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are identical or different and each denotes hydrogen or alkyl of 1 to 5 carbon atoms,  
X (m=1 to 5) is one or more identical or different substituents selected from the group consisting of halogen, cyano, trifluoromethyl, nitro, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, phenyl, phenoxy, halophenoxy, C<sub>1</sub>-C<sub>4</sub>-alkylphenoxy, benzyloxy, halobenzyloxy, C<sub>1</sub>-C<sub>4</sub>-alkylbenzyloxy, and hydrogen, and

Y is methyleneoxy, oxymethylene, ethylene, ethenylene, ethynylene, carboxymethylene, carbonylamino, methyleneamino or oxygen.

4,956,388

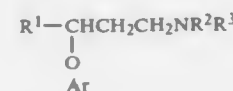
#### 3-ARYLOXY-3-SUBSTITUTED PROPANAMINES

David W. Robertson, Greenwood; David T. Wong, and Joseph H. Krushinski, Jr., both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation of Ser. No. 945,122, Dec. 22, 1986, abandoned. This application Jan. 12, 1990, Ser. No. 462,925

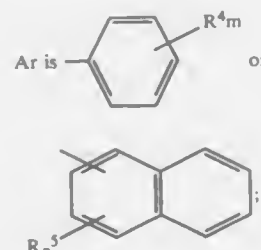
Int. Cl.<sup>5</sup> A61K 31/135; C07C 93/06  
U.S. Cl. 514-651 10 Claims

1. A compound of the formula



wherein:

R<sup>1</sup> is C<sub>3</sub>-C<sub>7</sub> cycloalkyl;



each of R<sup>2</sup> and R<sup>3</sup> independently is hydrogen or methyl;

each R<sup>4</sup> independently is halo, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>3</sub> alkoxy or trifluoromethyl;  
each R<sup>5</sup> independently is halo, C<sub>1</sub>-C<sub>4</sub> alkyl or trifluoromethyl;  
m is 0, 1 or 2;  
n is 0 or 1; and  
the pharmaceutically acceptable acid addition salts thereof.

4,956,389

#### COMPOUNDS HAVING CALCIUM BLOCKING ACTIVITY

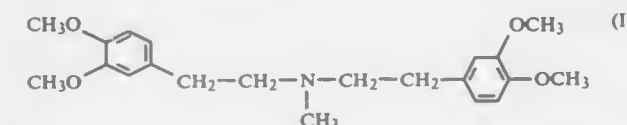
Giuseppe Quadro, Milan, Italy, and Jean Cahn, Montrouge, France, assignors to Yason S.R.L., Milan, Italy and SIR International S.A., Montrouge, France

Continuation of Ser. No. 512,170, Jul. 8, 1983, abandoned. This application Jan. 14, 1985, Ser. No. 691,157

Claims priority, application Italy, Jul. 9, 1982, 22339 A/82; Apr. 28, 1983, 20838 A/82

Int. Cl.<sup>5</sup> A61K 31/135; C07C 87/28  
U.S. Cl. 514-654 1 Claim

1. The method of treatment of a condition consisting of cardiovascular diseases due to myocardial ischemia, disturbances in cerebral circulation due to cerebral oligoemia and calcium ions accumulation, which consists of administering to a living subject affected by said condition an effective amount of the compound N-methyl-N-bis-(3,4-dimethoxy-phenyl-ethyl)amine of formula I



of melting point 67°-69° C. which forms a hydrochloride of melting point 182°-185° C., or an acid addition salt thereof with a pharmaceutically acceptable acid, and mixtures thereof in unit dosage form and inert excipients.

4,956,390

#### GAS TRANSPORT EMPLOYING PERFLUOROBUTYLDECALIN

Frank K. Schweighardt, Allentown, and Webb I. Bailey, Fogelsville, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 89,475, Aug. 25, 1987, Pat. No. 4,777,304. This application Jun. 6, 1988, Ser. No. 203,356

Int. Cl.<sup>5</sup> A61K 31/025; A01N 1/02  
U.S. Cl. 514-747 12 Claims

1. In a method of transporting gases in a fluid system, the improvement comprising using perfluorobutyldecalin as the gas transport agent for acid gases.

4,956,391

#### PROTECTED COMPLEX OF PROCAINE FOR THE TREATMENT OF SYMPTOMS FROM NARCOTICS ADDICTION, TINNITUS AND ALZHEIMER'S DISEASE

Alfred T. Sapae, Palm Bay Hotel, 780 N. E. 69th St., Apt. 7120, Miami Beach, Fla. 33138

Filed Aug. 17, 1988, Ser. No. 233,247  
Int. Cl.<sup>5</sup> A61K 27/00 12 Claims

1. A composition for the treatment of individuals addicted to narcotics which comprises procaine and a complexing agent capable of forming a protected complex with procaine, in an amount effective to reduce the withdrawal symptoms of addicted individuals, said complexing agent comprising an acid selected from the group consisting of ascorbic acid, pantothenic acid, acetylsalicylic acid and amino acids.

4,956,392

#### PROCESS FOR PRODUCING METHANOL OR MIXED ALCOHOL

Yoshihiko Saito; Osamu Hashimoto; Masaaki Kuwa; Takashi Kojima, and Kinya Tsuji, all of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Continuation of Ser. No. 160,280, Feb. 25, 1988, abandoned. This application Nov. 17, 1989, Ser. No. 437,314

Claims priority, application Japan, Feb. 27, 1987, 62-43021  
Int. Cl.<sup>5</sup> C07C 27/06, 27/08 6 Claims

U.S. Cl. 518-712 6 Claims

1. A process for producing methanol or a mixture of methanol and higher alcohols from a synthesis gas containing hydrogen and carbon monoxide and/or carbon dioxide, which comprises:

- (a) passing the synthesis gas through a fluidized bed catalytic reactor at a superficial linear velocity of at least 0.2 m/sec., a temperature of 180° to 500° C. and a pressure of 50 to 150 atmospheres, said fluidized bed catalytic reactor containing a catalyst for use in the production of methanol or a mixture of methanol and higher alcohols, said catalyst comprising particles having an average particle diameter of 30 to 150 μm and a particle density of 1.7 to 3.3 g/cm<sup>3</sup>, whereby methanol or a mixture of methanol and higher alcohols is produced in an exothermic reaction, and simultaneously with the reaction recovering heat from the reaction by passing a heat transfer medium through a heat transmission tube in said reactor,
- (b) cooling the gas stream resulting from the reaction containing methanol or mixture of methanol and higher alcohols, thereby condensing the methanol or mixture of methanol and higher alcohols into a liquid, and
- (c) separating the liquid methanol or mixture of methanol and higher alcohols from the gas stream.

4,956,393

#### STRUCTURES EXHIBITING IMPROVED TRANSMISSION OF ULTRAHIGH FREQUENCY ELECTROMAGNETIC RADIATION AND STRUCTURAL MATERIALS WHICH ALLOW THEIR CONSTRUCTION

Jack D. Boyd, Westminster; Hermann Sitt, Brea; Hong-Son Ryang, Camarillo, and Theodore F. Biermann, Mission Viejo, all of Calif., assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 29, 1988, Ser. No. 238,021  
Int. Cl.<sup>5</sup> C08J 9/32; C08G 73/12; B27J 5/00

U.S. Cl. 521-54 11 Claims

1. In a process for the manufacture or repair of radomes in which matrix resins, structural adhesives, and foams containing heat curable resin systems are utilized, the improvement comprising employing as said heat curable resin system, a resin system comprising, in weight percent relative to the total resin system weight,
  - (a) about 70 percent or more of a cyanate resin;
  - (b) from 0 to about 25 weight percent of a bismaleimide resin;
  - (c) from 0 to about 20 weight percent of an epoxy resin;
  - (d) from 0 to about 20 weight percent of an engineering thermoplastic selected from the group consisting of the polyimides, polyetherimides, and polyamideimides; and
  - (e) an effective amount of a cyanate cure promoting catalyst.
3. A syntactic foam having increased transparency to radar waves, comprising:
  - (a) from 90 to about 40 weight percent of a heat curable resin system component, comprising:
    - (i) about 70 weight percent or more of a heat curable cyanate resin; and
    - (ii) an amount of a catalyst effective to cure said cyanate resin;
  - (b) a microsphere component.



4,956,394

## CLOSED CELL PHENOLIC FOAM CONTAINING ALKYL GLUCOSIDES

Edward W. Kifer, Trafford; Vincent J. Wojtyna, Butler; James P. Colton, Trafford, and Jeffrey T. Stickel, Pittsburgh, all of Pa., assignors to Thermal Products International, Pittsburgh, Pa.

Filed Dec. 12, 1989, Ser. No. 449,732  
Int. Cl.<sup>5</sup> C08J 9/14

U.S. Cl. 521—84.1

23 Claims

1. An improved foamable phenolic resole composition of the type comprising aqueous phenol formaldehyde resole, surfactant, blowing agent, optional additives and anhydrous aryl sulfonic acid catalyst wherein the improvement comprises having from 2 to 12 percent by weight of the foamable phenolic resole composition of alkyl glucoside having an alkyl group of from 1 to 4 carbon atoms.

4,956,395

## STYRENIC FOAM BLOWING AGENT COMPOSITION

Edward C. Leduc, Marietta, Ga., assignor to Amoco Corporation, Chicago, Ill.

Filed Jan. 18, 1990, Ser. No. 466,977  
Int. Cl.<sup>5</sup> C08J 9/14

U.S. Cl. 521—79

9 Claims

1. A method of producing a styrene foam comprising: extruding and foaming a mixture of a styrene resin from the group consisting of polystyrene and copolymers of styrene with methyl methacrylate, acrylonitrile, maleic anhydride or acrylic acid, with a blowing agent comprising ethylchloride, propane and a halogenated ethane selected from the group consisting of 1,1,1-trifluoro-2-fluoroethane 1-chloro-1,1,1-difluoro-2,2,2-trifluoroethane, 1-chloro-1,1,1-difluoroethane and mixtures thereof wherein the blowing agent comprises about 0.5 to about 3.5 parts by weight propane per 100 parts by weight resin, about 2.5 to about 6.5 parts by weight ethyl chloride per 100 parts by weight resin and about 5.5 to about 12.0 parts by weight halogenated ethane per 100 parts by weight resin.

4,956,396

## PROCESS FOR PREPARING RIGID POLYVINYL CHLORIDE STRUCTURED FOAMS HAVING SUPERIOR SURFACE CHARACTERISTICS

Kwang-Ung Kim; Byoung-Chul Kim, and Soon-Man Hong, all of Seoul, Rep. of Korea, assignors to Korea Advanced Institute of Science & Technology, Seoul, Rep. of Korea  
Division of Ser. No. 277,894, Nov. 30, 1988, Pat. No. 4,886,837.  
This application Mar. 6, 1989, Ser. No. 319,628

Claims priority, application Rep. of Korea, Dec. 9, 1987, 14012

Int. Cl.<sup>5</sup> C08J 9/06

U.S. Cl. 521—85

11 Claims

1. A process for producing a rigid polyvinyl chloride foam of a polyvinyl chloride resin which has a thick non-foamed layer and superior brightness, scratch resistance and impact resistance, which process comprises mixing 0.75 parts per hundred of resin of sodium bicarbonate as a chemical blowing agent and 0.5 parts per hundred of resin of boric acid as a nucleating agent, 3–10 parts per hundred of resin of a polar plasticizer with a low molecular weight and 4–10 parts per hundred of resin of an impact resistance modifier with a raw polyvinyl chloride resin, and then extruding the mixture from a single-screw extruder to which a cylindrical die is attached.

4,956,397

## INSULATING LINER FOR SOLID ROCKET MOTOR CONTAINING VULCANIZABLE ELASTOMER AND A BOND PROMOTER WHICH IS A NOVOLAC EPOXY OR A RESOLE TREATED CELLULOSE

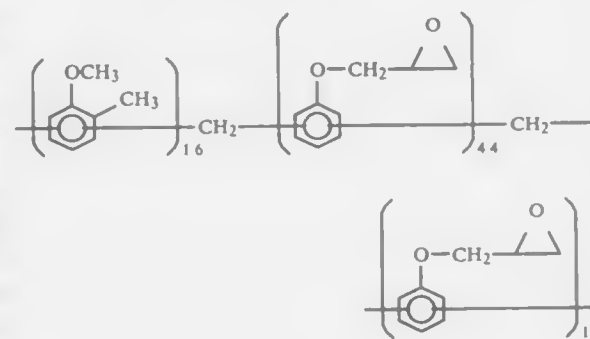
Gregory S. Rogowski, Richmond; Thomas F. Davidson, Manassas, and Timothy Ludlow, Sterling, all of Va., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 17, 1989, Ser. No. 381,541  
Int. Cl.<sup>5</sup> C08K 3/40, 3/36, 3/22

U.S. Cl. 523—138

6 Claims

1. In an insulating liner for a solid rocket propellant motor comprising a vulcanizable elastomeric composition, about 5 to 25 parts vulcanizing agents per 100 parts elastomer, about 5 to 20 parts aramid polymer fiber per 100 parts elastomer and about 5 to 20 parts powder filler per 100 parts elastomer, the improvement which comprises about 10 to 25 parts per 100 parts elastomer of a bond promoter selected from the group consisting of cellulosic fiber treated with a resorcinol-formaldehyde latex and a multifunctional aromatic epoxy resin having repeating groups of the formula



4,956,398

## NITRILE RUBBER/VINYL CHLORIDE POLYMER/SILICA COMPOSITIONS

Abdul L. Ayub, Clearwater, and Herbert F. Schwarz, Sarnia, both of Canada, assignors to Polysar Limited, Sarnia, Canada  
Filed Jun. 7, 1989, Ser. No. 362,562Int. Cl.<sup>5</sup> C08K 9/04, 3/36; C08L 27/06, 35/04

U.S. Cl. 523—209

6 Claims

1. A polymer composition comprising  
(i) from 5 to 95 parts by weight of vinyl chloride resin, and correspondingly to 100 parts combined weight,  
(ii) from 95 to 5 parts by weight nitrile rubber,  
(iii) from 5 to 40 parts by weight of coated silica per 100 parts combined weight of said vinyl chloride resin plus said nitrile rubber,

characterized in that said coated silica is prepared by an aqueous emulsion polymerization process utilizing water and a non-ionic emulsifier, wherein said process consists of

- (A) adding to a polymerization vessel:  
(a) from 20 to 80 parts by weight of a polymerizable monomer composition comprising at least 80 weight percent acrylate monomer  
(b) 100 parts by weight untreated silica, such that said silica is dispersed in said water,  
(c) sufficient non-ionic emulsifier to emulsify said monomer composition,  
(d) free radical initiator,

and  
(B) polymerizing at least 50 weight percent of said monomer composition in the presence of said untreated silica.

4,956,399

## EMULSIFIED MANNICH ACRYLAMIDE POLYMERS

Joseph J. Kozakiewicz, Trumbull, and Sun-Yi Huang, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 285,927, Dec. 19, 1988, abandoned. This application Oct. 30, 1989, Ser. No. 428,730  
Int. Cl.<sup>5</sup> C08K 7/16; D21H 17/00

U.S. Cl. 523—223

10 Claims

1. A composition comprising (alk)acrylamide-containing polymeric microparticles, said (alk)acrylamide polymer being substituted with at least about 1 mole percent of tertiary amino-methyl groups and having an average particle size of from about 200 to about 4000 Å in diameter, which aminomethyl groups continually self cross-link the polymer at ambient conditions.

4,956,400

## MICROEMULSIFIED FUNCTIONALIZED POLYMERS

Joseph J. Kozakiewicz, Trumbull, and David L. Dauplaise, Norwalk, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 286,078, Dec. 19, 1988, abandoned. This application Oct. 30, 1989, Ser. No. 428,704

The portion of the term of this patent subsequent to Sep. 4, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C08K 7/16; D21H 17/00

U.S. Cl. 523—223

8 Claims

1. In a water-soluble polymer-based polymer having functional groups which continually self cross-link said polymer at ambient conditions the improvement which comprises said polymer being in a form where substantially all of the polymer is present as discrete particles having diameters of between about 200 and about 4000 Å.

4,956,401

## PIGMENTED LOW TEMPERATURE CURE EMULSION POLYMERS

Kenneth G. Hahn, Jr., Hinckley, and Barbara L. Kunz, Bay Village, both of, assignors to The Glidden Company, Cleveland, Ohio

Filed Oct. 15, 1987, Ser. No. 108,762

The portion of the term of this patent subsequent to Mar. 1, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> C08J 3/08; C08L 61/00

U.S. Cl. 523—310

11 Claims

1. In a process for producing a pigmented paint composition based on polymeric binder comprising a functionally reactive emulsion polymer and a coreactive glycoluril derivative, the improvement comprising:

- copolymerizing ethylenically unsaturated monomers in an aqueous polymerization medium and in the presence of surfactants and initiators, said ethylenically unsaturated monomers including carboxyl or hydroxyl functional monomers but excluding amino monomers to produce a functionally reactive emulsion polymer;  
treating the functionally reactive emulsion polymer with an ion exchange resin to remove cations from the functionally reactive emulsion polymer to produce an ion-exchange emulsion polymer having a pH of less than 2.5;  
combining said ion-exchanged emulsion polymer with a cation-free opacifying pigment having less than 0.5% by weight residual cation to form a pigmented paint composition.

4,956,402

## SYNTHETIC RESIN WITH BASIC NITROGEN GROUPS FROM RESINS REACTED WITH THE KETIMINE-URETHANE PRODUCT OF AN

ALKANOLAMINE, A KETONE AND ANISOCYANATE  
Thomas Perner, Ludwigshafen; Rolf Osterloh, Erfstadt; Eberhard Schupp, Gruenstadt; Thomas Schwerzel, Ludwigshafen, and Klaus Ahlers, Muenster, all of Fed. Rep. of Germany, assignors to BASF Lacke & Farben Aktiengesellschaft, Muenster, Fed. Rep. of Germany

Filed Jun. 23, 1988, Ser. No. 210,499

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1987, 3720956

Int. Cl.<sup>5</sup> C08G 59/14, 59/50; C08L 63/00

U.S. Cl. 523—415

7 Claims

1. A synthetic resin which carries basic nitrogen groups, is water-dilutable by protonation with an acid, and comprises the reaction product of:

- (A) an epoxy resin having an average molecular weight  $M_n$  of from 300 to 6,000 and an average of from 1.5 to 3.0 epoxy groups per molecule; and  
(B) a ketimine of a primary amide additionally containing one or more urethane groups, said component B having been prepared by reacting an aliphatic diisocyanate with a diol, or a monoalcohol, or a mixture thereof and with the ketimine of an aliphatic primary alkanolamine in an equivalent ratio of from 1:0.1 to 1.9:0.9 to 0.1.

4,956,403

## SUPPRESSION OF PRESSURE WATER ABSORPTION OF LIGHTWEIGHT AGGREGATE BY AQUEOUS DISPERSION THEREIN OF ANIONIC POLYMERS

Toshio Yonezawa, Tokyo; Takashi Iwashimizu, Osaka; Yasuhiko Yoshioka; Koichi Ito, both of Tokyo; Kunio Sakane, and Tetsuo Nakase, both of Kyoto, all of Japan, assignors to Takenaka Komuten Co., Ltd., Osaka and Sanyo Chemical Industries, Ltd., Kyoto, both of, Japan

Filed Nov. 2, 1987, Ser. No. 122,134

Claims priority, application Japan, Nov. 7, 1986, 61-265275  
Int. Cl.<sup>5</sup> C08K 3/00

U.S. Cl. 524—5

7 Claims

1. A lightweight aggregate which is inhibited for water absorption by pressure, the aggregate being treated with an aqueous polymer dispersion having a viscosity permitting the dispersion to enter fine pores in a surface layer of said aggregate by absorption, the dispersion so entered in the pores being thickenable by rise of pH and when so thickened having a viscosity of not less than 50 times the viscosity before thickening.

4,956,404

## PLASTIC COMPOSITION FOR TOYS, NOVELTY ITEMS AND ARTS AND CRAFTS

Josef Pelzig, 16011 Hart St., Van Nuys, Calif. 91406  
Filed Jan. 10, 1989, Ser. No. 295,351Int. Cl.<sup>5</sup> C08L 3/02

U.S. Cl. 524—48

23 Claims

1. A semi-solid plastic composition that is elastic and pliable and which remains flexible and does not become brittle after exposure to air and which retains fine detail of surface impressions without flow-back, consisting essentially of:

- (a) a dextrin incompatible polyvinyl acetate homopolymer emulsion in an amount from about 50 to about 95 wt.%, which coagulates in the presence of dextrin with the resulting coagulum incorporating all of the water of the emulsion to form a semi-solid plastic composition;  
(b) glyceryl triester in an amount from about 1 to about 6 wt.%;  
(c) epoxidized oil in an amount from about 0.5 to about 3.0 wt.%;  
(d) fumed silica in an amount from about 1 to about 6 wt.%;

- (e) hydrogenated starch hydrolysate in an amount from about 0.5 to about 3.0 wt.%; and  
(f) dextrin in an amount from about 1 to about 4 wt.%.  
\_\_\_\_\_

4,956,405

## OZONE RESISTANT ELASTOMERIC ARTICLES

Edward L. Wheeler, Watertown, and Robert J. Franko, Beacon Falls, both of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.  
Division of Ser. No. 163,924, Mar. 4, 1988, Pat. No. 4,794,134, which is a continuation-in-part of Ser. No. 90,298, Aug. 28, 1987, Pat. No. 4,794,135. This application Oct. 5, 1988, Ser. No. 254,006

The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.

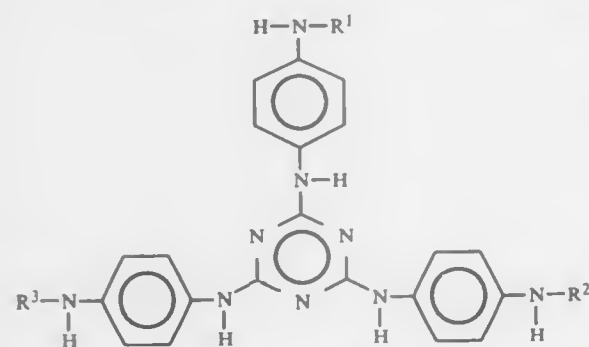
Int. Cl.<sup>5</sup> C08K 5/3492; B32B 9/04, 9/06, 25/06

U.S. Cl. 524—100

10 Claims

1. A rubber article having an elastomeric body having an outermost layer comprising:

- (a) at least one ozone degradation-prone highly unsaturated polymer; and  
(b) a compound of structure (I), added in an amount effective to protect said unsaturated polymer against ozone attack,



in which R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> are radicals independently selected from a C<sub>3</sub>-C<sub>18</sub> branched or linear alkyl, or a C<sub>3</sub>-C<sub>12</sub> cycloalkyl or a C<sub>3</sub>-C<sub>12</sub> cycloalkyl substituted with one or more C<sub>1</sub>-C<sub>12</sub> alkyl groups.

4,956,406

BIS-CYCLIC PHOSPHITE COMPOUNDS AND POLYMERIC MATERIALS STABILIZED THEREWITH  
Garry L. Myers, and Richard H. S. Wang, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

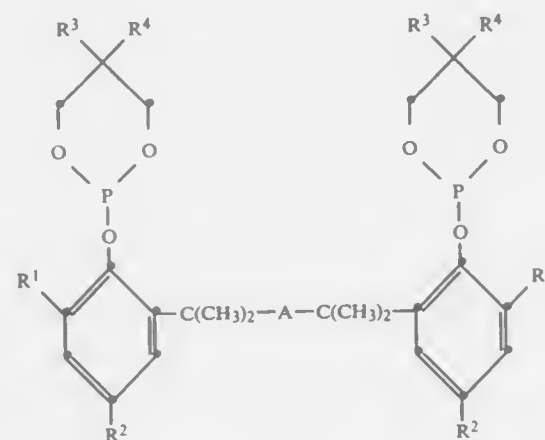
Filed Aug. 3, 1989, Ser. No. 389,240

Int. Cl.<sup>5</sup> C08K 5/524, 5/526

U.S. Cl. 524—119

12 Claims

1. A compound having the formula



wherein

each R<sup>1</sup> is independently selected from hydrogen, alkyl, aralkyl, aryl, carboxy, alkoxycarbonyl or halogen;  
each R<sup>2</sup> is independently selected from hydrogen, alkyl, aralkyl, alkoxy, aryl, carboxy, alkoxycarbonyl or halogen;  
each R<sup>3</sup> and R<sup>4</sup> is alkyl; and  
A is 1,3- or 1,4-phenylene.

4,956,407

## POLYMER COMPOSITION

Kazushige Funasaki; Kenji Tajima; Toshinori Yukino, and Hiroshi Yamanoi, all of Urawa, Japan, assignors to Adeka Argus Chemical Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 175,309, Mar. 30, 1988, abandoned.

This application Aug. 28, 1989, Ser. No. 399,362

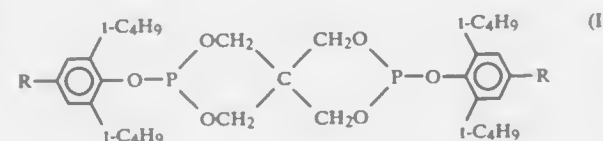
Claims priority, application Japan, Apr. 10, 1987, 62-87992; Apr. 24, 1987, 62-101464

Int. Cl.<sup>5</sup> C07F 9/15; C08K 5/524

U.S. Cl. 524—120

3 Claims

1. A polymer composition which comprises  
(A) a polymer blend comprising (a-1) a polyester and (a-2) a polycarbonate or  
(B) a polymer blend comprising (b-1) α-methylstyrene-modified ABS resin and (b-2) at least one polymer selected from a polycarbonate, a saturated polyester, polyphenylene ether, a polyamide and a polyacetal and  
(C) an organic phosphite compound having the formula (I):



in which R is an alkyl having 1 to 9 carbon atoms, said polymer composition comprising 100 parts by weight of (A) or (B) and 0.001 to 10 parts by weight of (C).

4,956,408

## COMPLEX ACRYLATES AS STABILIZER FOR CONJUGATED DIENE/MONOVINYL AROMATIC COPOLYMERS

Ronald D. Mathis; Alonzo G. Kitchen, and Frank J. Szalla, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 13, 1988, Ser. No. 220,105

Int. Cl.<sup>5</sup> C08K 5/36

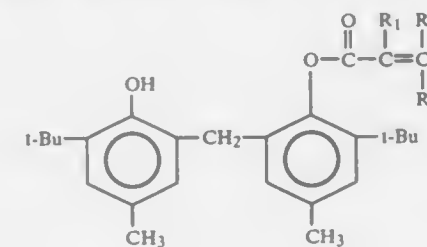
U.S. Cl. 524—147

22 Claims

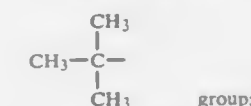
1. A method for stabilizing a polymeric composition comprising a conjugated diene/monovinyl substituted aromatic

hydrocarbon copolymer wherein said copolymer is selected from the group consisting of linear or branched block, tapered block or random block copolymers, wherein the weight ratio of conjugated diene to monovinyl substituted aromatic hydrocarbon in said copolymer is in the range of about 5:95 to about 50:50, which method comprises:

incorporating in said copolymer effective amounts of a complex acrylate of the formula



wherein t-Bu is a



group;

and R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> are the same or different and are selected from the group consisting of hydrogen, alkyl residues having from 1 to 16 carbon atoms, aryl residues, cycloalkyl residues having from 5 to 9 carbon atoms, and alkyl substituted aryl residues having from 7 to 12 carbon atoms; and

an organic phosphite of the formula

(RO)<sub>3</sub>P; and

a non-acrylate substituted hindered phenolic compound.

4,956,410  
BOUND ANTIOXIDANT MASTERBATCHES

Gerald Scott, 20 Gale Lane, Lichfield, Staffordshire, England WD13 7LW; Sahar Al-Malaka, 55 Monmouth Drive, Sutton Coldfield, England B73 6JH, and Abdni Ibrahim, c/o The University of Birmingham, Aston Triangle, Birmingham, England B4 7ET

Continuation of Ser. No. 170,961, Mar. 18, 1988, abandoned.

This application Jul. 7, 1989, Ser. No. 377,753

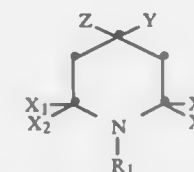
Claims priority, application United Kingdom, Mar. 19, 1987, 8706569

Int. Cl.<sup>5</sup> C08F 285/00, 255/02; C08L 51/06

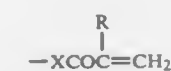
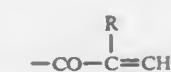
U.S. Cl. 525—73

11 Claims

1. A process for preparing a bound antioxidant polymer masterbatch concentrate which comprises grafting at least one antioxidant selected from bis-acrylic esters, bis-alkylacrylic esters, bis-acrylic amides, and bis-alkylacrylic amides having the structure



where Y represents

R<sub>1</sub> represents

Z represents H, OR, NHR, NR<sub>2</sub>, COOH or CH<sub>2</sub>COOH, each R, which can be the same or different, represents H or alkyl, X represents —O— or —NH—, and each of X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub> and X<sub>4</sub>, which can be the same or different, represents alkyl, onto a polymer selected from the group consisting of polyolefins, vinyl chloride polymers, polystyrene, polyamides, ethylene-propylene copolymers and terpolymers, rubber-modified plastics, thermoplastic rubbers and polyunsaturated rubbers, in an amount sufficient to provide from 2 to 50 grams of antioxidant per 100 g of bound antioxidant polymer masterbatch concentrate by reaction in the melt in the presence of free radicals at a temperature of 100° C. to 350° C., said free radicals being produced by shearing and/or by the presence of a radical generator in a molar ratio of said radical generator to said antioxidant of from 0.001:1 to 1:1, the reaction being continued whilst continuing to shear the melt for a time such that the melt viscosity of the polymer which increases initially during the reaction has reduced to a level which permits the concentrate to be homogeneously blended subsequently into unstabilized polymer.

4,956,409

## BINDER CHEMISTRY

Ronald F. Sletoff, Pataskala, Ohio, assignor to Owens-Corning Fiberglass Corporation, Toledo, Ohio

Continuation of Ser. No. 8,067, Jan. 13, 1987, abandoned, which is a continuation of Ser. No. 770,005, Aug. 27, 1985, abandoned, which is a continuation of Ser. No. 616,343, Jun. 1, 1984, abandoned. This application Jul. 26, 1988, Ser. No. 225,566

Int. Cl.<sup>5</sup> C08J 5/21

U.S. Cl. 524—211

6 Claims

1. A method of applying an aqueous foamed binder system to a glass fiber pack which already contains enough binder to hold the glass fiber pack together which comprises including in the aqueous foamed binder system a heat-decomposable surfactant, applying the aqueous foamed binder to the pack and heating the pack and binder system to decompose the surfactant and produce a hydrophobic surface layer on the pack.

2. A method of forming a fibrous glass product comprising combining in an aqueous medium a phenolic resole, urea, a silane or hydrolysis product thereof and a decomposable surfactant so as to form a phenolic resole binder, foaming said phenolic resole binder and applying said foamed resole binder to a wool pack which already contains a binder; molding and curing said wool pack to a final product and wherein said surfactant decomposes during molding and curing to leave a hydrophobic surface on said product.



**4,956,411**  
**EPOXY RESIN COMPOSITION FOR COMPOSITE MATERIAL FROM M- OR O-SUBSTITUTED TRIGLYCIDYLAMINOPHENOLS, DIAMINODIPHENYLSULFONE AND LATENT CURING AGENTS**

Hisaaki Tada, Yoshinobu Shiraiishi, and Shigetsugu Hayashi, all of Nagoya, Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

Filed Jan. 30, 1989, Ser. No. 303,274

Claims priority, application Japan, Feb. 5, 1988, 63-25204; Feb. 5, 1988, 63-25205; Feb. 5, 1988, 63-25206

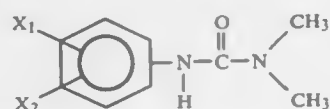
Int. Cl.<sup>3</sup> C08G 59/46, 59/56, 59/60

U.S. Cl. 525—93

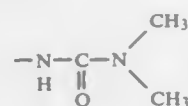
4 Claims

1. An epoxy resin composition for composite materials, comprising:

- (A) an epoxy compound containing 10 to 100% by weight of m- or o-methyl-p-N,N-diglycidyl-aminophenylglycidyl ether or its oligomer,  
 (B) a diaminodiphenylsulfone and/or a diaminodiphenylmethane in an amount of 50 to 200% for the total epoxy equivalent of the epoxy compound,  
 (C) 1 to 10 parts by weight of at least one compound selected from the group consisting of dicyandiamide, 2,6-xylenylbiguanide, o-tolylbiguanide, diphenylguanidine, adipyl dihydrazide, azelalyl dihydrazide, and isophthalic acid dihydrazide for 100 parts by weight of the epoxy compound, and  
 (D) 1.5 to 15 parts by weight of one or more of urea compounds represented by the following general formula:



wherein X<sub>1</sub> and X<sub>2</sub>, which may be the same or different, each represents —Cl, —Br, —NO<sub>2</sub>, —CH<sub>3</sub>, —H, —OCH<sub>3</sub>, —C<sub>2</sub>H<sub>5</sub>, or



for 100 parts by weight of the epoxy compound.

**4,956,412**  
**POLYMER BLEND**  
 William P. Gergen, Houston, Tex.; Robert G. Lutz, Santa Rosa, Calif., and William W.C. Hart, Avon, Conn., assignors to Shell Oil Company, Houston, Tex.

Filed Nov. 9, 1988, Ser. No. 269,033

Int. Cl.<sup>3</sup> C08L 73/00, 35/06

U.S. Cl. 525—190

9 Claims

1. A composition comprising a non-miscible blend of:  
 a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon, wherein the linear alternating polymer is represented by the formula



wherein B is the moiety of an ethylenically unsaturated hydrocarbon of at least 3 carbon atoms and the ratio of y:x is no more than about 0.5; and

a copolymer of a vinyl aromatic monomer and an  $\alpha,\beta$ -ethylenically unsaturated alkenyl nitrile, the alkenyl nitrile being present in an amount less than about 40% by weight of the copolymer, which is present in an amount between 0.5% and 35% by weight of the composition.

**4,956,413**  
**RUBBER COMPOSITIONS**  
 Yoshio Tanimoto, and Kohichi Iketani, both of Chiba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Mar. 20, 1989, Ser. No. 325,534

Int. Cl.<sup>3</sup> C08L 9/00, 23/16, 23/26, 23/32

U.S. Cl. 525—192

6 Claims

1. A rubber composition which comprises 100 parts by weight of ethylene- $\alpha$ -olefin-non-conjugated diene copolymer rubber, 5-40 parts by weight of solid diene rubber and 4-10 parts by weight of sulfur, the butadiene content of said solid diene rubber being 50% by weight or more, the butadiene portions of said solid diene rubber having 40% or more of 1,2 bonds based on all the bonds of said portion, and the ratio of weight-average molecular weight to number-average molecular weight being 2 or less.

**4,956,414**  
**PREPARATION OF IONICALLY CROSSLINKED ETHYLENE COPOLYMERS, IONICALLY CROSSLINKED ETHYLENE COPOLYMERS AND THEIR USE AS FILMS, CABLE SHEATHING AND ADHESION PROMOTERS**

Thomas Muehlenbernd, Heidelberg, and Norbert Hasenbein, Dirmstein, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 9, 1989, Ser. No. 363,785

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1988, 3822067

Int. Cl.<sup>3</sup> C08G 81/02

U.S. Cl. 525—196

5 Claims

1. A process for the preparation of an ionically crosslinked ethylene copolymer [A] by neutralizing the corresponding ethylene copolymer [B] which contains, as copolymerized units, from 0.1 to 20 mol % of  $\alpha,\beta$ -ethylenically unsaturated carboxylic acids or  $\alpha,\beta$ -ethylenically unsaturated comonomers which donate carboxyl groups, with the addition of a metal salt to a feed zone of an extruder, wherein the neutralization is carried out in the absence of a solvent in an extruder of an ethylene high pressure polymerization system, and the metal salt added is a metal salt of carboxyl-containing ethylene copolymer, ethylene graft copolymer or ethylene terpolymer [C].

**4,956,415**  
**PREPARATION OF TRIBLOCK COPOLYMERS**  
 Kent S. Dennis, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 318,788, Mar. 3, 1989, Pat. No. 4,885,343, which is a continuation of Ser. No. 33,444, Apr. 1, 1987, Pat. No. 4,839,430. This application Nov. 7, 1989, Ser. No. 433,649

Int. Cl.<sup>3</sup> C08L 293/00, 297/04, 297/02

U.S. Cl. 525—280

12 Claims

1. A method for the preparation of block copolymer of the ABA configuration, the steps of the method comprising:

- (a) providing a first anionically polymerizable monomer portion used in polymerizing the A block polymer chains, which first monomer portion has at least one monomer selected from the group consisting of styrene,  $\alpha$ -methylstyrene, m-ethylstyrene, p-methoxy- $\alpha$ -methylstyrene, p-ethyl- $\alpha$ -methylstyrene, p-ethyl- $\alpha$ -ethylstyrene, 2,4-diethylstyrene, m-isopropylstyrene, butadiene, dimethylbutadiene, isoprene, piperylene, mono- or diortho-, and halo-substituted styrenes;  
 (b) anionically polymerizing the first monomer portion to provide A block polymer chains having living ends;  
 (c) contacting the A block polymer chains with a second anionically polymerizable monomer portion used in polymerizing the B block polymer chain, which second monomer portion has at least one monomer selected from the group consisting of  $\alpha$ -methylstyrene, p-methoxy- $\alpha$ -methylstyrene, p-ethyl- $\alpha$ -methylstyrene, p-ethyl- $\alpha$ -ethylsty-

rene, or combinations thereof, provided that at least one monomer selected from the second monomer portion is different from at least one monomer selected from the first monomer portion;

- (d) anionically polymerizing the second monomer portion in the presence of the A block polymer chains to form A-B block polymer chains having living ends;  
 (e) contacting said A-B block polymer chains with up to at least a quantity sufficient to react with a substantial proportion of said polymer chain living ends of an  $\alpha$ -alkylstyrene or a ring-alkyl substituted  $\alpha$ -alkylstyrene, wherein the  $\alpha$ -alkyl groups contain between about 1 to about 20 carbon atoms, and the ring-alkyl groups have at least 2 carbon atoms; and  
 (f) coupling the A-B block polymer chains with a difunctional coupling agent to bring about substantial coupling.

**4,956,416**  
**AMINO OR HYDRAZINO PEROXIDES, DERIVATIVES AND THEIR USES**

Jose Sanchez, Grand Island, N.Y., assignor to Atochem North America, Inc., Philadelphia, Pa.

Filed Aug. 18, 1988, Ser. No. 233,643

Int. Cl.<sup>3</sup> C08F 8/30, 8/34; C07C 109/10; C07D 209/56

U.S. Cl. 525—327.6

2 Claims

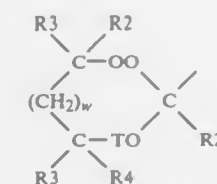
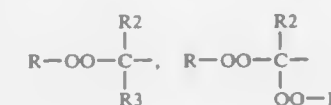
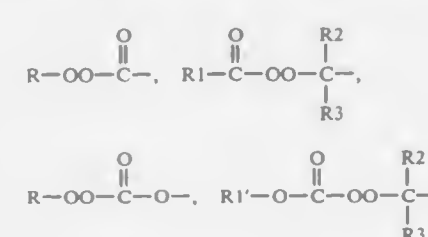
1. A compound of Structure A:



where x is 0 or 1, y is 1 or 2 and z is 1 to 3, with the further provisos that when y is 2, z can only be 1 and when z is 2 or 3, y can only be 1, and

(I) when y is 1 and z is 1,

P is a peroxide-containing mono-radical having a structure:



where

w is 1 or 2;

R is a substituted or unsubstituted t-alkyl radical of 4 to 12 carbons, a substituted or unsubstituted t-alkyl radical of 9 to 13 carbons, a t-cycloalkyl radical of 5 to 12 carbons or a substituted or unsubstituted t-alkynyl radical of 5 to 10 carbons;

R1 is a substituted or unsubstituted branched or unbranched, alkyl radical of 1 to 13 carbons, a substituted or unsubstituted cycloalkyl radical of 5 to 10 carbons, a substituted or unsubstituted, branched or unbranched, aralkyl radical of 7 to 11 carbons, or a substituted or unsubstituted aryl radical of 6 to 10 carbons;

R1' is a substituted or unsubstituted, branched or unbranched, alkyl radical of 1 to 13 carbons, a substituted or

unsubstituted cycloalkyl radical of 5 to 10 carbons, or a substituted or unsubstituted, branched or unbranched, aralkyl radical of 7 to 11 carbons;

R2 and R3 are the same or different and are substituted or unsubstituted alkyl radicals of 1 to 4 carbons; the substituents for R, R1, R1', R2 and R3 being alkyl radicals of 1 to 4 carbons, chloro or bromo;

R4 is hydrogen, a substituted or unsubstituted alkyl radical of 1 to 10 carbons or a substituted or unsubstituted aryl radical of 6 to 10 carbons, the R4 substituents being one or more alkyl radicals of 1 to 8 carbons, chloro, bromo or carboxy;

T is nothing or —;

R11 is a substituted or unsubstituted alkylene diradical of 2 to 8 carbons or a substituted or unsubstituted 1,2-, 1,3- or 1,4-phenylene diradical, the R11 substituents being alkyl radicals of 1 to 4 carbons, chloro or bromo;

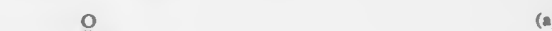
X is nothing,



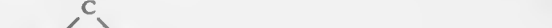
or —C(R2)(R3)—;

R22 is nothing, a substituted or unsubstituted alkylene diradical of 2 to 10 carbons or a substituted or unsubstituted 1,2-, 1,3- or 1,4-phenylene diradical, the R22 substituents being alkyl radicals of 1 to 3 carbons, chloro or bromo;

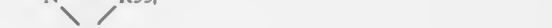
Q is a nitrogen-containing radical having a nitrogen-containing structure (a), (b), (c), (d) or (e), or a recurring unit in an addition polymer of ethylenic monomers having a structure (f) or (g):



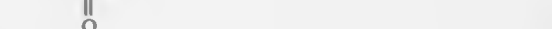
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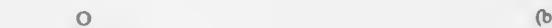
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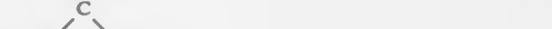
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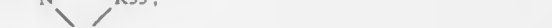
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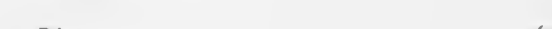
(e)



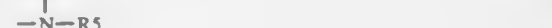
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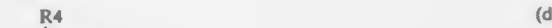
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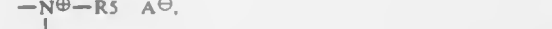
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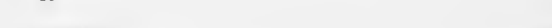
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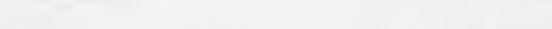
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(k)



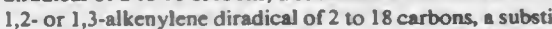
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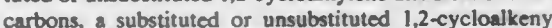
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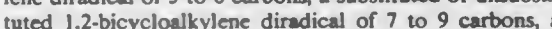
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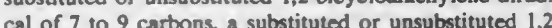
(o)



(p)



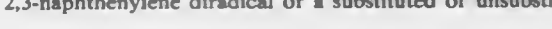
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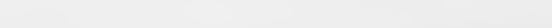
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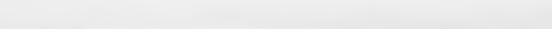
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(t)



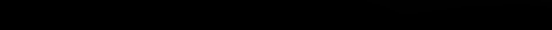
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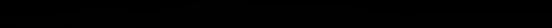
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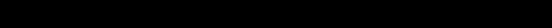
(w)



(x)



(y)



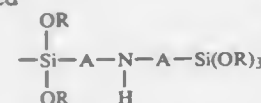
(z)







-continued



wherein:

each R is independently a lower alkyl of from 1 to 4 carbon atoms;

A is an alkylene group having from 2 to 6 carbon atoms; and n is a number ranging from about 5 to about 600 and thereafter curing said coating by hydrolysis to form a continuous solid coating.

#### 4,956,428 RATE-MODERATED GROUP TRANSFER POLYMERIZATION

Anthony Pickering, Kingsley; Andrew J. Thorne, Upton, and Peter J. I. Runciman, Newton, all of United Kingdom, assignors to Imperial Chemical Industries PLC, London, United Kingdom

Filed Feb. 16, 1989, Ser. No. 311,049

Claims priority, application United Kingdom, Feb. 18, 1988, 8803765

Int. Cl.<sup>5</sup> C08F 4/44

U.S. Cl. 526—190

4 Claims

1. A polymerisation process which comprises contacting at least one polar acrylic or maleimide monomer under polymerisation conditions with (i) a tetracoordinate organosilicon, organotin or organogermanium initiator having at least one initiating site and (ii) a co-catalyst which is a complex obtained by the interaction of a source of fluoride, bifluoride, cyanide or azide ions or a Lewis acid with a complexing agent which is an active hydrogen compound selected from the group consisting of alcohols, phenols, amines, carboxylic acids, diketones or oximes.

#### 4,956,429 METHOD OF MAKING A COCA LEAF FLAVOR EXTRACT

Ronald Harmetz, Randolph; Louis A. Laurenzo, Rutherford, and David V. Petrocine, Saddle River, all of N.J., assignors to Penick Corporation, Newark, N.J.

Filed Mar. 1, 1989, Ser. No. 317,608

Int. Cl.<sup>5</sup> A23L 2/38

U.S. Cl. 426—271

23 Claims

1. A method of making a coca flavor extract comprising the steps of:

- forming a raw extract of coca leaves incorporating flavors from said leaves together with one or more alkaloids selected from the group consisting of cocaine and ecgonine in a solvent;
- contacting said raw extract with a cation exchange resin so that said exchange resin takes up said one or more alkaloids in said raw extract to transform said raw extract into a flavor extract substantially devoid of said one or more alkaloids; and
- physically separating said flavor extract substantially devoid of said one or more alkaloids from the resin.

#### 4,956,430 PROCESS FOR PREPARING SUBSTANTIALLY PURE HIGH MOLECULAR WEIGHT VINYL LACTAM-QUATERNIZED ACRYLAMIDE COPOLYMERS

Mohammed Tazi, Wayne, N.J., assignor to GAF Chemicals Corporation, Wayne, N.J.

Filed May 1, 1989, Ser. No. 345,820

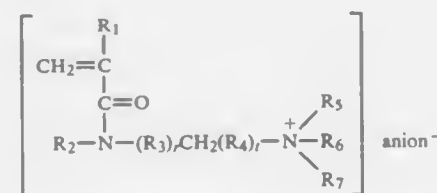
Int. Cl.<sup>5</sup> C08F 2/10

U.S. Cl. 526—195

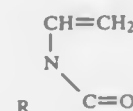
11 Claims

1. The process for solution copolymerization, in an oxygen-

free atmosphere of a quaternized amino acrylamide monomer having the formula:



with a vinyl lactam monomer having the formula:



wherein R is alkylene having from 3 to 8 carbon atoms and is optionally substituted with lower alkyl; R<sub>1</sub> and R<sub>2</sub> are each independently hydrogen or methyl; R<sub>3</sub> and R<sub>4</sub> are each independently alkylene having from 1 to 18 carbon atoms which is optionally substituted with alkyl; the sum of r and t is 1 to 3; R<sub>5</sub> and R<sub>6</sub> are each independently lower alkyl; R<sub>7</sub> is hydrogen, alkyl, aralkyl or alkaryl having from 1 to 8 carbon atoms or an N-alkylene lactam radical having from 3 to 8 ring carbon atoms and the anion is an acidic anion which process comprises buffering the system before contacting said lactam and quaternized monomer with an aqueous solution containing between about 0.05 and about 0.5 weight % based on lactam of a buffer chelating agent having complexing properties having a pH greater than 5.5, contacting said monomers in the presence of continuous or incremental addition of an organic free radical initiator, controlling the pH of the system to above about 5.5 throughout the reaction and reacting said monomers under a continuous ebullition of nitrogen under conditions conducive to polymerization for a period of from about 1 to about 10 hours and recovering the quaternized copolymer of from about 2 to about 15 wt. % quaternized amino acrylamide, from about 85 to about 98 weight % vinyl lactam and less than 0.5 wt. % total unreacted monomer.

#### 4,956,431 POLYMERIZABLE COMPOUND HAVING MILDEW RESISTANCE AND POLYMER THEREOF

Hideyuki Mitamura, and Yoshikazu Arimatsu, both of Shiga, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 111,801, Oct. 23, 1987, abandoned. This application Nov. 9, 1988, Ser. No. 268,956

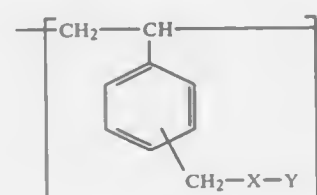
Claims priority, application Japan, Oct. 24, 1986, 61-254411; Nov. 4, 1986, 61-263128; Nov. 4, 1986, 61-263129; Apr. 30, 1987, 62-108237

Int. Cl.<sup>5</sup> C08F 128/00, 126/06

U.S. Cl. 526—257

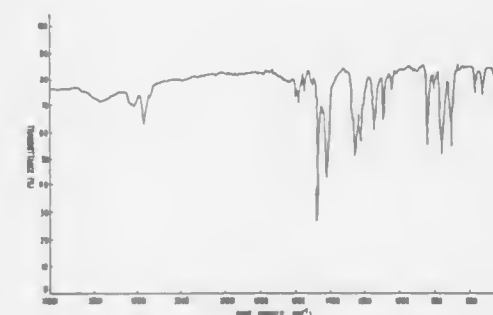
7 Claims

1. A mildew resistant linear, addition polymer comprising a repeating unit of the formula:



wherein X-Y is a residue of a compound selected from the group consisting of 8-hydroxyquinoline, 2-(4'-thiazolyl)ben-

zimidazole, 1,2-benzisothiazoline-3-one and 2-pyridinethiol-1-oxide.



#### 4,956,432 HYDROPHILIC TRANSPARENT CROSSLINKED COPOLYMER AND THE METHOD FOR PRODUCING THEREOF

Jiri Vacik; Blahoslav Obereigner, and Dana Soucková, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Jun. 7, 1989, Ser. No. 362,763

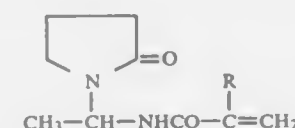
Claims priority, application Czechoslovakia, Jun. 8, 1988, PV3974

Int. Cl.<sup>5</sup> C08F 26/08

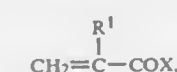
U.S. Cl. 526—264

12 Claims

1. Hydrophilic copolymer, prepared by the radical copolymerization of the monomers of general formula I



where R is hydrogen or methyl, either alone or in their combinations, or by copolymerization of the monomers with general formula I and the monomers with general formula II



(II)

where R<sup>1</sup> means hydrogen or methyl and X is a group OCH<sub>2</sub>C<sub>6</sub>H<sub>4</sub>OH, OCH<sub>2</sub>CH(OH)CH<sub>3</sub>, OCH<sub>2</sub>CH(OH)CH<sub>2</sub>OH, (OCH<sub>2</sub>CH<sub>2</sub>)<sub>3</sub>OH, (OCH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>OH, alkoxy OCH<sub>3</sub> to OC<sub>16</sub>H<sub>33</sub>, NH<sub>2</sub>, NHCH<sub>2</sub>CH(OCH<sub>3</sub>)CH<sub>3</sub>, N(C<sub>2</sub>H<sub>5</sub>)<sub>2</sub>, and NH-tert-C<sub>4</sub>H<sub>9</sub>, whereas the content of monomers with the general formulae I and II amounts to 40 to 99.99 wt.-% of the entire mixture, where at least 5 wt.-% is formed by the monomers of general formula I, and with 0.01 to 60 wt.-% of a crosslinking agent related to the entire monomer mixture, which contains at least two olefinic bonds, in the presence of radical initiators.

#### 4,956,433 TELECHELIC POLYMERS FROM THIURAM DISULFIDE OR DITHIOCARBAMATES

Thomas Mezger, Erlenbach/Main, Fed. Rep. of Germany, assignor to Akzo N.V., Netherlands

Continuation of Ser. No. 25,561, Mar. 13, 1987, abandoned. This application Nov. 14, 1988, Ser. No. 271,407

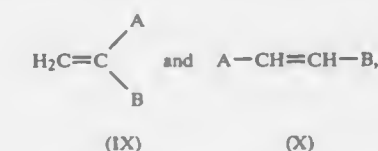
Claims priority, application Fed. Rep. of Germany, Mar. 14, 1986, 3608556

Int. Cl.<sup>5</sup> C08F 36/04, 26/06

U.S. Cl. 526—265

8 Claims

1. Telechelic polymers based on ethylenically unsaturated monomers selected from the group of formulas consisting of



wherein

A = H, CH<sub>3</sub>, Cl, CN, COOR, CH<sub>2</sub>—COORB = COOR, CH=CH<sub>2</sub>, Cl, CN, C<sub>6</sub>H<sub>5</sub>, C<sub>6</sub>H<sub>4</sub>Cl, p-methyl-phenyl chloromethyl or pyridyl,

R = alkyl residue with 1–12 C atoms,

radically polymerized by dithiocarbamate initiators, said telechelic polymers having been formed by polymerization with at least one initiator selected from the group consisting of thiuram disulfides and dithiocarbamates which have at least one additional reactive functional group in addition to a carbamate group, wherein said additional reactive functional group is at least one of amino groups, hydroxy groups, carboxyl groups and carbonyl groups.

#### 4,956,434 RUBBERY CARBOXYLATED ACRYLATE POLYMER, LATEX, AND PREPARATION THEREOF

Vie Stanislawczyk, North Ridgeville, Ohio, assignor to The B. F. Goodrich Company, Brecksville, Ohio

Continuation-in-part of Ser. No. 310,262, Feb. 13, 1989, Pat. No. 4,879,364, which is a continuation-in-part of Ser. No. 921,166,

Oct. 20, 1966, abandoned. This application Jun. 6, 1989, Ser. No. 376,281

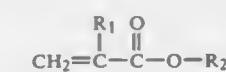
The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> G08F 122/02

U.S. Cl. 526—318.2

16 Claims

1. A rubbery carboxylated acrylate polymer consisting essentially of predominantly acrylate-containing, cross-linked polymer chains including repeating units derived from itaconic acid and an acrylate represented by the structure



(I)

wherein R<sub>1</sub> is hydrogen or methyl;R<sub>2</sub> represents C<sub>1</sub>–C<sub>20</sub> alkyl, C<sub>2</sub>–C<sub>7</sub> alkoxyalkyl, C<sub>2</sub>–C<sub>7</sub> alkylthioalkyl, or C<sub>2</sub>–C<sub>7</sub> cyanoalkyl;

said crosslinking is effected by a crosslinking monomer present in an amount in the range from 0.1 phr to 20 phr; said itaconic acid is present in the range from about 1 phr to about 20 phr;

at least 40 phr of said acrylate in said polymer is present as an alkyl acrylate in which alkyl is C<sub>4</sub>–C<sub>8</sub>; and, said polymer has a T<sub>g</sub> in the range from –20° C. to –60° C.



4,956,435

## NEUTRAL CURE SILICONE SEALANTS

Hsien-Kun Chu, Wethersfield Township, Hartford County, Conn.; Russell P. Kamis, Willard Township, County of Bay, Mich.; Jerome M. Klosowski, Moulton Township, County of Bay, Mich., and Loren D. Lower, Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Mar. 22, 1989, Ser. No. 327,209

Int. Cl. C08G 77/06

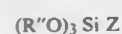
U.S. Cl. 528-17

10 Claims

1. A neutral cure silicone composition comprising (A) 100 parts by weight of polymer of the formula



where each R is free of aliphatic unsaturation and is selected from the group consisting of monovalent hydrocarbon, monovalent halohydrocarbon, and monovalent cyanoalkyl radicals of 1 to 18 inclusive carbon atoms, each D is selected from the group consisting of vinyl radical and radical of the formula



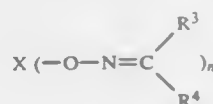
where each R' is methyl, ethyl, propyl, or butyl, Z is a divalent hydrocarbon radical or combination of divalent hydrocarbon radicals and siloxane radicals, and x is of a value such that the polymer has a viscosity of from 0.5 to 3000 Pa.s at 25° C., the amount of vinyl radical of D being from 0 to 40 percent of the total of endblocking radicals D,

(B) from 0.1 to 14 parts by weight of a crosslinker of the formula



where R' is methyl or phenyl. R'' is methyl, ethyl, propyl, or butyl, and a is 0, 1, or 2,

(C) from 0.2 to 6.0 parts by weight of titanium catalyst, and (D) from 0.5 to 4 parts by weight of an oxime compound of the formula.



where X is chosen from the group consisting of hydrogen and R<sup>5</sup>Si, R<sup>3</sup> is a hydrocarbon of from 1 to 18 carbon atoms, R<sup>4</sup> is a hydrocarbon of from 1 to 18 carbon atoms, R<sup>5</sup> is a hydrocarbon of from 1 to 18 carbon atoms, n is equal to the valence of X and p is 1 or 2.

4,956,436

## TIN MONOCHELATE CATALYSIS OF ORGANOPOLYSILOXANE COMPOSITIONS

Michel Letoffe, Sainte Foy Les Lyon; Claude Millet, Saint-Priest, and Serge Serafini, Venissieux, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Jan. 27, 1988, Ser. No. 211,916

Claims priority, application France, Jun. 25, 1987, 87 09180 The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.

Int. Cl. C08G 77/06

U.S. Cl. 528-18

6 Claims

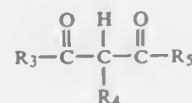
1. An organopolysiloxane composition of matter curable into elastomer state, comprising (1) a curable organopolysiloxane base which is an organopolysiloxane polymer and a cross-

linking agent therefor, and (2) a catalytically effective amount of the product of reaction between (a) a tin salt of the formula:



(1)

in which the symbols R<sub>1</sub> and R<sub>2</sub>, which may be identical or different, are each an optionally substituted, monovalent C<sub>1</sub>-C<sub>18</sub> hydrocarbon radical and X is a halogen atom or a monocarboxylate radical of the formula R<sub>6</sub>COO in which the symbol R<sub>6</sub> is the same R<sub>1</sub>, with (b) a β-dicarbonyl compound of the formula:



in which:

the symbols R<sub>3</sub> and R<sub>5</sub>, which may be identical or different, are each a radical R<sub>1</sub> or R<sub>2</sub>, a hydrogen atom, a C<sub>1</sub>-C<sub>5</sub> alkoxy radical or an Si(R<sub>1</sub>)<sub>3</sub> silyl radical; and the symbol R<sub>4</sub> is a hydrogen atom, or an optionally halogenated C<sub>1</sub>-C<sub>18</sub> hydrocarbon radical, with the proviso that R<sub>4</sub> and R<sub>5</sub> may together form, with the carbon atoms from which they depend, a divalent C<sub>5</sub>-C<sub>12</sub> cyclic hydrocarbon radical, or an optionally substituted such hydrocarbon radical bearing at least one chloro, nitro and/or cyano substituent, in a molar ratio (2)/(1) ranging from 0.01 to 100, said product of reaction being a monochelate of pentacoordinated tin of valency IV.

4,956,437

## SOLUBLE POLYIMIDESILOXANES AND METHODS FOR THEIR PREPARATION AND USE

Chung J. Lee, E. Amherst, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Jun. 10, 1988, Ser. No. 205,412

Int. Cl. B05D 3/02; C08F 2/46; C08G 77/04

U.S. Cl. 528-26

54 Claims

1. In a substantially fully imidized polyimidesiloxane comprising the reaction product of an organic dianhydride, a difunctional siloxane monomer, and an organic diamine, the improvement wherein the polyimidesiloxane is soluble in diglyme and the organic dianhydride comprises a sulfurdiphthalic anhydride (SDPA).

4,956,438

## BULK POLYURETHANE IONOMERS

Sven H. Ruetman, Walnut Creek, and Joginder N. Anand, Clayton, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 8, 1989, Ser. No. 308,350

Int. Cl. C08G 18/12

U.S. Cl. 528-60

17 Claims

1. A bulk polyurethane ionomer prepared by the reaction of (A) an isocyanate terminated ionic prepolymer with (B) a hydrocarbon polyol chain extender said prepolymer having been prepared from (i) an excess of a diisocyanate, (ii) a mixture comprising a diol and an organic polyol having three or more reactive hydroxyl groups each having a molecular weight of from about 250 to about 6,000 and (iii) a difunctional isocyanate-reactive component containing an ionic group or potential ionic group.

4,956,439

## HIGH PERFORMANCE MODIFIED POLYURETHANES

Shen-Nan Tong, #9, Lane 182, Lin-Shen Road; Shih-Jung Tsai, #10, Alley 7, Lane 10, Sec. 2, Chien-Kung Rd., both of Hsinchu, and Jyi-Shang Li, #137, Sec. 2, San-Ho Road, San-chung City, all of Taiwan

Continuation of Ser. No. 152,134, Feb. 4, 1988, abandoned. This application Sep. 8, 1989, Ser. No. 404,501

Int. Cl. C08G 18/32, 18/18, 18/24

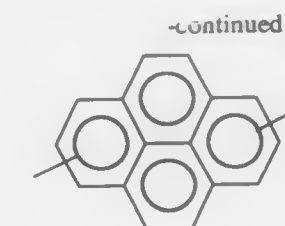
U.S. Cl. 528-53

9 Claims

1. A method for molding a heat resistant modified polyurethane, which comprises:

blending a polyol component containing at least 1% of at least one room temperature solid or semi-solid state polynuclear aromatic polyol or a derivative thereof, or mononuclear diol or a derivative thereof, at a temperature of from 100 to 180° C., so as to form a heated first liquid component;

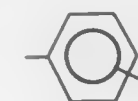
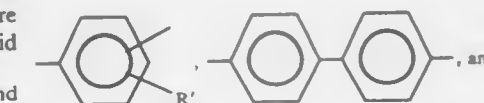
admixing said heated first liquid component with a second liquid component containing a diisocyanate or a polyisocyanate, one of said components containing a catalyst; and reacting and molding said admixture of the first and second liquid components in a mold maintained at a temperature of from 80° to 140° C.

, and -Ar-(X)<sub>n</sub>-Ar-

wherein:

n is 0 or 1,

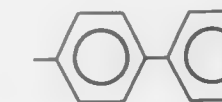
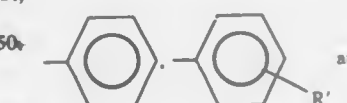
Ar is selected from the group consisting of:



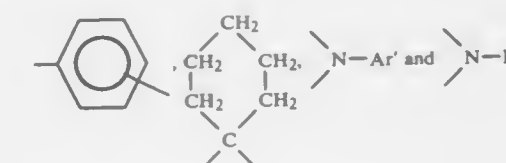
wherein:

R' is selected from the group consisting of -CH<sub>3</sub>, -C<sub>2</sub>H<sub>5</sub>, -C<sub>3</sub>H<sub>7</sub> and -C<sub>4</sub>H<sub>9</sub>.

Ar' is selected from the group consisting of:



X is selected from the group consisting of: -CH<sub>2</sub>-, -C(CH<sub>3</sub>)<sub>2</sub>-, -O-, -S-,

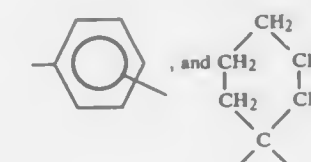


and

B is selected from the group consisting of: the arylamine group as defined for A, and



wherein Ar is as defined above, and V is selected from the group consisting of: -CH<sub>2</sub>-, -C(CH<sub>3</sub>)<sub>2</sub>-, -O-, -S-,



4,956,440

## ARYLAMINE CONTAINING POLYHYDROXYETHER RESINS

William W. Limburg, Penfield; Dale S. Renfer; John F. Yanus, both of Webster, and Leon A. Teuscher, Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

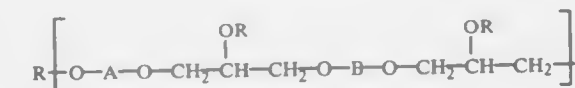
Division of Ser. No. 61,064, Jun. 10, 1987, Pat. No. 4,818,650. This application Nov. 23, 1988, Ser. No. 276,190

Int. Cl. C08G 59/28

U.S. Cl. 528-99

1 Claim

1. An arylamine polymer represented by the formula:

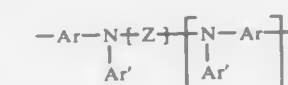


wherein:

R is selected from the group consisting of -H, -CH<sub>3</sub>, and -C<sub>2</sub>H<sub>5</sub>;

m is between about 4 and about 1,000; and

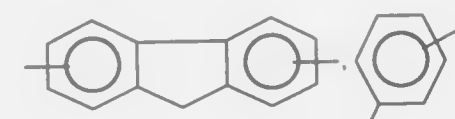
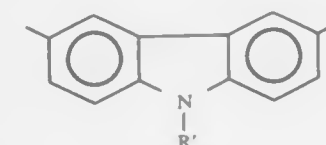
A is an arylamine group represented by the formula:



wherein:

m is 0 or 1,

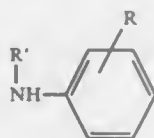
Z is selected from the group consisting of:



and n is 0 or 1.

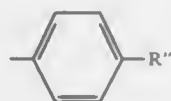
**4,956,441**  
**ELECTROCONDUCTIVE COPOLYMERS**  
Poopathi Kathiramanathan, North Harrow; Philip N. Adams, London, both of United Kingdom; Kieran Quill, Douglas, Ireland, and Alan E. Underhill, Bangor, United Kingdom, assignors to Cookson Group PLC, United Kingdom  
Filed Jul. 22, 1988, Ser. No. 222,779  
Claims priority, application United Kingdom, Jul. 23, 1987, 8717458

Int. Cl.<sup>5</sup> C08G 59/00; C08F 8/00  
U.S. Cl. 528—171 6 Claims  
1. A copolymer of an aniline monomer of the general formula:



where

R is in the ortho- or meta- position and is selected from the group consisting of hydrogen, C<sub>1-18</sub> alkyl, C<sub>1-6</sub> alkoxy, amino, chloro, bromo, sulpho, carboxy, hydroxy and the group



where

R' is selected from the group consisting of alkyl and aryl; and  
R' is selected from the group consisting of hydrogen, C<sub>1-6</sub> alkyl and aryl; with at least one other aniline monomer of formula I as defined above, the copolymer including counterions X where X is selected from the group consisting of Cl<sup>-</sup>, Br<sup>-</sup>, SO<sub>4</sub><sup>=</sup>, BF<sub>4</sub><sup>=</sup>, PF<sub>6</sub><sup>=</sup>, H<sub>2</sub>PO<sub>3</sub><sup>-</sup>, H<sub>2</sub>PO<sub>4</sub><sup>=</sup>, arylsulphonate, arenedicarboxylate, arenecarboxylate, polystyrene sulphonate, polyacrylate, alkylsulphonate, vinylsulphonate, vinylbenzene sulphonate, cellulose sulphonate, cellulose sulphate and a perfluorinated polyanion.

**4,956,442**  
**PROCESS FOR PREPARING POLY (VINYL BENZYL ETHERS) OF POLYPHENOLS**  
Ming-Biann Liu; James Godeschalz; Ernest Ecker, and Alfred Caldecourt, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.  
Filed Sep. 23, 1987, Ser. No. 100,067  
Int. Cl.<sup>5</sup> C08G 65/40, 67/02; C07C 41/00

U.S. Cl. 528—205 23 Claims  
1. A method of preparing a poly(vinylbenzyl ether) comprising the step of reacting an alkali metal, alkaline earth metal, or ammonium salt of a polyphenol with a vinylbenzyl halide in an essentially non-aqueous liquid reaction medium consisting essentially of a monohydric alcohol or glycol having less than 12 carbon atoms, a polyglycol having a weight average molecular weight ranging from about 200 to about 4000, or glycerol, said vinyl benzyl halide being in stoichiometric excess relative to the salt of the polyphenol.

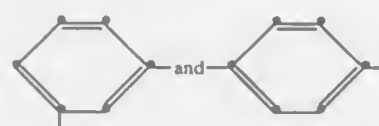
**4,956,443**  
**POLYESTER FROM HYDROXYETHOXYPHENOXY ACETIC ACID WITH IMPROVE GAS BARRIER PROPERTIES**

James R. Overton, Kingsport; Steven L. Stafford, Gray, and Charles E. Sumner, Jr., Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.  
Filed May 30, 1989, Ser. No. 358,229  
Int. Cl.<sup>5</sup> C08G 63/06

U.S. Cl. 528—206 4 Claims  
1. A polyester having an inherent viscosity of at least 0.5 measured at 25 degrees C. in a 60/40 by weight mixture of phenol/tetrachloroethane at a concentration of 0.5 g/100 mL comprised of recurring units corresponding to the structure



(I) wherein R is selected from the group consisting of



**4,956,444**  
**CHEMICAL SYNTHESIS OF STABLE AND ELECTROACTIVE POLYPYRROLE AND RELATED POLYHETEROCYCLIC COMPOUNDS**

En-Tang Kang; Thiam C. Tan, and Koon G. Neoh, all of Singapore, Singapore, assignors to National University of Singapore, Kent Ridge, Singapore  
Filed Apr. 9, 1987, Ser. No. 36,497  
Int. Cl.<sup>5</sup> C08G 2/06, 2/18

U.S. Cl. 528—220 25 Claims  
1. An electroactive polymer comprising the polymerized purely chemical reaction product of a five or six membered, heterocyclic ring monomer with an electron acceptor.

**4,956,445**  
**PROCESS FOR THE PREPARATION OF ACETAL POLYMER OR COPOLYMER**  
Kaoru Yamamoto; Hiroyuki Sano, and Shuichi Chino, all of Fuji, Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan  
Filed Dec. 12, 1988, Ser. No. 283,433  
Claims priority, application Japan, Dec. 25, 1987, 62-392240  
Int. Cl.<sup>5</sup> C08G 2/10

U.S. Cl. 528—230 6 Claims  
1. A process for the preparation of a normally solid, high molecular weight acetal polymer or copolymer, which process comprises polymerizing a principal monomer selected from anhydrous formaldehyde or a cyclic oligomer of formaldehyde, and optionally a comonomer polymerizable therewith, in the presence of between 0.1 to 5000 ppm, based on the total weight of said principal monomer and, optionally said comonomer, of a polymerization catalyst selected from heteropoly acids and acid salts of heteropoly acids.

**4,956,446**  
**POLYESTER FIBER WITH LOW HEAT SHRINKAGE**  
Toshiro Takahashi; Kinsake Nishikawa, and Masami Takahashi, all of Uji, Japan, assignors to Unitika Limited, Osaka, Japan  
Filed Jul. 3, 1989, Ser. No. 375,087  
Claims priority, application Japan, Aug. 23, 1988, 63-208656  
Int. Cl.<sup>5</sup> C08G 63/02

U.S. Cl. 528—272 2 Claims  
1. Polyester yarn which is made from polyethylene tere-

phthalate or from a polyester in which polyethylene terephthalate is the main component, said polyester yarn having the following combination of property characteristics:

- (a) an intrinsic viscosity of 0.70 to 1.05 dl/g,
- (b) a tenacity of at least 8.0 g/d,
- (c) an elongation at break of 17% or less,
- (d) an amorphous chain size of 60 to 70 Å,
- (e) a density of at least 1.395 g/cm<sup>3</sup>,
- (f) a dry heat shrinkage of 3.5% or less,
- (g) a heat resistance of at least 80%.

**4,956,447**  
**RINSE-ADDED FABRIC CONDITIONING COMPOSITIONS CONTAINING FABRIC SOFTENING AGENTS AND CATIONIC POLYESTER SOIL RELEASE POLYMERS AND PREFERRED CATIONIC SOIL RELEASE POLYMERS THEREFOR**  
Eugene P. Gosselink, Cincinnati, Ohio; Frederick E. Hardy, Ponteland, England, and Toan Trinh, Maineville, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio  
Filed May 19, 1989, Ser. No. 354,549  
Int. Cl.<sup>5</sup> C08G 63/02

U.S. Cl. 528—272 25 Claims  
1. Compound useful as cationic polymeric soil release agent having the generic empirical formula:



wherein:

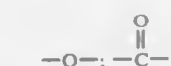
- (I) each (AO) represents an oxyalkyleneoxy group, excluding oxyalkyleneoxy groups of (E<sub>n</sub>), containing from 2 to about 6 carbon atoms, and each "x" is from about 1 to about 80;
- (II) each (T) represents a terephthaloyl group and each "y" is from about 1 to about 80;
- (III) each (CAT) represents a cationic group comprising at least one moiety selected from the group consisting of: (R)<sub>m</sub>N<sup>+</sup>(-)<sub>3-m</sub> wherein each "m" is from 0 to 2;



wherein each R group is selected from the group consisting of C<sub>1-4</sub> alkyl groups, C<sub>1-4</sub> hydroxyalkyl groups, C<sub>2-4</sub> alkylene groups, C<sub>2-4</sub> oxyalkylene groups, phenyl, phenyl C<sub>1-4</sub> alkyl groups, hydrogen, wherein two R groups can be joined to form cyclic structures, and wherein each A<sup>+</sup> is any compatible anion, and each "z" is selected from 1 to about 100 to provide the cationic charge to the polymer;

(IV) each (E<sub>n</sub>) represents a poly(oxyethylene)oxy group —(OCH<sub>2</sub>CH<sub>2</sub>)<sub>n</sub>O— wherein each "n" is from 2 to about 200, and each q is less than about 25;

(V) each (L), when present, represents a linking group comprising at least one hydrocarbylene group having from 2 to about 4 covalent bonds and containing from one to about 10 carbon atoms and 0 to 4 groups selected from the group consisting of:



and mixtures thereof and each "r" is a number from 0 to about 40; and

- (VI) each Formula Completing Group (FCG), when present, is selected from the group consisting of: (a) H—; (b) —OH; (c) C<sub>1-18</sub> alkyl, alkoxy, or hydroxy alkyl groups, except that when the molecular weight of the compound is above about 10,000, the maximum number of carbon atoms that is in each FCG is about 4; (d) —C(O)OH, and (e) anionic groups neutralized with a compatible cation.

and each "s" is a number from 0 to a number sufficient to complete the formula; and wherein the molecular weight of the compound is less than about 50,000, the net cationic charge of the compound is at least about one per 15,000 molecular weight units and the compound is essentially free of hydrazide groups.

**4,956,448**  
**COPOLYESTERS FROM 4,4'-BIPHENYLDICARBOXYLIC ACID, 1,4-CYCLOHEXANEDIMETHANOL, AND 1,4-BUTANEDIOL**  
John C. Morris, and Winston J. Jackson, Jr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

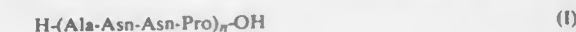
Filed Dec. 23, 1988, Ser. No. 289,298  
The portion of the term of this patent subsequent to Apr. 10, 2090, has been disclaimed.  
Int. Cl.<sup>5</sup> C08G 63/02

U.S. Cl. 528—272 18 Claims  
1. A copolyester comprising (A) an acid component comprising repeating units of at least 80 mol % 4,4'-biphenyldicarboxylic acid, and (B) a glycol component comprising repeating units of from about 95-20 mol % 1,4-butanediol, and about 5-80 mol % 1,4-cyclohexanedimethanol, wherein the total mol % of acid component and glycol component are each 100 mol %.

**4,956,449**  
**IMMUNOLOGICALLY ACTIVE SYNTHETIC PEPTIDES USEFUL FOR PREPARING AN ANTIMALARIAL VACCINE**

Antonio S. Verdini, Monterotondo; Fabio Bonelli, and Antonello Pessi, both of Rome, all of Italy, assignors to Eniricerche, S.p.A., Milan, Italy  
Filed Nov. 28, 1988, Ser. No. 276,699  
Claims priority, application Italy, Dec. 11, 1987, 22948 A/87  
Int. Cl.<sup>5</sup> C07K 7/10

U.S. Cl. 530—324 18 Claims  
1. An immunologically active peptide having the formula:



wherein  
n is an integer of not less than 2.

**4,956,450**  
**PROCESS FOR FORMING END-CAPPED POLYAMIC ACIDS POLYIMIDES**  
Burnell Lee, and Hsueh M. Li, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.  
Filed May 26, 1989, Ser. No. 357,236  
Int. Cl.<sup>5</sup> C08G 69/26, 8/02

U.S. Cl. 528—353 16 Claims  
1. A process for preparing a polyamic acid comprising contacting a solution of an aromatic diamine in a suitable solvent with a dianhydride of an aromatic tetracarboxylic acid and a monoanhydride of an aromatic polycarboxylic acid having one free carboxylic acid or esters thereof, said monoanhydride being at least greater than 2.0 mole percent of said diamine and the total mole ratio of said aromatic diamine to said dianhydride and monoanhydride being about 1:1.



# 4,956,451

## COMPOSITIONS FOR PRODUCTION OF ELECTRONIC COATINGS

Allan A. Eisenbraun, and Wesley C. Blocker, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va. Filed Oct. 11, 1988, Ser. No. 255,260

Int. Cl.<sup>5</sup> C08G 69/26, 12/00; B05D 3/02, 3/12  
U.S. Cl. 528—353 20 Claims

1. A partially fluorinated polyimide composition especially adapted for use in spin coating wafers of semiconductive materials which composition comprises a solution of (i) a 2,2-bis(3,4-dicarboxyphenyl)hexafluoropropane dianhydride/2,2-bis[4-(aminophenoxy)phenyl]hexafluoropropane polyimide polymer having an inherent viscosity in the range of about 0.05 to about 1.5 dL/g (as measured in N-methylpyrrolidone at room temperature at a concentration of 0.5 g/dL) in (ii) a liquid solvent containing at least 90% of a cycloaliphatic ketone or mixture of cycloaliphatic ketones, such that said solution (a) contains on a weight basis from about 5% to about 50% of such polyimide, and (b) does not undergo precipitate formation during spin coating in an atmosphere of up to at least about 55% relative humidity.

# 4,956,452

## MONOCLONAL ANTIBODY WHICH NEUTRALIZES MULTIPLE STRAINS OF INFECTIOUS BURSAL DISEASE VIRUS

David B. Snyder, Lanham; Warren W. Marquardt, New Carrollton; Sammy L. Gorham, Upper Marlboro, and Dolores P. Lasa, Baltimore, all of Md., assignors to The University of Maryland, College Park, Md. Filed Jan. 12, 1987, Ser. No. 61,083

Int. Cl.<sup>5</sup> C07K 15/14, 15/28; C12N 15/00; A61K 39/395  
U.S. Cl. 530—387 5 Claims

1. Hybridomas expressing monoclonal antibodies effective in neutralizing infectious bursal disease virus having the identifying characteristics of the a cell line selected from the group consisting of ATCC HB-9490 and ATCC HB 9437.

# 4,956,453

## ANTI-HUMAN OVARIAN CANCER IMMUNOTOXINS AND METHODS OF USE THEREOF

Michael J. Bjorn, Hercules, Calif.; Arthur E. Frankel, Durham, N.C.; Walter J. Laird, Pisale, Calif.; David B. Ring, Redwood City, Calif., and Jeffrey L. Winkelhake, Alameda, Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation of Ser. No. 806,256, Dec. 6, 1985, abandoned. This application Jul. 6, 1987, Ser. No. 69,720

The portion of the term of this patent subsequent to Sep. 18, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C07K 15/12; A61K 39/00  
U.S. Cl. 530—389 27 Claims

1. Immunotoxin comprising a cytotoxic moiety and an antigen binding portion selected from the group consisting of the Fab, Fab' and F(ab')<sub>2</sub> region of a monoclonal antibody wherein said monoclonal antibody

(i) binds human ovarian cancer tissue;  
(ii) has a selectivity of about 0.11 or less;  
(iii) is an IgG or IgM;  
said immunotoxin having at least one capability selected from the group consisting of:

a cytotoxicity ID<sub>50</sub> of about 10nM or less against human ovarian cancer cells; retarding the rate of growth of tumors comprised of human ovarian cancer cells carried by a mammal when said mammal is treated with said immunotoxin; or extending the survival time of a mammal bearing a tumor comprised of human ovarian cancer cells when said mammal is treated with said immunotoxin.

# 4,956,454

## MONOCLONAL ANTIBODY - PLATINUM CO-ORDINATION COMPOUND COMPLEX

James G. Heffernan, Pangbourne; Paul C. Hydes, Reading, both of England, and Donald H. Picker, Narbert, Pa., assignors to Johnson Matthey PLC, London, England

Division of Ser. No. 873,130, Jun. 11, 1986, Pat. No. 4,760,155, which is a continuation-in-part of Ser. No. 625,251, Jun. 27, 1984, abandoned. This application Apr. 21, 1988, Ser. No. 184,140

Claims priority, application European Pat. Off., Jun. 11, 1985, 85304131

Int. Cl.<sup>5</sup> C07K 15/12; A61K 39/00  
U.S. Cl. 530—389 4 Claims

1. A conjugate platinum co-ordination compound/monoclonal antibody complex having the general formula



in which the X groups are either the same or different and comprise monodentate ligands selected from the class consisting of halogen, pseudohalogen, sulphate, phosphate, nitrate, carboxylate or water, or together comprise a bidentate ligand selected from the class consisting of malonate, cycloalkanedicarboxylate or cycloalkenedicarboxylate ligands, R is selected from the class consisting of hydrogen, lower alkyl, aryl, aralkyl, alkenyl, cycloalkyl or cycloalkenyl, R' is selected from lower alkyl, aryl, alkaryl, aralkyl, alkenyl, cycloalkyl or cycloalkenyl residues, or R and R' together are selected from the class consisting of a methylene or polymethylene, cycloalkyl, cycloalkenyl or aryl residues, and Z is a functionalised polymethylene moiety in which the functionalising group is selected from —CO<sub>2</sub>—, —O— or —NH—, and M is a monoclonal antibody.

# 4,956,455

## BOVINE FIBROBLAST GROWTH FACTOR

Frederick S. Esch, Oceanside Andrew Baird, San Diego, Calif.; Peter Bohlens, Uster, Switzerland; Denis Gospodarowicz, San Francisco, and Nicholas C. Ling, San Diego, both of Calif., assignors to The Salk Institute for Biological Studies, San Diego, Calif.

abandoned, which is a continuation-in-part of Ser. No. 670,160, Nov. 9, 1984, abandoned. This application Jun. 20, 1985, Ser. No. 747,154

Int. Cl.<sup>5</sup> C07H 15/06  
U.S. Cl. 530—399 7 Claims

1. Substantially pure basic fibroblast growth factor containing the amino acid sequence:

Pro—Al—Leu—Pro—Glu—Asp—Gly—Gly—Ser—Gly—Ala—Phe—Pro—Pro—Gly—His—Phe—Lys—Asp—Pro—Lys—Arg—Leu—Tyr—Cys—Lys—Asn—Gly—Gly—Phe—Phe—Leu—Arg—Ile—His—Pro—Asp—Gly—Arg—Val—Asp—Gly—Val—Arg—Glu—Lys—Ser—Asp—Pro—His—Ile—Lys—Leu—Gln—Leu—Gln—Ala—Glu—Glu—Arg—Gly—Val—Val—Ser—Ile—Lys—Gly—Val—Cys—Ala—Asn—Arg—Tyr—Leu—Ala—Met—Lys—Glu—Asp—Gly—Arg—Leu—Leu—Ala—Ser—Lys—Cys—Val—Thr—Asp—Glu—Cys—Phe—Phe—Phe—Glu—Arg—Leu—Glu—Ser—Asn—Asn—Tyr—Asn—Thr—Tyr—Arg—Ser—Arg—Lys—Tyr—Ser—Ser—Trp—Tyr—Val—Ala—Leu—Lys—Arg—Thr—Gly—Gln—Tyr—Lys—Leu—Gly—Pro—Lys—Thr—Gly—Pro—Gly—Gln—Lys—Ala—Ile—Leu—Phe—Leu—Pro—Met—Ser—Ala—Lys—Ser.

# 4,956,456

## BETAINE-TYPE CYAN MONOAZO DYES FOR DYING AND PRINTING FIBROUS MATERIALS

Masaaki Tsukase, and Kozo Sato, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 135,202, Dec. 21, 1987, abandoned.

This application Dec. 1, 1989, Ser. No. 442,500

Claims priority, application Japan, Dec. 19, 1986, 61-302894

Int. Cl.<sup>5</sup> C09B 44/02; D06P 1/41, 3/24, 3/79

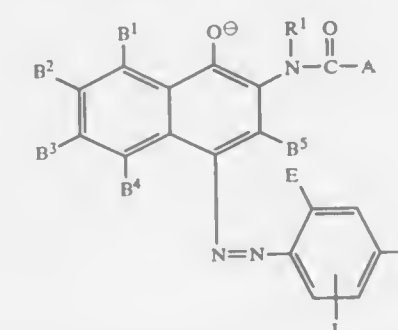
U.S. Cl. 534—615 13 Claims

1. A betaine-type monoazo dye represented by formula (I):

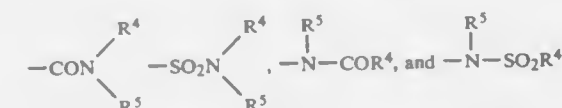


wherein Dye represents a cyan dye anion represented by formula (II):

X represents a bond or linking group;  
Y represents quaternary ammonium; and  
Dye and X are bonded to each other via A, B<sup>1</sup>, B<sup>2</sup>, B<sup>3</sup>, B<sup>4</sup> or B<sup>5</sup> in formula (II):

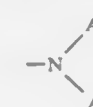


wherein B<sup>1</sup>, B<sup>2</sup>, B<sup>3</sup>, B<sup>4</sup> and B<sup>5</sup> are the same or different, and each represents a member selected from the group consisting of a bond, hydrogen, alkyl halogen, —OR<sup>4</sup>, —CO<sub>2</sub>R<sup>4</sup>,



wherein R<sup>4</sup> and R<sup>5</sup> are the same or different and each represents a member selected from the group consisting of hydrogen, alkyl and aryl, or R<sup>4</sup> and R<sup>5</sup> are taken together to form a 5- or 6- membered heterocyclic ring containing oxygen, nitrogen, sulfur or combinations thereof as heteroatoms;

A represents a member selected from the group consisting of hydrogen, alkyl, aryl, cycloalkyl, a 5- or 6- membered heterocyclic ring containing oxygen, nitrogen, sulfur or combinations thereof as heteroatoms and



wherein A<sup>2</sup> and A<sup>3</sup> have the same meaning as A, or A<sup>2</sup> and A<sup>3</sup> are bonded to each other to form a 5- or 6- membered heterocyclic ring containing oxygen, nitrogen, sulfur or combinations thereof as heteroatoms;

E represents a member selected from the group consisting of hydrogen, halogen, cyano, hydroxyl, carboxyl, alkyl aryl, a 5- or 6- membered heterocyclic ring containing oxygen, nitrogen, sulfur or combinations thereof as heteroatoms, alkoxy, aryloxy, alkylthio, arylthio, carbacylamino, sulfonylamino, carbamoyl, amino, alkylsulfonyl and phenylsulfonyl;

G represents a member selected from the group consisting of cyano, alkylsulfonyl and phenylsulfonyl;  
J represents a member selected from the group consisting of hydrogen, halogen, cyano, alkylsulfonyl and phenylsulfonyl; and  
R<sup>1</sup> represents a member selected from the group consisting of hydrogen and alkyl.

# 4,956,457

## DISAZO DISULFONAMIDES COMPOUNDS

Takeo Takayanagi, 41 Ellsworth Ave., Yonkers, N.Y. 10705

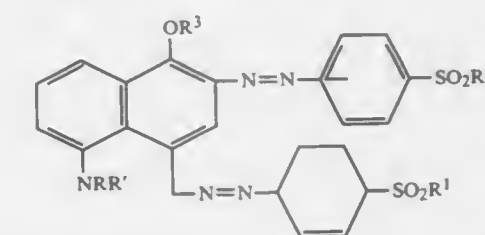
Division of Ser. No. 876,834, May 20, 1986, Pat. No. 4,863,910.

This application Aug. 10, 1989, Ser. No. 391,945

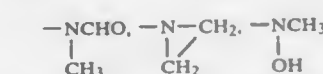
Int. Cl.<sup>5</sup> C07C 107/00, 107/04, 107/06, 107/08

U.S. Cl. 534—643 2 Claims

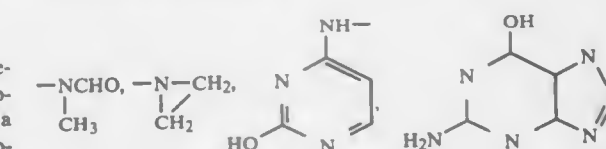
1. An azo compound of the formula



wherein R and R' are selected from the group consisting of hydrogen, —COCR<sub>3</sub><sup>4</sup>, —COCHR<sub>2</sub><sup>4</sup>, —SO<sub>2</sub>CH<sub>3</sub>, —CO<sub>2</sub>C<sub>2</sub>H<sub>5</sub>, —CH<sub>2</sub>CH<sub>2</sub>R<sup>4</sup>, —(CH<sub>2</sub>CH<sub>2</sub>R<sup>4</sup>)<sub>2</sub>, —CH<sub>2</sub>CH<sub>2</sub>OH, —CONHCH<sub>2</sub>CH<sub>2</sub>R<sup>4</sup> and —CH<sub>2</sub>CH<sub>2</sub>OCONH<sub>2</sub>, R<sup>4</sup> is selected from the group consisting of chlorine,



—NHCO<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>OH, —HNCO<sub>2</sub>C<sub>2</sub>H<sub>5</sub>, —NHOH, —NHCONHOH and —NHCH<sub>3</sub>; R<sup>1</sup> and R<sup>2</sup> are individually selected from the group consisting of



—NHCH<sub>2</sub>CH<sub>2</sub>Cl, —NHCONHOH, —NHCO<sub>2</sub>C<sub>2</sub>H<sub>5</sub>, 6-mercaptopurin, 5-fluoruracil and prenisololol, R<sup>3</sup> is selected from the group consisting of hydrogen, —COCHR<sub>2</sub><sup>4</sup>, —SO<sub>2</sub>CH<sub>3</sub>, —COC<sub>2</sub>H<sub>5</sub>, —CH<sub>2</sub>CH<sub>2</sub>R<sup>4</sup> and —CONH<sub>2</sub>, R<sup>4</sup> is the same as defined hereinabove or their salts.

# 4,956,458

## PURIFICATION OF POLYDEXTROSE BY REVERSE OSMOSIS

Shih J. Luo, Morris Plains; Frank J. Bunick, Budd Lake, and Robert H. Graf, Randolph, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed May 13, 1988, Ser. No. 193,961

Int. Cl.<sup>5</sup> C08B 37/02; C07H 1/06, 1/08

U.S. Cl. 536—112 13 Claims

2. A purified polydextrose product, which comprises a commercially available polydextrose purified by pressing an aqueous solution of said polydextrose along a reverse osmosis system to provide a purified polydextrose solution and recycling said purified polydextrose solution (retentate) to provide a purified polydextrose solution containing less than about 0.2% phenyl;

1,6-anhydroglucose and less than about 0.01% hydroxymethylfurfural.

4,956,459

# PLATINUM COMPOUNDS SUITABLE FOR USE AS PHARMACEUTICALS

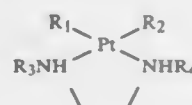
Abdolhossein Talebian, Herndon; Dianna C. Green, Falls Church, both of Va.; Charles F. Hammer, Washington, D.C., and Philip S. Schein, Bryn Mawr, Pa., assignors to Georgetown University, Washington, D.C.

Continuation-in-part of Ser. No. 74,600, Jul. 17, 1987, abandoned. This application Jan. 14, 1988, Ser. No. 143,763 Int. Cl.<sup>3</sup> A61K 31/28, 31/70; C07H 23/00

U.S. Cl. 536—121

9 Claims

1. A compound of the formula:



wherein each of R<sub>1</sub> and R<sub>2</sub> is independently selected from the group consisting of halogen, hydroxy, or mono carboxylic acid or R<sub>1</sub> and R<sub>2</sub> together is a multifunctional carboxylic acid residue which forms a ring with the platinum atom through two oxygens of said multifunctional carboxylic acid; R<sub>3</sub> is a deoxy mono or disaccharide or a derivative thereof; and R<sub>4</sub> is selected from the group consisting of hydrogen, C<sub>1-4</sub>-alkyl, phenyl, benzyl, substituted phenyl or substituted benzyl, wherein substituents are selected from the group consisting of halogen, nitro, C<sub>1-2</sub>-alkoxy, carboxy, carbonyl ester or phenyl or a pharmaceutically acceptable salt thereof.

4,956,460

# PROCESS FOR THE PREPARATION OF 1-ALKYL-3-CARBOXY-4-CINNOLONES

Raffaello Fusco; Fulvio L. Piselli, and Pier M. Boschi, all of Milan, Italy, assignors to Industria Chimica Profarmaco S.P.A., Milan, Italy

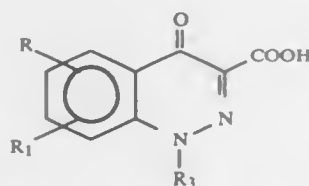
Filed Mar. 23, 1988, Ser. No. 172,072

Claims priority, application Italy, Apr. 23, 1987, 20230 A/87 Int. Cl.<sup>3</sup> C07D 237/28, 491/056

U.S. Cl. 544—234

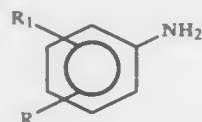
6 Claims

1. A process for the preparation of a cinnolone of formula I



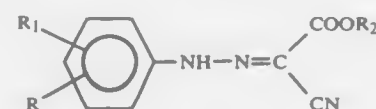
wherein R and R<sub>1</sub>, which may be the same or different, are hydrogen, alkoxy, alkylthio or, taken together, are methylenedioxy R<sub>3</sub> is C<sub>1-6</sub> alkyl or C<sub>3-6</sub> cycloalkyl which process comprises;

(a) diazotization of a compound of formula II



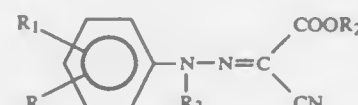
wherein R and R<sub>1</sub> are as above defined with an alkali nitrite in an acid medium suitable for diazotization, followed by reaction with a cyanoacetic acid ester of for-

mula CN—CH<sub>2</sub>—COOR<sub>2</sub> (R<sub>2</sub>=C<sub>1-4</sub> alkyl), to give a compound of formula III



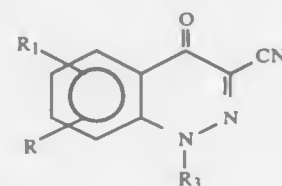
III

(b) alkylation of the compound of formula III with an alkylating agent R<sub>3</sub>X (X=halogen or sulfate and R<sub>3</sub> is the same as defined above in the presence of a base selected from alkali hydroxides and carbonates and a polar aprotic solvent at a temperature of 10°–100° C. to give an ester of formula IV



IV

(c) hydrolysis of the ester of formula IV to carboxylic acid with an alkali hydroxide in a water miscible solvent at a temperature of 0°–80° C., chlorination of the carboxylic acid to acyl chloride with a chlorinating agent in an inert solvent, and intramolecular cyclization of the acyl chloride in an inert solvent at a temperature of 100°–150° C. and in the absence of catalyst to give a compound of formula VII



VII

and

(d) acid hydrolysis of the compound of formula VII to the compound of formula I.

4,956,461

# DESAMINO-AMINOPTERIN AND -METHOTREXATE

Andre Rosowsky, Needham, Mass., assignor to Dana Farber Cancer Institute, Inc., Boston, Mass.

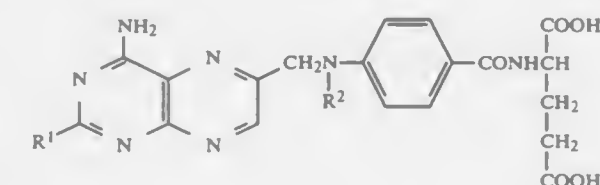
Continuation-in-part of Ser. No. 259,859, Oct. 19, 1988, abandoned. This application Aug. 24, 1989, Ser. No. 398,077

Int. Cl.<sup>3</sup> C07D 475/06

U.S. Cl. 544—258

5 Claims

1. A compound having the structure



in which R<sub>1</sub> is hydrogen or a lower alkyl group and R<sub>2</sub> is hydrogen or methyl.

4,956,462

# "TRIAZOLO-PYRIMIDINE INTERMEDIATES"

Shigeo Shimizu, and Hiroyuki Takano, both of Mukawa, Japan, assignors to Sanki Pharmaceutical Co., Ltd., Tokyo and Nippon Pharmaceutical Development Institute Co., Ltd., Hokkaido, both of Japan

Division of Ser. No. 222,404, Jul. 21, 1988. This application May 26, 1989, Ser. No. 357,124

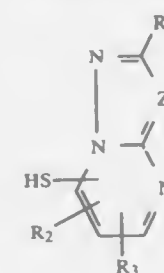
Claims priority, application Japan, Aug. 7, 1987, 62-196178

Int. Cl.<sup>3</sup> C07D 487/04; A61K 31/505

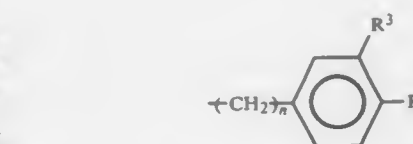
U.S. Cl. 544—263

3 Claims

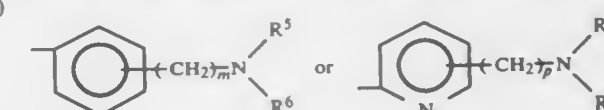
1. A compound represented by the formula (VII):



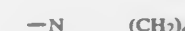
(VII)



wherein n is an integer of 1 to 3 and R<sup>3</sup> and R<sup>4</sup> each represents a hydrogen atom, an alkyl group having 1 to 6 carbon atoms, an alkoxy group having 1 to 6 carbon atoms or a methylenedioxy group; and A represents a group having the formula:



wherein m and p each represents an integer of 1 to 3; and R<sup>5</sup> to R<sup>8</sup> each represents a hydrogen atom or a linear or branched alkyl group having 1 to 6 carbon atoms, or —NR<sup>5</sup>R<sup>6</sup> and —NR<sup>7</sup>R<sup>8</sup> each represents a group of the formula:



wherein q is an integer of 4 to 6.

4,956,464

# PREPARATION OF DIHYDROQUINACRIDONES, QUINACRIDONES AND QUINACRIDONEQUINONES

Herbert Bender, Bochl-Iggelheim; Horst Colberg, Ludwigshafen; Friedhelm Teich, Karlsruhe, and Reinhard Kemper, Heidelberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 27, 1988, Ser. No. 263,355

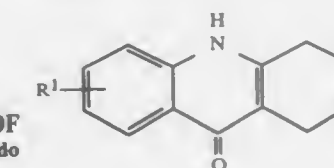
Claims priority, application Fed. Rep. of Germany, Oct. 27, 1987, 3736261; Apr. 22, 1988, 3813625

Int. Cl.<sup>3</sup> C09B 48/00

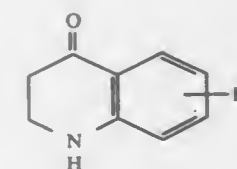
U.S. Cl. 546—57

7 Claims

1. A process for preparing a dihydroquinacridone of the formula:

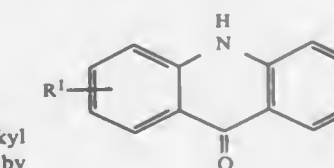


(I)



(II)

a quinacridone of the formula II:



4,956,463

# PYRIMIDONE COMPOUND AND PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Fujio Nohara, Takaoka, Japan, assignor to Ikeda Mohando Company, Ltd., Toyama, Japan

Filed Dec. 7, 1988, Ser. No. 281,040

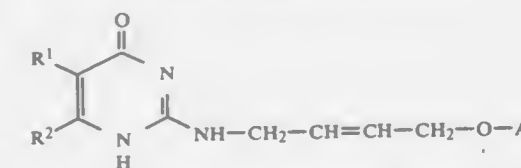
Claims priority, application Japan, Dec. 7, 1987, 62-309293

Int. Cl.<sup>3</sup> C07D 239/47, 401/12, 401/14, 403/12

U.S. Cl. 544—320

11 Claims

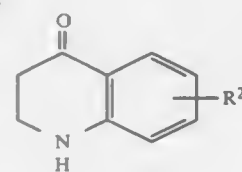
1. A pyrimidone compound represented by the formula (I) or a pharmaceutically acceptable salt thereof:



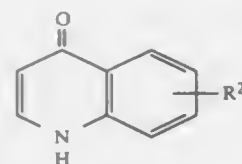
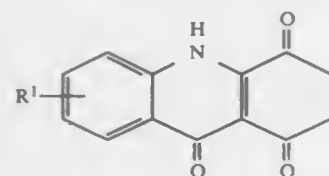
wherein R<sup>1</sup> and R<sup>2</sup> each represents a linear or branched alkyl group having 1 to 12 carbon atoms or a group represented by the formula:



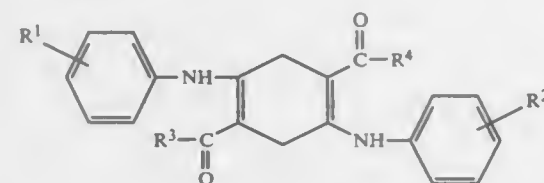
-continued



a quinacridonequinone of the formula III:

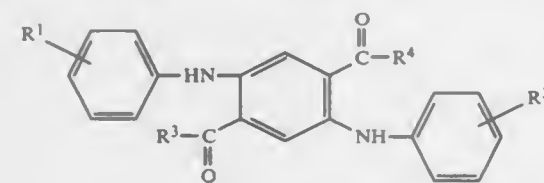


or a mixture thereof, wherein  $R^1$  and  $R^2$  in the formulae I, II and III are identical or different and each is independently of the other hydrogen, chlorine, bromine,  $C_1$ - $C_{10}$ -alkoxy,  $C_1$ - $C_{10}$ -alkyl or substituted or unsubstituted phenyl, wherein (a) to prepare a dihydroquinacridone of formula I, a 2,5-dianilino-3,6-dihydroterephthalic acid derivative of the formula IV



where  $R^1$  and  $R^2$  each have the above-mentioned meanings and  $R^3$  and  $R^4$  are identical or different and are each independently of the other  $C_1$ - $C_{10}$ -alkoxy, amino,  $C_1$ - $C_{10}$ -mono or -dialkylamino or halogen, is cyclized at a temperature of from 350° to 500° C. for a time of from 0.1 to 5 seconds in the liquid or solid state or in solution, in each case in a finely divided form, or in the gas phase,

(b) to prepare a quinacridone of formula II, a 2,5-dianilino-3,6-dihydroterephthalic acid derivative of formula IV is cyclized and dehydrogenated at a temperature of from 400° to 700° for a time of from 1 to 5 seconds in the liquid or solid state or in solution, in each case in a finely divided form, or in the gas phase or a 2,5-dianilino-3,6-dihydroterephthalic acid derivative of the formula V



where  $R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$  each have the above-mentioned meanings, is cyclized at a temperature of from 350° to 550° C. for a time of from 0.1 to 5 seconds in the liquid or solid state or in solution, in each case in a finely divided form, or in the gas phase; and

(c) to prepare a quinacridonequinone of formula III, a 2,5-dianilino-3,6-dihydroterephthalic acid derivative of for-

mula IV or a 2,5-dianilino-3,6-dihydroterephthalic acid derivative of formula V is cyclized at a temperature of from 300° to 700° C. for a time of from 0.5 to 10 seconds in the liquid or solid state or in solution, in each case in a finely divided form, or in the gas phase in the presence of an oxidizing agent.

4,956,465

QUINOLONE- AND

1,8-NAPHTHYRIDIN-4-ONE-CARBOXYLIC ACIDS WHICH ARE C-BONDED IN THE 7-POSITION

Michael Schriewer; Klaus Grobe, both of Odenthal, and Uwe Petersen, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

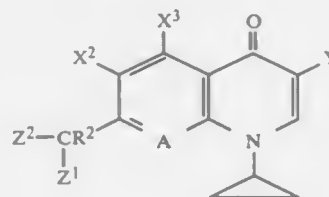
Filed Oct. 3, 1988, Ser. No. 252,631  
Claims priority, application Fed. Rep. of Germany, Oct. 9, 1987, 3734161; Apr. 2, 1988, 3811341

Int. Cl. 5 C07D 215/56

U.S. Cl. 546-156

5 Claims

1. A quinolone carboxylic acid or 1,8-naphthyridin-4-onecarboxylic acid of the formula



in which

Y is cyano or a  $-COO-C_1-C_4$ -alkyl group,  
 $X^2$  and  $X^3$  each independently is hydrogen, chlorine or fluorine,

A is the radical  $C-X^4$ , where  
 $X^4$  is hydrogen, chlorine or fluorine  
 $R^2$  is hydrogen or  $C_1-C_3$ -alkyl, and  
 $Z^1$  is alkoxy-carbonyl having 1-4 carbon atoms in the alcohol part or hydrogen and  $Z^2$  is cyano or alkoxy-carbonyl having 1-4 carbon atoms in the alcohol part.

4,956,466

THIAZOLE DERIVATIVES AND PROCESS FOR THE PREPARATION THEREOF

Antonio B. Vinas, Barcelona, Spain, assignor to Laboratorios Vinas, S. A., Barcelona, Spain

Filed May 23, 1989, Ser. No. 356,014

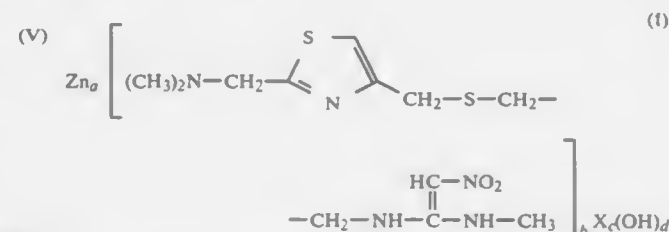
Claims priority, application Spain, Jun. 11, 1988, 8802172

Int. Cl. 5 C07F 3/06

U.S. Cl. 548-101

3 Claims

1. Thiazole derivatives of the general formula I:



where:

X is an anion of pharmaceutically acceptable acids;  
a is an integer from 1 to 5;  
b is an integer from 1 to 7;  
c is 0 or an integer from 1 to 4; and

d is 2a-c for monovalent acid anions, is a-c for divalent acid anions, and is 0 or 2 when c=0.

4,956,467

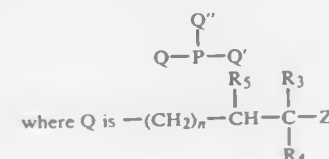
NUCLEOPHILIC TERTIARY ORGANOPHOSPHINES  
Lois M. Hinman, North Tarrytown, and Libby S. Miller, New York City, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 176,571, Apr. 1, 1988, abandoned. This application Apr. 5, 1989, Ser. No. 333,803  
Int. Cl. 5 C07F 9/50, 9/572, 9/58, 9/6506

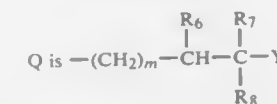
U.S. Cl. 548-112

7 Claims

1. Tertiary phosphines selected from compounds and formula.

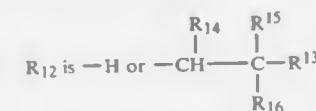


Q' is Q or Q''



Y and Z are  $-NR_{10}R_{11}$  or  $-OR_{12}$ ;

$R_{10}$  and  $R_{11}$  taken with the N form imidazolyl, pyrrolidonyl, pyridyl or morpholinyl rings



$R_{13}$  is  $[CH(R_{17})]_t-OH$

where n, m and t are independently 0-3;

$R_3$ ,  $R_4$ ,  $R_5$ ,  $R_6$ ,  $R_7$ ,  $R_8$ ,  $R_{14}$  and  $R_{15}$  are independently H or alkyl ( $C_1$ - $C_4$ );

$R_{16}$ - $R_{17}$  are independently  $-H$  or  $-OH$ ; with the proviso that Y and Z are not the same for any given compound.

4,956,468

PROCESS FOR THE ACYLATION OF THIAZOLIDINES  
Nancy Kerlinger, Lafayette, and Richard D. Gless, Oakland, both of Calif., assignors to ICI Americas Inc., Wilmington, Del.

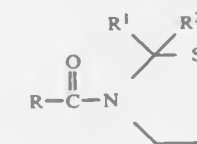
Continuation of Ser. No. 270,913, Nov. 14, 1988, abandoned.  
This application Sep. 8, 1989, Ser. No. 405,114

Int. Cl. 5 C07D 277/04

U.S. Cl. 548-200

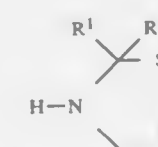
9 Claims

1. A process for the manufacture of a compound having the formula

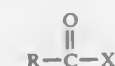


wherein

R is haloalkyl,  
 $R^1$  is hydrogen or lower alkyl, and  
 $R^2$  is hydrogen or lower alkyl; which process comprises treating a compound having the formula



wherein  $R^1$  and  $R^2$  are defined above, which an acyl halide of the formula



wherein X is a halogen atom and R is as defined above, in the presence of a buffer selected from the group of salts of weak bases and acid, wherein said buffer is present in an amount of from about 50 to about 250 mold percent based on the amount of Compound (II) to maintain a pH of from about 5 to about 12, at a temperature of from about 0° C. to about 15° C.

4,956,469

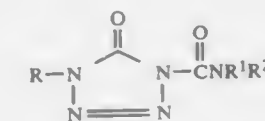
PREPARATION OF SUBSTITUTED TETRAZOLINONES  
Rupert A. Covey, Bethany; Patricia J. Forbes, Waterbury; Allyn R. Bell, and Allen R. Blem, both of Cheshire, all of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.

Division of Ser. No. 737,371, May 23, 1985, Pat. No. 4,826,529, which is a continuation of Ser. No. 560,031, Dec. 9, 1983, Pat. No. 4,618,365. This application Jan. 10, 1989, Ser. No. 283,109  
Int. Cl. 5 C07D 257/04

U.S. Cl. 548-251

3 Claims

1. A process for making a compound having the formula:



wherein

R is:

$C_1$ - $C_{12}$  alkyl,  
 $C_2$ - $C_{13}$  alkoxyalkyl,  
 $C_7$ - $C_9$  aralkyl,  
 $C_5$ - $C_6$  cycloalkyl,  
 $C_3$ - $C_{12}$  alkenyl,  
naphthyl,  
phenyl,  
phenyl substituted with at least one member selected from the group consisting of:  
fluorine,  
chlorine,  
bromine,  
iodine,  
 $C_1$ - $C_4$  alkyl,  
 $C_1$ - $C_4$  alkoxy,  
methylenedioxy,  
 $NR^3R^4$  wherein  $R^3$  and  $R^4$  are the same or different and are hydrogen or  $C_1$ - $C_6$  alkyl,  
 $C_2$ - $C_5$  alkoxyalkyl,  
carboxy,  
phenoxy,  
nitro,  
cyano,  
trihalomethyl wherein halo is fluorine, chlorine or bromine,  
trihalomethoxy wherein halo is fluorine, chlorine or bromine,  
 $C_1$ - $C_6$  alkylthio, and  
 $C_1$ - $C_6$  fluoroalkylthio; or

benzyl substituted with at least one member selected from the group consisting of:  
fluorine,  
chlorine,  
bromine,  
iodine,  
C<sub>1</sub>-C<sub>4</sub> alkyl,  
C<sub>1</sub>-C<sub>4</sub> alkoxy,  
methylenedioxy,  
C<sub>2</sub>-C<sub>5</sub> alkoxycarbonyl,  
phenoxy,  
nitro,  
cyano,  
trihalomethyl wherein halo is fluorine, chlorine or bromine,  
trihalomethoxy wherein halo is fluorine, chlorine or bromine,  
C<sub>1</sub>-C<sub>6</sub> alkylthio, and  
C<sub>1</sub>-C<sub>6</sub> fluoroalkylthio;

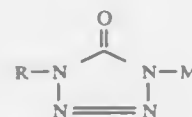
R<sup>1</sup> and R<sub>2</sub> are the same or different and are

C<sub>1</sub>-C<sub>6</sub> alkyl,  
C<sub>3</sub>-C<sub>6</sub> alkenyl,  
C<sub>5</sub>-C<sub>6</sub> cycloalkyl,  
C<sub>7</sub>-C<sub>9</sub> aralkyl,  
C<sub>7</sub>-C<sub>9</sub> aralkyl substituted with at least one member selected from the group consisting of:  
fluorine,  
chlorine,  
bromine,  
iodine,  
C<sub>1</sub>-C<sub>6</sub> alkyl,  
C<sub>1</sub>-C<sub>2</sub> haloalkyl wherein halo is fluorine, chlorine or bromine,  
halomethoxy wherein halo is fluorine, chlorine or bromine,  
C<sub>1</sub>-C<sub>6</sub> alkoxy,  
C<sub>1</sub>-C<sub>6</sub> alkylthio,  
C<sub>1</sub>-C<sub>6</sub> fluoroalkylthio,  
phenoxy,  
phenylthio,  
carboxy,  
C<sub>2</sub>-C<sub>5</sub> alkoxycarbonyl,  
methylenedioxy,  
nitro,  
cyano, and  
NR<sup>7</sup>R<sup>8</sup> wherein R<sup>7</sup> and R<sup>8</sup> are the same or different and are hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>4</sub>-C<sub>8</sub> alkylene or C<sub>4</sub>-C<sub>8</sub> oxydialkylene;

naphthyl,  
phenyl, or  
phenyl substituted with at least one member selected from the group consisting of:  
fluorine,  
chlorine,  
bromine,  
iodine,  
C<sub>1</sub>-C<sub>6</sub> alkyl,  
C<sub>1</sub>-C<sub>2</sub> haloalkyl wherein halo is fluorine, chlorine or bromine,  
halomethoxy wherein halo is fluorine, chlorine or bromine,  
C<sub>1</sub>-C<sub>6</sub> alkoxy,  
C<sub>1</sub>-C<sub>6</sub> alkylthio,  
C<sub>1</sub>-C<sub>6</sub> fluoroalkylthio,  
phenoxy,  
phenyl,  
phenylthio,  
carboxy,  
C<sub>2</sub>-C<sub>5</sub> alkoxycarbonyl,  
C<sub>1</sub>-C<sub>2</sub> alkylendioxy, optionally substituted with 1-2 methyl groups,  
C<sub>1</sub>-C<sub>2</sub> alkyleneoxy, optionally substituted with 1-2 methyl groups,

nitro,  
cyano, and  
NR<sup>7</sup>R<sup>8</sup> wherein R<sup>7</sup> and R<sup>8</sup> are the same or different and are hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>4</sub>-C<sub>8</sub> alkylene or C<sub>4</sub>-C<sub>8</sub> oxydialkylene; or

R<sup>1</sup> and R<sub>2</sub> together are C<sub>4</sub>-C<sub>8</sub> alkylene or C<sub>4</sub>-C<sub>8</sub> oxydialkylene, with the proviso that when R is other than C<sub>3</sub>-C<sub>12</sub> alkenyl, C<sub>1</sub>-C<sub>6</sub> alkylthio-substituted phenyl, C<sub>1</sub>-C<sub>6</sub> alkylthio-substituted benzyl, C<sub>1</sub>-C<sub>6</sub> fluoroalkylthio-substituted phenyl or benzyl and wherein at least one of R<sup>1</sup> and R<sub>2</sub> is C<sub>7</sub>-C<sub>9</sub> aralkyl, C<sub>7</sub>-C<sub>9</sub> substituted aralkyl phenyl or substituted phenyl, wherein substitution is as indicated above, comprising: the step of reacting, in an inert solvent at a temperature range from about 40° C. up to the boiling point of said solvent a tetrazolinone compound having the formula:



wherein R has the meanings given above and wherein M is hydrogen with an alkali metal carbonate to form an intermediate of the formula above wherein M is Li, Na or K followed by the reaction of said intermediate with a carbamoyl halide having the formula XCONR<sup>1</sup>R<sup>2</sup>, wherein X is chlorine or bromine and R<sup>1</sup> and R<sub>2</sub> have the meanings above.

4,956,470

## 1,3-DISUBSTITUTED/IMIDAZOLIUM SALTS

Wilhelm Klötzer, Innsbruck, Austria; Helmut Link, Basel, Switzerland; Renate Müssner, Innsbruck, Austria; Werner Schiestl, Innsbruck, Austria, and Nicolas Singewald, Innsbruck, Austria, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 46,473, May 4, 1987, Pat. No. 4,814,332.

This application Jan. 9, 1989, Ser. No. 295,165

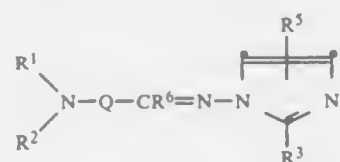
Claims priority, application Switzerland, May 13, 1986, 1940/86

Int. Cl.<sup>5</sup> C07D 413/06

U.S. Cl. 548—337

1. A compound of the formula

3 Claims



wherein Q is a carbo mono- or bicyclic aromatic group with two free valences which may be unsubstituted or substituted by one or two substituents selected from the group consisting of lower alkyl, lower alkoxy, lower alkylthio, lower alkanoyl, lower alkoxycarbonyl, phenyl, halogen, trifluoromethyl, hydroxy, nitro and cyano, the group —NR<sup>1</sup>R<sup>2</sup> is a basic amino group represented by the formula —NRR' in which R is hydrogen or lower alkyl and R' is a saturated lower hydrocarbon group which is unsubstituted or substituted by one or two lower alkoxy or hydroxy groups or by an amino, lower alkyl-amino, lower dialkylamino, oxo, lower alkoxycarbonyl or lower alkylendioxy group, R<sup>3</sup> is lower alkylthio, lower alkoxy or the group —(A)<sub>n</sub>—Ra, n is the integer 0 or 1, A is vinylene or lower alkylene, Ra is a carbo mono- or bicyclic aromatic group which may be unsubstituted or substituted by one, two or three substituents selected from the group consisting of di(lower alkyl)amino, lower alkyl, lower alkoxy, lower alkylthio, lower alkanoyl, lower alkoxycarbonyl, phenyl, halogen, hydroxy, trifluoromethyl, nitro and cyano, or a basic

amino group represented by the formula —NRR' in which R is hydrogen or lower alkyl and R' is a saturated lower hydrocarbon group which is unsubstituted or substituted by one or two lower alkoxy or hydroxy groups or by an amino, lower alkyl-amino, lower dialkylamino, oxo, lower alkoxycarbonyl or lower alkylendioxy group, R<sup>5</sup> is hydrogen, lower alkyl, lower hydroxyalkyl, lower alkoxyalkyl, lower haloalkyl, a carbo mono- or bicyclic aromatic group which may be unsubstituted or substituted by one, two or three substituents selected from the group consisting of di(lower alkyl)amino, lower alkyl, lower alkoxy, lower alkylthio, lower alkanoyl, lower alkoxycarbonyl, phenyl, halogen, hydroxy, trifluoromethyl, nitro and cyano or a fused benzene ring and R<sup>6</sup> is hydrogen or lower alkyl.

4,956,471

## PROCESS FOR ISOLATING AND PURIFYING AMINO ACIDS

Hisao Ito; Akio Nishi; Masasi Miyazawa, and Masayoshi Naruse, all of Kawasaki, Japan, assignors to Ajinomoto Company, Inc., Tokyo, Japan

Continuation of Ser. No. 238,529, Aug. 31, 1988, abandoned.

This application May 16, 1989, Ser. No. 355,821

Claims priority, application Japan, Apr. 28, 1986, 61-98512; Apr. 28, 1986, 61-98513; May 23, 1986, 61-118867; Jun. 11, 1986, 61-135517; Jan. 20, 1986, 61-144260

Int. Cl.<sup>5</sup> C07D 233/64; C07C 99/12

U.S. Cl. 548—344

5 Claims

1. A process for isolating and purifying an amino acid by ion-exclusion chromatography, which comprises:

(a) introducing an aqueous solution containing an amino acid to be purified, selected from the group consisting of histidine, threonine, valine, arginine, glutamine and isoleucine, into a column having packed therein a strongly acidic exchange resin, wherein said exchange resin is of the same cation type as the predominant cation existing in the feed solution, and wherein said resin has a crosslinking degree of 4-8%, and

(b) adding an aqueous solution to the column to pass through impurities originally contained in the aqueous solution containing the amino acid, and then passing through the purified amino acid, and wherein the flow rate of the elution liquid ranges from 0.5 to 4 SV, and wherein the pH of said aqueous solution for elution is adjusted to the isoelectric pH±1 pH unit of the amino acid to be purified, before being introduced into said column, and wherein said impurities for isoleucine, threonine, valine and histidine are composed mainly of at least one member selected from the group consisting of acidic amino acids, sulfate ions, chloride ions and pigments, and the same ion as is adsorbed in said resin;

and wherein said impurities for arginine are composed mainly of at least one member selected from the group consisting of lysine, ornithine, citrulline, histidine, sulfate ions, chloride ions and pigments, and the same ions as is adsorbed in said resin;

and wherein said impurities for glutamine are composed mainly of at least one member selected from the group consisting of glutamic acid, pyrrolidone, carboxylic acid and sulfate ions, and the same ion as is adsorbed in said resin.

4,956,472

## ORGANOSILICON OXYGEN BLEACH ACTIVATORS

Sunny J. Lo, Midland; Terence J. Swihart, Bay City, and Andrew H. Ward, Sanford, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 234,661, Aug. 19, 1988, Pat. No. 4,906,399.

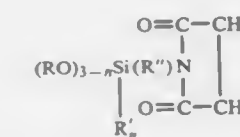
This application Feb. 6, 1990, Ser. No. 475,500

Int. Cl.<sup>5</sup> C07F 7/04, 7/18

U.S. Cl. 548—406

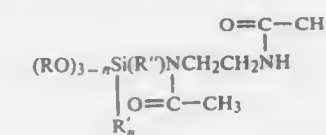
4 Claims

1. A compound having the formula:



wherein R=an alkyl group having 1-4 carbon atoms, R'=an alkyl group having 1-4 carbon atoms, R''=an alkylene group having 1-6 carbon atoms, and n=0, 1, or 2.

2. A compound having the formula:



wherein R=an alkyl group having 1-4 carbon atoms, R'=an alkyl group having 1-4 carbon atoms, R''=an alkylene group having 1-6 carbon atoms, and n=0, 1, or 2.

4,956,473

## 2-AZA-4-(ALKOXYCARBONYL)SPIRO[4,5]DECAN-3-ONE

Hans P. Mettler, Brig-Glis; Gareth Griffiths, Visp; Lester Mills, Naters, and Felix Previdoli, Brig, all of Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

Filed Aug. 30, 1989, Ser. No. 400,820

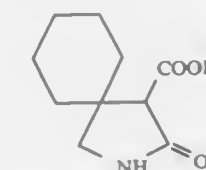
Claims priority, application Switzerland, Sep. 1, 1988, 3272/88; Apr. 12, 1989, 1382/89; Apr. 12, 1989, 1383/89

Int. Cl.<sup>5</sup> C07D 209/54; C07C 255/46; C07B 43/06

U.S. Cl. 548—408

3 Claims

1. 2-Aza-4-(alkoxycarbonyl)spiro[4,5]-decan-3-one of the formula:



wherein R is a lower alkyl radical of 1 to 4 C atoms.

4,956,474

## INTERMEDIATES OF CEPHALOSPORIN COMPOUNDS

Haruo Ohnishi, Funabashi; Hiroshi Kosuzume, Mishima; Masahiro Mizota, Gotenba; Yasuo Suzuki, Kawaguchi, and Ei Mochida, Tokyo, all of Japan, assignors to Mochida Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 174,518, Mar. 28, 1988, Pat. No. 4,904,791, which is a division of Ser. No. 838,309, Mar. 10, 1986, Pat. No. 4,804,945. This application Jun. 20, 1989, Ser. No. 368,846

Claims priority, application Japan, Apr. 1, 1985, 60-68866; May 17, 1985, 60-105704; Jul. 4, 1985, 60-147359; Jul. 27, 1985, 60-166259

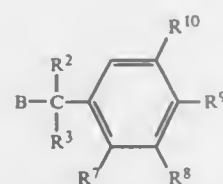
Int. Cl.<sup>5</sup> C07C 239/20; C07D 209/48

U.S. Cl. 548—475

8 Claims

1. An intermediate compound in the synthesis of cephalosporin derivatives, represented by the formula (XV):





or salts, solvates or salts of solvates thereof, wherein B represents a phthalimidooxy group or an aminoxy group, R<sup>2</sup> represents a hydrogen atom or a methyl group, R<sup>3</sup> represents a carboxyl group or a protected carboxyl group, R<sup>7</sup> represents a hydrogen atom, a carboxyl group, a protected carboxyl group, an isopropyl group, a hydroxy group, a methoxy group or an acetoxy group, R<sup>8</sup> and R<sup>9</sup> are the same or different and represent hydrogen atoms, hydroxy groups, methoxy groups, ethoxy groups, 2-methoxyethoxymethoxy groups, acetoxy groups, chloroacetoxy groups, butanoyloxy groups, methanesulfonyloxy groups, p-toluenesulfonyloxy groups, amino groups, acetamino groups, benzyloxycarbonylamino groups, methanesulfonyl groups, or together an ethylenedioxy group or a carbonyldioxy group, R<sup>10</sup> represents a hydrogen atom, a hydroxy group, an acetoxy group, a methoxy group, or a chloroacetoxy group, with the proviso that R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup> and R<sup>10</sup> do not represent hydrogen atoms at the same time.

#### 4,956,475 PREPARATION OF ENANTIOMERICALLY PURE 3-PROTECTED AMINO-PYRROLIDINES

Daniel T. Chu, Vernon Hills, Ill., and Terry J. Rosen, East Lyme, Conn., assignors to Abbott Laboratories, Abbott Park, Ill.

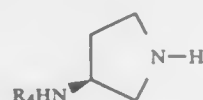
Division of Ser. No. 167,058, Mar. 11, 1989, Pat. No. 4,859,776. This application May 25, 1989, Ser. No. 356,970

Int. Cl.<sup>3</sup> C07D 207/14

U.S. Cl. 548—557

9 Claims

1. A process for the preparation of the enantiomerically pure (S) form of a compound having the formula:



wherein R<sub>4</sub> is a nitrogen protecting group, the process comprising:

- transforming the hydroxyl group of a N-1 protected enantiomerically pure (R)-3-hydroxypyrrolidine into a leaving group;
- introducing a nitrogen containing substituent by displacing the leaving group with a nitrogen nucleophile that is a precursor to an amino;
- converting the nitrogen nucleophile to an amine, which is then protected with a nitrogen protecting group R<sub>4</sub> that is stable under the conditions required to cleave the N-1 protecting group; and
- cleaving the N-1 protecting group.

4,956,476  
PREPARATION OF THIOLACTAMS  
Alan D. Eastman, Marvin M. Johnson, and Richard D. Skinner, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 1, 1990, Ser. No. 486,709

Int. Cl.<sup>3</sup> C07D 201/02, 207/267, 211/76, 223/02

U.S. Cl. 548—552

15 Claims

1. In a process for catalytically reacting at least one lactam with hydrogen sulfide so as to produce at least one thiolactam,

the improvement which comprises employing a catalyst consisting essentially of alumina.

7. In a process for reacting N-methyl-2-pyrrolidone with hydrogen sulfide so as to produce N-methyl-2-thiopyrrolidone, the improvement which comprises employing a catalyst consisting essentially of alumina.

#### 4,956,477 SYNTHESIS OF 1,2-DIOXETANES

Irena Y. Bronstein, Newtown, and Brooks Edwards, Cambridge, both of Mass., assignors to Tropix, Inc., Bedford, Mass.

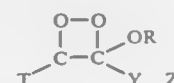
Division of Ser. No. 367,772, May 15, 1989, which is a continuation-in-part of Ser. No. 140,197, Dec. 31, 1987, abandoned. This application Sep. 22, 1989, Ser. No. 411,387

Int. Cl.<sup>3</sup> C07D 321/00; C07F 9/653

U.S. Cl. 549—221

25 Claims

1. A process for producing a 1,2-dioxetane compound having the formula:



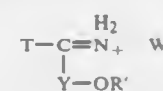
in which T is a spiro-bonded stabilizing group that prevents the dioxetane compound from decomposing before the bond between Y and Z is intentionally cleaved, Y is an aromatic, light-emitting fluorophore-forming fluorescent chromophore group capable of absorbing energy to form an excited energy state from which it emits optically detectable energy to return to its original energy state, Z is hydrogen, a chemically cleavable group or an enzyme-cleavable group, and R is a C<sub>1</sub>-C<sub>20</sub> unbranched or branched, substituted or unsubstituted, saturated or unsaturated alkyl group; a heteroalkyl group or aralkyl group; a substituted or unsubstituted polynuclear or heteropolynuclear aralkyl group; a saturated or unsaturated cycloalkyl group; an N, O or S heteroatom-containing group; or an enzyme-cleavable group; with one or more of T, Y, Z or R being substituted with a group that enhances the water solubility of the 1,2-dioxetane or unsubstituted with such a group, which comprises: reacting a nitrile having the formula:



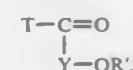
wherein T is the spiro-bonded stabilizing group, with an aromatic Grignard reagent having the formula:



wherein X is a halogen and R' is a substituent as defined for R hereinabove, and acidifying the thus-obtained reaction product with an acid HW, wherein W is the acid's anion, to form the corresponding ketimine salt having the formula:



reacting the ketimine salt with an aqueous alcoholic acid to form the corresponding ketone having the formula:



reacting the ketone with base plus an R-ylating agent to form the corresponding enol ether having the formula:

#### 4,956,478 METHOD FOR THE PRODUCTION OF ALKENYL-SUCCINIC ANHYDRIDES

Emanuel P. Fakoukakis, Brussels; Soria V. Mustatea, Locsin, both of Belgium, and Günter Bellmann, Commugny, Switzerland, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sep. 13, 1989, Ser. No. 406,938

Claims priority, application European Pat. Off., Sep. 14, 1988, 88810624.2

Int. Cl.<sup>3</sup> C07D 307/60

U.S. Cl. 549—255

8 Claims

1. A method for manufacturing alkenyl-succinic anhydrides in a form sufficiently pure for using them directly, this method including the steps of:

- mixing one molar equivalent of maleic anhydride (MA) with α-monoolefins in a quantity corresponding to at least one olefinic bond molar equivalent and heating to a temperature below 200° C. but sufficient to ensure complete dissolution of the MA in the monoolefins and forming a homogeneous solution;
  - heating this homogeneous solution in a closed vessel to a temperature between 200° and 260° C. where the reaction between the MA and the olefin proceeds smoothly to substantially near or full completion relative to the amount of MA used;
  - distilling off unreacted α-olefins and MA, if any, and isolating the alkenyl-succinic anhydride products for further end-uses,
- which comprises using as the starting α-monoolefins a 1:1 to 4:1 by weight mixture of dodecene and tetradecene, whereby no significant formation of polymeric by-products is observed, and isolating the desired alkenyl-succinic anhydride products by simply collecting the residue of distillation of step (c), no further purification being needed.

#### 4,956,479 23-DEOXY-27-CHLORO DERIVATIVES OF LL-F28249 COMPOUNDS

Susan Y. Tamura, Hamilton Sq., and Goro Asato, Titusville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

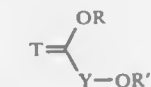
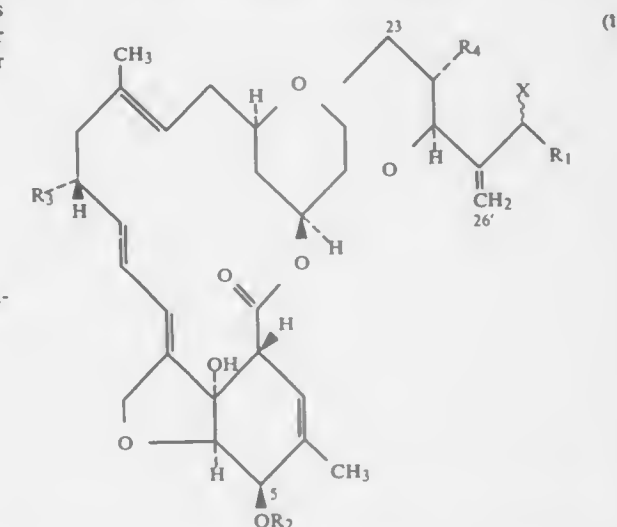
Filed Mar. 6, 1987, Ser. No. 22,848

Int. Cl.<sup>3</sup> A61K 31/335; C07D 313/06

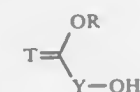
U.S. Cl. 549—264

19 Claims

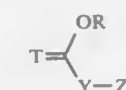
1. A compound represented by formula (I),



selectively deoxygenating the enol ether to form the corresponding monohydroxy enol ether having the formula:

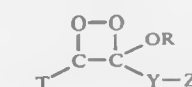


converting the hydroxy group in the monohydroxy enol ether to a Z group to form the corresponding enol ether having the formula:

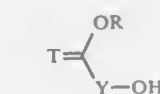


and oxygenating the T=C double bond in this enol ether to give the corresponding 1,2-dioxetane compound.

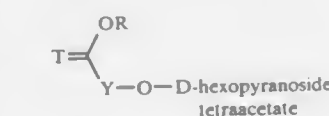
23. A process for producing a 1,2-dioxetane compound having the formula:



wherein T is a polycycloalkylidene group, R is a C<sub>1</sub>-C<sub>20</sub> unbranched or branched, substituted or unsubstituted, saturated or unsaturated alkyl group; a heteroalkyl group or aralkyl group; a substituted or unsubstituted polynuclear or heteropolynuclear aralkyl group; a saturated or unsaturated cycloalkyl group; an N, O or S heteroatom-containing group; or an enzyme-cleavable group; Y is an aromatic, light-emitting fluorophore-forming fluorescent chromophore group capable of absorbing energy to form an excited energy state from which it emits optically detectable energy to return to its original energy state, and Z is an O-glycosidically linked sugar molecule, which comprises reacting a monohydroxy enol ether having the formula:



with a tetra-O-acetyl-D-hexopyranosyl halide to give a compound having the formula:



hydrolyzing the O-tetraacetate groups in the D-hexopyranoside tetraacetate to give a compound having the formula: and oxygenating the double bond to give the corresponding 1,2-dioxetane compound.

wherein R<sub>1</sub> is methyl, ethyl or isopropyl; R<sub>2</sub> is hydrogen or methyl; R<sub>3</sub> is hydrogen, methyl or ethyl; R<sub>4</sub> is methyl or ethyl; and X is chlorine.

4,956,480  
7-AMINO-4-METHYL-COUMARIN-3-CARBOXYALKYL  
DERIVATES AND FLUORESCENT CONJUGATES  
THEREOF

Don Robinson, Brackenwood, Great Britain, assignor to Bi-oCarb AB, Sweden

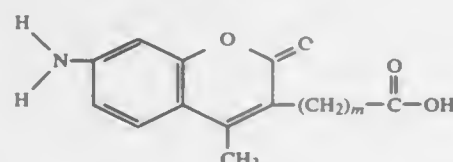
PCT No. PCT/SE86/00550, § 371 Date Jun. 17, 1988, § 102(e)  
Date Jun. 17, 1988, PCT Pub. No. WO87/03589, PCT Pub.  
Date Jun. 18, 1987

PCT Filed Dec. 2, 1986, Ser. No. 203,453  
Claims priority, application Sweden, Dec. 3, 1985, 8505716  
Int. Cl.<sup>3</sup> C07D 311/02; C07H 15/00

U.S. Cl. 549—288

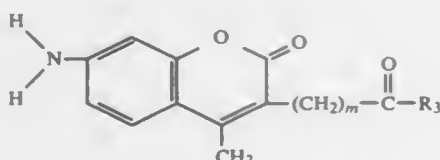
5 Claims

1. A compound having the formula (I):



or an ester or halide thereof, wherein m is an integer from 1 to 4 hydrogen.

4. A compound having the formula (II):



wherein m is an integer from 1 to 4 and R<sub>3</sub> is an N-oxy succinimide substituent, a hydroxy substituent or a halogen substituent.

4,956,481  
ADAMANTANE DERIVATIVES, COMPOSITIONS OF  
MATTER CONTAINING SAME, PROCESSES FOR  
PREPARING SAID ADAMANTANE DERIVATIVES AND  
SAID COMPOSITIONS, AND ORGANOLEPTIC AND  
DEODORANCY USES OF SAID ADAMANTANE  
DERIVATIVES AND SAID COMPOSITIONS

William Gillaspay, Aberdeen; Myrna L. Hagedorn, Edison;  
Marie R. Hanna, Hazlet; Kathleen E. Boardwick, Keyport;  
Charles E. J. Beck, Summit; Futoshi Fujioke, Oakhurst;  
Anthony G. Branco, Matawan; Anubhav Narula, Hazlet, and  
Richard M. Boden, Ocean, all of N.J., assignors to International  
Flavors & Fragrances Inc., New York, N.Y.

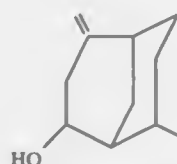
Filed Oct. 21, 1988, Ser. No. 261,275

Int. Cl.<sup>3</sup> C07C 35/22; C07D 307/00, 307/93; C11D 3/50

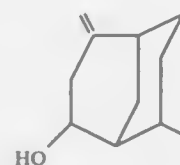
U.S. Cl. 549—459

6 Claims

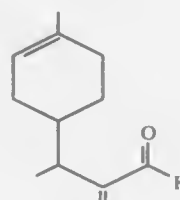
1. A compound having the structure:



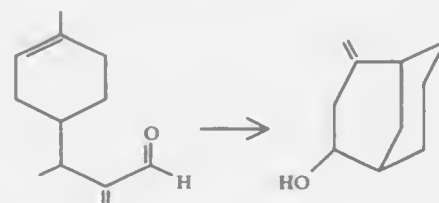
5. A process for producing a compound having the structure:



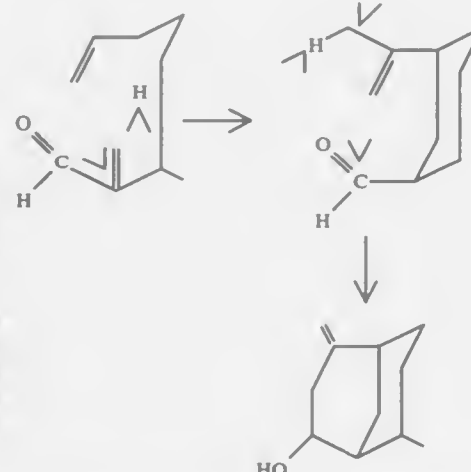
comprising the step of effecting the rearrangement of the compound having the structure:



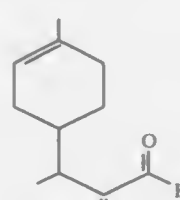
according to the over-all reaction:



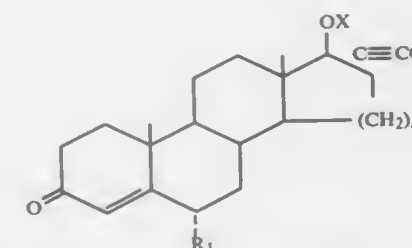
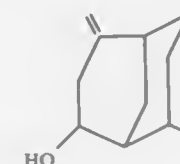
according to the mechanism:



comprising the step of heating the compound having the structure:



in the absence of acid at a temperature in the range of from about 130° C. up to about 250° C. for a period of time sufficient to form the product having the structure:



wherein , n and R as defined above and  
X is nitro, trifluoroacetyl, or trichloroacetyl,  
reacting the latter ester in the presence of a catalytically effective amount of silver(I), with formic acid to form the pregnane of the formula t,0260

wherein , n and R<sub>1</sub> are as defined above, and, optionally,  
(a) saponifying the thus produced 17-formyl ester, (b) exchanging the 21-chlorine atom against an alkanoyloxy group, or (c) exchanging the 21-chlorine atom against the alkanoyloxy group and saponifying the latter.

4,956,482  
PROCESS FOR THE PREPARATION OF PREGNANE  
DERIVATIVES

Helmnt Hofmeister, Berlin; Klaus Annen, Muenster-Albachten;  
Henry Laurent, and Rudolf Wiechert, both of Berlin, all of  
Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft,  
Berlin and Bergkamen, Fed. Rep. of Germany  
Continuation of Ser. No. 95,090, Sep. 11, 1987, which is a  
division of Ser. No. 776,923, Sep. 17, 1985, Pat. No. 4,708,823.  
This application Mar. 20, 1989, Ser. No. 325,585

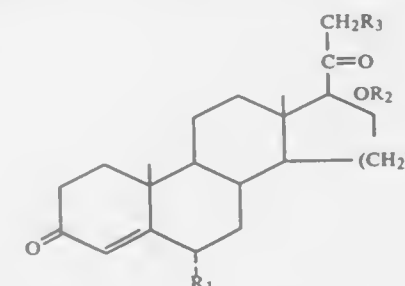
Claims priority, application Fed. Rep. of Germany, Sep. 17,  
1984, 3434448

Int. Cl.<sup>3</sup> C07J 1/00

U.S. Cl. 552—594

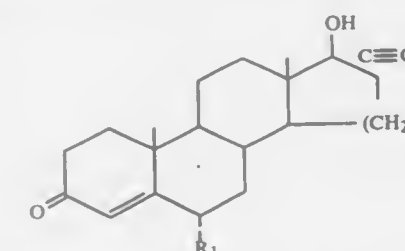
10 Claims

1. A process for preparing a pregnane derivative of the formula

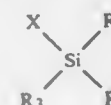


wherein

in each case is a single or double bond,  
n is 1 or 2,  
R<sub>2</sub> is hydrogen or formyl, and  
R<sub>3</sub> is chlorine, hydroxy or alkanoyloxy of up to 6 carbon  
atoms,  
comprising esterifying an androstane derivative of the formula



wherein , n and R<sub>1</sub> are as defined above, with nitric acid,  
trifluoroacetic acid, trichloroacetic acid, or a reactive derivative thereof, thereby forming the corresponding ester of the formula



(I)

4,956,484  
PROCESS FOR PRODUCING A SILANE OR SILOXANE  
COMPOUND CONTAINING A CYCLOALKYL RING

Francesco Gementi, Milan; Loris Sogli, Novara, and Raffaele  
Ungarelli, Treviso, all of Italy, assignors to Instituto Guido  
Donagani S.p.A., Novara, Italy

Filed Mar. 3, 1988, Ser. No. 163,948

Claims priority, application Italy, Mar. 6, 1987, 41003 A/87  
Int. Cl.<sup>3</sup> C07F 7/08, 7/10, 7/18

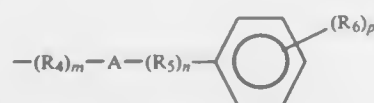
U.S. Cl. 556—410

14 Claims

1. A process for producing a silane or siloxane compound containing a cycloalkyl ring by catalytic hydrogenation, this process comprising hydrogenating, in the presence of a Raney nickel catalyst modified with chromium wherein the chromium content is from about 1 to 10% by weight of the nickel, a silane or siloxane compound containing at least an aromatic or heteroaromatic ring and having formula (I):

wherein X is an aryl, alkylaryl or arylalkyl group having from 6 to 20 carbon atoms or the radical





wherein  $R_4$  and  $R_5$  are the same or different and are each an alkylene radical containing from 1 to 20 carbon atoms;  $R_6$  is an alkyl, alkoxy, alcohol, acid or ester radical containing from 1 to 20 carbon atoms; A is a heteroatom selected from the group consisting of oxygen, sulfur, nitrogen; m, n and p are zero or a whole number from 1 to 10; and  $R_1$ ,  $R_2$  and  $R_3$  are the same or different and have the same definition as X or may be a hydrogen atom, an alkyl or alkylene radical containing from 1 to 20 carbon atoms, a linear or branched alkyl radical having from 1 to 20 carbon atoms and containing one or more alkoxy, carbonyl or carboxyl groups, or the group  $N(R'')_2$  in which  $R''$  is a hydrogen atom or an alkyl radical containing from 1 to 20 carbon atoms.

4,956,485

# TRIALKYL-SILOXY-1,1-DIPHENYL ETHYLENES AND POLYMERS PRODUCED THEREWITH

Edgar Leitz, Dormagen; Hans-Josef Buysch; Ludwig Bottenbruch, both of Krefeld, and Karl-Heinz Ott, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 16, 1989, Ser. No. 367,002

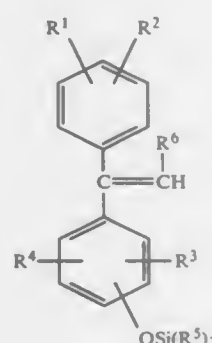
Claims priority, application Fed. Rep. of Germany, Jun. 28, 1988, 3821745

Int. Cl.<sup>5</sup> C07C 7/18; C07F 7/18

U.S. Cl. 556—446

3 Claims

1. Trialkylsiloxy-1,1-diphenyl ethylenes corresponding formula (I)



in which

$R^1, R^2 = H, C_1-C_4$  alkyl,  $OCH_3$ ,  
 $R^3 = H, C_1-C_4$  alkyl,  $O-C_1-C_4$  alkyl,  
 $R^4 = H, C_1-C_4$  alkyl,  
 $R^5 = C_1-C_4$  alkyl,  
 $R^6 = H, C_1-C_4$  alkyl.

4,956,486

# REMOVAL OF ORGANIC CHLORIDE FROM PHENYLCHLOROSILANES

Ollie W. Marko, and Robert D. Steinmeyer, both of Carrollton, Ky., assignors to Dow Corning Corporation, Midland, Mich.

Filed Mar. 7, 1990, Ser. No. 489,631

Int. Cl.<sup>5</sup> C07F 7/20

U.S. Cl. 556—466

20 Claims

1. A process for reducing organic chloride content of phenylchlorosilanes, where the phenylchlorosilanes are of formula



where  $a = 1, 2$ , or  $3$ ;  $b = 0, 1$ , or  $2$ ;  $a + b = 1, 2$ , or  $3$ ;  $\phi$  is a phenyl radical; and Me is a methyl radical; the process comprising:

- contacting a crude mixture containing as a major portion the phenylchlorosilanes and as minor portions an organic chloride and a phenyl source, with a catalyst; where the catalyst is a Lewis acid forming material;
- facilitating contact of the organic chloride with the catalyst and the phenyl source to convert the organic chloride to hydrocarbon adducts;
- separating the catalyst from the phenylchlorosilanes and the hydrocarbon adducts; and
- recovering the phenylchlorosilanes with lowered organic chloride content.

4,956,487

# PROCESS FOR PRODUCTION OF THIOPHOSPHONATES

Jeffrey D. Robbins, Berkeley, and Richard D. Gless, Jr., Oakland, both of Calif., assignors to ICI Americas Inc., Wilmington, Del.

Filed Dec. 12, 1988, Ser. No. 283,345

Int. Cl.<sup>5</sup> C07F 9/40

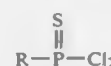
U.S. Cl. 558—98

16 Claims

1. A process for production of thiophosphonate compounds having the formula



in which R is alkyl, haloalkyl or aryl; X is chloro or  $SR^2$ ;  $R^1$  is alkyl or aryl; and when X is  $SH_2$  then  $R^2$  is a group identical to  $R^1$ , or  $R^1$  and  $R^2$  taken together form an optionally alkyl-substituted polymethylene group, comprising reacting a thiophosphonodichloride having the formula



with a mercaptan having the formula  $R_1SH$ , or  $HS-(R_1+R_2)-SH$  when  $R_1$  and  $R_2$  taken together form a polymethylene group, in the presence of a catalytic amount of a member selected from the group consisting of (a) quaternary ammonium or phosphonium salts having the general formula  $R_3R_4R_5R_6Y^+Z^-$  in which Y is nitrogen or phosphorus, Z is an anion, and  $R_3, R_4, R_5$ , and  $R_6$  are independently aromatic, aliphatic or aralkyl groups, the total number of carbon atoms in the quaternary onium cation being at least twelve; and (b) an alkali metal halide in combination with a Crown ether, in the substantial absence of a base.

4,956,488

OPTICALLY ACTIVE CYANOBIPHENYL COMPOUND  
 Toshihiro Shibata, and Masaki Kimura, both of Urawa, Japan, assignors to Adeka Argus Chemical Co., Ltd., Tokyo, Japan

Filed Apr. 5, 1988, Ser. No. 177,979

Claims priority, application Japan, Apr. 13, 1987, 62-90150; Jun. 10, 1987, 62-144948

Int. Cl.<sup>5</sup> C07C 43/02

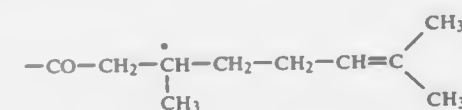
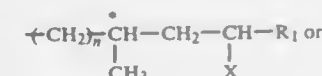
U.S. Cl. 558—414

15 Claims

1. An optically active cyanobiphenyl compound represented by the following general formula:



wherein, R is



X is hydrogen atom or chlorine atom; when X is hydrogen atom,  $R_1$  is straight chain alkyl having from 1 to 11 carbon atoms and when X is chlorine atom,  $R_1$  is hydrogen atom or straight chain alkyl having from 1 to 11 carbon atoms; n is 3 to 5; and \* represents an asymmetric carbon atom.

4,956,489

# WATER-SOLUBLE L-TYROSINE DERIVATIVES AND A PROCESS FOR PREPARING L-TYROSINE DERIVATIVES

Daniel H. Auriol; Francois B. Paul, both of Toulouse, and Pierre F. Monsan, Blagnac, all of France, assignors to Bloecore, France

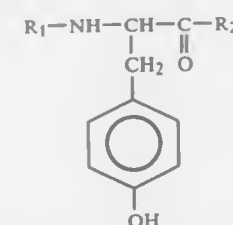
Filed Oct. 14, 1988, Ser. No. 257,823

Claims priority, application France, Oct. 19, 1987, 87 14352  
 Int. Cl.<sup>5</sup> C07C 101/32

U.S. Cl. 560—40

2 Claims

1. L-tyrosine derivatives, characterized in that they have the general formula



where  $R_1$  is an L-malyl group, and  $R_2$  is an —OH, —OM, methoxy, ethoxy or amino group, M denoting an alkali metal.

4,956,490

# PROCESS FOR PREPARING BENZYL-PYRUVIC ACIDS AND ESTERS

James W. McManus, Leesburg, and John F. Genus, Albany, both of Ga., assignors to Merck & Co., Inc., Rahway, N.J.

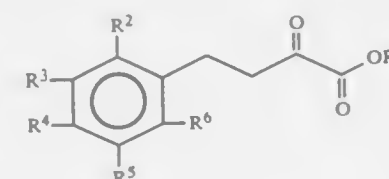
Filed Mar. 9, 1989, Ser. No. 321,040

Int. Cl.<sup>5</sup> C07C 69/76

U.S. Cl. 560—051

29 Claims

1. A continuous, non-isolation process for preparing benzyl-pyruvic acids and esters having the formula:



wherein

$R^1$  is H or  $C_1-C_4$  alkyl; and  
 $R^2-R^6$  can be the same or different and are hydrogen,  $C_1-C_6$  alkyl, aryl, halo (I, Cl, Br) nitro, hydroxy, alkoxy, phenoxy or nitrile,  
 which process comprises sequentially:

- condensing an aryl aldehyde with a pyruvate to obtain an unsaturated  $\alpha$ -keto acid;
- esterifying said unsaturated  $\alpha$ -keto acid with a  $C_1-C_4$  alkyl chloroformate to obtain an unsaturated  $\alpha$ -keto ester; and,
- reducing said unsaturated  $\alpha$ -keto acid or unsaturated  $\alpha$ -keto ester with hydrogen in the presence of a heterogeneous catalyst to obtain a compound of formula I, said condensation, esterification and reduction being carried out sequentially and continuously without isolation of said unsaturated  $\alpha$ -keto acid and said unsaturated  $\alpha$ -keto ester intermediates.

4,956,491

# ALPHA-ALKYLACRYLAMIDE DERIVATIVES AND THEIR POLYMERS

Yuji Suzuki, Osaka; Satoshi Urano, Kyoto; Hiroshi Umemoto, Kyoto; Ryuzo Mizuguchi, Kyoto; Kei Aoki, Nara, and Noriyuki Tsunoiwa, Osaka, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Apr. 27, 1987, Ser. No. 42,713

Claims priority, application Japan, Apr. 25, 1986, 61-97760; Apr. 25, 1986, 61-97761

The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C07C 103/147

U.S. Cl. 560—172

3 Claims

1. An N-(substituted oxalyl)-alpha-alkylacrylamide of the formula:  $CH_2=CH-CO-NH-CO-CO-OR'$ , wherein R is a lower alkyl group and R' has a molecular weight of not more than 500 and is selected from the group consisting of an alkenyl group, an alkynyl group, an aryl group, an aralkyl group and an alkyl group substituted with alkenyloxy.

4,956,492

# DIALKYL FUMARATE - VINYL ACETATE COPOLYMERS USEFUL AS DEWAXING AIDS

Abraham R. Dekraker, Sarnia, Canada, and David J. Martella, Plainsboro, N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Division of Ser. No. 589,536, Mar. 14, 1984, Pat. No. 4,670,130.  
 This application Dec. 19, 1986, Ser. No. 944,545

Int. Cl.<sup>5</sup> C07C 69/60

U.S. Cl. 560—190

4 Claims

1. A copolymer of dialkyl fumarate and vinyl acetate suitable for use as a dewaxing aid in wax containing oil wherein the improvement comprises said copolymer having a Specific Viscosity measured at 2 wt. % solution in xylene at 40° C. of at least 2.5, and wherein 50 to 100 wt. % of said alkyl groups are  $C_{20}$  to  $C_{24}$  alkyl groups.

4,956,493

# PROCESS FOR PRODUCING METHACRYLIC ESTER

Masatoshi Ueoka; Syoichi Matsumoto, both of Himeji; Hiroshi Yoshida, Toyonaka, and Masao Baba, Himeji, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Filed Apr. 14, 1988, Ser. No. 181,369

Claims priority, application Japan, Apr. 16, 1987, 62-91932; Aug. 6, 1987, 62-195347

Int. Cl.<sup>5</sup> C07C 67/00

U.S. Cl. 560—208

8 Claims

1. A process for producing a methacrylic ester which comprises catalytically oxidizing isobutylene, tert-butanol, methacrolein or isobutyl aldehyde in a vapor phase; removing light-boiling substances from the resulting reaction product by distillation or stripping; extracting methacrylic acid from the resulting methacrylic acid aqueous solution using a saturated chain aliphatic hydrocarbon having 6 to 9 carbon atoms as a solvent; recovering the solvent from the obtained solvent solution of methacrylic acid; esterifying the resulting methacrylic acid by the reaction of it with a lower aliphatic alcohol or a lower

alicyclic alcohol having 1 to 12 carbon atoms using a porous strongly acidic cation exchange resin as a catalyst for esterification; and then subjecting the thus obtained esterification reaction product to a purification step.

4,956,494  
OXIDATION OF THIOLS, DISULFIDES AND  
THIOLISULFONATES

Altai Husain, East Norriton, Pa., and Gregory A. Wheaton, Logan Township, Gloucester County, N.J., assignors to Pennwalt Corporation, Philadelphia, Pa.

Continuation of Ser. No. 112,648, Oct. 26, 1987, abandoned.  
This application Jun. 15, 1989, Ser. No. 366,350  
Int. Cl.<sup>3</sup> C07C 139/00, 51/58

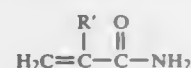
U.S. Cl. 562—118 13 Claims  
1. A process for preparing alkanesulfonic acids and alkanesulfonyl chlorides comprising contacting an alkanethiol, a dialkyldisulfide or an alkyl alkanethiolsulfonate mixed in aqueous hydrochloric acid with hydrogen peroxide to produce the corresponding alkanesulfonic acid or alkanesulfonyl chloride, the concentration of hydrogen chloride being from 10 to 38 percent based on the weight of said aqueous hydrochloric acid and the amount of hydrogen chloride used ranges from 1 to 10 moles for each mole of alkanethiol and from 2 to 20 moles for each mole of dialkyldisulfide or alkyl alkanethiolsulfonate.

4,956,495  
PROCESS FOR PREPARING UNSATURATED  
NITROGEN CONTAINING ACIDS

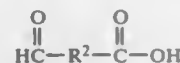
Woodrow W. White, Akron, Ohio, assignor to GenCorp. Inc., Fairlawn, Ohio

Division of Ser. No. 214,968, Jul. 5, 1988, which is a continuation of Ser. No. 930,485, Nov. 14, 1986, abandoned. This application Dec. 18, 1989, Ser. No. 451,660  
Int. Cl.<sup>3</sup> C07C 101/30

U.S. Cl. 562—567 5 Claims  
1. A process for preparing an unsaturated nitrogen containing acid, comprising the steps of:  
adding an unsaturated amide reactant to a vessel, said unsaturated amide having the formula

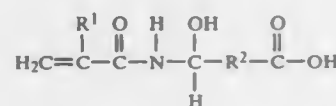


where R<sup>1</sup> is H, or an alkyl having from 1 to 3 carbon atoms,  
adding an aldehyde acid reactant to said vessel, said aldehyde acid having the formula



where R<sup>2</sup> is nonexistent, CH<sub>2</sub>, or C<sub>2</sub>H<sub>4</sub>, where the equivalent amount of said amide to said acid is from about 1.2 to about 2.4 equivalents, and

reacting said reactants in the presence of an acidic aqueous reaction medium having a pH of from about 1.2 to less than 7.0 and producing a salt free unsaturated nitrogen containing acid, said unsaturated nitrogen containing acid having the formula



wherein R<sup>1</sup> is H, or an alkyl having from 1 to 3 carbon atoms, wherein R<sup>2</sup> is nonexistent, CH<sub>2</sub>, or C<sub>2</sub>H<sub>4</sub>.

4,956,496  
PROCESS FOR ALLYLATION OF PERHALOALKYL-,  
PERHALOALKOXY- AND  
PERHALOALKYLTHIOANILINES IN THE PRESENCE  
OF A CATALYST

Jean-Pierre Denis, Doyet; Jean-Roger Desmurs, Communay, and Jean-Pierre LeCouve, Caluire, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie Cedex, France  
Filed Dec. 23, 1988, Ser. No. 288,880

Claims priority, application France, Dec. 23, 1987, 87 18011  
Int. Cl.<sup>3</sup> C07C 209/10

U.S. Cl. 564—404 16 Claims  
1. A process for the preparation of an N-allylperhaloalkyl-, perhaloalkoxy- or perhaloalkylthioaniline, which comprises placing a perhaloalkylated, perhaloalkoxylated or perhaloalkylthioaniline and an allyl halide in a solvent medium in contact with an effective amount of a metal catalyst selected from palladium, copper and nickel.

4,956,497  
PHENYLENE ETHER RESIN BASED THERMOPLASTIC  
COMPOSITIONS

Peter H. Thompson, and Richard J. Smalling, both of Parkersburg, W. Va., assignors to General Electric Company, Selkirk, N.Y.

Continuation-in-part of Ser. No. 928,129, Nov. 7, 1986, abandoned. This application Apr. 22, 1988, Ser. No. 185,013  
Int. Cl.<sup>3</sup> C08K 5/01; C08L 51/00, 53/00, 72/00

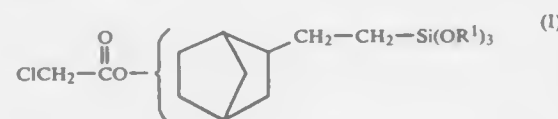
U.S. Cl. 524—474 10 Claims  
1. A thermoplastic polymer composition comprising:  
(a) a phenylene ether resin;  
(b) a preformed, two-phase high impact vinyl aromatic resin which includes a vinyl aromatic monomer and a rubber, at least some of said vinyl aromatic monomer being graft polymerized with said rubber; and  
(c) a preformed styrenic homopolymer having a number average molecular weight of about 65,000 to 120,000.

4,956,498  
COUPLING AGENTS FOR VULCANIZABLE MIXTURES  
OF UNSATURATED RUBBERS AND  
SILICON-CONTAINING FILLERS

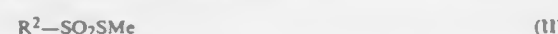
Dieter Zerpner, and Horst G. Haag, both of Marl, Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Jun. 28, 1989, Ser. No. 373,272  
Claims priority, application Fed. Rep. of Germany, Jun. 28, 1988, 3821670

Int. Cl.<sup>3</sup> C08K 3/34; C08C 19/00; C08F 20/44  
U.S. Cl. 524—492 6 Claims  
1. A vulcanizable mixture, comprising:  
(a) an unsaturated rubber;  
(b) an inorganic filler;  
(c) a coupling agent which is the reaction product of a 2(3)-chloroacetoxy-5-(2'-trialkoxysilyl)ethyl)norbornane of the formula:



wherein R<sup>1</sup> is methyl and/or ethyl, with a thiosulfonic acid salt of the formula:



wherein R<sup>2</sup> is a (cyclo)aliphatic or aromatic hydrocarbon radical having up to 20 carbon atoms, and Me is sodium or potassium; and  
(d) rubber processing additives.

4,956,499  
POLYARYLENE THIOETHER COMPOSITION FOR  
MOLDING

Makoto Fukuda; Siroo Suzuki; Toshio Hosokawa; Yo Iizuka; Yukichika Kawakami, and Zenya Shiiki, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo and Polyplastics Co., Ltd., Osaka, both of Japan

Filed Mar. 30, 1988, Ser. No. 175,250  
Claims priority, application Japan, Mar. 30, 1987, 62-77021  
Int. Cl.<sup>3</sup> C08L 81/02

U.S. Cl. 524—500 7 Claims  
1. A composition of polyarylene thioether for molding, having an improved anti-flash property, comprising (i) 100 parts by weight of the sum of components A and B, which is prepared by combining 0.2 to 90 parts by weight of component B with 100 parts by weight of component A, and (ii) 0 to 400 parts by weight of component C, component A being a resin comprising a polyarylene thioether which has a repeating unit of



as the main constituent, having a melt viscosity, measured at 310° C. under a shear rate of 5/second, of 10 to 5×10<sup>4</sup> poise; component B being a cross-linked polyarylene thioether having a melt viscosity, measured at 310° C. under a shear rate of 5/second, of 5×10<sup>3</sup> to 1×10<sup>9</sup> poise and becomes a gel when it is heated; component C being a fibrous filler, a non-fibrous inorganic filler or a mixture thereof.

4,956,500  
VULCANIZABLE RUBBER COMPOUND WITH  
IMPROVED TACKIFIER

Donn R. Vermillion, Newark, Ohio, assignor to Owens-Corning Fiberglass Corporation, Toledo, Ohio

Filed Sep. 6, 1988, Ser. No. 241,428  
Int. Cl.<sup>3</sup> C08L 7/00, 9/00, 9/06, 95/00

U.S. Cl. 525—54.5 16 Claims  
1. In a vulcanizable composition comprising a vulcanizable rubber and at least one rubber additive which is a tackifier and optionally including fillers, the tackifier being present in a minor but effective tack enhancing amount, the improvement wherein said tackifier is a preformed reaction product of a mixture consisting essentially of asphalt and a vulcanizable rubber, wherein said vulcanizable composition except for said reaction product is substantially free of asphalt.

4,956,501  
POLYESTERS HAVING IMPROVED IMPACT  
STRENGTH

Ronald H. Sunseri, and Michael W. O'Rourke, both of Baton Rouge, La., assignors to Copolymer Rubber & Chemical Corporation, Baton Rouge, La.

Division of Ser. No. 214,861, Jul. 1, 1988, which is a division of Ser. No. 105,455, Oct. 1, 1987, abandoned, which is a continuation of Ser. No. 800,333, Nov. 21, 1985, abandoned. This application Oct. 19, 1988, Ser. No. 259,805  
Int. Cl.<sup>3</sup> C08L 67/02

U.S. Cl. 525—64 16 Claims  
1. A method for producing a thermoplastic composition of a polyester resin matrix having improved unnotched izod impact strength at the knitline and improved notched izod impact strength comprising blending 60 to 90 parts by weight of the matrix resin with 40 to 10 parts by weight of a backbone rubber formed by interpolymerization of ethylene, a mono-olefin having from 3 to 16 carbon atoms and a polyene on which there is grafted an ester of methacrylic acid or acrylic acid having an epoxide functionality on the alkoxy portion of the ester, said ester being present in a range of about 1.5 to 20

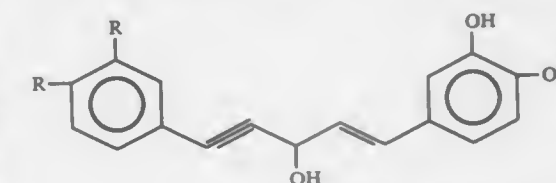
percent by weight based on the weight of the rubber to disperse the rubber in the matrix, and then reacting the dispersion with a cross-linking agent selected from the group consisting of a diamine and a diacid or its anhydride to provide a cross-linking limited primarily to the rubber phase.

4,956,502  
PROCESS FOR THE PREPARATION OF ROOPEROL  
DERIVATIVE

George L. Wenteler, Pretoria; Karl H. Regel, Durban; Siegfried Drews, Pietermaritzburg, and Hans Kuidig, Witpoort, all of South Africa, assignors to Rooperol (N.A.) NV, Bonaire, Netherlands Antilles

Continuation-in-part of Ser. No. 875,398, Jun. 17, 1986, abandoned. This application Jun. 13, 1989, Ser. No. 365,494  
Int. Cl.<sup>3</sup> C07C 39/205, 39/21, 33/28

U.S. Cl. 568—729 1 Claim  
1. A process for preparing a compound of the formula



in which both Rs are H or OH comprising the steps  
a. of treating the ethyl ester of caffeic acid with trialkylsilyl chloride at ambient conditions in equimolar proportions in the presence of imidazole;  
b. the reduction of the ester to the corresponding allylic alcohol with aluminium hydride reagent;  
c. of oxidizing the resulting product with manganese dioxide at ambient temperature and in excess molar proportion to yield the corresponding allylic aldehyde;  
d. of coupling the latter with the silyl ether of the relative phenyl acetylide; and  
e. of hydrolysis of this coupled product with alkylammonium fluoride at ambient conditions in equimolar proportions.

4,956,503  
PROCESS FOR THE PREPARATION OF  
N-CYANOETHANIMIDIC ACID ESTERS

Stefan Weiss; Helmut Krommer, and Karl-Heinz Neuhauser, all of Trostberg, Fed. Rep. of Germany, assignors to SKW Trostberg Aktiengesellschaft, Trostberg, Fed. Rep. of Germany  
Filed Apr. 18, 1989, Ser. No. 339,806

Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815084

Int. Cl.<sup>3</sup> C07C 261/04  
U.S. Cl. 564—106 13 Claims

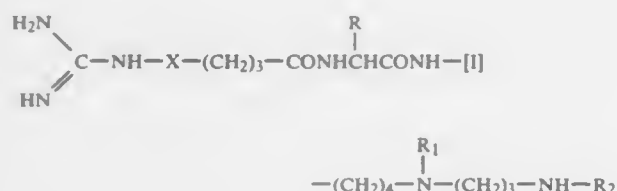
1. A process for the preparation of N-cyanoethanimidic acid esters consisting essentially of reacting orthoacetic acid esters with cyanamide in the presence of an acid catalyst and in an alcoholic reaction medium at a temperature up to about 90° C., said acid catalyst comprising one or more compounds which contain, or liberate in the reaction mixture, 10<sup>-6</sup> to 10<sup>-1</sup> mole of protons per mole of orthoacetic acid ester.



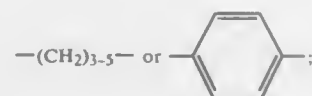
4,956,504  
SPERGUALIN-RELATED COMPOUNDS AND  
PROCESS FOR PRODUCING THE SAME  
Tomio Takeuchi, Tokyo; Tetsushi Saino, Yono, both of Japan;  
Masao Yoshida, Hastings-on-Hudson, N.Y.; Katsutoshi  
Takahashi, Tokyo; Teruya Nakamura, Kusatsu, both of Ja-  
pan, and Hamao Umezawa, deceased, late of Tokyo (by Mleko  
Umezawa, Kazuo Umezawa, Yoji Umezawa, administrators),  
assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai,  
Tokyo, Japan

Filed Apr. 1, 1987, Ser. No. 32,811  
Claims priority, application Japan, Apr. 4, 1986, 61-77747  
Int. Cl.<sup>5</sup> C07C 129/12

U.S. Cl. 564—153 10 Claims  
1. A spergualin-related compound represented by the formula [I]

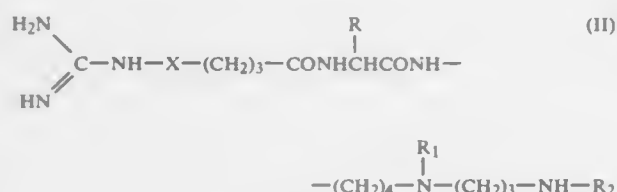


wherein X is

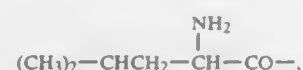
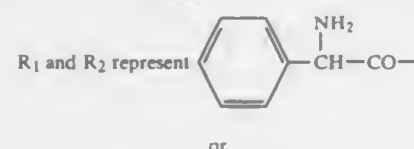
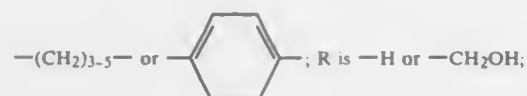


R is —H or —CH<sub>2</sub>OH; R<sub>1</sub> is —H, R<sub>2</sub> is a residue obtained by removing, from an amino acid or peptide, the hydroxyl group of the alpha-carboxyl group, or a pharmaceutically acceptable salt thereof.

5. A novel spergualin-related compound represented by the formula [II]



wherein X is



or a pharmaceutically acceptable salt thereof.

4,956,505  
PROCESS FOR THE PREPARATION OF  
4,4-DIMETHYL-1-(P-CHLOROPHENYL)PENTAN-3-ONE  
Franz-Josef Mais, Duesseldorf; Helmut Fiege, and Karl-Wil-  
helm Henneke, both of Leverkusen, all of Fed. Rep. of Ger-  
many, assignors to Bayer Aktiengesellschaft, Leverkusen,  
Fed. Rep. of Germany

Filed Jul. 5, 1989, Ser. No. 375,761  
Claims priority, application Fed. Rep. of Germany, Jul. 20,  
1988, 3824518

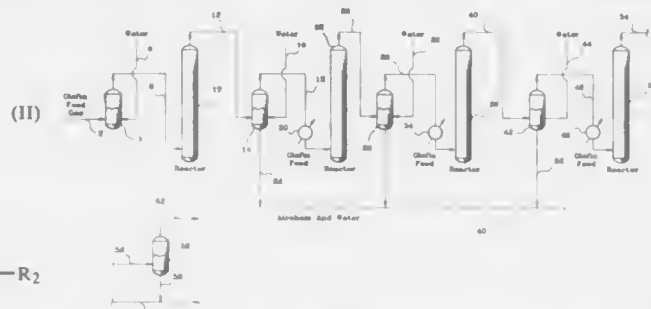
Int. Cl.<sup>5</sup> C07C 45/62 17 Claims  
U.S. Cl. 568—316

1. In a process for the preparation of 4,4-dimethyl-1-(p-chlorophenyl)pentan-3-one by condensation of pinacolone and p-chlorobenzaldehyde in an alcohol as solvent in the presence of an inorganic base and subsequent hydrogenation the improvement comprising

- (a) hydrogenating the reaction mixture obtained in the condensation directly without isolation of the intermediate 4,4-dimethyl-1-(p-chlorophenyl)-1-pentan-3-one said hydrogenation being conducted in the presence of a Raney Nickel to which compounds of divalent sulphur are added hydrogenation catalyst at a temperature of about 50–130° C. and superatmospheric pressure to give 4,4-dimethyl-1-1-(p-chlorophenyl) pentan-3-one,
- (b) separating the hydrogenation catalyst off from the liquid hydrogenation mixture, largely distilling off the alcohol, and adjusting the water content of the bottom product of the distillation in such a manner that the distillation mixture separates into an aqueous and an organic phase and
- (c) recovering 4,4-dimethyl-1-(p-chlorophenyl)pentan-3-one from the organic phase.

4,956,506  
VAPOR-PHASE HYDRATION OF OLEFINS TO  
ALCOHOLS IN SERIES REACTORS WITH  
INTERMEDIATE ALCOHOL REMOVAL  
Edward G. Latimer, Ponca City, Okla., assignor to Conoco Inc.,  
Ponca City, Okla.

Filed Dec. 21, 1989, Ser. No. 454,796  
Int. Cl.<sup>5</sup> C07C 29/04, 31/08, 31/10 19 Claims  
U.S. Cl. 568—899



1. A process for converting olefins to alcohols which comprises the steps of:

- (a) contacting a feed gas containing an olefin selected from the group consisting of ethylene, propylene, butylene, or pentylene and mixtures thereof with a perfluorinated ion-exchange polymer catalyst under vapor phase reaction conditions in a first reaction zone, wherein from about 1 to about 20 weight percent of said olefins are converted to alcohols;
- (b) contacting effluent gases from the first reaction zone with water whereby alcohols are extracted from said gases in water solution;
- (c) contacting the extracted effluent gases from the first reaction zone with additional perfluorinated ion-exchange catalyst under vapor phase reaction conditions in a second reaction zone connected in series with the first reaction zone whereby from about 1 to about 20 weight percent of

- said olefins in the extracted effluent gases are converted to alcohols;
- (d) contacting effluent gases from the second reaction zone with water whereby alcohols are extracted from said gases in water solution;
- (e) contacting the extracted effluent gases from the second reaction zone with additional perfluorinated ion-exchange catalyst under vapor phase reaction conditions in a third reaction zone connected in series with the first and second reaction zones whereby from about 1 to about 20 weight percent of said olefins in the extracted effluent gases are converted to alcohols;
- (f) contacting effluent gases from the third reaction zone with water whereby alcohols are extracted from said gases in water solution; and
- (g) recovering the alcohol products from each reaction zone.



wherein R is methyl.

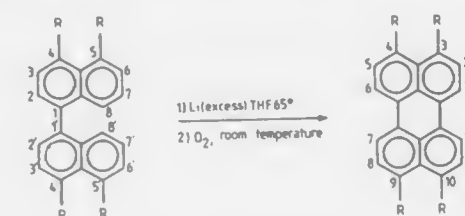
4,956,507  
PROCESS FOR PREPARING 4,4'-DIFLUOROBIPHENYL  
Michael S. Matson, Bartlesville, Okla., and Raymond L. Cobb,  
Mareta, Ohio, assignors to Phillips Petroleum Company,  
Bartlesville, Okla.

Filed Nov. 3, 1989, Ser. No. 431,244  
Int. Cl.<sup>5</sup> C07C 17/26, 25/18 15 Claims  
U.S. Cl. 570—140

1. An improved process for preparing 4,4'-difluorobiphenyl comprising the steps of:
- reacting p-halofluorobenzene with magnesium in a solvent to form a halomagnesiumfluorobenzene Grignard reagent; and then
- reacting said Grignard reagent with additional p-halofluorobenzene in said solution in the presence of a palladium chloride triphenyl-phosphine catalyst for a time period sufficient to form a high yield of said 4,4'-di-fluorobiphenyl.

4,956,508  
PROCESS FOR PREPARING POLYALKYL PERYLENES,  
PERYLENES OBTAINED BY THIS PROCESS, AND  
ORGANIC MATERIALS WITH ESR PROPERTIES  
DERIVED FROM THE SAME  
Philippe Michel; Alexandre Moradpour, both of Paris, and Paul  
Peuvrel, Orsay, all of France, assignors to Thomson-CSF,  
Paris, France

Filed Feb. 8, 1989, Ser. No. 307,550  
Claims priority, application France, Feb. 12, 1988, 88 01682  
Int. Cl.<sup>5</sup> C07C 13/465 1 Claim  
U.S. Cl. 585—26



1. A polyalkyl perylene compound which has the formula:

4,956,509  
INTEGRATED PARAFFIN UPGRADING AND  
CATALYTIC CRACKING PROCESSES  
Mohsen N. Harandi, Lawrenceville, and Hartley Owen, Belle  
Mead, both of N.J., assignors to Mobil Oil Corp., New York,  
N.Y.

Filed Oct. 16, 1989, Ser. No. 422,368  
Int. Cl.<sup>5</sup> C10G 35/06 28 Claims  
U.S. Cl. 585—300

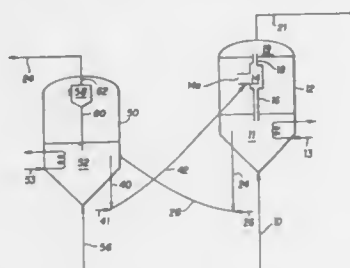
1. A process for endothermically upgrading a paraffinic feedstream comprising the steps of:
- (a) mixing a hydrocarbon feed with a regenerated cracking catalyst in a fluidized bed catalytic cracking reaction zone under cracking conditions sufficient to convert at least a portion of said hydrocarbon feed to product containing gasoline and distillate boiling range hydrocarbons whereby said regenerated cracking catalyst is at least partially coked and deactivated;
- (b) withdrawing a portion of said at least partially coked and deactivated cracking catalyst from said catalytic cracking reaction zone;
- (c) contacting said at least partially coked and deactivated cracking catalyst with an oxygen-containing regeneration gas in a fluid bed oxidative regeneration zone maintained at superatmospheric pressure, whereby coke is oxidatively removed from said cracking catalyst and a hot flue gas is generated;
- (d) contacting a C<sub>2</sub>–C<sub>10</sub> paraffinic feedstream with a second catalyst in a catalytic paraffin upgrading reaction zone under conversion conditions to produce a reaction zone effluent stream; and
- (e) maintaining pressure within said fluid bed oxidative regeneration zone by withdrawing hot flue gas from said oxidative regeneration zone and flowing said withdrawn hot flue gas through a heat exchange conduit positioned within said catalytic paraffin upgrading reaction zone to heat said catalytic paraffin upgrading reaction zone and to cool said flue gas.

4,956,510  
HYDROCARBON UPGRADING PROCESS AND  
REACTION SECTION DESIGN WITH REGENERATED  
CATALYST QUENCH  
Mohsen N. Harandi, Lawrenceville, N.J., assignor to Mobil Oil  
Corp., New York, N.Y.

Filed Mar. 14, 1989, Ser. No. 322,956  
Int. Cl.<sup>5</sup> C07C 12/02, 5/333; C10G 35/095 25 Claims  
U.S. Cl. 585—415

1. A process for converting an aliphatic feedstream comprising the steps of:
- (a) maintaining a catalyst in a reaction zone;
- (b) contacting said aliphatic feedstream with said catalyst under conversion conditions evolving a product stream and at least partially deactivating said catalyst;
- (c) separating said product stream from said catalyst;

- (d) withdrawing a portion of said at least partially deactivated catalyst from said catalyst bed;
- (e) regenerating said withdrawn portion of at least partially deactivated catalyst of step (b), above, at a temperature below that maintained in said reaction zone of step (a), above; and



- (f) quenching said product stream by directly contacting said product stream with regenerated catalyst to lower the temperature of said product stream sufficiently to avoid substantial thermal cracking of said product stream to light C<sub>2</sub>-hydrocarbons.

4,956,511

**TOLUENE DISPROPORTIONATION PROCESS**  
James R. Butler, Houston, and J. Randall Curtis, Webster, both of Tex., assignors to Fina Technology, Inc., Dallas, Tex.

Filed Jan. 4, 1989, Ser. No. 293,374

Int. Cl.<sup>3</sup> C10C 3/62

U.S. Cl. 585—475

30 Claims

1. In a method for the disproportionation of a toluene feedstock to produce a disproportionation product containing benzene and xylene, the steps comprising:

- (a) initiating a startup procedure comprising:

- (1) establishing a catalyst reaction zone by loading into said reaction zone a mordenite disproportionation catalyst modified by the inclusion of nickel into said catalyst;
- (2) establishing a hydrogen environment in said reaction zone while said reaction zone is at ambient temperature;
- (3) progressively heating said reaction zone while maintaining said reaction zone under a hydrogen environment until an intermediate temperature within the range of 250–500° F. is reached;
- (4) thereafter supplying said toluene feedstock and hydrogen to said reaction zone;
- (5) further continuing the heating of said reaction zone from said intermediate temperature to a higher initial toluene disproportionation temperature of at least 600° F.;

- (b) thereafter continuing to supply hydrogen and said hydrogen and toluene containing feedstock to said reaction zone to carry out the disproportionation of toluene to a disproportionation product containing benzene and xylene in the presence of said catalyst;

- (c) withdrawing said disproportionation product from said reaction zone.

4,956,512

**PROCEDURE FOR PRODUCING POLY-ALPHA-OLEFINE-TYPE LUBRICANTS**  
Fredrik Nisafolk, Porvoo; Salmi Koskimies, Helsinki; Peter Idelman, Vantaa; Matti Nurminen, and Salla Roni, both of Porvoo, all of Finland, assignors to Neste Oy, Finland

Filed Nov. 14, 1988, Ser. No. 271,022

Claims priority, application Finland, Nov. 12, 1987, 874999

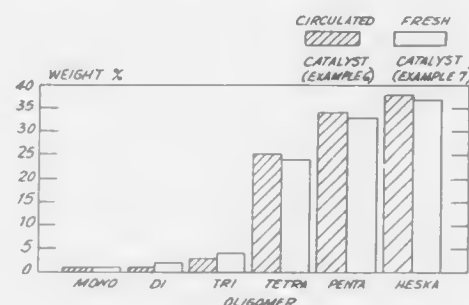
Int. Cl.<sup>3</sup> C07C 2/02

U.S. Cl. 585—521

10 Claims

1. Method for the production of poly-alpha-olefine containing lubricants, which comprises subjecting at least one olefine

in the presence of a BF<sub>3</sub> cocatalyst complex to oligomerization, thus forming a reaction product comprising a poly-alpha-olefine oligomer and said BF<sub>3</sub> cocatalyst complex, wherein said cocatalyst is either a C<sub>1</sub>–C<sub>15</sub> alcohol or a C<sub>1</sub>–C<sub>7</sub> carboxylic acid,



subjecting the thus formed reaction product to distillation, thereby separating said BF<sub>3</sub> cocatalyst complex from said oligomer, and conducting the thus separated BF<sub>3</sub> cocatalyst complex to a new oligomerization reaction, whereby said complex acts as catalyst for such oligomerization reaction.

4,956,513

**RECOVERY OF BF<sub>3</sub> FROM OLEFIN OLIGOMER PROCESS**

Howard W. Walker, and Ronny W. Lin, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Oct. 17, 1988, Ser. No. 258,387

Int. Cl.<sup>3</sup> C07C 2/08

U.S. Cl. 585—525

22 Claims

1. A process for recovering BF<sub>3</sub> from an α-olefin oligomerization procedure, said procedure being conducted by oligomerizing an α-olefin in the presence of BF<sub>3</sub> and at least one promoter for BF<sub>3</sub> which promoter is water, a water insoluble promoter, or a water soluble promoter wherein said water soluble promoter has a boiling point below the boiling point of BF<sub>3</sub>·2H<sub>2</sub>O, or which forms an azeotrope with water having a boiling point below the boiling point of BF<sub>3</sub>·2H<sub>2</sub>O, said process comprising:

- (A) water washing the oligomerization mixture after completing the oligomerization procedure to extract BF<sub>3</sub> as a BF<sub>3</sub> hydrate together with any water soluble promoter used in the procedure and
- (B) distilling water and water soluble promoter, if any, from the resultant wash water at a temperature below that at which substantial hydrolysis of the BF<sub>3</sub> occurs, leaving as a residue a concentrated aqueous BF<sub>3</sub> hydrate solution.

4,956,514

**PROCESS FOR CONVERTING OLEFINS TO HIGHER HYDROCARBONS**

Cynthia T-W. Chu, Princeton Junction, N.J., assignor to Mobil Oil Corp., New York, N.Y.

Continuation-in-part of Ser. No. 254,524, Oct. 6, 1988, which is a continuation-in-part of Ser. No. 98,176, Sep. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 890,268, Jul. 29, 1986, abandoned. This application Jan. 8, 1990, Ser. No. 461,896

Int. Cl.<sup>3</sup> C07C 2/12

U.S. Cl. 585—533

20 Claims

1. A process for converting olefin to higher molecular weight hydrocarbon product which comprises contacting a feedstock containing at least one oligomerizable olefin with an olefin oligomerization catalyst composition under olefin oligomerization conditions to provide said higher molecular weight hydrocarbon product, said olefin oligomerization catalyst

comprising a synthetic porous crystalline material characterized by an X-ray diffraction pattern including values substantially as set forth in Table I of the specification.

4,956,515

**DEHYDROGENATION PROCESS AND CATALYST**  
John H. Kolts, Ochelata, and Gary A. Delzer, Bartlesville, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 5, 1988, Ser. No. 279,608

Int. Cl.<sup>3</sup> C07C 4/02

U.S. Cl. 585—651

17 Claims

1. A process for converting hydrocarbons to less saturated hydrocarbons which comprises the step of contacting a feed comprising at least one hydrocarbon selected from the group consisting of propane, n-butane and isobutane with a solid catalyst composition consisting essentially of zinc oxide and manganese oxide, at a temperature of about 620° to about 700° C., under such contacting conditions as to convert at least a portion of said at least one hydrocarbon contained in said feed to at least one less saturated hydrocarbon containing fewer carbon atoms per molecule than said at least one hydrocarbon contained in said feed.

4,956,516

**DISPROPORTIONATION OF OLEFINS**

David M. Hamilton, Jr., and Richard A. Kemp, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed May 20, 1988, Ser. No. 196,576

The portion of the term of this patent subsequent to Jun. 28, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> C07C 6/00

U.S. Cl. 585—646

52 Claims

1. A process for the disproportionation of olefinic hydrocarbons having carbon numbers ranging from C<sub>2</sub> to about C<sub>100</sub> which comprises contacting said olefinic hydrocarbons at disproportionation conditions with a catalyst prepared by a process which comprises:

- (a) preparing an alumina hydrogel having a sufficient water content to provide a hydrogel which is thixotropic,
- (b) mixing said alumina hydrogel with cobalt, a heavy metal selected from the group consisting of molybdenum, tungsten and mixtures thereof, and a phosphorus-containing compound in an amount of from about 0.17 to about 7.1 moles of phosphorus per mole of heavy metal at a pH in the range between about 4.0 and about 10.0 and a temperature in the range between about 25° C. and about 100° C. until adsorption of the cobalt, heavy metal and phosphorus-containing compound onto the gel is sufficient to yield a final catalyst having from about 0.1% by weight to about 5% by weight cobalt from about 5% by weight to about 32% by weight heavy metal, and from about 1% by weight to about 6% by weight phosphorus,
- (c) extruding the product of step (b), and
- (d) calcining the product of step (c) at a temperature of at least about 700° C.

4,956,517

**DEHYDROGENATION PROCESS UTILIZING A PILLARED LAYERED SILICATE PLUS A BASE METAL OR NOBLE METAL**

Ivy D. Johnson, Medford; Poehen Chu, Voorhees, both of N.J., and Charles T. Kreage, West Chester, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 29, 1989, Ser. No. 459,215

Int. Cl.<sup>3</sup> C07C 5/333

U.S. Cl. 585—660

6 Claims

1. A process for producing unsaturated hydrocarbons which comprises contacting a feed containing saturated C<sub>2</sub> to C<sub>3</sub> hydrocarbons with a catalyst at a pressure of about atmospheric to 1000 psig, a weight hourly space velocity of about 0.05 to 300 and a temperature of about 204° to 675° C., wherein

said catalyst comprises a layered silicate and pillars of an oxide of at least one element selected from Groups IB, IIB, IIIA, IIIB, IVA, IVB, VA, VB, VIA, VIIA and VIIIA of the Periodic Table of Elements separating the layers of the silicate, said catalyst comprising at least one element selected from the group consisting of Cr, Mo, W, Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, and Pt.

4,956,518

**HETEROGENEOUS ISOPARAFFIN/OLEFIN ALKYLATION**

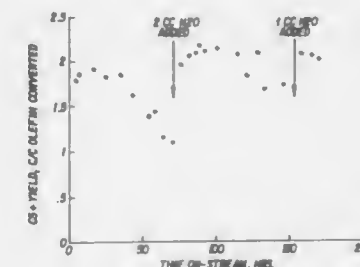
Jonathan E. Child, Sewell; Tai-Sheng Chou, Pennington, both of N.J.; Albin Huss, Jr., Chadds Ford; Clinton R. Kennedy, West Chester, both of Pa.; Francis P. Ragonese, Cherry Hill, and Samuel A. Tabak, Wenonah, both of N.J., assignors to Mobil Oil Corp., New York, N.Y.

Continuation-in-part of Ser. No. 219,129, Jul. 15, 1988, abandoned. This application Jul. 11, 1989, Ser. No. 377,993

Int. Cl.<sup>3</sup> C07C 2/58

U.S. Cl. 585—726

19 Claims



1. A continuous alkylation process for producing high octane gasoline comprising effecting reaction of an isoparaffin containing from 4 to 20 carbon atoms with an olefin containing from 2 to 12 carbon atoms at from about -40° to about 500° C. and at a pressure in the range of subatmospheric to about 5000 psig using a hydrocarbon feed wherein a molar ratio of the isoparaffin to the olefin in the hydrocarbon feed is from about 0.5:1 to about 200:1 in contact with a composite catalyst comprising a Lewis acid with a non-zeolitic solid inorganic oxide in the presence of water wherein a molar ratio of the water to said Lewis acid is less than about 1:1.

4,956,519

**CATALYST FOR HYDROCARBON CONVERSION AND CONVERSION PROCESS UTILIZING THE SAME**

Elmer J. Hollstein, Wilmington, Del.; James T. Wei, Ridge-wood, N.J., and Chao-Yang Hsu, Media, Pa., assignors to Sun Refining and Marketing Company, Philadelphia, Pa.

Division of Ser. No. 247,225, Sep. 21, 1988, Pat. No. 4,918,041. This application Nov. 13, 1989, Ser. No. 434,743

Int. Cl.<sup>3</sup> C07C 5/13

U.S. Cl. 585—751

3 Claims

1. Method of isomerizing a feedstock comprising acyclic hydrocarbons having 4 to 7 carbon atoms per molecule which comprises contacting said feedstock at a temperature in the range from 0 to 400° C., and a pressure in the range from 1 to 50 atmospheres with a solid mixture of (1) oxide or hydroxide of element from a first class consisting of Group III or Group IV elements, (2) oxide or hydroxide of metal from a second class consisting of Group V, Group VI or Group VII metals, and (3) oxide or hydroxide of Group VIII metals, the ratio of metal from said second class to Group VIII metal being in the range from 0.1:1 to 2.0:1.



4,956,520

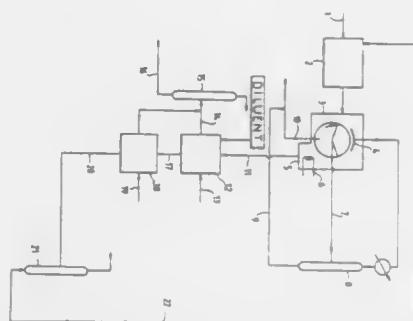
## SEPARATION PROCESS

David S. Flett, Middlesbrough, and John E. Lloyd, Darlington, both of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Oct. 9, 1987, Ser. No. 106,368  
Claims priority, application United Kingdom, Oct. 9, 1986, 8624266

U.S. Cl. 585—815 Int. Cl.<sup>5</sup> C07C 7/14

11 Claims



1. A process for the separation of a crystallisable component from a solution thereof which comprises crystallising at least part of the component by chilling the solution to give a mixture of crystals and liquid, separating crystals of the component in a first separator while simultaneously washing said crystals with a first wash liquid, melting said crystals to produce a second solution of the component, chilling said solution to produce a second mixture of crystals of the component and liquid, separating crystals of the component in a second separator and washing the crystals thus obtained with a second wash liquid.

4,956,521

## ADSORPTION AND ISOMERIZATION OF NORMAL AND MONO-METHYL PARAFFINS

Warren K. Volles, Mount Kisco, N.Y., assignor to UOP, Des Plaines, Ill.

Filed Oct. 6, 1988, Ser. No. 254,156  
Int. Cl.<sup>5</sup> C07C 7/13, 7/135

U.S. Cl. 585—826

26 Claims

1. A process for separating isopentane and di-methyl

branched hexane paraffins from a hydrocarbon feed containing isopentane, mono-methyl branched hexane paraffins, and di-methyl branched hexane paraffins, which comprises the steps of:

- passing said hydrocarbon feed through an adsorber bed containing a microporous molecular sieve adsorbent having pores of an elliptical cross-section with pore dimensions between about 5.0 and 5.5 along the minor axis and between about 5.5 and 6.0 along the major axis, wherein mono-methyl branched hexane paraffins and isopentane are adsorbed and isopentane is preferentially desorbed during continued adsorption to provide a mass transfer zone having isopentane concentrated at the leading edge thereof;
- removing an essentially non-adsorbed fraction comprising di-methyl branched hexane paraffins from said adsorber bed as a portion of an adsorption effluent;
- eluting at least a portion of the mass transfer zone which comprises isopentane from said adsorber bed as another portion of the adsorption effluent; and
- desorbing mono-methyl branched hexane paraffins from said adsorber bed to regenerate the adsorber bed and produce a desorption effluent comprising mono-methyl branched hexane paraffins.

4,956,522

## ZEOLITIC PARA-ETHYLTOLUENE SEPARATION WITH TETRALIN HEAVY DESORBENT

Hermann A. Zinnen, Evanston, Ill., assignor to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 197,787, May 23, 1988, Pat. No. 4,886,930. This application Nov. 20, 1989, Ser. No. 439,058  
Int. Cl.<sup>5</sup> C07C 7/12

U.S. Cl. 585—828

6 Claims

1. A process for separating p-ethyltoluene from a mixture comprising p-ethyltoluene and at least one other component selected from C<sub>8</sub> aromatic hydrocarbons and other C<sub>9</sub> aromatic hydrocarbons, which process comprises contacting said mixture with a type Y zeolite adsorbent containing potassium ions at exchangeable cationic sites at adsorption conditions to effect the selective adsorption of said p-ethyltoluene by said adsorbent and to produce a raffinate stream comprising the less strongly adsorbed C<sub>9</sub> hydrocarbons and said C<sub>9</sub> aromatic hydrocarbons and contacting said adsorbent with a desorbent comprising 1,2,3,4-tetrahydronaphthalene or a lower alkyl derivative thereof or an alkyl derivative of naphthalene at desorption conditions to effect the removal of p-ethyltoluene from said adsorbent as an extract stream.

4,956,523

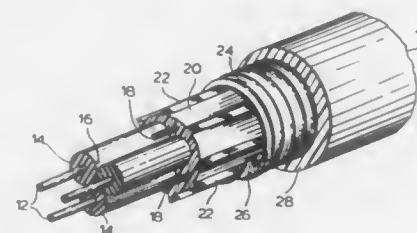
## ARMoured ELECTRIC CABLE WITH INTEGRAL TENSILE MEMBERS

Robert R. Pawluk, Scarborough, Canada, assignor to United Wire & Cable (Canada) Inc., Toronto, Canada and UMR-Lakton Inc., Ontario, Canada

Filed May 26, 1989, Ser. No. 356,762  
Claims priority, application Canada, May 5, 1989, 598834  
Int. Cl.<sup>5</sup> H01B 7/24

U.S. Cl. 174—107

8 Claims



1. An electric cable comprising:
  - (a) a plurality of separate current carrying insulated conductors,
  - (b) an inner jacket which is pressure extruded around the insulated conductors to securely grip the insulated conductors, the inner jacket having outwardly extending projections which are deformable under pressure,
  - (c) at least one longitudinally extending tensile member integrally embedded in the extruded inner jacket,
  - (d) a protective armor metallic cover around the inner jacket which deforms at least a portion of the deformable projections of the extruded inner jacket, whereby the armor cover securely grips the extruded inner jacket and the extruded inner jacket securely grips each of the insulated conductors and the said at least one tensile member, and
  - (e) a protective outer jacket which is pressure extruded around the armor cover to securely grip the armor cover.

4,956,524

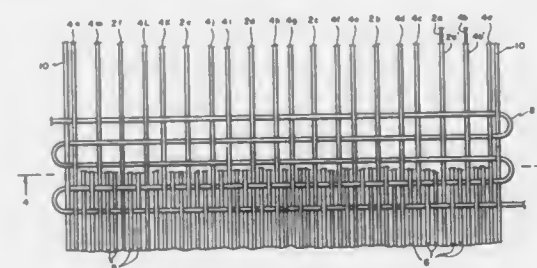
## WOVEN ELECTRICAL TRANSMISSION CABLE

Edward E. Karkow, Glen Arm, Md., assignor to GSI Corporation, Timonium, Md.

Filed May 2, 1989, Ser. No. 346,586  
Int. Cl.<sup>5</sup> H01B 7/08

U.S. Cl. 174—117 M

14 Claims



1. A woven electrical transmission cable having controlled impedance comprising:
  - a plurality of longitudinal conductor wires arranged in a substantially side by side relationship for transmitting signals;
  - a plurality of longitudinal ground wires coextending in a substantially parallel relationship with said conductor wires and separating said conductor wires;
  - insulating fiber strands interwoven with said conductor wires and said ground wires to define a woven pattern;
  - said woven pattern including said insulating fiber strands

woven in the warp and filling directions and said conductor wires and said ground wires woven in said woven pattern to have an undulating shape with the same number of undulations in said conductor wires as in said ground wires so that said conductor wires and associated said ground wires define essentially the same path and the lengths of the conductor wires and ground wires are equal; and

a selvage on each side of said cable.

4,956,525

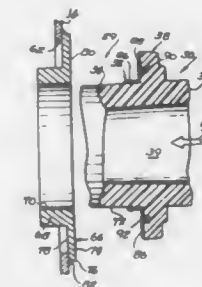
## ELECTRICAL INSULATING BUSHING ASSEMBLY, KIT FOR PROVIDING SAME, AND METHOD OF INSTALLING SAME

Robert J. Wilk, Oak Forest, Ill., assignor to G & W Electric Company, Blue Island, Ill.

Filed Jan. 5, 1989, Ser. No. 361,416  
Int. Cl.<sup>5</sup> H01B 17/26

U.S. Cl. 174—152 R

36 Claims



1. A method of installing an electrical insulating bushing in an electrical device having at least one outer metallic wall defining a bushing-receiving aperture, comprising the steps of:
  - providing a bushing having a body with opposed ends and electrical terminals at each end;
  - providing an external flange of electrical insulating material outwardly extending from said bushing body and located intermediate the ends thereof;
  - providing a metallic interface collar with a mating face for engaging said bushing external flange and an internal wall defining an aperture for telescopically receiving a portion of the bushing;
  - welding said interface collar to said device wall;
  - providing an annular gasket;
  - coating adhesive on at least one of said bushing and said interface collar;
  - inserting said gasket between said bushing flange and said interface collar;
  - inserting one end of said bushing through said interface collar;
  - pressing said bushing flange against said interface collar to compress said gasket therebetween to join said bushing and said interface collars together and to form a fluid-tight seal therebetween; and
  - allowing said adhesive to cure so as to maintain the joint and the fluid-tight seal between said bushing flange and said interface collar.

15. A housing assembly for an electrical component comprising:

- a closure for at least partly enclosing an electrical component immersed in a dielectric fluid and said closure having an external metallic wall defining an aperture through which an electrical insulating bushing can be inserted;
- an electrical-insulating bushing having a body with opposed ends, one of which is disposed within said closure and electrical terminals at each end;
- a metallic interface collar having an internal wall defining a central bushing-receiving passageway, a mating face and

an opposed closure-engaging face, said collar welded to said closure metallic wall;  
 a flange of insulating material outwardly extending from the bushing and pressed against said interface collar;  
 a resilient gasket between said bushing flange and said interface collar;  
 a first portion of said bushing extending through said interface collar and said metallic wall; and  
 said bushing flange and said interface collar being adhesively joined together so as to maintain a compression of said gasket between said bushing flange and said interface collar mating face and so as to form a fluid-tight seal therebetween.

32. A kit for providing an electrical-insulating bushing in an aperture of an external metallic wall of a fluid-containing enclosure of an electrical component immersed in a dielectric fluid, comprising:

- a metallic interface collar for welding to portions of the outer metallic wall of the enclosure surrounding said aperture and having an internal bushing-receiving passageway with internal threads;
- a bushing having an insulating body with opposed ends, electrically-conducting terminals at each end, an outwardly extending flange with a mating face intermediate the ends, a gasket-receiving recess in said flange extending from the mating face thereof, and external threads formed on an outside surface of said bushing intermediate the ends thereof and adjacent the flange thereof;
- a resilient gasket dimensioned to be at least partially received in said flange recess; and
- an adhesive for joining the bushing flange and the interface collar together after welding of said collar to the enclosure wall, so as to form a fluid-tight seal therebetween.

#### 4,956,526 DIGITIZER HAVING FLAT TABLET WITH MAGNETIC SHIELD PLATE

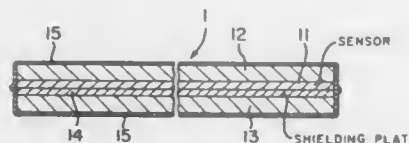
Azuma Murakami, and Yasuhiro Fukuzaki, both of Kitakatsukagawa, Japan, assignors to Kabushiki Kaisha Wacom and NKK Corporation, both of Japan

Filed Jul. 18, 1989, Ser. No. 381,757

Int. Cl.<sup>5</sup> G08C 21/00

U.S. Cl. 178—18

14 Claims



1. A digitizer for determining a coordinate value of a point designated on a given two-dimensional coordinate plane, comprising: a pointing instrument manually operable to designate a point on the given two-dimensional coordinate plane; a tablet including a flat sensor defining the given two-dimensional coordinate plane and operative for transmitting a magnetic signal between the flat sensor and the pointing instrument disposed thereon for detecting the designated point to thereby produce a detection signal, and a shielding plate disposed under the flat sensor for magnetically shielding the flat sensor, the shielding plate being composed of silicon steel containing 4.0 to 7.0 weight % of silicon; and a processing circuit connected to the flat sensor for processing the detection signal to determine the coordinate value of the designated point.

#### 4,956,527 ELECTROMECHANICAL TIMER WITH IMPROVED BLADE RETENTION

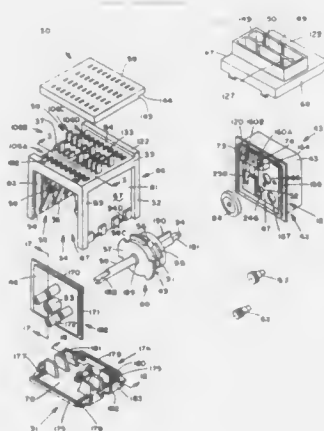
Ronald E. Cole, Greenwood, Ind., assignor to Emhart Industries, Inc., Towson, Md.

Filed Mar. 29, 1989, Ser. No. 330,157

Int. Cl.<sup>5</sup> H01H 43/10, 1/00, 9/08

U.S. Cl. 200—38 R

14 Claims



1. A timer comprising
  - a housing;
  - a plurality of slots passing through said housing in a first direction;
  - a motor-driven cam supported on said housing;
  - at least one electrical switch supported on said housing, said switch being responsive to said cam;
  - a plurality of electrical terminals supported on said housing, at least one of said terminals being connected to said motor and at least one of said terminals being connected to said switch, each of said terminals comprising a blade;
  - stop means for engaging said housing to prevent motion of said blade in one direction through said slot; and
  - first ramp means for engaging said housing at a point along said ramp to prevent motion of said blade in the direction opposite to said one direction.

#### 4,956,528 PUSHBUTTON SWITCH

Alain Janniere, Paris, and Bernard Juret, Dole, both of France, assignors to IIT Composants et Instruments, Bagnuex, France

Filed Mar. 30, 1989, Ser. No. 331,567

Claims priority, application France, Apr. 6, 1988, 88 04549

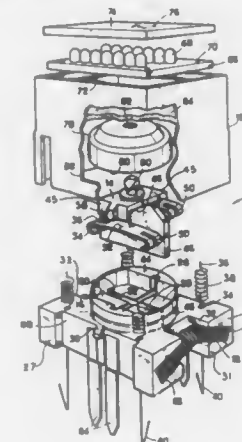
Int. Cl.<sup>5</sup> H01H 13/14

U.S. Cl. 200—314

9 Claims

1. An electrical contact switch adapted to be mounted on a printed circuit board comprising:
  - a base having electrical contacts;
  - a cover over said base movable in a predetermined direction with respect to said base and including illumination means; electrical connection means for carrying current to said illumination means;
  - at least one arched resilient element arranged substantially transversely to said predetermined direction seated in said base, said resilient element cooperating with said movable cover to resiliently resist movement of said cover in said predetermined direction;
  - a shoe coupled to said cover and lying between said base and said cover;
  - said shoe having electrical contacts positioned opposite said base contacts to engage said base contacts upon movement of said cover in said predetermined direction;

guide means for guiding and limiting movement of said shoe relative to said base in said predetermined direction, said



guide means including a groove in said base and a rib extending downwardly from said shoe and being slideable in said groove.

#### 4,956,529 COMPACT SWITCH DEVICE

Hiroshi Ueno, Aichi, Japan, assignor to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

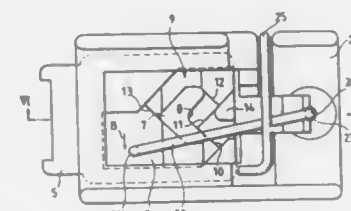
Filed Jan. 25, 1989, Ser. No. 301,303

Claims priority, application Japan, Feb. 8, 1988, 63-15296[U]

Int. Cl.<sup>5</sup> H01H 3/42

U.S. Cl. 200—524

4 Claims



1. A compact switch device comprising:
  - a casing having an interior, a first open end, and a second end;
  - an operating member depressibly mounted on the casing for movement within the interior of the casing between a first position and a second position;
  - a return spring cooperating with the operating member to bias the operating member in the first position;
  - a cam means mounted on the casing, the cam means having a cam groove with a closed loop configuration, a retaining portion generally V-shape and a convex guide portion spaced a distance from and opposite to the retaining portion;
  - a lock pin having first and second ends, the second end being pivotally mounted in the operating member, the first end being received in the cam groove for guided movement responsive to depression of the operating member, the first end being fixedly engageable in the retaining portion to secure the operating member in the second position, and the first end being displaceably guided by the convex guide portion toward the retaining portion, the lock pin including a wire bent in a generally U-shape and including a straight portion intermediate the first and second ends, the lock pin being angularly movable about the second end thereof to permit the first end of the lock pin to ride along the cam groove;
  - a holder spring for biasing the first end of the lock pin to ride

in the cam groove and to move the first end of the lock pin toward the retaining portion when the first end of the lock pin is situated between the retaining portion and the convex guide portion, the holder spring including a wire formed of a generally U-shape defined by two legs and one of the two legs of the holder spring being resiliently held against the straight portion of the lock pin; and a switching means mounted on the casing to be opened and closed selectively in response to the depressible movement of the operating member.

#### 4,956,530 METHOD OF OPERATION AND DEVICE FOR EVEN HEATING BY MEANS OF MICROWAVES

Klaus Koch, Laatzen, Fed. Rep. of Germany, assignor to Hermann Berstorff Maschinenbau GmbH, Hanover, Fed. Rep. of Germany

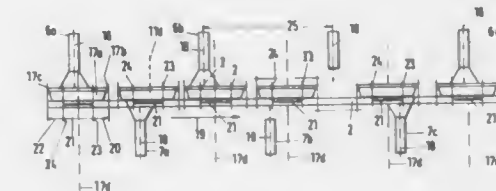
Filed Sep. 8, 1989, Ser. No. 404,644

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1988, 3830867

Int. Cl.<sup>5</sup> H05B 6/68, 6/78

U.S. Cl. 219—10.55 B

10 Claims



1. A method for the even heating of food products in containers, the containers traveling longitudinally on a continuous conveyor through a microwave treatment chamber, the heating being effected by longitudinally spaced microwave input channels positioned above and/or below said conveyor and extending into said treatment chamber, said channels having axial aperture centers and being operatively connected to microwave generators, comprising the steps of:
  - (a) registering before or during initial entry into the treatment chamber at least the beginning and end of each container positioned on said conveyor, without regard to the spacing between said containers, and transmitting such position information to a computer;
  - (b) switching on each microwave generator when a predetermined switch-on point of said container passes the axial aperture center of the associated input channel;
  - (c) switching off each microwave generator when a predetermined switch-off point of said container passes said axial aperture center of said associated input channel, and
  - (d) determining said switch-on and switch-off points based on the container length, the product to be heated, and the position of the axial aperture center, all of which are set or preset in the computer.

#### 4,956,531 MICROWAVE OVEN WITH ADAPTABLE POWER MODULE

Eckart Braunnisch, Kimstad, and Jan Önnegren, Norrköping, both of Sweden, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 27, 1989, Ser. No. 372,572

Claims priority, application Sweden, Jul. 6, 1988, 8802528

Int. Cl.<sup>5</sup> H05B 6/64

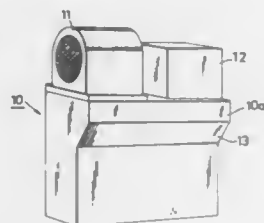
U.S. Cl. 219—10.55 B

16 Claims

1. A microwave oven comprising an oven cavity, a microwave source having an antenna projecting therefrom for feeding HF power into the oven cavity, a power supply device for the supply of power to the microwave source, a fan for cooling components of the power supply device and the microwave



source; the power supply device, the microwave source and the fan being combined into a power module unit comprising a substantially closed envelope containing at least some of said components of the power supply device and having an air inlet, an air outlet and an input for AC supply voltage, the envelope having an air channel between the air inlet and the air



outlet for passage of a forced cooling air stream produced by means of the fan, the components to be cooled being arranged in the path of the cooling air stream, the microwave source being mounted as a projecting part of the envelope at the air inlet or air outlet of the envelope and with the antenna projecting from the microwave source, said fan also being mounted as a projecting part of the envelope.

4,956,532

# METHOD AND APPARATUS FOR EVEN HEATING OF PRODUCTS BY MEANS OF MICROWAVES

Klaus Koch, Laatzen, Fed. Rep. of Germany, assignor to Hermann Berstorff Maschinenbau GmbH, Hannover, Fed. Rep. of Germany

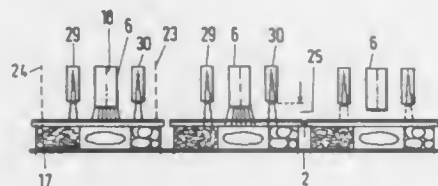
Filed Oct. 6, 1989, Ser. No. 419,218

Claims priority, application Fed. Rep. of Germany, Oct. 11, 1988, 3834574

Int. Cl.<sup>5</sup> H05B 6/68, 6/78

U.S. Cl. 219—10.55 M

9 Claims



1. A method for the even heating of different products by means of microwave energy, in which the products to be treated are passed on a conveyor belt through a microwave treatment chamber and are contained in either open containers or closed packages permeable to microwave energy supplied by microwave input channels longitudinally spaced along the conveyor belt, comprising the steps of:

- registering the beginning and end positions of each container before or during initial entry into the treatment chamber, and transmitting the registration information to a computer,
- measuring the temperature of the individual products prior to microwave heating, and transmitting the temperature information to said computer,
- creating a microwave energy profile from the measured temperature and from specific product parameters,
- inputting microwave energy into each product, according to the profile, at a first station following said temperature measurement,
- measuring the surface temperature of each product following step (d), and transmitting such temperature information to the computer,
- re-determining the microwave energy profile for each

product, based on the last measured temperature and the given specific product parameters,

(g) inputting microwave energy into each product according to the re-determined profile as it passes under the next succeeding input channel, and,

(h) repeating the temperature measurement and microwave input steps until the product has reached its desired, even temperature throughout.

4,956,533

# SOLID STATE CERAMIC MICROWAVE HEATING SUSCEPTOR COMPOSITIONS

Jonathan Seaborne, Corcoran, Minn., assignor to General Mills, Inc., Minneapolis, Minn.

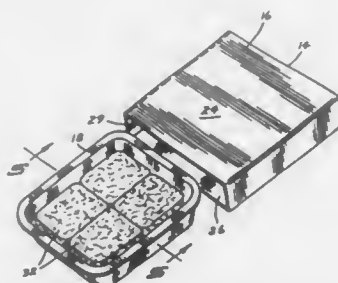
Division of Ser. No. 56,201, Jun. 1, 1987, Pat. No. 4,810,845.

This application Nov. 28, 1988, Ser. No. 276,609

Int. Cl.<sup>5</sup> H05B 6/80

U.S. Cl. 219—10.55 E

14 Claims



1. An article for use as a microwave heating susceptor in a microwave radiation field which article will absorb microwave radiation to produce heat and to raise the temperature of the article, comprising:

- a microwave absorptive body, said body fabricated from a ceramic composition comprising
- (a) a ceramic binder, and
- (b) a ceramic susceptor material which absorbs microwave energy and having a neutral lattice charge, and wherein the ceramic composition is unvitrified, said body having a thickness ranging from about 0.5 to 8 mm.

4,956,534

# INVERTED FRUSTUM SHAPED MICROWAVE HEAT EXCHANGER AND APPLICATIONS THEREOF

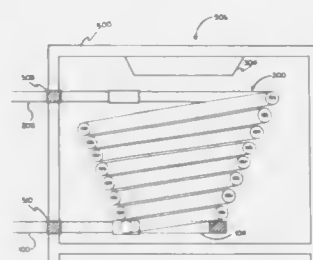
William A. Martin, 124 Elma-McCleary Rd. #38, Elma, Wash. 98541

Filed Apr. 29, 1988, Ser. No. 187,723

Int. Cl.<sup>5</sup> H05B 6/80

U.S. Cl. 219—10.55 A

15 Claims



1. A heat exchanger for use with a microwave source comprising:

- a microwave-transparent conduit having an inlet opening at one end and an outlet opening at another end, said conduit being shaped so as to form a three dimensional

path of widening perimeter from said inlet to said outlet openings, supply means connected to said inlet opening for channeling a heat conductive medium into said inlet opening, whereby the heat conductive medium may be heated by said microwave source, and exit said outlet opening.

4,956,535

# ELECTRODE SYSTEMS FOR IN SITU VITRIFICATION

James L. Buelt; John G. Carter; Eugene A. Eschbach; Vincent F. FitzPatrick; Paul L. Koehnstedt; William C. Morgan; Kenton H. Oma, and Craig L. Timmerman, all of Richland, Wash., assignors to Battelle Memorial Institute, Richland, Wash.

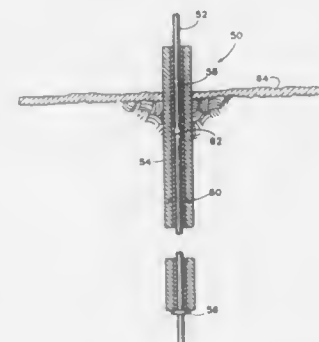
Continuation-in-part of Ser. No. 60,253, Jun. 8, 1987,

abandoned. This application Oct. 7, 1988, Ser. No. 255,057

Int. Cl.<sup>5</sup> H05B 6/54

U.S. Cl. 219—10.81

34 Claims



1. An electrode for use in the process of in situ vitrification of soil by application of electric current to the soil via said electrode to raise the soil to a high temperature for melting said soil at levels along said electrode, said electrode comprising:

- a first electrically conductive electrode shaft member adapted for positioning at least partially below the soil surface and adapted for connection to a source of said current for the purpose of conducting said current to the soil while maintaining its integrity at high temperatures, and
- a second electrically conductive sleeve electrode member within which said first conductive electrode shaft member is internally positioned at least along a portion of the length of said first conductive electrode shaft member, said portion of the length of said first conductive electrode shaft member corresponding to a portion thereof as would be located substantially between the soil surface and a location along said first conductive electrode shaft member below the soil surface when said first conductive electrode shaft member is positioned at least partially below the soil surface, said second conductive sleeve electrode member being formed of a material and having a diameter for providing a higher degree of thermal conduction than exhibited by said first conductive electrode shaft member.

4,956,536

# DEVICE FOR PRE-CALIBRATING HOLLOW CYLINDRICAL BODIES IN SEAM WELDING MACHINES

Luigi Pazzaglia, Bologna, Italy, assignor to Cefin S.p.A., Bologna, Italy

Filed Aug. 7, 1989, Ser. No. 389,957

Claims priority, application Italy, Nov. 30, 1988, 3682 A/88

Int. Cl.<sup>5</sup> B23K 11/36

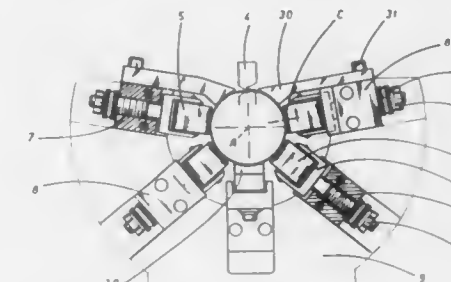
U.S. Cl. 219—64

20 Claims

1. A device for precalibrating hollow cylindrical can bodies

to be seam-welded by continuously operating machines comprising:

- an arm, by and along which rolled can bodies are supported and advanced while assuming cylindrical form, their two longitudinal edges approaching one another and overlapping;
- a calibration station at which the forming can body assumes prescribed dimensions and is welded by a pair of electrode rollers located internally and externally of the body, respectively;
- a precalibration device, located preceding the calibration station along the feed direction followed by the can bodies, consisting in one or more sets of rollers arranged



around a circumference coaxial with and of diameter substantially equal to that of the can body, of which at least one set consists in a plurality of rollers occupying fixed positions in relation to the feed direction and exhibiting surfaces with a radius of curvature greater than that of the encompassed cylindrical surface, in such a way that as physically small an area as possible is in rolling frictional contact between each roller and the cylindrical body passing through;

- a guide of Z section located above the calibration rollers and extending parallel with the feed direction to terminate immediately prior to the pair of electrode rollers, with which the as yet unwelded edges of the can body are brought into contact.

4,956,537

# METHOD FOR HINDGAS COVERAGE IN ARC WELDING AND HINDGAS DEVICE FOR CARRYING-OUT THE METHOD

Walter Schnorrer, Ryegade 40, Aalborg, Denmark

Filed Jun. 21, 1989, Ser. No. 369,658

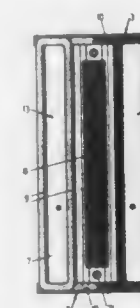
Claims priority, application Denmark, Jun. 23, 1988, 3472/88;

Apr. 24, 1989, 1957/89

Int. Cl.<sup>5</sup> B23K 9/16

U.S. Cl. 219—74

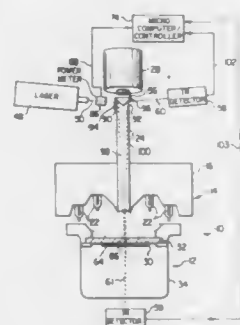
32 Claims



1. A device for isolation of introduced gas in arc welding in which the root or back side of a welded seam is isolated from atmospheric air by placing the device on the side of the root,

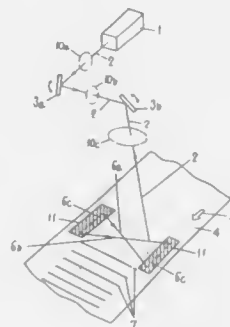
which device includes walls that together with the surface of the work piece to be welded or the work pieces to be welded form a substantially closed enclosure enclosing the root of the welded seam and in which a protective gas is conducted through the enclosure during the welding process, characterized in that the device is held against the work piece to be welded by creating a vacuum in one or more chambers in the device, which chambers include a surface of the work piece to be welded for one side and the walls of the chamber for the other sides, and which enclosure includes feed openings for protective gas, further characterized in that the walls have means permitting connection to a source of vacuum, said vacuum chamber being provided with sealing means that may bear against the surface of work piece to be welded, each said vacuum chamber and said enclosure having sealing means in common forming a boundary between said vacuum chamber and said enclosure.

**4,956,538**  
**METHOD AND APPARATUS FOR REAL-TIME WAFER TEMPERATURE MEASUREMENT USING INFRARED PYROMETRY IN ADVANCED LAMP-HEATED RAPID THERMAL PROCESSORS**  
 Mehrdad M. Moslehi, Dallas, Tex., assignor to Texas Instruments, Incorporated, Dallas, Tex.  
 Filed Sep. 9, 1988, Ser. No. 242,755  
 Int. Cl. B23K 26/00  
 U.S. Cl. 219—121.6 38 Claims



1. Apparatus for determining and adjusting temperature of a semiconductor wafer in a single-wafer rapid thermal processing reactor utilizing a heating lamp module, comprising:  
 at least one pyrometer positioned with the heating lamp module between said pyrometer and the wafer;  
 a light pipe optically coupling said pyrometer and the wafer through the lamp module, such that said pyrometer may determine the temperature of the wafer;  
 a lamp power supply; and  
 a controller for adjusting output from the lamp module based on input from said pyrometer, such that the wafer temperature may be adjusted.

**4,956,539**  
**LASER PROCESSING METHOD**  
 Yuji Uesugi, Osaka; Masashi Makino, Toyonaka; Yukio Nishikawa, Kobe; Kunio Oshima, and Akihito Shinohara, both of Matsue, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan  
 PCT No. PCT/JP87/00480, § 371 Date Apr. 18, 1988, § 102(e) Date Apr. 18, 1988, PCT Pub. No. WO88/00109, PCT Pub. Date Jan. 14, 1988  
 PCT Filed Jul. 7, 1987, Ser. No. 180,820  
 Claims priority, application Japan, Jul. 9, 1986, 61-161338; Aug. 7, 1986, 61-186026  
 Int. Cl. B23K 26/08  
 U.S. Cl. 219—121.8 10 Claims



1. A laser processing method comprising the steps of:  
 processing a work, which is running in a direction, by reciprocal way scanning a laser beam and by repeatedly processing substantially parallel processing lines having a given angle to the running direction of said work, provided that the running velocity vector of said work is set as  $v$ , the relative processing velocity vector against said work in a first way is set as  $V_1$ , the scanning velocity vector of the laser beam on the first way is set as  $V_1$ , and the scanning velocity vector of the laser beam on a second way is set as  $V_2$ ,  
 scanning the laser beam by determining  $V_1$ ,  $V_2$ , in a manner to hold:

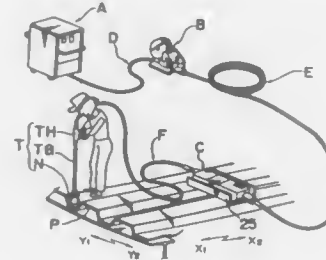
$$V_1 \approx V_a + v, V_2 \approx -V_a + v, \text{ and}$$

inclining the work in a manner that the angle made by the laser beam and the work is in a range of  $87^\circ$  to  $55^\circ$ .

**4,956,540**  
**ARC SPOT WELDING APPARATUS**  
 Mitsuo Kohno, Itami; Masao Sakai, Yokohama; Moritoshi Nagasaka, Ibaragi; Toshihiko Okada, Takatsuki, and Hiroyuki Morimoto, Itami, all of Japan, assignors to Daihen Corporation, Osaka, Japan  
 Filed Jul. 26, 1989, Ser. No. 385,894  
 Claims priority, application Japan, Jul. 29, 1988, 63-101888[U]; Nov. 22, 1988, 63-151941[U]; Jan. 11, 1989, 1-001848[U]  
 Int. Cl. B23K 9/007  
 U.S. Cl. 219—127 5 Claims

1. An arc spot welding apparatus comprising a welding power supplying unit, a wire feeder connected to the welding power supplying unit by a control cable and an arc spot welding torch connected to the wire feeder by a torch cable which is operable by operating an operation switch arranged on a holder thereof to be held by an operator, said apparatus being characterized in that the welding torch is comprised of a nozzle assembly including a power supply element for supplying electric power to a consumable electrode wire being fed in an axial direction thereof, a baffle having holes for spouting shielding gas and a nozzle surrounding said power supply

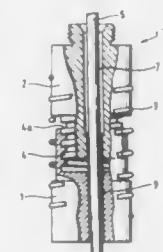
element, said baffle and said consumable electrode wire, a torch holder assembly being provided with the operating switch which is operable by an operator while holding said torch holder assembly, a torch body assembly for connecting said nozzle assembly and said torch holder assembly which is formed so as to have a length defined as the distance between



a tip end of the nozzle of said nozzle assembly and a holder portion of said torch holder assembly equal to or longer than 650 mm whereby the operator can operate said welding torch in a standing posture;  
 wherein said nozzle assembly includes at least one small hole which connects inner and outer spaces of said nozzle assembly at the bottom portion thereof.

**4,956,541**  
**CURRENT NOZZLE FOR MIG- AND MAG-WELDING BURNER**

Ossi Hiltunen, Box 3099, S-19500 Märsta, Sweden  
 PCT No. PCT/FI88/00028, § 371 Date Aug. 23, 1989, § 102(e) Date Aug. 23, 1989, PCT Pub. No. WO88/06072, PCT Pub. Date Aug. 25, 1988  
 PCT Filed Feb. 23, 1988, Ser. No. 399,470  
 Claims priority, application Finland, Feb. 23, 1987, 870749; Feb. 11, 1988, 880625  
 Int. Cl. B23K 9/24  
 U.S. Cl. 219—137.61 7 Claims



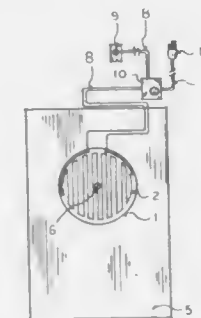
1. A current nozzle for a mig- or a mag-welding burner comprising a nozzle body having a nozzle orifice extending therethrough for the passage of welding wire, said wire having a longitudinal axis and passing longitudinally through said nozzle orifice with wear of an adjacent nozzle orifice wear surface during welding operation, and means for providing eccentric relative movement between the nozzle orifice and the wire along its longitudinal axis to maintain the wire in contact with said wear surface of the nozzle orifice.

**4,956,542**  
**MIRROR DEFOGGER**  
 Robert Prosser, P.O. Box 4425, Carlsbad, Calif. 92008  
 Continuation of Ser. No. 242,877, Sep. 12, 1988, abandoned. This application Feb. 21, 1989, Ser. No. 313,062  
 Int. Cl. H05B 3/84  
 U.S. Cl. 219—219 9 Claims

1. An improved electric heating source fastened to a surface

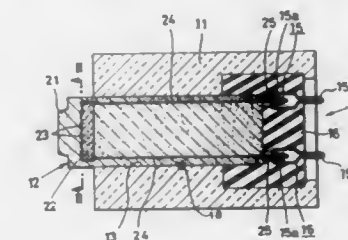
of a mirror for supplying heat to reduce the formation of moisture on the mirror surface wherein the improvement comprises:

- a heating element adhesively mounted to the surface of the mirror where the heating element is capable of conforming to any given geometrical shape;
- a thermistor or centrally mounted within and connected to the heating element to provide a means of electronic temperature control to protect from overheating of the heating elements;
- an adhesive coating on both sides of the heating element and protected by a removable covering sheet of material;
- an electronic control module mounted in the proximity of the mirror and intimately connected thereto;
- a manually operable electrical activation switch to activate the heating element;



- an automatically timed electric de-activation function switch which manages the control module;
- a humidistat that is remotely situated from the heating element and which sends a signal that is humidity activated through airwaves and a means for receiving the signal from the humidistat to activate the heating element;
- the humidistat being operable with DC and AC voltage;
- a converter to selectively convert alternating current from an AC power source to direct current; and
- a system circuit electrically connecting the manually operable activation switch, the humidistat, the automatically timed electric de-activation function switch, the electronic control module, the converter, the heating element, the thermistor and the AC power source.

**4,956,543**  
**BRANDING DEVICE HAVING CERAMIC TYPE BLOCK WITH EMBEDDED ELECTRIC HEATING ELEMENT**  
 Masato Shibata, Tokushima, Japan, assignor to Shikoku Kakoki Co., Ltd., Tokushima, Japan  
 Filed Apr. 21, 1988, Ser. No. 184,562  
 Claims priority, application Japan, Apr. 24, 1987, 62-102295  
 Int. Cl. H05B 1/00, 3/00; B44B 5/00  
 U.S. Cl. 219—227 3 Claims



1. A branding device comprising:  
 a holder, and  
 an elongated type block made of a ceramic material and having one end removably attached to the holder and a



forward end projected from the holder, the type block having a branding indicia on the projected forward end face, a ceramic plate embedded in the forward end of said type block, and an electrically resistive heat generating member printed as a pattern on a surface of said ceramic plate facing the forward end of said type block for heating the branding indicia.

4,956,544

## OVERHEAT PROTECTED ELECTRIC CARTRIDGE HEATER

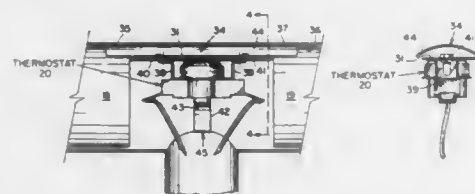
Samuel S. Sayward, Jr., Danvers, Mass., assignor to Hotwatt Inc., Danvers, Mass.

Filed Jul. 26, 1988, Ser. No. 224,470

Int. Cl.<sup>3</sup> H05B 1/02, 3/82; F24H 1/20

U.S. Cl. 219—335

12 Claims



1. A cartridge heater having an overheat protection device, for use in a steam table tank, the heater comprising:  
a riser tube attached to the inside of the tank;  
a tubular elongate sheath having a curved inner surface attached to said riser tube;  
an electric heater element inside said sheath;  
a heat transfer member having an enlarged, curved surface complementary to the curved inner surface of said sheath for engaging the inner surface of said sheath in an area of said sheath remote from said heater element;  
means urging said heat transfer member into close, intimate, thermal contact with the inner surface of said sheath; and  
switch means for turning the heater element on and off, said switch means including a thermally sensitive element responsive to a rise in the temperature of said heat transfer member above a predetermined level for actuating said switch means to interrupt current flow to the heater element to prevent it from overheating.

4,956,545

## HEATER WITH TAP

Helmuth Ohnmacht, Kandel; Karl-Heinz Nauwerth, Erlenbach, and Klaus Meywald, Kandel, all of Fed. Rep. of Germany, assignors to Fritz Eichensauer GmbH & Co. KG, Kandel, Fed. Rep. of Germany

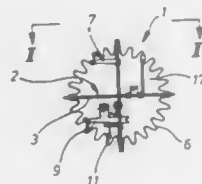
Filed Feb. 9, 1988, Ser. No. 153,917

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1987, 8701993[U]

Int. Cl.<sup>3</sup> H05B 3/02; F24H 3/04

U.S. Cl. 219—541

9 Claims



1. Electric heater with at least one insulating carrying part and at least one heat conductor carried by the carrying part and with at least one tap for tapping a reduced voltage as compared with a voltage applied to the heating conductor,

wherein the at least one carrying part has slots through which pass feet means of the at least one tap for fixing the at least one tap to the carrying part, and wherein a length of the slots is greater than a width of the feet means of the at least one tap.

4,956,546

## METHOD AND APPARATUS FOR ALIGNING IMAGE SENSORS WITH AN OPTICAL SYSTEM IN AN OPTICAL APPARATUS

Takashi Nishibe, and Shotaro Yokoyama, both of Kanagawa, Japan, assignors to Fujitsu Electric Co., Ltd., Kanagawa, Japan

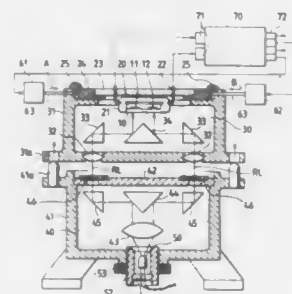
Filed Jul. 7, 1989, Ser. No. 376,514

Claims priority, application Japan, Aug. 4, 1988, 63-194910

Int. Cl.<sup>3</sup> G01J 1/20

U.S. Cl. 250—203.1

11 Claims



1. A method of aligning a plurality of image sensors with an optical system in an optical apparatus, each of the plurality of image sensors being spaced apart from the other image sensors and having at least one photosensor for receiving light, comprising the steps of:  
generating an alignment light beam from a light source disposed adjacent the optical system;  
splitting the alignment light beam into a plurality of reference light beams, each of the reference light beams corresponding to a different one of the plurality of image sensors;  
focusing each of the reference light beams on a specified one of the at least one photosensors in the corresponding one of the image sensors such that the cross-sectional size of each of the plurality of reference light beams is substantially equal in size to the size of the corresponding specified photosensor so that a maximum amount of light is received by each of the specified photosensors at times when the plurality of image sensors are aligned with the optical system;  
measuring the amount of light received by the specified photosensors; and  
moving the position of the plurality of image sensors relative to the optical system for alignment in response to said measured amount of light received by the specified photosensors until said measured amount of light reaches a maximum.

4,956,547

## APPARATUS FOR SENSING INFORMATION ON BOTH SIDES OF DOCUMENTS

Kikuo Mita, Tokyo, Japan, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 25, 1989, Ser. No. 398,696

Claims priority, application Japan, Sep. 28, 1988, 63-242865

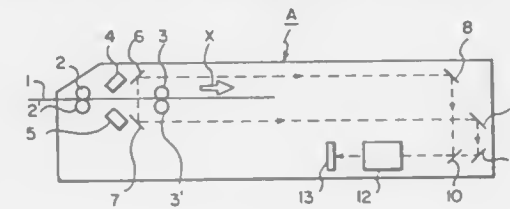
Int. Cl.<sup>3</sup> H01J 40/14

U.S. Cl. 250—208.1

6 Claims

1. Apparatus for sensing information existing on the top and bottom surfaces of a document comprising:  
a one-dimensional image sensor;  
means for feeding a document relative to said image sensor;

first and second light sources respectively illuminating the top and bottom surfaces of the document;  
light intermitting means for alternately passing light reflected by one of the surfaces of such document and then light reflected by the other surface thereof; and



an optical system operating to focus the beams of light reflected by the respective surfaces of the document onto said image sensor.

4,956,548

## ULTRAFAST OSCILLOSCOPE

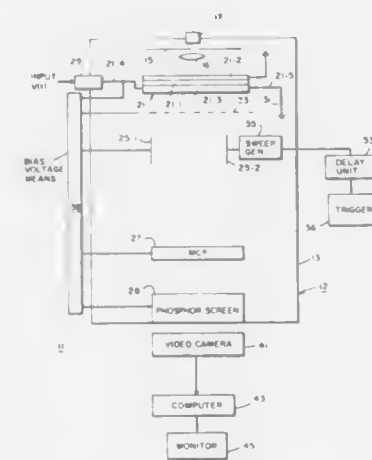
Robert R. Alfano, 3777 Independence Ave., Bronx, N.Y. 10463, and Ping P. Ho, 240-42 69th Ave., Douglaston, N.Y. 11362

Filed Jan. 6, 1989, Ser. No. 294,182

Int. Cl.<sup>3</sup> H01J 31/50

U.S. Cl. 250—213 VT

13 Claims



1. An oscilloscope for use in generating a time resolved profile of an ultrafast voltage signal comprising:  
(a) means for generating a constant beam of light;  
(b) a streak camera including a housing having disposed therein:  
(i) a transmission line photocathode upon which said beam of light impinges,  
(ii) means connected to said transmission line photocathode for receiving a voltage signal to be examined,  
(iii) whereby a number of electrons will be emitted from said transmission line photocathode as the voltage signal and the beam of light temporally and spatially intersect on said photocathode, the number of emitted electrons being proportional to the intensity of the voltage signal,  
(iv) an accelerating mesh for accelerating the emitted electrons away from the photocathode,  
(v) means for angularly deflecting the electrons as a function of time,  
(iv) electron multiplication means for performing electron multiplication on the deflected electrons,  
(v) a phosphor screen upon which the multiplied electrons

impinge to create a light image proportional in intensity to the number of electrons incident thereto,  
(vi) bias voltage means connected to said photocathode, said accelerating mesh, said means for angularly deflecting the electrons as a function of time, said multiplication means, and said phosphor screen, for creating a potential difference sufficient to convey the electrons from said transmission line photocathode to said phosphor screen;  
(c) a video camera focused on said phosphor screen for recording the light image appearing thereon;  
(d) computer means for digitizing and processing and/or storing the output of the video camera, and  
(e) a monitor connected to said computer means for displaying the time resolved profile of the voltage signal.

4,956,549

## OPTICAL SENSING SYSTEMS

Michael L. Henning, Somerset, and Christopher Lamb, Dorset, both of England, assignors to Plessey Overseas Limited, Ilford, England

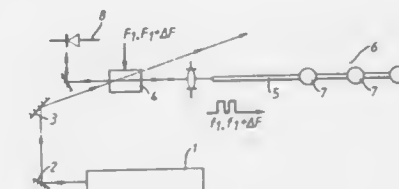
Filed Jul. 13, 1988, Ser. No. 218,168

Claims priority, application United Kingdom, Jul. 16, 1987, 8716776

Int. Cl.<sup>3</sup> H01J 5/16

U.S. Cl. 250—227.14

9 Claims



1. An optical sensing system comprising:  
a single continuous wave light source;  
a series of phase shifting switching devices comprising a first phase shifting switching device proximate said light source, a plurality of intermediate phase shifting switching devices, and a last phase shifting switching device, distant from said light source, said series of phase shifting devices being positioned along a line aligned with said light source to receive light from said light source; and  
a plurality of driving means each connected to one of the phase shifting switching devices for driving said devices with pulses at different frequencies;  
each of said phase shifting devices producing output pulses of different frequencies in different deflected directions and being subsequently operated by their respective driving means so that the light from the continuous wave light source passes straight through said first phase shifting switching after being driven by its respective driving means device and sequentially through each of said intermediate phase shifting switching devices after each is driven by its respective driving means to the last phase shifting switching until the last phase shifting switching device has produced output pulses whereupon the first device is reoperated for the generation of pulses.

4,956,550

**SUB-SEA FIBER OPTIC CABLE LOCATION APPARATUS WITH A PLURALITY OF TRANSPONDER MEANS**

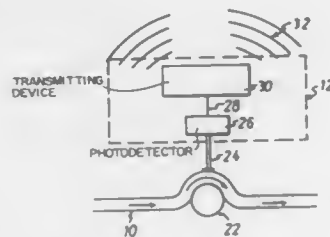
Geoffrey S. Edwards, Grange-over-Sands, and Robert S. Tebble, Wilsalaw, both of England, assignors to Oxley Developments Company Limited, London, England

Filed Jan. 13, 1989, Ser. No. 296,785

Claims priority, application United Kingdom, Jan. 16, 1988, 8800972

Int. Cl.<sup>3</sup> H01J 5/16; G02B 6/02; G01N 21/00  
U.S. Cl. 250—227.15

6 Claims



1. In a sub-sea optical fiber system having a main optical fiber cable, an apparatus used in searching for location of the cable, comprising:

- (a) means, disposed at a plurality of predetermined locations on said main optical fiber cable, each for tapping off a small portion of a light signal carried by said main optical fiber cable; and
- (b) a plurality of transponder means, each for radiating a signal, each being disposed on said main optical fiber cable at respective ones of said predetermined locations and each including
  - (i) means for converting the tapped off small portion of the light signal into an electrical signal for activating said transponder means; and
  - (ii) means, responsive to said electrical signal, for controlling the radiation of the signal from said transponder means, said control means being activated only upon receipt of a predetermined coded instruction in said tapped portion of the light signal whereby, of the plurality of transponder means disposed on said main optical fiber cable, only selected ones of the plurality of transponder means in a region of the cable being searched need be activated.

4,956,551

**SENSOR FOR CONSUMPTION MEASUREMENTS IN A HOUSEHOLD MEASURING SYSTEM**

Horst Repschläger, Aachen, and Heinz Riemer, both of Fed. Rep. of Germany, assignors to Infas Institut Für Angewandte Sozialwissenschaft GmbH, Fed. Rep. of Germany

Filed Nov. 28, 1988, Ser. No. 276,521

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1987, 3740974; Dec. 12, 1987, 3742249

Int. Cl.<sup>3</sup> G01D 5/30; H01J 5/02  
U.S. Cl. 250—231.14

7 Claims

1. Sensor, for consumption measurements in a household consumption measuring system having a measuring device, such as at least one of an electricity meter, a gas meter, a water meter and the like, with a display element placed behind a transparent cover plate, said sensor comprising a housing with an outlet side and a reflex photoelectric barrier emitter and a reflex photoelectric barrier receiver arranged next to each other in said housing on the outlet side thereof, wherein the housing of the sensor is constructed for mounting of its outlet side on the cover plate of the consumption measuring device, wherein the position of the reflex photoelectric barrier emitter and of the reflex photoelectric barrier receiver is adjustable in said housing, both mutually and relative to said outlet side of the housing for enabling the reflex photoelectric barrier emit-

ter and reflex photoelectric barrier receiver to be operatively aligned with the display element of the consumption measuring device, wherein the outlet side of the housing is covered by a transparent outlet plate, and wherein the transparent outlet

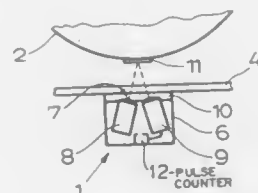
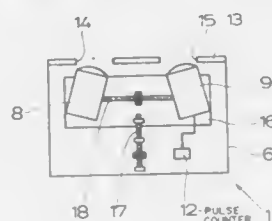


plate is provided, on its inner side, with cup-shaped recesses that are matched to emitting and receiving surfaces of the reflex photoelectric barrier emitter and reflex photoelectric barrier receiver, respectively, said recesses serving as a means for reducing optical losses.

4,956,552

**APPARATUS FOR EFFECTING THE SWEEP OF A BEAM OF LIGHT STRICTLY PLANE AND PARALLEL TO A GIVEN AXIS**

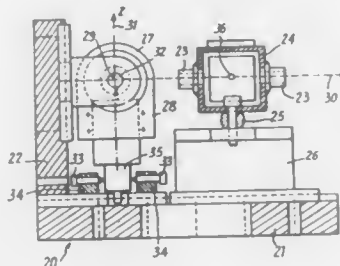
Michel Paramythioti, Lamorlaye, France, assignor to Societe a Responsabilite Limitee dite MENSIL, Paris, France

Filed May 17, 1989, Ser. No. 352,864

Claims priority, application France, May 19, 1988, 88 06702  
Int. Cl.<sup>3</sup> G02B 26/02

U.S. Cl. 250—236

6 Claims



1. Apparatus for effecting a strictly planar and parallel to a given axis scanning a beam of light comprising:
- (a) a scanning mirror having an axis of rotation substantially perpendicular to said given axis and having its plane substantially containing said axis of rotation;
  - (b) an optical device arranged substantially in the plane containing said given axis and perpendicular to said axis of rotation;
  - (c) first adjustment means for adjusting the angle of incidence of the beam of light with respect to a predetermined plane containing said given axis and substantially perpendicular to said axis of rotation of the mirror; and
  - (d) second adjustment means for adjusting the inclination of

said axis of rotation of the mirror with respect to said predetermined plane.

of a body acting as a heat sink, the element and the body being thermally coupled, characterized in that a non-hardening,

4,956,553

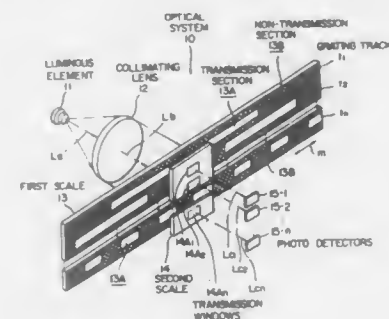
**OPTICAL ENCODER WITH VARYING GRATING PITCH**  
Keiji Matsui, Aichi, Japan, assignor to Kabushiki Kaisha Okuma Tekkosho, Aichi, Japan

Division of Ser. No. 251,089, Sep. 29, 1988. This application Jul. 3, 1989, Ser. No. 374,922

Claims priority, application Japan, Sep. 30, 1987, 62-246726; Sep. 30, 1987, 62-246727; Oct. 27, 1987, 62-271530

Int. Cl.<sup>3</sup> H01J 3/14; G01D 5/34  
U.S. Cl. 250—237 G

15 Claims



1. An optical encoder comprising:
- light source means for emitting coherent parallel light;
  - a scale having a grating track for diffracting parallel light emitted from said light source means, said grating track having a plurality of linear adjacent gratings extending in a lengthwise direction, each of said plurality of linear adjacent gratings extending in a widthwise direction to define a pitch, and each having a non-transmitting section and an adjacent transmitting section extending in said lengthwise direction;
  - wherein an aperture ratio defined by a ratio between a width of said transmitting portion and said pitch is substantially constant for each of said plurality of linear adjacent gratings of said grating track;
  - wherein said pitch of each of said plurality of linear adjacent gratings of said grating track varies along said grating track;
  - light spot position detecting means for receiving positive and negative diffracted light beams of a same order from the parallel light diffracted by said grating track, and for detecting light spot positions of said positive and negative diffracted light beams of the same order, and for converting the thus detected light spot positions into representative electrical signals.

4,956,554

**PYROELECTRIC INFRA-RED DETECTORS AND THEIR METHOD OF MANUFACTURE**

Geoffrey Baker, Roger Pearce, both of Southampton, and Paul L. Williamson, Shepperton, all of England, assignors to U.S. Philips Corp., New York, N.Y.

Filed Jan. 26, 1989, Ser. No. 302,716

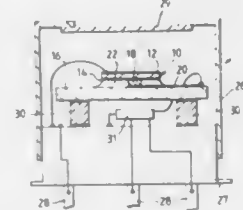
Claims priority, application United Kingdom, Mar. 2, 1988, 8804959

Int. Cl.<sup>3</sup> H01L 37/00

U.S. Cl. 250—338.3

9 Claims

1. A pyroelectric infra-red detector comprising a substantially planar pyroelectric element onto which infra-red radiation to be detected is directed, and which is supported in spaced and substantially parallel relationship over the surface



4,956,555

**MULTICOLOR FOCAL PLANE ARRAYS**

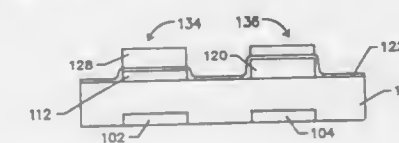
Frank J. Woodberry, Oxnard, Calif., assignor to Rockwell International Corporation, Thousand Oaks, Calif.

Filed Jun. 30, 1989, Ser. No. 374,412

Int. Cl.<sup>3</sup> G02B 5/20; G01J 3/36

U.S. Cl. 250—339

1 Claim



1. A multicolor focal plane array for detecting and distinguishing between incoming electromagnetic radiation within a first band of wavelengths and incoming electromagnetic radiation within a second band of wavelengths, comprising:

- a substrate;
  - a two dimensional array of detectors disposed on the substrate and responsive to electromagnetic radiation within a predetermined range of wavelengths including the first and second wavelength bands;
  - a first multilayer thin film filter disposed on the substrate and interposed between the incoming radiation and a first subset of the detectors in the array to prevent radiation outside of the first wavelength band from reaching the detectors in the first subset, the first filter including a first dielectric/thin metal/dielectric layer combination, the thicknesses of the dielectric layers in the first filter combination being adjusted to select the first wavelength band; and
  - a second multilayer thin film filter disposed on the substrate and interposed between the incoming radiation and a second subset of the detectors in the array to prevent radiation outside of the second wavelength band from reaching the detectors in the second subset, the second filter including a second dielectric/thin metal/dielectric layer combination, the thicknesses of the dielectric layers in the second filter combination being adjusted to select the second wavelength band,
- thereby rendering the detectors in the first subset sensitive to radiation within the first wavelength band and the detectors in the second subset sensitive to radiation within the second wavelength band, the first and second filters being substantially identical except for the thicknesses of two layers within each filter.



4,956,556

## RADIATION SCINTILLATION DETECTOR

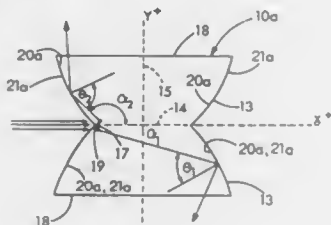
Jeffrey L. Radtke, Madison, Wis., assignor to Siemens Analytical X-Ray Instruments, Inc., Madison, Wis.

Filed Nov. 14, 1988, Ser. No. 271,239

Int. Cl.<sup>5</sup> G01T 1/20, 1/203

U.S. Cl. 250-368

20 Claims



## 1. A radiation scintillation detector comprising:

a solid body of rotation about a central axis, the body formed of a scintillator medium having a particular index of refraction and including: at least one point of most probable light emission within the body near where radiation is to be received by the detector; at least one internal reflective surface which has a curvilinear axial cross-section wherein substantially any line segment originating from an area in proximity to the point of most probable light emission and ending on the internal reflective surface anywhere along that surface has an angle of incidence to said surface at least as great as a critical angle of incidence determined by the scintillator medium, a surrounding medium adjacent to the body along the internal reflective surface, and a wavelength of the light emitted by the scintillator medium, so that substantially any light originating from the area in proximity to the point of most probable light emission which intersects the internal reflective surface is totally reflected internally; and a planar surface through which the light is substantially transmitted out of the body, the internal reflecting surface having decreasing taper as it approaches the planar surface.

4,956,557

## DOSIMETER FOR IONIZING RADIATION

Hugo Vlasbloem, Maasland, Netherlands, assignor to B.V. Optische Industrie 'De Oude Delft', Delft, Netherlands

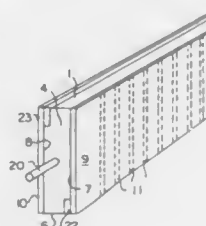
Continuation-in-part of Ser. No. 931,539, Nov. 14, 1986. This application Feb. 15, 1989, Ser. No. 311,107

Claims priority, application Netherlands, Nov. 15, 1985, 8503153

Int. Cl.<sup>5</sup> G21K 1/04; G01T 1/185

U.S. Cl. 250-385.1

32 Claims



1. A dosimeter for ionizing radiation comprising a casing defining a gas-filled measuring chamber in which there is provided electrode elements and wherein said casing is provided with at least one entry window for the ionizing radiation, characterized in that said casing is of an oblong shape defining an oblong measuring chamber, said casing including at least two opposed side walls of a material transparent to ionizing

radiation, an inner surface of one side wall being provided with wire electrodes extending essentially longitudinally to said oblong measuring chamber and an inner surface of another side wall being provided with a plurality of strip-like electrode elements essentially transversely to said oblong measuring chamber.

4,956,558

## SYSTEM FOR MEASURING FILM THICKNESS

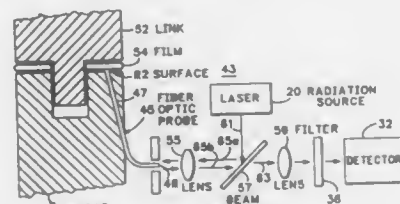
Charles R. Batishko, West Richland; Leslie J. Kiriha; Timothy J. Peters, and Donald E. Rasmussen, all of Richland, Wash., assignors to Battelle Memorial Institute, Richland, Wash.

Filed Mar. 16, 1989, Ser. No. 324,086

Int. Cl.<sup>5</sup> G01N 21/64

U.S. Cl. 250-461.1

29 Claims



## 1. A method for measuring the thickness of a thin film of material on a surface of a body, said film having fluorescent properties, comprising the steps of:

illuminating a section of said film with excitation energy suitable for stimulating fluorescence in the material of the film; measuring from within said body underneath the surface upon which said film resides the intensity of the fluorescent light produced over a limited area within said section of film; and correlating said intensity with the intensities of fluorescent light produced by established film thicknesses in order to determine the thickness of said film.

4,956,559

## METHOD OF DETECTING RADIOACTIVE SUBSTANCE

Hisashi Shirashi, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation of Ser. No. 804,323, Dec. 4, 1985, abandoned, which is a continuation of Ser. No. 614,635, May 29, 1984, abandoned. This application Jan. 27, 1987, Ser. No. 6,925

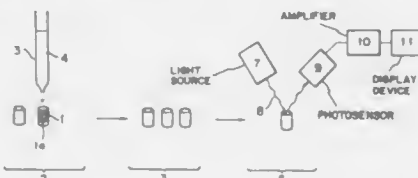
Claims priority, application Japan, May 27, 1983, 58-93600; Jun. 10, 1983, 58-103634; Jun. 10, 1983, 58-103635

The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> G01T 7/02, 1/167

U.S. Cl. 250-484.1

30 Claims



## 1. A method of detecting radioactive substance in a liquid sample which comprises the steps of:

(1) supplying a radiation-measuring instrument having a stimulative phosphor covered with a polymer material with the liquid sample continuously or intermittently; (2) keeping said measuring instrument in contact with the liquid sample for a given period of time to cause the instru-

ment to absorb at least a portion of radiation energy emitted by the radioactive substance in said liquid sample; and (3) irradiating said measuring instrument with an electromagnetic wave to release the radiation energy stored in the instrument as stimulated emission, and photoelectrically detecting the stimulated emission to measure radioactivity of said liquid sample sequentially.

4,956,560

## LIQUID LEVEL DETECTOR SYSTEM WITH FILL-LEVEL SIGNATURE DETECTION

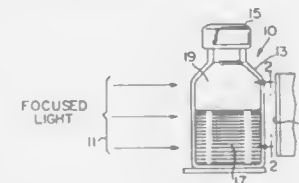
Bruce D. Smith, Jr., and Thomas A. Stalnaker, both of West Chester, Pa., assignors to The West Company, Phoenixville, Pa.

Filed Feb. 3, 1989, Ser. No. 306,795

Int. Cl.<sup>5</sup> G01N 21/49

U.S. Cl. 250-577

23 Claims



## 1. Apparatus for checking the fill level of a vial, comprising: locating means for indicating the presence of a vial in a predetermined location;

light sensing means for measuring the amount of light being passed through said vial at said location including a light source, a lens for focusing said light and remote sensing means including a photo diode for receiving said focused light and an amplifier to produce a signal from said diode proportional to the amount of material in said vial; said signal being a wave form of the energy transmitted through said vial from said light source and having a minimum and maximum sensor output value which provides a signature for the specific fill level of said vial; and response means for receiving said proportional signal and generating a response.

4,956,561

## SMART POWER CONNECTOR

Antanios B. Tamer, Peoria, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Dec. 27, 1988, Ser. No. 290,222

Int. Cl.<sup>5</sup> H02G 1/00; H01R 9/0

U.S. Cl. 307-10.1

22 Claims

## 1. An electrical connector (10) for connecting a plurality of peripheral devices to a vehicular power network (12), said connector (10) comprising:

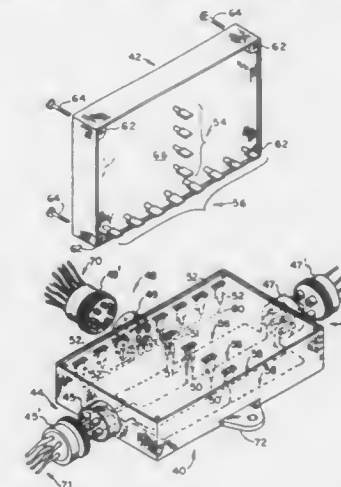
a printed circuit board (66) having electrical components (78) mounted thereon; a heat conducting element (80) being in heat transfer relation with respect to at least one of said electrical components (78), said heat conducting element (80) being mounted on said printed circuit board (66);

first housing portion (40) having first and second connecting means (44,46) for electrical connection to said vehicular network (12), and third connecting means (48) for electrical connection to said plurality of peripheral devices;

second housing portion (42) retaining said printed circuit board (66) and heat conducting element (80), said second housing portion (42) being adapted to overlie said first housing portion (40); and

a plurality of electrical terminals (54,56) being disposed in said second housing portion (42) and adapted for electrical connection to said first, second and third connecting means (44,46,48) when said first and second housing por-

tions (40,42) are contiguous and in electrical connection, said first, second and third connecting means (44,46,48) each having first and second end portions



(45,45',47,47',49,49'), said first end portions (45,47,49) being securely mounted to said first housing portion (40), and said second end portions (45',47',49') being detachable from said first end portions (45,47,49).

4,956,562

## HEADLIGHT, WINDSHIELD WIPER CONTROL SYSTEM

Charles E. Benedict, Tallahassee, and Donald M. Stumpf, Panama City, both of Fla., assignors to Benedict Engineering Co. Inc., Tallahassee, Fla.

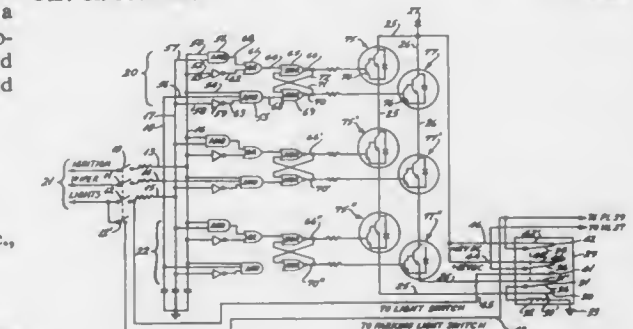
Continuation of Ser. No. 329,304, Mar. 27, 1989, abandoned.

This application Sep. 15, 1989, Ser. No. 409,612

Int. Cl.<sup>5</sup> H02G 3/00

U.S. Cl. 307-10.8

23 Claims

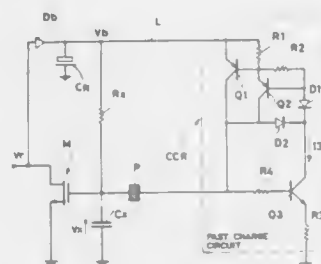


1. An automatic system for controlling the turning on of vehicle headlights when ignition and windshield wipers are turned on and for keeping them on when the wipers are turned off, comprising on-off switches for the ignition, wipers and headlights, a first relay circuit, a relay switch, said relay switch having means for connecting said headlights to power supply means, said first relay circuit being alternately connectable to actuating means for said relay switch which governs the connection of said headlights to said power supply means, said power supply means connected to said first relay circuit, control means for said first relay circuit, logic circuit means connecting the outputs of said ignition and headlight switches to the control means for said first relay circuit, said logic circuit means connecting the outputs of said ignition, wipers and headlights to form a latching circuit, said latching circuit producing a signal output to activate said control means for said first relay circuit to turn the headlights on when the ignition and wiper switches are turned on, said latching circuit continuing to produce such signal output when the wiper switch is turned off.

1. An integrated pilot circuit with preset firing delay for an MOS power transistor, comprising an R-C network which comprises a condenser inserted between and connected to a gate terminal of the MOS transistor and ground and of a resis-



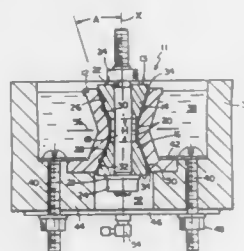
tance connected in series with said condenser, the pilot circuit further including an SCR circuit provided with threshold



circuit means for allowing firing of said SCR circuit when a charge voltage of said condenser reaches a preset threshold.

**4,956,571**  
**SUPERCONDUCTING MAGNETIC BEARING**  
Keith M. Gordon, Munsonville, and Robert A. Hanson, Peterborough, both of N.H., assignors to MPB Corporation, Keene, N.H.

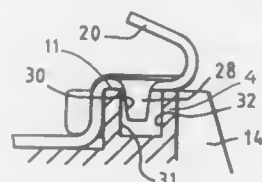
Filed Mar. 1, 1989, Ser. No. 317,440  
Int. Cl.<sup>5</sup> F16C 39/06  
U.S. Cl. 310—90.5 5 Claims



1. A superconducting magnetic bearing assembly comprising an outer element having an axis and, disposed about said axis, said outer element having a first generally conical outer element surface and a second generally conical outer element surface, said first generally conical outer element surface being inverted relative to said second generally conical outer element surface, each said generally conical outer element surface being disposed at an acute angle to said axis, said generally conical outer element surfaces defining a volume, fixedly disposed within said volume, an inner element rotatable relative to said outer element, said inner element comprising a first conical inner element and a second conical inner element, said first conical inner element having a first inner element surface opposed to and spaced from said first generally conical outer element surface of said outer element, said first inner element surface lying generally parallel to the opposed said first generally conical outer element surface, and said second conical inner element having a second inner element surface opposed to and spaced from said second generally conical outer element surface of said outer element, said second inner element surface lying generally parallel to the opposed said second generally conical outer element surface, spacer means disposed between said first conical inner element and said second conical inner element for adjusting the axial spacing between the inner element surfaces of said conical inner elements, thereby to adjust the dimension of a space defined between the opposed first surfaces

and the opposed second surfaces of said inner element and said outer element, a predetermined superconductive first element of one of said inner element and said outer element comprising superconductive material and a predetermined magnetic second element of another of said inner element and said outer element comprising a material adapted to generate a magnetic field, and means for forming a magnetic field about said predetermined magnetic second element, said predetermined superconductive first element adapted to expel said magnetic field in a manner to maintain the spaced apart relationship of the opposed first surfaces and the opposed second surfaces of said inner element and said outer element under load.

**4,956,572**  
**COMMUTATOR FOR AN ELECTRIC MOTOR**  
Georg Strobl, Repulse Bay, Hong Kong, assignor to Johnson Electric S.A., La Chaux de Fonds, Switzerland  
Filed Apr. 20, 1989, Ser. No. 340,827  
Claims priority, application United Kingdom, Apr. 20, 1988, 8809271  
Int. Cl.<sup>5</sup> H02K 13/04  
U.S. Cl. 310—233 11 Claims

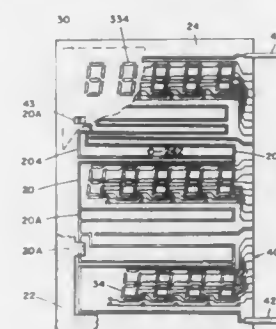


1. An assembled commutator comprising a cylindrical base of electrically insulating material, a plurality of commutator segments mounted on the base, each segment comprising a brush contacting portion which is supported by the base and a generally radially extending tang at one axial end of said brush contacting portion for connection to an armature coil wire, wherein the tang is formed locked to said base by a form locking connection, said form locking connection including an edge on a radially extending arm, said arm being folded about a line generally parallel to the axial direction of the base and behind a radially extending wall formed on the base so that said edge bears against said wall to prevent movement of the segment in a direction from said one axial end of said brush contacting portion towards an opposite end of the contacting portion.

**4,956,573**  
**GAS DISCHARGE DISPLAY DEVICE WITH INTEGRAL, CO-PLANAR, BUILT-IN HEATER**  
Paul H. Smith, La Habra; Lee R. Wood, Downey, and Elias J. Lara, Lake Elsinore, all of Calif., assignors to Babcock Display Products, Inc., Anaheim, Calif.  
Filed Dec. 19, 1988, Ser. No. 286,138  
Int. Cl.<sup>5</sup> H01J 61/24, 7/24  
U.S. Cl. 313—15 10 Claims

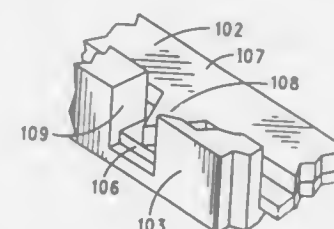
1. In a gas discharge display device having a cathode terminal and an anode terminal separated from each other within a sealed gas chamber formed between two layers of glass, the gas in the chamber including a mixture of inert gas and mercury at sub-atmospheric pressure, the improvement comprising: heater means on one of said layers of glass positioned proximate to and co-planar with the cathode terminals within the chamber in said display device for selectively maintaining an appropriate temperature within said display device so that mercury is maintained in a gaseous state within said display device; said heater means including trim portions thereof which may

be selectively removed in order to alter the characteristics of said heater means; insulating means intermediate said two layers of glass and including apertures overlying said trim portions of said heater means and said cathode terminals; said insulating means electrically insulating said heater means from said cathode terminals and from said anode



terminal and operative to facilitate the conduction of heat from said heater means to said gas in said chamber; and sealing means disposed around the periphery of said display device; said sealing means arranged to replace the trim portions of said heater means which have been selectively removed in order to prevent electrical interconnection thereof.

**4,956,574**  
**SWITCHED ANODE FIELD EMISSION DEVICE**  
Robert C. Kane, Woodstock, Ill., assignor to Motorola, Inc., Schaumburg, Ill.  
Filed Aug. 8, 1989, Ser. No. 391,211  
Int. Cl.<sup>5</sup> H01J 19/24, 19/32, 19/46  
U.S. Cl. 313—306 5 Claims

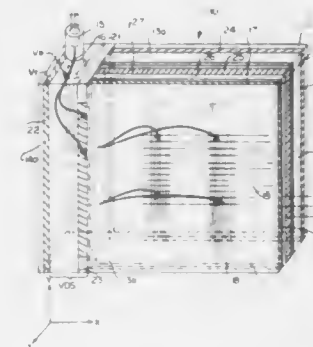


1. A field emission device, comprising:  
(A) an emitter for emitting electrons;  
(B) a first anode disposed substantially coplanar with respect to the emitter for collecting at least some of the electrons;  
(C) a second anode for selectively collecting at least some of the electrons, such that when the second anode collects electrons, the first anode does not collect electrons.

**4,956,575**  
**FLAT PANEL DISPLAY WITH DEFLECTION MODULATION STRUCTURE**  
Kern K. N. Chang, 91 Adams Dr., Princeton, N.J. 08540  
Filed Mar. 23, 1989, Ser. No. 327,614  
Int. Cl.<sup>5</sup> H01J 29/70  
U.S. Cl. 313—422 13 Claims

1. A flat panel display, comprising:  
an evacuated display envelope having a relatively flat front wall, a rear wall spaced apart in a depthwise direction from the front wall and substantially coextensive there-

with, and lateral sides enclosing the space defined between the front and rear walls, a phosphor screen provided on the inner surface of said front wall substantially in one plane and having a matrix of phosphor elements arranged in horizontal rows and vertical columns disposed over said inner surface of said front wall, an electron gun on one lateral side of the display envelope for providing an electron beam on a first path into the display envelope along a vertical direction substantially parallel to the plane of the screen, vertical deflection means for deflecting said beam over the horizontal rows successively in the vertical direction, said vertical deflection means including an initial deflection plate adjacent said first path of said beam from said electron gun to which incremental deflection voltages are applied for deflection said beam along different incremen-

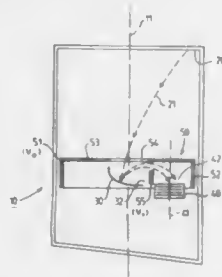


tal trajectories toward said one lateral side of said display envelope, and a vertical reflection plate at said one lateral side of said display envelope which is biased with a voltage for reflecting said beam on said different incremental trajectories toward the respective horizontal rows, horizontal deflection means for deflecting said beam on said different trajectories to sweep across the phosphor elements of the respective horizontal rows, said horizontal deflection means including a horizontal reflection plate disposed toward the rear wall of said display envelope and having a horizontal sweep voltage applied thereto for deflecting said beam toward said phosphor screen disposed at said front wall of said display envelope, and color modulation means interposed between said phosphor screen and said beam as deflected by said horizontal deflection means for controlling said beam to impinge upon selected portions of respective phosphor elements to produce the corresponding illumination intensities.

**4,956,576**  
**DEVICE FOR COUPLING A FIRST DYNODE OF A PHOTOMULTIPLIER TO A LEAF-TYPE MULTIPLIER**  
Pierre L'Hermite, Brive, France, assignor to U.S. Philips Corp., New York, N.Y.  
Filed Jun. 5, 1989, Ser. No. 361,525  
Claims priority, application France, Jun. 10, 1988, 88 07778  
Int. Cl.<sup>5</sup> H01J 43/06, 43/02  
U.S. Cl. 313—533 1 Claim

1. Photomultiplier tube (10) comprising a photocathode (20), a first cylindrical dynode (30) of generatrices (31) orthogonal to an axis (11) and which is intended to receive the photoelectrons (21) emitted by the photocathode (20), an electron multiplier device (40) of the "leaf" type, and a device (50) for coupling the first dynode (30) to the multiplier device (40), the axis (41) of the multiplier device (40) being parallel to the said axis (11), characterized in that the said coupling device (50) consists, of a first electrode (51) composed of a cylindrical lateral plate (52) of axis parallel to that of the multiplier device, sur-

rounding the first dynode (30) and the entrance (42) of the multiplier device (40), and of an upper plate (53) which is supported, facing the photocathode (20), on the lateral plate (52), and pierced by an opening (54) for passage of the photoelectrons (21) towards the first dynode (30) and, a second plane electrode (55), parallel to the generatrices (31) of the first



dynode and situated between the exit (32) of the first dynode (30) and the entrance (42) of the multiplier device (40), and in that the electrical potential ( $V_0$ ) of the first electrode (51) is positive in relation to that of the photocathode (20) and substantially equal to that of the first dynode (30), while the electrical potential ( $V_1$ ) of the second electrode (55) is greater than that ( $V_0$ ) of the first electrode.

4,956,577

**INTERACTIVE LUMINOUS PANEL DISPLAY DEVICE**

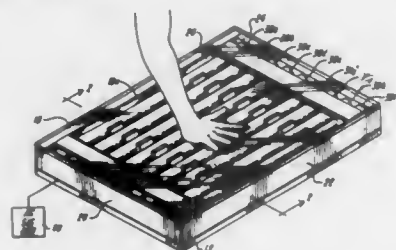
William P. Parker, Box 909, Waitsfield, Vt. 05673-0909

Continuation-in-part of Ser. No. 192,225, May 10, 1988, Pat. No. 4,887,003. This application Aug. 24, 1988, Ser. No. 235,660

Int. Cl.<sup>3</sup> H01J 17/02, 17/16; G09G 3/02

U.S. Cl. 313-634

45 Claims



1. An interactive luminous display device comprising:
  - a. an at least partially transparent, non-conductive sheet member having front and back surfaces, said first sheet member having a coupling region on portions of its front surface, said coupling region being adapted to receive thereon an externally applied conductive member;
  - b. a base member having front and back surfaces, and including an electrically conductive region on at least one of said surfaces;
  - c. spacer means for mutually positioning said sheet member and said base member whereby the back surface of said sheet member is offset by a predetermined distance from and opposite the front surface of said base member and said conductive region of said base member underlies at least a portion of said coupling region of said sheet member;
  - d. discharge chamber means for establishing one or more discrete gas impervious chambers between portions of the back surface of said sheet member and the front surface of said base member, said chambers defining closed regions in the gap between said back surface of said sheet member and the front surface of said base member and lying at

least partially between said coupling region and said conductive region of said base member; and  
e. electroluminescent gas disposed within said closed regions.

4,956,578

**SURFACE CONDUCTION ELECTRON-EMITTING DEVICE**

Akira Shimizu, Inagi; Hideohshi Suzuki, Atsugi; Masahiko Okanuki, Tokyo; Haruhito Ono, Ashigara; Ichiro Nomura, Yamato; Yoshikazu Banno, Atsugi; Toshihiko Takeda, Tokyo, and Tetsuya Kaneko, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

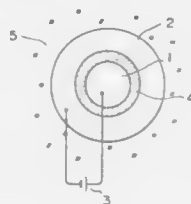
Filed Jul. 27, 1988, Ser. No. 224,912

Claims priority, application Japan, Jul. 28, 1987, 62-186648; Jun. 10, 1988, 63-141562; Jun. 10, 1988, 63-141563

Int. Cl.<sup>3</sup> H01J 29/96

U.S. Cl. 315-3

22 Claims



1. A surface conduction electron-emitting device comprising a high-potential electrode provided on a substrate surface, an electron-emitting region provided in contact with the entire periphery of an exposed part of said high-potential electrode, and a low-potential electrode further provided in contact with the entire periphery of said electron-emitting region.

4,956,579

**PLASMA DISPLAY USING A DOUBLE-WALLED ENCLOSURE**

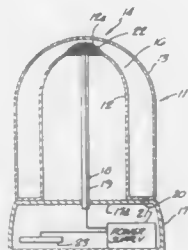
Larry W. Albright, 419 Sunset Ave., Venice, Calif. 90291

Filed Oct. 14, 1988, Ser. No. 258,200

Int. Cl.<sup>3</sup> H05B 37/00

U.S. Cl. 315-58

19 Claims



1. A gas discharge display device comprising:
  - a. a gas containing envelope in the form of a double walled cylinder closed at one end and open at its other end, with the double walls of the cylinder defining an enclosed gas discharge area, said double walls being of a transparent dielectric material, the gas discharge area formed by the double walls being filled with an ionizable gas,
  - b. an electrode disposed adjacent to or within the gas discharge area between the cylinder walls at the closed end of the envelope cylinder,
  - c. a ground potential reference point outside the double walled cylinder, and
  - d. a power supply for coupling an a.c. electrical signal between said electrode and the ground potential reference point for

producing visible electrical discharges in said gas discharge area,  
wherein the double walls of the cylinder are spaced between one-fourth of an inch and an inch apart.

4,956,580

**AUTOMATIC CAR LAMPS LIGHTING CONTROLLER**

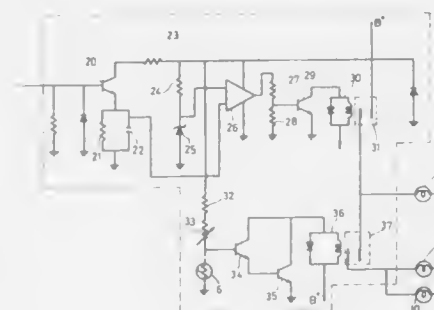
Wang Ynn-Shang, No. 4, Lane 34, An Jiu Street, Taipei, Taiwan

Filed Jul. 6, 1988, Ser. No. 215,640

Int. Cl.<sup>3</sup> B60Q 1/26

U.S. Cl. 315-83

3 Claims



1. In a vehicle having a spark ignition engine and a lamp system: the improvement comprising means for automatically energizing lamps in the lamp system in response in operation of the engine and variations in ambient light conditions in the vicinity of the vehicle;

said energizing means comprising an induction coil (3) in close physical proximity to an engine spark plug wire to generate an electrical signal only when the engine is operating;

an amplifier means (20) connected to said induction coil to provide an amplified signal when the engine is operating;

a comparator (26) having two inputs;

means (at 24,25) for supplying a reference voltage to one of the comparator inputs;

circuit means for supplying said amplified signal to the other comparator input, whereby the comparator produces an output trigger signal only when the engine is operating;

a first relay (30) having a first set of contacts (31) for supplying current to the lamp system;

circuit means (at 29) for applying the trigger signal to the first relay for energizing same;

a second relay (36) having a second set of contacts (37) in circuit with said first set of contacts to control current flow to at least some of the lamps in the lamp system;

and a photoresistance means (6) responsive to external ambient light conditions to control current flow through said second relay, whereby lamps in the lamp system are automatically turned on when the engine is operating and the ambient light level is below a predetermined value.

4,956,581

**FLYBACK CONVERTER MICROWAVE OVEN POWER SUPPLY**

Ole K. Nilssen, Caesar Dr., Rte. 5, Barrington, Ill. 60010

Continuation of Ser. No. 808,286, Dec. 12, 1985, abandoned.

This application Jun. 12, 1989, Ser. No. 366,269

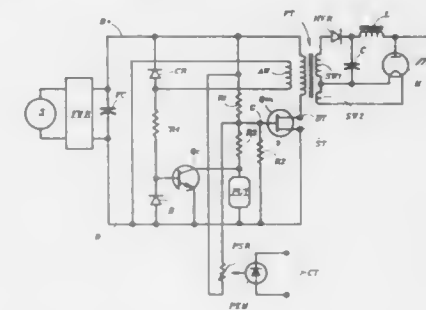
Int. Cl.<sup>3</sup> H05B 39/00, 41/14, 6/64; H02M 3/335

U.S. Cl. 315-101

7 Claims

1. An arrangement comprising:
  - a. a source of DC voltage;
  - b. a magnetron having a high-voltage DC input;
  - c. power supply means connected with the source and operable to provide unidirectional current pulses to a high-voltage DC output; and

filter means connected between the high-voltage DC output and the high-voltage DC input, thereby to provide to this



high-voltage DC input a unidirectional current of substantially constant magnitude.

4,956,582

**LOW TEMPERATURE PLASMA GENERATOR WITH MINIMAL RF EMISSIONS**

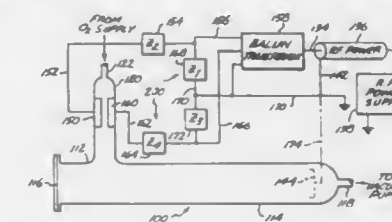
Roger J. Bourassa, Kent, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Apr. 19, 1988, Ser. No. 183,648

Int. Cl.<sup>3</sup> H01J 7/24, 17/26; H05B 31/26; H01Q 3/10

U.S. Cl. 315-111.21

19 Claims



1. A low temperature plasma generator having reduced radio frequency noise emissions, comprising:

- (a) a chamber formed of a material that is substantially electrically nonconductive, said chamber including a vacuum port adapted for connection to a vacuum pump and an inlet port adapted for connection to a source of a gas;
- (b) a first and a second electrode disposed in proximity to the chamber, spaced apart, but generally adjacent each other;
- (c) a radio frequency power source;
- (d) a transformer having primary terminals connected to the radio frequency power source, and secondary terminals isolated from ground potential upon which potentials are developed having opposite polarity in respect to each and varying about ground potential; and
- (e) balanced impedance matching means electrically connecting the secondary terminals of the transformer to the first and second electrodes, for matching an output impedance of the secondary terminals to an input impedance of the first and the second electrodes.



4,956,583

## CONTROL SYSTEM FOR ELECTRICAL LIGHTING

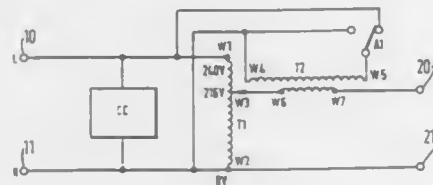
John A. Lawrence, and David A. Flach, both of Nutley, England, assigns to Econolight Limited, London, England  
PCT No. PCT/GB87/00756, § 371 Date Jul. 11, 1988, § 102(c)  
Date Jul. 11, 1988, PCT Pub. No. WO88/03353, PCT Pub. Date May 5, 1988

PCT Filed Oct. 26, 1987, Ser. No. 207,158  
Claims priority, application United Kingdom, Oct. 27, 1986, 8625690; Oct. 27, 1986, 8625691

Int. Cl.<sup>5</sup> H05B 37/00

U.S. Cl. 315—220

13 Claims



1. A control system for lighting rated to operate at a normal mains supply voltage comprising:  
first transformer means for providing a reduced voltage below normal mains voltage for the lighting to provide reduced power during operation thereof;  
second transformer means for providing a supplementary voltage when initially operating the lighting to increment the reduced voltage to a value approximating said normal mains voltage; and  
means for thereafter removing the supplementary voltage;  
said second transformer means including means defining primary and secondary windings, the primary and secondary windings being arranged so as to induce said supplementary voltage in the secondary winding when said primary winding is energized, and the control system being so arranged that the secondary winding present negligible impedance to current flow from the first transformer means to the lighting when not producing said supplementary voltage.

4,956,584

## STROBE TRIGGER PULSE GENERATOR

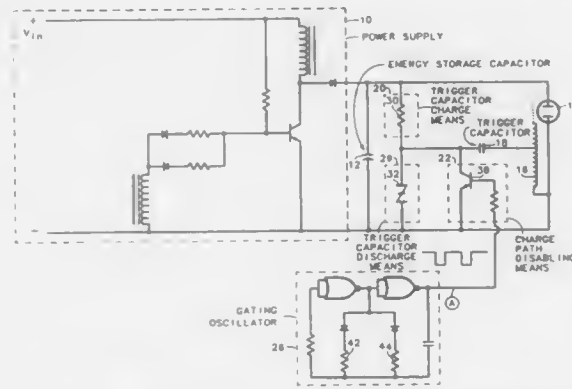
Scott T. Sikora, Mesa, Ariz., assignor to Tomar Electronics, Inc., Gilbert, Ariz.  
Continuation-in-part of Ser. No. 238,039, Aug. 29, 1988, which is a continuation of Ser. No. 42,357, Apr. 24, 1987, Pat. No. 4,775,821, which is a continuation-in-part of Ser. No. 794,415, Nov. 4, 1984, Pat. No. 4,682,081. This application Oct. 31, 1988, Ser. No. 265,414

Int. Cl.<sup>5</sup> H05B 37/00, 39/00; H02M 3/335, 7/537  
U.S. Cl. 315—241 R

39 Claims

1. Apparatus for delivering current to an intermittently energized gaseous discharge tube comprising:  
a. a power supply for receiving an input voltage and for generating an output voltage;  
b. an energy storage capacitor coupled to be charged to a predetermined voltage by the power supply;  
c. a trigger pulse generator for intermittently energizing a trigger pulse transformer including  
i. a trigger capacitor having first and second leads, the first lead being coupled to the trigger pulse transformer;  
ii. trigger capacitor charging means having an input terminal coupled to receive the power supply output voltage and an output terminal coupled to the second lead of the trigger capacitor for establishing a current flow path between the power supply and the trigger capacitor to direct a charging current to the trigger capacitor;  
iii. trigger capacitor discharge means coupled to the second lead of the trigger capacitor for periodically discharging the trigger capacitor through the trigger pulse

- transformer to generate a high voltage trigger pulse; and  
iv. charge path disabling means continuously coupled to the current flow path between the power supply and the



- trigger capacitor to actively control the charging current directed to the trigger capacitor without removing the input voltage from the power supply to control the generation of trigger pulses independent of the energy storage capacitor voltage.

4,956,585

## LINE DEFLECTION CIRCUIT FOR A PICTURE TUBE

Gérard Rilly, Unterkirchbach, France, assignor to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

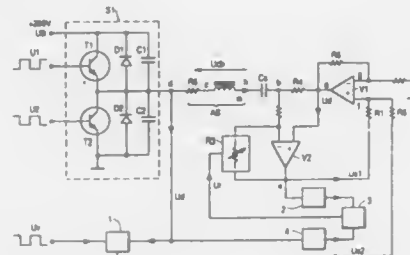
PCT No. PCT/EP88/00259, § 371 Date Oct. 27, 1989, § 102(c)  
Date Oct. 27, 1989, PCT Pub. No. WO88/07799, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 29, 1988, Ser. No. 411,486  
Claims priority, application Fed. Rep. of Germany, Apr. 2, 1987, 3711173

Int. Cl.<sup>5</sup> H01J 29/56, 29/70, 29/72

U.S. Cl. 315—371

9 Claims



1. A line deflection circuit for a picture tube, for generating a deflection current in a deflection coil and a tangential capacitor, said deflection circuit comprising:  
an active switch for supplying a near square wave shaped output voltage to one end of said deflection coil, at half line frequency and at a keying ratio of 1:1; and  
an amplifier having an output coupled to the other end of said deflection coil and having a control input responsive to at least one of first and second corrective variables to assure linearity of a deflection current flowing through said deflection coil and line centered zero crossing of said deflection current, said first corrective variable being representative of said deflection current through said deflection coil and said second corrective variable being related to a deviation of said output voltage from said square wave shape.

4,956,586

## FREQUENCY INDEPENDENT CRT HORIZONTAL SWEEP GENERATOR HAVING CURRENT FEEDBACK AND IMPROVED PINCUSHION CORRECTION CIRCUITRY

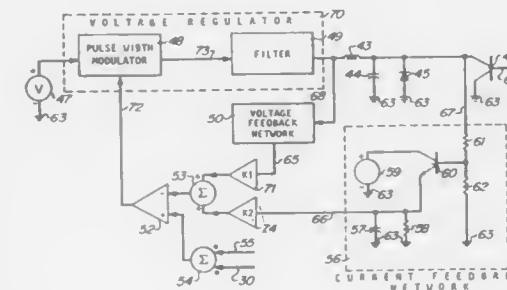
Kirk P. Gipson, Roseville, and Ronald M. Guly, Davis, both of Calif., assigns to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 3, 1989, Ser. No. 318,285

Int. Cl.<sup>5</sup> H01J 29/70

U.S. Cl. 315—387

13 Claims



1. A signal generator for generating a yoke signal for application to a horizontal yoke of a cathode ray tube, the signal generator having as a first input a first dc signal at a width voltage which determines the width of horizontal scan lines of the cathode ray tube and having a second input a pincushion correction signal having a pincushion correction signal voltage, the signal generator comprising:

- a voltage source;
- yoke current generator means, coupled to the horizontal yoke for generating a yoke current, the yoke current passing through the horizontal yoke, the yoke current having a peak value;
- current feedback network, coupled to the yoke generator means, the current feedback network generating a first feedback signal with a first feedback signal voltage proportional to the peak value of the yoke current;
- voltage feedback network, coupled to the horizontal yoke, for generating a second feedback signal with a second feedback signal voltage proportional to a yoke voltage applied to the horizontal yoke;
- first summing means, coupled to the first input and to the second input, for producing a first summing signal having a first summing signal voltage which is the sum of the width and the pincushion correction signal voltage;
- second summing means, coupled to the current feedback network and to the voltage feedback network, for producing a second summing signal which has a second summing signal voltage which is the sum of the first feedback signal voltage and the second feedback signal voltage;
- amplification means, coupled to the first summing means and to the second summing means for producing a third feedback signal having a third feedback signal voltage, the third feedback signal voltage being dependent on the difference of the first summing signal voltage and the second summing signal voltage; and
- voltage regulator means, coupled to the voltage source, the horizontal yoke, the voltage feedback network and the amplification means, for regulating the yoke voltage based on the third feedback signal voltage.

4,956,587

## HORIZONTAL DEFLECTION-HIGH VOLTAGE CIRCUIT

Kouji Kitou, and Makoto Onozawa, both of Yokohama, Japan, assigns to Hitachi, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 204,288, Jun. 9, 1988. This

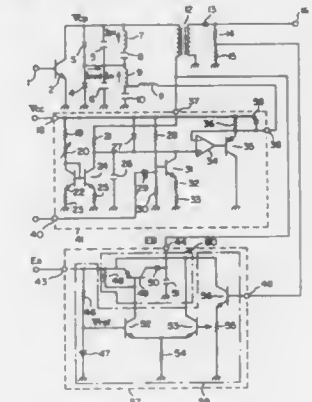
application Jan. 26, 1989, Ser. No. 301,531

Claims priority, application Japan, Jan. 29, 1988, 63-17006

Int. Cl.<sup>5</sup> H01J 29/70, 29/76

U.S. Cl. 315—408

14 Claims



1. Horizontal deflection signal and high voltage signal generator for driving a cathode ray tube comprising:

- a horizontal output transistor;
- a damper diode connected to said horizontal output transistor in parallel;
- a resonance means having a first resonance circuit and a second resonance circuit connected in parallel to said damper diode, wherein said first resonance circuit has a horizontal deflection coil connected to a first capacitor in series and said second resonance circuit has a modulating coil connected to a second capacitor in series;
- a flyback transformer wherein one end of a first winding of said flyback transformer is connected to said first resonance circuit;
- a voltage regulating means connected between the other end of said first winding of said flyback transformer and a voltage supply terminal, which controls voltage supplied to said first winding of said flyback transformer for keeping output voltage on a second winding of said flyback transformer constant; and
- a horizontal deflection current control means which detects deviation of said voltage supplied to said first capacitor and controls a voltage supplied to said second capacitor according to said detected deviation.

4,956,588

## ATTACHABLE HAND-OPERATED/AUTOMATIC DUAL USAGE VENETIAN BLIND CONTROLLER

Nien Ming, Room C. 4th FL, No. 99, Jen-Ai Rd., Sec. 4, Taipei, Taiwan

Filed Dec. 21, 1989, Ser. No. 454,463

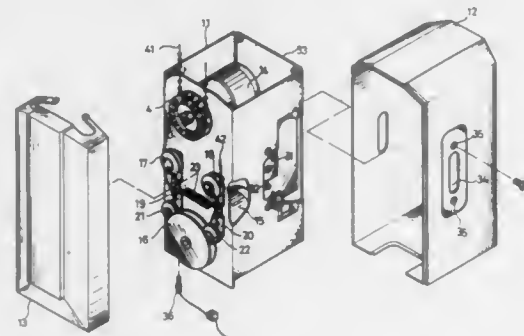
Int. Cl.<sup>5</sup> H04Q 9/02

U.S. Cl. 318—16

4 Claims

1. An attachable hand-operated/automatic dual usage venetian blind controller, including two DC motor and speed reducing gear set assemblies, a housing, an inner casing, an outer cover, a beading cord driving wheel, a pull cord driving wheel, two guide wheels, two pressure wheels, a spring, an infrared transmitter, and an infrared receiver control circuit, said inner casing being received in said housing covered with said outer cover and having two holes for positioning therein said two DC motor and speed reducing gear set assemblies respectively, said infrared receiver control circuit being

mounted on said inner casing at its back side, said beading cord driving wheel being mounted on a shaft on one of said two DC motor and speed reducing gear set assemblies and having a circular channel for mounting thereon a beading cord of a venetian blind, and a plurality of round holes bilaterally disposed on the two circular side walls defined by its circular channel, said pull cord driving wheel being made of resilient rubber material for mounting thereon of a pull cord of same venetian blind and fixedly attached to the other one of said two DC motor and speed reducing gear set assemblies, said two guide wheels being respectively mounted on two elongated plates at one ends thereof and firmly secured to said inner casing between said beading cord driving wheel and said pull cord driving wheel, said two pressure wheels being mounted on said two elongated plates at the opposite ends thereof, said



spring being connected between said two elongated plates to constantly pull said two pressure wheels inward to press on any cord mounted on the circular channel of said pull cord driving wheel, said infrared receiver control circuit being comprised of an infrared receiver, a microprogram control unit, two driving circuits and two motor overload detecting circuits,

wherein said infrared receiver control circuit drives either one of said two DC motor and speed reducing gear set assemblies to carry said beading cord driving wheel or said pull cord driving wheel to rotate, according to the signal received from said infrared transmitter, to further pull out or draw up the blades of the connected venetian blind or turn the blades of such a venetian blind to change their angular position.

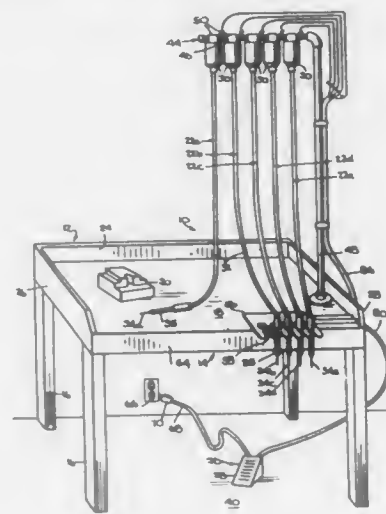
**4,956,589**  
**INTEGRATED TOOL CONTROL FOR WORK STATION**  
Victor M. Cherlo, 127 Archer Ave., Mount Vernon, N.Y. 10550  
Filed Dec. 12, 1988, Ser. No. 283,121  
Int. Cl.<sup>5</sup> H02P 7/36

U.S. Cl. 318—67

11 Claims

1. An integrated control system for a work station comprising:  
a speed control means;  
a plurality of power means for driving respective tools at the work station;  
means at the work station for selectively switching individual ones of the power means to the speed control means, and wherein each of said power means is provided with an output flexible drive member; and  
said switching means includes selector means responsive to the presence of respective ones of said flexible drive mem-

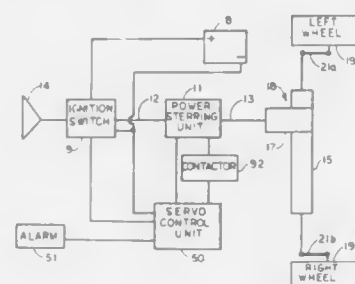
bers, said switching means being activated to apply power via said speed control means to the selected power means



for which the flexible drive member is removed from the switching means.

**4,956,590**  
**VEHICULAR POWER STEERING SYSTEM**  
Edward H. Phillips, Middletown, Calif., assignor to Techco Corporation, New York, N.Y.  
Filed Oct. 6, 1988, Ser. No. 254,968  
Int. Cl.<sup>5</sup> G05B 11/10; B62D 5/04  
U.S. Cl. 318—432

1 Claim



1. A steering assembly for multiplying steering torque and motion applied to a steering wheel of a vehicle by fixed and selectively varying ratios, respectively, said assembly comprising:

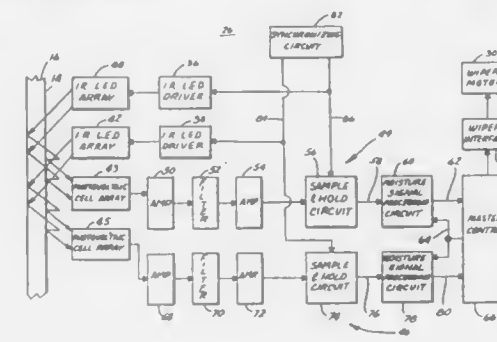
input shaft means for coupling steering torque and motion applied to the steering wheel to a sun gear of a planetary gear set,  
torque generating means  
means for coupling the torque generating means to a ring gear of the planetary gear set,  
means for determining rotational motion of the input shaft means,  
means for controlling rotational motion of the torque generating means in a rotational motion which is a selected function of the rotational motion of the input shaft,  
means for determining actual rotational motion of the torque generating means,  
means for terminating rotational motion of the torque generating means if the actual rotational motion of the torque generating means does not substantially match the selected rotational motion,

planetary gear and carrier means for receiving output torque and rotational motion from both the sun and ring gears, output shaft means for delivering the output torque and rotational position to a steering gear, whereby steering of said vehicle is maintained when failure of said torque generating means occurs.

**4,956,591**  
**CONTROL FOR A MOISTURE SENSOR**  
Kenneth L. Schierbeek, Zeeland; Mark L. Larson, Grand Haven, and Kenneth Schofield, Holland, all of Mich., assignors to Doanally Corporation, Holland, Mich.  
Continuation-in-part of Ser. No. 317,288, Feb. 28, 1989. This application Jul. 10, 1989, Ser. No. 377,589  
Int. Cl.<sup>5</sup> B60S 1/08

U.S. Cl. 318—483

35 Claims



12. A moisture sensing control for use with a window to detect and indicate the presence of moisture on a surface of said window, said control comprising:

emitter means for intermittently emitting a signal in a manner that said signal is modified in response to moisture on said window;  
circuit means for periodically actuating said emitter means to emit said signal for a predetermined duration of time; detecting means for detecting and processing said signal to produce a moisture signal that is a function of said signal; and  
inhibiting means responsive to said circuit means for inhibiting said detecting means from detecting and processing said signal except during said duration when said emitter means is actuated by said circuit means to emit said signal.

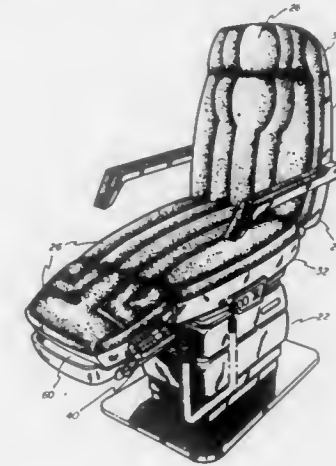
**4,956,592**  
**AUTOMATICALLY POSITIONABLE CHAIR**  
Stephen R. Schulte; Stephen C. Wissel, both of Cincinnati, and John B. Wilker, Sr., Fairfield, all of Ohio, assignors to Midmark Corporation, Versailles, Ohio  
Filed Mar. 31, 1989, Ser. No. 331,931  
Int. Cl.<sup>5</sup> G05B 11/01; A47C 1/02

U.S. Cl. 318—560

15 Claims

1. In a positionable chair comprising a moveable support surface, an electric motor for moving said support surface to a continuously variable series of work positions, a power supply for said electric motor and switch means for selectively connecting said motor to said power supply and causing said support surface to move to said work positions; improved positioning control apparatus comprising:  
timing means for indicating the time consumed during movement of said support surface,  
sensing means for sensing the current drawn by said motor during said movement,  
computing means responsive to said timing means and to said sensing means for computing a position parameter related to the position of said support surface, and

control means responsive to a target value of said position parameter for stopping said motor.  
14. Method of positioning a chair surface by an electric motor comprising the steps of:  
measuring the current drawn by said motor,

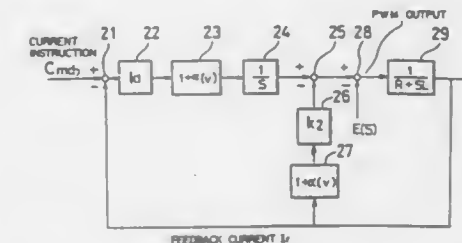


using the measured value of said current to determine the speed of said motor, integrating said speed over time to obtain a position parameter, and  
stopping said motor when said position parameter has reached a predetermined target value.

**4,956,593**  
**SERVO MOTOR CONTROLLING METHOD**  
Keiji Sakamoto, Hachioji; Shinji Seki, Kokubunji, and Yasusuke Iwashita, Minamitsuru, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan  
PCT No. PCT/JP88/00978, § 371 Date May 24, 1989, § 102(e) Date May 24, 1989, PCT Pub. No. WO89/03611, PCT Pub. Date Apr. 20, 1989  
PCT Filed Sep. 22, 1988, Ser. No. 368,291  
Claims priority, application Japan, Oct. 14, 1987, 62-259333  
Int. Cl.<sup>5</sup> G05B 13/00

U.S. Cl. 318—561

5 Claims



1. A servo motor controlling method for controlling both speed and current of a servomotor under digital control, and having a current controlling loop in a speed loop, comprising the steps of:

(a) sensing the speed of the servo motor; and  
(b) controlling an integration gain and a loop proportional gain of the current controlling loop, the integration gain and the proportional gain being changed depending upon the speed of the servo motor.



4,956,594

## METHOD OF CONTROLLING A ROBOT IN ACCORDANCE WITH LOAD CONDITIONS

Toru Mizuno, Tama; Haruyuki Ishikawa, Shinjuku, and Takashi Iwamoto, Oshino, all of Japan, assignors to Fanuc Ltd., Minamitsura, Japan

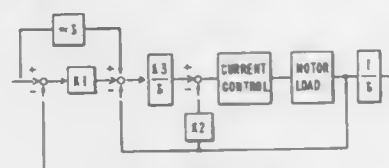
PCT No. PCT/JP88/00948, § 371 Date Mar. 23, 1989, § 102(e) Date Mar. 23, 1989, PCT Pub. No. WO89/02624, PCT Pub. Date Mar. 23, 1989

PCT Filed Sep. 17, 1988, Ser. No. 332,934

Claims priority, application Japan, Sep. 19, 1987, 62-233638 Int. Cl.<sup>5</sup> G05B 19/42

U.S. Cl. 318—568.1

10 Claims



K1, K2 PROPORTIONAL GAIN  
K3 INTEGRATING GAIN  
K4 DIFFERENTIATING GAIN

1. A method of controlling a robot in accordance with load conditions, comprising the steps of:

- storing beforehand load conditions for various operations of the robot;
- reading a program including operation commands, for instructing a series of operations to be executed by the robot, and load condition commands, each representing a load condition for a corresponding operation in the series of operations;
- reading one of the load conditions stored in step (a) corresponding to a load condition command individually read from the program in step (b), and determining a desired control condition based on the load condition read; and
- controlling the robot in accordance with the desired control condition determined in step (c).

4,956,595

## DRIVING CIRCUIT FOR A FIVE-PHASE STEPPING MOTOR

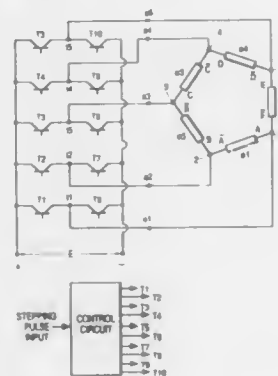
Satomi Hirofumi, and Domeki Hideo, both of Kashiwa, Japan, assignors to Oriental Motors Corp., Ltd., Tokyo, Japan

Filed May 9, 1988, Ser. No. 191,416

Claims priority, application Japan, Oct. 16, 1987, 62-261315 Int. Cl.<sup>5</sup> H02P 8/00

U.S. Cl. 318—696

6 Claims



1. For a five-phase stepping motor energizable by a power source having a positive pole and a negative pole, with the motor including five phase-windings each having a starting

end and a terminating end in which each of the starting ends of one phase-winding is successively connected at a junction to each of the terminating ends of another phase winding to form a ring,

a driving circuit, comprising:

a plurality of pairs of switching means connected in series to each other, each of said pairs including a connection therebetween, said connections each being connected to one of the junctions between the phase-windings, one of each pair of the switching means being connected to the positive pole of the power source and the other of each pair of the switching means being connected to the negative pole of the power source so that the switching means can be turned on and off to connect the junctions to a pole of the power source,

pulsing means responsive to input pulses for actuating said switching means and turning the switching means on and off in one of two sequences, the first of the sequences being such that at each pulse the switching means connect a total number of four junctions to the poles of the power source and the other of the other of said sequences includes two alternately repeated states in one state of which the switching means connect a total number of three junctions to the poles of the power source and in another state of which the switching means connect a total number of four junctions to the poles of the power source.

4,956,596

## VARIABLE SPEED DRIVE SYSTEM

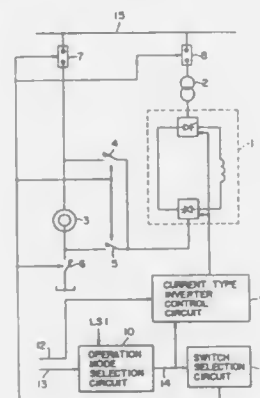
Yoshihiro Ogashi, Funabashi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 17, 1989, Ser. No. 422,551

Claims priority, application Japan, Oct. 17, 1988, 63-259381 Int. Cl.<sup>5</sup> H02P 7/62

U.S. Cl. 318—801

5 Claims



- An a.c. variable speed drive system comprising:
  - a forced commutation type inverter for controlling a wound-rotor type induction motor at variable speed;
  - an operation mode selection circuit for selectively outputting either a driving operation signal or a regenerative operation signal for said forced commutation type inverter by comparing an operation speed feedback signal from said wound-rotor type induction motor with a predetermined judgement value;
  - a forced commutation type inverter control circuit for causing said forced commutation type inverter to operate in a driving operation mode or a regenerative operation mode in accordance with an output from said operation mode selection circuit;
  - a connection circuit for supplying an output from a converter of said forced commutation type inverter to said wound-rotor type induction motor via a path suitable for

said driving operation mode or said regenerative operation mode; and  
a switch circuit for switching a path of said connection circuit in accordance with the output of said operation mode selection circuit.

4,956,597

## METHOD AND APPARATUS FOR CHARGING BATTERIES

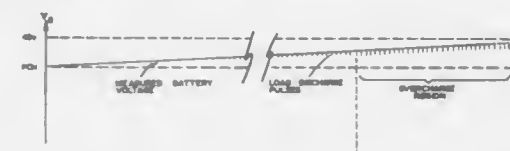
Frederick D. Heavey, St. Paul, and Rudolph Engleman, Minneapolis, both of Minn., assignors to American Monarch Corporation, Minneapolis, Minn.

Continuation of Ser. No. 10,828, Feb. 4, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,102

Int. Cl.<sup>5</sup> H02J 7/00; H01M 10/44

U.S. Cl. 320—14

31 Claims



1. Apparatus for charging a battery of the type that enters into a gassing phase when full charge is approached, comprising:

- means for applying charging current to charging terminals of the battery;
- means operatively connected with said battery charging terminals for periodically operatively connecting a load across said battery terminals;
- means operatively connected to said load for sensing the electrical response of said load when energized by said battery and for providing a sensed load signal in response thereto;
- means operatively connected to receive said sensed load signal for isolating therefrom that portion of said sensed load signal attributable only to energization of said load by said battery;
- means operatively connected to receive said isolated sensed load signal for determining therefrom when said battery enters its gassing phase and for producing a gassing phase signal indicative of the gassing phase condition of said battery; and
- means operatively connected with said battery and to receive said gassing phase signal for applying a predetermined overcharge to said battery after said battery has entered into its gassing phase.

4,956,598

## LOW DISTORTION CONTROL FOR A VSCF GENERATING SYSTEM

Bradley J. Recker, Thong-Meng Cheng, Derrick I. Roe, all of Rockford, Ill., and Christopher J. Rozman, Delavan, Wis., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 16, 1988, Ser. No. 285,423

Int. Cl.<sup>5</sup> H02P 9/42; H02M 5/32; H02J 3/00

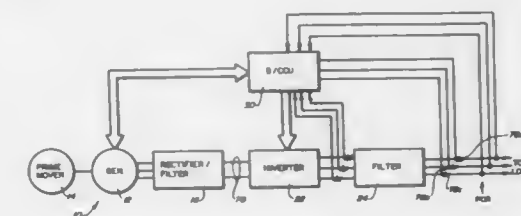
U.S. Cl. 322—28

16 Claims

1. A control for a variable speed, constant frequency (VSCF) system having a generator including an exciter and which develops generator AC output power, a rectifier for rectifying the generator AC output power to produce DC power on a DC link and an inverter coupled to the DC link which is controlled to produce AC power at a desired frequency at an inverter output, comprising:

- means for sensing a parameter of the AC power;
- means for sensing a parameter of the DC power;
- means responsive to the parameter of the AC power for developing a control signal for controlling the inverter to

maintain the parameter of the AC power at a desired level; and



means responsive to the developing means and to the parameter of the DC power for controlling the generator exciter to maintain the parameter of the DC power at a particular level relative to the parameter of the AC power.

4,956,599

## POWER CONTROL APPARATUS

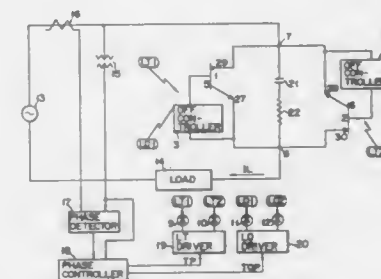
Jun-ichi Nishizawa, Takashige Tamamushi, both of Sendai; Koji Ishibashi, and Kiyoshi Wagatsuma, both of Tagajo, all of Japan, assignors to Tohoku Electric Manufacturing Co., Ltd., Tagajo and Zaidan Hojin Handotai Kenkyu Sinkokai, Sendai, both of, Japan

Filed Jan. 19, 1989, Ser. No. 298,900

Claims priority, application Japan, Jan. 22, 1988, 63-12096 Int. Cl.<sup>5</sup> G05F 1/455

U.S. Cl. 323—244

4 Claims



- A power control apparatus comprising:
  - static induction thyristor AC switch means including at least a pair of static induction thyristors coupled in parallel in mutually opposite bias directions between an AC power source and a load;
  - ON control means for turning on said static induction thyristor AC switch means, said ON control means including, a first phase control section for outputting a turn-on timing pulse within an ignition phase angle of 180° overlapping a zero-cross point of an AC voltage output from said AC power source, and
  - a light trigger driver section for irradiating a light ON signal directly on said pair of static induction thyristors in response to said timing pulse; and
  - OFF control means for turning off said static induction thyristor AC switch means, said OFF control means including, a phase detecting section for detecting a phase difference between said AC voltage and an AC current output from said AC power source,
  - a second phase control section for providing a phase-controlled turn-off timing pulse within a given period of said AC current using phase difference data attained from said phase detecting section and said AC voltage, and
  - a light quench driver section for supplying an OFF control signal to said static induction thyristor AC switch means in response to said turn-off timing pulse.

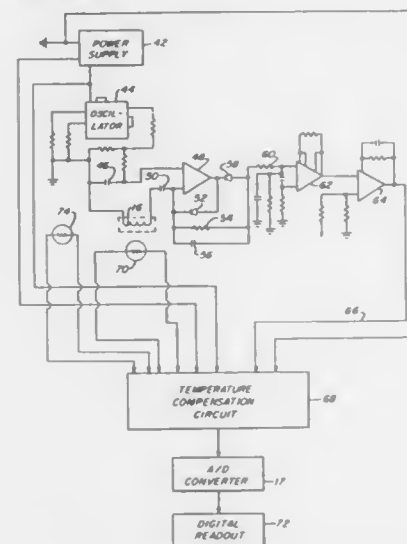
1. A structure comprising:
  - a carrier tape having an elongated dimension and a plurality of sets of beam leads thereon;
  - at least one electronic device supported on said tape and electrically connected to at least one set of said beam leads, at least a first said beam lead connected to a common potential connection on said device and at least a second said beam lead connected to a power terminal on said device;
  - a common potential bus which runs along said elongated dimension of said tape and is connected to said first beam lead;
  - a power bus which runs along said elongated dimension and is connected to said second beam lead; and
  - an interposer tape disposed in contact with said carrier tape, said interposer tape having a common potential portion and power portion, said interposer tape aligned with said carrier tape so that its common potential portion and power portion are aligned and in contact respectively with the common potential bus and power bus on said carrier tape.



carrier tape, whereby said interposer tape portions provide parallel conductive pathways for said buses.

**4,956,606**  
**NON-CONTACT INDUCTIVE DISTANCE MEASURING SYSTEM WITH TEMPERATURE COMPENSATION**  
 Richard F. Kwiatkowski, Wexford; Bruce C. Gallagher, Callery, and Jack L. Bicehouse, Renfrew, all of Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.  
 Filed Oct. 17, 1984, Ser. No. 661,726  
 Int. Cl.<sup>5</sup> G01R 33/025  
 U.S. Cl. 324—207.12

7 Claims



1. Apparatus for measuring the distance between a detecting coil and a metallic object comprising:  
 an oscillator,  
 an amplifier having an input,  
 an L-C circuit including a detecting coil and a capacitor in series connecting the output of said oscillator to the input of said amplifier whereby the amplitude of the signal appearing at the output of said amplifier will vary as a function of the distance between said detecting coil and an adjacent metallic object, the frequency of said oscillator being offset with respect to the resonant frequency of said L-C circuit whereby the output of said amplifier is essentially linear,  
 temperature-compensating means connected to the output of said amplifier for altering said output to correct for fluctuations in power supply voltages and electronic component operating characteristics due to temperature variations thereby producing a temperature-compensated signal; and  
 means for indicating the amplitude of said temperature-compensated signal, and, hence the distance between said detecting coil and an adjacent metallic object.

**4,956,607**  
**METHOD AND APPARATUS FOR OPTICALLY MEASURING ELECTRIC CURRENT AND/OR MAGNETIC FIELD**

Masano-i Abe, Tokyo; Syunzo Mase, Tobishima, and Yoshinari Kozuka, Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Feb. 23, 1989, Ser. No. 314,108  
 Claims priority, application Japan, Mar. 3, 1988, 63-50117  
 Int. Cl.<sup>5</sup> G01R 33/032, 19/00

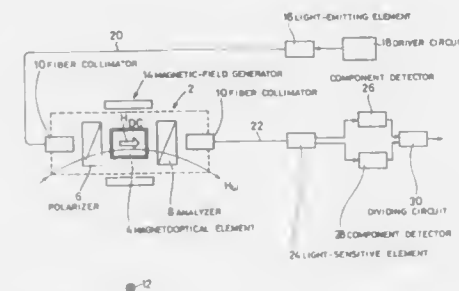
U.S. Cl. 324—244

11 Claims

1. A method of optically measuring the strength of an AC magnetic field, by a measuring apparatus which includes a magneto-optical sensing head having at least a magneto-optical element, a polarizer and an analyzer, a light source device for producing a light beam to which the sensing head is exposed,

and light-sensitive means for converting an optical output of the sensing head into an electric signal, said light beam being modulated into said optical output by the sensing head, according to the strength of said AC magnetic field to which said magneto-optical element is exposed, said method comprising the steps of:

directing said light beam from said light source device through said polarizer, said magneto-optical element and said analyzer, so that a plane of polarization of said light beam from said polarizer is rotated according to a variation in the strength of said AC magnetic field, and such that an angle of rotation of said plane of polarization is converted by said analyzer into an optical intensity signal as said optical output of the sensing head;



exposing said magneto-optical element to a reference magnetic field different from said AC magnetic field, to thereby bias said light beam while said light beam is transmitted through said magneto-optical element;  
 directing said optical intensity signal to said light-sensitive means, which said light sensitive means converts said optical intensity signal into said electric signal;  
 retrieving a first component ( $E\omega$ ) and a second component ( $E_2\omega$ ) of said electric signal which is produced by said light-sensitive means, said first component ( $E\omega$ ) having a same angular frequency as that of said AC magnetic field, while said second component ( $E_2\omega$ ) having an angular frequency which is two times that of said AC magnetic field; and  
 determining the strength of said AC magnetic field, based on said first and second components ( $E\omega$ ) and ( $E_2\omega$ ).

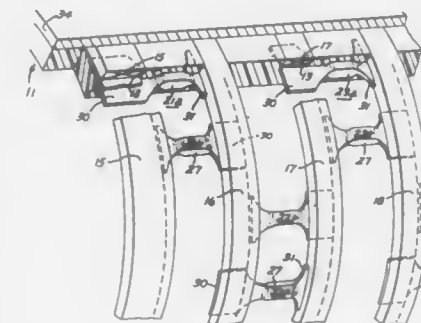
**4,956,608**  
**APPARATUS FOR PROPAGATING A QUENCH IN A SUPERCONDUCTING MAGNET**  
 Bizhan Dorri, Clifton Park; Dan A. Gross, Schenectady, and Lembit Salasoo, Delanson, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.  
 Filed May 1, 1989, Ser. No. 345,333  
 Int. Cl.<sup>5</sup> G01R 33/20

U.S. Cl. 324—319

23 Claims

1. A superconductive magnet for use in magnetic resonance imaging and spectroscopy comprising:  
 a coil form having a plurality of superconductive coils situated coaxially on the coil form spaced apart from one another; and  
 a plurality of pairs of thermal bridges, each of said thermal bridges comprising a bar shaped section connecting a first and second end portion, said first end portion having a surface area greater than the second end portion, each of said pairs of thermal bridges situated between a respective pair of adjacent coils, said bar sections of each of the pairs extending in the direction of the magnet's field generated when the coils are energized, between the adjacent coils, said first end of one of said pair and the second end of the other of said pair in thermal contact with one of the adjacent pair of coils, said second end of one of said pair of thermal bridges and the first end of said other thermal

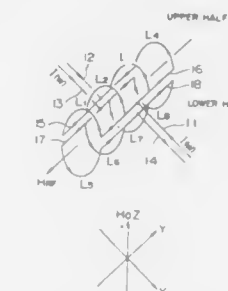
bridge in thermal contact with the other coil of the adjacent pair, so that each thermal bridge of the pair acts as a



heat flux amplifier in an opposite direction between the adjacent coils.

**4,956,609**  
**DIVISIBLE COIL SYSTEM FOR NMR IMAGING APPARATUS**  
 Goh Miyajima, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan  
 Filed Oct. 11, 1988, Ser. No. 255,996  
 Claims priority, application Japan, Oct. 12, 1987, 62-254539  
 Int. Cl.<sup>5</sup> G01R 33/20  
 U.S. Cl. 324—322

38 Claims

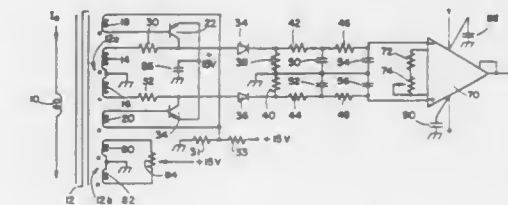


1. In a nuclear magnetic resonance signal detecting system in which a body subject to measurement placed in a static magnetic field is irradiated with a magnetic field of high frequency by means of a high-frequency magnetic field radiating coil and in which a nuclear magnetic resonance signal of said body is detected by means of a nuclear magnetic resonance signal detecting coil,

a high-frequency coil system for the nuclear magnetic resonance comprising a plurality of coil groups including a plurality of coils juxtaposed to one another in a predetermined direction in one of a loop-like form and a solenoid-like form around the predetermined direction, each of the plurality of coils being implemented in such a structure as to be divisible in a direction orthogonal to the predetermined direction, for detecting a magnetic field in an axial direction coinciding with an axis extending through said coil groups and/or generating a magnetic field in said axial direction.

**4,956,610**  
**CURRENT DENSITY MEASUREMENT SYSTEM BY SELF-SUSTAINING MAGNETIC OSCILLATION**  
 James M. Galm, Chardon, and Mark E. Podany, Parma Heights, both of Ohio, assignors to PGM Diversified Industries, Inc., Parma Hts., Ohio  
 Filed Feb. 12, 1988, Ser. No. 155,205  
 Int. Cl.<sup>5</sup> G01N 27/42; G01R 33/00  
 U.S. Cl. 324—425

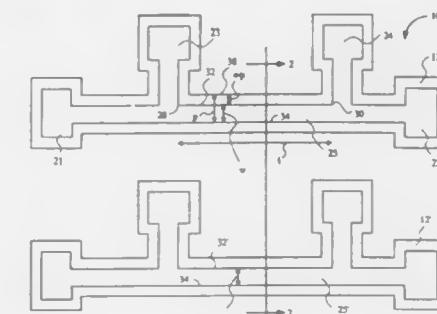
34 Claims



1. A current measuring device comprising:  
 a transformer adapted for placement within a secondary flux source;  
 an oscillator for periodically placing said transformer in forward and reverse flux saturation by application of a periodic voltage to an input winding thereof, whereby a period of the forward and reverse flux saturation is affected by the secondary flux source;  
 a pair of multi-section low pass filters operatively connected to an output winding of the transformer for generating an output signal including a slowly varying DC signal proportional to an on time of said transformer; and,  
 amplifier means for processing the output signal of said pair of multi-section low pass filters, wherein said amplifier output is representative of a current sensed by said transformer.

**4,956,611**  
**ELECTRICAL MEASUREMENTS OF PROPERTIES OF SEMICONDUCTOR DEVICES DURING THEIR MANUFACTURING PROCESS**  
 Ron Maltiel, 933 Eichler Dr., Mountain View, Calif. 94040  
 Filed Apr. 26, 1989, Ser. No. 343,753  
 Int. Cl.<sup>5</sup> G01R 27/22, 27/26, 31/16  
 U.S. Cl. 324—699

14 Claims



1. A method comprising the steps of:  
 constructing a structure on a substrate, said structure serving as the walls of a moat;  
 introducing an electrically conductive liquid into said moat so that said liquid is confined by said structure; and  
 measuring the electrical resistance exhibited by said liquid between a first location within said moat and a second location within said moat, said second location being laterally displaced relative to said first location.

4,956,612

## MAGNETIC MINE FIRING CIRCUIT

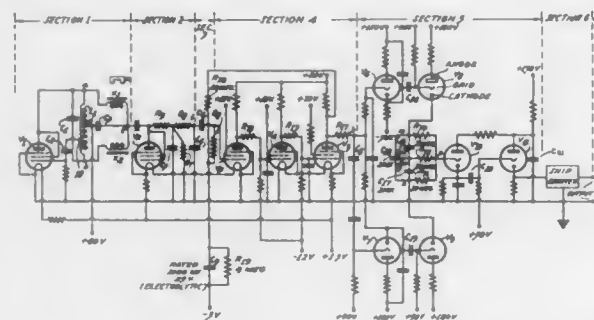
Robert L. Haynes, Indianapolis, Ind., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 30, 1945, Ser. No. 602,618

Int. Cl.<sup>3</sup> F42B 22/04

U.S. Cl. 328—5

5 Claims



5. A control device including a circuit for deriving a direct current signal which is a measure of changes in the strength of a magnetic field, a first gas tube channel connected to respond to a change in said signal in one direction, a second gas tube channel parallel with the first and connected to respond to a change in said signal in the opposite direction, a network for retaining and combining the outputs of said channels, a third gas tube channel connected to respond to a predetermined value of the output of said network, a utilization circuit forming the output of said third channel, said network comprising three resistor capacitor combinations connected in star, one of said combinations being connected in the output circuit of said first gas tube channel, another of said combinations being connected in the output of said second gas tube channel, and the values of the elements of said combinations being chosen to fire said third gas tube channel in response to firing of one of either said first or said second channels within a predetermined period after firing of the other of said first or second channels.

4,956,613

## DIFFERENTIAL AMPLIFIER HAVING EXTERNALLY CONTROLLABLE POWER CONSUMPTION

Bedrich Hosticka, Duisburg; Roland Klink, Dortmund, and Hans-Joerg Pfeleiderer, Zorneding, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

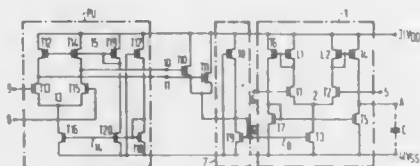
Filed Jan. 16, 1989, Ser. No. 367,268

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1988, 3824832

Int. Cl.<sup>3</sup> H05F 3/45

U.S. Cl. 330—253

8 Claims



1. A differential amplifier having first and second parallel circuit branches each of which contains a load element (L1, L2) and a field effect transistor (T1, T2), respectively, and having a field effect transistor (T3) serving as a current source that is connected via a first circuit node to the first and second

parallel circuit branches (L1, T1; L2, T2) and whose gate terminal is connected to a bias that defines the quiescent currents flowing in these circuit branches, comprising a circuit stage for setting the quiescent currents having an output-side resistor connected to a gate terminal of the field effect transistor (T3) serving as the current source; two additional field effect transistors (T10, T11) of a p-channel type connected in series with the output-side resistor; and a level-converting circuit having an input connected to gate terminals of the field effect transistors (T1, T2) in the parallel circuit branches, that, further, converts the DC part of an input signal to a higher output level that roughly corresponds to the value of the threshold voltage of the two additional field effect transistors (T10, T11) and that has an output side connected to gate terminals of the two additional field effect transistors (T10, T11).

4,956,614

## DEVICE INCLUDING A RADIAL COMBINER FOR ELECTROMAGNETIC WAVES

Michel Baril, Lesigny, France, assignor to Thomson-CSF, Paris, France

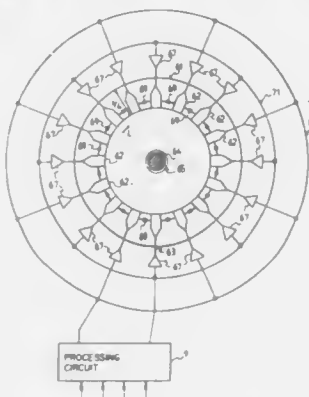
Filed Mar. 30, 1988, Ser. No. 175,193

Claims priority, application France, Apr. 3, 1987, 87 04726

Int. Cl.<sup>3</sup> H03F 3/60

U.S. Cl. 330—286

10 Claims



1. An electromagnetic wave transmitting device comprising:
  - a radial combiner;
  - a plurality of inputs connected to said radial combiner;
  - a plurality of impedance matchers, with each impedance matcher being connected between the radial combiner and a corresponding one of said plurality of inputs;
  - said radial combiner having an output connected to a waveguide;
  - a plurality of transmitting means each connected to a corresponding one of said plurality of inputs;
  - a plurality of resistors connecting impedance matchers which are at the same potential during normal operation;
  - said plurality of inputs arranged into at least two groups with at least one input in each group, a first group comprising certain ones of said plurality of inputs and receiving a first input signal from corresponding transmitting means connected thereto and a second group comprising certain other ones of said plurality of inputs and receiving a second input signal different from said first input signal from corresponding transmitting means connected thereto;
  - a control circuit connected to the transmitting means of at least one of said groups to modify the corresponding input signal;
  - wherein nonidentical signals of each group are combined to produce an output.
10. The device as claimed in claim 1, wherein said transmitting means is an amplifier.

4,956,615

## INPUT CIRCUIT FOR HIGH-FREQUENCY AMPLIFIERS

Rolf Böhme, Bad Friedrichshall, and Günter Gleim, Villingen-Schwenningen, both of Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen and Telefunken electronic GmbH, Heilbronn, both of, Fed. Rep. of Germany

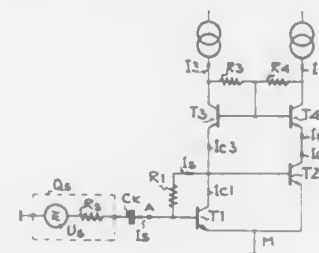
Filed Jul. 10, 1989, Ser. No. 377,406

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824556

Int. Cl.<sup>3</sup> H03F 3/04

U.S. Cl. 330—288

14 Claims



1. An input circuit for high-frequency amplifiers including first, second, third and fourth transistors of the same conductivity type, and wherein: the emitters of said first and second transistors are connected to a reference point; the base of said first transistor forms the input of said circuit; the base of said second transistor is connected to the collector of said first transistor; the collector of said first transistor is connected to the emitter of said third transistor; the collector of said second transistor is connected to the emitter of said fourth transistor; the bases of said third and fourth transistors are connected to one another; the collector of at least one of said third and fourth transistors is connected to a current supply; the collector of said third transistor is connected to the base of said third transistor; the collector of said fourth transistor is connected to the base of said fourth transistor; and at least one of said collector-base connections of said third and fourth transistors is effected via a resistor.

4,956,616

## MUTING CIRCUIT FOR AUDIO AMPLIFIERS

Eduardo Botti, Mortara, Italy, assignor to SGS-Thomson Microelectronics s.r.l.

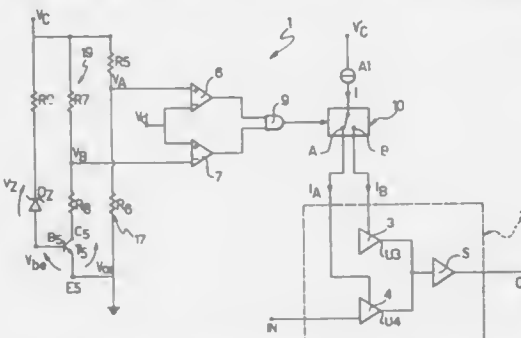
Filed May 31, 1989, Ser. No. 359,363

Claims priority, application Italy, Jun. 2, 1988, 20848 A/88

Int. Cl.<sup>3</sup> H03F 1/26

U.S. Cl. 330—297

11 Claims



1. An audio amplifier circuit comprising first and second input stages having parallel-connected outputs, and output stage having an input connected to the parallel-connected outputs of the first and second stages and an output, said second input stage having an input, means for connecting a signal to the second stage input, a supply voltage and a current source

connected in series, switching means connecting the current source to each of the first and second stages, comparator means connected to the switching means, a reference voltage connected to the comparator means, means for connecting the supply voltage with a time delay to the comparator means, said comparator means being operative to switch the switching means between the first and second stages in response to a comparison of the reference voltage to predetermined voltage values lower than that of the supply voltage.

4,956,617

## MECHANICAL ADJUSTMENT ARRANGEMENT FOR DIELECTRIC RESONATOR OSCILLATOR

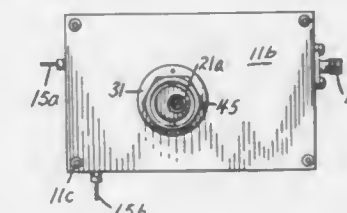
Daniel P. Bowlds, County of Davies, Ky., assignor to MPD, Inc., Owensboro, Ky.

Filed Apr. 10, 1989, Ser. No. 335,766

Int. Cl.<sup>3</sup> H03B 5/18, 7/12, 7/14; H01P 7/10

U.S. Cl. 331—96

8 Claims



1. An arrangement for mechanically adjusting a dielectric resonator mounted on a base member in a control relationship with circuitry for an oscillator comprising an opening extending through said base member, a first member rotatably disposed on one side of said base member over said opening and presenting an off-center opening extending therethrough, a second member rotatably disposed on the other side of said base member over said opening and presenting an off-center dielectric resonator extending in one direction and a centrally disposed stem extending in an opposite direction and through said off-center opening in said first member, whereby said dielectric resonator is movable along both X and Y coordinates, and means securing said stem and said dielectric resonator at a selected X and Y coordinate location.

4,956,618

## START-UP CIRCUIT FOR LOW POWER MOS CRYSTAL OSCILLATOR

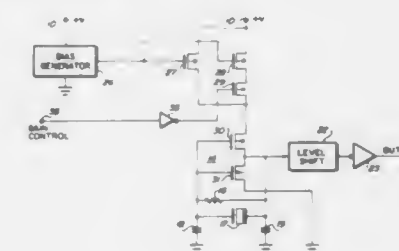
Richard W. Ulmer, Tempe, Ariz., assignor to VLSI Technology, Inc., San Jose, Calif.

Filed Apr. 7, 1989, Ser. No. 334,845

Int. Cl.<sup>3</sup> H03B 5/36

U.S. Cl. 331—116 FE

18 Claims



1. A low power MOS oscillator circuit including in combination:

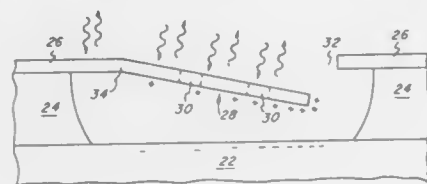


first and second power supply terminals for connection to a source of operating power;  
 first and second complementary MOS transistors, the source-drain circuits of which are connected together in series;  
 resonant circuit means coupled between the drains and gates of said first and second MOS transistors;  
 first current source means including a first current source MOS transistor, the source-drain circuit of which is connected in series circuit with the source-drain circuits of said first and second MOS transistors between said first and second power supply terminals;  
 bias generator means coupled to the gate of said first current source transistor for causing a constant current flow of a predetermined amount therethrough;  
 second current source means connected in parallel with said first current source means and supplying more current than said first current source means; and  
 means for selectively rendering said second current source means operative and non-operative.

4,956,619

## SPATIAL LIGHT MODULATOR

Larry J. Hornbeck, Van Alstyne, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.  
 Continuation of Ser. No. 159,466, Feb. 19, 1988, abandoned, which is a continuation of Ser. No. 636,180, Jul. 31, 1984, abandoned. This application Oct. 28, 1988, Ser. No. 266,220  
 Int. Cl.<sup>5</sup> G07F 1/29; B44C 1/22; C03C 15/00  
 U.S. Cl. 330—4.3 30 Claims



1. A spatial light modulator, comprising:
  - (a) a plurality of pixels formed in a layered structure;
  - (b) said layered structure including a substrate, a spacer layer on said substrate, a reflecting layer on said spacer layer, and electrical addressing circuitry;
  - (c) each of said pixels including
    - i. an electrostatically deflectable element formed in said reflecting layer and
    - ii. a well formed in said spacer and located beneath said deflectable element plus adjacent portions of said reflecting layer, said well characterized by formation by plasma etching of said spacer between said substrate and said reflecting layer with said spacer on said substrate; and
  - (d) said reflecting layer made of conductive material.

4,956,620

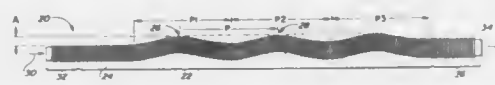
## WAVEGUIDE MODE CONVERTER AND METHOD USING SAME

Charles P. Moeller, Del Mar, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
 Filed Jun. 17, 1989, Ser. No. 381,756  
 Int. Cl.<sup>5</sup> H01P 1/16, 3/00, 3/14  
 U.S. Cl. 333—21 R 21 Claims

1. Waveguide mode converting apparatus for converting a first mode of transmission of electromagnetic power at a given free space wavelength to a second mode of transmission at the same wavelength, said apparatus including a length of circular corrugated waveguide of predetermined inner diameter and annular corrugations formed in a multiperiod periodic planar

curve with a period substantially equal to  $2\pi$  divided by the difference in axial wavenumbers of the respective first and second modes of transmission in said waveguide.

21. A method for converting electromagnetic power at a given free space wavelength from a TE<sub>01</sub> or TM<sub>02</sub> input mode, to an HE<sub>11</sub> output mode, said method comprising applying said power in said input mode to the input end of a length of circu-

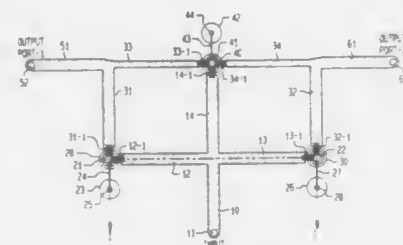


lar corrugated waveguide of given inner diameter and annular corrugations formed in a multiperiod periodic planar curve, adjusting the period of said curve to maximize power radiating from the output end of said length of waveguide in said HE<sub>11</sub> output mode, and adjusting the amplitude of said curve to minimize the power radiating from the output end of said length of waveguide in said input mode, thereby achieving maximum conversion to the HE<sub>11</sub> mode.

4,956,621

## THREE-STATE, TWO-OUTPUT VARIABLE RF POWER DIVIDER

Douglas E. Heckaman, Indialantic; John E. Baker, and Walter M. Whybrew, both of Palm Bay, all of Fla., assignors to Harris Corporation, Melbourne, Fla.  
 Filed Dec. 8, 1987, Ser. No. 129,993  
 Int. Cl.<sup>5</sup> H03H 11/36; H01P 5/12  
 U.S. Cl. 333—104 14 Claims



3. A signal coupling device comprising:
    - an input port;
    - a plurality of output ports;
    - a transmission line interconnect structure connected between said input port and said plurality of output ports;
    - a reference conductor spaced apart from said transmission line structure; and
    - means for selectively controllably coupling said input port to each of said output ports on a selected, exclusive basis, and thereby coupling a signal that is applied to said input port to a selected, exclusive one of said output ports, on the one hand, and also for selectively controllably coupling said input port to plural ones of said output ports and thereby dividing a signal that is applied to said input port among said plural ones of said output ports, on the other hand, exclusive of said one hand, said means comprising a plurality of switching elements coupled to controllably shunt respective portions of said transmission line interconnect structure to said reference conductor; and wherein
- locations within said transmission line interconnect structure that are controllably shunted by said switching elements and the configuration of said transmission line interconnect structure are such that the impedance of said transmission line interconnect structure presented to an input signal applied to said input port is the same irrespective of whether said input signal is coupled to a selected, exclu-

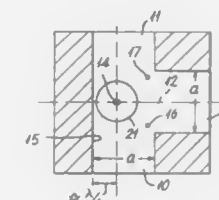
sive one of said output ports, on the one hand, or is coupled to plural ones of said output ports, on the other hand, when said selected, exclusive one of said output ports, on the one hand, or said plurality of output ports, on the other hand, are terminated in a prescribed impedance; and wherein

said output ports are effectively symmetrically arranged with respect to said input port and said transmission line interconnect structure is effectively symmetrically configured between said input port and said plurality of output ports, and wherein said transmission line interconnect structure is comprised of a microstrip transmission line structure.

4,956,622

## WAVEGUIDE H-PLANE JUNCTIONS

Frans C. de Roode, Bath, United Kingdom, assignor to National Research Development Corporation, London, England  
 Continuation-in-part of Ser. No. 55,131, May 28, 1987, Pat. No. 4,891,614. This application Nov. 28, 1988, Ser. No. 276,844  
 Claims priority, application United Kingdom, May 29, 1986, 8613028; Apr. 8, 1987, 8708373; Nov. 30, 1987, 8728017  
 Int. Cl.<sup>5</sup> H01P 5/12  
 U.S. Cl. 333—125 11 Claims

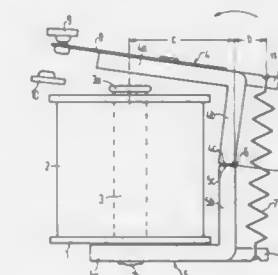


1. An H-plane junction comprising:
  - first, second and third rectangular waveguide portions, each waveguide portion formed by a pair of opposite wide walls and a pair of opposite narrow walls,
  - the waveguide portions being joined together at a junction with the first and second portions arranged end to end and the third portion opening into the junction on one side thereof along adjacent narrow walls of the first and second portions, the junction being substantially symmetrical about a plane through the third portion parallel to the narrow walls thereof,
  - first matching means, disposed inside said junction, for reducing the reflection of waves travelling into the junction from the third portion, and
  - second matching means inside the junction for reducing the variation with frequency of the reflection coefficient in the third waveguide for waves reflected from the junction including reflections from the first matching means,
  - said first matching means comprising an elongated conductor positioned in the said plane at a distance, from that narrow wall of the junction which is opposite the third portion, which is less than half the dimension of the wide wall of each first and second portion, the said elongated conductor being joined to two opposite wide walls of the junction.

4,956,623

## ELECTROMAGNETIC RELAY

Kimpel Rolf-Dieter, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
 Filed Feb. 17, 1989, Ser. No. 311,759  
 Claims priority, application Fed. Rep. of Germany, Feb. 19, 1988, 3805254  
 Int. Cl.<sup>5</sup> H01H 67/02  
 U.S. Cl. 335—128 5 Claims



1. An electromagnetic relay, comprising:
  - a coil having a coil axis;
  - a core axially arranged in said coil;
  - a first yoke being an L-shaped armature, said first yoke having:
    - a first leg defining a working air gap relative to a first end of said core,
    - a second leg of said L-shaped first yoke lying substantially parallel to said coil axis,
    - an extension of said first leg extending beyond said second leg;
  - a contact spring coupled to said first leg of said first yoke;
  - a second yoke being an L-shape, said second yoke having:
    - a first leg facing toward a second end of said core,
    - a second leg of said second yoke extending substantially parallel to said coil axis adjacent said coil, said second leg of said second yoke having a free end nest to said coil at which a free end of said second leg of said first yoke is seated next to said coil,
    - an extension of said second yoke;
    - a tension restoring spring acting upon said extensions of said first and second yokes, said tension restoring spring lying substantially parallel to said coil axis,
    - said second yoke being a second armature having said first leg defining a working air gap relative to said core, free ends of both second legs of said first and second yokes being seated relatively movable to one another, and
    - said first and second yokes having inter-engaging bearing elements.

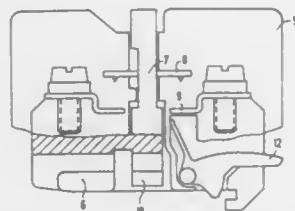
4,956,624

## AUXILIARY SWITCH ATTACHMENT BLOCK

Georg Streich, Amberg, and Guenter Gnahn, Sulzbach-Rosenberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany  
 Filed Apr. 27, 1989, Ser. No. 344,106  
 Claims priority, application Fed. Rep. of Germany, May 3, 1988, 8805878[U]  
 Int. Cl.<sup>5</sup> H01H 67/02  
 U.S. Cl. 335—32 16 Claims

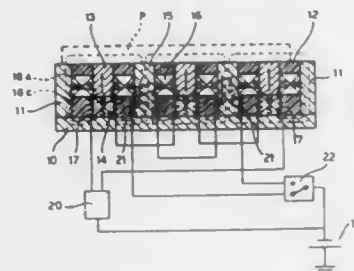
1. In an auxiliary switch attachment block for electromagnetic switchgear including a hammer head shaped, positive engagement coupling between the contact bridge carriers of the electromagnetic switchgear and the auxiliary switch, the hammer head supported on a hammer handle and the contact bridge carrier having free legs with subsurfaces below a point

of positive engagement of coupling with the hammer head, the improvement comprising the subsurfaces of the free legs of the



contact bridge carrier flanking the hammer handle extending away from the handle at an angle, starting at the hammer head.

**4,956,625**  
**MAGNETIC GRIPPING APPARATUS HAVING CIRCUIT FOR ELIMINATING RESIDUAL FLUX**  
Michele Cardone, Angelo Grandini, and Bruno Zaramella, all of Milan, Italy, assignors to Tecnomagnete S.p.A., Milano, Italy  
Filed May 26, 1989, Ser. No. 357,342  
Claims priority, application Italy, Jun. 10, 1988, 20943 A/88  
Int. Cl.<sup>5</sup> H01F 7/20  
U.S. Cl. 335—290

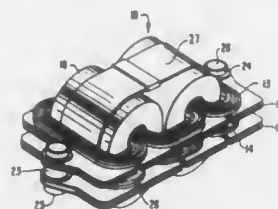


1. A magnetically gripping device for gripping ferromagnetic workpieces, comprising a base plate, peripheral walls and at least a first and second pole unit, each pole unit comprising a main pole piece having an outer face defining a gripping surface, and main permanent magnet arranged between said main pole piece and the base plate; an intermediate pole member being disposed between the main pole pieces of said pole units, said intermediate pole member extending from the base plate to the gripping surface; secondary magnets disposed between said pole member and said pole pieces and between said pole pieces and said peripheral walls the device further comprising first electrical windings encircling said main magnets and operatively connected to a control unit to activate and deactivate the device, in which a demagnetizing circuit for eliminating residual flux or remanence in the workpieces, said demagnetizing circuit comprising a demagnetizing winding encircling the above-mentioned intermediate pole member and a demagnetizing control unit to generate a progressively decreasing demagnetizing cyclical field in said intermediate pole member and between the workpiece to be demagnetized and said base plate.

**4,956,626**  
**INDUCTOR TRANSFORMER COOLING APPARATUS**  
Richard J. Hoppe, Rockford, and Mark W. Metzler, Davis, both of Ill., assignors to Sundstrand Corporation, Rockford, Ill.  
Filed Jan. 13, 1989, Ser. No. 296,830  
Int. Cl.<sup>5</sup> H01F 27/10  
U.S. Cl. 336—60

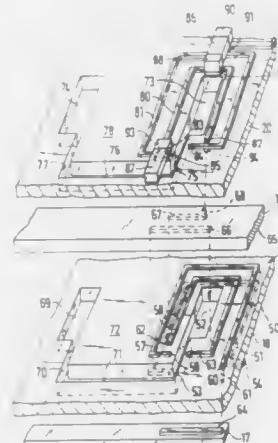
1. An electrical device in the form of a transformer or an inductor, comprising a permeable core having at least one leg about which is wrapped at least one coil layer through which

electric current flows to generate heat, and at least one metal, plate-shaped, plate-fin heat exchanger with lanced offset fins having a configuration through which said core passes, a liquid coolant and inlet admitting said liquid coolant into a path



therein and an outlet permitting said liquid coolant heated by the coil layer to exit therefrom, wherein the heat exchanger is in contact with the at least one coil layer for directly cooling the at least one coil layer and wherein said heat exchanger includes air gaps to reduce eddy current resistance losses.

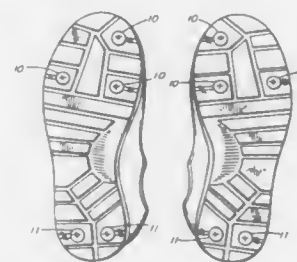
**4,956,627**  
**HIGH-FREQUENCY COMPONENT**  
Heinz Pfizenmaier, Leonberg, and Ewald Schmidt, Ludwigsburg, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
PCT No. PCT/DE88/00085, § 371 Date Jul. 19, 1989, § 102(c)  
Date Jul. 19, 1989, PCT Pub. No. WO88/07257, PCT Pub. Date Sep. 22, 1988  
PCT Filed Feb. 18, 1988, Ser. No. 420,493  
Claims priority, application Fed. Rep. of Germany, Mar. 13, 1987, 3708209  
Int. Cl.<sup>5</sup> H01F 15/02, 27/30  
U.S. Cl. 336—65



1. A high-frequency transformer comprising at least one annular core of a magnetizable material; at least two superposed elastic carrier sheets each formed with a pair of openings adjusted for receiving corresponding cross-sectional parts of the annular core, each of the pairs of openings delimiting a strip of the corresponding carrier sheet, the strip passing through the central hole of the annular core and extending into a cutout in the corresponding carrier sheet, in such a way that it forms an elastic tongue bendable for inserting the annular core into the openings; conductor tracks mounted on opposite sides of each of the carrier sheets around at least one of the openings whereby the portions of the conductor tracks on the respective sides are separated one from the other by the cutout; an intermediate bridge sheet sandwiched between the two carrier sheets and being provided on opposite sides thereof with conductor track sections for connecting the end portions

of the facing conductor tracks; two outer bridge sheets connected to the free outer sides of the carrier sheets and each being provided on one side thereof with conductor track sections for connecting the end portions of the facing conductor tracks on the free outer sides to complete primary and secondary coil turns around the annular core.

**4,956,628**  
**ELECTRONIC MONITORING OF GROUND CONTACT BY AN ATHLETE'S SHOES**  
Dennis Furlong, Box 1990 Dalhousie, New Brunswick, Canada E0K-1B0  
Filed Aug. 4, 1988, Ser. No. 228,036  
Claims priority, application Canada, Aug. 7, 1987, 544054  
Int. Cl.<sup>5</sup> G08B 23/00; A63B 5/00  
U.S. Cl. 340—323 R



1. Electronic athlete's shoe monitoring apparatus, comprising:  
pressure sensitive means in each shoe of a pair, the pressure sensitive means being reactive to pressure on contact of a shoe with the ground;  
signal generating means on each shoe and connected with said pressure sensitive means for producing a signal indicative of contact conditions between each shoe and the ground;  
transmitting means on one shoe for transmitting the signal generated on said one shoe;  
receiving means on the other shoe for receiving the signal from said one shoe;  
a signal path between said transmitting means and said receiving means, said signal path including a connection through a body of a user; and  
indicating means on said other shoe, said indicating means actuated from both shoes indicative of non-contact between the shoes and the ground, said indicating means including latch means for latching said indicating means ON in response to said non-contact between the shoes and the ground.

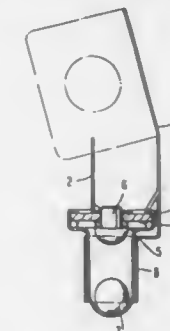
**4,956,629**  
**BURGLAR PROOF DEVICE FOR AUTOMOBILE USE**  
Michael Chen, 10F-3, No. 230, Nanking E. Road Sec. 5, Taipei, Taiwan  
Filed Feb. 3, 1989, Ser. No. 305,977  
Int. Cl.<sup>5</sup> B60R 25/10

U.S. Cl. 340—429  
1. An improved burglar proof device adapted for automobile use which can be instantly actuated to make a connected alarm function, comprising:

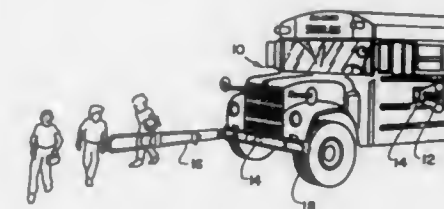
- a connection terminal;
- a circular ring-shaped washer;
- a first sealing ring;
- a second sealing ring;
- a rivet;
- a steel ball;
- a torch-shaped metallic casing; and
- a mounting seat;

wherein said connecting terminal, said circular washer and said second sealing ring are engaged with said rivet in a

consecutive order; and in combination with said first sealing ring and said steel ball, said connection terminal, said circular washer, said second sealing ring, and said rivet are received in said torch-shaped casing with said steel ball disposed at the bottom thereof and kept at a distance with said rivet in non-operation state; and said steel ball is movable toward said rivet as a result of gravi-



**4,956,630**  
**SAFETY UNIT ACTUATING DEVICE**  
James H. Wicker, Charlotte, N.C., assignor to Specialty Manufacturing Co., Inc., Charlotte, N.C.  
Filed Sep. 8, 1989, Ser. No. 404,789  
Int. Cl.<sup>5</sup> B60Q 1/46  
U.S. Cl. 340—433

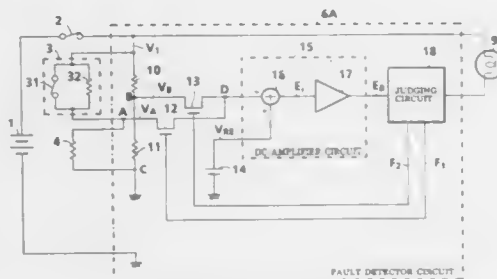


1. An actuating device for operating a safety unit which is mounted on a vehicle and normally carried at a retracted position adjacent said vehicle, said actuating device including:  
(a) means for mounting said actuating device on said vehicle;  
(b) motor means having an output drive means;  
(c) support means for supporting said safety unit for movement with respect to said vehicle, said support means being arranged to normally dispose said safety unit at said retracted position thereof and being pivotally movable by said motor means to move said safety unit between said retracted position and an extended position away from said vehicle in and through a predetermined path of movement and  
(d) control means for operating said motor means, said control means having a first energized condition for continuously moving said support means back and forth between said retracted and extended positions thereof in a continuous sweeping motion to cause said safety unit to form a continuously moving barrier within a predetermined area adjacent said vehicle, and a second de-energized condition at which said continuous sweeping movement is discontin-



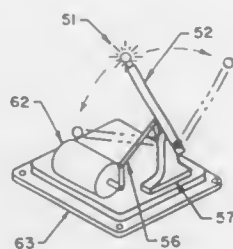
ued and said safety unit is positioned at said retracted position thereof.

**4,956,631**  
**FAULT DETECTOR FOR VEHICLE SAFETY SYSTEM**  
Hisatsugu Itoh, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Sep. 22, 1989, Ser. No. 410,874  
Claims priority, application Japan, Mar. 20, 1989, 1-66071  
Int. Cl.<sup>5</sup> B60Q 1/00  
U.S. Cl. 340—436 13 Claims



1. A fault detector for a vehicle safety system, comprising:  
a first series circuit having a squib resistor and a resistor connected thereto at a junction A;  
a second series circuit having a pair of resistors connected to each other at a junction B having the same resistance ratio as that of the first series circuit for providing a balanced wheatstone bridge with said first series circuit in parallel connection thereto;  
a DC power source for supplying electric power to the wheatstone bridge;  
a pair of switching circuits connected separately to the junctions A and B for alternative switching;  
a DC amplifier circuit connected to a common output of said switching circuits; and  
a judging circuit for determining existence of a fault in the squib resistor based on a difference of the output voltages of the DC amplifier circuit being switched synchronously with the alternative switching of said switching circuits.

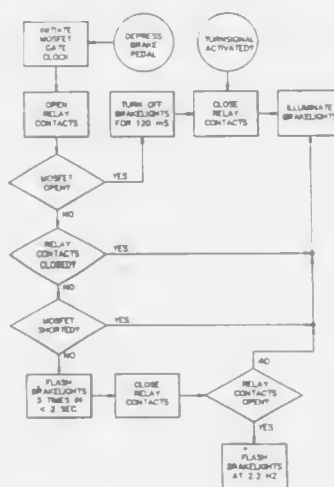
**4,956,632**  
**MULTIPLE PURPOSE ELECTROMECHANICAL VEHICLE SIGNAL DEVICE**  
John M. Perrigo, 5431 Crestview Dr., Chattanooga, Tenn. 37343  
Filed May 9, 1989, Ser. No. 349,486  
Int. Cl.<sup>5</sup> B60Q 1/22, 1/44  
U.S. Cl. 340—463 3 Claims



1. A vehicle with an improved rear-mounted signal device consisting of a brake light including a double filament light bulb attached to a moving rod;  
a variable speed drive unit connected to the moving rod for moving the brake light at various speeds;  
a motion detector unit to detect a change in speed of the vehicle in response to rapid braking;  
an electronic circuit with a relay, which is responsive to the

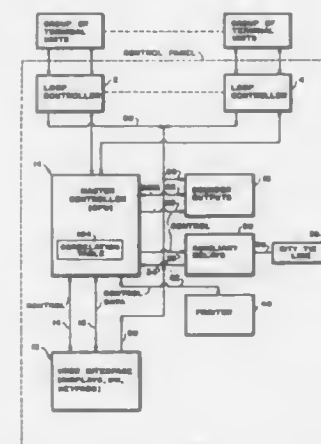
vehicle brake light circuit to energize the variable speed drive unit at a slow speed and to operate a first filament in said bulb to provide a dim slow moving brake light signal; said electronic circuit being responsive to said motion detector unit to energize the variable speed drive unit at a second, fast speed while energizing a second filament in said bulb, with said first filament remaining on, to provide a second bright, fast moving flashing brake light signal to indicate a rapid or an emergency deceleration of the vehicle when the brakes are applied;  
said electronic circuit being powered by the vehicle's battery;  
said device including a case with a wrap around lens and a curved reflector to increase the visibility of the brake light to the sides and rear of the vehicle.

**4,956,633**  
**BRAKE LIGHT ENHANCER WITH FAIL SAFE PROTECTION**  
Charles K. Waterson, Chapel Hill, N.C., and Richard Vercillo, Tucson, Ariz., assignors to Dr. Fernald Wentzell, Oceanside, Calif.  
Filed Nov. 14, 1989, Ser. No. 436,498  
Int. Cl.<sup>5</sup> B60Q 1/52  
U.S. Cl. 340—471 9 Claims



1. In a brake light enhancer circuit for a motor vehicle having left and right rear brake lamps normally continuously illuminated by manual closure of a brake light switch connected between the brake lamps and electric power source, and having left and right rear turn signal lamps which are selectively caused to flash intermittently by connecting thereto a flasher also connected to the electric power source through manual actuation of a turn signal switch from a neutral position, the brake light enhancer circuit being adapted to be connected between the brake light switch, the brake lamps and the turn signal flasher for causing the brake lamps to flash on and off a predetermined number of times when the turn signal switch is in a neutral position upon closure of the brake light switch and for causing the brake lamps to thereafter remain continuously illuminated during the remainder of the time that the brake light switch is closed, the improvement comprising:  
an electro-mechanical relay and a solid state switching device connected in parallel to the brake lights so that the brake lamps are flashed on and off by switching of the solid state switching device when the relay is in a predetermined condition.

**4,956,634**  
**CITY TIE LINE CONNECTION FOR FIRE ALARM SYSTEM**  
Robert W. Right, Huntington, Conn., assignor to General Signal Corporation, Stamford, Conn.  
Filed May 1, 1989, Ser. No. 345,598  
Int. Cl.<sup>5</sup> G08B 19/00  
U.S. Cl. 340—521 4 Claims

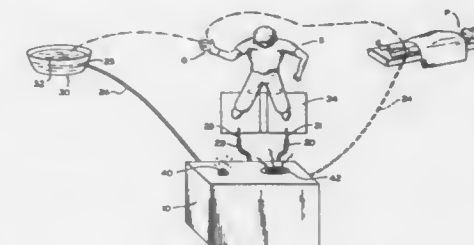


1. Apparatus for selectively connecting a city tie line to the fire alarm system;  
a plurality of transmission loops;  
a plurality of terminal units connected to each of said transmission loops;  
each of said terminal units having comparison means for determining whether a received address signal coincides with an identification address stored in the terminal unit, said comparison means producing an output signal responsive to coincidence;  
loop controllers connected to the respective transmission loops for transmitting address signals thereon;  
a master controller for receiving data from said loop controllers as to the alarm status of said terminal units;  
a city tie line for connecting to municipal fire authorities;  
means forming part of said master controller, including a correlation table, for selectively connecting, in response to particular terminal units being in alarm, said city tie line to provide a warning to the municipal fire authorities concerning those terminal units;  
an auxiliary relay for enabling the selective connection of said city tie line.

**4,956,635**  
**METHOD AND APPARATUS FOR TESTING PERSONAL BARRIERS**  
Robert S. Langdon, 29 Beaver Ln., Bedford, N.H. 03102  
Filed Apr. 14, 1989, Ser. No. 339,129  
Int. Cl.<sup>5</sup> G08B 21/00  
U.S. Cl. 340—540 16 Claims

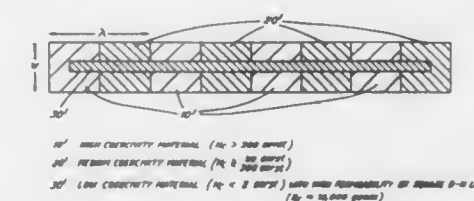
9. Apparatus for testing the integrity of a personal barrier worn by a human comprising:  
reference circuit means comprising first and second terminal means for establishing a reference external circuit traversing a portion of a human between said first and second terminal means;  
test circuit means comprising third terminal means for establishing a test external circuit between said first and third terminal means;  
verification means for continuously verifying the presence of the reference external circuit;  
status signal means responsive to said verification means for signaling the verification of said reference external circuit;  
detection means for detecting the existence of a conductive path connecting said first terminal and said third terminal

through the human and the personal barrier thereby indicating a lack of integrity of the personal barrier; and



alarm means responsive to said detection means for signaling the existence of said conductive path and the lack of the integrity of the personal barrier.

**4,956,636**  
**E.A.S. TAG HAVING A CONTROL COMPONENT WITH SELECTIVELY MAGNETIZEABLE REGIONS**  
David J. Sansom, Chertsey; Simon N. M. Wilcock, High Wycombe, and Robert A. Woolley, Uxbridge, all of England, assignors to Thorn Emi plc, London, England  
Filed Aug. 9, 1989, Ser. No. 390,993  
Claims priority, application United Kingdom, Aug. 9, 1988, 8818849  
Int. Cl.<sup>5</sup> G08B 13/24  
U.S. Cl. 340—551 11 Claims



1. A tag for use with an electromagnetic identification system, the tag comprising an element of magnetically soft material and, in magnetic communication therewith for enabling polarisation of the element, a magnetic control component including first and further regions having, respectively, first and further magnetic characteristics for enabling magnetisation or demagnetisation of first or further regions independently of the other regions.

**4,956,637**  
**SYSTEM FOR DETECTING IRREGULAR OPERATION OF SWITCH STATE VERIFICATION CIRCUIT**  
William R. Vogt, Rockaway, N.J., assignor to Baker Industries, Inc., Parsippany, N.J.  
Filed Apr. 29, 1988, Ser. No. 187,681  
Int. Cl.<sup>5</sup> G08B 21/00  
U.S. Cl. 340—644 8 Claims

1. For use with an arrangement for monitoring and indicating the condition of a switch having at least two possible states, sampling the switch state to provide a status signal connoting the switch state and thereafter examining the status signal to provide a confirmation signal upon verifying the status signal, a system for identifying irregular system operation, including:  
first means to accumulate a count of data signals related to switch state sampling, to receive the confirmation signal, and to provide an output signal denoting irregular system operation when the accumulated count reaches a predetermined value; and

1. A transponder comprising:  
an amplifier means for amplifying signal energy;  
a variable power divider coupled to the amplifier means for  
variably coupling power along two output paths;  
phase delay means disposed in one output path; and  
an antenna feed network comprising an energy distribution  
network and a plurality of antenna elements and coupler  
means coupled to the two output paths for selectively



coupling energy to the plurality of antenna elements and to a selected subset of the plurality of antenna elements; whereby selective control of the ratio of the power coupled to the respective output paths, and the phase delay provided by the phase delay circuit, provides for selective coupling of the power provided by the transponder to either the plurality of antenna elements or the selected subset of antenna elements, which selective coupling generates first and second predetermined beams radiated by the selected antenna elements.

4,956,644

## CHANNELIZED BINARY-LEVEL RADIOMETER

Ronald S. Leahy; Patrick J. Smith, both of Salt Lake City, Utah, and Scott R. Bullock, Cos. Colo., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Oct. 4, 1989, Ser. No. 417,124

Int. Cl.<sup>5</sup> G01S 3/02

U.S. Cl. 342—351

11 Claims



1. A detector for sensing the presence of a frequency-hopped signal comprising in combination:

- means for channelizing a frequency-hopped input signal into a plurality of channels having separate and individual frequency bands;
- amplification-quantization means, connected in each channel for detecting the power level of the frequency signals present in that band and quantizing said power level to a binary signal;
- first connection means for connecting the outputs of one-half of the channels into a first totalizing circuit means;
- second connection means for connecting the second half of said channels into a second totalizing circuit means;
- combining means for subtracting the totalized output of said second totalizing means from the output of said first totalizing means;
- means for providing a DC output voltage which indicates the presence of a frequency-hopped signal being transmitted.

4,956,645

## RADIO SYSTEM FOR DATA TRANSMISSION WITH ONE PASSIVE END AND STATION INCLUDED IN SUCH A SYSTEM

Jean Guena, Trebeurden; Jean-Claude Leost, Perros-Guirec, and Sylvain Meyer, Lannion, all of France, assignors to Etat Francais represente par le Ministre des Postes, Telecommunications et de l'Espace (Centre National d'Etudes des Telecommunications), Issy-Les-Moulineaux, France

Filed May 15, 1989, Ser. No. 351,234

Claims priority, application France, May 20, 1988, 88 06794

Int. Cl.<sup>5</sup> H01Q 21/06, 21/24

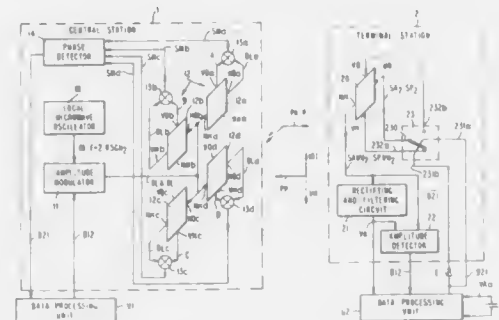
U.S. Cl. 342—361

11 Claims

1. A radio system for alternatively transmitting by microwaves first and second data signals (D12, D21) between first and second data processing units (U1, U2) connected to said radio system, said first data signal (D12) being transmitted

from said first unit (U1) to said second unit (U2) during first data transmission periods, and said second data signal (D21) being transmitted from said second unit (U2) to said first unit (U1) during said second data transmission periods,

said system comprising data signal transmitting and receiving central and terminal stations (1, 2), said transmitting and receiving central station (1) being connected to said first unit (U1) for emitting a first microwave (PA) modulated by said first data signal (D12) during said first transmission periods and a second unmodulated microwave (P) during said second transmission periods to said terminal station, said first and second emitted microwaves (PA, P) having a first linear polarization, said transmitting and receiving terminal station (2) being connected to said second unit (U2) and comprising: an antenna (20) having two first ports (H0, H $\pi$ ) arranged to transduce said first linear polarization and two second



ports (V $\pi$ , V0) arranged to transduce a second linear polarization, the second linear polarization being relative to said first linear polarization,

means (21, 22) connected to one (H $\pi$ ) of said first antenna ports for detecting said first data signal (D12) in the first modulated microwave (PA) thereby applying a replica of said first data signal to said second unit (U2), and a microwave switcher (23) having an input (230) connected to the other (H0) of said first antenna ports and two outputs (232a, 232b) respectively connected to said second antenna ports (V $\pi$ , V0), said second data signal (D21) controlling said microwave switcher so said switcher derives in response to said second microwave (P) received via said switcher input (230), a third microwave (PP) modulated in two phase states by said second data signal (D21) and transmitted according to said second polarization by said antenna (20) towards said central station (1) during said second data transmission periods.

4,956,646

## DEPLOYMENT APPARATUS AND METHOD FOR RADIOSONDES

Edward J. Miller, Richboro, Pa.; John M. Benkers, Stony Brook, N.Y., and Maurice Friedman, Roslyn, Pa., assignors to VIZ Manufacturing Company, Philadelphia, Pa.

Filed Oct. 17, 1988, Ser. No. 258,655

Int. Cl.<sup>5</sup> H01Q 1/30

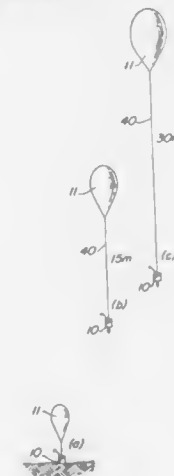
U.S. Cl. 343—706

23 Claims

1. Deployment apparatus comprising, in combination: a housing containing a brake drum and a compartment; brake means having radially movable members carried on a shaft rotatably mounted in said drum, said members frictionally engaging the inner surface of said drum in response to the centrifugal force caused by a predetermined rate of rotation of said shaft;

a cord stored in said compartment having one end fixed thereto, and the other end routed through said drum for attaching to an object, the portion of said cord passing through said drum being wrapped around said shaft; and

snubbing means fixed to said housing between said compartment and said drum and frictionally engaging said cord for producing drag thereat;



whereby a controlled rate of rotation is imparted to said shaft when tension in excess of the drag is applied to the other end of said cord.

4,956,647

## ROD ANTENNA

Misao Kimura, Yokosuka, Japan, assignor to Harada Kogyo Kabushiki Kaisha, Tokyo, Japan

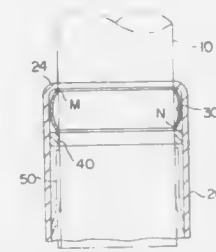
Filed Aug. 5, 1985, Ser. No. 762,922

Claims priority, application Japan, Dec. 10, 1984, 59-153128[U]

Int. Cl.<sup>5</sup> H01Q 1/10

U.S. Cl. 343—901

3 Claims



1. A rod antenna comprising:

- an antenna element formed of a plurality of rods which are respectively different in diameters and are coupled to each other in a freely slidable manner; and
- a rectangular film strip made of resin for forming a waterproof seal between the plurality of rods, the film strip being provided at least at a joint area for coupling the respective rods such that the film strip is mounted in a ring shape onto the inner circumferential surface of each of larger diameter rods, said film strip further being in contact with the inner circumferential surface of respective larger diameter rods and an outer circumferential surface of a respective smaller diameter rod.

4,956,648

## DOT POSITION DISCREPANCY CORRECTING CIRCUIT FOR PRINTING APPARATUS

Yutaka Hongo, Tokyo, Japan, assignor to Seiko Instruments, Tokyo, Japan

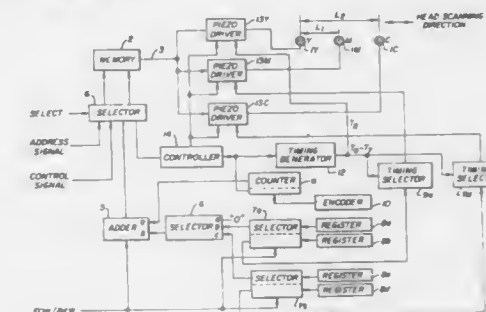
Filed Jul. 5, 1989, Ser. No. 375,485

Claims priority, application Japan, Jul. 5, 1988, 63-168432

Int. Cl.<sup>5</sup> G01D 15/06; B41J 3/04

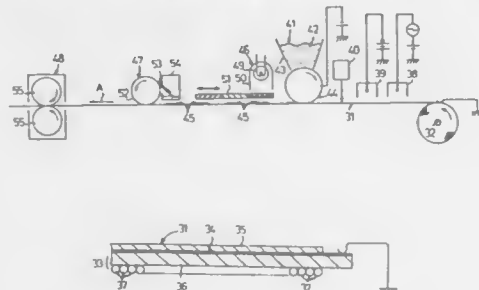
U.S. Cl. 346—1.1

33 Claims



conductive layer and the grounding means an electrostatic charge from local portions of said entire surface area of said photoconductive layer, so as to form as a preliminary latent image an electrostatically discharged pattern on said photoconductive layer, said light being incapable of exposing said photosensitive layer to form an optical latent image thereon;

means for applying a light-shielding material directly to the irradiated layer, so as to form as a light-shielding pattern a visible photomasking pattern corresponding to said preliminary latent image, said light-shielding material being capable of shielding a radiation;



second irradiating means for irradiating the imagewise marked surface of said transparent photoconductive layer with said radiation, and thereby forming on said photosensitive layer an optical latent image corresponding to said photomasking pattern;

cleaning means for removing said photomasking pattern from the photosensitive recording medium after said optical latent image is formed; and

developing means for developing said optical latent image into a visible image.

4,956,650

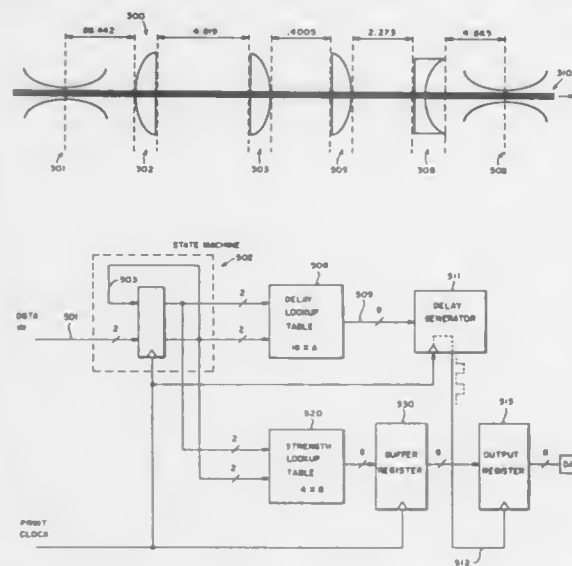
## PATTERN GENERATION SYSTEM

Paul C. Allen, Beaverton; Robin Teitzel, Portland, and Timothy Thomas, Lake Oswego, all of Oreg., assignors to ATEQ Corporation, Beaverton, Oreg.

Filed Aug. 26, 1988, Ser. No. 237,753

Int. Cl.<sup>5</sup> G01D 15/16; H04N 1/21; G02B 3/04; A61N 5/00  
U.S. Cl. 346—108

11 Claims



1. In a pattern generation apparatus, said pattern generation apparatus having a radiant energy source for providing a radi-

ant energy beam for generating a pattern on a workpiece, an improvement comprising an optical stigmator means for correcting astigmatism and ellipticity in said radiant energy beam; wherein said optical stigmator means comprises a plurality of optical lenses;

wherein said plurality of optical lenses comprises:

a first lens having a substantially convex surface oriented toward the source of said radiant energy beam and a substantially planar surface oriented away from the source of said radiant energy beam;

a second lens having a substantially planar surface oriented toward the source of said radiant energy beam and a substantially cylindrical convex surface oriented away from the source of said radiant energy beam;

a third lens having a substantially planar surface oriented toward the source of said radiant energy beam and a substantially convex surface oriented away from the source of said radiant energy beam;

a fourth lens having a substantially planar surface oriented toward the source of said radiant energy beam and a substantially cylindrical concave surface oriented away from the source of said radiant energy beam.

4,956,651

## IMAGE FORMING APPARATUS WHICH SHEET DETECTION AND TIMING CONTROL

Kiyoshi Emori, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

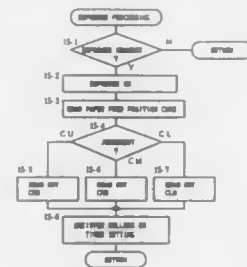
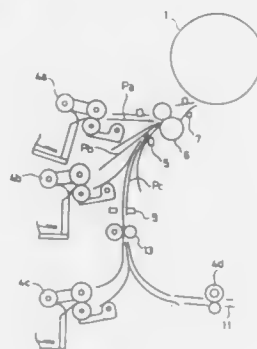
Filed Jun. 30, 1988, Ser. No. 213,821

Claims priority, application Japan, Jul. 1, 1987, 62-165829; Jul. 1, 1987, 62-165830; Aug. 31, 1987, 62-218153

Int. Cl.<sup>5</sup> G01D 15/14; G03G 15/00

U.S. Cl. 346—108

15 Claims



1. An image forming apparatus which transfers an image formed on a rotating photosensitive drum onto a moving paper sheet at a transfer position, comprising:

a first paper feed means which comprises of a plurality of sheet container sections and feeds paper sheets one by one from one of the sheet container sections selected;

a second paper feed means for feeding a paper sheet transported from the first paper feed means to a transfer position;

a data storing means provided with storage locations corresponding to each sheet container section having a data to decide a timing to actuate the second paper feed means;

a signal emitting means for giving signals to actuate the second paper feed means basing on the data stored in a storage location corresponding to the sheet container section selected;

a sheet detecting means for detecting the leading edge of a paper sheet being transported into a transfer section by the second paper feed means;

a time measuring means for measuring the time required from giving signal to the detecting means detects the leading edge of a paper sheet;

a data change means for changing a data stored in a storage location corresponding to a sheet container section in accordance with the time measured by the time measuring means.

4,956,652

## PEN SELECTION MECHANISM FOR A PRINTER

Takashi Onozato, Morioka, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Division of Ser. No. 98,542, Sep. 18, 1987, Pat. No. 4,845,516.

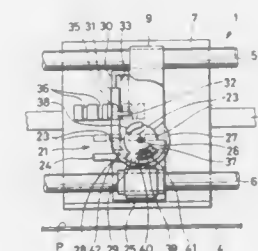
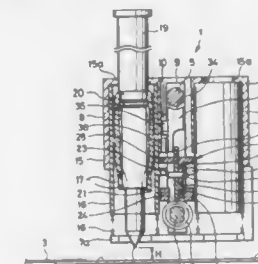
This application Mar. 17, 1989, Ser. No. 325,313

Claims priority, application Japan, Dec. 1, 1986, 61-183730; Dec. 1, 1986, 61-183731; Dec. 11, 1986, 61-293496; Dec. 12, 1986, 61-296348

Int. Cl.<sup>5</sup> G01D 9/30

U.S. Cl. 346—139 R

1 Claim



1. A pen selection mechanism for a pen type printer, comprising:

a carriage movable in a plane parallel to a surface to be printed;

a plurality of pen chuck mechanisms supported by said carriage, each movable in a direction perpendicular to said surface to be printed together with pens held thereon;

a slider mounted movably with respect to said carriage between a plurality of driving positions corresponding to said pen chuck mechanisms and engaged with said carriage at each of said driving positions;

a pen driving mechanism disposed on said slider and capable of driving at each of the driving positions a corresponding

one of said pen chuck mechanisms in the direction perpendicular to said surface;

an engagement mechanism disposed on said slider and capable of engaging said slider with said carriage and disengaging said slider from said carriage; and

a single drive source disposed on said slider for driving both said pen driving mechanism and said engagement mechanism.

4,956,653

## BUBBLE JET PRINT HEAD HAVING IMPROVED MULTI-LAYER PROTECTIVE STRUCTURE FOR HEATER ELEMENTS

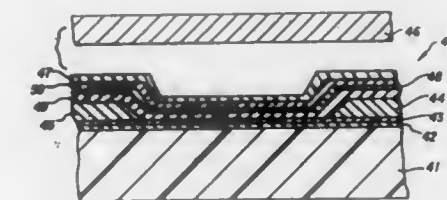
Hilarion Braun, Xenia, Ohio, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 12, 1989, Ser. No. 350,867

Int. Cl.<sup>5</sup> B41J 2/05

U.S. Cl. 346—140 R

11 Claims



1. In a bubble jet print head device of the kind having a substrate with a plurality of separately addressable resistive heater portions that are formed by address and common electrode pairs that provide electrical energy flow to and away from spaced edges of such heater portions, an improved protective cover construction for such heater portions comprising:

- a first layer of dielectric material formed on said heater portions;
- shielding meand, including a second layer of metal formed on said first layer and overlying said electrode pairs and said heater portions, for shielding a subsequently overlying layer(s) from localized electrical fields of said electrode pairs; and
- a third layer having a physically hard, scratch resistant and chemically inert outer surface portion overlying said first and second layers and said heater portions.

4,956,654

## LIQUID INJECTION RECORDING HEAD WITH FLEXIBLE SUPPORT

Hirokazu Komuro, Hiratsuka; Hiroto Matsuda, Ebina; Hiroto Takahashi; Makoto Shibata, both of Hiratsuka; Masami Ikeda, Machida, and Hisanori Tsuda, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 41,629, Apr. 22, 1987, abandoned,

which is a continuation of Ser. No. 694,063, Jan. 23, 1985,

abandoned. This application Oct. 25, 1988, Ser. No. 262,120

Claims priority, application Japan, Jan. 31, 1984, 59-14519

Int. Cl.<sup>5</sup> G01D 15/16; B41J 2/04

U.S. Cl. 346—140 R

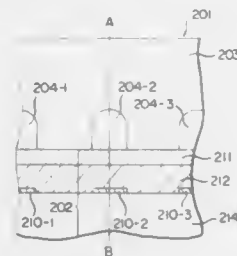
41 Claims

1. A liquid jet recording head having a discharge port for discharging liquid, the recording head comprising:

a flexible support member, formed of an organic resin, including an energy generating member for generating energy utilized to discharge liquid through the discharge port, said energy generating member having a heat gener-



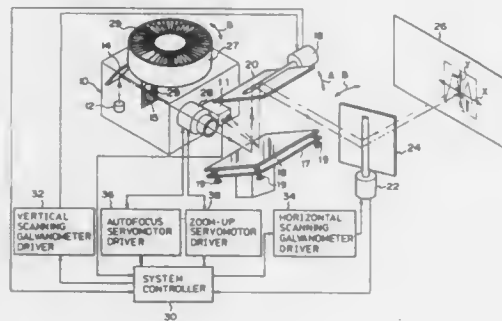
ating resistive layer and a pair of electrodes connected to said heat generating resistive layer; and



a member bonded to said support member to form a liquid path communicating with the discharge port.

**4,956,655**  
**PROJECTING APPARATUS**  
Shiro Wakebe, Tokyo, Japan, assignor to Kabushiki Kaisha System Ray, Tokyo, Japan  
Continuation-in-part of Ser. No. 21,972, Mar. 5, 1987. This application Nov. 14, 1988, Ser. No. 271,059  
Claims priority, application Japan, Nov. 17, 1987, 62-174285[U]

Int. Cl.<sup>5</sup> G03B 3/10  
U.S. Cl. 353—101 11 Claims



1. A projecting apparatus comprising:  
a projector for projecting an image;  
a first rotary mirror, a first rotary shaft for rotating said first rotary mirror, said first rotary shaft being arranged at a predetermined angle, to position the first mirror to reflect said image projected by said projector;  
a first driving means for rotating said first shaft of said first rotary mirror;  
a second rotary mirror, a second rotary shaft for rotating said second rotary mirror, said second rotary shaft being positioned at a predetermined angle in conjunction with said first rotary shaft of said first rotary mirror and being arranged to reflect said image reflected by said first rotary mirror toward a projection screen;  
a second driving means for rotating said second shaft of said second rotary mirror;  
control means for controlling said first and second driving means to effect angular rotation of said first and second rotary mirrors;  
a sensor means for measuring an optical path length between said projector and said image on said projection screen by emitting and receiving a light beam along the optical path to said projection screen to control the focus of said projector through said control means in accordance with variation of said optical path length to said image on the projection screen, said optical path being defined by the

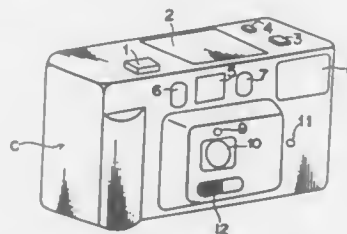
projector, the first and second mirrors and the projection screen; and  
said projector having an autofocus mechanism responsive to the sensor means for effecting automatic focusing of said projector so that said image projected onto said projection screen is maintained in focus.

**4,956,656**  
**CONTROL DEVICE FOR USE IN A CAMERA HAVING A CONSECUTIVE PICTURE TAKING MODE AND A SINGLE PICTURE TAKING MODE**

Kouji Yamamoto, Sakai; Akira Yamanaka, Sakai; Nobuyuki Taniguchi, Tondabayashi; all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan  
Continuation of Ser. No. 169,586, Mar. 17, 1988, Pat. No. 4,814,318, which is a division of Ser. No. 797,510, Nov. 13, 1985, abandoned. This application Mar. 8, 1989, Ser. No. 320,620  
Claims priority, application Japan, Nov. 14, 1984, 59-173261; Dec. 28, 1984, 59-197143; Feb. 27, 1985, 60-28848; Mar. 8, 1985, 60-33950; Mar. 12, 1985, 60-35962; Mar. 12, 1985, 60-35963; Mar. 27, 1985, 60-45490; Mar. 27, 1985, 60-45491; Mar. 28, 1985, 60-46676; Mar. 28, 1985, 60-46677; Mar. 28, 1985, 60-46678

The portion of the term of this patent subsequent to Jan. 20, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> G03B 1/00

U.S. Cl. 354—173.1 1 Claim



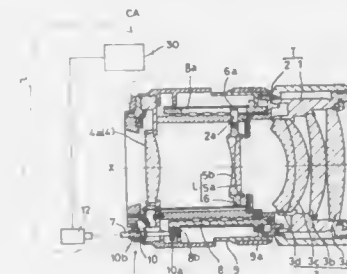
1. A control device for use in a camera comprising:  
means for selecting a first mode in which the camera operates to take pictures consecutively, and a second mode in which the camera operates to take only one picture;  
means for preliminary winding-up a film by predetermined length in response to a closure of a back lid of the camera, the film lying in the normal frame position when the preliminary winding is terminated; and  
means for forcibly selecting the second mode before the preliminary winding is terminated.

**4,956,657**  
**PHOTOGRAPHIC CAMERA**  
Dai Shintani; Toshihiko Taniguchi; Yukio Miki; Katsuhito Akagi, and Hideo Kajita, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Filed May 16, 1989, Ser. No. 352,262  
Claims priority, application Japan, May 16, 1988, 63-119849  
Int. Cl.<sup>5</sup> G03B 1/18

U.S. Cl. 354—195.12 10 Claims

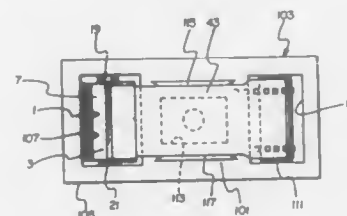
1. A photographic camera comprising:  
a lens movable along an optical axis;  
a manual lens moving mechanism for manually moving said lens;  
a drive device;  
an automatic lens moving mechanism for automatically moving said lens using a drive of said drive device and including a clutch provided between said drive device and said lens;  
urging means for urging said clutch towards an engaged state;

locking means for locking said clutch in a disengaged state against the urging force of said urging means; and



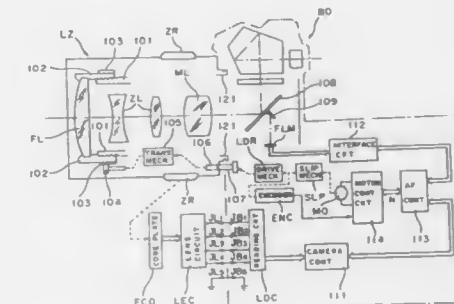
releasing means for releasing said locking means through operation of the drive of said drive device.

**4,956,658**  
**FILM THREADING APPARATUS**  
David C. Smart, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
Filed Jul. 14, 1989, Ser. No. 379,752  
Int. Cl.<sup>5</sup> G03B 17/28, 17/30  
U.S. Cl. 354—212 2 Claims



1. An improved photographic camera wherein a film threading path leads from a receiving chamber for a film cassette including a film spool rotatable to unwind a filmstrip off the spool to automatically thrust a non-protruding relatively wider leader portion of the filmstrip out of the cassette to enable the leader portion to be propelled along said film threading path, and wherein the improvement to said camera comprises:  
a pair of elongate film guide members fixed lengthwise along opposite sides of the film threading path, said fixed guide members being spaced apart a predetermined distance measured across the film threading path which is slightly less than the width of the leader portion and slightly greater than the width of the substantial remainder of the filmstrip to bow the leader portion across its width, but not the remainder of the filmstrip, to thereby significantly increase the longitudinal stiffness of the leader portion to facilitate its being propelled along the film threading path responsive to unwinding rotation of the film spool.

**4,956,659**  
**AUTOMATIC FOCUS ADJUSTING APPARATUS**  
Masataka Hamada; Tokujir Ishida, both of Osaka, and Yasuaki Adaka, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Continuation of Ser. No. 368,248, Jan. 19, 1989, abandoned, which is a division of Ser. No. 186,882, Apr. 27, 1988, Pat. No. 4,888,609, which is a continuation of Ser. No. 819,865, Jan. 16, 1986, abandoned. This application Dec. 15, 1989, Ser. No. 455,825  
Claims priority, application Japan, Jan. 14, 1985, 60-11250; Jan. 17, 1985, 60-7179  
Int. Cl.<sup>5</sup> G03B 13/36  
U.S. Cl. 354—400 5 Claims



1. A camera having an automatic focus adjusting apparatus for adjusting automatically a focus condition of an objective lens comprising:  
defocus detecting means for detecting a defocus amount and defocus direction of said objective lens;  
signal generating means for generating a defocus signal representing the detected defocus amount and defocus direction, and for generating a brake signal when it is detected that the objective lens has moved to an infocus condition;  
objective lens driving means for controlling the driving direction and driving amount based on said defocus signal and brake signal;  
exposure starting means for producing an exposure start signal which starts an exposure operation of said camera; and  
control means for inhibiting the generation of said brake signal from said signal generating means, in the case when said exposure start signal is generated during the movement of said objective lens by said driving means.

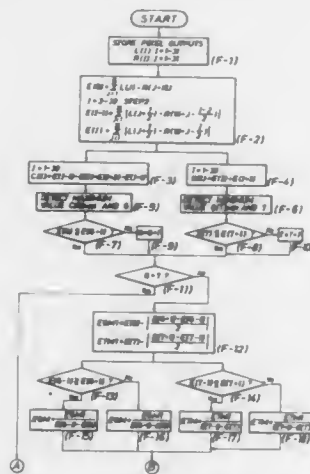
**4,956,660**  
**FOCUS DETECTING APPARATUS FOR CAMERA**  
Yoshiharu Takahashi, Hachioji, Japan, assignor to Konica Corporation, Tokyo, Japan  
Continuation of Ser. No. 215,855, Jul. 6, 1988, abandoned. This application Dec. 28, 1989, Ser. No. 456,620  
Claims priority, application Japan, Jul. 7, 1987, 62-167716; Jul. 7, 1987, 62-167717  
Int. Cl.<sup>5</sup> G03B 13/36

U.S. Cl. 354—402 7 Claims

1. A focus detecting apparatus for a camera, comprising:  
first and second light-receiving means for receiving first and second images formed by a light bundle received from an object to be photographed through first and second portions of a photographing lens and for outputting image signals corresponding to light distribution patterns of said first and second images; and  
correlation detecting means for detecting the portions of said first and second images representing the highest correlation degree of said first and second images in accordance with the image signals defined in pixel increments to thereby determine the focus position of said photo-

graphing lens by detecting the portion having the highest correlation degree using at least one of the following methods (1) and (2):

- (1) defining said image signals in pixel increments, determining the difference between said image signals in pixel outputs by shifting receiving means and calculating com-



parison data by adding the sum of said differences between said image signals to determine the portion of said first and second images producing the maximum comparison data change ratio and (2) detecting the portion of said first and second images producing the minimum comparison data, the correlation detecting means selecting a result of one of the methods (1) and (2) having higher reliability.

4,956,661

## CAMERA SYSTEM

Nobuyuki Taniguchi, Tondabayashi; Masatake Niwa, Sakai; Akira Fujii, Osaka; Takeo Hoda, Sakai; Masaki Nakai, Nara; Minoru Sekida, Sakai, and Masayoshi Sahara, Sennan, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

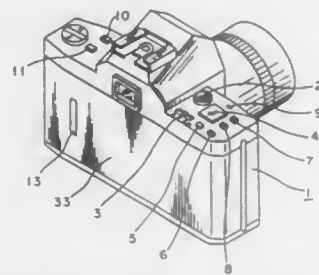
Division of Ser. No. 43,758, Apr. 29, 1987, Pat. No. 4,763,144, which is a division of Ser. No. 888,600, Jul. 23, 1986, Pat. No. 4,712,904, which is a division of Ser. No. 634,474, Jul. 25, 1984, Pat. No. 4,621,914. This application Jul. 15, 1988, Ser. No. 220,063

Claims priority, application Japan, Jul. 27, 1983, 58-138129; Jul. 29, 1983, 58-139600; Aug. 8, 1983, 58-144547; Aug. 8, 1983, 58-144549; Aug. 17, 1983, 58-150572; Jun. 22, 1984, 59-129572; Jun. 25, 1984, 59-131452; Jun. 25, 1984, 59-131453

Int. Cl.<sup>5</sup> G03B 7/20, 15/05, 17/18

U.S. Cl. 354-412

8 Claims



1. A camera system having a camera body and at least one camera necessary attachable to the camera body, comprising: a plurality of circuit elements provided in the camera body

and in said at least one camera accessory for performing predetermined respective operations;

means provided in the camera body for controlling the plurality of circuit elements, including:

a data bus for connecting the control means with the plurality of circuit elements, said data bus serially sending data from the control means to the plurality of circuit elements and from the plurality of circuit elements to the control means;

at least one signal line for connecting the control means with each of said circuit elements, respectively, for sending clock pulses utilized for synchronizing the data sent through the data bus; and

a plurality of selecting lines for selecting, by the control means, which circuit element receives the data from the control means and sends the data to the control means; and

said control means selecting, in accordance with predetermined camera operation, the circuit element which operates through said selecting lines, said control means receiving data from the selected circuit element through the data bus with pulses through the signal line to calculate data sent to the circuit element according to the predetermined camera operation, and said control means sending the calculated data to the selected circuit element through the data bus with pulses through the signal line for operating said circuit element.

4,956,662

## APPARATUS FOR AND METHOD OF RECORDING COLOR PICTURE IMAGE

Toshio Sakai; Osamu Kawano; Kazunori Tanabe, and Tomoaki Hattori, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

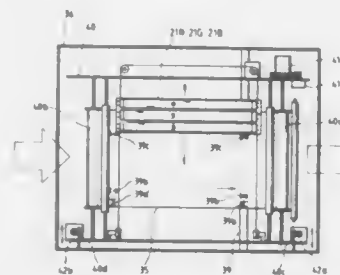
Filed Oct. 11, 1988, Ser. No. 255,342

Claims priority, application Japan, Oct. 9, 1987, 62-256000; Mar. 10, 1988, 63-32109[U]; Mar. 16, 1988, 63-62810; Apr. 22, 1988, 63-100913

Int. Cl.<sup>5</sup> G03B 27/32

U.S. Cl. 355-27

21 Claims



1. A color picture image recording apparatus for forming a color picture image on a photosensitive recording medium by exposing the photosensitive recording medium to light through each of a plurality of masking master plates produced according to original color picture image information, each of the masking master plates having a location mark, said apparatus comprising:

- (a) a housing;
- (b) a conveyor belt disposed in said housing and defining a flat surface for carrying thereon one of the masking master plates at a time, said flat surface having a downstream end and an upstream end;
- (c) a belt support unit mounted in said housing and supporting said conveyor belt, said belt support unit being movable relative to said housing and having a pair of downstream and upstream portions;
- (d) first drive means for moving said conveyor belt in a longitudinal direction;
- (e) second and third drive means operatively connected to

said belt support unit at said downstream and upstream portions, respectively, each of said second and third drive means being independently operable for moving a respective one of said downstream and upstream portions in a plane parallel to said flat surface of said conveyor belt and in a transverse direction substantially perpendicular to said longitudinal direction;

(f) a plurality of sensors disposed above said flat surface of said conveyor belt for reading out said location mark on the individual masking master plate carried on said flat surface of said conveyor belt and for issuing respective output signals; and

(g) control means for controlling said first, second and third drive means according to the output signals issued from said sensors.

4,956,664

## IMAGE PROCESSING APPARATUS HAVING AN OVERHEAD PROJECTOR

Takanori Hasegawa, Hachioji; Nobuyuki Abe, Toride; Toshiko Hirose, Yamaguchi; Takashi Kanda, Kofu; Hiroshi Saito, Yamanashi; Eiji Nakazawa, Nirasaki, and Masaki Oshima, Yamanashi, all of Japan, assignors to Riso Kagaku Corporation, Tokyo and Nippon Seimitsu Kogyo Kabushiki Kaisha, Kofu, both of Japan

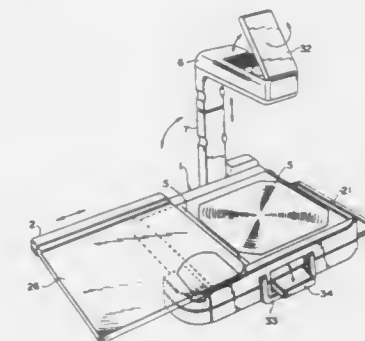
Filed May 15, 1989, Ser. No. 351,742

Claims priority, application Japan, May 17, 1988, 63-120172; May 17, 1988, 63-120173; May 17, 1988, 63-120174; May 17, 1988, 63-120175; May 17, 1988, 63-120176; May 17, 1988, 63-120177

Int. Cl.<sup>5</sup> G03B 27/52

U.S. Cl. 355-43

14 Claims



1. An image processing apparatus comprising:
  - (a) an input unit for inputting an image of an initial original;
  - (b) a support table on which the initial original is to be set, said support table being movably mounted along said input unit;
  - (c) a reflection-type focusing plate on which a projecting sheet is to be set, said reflection-type focusing plate being disposed alongside said input unit;
  - (d) an image forming unit disposed under said reflection-type focusing plate for forming on a sheet an image inputted from said input unit; and
  - (e) a projecting unit disposed above said reflection-type focusing plate for projecting an image of the projecting sheet set on said reflection-type focusing plate.

4,956,665

## FRAMING APPARATUS FOR A MEDICAL SCANNING CAMERA

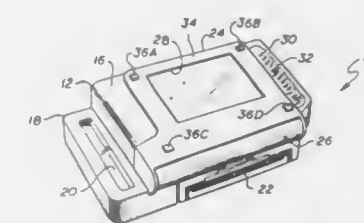
Thomas J. Niles, Tewksbury, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jul. 3, 1989, Ser. No. 375,191

Int. Cl.<sup>5</sup> G03B 27/48, 27/50

U.S. Cl. 355-50

8 Claims



1. Photographic apparatus for precisely selecting copying a portion of an illuminated image, comprising:

4,956,663

## DEVICE FOR PRINTING PHOTOGRAPHS

Franck Gerstch, Meylan, France, assignor to Kis Photo Industrie, Grenoble, France

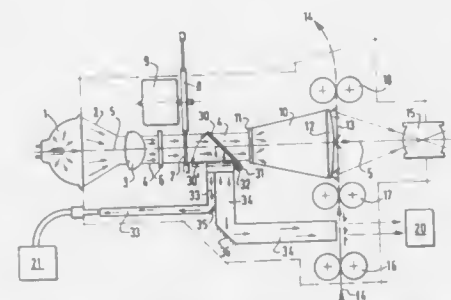
Filed Aug. 11, 1989, Ser. No. 392,778

Claims priority, application France, Aug. 18, 1988, 88 11137

Int. Cl.<sup>5</sup> G03B 27/80

U.S. Cl. 355-38

11 Claims

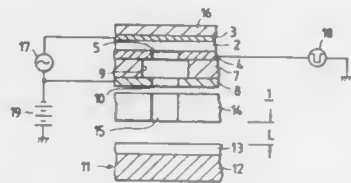


1. Apparatus for printing photographic negatives that include
  - a light source,
  - projecting means for directing light from the source along an optical path,
  - an exposure means mounted in the optical path for illuminating a film to be printed and projecting an image thereof onto an exposure plane for printing,
  - color filter means positioned in said optical path between the light source and the exposure means for filtering said light,
  - film transport means for passing a film to be printed sequentially through a color analysis means and then said exposure means,
  - a reflecting means movably mounted adjacent to the optical path between the filter means and the exposure means, positioning means to selectively place the reflecting means in a first position within said optical path to direct filtered light to said color analysis means wherein the color content of a film is analyzed and a second position outside of said optical path to permit filtered light to illuminate a film in said exposure means wherein the image carried on said film is projected onto said exposure plane.



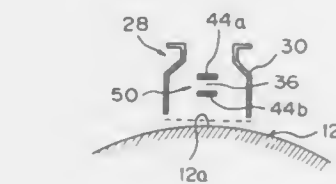
U.S. Cl. 355—210 8 Claims  
 1. An electrostatic latent image forming apparatus comprising:  
 first, second and third electrodes;  
 first and second insulating substrates, and  
 an insulating member;  
 wherein said first and second electrodes are provided with  
 said first insulating substrate interposed therebetween said  
 first and second electrodes, said second electrode having a  
 space area for producing creeping corona discharge in

response to a voltage being applied between said first and second electrodes, said third electrode being provided with said second insulating substrate disposed between said second and third electrodes, said third electrode



having an ion derivation area for deriving ions produced by said creeping corona discharge, said insulating member being provided on the ion derivation side of said third electrode and having a control area for controlling the direction of the derivation of ions.

**4,956,671**  
**WIRE CLEANING DEVICE FOR A CORONA DISCHARGE TYPE CHARGER**  
Hirohisa Otsuka, Kawaguchi, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan  
Filed Oct. 27, 1988, Ser. No. 263,361  
Claims priority, application Japan, Oct. 29, 1987, 62-271769  
Int. Cl.<sup>5</sup> G03G 21/00, 15/02  
U.S. Cl. 355—215 4 Claims



1. In a device for cleaning a wire of a charger having a shield case formed with an opening which faces a surface of a photoconductive element of an image recording apparatus to be charged and extends over substantially an entire length of the surface of said photoconductive element, and a wire extending within and in a lengthwise direction of said shield case, wherein the improvement comprises:

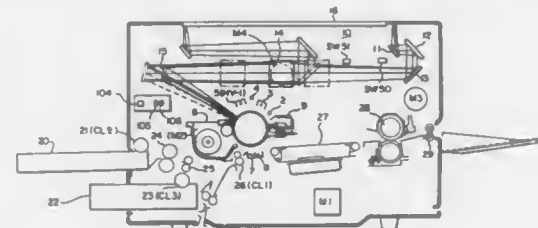
- movable cleaning members movable into and out of contact with a portion of said wire which faces the surface of said photoconductive element and a portion which is diametrically opposite to said first-mentioned portion, respectively, and movable relative to said wire;
- rotatable support means for slidably engaging said cleaning members with said wire when said movable cleaning members are moved in one direction relative to said wire; and
- means for spacing apart said cleaning members from said wire when said movable cleaning members are moved in the other direction relative to said wire.

**4,956,672**  
**COPYING MAGNIFICATION SETTING DEVICE FOR AN ELECTROPHOTOGRAPHIC COPYING APPARATUS**  
Kenji Shibasaki, Aichi; Yutaka Irie, Toyokawa; Masazumi Ito, Toyokawa, and Tomoji Murata, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Division of Ser. No. 932,777, Nov. 19, 1986, Pat. No. 4,827,310, which is a division of Ser. No. 762,122, Aug. 2, 1985, Pat. No. 4,644,499, which is a division of Ser. No. 496,885, May 27, 1983, Pat. No. 4,543,643. This application Sep. 16, 1988, Ser. No. 246,499

Claims priority, application Japan, May 28, 1982, 57-91877; Nov. 25, 1982, 57-206444; Nov. 29, 1982, 57-209845; Feb. 10, 1983, 58-20833; Mar. 8, 1983, 58-38743  
Int. Cl.<sup>5</sup> G03G 15/00

U.S. Cl. 355—243

5 Claims



1. A copying machine comprising:
  - means for forming an image of an original to be copied on copying paper;
  - a plurality of copy magnification selection keys each of which is assigned to a predetermined numerical value;
  - first display means having a plurality of display elements each of which corresponds to each of the copy magnification selection keys and is enabled when a corresponding copy magnification key is operated;
  - second display means for displaying numeric values when any one of said copy magnification selection keys is operated to as to display the numeric value corresponding to the operated copy magnification selection key;
  - an up key;
  - a down key;
  - means, operatively connected to said up key and said down key, for varying the numeric value in such a manner that the contents of the display is either increased or decreased by a predetermined value in response to the operation of said up key or down key;
  - control means for controlling said image forming means so that the numeric value displayed on the second display means corresponds to the ratio of the size of the image of the original and the size of the image of the copy paper, and
  - display control means for disabling the operation of said first display means when the numeric value displayed on said second display means is varied by said numeric value varying means.

**4,956,673**  
**IMAGE FORMING APPARATUS WITH EASILY REMOVABLE DEVELOPING UNITS**  
Yasuo Abuyama, Ebina; Fumito Ide, Zama; Osamu Hamanaka, Yokohama, and Takeshi Sanbayashi, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Continuation of Ser. No. 29,354, Mar. 23, 1987, Pat. No. 4,814,823, which is a continuation of Ser. No. 727,859, Apr. 26, 1985, abandoned. This application Sep. 12, 1988, Ser. No. 243,481

Claims priority, application Japan, Apr. 27, 1984, 59-85650  
Int. Cl.<sup>5</sup> G03G 15/06

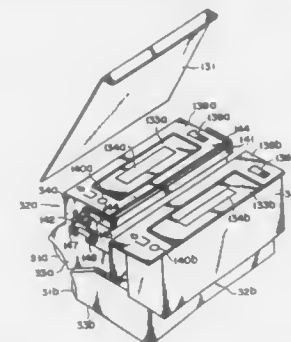
U.S. Cl. 355—245

10 Claims

1. An image-forming apparatus, comprising:
  - a housing;
  - an image carrier disposed in the housing and adapted to carry thereon a latent image corresponding to an original image;

a developing device for developing the latent image formed on the surface of the image carrier, said developing device including first developing means for developing the latent image by means of a first developing agent, and second developing means for developing the latent image by means of a second developing agent, at least one of said first and second developing means being removably set in said housing and being exchangeable;

inserting/removing means for inserting at least one of said first and second developing means in the housing or removing it from the housing; and

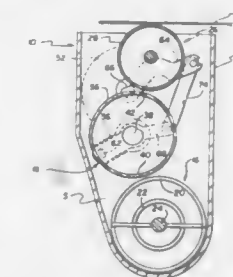


- selecting means for selecting the first or second developing means that is to be operated,
- said inserting/removing means including:
  - a handle; and
  - first and second hooks arranged to rotate about respective first and second supporting shafts at the outer two ends of said handle, said first and second hooks being provided for engaging with first and second pins on said housing for securing at least one of the first and second developing means to said housing when said handle is moved to a first-position, said first and second hooks disengaging from the first and second pins when said handle is moved to a second position.

**4,956,674**  
**METERING ASSEMBLY FOR DEVELOPMENT APPARATUS**  
Satyan K. Kalyandurg, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
Filed Aug. 29, 1989, Ser. No. 400,191  
Int. Cl.<sup>5</sup> G03G 15/09

U.S. Cl. 355—251

3 Claims



1. Apparatus for applying developer material to a latent electrostatic image; said apparatus comprising:
  - a housing having a sump for containing a supply of developer material;
  - a magnetic brush in said housing and spaced from said sump;
  - a feed mechanism between said sump and said magnetic brush, said feed mechanism including (1) rotary means for receiving developer material from said sump and for delivering such material to said magnetic brush and (2) a drive mechanism axially aligned with and drivingly engaged with said rotary means;
  - metering means between said sump and said magnetic brush, said metering means being mounted in said housing for rotation, about an axis substantially co-axial with said

rotary means for movement between (1) an open position communicating the magnetic brush and the sump and (2) a closed position substantially isolating the magnetic brush from the sump;

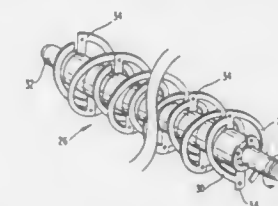
drive means outside said housing and spaced from said metering means, said drive mechanism being positioned axially between said drive means and said metering means;

means for drivingly connecting said metering means to said drive means while at the same time avoiding interference with said drive mechanism, said connecting means extending radially outwardly around said drive mechanism.

**4,956,675**  
**RIBBON BLENDER FOR A DEVELOPMENT APPARATUS WITH SELF ADJUSTING INNER AND OUTER RIBBONS**  
Brian J. Joseph, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
Filed Dec. 23, 1988, Ser. No. 289,147  
Int. Cl.<sup>5</sup> G03G 15/09

U.S. Cl. 355—251

7 Claims

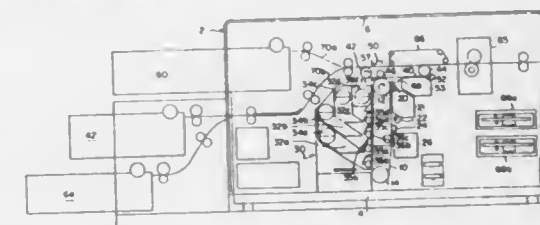


1. In an electrostatic developer material mixing apparatus including a ribbon blender having:
    - a drive member;
    - a first flexible helical ribbon drivingly connected at one of its ends to the drive member for moving developer material along the length of the ribbon in a first direction;
    - a second flexible helical ribbon drivingly connected at one of its ends to the drive member for moving developer material along the length of the second ribbon in a direction opposite to said first direction;
- the improvement wherein the end of each ribbon toward which developer material is moved is not connected to the drive member and is free to flex under load to change its pitch angle, whereby the rate of developer movement is reduced as developer material builds up at the ribbon ends.

**4,956,676**  
**ELECTROGRAPHIC COLOR PRINTER/COPIER**  
Kensuke Fukae, Monsey, N.Y., and Koichi Kinoshita, Shizuoka, Japan, assignors to Kentek Information Systems, Inc., Allendale, N.J.  
Continuation-in-part of Ser. No. 39,523, Apr. 16, 1987, abandoned. This application May 12, 1987, Ser. No. 49,715  
Int. Cl.<sup>5</sup> G03G 15/16, 15/01

U.S. Cl. 355—271

32 Claims



18. An electrographic color printing apparatus for imprinting information in color on a sheet of paper or the like, comprising:
  - a housing,
  - a source of paper and an output for said paper after it is imprinted,

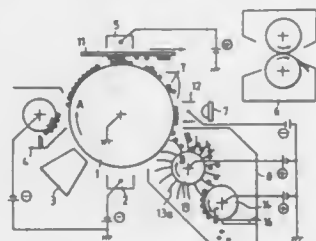


a paper path along which said paper travels within said printing apparatus;  
a photoconductive member for storing a latent electrostatic image of information to be imprinted;  
developer means containing toners of multiple colors for developing said electrostatic image in multiple colors;  
a transfer belt cooperating with said photoconductive member for receiving said developed color image from said photoconductive member and for transferring said developed color image to said paper;  
wherein said photoconductive member comprises a vertically aligned photoconductive belt, and said transfer belt is located above said photoconductive belt.

4,956,677

## CLEANING DEVICE FOR IMAGE FORMING APPARATUS

Keiichi Akiyama, Iwate, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan  
Filed Feb. 9, 1989, Ser. No. 308,858  
Claims priority, application Japan, Feb. 29, 1988, 63-46100  
Int. Cl.<sup>5</sup> G03G 15/00, 15/08, 21/00  
U.S. Cl. 355-303 6 Claims



1. A cleaning system for an image forming apparatus of the type wherein an electrostatic latent image on an image carrier is developed with colored fine particles, and the colored fine particles of the developed image are transferred to a transfer medium, said cleaning system being provided to remove colored fine particles remaining on said image carrier after transfer of the developed image to said transfer medium, said cleaning system comprising a conductive cleaning brush for slidably contacting with said image carrier to remove colored fine particles remaining on said image carrier, a first voltage applying means coupled to said cleaning brush for applying a first bias voltage to said conductive cleaning brush of the polarity opposite to the polarity of the charge of the colored fine particles, a precharging means for charging said colored fine particles remaining on said image carrier to a polarity opposite to the polarity of said cleaning brush, whereby colored fine particles remaining on said image carrier are removed by said conductive cleaning brush, and light irradiating means for removing residual charges from the image carrier after the transfer, said light irradiating means and said precharging means being arranged such that they affect charging and light irradiation on the same portion of the image carrier, whereby said precharging means uniformize the polarity of said colored fine particles remaining on the image carrier and, simultaneously, said light irradiating means removes residual charges on said image carrier, followed by cleaning by said cleaning brush.

4,956,678

## RECORDING SHEET TRANSPORT APPARATUS

Yukitoshi Kiya, Kawasaki, and Yasushi Nakazato, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan  
Filed Aug. 1, 1989, Ser. No. 388,341  
Claims priority, application Japan, Aug. 18, 1988, 63-204999; Aug. 25, 1988, 63-210958; Dec. 20, 1988, 63-321658; May 19, 1989, 1-126865

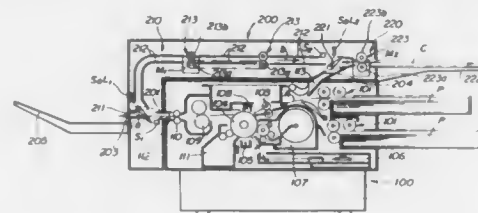
Int. Cl.<sup>5</sup> G03G 15/00

U.S. Cl. 355-318 15 Claims

1. A recording sheet transport apparatus of a duplex image forming apparatus which has an image forming part, at least

one paper supplying unit and an eject part, said recording sheet transport apparatus comprising:

a transport path for supplying a recording sheet which is received from the paper supplying unit to the image forming part;  
first transport means for transporting the recording sheet in said transport path;  
a reversing path for reversing side of the recording sheet;  
second transport means for transporting the recording sheet in said reversing path;  
a first path selector having a first position for guiding the recording sheet from the image forming part to said reversing path and a second position for guiding the recording sheet from the image forming part to the eject part;



refeeding means for refeeding the recording sheet in said reversing path to said transport path;  
driving means for driving said first and second transport means; and  
control means for controlling said first path selector to one of said first and second positions and for controlling driving timings of said first and second transport means, said driving means comprising a first driving source and a second driving source for independently driving said first and second transport means.

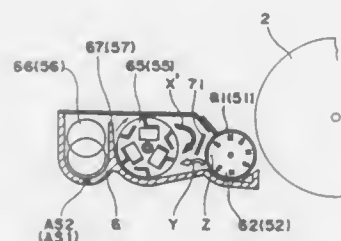
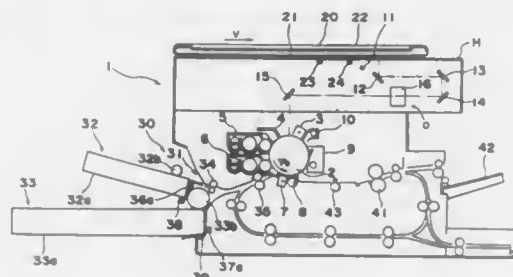
4,956,679

## IMAGE FORMING APPARATUS

Yoshiaki Takano, and Norihiko Suzuki, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Filed Apr. 22, 1988, Ser. No. 185,164  
Claims priority, application Japan, Apr. 25, 1987, 62-102934; Apr. 25, 1987, 62-102935; Apr. 25, 1987, 62-102936; Apr. 25, 1987, 62-102937

Int. Cl.<sup>5</sup> G03G 15/01

U.S. Cl. 355-326 8 Claims



1. An image forming apparatus comprising:

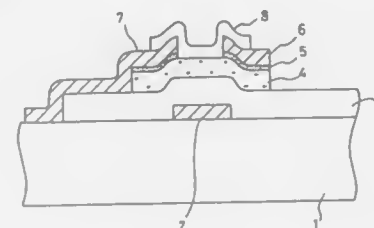
a rotatable support member;  
means for forming an electrostatic latent image on said support member;  
a first developing means for developing said electrostatic latent image by use of a first developer, said first developing means being so provided as to confront said support member;  
a second developing means including a developing roller for developing said electrostatic latent image and a supply means for supplying to the surface of the developing roller a second developer which has a color different from that of the first developer, said second developing means being provided at a downstream side of said first developing means in a rotational direction of said support member;  
a first preventing means for preventing a developing operation of said first developing means;  
a second preventing means for preventing a developing operation of said second developing means, said second preventing means including a shut-off means for shutting off supply by said supply means of the second developer to said developer roller and a driving means for changing over said shut-off means from a first state for shutting off supply of the second developer from said supply means to said developing roller to a second state enabling supply of the second developer from said supply means to said developing roller;  
a region designating means for designating, in the electrostatic latent image, first and second regions to be developed by the first and second developers, respectively;  
a control means for changing over the operation from the first developing means to the second developing means in response to a signal from said region designating means, said control means actuating, in a condition of rotating the developing roller, said driving means so that the second developer supplied to the developing roller is in contact with the electrostatic latent image on the support member after a trailing end of a visible image of the first developer on the support member has passed a position of the developing roller;  
a driving source for driving said first developing means or said second developing means; and  
a changeover means for performing changeover between transmission of a driving force of said driving source to said first developing means and that to said second developing means, said shut-off means stopping shut-off of supply of the second developer to said developing roller upon lapse of a predetermined time period after the driving force of said driving source has been changed over from said first developing means to said second developing means.

4,956,680

## THIN FILM TRANSISTOR

Hideo Tanaka, and Shunichi Motte, both of Tokyo, Japan, assignors to Seiko Instruments Inc., Japan  
Filed Dec. 14, 1987, Ser. No. 132,406  
Claims priority, application Japan, Dec. 22, 1986, 61-305708  
Int. Cl.<sup>5</sup> H01L 27/12 10 Claims

U.S. Cl. 357-4



1. A thin film transistor comprising: an insulating substrate, a gate electrode disposed on the insulating substrate, a gate

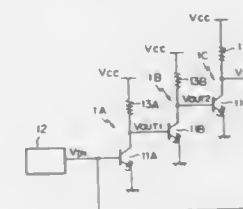
insulating film disposed on the gate electrode and the insulating substrate, an amorphous semiconductor film disposed on the gate insulating film, a source electrode and a drain electrode disposed in spaced relation to each other on the amorphous semiconductor film, and a light-shielding film disposed on the source electrode, the drain electrode and the amorphous semiconductor film for reducing optical leakage current, the light-shielding film being composed essentially of photoresist material containing black carbon.

4,956,681

## TERNARY LOGIC CIRCUIT USING RESONANT-TUNNELING TRANSISTORS

Naoki Yokoyama, Atsugi, and Masao Taguchi, Sagami-hara, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan  
Continuation of Ser. No. 917,060, Oct. 9, 1986, abandoned. This application Feb. 15, 1989, Ser. No. 310,463  
Claims priority, application Japan, Oct. 9, 1985, 60-223690  
Int. Cl.<sup>5</sup> H01L 27/12, 45/00, 49/02 15 Claims

U.S. Cl. 357-4



1. A logic circuit operatively connected to receive a pulse signal, comprising:

at least three resonant-tunneling transistors connected in series to form a closed loop, each said resonant-tunneling transistor having an emitter, a base, a superlattice formed between the emitter and the base and having a quantum well having at least one resonant energy level, and a collector, and having a negative resistance characteristic of a negative transfer conductance, each resonant-tunneling transistor conducting a current between the collector and the emitter, the current having one of at least three different current values including a first, a second or a third value, defined by said negative resistance characteristic and in response to a base voltage having one of three different voltage values including a first, a second or a third value, said third current value being between said first and second current values, and said second voltage value being between said first and third voltage values, said logic circuit holding at least three states, each state being, respectively, a high value, a low value, and a value approximately between said high and low values of said three resonant-tunneling transistors in response to the pulse signal applied to the base of one of said three resonant-tunneling transistors, the pulse signals having an amplitude of one of said first to third voltage values.

4,956,682

## OPTOELECTRONIC INTEGRATED CIRCUIT

Kiyoshi Ohnaka, Moriguchi; Hiraaki Tsujii, Nara; Yoichi Sasai, Hirakata, and Jun Shibata, Kawachinagano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 10, 1988, Ser. No. 154,214

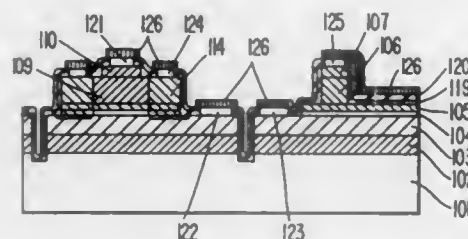
Claims priority, application Japan, Apr. 28, 1987, 62-105140; May 29, 1987, 62-135079

Int. Cl.<sup>5</sup> H01L 27/02 1 Claim

U.S. Cl. 357-16

1. An optoelectronic integrated circuit comprising:  
a laser device including a first cladding layer of a first type of conductivity formed on a semi-insulating substrate, an

active layer formed on said first cladding layer of said first type of conductivity, a waveguide layer of a second type of conductivity formed on said active layer being wider in band gap than said active layer, and a second cladding layer of said second type of conductivity formed partially on the surface of said waveguide layer of said second type of conductivity being wider in band gap than said waveguide layer; and

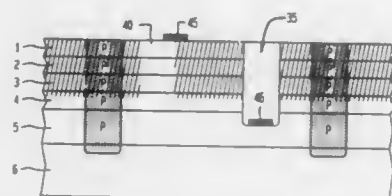


a heterojunction bipolar transistor including an emitter layer of said first type of conductivity formed partially on the surface of said waveguide layer of said second type of conductivity being wider in band gap than said waveguide layer, a collector formed by a portion of said first cladding layer of said first type of conductivity and a base formed by a portion of said waveguide layer of said second type of conductivity.

**4,956,683**  
**ISOLATION OF P-N JUNCTIONS**  
Victor E. Quintana, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.  
Filed Mar. 14, 1988, Ser. No. 167,780  
Int. Cl.<sup>3</sup> H01L 33/00

U.S. Cl. 357-17

14 Claims



1. A semiconductor structure including means for isolating discrete portions thereof comprises:

semi-insulating substrate;

a plurality of stacked layers overlying each other with the innermost layer thereof overlying said semi-insulating substrate, and the outermost layer doped with a first select species of dopant; and

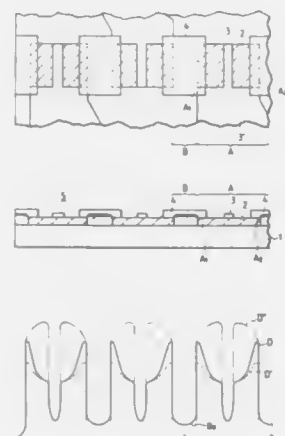
at least one first predetermined region comprising a dopant species of the same dopant type as that of the outermost layer of said stacked layers diffused therein at least to the depth of said semi-insulating substrate; and a second predetermined region ion implanted to a depth which is at least as deep as the outermost layer of said stacked layers which is doped with a dopant opposite from said first select species of dopant to render the second predetermined region substantially non-conductive, said first and second regions having common portions with respect to each other, and collectively defining at least one isolating barrier between the discrete portions of said semiconductor structure.

**4,956,684**  
**PRINTER HEAD WITH LIGHT EMITTING ELEMENT ARRAY**

Manabu Urata, Tokyo, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo and Sanyo Electrical Co., Ltd., Osaka, both of Japan  
Filed Sep. 20, 1988, Ser. No. 246,598  
Claims priority, application Japan, Sep. 24, 1987, 62-239674  
Int. Cl.<sup>3</sup> H01L 33/00

U.S. Cl. 357-17

5 Claims



1. A printer head having an array of light emitting elements, comprising:

a plurality of light emitting portions formed on a substrate; electrode portions disposed on said respective light emitting portions; and transparent film disposed only on edge portions of said respective light emitting portions in an aligning direction of the array.

**4,956,685**  
**THIN FILM SOLAR CELL HAVING A CONCAVE N-I-P STRUCTURE**

Roland Fischer, Nidderau; Gerhard Grabe, Rosdorf, and Ekkard Niemann, Maintal, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs GmbH, Frankfurt, Fed. Rep. of Germany

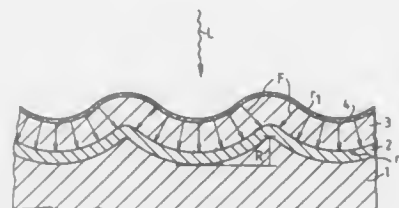
Continuation of Ser. No. 245,998, Sep. 14, 1988, abandoned. This application Feb. 13, 1990, Ser. No. 481,650

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 8437522[U]; Dec. 21, 1984, 3446807

Int. Cl.<sup>3</sup> H01L 27/14

U.S. Cl. 357-30

6 Claims



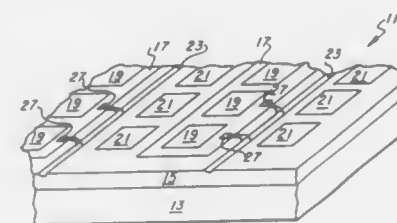
1. A thin film solar cell comprising: a substrate having a surface with a plurality of contiguous concave portions with rounded junctions therebetween; a semiconductor structure made from amorphous silicon with three superimposed layers including a layer of N conductivity type, a layer of P conductivity type and a layer of intrinsic type positioned between said layer of N conductivity type and said layer of P conductivity type, said semiconductor structure being positioned on said

substrate with said layer of P conductivity type being positioned facing said substrate, a surface of said semiconductor structure having a plurality of contiguous concave portions with rounded junctions therebetween corresponding to said contiguous concave portions with rounded junctions therebetween of said substrate.

**4,956,686**  
**TWO COLOR INFRARED FOCAL PLANE ARRAY**  
Sebastian R. Borrello, Dallas, and Charles G. Roberts, McKinney, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.  
Continuation of Ser. No. 827,207, Feb. 4, 1986, abandoned, which is a continuation of Ser. No. 65,499, Apr. 30, 1984, abandoned. This application Mar. 3, 1987, Ser. No. 21,373  
Int. Cl.<sup>3</sup> H01L 27/14

U.S. Cl. 357-30

13 Claims



1. A focal plane array, comprising:

(a) a body with a first surface,

(b) said body including regions of a first semiconductor material having photosensitivity in a first predetermined spectral band and extending to said first surface,

(c) said body including regions of a second semiconductor material different from said first semiconductor material and having photosensitivity in a second predetermined spectral band different from said first predetermined spectral band and extending to said first surface,

(d) said regions of said first material and said regions of said second material being disposed adjacent each other,

(e) a first plurality of gates, each of said first plurality of gates including a metal electrode and an insulating layer between said electrode and one of said regions, each of said gates of said first plurality positioned over said one of said regions of said first material and forming an MIS photodetector therewith,

(f) a second plurality of gates, each of said second plurality of gates including a metal electrode and an insulating layer between said electrode and the other of said regions, each of said gates of said second plurality positioned over said the other of said regions of said second material and forming an MIS photodetector therewith, and

(g) a plurality of electrical conduction lines in said body, each of said MIS photodetectors adjacent but separated from at least one of said conduction lines, each said line being coupled to one of said regions.

**4,956,687**  
**BACKSIDE CONTACT BLOCKED IMPURITY BAND DETECTOR**

Johannes B. de Bruin; Mary J. Hewitt, both of Santa Barbara, and James D. Phillips, Goleta, all of Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Continuation of Ser. No. 878,946, Jun. 26, 1986. This application Oct. 9, 1987, Ser. No. 107,874

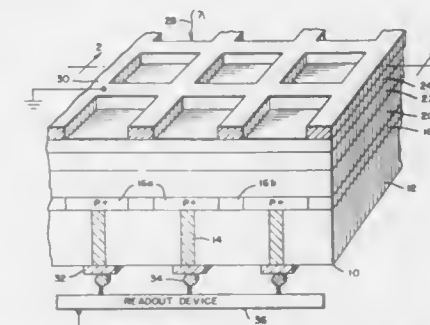
Int. Cl.<sup>3</sup> H01L 31/01

U.S. Cl. 357-30

8 Claims

1. A semiconductor array of radiation detectors comprising: an electrically insulating substrate having generally parallel top and bottom surfaces, said substrate having a plurality of electrical conductors extending between first and sec-

ond ends thereof completely through said insulating substrate between said top and bottom surfaces; a detection layer of radiation detecting semiconductor material overlying said top surfaces of said substrate; a plurality of electrically-conductive doped semiconductor regions disposed upon said top surface of said substrate and interposed between said detecting layer and said substrate, each of said doped semiconductor regions being in registration with and physically contacting said first end of one of said conductors for electrically coupling said conductor to said detection layer, each of said doped semiconductor regions defining, in conjunction with a



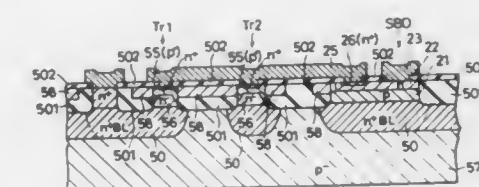
portion of said detection layer adjacent to said doped semiconductor region, a radiation detecting region; a blocking layer having a reduced electrical conductivity overlying said detecting layer for inhibiting a flow of dark current; and

a substantially transparent layer of electrically conductive material overlying a surface of said blocking layer opposite said detection layer and providing a common electrical terminal to all of said radiation detecting regions, and wherein each one of said plurality of electrical conductors provides an individual electrical terminal for a respective one of said radiation detecting regions for coupling each of said regions to a readout means.

**4,956,688**  
**RADIATION RESISTANT BIPOLAR MEMORY**  
Noriyuki Hoama, Kokubunji; Tohru Nakamura, Tanashi; Kazuo Nakazato; Motoaki Matsumoto, both of Kokubunji; Tetsuya Hayashida, Nishitama; Masaharu Kuno, Hachioji, and Kazuhiko Sagara, Suganami, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Continuation of Ser. No. 792,286, Oct. 28, 1985, abandoned. This application Jun. 27, 1989, Ser. No. 374,570  
Claims priority, application Japan, Oct. 29, 1984, 59-225738; Oct. 29, 1984, 59-225736; Oct. 29, 1984, 59-225737; Oct. 31, 1984, 59-227730; Mar. 20, 1985, 60-54404

Int. Cl.<sup>3</sup> H01L 29/72, 27/12, 29/04, 23/48  
U.S. Cl. 357-34

37 Claims



1. A semiconductor memory comprising: a semiconductor substrate; memory cells, each of which comprises first and second transistors formed on the semiconductor substrate and first and second load devices formed on the semiconductor



substrate; upper and lower word lines for selecting the memory cells; bit lines for reading and writing information of the memory cells; and coupling devices for electrically interconnecting the bit lines and the memory cells, wherein buried layers of the first and second transistors are isolated from the buried layers of the first and second load devices and/or from buried layers of the coupling devices, and wherein the first and second transistors employ the buried layers as emitters, respectively, wherein each memory cell is constructed by interconnecting a base of said first transistor and a collector of said second transistor and interconnecting a collector of said first transistor and a base of said second transistor, said load devices are first and second pnp transistors, a collector of said first pnp transistor is connected to a base of said first transistors and a collector of said second transistor, a collector of said second pnp transistor is connected to a base of said second transistor and a collector of said first transistor, and emitters of said first and second pnp transistors are electrically connected to said upper word line,

wherein a base of the first pnp transistor is connected to a collector of the first transistor and the base of the second transistor,

wherein a base of the second pnp transistor is connected to a collector of the second transistor and the base of the first transistor, and

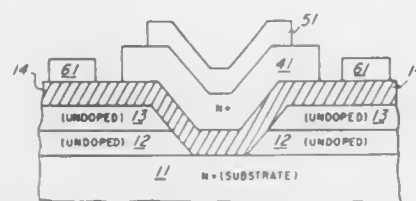
wherein emitters of said first and second transistors are electrically connected to the lower word line.

#### 4,956,689 HIGH SPEED GALLIUM ARSENIDE TRANSISTOR AND METHOD

Han-Tzong Yuan, and Liem Th. Tran, both of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex. Continuation of Ser. No. 338,445, Apr. 12, 1989, abandoned, which is a continuation of Ser. No. 65,433, Jun. 23, 1987, abandoned. This application Jan. 12, 1990, Ser. No. 462,926 Int. Cl.<sup>5</sup> H01L 29/72

U.S. Cl. 357—34

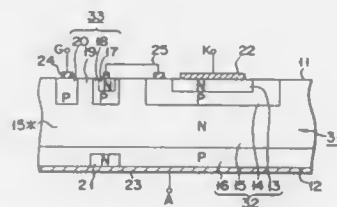
16 Claims



1. A semiconductor integrated circuit including a bipolar transistor comprising a collector region, a base region and an emitter region forming a base to emitter junction, said base region comprising a doped region of a first layer of semiconductor material overlying said emitter region, the base to emitter junction of said transistor being defined by the bottom of a trench formed in at least a second layer of semiconductor material overlying the emitter region of said transistor, wherein electrical contact to said base region is accomplished by providing a region in said second layer along portions of the walls of said trench that is more highly doped than other portions of said second layer.

4,956,690  
ZERO CROSSING TYPE THYRISTOR  
Mimoru Kato, Nagoya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Continuation of Ser. No. 143,936, Jan. 14, 1988, abandoned. This application Jan. 26, 1990, Ser. No. 471,025  
Claims priority, application Japan, Jan. 26, 1987, 62-14231 Int. Cl.<sup>5</sup> H01L 29/74, 29/06, 29/747, 49/00  
U.S. Cl. 357—38

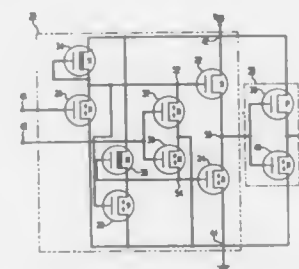
11 Claims



1. A zero-crossing thyristor comprising:  
a semiconductor substrate of a first conductivity type, having first and second main surfaces which are arranged substantially in parallel with and in opposition to each other;  
a first base layer of a second conductivity type, opposite to the first conductivity type, which is formed in said substrate and exposed to the first main surface;  
a second base layer of the second conductivity type, which is formed in said substrate and exposed to the first main surface, said second base layer being isolated from said first base layer by means of semiconductor regions constituting said semiconductor substrate;  
a first emitter layer of the second conductivity type, which is formed in said substrate and exposed to the first main surface, said first emitter layer being isolated from said first and second base layers by means of said semiconductor regions;  
a second emitter layer of the first conductivity type, which is formed in said first base layer and exposed to the first main surface;  
a third emitter layer of the first conductivity type, which is formed in said second base layer and exposed to the first main surface;  
a fourth emitter layer of the second conductivity type, which is formed in said substrate and exposed to the second main surface; and  
connecting means for connecting said third emitter layer to said first base layer,  
wherein said zero-crossing type thyristor has a gate, a cathode, and an anode which are respectively connected to said first, second, and fourth emitter layers;  
wherein said second emitter layer, first base layer, semiconductor region, and fourth emitter layer constitute a vertical main thyristor of said zero-crossing type thyristor;  
wherein said third emitter layer, second base layer, semiconductor region, and first emitter layer constitute a lateral driving thyristor of said zero-crossing type thyristor; and  
wherein the dimensions and the impurity concentrations of said second emitter layer, first base layer, semiconductor region and first emitter layer are so determined that the voltage, between the gate and cathode of said lateral driving thyristor, is more than the voltage between the anode and cathode of said vertical main thyristor, required for turning on said vertical main thyristor.

4,956,691  
NMOS DRIVER CIRCUIT FOR CMOS CIRCUITRY  
Jeffrey L. Calley, West Lafayette; Darrell E. Frazier, and Anthony E. Friesch, both of Kokomo, Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.  
Filed Mar. 24, 1989, Ser. No. 328,264  
Int. Cl.<sup>5</sup> H01L 27/02

U.S. Cl. 357—41



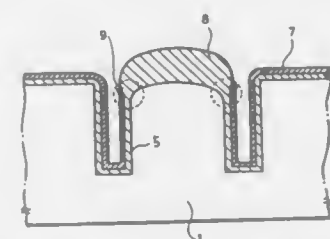
1. Circuitry comprising first (pullup) and second (pulldown) enhancement mode n-channel MOS transistors in a common p-type silicon substrate, each transistor comprising n-type source and drain regions spaced apart along said substrate and gates spaced from the substrate by a gate oxide layer extending between the source and drain regions, the source-drain paths of the two transistors being connected in series, and the gates adapted to be driven in opposite phase, characterized in that the surface of the substrate portion of the source-drain path of the second transistor includes a doping of acceptor ions higher than in a bulk portion of the substrate for setting the surface potential but the surface of the substrate portion of the source-drain path of the first transistor is free of doping with acceptor ions higher than the bulk of the substrate.

#### 4,956,692 SEMICONDUCTOR DEVICE HAVING AN ISOLATION OXIDE FILM

Hiroji Ozaki, Masahiro Yoneda; Ikno Ogaki; Yoshimori Okumura; Wataru Wakamiya, and Masao Nagatomo, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Nov. 3, 1988, Ser. No. 266,704  
Claims priority, application Japan, Nov. 9, 1987, 62-282567 Int. Cl.<sup>5</sup> H01L 27/12

U.S. Cl. 357—49

4 Claims

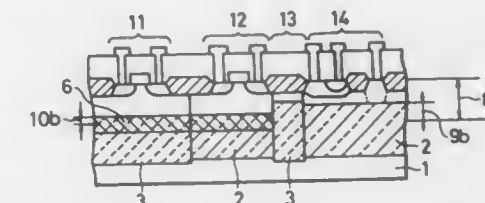


1. A semiconductor device having an isolation oxide film, comprising:  
a semiconductor substrate (1) having a main surface and a trench (5) formed on said main surface,  
a plurality of functional elements (12) formed on said semiconductor substrate (1), and  
an isolating film (8) for isolating said functional elements (12), formed on the main surface of said semiconductor substrate (1) near said trench (5), an end of a bird's beak of said isolation oxide film (8) being located on a side surface of said trench (5), said side surface of said trench (5) forming a rounded edge with said main surface of said semiconductor substrate.

ductor substrate and so that said side surface of said trench (5) and said main surface of said semiconductor substrate form an angle greater than an acute angle.

4,956,693  
SEMICONDUCTOR DEVICE  
Yasuo Sawahata; Ryuichi Saito, and Naohiro Momma, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Mar. 19, 1987, Ser. No. 28,140  
Claims priority, application Japan, Mar. 20, 1986, 61-60542 Int. Cl.<sup>5</sup> H01L 29/167  
U.S. Cl. 357—64

6 Claims

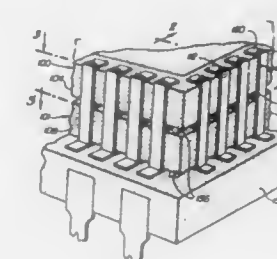


1. In a semiconductor device in which at least one of a MOS element and a bipolar element is provided in an element-forming region of a semiconductor substrate, and which has a buried layer formed between said element-forming region and a support region therefor, the improvement wherein an impurity-containing semiconductor layer, containing atoms of at least one kind of element selected from the group consisting of oxygen, nitrogen, carbon, argon, neon, krypton and helium, is provided on at least a portion of said buried layer so as to suppress swelling of the buried layer as compared to swelling of the buried layer without said impurity-containing semiconductor layer thereon, and wherein said device includes both a MOS element and a bipolar element, the impurity-containing semiconductor layer being formed only under the MOS element.

4,956,694  
INTEGRATED CIRCUIT CHIP STACKING  
Floyd Elide, Huntington Beach, Calif., assignor to Denset-Pac Microsystems, Inc., Garden Grove, Calif.  
Filed Nov. 4, 1988, Ser. No. 267,223  
Int. Cl.<sup>5</sup> H01L 23/02

U.S. Cl. 357—74

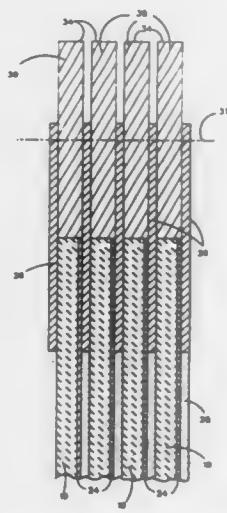
25 Claims



1. An electronic circuit comprising:  
a first electronic component having a first data input/output terminal and a first enable terminal;  
a second electronic component having a second data input/output terminal and a second enable terminal;  
stacking means for stacking the first electronic component on the second electronic component;  
first connecting means for electrically connecting the first data input/output terminal to the second data input/output terminal;  
first conducting means connected to the first enable terminal

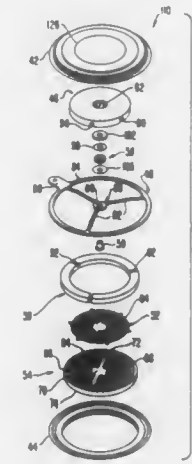
for providing electrical conduction to the first enable terminal; and  
second conducting means connected to the second enable terminal for providing electrical conduction to the second enable terminal independent of the first enable terminal.

**4,956,695**  
**THREE-DIMENSIONAL PACKAGING OF FOCAL PLANE ASSEMBLIES USING CERAMIC SPACERS**  
William L. Robinson, El Toro, and John C. Roth, Jr., Glendora, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.  
Filed May 12, 1989, Ser. No. 351,122  
Int. Cl.<sup>3</sup> H01L 23/02, 23/12  
U.S. Cl. 357-74 14 Claims



1. A three-dimensional focal plane assembly comprising a plurality of die assemblies stacked adjacent one another, wherein each die assembly comprises:
  - a silicon electronic die incorporating electronic circuitry and having first and second faces separated by a first thickness, and a third face between said first and second faces across said first thickness;
  - a dielectric layer having first and second dielectric faces, wherein said first dielectric face is bonded to said second face of said die, said dielectric layer having a second thickness between its first and second faces and having a third dielectric face, between said first and second dielectric faces across said second thickness, wherein said third dielectric face and said third die face are substantially coplanar;
  - a ceramic spacer having first and second surfaces, and having a third thickness between said first and second surfaces substantially the same as said first and second thickness together, said spacer additionally having a third spacer surface, between said first and second spacer surfaces, wherein said third spacer surface abuts said third die surface and said third dielectric surface so that said first die face and said first spacer surface are substantially coplanar and said second dielectric face and said second spacer surface are substantially coplanar; and
  - a gold ribbon lead bonded to said first face of said silicon die and to said first surface of said ceramic spacer.

**4,956,696**  
**COMPRESSION LOADED SEMICONDUCTOR DEVICE**  
Richard J. Hoppe, Steven E. Jackson, and William K. Anderson, all of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.  
Filed Aug. 24, 1989, Ser. No. 397,831  
Int. Cl.<sup>3</sup> H01L 23/42  
U.S. Cl. 357-79 22 Claims

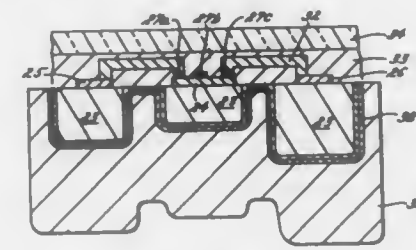


1. A compression loaded semiconductor device comprising:
  - a cylindrical semiconductor device having a first region on a first face, a control region on the first face having a central portion and a second region on a second face with the second face being opposed to the first face;
  - an upper cover in electrical contact with the first region of the semiconductor device;
  - a lower cover in electrical contact with the second region of the semiconductor device;
  - an electrically conductive contact having an external control terminal, an annulus electrically connected to the external control terminal, a plurality of projections electrically connected to the annulus and projecting radially inward, and a center connected to the radially inward projections and to the central portion of the control region; and
  - first and second annular insulators, each annular insulator having a plurality of faces, the upper cover being bonded to a first face of the first insulator, a second face of the first insulator being bonded to a first attachment ring with the first attachment ring being bonded to the annulus, the lower cover being bonded to a first face of the second insulator, a second face of the second insulator being bonded to a second attachment ring with the second attachment ring being bonded to the annulus, the bonds defining a sealed chamber containing the semiconductor device.

**4,956,697**  
**MICROWAVE MONOLITHIC INTEGRATED CIRCUIT WITH HEAT RADIATING ELECTRODE**  
Michihiro Kobiki, Masahiro Yoshida, and Takahide Ishikawa, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Sep. 30, 1988, Ser. No. 251,677  
Claims priority, application Japan, Dec. 14, 1987, 62-315595  
Int. Cl.<sup>3</sup> H01L 23/02  
U.S. Cl. 357-81 10 Claims

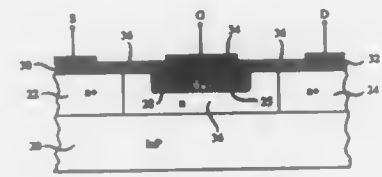
1. A microwave monolithic integrated circuit comprising:
  - a substrate having upper and lower opposed surfaces;
  - at least one active region and at least one passive region produced on the upper surface of the substrate, said regions being electronically coupled to one another; and

a heat sink produced on the lower surface of the substrate; wherein the substrate thickness beneath the active region is smaller than the substrate thickness beneath at least one passive region, thereby disposing the heat sink near the



active region to improve heat dissipation therefrom, the substrate thickness beneath the at least one passive region being adapted to provide the passive region with a terminating impedance of a predetermined magnitude.

**4,956,698**  
**GROUP III-V COMPOUND SEMICONDUCTOR DEVICE HAVING P-REGION FORMED BY BE AND GROUP V IONS**  
Kou-Wei Wang, Piscataway, N.J., assignor to The United States of America as represented by the Department of Commerce, Washington, D.C.  
Division of Ser. No. 79,371, Jul. 29, 1987, Pat. No. 4,818,721.  
This application Nov. 30, 1988, Ser. No. 278,125  
Int. Cl.<sup>3</sup> H01L 29/72  
U.S. Cl. 357-91 3 Claims

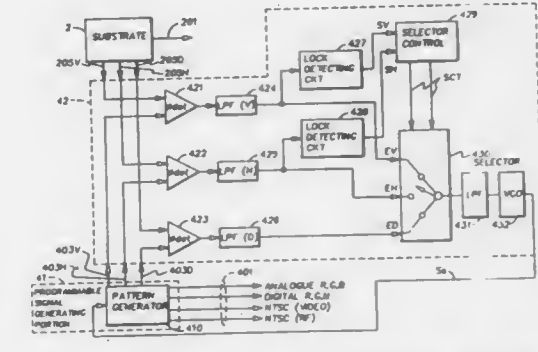


1. A semiconductor device comprising
  - a first region of a Group III-V compound semiconductor, and
  - a p-type region formed in said first region by Be ions and a Group V ion species other than the Group V species of said compound, wherein
  - said first region comprises InP, and
  - said Group V ion species comprises As ions.

**4,956,699**  
**SIGNAL SYNCHRONIZING SYSTEM**  
Mitsuo Ohashi, Osaka, Japan, assignor to NEC Home Electronics Ltd., Osaka, Japan  
Filed Jan. 24, 1989, Ser. No. 301,043  
Claims priority, application Japan, Jan. 27, 1988, 63-16572  
Int. Cl.<sup>3</sup> H04N 5/04  
U.S. Cl. 358-149 8 Claims

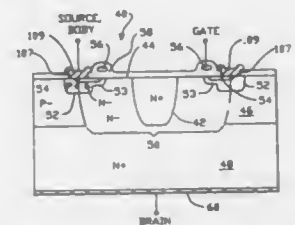
1. A signal synchronizing system, comprising:
  - a first circuit having a plurality of sync output signals;
  - a second circuit having a plurality of sync output signals corresponding to said sync signals of said first circuit; and
  - means for receiving and synchronizing output signals from said first and second circuits and for generating a control signal to said second circuit, said synchronizing means comprising:
    - a plurality of phase detectors corresponding to each of said sync signals of each of said first and second circuits;
    - a selecting means for selecting outputs of said phase detectors;

at least one lock condition detecting means connected to one of said phase detectors;  
means for controlling said selecting means in accordance with an output of said lock condition detecting means; and



means for outputting said control signal to said second circuit, said outputting means being provided between said selecting means and said second circuit.

**4,956,700**  
**INTEGRATED CIRCUIT WITH HIGH POWER, VERTICAL OUTPUT TRANSISTOR CAPABILITY**  
Richard A. Blanchard, Los Altos, and Richard K. Williams, Cupertino, both of Calif., assignors to Siliconix Incorporated, Santa Clara, Calif.  
Continuation of Ser. No. 85,792, Aug. 17, 1987, abandoned. This application May 22, 1989, Ser. No. 356,631  
Int. Cl.<sup>3</sup> H01L 29/78  
U.S. Cl. 357-23.4 20 Claims



1. A power transistor device, which comprises a substrate of a first conductivity type, an epitaxial layer of a second conductivity type and a given resistivity on said substrate, forming a p-n junction therewith and having an upper surface, a source region of the first conductivity type extending from the upper surface in to said epitaxial layer and being separated therefrom by a p-n junction, a vertical drain region of the first conductivity type spaced from said source region, having a portion with a higher dopant concentration than said epitaxial layer, extending from the upper surface through said epitaxial layer to said substrate and forming p-n junction with said epitaxial layer, an insulating layer on the upper surface extending between said source region and said vertical drain region, a conductive gate electrode on said insulating layer extending between said source region and said vertical drain region, a conductive electrode electrically connected to said source region, and a conductive electrode electrically connected to said substrate and, through said substrate, to said vertical drain region, said source region being separated from said vertical drain region by a region of the second conductivity type extending from the upper surface into said epitaxial layer a greater extent than said source region and having a portion between said source region and said vertical drain region, said source region being contained at least in part within said region



- a. a camera having an image pickup device for picking up an image of said object;
- b. producing means for producing a model of a surface of said object in a three-dimensional coordinate system based on the coordinates of picture elements on the image pickup device of said camera and the image pickup angle of said camera with respect to said object;

- c. mapping means for mapping image data output from said camera onto said model produced by said producing means;
- d. transformation means for rotationally transforming said model with said image data mapped thereon in said three-dimensional coordinate system such that the apparent visual point is changed; and
- e. a monitor for displaying said model with said image data mapped thereon.

4,956,707

## ADAPTIVE GRAPHICS VIDEO STANDARDS FORMAT CONVERTER USER-INTERFACE

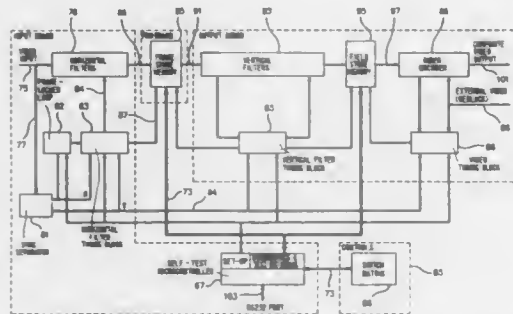
David Oakley, and Michael J. Hellmer, both of San Diego, Calif., assignors to Megatek Corporation, San Diego, Calif.

Filed Jul. 27, 1989, Ser. No. 387,487

Int. Cl. H04N 7/01, 11/20, 5/22

U.S. Cl. 358-140

14 Claims



11. A method for interactively setting up a video standards converter for receiving video signals in one format and converting them to signals in a different format, said method comprising the steps of:
- actuating function switches in a control switch matrix;
- sampling the switch matrix by means of a microcontroller to detect actuated switches;
- generating signals by the microcontroller in response to each actuated function switch;
- selectively coupling said generated signals to the video standards converter to modify the video signal transformation process therein;
- matching the two dimensional sampling aperture of the standards converter to the timing of the incoming video signals; and
- continuing to actuate function switches and modifying the converter output video signals interactively until optimal video output from the converter is achieved as determined visually.

4,956,708

## FRAME MEMORY CONTROL SYSTEM

Hirokazu Itagaki, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jun. 6, 1989, Ser. No. 362,280

Claims priority, application Japan, Jun. 9, 1988, 63-140509

Int. Cl. H04N 7/01

U.S. Cl. 358-140

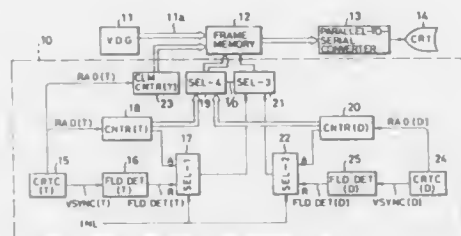
5 Claims

1. A frame memory control system for controlling a frame memory in accordance with an INL signal that indicates whether the scanning mode is sequential or interlaced and a T/D signal that differentiates between write transfer access and display access, causing said frame memory to receive data at one rate from a video data generator and provide said data at another, possibly different rate to a parallel/serial converter, comprising:

- a column address counter for generating a column address and furnishing said column address to said frame memory;
- a first field detection circuit for generating a FLDD(T)

signal that differentiates between even and odd fields in interlaced scanning;

- a first row address counter for generating a first row address;
- a first selector for selecting either said FLDD(T) signal or the most significant bit of said first row address according to said INL signal and furnishing the selected signal as output;
- a second field detection circuit for generating a FLDD(D) signal that differentiates between even and odd fields in interlaced scanning;
- a second row address counter for generating a second row address;



- a second selector for selecting either said FLDD(D) signal or the most significant bit of said second row address according to said INL signal and furnishing the selected signal as output;
- a third selector for selecting the output of said first selector or the output of said second selector according to said T/D signal and furnishing the selected signal to said frame memory; and
- a fourth selector for selecting either the lower bits of said first row address or the lower bits of said second row address according to said T/D signal and furnishing the selected bits to said frame memory.

4,956,709

## FORWARD ERROR CORRECTION OF DATA TRANSMITTED VIA TELEVISION SIGNALS

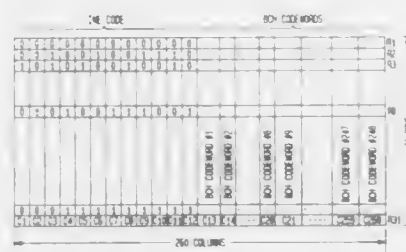
Mark S. Richer, Alexandria, Va.; Aderemi A. Adeyeye, Adelphi, Md., and Hermann Helgert, Washington, D.C., assignors to PBS Enterprises, Inc., Alexandria, Va. and EEG Enterprises, Inc., Farmingdale, N.Y.

Filed Mar. 11, 1988, Ser. No. 167,016

Int. Cl. H04N 5/08

U.S. Cl. 358-147

27 Claims



26. A receiver for digital data which is transmitted within the horizontal lines of a television signal, comprising:

- a memory for receiving the data transmitted within the lines of the television signal and storing the lines of data in the form of an array such that each line of data occupies a predetermined row of the array identified by the received data;
- means for detecting and correcting bit errors based upon the received bits in a column of the array; and

means for retrieving corrected blocks of data from the respective columns of the array.

4,956,710

## TELEVISION RECEIVER TUNER HIGH PASS INPUT FILTER WITH CB TRAP

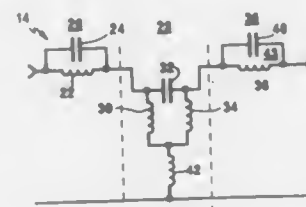
Michael A. Pagel, Indianapolis, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Apr. 14, 1989, Ser. No. 339,575

Int. Cl. H04B 1/16

U.S. Cl. 358-188

5 Claims



1. In a television receiver, a television signal processing system for highpass filtering the television signal comprising:
- an LC parallel resonant input filter section in series with and having an input for receiving said signal,
- an LC parallel resonant output filter section in series with and having an output of a highpass filtered version of said signal, and
- a generally pi configured intermediate filter section with an input terminal for receiving said signal from said input filter section and an output terminal for conveying said signal to said output section, said intermediate section comprising a capacitor coupled between the input terminal and the output terminal, a first and a second inductor each coupled from one of the terminals to a common junction, and a third inductor coupled from the common junction to a signal ground.

4,956,711

## AUTOMATIC BALANCING SYSTEM FOR COMMUNICATIONS RECEIVER APPARATUS

Gerhard Maier, Dachingen, Fed. Rep. of Germany, assignor to Deutsche Thompson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

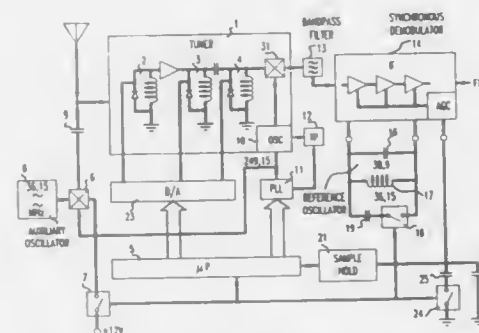
Filed Dec. 27, 1984, Ser. No. 686,649

Claims priority, application Fed. Rep. of Germany, Dec. 27, 1983, 3347132

Int. Cl. H03J 7/08

U.S. Cl. 358-191.1

17 Claims



1. An automatic balancing circuit for a communications receiver apparatus such as a color television receiver set comprising
- a phase locked loop circuit;

- a tuning oscillator connected to the phase locked loop circuit and adjustable to the phase locked loop circuit;
- an antenna having an output;
- a tuner connected to the antenna;
- an intermediate frequency component device fed with signals originating in the tuner and serving as an evaluation circuit during the automatic balancing process and having an output;
- an automatic gain control circuit AGC having an input connected to the output of the intermediate frequency component and having an output providing a measurement voltage;
- a sample-and-hold circuit having an input connected to the output of the automatic gain control circuit and having an output;
- a microprocessor having an input connected to the output of the sample-and-hold circuit;
- a reference oscillator circuit required for a synchronous demodulator comprised in an intermediate frequency component device and connected to the intermediate frequency component device, which reference oscillator circuit is controlled by the microprocessor during the automatic balancing process and switched in its resonance frequency to a frequency, which corresponds to an arithmetical average value of intermediate picture carrier frequency and intermediate sound carrier frequency.

4,956,712

## APPARATUS FOR DELAYING A SUB-AURAL SIGNAL IN A TELEVISION RECEIVER

Sam P. Hoag, Seoul, Rep. of Korea, assignor to Goldstar Co. Ltd., Seoul, Rep. of Korea

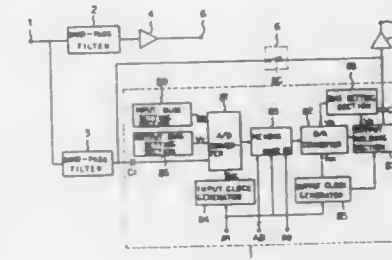
Filed Apr. 28, 1989, Ser. No. 344,376

Claims priority, application Rep. of Korea, Apr. 30, 1988, 5037/1988

Int. Cl. H04N 5/60

U.S. Cl. 358-198

4 Claims



1. An apparatus for delaying a sub-aural signal in a television receiver, comprising:
- a first band-pass filter for receiving a main aural signal from a plurality of aural signals input to a multiple aural signal input terminal and developing an output signal therefrom;
- a second band-pass filter for receiving the sub-aural signal from said plurality of aural signals input to said multiple aural signal input terminal and developing an output signal; therefrom
- a first amplifier for amplifying and outputting said output signal from said first band-pass filter to a main aural signal output terminal;
- a delaying section for outputting said output from said second band-pass filter by a predetermined delayed time interval in response to a microcomputer when a sub-aural signal delay is selected;
- a switching section for providing said output signal from said second band-pass filter in response to said microcomputer when said sub-aural signal delay fails to be selected; and
- a second amplifier for amplifying and outputting the output signal from said delaying section when said sub-aural



signal delay is selected from said switching section when said sub-aural signal delay fails to be selected.

4,956,713

**IMAGE PICK-UP APPARATUS USING PHOTO-TO-PHOTO CONVERSION ELEMENT**

Itsuo Takanashi, Kamakura; Shintaro Nakagaki, Fujisawa; Tsutomu Asakura, Yokohama; Masato Furuya, Yokosuka; Hirohiko Shinonaga, Yokohama, and Hiromichi Tai, Yokosuka, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

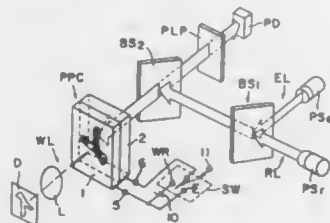
Filed May 12, 1989, Ser. No. 350,798

Claims priority, application Japan, May 13, 1988, 63-116157; May 19, 1988, 63-122281

Int. Cl.<sup>5</sup> H04N 5/30

U.S. Cl. 358—209

8 Claims



1. An image pickup apparatus comprising:  
means for forming an electric charge image corresponding to an optical image of an object to be image-picked up in a photo-photo conversion element constructed of two transparent electrodes with at least a photoconductive layer and a photo-modulation layer being interposed therebetween, by applying a light from said object of said photoconductive layer;  
means for reading said electric charge image corresponding to the optical image of said object as optical information, by applying a reading light to said photo-modulation layer;  
means for erasing said electric charge image corresponding to the optical image of said object, wherein an erase operation and read operation are intermittently repeated for said electric charge image; and  
said reading means operating in a limited period which is substantially short compared to a period in which said forming means operate.

4,956,714

**IMAGE PICKUP APPARATUS**

Itsuo Takanashi, Kamakura; Shintaro Nakagaki, Fujisawa; Hirohiko Shinonaga; Tsutomu Asakura, both of Yokohama, and Masato Furuya, Yokosuka, all of Japan, assignors to Victor Company of Japan, Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 139,005, Dec. 29, 1987, Pat. No. 4,831,452. This application Jan. 24, 1989, Ser. No. 301,324

Claims priority, application Japan, Jan. 24, 1988, 63-13251; Jan. 25, 1988, 63-13943; Jan. 26, 1988, 63-15263; Jan. 26, 1988, 63-15264

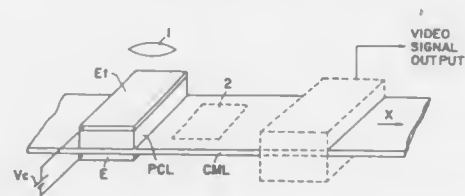
Int. Cl.<sup>5</sup> H04N 5/30

U.S. Cl. 358—213.11

6 Claims

1. An image pickup apparatus comprising:  
a movable charge storage member;  
a photo-charge conversion unit comprising a photoconductive layer member having a transparent electrode, an electrode, and means for applying an electric field between said transparent electrode and said electrode, said photo-charge conversion unit opposing said charge storage member; and  
means for focussing an optical image of an object through said transparent electrode onto an image focussing surface

of said photo-charge conversion unit via a taking lens, and for forming an electric charge image corresponding to



4,956,715

**IMAGE SENSING DEVICE HAVING A PHOTOMETRIC ELEMENT FOR SETTING AN EXPOSURE CONDITION FOR THE IMAGE SENSING DEVICE**

Tadaashi Okino; Nobuaki Date; Nobuo Tezuka, and Syuichiro Saito, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

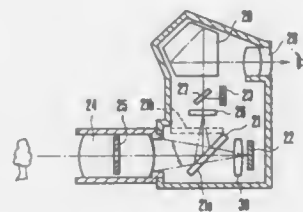
Continuation of Ser. No. 169,074, Mar. 16, 1988, abandoned, which is a continuation of Ser. No. 726,097, Apr. 23, 1985, abandoned. This application Sep. 19, 1989, Ser. No. 409,283

Claims priority, application Japan, Apr. 24, 1984, 59-82605

Int. Cl.<sup>5</sup> H04N 3/19

U.S. Cl. 358—213.19

25 Claims



1. An image sensing device comprising:  
(a) image sensing means;  
(b) a photometric element;  
(c) accumulating time control means for variably controlling the storing time of said image sensing means;  
(d) exposure information forming means for forming first exposure control information based on an output of said photometric element, and for forming second exposure control information based on an output of said image sensing means, under a condition in which the accumulating time is controlled by said accumulating time control means; and  
(e) exposure control means for correcting the exposure condition of said image sensing means on the basis of said second exposure control information, said exposure control means having a lower responsiveness than said accumulating time control means.

4,956,716

**IMAGING SYSTEM EMPLOYING CHARGE AMPLIFIER**

Mary J. Hewitt, and Johannes B. de Bruin, both of Santa Barbara, Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Filed Feb. 21, 1989, Ser. No. 312,262

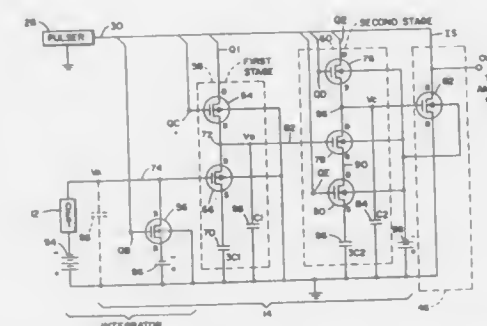
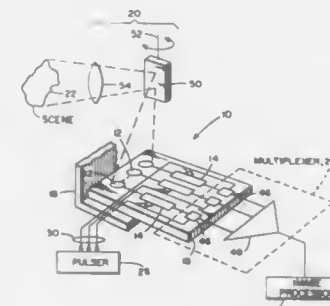
Int. Cl.<sup>5</sup> H04N 3/14

U.S. Cl. 358—213.27

14 Claims

11. An imaging system responsive to incident radiation of a scene for forming an image of the scene, the system comprising:  
an array of detectors;

an optical unit for focusing incident radiation of a scene upon said detectors, said array of detectors being positioned at a focal plane of said optical unit for detecting said radiation, said detectors producing signals in response to the incident radiation;  
a set of amplifiers, individual ones of the amplifiers being coupled to respective ones of the detectors for amplifying signals of the detectors;  
timing means for staggering the operations of individual ones of said amplifiers;  
multiplexing means for combining output signals of the amplifiers; and  
processor means coupled to said set of amplifiers via said multiplexing means for forming an image of the scene from the amplifier output signals;  
and wherein each of said amplifiers comprises:  
a first transistor and a second transistor, a source terminal of one of said transistors being connected to a drain terminal of the other of said transistors at a junction;  
an energy storage element connected to said junction;



charge means connected to a gate terminal of said first transistor for activating said first transistor to charge said storage element with electric energy during a first interval, said charge means acting periodically to provide a succession of said first intervals;  
signal means interconnecting a respective one of said detectors to a gate terminal of said second transistor for applying a sample of a detector signal to said second transistor during a second interval subsequent to said first interval, said first and said second transistors acting to amplify said signal by imparting energy thereto extracted from said storage element, said signal means acting periodically to provide a succession of signal samples during a succession of said second intervals; and  
disconnect means connected to a drain terminal of said first transistor and being operative periodically to disconnect said first and said second transistors from any external source of power during said second interval, said charge means inhibiting a flow of power from any external source of power during a succession of third intervals wherein

each of said third intervals extends from the end of a second interval to the next occurrence of a first interval.

4,956,717

**METHOD OF AND APPARATUS FOR CONTROLLER DUPLEX PAGE PRINTER**

Kenji Suzuki, Hadano; Kikuo Hatazawa, Atsugi, and Shinichi Kishi, Mito, all of Japan, assignors to Hitachi, Ltd. and Hitachi Koki Co., Ltd., both of Tokyo, Japan

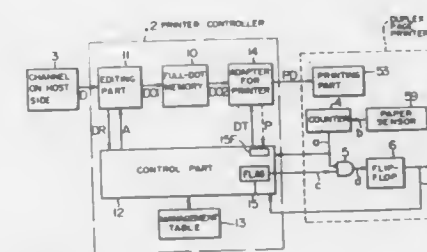
Filed Dec. 15, 1988, Ser. No. 284,635

Claims priority, application Japan, Dec. 18, 1987, 62-321020

Int. Cl.<sup>5</sup> H04N 1/23; G01D 15/28; G03B 27/52

U.S. Cl. 358—296

7 Claims



1. A method of controlling a duplex page printer operating in such a manner that a printing operation is first performed for the first surface of each of a plurality of sheets of paper which are successively supplied from a paper feed mechanism to a printing part, the sheets of paper are then sent to a paper transfer path having a paper turning-over mechanism, to be sent back to the printing part, a printing operation is performed for the second surface of each sheet of paper, and then the sheets of paper are sent to the outside, the method comprising the steps of:

preparing a dot pattern memory for storing dot pattern data to be printed on each surface of the sheets of paper;  
converting input printing data into dot pattern data sequentially for each surface of said sheets;  
storing the converted dot pattern data in respective page areas of a dot pattern memory which are allotted to the first and second surfaces of said sheets;  
starting a printing operation when the printing operation for the first and second surfaces of the first sheet of paper has been converted into dot pattern data and stored in said memory; and  
starting to convert input printing data for the following sheet of paper into dot pattern data at the same time as the said printing operation is started.

4,956,718

**TONAL CONVERSION METHOD FOR PICTURES**

Takashi Numakura, Tokyo; Susumu Kitazawa, Kanagawa; Junichi Naya, Miyagi, and Iwao Numakura, Tokyo, all of Japan, assignors to Yamatoya & Co., Ltd., Tokyo, Japan

Filed Aug. 8, 1989, Ser. No. 390,910

Claims priority, application Japan, Aug. 23, 1988, 63-207326

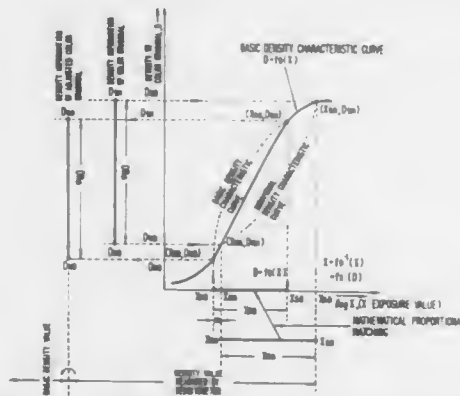
Int. Cl.<sup>5</sup> H04N 1/23

U.S. Cl. 358—296

6 Claims

1. A method for producing a reproduced picture by tonal conversion of an original picture on the basis of pictorial information from the original picture, which comprises:  
(i) setting the density value ( $H_n$ ) of the highlight area of the original picture, the density value ( $S_n$ ) of the shadow area of the original picture and an individual density characteristic curve  $fD_n(x)$  ranging from said  $H_n$  to said  $S_n$ , where  $x$  indicates a physical value correlated to the densities ( $D$ ) of the original picture and reproduced picture, such as exposure;  
(ii) setting the density value ( $H_0$ ) of the highlight area and the density value ( $S_0$ ) of the shadow area of a standard

(iii) adjusting the individual density characteristic curve  $fD_n(x)$  to the standard density characteristic curve  $fD_0(x)$  and further determining an adjusted density information value  $D_0$  on the standard original picture corresponding to the



(iv) then conducting tonal conversion of the picture in said density range on the basis of the thus-obtained adjusted density information value  $D_o$  on the standard original picture corresponding to the density information value  $D_n$  of the desired picture element on the original picture by using the following tonal conversion formula:

$$y = y_H + \frac{\alpha[1 - 10^{-k \cdot (D_0 - H_0)}]}{\alpha - \beta} \cdot (y_S - y_H)$$

where

( $D_0 - H_0$ ): the base density information datum obtained by subtracting the density value  $H_0$  of the highlight area of the standard original picture from the adjusted density information value  $D_0$  on the standard original picture corresponding to the density information value  $D_n$  of the desired picture element on the original picture;

$y$ : the halftone density intensity on the reproduced picture, corresponding to the desired picture element on the original picture;

$y_H$ : a desired halftone density intensity set for the highlight area on the picture to be reproduced;

$y_S$ : a desired halftone density intensity set for the shadow area on the picture to be reproduced;

$\alpha$ : the surface reflectance of a base material on which the reproduced picture is to be shown;

$\beta$ : a value obtained from  $\beta = 10^{-\gamma}$ ;

$\kappa$ : another value determined from  $\gamma/(S_0 - H_0)$ ; and

$\gamma$ : a desired optional factor.

4,956,719  
LOW-FREQUENCY CONVERTER FOR CARRIER  
CHROMINANCE SIGNAL

Hiromitsy Yamashita, Itami, Japan, assignor to Mitsubishi  
Denki Kabushiki Kaisha, Tokyo, Japan  
Filed May 26, 1968, Ser. No. 199,342  
Claims priority, application Japan, Jul. 30, 1967, 62-191694  
Int. Cl.<sup>3</sup> H04N 5/76, 9/80

U.S. Cl. 358—310

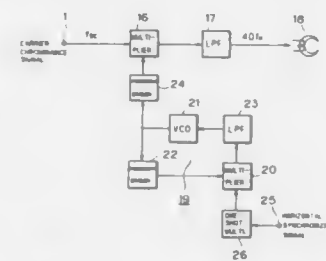
### 8 Claims

1. A low-frequency converter for frequency-converting a carrier chrominance signal having a first frequency of a predetermined relation with respect to a horizontal synchronizing frequency into a low-frequency range in order to obtain a low-frequency conversion chrominance signal having a second

frequency of a predetermined relation with respect to the horizontal synchronizing frequency, comprising:  
first input means for receiving said carrier chrominance signal;

second input means for receiving a synchronizing signal wherein said synchronizing signal is synchronous with horizontal synchronizing signal having the horizontal synchronizing frequency;

frequency conversion means connected to said second input means for frequency-converting said synchronizing signal wherein the output of said frequency conversion means is a continuous wave signal having a third frequency;



a multiplier means connected to said first input means and connected directly to said frequency conversion means for multiplying said carrier chrominance signal by said continuous wave signal and outputting a multiplied signal having a frequency equal to one of the sum of and the difference between said first and third frequency; and extracting means connected to said multiplier means for extracting said low-frequency conversion chrominance signal having said second frequency from said multiplier output signal.

4,956,720  
JITTER CONTROL CIRCUIT HAVING SIGNAL DELAY  
DEVICE USING CMOS SUPPLY VOLTAGE CONTROL  
Norio Tomisawa, Hamamatsu, Japan, assignor to Yamaha Cor-  
poration, Hamamatsu, Japan

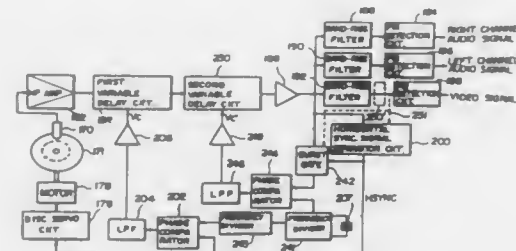
Division of Ser. No. 289,479, Dec. 21, 1988, which is a continuation of Ser. No. 760,332, Jul. 29, 1985, abandoned. This application Dec. 8, 1989, Ser. No. 448,160

Claims priority, application Japan, Jul. 31, 1984, 59-160784; Jul. 31, 1984, 59-160785; Jul. 31, 1984, 59-160786; Nov. 26, 1984, 59-179551; Dec. 18, 1984, 59-267050; Dec. 21, 1984, 59-270431

U.S. CL 358-324

Int. Cl.<sup>5</sup> H04N 9/89

### 5 Claims



1. A jitter absorption circuit having a first signal delay device for absorbing jitter in a recorded signal playback device, the first signal delay device including:

CMOS gate circuit means having an input terminal to which a binary input signal to be delayed is applied, an output terminal from which a delayed signal is derived and power voltage supply terminals to which operation power

voltages from operation power voltage sources are applied; and

voltage control means connected in series in a power supply ing path for said CMOS gate circuit means in associated with at least one MOS-FET of said CMOS gate circuit means for controlling voltage applied to said CMOS gate circuit means, a control signal being applied to said voltage control means for the control of the applied voltage; the voltage applied to said CMOS gate circuit means being controlled in response to the control signal applied to said voltage control means and a period of delay in the binary input signal between said input and output terminals of said CMOS gate circuit means thereby being controlled; and wherein:

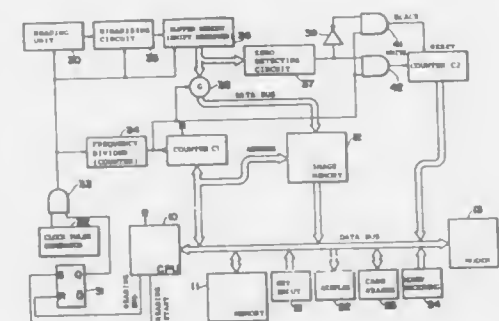
a reproduced signal from a recording medium is derived through said first signal delay device;  
said jitter absorption circuit includes reproduction means for providing said reproduced signal to the first signal delay device;  
said jitter absorption circuit further comprises a circuit for reproducing time axis data of said reproduced signal; and  
the delay time in said first signal delay device is controlled by an output signal of said time axis data reproducing circuit in such a manner that the delay time is prolonged when the reproduced signal is ahead of a reference position in the time axis direction and the delay time is shortened when the reproduced signal is delayed from the reference position whereby jitter in the reproduced signal is absorbed.

4,956,721  
METHOD OF FACSIMILE TRANSMISSION AFTER  
COLLECTION OF FACSIMILE CHARGE AND  
APPARATUS THEREFOR

**Hisashi Tasaki, and Kimikazu Endo, both of Kyoto, Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**  
Continuation of Ser. No. 884,559, Jul. 11, 1986, abandoned. This application May 22, 1989, Ser. No. 355,825  
Claims priority, application Japan, Jul. 15, 1985, 60-154067; Jul. 15, 1985, 60-154070

U.S. Cl. 358—402

## 10 Claims



1. A facsimile transmitting method for use with a facsimile apparatus for reading and transmitting information recorded on a document, comprising the steps of:

automatically calculating a facsimile charge (i) prior to any facsimile transmission of information read from a document to be transmitted and (ii) on the basis of data relating to an amount of information recorded on said document to be transmitted;

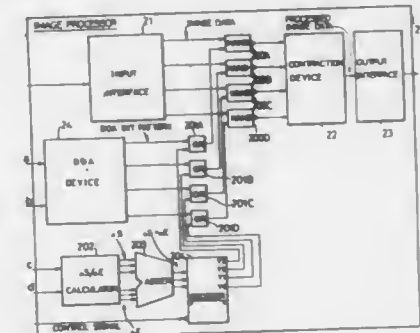
receiving a value corresponding to the facsimile charge calculated; and

thereafter transmitting information read from the document to be transmitted.

4,956,722  
**IMAGE PROCESSING APPARATUS**  
 Yonichi Hamada, Tokyo, Japan, assignor to Kabushiki Kaisha  
 Toshiba, Kawasaki, Japan  
 Continuation-in-part of Ser. No. 296,841, Jan. 13, 1966,  
 abandoned. Continuation of Ser. No. 182,228, Sep. 29, 1967. This  
 application Jun. 22, 1969, Ser. No. 349,228  
 Claims priority, application Japan, Sep. 30, 1966, 61-232335  
 Int. Cl.: H04N 1/40

U.S. Cl. 358-44

### 15 Claims



1. An image processing apparatus of parallel processing type using DDA method for processing image data, the apparatus comprising:

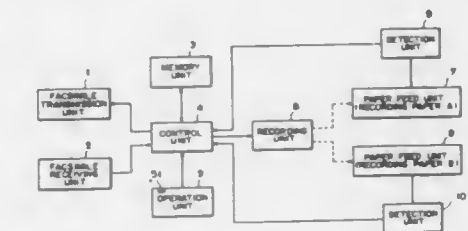
comprising:  
input interface means for feeding image data to be contracted as series of predetermined number of bits;  
DDA means for generating DDA bit pattern indicating valid bits in the series according to a given contraction rate;  
correction means for detecting those series which are fractional as a series of predetermined number of bits, and generating correction bit pattern indicating validity of last bits of the series which are fractional as a series of predetermined number of bits;  
means for producing valid bit pattern indicating valid bits in the image data as the series of predetermined number of bits, in accordance with the DDA bit pattern and the correction bit pattern; and  
means for performing contraction of the image data in accordance with the valid bit pattern.

4,956,723  
RECORDING APPARATUS WITH SHEET SIZE  
SELECTION

**Kozo Toda, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**  
Continuation of Ser. No. 303,060, Jan. 30, 1969, abandoned, which is a continuation of Ser. No. 156,889, Feb. 17, 1968, abandoned. This application Nov. 28, 1969, Ser. No. 441,205  
Claims priority, application Japan, Feb. 26, 1967, 62-44350  
Int. Cl.<sup>3</sup> H04N 1/00

U.S. Cl. 358-449

### 7 Claims



1. A recording apparatus comprising:



first sheet feeding means for feeding a large size of recording sheet;  
 first detection means for detecting the presence or absence of a sheet in said first sheet feeding means;  
 second sheet feeding means for feeding a small size of recording sheet;  
 second detection means for detecting the presence or absence of a sheet in said second sheet feeding means;  
 communication means for data communication;  
 recording means for recording image data received from said communication means or communication monitoring data; and  
 selection means for selecting either one of said first and second sheet feeding means, in the recording of the received image data, in accordance with size data transmitted to said communication means prior to said image data, and for selecting said second sheet feeding means in the recording of said communication monitoring data, said selection means selecting said first sheet feeding means in the recording of said communication monitoring data when said second detection means detects the absence of a sheet and said first detection means detects the presence of a sheet.

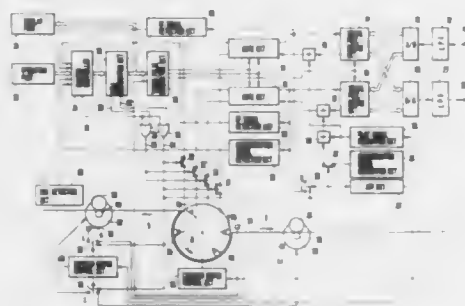
4,956,724

# MULTI-CHANNEL RECORDING AND/OR REPRODUCING APPARATUS CAPABLE OF SIMULTANEOUSLY RECORDING AND/OR REPRODUCING OF TWO CHANNELS

Kenichi Nagasawa, and Toshiyuki Masui, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
 Continuation of Ser. No. 813,669, Dec. 26, 1985, abandoned.  
 This application Oct. 7, 1988, Ser. No. 256,104  
 Claims priority, application Japan, Dec. 26, 1984, 59-276931  
 Int. Cl.<sup>3</sup> G11B 5/09

U.S. Cl. 360—8

23 Claims



1. An information signal recording apparatus, comprising:
  - (a) input means for inputting an information signal;
  - (b) data sequence forming means for forming first and second data sequences in parallel with each other by performing two different sampling operations on information signal inputted by said input means at different phases and at a same frequency;
  - (c) first recording means for recording a first recording signal relative to said first data sequence in a first area of a tape-shaped bearing medium extending in a longitudinal direction of said medium; and
  - (d) second recording means for recording a second recording signal relative to said second data sequence in a second area of said medium extending in parallel with said first area on said medium.

4,956,725

# IMAGE SIGNAL REPRODUCING APPARATUS

Susumu Kozuki, Tokyo; Koji Takahashi, Kanagawa; Hiroo Edakubo, Kanagawa; Tadayoshi Nakayama, Kanagawa, and Toshiyuki Masu, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

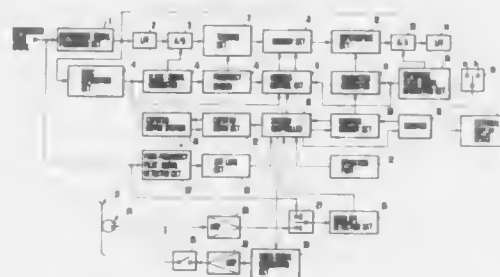
Filed Aug. 26, 1987, Ser. No. 89,674

Claims priority, application Japan, Aug. 29, 1986, 61-201365; Nov. 21, 1986, 61-276832

Int. Cl.<sup>3</sup> G11B 27/02

U.S. Cl. 360—14.3

19 Claims



1. An image signal reproducing apparatus for reproducing an image signal from a recording medium on which the image signal and an index signal indicating a desired position on the recording medium have been recorded, comprising:
  - (A) reproducing means for reproducing the image signal from said recording medium on which said image signal has been recorded;
  - (B) extracting means for detecting the index signal recorded on said recording medium and for extracting a representative image signal of one image plane corresponding to the detected index signal from the image signal reproduced by said reproducing means;
  - (C) position information signal generating means for generating a position information signal corresponding to a position on said recording medium where the representative image signal extracted by said extracting means has been recorded; and
  - (D) output means for outputting the representative image signal extracted by said extracting means and the position information signal generated by said position information signal generating means.

4,956,726

# INFORMATION SIGNAL REPRODUCING APPARATUS IN WHICH CONTROL SIGNAL CONDITION AND INFORMATION SIGNAL LEVEL ARE VARIED SO AS TO CORRESPOND

Hiroyuki Takimoto; Yutaka Kohtani, both of Yokohama, and Yoshiyuki Saitoh, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 27,097, Mar. 13, 1987, abandoned, which is a continuation of Ser. No. 503,636, Jun. 13, 1983, abandoned. This application Dec. 1, 1988, Ser. No. 279,318

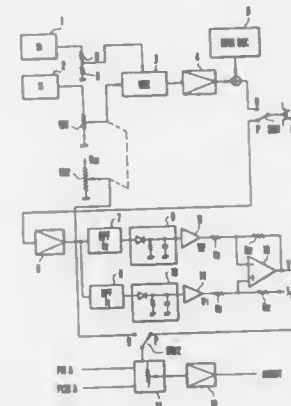
Claims priority, application Japan, Jun. 14, 1982, 57-102591  
 Int. Cl.<sup>3</sup> G11B 5/02

U.S. Cl. 360—27

15 Claims

1. An information signal reproducing apparatus, comprising:
  - (a) first reproducing means for reproducing an information signal recorded in a first area extending longitudinally on a tape-shaped recording medium;
  - (b) second reproducing means for reproducing a control signal recorded in a second area parallel with said first area on the tape-shaped recording medium;
  - (c) control means for variably controlling a level of the information signal reproduced by said first reproducing means based on a state of the control signal reproduced by said second reproducing means;

- (d) recording means for recording said control signal in the second area;
- (e) first selecting means for variably setting the level of the information signal reproduced by said first reproducing means by manual operation;
- (f) second setting means for variably setting the state of said control signal being recorded by said recording means;
- (g) interlocking means for interlocking said first and second setting means so that the state of said control signal corresponds to the level of the information signal reproduced; and
- (h) mode setting means for setting a mode of the apparatus between a plurality of modes, the plurality of modes including a first mode, and a second mode, when the apparatus is in said first mode, said first corresponding means reproduces the information signal, said second reproducing means reproduces the control signal, and the level of the information signal reproduced by said first reproducing means is controlled by said control means based on the state of the control signal reproduced by said second reproducing means, and when the apparatus is in said second mode said first reproducing means reproduces the information signal, the level of the information signal reproduced by said first reproducing means is variably set by said first setting means, said reproducing means records the control signal, and the state of the control signal being recorded by said recording means is variably set by said second setting means.



tus is in said first mode, said first corresponding means reproduces the information signal, said second reproducing means reproduces the control signal, and the level of the information signal reproduced by said first reproducing means is controlled by said control means based on the state of the control signal reproduced by said second reproducing means, and when the apparatus is in said second mode said first reproducing means reproduces the information signal, the level of the information signal reproduced by said first reproducing means is variably set by said first setting means, said reproducing means records the control signal, and the state of the control signal being recorded by said recording means is variably set by said second setting means.

4,956,727

# DISC MEMORY SERVO INDEXING SYSTEM

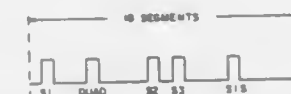
David J. Bezique, Santa Cruz, and James O. Jacques, Aptos, both of Calif., assignors to Seagate Technology, Inc., Scotts Valley, Calif.

Continuation of Ser. No. 07/31,764, Mar. 30, 1987, abandoned. This application Feb. 6, 1989, Ser. No. 308,931

Int. Cl.<sup>3</sup> G11B 20/14

U.S. Cl. 360—49

13 Claims



1. A servo disc in a magnetic disc drive comprising a plurality of data tracks and guard bands, each track and guard band including a plurality of frames, each frame including first pulse groups of at least one sync pulse which is used to generate a first track alignment signal (Quad) and second sync pulse groups of at least one sync pulse which is used to generate a second track alignment signal (Sig) and Index signal wherein said Sig and Index signal is generated by identifying different pulses patterns of said second sync pulse group, and wherein track identification is provided by selectively eliminating sync pulses in said second sync pulse group in a plurality of frames.

first track alignment signal (Quad) and second sync pulse groups of at least one sync pulse which is used to generate a second track alignment signal (Sig) and Index signal wherein said Sig and Index signal is generated by identifying different pulses patterns of said second sync pulse group, and wherein track identification is provided by selectively eliminating sync pulses in said second sync pulse group in a plurality of frames.

4,956,728

# METHOD OF AND DEVICE FOR DEMAGNETIZING MAGNETIC RECORDING MEDIUM

Yoshiichi Hayata, and Michihiro Matsui, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-shiga, Japan

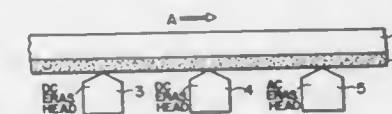
Continuation of Ser. No. 755,305, Jul. 12, 1985, abandoned. This application Nov. 19, 1986, Ser. No. 931,944

Claims priority, application Japan, Jul. 16, 1984, 59-147103

Int. Cl.<sup>3</sup> G11B 5/03

U.S. Cl. 360—66

3 Claims



1. A method of demagnetizing a magnetic recording medium, comprising the steps of:
  - moving said magnetic recording medium in one direction;
  - applying a saturating magnetic field to said magnetic recording medium, said saturating magnetic field producing a residual flux density with a first polarity in said magnetic recording medium;
  - after the step of applying a saturating magnetic field, applying an unsaturating magnetic field to said magnetic recording medium in a direction opposite to the direction of said saturating magnetic field, said unsaturating magnetic field producing a residual flux density with a second polarity in said magnetic recording medium, said second polarity being opposite to said first polarity; and
  - after the step of applying an unsaturating magnetic field, applying an alternating magnetic field to said magnetic recording medium to remove residual magnetism which has been left on the magnetic recording medium by said unsaturating magnetic field.

4,956,729

# VIDEO SIGNAL PREAMPLIFIER CIRCUIT

Tomishige Yatsugi; Hiroshi Toeda; Tadashi Takamiya; Norio Minami, and Isao Fukushima, all of Ibaraki, Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Video Engineering, Ltd., Kanagawa, both of Japan

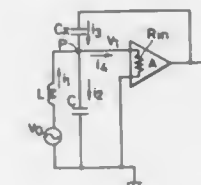
Filed Oct. 20, 1987, Ser. No. 110,424

Claims priority, application Japan, Oct. 20, 1986, 61-247407; Feb. 14, 1987, 61-30664

Int. Cl.<sup>3</sup> G11B 5/02, 15/14

U.S. Cl. 360—67

2 Claims

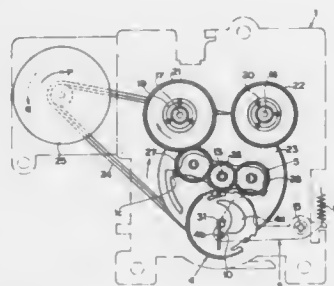


1. A preamplifier circuit for amplifying a video signal repro-

they are always in mesh with said capstan shaft to selectively drive a supply reel or a take-up reel, an assist gear having a toothless segment and whose engage-



ment with said capstan gear is controlled by the turning of said gear arm, an eccentric cam and a changeover cam formed on said assist gear, and



means for controlling the position of a head plate to slide forth said head plate by said eccentric cam and change said head plate to the "playback" or "fast forward" position.

4,956,735

## ACTUATOR MAGNETIC CIRCUIT

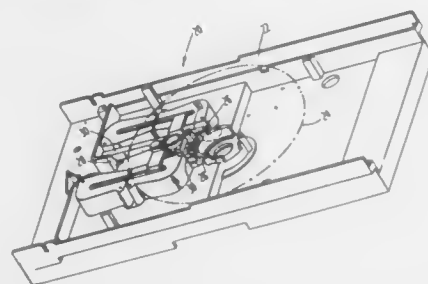
Wayne E. Foote, Eagle, and Richard L. Swantner, Meridian, both of Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 8, 1989, Ser. No. 349,469

Int. Cl.<sup>5</sup> G11B 27/08

U.S. Cl. 360-106

2 Claims



1. Magnetic circuit structure for use in an actuator, said actuator having a displaceable assembly and a coil attached to said assembly, said magnetic circuit comprising:

- a first pair of flux conductors, each flux conductor having generally parallel first and second poles defining a first gap therebetween and each having an integrally formed base joining one end of said first and second poles, wherein each of said flux conductors defines a continuous flux path, said first and said second poles being of predetermined thickness, said base of each said flux conductors being of greater thickness than said predetermined thickness of said first and second poles, said flux conductors being arranged such that the free ends of said first and second poles are facing so that the first gaps associated with each of said flux conductors are aligned; and
- a first pair of magnets, each magnet being attached to one of said first poles in said first gap so that flux generated by each magnet is directed across said first gap, wherein a portion of said coil passes through said first gap.

4,956,736  
THIN FILM MAGNETIC ELEMENT HAVING A RHOMBIC SHAPE

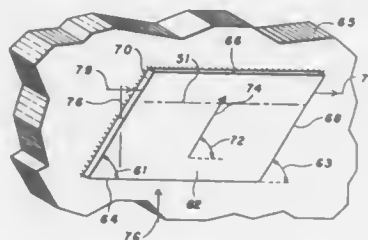
Nell Smith, San Diego, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 16, 1988, Ser. No. 285,178

Int. Cl.<sup>5</sup> G11B 5/39; G01R 33/02; B32B 15/00

U.S. Cl. 360-113

3 Claims



1. An improved magnetoresistive reproduce head for playback of magnetically recorded information from a magnetic medium, the improvement comprising:

- a. a magnetoresistive thin film element deposited on a non-magnetic substrate, said element being geometrically shaped as a rhomboid, whereby the magnetization of said single domain magnetoresistive element is stabilized against noise inducing domain wall formation.

4,956,737

MAGNETIC HEAD CONTOUR UTILIZING FACETS FOR AIR FILM SKIVING

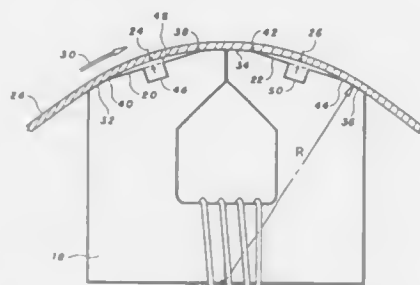
George W. Brock, La Jolla, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 4, 1989, Ser. No. 332,829

Int. Cl.<sup>5</sup> G11B 5/187

U.S. Cl. 360-122

6 Claims



1. An improved magnetic head comprising:

- a. an arcuate surface segment having a contour adapted for contacting a flexible magnetic tape,
- b. at least one facet in said contour wherein first and second edges of said facet are discontinuities in said arcuate contour, whereby said first and said second edges are adapted for skiving entrained air from said tape, and
- c. at least one slot in said facet, whereby said slot is an escape channel for said air.

4,956,738  
VERY HIGH SPEED CIRCUIT BREAKER ASSISTED BY SEMICONDUCTORS

Georges Defosse, Barchon; Henri Bonhomme, Ans, and Rene Lesceux, Alleur, all of Belgium, assignors to (ACEC) Ateliers De Constructions Electriques De Charleroi, Brussels, Belgium

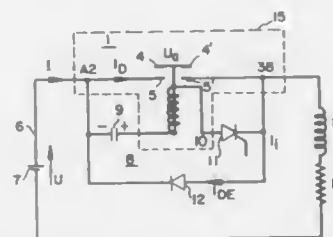
Filed Oct. 8, 1985, Ser. No. 785,398

Claims priority, application European Pat. Off., Oct. 12, 1984, 84201469.8

Int. Cl.<sup>5</sup> H02H 7/22

U.S. Cl. 361-8

14 Claims



1. A circuit breaker connected in a principal circuit via an inlet terminal and an outlet terminal, comprising: means for forming a mobile contact bridge between the inlet and outlet terminals, means, connected to said mobile contact bridge means, for magnetically holding said mobile contact bridge means in contact with the inlet and outlet terminals; and an auxiliary circuit connected across the inlet and outlet terminals and responsive to a defect current in the principal circuit for generating a surge of current opposing the defect current and for simultaneously applying an electrodynamic force to said mobile contact bridge means to overcome the magnetic hold and simultaneously separate said contact bridge means from the inlet and outlet terminals whereby a very fast circuit break in the principal circuit is formed.

4,956,739

DEVICE FOR LOCATING INTERNAL FAULTS IN A HIGH-VOLTAGE CAPACITOR BATTERY

Michael Becker, and Klaus Renz, both of Uttenreuth, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 27, 1989, Ser. No. 372,273

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1988, 3821944

Int. Cl.<sup>5</sup> H02H 7/16

U.S. Cl. 361-16

3 Claims



1. A device for determining internal faults in a high-voltage capacitor battery that has a plurality of symmetrically parallel and series-coupled capacitor banks arranged in parallel branches coupled by shunt branches such that shunt currents flow between the parallel branches each of said capacitor banks having a plurality of parallel and series-coupled capacitor windings and associated internal fuses, comprising: means for determining phase angles of shunt currents flow-

ing between parallel branches relative to a total current flowing through the parallel branches; and means for determining a faulty capacitor bank from said determined phase angles.

4,956,740

PROTECTION TECHNIQUE FOR SUPERCONDUCTING MAGNETS

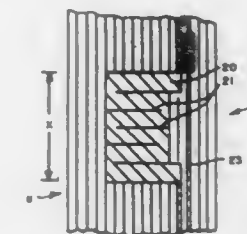
John E. C. Williams, Wayland, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Aug. 4, 1987, Ser. No. 81,645

Int. Cl.<sup>5</sup> H02H 7/10

U.S. Cl. 361-19

6 Claims



1. An electrical resistance device for use in a superconducting magnet having at least one superconducting winding, said device including

- a resistance element positioned in thermal contact with at least a portion of a winding of said magnet; and
- a superconducting gate element in series with said resistance element and positioned in thermal contact with said magnet winding relatively close to, but not in thermal contact with, said resistance element, said gate element capable of being switched from its superconducting state to its normal resistance state to limit current in said device so as to protect said resistance element and the portion of the winding with which it is in thermal contact.

4,956,741

SOLID-STATE TRIP UNIT FOR DC CIRCUIT BREAKERS

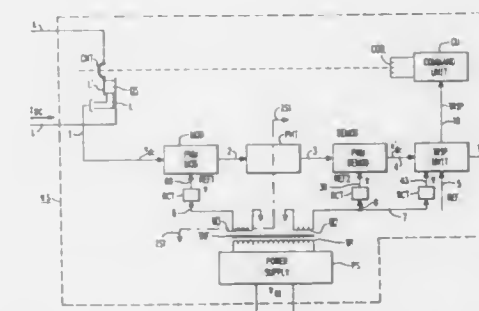
William J. Murphy, and Joseph C. Engel, both of Monroeville, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 3, 1989, Ser. No. 375,301

Int. Cl.<sup>5</sup> H02H 3/08

U.S. Cl. 361-95

6 Claims



1. In a circuit breaker having a housing, within the housing coil-actuated contacts connected to an electrical line for protection of a load supplied by said line; the housing containing at least one line current sensor for outputting a voltage signal representative of the current flowing in the line and solid state trip unit means responsive to said voltage signal for actuating said coil to trip the circuit breaker when the voltage signal exceeds a predetermined reference level;

a power supply being provided for supplying an operative DC voltage for said trip unit means;

the combination of:

means for pulse-width modulating said sensor voltage signal to derive a pulse-width modulated signal representative thereof;

photo-coupling means responsive to said pulse-width modulated representative signal for outputting a pulse-width modulated translated signal;

means for converting said translated signal into a second voltage signal as an input signal for said trip unit means;

the power supply including means responsive to a DC voltage source for generating in relation to said DC voltage a square-wave voltage of predetermined frequency;

a transformer having primary winding means responsive to said square-wave voltage and secondary winding means responsive thereto for outputting a square-wave current;

said modulating means including first rectifier means responsive to said square-wave current for establishing a second DC voltage operative with said modulating means;

said converting means including second rectifier means responsive to said first square-wave current for establishing a third DC voltage operative with said converting means;

said transformer primary and secondary winding means providing in combination with said photo-coupling means electrical isolation for said current sensor from said power supply and said tripping unit means within the housing; and

said secondary windings means being effective to translate any variation in the magnitude of said square-wave voltage into a related change in magnitude of said second and third operative DC voltages, and said converting means being effective through said third operative DC voltage to automatically compensate for such magnitude variation, whereby said second voltage signal is a faithful translation of said sensor voltage signal.

4,956,742

## SWITCH GEAR

Kunihiko Takagi, Tama; Masazumi Shiraiishi, Hachioji, and Ken-ichi Sato, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

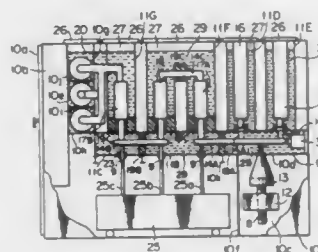
Filed Aug. 3, 1989, Ser. No. 388,857

Claims priority, application Japan, Aug. 11, 1988, 63-198955; Sep. 26, 1988, 63-238817; Jan. 23, 1989, 1-011894

Int. Cl.<sup>5</sup> H02B 1/04

U.S. Cl. 361—131

8 Claims



1. A switch gear comprising: a box structure constituting a case; items of electrical equipment including disconnecting means and circuit-breaking means installed within said box structure; connecting conductors for connecting said electrical equipment items; operating mechanisms for operating said disconnecting means and said circuit-breaking means installed within said box structure; connecting conductors for connecting said electrical equipment items; operating mechanisms for operating said disconnecting means and said circuit-breaking means; partition walls for partitioning the interior of the box structure into compartments for accommodating said operating mechanisms and compartments for accommodating the

electrical equipment items; and masses of a silicone gel filling said compartments accommodating the electrical equipment items, the interior of each of said compartments for accommodating said electrical equipment items being filled with said silicone gel up to a specific height level, an empty space being left at an upper part of each of said interior above the silicone gel.

4,956,743

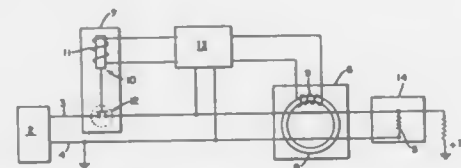
## GROUND FAULT INTERRUPTERS FOR GLASSY METAL ALLOYS

Ryuusuke Hasegawa, Morristown, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.  
Continuation of Ser. No. 323,120, Mar. 13, 1989, abandoned, which is a continuation of Ser. No. 180,663, Mar. 30, 1988, abandoned, which is a continuation of Ser. No. 817,208, Jan. 8, 1986, abandoned. This application Jan. 19, 1990, Ser. No. 465,658

Int. Cl.<sup>5</sup> H02H 3/16

U.S. Cl. 361—45

20 Claims



1. A ground fault interrupter comprising:

a. first means for receiving from a current source and passing to an electrical load a current;

b. second means for receiving from the electrical load and passing to the current source a current;

c. detection means associated with the first and second means for detecting a ground fault current, said detection means having a core composed of a metal alloy which is at least about 90% glassy and which consists essentially of a composition having the formula  $\text{Co}_x\text{Fe}_y\text{Ni}_z\text{M}_a\text{B}_b\text{Si}_c$  where M is at least one member selected from the group consisting of Cr, Mo, Mn and Nb, a-f are in atom percent, the sum (a+b+c+d+e+f) is equal to 100, "a" ranges from about 66 to 71, "b" ranges from about 2.5 to 4.5, "c" ranges from about 0 to 3, "d" ranges from about 0 to 2 except when M=m in which case "d" ranges from about 0 to 4, "e" ranges from about 6 to 24 and "f" ranges from about 0 to 19, with the proviso that the sum of "a", "b" and "c" ranges from about 72 to 76 and the sum of "e" and "f" ranges from about 25 to 27, said alloy having the form of a ribbon and having been heat-treated to induce therein Perminvar-like characteristics wherein said core has a constricted B-H loop having a relatively constant permeability near zero field excitation and a high permeability above a preselected threshold field; and,

d. interruption means associated with said first means operative in response to a signal from said detection means for interrupting the passage of current.

4,956,744

## MULTILAYER CAPACITOR

Cornelis W. Berghout, and Hendrikus J. J. M. Van Haren, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 3, 1989, Ser. No. 319,005

Claims priority, application Netherlands, Mar. 7, 1988, 8800559; Jan. 13, 1989, 8900079

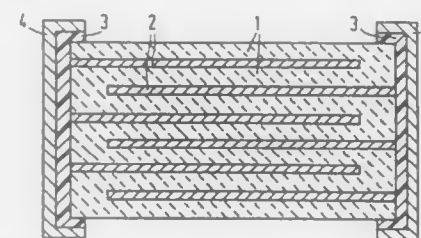
Int. Cl.<sup>5</sup> H01G 4/10, 7/00

U.S. Cl. 361—321

6 Claims

5. A multilayer capacitor comprising alternate layers of a dielectric oxide material and an electrode material which consists predominantly of palladium, the capacitor having metallic

end contacts which end contacts electrically connectively contact a prescribed part of the layers of electrode material and



which end contacts contain silver and wherein the electrode material comprises a glass composition comprising lead oxide.

4,956,745

## TRANSFORMER ASSEMBLY WITH EXPOSED LAMINATIONS AND HOLLOW HOUSINGS

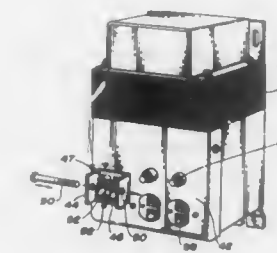
Peter H. Burgher, Captiva, Fla.; Richard L. Holmes, Lansing, and John Boomer, Howell, both of Mich., assignors to Marelec Power Systems, Inc., Howell, Mich.

Filed May 10, 1989, Ser. No. 349,705

Int. Cl.<sup>5</sup> H05K 7/20

U.S. Cl. 361—383

19 Claims



1. A transformer assembly for providing a source of auxiliary electrical power independent of a main power supply, the transformer assembly comprising:

a transformer having a core including a first side and a second side opposite thereto, and a coil including a first portion protruding outwardly from the first side of the core and a second portion protruding outwardly from the second side of the core, the core including corners and lateral side edges, said corners and edges extending between the first and second sides for facilitating the removal of heat generated by the transformer from said corners and edges by ambient air to which said corners and edges are exposed, so that heat can be removed therefrom;

a first hollow housing attached to the first side of the core and extending over the first portion of the coil; and

a second hollow housing attached to the second side of the core and extending over the second portion of the coil.

4,956,746

## STACKED WAFER ELECTRONIC PACKAGE

Louis E. Gates, Jr., Westlake Village, and Charles A. Flanila, Manhattan Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 29, 1989, Ser. No. 329,991

Int. Cl.<sup>5</sup> H05K 7/20

U.S. Cl. 361—385

21 Claims

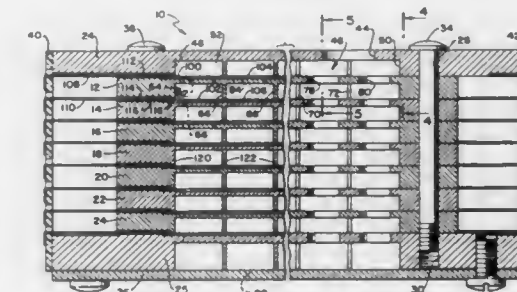
1. An electronic package comprising:

at least first and second support plates and a bottom support plate, each of said support plates having a support surface thereon, a semiconductor wafer directly supported on said support surface of each of said support plates, each of said

support plates having a plenum formed therein, said first and second support plates and said bottom support plate being stacked so that said first support plate is on top of said second support plate so that said plenum of said first support plate directly faces said support surface of said second support plate;

a top plate engaging on and covering said first support plate and a bottom plate beneath and covering the bottom of said bottom support plate, said top plate, said support plates and said bottom plate being stacked;

a plurality of webs formed in each of said plenums so that aid webs extend toward the support surface of the facing support plate to lie closely adjacent said semiconductor



wafer supported on said facing support surface, a resilient adhesive between said webs and said semiconductor wafer so that said semiconductor wafer is supported by said webs on the side of said semiconductor wafer away from said support surface and said webs and said adhesive enclose channels through each plenum over said semiconductor wafers;

a fluid opening in said bottom plate, a fluid opening in said top plate, said plenums being arranged so that fluid entering one of said openings passes through said plenums to the other of said openings so that said wafers on said support surfaces are directly in contact with fluid and are cooled by fluid passing through said plenums.

4,956,747

## MULTIPLE SIGNAL TRANSMISSION DEVICE

Dieter Beer, Mösbach/Feldkahl; Horst Reddehase, Detmold; Siegfried Kerbatat, Detmold; Detlef Hanning, Augustdorf; Ulrich Plass, and Hermann Krause, both of Detmold, all of Fed. Rep. of Germany, assignors to C. A. Weidmüller GmbH & Co., Fed. Rep. of Germany

Filed Oct. 13, 1989, Ser. No. 421,128

Claims priority, application European Pat. Off., Oct. 18, 1988, 88117313

Int. Cl.<sup>5</sup> H05K 7/00

U.S. Cl. 361—392

10 Claims

1. A multiple signal transmission device for controlling equipment, comprising

(a) a transmitter/receiver connected with a carrier rail;

(b) at least one input/output module connected with said transmitter/receiver for transferring control signals relative to the equipment, said module including

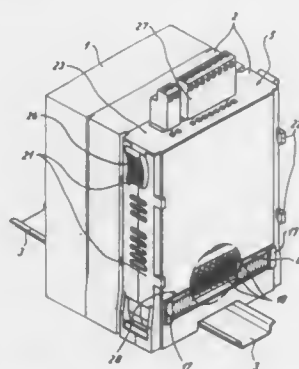
(1) a bottom portion connected with the carrier rail; and

(2) a top portion electrically connected with said bottom portion via a plug connecting;

(c) contact means connected with said module bottom portion and protruding laterally outwardly therefrom for engaging and electrically connecting said module bottom portion with a bottom portion of an adjacent module to



provide current to said modules and data transfer therebetween, said contact means being electrically connected



with said plug connection to supply current and transfer data relative to said module top portion.

4,956,748

## WIRING APPARATUS FOR AUTOMOBILE

Masaki Yamamoto, Hidehara Hayashi, and Yukio Muramatsu, all of Kosei, Japan, assignors to Yazaki Corporation, Tokyo, Japan

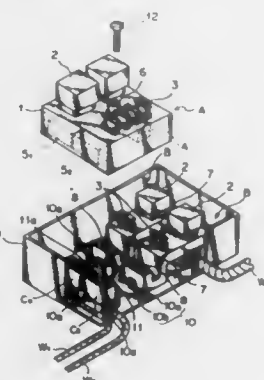
Continuation of Ser. No. 308,217, Feb. 9, 1989, abandoned. This application Feb. 9, 1990, Ser. No. 477,154

Claims priority, application Japan, Feb. 10, 1988, 63-15687

Int. Cl.<sup>5</sup> H01R 13/514

U.S. Cl. 361-394

1 Claim



1. A wiring apparatus for an automobile comprising:
  - a housing (9) having a flat bottom, a projection (11) upwardly projecting from the bottom and being formed with a female thread therein, and a plurality of resilient clamping straps (10b), said projection and clamping straps being integrally formed with the bottom;
  - at least one terminal connector (C) clamped to said bottom by means of said clamping straps, said terminal connector (C) having a wire harness connected to other electrical circuits in said automobile;
  - at least one option-circuit block (B) having a first body clamped to the bottom by means of said clamping straps, said first body having on a topside thereof an optional circuit specific to models and classes of automobiles and on an underside thereof a space through which a wire harness extends to other electrical circuits in said automobile, said first body having a first connector (8) integrally formed therewith and remote from said option-circuit; and
  - a basic-circuit block A having a second body, said second body having on a topside thereof a basic electrical circuit

common to the models and classes of the automobiles, said second body having on an underside thereof at least one second connector (4) matingly connected to said first connector (8) and at least one third connector (5) matingly connected to said terminal connector (C), said second body having a hole therein, wherein said basic-circuit block A is mated with said option-circuit block B and said terminal connectors and then secured to said bottom by means of a bolt which passes through the hole and is threaded into said female thread, thereby simultaneously establishing both mechanical and electrical connection between said option-circuit block B and between said terminal connector (C).

4,956,749

## INTERCONNECT STRUCTURE FOR INTEGRATED CIRCUITS

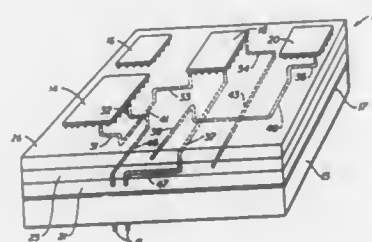
Cheng-Cheng Chang, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 20, 1987, Ser. No. 123,488

Int. Cl.<sup>5</sup> H05K 7/20

U.S. Cl. 361-414

16 Claims



1. An interconnection structure for semiconductor integrated circuits comprising,
  - a substrate having a plurality of electrical terminal members therein,
  - an electrically conductive metal block disposed over the substrate with a component mounting surface, the metal block containing an electrically conductive wire interconnection pattern, insulated from the metal block, extending from the plurality of electrical terminal members associated with the substrate to the component mounting surface of the block, and
  - a plurality of semiconductor integrated circuits joined to the wire interconnection pattern at the mounting surface.

4,956,750

## REGISTER RACK ASSEMBLY FOR A PROGRAMMABLE CONTROLLER SYSTEM

John Maggelet, Sussex, Wis., assignor to Square D Company, Palatine, Ill.

Filed Mar. 17, 1989, Ser. No. 325,414

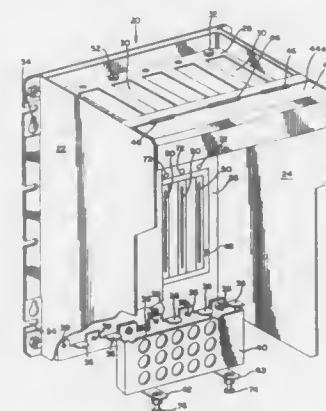
Int. Cl.<sup>5</sup> H05K 7/14

U.S. Cl. 361-415

9 Claims

1. A register rack assembly housing a plurality of electronic modules including a programmable controller and related

devices, each of said electronic modules containing an electronic circuit board, said register rack assembly comprising: a rear wall, a pair of spaced side walls and a top wall; a mounting member extending between said side walls and mounted at a lower end of said rear wall, said mounting member having spaced tabs defining positioning slots for receiving a complementary mounting tab forming part of each said electronic modules;



a latch member disposed between said side walls and mounted thereto adjacent respective upper forward edges thereof, said latch member including means for pivoting said latch member relative to said side walls; and means associated with said latch member for locking said latch member in a closed position in engagement with an abutment on said electronic modules, said latch member retaining said modules in said register rack assembly.

4,956,751

## ILLUMINATION EQUIPMENT

Tetsuhiro Kano, Lobenhofferstrasse 49, 8600 Bamberg, Fed. Rep. of Germany

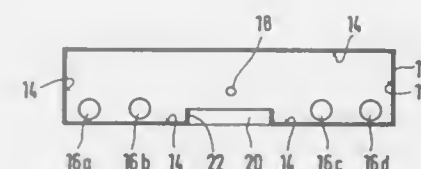
Filed Jun. 12, 1989, Ser. No. 365,930

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1988, 3820576

Int. Cl.<sup>5</sup> F21V 9/00

U.S. Cl. 362-1

5 Claims



1. Illumination equipment for producing light closely resembling natural daylight, comprising:
  - a housing having a reflective inner surface, an upper wall and an opening oppositely disposed from said upper wall;
  - at least one light source radiating substantially in the blue-green region of the light spectrum positioned at a location within said housing at which radiation therefrom can exit from said opening only after having been reflected at least once from the reflective inner surface of said housing; and
  - at least one light source radiating substantially in the red-orange-yellow region of the light spectrum positioned within said housing at a location at which a portion of the radiation therefrom exits directly from said opening without having been reflected from the reflective surface of the housing and a portion of the radiation therefrom is blended by reflection on the reflective inner surface of said housing with radiation from said at least one blue-

green light source prior to exiting from said opening, whereby the light radiated from said opening is composed, at each radiation angle, of components which originate from said at least one blue-green light source and from said at least red-orange-yellow light source.

4,956,752

## CYCLOPS LIGHTED MOTORCYCLE HELMET

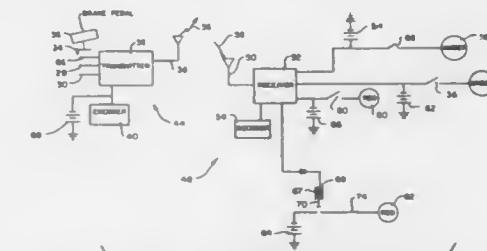
Joe Foglietti, 3120 East Blvd., #C, Bethlehem, Pa. 18017

Filed Dec. 28, 1988, Ser. No. 291,169

Int. Cl.<sup>5</sup> F21V 33/00

U.S. Cl. 362-72

2 Claims



1. A safety helmet, wearable by an operator of a motorcycle having a brake pedal, comprising:
  - (A) a protective helmet having a rear portion;
  - (B) a multicolored light source mounted on said helmet at said rear portion, and including a green light, an amber light and a red light;
  - (C) a plurality of switches, each switch of said plurality of switches being associated with one colored light of said multicolored lights source and adapted to actuate said one colored light;
  - (D) switch control means for operating said switches as the brake pedal is operated to activate each colored light as the brake pedal is operated, with said green light being associated with an untouched brake pedal with the motorcycle in a normal forward speed mode, said amber light being associated with a gently depressed brake pedal and said red light being associated with a hard braking action, said switch control means including
    - (1) a transmitter attached to the motorcycle brake pedal and adapted to transmit a signal that is associated with the movement of the brake pedal as that brake pedal is operated so that different signals are transmitted as the brake pedal is untouched, depressed gently and depressed in a hard braking action,
    - (2) a receiver located inside said protective helmet and which is adapted to receive signals transmitted by said transmitter,
    - (3) a motorcycle electrical power source associated with each colored light of said multicolored lights and connected to said receiver and to the switch associated with the associated colored lights by the switches of said switch means so that each colored light of said multicolored lights is activated sequentially as the brake pedal is untouched, depressed gently and depressed in a hard braking action to be green, then to go amber and then red as said brake pedal is moved from a non-brake activating position in a normal cruising mode to a hard braking position; and
  - (E) loss of power signal circuit means which includes
    - (1) a second red light,
    - (2) a backup power source,
    - (3) a first line conductor connected to said backup power source,
    - (4) a second line conductor connected to said second red light,
    - (5) a normally open switch connecting said backup power

source to said second red light when closed, said normally open switch including

- (a) an electrical contact with electrically connects said first line conductor to said second line conductor and which is movable from a first position contacting both of said first and second line conductors to a second position spaced from both of said first and second line conductors,
- (b) a solenoid connected to said motorcycle electrical power source and attached to said electrical contact to move said electrical contact between said first and said second positions,
- (c) a spring biasing said solenoid to move said electrical contact into said first position, said solenoid holding said electrical contact in said second position against the bias of said spring when said solenoid is energized from said motorcycle electrical power source,
- (d) a normally closed switch in said second line conductor, said normally closed switch being manually operable to open said loss of power circuit means and separate said second red light from said backup power source.

4,956,753

## LAMP ASSEMBLY

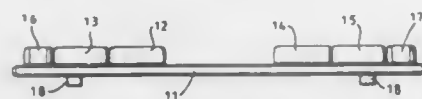
Andrew B. Renfrew, Setton Coldfield, United Kingdom, assignor to Lucas Industries, plc, Birmingham, England  
Filed Nov. 5, 1987, Ser. No. 116,835

Claims priority, application United Kingdom, Nov. 5, 1986, 8626437

Int. Cl.<sup>5</sup> B60Q 1/52

U.S. Cl. 362-74

20 Claims



1. A lamp assembly comprising an elongate support member having a hollow cross section, and a plurality of lamp units secured to said support member at positions spaced along the length of said support member, electrical connecting leads of said lamp units being disposed in the hollow interior of said support member, said lamp units each comprising a body housing a lighting assembly of the unit and having opposite ends, and closure members closing said opposite ends, at least one of said closure members being transparent, said closure members of all of said lamp units of the assembly being of similar shape, and said lamp unit bodies having the same cross-sectional shape.

4,956,754

## ULTRAVIOLET LAMP ASSEMBLY

Sen-Lung Chen, No. 371, Min-Tsu Road, Tainan, Taiwan  
Filed Mar. 1, 1990, Ser. No. 486,909

Int. Cl.<sup>5</sup> F21V 33/00

U.S. Cl. 362-101

3 Claims



1. An ultraviolet lamp assembly for immersion in the water of an aquarium comprising:  
an tubular ultraviolet lamp having electric supply conductors;  
a compartment means wrapped in a helical pattern around and along the length of the ultraviolet lamp;  
an elongated reflector means having two open ends and

enveloping said ultraviolet lamp and compartment means with its inner surface abutting against an outer periphery of the compartment means for defining a helical fluid flow passage therein;

plug means secured to the open ends of the reflector means; passage means formed in the plug means and communicating ends of the helical passage defined by the compartment means; and

pipe means connected to the passage means of the plug means for communicating the helical passage and exterior of this assembly.

4,956,755

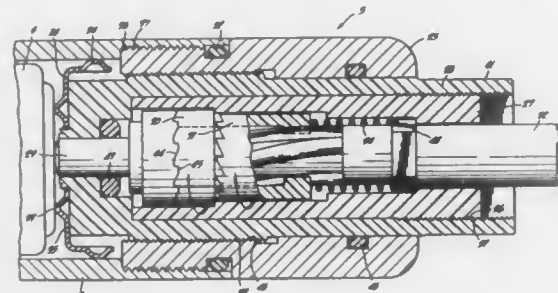
## MECHANICAL ACTUATION

Anthony Maglica, 219 Armaley Sq., Ontario, Calif. 91763; Robert J. DeLong, 9168 E. Jaylee Dr., Temple City, Calif. 91780, and Arnis L. Lewis, 10617 Sunburst Dr., Cucamonga, Calif. 91730

Division of Ser. No. 106,064, Oct. 7, 1987, Pat. No. 4,841,417, which is a continuation-in-part of Ser. No. 43,066, Jul. 27, 1987, Pat. No. 4,819,141, which is a continuation-in-part of Ser. No. 34,918, Apr. 6, 1987, abandoned, which is a continuation of Ser. No. 828,729, Feb. 11, 1986, Pat. No. 4,658,336, which is a continuation of Ser. No. 648,032, Sep. 6, 1984, Pat. No. 4,557,263. This application May 11, 1989, Ser. No. 350,386  
Int. Cl.<sup>5</sup> F21L 7/00

U.S. Cl. 362-206

7 Claims



1. A push button actuator comprising:  
a housing;

a first plunger having a first end positioned at an initial position within said housing;  
a second plunger having a first end positioned at an initial position within said housing;  
means to convert longitudinal motion of said second plunger into rotational motion and to convert said rotational motion into longitudinal motion of the first plunger whereby the first end of the first plunger is moved to, but not beyond a second position and the actuator is thereby alternately switched from a condition of on to off.

4,956,756

## TABLE LAMP ADAPTER SYSTEM

Wen J. Hsiao, No. 20, Lane 126, Jen Ai Street, Hsin Chu City, Taiwan

Filed Feb. 10, 1989, Ser. No. 308,604

Int. Cl.<sup>5</sup> H01R 33/00

U.S. Cl. 362-226

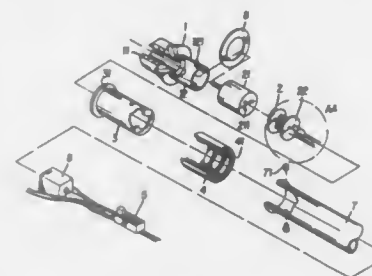
2 Claims

1. A table lamp adapter system for providing interchangeability between incandescent and fluorescent light bulbs, comprising:

(a) a lamp holder tubular housing having a front section coupled to said light bulb and a rear section having a stub member protruding therefrom;

(b) selector switch means for switching reversibly from incandescent to fluorescent light bulb power actuation, said selector switch means including a contact plug member received within said lamp holder tubular housing;

- (c) a sleeve member having a guide slot formed therein, said stub member being linearly displaceable within said guide slot;
- (d) a spiral coupling having internal threads and rotatable responsive to said linear displacement of said stub within said guide slot, said spiral coupling being mounted on said sleeve member on a frontal portion thereof in a manner such that through alignment of said internal threads with said guide slot, said stub member is displaced within said guide slot;
- (e) a support arm member fixedly coupled to a rear portion of said sleeve member, said selector switch means further



including a conduction member having four terminals arranged in two sets, said conduction member being mounted in said sleeve member, said conduction member further including a front end surface member having four recess holes and a rear end surface member which includes four mandrels for mounting thereon of four springs respectively wherein two pairs of terminals are respectively mounted on said springs, said springs in alignment with said mandrels and recess holes of said front end surface member, said terminals being resiliently mounted whereby a pair of contact noses of said contact type plug may be selectively in contact with said pairs of said terminals of said conduction member.

4,956,757

## LAMP DEVICE

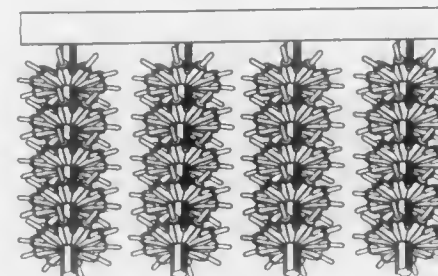
Chen-Jen Wang, No. 199, Sec. 1, Hua Mei W. St., Taichung, Taiwan

Filed Aug. 21, 1989, Ser. No. 396,298

Int. Cl.<sup>5</sup> F21P 1/00

U.S. Cl. 362-252

1 Claim



1. A lamp device comprising: a plurality of lamps each of which has a lamp base provided with two electric contacts;  
a lamp-holding member having two half portions detachably connected with each other, each of said half portions having an annular member with a central opening and a plurality of channel members with a groove extending radially from a periphery thereof which mates with said channel member of another said half portions to define a socket for holding one of said lamp bases of said lamps;  
a plurality of conducting members positioned among said channel members of said lamp-holding member and con-

nected with said contacts of said lamps so as to form a series circuit;

at least two fixing seats mounted diametrically opposite in said lamp-holding member which are adjacent to central openings, each of said fixing seats having a contact member mounted therein and being electrically connected to said series circuit;

an elongated insulating column having at least two opposed grooves formed along a length thereof, each of said grooves having a conducting strip fixed therealong, said column being adapted to be passed through said central openings of said lamp-holding member with said conducting strips thereof being slidably engaged with said contact members;

whereby said column can pass through a plurality of said lamp-holding members to form a linear lamp assembly; and

wherein each of said grooves of said column is generally U-shaped in cross section with a bottom portion and has a channel which is trapezoidal in cross section formed inwardly along said bottom portion of said groove for receiving one of said conducting strips.

4,956,758

## LAMP MOUNTING APPARATUS AND METHOD

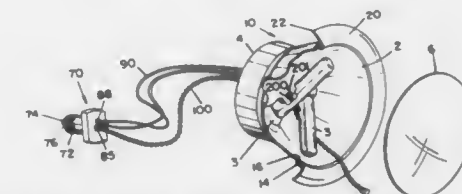
Truman R. Aubrey, Glendale, and Steven R. Gerke, Los Angeles, both of Calif., assignors to Janice Industries, Los Angeles, Calif.

Filed Apr. 10, 1989, Ser. No. 335,554

Int. Cl.<sup>5</sup> F21V 17/06

U.S. Cl. 362-285

18 Claims



1. A lamp mounting apparatus comprising:  
electrical connector means;

support means for supporting at least one lamp receptacle; said support means having at least one aperture there-through; and

elongated means connected to said electrical connector means and extending through said aperture in said support means;

said aperture arranged to selectively engage said elongated means to prevent movement of said elongated means relative to said support means.

4,956,759

## ILLUMINATION SYSTEM FOR NON-IMAGING REFLECTIVE COLLECTOR

Jill F. Goldenberg, Pelham Manor, N.Y., and Roland Winston, Chicago, Ill., assignors to North American Philips Corporation, New York, N.Y.

Filed Dec. 30, 1988, Ser. No. 292,593

Int. Cl.<sup>5</sup> F21V 7/00

U.S. Cl. 362-297

18 Claims

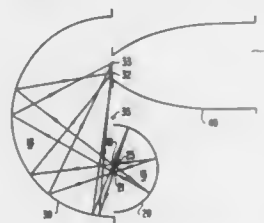
1. An illumination system comprising  
a light source,

a first concave mirror positioned to collect substantially all of the luminous flux emitted within a first half space and to reflect it toward a second opposite half space, said first concave mirror being profiled to form a first image of said light source proximate to said light source,

a second concave mirror positioned to collect all the light emitted by the light source within said second half space



as well as all the light reflected by said first concave mirror through said first image into said second half space, said second concave mirror being profiled to form a second image of said light source at a point remote therefrom



and to form a third image proximate to said second image, said third image being formed from said first image, a non-imaging reflector having an input aperture positioned to receive substantially all the light from said second and third images of said light source.

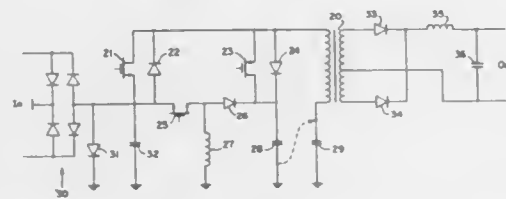
4,956,760

# HIGH POWER SWITCHING POWER SUPPLY HAVING HIGH POWER FACTOR

Zdzislaw Guczynski, P.O. Box 441, Winchester, Mass. 01890  
Filed Jan. 31, 1989, Ser. No. 304,509  
Int. Cl.<sup>5</sup> H02M 3/335

U.S. Cl. 363-16

18 Claims



1. Switching power supply converting pulsating input voltage having one polarity into output signal, comprising:
  - a first capacitive means coupled to ground for storing a first voltage having the opposite polarity;
  - an inductive means coupled in series with the first capacitive means for providing the output signal;
  - a second capacitive means coupled to ground for storing a second voltage having the opposite polarity;
  - a switch means for alternatively applying the input voltage or second voltage to the inductive means; and
  - a charging means coupled to the input voltage for charging the second capacitive means.

4,956,761

# SWITCHING POWER SOURCE APPARATUS OF RINGING CHOKE CONVERTER SYSTEM

Shinya Higashi, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

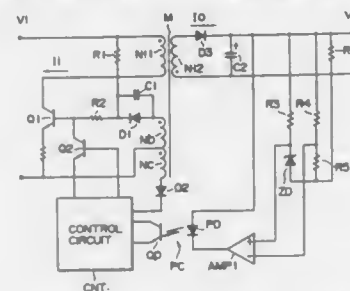
Filed Feb. 25, 1988, Ser. No. 160,322  
Claims priority, application Japan, Feb. 27, 1987, 62-28214[U]  
Int. Cl.<sup>5</sup> H02M 3/338

U.S. Cl. 363-19

2 Claims

1. A switching power source apparatus of a ringing choke converter system, comprising:
  - a switching transistor;
  - load detecting means for detecting that a load connected to said switching power source apparatus is either one of large and normal loads or a small load and outputting a detection signal; and
  - sawtooth wave voltage generating means for generating a sawtooth wave voltage;
  - means for increasing a duty ratio of said sawtooth wave

voltage means when one of said large and normal loads is detected by said load detecting means; and



means for turning off said switching transistor to decrease the duty ratio thereof when the small load is detected by said load detecting means.

4,956,762

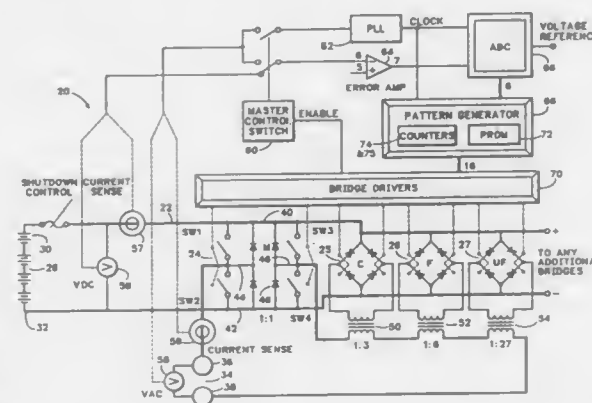
# CONTROLLED SWITCHED BRIDGE-BASED POWER RECONFIGURING APPARATUS

Harlan K. Lovenes, Beavercreek, and Robert P. Lewis, Hillsboro, both of Oreg., assignors to S-V Technology, Inc., Portland, Oreg.

Filed Jan. 13, 1989, Ser. No. 297,500  
Int. Cl.<sup>5</sup> H02M 7/00

U.S. Cl. 363-65

5 Claims



2. A power manipulating apparatus for manipulating an input source of power having a voltage of a predetermined amplitude characteristic into an output power source having a voltage of a different predetermined amplitude characteristic, the apparatus comprising:
  - a plurality of switching bridge means coupled in series, each bridge means comprising two input terminals coupleable to an input power source, two output terminals on which an output power source is generated, and four switch means for coupling selectively each of the input terminals to each of the output terminals;
  - means for generating, for each bridge means, first and second control signals representative of a predetermined pattern of switching of the associated four switch means, each of the first and second control signals being associated with two of the switch means and having two states, the means for generating first and second control signals being responsive to a third control signal having two states, with all of the first and second control signals having a third state when the third control signal is in a first state whereby all of the switch means are open, and the first and second control signals are in the first and second states as determined by the means for generating the first and second control signals when the third control signal is in the second state;
  - switch driver means responsive to the first and second control signals and coupled to each of the switch means, with

the switch driver means associated with a first switch means opening the first switch means and the switch driver means associated with the second switch means closing the second switch means when the corresponding one of the first and second control signals is in a first state, and the first switch driver means closing the first switch means and the second switch driver means opening the second switch means when the corresponding one of the first and second control signals is in the second state; and means controllable for generating the third control signal in either the first or second state.

4,956,763

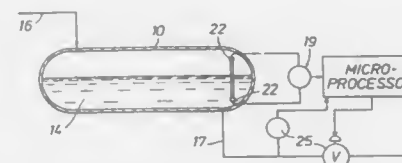
# PORTABLE SELF-CONTAINED SURGE LEVEL CONTROLLER

William B. Stewart, Jr., Houston; Henry K. Lau, Sugarland, and Anthony M. Leonardi-Cattolica, Houston, all of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Jul. 29, 1988, Ser. No. 226,171  
Int. Cl.<sup>5</sup> F17D 3/01; F01N 23/00

U.S. Cl. 364-154

20 Claims



1. For controlling the flow in a fluid-containing in-line vessel having a surge or reservoir capacity, a surge level control system, comprising:

- (a) a neutron backscatter level detector having detectable count rates attachable to such a vessel for detecting the fluid level therein, and having at least two spaced neutron sources and means for converting the detected count rates to a substantially continuous indication of the detected fluid level; and
- (b) computational means connected to said level detector and connectable to regulate the flow in such a vessel in response to the detected fluid level by:
  - (i) estimating an instantaneous mass imbalance and predicting the resultant volume in the vessel;
  - (ii) in a predetermined manner, calculating a normal control move in response to said estimated instantaneous mass imbalance and predicted resultant volume;
  - (iii) determining whether said predicted resultant volume exceeds one of a predetermined volume high limit and a predetermined volume low limit of the vessel, and, when the high limit, then calculating an out-of-limit control move with substantially said volume high limit as a target, and, when the low limit, then calculating an out-of-limit control move with substantially said volume low limit as a target;
  - (iv) at least when the instantaneous mass imbalance differs from zero by a predetermined amount, and when it is determined by said step of determining whether said predicted resultant volume exceeds one of said vessel limits that neither limit will be exceeded, then calculating an upset move based upon a predetermined relationship of the vessel's surge capacity and said estimated mass imbalance; and
  - (v) comparing the signs and magnitudes of said calculated moves according to a predetermined relationship to select the move to be implemented;
 thereby generating control moves to regulate the fluid flow in the vessel to smoothly converge the fluid level in the vessel toward a predetermined volume target or set-point and protect against exceeding the capacity of the vessel.

4,956,764

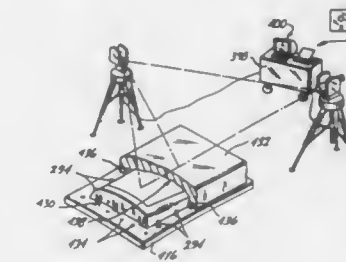
# ASSEMBLY DATA MODEL TOOL SYSTEM

Larry L. Carver, Manhattan Beach; Charles E. Zamzow, Rancho Palos Verdes, and Donald D. Mladenoff, Alta Loma, all of Calif., assignors to Northrop Corporation, Hawthorne, Calif.

Continuation-in-part of Ser. No. 50,794, Apr. 14, 1987, abandoned. This application Mar. 6, 1989, Ser. No. 319,491  
Int. Cl.<sup>5</sup> G06F 15/00

U.S. Cl. 364-167.01

10 Claims



1. A mold system for use in mold forming a part, said mold system comprising:

- a surface;
- a plurality of target means for defining a precisely known spatial relationship in a three dimensional coordinate system, said plurality of target means located on said surface for defining precisely known positions on said surface;
- an image mold, said image mold including an image of said part, said image mold locatable on said surface in a known association with said target means;
- a complimentary mold formed on said image mold and said surface, said complimentary mold including a complimentary image of said part and further including an image of said target means on said surface; and
- said image of said target means on said complimentary mold defining precisely known positions on said complimentary mold which are precisely located with respect to said complimentary image of said part on said complimentary mold to precisely define said complimentary image of said part with respect to said three dimensional coordinate system whereby when a part is molded on said complimentary mold, points on said part are precisely known with respect to said three dimensional coordinate system.

4,956,765

# APPARATUS FOR PROCESSING NUMERICAL CONTROL PROGRAM

Takashi Iwagaya, Hachioji, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP87/00283, § 371 Date Jan. 7, 1988, § 102(e) Date Jan. 7, 1988, PCT Pub. No. WO87/07045, PCT Pub. Date Nov. 19, 1987

PCT Filed May 7, 1987, Ser. No. 150,652  
Claims priority, application Japan, May 7, 1986, 61-104086  
Int. Cl.<sup>5</sup> G06F 15/02, 3/02

U.S. Cl. 364-192

5 Claims

1. An apparatus for processing a numerical control program for controlling a numerical control system, comprising:
  - compiler cassette means for compiling data and being detachable from the apparatus and including converting means for converting a numerical control program input to the numerical control system in the form of a high-level language to a machine language applicable to the numerical control system;
  - ROM cassette means, detachable from the apparatus and having a read-only memory, for storing programs;
  - writing means for writing the numerical control program as converted to the machine language by said compiler cas-

(i) comparing said fourth request table entry for the requested Input/Output operation with said second entry of



said data security access table whenever said second security condition "flag" is in said "allowed" condition and setting said second security condition "flag" to a "violation" condition if no match is found;

- (j) comparing said third request table entry for the terminal location address with the first terminal location security access table entry and setting at said computer host system a third security condition "flag" to an "allowed" condition if a match is found and to a "violation" condition otherwise;
- (k) comparing said fourth request table entry for the requested Input/Output operation with said second entry of said terminal location security access table whenever said third security condition "flag" is in said "allowed" condition and setting said third security condition "flag" to a "violation" condition if no match is found;
- (l) writing at said computer host system said request table entries to a security log database whenever said first, second or third security condition "flag" is in said "violation" condition and cancelling the execution of the parsed Input/Output request by the host system;
- (m) returning the Input/Output request to the host system for processing whenever said first, second and third security condition "flag" is not in said "violation" condition.

4,956,770

#### METHOD AND DEVICE TO EXECUTE TWO INSTRUCTION SEQUENCES IN AN ORDER DETERMINED IN ADVANCE

Sten E. Johnson, Huddinge, and Lars-Örjan Kling, Södertälje, both of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

PCT No. PCT/SE87/00437, § 371 Date May 17, 1988, § 102(e) Date May 17, 1988, PCT Pub. No. WO88/02513, PCT Pub. Date Apr. 7, 1988

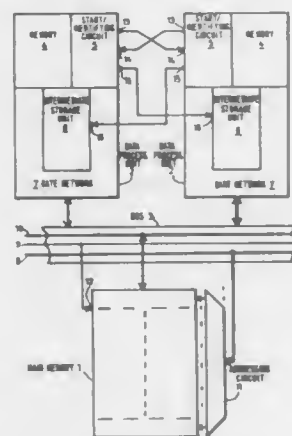
PCT Filed Sep. 28, 1987, Ser. No. 197,410

Claims priority, application Sweden, Oct. 3, 1986, 8604223

Int. Cl. G06F 9/30

U.S. Cl. 364—200

2 Claims



1. A method of operating computer means to enable the computer means to execute a first and second instruction sequence, said computer means comprising auxiliary memory means and a main memory comprising a plurality of main memory locations accessible by an address, said instruction sequences adapted to be executed sequentially in a predetermined order and each instruction sequence comprising at least one instruction, said at least one instruction being selected from at least one read instruction and at least one write instruction, each of said at least one read instruction comprising a read address for retrieval of data stored in one of said main memory locations accessible by said read address, and each of said at least one write instruction comprising data and an associated write address, said write address for specifying one of the main

memory locations to which said write instruction data is to be transferred, wherein data used in conjunction with the execution of the second sequence is not necessarily independent of data obtained in conjunction with the execution of the first sequence, said method comprising the steps of:

executing the instructions in both sequences independent of the predetermined order for execution of the sequences; preventing data transfer to the main memory locations during execution of said first sequence, if said data to be transferred is obtained from the execution of said at least one write instruction of said second sequence;

upon encountering said at least one write instruction during the execution of said second sequence, immediately storing the write address and data of said at least one write instruction in said auxiliary memory means;

upon encountering the at least one said read instruction during the execution of said second sequence, immediately storing the read address of said at least one read instruction in said auxiliary memory means, if said read address is not equal to any address which was encountered in conjunction with execution of the at least one write instruction of said second sequence;

comparing each read address encountered during the execution of said second sequence and the immediately stored write address and generating a first signal when said compared read address is equal to one of the immediately stored write addresses;

preventing, upon receiving said first signal, reading of the data from the main memory location accessible by said compared read address and instead reading from said auxiliary memory means the immediately stored data associated with said write address;

comparing the write address of the at least one write instruction encountered during execution of said first sequence to the immediately stored read addresses and generating a second signal when one of said compared write addresses is equal to one of the immediately stored read addresses; reexecuting the at least one instruction of said second sequence responsive to generation of said second signal; and transferring, responsive to termination of the execution of said first sequence, any immediately stored data into the main memory locations accessible by the associated immediately stored write addresses.

4,956,771

#### METHOD FOR INTER-PROCESSOR DATA TRANSFER

Tari Neustaedter, Ashland, Mass., assignor to Prime Computer, Inc., Natick, Mass.

Filed May 24, 1988, Ser. No. 198,161

Int. Cl. G06F 15/20, 13/00, 12/00

U.S. Cl. 364—200

22 Claims

1. In a computer system comprising a host computer coupled to an intelligent controller, said host computer including a virtual memory, said virtual memory including an I/O segment, a method for transferring data between a plurality of tasks being executed in the host computer and a corresponding plurality of tasks being executed in the controller, each pair of corresponding tasks in the host computer and the controller having a logical connection therebetween, said method comprising the steps of:

said host computer allocating to each connection one or more memory buffers for holding said data;

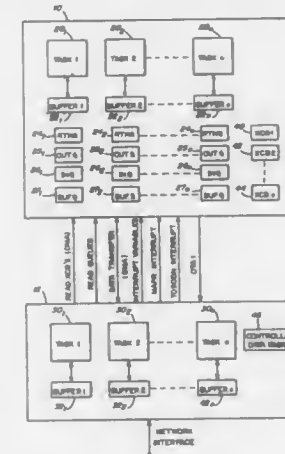
said host computer providing for each connection an output queue for queueing descriptions of output buffers containing data ready for transfer from the host computer to the controller;

said host computer providing for each connection a buffer queue for queueing descriptions of input buffers available for transfer of data from the controller to the host computer;

for each host computer task having data for transfer to said controller, said host computer writing the data to a selected output buffer, writing a description of the selected

output buffer on the associated output queue, and notifying the controller of activity on the associated output queue;

for each controller task having data for transfer to said host computer, said controller reading a description of a selected input buffer from the associated buffer queue; for each data transfer, said controller forwarding the description of the selected output buffer or the selected input buffer from the controller to the host computer;



for each data transfer, said host computer mapping the selected output buffer or the selected input buffer to the I/O segment of virtual memory; said controller reading the selected output buffer through said I/O segment; and said controller writing to the selected input buffer through said I/O segment and notifying the associated task that data has been written in the selected input buffer.

4,956,772

#### METHODS OF SELECTING SIMULTANEOUSLY TRANSMITTED MESSAGES IN A MULTIPROCESSOR SYSTEM

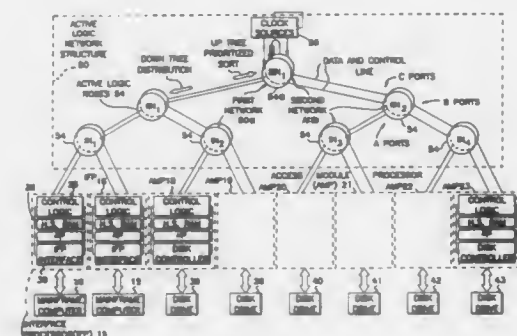
Philip M. Neches, Pasadena, Calif., assignor to Teradata Corporation, Los Angeles, Calif.

Division of Ser. No. 755,436, Jul. 16, 1985, Pat. No. 4,814,979, which is a division of Ser. No. 601,808, Apr. 19, 1984, Pat. No. 4,543,630, which is a division of Ser. No. 250,094, Apr. 1, 1981, Pat. No. 4,445,171. This application Nov. 3, 1988, Ser. No. 266,899

Int. Cl. G06F 13/376, 13/368, 15/16, 15/40

U.S. Cl. 364—200

19 Claims



1. A method of processing data using a plurality of processor modules comprising the steps of:

- a. subdividing a data processing task into information packets each said information packet representing a subtask;
- b. simultaneously broadcasting pairs of successive said information packets to a priority determining network having a plurality of priority determining nodes;
- c. determining at each said priority determining node which said information packet of the broadcasting pair has a higher priority solely based upon data contents thereof;
- d. selecting by said priority determining network a chosen information packet from a plurality of said information packets each having a higher priority;
- e. broadcasting successive chosen information packets to all the processor modules simultaneously, each of the chosen information packets containing a characterizing message;
- f. determining from the characterizing message in each said chosen information packet, at all the processor modules, an appropriate individual processor module or modules for carrying out the subtask represented by each said chosen information packet;
- g. generating processed information packets at the processor modules based upon result of said determining step;
- h. broadcasting different ones of the processed information packets to all the processor modules simultaneously.

4,956,773

#### SYSTEM AND METHOD OF GENERATING A SOURCE PROGRAM FROM INPUTTED SCHEMATIC INFORMATION

Kazumasa Saito, Aso, Hiroyuki Maezawa, Sagami-hara, Masakazu Kobayashi, Ota, and Yoshihiko Futamura, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 145,410, Jan. 19, 1988, Pat. No. 4,831,525, which is a continuation of Ser. No. 695,229, Jan. 28, 1985, abandoned. This application Mar. 28, 1989, Ser. No. 329,598

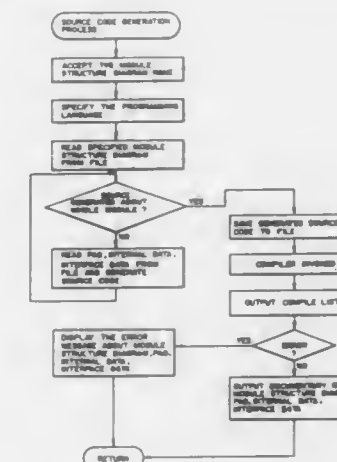
Claims priority, application Japan, Jan. 30, 1984, 59-13461

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl. G06F 9/00

U.S. Cl. 364—200

13 Claims



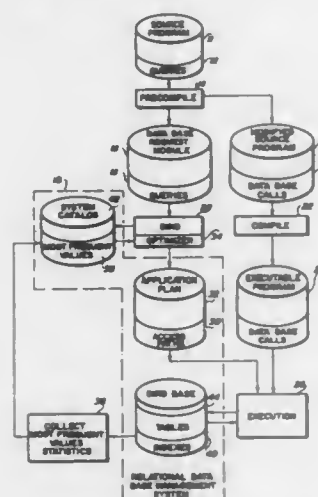
1. A method of generating a source program in an information processing system having a processing means, comprising the steps of:

preparing various schematic information items which include a flow of processes for said processing means; and generating the source program based on prepared schematic information items in said processing means.

**4,956,774**  
**DATA BASE OPTIMIZER USING MOST FREQUENCY VALUES STATISTICS**  
Akira Shibemitsu, Los Altos, and Melvin R. Zimowski, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.  
Filed Sep. 2, 1988, Ser. No. 239,712  
Int. Cl.<sup>3</sup> G06F 15/40

U.S. Cl. 364-200

9 Claims



1. In a method for accessing data of a relational data base management system having at least one index, the improvement characterized by the steps performed by a computer of:
  - (a) selecting a number of most frequently occurring values of at least part of a key of the index, the number being greater than zero and less than a total number of such values;
  - (b) collecting frequency of occurrence statistics for the selected most frequently occurring values of the index;
  - (c) estimating a time required for using the index as the access path, based at least in part on the collected frequency of occurrence statistics;
  - (d) selecting an access path based at least in part on the estimated time; and
  - (e) accessing the data using the selected access path.

**4,956,775**  
**OBJECT SENSOR FOR DETECTING CHARACTERISTICS SUCH AS COLOR FOR GAMES**  
Reuben B. Klammer, 969 Hilgard Ave. - Suite 1001; David I. Lappen, 10427 Linbrook Dr., both of Los Angeles, Calif. 90024; William A. Lappen, 2167 Kenilworth Ave., Los Angeles, Calif. 90039, and Beatriz E. Pardo, 2234-A Bentley Ave., Los Angeles, Calif. 90064

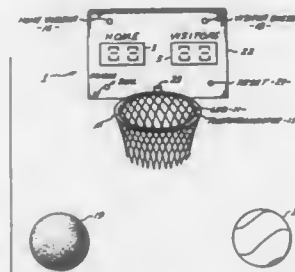
Filed Oct. 1, 1988, Ser. No. 782,557  
Int. Cl.<sup>3</sup> G06F 15/28; A63B 67/00, 63/02

U.S. Cl. 364-411

6 Claims

1. Game apparatus for use in a game providing automatic scoring comprising:
  - a plurality of game balls each being of a particular color, means defining a single scoring area for said game when one of said plurality of game balls is found within said scoring area;
  - a sensor for sensing the presence of one of said balls in the single scoring area and producing a scoring event signal, said sensor including light means for illuminating the one of said game balls in the single scoring area responsive to said scoring event signal and photoelectric means for receiving light reflected by the one of said game balls in said scoring area, and for providing a plurality of sensor output signals indicative of the reflectivity of the one of said game balls and for averaging the plurality of signals to determine reflectivity in order to reduce errors, with

which reflectivity of said one of said game balls said sensor identifies said particular one of said game balls by its color, said sensor including delay means for delaying the beginning of sensor signals indicating reflectivity and lengthening the shortest time within which two consecutive scoring event signals can be generated, thereby assuring



ing that noise signals are not sensed as a scoring event and no single game ball is sensed as multiple game balls; and a score-keeping means having display means for a plurality of a scores for automatically monitoring said sensor output signals and incrementing a score on said display means corresponding to a particular game ball detected in said scoring area.

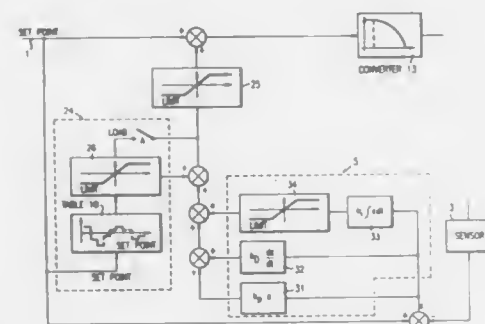
**4,956,776**  
**DEVICE FOR MANAGING AN ELECTROHYDRAULIC PRESSURE CONTROL**

Jean-Claude Carre, Amieres, France, assignor to Regie Nationale Des Usines Renault, Boulogne-Billancourt, France  
Continuation of Ser. No. 209,969, Jun. 22, 1988, abandoned.

This application Jan. 22, 1990, Ser. No. 465,649  
Claims priority, application France, Jan. 22, 1987, 87 08746  
Int. Cl.<sup>3</sup> G05B 13/02; G06F 15/00

U.S. Cl. 364-424.1

2 Claims



1. A system for regulating a parameter, comprising:
  - a input for receiving a set point signal;
  - a first control element having an input and an output;
  - second control element receiving the output of said first control element and producing an output for regulating said parameter;
  - a sensor connected to the output of said second control element;
  - a comparator for comparing the output of said sensor with said set point signal to produce an error signal;
  - a proportional-plus-integral-plus-derivative controller receiving said error signal and producing an output;
  - a table being addressed by said set point signal to produce a value in response thereto;
  - means for adding said value, the output of said proportional-plus-integral-plus-derivative controller and the set point signal to produce an output;

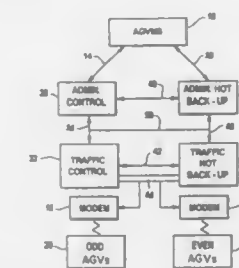
a converter receiving the output of said adding means to produce an output connected to the input of said first control element, said converter thus continuing to provide an output even in the event of the failure of said sensor.

**4,956,777**  
**AUTOMATIC VEHICLE CONTROL SYSTEM**  
Thomas W. Cearley, Clemmons; Michael F. Donovan, Advance; Raymond A. Gardea, II, Winston-Salem; Kolleen C. Hughes, King; William R. Hunt, III, Mt. Airy; William R. Jarvis; Marvin R. Martin, both of Winston-Salem, all of N.C.; Aftab Shamb, Clay, N.Y.; Michael D. Shepard, Winston-Salem, N.C.; William F. Summers, Mocksville, N.C.; David C. Twine, Winston-Salem, N.C., and Lonnie M. Utt, Jr., Mt. Airy, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Jun. 9, 1988, Ser. No. 204,336  
Int. Cl.<sup>3</sup> C06F 15/50

U.S. Cl. 364-424.02

19 Claims



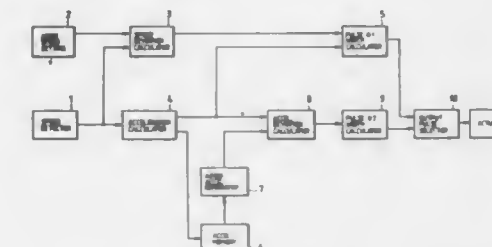
9. A system, comprising:
  - a guided vehicle path;
  - a plurality of guided vehicles operating along said path;
  - a plurality of indicators positioned along said path for indicating to said vehicles position on said path; and
  - a guided vehicle controller, comprising:
    - means for communicating with said guided vehicles;
    - a first computer system for exchanging information with said guided vehicles through said communicating means, said first computer system including a first memory section for storing information received from said vehicles including vehicle position information of each vehicle in relation to said indicators and including a second memory section for storing information to be transmitted to said vehicles including vehicle destination information;
    - a second computer system for receiving vehicle movement requests from external sources and determining which vehicles are to respond to said requests, said second computer system including a third memory section for storing information relating to vehicle position in relation to said indicators and including a fourth memory section for storing information including vehicle destination information;
    - first transfer means for copying said information in said first memory section to said third memory section so that said first memory section and said third memory section contain the same vehicle position information; and
    - second transfer means for copying said information in said fourth memory section to said second memory section so that said fourth memory section and said second memory section contain the same vehicle destination information;
- wherein said first computer system polls said vehicles using a fast polling routine for vehicles within a first predetermined distance of a next position indicator and using a slow polling routine after the fast polling routine is completed, and wherein said fast polling routine includes requesting information from each vehicle as to its position, storing said requested fast polling position information in

said first memory section and indicating to each fast polled vehicle whether it should stop or continue

**4,956,778**  
**CONSTANT SPEED HOLDING DEVICE**  
Yasuo Naito, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Jun. 30, 1988, Ser. No. 213,856  
Claims priority, application Japan, Jul. 2, 1987, 62-167173  
Int. Cl.<sup>3</sup> B60K 31/04

U.S. Cl. 364-426.04

4 Claims



1. A constant speed holding device for a vehicle, said device enabling said vehicle to recover to a constant speed, said device comprising:
  - a running speed detector for measuring an actual speed of a vehicle;
  - an aimed speed setting means for setting a speed desired by an operator;
  - a speed deviation calculating means responsive to an actual running speed signal from said running speed detector and a set speed signal from said aimed speed setting means for calculating a speed deviation therebetween;
  - an acceleration calculating means responsive to the running speed signal for calculating an acceleration of the vehicle;
  - a first pulse width calculating means responsive to a speed deviation signal from said speed deviation calculating means and an acceleration signal from said acceleration calculating means for calculating a pulse width of a first pulse signal having a predetermined period;
  - an acceleration memory means for storing a value of the acceleration signal in the past;
  - an aimed acceleration generating means responsive to an output of said acceleration memory means for generating an aimed acceleration  $\alpha_0$ ;
  - an acceleration deviation calculating means responsive to the aimed acceleration signal and the acceleration signal for calculating an amount of acceleration deviation and outputting an acceleration deviation signal accordingly;
  - a second pulse width calculating means responsive to the acceleration deviation signal for calculating a pulse width of a second pulse signal having a predetermined period;
  - an output pulse selection means for selecting said first pulse signal when said vehicle is not recovering to said constant speed, or said second pulse signal, when the vehicle is recovering to said constant speed; and
  - an actuator responsive to a selected output pulse signal for on-off controlling a throttle valve of an engine of the vehicle on the basis of the pulse width thereof.





and other components of the factory relating to an amount of time required to process a job in the factory and an amount of time anticipated to complete the job within the factory including waiting time at the machines; calculating a continuity index (CI) for one of the jobs in said pool of pending jobs, said continuity index being related to the total amount of processing time required by said one of said pending jobs, and the anticipated time to complete said one of said pending jobs; calculating a mean continuity index (MCI) related to an operational parameter of said factory according to management objectives for processing and completing a job in said factory; calculating a lower range (r1) and an upper range (r2) related to said management objectives; and operating said job release scheduler for releasing said one of said jobs into said factory if:

$$MCI - r1 < CI < MCI + r2.$$

4,956,785

# NUMERICAL CONTROL METHOD WITH A PARALLEL PROCESSING FUNCTION

Hideaki Kawamura, Hachioji; Kentaro Fujibayashi, Mitaka, and Yoseto Hidaka, Hachioji, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP88/00046, § 371 Date Jul. 11, 1988, § 102(e) Date Jul. 11, 1988, PCT Pub. No. WO88/05565, PCT Pub. Date Jul. 28, 1988

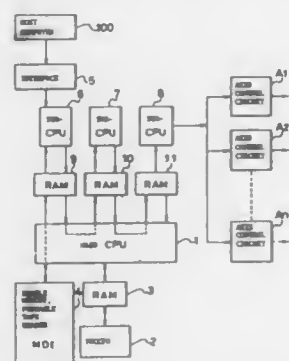
PCT Filed Jan. 22, 1988, Ser. No. 243,298

Claims priority, application Japan, Jan. 23, 1987, 62-12583

Int. Cl. F05B 19/403; F06F 9/22

U.S. Cl. 364-474.01

10 Claims



10. A numerical control apparatus, comprising:

- a first processor for receiving a block of command data, executing a first partial process of a preparatory processing block, and for outputting intermediate data;
- a first storage unit, operatively connected to said first processor, for storing the intermediate data;
- a second processor, operatively connected to said first storage unit, for receiving the intermediate data from said first storage unit, executing a second partial process of the preparatory processing block concurrently with the executing of said first processor, and for outputting executable data;
- a second storage unit, operatively connected to said second processor, for storing the executable data; and
- a third processor, operatively connected to said second storage unit, for receiving the executable data from said second storage unit and for executing the executable data, concurrently with the executing of said second processor, to produce pulse distribution signals.

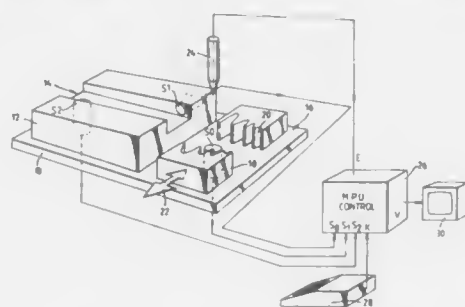
4,956,786  
MARKING OR ENGRAVING MACHINE  
Stephen J. Drummond, Rickmansworth, and John W. Heary, Colne, both of England, assignors to Rolls-Royce plc, London, England

Filed Jan. 12, 1989, Ser. No. 296,076

Int. Cl. B23C 3/00

U.S. Cl. 364-474.02

11 Claims



1. A marking or engraving machine comprising means for identifying a range of different types of components, memory means for storing in machine readable form part numbers for each of the different types of component, means responsive to an identification of a component to retrieve from said memory means a corresponding part number and means operative to mark or engrave said part number on the component.

4,956,787

ELIMINATION WORK SIMULATOR APPARATUS  
Kumiko Ito, Mito; Yasumasa Kawashima, Hitachi; Shiro Nonaka, Hitachi, and Tomotoshi Ishida, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

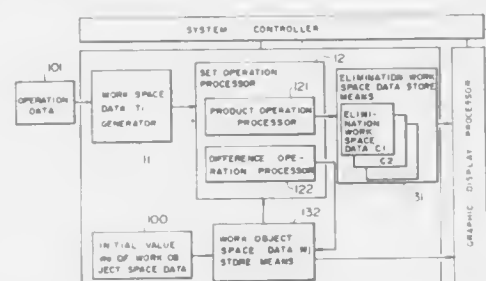
Filed Sep. 13, 1988, Ser. No. 243,640

Claims priority, application Japan, Sep. 21, 1987, 62-234988

Int. Cl. G06F 15/46

U.S. Cl. 364-474.24

20 Claims



1. An elimination work simulator in which a work is achieved through m operation units comprising:

- a first set operation processor for respectively generating a difference space between an n-dimensional work object space data  $W_j - 1$  corresponding to a work object in a jth work operation unit from among j operation units, where  $j = 1, 2, \dots, m$ , and an n-dimensional work space data  $T_j$  corresponding to a space through which a machining device passes in the jth work operation unit in order to provide a difference space respectively corresponding to each of the operation units, wherein n is an integer greater than or equal to 2;
- first store means for storing the difference spaces as new work object space data  $W_j$ ;
- a second set operation processor for respectively generating a product space between the work object space data  $W_j - 1$  and the work space data  $T_j$  in order to provide a

product space respectively corresponding to each of the operation units; and  
second store means for sequentially storing the product spaces as elimination work space data  $C_j$ .

4,956,788

# PC-BASED FT/ICR SYSTEM

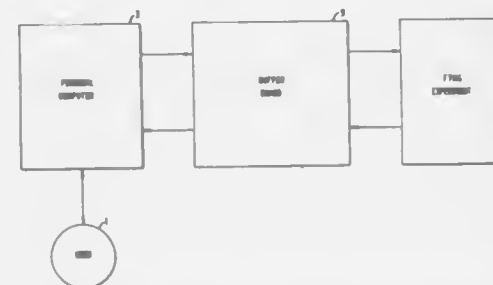
Shenheeng Guan, and Patrick R. Jones, both of Stockton, Calif., assignors to University of the Pacific, Stockton, Calif.

Filed Nov. 28, 1988, Ser. No. 276,979

Int. Cl. G06F 3/14; G01B 9/02

U.S. Cl. 364-498

4 Claims



1. In a Fourier transform ion cyclotron resonance mass spectrometer ("FT/ICR"), a system, utilizing a personal computer ("PC") for providing an ion excitation signal and acquiring and storing resulting ion transient data, the system capable of setting up a precise timing interval between the beginning of ion excitation and the end of data acquisition, comprising:

- a static random access memory device ("SRAM") for storing digital data;
- a digital to analog ("D/A") converter for receiving the ion excitation signal in digital form from said SRAM, converting the ion excitation signal to analog form, and outputting the ion excitation signal in analog form in response to an ion excitation control signal;
- an analog to digital ("A/D") converter for receiving the resulting ion transient data in analog form, converting the resulting ion transient data to digital form, and transmitting the resulting ion transient data in digital form to said SRAM in response to a data acquisition control signal;
- a state machine ("SM") connected to the PC, said SRAM, said D/A converter, and said A/D converter through control lines, said SM for issuing said ion excitation control signal to said D/A converter causing the ion excitation signal to be output, for issuing said data acquisition control signal to said A/D converter causing said A/D converter to start receiving acquired data, and for issuing a read/write control signal to said SRAM, to control ion excitation, data acquisition, and read/write operations in said SRAM, with said SM starting operation upon receipt of a start operation signal from the PC;
- an address counter, connected to said SM and said SRAM, for keeping track of the present memory location of said SRAM and for interacting with said SM such that said SM causes said address counter to be loaded with a selected value and said address counter provides said SM with a count signal every time said address counter counts to a designated value where the occurrence of said count signal causes said SM to issue said data acquisition control signal after the expiration of a predetermined time interval;
- a command register, connected to the PC and said SM, for receiving control signals from the PC and passing said control signals onto said SM;
- a status register, connected to the PC and said SM, for keeping track of the present state of said SM;
- an address latch connected to the PC, said address counter, and said SM for receiving a starting address from the PC

and transmitting it to said address counter when issued an address latch control signal by said SM;  
a data transceiver, connected to said SRAM, said SM, and the PC, for controlling data transfer direction between said SRAM and the PC when issued a data direction control signal by said SM; and  
an address decoder, connected to the PC and said SM, said command register, and said status register, for receiving said starting address from the PC and for transmitting a decode signal to said SM so that said SM may issue said address latch control signal causing said address latch to input said starting address to said address counter.

4,956,789

# METHOD AND APPARATUS FOR DRIVING A SERVO SYSTEM WHILE SUPPRESSING RESIDUAL VIBRATION GENERATED DURING POSITION CONTROL

Yosuke Hamada, Ibaraki; Hiromasa Hirai, Tsukuba, and Isao Kobayashi, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

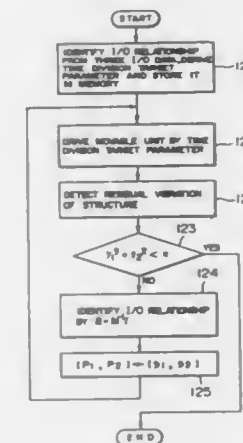
Filed May 10, 1988, Ser. No. 192,135

Claims priority, application Japan, May 13, 1987, 62-114656; May 13, 1987, 62-114657

Int. Cl. G05B 13/04

U.S. Cl. 364-508

12 Claims



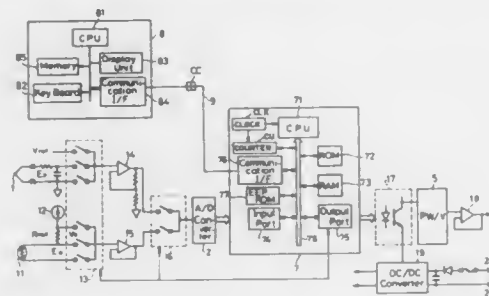
6. A method for driving a servo system comprising the steps of:

- calculating and storing, in response to a move command, a target trajectory for suppressing vibration of a controlled object having a movable unit at a time point immediately after a stop of displacement of the movable unit by using a model of the controlled object, a constraint of an actuator for driving the movable unit and a boundary condition for the displacement;
- generating target positions during the displacement of the movable unit based on the target trajectory;
- calculating a drive signal to eliminate a difference between a target position and a position of the movable unit detected by a displacement detection device;
- driving the actuator by the drive signal to displace the movable unit to a predetermined final position determined by the move command;
- detecting vibration of the controlled object at a time point immediately after the stop of the displacement, modifying the target trajectory based on the detected vibration such that a vibration immediately after the stop of displacement is minimized, and storing the modified target trajectory; and
- controlling the position of the movable unit in response to a subsequent move command based on the modified and stored target trajectory.



1. A signal conditioner comprising an A/D converter for converting a signal transmitted from a sensor into a digital signal; arithmetic means for performing a predetermined arithmetic operation on said digital signal; pulse outputting means for outputting a pulse signal with a duty ratio corresponding to an arithmetic result obtained by said arithmetic means; smoothing means for smoothing said pulse signal and for outputting said pulse signal as a predetermined standard signal; and

setting means for setting data used for said arithmetic operation by said arithmetic means and for outputting condi-



tions of said pulse outputting means on receiving a signal from a source external to said signal conditioner.

4,956,796

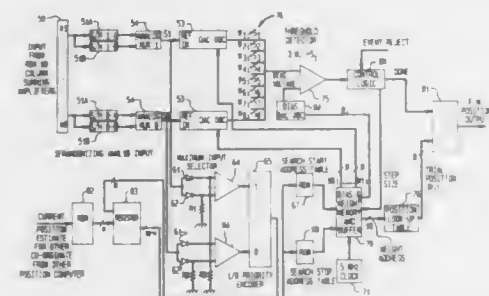
**MULTIPLE SENSOR POSITION LOCATING SYSTEM**  
W. Leslie Rogers, and Neal H. Clinthorne, both of Ann Arbor, Mich., assignors to The University of Michigan, Ann Arbor, Mich.

Continuation-in-part of Ser. No. 876,762, Jun. 20, 1986, Pat. No. 4,852,056. This application May 20, 1988, Ser. No. 196,928. The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> G06F 15/20; G01T 1/20

U.S. Cl. 364—581

19 Claims



1. A system for locating a position of a source of a detectable emittance, the system comprising:

a plurality of sensors arranged in a predetermined multi-dimensional configuration with respect to one another, each for detecting the detectable emittance and producing at an associated output thereof a respective sensor signal having a sensor signal value which is substantially responsive to the detectable emittance impinging on said associated sensor, each of said sensors in said predetermined multi-dimensional configuration having associated therewith respective first dimension and second dimension coordinate addresses for defining a location of said respective sensors in said predetermined multi-dimensional configuration;

memory means for storing a plurality of weighting values for respective ones of said sensors, said weighting values being responsive to response characteristics of said respective sensors;

arithmetic combiner means for receiving a plurality of weighting values from said memory means corresponding to a respective plurality of said sensor means having a common first dimension coordinate address selected in response to a second dimension coordinate address, for producing at an output thereof a composite weighting signal having a composite weighting signal value responsive to said plurality of weighting values; and

position encoder means for producing a position value responsive to said composite weighting signal value.

4,956,797

**FREQUENCY MULTIPLIER**

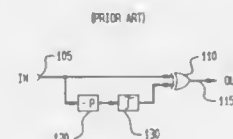
Paul M. Berard, Phoenix, Ariz., assignor to Siemens Transmission Systems, Inc., Phoenix, Ariz.

Filed Jul. 14, 1988, Ser. No. 219,511

Int. Cl.<sup>3</sup> G06F 7/52; H03K 23/64

U.S. Cl. 364—703

6 Claims



1. A frequency multiplier, for producing an output signal having a frequency greater than the frequency of an input signal by a factor  $(1+N/M)$ , where  $N$  and  $M$  are positive integers greater than 1, and  $N \leq M$ , comprising:

an input terminal and an output terminal; and

a plurality of frequency multiplying stages, coupled in series between said input and output terminals, each stage having a stage input and a stage output, wherein each stage input is coupled to said input terminal or a stage output of a preceding stage, and each stage output is coupled to a stage input of a succeeding stage or said output terminal, and each stage including circuitry of a similar structure producing a stage output signal having a frequency greater than the frequency of its stage input signal by a stage multiplier factor having the general form  $(1+1/P)$ , where  $P$  is any positive integer greater than 1,

wherein the series multiplication of the stage multiplier factors of said plurality of frequency multiplier stages produces the output multiplier factor  $1+N/M$ , and each stage multiplier factor corresponds to one factor or a subset of factors on the right hand side of the following series multiplication equation:

$$1 + N/M = \prod_{j=0}^{N-1} (1 + 1/(M+j))$$

4,956,798

**ARBITRARY WAVEFORM GENERATOR WITH ADJUSTABLE SPACING**

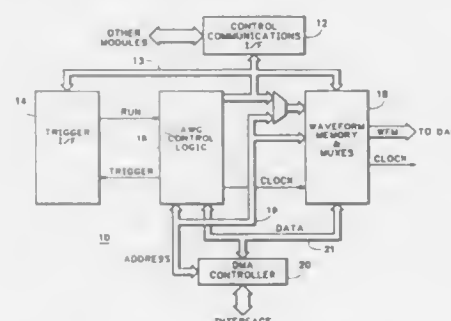
Bryan J. Dinteman, Aloha, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Aug. 3, 1989, Ser. No. 389,076

Int. Cl.<sup>3</sup> G06F 1/02, 101/00

U.S. Cl. 364—718

13 Claims



1. An arbitrary waveform generator of the type having

waveform segments stored in a memory and having a desired waveform represented by a plurality of packet data words, each packet data word having a plurality of elements, comprising:

means for storing each element, one element being a clock control word;

means for generating a sequence of addresses for the memory to access a particular waveform segment determined by each packet data word according to the elements in the storing means, the rate at which the sequence of addresses is generated being determined by a clock signal; and

means for varying a clock frequency for each packet data word according to the clock control word to produce the clock signal so that the duration of each waveform segment is adjusted to produce the desired waveform.

4,956,799

**TRIGONOMETRIC FUNCTION ARITHMETIC PROCESSOR USING PSEUDO-DIVISION**

Takashi Nakayama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 213,869, Jun. 30, 1988, abandoned.

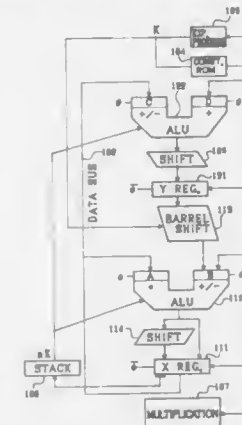
This application Oct. 27, 1989, Ser. No. 428,035

Claims priority, application Japan, Jun. 30, 1987, 62-164460; Sep. 18, 1987, 62-234195

Int. Cl.<sup>3</sup> G06F 1/02

U.S. Cl. 364—729

4 Claims



1. A trigonometric function arithmetic processor for use in computers for computing the values of trigonometric function  $\sin \theta$  and  $\cos \theta$ , with a resolution of  $n$  bits (where  $n=2m$  and  $m$  is positive integer), comprising:

a bus to which an input angular data of  $\theta$  is supplied in the form of a binary floating-point number;

an exponent processing means coupled to said bus for receiving an exponent  $i$  (where  $i$ =integer) of said angular data and for incrementing its output  $k$  in the order of  $i, i+1, i+2, \dots, m-1$  and then decrementing its output  $k$  in the order of  $m, m-1, m-2, \dots, i+1$ ;

constant memory means coupled to said bus for storing a constant  $1/K$  where

$$K = \sum_{k=0}^{n-1} \sqrt{1+2^{-2k}}$$

and a sequence of constants  $\Gamma_k = 2^k \times \arctan(2^{-k})$  where  $k=i, i+1, i+2, \dots, m-1$ ;

first register means coupled to said bus for receiving a mantissa  $V_k$  of said angular data;

stack means coupled to said first register means for receiving a sign data of said mantissa of said angular data stored in said first register means;

first adder/subtractor means having a first input connected

to said first register means and a second input coupled to said bus for receiving a constant  $\Gamma_k$  from said constant memory means, said first adder/subtractor means being controlled by an output of said stack means so that when said sign data indicates positive said first adder/subtractor means executes subtraction of said second input from said first input, and when said sign data indicates negative said first adder/subtractor means executes addition between said first and second inputs, this addition/subtraction of said first adder/subtractor means being repeatedly performed each time said output  $k$  of said exponent processing means is incremented in the order of  $i, i+1, i+2, \dots, m-1$ ;

first shifter means coupled to an output of said first adder/subtractor means for writing a doubled value of said output of said first adder/subtractor means to said first register means each time said output  $k$  of said exponent processing means is incremented, so that each time said output  $k$  of said exponent processing means is incremented, said first register means is written with  $V_{k+1} = 2(V_k - a_k \times \Gamma_k)$  where  $a_k$  is a sign data given by said stack means, a content  $V_m$  of said first register means obtained when said output  $k$  of said exponent processing means has been incremented to  $m-1$  being used as an initial value  $X_k$ ;

multiplication means coupled to said bus for receiving said constant  $1/K$  from said constant memory means and said content  $V_m$  of said first register means obtained when said output  $k$  of said exponent processing means has been incremented to  $m-1$ , for generating a product  $V_m/K$ ;

second register means coupled to said bus for receiving, as an initial value  $Y_k$ , said product  $V_m/K$  generated by said multiplication means;

second adder/subtractor means having a first input connected to said first register means and a second input coupled to said bus for receiving said initial value  $Y_k$  from said second register means, said second adder/subtractor means being controlled by said output of said stack means so that when said sign data indicates positive said second adder/subtractor means executes addition between said first and second inputs and when said sign data indicates negative said second adder/subtractor means executes subtraction of said first input from said second input;

second shifter means coupled to an output of said second adder/subtractor means for writing a halved value of said output of said second adder/subtractor means to said second register means each time said output  $k$  of said exponent processing means is decremented; and

barrel shift means coupled to said second shift register means for outputting  $2^{-2k}$  times the value of the content of said second shift register means to said second input of said first adder/subtractor means;

so that when said output  $k$  of said exponent processing means is decremented in the order of  $m, m-1, m-2, \dots$

,  $i+1$ , said first and second adder/subtractor means being

controlled by said output of said stack means so as to

respectively add/subtract each time said output  $k$  of said

exponent processing means is decremented, whereby,

each time said output  $k$  of said exponent processing means

is decremented, said first register means holds

$X_{k-1} = X_k - a_k \times 2^{-2k} \times Y_k$  and said second register means

holds  $Y_{k-1} = (Y_k + a_k \times X_k)/2$ , and finally, said first register

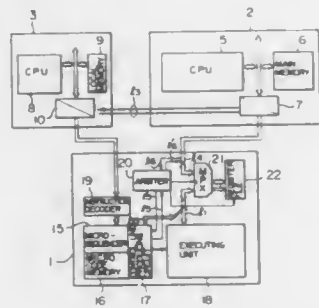
means holds a value corresponding to  $\cos \theta$  and said second register means holds a value corresponding to a

mantissa of  $\sin \theta$ .



4,956,800  
ARITHMETIC OPERATION PROCESSING APPARATUS  
OF THE PARALLEL PROCESSING TYPE AND  
COMPILER WHICH IS USED IN THIS APPARATUS  
Masatsugu Kametani, Ibaraki, Japan, assignor to Hitachi, Ltd.,  
Tokyo, Japan

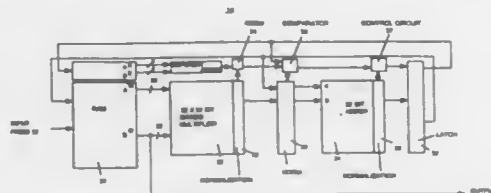
Filed Jan. 17, 1988, Ser. No. 208,107  
Claims priority, application Japan, Jan. 19, 1987, 62-151207;  
Jul. 3, 1987, 62-165338  
Int. Cl.<sup>5</sup> G06F 7/38  
U.S. Cl. 364-736 13 Claims



1. An arithmetic operation processing apparatus of a parallel processing type, comprising:  
a first processor having means for outputting a series of macro instruction sequences which are each obtained by dividing a whole executing sequence composed of multiple instructions to specify respective arithmetic operating processes;  
a second processor connected to receive said series of macro instruction sequences from said first processor and including means for storing said multiple instructions of said whole executing sequence, and means coupled to said storing means for outputting instructions relevant to an arithmetic operating process of a macro instruction sequence in response to the receipt of each macro instruction;  
an arithmetic operating unit for executing an arithmetic operation on data in accordance with an instruction received from said second processor; and  
data transfer means for transferring necessary operand data and result data relevant to said arithmetic operations between said first processor and said arithmetic operating unit.

4,956,801  
MATRIX ARITHMETIC CIRCUIT FOR PROCESSING  
MATRIX TRANSFORMATION OPERATIONS  
Curtis Priem, Fremont, and Chris Malachowsky, Santa Clara,  
both of Calif., assignors to Sun Microsystems, Inc., Mountain  
View, Calif.

Filed Sep. 15, 1989, Ser. No. 407,549  
Int. Cl.<sup>5</sup> G06F 7/38  
U.S. Cl. 364-748 6 Claims



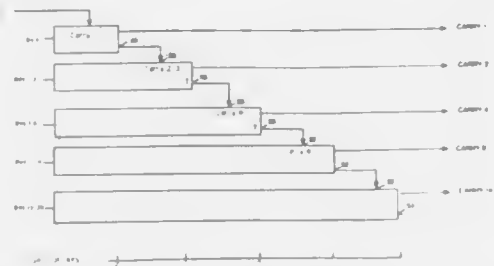
1. In a data processing system, an improved matrix arithmetic

circuit for processing matrix transformation operations, comprising:

- random access memory means for receiving and storing a plurality of numbers in Modulo 256 with multiple tap points number format, said plurality of numbers being provided by an input conversion circuit coupled to said data processing system;
- multiplier means coupled to said memory means for multiplying first and second of said numbers stored in said memory means in Modulo 256 format, to form a first result, said result including an exponent;
- normalization means coupled to said multiplier means for normalizing said first result, said normalization means including shifting means for shifting said first result by eight bit increments as far to the left of the format space available as possible, and means for reducing said exponent of the result by one for each such shift;
- adder means coupled to said normalization means for adding said normalized first result to a third number in Modulo 256 with multiple tap points number format to obtain a second result;
- register means coupled to said adder means for receiving said second result and coupling said result to said memory means for storage, said second result also coupled to an output conversion circuit coupled to said data processing system.

4,956,802  
METHOD AND APPARATUS FOR A PARALLEL CARRY  
GENERATION ADDER  
Curtis Priem, Fremont, Calif., assignor to Sun Microsystems,  
Inc., Mountain View, Calif.

Filed Dec. 14, 1988, Ser. No. 284,110  
Int. Cl.<sup>5</sup> G06F 7/50  
U.S. Cl. 364-787 6 Claims

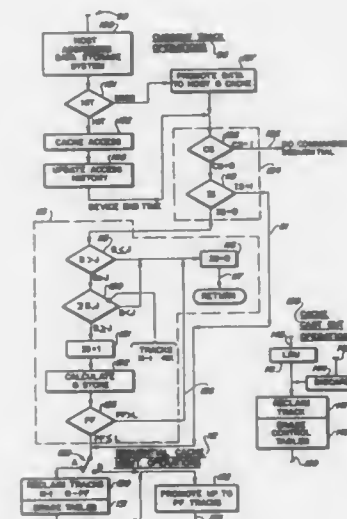
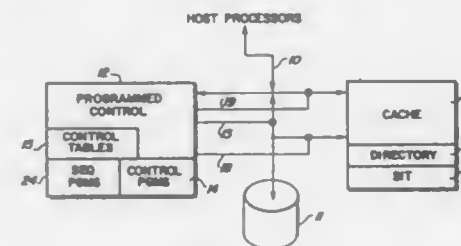


1. A circuit to generate carry-out bits of a multi-bit sum of a first multi-bit input and second multi-bit input wherein each bit sum is derived from a bit from the first input, a bit from the second input, and a carry-in bit, said circuit comprising:  
a first sub-circuit comprising components to compute a least significant carry-out bit, said least significant carry-out bit being equal to a carry-in bit to the circuit;  
at least one second sub-circuit coupled to said first sub-circuit to compute carry-out bits more significant than the least significant carry-out bit, each of said second sub-circuits being organized according to binary ordered groups of input bits wherein a binary-ordered group is determined according to the equation  $group_n = \text{input bits } (2^n)$  through input bits  $(2^{n+1} - 1)$ , the number of said second sub-circuits being equal to the number of binary groups, each of said second sub-circuits being organized in a less significant to more significant order and comprising:  
a carry-in bit to the second sub-circuit of a group, the value of the carry-in bit being the value of the carry-out bit computed by an adjacent less significant second sub-circuit;  
a first group of components to compute a preliminary carry-out bit for the respective input bits, said first group of components organized to compute approximately concurrent

rent with the components of said adjacent less significant second sub-circuit which computes the carry-in bit to the second sub-circuit, the number of gate delays required for the first group of components to compute being less than or equal to the number of gate delays required for the components of the less significant second sub-circuit to compute the carry-in bit; and  
a second group of components coupled to the first group of components to compute the carry-out bit for the respective group of the input bits as the combination of the carry-in bit and the output of the first group of components, said output being equal to said preliminary carry out bit, said second group of components computing the carry-out bit in one gate delay;  
wherein said second sub-circuit, to compute the carry-out bit for the respective input bits for the binary-ordered group, utilizes one gate delay more than the number of gate delays utilized to generate the carry-in bit to the second sub-circuit.

4,956,803  
SEQUENTIALLY PROCESSING DATA IN A CACHED  
DATA STORAGE SYSTEM  
Gerald E. Taylor, Berthoud, Colo., and Robert E. Wagner, Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 68,857, Jul. 2, 1987, Pat. No. 4,882,642.  
This application Sep. 14, 1989, Ser. No. 407,077  
Int. Cl.<sup>5</sup> G06F 9/00  
U.S. Cl. 364-900 13 Claims

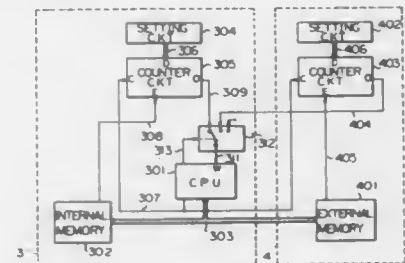


1. Data processing apparatus including a cache store operatively connected between a host processor and a backing store, the backing store having addressable data storage tracks, both stores storing data addressable by the addresses of the backing store data storage tracks, each track being capable of storing an amount of data equal to a given number of data bits, the host

processor accessing, or primarily accessing, the cache store for writing and reading data to and from both stores, and a cache controller determining the promotion and demotion of data between the cache and the backing store and arranged, in operation, to switch between promotion and demotion protocols in dependence on the result of a running analysis of the proportion of data in the currently accessed track and its connected previously accessed tracks actually referenced in relation to predetermined thresholds, the controller, for each access to the cache store by the host processor, measuring the amount of data in that track that is referenced by the access as an indication of locality of reference and separately storing the measured amount as an access extent for that track or incorporating such there into and means for comparing the predetermined thresholds with the stored access extents for yielding a given result, and the controller having means responsive to the given result to control said promotion and demotion of data.

4,956,804  
DATA PROCESSING SYSTEM WITH MEMORIES  
ACCESS TIME COUNTING AND INFORMATION  
PROCESSOR WAIT SIGNAL GENERATING  
CIRCUITRIES  
Kozo Matsumoto, Tokyo, Japan, assignor to Canon Kabushiki  
Kaisha, Tokyo, Japan

Continuation of Ser. No. 690,643, Jan. 11, 1985. This application  
Dec. 12, 1988, Ser. No. 282,890  
Claims priority, application Japan, Jan. 20, 1984, 59-7057;  
Jan. 20, 1984, 59-7058  
Int. Cl.<sup>5</sup> G06F 7/62, 9/02, 13/14, 15/08  
U.S. Cl. 364-900 8 Claims



1. An electronic equipment comprising:  
information processing means;  
first memory means accessible by said information processing means;  
first output means operatively responsive to said first memory means for outputting a first signal representing a rated access time of said first memory means;  
second memory means accessible by said information processing means, said second memory means being detachable from said equipment;  
second output means operatively responsive to said second memory means for outputting a second signal representing a rated access time of said second memory means;  
wherein said second output means is detachable from said equipment; and  
control means connected to said information processing means for controlling an operation of said information processing means in response to the first signal when said information processing means accesses said first memory means, and for controlling an operation of said information processing means in response to the second signal when said information processing means accesses said second memory means,  
said control means including wait signal generating means for entering the first or second signal from said first or second output means, respectively, and for generating a wait signal for causing said information processing means to be in a wait condition, said wait signal having a waiting

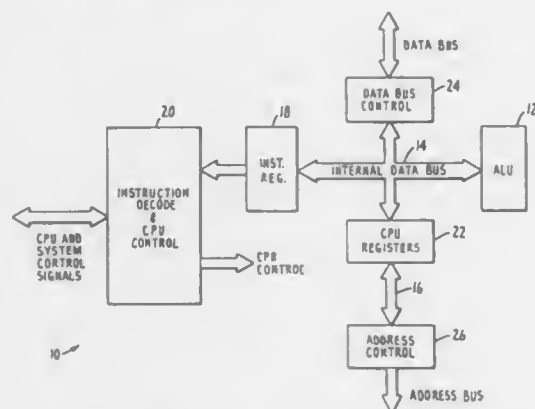
time period different in dependence upon the entered first or second signal,  
said wait signal generating means including means for counting a time in response to the entered first or second signal, said time counting means sending the wait signal to said information processing means in accordance with a time count operation.

#### 4,956,805 CIRCUITRY FOR CHARACTER TRANSLATE FUNCTIONS

L. Leslie Biffle, Cave Creek, and Chad R. Larson, Scottsdale, both of Ariz., assignors to Anasazi, Inc. and International Anasazi, Inc., both of Phoenix, Ariz.  
Filed Sep. 22, 1987, Ser. No. 99,754  
Int. Cl.<sup>5</sup> G06F 9/00

U.S. Cl. 364-900

20 Claims



1. Character translate circuitry external to a central processing unit (CPU) for enabling character translation functions, wherein the CPU performs functions on data characters in response to referenced program instructions retrieved by the CPU from a main memory storage element, and wherein the CPU includes an arithmetic logic unit for performing the functions on the data characters, at least one internal storage register for storing a data character, a data bus for transmitting and receiving data characters, and an address bus connected between the CPU and the main memory storage element for providing referenced program instruction addresses to the main memory storage element, and wherein each referenced program instruction address includes an instruction address portion comprising the data character stored in the at least one internal storage register, the character translate circuitry comprising:

- a character translation storage unit comprising a plurality of translation character storage locations and including address input means responsive to a translation storage location address for accessing a corresponding translation character storage location; and
  - access means connected between the address bus and the character translation storage unit for providing the instruction address portion to the address input means as the storage location address,
- wherein the address bus comprises a most significant bit set and a low order bit set and the address input means comprises a least significant bit set and a remaining bit set, the most significant bit set being connected to the least significant bit set, the low order bit set being connected to the remaining bit set, the most significant bit set corresponding to the instruction address portion, and
- wherein the translation character storage locations are divided into a plurality of tables, a table to be accessed being selected by the low order bit set, selection of the transla-

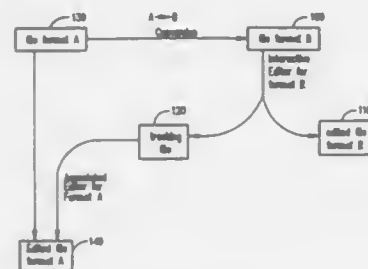
tion character storage location within the selected table being determined by the most significant bit set.

#### 4,956,806 METHOD AND APPARATUS FOR EDITING SOURCE FILES OF DIFFERING DATA FORMATS USING AN EDIT TRACKING FILE

Andrew S. Crowe, Mountain View, and Daniel T. Lai, Fremont, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.  
Filed Jul. 12, 1988, Ser. No. 217,996  
Int. Cl.<sup>5</sup> G06F 1/00

U.S. Cl. 364-900

12 Claims



1. A method for editing source files containing audio information of differing data formats on a display using a plurality of edit commands, comprising the steps of:

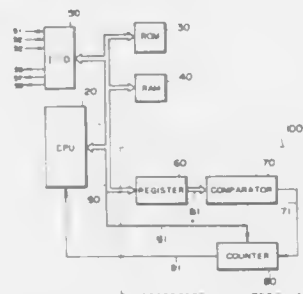
- performing one of said plurality of edit commands on a source file containing audio information of a first data format;
  - copying said performed edit command in a buffer;
  - writing said edit command from said buffer to a tracking file; and
  - repeating steps (a)-(c) for each of said plurality of edit commands;
- and
- reading each of said written edit commands from said tracking file and replaying said read edit commands against at least one source file containing audio information having a second data format thereby effecting commensurate changes to the at least one source file having the second data format and creating an edit file corresponding to said source file having the first data format.

#### 4,956,807 WATCHDOG TIMER

Akio Hosaka, Kanagawa, and Akito Yamamoto, Yokohama, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan  
Filed Dec. 16, 1983, Ser. No. 562,011  
Claims priority, application Japan, Dec. 21, 1982, 57-222846  
Int. Cl.<sup>5</sup> G06F 1/24

U.S. Cl. 364-900

8 Claims



1. A watchdog timer for a computer, said computer alternately producing first and second periodic signals representative of first and second data which are different from one

another, each of said first and second data consisting of a plurality of bits, said watchdog timer comprising:

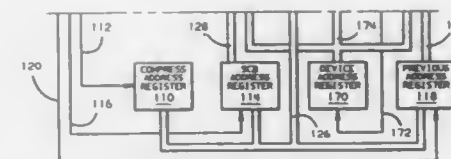
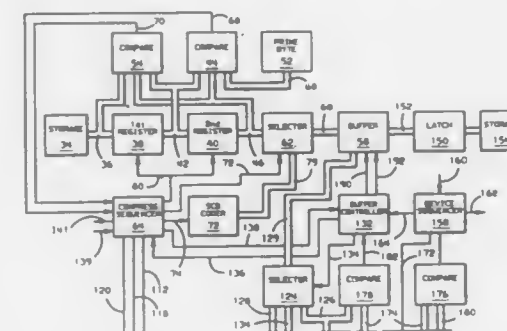
- a register receiving and storing said first and second data;
- means for comparing said first data stored in said register with a first reference data and for comparing said second data stored in said register with different second reference data and producing an output signal only when the pairs of compared data coincide;
- means for generating clock pulses; and
- means for counting the clock pulses from said clock generating means and for producing a reset signal to said computer when the count of said counting means reaches a predetermined value, said counting means being reset by the output signal of said comparing means, and the time interval required for said counting means to count to the predetermined value being longer than the interval of occurrence of said output signal of said comparing means while said computer operates in a normal state.

#### 4,956,808 REAL TIME DATA TRANSFORMATION AND TRANSMISSION OVERLAPPING DEVICE

David E. Aakre, Kansas; Roy L. Hoffman, Pine Island; David N. Moen, and Quentin G. Schmierer, both of Rochester, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.  
Continuation of Ser. No. 689,545, Jan. 7, 1985, abandoned. This application May 20, 1987, Ser. No. 54,111  
Int. Cl.<sup>5</sup> G06F 5/06

U.S. Cl. 364-900

20 Claims



1. Real time data transformation and transmission apparatus for overlapping transformation of blocks of data provided from a first data medium which has a selected data transfer rate and transmission of the transformed blocks of data to a second data medium which has a selected data receiving rate, said apparatus comprising:

- transformation means coupled to the first data medium for transforming blocks of data received from the first data medium into variable size blocks of transformed data and providing said transformed data of an irregular rate;
- buffer means coupled to the transformation means and to the second data medium for storing the transformed data and transmitting the transformed data to the second data medium; and
- control means coupled to the transformation means and to the buffer means for controlling the transformation means to provide transformed data to the buffer means as a

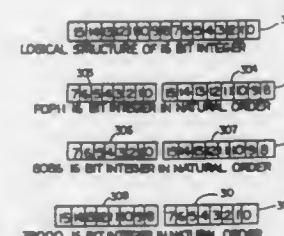
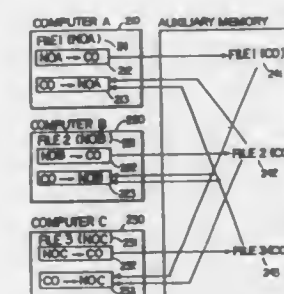
function of the amount of data in the buffer means and controlling the buffer means to transmit the transformed data to the second data medium as a function of the data receiving rate of the second data medium provided that the buffer means contains a predetermined amount of data sufficient to ensure that each block of transformed data is transmitted to the second data medium continuously at the data receiving rate of the second data medium.

#### 4,956,809 METHOD FOR CANONICAL ORDERING OF BINARY DATA FOR PORTABLE OPERATING SYSTEMS

Johann George, Holland Landing, Canada; Trevor J. Thompson, New Providence, N.J.; David G. Courroy, Maynard, Mass., and Frederick H. Tudor, Evanston, Ill., assignors to Mark Williams Company, Chicago, Ill.  
Continuation of Ser. No. 934,341, Nov. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 391,223, Jan. 23, 1982, abandoned. This application Dec. 29, 1988, Ser. No. 291,348  
Int. Cl.<sup>5</sup> G06F 9/00

U.S. Cl. 364-900

5 Claims



1. A method for use with a portable operating system used on different computers which use different binary structures, whereby files containing binary data become portable, comprising the steps of:

- by means of a computer, representing in a standardized order consisting of a standard binary structure files stored on auxiliary memory or transported on a communications means, said standardized order being different from a natural order used on at least one of the different computers;
- converting in each of the different computers binary data read from auxiliary data storage or communications means from the standardized order to the natural order of the respective host computer after said binary data are read from said auxiliary data storage or communications means and before said binary data are used by the respective host computer; and
- converting in each of the different computers binary data written into auxiliary data storage or communications means from the natural order of the respective host computer to the standardized order prior to said writing.





transistor of said pair being connected to a first terminal of said first transistor; and  
a current compensation device, connected to each inverter, operable to supply current in response to ionizing radiation in a direction opposite to that required to change the state of the device.

4,956,816

**NON-VOLATILE SEMICONDUCTOR MEMORY  
HAVING IMPROVED TESTING CIRCUITRY**

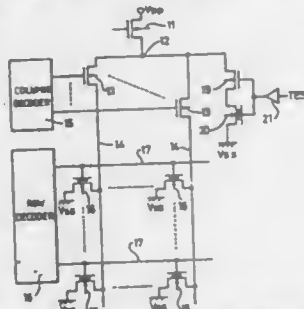
Shigeru Aizumi; Sumio Tanaka, both of Tokyo; Shinji Saito, and Nobuaki Otsuka, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Continuation of Ser. No. 29,763, Mar. 24, 1987, abandoned. This application May 30, 1989, Ser. No. 358,482

Claims priority, application Japan, Mar. 31, 1986, 61-71143  
Int. Cl.<sup>5</sup> G11C 29/00

U.S. Cl. 365—201

3 Claims



1. A non-volatile semiconductor memory having a first node and a second node, the second node having a ground potential, comprising:

a plurality of non-volatile memory cells each having a drain, a floating gate, a control gate, and a threshold potential, wherein data is written into a selected cell when the drain potential of the selected cell is at a predetermined normal writing voltage and a select signal is applied to the control gate of the selected cell;

a plurality of bit lines, each memory cell being connected between one of the bit lines and said second node, each of said bit lines transferring data to and from associated memory cells;

write voltage means for generating a first signal having the predetermined normal writing voltage and for supplying the first signal to the drain of at least one non-volatile memory cell when data is written into said at least one non-volatile memory cell;

test voltage means for generating a second signal having a voltage equivalent to the predetermined normal writing voltage and for supplying the second signal to the drain of each non-volatile memory cell to simultaneously test all of the memory cells, said test voltage means including:

circuit means, connected to the bit lines, for simultaneously testing all of the memory cells by supplying to the drain of each memory cell said second signal to detect changes in the threshold potential of each memory cell,

said circuit means including a select transistor and a dummy cell, the select transistor of the circuit means and the dummy cell being connected in series between the first node and the second node.

4,956,817

**HIGH DENSITY DATA STORAGE AND RETRIEVAL  
SYSTEM**

Paul E. West, Glendale, and Jamshid Jahanmir, Pomona, both of Calif., assignors to QuanScan, Inc., Pasadena, Calif.

Filed May 26, 1988, Ser. No. 199,008

Int. Cl.<sup>5</sup> G11C 13/00

U.S. Cl. 365—189.01

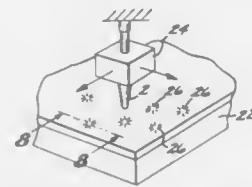
33 Claims

1. A random access memory which comprises:  
a memory medium, said memory medium including a por-

tion of said medium which is formed to be essentially planar;

an underlying structure, said structure providing means to mount said memory medium and other elements of said random access memory in a fixed relationship to one another;

a probe, said probe capable of movement in a plane parallel to said planar portion of said memory medium, said probe spaced apart from said medium a distance such that the variations in surface smoothness of said planar portion are small compared to the distance between said probe and said planar portion;



means to move said probe parallel to said planar portion of said memory medium to a predetermined location over said memory medium on the basis of an input related to said predetermined location;

means to locate the actual position of said probe relative to a fixed location on said planar portion of said memory medium; and

means to determine the binary logic state of a location on said memory medium on the basis of emissions caused when a voltage differential from a power source is applied between said probe and said medium and the gap between said probe and said medium is maintained between 20 and 1000 angstroms to effect either Schottky and/or Field emissions between said probe and said memory medium.

4,956,818

**MEMORY INCORPORATING LOGIC LSI AND METHOD  
FOR TESTING THE SAME LSI**

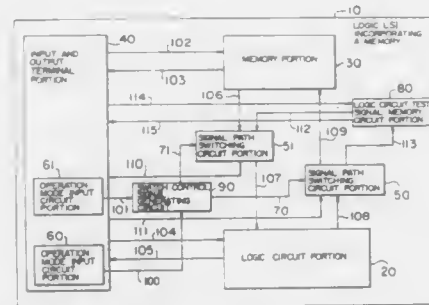
Kazumi Hatayama, and Terumine Hayashi, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 30, 1988, Ser. No. 251,913

Claims priority, application Japan, Oct. 2, 1987, 62-249162  
Int. Cl.<sup>5</sup> G11C 7/00

U.S. Cl. 365—189.08

12 Claims



1. A memory incorporating logic LSI comprising:  
an input and output terminal portion, which is capable of interfacing to an exterior of the LSI and which receives input and transmits output signals;  
a memory portion, to and from which information is written and read out from the LSI, respectively, through said input and output terminal portion;  
a logic circuit portion, which determines an output signal

according to a predetermined logic, responding to an input signal;

a first signal path, through which a first signal is transmitted from said logic circuit portion to said memory portion;

a second signal path, through which a second signal is transmitted from said memory portion to said logic circuit portion;

operation mode input circuit portions, which input a plurality of operation mode signals, that determine the operational state of said memory incorporating logic LSI, via said input and output terminal portion;

a memory test input signal path, connected to said input and output terminal portion and through which an input signal for memory test, which is inputted from said input and output terminal portion, is transmitted to said memory portion;

a memory test output signal path, through which an output signal for memory test which is an output of said memory portion, is transmitted to said input and output terminal portion; and

a signal path switching circuit portion disposed in said first signal path, which transmits said input signal for memory test from said memory test input signal path to said memory portion by switching off said first signal path from said logic circuit portion to said memory portion on the basis of said operation mode signals.

4,956,819

**CIRCUIT CONFIGURATION AND A METHOD OF  
TESTING STORAGE CELLS**

Kurt Hoffmann, Taufkirchen; Hans-Dieter Oberle, Puchheim; Rainer Kraus, Munich, and Oskar Kowarik, Grafting, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

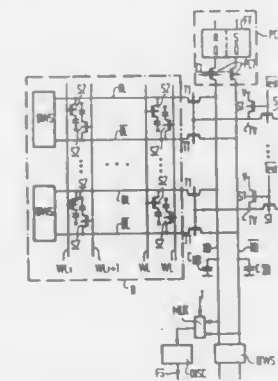
Filed Mar. 16, 1988, Ser. No. 168,653

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1987, 3708534

Int. Cl.<sup>5</sup> G11C 29/00

U.S. Cl. 365—201

9 Claims



1. A circuit configuration for testing storage cells of an integrated semiconductor memory which includes a block in which the storage cells are disposed in the form of a matrix, word lines and internal bit lines for driving the storage cells, evaluator circuits each being assigned to a respective internal bit line, each internal bit line having first and second mutually complementary bit line halves, a pair of first and second external bit lines, transfer transistors connecting the first external bit line to each of the first internal bit line halves and connecting the second external bit line to each of the second internal bit line halves, and a bit line decoder assigned to the respective internal bit lines and connected to gates of the transfer transistors; the circuit configuration comprising a precharge device connected to said pair of external bit lines for precharging the pair of external bit lines to two mutually-complemen-

tary logic levels in a test mode, a discriminator circuit having means for sensing potentials, being connected to the pair of external bit lines and having an output for generating a fault signal indicating the occurrence of faults in test operation, the gates of all of the transfer transistors carrying a control potential, said fault signal being generated when the external bit line precharged to the higher level falls in level to at least a value which corresponds to the magnitude of a control potential on the gates of the transfer transistors minus a threshold voltage of the transfer transistors when data is read out from the memory cells during a test mode.

4,956,820

**ARBITER CIRCUIT FOR ESTABLISHING PRIORITY  
CONTROL OF READ, WRITE AND REFRESH  
OPERATIONS WITH RESPECT TO MEMORY ARRAY**

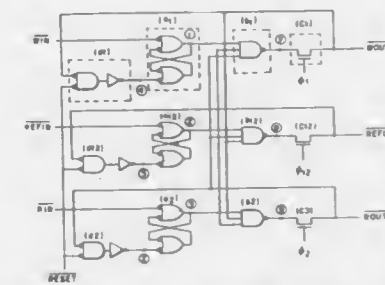
Masashi Hashimoto, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 26, 1988, Ser. No. 161,059

Claims priority, application Japan, Mar. 11, 1987, 62-56117  
Int. Cl.<sup>5</sup> G11C 7/00

U.S. Cl. 365—222

7 Claims



1. An arbiter circuit for providing priority control of dynamic memory operations in determining the order in which dynamic memory access signals such as write, read and refresh signals are executed, said arbiter circuit comprising:

first circuit holding means comprising a plurality of holding circuits for temporarily holding dynamic memory access signals and corresponding to write, read and refresh request signals respectively, each of said holding circuits having an input for receiving the one of said write, read and refresh request signals corresponding thereto;

second circuit inhibiting means comprising a plurality of inhibit logic gates for inhibiting transfer of a dynamic memory access signal when another dynamic memory access signal is already being executed and corresponding to write read and refresh request signals respectively, each of said inhibit logic gates having a plurality of inputs, one of said inputs for each said inhibit logic gate being connected to the output of a corresponding one of said plurality of holding circuits;

third circuit synchronizing means comprising a plurality of synchronizer switches for synchronizing individual dynamic memory access signals and corresponding to write, read and refresh request signals respectively, each of said switches being connected to the output of a corresponding one of said inhibit logic gates and being respectively responsive to a synchronizing signal for transmitting an output signal from said inhibit logic gate corresponding thereto as a memory access signal for one of the write, read and refresh functions;

fourth circuit reset means comprising a plurality of reset logic gates for resetting the arbiter circuit upon the end of each dynamic memory access signal and corresponding to write, read and refresh request signals respectively, each of said reset logic gates having a plurality of inputs, and one of said inputs of each of said reset logic gates begin adapted to receive a reset signal for application of said



- reset signal to each of said reset logic gates simultaneously; and
- a plurality of feedback lines respectively connected at one end thereof at the output of a synchronizer switch and at its other end to another input of said reset logic gate for each circuit arrangement corresponding to said write, read and refresh request signals respectively, said plurality of feedback lines including
- a first feedback line associated with said write request signal and being connected to inputs of said inhibit logic gates associated with said refresh and said read request signals,
- a second feedback line associated with said refresh request signal and being connected to inputs of said inhibit logic gates associated with said write and said read request signals, and
- a third feedback line associated with said read request signal and being connected to inputs of said inhibit logic gates associated with said write and said refresh request signals.

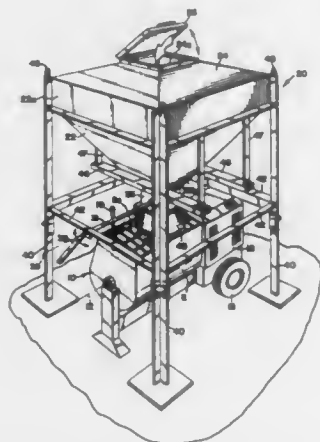
4,956,821

## SILO AND DELIVERY SYSTEM FOR PREMIXED DRY MORTAR BLENDS TO BATCH MIXERS

Terrance P. Fenelon, 173 Montrose Pl., St. Paul, Minn. 55104  
Filed Oct. 12, 1989, Ser. No. 420,335  
Int. Cl.<sup>3</sup> B28C 7/04

U.S. Cl. 366—8

17 Claims



1. A portable silo for storing and delivering premixed dry mortar-blend materials to an inlet port of a portable batch mixer apparatus of the type used at a construction site, comprising:

- (a) a silo chassis defining an inner cavity for retainably storing a charge of premixed dry mortar-blend material, comprising:
- (i) a sidewall portion extending between upper and lower ends and peripherally defining said inner cavity;
- (ii) upper wall means cooperatively engaging said sidewall portion upper end for closing the inner cavity at its upper end, said upper wall means defining an inlet port opening into said inner cavity; and
- (iii) lower wall means for closing the inner cavity at its lower end, said lower wall means defining an outlet port opening into said inner cavity;
- (b) inlet means cooperatively connected with said upper wall means for selectively providing sealed closure and open access to said inner cavity through said inlet port;
- (c) discharge means cooperatively connected with said lower wall means for selectively providing sealed closure and open access to said inner cavity through said outlet port; said discharge means being operable between closed and open positions; said discharge means when in said closed position being operable to sealingly close said outlet port of the inner cavity to prevent mortar-blend material within said inner cavity from passing through

- said outlet port and being operable between said closed and said open positions to enable measured amounts of mortar-blend material within said inner cavity to pass by gravity through said outlet port; and
- (d) leg means operatively connected with said chassis for elevating said chassis above a support surface such that said discharge means operatively overlies an inlet port of a portable batch mixer supported by said support surface, said leg means being arranged and configured to allow the portable batch mixer to operatively stand therebetween; whereby material leaving said inner cavity through said discharge means falls by gravity into the inlet port of the batch mixer.

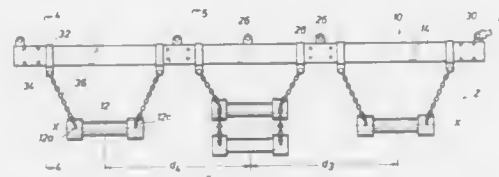
4,956,822

## METHOD AND APPARATUS FOR SEISMIC EXPLORATION

Harold P. Barber, 3143 Cypress Point, Missouri City, Tex. 77459; Clyde Lee, 6321 Del Monte, Houston, Tex. 77057, and Paul J. Rockman, 509 W. Hillary, Sugar Land, Tex. 77478  
Filed Dec. 9, 1988, Ser. No. 281,669  
Int. Cl.<sup>3</sup> G01V 1/38

U.S. Cl. 367—23

13 Claims



10. An apparatus for producing a seismic signal in a marine environment when towed behind a vessel and located below the surface of a body of water, including:

- a support frame;
- means for securing said support frame to a towing line from the vessel;
- means for locating said support frame at a desired depth in the range of 1 to 3 meters below the water surface;
- a plurality of air guns;
- means for operably mounting each of said air guns with said support frame for forming an array;
- said plurality of air guns forming said array arranged on said support frame in two parallel vertical planes with each vertical plane axis having four air guns disposed therein; each of said vertical planes having positioned therein a first air gun and a second air gun with said first and second air guns spaced apart a distance of substantially 10 feet in a horizontal plane containing said first and second air guns; each of said vertical planes having a third air gun and a fourth air gun positioned therein and disposed substantially midway between said first air gun and said second air gun, said third and fourth air gun being spaced apart a vertical distance of substantially 20 inches and located substantially equidistant from said horizontal plane containing said first and second air guns.

4,956,823

## SIGNAL TRANSMITTERS

Michael K. Russell, Lynworth House, 54 High Street, Prestbury, Cheltenham, England, and Anthony W. Russell, Drachlaw, Turriff, Aberdeenshire, Scotland  
Filed Dec. 19, 1988, Ser. No. 286,299

Claims priority, application United Kingdom, Jan. 19, 1988, 8801072

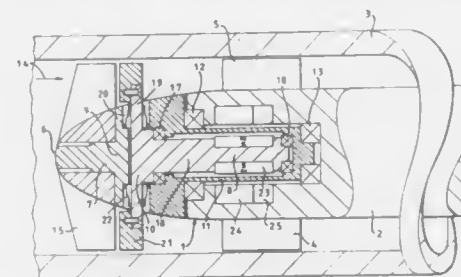
Int. Cl.<sup>3</sup> G01V 1/00

U.S. Cl. 367—84

9 Claims

1. A signal transmitter for transmitting pressure signals within a flowing liquid, the transmitter comprising an impeller

assembly rotatable by the liquid flow about an axis of rotation and an electrical generator having a stator and a rotor arranged to be driven by said impeller assembly, wherein said impeller assembly comprises a main impeller portion and a secondary impeller portion angularly displaceable relative to one another about said axis of rotation of said impeller assembly in response to a change in the load of said generator so as to vary the pressure drop across said rotating impeller assembly, whereby appropriate variation of the load of said generator serves to



control said impeller assembly in such a manner as to transmit pressure signals within the flowing liquid, said main impeller portion including main blades rotatable about said axis by the liquid flow, and said secondary impeller portion including secondary blades located axially downstream of said main blades and rotatable with said main blades about said axis, the pressure drop across said rotating impeller assembly being dependent on the angular orientation of said secondary blades relative to said main blades about said axis.

4,956,824

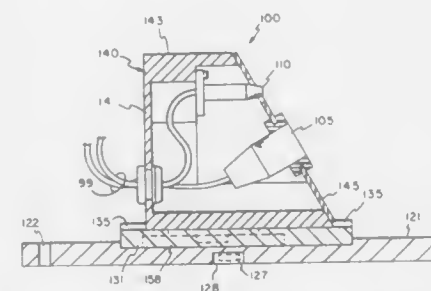
## POSITION DETERMINATION APPARATUS

Seymour J. Sindeland, Pound Ridge, N.Y., and Robert Butler, Milford, Conn., assignors to Science Accessories Corp., Stratford, Conn.

Filed Sep. 12, 1989, Ser. No. 405,944  
Int. Cl.<sup>3</sup> G01S 3/80

U.S. Cl. 367—129

23 Claims



1. Apparatus for determining the position of a moveable element in a three-dimensional workspace near a mounting surface, comprising:

- a sound source in said moveable element;
- a plurality of at least three housing units adapted to be secured to said mounting surface in spaced relationship to one another;
- a sound sensor mounted on each of said units;
- a sound source mounted on at least some of said units;
- means for adjusting the positions of the sound sensor and the sound source of said at least some of said units;
- means responsive to the sound from the sound source of at least one of said units and received at the sound sensor of another of said units, for computing the distance between the sound source of said one of said units and the sound sensor of said another of said units; and
- means responsive to the initiation of sound from the sound

source of the moveable element and to sound received at the sound sensors of said units, for determining the three-dimensional position of the moveable element.

4,956,825

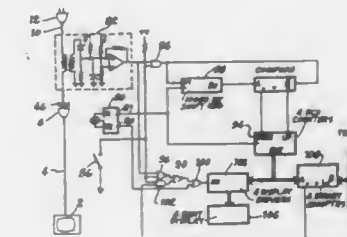
## DEVICE FOR MONITORING THE RATE OF USE OF AN ELECTRICAL APPLIANCE

Charles H. Wilts, 11982 Pomerado Rd.; Michael T. Burke, 14132 Rio Court Rd., both of Poway, Calif. 92062, and David W. Thygeson, 4727 Otomi Ave., San Diego, Calif. 92117  
Filed Feb. 5, 1990, Ser. No. 475,164

Int. Cl.<sup>3</sup> G04F 8/00

U.S. Cl. 368—9

9 Claims



1. A use monitor for an electrical appliance for providing a continuous report of appliance use time during a specific moving time interval immediately prior to the report, said monitor comprising:

- (a) a sensor for detecting when said appliance is in use;
- (b) a register operatively connected to said sensor which records a continuous pulse train indicative of sequential periods of use or non-use of said appliance over said time interval;
- (c) counter means for counting the periods of use represented by said pulse train; and
- (d) utilization means connected to said counter means for utilizing the results therefrom.

4,956,826

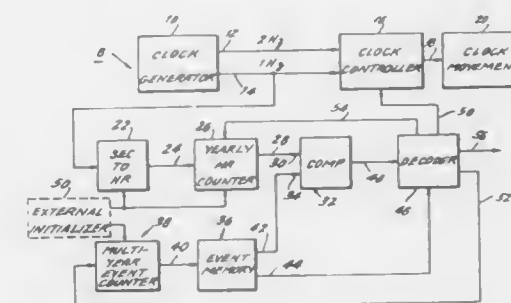
## MULTI-YEAR TIME CLOCK HAVING AUTOMATIC DAYLIGHT SAVING TIME COMPENSATOR

Dennis Coyman, Sterling Forest, N.Y., and Richard Gawronski, Naugatuck, Conn., assignors to Master Free Time, Inc., Sterling Forest, N.Y.

Filed Mar. 17, 1989, Ser. No. 325,678  
Int. Cl.<sup>3</sup> G04B 19/24, 9/00

U.S. Cl. 368—28

20 Claims



1. A clock circuit for driving a clock movement, the clock circuit comprising:

- a frequency generator for providing a timing reference;
- time keeping means coupled to the timing reference for developing time information;
- a memory containing event-hour information and event-

identifying information, said event-hour information being effective to indicate the time when predetermined events are to occur including daylight saving time schedules for a plurality of years;

comparing means for comparing said time information developed by said time keeping means against said event-hour information obtained from said memory and activating a comparator output when said time information and event-hour information are matched;

a controller, responsive to said comparator output and to said event-identifying information of said memory, for producing clock driving signals for driving a clock movement and for automatically adjusting the clock movement for daylight saving time over a plurality of years;

wherein said frequency generator includes an AC frequency source for developing a primary, AC derived, frequency signal and a secondary, crystal-oscillator-derived, frequency signal and including clock operating means for normally operating said time keeping means from said primary frequency signal and from said secondary frequency signal during AC power outages;

said clock operating means comprising AC power detecting means for detecting said AC power outages and means for producing an AC power status output; and

further comprising a latch coupled between said memory and said controller, delaying means for providing a delayed version of said AC power status output to said memory and to said latch in a manner such that, during power outages, information supplied from said memory is latched in said latch for use during said power outages.

#### 4,956,827 TIMEPIECE

Paolo Spadini, 6, Rue du Gothard, 1225 Chêne-Bourg, Switzerland

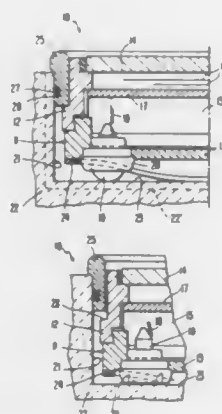
Filed Oct. 17, 1988, Ser. No. 258,608

Claims priority, application Switzerland, Oct. 21, 1987, 4114/87

Int. Cl.<sup>5</sup> G04C 17/00; G04B 1/00

U.S. Cl. 368—69

24 Claims



1. A watch comprising:

a housing;

a quartz-controlled watchwork arranged in said housing;

display means arranged in said housing;

a viewing window provided for said housing and covering said display means;

said housing having a base;

at least one contact arranged internally of said housing and serving for accomplishing control functions of the watch;

said contact being actuatable from the base of the housing;

resilient means acting upon said housing;

receptacle means; and

said housing being displaceably mounted against the action

of said resilient means in said receptacle means so that

upon application of pressure to at least one of the housing or the viewing window said contact is actuated.

#### 4,956,828

##### WALL CLOCK

Hiroshi Yamada, 1-1, Taihei 4-chome, Sumida-ku, Tokyo, Japan

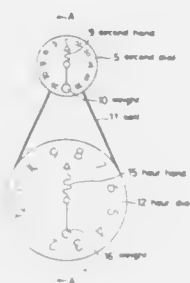
Filed Jun. 1, 1989, Ser. No. 359,574

Claims priority, application Japan, Jun. 1, 1988, 63-72993[U]

Int. Cl.<sup>5</sup> G04B 19/00, 19/20

U.S. Cl. 368—76

20 Claims



1. A wall clock comprising:

a second dial rotatable in interlocked relation to the rotational driving of a timepiece movement,

a wheel mounted coaxially with said second dial and rotatable in interlocked relation to the rotational driving of said timepiece movement,

an hour dial suspended below said wheel by a belt stretched therearound and rotated in a decelerated manner by means of said belt, and

hands mounted rotatably in respective central portions of said second and hour dials and always pointing upwardly by virtue of weights provided in their respective lower end portions.

#### 4,956,829

##### TIMEPIECE WITH MODIFIED CLOCK RATE FOR FACILITATING ADAPTATION TO NEW TIME STANDARD

Ross E. Mitchell, 4 Allston St., Newtonville, Mass. 02160

Continuation of Ser. No. 325,293, Mar. 17, 1989, Pat. No.

4,901,296. This application Dec. 22, 1989, Ser. No. 455,564

The portion of the term of this patent subsequent to Feb. 20, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> G04C 9/00

U.S. Cl. 368—185

15 Claims

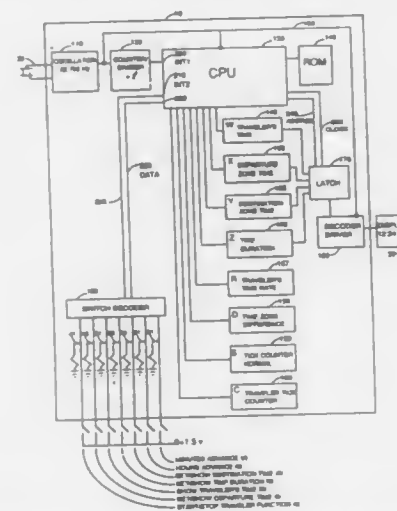
1. In a timepiece for continuously advancing an indication of time at a standard rate, an improvement for assisting a user to accommodate to a change, over a given adaptation period, from one time standard originally applicable to said user, to another different time standard, subsequently applicable to said user, comprising:

input means for supplying to said timepiece, control data representing at least two of the following: said one time standard originally applicable to said user, said other time standard, subsequently applicable to said user, and said adaptation period;

storage means for storing data representing the time under said original time standard, the time under said other time standard, and said adaptation period;

calculation means, responsive to said data in said storage means, for automatically calculating and supplying, during said adaptation period, output data representing a non-standard rate of advance of time for said timepiece based upon said control data, such that said non-standard rate of advance will correspond to the rate at which time would progress if the time standard experienced by said user gradually changed during said adaptation period

from said original time standard to said other time standard;  
display means, responsive to said output data of said calculation means, for indicating time to said user at said non-standard rate during said adaptation period,



such that the time indicated by said timepiece varies gradually during said adaptation period, between the time under said original time standard and the time under said other time standard, and such that said user, by observing said timepiece during said adaptation period, will tend to become gradually psychologically adapted to the time under said other time standard.

#### 4,956,830

##### WATCH HAVING A CASE FORMED AT LEAST PARTIALLY FROM A HARD MATERIAL

Elmar Mock, and Georges A. Gabus, both of Bienne, Switzerland, assignors to ETA SA Fabriques d'Ebauches, Grenchen, Switzerland

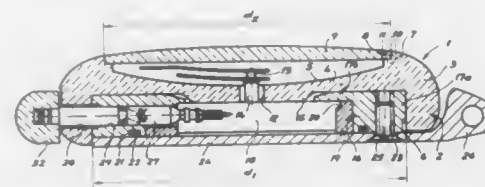
Continuation of Ser. No. 916,432, Oct. 7, 1986, abandoned. This application Oct. 26, 1987, Ser. No. 113,423

Claims priority, application Switzerland, Oct. 7, 1985, 04300/85

Int. Cl.<sup>5</sup> G04B 37/00, 29/00

U.S. Cl. 368—280

5 Claims



1. A watch, comprising: a case at least partially formed from a hard material incapable of establishing a reliable fluid tight seal, said case including a continuous and uninterrupted, closed outer caseband (3) formed of said hard material, and an inner caseband (16) housing a watch movement (18) and formed of a rigid but easily machinable metallic material capable of establishing a reliable fluid tight seal, said inner caseband including a first cylindrical bore (29) extending radially therethrough for accommodating a setting stem (27) disposed therein and extending therethrough, said stem being engaged therein in a fluid tight manner by a packing (31) lodged in a peripheral annular groove (30) on the stem so as to be sealingly applied against an inner circumferential wall of said first cylindrical bore, said outer caseband including a second cylindrical bore

(28) extending radially therethrough and axially aligned with the first cylindrical bore in the inner caseband, and the stem passing through said second cylindrical bore and having an outer end portion extending to an exterior of the watch, the diameter of the second bore being larger than the diameter of the first bore to enable the insertion of the stem through said bores and into the movement, and the thickness of the inner caseband being greater than the thickness of the movement to establish a sufficient strength of the inner caseband surrounding the first bore to prevent any cross-sectional flattening thereof and an attendant disruption of the stem seal therewith, wherein the outer caseband is fashioned integrally with a central hub portion (4) defining a dial (5), and wherein a cavity (6) bounded by the outer caseband and the central hub portion and intended to house the watch movement includes a recessed annular sump surrounding a thickened stiffening portion (15) provided in a central part of the hub portion, the inner caseband being seated against said sump, and the radial length of said annular sump corresponding approximately to the radial length of the inner caseband.

#### 4,956,831

##### LOW ACOUSTIC NOISE HEAD ACTUATOR

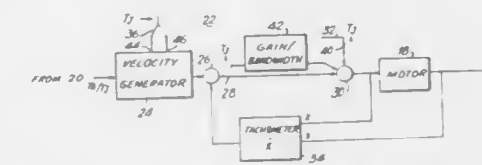
Raymond E. Sarraf, Westminster, and Daniel R. Zaharris, Longmont, both of Colo., assignors to MiniScribe Corporation, Longmont, Colo.

Filed Sep. 14, 1988, Ser. No. 244,059

Int. Cl.<sup>5</sup> G11B 21/10

U.S. Cl. 369—32

14 Claims



1. A disk drive system for recording and/or reproducing data on a disk in a plurality of substantially circular, concentric tracks, said system comprising:

head means for recording and/or reproducing said data in said tracks;

actuator means for positioning said head means at a desired one of said tracks;

a mechanical mounting structure for mounting at least said actuator means;

controller means for generating a selected one of a track access signal and a track jump signal;

closed loop servo control means having predetermined operating parameters for controlling said actuator means to respond to said track access signal to perform a track access operation in which said head means is moved across a relatively large number of said tracks to reach said desired track and to respond to said track jump signal to perform a track jump operation in which said head means is moved across a relatively small number of said tracks to reach said desired track; and

means for modifying the operating parameters of said servo control means in response to said track jump signal.



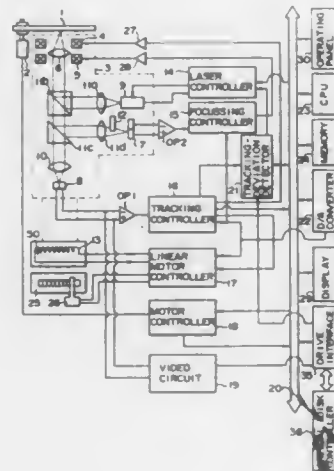
4,956,832  
TRACKING-DEVIATION DETECTOR APPARATUS  
CAPABLE OF PREVENTING OVERWRITING OF DATA  
ON AN ADJACENT TRACK

Toshiyuki Miyasaka, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 20, 1988, Ser. No. 246,719  
Claims priority, application Japan, Sep. 21, 1987, 62-236775  
Int. Cl. G11B 7/00

U.S. Cl. 369—44.11

5 Claims



1. An optical apparatus for use in an optical disk controller having means for recording data via a light beam onto an object and means for reproducing data from the object, the apparatus comprising:

- directing means for directing the light beam onto a desired position on the object;
- tracking position detecting means for detecting the light beam reflected from the object during recording and for supplying a track-error signal, representing a deviation from the desired position of the light beam on the object, to the directing means;
- gain switching means for amplifying the track-error signal with different gains between data recording and data reproduction;
- inhibit signal generating means connected to the output of the gain switching means for comparing a level of the amplified track-error signal with a predetermined level and for outputting a write inhibition signal when the level of the amplified track-error signal exceeds the predetermined level; and
- record data control means for receiving the record data, and connected to the inhibit signal generating means for inhibiting the record data from being written in response to the write inhibition signal.

4,956,833  
OBJECTIVE DRIVING DEVICE FOR AN OPTICAL DISK  
APPARATUS

Hiroshi Kokado; Suguru Takishima; Koichiro Nishikawa; Junichi Takeda; Masahiko Sasaki; Isao Okuda; Hiroshi Yamamoto; Masami Ninomiya; Akihiro Tanaka; Hiroshi Motokashi; Makoto Iwaki, and Wataru Kubo, all of Tokyo, Japan, assignors to Asahi Kogyo Kogyo Kabushiki Kaisha, Tokyo, Japan

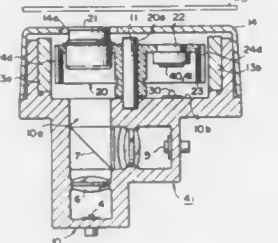
Continuation of Ser. No. 32,001, Mar. 30, 1987, abandoned. This application Dec. 26, 1989, Ser. No. 456,068

Claims priority, application Japan, Mar. 31, 1986, 61-73613; Mar. 31, 1986, 61-73614; Apr. 18, 1986, 61-89518; Apr. 21, 1986, 61-91871; Apr. 26, 1986, 61-95901; Apr. 26, 1986, 61-95902; Apr. 28, 1986, 61-100472; Apr. 30, 1986, 61-99732; May 7, 1986, 61-104452; May 14, 1986, 61-110113; May 16, 1986, 61-112079; Jun. 18, 1986, 61-141569; Jun. 26, 1986, 61-150220; Oct. 15, 1986, 61-157801[U]

Int. Cl. G11B 7/09

U.S. Cl. 369—46

22 Claims



1. An optical pickup for a planar optical disk having a plurality of tracks, said optical pickup comprising:
  - (a) an optical pickup body provided with a laser for producing laser light;
  - (b) a movable portion mounted on said optical pickup body for movement relative thereto in a tracking direction essentially perpendicular to a track and for rotation about an axis perpendicular to the plane of the disk;
  - (c) an optical system, including an objective mounted on said movable portion, for focusing laser light into a spot of said disk;
  - (d) a photodetector cooperable with said optical system for receiving laser light reflected from said disk and producing tracking error signals;
  - (e) a position sensor for producing position signals that establish the position of said movable portion relative to said body;
  - (f) a servo tracking circuit responsive to said position signals and said tracking error signals for producing a driving signal;
  - (g) an actuator means for moving said movable portion on said optical pickup to thereby displace said objective in a tracking direction in response to said driving signal;
  - (h) said position sensor including a light source, and light receiving means for receiving light from said source, said position sensor being constructed and arranged so that said light receiving means produces said position signals; and
  - (i) said light receiving means including at least two photosensitive receivers displaced from each other in the tracking direction, said light source being different from said laser, said movable portion including a planar plate having a surface parallel to the plane of said disk, said receivers being mounted on said plate, and said light source being mounted on said optical pickup body.

4,956,834  
COHERENCE MULTIPLEXED OPTICAL SIGNAL  
TRANSMISSION SYSTEM AND METHOD

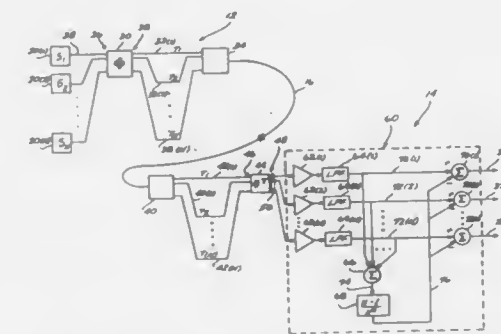
Jeffrey O. Coleman, Medina, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 12, 1989, Ser. No. 296,445

Int. Cl. H04B 9/00

U.S. Cl. 370—1

12 Claims



7. A coherence multiplexed optical signal transmission method for transmitting a plurality of N input signals over a common optical bus, the method comprising:
  - combining the input signals to produce N intermediate transmitter signals such that the coupling between input signals and intermediate transmitter signals is represented by a unitary coupling matrix;
  - time delaying the intermediate transmitter signals using a set of first time delays, such that there is a delay difference between each pair of first time delays, and such that the difference between each pair of delay differences is greater than the coherence length of each input signal;
  - combining the transmitter intermediate signals to produce a composite signal;
  - coupling the composite signal into the common optical bus; receiving the composite input signal from the common optical bus and dividing the composite input signal to produce N intermediate receiver signals;
  - time delaying the intermediate receiver signals using a second set of second time delays substantially equal to said first time delays; and
  - combining the intermediate receiver signals to produce N output signals, such that the coupling between the intermediate receiver signals and the output signals is represented by a unitary coupling matrix.

4,956,835  
METHOD AND APPARATUS FOR SELF-RESTORING  
AND SELF-PROVISIONING COMMUNICATION  
NETWORKS

Wayne D. Grover, Edmonton, Canada, assignor to Alberta Telecommunications Research Centre, Edmonton, Canada

Filed Oct. 19, 1988, Ser. No. 255,748

Claims priority, application Canada, Nov. 6, 1987, 551311

Int. Cl. H04J 1/16, 3/14

U.S. Cl. 370—16

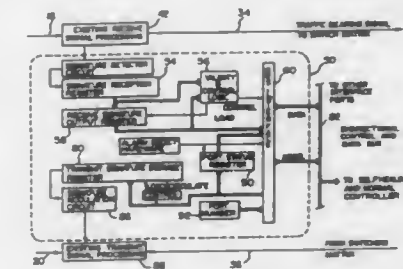
76 Claims

1. A method of restoring communications between a pair of nodes in a network having an arbitrary number of nodes and an arbitrary number of spans interconnecting said nodes, each said span having working circuits between nodes designated for transmitting actual communications traffic and spare circuits between nodes capable of, but not designated for, transmitting actual communications traffic, said method comprising the steps of:

- (a) establishing one or more independent communication paths between said pair of nodes through a series of spare circuits of spans interconnecting said pair of nodes and

other interconnected nodes in said network, including the steps of:

- i. repeatedly transmitting restoration signals along logical spans of spare circuits departing said one node;
- ii. repeatedly retransmitting said restoration signals from said other interconnected nodes along logical spans of spare circuits departing said interconnected nodes; and



- iii. upon receipt of a restoration signal by said other node, transmitting a complement restoration signal from said other node along a path consisting of the same spare circuits along which said restoration signal was communicated to said other node; and
- (b) redirecting communications traffic intended for one or more failed spans interconnecting said pair of nodes through one or more of said paths.

4,956,836  
AUTOMATIC BYPASS SYSTEM FOR RING TYPE LOCAL  
AREA NETWORK

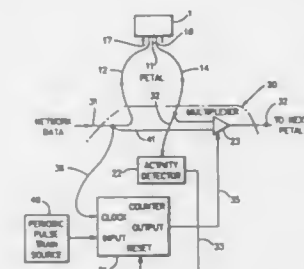
Darrell L. Bostwright, Cedar Rapids, Iowa, assignor to PAR Microsystems Corp., New Hartford, N.Y.

Filed Mar. 28, 1988, Ser. No. 173,824

Int. Cl. H04J 1/16

U.S. Cl. 370—16.1

8 Claims

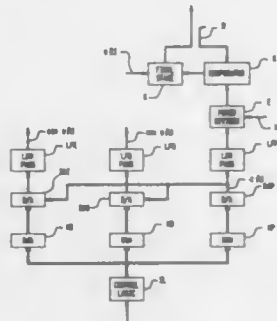


1. In a local area ring network wherein a plurality of signal transmitting and receiving nodes, each including a transmission link switch operable in either a transmitting or a blocking condition, each of said nodes being connected to the next in a continuous series by a signal-conducting path having first portions including an individual node and input and output lines connected thereto, and second portions through which each of said first portion output lines is connected to the next first portion input line, an automatically operable bypass system for isolating one of said first portions from the remainder of said signal-conducting path in response to a failure within said one first portion while maintaining the continuous series connection of all parts of said network other than said one first portion, said bypass system comprising:

- (a) an activity detector (22) having an input connected (via 32) to said one node output line (14), and adapted to generate an output when signals are present on said one node output line;
- (b) a signal-conducting bypass line (41) for conducting sig-

- nals from the node preceding to the node succeeding said one node without passing through said one first portion;
- (c) first means (23) operable in response to a control input to enable signals from either said bypass line or said one node output line to be transmitted to the input line (37) of said succeeding node; and
- (d) second means (21) connected to receive and detect inputs from both said activity detector output (via 33) and said one node input line (via 36), and operable to supply (via 35) said control input to said first means in response to absence of an input from said activity detector output when inputs from said one node input line are detected.

**4,956,837**  
**APPARATUS FOR AVOIDING SPECTRUM SPREADING WHEN SWITCHING A TRANSMITTER ON AND OFF**  
Per C. M. Vallmer, Haden, Sweden, assignor to Telefonaktiebolaget L. M. Ericsson, Stockholm, Sweden  
Filed Sep. 7, 1988, Ser. No. 241,305  
Claims priority, application Sweden, Sep. 8, 1987, 8703483  
Int. Cl.<sup>5</sup> H04B 7/005  
U.S. Cl. 370-20 5 Claims

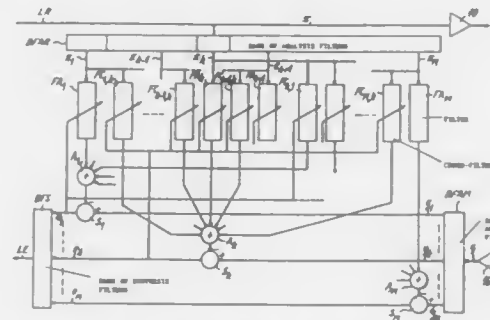


1. Apparatus for avoiding spectrum spreading caused by switching on and off a transmitter in a station included in a time multiplexed radio transmission system comprising:
- means for generating two mutually 90-degree phase shifted baseband signals for modulating a carrier wave;
- means for controlling the power of the baseband signals during a given time period in the beginning of each transmission time slot, which is assigned to the station, such that the power of each baseband signal at least practically follows an at least substantially increasing reference level; and
- means for controlling the power of the baseband signals during a given time period at the end of each such time slot such that the power of each baseband signal at least practically follows an at least substantially decreasing reference level.

**4,956,838**  
**ECHO CANCELLING DEVICE WITH FREQUENCY SUB-BAND FILTERING**  
André Gilloire, Lannion, France, and Martin Vetterli, New York, N.Y., assignors to ETAT Français représenté par le Ministre des postes, Télécommunications et de l'Espace (Centre National d'Etudes des Télécommunications), Issy les Moulineaux, France  
Filed Mar. 14, 1989, Ser. No. 322,947  
Claims priority, application France, Mar. 15, 1988, 88 03341  
Int. Cl.<sup>5</sup> H04B 3/23 9 Claims

1. An echo cancelling device for use between a line receiving an incoming echo-affected signal and a line transmitting an outgoing signal, for cancelling out echo, comprising a plurality of processing channels connected in parallel relation and assigned to successive mutually adjacent sub-bands of the spec-

- tral band of the outgoing signal, each of said channels comprising:
- a subtractor circuit having an additive input and a subtractive input for delivering an output signal at an output;
- an adaptive filter having an input and an output connected to the subtractive input of said subtractor circuit;
- a first analysis band-pass filter receiving the incoming echo-affected signal, the output of said first band-pass filter being connected to the additive input of said subtractor circuit;
- a second analysis band-pass filter, identical to the first band-pass filter, receiving the incoming echo-affected signal and feeding the input of said adaptive filter for delivering

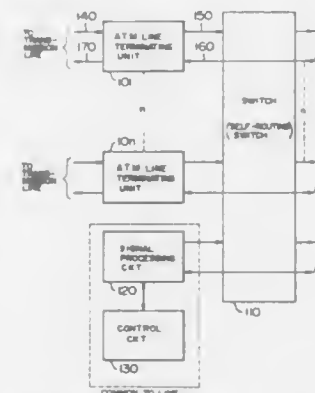


- an estimated echo value in the sub-band of the corresponding channel to the subtractive input of the subtractor; and
- a synthesis filter connected to the output of said subtractor circuit for rebuilding the full band of said incoming echo-affected signal and whose output feeds the line transmitting the output signal,
- means for extracting through filtering for a particular sub-band, the aliasing component originating from another sub-band and for eliminating the aliasing component by adding it to the signal originating from the filter analyzing the incoming echo-affected signal corresponding to said particular sub-band.

**4,956,839**  
**ATM SWITCHING SYSTEM**  
Yutaka Torii, Makoto Mori, Shinobu Gohara, all of Yokohama; Kenichi Ohtsuki, Kanagawa, and Yoshito Sakurai, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Jul. 20, 1989, Ser. No. 382,419  
Claims priority, application Japan, Jul. 22, 1988, 63-181885; Sep. 28, 1988, 63-241098  
Int. Cl.<sup>5</sup> H04Q 11/04 18 Claims

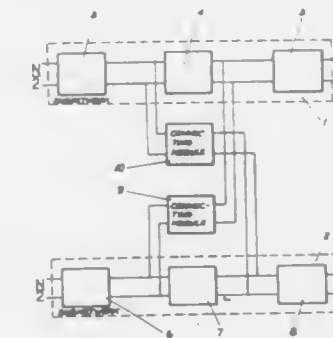
1. An ATM (Asynchronous Transfer Mode) switching system, comprising:
- a plurality of ATM line terminating apparatus each provided for each of a plurality of lines, respectively, each ATM line terminating apparatus including:
- (a) line terminating means for accommodating a transmission line to perform (i) extraction of a clock signal and detection of a frame from an input signal coming in the form of cells, each of a fixed length, and (ii) phase synchronization on a bit basis,
- (b) cell phase synchronizing means connected to the output of said line terminating means for detecting the phase of the cells inputted with phases differing from one to another line and for synchronizing said cells of said lines with respect to the phase thereof,
- (c) header detecting means connected to the output of said cell phase synchronizing means for reading a header contained as a part of the cell,
- (d) storage means for storing header information read out by said header detecting means,

- (e) flow monitor means for monitoring flows of cells on said lines on the basis of the header information stored in said storage means, and
- (f) header conversion means connected to the output of said header detection means, the output of said storage means and the output of said flow monitoring means for changing the header of the cell on the basis of the outputs of said header detection means, said storage means and said flow monitoring means;
- a signal processing circuit provided in common to said lines for processing a call control signal on a line basis;



- a control circuit provided in common to said lines and interconnected with said signal processing circuit for controlling the processing of calls on a line basis in accordance with call control information supplied from said signal processing circuit; and
- a self-routing type switch connected to each of said ATM line terminating apparatus for switching the cell coming from a given one of said ATM line terminating apparatus to another ATM line terminating apparatus in accordance with the header information contained in said cells.

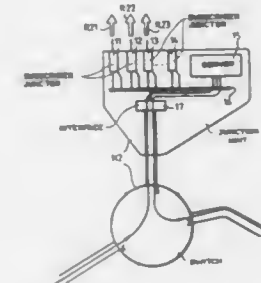
**4,956,840**  
**MULTISTAGE DIGITAL SWITCHING NETWORK**  
Andrzej Jajaczzyk, and Wojciech Kabacinski, both of Poznan, Poland, assignors to Politechnika Poznanska, Poznan, Poland  
Continuation of Ser. No. 891,211, Jul. 28, 1986, abandoned. This application Dec. 1, 1988, Ser. No. 279,314  
Claims priority, application Poland, Aug. 12, 1985, 254969; Mar. 25, 1986, 258628  
Int. Cl.<sup>5</sup> H04J 3/02 2 Claims



1. A multistage digital switching network composed of two, first and second, identical subnetworks each of said subnetworks having a capacity of  $N/2 \times N/2$  PCM links, characterized in that each of said subnetworks consists of three, first, middle and last modules connected in series, wherein each of

said modules constitutes either a single switching element or a single-stage switching network or a multi-stage switching network, inputs of said middle module of said first of said subnetworks being connected through an additional connecting module with outputs of said middle module of said second of said subnetworks; and inputs of said middle module of said second of said subnetworks being connected through another additional connecting module with outputs of said middle module of said first of said subnetworks; said additional connecting modules being identical to said middle modules of said subnetworks.

**4,956,841**  
**METHOD AND DEVICE FOR SWITCHING A PACKET OF DATA**  
André Judeinstein, Remy-Les Chevreuses, and Laurent Fevrier, Paris, both of France, assignors to LMT Radioprofessionnelle, Boulogne Billancourt, France  
Filed Jan. 4, 1989, Ser. No. 293,418  
Claims priority, application France, Jan. 8, 1988, 88 00139  
Int. Cl.<sup>5</sup> H04J 3/24 3 Claims



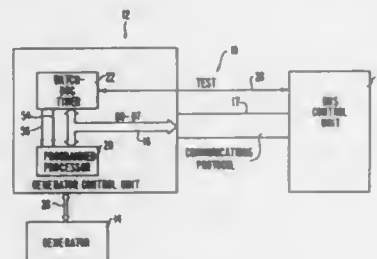
1. A method for switching of a data packet along a main trunk route of a communications network, comprising switch nodes, wherein said method uses an arrowed packet comprising ordinary node-to-node guiding arrows and consists in effecting, from certain nodes of the main trunk route, a local transmission of data from a subscriber towards addresses and, for this purpose, in placing, in the packet, after each of the ordinary arrows which make the packet reach a node where a local transmission of data towards the addresses has to be made, an other arrow and pieces of information, said other arrow designating a transmission server proper to the node to which the packet was made to reach by the ordinary arrow preceding said other arrow, and said pieces of information being of three types: a designation of a zone of the server containing a list of addresses, data to be sent to the addresses and a protocol for the use of this data.

**4,956,842**  
**DIAGNOSTIC SYSTEM FOR A WATCHDOG TIMER**  
Waleed Said, Rockford, Ill., assignor to Sandstrand Corporation, Rockford, Ill.  
Filed Nov. 16, 1988, Ser. No. 272,059  
Int. Cl.<sup>5</sup> G06F 11/00 24 Claims

3. A testing system for a watchdog timer monitoring a programmed processor and associated with a system which is controlled by a control program executed by the programmed processor and which is monitored by a supervisory system with the watchdog timer generating an interruption signal which interrupts execution of the control program when the watchdog timer does not generate a reset comprising:
- means contained in the supervisory system coupled to the watchdog timer for initiating testing of the watchdog timer; and
- means contained in the watchdog timer for disabling the



generation of the interruption signal during testing of the watchdog timer;  
wherein the watchdog timer further comprises;  
means for shutting down the system which is controlled by the control program when the control program does not

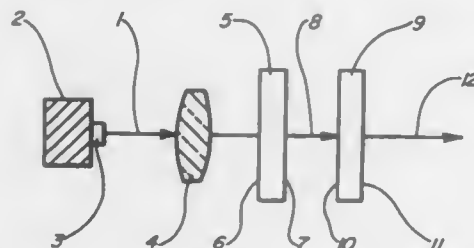


resume normal operation in response to an interruption signal; and wherein  
the watchdog timer has means for disabling the means for shutting down the system which is controlled by the control program during testing of the watchdog timer.

**4,956,843**  
**SIMULTANEOUS GENERATION OF LASER RADIATION AT TWO DIFFERENT FREQUENCIES**  
Pedram Akhavan-Lefahady, Woodridge, and Douglas W. Anthony, Wheaton, both of Ill., assignors to Amoco Corporation, Chicago, Ill.  
Filed Oct. 10, 1989, Ser. No. 418,856  
Int. Cl.<sup>5</sup> H01S 3/10

U.S. Cl. 372-23

28 Claims



19. An apparatus for simultaneously generating laser radiation of two different frequencies which comprises:

- optical pumping means for generating optical pumping radiation, wherein said optical pumping means comprises a semiconductor light source;
- a first optical cavity for resonating laser radiation of a first frequency;
- first optical gain means for receiving said optical pumping radiation which is disposed within said first optical cavity, wherein said first optical gain means is effective to transmit a portion of said optical pumping radiation and to absorb a portion of said optical pumping radiation, and wherein said first optical gain means consists of a solid lasant material;
- a second optical cavity for resonating laser radiation of a second frequency; and
- second optical gain means for receiving said transmitted portion of the optical pumping radiation which is disposed within said second optical cavity, wherein said second optical gain means is effective to generate laser radiation of said second frequency in response to the transmitted portion of said optical pumping radiation, and wherein

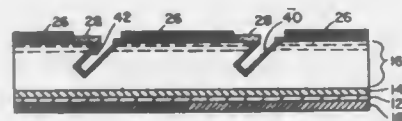
said second optical gain means consists of a solid lasant material.

**4,956,844**  
**TWO-DIMENSIONAL SURFACE-EMITTING LASER ARRAY**

William D. Goodhue, Chelmsford; Kurt Rauschenbach, Marlboro, and Christine A. Wang, Bedford, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.  
Filed Mar. 17, 1989, Ser. No. 325,292  
Int. Cl.<sup>5</sup> H01S 3/00

U.S. Cl. 372-44

18 Claims

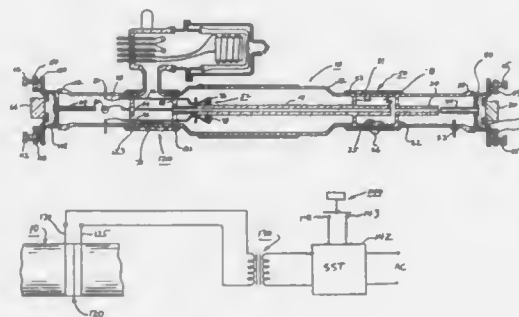


- A two-dimensional semiconductor surface-emitting laser array formed of a plurality of laser cavities each comprising:
  - an active layer of lasing semiconductor material for emitting rays of light extending longitudinally in a plane between two semiconductor layers;
  - a first intra-cavity reflective surface formed at one end of said layer and bisecting the plane of said active layer at an angle which internally reflects said light rays from said layer in a first direction approximately normal to said plane;
  - a second intra-cavity reflective surface formed at an opposite end of said layer and bisecting said plane at about the same angle as in (b) to internally reflect light rays from said layer in a second direction opposite said first direction and approximately normal to said plane;
  - a light reflective mirror formed in the path of said second direction.

**4,956,845**  
**METAL VAPOR LASER HAVING MEANS TO EXTEND LIFETIME OF TUBE**  
Manfred R. Otto, 1016 Corinthian Way, Pomona, Calif. 91768; Edwin A. Reed, 1092 W. 17th St., Upland, Calif. 91786, and William F. Hug, 382 E. California, #106, Pasadena, Calif. 91106  
Filed Aug. 6, 1987, Ser. No. 82,304  
Int. Cl.<sup>5</sup> H01S 3/22

U.S. Cl. 372-56

1 Claim



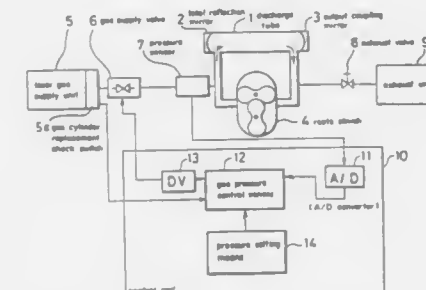
- A gas laser comprising:
  - a gas envelope;
  - an active gaseous medium disposed within said envelope, said medium comprising a mixture of first and second components, said first component having a lower ionization potential than the ionization potential of said second

component in said mixture, said first component comprising a metal vapor;  
cathode means disposed within said envelope;  
anode means disposed within said envelope;  
a capillary member positioned within said envelope between said cathode means and said anode means;  
means for applying a voltage between said cathode means and said anode means for creating a discharge in said active gaseous medium which provides stimulated emission gases for generating laser radiation;  
means adjacent said anode means for supplying said first component of said gas mixture which flows in the direction of said cathode means through said capillary means during the generation of said laser radiation;  
means positioned adjacent the end of said capillary member closest to said cathode means for melting the metal condensate which builds up near said capillary member and which inhibits transmission of the laser beam internal to said envelope during operation of said gas laser;  
circuit means for energizing said melting means, said circuit means including a switch for enabling a user to periodically energize said melting means and melt said condensate; and  
timing means connected to said switch means for enabling said melting means to be energized for a pre-determined time interval.

**4,956,846**  
**GAS LASER DEVICE**  
Nobuaki Iehisa, Yamanashi, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan  
PCT No. PCT/JP88/00672, § 371 Date Feb. 22, 1989, § 102(e) Date Feb. 22, 1989, PCT Pub. No. WO89/00352, PCT Pub. Date Jan. 12, 1989  
PCT Filed Jul. 6, 1988, Ser. No. 320,307  
Claims priority, application Japan, Jul. 7, 1987, 62-169295  
Int. Cl.<sup>5</sup> H01S 3/22

U.S. Cl. 372-58

4 Claims

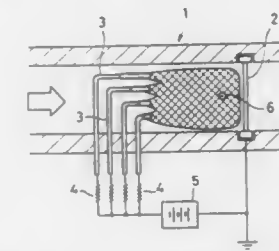


- A gas laser device for effecting a laser oscillation while circulating a laser gas, comprising:
  - a laser gas supply unit;
  - a gas supply valve provided at an outlet of said laser gas supply unit;
  - a discharge tube;
  - an exhaust unit for exhausting gas in said discharge tube;
  - a sequence start means for starting an exhaust sequence, said sequence start means comprising a gas cylinder replacement check switch; and
  - an exhaust sequence means for exhausting air in said discharge tube after closing said gas supply valve, introducing a laser gas into the discharge tube by opening said gas supply valve after the discharge tube has been brought to a vacuum state and effecting a vacuum exhausting of the discharge tube after closing said gas supply valve.

**4,956,847**  
**ELECTRODES FOR A GAS LASER APPARATUS AND METHOD OF MAKING THE SAME**  
Kiyohisa Terai, and Koichi Nishida, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed May 25, 1989, Ser. No. 356,421  
Claims priority, application Japan, Jun. 10, 1988, 63-143944  
Int. Cl.<sup>5</sup> H01S 3/077

U.S. Cl. 372-87

8 Claims

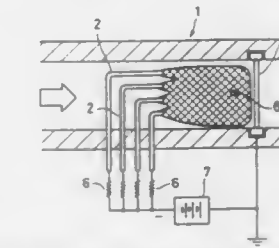


- A gas laser apparatus comprising:
  - an anode and cathode disposed in an atmosphere of a gas mixture as a laser medium, said cathode having a titanium base;
  - means for applying DC voltage across said anode and cathode so that an electric discharge is initiated, thereby exciting said gas mixture;
  - a lightening portion on said cathode having a titanium oxide layer on a surface thereof, said lightening portion corresponding to a portion covered with a glow during said electric discharge.

**4,956,848**  
**ELECTRODES FOR GAS APPARATUS AND METHOD OF MAKING THE SAME**  
Kiyohisa Terai, and Koichi Nishida, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed May 25, 1989, Ser. No. 356,420  
Claims priority, application Japan, Jun. 15, 1988, 63-147650  
Int. Cl.<sup>5</sup> H01S 3/097

U.S. Cl. 372-87

5 Claims



- A gas laser apparatus comprising:
  - a cathode;
  - an anode with a chromium coating on a surface thereof;
  - means for enclosing said cathode and said anode in an atmosphere of a gas mixture as a laser medium; and
  - means for causing electric discharge between said cathode and said anode, thereby exciting said gas mixture.

**4,956,849**  
**PROCESS AND APPARATUS FOR GRAPHITIZING CARBON BODIES**  
Claude Holuigue, Le Fayet, France; Heinrich Panholzer, Linz, Austria; Karl-Wilhelm Maier, Fürth, Fed. Rep. of Germany, and Wolfgang Trimmel, Leoben, Austria, assignors to Voest-Alpine Maschinenbau Gesellschaft m.b.H., Linz, Austria  
Filed Aug. 1, 1989, Ser. No. 388,256  
Claims priority, application Austria, Aug. 4, 1988, 1966/88  
Int. Cl.<sup>5</sup> H05B 3/00

U.S. Cl. 373-120

9 Claims

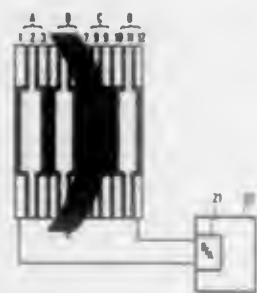
- An apparatus for graphitizing carbon bodies arranged in a horizontally extending train consisting of a series of carbon

#### 4 Claims

1. An X-ray line detector device, comprising an array of parallel arranged solid state detector elements, characterized in that each of the solid state detector elements has the same width and is identically segmented into a plurality of neighbor-

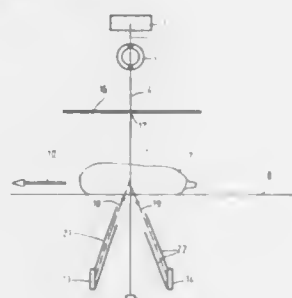


ing separate segments, comprising a central segment and an adjacent segment wherein a central portion of said central segment having a width which approximates that of the solid state detector element, said central segment further comprising end portions having a substantially smaller width than the



central portion of said central segment, and wherein said adjacent segment comprises a central portion and end portions, wherein the width of the end portions of said adjacent segment is substantially larger than the width of the central portion of said adjacent segment.

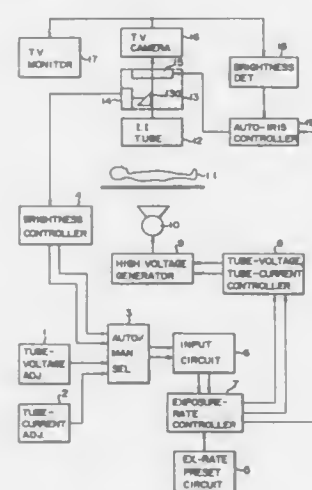
**4,956,856**  
**ARRANGEMENT FOR EXAMINING A BODY COMPRISING A RADIATION SOURCE**  
Geoffrey Harding, Hilstenbek, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.  
Filed Oct. 3, 1988, Ser. No. 252,955  
Claims priority, application Fed. Rep. of Germany, Oct. 5, 1987, 3733599; Jun. 10, 1988, 3819739  
Int. Cl.<sup>5</sup> G01N 23/201  
U.S. Cl. 378—88



1. A radiation arrangement for examining a body comprising:
  - (a) radiation source means for producing a primary radiation beam having a pencil beam cross-section,
  - (b) displacement means for producing a relative displacement between a body to be examined and said primary radiation beam,
  - (c) detection means for detecting radiation elastically scattered at small scattering angles by said body from said primary radiation beam, wherein said small scattering angles are approximately equal to the sine of said scattering angle, and
  - (d) diaphragm means constituting a plurality of lamella disposed between said body and said detection means for directing scattered radiation at said small scattering angles from different sections of said primary radiation beam in said body to different measuring strips on a measuring surface of said detection means, said detection means having a lateral resolution in a longitudinal direction of said measuring strips, such that said detection means is position sensitive along each of said plurality of lamella, wherein said detection means includes a plurality of parallel

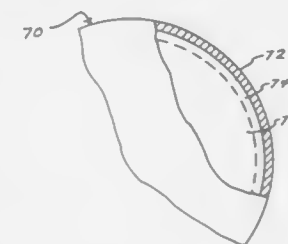
detectors, said plurality of detectors being disposed adjacent an area of said primary radiation beam, and said detectors detecting each time said scattered radiation passing through adjacent lamellas, said small scattering angle being determined by the striking point of said scattered radiation on said detectors, and wherein reciprocating diaphragm means are disposed between said radiation source means and said body for producing said primary radiation beam in a reciprocating movement in a plane parallel to said detection means.

**4,956,857**  
**X-RAY FLUOROSCOPIC APPARATUS**  
Kaoru Kuroaki, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Jul. 12, 1988, Ser. No. 217,982  
Claims priority, application Japan, Jul. 16, 1987, 62-177406  
Int. Cl.<sup>5</sup> H05G 1/34  
U.S. Cl. 378—110



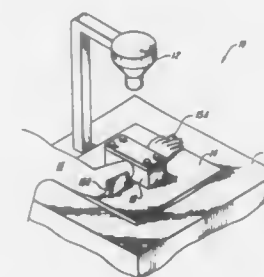
1. An X-ray fluoroscopic apparatus comprising:
  - fluoroscope means for obtaining a fluoroscopic image of an object to be examined by detecting X-rays radiated by an X-ray tube and transmitted through the object;
  - camera means, having an iris closed to a predetermined setting, for receiving through the iris a fluoroscopic image of the object obtained from X-rays transmitted through the object;
  - input means for inputting an entrance exposure rate of the X-rays radiated by said X-ray tube; and
  - exposure rate setting means, connected to said fluoroscope means and said input means, for comparing the entrance exposure rate with a predetermined reference exposure rate, and for applying in said X-ray tube a tube current and a tube voltage which are determined in accordance with the entrance exposure rate input by said input means;
  - said exposure rate setting means having means for adjusting said iris to a predetermined setting when the input entrance exposure rate is less than the reference exposure rate; and
  - said exposure rate setting means having means for opening said iris such that the brightness of an image received by said camera means becomes a desired value when the entrance exposure rate input by said input means is greater than the reference rate.

**4,956,858**  
**METHOD OF PRODUCING LUBRICATED BEARINGS**  
Kamleshwar Upadhyay, Glendale, Wis., assignor to General Electric Company, Milwaukee, Wis.  
Filed Feb. 21, 1989, Ser. No. 313,182  
Int. Cl.<sup>5</sup> H01J 35/10, 35/26  
U.S. Cl. 378—133



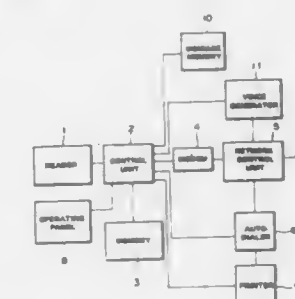
1. An x-ray tube comprising:
  - an evacuated envelope;
  - an anode and cathode contained within said envelope;
  - a bearing means of supporting said anode, said bearing means including a bearing substrate material with an implantation layer of solid lubricant implanted in the substrate material to a depth of at least 2 atomic diameters beneath the surface of said substrate said implantation layer covered by an ion plated layer plated by plasma assisted ion plating with a layer of solid lubricant.

**4,956,859**  
**SOURCE FILTER FOR RADIOGRAPHIC IMAGING**  
Richard C. Lanza, Brookline, and Joseph R. Votano, Twickenbury, both of Mass., assignors to Expert Image Systems, Inc., Somerville, Mass.  
Filed Mar. 10, 1989, Ser. No. 321,969  
Int. Cl.<sup>5</sup> G21K 3/00  
U.S. Cl. 378—157



1. An apparatus for analyzing biological structures by photon absorptiometry, the apparatus comprising:
  - a radiation source emitting photons with a range of energy levels, said radiation source including at least one source filter element which operates to reduce the emission of high energy photons; and
  - a detector means for determining the spatial intensity of radiation from the radiation source, said detector means having a selective characteristic response which is relatively insensitive to low energy photons, the detector means cooperating with said source filter to measure the intensity of photons within a narrowed band of energy levels.

**4,956,860**  
**SYSTEM FOR REPORTING STATUS DATA IN A FACSIMILE NETWORK**  
Tsuneo Murata, Mitaka, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Dec. 18, 1987, Ser. No. 134,864  
Claims priority, application Japan, Dec. 19, 1986, 61-194395[U]  
Int. Cl.<sup>5</sup> H04M 11/00; H04N 1/21  
U.S. Cl. 379—100



1. A facsimile apparatus having a multi-address calling function of sequentially transmitting identical picture data to a plurality of destination parties, wherein an abnormality can occur during the multi-address calling procedure, said apparatus comprising:
  - instruction issuing means for issuing an instruction to transmit a communication result after completion of communication;
  - a memory means for registering a telephone number of a telephone set to which said communication result is to be transmitted, data concerning a destination office with which line interconnection could not be made, data on a destination office in which facsimile communication has abnormally terminated, and a content of the abnormality during the multi-address calling operation;
  - means for controllably performing line interconnection with the telephone set having the telephone number registered in said memory means when there is an instruction issued from said instruction issuing means after the communication is completed;
  - message information generating means for judging whether or not the communication has performed normally based on the content of said memory means after completion of the multi-address calling operation, and for generating message information indicative of the destination office with which line interconnection could not be made, the destination office of which facsimile communication has abnormally terminated and the content of the abnormality, the message information corresponding to a result of the judgement;
  - journal outputting means for outputting a journal on which the generated message information is printed; and
  - message transmitting means for converting the generated message information into a voice corresponding to the generated message information and then transmitting by said line interconnection control means the voice to the telephone set connected with the line.

**4,956,861**  
**METHOD AND APPARATUS FOR ADDRESSEE LOCATION**  
Tetsuo Kondo, Yokohama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan  
Filed Mar. 28, 1989, Ser. No. 329,518  
Claims priority, application Japan, Mar. 29, 1988, 63-73391  
Int. Cl.<sup>5</sup> H04M 3/54  
U.S. Cl. 379—142

1. A method of locating an addressee for a call on a private





mined numbers of bits for processing each of said "N" groups of bits and providing an output signal representative of the frequency of said signals at the source of input signals for each of said "N" groups of bits;  
 averaging means for averaging the output signals from said control means to provide a first comparison output signal representative of the average value of the output signals from said control means;  
 means coupled with said control means for determining the peak values of the output signals from said control means to produce a second comparison output signal;  
 first comparison means with first and second inputs coupled to continuously receive said first and second comparison output signals to produce a continuous sequence of flag output signals whenever an emergency siren sound signal is present;  
 reference signal pattern means; and  
 second comparison means coupled with the output of said first comparison means and said reference signal pattern means for continuously comparing successive flag output signals from said first comparison means with said reference signal pattern means for providing an alarm output signal in response to a predetermined comparison correlation.

4,956,867

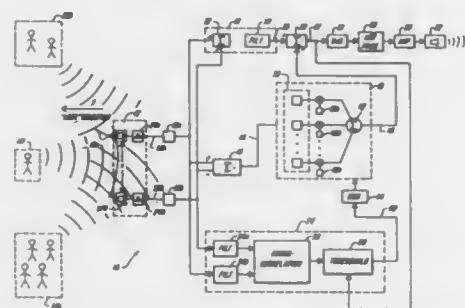
**ADAPTIVE BEAMFORMING FOR NOISE REDUCTION**  
 Patrick M. Zarek, Arlington, Mass.; Julie E. Greenberg, Farmington Hills, Mich., and Patrick M. Peterson, Cambridge, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Apr. 20, 1989, Ser. No. 341,139

Int. Cl.<sup>5</sup> H04R 3/00

U.S. Cl. 381-94.1

20 Claims



1. An adaptive noise cancelling apparatus comprising:
  - A. a receiving array including a plurality of spatially disposed sensors, each for receiving an input signal, comprising at least one of a component of target signal and a component of a noise signal, and for generating a signal representative of said input signal,
  - B. primary signal means coupled with said receiving array for generating a primary signal representative of a first selected combination of one or more of said input-representative signals,
  - C. reference signal means coupled with said receiving array for producing one or more signals representative of a second selected combination of said input-representative signals,
  - D. adaptive filter means coupled to said reference signal means for generating a noise-approximating signal as a function of one or more noise component-representative signals produced during a selected period of time,
  - E. output means coupled to said primary signal means and to said adaptive filter means for subtracting said noise-approximating signal from said primary signal to generate an output signal representative of said target signal,
  - F. adaptation controlling means coupled with said receiving

array for generating an SNR signal representative of a relative strength of said target signal to said noise signal, said adaptation controlling means including means coupled with said output means for generating an adaptation signal as a function of said output signal on said SNR signal, and

G. modification means coupled with said adaptation controlling means and with said adaptive filter means for responding to said adaptation signal to selectively modify said noise-approximating signal to minimize a difference between it and one or more selected noise components of said primary signal.

4,956,868

**MAGNETICALLY SHIELDED ELECTROMAGNETIC ACOUSTIC TRANSDUCER**

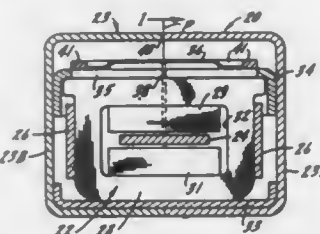
Elmer V. Carlson, Prospect Heights, Ill., assignor to Industrial Research Products, Inc., Elk Grove Village, Ill.

Filed Oct. 26, 1989, Ser. No. 426,999

Int. Cl.<sup>5</sup> H04R 1/02

U.S. Cl. 381-189

5 Claims



1. A magnetically shielded electromagnetic acoustic transducer comprising:
  - an acoustic diaphragm;
  - a magnetic armature;
  - mechanical drive connection means interconnecting the armature and the diaphragm;
  - an electromagnetic coil disposed in encompassing relation to a portion of the armature;
  - magnetic connection means linking the electromagnetic coil and the armature in a complete magnetic circuit having a plane of symmetry across which no appreciable magnetic flux flows;
  - and a magnetic shield encompassing the diaphragm, the armature, the coil, and both connection means, the magnetic shield comprising two generally cup-shaped casing halves of high magnetic permeability joined together along a joint plane closely adjacent to and parallel to said plane of symmetry.

4,956,869

**METHOD OF TRACING CONTOUR AND A SYSTEM THEREFOR**

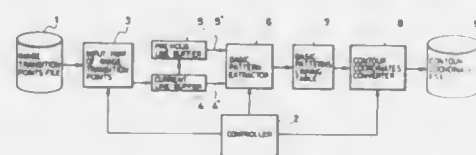
Takafumi Miyatake, Hachioji, and Hitoshi Matsushima, Takikawa, both of Japan, assignors to Hitachi, Ltd.

Filed Feb. 10, 1988, Ser. No. 154,378

Int. Cl.<sup>5</sup> G06K 9/48

U.S. Cl. 382-22

8 Claims



1. A method of tracing a contour to obtain contour coordinates by extracting segments of a contour of a figure from a sampled image, comprising the steps of:

scanning said figure along sequential scanning lines in a single scanning direction;  
 detecting at least one image transition point for each sequential scanning line through said figure;  
 extracting segments of the contour of the figure by comparing a detected relationship between the position of an image transition point of each scanning line and the position of an image transition point of the adjacent preceding scanning line to a plurality of basic patterns representing different positional relationships and selecting a basic pattern corresponding to each detected relationship along the contour of the figure;  
 combining selected basic patterns into a basic pattern sequence on the basis of the positions of the detected image transition points; and  
 converting said basic pattern sequence into a sequence of contour coordinates.

4,956,870

**PATTERN SELECTING DEVICE CAPABLE OF SELECTING FAVORABLE CANDIDATE PATTERNS**  
 Masamori Hara, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

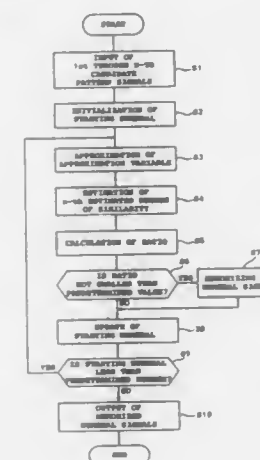
Filed Nov. 28, 1989, Ser. No. 442,281

Claims priority, application Japan, Nov. 29, 1988, 63-299434

Int. Cl.<sup>5</sup> G06K 9/00

U.S. Cl. 382-30

8 Claims



1. A pattern selecting device for producing an output numeral indicative of one of first through N-th candidate patterns which have first through N-th candidate degrees of similarity relative to an input pattern and are decided by a pattern collating system for collating said input pattern with a plurality of registered patterns to produce, successively in a descending order of said first through said N-th candidate degrees, first through N-th candidate pattern signals representative of said first through said N-th candidate patterns, where N represents an integer which is not less than two and is not greater than said plurality, said pattern selecting device comprising:
  - processing means for processing said first through said N-th candidate pattern signals to produce, when an (n+1)-th candidate pattern signal is processed, where n is variable from 1 towards N, an n-th processed signal related to said (n+1)-th through said N-th candidate degrees;
  - estimating means connected to said processing means for estimating an n-th estimated degree for an n-th candidate pattern with reference to said processed signal to produce an estimated signal representative of said n-th estimated degree; and
  - deciding means connected to said processing means and said estimating means for deciding whether or not a ratio of said n-th estimated degree to said n-th candidate degree is not smaller than a predetermined value, said deciding

means thereby producing a numeral indicative of said n-th candidate pattern as said output numeral.

4,956,871

**IMPROVING SUB-BAND CODING OF SPEECH AT LOW BIT RATES BY ADDING RESIDUAL SPEECH ENERGY SIGNALS TO SUB-BANDS**

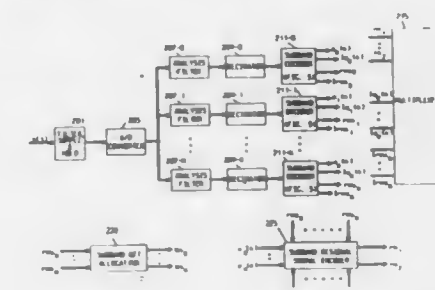
Kumar Swaminathan, Randolph, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 30, 1988, Ser. No. 252,250

Int. Cl.<sup>5</sup> G10L 7/02

U.S. Cl. 381-31

22 Claims



1. An arrangement for coding speech comprising:
  - means for receiving a speech pattern;
  - means connected to the speech pattern receiving means for sampling the received speech pattern at a predetermined rate corresponding to the speech pattern bandwidth;
  - means having an input connected to the speech pattern sampling means and a plurality of outputs for dividing the spectrum of the speech pattern samples into a plurality of sub-band portions;
  - means connected to each spectrum dividing means output for reducing the sampling rate of the sub-band speech samples therefrom to a lower sampling rate than the predetermined rate;
  - means connected to each reducing means output for grouping the sub-band speech samples from the spectrum dividing means into successive time frame intervals of K+1 speech samples;
  - means connected to the grouping means responsive to the K+1 sub-band speech samples of the present time frame interval for generating a signal representative of the energy of the sub-band speech of the time frame interval in each sub-band;
  - means responsive to the speech energy signals of a plurality of the sub-band portions for generating a set of signals allocating a predetermined number of bits to each sub-band portion;
  - means for coding each sub-band speech portion of the present time frame interval including means jointly responsive to the speech energy signal and the bit allocation signal of the sub-band portion for quantizing the sequence of K+1 speech samples of the sub-band;
  - means for generating a sequence of signals representative of the residual differences between the sub-band speech samples of the time frame interval and the corresponding quantized sub-band speech samples;
  - means connected to the speech energy signal generating means, the bit allocation generating means and the residual difference signal generating means responsive to the energy representative signals and the bit allocation signals of a plurality of the sub-bands for encoding the time frame interval residual difference signal sequence;
  - means connected to the sub-band selecting means for generating a coded signal representative of the sequence of

residual difference signals of the at least one selected sub-band of the time frame interval; and means for multiplexing the quantized speech samples, the energy signals of the sub-band portions and coded signal representing the residual difference of the at least one selected sub-band portion to form a coded signal representative of the speech pattern of the time frame interval.

**4,956,872**  
**IMAGE PROCESSING APPARATUS CAPABLE OF RANDOM MOSAIC AND/OR OIL-PAINTING-LIKE PROCESSING**

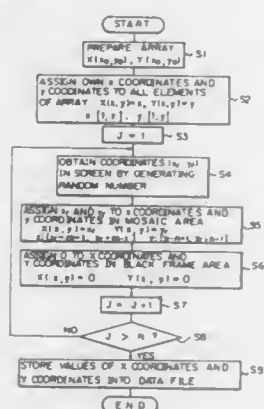
Hiroyuki Kimura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 29, 1987, Ser. No. 113,997

Claims priority, application Japan, Oct. 31, 1986, 61-258605; Oct. 31, 1986, 61-258606; Oct. 31, 1986, 61-258607

Int. Cl. G06K 9/36

U.S. Cl. 382-44



1. An image processing method for converting image data of a plurality of pixels in a predetermined block into image data of a representative pixel in the predetermined block of an original image, comprising the steps of:

- randomly designating the representative pixel;
- converting a plurality of coordinate values of a plurality of pixels in the predetermined block into a coordinate value of the representative pixel, and storing the converted coordinate value in a coordinate file;
- executing said designating step and said converting-and-storing step plural times, once for each block of the original image, to complete the coordinate file, wherein said executing step further includes the step of changing the position of the predetermined block on the basis of a position of the representative pixel randomly designated in said designating step;
- storing an original image comprising image data of a plurality of pixels; and
- converting image data of each pixel of the original image into image data of a pixel in the same block and corresponding to the representative pixel of that block stored in said coordinate file.

**4,956,873**  
**IMAGE PROCESSING APPARATUS**  
Mark A. Samuels, Hockley, and Stephen Dimmick, Rayleigh, both of United Kingdom, assignors to GEC-Marconi Limited, Stanmore, United Kingdom

Filed Jan. 6, 1988, Ser. No. 202,634

Claims priority, application United Kingdom, Jan. 5, 1987, 8713194

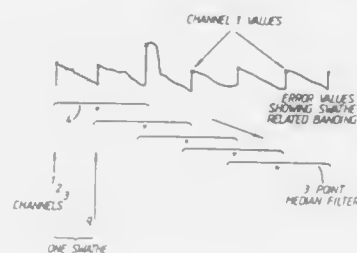
Int. Cl. G06K 9/40

U.S. Cl. 382-54

11 Claims

1. Apparatus for processing an image, which image is of the type comprising a plurality of lines which together form a

representation of the image, comprising, means for deriving a first set of values, each value being representative of a predetermined parameter of each image line; set of values, each respective second value being substantially representative of



12 Claims an artifact image for each respective line; means for deriving from the second set of values a set of correction values for applying to the image; and means for applying the correction values to the image.

**4,956,874**  
**METHOD AND APPARATUS FOR PROCESSING DIGITIZED IMAGES**

Jean Appel, Vanves, France, assignor to Office National d'Etudes et de Recherche Aerospatiales (ONERA), Chatillon, France

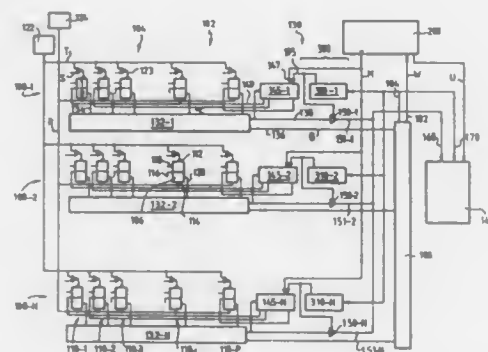
Filed Mar. 7, 1988, Ser. No. 164,801

Claims priority, application France, Mar. 16, 1987, 87 03573

Int. Cl. G06K 9/36

U.S. Cl. 382-56

9 Claims



1. Apparatus for processing digitized images comprising: a matrix memory of pixels having N number of lines by P number of columns where N and P are integer values; and processing means for determining which pixels are in the excited state and for storing the address of said excited pixels occupying an extreme position in a line or a column and by switching said pixel to a non-excited state, and by reiterating these operations until none of the pixels is excited; and an output memory adapted to store the addresses of said excited pixels received from said processing means.

**4,956,875**  
**EMERGENCY RADIO ALERTING AND MESSAGE TRANSMITTING SYSTEM DIRECTABLE TO SELECTED CLASSES AND NUMBERS OF RECEIVERS**

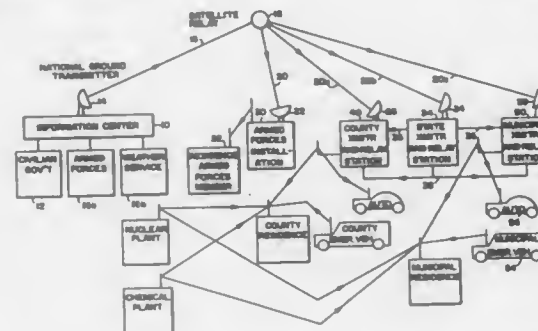
William B. Bernard, Longboat Key, and William B. Minter, Bradenton, both of Fla., assignors to Com-Ser Laboratories, Inc., Sarasota, Fla.

Filed Jan. 5, 1988, Ser. No. 215,011

Int. Cl. H04B 7/14, 7/24

U.S. Cl. 455-13

4 Claims



1. In an emergency radio alerting and warning system directable to selected classes and numbers of receivers, the system comprising at least one FM radio transmitter for broadcasting modulated signals in a selected FM band and a plurality of cooperating FM radio receivers energized at all times and tuned for receiving broadcast signals in the selected FM band and each receiver having an audio circuit functioning in response to the modulated signals, the improvement comprising a plurality of encoders in the FM transmitter, at least one encoder settable to generate a first series of signal pulses which when broadcast and received by the FM receivers and demodulated will activate the audio circuit in a large selected group of the plurality of FM receivers, at least one other encoder in the transmitter for generating another series of signal pulses that when demodulated will fully activate only selected ones of a smaller number of the plurality of FM receivers, whereby alerting and warning messages may be transmitted from the FM transmitter and received only by the fully activated selected FM receivers, and means in the FM transmitter for generating alerting and warning modulating signals which upon reception by the FM receivers that are fully activated will cause warning means associated with the FM receivers to alert anyone in the vicinity that an emergency situation has arisen, and message means in the FM transmitter for broadcasting a message in the FM band only to the selected fully activated FM receivers, and means in the FM transmitter for so modulating the FM band as to broadcast in sequence a series of encoded pulses for fully activating selected FM receivers, the alerting and warning signals, and finally an audio message, and timer means in each receiver in each FM receiver operable upon receipt by a decoder of a coded signal pulse to activate audio circuit for a selected brief period and at the end of this period the timer means inactivates the audio circuit.

**4,956,876**  
**DC DECOUPLED RADIO COMMUNICATION SYSTEM**  
Takaho Koshikishi, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 15, 1988, Ser. No. 284,690

Claims priority, application Japan, Dec. 15, 1987, 62-315156

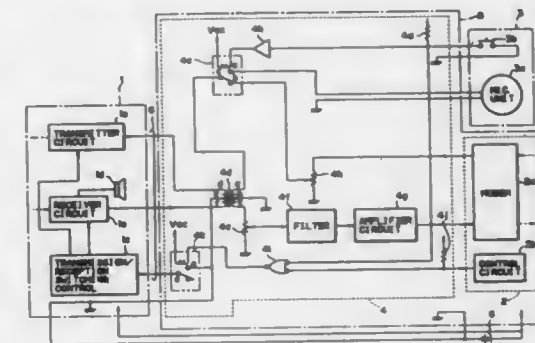
Int. Cl. H04B 1/44

U.S. Cl. 455-78

6 Claims

1. A radio communication system comprising: a radio unit including a transmitter circuit, a receiver circuit and selecting means for selecting either one of said transmitter and receiver circuits for operation; a microphone unit; a data communication unit; and an interface circuit including a d.c. decoupling means having a first side operatively coupled to said transmitter and receiver circuits and a second side which is d.c. decoupled

from said first side to prevent the passing of noise, a first switching means selectively connecting said second side to one of said microphone unit and said data communica-



tion unit, and a second switching means for selectively switching between a transmission mode and a reception mode and thus supplying a mode select signal to said selecting means.

**4,956,877**  
**OPTICAL FIBER REFLECTIVE SIGNAL MODULATION SYSTEM**

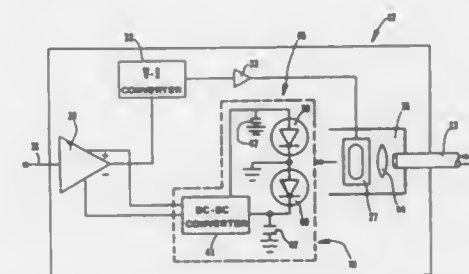
Mark W. Kroll, Minnetonka, and Mark R. Pommeroy, Eden Prairie, both of Minn., assignors to Charn Medical, Inc., Edina, Minn.

Filed Jan. 10, 1987, Ser. No. 60,740

Int. Cl. H04B 10/00

U.S. Cl. 455-605

31 Claims



1. A signal modulation system comprising:  
a. an optical fiber;  
b. a first station communicatively connected to said optical fiber and having means to transmit an unmodulated light carrier signal through said optical fiber, and first means to convert a modulated light carrier signal from said optical fiber to a demodulated electrical signal for output, said first station further having means to separate said unmodulated light carrier signal and said modulated light carrier signal; and  
c. a second station communicatively connected to said optical fiber and having at least one terminal to receive an electrical input signal, an amplifier connected to said at least one terminal, a power source connected to said amplifier, a digital modulator connected to said amplifier and converting said input signal to a modulating signal, an optical shutter constructed and arranged to modulate and reflect said unmodulated light carrier signal emitted from said optical fiber back to said optical fiber, said optical shutter being responsive to said modulating signal, and means to direct both said unmodulated light carrier signal emitted from said optical fiber to said optical shutter, and said modulated light carrier signal reflected to said optical fiber.



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## DESIGNS

SEPTEMBER 11, 1990

310,440  
CONFECTION

Salvatore A. Puglisi, Wayne, and Carolina Calayan, Morris Plains, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed May 28, 1987, Ser. No. 56,208  
Term of patent 14 years

U.S. Cl. D1—127

310,441  
WEIGHTED SHOE UPPER

S. Altaf Ali, Bell Air, Md., and Jack W. Harmon, Guttentberg, N.J., assignors to San Shoe Trading Corp., New York, N.Y.

Filed Dec. 4, 1987, Ser. No. 130,336  
Term of patent 14 years

U.S. Cl. D2—314

310,442  
ATHLETIC SHOE UPPER AND MIDSOLE

Tinker L. Hatfield, Portland, Oreg., assignor to Nike, Inc., Beaverton, Oreg.

Filed Apr. 3, 1990, Ser. No. 504,414

Term of patent 14 years

U.S. Cl. D2—314

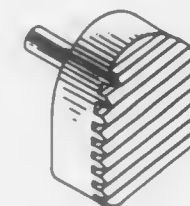
310,443  
HEEL LIFT

William A. Lobosco, West Lebanon, N.H., assignor to The Goodyear Tire &amp; Rubber Company, Akron, Ohio

Filed May 14, 1987, Ser. No. 50,344

Term of patent 14 years

U.S. Cl. D2—323



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OFFICIAL GAZETTE

SEPTEMBER 11, 1990

310,444

## CONTAINER FOR DRILLING CORE

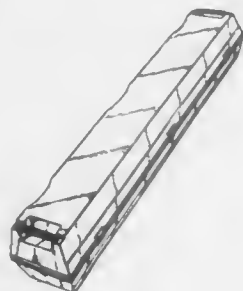
Finn Utsola, Karisto 14 B, N-4040 Madla, Norway

Filed Jan. 30, 1987, Ser. No. 9,142

Claims priority, application Norway, Sep. 26, 1986, 67689

Term of patent 14 years

U.S. Cl. D3—30.1



310,446

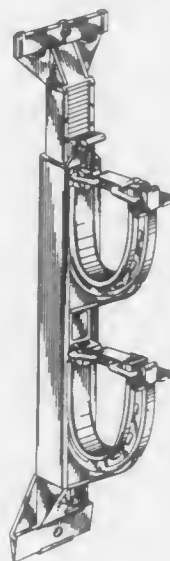
## GUN RACK FOR A VEHICLE

Johnny C. Elkins, Rte. 5, Box 512C, San Angelo, Tex. 76904

Filed Feb. 2, 1987, Ser. No. 10,146

Term of patent 14 years

U.S. Cl. D3—38



310,447

## KEY RING HOLDER

Sumner MacDonald, P.O. Box 2552, Providence, R.I. 02906

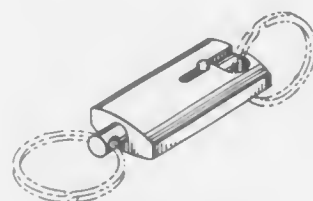
Filed May 7, 1987, Ser. No. 46,863

The portion of the term of this patent subsequent to Aug. 28,

2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D3—61



310,445

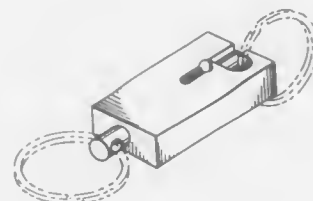
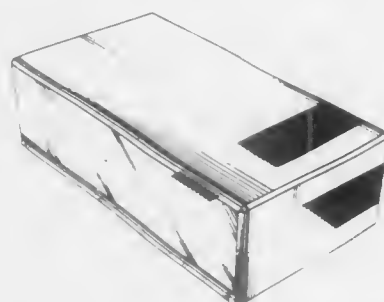
## COMPACT DISC FILE

Jerry M. Long, Pleasant, and Peter W. Palmer, San Jose, both of Calif., assignors to Creative Point, Inc., Fremont, Calif.

Filed Sep. 5, 1986, Ser. No. 904,265

Term of patent 14 years

U.S. Cl. D3—35



SEPTEMBER 11, 1990

U.S. PATENT AND TRADEMARK OFFICE

1249

310,449

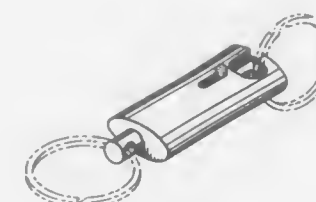
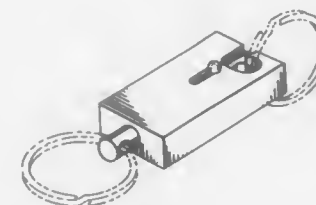
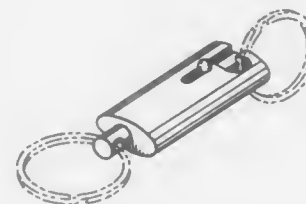
## COMBINATION KEY RING AND PEN

Galoppo Agrippino, Via Crosetto No. 13/A, Grugliasco, Torino, Italy

Filed Jun. 5, 1987, Ser. No. 58,544

Term of patent 14 years

U.S. Cl. D3—62



310,448

## KEY RING

Frank Scognamillo, 28W168 Marion, Winfield, Ill. 60190, and Jay C. Covington, 8525 Clarendon Hills Rd., Hinsdale, Ill. 60521

Continuation-in-part of Ser. No. 922,545, Oct. 23, 1986. This application Sep. 21, 1988, Ser. No. 247,306

The portion of the term of this patent subsequent to Sep. 4, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D3—61





310,450

## LUGGAGE CASE

Renato P. Castelli, Gent; Willibald Van Hove, Zwijnaarde, both of Belgium; Richard Miles, Crowborough, and Stephen T. Green, Oxford, both of England, assignors to Samsonite Corporation, Denver, Colo.

Filed Apr. 30, 1986, Ser. No. 858,295

Claims priority, application United Kingdom, Oct. 31, 1985, 1030155

The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.

Term of patent 14 years

U.S. Cl. D3—76



310,451

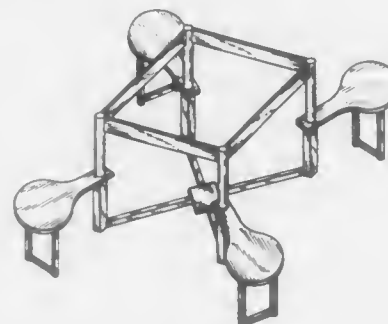
## COMBINED TABLE TOP SUPPORT AND MULTIPLE SEATING UNIT

Thomas E. Webb, Rte. 1, Box 78, Arkansaw, Wis. 54721

Filed Apr. 13, 1987, Ser. No. 37,454

Term of patent 14 years

U.S. Cl. D6—337



310,452

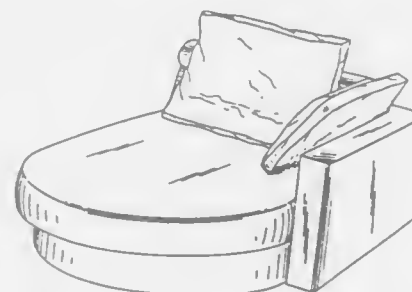
## CHAISE LOUNGE

Hans Hopper, Paris, France, assignor to Alex Synn AG, Cham, Switzerland

Filed Mar. 7, 1988, Ser. No. 165,163

Term of patent 14 years

U.S. Cl. D6—361



310,453

## CHAIR

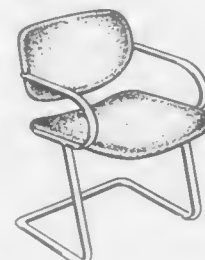
Warren H. Snodgrass, 223 Woodland Rd., Kentfield, Calif. 94904

Filed Nov. 4, 1986, Ser. No. 927,305

The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.

Term of patent 14 years

U.S. Cl. D6—372



310,454

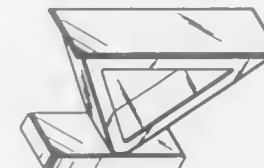
## MEMORIAL FLAG DISPLAY CASE

Hollis R. Beasley, Bay Dr. No 29, Niceville, Fla. 32578

Filed Oct. 31, 1988, Ser. No. 265,125

Term of patent 14 years

U.S. Cl. D6—470



310,455

## MOUNTING FITTING FOR A SHELF

Lars Larsson, Herrijunga, Sweden, assignor to Herrijunga Formplast AB, Herrijunga, Sweden

Filed Dec. 17, 1986, Ser. No. 942,825

Claims priority, application Sweden, Jan. 17, 1986, 86-1469

Term of patent 14 years

U.S. Cl. D6—491



310,456

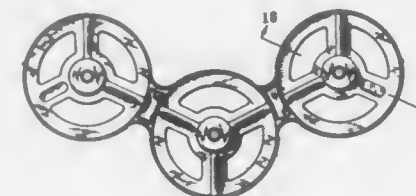
## TOP FOR MERCHANDISE DISPLAY UNIT

Dale Hodgson, Parma, and John Stram, Stronville, both of Ohio, assignors to American Greetings Corporation, Cleveland, Ohio

Filed Mar. 12, 1987, Ser. No. 25,015

Term of patent 14 years

U.S. Cl. D6—491



310,457

## GENERAL PURPOSE RACK

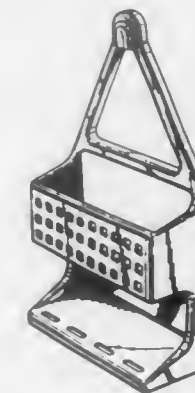
Neo Heap, Selangor Darul Ehsan, Malaysia, assignor to Kibi (Malaysia) SDN. BHD, Selangor Darul Ehsan, Malaysia

Filed Dec. 30, 1988, Ser. No. 292,514

Claims priority, application United Kingdom, Jul. 12, 1988, 1052253

Term of patent 14 years

U.S. Cl. D6—525



310,458

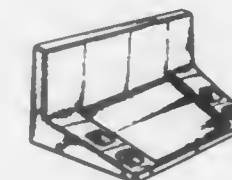
## COMBINED TOOTHBRUSH AND TUMBLER HOLDER

E. Pekka Korpijaakko, Rocky Hill, N.J., assignor to The Willette Corporation, New Brunswick, N.J.

Filed Jan. 4, 1988, Ser. No. 140,833

Term of patent 14 years

U.S. Cl. D6—531



310,459

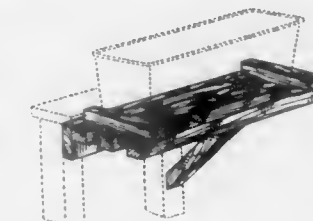
## FLOWER BOX SUPPORT

Thomas A. Gipe, 3710 Evans Trail Way, Beltsville, Md. 20705

Filed Feb. 29, 1988, Ser. No. 161,887

Term of patent 14 years

U.S. Cl. D6—556



310,460

## BATHROOM MAT OR SIMILAR ARTICLE

Baldo Verguano, Corso Orbassano 462/A, Turin, Italy

Filed Oct. 30, 1986, Ser. No. 925,877

Claims priority, application Italy, Jun. 27, 1986, 53573/86[U]

Term of patent 14 years

U.S. Cl. D6—583



310,462

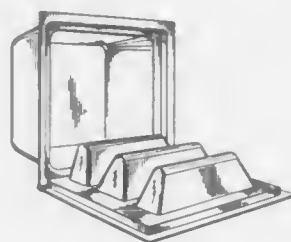
## FOOD SUPPORT

E. David Schoen, 14256 Chestnut Dr., Eden Prairie, Minn. 55347

Continuation-in-part of Ser. No. 225,143, Jul. 28, 1988. This application Dec. 27, 1988, Ser. No. 289,763

Term of patent 14 years

U.S. Cl. D7—504



310,463

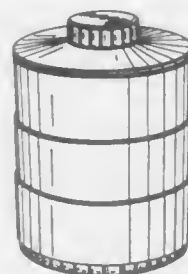
## COVERED DISH SET OR THE LIKE

Douglas M. Laib, Blackstone, Mass., assignor to Dart Industries Inc., Deerfield, Ill.

Filed Nov. 22, 1988, Ser. No. 275,142

Term of patent 14 years

U.S. Cl. D7—614



310,461

## PITCHER

Jean-Jacques Durand, LaBute, 62510, Arques, France

Filed Oct. 20, 1987, Ser. No. 110,487

Term of patent 14 years

U.S. Cl. D7—318



310,464

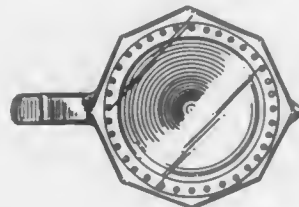
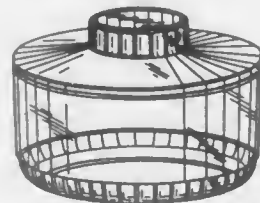
## COVERED DISH OR THE LIKE

Douglas M. Laib, Blackstone, Mass., assignor to Dart Industries Inc., Deerfield, Ill.

Filed Nov. 22, 1988, Ser. No. 275,143

Term of patent 14 years

U.S. Cl. D7—615



310,465

## CHOP STICK KNIFE

Donald Bonasia, 100 N. Clark Dr. #103, Los Angeles, Calif. 90048

Filed Dec. 21, 1987, Ser. No. 135,286

Term of patent 14 years

U.S. Cl. D7—644



310,467

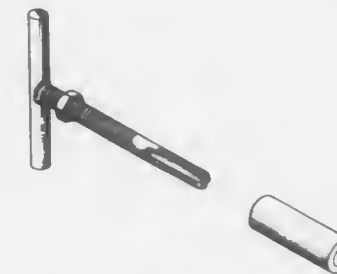
## GOLF CLUB SHAFT EXTRACTOR

Gary R. Taylor, 812 E. Aloha St., Camarillo, Calif. 93010

Filed Nov. 27, 1987, Ser. No. 126,287

Term of patent 14 years

U.S. Cl. D8—14



310,468

## INTEGRATED CIRCUIT INSERTION TOOL

Yee C. Feng, 5F-1, No. 189, Chang An E. Rd., Sec. 2, Taipei, Taiwan

Filed Aug. 3, 1988, Ser. No. 228,209

Term of patent 14 years

U.S. Cl. D8—14



310,466

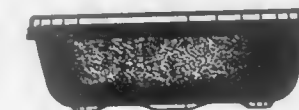
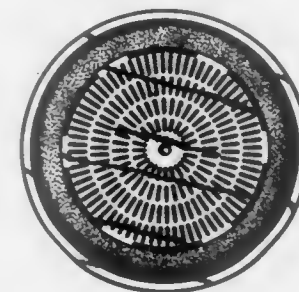
## COLANDER OR THE LIKE

Rino Conti, Stoughton, Mass., assignor to Dart Industries Inc., Deerfield, Ill.

Continuation of Ser. No. 9,402, Jan. 30, 1987, abandoned. This application Oct. 31, 1989, Ser. No. 429,905

Term of patent 14 years

U.S. Cl. D7—667



310,469

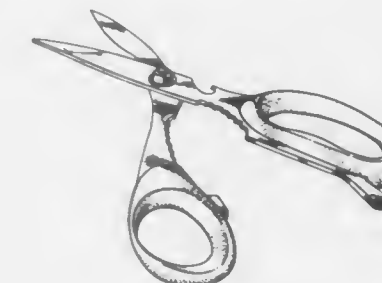
## SCISSORS

Berad J. Dressler, 408 Bryant Cir., Suite A, Ojai, Calif. 93023

Filed Jul. 27, 1988, Ser. No. 224,891

Term of patent 14 years

U.S. Cl. D8—57





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## PORTABLE ELECTRIC GRINDER

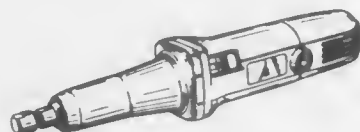
Masaharu Tohdoh, Hiroshima, Japan, assignor to Ryobi Ltd., Hiroshima, Japan

Filed Sep. 8, 1987, Ser. No. 94,790

Claims priority, application Japan, Mar. 9, 1987, 62-8997

Term of patent 14 years

U.S. Cl. D8—62



310,472

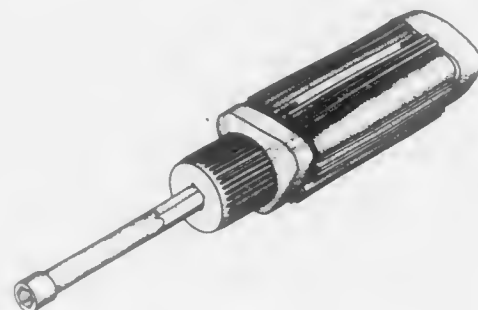
## NUT DRIVER

William G. Mader, York, Pa., and Paul J. Rowan, West Hartford, Conn., assignors to Easco Hand Tool, Inc., Hunt Valley, Md.

Filed May 17, 1989, Ser. No. 352,908

Term of patent 14 years

U.S. Cl. D8—82



310,473

## DIAMOND FILE

Yasuharu Takeda, and Yutaka Kanamaru, both of Tokyo, Japan, assignors to Ryoki Ltd., Hiroshima, Japan

Filed Oct. 2, 1987, Ser. No. 103,973

Term of patent 14 years

U.S. Cl. D8—90



310,471

## CLAMP FOR POLISH ROD LINER OF AN OIL WELL PUMPING UNIT

Jimmie R. Kaykendall, 1349 Chimney Hill Rd., Yukon, Okla. 73099

Filed Oct. 23, 1987, Ser. No. 113,190

Term of patent 14 years

U.S. Cl. D8—72



310,474

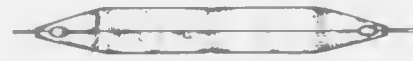
## RETRACTABLE DOUBLE BLADE KNIFE

Daniel Bartsch, and Jane A. Bartsch, both of 704 Lincoln St., McMechen, W. Va. 26040

Filed Jan. 19, 1988, Ser. No. 145,198

Term of patent 14 years

U.S. Cl. D8—99



310,475

## CARPET KNIFE HANDLE

George F. Weimann, Avon, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed Feb. 8, 1988, Ser. No. 153,026

The portion of the term of this patent subsequent to Dec. 15, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D8—99



310,476

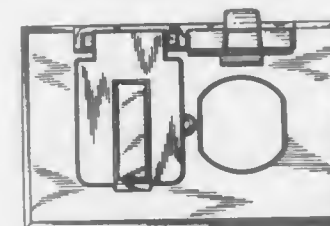
## WEATHER-RESISTANT ASSEMBLY FOR PROTECTING OUTDOOR DUPLEX ELECTRICAL RECEPTACLES

David Grenell, North Woodmere, N.Y., assignor to Greenfield Diecasting Corp., Freeport, N.Y.

Filed Jan. 25, 1987, Ser. No. 66,403

Term of patent 14 years

U.S. Cl. D8—353



310,477

## LAWN SPRINKLER SUPPORT

Gregory E. Fleeca, R.R. #1, Box 39, Sutherland, Nebr. 69165

Filed Feb. 2, 1987, Ser. No. 10,234

Term of patent 14 years

U.S. Cl. D8—356



310,478

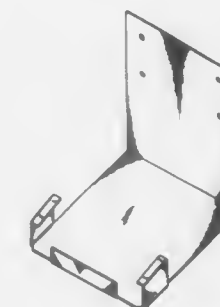
## WALL MOUNT FOR A PH METER OR SIMILAR ARTICLE

Karen Lang, La Habra, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Sep. 16, 1987, Ser. No. 97,468

Term of patent 14 years

U.S. Cl. D8—373



310,479

## FOLDING HANGER RACK

Arthur J. Speetzen, 17315 Hillview, Spring, Tex. 77379

Filed Jan. 24, 1988, Ser. No. 153,651

Term of patent 14 years

U.S. Cl. D8—376



310,480

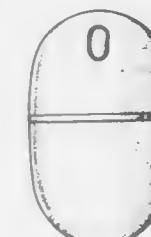
## DISPENSER FOR SCENTED LIQUIDS

Reinold Geiger, Saint-Germain-en-Laye, France, assignor to Ateliers de Moulage Specialise Packaging, France

Division of Ser. No. 776,289, Sep. 16, 1985, Pat. No. Des. 299,694. This application Oct. 13, 1988, Ser. No. 257,039

Term of patent 14 years

U.S. Cl. D9—300

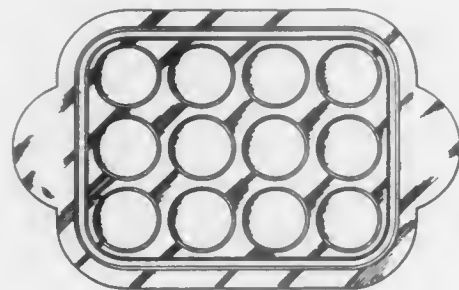
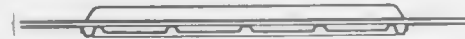


310,481  
PACKAGE

Arthur Chanel, Saint-Remy Polliat, France, assignor to Fromageries Breasse-Bleu - Societe Laitiere Cooperative Agricole, Servas, France

Filed Feb. 16, 1988, Ser. No. 155,766  
Claims priority, application France, Aug. 12, 1987, 874,780  
Term of patent 14 years

U.S. Cl. D9—341

310,483  
COMBINED BOTTLE AND CLOSURE

Henri C. De Giovellina, Paris, France, assignor to Pochet S.A., Paris, France

Filed Jan. 3, 1988, Ser. No. 202,904  
Claims priority, application France, Dec. 4, 1987, 877,258  
Term of patent 14 years

U.S. Cl. D9—377



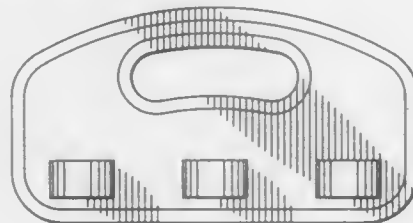
## 310,482

## CARRIER FOR BABY BOTTLES

Edmund Smith, P.O. Box 754, Intervale, N.H. 03485  
Filed Mar. 31, 1988, Ser. No. 176,405

Term of patent 14 years

U.S. Cl. D9—344



## 310,484

## DECANTER WITH STOPPER

Michel Daucourt, Cognac, France, assignor to Camus La Grande Marque, Cognac, France

Filed Mar. 24, 1988, Ser. No. 172,652

Term of patent 14 years

U.S. Cl. D9—384



## 310,485

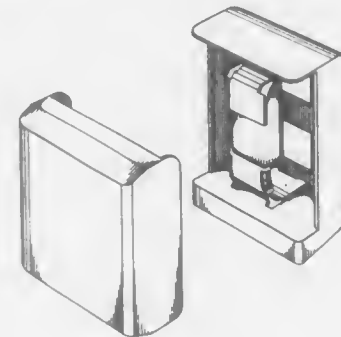
## WATCH DISPLAY CASE

Thomas J. Harvey, Pawtucket, R.I., assignor to International Packaging Corporation, Pawtucket, R.I.

Filed Oct. 5, 1987, Ser. No. 104,811

Term of patent 14 years

U.S. Cl. D9—424

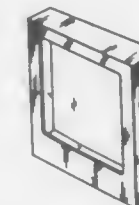
310,488  
PACKAGE

Christopher J. Callinan, Centerport, N.Y., assignor to Regent Sheffield, Ltd., Farmingdale, N.Y.

Filed Dec. 29, 1987, Ser. No. 139,042

Term of patent 14 years

U.S. Cl. D9—418

310,489  
CLOCK

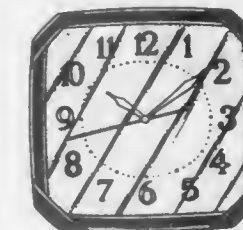
Keiko Nomura, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Sep. 10, 1986, Ser. No. 905,941

Claims priority, application Japan, Mar. 12, 1986, 61-8822

Term of patent 14 years

U.S. Cl. D10—24

310,486  
PACKAGE

Arthur Chanel, Saint-Remy Polliat, France, assignor to Fromageries Breasse-Bleu - Societe Laitiere Cooperative Agricole, Servas, France

Filed Feb. 12, 1988, Ser. No. 155,637

Claims priority, application France, Aug. 12, 1987, 874,780

Term of patent 14 years

U.S. Cl. D9—425



## 310,487

## TOOTHPASTE TUBE OR THE LIKE

Donald M. Genaro, Haworth, N.J., assignor to Henry Dreyfuss Associates, New York, N.Y.

Filed May 25, 1988, Ser. No. 200,172

Term of patent 14 years

U.S. Cl. D9—371

310,490  
WRISTWATCH

Wa N. Fong, Hong Kong, Hong Kong, assignor to DesignTime Company Limited, North Point, Hong Kong

Filed Mar. 11, 1987, Ser. No. 24,397

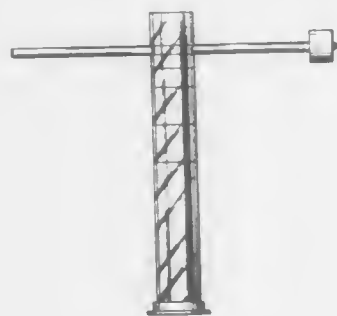
Term of patent 14 years

U.S. Cl. D10—32





310,491  
CORE SAMPLE TUBE  
Dale Mitchell, 834 NW 9th Way, Boynton Beach, Fla. 33435  
Filed Jan. 26, 1987, Ser. No. 67,460  
Term of patent 14 years  
U.S. Cl. D10—46



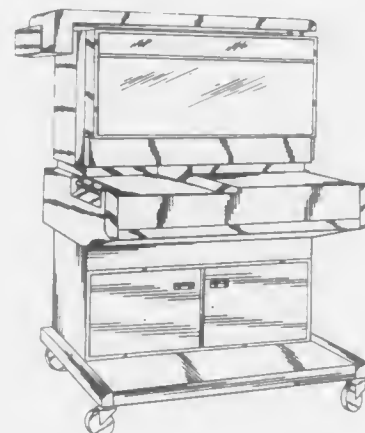
310,492  
HELMET PHOTODETECTOR ARRAY  
Leo O. Taylor, and Fritz W. Henley, both of Alta Loma, Calif.,  
assignors to Loral Electro-Optical Systems, Inc., Pasadena,  
Calif.  
Filed Feb. 11, 1988, Ser. No. 155,011  
Term of patent 14 years  
U.S. Cl. D10—46



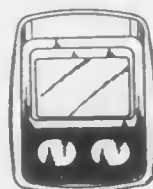
310,493  
CRIBBAGE BOARD  
P. Michael Coffee, 10936 Calavo Dr., La Mesa, Calif. 92041  
Filed Jun. 16, 1987, Ser. No. 62,567  
Term of patent 14 years  
U.S. Cl. D10—46.1



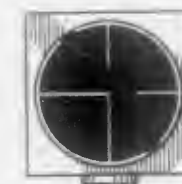
310,494  
COMPUTER ANALYZER  
Robert J. Rzedzki, Schaumburg, and Lee F. Radtke, Lake Zurich, both of Ill., assignors to Sun Electric Corporation, Crystal Lake, Ill.  
Filed Jan. 28, 1987, Ser. No. 8,641  
Term of patent 14 years  
U.S. Cl. D10—75



310,495  
BICYCLE SPEEDOMETER  
Jou Kagayama, Izumi, Japan, assignor to Cat Eye Co., Ltd., Osaka, Japan  
Filed Jul. 6, 1987, Ser. No. 69,620  
Claims priority, application Japan, Jan. 8, 1987, 62-348  
Term of patent 14 years  
U.S. Cl. D10—98



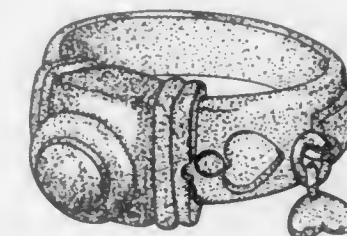
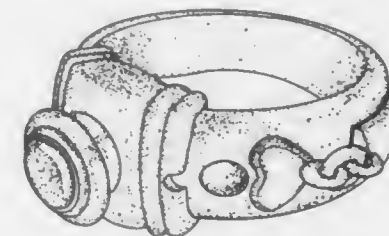
310,496  
ALERT SIGNAL FOR WAFFLE IRONS  
Joseph D. Timponi, 654 E. 87 St., Brooklyn, N.Y. 11236  
Filed Feb. 25, 1988, Ser. No. 160,104  
Term of patent 14 years  
U.S. Cl. D10—106



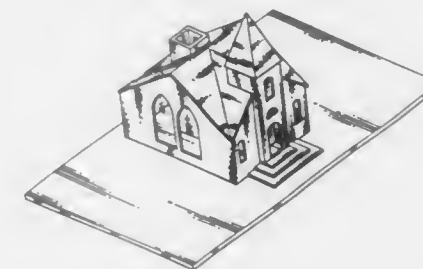
310,497  
ROAD MARKER  
Albert M. Provence, Jr., 735 S. El Molino, Pasadena, Calif. 91106  
Filed Apr. 25, 1988, Ser. No. 185,931  
Term of patent 14 years  
U.S. Cl. D10—109



310,498  
ORNAMENTAL RING  
André Méjias, Vevey, Switzerland, assignor to Premiere de Tabbah, S.A., Fribourg, Switzerland  
Filed Jan. 25, 1988, Ser. No. 148,221  
Claims priority, application Int'l Pat. Institute, Jul. 23, 1987, DMA/000/645  
Term of patent 14 years  
U.S. Cl. D11—35



310,499  
CHRISTMAS TREE STAND  
Allen C. Grzebyk, 5009 Chippewa Ct., Sterling Heights, Mich. 48310  
Filed Feb. 17, 1987, Ser. No. 15,230  
Term of patent 14 years  
U.S. Cl. D11—130.1



310,500

## CHRISTMAS TREE STAND

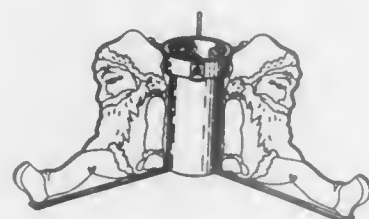
Jaroslav Matousek, Vilatorpavägen 17, S-255 90 Helsingborg, Sweden

Filed Aug. 10, 1988, Ser. No. 231,832

Claims priority, application Sweden, Feb. 10, 1988, 88-0299

Term of patent 14 years

U.S. Cl. D11—130.1



310,501

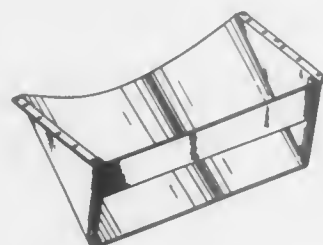
## TRACTOR TRAILER AIR CHUTE

Lyle W. Brys, 1465 Glencoe, Denver, Colo. 80220

Filed Jul. 14, 1987, Ser. No. 72,845

Term of patent 14 years

U.S. Cl. D12—97



310,502

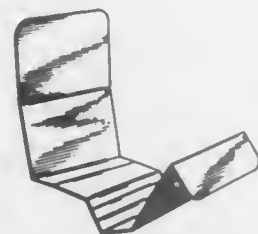
## SHADE FOR AN AUTOMOBILE STEERING WHEEL AND SEAT

Robert J. Gantner, 550 Sheridan Sq., Evanston, Ill. 60202

Filed Dec. 27, 1988, Ser. No. 289,754

Term of patent 14 years

U.S. Cl. D12—155



310,503

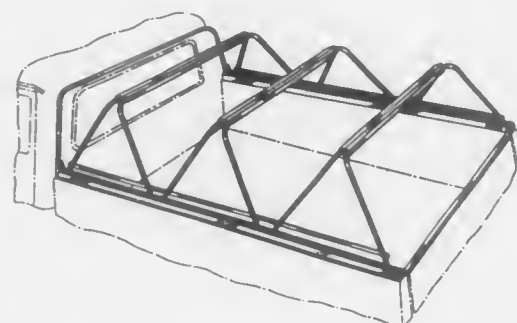
## FRAME UNIT FOR TRUCK BED COVER

A. Edward Moore, 215 Grandpre, l'Arcadie, Quebec, Canada J0J 1H0

Filed Mar. 11, 1988, Ser. No. 166,614

Term of patent 14 years

U.S. Cl. D12—156



310,504

## TOOL BOX DRAWER FOR PICKUP TRUCK

Laurence E. Dortch, P.O. Box 74, Pratt, Kans. 67124

Filed Nov. 2, 1988, Ser. No. 266,354

Term of patent 14 years

U.S. Cl. D12—157



310,505

## SIDE MIRROR FOR VEHICLES

Kenichiro Unno, Tokyo, Japan, assignor to Tanaka Manufacturing Company Limited, Tokyo, Japan

Filed Feb. 18, 1987, Ser. No. 15,955

Claims priority, application Japan, Aug. 20, 1986, 61-32416

The portion of the term of this patent subsequent to Jul. 16, 1999, has been disclaimed.

Term of patent 14 years

U.S. Cl. D12—187



310,506

## AUTOMOBILE DOOR PANEL EXTERIOR SURFACE

Leonardo Fioravanti, Moncalieri, Italy, assignor to Fabrice Automobile Ferrari Societa per Azioni Esercizio, Modena, Italy

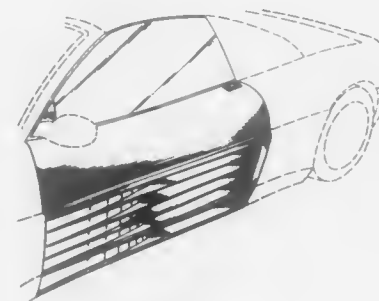
Division of Ser. No. 912,493, Sep. 29, 1986. This application

Mar. 22, 1989, Ser. No. 327,186

Claims priority, application Italy, Mar. 29, 1986, 65206/86

Term of patent 14 years

U.S. Cl. D12—196



310,508

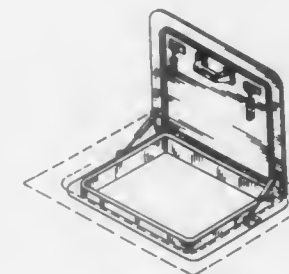
## BOAT HATCH

Allan Brown, North Miami Beach; Robert B. Gowens, Plantation, and Valentine Jenkins, Pembroke Lakes, all of Fla., assignors to Cigarette Racing Team, Inc., North Miami Beach, Fla.

Continuation-in-part of Ser. No. 792,974, Oct. 30, 1985. This application Sep. 10, 1987, Ser. No. 95,513

Term of patent 14 years

U.S. Cl. D12—317



310,509

## PORTABLE BATTERY CASE

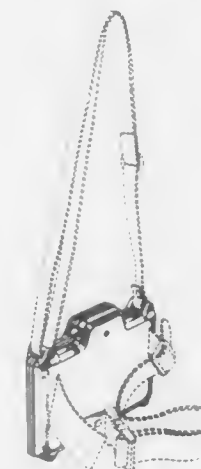
Fusao Fushiya, and Hajime Ohta, both of Anjo, Japan, assignors to Makita Electric Works, Ltd., Anjo, Japan

Filed Apr. 4, 1988, Ser. No. 177,030

Claims priority, application Japan, Nov. 5, 1987, 62-45153

Term of patent 14 years

U.S. Cl. D13—103



310,507

## SPARE TIRE HOLDER

Ira J. Ware, Rte. 4, Box 143, Seminole, Okla. 74868

Filed Jul. 17, 1987, Ser. No. 74,497

The portion of the term of this patent subsequent to Jul. 3, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D12—202





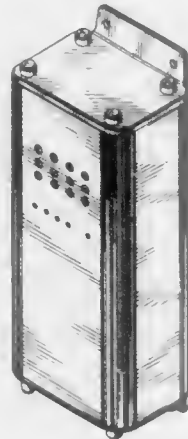
310,510

**DEFAULT CONTROLLER FOR RAILWAY VEHICLES**  
Angel P. Bezos, Rockville, Md., assignor to Pulse Electronics, Inc., Rockville, Md.

Filed Sep. 9, 1988, Ser. No. 242,069

Term of patent 14 years

U.S. Cl. D13—128



310,512

**CONNECTOR SOCKET**

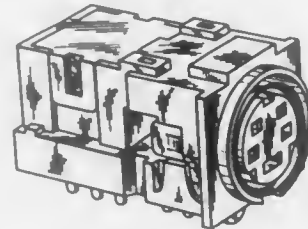
Kyousuke Tajima, Gunma, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan

Filed Feb. 16, 1988, Ser. No. 155,937

Claims priority, application Japan, Aug. 24, 1987, 62-34525

Term of patent 14 years

U.S. Cl. D13—146



310,513

**CONNECTOR SOCKET**

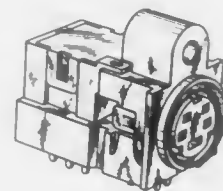
Kyousuke Tajima, Gunma, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan

Filed Feb. 16, 1988, Ser. No. 155,938

Claims priority, application Japan, Aug. 19, 1987, 62-33737

Term of patent 14 years

U.S. Cl. D13—146



310,511

**ADAPTER FOR A TRACK LIGHT**

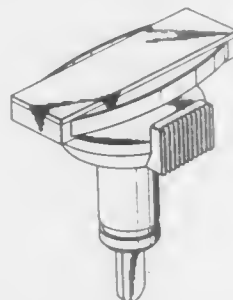
Lou Bedoca, Bishops Stortford, England, and Michael C. Eksteen, Verwoerdburg, South Africa, assignors to Thorn EMI plc, London, England

Filed Jun. 12, 1987, Ser. No. 60,894

Claims priority, application South Africa, Dec. 12, 1986, 86/1066

Term of patent 14 years

U.S. Cl. D13—133



310,514

**CHIP CARTRIDGE**

Bernard Maurer, Melrose; Robert Faranda, Acton, and Thomas G. Wu, Lexington, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Apr. 23, 1987, Ser. No. 41,588

Term of patent 14 years

U.S. Cl. D13—182



310,515

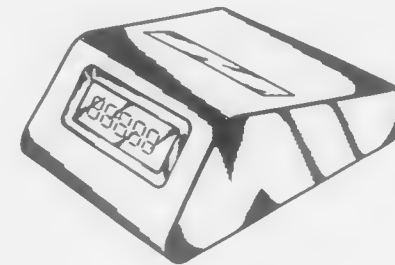
**SHOP FLOOR DATA TERMINAL OR THE LIKE**

James S. Bianco, 217 Brainard Rd., Enfield, Conn. 06082

Filed Oct. 19, 1987, Ser. No. 109,853

Term of patent 14 years

U.S. Cl. D14—100



310,516

**COMPUTER KEYBOARD**

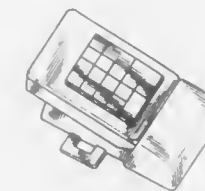
Masaki Hara; Masayuki Sakai, and Minoru Kato, all of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 30, 1988, Ser. No. 175,220

Claims priority, application Japan, Oct. 22, 1987, 62-43268

Term of patent 14 years

U.S. Cl. D14—100



310,517

**PORTABLE COMPUTER**

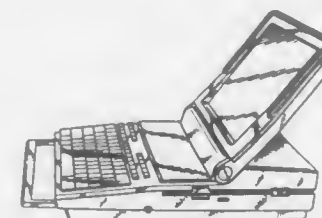
Masaki Hara; Masayuki Sakai; Masaharu Sawatani; Midori Yonezawa, and Katsuo Fukuyama, all of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 18, 1987, Ser. No. 98,956

Claims priority, application Japan, May 15, 1987, 62-19068

Term of patent 14 years

U.S. Cl. D14—106



310,518

**VIDEOTEX TERMINAL**

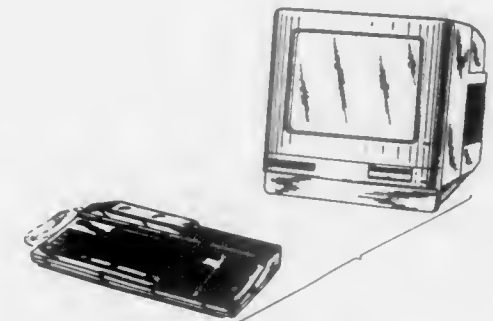
Robert Dezes, Suresnes, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 16, 1987, Ser. No. 133,691

Claims priority, application France, Jun. 16, 1987, 873558

Term of patent 14 years

U.S. Cl. D14—106



310,519

**VIDEOTEX TERMINAL**

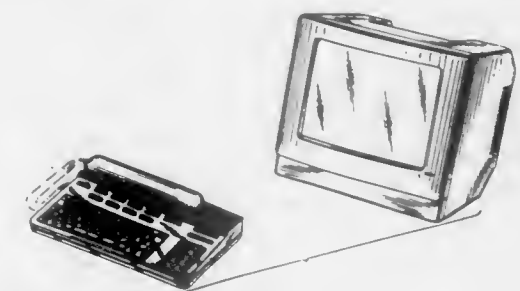
Robert Dezes, Suresnes, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 16, 1987, Ser. No. 133,692

Claims priority, application France, Jun. 16, 1987, 873557

Term of patent 14 years

U.S. Cl. D14—106



310,520

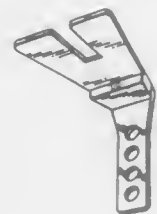
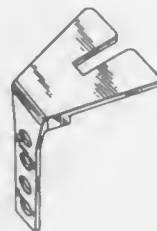
**BRACKET FOR SUSPENDING A FILTER IN FRONT OF A VIDEO MONITOR SCREEN**

Paul R. Bodard, Oakville, Canada, assignor to Fellowes Manufacturing Inc., Itasca, Ill.

Filed Aug. 7, 1987, Ser. No. 82,693

Term of patent 14 years

U.S. Cl. D14—114



310,522

**COMBINED TELEVISION RECEIVER AND VIDEO CASSETTE RECORDER**

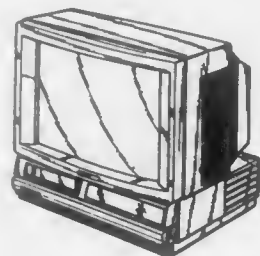
Doo S. Yang, Seoul, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea

Filed Oct. 5, 1988, Ser. No. 254,290

Claims priority, application Rep. of Korea, Apr. 11, 1988, 4867/1988[U]

Term of patent 14 years

U.S. Cl. D14—129



310,521

**COMBINED DRAWING TABLET AND CURSOR CONTROL FOR COMPUTER**

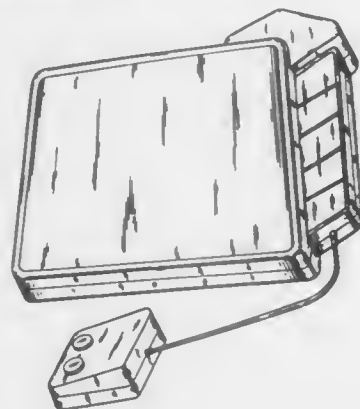
Donny Leung, Tai Koo Sing, Hong Kong, assignor to Video Technology Industries, Inc., Palatine, Ill.

Filed Apr. 15, 1988, Ser. No. 182,312

Claims priority, application United Kingdom, Oct. 28, 1987, 1,045,905

Term of patent 14 years

U.S. Cl. D14—114



310,523

**TRANSCIVER**

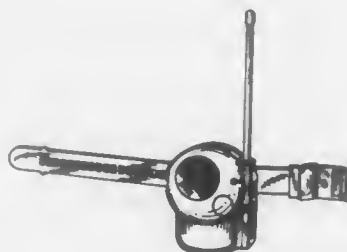
Ichiro Hino, Yokohama, and Toshikisa Yokoi, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 27, 1988, Ser. No. 289,769

Claims priority, application Japan, Aug. 15, 1988, 63-32536

Term of patent 14 years

U.S. Cl. D14—137



310,524

**TELEPHONE STATION SET**

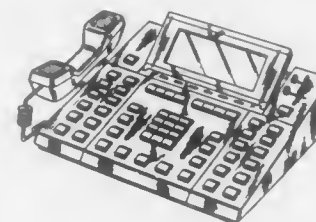
Toshiyuki Utsuki, Tahikawa; Nobuo Fukuda, Machida; Yoshihiro Kwakatsu, Sayama, and Yasunari Ichara, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 12, 1989, Ser. No. 378,610

Claims priority, application Japan, Feb. 17, 1989, 1-5611

Term of patent 14 years

U.S. Cl. D14—151



310,526

**COMBINED TAPE PLAYER AND TUNER**

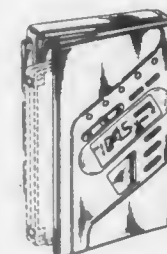
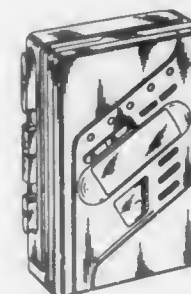
Hidaki Tsuboi, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 7, 1988, Ser. No. 165,131

Claims priority, application Japan, Sep. 10, 1987, 62-36762

Term of patent 14 years

U.S. Cl. D14—163



310,525

**COMBINED RADIO AND CASSETTE RECORDER**

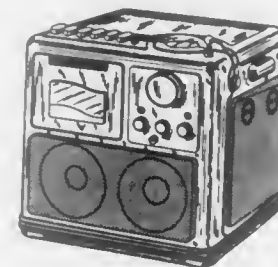
Murray I. C. Camens, Singapore, Singapore, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 9, 1988, Ser. No. 206,157

Claims priority, application United Kingdom, Dec. 22, 1987, 1,047,290

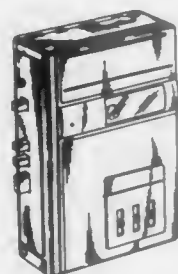
Term of patent 14 years

U.S. Cl. D14—162

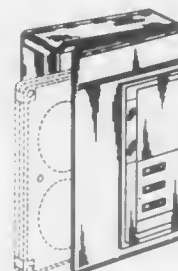
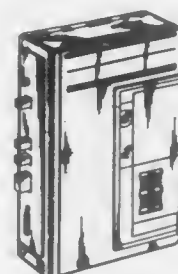




310,527  
**COMBINED TAPE PLAYER AND TUNER**  
 Kazuharu Yamamoto, and Reiko Koshimura, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed Apr. 26, 1988, Ser. No. 186,204  
 Claims priority, application Japan, Oct. 27, 1987, 62-43628  
 Term of patent 14 years  
 U.S. Cl. D14—163



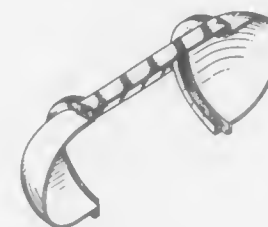
310,528  
**COMBINED TAPE PLAYER AND TUNER**  
 Kazuharu Yamamoto, and Reiko Koshimura, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed Apr. 26, 1988, Ser. No. 186,209  
 Claims priority, application Japan, Oct. 27, 1987, 62-43627  
 Term of patent 14 years  
 U.S. Cl. D14—163



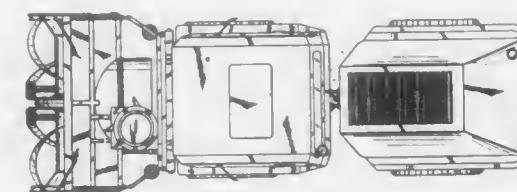
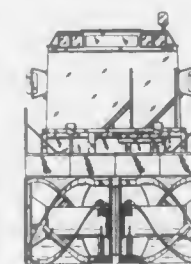
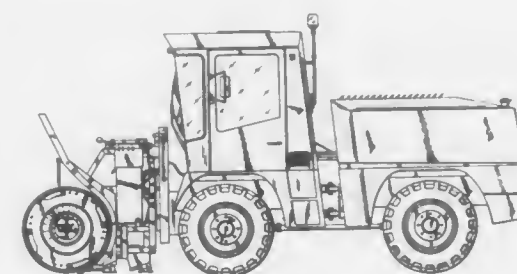
310,529  
**COMBINED AM/FM RADIO, CASSETTE PLAYER, SPOTLIGHT AND TOOL BOX**  
 John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong  
 Filed Jul. 28, 1988, Ser. No. 225,146  
 Claims priority, application United Kingdom, Feb. 2, 1988, 1048181  
 Term of patent 14 years  
 U.S. Cl. D14—168



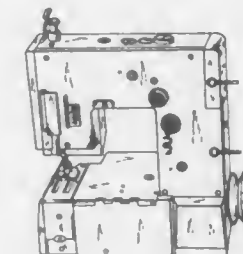
310,530  
**NON-ELECTRONIC SOUND AMPLIFIER**  
 Rex McGuire, 2108 Rodeo Dr., Mountain Home, Ark. 72653  
 Filed Sep. 21, 1988, Ser. No. 247,070  
 Term of patent 14 years  
 U.S. Cl. D14—205



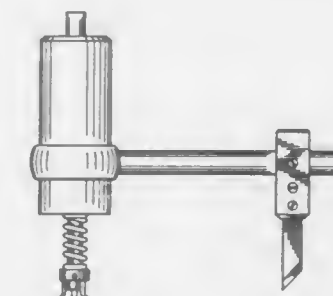
310,531  
**SNOW-CUTTING MACHINE**  
 Louis L. LePoix, Baden-Baden, assignor to Ing. Alfred Schmidt GmbH, St. Blasien, Fed. Rep. of Germany  
 Filed Dec. 23, 1987, Ser. No. 137,135  
 Claims priority, application Fed. Rep. of Germany, Jun. 24, 1987, AZ 2 REG686/87  
 Term of patent 14 years  
 U.S. Cl. D15—11



310,532  
**INDUSTRIAL SEWING MACHINE**  
 Toyokichi Goto, Soaka, Japan, assignor to Newlong Machine Works, Ltd., Tokyo, Japan  
 Filed Jul. 17, 1986, Ser. No. 886,775  
 Claims priority, application Japan, May 25, 1986, 61-10510  
 The portion of the term of this patent subsequent to Jul. 3, 2004, has been disclaimed.  
 Term of patent 14 years  
 U.S. Cl. D15—69



310,533  
**SPECIALIZED CIRCLE CUTTER**  
 Robert L. Garrett, 46301 Twp. Rd. 1171, and Gregory A. Lanvray, 335 Sycamore, both of Coshocton, Ohio 43812  
 Filed Jun. 19, 1987, Ser. No. 63,848  
 Term of patent 14 years  
 U.S. Cl. D15—139



310,534  
**PHOTOGRAPHIC CAMERA OR SIMILAR ARTICLE**  
 James M. Ryan, New York; Enrique Alie, Brooklyn, both of N.Y., and David C. Stowers, Nutley, N.J., assignors to Polaroid Corporation, Cambridge, Mass.  
 Filed Nov. 23, 1987, Ser. No. 123,989  
 Term of patent 14 years  
 U.S. Cl. D16—214



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OFFICIAL GAZETTE

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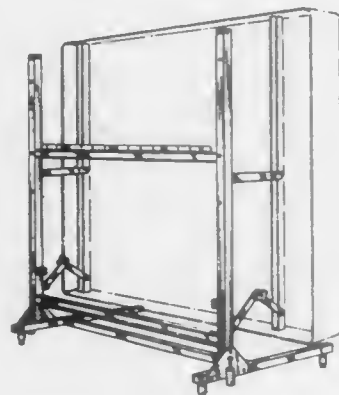
SCREEN STAND

William H. Barrett, Woodstock; Joseph A. Gregory, Kingston; Lisa M. Mohr, and David L. Schumm, both of Woodstock, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 3, 1986, Ser. No. 926,474

Term of patent 14 years

U.S. Cl. D16—241



310,537

SNARE DRUM LUG CASING

Mitsuo Yanagisawa, Chiba, Japan, assignor to Pearl Musical Instrument Co., Chiba, Japan

Filed Apr. 22, 1988, Ser. No. 184,706

Term of patent 14 years

U.S. Cl. D17—22



310,536

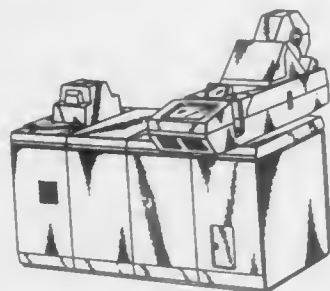
COMBINED PHOTOGRAPHIC PRINTER AND FILM PROCESSOR

Monte D. Lavine, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 6, 1987, Ser. No. 12,901

Term of patent 14 years

U.S. Cl. D16—246



310,538

BASS DRUM LUG CASING

Mitsuo Yanagisawa, Chiba, Japan, assignor to Pearl Musical Instrument Co., Chiba, Japan

Filed Apr. 22, 1988, Ser. No. 184,707

Term of patent 14 years

U.S. Cl. D17—22



SEPTEMBER 11, 1990

U.S. PATENT AND TRADEMARK OFFICE

1269

310,539

DEVELOPING DEVICE FOR COPYING MACHINE

Takeshi Komada, Yokohama, and Yutaka Okayama, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 19, 1988, Ser. No. 221,179

Claims priority, application Japan, Jan. 22, 1988, 63-2205

Term of patent 14 years

U.S. Cl. D18—40



310,540

DOCUMENT FEEDER FOR A COPY MACHINE

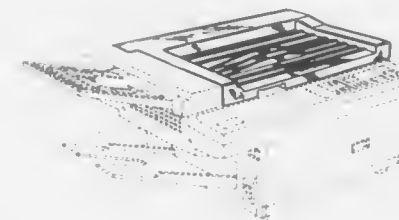
Toshikazu Matsui, Osaka; Shigetoshi Ishikawa, Hyogo, and Yoshinari Itoi, Osaka, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Aug. 2, 1988, Ser. No. 227,268

Claims priority, application Japan, Mar. 11, 1988, 63-10066

Term of patent 14 years

U.S. Cl. D18—42



310,542

WRITING INSTRUMENT

Pierre Regnault, Valence, France, assignor to Etablissements Regnault, Valence, France

Filed May 28, 1987, Ser. No. 55,113

Claims priority, application France, Nov. 28, 1986, 86 6327

Term of patent 14 years

U.S. Cl. D19—43



310,543

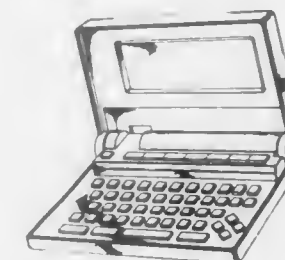
ELECTRONIC ADDRESS BOOK

Toran S. Brown, Carmichael, Calif., assignor to The McGregor Company, Santa Monica, Calif.

Filed Nov. 23, 1987, Ser. No. 124,757

Term of patent 14 years

U.S. Cl. D19—76



310,544

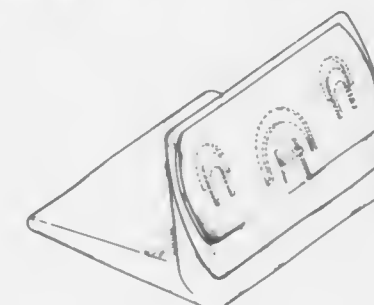
BASE FOR A FILE ASSEMBLY

Mei Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.

Filed Jan. 16, 1987, Ser. No. 4,022

Term of patent 14 years

U.S. Cl. D19—99



310,541

TONER CARTRIDGE FOR A COPYING MACHINE

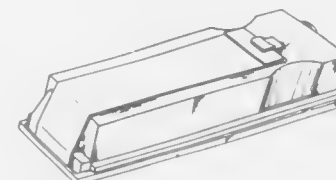
Yoshitake Miyoshi, Ikoma, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Filed Jan. 13, 1988, Ser. No. 143,552

Claims priority, application Japan, Aug. 27, 1987, 62-35019

Term of patent 14 years

U.S. Cl. D18—43





310,545

## SALE SIGN

Naftali Avittan, 431 Malden, Richardson, Tex. 75080

Filed Sep. 21, 1987, Ser. No. 98,669

Term of patent 14 years

U.S. Cl. D20-10



310,546

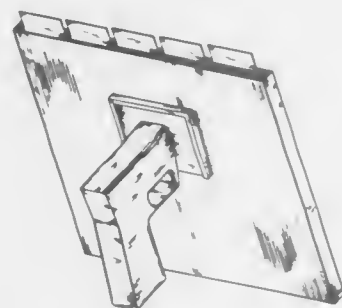
## HAND-HELD MESSAGE SIGN

David Peltz, 5766 N. Bel Aire Dr., Glendale, Wis. 53209

Filed Feb. 19, 1988, Ser. No. 158,161

Term of patent 14 years

U.S. Cl. D20-10



310,547

## BOWLING GAME BOARD

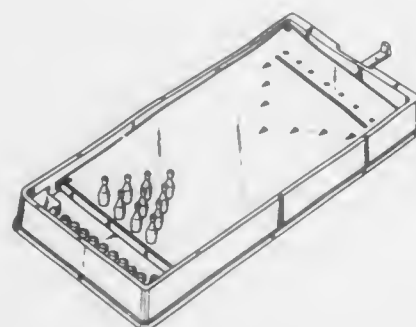
Erlend Wikner, Tranaa, Sweden, assignor to Stiga Aktiebolag, Tranaa, Sweden

Filed Jul. 20, 1988, Ser. No. 225,133

Claims priority, application Sweden, Feb. 3, 1988, 88-0229

Term of patent 14 years

U.S. Cl. D21-11



310,548

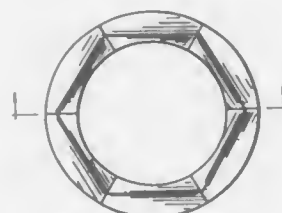
## AERIAL TOY

Stephen Weiss, 570 S. Shore Dr., Miami Beach, Fla. 33141

Filed Oct. 27, 1988, Ser. No. 263,601

Term of patent 14 years

U.S. Cl. D21-86



310,549

## DOLL

Amy J. Rogers, Gilbert, Ariz., assignor to Julie L. Davis, Las Vegas, Nev., a part interest

Filed Dec. 12, 1988, Ser. No. 283,879

Term of patent 14 years

U.S. Cl. D21-157



310,550

## HOUSING FOR EXERCISE CYCLE OR SIMILAR ARTICLE

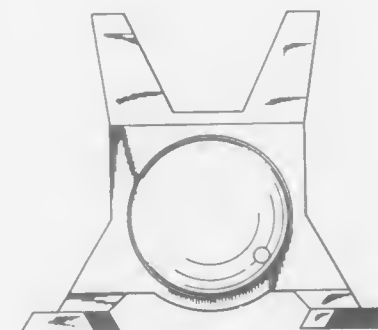
Roger P. Fry, Llantwit Major, United Kingdom, assignor to Gympac Systems Limited, Barry, United Kingdom

Filed Mar. 15, 1988, Ser. No. 168,331

Claims priority, application United Kingdom, Sep. 19, 1987, 1045001

Term of patent 14 years

U.S. Cl. D21-194



310,552

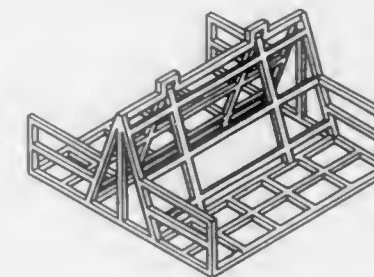
## DOUBLE BACK SWING SEAT

Larry D. Campbell, Rte. 3, Box 296C, Tecumseh, Okla. 74873

Filed Apr. 27, 1987, Ser. No. 43,236

Term of patent 14 years

U.S. Cl. D21-246



310,553

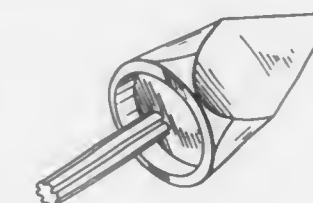
## ARROWHEAD

Bruce Kania, 77 S. 14th St., Bozeman, Mont. 59715, and William Walker, 3141 Swetzer, Loomis, Calif. 95650

Filed Nov. 29, 1988, Ser. No. 277,921

Term of patent 14 years

U.S. Cl. D22-115



310,554

## FISHHOOK DISGORGER

Randy Smith, Box 131, Rena Lava, Miss. 38767

Filed Oct. 13, 1987, Ser. No. 108,028

Term of patent 14 years

U.S. Cl. D22-149



310,551

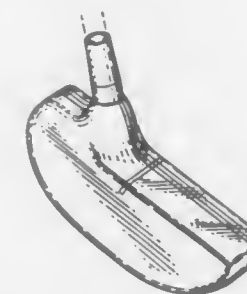
## GOLF PUTTER HEAD

Scott W. West, Leslie C. Streeter, and Gregory S. Halter, all of Coos Bay, Oreg., assignors to The House of Myrtlewood, Inc., Coos Bay, Oreg.

Filed Sep. 14, 1987, Ser. No. 95,656

Term of patent 14 years

U.S. Cl. D21-219



310,555

**COMBINED REVERSIBLE SPRINKLER NOZZLE AND SUPPORT RING**

Robert W. Hengesbach, 7886 Munson Rd., Mentor, Ohio 44060  
 Division of Ser. No. 224,249, Jul. 26, 1988, which is a continuation of Ser. No. 20,684, Mar. 2, 1987, which is a continuation-in-part of Ser. No. 674,272, Nov. 23, 1984, Pat. No. D. 293,127, which is a continuation-in-part of Ser. No. 461,874, Jan. 28, 1983, Pat. No. D. 282,392, which is a division of Ser. No. 756,186, Jul. 18, 1985, Pat. No. D. 284,301. This application Sep. 28, 1989, Ser. No. 414,069  
 Term of patent 14 years

U.S. Cl. D23—213



310,556

**FLEXIBLE HOSE CLAMP COVER**

David L. Russell, Manhattan Beach, Calif., assignor to Russell Industries, Inc., Paramount, Calif.  
 Filed Jan. 8, 1987, Ser. No. 59,274  
 Term of patent 14 years

U.S. Cl. D23—265

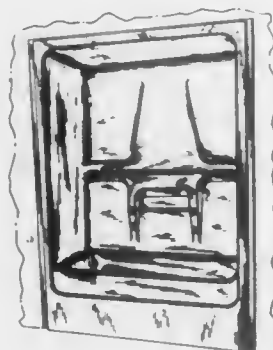


310,557

**BATHING ENCLOSURE OR THE LIKE**

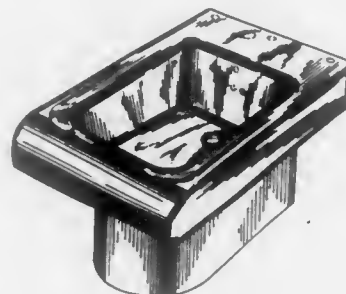
Iain M. Smith, Vernon, Canada, assignor to Kohler LTD/LTEE, Toronto, Canada  
 Filed Oct. 26, 1987, Ser. No. 112,127  
 Term of patent 14 years

U.S. Cl. D23—275

310,558  
BIDET

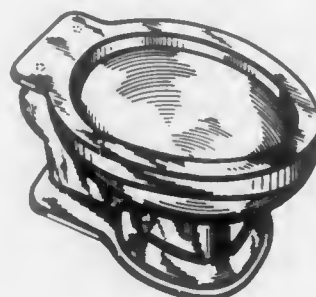
Herbert V. Kohler, Jr., Kohler, and Mary J. Reid, Sheboygan, both of Wis., assignors to Kohler Co., Kohler, Wis.  
 Filed Jan. 12, 1988, Ser. No. 144,438  
 Term of patent 14 years

U.S. Cl. D23—295

310,559  
TOILET

Mark W. Cors, Lodi, Wis., assignor to Kohler Co., Kohler, Wis.  
 Filed Jan. 17, 1989, Ser. No. 297,918  
 Term of patent 14 years

U.S. Cl. D23—295

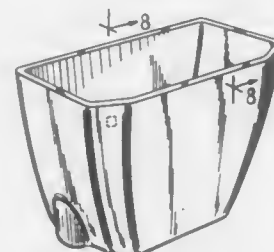


310,560

**TANK OR THE LIKE**

Henry M. Stairs, Jr., Neeshanic, N.J., assignor to American Standard Inc., New York, N.Y.  
 Filed Dec. 1, 1987, Ser. No. 128,535  
 Term of patent 14 years

U.S. Cl. D23—313

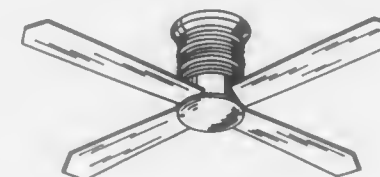


310,561

**CEILING FAN**

Thomas H. Janicz, Ardmore, Pa., assignor to Casablanca Fan Company, Inc., City of Industry, Calif.  
 Filed Oct. 28, 1988, Ser. No. 264,494  
 Term of patent 14 years

U.S. Cl. D23—377

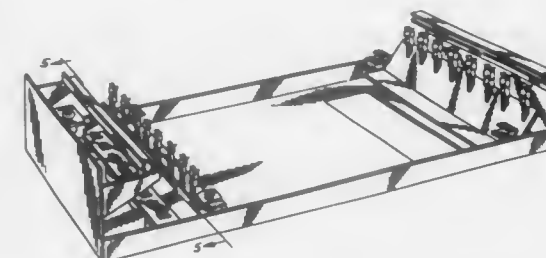


310,562

**HOUSING FOR MOUNTING A PLURALITY OF INFRARED HEATING LAMPS**

Jürgen Socha, Vänersborg, Sweden, assignor to Itronix Process AB, Uddevalla, Sweden  
 Filed Aug. 5, 1986, Ser. No. 893,346  
 Claims priority, application Sweden, Feb. 6, 1986, 860311  
 Term of patent 14 years

U.S. Cl. D23—386

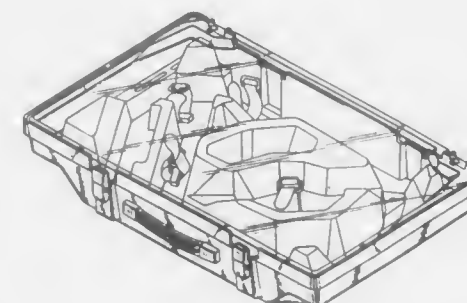


310,563

**STORAGE CASE FOR MEDICAL INSTRUMENT**

Stuart M. Greengrass, 56 Kimberley Road, Little Wakering, Essex; Philip M. Coath, 9 Canute Close, Canewdon, Essex; Russell Manoy, 4 The Green, Welwyn, Hertfordshire; David Muston, Old Pond Barn, Lower Weald, Calverton, and Andrew Scagell, Flat D, 74 Cophall Gardens, Twickenham, Middlesex, all of United Kingdom  
 Filed Jul. 22, 1986, Ser. No. 888,193  
 Term of patent 14 years

U.S. Cl. D24—9



310,564

**PILL CRUSHER**

Bradley M. Besaw, 10701 Call Canyon Rd., Castro Valley, Calif. 94546  
 Filed Feb. 8, 1988, Ser. No. 153,646  
 Term of patent 14 years

U.S. Cl. D24—23



310,565

**NASAL DILATOR**

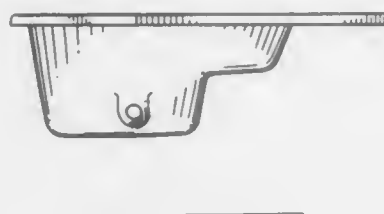
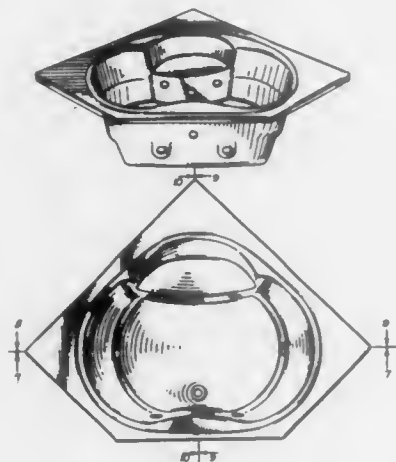
Björn Petruson, Santessonsgatan 1, S-412 66 Göteborg, Sweden  
 Filed May 19, 1988, Ser. No. 196,085  
 Claims priority, application United Kingdom, Nov. 19, 1987, 1046459  
 Term of patent 14 years

U.S. Cl. D24—34





310,566  
WHIRLPOOL BATHTUB  
Remo C. Jacuzzi, Little Rock, Ark., assignor to Jason International, Inc., Little Rock, Ark.  
Filed Aug. 10, 1967, Ser. No. 83,088  
Term of patent 14 years  
U.S. Cl. D24—38



310,567  
**TRAINER SPOUT TO BE USED IN CONJUNCTION  
 WITH A BABY BOTTLE**  
 William E. Fitzpatrick, Wyckoff, N.J., assignor to Playtex  
 Family Products, Inc., Stamford, Conn.  
 Filed Apr. 26, 1968, Ser. No. 186,273  
 Term of patent 14 years  
 U.S. Cl. D24—47



310,568  
BABY BOTTLE  
Paul L. Chapin, 1783 Haight St., San Francisco, Calif. 94117  
Filed May 8, 1969, Ser. No. 349,137  
Term of patent 14 years  
U.S. Cl. D24-47



310,569  
CANNULA FOR WITHDRAWING A TEST SAMPLE  
FROM A TEST TUBE  
Bengt-Inge Brodén, Gårdarivägen 3, S-532 00 Skara, Sweden  
Filed Aug. 10, 1967, Ser. No. 83,968  
Claims priority, application Sweden, Feb. 9, 1967, 87-0272  
Term of patent 14 years  
U.S. Cl. D24—51



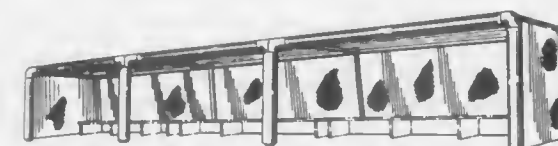
SEPTEMBER 11, 1990

U.S. PATENT AND TRADEMARK OFFICE

310,570  
**PORTABLE INTRAVENOUS POLE**  
 James A. Wells, 2401 Miriam, Arlington, Tex. 76010  
 Filed Feb. 8, 1988, Ser. No. 153,650  
 Term of patent 14 years  
 U.S. Cl. D24—51



310,571  
SIDELINE SHELTER  
Frank M. Lipousky, 402 Birch, Champaign, Ill. 61820  
Filed Dec. 18, 1987, Ser. No. 134,900  
Term of patent 14 years  
U.S. Cl. D25—1



310,572

**WINDOW COMPONENT EXTRUSION**

Ludwig Reisinger, McPherson; Dennis Westphal, Galva, and Jonathan Piles, McPherson, all of Kans., assignors to Certain-Teed Corporation, Valley Forge, Pa.

Filed Sep. 1, 1987, Ser. No. 91,704

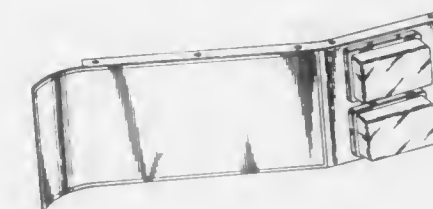
The portion of the term of this patent subsequent to Mar. 21, 2003, has been disclaimed.

Term of patent 14 years

U.S. Cl. D25—119



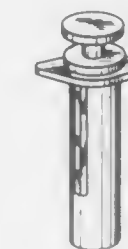
310,573  
AUXILIARY TURN SIGNAL FOR VEHICLES  
Howard Lubin, 10012 Nevada Ave., Chatsworth, Calif. 91311  
Filed Apr. 2, 1987, Ser. No. 33,502  
Term of patent 14 years  
U.S. Cl. D26—35



310,574  
PORTABLE LAMP  
Burton Trattner, Ringwood, N.J., assignor to Harvey-Westbury  
Corp., Westbury, N.Y.  
Filed Sep. 21, 1987, Ser. No. 98,667  
Term of patent 14 years  
U.S. Cl. D26-44



310,575  
FLASHLIGHT FOR USE BY PHYSICIANS FOR MOUTH,  
EAR, AND THE LIKE  
Nobret Leopoldi, Chicago, and William Heinrich, McHenry,  
both of Ill., assignors to The Cloverline, Inc., Chicago, Ill.  
Filed Jun. 10, 1987, Ser. No. 60,375  
Term of patent 14 years  
U.S. Cl. D26—47



310,576

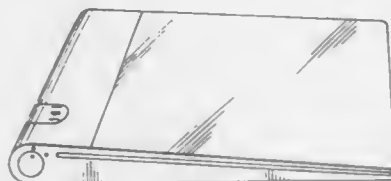
## ILLUMINATED MAP HOLDER

Theresa M. Narbut, 269 W. Camino Real, Arcadia, Calif. 91006, and Andres E. Ramirez, 551 Meadow Grove, Flintridge, Calif. 91011

Filed Jan. 15, 1988, Ser. No. 144,079

Term of patent 14 years

U.S. Cl. D26—58



310,577

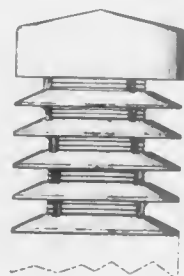
## POST LIGHT FIXTURE

Jay J. Kakuk, Plymouth; Joseph J. Walto, Carver, and Steven T. O'Brien, Champlin, all of Minn., assignors to The Toro Company, Minneapolis, Minn.

Filed Mar. 10, 1988, Ser. No. 166,843

Term of patent 14 years

U.S. Cl. D26—67



310,578

## CIGARETTE PACKAGE HOLDER

Mikhail Vaynshteyn, 250 Ashley Dr., Rochester, N.Y. 14620

Filed Feb. 1, 1988, Ser. No. 150,707

Term of patent 14 years

U.S. Cl. D27—187



310,579

## TRISCORED DRUG TABLET

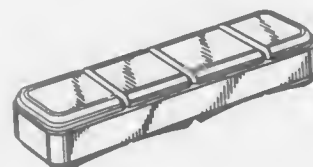
Phillip F. Ni, Mattawan, and Larry F. Odar, Galesburg, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 133,992, Dec. 17, 1987, abandoned.

This application Apr. 28, 1989, Ser. No. 345,428

Term of patent 14 years

U.S. Cl. D28—2



310,580

## DISPOSABLE RAZOR/TWEEZER

Victor S. King, 7920 San Felipe Blvd., #2507, Austin, Tex. 78729

Filed Oct. 9, 1987, Ser. No. 106,321

Term of patent 14 years

U.S. Cl. D28—46



310,581

## NAIL FILE

Chariton Sadler, P.O. Box 446, Brooksville, Fla. 33512

Filed Oct. 18, 1989, Ser. No. 423,139

Term of patent 14 years

U.S. Cl. D28—59



310,582

## DENTAL FLOSS HOLDER

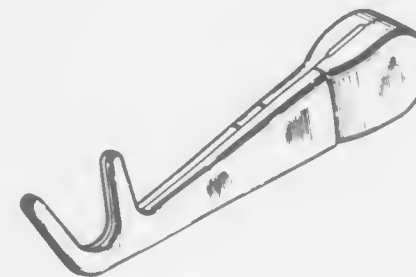
Osamu Kujirai, Kumagaya, Japan, assignor to G-C Dental Industrial Corporation, Tokyo, Japan

Filed Sep. 7, 1988, Ser. No. 241,399

Claims priority, application Japan, Mar. 8, 1988, 63-9147

Term of patent 14 years

U.S. Cl. D28—64



310,583

## DENTAL FLOSS HOLDER

William J. Pickett, P.O. Box 827, Walnut Grove, Calif. 95690

Filed Aug. 21, 1989, Ser. No. 396,017

Term of patent 14 years

U.S. Cl. D28—64



310,584

## LIGHTED TELESCOPIC MIRROR

Emmanuel Cadet, 335-A Beaver Rd., Lagrangeville, N.Y. 12540

Filed Jul. 7, 1988, Ser. No. 216,241

Term of patent 14 years

U.S. Cl. D28—64.1



310,585

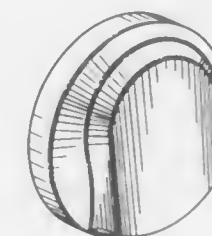
## PROTECTIVE CAP FOR A RESPIRATOR'S REPLACEABLE FILTER

William E. Newcomb, Coventry, R.I., assignor to Siebe North, Inc., Charleston, S.C.

Filed Apr. 29, 1987, Ser. No. 43,988

Term of patent 14 years

U.S. Cl. D29—7



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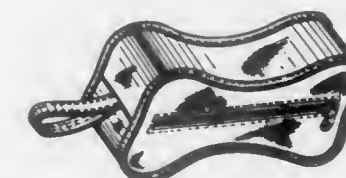
## PET CARRYING CASE

Howard Dobelle, New City, N.Y., assignor to Andoe Inc., New City, N.Y.

Filed Jan. 28, 1988, Ser. No. 150,566

Term of patent 14 years

U.S. Cl. D30—109





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SEPTEMBER 11, 1990

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## CAT LITTER BOX

Robert Hinson, 27251 Comba, Mission Viejo, Calif. 92692

Filed Mar. 8, 1985, Ser. No. 709,814

Term of patent 14 years

U.S. Cl. D30—161



310,588

## DISPOSABLE CAT LITTER BOX

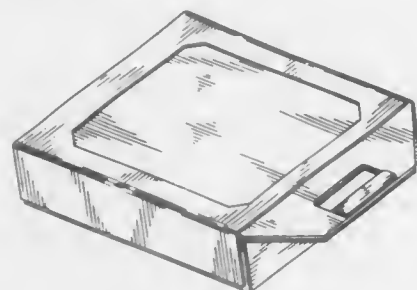
Tina M. Valinsky, 7152 Rock Ridge Ter., West Hills, Calif.

91307

Filed Nov. 28, 1988, Ser. No. 276,568

Term of patent 14 years

U.S. Cl. D30—161



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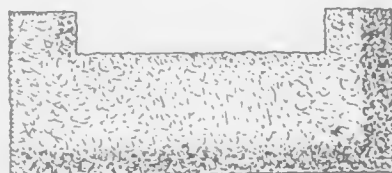
## FLEXIBLE COVER FOR A SPONGE MOP

Francis P. Paciullo, Middlesex, and Ligia A. Rivera, North Brunswick, both of N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.

Filed Apr. 14, 1988, Ser. No. 181,621

Term of patent 14 years

U.S. Cl. D32—40



SEPTEMBER 11, 1990

U.S. PATENT AND TRADEMARK OFFICE

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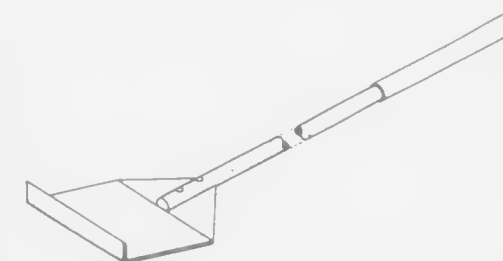
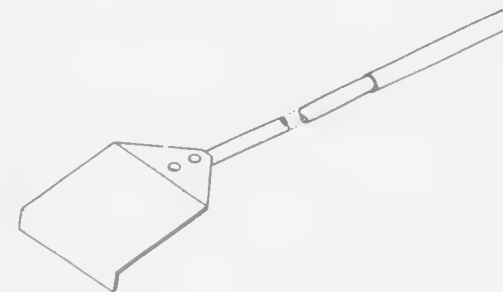
## GUTTER CLEANING TOOL

John T. Williams, Jr., 3240 Burning Tree Dr., Birmingham, Ala. 35226

Filed Mar. 16, 1988, Ser. No. 168,752

Term of patent 14 years

U.S. Cl. D32—49



310,591

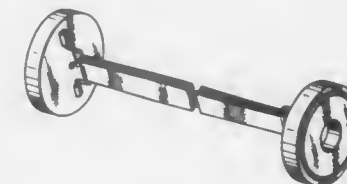
## LINE-TYPE HOLDER WITH A MAGNETIC SUPPORT UNIT FOR SUPPORTING ARTICLES

Stanley E. Jeffus, 202 Hockaday, Garland, Tex. 75043

Filed Jul. 21, 1986, Ser. No. 887,450

Term of patent 14 years

U.S. Cl. D32—60



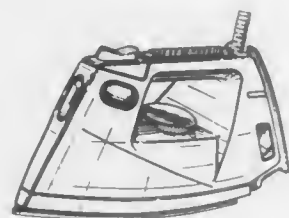
310,592  
IRON

Michael N. Komar, Shropshire, England, assignor to Russell Hobbs Tower Ltd., Wombourne, United Kingdom

Filed Aug. 5, 1988, Ser. No. 229,104  
Claims priority, application United Kingdom, Feb. 5, 1988, 1048308

Term of patent 14 years

U.S. Cl. D32-70



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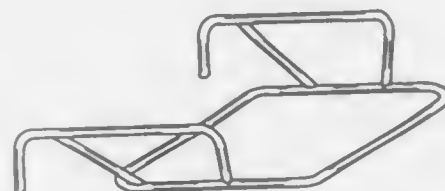
CARRIER RACK FOR HOUSING A COOLER WHEN ATTACHED TO A GOLF CART

Joseph R. Lamarche, 562 Kintail Street, Sarnia, Ontario, Canada NT1 1Z1

Filed Jan. 5, 1987, Ser. No. 972

Claims priority, application Canada, Jul. 4, 1986, 04-07-86-6  
Term of patent 14 years

U.S. Cl. D34-27



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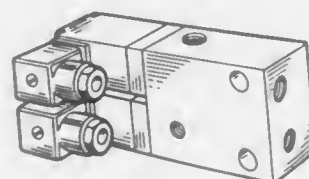
VENTURI UNIT FOR A VACUUM LIFTER

Karl E. Johansson, Nykyrkevägen 52, S-565 00 Mullsjö, Sweden

Filed Oct. 1, 1987, Ser. No. 103,567

Claims priority, application Sweden, Apr. 1, 1987, 87-0741  
Term of patent 14 years

U.S. Cl. D34-28



## LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF SEPTEMBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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- A. H. Robins Company, Inc.: See—  
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- A. Stephan u. Soehne GmbH & Co.: See—  
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- Aakre, David E.; Hoffman, Roy L.; Moen, David N.; and Schmierer, Quentin G., to International Business Machines Corporation. Real time data transformation and transmission overlapping device. 4,956,808, Cl. 364-900.000.
- AB Perma System: See—  
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- Abbott Laboratories: See—  
Chu, Daniel T.; and Rosen, Terry J., 4,956,475, Cl. 548-557.000.
- Gordon, Julian; and Pugh, Charles S. G., 4,956,302, Cl. 436-161.000.
- Grandone, Cass J., 4,956,148, Cl. 422-64.000.
- Abdulally, Iqbal F., to Foster Wheeler Energy Corporation. Method and system for controlling the backflow sealing efficiency and recycle rate in fluidized bed reactors. 4,955,295, Cl. 110-263.000.
- Abe, Masanori; Mase, Syunzo; and Kozuka, Yoshinari, to NGK Insulators, Ltd. Method and apparatus for optically measuring electric current and/or magnetic field. 4,956,607, Cl. 324-244.000.
- Abe, Nobuyuki: See—  
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- Abe, Taizo, to Okamura Corporation. Foldable table. 4,955,294, Cl. 108-6.000.
- Abe, Takao: See—  
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- Abiru, Toichi: See—  
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- Abis, Luigi: See—  
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- Abolins, Andrew: See—  
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- Abuyama, Yasuo; Ide, Fumito; Hamanaka, Osamu; and Sanbayashi, Takashi, to Kabushiki Kaisha Toshiba. Image forming apparatus with easily removable developing units. 4,956,673, Cl. 355-245.000.
- Academy of Applied Science: See—  
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- Acco Cable Controls Limited: See—  
Clissett, Peter A. G.; and Lacey, Roger A., 4,955,252, Cl. 74-502.400.
- Ace Orthopedic Manufacturing: See—  
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- (ACEC) Ateliers de Constructions Electriques de Charleroi: See—  
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- Acushnet Company: See—  
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- Adair, Paul C.; and Moore, Cheryl L., to Mead Corporation. The Microroughened developer sheet for forming high density images. 4,956,309, Cl. 430-138.000.
- Adaka, Yasuaki: See—  
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- Adams, Philip N.: See—  
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- Adeka Argus Chemical Co., Ltd.: See—  
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- Shibata, Toshihiro; and Kimura, Masaki, 4,956,488, Cl. 558-414.000.
- Adell, Loren S., to Trident Laboratories, Inc. Mouthguard with conformable arch liners. 4,955,393, Cl. 128-859.000.
- Adeyeye, Aderemi A.: See—  
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- Admassu, Wudneh: See—  
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- Administrator, National Aeronautics and Space Administration: See—  
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- Advanced Cardiovascular Systems, Inc.: See—  
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- Aga, Keigo: See—  
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- Agostinelli, John A.; and Lubberts, Gerri, to Eastman Kodak Company. Conductive articles and processes for their preparation. 4,956,335, Cl. 505-1.000.
- Ahlens, Klaas: See—  
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- Aiello, Bruno, to AMP Incorporated. Method of operating harness making machine. 4,955,927, Cl. 29-861.000.
- Aimoto, Toyoka: See—  
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- Aimura, Yoshiaki: See—  
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- Ainger, Raymond, III: See—  
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- Air Products and Chemicals, Inc.: See—  
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- Schweighardt, Frank K.; and Bailey, Webb I., 4,956,390, Cl. 514-747.000.
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- Aisan Kogyo Kabushiki Kaisha: See—  
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- Ajinomoto Company, Inc.: See—  
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- Ueda, Shinji; and Takizawa, Koichi, 4,956,191, Cl. 426-330.300.
- Ajioka, Masanobu; Takenaka, Shinji; Itoh, Hiroyuki; Kataita, Masafumi; and Kohno, Yoshitsugu, to Mitsui Toatsu Chemicals, Incorporated. Production process of chlorine. 4,956,169, Cl. 423-502.000.
- Akagi, Katsuhito: See—  
Shintani, Dai; Taniguchi, Toshihiko; Miki, Yukio; Akagi, Katsuhito; and Kajita, Hideo, 4,956,657, Cl. 354-195.120.
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- Akimoto, Haruo; and Takeya, Kunio, to UBE Industries, Ltd. Pressing mechanism for casting apparatus. 4,955,426, Cl. 164-314.000.
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- Aktiebolaget Electrolux: See—  
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- Al-Malaika, Sahar: See—  
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- Alberta Telecommunications Research Centre: See—  
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- Albertson, William C.: to General Motors Corporation. Fuel injection. 4,955,350, Cl. 123-533.000.
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- Albrecht, Leonard N.; and Burke, Steven R., to McLeod, Bruce G.; and Fowler, Allan R., a part interest. Display sign holder and display sign therefor. 4,955,153, Cl. 40-661.000.
- Albright, Larry E.; Mather, Joseph M.; Loraas, Orlan J.; and Lynnes, Carman, to Clark Equipment Company. Method for assembling a skid steer loader. 4,955,455, Cl. 180-291.000.
- Albright, Larry W. Plasma Display using a double-walled enclosure. 4,956,579, Cl. 315-58.000.
- Alcatel N.V.: See—  
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- Aldcroft, Derek; Newton, John; Quinn, James P.; and Stanier, Peter W., to Unilever Patent Holdings B.V. Silicas. 4,956,167, Cl. 423-339.000.
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- Alfano, Robert R.; and Ho, Ping P. Ultrafast oscilloscope. 4,956,548, Cl. 250-213.0VT.
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- Allen, Donald R., to Frazier Industrial Company. Storage rack system. 4,955,489, Cl. 211-151.000.
- Allen, James D.; Harris, Calvin E.; Litwiller, Debora M.; and Russel, Matthew J., to Eastman Kodak Company. Secure copier and method of reproduction. 4,956,666, Cl. 355-201.000.
- Allen, Paul C.; Teitzel, Robin; and Thomas, Timothy, to ATEQ Corporation. Pattern generation system. 4,956,650, Cl. 346-108.000.
- Allen, Thomas E.; Matzinger, James E.; and Weaver, William R., to Libbey-Owens-Ford Co. Molding process utilizing a mold release membrane. 4,956,141, Cl. 264-297.200.
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- Allied-Signal Inc.: See—  
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- Knight, David J.; Kubik, James M.; and Neal, Brian P., 4,955,994, Cl. 55-163.000.
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- Amataka, Atsushi; Kushida, Kazumitsu; Nakajima, Koji; and Yamamoto, Hitoshi, to Honda Giken Kogyo Kabushiki Kaisha. Piston for internal combustion engine. 4,955,353, Cl. 123-668.000.
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- Leduc, Edward C., 4,956,395, Cl. 521-79.000.
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- Anderson, Carl. Pump jack. 4,955,584, Cl. 182-133.000.
- Anderson, Michael D., to Zinpro Corporation. Copper complexes with alpha hydroxy organic acids and their use as nutritional supplements. 4,956,188, Cl. 426-74.000.
- Anderson, Michael W., to Moore Business Forms, Inc. Z-folded packing list/invoice. 4,955,640, Cl. 281-2.000.
- Anderson, William K.: See—  
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- Astra Pharmaceutical Products, Inc.: See—  
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- Astra-Vent AB: See—  
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- Avon Industrial Polymers Limited: See—  
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- Awano, Katsuya: See—  
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- Babu, Suryadevara V.; Lu, Neng-Hsing; and Jones, Gerald W., to International Business Machines Corporation. Plasma conditioning of a substrate for electroless plating, 4,956,197, Cl. 427-39.000.
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- Baier & Koppel GmbH & Co. Präzisionsapparate: See—  
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- Bailey, Alan; and Yew, David K., to British Nuclear Fuels plc. Apparatus for transporting objects, 4,956,079, Cl. 209-552.000.
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- Baker Industries, Inc.: See—  
Vogt, William R., 4,956,637, Cl. 340-644.000.
- Baker, Jeffrey H., to M-D, Inc. Surgical chair or table with debris-catching facility and disposable catch bag therefor, 4,955,666, Cl. 297-182.000.
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Heckaman, Douglas E.; Baker, John E.; and Whybrew, Walter M., 4,956,621, Cl. 333-104.000.
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- Bamberg, Peter; Ekstrom, Bertil A.; Forsgren, Ulf E.; and Sjöberg, Berndt O. H., to Astra Lakemedel Aktiebolag; and Astra Pharmaceutical Products, Inc. Antibacterial combination of penicillin and cephalosporin, 4,956,179, Cl. 424-114.000.
- Ban, Keisuke: See—  
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- Banno, Yoshikazu: See—  
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- Baril, Michel, to Thomson-CSF. Device including a radial combiner for electromagnetic waves, 4,956,614, Cl. 330-286.000.
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- Barlow, James L. Incinerator grate assembly, 4,955,296, Cl. 110-300.000.
- Barnhart, William D. Produce dispenser, 4,955,529, Cl. 229-122.100.
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- Barrall, Jeffery L., to Armstrong World Industries, Inc. Surface pacified wollastonite, 4,956,321, Cl. 501-146.000.
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- Barry, Michael, to Neihold, Daniel A. Mounting structure for arcuate window frames, 4,955,168, Cl. 52-210.000.
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- Bartholmey, Brett A.: See—  
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- Barwise, Christopher H., to Fospur Limited. Froth flotation of mineral fines, 4,956,077, Cl. 209-166.000.
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- Battaglia, Michael A. Trash receptacle lining system, 4,955,505, Cl. 220-407.000.
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- Bennett, Kurt K., to Weatherchem Corporation. Dispensing closure with flap retention, 4,955,513, Cl. 222-480.000.
- Benz, Erwin; Rau, Wolfgang; Bauer, Rainer; and Willy, Gerd, to Daimler-Benz Aktiengesellschaft. Closed hollow support, 4,955,570, Cl. 248-300.000.
- Bequette, Robert J.; Bonenberger, Bruce A.; Gallian, Claude E.; and Reckelhoff, John R., to Bristol-Myers Company. Direct compression cholestyramine tablet and solvent-free coating therefor, 4,956,182, Cl. 424-476.000.
- Berard, Paul M., to Siemens Transmission Systems, Inc. Frequency multiplier, 4,956,797, Cl. 364-703.000.
- Berchem, Rutger, to Metalpræcis Berchem + Schaberg Gesellschaft für Metallformgebung mit beschränkter Haftung. Joint prosthesis, 4,955,912, Cl. 623-18.000.
- Berghout, Cornelis W.; and Van Haren, Hendrikus J. J. M., to U.S. Philips Corporation. Multilayer capacitor, 4,956,744, Cl. 361-321.000.
- Berman, Arnold L.: See—  
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- Beth Israel Hospital Association, The: See—  
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- Betz PaperChem, Inc.: See—  
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- Billman, Elizabeth R.: See—  
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- Biofield Corporation: See—  
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- Biogen, Inc.: See—  
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- Blackmer, Richard H.; and Hedman, Jonathan W., to Transpirator Technologies, Inc. Method and apparatus for pulmonary and cardiovascular conditioning of racehorses and competition animals. 4,955,372, Cl. 128-203.160.
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- Boehringer Mannheim Corporation: See—  
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- Bollinger, Pietro; Gubler, Hans U.; and Schnyder, Jorg, to Sandoz Ltd. Treating tissue calcium depletion or degenerative processes in bone or cartilage. 4,956,381, Cl. 514-443.000.
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- Bos, Louisa. Shoe, sandal or similar footwear. 4,955,147, Cl. 36-11.500.
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- Bott, John A. Cargo restraint system. 4,955,771, Cl. 410-94.000.
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- Botti, Edoardo, to Jacobacci-Casetta & Perani. Muting circuit for audio amplifiers. 4,956,616, Cl. 330-297.000.
- Bourassa, Roger J., to Boeing Company, The. Low temperature plasma generator with minimal RF emissions. 4,956,582, Cl. 315-111.210.
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- Bowlds, Daniel P., to MPD, Inc. Mechanical adjustment arrangement for dielectric resonator oscillator. 4,956,617, Cl. 331-96.000.
- Boyd, Jack D.; Sitt, Hermann; Ryang, Hong-Son; and Biermann, Theodore F., to BASF Aktiengesellschaft. Structures exhibiting improved transmission of ultrahigh frequency electromagnetic radiation and structural materials which allow their construction. 4,956,393, Cl. 521-54.000.
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- Boyer, Keith: See—  
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- Branco, Anthony G.: See—  
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- Chen, Tsai-An. Cake manufacturing machine. 4,955,288, Cl. 99-348.000.
- Cheng, Thong-Meng: See—  
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- Cherko, Victor M. Integrated tool control for work station. 4,956,589, Cl. 318-67.000.
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- Cherne Medical, Inc.: See—  
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- CHF Industries, Inc.: See—  
Marinescu, Florin; Patel, Bakulesh N.; and Hammond, William M., 4,955,420, Cl. 160-178.200.
- Chiang, Yung-Tung, to Chyuan How Enterprise Co., Ltd. Automatic corkscrew. 4,955,261, Cl. 81-3.200.



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Child, Jonathan E.; Chou, Tai-Sheng; Huss, Albin, Jr.; Kennedy, Clinton R.; Ragonese, Francis P.; and Tabak, Samuel A., to Mobil Oil Corp. Heterogeneous isoparaffin/olefin alkylation. 4,956,518, Cl. 585-726.000.  
Childers, Robert W.: See—  
Cummings, Arthur L.; and Childers, Robert W., 4,956,145, Cl. 422-28.000.  
Ching, Daw-Long. Removable mounting assembly for fog lights and flag poles. 4,955,577, Cl. 248-539.000.  
Chino, Shuichi: See—  
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Chitty, Joseph M.: See—  
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Chiu, David. Mini foldable cycle. 4,955,628, Cl. 280-239.000.  
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Lorence, Brian S.; and Phelps, Richard A., 4,955,571, Cl. 248-311.200.  
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Choi, Sung Hui. Centrifugal bio-contact apparatus. 4,956,082, Cl. 210-150.000.  
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Chr. Hansen's Laboratory, Inc.: See—  
Sudoma, A. Louis, 4,956,295, Cl. 435-252.100.  
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Krogstrup, Johan; Nohr, Henning; Christensen, Bruno; and Fosnaes, Frank, 4,955,656, Cl. 294-100.000.  
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Glowaczewski, Thomas; Macomb County; and Carle, Keith B., 4,955,336, Cl. 123-179.000.  
Chu, Cynthia T.-W., to Mobil Oil Corp. Process for converting olefins to higher hydrocarbons. 4,956,514, Cl. 585-533.000.  
Chu, Daniel T.; and Rosen, Terry J., to Abbott Laboratories. Preparation of enantiomerically pure 3-protected amino-pyrrolidines. 4,956,475, Cl. 548-557.000.  
Chu, Hsien-Kun; Kamis, Russell P.; Klosowski, Jerome M.; and Lower, Loren D., to Dow Corning Corporation. Neutral cure silicone sealants. 4,956,435, Cl. 528-17.000.  
Chu, Pochen: See—  
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Chu, Shaw-Chang; Heilman, Paul D.; and Kirk, Kevin A., to Mobil Oil Corporation. Slip coated thermoplastic films. 4,956,233, Cl. 428-349.000.  
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Chyuan How Enterprise Co., Ltd.: See—  
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Ciba Corning Diagnostics Corp.: See—  
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Bernheim, Michael; Strasilla, Dieter; De Sousa, Bernardo; and Rohringer, Peter, 4,956,049, Cl. 162-158.000.  
Lacroix, Roger; and Ruhlmann, Edmond, 4,955,987, Cl. 8-549.000.  
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Ciccone, Frank E., to International Nautical Supplies, Inc. Yieldable line assembly and in line shock absorber. 4,955,309, Cl. 114-230.000.  
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Circon Corporation: See—  
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Clarion Co., Ltd.: See—  
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Clark, Daniel O.: See—  
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Albright, Larry E.; Mather, Joseph M.; Loraas, Orlan J.; and Lynnes, Carman, 4,955,455, Cl. 180-291.000.  
Clark, Lloyd T.; and Marshall, James W. Apparatus for applying a sulphur-based structural material to paved surfaces. 4,955,721, Cl. 366-24.000.  
Clark, Robin D.; Kilpatrick, Andrew T.; and Spedding, Michael, to Syntex (U.S.A.) Inc. Decahydro-8H-isoquinol(2,1-g)(1,6)naphthyridine derivatives and related compounds. 4,956,365, Cl. 514-233.200.  
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Clarke, Roy: See—  
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Zarnowski, Alfred J.; and Cohen, Robert C., 4,955,325, Cl. 623-22.000.  
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Coleman, Jeffrey O., to Boeing Company, The. Coherence multiplexed optical signal transmission system and method. 4,956,834, Cl. 370-1.000.  
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- Colthurst Limited: See—  
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Columbia University in the City of New York, The Trustees of: See—  
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Cossement, Eric; Gobert, Jean; Boydens, Roland; and Mathieu, Jacques, to U C B S.A. 2-amino-4-morpholino-6-propyl-1,3,5-triazines. 4,956,367, Cl. 514-236.200.  
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- Dainippon Screen Mfg. Co., Ltd.: See—  
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- Dalebout, William T.: See—  
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- Dana Farber Cancer Institute, Inc.: See—  
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- Wallner, Barbara P.; Springer, Timothy A.; Hession, Catherine; Tizard, Richard; Mattaliano, Robert; and Dustin, Michael L., 4,956,281, Cl. 435-69.300.
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- Petersen, Jens K.; and Sorensen, Ole V., 4,955,444, Cl. 180-132.000.
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- D'Angelo, Mario: See—  
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- Frankel, Arthur E.: See—  
Bjorn, Michael J.; Frankel, Arthur E.; Laird, Walter J.; Ring, David B.; and Winkelhake, Jeffery L., 4,956,453, Cl. 530-389.000.
- Franko, Robert J.: See—  
Wheeler, Edward L.; and Franko, Robert J., 4,956,405, Cl. 524-100.000.
- Frans Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: See—  
Theurer, Josef; and Hanemann, Johann, 4,955,302, Cl. 104-7.200.
- Franz, Michael; and Lundquist, Ingemar, to EP Technologies. Apparatus and method for recording monophasic action potentials from an in vivo heart. 4,955,382, Cl. 128-642.000.
- Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: See—  
Theurer, Josef; Hansmann, Johann; and Worgotter, Herbert, 4,955,301, Cl. 104-7.200.
- Fraunhofer Gesellschaft zur Forderung der Angewandten Forschung E.V.: See—  
Kossatz, Gert; Heine, Wolfgang; Lempfer, Karsten; and Sattler, Heinz, 4,955,171, Cl. 52-612.000.
- Frazier, Darrell E.: See—  
Culley, Jeffrey L.; Frazier, Darrell E.; and Frisch, Anthony E., 4,956,691, Cl. 357-41.000.
- Frazier Industrial Company: See—  
Allen, Donald R., 4,955,489, Cl. 211-151.000.
- Freeman, Ferre M. Universal medical forcep tool. 4,955,896, Cl. 606-210.000.
- Freeman, Gerald C.; and Feinland, Seymour, to Pitney Bowes Inc. Mailing system for mixed weight mail. 4,956,782, Cl. 364-464.030.

- Freeman, Lucius J.; and Gagen, Paul F., to AT&T Bell Laboratories. Optical fiber connector. 4,955,976, Cl. 350-96.210.
- Freier, Fred, to Egli, Fischer & Co. AG. Pipe clip. 4,955,574, Cl. 248-316.500.
- Freisinger, Henry: See—  
Stritzl, Karl; Freisinger, Henry; Wurthner, Hubert; and Riegler, Andreas, 4,955,633, Cl. 280-633.000.
- Fresco System USA, Inc.: See—  
Beer, Jeffrey S.; and Gracie, Michael D., Sr., 4,955,479, Cl. 206-455.000.
- Frey, Andre F. Device for the in situ repair of a pipe. 4,955,755, Cl. 405-155.000.
- Frey, Otto; and Koch, Rudolf, to Sulzer Brothers Limited. Metallic intervertebral prosthesis. 4,955,908, Cl. 623-17.000.
- Frey, Otto; and Koch, Rudolf, to Sulzer Brothers Limited. Bone implant. 4,955,911, Cl. 623-16.000.
- Frick, Vincent, to United States of America. Air Force. Method of creating passageways in niobium by CVD of niobium over sintered vanadium which is thereafter leached. 4,956,201, Cl. 427-181.000.
- Friedman, Maurice: See—  
Miller, Edward J.; Beukers, John M.; and Friedman, Maurice, 4,956,646, Cl. 343-706.000.
- Friedrich, Karl, to Kramer-Werke GmbH. Vehicle, especially a loader. 4,955,664, Cl. 296-204.000.
- Friel, Thomas C., Jr.; and O'Lenick, Anthony J., Jr. Particulate defoaming compositions. 4,956,119, Cl. 252-358.000.
- Friese, Hans-Herbert: See—  
Fabry, Bernd; Friese, Hans-Herbert; Pieper, Friedrich; and Uphues, Guenter, 4,956,116, Cl. 252-174.160.
- Frigerio, Marco; Gandolfi, Carmelo A.; and Tognella, Sergio, to Boehringer Biochemia Robin S.p.A. 2-dithioalkyl-dihydropyridines and pharmaceutical compositions containing them. 4,956,369, Cl. 514-274.000.
- Frisch, Anthony E.: See—  
Culley, Jeffrey L.; Frazier, Darrell E.; and Frisch, Anthony E., 4,956,691, Cl. 357-41.000.
- Frisk, Don L., to PZF, Inc. Shoulder harness reel assembly with automatic reel lock. 4,955,556, Cl. 242-107.40B.
- Frito-Lay, Inc.: See—  
Beatty, Dennis W.; and Shafer, C. Brooks, 4,955,226, Cl. 73-49.300.
- Fritz Eichenauer GmbH & Co. KG: See—  
Ohnmacht, Helmut; Nauert, Karl-Heinz; and Meywald, Klaus, 4,956,545, Cl. 219-541.000.
- Fritz Schafer Gesellschaft mit beschränkter Haftung: See—  
Schafer, Gerhard, 4,955,490, Cl. 211-187.000.
- Fritzsch, Peter: See—  
Staheli, Paul; Demuth, Robert; and Fritzsch, Peter, 4,955,266, Cl. 19-105.000.
- Fröse-Peeck, Ruediger; and Poleschinski, Richard, to Siemens Aktiengesellschaft. Method and apparatus for automatically adjusting the focus of cathode ray tubes. 4,955,680, Cl. 315-382.000.
- Frohning, Carl D.; and Horn, Gerhard, to Hoechst Aktiengesellschaft. Process for the preparation of catalyst compositions containing nickel, alumina, and zirconium dioxide and catalysts made therefrom. 4,956,328, Cl. 502-242.000.
- Froning, Edilbert A. K.; and Langner, Klaus A. Device for carrying out field supported ion exchange in plane-parallel plates. 4,956,066, Cl. 204-243.00R.
- Fruzinsky, Otto: See—  
Wellershausen, Ulf; and Fruzinsky, Otto, 4,955,920, Cl. 623-36.000.
- Fry, David, to Diversified Graphics, Ltd. Method of adhering holograms to textile wearing apparel. 4,956,040, Cl. 156-267.000.
- Fry, Francis J.; and Sanghvi, Narendra T., to Laboratory Equipment, Corp. Localization and therapy system for treatment of spatially oriented focal disease. 4,955,365, Cl. 128-24.00A.
- Fryd, Michael; Leberzammer, Ernst; and Sebastian, S. Andries R., to Du Pont de Nemours, E. I., and Company. Aqueous processible photosensitive compositions containing core shell microgels. 4,956,252, Cl. 430-138.000.
- Fuji Electric Co., Ltd.: See—  
Kuroda, Masami; Sugata, Yoshinobu; and Furusho, Noboru, 4,956,250, Cl. 430-58.000.
- Kuroda, Masami; Nakamura, Youichi; and Furusho, Noboru, 4,956,277, Cl. 430-58.000.
- Nakanishi, Shingo; and Yamamoto, Susumu, 4,955,790, Cl. 417-45.000.
- Nishibe, Takashi; and Yokoyama, Shotaro, 4,956,546, Cl. 250-203.100.
- Shimizu, Hiroshi; Harada, Takashi; Kondoh, Kaoru; and Kobayashi, Yoshiji, 4,956,245, Cl. 429-26.000.
- Fuji Jukogyo Kabushiki Kaisha: See—  
Kotajima, Takao, 4,955,848, Cl. 474-28.000.
- Tohmiya, Masato, 4,955,342, Cl. 123-339.000.
- Yamaashi, Shunji; and Arai, Yoshimitsu, 4,955,255, Cl. 74-856.000.
- Fuji Machinery Company Ltd.: See—  
Seko, Kiyoshi; Hatano, Masato; and Suzuki, Shigeki, 4,955,176, Cl. 53-73.000.
- Fuji Photo Film Co., Ltd.: See—  
Hayata, Youichi; and Matsui, Michihiro, 4,956,728, Cl. 360-66.000.
- Ikeda, Hideo; and Ohno, Shigeru, 4,956,269, Cl. 430-505.000.
- Inoue, Nobuaki, 4,956,257, Cl. 430-264.000.
- Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hisashi; Ukai, Toshinao; Yagihara, Morio; Takagi, Yoshihiro; and Yoneyama, Masakazu, 4,956,263, Cl. 430-264.000.
- Masuda, Toshiyuki, 4,956,213, Cl. 428-64.000.
- Nakada, Junji; and Takeuchi, Hideaki, 4,956,070, Cl. 204-298.180.
- Nakamura, Koichi, 4,956,260, Cl. 430-138.000.
- Nakamura, Taku, 4,956,253, Cl. 430-138.000.
- Nakazyo, Kiyoshi; Ishikawa, Takatoshi; and Fujita, Yoshikazu, 4,956,268, Cl. 430-393.000.
- Shiraishi, Hisashi, 4,956,559, Cl. 250-484.100.
- Takase, Masaaki; and Sato, Kozo, 4,956,456, Cl. 534-615.000.
- Ueda, Shinji; Heki, Tatsuo; Inoue, Noriyuki; Ishikawa, Tatatoshi; Ohki, Nobutaka; Yagihara, Morio; Morimoto, Kiyoshi; Fujimoto, Hiroshi; and Andoh, Kazuto, 4,956,267, Cl. 430-372.000.
- Washizu, Shintaro; Usami, Toshimasa; Tatsuta, Sumitaka; and Yamaguchi, Jun, 4,956,251, Cl. 430-138.000.
- Washizu, Shintaro; and Yamaguchi, Jun, 4,956,254, Cl. 430-138.000.
- Yasunaga, Tadashi; Yanai, Akio; Sasazawa, Koji; and Nagao, Makoto, 4,956,229, Cl. 428-336.000.
- Yuhki, Hirokazu; Fujiwara, Kazuhiko; Ohnishi, Hiroshi; and Arai, Fuminori, 4,956,146, Cl. 422-56.000.
- Fuji Xerox Co., Ltd.: See—  
Hiroshige, Ken; and Ueha, Sadayuki, 4,955,598, Cl. 271-267.000.
- Masuda, Koji; Suemitsu, Yuji; and Asano, Kazuo, 4,956,670, Cl. 355-210.000.
- Urata, Manabu, 4,956,684, Cl. 357-17.000.
- Fujibayashi, Kentaro: See—  
Kawamura, Hideaki; Fujibayashi, Kentaro; and Hidaka, Yosato, 4,956,785, Cl. 364-474.010.
- Fujii, Akira: See—  
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,956,661, Cl. 354-412.000.
- Fujii, Eiichiro, to Kabushiki Kaisha Toshiba. Bearing having a valve seat for a rotary compressor. 4,955,414, Cl. 148-324.000.
- Fujii, Masao: See—  
Kitada, Taizo; Katsumoto, Takehiko; Hirako, Osamu; Ninoyu, Masatoshi; Makigawa, Yasuyuki; Yamanaka, Gorou; and Fujii, Masao, 4,955,327, Cl. 123-41.420.
- Fujimori, Shizuyoshi: See—  
Kojima, Eisuke; Fujimori, Shizuyoshi; and Awano, Katsuya, 4,956,372, Cl. 514-311.000.
- Fujimoto, Akihiko: See—  
Suda, Nobuyuki; Fujimoto, Akihiko; and Suzuki, Ryuji, 4,955,127, Cl. 29-568.000.
- Fujimoto, Hiroshi: See—  
Ueda, Shinji; Heki, Tatsuo; Inoue, Noriyuki; Ishikawa, Tatatoshi; Ohki, Nobutaka; Yagihara, Morio; Morimoto, Kiyoshi; Fujimoto, Hiroshi; and Andoh, Kazuto, 4,956,267, Cl. 430-372.000.
- Fujinoki, Akira: See—  
Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiko; Aoyama, Masaki; Shinomiya, Eiichi; Fujinoki, Akira; and Ogino, Nobuyoshi, 4,956,208, Cl. 428-34.600.
- Fujioka, Futoshi: See—  
Gillaspay, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M., 4,956,481, Cl. 549-459.000.
- Fujisawa Pharmaceutical Co., Ltd.: See—  
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, 4,956,352, Cl. 514-63.000.
- Fujita, Kozo: See—  
Ise, Kiyotaka; and Fujita, Kozo, 4,955,448, Cl. 180-197.000.
- Fujita, Minoru; and Fukushima, Yoichi, to Kyodo Printing Co., Ltd. Optical recording card and method of producing the same. 4,956,215, Cl. 428-64.000.
- Fujita, Toshiaki; Kimura, Hirokazu; and Yamato, Yoshihiro, to Toyo Garasu Kabushiki Kaisha. Apparatus for inspecting glass bottles. 4,955,227, Cl. 73-104.000.
- Fujita, Yoshikazu: See—  
Nakazyo, Kiyoshi; Ishikawa, Takatoshi; and Fujita, Yoshikazu, 4,956,268, Cl. 430-393.000.
- Fujitsu Limited: See—  
Shimane, Kazuo; Iijima, Nobuo; and Kawabata, Tatsuro, 4,955,780, Cl. 414-744.200.
- Yokoyama, Naoki; and Taguchi, Masao, 4,956,681, Cl. 357-4.000.
- Fujiwara, Kazuhiko: See—  
Yuhki, Hirokazu; Fujiwara, Kazuhiko; Ohnishi, Hiroshi; and Arai, Fuminori, 4,956,146, Cl. 422-56.000.
- Fukae, Kensuke; and Kinoshita, Koichi, to Kentek Information Systems, Inc. Electrophoretic color printer/copier. 4,956,676, Cl. 355-271.000.
- Fukuda, Hiroyuki: See—  
Shigeta, Masatomo; Fukuda, Hiroyuki; Kaji, Hisatsugu; and Saitoh, Kuniyuki, 4,956,131, Cl. 264-29.500.
- Fukuda, Kazumi: See—  
Kanehara, Koichi; Fukuda, Kazumi; Sato, Masashi; and Shimeno, Toshiaki, 4,955,532, Cl. 232-7.000.
- Fukuda, Makoto; Suzuki, Sirou; Hosokawa, Toshio; Iizuka, Yo; Kawakami, Yukichika; and Shiiki, Zenta, to Kureha Kagaku Kogyo Kabushiki Kaisha; and Polyplastics Co., Ltd. Polyarylene thioether composition for molding. 4,956,499, Cl. 524-500.000.
- Fukuda, Masatoshi: See—  
Matsutani, Kanji; and Fukuda, Masatoshi, 4,955,898, Cl. 606-219.000.
- Fukuda, Mitsunobu, to Nissan Motor Co., Ltd. Arrangement of electronic antiskid brake system. 4,955,673, Cl. 303-113.000.



- Fukumoto, Noriyoshi. Connectors. 4,955,830, Cl. 439-821.000.  
Fukuoka, Toshio: See—  
Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiko; Aoyama, Masaaki; Shinomiya, Eiichi; Fujinoki, Akira; and Ogino, Nobuyoshi, 4,956,208, Cl. 428-34.600.  
Fukushima, Isao: See—  
Yatsugi, Tomihige; Toeda, Hiroshi; Takamiya, Tadashi; Minami, Norio; and Fukushima, Isao, 4,956,729, Cl. 360-67.000.  
Fukushima, Yoichi: See—  
Fujita, Minoru; and Fukushima, Yoichi, 4,956,215, Cl. 428-64.000.  
Fukuzaki, Yasuhiro: See—  
Morakami, Azuma; and Fukuzaki, Yasuhiro, 4,956,526, Cl. 178-18.000.  
Fuller, Elizabeth L.: See—  
Mason, Stanley I., Jr.; Fuller, Elizabeth L.; and Doty, Roy E., 4,955,617, Cl. 273-256.000.  
Fuller, Mark W.; and Robinson, Alan S., to WET Enterprises, Inc. Water displays. 4,955,540, Cl. 239-20.000.  
Fuller Research Corporation: See—  
Fuller, Terry A.; Nadkarni, Vijay J.; and Peschke, John R., 4,955,689, Cl. 330-96.340.  
Fuller, Robert T.; Tsang, Joseph C.; and Richards, William R., Jr., to Harris Corporation. Method for forming complementary patterns in a semiconductor material while using a single masking step. 4,956,306, Cl. 437-34.000.  
Fuller, Terry A.; Nadkarni, Vijay J.; and Peschke, John R., to Fuller Research Corporation. IR transmitting optical fiber. 4,955,689, Cl. 330-96.340.  
Funasaki, Kazushige; Tajima, Kenji; Yukino, Toshinori; and Yamanai, Hiroshi, to Adeka Argus Chemical Co., Ltd. Polymer composition. 4,956,407, Cl. 524-120.000.  
Furlong, Dennis. Electronic monitoring of ground contact by an athlete's shoes. 4,956,628, Cl. 340-323.00R.  
Furukawa Electric Co., Ltd., The: See—  
Sotani, Junji; and Sasaki, Chiyoshi, 4,955,361, Cl. 126-374.000.  
Furukawa, Nobuhiko; Nohma, Toshiyuki; and Yamamoto, Yuji, to Sanyo Electric Co., Ltd. Non-aqueous secondary cell. 4,956,248, Cl. 429-194.000.  
Furukawa, Yohta: See—  
Yamaguchi, Kenji; and Furukawa, Yohta, 4,956,795, Cl. 364-371.030.  
Furusbo, Noboru: See—  
Kuroda, Masami; Sugata, Yoshinobu; and Furusho, Noboru, 4,956,250, Cl. 430-58.000.  
Kuroda, Masami; Nakamura, Youichi; and Furusho, Noboru, 4,956,277, Cl. 430-58.000.  
Furuysa, Masato: See—  
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuysa, Masato; Shinonaga, Hirohiko; and Tai, Hiromichi, 4,956,713, Cl. 358-209.000.  
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuysa, Masato, 4,956,714, Cl. 358-213.110.  
Fusco, Raffaello; Pielli, Fulvio L.; and Boschi, Pier M., to Industria Chimica Profarmaco S.p.A. Process for the preparation of 1-alkyl-3-carboxy-4-cinnolones. 4,956,460, Cl. 544-234.000.  
Fusegawa, Izumi: See—  
Yamagishi, Hiroto; Fusegawa, Izumi; Yokota, Shunji; and Abe, Takao, 4,956,153, Cl. 422-249.000.  
Futamura, Yoshihiko: See—  
Saito, Kazumasa; Maezawa, Hiroyuki; Kobayashi, Masakazu; and Futamura, Yoshihiko, 4,956,773, Cl. 364-200.000.  
G & W Electric Company: See—  
Wilk, Robert J., 4,956,525, Cl. 174-152.00R.  
Gabus, Georges A.: See—  
Mock, Elmar; and Gabus, Georges A., 4,956,830, Cl. 368-280.000.  
GAF Chemicals Corporation: See—  
Tazi, Mohammed, 4,956,430, Cl. 526-195.000.  
Gage, Gary W.: See—  
Binkley, Michael J.; Thorngren, John T.; Bonilla, Jorge A.; and Gage, Gary W., 4,956,127, Cl. 261-114.100.  
Gagen, Paul F.: See—  
Freeman, Lucius J.; and Gagen, Paul F., 4,955,976, Cl. 350-96.210.  
Gallagher, Bruce C.: See—  
Kwiatkowski, Richard F.; Gallagher, Bruce C.; and Bicehouse, Jack L., 4,956,606, Cl. 324-207.120.  
Gallian, Claude E.: See—  
Bequette, Robert J.; Bonenberger, Bruce A.; Gallian, Claude E.; and Reckelhoff, John R., 4,956,182, Cl. 424-476.000.  
Galloway, Bennie E.: See—  
Staszewski, Edward T.; Reynolds, Steve J.; Vinyard, Richard C.; and Galloway, Bennie E., 4,955,784, Cl. 414-796.400.  
Galm, James M.; and Podany, Mark E., to PGM Diversified Industries, Inc. Current density measurement system by self-sustaining magnetic oscillation. 4,956,610, Cl. 324-425.000.  
Galmard, Yves: See—  
Brugere, Robert; Faure, Robert; Galmard, Yves; and Gerenton, Jacques, 4,955,652, Cl. 294-106.000.  
Gandolfi, Carmelo A.: See—  
Frigerio, Marco; Gandolfi, Carmelo A.; and Tognella, Sergio, 4,956,369, Cl. 514-274.000.  
Ganzi, Gary C.: See—  
Giuffrida, Anthony J.; Ganzi, Gary C.; and Oren, Yoram, 4,956,071, Cl. 204-301.000.

- Garavaglia, Carlo: See—  
Cassani, Giorgio; Borgonovi, Giorgio; Cidaria, Dante; Tolentino, Daniela; Abis, Luigi; Guglielmetti, Gianfranco; Garavaglia, Carlo; Confalonieri, Giovanni; and Pirali, Giorgio, 4,956,180, Cl. 424-118.000.  
Garceria, Daniel; and Gillot, Jacques, to Societe Anonyme dite: Societe des Ceramiques Techniques. Module for rigid cylindrical membrane elements for separation, filtration, or catalytic transformation. 4,956,087, Cl. 210-321.800.  
Gard, David R., to Monsanto Company. Method of forming amido-phosphates in aqueous solutions. 4,956,163, Cl. 423-302.000.  
Gardea, Raymond A., II: See—  
Cearley, Thomas W.; Donovan, Michael F.; Gardea, Raymond A., II; Hughes, Kathleen C.; Hunt, William R., III; Jarvis, William R.; Martin, Marvin R.; Shamb, Aftab; Shepard, Michael D.; Summers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., 4,956,777, Cl. 364-424.020.  
Garman, Jonathan D., to Sun Microsystems, Inc. Active fiber for optical signal transmission. 4,955,685, Cl. 350-96.300.  
Garnier, Steven F.; Ton, Robert B.; Turner, Vernon S.; Pilarski, James K.; Magill, Mark R.; and Murphy, Allen J., to Melco Industries, Inc. Modular system for use with X-Y peripherals. 4,955,305, Cl. 112-121.110.  
Gartner, Margaret C., to Eastman Kodak Company. Priority interrupt during editing mode. 4,956,667, Cl. 355-202.000.  
Gas Research Institute: See—  
Wilkinson, William H., 4,955,205, Cl. 62-94.000.  
Gaslock Corporation: See—  
Pitzen, Terry, 4,955,404, Cl. 137-15.000.  
Gate, Hubert; and Huerre, Dominique, to Societe Electronique de la Region Pays de Loire. Connection socket, in particular to connect coaxial plug, with front mounting. 4,955,815, Cl. 439-350.000.  
Gates, Louis E., Jr.; and Finnella, Charles A., to Hughes Aircraft Company. Stacked wafer electronic package. 4,956,746, Cl. 361-385.000.  
Gates Rubber Company, The: See—  
Sedlacek, Douglas R., 4,956,036, Cl. 156-137.000.  
Gawronski, Richard: See—  
Coymann, Dennis; and Gawronski, Richard, 4,956,826, Cl. 368-28.000.  
Gazeley, Albert E., to Polaroid Corporation. Pivoting optical accessory for use with spectacles. 4,955,707, Cl. 351-47.000.  
Gebr. Eickhoff Maschinenfabrik u. EisemieBerei mbH: See—  
Schupphaus, Herbert, 4,955,668, Cl. 299-42.000.  
Gebr. Hofmann GmbH & Co. KG Maschinenfabrik: See—  
Himmeler, Gunther, 4,955,229, Cl. 73-146.000.  
GEC-Marconi Limited: See—  
Samuels, Mark A.; and Dimmick, Stephen, 4,956,873, Cl. 382-54.000.  
Geck, Reginald W.: See—  
Ardell, George G.; Geck, Reginald W.; Jenkins, John M., III; and Sheard, William G., 4,956,426, Cl. 526-60.000.  
Geddes, Leslie A.: See—  
Badylak, Stephen F.; Geddes, Leslie A.; Lantz, Gary; and Coffey, Arthur C., 4,956,178, Cl. 424-551.000.  
Geibler, Michael: See—  
Hausler, Alfons; Ludwig, Rainer; Geibler, Michael; and Jung, Michael, 4,956,216, Cl. 428-64.000.  
Geiger, Friedrich, to Passat-Maschinenbau GmbH. Ram press for pressing liquid out of material being pressed. 4,955,214, Cl. 68-242.000.  
Geilinger AG: See—  
Geilinger, Peter; and Keller, Bruno, 4,955,285, Cl. 98-39.100.  
Geilinger, Peter; and Keller, Bruno, to Geilinger AG. System for covering the energy requirement of a room. 4,955,285, Cl. 98-39.100.  
Geissberger, Arthur E.: See—  
Griffin, Edward L.; Sadler, Robert A.; and Geissberger, Arthur E., 4,956,308, Cl. 437-41.000.  
Geissler, Ulrich; Steppan, Hartmut; and Herwig, Walter, to Hoechst Aktiengesellschaft. Radiation-polymerizable mixture. 4,956,264, Cl. 430-281.000.  
Gementi, Francesco; Sogli, Loris; and Ungarelli, Raffaele, to Istituto Guido Donegani S.p.A. Process for producing a silane or siloxane compound containing a cycloalkyl ring. 4,956,484, Cl. 556-410.000.  
GenCorp, Inc.: See—  
White, Woodrow W., 4,956,495, Cl. 562-567.000.  
Gendreau, Paul M.; and Cadorniga, Lauro C., to Acushnet Company. Polybutadiene golf ball product. 4,955,613, Cl. 273-218.000.  
General Electric Company: See—  
Dorri, Bizhan; Gross, Dan A.; and Salasoo, Lembit, 4,956,608, Cl. 324-319.000.  
Falk, John C.; and Khait, Klementina, 4,956,422, Cl. 525-392.000.  
Jackson, Melvin R.; and Huang, Shyh-Chin, 4,956,144, Cl. 420-580.000.  
Thompson, Peter H.; and Smalling, Richard J., 4,956,497, Cl. 524-474.000.  
Upadhyay, Kamleshwar, 4,956,858, Cl. 378-133.000.  
General Instrument Corporation: See—  
Robbins, Clyde; and Schilling, John, 4,956,862, Cl. 380-19.000.  
General Mills, Inc.: See—  
Seaborn, Jonathan, 4,956,533, Cl. 219-10.55E.  
General Motors Corporation: See—  
Albertson, William C., 4,955,350, Cl. 123-533.000.  
Bausch, Paul, 4,955,443, Cl. 180-79.100.  
Bausch, Paul, 4,955,853, Cl. 475-241.000.  
Brown, David B.; and Gonze, Eugene V., 4,955,345, Cl. 123-381.000.

- Caracciolo, Anthony, Jr.; Austin, Wayne R.; Zuccaro, Dante C.; and Pomrehn, Leonard P., 4,955,655, Cl. 294-93.000.  
Coleman, John R.; and Schubert, Malvin L., 4,955,197, Cl. 60-547.100.  
Diwakar, Ramachandra; Krieger, Roger B.; Meintjes, Keith; and Groff, Edward G., 4,955,338, Cl. 123-276.000.  
Klomp, Edward D., 4,955,333, Cl. 123-73.0AC.  
Mahoney, Christopher J., 4,955,231, Cl. 73-313.000.  
Martell, William A.; and Brown, Colin R., 4,955,804, Cl. 425-548.000.  
Reinert, Karl A.; and Alcorn, Gary W., 4,955,251, Cl. 74-501.50R.  
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Goldfarb, Adolph E. Home basketball apparatus. 4,955,605, Cl. 273-15.00A.  
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Hong, Sam P., 4,956,712, Cl. 358-198.000.  
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- Hardman, Allen D., to Raymond Production Systems Corporation. Plenum fan assembly. 4,955,762, Cl. 406-88.000.
- Hardy, Frederick E.: See—  
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- Harju, Matti E.; and Heikkilä, Heikki O., to Valio Meijerien Keskusosuusliike. Process of recovering lactose from whey. 4,955,363, Cl. 127-46.100.
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- Harris Corporation: See—  
Fuller, Robert T.; Tsang, Joseph C.; and Richards, William R., Jr., 4,956,306, Cl. 437-34.000.
- Heckaman, Douglas E.; Baker, John E.; and Whybrew, Walter M., 4,956,621, Cl. 333-104.000.
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- Harris, Rodney G.; Seal, John; Johnston, Robert L.; and Windham, Marvin R., to W. C. Bradley Company. Barbecue grill cart assembly. 4,955,358, Cl. 126-25.00R.
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- Hart, William W.C.: See—  
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- Harting, Dietmar; Nagel, Hans; and Pape, Gunter, to Harting Elektronik GmbH. Plug connector having bent contact posts for insertion into printed circuit board holes. 4,955,819, Cl. 439-79.000.
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- Hartmann, Dirck T. Five speed chainless drive for heavily loaded pedal powered tricycles. 4,955,627, Cl. 280-236.000.
- Hartmann, Heinrich: See—  
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- Haegawa, Ryusuke, to Allied-Signal Inc. Ground fault interrupters for glassy metal alloys. 4,956,743, Cl. 361-45.000.
- Haegawa, Takanori; Abe, Nobuyuki; Hirose, Toshihiko; Kanda, Takashi; Saito, Hiroshi; Nakazawa, Eiji; and Oshima, Masaki, to Riso Kagaku Corporation; and Nippon Seimitsu Kogyo Kabushiki Kaisha. Image processing apparatus having an overhead projector. 4,956,664, Cl. 355-43.000.
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- Hashimoto, Masashi, to Texas Instruments Incorporated. Arbiter circuit for establishing priority control of read, write and refresh operations with respect to memory array. 4,956,820, Cl. 365-222.000.
- Hashimoto, Osamu: See—  
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- Hatanaka, Hiroshi: See—  
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- Hatayama, Kazumi; and Hayashi, Terumine, to Hitachi, Ltd. Memory incorporating logic LSI and method for testing the same LSI. 4,956,818, Cl. 365-189.080.
- Hatazawa, Kikuo: See—  
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- Hatta, Yoshihiko: See—  
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- Haushalter, Robert C.: See—  
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- Hauske, James R.: See—  
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- Hausler, Alfons; Ludwig, Rainer; Geibler, Michael; and Jung, Michael, to Leybold Aktiengesellschaft. Optical recording medium. 4,956,216, Cl. 428-64.000.
- Haussein, Friedrich: See—  
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- Hawkes, Thomas E.: See—  
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- Hayamizu, Katsuyoshi; Nakajima, Masakatsu; and Ogawa, Hiroyuki, to Japan Vileen Company, Ltd. Method for producing tubular needle punched felt. 4,955,116, Cl. 28-110.000.
- Hayashi, George, to Swift Instruments, Inc. Microscope base illuminator. 4,955,978, Cl. 350-523.000.
- Hayashi, Hideharu: See—  
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- Hayashi, Shigetugu: See—  
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- Hayata, Youichi; and Matsui, Michihiro, to Fuji Photo Film Co., Ltd. Method of and device for demagnetizing magnetic recording medium. 4,956,728, Cl. 360-66.000.
- Hayes, John B., to Wyko Corporation. Interferometer with thin absorbing beam equalizing pellicle. 4,955,719, Cl. 356-359.000.
- Hayn, Holger V.; and Rausch, Juergen, to Alfred Teves GmbH. Anti-locking hydraulic brake system. 4,955,674, Cl. 303-114.000.
- Haynes, Deborah I.: See—  
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- Haynes, Robert L., to United States of America, Navy. Magnetic mine firing circuit. 4,956,612, Cl. 328-5.000.
- Heaton, Jeff S.: See—  
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- Heavey, Frederick D.; and Engleman, Rudolph, to American Monarch Corporation. Method and apparatus for charging batteries. 4,956,597, Cl. 320-14.000.
- Hebrank, John H., to Embrex, Inc. Method and apparatus of distinguishing between live and dead poultry eggs. 4,955,728, Cl. 374-124.000.
- Heckaman, Douglas E.; Baker, John E.; and Whybrew, Walter M., to Harris Corporation. Three-state, two-output variable RF power divider. 4,956,621, Cl. 333-104.000.
- Heckendorn, Larry C.: See—  
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- Hedman, Jonathan W.: See—  
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- Hefner, John G., to Dow Chemical Company. The. Catalysts prepared from tetrakis(dialkylamide or diarylamide) derivatives of titanium and polymerization of olefins therewith. 4,956,323, Cl. 502-113.000.
- Hefner, Robert E., Jr.; and Haynes, Deborah I., to Dow Chemical Company. The. Polymerized monomers in unsaturated compound-reacted epoxy resins advanced with dihydric phenol. 4,956,423, Cl. 525-524.000.

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- Heimann, Dieter. Cervical collar. 4,955,368, Cl. 128-75.000.
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- Heinz Kaiser AG: See—  
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- Heitkamp, Richard R., to Ciba-Geigy Corporation. Silicate treated honeycomb structures. 4,956,217, Cl. 428-116.000.
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- Hellmer, Michael J.: See—  
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- Hemenway, Lloyd F., Jr., to United States of America, Energy. In-bed tube bank for a fluidized-bed combustor. 4,955,942, Cl. 122-4.00D.
- Hempstead, David C.: See—  
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- Henderson, William A.; and Nelson, Isaac H., to Zebco Corporation. Recessed trolling motor mounting. 4,955,834, Cl. 440-63.000.
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- Fabry, Bernd; Friese, Hans-Herbert; Pieper, Friedrich; and Uphues, Guenter, 4,956,116, Cl. 252-174.160.
- Henneke, Karl-Wilhelm: See—  
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- Henning, Michael L.; and Lamb, Christopher, to Plessey Overseas Limited. Optical sensing systems. 4,956,549, Cl. 250-227.140.
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- Henry, John W.: See—  
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- Henry, Wayne M., to Alerchek. Disposable microtiter stick. 4,956,150, Cl. 422-102.000.
- Hensel, Robert J.; and Fenrich, William G., to Brunswick Corporation. Metering pump controlled oil injection system for two cycle engine. 4,955,943, Cl. 123-73.0AD.
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- Herbst, Richard L.: See—  
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- Herling, Andreas W.: See—  
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- Herman, Wesley K., to Alcon Laboratories, Inc. Posterior capsulotomy knife. 4,955,894, Cl. 606-167.000.
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- Herndon, George W. Swivel wheel wheelbarrow. 4,955,625, Cl. 280-47.310.
- Herrington, Fox J., to Mobil Oil Corporation. Two-stage box pusher for carton indexer. 4,955,175, Cl. 53-67.000.
- Herwig, Walter: See—  
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- Hess, Bradford K.: See—  
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- Hession, Catherine: See—  
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- Hessmann, Hans-Wilhelm: See—  
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- Foot, Wayne E.; and Swantner, Richard L., 4,956,735, Cl. 360-106.000.
- Gipson, Kirk P.; and Guly, Ronald M., 4,956,586, Cl. 315-387.000.
- Jundanian, Richard H.; and Hempstead, David C., 4,956,640, Cl. 340-799.000.
- Su, Chung-Yi; Ty Tan, Michael R.; and Ankam, William J., 4,956,568, Cl. 307-352.000.
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- Hideo, Domeki: See—  
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- Hirako, Osamu: See—  
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- Hiraoka, Eiichi; and Onaka, Junji, to Sumitomo Heavy Industries, Ltd. Sealing structure of pressure container, 4,955,498, Cl. 220-3.000.
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- Hirata, Toichi: See—  
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- Hirayama, Masayoshi: See—  
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- Hirayama, Naoto; Aoki, Yuichi; Takigawa, Akio; Yoshida, Motoaki; and Shirashi, Yasunori, to Nippon Sheet Glass Co., Ltd. Laminated structure, 4,956,227, Cl. 428-331.000.
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- Hirose, Kimimoto; and Hiramoto, Tsutomu, to Konica Corporation. Packaging structure for a ring-shaped product, 4,955,471, Cl. 206-303.000.
- Hirose, Toshihiko: See—  
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- Hise, Ronnie G., to Westvaco Corporation. Method of alcohol washing brownstock pulp prior to a chlorination bleaching stage, 4,956,048, Cl. 162-60.000.
- Hise, Tony: See—  
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- Kaneyasu, Masayoshi; and Kurihara, Nobuo, 4,955,346, Cl. 123-399.000.
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- Kondo, Tetsuo, 4,956,861, Cl. 379-142.000.
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- Sawahata, Yasuo; Saito, Ryuichi; and Momma, Naohiro, 4,956,693, Cl. 357-64.000.
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- Suzuki, Kenji; Hatazawa, Kikuo; and Kishi, Shinichi, 4,956,717, Cl. 358-296.000.
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- Hitzler, Werner: See—  
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- Hjippieris, George: See—  
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- Ho, Ping P.: See—  
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- Hoda, Takeo: See—  
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- Hoden, Ebbe: See—  
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- Hodge, Allan M. Trash bin lid-locking device, 4,955,501, Cl. 220-315.000.
- Hodge, Dean Y., to Universal Data Systems, Inc. Method for remote configuration of a modem, 4,956,852, Cl. 375-8.000.
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- Hoechst CeramTec Aktiengesellschaft: See—  
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- Hofmann, Frieder K.: See—  
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- Hofmann Werkstatt-Technik GmbH: See—  
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- Holladay, Bruce R. Variable rate boat loading method, 4,955,781, Cl. 414-786.000.
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- Hope Technologies Corp.: See—  
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- Hunt, William R., III: See—  
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- mers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., 4,956,777, Cl. 364-424.020.
- Hurst, Boyd E.: See—  
Cahn, Robert P.; and Hurst, Boyd E., 4,956,161, Cl. 423-235.000.
- Hurst, Stephen: Forming an end-cap on a filter cartridge, 4,956,089, Cl. 210-484.000.
- Husain, Altaf; and Wheaton, Gregory A., to Pennwalt Corporation: Oxidation of thiols, disulfides and thiol-sulfonates, 4,956,494, Cl. 562-118.000.
- Huss, Albin, Jr.: See—  
Angevine, Philip J.; Bundens, Robert G.; Herbst, Joseph A.; Huss, Albin, Jr.; and Mizrahi, Sadi, 4,956,075, Cl. 208-120.000.
- Child, Jonathan E.; Chou, Tai-Sheng; Huss, Albin, Jr.; Kennedy, Clinton R.; Ragonese, Francis P.; and Tabak, Samuel A., 4,956,518, Cl. 585-726.000.
- Hyde, George E.: See—  
Roy, Dharendra C.; and Hyde, George E., 4,955,827, Cl. 439-595.000.
- Hyde, Leo J., to Du Pont (Australia) Ltd.: Reinforcing method and means, 4,955,758, Cl. 405-261.000.
- Hydes, Paul C.: See—  
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- Hyodo, Masakatsu: See—  
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- I.M.A. Industria Macchine Automatiche S.p.A.: See—  
Grazia, Alessandro, 4,955,783, Cl. 414-795.000.
- I.W. Industries: See—  
Antonello, Frank, 4,955,406, Cl. 137-318.000.
- Ibrahim, Abdul: See—  
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- Ibrahim, Radwan H.: See—  
Chawan, Dhyaneshwar B.; Merritt, Carleton G.; and Ibrahim, Radwan H., 4,956,190, Cl. 426-269.000.
- Ichikawa, Tadaaki: See—  
Koizumi, Hiroshi; Kawata, Hideaki; Arai, Katsumi; Miyamoto, Koji; Ichikawa, Tadaaki; and Ogata, Koji, 4,956,139, Cl. 264-156.000.
- Ichikawa, Yutaka: See—  
Matai, Masahiro; Oyagi, Takashi; Ichikawa, Yutaka; and Umetsu, Shinjiro, 4,956,641, Cl. 340-825.440.
- ICI Americas Inc.: See—  
Kerlinger, Nancy; and Gless, Richard D., 4,956,468, Cl. 548-200.000.
- Robbins, Jeffrey D.; and Gless, Richard D., Jr., 4,956,487, Cl. 558-98.000.
- Scher, Herbert B.; and Rodson, Marius, 4,956,129, Cl. 264-4.700.
- Woodard, Frank X., 4,956,006, Cl. 71-95.000.
- ICKINGER, Georg; Fermüller, Willibald; Paugger, Anton; and Pinter, Reinhard, to Sulzer-Escher Wyss GmbH: Apparatus containing a work surface heated with a heat carrier medium, 4,955,268, Cl. 29-130.000.
- Ide, Fumito: See—  
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- Idelman, Peter: See—  
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- Idemitsu Kōsan Company Limited: See—  
Tanaka, Masato; and Machida, Shuji, 4,956,418, Cl. 525-330.600.
- Iehisa, Nobuaki, to Fanuc Ltd.: Gas laser device, 4,956,846, Cl. 372-58.000.
- Igarashi, Yasuo, to Sumitomo Rubber Industries, Ltd.: Low pressure tire, 4,955,417, Cl. 152-454.000.
- Igawa, Akihiko: See—  
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- Iijima, Nobuo: See—  
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- Iio, Satoshi: See—  
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- Iizuka, Yo: See—  
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- Ijiri, Masaaki: See—  
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- Ikeda Busan Co., Ltd.: See—  
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- Ikeda, Haruo, to Railway Technical Research Institute: Linear motor feeder system, 4,955,303, Cl. 104-292.000.
- Ikeda, Hideo; and Ohno, Shigeru, to Fuji Photo Film Co., Ltd.: Silver halide color photographic materials, 4,956,269, Cl. 430-505.000.
- Ikeda, Masami: See—  
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- Ikeda Mohando Company, Ltd.: See—  
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- Iketani, Kohichi: See—  
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- Ilzhofer, Karl-Heinz: See—  
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- Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, to Canon Kabushiki Kaisha: Information recording medium, production process and molding die for substrate therefor, 4,956,214, Cl. 428-64.000.
- Imperial Chemical Industries PLC: See—  
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- Jones, Michael E. B.; and Carey, John G., 4,956,266, Cl. 430-325.000.
- Pickering, Anthony; Thorne, Andrew J.; and Runciman, Peter J. I., 4,956,428, Cl. 526-190.000.
- Implant Innovations, Inc.: See—  
Lazzara, Richard J.; and Beaty, Keith D., 4,955,811, Cl. 433-173.000.
- Impra, Inc.: See—  
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- Imta: See—  
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- Imura, Yutaka, to Mazda Motor Corporation: Front body construction of a vehicle, 4,955,663, Cl. 296-194.000.
- INA Bearing Company: See—  
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- Inada, Toshio: See—  
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- Inco Limited: See—  
Bell, James A. E., 4,956,026, Cl. 148-127.000.
- Industria Chimica Profarmaco S.p.A.: See—  
Fusco, Raffaello; Piselli, Fulvio L.; and Boschi, Pier M., 4,956,460, Cl. 544-234.000.
- Industrial Equipment & Engineering Company: See—  
Rahill, Paul F., 4,955,548, Cl. 241-30.000.
- Industrial Research Products, Inc.: See—  
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- Industrias Salver, S.A. de C.V.: See—  
Morales, Jorge L., 4,956,234, Cl. 428-36.500.
- Ineson, Malcolm P., to M L Douglas Equipment Ltd.: Aircraft ground handling tractor, 4,955,777, Cl. 414-426.000.
- Infas Institut Für Angewandte Sozialwissenschaft GmbH: See—  
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- Ingalls, David E.: Board game, 4,955,616, Cl. 273-249.000.
- Ingersoll-Rand Company: See—  
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- Inoue, Masahiro: See—  
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- Inoue, Nobuaki, to Fuji Photo Film Co., Ltd.: Silver halide photographic material and method for forming an image, 4,956,257, Cl. 430-264.000.
- Inoue, Nobuaki: See—  
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- Inoue, Noriyuki: See—  
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- Inoue, Seiji; and Tanaka, Seiichi, to Sanshin Kogyo Kabushiki Kaisha: Ignition timing control system for outboard engine, 4,955,831, Cl. 440-1.000.
- Inoue, Sunao: See—  
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- Inoue, Yoshimichi, to Jidosha Kiki Co., Ltd.: Check valve insertable into a hose, 4,955,407, Cl. 137-434.200.
- Institut Pasteur: See—  
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- Institute of Gas Technology: See—  
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- Instituto Guido Donegani S.p.A.: See—  
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- Intel Corporation: See—  
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- International Anasazi, Inc.: See—  
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- International Bedding Corporation: See—  
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- International Business Machines Corporation: See—  
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- Babu, Suryadevara V.; Lu, Neng-Hsing; and Jones, Gerald W., 4,956,197, Cl. 427-39.000.
- Bickford, Harry R.; Boland, William L.; Morris, Daniel P.; and Reiley, Timothy C., 4,956,605, Cl. 324-158.000.
- Cote, William J.; Kaanta, Carter W.; Leach, Michael A.; and Paulsen, James K., 4,956,313, Cl. 437-203.000.

- Crowe, Andrew S.; and Lai, Daniel T., 4,956,806, Cl. 364-900.000.
- Dhopeshwarkar, Dharendra; Hightower, Scott A.; Mathis, Mac A.; and Mehl, John W., 4,956,766, Cl. 364-200.000.
- Larky, Steven P.; Lucas, Bruce D.; McCabe, Daniel H.; and Rodgers, Todd K., 4,956,638, Cl. 340-701.000.
- Lee, Ho S.; and Schor, Marshall I., 4,956,791, Cl. 364-513.000.
- Mahmoud, Issa S., 4,956,022, Cl. 134-41.000.
- Sherman, Arthur M.; and Yanker, Peter C., 4,956,810, Cl. 364-900.000.
- Shibamiya, Akira; and Zimowski, Melvin R., 4,956,774, Cl. 364-200.000.
- Taylor, Gerald E.; and Wagner, Robert E., 4,956,803, Cl. 364-900.000.
- International Flavors & Fragrances Inc.: See—  
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- International Nautical Supplies, Inc.: See—  
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- International Paper Company: See—  
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- Intevpe, S.A.: See—  
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- Inui, Tsuneo: See—  
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- Invenomed, Inc.: See—  
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- Ippen, Joachim; Baasner, Bernd; Marhold, Albrecht; Kysela, Ernst; Schaller, Klaus; and von Bitter, Miklos, to Bayer Aktiengesellschaft: Antimicrobially active substituted 2-aminothiazoles, 4,956,370, Cl. 514-275.000.
- Irick, Virgil, Jr.: See—  
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- Irie, Yutaka: See—  
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- Irizarry, Guillermo: Shower curtain operator, 4,955,422, Cl. 160-344.000.
- Isaka, Tsutomu; and Ohta, Saburo, to Toyo Boseki Kabushiki Kaisha: Anti-fogging multilayered film and bag produced therefrom for packaging vegetables and fruits, 4,956,209, Cl. 428-35.200.
- Iscar Ceramics, Inc.: See—  
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- Ise, Kiyotaka; and Fujita, Kozo, to Toyota Jidosha Kabushiki Kaisha: Controller for reducing acceleration slippage of a driven wheel, 4,955,448, Cl. 180-197.000.
- Ishibashi, Koji: See—  
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- Ishida, Katsunori: See—  
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- Ishida, Nobumasa: See—  
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- Ishida, Tokuji: See—  
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- Ishida, Tomotoshi: See—  
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- Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hisashi; Ukai, Toshinao; Yagihara, Morio; Takagi, Yoshihiro; and Yoneyama, Masakazu, to Fuji Photo Film Co., Ltd.: Silver halide photographic material containing a compound capable of releasing a dye, 4,956,263, Cl. 430-264.000.
- Ishigaki, Reisaburo, to Terumo Kabushiki Kaisha: Process for preparing iron enriched food products, 4,956,187, Cl. 426-46.000.
- Ishiguro, Katsusuke; Hayakawa, Tsuneyasu; and Yokoyama, Nobuyoshi, to Paloma Kogyo Kabushiki Kaisha: Check-valve mechanisms for a pulse combustion apparatus, 4,955,805, Cl. 431-1.000.
- Ishihara, Koji: See—  
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- Ishihara, Kouichiro: See—  
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- Ishii, Katsumi; and Sasaki, Yasushi, to Te' Sagami Limited: Apparatus for holding plates, 4,955,649, Cl. 294-1.100.
- Ishii, Yoshitaro: See—  
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- Ishikawa, Futoshi: See—  
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- Ishikawa, Haruyuki: See—  
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- Ishikawa, Junji: See—  
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- Ishikawa, Shizuo: See—  
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- Ishikawa, Takahide: See—  
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- Ishikawa, Takatoshi: See—  
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- Ishikawa, Takeshi: See—  
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- Ishikawa, Tatatoshi: See—  
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- Ismail, Ibrahim A.; and Michaels, David W., to Miles Inc.: Test device and method of assaying for fructosamines, 4,956,301, Cl. 436-87.000.
- Isoda, Tetsuo: See—  
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- Isuzu Ceramics Research Institute Co., Ltd.: See—  
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- Isuzu Motors Limited: See—  
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- Nishioka, Keichi; and Hirako, Atsushi, 4,955,453, Cl. 180-287.000.
- Itagaki, Hirokazu, to Oki Electric Industry Co., Ltd.: Frame memory control system, 4,956,708, Cl. 358-140.000.
- Itami, Atsushi: See—  
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- Ito, Hisao; Nishi, Akio; Miyazawa, Masashi; and Naruse, Masayoshi, to Ajinomoto Company, Inc.: Process for isolating and purifying amino acids, 4,956,471, Cl. 548-344.000.
- Ito, Koichi: See—  
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- Ito, Kumiko; Kawashima, Yasumasa; Nonaka, Shiro; and Ishida, Tomotoshi, to Hitachi, Ltd.: Elimination work simulator apparatus, 4,956,787, Cl. 364-474.240.
- Ito, Masazumi: See—  
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- Ito, Narushi: See—  
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- Ito, Yasunobu; and Suzuki, Kenji, to Aisin AW Kabushiki Kaisha: Device and method of fail-safe control for electronically controlled automatic transmission, 4,955,258, Cl. 74-866.000.
- Ito, Yutaka: See—  
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- Itoh, Hiroyuki: See—  
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- Itoh, Hisatsugu, to Mitsubishi Denki Kabushiki Kaisha: Fault detector for vehicle safety system, 4,956,631, Cl. 340-436.000.
- ITT Composants et Instruments: See—  
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- ITT Corporation: See—  
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- Iwagaya, Takashi, to Fanuc Ltd.: Apparatus for processing numerical control program, 4,956,765, Cl. 364-192.000.
- Iwai, Kiyoshi: See—  
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- Iwaki, Makoto: See—  
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- Iwamoto, Hirofumi: See—  
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- Iwamoto, Takashi: See—  
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- Iwasa, Yoshio: See—  
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Iwashita, Yasuhide: See—  
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Iwata, Michihiro: See—  
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Iwata, Satoshi; Toida, Akikazu; and Takahashi, Fumio, to Shinko Denki Kabushiki Kaisha. Method and apparatus for energizing thermal head in accordance with dot pattern coincidence tables. 4,955,736, Cl. 400-120.000.

Iwatsuki, Kunihiro: See—  
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J & R Livestock Consultants Ltd.: See—  
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Jackson, Charles W.: See—  
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Jackson, Clifford. Portable gem faceting kit. 4,955,162, Cl. 51-125.500.

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Jackson, Steven E.: See—  
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Jackson, Winston J., Jr.: See—  
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Jacobacci-Casetta & Perani: See—  
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Jacobs, Robert S.; and Krall, Jack, to Newcomer Products, Inc. Dispersion alloyed hard metal composites. 4,956,012, Cl. 75-236.000.

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Jacques, James O.: See—  
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Inoue, Yoshimichi, 4,955,407, Cl. 137-454.200.

Yanagawa, Ichiro; and Hara, Hiroshi, 4,955,198, Cl. 60-551.000.

Jingu, Nobuhisa; and Iwasa, Yoshio, to Nissan Motor Co., Ltd. Camshaft driving arrangement for internal combustion engine. 4,955,335, Cl. 123-90.310.

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Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,955,985, Cl. 418-257.000.

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Strobl, Georg, 4,956,572, Cl. 310-233.000.

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Johnston, Robert L.: See—  
Harris, Rodney G.; Seal, John; Johnston, Robert L.; and Windham, Marvin R., 4,955,358, Cl. 126-25.00R.

Johnston, Vaughn R. Seal apparatus. 4,955,436, Cl. 166-82.000.

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Jones, Patrick R.: See—  
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Jones, Roger E.; Hale, Peter G.; and Willson, Jolyon P., to STC PLC. Optical sensor. 4,955,238, Cl. 73-800.000.

Jones, Thomas B.: See—  
Kaler, Karen V. I. S.; and Jones, Thomas B., 4,956,065, Cl. 204-183.100.

Jongen, Yves: See—  
Legras, Roger; and Jongen, Yves, 4,956,219, Cl. 428-137.000.

Jorgensen, Jorgen: See—  
Olesen, John; and Jorgensen, Jorgen, 4,956,039, Cl. 156-180.000.

Josef, Moshe; and Wiesenfeld, David, to Videx-Wire Products (Proprietary) Limited. Rock bolt. 4,955,219, Cl. 72-187.000.

Josefik, John, to Microlift Systems, Incorporated. High pressure oxygen-saturated water treatment apparatus. 4,956,080, Cl. 210-109.000.

Joseph, Brian J., to Eastman Kodak Company. Ribbon blender for a development apparatus with self adjusting inner and outer ribbons. 4,956,675, Cl. 355-251.000.

Josten, Karl H.: See—  
Arlt, Klaus; Dirking, Theodora; Josten, Karl H.; and Streiberger, Hans J., 4,956,096, Cl. 210-692.000.

Jourdain, Gerard E. A.: See—  
Carteron, Olivier; and Jourdain, Gerard E. A., 4,955,541, Cl. 239-127.100.

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Rock, Erich, 4,955,160, Cl. 312-340.000.

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Haußler, Alfons; Ludwig, Rainer; Geibler, Michael; and Jung, Michael, 4,956,216, Cl. 428-64.000.

Junino, Alex: See—  
Lang, Gerard; Richard, Herve; Leduc, Madeleine; and Junino, Alex, 4,956,174, Cl. 424-63.000.

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Juret, Bernard: See—  
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Jursov, Vitaly V. Intermittent epicyclic mill. 4,955,551, Cl. 241-175.000.

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Cote, William J.; Kaanta, Carter W.; Leach, Michael A.; and Paulsen, James K., 4,956,313, Cl. 437-203.000.

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Jajszczyk, Andrzej; and Kabacinski, Wojciech, 4,956,840, Cl. 370-65.500.

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Nemoto, Isao; and Yamaoka, Yuji, 4,955,951, Cl. 166-55.700.

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Watanabe, Takemi; and Shiba, Noriyuki, 4,956,044, Cl. 156-350.000.

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Takasugi, Kiyomi, 4,955,278, Cl. 84-605.000.

Kabushiki Kaisha Kobe Seiko Sho: See—  
Hidaka, Sachio; Shihata, Hiroshi; and Yoshimatsu, Hideaki, 4,955,283, Cl. 91-447.000.

Kabushiki Kaisha Komatsu Seisakusho: See—  
Hashimoto, Haruo; and Ono, Toyochi, 4,955,447, Cl. 180-168.000.

Kabushiki Kaisha Okuma Tekkoku: See—  
Matsui, Keiji, 4,956,553, Cl. 250-237.00G.

Kabushiki Kaisha Sankyo Seiki Seisakusho: See—  
Kamijo, Masao, 4,956,734, Cl. 360-105.000.

Kabushiki Kaisha Suiden: See—  
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Kabushiki Kaisha System Ray: See—  
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Hirose, Hisashi; and Kouno, Kazuo, 4,955,228, Cl. 73-118.100.

Tanaka, Kohbun, 4,955,115, Cl. 24-641.000.

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Kabushiki Kaisha Toshiba: See—  
Abuyama, Yasuo; Ide, Fumito; Hamanaka, Osamu; and Sanbayashi, Takeshi, 4,956,673, Cl. 355-245.000.

Atsumi, Shigeru; Tanaka, Sumio; Saito, Shinji; and Otsuka, Nobuaki, 4,956,816, Cl. 365-201.000.

Fujii, Eiichiro, 4,955,414, Cl. 148-324.000.

Hamada, Youichi, 4,956,722, Cl. 358-444.000.

Higashi, Shinya, 4,956,761, Cl. 363-19.000.

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Okamoto, Hiroaki; Takahara, Takeshi; and Maeda, Fukuo, 4,955,191, Cl. 60-39.300.

Takagi, Kunihiro; Shirashi, Masazumi; and Sato, Ken-ichi, 4,956,742, Cl. 361-131.000.

Tera, Kiyohisa; and Nishida, Koichi, 4,956,847, Cl. 372-87.000.

Tera, Kiyohisa; and Nishida, Koichi, 4,956,848, Cl. 372-87.000.

Tsuchihashi, Toshio; Wakahara, Yasuhide; and Asano, Kuniji, 4,956,790, Cl. 364-513.000.

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Murakami, Azuma; and Fukuzaki, Yasuhiro, 4,956,526, Cl. 178-18.000.

Kagawa, Nobuaki: See—  
Tachibana, Noriki; Ueda, Eiichi; Kagawa, Nobuaki; and Ota, Hideo, 4,956,270, Cl. 430-527.000.

Kageyama, Hidebei; Mitsuya, Yoshihide; and Nakazato, Youichi, to Kotobuki & Co., Ltd. Mechanical pencil having side push button actuated lead advance. 4,955,739, Cl. 401-65.000.

Kagoshima University: See—  
Ogushi, Tetsuya, 4,956,337, Cl. 505-1.000.

Kah, Carl L. C., Jr. Reversing transmission for oscillating sprinklers. 4,955,542, Cl. 239-242.000.

Kahaney, Alan. Sunglasses having adjustable temples. 4,955,708, Cl. 351-44.000.

Kaiser Aerospace and Electronics Corporation: See—  
Grills, Lawrence M.; and Colditz, Eugene F., 4,955,091, Cl. 4-321.000.

Kaiser, Heinz; and Stadelmann, Rudolf, to Heinz Kaiser AG. Boring attachment. 4,955,767, Cl. 408-146.000.

Kaita, Jun: See—  
Yoneda, Noriyuki; Makabe, Toshiji; Kaita, Jun; Nakamura, Munekazu; Endoh, Yoshiko; Kudoh, Hidehiko; and Higashi, Shunji, 4,956,326, Cl. 502-1.780.

Kaiya, Nobuo; and Sasaki, Shosaku, to Toray Silicone Company, Ltd. Release composition. 4,956,206, Cl. 427-387.000.

Kaji, Hisatsugu: See—  
Shigeta, Masatomo; Fukuda, Hiroyuki; Kaji, Hisatsugu; and Saitoh, Kuniyuki, 4,956,131, Cl. 264-29.500.

Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, to Hitachi, Ltd.; and Hitachi VLSI Engineering Corp. Semiconductor memory. 4,956,811, Cl. 365-51.000.

Kajita, Hideo: See—  
Shintani, Dai; Taniguchi, Toshihiko; Miki, Yukio; Akagi, Katsuhito; and Kajita, Hideo, 4,956,657, Cl. 354-195.120.

Kakimoto, Norihiro; Kumano, Kazuo; and Nakamura, Kunie, to Asahi Germanium Research Institute Co., Ltd. Organogermanium containing solution for washing and storing separated organs. 4,956,272, Cl. 435-1.000.

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Kalder, Dieter: See—  
Barth, Rudolf; Guilino, Gunther; and Kalder, Dieter, 4,955,712, Cl. 351-169.000.

Kaler, Karen V. I. S.; and Jones, Thomas B. Method and apparatus for three dimensional dynamic dielectric levitation. 4,956,065, Cl. 204-183.100.

Kallenbach, Ralph, to Fluor Corporation. Energy damping device. 4,955,467, Cl. 188-381.000.

Kalyandurg, Satyan K., to Eastman Kodak Company. Metering assembly for development apparatus. 4,956,674, Cl. 355-251.000.

Kamano, Toshiyasu: See—  
Ohsugi, Hiroshi; Toshimitsu, Hiroyuki; Kamano, Toshiyasu; Shikamori, Tamotzu; and Hirayama, Masayoshi, 4,955,213, Cl. 68-12.00R.

Kameda, Miyakichi: See—  
Kawashima, Masae; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, 4,955,208, Cl. 62-264.000.

Kametani, Masatsugu, to Hitachi, Ltd. Arithmetic operation processing apparatus of the parallel processing type and compiler which is used in this apparatus. 4,956,800, Cl. 364-736.000.

Kami, Kuniaki: See—  
Uchiyama, Naoki; Takayama, Syuichi; Gotanda, Masakazu; Kubota, Tetsumaru; Tsukaya, Takashi; Ishihara, Kouichiro; Kami, Kuniaki; Sekino, Naomi; Murata, Akira; and Hayashi, Masaki, 4,955,366, Cl. 128-24.00A.

Kamide, Akira: See—  
Miyazaki, Yasuo; Kamide, Akira; and Watari, Shigeki, 4,956,041, Cl. 156-267.000.

Kamijo, Masao, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Mode changeover mechanism for tape recorders. 4,956,734, Cl. 360-105.000.

Kaminskas, Rimvykas A., to TRW Inc. Thrust vector control system for aerospace vehicles. 4,955,559, Cl. 244-52.000.

Kamis, Russell P.: See—  
Chu, Hsien-Kun; Kamis, Russell P.; Klossowski, Jerome M.; and Lower, Loren D., 4,956,435, Cl. 528-17.000.

Kamiyama, Yoshiteru: See—  
Honma, Eiichi; Hironaka, Masakazu; Miyayama, Masaki; Ito, Yutaka; Oookuma, Kuniaki; and Kamiyama, Yoshiteru, 4,955,463, Cl. 198-346.100.

Kammeyer, Donald L.: See—  
Bricker, Cedric L.; Pease, Timothy K.; and Kammeyer, Donald L., 4,955,130, Cl. 29-734.000.

Kamuf, Alfred; and Dornscheidt, Wolfgang, to Ases Brown Boveri Aktiengesellschaft. Electrochemical storage cell. 4,956,246, Cl. 429-104.000.

Kamyr, Inc.: See—  
Elmore, Carl L.; and Mitchell, Phillip, 4,955,482, Cl. 209-17.000.

Kanagawa, Yoichi: See—  
Watanabe, Hideo; Kanagawa, Yoichi; Suzuki, Takashi; and Nomura, Takeshi, 4,956,114, Cl. 252-62.580.



Kanda, Takashi: See—  
Hasegawa, Takanori; Abe, Nobuyuki; Hirose, Toshihiko; Kanda, Takashi; Saito, Hiroshi; Nakazawa, Eiji; and Oshima, Masaki, 4,956,664, Cl. 355-43.000.

Kane, Robert C., to Motorola, Inc. Switched anode field emission device. 4,956,574, Cl. 313-306.000.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: See—  
Tsuge, Kazunori; Endo, Toshihito; Kobayashi, Kenji; and Tawada, Yoshihisa, 4,956,023, Cl. 136-244.000.

Kanehara, Koichi; Fukuda, Kazumi; Sato, Masashi; and Shimeno, Toshiaki, to Mitsubishi Jukogyo K.K. Automatic toll collector for a toll road. 4,955,532, Cl. 232-7.000.

Kaneko, Tetsuya: See—  
Shimizu, Akira; Suzuki, Hidetoshi; Okunuki, Masahiko; Ono, Haruhito; Nomura, Ichiro; Banno, Yoshikazu; Takeda, Toshihiko; and Kaneko, Tetsuya, 4,956,578, Cl. 315-3.000.

Kaneko, Yoshiyuki: See—  
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Kanemitsu, Nobuhisa: See—  
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Kaneshige, Masatoshi: See—  
Asanuma, Masato; Kaneshige, Masatoshi; and Aimoto, Toyoka, 4,955,316, Cl. 118-657.000.

Kanetomo, Masafumi; Tachi, Shinichi; Tsujimoto, Kazunori; Mukai, Kiichiro; Daikoku, Takahiro; Kieda, Shigekazu; Shindo, Keijiro; and Tamura, Kenshiro, to Hitachi, Ltd. Dry etching apparatus. 4,956,043, Cl. 156-345.000.

Kaneyasu, Masayoshi; and Kurihara, Nobuo, to Hitachi, Ltd. Throttle control apparatus of internal combustion engine. 4,955,346, Cl. 123-399.000.

Kang, En-Tang; Tan, Thiam C.; and Neoh, Koon G., to National University of Singapore. Chemical synthesis of stable and electroactive polypyrrole and related polyheterocyclic compounds. 4,956,444, Cl. 528-220.000.

Kanner, Rowland W.; and Williams, Fred E., Jr., to Ryder International Corporation. Pressure venting system for lens cases. 4,956,156, Cl. 422-300.000.

Kanno, Takao; Koda, Yutaka; and Nagato, Hirokazu, to NOK Corporation. Process for preparing a magnetic fluid. 4,956,113, Cl. 252-62.520.

Kano, Tetsuhiro. Illumination equipment. 4,956,751, Cl. 362-1.000.

Kansai Electric Power Co., Inc., The: See—  
Shimizu, Masayuki; Sakamoto, Tatsuhiko; and Shigematsu, Toshio, 4,956,244, Cl. 429-17.000.

Kao Corporation: See—  
Shirasaki, Yoshitsugu; and Torimoto, Yoshiaki, 4,956,259, Cl. 430-137.000.

Karkow, Edward E., to GSI Corporation. Woven electrical transmission cable. 4,956,524, Cl. 174-117.00M.

Karn, Donald L.: See—  
Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Montelith, John R.; Seale, Mark A.; and Wisecup, David R., 4,956,045, Cl. 156-384.000.

Karpf, Kurt, to Sulzer Brothers Limited. Prosthetic acetabulum. 4,955,917, Cl. 623-22.000.

Karra, Vijia K.: See—  
Magerowski, Anthony J.; Karra, Vijia K.; Szalanski, Scott E.; and Gieschen, John A., 4,956,078, Cl. 209-254.000.

Kasama, Yasuhiro: See—  
Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, 4,956,811, Cl. 365-51.000.

Kaschper, Jürgen R., to Big Creek Sports Ltd. Oar for racing shells and method of making same. 4,955,839, Cl. 440-101.000.

Kasenga, Anthony F.; Sigai, A. Gary; Peters, Thomas E.; and Hunt, Roger B., to GTE Products Corporation; and GTE Laboratories Incorporated. Firing and milling method for producing a manganese activated zinc silicate phosphor. 4,956,202, Cl. 427-215.000.

Kaser, Beda, to Zumbach Electronic AG. Process for producing HOE's for use in combination to produce a telecentric beam. 4,955,694, Cl. 350-320.000.

Kashihara, Yuji; Iwatsuki, Kunihiko; and Taga, Yutaka, to Toyota Jidosha Kabushiki Kaisha. Transmission control apparatus, having means for determining the completion of a shifting action of a coupling device with pressure adjusting accumulator. 4,955,256, Cl. 74-866.000.

Kashima, Mitsuhiro; and Suzuki, Kensei, to Kayaba Kogyo Kabushiki Kaisha. Oil-pressure bearing apparatus. 4,955,730, Cl. 38.4-101.000.

Kashiwabuchi, Masaaki: See—  
Kawashima, Masaaki; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, 4,955,208, Cl. 62-264.000.

Kasler, Karl H.: See—  
Williams, John L.; Dederichs, Reinhold; Schlak, Otfried; Kasler, Karl H.; Grigo, Ulrich; and Nouvertne, Werner, 4,956,240, Cl. 428-423.700.

Kassen, Albert D. Golf club with green surface repair device. 4,955,609, Cl. 273-162.00F.

Katahira, Masayuki, to Nippon Seiko Kabushiki Kaisha. Operating apparatus for clean room. 4,955,244, Cl. 74-89.150.

Kataita, Masafumi: See—  
Ajioka, Masanobu; Takenaka, Shinji; Itoh, Hiroyuki; Kataita, Masafumi; and Kohno, Yoshitsugu, 4,956,169, Cl. 423-502.000.

Katakura, Kageyoshi: See—  
Nishiyama, Hisashi; Katakura, Kageyoshi; Ishikawa, Shizuo; and Ogawa, Toshio, 4,955,386, Cl. 128-661.090.

Kataoka, Yoshikazu; Wakimoto, Zenji; and Sugata, Takeshi, to Dainippon Screen Mfg. Co., Ltd. Apochromat optical system. 4,955,701, Cl. 350-481.000.

Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, to Mitsubishi Jukogyo Kabushiki Kaisha; and Sumitomo Rubber Industries, Ltd. Metal mold centering and clamping device in a tire vulcanizing machine. 4,955,799, Cl. 425-47.000.

Katayama, Hiroyuki: See—  
Miyake, Tomoyuki; Murakami, Yoshiteru; Katayama, Hiroyuki; Takahashi, Akira; and Ohta, Kenji, 4,956,243, Cl. 428-694.000.

Katayama, Kazuo, to Mazda Motor Corporation. Gear shift device for automotive vehicle. 4,955,935, Cl. 74-473.0SW.

Kathirgamanathan, Poopathy; Adams, Philip N.; Quill, Kieran; and Underhill, Alan E., to Cookson Group PLC. Electroconductive copolymers. 4,956,441, Cl. 528-171.000.

Kato, Heizaburo; and Nishioka, Masao, to Sankyo Manufacturing Company, Ltd. Motion transforming apparatus. 4,955,243, Cl. 74-84.00R.

Kato, Heizaburo, to Sankyo Manufacturing Company, Ltd. Eccentricity control device. 4,955,254, Cl. 74-603.000.

Kato, Hideo; Shibata, Hirohumi; Matsushita, Keiko; and Takamatsu, Osamu, to Canon Kabushiki Kaisha. Mask structure for lithography. 4,956,249, Cl. 430-5.000.

Kato, Minoru, to Kabushiki Kaisha Toshiba. Zero crossing type thyristor. 4,956,690, Cl. 357-38.000.

Katoh, Kazunobu: See—  
Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hisashi; Ukai, Toshinao; Yagihara, Morio; Takagi, Yoshihiro; and Yoneyama, Masakazu, 4,956,263, Cl. 430-264.000.

Katoh, Shunsaku: See—  
Ooi, Kenta; Miyai, Yoshitaka; and Katoh, Shunsaku, 4,956,062, Cl. 204-153.150.

Katsumoto, Takehiko: See—  
Kitada, Taizo; Katsumoto, Takehiko; Hirako, Osamu; Ninoyu, Masatoshi; Makigawa, Yasuyuki; Yamanaka, Gorou; and Fujii, Masao, 4,955,327, Cl. 123-41.420.

Katz, Sol: See—  
Lienard, Jean; Haesebrouck, Francis; Katz, Sol; Abolins, Andrew; and Schmidt, George, 4,955,144, Cl. 105-4.200.

Kauffman, Thomas F.; and Puletti, Paul P., to National Starch and Chemical Investment Holding Corporation. Bonding method employing sprayable hot melt adhesives for case and carton sealing. 4,956,207, Cl. 428-34.200.

Kaulig, Heinz: See—  
Stein, Klaus; and Kaulig, Heinz, 4,955,106, Cl. 15-335.000.

Kauss, Wolfgang, to Mannesmann Rexroth GmbH. Hydrostatic auxiliary power steering mechanism for motor vehicles. 4,955,445, Cl. 180-133.000.

Kavanagh, James A.: See—  
Houriet, John W., Jr.; and Kavanagh, James A., 4,955,967, Cl. 273-372.000.

Kawabata, Tatsuro: See—  
Shimane, Kazuo; Iijima, Nobuo; and Kawabata, Tatsuro, 4,955,780, Cl. 414-744.200.

Kawagoe, Takahiro: See—  
Miyazaki, Tadaaki; Ogino, Takao; and Kawagoe, Takahiro, 4,956,247, Cl. 429-194.000.

Kawahara, Kenichi; Nomura, Masaharu; Tsugawa, Hiroaki; and Iwamoto, Hirofumi, to Nippon Kayaku Kabushiki Kaisha. Heat-sensitive recording material. 4,956,333, Cl. 503-209.000.

Kawai, Akira: See—  
Tokui, Akira; Sato, Shinichi; Kawai, Akira; Nakajima, Masayuki; Ozaki, Hiroji; and Nagatomo, Masao, 4,956,310, Cl. 437-52.000.

Kawai, Yuzo, to Kabushiki Kaisha Suiden. Suction cleaner. 4,955,107, Cl. 15-339.000.

Kawakami, Yukichika: See—  
Fukuda, Makoto; Suzuki, Sirou; Hosokawa, Toshio; Iizuka, Yo; Kawakami, Yukichika; and Shiiki, Zenya, 4,956,499, Cl. 524-500.000.

Kawamata, Yoshio; and Iwai, Kiyoshi, to Showa Sangyo Co., Ltd. Method for extracting fats and oils. 4,956,125, Cl. 260-412.800.

Kawamura, Hideaki; Fujihayashi, Kentaro; and Hidaka, Yosato, to Fanuc Ltd. Numerical control method with a parallel processing function. 4,956,785, Cl. 364-474.010.

Kawamura, Hideo, to Isuzu Ceramics Research Institute Co., Ltd. Drive system for turbochargers with rotary electric machines. 4,955,199, Cl. 60-608.000.

Kawamura, Hideo, to Isuzu Motors Limited. Control apparatus for valve driven by electromagnetic force. 4,955,334, Cl. 123-90.110.

Kawana, Yoshie; and Ito, Narushi, to NEC Corporation. Biosensor device provided with an agitator. 4,956,149, Cl. 422-68.100.

Kawano, Minoru; Miura, Kazunobu; Murata, Kazushige; and Nagoshi, Mitsuru, to Konica Corporation. Document feeding apparatus. 4,955,595, Cl. 271-9.000.

Kawano, Osamu: See—  
Sakai, Toshio; Kawano, Osamu; Tanabe, Kazunori; and Hattori, Tomoaki, 4,956,662, Cl. 355-27.000.

Kawarai, Seigi: See—  
Sueyoshi, Toshinobu; Asada, Seiichi; Amemiya, Masahiro; Kawarai, Seigi; and Miyake, Akira, 4,956,220, Cl. 428-141.000.

Kawasaki, Kaoru: See—  
Koyama, Kazuo; Taira, Taketoshi; Kawasaki, Kaoru; Itami, Atsushi; and Matsuzo, Nobuhiko, 4,956,025, Cl. 148-12.00C.

Kawasaki Steel Corporation: See—  
Shibata, Masaru; Onishi, Masayuki; Ohsugi, Hitoaki; Ogura, Shigeru; Washio, Masaru; Kuguminato, Hideo; and Hara, Yoshiaki, 4,955,126, Cl. 29-527.600.

Kawashima, Masaaki; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, to Hitachi, Ltd. Refrigerating apparatus having a stink removing device. 4,955,208, Cl. 62-264.000.

Kawashima, Yasumasa: See—  
Ito, Kumiko; Kawashima, Yasumasa; Nonaka, Shiro; and Ishida, Tomotoaki, 4,956,787, Cl. 364-474.240.

Kawata, Hideaki: See—  
Koizumi, Hiroshi; Kawata, Hideaki; Arai, Katsumi; Miyamoto, Koji; Ichikawa, Tadaaki; and Ogata, Koji, 4,956,139, Cl. 264-156.000.

Kayaba Kogyo Kabushiki Kaisha: See—  
Kashima, Mitsuhiro; and Suzuki, Kensei, 4,955,730, Cl. 38.4-101.000.

Kayser, John P., to KLS International Corporation. Lubricating device. 4,955,953, Cl. 184-42.000.

Kech, Fernand J.: See—  
Lenack, Alain L. P.; and Kech, Fernand J., 4,956,110, Cl. 252-49.500.

Keenan, Bruce S.; and Sparrow, James T. Biological methods utilizing dihydrotestosterone heptanoate. 4,956,357, Cl. 514-178.000.

Keir, John B., to Vickers, Incorporated. Valve system for preventing uncontrolled descent in fork lift trucks. 4,955,461, Cl. 187-9.00R.

Keller, Bruno: See—  
Geilinger, Peter; and Keller, Bruno, 4,955,285, Cl. 98-39.100.

Keller Industries Ltd.: See—  
Hahn, Paul; and Allan, James, 4,956,032, Cl. 156-94.000.

Kelley Company Inc.: See—  
Hageman, Martin P., 4,955,923, Cl. 14-71.700.

Kelly, Eudell L., to Cummins Engine Company, Inc. High compression internal combustion engine. 4,955,337, Cl. 123-193.0CH.

Kelly, Michael C.: See—  
Williams, David E.; and Kelly, Michael C., 4,955,952, Cl. 181-111.000.

Kelman, Charles D. Decentered intraocular lens. 4,955,902, Cl. 623-6.000.

Kemp, Richard A.: See—  
Hamilton, David M., Jr.; and Kemp, Richard A., 4,956,516, Cl. 585-646.000.

Kemper, Reinhard: See—  
Bender, Herbert; Colberg, Horst; Teich, Friedhelm; and Kemper, Reinhard, 4,956,464, Cl. 546-57.000.

Kendig, Robert P.; Lucheta, Roger A.; and McKendree, Francis S., to Westinghouse Electric Corp. Turbine blade fatigue monitor. 4,955,269, Cl. 73-577.000.

Kennametal Inc.: See—  
Armbrust, William D., 4,955,264, Cl. 82-158.000.

Mehrotra, Pankaj K.; Swiokla, Joyce L.; and Billman, Elizabeth R., 4,956,315, Cl. 501-87.000.

Kennedy, Clinton R.: See—  
Child, Jonathan E.; Chou, Tai-Sheng; Husa, Albin, Jr.; Kennedy, Clinton R.; Ragonese, Francis P.; and Tabak, Samuel A., 4,956,518, Cl. 585-726.000.

Kennedy, John K.: See—  
Harris, Meekie T.; Larkin, John J.; Armington, Alton F.; and Kennedy, John K., 4,956,047, Cl. 156-623.00Q.

Kennedy, Ronald C.; Dreesman, Gordon R.; and Essex, Myron, to Southwest Foundation For Biomedical Research; and President and Fellows of Harvard College. Synthetic peptides and method of use for diagnosis and vaccination for AIDS and ARC. 4,956,273, Cl. 435-5.000.

Kenney Manufacturing Company: See—  
Torti, Anthony, 4,955,421, Cl. 160-243.000.

Kent, Henry J.: See—  
Blecha, William E.; and Kent, Henry J., 4,955,720, Cl. 356-429.000.

Kentek Information Systems, Inc.: See—  
Fukae, Kensuke; and Kinoshita, Koichi, 4,956,676, Cl. 355-271.000.

Kenyon, Ian R.; and Smith, Bryan C., to Lever Brothers Company. Composition for softening fabrics: clay softening agent and nonionic surfactant with 0°-15° C. cloudy phase. 4,956,112, Cl. 252-8.900.

Keough, James R.; Miller, Arthur E.; and Schrader, Charles R., to Electro Statics, Inc. Emission control unit. 4,956,152, Cl. 422-181.000.

Kerbatat, Siegfried: See—  
Beer, Dieter; Reddehase, Horst; Kerbatat, Siegfried; Hanning, Detlef; Plass, Ulrich; and Krause, Hermann, 4,956,747, Cl. 361-392.000.

Kerlinger, Nancy; and Gleason, Richard D., to ICI Americas Inc. Process for the acylation of thiazolidines. 4,956,468, Cl. 548-200.000.

Kerze, Joseph E. Stain cleaning method. 4,956,021, Cl. 134-40.000.

Keasler, Herb; and Spector, George. Automatic apparatus for making strudel type pastry. 4,955,801, Cl. 425-92.000.

Keung, Jay K.: See—  
Balloni, Riccardo; Donovan, Kevin M.; and Keung, Jay K., 4,956,232, Cl. 428-349.000.

Key, James C.: See—  
Honeycutt, LeRoy, III; Key, James C.; and Moody, Herbert, III, 4,955,429, Cl. 164-479.000.

Key Manufacturing Group, Inc.: See—  
Toth, John A., 4,955,773, Cl. 411-429.000.

Khait, Klementina: See—  
Falk, John C.; and Khait, Klementina, 4,956,422, Cl. 525-392.000.

Khanna, Pyare L.; Dworschack, Robert; and Ruprecht, Phillip, to Microgenics Corporation. Reagent stabilization in enzyme-donor and acceptor assay. 4,956,274, Cl. 435-7.000.

Khapp, Floyd: See—  
Budde, William A.; and Khapp, Floyd, 4,955,348, Cl. 123-478.000.

Kieda, Shigekazu: See—  
Kanetomo, Masafumi; Tachi, Shinichi; Tsujimoto, Kazunori; Mukai, Kiichiro; Daikoku, Takahiro; Kieda, Shigekazu; Shindo, Keijiro; and Tamura, Kenshiro, 4,956,043, Cl. 156-345.000.

Kiener, Heinz: See—  
Kunkel, Heinrich; Kiener, Heinz; and Olschewski, Armin, 4,955,786, Cl. 415-110.000.

Kifer, Edward W.; Wojtyna, Vincent J.; Colton, James P.; and Stickel, Jeffrey T., to Thermal Products International. Closed cell phenolic foam containing alkyl glucosides. 4,956,394, Cl. 521-84.100.

Kikuchi, Yoshinori: See—  
Ogawa, Yoshihiro; Takahashi, Hiroo; and Kikuchi, Yoshinori, 4,955,360, Cl. 126-263.000.

Kilpatrick, Andrew T.: See—  
Clark, Robin D.; Kilpatrick, Andrew T.; and Spedding, Michael, 4,956,365, Cl. 514-233.200.

Kim, Byoung-Chul: See—  
Kim, Kwang-Ung; Kim, Byoung-Chul; and Hong, Soon-Man, 4,956,396, Cl. 521-85.000.

Kim, Kwang-Ung; Kim, Byoung-Chul; and Hong, Soon-Man, to Korea Advanced Institute of Science & Technology. Process for preparing rigid polyvinyl chloride structured foams having superior surface characteristics. 4,956,396, Cl. 521-85.000.

Kim, Peter K.: See—  
Sanders, Edgar S., Jr.; Jensvold, John A.; Clark, Daniel O.; Coan, Frederick L.; Back, Henry N.; Mickola, William E.; Kim, Peter K.; and Admasu, Wudneh, 4,955,993, Cl. 55-16.000.

Kimberly-Clark Corporation: See—  
Rajala, Gregory J.; and King, Lon M., 4,955,113, Cl. 24-448.000.

Kimpel Rolf-Dieter, to Siemens Aktiengesellschaft. Electromagnetic relay. 4,956,623, Cl. 335-128.000.

KimRick, Inc.: See—  
Brennan, Richard, Sr., 4,955,592, Cl. 269-68.000.

Kimura, Etsuji; Hasegawa, Nozomu; and Nishiyama, Yutaka, to Mitsubishi Kinzoku Kabushiki Kaisha. Process for preparing compound metal oxides of yttrium, barium and copper. 4,956,340, Cl. 505-1.000.

Kimura, Etsuji: See—  
Shibasaki, Takeyoshi; Kimura, Etsuji; and Nishiyama, Yutaka, 4,956,159, Cl. 423-135.000.

Kimura, Hideaki; and Uda, Shoichi, to Laurel Bank Machines Co., Ltd. Coin wrapping paper feeding apparatus for coin wrapping machine. 4,955,179, Cl. 53-212.000.

Kimura, Hirokazu: See—  
Fujita, Toshiki; Kimura, Hirokazu; and Yamato, Yoshihiro, 4,955,227, Cl. 73-104.000.

Kimura, Hiroyuki, to Canon Kabushiki Kaisha. Image processing apparatus capable of random mosaic and/or oil-painting-like processing. 4,956,872, Cl. 382-44.000.

Kimura, Kiyoshi; Ukai, Yojiro; Ogasawara, Takashi; and Nakagawa, Yutaka, to Nippon Shinyaku Co., Ltd. Nootropic agent. 4,956,364, Cl. 514-227.500.

Kimura, Masaki: See—  
Shibata, Toshihiro; and Kimura, Masaki, 4,956,488, Cl. 558-414.000.

Kimura, Masanori; Narisue, Shigetoshi; Nakatomi, Hiroshi; and Matsuo, Eito, to Mitsubishi Jukogyo Kabushiki Kaisha. Driving linkage device. 4,955,788, Cl. 415-150.000.

Kimura, Misao, to Harada Kogyo Kabushiki Kaisha. Rod antenna. 4,956,647, Cl. 343-901.000.

King, John R., to S&K Enterprises, Inc. Rack beam latch. 4,955,743, Cl. 403-234.000.

King, Lon M.: See—  
Rajala, Gregory J.; and King, Lon M., 4,955,113, Cl. 24-448.000.

King, Martin J., to Hope Technologies Corp.; and Columbia Technology Corp. Body scrubbing brush apparatus. 4,955,101, Cl. 15-21.100.

King, Simon: See—  
Smith, Eric O. M.; Fisher, James; and King, Simon, 4,955,626, Cl. 280-87.042.

King, Stephen W.; Fowler, Geoff G.; and Vandenberg, Peter A., to MicroLife Technics, Inc. Method for inhibiting fungi. 4,956,177, Cl. 424-93.000.

Kinnan, Frank R., to Underground Technologies. Self-propelled subsoil penetrating tool system. 4,955,439, Cl. 175-45.000.

Kino, Tohru: See—  
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, 4,956,352, Cl. 514-63.000.

Kinoshita, Keichi: See—  
Johdai, Akiyoshi; Kinoshita, Keichi; Matsui, Toshio; and Yamada, Hirokazu, 4,955,597, Cl. 271-215.000.

Kinoshita, Koichi: See—  
Fukae, Kensuke; and Kinoshita, Koichi, 4,956,676, Cl. 355-271.000.

Kinoshita, Naoyoshi; and Hatta, Yoshihiko, to Minolta Camera Kabushiki Kaisha. Image forming apparatus having a plurality of developing units each containing two-component developer. 4,955,317, Cl. 118-689.000.

Kinoshita, Yoshihiko, to Honda Giken Kogyo Kabushiki Kaisha. Deceleration sensor having safety catch means. 4,955,638, Cl. 280-806.000.

Kipphan, Helmut; and Löffler, Gerhard, to Heidelberger Druckmaschinen AG. Electronic multimachine operating system for remotely controlling printing machines. 4,955,290, Cl. 101-183.000.



- Kirihara, Leslie J.: See—  
Batishko, Charles R.; Kirihara, Leslie J.; Peters, Timothy J.; and Rasmussen, Donald E., 4,956,558, Cl. 250-461.100.
- Kirk, James F.: See—  
Yannas, Ioannis V.; Orgill, Dennis P.; Loree, Howard M., II; Kirk, James F.; Chang, Albert S. P.; Mikic, Borivoje B.; Krarup, Christian; and Norregaard, Thorkild V., 4,955,893, Cl. 606-154.000.
- Kirk, Kevin A.: See—  
Chu, Shaw-Chang; Heilman, Paul D.; and Kirk, Kevin A., 4,956,233, Cl. 428-349.000.  
Chu, Shaw-Chang; Heilman, Paul D.; and Kirk, Kevin A., 4,956,241, Cl. 428-516.000.
- Kirschner, Jonathan; Smazik, Kenneth G.; and Paisley, Gary V., to Coca-Cola Company, The. Orange juice dispensing system. 4,955,507, Cl. 222-65.000.
- Kis Photo Industrie: See—  
Gerstch, Franck, 4,956,663, Cl. 355-38.000.
- Kishi, Shinichi: See—  
Suzuki, Kenji; Hatazawa, Kikuo; and Kishi, Shinichi, 4,956,717, Cl. 358-296.000.
- Kitada, Taizo; Katsumoto, Takehiko; Hirako, Osamu; Ninoyu, Masatoshi; Makigawa, Yasuyuki; Yamanaka, Gorou; and Fujii, Masao, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha; and Mitsubishi Denki Kabushiki Kaisha. Partial-boil cooling apparatus for engine. 4,955,327, Cl. 123-41.420.
- Kitagawa, Katsuhiko; and Maeda, Takeshi, to Central Glass Company, Limited. Method and apparatus for bending and annealing glass sheets to be laminated. 4,956,001, Cl. 65-107.000.
- Kitagishi, Nozomu, to Canon Kabushiki Kaisha. Pseudo format camera. 4,955,715, Cl. 354-155.000.
- Kitamura, Koichiro, to Kitamura Machinery Co., Ltd. Bed for a machine tool. 4,955,770, Cl. 409-137.000.
- Kitamura Machinery Co., Ltd.: See—  
Kitamura, Koichiro, 4,955,770, Cl. 409-137.000.
- Kitamura, Yutaka: See—  
Aso, Hiroaki; and Kitamura, Yutaka, 4,955,944, Cl. 123-41.310.
- Kitaura, Toshihiko; Nakamura, Akio; Sakamoto, Masayuki; Takashima, Kouichi; Hirakawa, Kiyotaka; and Mizota, Matao, to Nitto Denko Corporation. Method for applying mold-releasing agent onto mold surfaces using a mold-releasing sheet. 4,956,132, Cl. 264-39.000.
- Kitazawa, Susumu: See—  
Numakura, Takashi; Kitazawa, Susumu; Naya, Junichi; and Numakura, Iwao, 4,956,718, Cl. 358-298.000.
- Kitchen, Alonzo G.: See—  
Mathis, Ronald D.; Kitchen, Alonzo G.; and Szalla, Frank J., 4,956,408, Cl. 524-147.000.
- Kito, Go: See—  
Aono, Tetsuya; Suno, Masahiro; and Kito, Go, 4,956,360, Cl. 514-215.000.
- Kitou, Kouji; and Onozawa, Makoto, to Hitachi, Ltd. Horizontal deflection-high voltage circuit. 4,956,587, Cl. 315-408.000.
- Kitsutaka, Eiji: See—  
Terayama, Satoshi; Aoki, Takashi; Ozawa, Shigeo; and Kitsutaka, Eiji, 4,955,257, Cl. 74-866.000.
- Kivi, Ilkka; Mannen, Tapio; Kuvaja, Kari; and Terava, Jorma, to Exel Oy; and Rauma-Repol Oy. Method of forming a joint: between a connecting piece and a product formed of composite material, said joint, and said connecting piece for forming said joint. 4,955,970, Cl. 285-149.000.
- Kiya, Yukitoshi; and Nakazato, Yasushi, to Ricoh Company, Ltd. Recording sheet transport apparatus. 4,956,678, Cl. 355-318.000.
- Klamar, Ed. Pipeline padding system. 4,955,756, Cl. 405-179.000.
- Klamer, Reuben B.; Lappen, David I.; Lappen, William A.; and Pardo, Beatriz E. Object sensor for detecting characteristics such as color for games. 4,956,775, Cl. 364-411.000.
- Klann, Holm: See—  
Foller, Werner; and Klann, Holm, 4,955,536, Cl. 236-48.000.
- Klapp, Hartmut, to Jagenberg Aktiengesellschaft. Device for introducing material into containers. 4,955,929, Cl. 53-244.000.
- Klassen, Lorraine J. Combination bath tub shelf and bench. 4,955,093, Cl. 4-379.000.
- Klein, Edward. Disposable safety medical syringe. 4,955,868, Cl. 604-198.000.
- Klimczak, William J.: See—  
Edwards, Robert R.; and Klimczak, William J., 4,955,996, Cl. 55-302.000.
- Kling, Lars-Orjan: See—  
Johnson, Sten E.; and Kling, Lars-Orjan, 4,956,770, Cl. 364-200.000.
- Klinke, Roland: See—  
Hosticka, Bedrich; Klinke, Roland; and Pfeleiderer, Hans-Joerg, 4,956,613, Cl. 330-253.000.
- Klomp, Edward D., to General Motors Corporation. Variable volume crankcase scavenge control. 4,955,333, Cl. 123-73.0A.C.
- Klosowski, Jerome M.: See—  
Chu, Hsien-Kun; Kamis, Russell P.; Klosowski, Jerome M.; and Lower, Loren D., 4,956,435, Cl. 528-17.000.
- Klotzer, Wilhelm; Link, Helmut; Musaner, Renate; Schiestl, Werner; and Singewald, Nicolas, to Hoffmann-La Roche Inc. 1,3-disubstituted imidazolium salts. 4,956,470, Cl. 548-337.000.
- KLS International Corporation: See—  
Kayser, John P., 4,955,953, Cl. 184-42.000.
- Klun, Thomas P.; Robbins, Aida F.; and Ali, M. Zaki, to Minnesota Mining and Manufacturing Company. Radiation crosslinkable compositions. 4,956,265, Cl. 430-283.000.
- Knackstedt, Jack S., to Drazil, Jaromir Vlacav. Connector. 4,955,779, Cl. 414-723.000.
- Knauf, Vic C.: See—  
Goodman, Robert M.; Knauf, Vic C.; Houck, Catherine M.; and Comai, Luca, 4,956,282, Cl. 435-69.510.
- Kniest, James N.; and Campbell, Dean D., to Ultrasonic Arrays, Inc. Automatic calibration method for thickness gauges. 4,955,225, Cl. 73-1.00J.
- Knight, David J.; Kubik, James M.; and Neal, Brian P., to Allied-Signal Inc.; and Bendix Limited. Compressed gas apparatus. 4,955,994, Cl. 55-163.000.
- Knoll, Peter; Konig, Winfried; Mock-Hecker, Rudiger; and Gunther, Clemens, to Robert Bosch GmbH. Opto-electronic indicating matrix, and indicating device provided therewith. 4,955,698, Cl. 350-336.000.
- Knowles, Charlene G. Catamenial appliance. 4,955,875, Cl. 604-331.000.
- Kobayashi, Isao: See—  
Hamada, Yoosuke; Hirai, Hiromu; and Kobayashi, Isao, 4,956,789, Cl. 364-508.000.
- Kobayashi, Kenji: See—  
Tsuge, Kazunori; Endo, Toshihito; Kobayashi, Kenji; and Tawada, Yoshihisa, 4,956,023, Cl. 136-244.000.
- Kobayashi, Masakazu: See—  
Saito, Kazumasa; Maezawa, Hiroyuki; Kobayashi, Masakazu; and Futamura, Yoshihiko, 4,956,773, Cl. 364-200.000.
- Kobayashi, Michihito: See—  
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, 4,955,799, Cl. 425-47.000.
- Kobayashi, Michio: See—  
Sawada, Hideo; Kobayashi, Michio; and Yoshida, Masato, 4,956,123, Cl. 260-408.000.
- Kobayashi, Shigeotshi, to Clarion Co., Ltd. Engaging structure for a mountable/dismountable electronic apparatus used in a vehicle. 4,955,678, Cl. 312-320.000.
- Kobayashi, Yoshiji: See—  
Shimizu, Hiroshi; Harada, Takashi; Kondoh, Kaoru; and Kobayashi, Yoshiji, 4,956,245, Cl. 429-26.000.
- Kobiki, Michihito; Yoshida, Masahiro; and Ishikawa, Takahide, to Mitsubishi Denki Kabushiki Kaisha. Microwave monolithic integrated circuit with heat radiating electrode. 4,956,697, Cl. 357-81.000.
- Koch, Klaus, to Hermann Berstorff Maschinenbau GmbH. Method of operation and device for even heating by means of microwaves. 4,956,530, Cl. 219-10.55B.
- Koch, Klaus, to Hermann Berstorff Maschinenbau GmbH. Method and apparatus for even heating of products by means of microwaves. 4,956,532, Cl. 219-10.55M.
- Koch, Rudolf: See—  
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Frey, Otto; and Koch, Rudolf, 4,955,911, Cl. 623-16.000.
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- Koehmstedt, Paul L.: See—  
Buel, James L.; Carter, John G.; Eschbach, Eugene A.; FitzPatrick, Vincent F.; Koehmstedt, Paul L.; Morgan, William C.; Oma, Kenton H.; and Timmerman, Craig L., 4,956,535, Cl. 219-10.810.
- Koester, Rita: See—  
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- Kofman, Anatoly. Padlock. 4,955,932, Cl. 70-39.000.
- Koger, Hein S.: See—  
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- Koizumi, Hiroshi; Kawata, Hideaki; Arai, Katsumi; Miyamoto, Koji; Ichikawa, Tadaaki; and Ogata, Koji, to Canon Denshi Kabushiki Kaisha. Method of producing an exposure blade. 4,956,139, Cl. 264-156.000.
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- Kojima, Takao; and Ujita, Yasuhiro, to NGK Spark Plug Co., Ltd. Oxygen sensor. 4,956,072, Cl. 204-424.000.
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- Kolb, Robert E.; Tuckner, Paul F.; and Guenther, Richard A., to Minnesota Mining and Manufacturing Company. Fluorine-containing polymers with pendant thioorgano groups and method of making said polymers. 4,956,419, Cl. 525-342.000.
- Kolb, Wolfgang; and Albrecht, Ernst, to Pfaff Industriemaschinen GmbH. Device on sewing machines for the transport of work pieces. 4,955,307, Cl. 112-304.000.
- Koller, William R. Shield for detailing vehicle tires. 4,955,670, Cl. 301-37.00R.
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- Kolts, John H.; and Delzer, Gary A., to Phillips Petroleum Company. Dehydrogenation process and catalyst. 4,956,515, Cl. 585-651.000.
- Kolts, John H.: See—  
Elliott, David J.; and Kolts, John H., 4,956,330, Cl. 502-326.000.
- Komeyama, Nobuo, to Koyo Seiko Co., Ltd. Universal joint. 4,955,741, Cl. 403-57.000.
- Komoto, Akira, to Shimadzu Corporation. Vibration type force detector. 4,955,240, Cl. 73-862.590.
- Komuro, Hirokazu; Matsuda, Hiroto; Takahashi, Hiroto; Shibata, Makoto; Ikeda, Masami; and Tsuda, Hisanori, to Canon Kabushiki Kaisha. Liquid injection recording head with flexible support. 4,956,654, Cl. 346-140.00R.
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- Kondo, Tetsuo, to Hitachi, Ltd. Method and apparatus for addressee location. 4,956,861, Cl. 379-142.000.
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Shimizu, Keiichi; Tanabe, Junichi; Sugawara, Toshio; Inui, Tsuneo; and Kondo, Yoshiyuki, 4,956,242, Cl. 428-606.000.
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- Kondoh, Kaoru: See—  
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- Kone Oy: See—  
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- Kawano, Minoru; Miura, Kazunobu; Murata, Kazushige; and Nagoshi, Mitsuru, 4,955,595, Cl. 271-9.000.
- Takahashi, Yoshiharu, 4,956,660, Cl. 354-402.000.
- Konig, Winfried: See—  
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- Konishi, Masataka: See—  
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- Konishiroku Photo Industry Co., Ltd.: See—  
Tachibana, Noriki; Ueda, Eiichi; Kagawa, Nobuaki; and Ota, Hideo, 4,956,270, Cl. 430-527.000.
- Kopf, Henry B. Filter plate, filter plate element and filter comprising same. 4,956,085, Cl. 210-231.000.
- Kopp, Volker, to C. Ehrensperger AG. Dosage gun. 4,955,544, Cl. 239-304.000.
- Korea Advanced Institute of Science & Technology: See—  
Kim, Kwang-Ung; Kim, Byoung-Chul; and Hong, Soon-Man, 4,956,396, Cl. 521-85.000.
- Korea Institute of Science and Technology: See—  
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- Korf Engineering GmbH: See—  
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- Koshiishi, Takaho, to Ricoh Company, Ltd. DC decoupled radio communication system. 4,956,876, Cl. 455-78.000.
- Koskimies, Salme: See—  
Nissfolk, Fredrik; Koskimies, Salme; Idelman, Peter; Nurminen, Matti; and Roni, Salla, 4,956,512, Cl. 585-521.000.
- Kossatz, Gert; Heine, Wolfgang; Lempfer, Karsten; and Sattler, Heinz, to Fraunhofer Gesellschaft zur Förderung der Angewandten Forschung E.V. Building panel constructed in layers. 4,955,171, Cl. 52-612.000.
- Kosugi, Toshio, to Suzuki Motor Company Ltd. Vehicular back door fitting mechanism. 4,955,659, Cl. 296-146.000.
- Kosuzume, Hiroshi: See—  
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, 4,956,474, Cl. 548-475.000.
- Kotajima, Takao, to Fuji Jukogyo Kabushiki Kaisha. Transfer device of four-wheel-drive vehicle. 4,955,848, Cl. 474-28.000.
- Kotani, Hiroaki: See—  
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- Kotobuki & Co., Ltd.: See—  
Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Youichi, 4,955,739, Cl. 401-65.000.
- Kottke, Mary L.: See—  
Gutierrez, Gregoria, 4,956,354, Cl. 514-157.000.
- Kottke, Thomas G.: See—  
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- Kouno, Kazuo: See—  
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- Kowarik, Oskar: See—  
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- Kowligi, Rajagopal R.: See—  
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- Koyama, Kazuo; Taira, Taketoshi; Kawasaki, Kaoru; Itami, Atsushi; and Matsuzo, Nobuhiko, to Nippon Steel Corporation. Process for producing cold-rolled high strength steel sheet having excellent formability and conversion-treatability. 4,956,025, Cl. 148-12.00C.
- Koyama, Toshio: See—  
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- Koyo Seiko Co., Ltd.: See—  
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- Oishi, Hiroshi, 4,955,446, Cl. 180-143.000.
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- Kozuki, Susumu; Takahashi, Koji; Edakubo, Hiroo; Nakayama, Tadayoshi; and Masu, Toshiyuki, to Canon Kabushiki Kaisha. Image signal reproducing apparatus. 4,956,725, Cl. 360-14.300.
- Kraft General Foods, Inc.: See—  
Moorman, Charles T., 4,956,176, Cl. 426-478.000.
- Krall, Jack: See—  
Jacobs, Robert S.; and Krall, Jack, 4,956,012, Cl. 75-236.000.
- Kramer, Rolf; Lohmann, Alfred; Bieker, Guido; and Budenbender, Herbert, to Waggon Union GmbH. Slider. 4,955,293, Cl. 105-199.300.
- Kramer, Ulrich: See—  
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- Kramer-Werke GmbH: See—  
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- Kranz, Joachim; and Wiesenberger, Alois, to BASF Aktiengesellschaft. Preparation of strong and soft-textured surface coating pigments. 4,956,018, Cl. 106-401.000.
- Krarup, Christian: See—  
Yannas, Ioannis V.; Orgill, Dennis P.; Loree, Howard M., II; Kirk, James F.; Chang, Albert S. P.; Mikic, Borivoje B.; Krarup, Christian; and Norregaard, Thorkild V., 4,955,893, Cl. 606-154.000.
- Kraus, Rainer: See—  
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- Krause, Hermann: See—  
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- Kroova, Zuzana: See—  
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- Kreidl, Janos; Turcsanyi, Peter; Stefko, Bela; Meszaros nee Brill, Judit; and Bogach, Erika, to Richter Gedeon Vegyeszeti Gyor Rt. Nitraminodaryl sulfoxide derivatives, process for their preparation and pharmaceutical and pesticidal compositions containing them. 4,956,007, Cl. 71-103.000.
- Kresge, Charles T.: See—  
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- Krieger, Roger B.: See—  
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- Krogstrup, Johan; Nohr, Henning; Christensen, Bruno; and Fosnaes, Frank, to Tex-Matic ApS. Gripping device for nappy materials. 4,955,656, Cl. 294-100.000.
- Kroll, Mark W.; and Pommrehn, Mark R., to Cheme Medical, Inc. Optical fiber reflective signal modulation system. 4,956,877, Cl. 455-605.000.
- Krommer, Helmut: See—  
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- Kross, Robert D., to Alcide Corporation. Topical treatment of genital herpes lesions. 4,956,184, Cl. 424-661.000.
- Kroupa, Loretta N., to Dow Corning Corporation. Electrically conductive silicone compositions. 4,956,203, Cl. 427-221.000.
- Krug, Gerhard: See—  
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- Kruk, David: See—  
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- Krumholz, Robert. Dustless drywall finisher. 4,955,748, Cl. 401-140.000.
- Krupp Industrietechnik GmbH: See—  
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- Krushinski, Joseph H., Jr.: See—  
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- Kubic, Helmut: See—  
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- Kubik, James M.: See—  
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- Kubik, Klaus: See—  
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- Kubo, Kiichiro; and Moryia, Masamichi, to Hitachi, Ltd. Liquid crystal display device, 4,955,695, Cl. 350-331.00R.
- Kubo, Masaharu: See—  
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- Kubo, Wataru: See—  
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- Kubo, Yoichiro: See—  
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- Kubota, Akinori: See—  
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- Kubota, Tetsumaru: See—  
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- Kubota, Yoshiya: See—  
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- Kudo, Hajime; Asano, Masami; Toma, Ken; and Takeuchi, Yo, to Mitsubishi Aluminum Co., Ltd. Heat exchanger and method of producing same, 4,955,525, Cl. 228-183.000.
- Kudo, Michio, to Nissan Motor Co., Ltd. Vehicle body structure reinforced by cowl member, 4,955,662, Cl. 296-192.000.
- Kudoh, Hidehiko: See—  
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- Kuguminato, Hideo: See—  
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- Kumagai, Kazushi: See—  
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- Kumano, Kazuo: See—  
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- Kundig, Hans: See—  
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- Kunkel, Heinrich; Kiener, Heinz; and Olschewski, Armin, to SKF Kugellagerfabriken GmbH. Drive device for pumps, 4,955,786, Cl. 415-110.000.
- Kunz, Barbara L.: See—  
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- Kupferschmidt, Albert: See—  
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- Kurabe Industrial Co., Ltd.: See—  
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- Kuramoto, Takashi: See—  
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- Kuraoka, Kesatoshi: See—  
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- Kurata, Takatsugu: See—  
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- Kureha Kagaku Kogyo Kabushiki Kaisha: See—  
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- Shigeta, Masatomo; Fukuda, Hiroyuki; Kaji, Hisatsugu; and Saitoh, Kuniyuki, 4,956,131, Cl. 264-29.500.
- Kurihara, Nobuo: See—  
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- Kuroda, Masami; Sugata, Yoshinobu; and Furusho, Noboru, to Fuji Electric Co., Ltd. Azulenium photoconductor for electrophotography, 4,956,250, Cl. 430-58.000.
- Kuroda, Masami; Nakamura, Youichi; and Furusho, Noboru, to Fuji Electric Co., Ltd. Photoconductor comprising charge transporting hydrazone compounds, 4,956,277, Cl. 430-58.000.
- Kurosaki, Kaoru, to Kabushiki Kaisha Toshiba. X-ray fluoroscopic apparatus, 4,956,857, Cl. 378-110.000.
- Kurtz, Robert J.; and LiCausi, Joseph, to BioResearch, Inc. Autotransfusion bag, 4,955,877, Cl. 604-408.000.
- Kushida, Kazumitsu: See—  
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- Kusters, Karl-Heinz: See—  
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- Kutz, Johannes; and von Harten, Gunter, to Eduard Kusters Maschinenfabrik GmbH & Co. KG. Apparatus for treating a textile web with a liquid, 4,955,212, Cl. 68-9.000.
- Kuvaja, Kari: See—  
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- Kuwa, Masaaki: See—  
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- Kuwabara, Yohei; Asaoka, Teruo; Yoshioka, Shogo; and Sugiyama, Haruki, to Shizuoka Seiki Co., Ltd. Finishing method employing electro-chemical machining, and an electro-chemical finishing machine, 4,956,060, Cl. 204-129.200.
- Kvalo, Michael L.; and Carson, Culley C., to C. R. Bard, Inc. Ultrasound targeting system for shockwave lithotripsy, 4,955,385, Cl. 128-660.030.
- Kwiatkowski, Richard F.; Gallagher, Bruce C.; and Bicehouse, Jack L., to Mine Safety Appliances Company. Non-contact inductive distance measuring system with temperature compensation, 4,956,606, Cl. 324-207.120.
- Kyodo Printing Co., Ltd.: See—  
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- Kyokuichi, Sato: See—  
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- Kyorin Pharmaceutical Co., Ltd.: See—  
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- Kysela, Ernst: See—  
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- Laboratorios Vinas, S. A.: See—  
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- Laboratory Equipment, Corp.: See—  
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- LaBounty, Roy E. Catch basin for bridge deck demolition, 4,955,972, Cl. 294-68.260.
- Lacey, Roger A.: See—  
Clissett, Peter A. G.; and Lacey, Roger A., 4,955,252, Cl. 74-502.400.
- LaConti, Anthony B.: See—  
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- Lacroix, Roger; and Ruhlmann, Edmond, to Ciba-Geigy Corporation. Process for the preparation of concentrated aqueous, substantially salt-free solutions of aminotriazinyl reactive dyes, aqueous dye solutions produced thereby and process of dyeing, 4,955,987, Cl. 8-549.000.
- Lai, Daniel T.: See—  
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- Lai, Wen-Yih F.: See—  
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- Laird, Ronald C. Machine tool table having disposable wooden table section mechanism, 4,955,765, Cl. 408-87.000.
- Laird, Walter J.: See—  
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- Lam, Edward K.; and Luksch, Heinrich E., to Outboard Marine Corporation. Dynamic damper on marine propeller or propeller shaft, 4,955,833, Cl. 440-49.000.
- Lamb, Christopher: See—  
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- Lamb-Weston, Inc.: See—  
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- Lambert, Robert W.; Martin, Joseph A.; and Thomas, Gareth J., to Hoffmann-La Roche Inc. Pyrimidine derivatives as an antiviral agent, 4,956,346, Cl. 514-50.000.
- Lana, Dolores P.: See—  
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- Lang, Gary D.; and Zyer, Benjamin, to Liquid Carbonic Corporation. Liquid cryogen freezer with improved vapor balance control, 4,955,206, Cl. 62-186.000.
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- Maeda, Hiroshi: See—  
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- Maetzawa, Hiroyuki: See—  
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- Magdica, Alex; and Stain, Donald B., to UNC Reclamation: Selective removal of chromium, nickel, cobalt, copper and lead cations from aqueous effluent solutions, 4,956,154, Cl. 423-54.000.
- Magerowski, Anthony J.; Karra, Vijia K.; Szalanski, Scott E.; and Gieschen, John A., to Nordberg Inc.: Feed prestratification attach-

ment for high efficiency vibratory screening, 4,956,078, Cl. 209-254.000.

Maggelet, John, to Square D Company: Register rack assembly for a programmable controller system, 4,956,750, Cl. 361-415.000.

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Maguire, John N., III: Air breathing assembly and air filter attachment therein, 4,955,373, Cl. 128-205.270.

Mahmoud, Issa S., to International Business Machines Corporation: Chemical polishing of aluminum alloys, 4,956,022, Cl. 134-41.000.

Mahoney, Christopher J., to General Motors Corporation: Liquid float gage assembly, 4,955,231, Cl. 73-313.000.

Maier, Gerhard, to Deutsche Thompson-Brandt GmbH: Automatic balancing system for communications receiver apparatus, 4,956,711, Cl. 358-191.100.

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Makabe, Toshiji: See—  
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- Marcotti, Ettore. Flying disk with retrieving device. 4,955,842, Cl. 446-46.000.
- Marcus, Bonita K.: See—  
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- Marek, Jiri, to Robert Bosch GmbH. Sensor. 4,955,234, Cl. 73-517.00R.
- Marelo Power Systems, Inc.: See—  
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- Maresca, Carlo P. Combination backpack and chaise. 4,955,517, Cl. 224-155.000.
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- Marks, Geoff, to Astro Aerospace Corp. Erectable structure truss attachment joint. 4,955,742, Cl. 403-246.000.
- Marks, Robert J.; and Kupferschmidt, Albert, to Northern Telecom Limited. Fanning strip member and terminal block member arrangement. 4,955,829, Cl. 439-719.000.
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- Marquette Gas Analysis: See—  
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- Marquez, Joseph A.: See—  
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- Marshall, Dennis L.; Behm, Dale H.; Eberle, Theodore F.; and Powers, Thomas F., to Hoover Universal, Inc. Plastic container with reinforcing ring in the base. 4,955,491, Cl. 215-12.100.
- Marshall, Ernest H. Transmission. 4,955,247, Cl. 74-347.000.
- Marshall, James W.: See—  
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- Marshall, Mark A.: See—  
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- Martell, William A.; and Brown, Colin R., to General Motors Corporation. Tool for molding plastic articles. 4,955,804, Cl. 425-548.000.
- Martella, David J.: See—  
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- Martin, Bror: See—  
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- Martin, John E.; DeLaurier, James D.; Jull, George W.; and Lillemark, Arne, to Canada, Her Majesty the Queen in right of, as represented by the Minister of Communications. Microwave powered aircraft. 4,955,562, Cl. 244-62.000.
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- Martin, Marvin R.: See—  
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- Martin, William A. Inverted frustum shaped microwave heat exchanger and applications thereof. 4,956,534, Cl. 219-10.55A.
- Martinez, Ricardo. Endotracheal tube with channel for delivering drugs. 4,955,375, Cl. 128-207.150.
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- Maruzeni, Shoji: See—  
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- Marx, Gunter. Hearing aid which cuts on/off during removal and attachment to the user. 4,955,729, Cl. 381-68.000.
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- Mashiba, Tamaki: See—  
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- Mason, Stanley I., Jr.; Fuller, Elizabeth L.; and Doty, Roy E. Kit for board games. 4,955,617, Cl. 273-256.000.
- Massachusetts Institute of Technology: See—  
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- Master Free Time, Inc.: See—  
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- Masu, Toshiyuki: See—  
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- Masuda, Koji; Suemitsu, Yuji; and Asano, Kazuo, to Fuji Xerox Co., Ltd. Electrostatic latent image forming apparatus controlling the direction of derivation of ions. 4,956,670, Cl. 355-210.000.
- Masuda, Toshiyuki, to Fuji Photo Film Co., Ltd. Information recording medium. 4,956,213, Cl. 428-64.000.
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- Mastuo, Yoshihisa, to Omron Corporation. Thermometer probe. 4,955,980, Cl. 374-185.000.
- Matai, Masahiro; Oyagi, Takashi; Ichikawa, Yutaka; and Umetsu, Shinjiro, to NEC Corporation. Radio paging device having circuitry of rewriting a stored message with error-free characters. 4,956,641, Cl. 340-825.440.
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- Mathieu, Jacques: See—  
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- Mathis, Mac A.: See—  
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- Mathis, Ronald D.; Kitchen, Alonzo G.; and Szalla, Frank J., to Phillips Petroleum Company. Complex acrylates as stabilizer for conjugated diene/monovinyl aromatic copolymers. 4,956,408, Cl. 524-147.000.
- Matics Srl: See—  
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- Matloubian, Misha: See—  
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- Matson, Michael S.; and Cobb, Raymond L., to Phillips Petroleum Company. Process for preparing 4,4'-difluorobiphenyl. 4,956,507, Cl. 570-140.000.
- Matsuda, Akira: See—  
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- Matsuda, Hiroto: See—  
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- Matsui, Hiroshi: See—  
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- Matsui, Keiji, to Kabushiki Kaisha Okuma Tekkosho. Optical encoder with varying grating pitch. 4,956,553, Cl. 250-237.00G.
- Matsui, Michihiro: See—  
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- Matsui, Shinya: See—  
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- Matsui, Toshio: See—  
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- Matsumoto, Kozo, to Canon Kabushiki Kaisha. Data processing system with memories access time counting and information processor wait signal generating circuitries. 4,956,804, Cl. 364-900.000.
- Matsumoto, Motoaki: See—  
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- Matsumoto, Syoichi: See—  
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- Matsumura, Mitsuo: See—  
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- Matsuo, Eito: See—  
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- Matsushima, Hitoshi: See—  
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- Matsushita Electric Industrial Co., Ltd.: See—  
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- Matsushita, Keiko: See—  
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- Matsutani, Kanji; and Fukuda, Masatoshi, to Matsutani Seisakusho Co., Ltd. Surgical staple. 4,955,898, Cl. 606-219.000.
- Matsutani Seisakusho Co., Ltd.: See—  
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- Matsura, Isao; Wakatsuki, Akira; and Shida, Yuu, to Sumitomo Chemical Company, Limited. Formable vinyl chloride resin composition for powder molding and method for producing same. 4,956,222, Cl. 428-212.000.
- Matsuzaki, Nobuhiko: See—  
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- Mattaliano, Robert: See—  
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- Matthews, James J., to Ripley Company, Inc. Mechanism for adjusting depth of cut on wire and cable jackets. 4,955,137, Cl. 30-90.100.
- Mattice, Richard E., to Medical Coaches, Incorporated. Environmentally protected expandable trailer. 4,955,661, Cl. 296-171.000.
- Mattingly, Bruce W.; and Coates, Roger J., to Soltech, Inc. Water heater package construction. 4,955,474, Cl. 206-320.000.
- Matzinger, James E.: See—  
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- Maur, Hans-Dietmar; and Buslowits, Wolfgang, to O&K Orenstein & Koppel Aktiengesellschaft. Method for the heat treatment of finely granular material. 4,955,986, Cl. 432-14.000.
- Mausier-Werke Oberndorf GmbH: See—  
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- Mawby, Harold S.: See—  
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- Maxwell, M. Craig: See—  
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- May, Dennis J.: See—  
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- May, Manfred: See—  
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- Maye, Franklin. Baseball spot pitching practicing device. 4,955,607, Cl. 273-26.00A.
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- Mazelsky, Robert: See—  
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- MBB GmbH: See—  
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- McCabe, Daniel H.: See—  
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- McCarthy, Francis T.; and Archambault, Roger J., to Dennison Manufacturing Company. Continuous fastener stock. 4,955,475, Cl. 206-346.000.
- McCormick, William A.: See—  
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- McCullough, Francis P., Jr.; Brewster, Steven L.; Snelgrove, R. Vernon; and Higgins, George C., to Dow Chemical Company, The. Carbonaceous fiber or fiber assembly with inorganic coating. 4,956,235, Cl. 428-368.000.
- McCullough, James D., Jr.: See—  
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- McDade, Michael: See—  
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- McDermott, Francis E.: See—  
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- McFarlane, Richard H., to Taut, Inc. Method and apparatus for the multi-unit production of thin-walled tubular products utilizing an injection molding technique. 4,956,143, Cl. 264-334.000.
- McKay, Alan R. Roadway barrier system. 4,955,753, Cl. 404-6.000.
- McKendree, Francis S.: See—  
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- McKenna, James F. Casting handling apparatus. 4,955,425, Cl. 164-269.000.
- McLeod, Bruce G.: See—  
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- McLoughlin, Christopher J.; and Himstedt, Ross B., to Gist-Brocades N.V. Pharmaceutical compositions and process for their preparation. 4,956,386, Cl. 514-503.000.
- McManus, James W.; and Genus, John F., to Merck & Co., Inc. Process for preparing benzylpyruvic acids and esters. 4,956,490, Cl. 560-051.000.
- McMullen, Barclay J.: See—  
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- McNeilly, Michael A., to Advantage Production Technology, Inc. Semiconductor substrate treating method. 4,956,046, Cl. 156-613.000.
- McQuade, John M.; and Paidosh, Richard L., to Minnesota Mining and Manufacturing Company. Imaging apparatus including three laser diodes and a photographic element. 4,956,702, Cl. 358-75.000.
- McQuilkin, Frederick T., to Rockwell International Corporation. Apparatus for superplastic forming and ejection of a part from a die. 4,956,008, Cl. 72-427.000.
- MCR Technology Corporation: See—  
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- McTavish, Mary S.: See—  
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- Mead Corporation, The: See—  
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- Meanwell, Nicholas A., to Bristol-Myers Squibb Company. Tetrazole carboxylic acids and esters and inhibition of blood platelet aggregation therewith. 4,956,376, Cl. 514-381.000.
- Meanwell, Nicholas A., to Bristol-Myers Squibb Company. Pyrazole carboxylic acids and esters and inhibition of blood platelet aggregation therewith. 4,956,379, Cl. 514-406.000.
- Medical Coaches, Incorporated: See—  
Mattice, Richard E., 4,955,661, Cl. 296-171.000.
- Meermoller, Theodor, to Westfalia Separator AG. Vacuum-control valve for milking systems. 4,955,408, Cl. 137-470.000.
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- Mizuguchi, Ryuzo: See—  
Suzuki, Yuji; Urano, Satoshi; Umamoto, Hiroto; Mizuguchi, Ryuzo; Aoki, Kei; and Tsubonawa, Noriyuki, 4,956,491, Cl. 560-172.000.
- Mizuno, Hisayoshi; and Nara, Fumio, to Ikeda Bussan Co., Ltd. Method of molding skin-covered foamed plastic article, 4,956,136, Cl. 264-46.600.



- Mizuno, Toru; Ishikawa, Haruyuki; and Iwamoto, Takashi, to Fanuc Ltd. Method of controlling a robot in accordance with load conditions. 4,956,594, Cl. 318-568.100.
- Mladenoff, Donald D.: See—  
Carver, Larry L.; Zamzow, Charled E.; and Mladenoff, Donald D., 4,956,764, Cl. 364-167.010.
- Moberg, Michael K. Versatile writing board. 4,955,576, Cl. 248-449.000.
- Mobil Oil Corporation: See—  
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- Balloni, Ricardo; Donovan, Kevin M.; and Keung, Jay K., 4,956,232, Cl. 428-349.000.
- Child, Jonathan E.; Chou, Tai-Sheng; Huss, Albin, Jr.; Kennedy, Clinton R.; Ragonese, Francis P.; and Tabak, Samuel A., 4,956,518, Cl. 585-726.000.
- Chu, Cynthia T.-W., 4,956,514, Cl. 585-533.000.
- Chu, Shaw-Chang; Heilman, Paul D.; and Kirk, Kevin A., 4,956,233, Cl. 428-349.000.
- Chu, Shaw-Chang; Heilman, Paul D.; and Kirk, Kevin A., 4,956,241, Cl. 428-516.000.
- Farrag, Liehpao O.; and Horodysky, Andrew G., 4,956,105, Cl. 252-32.70E.
- Farrag, Liehpao O.; and Horodysky, Andrew G., 4,956,108, Cl. 252-486.000.
- Harandi, Mohsen N.; and Owen, Hartley, 4,956,509, Cl. 585-300.000.
- Harandi, Mohsen N., 4,956,510, Cl. 585-415.000.
- Herrington, Fox J., 4,955,175, Cl. 53-67.000.
- Johnson, Ivy D.; Chu, Pochen; and Kresge, Charles T., 4,956,517, Cl. 585-660.000.
- Mochida, Ei: See—  
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- Mochida Pharmaceutical Co., Ltd.: See—  
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- Mochizuki, Masashi: See—  
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- Mock, Elmar; and Gabus, Georges A., to ETA SA Fabriques d'Ebauches. Watch having a case formed at least partially from a hard material. 4,956,830, Cl. 368-280.000.
- Mock-Hecker, Rudiger: See—  
Knoll, Peter; König, Winfried; Mock-Hecker, Rudiger; and Gunther, Clemens, 4,955,698, Cl. 350-336.000.
- Moeller, Charles P., to United States of America, Energy. Waveguide mode converter and method using same. 4,956,620, Cl. 333-21.00R.
- Moen, David N.: See—  
Aakre, David E.; Hoffman, Roy L.; Moen, David N.; and Schmirer, Quentin G., 4,956,808, Cl. 364-900.000.
- Molecular Devices Corporation: See—  
Zuk, Robert F.; Armenta, Richard D.; and Briggs, Jonathan, 4,956,275, Cl. 435-7.000.
- Molex Incorporated: See—  
Roberts, James T.; and Silbernagel, Raymond A., 4,955,816, Cl. 439-421.000.
- Yamada, Shoji; and Yamada, Tomoo, 4,955,820, Cl. 439-83.000.
- Moller, Bynum W. Golf practice device. 4,955,611, Cl. 273-195.00A.
- Moltech Invent S.A.: See—  
Nguyen, Thinh; Lazouni, Abdelkrim; and Doan, Kim S., 4,956,068, Cl. 204-242.000.
- Momma, Naohiro: See—  
Sawahata, Yasuo; Saito, Ryuichi; and Momma, Naohiro, 4,956,693, Cl. 357-64.000.
- Monarch Marking Systems, Inc.: See—  
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- Monroe Auto Equipment Company: See—  
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- Monsan, Pierre F.: See—  
Auriol, Daniel H.; Paul, Francois B.; and Monsan, Pierre F., 4,956,489, Cl. 560-40.000.
- Monsanto Company: See—  
Gard, David R., 4,956,163, Cl. 423-302.000.
- Montedison S.p.A.: See—  
Bargigia, Gianangelo; Caporiccio, Gerardo; Tonelli, Claudio; Flabbi, Luciano; and Marchionni, Giuseppe, 4,955,726, Cl. 374-57.000.
- Monteith, John R.: See—  
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- Moody, Herbert, III: See—  
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- Moomaw, David E., to Quaker Oats Company, The. Toy sound-emitting and bubble-blowing saxophone. 4,955,840, Cl. 446-17.000.
- Moore Business Forms, Inc.: See—  
Anderson, Michael W., 4,955,640, Cl. 281-2.000.
- Moore, Cheryl L.: See—  
Adair, Paul C.; and Moore, Cheryl L., 4,956,309, Cl. 430-138.000.
- Moore, Daniel S., to Boss Manufacturing & Distributing Inc. Tilting/removable seat mounting assembly. 4,955,575, Cl. 248-398.000.
- Moorman, Charles T., to Kraft General Foods, Inc. Solids-fluid contacting apparatus with screen at fluid outlet. 4,956,176, Cl. 426-478.000.
- Moradpour, Alexandre: See—  
Michel, Philippe; Moradpour, Alexandre; and Penven, Paul, 4,956,508, Cl. 585-26.000.
- Morales, Jorge L., to Industrias Salver, S.A. de C.V. Foamed PVC pneumatic ball. 4,956,234, Cl. 428-36.500.
- Moreland, Robert D., to Betz PaperChem, Inc. Detackification of adhesive materials contained in secondary fiber using polyvinyl alcohol. 4,956,051, Cl. 162-199.000.
- Morgan, William C.: See—  
Buel, James L.; Carter, John G.; Eschbach, Eugene A.; FitzPatrick, Vincent F.; Koehmstedt, Paul L.; Morgan, William C.; Oma, Kenton H.; and Timmerman, Craig L., 4,956,535, Cl. 219-10.810.
- Mori, Kei. Rainbow forming device. 4,955,975, Cl. 350-96.190.
- Mori, Kiju; and Kanemitsu, Nobuhisa, to Stanley Electric Co., Ltd. Method of manufacturing an elongated electroluminescence element. 4,956,031, Cl. 156-67.000.
- Mori, Makoto: See—  
Torii, Yutaka; Mori, Makoto; Gohara, Shinobu; Ohtsuki, Kenichi; and Sakurai, Yoshito, 4,956,839, Cl. 370-60.000.
- Morimoto, Akira; Noguchi, Noriyoshi; and Choh, Nobuo, to Takeda Chemical Industries, Ltd. Tricyclic cepham compounds and use. 4,956,358, Cl. 514-202.000.
- Morimoto, Hiroyuki: See—  
Kohno, Mitsuo; Sakai, Masao; Nagasaka, Moritoshi; Okada, Toshihiko; and Morimoto, Hiroyuki, 4,956,540, Cl. 219-127.000.
- Morimoto, Kiyoshi: See—  
Ueda, Shinji; Heki, Tatsuo; Inoue, Noriyuki; Ishikawa, Tatatoshi; Ohki, Nobutaka; Yagihara, Morio; Morimoto, Kiyoshi; Fujimoto, Hiroshi; and Andoh, Kazuto, 4,956,267, Cl. 430-372.000.
- Morimoto, Takuo: See—  
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- Morinaga, Akio; Hyodo, Masakatsu; Nishimoto, Tomiyo; Sakuragi, Hiroyuki; and Onishi, Shinji, to Tokyo Gas Kabushiki Kaisha; and Ashimori Kogyo Kabushiki Kaisha. Method for lining pipe lines. 4,956,038, Cl. 156-156.000.
- Morisawa, Kunio, to Toyota Jidosha Kabushiki Kaisha. Planetary gear mechanism having means for accurate alignment of sun gear. 4,955,852, Cl. 475-146.000.
- Moriyama, Masahiro, to Sanyo Electric Co., Ltd. Device for continuously driving a tape reel support as a tape is unloaded. 4,956,732, Cl. 360-96.300.
- Moriyama, Yuichi: See—  
Sekihara, Toshinobu; Yokomakura, Mitsunori; Moriyama, Yuichi; Watanabe, Michiaki; Sekiguchi, Tomohiro; Nagata, Keiji; and Kurata, Takatsugu, 4,955,681, Cl. 313-495.000.
- Morris, Daniel P.: See—  
Bickford, Harry R.; Boland, William L.; Morris, Daniel P.; and Reiley, Timothy C., 4,956,605, Cl. 324-158.00F.
- Morris, John C.; and Jackson, Winston J., Jr., to Eastman Kodak Company. Copolyesters from 4,4'-biphenyldicarboxylic acid, 1,4-cyclohexanedimethanol, and 1,4-butanediol. 4,956,448, Cl. 528-272.000.
- Morris, John F., to Graber Industries, Inc. Foldable valance. 4,955,419, Cl. 160-38.000.
- Moril, Engelbert: See—  
Zimmer, Johannes; Gutler, Franz; and Moril, Engelbert, 4,955,298, Cl. 101-120.000.
- Moryia, Masamichi: See—  
Kubo, Kiichiro; and Moryia, Masamichi, 4,955,695, Cl. 350-331.00R.
- Mosbey, Deral T., to Minnesota Mining and Manufacturing Company. Wound filling compositions. 4,956,350, Cl. 514-55.000.
- Moskowitz, David; and Porat, Reuven, to Iscar Ceramics, Inc. Ceramic cutting tool. 4,956,318, Cl. 501-96.000.
- Moslehi, Mehrdad M., to Texas Instruments, Incorporated. Method and apparatus for real-time wafer temperature measurement using infrared pyrometry in advanced lamp-heated rapid thermal processors. 4,956,538, Cl. 219-121.600.
- Moss, Nathan S. Anti-theft identification deterrent fastener. 4,955,154, Cl. 40-663.000.
- Motohashi, Hiroshi: See—  
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.
- Motoki, Hideo, to Shikoku Kaken Kogyo Co., Ltd. Refractory coating composition. 4,956,013, Cl. 106-675.000.
- Motorola, Inc.: See—  
Bengtson, Dale F., 4,956,854, Cl. 375-111.000.
- Kane, Robert C., 4,956,574, Cl. 313-306.000.
- Tam, Gordon; Legge, Ronald N.; and Paulson, Wayne M., 4,956,314, Cl. 437-241.000.
- Motte, Shunichi: See—  
Tanaka, Hideo; and Motte, Shunichi, 4,956,680, Cl. 357-4.000.
- Mount, Bruce E.; and Becker, Douglas P., to Marquette Gas Analysis. Respiratory CO<sub>2</sub> detector circuit with high quality waveform. 4,955,946, Cl. 128-719.000.

- MPB Corporation: See—  
Gordon, Keith M.; and Hanson, Robert A., 4,956,571, Cl. 310-90.500.
- MPD, Inc.: See—  
Bowlds, Daniel P., 4,956,617, Cl. 331-96.000.
- Mucic, Vinko, to TCH Thermo-Consulting-Heidelberg GmbH. Resorptive thermal conversion apparatus. 4,955,931, Cl. 62-238.300.
- Muehlenbernd, Thomas; and Hasenbein, Norbert, to BASF Aktiengesellschaft. Preparation of ionically crosslinked ethylene copolymers, ionically crosslinked ethylene copolymers and their use as films, cable sheathing and adhesion promoters. 4,956,414, Cl. 525-196.000.
- Muir, William L.: See—  
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- Mukai, Kiichiro: See—  
Kanetomo, Masafumi; Tachi, Shinichi; Tsujimoto, Kazunori; Mukai, Kiichiro; Daikoku, Takahiro; Kieda, Shigekazu; Shindo, Keiji; and Tamura, Kenshiro, 4,956,043, Cl. 156-345.000.
- Mulkey, Dennis. Hunting vest with attached rope. 4,955,456, Cl. 182-3.000.
- Mullaly, Peirce J. Head-board recliner using the only one hinge. 4,955,094, Cl. 5-433.000.
- Muller, Gottfried; and Hipp, Paul, to Schako Metallwarenfabrik Ferdinand Schlad AG. Turbulence outlet. 4,955,286, Cl. 98-40.110.
- Muller, Richard P.: See—  
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- Multi-Technology Inc.: See—  
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- Murakami, Azuma; and Fukuzaki, Yasuhiro, to Kabushiki Kaisha Wacom; and NKK Corporation. Digitizer having flat tablet with magnetic shield plate. 4,956,526, Cl. 178-18.000.
- Murakami, Toshifumi: See—  
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, 4,955,799, Cl. 425-47.000.
- Murakami, Yoshiteru: See—  
Miyake, Tomoyuki; Murakami, Yoshiteru; Katayama, Hiroyuki; Takahashi, Akira; and Ohta, Kenji, 4,956,243, Cl. 428-694.000.
- Murakawa, Katuhiko: See—  
Kondo, Koji; Murakawa, Katuhiko; Nomoto, Kaoru; Ishikawa, Futoshi; Ishida, Nobumasa; and Ishikawa, Junji, 4,956,014, Cl. 106-1.230.
- Muramatsu, Yukio: See—  
Yamamoto, Masaki; Hayashi, Hideharu; and Muramatsu, Yukio, 4,956,748, Cl. 361-394.000.
- Murata, Akira: See—  
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- Murata, Kazushige: See—  
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- Murata, Tomoji: See—  
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- Murata, Tsuneo, to Kabushiki Kaisha Toshiba. System for reporting status data in a facsimile network. 4,956,860, Cl. 379-100.000.
- Murphy, Allen J.: See—  
Garnier, Steven F.; Ton, Robert B.; Turner, Vernon S.; Pilarski, James K.; Magill, Mark R.; and Murphy, Allen J., 4,955,305, Cl. 112-121.110.
- Murphy, James C.: See—  
Scott, Ernest R.; and Murphy, James C., 4,955,103, Cl. 15-319.000.
- Murphy, Wayne H., to Consolidated Rail Corporation. Strapless wheel chocking assembly. 4,955,459, Cl. 188-32.000.
- Murphy, William J.; and Engel, Joseph C., to Westinghouse Electric Corp. Solid-state trip unit for DC circuit breakers. 4,956,741, Cl. 361-95.000.
- Murray Europe S.p.A.: See—  
Bona, Alfredo D.; and Airaghi, Attilio, 4,955,643, Cl. 285-190.000.
- Musella, Vincenzo; and D'Angelo, Mario, to Nuova Merisinter S.p.A. Process for pretreating metal in preparation for compacting operations. 4,955,798, Cl. 419-31.000.
- Mussner, Renate: See—  
Klotzer, Wilhelm; Link, Helmut; Mussner, Renate; Schiestl, Werner; and Singewald, Nicolas, 4,956,470, Cl. 548-337.000.
- Mustatea, Sorin V.: See—  
Fakoukakis, Emanuel P.; Mustatea, Sorin V.; and Bellmann, Gunter, 4,956,478, Cl. 549-255.000.
- Myers, Garry L.; and Wang, Richard H. S., to Eastman Kodak Company. Bis-cyclic phosphite compounds and polymeric materials stabilized therewith. 4,956,406, Cl. 524-119.000.
- Naaktgeboren, Adrianus: See—  
Van Eecke, Roger H.; and Naaktgeboren, Adrianus, 4,955,774, Cl. 414-111.000.
- Naderi, Mohammad T. Spectacles for improving binocular vision. 4,955,713, Cl. 351-200.000.
- Nadkarni, Vijay J.: See—  
Fuller, Terry A.; Nadkarni, Vijay J.; and Peschke, John R., 4,955,689, Cl. 350-96.340.
- Nagano, Masashi, to Shimano Industrial Co., Ltd. Front derailleur for use in bicycle. 4,955,849, Cl. 474-80.000.
- Nagao, Makoto: See—  
Yasunaga, Tadashi; Yanai, Akio; Sasazawa, Koji; and Nagao, Makoto, 4,956,229, Cl. 428-336.000.
- Nagasaka, Moritoshi: See—  
Kohno, Mitsuo; Sakai, Masao; Nagasaka, Moritoshi; Okada, Toshihiko; and Morimoto, Hiroyuki, 4,956,540, Cl. 219-127.000.
- Nagasawa, Kenichi; and Masui, Toshiyuki, to Canon Kabushiki Kaisha. Multi-channel recording and/or reproducing apparatus capable of simultaneously recording and/or reproducing of two channels. 4,956,724, Cl. 360-8.000.
- Nagashima, Masasumi: See—  
Uchikata, Yoshio; Nozaki, Mineo; Asakura, Osamu; and Nagashima, Masasumi, 4,955,738, Cl. 400-229.000.
- Nagata, Keiji: See—  
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- Nagato, Hirokazu: See—  
Kanno, Takao; Koda, Yutaka; and Nagato, Hirokazu, 4,956,113, Cl. 252-62.520.
- Nagatomo, Masao: See—  
Ozaki, Hiroji; Yoneda, Masahiro; Ogoh, Ikuo; Okumura, Yoshinori; Wakamiya, Wataru; and Nagatomo, Masao, 4,956,692, Cl. 357-49.000.
- Tokui, Akira; Sato, Shinichi; Kawai, Akira; Nakajima, Masayuki; Ozaki, Hiroji; and Nagatomo, Masao, 4,956,310, Cl. 437-52.000.
- Nagel, Hans: See—  
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- Nagelberg, Alan S.: See—  
Rapp, Robert A.; Urquhart, Andrew W.; Nagelberg, Alan S.; and Newkirk, Marc S., 4,956,338, Cl. 505-1.000.
- Nagoshi, Mitsuru: See—  
Kawano, Minoru; Miura, Kazunobu; Murata, Kazushige; and Nagoshi, Mitsuru, 4,955,595, Cl. 271-9.000.
- Nahigian, Stanley H.: See—  
Carignan, Roger G.; Nahigian, Stanley H.; and Pratt, Clyde R., 4,955,916, Cl. 623-21.000.
- Nahrwold, Klaus H., to Rheinmetall GmbH. Apparatus for setting a projectile time fuse. 4,955,279, Cl. 89-6.500.
- Naito, Yasuo, to Mitsubishi Denki Kabushiki Kaisha. Constant speed holding device. 4,956,778, Cl. 364-426.040.
- Naka, Reishi: See—  
Kawashima, Masae; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Koosuke, 4,955,208, Cl. 62-264.000.
- Nakada, Junji; and Takeuchi, Hideaki, to Fuji Photo Film Co., Ltd. Sputtering apparatus. 4,956,070, Cl. 204-298.180.
- Nakagaki, Shintaro: See—  
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Shinonaga, Hirohiko; and Tai, Hiromichi, 4,956,713, Cl. 358-209.000.
- Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,956,714, Cl. 358-213.110.
- Nakagawa, Hiroshi; Tokiwa, Shizuro; and Takeuchi, Kunio, to Tokyo Kikai Seisakusho Ltd. Web cutting position control system. 4,955,265, Cl. 83-74.000.
- Nakagawa, Yutaka: See—  
Kimura, Kiyoshi; Ukai, Yojiro; Ogasawara, Takashi; and Nakagawa, Yutaka, 4,956,364, Cl. 514-227.500.
- Nakai, Eiji: See—  
Suzuki, Kazuaki; Maruzeni, Shoji; Nakai, Eiji; and Nezu, Toru, 4,956,287, Cl. 435-134.000.
- Nakai, Hitoshi: See—  
Sakai, Toshio; Nakai, Hitoshi; Suzuki, Makoto; Hayakawa, Kiyoharu; and Tanabe, Kazunori, 4,956,649, Cl. 346-107.00R.
- Nakai, Masaaki: See—  
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,956,661, Cl. 354-412.000.
- Nakajima, Ikuo: See—  
Nishiguchi, Toshiji; Okamura, Moriaki; and Nakajima, Ikuo, 4,955,901, Cl. 623-6.000.
- Nakajima, Koji: See—  
Amataka, Atsushi; Kushida, Kazumitsu; Nakajima, Koji; and Yamamoto, Hitoshi, 4,955,353, Cl. 123-668.000.
- Nakajima, Koshiro: See—  
Nakata, Akio; Yoshida, Masahiro; and Nakajima, Koshiro, 4,955,476, Cl. 206-346.000.
- Nakajima, Masakatsu: See—  
Hayamizu, Katsuyoshi; Nakajima, Masakatsu; and Ogawa, Hiroyuki, 4,955,116, Cl. 28-110.000.
- Nakajima, Masayuki: See—  
Tokui, Akira; Sato, Shinichi; Kawai, Akira; Nakajima, Masayuki; Ozaki, Hiroji; and Nagatomo, Masao, 4,956,310, Cl. 437-52.000.
- Nakajima, Sadao, to Hakuto Chemical Co., Ltd. Inhibiting popcorn polymer growth. 4,956,020, Cl. 134-22.190.
- Nakajima, Toshio: See—  
Higashi, Kazumi; Nakajima, Toshio; Hino, Atsushi; and Inoue, Sunao, 4,955,900, Cl. 623-6.000.
- Nakajima, Yuji; Ishida, Katsunori; and Mochizuki, Masashi, to Hoya Corporation. Multi-layered back reflecting mirror. 4,955,705, Cl. 350-642.000.



- Nakamura, Akio: See—  
Kitaura, Toshihiko; Nakamura, Akio; Sakamoto, Masayuki; Takashima, Kouichi; Hirakawa, Kiyotaka; and Mizota, Matao, 4,956,132, Cl. 264-39.000.
- Nakamura, Hiroaki: See—  
Amazawa, Takao; and Nakamura, Hiroaki, 4,956,204, Cl. 427-248.100.
- Nakamura, Ikushi: See—  
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,956,656, Cl. 354-173.100.
- Nakamura, Koichi, to Fuji Photo Film Co., Ltd. Light-sensitive material containing silver halide, reducing agent and polymerizable compound, and image-forming method employing the same. 4,956,260, Cl. 430-138.000.
- Nakamura, Kunie: See—  
Kakimoto, Norihiro; Kumano, Kazuo; and Nakamura, Kunie, 4,956,272, Cl. 435-1.000.
- Nakamura, Masakazu. Fixed focus binocular with visual acuity compensating mechanism. 4,955,702, Cl. 350-556.000.
- Nakamura, Minoru, to Minolta Camera Kabushiki Kaisha. Control apparatus for controlling density of toner in a developing unit. 4,956,669, Cl. 355-208.000.
- Nakamura, Munekazu: See—  
Yoneda, Noriyuki; Makabe, Toshiji; Kaita, Jun; Nakamura, Munekazu; Endoh, Yoshiko; Kudoh, Hidehiko; and Higashi, Shunji, 4,956,326, Cl. 502-1.780.
- Nakamura, Taku, to Fuji Photo Film Co., Ltd. Image-forming method employing image-receiving material. 4,956,253, Cl. 430-138.000.
- Nakamura, Teruya: See—  
Takeuchi, Tomio; Saino, Tetsushi; Yoshida, Masao; Takahashi, Katsutoshi; Nakamura, Teruya; and Umezawa, Hamao, deceased, 4,956,504, Cl. 564-153.000.
- Nakamura, Tohru: See—  
Honma, Noriyuki; Nakamura, Tohru; Nakazato, Kazuo; Matsumoto, Motoaki; Hayashida, Tetsuya; Kubo, Masaharu; and Sagara, Kazuhiko, 4,956,688, Cl. 357-34.000.
- Nakamura, Toshihide: See—  
Tsurumi, Kazunori; Nakamura, Toshihide; and Sato, Akira, 4,956,331, Cl. 502-339.000.
- Nakamura, Youichi: See—  
Kuroda, Masami; Nakamura, Youichi; and Furusho, Noboru, 4,956,277, Cl. 430-58.000.
- Nakanishi, Shingo; and Yamamoto, Susumu, to Aisan Kogyo Kabushiki Kaisha; and Fuji Electric Co., Ltd. Current limiting circuit for fuel pump motor. 4,955,790, Cl. 417-45.000.
- Nakano, Mamoru: See—  
Takeguchi, Masakatsu; Yamamoto, Takashi; and Nakano, Mamoru, 4,955,357, Cl. 125-23.010.
- Nakano, Masaki, to Nissan Motor Co., Ltd. Continuously variable traction roller transmission. 4,955,246, Cl. 74-200.000.
- Nakase, Tetsuo: See—  
Yonezawa, Toshiro; Iwashimizu, Takashi; Yoshioka, Yasuhiko; Ito, Koichi; Sakae, Kunio; and Nakase, Tetsuo, 4,956,403, Cl. 524-5.000.
- Nakata, Akio; Yoshida, Masahiro; and Nakajima, Koshiro, to Matsushita Electric Industrial Co., Ltd. Fastener carrier for the support of screw members. 4,955,476, Cl. 206-346.000.
- Nakatomi, Hiroshi: See—  
Kimura, Masanori; Narisue, Shigetoshi; Nakatomi, Hiroshi; and Matsuo, Eito, 4,955,788, Cl. 415-150.000.
- Nakayama, Tadayoshi: See—  
Kozuki, Susumu; Takahashi, Koji; Edakubo, Hiroo; Nakayama, Tadayoshi; and Masu, Toshiyuki, 4,956,725, Cl. 360-14.300.
- Nakayama, Takashi, to NEC Corporation. Trigonometric function arithmetic processor using pseudo-division. 4,956,799, Cl. 364-729.000.
- Nakazato, Kazuo: See—  
Honma, Noriyuki; Nakamura, Tohru; Nakazato, Kazuo; Matsumoto, Motoaki; Hayashida, Tetsuya; Kubo, Masaharu; and Sagara, Kazuhiko, 4,956,688, Cl. 357-34.000.
- Nakazato, Yasushi: See—  
Kiya, Yukitoshi; and Nakazato, Yasushi, 4,956,678, Cl. 355-318.000.
- Nakazato, Youichi: See—  
Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Youichi, 4,955,739, Cl. 401-65.000.
- Nakazawa, Eiji: See—  
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- Nakazawa, Shinichiro, to Canon Kabushiki Kaisha. Information processing apparatus. 4,955,734, Cl. 400-63.000.
- Nakazyo, Kiyoshi; Ishikawa, Takatoshi; and Fujita, Yoshikazu, to Fuji Photo Film Co., Ltd. Bleach-fixing solution concentrate composition and method for processing silver halide color photographic materials. 4,956,268, Cl. 430-393.000.
- Napadow, Stanley C., to Protectaire Systems Co. Disposable baffle system and method. 4,955,990, Cl. 55-90.000.
- Nara, Fumio: See—  
Mizuno, Hisayoshi; and Nara, Fumio, 4,956,136, Cl. 264-46.600.
- Narisue, Shigetoshi: See—  
Kimura, Masanori; Narisue, Shigetoshi; Nakatomi, Hiroshi; and Matsuo, Eito, 4,955,788, Cl. 415-150.000.
- Narita, Yasushi, to Nissan Motor Co., Ltd. Line pressure control arrangement for automatic automotive transmission. 4,955,259, Cl. 74-866.000.
- Narula, Anubhav: See—  
Gillaspay, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M., 4,956,481, Cl. 349-459.000.
- Naruse, Masayoshi: See—  
Ito, Hisao; Nishi, Akio; Miyazawa, Masasi; and Naruse, Masayoshi, 4,956,471, Cl. 348-344.000.
- Narushima, Masaki; and Takao, Itaru, to Tokyo Electron Limited. Plate-like member receiving apparatus. 4,955,590, Cl. 269-21.000.
- Nasu, Atsushi. Process for separating salts in seawater. 4,956,157, Cl. 423-104.000.
- National Research Development Corporation: See—  
de Ronde, Frans C., 4,956,622, Cl. 333-125.000.
- Hall, Peter R., 4,955,379, Cl. 128-633.000.
- National Rolling Mills, Inc.: See—  
Platt, William J., 4,955,134, Cl. 29-897.312.
- National Semiconductor Corporation: See—  
Liou, Tian-I; and Teng, Chih-Sieh, 4,956,311, Cl. 437-57.000.
- National Space Development Agency of Japan: See—  
Tsuchihashi, Akira; Noguchi, Naoki; and Kuraoka, Kesatoshi, 4,955,654, Cl. 294-86.400.
- National Starch and Chemical Investment Holding Corporation: See—  
Kauffman, Thomas F.; and Puletti, Paul P., 4,956,207, Cl. 428-34.200.
- National University of Singapore: See—  
Kang, En-Tang; Tan, Thiam C.; and Neoh, Koon G., 4,956,444, Cl. 528-220.000.
- Nauerth, Karl-Heinz: See—  
Ohnmacht, Helmut; Nauerth, Karl-Heinz; and Meywald, Klaus, 4,956,345, Cl. 219-541.000.
- Naya, Junichi: See—  
Numakura, Takashi; Kitazawa, Susumu; Naya, Junichi; and Numakura, Iwao, 4,956,718, Cl. 358-298.000.
- NCR Corporation: See—  
Hain, David A., 4,955,964, Cl. 271-225.000.
- Neal, Brian P.: See—  
Knight, David J.; Kubik, James M.; and Neal, Brian P., 4,955,994, Cl. 55-163.000.
- Neale, Douglas L.: See—  
Blackman, Stephen M.; and Neale, Douglas L., 4,955,527, Cl. 229-114.000.
- NEC Corporation: See—  
Hara, Masanori, 4,956,870, Cl. 382-30.000.
- Kawana, Yoshie; and Ito, Narushi, 4,956,149, Cl. 422-68.100.
- Matai, Masahiro; Oyagi, Takashi; Ichikawa, Yutaka; and Umetsu, Shinjiro, 4,956,641, Cl. 340-825.440.
- Nakayama, Takashi, 4,956,799, Cl. 364-729.000.
- NEC Environment Engineering Ltd.: See—  
Yokoyama, Kenji; and Saizyo, Hidehiko, 4,955,236, Cl. 73-655.000.
- NEC Home Electronics Ltd.: See—  
Ohashi, Mitsuo, 4,956,699, Cl. 358-149.000.
- Neeches, Philip M., to Teradata Corporation. Methods of selecting simultaneously transmitted messages in a multiprocessor system. 4,956,772, Cl. 364-200.000.
- Neher, Paul, to Sipra Patententwicklungs-und Beteiligungsgesellschaft mbH. Circular knitting machine for producing single face plush articles. 4,955,211, Cl. 66-9.00R.
- Neihold, Daniel A.: See—  
Barry, Michael, 4,955,168, Cl. 52-210.000.
- Neki, Shigeo: See—  
Sato, Tadashi; and Neki, Shigeo, 4,955,306, Cl. 112-275.000.
- Nelles, Lynn P.: See—  
Harrison, Roger G., Jr.; and Nelles, Lynn P., 4,956,290, Cl. 435-189.000.
- Nelson, Isaac H.: See—  
Henderson, William A.; and Nelson, Isaac H., 4,955,834, Cl. 440-63.000.
- Nelson, Robert L.: See—  
Hood, John K.; Lund, Mariys E.; and Nelson, Robert L., 4,956,297, Cl. 435-292.000.
- Nelson, Stanford C. Refuse bag stabilizer. 4,955,496, Cl. 220-1.00T.
- Nemoto, Isao; and Yamaoka, Yuji, to Kabushiki Kaisha Iseki Kaishatsu Koki; and Nemoto Kikaku Kogyo Kaishiki Kaisha. Boring apparatus. 4,955,951, Cl. 166-55.700.
- Nemoto Kikaku Kogyo Kabushiki Kaisha: See—  
Nemoto, Isao; and Yamaoka, Yuji, 4,955,951, Cl. 166-55.700.
- Neoh, Koon G.: See—  
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- Neste Oy: See—  
Nissfolk, Fredrik; Koskimies, Salme; Idelman, Peter; Nurminen, Matti; and Roni, Salla, 4,956,512, Cl. 585-521.000.
- Neuhauser, Karl-Heinz: See—  
Weiss, Stefan; Krommer, Helmut; and Neuhauser, Karl-Heinz, 4,956,503, Cl. 564-106.000.
- Neustaedter, Tati, to Prime Computer, Inc. Method for inter-processor data transfer. 4,956,771, Cl. 364-200.000.
- Nevill, David C. E., to Cadbury Schweppes plc. Dispensing of liquids. 4,955,509, Cl. 222-129.400.
- Nevyas, Herbert J.; and Loughane, Michael H., to Diversatronics. Glaucoma needle with a thermal heat band. 4,955,883, Cl. 606-28.000.
- Newcomer Products, Inc.: See—  
Jacobs, Robert S.; and Krall, Jack, 4,956,012, Cl. 75-236.000.

- Newkirk, Marc S.: See—  
Rapp, Robert A.; Urquhart, Andrew W.; Nagelberg, Alan S.; and Newkirk, Marc S., 4,956,338, Cl. 505-1.000.
- Newman, Marlene. Ant-rub device and method for protecting a horse's coat from damage from a horse blanket. 4,955,182, Cl. 54-79.000.
- Newnan, Brian D., to Grindmaster Corporation. Bean and ground coffee carrier member for use in coffee systems. 4,955,510, Cl. 222-305.000.
- Newton, John: See—  
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- Nezu, Toru: See—  
Suzuki, Kazuaki; Maruzeni, Shoji; Nakai, Eiji; and Nezu, Toru, 4,956,287, Cl. 435-134.000.
- NGK Insulators, Ltd.: See—  
Abe, Masanori; Mase, Syunzo; and Kozuka, Yoshinari, 4,956,607, Cl. 324-244.000.
- NGK Spark Plug Co., Ltd.: See—  
Kojima, Takao; and Ujita, Yasuhiro, 4,956,072, Cl. 204-424.000.
- Yokoi, Hitoshi; Watanabe, Masakazu; Okuno, Akiyasu; and Iio, Satoshi, 4,956,317, Cl. 501-92.000.
- Ngoc Le, Binh, to Merichem Company. Method of impregnating a support material. 4,956,325, Cl. 502-163.000.
- Nguyen, Quyen C.; and Hittner, Herman J., to Aluminum Company of America. Stabilization of fluorides of spent potlining by chemical dispersion. 4,956,158, Cl. 423-111.000.
- Nguyen, Thinh; Lazouni, Abdelkrim; and Doan, Kim S., to Moltech Invent S.A. Non-consumable anode for molten salt electrolysis. 4,956,068, Cl. 204-242.000.
- Nichias Corporation: See—  
Ashizawa, Masaki; Nishimoto, Kazuo; and Saito, Hiroshi, 4,956,226, Cl. 428-323.000.
- Nicoll, James D. Cluster bin system. 4,955,488, Cl. 211-88.000.
- Niekamp, Carl W.: See—  
White, Dorothy C.; and Niekamp, Carl W., 4,955,364, Cl. 127-63.000.
- Niemann, Ekkehard: See—  
Fischer, Roland; Grabe, Gerhard; and Niemann, Ekkehard, 4,956,685, Cl. 357-30.000.
- Nihon Parkerizing Co., Ltd.: See—  
Saeki, Kenshi; Yoshitake, Noriaki; and Aoki, Takayuki, 4,956,027, Cl. 148-257.000.
- Nijhuis, Jozef H. H.: See—  
Meijer, Egbert W.; Van Vroonhoven, Franciscus C. B. M.; and Nijhuis, Jozef H. H., 4,956,239, Cl. 428-411.100.
- Niles, Thomas J., to Polaroid Corporation. Framing apparatus for a medical scanning camera. 4,956,665, Cl. 355-30.000.
- Nilsen, Ole K. Flyback converter microwave oven power supply. 4,956,581, Cl. 315-101.000.
- Nimmegern, Hildegard; Weidmann, Klaus; Lang, Hans-Jochen; Rippe, Robert; and Herling, Andreas W., to Hoechst Aktiengesellschaft. Substituted thienimidazole derivatives, a process for the preparation thereof, pharmaceutical compositions containing them, and the use thereof as inhibitors of gastric acid secretion, as gastroprotectives and as medicaments for intestinal inflammations. 4,956,366, Cl. 514-235.800.
- Ninomiya, Masami: See—  
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.
- Ninoyu, Masatoshi: See—  
Kitada, Taizo; Katsumoto, Takehiko; Hirako, Osamu; Ninoyu, Masatoshi; Makigawa, Yasuyuki; Yamanaka, Gorou; and Fujii, Masao, 4,955,327, Cl. 123-41.420.
- Nippon Air Brake Co., Ltd.: See—  
Ootsuki, Noboru; Tomioka, Katsumi; and Cenishi, Toshihiko, 4,955,122, Cl. 29-237.000.
- Nippon Ferrofluidics Corporation: See—  
Yamamura, Akira, 4,955,731, Cl. 384-133.000.
- Nippon Filletar Co., Ltd.: See—  
Ogawa, Yutaka, 4,955,110, Cl. 17-53.000.
- Nippon Kayaku Kabushiki Kaisha: See—  
Kawahara, Kenichi; Nomura, Masaharu; Tsugawa, Hiroaki; and Iwamoto, Hirofumi, 4,956,333, Cl. 503-209.000.
- Nippon Kokan Co., Ltd.: See—  
Yoneda, Noriyuki; Makabe, Toshiji; Kaita, Jun; Nakamura, Munekazu; Endoh, Yoshiko; Kudoh, Hidehiko; and Higashi, Shunji, 4,956,326, Cl. 502-1.780.
- Nippon Oils & Fats Company, Ltd.: See—  
Sawada, Hideo; Kobayashi, Michio; and Yoshida, Masato, 4,956,123, Cl. 260-408.000.
- Nippon Paint Co., Ltd.: See—  
Suzuki, Yuji; Urano, Satoshi; Umamoto, Hiroto; Mizuguchi, Ryuzo; Aoki, Kei; and Tsuboniwa, Noriyuki, 4,956,491, Cl. 560-172.000.
- Nippon Pharmaceutical Development Institute Co., Ltd.: See—  
Shimizu, Shigeo; and Takano, Hiroyuki, 4,956,462, Cl. 544-263.000.
- Nippon Seiko Kabushiki Kaisha: See—  
Katahira, Masayuki, 4,955,244, Cl. 74-89.150.
- Nippon Seimitsu Kogyo Kabushiki Kaisha: See—  
Hasegawa, Takanori; Abe, Nobuyuki; Hirose, Toshihiko; Kanda, Takashi; Saito, Hiroshi; Nakazawa, Eiji; and Oshima, Masaki, 4,956,664, Cl. 355-43.000.
- Nippon Sheet Glass Co., Ltd.: See—  
Hirayama, Naoto; Aoki, Yuichi; Takigawa, Akio; Yoshida, Motoaki; and Shiraiishi, Yasunori, 4,956,227, Cl. 428-331.000.
- Shinozaki, Kazushi; and Seki, Shingo, 4,956,034, Cl. 156-102.000.
- Nippon Shinyaku Co., Ltd.: See—  
Kimura, Kiyoshi; Ukai, Yojiro; Ogasawara, Takashi; and Nakagawa, Yutaka, 4,956,364, Cl. 514-227.500.
- Nippon Shokubai Kagaku Kogyo Co., Ltd.: See—  
Ueoka, Masatoshi; Matsumoto, Syoichi; Yoshida, Hiroshi; and Baba, Masao, 4,956,493, Cl. 560-208.000.
- Nippon Steel Corporation: See—  
Koyama, Kazuo; Taira, Taketoshi; Kawasaki, Kaoru; Itami, Atsushi; and Matsuzo, Nobuhiko, 4,956,025, Cl. 148-12.00C.
- Nishida, Tokuhiko; and Yamamiya, Masao, 4,956,011, Cl. 75-230.000.
- Ogawa, Yoshihiro; Takahashi, Hiroo; and Kikuchi, Yoshinori, 4,955,360, Cl. 126-263.000.
- Tanikawa, Keiichi; and Yuzo, Higaki, 4,956,109, Cl. 252-48.600.
- Nippon Telegraph and Telephone Corporation: See—  
Amazawa, Takao; and Nakamura, Hiroaki, 4,956,204, Cl. 427-248.100.
- Nippon Zeon Co., Ltd.: See—  
Hayashi, Sachio; Kubo, Yoichiro; Watanabe, Noboru; and Aimura, Yoshiaki, 4,956,417, Cl. 525-327.700.
- Nippondenso Co., Ltd.: See—  
Miki, Yoshiaki; and Ueda, Tsunehisa, 4,956,183, Cl. 424-630.000.
- Kondo, Koji; Murakawa, Katuhiko; Nomoto, Kaoru; Ishikawa, Futoshi; Ishida, Nobumasa; and Ishikawa, Junji, 4,956,014, Cl. 106-1.230.
- Takehisa, Fumitaka; Kondoh, Fumio; and Yokoi, Mitsuyoshi, 4,955,424, Cl. 164-72.000.
- Nishi, Akio: See—  
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- Nishibe, Takashi; and Yokoyama, Shotaro, to Fuji Electric Co., Ltd. Method and apparatus for aligning image sensors with an optical system in an optical apparatus. 4,956,546, Cl. 250-203.100.
- Nishida, Koichi: See—  
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- Terai, Kiyohisa; and Nishida, Koichi, 4,956,848, Cl. 372-87.000.
- Nishida, Tokuhiko; and Yamamiya, Masao, to Nippon Steel Corporation. Iron-silicon alloy powder magnetic cores and method of manufacturing the same. 4,956,011, Cl. 75-230.000.
- Nishiguchi, Toshiji; Okamura, Moriyuki; and Nakajima, Ikuo, to Canon Kabushiki Kaisha. Intraocular implant having coating layer. 4,955,901, Cl. 623-6.000.
- Nishikawa, Kinsaku: See—  
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- Nishikawa, Koichiro: See—  
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.
- Nishikawa, Yukio: See—  
Uesugi, Yuji; Makino, Masashi; Nishikawa, Yukio; Oshima, Kunio; and Shinohara, Akihito, 4,956,539, Cl. 219-121.800.
- Nishimoto, Kazuo: See—  
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- Nishimoto, Tomio: See—  
Morinaga, Akio; Hyodo, Masakatsu; Nishimoto, Tomio; Sakuragi, Hiroyuki; and Onishi, Shinji, 4,956,038, Cl. 156-156.000.
- Nishina, Edward T.; and Spector, George. Electro motor helicopter. 4,955,560, Cl. 244-53.00R.
- Nishio, Maki; Ando, Shigeyuki; Miyaki, Takeo; Konishi, Masataka; and Oki, Toshikazu, to Bristol-Myers Company. Polysubstituted thiazolopyridine carboxamide antifungal antibiotic. 4,956,374, Cl. 514-342.000.
- Nishioka, Keiichi; and Hirako, Atsushi, to Isuzu Motors Limited. Prevention against car burglar. 4,955,453, Cl. 180-287.000.
- Nishioka, Masao: See—  
Kato, Heizaburo; and Nishioka, Masao, 4,955,243, Cl. 74-84.00R.
- Nishiuchi, Kihachiro: See—  
Yuki, Syoji; Tokui, Yasuyuki; Nishiuchi, Kihachiro; Wada, Kenichi; Suzue, Masayoshi; and Morimoto, Takuo, 4,955,966, Cl. 273-218.000.
- Nishiyama, Hisashi; Katakura, Kageyoshi; Ishikawa, Shizuo; and Ogawa, Toshio, to Hitachi, Ltd. Pulse doppler flow speed meter. 4,955,386, Cl. 128-661.090.
- Nishiyama, Yutaka: See—  
Kimura, Etsuji; Hasegawa, Nozomu; and Nishiyama, Yutaka, 4,956,340, Cl. 505-1.000.
- Shibasaki, Takeyoshi; Kimura, Etsuji; and Nishiyama, Yutaka, 4,956,159, Cl. 423-135.000.
- Nishizawa, Jun-ichi; Tamamushi, Takashige; Ishibashi, Koji; and Wagatsuma, Kiyoshi, to Tohoku Electric Manufacturing Co., Ltd.; and Zaidan Hojin Handotai Kenkyu Sinkokai. Power control apparatus. 4,956,599, Cl. 323-244.000.
- Nissan Motor Co., Ltd.: See—  
Fukuda, Mitsunobu, 4,955,673, Cl. 303-113.000.
- Hosaka, Akio; and Yamamoto, Akito, 4,956,807, Cl. 364-900.000.
- Jingu, Nobuhisa; and Iwasa, Yoshio, 4,955,335, Cl. 123-90.310.
- Kudo, Michio, 4,955,662, Cl. 296-192.000.
- Nakano, Masaki, 4,955,246, Cl. 74-200.000.
- Narita, Yasushi, 4,955,259, Cl. 74-866.000.



- Ogami, Etsuo, 4,955,343, Cl. 123-195.00R.  
Oshidari, Toshikazu, 4,955,260, Cl. 74-868.000.  
Nissfolk, Fredrik; Koskimies, Salme; Idelman, Peter; Nurminen, Matti; and Roni, Salla, to Neste Oy. Procedure for producing poly-alpha-olefine-type lubricants. 4,956,512, Cl. 585-521.000.  
Nissahin Oil Mills, Ltd., The: See—  
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Nitto Denko Corporation: See—  
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Kitaura, Toshihiko; Nakamura, Akio; Sakamoto, Masayuki; Takashima, Kouichi; Hirakawa, Kiyotaka; and Mizota, Matao, 4,956,132, Cl. 264-39.000.  
Nitto Kogyo Co., Ltd.: See—  
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Niwa, Masatake: See—  
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaki; Sekida, Minoru; and Sahara, Masayoshi, 4,956,661, Cl. 354-412.000.  
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Noddin, Richard A.: See—  
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Noe, Andreas: See—  
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Noe, Oskar; Noe, Rolf; Noe, Andreas; and Lux, Herbert, to BWG Bergwerk- und Walzwerk-Maschinenbau GmbH. Coiling reel. 4,955,553, Cl. 242-63.000.  
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Noe, Oskar; Noe, Rolf; Noe, Andreas; and Lux, Herbert, 4,955,553, Cl. 242-63.000.  
Nogrady, Claude B.: See—  
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Tsuchihashi, Akira; Noguchi, Naoki; and Kuraoka, Kesatoshi, 4,955,654, Cl. 294-86.400.  
Noguchi, Noriyoshi: See—  
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Noguchi, Tamio; and Watanabe, Takaji, to Merck Patent Gesellschaft mit beschränkter Haftung. Novel flaky color pigment and process for producing the same. 4,956,019, Cl. 106-415.000.  
Nohara, Fujio, to Ikeda Mohando Company, Ltd. Pyrimidine compound and pharmaceutically acceptable salts thereof. 4,956,463, Cl. 544-320.000.  
Nohma, Toshiyuki: See—  
Furukawa, Nobuhiro; Nohma, Toshiyuki; and Yamamoto, Yuji, 4,956,248, Cl. 292-194.000.  
Nohr, Henning: See—  
Krogstrup, Johan; Nohr, Henning; Christensen, Bruno; and Fosnaes, Frank, 4,955,656, Cl. 294-100.000.  
NOK Corporation: See—  
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Nonaka, Shiro: See—  
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Nordberg Inc.: See—  
Magerowski, Anthony J.; Karra, Vijia K.; Szalanski, Scott E.; and Gieschen, John A., 4,956,078, Cl. 209-254.000.  
Norregaard, Thorkild V.: See—  
Yannas, Ioannis V.; Orgill, Dennis P.; Loree, Howard M., II; Kirk, James F.; Chang, Albert S. P.; Mikic, Borivoje B.; Krarup, Christian; and Norregaard, Thorkild V., 4,955,893, Cl. 606-154.000.  
Norak Hydro a.s.: See—  
Dronnesund, Kjartan; and Stale, Heggo, 4,956,054, Cl. 204-67.000.  
North American Dynamics: See—  
Baldwin, William C., 4,955,280, Cl. 89-33.040.  
North American Philips Corporation: See—  
Goldenberg, Jill F.; and Winston, Roland, 4,956,759, Cl. 362-297.000.  
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Lennig, Matthew; Mermelstein, Paul; and Gupta, Vishwa N., 4,956,865, Cl. 381-43.000.  
Marks, Robert J.; and Kupferschmidt, Albert, 4,955,829, Cl. 439-719.000.  
Northrop Corporation: See—  
Carver, Larry L.; Zamzow, Charles E.; and Mladenoff, Donald D., 4,956,764, Cl. 364-167.010.  
Northwest Marine Technology, Inc.: See—  
Fralick, Richard D.; and Ekstrom, Philip A., 4,955,396, Cl. 128-898.000.  
Norton, Ian T.: See—  
Cain, Frederick W.; Clark, Allan H.; Dunphy, Patrick J.; Jones, Malcolm G.; Norton, Ian T.; and Ross-Murphy, Simon B., 4,956,193, Cl. 426-573.000.  
Nouvertne, Werner: See—  
Williams, John L.; Dederichs, Reinhold; Schlack, Ottfried; Kasler, Karl H.; Grigo, Ulrich; and Nouvertne, Werner, 4,956,240, Cl. 428-423.700.  
Novinski, Michael V.; and Patton, Thomas J., to American Home Products Corp. Tablet package having alternative indicators and method of use. 4,955,481, Cl. 206-534.000.  
NOWAX s.r.l.: See—  
Caoduro, Bruno, 4,955,793, Cl. 417-423.110.  
Nozaki, Mineo: See—  
Uchikata, Yoshio; Nozaki, Mineo; Asakura, Osamu; and Nagashima, Masasumi, 4,955,738, Cl. 400-229.000.  
Nozomi, Mamoru: See—  
Ohtsuka, Shigenori; Urabe, Hiroshi; Nukui, Masahiro; Nozomi, Mamoru; and Sasakawa, Setsuko, 4,956,256, Cl. 430-96.000.  
Nudenberg, Walter: See—  
Watts, Raymond F.; Loveless, Frederick C.; and Nudenberg, Walter, 4,956,122, Cl. 252-565.000.  
Nukui, Masahiro: See—  
Ohtsuka, Shigenori; Urabe, Hiroshi; Nukui, Masahiro; Nozomi, Mamoru; and Sasakawa, Setsuko, 4,956,256, Cl. 430-96.000.  
Numakura, Iwao: See—  
Numakura, Takashi; Kitazawa, Susumu; Naya, Junichi; and Numakura, Iwao, 4,956,718, Cl. 358-298.000.  
Numakura, Takashi; Kitazawa, Susumu; Naya, Junichi; and Numakura, Iwao, to Yamato & Co., Ltd. Tonal conversion method for pictures. 4,956,718, Cl. 358-298.000.  
Nuova Merisinter S.p.A.: See—  
Musella, Vincenzo; and D'Angelo, Mario, 4,955,798, Cl. 419-31.000.  
Nurminen, Matti: See—  
Nissfolk, Fredrik; Koskimies, Salme; Idelman, Peter; Nurminen, Matti; and Roni, Salla, 4,956,512, Cl. 585-521.000.  
Nykoluk, Michael: See—  
Christie, Craig; and Nykoluk, Michael, 4,955,814, Cl. 439-77.000.  
O&K Orenstein & Koppel Aktiengesellschaft: See—  
Maury, Hans-Dietmar; and Buslowski, Wolfgang, 4,955,986, Cl. 432-14.000.  
Oakley, David; and Hellmer, Michael J., to Megatek Corporation. Adaptive graphics video standards format converter user-interface. 4,956,707, Cl. 358-140.000.  
Oberaigner, Blahoslav: See—  
Vacik, Jiri; Oberaigner, Blahoslav; and Souckova, Dana, 4,956,432, Cl. 526-264.000.  
Oberle, Hans-Dieter: See—  
Hoffmann, Kurt; Oberle, Hans-Dieter; Kraus, Rainer; and Kowarik, Oskar, 4,956,819, Cl. 365-201.000.  
Occidental Chemical Corporation: See—  
Lee, Chung J., 4,956,423, Cl. 525-432.000.  
Lee, Chung J., 4,956,437, Cl. 528-26.000.  
Ochiai, Kiyoshi: See—  
Takeuchi, Akihiro; Horiuchi, Kouichi; Ochiai, Kiyoshi; and Yoshikawa, Hideaki, 4,955,416, Cl. 152-454.000.  
Ochs, Siegfried: See—  
Hilburger, Walter; and Ochs, Siegfried, 4,955,449, Cl. 180-197.000.  
O'Connor, Chadwell; and Johnson, Joel W., to Q-CO Industries, Inc. Panhead for camera. 4,955,568, Cl. 248-183.000.  
O'Connor, Sean P., to BP Chemicals Limited. Lubricating composition containing anti-wear/extreme pressure additives. 4,956,118, Cl. 544-240.000.  
Oda, Masatsugu; Sakaki, Toshiro; Sasaki, Naoko; Tomita, Hirofumi; and Nonaka, Nobuyuki, to Mitsubishi Chemical Industries Limited. N-indanyl carboxamide derivative and agricultural/horticultural fungicide containing the derivative as active ingredient. 4,956,375, Cl. 514-361.000.  
O'Dea, Kevin J.; and McDermott, Francis E., to Pitney Bowes Inc. Mail handling machine with mis-sealed envelope detector. 4,955,483, Cl. 209-548.000.  
Office National d'Etudes et de Recherche Aérospatiales (ONERA): See—  
Appel, Jean, 4,956,874, Cl. 382-56.000.  
Ogami, Etsuo, to Nissan Motor Co., Ltd. Cylinder block. 4,955,343, Cl. 123-195.00R.  
Ogasawara, Takashi: See—  
Kimura, Kiyoshi; Ukai, Yojiro; Ogasawara, Takashi; and Nakagawa, Yutaka, 4,956,364, Cl. 514-227.500.  
Ogashi, Yoshihiro, to Kabushiki Kaisha Toshiba. Variable speed drive system. 4,956,596, Cl. 318-801.000.

- Ogata, Koji: See—  
Koizumi, Hiroshi; Kawata, Hideaki; Arai, Katsumi; Miyamoto, Koji; Ichikawa, Tadaaki; and Ogata, Koji, 4,956,139, Cl. 264-156.000.  
Ogawa, Hiroyuki: See—  
Hayamizu, Katsuyoshi; Nakajima, Masakatsu; and Ogawa, Hiroyuki, 4,955,116, Cl. 28-110.000.  
Ogawa, Syozo: See—  
Kawashima, Masae; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaaki; Kameda, Miyakichi; and Tanaka, Kosuke, 4,955,208, Cl. 62-264.000.  
Ogawa, Toshio: See—  
Nishiyama, Hisashi; Katakura, Kageyoshi; Ishikawa, Shizuo; and Ogawa, Toshio, 4,955,386, Cl. 128-661.090.  
Ogawa, Yoshihiro; Takahashi, Hiroo; and Kikuchi, Yoshinori, to Nippon Steel Corporation; and Finetec Co., Ltd. Heat-generating material for portable hair curler. 4,955,360, Cl. 126-263.000.  
Ogawa, Yutaka, to Nippon Fillestar Co., Ltd. Apparatus for collecting roe. 4,955,110, Cl. 17-53.000.  
Ogino, Nobuyoshi: See—  
Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiro; Aoyama, Masaaki; Shinomiya, Eiichi; Fujinoki, Akira; and Ogino, Nobuyoshi, 4,956,208, Cl. 428-34.600.  
Ogino, Takao: See—  
Miyazaki, Tadaaki; Ogino, Takao; and Kawagoe, Takahiro, 4,956,247, Cl. 429-194.000.  
Ogoh, Ikuo: See—  
Ozaki, Hiroji; Yoneda, Masahiro; Ogoh, Ikuo; Okumura, Yoshinori; Wakamiya, Wataru; and Nagatomo, Masao, 4,956,692, Cl. 357-49.000.  
Ogren, Axel E. Fifth wheel activated trailer steering. 4,955,630, Cl. 280-419.000.  
Ogura, Shigeru: See—  
Shibata, Masaru; Onishi, Masayuki; Ohsugi, Hitoshi; Ogura, Shigeru; Washio, Masaru; Kuguminato, Hideo; and Hara, Yoshiaki, 4,955,126, Cl. 29-527.600.  
Ogura, Yukio: See—  
Mifune, Hironobu; Inada, Toshio; Ueda, Aki; and Ogura, Yukio, 4,955,691, Cl. 350-162.130.  
Ogushi, Tetsuya, to Kagoshima University. Nb-Si-Al-O superconductors with high transition temperatures and process for manufacturing the same. 4,956,337, Cl. 505-1.000.  
Ohara, Junryou: See—  
Suzuki, Yoshio; Hatanaka, Munenori; Ohara, Junryou; and Makiyama, Yorio, 4,955,237, Cl. 73-784.000.  
Ohashi, Mitsuo, to NEC Home Electronics Ltd. Signal synchronizing system. 4,956,699, Cl. 358-149.000.  
Ohba, Akio, to Sony Corporation. Apparatus for processing image. 4,956,706, Cl. 358-93.000.  
Ohio Medical Instrument Company, Inc.: See—  
Carol, Mark P., 4,955,891, Cl. 606-130.000.  
Ohkase, Wataru; and Sato, Seishiro, to Tel Sagami Limited. Semiconductor wafer treating apparatus. 4,955,775, Cl. 414-152.000.  
Ohki, Nobutaka: See—  
Ueda, Shinji; Heki, Tatsuo; Inoue, Noriyuki; Ishikawa, Tatatoshi; Ohki, Nobutaka; Yagihara, Morio; Morimoto, Kiyoshi; Fujimoto, Hiroshi; and Andoh, Kazuro, 4,956,267, Cl. 430-372.000.  
Ohnaka, Kiyoshi; Tsujii, Hiraaki; Sasai, Yoichi; and Shibata, Jun, to Matsushita Electric Industrial Co., Ltd. Optoelectronic integrated circuit. 4,956,682, Cl. 357-16.000.  
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, to Mochida Pharmaceutical Co., Ltd. Intermediates of cephalosporin compounds. 4,956,474, Cl. 548-475.000.  
Ohnishi, Hiroshi: See—  
Yuhki, Hirokazu; Fujiwara, Kazuhiko; Ohnishi, Hiroshi; and Arai, Fuminori, 4,956,146, Cl. 422-56.000.  
Ohnmacht, Helmut; Nauerth, Karl-Heinz; and Meywald, Klaus, to Fritz Eichenauer GmbH & Co. KG. Heater with tap. 4,956,545, Cl. 219-541.000.  
Ohno, Hiroyuki: See—  
Toda, Masaaki; Ohuchida, Shuichi; and Ohno, Hiroyuki, 4,956,380, Cl. 514-422.000.  
Ohno, Shigeru: See—  
Ikeda, Hideo; and Ohno, Shigeru, 4,956,269, Cl. 430-505.000.  
Ohsugi, Hiroshi; Toshimitsu, Hiroyuki; Kamano, Toshiyasu; Shikamori, Tamotu; and Hirayama, Masayoshi, to Hitachi, Ltd. Full automatic electric washing machine having an auto-off power source structure. 4,955,213, Cl. 68-12.00R.  
Ohsugi, Hitoshi: See—  
Shibata, Masaru; Onishi, Masayuki; Ohsugi, Hitoshi; Ogura, Shigeru; Washio, Masaru; Kuguminato, Hideo; and Hara, Yoshiaki, 4,955,126, Cl. 29-527.600.  
Ohta, Hirotake, to Taiyo Kikai Ltd. Web printing press with replaceable print unit. 4,955,299, Cl. 101-143.000.  
Ohta, Kenji: See—  
Miyake, Tomoyuki; Murakami, Yoshiteru; Katayama, Hiroyuki; Takahashi, Akira; and Ohta, Kenji, 4,956,243, Cl. 428-694.000.  
Ohta, Saburo: See—  
Isaka, Tsutomu; and Ohta, Saburo, 4,956,209, Cl. 428-35.200.  
Ohtsuka, Shigenori; Urabe, Hiroshi; Nukui, Masahiro; Nozomi, Mamoru; and Sasakawa, Setsuko, to Mitsubishi Chemical Industries Limited. Photosensitive member for electrophotography. 4,956,256, Cl. 430-96.000.  
Ohtsuki, Kenichi: See—  
Torii, Yutaka; Mori, Makoto; Gohara, Shinobu; Ohtsuki, Kenichi; and Sakurai, Yoshito, 4,956,839, Cl. 370-60.000.  
Ohuchida, Shuichi: See—  
Toda, Masaaki; Ohuchida, Shuichi; and Ohno, Hiroyuki, 4,956,380, Cl. 514-422.000.  
Oikawa, Toshihiro: See—  
Sato, Masakazu; Koike, Seiichi; Oikawa, Toshihiro; and Ban, Keisuke, 4,955,121, Cl. 29-888.200.  
Oji Paper Co., Ltd.: See—  
Takahashi, Yoshiyuki; Toyofuku, Kunitaka; and Iwasaki, Akiko, 4,956,332, Cl. 503-209.000.  
Oka, Kunihiko; and Unoki, Hiromi, to Agency of Industrial Science and Technology. Method for preparing a single crystal of lanthanum cuprate. 4,956,334, Cl. 505-1.000.  
Okada, Hisashi: See—  
Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hisashi; Ukai, Toshinao; Yagihara, Morio; Takagi, Yoshihiro; and Yoneyama, Masakazu, 4,956,263, Cl. 430-264.000.  
Okada, Kazuo: See—  
Seya, Masatomo; Okada, Kazuo; Yoshimura, Motomu; and Maeda, Mitsuo, 4,956,812, Cl. 365-119.000.  
Seya, Masatomo; and Okada, Kazuo, 4,956,813, Cl. 365-127.000.  
Okada, Toshihiro: See—  
Kohn, Mitsuo; Sakai, Masao; Nagasaka, Moritoshi; Okada, Toshihiro; and Morimoto, Hiroyuki, 4,956,540, Cl. 219-127.000.  
Okajima, Taizo; Ootani, Kouichi; and Yamada, Tsutomu, to Mitsubishi Kasei Corporation. Polishing composition. 4,956,015, Cl. 106-3.000.  
Okamoto, Hiroaki; Takahara, Takeshi; and Maeda, Fukuio, to Kabushiki Kaisha Toshiba. Combustor for gas turbine. 4,955,191, Cl. 60-39.300.  
Okamoto, Shoji: See—  
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, 4,955,799, Cl. 425-47.000.  
Okamura Corporation: See—  
Abe, Taizo, 4,955,294, Cl. 108-6.000.  
Okamura, Moriyo: See—  
Nishiguchi, Toshiji; Okamura, Moriyo; and Nakajima, Ikuo, 4,955,901, Cl. 623-6.000.  
Oki Electric Industry Co., Ltd.: See—  
Itagaki, Hirokazu, 4,956,708, Cl. 358-140.000.  
Oki, Toshikazu: See—  
Nishio, Maki; Ando, Shigeyuki; Miyaki, Takeo; Konishi, Masataka; and Oki, Toshikazu, 4,956,374, Cl. 514-342.000.  
Okino, Tadashi; Date, Nobuaki; Tezuka, Nobuo; and Saito, Syuichiro, to Canon Kabushiki Kaisha. Image sensing device having a photo-metric element for setting an exposure condition for the image sensing device. 4,956,715, Cl. 358-213.190.  
Okuda, Isao: See—  
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.  
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, to Fujisawa Pharmaceutical Co., Ltd. Tricyclo compounds, a process for their production and a pharmaceutical composition containing the same. 4,956,352, Cl. 514-63.000.  
Okumura, Yoshinori: See—  
Ozaki, Hiroji; Yoneda, Masahiro; Ogoh, Ikuo; Okumura, Yoshinori; Wakamiya, Wataru; and Nagatomo, Masao, 4,956,692, Cl. 357-49.000.  
Okuno, Akiyasu: See—  
Yokoi, Hitoshi; Watanabe, Masakazu; Okuno, Akiyasu; and Iio, Satoshi, 4,956,317, Cl. 501-92.000.  
Okunuki, Masahiko: See—  
Shimizu, Akira; Suzuki, Hidetoshi; Okunuki, Masahiko; Ono, Haruhito; Nomura, Ichiro; Banno, Yoshikazu; Takeda, Toshihiko; and Kaneko, Tetsuya, 4,956,578, Cl. 315-3.000.  
Oldani, Battistino: See—  
Bonomi, Giovanni B.; and Oldani, Battistino, 4,955,119, Cl. 29-50.000.  
O'Lenick, Anthony J., Jr.: See—  
Friel, Thomas C., Jr.; and O'Lenick, Anthony J., Jr., 4,956,119, Cl. 252-358.000.  
Olesen, John; and Jorgensen, Jorgen, to Roblon A/S. Method of manufacturing a cable-like plastic composite body. 4,956,039, Cl. 156-180.000.  
Olin Corporation: See—  
Polan, Ned W.; Smialek, Raymond J.; and Menkin, Paul, 4,956,053, Cl. 204-13.000.  
Olivo, Marco; Pascucci, Luigi; Riva, Carlo; Rosini, Paolo; and Villa, Corrado, to SGS-Thomson Microelectronics S.R.L. CMOS logic circuit for high voltage operation. 4,956,569, Cl. 307-443.000.  
Olschewski, Armin: See—  
Kunkel, Heinrich; Kiener, Heinz; and Olschewski, Armin, 4,955,786, Cl. 415-110.000.  
Olsen, Roy W.; and Bell, Curtis H., to Goodyear Tire & Rubber Company, The. Hose having index mark. 4,955,411, Cl. 138-109.000.  
Olympic Machines, Inc.: See—  
Paulos, Harry D., 4,955,982, Cl. 404-11.000.  
Olympus Optical Co., Ltd.: See—  
Uchiyama, Naoki; Takayama, Syuichi; Gotanda, Masakazu; Kubota, Tetsumaru; Tsukaya, Takashi; Ishihara, Kouichiro; Kami, Kuniaki; Sekino, Naomi; Murata, Akira; and Hayashi, Masaki, 4,955,366, Cl. 128-24.00A.



OM Industrial Co., Ltd.: See—  
Seichi, Takatsuka; and Kyokuichi, Sato, 4,955,950, Cl. 141-46.000.  
Oma, Kenton H.: See—  
Buel, James L.; Carter, John G.; Eschbach, Eugene A.; FitzPatrick, Vincent F.; Kochmstedt, Paul L.; Morgan, William C.; Oma, Kenton H.; and Timmerman, Craig L., 4,956,535, Cl. 219-10.810.  
Omron Corporation: See—  
Masuo, Yoshihisa, 4,955,980, Cl. 374-185.000.  
Omron Tateisi Electronics Co.: See—  
Tasaki, Hisashi; and Endo, Kimikazu, 4,956,721, Cl. 358-402.000.  
On-Gard Systems, Inc.: See—  
Steiner, Eric L.; and Sable, Arthur J., 4,955,865, Cl. 604-192.000.  
Onaka, Junji: See—  
Hirakawa, Eiichi; and Onaka, Junji, 4,955,498, Cl. 220-3.000.  
Onga, Takeo: See—  
Uruda, Tetsuji; Kuramoto, Takashi; Onga, Takeo; Suzuki, Tetsuo; and Suwa, Takashi, 4,956,703, Cl. 358-76.000.  
Onishi, Masayoshi; and Ozawa, Hiromasa, to Mitsubishi Denki Kabushiki Kaisha. Motor-driven control apparatus, 4,955,954, Cl. 192-0.02R.  
Onishi, Masayuki: See—  
Shibata, Masaru; Onishi, Masayuki; Ohsugi, Hitoshi; Ogura, Shigeru; Washio, Masaru; Kuguminato, Hideo; and Hara, Yoshiaki, 4,955,126, Cl. 29-527.600.  
Onishi, Shinji: See—  
Morinaga, Akio; Hyodo, Masakatsu; Nishimoto, Tomiyo; Sakuragi, Hiroyuki; and Onishi, Shinji, 4,956,038, Cl. 156-156.000.  
Onizuka, Masakazu; and Tanani, Atsushi, to Mitsubishi Jukogyo Kabushiki Kaisha. Apparatus for treating slurry by gas-liquid contact method, 4,955,586, Cl. 261-87.000.  
Onnegren, Jan: See—  
Bramisch, Eckart; and Onnegren, Jan, 4,956,531, Cl. 219-10.55B.  
Ono, Haruhito: See—  
Shimizu, Akira; Suzuki, Hidetoshi; Okunuki, Masahiko; Ono, Haruhito; Nomura, Ichiro; Banno, Yoshikazu; Takeda, Toshihiko; and Kaneko, Tetsuya, 4,956,578, Cl. 315-3.000.  
Ono Pharmaceutical Co., Ltd.: See—  
Toda, Masaki; Ohuchida, Shuichi; and Ohno, Hiroyuki, 4,956,380, Cl. 514-422.000.  
Ono, Toyochi: See—  
Hashimoto, Haruo; and Ono, Toyochi, 4,955,447, Cl. 180-168.000.  
Onozato, Takashi, to Alps Electric Co., Ltd. Pen selection mechanism for a printer, 4,956,652, Cl. 346-139.00R.  
Onozawa, Makoto: See—  
Kitou, Kouji; and Onozawa, Makoto, 4,956,587, Cl. 315-408.000.  
Ooi, Kent; Miyai, Yoshitaka; and Katoh, Shunsaku, to Japan as represented by Director General of Agency of Industrial Science and Technology. Method for concentration determination of lithium ions, 4,956,062, Cl. 204-153.150.  
Ootani, Hiroshi, to Koyo Seiko Co., Ltd. Hydraulic power steering apparatus, 4,955,446, Cl. 180-143.000.  
Ookuma, Kuniaki: See—  
Honma, Eiichi; Hironaka, Masakazu; Miyazaki, Masaki; Ito, Yutaka; Ookuma, Kuniaki; and Kamiyama, Yoshiteru, 4,955,463, Cl. 198-346.100.  
Ootani, Kouichi: See—  
Okajima, Taizo; Ootani, Kouichi; and Yamada, Tautomu, 4,956,015, Cl. 106-3.000.  
Ootsuki, Noboru; Tomioka, Katsumi; and Onishi, Toshihiko, to Nippon Air Brake Co., Ltd. Lock unit for a fluid coupling apparatus, 4,955,122, Cl. 29-237.000.  
Opitz, Reinhard; and Schellenberg, Lutz, to Gerhard Collardin GmbH. Anticorrosive agents and use thereof, 4,956,016, Cl. 106-14.120.  
Optische werke G. Rodenstock: See—  
Barth, Rudolf; Guillin, Gunther; and Kalder, Dieter, 4,955,712, Cl. 351-169.000.  
Optyl Eyewear Fashion International Corporation: See—  
Schmidthalder, Johann J.; and Zach, Ronald, 4,955,706, Cl. 351-41.000.  
Orain, Michel A., to Olaenzer-Spicer. Homokinetic transmission joint having a tripod element connected to a housing element by rolling elements on the tripod element and rolling tracks in the housing element, 4,955,847, Cl. 464-111.000.  
Orbisphere Laboratories (Inc.): See—  
Hale, John M., 4,956,063, Cl. 204-153.170.  
Oren, Yoram: See—  
Giuffrida, Anthony J.; Ganzi, Gary C.; and Oren, Yoram, 4,956,071, Cl. 204-301.000.  
Orgill, Dennis P.: See—  
Yannas, Ioannis V.; Orgill, Dennis P.; Loree, Howard M., II; Kirk, James F.; Chang, Albert S. P.; Mikic, Borivoje B.; Krarup, Christian; and Norregaard, Thorkild V., 4,955,893, Cl. 606-154.000.  
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Hirofumi, Satomi; and Hideo, Domeki, 4,956,595, Cl. 318-696.000.  
Oronzio de Nora Permelec S.p.A.: See—  
Dempsey, Russell M.; Coker, Thomas G.; LaConti, Anthony B.; and Frigala, Anthony R., 4,956,061, Cl. 204-128.000.  
O'Rourke, Michael W.: See—  
Sunseri, Ronald H.; and O'Rourke, Michael W., 4,956,501, Cl. 525-64.000.  
Orth, Peter; and Witt, Ulrich, to Hella KG Hueck & Co. Vehicle pane washing apparatus, particularly for headlight diffusing lenses, 4,955,543, Cl. 239-284.200.

Osaka Bousui Construction Co., Ltd.: See—  
Miyazaki, Yasuo; Kamide, Akira; and Watari, Shigeki, 4,956,041, Cl. 156-267.000.  
Oshidari, Toshihiko, to Nissan Motor Co., Ltd. Hydraulic control system for transmission, 4,955,260, Cl. 74-868.000.  
Oshima, Kazuyoshi: See—  
Kajigaya, Kazuhiko; Kotani, Hiroaki; Oshima, Kazuyoshi; Kasama, Yasuhiro; and Udo, Shinji, 4,956,811, Cl. 365-51.000.  
Oshima, Kunio: See—  
Uesugi, Yuji; Makino, Masashi; Nishikawa, Yukio; Oshima, Kunio; and Shinohara, Akihito, 4,956,539, Cl. 219-121.800.  
Oshima, Masaki: See—  
Hasegawa, Takanori; Abe, Nobuyuki; Hirose, Toshihiko; Kanda, Takashi; Saito, Hiroshi; Nakazawa, Eiji; and Oshima, Masaki, 4,956,664, Cl. 355-43.000.  
Osteonica Corp.: See—  
Zarnowski, Alfred J.; and Cohen, Robert C., 4,955,325, Cl. 623-22.000.  
Osterhoudt, Hans W.: See—  
Bayer, Gerald W.; Diamantopoulos, Paul A.; Osterhoudt, Hans W.; and Schmit, Paul F., 4,956,181, Cl. 424-448.000.  
Osterloh, Rolf: See—  
Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, 4,956,402, Cl. 523-415.000.  
Ota, Hideo: See—  
Tachibana, Noriki; Ueda, Eiichi; Kagawa, Nobuaki; and Ota, Hideo, 4,956,270, Cl. 430-527.000.  
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Otto Bock Orthopaedische Industrie Besitz- und Verwaltungsgesellschaft: See—  
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Otto, Friedrich, to A. Stephan u. Soehne GmbH & Co. Food processing machine, 4,955,724, Cl. 366-314.000.  
Otto, Manfred R.; Reed, Edwin A.; and Hug, William F. Metal vapor laser having means to extend lifetime of tube, 4,956,845, Cl. 372-56.000.  
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Lam, Edward K.; and Luksch, Heinrich E., 4,955,833, Cl. 440-49.000.  
Wenstadt, Thomas D., 4,955,838, Cl. 440-89.000.  
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Sieloff, Ronald F., 4,956,409, Cl. 524-211.000.  
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Ozaki, Hiroji: See—  
Tokui, Akira; Sato, Shinichi; Kawai, Akira; Nakajima, Masayuki; Ozaki, Hiroji; and Nagatomo, Masao, 4,956,310, Cl. 437-52.000.  
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Ozawa, Kazuhito, to Sharp Kabushiki Kaisha. Method for mounting a semiconductor chip, 4,955,132, Cl. 29-840.000.  
Ozawa, Shigeo: See—  
Terayama, Satoshi; Aoki, Takashi; Ozawa, Shigeo; and Kutsutaka, Eiji, 4,955,257, Cl. 74-866.000.  
Ozawa, Susumu: See—  
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Shoji; Kubota, Akinori; Kobayashi, Michihito; Ijiri, Masaaki; Ozawa, Susumu; and Tomosada, Kiyoshi, 4,955,799, Cl. 425-47.000.  
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Paco Pharmaceutical Services, Inc.: See—  
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Edwards, Donald W.; Paff, Armin J.; and Duan, Daniel C., 4,956,230, Cl. 428-341.000.  
Pafford, Thomas L. Fiber optic telescope, 4,955,687, Cl. 350-96.250.  
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Paisley, Gary V.: See—  
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Palicka, Cathy S.: See—  
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Ishiguro, Katsusuke; Hayakawa, Tsuneyasu; and Yokoyama, Nobuyoshi, 4,955,805, Cl. 431-1.000.  
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Donate, Felipe A.; Hartwell, George E.; DeBolt, Bruce D.; Papajek, James G.; and Buzzard, Mark V., 4,956,017, Cl. 106-311.000.  
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PAR Microsystems Corp.: See—  
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Parenti, Francesco: See—  
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Parker, William P. Interactive luminous panel display device, 4,956,577, Cl. 313-634.000.  
Parrish, William J., to Amber Engineering, Inc. Wafer scale testing of redundant integrated circuit dies, 4,956,602, Cl. 324-158.00R.  
Parsons, Kevin L.; Grundy, Gary M.; and Dunstand, Jacqueline M. Baton clip for expandable batons, 4,955,518, Cl. 224-247.000.  
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Patel, Bakulesh N.: See—  
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Patel, Mahesh G.; Horan, Ann C.; Marquez, Joseph A.; and Waitz, J. Allan, to Schering Corporation. Antifungal triacylenic dioxolone from *Microbispora* sp. SCC 1438, ATCC 53620, 4,956,383, Cl. 514-467.000.  
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Paulson, Wayne M.: See—  
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Pawluk, Robert J., to Columbia University in the City of New York, The Trustees of. Dual-taper, asymmetric hole placement in reconstruction and fracture plates, 4,955,886, Cl. 606-69.000.  
Pawluk, Robert R., to United Wire & Cable (Canada) Inc.; and UMR-Luktion Inc. Armoured electric cable with integral tensile members, 4,956,523, Cl. 174-107.000.  
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Payne, Le Roy. Laminate forming and applying apparatus and method and product therefrom, 4,955,760, Cl. 405-270.000.  
Payne, Le Roy. Continuous molding apparatus and method, 4,956,133, Cl. 264-39.000.  
Payne, Le Roy. Molding apparatus and method, 4,956,135, Cl. 264-40.700.  
Pazzaglia, Luigi, to Cefin S.p.A. Device for pre-calibrating hollow cylindrical bodies in seam welding machines, 4,956,536, Cl. 219-64.000.  
PBS Enterprises, Inc.: See—  
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Pease Windmatic Systems, Inc.: See—  
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Pehl, Richard H.; Madden, Norman W.; and Malone, Donald F., to University of California, The Regents of. Cryostat including heater to heat a target, 4,955,204, Cl. 62-51.100.  
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Perma Power Electronics, Inc.: See—  
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Perner, Thomas; Osterloh, Rolf; Schupp, Eberhard; Schwerzel, Thomas; and Ahlers, Klaas, to BASF Lacke & Farben Aktiengesellschaft. Synthetic resin with basic nitrogen groups from resins reacted with the ketimine-urethane product of an alkanolamine, a ketone and anisocyanate, 4,956,402, Cl. 523-415.000.  
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- Pessi, Antonello: See—  
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- Pessina, Gianluigi: See—  
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- Peters, James W.: See—  
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- Peters, Thomas E.: See—  
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- Peters, Timothy J.: See—  
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- Petersen, Jens K.; and Sorensen, Ole V., to Danfoss A/S. Hydrostatic steering device, 4,955,444, Cl. 180-132.000.
- Petersen, Uwe: See—  
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- Peterson, Donald M., to Haggerty, James A.; and Hawkes, Thomas E. Stop apparatus for use in collets, 4,955,622, Cl. 279-15.000.
- Peterson, Patrick M.: See—  
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- Petrocine, David V.: See—  
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- Petrolite Corporation: See—  
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- Petrusky, James A.; Backofen, Joseph E.; and Butz, Donald J., to United States of America, Navy. Shaped charge with explosively driven liquid follow through, 4,955,939, Cl. 102-476.000.
- Pettine, Kenneth A. Achilles tendon rehabilitation brace and method for its manufacture, 4,955,370, Cl. 128-80.00E.
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- Pfaff Industriemaschinen GmbH: See—  
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- Pfeiffer, Gerd; Quadflieg, Erich; Lenze, Friedrich; Krug, Gerhard; and Siekmeyer, Josef, to Mannesmann Aktiengesellschaft. Drill pipe coupling, 4,955,644, Cl. 285-333.000.
- Pfizenmaier, Heinz; and Schmidt, Ewald, to Robert Bosch GmbH. High-frequency component, 4,956,627, Cl. 336-65.000.
- Pfizer Hospital Products Group, Inc.: See—  
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- Rajlevsky, Jack, 4,955,873, Cl. 604-322.000.
- Pfizer Inc.: See—  
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- Cullen, Walter P.; Hauske, James R.; Maeda, Hiroshi; and Tone, Junsuke, 4,956,283, Cl. 435-76.000.
- Pfleiderer, Hans-Joerg: See—  
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- Pflueger, Werner: See—  
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- PGM Diversified Industries, Inc.: See—  
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- Pham, Dinh-Tuong, to Herman Miller, Inc. Drawer interlock, 4,955,672, Cl. 312-107.500.
- Phelps, Richard A.: See—  
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- Phillips, Edward H., to Techco Corporation. Vehicular power steering system, 4,956,590, Cl. 318-432.000.
- Phillips, Gareth T.; Robertson, Brian W.; Bertola, Mauro A.; Koger, Hein S.; Marx, Arthur F.; and Watts, Peter D., to Gist-Brocades N.V. Process for producing 4-(2-methoxyethyl)-phenyl-glycidyl ether and/or metoprolol, 4,956,284, Cl. 435-123.000.
- Phillips, James D.: See—  
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- Phillips Petroleum Company: See—  
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- Elliott, David J.; and Kolts, John H., 4,956,330, Cl. 502-326.000.
- Harrison, Roger G., Jr.; and Nelles, Lynn P., 4,956,290, Cl. 435-189.000.
- Kolts, John H.; and Delzer, Gary A., 4,956,515, Cl. 585-651.000.
- Lee, Fu M., 4,955,468, Cl. 203-53.000.
- Mathis, Ronald D.; Kitchen, Alonzo G.; and Szalla, Frank J., 4,956,408, Cl. 524-147.000.
- Mattson, Michael S.; and Cobb, Raymond L., 4,956,507, Cl. 570-140.000.
- Phillips, Steven J. Method and apparatus for installing a ventricular assist device cannulae, 4,955,856, Cl. 600-16.000.
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- Pickering, Anthony; Thorne, Andrew J.; and Runciman, Peter J. I., to Imperial Chemical Industries PLC. Rate-moderated group transfer polymerization, 4,956,428, Cl. 526-190.000.
- Pieper, Friedrich: See—  
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- Pier, Nicholas F., to Litton Systems, Inc. Protected hinge assembly for mechanical accelerometer, 4,955,108, Cl. 16-226.000.
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- Pierston, Charles W.; and Tone, Frederick F., to Eastman Kodak Company. Leader-retracting film magazine and method for enclosing film, 4,955,555, Cl. 242-74.000.
- Pierston, Neil W. Veneer anchor, 4,955,172, Cl. 52-710.000.
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- Pillon, Robert E.: See—  
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- Pinkhasov, Eduard, to Vapor Technologies Inc. Method of making matrix composites, 4,955,135, Cl. 29-527.200.
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- Pioneer Aerospace Corporation: See—  
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- Piot, Odile: See—  
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- Piper, Frank R., to Penn's Woods Products, Inc. Game calling device, 4,955,845, Cl. 446-397.000.
- Pirali, Giorgio: See—  
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- Piran, Uri; Stastny, Milos; and Uretsky, Laura S., to Ciba Corning Diagnostics Corp. Complement stabilization, 4,956,299, Cl. 436-18.000.
- Pirbazari, Massoud; and Shorr, Jacob. Wastewater treatment process, 4,956,093, Cl. 210-616.000.
- Pirttiaho, Aimo: See—  
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- Piselli, Fulvio L.: See—  
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- Piszko, John: See—  
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- Gough, Rex M. K., 4,955,186, Cl. 53-569.000.
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- Pitrova, Sarka: See—  
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- Pittman, Deborah M.: See—  
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- Pitzen, Terry, to Gaslock Corporation. Method and apparatus for sealing leaking valves on compressed gas tanks, 4,955,404, Cl. 137-15.000.
- Plant Tech., Horticultural Products Inc.: See—  
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- Plass, Ulrich: See—  
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- Platt, William J., to National Rolling Mills, Inc. Method of forming a spring-like fire strip, 4,955,134, Cl. 29-897.312.
- Platti, Rita J. Raker taker I, 4,955,925, Cl. 15-257.600.
- Plessey Overseas Limited: See—  
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- Podany, Mark E.: See—  
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- Pogue, David C. Weight lifting rack, 4,955,604, Cl. 272-123.000.
- Pohl, Reinhold; Dresselmann, Manfred; and Hessemann, Hans-Wilhelm, to Robota GmbH Feuerungs- und Schornsteinbau. Arrangement for the demolition of smokestacks, 4,955,457, Cl. 182-128.000.
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- Polan, Ned W.; Smialek, Raymond J.; and Menkin, Paul, to Olin Corporation. Apparatus and process for the production of micro-pore free high ductility metal foil, 4,956,053, Cl. 204-13.000.
- Polaroid Corporation: See—  
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- Quintana, Victor E., 4,956,683, Cl. 357-17.000.

- Poleschinski, Richard: See—  
Froese-Peeck, Ruediger; and Poleschinski, Richard, 4,955,680, Cl. 315-382.000.
- Politechnika Poznanska: See—  
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- Pollack, Jack. Bearing arrangement for single point terminal, 4,955,310, Cl. 114-230.000.
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- Polyplastics Co., Ltd.: See—  
Fukuda, Makoto; Suzuki, Sirow; Hosokawa, Toshio; Iizuka, Yo; Kawakami, Yukichika; and Shiiki, Zenya, 4,956,499, Cl. 524-500.000.
- Yamamoto, Kaoru; Sano, Hiroyuki; and Chino, Shuichi, 4,956,445, Cl. 528-230.000.
- Polysar Limited: See—  
Ayub, Abdul L.; and Schwarz, Herbert F., 4,956,398, Cl. 523-209.000.
- Pommrehn, Mark R.: See—  
Kroll, Mark W.; and Pommrehn, Mark R., 4,956,877, Cl. 455-605.000.
- Pommrehn, Leonard P.: See—  
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- Pontius, Jeffrey S., to Columbus Industries, Inc. Range hood filter pad, 4,955,995, Cl. 55-274.000.
- Porat, Reuven: See—  
Moskowitz, David; and Porat, Reuven, 4,956,318, Cl. 501-96.000.
- Porter, Joseph B. Tie clip, 4,955,112, Cl. 24-49.00C.
- Porter, Ronald D.: See—  
Buzby, Jeffery S.; Porter, Ronald D.; and Stevens, S. Edward, Jr., 4,956,280, Cl. 435-69.100.
- Potter, Christopher M.; Hjiptier, George; and Bunyan, Paul, to Marconi Instruments Limited. Connector, 4,955,826, Cl. 439-578.000.
- Potter, Dennis L.; Raker, Mark L.; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Westmoreland, Amos E.; Woods, Donna K.; and Banerjee, Chandra K., to R. J. Reynolds Tobacco Company. Smoking article, 4,955,399, Cl. 131-359.000.
- Powers, Thomas F.: See—  
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- PPG Industries, Inc.: See—  
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- Pratt, Clyde R.: See—  
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- Precision Handling Devices, Inc.: See—  
Ferguson, Gregory A., 4,955,520, Cl. 226-74.000.
- Prendergast, Patrick T., to Colthurst Limited. Agents for the arrest and therapy of retroviral infections, 4,956,355, Cl. 514-178.000.
- President and Fellows of Harvard College: See—  
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- Presidenza Del Consiglio Dei Ministri: See—  
Cassani, Giorgio; Borgonovi, Giorgio; Cidaria, Dante; Tolentino, Daniela; Abis, Luigi; Guglielmetti, Gianfranco; Garavaglia, Carlo; Confalonieri, Giovanni; and Pirali, Giorgio, 4,956,180, Cl. 424-118.000.
- Prestipino Giarrutta, Adriano; and Robba, Fabrizio. Safety fastenings for "surf" snowboards, 4,955,632, Cl. 280-607.000.
- Presty, Dominic F.: See—  
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- Pretchel, David A.; Venaleck, Howard J.; and Venaleck, John T. Two pin shunt, 4,955,824, Cl. 439-510.000.
- Preuss, August-Wilhelm: See—  
Hohr, Dieter; Preuss, August-Wilhelm; Schug, Kurt-Peter; and Riegel, Helmut, 4,955,331, Cl. 123-1.00A.
- Previdoli, Felix: See—  
Mettler, Hans P.; Griffiths, Gareth; Mills, Lester; and Previdoli, Felix, 4,956,473, Cl. 548-408.000.
- Pribat, Didier; Perret, Joel; Rouffy, Jean-Claude; and Velasco, Gonzalo, to Thomson-CSF. Method to make microcavities and its application to an electrochemical sensor, 4,956,073, Cl. 204-426.000.
- Price, Henry C., to Llanelli Radiators Limited. Radiator assembly and a cowl assembly therefor, 4,955,434, Cl. 165-122.000.
- Priem, Curtis; and Malachowsky, Chris, to Sun Microsystems, Inc. Matrix arithmetic circuit for processing matrix transformation operations, 4,956,801, Cl. 364-748.000.
- Priem, Curtis, to Sun Microsystems, Inc. Method and apparatus for a parallel carry generation adder, 4,956,802, Cl. 364-787.000.
- Prime Computer, Inc.: See—  
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- Procter & Gamble Company, The: See—  
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- Gosselink, Eugene P.; Hardy, Frederick E.; and Trinh, Toan, 4,956,447, Cl. 528-272.000.
- Produits Carmine Inc.: See—  
Bilodeau, Marcel J.; Dube, Andre; and Quesnel, Andre-Paul, 4,955,462, Cl. 193-37.000.
- Proform Fitness Products, Inc.: See—  
Bersonnet, George; and Dalebout, William T., 4,955,599, Cl. 272-73.000.
- Propes, Michael L. Partitioned drinking cup, 4,955,503, Cl. 220-526.000.
- Prosl, Frank R.: See—  
Enegren, Bradley J.; Melsky, Gerald S.; and Prosl, Frank R., 4,955,861, Cl. 604-141.000.
- Prosser, Robert. Mirror defogger, 4,956,542, Cl. 219-219.000.
- Protectaire Systems Co.: See—  
Napadow, Stanley C., 4,955,990, Cl. 55-90.000.
- Provencher, Roland L. Convertible bench seat for vans, 4,955,973, Cl. 296-65.100.
- Provost, George A., to Velcro Industries B.V. Reclosable bag having hook and loop sealing strips, 4,955,981, Cl. 383-86.000.
- Puckette, Thomas A., to Eastman Kodak Company. Preparation of bidentate ligands, 4,956,055, Cl. 204-72.000.
- Pugel, Michael A., to RCA Licensing Corporation. Television receiver tuner high pass input filter with CB trap, 4,956,710, Cl. 358-188.000.
- Pugh, Charles S. G.: See—  
Gordon, Julian; and Pugh, Charles S. G., 4,956,302, Cl. 436-161.000.
- Pugh, Gregory E. Arrow holding and loading device for archery bows, 4,955,355, Cl. 124-52.000.
- Puletti, Paul P.: See—  
Kauffman, Thomas F.; and Puletti, Paul P., 4,956,207, Cl. 428-34.200.
- Purdue Research Foundation: See—  
Badyiak, Stephen F.; Geddes, Leslie A.; Lantz, Gary; and Coffey, Arthur C., 4,956,178, Cl. 424-551.000.
- PZF, Inc.: See—  
Frisk, Don L., 4,955,556, Cl. 242-107.40B.
- Q-CO Industries, Inc.: See—  
O'Connor, Chadwell; and Johnson, Joel W., 4,955,568, Cl. 248-183.000.
- Quadflieg, Erich: See—  
Pfeiffer, Gerd; Quadflieg, Erich; Lenze, Friedrich; Krug, Gerhard; and Siekmeyer, Josef, 4,955,644, Cl. 285-333.000.
- Quadro, Giuseppe; and Cahn, Jean, to Yason S.R.L.; and SIR International S.A. Compounds having calcium blocking activity, 4,956,389, Cl. 514-654.000.
- Quaker Oats Company, The: See—  
Moomaw, David E., 4,955,840, Cl. 446-17.000.
- Quallich, Robert J. Rafter gun rack, 4,955,487, Cl. 211-64.000.
- Qualline, Steve M.; and Dunnam, Louis R. Tornado underground shelter, 4,955,166, Cl. 52-169.600.
- QuanScan, Inc.: See—  
West, Paul E.; and Jahanmir, Jamshid, 4,956,817, Cl. 365-189.010.
- Quantum Chemical Corporation: See—  
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- Quartz et Silice: See—  
Luc, Jean-Claude, 4,956,134, Cl. 264-40.200.
- Quast, Jörn-Rainer: See—  
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- Quesnel, Andre-Paul: See—  
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- Quill, Kieran: See—  
Kathirgamanthan, Poopathy; Adams, Philip N.; Quill, Kieran; and Underhill, Alan E., 4,956,441, Cl. 528-171.000.
- Quinn, James P.: See—  
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- Quintana, Victor E., to Polaroid Corporation. Isolation of p-n junctions, 4,956,683, Cl. 357-17.000.
- R. G. Barry Corporation: See—  
Hudspeth, Derick, 4,955,469, Cl. 206-45.230.
- R. J. Reynolds Tobacco Company: See—  
Cearley, Thomas W.; Donovan, Michael F.; Gardea, Raymond A.; II; Hughes, Kolleen C.; Hunt, William R., III; Jarvis, William R.; Martin, Marvin R.; Shamb, Aftab; Shepard, Michael D.; Summers, William F.; Twine, David C.; and Utt, Lonnie M., Jr., 4,956,777, Cl. 364-424.020.
- Potter, Dennis L.; Raker, Mark L.; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Westmoreland, Amos E.; Woods, Donna K.; and Banerjee, Chandra K., 4,955,399, Cl. 131-359.000.
- Radio Controle S.A.: See—  
Palencher, Jacques; and Jaillant, Gabriel, 4,956,601, Cl. 324-154.0PB.
- Radtke, Jeffrey L., to Siemens Analytical X-Ray Instruments, Inc. Radiation scintillation detector, 4,956,556, Cl. 250-368.000.
- Ragonese, Francis P.: See—  
Child, Jonathan E.; Chou, Tai-Sheng; Huss, Albin, Jr.; Kennedy, Clinton R.; Ragonese, Francis P.; and Tabak, Samuel A., 4,956,518, Cl. 585-726.000.
- Rahill, Paul F., to Industrial Equipment & Engineering Company. Method and apparatus for comminuting cremation remains, 4,955,548, Cl. 241-30.000.
- Raible, Fred A. Swivel mail box, 4,955,534, Cl. 232-39.000.
- Railway Technical Research Institute: See—  
Ikeda, Haruo, 4,955,303, Cl. 104-292.000.
- Rajala, Gregory J.; and King, Lon M., to Kimberly-Clark Corporation. Fastening means, apparatus, and methods, 4,955,113, Cl. 24-448.000.



Rajlevsky, Jack, to Pfizer Hospital Products Group, Inc. Stabilizing support stand. 4,955,873, Cl. 604-322.000.

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Potter, Dennis L.; Raker, Mark L.; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Westmoreland, Amos E.; Woods, Donna K.; and Banerjee, Chandra K., 4,955,399, Cl. 131-359.000.

Ramni, Karthik: See—  
Miller, Alan K.; Ramni, Karthik; and Gur, Micha M., 4,955,803, Cl. 425-145.000.

Ranson, Ronald W. Uniform flow hydraulic system. 4,955,282, Cl. 91-436.000.

Rapp, Robert A.; Urquhart, Andrew W.; Nagelberg, Alan S.; and Newkirk, Marc S., to Lanxide Technology Company, LP. Methods for forming complex oxidation reaction products including superconducting articles. 4,956,338, Cl. 505-1.000.

Rasmussen, Donald E.: See—  
Batishko, Charles R.; Kiriara, Leslie J.; Peters, Timothy J.; and Rasmussen, Donald E., 4,956,558, Cl. 250-461.100.

Rastelli, Gerard. Method and apparatus for training in the martial arts. 4,955,602, Cl. 272-76.000.

Rau, Georg; Hitzler, Werner; and Riess, Gerhard, to Georg Knoblauch, Firma. Flip-top drill-bit storage and display box. 4,955,478, Cl. 206-379.000.

Rau, Wolfgang: See—  
Benz, Erwin; Rau, Wolfgang; Bauer, Rainer; and Willy, Gerd, 4,955,570, Cl. 248-300.000.

Raubenheimer, Hans-Juergen: See—  
Denzinger, Walter; Hartmann, Heinrich; Baur, Richard; Perner, Johannes; Triselt, Wolfgang; Trapp, Horst; and Raubenheimer, Hans-Juergen, 4,956,421, Cl. 525-385.000.

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Rauma-Kepola Oy: See—  
Kivi, Ilkka; Manner, Tapio; Kuvaja, Kari; and Terava, Jorma, 4,955,970, Cl. 285-149.000.

Rausch, Juergen: See—  
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Raychem Corporation: See—  
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RCA Licensing Corporation: See—  
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RD Chemical Company: See—  
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Reactive Metals and Alloys Corporation: See—  
Robison, James W., Jr., 4,956,097, Cl. 75-307.000.

Reccius, Helmut, to Dornier Luftfahrt GmbH. Deforming panels having ribs. 4,955,222, Cl. 72-295.000.

Reck, Bernhard, to EJOT Eberhard Jaeger GmbH & Co. KG. Connecting element. 4,955,772, Cl. 411-175.000.

Reckelhoff, John R.: See—  
Bequette, Robert J.; Bonenberger, Bruce A.; Gallian, Claude E.; and Reckelhoff, John R., 4,956,182, Cl. 424-476.000.

Recker, Bradley J.; Cheng, Thong-Meng; Roe, Derrick I.; and Rozman, Christopher J., to Sundstrand Corporation. Low distortion control for a VSCF generating system. 4,956,598, Cl. 322-28.000.

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Redecker, Klaus: See—  
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Reeber, Robert R.; Chu, Wei-Kan; and Bedair, Salah M. Gradient lens fabrication. 4,956,000, Cl. 65-18.100.

Reed, Andrew M. Method and apparatus for monitoring pressure of human tissue expansion devices. 4,955,905, Cl. 623-8.000.

Reed, Charles G.: See—  
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Reed, Edwin A.: See—  
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Rehabilitation Institute of Chicago: See—  
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Reifenhauser GmbH & Co. Maschinenfabrik: See—  
Halter, Hartmut; and Schnell, Willi, 4,955,802, Cl. 425-72.100.

Reiley, Timothy C.: See—  
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Reimann, Klaus: See—  
Englisch, Wolfgang; Leber, Helmut; Reimann, Klaus; and Simmat, Fritz, 4,956,059, Cl. 204-130.000.

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Reinert, Karl A.; and Rendon, Edmund L., Jr., to General Motors Corporation. Modular bolt assembly for steering shaft lock. 4,955,454, Cl. 180-287.000.

Reinhall, Rolf B., to Sunds Defibrator Aktiebolag. Apparatus for treatment of fibre suspensions. 4,955,549, Cl. 241-80.000.

Reinke, Thomas E. Aerial game projectile. 4,955,620, Cl. 273-428.000.

Rendon, Edmund L., Jr.: See—  
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Renfer, Dale S.: See—  
Limburg, William W.; Renfer, Dale S.; Yanus, John F.; and Teuscher, Leon A., 4,956,440, Cl. 528-99.000.

Renfrew, Andrew B., to Lucas Industries, plc. Lamp assembly. 4,956,753, Cl. 362-74.000.

Renz, Klaus: See—  
Becker, Michael; and Renz, Klaus, 4,956,739, Cl. 361-16.000.

Renz, Rainer; and Ilzhoef, Karl-Heinz, to Daimler Benz Aktiengesellschaft. Welded joint between plastic parts. 4,955,740, Cl. 403-27.000.

Repschlager, Horst; and Riemer, Heinz, to Infas Institut Fur Angewandte Sozialwissenschaft GmbH. Sensor for consumption measurements in a household measuring system. 4,956,551, Cl. 250-231.140.

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Research Development Corporation of Japan: See—  
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Reuter, Horst; Quast, Jörn-Rainer; and Schall, Roland, to Boge AG. Bearing for the elastic mounting of machines, machine parts and/or vehicle parts. 4,955,588, Cl. 267-140.100.

Reuter, James D., to Pioneer Aerospace Corporation. Main parachute apparatus with secondary parachute for aiding initial inflation thereof. 4,955,564, Cl. 244-149.000.

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Honeycutt, LeRoy, III; Key, James C.; and Moody, Herbert, III, 4,955,429, Cl. 164-479.000.

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Reynolds, Steve J.: See—  
Staszewski, Edward T.; Reynolds, Steve J.; Vinyard, Richard C.; and Galloway, Bennie E., 4,955,784, Cl. 414-796.400.

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Nahrwold, Klaus H., 4,955,279, Cl. 89-6.500.

Romer, Rudolf; Becker, Wilfried; and Bisping, Bernhard, 4,955,938, Cl. 102-430.000.

Rhoads, John R. Sealing groove cover. 4,955,500, Cl. 220-212.000.

Rhodes, Charles K.; Boyer, Keith; Solem, John Dale C.; and Haddad, Waleed S., to MCR Technology Corporation. Apparatus for generating x-ray holograms and method for object reconstruction. 4,955,974, Cl. 350-3.670.

Rhone-Poulenc Chimie: See—  
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Denis, Jean-Pierre; Desmurs, Jean-Roger; and LeCouve, Jean-Pierre, 4,956,496, Cl. 564-404.000.

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Richer, Mark S.; Adeyeye, Ademire A.; and Helgert, Hermann, to PBS Enterprises, Inc.; and EEG Enterprises, Inc. Forward error correction of data transmitted via television signals. 4,956,709, Cl. 358-147.000.

Richer, Steven P. Retractable seat cover. 4,955,665, Cl. 297-4.000.

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Mifune, Hironobu; Inada, Toshio; Ueda, Aki; and Ogura, Yukio, 4,955,691, Cl. 350-162.130.

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Watanabe, Yoichiro; Isoda, Tetsuo; and Aoki, Mitsuo, 4,956,258, Cl. 430-109.000.

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Ridderheim, Kristen A.; Sudharto, V. Widadi; and Ridderheim, Alice F. Hypodermic syringe with retractable needle. 4,955,870, Cl. 604-195.000.

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Rigby, William R.; and Woyce, Louis C., Jr., to Westvaco Corporation. Easy opening lid for ovenable carton. 4,955,530, Cl. 229-123.200.

Right, Robert W., to General Signal Corporation. City tie line connection for fire alarm system. 4,956,634, Cl. 304-521.000.

Rilly, Gerard, to Deutsche Thomson-Brandt GmbH. Line deflection circuit for a picture tube. 4,956,585, Cl. 315-371.000.

Ring, David B.: See—  
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Rintala, Kari; Paarma, Jyrki; and Sissala, Mikko, to Kone Oy. Device for separating hard objects, such as stones, from a stream of wood. 4,955,484, Cl. 209-599.000.

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Rippel, Robert: See—  
Nimmegern, Hildegard; Weidmann, Klaus; Lang, Hans-Jochen; Rippel, Robert; and Herling, Andreas W., 4,956,366, Cl. 514-235.800.

Riso Kagaku Corporation: See—  
Hasegawa, Takanori; Abe, Nobuyuki; Hirose, Toshihiko; Kanda, Takashi; Saito, Hiroshi; Nakazawa, Eiji; and Oshima, Masaki, 4,956,664, Cl. 355-43.000.

Riva, Carlo: See—  
Olivo, Marco; Pascucci, Luigi; Riva, Carlo; Rosini, Paolo; and Villa, Corrado, 4,956,569, Cl. 307-443.000.

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Robba, Fabrizio: See—  
Prestipino Giarrutta, Adriano; and Robba, Fabrizio, 4,955,632, Cl. 280-607.000.

Robbins, Aida F.: See—  
Klun, Thomas P.; Robbins, Aida F.; and Ali, M. Zaki, 4,956,265, Cl. 430-283.000.

Robbins, Clyde; and Schilling, John, to General Instrument Corporation. Method of providing sound privacy system compatible with mono and bsc stereo audio. 4,956,862, Cl. 380-19.000.

Robbins, Jeffrey D.; and Gless, Richard D., Jr., to ICI Americas Inc. Process for production of thiophosphonates. 4,956,487, Cl. 558-98.000.

Robert Bosch GmbH: See—  
Barth, Walter; Hausslein, Friedrich; Helm, Winfried; and Stabler, Manfred, 4,955,744, Cl. 403-259.000.

Burger, Karl-Heinz; Collmer, Rosemarie; Fimpel, Walter; Gieseler, Klaus; Kochendorfer, Heinrich; and Stegmüller, Helmut, 4,955,464, Cl. 198-463.300.

Knoll, Peter; König, Winfried; Mock-Hecker, Rudiger; and Gunther, Clemens, 4,955,698, Cl. 350-336.000.

Marek, Jiri, 4,955,234, Cl. 73-517.00R.

Pfizenmaier, Heinz; and Schmidt, Ewald, 4,956,627, Cl. 336-65.000.

Robert Sun Company: See—  
Briggs, Eugene C.; and Cooperrider, Myron T., 4,955,359, Cl. 126-110.00R.

Roberts, Charles G.: See—  
Borrello, Sebastian R.; and Roberts, Charles G., 4,956,686, Cl. 357-30.000.

Roberts, James T.; and Silbernagel, Raymond A., to Molex Incorporated. Electrical connector system and insulation displacement terminals therefor. 4,955,816, Cl. 439-421.000.

Robertshaw Controls Company: See—  
Shopsky, Harvey J., 4,955,583, Cl. 251-11.000.

Robertson, Archibald S., Jr., to Foster Wheeler Development Corporation. Method for driving a gas turbine utilizing a hexagonal pressurized fluidized bed reactor. 4,955,190, Cl. 60-39.020.

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Phillips, Gareth T.; Robertson, Brian W.; Bertola, Mauro A.; Koger, Hein S.; Marx, Arthur F.; and Watts, Peter D., 4,956,284, Cl. 435-123.000.

Robertson, David W.; Wong, David T.; and Krushinski, Joseph H., Jr., to Eli Lilly and Company. 3-aryloxy-3-substituted propanamines. 4,956,388, Cl. 514-651.000.

Robertson, Elmer W., III. Flush mounted ceiling air cleaner. 4,955,997, Cl. 55-316.000.

Robeson, Lloyd M.; and Langsam, Michael, to Air Products and Chemicals, Inc. Water or gas purification by bulk absorption. 4,956,095, Cl. 210-670.000.

Robinson, Alan S.: See—  
Fuller, Mark W.; and Robinson, Alan S., 4,955,540, Cl. 239-20.000.

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Robinson, Glen P., Jr. Variable water flow control for heat pump water heaters. 4,955,930, Cl. 62-79.000.

Robinson, Kelly S.: See—  
Arnold, Kenneth A.; Chang, Wunan; and Robinson, Kelly S., 4,956,668, Cl. 355-208.000.

Robinson, Walter C. Surgical tie. 4,955,913, Cl. 606-228.000.

Robinson, William, to Richard Berg Aktiebolag. Hydrocyclone divided into sections. 4,956,090, Cl. 210-512.100.

Robinson, William L.; and Roth, John C., Jr., to Rockwell International Corporation. Three-dimensional packaging of focal plane assemblies using ceramic spacers. 4,956,695, Cl. 357-74.000.

Robison, James W., Jr., to Reactive Metals and Alloys Corporation. Calcium alloy steel additive and method thereof. 4,956,009, Cl. 75-307.000.

Roblon A/S: See—  
Olesen, John; and Jorgensen, Jorgen, 4,956,039, Cl. 156-180.000.

Robota GmbH Feuerungs- und Schornsteinbau: See—  
Pohl, Reinhold; Dresselmann, Manfred; and Hessmann, Hans-Wilhelm, 4,955,457, Cl. 182-128.000.

Rock, Erich, to Julius Blum Gesellschaft m.b.H. Guide wall assembly for drawers. 4,955,160, Cl. 312-340.000.

Rockwell-CIM: See—  
Bertolini, Carlo, 4,955,161, Cl. 49-351.000.

Rockwell International Corporation: See—  
Arzoian, John; Shih, Shan; and Trachman, Edward G., 4,955,851, Cl. 475-59.000.

McQuilkin, Frederick T., 4,956,008, Cl. 72-427.000.

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Woodberry, Frank J., 4,956,555, Cl. 250-339.000.

Roderer, Thomas C. Belt buckle wrench. 4,955,097, Cl. 7-138.000.

Rodgers, Todd K.: See—  
Larky, Steven P.; Lucas, Bruce D.; McCabe, Daniel H.; and Rodgers, Todd K., 4,956,638, Cl. 340-701.000.

Rodriguez, Frank N. Float guard for a livestock watering trough. 4,955,322, Cl. 119-78.000.

Rodriguez, Renee L. Reusable diaper pant with disposable liner. 4,955,880, Cl. 604-393.000.

Rodriguez S.p.A.: See—  
Magazzu, Alfredo, 4,955,312, Cl. 114-280.000.

Rodson, Marius: See—  
Scher, Herbert B.; and Rodson, Marius, 4,956,129, Cl. 264-4.700.

Roe, Derrick I.: See—  
Recker, Bradley J.; Cheng, Thong-Meng; Roe, Derrick I.; and Rozman, Christopher J., 4,956,598, Cl. 322-28.000.

Rogers, H. David: See—  
Davidson, Donald R.; Huang, Pao-Ter; and Rogers, H. David, 4,955,152, Cl. 38-36.000.

Rogers, Tracy G., to Schlegel Corporation. Retaining catch for tip-out sash. 4,955,159, Cl. 49-161.000.

Rogers, W. Leslie; and Clinthorne, Neal H., to University of Michigan. The. Multiple sensor position locating system. 4,956,796, Cl. 364-581.000.

Rogowski, Gregory S.; Davidson, Thomas F.; and Ludlow, Timothy, to United States of America, Air Force. Insulating liner for solid rocket motor containing vulcanizable elastomer and a bond promoter which is a novolac epoxy or a resole treated cellulose. 4,956,397, Cl. 523-138.000.



- Rohm, Gunter H. Self-tightening and lockable hammer-drill chuck. 4,955,623, Cl. 279-60.000.
- Rohrer, Michael D.; and Bulard, Ronald A., to University of OK, The Board of Regents of the. Method and apparatus for sterilizing contact lenses. 4,956,155, Cl. 422-297.000.
- Rohringer, Peter: See—  
Bernheim, Michael; Strassila, Dieter; De Sousa, Bernardo; and Rohringer, Peter, 4,956,049, Cl. 162-158.000.
- Rolles, Rolf; and Humphries, Darrel V., to Aluminum Company of America ALCOA Laboratories. Methods of and apparatus for producing biaxially oriented polymer product. 4,956,140, Cl. 264-280.000.
- Rolls-Royce plc.: See—  
Coplin, John F., 4,955,565, Cl. 244-199.000.
- Drummond, Stephen J.; and Henry, John W., 4,956,786, Cl. 364-474.020.
- Romeo, Alfredo: See—  
Capanna, Dario; Romeo, Alfredo; and Mescia, Luigi, 4,955,508, Cl. 222-94.000.
- Romer, Rudolf; Becker, Wilfried; and Bisping, Bernhard, to Rheinmetall GmbH. Ammunition, preferably for use in high-angle fire. 4,955,938, Cl. 102-430.000.
- Ronald W. Underdown: See—  
Underdown, Ronald W., 4,955,362, Cl. 126-540.000.
- Roni, Salla: See—  
Nissfolk, Fredrik; Koskimies, Salme; Idelman, Peter; Nurminen, Matti; and Roni, Salla, 4,956,512, Cl. 585-521.000.
- Rooperol (N.A.) NV: See—  
Wenteler, George L.; Regel, Karl H.; Drews, Siegfried; and Kundig, Hans, 4,956,502, Cl. 568-729.000.
- Rosen, Terry J.: See—  
Chu, Daniel T.; and Rosen, Terry J., 4,956,475, Cl. 548-557.000.
- Rosini, Paolo: See—  
Olivo, Marco; Pascucci, Luigi; Riva, Carlo; Rosini, Paolo; and Villa, Corrado, 4,956,569, Cl. 307-443.000.
- Rosowsky, Andre, to Dana Farber Cancer Institute, Inc. Desamino-aminopterin and -methotrexate. 4,956,461, Cl. 544-258.000.
- Ross-Murphy, Simon B.: See—  
Cain, Frederick W.; Clark, Allan H.; Dunphy, Patrick J.; Jones, Malcolm G.; Norton, Ian T.; and Ross-Murphy, Simon B., 4,956,193, Cl. 426-573.000.
- Roth, John C., Jr.: See—  
Robinson, William L.; and Roth, John C., Jr., 4,956,695, Cl. 357-74.000.
- Roth, Oscar. Apparatus for subdividing stacks of sheets of paper and the like. 4,955,854, Cl. 225-103.000.
- Rothwell, George P.: See—  
Rothwell, Terrence M.; and Rothwell, George P., 4,955,800, Cl. 425-63.000.
- Rothwell, Terrence M.; and Rothwell, George P., to Tampa-Hall Limited. Apparatus for producing prefabricated foam-insulated walls. 4,955,800, Cl. 425-63.000.
- Rouffey, Jean-Claude: See—  
Pribat, Didier; Perret, Joel; Rouffey, Jean-Claude; and Velasco, Gonzalo, 4,956,073, Cl. 204-426.000.
- Rouquette, Blandine: See—  
Chermann, Jean-Claude; Rouquette, Blandine; Rey, Francoise; and Barre-Sinoussi, Francoise, 4,956,292, Cl. 435-235.000.
- Rousseau, Tony. Support table for bench saw. 4,955,941, Cl. 108-65.000.
- Roxas, Ren: See—  
Haas, Dave; VanderSyde, Gary; Beatty, Paul; and Roxas, Ren, 4,955,185, Cl. 53-460.000.
- Roy, Dharendra C.; and Hyde, George E., to United Technologies Automotive, Inc. Double-locked subminiature terminal pin with opposed locking openings. 4,955,827, Cl. 439-595.000.
- Rozman, Christopher J.: See—  
Recker, Bradley J.; Cheng, Thong-Meng; Roe, Derrick I.; and Rozman, Christopher J., 4,956,598, Cl. 322-28.000.
- Ruano, Miguel M. Volumetric pump for parenteral perfusion. 4,955,860, Cl. 604-67.000.
- Ruckman, Paul J.: See—  
Barber, Harold P.; Lee, Clyde; and Ruckman, Paul J., 4,956,822, Cl. 367-23.000.
- Ruebsam, George B. Hazardous waste container with integral hold-down mechanism. 4,955,495, Cl. 220-545.000.
- Ruebsam, Klemens: See—  
Wagner, Wolfgang; Ruebsam, Klemens; Kubic, Helmut; Heinrich, Stefan; Eckert, Klaus; and Pflueger, Werner, 4,956,196, Cl. 427-38.000.
- Ruediger, Edward H.: See—  
Cipollina, Joseph A.; and Ruediger, Edward H., 4,956,368, Cl. 514-254.000.
- Ruetman, Sven H.; and Anand, Joginder N., to Dow Chemical Company, The. Bulk polyurethane ionomers. 4,956,438, Cl. 528-60.000.
- Ruhlmann, Edmond: See—  
Lacroix, Roger; and Ruhlmann, Edmond, 4,955,987, Cl. 8-549.000.
- Ruisi, Santo J. Method of making roofing plies, including method of applying the same to a roof. 4,956,199, Cl. 427-173.000.
- Runciman, Peter J. I.: See—  
Pickering, Anthony; Thorne, Andrew J.; and Runciman, Peter J. I., 4,956,428, Cl. 526-190.000.
- Rupp, Juergen, to Siemens Aktiengesellschaft. Circuit configuration with a generator system for path- or angle-dependent signals. 4,956,566, Cl. 307-261.000.
- Ruprecht, Phillip: See—  
Khanna, Pyare L.; Dworschack, Robert; and Ruprecht, Phillip, 4,956,274, Cl. 435-7.000.
- Russel, Matthew J.: See—  
Allen, James D.; Harris, Calvin E.; Litwiller, Debora M.; and Russel, Matthew J., 4,956,666, Cl. 355-201.000.
- Russell, Anthony W.: See—  
Russell, Michael K.; and Russell, Anthony W., 4,956,823, Cl. 367-84.000.
- Russell, Herman F.; and Lynn, Ray E. Information organizer. 4,955,679, Cl. 312-321.500.
- Russell, Michael K.; and Russell, Anthony W. Signal transmitters. 4,956,823, Cl. 367-84.000.
- Russo, Vincenzo, to SGS-Thomson Microelectronics S.r.l. Method and apparatus for measuring the lifetime on P-N semiconductor junctions by photovoltaic effect. 4,956,603, Cl. 324-158.000.
- Rutherford, David B., to General Signal Corporation. Digital over-speed controller for use in a vital processing system. 4,956,779, Cl. 364-426.050.
- Ruttenberg, Gideon. Method and apparatus for converting pressurized low continuous flow to high flow in pulses. 4,955,539, Cl. 239-1.000.
- Ryang, Hong-Son: See—  
Boyd, Jack D.; Sitt, Hermann; Ryang, Hong-Son; and Biermann, Theodore F., 4,956,393, Cl. 521-54.000.
- Ryder International Corporation: See—  
Kanner, Rowland W.; and Williams, Fred E., Jr., 4,956,156, Cl. 422-300.000.
- S. C. Johnson & Son, Inc.: See—  
Lee, Andrew S., 4,956,170, Cl. 424-81.000.
- S&K Enterprises, Inc.: See—  
King, John R., 4,955,743, Cl. 403-254.000.
- S-V Technology, Inc.: See—  
Loveness, Harlan K.; and Lewis, Robert P., 4,956,762, Cl. 363-65.000.
- Sabadie, Michel: See—  
Le Fur, Gerard; Bousquet, Michele; Crisafulli, Emilio; and Sabadie, Michel, 4,956,173, Cl. 424-63.000.
- Sable, Arthur J.: See—  
Steiner, Eric L.; and Sable, Arthur J., 4,955,865, Cl. 604-192.000.
- Sadeck, James E.: See—  
Lee, Calvin K.; and Sadeck, James E., 4,955,563, Cl. 244-152.000.
- Sadler, Robert A.: See—  
Griffin, Edward L.; Sadler, Robert A.; and Geissberger, Arthur E., 4,956,308, Cl. 437-41.000.
- Saebele, Walter; and Resnick, Michael. Die cutting apparatus with incompressible coating. 4,955,855, Cl. 493-404.000.
- Sacki, Kenshi; Yoshitake, Noriaki; and Aoki, Takayuki, to Nihon Park-erizing Co., Ltd. Treatment of chromate coating. 4,956,027, Cl. 148-257.000.
- Safr, Paul: See—  
Brighton, Rich W.; and Safr, Paul, 4,955,157, Cl. 42-77.000.
- Sagae, Kyuta: See—  
Sugiyama, Yoshiaki; and Sagae, Kyuta, 4,955,895, Cl. 606-194.000.
- Sagara, Kazuhiko: See—  
Honma, Noriyuki; Nakamura, Tohru; Nakazato, Kazuo; Matsumoto, Motoaki; Hayashida, Tetsuya; Kubo, Masaharu; and Sagara, Kazuhiko, 4,956,688, Cl. 357-34.000.
- Sahara, Masayoshi: See—  
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- Sahatjian, Ronald: See—  
Lennox, Charles D.; Noddin, Richard A.; and Sahatjian, Ronald, 4,955,377, Cl. 128-401.000.
- Said, Waleed, to Sundstrand Corporation. Diagnostic system for a watchdog timer. 4,956,842, Cl. 371-62.000.
- Saino, Tetsushi: See—  
Takeuchi, Tomio; Saino, Tetsushi; Yoshida, Masao; Takahashi, Katsutoshi; Nakamura, Teruya; and Umezawa, Hamao, deceased, 4,956,504, Cl. 564-153.000.
- Saito, Fumiyoshi, to Sanden Corporation. Scroll type fluid displacement apparatus with surface treated spiral element. 4,956,058, Cl. 204-129.350.
- Saito, Hiroshi: See—  
Ashizawa, Masaaki; Nishimoto, Kazuo; and Saito, Hiroshi, 4,956,226, Cl. 428-323.000.
- Hasegawa, Takanori; Abe, Nobuyuki; Hirose, Toshihiko; Kanda, Takashi; Saito, Hiroshi; Nakazawa, Eiji; and Oshima, Masaki, 4,956,664, Cl. 355-43.000.
- Saito, Kazumasa; Maezawa, Hiroyuki; Kobayashi, Masakazu; and Futamura, Yoshihiko, to Hitachi, Ltd. System and method of generating a source program from inputted schematic information. 4,956,773, Cl. 364-200.000.
- Saito, Ryuichi: See—  
Sawahata, Yasuo; Saito, Ryuichi; and Momma, Naohiro, 4,956,693, Cl. 357-64.000.
- Saito, Shinji, to Nitto Kogyo Co., Ltd. Elastic roller and a process for manufacturing the same. 4,956,211, Cl. 428-36.500.
- Saito, Shinji: See—  
Atsumi, Shigeru; Tanaka, Sumio; Saito, Shinji; and Otsuka, Nobuaki, 4,956,816, Cl. 365-201.000.
- Saito, Syuichiro: See—  
Okino, Tadashi; Date, Nobuaki; Tezuka, Nobuo; and Saito, Syuichiro, 4,956,715, Cl. 358-213.190.
- Saito, Yoshihiko; Hashimoto, Osamu; Kuwa, Masaaki; Kojima, Takashi; and Tsuji, Kinya, to Mitsubishi Gas Chemical Company, Inc.

- Process for producing methanol or mixed alcohol. 4,956,392, Cl. 518-712.000.
- Saitoh, Kuniyuki: See—  
Shigeta, Masatomo; Fukuda, Hiroyuki; Kaji, Hisatsugu; and Saitoh, Kuniyuki, 4,956,131, Cl. 264-29.500.
- Saitoh, Yoshiyuki: See—  
Takimoto, Hiroyuki; Kohtani, Yutaka; and Saitoh, Yoshiyuki, 4,956,726, Cl. 360-27.000.
- Saizyo, Hidehiko: See—  
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- Sakai, Masao: See—  
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- Sakai, Toshio; Nakai, Hitoshi; Suzuki, Makoto; Hayakawa, Kiyoharu; and Tanabe, Kazunori, to Brother Kogyo Kabushiki Kaisha. Image recording apparatus forming photomasking pattern on photosensitive medium. 4,956,649, Cl. 346-107.00R.
- Sakai, Toshio; Kawano, Osamu; Tanabe, Kazunori; and Hattori, Tomosaki, to Brother Kogyo Kabushiki Kaisha. Apparatus for and method of recording color picture image. 4,956,662, Cl. 355-27.000.
- Sakai, Yoshio; and Yamada, Takeshi, to HTC Co., Ltd. and Totoku Electric Co., Ltd. Self-locking knob for adjustable control mechanism. 4,955,253, Cl. 74-553.000.
- Sakaki, Mamoru: See—  
Arai, Ryueichi; Sakaki, Mamoru; and Matsui, Shinya, 4,956,223, Cl. 428-212.000.
- Sakaki, Toshiro: See—  
Oda, Masatsugu; Sakaki, Toshiro; Sasaki, Naoko; Tomita, Hirofumi; and Nonaka, Nobuyuki, 4,956,375, Cl. 514-361.000.
- Sakaki, Yasunori; and Tomomori, Tsutomu, to Strapack Corporation. Method and apparatus for feeding and tightening a band in strapping machine. 4,955,180, Cl. 53-399.000.
- Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanazawa, Kenji, to Eagle Industry Co., Ltd. Vane pump with annular ring for engaging vanes and drive means in which the rotor drives the annular ring. 4,955,985, Cl. 418-257.000.
- Sakamoto, Keiji; Seki, Shinji; and Iwashita, Yasuhide, to Fanuc Ltd. Servo motor controlling method. 4,956,593, Cl. 318-561.000.
- Sakamoto, Masayuki: See—  
Kitaura, Toshihiko; Nakamura, Akio; Sakamoto, Masayuki; Takashima, Kouichi; Hirakawa, Kiyotaka; and Mizota, Matao, 4,956,132, Cl. 264-39.000.
- Sakamoto, Tatsuhiko: See—  
Shimizu, Masayuki; Sakamoto, Tatsuhiko; and Shigematsu, Toshio, 4,956,244, Cl. 429-17.000.
- Sakaue, Kunio: See—  
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- Sakuma, Nobuo: See—  
Yamaguchi, Katsumi; and Sakuma, Nobuo, 4,955,682, Cl. 350-6.800.
- Sakuragi, Hiroyuki: See—  
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- Sakuragi, Shoji, to Brother Kogyo Kabushiki Kaisha. Printer with combined data and operating-mode display. 4,955,735, Cl. 400-83.000.
- Sakurai, Yoshito: See—  
Torii, Yutaka; Mori, Makoto; Gohara, Shinobu; Ohtsuki, Kenichi; and Sakurai, Yoshito, 4,956,839, Cl. 370-60.000.
- Salama, Kamel; and Selvamani, Venkatakrishnan, to University of Houston - University Park. Oriented grained Y-Ba-Cu-O superconductors having high critical currents and method for producing same. 4,956,336, Cl. 505-1.000.
- Salasoo, Lembit: See—  
Dorri, Bizhan; Gross, Dan A.; and Salasoo, Lembit, 4,956,608, Cl. 324-319.000.
- Salazar, Hermilo Tamez. Electrolytic membrane cells for the production of alkalis. 4,956,069, Cl. 204-257.000.
- Salk Institute for Biological Studies, The: See—  
Baird, Andrew; Bohlen, Peter; Gospodarowicz, Denis; and Ling, Nicholas C., 4,956,455, Cl. 530-399.000.
- Samuels, Mark A.; and Dimmick, Stephen, to GEC-Marconi Limited. Image processing apparatus. 4,956,873, Cl. 382-54.000.
- Samuelson, Harry V., to Du Pont de Nemours, E. I., and Company. Hollow fibers having curved members projecting therefor. 4,956,237, Cl. 428-398.000.
- Sanbayashi, Takeshi: See—  
Abuyama, Yasuo; Ide, Fumito; Hamanaka, Osamu; and Sanbayashi, Takeshi, 4,956,673, Cl. 355-245.000.
- Sanchez, Jose, to Atochem North America, Inc. Amino or hydrazino peroxides, derivatives and their uses. 4,956,416, Cl. 525-327.600.
- Sanden Corporation: See—  
Saito, Fumiyoshi, 4,956,058, Cl. 204-129.350.
- Sanders, Edgar S., Jr.; Jensvold, John A.; Clark, Daniel O.; Coan, Frederick L.; Back, Henry N.; Mickols, William E.; Kim, Peter K.; and Admassu, Wudneh, to Dow Chemical Company, The. Semi-permeable hollow fiber gas separation membranes possessing a non-external discriminating region. 4,955,993, Cl. 55-16.000.
- Sandoz Ltd.: See—  
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- Sandvik Special Metals Corporation: See—  
Duerring, Anthony A., 4,955,220, Cl. 72-214.000.
- Sanghvi, Narendra T.: See—  
Fry, Francis J.; and Sanghvi, Narendra T., 4,955,365, Cl. 128-24.00A.
- Sankei Pharmaceutical Co., Ltd.: See—  
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- Sankrihi, Mithra M. K. V.; and Pelton, Scott L., to Boeing Company, The. Flight path angle command flight control system for landing flare. 4,956,780, Cl. 364-428.000.
- Sankyo Manufacturing Company, Ltd.: See—  
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- Kato, Heizaburo, 4,955,254, Cl. 74-603.000.
- Sano, Hiroyuki: See—  
Yamamoto, Kaoru; Sano, Hiroyuki; and Chino, Shuichi, 4,956,445, Cl. 528-230.000.
- Sanshin Kogyo Kabushiki Kaisha: See—  
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- Suzuki, Tomonori; and Toyohara, Makoto, 4,955,836, Cl. 440-77.000.
- Yoshimura, Tsuyoshi, 4,955,837, Cl. 440-88.000.
- Sanshu Press Industry Company, Ltd.: See—  
Tanaka, Haruma, 4,955,133, Cl. 29-892.300.
- Sansom, David J.; Willcock, Simon N. M.; and Woolley, Robert A., to Thorn Emi plc. E.A.S. tag having a control component with selectively magnetizable regions. 4,956,636, Cl. 340-551.000.
- Santa Barbara Research Center: See—  
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- de Bruin, Johannes B.; Hewitt, Mary J.; and Phillips, James D., 4,956,687, Cl. 357-30.000.
- Hewitt, Mary J.; and de Bruin, Johannes B., 4,956,716, Cl. 358-213.270.
- Sanyo Chemical Industries, Ltd.: See—  
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- Sanyo Electric Co., Ltd.: See—  
Furukawa, Nobuhiro; Nohma, Toshiyuki; and Yamamoto, Yuji, 4,956,248, Cl. 429-194.000.
- Moriyama, Masahiro, 4,956,732, Cl. 360-96.300.
- Sanyo Electrical Co., Ltd.: See—  
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- Sarraf, Raymond E.; and Zaharris, Daniel R., to MiniScribe Corporation. Low acoustic noise head actuator. 4,956,831, Cl. 369-32.000.
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- Sasakawa, Setsuko: See—  
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- Sasaki, Chiyoshi: See—  
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- Sasaki, Masahiko: See—  
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.
- Sasaki, Naoko: See—  
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- Sasaki, Shosaku: See—  
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- Sasaki, Yasushi: See—  
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- Sasano, Akira: See—  
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- Sasazawa, Koji: See—  
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- Satake, Hideo; Shimizu, Hideo; and Tanaka, Hozumi, to Toyota Jidosha Kabushiki Kaisha; and Toyo Ink Mfg. Co., Ltd. Quantitative feeding apparatus usable for pulverized and/or granular material and batch type multi-colored automatic feeding apparatus. 4,955,550, Cl. 241-101.400.
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- Sato, Ken-ichi: See—  
Takagi, Kunihiko; Shiraiishi, Masazumi; and Sato, Ken-ichi, 4,956,742, Cl. 361-131.000.
- Sato, Kozo: See—  
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- Sato, Masakazu; Koike, Seiichi; Oikawa, Toshihiro; and Ban, Keisuke, to Honda Giken Kogyo Kabushiki Kaisha. Method for producing a rocker arm for use in an internal combustion engine. 4,955,121, Cl. 29-888.200.
- Sato, Masashi: See—  
Kanehara, Koichi; Fukuda, Kazumi; Sato, Masashi; and Shimeno, Toshiaki, 4,955,532, Cl. 232-7.000.
- Sato, Seishiro: See—  
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Tokui, Akira; Sato, Shinichi; Kawai, Akira; Nakajima, Masayuki; Ozaki, Hiroji; and Nagatomo, Masao, 4,956,310, Cl. 437-52.000.  
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Satterfield, Gary T. Portable beverage carrier. 4,955,516, Cl. 224-35.000.  
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Sauter, Hubert: See—  
Wenderoth, Bernd; Brand, Siegfert; Schuetz, Franz; Sauter, Hubert; Ammermann, Eberhard; and Lorenz, Gisela, 4,956,387, Cl. 514-522.000.  
Sawada, Hideo; Kobayashi, Michio; and Yoshida, Masato, to Nippon Oils & Fats Company, Ltd. Method for manufacture of fluorine-containing aromatic derivatives. 4,956,123, Cl. 260-408.000.  
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Jenkins, John M., III; McCullough, James D., Jr.; and Sawin, Steven P., 4,956,427, Cl. 526-62.000.  
Sawyer, Linda C., to Hoechst Celanese Corp. Process for dispersing silicon carbide whiskers. 4,956,316, Cl. 501-88.000.  
Sawyer, Robert D.: See—  
Driker, Joseph R., 4,955,955, Cl. 198-318.000.  
Sayward, Samuel S., Jr., to Hotwatt Inc. Overheat protected electric cartridge heater. 4,956,544, Cl. 219-335.000.  
Schaefer, Stephen H. Utility vehicle. 4,955,451, Cl. 180-213.000.  
Schaefer, William L.; and Reese, Walter J., to PPG Industries, Inc. Stationary strand deflector for continuous strand manufacture. 4,955,999, Cl. 65-4.400.  
Schaefer, Gerhard; to Fritz Schaefer Gesellschaft mit beschränkter Haftung. Shelf system, particularly pallet shelf system. 4,955,490, Cl. 211-187.000.  
Schako Metallwarenfabrik Ferdinand Schad AG: See—  
Müller, Gottfried; and Hipp, Paul, 4,955,286, Cl. 98-40.110.  
Schall, Roland: See—  
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Schaller, Klaus: See—  
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Schaper, Rolf: See—  
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Schellenberg, Lutz: See—  
Opitz, Reinhard; and Schellenberg, Lutz, 4,956,016, Cl. 106-14.120.  
Scher, Herbert B.; and Rodson, Marius, to ICI Americas Inc. Microencapsulation process. 4,956,129, Cl. 264-4.700.  
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Hofmeister, Helmut; Annen, Klaus; Laurent, Henry; and Wiechert, Rudolf, 4,956,482, Cl. 552-594.000.  
Schering Corporation: See—  
Patel, Mahesh G.; Horan, Ann C.; Marquez, Joseph A.; and Waitz, J. Allan, 4,956,383, Cl. 514-467.000.  
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Schilling, John: See—  
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Schlosser, Hans-Joachim; and Gersdorf, Joachim, to Hoechst Aktiengesellschaft. Photosensitive printing plate for waterless offset printing with photosensitive layer of diazonium salt polycondensation product

and photopolymerizable composition and overlying silicone rubber layer. 4,956,262, Cl. 430-162.000.  
Schluckebier, Patricia A. Container for food and condiments. 4,955,528, Cl. 229-120.180.  
Schmidt, Daniel: See—  
Feldman, Anita; and Schmidt, Daniel, 4,955,276, Cl. 84-403.000.  
Schmidt, Ewald: See—  
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Schmidt, George: See—  
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Aankre, David E.; Hoffman, Roy L.; Moen, David N.; and Schmierer, Quentin G., 4,956,808, Cl. 364-900.000.  
Schmit, Paul F.: See—  
Bayer, Gerald W.; Diamantopoulos, Paul A.; Osterhoudt, Hans W.; and Schmit, Paul F., 4,956,181, Cl. 424-448.000.  
Schneider, John R. Slurry mixing apparatus with dry powder conveyor. 4,955,723, Cl. 366-136.000.  
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Halter, Hartmut; and Schnell, Willi, 4,955,802, Cl. 425-72.100.  
Schnorrer, Walter. Method for hindgas coverage in arc welding and hindgas device for carrying-out the method. 4,956,537, Cl. 219-74.000.  
Schnyder, Jorg: See—  
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Schrewe, Hans, to Mannesmann AG. Device for continuous casting of slabs. 4,955,428, Cl. 164-417.000.  
Schriewer, Michael; Grohe, Klaus; and Petersen, Uwe, to Bayer Aktiengesellschaft. Quinolone- and 1,8-naphthyridin-4-one-carboxylic acids which are C-bonded in the 7-position. 4,956,465, Cl. 546-156.000.  
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Schulte, Stephen R.; Wissel, Stephen C.; and Wilker, John B., Sr., to Midmark Corporation. Automatically positionable chair. 4,956,592, Cl. 318-560.000.  
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Schupphaus, Herbert, to Gebr. Eickhoff Maschinenfabrik u. EisenieBerei mbH. Drum cutter-loader equipped with an auxiliary drum. 4,955,668, Cl. 299-42.000.  
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Schweiberer, Franz. Device for the individual withdrawal of sheet-type printed products, in particular newspapers. 4,955,506, Cl. 221-213.000.  
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Scott, Ernest R.; and Murphy, James C., to Scott Fetzer Company, The. Vacuum cleaner with suction indicator. 4,955,103, Cl. 15-319.000.  
Scott Fetzer Company, The: See—  
Scott, Ernest R.; and Murphy, James C., 4,955,103, Cl. 15-319.000.  
Scott, Gerald; Al-Malaika, Sahar; and Ibrahim, Abdul. Bound antioxidant masterbatches. 4,956,410, Cl. 525-73.000.  
Scozzafava, Michael: See—  
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Seden, William E.; Shepherd, David W. J.; and Henderson, Peter, to CooperVision Optics Limited. Contact lens mold. 4,955,580, Cl. 249-82.000.  
Sedlacek, Douglas R., to Gates Rubber Company, The. Method of making a power transmission belt including moisturizing and grinding. 4,956,036, Cl. 156-137.000.  
Sedlak, Rudolf P., to RD Chemical Company. Composition and process for promoting adhesion on metal surfaces. 4,956,035, Cl. 156-664.000.  
See, Jackie R.; and Shell, William E., to Biotechnology, Inc. Kit for preventing or treating arterial dysfunction resulting from angioplasty procedures. 4,955,878, Cl. 604-181.000.  
Seefuth, U. C., to U. Christian Seefuth. Cogwheel drive mechanism for aircraft. 4,955,561, Cl. 244-60.000.  
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Sekine, Matsuo. Target signal detecting apparatus. 4,956,792, Cl. 364-517.000.  
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Seko, Kiyoshi; Hatano, Masato; and Suzuki, Shigeki, to Fuji Machinery Company Ltd. Vacant package-proofing control device for packaging machine. 4,955,176, Cl. 53-73.000.  
Self, Colin H., to Antibody Technology Limited. Secondary antibodies against complexes of small molecules and binding partners therefor, their preparation, and their use in diagnostic methods. 4,956,303, Cl. 436-542.000.  
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Senco Products, Inc.: See—  
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Sensabaugh, Andrew J., Jr.: See—  
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Sewell, Virgil L.; and Sewell, Martha A. Handcraft yarn dispenser. 4,955,557, Cl. 242-134.000.  
Sexton, Wilson C. Portable insulated carrier. 4,955,480, Cl. 206-528.000.  
Seya, Masatomo; Okada, Kazuo; Yoshimura, Motomu; and Maeda, Mitsuo, to Mitsubishi Denki Kabushiki Kaisha. Wavelength selective optical recording and reproducing device. 4,956,812, Cl. 365-119.000.  
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SGS-Thomson Microelectronics s.r.l.: See—  
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Olivo, Marco; Pascucci, Luigi; Riva, Carlo; Rosini, Paolo; and Villa, Corrado, 4,956,569, Cl. 307-443.000.  
Russo, Vincenzo, 4,956,603, Cl. 324-158.00D.  
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Shikamori, Tamotsu: See—  
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Shikoku Kaken Kogyo Co., Ltd.: See—  
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Spektor, Gerald A.; and Spektor, John, 4,955,926, Cl. 29-271.000.  
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Komoto, Akira, 4,955,240, Cl. 73-862.590.  
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Yamagishi, Hiroto; Fusegawa, Izumi; Yokota, Shuuj; and Abe, Takao, 4,956,153, Cl. 422-249.000.  
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Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiko; Aoyama, Masaaki; Shinomiya, Eiichi; Fujinoki, Akira; and Ogino, Nobuyoshi, 4,956,208, Cl. 428-34.600.  
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Shinonaga, Hirohiko: See—  
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Ship, Arthur O. Tissue forceps. 4,955,897, Cl. 606-210.000.  
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- Shizuoka Seiki Co., Ltd.: See—  
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Shuster, Jerry P.; and Cesaroni, Anthony J., to Du Pont Canada, Inc. Heat exchanger fabricated from polymer compositions. 4,955,435, Cl. 165-170.000.  
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Sidi, Jean A.; and Nogrady, Claude B., to Etat Francais, Centre National d'Etudes des Telecommunications. Wideband server, in particular for transmitting music or images. 4,956,768, Cl. 364-200.000.  
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Hosticka, Bedrich; Klinka, Roland; and Pfeleiderer, Hans-Joerg, 4,956,613, Cl. 330-253.000.  
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Siemens-Bendix Automotive Electronics L.P.: See—  
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Siemens Corporate Research, Inc.: See—  
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Simon, John C., to Trak International, Inc. Locking apparatus for skid steer loader. 4,955,452, Cl. 180-271.000.  
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Smith, Bryan K., to Cryo-Chem Inc. Cryogenic bath freezer with pivoted conveyor belt. 4,955,209, Cl. 62-380.000.  
Smith, Donald W., to Barber-Greene Company. Shock absorbing device for a paving machine. 4,955,754, Cl. 404-108.000.  
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Smith, Paul H.; Wood, Lee R.; and Lara, Elias J., to Babcock Display Products, Inc. Gas discharge display device with integral, co-planar, built-in heater. 4,956,573, Cl. 313-15.000.  
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- Snyder, Richard H., to Brunswick Corporation. Outboard motor retainer. 4,955,963, Cl. 248-640.000.
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- Societe a Responsabilite Limitee dite MENSIL: See—  
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- Societe Anonyme dite l'Oreal: See—  
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- Societe Anonyme dite Societe des Ceramiques Techniques: See—  
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- Societe Anonyme: SANOFI: See—  
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- Societe Chimique des Charbonnages S.A.: See—  
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- Societe Electronique de la Region Pays de Loire: See—  
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- Sommerfeld, Craig A. Holding fixture for drilling pocket joints. 4,955,766, Cl. 408-87.000.
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- Splicerite Limited: See—  
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- Steiner, Eric L.; and Sable, Arthur J., to On-Gard Systems, Inc. Needle unsealing, resealing and handling apparatus. 4,955,865, Cl. 604-192.000.
- Steinmas, Gerald W. Method of forming a pizza grill. 4,955,125, Cl. 29-509.000.
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Suzuki, Shigeki: See—  
Seko, Kiyoshi; Hatano, Masato; and Suzuki, Shigeki, 4,955,176, Cl. 53-73.000.  
Suzuki, Sirow: See—  
Fukuda, Makoto; Suzuki, Sirow; Hosokawa, Toshio; Iizuka, Yo; Kawakami, Yukichika; and Shiiki, Zenya, 4,956,499, Cl. 524-500.000.  
Suzuki, Takashi: See—  
Watanabe, Hideo; Kanagawa, Yoichi; Suzuki, Takashi; and Nomura, Takeshi, 4,956,114, Cl. 252-62.580.  
Suzuki, Teruo: See—  
Uzuda, Tetsuji; Kuramoto, Takashi; Onga, Takeo; Suzuki, Teruo; and Sewa, Takeshi, 4,956,703, Cl. 358-76.000.  
Suzuki, Tomonori; and Toyohara, Masazumi, to Sanshin Kogyo Kabushiki Kaisha. Outboard motor, 4,955,836, Cl. 440-77.000.

Suzuki, Yasuo: See—  
Ohnishi, Haruo; Kosuzume, Hiroshi; Mizota, Masahiro; Suzuki, Yasuo; and Mochida, Ei, 4,956,474, Cl. 548-475.000.  
Suzuki, Yoshio; Hatanaka, Munenori; Ohara, Junryou; and Makihara, Yorio, to Takenaka Corp.; and Tokyo Soil Research Co., Ltd. Method and apparatus for measurement of in-situ horizontal stress by freezing of the ground in-situ, 4,955,237, Cl. 73-784.000.  
Suzuki, Yuji; Urano, Satoshi; Umemoto, Hiroto; Mizuguchi, Ryuzo; Aoki, Kei; and Tsuboniwa, Noriyuki, to Nippon Paint Co., Ltd. Alpha-alkylacrylamide derivatives and their polymers, 4,956,491, Cl. 560-172.000.  
Swaminathan, Kumar, to AT&T Bell Laboratories. Improving sub-band coding of speech at low bit rates by adding residual speech energy signals to sub-bands, 4,956,871, Cl. 381-31.000.  
Swanson, Alfred B. Lunate implant and method of stabilizing same, 4,955,915, Cl. 623-21.000.  
Swantner, Richard L.: See—  
Foote, Wayne E.; and Swantner, Richard L., 4,956,735, Cl. 360-106.000.  
Swift Instruments, Inc.: See—  
Hayashi, George, 4,955,978, Cl. 350-523.000.  
Swihart, Terence J.: See—  
Lo, Sunny J.; Swihart, Terence J.; and Ward, Andrew H., 4,956,472, Cl. 548-406.000.  
Swinburne Limited: See—  
Silberstein, Richard B., 4,955,388, Cl. 128-731.000.  
Swinkels, Johannes M. M.: See—  
Dona, Marinus J. J.; and Swinkels, Johannes M. M., 4,955,937, Cl. 82-1.110.  
Swiokla, Joyce L.: See—  
Mehrotra, Pankaj K.; Swiokla, Joyce L.; and Billman, Elizabeth R., 4,956,315, Cl. 501-87.000.  
Sy/Lert System Ltd.: See—  
Bernstein, Bernard; and Sohie, Guy L., 4,956,866, Cl. 381-43.000.  
Syntex (U.S.A.) Inc.: See—  
Clark, Robin D.; Kilpatrick, Andrew T.; and Spedding, Michael, 4,956,365, Cl. 514-233.200.  
Sysmith, Inc.: See—  
Smith, Robert D., 4,956,769, Cl. 364-200.000.  
Szabo, Georges: See—  
Gouard, Jean P.; and Szabo, Georges, 4,956,322, Cl. 502-62.000.  
Szalanski, Scott E.: See—  
Magerowski, Anthony J.; Karra, Vijia K.; Szalanski, Scott E.; and Gieschen, John A., 4,956,078, Cl. 209-234.000.  
Szalla, Frank J.: See—  
Mathia, Ronald D.; Kitchen, Alonzo G.; and Szalla, Frank J., 4,956,408, Cl. 524-147.000.  
Ta Triumph Adler Aktiengesellschaft: See—  
Haftmann, Johannes; and Haczek, Werner, 4,955,737, Cl. 400-208.000.  
Tabak, Samuel A.: See—  
Child, Jonathan E.; Chou, Tai-Sheng; Huss, Albin, Jr.; Kennedy, Clinton R.; Ragonese, Francis P.; and Tabak, Samuel A., 4,956,518, Cl. 585-726.000.  
Tachi, Shinichi: See—  
Kanetomo, Masafumi; Tachi, Shinichi; Tsujimoto, Kazunori; Mukai, Kiichiro; Daikoku, Takahiro; Kieda, Shigekazu; Shindo, Keijiro; and Tamura, Kenshiro, 4,956,043, Cl. 156-345.000.  
Tachibana, Noriki; Ueda, Eiichi; Kagawa, Nobuaki; and Ota, Hideo, to Konishiroku Photo Industry Co., Ltd. Silver halide photographic material having improved antistatic and antiblocking properties, 4,956,270, Cl. 430-527.000.  
Tada, Hisashi; Shiraiishi, Yoshinobu; and Hayashi, Shigetugu, to Mitsubishi Rayon Company, Ltd. Epoxy resin composition for composite material from m- or o-substituted triglycidylaminophenols, diamidodiphenylsulfone and latent curing agents, 4,956,411, Cl. 528-93.000.  
Tadlock, John W.: See—  
Thomson, Jack W.; Regunathan, Perialwar; and Tadlock, John W., 4,956,086, Cl. 210-232.000.  
Taga, Yutaka: See—  
Kashihara, Yuji; Iwatsuki, Kunihiro; and Taga, Yutaka, 4,955,256, Cl. 74-866.000.  
Tagawa, Itsuo, to Tagawakougyou Co. Ltd. Working machine, 4,955,961, Cl. 241-264.000.  
Tagawakougyou Co. Ltd.: See—  
Tagawa, Itsuo, 4,955,961, Cl. 241-264.000.  
Tagomori, Tsutomu: See—  
Sakaki, Yasunori; and Tagomori, Tsutomu, 4,955,180, Cl. 53-399.000.  
Taguchi, Masao: See—  
Yokoyama, Naoki; and Taguchi, Masao, 4,956,681, Cl. 357-4.000.  
Tai, Hiromichi: See—  
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Shinonaga, Hirohiko; and Tai, Hiromichi, 4,956,713, Cl. 358-209.000.  
Tai, William K. Golf swing training aid, 4,955,612, Cl. 273-200.00B.  
Taira, Taketoshi: See—  
Koyama, Kazuo; Taira, Taketoshi; Kawasaki, Kaoru; Itami, Atsushi; and Matsuzo, Nobuhiko, 4,956,025, Cl. 148-12.00C.  
Taiyo Kikai Ltd.: See—  
Ohta, Hirotake, 4,955,299, Cl. 101-143.000.  
Tajima, Kenji: See—  
Funasaka, Kazushige; Tajima, Kenji; Yukino, Toshinori; and Yamanoi, Hiroshi, 4,956,407, Cl. 524-120.000.  
Takagi, Kunihiko; Shiraiishi, Masazumi; and Sato, Ken-ichi, to Kabushiki Kaisha Toshiba. Switch gear, 4,956,742, Cl. 361-131.000.

Takagi, Yoshihiro: See—  
Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hideshi; Urai, Toshinaga; Yagihara, Morio; Takagi, Yoshihiro; and Yoneyama, Masakazu, 4,956,263, Cl. 430-264.000.  
Takahara, Takeshi: See—  
Okamoto, Hiroaki; Takahara, Takeshi; and Maeda, Fuku, 4,955,191, Cl. 60-39.300.  
Takahashi, Akira: See—  
Miyake, Tomoyuki; Murakami, Yoshiteru; Katayama, Hiroyuki; Takahashi, Akira; and Ohta, Kenji, 4,956,243, Cl. 428-694.000.  
Takahashi, Fumio: See—  
Iwata, Satoshi; Toida, Akiyazu; and Takahashi, Fumio, 4,955,736, Cl. 400-120.000.  
Takahashi, Hiroo: See—  
Ogawa, Yoshihiro; Takahashi, Hiroo; and Kikuchi, Yoshinori, 4,955,360, Cl. 126-263.000.  
Takahashi, Hiroto: See—  
Komuro, Hirokazu; Matsuda, Hiroto; Takahashi, Hiroto; Shibata, Makoto; Ikeda, Masami; and Tsuda, Hisanori, 4,956,654, Cl. 346-140.00R.  
Takahashi, Katsutoshi: See—  
Takeuchi, Tomio; Saino, Tetsushi; Yoshida, Masao; Takahashi, Katsutoshi; Nakamura, Teruya; and Umezawa, Hamao, deceased, 4,956,504, Cl. 564-153.000.  
Takahashi, Koji: See—  
Kozuki, Susumu; Takahashi, Koji; Edakubo, Hiroo; Nakayama, Tadayoshi; and Masu, Toshiyuki, 4,956,725, Cl. 360-14.300.  
Takahashi, Masakatsu. Wiga, 4,955,400, Cl. 132-56.000.  
Takahashi, Masami: See—  
Takahashi, Toshiro; Nishikawa, Kinsaku; and Takahashi, Masami, 4,956,446, Cl. 528-272.000.  
Takahashi, Toshiro; Nishikawa, Kinsaku; and Takahashi, Masami, to Unifika Limited. Polyester fiber with low heat shrinkage, 4,956,446, Cl. 528-272.000.  
Takahashi, Yoshiharu, to Konica Corporation. Focus detecting apparatus for camera, 4,956,660, Cl. 354-402.000.  
Takahashi, Yoshiyuki; Toyofuku, Kunitaka; and Iwasaki, Akiko, to Oji Paper Co., Ltd. Heat-sensitive recording material, 4,956,332, Cl. 503-209.000.  
Takamatsu, Osamu: See—  
Kato, Hideo; Shibata, Hirohumi; Matsushita, Keiko; and Takamatsu, Osamu, 4,956,249, Cl. 430-5.000.  
Takamiya, Tadashi: See—  
Yatsugi, Tomishige; Toeda, Hiroshi; Takamiya, Tadashi; Minami, Norio; and Fukushima, Isao, 4,956,729, Cl. 360-67.000.  
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Shinonaga, Hirohiko; and Tai, Hiromichi, to Victor Company of Japan, Ltd. Image pick-up apparatus using photo-to-photo conversion element, 4,956,713, Cl. 358-209.000.  
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, to Victor Company of Japan, Ltd. Image pickup apparatus, 4,956,714, Cl. 358-213.110.  
Takano, Hiroyuki: See—  
Shimizu, Shigeo; and Takano, Hiroyuki, 4,956,462, Cl. 544-263.000.  
Takano, Yoshiaki; and Suzuki, Norihiko, to Minolta Camera Kabushiki Kaisha. Image forming apparatus, 4,956,679, Cl. 355-326.000.  
Takao, Itaru: See—  
Narushima, Masaki; and Takao, Itaru, 4,955,590, Cl. 269-21.000.  
Takasaki, Yoshiyuki: See—  
Yamanobe, Takashi; Mitsuishi, Yasushi; and Takasaki, Yoshiyuki, 4,956,291, Cl. 435-200.000.  
Takashima, Kouichi: See—  
Kitaura, Toshiko; Nakamura, Akio; Sakamoto, Masayuki; Takashima, Kouichi; Hirakawa, Kiyotaka; and Mizota, Masao, 4,956,132, Cl. 264-39.000.  
Takaui, Kiyomi, to Kabushiki Kaisha Kawai Gakki Seisakusho. Optimization of waveform operation in electronic musical instrument, 4,955,278, Cl. 84-605.000.  
Takayama, Syuichi: See—  
Uchiyama, Naoki; Takayama, Syuichi; Gotanda, Masakazu; Kubota, Tetsumaru; Tsukaya, Takashi; Ishihara, Kouichiro; Kami, Kuniaki; Sekino, Naomi; Murata, Akira; and Hayashi, Masaki, 4,955,366, Cl. 128-24.00A.  
Takayanagi, Takeo. Disazo disulfonamides compounds, 4,956,457, Cl. 534-643.000.  
Takeda Chemical Industries, Ltd.: See—  
Aono, Tetsuya; Suno, Masahiro; and Kito, Go, 4,956,360, Cl. 514-215.000.  
Morimoto, Akira; Noguchi, Noriyoshi; and Choh, Nobuo, 4,956,358, Cl. 514-202.000.  
Takeda, Junichi: See—  
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.  
Takeda, Toshihiko: See—  
Shimizu, Akira; Suzuki, Hidetoshi; Okunuki, Masahiko; Ono, Haruhito; Nomura, Ichiro; Banno, Yoshikazu; Takeda, To-shihiko; and Kaneko, Tetsuya, 4,956,578, Cl. 315-3.000.  
Takeda, Toshio, to Aisin Seiki Kabushiki Kaisha. Combined supercharger and supercharger coolant pump for an internal combustion engine, 4,955,352, Cl. 123-559.100.  
Takeguchi, Masakatsu; Yamamoto, Takashi; and Nakano, Mamoru, to Hi-Silicon Co., Ltd. Method and apparatus for cutting polycrystalline silicon rods, 4,955,357, Cl. 125-23.010.

Takehisa, Fumitaka; Kondoh, Fumio; and Yokoi, Mitsuyoshi, to Nippondenso Co., Ltd. Die-casting method and device, 4,955,424, Cl. 164-72.000.  
Takenaka Corp.: See—  
Suzuki, Yoshio; Hatanaka, Munenori; Ohara, Junryou; and Makihara, Yorio, 4,955,237, Cl. 73-784.000.  
Takenaka Komuten Co., Ltd.: See—  
Yonezawa, Toshio; Iwashimizu, Takashi; Yoshioka, Yasuhiko; Ito, Koichi; Sakane, Kunio; and Nakase, Tetsuo, 4,956,403, Cl. 524-5.000.  
Takenaka, Shinji: See—  
Ajioka, Masanobu; Takenaka, Shinji; Itoh, Hiroyuki; Katata, Masafumi; and Kohno, Yoshitsugu, 4,956,169, Cl. 423-502.000.  
Takeuchi, Akihiro; and Koyama, Toshio, to Sumitomo Rubber Industries, Ltd. Pneumatic radial tire with groove platforms to prevent stone entrapment, 4,955,415, Cl. 152-209.00R.  
Takeuchi, Akihiro; Horiuchi, Kouichi; Ochiai, Kiyoshi; and Yoshikawa, Hideaki, to Sumitomo Rubber Industries, Ltd. Pneumatic radial tire carcass profile, 4,955,416, Cl. 152-454.000.  
Takeuchi, Akira: See—  
Teranishi, Mitsuji; Watanabe, Yasuo; and Takeuchi, Akira, 4,956,783, Cl. 364-468.000.  
Takeuchi, Hideaki: See—  
Nakada, Junji; and Takeuchi, Hideaki, 4,956,070, Cl. 204-298.180.  
Takeuchi, Hirofumi: See—  
Tsutsui, Osamu; Haraga, Hisato; Arita, Kinya; Makita, Atsuo; Takeuchi, Hirofumi; and Tsukada, Ryoichi, 4,955,335, Cl. 236-12.120.  
Takeuchi, Kunio: See—  
Nakagawa, Hiroshi; Tokiwa, Shizuro; and Takeuchi, Kunio, 4,955,265, Cl. 83-74.000.  
Takeuchi, Tomio; Saino, Tetsushi; Yoshida, Masao; Takahashi, Katsutoshi; Nakamura, Teruya; and Umezawa, Hamao, deceased (by Umezawa, Mieko, Kazuo Umezawa, Yoji Umezawa, administrators), to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Novel spergulin-related compounds and process for producing the same, 4,956,504, Cl. 564-153.000.  
Takeuchi, Yo: See—  
Kudo, Hajime; Asano, Masami; Toma, Ken; and Takeuchi, Yo, 4,955,525, Cl. 228-183.000.  
Takeya, Kunio: See—  
Akimoto, Haruo; and Takeya, Kunio, 4,955,426, Cl. 164-314.000.  
Takigawa, Akio: See—  
Hirayama, Naoto; Aoki, Yuichi; Takigawa, Akio; Yoshida, Motoaki; and Shiraiishi, Yasunori, 4,956,227, Cl. 428-331.000.  
Takimoto, Hiroyuki; Kohtani, Yutaka; and Saitoh, Yoshiyuki, to Canon Kabushiki Kaisha. Information signal reproducing apparatus in which control signal condition and information signal level are varied so as to correspond, 4,956,726, Cl. 360-27.000.  
Takishima, Suguru: See—  
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.  
Takizawa, Koichi: See—  
Ueda, Shinji; and Takizawa, Koichi, 4,956,191, Cl. 426-330.300.  
Talbert Fuel Systems, Inc.: See—  
Talbert, William L., 4,955,332, Cl. 123-1.00A.  
Talbert, William L., to Talbert Fuel Systems, Inc. Method of improving fuel combustion efficiency, 4,955,332, Cl. 123-1.00A.  
Talebain, Abdolhossein; Green, Dianna C.; Hammer, Charles F.; and Schein, Philip S., to Georgetown University. Platinum compounds suitable for use as pharmaceuticals, 4,956,459, Cl. 536-121.000.  
Talley, William. Single piece wedge clamp, 4,955,391, Cl. 269-217.000.  
Tam, Gordon; Legge, Ronald N.; and Paulson, Wayne M., to Motorola, Inc. Differential etching of silicon nitride, 4,956,314, Cl. 437-241.000.  
Tam, Simon M.: See—  
Holler, Mark A.; Tam, Simon M.; and Castro, Hernan A., 4,956,564, Cl. 307-201.000.  
Tamaki, Yoshiyuki: See—  
Sasaki, Shiro; and Tamaki, Yoshiyuki, 4,955,339, Cl. 123-295.000.  
Tamamushi, Takahige: See—  
Nishizawa, Jun-ichi; Tamamushi, Takahige; Ishibashi, Koji; and Wagatsuma, Kiyoshi, 4,956,599, Cl. 323-244.000.  
Tamer, Antonios B., to Caterpillar Inc. Smart power connector, 4,956,561, Cl. 307-10.100.  
Tampa-Hall Limited: See—  
Rothwell, Terrence M.; and Rothwell, George P., 4,955,800, Cl. 425-63.000.  
Tamura, Kenshiro: See—  
Kanetomo, Masafumi; Tachi, Shinichi; Tsujimoto, Kazunori; Mukai, Kiichiro; Daikoku, Takahiro; Kieda, Shigekazu; Shindo, Keijiro; and Tamura, Kenshiro, 4,956,043, Cl. 156-345.000.  
Tamura, Susan Y.; and Asato, Goro, to American Cyanamid Company. 23-deoxy-27-chloro derivatives of LL-F28249 compounds, 4,956,479, Cl. 549-264.000.  
Tamura, Tomoyuki: See—  
Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, 4,956,214, Cl. 428-64.000.  
Tan, Thiam C.: See—  
Kang, En-Tang; Tan, Thiam C.; and Neoh, Koon G., 4,956,444, Cl. 528-220.000.  
Tanabe, Junichi: See—  
Shimizu, Keiichi; Tanabe, Junichi; Sugawara, Toshio; Inui, Tsuneo; and Kondo, Yoshikazu, 4,956,242, Cl. 428-606.000.



- Tanabe, Kazunori: See—  
Sakai, Toshio; Nakai, Hitoshi; Suzuki, Makoto; Hayakawa, Kiyoharu; and Tanabe, Kazunori, 4,956,649, Cl. 346-107.00R.  
Sakai, Toshio; Kawano, Osamu; Tanabe, Kazunori; and Hattori, Tomoaki, 4,956,662, Cl. 355-27.000.  
Tanaka, Akihiro: See—  
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takeda, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.  
Tanaka, Haruma, to Sanshu Press Industry Company, Ltd. Method of making pulleys with plural V-shaped grooves, 4,955,133, Cl. 29-892.300.  
Tanaka, Hideo; and Motte, Shunichi, to Seiko Instruments Inc. Thin film transistor, 4,956,680, Cl. 357-4.000.  
Tanaka, Hirokazu: See—  
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, 4,956,352, Cl. 514-63.000.  
Tanaka, Hozumi: See—  
Satake, Hideo; Shimizu, Hideo; and Tanaka, Hozumi, 4,955,550, Cl. 241-101.400.  
Tanaka Kikinzoku Kogyo K.K.: See—  
Tsurumi, Kazunori; Nakamura, Toshihide; and Sato, Akira, 4,956,331, Cl. 502-339.000.  
Tanaka, Kohbun, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Buckle device, 4,955,115, Cl. 24-641.000.  
Tanaka, Kousuke: See—  
Kawashima, Masaki; Naka, Reishi; Tsunoda, Teruo; Suenaga, Nobuyoshi; Ogawa, Syozo; Kashiwabuchi, Masaki; Kameda, Miyakichi; and Tanaka, Kousuke, 4,955,208, Cl. 62-264.000.  
Tanaka, Masato; and Machida, Shuji, to Idemitsu Kosan Company Limited. Ionomer resin and preparation of same, 4,956,418, Cl. 525-330.600.  
Tanaka, Seichi: See—  
Inoue, Seiji; and Tanaka, Seichi, 4,955,831, Cl. 440-1.000.  
Tanaka, Sumio: See—  
Atsumi, Shigeru; Tanaka, Sumio; Saito, Shinji; and Otsuka, Nobuaki, 4,956,816, Cl. 365-201.000.  
Tanashin Denki Co., Ltd.: See—  
Yoshimura, Toshio, 4,956,731, Cl. 360-96.300.  
Tandon Corporation: See—  
Dalziel, Warren L., 4,956,733, Cl. 360-105.000.  
Tang, Jiunn-Yann: See—  
Johnson, Robert R.; and Tang, Jiunn-Yann, 4,955,397, Cl. 131-194.000.  
Taniguchi, Katsutoshi: See—  
Yanagihara, Masaaki; Taniguchi, Katsutoshi; and Awata, Muneaki, 4,955,189, Cl. 57-207.000.  
Taniguchi, Koki; and Mashiba, Tamaki, to Sharp Kabushiki Kaisha. Liquid crystal driving system, 4,955,696, Cl. 350-332.000.  
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, to Minolta Camera Kabushiki Kaisha. Camera system, 4,956,661, Cl. 354-412.000.  
Taniguchi, Nobuyuki: See—  
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,956,656, Cl. 354-173.100.  
Taniguchi, Toshihiko: See—  
Shintani, Dai; Taniguchi, Toshihiko; Miki, Yukio; Akagi, Katsuhito; and Kajita, Hideo, 4,956,657, Cl. 354-195.120.  
Tanikawa, Keiichi; and Yuzo, Higaki, to Nissin Oil Mills, Ltd., The; and Nippon Steel Corporation. Lubricating oil, 4,956,109, Cl. 252-48.600.  
Tanimoto, Yoshio; and Iketani, Kohichi, to Sumitomo Chemical Company, Limited. Rubber compositions, 4,956,413, Cl. 525-192.000.  
Tanner, James A., to Signstrut, Ltd. Tensioning connector for retaining sign membranes, 4,955,928, Cl. 40-603.000.  
Tanzawa, Kenji: See—  
Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,955,985, Cl. 418-257.000.  
Target Therapeutics, Inc.: See—  
Sepetka, Ivan, 4,955,862, Cl. 604-164.000.  
Tarver, Matthew A. Applicator and polishing device, 4,955,747, Cl. 401-139.000.  
Tasaki, Hisashi; and Endo, Kimikazu, to Omron Tateisi Electronics Co. Method of facsimile transmission after collection of facsimile charge and apparatus therefor, 4,956,721, Cl. 358-402.000.  
Tatani, Atsushi: See—  
Onizuka, Masakazu; and Tatani, Atsushi, 4,955,586, Cl. 261-87.000.  
Tatsumi, Akira; Hirata, Toichi; Egashira, Masaki; Tomikawa, Osamu; and Watanabe, Hiroshi, to Hitachi Construction Machinery Co., Ltd. Apparatus for controlling rotational speed of prime mover of construction machine, 4,955,344, Cl. 123-352.000.  
Tatsuta, Sumitaka: See—  
Washizu, Shintaro; Usami, Toshimasa; Tatsuta, Sumitaka; and Yamaguchi, Jun, 4,956,251, Cl. 430-138.000.  
Taut, Inc.: See—  
McFarlane, Richard H., 4,956,143, Cl. 264-334.000.  
Tawada, Yoshihisa: See—  
Tsuge, Kazunori; Endo, Toshihito; Kobayashi, Kenji; and Tawada, Yoshihisa, 4,956,023, Cl. 136-244.000.  
Tayler, Gerald E.; and Wagner, Robert E., to International Business Machines Corporation. Sequentially processing data in a cached data storage system, 4,956,803, Cl. 364-900.000.  
Taylor, Chandler R., Jr.; Cale, Albert D., Jr.; and Stauffer, Harold F., Jr., to A. H. Robins Company, Inc. 3-aryloxy and 3-arylthio-

- azetidinecarboxamides as anticonvulsants and antiepileptics, 4,956,359, Cl. 514-210.000.  
Taylor, Charles S.; and Hampton, Hilary J., to Advanced Cardiovascular Systems, Inc. Guiding member for vascular catheters with a flexible link distal section, 4,955,384, Cl. 128-657.000.  
Tazi, Mohammed, to GAF Chemicals Corporation. Process for preparing substantially pure high molecular weight vinyl lactam-quaternized acrylamide copolymers, 4,956,430, Cl. 526-195.000.  
TCH Thermo-Consulting-Heidelberg GmbH: See—  
Mucic, Vinko, 4,955,931, Cl. 62-238.300.  
TDK Corporation: See—  
Watanabe, Hideo; Kanagawa, Yoichi; Suzuki, Takashi; and Nomura, Takeshi, 4,956,114, Cl. 252-62.580.  
Tebble, Robert S.: See—  
Edwards, Geoffrey S.; and Tebble, Robert S., 4,956,550, Cl. 250-227.150.  
Techco Corporation: See—  
Phillips, Edward H., 4,956,590, Cl. 318-432.000.  
Techmedica, Inc.: See—  
Carignan, Roger G.; Nahigian, Stanley H.; and Pratt, Clyde R., 4,955,916, Cl. 623-21.000.  
Technion Research and Development Foundation Ltd.: See—  
Zeevi, Yehoshua; and Hilsenrath, Oliver, 4,956,794, Cl. 364-559.000.  
Tecnomagnet S.p.A.: See—  
Cardone, Michele; Grandini, Angelo; and Zaramella, Bruno, 4,956,625, Cl. 335-290.000.  
Tecumseh Products Company: See—  
Cowen, Russell A., 4,955,797, Cl. 418-15.000.  
Teich, Friedhelm: See—  
Bender, Herbert; Colberg, Horst; Teich, Friedhelm; and Kemper, Reinhard, 4,956,464, Cl. 546-57.000.  
Teijin Limited: See—  
Yanagihara, Masaaki; Taniguchi, Katsutoshi; and Awata, Muneaki, 4,955,189, Cl. 57-207.000.  
Teitzel, Robin: See—  
Allen, Paul C.; Teitzel, Robin; and Thomas, Timothy, 4,956,650, Cl. 346-108.000.  
Tektronix, Inc.: See—  
Dinteman, Bryan J., 4,956,798, Cl. 364-718.000.  
Tel Sagami Limited: See—  
Ishii, Katsumi; and Sasaki, Yasushi, 4,955,649, Cl. 294-1.100.  
Miyagawa, Kazuhisa, 4,955,808, Cl. 432-5.000.  
Ohkase, Wataru; and Sato, Seishiro, 4,955,775, Cl. 414-152.000.  
Telefonaktiebolaget L M Ericsson: See—  
Johnson, Sten E.; and Kling, Lars-Orjan, 4,956,770, Cl. 364-200.000.  
Vollmer, Per C. M., 4,956,837, Cl. 370-20.000.  
Telefunken Electronic GmbH: See—  
Arndt, Jurgen, 4,956,305, Cl. 437-31.000.  
Bohme, Rolf; and Gleim, Gunter, 4,956,615, Cl. 330-288.000.  
Teletronics N.V.: See—  
Callaghan, Francis J.; and Vollmann, William, 4,955,376, Cl. 128-419.0PG.  
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Liou, Tian-I; and Teng, Chih-Sieh, 4,956,311, Cl. 437-57.000.  
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Neches, Philip M., 4,956,772, Cl. 364-200.000.  
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Terauchi, Ryugo. Urine-collecting apparatus for wheel-chair, 4,955,922, Cl. 4-480.000.  
Terava, Jorma: See—  
Kivi, Ilkka; Manner, Tapio; Kuvaja, Kari; and Terava, Jorma, 4,955,970, Cl. 285-149.000.  
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Terjesen, John W. Underwear structure, 4,955,088, Cl. 2-403.000.  
Terry, Alfred E., III. Height-adjustable roof for a pilot house/helm station, 4,955,313, Cl. 114-361.000.  
Terumo Kabushiki Kaisha: See—  
Ishigaki, Reisaburo, 4,956,187, Cl. 426-46.000.  
Sugiyama, Yoshiaki; and Sagae, Kyuta, 4,955,895, Cl. 606-194.000.  
Terwilliger, Gerald L., to Bristol Compressors, Inc. Refrigerant gas compressor construction, 4,955,796, Cl. 417-547.000.  
Teuscher, Leon A.: See—  
Limburg, William W.; Renfer, Dale S.; Yanus, John F.; and Teuscher, Leon A., 4,956,440, Cl. 528-99.000.  
Tex-Matic ApS: See—  
Krogstrup, Johan; Nohr, Henning; Christensen, Bruno; and Fosnaes, Frank, 4,955,656, Cl. 294-100.000.  
Texas Instruments, Incorporated: See—  
Balmer, Keith, 4,956,850, Cl. 375-3.000.  
Borrello, Sebastian R.; and Roberts, Charles G., 4,956,686, Cl. 357-30.000.  
Hashimoto, Masashi, 4,956,820, Cl. 365-222.000.  
Hornbeck, Larry J., 4,956,619, Cl. 330-4.300.  
Houston, Theodore W., 4,956,814, Cl. 365-154.000.

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Mosleh, Mehrdad M., 4,956,538, Cl. 219-121.600.  
Pollack, Gordon P.; Matloubian, Mishel; and Sundaresan, Ravishankar, 4,956,307, Cl. 437-40.000.  
Yuan, Han-Tzong; and Tran, Liem Th., 4,956,689, Cl. 357-34.000.  
Tezuka, Nobuo: See—  
Okino, Tadashi; Date, Nobuaki; Tezuka, Nobuo; and Saito, Syuichiro, 4,956,715, Cl. 358-213.190.  
Theodoridis, George, to FMC Corporation. Herbicidal triazinediones, 4,956,004, Cl. 71-93.000.  
Therex Corp.: See—  
Enegren, Bradley J.; Melsky, Gerald S.; and Prosl, Frank R., 4,955,861, Cl. 604-141.000.  
Thermal Products International: See—  
Kifer, Edward W.; Wojtyna, Vincent J.; Colton, James P.; and Stickel, Jeffrey T., 4,956,394, Cl. 521-84.100.  
Theurer, Josef; Hansmann, Johann; and Worgotter, Herbert, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Tie exchange machine, 4,955,301, Cl. 104-7.200.  
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Thomas, Gareth J.: See—  
Lambert, Robert W.; Martin, Joseph A.; and Thomas, Gareth J., 4,956,346, Cl. 514-50.000.  
Thomas, Geoffrey N.: See—  
Arrowsmith, John E.; Cross, Peter E.; Dickinson, Roger P.; and Thomas, Geoffrey N., 4,956,382, Cl. 514-443.000.  
Thomas, Ronny D., to PATH. Single-use disposable syringe, 4,955,871, Cl. 604-217.000.  
Thomas, Timothy: See—  
Allen, Paul C.; Teitzel, Robin; and Thomas, Timothy, 4,956,650, Cl. 346-108.000.  
Thompson, Neil E. S.; and Asperger, Robert G., to Petrolite Corporation. Methods for treating hydrocarbon recovery operations and industrial waters, 4,956,099, Cl. 210-764.000.  
Thompson, Peter H.; and Smalling, Richard J., to General Electric Company. Phenylene ether resin based thermoplastic compositions, 4,956,497, Cl. 524-474.000.  
Thompson, Steven L.: See—  
Henke, David R.; and Thompson, Steven L., 4,955,138, Cl. 30-169.000.  
Thompson, Trevor J.: See—  
George, Johann; Thompson, Trevor J.; Conroy, David G.; and Tudor, Frederick H., 4,956,809, Cl. 364-900.000.  
Thomsen, Jack W.; Regunathan, Perialwar; and Tadlock, John W., to Everpure, Inc. Filter cartridge with a lugged concentric closure portion, 4,956,086, Cl. 210-232.000.  
Thomsen, Svend E.: See—  
Christensen, Thorkild; Thomsen, Svend E.; and Zenker, Siegfried, 4,955,194, Cl. 60-329.000.  
Thomson-CSF: See—  
Baril, Michel, 4,956,614, Cl. 330-286.000.  
Michel, Philippe; Moradpour, Alexandre; and Penven, Paul, 4,956,508, Cl. 385-26.000.  
Pribat, Didier; Perret, Joel; Rouffey, Jean-Claude; and Velasco, Gonzalo, 4,956,073, Cl. 204-426.000.  
Thorn Emi plc: See—  
Sansom, David J.; Willcock, Simon N. M.; and Woolley, Robert A., 4,956,636, Cl. 340-551.000.  
Thorne, Andrew J.: See—  
Pickering, Anthony; Thorne, Andrew J.; and Runciman, Peter J. I., 4,956,428, Cl. 526-190.000.  
Thorngren, John T.: See—  
Binkley, Michael J.; Thorngren, John T.; Bonilla, Jorge A.; and Gage, Gary W., 4,956,127, Cl. 261-114.100.  
Thygeson, David W.: See—  
Wilts, Charles H.; Burke, Michael T.; and Thygeson, David W., 4,956,825, Cl. 368-9.000.  
Tiehuis, Joseph H. M.: See—  
Janssen, Hendrikus C. J. G.; and Tiehuis, Joseph H. M., 4,955,245, Cl. 74-109.000.  
Timmerman, Craig L.: See—  
Buel, James L.; Carter, John G.; Eschbach, Eugene A.; FitzPatrick, Vincent F.; Koehmstedt, Paul L.; Morgan, William C.; Oma, Kenton H.; and Timmerman, Craig L., 4,956,535, Cl. 219-10.810.  
Tizard, Richard: See—  
Wallner, Barbara P.; Springer, Timothy A.; Hession, Catherine; Tizard, Richard; Mattaliano, Robert; and Dustin, Michael L., 4,956,281, Cl. 435-69.300.  
TMC Corporation: See—  
Stritzl, Karl; Freisinger, Henry; Wurthner, Hubert; and Riegler, Andreas, 4,955,633, Cl. 280-633.000.  
Toda, Kozo, to Canon Kabushiki Kaisha. Recording apparatus with sheet size selection, 4,956,723, Cl. 358-449.000.  
Toda, Masaaki; Ohuchida, Shuichi; and Ohno, Hiroyuki, to Ono Pharmaceutical Co., Ltd. Proline compounds useful in treating amnesia, 4,956,380, Cl. 514-422.000.  
Todd, E. T., Jr.; and Shivar, John R. Convertible chassis for a semi-trailer, 4,955,629, Cl. 280-407.000.  
Todd, Paul H., Jr., to Kalamazoo Holdings, Inc. Hop flavors wherein deleterious odor-forming impurities have been removed, 4,956,195, Cl. 426-600.000.  
Todd, Raymond A., Jr.: See—  
Bailey, Thomas F.; and Todd, Raymond A., Jr., 4,955,949, Cl. 137-71.000.  
Todd, William J.: See—  
Hart, Lewis T.; Luther, Donald G.; and Todd, William J., 4,956,278, Cl. 435-30.000.  
Toeda, Hiroshi: See—  
Yatsugi, Tomishige; Toeda, Hiroshi; Takamiya, Tadashi; Minami, Norio; and Fukushima, Isao, 4,956,729, Cl. 360-67.000.  
Tognella, Sergio: See—  
Frigerio, Marco; Gandolfi, Carmelo A.; and Tognella, Sergio, 4,956,369, Cl. 514-274.000.  
Tohmiya, Masato, to Fuji Jukogyo Kabushiki Kaisha. Idle revolution number control apparatus for carburetor, 4,955,342, Cl. 123-339.000.  
Tohoku Electric Manufacturing Co., Ltd.: See—  
Nishizawa, Jun-ichi; Tamamushi, Takashige; Ishibashi, Koji; and Wagatsuma, Kiyoshi, 4,956,599, Cl. 323-244.000.  
Toida, Akikazu: See—  
Iwata, Satoshi; Toida, Akikazu; and Takahashi, Fumio, 4,955,736, Cl. 400-120.000.  
Tokiwa, Shizuro: See—  
Nakagawa, Hiroshi; Tokiwa, Shizuro; and Takeuchi, Kunio, 4,955,265, Cl. 83-74.000.  
Tokuda, Teruhiko; Ishihara, Koji; Maruyama, Masahiko; and Wada, Manabu, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Fuel supply system, 4,955,409, Cl. 137-561.00A.  
Tokui, Akira; Sato, Shinichi; Kawai, Akira; Nakajima, Masayuki; Ozaki, Hiroki; and Nagatomo, Masao, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device and fabricating method thereof, 4,956,310, Cl. 437-52.000.  
Tokui, Yasuyuki: See—  
Yuki, Syoji; Tokui, Yasuyuki; Nishiuchi, Kihachiro; Wada, Kenichi; Suzue, Masayoshi; and Morimoto, Takuo, 4,955,966, Cl. 273-218.000.  
Tokyo Electron Limited: See—  
Narushima, Masaki; and Takao, Itaru, 4,955,590, Cl. 269-21.000.  
Tokyo Gas Kabushiki Kaisha: See—  
Moringa, Akio; Hyodo, Masakatsu; Nishimoto, Tomiyo; Sakuragi, Hiroyuki; and Onishi, Shinji, 4,956,038, Cl. 156-156.000.  
Tokyo Kikai Seisakusho Ltd.: See—  
Nakagawa, Hiroshi; Tokiwa, Shizuro; and Takeuchi, Kunio, 4,955,265, Cl. 83-74.000.  
Tokyo Soil Research Co., Ltd.: See—  
Suzuki, Yoshio; Hatanaka, Munenori; Ohara, Junryou; and Makihara, Yorio, 4,955,237, Cl. 73-784.000.  
Toledo Automated Concepts, Inc.: See—  
Delventhal, Kent A.; and Grosjean, Kenith E., 4,955,763, Cl. 408-40.000.  
Toledo Scale Corporation: See—  
Mills, Nigel G.; Heckendorn, Larry C.; Long, Curtis W.; and Smigel, Richard T., 4,955,441, Cl. 177-255.000.  
Tolentino, Daniela: See—  
Cassani, Giorgio; Borgonovi, Giorgio; Cidaria, Dante; Tolentino, Daniela; Abis, Luigi; Guglielmetti, Gianfranco; Garavaglia, Carlo; Confalonieri, Giovanni; and Pirlai, Giorgio, 4,956,180, Cl. 424-118.000.  
Toma, Ken: See—  
Kudo, Hajime; Asano, Masami; Toma, Ken; and Takeuchi, Yo, 4,955,525, Cl. 228-183.000.  
Toma Electronics, Inc.: See—  
Sikora, Scott T., 4,956,584, Cl. 315-241.00R.  
Tomikawa, Osamu: See—  
Tatsumi, Akira; Hirata, Toichi; Egashira, Masaki; Tomikawa, Osamu; and Watanabe, Hiroshi, 4,955,344, Cl. 123-352.000.  
Tominaga, Shinji: See—  
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,956,656, Cl. 354-173.100.  
Tomino, Tadashi: See—  
Uemura, Susumu; Tsujioka, Hiroshi; Yatsuzuka, Yasuhumi; Tomino, Tadashi; Yoneda, Shigeo; and Shindoh, Shigeru, 4,956,639, Cl. 340-707.000.  
Tomioka, Katsumi: See—  
Otsuki, Noboru; Tomioka, Katsumi; and Conishi, Toshihiko, 4,955,122, Cl. 29-237.000.  
Tomisawa, Norio, to Yamaha Corporation. Jitter control circuit having signal delay device using CMOS supply voltage control, 4,956,720, Cl. 358-324.000.  
Tomita, Hirofumi: See—  
Oda, Masatsugu; Sakaki, Toshiro; Sasaki, Naoko; Tomita, Hirofumi; and Noraka, Nobuyuki, 4,956,375, Cl. 514-361.000.  
Tomasada, Kiyoshi: See—  
Katayama, Hideaki; Murakami, Toshifumi; Soeda, Koji; Kubota, Yoshiya; Okamoto, Sboji; Kubota, Akinori; Kobayashi, Michihiro; Ijiri, Masaaki; Ozawa, Susumu; and Tomasada, Kiyoshi, 4,955,799, Cl. 425-47.000.  
Tompkins, Thomas M.; and Presty, Dominic F., to United States Surgical Corporation. Locking mechanism for a surgical fastening apparatus, 4,955,959, Cl. 227-178.000.  
Ton, Robert B.: See—  
Garnier, Steven F.; Ton, Robert B.; Turner, Vernon S.; Pilarski, James K.; Magill, Mark R.; and Murphy, Allen J., 4,955,305, Cl. 112-121.110.  
Tone, Frederick F.: See—  
Pierson, Charles W.; and Tone, Frederick F., 4,955,555, Cl. 242-74.000.



Tone, Junsuke: See—  
Callen, Walter P.; Hauske, James R.; Maeda, Hiroshi; and Tone, Junsuke, 4,956,283, Cl. 435-76.000.  
Tonelli, Claudio: See—  
Bargigia, Gianangelo; Caporiccio, Gerardo; Tonelli, Claudio; Flabbi, Luciano; and Marchionni, Giuseppe, 4,955,726, Cl. 374-57.000.  
Tong, Shen-Nan; Tsai, Shih-Jung; and Lii, Jyi-Shang: High performance modified polyurethanes, 4,956,439, Cl. 528-53.000.  
Toppan Printing Co., Ltd.: See—  
Uzuda, Tetsuji; Kuramoto, Takashi; Onga, Takeo; Suzuki, Teruo; and Suwa, Takeshi, 4,956,703, Cl. 358-76.000.  
Toray Silicone Company, Ltd.: See—  
Kaiya, Nobuo; and Sasaki, Shosaku, 4,956,206, Cl. 427-387.000.  
Torii, Yutaka; Mori, Makoto; Gohara, Shinobu; Ohtsuki, Kenichi; and Sakurai, Yoshito, to Hitachi, Ltd. ATM switching system, 4,956,839, Cl. 370-60.000.  
Torimoto, Yoshiaki: See—  
Shirasaki, Yoshitsugu; and Torimoto, Yoshiaki, 4,956,259, Cl. 430-137.000.  
Torok, Vilmos; and Loreth, Andrezej, to Astra-Vent AB. Arrangement for generating an electric corona discharge in air, 4,955,991, Cl. 55-120.000.  
Torti, Anthony, to Kenney Manufacturing Company. Continuous cord roll up blind, 4,955,421, Cl. 160-243.000.  
Toshimitsu, Hiroyuki: See—  
Ohsugi, Hiroshi; Toshimitsu, Hiroyuki; Kamano, Toshiyasu; Shikamori, Tamotzu; and Hirayama, Masayoshi, 4,955,213, Cl. 68-12.000.  
Toth, John A., to Key Manufacturing Group, Inc. Decorative capped wheel nut and method of making same, 4,955,773, Cl. 411-429.000.  
Toto Ltd.: See—  
Tsutsui, Osamu; Haraga, Hisato; Arita, Kinya; Makita, Atsuo; Takeuchi, Hirofumi; and Tsukada, Ryoichi, 4,955,535, Cl. 236-12.120.  
Totoku Electric Co., Ltd.: See—  
Sakai, Yoshio; and Yamada, Takeshi, 4,955,253, Cl. 74-553.000.  
Touzani, William N. Collapsible expandable plastic hollow articles in a latchable configuration, 4,955,493, Cl. 215-100.000.  
Tovar, Domingo. Water purification device, 4,956,083, Cl. 210-222.000.  
Toyo Boseki Kabushiki Kaisha: See—  
Isaka, Tautomu; and Ohta, Saburo, 4,956,209, Cl. 428-35.200.  
Mitamura, Hideyuki; and Arimatsu, Yoshikazu, 4,956,431, Cl. 526-257.000.  
Toyo Garasu Kabushiki Kaisha: See—  
Fujita, Toshiaki; Kimura, Hirokazu; and Yamato, Yoshihiro, 4,955,227, Cl. 73-104.000.  
Toyo Ink Mfg. Co., Ltd.: See—  
Satake, Hideo; Shimizu, Hideo; and Tanaka, Hozumi, 4,955,550, Cl. 241-101.400.  
Toyo Kohan Co., Ltd.: See—  
Shimizu, Keiichi; Tanabe, Junichi; Sugawara, Toshio; Inui, Tsuneo; and Kondo, Yoshikazu, 4,956,242, Cl. 428-606.000.  
Toyoda, Yasuhiro, to Honda Giken Kogyo Kabushiki Kaisha. Fuel injector assembly for fuel-injected engine, 4,955,347, Cl. 123-472.000.  
Toyofuku, Kunitaka: See—  
Takahashi, Yoshiyuki; Toyofuku, Kunitaka; and Iwasaki, Akiko, 4,956,332, Cl. 503-209.000.  
Toyohara, Makoto: See—  
Suzuki, Tomonori; and Toyohara, Makoto, 4,955,836, Cl. 440-77.000.  
Toyota Jidosha Kabushiki Kaisha: See—  
Haraguchi, Tetsunori, 4,955,635, Cl. 280-675.000.  
Ise, Kiyotaka; and Fujita, Kozo, 4,955,448, Cl. 180-197.000.  
Kashihara, Yuji; Iwatsuki, Kunihiro; and Taga, Yutaka, 4,955,256, Cl. 74-866.000.  
Morisawa, Kunio, 4,955,852, Cl. 475-146.000.  
Sasaki, Shizuo; and Tamaki, Yoshiyuki, 4,955,339, Cl. 123-295.000.  
Satake, Hideo; Shimizu, Hideo; and Tanaka, Hozumi, 4,955,550, Cl. 241-101.400.  
Traber, Jorg; and Horstmann, Harald, to Troponwerke GmbH & Co. KG. New combination products having an antidepressant action, 4,956,361, Cl. 514-217.000.  
Trachman, Edward O.: See—  
Arzoian, John; Shih, Shan; and Trachman, Edward G., 4,955,851, Cl. 475-59.000.  
Trak International, Inc.: See—  
Simons, John C., 4,955,452, Cl. 180-271.000.  
Tran, Liem Th.: See—  
Yuan, Han-Tzong; and Tran, Liem Th., 4,956,689, Cl. 357-34.000.  
Transnorm System GmbH: See—  
Almes, Horst-Dieter; and Grutza, Bernd, 4,955,466, Cl. 198-831.000.  
Transpirator Technologies, Inc.: See—  
Blackmer, Richard H.; and Hedman, Jonathan W., 4,955,372, Cl. 128-203.160.  
Transtech Scientific, Inc.: See—  
Zamba, Gene; and Glazier, Stephen C., 4,955,371, Cl. 128-200.180.  
Trapp, Horst: See—  
Denzinger, Walter; Hartmann, Heinrich; Baur, Richard; Perner, Johannes; Trieselt, Wolfgang; Trapp, Horst; and Raubenheimer, Hans-Juergen, 4,956,421, Cl. 525-385.000.  
Tri Tool Inc.: See—  
VanderPol, Jerald; Marshall, Mark A.; and Wheeler, Warren V., 4,955,263, Cl. 82-118.000.

Trident Laboratories, Inc.: See—  
Adell, Loren S., 4,955,393, Cl. 128-859.000.  
Trieselt, Wolfgang: See—  
Denzinger, Walter; Hartmann, Heinrich; Baur, Richard; Perner, Johannes; Trieselt, Wolfgang; Trapp, Horst; and Raubenheimer, Hans-Juergen, 4,956,421, Cl. 525-385.000.  
Trimmel, Wolfgang: See—  
Holligues, Claude; Panholzer, Heinrich; Maier, Karl-Wilhelm; and Trimmel, Wolfgang, 4,956,849, Cl. 373-120.000.  
Trinh, Toan: See—  
Gosselink, Eugene P.; Hardy, Frederick E.; and Trinh, Toan, 4,956,447, Cl. 528-272.000.  
Trombley, Douglas E.; and Buslepp, Kenneth J., to General Motors Corporation. Idle control system for a crankcase scavenged two-stroke engine, 4,955,341, Cl. 123-339.000.  
Tropia, Inc.: See—  
Bronstein, Irena Y.; and Edwards, Brooks, 4,956,477, Cl. 549-221.000.  
Troponwerke GmbH & Co. KG: See—  
Traber, Jorg; and Horstmann, Harald, 4,956,361, Cl. 514-217.000.  
True Manufacturing Co., Inc.: See—  
Trulaske, Robert J., Sr., 4,955,486, Cl. 211-59.200.  
Trulaske, Robert J., Sr., to True Manufacturing Co., Inc. Gravity feed shelf, 4,955,486, Cl. 211-59.200.  
Truszchler GmbH & Co. KG: See—  
Jagst, Peter, 4,955,111, Cl. 19-102.000.  
TRW Inc.: See—  
Goss, Kenneth C., 4,956,863, Cl. 380-30.000.  
Kaminskas, Rimvykas A., 4,955,559, Cl. 244-52.000.  
Tryon, James A.: See—  
Stern, Donald J.; Heaton, Jeff S.; Tryon, James A.; and Bartholmey, Brett A., 4,955,545, Cl. 239-320.000.  
Tsai, John. Crossroad without traffic lights, 4,955,751, Cl. 404-1.000.  
Tsai, Shih-Jung: See—  
Tong, Shen-Nan; Tsai, Shih-Jung; and Lii, Jyi-Shang, 4,956,439, Cl. 528-53.000.  
Tsang, Joseph C.: See—  
Fuller, Robert T.; Tsang, Joseph C.; and Richards, William R., Jr., 4,956,306, Cl. 437-34.000.  
Tsubomiwa, Noriyuki: See—  
Suzuki, Yuji; Urano, Satoshi; Umamoto, Hiroto; Mizuguchi, Ryuzo; Aoki, Kei; and Tsubomiwa, Noriyuki, 4,956,491, Cl. 560-172.000.  
Tsuchihashi, Akira; Noguchi, Naoki; and Kuraoka, Kesatoshi, to National Space Development Agency of Japan. End effector, 4,955,654, Cl. 294-86.400.  
Tsuchihashi, Toshio; Wakahara, Yasushi; and Asano, Kuniji, to Kabushiki Kaisha Toshiba. Instruction system of remote-control robot, 4,956,790, Cl. 364-513.000.  
Tsuda, Hisanori: See—  
Komuro, Hirokazu; Matsuda, Hiroto; Takahashi, Hiroto; Shibata, Makoto; Ikeda, Masami; and Tsuda, Hisanori, 4,956,654, Cl. 346-140.000.  
Tsugawa, Hiroaki: See—  
Kawahara, Kenichi; Nomura, Masaharu; Tsugawa, Hiroaki; and Iwamoto, Hirofumi, 4,956,333, Cl. 503-209.000.  
Tsuje, Kazunori; Endo, Toshihiro; Kobayashi, Kenji; and Tawada, Yoshihisa, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Integrated solar cell device, 4,956,023, Cl. 136-244.000.  
Tsuji, Kinya: See—  
Saito, Yoshihiko; Hashimoto, Osamu; Kuwa, Masaaki; Kojima, Takashi; and Tsuji, Kinya, 4,956,392, Cl. 518-712.000.  
Tsuji, Hiraaki: See—  
Ohnaka, Kiyoshi; Tsuji, Hiraaki; Sasai, Yoichi; and Shibata, Jun, 4,956,682, Cl. 357-16.000.  
Tsuji, Kazunori: See—  
Kanetomo, Masafumi; Tachi, Shinichi; Tsujimoto, Kazunori; Mukai, Kiichiro; Daikoku, Takahiro; Kieda, Shigeo; Shindo, Keiji; and Tamura, Kenshiro, 4,956,043, Cl. 156-345.000.  
Tsujioka, Hiroshi: See—  
Uemura, Susumu; Tsujioka, Hiroshi; Yatsuzuka, Yasuhumi; Tomino, Tadashi; Yoneda, Shigeo; and Shindoh, Shigeru, 4,956,639, Cl. 340-707.000.  
Tsukada, Ryoichi: See—  
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Kolb, Robert E.; Tuckner, Paul F.; and Guenther, Richard A., 4,956,419, Cl. 525-342.000.  
Tudor, Frederick H.: See—  
George, Johann; Thompson, Trevor J.; Conroy, David G.; and Tudor, Frederick H., 4,956,809, Cl. 364-900.000.  
Turbak, Albin F.: See—  
Tymon, Thomas M.; and Turbak, Albin F., 4,956,121, Cl. 252-378.000.  
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Twine, David C.: See—  
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Cosement, Eric; Gobert, Jean; Boydens, Roland; and Mathieu, Jacques, 4,956,367, Cl. 514-236.200.  
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U. Christian Seeluth: See—  
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Uchikata, Yoshio; Nozaki, Mineo; Asakura, Osamu; and Nagashima, Masasumi, to Canon Kabushiki Kaisha. Printer with disengageable ribbon feed, 4,955,738, Cl. 400-229.000.  
Uchikawa, Akira; Iwasaki, Atsushi; Fukuoka, Toshio; Matsumura, Mitsuo; Matsui, Hiroshi; Sato, Yasuhiko; Aoyama, Masaaki; Shinomiya, Eiichi; Fujinoki, Akira; and Ogino, Nobuyoshi, to Shin-Etsu Handotai Co., Ltd., and Shin-Etsu Quartz Products Co., Ltd. Manufacture of a quartz glass vessel for the growth of single crystal semiconductor, 4,956,208, Cl. 428-34.600.  
Uchiyama, Naoki; Takayama, Syuichi; Gotanda, Masakazu; Kubota, Tetsumaru; Tsukaya, Takashi; Ishihara, Kouichiro; Kami, Kuniaki; Sekino, Naomi; Murata, Akira; and Hayashi, Masaki, to Olympus Optical Co., Ltd. Ultrasonic therapeutic apparatus, 4,955,366, Cl. 128-24.00A.  
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Ueda, Aki: See—  
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Ueda, Eiichi: See—  
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Ueda, Shinji; and Takizawa, Koichi, to Ajinomoto Co., Inc. Method of preparing a carbonated beverage containing aspartame, 4,956,191, Cl. 426-330.300.  
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Fisher, John J., 4,955,250, Cl. 74-479.000.  
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- Winkler, Dieter: See—  
Stucki, Samuel; and Winkler, Dieter, 4,956,057, Cl. 204-101.000.
- Winston, Roland: See—  
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- Wise, Randall E.; and Leighton, Alvah T., Jr., to Animalens, Inc. Contact lenses for animals, 4,955,711, Cl. 351-160.00R.
- Wisecup, David R.: See—  
Goodwin, Brent E.; Karn, Donald L.; Mistyurik, John D.; Monteth, John R.; Seale, Mark A.; and Wisecup, David R., 4,956,045, Cl. 156-384.000.
- Wissel, Stephen C.: See—  
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- Witt, Ulrich: See—  
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- Wojtyna, Vincent J.: See—  
Kifer, Edward W.; Wojtyna, Vincent J.; Colton, James P.; and Stickle, Jeffrey T., 4,956,394, Cl. 521-84.100.
- Wolensky, Joel A.; and Dunn, William A., to Case Communications Inc. Modem with remote speed-change capability, 4,956,851, Cl. 375-8.000.
- Wolverine Corporation: See—  
Milone, Philip G., 4,956,271, Cl. 432-59.000.
- Womack, Kent; and Hise, Tony. Socket pipe wrench, 4,955,262, Cl. 81-165.000.
- Wong, David T.: See—  
Robertson, David W.; Wong, David T.; and Krushinski, Joseph H., Jr., 4,956,388, Cl. 514-651.000.
- Wood, Lee R.: See—  
Smith, Paul H.; Wood, Lee R.; and Lara, Elias J., 4,956,573, Cl. 313-15.000.
- Woodberry, Frank J., to Rockwell International Corporation. Multicolor focal plane arrays, 4,956,555, Cl. 250-339.000.
- Woods, Donna K.: See—  
Potter, Dennis L.; Raker, Mark L.; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Westmoreland, Amos E.; Woods, Donna K.; and Banerjee, Chandra K., 4,955,399, Cl. 131-359.000.
- Woods, Robert L., to Spectra Technologies, Inc. Fluidic oscillating nozzle, 4,955,547, Cl. 239-389.100.
- Woodward, Fred E.; and Hudson, Alice P., to Westvaco Corporation. Low foaming rust inhibiting composition, 4,956,106, Cl. 252-390.000.
- Woolard, Frank X., to ICI Americas Inc. Substituted 1-phenyl pyrrolidones and their use as herbicides, 4,956,006, Cl. 71-95.000.
- Woolley, Robert A.: See—  
Sansom, David J.; Willcock, Simon N. M.; and Woolley, Robert A., 4,956,636, Cl. 340-551.000.
- Worgotter, Herbert: See—  
Theurer, Josef; Hansmann, Johann; and Worgotter, Herbert, 4,955,301, Cl. 104-7.200.
- Woyce, Louis C., Jr.: See—  
Rigby, William R.; and Woyce, Louis C., Jr., 4,955,530, Cl. 229-123.200.
- Wrasidlo, Wolfgang J.; and Hofmann, Frieder K., to Brunswick Corporation. Thin film membrane enzyme reactor and method of using same, 4,956,289, Cl. 435-180.000.
- Wright, Douglas, to Dimensional Visions Group. Electronic method and apparatus for stereoscopic photography, 4,956,705, Cl. 358-88.000.
- Wright, James B.: See—  
Meess, Daniel C.; Jones, Bobby J.; Mello, Raymond M.; Weiss, Thomas G., Jr.; and Wright, James B., 4,955,983, Cl. 405-128.000.
- Wright, Ronald R.: See—  
Levin, Gilbert V.; and Wright, Ronald R., 4,956,094, Cl. 210-625.000.
- Wrobel, Gunter, to Papst-Motoren & Co. GmbH. Small size fan, 4,955,791, Cl. 417-354.000.
- Wuerzer, Bruno: See—  
Jahn, Dieter; Becker, Rainer; Goetz, Norbert; and Wuerzer, Bruno, 4,956,003, Cl. 71-92.000.
- Wulfert, Ernst; Gobert, Jean; and Cossement, Eric, to U C B S.A. Treatment of cognitive and behavioral disorders associated with aging and with dementia syndromes, 4,956,363, Cl. 514-232.200.
- Wurthner, Hubert: See—  
Stritzl, Karl; Freisinger, Henry; Wurthner, Hubert; and Riegler, Andreas, 4,955,633, Cl. 280-633.000.
- Wyko Corporation: See—  
Hayes, John B., 4,955,719, Cl. 356-359.000.
- Xerox Corporation: See—  
Limburg, William W.; Renfer, Dale S.; Yanus, John F.; and Teuscher, Leon A., 4,956,440, Cl. 528-99.000.
- Malhotra, Shadi L., 4,956,225, Cl. 428-216.000.
- Mandel, Barry P., 4,955,965, Cl. 271-225.000.
- Yagihara, Morio: See—  
Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hisashi; Ukai, Toshinao; Yagihara, Morio; Takagi, Yoshihiro; and Yoneyama, Masakazu, 4,956,263, Cl. 430-264.000.
- Ueda, Shinji; Heki, Tatsuo; Inoue, Noriyuki; Ishikawa, Tatatoshi; Ohki, Nobutaka; Yagihara, Morio; Morimoto, Kiyoshi; Fujimoto, Hiroshi; and Andoh, Kazuto, 4,956,267, Cl. 430-372.000.
- Yamaashi, Shunji; and Arai, Yoshimitsu, to Fuji Jukogyo Kabushiki Kaisha. Power transmission system for a motor vehicle with an automatic transmission, 4,955,255, Cl. 74-856.000.
- Yamada, Hirokazu: See—  
Johdai, Akiyoshi; Kinoshita, Keichi; Matsui, Toshio; and Yamada, Hirokazu, 4,955,597, Cl. 271-215.000.
- Yamada, Hiroshi. Wall clock, 4,956,828, Cl. 368-76.000.
- Yamada, Shigeki, to Canon Kabushiki Kaisha. Image processing apparatus and methods for making a creative image from an original image, 4,956,704, Cl. 358-80.000.
- Yamada, Shoji; and Yamada, Tomoo, to Molex Incorporated. T-leg SMT contact, 4,955,820, Cl. 439-83.000.
- Yamada, Takeshi: See—  
Sakai, Yoshio; and Yamada, Takeshi, 4,955,253, Cl. 74-553.000.
- Yamada, Tomoo: See—  
Yamada, Shoji; and Yamada, Tomoo, 4,955,820, Cl. 439-83.000.



Yamada, Tsutomu: See—  
Okajima, Taizo; Ootani, Kouichi; and Yamada, Tsutomu, 4,956,015, Cl. 106-3.000.  
Yamagishi, Hirotoishi; Fusegawa, Izumi; Yokota, Shuui; and Abe, Takao, to Shin-Etsu Handotai Co., Ltd. Apparatus for Czochralski single crystal growing, 4,956,153, Cl. 422-249.000.  
Yamaguchi, Jun: See—  
Washizu, Shintaro; Usami, Toshimasa; Tatsuta, Sumitaka; and Yamaguchi, Jun, 4,956,251, Cl. 430-138.000.  
Yamaguchi, Katsumi; and Sakuma, Nobuo, to Ricoh Company, Ltd. Scanning optical system, 4,955,682, Cl. 350-6.800.  
Yamaguchi, Kenji; and Furukawa, Yohta, to Yokogawa Electric Corporation. Signal conditioners, 4,956,795, Cl. 364-571.030.  
Yamaguchi, Takao, to Ricoh Company, Ltd. Small-size zoom lens system, 4,955,700, Cl. 350-423.000.  
Yamaguchi, Jun: See—  
Washizu, Shintaro; and Yamaguchi, Jun, 4,956,254, Cl. 430-138.000.  
Yamaha Corporation: See—  
Tomisawa, Norio, 4,956,720, Cl. 358-324.000.  
Yamamiya, Masao: See—  
Nishida, Tokuhiko; and Yamamiya, Masao, 4,956,011, Cl. 75-230.000.  
Yamamoto, Akito: See—  
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Yamamoto, Hiroshi: See—  
Kokado, Hiroshi; Takishima, Suguru; Nishikawa, Koichiro; Takada, Junichi; Sasaki, Masahiko; Okuda, Isao; Yamamoto, Hiroshi; Ninomiya, Masami; Tanaka, Akihiro; Motohashi, Hiroshi; Iwaki, Makoto; and Kubo, Wataru, 4,956,833, Cl. 369-46.000.  
Yamamoto, Hitoshi: See—  
Amatake, Atsushi; Kishida, Kazumitsu; Nakajima, Koji; and Yamamoto, Hitoshi, 4,955,353, Cl. 123-668.000.  
Yamamoto, Kaoru; Sano, Hiroyuki; and Chino, Shuichi, to Polypastics Co., Ltd. Process for the preparation of acetal polymer or copolymer, 4,956,445, Cl. 528-230.000.  
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, to Minolta Camera Kabushiki Kaisha. Control device for use in a camera having a consecutive picture taking mode and a single picture taking mode, 4,956,656, Cl. 354-173.100.  
Yamamoto, Masaki; Hayashi, Hideharu; and Muramatsu, Yukio, to Yazaki Corporation. Wiring apparatus for automobile, 4,956,748, Cl. 361-394.000.  
Yamamoto, Ronald K.; and Conston, Stanley R., to Vitaphore Corporation. Surgical skin incision device, percutaneous infection control kit and methods of use, 4,955,890, Cl. 606-108.000.  
Yamamoto, Susumu: See—  
Nakanishi, Shingo; and Yamamoto, Susumu, 4,955,790, Cl. 417-45.000.  
Yamamoto, Takashi: See—  
Takeguchi, Masakatsu; Yamamoto, Takashi; and Nakano, Mamoru, 4,955,357, Cl. 125-23.010.  
Yamamoto, Toshimasa, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Structure for mounting a slip joint, 4,955,639, Cl. 280-808.000.  
Yamamoto, Yuji: See—  
Furukawa, Nobuhiro; Nohma, Toshiyuki; and Yamamoto, Yuji, 4,956,248, Cl. 429-194.000.  
Yamamura, Akira, to Nippon Ferrofluidics Corporation. Bearing equipment for vacuum devices, 4,955,731, Cl. 384-133.000.  
Yamanaka, Akira: See—  
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,956,656, Cl. 354-173.100.  
Yamanaka, Gorou: See—  
Kitada, Taizo; Katsumoto, Takehiko; Hirako, Osamu; Ninoyu, Masatoshi; Makigawa, Yasuyuki; Yamanaka, Gorou; and Fujii, Masao, 4,955,327, Cl. 123-41.420.  
Yamanobe, Takashi; Mitsuishi, Yasushi; and Takasaki, Yoshiyuki, to Agency of Industrial Science & Technology; and Ministry of International Trade & Industry. Method for production of cellulolytic enzymes and method for saccharification of cellulosic materials therewith, 4,956,291, Cl. 435-200.000.  
Yamanoi, Hiroshi: See—  
Funasaki, Kazushige; Tajima, Kenji; Yukino, Toshinori; and Yamanoi, Hiroshi, 4,956,407, Cl. 524-120.000.  
Yamaoka, Yuji: See—  
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Yamasa Shoyu Kabushiki Kaisha: See—  
Miyasaka, Tadashi; Matsuda, Akira; Abiru, Toichi; and Machida, Haruhiko, 4,956,345, Cl. 514-46.000.  
Yamashita, Hiromitsu, to Mitsubishi Denki Kabushiki Kaisha. Low-frequency converter for carrier chrominance signal, 4,956,719, Cl. 358-310.000.  
Yamato, Yoshihiro: See—  
Fujita, Toshiaki; Kimura, Hirokazu; and Yamato, Yoshihiro, 4,955,227, Cl. 73-104.000.  
Yamatoya & Co., Ltd.: See—  
Numakura, Takashi; Kitazawa, Susumu; Naya, Junichi; and Numakura, Iwao, 4,956,718, Cl. 358-298.000.  
Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Method for manufacturing superconducting ceramics in a magnetic field, 4,956,339, Cl. 505-1.000.  
Yamazoe, Makiko: See—  
Yamazoe, Wataru, 4,955,472, Cl. 206-315.600.

Yamazoe, Takahiro: See—  
Yamazoe, Wataru, 4,955,472, Cl. 206-315.600.  
Yamazoe, Wataru, to Yamazoe, Wataru; Yamazoe, Takahiro; Yamazoe, Makiko; and Yamazoe, Yuriko, a part interest to each. Golf bag with a club securing device, 4,955,472, Cl. 206-315.600.  
Yamazoe, Yuriko: See—  
Yamazoe, Wataru, 4,955,472, Cl. 206-315.600.  
Yanagawa, Ichiro; and Hara, Hirohisa, to Jidosha Kiki Co., Ltd. Clutch booster, 4,955,198, Cl. 60-551.000.  
Yanagihara, Masaaki; Taniguchi, Katsutoshi; and Awata, Muneaki, to Teijin Limited. Worsted yarn-like false-twisted yarn, 4,955,189, Cl. 57-207.000.  
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Yang, Tai-Her. Position and angle of polar coordinate adjustable vice, 4,955,593, Cl. 269-71.000.  
Yanker, Peter C.: See—  
Sherman, Arthur M.; and Yanker, Peter C., 4,956,810, Cl. 364-900.000.  
Yannas, Ioannis V.; Orgill, Dennis P.; Loree, Howard M., II; Kirk, James F.; Chang, Albert S. P.; Mikic, Borivoje B.; Krarup, Christian; and Norregaard, Thorkild V., to Massachusetts Institute of Technology. Prosthesis for promotion of nerve regeneration, 4,955,893, Cl. 606-154.000.  
Yanus, John F.: See—  
Limburg, William W.; Renfer, Dale S.; Yanus, John F.; and Teuscher, Leon A., 4,956,440, Cl. 528-99.000.  
Yason S.R.L.: See—  
Quadro, Giuseppe; and Cahn, Jean, 4,956,389, Cl. 514-654.000.  
Yasunaga, Tadashi; Yanai, Akio; Sasazawa, Koji; and Nagao, Makoto, to Fuji Photo Film Co., Ltd. Magnetic recording medium, 4,956,229, Cl. 428-336.000.  
Yatsugi, Tomishige; Toeda, Hiroshi; Takamiya, Tadashi; Minami, Norio; and Fukushima, Isao, to Hitachi, Ltd.; and Hitachi Video Engineering, Ltd. Video signal preamplifier circuit, 4,956,729, Cl. 360-67.000.  
Yatsuzuka, Yasuhumi: See—  
Uemura, Susumu; Tsujioka, Hiroshi; Yatsuzuka, Yasuhumi; Tomino, Tadashi; Yoneda, Shigeo; and Shindoh, Shigeru, 4,956,639, Cl. 340-707.000.  
Yazaki Corporation: See—  
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Yeung, Eileen: See—  
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Yew, David K.: See—  
Bailey, Alan; and Yew, David K., 4,956,079, Cl. 209-552.000.  
Yokogawa Electric Corporation: See—  
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Yokoi, Hitoshi; Watanabe, Masakazu; Okuno, Akiyasu; and Iio, Satoshi, to NGK Spark Plug Co., Ltd. Whisker-reinforced ceramics, 4,956,317, Cl. 501-92.000.  
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Yokomakura, Mitsunori: See—  
Sekihara, Toshinobu; Yokomakura, Mitsunori; Moriyama, Yuichi; Watanabe, Michiaki; Sekiguchi, Tomohiro; Nagata, Keiji; and Kurata, Takatsugu, 4,955,681, Cl. 313-495.000.  
Yokota, Shuui: See—  
Yamagishi, Hirotoishi; Fusegawa, Izumi; Yokota, Shuui; and Abe, Takao, 4,956,153, Cl. 422-249.000.  
Yokoyama, Kenji; and Saizyo, Hidehiko, to NEC Environment Engineering Ltd. Method for observation of vibration mode, 4,955,236, Cl. 73-655.000.  
Yokoyama, Naoki; and Taguchi, Masao, to Fujitsu Limited. Ternary logic circuit using resonant-tunneling transistors, 4,956,681, Cl. 357-4.000.  
Yokoyama, Nobuyoshi: See—  
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Yokoyama, Shotaro: See—  
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Yoneda, Masahiro: See—  
Ozaki, Hiroji; Yoneda, Masahiro; Ogoh, Ikuo; Okumura, Yoshinori; Wakamiya, Wataru; and Nagatomo, Masao, 4,956,692, Cl. 357-49.000.  
Yoneda, Noriyuki; Makabe, Toshiji; Kaita, Jun; Nakamura, Muneakazu; Endoh, Yoshiko; Kudoh, Hidehiko; and Higashi, Shunji, to Chiyoda Chemical Engineering & Construction Co., Ltd.; and Nippon Kokan Co., Ltd. Method for dehalogenation of a halide and catalyst used therefor, 4,956,326, Cl. 502-1.780.  
Yoneda, Shigeo: See—  
Uemura, Susumu; Tsujioka, Hiroshi; Yatsuzuka, Yasuhumi; Tomino, Tadashi; Yoneda, Shigeo; and Shindoh, Shigeru, 4,956,639, Cl. 340-707.000.  
Yoneyama, Masakazu: See—  
Ishigaki, Kunio; Katoh, Kazunobu; Inoue, Nobuaki; Okada, Hisashi; Ukai, Toshinao; Yagihara, Morio; Takagi, Yoshihiro; and Yoneyama, Masakazu, 4,956,263, Cl. 430-264.000.  
Yonezawa, Toshio; Iwashimizu, Takashi; Yoshioka, Yasuhiko; Ito, Koichi; Sakae, Kunio; and Nakase, Tetsuo, to Takenaka Komuten Co., Ltd.; and Sanyo Chemical Industries, Ltd. Suppression of pres-

sure water absorption of lightweight aggregate by aqueous dispersion thereof of anionic polymers, 4,956,403, Cl. 524-5.000.  
Yoshida, Hiroshi: See—  
Ueoka, Masatoshi; Matsumoto, Syoichi; Yoshida, Hiroshi; and Baba, Masao, 4,956,493, Cl. 560-208.000.  
Yoshida, Masahiro: See—  
Kobiki, Michihiro; Yoshida, Masahiro; and Ishikawa, Takahide, 4,956,697, Cl. 357-81.000.  
Nakata, Akio; Yoshida, Masahiro; and Nakajima, Koshiro, 4,955,476, Cl. 206-346.000.  
Yoshida, Masao: See—  
Takeuchi, Tomio; Saino, Tetsushi; Yoshida, Masao; Takahashi, Katsutoshi; Nakamura, Teruya; and Umezawa, Hamao, deceased, 4,956,504, Cl. 564-153.000.  
Yoshida, Masato: See—  
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Yoshida, Motoaki: See—  
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Yoshihara, Hideaki: See—  
Takeuchi, Akihiro; Horiuchi, Kouichi; Ochiai, Kiyoshi; and Yoshihara, Hideaki, 4,955,416, Cl. 152-454.000.  
Yoshimatsu, Hideaki: See—  
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Yoshimura, Motomu: See—  
Seya, Masamoto; Okada, Kazuo; Yoshimura, Motomu; and Maeda, Mitsuo, 4,956,812, Cl. 365-119.000.  
Yoshimura, Toshio, to Tanashin Denki Co., Ltd. Tape feeding direction controlling device for automatic reversing tape recorder, 4,956,731, Cl. 360-96.300.  
Yoshimura, Tsuyoshi, to Sanshin Kogyo Kabushiki Kaisha. Cooling water feed structure for inboard/outboard engine, 4,955,837, Cl. 440-88.000.  
Yoshioka, Shogo: See—  
Kuwabara, Yohei; Asaka, Teruo; Yoshioka, Shogo; and Sugiyama, Haruki, 4,956,060, Cl. 204-129.200.  
Yoshioka, Yasuhiko: See—  
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Saeiki, Kenshi; Yoshitake, Noriaki; and Aoki, Takayuki, 4,956,027, Cl. 148-257.000.  
Young, Lydia J.: See—  
Dean, Robert L.; Young, Lydia J.; and Veneklasen, Lee H., 4,956,024, Cl. 134-37.000.  
Younts, Donna; and Yeung, Eileen, to Continental American Corporation. Apparatus for injecting confetti into a balloon, 4,955,412, Cl. 141-114.000.  
Youtz, Stephen E.: See—  
Grunden, Michael T.; Youtz, Stephen E.; and Mierzewski, Eugene P., 4,955,806, Cl. 431-24.000.  
Yuan, Han-Tzong; and Tran, Liem Th., to Texas Instruments Incorporated. High speed gallium arsenide transistor and method, 4,956,689, Cl. 357-34.000.  
Yuhki, Hirokazu; Fujiwara, Kazuhiko; Ohnishi, Hiroshi; and Arai, Fuminori, to Fuji Photo Film Co., Ltd. Dry analytical element and process for producing the same, 4,956,146, Cl. 422-56.000.  
Yuki, Syoji; Tokui, Yasuyuki; Nishiuchi, Kihachiro; Wada, Kenichi; Suzue, Masayoshi; and Morimoto, Takuo, to Asics Corporation; and Otsuka Chemical Co., Ltd. Rubber composition and golf ball comprising it, 4,955,966, Cl. 273-218.000.  
Yukino, Toshinori: See—  
Funasaki, Kazushige; Tajima, Kenji; Yukino, Toshinori; and Yamanoi, Hiroshi, 4,956,407, Cl. 524-120.000.  
Yun, Kyung S.; and Cho, Byung W., to Korea Institute of Science and Technology. Multi-rotating disk electrode and solid polymer electrolyte electrode type electrolytic bath, 4,956,067, Cl. 204-212.000.  
Yun-Shang, Wang. Automatic car lamps lighting controller, 4,956,580, Cl. 315-83.000.  
Yuzo, Higaki: See—  
Tanikawa, Keiichi; and Yuzo, Higaki, 4,956,109, Cl. 252-48.600.  
Zaccone, Samuel G. Dispenser for string for bird nests, 4,955,320, Cl. 119-57.800.  
Zach, Ronald: See—  
Schmidthalder, Johann J.; and Zach, Ronald, 4,955,706, Cl. 351-41.000.  
Zaharris, Daniel R.: See—  
Sarraf, Raymond E.; and Zaharris, Daniel R., 4,956,831, Cl. 369-32.000.

Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: See—  
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Zaidan Hojin Handotai Kenkyu Sinkokai: See—  
Nishizawa, Jun-ichi; Tamamushi, Takashige; Ishibashi, Koji; and Wagatsuma, Kiyoshi, 4,956,599, Cl. 323-244.000.  
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Zubatova, Lidia S.; Grodzinsky, Eduard Y.; Shelyagin, Ivan V.; and Zaitsev, Alexandr A., 4,956,056, Cl. 204-129.430.  
Zamba, Gene; and Glazier, Stephen C., to Transtech Scientific, Inc. Disposable inhalation activated, aerosol device for pulmonary medicine, 4,955,371, Cl. 128-200.180.  
Zamzow, Charled E.: See—  
Carver, Larry L.; Zamzow, Charled E.; and Miladoff, Donald D., 4,956,764, Cl. 364-167.010.  
Zaoralek, Heinz-Michael, to Schwabische Huttenwerke GmbH. Heating or cooling roller, 4,955,433, Cl. 165-89.000.  
Zappa, Donald E.; and Cascone, James J., to Westinghouse Electric Corp. Closed loop system and method for cleaning articles with a volatile cleaning solvent, 4,955,403, Cl. 134-109.000.  
Zaramella, Bruno: See—  
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Zarnowski, Alfred J.; and Cohen, Robert C., to Osteonics Corp. Acetabular cup component cement spacer system, 4,955,325, Cl. 623-22.000.  
Zebco Corporation: See—  
Henderson, William A.; and Nelson, Isaac H., 4,955,834, Cl. 440-63.000.  
Zeevi, Yehoshua; and Hilsenrath, Oliver, to Technion Research and Development Foundation Ltd. Single camera three dimensional head position sensing system, 4,956,794, Cl. 364-559.000.  
Zenker, Siegfried: See—  
Christensen, Thorkild; Thomsen, Svend E.; and Zenker, Siegfried, 4,955,194, Cl. 60-329.000.  
Zerper, Dieter; and Haag, Horst G., to Huels Aktiengesellschaft. Coupling agents for vulcanizable mixtures of unsaturated rubbers and silicon-containing fillers, 4,956,498, Cl. 524-492.000.  
Zielski, Alfred G.; and Fong, Ronald A., to Clorox Company. The Phenoxyacetate peracid precursors and perhydrolysis systems therewith, 4,956,117, Cl. 252-186.380.  
Ziemianek, Janusz B., to Foster Wheeler USA Corporation. Fired heater, 4,955,323, Cl. 122-4.00D.  
Zilber, Serge, to C. R. Bard, Inc. High-friction prosthetic stent, 4,955,859, Cl. 604-8.000.  
Zimmer, Inc.: See—  
Meyers, John E., 4,955,885, Cl. 606-53.000.  
Zimmer, Johannes; Gutler, Franz; and Mortl, Engelbert, to Zimmer, Johannes. Roller doctor or squeegee apparatus for applying fluid material to a substrate, 4,955,298, Cl. 101-120.000.  
Zimmerman, John M.: See—  
Shama, Sami A.; Poklacki, Erwin S.; and Zimmerman, John M., 4,956,198, Cl. 427-54.100.  
Zimmerman, Sheldon B.: See—  
Currie, Sara A.; Miller, Thomas W.; Dulaney, Eugene L.; Springer, James P.; Valiant, Mary E.; Zimmerman, Sheldon B.; and Del Val, Sagrario M., 4,956,294, Cl. 435-252.100.  
Zimowski, Melvin R.: See—  
Shibamiya, Akira; and Zimowski, Melvin R., 4,956,774, Cl. 364-200.000.  
Zinnen, Hermann A., to UOP. Zeolitic para-ethyltoluene separation with tetralin heavy desorbent, 4,956,522, Cl. 585-828.000.  
Zinpro Corporation: See—  
Anderson, Michael D., 4,956,188, Cl. 426-74.000.  
Zirm, Mathias; to Storz Instrument Company. Optical surgical instrument, 4,955,887, Cl. 606-107.000.  
Zubatova, Lidia S.; Grodzinsky, Eduard Y.; Shelyagin, Ivan V.; and Zaitsev, Alexandr A. Method of abrasive electroerosion grinding, 4,956,056, Cl. 204-129.430.  
Zuccaro, Dante C.: See—  
Caracciolo, Anthony, Jr.; Austin, Wayne R.; Zuccaro, Dante C.; and Pomrehn, Leonard P., 4,955,655, Cl. 294-93.000.  
Zuk, Robert F.; Armenta, Richard D.; and Briggs, Jonathan, to Molecular Devices Corporation. Migratory detection immunoassay, 4,956,275, Cl. 435-7.000.  
Zumbach Electronic AG: See—  
Kaser, Beda, 4,955,694, Cl. 350-320.000.  
Zundel, Jean-Luc: See—  
Goni, Sylvie; Piot, Odile; and Zundel, Jean-Luc, 4,956,362, Cl. 514-217.000.  
Zurek, Patrick M.; Greenberg, Julie E.; and Peterson, Patrick M., to Massachusetts Institute of Technology. Adaptive beamforming for noise reduction, 4,956,867, Cl. 381-94.100.  
Zyer, Benjamin: See—  
Lang, Gary D.; and Zyer, Benjamin, 4,955,206, Cl. 62-186.000.



## LIST OF REISSUE PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF SEPTEMBER, 1990

NOTE—Arranged in accordance with the first significant character or word of the name  
(in accordance with city and telephone directory practice).

- Carlson, Randolph S., to Irvine Sensors Corporation. Multiplexer circuitry for high density analog signals. Re. 33,331, Cl. 307-243.000. Dickson, James: See—  
Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., Re. 33,327, Cl. 164-463.000.  
Director, Dennis. Write protect control circuit for computer hard disc systems. Re. 33,328, Cl. 364-200.000.  
Dunlap, David L.: See—  
Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., Re. 33,327, Cl. 164-463.000.  
Ebata, Hitoshi; and Matunaga, Shigetugu, to Toshiba Kikai Kabushiki Kaisha. Semiconductor vapor phase growing apparatus. Re. 33,326, Cl. 118-697.000.  
Fuji Xerox Co., Ltd.: See—  
Ishii, Shoichi, Re. 33,329, Cl. 271-245.000.  
Furuya, Tsuneo; and Hori, Katsuya, to Sony Corporation. Apparatus for correcting errors. Re. 33,332, Cl. 371-37.400.  
Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., to Ribbon Technology Corporation. Melt overflow system for producing filamentary and film products directly from molten materials. Re. 33,327, Cl. 164-463.000.  
Hand, Larry E.: See—  
Taylor, Wilson E., Jr.; and Hand, Larry E., Re. 33,333, Cl. 330-10.000.  
Handshey, Mark E.: See—  
Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., Re. 33,327, Cl. 164-463.000.  
Hida, Yukio: See—  
Ogasawara, Takaaki; Maruyama, Tokuji; Sato, Masaharu; Hida, Yukio; and Saito, Takashi, Re. 33,330, Cl. 219-137.0PS.  
Hori, Katsuya: See—  
Furuya, Tsuneo; and Hori, Katsuya, Re. 33,332, Cl. 371-37.400.  
Irvine Sensors Corporation: See—  
Carlson, Randolph S., Re. 33,331, Cl. 307-243.000.  
Ishii, Shoichi, to Fuji Xerox Co., Ltd. Automatic feeding device for copying machines. Re. 33,329, Cl. 271-245.000.  
Kabushiki Kaisha Kobe Seiko Sho: See—  
Ogasawara, Takaaki; Maruyama, Tokuji; Sato, Masaharu; Hida, Yukio; and Saito, Takashi, Re. 33,330, Cl. 219-137.0PS.  
Maruyama, Tokuji: See—  
Ogasawara, Takaaki; Maruyama, Tokuji; Sato, Masaharu; Hida, Yukio; and Saito, Takashi, Re. 33,330, Cl. 219-137.0PS.  
Matunaga, Shigetugu: See—  
Ebata, Hitoshi; and Matunaga, Shigetugu, Re. 33,326, Cl. 118-697.000.  
Ogasawara, Takaaki; Maruyama, Tokuji; Sato, Masaharu; Hida, Yukio; and Saito, Takashi, to Kabushiki Kaisha Kobe Seiko Sho. Output control of short circuit welding power source. Re. 33,330, Cl. 219-137.0PS.  
Peavey Electronics Corporation: See—  
Taylor, Wilson E., Jr.; and Hand, Larry E., Re. 33,333, Cl. 330-10.000.  
Ribbon Technology Corporation: See—  
Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., Re. 33,327, Cl. 164-463.000.  
Saito, Takashi: See—  
Ogasawara, Takaaki; Maruyama, Tokuji; Sato, Masaharu; Hida, Yukio; and Saito, Takashi, Re. 33,330, Cl. 219-137.0PS.  
Sato, Masaharu: See—  
Ogasawara, Takaaki; Maruyama, Tokuji; Sato, Masaharu; Hida, Yukio; and Saito, Takashi, Re. 33,330, Cl. 219-137.0PS.  
Sony Corporation: See—  
Furuya, Tsuneo; and Hori, Katsuya, Re. 33,332, Cl. 371-37.400.  
Taylor, Wilson E., Jr.; and Hand, Larry E., to Peavey Electronics Corporation. Digital audio amplifier having a high power output level and low distortion. Re. 33,333, Cl. 330-10.000.  
Toshiba Kikai Kabushiki Kaisha: See—  
Ebata, Hitoshi; and Matunaga, Shigetugu, Re. 33,326, Cl. 118-697.000.

## LIST OF REEXAMINATION PATENTEEES

TO WHOM

CERTIFICATES WERE ISSUED

- Becker, Phillip D.: See—  
Peterson, Francis C.; and Becker, Phillip D., B1 4,729,706, Cl. 411-175.000.  
Buell Industries, Inc.: See—  
Peterson, Francis C.; and Becker, Phillip D., B1 4,729,706, Cl. 411-175.000.  
Han II E'wha: See—  
Lee, Chang Y., B1 4,866,110, Cl. 524-11.000.  
Lee, Chang Y., to Han II E'wha. Thermoplastic compositions resin molded product for vehicle lining and method for manufacturing the same. B1 4,866,110, 9-11-90, Cl. 524-11.000.  
Matta, Grant B., to Penetone Corp. D-limonene based aqueous cleaning compositions. B1 4,511,488, 9-11-90, Cl. 252-162.000.  
Penetone Corp.: See—  
Matta, Grant B., B1 4,511,488, Cl. 252-162.000.  
Peterson, Francis C.; and Becker, Phillip D., to Buell Industries, Inc. Fastener clip. B1 4,729,706, 9-11-90, Cl. 411-175.000.

## LIST OF DESIGN PATENTEEES

- Agrippino, Galoppo. Combination key ring and pen. 310,449, 9-11-90, Cl. D3-62.000.  
Alex Synn AG: See—  
Hopfer, Hans, 310,452, Cl. D6-361.000.  
Ali, S. Altaf; and Harmon, Jack W., to San Shoe Trading Corp. Weighted shoe upper. 310,441, 9-11-90, Cl. D2-314.000.  
Alie, Enrique: See—  
Ryan, James M.; Alie, Enrique; and Stowers, David C., 310,534, Cl. D16-214.000.  
American Greetings Corporation: See—  
Hodgson, Dale; and Stram, John, 310,456, Cl. D6-491.000.  
American Standard Inc.: See—  
Stairs, Henry M., Jr., 310,560, Cl. D23-313.000.  
Andoe Inc.: See—  
Dobelle, Howard, 310,586, Cl. D30-109.000.  
Ateliers de Moulage Specialise Packaging: See—  
Geiger, Reinold, 310,480, Cl. D9-300.000.  
Avittan, Naftali. Sale sign. 310,545, 9-11-90, Cl. D20-10.000.  
Barrett, William H.; Gregory, Joseph A.; Mohr, Lisa M.; and Schaum, David L., to International Business Machines Corporation. Screen stand. 310,535, 9-11-90, Cl. D16-241.000.  
Bartsch, Daniel; and Bartsch, Jane A. Retractable double blade knife. 310,474, 9-11-90, Cl. D8-99.000.  
Bartsch, Jane A.: See—  
Bartsch, Daniel; and Bartsch, Jane A., 310,474, Cl. D8-99.000.

## LIST OF DESIGN PATENTEEES

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- Beasley, Hollis R. Memorial flag display case. 310,454, 9-11-90, Cl. D6-470.000.  
Beckman Instruments, Inc.: See—  
Lang, Karen, 310,478, Cl. D8-373.000.  
Bedard, Paul R., to Fellowes Manufacturing Inc. Bracket for suspending a filter in front of a video monitor screen. 310,520, 9-11-90, Cl. D14-114.000.  
Bedocs, Lou; and Eksteen, Michael C., to Thorn EMI plc. Adapter for a track light. 310,511, 9-11-90, Cl. D13-133.000.  
Besaw, Bradley M. Pill crusher. 310,564, 9-11-90, Cl. D24-23.000.  
Bezoz, Angel P., to Pulse Electronics, Inc. Default controller for railway vehicles. 310,510, 9-11-90, Cl. D13-128.000.  
Bianco, James S. Shop floor data terminal or the like. 310,515, 9-11-90, Cl. D14-100.000.  
Bonasia, Donald. Chop stick knife. 310,465, 9-11-90, Cl. D7-644.000.  
Broden, Bengt-Inge. Cannula for withdrawing a test sample from a test tube. 310,569, 9-11-90, Cl. D24-51.000.  
Brown, Allan; Gowens, Robert B.; and Jenkins, Valentine, to Cigarette Racing Team, Inc. Boat hatch. 310,508, 9-11-90, Cl. D12-317.000.  
Brown, Toran S., to McGregor Company, The. Electronic address book. 310,543, 9-11-90, Cl. D19-76.000.  
Brys, Lyle W. Tractor trailer air chute. 310,501, 9-11-90, Cl. D12-97.000.  
Cadet, Emmanuel. Lighted telescopic mirror. 310,584, 9-11-90, Cl. D28-64.100.  
Calayan, Carolina: See—  
Puglisi, Salvatore A.; and Calayan, Carolina, 310,440, Cl. D1-127.000.  
Callinan, Christopher J., to Regent Sheffield, Ltd. Package. 310,488, 9-11-90, Cl. D9-418.000.  
Camens, Murray I. C., to U.S. Philips Corporation. Combined radio and cassette recorder. 310,525, 9-11-90, Cl. D14-162.000.  
Campbell, Larry D. Double back swing seat. 310,552, 9-11-90, Cl. D21-246.000.  
Camus La Grande Marque: See—  
Daucourt, Michel, 310,484, Cl. D9-384.000.  
Canon Kabushiki Kaisha: See—  
Komada, Takeshi; and Okayama, Yutaka, 310,539, Cl. D18-40.000.  
Casablanca Fan Company, Inc.: See—  
Janicz, Thomas H., 310,561, Cl. D23-377.000.  
Castelli, Renato P.; Van Hove, Willibald; Miles, Richard; and Green, Stephen T., to Samsonite Corporation. Luggage case. 310,450, 9-11-90, Cl. D3-76.000.  
Cai Eye Co., Ltd.: See—  
Kagayama, Jou, 310,495, Cl. D10-98.000.  
CertainTeed Corporation: See—  
Reisinger, Ludwig; Westphal, Dennis; and Piles, Jonathan, 310,572, Cl. D25-119.000.  
Chanel, Arthur, to Fromageries Bresse-Bleu - Societe Laitiere Cooperative Agricole. Package. 310,481, 9-11-90, Cl. D9-341.000.  
Chanel, Arthur, to Fromageries Bresse-Bleu - Societe Laitiere Cooperative Agricole. Package. 310,486, 9-11-90, Cl. D9-425.000.  
Chapin, Paul L. Baby bottle. 310,568, 9-11-90, Cl. D24-47.000.  
Cigarette Racing Team, Inc.: See—  
Brown, Allan; Gowens, Robert B.; and Jenkins, Valentine, 310,508, Cl. D12-317.000.  
Cloverline, Inc., The: See—  
Leopoldi, Nobret; and Heinrich, William, 310,575, Cl. D26-47.000.  
Coath, Philip M.: See—  
Greengrass, Stuart M.; Coath, Philip M.; Manoy, Russell; Muston, David; and Scagell, Andrew, 310,563, Cl. D24-9.000.  
Coffee, P. Michael. Cribbage board. 310,493, 9-11-90, Cl. D10-46.100.  
Colgate-Palmolive Company: See—  
Paciullo, Francis P.; and Rivera, Ligia A., 310,589, Cl. D32-40.000.  
Conti, Rino, to Dart Industries Inc. Colander or the like. 310,466, 9-11-90, Cl. D7-667.000.  
Cors, Mark W., to Kohler Co. Toilet. 310,559, 9-11-90, Cl. D23-295.000.  
Covington, Jay C.: See—  
Scognamiglio, Frank; and Covington, Jay C., 310,448, Cl. D3-61.000.  
Creative Point, Inc.: See—  
Long, Jerry M.; and Palmer, Peter W., 310,445, Cl. D3-35.000.  
Dart Industries Inc.: See—  
Conti, Rino, 310,466, Cl. D7-667.000.  
Laib, Douglas M., 310,463, Cl. D7-614.000.  
Laib, Douglas M., 310,464, Cl. D7-615.000.  
Daucourt, Michel, to Camus La Grande Marque. Decanter with stopper. 310,484, 9-11-90, Cl. D9-384.000.  
Davis, Julie L.: See—  
Rogers, Amy J., 310,549, Cl. D21-157.000.  
De Giovellina, Henri C., to Pochet S.A. Combined bottle and closure. 310,483, 9-11-90, Cl. D9-377.000.  
DesignTime Company Limited: See—  
Fong, Wa N., 310,490, Cl. D10-32.000.  
Dezes, Robert, to U.S. Philips Corporation. Videotex terminal. 310,518, 9-11-90, Cl. D14-106.000.  
Dezes, Robert, to U.S. Philips Corporation. Videotex terminal. 310,519, 9-11-90, Cl. D14-106.000.  
Digital Equipment Corporation: See—  
Maurer, Bernard; Faranda, Robert; and Wu, Thomas G., 310,514, Cl. D13-182.000.  
Dobelle, Howard, to Andoe Inc. Pet carrying case. 310,586, 9-11-90, Cl. D30-109.000.  
Dortch, Laurence E. Tool box drawer for pickup truck. 310,504, 9-11-90, Cl. D12-157.000.  
Dressler, Bernd J. Scissors. 310,469, 9-11-90, Cl. D8-57.000.  
Durand, Jean-Jacques. Pitcher. 310,461, 9-11-90, Cl. D7-318.000.  
Esco Hand Tool, Inc.: See—  
Mader, William G.; and Rowan, Paul J., 310,472, Cl. D8-82.000.  
Eastman Kodak Company: See—  
Lavine, Monte D., 310,536, Cl. D16-246.000.  
Eksteen, Michael C.: See—  
Bedocs, Lou; and Eksteen, Michael C., 310,511, Cl. D13-133.000.  
Eldon Industries, Inc.: See—  
Evenson, Mel, 310,544, Cl. D19-99.000.  
Elkins, Johnny C. Gun rack for a vehicle. 310,446, 9-11-90, Cl. D3-38.000.  
Etablissements Regnault: See—  
Regnault, Pierre, 310,542, Cl. D19-43.000.  
Evenson, Mel, to Eldon Industries, Inc. Base for a file assembly. 310,544, 9-11-90, Cl. D19-99.000.  
Fabrique Automobile Ferrari Societa per Azioni Esercizio: See—  
Fioravanti, Leonardo, 310,506, Cl. D12-196.000.  
Faranda, Robert: See—  
Maurer, Bernard; Faranda, Robert; and Wu, Thomas G., 310,514, Cl. D13-182.000.  
Fellowes Manufacturing Inc.: See—  
Bedard, Paul R., 310,520, Cl. D14-114.000.  
Feng, Yee C. Integrated circuit insertion tool. 310,468, 9-11-90, Cl. D8-14.000.  
Fioravanti, Leonardo, to Fabrique Automobile Ferrari Societa per Azioni Esercizio. Automobile door panel exterior surface. 310,506, 9-11-90, Cl. D12-196.000.  
Fitzpatrick, William E., to Playtex Family Products, Inc. Trainer spout to be used in conjunction with a baby bottle. 310,567, 9-11-90, Cl. D24-47.000.  
Fleecs, Gregory E. Lawn sprinkler support. 310,477, 9-11-90, Cl. D8-356.000.  
Fong, Wa N., to DesignTime Company Limited. Wristwatch. 310,490, 9-11-90, Cl. D10-32.000.  
Fromageries Bresse-Bleu - Societe Laitiere Cooperative Agricole: See—  
Chanel, Arthur, 310,481, Cl. D9-341.000.  
Chanel, Arthur, 310,486, Cl. D9-425.000.  
Fry, Roger P., to Gypmac Systems Limited. Housing for exercise cycle or similar article. 310,550, 9-11-90, Cl. D21-194.000.  
Fukuda, Nobuo: See—  
Utsuki, Toshiyuki; Fukuda, Nobuo; Kwakatsu, Yoshihiro; and Iehara, Yasunari, 310,524, Cl. D14-151.000.  
Fukuyama, Katsuo: See—  
Hara, Masaki; Sakai, Masayuki; Sawatani, Masaharu; Yonezawa, Midori; and Fukuyama, Katsuo, 310,517, Cl. D14-106.000.  
Fushiya, Fusao; and Ohta, Hajime, to Makita Electric Works, Ltd. Portable battery case. 310,509, 9-11-90, Cl. D13-103.000.  
G-C Dental Industrial Corporation: See—  
Kujirai, Osamu, 310,582, Cl. D28-64.000.  
Gantner, Robert J. Shade for an automobile steering wheel and seat. 310,502, 9-11-90, Cl. D12-155.000.  
Garrett, Robert L.; and Lauvray, Gregory A. Specialized circle cutter. 310,533, 9-11-90, Cl. D15-139.000.  
Geiger, Reinold, to Ateliers de Moulage Specialise Packaging. Dispenser for scented liquids. 310,480, 9-11-90, Cl. D9-300.000.  
Genaro, Donald M., to Henry Dreyfuss Associates. Toothpaste tube or the like. 310,487, 9-11-90, Cl. D9-371.000.  
Gipe, Thomas A. Flower box support. 310,459, 9-11-90, Cl. D6-556.000.  
Gold Star Co., Ltd.: See—  
Yang, Doo S., 310,522, Cl. D14-129.000.  
Goodyear Tire & Rubber Company, The: See—  
Lobosco, William A., 310,443, Cl. D2-323.000.  
Gotou, Toyokichi, to Newlong Machine Works, Ltd. Industrial sewing machine. 310,532, 9-11-90, Cl. D15-69.000.  
Gowens, Robert B.: See—  
Brown, Allan; Gowens, Robert B.; and Jenkins, Valentine, 310,508, Cl. D12-317.000.  
Green, Stephen T.: See—  
Castelli, Renato P.; Van Hove, Willibald; Miles, Richard; and Green, Stephen T., 310,450, Cl. D3-76.000.  
Greenfield Diecasting Corp.: See—  
Grenell, David, 310,476, Cl. D8-353.000.  
Greengrass, Stuart M.; Coath, Philip M.; Manoy, Russell; Muston, David; and Scagell, Andrew. Storage case for medical instrument. 310,563, 9-11-90, Cl. D24-9.000.  
Gregory, Joseph A.: See—  
Barrett, William H.; Gregory, Joseph A.; Mohr, Lisa M.; and Schaum, David L., 310,535, Cl. D16-241.000.  
Grenell, David, to Greenfield Diecasting Corp. Weather-resistant assembly for protecting outdoor duplex electrical receptacles. 310,476, 9-11-90, Cl. D8-353.000.  
Grzebyk, Allen C. Christmas tree stand. 310,499, 9-11-90, Cl. D11-130.100.  
Gypmac Systems Limited: See—  
Fry, Roger P., 310,550, Cl. D21-194.000.  
Halter, Gregory S.: See—  
West, Scott W.; Streeter, Leslie C.; and Halter, Gregory S., 310,551, Cl. D21-219.000.  
Hara, Masaki; Sakai, Masayuki; and Kato, Minoru, to Mitsubishi Denki Kabushiki Kaisha. Computer keyboard. 310,516, 9-11-90, Cl. D14-100.000.  
Hara, Masaki; Sakai, Masayuki; Sawatani, Masaharu; Yonezawa, Midori; and Fukuyama, Katsuo, to Mitsubishi Denki Kabushiki Kaisha. Portable computer. 310,517, 9-11-90, Cl. D14-106.000.

Harmon, Jack W.: See—  
Ali, S. Altai; and Harmon, Jack W., 310,441, Cl. D2-314.000.  
Harvey, Thomas J., to International Packaging Corporation. Watch display case. 310,485, 9-11-90, Cl. D9-424.000.  
Harvey-Westbury Corp.: See—  
Trattner, Burton, 310,574, Cl. D26-44.000.  
Hatfield, Tinker L., to Nike, Inc. Athletic shoe upper and midsole. 310,442, 9-11-90, Cl. D2-314.000.  
Healey, Fritz W.: See—  
Taylor, Leo O.; and Healey, Fritz W., 310,492, Cl. D10-46.000.  
Heap, Neo, to Kibi (Malaysia) SDN. BHD. General purpose rack. 310,457, 9-11-90, Cl. D6-525.000.  
Heinrich, William: See—  
Leopoldi, Nobret; and Heinrich, William, 310,575, Cl. D26-47.000.  
Hengesbach, Robert W. Combined reversible sprinkler nozzle and support ring. 310,555, 9-11-90, Cl. D23-213.000.  
Henry Dreyfus Associates: See—  
Genaro, Donald M., 310,487, Cl. D9-371.000.  
Herrljunga Formplast AB: See—  
Larsson, Lars, 310,455, Cl. D6-491.000.  
Hino, Ichiro; and Yokoi, Toshihisa, to Sony Corporation. Transceiver. 310,523, 9-11-90, Cl. D14-137.000.  
Hinson, Robert. Cat litter box. 310,587, 9-11-90, Cl. D30-161.000.  
Hitachi, Ltd.: See—  
Utsuki, Toshiyuki; Fukuda, Nobuo; Kwakatsu, Yoshihiro; and Iehara, Yasunari, 310,524, Cl. D14-151.000.  
Hodgson, Dale; and Stram, John, to American Greetings Corporation. Top for merchandise display unit. 310,456, 9-11-90, Cl. D6-491.000.  
Hopfer, Hans, to Alex Synn AG. Chaise lounge. 310,452, 9-11-90, Cl. D6-361.000.  
Hosiden Electronics Co., Ltd.: See—  
Tajima, Kyosuke, 310,513, Cl. D13-146.000.  
Hosiden Electronics Co., Ltd.: See—  
Tajima, Kyosuke, 310,512, Cl. D13-146.000.  
House of Myrtlewood, Inc.: See—  
West, Scott W.; Streeter, Leslie C.; and Halter, Gregory S., 310,551, Cl. D21-219.000.  
Iehara, Yasunari: See—  
Utsuki, Toshiyuki; Fukuda, Nobuo; Kwakatsu, Yoshihiro; and Iehara, Yasunari, 310,524, Cl. D14-151.000.  
Ing. Alfred Schmidt GmbH: See—  
LePoix, Louis L., 310,531, Cl. D15-11.000.  
International Business Machines Corporation: See—  
Barrett, William H.; Gregory, Joseph A.; Mohr, Lisa M.; and Schaum, David L., 310,535, Cl. D16-241.000.  
International Packaging Corporation: See—  
Harvey, Thomas J., 310,485, Cl. D9-424.000.  
Ishikawa, Shigetoshi: See—  
Matsui, Toshikazu; Ishikawa, Shigetoshi; and Itoi, Yoshinari, 310,540, Cl. D18-42.000.  
Itoi, Yoshinari: See—  
Matsui, Toshikazu; Ishikawa, Shigetoshi; and Itoi, Yoshinari, 310,540, Cl. D18-42.000.  
Itronic Process AB: See—  
Socha, Jurgen, 310,562, Cl. D23-386.000.  
Jacuzzi, Remo C., to Jason International, Inc. Whirlpool bathtub. 310,566, 9-11-90, Cl. D24-38.000.  
Janicz, Thomas H., to Casablanca Fan Company, Inc. Ceiling fan. 310,561, 9-11-90, Cl. D23-377.000.  
Jason International, Inc.: See—  
Jacuzzi, Remo C., 310,566, Cl. D24-38.000.  
Jeffus, Stanley E. Line-type holder with a magnetic support unit for supporting articles. 310,591, 9-11-90, Cl. D32-60.000.  
Jenkins, Valentine: See—  
Brown, Allan; Gowens, Robert B.; and Jenkins, Valentine, 310,508, Cl. D12-317.000.  
Johansson, Karl E. Venturi unit for a vacuum lifter. 310,594, 9-11-90, Cl. D34-28.000.  
John Manufacturing Limited: See—  
Yuen, John S., 310,529, Cl. D14-168.000.  
Kabushiki Kaisha Toshiba: See—  
Tsuboi, Hideki, 310,526, Cl. D14-163.000.  
Yamamoto, Kazuharu; and Koshimura, Reiko, 310,527, Cl. D14-163.000.  
Yamamoto, Kazuharu; and Koshimura, Reiko, 310,528, Cl. D14-163.000.  
Kagayama, Jou, to Cat Eye Co., Ltd. Bicycle speedometer. 310,495, 9-11-90, Cl. D10-98.000.  
Kakuk, Jay J.; Walto, Joseph J.; and O'Brien, Steven T., to Toro Company, The. Post light fixture. 310,577, 9-11-90, Cl. D26-67.000.  
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## CLASSIFICATION OF PATENTS

ISSUED SEPTEMBER 11, 1990

NOTE—First number, class; second number, subclass; third number, patent number

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			136	4,955,150	753	4,955,202	868	4,955,260	121.11	4,955,305	207.12	4,955,375
	433	4,955,094							275	4,955,306	207.15	4,955,376
	446	4,955,095			51.1	4,955,204	230	4,956,011	304	4,955,307	401	4,955,377
	464	4,955,096			39.36	4,955,205	236	4,956,012			419 PG	4,955,378
CLASS 7			190	4,955,151	94	4,955,206	304	4,956,010			421	4,955,379
	138	4,955,097	36	4,955,152	186	4,955,207	307	4,956,009	45	4,955,308	633	4,955,380
CLASS 8					238.3	4,955,208			219	4,955,314	635	4,955,381
	549	4,955,098	603	4,955,153	238.6	4,955,209	3.2	4,955,261	230	4,955,309	640	4,955,382
CLASS 14			661	4,955,154	264	4,955,210	165	4,955,262	263	4,955,311	642	4,955,383
			663		361		441	4,955,263	280	4,955,312	653 R	4,955,384
	16.1	4,955,098			380				361	4,955,313	657	4,955,385
	71.7	4,955,093			511						660.03	4,955,386
CLASS 15			69.01	4,955,155	4.4	4,955,211	1.11	4,955,264	28 R	4,955,315	661.09	4,955,387
			77	4,955,157	18.1	4,956,001	158	4,955,265			687	4,955,388
	1.7	4,955,099			107				657	4,955,316	719	4,955,389
	3.51	4,955,100	25	4,955,156					689	4,955,317	731	4,955,390
	21.1	4,955,101	81	4,955,158	9 R	4,955,211	74	4,955,265	697	Re.33,326	745	4,955,391
	103	4,955,094					404.3	4,955,271			748	4,955,392
	182	4,955,102					425.2	4,955,272			771	4,955,393
	257.6	4,955,095	193	4,955,098	9	4,955,212	845	4,955,273			844	4,955,394
	319	4,955,103	197 R	4,955,099	12 R	4,955,213					859	4,955,395
	322	4,955,104			242	4,955,214					863	4,955,396
	323	4,955,105					275	4,955,274	17	4,955,318	898	4,955,397
	335	4,955,106	161	4,955,159			313	4,955,275	52.2	4,955,319		
	339	4,955,107	351	4,955,161	18	4,955,215	403	4,955,276	57.8	4,955,320		
CLASS 16					39	4,955,216	422.1	4,955,277	61	4,955,321		
	226	4,955,108	125.5	4,955,162			605	4,955,278	78	4,955,322		
CLASS 17			287	4,955,163								
	41	4,955,109	321	4,955,164	9	4,956,002	6.5	4,955,279	4 D	4,955,323	194	4,955,397
	53	4,955,110	331	4,955,165	92	4,956,003	33.04	4,955,280	510	4,955,324	280	4,955,398
CLASS 19					93	4,956,004	43.01	4,955,281			359	4,955,399
	102	4,955,111	169.6	4,955,166	95	4,956,005			1 A	4,955,331		
	105	4,955,266	199	4,955,167	103	4,956,006			27 GE	4,955,332	56	4,955,400
CLASS 24			210	4,955,168		4,956,007			41.31	4,955,333	262	4,955,401
	49 C	4,955,112	536	4,955,169			436	4,955,282	41.42	4,955,334	271	4,955,402
	448	4,955,113	547	4,955,170	10	4,955,216	447	4,955,283	51 R	4,955,335		
	641	4,955,115	612	4,955,171	134	4,955,217			52 MF	4,955,336	22.19	4,956,020
CLASS 26			710	4,955,172	146	4,955,218	248	4,955,284	73 AC	4,955,337	37	4,956,021
	18.6	4,955,114	727	4,955,173	147	4,955,219			73 AD	4,955,338	40	4,956,022
CLASS 28			745	4,955,174	214	4,955,220	39.1	4,955,285	90.11	4,955,339	41	4,956,023
	110	4,955,116			247	4,955,221	40.11	4,955,286	90.17	4,955,340	107	4,956,024
	281	4,955,117			295	4,955,222	42.2	4,955,287	90.31	4,955,341	109	4,956,025
CLASS 29			67	4,955,175	336	4,955,223			179 B	4,955,342		
	7.1	4,955,118	73	4,955,176	427	4,956,008			193 CH	4,955,343		
	50	4,955,119	137	4,955,177	457	4,955,224	348	4,955,288	195 R	4,955,344	244	4,956,026
	113.2	4,955,120	148	4,955,178			483	4,955,289	276	4,955,345		
	130	4,955,268	212	4,955,179					295	4,955,346	15	4,955,404
	237	4,955,122	244	4,955,180	1 J	4,955,225			297	4,955,347	71	4,955,405
	271	4,955,096	399	4,955,181	9	4,955,226			339	4,955,348	234.6	4,955,406
	419.1	4,955,123	448	4,955,182	49.3	4,955,227	120	4,955,298			318	4,955,407
	426.4	4,955,124	460	4,955,183	104	4,955,228	143	4,955,299	352	4,955,349	454.2	4,955,408
	509	4,955,125	556	4,955,184	118.1	4,955,229	183	4,955,300	381	4,955,350	40	4,955,409
	527.2	4,955,133	569	4,955,185	146	4,955,230			399	4,955,351		
	527.6	4,955,126			204.21	4,955,231	430	4,955,338	472	4,955,352	561 A	4,955,410
	568	4,955,127			313	4,955,232	446	4,955,339	478	4,955,353		
	596	4,955,128	79	4,955,182	382 G	4,955,233	476	4,955,340	531	4,955,354	109	4,955,411
	611	4,955,129			497	4,955,234			533	4,955,355		
	734	4,955,130			517 R	4,955,235			557	4,955,356		
	830	4,955,131	16	4,955,193	577	4,955,236	7.2	4,955,301	559.1	4,955,357	883	4,955,412
	840	4,955,132			601	4,955,237			668	4,955,358		
	861	4,955,133			655	4,955,238						
	882.2	4,955,134			784	4,955,239						
	892.3	4,955,135			800	4,955,240						
	897.312	4,955,136			861.38	4,955,241						
CLASS 30					861.71	4,955,242						
	32	4,955,136			862.340	4,955,243						
	90.1	4,955,137			862.59	4,955,244						
	169	4,955,138			863.91	4,955,245						
	340	4,955,139										
CLASS 36												
	316	4,955,090										
	321	4,955,091										
	354	4,955,092										
	480	4,955,093										
	502	4,955,094										
	579	4,955,095										
CLASS 42												
	433	4,955,096										
	446	4,955,097										
	464	4,955,098										
CLASS 47												
	138	4,955,097										
CLASS 48												
	549	4,955,098										
CLASS 49												
	16.1	4,955,099										
	71.7	4,955,100										
CLASS 51												
	226	4,955,108										
CLASS 52												
	41	4,955,109										
	53	4,955,110										
CLASS 53												
	102	4,955,111										
	105	4,955,266										
CLASS 54												
	49 C	4,955,112										
	448	4,955,113										
	641	4,955,115										
CLASS 55												
	18.6	4,955,114										
CLASS 56												
	110	4,955,116										
	281	4,955,117										
CLASS 57												
	7.1	4,955,118										
	50	4,955,119										
	113.2	4,955,120										
	130	4,955,268										
	237	4,955,122										
	271	4,955,096										
	419.1	4,955,123										
	426.4	4,955,124										
	509	4,955,125										
	527.2	4,955,133										

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434	4,955,416	32	4,955,499	151	4,955,489	304	4,955,544	4.7	4,956,129	CLASS 292	
539	4,955,417	281	4,955,460	187	4,955,490	320	4,955,545	18	4,956,130	85	4,955,646
	4,955,418	381	4,955,467			440	4,955,546	29.5	4,956,131	258	4,955,648
				CLASS 215		589.1	4,955,547	39	4,956,132		
61	4,956,030	CLASS 192		12.1	4,955,491	30	4,955,548	40.2	4,956,134	CLASS 294	
67	4,956,031	0.02 R	4,955,954	100 R	4,955,493	80	4,955,549	40.7	4,956,135	1.1	4,955,649
94	4,956,032	CLASS 193				101.4	4,955,550	46.6	4,956,136	7	4,955,671
	4,956,033	37	4,955,462	CLASS 219		264	4,955,551	60	4,956,137	14	4,955,647
102	4,956,034	CLASS 198		10.55 A	4,956,534		4,955,552	129	4,956,138	26	4,955,650
137	4,956,036	318	4,955,955	10.55 B	4,956,530		4,955,553	156	4,956,139	68.26	4,955,972
155	4,956,037	346.1	4,955,463	10.55 E	4,956,533		4,955,554	280	4,956,140	82.19	4,955,651
156	4,956,038	463.3	4,955,464	10.55 M	4,956,532	35.5 R	4,955,552	297.2	4,956,141	84.4	4,955,654
180	4,956,039	778	4,955,465	10.81	4,956,535	63	4,955,553	318	4,956,142	95	4,955,655
267	4,956,040	831	4,955,466	64	4,956,536	65	4,955,554	334	4,956,143	100	4,955,656
	4,956,041			74	4,956,537		4,955,555			106	4,955,652
344	4,956,042	CLASS 200		121.6	4,956,538	107.4 B	4,955,556	118	4,955,657	118	4,955,657
345	4,956,043	38 R	4,956,527	121.8	4,956,539	134	4,955,557	119.1	4,955,653		
350	4,956,044	314	4,956,528	127	4,956,540						
384	4,956,045	524	4,956,529	137 FS	Re.33.330			CLASS 266			
613	4,956,046			137.61	4,956,541	3.22	4,955,558	140.1	4,955,588	CLASS 267	
623 Q	4,956,047	CLASS 203		219	4,956,542	23 C	4,955,559		4,955,589	65.1	4,955,973
664	4,956,035	19	4,956,052	227	4,956,543	23	4,955,560		4,955,589	75	4,955,658
		53	4,955,468	335	4,956,544	53 R	4,955,561	21	4,955,590	146	4,955,659
38	4,955,419	CLASS 204		541	4,956,545	60	4,955,562	21	4,955,591	165	4,955,660
178.2	4,955,420			CLASS 220		62	4,955,563	68	4,955,592	171	4,955,661
243	4,955,421	13	4,956,053	I T	4,955,496	149	4,955,564	71	4,955,593	192	4,955,662
344	4,955,422	67	4,956,054	4 E	4,955,498	152	4,955,565	217	4,955,591	194	4,955,663
		101	4,956,055		4,955,499	199	4,955,566			204	4,955,664
60	4,956,048	128	4,956,061		4,955,502	213	4,955,568	58	4,955,594	204	4,955,664
158	4,956,049	129.2	4,956,060		4,955,503		4,955,569	58	4,955,594	4	4,955,665
198	4,956,050	129.35	4,956,058		4,955,504	101	4,955,566	9	4,955,595	182	4,955,666
199	4,956,051	129.43	4,956,056		4,955,505	108	4,955,567	9	4,955,595	446	4,955,667
		130	4,956,059		4,955,506	183	4,955,568	110	4,955,596		
CLASS 164		153.15	4,956,062		4,955,507	188.2	4,955,569	215	4,955,597	42	4,955,668
35	4,955,423	153.17	4,956,063		4,955,508	300	4,955,570	225	4,955,598		
72	4,955,424	157.94	4,956,064		4,955,509	311.2	4,955,571		4,955,599		
269	4,955,425	183.1	4,956,065		4,955,510	312	4,955,572	245	4,955,600		
314	4,955,426	212	4,956,067		4,955,511	313	4,955,573	267	4,955,601		
338	4,955,427	242	4,956,068		4,955,512	316.5	4,955,574		4,955,602		
417	4,955,428	243 R	4,956,066		4,955,513	398	4,955,575	73	4,955,599		
463	Re.33.327	257	4,956,069		4,955,514	449	4,955,576		4,955,603		
479	4,955,429	298.18	4,956,070		4,955,515	539	4,955,577	75	4,955,604		
485	4,955,430	301	4,956,071		4,955,516	559	4,955,578	76	4,955,605		
		424	4,956,072		4,955,517	640	4,955,579	123	4,955,606		
CLASS 165		426	4,956,073		4,955,518		4,955,580				
1	4,955,431	434	4,956,074		4,955,519		4,955,581				
81	4,955,432	CLASS 206		129.4	4,955,520	19	4,955,579				
89	4,955,433			305	4,955,521	82	4,955,580				
122	4,955,434	45.23	4,955,469		4,955,522		4,955,581				
170	4,955,435	213	4,955,470		4,955,523		4,955,582				
		303	4,955,471		4,955,524		4,955,583				
CLASS 166		480	4,955,472		4,955,525		4,955,584				
55.7	4,955,951	315.11	4,955,473		4,955,526	203.1	4,956,546	15 A	4,955,605		
82	4,955,436	315.6	4,955,474		4,955,527	208.1	4,956,547	26 A	4,955,606		
CLASS 172		320	4,955,475		4,955,528	213 VT	4,956,548	26 D	4,955,607		
1	4,955,437	346	4,955,476		4,955,529	227.14	4,956,549	29 A	4,955,608		
CLASS 174		366	4,955,477		4,955,530	231.15	4,956,550	162 F	4,955,609		
379	4,955,478	379	4,955,478		4,955,531	231.15	4,956,551	169	4,955,610		
455	4,955,479	355	4,955,479		4,955,532	236	4,956,552	195 A	4,955,611		
528	4,955,480	379	4,955,478		4,955,533	237 G	4,956,553	200 B	4,955,612		
534	4,955,481	455	4,955,479		4,955,534	338.3	4,956,554	218	4,955,613		
		528	4,955,480		4,955,535	339	4,956,555	240	4,955,614		
117 M	4,956,525	534	4,955,481		4,955,536	368	4,956,556	241	4,955,615		
152 R		CLASS 208		385.1	4,956,557	256	4,956,557	249	4,955,616		
				461.1	4,956,558	258	4,956,558	258	4,955,617		
CLASS 175		120	4,956,075		4,956,559	273	4,956,559	273	4,955,618		
45	4,955,438	291	4,956,076		4,956,560	372	4,956,560	372	4,955,619		
371	4,955,440	CLASS 209		577	4,956,561	428	4,956,561	428	4,955,620		
					4,956,562		4,956,562		4,955,621		
CLASS 177		17	4,955,482		4,956,563		4,956,563		4,955,622		
255	4,955,441	3	4,956,077		4,956,564		4,956,564		4,955,623		
CLASS 178		254	4,956,078		4,956,565		4,956,565		4,955,624		
18	4,956,526	548	4,955,483		4,956,566		4,956,566		4,955,625		
		599	4,956,079		4,956,567		4,956,567		4,955,626		
CLASS 180		122	4,955,484		4,956,568		4,956,568		4,955,627		
6.44	4,955,442	109	4,956,080		4,956,569		4,956,569		4,955,628		
79.1	4,955,443	136	4,956,081		4,956,570		4,956,570		4,955,629		
132	4,955,444	150	4,956,082		4,956,571		4,956,571		4,955,630		
133	4,955,445	222	4,956,083		4,956,572		4,956,572		4,955,631		
143	4,955,446	231	4,956,084		4,956,573		4,956,573		4,955,632		
168	4,955,447	232	4,956,085		4,956,574		4,956,574		4,955,633		
197	4,955,448	232.8	4,956,086		4,956,575		4,956,575		4,955,634		
199	4,955,450	321.8	4,956,087		4,956,576		4,956,576		4,955,635		
213	4,955,451	484	4,956,088		4,956,577		4,956,577		4,955,636		
271	4,955,452	512.1	4,956,089		4,956,578		4,956,578		4,955,637		
287	4,955,453	512.2	4,956,090		4,956,579		4,956,579		4,955,638		
	4,955,454	609	4,956,091		4,956,580		4,956,580		4,955,639		
291	4,955,455	616	4,956,092		4,956,581		4,956,581		4,955,640		
		625	4,956,093		4,956,582		4,956,582		4,955,641		
CLASS 181		670	4,956,094		4,956,583		4,956,583		4,955,642		
111	4,955,952	692	4,956,095		4,956,584		4,956,584		4,955,643		
		717.6	4,956,100		4,956,585		4,956,585		4,955,644		
CLASS 182		718	4,956,097		4,956,586		4,956,586		4,955,645		
3	4,955,456	748	4,956,098		4,956,587		4,956,587		4,955,646		
128	4,955,457	764	4,956,099		4,956,588		4,956,588		4,955,647		
133	4,955,458	780	4,956,101		4,956,589		4,956,589		4,955,648		
		784	4,956,102		4,956,590		4,956,590		4,955,649		
CLASS 184		787	4,956,103		4,956,591		4,956,591		4,955,650		
42	4,955,953	CLASS 211		1	4,955,538		4,955,539		4,955,651		
				3	4,955,540		4,955,541		4,955,652		
9 R	4,955,461	14	4,955,485		4,955,542		4,955,543		4,955,653		
		59.2	4,955,486		4,955,543		4,955,544		4,955,654		
CLASS 188		64	4,955,487		4,955,544		4,955,545		4,955,655		
2 D	4,955,458	88	4,955,488		4,955,545		4,955,546		4,955,656		

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CLASS 322			353	4,955,699	CLASS 360			201	4,956,816	63	4,955,734	103	4,956,131				
28	4,956,598	423	4,955,700	8	4,956,724	222			4,956,819	83	4,955,735	181	4,956,132				
CLASS 323			523	4,955,702	14.3	4,956,725	CLASS 366			120	4,955,736	249	4,956,133				
244	4,956,599	536	4,955,707	27	4,956,726	8			4,956,821	208	4,955,737	297	4,956,135				
CLASS 324			637	4,955,703	49	4,956,727	24			4,955,721	229	4,955,738	300	4,956,136			
103 R	4,956,600	642	4,955,704	66	4,956,728	25			4,955,722	65	4,955,739	34	4,956,134				
134 PB	4,956,601	CLASS 351			96.3	4,956,731	136			4,955,723	119	4,955,744	104	4,956,137			
158 D	4,956,603	41	4,955,706	70	4,956,730	4,956,732			CLASS 367			139	4,955,747	135	4,956,139		
158 F	4,956,604	44	4,955,708	105	4,956,733	23			4,956,822	140	4,955,748	231	4,956,160				
	4,956,605	46	4,955,709	106	4,956,734	24			4,956,823	CLASS 401			235	4,956,161			
158 R	4,956,602	47	4,955,707	104	4,956,735	129			4,956,824	CLASS 403			244	4,956,162			
207.12	4,956,606	156	4,955,710	113	4,956,736	CLASS 368			57	4,955,741	302	4,956,163					
244	4,956,607	160 R	4,955,711	122	4,956,737	9			4,956,825	246	4,955,742	328	4,956,166				
319	4,956,608	169	4,955,712	CLASS 361			8	4,956,738	28	4,956,826	254	4,955,743	339	4,956,167			
425	4,956,610	200	4,955,713	CLASS 353			16	4,956,739	69	4,956,827	239	4,955,744	386	4,956,168			
699	4,956,611	CLASS 354			131	4,956,742	CLASS 369			1	4,955,751	CLASS 424					
CLASS 328			62	4,955,714	321	4,956,744	32			4,956,831	2	4,955,752	54	4,956,172			
5	4,956,612	101	4,956,655	383	4,956,745	44.11			4,956,832	11	4,955,752	63	4,956,173				
CLASS 330			CLASS 355			1	4,956,751	46			4,956,833	108	4,955,754	72	4,956,175		
4.3	4,956,619	155	4,955,715	392	4,956,747	16			4,956,834	CLASS 405			81	4,956,177			
103	Re.33.333	173.1	4,956,656	394	4,956,748	16.1			4,956,835	CLASS 406			114	4,956,179			
253	4,956,613	195.12	4,956,657	414	4,956,749	32.1			4,956,836	CLASS 409			118	4,956,180			
286	4,956,614	212	4,956,658	415	4,956,750	60			4,956,837	CLASS 410			148	4,956,181			
288	4,956,615	400	4,956,659	CLASS 362			63.5	4,956,838	CLASS 411			151	4,956,182				
297	4,956,616	402	4,956,660	CLASS 363			94.1	4,956,841	CLASS 412			154	4,956,183				
CLASS 331			412	4,956,661	CLASS 364			37.4	Re.33.332	CLASS 413			157	4,956,184			
96	4,956,617	CLASS 333			27	4,956,662	62			4,956,842	CLASS 414			158	4,956,185		
116 FE	4,956,618	38	4,956,663	43	4,956,664	104			4,956,620	CLASS 415			159	4,956,186			
21 R	4,956,620	50	4,956,665	201	4,956,666	125			4,956,622	CLASS 416			160	4,956,187			
CLASS 335			208	4,956,667	CLASS 365			32	4,956,624	CLASS 417			161	4,956,188			
128	4,956,623	210	4,956,670	CLASS 366			128	4,956,625	CLASS 418			162	4,956,189				
290	4,956,625	215	4,956,671	CLASS 367			22	4,955,725	CLASS 419			163	4,956,190				
CLASS 336			243	4,956,672	CLASS 368			23	4,956,643	CLASS 420			164	4,956,191			
60	4,956,626	245	4,956,673	CLASS 369			44	4,956,644	CLASS 421			165	4,956,192				
65	4,956,627	251	4,956,674	CLASS 370			56	4,956,645	CLASS 422			166	4,956,193				
CLASS 340			271	4,956,676	CLASS 371			58	4,956,646	CLASS 423			167	4,956,194			
323 R	4,956,628	303	4,956,677	CLASS 372			87	4,956,647	CLASS 424			168	4,956,195				
429	4,956,629	318	4,956,678	CLASS 373			10	4,955,768	CLASS 425			169	4,956,196				
433	4,956,630	326	4,956,679	CLASS 374			12	4,955,769	CLASS 426			170	4,956,197				
436	4,956,631	CLASS 375			137	4,956,649	CLASS 375			459	4,955,813	CLASS 427					
463	4,956,632	152	4,955,716	CLASS 376			94	4,955,771	CLASS 428			34.2	4,956,200				
471	4,956,633	316	4,955,717	CLASS 377			57	4,955,772	CLASS 429			34.6	4,956,201				
521	4,956,634	356	4,955,718	CLASS 378			124	4,955,773	CLASS 430			35.2	4,956,202				
540	4,956,635	359	4,955,719	CLASS 379			131	4,955,774	CLASS 431			35.8	4,956,203				
551	4,956,636	429	4,955,720	CLASS 380			185	4,955,775	CLASS 432			36.4	4,956,204				
644	4,956,637	CLASS 381			411	4,956,776	CLASS 381			100	4,956,860	CLASS 433					
701	4,956,638	4	4,956,680	CLASS 382			424.02	4,956,777	CLASS 382			142	4,956,861	CLASS 434			
707	4,956,639	17	4,956,681	CLASS 383			426.04	4,956,778	CLASS 383			19	4,955,785	CLASS 435			
799	4,956,640	23.4	4,956,682	CLASS 384			426.06	4,956,779	CLASS 384			26	4,955,786	CLASS 436			
825.44	4,956,641	30	4,956,683	CLASS 385			426.05	4,956,780	CLASS 385			110	4,955,787	CLASS 437			
CLASS 341			133	4,956,642	CLASS 386			431.04	4,956,781	CLASS 386			111	4,955,788	CLASS 438		
CLASS 342			51	4,956,643	CLASS 387			431.05	4,956,782	CLASS 387			112	4,955,789	CLASS 439		
351	4,956,644	34	4,956,645	CLASS 388			431.06	4,956,783	CLASS 388			113	4,955,790	CLASS 440			
51	4,956,644	38	4,956,646	CLASS 389			431.07	4,956,784	CLASS 389			114	4,955,791	CLASS 441			
361	4,956,645	41	4,956,647	CLASS 390			431.08	4,956,785	CLASS 390			115	4,955,792	CLASS 442			
CLASS 343			706	4,956,646	CLASS 391			431.09	4,956,786	CLASS 391			116	4,955,793	CLASS 443		
107 R	4,956,648	79	4,956,649	CLASS 392			431.10	4,956,787	CLASS 392			117	4,955,794	CLASS 444			
108	4,956,650	81	4,956,697	CLASS 393			431.11	4,956,788	CLASS 393			118	4,955,795	CLASS 445			
139 R	4,956,652	91	4,956,698	CLASS 394			431.12	4,956,789	CLASS 394			119	4,955,796	CLASS 446			
140 R	4,956,653	11	4,956,701	CLASS 395			431.13	4,956,790	CLASS 395			120	4,955,797	CLASS 447			
CLASS 390			75	4,956,702	CLASS 396			431.14	4,956,791	CLASS 396			121	4,955,798	CLASS 448		
3.67	4,955,974	76	4,956,703	CLASS 397			431.15	4,956,792	CLASS 397			122	4,955,799	CLASS 449			
6.8	4,955,682	80	4,956,704	CLASS 398			431.16	4,956,793	CLASS 398			123	4,955,800	CLASS 450			
96.19	4,955,975	88	4,956,705	CLASS 399			431.17	4,956,794	CLASS 399			124	4,955,801	CLASS 451			
96.20	4,955,683	93	4,956,706	CLASS 400			431.18	4,956,795	CLASS 400			125	4,955,802	CLASS 452			
	4,955,684	140	4,956,707	CLASS 401			431.19	4,956,796	CLASS 401			126	4,955,803	CLASS 453			
96.21	4,955,685	147	4,956,708	CLASS 402			431.20	4,956,797	CLASS 402			127	4,955,804	CLASS 454			
96.22	4,955,686	149	4,956,709	CLASS 403			431.21	4,956,798	CLASS 403			128	4,955,805	CLASS 455			
96.23	4,955,687	188	4,956,710	CLASS 404			431.22	4,956,799	CLASS 404			129	4,955,806	CLASS 456			
96.29	4,955,688	191.1	4,956,711	CLASS 405			431.23	4,956,800	CLASS 405			130	4,955,807	CLASS 457			
96.3	4,955,689	198	4,956,712	CLASS 406			431.24	4,956,801	CLASS 406			131	4,955,808	CLASS 458			
96.34	4,955,690	209	4,956,713	CLASS 407			431.25	4,956,802	CLASS 407			132	4,955,809	CLASS 459			
105	4,955,691	213.11	4,956,714	CLASS 408			431.26	4,956,803	CLASS 408			133	4,955,810	CLASS 460			
162.13	4,955,692	213.27	4,956,715	CLASS 409			431.27	4,956,804	CLASS 409			134	4,955,811	CLASS 461			
166	4,955,693	296	4,956,716	CLASS 410			431.28	4,956,805	CLASS 410			135	4,955,812	CLASS 462			
331	4,955,694	298	4,956,717	CLASS 411			431.29	4,956,806	CLASS 411			136	4,955,813	CLASS 463			
330 R	4,955,695	310	4,956,718	CLASS 412			431.30	4,956,807	CLASS 412			137	4,955,814	CLASS 464			
332 R	4,955,696	324	4,956,719	CLASS 413			431.31	4,956,808	CLASS 413			138	4,955,815	CLASS 465			
332	4,955,697	402	4,956,720	CLASS 414			431.32	4,956,809	CLASS 414			139	4,955,816	CLASS 466			
116	4,955,698	444	4,956,721	CLASS 415			431.33	4,956,810	CLASS 415			140	4,955,817	CLASS 467			
116	4,955,699	449	4,956,722	CLASS 416			431.34	4,956,811	CLASS 416			141	4,955,818	CLASS 468			
116	4,955,700	451	4,956,723	CLASS 417			431.35	4,956,812	CLASS 417			142	4,955,819	CLASS 469			
116	4,955,701	452	4,956,724	CLASS 418			431.36	4,956,813	CLASS 418			143	4,955,820	CLASS 470			
116	4,955,702	453	4,956,725	CLASS 419			431.37	4,956,814	CLASS 419			144	4,955,821	CLASS 471			
116	4,955,703	454	4,956,726	CLASS 420			431.38	4,956,815	CLASS 420			145	4,955,822	CLASS 472			
116	4,955,704	455	4,956,727	CLASS 421			431.39	4,956,816	CLASS 421			146	4,955,823	CLASS 473			
116	4,955,705	456	4,956,728	CLASS 422			431.40	4,956,817	CLASS 422			147	4,955,824	CLASS 474			
116	4,955,706	457	4,956,729	CLASS 423			431.41	4,956,818	CLASS 423			148	4,955,825	CLASS 475			
116	4,955,707	458	4,956,730	CLASS 424			431.42	4,956,819	CLASS 424			149	4,955,826	CLASS 476			
116	4,955,708	459	4,956,731	CLASS 425			431.43	4,956,820	CLASS 425			150	4,955,827	CLASS 477			
116	4,955,709	460	4,956,732	CLASS 426			431.44	4,956,821	CLASS 426			151	4,955,828	CLASS 478			
116	4,955,710	461	4,956,733	CLASS 427			431.45	4,956,822	CLASS 427			152	4,955,829	CLASS 479			
116	4,955,711	462	4,956,734	CLASS 428			431.46	4,956,823	CLASS 428			153	4,955,830	CLASS 480			
116	4,955,712	463	4,956,735	CLASS 429			431.47	4,956,824	CLASS 429			154	4,955,831	CLASS 481			
116	4,955,713	464	4,956,736	CLASS 430			431.48	4,956,825	CLASS 430			155	4,955,832	CLASS 482			
116	4,955,714	465	4,956,737	CLASS 431			431.49	4,956,826	CLASS 431			156	4,955,833	CLASS 483			
116	4,955,715</																



408	4,956,238	292	4,956,297	88	4,956,316	810	4,956,391	399	4,956,435	646	4,956,516
411.1	4,956,239		CLASS 436	92	4,956,317		CLASS 518		CLASS 536	651	4,956,515
423.7	4,956,240	18	4,956,299	96	4,956,318			615	4,956,456	660	4,956,517
516	4,956,241	66	4,956,300	137	4,956,320	712	4,956,392	643	4,956,457	726	4,956,518
606	4,956,242	87	4,956,301	146	4,956,321		CLASS 521		CLASS 536	751	4,956,519
694	4,956,243	161	4,956,302		CLASS 502	54	4,956,393		CLASS 546	815	4,956,520
		542	4,956,303	1.78	4,956,326	79	4,956,395	112	4,956,458	826	4,956,521
17	4,956,244		CLASS 437	62	4,956,327	84.1	4,956,394	121	4,956,459	828	4,956,522
26	4,956,245	113	4,956,323		4,956,325	85	4,956,396		CLASS 544		CLASS 600
104	4,956,246	3	4,956,304	163	4,956,324		CLASS 523	234	4,956,460	16	4,933,856
194	4,956,247	31	4,956,305		4,956,325			240	4,956,118		CLASS 604
	4,956,248	34	4,956,306	216	4,956,327	138	4,956,397	238	4,956,461	5	4,953,858
CLASS 438		40	4,956,307	242	4,956,328	209	4,956,398	263	4,956,462	8	4,953,859
3	4,956,249	41	4,956,308	251	4,956,329	223	4,956,399	320	4,956,463		
58	4,956,250	52	4,956,310	326	4,956,330		4,956,400		CLASS 546	67	4,953,860
	4,956,250	57	4,956,311	339	4,956,331	310	4,956,401			61	4,953,861
	4,956,277	180	4,956,312			413	4,956,402			144	4,953,862
59	4,956,253	203	4,956,313		CLASS 503		CLASS 524	57	4,956,464	164	4,953,863
96	4,956,256	241	4,956,314	209	4,956,332	5	4,956,403	156	4,956,465	174	4,953,864
109	4,956,258		CLASS 439		4,956,333	11	B1 4,866,110		CLASS 548	179	4,953,867
137	4,956,259	60	4,953,817		CLASS 505	48	4,956,404	101	4,956,466	181	4,953,878
138	4,956,251	66	4,953,818	1	4,956,334	100	4,956,405	112	4,956,467	182	4,953,865
	4,956,252	77	4,953,814		4,956,335	119	4,956,406	200	4,956,468		4,953,866
	4,956,253	79	4,953,819		4,956,336	120	4,956,407	231	4,956,469	195	4,953,869
	4,956,254	83	4,953,820		4,956,337	147	4,956,408	337	4,956,470		4,953,870
	4,956,260	133	4,953,821		4,956,338	211	4,956,409	344	4,956,471	198	4,953,868
	4,956,309	350	4,953,815		4,956,339	474	4,956,497	406	4,956,472	217	4,953,871
	4,956,261	421	4,953,816		4,956,340	492	4,956,498	408	4,956,473	273	4,953,872
156	4,956,262	505	4,953,822		CLASS 512		4,956,499	475	4,956,474	319	4,953,874
162	4,956,263	510	4,953,823		4,956,341		CLASS 525	332	4,956,476	322	4,953,873
264	4,956,264	510	4,953,824	23	4,956,342	54.5	4,956,500	337	4,956,475	327	4,953,879
281	4,956,265	578	4,953,825	24		64	4,956,501		CLASS 549	331	4,953,875
283	4,956,266	598	4,953,826		CLASS 514	73	4,956,510	221	4,956,	385.2	4,953,876
311	4,956,298	668	4,953,828	11	4,956,343	190	4,956,512	255	4,956,478	393	4,953,880
325	4,956,266	719	4,953,829	18	4,956,344	192	4,956,513	264	4,956,479	408	4,953,877
372	4,956,267	821	4,953,830	46	4,956,345	280	4,956,514	288	4,956,480	890.1	4,953,881
393	4,956,268		CLASS 440	47	4,956,346	327.6	4,956,515	459	4,956,481		CLASS 606
505	4,956,269	1	4,955,831	50	4,956,347	327.7	4,956,516		CLASS 552	14	4,955,882
527	4,956,270	49	4,955,832	54	4,956,348	330.6	4,956,517	594	4,956,482	28	4,955,883
CLASS 431		63	4,955,833	53	4,956,349	330.6	4,956,518		CLASS 556	46	4,955,884
1	4,955,805	88	4,955,834	58	4,956,350	331	4,956,519			53	4,955,885
24	4,955,806	77	4,955,836	63	4,956,351	351	4,956,520	26	4,956,483	69	4,955,886
296	4,955,807	84	4,955,837	65	4,956,352	385	4,956,521	410	4,956,484	82	4,955,888
CLASS 432		89	4,955,838	65	4,956,353	392	4,956,522	446	4,956,485	107	4,955,887
5	4,955,808	101	4,955,839	157	4,956,354	432	4,956,523	466	4,956,486	108	4,955,889
14	4,955,966		CLASS 441	178	4,956,355	462	4,956,524		CLASS 558	130	4,953,890
39	4,956,271	74	4,955,835	202	4,956,356	424	4,956,525	98	4,956,487	152	4,953,891
247	4,955,809		CLASS 446	210	4,956,357		CLASS 526	414	4,956,488	154	4,953,892
CLASS 433		17	4,955,840	213	4,956,358	60	4,956,526		CLASS 560	167	4,955,894
72	4,955,810	46	4,955,841	217	4,956,360	62	4,956,527			194	4,955,895
173	4,955,811	16	4,955,842	227.5	4,956,361	90	4,956,528	40	4,956,489	210	4,955,896
CLASS 434		160	4,955,843	232.2	4,956,362	195	4,956,529	051	4,956,490		4,953,897
16	4,955,812	330	4,955,844	232.2	4,956,363	255	4,956,531	172	4,956,491	219	4,955,898
CLASS 435		397	4,955,845	235.8	4,956,366	264	4,956,532	190	4,956,492	228	4,953,913
			CLASS 458	236.2	4,956,367	318.2	4,956,534	208	4,956,493	235	4,953,914
1	4,956,272		4,956,368		4,956,368		CLASS 528		CLASS 562		CLASS 623
5	4,956,273	69	4,955,846	254	4,956,369		4,956,435	118	4,956,494	1	4,953,899
7	4,956,274		CLASS 455	274	4,956,370	17	4,956,436	567	4,956,495	6	4,953,900
12	4,956,275	13	4,956,875	307	4,956,371	18	4,956,437		CLASS 544	106	4,953,901
30	4,956,276	78	4,956,876	311	4,956,372	26	4,956,438			133	4,953,902
42	4,956,277	605	4,956,877	321	4,956,373	53	4,956,439			106	4,953,903
69.1	4,956,280		CLASS 464	341	4,956,374	60	4,956,440			133	4,953,904
69.3	4,956,281	111	4,955,847	342	4,956,375	93	4,956,441	404	4,956,496	8	4,953,905
69.51	4,956,282		4,955,848	361	4,956,376	171	4,956,442		CLASS 568		4,953,906
76	4,956,283		CLASS 474	381	4,956,377	205	4,956,443	316	4,956,505	11	4,953,907
123	4,956,284	28	4,953,848	404	4,956,378	206	4,956,444	729	4,956,502	13	4,953,908
126	4,956,285	80	4,953,849	406	4,956,379	220	4,956,445	899	4,956,506	16	4,953,911
134	4,956,286	92	4,953,850	422	4,956,380	272	4,956,446		CLASS 570	17	4,953,912
	4,956,287		CLASS 475	443	4,956,381		4,956,447	140	4,956,507	21	4,953,915
172.3	4,956,288		4,955,851		4,956,382		4,956,448		CLASS 585		4,953,916
180	4,956,289	59	4,955,852	467	4,956,383		4,956,449			22	4,953,925
189	4,956,290	146	4,955,853	470	4,956,384	353	4,956,450	26	4,956,508		4,953,917
200	4,956,291	241	4,955,854	494	4,956,385		4,956,451	300	4,956,509		4,953,919
235	4,956,292		CLASS 493	503	4,956,386		CLASS 530	415	4,956,510	24	4,953,918
252.1	4,956,294	404	4,953,855	522	4,956,387	324	4,956,449	475	4,956,511	36	4,953,920
252.33	4,956,295		CLASS 501	651	4,956,388	387	4,956,452	521	4,956,512		CLASS 8.4
253.2	4,956,296	87	4,956,313	654	4,956,389	389	4,956,453	525	4,956,513	101	4,953,923
	4,956,297		4,956,314	747	4,956,390		4,956,454	533	4,956,514		

# CLASSIFICATION OF DESIGNS

PI 83

D1—	127	310,440	D8—	667	310,466	46.1	310,492	310,518	99	310,544	D25—	1	310,570		
D2—	314	310,441		14	310,467					310,545		119	310,571		
		310,442			310,468					310,546			310,572		
	323	310,443		57	310,469	98	310,493	310,521	D21—	11	310,547	D26—	35	310,573	
D3—	30.1	310,444		62	310,470	106	310,496	129	310,522	86	310,548		44	310,574	
	35	310,445		72	310,471	109	310,497	137	310,523	157	310,549		47	310,575	
	38	310,446		82	310,472	D11—	35	310,498	151	310,524	194	310,550		58	310,576
	61	310,447		90	310,473	130.1	310,499	162	310,525	219	310,551		67	310,577	
		310,448		99	310,474		310,500	163	310,526	246	310,552	D27—	187	310,578	
	62	310,449			310,475	D12—	97	310,501	310,527	115	310,553	D28—	2	310,579	
	76	310,450		353	310,476		155	310,502	310,528	149	310,554		46	310,580	
D6—	337	310,451		356	310,477		156	310,503	168	310,529	D23—	213	310,581		
	361	310,452		373	310,478		157	310,504	205	310,530		263	310,582		
	372	310,453		376	310,479		187	310,505	D15—	11	310,531		64	310,583	
	470	310,454		300	310,480		196	310,506		69	310,532			310,584	
	491	310,455		341	310,481		202	310,507		139	310,533		64.1	310,585	
		310,456		344	310,482		317	310,508	D16—	214	310,534		D29—	7	310,586
	525	310,457		371	310,483	D13—	103	310,509		241	310,535		D30—	109	310,586
	531	310,458		384	310,484		128	310,510		246	310,536		161	310,587	
	556	310,459		418	310,488		133	310,511	D17—	22	310,537			310,588	
	583	310,460		424	310,485		146	310,512			310,538		D32—	40	310,589
D7—	318	310,461		423	310,486		182	310,514	D18—	40	310,539		60	310,590	
	504	310,462		24	310,489	D14—	100	310,515		42	310,540		60	310,591	
	614	310,463	D10—	32	310,490		106	310,516		43	310,541		70	310,592	
	615	310,464		46	310,491			310,517	D19—		310,542		27	310,593	
	644	310,465								76	310,543		28	310,594	

## CLASSIFICATION OF PLANTS

P.—	1 17	7,319 7,320	68	7,321	7,322	69	7,323	74	7,324	7,325
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4,956,422	4,956,767	4,956,047	4,956,283	4,956,648
4,956,475	4,956,771	4,956,571	4,956,335	4,956,762
4,956,522	4,956,829	4,956,635	4,956,416	4,956,798
4,956,525	4,956,844	4,955,104	4,956,423	4,955,097
4,956,561	4,956,859	4,955,152	4,956,437	4,955,134
4,956,563	4,956,867	4,955,190	4,956,440	4,955,182
4,956,574	4,955,089	4,955,295	4,956,457	4,955,235
4,956,581	4,955,231	4,955,319	4,956,467	4,955,269
4,956,598	4,955,251	4,955,325	4,956,521	4,955,273
4,956,626	4,955,291	4,955,477	4,956,548	4,955,292
4,956,696	4,955,311	4,955,489	4,956,589	4,955,318
4,956,842	4,955,333	4,955,511	4,956,605	4,955,323
4,956,843	4,955,336	4,955,601	4,956,608	4,955,326
4,956,854	4,955,338	4,955,614	4,956,658	4,955,332
4,956,868	4,955,341	4,955,842	4,956,666	4,955,395
4,955,130	4,955,345	4,955,843	4,956,667	4,955,403
4,955,337	4,955,350	4,955,886	4,956,668	4,955,405
4,955,365	4,955,354	4,955,919	4,956,674	4,955,427
4,955,575	4,955,355	4,955,921	4,956,675	4,955,436
4,955,806	4,955,356	4,956,002	4,956,676	4,955,437
4,955,864	4,955,454	4,956,004	4,956,705	4,955,459
4,955,870	4,955,461	4,956,075	4,956,759	4,955,479
4,955,885	4,955,473	4,956,105	4,956,779	4,955,481
4,955,910	4,955,488	4,956,107	4,956,791	4,955,487
4,956,130	4,955,492	4,956,108	4,956,824	4,955,531
4,956,178	4,955,497	4,956,122	4,956,826	4,955,567
4,956,182	4,955,524	4,956,161	4,955,088	4,955,583
4,956,279	4,955,534	4,956,171	4,955,109	4,955,699
4,956,301	4,955,534	4,956,176	4,955,146	4,955,756
4,956,388	4,955,571	4,956,185	4,955,264	4,955,768
4,956,527	4,955,616	4,956,233	4,955,351	4,955,769
4,956,612	4,955,621	4,956,241	4,955,399	4,955,787
4,956,691	4,955,655	4,956,252	4,955,429	4,955,789
4,956,710	4,955,658	4,956,294	4,955,728	4,955,818
4,955,410	4,955,672	4,956,316	4,955,732	4,955,823
4,955,766	4,955,675	4,956,342	4,956,000	4,955,845
4,955,778	4,955,676	4,956,383	4,956,085	4,955,883
4,956,856	4,955,692	4,956,420	4,956,306	4,955,967
4,956,836	4,955,743	4,956,429	4,956,630	4,955,983
4,955,594	4,955,750	4,956,430	4,956,633	4,955,999
4,955,102	4,955,771	4,956,458	4,956,777	4,956,009
4,955,359	4,955,773	4,956,479	4,955,455	4,956,012
4,955,397	4,955,797	4,956,481	4,955,576	4,956,095
4,955,474	4,955,804	4,956,509	Re.33.327	4,956,121
4,955,510	4,955,827	4,956,510	4,955,103	4,956,140
4,955,679	4,955,851	4,956,514	4,955,181	4,956,145
4,955,875	4,955,915	4,956,517	4,955,197	4,956,158
4,956,486	4,956,017	4,956,518	4,955,203	4,956,172
4,956,617	4,956,033	4,956,575	4,955,205	4,956,202
4,956,766	4,956,095	4,956,637	4,955,223	4,956,207
4,955,287	4,956,203	4,956,698	4,955,328	4,956,237
4,955,591	4,956,221	4,956,743	4,955,423	4,956,315
4,955,608	4,956,218	4,956,784	4,955,441	4,956,321
4,955,765	4,956,415	4,956,871	4,955,458	4,956,390
4,955,892	4,956,424	4,956,888	4,955,513	4,956,394
4,955,952	4,956,442	4,955,092	4,955,538	4,956,483
4,956,104	4,956,472	4,955,112	4,955,609	4,956,494
4,956,278	4,956,591	4,955,135	4,955,763	4,956,560
4,956,450	4,956,796	4,955,142	4,955,795	4,956,606
4,956,451	4,955,138	4,955,149	4,955,813	4,956,646
4,956,501	4,955,172	4,955,154	4,955,824	4,956,741
4,956,513	4,955,505	4,955,158	4,955,825	4,956,752
4,956,150	4,955,690	4,955,159	4,955,928	4,956,862
4,955,868	4,955,757	4,955,174	4,955,984	4,955,136
4,955,939	4,955,866	4,955,175	4,955,995	4,955,421
4,956,094	4,955,876	4,955,177	4,956,028	4,955,117
4,956,168	4,955,926	4,955,215	4,956,045	4,955,373
4,956,200	4,955,972	4,955,276	4,956,141	4,955,420
4,956,296	4,956,188	4,955,313	4,956,189	4,955,503
4,956,432	4,956,230	4,955,315	4,956,210	4,955,657
4,956,524	4,956,265	4,955,372	4,956,309	4,955,913
4,956,600	4,956,297	4,955,406	4,956,338	4,955,996
4,956,851	4,956,350	4,955,469	4,956,401	4,956,048
4,955,141	4,956,419	4,955,482	4,956,409	4,956,212
4,955,284	4,956,533	4,955,555	4,956,434	4,955,631
4,955,380	4,956,597	4,955,572	4,956,447	4,955,242
4,955,475	4,956,702	4,955,584	4,956,495	4,955,604
4,955,520	4,956,793	4,955,592	4,956,500	4,955,872
4,955,563	4,956,808	4,955,602	4,956,592	4,955,896
4,955,613	4,956,821	4,955,628	4,956,610	4,956,347
4,955,686	4,956,877	4,955,640	4,956,633	4,956,406
4,955,711	Re.33.333	4,955,647	4,956,635	4,956,443
4,955,861	4,955,984	4,955,651	4,955,232	4,956,448
4,955,874	4,955,125	4,955,661	4,955,391	4,956,632
4,955,893	4,955,209	4,955,720	4,955,468	4,955,095
4,955,904	4,955,486	4,955,748	4,955,485	4,955,124
4,955,969	4,955,502	4,955,801	4,955,615	4,955,140
4,956,030	4,955,746	4,955,840	4,955,834	4,955,151
4,956,061	4,956,040	4,955,873	4,956,155	4,955,165
4,956,071	4,956,099	4,955,877	4,956,290	4,955,166
4,956,194	4,956,115	4,955,897	4,956,330	4,955,195
4,956,271	4,956,163	4,955,902	4,956,408	4,955,226
4,956,281	4,955,759	4,955,962	4,956,476	4,955,262
4,956,288	4,955,760	4,955,965	4,956,506	4,955,322
4,956,299	4,956,133	4,955,977	4,956,507	4,955,367
4,956,348	4,956,135	4,956,144	4,956,515	4,955,369
4,956,461	4,955,411	4,956,164	4,955,401	4,955,393
4,956,477	4,955,660	4,956,165	4,955,439	4,955,515
4,956,544	Re.33.331	4,956,181	4,955,528	4,955,547
4,956,604	4,955,090	4,956,184	4,955,693	4,955,585
4,956,640	4,955,309	4,956,186	4,955,714	4,955,611
4,956,665	4,955,377	4,956,190	4,955,812	4,955,634
4,956,683	4,955,519	4,956,197	4,955,888	4,955,645
4,956,740	4,955,582	4,956,199		
4,956,760	4,955,981	4,956,232		



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## DESIGN PATENTS

01 :	310,590	310,564	310,494	28 :	310,577	310,534	44 :	310,561
04 :	310,549	310,568	310,502	30 :	310,554	310,535		310,447
05 :	310,530	310,573	310,571	31 :	310,553	310,536		310,485
	310,566	310,576	310,575	33 :	310,477	310,578		310,585
06 :	310,445	310,583	310,504	34 :	310,443	310,584	48 :	310,446
	310,453	310,587	310,572		310,482	310,586		310,479
	310,465	310,588	310,441	39 :	310,440	310,456		310,545
	310,467	08 : 310,501	310,459		310,458	310,533		310,570
	310,469	09 : 310,475	310,510		310,487	310,555		310,580
	310,478	12 : 310,515	310,463	25 :	310,560	310,471	54 :	310,591
	310,492		310,464		310,567	310,507	55 :	310,474
	310,493		310,514		310,574	310,552		310,451
	310,497		310,579	36 :	310,476	310,442		310,546
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	310,544	17 : 310,581	310,462	42 :	310,496	310,472		310,559
	310,556							

## PLANT PATENTS

06 :	7,320	7,321	7,322	7,324	7,325
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U.S. DEPARTMENT OF COMMERCE  
Robert A. Mosbacher, *Secretary*  
PATENT AND TRADEMARK OFFICE  
Harry F. Marbeck, Jr., *Commissioner*

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## PATENT AND TRADEMARK OFFICE NOTICES

### Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1118 O.G. 14 on Sept. 11, 1990.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on September 1, 1990 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss Franc and were announced in the *Official Gazette* at 1116 O.G. 32 on July 17, 1990.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee: .....	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as	
International Searching Authority (ISA)	
—No corresponding prior U.S. national	
application filed .....	550.00
—Corresponding prior U.S. national	
application filed .....	380.00
—Supplemental search fee, per	
additional invention .....	150.00
European Patent Office as ISA .....	1242.00
Preliminary examination fee	
USPTO as International Preliminary Examining	
Authority (IPEA)	
—Search fee paid to USPTO as ISA .....	400.00
—Additional examination fee, per	
additional invention .....	130.00
—ISA not the USPTO .....	600.00
—Additional examination fee,	
per additional invention .....	200.00
International fees	
Basic fee .....	502.00
Basic Supplemental fee (for each page	
over 30) .....	10.00
Designation fee per country or region	
for the first 10 national or regional	
offices .....	122.00
Designation fee for 11th and	No
subsequent designations .....	Charge
Handling fee .....	154.00

### U.S. National Stage fees

					Small Entity	Regular
USPTO	was	IPEA			165.00	330.00
1118 OG 28						

USPTO was ISA but not IPEA .....	185.00	370.00
USPTO was neither ISA nor IPEA .....	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) .....	25.00	50.00
—For each independent claim in excess of 3 .....	18.00	36.00
—For each claim in excess of 20 .....	6.00	12.00
—For each application con- taining a multiple depen- dent claim .....	60.00	120.00
—Surcharge for filing nation- al fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1) .....	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1) .....	30.00	30.00

Aug. 16, 1990

HARRY F. MANBECK, Jr.  
Assistant Secretary and Commissioner  
of Patents and Trademarks.

### Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on September 15, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,692,946 through 4,694,504  
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on September 13, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,403,353 through 4,404,686  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....	\$245.00"
"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....	\$495.00"
"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:	
By a small entity (§ 1.9(f)).....	\$245.00
By other than a small entity.....	\$490.00"
"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:	
By a small entity (§ 1.9(f)).....	\$495.00
By other than a small entity.....	\$990.00"
The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:	
"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982.....	\$120.00"
"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:	
By a small entity (§ 1.9(f)).....	\$60.00
By other than a small entity.....	\$120.00"
"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....	\$550.00"
 <b>Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees</b>	
35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.	
According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.	
<b>PATENTS WHICH EXPIRED JULY 8, 1990 DUE TO FAILURE TO PAY MAINTENANCE FEES</b>	
Patent Number	Serial Number Issue Date
4,337,551	06/289,708 7/06/82
4,337,559	06/281,741 7/06/82
4,337,561	06/289,152 7/06/82
4,337,678	06/249,048 7/06/82
4,337,694	06/278,629 7/06/82
4,337,725	06/243,340 7/06/82
4,337,782	06/266,215 7/06/82
4,337,783	06/231,145 7/06/82
4,337,799	06/252,917 7/06/82
4,337,811	06/277,172 7/06/82
4,337,816	06/256,988 7/06/82
4,337,825	06/231,983 7/06/82
4,337,860	06/304,315 7/06/82
4,337,875	06/243,068 7/06/82
4,337,888	06/254,002 7/06/82
4,337,919	06/275,496 7/06/82
4,338,073	06/253,153 7/06/82
4,338,093	06/279,375 7/06/82
4,338,097	06/217,151 7/06/82
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4,338,118	06/276,588 7/06/82
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4,338,203	06/231,647 7/06/82
4,338,206	06/246,512 7/06/82
4,338,235	06/220,952 7/06/82
4,338,236	06/220,956 7/06/82
4,338,257	06/238,338 7/06/82
4,338,281	06/254,855 7/06/82
4,338,296	06/231,528 7/06/82
4,338,321	06/233,429 7/06/82
4,338,363	06/234,476 7/06/82
4,338,373	06/217,919 7/06/82
4,338,374	06/217,918 7/06/82
4,338,392	06/287,662 7/06/82
4,338,394	06/220,756 7/06/82
4,338,400	06/228,240 7/06/82
4,338,404	06/228,505 7/06/82
4,338,441	06/225,198 7/06/82
4,338,444	06/217,864 7/06/82
4,338,446	06/238,483 7/06/82
4,338,449	06/273,718 7/06/82
4,338,458	06/245,519 7/06/82
4,338,459	06/240,721 7/06/82
4,338,478	06/218,018 7/06/82
4,338,482	06/234,646 7/06/82
4,338,551	06/215,768 7/06/82
4,338,570	06/271,061 7/06/82
4,338,646	06/257,837 7/06/82
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4,598,446	06/654,416 7/08/86
4,598,448	06/583,246 7/08/86
4,598,450	06/685,911 7/08/86
4,598,457	06/769,219 7/08/86
4,598,464	06/573,393 7/08/86
4,598,465	06/539,146 7/08/86
4,598,474	06/619,393 7/08/86
4,598,480	06/794,690 7/08/86
4,598,481	06/764,678 7/08/86
4,598,485	06/743,383 7/08/86
4,598,492	06/781,270 7/08/86
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4,598,505	06/699,746 7/08/86
4,598,509	06/747,926 7/08/86
4,598,519	06/630,822 7/08/86
4,598,524	06/755,895 7/08/86
4,598,527	06/662,366 7/08/86
4,598,530	06/747,790 7/08/86
4,598,549	06/740,220 7/08/86</

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Patent Number	Serial Number	Issue Date	4,599,039	06/539,730	7/08/86
4,598,626	06/685,204	7/08/86	4,599,046	06/482,957	7/08/86
4,598,631	06/652,224	7/08/86	4,599,048	06/722,192	7/08/86
4,598,635	06/740,703	7/08/86	4,599,052	06/714,694	7/08/86
4,598,637	06/645,417	7/08/86	4,599,057	06/673,744	7/08/86
4,598,641	06/697,735	7/08/86	4,599,059	06/642,243	7/08/86
4,598,644	06/720,490	7/08/86	4,599,066	06/792,165	7/08/86
4,598,650	06/789,430	7/08/86	4,599,070	06/288,131	7/08/86
4,598,651	06/653,680	7/08/86	4,599,072	06/589,357	7/08/86
4,598,653	06/755,981	7/08/86	4,599,074	06/671,205	7/08/86
4,598,657	06/782,146	7/08/86	4,599,081	06/430,403	7/08/86
4,598,659	06/627,994	7/08/86	4,599,084	06/497,624	7/08/86
4,598,662	06/465,768	7/08/86	4,599,085	06/575,696	7/08/86
4,598,672	06/699,217	7/08/86	4,599,092	06/559,725	7/08/86
4,598,688	06/429,301	7/08/86	4,599,106	06/736,748	7/08/86
4,598,690	06/721,459	7/08/86	4,599,126	06/491,319	7/08/86
4,598,696	06/726,579	7/08/86	4,599,140	06/602,882	7/08/86
4,598,698	06/692,434	7/08/86	4,599,146	06/674,739	7/08/86
4,598,699	06/743,000	7/08/86	4,599,147	06/629,855	7/08/86
4,598,706	06/584,122	7/08/86	4,598,158	06/717,833	7/08/86
4,598,721	06/665,838	7/08/86	4,599,172	06/686,072	7/08/86
4,598,723	06/657,767	7/08/86	4,599,177	06/597,237	7/08/86
4,598,724	06/643,171	7/08/86	4,599,179	06/512,919	7/08/86
4,598,725	06/691,859	7/08/86	4,599,194	06/621,404	7/08/86
4,598,734	06/775,698	7/08/86	4,599,205	06/624,004	7/08/86
4,598,737	06/763,341	7/08/86	4,599,225	06/752,097	7/08/86
4,598,740	06/488,238	7/08/86	4,599,236	06/720,910	7/08/86
4,598,742	06/794,598	7/08/86	4,599,237	06/768,726	7/08/86
4,598,746	06/717,830	7/08/86	4,599,258	06/715,286	7/08/86
4,598,749	06/691,318	7/08/86	4,598,278	06/696,455	7/08/86
4,598,762	06/575,983	7/08/86	4,599,283	06/522,823	7/08/86
4,598,766	06/421,485	7/08/86	4,599,308	06/536,579	7/08/86
4,598,783	06/653,456	7/08/86	4,599,331	06/685,568	7/08/86
4,598,802	06/655,538	7/08/86	4,599,333	06/591,904	7/08/86
4,598,807	06/674,392	7/08/86	4,599,337	06/755,404	7/08/86
4,598,817	06/755,790	7/08/86	4,599,346	06/630,963	7/08/86
4,598,822	06/703,220	7/08/86	4,599,347	06/560,699	7/08/86
4,598,824	06/646,636	7/08/86	4,599,348	06/648,910	7/08/86
4,598,825	06/686,945	7/08/86	4,599,349	06/597,777	7/08/86
4,598,836	06/660,200	7/08/86	4,599,350	06/675,159	7/08/86
4,598,839	06/495,526	7/08/86	4,599,351	06/575,971	7/08/86
4,598,841	06/512,969	7/08/86	4,599,355	06/637,882	7/08/86
4,598,847	06/580,732	7/08/86	4,599,359	06/668,896	7/08/86
4,598,848	06/807,129	7/08/86	4,599,390	06/777,458	7/08/86
4,598,855	06/406,770	7/08/86	4,599,398	06/652,699	7/08/86
4,598,858	06/717,241	7/08/86	4,599,409	06/580,181	7/08/86
4,598,874	06/558,358	7/08/86	4,599,415	06/720,744	7/08/86
4,598,887	06/773,091	7/08/86	4,599,417	06/668,156	7/08/86
4,598,895	06/646,099	7/08/86	4,599,423	06/595,751	7/08/86
4,598,902	06/686,209	7/08/86	4,599,430	06/576,294	7/08/86
4,598,906	06/669,640	7/08/86	4,599,436	06/479,746	7/08/86
4,598,912	06/654,970	7/08/86	4,599,446	06/723,800	7/08/86
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4,598,916	06/678,721	7/08/86	4,598,450	06/608,990	7/08/86
4,598,919	06/617,479	7/08/86	4,599,452	06/616,894	7/08/86
4,598,925	06/529,736	7/08/86	4,599,461	06/690,120	7/08/86
4,598,927	06/719,525	7/08/86	4,599,467	06/722,180	7/08/86
4,598,928	06/572,101	7/08/86	4,599,468	06/744,569	7/08/86
4,598,931	06/693,679	7/08/86	4,599,516	06/472,199	7/08/86
4,598,940	06/681,286	7/08/86	4,599,536	06/581,826	7/08/86
4,598,945	06/769,349	7/08/86	4,599,544	06/613,459	7/08/86
4,598,949	06/671,510	7/08/86	4,599,554	06/679,939	7/08/86
4,598,959	06/548,979	7/08/86	4,599,566	06/480,639	7/08/86
4,598,963	06/548,739	7/08/86	4,599,577	06/705,705	7/08/86
4,598,968	06/292,591	7/08/86	4,599,588	06/570,602	7/08/86
4,598,971	06/718,561	7/08/86	4,599,592	06/697,627	7/08/86
4,598,976	06/728,033	7/08/86	4,599,605	06/690,085	7/08/86
4,598,978	06/468,712	7/08/86	4,599,609	06/678,538	7/08/86
4,598,987	06/674,805	7/08/86	4,599,614	06/531,940	7/08/86
4,598,988	06/653,602	7/08/86	4,599,616	06/512,435	7/08/86
4,598,995	06/729,546	7/08/86	4,599,622	06/629,926	7/08/86
4,599,003	06/693,563	7/08/86	4,599,630	06/669,838	7/08/86
4,599,012	06/672,807	7/08/86	4,599,633	06/675,924	7/08/86
4,599,017	06/588,133	7/08/86	4,599,646	06/611,756	7/08/86
4,599,023	06/681,379	7/08/86	4,599,665	06/732,881	7/08/86
4,599,029	06/709,833	7/08/86	4,599,682	06/667,808	7/08/86
4,599,033	06/577,261	7/08/86	4,599,683	06/623,822	7/08/86
4,599,035	06/694,972	7/08/86	4,599,686	06/645,812	7/08/86
			4,599,687	06/672,259	7/08/86

SEPTEMBER 18, 1990

U. S. PATENT AND TRADEMARK OFFICE

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Patent Number	Serial Number	Issue Date	4,599,731	06/604,686	7/08/86
4,599,700	06/731,597	7/08/86	4,599,736	06/632,582	7/08/86
4,599,726	06/606,039	7/08/86	4,599,745	06/612,484	7/08/86

**NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)**

The patent(s) listed below is considered as not having expired but is subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fee which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,498,747	06/519,484	2/12/85	8/01/83	8/14/90

**REISSUE APPLICATIONS FILED**

Notice under 37 CFR 1.111(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**4,752,793**, Re. S. N. 07/540,192, Filed June 19, 1990, Cl. 354/173.11, CAMERA WITH MOTORIZED FILM REWINDING DEVICE, Masahura Kawamura, et al., Owner of Record: *Canon Kabushiki Kaisha, Tokyo, Japan*, Attorney or Agent: James J. Daley, Ex. Gp.: 211

**4,762,316**, Re. S. N. 07/563,412, Filed Aug. 7, 1990, Cl. 272/56.5, WAVE SURFING SIMULATION, Dennis Merino, Owner of Record: *Inventor*, Attorney or Agent: Louis J. Bovasso, Ex. Gp.: 354

**4,767,537**, Re. S. N. 07/562,970, Filed Aug. 6, 1990, Cl. 210/608, DEWATERING OF SLUDGE USING NITRATE, H. Forbes Davis, Owner of Record: *Davis Water & Waste Industries, Inc., Thomasville, Ga.*, Attorney or Agent: Michail J. Keenan, Ex. Gp.: 136

**4,722,819**, Re. S. N. 07/564,496, Filed Aug. 6, 1990, Cl. 264/177.11, DIE AND PROCESSES FOR MANUFACTURING HONEY COMB STRUCTURES, Christian Bent Lundsager, Owner of Record: *W. R. Grace & Co.-Conn, New York, N. Y.*, Attorney or Agent: Edward J. Cabic, Ex. Gp.: 137

**4,744,237**, Re. S. N. 07/565,806, Filed May 15, 1990, Cl. 72/367, METHOD OF FORMING BOX-LIKE FRAME MEMBERS, Ivano Cudini, Owner of Record: *TI Corporate Services Limited, London, England*, Attorney or Agent: Conrad J. Clark, Ex. Gp.: 321

**4,775,180**, Re. S. N. 07/563,563, Filed Aug. 6, 1990, Cl. 160/84.1, AUTOMATIC RETRACTABLE SHADE, Arthur J. Phillips, Owner of Record: *Inventor*, Attorney or Agent: Glenn K. Beaton, Ex. Gp.: 355

**4,783,031**, Re. S. N. 07/560,834, Filed July 31, 1990, Cl. 248/97, TRASH BAG ASSEMBLY AND HOLDER, Richard M. Ebentheuer, Owner of Record: *Inventor*, Attorney or Agent: Alan C. Rose, Ex. Gp.: 355

**4,801,585**, Re. S. N. 07/562,887, Filed Aug. 3, 1990, Cl. 514/210, CYCLIC CARBOXAMIDE DERIVATIVES AND THEIR USE AS ANALGESICS, Vittorio Vecchiatti, et al., Owner of Record: *Dr. Lo. Zambelletti, S.P.A., Milan, Italy*, Attorney or Agent: Jesse D. Reingold, Ex. Gp.: 125

**4,814,819**, Re. S. N. 07/562,698, Filed Aug. 6, 1990, Cl. 355/290, HEAT-FIXING APPARATUS, Mitsuhiro Torino, et al., Owner of Record: *Hitachi Metals, Ltd., Tokyo, Japan*, Attorney or Agent: Bruce C. Zotter, Ex. Gp.: 215

**4,825,547**, Re. S. N. 07/563,319, Filed July 27, 1990, Cl. 30/216, PILE CARPET TRIMMER, William E. Carder, Owner of Record: *Inventor*, Attorney or Agent: Inventor, Ex. Gp.: 324

**4,833,558**, Re. S. N. 07/564,864, Filed July 6, 1990, Cl. 360/106, HEAD POSITIONING ASSEMBLY, Hamid Baheri, Owner of Record: *Archive Corp., Costa Mesa, Calif.*, Attorney or Agent: John B. Sganga, Ex. Gp.: 233

**REQUESTS FOR REEXAMINATION FILED**

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**4,271,093**, Reexam. No. 90/002,101, Requested Aug. 3, 1990, Cl. 361/034.9, CARBURETOR, Takeshi Kobayashi, Owner of Record: *Walbro Far East Co., Kawasaki, Japan*, Attorney or Agent: Robert A. Choate, Barnes, Kisselle, et al., Ex. Gp.: 135, Requester: Kawasaki Jukogyo, Kobe, Japan

**4,305,091**, Reexam. No. 90/002,107, Requested Aug. 13, 1990, Cl. 358/036, ELECTRONIC NOISE REDUCING APPARATUS AND METHOD, J. Carl Cooper, Owner of Record: *Inventor, Santa Clara, Calif.*, Attorney or Agent: Blanchard, Flynn, Thiel, et al., Ex. Gp.: 262, Requester: US JVC Corp., Elmwood Park, N. J.

**4,446,715**, Reexam. No. 90/002,106, Requested Aug. 9, 1990, Cl. 073/1R, TRANSDUCER CALIBRATION SYSTEM, Wilber H. Bailey, Owner of Record: *Camino Laboratories, Inc., San Diego, Calif.*, Attorney or Agent: Fulwider, Patton, Lee, et al., Ex. Gp.: 265, Requester: Owner

**4,483,723**, Reexam. No. 90/002,104, Requested July 23, 1990, Cl. 148/31.500, STEEL WITH ANTIMONY ADDITION, Gregory Lyudkovsky, Owner of Record: *Island Steel Co., Chicago, Ill.*, Attorney or Agent: Marshall, O'Toole, Bernstein, et al., Ex. Gp.: 111, Requester: Owner

**4,522,610**, Reexam. No. 90/002,105, Requested Aug. 10, 1990, Cl. 474/141, GEAR CRANK APPARATUS FOR A BYCYCLE, Masaki Nagano, Owner of Record: *Shimano Industrial Co., Ltd., Osaka, Japan*, Attorney or Agent: Unknown, Ex. Gp.: 356, Requester: Owner

**4,767,308**, Reexam. No. 90/002,103, Requested Aug. 6, 1990, Cl. 425/405.1, MOULD FOR MOULDING AN ARTICLE, Alfred A. Adams, Owner of Record: *Group Lotus, Plc., Norfolk, England*, Attorney or Agent: Seidel, Gonda, Lavorgna & Monaco, Ex. Gp.: 135, Requester: Owner

**4,773,485**, Reexam. No. 90/002,108, Requested Aug. 14, 1990, Cl. 169/065, FIRE EXTINGUISHING SYSTEM FOR COOKSTOVE AND RANGES, Robert R. Silverman, Owner of Record: *21st Century International Fire Equipment & Services Corp., Irving, Tex.*, Attorney or Agent: John R. Moses, Millen &



White, Ex. Gp.: 315, Requester: Raphael A. Monsanto, Ruden, Barnett, et al., Miami, Fla.,

4,798,465, Reexam. No. 90/002,102, Requested Aug. 6, 1990, Cl. 198/432, PARTICLE SIZE DETECTION DEVICE HAVING HIGH SENSITIVITY IN HIGH MOLECULAR SCATTERING ENVIRONMENT, Robert G. Knollenberg, Owner of Record: *Particle Measuring Systems, Inc.*, Boulder, Colo., Attorney or Agent: Harris & Burdick, Ex. Gp.: 317, Requester: Met One, Inc., Grants Pass, Oreg.

4,834,188, Reexam. No. 90/002,109, Requested Aug. 14, 1990, Cl. 169/065, FIRE EXTINGUISHING SYSTEM FOR COOKSTOVE AND RANGES, Robert R. Silverman, Owner of Record: *21st Century International Fire Equipment & Services Corp.*, Irving, Tex., Attorney or Agent: John R. Moses, Millen & White, Ex. Gp.: 315, Requester: Raphael A. Monsanto, Ruden, Barnett, et al., Miami, Fla.,

#### Erratum

"All reference to Reexamination Certificate No. B1 4,452,053 (602nd) appearing in the Official Gazette of December 16, 1986, should be deleted since no reexamination certificate has been granted."

#### Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by certified mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Trend Set Inc., Minden, La., Reg. No. 1,042,983, for the mark "DIG IT", Canc. No. 18,592.

Scott E. Green, Doraville, Ga., Reg. No. 1,383,584, for the mark "YOGI", Canc. No. 18,797.

Graham Software Corp., Kingwood, Tex., Reg. No. 1,453,975, for the mark "INTELLISYS", Canc. No. 18,918.

JEAN BROWN  
Administrator,  
Trademark Trial and Appeal Board  
For JEFFREY M. SAMUELS  
Assistant Commissioner  
for Trademarks

#### PATENT NOTICES

##### Certificates of Correction For Week of September 18, 1990

Re. 32,115	4,850,766	4,867,662	4,874,555
3,816,326	4,851,200	4,867,907	4,875,003
3,888,786	4,851,228	4,868,005	4,875,038
4,666,956	4,851,798	4,868,110	4,875,103
4,745,124	4,852,439	4,868,255	4,875,131
4,750,212	4,853,036	4,868,392	4,875,160
4,753,866	4,854,813	4,868,605	4,875,982
4,763,893	4,855,262	4,868,630	4,876,153
4,777,650	4,855,329	4,868,793	4,876,214
4,783,089	4,855,366	4,869,266	4,876,519
4,800,312	4,856,330	4,869,290	4,876,762
4,807,129	4,858,038	4,869,619	4,876,875
4,808,000	4,858,141	4,869,662	4,877,070
4,815,471	4,858,756	4,870,270	4,877,817
4,822,985	4,859,116	4,870,341	4,877,869
4,824,553	4,860,341	4,870,980	4,878,063
4,826,466	4,861,785	4,871,020	4,878,494
4,826,736	4,862,302	4,871,131	4,878,773
4,826,865	4,863,150	4,871,165	4,878,829
4,827,254	4,863,293	4,871,186	4,878,901
4,828,313	4,863,357	4,871,345	4,879,033
4,832,460	4,863,940	4,871,496	4,879,130
4,833,049	4,863,951	4,871,912	4,879,682
4,834,689	4,864,597	4,872,119	4,879,916
4,834,895	4,864,641	4,872,199	4,880,799
4,835,217	4,864,842	4,872,498	4,881,868
4,835,228	4,865,118	4,872,531	4,881,951
4,837,232	4,865,547	4,872,704	4,882,165
4,841,207	4,865,669	4,872,865	4,883,354
4,841,529	4,865,854	4,873,015	4,883,682
4,843,633	4,865,953	4,873,344	4,886,210
4,845,470	4,865,979	4,873,439	4,887,062
4,848,253	4,866,020	4,873,455	4,887,320
4,848,896	4,866,085	4,873,527	4,908,996
4,848,992	4,866,267	4,873,688	4,916,128
4,849,212	4,866,675	4,873,751	4,925,276
4,849,251	4,867,250	4,873,791	
4,850,699	4,867,443	4,873,899	

##### Disclaimers

4,022,479.—*David C. Orlowski*, Rock Island, Ill. SEALING RINGS. Patent dated May 10, 1977. Disclaimer filed July 13, 1990, by the inventor.

Hereby enters this disclaimer to claims 1, 2, and 4 of said patent.

4,556,952.—*James A. Brewer*, Delray Beach, Fla.; *Lewis C. Eggebrecht*, Rochester, Minn.; *David A. Kummer*; *Patricia P. McHugh*, both of Boca Raton, Fla. REFRESH CIRCUIT FOR DYNAMIC MEMORY OF A DATA PROCESSOR EMPLOYING A DIRECT MEMORY ACCESS CONTROLLER. Patent dated Dec. 3, 1985. Disclaimer filed Apr. 12, 1990, by the assignee, International Business Machines Corporation.

The term of this patent subsequent to March 5, 1990, has been disclaimed.

4,600,205.—*Denzil S. Stewart*; *Alfred J. Bland*, both of Canoga Park; *Donald D. Rogers*, Moorpark, all of Calif. STEERING APPARATUS FOR MOTOR VEHICLES. Patent dated July 15, 1986. Disclaimer filed June 18, 1990, by the assignee, Steering Control Systems, Inc.

Hereby enters this disclaimer to claims 1, 4, 7, 8, 9, 10, 14, and 16 of said patent.

4,614,779.—*Noboru Watanabe*, Yokohama; *Hideyoshi Shomoda*, Kamakura; *Yoichiro Kubo*, Yokohama, all of Japan. OIL-AND HEAT-RESISTANT RUBBER COMPOSITION COMPRISING NITRILE CONTAINING RUBBER AND FLOURINE CONTAINING RUBBER. Patent dated Sept. 30, 1986. Disclaimer filed June 8, 1990, by the assignee, Nippon Zeon Co., Ltd.

Hereby enters this disclaimer to the remaining term of said patent.

4,700,924.—*John E. Nelson*, Houston; *Raymond J. Smith*, Friendswood, both of Tex. PRESSURE ENERGIZED ROTARY HYDRAULIC SEAL. Patent dated Oct. 20, 1987. Disclaimer filed Mar. 30, 1990, by the assignee Vetco Gray Inc.

Hereby enters this disclaimer to claims 1-3 of said patent.

4,816,588.—*William F. Rieker*, Plainsboro; *William A. Daniels*, Belle Mead, both of N.J. METHOD FOR THE PREPARATION OF PYRIDINE-2, 3-DICARBOXYLIC ACIDS. Patent dated Mar. 28, 1989. Disclaimer filed Oct. 12, 1989, by the assignee, American Cyanamid Company.

The term of this patent subsequent to October 10, 1989, has been disclaimed.

4,888,647.—*Kanji Wada*, Osaka, Japan. IMAGE RECORDING APPARATUS WITH IMPROVED SOS DETECTION. Patent dated Dec. 19, 1989. Disclaimer filed April 13, 1990, by the assignee, Minolta Camera Kabushiki Kaisha.

Hereby enters this disclaimer to claims 7 through 13 of said patent.

##### Dedication

Re. 30,322.—*Clarence F. Hammer*, Wilmington, Del; *Harold K. Sinclair*, Louisville, KY. NOVEL ELASTOMERIC GRAFT COPOLYMERS. Patent dated July 1, 1980. Dedication filed April 16, 1986, by the assignee, E. I. du Pont de Nemours and Company.

Hereby dedicates to the Public the remaining term of said patent

##### Disclaimers and Dedications

4,851,305.—*William H. Kump*, St. Paul; *Richard M. Sahli*, Cottage Grove, both of Minn. COVER ASSEMBLIES FOR ELECTRIC STORAGE BATTERIES AND BATTERIES UTILIZING SUCH COVER ASSEMBLIES. Patent dated July 25, 1989. Disclaimer and Dedication filed June 7, 1990, by the assignee, GNB Incorporated.

Hereby disclaims and dedicates to the Public the remaining term of said patent.

4,896,601.—*Willi Jeschke*, Bad Herrenalb, Fed. Rep. of Germany. INKING UNIT FOR ROTARY PRINTING PRESSES. Patent dated Jan. 30, 1990. Disclaimer and Dedication filed July 3, 1990, by the assignee, Heidelberger Druckmaschinen Aktiengesellschaft.

Hereby disclaims and dedicates to the Public claims 1-4 and 11-14 of said patent.

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SEPTEMBER 18, 1990

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JAMES E. DENNY, Acting Assistant Commissioner  
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner  
CONDITION OF PATENT APPLICATIONS AS OF July 28, 1990

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
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CHEMICAL EXAMINING GROUPS

GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	7-7-87
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director	11-21-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP—130	
BARRY S. RICHMAN, Director	5-12-88
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	8-3-88
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-28-87

ELECTRICAL EXAMINING GROUPS

INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director	8-15-88
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STEWART LEVY, Acting Director	4-22-88
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MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	10-25-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	3-16-89
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	8-15-89

Expiration of patents: The patents within the range of numbers indicated below expire during July 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents	Numbers 3,742,517 to 3,750,191 inclusive
Plant Patents	3,370 to 3,384 inclusive

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## REEXAMINATIONS

SEPTEMBER 18, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 Re. 32,521 (1353rd)  
**LIGHT MODULATOR DEMODULATOR AND METHOD OF COMMUNICATION EMPLOYING THE SAME**  
 James L. Fergason, 90 Adam Way, Atherton, Calif. 94025  
 Reexamination Request No. 90/001,777, Jun. 2, 1989.  
 Reexamination Certificate for Reissue Patent Re. 32,521, issued Oct. 13, 1987, Ser. No. 710,846, Mar. 12, 1985.  
 Original No. 4,436,376, dated Mar. 13, 1984, Ser. No. 235,006, Feb. 17, 1981. Continuation-in-part of Ser. No. 121,071, Feb. 13, 1980, Pat. No. 4,385,806, which is a continuation-in-part of Ser. No. 913,618, Jun. 8, 1978, abandoned.  
 Int. Cl.<sup>5</sup> G02F 1/13, 1/00, 2/00; H01S 3/00  
 U.S. Cl. 350—334

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-31, 52 and 54-56 is confirmed.

Claims 32, 42-44, 50, 53 and 57-59 are determined to be patentable as amended.

Claims 33-41, 45-49 and 51, dependent on an amended claim, are determined to be patentable.

New claims 60-156 are added and determined to be patentable.

1. A light modulator comprising at least one liquid crystal cell comprising two parallel transparent plates; a transparent electrical conductive layer applied to the confronting surfaces of the said two plates; each said conductive layer having parallel surface alignment, the said alignment of the two adjoining surfaces being parallel; a continuous layer of nematic liquid crystal having positive dielectric anisotropy between the two electrical conducting coatings;

means for applying a fixed electrical bias to the two said electrical conducting coatings;

means for applying an amplitude modulated oscillatory electrical signal having a frequency greater than 10 hertz across the said continuous layer;

a source of polarized light directed through the said two transparent plates;

whereby the light which passes through the said two transparent plates is a phase-shifted beam which is distinguishable from the light from the said source in a manner which corresponds to the said oscillatory electrical signal.

32. A method for controlling polarized *multicolor* light comprising:

(a) establishing a film of nematic liquid crystal having positive dielectric anisotropy between two parallel surfaces and imparting a first generally parallel surface orientation to the said liquid crystal film at the said surfaces;

(b) establishing a second bulk orientation of the bulk of the liquid crystal in a direction which is different from the said first generally parallel orientation of the liquid crystal at the said surfaces;

(c) applying a varying electrical signal to said surfaces to alter the relative direction of the alignment of the liquid crystal between the said surface orientation and the said bulk orientation;

(d) passing polarized light through said film to generate light which is phase shifted in a manner corresponding to the said varying electrical signal; and

wherein said step of applying a varying electrical signal comprises applying such electrical signal to effect phase shifting of

*such polarized light without significant color dispersion thereby to permit on-off modulation of said multicolor light.*

B1 3,957,084 (1354th)  
**DEVICE FOR CARRYING FLEXIBLE CABLES OR PIPES FROM A FIXED CONNECTION POINT TO A MOBILE CONSUMER BY MEANS OF A FLEXIBLE TUBE**  
 Werner Jung, Rheyd, Fed. Rep. of Germany, assignor to Katripat AG, Zug, Switzerland  
 Reexamination Request No. 90/000,900, Nov. 6, 1985.  
 Reexamination Certificate for Patent No. 3,957,084, issued May 18, 1976, Ser. No. 441,104, Feb. 11, 1974.  
 Claims priority, application Fed. Rep. of Germany, Feb. 14, 1973, 7305486  
 Int. Cl.<sup>5</sup> F16L 11/00

U.S. Cl. 138—136

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 1 is determined to be patentable as amended.

Claims 2-16 dependent on an amended claim, are determined to be patentable.

New claims 17 and 18 are added and determined to be patentable.

1. A device for carrying flexible cables or pipes from a fixed connection point to a mobile load, said device comprising a flexible support tube capable of bending into an arcuate curve about a bending axis spaced laterally from the tube, said flexible support tube being formed from a profiled strip having two oppositely facing, side-by-side channels formed therein, each channel having an outer sidewall, and both channels having a common inner sidewall, said strip being spirally wound on itself with the outer sidewall of each channel extending into the oppositely facing channel of the adjoining winding; and means provided along one side of said flexible tube for [maintaining said one side at a constant length; the other side of said tube being variable in length] *preventing said one side from expanding or contracting while permitting the opposite side to expand or contract a limited amount to accommodate itself to the circumference of an arc following the surface of said [other] opposite side and having its center at said bending axis.*

17. A device for carrying flexible cables or conduits from a fixed connection point to a mobile load, said device comprising a flexible support tube capable of bending into an arcuate curve about a bending axis spaced laterally from the tube, said flexible support tube being formed from a profiled strip having two oppositely facing, side-by-side channels formed therein, each channel having an outer side wall and both channels having a common inner side wall, said strip being spirally wound on itself to form a plurality of windings, each presenting an inner surface and an outer surface with the outer side wall of each channel extending into the oppositely facing channel of the adjoining winding so that said outer side wall can move within the channel of the adjoining winding to enable said tube to be extended and compressed a limited amount; and means attached to the surfaces of said windings along one side of said flexible tube for preventing the movement of said windings relative to each other along said one side and thereby preventing said one side of said tube from expanding or contracting while permitting the other side of said tube to expand or contract a limited amount to accommodate itself to the circumference of an arc following the surface of said other side and having its center at said bending axis.



**B1 4,540,243 (1355th)**  
**METHOD AND APPARATUS FOR CONVERTING**  
**PHASE-MODULATED LIGHT TO**  
**AMPLITUDE-MODULATED LIGHT AND**  
**COMMUNICATION METHOD AND APPARATUS**  
**EMPLOYING THE SAME**

James L. Ferguson, 5806 Horning Rd., Kent, Ohio 44240  
 Reexamination Request No. 90/001,778, Jun. 2, 1989.  
 Reexamination Certificate for Patent No. 4,540,243, issued Sep.  
 10, 1985, Ser. No. 409,526, Aug. 19, 1982.  
 Int. Cl.<sup>5</sup> G02F 1/13

U.S. Cl. 350—337

AS A RESULT OF REEXAMINATION, IT HAS BEEN  
 DETERMINED THAT:

The patentability of claims 1-13 and 15-20 is confirmed.

Claim 14 having been finally determined to be unpatentable,  
 is cancelled.

New claims 21-36 are added and determined to be patent-  
 able.

1. A light transmitter comprising  
 at least one liquid crystal cell comprising two parallel trans-  
 parent plates; a transparent electrical conductive layer  
 applied to the confronting surfaces of the said two plates;  
 each said conductive layer having parallel surface align-  
 ment, the said alignment of the two adjoining surfaces  
 being parallel; a continuous layer of nematic liquid crystal  
 having positive dielectric anisotropy between the two  
 electrical conducting coatings;  
 means for applying a fixed electrical bias to the two said  
 electrical conducting coatings;  
 means for applying an amplitude modulated oscillatory  
 electrical signal across the said continuous layer; a source  
 of polarized light directed through the said two transpar-  
 ent plates;  
 whereby the light which passes through the said two trans-  
 parent plates is a phase-shifted beam which is distinguish-  
 able from the light from the said source in a manner which  
 corresponds to the said oscillatory electrical signal; and  
 a linear polarizer for converting said phase-shifted beam to a  
 light beam whose amplitude corresponds to said oscilla-  
 tory electrical signal.

## REISSUES

SEPTEMBER 18, 1990

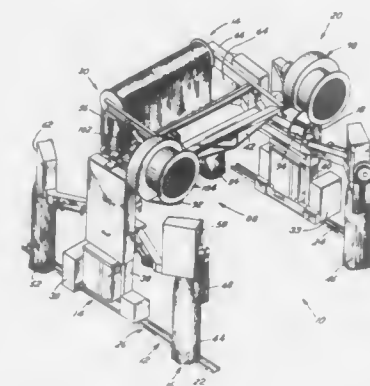
Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics  
 indicates additions made by reissue.

Re. 33,334  
**VEHICLE WASH AND DRYER**  
 James A. Nelson, Des Moines, Iowa, assignor to Ryko Manufac-  
 turing Company, Grimes, Iowa  
 Original No. 4,685,169, dated Aug. 11, 1987, Ser. No. 769,666,  
 Aug. 26, 1985. Application for reissue Oct. 18, 1988, Ser. No.  
 259,339

Int. Cl.<sup>5</sup> B60S 3/06

U.S. Cl. 15—302

9 Claims



2. An apparatus for washing and drying an automotive  
 vehicle comprising, in combination:  
 a gantry for moving along said vehicle, [and] said gantry  
 separating said apparatus into entry and exit sections;  
 water outlet means, mounted on said gantry, for wetting said  
 vehicle;  
 [two blowers] dryer means, mounted on said gantry, for  
 expelling air;  
 [a nozzle] at least two nozzles on [each of said blowers]  
 said dryer means, each of said nozzles defining an orienta-  
 tion and directing air from [one of said blowers] said  
 dryer means in a direction substantially parallel with said  
 orientation, one of said nozzles oriented toward said entry  
 section of said apparatus and another of said nozzles ori-  
 ented toward said exit section of said apparatus; and  
 oscillation means, interconnected to both of said nozzles, for  
 changing said orientation of each of said nozzles and  
 thereby changing said direction of said air from [each  
 of] said [blowers] dryer means, whereby air is directed  
 by each of said nozzles toward said vehicle from changing  
 directions in order to substantially dry the sides and top of  
 said vehicle.

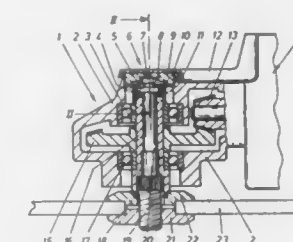
Re. 33,335  
**DEVICE FOR ATTACHING A TOOL**  
 Josef Gentischer, Weinstadt, and Boris Rudolf, Stuttgart, both  
 of Fed. Rep. of Germany, assignors to C. & E. Fein GmbH &  
 Co., Stuttgart, Fed. Rep. of Germany  
 Original No. 4,597,227, dated Jul. 1, 1986, Ser. No. 680,194,  
 Dec. 10, 1984. Application for reissue Jun. 29, 1988, Ser. No.  
 213,180  
 Claims priority, application Fed. Rep. of Germany, Feb. 18,  
 1984, 3405885; Apr. 14, 1984, 3414148; Aug. 30, 1984, 3431901  
 Int. Cl.<sup>5</sup> B24B 23/02

U.S. Cl. 51—168

41 Claims

1. Apparatus for attaching a tool in portable angled grinders  
 comprising a motor; angular drive means, and a securing sta-  
 tion for the tool; said angular drive means comprising a pinion,  
 a beveled cogwheel, and a hollow driveshaft having an axis;  
 a spindle positioned in said driveshaft; housing means for hous-

ing said drive means; displacing means, said spindle being  
 positioned in said driveshaft so that it cannot rotate *relative to*  
*the driveshaft* but can be displaced axially from outside said  
 housing means by said displacing means; activating means in  
 said displacing means; traveling means and a terminal compo-  
 nent, said spindle having an appendage; resilient means be-  
 tween a face of said driveshaft and said appendage on said  
 spindle, said activating means in said displacing means acting



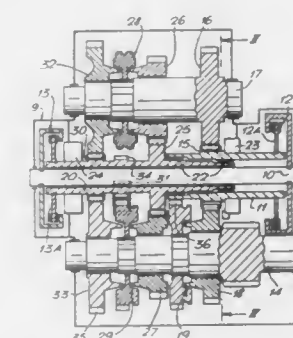
[through said traveling means at an angle to the axis of said  
 driveshaft] on said terminal component against a force of said  
 [resilinet] resilient means by use of surface of said traveling  
 means, said surface being inclined at an angle to the axis of said  
 driveshaft; said [driveshaft] spindle having a threaded pin; a  
 nut screwed onto said threaded pin; a bushing-shaped cover on  
 said driveshaft for limiting travel so that said nut screwed onto  
 said threaded pin on said [driveshaft] spindle is lifted away  
 from the tool.

Re. 33,336  
**CHANGE SPEED TRANSMISSION**  
 Wilfred N. Bainbridge, Banbury, and Alastair J. Young, Kenil-  
 worth, both of United Kingdom, assignors to Automotive  
 Products plc, Warwickshire, England  
 Original No. 4,627,301, dated Dec. 9, 1986, Ser. No. 713,284,  
 Mar. 18, 1985. Application for reissue Jun. 1, 1988, Ser. No.  
 200,957  
 Claims priority, application United Kingdom, Mar. 16, 1984,  
 84069

Int. Cl.<sup>5</sup> F16H 3/08, 3/04

U.S. Cl. 74—330

11 Claims



1. A change speed transmission including gear trains which  
 provide increasing speed ratios and two clutches [which are]  
 having respective driving and driven members, the clutches being

independently operable [and] provide alternative drive paths through the gear trains between an input and an output, the gear trains providing alternate ratios driven respectively through one and the other clutch said input comprising a drive input shaft for the driving members of the clutches, a first shaft coaxial with the drive input shaft and rotatably fast with a driven member of one said clutch and a second shaft coaxial with the first shaft and rotatably fast with a driven member of the other clutch, the output comprising an output shaft through which drive is transmitted in all ratios and which has gearing thereon in constant mesh with gearing on at least one of the first and second shafts, a layshaft being provided [through which] having an axis spaced from the axis of the output shaft and having gearing thereon in constant mesh with gearing on the first and second shafts whereby drive in a selected ratio is transmitted from one of the first and second shafts to the layshaft, through the layshaft to the other of the first and second shafts and from the other of the first and second shafts to drive the output [one of the first and second shafts having a gear thereon which meshes with a gear on the output] shaft.

Re. 33,337

## STENOGRAPHIC TRANSLATION SYSTEM

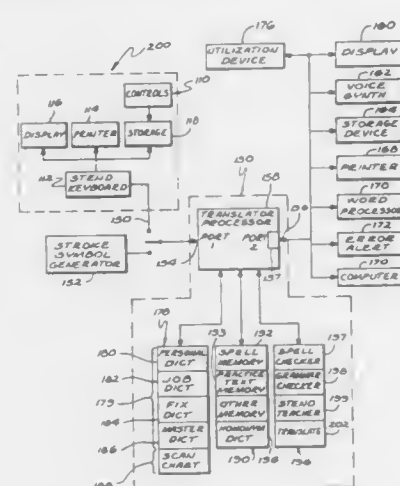
Jerrold P. Lefter, Hidden Hills, Calif., and Scott Woodard, Arlington Heights, Ill., assignors to Digitext, Inc., Thousand Oaks, Calif.

Original No. 4,724,285, dated Feb. 9, 1988, Ser. No. 942,068, Dec. 17, 1986. Continuation of Ser. No. 795,944, Nov. 7, 1985, abandoned. Application for reissue Dec. 20, 1988, Ser. No. 287,788

Int. Cl.<sup>5</sup> H04L 3/00

U.S. Cl. 178—21

46 Claims



40. A steno translator system for translating lexical stroke symbols into language format in accordance with a predefined stenographic methodology, each lexical stroke symbol defined by at least one character from a character set comprising consonants and vowels, the system comprising:

stroke symbol means for providing a sequence of lexical stroke symbols, each lexical stroke symbol defined by at least one of a left consonant part comprising at least one consonant character, a vowel part comprising at least one vowel character, and a right consonant part comprising at least one consonant character;

processor means coupled for receiving the lexical stroke symbols from the stroke symbol means, comprising:

a scan chart memory for storing a selected list of chart entries, the list comprising a left consonant sublist, a vowel sublist and a vowel/right consonant sublist, each entry having stored in association therewith a language part defining a translation of the chart entry; and

translator means comprising comparing means for comparing the left consonant part of selected lexical stroke symbols

having a left consonant part against the left consonant sublist to find a match, the language part associated with the matched member of the left consonant sublist defining a left consonant translation, comparing the vowel part of selected lexical stroke symbols having a vowel part but no right consonant part against the vowel sublist to find a match, the language part associated with the matched member of the vowel sublist defining a vowel translation, and comparing the combined vowel part and right consonant part of selected lexical stroke symbols having a right consonant part against the vowel/right consonant list to find a match, the language part associated with the matched member of the vowel/right consonant sublist defining a vowel/right consonant translation; and means for combining the left consonant, vowel and vowel/right consonant translations to define a stroke symbol translation from the scan chart memory.

Re. 33,338

## MEMBRANE SEAL AND KNIFE COMBINATION FOR A POST-MIX BEVERAGE DISPENSING SYSTEM

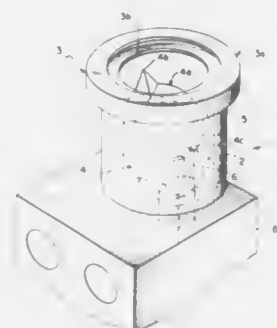
Jason K. Sedam, Dunwoody, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.

Original No. 4,426,019, dated Jan. 17, 1984, Ser. No. 311,645, Oct. 15, 1981. Application for reissue Jan. 16, 1986, Ser. No. 819,425

Int. Cl.<sup>5</sup> B67B 7/24

U.S. Cl. 222—88

26 Claims



1. An opening device to be used in a post-mix beverage dispenser, together with a disposable syrup container, said container having a neck portion with an opening sealed by a rupturable membrane from which said syrup will flow when said membrane is ruptured, said device comprising a cylindrical piercing means surrounded by a cylindrically-shaped socket member, said socket member having a discharge port at the bottom thereof, said piercing means and socket member forming an annular compartment surrounding said discharge port defined by the outer wall of said cylindrical piercing means and the inner wall of said socket member for receipt of the neck of said container, said piercing means and said neck being substantially concentric when the neck is in said socket, the diameter of the outer wall of said piercing means being only slightly less than the diameter of the inner wall of said neck, providing minimum clearance between the piercing means and the neck, and the inner wall of said neck and the outer wall of said piercing means being parallel, and drainage means through said outer wall of said piercing means for permitting syrup flow from said annular compartment to said discharge port, said piercing means having an angular truncated cutting edge with a pyramidal piercing element on the apex thereof, said socket member being provided with a seal for securely receiving the neck of said syrup container into the compartment formed between said piercing means and socket member.

Re. 33,339

## CHAIN FOR SUPPORTING ENERGY CONVEYING MEANS, AND CHAIN LINK THEREFOR

Klaus Heidrich, Siegen; Alfred Krewitt, Kreutznal; Kurt Loos, Dreis-Tiefenbach, and Fritz Ipithan, Huttental-Weidenau, all of Fed. Rep. of Germany, assignors to Kabelschlepp Gesellschaft mit Beschränkter Haftung, Siegen, Fed. Rep. of Germany

Original No. 3,664,619, dated May 23, 1972, Ser. No. 49,347, Jun. 24, 1970. Application for reissue May 27, 1980, Ser. No. 153,799

Claims priority, application Fed. Rep. of Germany, Jun. 26, 1969, 1932428

Int. Cl.<sup>5</sup> F16L 3/00

U.S. Cl. 248—51

22 Claims



1. A power-line supporting chain for supporting energy conveying means, especially power lines and hoses, which includes a plurality of chain links pivotally connected to each other, each of said links being H-shaped and having two oppositely located and substantially parallel plate-shaped arms [and a transverse] integrally formed with wall [transverse] means extending transversely to the longitudinal extension of said arms and interconnecting the same at an area between the ends of said arms, said transverse wall means defining at least one transverse opening in each link adapted to receive energy conveying means for retention between said arms, each of said arms being laterally elastically yieldable relative to the other arm in a direction transverse to the longitudinal plane of symmetry of the respective link and having two sections connected to each other at the region of said transverse wall [while] means, one of said sections of each arm [is] being provided with a bore and the pertaining other section of the same arm [is] being provided with a stud having an outer diameter corresponding to a slide fit for said bore, said chain links being arranged so that the studs of one chain link pivotally engage the bores of the respective next following link while the bores of said one chain link are pivotally engaged by the studs of the respective next preceding link, the end portion of each side plate which bears the stud being offset from the end portion of the side plate which contains the [hole] bore.

Re. 33,340

## COLOR PRINTER HAVING APPARATUS FOR SHIFTING INK RIBBON

Tetsuo Tsukada, Kawasaki; Hideyuki Shimobuchi, Akishima, and Takahiro Yoshikawa, Sagami-hara, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Original No. 4,695,175, dated Sep. 22, 1987, Ser. No. 788,566, Oct. 17, 1985. Application for reissue Apr. 28, 1988, Ser. No. 187,632

Claims priority, application Japan, Oct. 23, 1984, 59-222607

Int. Cl.<sup>5</sup> B41J 32/02

U.S. Cl. 400—196.1

25 Claims

18. A color printer, comprising:

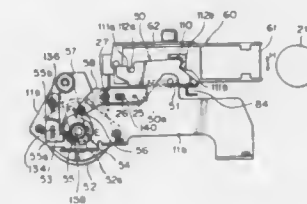
a base unit;

a platen mounted on said base unit for supporting a printing paper;

a printing head;

a carrier reciprocally movable along said platen for supporting

said printing head to reciprocally move said printing head along a printing line on the printing paper on said platen; a supporting member mounted on said base unit for detachably and swingably supporting a color ink ribbon cassette, said color ink ribbon cassette comprising a cassette case for accommodating therein a color ink ribbon which has a plurality of different color longitudinal stripes so that at least a part of said ink ribbon forms a loop exposed from and extending to the cassette case, which ribbon loop is positioned along said platen and between said printing head and platen, when the color ink ribbon cassette is set on said supporting member;



a ribbon guide member slidably mounted on said carrier for supporting said ink ribbon at a position adjacent to said printing head; slide shifting means for slide shifting said ribbon guide member so that a desired one of said color stripes of the ink ribbon is positioned on said printing line; and swing shifting means for swing shifting said color ink ribbon cassette so that the position of the cassette case substantially follows that of the shifted position of the ink ribbon, said swing shifting means being driven in accordance with said slide shifting means.

Re. 33,341

## WAFER TRANSFER APPARATUS

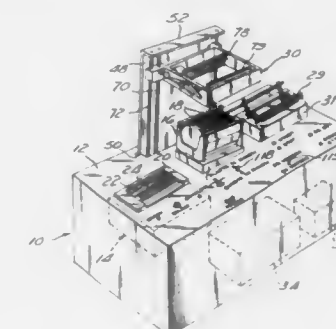
Steven N. Lee, and Jae Y. Kim, both of Irvine, Calif., assignors to ASQ Technology, Inc., San Clemente, Calif.

Original No. 4,568,234, dated Feb. 4, 1986, Ser. No. 496,832, May 23, 1983. Application for reissue Jul. 31, 1987, Ser. No. 80,437

Int. Cl.<sup>5</sup> B65G 65/30

U.S. Cl. 414—404

21 Claims



18. Apparatus for transferring a batch of thin, disk-like elements, such as semiconductor wafers, from one slotted carrier to another, wherein the flat faces of the wafers are leaning at a slight angle with respect to vertical in at least one of said carriers tending to arrange said wafers in a uniformly spaced parallel relation, said apparatus comprising:

a support surface for supporting a first slotted carrier adapted to carry a batch of wafers arranged in edgewise, parallel relation;

a wafer transfer assembly located above said surface so that it may be positioned above either carrier, for receiving and



supporting said wafers at said angle with respect to vertical, said assembly including a pair of horizontally oriented and elongated jaws movable into open or closed position, said jaws having a series of spaced slots oriented at said angle for receiving the edges of said wafers; and means for controlling said jaws of said assembly so that said batch of wafers is aligned with the slots in the first and therefor the second carrier at time of wafer transfer by said assembly.

Re. 33,342

# LIQUID CRYSTAL ALIGNING AGENT FROM TETRACARBOXYLIC ACID DIANHYDRIDE, DIAMINE AND MONOAMINE

Noriaki Kohtoh; Toyohiko Abe, and Hiroyoshi Fukuro, all of Ichihara, Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

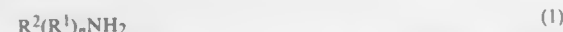
Original No. 4,749,777, dated Jun. 7, 1988, Ser. No. 60,515, Jun. 11, 1987. Application for reissue Sep. 1, 1988, Ser. No. 239,336

Claims priority, application Japan, Jun. 18, 1986, 61-142099 Int. Cl.<sup>5</sup> C08G 73/10, 69/04

U.S. Cl. 528—351

11 Claims

1. A liquid crystal aligning agent consisting essentially of a polyimide resin obtained by the polymerization of a diamine, a tetracarboxylic acid dianhydride and a monoamine of the formula:



wherein  $R^1$  is a divalent organic group,  $R^2$  is an alkyl group having from 6 to 20 carbon atoms, and  $n$  is 0 or 1.

Re. 33,343

# CRACK DETECTOR FOR ELECTRICALLY CONDUCTIVE WINDSHIELD

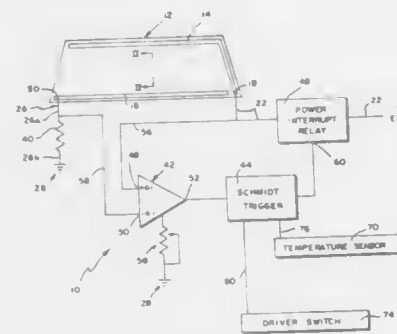
Lowell E. Bitter, Holland, and Bryan L. Lundgren, South Haven, both of Mich., assignors to Donnelly Corporation, Holland, Mich.

Original No. 4,565,919, dated Jan. 21, 1986, Ser. No. 620,687, Jun. 14, 1984. Application for reissue Jan. 11, 1988, Ser. No. 141,918

Int. Cl.<sup>5</sup> H05B 1/02; B60L 1/02

U.S. Cl. 219—509

18 Claims



13. An improved electrically conductive panel assembly including a panel having an electrically conductive element, circuit means for conducting direct current through the element, and switch means for controlling the current passing through said circuit means, wherein the improvement comprises said switch means comprising:

a controllable switch coupled in series with said circuit means, said controllable switch being actuatable between first and second states and including a control terminal; current signal means for providing a signal indicative of the current passing through the element;

voltage signal means for providing a signal indicative of the voltage across the element; calculator means responsive to said current signal means and said voltage signal means for producing an output indicative of the resistance of the element; and control means responsive to said calculator means and coupled to said control terminal for actuating said controllable switch from one of the states to the other of the states when the resistance of the element is unacceptable.

Re. 33,344

# APPARATUS AND METHOD FOR DETECTING NEGATIVE IONS

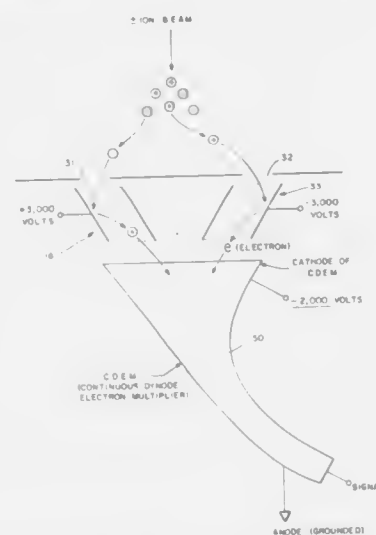
George C. Stafford, San Jose, Calif., assignor to Finnigan Corporation, San Jose, Calif.

Original No. 4,423,324, dated Dec. 27, 1983, Ser. No. 59,961, Jul. 23, 1979. Continuation of Ser. No. 897,150, Apr. 18, 1978, abandoned. Application for reissue Dec. 24, 1985, Ser. No. 813,880

Int. Cl.<sup>5</sup> H01J 43/00, 49/02

U.S. Cl. 250—281

22 Claims



8. Apparatus for detecting the abundance of negative ions from a source of such ions comprising: conversion dynode means maintained at a high positive voltage for attracting and accelerating only said negative ions whereby the negative ions impact the conversion dynode means with sufficient kinetic energy to produce a substantially proportional amount of secondary positive ions, and electron multiplier means having an input operated at a potential to attract said secondary positive ions and for providing an output signal indicative of the abundance of said negative ions.

Re. 33,345

# TOROID TRANSFORMERS AND SECONDARY WINDINGS

Robert D. Sylvester, Jr., Dover; Paul C. Horn, Somersworth, and Vincent J. Bober, Rochester, all of N.H., assignors to GFS Manufacturing Company, Inc., Dover, N.H.

Original No. 4,631,511, dated Dec. 23, 1986, Ser. No. 707,135, Mar. 1, 1985. Application for reissue Jun. 30, 1987, Ser. No. 68,633

Int. Cl.<sup>5</sup> H01F 27/28

U.S. Cl. 336—180

16 Claims

9. In a toroid transformer having an annular core of permeable material about which radially is wound a toroidal primary winding, and about which radially is wound at least one toroidal secondary winding;

the improvement wherein at least the secondary winding comprises a flat, multifilar strap which includes a plurality of

filaments arranged in substantially parallel, caplanar rela-

tionship, and elongate strip means of electrically insulating

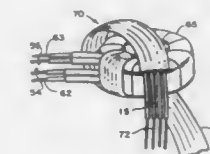
material underlying and overlying the plurality of filaments,

the flat, multifilar strap secondary winding providing for main-

taining the substantially parallel, caplanar relationship of the

filaments without crossover during radial toroidal winding

about curved or irregular toroid surfaces, and providing electrical insulation between turns of the multifilar strap



secondary winding and between the secondary and primary windings.

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## PLANT PATENTS

GRANTED SEPTEMBER 18, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,326

## ROSE PLANT—LAVJACK VARIETY

Keith Laver, Caledon East, Canada, assignor to The Conard-Pyle Company, West Grove, Pa.

Filed Apr. 27, 1989, Ser. No. 343,869

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—10

1 Claim

1. A new and distinct variety of Miniature rose plant characterized by the following combination of characteristics:

- (a) forms in abundance on a continuous basis attractive fully double long lasting blossoms which are of a very stable orange-red coloration,
- (b) forms small foliage,
- (c) exhibits a bushy growth habit,
- (d) exhibits good disease resistance, and
- (e) is well suited for greenhouse production as a pot plant; substantially as herein shown and described.

7,327

## APPLE TREE NAMED 'BENIFUJI'

Tsuneo Murakami, Aomori, Japan, assignor to Hideki Otani, Reedley, Calif.

Filed Nov. 21, 1988, Ser. No. 274,501

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—34

1 Claim

1. A new and distinct apple tree substantially as shown and described, particularly characterized by fruit which has less skin russet than Kitanosachi variety but a color, eating quality and maturing time resembling Fuji.

7,328

## APPLE TREE: EARLY SPUR ROME

Wilfred M. Berger, Quincy, Wash., assignor to Columbia and Okanagan Nursery Company, Wenatchee, Wash.

Filed Jan. 23, 1989, Ser. No. 299,947

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—34

1 Claim

1. A new and distinct variety of apple tree, substantially as herein shown and described, characterized by its dense foliage and fruit which takes on a red color early in its development and which ripens early.

7,329

## GAZANIA PLANT CALLED 'MITSUWA BETTER WHITE'

Janet N. Egger, Ventura, and Stephen H. Belmel, Agoura, both of Calif., assignors to Mitsuba Nursery, Inc., Moorpark, Calif.

Filed May 10, 1989, Ser. No. 349,859

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—68

1 Claim

1. A new and distinct cultivar of Gazania are described and illustrated, particularly characterized by its floriferous showy clear white flowers, green foliage, vigorous growth, and trailing habit.

7,330

## AFRICAN VIOLET PLANT NAMED IMPROVED SOUTH CAROLINA

Reinhold Holtkamp, Sr., Blumenstrasse 28, D 4242 Rees-Haffen, Fed. Rep. of Germany

Filed Jan. 8, 1989, Ser. No. 363,464

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—69

1 Claim

1. A new and distinct cultivar of African violet named Improved South Carolina, as described and illustrated, and particularly characterized by its shiny white, star-shaped flowers with slightly wavy edges; occasional purplish blue touch in the center; strong, upright flower stems that curve slightly toward the center to form a compact bouquet above the leaves; medium green, oval, slightly serrated leaves; profuse flowering, vigorous and compact growth habit, flowering 10–11 weeks after potting, and its long lasting and non-dropping flowers.

7,331

## AFRICAN VIOLET PLANT NAMED EVERGLADES

Reinhold Holtkamp, Sr., Blumenstrasse 28, D 4242 Rees-Haffen, Fed. Rep. of Germany

Filed Jun. 8, 1989, Ser. No. 363,465

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—69

1 Claim

1. A new and distinct cultivar of African violet named Everglades, as described and illustrated, and particularly characterized by its single violet-shaped to semi-double, blue flowers with frilled edges; strong, upright flower stems that curve slightly toward the center to form a compact bouquet above the leaves; large medium green leaves, profuse flowering, vigorous growth habit, flowering 10–11 weeks after potting, and its long lasting and non-dropping flowers.

7,332

## CHRYSANTHEMUM PLANT NAMED SALMON SPLENDOR

Betty C. Callahan, Waleska, Ga., assignor to Callahan's Greenhouses, Inc., Waleska, Ga.

Filed Jun. 13, 1989, Ser. No. 365,473

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—74

1 Claim

1. A new and distinct Chrysanthemum plant named Salmon Splendor, as described and illustrated.

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## PATENTS

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### ERRATA

For CLASS	See PATENT NO.
019-035 .....	4,956,896
413-008 .....	4,956,906
049-381 .....	4,956,954
089-001 .....	4,957,027
089-047 .....	4,957,028
134-167 .....	4,957,123
248-296 .....	4,957,186
277-217 .....	4,957,212
272-117 .....	4,957,281
272-073 .....	4,957,282
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148-013 .....	4,957,543
203-051 .....	4,957,595
201-020 .....	4,957,596
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514-252 .....	4,957,971
328-155 .....	4,958,120
355-053 .....	4,958,160
357-084 .....	4,958,222
368-282 .....	4,958,279
357-072 .....	4,958,372

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## PATENTS

GRANTED SEPTEMBER 18, 1990

## GENERAL AND MECHANICAL

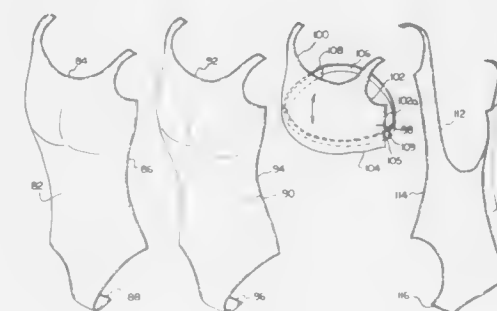
4,956,878

## SWIM SUIT CONSTRUCTION

Nancy V. Boynton, 5814 Vestavia Dr., Houston, Tex. 77069  
Division of Ser. No. 117,488, Nov. 5, 1987. This application Aug.  
16, 1989, Ser. No. 394,476  
Int. Cl.<sup>5</sup> A41D 7/00

U.S. Cl. 2—67

5 Claims



1. A swim suit construction for securely supporting a female while allowing freedom of movement, comprising:
  - a front outer shell of stretch fabric having an upper edge, side edges, and a lower edge;
  - a front liner of stretch fabric having the same general shape as said front outer shell, said liner being attached to said front outer shell along said upper edge, side edges and bottom edge;
  - a bra of two-way vertically stretchable fabric positioned on the side of said front liner remote from said front shell, said bra having upper, lower and side edges attached along said upper edges to said outer shell and liner;
  - a rear outer shell of four-way stretch fabric having an upper edge, side edges and a bottom edge, said rear outer shell being attached along portions of said top, side and bottom edges to said front shell and liner and cooperating therewith to provide a body enclosure having arm, neck and leg openings; and
  - said bra extending below said arm openings and being attached to said front and rear shells and said front liner along said side edges thereof below said arm openings, said bra being exposed to the interior of said swim suit;
  - an elastic loop means providing a front half attached to said bra along said bottom edge thereof and to said side edges of said liner and said front and back shells;
  - said elastic loop means providing a rear half cooperating with said front half to encircle a female body and hold the lower portion of said bra against the body of such a female;
  - said lower edge of said bra and elastic loop means being free of connections with said front and rear shells and said liner except along said side edges thereof;
  - said front liner and said shell being stretchable at least in the direction toward said side edges.

4,956,879

## GARMENT HAVING SEAMLESS BODY

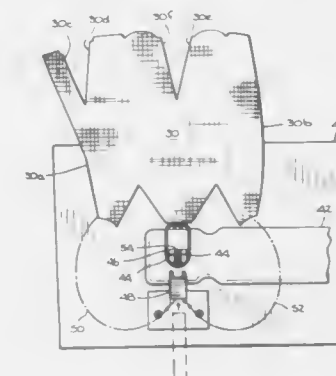
Marvin Adams, Sylva, N.C., assignor to Meltzer Industries Corporation, New York, N.Y.  
Filed Apr. 18, 1989, Ser. No. 339,529  
Int. Cl.<sup>5</sup> A41D 10/00

U.S. Cl. 2—80

3 Claims

1. A method of making a garment having a seamless body portion, said method comprising the steps of:

- a. cutting a piece of fabric to the pattern of a one-piece body portion of a garment,
- b. positioning said cut piece of fabric face down on a sewing machine table behind the needles of a two-needle sewing machine mounted on said table, the sides of said cut piece of fabric disposed on opposite sides of the needles,
- c. drawing the sides of the cut piece of fabric forwardly on opposite sides of the needles while preventing any contact between the said cut piece of fabric and the said needles,



- d. then turning said sides of the cut piece of fabric toward the needles and feeding said sides to the needles,
- e. concurrently feeding a slide fastener to the needles,
- f. thereby sewing the slide fastener to the sides of the cut piece of fabric to form a closure between said sides, and
- g. finally completing the garment by attaching sleeves to the seamless body portion.

4,956,880

## ACTUATING DEVICE FOR MOVING A VALVE FOR EMPTYING A FLUSH TANK

Jean-Claude Baillet, Villefranche, France, assignor to Siamp Cedap S.A., Monaco

Filed Jun. 5, 1989, Ser. No. 365,134

Claims priority, application France, Oct. 5, 1987, 87 13720  
Int. Cl.<sup>5</sup> E03D 1/34

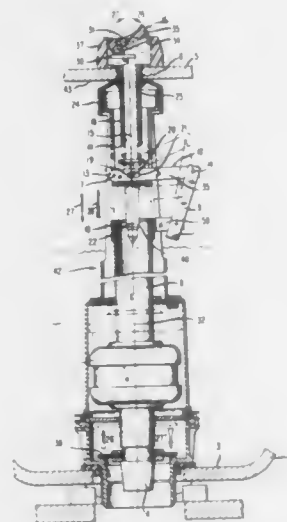
U.S. Cl. 4—413

17 Claims

1. A discharge-valve actuating device for a flush tank reservoir comprising
  - a reservoir tank having an open top and having a bottom;
  - a cover lid having a central opening for positioning and supporting the operating member and mating the top of the reservoir tank;
  - a vertically disposed tube;
  - a valve supported by the vertical tube;
  - an operating member pivotally mounted on said tank exterior for providing a first operating position corresponding to an open position of the valve, and for providing a second operating position corresponding to a closed position of the valve;
  - a body mounted solidly to the bottom of the reservoir tank and wherein the vertical tube is shiftable in axial direction in the body;
  - a case solidly attached to the body and to the reservoir tank;
  - a linking rod pivotally attached to the tube and disposed at an angle relative to the axis of the tube and constructed to transfer the vertical motion of said tube;
  - an operating lever pivotally attached at one end via a first pivot axis first pivot axis to the linking rod and pivotally attached to the body at the other end and having an elongated opening between said pivot axis; a control rod dis-



posed substantially in the axis of the tube and mechanically connected, on the one hand, to the operating lever for engaging the operating lever and, on the other hand, to the operating member, and guided in the case;  
a cog attached to the control rod, wherein the cog forms a mechanical connection between the rod and the operating lever and wherein the cog slides in the elongated opening of the operating lever;



a laterally extending bar carried by the control rod exterior of said tank;  
a rocker bar attached to the operating member on one side of said pivotal mount for supplying a mechanical connection between the control rod and the operating member by engaging said bar in a sliding lifting manner to lift said valve.

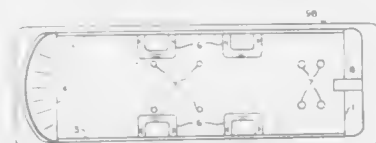
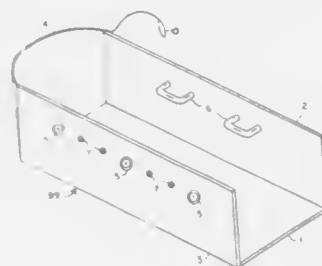
**4,956,881**  
**HEAD SUPPORT APPARATUS**  
Stephen M. Lindley, 2400 Creekwood, and Brandy L. Stein, 302 Denton St., both of Denton, Tex. 76205  
Filed Aug. 7, 1989, Ser. No. 389,984  
Int. Cl.<sup>5</sup> A45D 44/10  
U.S. Cl. 4—517 25 Claims



1. Apparatus for supporting a person's head comprising:  
a support sling adapted to be placed under the back of the person's head wherein each end of the sling extends upward on either side of the person's head;  
a rope having two sections, each section of rope being attached to one end of the sling wherein the two sections of rope extend upward from the sling;  
holding means for holding the two sections of rope above the person's head; and  
means operatively interconnecting the two sections of rope above the person's head so that when the person's head is

rotated one section of rope moves upward and the other section of rope moves downward.

**4,956,882**  
**BATH TUB LINER**  
Harold S. Cohn, III, 253 New Jesup Rd., Brunswick, Ga. 31520  
Filed Jul. 19, 1989, Ser. No. 382,776  
Claims priority, application Japan, Dec. 30, 1988, 63-335549  
Int. Cl.<sup>5</sup> A47K 3/02  
U.S. Cl. 4—580 5 Claims



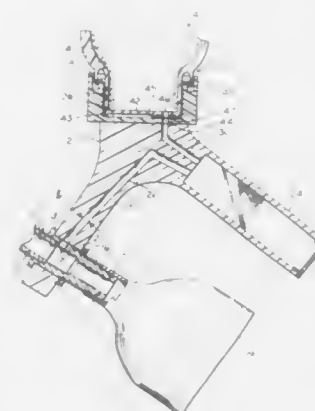
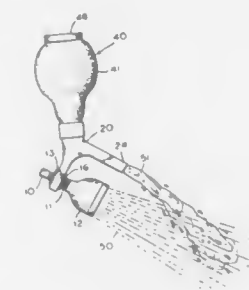
1. The combination of a bathtub liner temporarily attachable to the vertical walls of a bathtub and detachable support means attachable to the bathtub liner, where the combination is capable of supporting the weight of a child and assisting an adult in entering or exiting the bathtub, comprising:  
a substantially rigid bottom panel;  
two substantially rigid lateral panels having suction cups for temporary attachment of the lateral panels to the vertical sides of a bathtub, said lateral panels having sufficient rigidity and thickness to support the weight of a child or an adult entering or exiting the bathtub;  
a plurality of support member attachment means, located in said bottom panel and said lateral panels, adapted to detachably retain support members;  
said support members adapted to be detachably retained by said support member attachment means;  
where said support member attachment means are sockets and said support members have ends which interlock with said sockets;  
where the interlock of said support members to said sockets and the attachment of said lateral panels to said bathtub are of sufficient strength to remain intact when subjected to the weight of a child or an adult entering or exiting said bathtub.

**4,956,883**  
**SHOWER FIXTURE**  
Dale Lane, 4411 Marsh Rd., Marietta, Ga. 30066  
Filed Oct. 30, 1989, Ser. No. 428,996  
Int. Cl.<sup>5</sup> A47K 3/22  
U.S. Cl. 4—605 10 Claims

1. Apparatus for dispensing liquid soap into or adjacent to a water stream emitted from a primary shower head mounted to a water line of a selected size, and with the apparatus comprising an auxiliary shower head from which a branch line extends of a size smaller than the water line size; means for mounting said auxiliary shower head adjacent to the primary shower

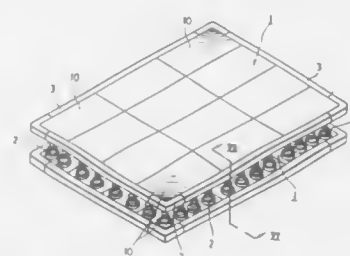
head with said branch line in fluid communication with the water line, and a liquid soap reservoir mounted in valved fluid communication with said auxiliary shower head.

10. A shower fixture comprising a primary shower head having a set of holes of a selected primary cumulative size, an



auxiliary shower head having a set of holes of a selected cumulative size as large as or greater than said primary cumulative size, means for mounting said primary shower head and said auxiliary shower head to a water line in fluid communication therewith, and a liquid soap reservoir mounted above said auxiliary shower head in fluid communication therewith.

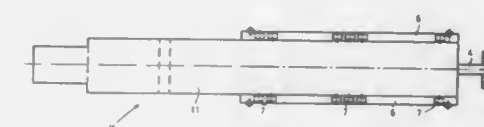
**4,956,884**  
**MODULAR BOX SPRING MATTRESS**  
Dye-Shuh Hwang, 237, Chong-Ming St., Kaohsiung, Taiwan  
Filed Nov. 18, 1988, Ser. No. 273,448  
Int. Cl.<sup>5</sup> A47C 23/04  
U.S. Cl. 5—246 7 Claims



1. A modular box spring mattress comprising two flexible plate units having a spring unit disposed between said plate units for biasing said plate units away from each other, said spring unit including a plurality of coiled compression springs and one of said flexible plate units comprising:  
a plurality of plate subunits joined together side by side

defining at least one of the flexible plate units, each plate subunit having a substantially rectangular configuration and including a plurality of pins and a plurality of retaining holes formed along two adjacent sides thereof, a plurality of insertion members secured to the remaining adjacent sides thereof, said insertion members including a looped portion generally perpendicular to said subunits for insertion through said retaining holes in a side of an adjacent subunit so as to form a pin hole in an end portion of each of said looped portions, said pins being inserted through said pin holes so as to retain said subunits together;  
a plurality of annular flanges extending from each plate unit towards each other, said annular flanges of one of said plate units opposing said annular flanges of the other plate unit so that end turns of said compression springs are receivable within said annular flanges;  
a plurality of flexible retaining arms extending obliquely and inwardly from each of said annular flanges in a plane generally parallel to said plate subunits, the angle formed at the tangent of each flexible retaining arm and its respective annular flange being approximately 45°, said flexible retaining arms including end portions spaced apart from its corresponding plate subunits so that said end turns of said compression springs can be respectively retained between said flexible retaining arms and said plate subunits.

**4,956,885**  
**PATIENT SUPPORT FOR DIAGNOSTIC APPARATUS**  
Thomas Alich, Elmsborn; Peter Flisikowski, and Horst Peemoller, both of Hamburg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.  
Filed Sep. 21, 1989, Ser. No. 410,692  
Claims priority, application Fed. Rep. of Germany, Oct. 3, 1988, 3833594  
Int. Cl.<sup>5</sup> A61G 7/06  
U.S. Cl. 5—431 6 Claims

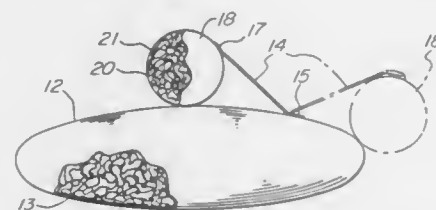


1. A patient support for a diagnostic apparatus, notably for an MRI apparatus, comprising a cantilevered stretcher to support an object to be examined and to be introduced into an examination zone of the apparatus, the support comprising a core of fibre-reinforced epoxy resin provided with a coating, characterized in that the core is made of a fibreglass-reinforced synthetic material on an epoxy resin basis with an isotropic fibreglass structure where through cavities extend in a longitudinal direction of the stretcher, which cavities are filled with a fibreglass fleece impregnated with epoxy resin, an upper side of the stretcher being provided with a fibre-reinforced coating of a synthetic material on an epoxy resin basis with unidirectional fibres of a synthetic material of high tensile strength.

**4,956,886**  
**SELF ADJUSTABLE NECK SUPPORT PILLOW**  
Jeff Sarkozi, 1117 N. Avila Pl., Orange, Calif. 92669  
Filed Oct. 2, 1989, Ser. No. 415,873  
Int. Cl.<sup>5</sup> A47G 9/00  
U.S. Cl. 5—437 5 Claims

1. A three-component, self adjustable pillow comprising:  
a. a base portion having a generally elliptically-shaped cross section, and including a cloth exterior and soft fill interior;  
b. a generally rectangularly-shaped cloth attachment piece

- defining an attachment edge, and a free edge, the attachment edge being connected to the pillow; and,
- c. a cylindrically-shaped neck support defining a longitudinal portion connected to the attachment piece along the free edge, the neck support providing a cloth exterior and soft fill interior; whereby:
- i. the attachment piece is adapted to freely move over part of the said base portion along with the attached neck support, for adjustable positioning by the user;
  - ii. the soft fill interior of the said base portion is adapted to transmit forces of compression by the shoulders inwardly along the said base portion and upwardly to the neck support for supporting the neck of the user;
  - iii. the head and shoulders of the user are supported by the said base portion, the size of the neck support being sufficient to maintain the head, shoulders and neck of the user reasonably aligned, thus reducing aching, discomfort, stiffness and muscle strain of the neck muscles;



wherein the base portion dimensions are about 12"-18" wide, about 30"-36" in length, the cloth attachment piece is about 3"-5" wide, and the neck support is about 1"-4" in diameter, whereby,

- i. during sleep, the inward forces of compression on the said base portion due to the user's shoulders will produce a corresponding upward force on the neck support, and self adjustment of the components; ii. the neck support provides a freely movable range along the plane or surface of the said base portion from about midway to about the edge thereof; iii. the attachment piece maintains the neck support portion in contact with the said surface throughout its range of movement, while simultaneously maintaining the user's head and neck on the said base portion; and iv. the said neck support throughout its freely movable range may be purposefully adjusted by the user while awake, or may self adjust when the user is asleep, and maintains the user's head and shoulders on the pillow, while enabling the user to adjust the degree of support on the neck when adjusting body position from side to back.

4,956,887

## METHOD OF METERING DETERGENT

Vesa Hakulinen, Kansakoulunkatu 2 A 5, SF-04400 Järvenpää, Finland

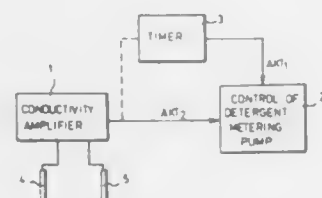
Filed Apr. 4, 1989, Ser. No. 333,047

Claims priority, application Finland, Apr. 7, 1988, 881619

Int. Cl. D06F 39/02

U.S. Cl. 8-158

8 Claims



1. A method of metering detergent into a washing solution in

large washing apparatuses and systems, comprising measuring, from a washing solution containing water and detergent, a property proportional to the detergent concentration of the washing solution, and adding detergent to the washing solution if the value of the measured property corresponds to a detergent concentration below a predetermined threshold value, the addition of detergent being allowed only during a predetermined metering period for the time when the detergent concentration corresponding to the property measured from the washing solution is below said threshold value during said metering period, and that the addition of detergent is prevented after each metering period for the time of a predetermined mixing period.

4,956,888

## FORMATION OF FASTENERS AND CONNECTIONS WITH VARIABLE PITCH THREADS

William P. Green, 3570 E. Lombardy Rd., Pasadena, Calif. 91107

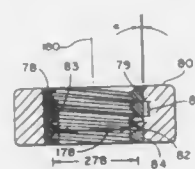
Division of Ser. No. 738,256, May 28, 1985, Pat. No. 4,842,464.

This application Mar. 6, 1989, Ser. No. 318,859

Int. Cl. B21D 53/20; F16B 39/30

U.S. Cl. 10-86 A

5 Claims



1. The method of forming a composite nut that comprises: progressively deforming an elongated element having a predetermined initial cross section to the form of a coil defining an internal thread and having a progressively changing cross section giving the thread a progressively changing pitch; and securing said coil rigidly within a passage in a nut body with the thread at said changing pitch; said deforming of the element including shaping said element to have axial and radial dimensions one of which progressively increases in a predetermined direction, and the other of which progressively decreases in said direction at a rate compensating for the increase in said one dimension and giving the element a substantially uniform cross sectional area along its length.

4,956,889

## PORTABLE DRAIN CLEANING APPARATUS

Karl L. Klrk, Elyria, Ohio, assignor to Emerson Electric Co., St. Louis, Mo.

Filed Jul. 3, 1989, Ser. No. 374,842

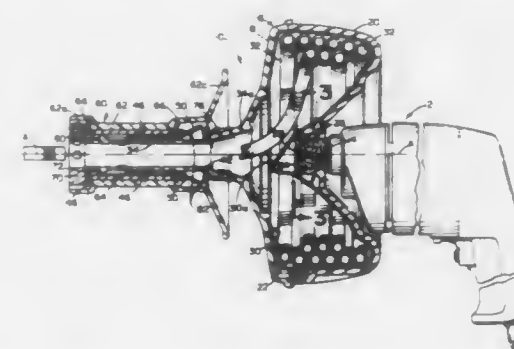
Int. Cl. B08B 9/02

U.S. Cl. 15-104.33

36 Claims

1. In a drain cleaning apparatus comprising tubular guide means having an axis, snake means extending through said guide means, means to rotate said guide means about said axis, spring finger means rotatable with said guide means and including jaw means displaceable toward and away from said snake means between clamping and released positions relative thereto, and sleeve means removably received on said guide means and being axially displaceable relative thereto to actuate said spring finger means to displace said jaw means between said positions thereof, the improvement comprising: said spring finger means, said guide means and said sleeve means including means engaging with one another to alone support said spring finger means against axial and circumferential dis-

placement relative to and radial separation from said guide means, said means engaging with one another including inner surface means on said sleeve means radially capturing said



spring finger means between said guide means and sleeve means, whereby said sleeve means when removed from said guide means releases said spring finger means for free radial separation from said guide means.

4,956,890

## DOUBLE CHANNEL BLADE FOR A WINDSHIELD WIPER

Maurice A. Journee, Reilly, France, assignor to Paul Journee S.A., Colombes Cedex, France

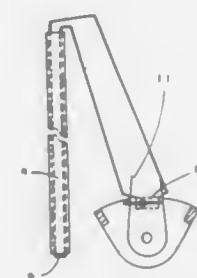
Filed Mar. 1, 1989, Ser. No. 317,664

Claims priority, application France, Mar. 2, 1988, 88 02640

Int. Cl. B60S 1/04

U.S. Cl. 15-250.36

13 Claims



1. A wiper blade for use with a windshield wiper, said wiper blade comprising: a body; a working portion connected to said body; two channels extending longitudinally through said blade; and communicating means, at a first end of said blade, connecting said two channels and providing communication therebetween.

4,956,891

## FLOOR CLEANER

Richard F. Wulff, Maple Plain, Minn., assignor to Castex Industries, Inc., Holland, Mich.

Filed Feb. 21, 1990, Ser. No. 483,260

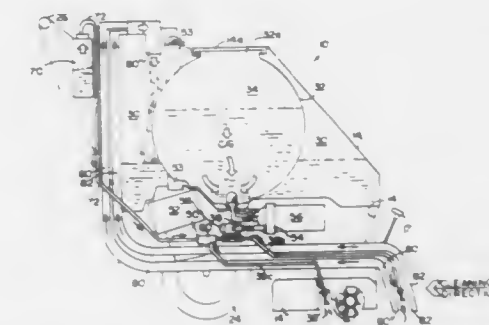
Int. Cl. A47L 11/34

U.S. Cl. 15-320

18 Claims

1. A floor cleaning machine comprising: a support structure including a housing thereon forming a front and a rear for said machine; wheel means having an axle means beneath said support

structure on a transverse axis intermediate said front and said rear for mobility of said machine; handle means at the upper front of said machine for moving said machine; floor engaging cleaning means adjacent said rear for cleaning the floor, including a clean water outlet and a dirty water inlet; said housing having a first water retention chamber with a center of gravity rearward of said axis and substantially forward of said floor engaging cleaning means; an inner container within said first chamber defining an inner chamber for retention of water separated from water in said first chamber; said inner chamber being substantially symmetrical with said center of gravity;



clean water conduit means between one of said chambers and said floor engaging cleaning means clean water outlet for conducting clean water to said floor engaging cleaning means; dirty water conduit means between the other of said chambers and said floor engaging cleaning means dirty water inlet to conduct dirty water from said dirty water inlet to said other chamber; said first chamber extending in front of and to the rear of said inner chamber, said first chamber and said inner chamber being located and configured to cause said center of gravity to remain substantially constant during emptying of said one chamber of clean water and filling of said other chamber of dirty water, such that downward force on said floor engaging cleaning means remains substantially constant throughout the cleaning cycle.

4,956,892

## CORDLESS VACUUM BRUSH

Donald G. Fawkes, 1000 S. Illinois, #1006, Mason City, Iowa 50401

Filed May 3, 1989, Ser. No. 346,691

Int. Cl. A47L 5/24

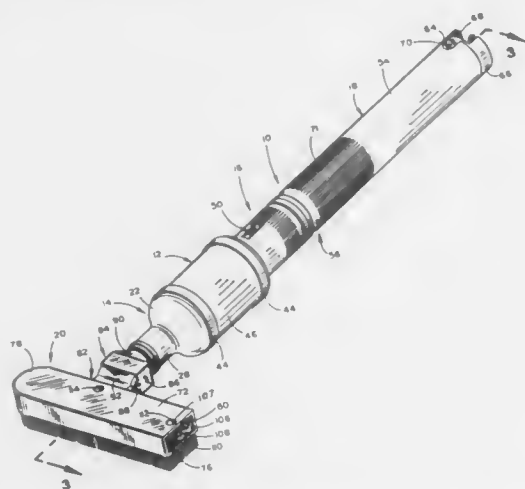
U.S. Cl. 15-339

23 Claims

1. A cordless battery operated electric portable vacuum brush, comprising: a vacuum assembly including a dust trap, a motor operated fan and a brush head for picking up dust particles of the approximate consistency of talcum powder, a handle assembly containing one or more rechargeable batteries and a battery charger operably connected thereto, said handle assembly being detachably secured to said vacuum assembly so that it can be removed therefrom for charging said battery, switch means for controlling connection of said battery to said motor, said brush head being of an elongated configuration with a hollow interior, open bottom and peripheral soft, depending bristles, and



means to selectively mount said brush head to said vacuum assembly in a broadside orientation therewith for general



use and in an endwise orientation therewith to facilitate insertion into confined areas.

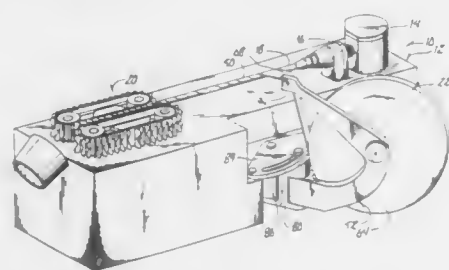
4,956,893

## APPARATUS FOR ENCASING A PRODUCT

Ray T. Townsend, Des Moines, Iowa, assignor to Townsend Engineering Company, Des Moines, Iowa  
Continuation of Ser. No. 319,261, Mar. 6, 1989, Pat. No. 4,905,349. This application Jan. 12, 1990, Ser. No. 464,303  
Int. Cl.<sup>5</sup> A22C 11/10, 11/00

U.S. Cl. 17—34

1 Claim



1. An apparatus for encasing a plastic product, comprising: a support; an elongated casing strip having opposite side edges; first means on said support for forming said strip into a plurality of helical revolutions with said side edges of said strip within each one of said helical revolutions frictionally engaging and overlapping said side edges of said strip within those of said helical revolutions adjacent said one helical revolution so as to form an elongated tubular casing; said overlapped edges of said casing strip being sufficiently overlapped to create enough friction cohesiveness to maintain said helical revolutions in a self-contained tubular casing to contain said plastic product; second means on said support for introducing said plastic product into said casing; and a third means to sequentially twist said casing containing said plastic product at spaced intervals to form a linked product with twist points at opposite ends thereof, with the number of twists in said cylindrical casing at said twist points being equal to the number of helical revolutions of said strip in each of said linked products.

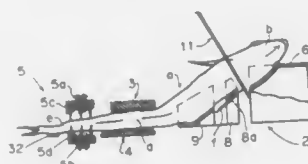
4,956,894

## APPARATUS FOR COLLECTING FISH EGGS

Kaneo Matsubayashi, Kishiwada, Japan, assignor to Toyo Suisan Kikai Co. Ltd., Osaka, Japan  
Filed Dec. 20, 1989, Ser. No. 454,040  
Int. Cl.<sup>5</sup> A22C 25/14

U.S. Cl. 17—58

4 Claims



1. An apparatus for collecting fish eggs comprising a main endless conveyor for transporting fish with the head of each fish positioned in place and also with the upper half of the fish inclined upward, a pair of upper and lower tail holding endless conveyor belts for holding the tail of each fish therebetween during transport, a pair of upper and lower trunk holding endless conveyor belts disposed between the main endless conveyor and the pair of conveyor belts for holding therebetween the trunk lower half portion of each fish between the abdomen and the tail during transport, trunk support portions and fish back restraining frames arranged alternately on the lower trunk holding endless conveyor belt, a cutter for cutting off the head of each fish during transport, a press member adapted to come into contact with the anal portion of each fish after the head has been cut off, and a press member operating mechanism for moving the press member along a fish back bearing face of each restraining frame approximately in parallel thereto as each fish is transported.

4,956,895

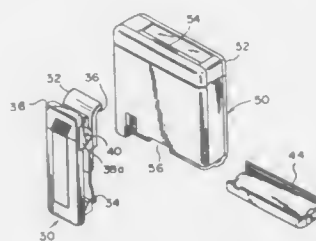
## REMOVABLE CLIP FOR PORTABLE EQUIPMENT

Sigeki Hayasaka, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan  
Continuation of Ser. No. 138,403, Dec. 28, 1987, abandoned.  
This application Oct. 4, 1989, Ser. No. 418,749  
Claims priority, application Japan, Dec. 25, 1986, 61-201952[U]

Int. Cl.<sup>5</sup> A45F 5/02

U.S. Cl. 24—3 J

5 Claims



1. A structure for removably mounting a clip to portable equipment, said clip having a molded plastic support member which is shaped complementary to a back of a housing of said equipment and a clip member constantly biased by a spring toward said back of said housing, said structure comprising: a first, plastic mating portion provided on a top of said housing of said equipment; a second mating portion provided on said back of said housing; a third mating portion provided on a top of said support member of said clip for mating with said first mating portion; and a fourth, metal mating portion buried in a lower end of said

support member for mating with said second mating portion.

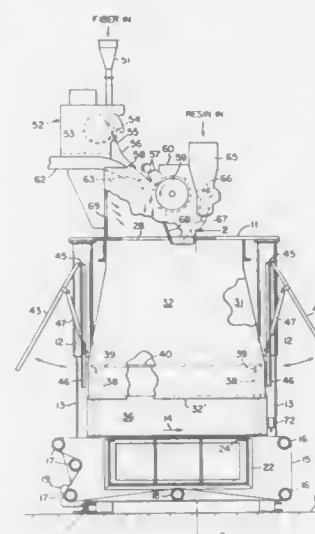
4,956,896

## METHOD AND APPARATUS FOR FORMING NONWOVEN FIBER WEBS

Michael L. Wilder, Victor; Michael A. Ruffalo, Newark; George R. Lilly, Palmyra, and William M. Hardy, Victor, all of N.Y., assignors to Phoenix Associates, Victor, N.Y.  
Filed May 3, 1989, Ser. No. 347,392  
Int. Cl.<sup>5</sup> D01G 25/00; D04H 1/00

U.S. Cl. 19—305

13 Claims



1. Apparatus for producing nonwoven fiber mats comprising: a frame, a screen mounted on said frame to travel in an endless path, and having an upper run mounted to travel in a generally horizontal plane in one direction, a platform mounted on said frame above and in vertically spaced relation to the upper run of said screen, means for directing a supply of fibers downwardly through an opening in said platform and onto said upper run of said screen to form a substantially shingle-free nonwoven fiber mat thereon, said means comprising an adjustable hood mechanism extending between said platform and said upper run of said screen, and operative to guide fibers from said supply thereof onto preselected surface areas of said upper run, said hood mechanism comprising a pair of adjustable, laterally spaced, fiber-guiding curtain members connected adjacent their upper ends to said platform adjacent opposite sides, respectively, of said opening therein, and extending downwardly therefrom to points adjacent opposite sides, respectively, of said upper run of said screen, said pair of curtain members being operative to form therebetween a generally tunnel shaped passage extending beneath said platform in the direction of travel of said upper run, and open at opposite ends thereof to the ambient atmosphere, means adjacent opposite sides of said upper run of said screen for moving the lower ends of said curtain members selectively toward and away from each other, thereby selectively to decrease or increase, respectively, the space between said curtain members and consequently the width of the mat formed on said screen.

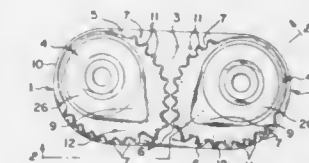
4,956,897

## CAM CLEAT

Robert Speedie, Sandringham, Australia, assignor to Ronstan International Pty. Ltd., Sandringham, Australia  
Filed Jun. 21, 1989, Ser. No. 369,146  
Claims priority, application Australia, Jun. 21, 1988, P18902  
Int. Cl.<sup>5</sup> F16G 11/00

U.S. Cl. 24—134 P

14 Claims



1. A cam cleat including at least two gripping members mounted in spaced apart relation, the gripping members provided a line gripping passage therebetween through which a line can extend; at least one of the gripping members including a cam shaped gripping pawl mounted on a base member for pivotal movement, relative to the or at least one other gripping member, movement of the gripping pawl toward the other gripping member closing the line gripping passage until a line therein is gripped between the gripping members; the or each gripping pawl having a pair of gripping surfaces arranged in a symmetrical relation so that one or other of the gripping surfaces engage the line during gripping, the surface allocated for gripping depending on the orientation of the gripping pawl relative to other gripping member.

4,956,898

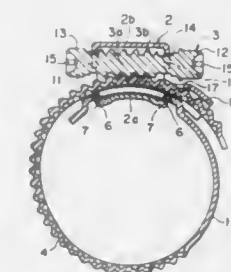
## HOSE CLAMPING DEVICE

Masashi Miyamura, Kurobe, and Nobuyuki Kawano, Nagaoka, both of Japan, assignors to Toyox Co., Ltd., Japan  
Filed Sep. 29, 1989, Ser. No. 414,242  
Claims priority, application Japan, Sep. 29, 1988, 63-128214[U]; Nov. 21, 1988, 63-152149[U]; Nov. 21, 1988, 63-152150[U]

Int. Cl.<sup>5</sup> F16L 33/08

U.S. Cl. 24—274 R

2 Claims

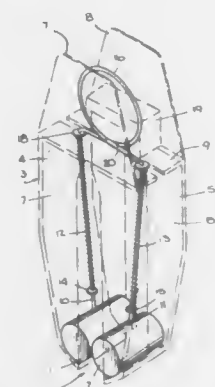


1. A hose clamping device which comprises: an elongated clamping band which has a first end portion, a second end portion and a plurality of engagement means therealong, a housing which is attached to said first end portion of said clamping band and which provides a first end, a second end and a passageway that extends from said first end to said second end, the second end portion of said clamping band extending through said passageway from said first end to said second end of said housing to form said clamping band into a main portion having a generally circular shape and a projecting portion which extends beyond the second end of said housing, a worm screw which is stationarily mounted in said housing

and which includes a central shaft that has worm threads that engage with said plurality of engagement means of said clamping band and a head end having means for engagement by an operating tool in order to rotate said worm screw and move the second end portion of said clamping band through the passageway in said housing to thereby increase or decrease the diameter of the generally circular shape formed by the main portion of said clamping band and the length of the projecting portion of the clamping band, and

a band guide means which comprises two curved support arms extending away from the second end of said housing and a guide element connected between said two curved support arms, said guide element contacting the projecting portion of said clamping band to cause the projecting portion to extend in general conformity with the generally circular shape formed by the main portion of said clamping band.

**4,956,899**  
**SELF CLAMPING DEVICE**  
 John Green, 7 Avenue de Grande Bretagne, "Le Montaigne" Monte Carlo, Monaco  
 Filed Apr. 17, 1989, Ser. No. 339,504  
 Claims priority, application European Pat. Off., Mar. 22, 1989, 89440023.3  
 Int. Cl.<sup>5</sup> B42F 1/00  
 U.S. Cl. 24—488  
 14 Claims



1. A self-clamping device for temporarily securing a relatively flat piece of material without damaging said material, comprising:

a casing having a longitudinal opening lying in a first plane through which opening said relatively flat piece of material can pass, said casing being formed with a relatively flat interior side wall of a given width diverging away from a second plane, said second plane lying perpendicularly to said first plane, and a relatively flat interior opposing wall of about said same given width as said diverging wall, said opposing wall facing said diverging wall;

a first and second parallel roller each of said given width and each rotatably and slidably mounted in said casing, said casing having two flat interior side walls each diverging away from said second plane, said rollers being dimensioned and disposed so as to contact substantially all of said material as is covered by said device;

first and second rods;

first and second compression springs wound about and engaging said first and second rods;

first and second means for attaching said first and second rods to said first and second rollers; and

means for releasing said material;

said rollers, diverging side walls and springs all cooperating so that when said material is inserted into said opening said material passes between said rollers and said rollers roll along said diverging walls away from said opening, compressing said springs, whereby after said material is inserted in said casing said springs force said rollers along said diverging walls toward said opening and said material so that said rollers are urged against said material by the wedging action of said rollers as they contact said diverging walls, and furthermore, if any pulling force is applied in an attempt to pull said material from said casing said rollers are even more securely drawn toward said opening by said force, thereby even more firmly wedging said rollers against said material with a wedging action proportional to said pulling force.

**4,956,900**  
**FASTENING DEVICE**  
 Bernard Mair, 1141 Burmac Dr., Unit 9, Weston, Ontario, Canada (M2H 1X4)  
 Filed Apr. 5, 1989, Ser. No. 333,215  
 Int. Cl.<sup>5</sup> A44B 11/25  
 U.S. Cl. 24—606  
 20 Claims



1. A lockable latch comprising:

an outer cylindrical member and an inner member mounted coaxially within said cylindrical member for relative coaxial movement between first and second positions respectively defining unlocked and locked latch positions;

one of said members including a resilient tongue forming part of the radial wall surface thereof;

the other of said members having an opening in the radial wall surface thereof;

said tongue and said opening being in register when said members are in said first position to permit said tongue to be deformed into said opening, said tongue and said opening being out of register when said members are in said second position whereby said tongue is blocked by contiguous portions of said other member; and

a latching projection formed on distal portions of said tongue facing away from said other member.

**4,956,901**  
**APPARATUS AND PROCESS FOR FORMING A WAD OF YARN**  
 Joseph E. Koskol, Wilmington, Del.; Robert J. Santucci, West Chester, Pa., and Louis G. Rosanio, Jr., Wilmington, Del., assigns to E. I. du Pont de Nemours and Company, Wilmington, Del.  
 Division of Ser. No. 121,059, Nov. 16, 1987, Pat. No. 4,863,029.  
 This application Mar. 6, 1989, Ser. No. 319,311  
 Int. Cl.<sup>5</sup> D02G 1/12, 1/20  
 U.S. Cl. 28—255  
 5 Claims

4. A process for compacting yarn into a wad in a wad forming space having an entrance and an exit using pressurized fluid including forwarding said yarn into said wad forming space, comprising:

passing the forwarded yarn through a fluid pressure chamber having an entrance and an exit, the chamber exit in fluid communication with the entrance of said wad forming space;

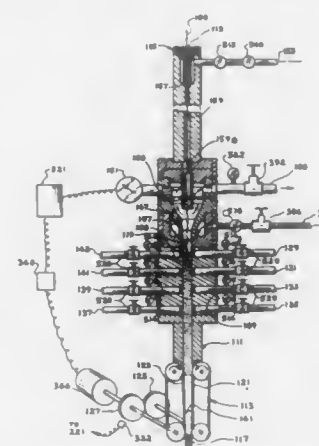
delivering said yarn into said chamber at a location beyond said chamber entrance;

and venting a portion of said pressurized fluid from said chamber at a location before said location of delivery of said yarn into said chamber.

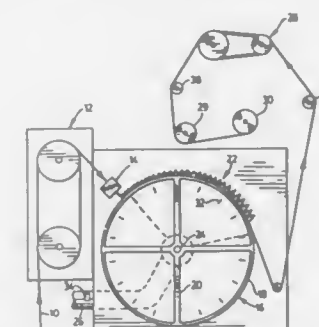
ber having an entrance and an exit, the chamber exit in fluid communication with the entrance of said wad forming space;

delivering said yarn into said chamber at a location beyond said chamber entrance;

and venting a portion of said pressurized fluid from said chamber at a location before said location of delivery of said yarn into said chamber.



**4,956,902**  
**METHOD OF PREDICTING YARN CATERPILLAR LENGTH**  
 Douglas E. Turek, Kingston, Canada, assignor to Du Pont Canada Inc., Mississauga, Canada  
 Filed Sep. 12, 1989, Ser. No. 406,804  
 Int. Cl.<sup>5</sup> D02G 1/16  
 U.S. Cl. 28—257  
 3 Claims



1. A method of predicting changes in caterpillar length of yarn wherein said yarn is subject to the following processing steps:

passing yarn through a set of hot rollers to bulk the fibre;

contacting said yarn with an air jet to pull the yarn away from the hot rollers and impinge it upon a rotating drum comprising an endless textured screen forming a cylindrical outer surface of said drum and a frame to support said screen, thereby forming said yarn into a caterpillar on said screen;

exhausting air from the centre of said drum to draw air through said screen and cool said yarn;

pulling said yarn off of said screen using take-up rollers;

said process comprising:

measuring the change in temperature of the exhaust air (dT1), the change in temperature of the yarn (dT2) as it is taken up from the drum and the change in tension of the yarn (dF) as it is taken up from the drum after a given period of time;

predicting caterpillar length changes (dL) after said given period of time using the correlation:

$$dL = \frac{a(dT1)}{(dL0)}(dT1) + \frac{b(dT2)}{(dL0)}(dT2) + \frac{c(dF)}{(dL0)}(dF) \quad (1)$$

wherein a, b and c are weighted averages, and a + b + c = 1; and wherein:

$$\frac{(dT1)}{(dL0)}, \frac{(dT2)}{(dL0)} \text{ and } \frac{(dF)}{(dL0)}$$

are all empirically determined constants.

yarn (dF) as it is taken up from the drum after a given period of time;

predicting caterpillar length changes (dL) after said given period of time using the correlation:

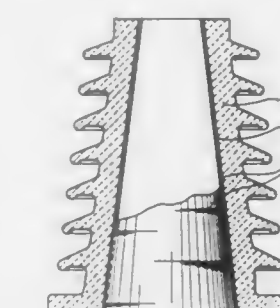
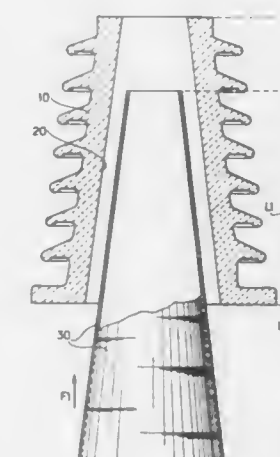
$$dL = \frac{a(dT1)}{(dL0)}(dT1) + \frac{b(dT2)}{(dL0)}(dT2) + \frac{c(dF)}{(dL0)}(dF) \quad (1)$$

wherein a, b and c are weighted averages, and a + b + c = 1; and wherein:

$$\frac{(dT1)}{(dL0)}, \frac{(dT2)}{(dL0)} \text{ and } \frac{(dF)}{(dL0)}$$

are all empirically determined constants.

**4,956,903**  
**METHOD OF PRODUCING AN INSULATING BUSHING FREE FROM ANY RISK OF EXPLOSION**  
 Edmond Thuries, Pusignan, France, assignor to Societe Annyne Dite, France  
 Filed Mar. 15, 1989, Ser. No. 323,917  
 Claims priority, application France, Mar. 15, 1988, 88 03335  
 Int. Cl.<sup>5</sup> H01B 19/00  
 U.S. Cl. 29—631  
 4 Claims



1. A method of producing a ceramic insulating bushing to be filled with dielectric gas under pressure and which is free from any risk of explosion, said method comprising the following operations:

(1) manufacturing a ceramic bushing having an inside surface which is conical over the entire length of the bushing;

(2) making a conical sleeve of strong insulating material, said sleeve having the same cone angle as the inside surface of the bushing.



- the bushing and having a length which exceeds that of the bushing;
- (3) inserting the sleeve into the bushing until it makes contact with the entire inside surface of the bushing; and
  - (4) cutting off the sleeve at the ends of the bushing.

4,956,904

## DEVICE FOR JOINING PIPING MATERIALS

Hidetoshi Yamamoto; Taiji Gotoh, both of Kuwana, and Yoshinori Katoh, Mie, all of Japan, assignors to Mie Horo Co., Ltd., Mie, Japan

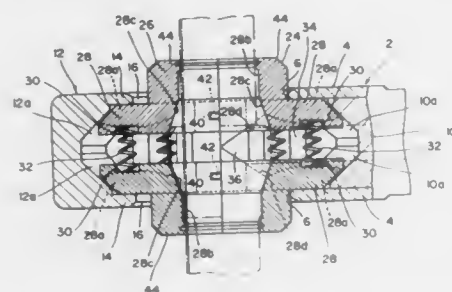
PCT No. PCT/JP88/01226, § 371 Date Aug. 15, 1989, § 102(e) Date Aug. 15, 1989, PCT Pub. No. WO89/06168, PCT Pub. Date Jul. 13, 1989

PCT Filed Dec. 5, 1988, Ser. No. 397,461

Claims priority, application Japan, Dec. 29, 1987, 62-199657 Int. Cl.<sup>5</sup> F16L 35/00

U.S. Cl. 29—237

4 Claims



1. A device for joining piping materials, comprising:
  - a first processing die (24) in which a pair of half-die member (28) each having an inclined cam face (28a) formed on an outer side of its back portion are combined through connecting means, said half-die members (28) being mutually approachable in a direction parallel to the axis of the piping materials to be joined by use of a means for moving them closer or farther relative to each other;
  - a second processing die (26) having a similar structure to said first processing die (24) composed of a pair of half-die members (28) designed to be disposed symmetrically relative to the axis of said first processing die (24) and the piping materials;
  - a first and second box-shaped cam housings (2, 12) for receiving said two processing dies (24, 26), respectively, disposed to oppose each other, such that they can be opened or closed;
  - wherein said first and second box-shaped cam housings (2, 12) each having cam faces (10a, 12a) which push the respective inclined cam faces (28a) formed on said pair of half-die members (28) so as to move said pair of half-die members (28) closer to each other in said direction parallel to the axis of the piping materials to be joined; and
  - guide plate (36) being disposed in at least one of said box-shaped cam housings (2, 12) to maintain movement of said half-die members (28) closer or farther relative to each other in said direction parallel to the axis of the piping materials to be joined, with opposing faces of the half-die members (28) being kept parallel to each other.

4,956,905

## TOOL FOR HOLDING A ROTATABLE LAWN MOWER BLADE

Leonard D. Davidson, 301 East St., Farmersville, Ill. 62533

Filed Nov. 30, 1989, Ser. No. 443,749

Int. Cl.<sup>5</sup> B23Q 3/00

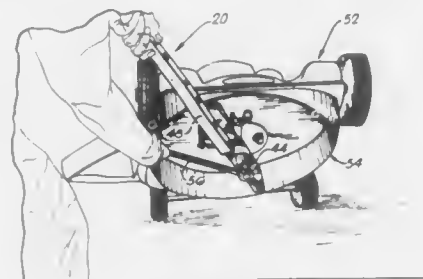
U.S. Cl. 29—281.1

8 Claims

1. A tool for holding a rotatable lawn mower blade having cutter and air vane formations along leading and lagging edges

at opposite end portions thereof, the lawn mower blade holding tool comprising:

- a U-shaped bracket having a horizontal web and a pair of upstanding, horizontally-spaced flanges parallel to and spaced equidistantly from a central vertical plane;
- said flanges having bolt hole means spaced upwardly from said web;
- retainer bolt means extending through said bolt hole means;
- said web, flanges and retainer bolt means adapted to surround and retain a lawn mower blade and to define a retaining space for an end portion of the blade; and



- an elongated handle rigidly fixed to the underside of the web and extending horizontally from said bracket along said central vertical plane and being offset downwardly to a level below the web to clear the bottom edge of the skirt of a lawn mower housing while a lawn mower blade is retained in said space;
- whereby the tool is engageable with a lawn mower blade in a lawn mower housing to hold the blade against rotation during removal and replacement.

4,956,906

## METHOD OF PREPARING PRE-DISTORTED IMAGES FOR DECORATING A SHAPED BLANK

Christophe Masse, La Tronche, and Michel Philippe, Villaines sous Mailcorne, both of France, assignors to Cebal, Clichy, France

Filed Dec. 5, 1988, Ser. No. 279,579

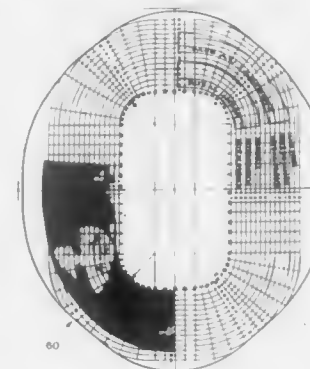
Claims priority, application France, Dec. 1, 1988, 88 16099 Int. Cl.<sup>5</sup> B21K 21/16

U.S. Cl. 413—8

13 Claims

1. A method for decorating the surface of a blank to be shaped into a product, comprising the steps of:
  - (a) locating on a test blank a plurality of reference points distributed over the entire surface of the test blank which will be affected by shaping;
  - (b) shaping the test blank into a test product and determining new positions of the reference points, each said new position corresponding to a reference point on the test blank;
  - (c) forming a block of a decoration to be obtained on the product, and locating on the decoration the new positions of the reference points on the test product;
  - (d) converting said decoration into a plurality of pixels of each inking color, and determining the position on each pixel with respect to the new position of a reference point;
  - (e) relocating each said pixel with respect to each other individually, from a new position to the corresponding reference point on the test blank;
  - (f) locating on a film a plurality of reference points corresponding to the reference points on said test blank, and

printing said film with each pixel of the decoration reproduced in a location corresponding to the reference point



- on the test blank to which the pixel was relocated, thereby forming a film blank; and
- (g) decorating at least one blank with said film blank.

4,956,907

## METHOD FOR SAFELY REMOVING, STORING AND ULTIMATELY DISPOSING OF NEEDLES FROM HYPODERMIC NEEDLE/SYRINGE ASSEMBLIES

John Bruno, 77-83 Second Ave., Paterson, N.J. 07514

Division of Ser. No. 12,949, Feb. 10, 1987, Pat. No. 4,801,013.

This application Dec. 19, 1988, Ser. No. 286,315

Int. Cl.<sup>5</sup> B23P 19/00; B65D 25/00, 51/00

U.S. Cl. 29—426.5

2 Claims



1. A method for removing the needle portion from a hypodermic needle/syringe assembly and safely storing the removed needle, comprising the steps of:
  - opening a top closure member formed as part of the top assembly of a needle removal/storage device to expose a

needle-receiving opening formed by grasping means which make up part of said top assembly by exerting a downward force on an oppositely projecting flange on said closure member by a finger of the same hand holding the device and simultaneously squeezing said top assembly to release releasable locking means formed between the top closure member and the rest of said top assembly; inserting the needle into said needle-receiving opening of said needle removal/storage device until its ribbed hub portion is adjacent said grasping means; exerting a squeezing force on said top assembly to cause constriction of said opening by forcing said grasping means towards each other to grasp the needle hub; rotating the needle/syringe assembly to separate the syringe from the needle; and releasing the squeezing force on the top assembly after the separation is complete to allow the needle to drop into said needle removal/storage device.

4,956,908

## METHOD FOR MAKING A LIGHT-TIGHT CASSETTE

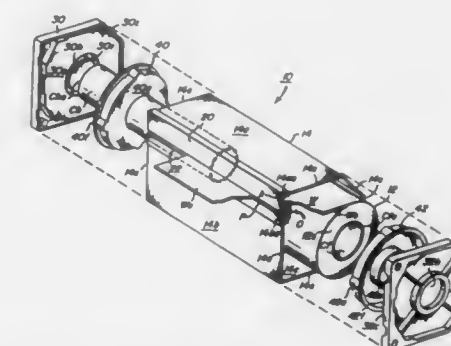
Mark J. Morse, and Andrew E. Dominesey, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 26, 1989, Ser. No. 359,073

Int. Cl.<sup>5</sup> B23P 11/00

U.S. Cl. 29—438

18 Claims



1. A method of making a light-tight cassette for enclosing and dispensing a roll of web material, said method comprising the steps of:
  - providing a fiberboard sheet of predetermined dimensions; folding said sheet to form a housing having a plurality of housing wall portions with oppositely projecting lateral edges defining first and second open sides of said housing, said plurality including first and second substantially planar wall portions that extend substantially perpendicularly to each other to respective first and second ends thereof which are disposed in spaced alignment to define an opening therebetween;
  - providing first and second extruded plastic light-locking members having means for respective attachment thereof to said first and second ends of said first and second wall portions, wherein said providing said light-locking members includes extruding each of said members so that its means for attachment comprises a resiliently flexible U-shaped portion with open and closed ends defining a channel configured to slidably receive and resiliently grip one of said wall portion ends, and wherein said providing said members further includes extruding said first member so that it has a substantially planar intermediate portion extending substantially perpendicularly from its U-shaped portion closed end to a cantilever portion thereof, and so that said cantilever portion is flexibly joined to said intermediate portion to project therefrom in a resiliently flexible manner;
  - attaching said first and second light-locking members to said

first and second wall portion ends, respectively, so that said first member intermediate portion extends across said opening toward said second member to define web exit passageway therebetween, and so that said first member cantilever portion projects inwardly from said intermediate portion and is resiliently biased toward an opposing portion of said second member, at least one of said cantilever and opposing portions having light-locking material thereon for light-locking said passageway;

providing said roll of web material wound upon a hollow roll forming core having first and second opposite ends substantially flush with respective lateral edges of said web material wound thereon, said roll forming core ends defining an overall roll width therebetween;

providing a roll bearing core configured to fit slidably within said hollow roll forming core, said roll bearing core having first and second oppositely projecting end portions that define a bearing core length greater than said overall roll width;

providing first and second molded plastic side caps having means for respective attachment thereof to said first and second open housing sides and means for receiving, respectively, said first and second end portions of said roll bearing core;

attaching said first side cap to said first open housing side so that said first housing side is thereby closed;

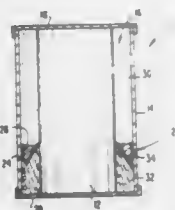
inserting said roll bearing core through said second open housing side and fully into said housing so that said first bearing core end portion is received by said receiving means on said first side cap;

inserting said roll of web material through said second open housing side, around said roll bearing core, and slidably along said bearing core into said housing so that both of said bearing core end portions extend beyond side roll forming core ends, respectively, and so that an end portion of said web material leading from said roll projects outwardly through said passageway; and

attaching said second side cap to said second open housing side so that said second bearing core end portion is received by said receiving means on said second side cap, and so that said second housing side is thereby closed.

#### 4,956,909 METHOD OF MAKING SPACED-WALL APPLIANCE WITH A SEALING AND INSULATING DEVICE BETWEEN SAID WALLS

Thomas E. Nelson, Anchorage, Ky., assignor to Soltech, Inc., Shelbyville, Ky.  
Continuation of Ser. No. 216,384, Jan. 7, 1988, Pat. No. 4,875,272. This application Jun. 30, 1989, Ser. No. 376,138  
Int. Cl.<sup>5</sup> B23P 11/02, 19/04; B21D 39/00  
U.S. Cl. 29—451 13 Claims



1. A method of assembling an appliance having a first wall surface spaced from a second wall surface defining a space therebetween comprising the steps of:

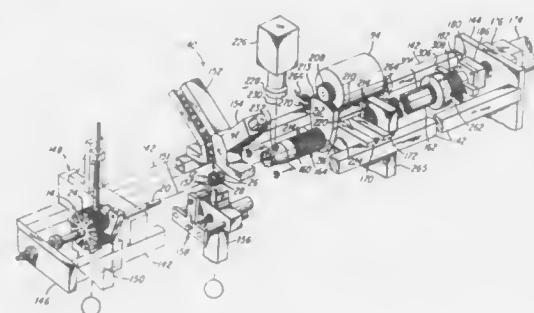
providing a wedge-shaped insulation and sealing device having a first end and a second opposite end and including a pair of walls converging together at said first end and spaced apart at said opposite end, the direction of taper being from said opposite end to said first end, said pair of walls being fabricated of a flexible material, the width of spacing of said walls at said opposite end being at least

approximately equal to the space between the first and second walls of the appliance, and a resilient insulating material disposed within the trough formed by the converging walls of said insulation and sealing device;

positioning the insulation and sealing device in contact with the first wall of said appliance; and

moving the first wall of said appliance in the direction of taper to a position overlaying the second wall in spaced apart juxtaposition with the second wall such that the insulation and sealing device is in contact with the second wall creating a seal across the space.

4,956,910  
ARMATURE ASSEMBLY METHOD  
Alvin C. Banner, Montgomery County; Gary E. Clemenz, Greene County; Frank D. Varecka, Monroe County; and Ballard E. Walton, Montgomery County, all of Ohio, assignors to Globe Products Inc., Dayton, Ohio and General Motors Corporation, Detroit, Mich.  
Division of Ser. No. 203,378, Jun. 3, 1988, abandoned. This application Apr. 28, 1989, Ser. No. 345,219  
Int. Cl.<sup>5</sup> H02K 15/00  
U.S. Cl. 29—593 19 Claims



1. A method for aligning a commutator relative to an armature core mounted on an armature shaft in preparation for placing the commutator onto the armature shaft utilizing a commutator placing ram having a commutator-receiving fixture at one end thereof that non-rotatably receives a commutator and positions said commutator with its center axis aligned with the axis of movement of said ram, said method comprising the steps of:

supporting an assembled armature core and armature shaft in axial alignment with said fixture;

positioning a tang-oriented commutator within said fixture; detecting the angular distance of an edge of a commutator bar of said commutator relative to a predetermined reference position; and

bar edge-orienting said commutator relative to said core by rotating said fixture relative to said core through an angle equal to said detected angular distance.

4,956,911  
TOOL FOR REPAIRING SURFACE MOUNTED  
COMPONENTS ON PRINTED CIRCUIT BOARD  
Norman S. Zaremba, St. Charles, and John P. Beyer, Western Springs, both of Ill., assignors to AG Communication Systems Corporation, Phoenix, Ariz.  
Filed May 18, 1990, Ser. No. 524,893  
Int. Cl.<sup>5</sup> H05K 3/30  
U.S. Cl. 29—721 14 Claims

1. A tool for use in repairing an improperly positioned surface mounted component on a printed circuit board, comprising:

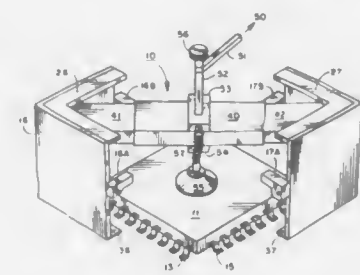
a horizontal body;

a plurality of vertical members depending at right angles from said body;

said members angularly positioned on said circuit board adjacent said component;

locating means positioned on each of said members;

a vertically movable vacuum plunger mounted on said body operated in a downward direction to engage said component followed by vertical motion of said plunger to move

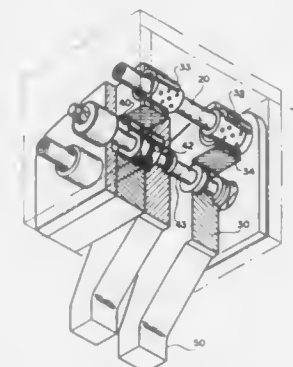


said engaged component upward into contact with said locating means;

whereby said component is relocated relative to said printed circuit board;

said plunger further operated to release said component thereby positioning said component in proper position on said printed circuit board.

4,956,912  
UNIVERSAL TOOL HOLDER  
Robert Preg, 2809 Filbert Ave., Reading, Pa. 19604  
Filed Mar. 15, 1989, Ser. No. 324,245  
Int. Cl.<sup>5</sup> B23P 19/00  
U.S. Cl. 29—730 21 Claims



1. A tool holder useful in the assembly of an electronic storage battery case work piece having at least one cell partition comprising:

(a) a housing;

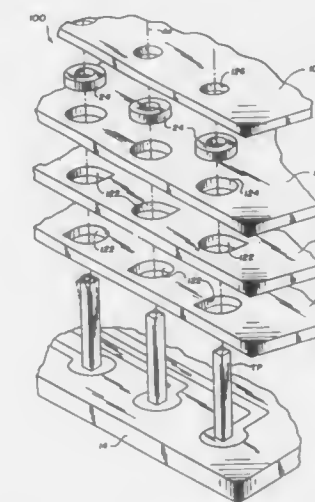
(b) movable first and second jaw holders for holding jaws which are disposed on sliding means in the housing which houses a multiplicity of guide rods whose longitudinal axes define point centers equidistantly disposed about a defined geometric point center from each other;

(c) the first jaw holder having constructed interiorly a cylindrical piston chamber in which is disposed a fluid driven reciprocating piston with a shaft whose longitudinal axis is parallel to the guide rod axes and has lying on its linear extension the geometric center point;

(d) the shaft being connected to the second jaw holder such that the first and second jaw holders will move toward each other to close and away from each other to open slidingly on the guide rods by bearing means;

(e) and when closed the jaw holders will center up slidingly over the workpiece partition.

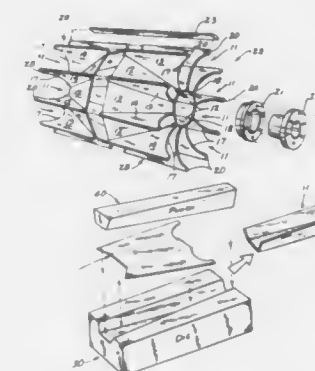
4,956,913  
PIN ALIGNMENT METHOD  
Michael P. Eck, Wellsville, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.  
Division of Ser. No. 192,689, May 11, 1988. This application Oct. 10, 1989, Ser. No. 418,833  
Int. Cl.<sup>5</sup> H01R 43/00  
U.S. Cl. 29—884 1 Claim



1. A method for aligning terminal pins in a pin field and for installing a solder preform onto the aligned pins, the method comprising the steps of:

matting the tips of a plurality of pins in a field in jaw plate assembly having a plurality of openings, the size of each of said openings being variable, controlling the size of the openings from a first size to a second size thereby constraining the pins to a selected predetermined alignment; placing a solder preform over each so-aligned pin; advancing the jaw plate assembly and solder preform in the direction of a proximate, base end of the pin; and withdrawing the jaw plate assembly to thus install the solder preform onto the pin.

4,956,914  
METHOD OF MAKING WING PULLEYS  
Karl C. Valster, and Allen V. Reicks, both of Pella, Iowa, assignors to Precision Pulley, Inc., Pella, Iowa  
Filed Dec. 21, 1989, Ser. No. 454,428  
Int. Cl.<sup>5</sup> B21K 1/42  
U.S. Cl. 29—892.1 8 Claims



1. A method of making a wing pulley using a plurality of



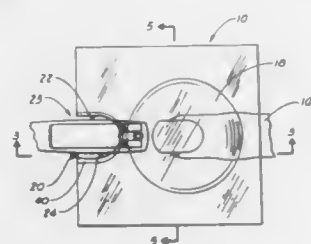
substantially identical building block segments, said building block segments comprising:

- a first panel disposed at least generally in a first plane, said first panel having a first edge, a second edge, an outer end and an inner end, said first panel being wider at the inner end than at the outer end thereof;
- a second panel disposed at least generally in a second plane, said second panel having a first edge connected to said first edge of said first panel and a second edge, an outer end and an inner end; and
- a third panel disposed at least generally in a third plane, said third panel having a first edge connected to the second edge of said first panel, a second edge, an outer end and an inner end;

said method comprising:

- connecting together a predetermined number of said building block segments to form a first rigid annular subassembly by connecting the second panel of each building block segment to the third panel of each adjacent building block segment whereby said first annular subassembly extends a full 360 degrees, said first rigid annular subassembly having an outer end and an inner end;
- connecting together a second rigid annular subassembly from said predetermined number of said building block segments by rigidly connecting the second panel of each building block segment of said second annular subassembly to the third panel of each adjacent building block segment of said second rigid annular subassembly whereby said second annular subassembly is substantially identical to said first annular subassembly, said second rigid annular subassembly having an outer end and an inner end;
- rigidly connecting said inner ends of said first and second rigid annular subassemblies together in a relationship whereby the second and third panels of said first rigid annular subassembly are generally in the same plane as corresponding third and second panels respectively of said second rigid annular subassembly;
- rigidly attaching a hub to the outer end of said first rigid annular subassembly; and
- rigidly attaching a hub to the outer end of said second rigid annular subassembly.

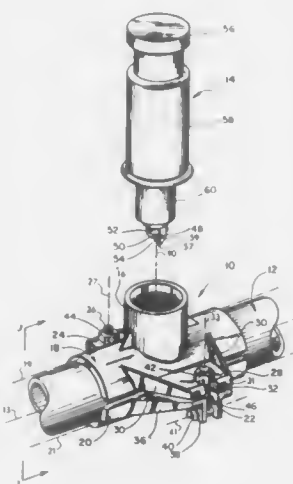
**4,956,915**  
**SANITARY NAIL CLIPPING DEVICE**  
Charles A. Anderson, 1400 George, Norman, Okla. 73072  
Filed Jun. 2, 1989, Ser. No. 360,769  
Int. Cl.<sup>3</sup> A45D 29/00, 29/18  
U.S. Cl. 30—28 8 Claims



1. A sanitary nail clipping device for clipping fingernails and toenails comprising:
  - an enclosure having an opening thereinto to facilitate the insertion of a nail-carrying digit into the enclosure;
  - an aperture in the enclosure opposite said opening; and
  - a nail clipper having a jaw-carrying end portion extending through said aperture, with said jaws located within said enclosure; and
  - means detachably engaging said nail clipper with said enclosure so that when desired, said clipper can be withdrawn from said enclosure through said aperture.

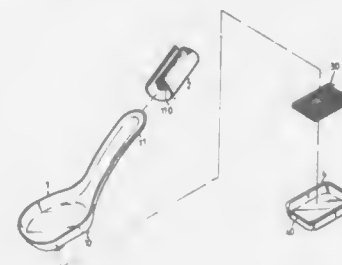
**4,956,916**  
**CUTTING TOOL**

Duane D. Robertson, 2601 Utica St., Denver, Colo. 80212  
Division of Ser. No. 12,291, Feb. 9, 1987, Pat. No. 4,789,189, which is a continuation-in-part of Ser. No. 834,960, Feb. 28, 1986, abandoned. This application Aug. 22, 1988, Ser. No. 234,680  
Int. Cl.<sup>3</sup> B23D 21/06  
U.S. Cl. 30—92 4 Claims



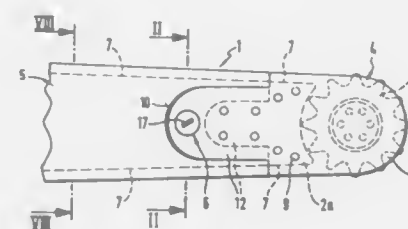
1. A cutting tool primarily intended for forming a hole in a plastic pipe in alignment with a pipe saddle opening of a pipe saddle, said cutting tool including:
  - handle means extending along a central axis,
  - prong means extending along an axis and mounted to said handle means with the axis of said prong means substantially parallel to and colinear with said central axis of said handle means, said prong means having a pointed end for penetrating said pipe, said pointed end facing in the direction of the axis of said prong means,
  - cutting means including at least one blade member extending along an axis and mounted to said handle means with the axis of said blade member spaced from and substantially parallel to the central axis of said housing means and to the axis of said prong means, said blade member extending about said central axis for a radial angle substantially less than 180° and said blade member having a knife edge extending along the axis of said blade member and facing in a direction substantially perpendicular to the axis of the blade member wherein said handle means can be manipulated to have the pointed end of the prong means and the blade member penetrate the pipe whereby the handle means can then be rotated about said central axis to radially advance said knife edge through said pipe about said central axis and the axis of said
  - housing means disposed about said handle means and means for mounting said handle means and prong means and cutting means for movement as a unit relative to said housing means along said central axis, said handle means, prong means, and cutting means being moveable relative to said housing means from a first position exposing said pointed end of said prong means and said knife edge of said blade member beyond said housing means and a second position in which said prong means and cutting means are retracted into said housing means, said housing means including means for abutting and removing said impaled plug from said prong means as said prong means is moved from said first position to said second position.

**4,956,917**  
**STRUCTURE OF SPOON**  
Chin-Fu Chung, No. 18, Hsin Hsing Rd., Tainan, Taiwan  
Filed Jan. 18, 1990, Ser. No. 466,817  
Int. Cl.<sup>3</sup> A47J 43/28, 47/00  
U.S. Cl. 30—326 1 Claim



1. A spoon, including
  - a small, shallow, oval-shaped body having an unitary handle obliquely extending upward therefrom, and comprising a retainer member on its bottom;
  - a bottom cap secured to said retainer member of said body and comprising a notch on its one side;
  - a sheet of plastic bags being received in said bottom cap, and comprised of a plurality of plastic bags each being respectively defined by a sealing line and an indentation line; and
  - a retainer ring having an inner projection;
 characterized in that a plastic bag can be drawn out of said bottom cap and separated from said sheet of plastic bags through respective indentation line, for wrapping up the spoon; said retainer ring can be sleeved on said handle to secure a plastic bag thereto; each plastic bag which is separated from said sheet of plastic bag to wrap up the spoon therein can be removed from the spoon each time after use, permitting a new plastic bag from said sheet of plastic bag to wrap up the spoon so that the spoon can be repeatedly used without the need to wash.

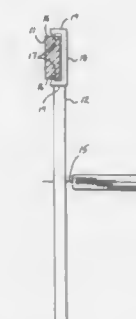
**4,956,918**  
**GUIDE BAR FOR THE SAW CHAIN OF A MOTOR-DRIVEN CHAIN SAW**  
Hans-Joachim Beyer, Winnenden, Fed. Rep. of Germany, assignor to Andreas Stihl, Waiblingen, Fed. Rep. of Germany  
Filed Sep. 13, 1989, Ser. No. 406,520  
Claims priority, application Fed. Rep. of Germany, Sep. 13, 1988, 3831110  
Int. Cl.<sup>3</sup> B27B 17/04  
U.S. Cl. 30—387 15 Claims



15. A guide bar for the saw chain of a motor-driven chain saw, the guide bar comprising:
  - a base body section;
  - a nose assembly section for changing the direction of the saw chain;
  - a releasable locking device for connecting said nose assembly section to said base body section with said locking device being releasable without destroying the same; and
  - said locking device including non-deforming cam means

permanently mounted in said guide bar for movement between a release position and a cammed position wherein said sections are held in force-tight engagement with each other.

**4,956,919**  
**DRYWALL T-SQUARE**  
James P. Granger, 7621B Broughton St., Sarasota, Fla. 34243  
Filed Sep. 11, 1989, Ser. No. 406,033  
Int. Cl.<sup>3</sup> B43L 13/00  
U.S. Cl. 33—32.2 8 Claims

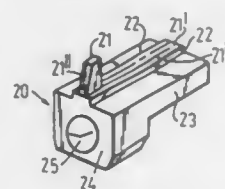


1. A T-square for marking and scoring drywall comprising, a first rule positioning member and a second rule member slidably mounted
  - orthogonally relative to the first rule member, and track means formed in the first rule member for slidably receiving said second rule member, and
  - a cutting tool, and
  - a plurality of slot means formed in the second rule member for aligning and guiding the tool and the second rule member relative to the first rule member, and
  - wherein the first rule member includes a plurality of side walls, and the track means includes a single elongate groove formed continuously within each side wall, and the grooves aligned and parallel relative to one another within the side walls of the first rule member, and the second rule member including a head portion slidably engaging and overlying the first rule member, the head portion including a plurality of downwardly directed flanges parallel relative to one another and orthogonally oriented relative to a top surface of the head member, and a "V" shaped guide projection formed coextensively on confronting surfaces of the flanges, the projections slidably received within the grooves, and
  - wherein the slot means includes a series of slots parallel to one another oriented orthogonally relative to side edges of the second rule member, and the tool including a pointed blade directed exteriorly therefrom selectively receivable within each slot.

**4,956,920**  
**DEVICE FOR DETERMINING TRUE BEARING DURING DAYTIME**  
Giora Kutz, Tel Aviv, Israel, assignor to Azimuth Ltd., Israel  
Filed May 5, 1988, Ser. No. 190,729  
Int. Cl.<sup>3</sup> G01C 17/34  
U.S. Cl. 33—268 7 Claims

1. An instrument for determining true bearing during daytime using the sun as a reference, comprising:
  - a reference member including a rectangular horizontal surface;
  - a vertical post for producing a shadow, the post having a rectangular horizontal cross section and attached to the reference member to project vertically from the rectangular horizontal surface such that the sun casts a shadow of the post upon the rectangular horizontal surface;

the post being positioned to cast said shadow on a predetermined location of the rectangular horizontal surface when the post is exactly aligned with the sun; at exact alignment,



the shadow falling centrally upon the rectangular horizontal surface and being straddled by equally-dimensioned unshadowed side margins.

#### 4,956,921 METHOD TO IMPROVE DIRECTIONAL SURVEY ACCURACY

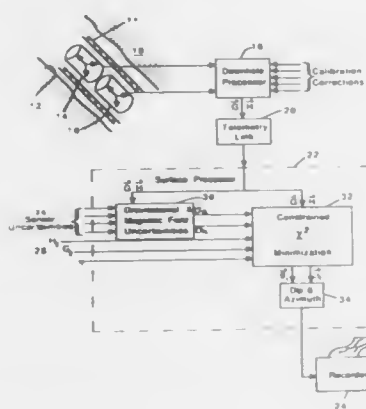
Mark Coles, Richmond, Tex., assignor to Anadrill, Inc., Sugar Land, Tex.

Filed Feb. 21, 1989, Ser. No. 313,765

Int. Cl.<sup>5</sup> E21B 47/22

U.S. Cl. 33—304

18 Claims



2. A method for surveying a borehole formed through subsurface geological earth formations comprising the steps of:
  - a. at an in situ location in said borehole, measuring, with magnetic and gravitational field responsive measuring instruments, a plurality of components of the gravitational field strength and a plurality of components of the magnetic field strength;
  - b. determining measurement uncertainties for each of said gravitational and magnetic field components; and
  - c. in response to said measured components and to said measurement uncertainties, determining the azimuth and the inclination of the borehole at said in situ location in the borehole.

#### 4,956,922 BUBBLE INCLINATION GAUGE INCLUDING A CENTRAL SHIELD FOR LIGHT-EMITTING AND LIGHT-DETECTING MEANS

Johannes W. M. Bodewes, Beverwijk, Netherlands, assignor to Sophia Bodewes-Tunhuu, Beverwijk, Netherlands

Filed Jul. 3, 1989, Ser. No. 383,740

Claims priority, application Netherlands, Jul. 1, 1988, 8901678

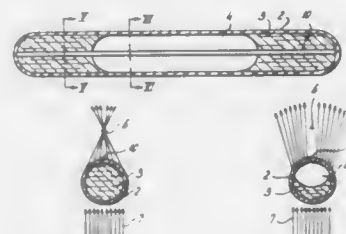
Int. Cl.<sup>5</sup> G01C 9/06, 9/34

U.S. Cl. 33—366

7 Claims

1. Inclination gauge comprising a reservoir, containing a clear liquid and a gas bubble, light emitting and light detecting

means arranged at opposed positions with regard to said reservoir, the refractory index of the liquid, of the gas and of the tube material being chosen such that light going through the reservoir completely filled with liquid follows a trajectory substantially differing from the trajectory followed by light traversing the reservoir at least partially filled with gas,



wherein on the center line in the path from the light emitting means and detecting means near the point of egress of light from the reservoir a shield is provided, arranged such that rectilinear transmittal of light from the light emitting means to the light detecting means through the gas bubble is substantially completely blocked.

#### 4,956,923 PROBE ASSEMBLY INCLUDING TOUCHDOWN SENSOR

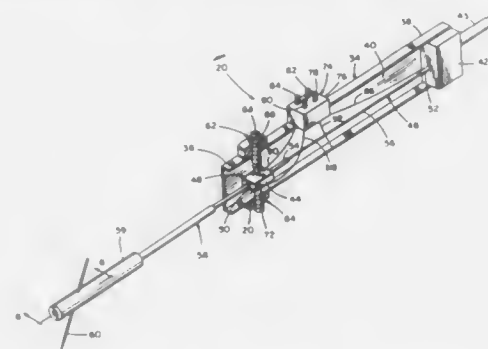
James T. Pettingell, Escondido, Calif., and Kenneth F. Hollman, Carson City, Nev., assignors to The Micromanipulator Co., Inc., Carson City, Nev.

Filed Nov. 6, 1989, Ser. No. 433,021

Int. Cl.<sup>5</sup> G01R 1/06, 31/02; G01B 7/00

U.S. Cl. 33—558

10 Claims



1. A probe assembly for use at a test station for contacting a predetermined target on an electrical circuitry component and providing a switched output to signal that contact with the target has been made, said probe assembly comprising:
  - an elongated tubular housing having a first end and a second end and defining a cavity extending between said ends;
  - a base of insulative material rigidly supported in said housing adjacent said second end;
  - a contact block located in said housing adjacent said first end;
  - an interior beam assembly interconnecting said block and said base so that said block is supported by said base, said interior beam assembly including a relatively flexible cantilever beam;
  - a relatively rigid second beam assembly extending from said contact block beyond said housing first end;
  - a probe point held by said second beam assembly for contacting said target;
  - an upper contact held by said housing and extending into said cavity toward said contact block and in alignment therewith; and
  - a lower contact held by said housing and extending into said

cavity toward said contact block and in alignment therewith, the spacing between said upper and lower contacts being greater than the height of said contact block and the surfaces of said contact block facing said contacts being conductive, said contact block engaging said lower contact when said probe point does not engage said target, said contact block moving out of engagement with said lower contact after said probe point engages said target, and said contact block moving into engagement with said upper contact upon the force applied by said point against said target reaching a predetermined magnitude.

#### 4,956,924 GAUGE DEVELOPER

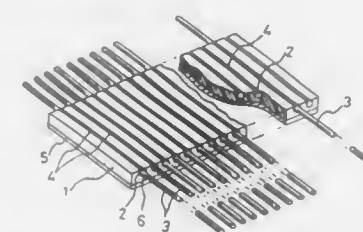
Ming C. Hu, No. 1, Lane 109, Ta Kuang Road, Sec. 2, Pan Chiao City, Taipei Hsien, Taiwan

Filed Feb. 6, 1989, Ser. No. 306,748

Int. Cl.<sup>5</sup> G01B 5/20

U.S. Cl. 33—561.1

10 Claims



1. A gauge developer, comprising:
  - a flexible strip having a substantially planar front surface and a plurality of pin holding spaces extending through said flexible strip from one side thereof to an opposite side thereof parallel to said planar front surface;
  - a plurality of pins made of relatively long and thin steel wire for movable and removable insertion in respective said pin holding spaces; and
  - magnetic means for magnetically attracting said plurality of pins toward respective surfaces of said plurality of pin holding spaces in said flexible strip for securing said pins therein by frictional resistance;
 wherein each said pin holding space is tubular and has an elongated opening which opens onto said substantially planar front surface of said flexible strip.

#### 4,956,925 EDGE THICKNESS CALIPER

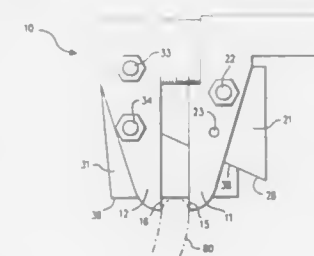
William S. East, Mt. Airy, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 5, 1989, Ser. No. 402,573

Int. Cl.<sup>5</sup> G01B 5/02

U.S. Cl. 33—810

12 Claims



1. A caliper for measuring the thickness of a blade edge comprising:

a pair of opposed jaws disposed for displacement relative to each other in a first plane, each jaw having a free end, a sliding member mounted to one of said jaws for displacement relative to said free ends of said jaws in a second plane, the second plane being substantially perpendicular to the first plane, said sliding member defining a stop edge between said jaws, and

guiding means operatively associated with said sliding member for causing the magnitude of the displacement of said sliding member in the second plane to be a fixed proportion of the magnitude of relative displacement of said jaws in the first plane and for causing displacement of said sliding member to increase or decrease the distance between said stop edge of said sliding member and said free ends of said jaws as said relative displacement of said jaws increases or decreases the distance between said jaws, respectively,

wherein the distance between the jaws is used to measure the thickness of the blade edge.

#### 4,956,926 SLUDGE TREATMENT PROCESS

John D. Glorioso, Clearwater, Fla., assignor to Eavro-Gro Technologies, Baltimore, Md.

Division of Ser. No. 232,640, Aug. 8, 1988, Pat. No. 4,829,678.

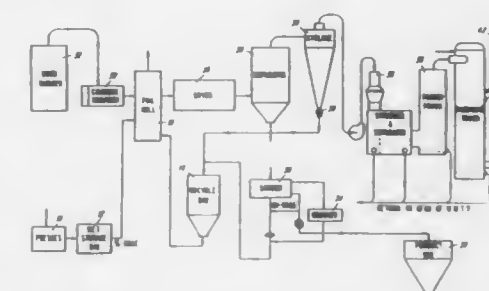
This application May 18, 1989, Ser. No. 353,711

The portion of the term of this patent subsequent to Aug. 9, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> F26B 3/24

U.S. Cl. 34—111

9 Claims



1. A process for drying mechanically dewatered sewage sludge to produce pellets of a predetermined small and uniform size comprising the steps of:
  - providing a first and a second pug mill, each having an inlet and an outlet, said second pug mill being disposed below said first pug mill and at about a 90° angle thereto;
  - mixing said sludge with recycled, previously dried sludge particles and pellets in said first pug mill; dropping said mixture into said second pug mill; mixing said material further in said second pug mill;
  - providing a rotary dryer having an inlet and an outlet, the inlet being disposed adjacent the outlet from said second pug mill; dropping said mixture from said second pug mill into the inlet of said rotary dryer and drying said mixture to form pellets and particles thereof;
  - conveying the dried pellets and particles and drier off gas to a low velocity gas/solids separator and separating and collecting the pellets and a substantial portion of the particles;
  - clarifying the collected pellets and particles and separating and collecting pellets of a predetermined size, the under-size pellets and particles and oversize pellets constituting recycle material;
  - mechanically crushing the recycle materials and collecting the crushed pellets and under-size particles and pellets; and recycling the collected under-size pellets and particles by mixing said recycle materials with said incoming sludge in said first pug mill.



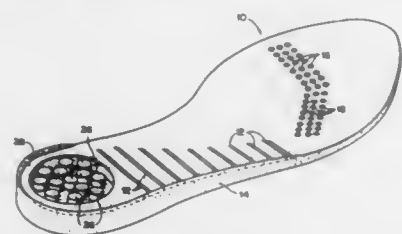
4,956,927

## MONOLITHIC OUTSOLE

Kenneth W. Miserich, Griswold, Conn., and Thomas E. Mintel, Rahway, N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.

Filed Dec. 20, 1988, Ser. No. 286,803  
Int. Cl.<sup>3</sup> A43B 13/18, 13/04, 3/14  
U.S. Cl. 36—32 R

33 Claims



1. An improved monolithic outsole formed as a homogeneous structure for mating with a shoe upper to provide a shoe construction, comprising:

an elongated planar member having the general outline of a foot with a heel region, a ball region and a midfoot region between said heel and ball regions, and with lateral and medial sides or borders and formed with a monolithic structure, said planar member having a plurality of parallel transverse slots located in the upper surface of said planar member in the midfoot region adjacent the lateral border and with said transverse slots being located outside the region of said outsole which is directly under the arch of the foot, said slots being generally perpendicular to the longitudinal axis of said planar member.

4,956,928

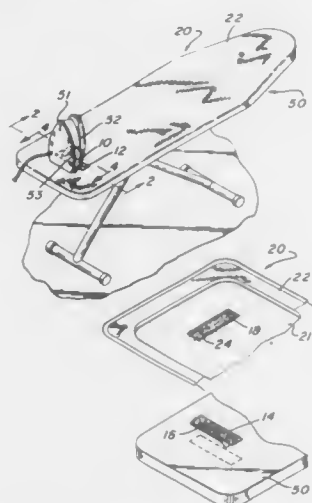
## APPARATUS FOR SECURING AN IRON TO AN IRONING BOARD COVER

David Lehrman, 207 Barclay Cir., Cheltenham, Pa. 19012

Filed Jan. 11, 1989, Ser. No. 295,867  
Int. Cl.<sup>3</sup> D06F 79/00

U.S. Cl. 38—107

23 Claims



1. An apparatus for securing an iron to an ironing board, comprising:  
an ironing board cover; and  
a strap attached to the top surface of said ironing board cover, for releasably engaging the handle of an iron, which strap is adjustable in length.

4,956,929

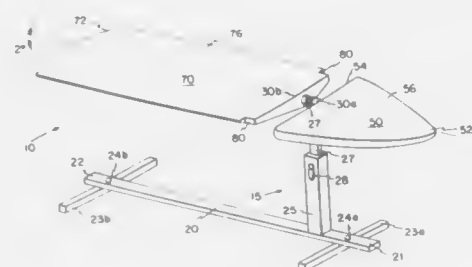
## ADJUSTABLE MULTI-PIECE IRONING BOARD

Sapon Chirabandalsuk, 6300 Ranchester #226A, Houston, Tex. 77036

Filed Apr. 14, 1989, Ser. No. 337,934  
Int. Cl.<sup>3</sup> D06F 71/02

U.S. Cl. 38—136

27 Claims



1. A rotatably adjustable ironing board comprising:

a supporting frame structure including a base structure, a substantially horizontally disposed supporting member, and a generally vertically disposed, adjustable central support joined at its proximal end to said base member and joined at its distal end to said substantially horizontally disposed supporting member;  
a first ironing table supported by a first portion of said substantially horizontally disposed supporting member, said first portion of said substantially horizontally disposed supporting member being positioned generally along a longitudinal axis of said first ironing table, said first ironing table, including first means for rotation of said first ironing table about said first portion of said substantially horizontally disposed supporting member;  
a second ironing table supported by a second portion of said substantially horizontally disposed supporting member, said second portion of said substantially horizontally disposed supporting member being positioned generally along a longitudinal axis of said second ironing table, said second ironing table, including second means for rotation of said second ironing table about said second portion of said substantially horizontally disposed supporting member;  
a first locking mechanism operatively connected both to said first table and to said first portion for locking said first table against rotation about said first portion; and  
a second locking means operatively connected both to said second table and to said second portion for locking said second table against rotation about said second portion.

4,956,930

## VEHICLE LICENSE PLATE COVER

Vincent F. Troncoso, 14090-6100 Rd., Montrose, Colo. 81401

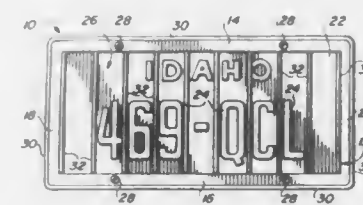
Filed Apr. 12, 1989, Ser. No. 336,684  
Int. Cl.<sup>3</sup> G09F 7/00

U.S. Cl. 40—209

12 Claims

1. An improved vehicle license plate assembly, said assembly comprising, in combination:  
(a) a vehicle license plate bearing identification indicia on the front face thereof;  
(b) a generally flat frame comprising interconnected top, bottom and sides collectively defining a central opening, said frame overlying the outer perimeter of said vehicle license plate, with said opening exposing the identification indicia of said license plate to viewing; and,

(c) a plurality of spaced vanes connected to said frame and spanning said opening, said vanes projecting outwardly at



an angle to said frame so as to obscure viewing of said identification indicia from the sides of said plate.

4,956,931

## IDENTIFICATION DEVICE

George V. Selke, Denver, Colo., assignor to Clink Products, Inc., Denver, Colo.

Filed Feb. 27, 1987, Ser. No. 19,640  
Int. Cl.<sup>3</sup> A61B 5/00

U.S. Cl. 40—633

12 Claims



3. An identification and personal information conveying device to be worn by a person comprising:  
an elongate, flat, unitary, plastic member having a first end portion, a second end portion, and an intermediate portion and having a generally planar top surface and a generally planar bottom surface and having two parallel lateral side edges comprising a leading edge and a trailing edge and having opposite first and second end edges;  
information receiving and displaying means fixedly attached to said bottom surface of said member for receiving and displaying information particular to a person wearing the device;  
wherein said information receiving and displaying means comprises means for receiving and displaying information transcribed thereon by a writing instrument such as a pen or pencil and wherein said information receiving and displaying means is adapted to maintain said transcribed information in readily readable form after exposure of said information displaying means to conditions associated with wearing of said device including perspiration and frictional contact with the wearer and wherein said information receiving and displaying means comprises hot stamped plastic film;  
nondestructably releasable attachment means for attaching said first end portion of said device to said second end portion of said device for providing an annular configuration for positioning said device in encompassing relation-

ship about a wearer's limb, said top surface of said member being positioned outwardly and said bottom surface of said member being positioned inwardly whereby information provided on said information receiving and display means is not readily viewable without removal of said device from the wearer.

4,956,932

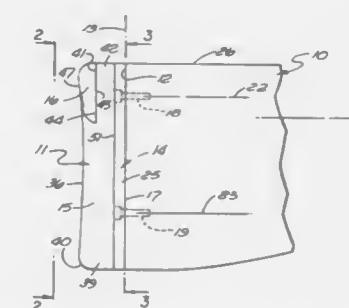
## GUN RECOIL PAD

Carl J. Cupp, Hawaiian Gardens, Calif., assignor to Pachmayr Ltd., Moorovia, Calif.

Filed Oct. 16, 1989, Ser. No. 422,084  
Int. Cl.<sup>3</sup> F41C 23/08

U.S. Cl. 42—74

10 Claims



1. A recoil pad to be attached to a shoulder gun, comprising:  
a forward plate containing upper and lower openings and adapted to be secured to the buttstock of the gun by upper and lower screws extending through said openings respectively and into the buttstock;  
a body of elastomeric material which is secured to the back of said forward plate and which is softer than said forward plate and resiliently deformable to absorb recoil forces;  
said elastomeric body containing upper and lower passages rearwardly opposite said upper and lower openings respectively in said forward plate to receive a tool for connecting said screws to the buttstock;  
a rear member which is formed of a material harder than said elastomeric body and which is embedded in the back of said elastomeric body at the upper end thereof;  
said rear member having two side portions extending downwardly in spaced relation at opposite sides of said upper passage in the elastomeric body and defining between said side portions a bottom recess in said member allowing access through said upper passage to said upper screw;  
said elastomeric body having a lower portion with a rear surface formed of said resiliently deformable elastomeric material and adapted to engage a user's clothing in the shoulder area;  
said rear member having a back surface formed of said harder material merging with and forming a smooth upper continuation of said rear surface of said lower portion of the elastomeric body for engaging the user's clothing thereabove, with less friction than the elastomeric material, to facilitate sliding of the recoil pad upwardly adjacent the clothing to firing position;  
said body having an upper reduced thickness portion formed of said elastomeric material which extends upwardly in front of said rear member at a location between said member and an upper portion of said plate, and which is softer than said rear member and softer than said forward plate, and which is secured to and retains said rear member and is resiliently deformable to cushion the transmission of recoil forces from said forward plate to said rear member; said rear member being free of attachment to said forward plate except through said elastomeric body;  
said upper portion of the elastomeric body having a periph-

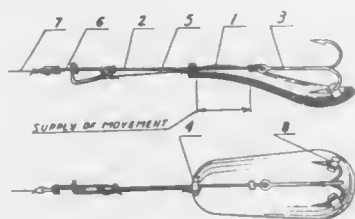
eral edge surface which is exposed between peripheral edges of said rear member and said forward plate continuously from a lower extremity of a first of said side portions of said member, at a first side of said bottom recess in said member, upwardly along said first side portion and across the top of said member and then downwardly along the second side portion of said member to a lower extremity thereof, at a second side of said bottom recess in said rear member.

**4,956,933**  
**ARTIFICIAL LURE**  
Konstantin Radtchenko, 235 Manhattan Ave., Jersey City, N.J. 07307

Filed Feb. 28, 1989, Ser. No. 316,808  
Int. Cl.<sup>5</sup> A01K 85/00

U.S. Cl. 43—42.5

6 Claims

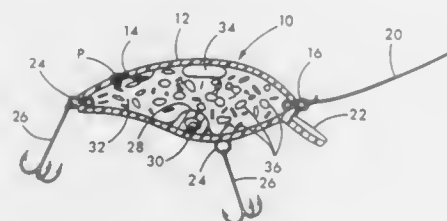


1. An artificial lure, comprising a main body; a thin rod provided with a hook; and means for temporarily connecting said thin rod to said main body so that during throwing of the lure and manipulations in water said thin rod remains connected with said main body in their initial position, while under the action of setting by a fisherman to set said hook said thin rod moves relative to said main body by a predetermined distance to ensure threading of said hook in a fish mouth, said means being formed so that under the action of the setting it is destroyed.

**4,956,934**  
**FISHING LURE**  
Joshua R. Dahl, Rt. 2, Box 97, Bagley, Minn. 56621  
Filed Jul. 17, 1989, Ser. No. 380,325  
Int. Cl.<sup>5</sup> A01K 85/00

U.S. Cl. 43—42.31

7 Claims



1. An artificial fishing lure composed of, a substantially hollow body having walls of transparent or lightly colored transparent plastic containing at least one chamber, a transparent antifreeze liquid contained in at least one of the chambers, a multiplicity of small reflective flakes contained within the liquid-filled chamber and suspended in the liquid, said flakes having a specific gravity sufficiently close to that of the liquid in which the flakes are contained so as to promote suspension thereof in the liquid to make the lure

more visible, especially at night or in very deep or dark water, so as to attract fish from a greater distance, the liquid comprises a transparent antifreezing solution having a freezing point sufficiently low to resist freezing when used for ice fishing, said flakes comprise pieces of plastic film that have been metallized to render the pieces light reflective by electro-deposition of a metal onto a least one surface thereof to control the relative amounts of plastic and metal, the specific gravity of the liquid and the flakes are matched such that the specific gravity of each is sufficiently close to promote suspension of the flakes in the liquid whereby the flakes remain in suspension for at least a few seconds after the lure is agitated, means sealing each such chamber to prevent escape and/or evaporation of the antifreezing liquid such that the retention of the liquid therein prevents deposits, films, molds and/or algae from coating the inside walls of the chamber and dulling the flakes which if it occurred could reduce or destroy the effectiveness of the lure in attracting fish, and at least one connector to which a fishing line can be attached.

**4,956,935**  
**SPRING POWERED CRAB NET**  
Henry N. Riddell, 204 Clyde St., Lexington, Ky. 40508  
Filed Dec. 5, 1989, Ser. No. 446,445  
Int. Cl.<sup>5</sup> A01K 713/00

U.S. Cl. 43—105

3 Claims



1. A collapsible and expandable crab net comprising a net section attached by flexible draw-strings to the lower ends of upward-extending rigid rods whose upper ends are attached to a centrally located hub block by means of springs whose function is to allow the rigid rods to expand outwardly to hold the net open and flat when deployed upon the water bottom and said springs to allow the rods to deform downwardly when the crab net is retrieved by means of upward force upon a retrieval line attached to the hub block for that purpose.

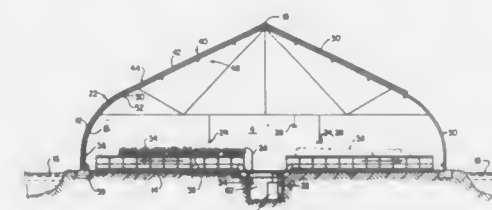
**4,956,936**  
**METHOD AND SYSTEM FOR PURIFICATION OF WATER FOR GREENHOUSE STRUCTURES**  
Philip D. Sprung, c/o 1001-10th Ave., S.W., Calgary, Alberta, Canada (T2R 0B7)  
Filed Dec. 7, 1988, Ser. No. 281,189  
Int. Cl.<sup>5</sup> A01G 9/00

U.S. Cl. 47—17

20 Claims

13. A method of purifying water in a sealed greenhouse structure comprising the steps of spraying water in the form of a mist into the interior of the sealed greenhouse structure; vaporizing the mix into water vapor within the greenhouse structure; condensing the water vapor within the greenhouse structure on an internal side of at least one wall of heat-conductive translucent material; cooling an external side of said wall to cause condensation of

the water vapor to water on the internal side of said wall while passing the heat of condensation of the condensed water vapor to said external side of said wall; and

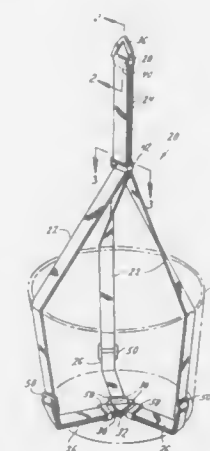


collecting the condensed water on said wall at a lower end for recycling.

**4,956,937**  
**HANGER FOR PLANT CONTAINER**  
Holly A. Haddox, 1001 S. Main, St. Charles, Mo. 63301  
Filed Jan. 4, 1989, Ser. No. 293,217  
Int. Cl.<sup>5</sup> A47G 7/00

U.S. Cl. 47—67

13 Claims



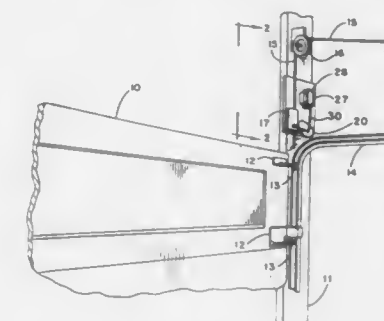
1. A hanger for suspending a plant container of the like from a fixed support, said hanger comprising a plurality of flexible straps having upper reaches terminating in upper extremities adapted for connection to said fixed support and lower reaches terminating in lower extremities adapted for disposition adjacent the plant container, support means on said lower extremities of the straps for supporting the container, each strap having an effective length defined by the distance between its upper and lower extremities, and means for adjusting the effective length of each strap independent of the adjustment of the other straps for varying the position of the plant with respect to said fixed support, each strap including an end portion and an intermediate portion, the end portion of each strap being doubled back on the intermediate portion of the strap to form a loop, said adjustment means comprising slide fastener means slideably fastening the end portion of the strap to the intermediate portion of the strap, said slide fastener means being slideable along the intermediate portion of the strap to vary the size of said loop and thereby adjust the effective length of the strap, the support means comprising the means for connecting the lower reaches of straps together in relatively close proximity to one another to form a cradle for holding the container in a position above said support means.

**4,956,938**  
**SAFETY DEVICE FOR POWER OPERATED OVERHEAD DOOR**  
Neaville L. DeMent, 5017 78th La. N., Brooklyn Park, Minn. 55443

Filed Jan. 16, 1990, Ser. No. 465,506  
Int. Cl.<sup>5</sup> E05F 15/00

U.S. Cl. 49—28

8 Claims

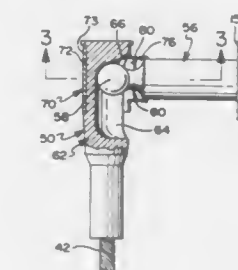


1. For use with a frame-enclosed power operated overhead door having an attached wire cable which moves longitudinally as the door is opened and closed and has a sensor for detecting an object in the path of the door, a safety device for immediately stopping the closing of the door when an object is detected by the sensor, said safety device comprising: an anvil attached to the frame of the door in close proximity to the wire cable; a cam plate pivotably mounted on the door frame with an edge of the cam plate facing the anvil with the wire cable slidably located between said edge and the anvil; means coupled to said cam plate for pivotably biasing said cam plate so that said edge of said cam plate is away from but in close proximity to the wire cable; and means coupled to said cam plate responsive to the sensor for pivotably moving said cam plate in opposition to said first mentioned means to bring said edge in pressing contact with the wire cable to bind the wire cable against said anvil to stop the longitudinal movement of the cable when the door is being closed.

**4,956,939**  
**RELEASABLE CONNECTOR FOR CLOSURE OPERATING MECHANISM**  
Howard W. Kuhlman, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.  
Filed Jul. 31, 1989, Ser. No. 386,748  
Int. Cl.<sup>5</sup> E05F 11/04

U.S. Cl. 49—347

3 Claims



1. A releasing connection device for attaching a motor driven drive element to a vehicle body closure, comprising: a pin having a head supported by a necked down stem attached to the closure; and a housing member connected to the motor driven drive



element and having an opening in a lateral wall thereof receiving the head of the pin and a ramp surface formed on the housing member and within the opening and being engaged by the head of the pin upon imposition of force on the housing member so that the force imposed is resolved in the direction to urge the head of the pin outwardly of the opening;

and a spring clip immovably mounted on the housing and having yieldable means of one-piece integral construction therewith engaging the head of the pin to retain the pin in the housing member and thereby effect a connection between the motor driven drive element and the vehicle body closure, said spring clip yielding in response to a predetermined level of force imposed whereby the pin is released from the housing member to disconnect the drive member from the closure.

4,956,940

**BOTTOM OFFSET DOOR PIVOT AND SPLINE THRESHOLD**

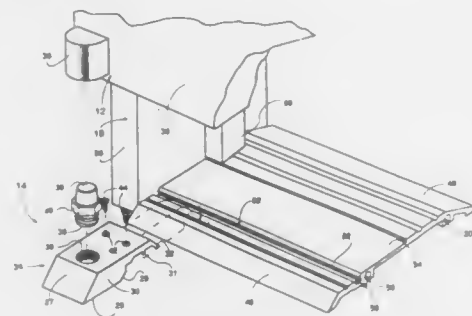
Charles P. Touton, III, Buford, Ga., assignor to Kawneer Company, Inc., Norcross, Ga.

Filed May 28, 1990, Ser. No. 500,688

Int. Cl.<sup>5</sup> E05D 7/08

U.S. Cl. 49—388

6 Claims



1. An apparatus for pivotably supporting a lower portion of a door, comprising:
  - a threshold having an axis of elongation, said threshold having a keyway formed therein in a direction generally parallel to said axis of elongation;
  - an offset door pivot body configured to abut said threshold, said pivot body having a pivot spindle projecting upwardly therefrom for pivotably mounting a lower portion of a door to said body; and
  - a hook formed on said pivot body and configured to mechanically hook into said keyway in said threshold, said hook being disposed relative to said pivot spindle such that when said hook engages said keyway said pivot spindle is properly offset with respect to said threshold.

4,956,941

**FRONT LOADING FLUSH GLASS RUN SYSTEM**

Robert A. Vaughan, Dearborn, Mich., assignor to The Standard Products Company, Cleveland, Ohio

Continuation of Ser. No. 296,801, Jan. 12, 1989, abandoned. This application Feb. 27, 1990, Ser. No. 488,432

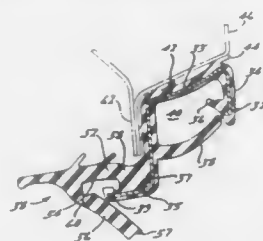
Int. Cl.<sup>5</sup> E06B 7/16

U.S. Cl. 49—440

11 Claims

1. A glass run assembly comprising:
  - frame means defining a channel for receiving a vehicle window for enabling up and down movement of the window in said channel said frame means including a polymeric skin surrounding said frame means;
  - means for securing said frame means to a flange of a vehicle door, said securing means including a deflectable portion enabling said frame means to be front loaded onto said flange, said deflectable portion including means for rigidi-

fying said deflectable portion to secure to said flange, and said securing means unitarily formed with said polymeric skin surrounding said frame means; and



means for providing a mounting surface for a side view mirror, said mounting surface means coupled with said frame means.

4,956,942

**WINDOW ADJUSTMENT MECHANISM**

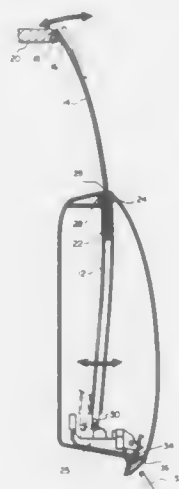
Stephen P. Lisak, and Harold L. Purdy, both of Arab, Ala., assignors to Textron Inc., Rockford, Ill.

Filed Jun. 9, 1989, Ser. No. 364,012

Int. Cl.<sup>5</sup> B60J 1/00

U.S. Cl. 49—502

13 Claims



1. A window adjustment apparatus for use with an automotive vehicle type of window assembly of the type having an elongate guide channel defining a longitudinal axis and which mounts a window for reciprocal motion relative to a vehicle body panel such as a vehicle door, and a pivot arrangement which mounts said guide channel for pivotal movement generally about one end thereof and within said vehicle body panel in which said guide channel is located, said window adjustment apparatus comprising: housing means; an adjustment member having channel-coupling means for coupling thereof to said guide channel at a location thereon generally remotely located from the end about which said guide channel is mounted for pivotal motion; a driven member mounted to said adjustment member; drive means rotatably mounted to said housing, said drive means being of complementary form with said driven member for engaging the same for causing bidirectional movement of said adjustment member relative to said housing to achieve said bidirectional pivoting of said guide channel in response to bidirectional rotation of the drive means; and engageable means for engagement and bidirectional rotation by means acting from exteriorly of the body panel and operatively coupled with said drive means, such that bidirectional rotation of the engageable means achieves a pre-

determined and corresponding amount of bidirectional pivotal motion of the guide channel; wherein said engageable means comprises a gear member nonrotatably coupled with said drive means; wherein said gear has a tool-engageable portion accessible for engagement and rotation by a mating tool; and wherein said housing includes an entry port in alignment with said tool-engageable portion of said gear for permitting the ingress of a mating tool for rotating the same.

4,956,943

**AUTOMOBILE SIDE DOOR ASSEMBLY**

Kiyoshige Yamada; Takashi Mizuma, and Kohji Kishino, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

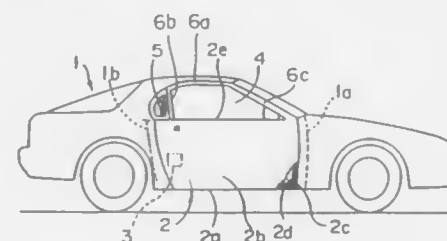
Filed Feb. 20, 1990, Ser. No. 481,558

Claims priority, application Japan, Feb. 20, 1989, 1-39695

Int. Cl.<sup>5</sup> E06B 3/00

U.S. Cl. 49—503

7 Claims



1. A side door assembly in an automobile body structure for selectively opening and closing an access opening leading into the interior of the automobile body structure, which assembly comprises:

- a generally rectangular double-walled door panel structure including outer and inner panels connected together to define a windowpane chamber therebetween while leaving a windowpane slot at an upper edge of the door panel structure;
- a windowpane supported for movement between elevated and lowered positions, said windowpane in said lowered position being substantially concealed within the windowpane chamber;
- a window sash mounted on the door panel structure and extending above the windowpane slot so as to define a window, said windowpane in said elevated position closing the window, said window sash having a generally rearwardly extending front sash portion, a generally rearwardly extending sash portion continued from an upper end of the front sash portion and a generally downwardly extending rear sash portion continued from a rear end of said rearwardly extending sash portion;
- a bezel mounted on the door panel structure at a location rearwardly of the downwardly extending sash portion;
- a door handle supported by the bezel for movement between a released position at which the side door assembly is in position to open the access opening, and a locked position at which the side door assembly is in position to close the access opening; and
- a weather strip fitted to the rearwardly extending sash portion and a rear edge of the bezel so as to continue from the rearwardly extending sash portion down to a rear edge of the door panel structure by way of the rear edge of the bezel.

4,956,944

**POLISHING APPARATUS**

Manabu Ando; Nobuo Nakamura; Yoshitane Tsuchiya, all of Yokohama; Hirotaka Fuse, Tsuchiura; Kazuo Watanabe, and Konishi Shinoda, both of Utsunomiya, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 168,001, Mar. 14, 1988, abandoned.

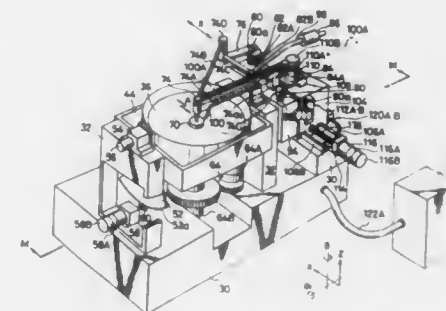
This application Aug. 29, 1989, Ser. No. 401,477

Claims priority, application Japan, Mar. 19, 1987, 62-62592; Mar. 19, 1987, 62-34808

Int. Cl.<sup>5</sup> B24B 49/00

U.S. Cl. 51—165.71

6 Claims



1. A polishing apparatus for polishing a work piece having a curved surface comprising:

- holding means for holding a tool on the curved surface of the work piece to be polished;
- first moving means for moving the tool to a polishing position in a radial direction on the curved surface;
- pivoting means for pivoting the work piece, said pivoting means providing a pivot axis positioned on a line connecting a center of curvature of the curved surface and an uppermost portion of the curved surface, and pivoting the work piece around said pivot axis by a pivot angle corresponding to a distance between said uppermost portion and said polishing position;
- a control unit for outputting information of an amount of movement of the tool with respect to the pivot angle of the work piece;
- second moving means for moving the tool in an axial direction of the work piece in accordance with said output information so that an axial direction of the tool coincides with a direction normal to the work piece at said polishing position; and
- force adjusting means for adjusting a pressing force of the tool on the work piece with said force adjusting means having a balance member held by said second moving means for adjusting the pressing force applied to the work piece.

4,956,945

**INTERNAL GRINDER**

Jinichiro Ooshima, Narashino, Japan, assignor to Selko Seiki Kabushiki Kaisha, Japan

Filed Mar. 14, 1989, Ser. No. 324,228

Claims priority, application Japan, Mar. 18, 1988, 63-65099

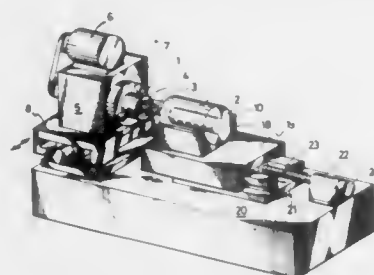
Int. Cl.<sup>5</sup> B24B 49/00

U.S. Cl. 51—165.93

24 Claims

1. An internal grinding machine comprising:
  - a spindle rotor having a grinding wheel fixed at one end thereof through a grinding wheel shaft;
  - a spindle head encompassing said spindle rotor;
  - rotational driving means for rotationally driving a work-piece having a bore about an axis of rotation parallel with the bore;
  - feeding means for providing relative movement between said grinding wheel and the workpiece;
  - electromagnetic bearing means coupled with said spindle

rotor for magnetically floating and supporting said spindle rotor;  
sensing means for detecting a position of said spindle rotor relative to said electromagnetic bearing means;  
means for sensing the axial position of the grinding wheel relative to a surface of the bore;  
calculating means for calculating a predetermined tilt angle of said grinding wheel relative to the axis of rotation of the



workpiece for different axial positions of said grinding wheel relative to a surface of the bore in the workpiece and including means for storing data corresponding to the tilt angle for each relative position; and  
control means for controlling said electromagnetic bearing means to tilt the axis of said spindle rotor at the calculated predetermined tilt angle of said grinding wheel for the said positions sensed by the means sensing the axial position of the grinding wheel relative to the surface of the bore.

4,956,946

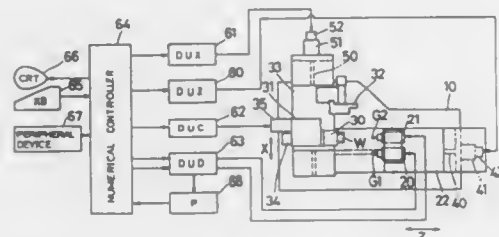
**NUMERICALLY CONTROLLED GRINDING MACHINE**  
Toshio Tsujilachi, Kariya; Norio Ohta, Okazaki, and Masatomo Yoshimura, Toyooka, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya, Japan

Filed Mar. 13, 1989, Ser. No. 322,300

Claims priority, application Japan, Mar. 15, 1988, 63-60794  
Int. Cl.<sup>5</sup> B24B 49/05

U.S. Cl. 51-165.71

11 Claims



1. A numerically controlled grinding machine having a wheelhead slide supporting a rough grinding wheel and a finish grinding wheel, and a spindlehead slide supporting a workpiece, in which relative movement is produced between said wheelhead and spindlehead slides and said workpiece according to numerical data in order to grind said workpiece by a rough grinding operation with said rough grinding wheel and a finish grinding operation with said finish grinding wheel, said numerically controlled grinding machine comprising:  
means for detecting a grinding load of said finish grinding wheel at the beginning of said finish grinding operation in order to indirectly detect the amount of unground portion remaining after the rough grinding operation;  
means for determining a compensation value based upon said grinding load detected by said grinding load detecting means; and  
means for compensating the relative positional relationship between said rough grinding wheel and said workpiece

according to said determined compensation value in a next rough grinding operation for a next workpiece in order to keep the amount of unground portion remaining after the rough grinding operation constant.

4,956,947

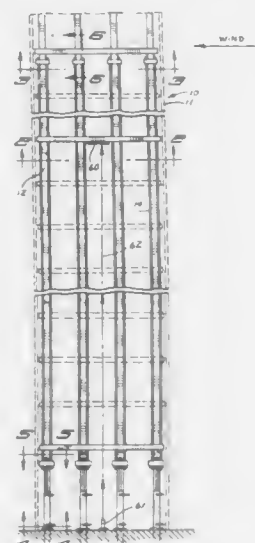
**LIVE TENDON SYSTEM INHIBITING SWAY OF HIGH RISE STRUCTURES AND METHOD**

Leonard E. Middleton, 2907 N. 22nd Ave. W., Duluth, Minn. 55811

Continuation-in-part of Ser. No. 176,083, Apr. 1, 1988, abandoned. This application Oct. 16, 1989, Ser. No. 422,043  
Int. Cl.<sup>5</sup> E02D 27/34

U.S. Cl. 52-1

16 Claims



1. A live tendon automatically self operable control system inhibiting sway and oscillation in a structure deflected by a lateral force, having in combination  
a structure subject to deflection comprising a framework of stabilizing members,  
a plurality of elastic steel rod tendons extending along preselected of said stabilizing members,  
a programmed self operable controller,  
tensioning means operatively connected with said tendons and in circuit with and activated by said controller,  
sensing means in circuit with said controller indicating the deflection of said structure,  
said sensing means comprising a graduated grid of sensors, a steady beam focused upon the center of said grid,  
said sensing means being arranged and adapted to indicate to said controller a measured extent and direction of deflection of said structure relative to the position of said beam, whereby  
said sensing means causes said controller to activate said tensioning means to counter the effect of said lateral force in deflecting said structure.

4,956,948

**CLOG RESISTANT GUTTER-DOWNSPOUT CONNECTION UNIT**

Richard Hart, 3497 Citrus Dr., Duluth, Ga. 30136

Filed Oct. 19, 1989, Ser. No. 424,528

Int. Cl.<sup>5</sup> E04D 13/08

U.S. Cl. 52-16

10 Claims

1. An improved gutter-downspout connection unit comprising  
first and second upper body sides and first and second end pieces, each of the upper body sides and end pieces having an upper edge, a lower edge and two side edges, the first

4,956,950

**ASSEMBLY OF EAVES FASCIA**

Norio Hirose, Gifu, Japan, assignor to Sunrail Co., Ltd., Gifu, Japan

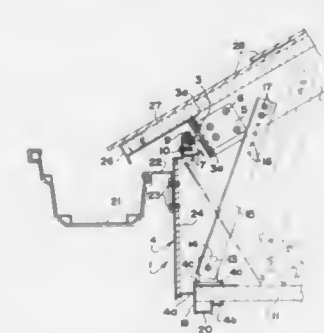
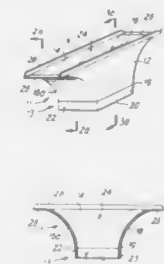
Filed Dec. 27, 1988, Ser. No. 290,150

Claims priority, application Japan, Feb. 8, 1988, 63-15536[U];  
Feb. 8, 1988, 63-15537[U]; Mar. 15, 1988, 63-34304[U]

Int. Cl.<sup>5</sup> A63H 23/04; E04D 13/00

U.S. Cl. 52-94

6 Claims



wherein the upper body sides and the end pieces adjoin each other along the side edges forming a unitary, generally hollow structure such that the upper edges of the upper body sides and the end pieces form a first common edge defining a top opening, and the lower edges of the upper body sides and the end pieces form a second common edge defining a bottom opening, said bottom opening being substantially opposite the top opening.

4,956,949

**BRICK PANEL WALL CONSTRUCTION**

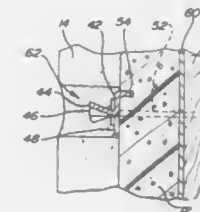
Gerald T. Francis, 41757 Onaway Dr., Northville, Mich. 48167, assignor to Gerald T. Francis, Northville, Mich.

Filed May 25, 1989, Ser. No. 357,133

Int. Cl.<sup>5</sup> E04F 13/08; E04C 1/14

U.S. Cl. 52-38

20 Claims



1. A brick panel wall construction having a plurality of brick panels, said brick panels being secured to supporting structure, each brick panel including a backing board having a plurality of bricks secured thereto in a pattern with adjacent bricks separated by mortar joints said mortar joints having a back wall and side walls;

at least one fastening means having a body portion mounted in said mortar joint between adjacent bricks said body portion being defined by a generally planar surface, said planar surface being juxtaposed with said back wall, said body portion having at least two attaching means, a first attaching means for attaching said body portion to said supporting structure and a second attaching means for attaching said body portion to said backing board said second attaching means extending only partially into said backing board; and  
mortar applied to said mortar joint to cover said fastening means.

4,956,951

**LAMINATED SHEET FOR PROTECTING UNDERGROUND VERTICAL WALLS**

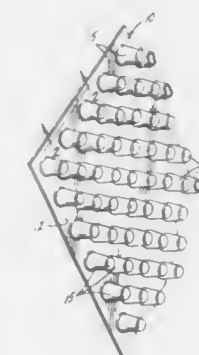
Charles P. Kannankeril, North Caldwell, N.J., assignor to Sealed Air Corporation, Saddle Brook, N.J.

Filed Jun. 26, 1989, Ser. No. 371,511

Int. Cl.<sup>5</sup> E02D 31/02

U.S. Cl. 52-169.5

34 Claims



1. A laminated sheet useful to facilitate the drainage of



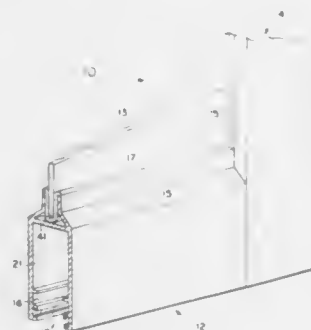
ground water to protect underground vertical walls and foundations when placed thereagainst, said laminated sheet having an array of spaced apart projections extending laterally outwardly from one side thereof and forming a series of drainage channels, and comprising a layer of crystalline polystyrene providing compression strength and creep resistance properties to said laminated sheet and at least one non-pervious layer of a polyolefin laminated to said crystalline polystyrene layer and providing chemical and impact resistance to said laminated sheet.

**4,956,952**  
**UNIVERSAL DOOR PANEL SYSTEM**  
Joseph C. Bancroft, 812 Sweetwater Blvd., Longwood, Fla. 32779

Filed Aug. 17, 1989, Ser. No. 394,888  
Int. Cl.<sup>3</sup> E06B 1/04

U.S. Cl. 52—207

12 Claims



1. A universal door panel for installation in a door frame for a patio door or the like, said door frame including a sill member having a first track and a second track, comprising:
  - (a) a pair of fixed panel adapters, each having
    - (i) a body portion, and
    - (ii) an arcuate channel along a lower edge thereof;
  - (b) a pair of wheel assemblies, each having
    - (i) a body portion, and
    - (ii) a wheel operatively disposed in said body portion, said wheel having an arcuate periphery; and
  - (c) a door panel metal frame having a hollow sill member, wherein said pair of fixed panel adapters, or said pair of wheel assemblies selectively wholly fitting within said hollow sill member;
  - (d) whereby said panel frame may be configured to provide either a fixed door panel or a sliding door panel.

**4,956,953**  
**OFFICE PANEL SYSTEM INCORPORATING IMPROVED LOCKING AND ALIGNMENT MECHANISM**  
Norman H. Bates, 1182 Hyde Park, Santa Ana, Calif. 92705  
Filed Mar. 8, 1989, Ser. No. 320,758  
Int. Cl.<sup>3</sup> E04B 2/74

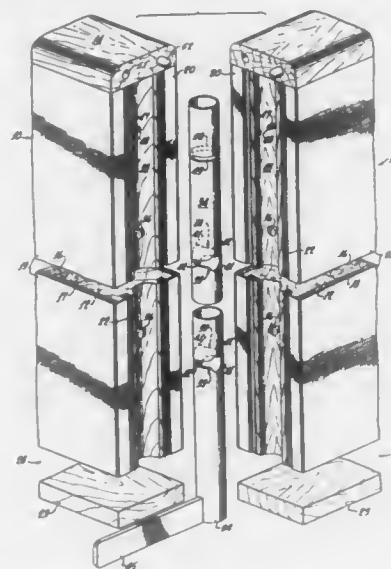
U.S. Cl. 52—239

20 Claims

1. A panel system, which comprises:
  - (a) first and second office panel sections each having a vertical end that it is desired to connect to the vertical end of another office panel section, and so that said first and second office panel sections will be aligned and coplanar,
  - (b) projecting elements provided on each of said ends in vertically-spaced relationship,
  - (c) an elongate connector and alignment element disposed in vertical relationship between the opposed vertical ends of said first and second panel sections to cooperate with said projecting elements in connecting said ends together, and in aligning said panel sections relative to each other,
  - (d) means on said connector and alignment element to interact with said projecting elements to effect said connection

of said ends to each other and to effect said alignment of said panel sections, characterized in that said last-named means effects said connection and alignment in response to rotation of said connector and alignment element about the longitudinal axis thereof,

further characterized in that said projecting elements and said last-named means are so shaped and related that



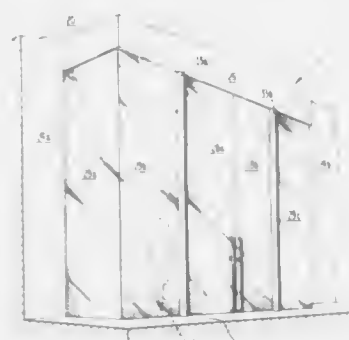
said rotation of said connector and alignment element effects pulling of said panel sections towards each other, and

- (e) means on said first and second panel sections to come into abutment with each other in response to said pulling of said panel sections towards each other, said last-named means being so disposed that the connected panel sections are maintained in substantially the same plane, without the necessity of relying on friction.

**4,956,954**  
**DOORWAY SYSTEM FOR GLASS DOORS AND METHOD OF INSTALLATION**  
William J. Horgan, Jr., Pittsburgh, Pa., assignor to Blumcraft of Pittsburgh, Pittsburgh, Pa.  
Filed Mar. 17, 1989, Ser. No. 325,226  
Int. Cl.<sup>3</sup> E05D 7/08, 11/06

U.S. Cl. 49—381

11 Claims



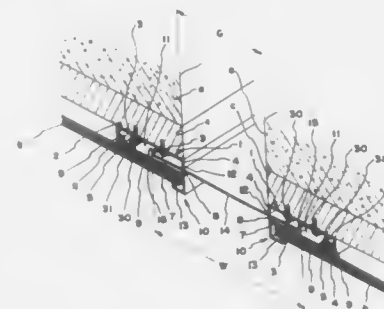
1. A header system for a building which includes a floor and a ceiling and a door or a panel extending therebetween comprising:
  - a channel attached to the ceiling, said channel having a

longitudinally extending slot therethrough with opposed inner side walls joined by a center wall; at least one first projection of pre-determined size extending from each side wall opposite one another and adjacent said center wall to form a track therebetween; and at least two right-angular projections extending from each said side walls with the right angles facing one another to form a pocket-area spaced apart from said track and adjacent each said side wall; wherein filler means comprising a slidable and lockable platform, having at least one aperture therethrough, and being movable in said track is held between said walls and stop means is attached to a face of said filler means to halt door rotation.

**4,956,955**  
**EXPANSION JOINT DEVICE FOR USE IN INTERIOR DESIGNS**  
Toshikazu Ohmatsu, 178-1 Bonsai-cho, Ohmiya, Saitama, Japan  
Filed Feb. 24, 1989, Ser. No. 315,059  
Int. Cl.<sup>3</sup> E04B 1/68

U.S. Cl. 52—396

13 Claims



1. An expansion joint for mounting building panels within the vicinity of an expansion joint gap defined between two building structures, comprising:
  - base frame members secured to said two building structures; cover frame members secured to said base frame members in spaced relationship with respect thereto so as to define cavities therebetween;
  - an expansion joint covering plate having a width greater than said gap defined between said two building structures and having opposite side edge portions thereof slidably disposed within said cavities so as to cover said gap defined between said two building structures under expansion and contraction conditions; and
  - channel means provided upon said cover frame members for housing side edge portions of said building panels in order to mount said building panels upon said building structures.

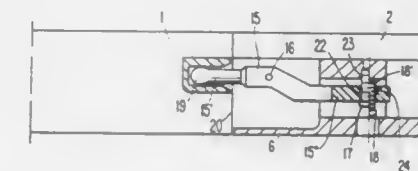
**4,956,956**  
**CONNECTOR FOR CONNECTING TWO ELEMENTS**  
Friedrich Maier, Leonberg, Fed. Rep. of Germany; Fredi Dubach, Adetswil, Switzerland; Erich Röck, Höchst, and Klaus Brüstle, Lauterach, both of Austria, assignors to Julius Blum Gesellschaft m.b.H., Höchst, Austria  
Continuation-in-part of Ser. No. 184,618, Apr. 21, 1988, abandoned, and a continuation-in-part of Ser. No. 337,402, Apr. 13, 1989, abandoned. This application Oct. 18, 1989, Ser. No. 423,032  
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1987, 3713483; Austria, May 22, 1987, A1313/87; European Pat. Off., Apr. 16, 1988, 88106117.0; Austria, Jun. 17, 1988, A1571/88

U.S. Cl. 52—584

Int. Cl.<sup>3</sup> E04C 5/16

57 Claims

1. In a connector for connecting two structural elements, particularly for the endwise connection of two panels, said



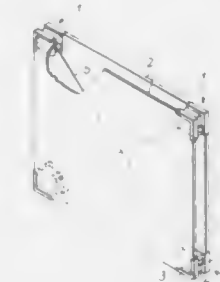
connector including a pair of fitment members to be mounted on respective of the structural elements in the region of connection therebetween, a tie anchor and associated clamping means for applying a pulling force on said fitment members in a first direction to clamp said fitment members together, and adjusting means for adjusting the relative positions of said fitment members, and thereby of the structural elements to be connected, in a second direction perpendicular to said first direction, the improvement wherein said adjusting means comprises:

a lever pivotally mounted in a first said fitment member for pivotal movement about an axis extending in a third direction perpendicular to both said first and second directions, said lever having a first end to extend into a second said fitment member; and rotatable means operable between said first fitment member and a second end of said lever for pivoting said lever about said axis.

**4,956,957**  
**DEVICE FOR ASSOCIATING A PAIR OF PLANAR PARALLEL PANELS**  
Aldo Vandini, Bologna, Italy, assignor to Koaladesign S.r.l., Italy  
Filed Oct. 17, 1988, Ser. No. 258,527  
Int. Cl.<sup>3</sup> E04C 1/10

U.S. Cl. 52—584

5 Claims



1. Device for associating a pair of planar parallel panels particularly to provide walls for exhibition stands and the like, comprising a pair of profiled elements and a spacer block arranged between said profiled elements and connected therewith, each profiled element comprising a plate having a right angle and an outer edge extending along two sides of said plate enclosing said right angle, said plate and edge defining a groove into which a corner of said panels engages, said spacer block including a seat and a cylinder being rotatably accommodated in said seat according to an axis perpendicular to said plates, said cylinder being provided with means for anchoring one end of a tensioning member extending between said pair of panels and having the opposite end associated to a similar device applied in diagonally opposite corners of said panels.

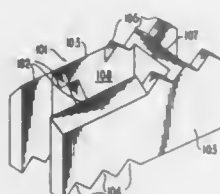
4,956,958

**AUTOFITTING BUILDING BLOCKS AND BRICKS**  
Gino P. N. Caroti, 56 Mayflower Dr., Wilton, Conn. 06897  
Filed Feb. 15, 1989, Ser. No. 311,088

Int. Cl.<sup>5</sup> E04B 5/04

U.S. Cl. 52—605

17 Claims



1. A building block comprising a block having two opposing side surfaces, two opposing end surfaces, a top surface and a bottom surface, said top surface having a plurality of first dihedral projections each having a first load-supporting side surface and a second load-supporting side surface and extending longitudinally along the block, said bottom surface having a plurality of first dihedral recessions extending longitudinally along the block, wherein said bottom surface has at least one more of said first dihedral recessions than the top surface has of said first dihedral projections, wherein one of said first dihedral projections adjoins one of said two opposing side surfaces, and another of said first dihedral projections adjoins the other of said two opposing side surfaces.

4,956,959

**HOUSING FOR HOLDING A SUPPLY ROLL OF LARGE ROUND BALE WRAP MATERIAL**  
George W. Rumph, Bloomfield, and Henry D. Anstey, Ottumwa, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jun. 23, 1989, Ser. No. 370,552  
Int. Cl.<sup>5</sup> B65B 11/30, 27/12; B65H 19/00

U.S. Cl. 53—118

11 Claims



1. In a large round baler including a bale-forming chamber defined in part by a bale discharge gate, a support structure connected to a lower rear portion of the bale discharge gate, a bale wrapping mechanism mounted to the support structure and including a wrap material supply roll housing adapted for holding a supply roll from which wrap material may be pulled during wrapping of a bale formed in the chamber, the improvement comprising: said housing having a bottom wall extending transversely behind said discharge gate having an upwardly facing roll support surface extending between front and rear ends of the bottom wall and being fixed to said support structure; and a roll loading arm being vertically pivotally mounted

directly to said support structure for rotation about a horizontal transverse axis located adjacent a rear end portion of the support surface, said arm being shaped to form cradle means for receiving and supporting a roll of wrap material at a level below said pivot axis, when the arm is in a lowered loading position, and for depositing a cradled roll of wrap material onto the support surface when the arm is pivoted from its loading position to a raised discharge position.

4,956,960

**HOUSING FOR HOLDING A SUPPLY ROLL OF LARGE ROUND BALE WRAP MATERIAL**

Henry D. Anstey, Ottumwa, and George W. Rumph, Bloomfield, both of Iowa, assignors to Deere & Company, Moline, Ill.  
Filed Jun. 23, 1989, Ser. No. 370,537

Int. Cl.<sup>5</sup> B65B 11/30, 13/22, 27/12; B65H 19/00  
U.S. Cl. 53—118

9 Claims



7. In a large round baler including a bale discharge gate having a pair of transversely spaced sidewalls and a wrapping mechanism including a pair of support walls respectively connected to lower rear portions of the pair of side walls, said mechanism including an improved wrap material supply roll housing, comprising: an upright front wall extending between and being fixed to said sidewalls; a bottom wall means extending transversely behind and being sloped upwardly and rearwardly relative to the front wall and including a transverse forward end spaced rearwardly of said front wall and cooperating with the latter to define a wrap material passage therebetween; and said bottom wall means cooperating with said front wall to define brake means for resisting the unwrapping of wrap material from a wrap material supply roll resting on the bottom wall means by a substantially constant force throughout the usage of the roll as the latter decreases in weight and diameter.

4,956,961

**APPARATUS FOR WRAPPING AND CLOSING A BOOK PACKAGE**

Veikko I. Janhonen, Jorvas, Finland, assignor to Pussikeskus Oy, Helsinki, Finland

Filed May 12, 1989, Ser. No. 351,872

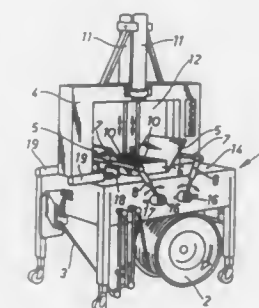
Claims priority, application Finland, May 19, 1988, 882347  
Int. Cl.<sup>5</sup> B65B 11/02, 13/22

U.S. Cl. 53—176

4 Claims

1. An apparatus for wrapping and closing a package around a book, said apparatus having a base to support the material to be wrapped about the book, a holding element movable to seat against the book for holding it firmly against the wrapping material, said holding element having a pair of press members, means mounting said press members spaced apart from each other sufficiently to permit a strapping tape to be passed between them, a pair of folding means one on each of opposite sides of the book and each having a portion underlying the wrapping material, actuator means connected to said folding means to move said portions upwardly and inwardly to fold

the ends of said material against the opposite edges of the book and then into overlapping relationship over the top of the book, actuator means for withdrawing said holding element



after said portions have urged said wrapping against the opposite edges of the book and to move said holding element again into engagement with the overlapped ends of the wrapping material to hold it firmly ready for strapping.

4,956,962

**METHOD OF MAKING RECLOSABLE SEALED PACKAGE**

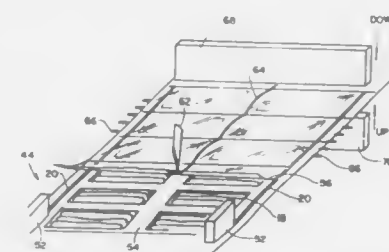
Roger S. Williams, Calhoun, Ga., assignor to Bryan Food, Inc., West Point, Miss.

Filed Jul. 14, 1989, Ser. No. 379,913

Int. Cl.<sup>5</sup> B65B 9/04, 31/02, 47/00

U.S. Cl. 53—433

15 Claims



1. A method of forming a package having a product hermetically enclosed therein between a pair of sheets of thermoplastic material and having a readily peelable reclosable seal, said method comprising:

- (a) feeding a first sheet of thermoplastic material,
- (b) placing said product upon a surface of said sheet,
- (c) dispensing a peelable pressure sensitive adhesive having re-adhering properties onto said surface at a peripheral area of said sheet adjacent said product,
- (d) thereafter laying a cover sheet of material upon said first sheet so that said covering material overlays and adheres to said adhesive and forms a peelable rescalable seal and overlays said product and the remainder of said first sheet,
- (e) thereafter joining the first and second sheets together peripherally about said product at all but a second peripheral area of said sheet spaced from said adhesive adjacent said product, and
- (f) thereafter evacuating said package and permanently sealing the first and second sheets together about said second area.

4,956,963

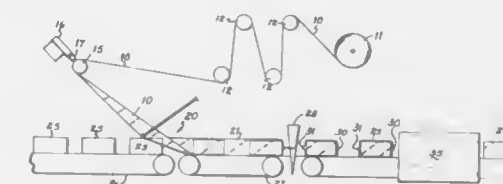
**METHOD OF SEALING A SHRINK WRAP PACKAGE**  
Stephen N. Johnson, Mechanicsville, Va., assignor to Nordson Corporation, Westlake, Ohio

Filed Nov. 14, 1988, Ser. No. 271,024

Int. Cl.<sup>5</sup> B65B 9/06, 53/02

U.S. Cl. 53—442

6 Claims



1. The method of wrapping a package comprising the steps of:

- applying a light deposit of pressure-sensitive hot melt adhesive to at least one edge of a polyvinylchloride heat-shrinkable film;
- wrapping an article with said film;
- bringing together opposed edges of said film with said adhesive between said edges; and
- heating said film to shrink it about said article and to cause the adhesive to flow to form a more complete bond between said opposed edges.

4,956,964

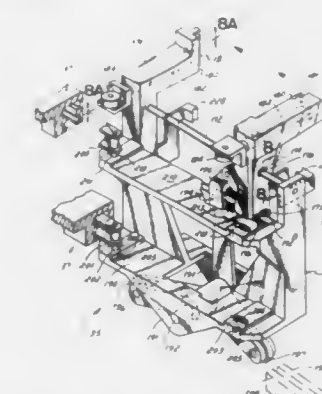
**ADJUSTABLE POUCH FORM, FILL, SEAL MACHINE**  
Wickliffe Jones, deceased, late of Cincinnati, Ohio (by Martha W. Jones, Executrix); Eric W. Scarpa, Cincinnati, Ohio; Joseph D. Greenwell, Florence, Ky.; Mark R. Nease, Lakeside Park, Ky.; Robert M. Kalany, Florence, Ky., and Michael E. Myers, Bellevue, Ky., assignors to R. A. Jones & Co. Inc., Covington, Ky.

Filed Mar. 13, 1989, Ser. No. 323,365

Int. Cl.<sup>5</sup> B65B 43/26

U.S. Cl. 53—570

13 Claims



1. A gripper unit for gripping the sealed edges of flat pouches comprising:

- a frame having opposed vertical sides, vertically spaced horizontal bars fixed in said vertical sides, a leading gripping jaw fixed to one of said vertical sides, a trailing gripping jaw slidably mounted on said bars and frictionally gripping said bars, means for sliding said trailing jaw on said bars to position it for pouch opening and filling operations.



4,956,965

**BOOM MOWER ATTACHMENT FOR A TRACTOR ADJUSTABLE FOR CUTTING AT EITHER SIDE THEREOF**

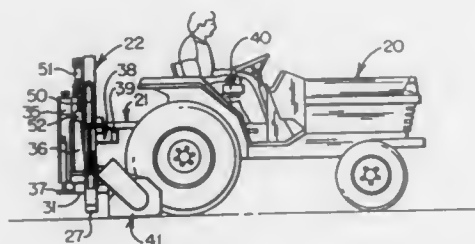
Ralph L. Parsons, Jr., 1795 Olmstead Rd., West Jefferson, Ohio 43162

Continuation-in-part of Ser. No. 228,232, Aug. 4, 1988, Pat. No. 4,912,916, which is a continuation-in-part of Ser. No. 156,816, Feb. 17, 1988, Pat. No. 4,887,417. This application Oct. 10, 1989, Ser. No. 418,669

Int. Cl.<sup>3</sup> A01D 34/66, 34/86

U.S. Cl. 56—15.1

24 Claims



1. A boom attachment for supporting a work unit comprising a support, a boom pivoted by a pivot at its inner end to said support for swinging movement, a work unit supported on the outer end of said boom, and means for swinging said boom about said support pivot, said swinging means comprising a cylinder and piston unit connected at a laterally outwardly extending pivot to said support and a laterally outwardly extending pivot to said boom intermediate its inner and outer ends so it will be disposed along the side of the boom in a plane spaced from that of the boom and will not interfere with movement of the boom about its said pivot to said support; said work unit being a mower comprising a support pivoted to the boom, a plurality of vertical spindles carried by the support, a housing covering said spindles, cutters carried by the spindles in overlapping relationship to each other, and means for driving said spindles, a forwardly facing slot in said housing, said cutters being mounted in said housing to rotate with said spindles such that a part of each cutter projects forwardly through said slot during said cutter rotation.

4,956,966

**HEADER FOR A COMBINE HARVESTING MACHINE**

Roger L. Patterson, Manitoba, Canada, assignor to MacDon Industries Ltd., Winnipeg, Canada

Continuation of Ser. No. 209,901, Jun. 22, 1988, abandoned. This application Jan. 25, 1990, Ser. No. 470,640

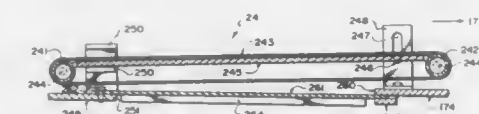
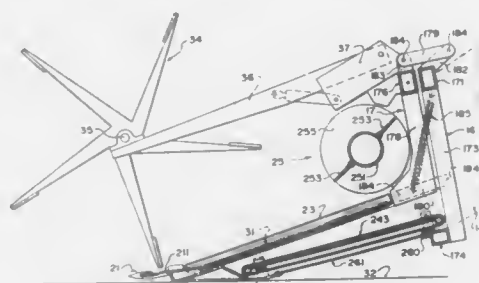
Int. Cl.<sup>3</sup> A01D 47/00

U.S. Cl. 56—181

20 Claims

1. A header for a combine harvesting machine comprising a header frame, a mounting frame including means for mounting the mounting frame fixedly on the machine for transportation of the header frame in a working direction across a field including a standing crop to be harvested, said header frame including ends thereof extending outwardly to respective sides of the mounting frame, means mounting said header frame on said mounting frame for limited vertical movement of the header frame relative to the mounting frame and limited pivotal movement of the header frame relative to the mounting frame about an axis generally parallel to the working direction such that each end of the header frame can be lifted independently of movement of the other end of the header frame, a knife arrangement extending transversely across a front edge of the header frame for cutting the standing crop, means defining a feed opening of the mounting frame through which the cut crop is guided to pass, means for transporting said cut crop inwardly from the ends of the header frame and for feeding said cut crop through said feed opening, said mounting frame

including a mounting frame member fixed relative to the mounting frame and defining an edge extending across the mounting frame in front of the feed opening adjacent a lower edge of the feed opening, said header frame including a header frame member fixed relative to the header frame and defining an edge extending partly along the header frame rearwardly of said knife arrangement and substantially parallel to the edge of the mounting frame member leaving an opening between the edge of the mounting frame member and the edge of the header frame member which opening varies in dimension as the header frame moves relative to the mounting frame, a flexible pan member arranged underneath said transporting means with a forward end thereof in engagement with said header frame



member at a position rearwardly of said knife arrangement and a rearward end thereof in engagement with said mounting frame member, said vertical movement and pivotal movement of said header frame being accommodated by flexing of said pan member, means attaching the respective end of said flexible pan member to one of said header frame member and said mounting frame member, and contact maintaining means maintaining the respective end of the flexible pan member substantially continually in contact with the other of said header frame member and mounting frame member during said vertical movement and pivotal movement of said header frame so as to form a bridge across said opening between the edge of the header frame member and the edge of the mounting frame member.

4,956,967

**AGRICULTURAL BALER WITH FEEDER DOOR**

Cyriel R. J. De Busscher, Damme; Cornelis G. M. Muljs, Merelbeke, and Gery G. R. Verweider, Zedelgem, all of Belgium, assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Apr. 25, 1989, Ser. No. 343,457

Claims priority, application United Kingdom, Apr. 28, 1988, 8810064

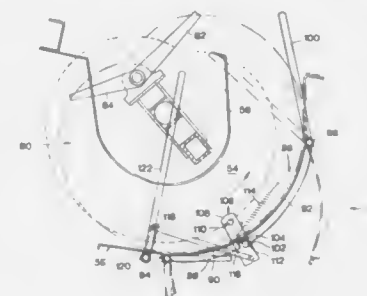
Int. Cl.<sup>3</sup> A01D 39/00

U.S. Cl. 56—341

6 Claims

1. In an agricultural baler including a bale case having an inlet opening formed in a bottom wall thereof, a feeder duct communicating at one end with the inlet opening in the bale case, a pickup disposed adjacent the other end of the feeder duct, and feeder means operable to feed crop material into the feeder duct to form a wad of crop material for subsequent transfer to the bale case; wherein an improvement comprises the feeder duct being provided with a lower wall which is curved upwardly and rearwardly from the pickup to the bale

case, door means disposed in a curved portion of the feeder duct lower wall for movement between an open position and a



closed position, and releasable latch means for latching the door means in said closed position.

4,956,968

**ROUND BALER WITH MECHANISM FOR DISPENSING WRAPPING MATERIAL**

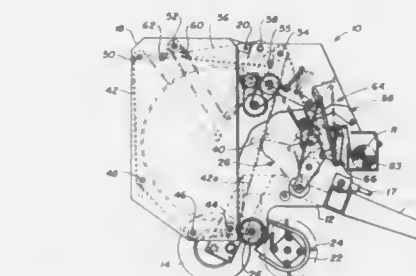
Kenneth R. Underhill, Strasburg, Pa., assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Dec. 11, 1989, Ser. No. 448,404

Int. Cl.<sup>3</sup> A01D 39/00

U.S. Cl. 56—341

7 Claims



1. An agricultural baler of the type for making cylindrical bales of crop material, said baler comprising:

- a main frame,
- a tailgate pivotally connected to said main frame;
- a sledge assembly mounted on said main frame for movement between a bale starting position and a full bale position, said sledge assembly including a plurality of rollers extending transversely of said main frame;
- an apron movably supported on said main frame and said tailgate, said apron cooperating with the rollers of said sledge assembly to define a bale forming chamber; and
- dispensing means carried on said sledge assembly for dispensing sheet material into said bale forming chamber so that the sheet material is wrapped circumferentially around a cylindrical bale of crop material disposed in said bale forming chamber.

4,956,969

**METHOD AND APPARATUS FOR CONTROLLING THE SUPPLY OF SLIVER TO THE SPINNING STATIONS OF A SPINNING MACHINE**

Hans Raasch, Moenchengladbach, Fed. Rep. of Germany, assignor to W. Schlafhorst &amp; Co., Fed. Rep. of Germany

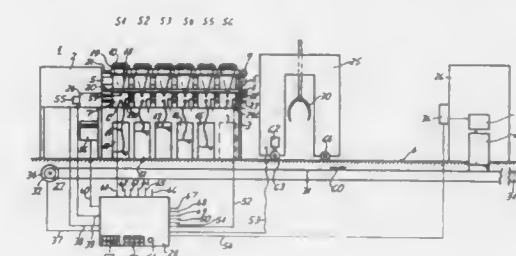
Filed Sep. 7, 1989, Ser. No. 404,340

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1988, 3831639

Int. Cl.<sup>3</sup> D01H 4/00, 9/00, 9/18

U.S. Cl. 57—281

8 Claims



1. A method for controlling the operation of a spinning machine of the type having a plurality of stations for spinning sliver into yarn and winding yarn into packages, the sliver being drawn from cans at the stations, a sliver can filling device and a sliver can transport device for transporting empty cans to the sliver can filling device and cans with sliver therein from the sliver can filling device to the stations, the sliver can transport device and the sliver can filling device being cooperatively operated to provide sliver cans containing sliver to the stations individually during the contemporaneous operation of the stations in winding a batch of a predetermined number of packages, comprising:

- supplying each spinning station with a first can of sliver; continuously replenishing the supply of sliver at each of the stations independently by removing cans from each station as they become empty and transporting full cans to the station;
  - prior to completion of winding of the batch, determining an individual finishing quota of packages to be wound at each station to complete the batch, said individual finishing quota corresponding to the number of packages which can be substantially completely wound by the respective spinning station within a predetermined remaining batch running time for each station;
  - monitoring the winding at each spinning station during the winding of the individual finishing quota of packages to determine, for each station, the number of packages to be wound from the sliver in a final can to be transported to each station; and
  - in response to said monitoring, loading a quantity of sliver into each final can substantially equal to the quantity of sliver required to complete the winding of the individual finishing quota of packages at the respective spinning station, whereby the final sliver can of each spinning station is substantially empty upon completion of winding of the last full package of the individual finishing quota for the spinning station.
8. An apparatus for controlling the operation of a spinning machine of the type having a plurality of stations for spinning sliver into yarn and winding yarn into packages, the sliver being drawn from cans at the stations, comprising:
- a sliver can filling device for individually filling the sliver cans with a selected quantity of sliver;
  - a sliver can transport device for transporting empty cans to the sliver can filling device and cans with sliver therein from said sliver can filling device to the stations, said sliver can transport device and said sliver can filling device being cooperatively operated to provide sliver cans containing sliver to the stations individually during the

contemporaneous operation of the stations in winding a batch of a predetermined number of packages;  
means for determining an individual finishing quota of packages to be wound at each station to complete said batch, said individual finishing quota corresponding to the number of packages which can be substantially completely wound by the respective spinning station within a predetermined remaining batch running time for the station; and means for monitoring the winding at each spinning station during the winding of the individual finishing quota of packages to determine, for each station, the number of packages to be wound from the sliver in a final can to be transported to each station,  
said monitoring means and said sliver can filling device being operably connected to one another and said sliver can filling device being operable to load a quantity of sliver into each final can in response to said monitoring of the winding at each station, said quantity of sliver in each final can being substantially equal to the quantity of sliver required to complete the winding of the individual finishing quota of packages at the respective spinning station, whereby the final sliver can of each spinning station is substantially empty upon completion of the winding of the last full package of the individual finishing quota of the spinning station.

4,956,970

## FALSE TWIST ROLL

Karl Bauer, and Hellmut Lorenz, both of Remscheid, Fed. Rep. of Germany, assignors to Barmag AG, Remscheid, Fed. Rep. of Germany

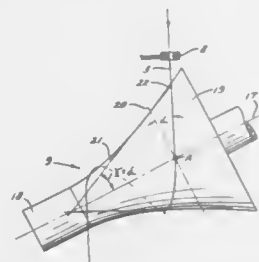
PCT No. PCT/DE88/00637, § 371 Date May 11, 1989, § 102(e) Date May 11, 1989, PCT Pub. No. WO89/03905, PCT Pub. Date May 5, 1989

PCT Filed Oct. 16, 1988, Ser. No. 360,884

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1987, 3735942

Int. Cl.<sup>5</sup> D02G 1/08

U.S. Cl. 57—334



1. A yarn twisting apparatus for imparting twist to an advancing yarn, and comprising  
a twisting roll having a concave yarn contacting surface portion, and defining a central roll axis,  
means mounting said twisting roll for rotation about said roll axis and for pivotal movement about a pivot axis which is perpendicular to said roll axis, and including means for setting said twisting roll in a selected pivotal position,  
yarn guide means for guiding an advancing yarn along a predetermined yarn path leading into contact with said yarn contacting surface portion,  
said concave yarn contacting surface portion being configured and said pivotal axis being located so that in all pivotal positions of said roll the angle alpha is equal to the angle gamma, with the angle alpha being defined as the angle between said predetermined yarn path and a circumferential tangent to the roll at the point of contact of the yarn path to the roll, and with the angle gamma being defined as the angle between the roll axis and a tangent to the concave surface portion at the point of contact of the

yarn path to said surface portion and which intersects the roll axis.

5. A yarn twisting apparatus for imparting twist to an advancing yarn, and comprising  
a twisting roll having a concave yarn contacting surface portion, and defining a central roll axis,  
means mounting said twisting roll for rotation about said roll axis, for axial displacement along said central axis, and for pivotal movement about a pivot axis which is perpendicular to said central roll axis, and including means for setting said twisting roll in a selected pivotal position and in a selected axial position,  
yarn guide means for guiding an advancing yarn along a predetermined yarn path leading into contact with said yarn contacting surface portion, and so as to define an angle alpha between the yarn path and a circumferential tangent to the roll at the point of yarn contact, and an angle gamma between the roll axis and a tangent to the concave surface portion at the point of yarn contact and which intersects the roll axis,

said concave yarn contacting surface portion being configured and said pivotal axis being located such that upon pivotal movement of said roll about said pivotal axis, the roll may be axially displaced along said roll axis so as to permit the yarn path of travel to be maintained unchanged, and the angle alpha maintained equal to the angle gamma.

4,956,971

## SOLID PROPELLANT CANISTER LOADED MULTIPLE PULSED OR STAGED ROCKET MOTOR

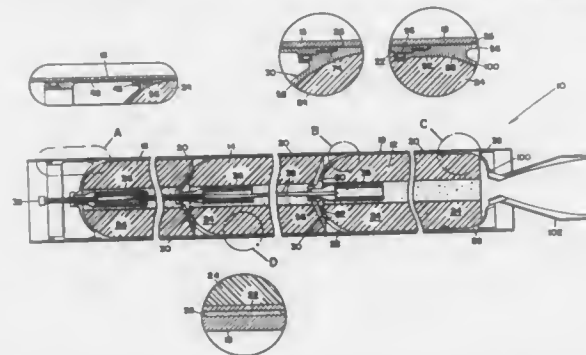
Bradley W. Smith, Ogden, Utah, assignor to Morton Thiokol, Inc., Chicago, Ill.

Filed Aug. 3, 1988, Ser. No. 227,748

Int. Cl.<sup>5</sup> F02K 9/28, 9/34

U.S. Cl. 60—245

8 Claims



1. A rocket motor comprising a monolithic elongate generally cylindrical case having means defining an aft aperture, at least two canisters each of which has an individual case and contains an individual grain of solid propellant material, said canisters disposed sequentially within said monolithic case in end to end relation with said canister cases attached to said monolithic case and to each other, means forming a closure to preclude flow communication between said canisters which includes means providing flow communication between said canisters when a higher pressure is present in the forward one of said canisters than in the aft one of said canisters, means for igniting each of said solid propellant grains, and a thrust nozzle means attached to said monolithic case in flow communication with said aft aperture.

4,956,972

## METHOD OF CONTROLLING SPEED REDUCTION RATIO FOR A CONTINUOUSLY VARIABLE SPEED TRANSMISSION

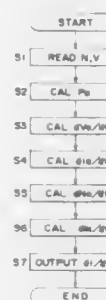
Koji Sasajima, Tokyo, and Kouji Yamaguchi, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 16, 1988, Ser. No. 286,381

Claims priority, application Japan, Dec. 18, 1987, 62-320174 Int. Cl.<sup>5</sup> F16H 61/42

U.S. Cl. 60—327

4 Claims



1. A method of controlling the speed reduction ratio of a continuously variable speed transmission for transmitting engine power with continuously variable speed to drive road wheels, by detecting a parameter representing a driver's intention of acceleration or deceleration, establishing a reference engine speed corresponding to the detecting parameter, and controlling the speed reduction ratio so as to equalize an actual engine speed with said reference engine speed, at a predetermined time interval, said method comprising the steps of:

when said actual engine speed is lower than said reference engine speed, establishing a controlling output value for the speed reduction ratio for bringing said actual engine speed into agreement with said reference engine speed, based on the difference between said actual engine speed and said reference engine speed, and calculating a predicted engine speed after elapse of said predetermined time interval based on the rate of change of said actual engine speed; and

when said predicted engine speed is higher than said reference engine speed, correcting said controlling output value to lower said predicted engine speed below said reference engine speed after elapse of said predetermined time interval.

4,956,973

## EXHAUST GAS RECYCLING SYSTEM FOR AN EXHAUST GAS TURBOCHARGED ENGINE

Manfred Fortnagel, Korb, and Dieter Platzter, Bisingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Continuation of Ser. No. 731,599, May 6, 1985, abandoned, which is a continuation of Ser. No. 491,181, May 3, 1983, abandoned. This application Feb. 28, 1986, Ser. No. 834,516 Claims priority, application Fed. Rep. of Germany, May 14, 1982, 3218156

Int. Cl.<sup>5</sup> F02B 37/12, 47/08

U.S. Cl. 60—605.2

4 Claims

1. Exhaust gas recycling apparatus for an internal combustion engine having a combustion air intake line and an exhaust gas line and having a turbocharger which includes a turbine in the exhaust gas line and a compressor in the combustion air intake line, comprising:

an exhaust gas recycling line connecting the exhaust gas line upstream of the turbine to the combustion air intake line downstream of the compressor;  
an exhaust gas recycling valve located in said exhaust gas

recycling line for controlling a flow of exhaust gas from said exhaust gas line to said combustion air intake line;  
a bypass line connected to the combustion air intake line at a first connecting point which is located upstream of the exhaust gas recycling line and downstream of the compressor, and at a second connecting point which is located upstream of the compressor;  
a bypass control valve located in said bypass line for controlling air line pressure downstream of the compressor;

vacuum means for controlling opening and closing of said exhaust gas recycling valve and said bypass control valve such that said valves are closed during full load operation and open during partial load operation of the engine; and electrical control means for controlling said vacuum means in response to variations in operating characteristics of the engine.

4,956,974

## REPLACEMENT METHOD AND APPARATUS FOR A CRYOGENIC REFRIGERATION UNIT

David C. Planchard, Shrewsbury, and Paul D. Lanoue, Ocean Bluff, both of Mass., assignors to Helix Technology Corporation, Waltham, Mass.

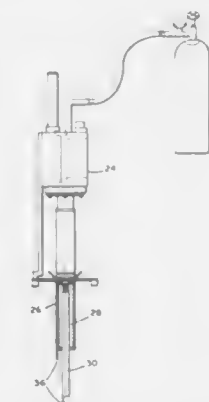
Division of Ser. No. 287,074, Dec. 20, 1984, Pat. No. 4,906,266.

This application Jan. 31, 1990, Ser. No. 472,818

Int. Cl.<sup>5</sup> F25B 9/00

U.S. Cl. 62—6

10 Claims



1. An apparatus for forcing gas into the housing of a refrigeration unit when the refrigeration unit is removed, wherein said housing extends into a cryogenically cooled system and said gas is delivered by said apparatus in predetermined relative



quantities to end surfaces of said housing, said apparatus comprising:

- first and second concentric cylindrical members, the first cylindrical member being of larger radius than said second cylindrical member, said second cylindrical member extending beyond the first cylindrical member away from the opening of the housing into a region of the housing of different temperature than the region into which the first cylindrical member extends; and
- a pressurized source of heated gas with an output attached to the cylindrical members, the cylindrical member conducting the gas to and expelling the gas at opposite ends thereof.

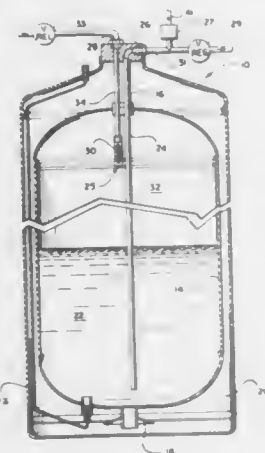
#### 4,956,975 SHUTOFF VALVE FOR CRYOGENIC LIQUID STORAGE TANK

Keith W. Gustafson, Station 1101, Lake Arrowhead, Waleska, Ga. 30183

Filed Aug. 17, 1989, Ser. No. 395,324  
Int. Cl.<sup>5</sup> F17C 13/00

U.S. Cl. 62—50.7

3 Claims



1. In a cryogenic fluid storage tank having an inner vessel for holding a cryogenic fluid in a liquid phase with a gas phase disposed above the liquid phase, an outer vessel with an insulating space between the inner and outer vessels, a sealable access port connected to the inner vessel to provide sealed access from outside the outer vessel to inside the inner vessel, an inlet tube extending from outside the outer vessel through the access port into the inner vessel, and vapor pressure relief means having a pressure relief valve outside the tank connected to a vent tube extending from outside the outer vessel through the access port into the vapor space inside the inner vessel, the improvement comprising an internal pressure relief valve comprising an enclosed housing having a sealing seat at one end attached to the vent tube and having a hole at its other end and a ball confined in the housing wherein the ball's density is greater than the liquid, and the ball's diameter and the inside diameter of the housing are dimensioned so that the momentum of the liquid flowing through the housing is sufficient to drive the ball into engagement with the seat at the top of the housing but the momentum of the gas flowing through the housing is insufficient to drive the ball into engagement with the seat at the top of the housing.

#### 4,956,976 MAGNETIC REFRIGERATION APPARATUS FOR HE II PRODUCTION

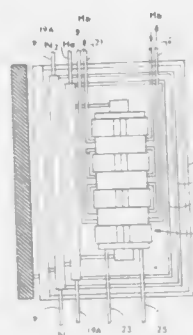
Stephen F. Kral; John A. Barclay; Peter Claybaker, and Steven R. Jaeger, all of Madison, Wis., assignors to Astronautics Corporation of America, Milwaukee, Wis.

Filed Jan. 24, 1990, Ser. No. 469,186

Int. Cl.<sup>5</sup> F25B 19/00

U.S. Cl. 62—51.3

50 Claims



1. Magnetic refrigeration apparatus comprising:
  - (a) magnetic material which exhibits the magnetocaloric effect mounted for movement;
  - (b) means for producing a magnetic field at a position over a portion of the magnetic material such that each point of the magnetic material can be moved into and out of the magnetic field as the material is moved;
  - (c) a high temperature heat exchanger located proximate the portion of the magnetic material in the magnetic field;
  - (d) means for conducting liquid helium through the high temperature heat exchanger;
  - (e) a low temperature heat exchanger located proximate the portion of the magnetic material outside the magnetic field; and,
  - (f) means for conducting He II through the low temperature heat exchanger.

#### 4,956,977 ADSORPTION APPARATUS USED AS AN ELECTRO-HEATING STORAGE

Peter Maier-Laxhuber, Saumweberstrabe 14, D-8000 Munchen 60, and Fritz Kaubek, Gasparistrabe 5 A, D-8000 Munchen 71, both of Fed. Rep. of Germany

Division of Ser. No. 695,484, Jan. 28, 1985, Pat. No. 4,802,341.

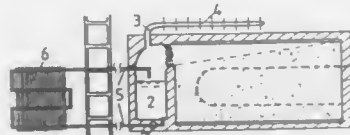
This application Aug. 17, 1988, Ser. No. 233,269

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1984, 3413349

Int. Cl.<sup>5</sup> F25B 17/00

U.S. Cl. 62—106

8 Claims



1. A process for operating a periodic adsorption apparatus for use as an electro-heat storage provided with a heat pumping effect, said periodic adsorption apparatus being characterized by a charge phase and a discharge phase of operation, said process comprising the steps: during said charge phase of operation,

- (a) desorbing water from an adsorption substance contained

- in an adsorption substance container, employing heat produced from a heat producing source so as to produce vapor;
- (b) liquifying said vapor into water using a condenser thereby liberating condensation heat; and
- (c) discharging said condensation heat as operating heat and collecting said water in a collecting container; and during said discharge phase,
- (d) removing heat from said adsorption substance so that thereupon a portion of said water in said collecting container evaporates and is exothermically absorbed in said adsorption substance, while a residual portion of said water remains in said collecting container; and
- (e) pumping said residual portion of water through a heat collector using a pump, so that said residual portion of water in said heat collector absorbs heat from a heat flow presented in a heat exchanging relationship with said heat collector.

#### 4,956,978 TRANSPORT REFRIGERATION APPARATUS HAVING SOUND REDUCTION COVER

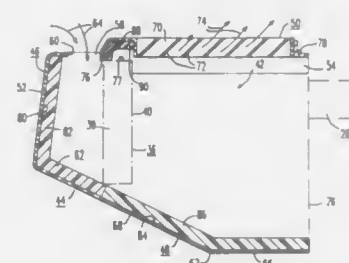
Gregory D. Bleck, Chaska, and Peter B. Allard, Minnetonka, both of Minn., assignors to Thermo King Corporation, Minneapolis, Minn.

Filed Sep. 7, 1989, Ser. No. 404,038

Int. Cl.<sup>5</sup> B60H 1/32

U.S. Cl. 62—239

13 Claims



1. In a transport refrigeration unit having top and bottom portions and side planes therebetween which include a front and first and second sides, a condenser having laterally disposed air intake openings located along a selected side plane of the unit, and a condenser air discharge opening at the top portion of the unit, the improvement comprising:

- a sound reducing cover on said transport refrigeration unit, said sound reducing cover being devoid of openings which emit sound directly outward from the side planes of the unit,
- said sound reducing cover including means for directing air to the laterally disposed air intake openings of the condenser from the top portion of the unit,
- said air intake openings of the condenser being disposed along the front of the unit, with the sound reducing cover including a substantially U-shaped front cover member, and a top cover member,
- said U-shaped front cover member being the means which directs air to the laterally disposed air intake openings of the condenser,
- said U-shaped front cover member including a front portion devoid of openings, and first and second side portions,
- said first and second side portions contacting the first and second sides, respectively, of the transport refrigeration unit,
- said U-shaped front cover member being dimensioned such that the front portion thereof is spaced outwardly from the laterally disposed condenser air intake openings to define a vertically extending condenser air inlet duct having an open upper end and a closed lower end,
- said top cover member extending between the first and second side portions of the U-shaped front cover member

without blocking the open upper end of the condenser air inlet duct,

said top cover member defining a condenser air discharge path having an opening in communication with the condenser air discharge opening at the top portion of the transport refrigeration unit,

whereby air is drawn downwardly through the open upper end of the condenser air inlet duct, through the condenser, and is discharged upwardly through the opening defined by the top cover member.

#### 4,956,979 HEATING AND/OR AIR-CONDITIONING SYSTEM FOR A MOTOR VEHICLE

Hermann Burst, Rutesheim; Klaus-Roger Düwel, Marbach; Ulrich Scheyhing, Winnenden; Walter Pross, Sindelfingen, and Horst Petri, Hemmingen, all of Fed. Rep. of Germany, assignors to Ing. h.c.F. Porsche AG, Fed. Rep. of Germany

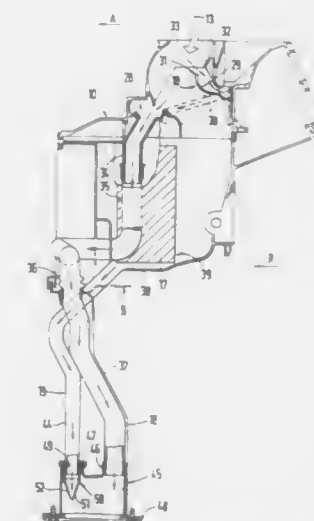
Filed Jul. 31, 1989, Ser. No. 387,532

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1988, 3826021

Int. Cl.<sup>5</sup> B60H 1/32

U.S. Cl. 62—244

13 Claims



1. A heating and/or air-conditioning system for a motor vehicle having a housing containing an evaporator and a fan, having an inflow duct for fresh air, a first drain for the entering rain and washing water, and a second drain for the condensation water forming in the area of the evaporator, the fresh air, by way of an inlet opening arranged adjacent to a windshield, reaching the inflow duct, wherein at least portions of the two drains, at least in sections, are integrated, specifically separately from one another, into the housing of the heating and/or air-conditioning system.

#### 4,956,980 APPARATUS FOR PRODUCING SOFT SERVE DAIRY PRODUCTS, IN PARTICULAR YOGURT

Thomas A. Carvel, Ardsley, N.Y., assignor to Carvel Corporation, Yonkers, N.Y.

Filed Oct. 30, 1989, Ser. No. 429,303

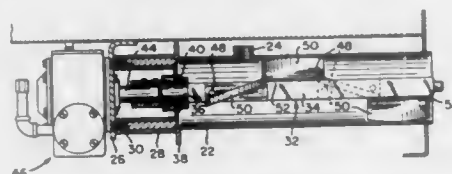
Int. Cl.<sup>5</sup> A23G 9/16

U.S. Cl. 62—342

5 Claims

1. An apparatus for producing soft-serve dairy products, especially yogurt, said apparatus comprising a housing; a freeze barrel mounted in said housing and including a front end, a rear end having a rear end wall, and an inlet spaced about one-fourth of the length of said freeze barrel from said

rear end wall and through which product mix is fed into said freeze barrel; a front plate assembly mounted over said front end of said freeze barrel for dispensing soft frozen product made in said freeze barrel; a beater shaft assembly supported in said freeze barrel for agitating and mixing the product mix and for propelling the product from said inlet to said front end of said freeze barrel; and a drive assembly for driving said beater shaft assembly, said beater shaft assembly including a shaft having a square cross-section and a longitudinal axis, four pairs of spaced pins projecting successively radially from four faces of said shaft, respectively, and extending along said shaft in a form of a spiral, and four blade elements supported on said four pairs of pins, respectively, with each blade element having a unidirectional spirally-curved longitudinal outer surface, said pairs of pins being arranged along said shaft with a first pin of a first pair of pins being spaced from said rear end wall about half-distance between said rear end wall and said inlet and with



a first pin of third and fourth pairs of pins being spaced beyond a second pin of a preceding pair of pins in a direction of propelling of the product mix, each of said blade elements having a base and a fin projecting from said base and defining said unidirectional spirally-curved outer surface, said base having a substantially rectangular shape defining longitudinal and transverse edges of said base, and two spaced openings for engaging a respective pair of pins, said transverse edges being spaced from respective axes of said openings a distance substantially equal to a diameter of a pin, said fin having opposite outer edges that lie in planes that pass through respective end faces of said base and that extend slightly beyond respective longitudinal edges of said base so that when said four blade elements are mounted on said four pairs of pins, the unidirectional spirally-curved outer surfaces of the second and subsequent blade elements forming almost a perfect continuous spiral formation about said shaft.

**4,956,981**  
**CIRCULAR KNITTING MACHINE WITH MULTIPLE NUMBER OF FEEDS**  
Yukiari Iida, Hyogo, Japan, assignor to Precision Fukuhara Works, Ltd., Hyogo, Japan  
Continuation-in-part of Ser. No. 180,055, Apr. 11, 1988, abandoned. This application Apr. 11, 1989, Ser. No. 336,094  
Int. Cl.<sup>5</sup> D04B 9/38

U.S. Cl. 66—20

2 Claims



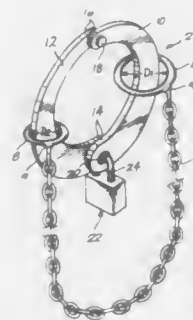
1. In a circular knitting machine including a multiple number of feeds spaced around the machine, and selector means positioned immediately in advance of each of said feeds and being

operable to selectively position dial and cylinder needles in one of four positions, knit, tuck, welt and early withdrawal positions at each of said feeds, the combination therewith of two types of knitting needles, each of said two types of needles including a master butt, a knit selector butt, and a tuck selector butt, stitch cams for engaging said master butt and drawing all of said needles to a stitch forming level immediately following each of said feeds, two tuck selector cams positioned in advance of the position where said needles are drawn to stitch forming level, said tuck selector cams being aligned to engage said tuck selector butts, two knit selector cams aligned to engage said knit selector butts, cylinders mounted for rotation and supporting said tuck and knit selector cams to selectively position the same in operative position, and wherein said knit selector cam cylinders are rotatable to the early withdrawal position to cause dial needles to be moved inwardly at an earlier than normal position to prevent interference with the feeding of yarn to the cylinder needles when forming blister type stitch constructions.

**4,956,982**  
**ANTI-THEFT DEVICE FOR GARMENTS**  
Jana Valley, 2301 Fairview Ave. E., #109, Seattle, Wash. 98102  
Filed Feb. 9, 1990, Ser. No. 477,711  
Int. Cl.<sup>5</sup> E05B 73/00

U.S. Cl. 70—59

3 Claims



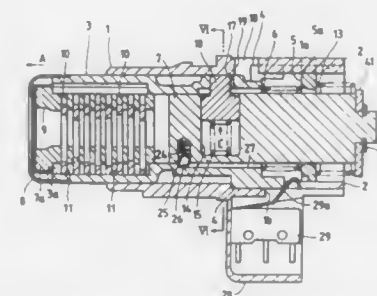
1. An anti-theft device for garments, comprising: a flexible elongated member having opposite ends; first and second rings secured to said opposite ends, respectively; said first ring having a first maximum diameter, and said second ring having a second maximum diameter smaller than said first maximum diameter; and a pair of substantially semicircular jaws; each said jaw having first and second opposite ends and tapering in width from said first end to said second end, said second ends being permanently pivotally connected to each other, and said first ends having lock engaging portions; and said jaws being dimensioned to surroundingly receive an arm of a chair or a closet pole; said first maximum diameter being sufficiently large to permit said first ring to slide over said first ends, and said second maximum diameter being sufficiently large to permit said second ring to slide over said second ends but sufficiently small to prevent said second ring from sliding over said first ends; and said second ring being slidably received onto said jaws; and said device being foldable into a compact configuration to fit into a pocket of a garment.

**4,956,983**  
**LOCKING APPARATUS WITH A KEY**  
Naokatsu Okamura; Noboru Yamaguchi; Shuji Masuda, and Noboru Kanou, all of Aichi, Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan  
Filed Sep. 8, 1989, Ser. No. 404,565  
Claims priority, application Japan, Sep. 22, 1988, 63-124030[U]; Sep. 22, 1988, 63-124031[U]

Int. Cl.<sup>5</sup> E05B 65/19

U.S. Cl. 70—241

10 Claims



1. A locking apparatus with a key, comprising:  
a cylindrical body having an axis;  
a cylindrical operation member mounted inside said body, said operation member being movable along said axis of said body;  
a first spring for producing an elastic force to return said operation member to an original position;  
a key rotor mounted inside said operation member, said key rotor being rotatable with respect to said operation member using said key, said key rotor being movable together with said operation member along said axis with respect to said body;  
a second spring for producing an elastic force to urge said key rotor to rotate to an original position;  
a limiting member provided in said key rotor;  
a third spring for urging said limiting member to project outwardly from said key rotor;  
an engagement portion disposed in said body, said engagement portion being engaged with said limiting member projected outwardly by said third spring when said operation member is pushed inwardly by a predetermined stroke along said axis against said first spring by a manual operation; and  
a disengagement portion provided in said body, said disengagement portion unlocking said limiting member from said engagement portion, thereby returning said operation member and said key rotor to said respective original positions under said elastic forces of said first and second springs, in response to rotation of said key rotor.

**4,956,984**  
**LOCKING DEVICE**  
Lo Chi-Cheng, 8, Alley 158, Sec. 4, Nanking East Rd., Taipei, Taiwan

Filed Dec. 6, 1988, Ser. No. 280,389

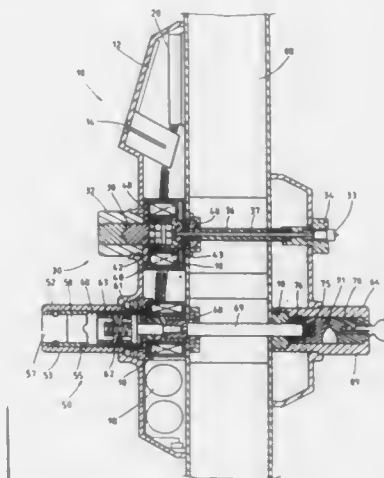
Int. Cl.<sup>5</sup> E05B 47/00

U.S. Cl. 70—277

6 Claims

1. A door locking device comprising:  
a card reader (14) adapted to receive a magnetic card to generate a first control signal; a first magnetic coil (16) operable by the first signal;  
a push button keyboard (12) operable to generate a second control signal;  
a second magnetic coil (18) operable by the second control signal;  
a first rotary latch bolt (36), an external manual operating member (32), a first disengageable clutch means (40,43) operated by said first magnetic coil for transmitting a rotary drive force from said external operating member to

one end of said first latch bolt, and an internal manual operating member (34) drivably connected to the other end of said first latch bolt independent of said external operating member;  
a second rotary latch bolt (69), an external handle (52), a second disengageable clutch means (60, 61) operated by said second magnetic coil for transmitting a drive from

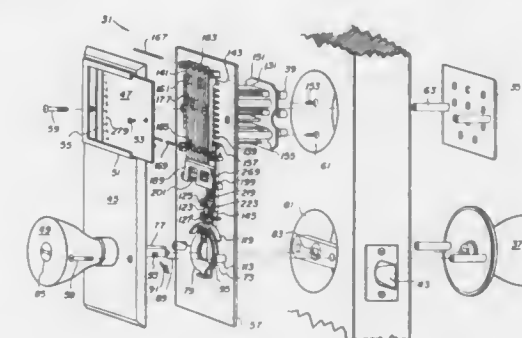


said external handle to one end of said second latch bolt, key-operated means (58) in said external handle for operating said second clutch means independently of said second coil, and internal handle (88), and a second key-operated means (78,71) within said internal handle for transmitting a drive force from said internal handle to the other end of said second latch bolt.

**4,956,985**  
**COMBINATION LOCK MECHANISM AND METHOD**  
Sung B. Kim, 4418 Pickett Rd., Fairfax, Va. 22032  
Filed Apr. 28, 1989, Ser. No. 344,802  
Int. Cl.<sup>5</sup> E05B 37/00

U.S. Cl. 70—313

6 Claims



1. A combination locking apparatus, comprising:  
combination slide means for designating a selected combination digit;  
combination bar means associated with each of said combination slide means for slidably mounting said combination slide means thereon at selected intervals;  
push button means for selectively actuating a combination digit;  
push bar means associated with each of said push button means for transmitting the actuating motion of said push button means to said combination slide means, and succes-



sively incrementing each of said combination slide means and combination bar means to a translated first position; common panel means for engaging and maintaining each of said combination bar means in said first position as successively correct combination digits are selected, said common panel means engaging successively deeper notches in each of said combination bar means to maintain said bars in said first position.

4,956,986

# ROLL FORMING NOTCHES IN A THIN-WALL POWER TRANSMISSION MEMBER

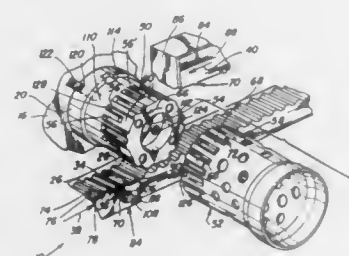
Carl Anderson, Mt. Clemens, Mich., assignor to Anderson-Cook, Inc., Fraser, Mich.

Division of Ser. No. 302,374, Jan. 27, 1989, Pat. No. 4,891,962, which is a division of Ser. No. 263,396, Oct. 27, 1988, Pat. No. 4,882,926, which is a division of Ser. No. 88,696, Aug. 21, 1987, Pat. No. 4,819,468. This application Sep. 13, 1989, Ser. No. 406,455

Int. Cl.<sup>5</sup> B21H 5/00; B21D 28/30

U.S. Cl. 72-71

5 Claims



1. A method for forming notches (72) in a thin-walled annular sleeve portion (58) of a power transmission member (52), said method comprising: rotating the sleeve member (52) mounted on a mandrel (50) between two dies (84) having teeth (36) and roll punching projections (70) extending from the dies (84) to simultaneously form splines (68) in the sleeve member (52) while punching notches (72) through the sleeve member in at least some of the splines (68) as the sleeve member (52) is rotated on the mandrel (50) between the two dies (84).

4,956,987

# ROTARY CUTTER FOR CUTTING A CONTINUOUS CORRUGATED STRIP

Yoshihiro Hara, Nagoya, and Takatoshi Iwase, Anjo, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jul. 25, 1989, Ser. No. 384,483

Claims priority, application Japan, Jul. 27, 1988, 63-187168

Int. Cl.<sup>5</sup> B21D 13/04

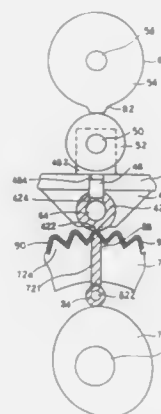
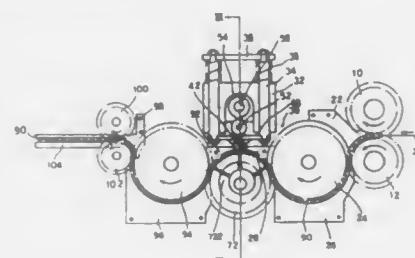
U.S. Cl. 72-185

6 Claims

1. A rotary cutter for cutting a continuous corrugated strip comprising:

- a frame fixed on a stationary plane;
- a toothed counterwheel rotatably supported on the frame and having at least one radial slot extending in the axial direction of the counterwheel;
- a rotating means for rotating the toothed counter wheel;
- a first cutting blade having a first cutting edge at its outer end slidably received in the radial slot in such a manner that the first cutting edge reciprocates between a retracted position in which the first cutting edge substantially is restored in the radial slot and a projected position in which the first cutting edge is radially outwardly projected from the radial slot;
- a first biasing means for biasing the first cutting edge toward the retracted position;
- a second biasing means for biasing the first cutting edge toward the projected position;
- a second cutting blade having a second cutting edge at its

outer end confronting the first cutting edge, the second cutting blade being arranged in such a manner that the second cutting edge is engaged with the first cutting edge when the first cutting blade is in the projected position; a third biasing means for biasing the second cutting blade toward a cutting position in which the first cutting edge shears the continuous corrugated strip in cooperation with the second cutting edge when the first cutting blade is at the projected position; and



at least one of the first cutting edge and the second cutting edge being inclined to a line which is perpendicular to an advancing direction of the continuous corrugated strip at a certain degree so that a cross point of the first cutting edge and the second cutting edge progresses from one side of the continuous corrugated strip to the other side of the continuous corrugated strip, the first cutting blade being positioned at the projected position and the second cutting blade being positioned at the cutting position until said cross point moves across the full width of the first and the second cutting edge.

4,956,988

# MANDREL ROD FOR PIPE ROLLING MILLS

Francis Fischer, Sins; Jean-Paul Calmes, Grandvaux, and Alain Cron, Hildisrieden, all of Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

Filed Aug. 22, 1989, Ser. No. 396,917

Claims priority, application Switzerland, Aug. 31, 1988, 03254/88

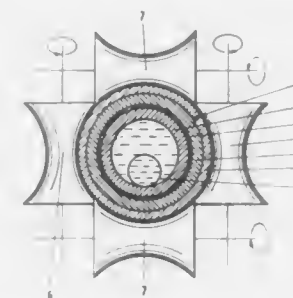
Int. Cl.<sup>5</sup> B21B 25/00, 25/04

U.S. Cl. 72-208

14 Claims

1. Mandrel rod (1) for pipe rolling mills in which hollow billet (5) is rolled on mandrel rod (1), comprising a metallic outer pipe (2) and at least one metallic inner pipe (3) lying inside one another, said outer pipe (2) being separated radially from said at least one inner pipe (3) by a force transmission means consisting essentially of a non-metallic, solid-state mate-

rial (4) that transmits the rolling forces acting on said outer pipe (2) to said at least one inner pipe (3) so that said outer pipe



(2) is braced in a sandwich-like manner by said at least one inner pipe (3).

4,956,989

# METHOD OF FORMING A COLLAR FOR HEATING EXCHANGER FIN AND DIE FOR USE THEREIN

Kazuto Nakajima, Yamatokoriyama, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

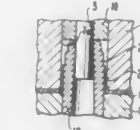
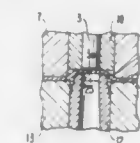
Filed Mar. 30, 1989, Ser. No. 334,886

Claims priority, application Japan, Mar. 31, 1988, 63-80819

Int. Cl.<sup>5</sup> B21D 28/14, 28/26

U.S. Cl. 72-327

5 Claims



1. A method of forming a collar for heat exchanger fins, comprising:

- providing a die set having a forming punch with a central axial punch-through hole therein, a free end with a rounded edge thereon and a guide portion having a plurality of successively larger outer diameter portions in succession from the free end, and a forming die in opposition to said forming punch and having a forming hole therein with an outer end and with a knockout collar slidable in said forming hole and a spring means urging said knockout collar toward the outer end of said forming hole and with a punch-through punch fixed in said knockout collar at a position spaced inwardly from the outer end of said forming hole and fittable into said punch-through hole in said forming punch for punching a hole in a sheet of material; positioning a metal plate in which a collar is to be formed between said forming punch and said forming die and over said punch-through hole;
- bringing said forming punch and said forming die together to move said forming punch into said forming hole and causing said knockout collar to yieldably engage said sheet material for first deforming the metal plate into said

forming hole toward said punch-through punch for starting the formation of the collar;

continuing to move said forming punch and said forming die together to force said free end of said forming punch and said punch-through punch past each other for punching a hole in said deformed portion of said metal plate; and continuing to move said forming punch and said forming die together to move said successive larger diameter portions of said forming punch into said forming hole for forming the desired collar.

4,956,990

# APPARATUS FOR FORMING CAN BODIES

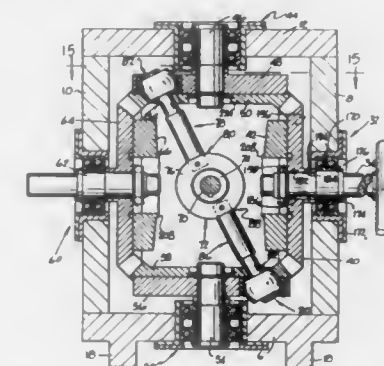
Warren R. Williams, Fort Collins, Colo., assignor to Adolph Coors Company

Filed Sep. 5, 1989, Ser. No. 402,608

Int. Cl.<sup>5</sup> B21D 22/28

U.S. Cl. 72-349

20 Claims



1. Apparatus for forming can blanks into elongated can bodies comprising:

- support structure installed at a fixed location;
- a first gear rotatably mounted on said support structure and having an axis of rotation;
- a second gear rotatably mounted on said support structure and having an axis of rotation which is aligned with said axis of rotation of said first gear;
- drive means for producing counter rotation between said first and second gears;
- at least one can forming and ironing die means supported at a fixed location for use in forming can blanks into elongated can bodies;
- at least one redraw assembly for positioning can blanks to be moved through said at least one can forming and ironing die means;
- a ram mounted on said support structure for reciprocating linear sliding movement with portions thereof moving through said at least one redraw assembly and said at least one can forming and ironing die means to form a can blank into an elongated can body; and
- connecting means for connecting said first and second gears to said ram so that rotation of said first and second gears reciprocates said ram in said linear directions.

4,956,991

# VARIABLE DEPTH COLD WORKING TOOL

Denis E. Noonan, Hicksville, N.Y., assignor to Gramman Aerospace Corporation, Bethpage, N.Y.

Filed Dec. 1, 1989, Ser. No. 445,570

Int. Cl.<sup>5</sup> B21J 13/02; B23P 11/02

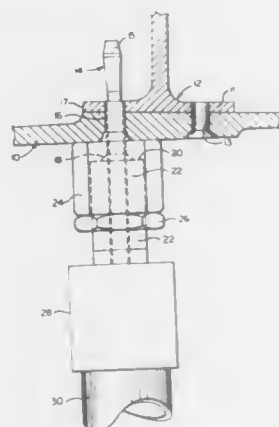
U.S. Cl. 72-370

5 Claims

5. A method for cold working a preselected depth of a hole comprising the steps:

- extending a micrometer anvil to a measured distance beyond

a reference plane equal to the hole depth to be cold worked;  
inserting a mandrel into puller tool;  
sliding a sleeve over the mandrel;  
fixing the protrusion of the sleeve beyond the tool to equal the measured distance;

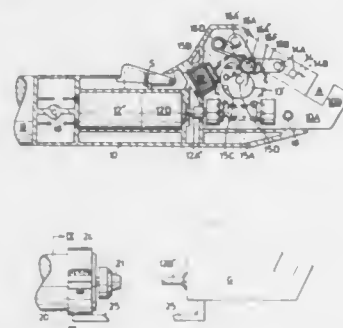


inserting the sleeve bearing mandrel into the hole so that the sleeve extends to the preselected depth;  
pulling the mandrel outwardly thereby causing expansion of the sleeve to cold work the hole; and  
removing the sleeve.

**4,956,992**  
**MANUAL TOOL DRIVABLE BY A ROTARY MOTOR**  
Haas Undin, Åkersberga, Sweden, assignor to C. A. Weidmuller GmbH & Co., Detmold, Fed. Rep. of Germany  
Filed Oct. 10, 1989, Ser. No. 419,113  
Claims priority, application Sweden, Oct. 17, 1988, 8803688  
Int. Cl.<sup>5</sup> B21J 9/18

U.S. Cl. 72-451

20 Claims



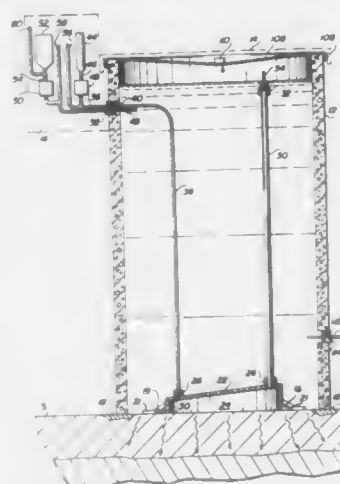
1. A hand tool, drivable by a rotary motor, for treating work pieces by pressure comprising:  
a tool body having a recess adjacent one end thereof, said recess having two sides and adapted to accommodate said work pieces, one of said two sides being disposed closer to said one tool body end and the other of said two sides being disposed farther away from said one tool body end,  
an end support part of the tool body limiting said recess on the one side closer to said one tool body end,  
a stamp member movable in a reciprocating motion toward and away from said end support part and limiting said recess on the other side farther away from said one tool body end,  
said tool body having means defining a rectilinear path for slidably accommodating said stamp member, and

a motor driven force transforming mechanism for driving the stamp member in said reciprocating motion,  
said motor driven force transforming mechanism comprising:  
an input shaft drivable by the motor in rotary motion,  
a cam disc rotatable about an axis parallel with said recess and drivably connected with said input shaft,  
a toggle linkage comprising first and second lever arm elements,  
said first lever arm element having a first end pivotally mounted in said tool body and a second end pivotally attached to said second lever arm element in a fulcrum point,  
said second lever arm element having a first end pivotally attached to the second end of said first lever arm element in said fulcrum point and a second end attached to said stamp member so as to move it in said reciprocating motion, and  
a roller defining a cam follower cooperating with said cam disc mounted in said fulcrum point.

**4,956,993**  
**SOIL INFILTRATOR**  
Marvin R. Mehler, Hutsonville, Ill., assignor to Marathon Oil Company, Findlay, Ohio  
Filed Apr. 25, 1989, Ser. No. 343,101  
Int. Cl.<sup>5</sup> G01N 15/08

U.S. Cl. 73-38

18 Claims



1. An infiltrator useful for field testing soil permeability, comprising:  
a large reservoir having an open bottom resting on the soil;  
a small reservoir having an open bottom resting on the soil, the small reservoir being positioned within the large reservoir;  
the small reservoir comprising a relatively large receptacle adjacent the soil and a relatively small receptacle connected thereto and extending upwardly therefrom;  
the volume of the large reservoir greatly exceeding the volume of the small reservoir;  
the ratio of the upper surface area of liquid in the large reservoir to the surface area of the soil covered thereby greatly exceeding the ratio of the upper surface area of liquid in the relatively small receptacle of the small reservoir to the surface area of the soil covered thereby; and  
means for determining the amount of liquid from the small reservoir permeating into the soil.

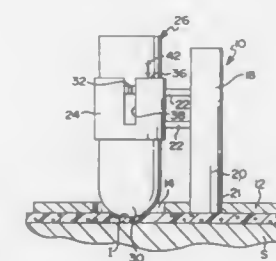
**4,956,994**  
**METHOD AND APPARATUS FOR TESTING THE CURING CHARACTERISTICS OF PLASTICS**  
Ching-Tai Lee, Dover, N.H., assignor to Davidson Textron Inc., Dover, N.H.

Filed Apr. 10, 1989, Ser. No. 335,951

Int. Cl.<sup>5</sup> G01N 3/48

U.S. Cl. 73-81

6 Claims



1. A device for testing the curing characteristics of a test sample of curable thermosetting polymer material comprising:  
a base adapted to be placed on a surface of said test sample of curable thermosetting polymer material during curing thereof; said base having an opening therethrough;  
first support means affixed to said base and extending upwardly therefrom;  
second support means including a guide sleeve affixed to said first support means and extending over said test sample and disposed at a predetermined distance therefrom;  
a plunger slidably mounted within said guide sleeve, coating means on said plunger and said guide sleeve for locating said plunger above said base opening and spaced from the surface of the test sample by supporting said plunger on said guide sleeve for subsequently positioning said plunger in non-impact contact with the surface of said test sample on which said base is supported to effect a finger contact pressure on the plastic material to form a first indentation in the surface of the test sample; said coating means operable to reposition said plunger on said guide sleeve as said base is moved with respect to the surface of the test sample for aligning the plunger and said base opening with the test sample for subsequent non-impact contact with the surface of the test sample for producing a series of indentations in the surface of the test sample during a cure period.

5. A method for determining the curing characteristics of a test sample of a settable polymer material within a selected time period subsequent to the manufacture of said material from mixable components comprising the steps of:

providing a device for applying a non-impact load on a surface of a test sample made from said material including a guide sleeve, a plunger slidably supported in the guide sleeve and coating means for supporting the plunger on the top of the guide sleeve and for hand releasing the plunger for movement against the upper surface of the test sample to emulate finger pressure thereon;  
mixing said mixable components to form a test sample of uncured polymer material having an upper surface;  
applying a given non-impact load to a first point on the upper surface of said test sample of uncured polymer material with the plunger to effect a first indentation in the upper surface of the material as it cures;  
applying said given non-impact load to a second point on the upper surface of said polymer material by hand releasing the plunger to a second point on the upper surface at a selected time after said first indentation has been made to effect a second indentation in the upper surface of said material;  
measuring and recording the depth of the second indentation, subsequently hand releasing the plunger for applying said given non-impact load to a series of other points on

the upper surface of said polymer material each at a different selected time after said first indentation has been made to effect a series of other indentations in said material until the depth of said other indentations in said material until the depth of said other indentations is substantially constant to reflect the cure point of the material, and correlating the cure point of said material with the time elapsed from said mixing of uncured polymer to the production of indentations with the depths thereof of substantially constant value.

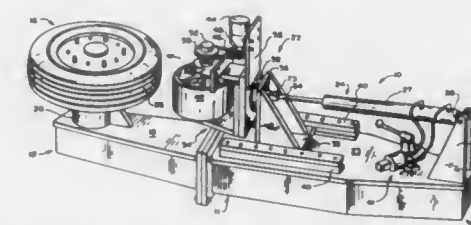
**4,956,995**  
**COMPACT RADIAL FORCE MEASURING APPARATUS FOR DETERMINING VARIATIONS IN RADIAL FORCE AROUND A TIRE AND RIM ASSEMBLY**  
David O. Harrold, and Charles F. Powell, both of Fort Wayne, Ind., assignors to Navistar International Transportation Corp., Chicago, Ill.

Filed Jan. 16, 1990, Ser. No. 465,687

Int. Cl.<sup>5</sup> G01M 17/02

U.S. Cl. 73-146

23 Claims



1. A compact radial force measuring apparatus for use in determining the radial force variation exhibited by a tire and rim assembly of a vehicle wheel comprising:

a base member;  
a rim mounting flange rotatably mounted on said base member for rotation about a fixed axis, said flange being adapted to receive a tire and rim assembly;  
rotatable drum means movably mounted on said base member for selective contact with the circumference of a tire and rim assembly mounted on said flange, said drum means having a diameter less than the diameter of said tire and rim assembly;  
force applying means associated with said rotatable drum means for moving said rotatable drum means against said circumference of said tire and rim assembly, said force applying means being disposed to maintain a constant center-to-center distance between said tire and rim assembly and said rotatable drum means subsequent to the application of an initial predetermined force;  
means for causing relative rotation between said rotatable drum means and said tire and rim assembly; and,  
sensing means for measuring the force existing between said tire and rim assembly and said rotatable drum means at a plurality of points around the circumference of said tire and rim assembly.

**4,956,996**  
**TANK GAUGING APPARATUS AND METHOD**  
Brian G. Morris, Houston, Tex., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation of Ser. No. 217,725, Jul. 11, 1988, abandoned. This application Aug. 18, 1989, Ser. No. 396,726

Int. Cl.<sup>5</sup> G01F 17/00

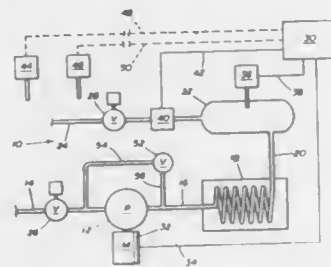
U.S. Cl. 73-149

6 Claims

1. A method of gauging the amount of liquid in a container of liquid and gas in low or zero gravity net conditions, comprising the following steps:



- a. providing a closed fluid system comprising an accumulator for receiving gas removed from said container, a compressor for pumping said gas from said container into the accumulator, and means for selectively connecting the compressor and accumulator to the container;
- b. determining the pressure and temperature of fluid in the container and of gas in the accumulator;
- c. pumping gas from the container into the accumulator;
- d. determining the pressure and temperature of fluid in the container and of gas in the accumulator; and



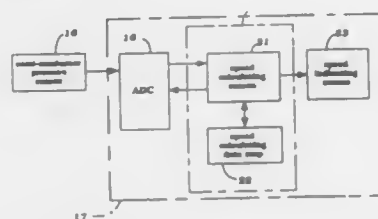
- e. utilizing the pressure and temperature values to determine the volume of gas in the container, and determining the volume of liquid in the container from the difference between the volume of the container and the volume of the gas in the container, whereby the closed system precludes the need of an external gas source, and subsequent volume determinations are made after gas is transferred from the accumulator to the container.

**4,956,997**  
**VESSEL SPEED DETECTING DEVICE**  
 Kazuhiro Nakamura; Tatsuya Yoshioka, both of Hamamatsu; Ryoji Sawada, and Tomoji Nakamura, both of Iwata, all of Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Oct. 14, 1988, Ser. No. 257,707  
 Claims priority, application Japan, Oct. 16, 1987, 62-259564  
 Int. Cl. G01C 21/10

U.S. Cl. 73—182

4 Claims



1. A speed indicator for a watercraft comprising a pressure transducer for experience dynamic water pressure created by the movement of said watercraft in a body of water, processing means for generating a speed indication signal from the output of said pressure transducer, display means for indicating watercraft speed in response to said speed indicator signal, and means for providing a modified speed indication in the event of an abrupt change in watercraft speed.

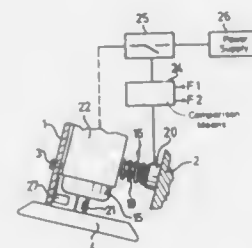
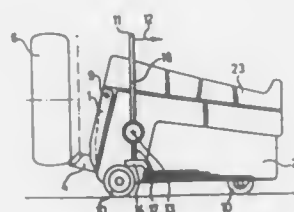
**4,956,998**  
**APPARATUS FOR DRIVING A MOTOR VEHICLE WHEEL FOR DETERMINING UNBALANCE THEREOF**  
 Eickhart Goebel, Pfungstadt, Fed. Rep. of Germany, assignor to Hofmann Werkstatt-Technik GmbH, Pfungstadt, Fed. Rep. of Germany

Filed Aug. 2, 1989, Ser. No. 388,002  
 Claims priority, application Fed. Rep. of Germany, Aug. 24, 1988, 3828724

U.S. Cl. 73—457

Int. Cl. G01M 1/28

12 Claims



1. Apparatus for driving a motor vehicle wheel while it is fitted to the motor vehicle for the purposes of determining unbalance thereof, comprising a drive motor; a friction wheel adapted to be driven by the drive motor; means for pressing the friction wheel against the motor vehicle wheel for driving same at a speed of rotation required for an unbalance measuring operation; and means for switching the drive motor on and off in dependence on the pressure force with which the friction wheel is adapted to be pressed against the motor vehicle wheel, the pressure force being of such a magnitude as to provide for substantially slip-free transmission of torque between the friction wheel and the motor vehicle wheel both when the drive motor is switched on and when it is switched off.

**4,956,999**  
**METHODS AND APPARATUS FOR MONITORING STRUCTURAL MEMBERS SUBJECT TO TRANSIENT LOADS**

William L. Bohannon, Gales Ferry; Harrington, J. Vincent, Groton, both of Conn., and John K. Pfister, Mt. Airy, Md., assignors to GP Taurio, Inc., Columbia, Md.  
 Division of Ser. No. 278,196, Nov. 30, 1988, Pat. No. 4,901,575.  
 This application Oct. 27, 1989, Ser. No. 428,503  
 Int. Cl. G01D 21/00

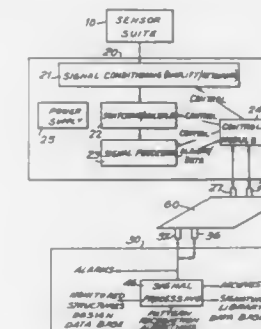
U.S. Cl. 73—587

32 Claims

1. A method of central station monitoring a plurality of structural members remote from the central station for detecting changes in the structural integrity of any of the plurality of structural members, comprising:

- providing each remote structural member with a linear motion sensor for detecting the sonic and infrasonic frequencies transmitted by the structural member along a first linear dimension in response to a transient load applied to the structural member, such frequencies including the natural fundamental and harmonic frequencies of the structural member in response to the transient load, said

linear motion sensor providing a signal corresponding to the detected frequencies in said first linear dimension; and, separately for each of the plurality of structural members, subjecting the structural member to a first transient load; detecting a first signal corresponding to the frequencies transmitted by the structural member along a first linear dimension in response to the first transient load; determining from the first signal a first structural acoustic signature including the detected fundamental and harmonic frequencies subsequent to the first transient load; and thereafter detecting a second signal corresponding to the frequencies transmitted by the structural member along the first linear dimension in response to a subsequent transient load;



- determining from the second signal a second structural acoustic signature including the detected fundamental and harmonic frequencies subsequent to the subsequent transient load;
- comparing the second signature and the first signature to determine whether there has been a change in the detected fundamental or harmonic frequencies subsequent to the transient load from the first signature to the second signature that is greater than a predetermined amount, whereby said change corresponds to a change in structural integrity; and
- providing information to the central station identifying which of the plurality of structural members have undergone a determined change in structural integrity.

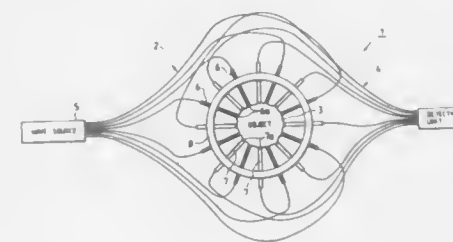
**4,957,000**  
**APPARATUS FOR OBTAINING INFORMATION ON THE INTERIOR OF AN OBJECT**

David T. Delpy; Hideo Hiruma, and Susumu Suzuki, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed Jan. 18, 1989, Ser. No. 298,138  
 Claims priority, application Japan, Jan. 19, 1988, 63-009007  
 Int. Cl. G01N 29/00

U.S. Cl. 73—622

7 Claims



- I. An apparatus for obtaining information on the interior of an object, said apparatus comprising:

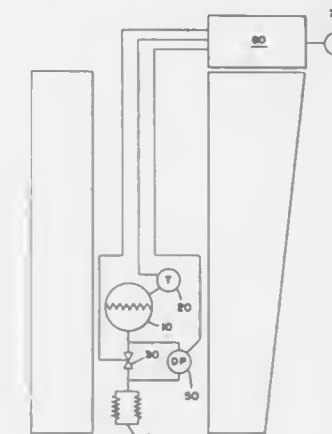
irradiating means for applying an electromagnetic wave to an object being measured;  
 detecting means for detecting the electromagnetic wave passed through and scattered inside the object, said detecting means comprising a plurality of detecting elements for receiving the electromagnetic wave from the object;  
 holding means for supporting said irradiating means and said detecting means in such a manner that said irradiating means and said detecting means are slidable; and  
 position detecting means for detecting the position of said irradiating means and said detecting means with respect to said holding means.

**4,957,001**  
**APPARATUS AND METHOD FOR MEASURING RESERVOIR PRESSURE CHANGES**  
 John M. Powell, Yorba Linda, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jun. 29, 1989, Ser. No. 374,192  
 Int. Cl. G01L 13/02

U.S. Cl. 73—716

6 Claims



1. An apparatus for the accurate measurement of pressure changes comprising:

- (a) a reference accumulator that stores a reference pressure representative of the environment being measured,
- (b) a differential pressure transducer connected to said reference accumulator, wherein said differential pressure transducer measures the difference between the reference pressure and the pressure of the environment being measured,
- (c) a valve connected to said reference accumulator that allows the reference accumulator to be charged to a pressure representative of the environment being measured and provides protection to said differential pressure transducer from overpressuring, and
- (d) an isolation bellows, connected to said valve, for protecting said apparatus from the environment being measured.

**4,957,002**  
**METHOD, SYSTEM AND DEVICE FOR DETERMINING QUALITY OF ASSEMBLY OF TOOL PARTS**

William E. Coyle, Jr., Houma, and Dennis J. Pennison, Raceland, both of La., assignors to Bilco Tools, Inc., Houma, La.

Filed Feb. 27, 1989, Ser. No. 315,830  
 Int. Cl. G01B 7/16

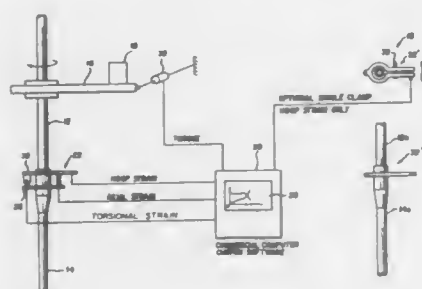
U.S. Cl. 73—761

49 Claims

1. A method for determining the quality of assembly of tool parts, wherein a first tool part is assembled with a second tool part by rotatably inserting the first tool part into the second tool part to form a tool joint, the method comprising the steps of:

- (a) measuring at least one of the rates of rotation of the first

- and second tool parts and the torque imposed on the first and second tool parts to obtain a first set of data;  
(b) measuring at least two of axial strain, torsional strain and



- hoop strain imposed on the tool joint to obtain a second set of data; and  
(c) processing the first and second sets of data to determine the quality of assembly of the tool parts.

**4,957,003**  
**SLOW STRAIN RATE SHEAR STRENGTH TESTER FOR COMPACT**

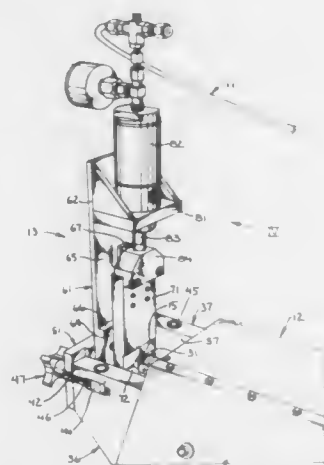
Everett N. Hiestand, Galesburg; Stephen Balog, Kalamazoo, and David D. Gleason, Oshtemo, all of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Sep. 8, 1989, Ser. No. 405,459

Int. Cl.<sup>5</sup> G01N 3/40

U.S. Cl. 73—818

7 Claims



1. A slow strain rate compression tester for measuring a physical characteristic of a large blocklike tablet of compressed particulate material, such as for pharmaceutical applications, said tester comprising: a pressing arrangement including a housing having a generally vertical end wall, a drive motor, and a ram assembly coupled to and driven by said drive motor for linear reciprocating movement relative to said housing along a substantially horizontal movement axis, said ram assembly including a linearly reciprocal ram member which is elongate along said horizontal movement axis and which slidably projects outwardly beyond the end wall of said housing, said ram member having a tablet compression element mounted on a free outer end thereof;

first and second support bracket means fixedly mounted on the end wall of said housing and projecting outwardly therefrom in generally cantilevered relation, said first and second bracket means being sidewardly spaced apart and defining a vertically open region therebetween, said ram member being positioned centrally within said region with

said first and second bracket means being disposed substantially equally horizontally spaced from said ram member on opposite sides thereof;  
each of said bracket means defining thereon an upper inner side surface and a lower inner side surface which are sidewardly spaced apart and are joined together by a generally upwardly facing and substantially horizontally extending steplike surface, the upper inner side surfaces on said first and second bracket means being disposed in directly opposed and parallel relationship, the lower inner side surfaces of said first and second bracket means being disposed in directly opposed and parallel relationship, the transverse horizontal spacing between the opposed lower side surfaces being less than the transverse horizontal spacing between the opposed upper side surfaces;

said first and second bracket means defining thereon outer end surfaces which are sidewardly spaced apart and which are disposed within a generally common vertical plane;

manually-operable clamping means mounted on each of said bracket means and including an elongate member which is coupled to the respective bracket means and which projects outwardly a significant extent beyond the end surface and which mounts thereon a manually movable clamping member; and

a tablet-supporting head assembly removably mounted on said first and second support bracket means and fixedly secured to said bracket means by said clamping means;  
said head assembly including a generally vertically oriented mounting plate extending horizontally between said first and second bracket means and having opposite vertically-extending edge portions which overlap and abut the end surfaces of said first and second bracket means, the edge portions having openings extending therethrough for accommodating the elongate members of the clamping means to permit the mounting plate to be rigidly and fixedly clamped to the end surfaces of the first and second bracket means to close off the outer end of said open region whereby said mounting plate is spaced horizontally outwardly from the end wall of said housing, said mounting plate having guide means fixedly and integrally associated therewith and projecting inwardly therefrom for slidable and abutting engagement with the opposed upper inner surfaces and the steplike surfaces defined on said first and second bracket means;

said head assembly also including tablet support means mounted to said mounting plate and projecting inwardly therefrom into the region between said first and second bracket means, said tablet support means having a pair of tablet engaging members for supporting a tablet so that parallel side faces of the tablet are vertically oriented with one said side face abutting a flat support surface defined on the tablet support means, the other side face being disposed substantially in opposed relation to the tablet compression element and substantially aligned with the horizontal motion axis so as to be contacted by the tablet compression element during extension of the ram member.

**4,957,004**  
**TESTING APPARATUS**

Peter R. McKinlay, and Christos Tseglakoff, both of Victoria, Australia, assignors to Amcor Limited, S. Melbourne, Australia

Filed Jun. 19, 1989, Ser. No. 367,803

Claims priority, application Australia, Jun. 23, 1988, PI8941

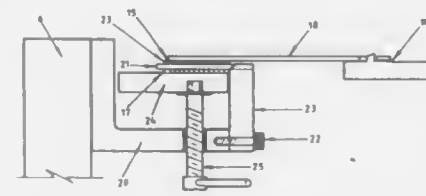
Int. Cl.<sup>5</sup> G01N 3/24

U.S. Cl. 73—842

4 Claims

1. In corrugated paperboard which comprises a corrugated medium with flutes held between a first liner and a second liner, a system for testing the strength of the adhesive bond between said corrugated medium and one first liner, comprising a load measuring device and a load applying device, gripping means connected to said load measuring device for clamp-

ing said medium of a sample of said corrugated paperboard, said gripping means comprising a plate and a plurality of prongs adapted to lie within the flutes of the corrugated me-



**4,957,005**

**CORIOLIS-TYPE FLOWMETER**

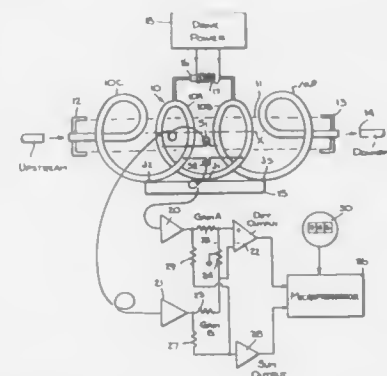
John Yard, Doylestown, and Warren O. Strohmeler, Warminster, both of Pa., assignors to Fischer & Porter Company, Warminster, Pa.

Filed Oct. 5, 1989, Ser. No. 417,692

Int. Cl.<sup>5</sup> G01F 1/84

U.S. Cl. 73—861.38

11 Claims



1. A mass flowmeter of the Coriolis-type comprising:  
(a) a flow tube helically coiled to define a helix having a pair of adjacent identical measuring loops forming a double loop, on either side of which is an isolation loop;  
(b) a support structure coaxial with the helix having at one end a flow inlet to which is affixed an input to one of said isolation loops to which a fluid to be metered is admitted, and having at its other end a flow outlet to which is affixed an output from the other isolation loop from which the fluid is discharged;  
(c) a rigid bar joined to the junction of the measuring loops as well as to the respective junctions of each measuring loop and its associated isolation loop whereby the isolation loops then behave as decoupling springs to effectively isolate the bar and the double loop from external forces;  
(d) means to excite the measuring loops to cause them to vibrate in phase opposition as the tines of a tuning fork, the fluid passing through these loops being subjected to Coriolis forces causing the vibrating loops to torsionally oscillate; and  
(e) means to sense the torsional oscillations to produce signals indicative of the mass flow of the signal.

**4,957,006**

**MULTIPLE ORIFICE FLOW MEASURING DEVICE**

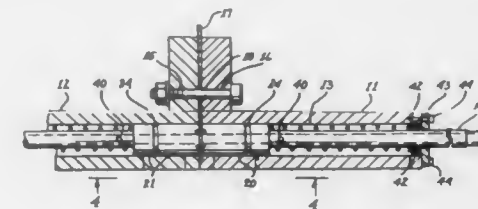
James B. Harter, 1502 W. Broadway, Phoenix, Ariz. 85041

Filed Nov. 27, 1989, Ser. No. 441,766

Int. Cl.<sup>5</sup> G01F 1/42

U.S. Cl. 73—861.62

15 Claims



1. A multiple orifice flow measuring device comprising:  
a. a housing having a central passage and a shaft passage located above and parallel to the central passage;  
b. a pipe located in the central passage, the pipe adapted to be connected to a gas flow line;  
c. a shaft mounted in the shaft passage;  
d. a disk rotatably mounted on the shaft and having a plurality of orifices of various diameters spaced circumferentially about the disk and selectively registerable in the flow passage of the pipe;  
e. a piston movably positioned around the pipe in the central passage and positioned against the disk, the piston having an annular recess; and  
f. a spring located in the central passage between the piston and the end of the housing opposite the disk so that the spring forces the piston against the disk, thereby maintaining it in position;  
g. means for applying force to compress said spring and move said piston away from said disk, said force means extending from outside the housing into the piston annular recess.

**4,957,007**

**BI-DIRECTIONAL PRESSURE SENSING PROBE**

Lewis Gray, Winter Springs, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

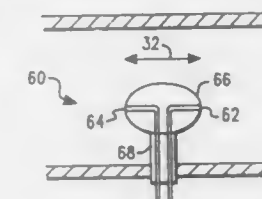
Continuation-in-part of Ser. No. 187,137, Apr. 28, 1988,

abandoned. This application Apr. 12, 1989, Ser. No. 337,075

Int. Cl.<sup>5</sup> G01F 1/46

U.S. Cl. 73—861.65

4 Claims



1. A bi-directional pressure sensing probe sensing fluid flow, comprising:  
a first orifice facing into the flow;  
a second orifice facing away from the flow; and  
a probe body comprising:  
differential means for maximizing a pressure differential between said first and second orifices and comprising said probe body having an ellipsoidal shape; and  
positioning means for positioning said first and second orifices in a laminar region of the flow, said positioning means comprising:  
first and second streamlined stems; and  
first and second pressure sensing tubes attached to and suspending said body away from said stems.



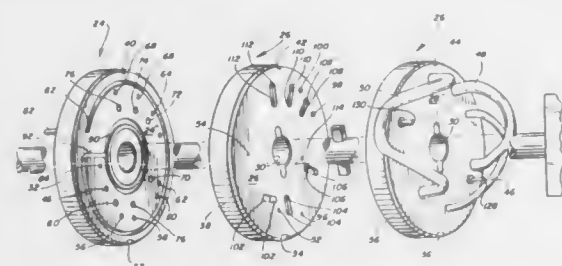
4,957,008  
**FLUID SAMPLING AND TRANSFER VALVE ASSEMBLY**  
 Oscar Proni; Ervin Fayer, both of Hollywood, and George G. Dominick, Miramar, all of Fla., assignors to Coulter Electronics, Inc., Hialeah, Fla.

Filed Dec. 28, 1988, Ser. No. 290,963

Int. Cl.<sup>5</sup> G01N 1/10

U.S. Cl. 73—864.83

12 Claims



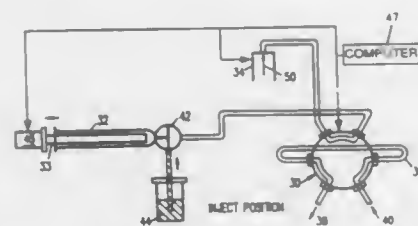
1. A liquid sampling, metering and transfer valve assembly for use in diluting apparatus of the type employed in a particle study system, the valve assembly being capable of providing plural precise liquid sample volumes from a single liquid source, said valve assembly including internal segmenting passageways for measuring, isolating and storing precise liquid sample aliquots therein, means for delivering each aliquot to different locations exterior of said valve assembly along with respective precise volumes of liquid diluent as individual dilutions, each dilution being of predetermined concentrations and loop means integral with said valve assembly for measuring, isolating and storing each of said precise volumes of liquid diluent as individual volumes for delivery to each respective one of said aliquots as said individual dilutions.

4,957,009  
**PUSHLOOP LIQUID SAMPLING METHOD**  
 Andre Nohl, Sunnyvale, and Landy B. White, Sunol, both of Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.  
 Continuation of Ser. No. 248,832, Sep. 23, 1988, abandoned. This application Jan. 11, 1990, Ser. No. 467,299

Int. Cl.<sup>5</sup> G01N 1/14

U.S. Cl. 73—864.84

13 Claims



1. A method of transferring a liquid sample from a reservoir to an analytical column by means of a valve having a body and having at least two position comprising the steps of: drawing the sample from the reservoir through a needle; passing the sample from the needle through the valve in a first direction with the valve in a first position; switching the valve to a second position; passing only a portion of the sample into the valve in a second direction; and then injecting the portion of sample into the column; wherein at all times the needle is stationary relative to the body of the valve.

4,957,010  
**METHOD AND APPARATUS FOR DETERMINING PARTICLE SIZE DISTRIBUTION**  
 Paul C. Cirignano, Braintree, Mass., assignor to W. R. Grace & Co.-Conn., Lexington, Mass.

Filed Jul. 25, 1989, Ser. No. 384,942

Int. Cl.<sup>5</sup> G01N 15/02

U.S. Cl. 73—865.5

7 Claims



1. Apparatus for determining the particle size distribution of lightweight polymer material, said apparatus comprising chamber means for initially containing said material, said chamber means being in communication with chamber gas supply means so as to create in said chamber means a downward draft; material agitation means disposed in said chamber means for agitating said material, said material agitation means comprising a flexible tube in communication with material agitation gas supply means, said gas supply means supplying gas to said tube so as to cause said tube to move randomly in said chamber and agitate said material; filtering means in communication with said chamber means for classifying said material according to size; and receptacle means in communication with said filtering means for receiving gas and material passing through said filtering means.

4,957,011  
**WEATHERING TESTING SYSTEM**  
 James V. Huber, Oak Park; Kurt P. Scott, Chicago, and Rudolph J. Leber, Palatine, all of Ill., assignors to Atlas Electric Devices Co., Chicago, Ill.  
 Continuation of Ser. No. 131,221, Dec. 10, 1987, Pat. No. 4,843,893.

This application May 1, 1989, Ser. No. 345,658  
 The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

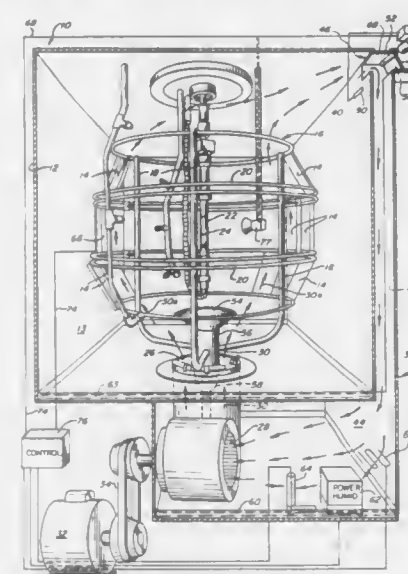
Int. Cl.<sup>5</sup> G01N 25/00

U.S. Cl. 73—865.6

13 Claims

1. In a weathering testing system which comprises rack means for carrying samples to be tested, means for irradiating the inner-facing surfaces of said samples carried on said rack, and blower means for directing a stream of air through said rack, the improvement comprising, in combination: said system carrying temperature sensing means comprising a first temperature sensor positioned to be irradiated by said irradiating means and a second temperature sensor positioned to be less influenced by radiation from said irradiating means than said first temperature sensor, said temperature sensors being positioned in said stream of air, said first temperature sensor being in electrical connection with first automatic control means for the air flow, said first automatic control means being operably connected to said blower means, whereby the output of said

blower means, is selectively adjusted responsive to the temperature sensed at said first sensor, the second temperature sensor



being in electrical connection with second automatic control means for regulating a fresh air supply.

4,957,012  
**PREDICTIVE AGING OF POLYMERS**  
 Edward F. Cuddihy, Tujunga, and Paul B. Willis, La Canada, both of, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jun. 16, 1989, Ser. No. 366,957

Int. Cl.<sup>5</sup> G01N 21/00, 25/00

U.S. Cl. 73—866

20 Claims



1. A method of predicting the aging of polymers exposed to solar radiation in the outdoors comprising the steps of:

- Placing a specimen of a polymers to be tested on a heatable platen assembly;
- Disposing the platen assembly in an outdoor environment during periods of sunlight alternating with periods of dark such that the polymer specimen is exposed to and receives solar radiation from the sun during periods of sunlight;
- Periodically heating the platen assembly only during said periods of sunlight to a constant temperature from between 30° C. up to 20° C. below the melting temperature of the polymer being tested to periodically heat the polymer specimen while it is exposed to sunlight;
- Measuring a physical property of the polymer specimen over an induction period from the initial disposition of the polymer specimen outdoors until a sudden change in said physical property; and
- recording said induction period.

4,957,013  
**SPINDLE DRIVE FOR A COORDINATE MEASURING MACHINE**

Heinz Broghammer, Zimmern, and Gerhard Band, Oberndorf, both of Fed. Rep. of Germany, assignors to Mauser-Werke Oberndorf GmbH, Fed. Rep. of Germany

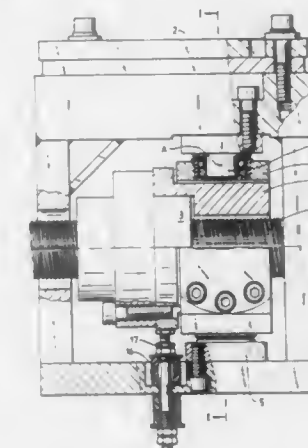
Filed Aug. 15, 1989, Ser. No. 393,995

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1988, 3830526

Int. Cl.<sup>5</sup> F16H 25/24

U.S. Cl. 74—89.15

5 Claims



1. A spindle drive for a coordinate measuring machine; comprising a driven threaded spindle having an axis, a spindle nut being seated on said spindle and fastened in a receiving member; a retaining component connected with said driven threaded spindle through a plurality of compensating means so as to facilitate a radial compensating play relative to the spindle axis and a compensating of wobbling movements of the spindle between said receiving member and retaining component; a spacer ring intermediate said receiving member and said retaining component; said compensating means connecting said spacer ring with said receiving member to facilitate a compensating play in a first perpendicular direction relative to the spindle axis; second compensating means connecting said spacer ring with the retaining component to facilitate a compensating play in a second direction perpendicular to the spindle axis and to the first perpendicular direction, and said first and second compensating means each include at least one cylindrical carrier trunnion; a ball bearing ring for guiding each trunnion in, respectively, said first or second direction and free from play along the direction of the spindle axis, the axes of the carrier trunnions and the ball bearing rings extending in, respectively, the first and second direction and intersecting the spindle axis at a common point.

4,957,014  
**CABLE DRIVE GEOMETRY**  
 Edward F. Burke, Lake Oswego, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 10, 1989, Ser. No. 335,359

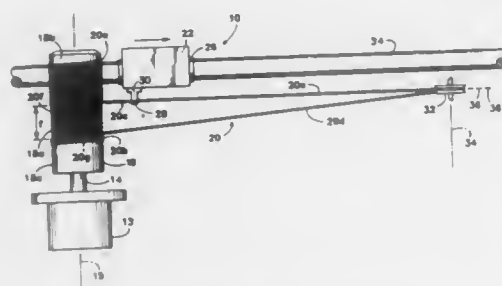
Int. Cl.<sup>5</sup> F16H 19/06

U.S. Cl. 74—89.22

9 Claims

1. Fixed length cable drive apparatus for moving a mass along a predetermined mass path comprising: guide means comparable to a mass for maintaining the mass on the mass path during movement; fixed length cable means comprising first and second cable portions, with each portion having two ends, one end of each cable portion being attached to the guide means; first and second reel means rotatable about respective axes of rotation and being attached to the other end of a respec-

tive one of the first and second cable portion during movement of the mass along the path;  
pulley means fixed relative to the reel means for carrying one of the cable portions; and  
drive means for rotating the first and second reel means about the respective axes of rotation, and thereby moving a mass coupled to the guide means along the mass path;



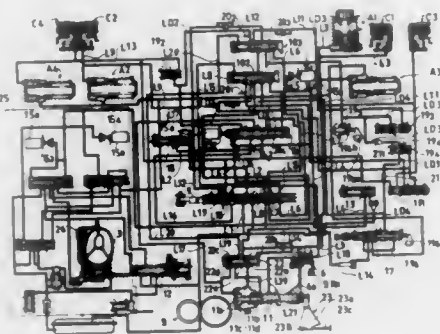
said cable means, reel means, and pulley means being arranged to provide a desired tensile preload in said cable means; and  
the first and second reel means, pulley means and guide means defining a cable travel path of substantially uniform length for all positions of the mass along the mass path, thereby maintaining the desired tensile preload in said cable means during movement of the mass along the mass path.

**4,957,015**  
**HOLDING MEANS AND BINDING MEANS FOR SELECTOR GEAR SERVO VALVE IN A HYDRAULIC TRANSMISSION**

Ketichi Ishikawa, Utsunomiya, and Sboji Asatsuke, Takanezawa, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 14, 1988, Ser. No. 244,224  
Claims priority, application Japan, Sep. 17, 1987, 62-230999; Sep. 17, 1987, 62-231000

Int. Cl.<sup>5</sup> B60K 20/14, 41/10  
U.S. Cl. 74—335 6 Claims



1. A control apparatus for a hydraulically operated vehicular transmission comprising a plurality of forward transmission trains which are established respectively by individual hydraulic clutches; a reverse transmission train which shares for common use a hydraulic clutch with a predetermined first one of the forward transmission trains; a selector device sleeve which is switchable to a forward side in which said predetermined first forward transmission train is established and to a reverse side in which said reverse transmission train is established; and a hydraulic circuit including a manual valve for switching over the transmission between a forward position, a reverse position, a neutral position and a parking position, a

servo valve for forward/reverse switchover connected to the selector device sleeve so that, when the manual valve provided in said hydraulic circuit is operated for switchover to a reverse position, the servo valve may be pushed by hydraulic pressure to a reverse location at which the selector device sleeve is set to the reverse side and at the same time oil may be supplied to the hydraulic clutch for said predetermined first transmission train, a holding means for holding the servo valve in the reverse location so that, when the manual valve is switched over from the reverse position to the neutral or parking position, the servo valve may be held in the reverse location and, when the manual valve is switched over to the forward position, the servo valve may be pushed by the hydraulic pressure to the forward location at which the selector device sleeve is set to the forward side, and a binding means for, when the manual valve is operated for switchover to the forward position, binding the servo valve to remain in the reverse location by shutting out inputting of the hydraulic pressure into the servo valve until a hydraulic clutch for a second transmission train attains a predetermined level of the hydraulic pressure, said second transmission train being, among the forward transmission trains, the very one to which supplying of the oil is started right with said switchover of the manual valve.

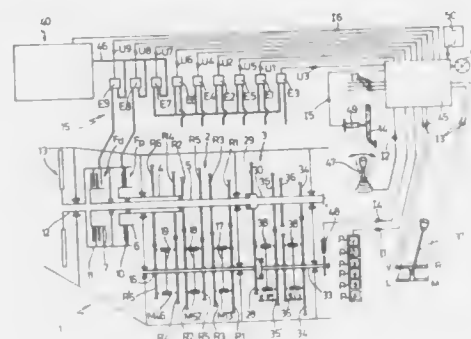
**4,957,016**  
**VEHICLE TRANSMISSION, PARTICULARLY FOR AN AGRICULTURAL TRACTOR**

Giuseppe Amedei, Modena, and Angelo Rondelli, Cento, both of Italy, assignors to Fiatgeotech - Technologie Per La Terra S.p.A., Modena, Italy

Continuation of Ser. No. 359,211, May 31, 1989, abandoned. This application Mar. 22, 1990, Ser. No. 497,832

Claims priority, application Italy, May 31, 1988, 67501 A/88 Int. Cl.<sup>5</sup> B60K 20/14, 20/16

U.S. Cl. 74—336 R 11 Claims



1. A vehicle transmission, particularly for an agricultural tractor, comprising an input shaft at least a first stage having two drive shafts selectively connectable to said input shaft via respective first hydraulic clutch means, an output shaft angularly connectable to each said drive shaft via a number of transmission ratios defined by respective constant mesh gears, and second selective clutch means for each pair of adjacent said gears, operated by respective three-position hydraulic actuators; and control means for controlling said first clutch means and said hydraulic actuators; characterised by the fact that said control means comprise two on-off solenoid valves (E1, E3, E5, E2; E4, E6) for each said hydraulic actuator (A13, A52, A46), each designed to control engagement of a respective transmission ratio; two proportional-response solenoid valves (E8, E9) for engaging and releasing respective said first clutch means (Fp, Fd) on said drive shafts (4, 5); at least a third proportional-response solenoid valve (E7) for regulating supply pressure to said on-off solenoid valves (E1, . . . E6); and a control unit (45) designed to control said solenoid valves (E1, . . . E9) in such a manner as to engage and release said first and

second clutch means (Fp, Fd; M13, M52, M46) according to predetermined laws depending on the service condition of said vehicle.

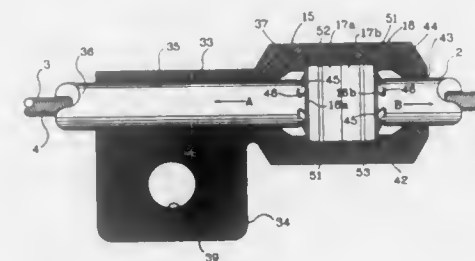
**4,957,017**  
**ASSEMBLY AND METHOD FOR THE ADJUSTMENT OF A CABLE CASING**

Christopher H. Corbett, Bolivar, Ohio, assignor to Flex Technologies, Inc., Midvale, Ohio

Filed Apr. 12, 1989, Ser. No. 336,738

Int. Cl.<sup>5</sup> F16C 1/10

U.S. Cl. 74—502.4 10 Claims



1. An improved assembly for the adjustment of a casing of the type having a cable slideably mounted therein, wherein said cable extends between and operatively connects a pair of movable members, said assembly including, first and second mounting means for attaching the casing at spaced locations generally adjacent to the movable members, said first mounting means movably mounting a first end of the casing, and said second mounting means immovably mounting a second end of the casing; gripping means including a plurality of tangs spaced circumferentially about and gripping the casing mounted in the first mounting means for permitting movement of the movable first end of the casing in a first direction and for restraining movement of said casing in a second direction opposite to said first direction, so that upon movement of one of the movable members in a predetermined direction the movable first end of the casing moves in the first direction to remote slack from the casing, and is retained in an adjusted position and restrained from moving in the second direction by the gangs of the gripping means; lock means movably mounted on the casing adjacent to and spaced from the first mounting means for restraining post-adjustment movement of said casing in the first direction, so that upon manual movement of the lock means into abutment with the first mounting means after movement of the casing to the adjusted position, said casing subsequently is restrained from additional movement in the first direction.

**4,957,018**  
**MECHANISM FOR SELECTIVELY LOCKING AND UNLOCKING A TRANSLATABLE SHAFT**

Antoni F. Jakubiec, San Mateo, and Thomas M. Daley, San Jose, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

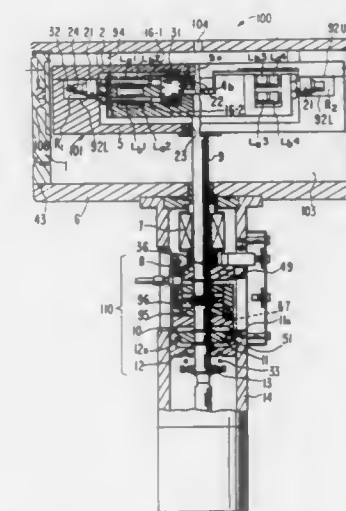
Continuation of Ser. No. 326,398, Mar. 2, 1989, Pat. No. 4,903,937. This application Feb. 26, 1990, Ser. No. 484,951

Int. Cl.<sup>5</sup> G05G 5/06

U.S. Cl. 74—531 22 Claims

1. A mechanism for selectively locking and unlocking a translatable shaft comprising a spring mechanism concentric with the shaft, a member fixed to the shaft, said member having an inclined surface, a wall concentric with the shaft, a set of balls, an assembly for the balls, the balls and assembly being translatable together with respect to the shaft and the inclined surface between a first position where the balls are jammed between the inclined surface and the wall by the spring mechanism exerting a first force in a first direction along the shaft axis against the inclined surface and a second position where the balls are not in contact with the inclined surface, the shaft

being in locked and unlocked conditions while the balls and assembly are respectively in the first and second positions, and means for selectively exerting a second force against the assembly in a second direction, the second force being greater than



the first force applied to the balls and assembly so the assembly and balls are driven by the second force to cause the balls to be driven to the second position, the first and second directions being opposite to each other along the direction of the shaft axis.

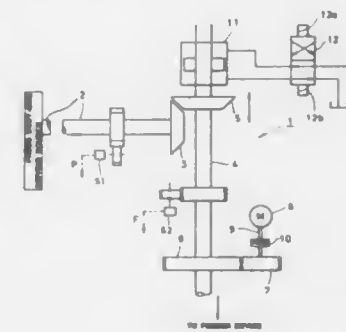
**4,957,019**  
**POWER TRANSMISSION DEVICE OF A PRESS MACHINE**

Kazuo Kubo, Ishikawa, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

PCT No. PCT/JP88/00433, § 371 Date Dec. 22, 1988, § 102(e) Date Dec. 22, 1988, PCT Pub. No. WO88/08342, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 28, 1988, Ser. No. 339,821  
Claims priority, application Japan, Apr. 28, 1987, 62-105586 Int. Cl.<sup>5</sup> F16H 3/22, 37/06

U.S. Cl. 74—665 H 16 Claims



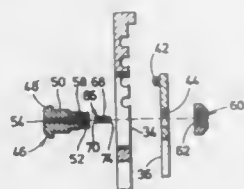
1. A power transmission device of a press machine comprising:

- a power transmission mechanism for coupling a press-side output shaft connected to a press body-side driving source and a power-delivering shaft connected to a feeder device, and transmitting the power of the press body-side driving source to the feeder device via said press-side output shaft and power-delivering shaft;
- a motor for transmitting power to said power-delivering shaft through a course which is different from said power



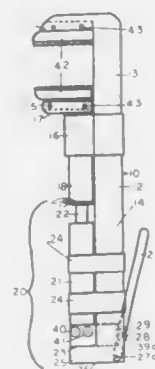
transmission mechanism, and driving the feeder device independently of the press body-side driving source; interrupting means for interrupting the power transmission by said power transmission mechanism; first detection means for detecting the rotating position of said press-side output shaft; second detection means for detecting the rotating position of said power-delivering shaft; and control means for receiving detected values of said first and second detection means when an instruction for coupling said power transmission mechanism is received from a switch, and rotating said power-delivering shaft in the forward or reverse direction by driving said motor so that a difference between said detected values enters within a predetermined range, and coupling said power-delivering shaft to the press-side output shaft by driving said interrupting means when said difference enters within said range.

4,957,030  
**ADJUSTABLE PLIER**  
Arthur Monceret, Rt. 5, Box 126, Killen, Ala. 35645  
Filed Oct. 10, 1989, Ser. No. 419,321  
Int. Cl.<sup>5</sup> B25B 7/04, 7/06  
U.S. Cl. 81—414



1. Pliers having a pair of crossed members with a pivotal joint between members comprising:  
A bore in one member, a slot in the other member and a pivot member slidably received within said bore and said slot whereby one member may move relative to the other member lengthwise of the slot and with jaws on each member; said pivotal joint comprising an arcuate circular rib cross sectioned on one said member and a plurality of open-ended circular cross sectioned grooves on the other said member extending crosswise of the slot, the said grooves being centered on the center line of the slot, said rib being receivable in any one of said grooves to provide a connection between the members carrying the working pressure of the jaws, the said rib and the said groove in which the said rib is received having surfaces engaging under working pressure of substantially the same radius causing the engaging surfaces to remain engaged under working pressure; said pivot member having a bore along its longitudinal axis with a head at one end, external thread into at the other end and said bore having internal threads; a screw having external threads along its longitudinal axis threadably received within said bore, said screw positioned with an aperture toward said head of said pivot member, and a cap having an aperture at one end and closed on the other end, said cap being threadably received over said pivot member at its threaded end.

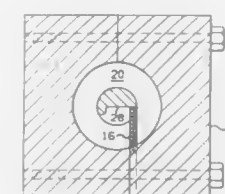
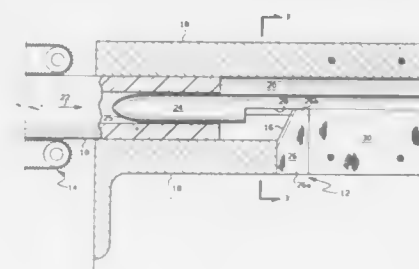
4,957,021  
**SELF-CONTAINED, HAND-HELD HYDRAULIC CLAMP/WRENCH**  
Darion L. Helton, 12421 I Whisper Hollow Dr., Maryland Heights, Mo. 63043  
Filed May 23, 1989, Ser. No. 355,469  
Int. Cl.<sup>5</sup> B25B 13/12  
U.S. Cl. 81—57.44



1. In an improved self-contained, hand-held hydraulic clamp/wrench having a main wrench body, a fixed jaw integral with an extending from said main wrench body, a lower, horizontal extension on said main wrench body, a movable jaw slidably connected to said main wrench body, said slidable jaw having a lower, vertically movable extension adapted to be driven by a hydraulic drive assembly, the improvement consisting of:

- a completely self-contained, separable hydraulic drive assembly disposed adjacent, and removably secured to said main wrench body, said hydraulic drive assembly comprising in combination:
  - (1) a cylindrical housing defining a fluid reservoir and an integral hydraulic pump cylinder at the lower end of said housing, said housing having a vertical opening in the upper end and also having a check valve at the lower end of the housing;
  - (2) a hydraulic cylinder integral with said housing, said hydraulic cylinder being disposed axially inside and completely surrounded by the fluid reservoir, said hydraulic cylinder having a pressure relief valve communicating with said fluid reservoir, and also having a spring biased ball check valve axially disposed at its lower end;
  - (3) a pump cylinder integral with said housing and disposed with its long axis perpendicular to the vertical axis of said housing, said pump cylinder communicating with said fluid reservoir through a normally open ball check valve, and with said hydraulic cylinder through a normally closed ball check valve;
  - (4) a pump piston rod slidably disposed in the pump cylinder, said pump piston rod having actuating means connected to its outer end to cause it to draw hydraulic fluid from the fluid reservoir on its outward stroke and to inject the hydraulic fluid under pressure into the hydraulic cylinder on its inward stroke;
  - (5) a piston disposed in the hydraulic cylinder which moves vertically upward in response to actuation of the hydraulic pump and consequent increase in hydraulic fluid in the hydraulic cylinder;
  - (6) a piston rod connected to the upper end of said piston, and extending axially out the upper end of the cylindrical housing through the vertical opening therein, said piston rod being urged into contact with the lower vertical extension of the movable jaw to urge the movable jaw towards the fixed jaw upon manual actuation of the hydraulic pump piston rod.

4,957,022  
**PIPE SLITTER**  
Michael R. Harris, Plano, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.  
Filed Mar. 3, 1989, Ser. No. 319,014  
Int. Cl.<sup>5</sup> B26D 3/08  
U.S. Cl. 83—16

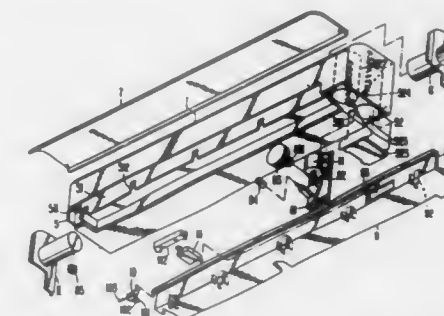


10. A method comprising the steps of:  
positioning a mandrel, having a cylindrical portion and a tapered leading edge, in alignment with a longitudinal axis of a bore through a supporting frame;  
positioning the cutting edge of a knife member so as to traverse a portion of the bore from the mandrel to the supporting frame, the cutting edge facing the entrance end of the bore, and being positioned non-radially with respect to the bore;  
inserting the tapered leading edge of the mandrel into an inner diameter of a tubular piece, having an inner diameter and an outer diameter, as the tubular piece advances through the bore in the supporting frame; and  
feeding the tubular piece through the bore of the supporting frame whereby the tubular piece is centered in the bore of said frame by said mandrel and is cut by the cutting edge of the knife member.

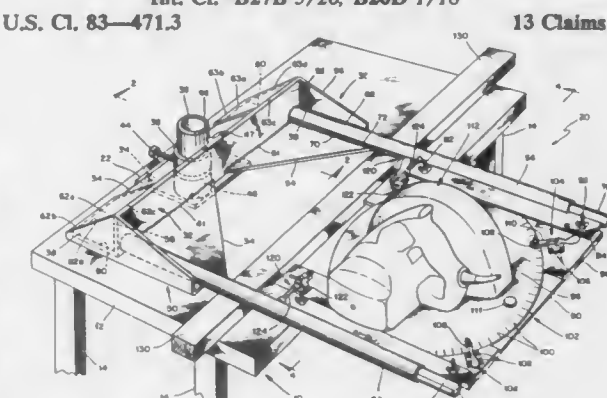
4,957,023  
**WRAP DISPENSER WITH AUTOMATIC CUTTING DEVICE**  
Stephen Chen, No. 53, Lane 536, Chang Tsao Road, Changhua, Taiwan  
Filed Apr. 27, 1989, Ser. No. 343,702  
Int. Cl.<sup>5</sup> B26D 5/38  
U.S. Cl. 83—372

1. An improved plastic wrap dispenser having an automatic cutting device disposed thereon comprising:  
a housing having an upper reception room which permits the location of a pair of roll supporting members disposed on the opposite ends thereof so that a roll of the wrap can be housed in said upper reception room;  
an openable upper cover disposed on top of said housing with the wrap extended outward therethrough;  
an elongate trough disposed at the lower portion of said housing, which is associated with a bottom cover, one end of said trough extending to communicate with a mounting seat disposed at one side of said housing;  
a power transmission mechanism disposed within said mounting seat;

a cutting blade mount slidably moved within said trough in back and forth manner with a blade mounted thereon;  
a limiting switch engaged with an operation button extended out of the front edge of said bottom cover, permitting a downward pulled and tensioned plastic wrap to abut thereagainst for control operation;  
a partition board to divide said mounting seat into two portions in one of which a number of batteries are housed with a cap removably attached thereon;



4,957,024  
**SAW MOUNT FOR USE ON A CONVENTIONAL WORKSHOP TABLE**  
James O. Albrecht, 4701 Aberdeen Rd., Mound, Minn. 55364  
Continuation of Ser. No. 81,604, Aug. 13, 1987, abandoned, which is a continuation of Ser. No. 766,680, Aug. 19, 1985, abandoned, which is a continuation of Ser. No. 440,450, Nov. 10, 1982, abandoned, which is a continuation-in-part of Ser. No. 177,215, Aug. 11, 1980, abandoned. This application Mar. 9, 1989, Ser. No. 320,781  
Int. Cl.<sup>5</sup> B27B 5/20; B26D 1/18  
U.S. Cl. 83—471.3



1. A saw mount comprising:  
a support member;  
a base plate for attachment to a workshop table and a vertical post extending upwardly from said base plate;  
said support member including an angle member having a vertical flange, a horizontal flange with a collar member thereon to be movably disposed on said vertical post;  
means for holding said angle member in a spaced position from the base plate;

a pair of parallel elongated tubular rails, each having one end attached to and extending perpendicular from the vertical flange on said support member;  
a turntable assembly for mounting a circular saw thereon; and  
elongated generally U-shaped members slidably received in said rails for constraining and carrying said turntable assembly for rectilinear parallel movement with respect to said rails in a direction toward and away from said support member.

4,957,025

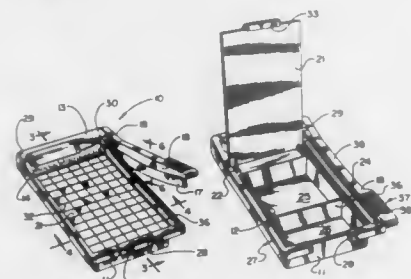
## PAPER TRIMMER

Steven J. Bemo, c/o Ideal School Supply Corp., 2245 Delany Rd., Waukegan, Ill. 60087

Filed Mar. 22, 1989, Ser. No. 326,914  
Int. Cl.<sup>5</sup> B26D 5/10

U.S. Cl. 83—607

19 Claims



1. A paper trimmer comprising:

- a base having a front portion defining a first upwardly opening recess, a rear portion defining a second upwardly opening recess, and an edge portion;
- a cover removably overlying said first recess;
- a fixed cutter blade on said base edge portion defining a top surface and an outer, first, cutting edge; and
- a movable cutter blade pivotally mounted to said base and defining a lower, second cutting edge arranged to cut paper extending outwardly from said top surface of said fixed cutter blade.

4,957,026

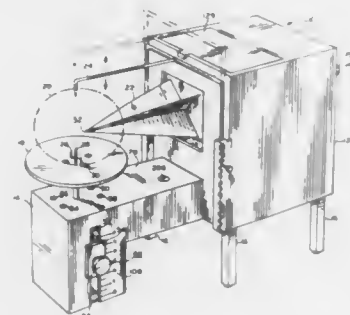
## FOOD PREPARATION APPLIANCE FOR SCULPTURING FRUITS AND VEGETABLES

Jack R. Butterbaugh, 3213 S. Parnell, Apt. 2R, Chicago, Ill. 60616

Filed Sep. 22, 1989, Ser. No. 411,047  
Int. Cl.<sup>5</sup> B26D 3/26

U.S. Cl. 83—870

32 Claims



1. A food preparation mechanism comprising:  
a housing,

a food support member supported by said housing, said food

support member including a holding mean for retaining a food product, on said food support member,  
a food cutting assembly supported by said housing,  
an adjusting means supported by said housing, said adjusting means being effective to adjust the relative positions in which said food support member and said food cutting assembly are supported with respect to each other by said housing,  
a reciprocating means supported by said housing, said reciprocating means being effective to provide reciprocating movement with respect to each other of said food support member and said food cutting assembly,  
a drive train mounted on said housing, said drive train being responsive to said reciprocating movement to change the position of said food support member with respect to said food cutting assembly,

whereby reciprocating movement of said food cutting assembly causes a predetermined change in the position of said food support member with respect to said food cutting assembly, such that with each successive reciprocating movement toward each other of said food support member and said food cutting assembly, said food cutting assembly engages and cuts the food product in successive predetermined positions so as to form a continuous cut in said food product.

4,957,027

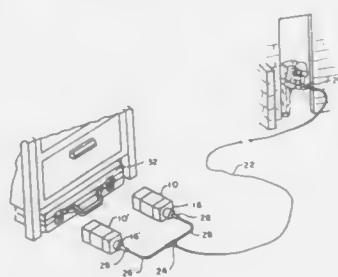
## VERSATILE NONELECTRIC DEARMER

Christopher R. Cherry, La Plata, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 2, 1989, Ser. No. 415,758  
Int. Cl.<sup>5</sup> F41A 19/57

U.S. Cl. 89—1.14

19 Claims



1. A versatile dearmer using small arms cartridges comprising:

- a barrel having a receiver sized to receive a small arms cartridge and a muzzle end; and
- a housing to stabilize and hold said barrel in stable firing position; and
- a mechanical firing circuit comprising of a piston shaped on one end as a firing pin slidably mounted in a tubular guide operatively positioned to fire a small arms cartridge loaded in the receiving end of said barrel; and
- an unspecified length of shock tube to initiate movement of the piston in said mechanical firing circuit; and
- an initiator to initiate energy transfer in said unspecified length of shock tube.

4,957,028

## RAMMER FOR ARTILLERY SHELLS

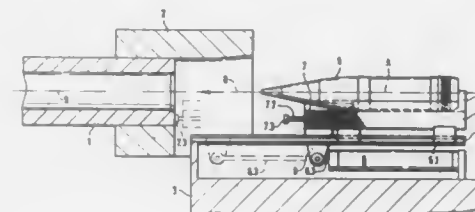
Karl Lieberum, Nledenstein; Werner Hofmeister, Reinhardtshagen, and Peter Grunewald, Fuldabruck, all of Fed. Rep. of Germany, assignors to Firma Wegmann & Co. GmbH, Kassel, Fed. Rep. of Germany

Filed Jul. 14, 1989, Ser. No. 380,928  
Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825662

Int. Cl.<sup>5</sup> F41A 9/44

U.S. Cl. 89—47

7 Claims



1. A rammer for artillery shells having a carriage behind a gun tube for supporting a tray in alignment with a powder chamber, means disposed at a rear end of the tray to intercept a shell of the artillery shells, means mounting the rammer for movement on slides along a track paralleling an axis of the tube, a piston-and-cylinder drive mechanism coupled to the rammer to accelerate same toward the tube, and braking means to brake the rammer at a prescribed distance from a rear end of the tube, wherein the braking means has a shock absorber positioned in a longitudinal midplane of the carriage comprising a cylinder with a friction spring therein and a piston in the cylinder that moves against a force of the friction spring inside the cylinder and having a piston rod projecting forward from the cylinder beyond a front portion of the carriage with a stop mounted on the piston rod and resting directly against said rear end of the tube when the carriage is in a forward and braked position, wherein the friction spring converts at least  $\frac{1}{3}$  of the kinetic energy of the carriage by way of friction into heat, with a remaining  $\frac{2}{3}$  of the kinetic energy used to return the carriage to its starting position and another shock absorber for absorbing any excess energy.

4,957,029

## ACTION FOR A WIND INSTRUMENT

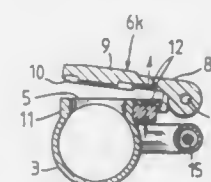
Matti Kähönen, Porvoonkatu 37 A 4, 00520 Helsinki, Finland  
PCT No. PCT/FI88/00089, § 371 Date Mar. 1, 1989, § 102(e)  
Date Mar. 1, 1989, PCT Pub. No. WO88/09987, PCT Pub. Date Dec. 15, 1988

PCT Filed Jun. 8, 1988, Ser. No. 314,068

Claims priority, application Finland, Jun. 8, 1987, 872562  
Int. Cl.<sup>5</sup> G10D 7/02

U.S. Cl. 84—384

7 Claims



1. An action for a wind instrument having a body (3, 4) with holes (5) therein, comprising:  
keys (6) turnable relative to the body (3, 4) so as to selectively open and close the holes (5) to produce notes of different pitch; and  
two magnets (12) associated with each of said keys (6) so as to return each key (6) to an initial position after actuation

of the key (6) ceases, a first of said two magnets being disposed on each of said keys (6) and a second of said two magnets being disposed on said body (3, 4).

4,957,030

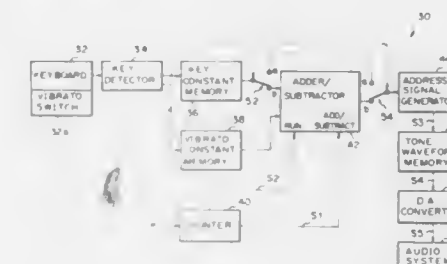
## ELECTRONIC MUSICAL INSTRUMENT HAVING A VIBRATO EFFECTING CAPABILITY

Isao Suzuki, Toyohashi, Japan, assignor to Kawai Musical Instruments Mfg. Co., Ltd., Japan

Filed May 23, 1989, Ser. No. 355,555  
Claims priority, application Japan, May 26, 1988, 63-129066  
Int. Cl.<sup>5</sup> G10H 1/02, 7/06

U.S. Cl. 84—604

1 Claim



1. An electronic musical instrument capable of effecting vibratos with a tone being produced, comprising:

- a keyboard having a vibrato switch;
- key detecting means for detecting a key on said keyboard which is pressed down;
- key constant storing means storing predetermined key constants each being associated with respective one of tones which may be produced by said instrument;
- address signal generating means for generating an address signal by performing, every predetermined period of time, an arithmetic operation with the key constant associated with the key which is pressed;
- tone waveform storing means storing amplitudes of a tone waveform each being associated with respective one of a plurality of sampling points, in the form of digital values; digital-to-analog converting means for sequentially converting the digital amplitudes read out of said tone waveform storing means in response to the address signals into an analog tone signal;
- counting means for counting clock pulses which begin to appear when a power supply of said instrument is turned on;
- vibrato constant storing means storing vibrato constant each being associated with respective one of the keys on said keyboard; and
- adding and subtracting means for, when said vibrato switch is pressed, periodically performing addition and subtraction with the key constant and vibrato constant in response to an addition/subtraction switchover signal and an addition/subtraction execution control signal which are constituted by an output of said counting means.

4,957,031

## AUTOMATIC MUSIC PLAYING APPARATUS HAVING PLURAL TONE GENERATING CHANNELS SEPARATELY ASSIGNABLE TO THE PARTS OF A MUSICAL PIECE

Masao Kondo, and Yasunao Abe, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Jan. 4, 1989, Ser. No. 293,375  
Claims priority, application Japan, Jan. 6, 1988, 63-1081  
Int. Cl.<sup>5</sup> G10H 1/38, 7/00

U.S. Cl. 84—613

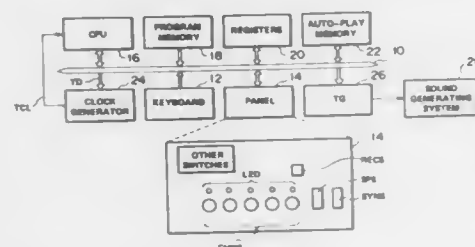
11 Claims

1. An automatic music playing apparatus, capable of gener-



ating a musical tone to be assigned for at least one of a melody part, chord part, and bass part of a musical piece, comprising:

- (a) tone generating means having a plurality of tone generating channels for generating musical tone signals in response to music playing information;
- (b) input means for inputting music playing information;
- (c) memory means for storing music playing information, said memory means having plural storage areas with each storage area corresponding to a tone generating channel;

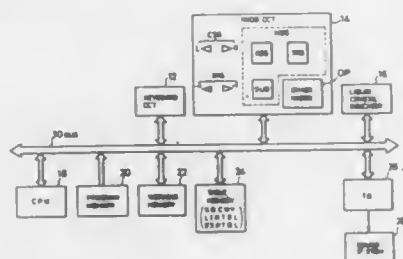


- (d) means for detecting an amount of data stored in a storage area of said memory means;
- (e) channel number designation means for separately designating a desired number of tone generating channels of the tone generating means for each part of the musical piece; and
- (f) assignment means for assigning music playing information to at least one of the storage areas based on a data amount detected by said means for detecting.

**4,957,032**  
**APPARATUS FOR REALIZING VARIABLE KEY SCALING IN ELECTRONIC MUSICAL INSTRUMENT**  
 Katsuhiko Hirano, Masahiko Koike, and Hiroyuki Toda, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Nov. 24, 1987, Ser. No. 124,915  
 Int. Cl.<sup>5</sup> G10H 7/00, 5/00  
 U.S. Cl. 84—622

10 Claims



1. A key scaling apparatus for an electronic musical instrument, comprising:

- a keyboard having a plurality of keys representing a plurality of notes, respectively, said notes being sectioned into at least three note groups each consisting of at least one note;
- a memory unit having a plurality of memory areas associated with each of said notes or note groups;
- manipulator knob means for producing musical tone preparing instruction signals determining characteristics of a musical tone to be produced;
- registering means for writing, in said plural memory areas corresponding to a desired note or note group designated by an operated key of the keyboard, the instruction signals produced by the manipulator knob means;
- reading-out means for reading out, when a performance mode is designated, from the concerned memory areas

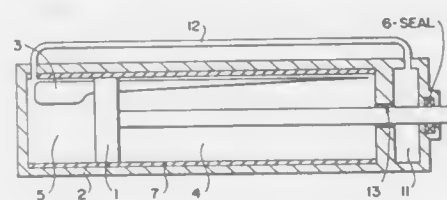
corresponding to the note or note group representing said operated key; and

control means for controlling, based on the instruction signals supplied from said reading-out means, the characteristics of a musical tone intended to be produced.

**4,957,033**  
**DEVICE FOR SEALING THE MOBILE ELEMENTS OF AN ARTILLERY RECOIL BRAKE**  
 Dominique Relange, 30, rue Henri Boyer, F-18000 Bourges, France

Filed Jun. 23, 1989, Ser. No. 371,558  
 Claims priority, application France, Jun. 30, 1988, 88 08804  
 Int. Cl.<sup>5</sup> F41A 25/02  
 U.S. Cl. 89—43.01

9 Claims



1. A sealing device between a piston rod and a cylinder of an artillery recoil brake, wherein the recoil brake comprises a cylinder containing a fluid, a piston slidably mounted in said cylinder, a piston rod connected to said piston, a low-pressure chamber and high-pressure chamber, said chambers being defined by portions of said cylinder and having variable volumes determined by the position of said piston within said cylinder, said sealing device comprising:

- a medium-pressure chamber defined by said cylinder and separated from said high-pressure chamber by a partition, said partition having a bore formed therethrough which allows said piston rod to pass through said partition;
- a substantially annular channel formed between and defined by said bore and said piston rod;
- a pipe which provides communication between said medium-pressure chamber and said low-pressure chamber, said pipe having a greater cross-sectional area than that of said annular channel, wherein fluid gathered in said medium-pressure chamber flows toward said low-pressure chamber through said pipe; and
- a seal fixed in an end wall of said cylinder which defines an end wall of said medium-pressure chamber, said seal being in fluid-contact with said piston rod which protrudes from said cylinder through said end wall.

**4,957,034**  
**CANDY CANE CONFIGURATION FOR MODULAR ARMOR UNIT**  
 Server Tasdemiroglu, Oakland, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 15, 1989, Ser. No. 451,064  
 Int. Cl.<sup>5</sup> F41H 5/04

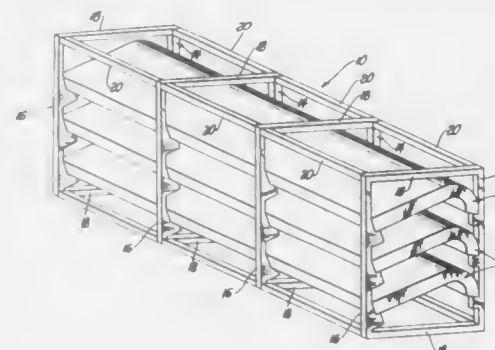
U.S. Cl. 89—36.02

11 Claims

1. A modular armor structure for attachment to a military vehicle wherein the vehicle has a top, a bottom, and sides connecting the top and bottom, the modular armor being attached to one of the sides and comprising:

- a frame;
- a horizontal reference plane passing through the frame;
- a plurality of vertically spaced internal beams mounted inside the frame and extended along the side of the vehicle, the internal beams having an outboard portion more distal from the side of the vehicle than an inboard portion of the internal beams, the outboard portions having wide

straight cross sections which are parallel with one another and which are oblique to the horizontal reference plane, the inboard portions of the internal beams having arcuate cross sections whose radial thickness is approximately equal to a cross sectional thickness of the outboard portions, the arcuate cross section defining an inside curve



whose radius of curvature is approximately equal to one-half the distance between straight cross sections, the angular dimension of the arcuate cross section being between 90 degrees and 150 degrees;

wherein the minimum sum of the average arc length of the arcuate cross section and width of the straight cross section is approximated by the formula

$$b_0 = \frac{6M}{G h^2 g}$$

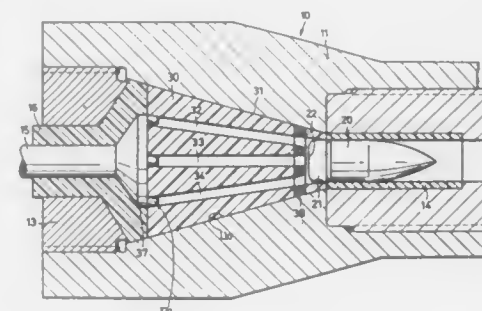
where  $b_0$  is the minimum sum,  $M$  is the desired moment of resistance of the internal beam,  $G$  is the yield strength of a metal from which the internal beam is made,  $h$  is the thickness of the outboard portion of the internal beam, and  $g$  is a constant number.

**4,957,035**  
**ELECTROTHERMAL ACCELERATION DEVICE**  
 Armin Eskam, Langenfeld; Günter Frye, Erkrath, and Herbert Krumm, Kaarst, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany  
 Filed Apr. 12, 1989, Ser. No. 337,047  
 Claims priority, application Fed. Rep. of Germany, Apr. 28, 1988, 3814330

U.S. Cl. 89—8

Int. Cl.<sup>5</sup> F41B 6/00

12 Claims



1. An electrothermal acceleration device for accelerating projectiles, comprising:

a housing having a breechblock at one end, an open end

opposite said one end and a space between said one end and said open end; and

a plasma burner/projectile unit removably disposed in said housing, including

- a projectile to be accelerated, said projectile being disposed in said space, and
- a plasma burner at said one end, said plasma burner having at least two plasma channels formed therein;

said plasma burner including

- first and second spaced apart electrodes,
- means for electrically insulating said at least two plasma channels from each other and from said housing, said at least two plasma channels extending from said first electrode to said second electrode, said first electrode being disc shaped, being fixed at a frontal portion of said plasma burner, and having passage means therein through which said at least two plasma channels communicate with said space, and

means for generating an electric arc extending through said at least two plasma channels from said first electrode to said second electrode to produce and heat a plasma in said at least two plasma channels which accelerates the projectile from said space toward said open end of said housing;

said projectile being removably mounted to a front end of said plasma burner, wherein said passage means comprises bores in said disk-shaped electrode respectively aligned with said at least two plasma channels so that the inner peripheral surfaces of the bores define ring electrodes corresponding to the respective plasma channels, said at least two plasma channels communicating with said space through the respective aligned bores.

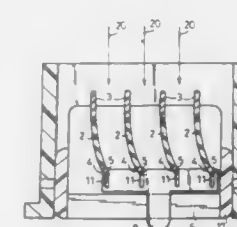
**4,957,036**  
**GRILLES FOR AIR CONDITIONER**  
 Kazuo Fujihara, and Takahiro Komori, both of Inazawa, Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasuga, Japan  
 Filed Jul. 18, 1989, Ser. No. 381,318

Claims priority, application Japan, Jul. 27, 1988, 63-99692[U]; Oct. 28, 1988, 63-141824[U]; Nov. 8, 1988, 63-145804[U]; Jan. 23, 1989, 1-6164[U]

U.S. Cl. 98—2

Int. Cl.<sup>5</sup> B60H 1/34

13 Claims



1. A grille for air conditioning comprising:

a main body portion having an opening for blowing out a wind;

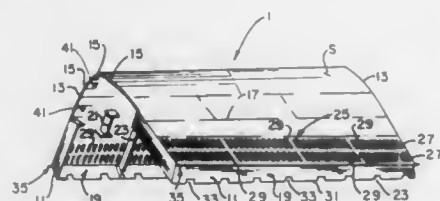
- a plurality of reinforcing plates each said plate having a longitudinal axis, a proximal edge located at a downstream side of the wind and a distal edge located at an upstream side of the wind, said reinforcing plates being connected at each longitudinal end thereof between opposing walls of said main body portion so that said reinforcing plates are disposed in parallel spaced relation, said reinforcing plates being disposed so that the edges thereof extend in a substantially intersecting direction with a blowing direction of the wind;

a plurality of flexible wind deflecting plates, each said flexible wind deflecting plate having a longitudinal axis, a proximal edge located at a downstream side of the wind and a distal edge located at an upstream side of the wind, said distal edge of each said flexible wind deflecting plate

being connected to the proximal edge of a respective said reinforcing plate so that the longitudinal axis of each said flexible wind deflecting plate is substantially parallel to the longitudinal axis of said respective reinforcing plates; a plurality of front wind deflecting plates mounted to said main body so as to be disposed downstream of said flexible wind deflecting plates, each said wind deflecting plate having a longitudinal axis disposed substantially perpendicular to said longitudinal axis of said flexible deflecting plates; and an operating piece slidably supported by one of said front wind deflecting plates, said operating piece having an upstream portion and a downstream portion, said upstream portion of said operating piece having grooves defined therein, each said groove engaging a center of said downstream edge of a said flexible wind deflecting plate, the engaged portions of said flexible wind deflecting plates being movable within said grooves.

**4,957,037**  
**ROOF RIDGE VENTILATOR**  
Robert A. Tabbering, and Bruce D. Carter, both of St. Louis County, Mo., assignors to Greenstreak Plastics Products Co., Kirkwood, Mo.

Filed Jun. 12, 1989, Ser. No. 364,144  
Int. Cl.<sup>5</sup> F24F 7/02  
U.S. Cl. 98—42.21 24 Claims

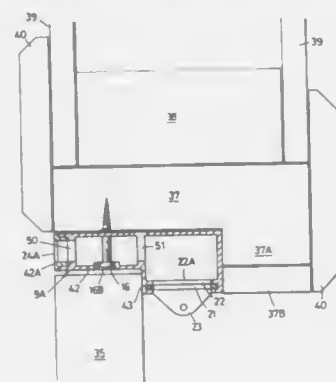


9. In a roof ridge ventilator for an open roof ridge including an elongated base sheet member extending over and mounted to sloping roof surfaces on both sides of said open roof ridge, the improvement comprising: a pair of end walls attached to said base member and extending both generally parallel to said open roof ridge while also extending generally transverse to said base sheet member, a series of upwardly facing vents provided in said base sheet member in the vicinity of and along each end wall for ventilating air from beneath the roof through the open roof ridge and then through the upwardly facing vents to atmosphere, and an air deflector extending between each end wall and the upwardly facing vents in said base sheet member positioned to direct wind and wind driven water flowing upwardly along a sloping roof surface to follow a path above and over the upwardly facing vents while also creating a negative pressure differential above the upwardly facing vents to assist in ventilating air beneath the roof, each air deflector being angularly offset outwardly both with respect to said base sheet member and its associated end wall.

**4,957,038**  
**VENTILATION DEVICE**  
John G. Hamilton, 95 Warrender Park Rd., Edinburgh, Scotland EH9 1EW  
Continuation of Ser. No. 318,646, Mar. 3, 1989, abandoned. This application Nov. 3, 1989, Ser. No. 432,315  
Int. Cl.<sup>5</sup> E06B 7/02

U.S. Cl. 98—87 12 Claims  
1. A ventilation device for use at a door, comprising an elongate member adapted to serve as part of a side frame structure of a doorway, said elongate member comprising a box structure which is L-shaped in transverse cross-section, the box-structure being adapted such that the shorter leg projects laterally so as an overhang a door and serve as a stop

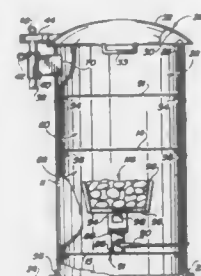
for the door, an air conduit being defined between spaced walls of the box structure for through passage of ventilating air, said elongate structure including an inlet port to said conduit and a discharge port from the conduit, one of said ports being lo-



cated in the shorter leg of the box structure such that said one port faces downwardly, and a reinforcing structure extends between the spaced wall portions of the box structure in said shorter leg, said reinforcing structure defining openings for passage of air via said one port in the shorter leg.

**4,957,039**  
**FIVE IN ONE COOKER**  
Clyde L. Reyes, 515 E. Tennessee, Midland, Tex. 79701  
Filed Jan. 17, 1990, Ser. No. 466,185  
Int. Cl.<sup>5</sup> A47J 37/00

U.S. Cl. 99—340 12 Claims



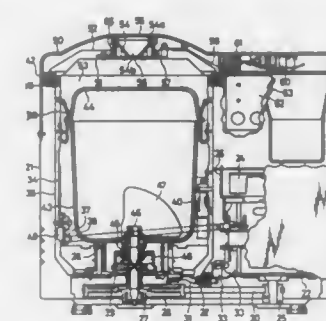
1. A combination fajitas cooker and barbecue grill apparatus comprising an upwardly opening chamber having a lower end opposed to an upper end, a support base at said lower end, heating means supported within said chamber, a grill, means supporting said grill within said chamber in spaced relationship respective to said upper and said lower end, and a closure member attached to said upper end; said closure member is in the form of a dome having a circumferentially extending peripheral edge portion from which said closure member upwardly slopes to form the dome when in one operative position and which can be inverted to form a frying pan within which fajitas can be cooked; support means by which said closure member is supported by said chamber and by which said closure member can be selectively elevated above said upper end and thereby form an adjustable flue by which the escape of heat from the interior of said chamber can be controlled; said support means further enables said closure member to be pivoted in a horizontal plane whereby said closure member can be pivoted towards and away from the longitudinal vertical axis of said chamber, said support means further pivotally supports said closure means for rotation about a horizontal axis whereby the

closure member can be rotated from a dome configuration into a frying pan configuration; whereby: food can be cooked in said pan while other food is simultaneously supported on said grill, and said pan can be elevated above said upper end to control the heat received from said heating means, and said pan can be pivoted away from said chamber and rotated to pour the contents thereof out of the pan, and said closure member can be rotated from a pan configuration into a dome configuration and lowered to close the upper end of said chamber.

**4,957,040**  
**APPARATUS FOR MAKING BREAD**  
Hirofumi Nakakura, Osaka; Morio Shibata, Amagasaki; Haruo Ishikawa, Kawanishi; Akihisa Nakano; Hiromi Hirota, both of Osaka, and Hajime Oyabu, Kawanishi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan  
Division of Ser. No. 64,253, Jun. 19, 1987, Pat. No. 4,885,176.

This application Aug. 24, 1989, Ser. No. 397,943  
Claims priority, application Japan, Jun. 20, 1986, 61-145127; Jun. 24, 1986, 61-147319; Dec. 18, 1986, 61-300037; Dec. 18, 1986, 61-300041; Dec. 20, 1986, 61-305117; Dec. 23, 1986, 61-305518; Dec. 24, 1986, 61-306212; Dec. 26, 1986, 61-315762; Dec. 26, 1986, 61-315763; Jan. 30, 1987, 62-20806  
Int. Cl.<sup>5</sup> A47J 27/00

U.S. Cl. 99—348 8 Claims

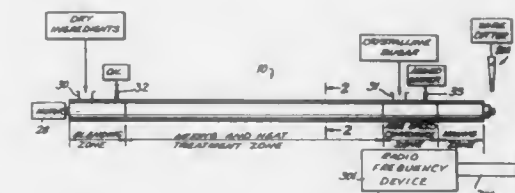


1. A bread-making apparatus, comprising a housing; a baking container disposed in the housing, said baking container being provided with an opening and a source of heat; a kneading container suitable for containing bread ingredients and water, said kneading container being detachably mounted in the baking container; a lid assembly positioned above the kneading container, said lid assembly being capable of assuming a first and second positions, the first position wherein the lid assembly covers the opening of the baking container and the second position where the lid assembly is positioned away from the opening; a kneading blade movably disposed in the kneading container; a motor for operating the kneading blade for kneading bread ingredients and water into a dough in the kneading container; means for detecting temperature in the dough being kneaded in the kneading container; a yeast charger for charging dry yeast into the kneading container; and a control unit for controlling the source of heat and the motor.

**4,957,041**  
**EXTRUDER APPARATUS FOR PRODUCING AN AT LEAST PARTIALLY BAKED PRODUCT HAVING A COOKIE-LIKE CRUMB STRUCTURE INCLUDING A POST-EXTRUSION RADIO FREQUENCY DEVICE**  
Bernhard H. van Lengerich, Ringwood, N.J., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Filed Jun. 7, 1989, Ser. No. 362,377  
The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> A21C 3/04; A47J 27/12; A23P 1/00  
U.S. Cl. 99—353 17 Claims



1. An extruder, which comprises a housing including a screw channel formed along the longitudinal axis of the housing; at least one screw-type element rotatably received within the screw channel to convey and mix ingredients; a feed port means arranged in the housing adjacent the upstream end thereof to input ingredients into the screw channel for conveyance and mixing by the screw-type element; means for inputting at least certain ingredients of a cookie-like dough formulation, including oil and flour, with less than a preselected total water content, by weight, of the ingredients; the means for inputting being coupled to the feed port means; an added water inlet port arranged in the housing downstream from the feed port means to input water into the screw channel; a vigorous mixing zone formed by the screw channel and screw-type element intermediate the feed port means and the added water inlet port to vigorously mix and convey the ingredients input into the feed port means; a temperature control means operating to elevate the temperature of the screw channel for heat treatment of the ingredients input into the feed port means in a heat treatment zone of the housing extending intermediate the feed port means the added water inlet port; a source of water coupled to the added water inlet port to add a preselected amount of water through the added water inlet port to increase the water content and modify the consistency of the ingredients input into the feed ports means at a location in the screw channel downstream from the vigorous mixing and heat treatment zones; a mixing zone formed by the screw channel and screw-type element downstream from the added water inlet port and operating to mix the added water throughout the heat treated ingredients under pressure and temperature conditions to avoid substantial oil separation from the heat treated ingredients and added water; and an output means at the downstream most end of the housing; and a radio frequency device coupled to the output means of the extruder to receive and further heat treat the ingredients output by the output means.



4,957,042

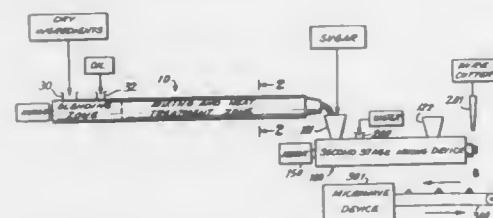
# EXTRUDER AND CONTINUOUS MIXER ARRANGEMENT FOR PRODUCING AN AT LEAST PARTIALLY BAKED PRODUCT HAVING A COOKIE-LIKE CRUMB STRUCTURE INCLUDING A POST-EXTRUSION MICROWAVE DEVICE

Bernhard H. van Lengerich, Ringwood, N.J., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Filed Jun. 7, 1989, Ser. No. 362,620

The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> A21C 3/04; A47J 27/12; A23P 1/00  
U.S. Cl. 99—353 18 Claims



1. An apparatus for producing a product having a cookie-like crumb structure, which comprises an extruder including a housing having a screw channel formed along the longitudinal axis of the housing; at least one screw-type element rotatably received within the screw channel to convey and mix ingredients; a feed port means arranged in the housing adjacent the upstream end thereof to input ingredients into the screw channel for conveyance and mixing by the screw-type element; means for inputting at least certain ingredients of a cookie-like dough formulation, including oil and flour, with less than a preselected total water content, by weight, of the ingredients; the means for inputting being coupled to the feed port means; a vigorous mixing zone formed by the screw channel and screw-type element downstream from the feed port means to vigorously mix and convey the ingredients input into the feed port means; a temperature control means operating to elevate the temperature of the screw channel for heat treatment of the ingredients input into the feed port means in a heat treatment zone of the housing extending downstream from the feed port means; a second stage mixing apparatus including an inlet port coupled to the downstream end of the extruder housing to receive, mix and convey the heat treated ingredients conveyed through the extruder; an added water inlet port arranged in the second stage mixing apparatus; a source of water coupled to the added water inlet port to add a preselected amount of water through the added water inlet port to increase the water content and modify the consistency of the heat treated ingredients from the extruder input into the inlet port of the second stage mixing apparatus; a mixing zone formed by the second stage mixing apparatus and operating to mix the added water throughout the heat treated ingredients under pressure and temperature conditions to avoid substantial oil separation from the heat treated ingredients and added water; and an output means at the downstream most end of the second stage mixing apparatus; and a microwave device coupled to the output means of the continuous mixing apparatus to receive and further heat treat the ingredients output by the output means of the continuous mixing apparatus.

4,957,043

# FRUIT DISINTEGRATING APPARATUS

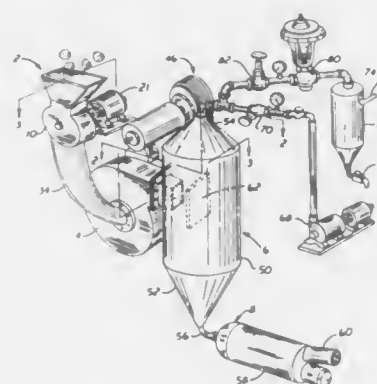
Jesus A. Silvestrini, and Jose E. Barbler, both of Mendoza, Argentina, assignors to IMDEC S.A., Tampa, Fla.

Filed Mar. 31, 1989, Ser. No. 331,699

Claims priority, application Argentina, Apr. 26, 1988, 310.677  
Int. Cl.<sup>5</sup> A23N 1/00; A23L 1/212

U.S. Cl. 99—472

13 Claims



1. Fruit disintegrating apparatus for pulverizing fruit into pulp and juice, comprising fruit introducing means for substantially limiting the rate of introduction of fruit and of ambient atmosphere into said apparatus to a predetermined maximum; a generally cylindrical rotor housing having an entrance aperture connected to said fruit introducing means adjacent the cylindrical axis of said rotor housing and having an outlet channel extending generally tangential to the cylindrical sidewall of said rotor housing; a rotor drivably rotated within said rotor housing about an axis of rotation generally coincident with said rotor cylindrical housing axis, said rotor having a fruit receiving portion adjacent said housing entrance aperture and having a fruit discharge portion radially spaced therefrom with said fruit discharge portion being closely proximal said housing cylindrical sidewall, such that said cylindrical sidewall blocks discharge of fruit from said rotor except when said rotor fruit discharge portion is adjacent said housing outlet channel, whereby fruit carried by said rotor will be discharged from said rotor and said housing through said housing outlet channel generally tangential to said housing cylindrical sidewall; and a fruit disintegration chamber connected to the outer end of said outlet channel to receive fruit therefrom, said chamber having a fruit disintegrating member having a fruit impact surface generally normal to the path of fruit moving through said housing outlet channel, whereby fruit moving through the outlet channel will be impelled against the impact surface to disintegrate the fruit into pulp and juice for subsequent packing and pulp and juice removal means for removing said pulp and juice from said fruit disintegration chamber for subsequent packing.

4,957,044

# DOUBLE SIDED SCREENER FOR PRINTED CIRCUIT BOARDS

John V. Cronin, 17282 Mt. Wynne Cir., Fountain Valley, Calif. 92708

Filed Jun. 19, 1989, Ser. No. 368,460

Int. Cl.<sup>5</sup> B41F 15/08, 17/00

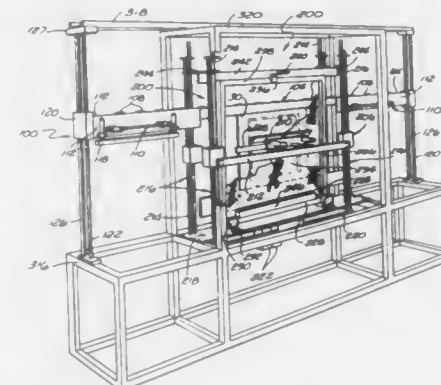
U.S. Cl. 101—35

14 Claims

1. A vertical screening apparatus for simultaneously screen-

ing each side of a printed circuit board with inking material, comprising:

- a screen print assembly comprising two vertically oriented chases pivotally mounted about their bases in opposing spacial parallel relationship with respect to each other; a squeegee vertical drive system that reciprocates through a vertical plane on opposite sides of the chases, consisting of



- opposing flood blades and print squeegees adapted for sequentially contacting and compressing print screens disposed within each of said chases; and a board transport mechanism synchronously integrated with said screen print assembly, above and extending from a feed platen assembly to an output platen assembly comprising means for sequentially moving said board into and out of a print zone within said screen print assembly.

4,957,045

# DOCTOR FOR SCREEN PRINTING

Elmar Messerschmitt, Paul-Hoech-Str. 13, 8000 Munchen 60, Fed. Rep. of Germany

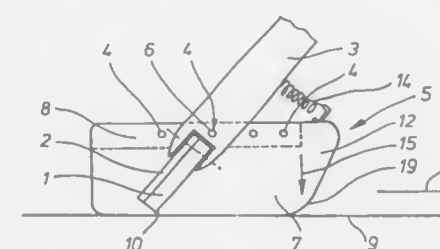
Filed Dec. 5, 1988, Ser. No. 279,656

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1988, 3812826

Int. Cl.<sup>5</sup> B41F 15/44

U.S. Cl. 101—123

11 Claims



1. A doctor for screen printing, comprising a doctor strip with an edge for contact on a printing screen and an elastic backing, said doctor strip and elastic backing being laminated together in face to face contact over at least substantially the whole of their surface areas to form a composite material, the doctor strip and the backing having different degrees of elasticity and being installed together in a doctor holder, and a retainer means for a printing screen positioned at respective left and right hand ends of said doctor holder, and pivotal mounting means for pivotally mounting said respective left and right hand ends of said doctor holder on said retainer.

4,957,046

# PROJECTILE

Michael C. Pattock, Ashford, England, assignor to Thorn EMI Electronics Limited, Hayes, England

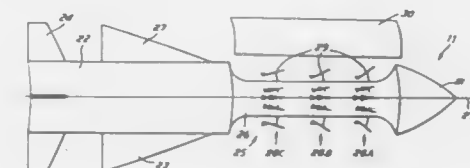
Filed Nov. 22, 1988, Ser. No. 274,374

Claims priority, application United Kingdom, Dec. 12, 1987, 8729073

Int. Cl.<sup>5</sup> F42B 13/50

U.S. Cl. 102—489

5 Claims



1. A projectile having a nose portion and a body portion, said projectile comprising a plurality of winged, fin-stabilised flechettes mounted in said body portion wherein each flechette is mounted with its longitudinal axis at a pre-set pitch to a longitudinal axis of said projectile, the projectile further comprising means for releasing each flechette, the releasing means allowing each flechette to lift off the projectile without any additional lateral force, whereby, in use, with the projectile moving on a projectile trajectory, each released flechette flows a respective trajectory parallel to and at a predetermined distance from said projectile trajectory, said predetermined distance being determined by said pre-set pitch.

4,957,047

# CABLE TRANSPORT INSTALLATION

Fritz Feuz, Thun, and Walter Brawand, Bönigen, both of Switzerland, assignors to Von Roll Transportsysteme AG, Thun, Switzerland

Continuation of Ser. No. 172,421, Mar. 23, 1988, abandoned.

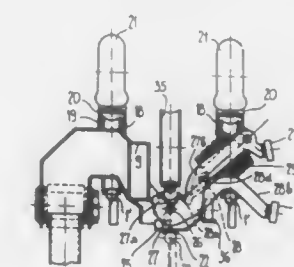
This application Oct. 27, 1989, Ser. No. 427,992

Claims priority, application Switzerland, Mar. 25, 1987, 144/87

Int. Cl.<sup>5</sup> B61B 12/12

U.S. Cl. 104—204

15 Claims



1. An aerial cable transport installation comprising: a plurality of cables including two substantially horizontally spaced support cables and a revolving traction cable arranged between said two support cables;

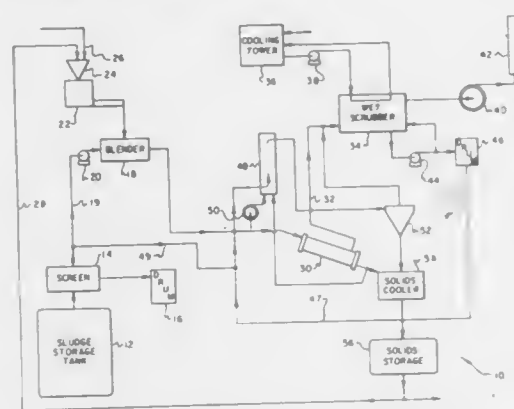
a plurality of vehicles supported by said two support cables and moved by said revolving traction cable;  
 a carriage for each of said vehicles;  
 actuable cable clamp means for each carriage including jaw means for coupling the carriage of each vehicle with the revolving traction cable; and  
 means for displaceably connecting each said jaw means with the corresponding carriage for relative elevational movement therebetween.

#### 4,957,048 APPARATUS FOR TREATING CRUDE OIL SLUDGES AND THE LIKE

Gary L. Beer, and Ying H. Li, both of Plano, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.  
 Division of Ser. No. 84,596, Aug. 12, 1987, Pat. No. 4,775,457.  
 This application Jul. 14, 1988, Ser. No. 219,019  
 Int. Cl.<sup>5</sup> F23D 14/00

U.S. Cl. 110—235

3 Claims



1. A system for treating sludges containing relatively heavy hydrocarbon liquid and solids which are coated with said hydrocarbon liquid, said system comprising:  
 a combustion unit for combusting hydrocarbons to provide gaseous combustion products and a substantially hydrocarbon free, friable solids mixture;  
 a source of solids material having a particle size which averages about one inch or less and having a relatively high liquid adsorption capability;  
 means for mixing said sludge with said solids material and for conveying a mixture of said solids material and said sludge comprising a flowable and friable solids mixture to said combustion unit;  
 means for receiving a friable, hydrocarbon free solids mixture from said combustion unit for disposal;  
 means for receiving gaseous combustion products from said combustion unit and for condensing at least part of said gaseous combustion products; and  
 means for conveying a mixture of condensed combustion products and solids fines to said combustion unit.

#### 4,957,049 ORGANIC WASTE FUEL COMBUSTION SYSTEM INTEGRATED WITH A GAS TURBINE COMBINED CYCLE

Charles Strohmeyer, Jr., Gladwyne, Pa., assignor to Electrodyne Research Corp., Gladwyne, Pa.  
 Filed Feb. 22, 1990, Ser. No. 483,580  
 Int. Cl.<sup>5</sup> F23B 7/00

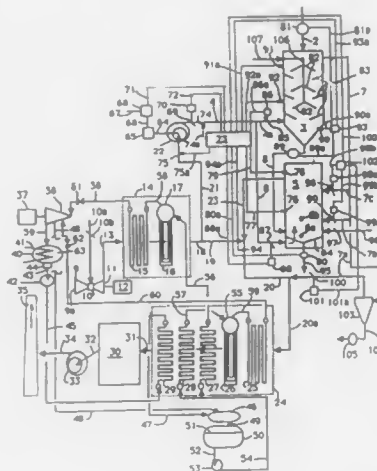
U.S. Cl. 110—234

7 Claims

1. An apparatus for integrating the firing and heat transfer components of a gas turbine combined steam generating plant with means for stabilizing combustion of high moisture content waste fuel, adapted to reheat said gas turbine exhaust gas

intermediately within said combined cycle steam generating plant which comprises:

means defining a gas turbine combined cycle steam generating plant in which said reheating of said gas turbine exhaust gas intermediately within said combined cycle is carried out;  
 said gas turbine comprising a serially connected air intake, compressor, first combustor for firing gas and/or distillate fuel oil under compression, a gas turbine powered by expansion of exhaust gas from said first combustor, an exhaust port for discharge of said hot expanded exhaust gas from said gas turbine and, means whereby said gas turbine drives an energy consumer;  
 a first contained gas flow path connecting to and receiving said exhaust gas from said exhaust port;



a second contained gas flow path connected to and receiving said exhaust gas from said first contained gas flow path;  
 serial means for drying and combusting said high moisture content waste fuel;  
 said second contained gas flow path having means to discharge said exhaust gas selectively to said serial means drying portion and to said serial means combusting portion;  
 means for combining said exhaust gas from said drying portion and from said combusting portion of said serial means, and for discharge of said combined exhaust gas, after drying and combusting, to a third enclosed gas path containing steam generating means.

#### 4,957,050 COMBUSTION PROCESS HAVING IMPROVED TEMPERATURE DISTRIBUTION

Min-Da Ho, Somers, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.

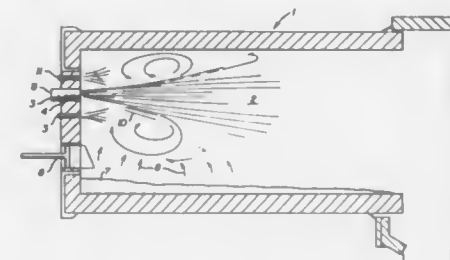
Filed Sep. 5, 1989, Ser. No. 402,556  
 Int. Cl.<sup>5</sup> F23G 7/04

U.S. Cl. 110—346

20 Claims

1. A combustion process comprising:  
 (A) providing combustible vapor to a combustion zone;  
 (B) providing oxidant, having an oxygen concentration of at least 25 percent, into the combustion zone separately from the provision of said combustible vapor at a high velocity sufficient to establish recirculating matter within the combustion zone;  
 (C) providing atomized liquid into the combustion zone separately from said oxidant and said combustible vapor to provide coolant to the combustion zone and mixing coolant with recirculating matter;

(D) mixing resulting coolant with said combustible vapor and/or oxidant; and



(E) combusting the resulting combustible vapor with the resulting oxidant.

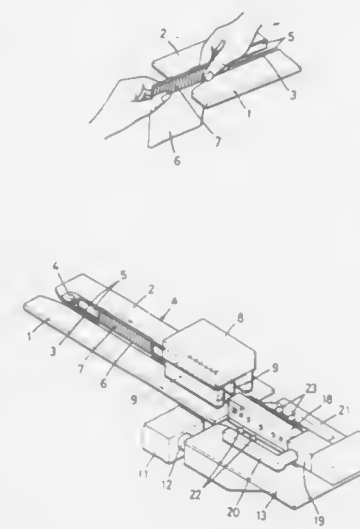
#### 4,957,051 AUTOMATIC FITTING APPARATUS FOR HOSE PART OF HALF MADE PANTYHOSE

Hiroji Macgawa, Kashiwara, and Tatsuro Omura, Kitakatsuragi, both of Japan, assignors to Takatori Corporation, Japan  
 Filed Apr. 5, 1989, Ser. No. 333,580

Claims priority, application Japan, Apr. 11, 1988, 63-88542  
 Int. Cl.<sup>5</sup> D05B 21/00

U.S. Cl. 112—121.12

4 Claims U.S. Cl. 112—147



1. Apparatus for delivering hose parts of half made pantyhose to a pantyhose finishing machine, said apparatus comprising:

a forwarding mechanism means for holding a hose part of pantyhose at a welt portion thereof and conveying a hose part of pantyhose so held in a forward direction in the apparatus;  
 a hose part-receiving table disposed in the apparatus to receive hose parts of pantyhose conveyed by said forwarding mechanism, said table defining a pair of slits into which respective hose parts of pantyhose are insertable, said table having a horizontally extending pivot axis about which said table is rotatably mounted in the apparatus, and said table comprising a suction member means extending between said slits for exerting suction to suck portions of hose parts of pantyhose disposed in said slits thereto, and suction device means disposed across each of said slits from said suction member means for also exerting suction

to suck other portions of hose parts of pantyhose disposed in said slits thereto;

drive means operatively connected to said table for rotating said table about the pivot axis thereof between upright and sideways positions of the table;  
 transfer means operatively disposed between said forwarding mechanism means and said hose part-receiving table for transferring hose parts of pantyhose from said forwarding mechanism means into the slits defined in said table when said table is positioned by said drive means in said upright position; and

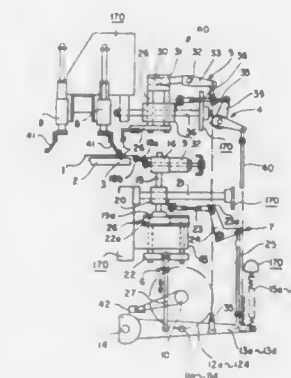
stretching means disposed adjacent said hose part-receiving table for stretching, at the inside of the welt portions thereof, hose parts of pantyhose sucked to said suction member means and said suction device means to grasp the hose parts when said table is positioned at said sideways position thereof by said drive means, and for withdrawing the hose parts so grasped from said table.

#### 4,957,052 TRIPLE FOLDING DEVICE FOR FOLDING A TOWEL HEM

Kenichi Sotome, Utsunomiya, and Munetaka Nagasaki, Kadoma, both of Japan, assignors to SSMC Inc., Edison, N.J.  
 Filed Apr. 17, 1989, Ser. No. 338,818

Claims priority, application Japan, May 24, 1988, 63-125029  
 Int. Cl.<sup>5</sup> D05B 35/04

5 Claims



1. A triple folding device for folding a hem of a towel comprising:

a first cam, a second cam, a third cam, and a fourth cam respectively fixed to a main shaft and driven by a single rotative drive source;  
 a first lever, a second lever, a third lever, a fourth lever respectively swingably supported by a shaft of a body of a sewing machine and swung by said first cam, said second cam, said third cam, and said fourth cam via rollers;  
 a first thrust block fixedly supported by a first horizontal guide shaft fixed to the body and having a through hole therein;  
 a first link mechanism having one end fixed to said first thrust block and another end connected to said first lever so that a swinging motion of said first lever is converted to a horizontal motion of said first thrust block;  
 a block connected to a guide ruler holder by a first guide shaft composed of a pair of guide shafts, said first guide shaft slidably penetrating said through hole of said first thrust block;  
 a second link mechanism having one end fixed to said block and another end connected to said second lever so that a swinging motion of said second lever is converted to a vertical motion of said first guide shaft;  
 a working table fixed to said body to which a towel material having a hem at one end thereof is delivered;

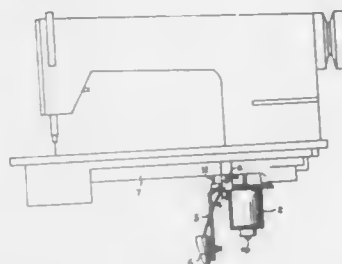


- a guide ruler fixed to said guide ruler holder and positioned over said working table, said guide ruler movable horizontally by horizontal motion of said first thrust block and vertically by vertical motion of said first guide shaft whereby said guide ruler is moved downwardly by a lowering motion of said first guide shaft to thereby press the hem of the towel and movable forwardly by forward motion of said first thrust block to thereby move away from said hem of the towel;
- an upper presser fixed to an upper presser holder for folding said hem of the towel, said upper presser holder having a second guide shaft fixed thereto;
- a lower presser positioned under said upper presser and supported slidably horizontally by said upper presser holder;
- a second thrust block supported by a second horizontal guide shaft fixed to said body for slidably vertically supporting said second guide shaft;
- a third link mechanism having one end fixed to said second guide shaft and another end connected to said third lever so that a swinging motion of said third lever is converted to a vertical motion of said second guide shaft whereby said upper presser is moved horizontally;
- a fourth link mechanism having one end fixed to said second thrust block and another end connected to said fourth lever so that a swinging motion of said fourth lever is converted to a horizontal motion of said second thrust block whereby said upper presser is moved vertically;
- a first drive unit provided at said upper presser holder for driving said lower presser to move horizontally so that said lower presser is moved away from said hem of the towel when said upper presser is moved into said hem of the towel; and
- a pressing unit driven by a second drive unit for pressing and holding said folded hem of the towel laid between said working table and said pressing unit.

4,957,053  
LINKING MECHANISM FOR SEWING MACHINE  
Hsiao C. Liu, No. 21, Hwating Street, Taipei City, Taiwan  
Filed Aug. 12, 1988, Ser. No. 231,273  
Int. Cl.<sup>5</sup> D05B 29/02

U.S. Cl. 112-237

2 Claims



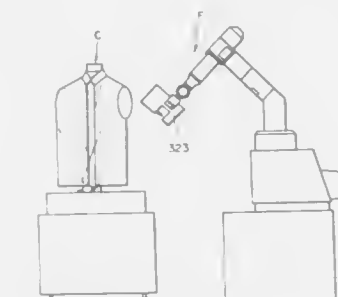
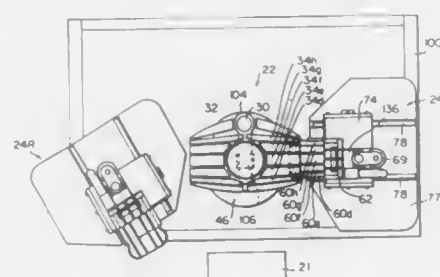
1. A transmission mechanism used for sewing machines having at least a carriage (7), said transmission mechanism comprising:
- a base plate (1) having a plurality of mounts (11) formed thereon, four bolts (12) each having a plastic head and being threadably disposed at one of four respective corners of said base plate (1), said base plate (1) having an opening (13) being formed therethrough;
- a switch box (6) supported by a first end of a connecting rod (5), said connecting rod (5) having a second end coupled to a fixing clamp (4);
- a bar member (3) coupled to said fixing clamp (4) on one end thereof, said bar member (3) being additionally coupled to said plurality of mounts (11) of said base plate (1) and a carriage (7); and,
- transmission means (2) for controlling a sewing machine presser responsive to a control signal from said switch box

- (6), said transmission means (2) being vertically attached to said base plate (1) under said opening (13), said transmission means (2) having a plunger (21) passable through said opening (13), said plunger (21) being capable of performing a reciprocating vertical movement.

4,957,054  
METHOD FOR THREE DIMENSIONAL SEWING OF SUIT COAT BODY AND SLEEVES THEREFOR  
Kuniharu Sakuma, Saitama; Hiroshi Honda, Tokyo; Koukichi Maehata, Tokyo, and Takayuki Aikawa, Tokyo, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan  
Division of Ser. No. 299,568, Jan. 18, 1989, Pat. No. 4,915,040.  
This application Dec. 5, 1989, Ser. No. 446,289  
Claims priority, application Japan, Jun. 1, 1988, 63-132866  
Int. Cl.<sup>5</sup> D05B 21/00

U.S. Cl. 112-262.2

1 Claim



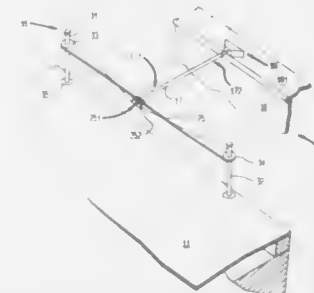
1. A method for three dimensional sewing of a suit coat body and suit sleeves of a suit material, comprising the steps of:
- (1) providing a suit coat body support member which supports a suit coat body turned inside out thereon;
- (2) positioning a sleeve support member adjacent to said suit coat body support member, said sleeve support member having sleeve supporting bars deformable from a contracted position to an expanded position;
- (3) placing the shoulder end of a sleeve onto the sleeve bars while the sleeve bars are in the contracted position;
- (4) expanding the sleeve bars to the expanded position to hold and maintain the shoulder end of the sleeve against said sleeve bars;
- (5) placing a suit coat body which has been turned inside out onto said suit coat body support member;
- (6) moving the sleeve support member toward said suit coat body support member and bringing the seam line of the sleeve into a predetermined position in relation to a seam line of said suit coat body;
- (7) transferring the sleeve to said suit coat body support member while keeping the respective seam lines in the predetermined positional relation, and holding and keeping the sleeve on the suit coat body support member;
- (8) contracting the sleeve bars to the contracted position and

- moving the sleeve support member away from the suit coat body support member; and
- (9) moving a sewing machine along seam lines of the suit coat body and sleeve to produce three dimensional sewing of the suit coat body and the sleeve to each other.

4,957,055  
FENDER FOR FLOATING VESSEL  
Leonard W. Johnson, 483 Main St., Amesbury, Mass. 01913  
Filed Jun. 27, 1989, Ser. No. 372,291  
Int. Cl.<sup>5</sup> B63B 59/02

U.S. Cl. 114-219

10 Claims



1. A fender for maintaining separation between a vessel and a wharf to which the vessel is moored, such fender comprising: a thrust rod having two ends, hereinafter called a "wharf end" and a "vessel end;" attachment means for attaching the vessel end of the thrust rod to the vessel;
- an elastic shock absorber element attached to the wharf end of the thrust rod, such that the elastic shock absorber element is transverse to the thrust rod, the elastic shock absorber element having a first end and a second end, the elastic shock absorber element being linked to the wharf end of the thrust rod at some point between the first and second ends of the elastic shock absorber element; and
- elevation means, rigidly attached to the wharf, for supporting the elastic shock absorber element and the thrust rod at some distance away from the top of the wharf, such that the thrust rod is substantially horizontal and is subject only to forces applied by the elastic shock absorber element and the vessel, the elevation means including a first arm and a second arm attached respectively to the first and second ends of the elastic shock absorber element; such that translation of the wharf end of the thrust rod with respect to the wharf, such translation caused by movement of the vessel towards the wharf, is opposed by forces exerted by the elastic shock absorber element.

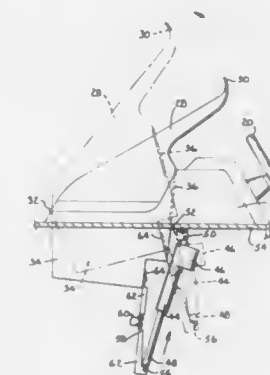
4,957,056  
RETRACTABLE ARRANGEMENT FOR FISHING BOAT CONSOLE COMPONENTS  
Robert L. Martin, Springfield, Mo., assignor to Tracker Marine Corporation, Springfield, Mo.  
Filed May 15, 1989, Ser. No. 351,397  
Int. Cl.<sup>5</sup> B63B 17/00

U.S. Cl. 114-343

20 Claims

1. In a fishing boat having a control console, the improvement comprising:
- a windscreen;
- means for mounting said windscreen on the console for pivotal movement about a hinge axis between a raised position and a lowered position;
- an extensible and retractable power actuator having opposite upper and lower ends and being extensible to increase the distance between said ends;
- means for pivotally connecting the upper end of said actuator with said console;

- a rigid bracket having upper and lower ends, said upper end of the bracket being connected with the windscreen; and means for pivotally connecting the lower end of said bracket

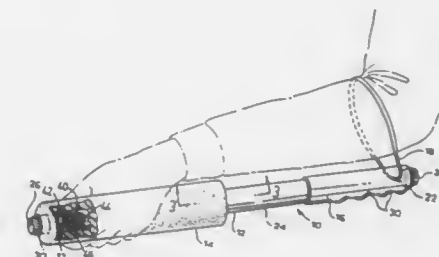


- with the lower end of said actuator in a manner to effect movement of the windscreen toward the raised position upon retraction of the actuator and toward the lowered position upon extension of the actuator.

4,957,057  
JOGGER'S NIGHTSTICK  
Albert Marcucci, 1493 Kenmuir Avenue, Mississauga, Ontario, Canada L5G 4B6  
Continuation-in-part of Ser. No. 911,600, Sep. 25, 1986, abandoned. This application Dec. 30, 1988, Ser. No. 292,072  
Claims priority, application Canada, Jun. 5, 1986, 510956  
Int. Cl.<sup>5</sup> A63H 5/00; G08B 21/00

U.S. Cl. 116-22 A

20 Claims



1. A baton comprising an elongate, tubular body having (a) opposed first and second ends, (b) a striking portion terminating at said first end, (c) a soft padding surrounding said striking portion and extending towards said second end and (d) sound producing means for producing a sound, said sound producing means having one part which moves relative to said body in response to the movement of the baton.

4,957,058

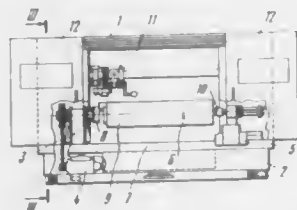
**MACHINE FOR APPLYING GAS-THERMAL COATINGS**  
Alexandr M. Boguslavsky; Viktor F. Semenikhin; Vladimir I. Chergikalo; Lev I. Rozenman; Yakov K. Tregub; Arkady I. Rismen; Yankel M. Topopolaky; Egor V. Khatanzeisky, and Edvard A. Rubin, all of Kiev, U.S.S.R., assignors to Nauchno-Proizvodstvennoe Obiedinenie Po Vypusku Mekhanicheskogo Svarochnog Oborudovaniya, Kiev, U.S.S.R.

PCT No. PCT/SU87/00128, § 371 Date Jul. 14, 1989, § 102(e) Date Jul. 14, 1989, PCT Pub. No. WO89/04879, PCT Pub. Date Jan. 1, 1989

PCT Filed Nov. 16, 1987, Ser. No. 397,441  
Int. Cl.<sup>3</sup> B05C 1/02

U.S. Cl. 118—323

5 Claims



1. A machine for applying gas-thermal coatings to workpieces comprising a box-like chamber, the chamber accommodating a headstock provided with a rotation drive, and a tailstock having a guide and capable of longitudinal movement relative to the workpiece along this guide, a carriage having a drive and a guide, the carriage being capable of longitudinal reciprocations along the guide relative to the workpiece, a rod carrying a spray gun and capable of lateral displacements relative to the workpiece in guides secured on the carriage, wherein the machine has a table secured on the guide of the tailstock, said tailstock having a hole of a size exceeding the cross-sectional dimensions of the table, a drive for imparting reciprocating motion to the rod relative to the workpiece and an arrangement for changing distance the rod can travel along said guide, a rear wall of the chamber having a longitudinally extending slot, the chamber having a gate slidable longitudinally relative to the workpiece and engageable with a hollow pusher which is secured on the carriage and receives the rod, the drive of the carriage and drive for imparting lateral reciprocations to the rod, as well as guides of the carriage and rod, being accommodated at the outer side of the rear wall of the chamber.

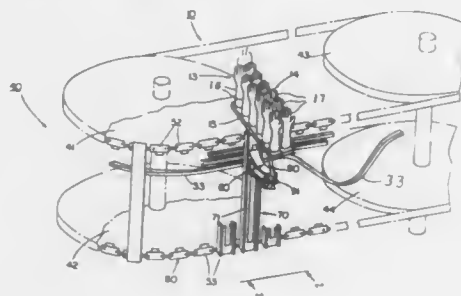
4,957,059

**PATTERN CARRIER FOR CONTINUOUS DIPPING**  
Gary Daughenbaugh, Canton, Ohio, assignor to ACC Automation, Inc., Akron, Ohio

Filed Apr. 24, 1989, Ser. No. 342,548  
Int. Cl.<sup>3</sup> B05C 3/00

U.S. Cl. 118—423

4 Claims



1. In an apparatus for continuously transporting and dipping

forms in a process wherein forms of a desired shape are dipped in and coated with a liquid that subsequently forms a thin membrane thereon, the apparatus including an endless roller chain assembly with a uniform pitch that carries a plurality of form carrier assemblies through a linear dipping span, the improvement wherein each form carrier assembly comprises: vertical track means mounted to said roller chain assembly at a horizontal spacing of at least twice said pitch from adjacent tracks; a carrier arm slidably connected to said track means for vertical movement therein between a raised position and a lowered dipping position; means providing horizontal travel of said track; means responsive to horizontal travel of said track for raising and lowering said carrier arm; an elongated, generally horizontal form support bar operatively connected to said carrier arm and extending perpendicular to said dipping span of said roller chain assembly; and a plurality of parallel rows of forms supported in a suspended position from said support bar with their maximum width dimension extending perpendicular to said bar and with the forms of each row being closely spaced to the forms of the adjacent row whereby the rows of forms are transported simultaneously by the same carrier arm.

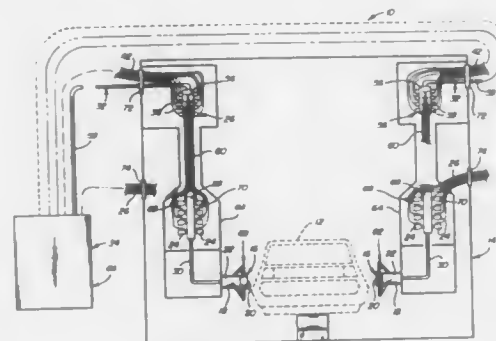
4,957,060

**ELECTROSTATIC SPRAY COATING SYSTEM**  
Roger Cann, Mt. Clemens, Mich., assignor to Behr Industrial Equipment Inc., Rochester, Mich.

Filed Dec. 14, 1988, Ser. No. 284,125  
Int. Cl.<sup>3</sup> B05B 5/08, 15/12

U.S. Cl. 118—699

17 Claims



1. A spray coating apparatus (10) for applying a flammable liquid coating material onto a work part (12), said apparatus (10) comprising: spray booth means (14) for containing the sprayed flammable coating material in an isolated zone; discharge means (16) disposed in said spray booth means (14) for discharging the coating material onto the work part (12); a pneumatic valve (24) disposed in said spray booth means (14) for controlling supply of the coating material to said discharge means (16) in response to a pneumatic signal; conduit means (32) extending from an air supply outside said spray booth means (14) to said pneumatic valve (24) for supplying said pneumatic signal to said pneumatic valve (24); control means (34) for controlling the pneumatic signal sent to said pneumatic valve (24); and said control means (34) including intrinsically safe electric valve means (36) in fluid communication with said conduit means (32) and disposed in said spray booth means (14) remote and electrically isolated from said pneumatic valve (24) for alternately preventing and allowing the pneumatic signal to flow through said conduit means (32) to said pneumatic valve (24) solely in response to an electrical signal to said electric valve means (36) to pneumatically signal said pneumatic valve (24).

4,957,061

**PLURALITY OF BEAM PRODUCING MEANS DISPOSED IN DIFFERENT LONGITUDINAL AND LATERAL DIRECTIONS FROM EACH OTHER WITH RESPECT TO A SUBSTRATE**

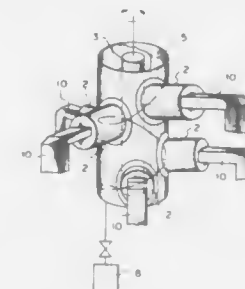
Kenji Ando, Kawasaki; Osamu Kamiya, Machida; Masao Sugata, Yokohama; Noriko Kurihara, Tokyo; Hiroyuki Sugata, Atsugi; Tohru Den, Tokyo; Toshiaki Kimura, Sagami; Takashi Hamamoto, Yokohama; Masahiro Haruta, Tokyo, and Kuniji Osabe, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 937,506, Dec. 3, 1986, abandoned. This application Dec. 18, 1989, Ser. No. 453,240

Claims priority, application Japan, Dec. 4, 1985, 60-271328; Dec. 4, 1985, 60-271329; Jul. 15, 1986, 61-164589

Int. Cl.<sup>3</sup> C23C 16/00

U.S. Cl. 118—719

58 Claims



1. A device for blowing fine particles onto a substrate, the device comprising: a plurality of means for producing a beam of a flow of fine particles, wherein each said beam producing means is provided with an upstream chamber for dispersing the fine particles in a carrier gas, with said upstream chamber communicating with a pressure-adjusting chamber through a nozzle for jetting out the dispersed fine particles as a beam to a downstream side; energy imparting means for imparting energy to the substrate, wherein said beam producing means communicates through each of said pressure-adjusting chambers with a downstream chamber provided therein with a movable substrate, and said plurality of beams produced by said beam producing means being arranged such that each of a plurality of the beams produced by said beam producing means is projected on different portions on the substrate along the moving direction of the substrate, with said plurality of beam producing means being disposed in different longitudinal and lateral directions from each other with respect to the substrate.

4,957,062

**APPARATUS FOR PLASMA SURFACE TREATING AND PREPARATION OF MEMBRANE LAYERS**

Hubertus J. A. Schuurmans; Jan Werner, both of Amsterdam; Daniel C. Schram, and Gerardus M. W. Kroesen, both of Eindhoven, all of Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed May 9, 1988, Ser. No. 191,502  
Int. Cl.<sup>3</sup> C23C 16/50

U.S. Cl. 118—723

1 Claim

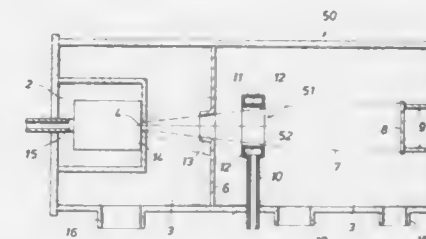
1. Plasma surface treating apparatus for depositing a layer formed from reactants on a substrate surface which comprises: a plasma generation section which is operable at least at substantially atmospheric pressure to generate a high temperature plasma by means of a cascaded arc, said section including an anode having a nozzle-shaped opening defined therethrough; and an enclosed plasma treating section which is operable at a

lower pressure than the plasma generation section, said plasma treating section including:

rim-shaped skimming means located adjacent said nozzle-shaped opening for directing a plasma beam toward said substrate surface which is to be treated with said plasma beam;

material support means to support said substrate;

fluid reactant inlet means located between said rim-shaped skimming means and said material support means, said inlet means including annular shaped distribution means for contacting fluid reactants with said plasma beam, said annular distribution means having an annular inner wall shaped to define a central opening through said inlet



means, said annular wall positioned about the path of flow of said plasma beam, said annular distribution means spaced a distance greater than the thickness of said rim-shaped skimming means away from said nozzle-shaped anode; and

pumping means placed in fluid communication with said plasma treating section for causing said plasma to exhibit supersonic behavior by sufficient withdrawal of gases from said plasma treating section, said plasma beam sequentially passing through said nozzle-shaped anode, said rim-shaped skimming means, said annular shaped distribution means, and thereafter impinging said substrate surface for depositing said layer formed from said reactants.

4,957,063

**ODOR CONTROL ANIMAL LITTER**

Fred A. Heitfeld, Castro Valley, and Randy L. Wood, San Ramon, both of Calif., assignors to The Clorox Company, Oakland, Calif.

Filed Jul. 25, 1988, Ser. No. 223,502  
Int. Cl.<sup>3</sup> A01K 1/015

U.S. Cl. 119—1

11 Claims

1. An odor control animal litter comprising: particles of an absorbent litter substrate, said particles being contacted with an odor-controlling-effective amount of a guanidine salt.

4,957,064

**OFFSHORE FISH CAGE FOR FARMING FISH**

Norihiko Koma, Tokyo, Japan, assignor to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 11, 1988, Ser. No. 167,316

Claims priority, application Japan, Mar. 13, 1987, 62-56715  
Int. Cl.<sup>3</sup> A01K 61/00

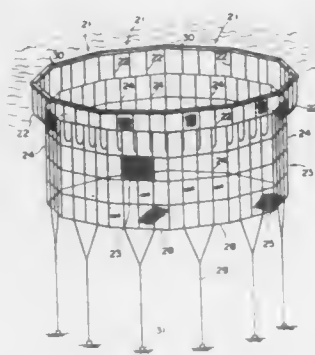
U.S. Cl. 119—3

10 Claims

1. An offshore fish cage for farming fish comprising: a polygonal frame floating on a water surface composed of a multiplicity of frame elements; an upper net hung down from the frame and having a length of slack equal to or more than the distance said frame is caused to move up and down by waves; a lower net having a top end and a bottom end, the lower net composed of a side net fixed to the upper net and a bottom



portion joined to the bottom end of the side net, an opening being provided at the top end of the lower net; underwater floats fitted to the side net; and



mooring wires mooring the bottom end of the lower net to the bottom of the sea.

4,957,065

## PULSATION SELECTOR

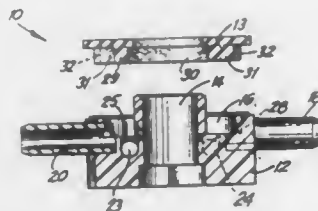
Clayton Neff, Shawnee, and Mofazzal H. Chowdhury, Lenexa, both of Kans., assignors to Alfa-Laval Agri Inc., Kansas City, Mo.

Continuation-in-part of Ser. No. 180,526, Apr. 12, 1988, abandoned. This application Oct. 19, 1989, Ser. No. 423,985

Int. Cl.<sup>5</sup> A01J 5/10

U.S. Cl. 119—14.37

8 Claims



1. A pulsation selector for milking machines which comprises a housing, a connecting chamber in said housing around the circumference of said housing, a plurality of outlet tubes arranged around said housing and communicating with said chamber, two inlet tubes connecting to said chamber on opposite sides of said housing, and a closure for said chamber, said closure having a partition extending into and across said chamber dividing said chamber into two sections, one section connecting one of said inlet tubes to certain of said outlet tubes and the other section connecting the other inlet tube to others of said outlet tubes, said closure and its partition being rotatable, thereby to connect said inlet tubes to different sets of outlet tubes.

4,957,066

## FAN ASSEMBLY FOR AN EGG INCUBATOR ENCLOSURE OR A HATCHING ENCLOSURE

Pierre Dambre, Chalonnès-sur-Loire, France, assignor to Elevage Avicole de la Bohardière, Chalonnès-sur-Loire, France

Filed Oct. 25, 1988, Ser. No. 262,429

Claims priority, application France, Oct. 27, 1987, 87 14846

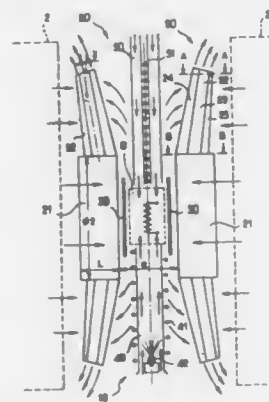
Int. Cl.<sup>5</sup> A01K 41/02

U.S. Cl. 119—39

10 Claims

1. A fan assembly for an egg incubator enclosure or for a hatching enclosure, in which a centrifugal fan establishes a pressure reduction and thereby sets up a flow of air through egg storage boxes disposed in near the fan, wherein the centrifugal fan comprises two turbines mounted on a horizontal axis

and placed face to face on either side of a vertical central plane disposed substantially in the middle of the enclosure, with the boxes placed on either side of the fan and with each turbine being constituted by a ring which is hollow in the center and provided with blades around its periphery; and wherein each said blade has a transverse cross-section comprising a central web having an inside edge at its end



oriented towards said central plane and an outside edge at its opposite end, each of said edges having a V-shape, with its apex adjacent said central web and opening outwardly therefrom for producing within the hollow ring a region of reduced pressure, thereby sucking in an axially oriented direction the air from the boxes, and for expelling the air so sucked along said blades, in a radially outwardly oriented direction.

4,957,067

## FEEDER FOR ANIMALS

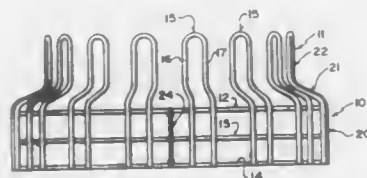
Edward A. Akins, Box 158, Winnipeg, Manitoba, Canada (R2H 3B4)

Filed Jun. 3, 1989, Ser. No. 375,262

Int. Cl.<sup>5</sup> A01K 1/10, 5/00

U.S. Cl. 119—60

20 Claims



1. A feeder for receiving a large cylindrical bale for distributing the bale to a number of animals, comprising an outer frame portion shaped to rest upon the ground and to define a band surrounding the bale and having an upper edge at which the outer frame terminates and a plurality of elongate frame members each connected to the outer frame and each having a first portion extending therefrom inwardly toward the bale and a second portion extending from the first portion upwardly to a height above the upper edge of the outer frame portion.

4,957,068

## LIQUID-COOLED FOUR-VALVE CYLINDER HEAD FOR A MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

Wolf-Dietrich Wagner, Stuttgart; Willi Springer, Göppingen; Ludwig Meissner, Reichenbach; Helmut Bonfert, Böblingen; Michael Böttcher, Stuttgart; Thomas Hardt, Ostfildern; Rolf Klumpp, Kernen; Klaus Krause, Markgröningen; Arndt Peters, Weinstadt; Ernst Plattner, Mannheim; Wolfgang Strobel, Remshalden; Wolfgang Waller, Stuttgart, and Günter Wiemann, Oppenweiler, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

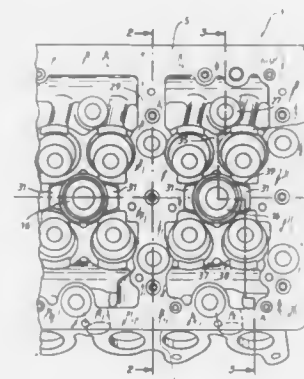
Filed Jun. 8, 1989, Ser. No. 363,150

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1988, 3819655

Int. Cl.<sup>5</sup> F01P 3/02

U.S. Cl. 123—41.82 R

10 Claims



1. Liquid-cooled four-valve cylinder head for a multi-cylinder internal combustion engine having a casting comprising:

- a cooling-fluid space limited by outer walls, a cylinder-head bottom, and a cylinder-head ceiling spaced at a distance from the cylinder-head bottom;
- valve channels, each having valve channel walls, for each cylinder, each of the valve channels passing through the cooling-fluid space and extending from combustion space portions of the cylinder head bottom to the outer walls;
- a tubular chamber extending cylindrically, axially between the valve channels for receiving at least one of a spark plug, an injection nozzle and an injection nozzle with a prechamber, the chamber being directly connected to the valve channel walls of the valve channels within the cooling-fluid space;
- a control space, above the cooling-fluid space, enclosed by the cylinder-head ceiling and the outer walls, extending to a cover plane;
- two guide housings combined by a bridging member in the manner of spectacles arranged on both sides of a longitudinal mid-plane of each cylinder, and having guide bores for receiving cup tappets, the guide housings extending through the control space;
- transverse booms extending between the combustion space portions of the cylinder head, intermediate portions of the transverse booms being connected to one another in a longitudinal direction of the cylinder head solely by the guide housings; and
- supporting struts, positioned at a region of the longitudinal mid-plane of each cylinder, each supporting strut connecting one of the transverse booms to the cylinder-head ceiling and the cylinder-head bottom and having ribs which project outwardly from a longitudinal axis thereof.

4,957,069

## DRIVING OR WORKING ENGINE, IN PARTICULAR AN INTERNAL COMBUSTION ENGINE

Gerhard Mederer, Kellerstrasse 7, D-8501 Allersberg, Fed. Rep. of Germany

PCT No. PCT/EP88/00367, § 371 Date Jan. 5, 1989, § 102(e) Date Jan. 5, 1989, PCT Pub. No. WO88/08922, PCT Pub. Date Nov. 17, 1988

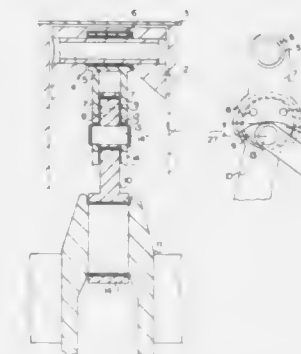
PCT Filed May 3, 1988, Ser. No. 299,357

Claims priority, application Fed. Rep. of Germany, May 8, 1987, 3715391; Aug. 17, 1987, 87111871

Int. Cl.<sup>5</sup> F02B 75/32

U.S. Cl. 123—48 B

11 Claims



1. An engine having a housing comprising:

- at least one cylinder;
- a piston for moving axially within said cylinder;
- a crankshaft;
- a multi-piece connecting rod having an upper section and a lower section;
- said piston being connected to the crankshaft by the upper section of said connecting rod;
- a common hinge having a central axis for connecting the lower section of the connecting rod to said upper section;
- an adjustable pivot for connecting said upper and lower connecting rod sections with the engine housing through a pivoting lever attached to said hinge;
- said upper section having a lower portion, said lower portion of the upper section of the connecting rod carrying an axial extension;
- said axial extension extending axially beyond the common hinge central axis towards said lower section;
- said pivoting lever having a first end and a second end, said first end joined to said common hinge in an articulated manner, and said second end being supported by an eccentric pivot; and
- a plate having said eccentric pivot eccentrically placed thereon and said plate rigidly and adjustably attached to the engine housing.

4,957,070

## ENGINE AIR-FUEL INTAKE TRIPLE MANIFOLD

Lawrence E. Ofria, Northridge, and Francis R. Lyndhurst, Costa Mesa, both of Calif., assignors to Thunder Power, Inc., Redondo Beach, Calif.

Filed Dec. 5, 1989, Ser. No. 445,290

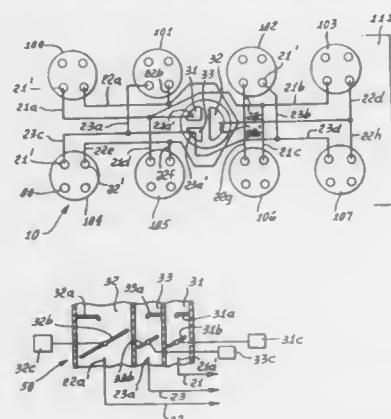
Int. Cl.<sup>5</sup> F02M 35/10

U.S. Cl. 123—52 MB

13 Claims

1. In an internal combustion engine having cylinders and a carburetor defining barrel means, each cylinder having two fuel/air intake ports, the combination comprising (a) a first manifold runner system having a fuel/air intake end communicating with first barrel means of the carburetor, and a fuel/air delivery end or ends communicating

with one of the fuel/air intake ports at each of certain engine cylinders, and  
(b) a second manifold runner system having a fuel/air intake end communicating with second barrel means of the car-

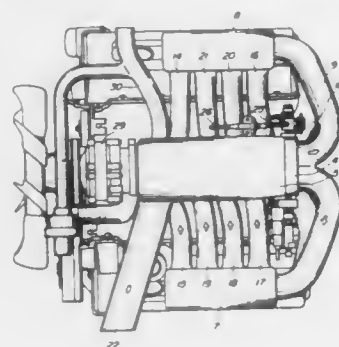


buretor, and a fuel/air delivery end or ends communicating with fuel/air intake ports at each cylinder,  
(c) the first manifold runner system serving less than all of the engine cylinders, and the second manifold runner system serving all of the engine cylinders.

#### 4,957,071 INTAKE SYSTEM FOR V-TYPE INTERNAL COMBUSTION ENGINE

Isaya Matsuo, Yokohama; Sachiro Urabe, Fujisawa, and Eichi Fujisawa, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd.

Filed Jul. 25, 1989, Ser. No. 384,610  
Claims priority, application Japan, Jul. 26, 1988, 63-97892[U]; Jul. 26, 1988, 63-97893[U]  
Int. Cl.<sup>5</sup> F02M 35/00  
U.S. Cl. 123—52 MV 10 Claims



1. An intake system for a V-type internal combustion engine having first and second banks, comprising:  
first and second sub-collectors disposed above the first and

second banks, respectively, each sub-collector defining therein an air flow chamber which is in fluid communication with cylinders in the banks of the engine;  
a main collector disposed above and between the first and second banks, said main collector defining therein an air flow chamber in fluid communication with each sub-collector air flow chamber; and  
a throttle device through which intake air flows from said main collector to said first and second sub-collectors, said throttle device being disposed at rear end side of the engine and arranged to control air flow from said main collector to said first and second sub-collectors.

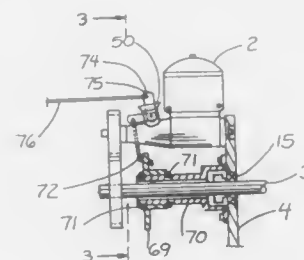
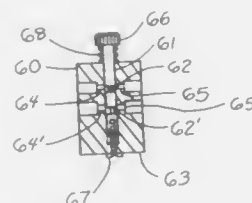
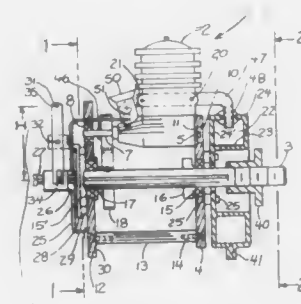
4,957,072

#### BALANCED RADIAL ENGINE

Michael P. Goldowsky, 7 Greenwood Ln., Valhalla, N.Y. 10595  
Continuation-in-part of Ser. No. 276,943, Nov. 28, 1988. This application May 15, 1989, Ser. No. 334,600  
Int. Cl.<sup>5</sup> F02B 75/22

U.S. Cl. 123—55 A

16 Claims



1. A gravity flow fuel delivery system for multi-carburetor engines that provides a single fuel mixture adjustment for all carburetors and compensates for fuel head elevation differences between carburetors, incorporating a plurality of fuel tank means with relative elevation differences corresponding to the elevation differences of the respective carburetors to be pressure head compensated, said individual fuel tank means each having outlet conduits that introduce fuel to an individually isolated inlet port of a single hydraulic valve, said valve possessing a single adjustment means and at least one isolated

outlet port means matched to a respective one of said inlet ports for each fuel tank means, said valve producing equal and adjustable flow resistances due to movement of said single adjustment means between all the respective inlet and outlet port means in the valve thereby producing equal flow rates from each tank means.

4,957,074

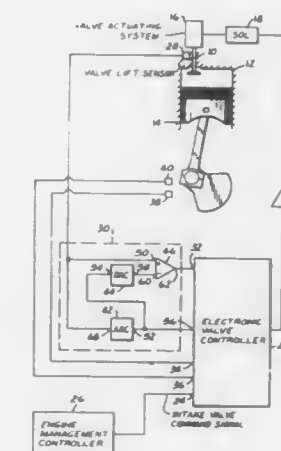
#### CLOSED LOOP ELECTRIC VALVE CONTROL FOR I. C. ENGINE

Harold E. Weissler, II; Robert E. Weber, and Russell J. Wakeman, all of Newport News, Va., assignors to Siemens Automotive L.P., Troy, Mich.

Filed Nov. 27, 1989, Ser. No. 441,790  
Int. Cl.<sup>5</sup> F01L 9/04

U.S. Cl. 123—90.11

6 Claims



4,957,073

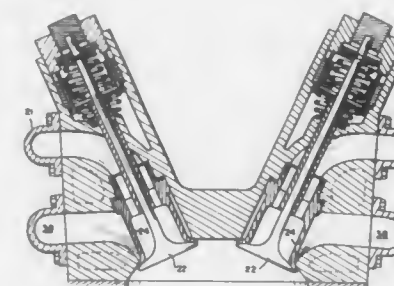
#### MULTIPLE CONCENTRIC INTAKE/EXHAUST VALVE SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Charles W. Bergeron, 7694 Little John Dr., Apt. #10, Indianapolis, Ind. 46219

Continuation of Ser. No. 363,335, Jun. 8, 1989, abandoned, which is a continuation of Ser. No. 205,620, Jun. 2, 1988, abandoned, which is a continuation of Ser. No. 312,871, Nov. 19, 1981, abandoned. This application Feb. 6, 1990, Ser. No. 474,685  
Int. Cl.<sup>5</sup> F01L 1/28; F02M 35/10

U.S. Cl. 123—79 C

10 Claims



4. An intake and exhaust valve system deployed in a four stroke, internal combustion engine for improving intake and exhaust charge volume per unit time in each cylinder comprising:

at least three concentric intake and exhaust valve assemblies, each assembly having a separate poppet intake valve and intake valve seat and a separate cylindrical exhaust valve and exhaust valve seat, said intake valve being concentrically disposed relative to said exhaust valve, mounted in fluid communication with each engine cylinder;  
means for opening said intake valves coupled to said intake valves;  
means for opening said exhaust valves coupled to said exhaust valves;  
intake valve spring connected to each intake valve for closing each intake valve independently;  
exhaust valve spring connected to each exhaust valve for closing each exhaust valve independently;  
said intake valves each having a diameter size substantially equal to each other and strategically selected such that the sum total of the circumferences of the first, second, and third intake valves exceed the circumference of the combustion chamber;  
whereby the available intake valve opening area of the combustion chamber is a function of the sum total of the circumferences of each intake valve multiplied by the valve lift height for a predetermined time to provide optimum charge density for maximum volumetric efficiency.

1. In an internal combustion engine having one or more solenoid-controlled valves that are operated to open and close combustion chambers in variable phasing to engine crankshaft rotation, said engine also having an electronic management controller for issuing commands for various engine functions including command of the phasing of said solenoid-controlled valves in relation to engine crankshaft rotational position, the improvement comprising a closed loop control system for the closed loop control of the phasing of said solenoid-controlled valves, said system comprising an electronic valve controller having multiple input means and output means, a lift sensor for each of said valves for sensing valve lift, a lift sensor processing circuit for each lift sensor for coupling the corresponding lift sensor with a corresponding one of said electronic valve controller input means, means providing to another of said electronic valve controller input means real time information about current crankshaft rotational position in relation to a known reference, means supplying from said electronic management controller to a further one of said electronic valve controller input means a command for the phasing of said solenoid-controlled valves; a driver circuit for each of said valves for coupling the corresponding controlling solenoid with a corresponding one of said electronic valve controller output means, said electronic valve controller comprising means for closed loop controlling, by means of the corresponding lift sensor and lift sensor processing circuit, each solenoid-controlled valve to operate under the command delivered from said electronic management controller to said further one of said input means, and each lift sensor processing circuit comprising means for processing information from the corresponding lift sensor to disclose to said electronic valve controller, as the corresponding valve operates, the actual opening and closing of the valve, wherein said means for processing information includes a means to accurately re-calibrate the lift sensor each time before the valve opens.



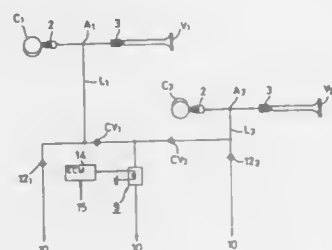
4,957,075

## APPARATUS FOR CONTROLLING INLET OF EXHAUST VALVES

Shunpei Hasegawa, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 145,479, Jan. 19, 1988, abandoned. This application Sep. 5, 1989, Ser. No. 403,852  
Claims priority, application Japan, Jan. 19, 1987, 62-8099  
Int. Cl.<sup>5</sup> F01L 1/00

U.S. Cl. 123—90.12

3 Claims



1. In an apparatus for hydraulically controlling inlet or exhaust valves of a multiple-cylinder engine having sealed hydraulic chambers and solenoid valve means that open and close to connect and disconnect the hydraulic chambers with a hydraulic low-pressure source, each hydraulic chamber having a first plunger driven by a cam and a second plunger for actuating an inlet or exhaust valve, the improvement comprising said solenoid valve means comprising a single solenoid valve having a plurality of passages connected separately to a like plurality of hydraulic chambers, a one-way valve disposed in each passage between the associated hydraulic chamber and said single solenoid valve to permit fluid flow in a direction from said associated hydraulic chamber to said single solenoid valve but to prevent flow from any of the other hydraulic chambers of said plurality of hydraulic chambers;

said solenoid valve means comprising control means including a hydraulically-operated main valve operative in said hydraulic chambers to control the fluid pressure therein and said solenoid valve being a pilot valve operatively associated with said main valve to actuate said main valve to effect fluid flow from said hydraulic chambers in response to actuation of said solenoid valve; and each said hydraulic chamber being connected to said low pressure oil source through another one-way valve for adding oil to the hydraulic chamber as needed when the hydraulic chamber is at a pressure lower than said low pressure oil source.

4,957,076

## VALVE OPERATING MECHANISM FOR AN INTERNAL COMBUSTION ENGINE

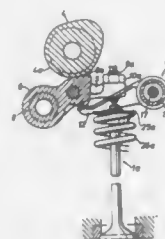
Kazuo Inoue, Takashi Hanaoka, and Tsuneo Konno, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 39,111, Apr. 15, 1987, abandoned. This application Feb. 3, 1989, Ser. No. 306,220  
Claims priority, application Japan, Apr. 16, 1986, 61-86072; Jul. 4, 1986, 61-157488; Oct. 13, 1986, 61-242675  
Int. Cl.<sup>5</sup> E01L 1/00

U.S. Cl. 123—90.16

23 Claims

1. A valve operating mechanism for an internal combustion engine having a valve disposed in an intake port or an exhaust port of a combustion chamber, cam means rotatable in synchronism with a crankshaft, cam follower means for operably connecting said cam means to said valve, means for selectively operably connecting said cam means to said valve for varying the mode of operation of said valve according to variable engine operating conditions, said valve operating mechanism comprising:

spring means for applying a biasing force on said valve in opposition to said cam follower means;  
means responsive to a first engine operating characteristic for changing the operation of said cam follower means for varying said mode of valve operation; and



means responsive to a second engine operating characteristic for varying the biasing force on said valve, wherein said cam follower means includes a cam follower engaging said cam, and said spring means includes an auxiliary spring means urging said cam follower in a direction to be pressed against said cam.

4,957,077

## CAMSHAFT DRIVING ARRANGEMENT FOR DOUBLE OVERHEAD CAMSHAFT ENGINE

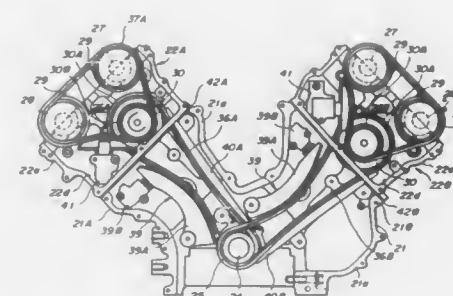
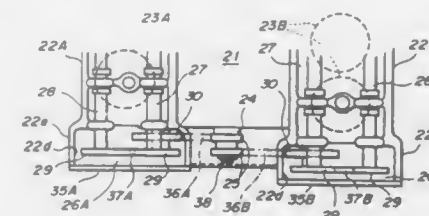
Nobuyuki Okitsu, Masaru Mitsuhashi, both of Yokohama, and Yoshio Iwasa, Nagareyama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan  
Filed Dec. 14, 1989, Ser. No. 450,696  
Claims priority, application Japan, Dec. 21, 1988, 63-320594  
Int. Cl.<sup>5</sup> F01L 1/02

U.S. Cl. 123—90.31

5 Claims

1. In a DOHC engine having a cylinder block including two cylinder banks angularly disposed to each other, two cylinder heads mounted on the two cylinder banks, respectively, two pairs of camshafts, each pair being rotatably mounted to one of the two cylinder heads, and a crankshaft mounted to the cylinder block, a camshaft driving arrangement comprising: two pairs of cam sprockets, each pair being mounted to each of the camshafts at one end thereof;  
two idler gears, each being rotatably mounted to one of the cylinder heads;  
a first camshaft driving chain drivingly interconnecting one of said idler gears and the adjacent pair of said cam sprockets;  
a second camshaft driving chain drivingly interconnecting the other of said idler gears and the other pair of said cam sprockets, said first and second camshaft driving chains

having different running planes which are axially spaced along the axis of the crankshaft; and



means for drivingly interconnecting the crankshaft and said idler gears.

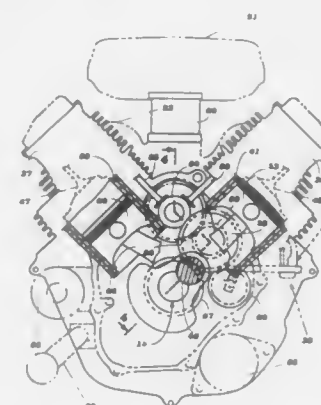
4,957,078

## V-TYPE MULTI-CYLINDER ENGINE

Tsuyoshi Ohkawa, and Reichi Kaji, both of Iwata, Japan, assignors to Yamaha Katsudoki Kabushiki Kaisha, Iwata, Japan  
Filed Jul. 19, 1989, Ser. No. 382,093  
Claims priority, application Japan, Jul. 22, 1988, 63-181478  
Int. Cl.<sup>5</sup> F01L 1/02

U.S. Cl. 123—90.31

22 Claims



1. An internal combustion engine having a cylinder, a crankshaft at one end of said cylinder rotatably driven from a piston reciprocating in said cylinder, a camshaft rotatable about an axis offset from the axis of rotation of said crankshaft, cam means on said camshaft for operating a valve associated with said cylinder, an intermediate shaft journaled for rotation about an axis parallel to and offset from said crankshaft and said camshaft axes, a first pair of gears comprising a gear fixed for rotation with said crankshaft and a gear meshed therewith and affixed for rotation with said intermediate shaft for driving said intermediate shaft from said crankshaft, and a second pair of gears comprising a gear fixed for rotation with said interme-

diate shaft and a gear meshed therewith and fixed for rotation with said camshaft for driving said camshaft from said intermediate shaft, said first pair of gears and said second pair of gears each having a ratio other than unity and other than one-half to one with the overall ratio of rotation of said camshaft to said crankshaft being one-half to one.

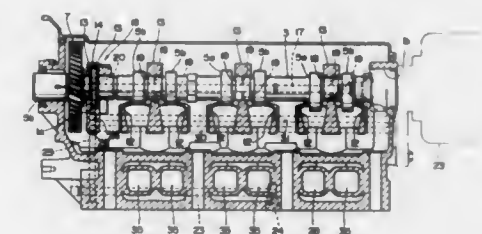
4,957,079

## CAMSHAFT STRUCTURE FOR DOUBLE OVERHEAD CAMSHAFT ENGINE

Shigeki Nakatani, Naohide Koshimoto, and Hiroyuki Sagimoto, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan  
Filed Nov. 29, 1989, Ser. No. 442,794  
Claims priority, application Japan, Dec. 3, 1988, 63-306285  
Int. Cl.<sup>5</sup> F01M 9/10

U.S. Cl. 123—90.34

8 Claims



1. An overhead camshaft structure for a double overhead camshaft internal combustion engine comprising a cylinder block formed with a series of at least three cylinders, a cylinder head and two overhead camshafts formed with a series of cams and a series of camshaft bearing journals for said at least three cylinders, said two overhead camshafts being operatively connected with each other by means of helical gears connected to said two overhead camshafts, respectively, said overhead camshaft structure comprising:

a circular thrust collar formed on each said overhead camshaft;  
a thrust bearing comprising upper and lower halves for supporting each said overhead camshaft therebetween, said thrust bearing including a thrust restrictive groove having an upper half formed in said upper half of said thrust bearing and a lower half formed in said lower half of said thrust bearing for receiving therein said circular thrust collar, said upper half of said thrust restrictive groove being wider than said lower half of said thrust restrictive groove; and  
an oil passage comprising a radial passage portion extending in parallel with a diameter of said circular thrust collar and opening in a periphery of said circular thrust collar and an axial passage portion formed in each said overhead camshaft along its length for allowing lubricating oil to pass up to each said camshaft bearing journal, said radial passage being directed in parallel with a straight line connecting an axial centerline of rotation of each said overhead camshaft and a juncture between a valve opening ramp of a cam lobe and a cam base of said cam.

4,957,080

## ENGINE PROTECTION SYSTEM

Mark W. Howland, 6198 Fireside La., Allenton, Wis. 53002  
Filed Aug. 30, 1988, Ser. No. 238,178  
Int. Cl.<sup>5</sup> F02M 39/00

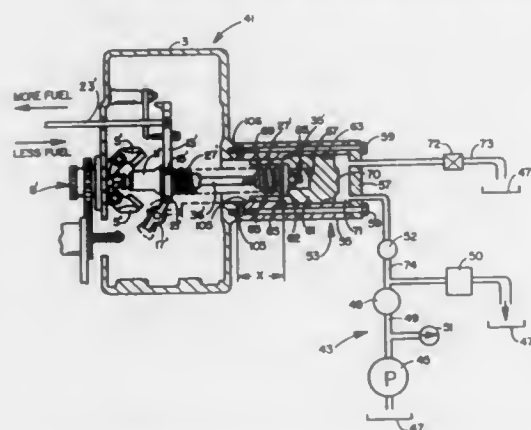
U.S. Cl. 123—198 D

23 Claims

1. Apparatus useful for protecting an internal combustion engine having a governor with a housing secured to the engine and a lubrication oil system against failure due to insufficient lubrication oil pressure comprising:

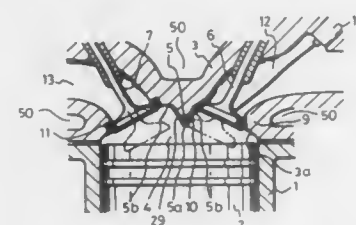
(a) cylinder means for fixedly mounting to and being immo-

bile relative to the engine governor housing and for tapping into the engine lubrication oil system; and  
(b) piston means received within the cylinder means for cooperating therewith to define a cylindrical chamber for receiving a portion of the engine lubrication oil and for sliding within the cylinder means between first and second positions, the piston means having a bearing face contactable by the governor, the piston means being slidable to



the first position against the governor when a predetermined lubrication oil pressure is present in the chamber to permit the governor to control the engine to a running condition, the piston means being slidable by the governor to the second position free of any force that resists sliding of the piston means to the second position when a lubrication oil pressure less than the predetermined lubrication oil pressure is present in the chamber to thereby cause the governor to control the engine to a shut down condition.

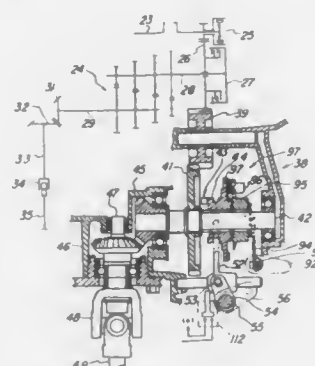
**4,957,081**  
**COMBUSTION CHAMBER OF AN ENGINE**  
Toshio Ito, and Toshio Tanahashi, both of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan  
Filed Aug. 14, 1989, Ser. No. 393,404  
Claims priority, application Japan, Aug. 30, 1988, 63-213648  
Int. Cl.<sup>3</sup> F02B 31/00  
U.S. Cl. 123—302 21 Claims



1. An engine comprising:  
an engine body including a cylinder head having an inner wall;  
a piston reciprocally movable in said engine body, the inner

wall of said cylinder head and a top face of said piston defining a combustion chamber therebetween;  
valve means arranged on the inner wall of said cylinder head; and  
a masking wall formed on the inner wall of said cylinder head to mask a part of a valve opening formed between a valve seat and a peripheral portion of said valve means, said valve seat and said masking wall being formed by a built-up layer which is built up on said cylinder and is machined, said built-up layer comprising a copper-based metallic material containing nickel, iron, and phosphorus, said metallic material being different from that of said cylinder head.

**4,957,082**  
**VEHICLE CONTROL SYSTEM**  
Akira Takayama, Fukuoka, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan  
Filed Mar. 31, 1986, Ser. No. 846,567  
Int. Cl.<sup>3</sup> F02D 9/00, 31/00  
U.S. Cl. 123—334 14 Claims



1. In a governor for an internal combustion engine having a shaft driven by said engine, and governor means driven by said engine for controlling the speed of said engine by operation of a first control system of said engine, the improvement comprising means for detecting the speed of said shaft and means for retarding the speed of said engine through operation of a second control system of said engine if said detecting means senses an over speed condition.

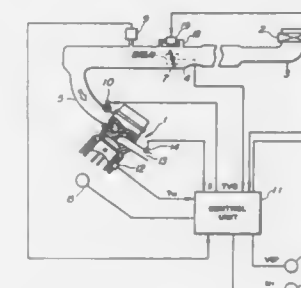
**4,957,083**  
**FUEL SUPPLY CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE WITH FEATURE PROVIDING ENGINE STABILITY IN LOW ENGINE LOAD CONDITION**

Shinpei Nakaniwa, and Naoki Tomisawa, both of Gunma, Japan, assignors to Japan Electronic Control Systems Company, Limited, Isezaki, Japan  
Filed Oct. 5, 1988, Ser. No. 253,532  
Claims priority, application Japan, Oct. 12, 1987, 62-254678  
Int. Cl.<sup>3</sup> F02D 41/04  
U.S. Cl. 123—436 13 Claims

1. A fuel supply control system for controlling an amount of fuel to be delivered to an internal combustion engine, comprising:

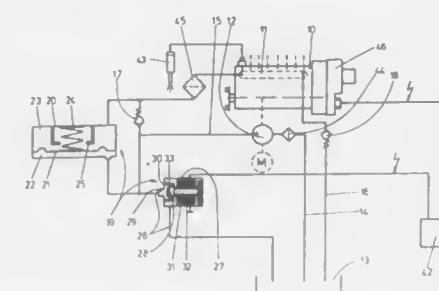
- a sensor means for monitoring preselected engine driving condition indicative parameters including an intake air pressure and an engine speed;
- a first detector means for detecting a predetermined stable engine driving condition at an engine load condition lower than a predetermined value to produce a first detector signal;
- a second detector means for detecting an engine speed variation rate to produce a second detector signal when the

engine speed variation rate is smaller than a predetermined value;  
a first arithmetic means for deriving a basic fuel supply amount on the basis of said intake air pressure;  
a second arithmetic means for projecting an intake air flow rate data on the basis of said engine speed and said basic fuel supply amount under the presence of said first and second detector signals;



a third arithmetic means for deriving said basic fuel supply amount on the basis of said engine speed and said projected intake air flow rate data under the presence of said first detector signal and the absence of said second detector signal, said first arithmetic means being otherwise operable to derive said basic fuel supply amount; and  
a controlling means for deriving a fuel supply control signal based on said basic fuel supply amount for controlling fuel supply for said engine.

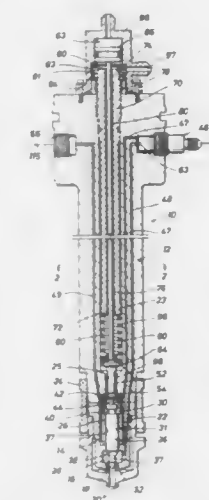
**4,957,084**  
**FUEL INJECTION APPARATUS FOR INTERNAL COMBUSTION ENGINES**  
Manfred Krämer, Schwieberdingen, and Erhard Sitter, Horb, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
PCT No. PCT/DE87/00288, § 371 Date Oct. 13, 1988, § 102(e) Date Oct. 13, 1988, PCT Pub. No. WO88/00292, PCT Pub. Date Jan. 14, 1988  
PCT Filed Jan. 25, 1987, Ser. No. 272,887  
Claims priority, application Fed. Rep. of Germany, Jul. 5, 1986, 3622626; Jun. 16, 1987, 3720067  
Int. Cl.<sup>3</sup> F02M 39/00  
U.S. Cl. 123—447 12 Claims



1. A fuel injection apparatus for internal combustion engines, particularly diesel internal combustion engines having injection nozzles and a fuel injection pump with a suction chamber for communicating fuel from the suction chamber to the injection nozzles, said fuel injection apparatus comprising:  
a fuel delivery pump for communicating fuel from a fuel tank to the suction chamber of the fuel injection pump;  
a return line for communicating the suction chamber of the fuel injection pump with the fuel tank;

an overflow valve located in said return line for limiting pressure in the suction chamber; and  
a cut-off device located downstream of said delivery pump and upstream of the fuel injection pump, said delivery pump having an outlet, said cut-off device comprising an inlet valve located upstream of the suction chamber of the fuel injection pump and having an open position in which it communicates said outlet of said delivery pump with the suction chamber, a spring-loaded accumulator including a storage chamber communicating with said outlet of said delivery pump, a spring chamber communicating with the suction chamber of the injection pump, a spring located in said spring chamber for loading said accumulator, a fuel bypass line communicating said outlet of said delivery pump with the fuel tank, and a control valve located in said bypass line for communicating said outlet of said delivery pump with the fuel tank upon actuation of said cut-off device.

**4,957,085**  
**FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES**  
Anatoly Sverdlin, 1847 Raintree Cir., Seabrook, Tex. 77586  
Filed Feb. 16, 1989, Ser. No. 311,626  
Int. Cl.<sup>3</sup> F02M 39/00  
U.S. Cl. 123—467 46 Claims



1. An improved fuel injector adapted for use with a fuel injection system for a multi-cylinder internal combustion engine including a control fluid pressure source and a pressurized fuel source; said fuel injector comprising:

- an elongate body having a bore therein;
- a fuel nozzle at an inner end of said body for projecting within an associated cylinder combustion chamber for delivery of fuel therein, a fuel chamber adjacent the fuel nozzle and having pressurized fuel therein, and a valve seat between the fuel nozzle and fuel chamber;
- a valve mounted within said bore on said valve seat and movable between open and closed positions relative to said valve seat and said nozzle, said valve being in communication with pressurized fuel in said fuel chamber and urged toward an open unseated position by said pressurized fuel for providing fuel to said nozzle for discharge into an associated cylinder;
- a pressurized control fluid chamber in said body adjacent said valve and having pressurized control fluid therein for urging said valve toward a closed seated position on said valve seat to block the flow of fuel to said nozzle under a primary fluid control mode of operation;
- a mechanical mode spring in said body operable upon the decrease in pressure of said control fluid below a predetermined minimum amount for urging said valve toward a



said pump element bushing is formed as an integral member with a blink longitudinal bore which directly receives said pump piston;

said pump spring circumferentially surrounds said pump element bushing throughout a portion of the longitudinal extent of said pump element bushing; and said pump spring extends from the level of said adjusting means to the level of a working chamber of said pump piston.

4,957,091

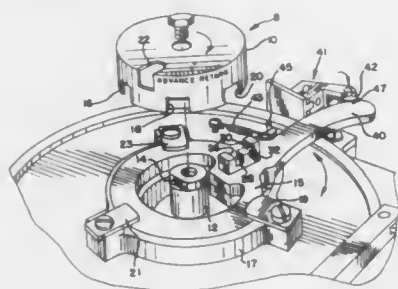
## DUAL SCHEDULE IGNITION SYSTEM

Gregory M. Remmers, Ingleside, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.  
Continuation-in-part of Ser. No. 131,457, Dec. 11, 1987, Pat. No. 4,858,585, which is a continuation of Ser. No. 12,336, Feb. 9, 1987, abandoned. This application Feb. 24, 1989, Ser. No. 315,147

Int. Cl. F02P 7/00

U.S. Cl. 123—602

27 Claims



1. An ignition system for an internal combustion engine of the type which has an ignition capacitor means, means for charging the ignition capacitor means, and means for discharging the ignition capacitor means in response to trigger pulses, the system comprising:

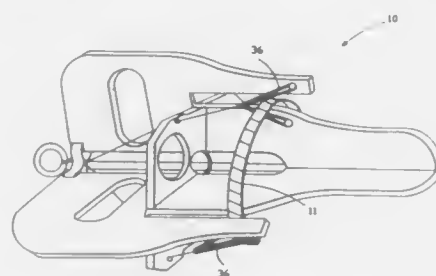
trigger pulse generating means for producing trigger pulses related to crankshaft position, said trigger pulse generating means being adapted to provide a non-advanced timing characteristic, and an advanced timing characteristic which is advanced a predetermined time with respect to said non-advanced timing characteristic;  
said trigger pulse generating means including a time base generator comprising an encoder disk having a generally cylindrical encoding portion and an end support, said end support being connected to the crankshaft of the engine for rotating said encoder disk synchronously therewith, said encoding portion including timing sections of a predetermined width corresponding to a fixed crankshaft angle; means for sensing the beginning of each timing section and producing a trigger pulse indicative thereof to generate said advanced timing characteristic; and means for sensing the ending of each timing section and producing a trigger pulse indicative thereof to generate said non-advanced timing characteristic;  
whereby the width of said timing sections correspond to the degree of advance of said advanced timing characteristic over said non-advanced timing characteristic;  
means for generating either an advanced signal for the selection of said advanced timing characteristic or a non-advanced signal for the selection of said non-advanced timing characteristic based upon at least one operating condition of the engine;  
said trigger pulse generating means providing trigger pulses with said advanced timing characteristic in response to said advance signal being applied thereto and providing trigger pulses with said non-advanced timing characteristic in response to said non-advanced signal being applied thereto.

4,957,092  
RING LAUNCHING METHOD AND APPARATUS  
Richard O. Rhodes, 490 Belvedere St., San Francisco, Calif. 94117

Filed Sep. 8, 1989, Ser. No. 404,826  
Int. Cl. F41F 7/00

U.S. Cl. 124—20.1

25 Claims



1. An apparatus for launching a ring, comprising:  
a frame defining a central longitudinal launching axis for supporting said ring such that said ring is positioned around the frame concentric with said longitudinal axis; and  
launching means supported on said frame for simultaneously imparting to said ring a rotational force and a forward, axial force along said longitudinal launching axis, whereby said imparted rotational and axial forces cause said ring to be launched from said frame and advance in a forward direction with inertial stability provided by said rotational motion thereby allowing prolonged and stable progression of said ring in said forward direction;  
said launching means including elastic members movable between a relaxed position and a stretched position such that said ring rests against said elastic members when the latter is in said relaxed position and said stretched position, whereby movement of said elastic members from said stretched position to said relaxed position launches said ring.  
25. A method of launching a ring from an apparatus comprising a frame defining a central longitudinal launching axis and a plurality of elastic members supported on said frame for holding said ring and for movement between a relaxed position and a stretched position, said method comprising the steps of:  
positioning said ring against said elastic members;  
stretching said elastic members from said relaxed position to said stretched position and causing it to move back to its relaxed position in a way which imparts to said ring both axial and rotational motion causing said ring to be launched from said frame and advance in a forward direction along said central longitudinal axis with inertial stability provided by said rotational motion thereby allowing prolonged and stable progression of said ring in said forward direction.

4,957,093

## COMPOUND BOW HAVING A PISTOL GRIP

Bruce R. Hamlett, 6027 Amadore, Union Lake, Mich. 48085  
Continuation-in-part of Ser. No. 134,468, Dec. 17, 1987, abandoned. This application Jul. 19, 1989, Ser. No. 382,732

Int. Cl. F14B 5/00

U.S. Cl. 124—24.1

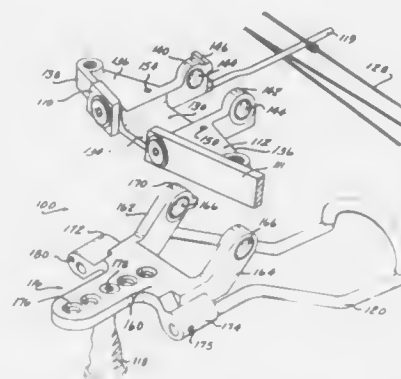
28 Claims

27. In a compound bow for projecting an arrow including first and second tensionable limbs, each limb having first and second end portions, a central body having first and second end portions adapted to support corresponding first end portions of said first and second tensionable limbs in an outwardly extending relationship thereto, a pair of pulleys, one pulley rotatably mounted on said second end portion of each tensionable limb with a bow string extending between said pulleys in

a conventional manner, said first and second tensionable limbs, said central body, and said bow string defining a longitudinal bow plane, a laterally offset portion formed in said central body defining an arrow passage for supporting an arrow having a longitudinal arrow axis disposed in said longitudinal bow plane;

the improvement comprising:

first and second arm portions extending from said central body with said arrow passage interposed between said first and second arm portions, each arm portion having a bearing bore formed therein defining a common longitudinal hinge axis lying in said longitudinal bow plane and intersecting said arrow axis in a perpendicular relationship thereto;  
a stop member formed on one of said arm portions projecting laterally beyond an outer surface of said one of said arm portions;  
a support member having first and second integral inclined



arms formed thereon, each inclined arm having a bearing bore formed therein alignable in coaxial relationship with said bearing bores of said arm portions of said central body;  
a stop projection formed on one of said inclined arms engageable with said stop member for limiting pivotal movement of said support member with respect to said central body;  
first and second pivot members for pivotally coupling said support member to said central body such that said arrow passage is unobstructed, said first pivot member coupling said first arm portion to said first inclined arm through said aligned bearing bores, said second pivot member coupling said second arm portion to said second inclined arm through said aligned bearing bores; and  
a hand grip member connectable to said support member and having a central longitudinal axis generally normal to said longitudinal bow plane and intersecting said arrow axis in a generally perpendicular relationship thereto.

4,957,094

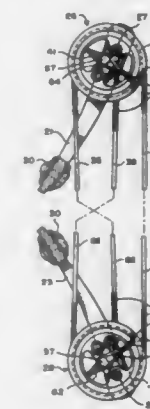
COMPOUND ARCHERY BOW WITH NON-STRETCH BOWSTRING AND ECCENTRICS FOR SECURING SAME  
James A. Pickering, Sandy; Joseph R. Johnston, Park City, both of Utah, and Thomas A. Fisher, Prescott Valley, Ariz., assignors to The Hoyt/Easton Archery Company, Inc., Salt Lake City, Utah

Filed Nov. 25, 1987, Ser. No. 125,120  
Int. Cl. F14B 5/00

U.S. Cl. 124—24.1

36 Claims

22. An eccentric for use with a compound bow having a handle section and a pair of limbs extending from the handle section to provide a pair of limb tips, comprising a bowstring section; a bowstring receiving groove about the periphery of the bowstring section; a buss cable section adjacent the bowstring section; a buss cable receiving groove about the periphery of the buss cable section; means located inwardly from the



securing a looped end of a bowstring to the eccentric so that a portion of the bowstring so attached will rest in the bowstring receiving groove; and means in the eccentric for receiving an axle for rotatably mounting the eccentric to a limb tip of a compound bow.

4,957,095

## ARCHERY BOW STABILIZER AND EMBEDDED ARROWHEAD REMOVER

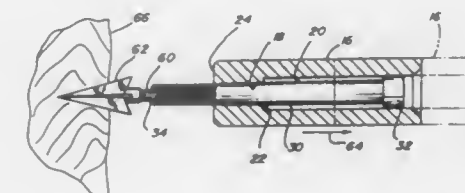
Ronald D. Cameron, Ann Arbor, Mich., assignor to Cougar Archery Products, Ann Arbor, Mich.

Filed Feb. 1, 1990, Ser. No. 473,400

Int. Cl. F41B 5/00; B23D 19/04

U.S. Cl. 124—89

14 Claims

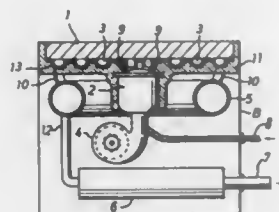


1. An archery bow stabilizer and embedded arrowhead extractor comprising:  
an elongated shaft having an enlarged head at one end thereof;  
a weight surrounding said shaft and having a bore extending longitudinally therethrough, said bore having a first portion with a diameter larger than said shaft and smaller than said enlarged head and a second portion with a diameter larger than the enlarged head to enable said head to slide through said second portion, a radial shoulder being formed at the merger of said bore portions;  
said shaft having a mounting end opposite from said enlarged head, said mounting end including means for mounting said shaft to said archery bow and means for coupling said mounting end to an arrowhead;  
said shaft being positioned in said bore in a first direction with the enlarged head engaging one end of said weight and the mounting end of said shaft projecting from the opposite end of said weight a predetermined distance for mounting said shaft to said bow for use as a bow stabilizer; and  
said shaft being positioned in said bore in a second direction opposite said first direction with the enlarged head slidable in said bore second portion, said shaft mounting end



being coupled to an embedded arrowhead whereby reciprocating motion of said weight impacting said shoulder against said enlarged head removes said arrowhead.

**4,957,096**  
**GAS COOKING APPLIANCE**  
 Nobuyoshi Yokoyama, c/o Engineering Department of Paloma Kogyo K.K., 6-23, Momozono-cho, Mizuho-ku, Nagoya-shi, Aichi-ken, Japan  
 Filed Dec. 1, 1989, Ser. No. 444,397  
 Claims priority, application Japan, Jul. 25, 1987, 62-114402  
 Int. Cl.<sup>5</sup> F24C 3/00  
 U.S. Cl. 126—39 H 4 Claims

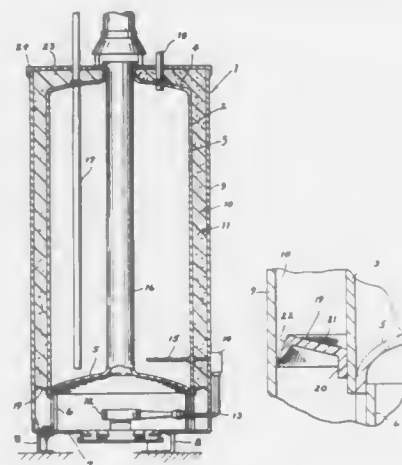


1. A gas cooking appliance for cooking chow mein, pan cakes or the like on a hotplate mounted thereon, comprising: a pulse combustion burner, installed within an internal compartment of the appliance and having a combustion chamber coupled with a bottom portion of said hotplate, suitable to effect pulse combustion of a mixture of gaseous fuels and air supplied thereto; wherein said hotplate is in the form of a thick metallic plate having immediately adjacent only the bottom portion thereof, a tailpipe passage which is connected at one end to an exhaust port of said combustion chamber and extends outwardly along and in direct contact with said metallic plate to permit the flow of combustion products, discharged therethrough, from said combustion chamber; and wherein the tailpipe passage is formed by pressed sheet metal secured to the bottom portion of said metallic plate.

**4,957,097**  
**FOAM INSULATED VESSEL AND METHOD OF MAKING THE SAME**  
 James L. Chevalier, Mequon; John D. Pfeffer, Brookfield, and Thomas F. Brownell, Oconomowoc, all of Wis., assignors to AOS Holding Company, Wilmington, Del.  
 Filed Feb. 18, 1988, Ser. No. 157,320  
 Int. Cl.<sup>5</sup> F24H 1/00  
 U.S. Cl. 126—373 5 Claims

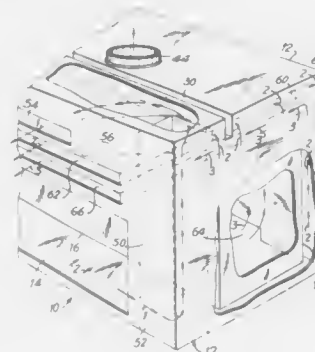
1. A foam insulated vessel, comprising a tank member to contain a fluid, a jacket member spaced outwardly of said tank member to provide an annular cavity therebetween, a flexible relatively stiff annular sealing strip disposed within said cavity, and aperture means at one end of said cavity for introducing a liquid foamable resin into said cavity, said strip having one edge secured to a first of said members and having a second distal edge disposed in sliding contact with the second of said members to provide a seal for said cavity, the central portion of said strip between said edges being arched in a direction toward said aperture means, said liquid foamable resin being supported by said strip to enable said liquid resin to expand to substantially fill said cavity and provide an insulating layer between said tank member and said jacket member, said strip

being constructed and arranged such that the pressure exerted by said foamable resin against said arched central portion will



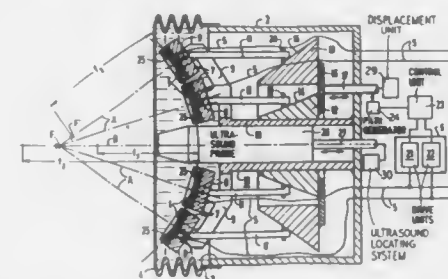
urge said distal edge into tight engagement with said second member.

**4,957,098**  
**WALL SHIELD AND CHIMNEY SUPPORT**  
 John G. Meeker, Rte. 6, Jefferson Valley, N.Y. 10535  
 Continuation of Ser. No. 203,853, Jun. 7, 1988, abandoned. This application Jun. 13, 1989, Ser. No. 366,281  
 Int. Cl.<sup>5</sup> F24B 7/00  
 U.S. Cl. 126—531 10 Claims



1. A wall shield and chimney support unit for insertion into a wall comprising flammable materials, comprising: an outermost metal box comprising a front wall, a rear wall, side walls, and top and bottom walls, an opening being formed in the front wall of said box, a chimney duct member extending from the top wall of the box and adapted to mate with an associated chimney in an associated dwelling, support means formed integrally with the top of said box for supporting the weight of the associated chimney, and air ducting means for ducting air in plural different air flow paths from inlets near the bottom front of the box up the front lateral corners of the box, thence laterally inwardly and exiting through at least one exit opening generally in the front surface of the box, whereby flammable building materials may be brought in close juxtaposition to the periphery of the front of said box.

**4,957,099**  
**SHOCK WAVE SOURCE FOR EXTRACORPOREAL LITHOTRIPSY**  
 Dietrich Hassler, Uttenreuth, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
 Filed Jan. 12, 1989, Ser. No. 296,077  
 Claims priority, application Fed. Rep. of Germany, Feb. 10, 1988, 3804096  
 Int. Cl.<sup>5</sup> A61B 17/22  
 U.S. Cl. 128—24 A 20 Claims

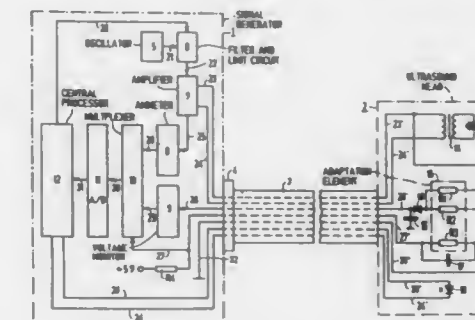


1. A shock wave source for non-contacting disintegration of calculi in a patient comprising:  
 a housing having an emission face;  
 a transducer arrangement in said housing consisting of a plurality of electro-acoustic transducers arranged on a concave surface, said transducer arrangement having an acoustic axis and each transducer having an acoustic axis in respective planes containing the acoustic axis of the transducer arrangement;  
 a shock wave-propagating medium disposed in said housing at least between said transducers and said emission face;  
 means for driving said transducers to generate shock waves in said medium adapted for disintegrating a calculus in a patient;  
 means for individually pivotally mounting each of said transducers so that the respective acoustic axes of said transducers are pivotable in said respective planes containing the acoustic axis of the transducer arrangement; and  
 means for adjustably controlling pivoting of said transducers in common so that their acoustic axes intersect at a focus on said acoustic axis of said transducer arrangement and for displacing said focus along said acoustic axis of said transducer arrangement.

**4,957,100**  
**ULTRASOUND GENERATOR AND EMITTER**  
 Ludwig Herzog, and Volker Knapp, both of Waldmichelbach, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
 Filed Mar. 8, 1988, Ser. No. 165,548  
 Claims priority, application Fed. Rep. of Germany, Mar. 20, 1987, 3709110  
 Int. Cl.<sup>5</sup> A61B 23/02  
 U.S. Cl. 128—24 A 6 Claims

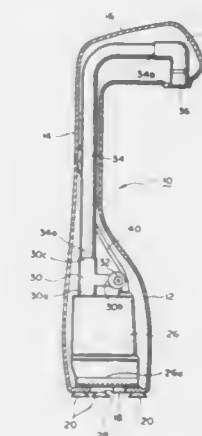
6. A method for substituting components in an ultrasound device having an ultrasound head which includes an ultrasound transducer and having a drive circuit for driving said ultrasound transducer, wherein said ultrasound transducer is removably mounted in said ultrasound head and an adaptation element which is electrically connected in a signal path between said ultrasound transducer is removably mounted in said ultrasound head, said method comprising the steps of:  
 electrically matching said adaptation element to said ultrasound transducer before installation of said adaptation element and said ultrasound transducer in said ultrasound head;

installing the matched ultrasound transducer and adaptation element as a pair in said ultrasound head; and



removing the matched ultrasound transducer and adaptation element as a pair from said ultrasound head in the event of a substitution of said ultrasound transducer.

**4,957,101**  
**PORTABLE BUBBLE BATH ASSEMBLY**  
 Zenzaburo Hara, Tokyo, Japan, assignor to Hara Health Industrial Co., Ltd., Tokyo, Japan  
 Filed Aug. 21, 1987, Ser. No. 88,422  
 Int. Cl.<sup>5</sup> A61H 9/00  
 U.S. Cl. 128—66 4 Claims



1. In a bubble bath assembly for use on the bottom wall of a bathtub and for creating a bubbling effect in the water in the bathtub, the bubble bath assembly including: pump means for drawing water thereinto from the bathtub and for discharging water under pressure into the bathtub, the pump means having an inlet and an outlet; a nozzle member connected to the outlet of the pump means for discharging water in a jet therefrom; and means for retaining the nozzle member over the water in the bathtub upon the installment of the assembly in the bathtub so that the jet of water is directed against the surface of the bath water when the pump means is operated, the improvement wherein the pump means comprises an underwater electric pump, and wherein the retaining means comprises: means for stably setting the underwater electric pump on the bottom wall of the bathtub; and support means, interposed between the pump and the nozzle member, for supporting the nozzle member over the pump, said setting means comprising a bottom housing in which said electric pump is enclosed and rigidly mounted, the bottom housing having a lower end surface and being adapted to be disposed within the bathtub, said setting means further comprising one or more suction cup members, attached to and projecting from the lower end surface of the

bottom housing, for releasably securing the bottom housing to the bottom wall of the bathtub, said bottom housing including means for urging the bottom housing toward the bottom wall of the bathtub, the urging means comprising a suction opening formed in the lower end surface of the bottom housing, the suction opening in fluid communication with the inlet of the electric pump, said one or more suction cup members being arranged at that portion of the lower end surface around said suction opening, an auxiliary nozzle member connected to the outlet of the pump, the auxiliary nozzle member attached to the bottom housing so that water is jetted out of the auxiliary nozzle member in a generally horizontal direction.

4,957,102

## LUMBAR SUPPORT DEVICE

Kenichi Tan, and Shoji Mizuno, both of Ayase, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan

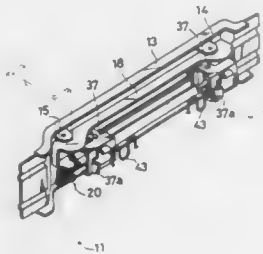
Filed Sep. 27, 1988, Ser. No. 249,667

Claims priority, application Japan, Sep. 30, 1987, 62-148103[U]

Int. Cl.<sup>5</sup> A61F 5/00

U.S. Cl. 128—68

5 Claims



1. A lumbar support device within a seat back comprising:
  - a pair of vertical side frames;
  - a horizontal lower frame fixed at said side frames at the position of the lumbar of an occupant;
  - a horizontal lumbar frame including two ends vertically movably supported by the horizontal lower frame;
  - a pair of support brackets each one forwardly and rearwardly movably supported by one of said ends of said horizontal lumbar frame via a pair of link mechanisms;
  - a support member fixed to said brackets to support the lumbar of the occupant;
  - a first pair of air mats each one interposed between the lumbar frame and one of the support brackets;
  - a second pair of air mats each one interposed between the lower frame and one of the ends of said lumbar frame; and
  - an air supply and discharge means connected to the first air mats to forwardly and rearwardly move the bracket, and connected to the second air mats to vertically move the horizontal lumbar frame.

4,957,103

## ORTHOPAEDIC BODY JACKETS

David E. Young, Watlington, and Kenneth P. Davis, Hillington, both of England, assignors to Protectair Limited, Abingdon, England

Continuation-in-part of Ser. No. 882,597, Jul. 7, 1986, Pat. No. 4,776,326. This application Sep. 27, 1988, Ser. No. 249,729

Claims priority, application United Kingdom, Oct. 14, 1987, 8710080; Jan. 27, 1988, 8815259

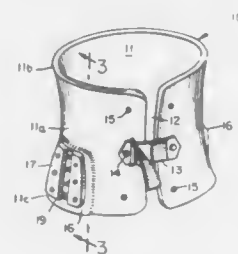
Int. Cl.<sup>5</sup> A61F 5/02

U.S. Cl. 128—78

8 Claims

1. An orthopaedic body jacket comprising a semi-rigid thermoplastic shell adapted to be fitted and fastened around the abdomen of a patient; said shell having a constricted waist

portion and outwardly flared upper and lower portions; said shell having a pair of front portions defining a ventral opening therebetween and being sufficiently flexible to permit said front portions to be flexed apart when fitting said shell about the waist of a wearer; said shell also having an integrally moulded upstanding lateral portion; said lateral portion extending upwardly from said flared lower portion and having an upper end protruding outwardly a substantial distance from



said constricted waist portion; means along said upstanding lateral portion defining a generally vertically extending externally-facing channel that opens laterally outwardly away from said shell and having a straight, outwardly-facing, planar surface for mounting an orthotic component in any of a plurality of positions of vertical adjustment; said externally-facing channel being of substantially uniform width throughout its length.

4,957,104

## IMPROVEMENTS TO OBLIVATE PURE VENOUS IMPOTENCE

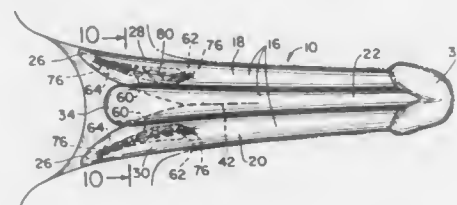
Adrian W. Zorziotti, 33 E. 74th St., New York, N.Y. 10021

Filed Apr. 27, 1989, Ser. No. 343,628

Int. Cl.<sup>5</sup> A61F 2/26

U.S. Cl. 128—79

4 Claims



1. A method of obviating male impotence due to venous leakage preventing erection of the penis by using hollow plastic implants, said method comprising the steps of selecting two implant sites in which each site is a location in each posterior end of the penis corpora cavernosa adjacent to the penis outflowing venous system and is oriented lengthwise of the penis on opposite sides of the penis centrally located corpus spongiosum, suturing in place each said hollow plastic implant at each said selected site in a clearance position from said corpus spongiosum with said outflowing venous system contributing to said venous leakage in said clearance therebetween, and increasing and decreasing the size of each said plastic implant by injecting thereinto and removing therefrom fluid to obtain a fluid volume effective to correspondingly adjust the size of said clearance, whereby said venous system is squeezed closed during erection by said implants creating a reduced clearance therebetween to the extent effective to counteract said venous leakage.

4,957,105

## FEMORAL COMPRESSION DEVICE FOR POST-CATHETERIZATION HEMOSTASIS

Paul A. Kurth, 1423 Brett Pl., Apt. 201, San Pedro, Calif. 90732

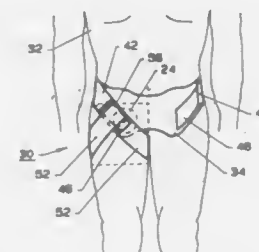
Filed Oct. 4, 1988, Ser. No. 253,188

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A61F 5/24

U.S. Cl. 128—96.1

21 Claims



1. An apparatus for applying pressure to a femoral vessel within the groin in the abdomen of a human body comprising:
  - a pellet means for applying a directed force to said femoral vessel of said human body;
  - a pelvic apron means for positioning said pellet means over said femoral vessel in one leg, said pellet means attached to said pelvic apron means, said pelvic apron means encircling said abdomen, extending downwardly toward said groin and completing encirclement of said abdomen at said groin; and
  - groin strap means for applying a compressive force to said pellet means tending to compress said femoral vessel, so that a substantial inward force is adjustably applied to said femoral vessel and blood flow therefrom is stanchied, said groin strap means having a first and second end, said first end attached to said pelvic apron means, said groin strap means extending over said point of attachment of said pellet means to said pelvic apron means toward said groin, around and behind said one leg, said second end of said groin strap means attaching to said pelvic apron means in the overlapping proximity of said point of attachment thereto of said pellet means to include said pellet means within the encirclement of said groin strap means, said groin strap means encircling the upper portion of said one leg and completing said encirclement at said groin where said apron means completes encirclement of said abdomen, said groin strap means and pelvic apron means forming in combination a figure of eight with the intersection of said figure of eight at said point of attachment of said pellet means at said groin.

4,957,106

## GAS MASK COUPLED TO MONOLITHIC MEMBER WITH SPEECH MEMBRANE

Gilbert Vandeputte, Berchem, Belgium, assignor to Engicom, Naamloze Vennootschap, Brussels, Belgium

Continuation of Ser. No. 24,999, Mar. 12, 1987, abandoned. This application Nov. 17, 1988, Ser. No. 273,127

Claims priority, application Belgium, Mar. 12, 1986, PV2/60937

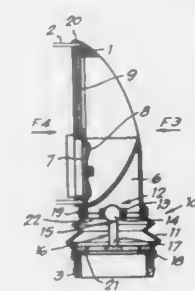
Int. Cl.<sup>5</sup> A62B 18/08

U.S. Cl. 128—201.19

7 Claims

1. A gas mask comprising a facepiece with a seat, a monolithic member having wall means made of rigid material and a plurality of seats formed therein, means for mounting said monolithic member in said seat of said facepiece, inlet opening means, outlet valve means, and speech membrane means each mounted in respective seats of said monolithic member, and an axis defined as being normal to the surface of and extending through the center of said inlet opening means and a coupling member pivotally mounted on said monolithic member for

pivoting about said axis, said coupling member having an inlet opening and an outlet opening, said outlet opening connected



with said inlet opening means and said inlet opening of said coupling member traveling along an arc during pivoting of said coupling member about said axis.

4,957,107

## GAS DELIVERY MEANS

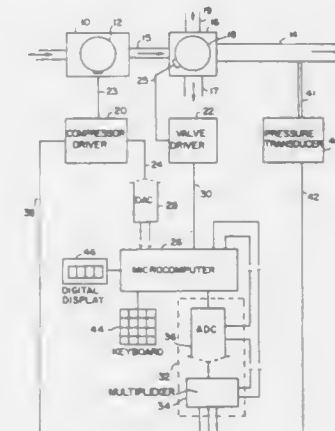
Anatole J. Sliem, 221 E. 78th St., New York, N.Y. 10021

Filed May 10, 1988, Ser. No. 192,177

Int. Cl.<sup>5</sup> A61M 16/00

U.S. Cl. 128—204.21

17 Claims

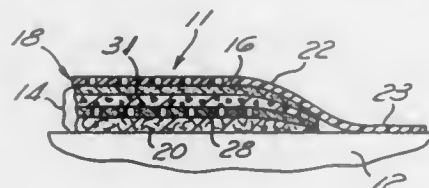


1. A system to cyclically deliver a controlled volume of gas through a line including:
  - (a) A variable speed rotary compressor driven by a rotary electric motor to supply pressurized gas;
  - (b) valve means to direct gas from the compressor to the line during the delivery interval of the cycle, and to divert the gas between such intervals;
  - (c) control means to drive the compressor motor and to actuate the valve means said control means including:
    - Means to select and maintain the cycle frequency;
    - Means to select and control the time of the delivery interval;
    - Means to select a reference value of the delivered gas volume;
    - Means to measure the instantaneous flow rate of the gas supplied by the compressor during a delivery interval of the cycle;
    - Means to compute the average flow rate measurement during the delivery interval to provide a computed value of the delivered gas volume; and
    - Means to adjust the compressor speed in the next succeeding delivery interval by an increment related to the difference between the computed value of the delivered gas volume and the reference value of delivered gas



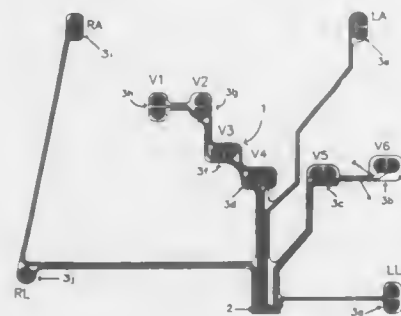
volume in a direction to reduce the difference between said delivered gas volume and said reference gas volume.

**4,957,108**  
**METHOD AND APPARATUS FOR DETERMINATION OF CHEMICAL SPECIES IN BODY FLUID**  
 Donald W. Schoendorfer, and William R. Miller, both of Santa Ana, Calif., assignors to Sudor Partners, Santa Ana, Calif.  
 Filed Sep. 8, 1988, Ser. No. 241,707  
 Int. Cl. A61B 5/00  
 U.S. Cl. 128—632 8 Claims



1. A dermal concentration patch for determining the presence of an analyte in a subject mammal's perspiration, comprising:
  - a water permeable support layer having a first and a second side;
  - at least one reagent immobilized to the support layer;
  - means for removably securing the first side of the support layer in fluid communication with the subject's skin, wherein water is permitted to escape through the support layer and outside of the concentration patch, and the reagent comprises a specific binding partner for the analyte to be determined; and
  - a permeable outer protective layer disposed adjacent the second side of the support layer.

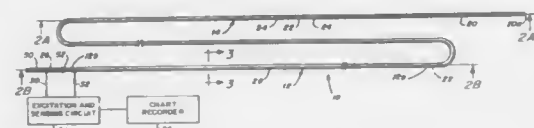
**4,957,109**  
**ELECTROCARDIOGRAPH SYSTEM**  
 Jeffrey Groeger, Bardonia, and Saul Miodownik, W. Hempstead, both of N.Y., assignors to Cardiac Spectrum Technologies, Inc., Bardonia, N.Y.  
 Filed Aug. 22, 1988, Ser. No. 234,982  
 Int. Cl. A61B 5/04  
 U.S. Cl. 128—640 7 Claims



1. An electrode assembly for receiving physiological signals, comprising:
  - a flexible substrate comprising a first section disposable over the heart and at least three elongated sections extending from the first section having a bottom surface and a top surface;
  - means forming a plurality of electrodes at the bottom surface of the substrate at the first section and the elongated sections and each electrode having a bottom surface facing away from the substrate;

an electrode connector fixed to the substrate and having a plurality of connector elements;  
 a plurality of flexible conductors fixed on the substrate and connecting the plurality of electrodes to the connector elements;  
 means for adjusting the length of at least one of the three elongated sections of the substrate and the conductors fixed thereto comprising means for releasably retaining the at least one elongated section folded on itself;  
 a layer of conductive adhesive on the bottom surface of each electrode; and  
 an adhesive layer on at least a portion of the bottom surface of the substrate.

**4,957,110**  
**STEERABLE GUIDEWIRE HAVING ELECTRODES FOR MEASURING VESSEL CROSS-SECTION AND BLOOD FLOW**  
 Robert A. Vogel, Lutherville, Md.; William A. Berthlaume, Hudson, and Thomas J. Palermo, Methuen, both of Mass., assignors to C. R. Bard, Inc., Murray Hill, N.J.  
 Filed Mar. 17, 1989, Ser. No. 325,223  
 Int. Cl. A61B 5/04, 5/026  
 U.S. Cl. 128—642 40 Claims

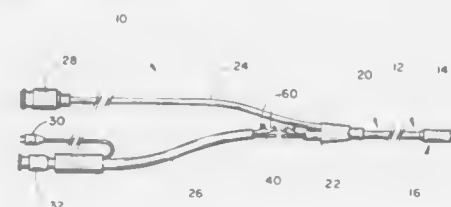


1. A steerable guidewire comprising:
  - an elongated shaft having a distal end and a proximal end, said shaft being sufficiently torsionally rigid along its length for controllably transmitting to the distal end substantially all of the rotation applied to the proximal end, said shaft including a first electrical conductor and a second electrical conductor insulated from said first electrical conductor, said electrical conductors extending from the distal end to the proximal end of said shaft; and
  - a tip attached to the distal end of said shaft, said tip adapted to be bent to a desired curve, said tip being sufficiently flexible so as to adapt to and follow the contours of a blood vessel, said tip including a distal electrode electrically connected to one of said conductors and a proximal electrode electrically connected to the other of said conductors, said electrodes being axially spaced apart on said tip by a predetermined distance, said distal electrode comprising a distal, conductive, helically-wound spring and said proximal electrode comprising a proximal, conductive helically-wound spring, said tip including a tapered distal region of said second conductor passing through said proximal spring and at least a portion of said distal spring and electrically connected to said distal spring.

**4,957,111**  
**METHOD OF USING A DOPPLER CATHETER**  
 Huntly D. Millar, Houston, Tex., assignor to Pfizer Hospital Products Group, Inc., New York, N.Y.  
 Continuation of Ser. No. 943,446, Dec. 16, 1986, Pat. No. 4,889,128, and a continuation of Ser. No. 775,857, May 19, 1987, Pat. No. 4,665,925. This application Sep. 23, 1988, Ser. No. 248,777  
 Int. Cl. A61B 8/12  
 U.S. Cl. 128—662.06 5 Claims

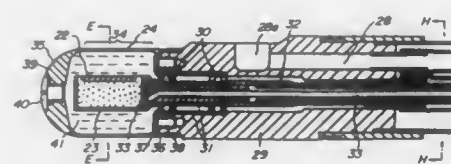
1. A method of treating stenosis in the arterial tree comprising the steps of:
  - providing a catheter having a Doppler crystal attached at the distal tip thereof and axially oriented therewith, an angio-balloon proximate to the distal end, and a passageway disposed for operable contact with the blood stream;

placing a wire guide in the passageway;  
 inserting the catheter into the arterial tree;  
 manipulating the wire guide to position the catheter in the region of the stenosis;



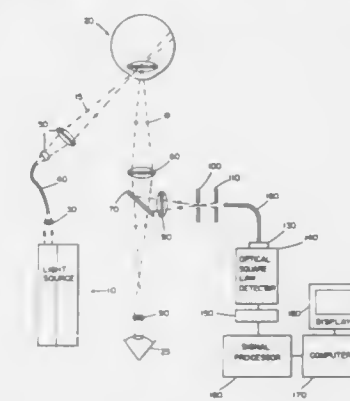
- expanding the angio-balloon in the region of the stenosis; and
- operating the Doppler crystal to measure the velocity of the blood in the region of the stenosis.

**4,957,112**  
**ULTRASONIC DIAGNOSTIC APPARATUS**  
 Takeshi Yokoi, Hachioji; Tsuguhisa Sasai; Kenji Hirooka, both of Tokyo, all of Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan  
 Filed Nov. 17, 1988, Ser. No. 272,464  
 Claims priority, application Japan, Nov. 20, 1987, 62-176500; Dec. 26, 1987, 62-331519; Dec. 28, 1987, 62-330292  
 Int. Cl. A61B 8/12  
 U.S. Cl. 128—662.06 12 Claims



1. An ultrasonic diagnostic apparatus comprising:
  - an inserting portion having distal and proximal ends and a center axis at said distal end;
  - an ultrasonic wave transmitting and receiving means having an ultrasonic vibrating element arranged at the distal end of the inserting portion for transmitting and receiving an ultrasonic wave for scanning an object to be inspected along a plane that crosses at substantially right angles with respect to an axis of the inserting portion;
  - a cover arranged at the distal end of said inserting portion and having a window, said window having a preformed curvature through which the ultrasonic wave transmitted by said ultrasonic vibrating element exits toward the object and the ultrasonic wave reflected by the object is made incident upon said ultrasonic vibrating element;
  - a rotating means connected to said ultrasonic wave transmitting and receiving means for rotating at least a part of said ultrasonic wave transmitting and receiving means about an axis of rotation to scan the object along said plane;
  - an illuminating system for illuminating the object; and
  - an observing system for forming an optical image of said object;
- whereby the axis of said inserting portion at said distal end is arranged to be deviated from said rotating axis of said ultrasonic wave transmitting and receiving means in a radial direction with respect to said rotating axis; and said center of curvature of said window is arranged to be coincident with the rotating axis of said ultrasonic wave transmitting and receiving means.

**4,957,113**  
**METHOD FOR DETECTING CATARACTOGENESIS USING QUASI-ELASTIC LIGHT SCATTERING**  
 George B. Benedek, Belmont, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.  
 Continuation of Ser. No. 91,658, Sep. 1, 1987, abandoned. This application Jan. 8, 1990, Ser. No. 463,883  
 Int. Cl. A61B 3/10  
 U.S. Cl. 128—665 16 Claims

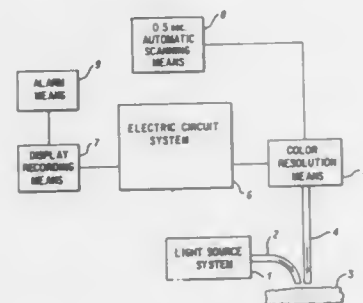


1. A method for in-vivo inspection of ocular tissue comprising:
  - (a) providing a source of substantially monochromatic, coherent, collimated light;
  - (b) focusing light from the source on a specific measurement location of a subject's ocular tissue;
  - (c) collecting the light scattered by the ocular tissue;
  - (d) converting the scattered light into an electrical signal representative of temporal fluctuations in the intensity of the scattered light;
  - (e) analyzing the electrical signal produced by the scattered light to determine the relative average intensity of the light scattered by slow moving protein aggregates in the ocular tissue ( $I_s$ ) and the relative average intensity of the light scattered by fast moving protein species in the ocular tissue ( $I_f$ ); and
  - (f) locating the position of a first member of the group of variables consisting of  $I_s$ ,  $I_f$ , and their sum  $I_{tot}$  on a universal curve produced by plotting the first member of the group as a function of a second member of the group, the position on the curve corresponding to the degree of cataractogenesis at the specific measurement location in the ocular tissue of the subject.

**4,957,114**  
**DIAGNOSTIC APPARATUS FOR INTRINSIC FLUORESCENCE OF MALIGNANT TUMOR**  
 Kun Zeng, Jinrong Wu; Sen Yang; Zhenfen Yu, all of No. 77 Jiangning La, and Jinde Zhu, No. 111 Zan Yi La, all of Shanghai, China  
 Continuation of Ser. No. 843,950, Mar. 25, 1986, abandoned.  
 This application Jun. 28, 1988, Ser. No. 212,630  
 Claims priority, application China, Apr. 1, 1985, 85100424  
 Int. Cl. A61B 6/00  
 U.S. Cl. 128—665 7 Claims

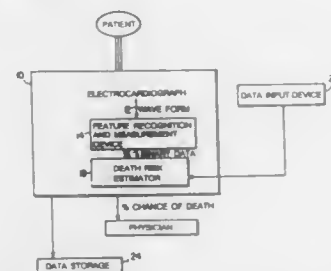
1. An apparatus for the diagnosis of malignant tumors comprising:
  - (a) means for generating near ultraviolet light having a frequency range of 3000 Å to 4000 Å;
  - (b) light transmission means composed of a bundle of optical fibers for transmitting the light to the surface of a tumor in order to stimulate intrinsic fluorescent light emission from said tumor;
  - (c) further light transmission means composed of a second bundle of optical fibers having an incident end and an

effluent end for transmitting the stimulated intrinsic fluorescence light emitted by the tumor wherein the incident end of said second bundle of optical fibers has means to maintain the incident end of the fibers in a position perpendicular to the surface of the tumor;



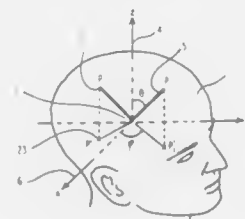
(d) color resolution means connected to the effluent end of said second bundle of optical fibers for processing the intrinsic fluorescent light output therefrom in order to determine the presence of light of a frequency of 6000° A to 6900° A, characterizing the presence of a malignant tumor.

**4,957,115**  
**DEVICE FOR DETERMINING THE PROBABILITY OF DEATH OF CARDIAC PATIENTS**  
Harry P. Selker, Wellesley, Mass., assignor to New England Medical Center Hosp., Boston, Mass.  
Filed Mar. 25, 1988, Ser. No. 173,220  
Int. Cl.<sup>5</sup> A61B 5/04  
U.S. Cl. 128—696 22 Claims



1. A device for determining the probability of imminent death of a patient from cardiovascular disease comprising:
  - a. an electrocardiograph adapted to deliver a signal in the form of an electrical waveform containing information about the condition of said patient's heart;
  - b. a waveform recognition and measurement device adapted to analyze said waveform and generate output based on said analysis; and
  - c. a computer adapted to receive said output and calculate a numerical value representing said probability based on said output.

**4,957,116**  
**METHOD AND DEVICE OF BRAIN'S CARTOGRAPHY IMPLEMENTED BY INTERPOLATION**  
Jacques Pernier, Saint Priest, and Francois Perrin, Sainte Foy, both of France, assignors to Institut National de la Sante et de la Recherche Medicale, I.N.S.E.R.M., Paris, France  
Filed Jan. 19, 1989, Ser. No. 299,153  
Claims priority, application France, Jan. 19, 1988, 88 00545  
Int. Cl.<sup>5</sup> A61B 5/04  
U.S. Cl. 128—731 7 Claims



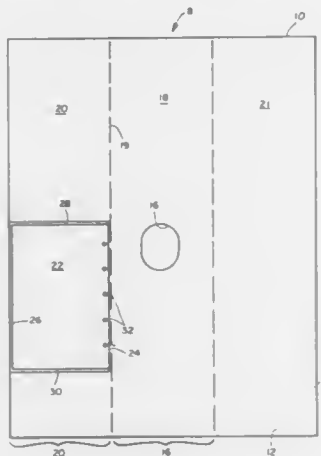


4,957,120

**SURGICAL DRAPE WITH EXTREMITY POUCH**  
 Carletta Grier-Idris, Acworth, Ga., assignor to Kimberly-Clark Corporation, Neenah, Wis.  
 Continuation of Ser. No. 246,041, Sep. 16, 1988, abandoned. This application Feb. 6, 1990, Ser. No. 474,694  
 Int. Cl.<sup>5</sup> A61F 13/00

U.S. Cl. 128—849

4 Claims



1. A surgical drape for use in limb surgery on an operating table having atop comprising a main sheet having an external surface and a bottom surface and a fenestration to permit a limb to be extended therethrough from said bottom surface to said external surface, said main sheet having a first section which is adapted to be positioned on said operating table top and includes said fenestration, and a second section which is adapted to hang below said operating table, and  
 a pouch for receiving said limb when positioned below said operating table top, said pouch being secured to said external surface of said main sheet on said second portion, said pouch having a top edge and a bottom edge jointed by opposed first and second side edges, said first and second side edges and said bottom edge being secured to said main sheet and said top edge being detachably secured to said main sheet to allow said pouch to be opened to receive said limb and then closed after insertion of said limb.

4,957,121

**MOBILE INTENSIVE CARE PATIENT HANDLING SYSTEM APPARATUS AND METHOD OF USING**  
 Timothy Icenogle; William F. Machamer; Robert J. Nelson; Stephen Mikitish, Jr.; and Robert R. Davis, all of Tucson, Ariz., assignors to Arizona Technology Development Corporation, Tucson, Ariz.

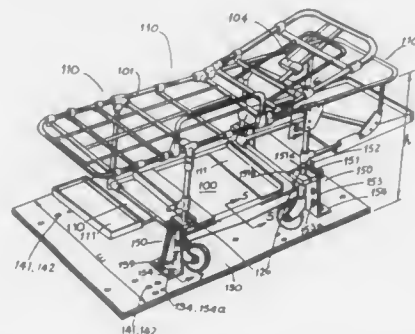
Filed Jul. 5, 1988, Ser. No. 217,365  
 Int. Cl.<sup>5</sup> B64D 9/00

U.S. Cl. 128—897

10 Claims

1. A mobile intensive care patient handling transport apparatus, said apparatus comprising:  
 (a) framework means for supporting a critically ill patient in a cot portion and associated life sustaining medical equipment secured in an undercarriage portion of said framework means, said undercarriage portion having restraint bracket attachment members for attaching to a conventional ambulance restraint bracket means provided on conventional ground ambulance vehicles; and  
 (b) detachable pallet means for supporting said framework means, said detachable pallet means having first restraint bracket means for detachably securing said framework means to said pallet means utilizing said restraint bracket attachment members, said first restraint bracket means comprising a pallet mounting plate member and a frame-

work undercarriage mounting member, said framework undercarriage mounting member being mechanically coupled to said pallet mounting plate member, said detachably secured framework means and said pallet means forming a transportable unit for being transported in an aircraft,



said detachable pallet means having second restraint bracket means attached to an underside of said pallet means for securing said pallet means to seat rails of said aircraft.

4,957,122

**DEVICE FOR THE ELECTROSTATIC PERFORATION OF WEBS OF PAPER**

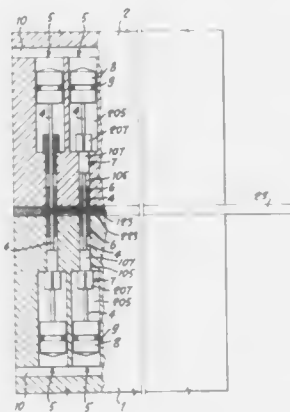
Paolo Maldina, Bologna; Maurizio Piana, Casalecchio di Reno, and Antonio V. Suzzi, Bologna, all of Italy, assignors to Sasib, S.p.A., Bologna, Italy

Filed Sep. 6, 1983, Ser. No. 529,851

Claims priority, application Italy, Sep. 15, 1982, 12621 A/82  
 Int. Cl.<sup>5</sup> A24C 5/00, 5/60

U.S. Cl. 131—281

24 Claims



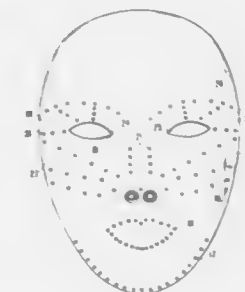
1. A device for electrostatic perforation of a web, comprising:  
 a first electrode-carrying head; and  
 a second electrode-carrying head spaced apart from said first head to permit said web to pass between said heads along a path having a portion thereof lying in a plane, said second electrode-carrying head including  
 an electrode support,  
 a plurality of needle-shaped electrodes having axes and discharge ends, said electrodes being slidably mounted to said electrode support with their discharge ends extending toward said first electrode-carrying head and with their axes substantially perpendicular to said plane,

4,957,124  
TEMPLATE

Lillian A. Mooney, 7520 E. 550 South, Zionville, Ind. 46077  
 Continuation-in-part of Ser. No. 154,232, Feb. 10, 1988, Pat. No. 4,886,079. This application Mar. 14, 1988, Ser. No. 167,772  
 The portion of the term of this patent subsequent to Dec. 12, 2006, has been disclaimed.  
 Int. Cl.<sup>5</sup> A45D 40/30

U.S. Cl. 132—200

7 Claims



said electrodes being slidable in the direction of their axes, and  
 adjustment means for exerting a pushing force on said electrodes to force the discharge ends thereof toward said first head so that a predetermined electrode spacing can be achieved when said web is replaced by a gauged shim and said discharge ends are pushed against said shim, said adjustment means additionally including restraining means for exposing said electrodes to an opposing force as they are being pushed,  
 wherein said electrode support has a plurality of bores, each electrode being disposed in a respective bore, wherein said electrodes have rear ends, and wherein said adjustment means includes, for each electrode, an electrode-carrying clamp disposed in the respective bore and frictionally engaging the electrode, and a piston slidably disposed in the respective bore, the piston having a first side disposed adjacent the rear end of the electrode and a second side for exposure to pressurized fluid.

4,957,123

**DEVICE FOR CLEANING A DRAIN**

George J. McHugh, Broomall, Pa., assignor to AGF Manufacturing, Inc., West Chester, Pa.

Division of Ser. No. 205,214, Jun. 10, 1988, Pat. No. 4,895,178.  
 This application Oct. 6, 1989, Ser. No. 417,897

Int. Cl.<sup>5</sup> B08B 9/02

U.S. Cl. 134—167 C

8 Claims



1. An apparatus for use in delivering fluid under pressure to a drain of a given diameter, comprising:  
 a bladder having an inlet end, an outlet end and an expandable wall having an outer diameter which is smaller than the given diameter of the drain when the bladder is unexpanded, the inlet end including an inlet;  
 supply connection means for connecting the apparatus to a fluid supply source which supplies fluid under pressure to the inlet; and  
 an orifice member including an end wall located at the outlet end of the bladder, the orifice member extending generally axially at said outlet end of the bladder and having an orifice in the end wall, the expandable wall of the bladder including valve means for closing the orifice when the bladder is unexpanded and for opening the orifice as the bladder is expanded, said valve means including the expandable wall of the bladder which is formed with an inner wall surface having a lip extending radially inwardly of the expandable wall, the lip covering the orifice when the bladder is unexpanded and being pulled away from the orifice by the expandable wall when the bladder is expanded, the outlet end of said bladder being closed except when said orifice is opened by said valve means, whereby when fluid under pressure is supplied to the bladder, the valve means prevents fluid from flowing through the orifice until after the pressure in the bladder initiates expansion in the bladder.

4,957,125

**TOOTHBRUSHING ASSEMBLY**

Merle L. Yaneza, 11708 S. Valley View, Whittier, Calif. 90604

Filed Jul. 26, 1989, Ser. No. 385,439

Int. Cl.<sup>5</sup> G01F 11/00; A46B 11/00

U.S. Cl. 132—309

1 Claim



1. A tooth brushing assembly for dispensing both toothpaste and for dispensing dental floss, said assembly comprising:  
 a cylindrical toothpaste reservoir having a cap end and an external end and an inner reservoir wall, said cap end including a conical cover to which a toothbrush is removably affixed and wherein said toothbrush includes a cover which is impervious to toothpaste;  
 a cylindrical knob affixed to said reservoir at the external end thereof, said cylindrical knob having an outwardly facing cylindrical chamber and having an inwardly facing cylindrical chamber and having an inwardly facing cylindrical chamber which surrounds the external end of said reservoir to support the cylindrical knob;  
 a threaded shaft affixed to said cylindrical knob and extending axially within said cylindrical toothpaste reservoir to about the cap end thereof;  
 a piston having an outer contact wall and having internal threads which mate with the threads of said threaded shaft, said piston being positioned within said cylindrical reservoir, and the outer contact wall touching the inner reservoir wall;  
 a spool of dental floss held within said outwardly facing cylindrical chamber; and

cap and cutoff means affixed to said outwardly facing cylindrical chamber.

4,957,126

**BRUSH-LESS WASHING INSTALLATION**

Pierre Allays, Poperinge, Belgium, assignor to Cleaning Systems International, Poperinge, Belgium

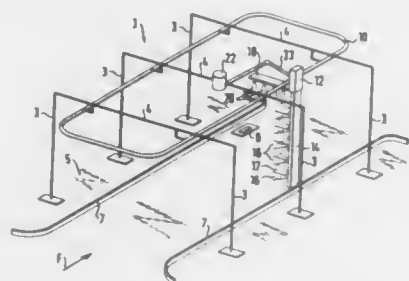
Filed Jun. 24, 1988, Ser. No. 210,951

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1987, 3723978

Int. Cl.<sup>5</sup> B08I 3/02

U.S. Cl. 134—57 R

12 Claims



2. A brush-less washing installation for vehicles comprising: a nozzle assembly for spraying washing fluid on to a vehicle to be cleaned, and including at least one substantially vertically arranged row of nozzles; means for moving said at least one row of nozzles about the vehicle; and means for rotating said row of nozzles at the same time about a vertical axis, in such a way that said nozzles are operable to spray against at least one side surface and at least one of the front and rear surfaces of said vehicle to be cleaned; wherein the row of nozzles includes at least first and second groups of nozzles of which one is designed to provide for a smaller cleaning width and the other for a larger cleaning width; and further comprising sensing means for detecting the length of a vehicle to be washed, for vehicles of different lengths which are always arranged for the washing operation in such a way that their front surface occupies substantially the same position in the washing installation, and means operable with reference to the detected vehicle length to switch the supply of washing fluid between a said group of nozzles with a first said cleaning width to a said group of nozzles with a second said cleaning width when, in the circulatory movement of the row of nozzles around the vehicle, the spacing of the row of nozzles from the respective surface of the vehicle which is just to be cleaned threatens to deviate from a predetermined value.

4,957,127

**PAINT ROLLER COVER APPLICATOR CLEANING APPARATUS**

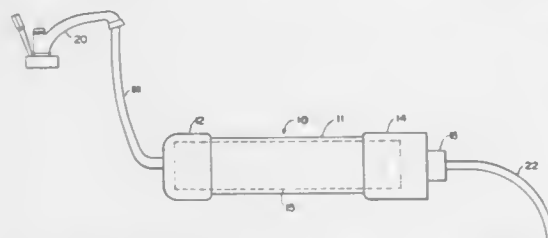
George P. Kostopoulos, 26 Ruth St., Trumbull, Conn. 06611

Filed Nov. 17, 1989, Ser. No. 438,716

Int. Cl.<sup>5</sup> B08B 3/04

U.S. Cl. 134—117

3 Claims



1. A paint roller cover applicator cleaning apparatus for cleaning a hollow, cylindrical paint roller cover applicator of

the type having a hollow body member supporting a paint absorbing layer with the hollow body member being plugged prior to insertion in the apparatus for cleaning comprising:

a cylindrical sleeve housing having an inside diameter slightly smaller than the outside diameter of a paint roller cover applicator to be cleaned by the apparatus;

a first end cap having a central opening therein adapted to couple a water supply to said apparatus mounted on one end of said sleeve;

a coupling means having a first end frictionally mounted on the other end of said cylindrical sleeve housing and a second end having a bayonet socket positioned therein adapted to removably house a second end cap therein;

a second end cap having a plurality of bayonet studs equally spaced around the periphery adapted to be removably inserted and locked in said bayonet socket of said coupling means;

said second end cap having a central opening therein coupled to a discharge hose whereby water is forced through the paint absorbing layer of an applicator placed in said apparatus and the water is discharged from the central opening of said second end cap by said discharge hose for the orderly disposal of the guided paint polluted water from the apparatus.

4,957,128

**COMPACT, VIBRATING-TYPE CONTACT LENS CLEANER**

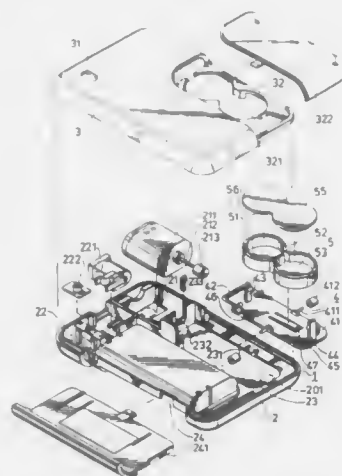
Ching-Shih Chen, No. 18, Shuang-Hsi St., Sheh-Lin Dist., Taipei, Taiwan

Filed Nov. 28, 1989, Ser. No. 442,067

Int. Cl.<sup>5</sup> B08B 3/12

U.S. Cl. 134—118

2 Claims



1. A contact lens cleaner comprising a base, a swingable vibrating plate with a free end mounted swingably on said base, a container mounted removably on said vibrating plate so as to receive an amount of a cleaning liquid and a contact lens therein, said container having two retaining notches formed in upper ends of two opposite side walls thereof, and said vibrating plate includes two gripping arms with barb-like ends projecting upward from an upper surface of said vibrating plate to engage said retaining notches with said barb-like ends of said gripping arms so as to retain said container on said upper surface of said vibrating plate; a motor disposed on said base so as to swing said vibrating plate, a cam member mounted rotatably on said base and having a cam surface which is engaged with said free end of said vibrating plate, and a resilient element biasing said free end of said vibrating plate toward said cam member, whereby, when said motor is started so as to rotate said cam member, said cam surface of said cam member

pushes said free end of said vibrating plate to move in one direction, while said resilient element moves said free end of said vibrating plate in the opposite direction to engage with said cam surface of said cam member, so as to swing said vibrating plate, thereby rinsing said contact lens with said cleaning liquid.

4,957,129

**FLUID REMOVING APPARATUS**

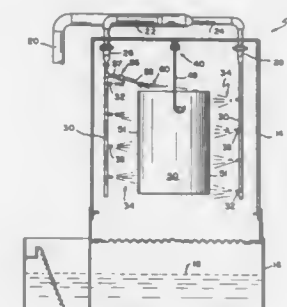
Kenneth N. Kraft, and R. Craig Allen, both of Evansville; Larry J. Schenk, Mount Vernon, all of Ind., assignors to George Koch Sons, Inc., Evansville, Ind.

Filed Jan. 6, 1989, Ser. No. 294,274

Int. Cl.<sup>5</sup> B08B 3/02

U.S. Cl. 134—151

8 Claims



1. An apparatus for removing excess solution from an article comprising a housing, means for spraying a high pressure liquid stream across a predetermined area inside the housing, the spraying means including a nozzle coupled to a liquid supply pipe, means for supplying liquid to the spraying means, and means for transporting an article having excess fluid on a portion of its exterior surface through the housing so that the portion of the exterior surface of the article having excess fluid thereon passes through the high pressure liquid stream, with the high pressure liquid stream forcing substantially all the excess fluid off the exterior surface of the article, the article including a top surface having an upwardly-turned outer edge forming a cavity which contains the excess fluid, the high pressure liquid stream being directed at the top surface of the article to force the excess fluid from the cavity as the article passes through the high pressure liquid stream.

4,957,130

CLEANING APPARATUS FOR CONTACT LENSES  
Chien H. Lee, 3 Fl., No. 3, Alley 16 Lane 591, Sec. 1, Nei Au Rd., Taipei, Taiwan

Filed Aug. 9, 1989, Ser. No. 391,239

Int. Cl.<sup>5</sup> B08B 3/04

U.S. Cl. 134—158

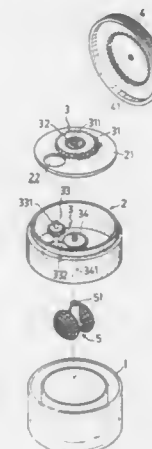
2 Claims

1. A cleaning apparatus having a pair of containers for receiving contact lenses therein, comprising:  
a cylindrical housing for containing a cleaning solution;  
transmission means disposed within an enclosure for drivingly rotating said pair of containers;  
plate means disposed within said enclosure for dividing said enclosure into an upper portion and a lower portion, said plate means including (1) a plate member having a through opening formed therein, and (2) a first spindle member fixedly coupled to said plate member adjacent said through opening;  
said transmission means comprising:  
(a) a main gear disposed within said upper portion of said enclosure and rotatably coupled to said first spindle member;  
(b) spring means having one end coupled to said main gear and an opposing end coupled to said first spindle member for rotatably driving said main gear in a first direc-

tion subsequent to said main gear being rotatably driven in a second direction;

(c) an output gear disposed in said lower portion of said enclosure adjacent a bottom surface thereof, said output gear being coupled to a second spindle member, said second spindle member being coupled to said pair of containers for rotative displacement responsive to rotation of said output gear;

(d) compound gear means extending between said upper and lower portions of said enclosure through said



through opening of said plate member for providing rotative coupling between said main gear and said output gear; and,

(e) a knob member having an internal circumferential toothed portion in meshing relationship with said main gear for manual rotative displacement of said main gear in said second direction, whereby said rotation of said knob member in said second direction stores energy in said spring means for driving said main gear in said first direction subsequent to a manual release of said knob member.

4,957,131

**ANIMAL WASTE FLUSHING ASSEMBLY**

James L. Robinson, 1421 N. 55th St., Philadelphia, Pa. 19131

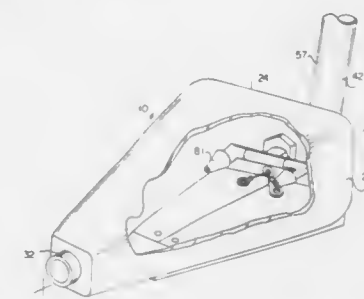
Continuation-in-part of Ser. No. 137,239, Dec. 23, 1987,

abandoned. This application Mar. 16, 1989, Ser. No. 324,393

Int. Cl.<sup>5</sup> B08B 3/02

U.S. Cl. 134—175

24 Claims



1. An assembly for flushing animal wastes from the ground, comprising:

a liquid supply tube with proximal and distal tube ends, said supply including  
connect means at said proximal tube end to connect said supply tube with a source of fluid under pressure;  
valve means along the liquid supply tube end to regulate flow of said fluid;

connect means at said distal tube end;

a domed waste enclosure connected to said distal end, and



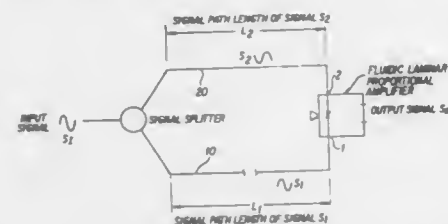
having liquid sprayer means, and drain means, the drain means being disposed substantially at an end opposite from the sprayer means, the sprayer means directing a substantial portion of a liquid stream from the liquid supply tube through an opening defined under the domed waste enclosure, directly into said drain means, substantially parallel and adjacent to the ground when said enclosure is placed on the ground, whereby the enclosure can be placed over animal wastes on the ground, and the valve means opened, whereupon fluid from the supply breaks up the waste and flushes them through the drain means; and means for defining an enclosure extending at least partly under the animal wastes, whereby the animal wastes are at least partly confined in the enclosure under action of the spray means.

**4,957,132**  
**METHOD FOR LOW FREQUENCY ATTENUATION IN FLUIDIC AMPLIFICATION OF ACOUSTIC SIGNALS**  
Nancy Srouer, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 12, 1989, Ser. No. 449,206  
Int. Cl.<sup>3</sup> F15C 1/12

U.S. Cl. 137-14

8 Claims



1. A method for adjustment of low frequency acoustic sound in an acoustic detector comprising the steps of:  
collecting incoming sound waves in the frequency range of DC to 3000 Hz so as to provide an incoming signal  $S_1$ ;  
splitting said incoming signal into two signals  $S_1$  and  $S_2$  such that signal  $S_1$  travels through a first acoustic transmission means a distance of  $L_1$  to a first control port of a fluidic laminar proportional amplifier and signal  $S_2$  travels through a second acoustic transmission means a distance of  $L_2$  to a second control port of said fluidic laminar proportional amplifier;  
adjusting said  $L_1$  distance such that the phase of input signal  $S_1$  is shifted in relation to the phase of input signal  $S_2$  when said input signals  $S_1$  and  $S_2$  arrive at said control ports of said laminar proportional amplifier.

**4,957,133**  
**FLUSHING UNIT**  
Dieter Linz, Bad Soden, and Peter Elmer, Frankfurt, both of Fed. Rep. of Germany, assignors to Messer. Griesheim, Fed. Rep. of Germany

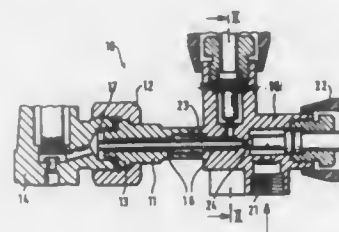
Filed Jul. 26, 1989, Ser. No. 385,189  
Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 8810259[U]

Int. Cl.<sup>3</sup> B08B 9/06; F17D 3/00  
U.S. Cl. 137-240

7 Claims

1. A flushing unit for gas cylinders comprising a solid unitary block housing, said housing having connecting means for connection to the cylinder valve of the gas cylinder, an extraction borehole in said housing, one end of said extraction borehole terminating at and communicating with the outlet of said cylinder valve, said extraction borehole having an outlet within said housing whereby a process gas may flow from said cylinder and through said extraction borehole when said cylinder valve is open, a process gas stop valve at the other end of said extraction borehole and being spaced from said cylinder

valve in said housing selectively opening and closing said extraction borehole to selectively permit and prevent the process gas from being discharged from said extraction borehole, a flushing gas inlet in said housing, a flushing gas line in said housing located parallel to said extraction borehole over substantially the entire length of said flushing gas line, a flushing gas inlet stop valve in said housing adjacent said process gas stop valve in said housing selectively opening and closing said flushing gas line, said flushing gas line communicating with said flushing gas inlet and said cylinder valve, one end of said flushing gas line terminating at said cylinder valve outlet, a space being created in said housing at said outlet of said cylinder valve where said outlet of said cylinder valve communicates with said one end of said extraction borehole and said one

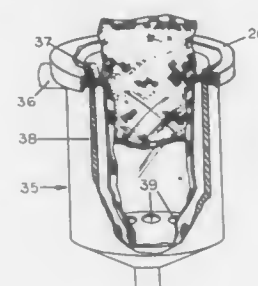


end of said flushing gas line, a flushing gas outlet in said housing communicating with said extraction borehole whereby said extraction borehole comprises an outlet passage for the flushing gas when the flushing gas enters said space, a flushing gas outlet stop valve adjacent said process gas stop valve in said housing selectively opening and closing said flushing gas outlet whereby a flushing gas may be supplied into said housing when said flushing gas outlet stop valve is open and said process gas stop valve is closed to flow through said flushing gas line and into said cylinder valve outlet at said space to mix with any process gas in said cylinder valve outlet and in said space and then flow out of said housing through said extraction borehole and said flushing gas outlet until all of the process gas has been displaced and whereby the space requirements and flushing gas requirements are minimized.

**4,957,134**  
**FERTILIZER CONTAINER FOR SPRINKLER SYSTEM**  
James R. Craig, 2925 Cody St., Riverside, Calif. 92503  
Continuation-in-part of Ser. No. 78,165, Jul. 27, 1987, Pat. No. 4,750,512. This application Jun. 10, 1988, Ser. No. 205,062  
Int. Cl.<sup>3</sup> B01D 11/02

U.S. Cl. 137-268

12 Claims



1. A fertilizer applicator for a sprinkler system, comprising:  
A. a screen for holding solid fertilizer, the fertilizer being contained in a water permeable bag;  
B. a screen holder for containing the screen, including:  
i. integrally formed upper and lower end flange members and sidewall elements joined thereto, the said elements providing openings for water to pass therethrough at a controlled rate and dissolve the fertilizer, the lower

flange member being perforated to permit water to drain therethrough; and,  
ii. a bottom support member for the screen, the support member having a plurality of sized openings to permit dissolved fertilizer to pass therethrough at a controlled rate;  
C. a case member, including:  
i. a sidewall portion for enclosing the screen holder and contained screen therein;  
ii. the case member being removably secured to the upper flange member of the screen holder, thereby spacing the sidewall of the case member and the sidewall elements of the screen holder;  
iii. the case member providing inlet and outlet means for water and diluted fertilizer solution, respectively, whereby:  
i. water fed into the inlet will be pressured between the sidewall of the case, through the sidewall elements of the screen holder and into the screen to dissolve the fertilizer;  
ii. water draining from the perforations in the lower flange member will dilute the dissolved fertilizer solution to reduce fertilizer burning; and,  
iii. when the solid fertilizer is dissolved, water is passed principally through openings of the bottom support member and the outlet of the applicator, and then to the sprinkler system.

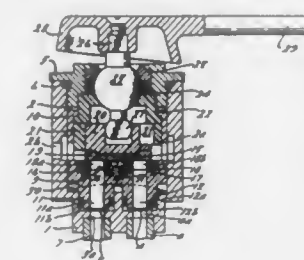
**4,957,135**  
**MIXING VALVE WITH VALVE PLATES PROVIDED WITH AN ATTACHMENT MECHANISM FOR THE FIXED PLATE TO PROVIDE A COMPRESSIVE FORCE**  
Alfons Knapp, Biberach/Riss, Fed. Rep. of Germany, assignor to Masco Corporation, Taylor, Mich.

PCT No. PCT/US87/00542, § 371 Date Dec. 22, 1988, § 102(e) Date Dec. 22, 1988, PCT Pub. No. WO88/07151, PCT Pub. Date Sep. 22, 1988

PCT Filed Mar. 16, 1987, Ser. No. 378,528  
The portion of the term of this patent subsequent to Sep. 9, 2003, has been disclaimed.

Int. Cl.<sup>3</sup> F16K 11/078, 25/00  
U.S. Cl. 137-454.6

8 Claims



1. A mixing valve comprising  
a faucet body having a cartridge receiving chamber;  
a cartridge housed in said cartridge receiving chamber and having a fluid receiving chamber and a support surface facing the fluid receiving chamber;  
a valve plate fixedly mounted on the support surface;  
a seal means interposed between the fixed plate and the support surface;  
a movable valve plate in contact against said fixed valve plate and operably connected to a control means for moving said valve plate relative to said fixed valve plate;  
compressive means for pressing the fixed valve plate against said support valve surface thereby compressing the seal means interposed between the fixed plate and said support surface independent of any smaller compressive forces exerted between said fixed plate and said movable plate.

**4,957,136**  
**NON-FLOWING MODULATING PILOT OPERATED RELIEF VALVE**

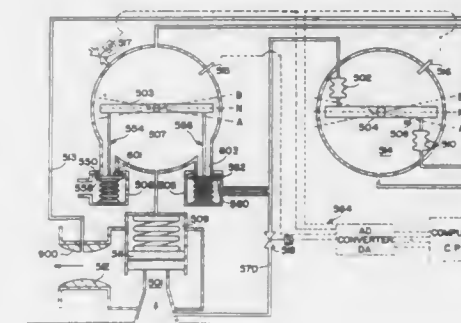
Gelo N. Gavril, Parsippany, N.J., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 292,558, Dec. 30, 1988, Pat. No. 4,905,727. This application Apr. 11, 1989, Ser. No. 336,433

The portion of the term of this patent subsequent to May 6, 2006, has been disclaimed.  
Int. Cl.<sup>3</sup> G05D 16/00

U.S. Cl. 137-488

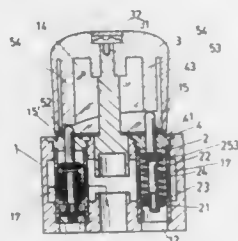
89 Claims



1. A pilot device for use in a relief valve system wherein said pilot device controls a piston-covers-nozzle type of main valve connected to a pressure system which is protected by the relief valve system, said pilot device being operable to control the pressure in a dome pressure chamber of the main valve with the dome pressure biasing the piston in the main valve to regulate fluid flow through the main valve, said pilot device comprising:

a housing having a first controlled pressure chamber and a second pressure chamber, said first controlled pressure chamber including a first pressure inlet port, a second pressure venting port, a third dome pressure communication port and a fourth pressure transducer feedback port;  
a torsion device adapted to assume a pre-set torque position; first and second pressure transducers located in said second pressure chamber, said first and second pressure transducers being in communication with said torsion device, and said first pressure inlet port communicating with both the pressure system protected by the relief valve system and said second pressure transducer, and said second pressure venting port adapted to vent pressurized fluid in said first controlled pressure chamber to a venting area;  
follower means for opening and closing said first pressure inlet port and said second pressure venting port, and said follower means being responsive to movement of said torsion device;  
said third dome communication port connecting said first controlled pressure chamber to the dome pressure chamber of the main valve;  
said fourth pressure transducer feedback port being in communication with said first pressure transducer so as to provide a first feedback line;  
said first pressure transducer having means for sensing pressure variations in said first controlled pressure chamber and means for applying torque to said torsion device in response to pressure variations in said first controlled pressure chamber;  
said second pressure transducer having means for sensing pressure variations in the pressure system protected by the pilot operated relief valve, and means for applying torque to said torsion device in response to the sensed pressure variations of the pressure system protected by the pilot operated relief valve.

**4,957,137**  
**HOT/COOL WATER REGULATING FAUCET**  
 Hong-Shang Wang, No. 70, Lane 139, Lien Cheng Road,  
 Chungko, Taipei Hsien, Taiwan  
 Filed Mar. 8, 1989, Ser. No. 320,445  
 Int. Cl.<sup>5</sup> F16K 11/16  
 U.S. Cl. 137—549 6 Claims

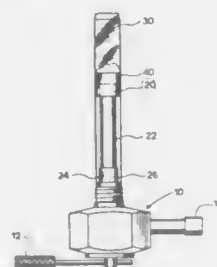


1. A hot/cool water regulating faucet, comprising:
  - a housing, having two cross shaped openings, said cross shaped openings each comprising an inner thread at the top and being respectively in communication with an associated water inlet and water outlet, said housing also comprising a main shaft at the center, said main shaft having a thread hole;
  - two sleeves being set in said two cross shaped openings respectively, said two sleeves each comprising a plurality of holes at the middle portion and having a movable axle thereinside for mounting thereon of a spring to further be connected with a rubber cock and a metal cap and screwed up with a nut;
  - two stepped upper caps to match with said two sleeves, said two stepped upper caps each having an outer thread and a central hole to allow the associated movable axle to be inserted into said central hole so as to confine the associated sleeve in the associated cross shaped opening of said housing;
  - a cover knob, comprising two grooves, a retainer means, and two tracks, said two tracks being to control said two movable axles of said two sleeves respectively;
  - said two sleeves are respectively set in said two cross shaped openings of said housing and said cover knob is fixedly mounted on said main shaft such that the revolving of said cover knob drives said two tracks to push said two movable axles of said two sleeves to move so as to simultaneously control the water flow rate of hot water and cool water.

**4,957,138**  
**ANTI-SIPHONING DEVICE FOR A RESERVE METERING VALVE**  
 Wayne H. Pingel, and Donna M. Pingel, both of Rte. 1, Box 303, Grand Marsh, Wis. 53936  
 Filed Nov. 10, 1987, Ser. No. 119,077  
 Int. Cl.<sup>5</sup> E03B 3/18 9 Claims

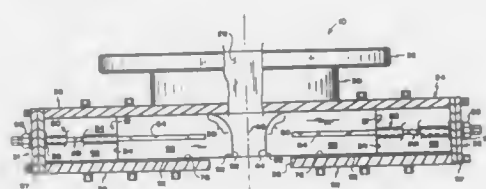
1. An anti-siphon device for attachment to a reserve metering valve having a standpipe with an orifice at its upper extremity and a filter screen surrounding the standpipe to prevent the siphoning of liquid upwards on the filter screen surrounding the standpipe comprising:

a sleeve member arranged to circumscribe the standpipe and mounted proximate the upper extremity of the standpipe



in contact with the screen, and extending above and below the standpipe orifice.

**4,957,139**  
**LOW-NOISE NOZZLE VALVE**  
 Hal S. Gwin, Madison, and James R. Aaron, Athens, both of Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.  
 Filed Sep. 7, 1989, Ser. No. 404,290  
 Int. Cl.<sup>5</sup> F16K 3/32, 37/00, 3/316 6 Claims



1. A low-noise, variable discharge area, split gate valve comprising:
  - a valve housing having a fluid entrance opening and a fluid exit opening, said openings being aligned about a common axis;
  - a pair of opposed, elongated recesses in said housing, with said axis passing therebetween, with each interior side of each said recess provided with a spline longitudinally disposed therein, and each said recess having an end wall; facing gates movably disposed in each recess, each said facing gate having a forward edge provided with a radiused upstream region for smoothyl accelerating fluid passing therebetween;
  - a groove longitudinally disposed on each narrow side of said gates and disposed to slidably receive the splines, and a sheet of material having a low coefficient of friction disposed on a lower surface of each said recess adjacent to said exit opening for enabling smooth movement of the gates in said recesses; and
  - means for moving each said gate inward or outward with respect to said axis, thereby closing or opening said valve.

**4,957,140**  
**HYDRAULIC PRESSURE CONTROL VALVE FOR USE WITH BRAKE MASTER CYLINDER**  
 Ichiro Ishiwata, Yokosuka, Japan, assignor to Nippon Air Brake Co., Ltd., Japan  
 Filed Apr. 14, 1989, Ser. No. 337,955  
 Int. Cl.<sup>5</sup> G05D 16/04 10 Claims

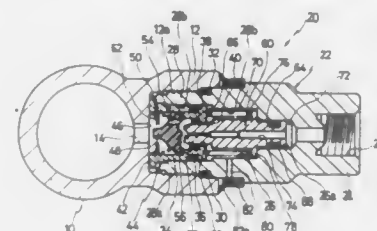
1. A hydraulic pressure control valve for use with a brake master cylinder, comprising:
  - a hollow body of one-piece structure having an outlet bore

and an inlet formed respectively in one and other ends of said body, said body having an internal stepped bore which extends between said outlet bore and said inlet bore and through which said outlet bore and said inlet bore communicate with each other, said body being provided, adjacent the other end thereof, with a mounting portion to said master cylinder;

a piston arranged in said stepped bore of said body for reciprocative movement along said stepped bore in response to hydraulic pressure introduced into said body from said master cylinder, said piston being formed therein with a passage through which said outlet bore and said inlet bore communicate with each other, said piston having one end thereof remote from said outlet bore, whose end face serves as a valve seat;

spring means arranged within said body for biasing said piston toward said outlet bore;

a substantially tubular cap element arranged in said inlet



bore for substantially closing said stepped bore, wherein said cap element supports said one end of said piston, and wherein said cap element has an inner peripheral surface thereof which defines a valve chamber;

fixing means arranged between said cap element and said body for fixing said cap element to said body without being accompanied with rotation of said cap element and said body relative to each other, wherein said fixing means is formed by caulking of one of said body and said cap element to the other; and

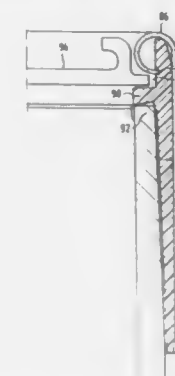
a valve element arranged within said valve chamber in facing relation to said valve seat provided at the one end of said piston, wherein said valve element is normally spaced away from said valve seat, but is seated on said valve seat when said hydraulic pressure reaches a predetermined level to move said piston toward said valve element against biasing force of said spring means, thereby causing said valve element to close said passage in said piston.

**4,957,141**  
**PIPE-END PROTECTOR**  
 Wilfried Dreyfuss, Dorfstrasse 52, D-3111 Eimke, Fed. Rep. of Germany; Thomas E. Remp, 5555 Del Monte Dr., Houston, Tex., and Kurt Müller, Eicklingen, Fed. Rep. of Germany, assignors to Wilfried Dreyfuss, Elmke, Fed. Rep. of Germany and Thomas E. Remp, Houston, Tex.  
 Filed Jun. 29, 1988, Ser. No. 212,795  
 Int. Cl.<sup>5</sup> B65D 59/06; F16L 55/10 1 Claim

1. A protector for the threads of a pipe-end, comprising:
  - (a) a longitudinally extending metallic tubular member;
  - (b) an elastomeric sleeve adapted to engage the threads of a pipe-end and affixed co-axially and co-extensively relative to said tubular member, thereby forming a unit;
  - (c) means for securing said sleeve to said tubular member;
  - (d) said unit having first and second spaced end portions;
  - (e) said unit first end portion including an annular groove;
  - (f) an elastic lid removably secured to said annular groove;
  - (g) said sleeve is disposed within said tubular member;
  - (h) said tubular member including a first end portion curved inwardly;
  - (i) said tubular member including an edge section extending transversely thereto and engaging an end portion of said

sleeve, thereby securing said sleeve to said tubular member;

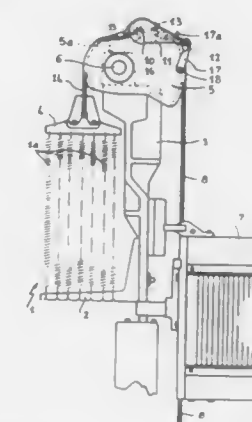
(j) said sleeve including a radially extending annular flange



adjacent said tubular member first edge section for engaging an end portion of the pipe-end; and

(k) said flange is spaced from said tubular member edge section, thereby forming said annular groove.

**4,957,142**  
**TENSION LEVER FOR NEGATIVE DOBBY**  
 Louis Houloa, Duingt, France, assignor to S.A. des Etablissements Stanbli (France), Faverges, France  
 Filed Mar. 21, 1989, Ser. No. 326,562  
 Claims priority, application France, Mar. 31, 1988, 88 04569  
 Int. Cl.<sup>5</sup> D03C 13/00 8 Claims



1. In a drawing system for controlling the heddle frames of weaving mechanisms of the negative type and which includes for each heddle frame at least one elongated transmission element having a length dimension, said transmission element having one of the end portions thereof attached to a mobile member for actuating the mechanism and an opposite end portion which is associated with a register of springs which act to return the heddle frame after it has been moved, the improvement comprising, a tension lever member, first pin means for connecting said tension lever member to and along the length of the transmission element, second pin means for pivotally mounting said tension lever member about an axis oriented transversely to the length of the transmission element, said first pin means spaced from said second pin means and being relative movable with respect to said second pin means as said tension lever member is pivoted about said second pin means



between a first and second position, said tension lever member being moveable to selectively tension and relax the springs of the register.

4,957,143

# REED OPERATING SYSTEM FOR LOOM

Takao Takahashi, Hachioji; Takatsugu Kato, and Shigero Terushima, both of Tokyo, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

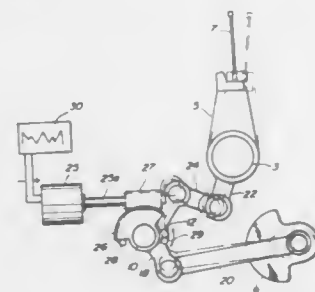
Filed Jul. 1, 1988, Ser. No. 213,955

Claims priority, application Japan, Jul. 8, 1987, 62-103798[U]

Int. Cl.<sup>5</sup> D03D 49/00

U.S. Cl. 139—190

6 Claims



1. A reed operating system for a loom, comprising:
  - a crank for driving a reed between an advance position and a backdown position;
  - a swingable link through which said sley sword is connected to said crank;
  - a pivot shaft on which said swingable link is mounted so as to be swingably rotatable around an axis of said pivot shaft, said pivot shaft including a first shaft section, and a second shaft section on which said link is mounted, said second shaft section being eccentric relative to said first shaft section;
  - pattern means;
  - means for shifting and fixing location of said pivot shaft in a predetermined distance in a predetermined direction in accordance with a predetermined pattern whereby the advance position of the reed can be changed without substantially changing the backdown position, said pivot shaft location shifting and fixing means including a servo-motor, means for driving said servo-motor in accordance with said predetermined pattern, a sector gear fixed to said pivot shaft first section, and a worm gear engaged with said sector gear and driven by an output shaft of said servo-motor.

4,957,144

# TACK-IN SYSTEM OF SHUTTLELESS LOOM

Tetsuji Watanabe, Tokyo; Hidetsugu Umezawa, Higashiyama, and Sigenori Tanaka, Tokyo, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 27, 1988, Ser. No. 289,802

Claims priority, application Japan, Dec. 28, 1987, 62-335468; Mar. 31, 1988, 63-42014[U]; Jul. 4, 1988, 63-87941[U]; Jul. 6, 1988, 63-166953; Jul. 22, 1988, 63-97047[U]

Int. Cl.<sup>5</sup> D03D 47/48

U.S. Cl. 139—434

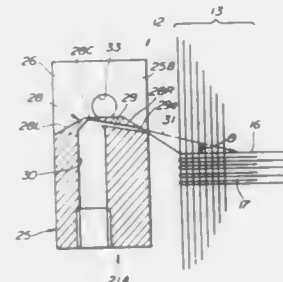
23 Claims

1. A tack-in system of a shuttleless loom having means for picking a weft yarn into a shed of warp yarns, said tack-in system comprising:
  - means defining a slit located near an edge of an array of the warp yarns, the weft yarn picked from the weft picking means being extended through said slit;
  - means for cutting the weft yarn picked from the weft picking means;
  - means for holding an end section of the picked and cut weft yarn having at least a part of said end section located

within said slit, said end section projecting from an edge of a woven fabric;

means defining a fluid jet nozzle having an opening from which a fluid jet is ejected;

means for locating an opening of said nozzle such that the



fluid jet therefrom blows the picked and cut weft yarn end section held by the holding means; and

means for directing the fluid jet from said fluid jet nozzle so that an axis of the fluid jet crosses a cloth fell at an acute angle when projected on a horizontal plane passing through said cloth fell.

4,957,145

# PNEUMATIC WEFT THREAD HOLDER FOR A SELVAGE DEVICE

Eddy Vercluyte, Ieper; Ignace Meyns, Reninge, and Patrick Glorie, Ieper, all of Belgium, assignors to Picanol N.V., Belgium

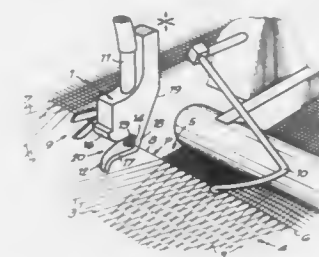
Filed Jun. 26, 1989, Ser. No. 371,029

Claims priority, application Belgium, Jun. 29, 1988, 8800746

Int. Cl.<sup>5</sup> D03D 47/38, 47/48

U.S. Cl. 139—434

2 Claims



1. A pneumatic weft holder for a weaving machine selvedge device including a tucking needle which passes on one side of said holder during a selvedge forming operation, comprising a blower nozzle; means on a side of said nozzle located in a blowing direction of said blower nozzle for supporting said weft thread, said support means being located between said blower nozzle and said one side of the holder passed by the tucking needle; and an opening in the support means which is in line with the blowing direction of said blower nozzle, wherein said opening has means including an enlargement transverse to the blowing direction of the blower nozzle for permitting air to escape when said tucking needle passes on said one side of the holder, thereby preventing air current fluctuations caused by said needle from disturbing the position of said thread.

4,957,146

# FLATPACK PREPARATION MACHINE

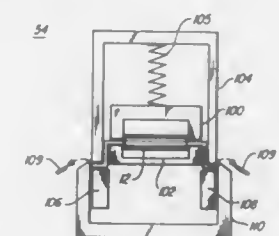
Nathaniel J. Satterfield, Anderson, S.C.; J. Gregg Ellis, Indian Harbour Beach, and Leonard T. Heach, Jr., Palm Bay, both of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Mar. 6, 1989, Ser. No. 319,036

Int. Cl.<sup>5</sup> B21F 45/00

U.S. Cl. 140—105

10 Claims



1. A process for forming the leads of an integrated circuit having a body and a plurality of leads extending therefrom, including the steps of:

- (a) clamping each lead between the body and the lead portion to be formed;
- (b) bending each lead downwardly to form a first lead segment forming an angle of between approximately 45 degrees and approximately 90 degrees with the body;
- (c) for each lead, bending a portion of the first lead segment outwardly to form an approximately horizontal second lead segment; and
- (d) cutting each lead vertically upward to remove a predetermined portion of said second lead segment.

4,957,147

# CONTAINER FILLING APPARATUS

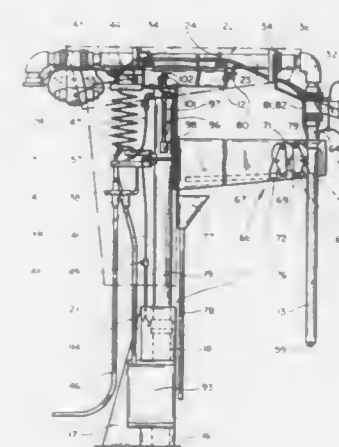
Terry B. Lowe, 133 Pagosa Way, Fremont, Calif. 94539

Filed Oct. 1, 1987, Ser. No. 103,519

Int. Cl.<sup>5</sup> B65B 3/28

U.S. Cl. 141—83

11 Claims



1. In apparatus for filling a container with a liquid: a base, an arm mounted on the base for movement between raised and lowered positions, a filling lance carried by the arm for introducing the liquid into the container, a first sensing tube carried by the lance and having a discharge opening which is normally positioned above the level of the liquid in the container, a second sensing tube having a discharge opening positioned below the discharge opening in the first named sensing tube and normally below the level of the liquid in the container, means for introducing a fluid into the sensing tubes, means for withdrawing the lance from the container as the container is filled, means for monitoring the pressure of the fluid in the sensing tubes, and means responsive to the pressure of the fluid

in the tubes for increasing the rate at which the lance is removed in the event of an increase in the pressure in the first tube and decreasing the rate at which the lance is removed in the event of a decrease in the pressure in the second tube.

4,957,148

# CHIP REMOVING DEVICE FOR MULTI-HEAD MACHINE TOOL

Isao Shoda, 1116-4, Okaba-cho, Hamamatsu, Shizuoka, Japan

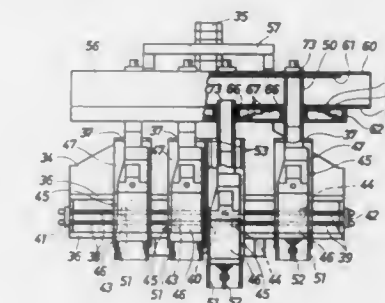
Filed Oct. 27, 1989, Ser. No. 427,400

Claims priority, application Japan, Nov. 2, 1988, 63-143961[U]; Apr. 5, 1989, 64-86068

Int. Cl.<sup>5</sup> B27G 19/00

U.S. Cl. 144—252 R

5 Claims

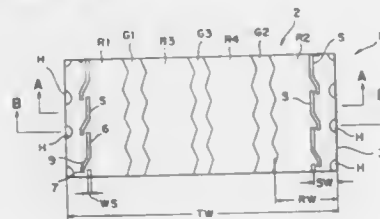


1. A chip removing device for a multi-head machine tool comprising:

- a ram;
- a plurality of working heads, each including a motor and individually movably mounted on the ram;
- individual head holders for moving the heads in horizontal opposite directions;
- an actuator for moving each of the heads selectively between an upper position and a lower position;
- means for defining a suction air passage around each said motor;
- a connecting pipe extending from an upper portion of each of said working heads;
- a horizontally extending common duct, connected commonly to each said connecting pipe, for causing a vacuum sucking action to act upon said working heads there-through to collect chips produced by said working heads, said duct having a horizontally elongated slit formed in a lower wall thereof;
- expandable shutter means for normally closing said slit of said common duct, upper end portions of said connecting pipes extending in an airtight condition through said shutter means into said duct, said shutter means opening and closing in response to horizontal movement of said working heads such that, when one of said working heads is moved in one of said horizontal opposite directions, said shutter means is partially expanded and contracted on opposite sides of said one of said working heads; and
- a horizontally elongated seal plate, secured horizontally within said duct and disposed commonly to said working heads such that, when each of said working heads is at the upper position, said connecting pipe of said one of said working heads is pressed at an upper end opening thereof against said seal plate so that said upper end opening is closed in an airtight condition by said seal plate, but when the working head is at the lower position, said upper end opening of said connecting pipe is spaced away from said seal plate and is in an open condition.

**4,957,149**  
**PNEUMATIC TIRE TREAD WITH PLURAL OVERLAPPING NARROW GROOVES IN SHOULDER**  
 Munemori Iuchi, Kobe, Japan, assignor to Sumitomo Rubber Industries, Ltd., Japan

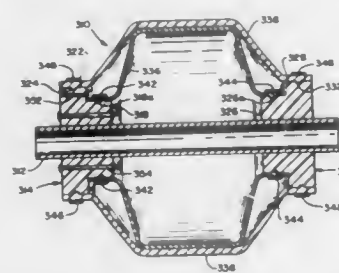
Filed Jan. 31, 1989, Ser. No. 304,194  
 Claims priority, application Japan, Feb. 1, 1988, 63-22447  
 Int. Cl.<sup>5</sup> B60C 11/06  
 U.S. Cl. 152—209 R 7 Claims



1. A pneumatic tire having a tread region and a pair of shoulder regions, one extended radially inwardly from each tread edge, said tread region provides with a pair of circumferentially extending shoulder ribs, said shoulder regions being provided with buttress hollows arranged circumferentially at intervals, one of said shoulder ribs being provided with a plurality of circumferentially extending narrow grooves, said narrow grooves arranged in the circumferential direction of the tire so that the circumferentially adjacent narrow grooves are overlapped with each other at their end portions, the locations of the overlaps in said narrow grooves being coincident with the locations of the buttress hollows in the circumferential direction of the tire, each of said narrow grooves comprising a long main portion, a short overlap portion and an inclined portion extending therebetween to connect the overlap portion with the main portion, and said main portion and said overlap portion extending in parallel to the circumferential direction of the tire, and said inclined portion being inclined with respect to the circumferential direction of the tire and connecting said overlap portion with said main portion.

**4,957,150**  
**LINEAR TIRE**  
 Louis A. Dionisio, 750 S. Pecan St., Lindenhurst, N.Y. 11757, and Philip Dionisio, 228 Bayview Dr., Mastic Beach, N.Y. 11951

Filed Jan. 23, 1989, Ser. No. 299,907  
 Int. Cl.<sup>5</sup> B60C 5/00, 3/04  
 U.S. Cl. 152—454 4 Claims

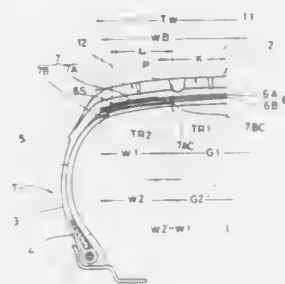


1. A wheel and tire assembly for a vehicle comprising:  
 a. means forming a cylindrical hub;  
 b. a pair of spaced flanges mounted on said hub, each of said flanges including a cylindrical collar;  
 c. an inner liner comprising a continuous sheet of inflatable material surrounding and extending between the collars of said flanges;  
 d. jacket means surrounding said inner liner capable of tak-

ing a predetermined shape upon being expanded by the inflation of said continuous sheet;  
 e. an outer tire casing means enclosing said jacket means for being expanded into the shape of said jacket means upon the latter being expanded by the inflation of said inner liner and thereafter functioning as a tire;  
 f. sealing means mounted on each said collar to prevent air from escaping from within said inner liner;  
 g. opening means in one of said flanges for permitting gas under pressure to be injected into said inner liner for inflation thereof;  
 h. said sealing means comprising external bead means for retaining said inner liner, jacket means, and casing means on said flanges and preventing loss of air under pressure from said inner liner;  
 i. said external bead means comprising straps for clamping the ends of said inner liner, jacket means and casing means on each said collar and;  
 j. said opening means comprising a passageway to permit gas under pressure to be injected, said passageway being sealed closed by tightening the strap on the flange containing said passageway.

**4,957,151**  
**RADIAL TIRE FOR PASSENGER CARS INCLUDING FOLDED BAND LAYER AT THE BELT EDGES**  
 Kenji Takehara, Kobe, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Jun. 17, 1988, Ser. No. 207,964  
 Claims priority, application Japan, Jun. 17, 1987, 62-152321  
 Int. Cl.<sup>5</sup> B60C 3/00, 9/28  
 U.S. Cl. 152—454 2 Claims

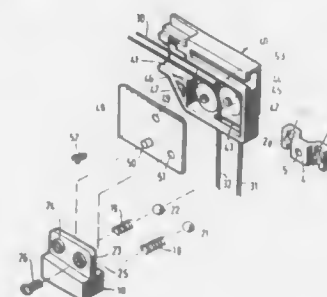


1. A radial tire for passenger cars comprising:  
 a bead core disposed in each bead portion of the tire;  
 a carcass having a ply of radially arranged cords both ends of which are turned up around the bead cores;  
 a tread disposed on the carcass;  
 a belt layer having two plies of steel cords disposed between the carcass and the tread; and  
 a band layer disposed at each edge of the belt layer and turned back on itself to form an upper portion disposed radially outside the belt layer and a lower part disposed radially inside the belt layer, said band layers being composed of organic fiber cords inclined at 5 to 45 degrees to the circumferential direction of the tire, the band layers being axially separated from each other between the upper portion and the lower portion, and the gap between the upper portion being in a range of 35 to 65% of the width of the belt layer, the width of the lower portion of each band layer being 5 to 20 mm larger than the width of the upper portion thereof, the tread, in a state that the tire is mounted on a regular rim and inflated to 5% of a regular internal pressure, provided with a tread face composed of a central arc portion with a radius of curvature (TR1) and a pair of lateral arc portions with a radius of curvature (TR2) located one on each side of the central arc portion, the ratio (TR2/TR1) of the radius of curvature (TR2) of the

lateral arc portions to the radius of curvature (TR1) of the central arc portion being in a range of 0.15 to 0.45, and a connection between the internal arc portion and each external arc portion located axially outward of the axially inner edge of the lower part of each band layer and axially inward of each edge of the overlap of the two belt plies.

**4,957,152**  
**CORD TENSIONING DEVICE**  
 Peter E. Knight, Walsall, and John E. Lyons, Burton-on-Trent, both of United Kingdom, assignors to Swish Products Limited, Staffordshire, England

Filed May 2, 1988, Ser. No. 189,155  
 Int. Cl.<sup>5</sup> A47H 5/00  
 U.S. Cl. 160—345 8 Claims



1. A device for maintaining tension in two runs of a cord, said runs of cord having at one end of the run a first means about which a cord is looped to provide the said runs of cord and at the other end second means over which the said runs of cord pass to provide end portions extending downwardly of said runs, said device comprising:

a first member containing two parallel open channel means to receive a respective downwardly extending end portion of each of said runs of cord,  
 a second member at least partially closing each said channel to retain said end portions in their respective channels, and resilient pressure means acting between said second member and said end portions to urge each said end portion into frictional contact with a wall of its respective channel means opposite said second member, whereby the runs of the cord may be tensioned by the application of a tensioning force to one or both of said downwardly extending end portions, and the said runs of cord remaining in a tensioned condition when the said tensioning force is removed.

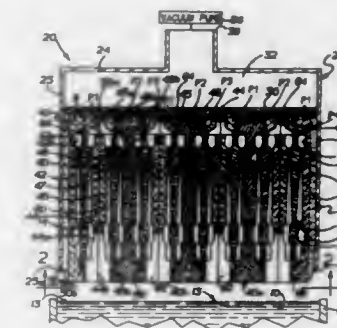
**4,957,153**  
**COUNTERGRAVITY CASTING APPARATUS AND METHOD**  
 George D. Chandley, Amherst, N.H., assignor to General Motors Corporation, Detroit, Mich.

Filed May 2, 1989, Ser. No. 346,627  
 Int. Cl.<sup>5</sup> B22C 9/04; B22D 19/06  
 U.S. Cl. 164—7.1 55 Claims

1. Apparatus for countergravity casting of molten metal, comprising:  
 (a) a container having an open bottom end,  
 (b) a gas permeable, self-supporting mold disposed in the container, said mold including a mold cavity and molten metal inlet means communicating with the underside of said mold for admitting the molten metal into the mold cavity from an underlying molten metal pool,  
 (c) a particulate bed compacted in the container about the mold, and  
 (d) means for establishing a negative differential pressure between the inside and the outside of the container suffi-

cient to hold the particulate bed about the mold before, during and after filling of the mold cavity with metal.  
 37. A method of countergravity casting of molten metal, comprising:

(a) positioning a gas-permeable, self-supporting mold in a container having an open end, said mold having a mold cavity therein and molten metal inlet means communicating said mold cavity with the underside of said mold,  
 (b) compacting a particulate bed about said mold in said container,  
 (c) establishing a sufficient negative differential pressure between the inside and the outside of the container to hold

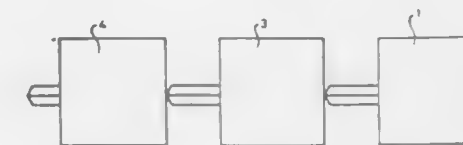


the particulate bed in the container about the mold when the open end thereof faces an underlying molten metal pool,

(d) orienting the container such that the open end of the container and said molten metal inlet means of the mold face said pool,  
 (e) relatively moving the underlying molten metal pool and the container to immerse said molten metal inlet means in said pool, and  
 (f) drawing the molten metal upwardly through the molten metal inlet means into said mold cavity to fill said mold cavity with said molten metal when the molten metal inlet means is immersed in the pool.

**4,957,154**  
**PROCESS FOR THE IN-LINE HOMOGENIZATION AND RECRYSTALLIZATION OF METALLIC PRODUCTS OBTAINED BY CONTINUOUS CASTING**  
 Gérard Durand-Texte, Aubervilliers, France, assignor to Etablissements Griset, Aubervilliers, France

Filed May 8, 1989, Ser. No. 348,816  
 Claims priority, application France, Jun. 3, 1988, 88 07432  
 Int. Cl.<sup>5</sup> B22D 11/12  
 U.S. Cl. 164—476 3 Claims



1. A process for the in-line homogenization and recrystallization of a continuous casting product, comprising:

(a) providing a continuous casting product including an alloy having a plurality of phases therein disposed proximate to the surface of said product;  
 (b) forming a plurality of voids at least near said surface by superficially cold-working said product; and  
 (c) homogenizing at least said surface by heat treating said product, and substantially reducing at least one of said phases whereby a portion of said voids assist in accelerating a diffusion of a portion of said phases into said alloy.



1. A baffle for a tubular structure of at least two pairs of spaced tubes, comprising in combination:  
a first baffle sheet having two portions curved in accommodation of spaced tubes in one of said pairs; and

a second baffle sheet having another two portions curved in accommodation of spaced tubes in the other of said pairs when said baffle is inserted in between said two pairs of spaced tubes;  
said first and second baffle sheets being structurally interconnected and biased away from each other for self-clamping retention between said two pairs of spaced tubes.

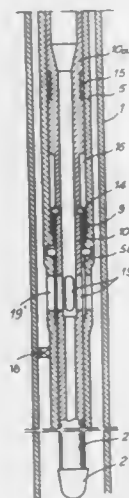
**4,957,161**  
**DEVICE FOR PUMPING A FLUID AT THE BOTTOM OF A WELL**

Henri Cholet, Le Pecq, and Edmond Chanton, Clamart, both of France, assignors to Institut Français du Pétrole, Malmaison, France

Continuation-in-part of Ser. No. 213,239, Jun. 29, 1988, abandoned. This application May 15, 1989, Ser. No. 352,017  
Claims priority, application France, Jun. 30, 1987, 87 09231  
Int. Cl.<sup>5</sup> F04B 47/14

U.S. Cl. 166—105

11 Claims



1. A device for pumping a fluid at a bottom of a well extending down from a surface, said device comprising tubing disposed vertically within the well and having a lower end part plunging into the fluid and an upper end which opens out on the surface and through which upper end the fluid is discharged, a pump seat connected to the lower part of the tubing, a gear pump being on the pump seat inside the tubing and comprising a pump case having a lower portion and an inner volume which communicates with an inner volume of the tubing, at least one stator fixed in the case and at least one helical rotor rotatively mounted in the stator, means for driving the rotor, and means for raising and suspending the pump in the tubing, said driving and raising means being actuatable from the surface, the pump seat having a tubular shape and including on an inner surface thereof, a bearing portion for the pump case, a bore downwardly extending the bearing portion axially of the tubing and having a reduced diameter relative to an inside diameter of the tubing and opening onto the fluid and constituting a cavity for the lower portion of the pump case in which the fluid is aspirated, wherein the lower portion of the pump case is connected to a cylindrical heavy body having a diameter less than the diameter of the bore of the pump seat, disposed in the axial extension of the pump case, the weight of the said heavy body being at least equal to the greatest of the two forces  $F_1$  and  $F_2$  given by the hereunder expressions:

$$F_1 = \frac{Cf}{\sqrt{4E^2 + R^2}} \times \frac{T}{\sqrt{T^2 + 4\pi^2(4E^2 + R^2)}}$$

in which expressions:

E is the eccentricity of the rotor (in cm)  
R is the radius of the rotor (in cm)  
 $\Delta P$  is the raise of pressure through the pump (in bars)  
 $S_j$  is the surface area of the transverse section of the sealing device of the pump case (in cm<sup>2</sup>)  
 $C_f$  is the torque exerted on the rotor at the starting of the pump (in cm Kg)  
 $C_r$  is the torque then the pump is operated continuously (in cm Kg)  
T is the pitch length of the stator (in cm).

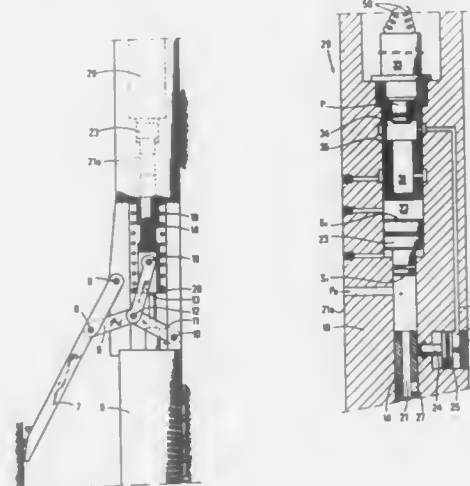
**4,957,162**  
**DEVICE FOR ANCHORING A PROBE IN A WELL BY SPREADING MOBILE ANCHORAGE ARMS**

Noël Etourmy, Saint Gaudens, and Jean Laurent, Orgeval, both of France, assignors to Institut Français du Pétrole, Roell-Malmaison and Ateliers Mécaniques mde Saint Gaudens "A.M.G.", Saint Gaudens, both of, France

Filed May 30, 1989, Ser. No. 357,994  
Claims priority, application France, May 30, 1988, 88 07275  
Int. Cl.<sup>5</sup> E21B 23/04

U.S. Cl. 166—212

4 Claims



2. A anchorage device for anchoring a probe means in a well, the anchorage device comprising at least one anchorage arm adapted to be pivoted with respect to a body of the probe means, at least one spring means, a rod means driven in a translatory movement by expansion of the spring means, means for transforming the translatory movement of the rod means into a pivoting movement of the at least one anchorage arm means, means for intermittently immobilizing the rod means in a compressed position of the spring means comprising a bolt means adapted to be engaged in a radial recess means of the rod means in the compressed position of the spring means, and hydraulic means for moving the bolt means towards a release position when the rod means is released, said hydraulic means comprising a cavity means formed in the body of the probe means, a head means fast with the bolt means in translation and adapted to slide in said cavity means, a section of said head means being greater than a section of the bolt means, and a hydraulic circuit means for applying a variable pressure to the head means of the bolt means, wherein pressure application means are provided for permanently applying to the bolt means a pressure equal to a pressure prevailing in the well and an opposite pressure to the head means which may vary between a first pressure having a value sufficient to move the bolt means toward said engagement position in the radial recess means of the rod means, and a second low pressure so that the bolt means is pushed toward said release position, and wherein the hydraulic circuit means comprises a duct means opening

into the cavity means on a side of the head means opposite to the bolt means, and switching means for selectively applying the first pressure or the second pressure to said head means.

**4,957,163**  
**METHOD OF STABILIZING POLYMER SOLUTIONS IN A SUBTERRANEAN FORMATION**

Mark B. Ward, Missouri City, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Jan. 8, 1990, Ser. No. 461,942  
Int. Cl.<sup>5</sup> E21B 43/22

U.S. Cl. 166—273

13 Claims

1. A process for recovering petroleum from an underground reservoir having acidic sites wherein the reservoir is penetrated by at least one injection well and at least one production well, said wells being in fluid communication with each other, comprising:

- injecting through the injection well into the reservoir an effective amount of an aqueous solution of urea to neutralize the acidic sites on rock in the reservoir;
- injecting into the reservoir an amount of an aqueous solution of a water-soluble polymer as an oil drive fluid;
- forcing the urea and polymer solutions through the reservoir to drive the petroleum toward the production well, and
- recovering petroleum from the reservoir through the production well.

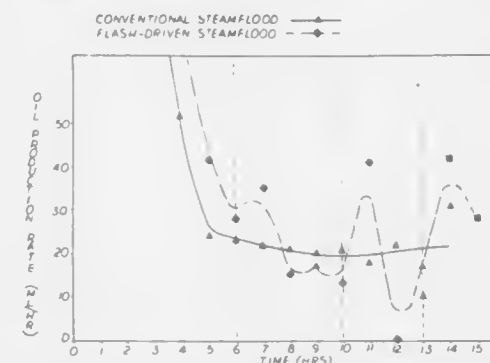
**4,957,164**  
**ENHANCED OIL RECOVERY USING FLASH-DRIVEN STEAMFLOODING**

Steven D. Roark, Bartlesville, Okla., assignor to IIT Research Institute, Chicago, Ill.

Filed Apr. 17, 1989, Ser. No. 339,148  
Int. Cl.<sup>5</sup> E21B 43/24

U.S. Cl. 166—263

3 Claims



1. In a method for recovery of oil from light oil reserves in a subterranean oil-bearing formation by injecting steam into the formation through an injection well and recovering oil from a production well at a distance from the injection well, the improvement comprising:

- injecting steam through an injection well into a light oil-bearing formation while gradually reducing the production rate of oil recovered from a production well located at a distance from said injection well so that the pressure in said formation increases at a predetermined rate of from about 5 to about 50 psia per day from an original value to a predetermined maximum value; (b) maintaining injection of said steam through said injection well after increasing the production rate of oil recovered from said production well to a value such that said predetermined maximum pressure value is maintained for a predetermined time; and (c) gradually increasing the production rate of oil recovered from said production well so that the pressure in said formation decreases at a predetermined rate of from about 5 to about 50 psia per day from

said predetermined maximum value back down to said original value.

**4,957,165**  
**WELL TREATMENT PROCESS**  
Lisa A. Cantu, Ponca City, Okla.; Marion W. Osborne, Houston, Tex., and Edward F. McBride, Wilmington, Del., assignors to Conoco Inc., Ponca City, Okla.

Continuation-in-part of Ser. No. 155,786, Feb. 16, 1988, Pat. No. 4,848,467. This application Jan. 19, 1989, Ser. No. 368,689  
The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> E21B 33/138, 43/12

U.S. Cl. 166—295

7 Claims

1. In a process for treating a well in a subterranean formation penetrated by a wellbore wherein a well treatment fluid comprising an aqueous gel is pumped down said wellbore as part of a well treatment procedure, wherein a particulate fluid loss additive is included in said well treatment fluid, and wherein a gel filter cake is formed on the surfaces of said wellbore in said formation, the improvement comprising:

- utilizing as at least a part of said fluid loss additive a hydroxyacetic acid condensation product, said condensation product being degradable at formation conditions whereby hydroxyacetic acid monomers and dimers are formed, and said condensation product being present in an amount sufficient to provide enough degradation products including hydroxyacetic acid to react with and break the gel in said filter cake and to recover permeability in said formation without the necessity of adding a separate gel-breaking material after formation of said gel filter cake.

**4,957,166**  
**LOST CIRCULATION TREATMENT FOR OIL FIELD DRILLING OPERATIONS**

Robert D. Sydanski, Littleton, Colo., assignor to Marath Oil Company, Findlay, Ohio

Continuation-in-part of Ser. No. 380,565, Jul. 14, 1989. This application Oct. 11, 1989, Ser. No. 419,862  
Int. Cl.<sup>5</sup> E21B 21/08, 33/138

U.S. Cl. 166—295

47 Claims

1. A process for preventing significant lost circulation of a drilling fluid across a face in a formation while drilling a wellbore in said formation having a matrix below and earthen surface, the process comprising:

- suspending drilling of said wellbore;
- admixing components of a continuous nonflowing gel at the surface to form a flowing partial gel having an initial pH of about 3 to about 13 and comprising a water-soluble carboxylate-containing polymer, a complex capable of crosslinking said polymer and formed of at least one electropositive chromium III species and at least one electronegative carboxylate species, and an aqueous solvent for said polymer and said complex;
- injecting said partial gel into said wellbore and placing said partial gel at a face in direct communication with said wellbore;
- forming said nonflowing gel from said partial gel at said face to prevent significant lost circulation across said face; and
- resuming of said wellbore.

**4,957,167**  
**RETRIEVABLE FLUID CONTROL VALVE WITH DAMPING**

Roger L. Schultz, Plano, Tex., assignor to Halliburton Co., Stephens County, Okla.

Filed Apr. 14, 1989, Ser. No. 338,256  
Int. Cl.<sup>5</sup> E21B 34/08

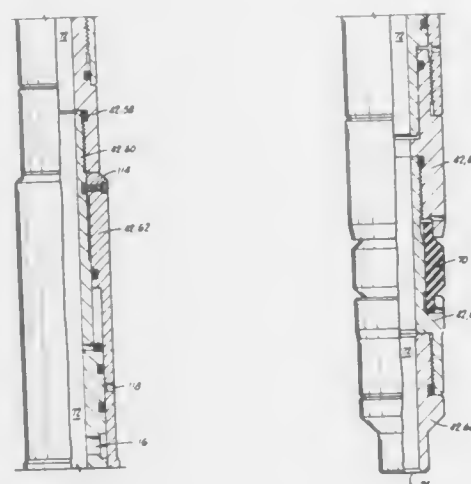
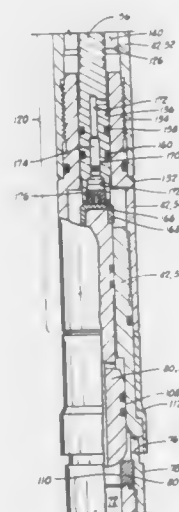
U.S. Cl. 166—319

15 Claims

1. A fluid control valve apparatus for controlling fluid flow through a tubing string of a well, comprising:



a housing including:  
 sealing means for sealingly engaging said tubing string;  
 a flow passage defined through said housing and having an open end defined in said housing below said sealing means; and  
 a flow port defined through said housing and communicating said flow passage with an exterior of said housing above said sealing means;  
 a flow valve means, disposed in said housing, and movable between a closed position wherein said flow passage is closed, and an open position wherein said flow passage is open;  
 spring biasing means, associated with said flow valve means, for biasing said flow valve means toward its said closed position;  
 differential area piston means, associated with said flow valve means, for overcoming said spring biasing means and for moving said flow valve means to its said open position when a fluid pressure exterior of said housing at said flow port exceeds a predetermined value; and

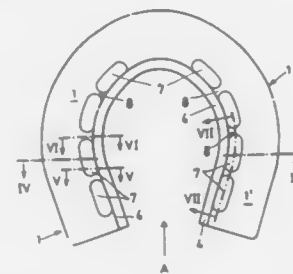


damping means, associated with said flow valve means, for substantially overdamping closing movement of said flow valve means from its said open position to its said closed position, and for eliminating the possibility of resonant vibration of said flow valve means regardless of a rate of fluid flow through said flow passage.

**4,957,168**  
**METALLIC-SOUNDING PLASTIC HORSESHOES**  
 Orlando A. Battista, 3863 SW Loop 820, Suite 100, Fort Worth, Tex. 76133-2076  
 Filed May 3, 1989, Ser. No. 346,719  
 Int. Cl.<sup>5</sup> A01L 5/00

U.S. Cl. 169—4

11 Claims

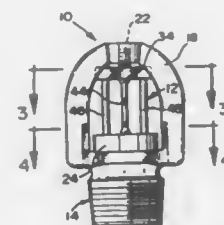


8. The method of molding a horseshoe comprising the step of molding a horseshoe from a synthetic polyphenylene sulfide resin.

**4,957,169**  
**SPRINKLER VALVE ASSEMBLY**  
 George S. Polan, Harleysville, Pa., assignor to Central Sprinkler Corporation, Lansdale, Pa.  
 Continuation-in-part of Ser. No. 307,557, Feb. 1, 1989, abandoned. This application Feb. 6, 1990, Ser. No. 475,629  
 Int. Cl.<sup>5</sup> A62C 37/12

U.S. Cl. 169—37

13 Claims



1. A sprinkler including a body having a flow passage for a fire extinguishing fluid and a valve assembly axially loaded by an adjustable screw or the like to seal the flow passage, said valve assembly comprising:

a plate,  
 a valve plug seated at an outlet end of the flow passage,  
 a single thermal responsive element and two or more support pins extending between and seated at opposite ends thereof in said plate and valve plug,  
 said thermal responsive element and support pins being spaced apart so as to reduce the axial load on said thermal responsive element substantially without thermal obstruction of said thermal responsive element to an air stream by said support pins at substantially all angular orientations of said valve assembly with respect to a central axis of the valve assembly.

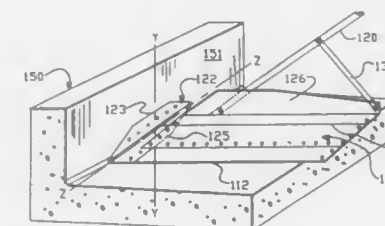
**4,957,170**  
**CURB AND GUTTER SHOVEL**  
 Larry D. Beard, P.O. Box 160, Clayton, Calif. 94517  
 Filed Jul. 28, 1989, Ser. No. 386,309  
 Int. Cl.<sup>5</sup> A01B 1/00

U.S. Cl. 172—372

24 Claims

1. A shovel for scraping material from a curb and gutter interconnected by a fillet, said curb having a curb face extending from the fillet, said shovel comprising: a shovel blade

having a bottom edge and top edge and first side edge that forms an acute internal angle with the bottom edge and a second side edge that forms an oblique internal angle with the bottom edge, wherein the first side edge has a first wall that extends from the first side edge parallel to the curb face wherein the first wall conforms to the shape of the fillet and the

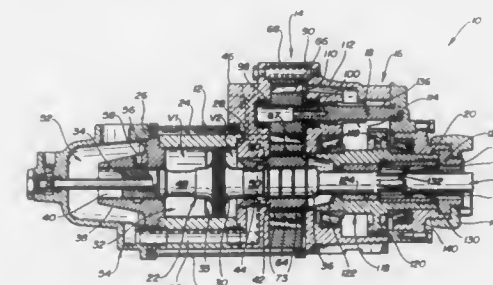


curb face interconnecting the gutter so that the first wall of the shovel slidably engages the fillet between the curb and gutter so as to prevent scraped material from flowing between the wall and the curb, a means for preventing material from rolling over the top edge of the shovel, said preventing means connected to the shovel blade, and a handle connected to said blade at an acute internal angle.

**4,957,171**  
**PNEUMATIC DRILL**  
 Ward D. Morrison, and Arthur A. Michaud, both of Claremont, N.H., assignors to Cannon Industries, Inc., Claremont, N.H.  
 Filed Apr. 24, 1989, Ser. No. 341,777  
 Int. Cl.<sup>5</sup> B25D 9/18

U.S. Cl. 173—104

11 Claims



1. An improved valveless pneumatic drill having a percussion unit with a cylinder block having a central passage with a piston reciprocating therein between a first and a second distributor, a pneumatic motor, and a main housing containing a chuck drive assembly having a rotating chuck for engaging a striker bar; the improvement comprising:

a reservoir communicating with the first distributor and the second distributor; and  
 a pneumatic motor gear rotatably mounted around the second distributor, said motor gear being mounted between a first plate and a second plate, wherein the piston of the percussion unit, the air motor gear, and the striker bar are axially aligned.

**4,957,172**  
**SURVEYING METHOD FOR LOCATING TARGET SUBTERRANEAN BODIES**  
 Bob J. Patton, Dallas, and C. Mackay Foster, Burleson, both of Tex., assignors to Patton Consulting, Inc., Dallas, Tex.  
 Filed Mar. 1, 1989, Ser. No. 317,634  
 Int. Cl.<sup>5</sup> E21B 7/04, 47/022; G01V 3/08, 3/26

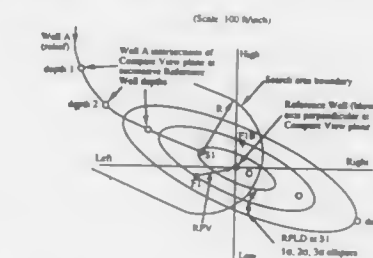
U.S. Cl. 175—61

5 Claims

1. A method of drilling a relief well for intersection with a

blowout well for the purpose of killing said blowout well, comprising the steps of:

collecting survey data relating to the blowout wellbore surface location and the borehole path of said blowout wellbore;  
 determining a first set of error coefficients for said survey data for said blowout wellbore;  
 collecting survey data relating to the surface location of a relief wellbore and the borehole path of said relief wellbore;  
 determining a second set of error coefficients for said survey data for said relief wellbore;

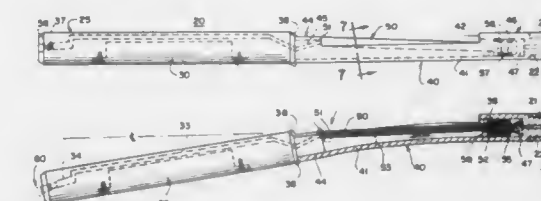


using said first and second sets of error coefficients to calculate a relative probable location distribution describing the location of said blowout wellbore relative to the location of said relief wellbore at successive depths;  
 using said relative probable location distribution at said successive depths to calculate an integral probability of find for each said depth, said integral probability of find being the probability of locating said blowout wellbore using a search tool in said relief wellbore; and  
 drilling said relief wellbore along a path having a maximum integral probability of find, such that said relief wellbore intersects said blowout wellbore.

**4,957,173**  
**METHOD AND APPARATUS FOR SUBSOIL DRILLING**  
 Frank R. Kinnan, Camas Valley, Oreg., assignor to Underground Technologies, Inc., Byron, Calif.  
 Filed Jun. 14, 1989, Ser. No. 366,661  
 Int. Cl.<sup>5</sup> E21B 7/06, 7/18

U.S. Cl. 175—61

12 Claims



11. A method of drilling an underground bore hole comprising the steps of:

(a) providing a nose assembly having a nozzle means to eject a pattern of viscous fluid to disturb and displace subsoil thereby cutting a bore in a first direction;  
 (b) connecting said nose assembly through a bendable mechanism having a longitudinal axis to a length of trailing drill pipe, said bendable mechanism including a bendable member and a rod having a passage extending therethrough in fluid communication with the drill pipe and the nose assembly, said rod having one end fixedly connected to one end of the bendable member and the other end slidably connected to the other end of the bendable member;  
 (c) providing said predetermined pressure of said viscous fluid while simultaneously rotating said drill string to effect a cutting action through said subsoil; and  
 (d) intermittently terminating said rotating action and increasing said predetermined fluid pressure of said viscous

fluid to a second pressure to effect a change in the cutting direction of said nozzle means and said trailing pipe by moving said other end of the rod relative to the bendable member thereby bending said bendable member away from its longitudinal axis and thereafter reducing the pressure of said viscous fluid to said predetermined first pressure whereby said bendable member will relax and return to a position generally parallel to its longitudinal axis and thereafter effecting rotation of said drill pipe with said fluid flow at said first predetermined pressure to continue cutting said bore.

#### 4,957,174 METHOD OF CONTROLLING LOST CIRCULATION IN WELL DRILLING

Donald L. Whitfill, Ponca City, Okla.; Edwin Kubena, Jr., Richmond, Tex.; Terry S. Cantu, Ponca City, Okla., and Matthew C. Sooter, Katy, Tex., assignors to Conoco Inc., Ponca City, Okla.

Filed Jun. 29, 1989, Ser. No. 374,399

Int. Cl.<sup>5</sup> C09K 7/00, 7/02; E21B 33/138

U.S. Cl. 175—72

8 Claims  
1. In a process of drilling a well wherein a drilling fluid is pumped from the surface of the ground through a drill pipe string in said well and back to the surface of the ground via the annulus between said drill pipe string and the borehole wall of said well and wherein lost circulation of said drilling fluid is encountered, the improvement in correcting said lost circulation of said drilling fluid comprising:

- adding to said drilling fluid a lost circulation material consisting essentially of petroleum coke, said petroleum coke having from 35 to 80 percent by weight particles between 10 and 60 mesh and being added in an amount effective to correct said lost circulation; and
- pumping said drilling fluid containing said lost circulation material into said well to contact said lost circulation zone whereby said zone is sealed from further lost circulation by said lost circulation material.

4,957,175  
SOIL DRILLING EQUIPMENT  
Yitzhaq Lipsker, and Boris Prokapsky, both of 24 Trumpeldor Street, 47264 Ramat Hasharon, Israel  
Continuation-in-part of Ser. No. 859,493, May 5, 1986, abandoned, and Ser. No. 51,429, May 19, 1987, abandoned. This application Apr. 28, 1989, Ser. No. 344,388  
Claims priority, application Israel, May 10, 1985, 75160  
Int. Cl.<sup>5</sup> E21B 4/18, 7/02  
U.S. Cl. 175—94



5. Apparatus for drilling bore holes, comprising:  
first gripping means for holding at least a portion of the apparatus against longitudinal movement in a bore hole, said first gripping means including a pair of gripping

members reciprocable transversely with respect to the bore hole;  
reciprocable second gripping means for gripping a drilling tool;  
means for moving said second gripping means and the gripped drilling tool longitudinally in the bore hole relative to said first gripping means;  
drive means for rotating said second gripping means and the gripped drilling tool; and  
drive shaft means for connecting said drive means to said second gripping means and the gripped drilling tool.

#### 4,957,176 PROCESS AND APPARATUS FOR DETERMINING THE CONSUMPTION OF A RAW MATERIAL IN A PROCESSING MACHINE

Udo Roth, Ranstadt, Fed. Rep. of Germany, assignor to Colortronic Reinhard GmbH & Co. KG, Friedrichsdorf-Köppern, Fed. Rep. of Germany

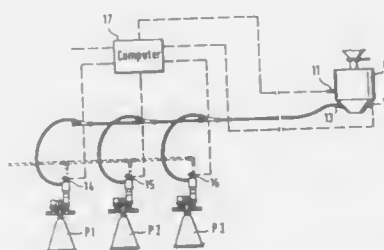
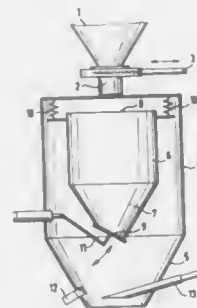
Filed Jul. 10, 1989, Ser. No. 377,703

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1988, 3827927

Int. Cl.<sup>5</sup> G01G 13/16, 13/24

U.S. Cl. 177—59

10 Claims



1. A process for determining the consumption of a raw material in a processing machine, especially a plastics processing machine, in which said raw material is stored in a raw material storage container, comprising the steps of withdrawing a portion of the quantity of the raw material stored in said storage container, gravimetrically determining said portion, storing said gravimetrically determined portion in an intermediate storage vessel, connecting a plurality of said processing machines with said intermediate storage vessel, supplying one of said processing machines with said raw material and determining which one of said processing machines is being supplied with said raw material from said intermediate storage vessel.

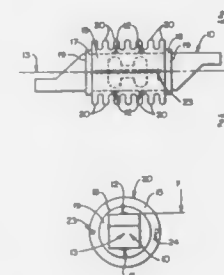
#### 4,957,177 ENCLOSED MOMENT-INSENSITIVE LOAD CELL Michael N. Hamilton, Columbus, and Edwin J. Stolz, Westerville, both of Ohio, assignors to Toledo Scale Corporation, Worthington, Ohio

Filed Aug. 9, 1989, Ser. No. 391,461

Int. Cl.<sup>5</sup> G01G 3/14, 21/02; G01L 25/00

U.S. Cl. 177—211

15 Claims



1. A load cell comprising at least one beam having a central longitudinal axis, a force transducer mounted on the beam, enclosure means enclosing the portion of said beam bearing the force transducer, said enclosure means having a first end and a second end rigidly attached to said beam, said enclosure means including at least one convolution to render it flexible to loads applied along said longitudinal axis and means rigid relative to said convolution for reducing non-linear torsional deformation of said enclosure means under loads applied transversely to said longitudinal axis.

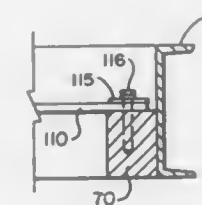
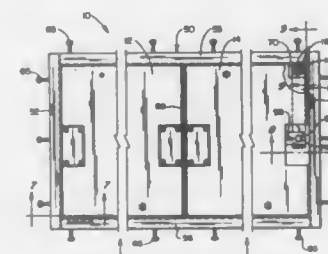
#### 4,957,178 WEIGH-IN-MOTION SCALE Nigel G. Mills, Worthington, Ohio, assignor to Toledo Scale Corporation, Worthington, Ohio

Filed Aug. 22, 1989, Ser. No. 397,108

Int. Cl.<sup>5</sup> G01G 19/02, 21/24

U.S. Cl. 177—134

12 Claims



1. Apparatus for weighing vehicles in motion comprising a base for anchoring to a roadbed in the path of moving vehicles, a weighing platform mounted on said base for receiving the wheels of moving vehicles, load cell means between the base and the platform for providing signals indicating the loads applied by the wheels on the platform, and means connected between the platform and the base to apply a vertical preload

and to resist relative horizontal movement between the base and the platform.

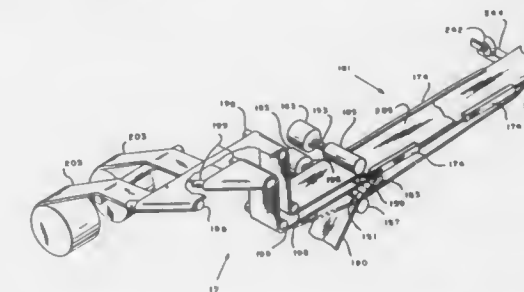
#### 4,957,179 TAPE MODULE FOR A MODULAR MAILING MACHINE Hugh S. Dannatt, Bethel, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Division of Ser. No. 134,626, Dec. 17, 1987, Pat. No. 4,852,786. This application Dec. 19, 1988, Ser. No. 286,119

Int. Cl.<sup>5</sup> B41J 3/00; G01G 19/40

U.S. Cl. 177—145

4 Claims



1. A mailing machine comprised of a plurality of modules, each of said modules mounted in said mailing machine to form a single process station, said mailing machine having a base and a plurality of support walls, wherein said modules comprise:  
a scale module having means for weighing an envelope, means including a weighing plate with a recess formed therein;

- transport module having means for positioning said envelope in said process station and ejecting said envelope from said process station;
- meter module having a registration area and a printing means located in said registration area for imprinting an indicia on said envelope, said registration area being vertically aligned to and spaced above said recess in said weighing plate;
- platen module having a platen plate and an elastomeric member fixably mounted to a first surface of said platen plate;
- platen support means for supporting said platen plate such that said elastomeric member is opposite said registration area of said meter module and for selectively positioning said platen module in a first position wherein said elastomeric member is in close proximity to said printing means of said meter module and a second position wherein said elastomeric member is positioned generally below said weigh plate of said scale module, and
- tape module, including,

- a tape track,
- means for supporting said tape track in a generally cantilevered manner;
- tape positioning means for selectively positioning said tape track supporting means in a first position, between said meter module and said platen module and in second position laterally removed from said first position and below said meter module;
- tape feed means for selectively feeding a tape to and through said tape track such that said fed tape resides within said tape track when said tape track is in said first position;

said mailing machine having a support surface; and said tape positioning means comprising:

- a rail track fixably mounted to said support surface;
- a rail mounted for sliding motion along said rail track; said tape track supporting means being fixably mounted to said rail;
- a bracket fixably mounted to said tape track supporting means, said bracket having an elongated slot formed therein;



a crank rotatably mounted to said support surface and having a pin slidably mounted in said slot of said bracket such that rotation of said crank causes said rail to displace along said rail track; and  
drive means for rotatably displacing said crank.

4,957,180

## GUARD ASSEMBLY FOR A VEHICLE

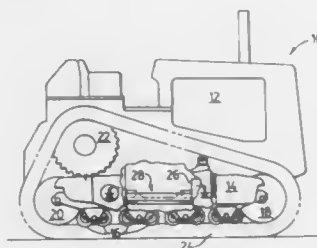
Bryan G. Lammers, Washington, and Kenneth V. Blaha, East Peoria, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Jul. 14, 1989, Ser. No. 379,767

Int. Cl.<sup>5</sup> B62D 25/20

U.S. Cl. 180—69.1

10 Claims



1. A guard assembly for a vehicle having a frame having first and second sidewalls and first and second endwalls, said sidewalls and endwalls each having an inner surface and defining a first space therebetween, said guard assembly comprising:

- a plurality of stop blocks, each block being connected to a respective inner surface of one of said sidewalls and said endwalls at a preselected first elevational position;
- a plurality of retaining brackets, each bracket being in contact with and connectable to one of the inner surfaces of said sidewalls and said endwalls at a preselected second elevational position, said second position being elevationally lower than said first position, each of said stop blocks and each of said retaining brackets defining a second space therebetween; and
- a guard plate having first and second side portions, first and second end portions, and a central body portions, said guard plate adapted to be positioned completely within said first space and maintained substantially in said position by said stop blocks and said retaining brackets, said guard plate being moveable within said first and second spaces and within predetermined limits in longitudinal and lateral directions.

4,957,181

## ELECTRIC POWER STEERING SYSTEM

Saichiro Oshita, and Toyohiko Mouri, both of Ohta, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 198,393, May 24, 1988, abandoned.

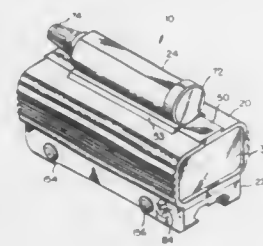
This application Dec. 8, 1989, Ser. No. 449,131

Claims priority, application Japan, May 25, 1987, 62-127427

Int. Cl.<sup>5</sup> B62D 5/04

U.S. Cl. 180—79.1

8 Claims



1. In an electric power steering system having a motor operatively connected to a steering system for reducing steering

effort, a vehicle speed sensor for producing a vehicle speed signal representing vehicle speed, a torsion torque sensor provided for detecting torsion torque generated in the steering system in a steering operation, assist means responsive to an output signal of the torsion torque sensor for producing an assist signal, a steering angle sensor provided for detecting steering angle of a steering wheel for producing a steering angle signal representing the steering angle, return torque means responsive to said steering angle signal for producing a return torque signal for returning said steering wheel, the improvement comprising:

- angular velocity calculator means for differentiating the steering angle signal and for producing an angular velocity signal representing angular velocity of the steering wheel;
- damping means responsive to said angular velocity signal for producing a damping signal having a reverse polarity to rotational direction of the steering wheel;
- storing means for storing a plurality of coefficients which increase in value with increasing vehicle speed;
- said storing means being responsive to said vehicle speed signal for deriving from said storing means the coefficient corresponding to the vehicle speed represented by said vehicle speed signal;
- multiplying means for multiplying said damping signal by the derived coefficient and for producing a corrected damping signal;
- summing means for summing said assist signal, said return torque signal and said corrected damping signal for producing a total signal;
- driving means responsive to said total signal for driving the motor, whereby the steering wheel is returned by the total signal of said return torque signal and said corrected damping signal, the latter increasing in value with increase of the vehicle speed, when said assist signal disappears upon as driver releasing the steering wheel.

4,957,182

## ELECTRIC POWER STEERING APPARATUS

Mitsuharu Morishita, Kosaku Uota, and Takeshi Yasukawa, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

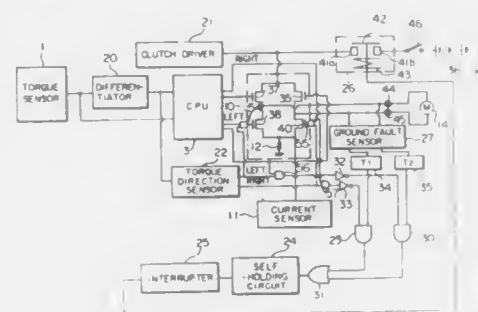
Filed Apr. 28, 1989, Ser. No. 344,579

Claims priority, application Japan, Apr. 28, 1988, 63-108132

Int. Cl.<sup>5</sup> B62D 5/04

U.S. Cl. 180—79.1

2 Claims



1. An electric power steering apparatus for a vehicle comprising:
- an electric motor which can be connected to a steering gear of a vehicle so as to steer the vehicle;
  - a steering torque sensor for sensing the steering torque applied to a steering shaft by a driver of the vehicle and generating a corresponding output signal;
  - control means for determining the proper rotational direction of said motor based on the output signal of said torque

sensor and generating a drive direction signal indicating the direction in which said motor should rotate;

- a torque direction sensor which senses the direction of the torque applied to the steering shaft by the driver based on the output signal of said steering torque sensor and generates a torque direction signal indicating the direction of the applied torque;
- a motor driver which is responsive to said control means and drives said motor in the direction indicated by the drive direction signal;
- a ground fault sensor which senses a ground fault in said motor driver and generates a corresponding output signal; disagreement sensing means for sensing when the direction indicated by the torque direction signal from said torque direction sensor does not agree with the direction indicated by the drive direction signal from said control means; and
- interrupter means for preventing current from being supplied to said motor driver when said ground fault sensor generates an output signal indicating a ground fault of said motor driver and said disagreement sensing means senses a disagreement of the torque direction signal and the drive direction signal.

4,957,183

4-WHEEL COORDINATED STEERING  
MULTI-PURPOSE TRACTOR

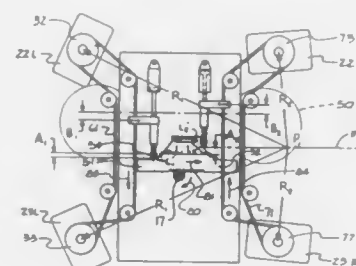
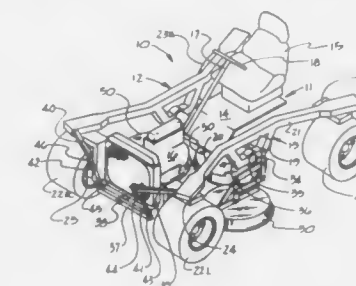
Paul W. Mullett, Hesston, and Elmer D. Voth, Newton, both of Kans., assignors to Excel Industries, Inc., Hesston, Kans.

Filed Jun. 1, 1989, Ser. No. 360,118

Int. Cl.<sup>5</sup> A01D 35/26; B60G 11/08; B62D 5/06, 7/16

U.S. Cl. 180—234

13 Claims



1. Apparatus for controlling the longitudinal direction of movement of a motorized vehicle comprising:
- (a) a frame means having a central frame and first and second side frames;
  - (b) first and second pairs of wheels;
  - (c) journal means mounting each of said wheels to said side frames and the side frames to the central frame for rotation of the side frames about a first axis parallel to a plane through said frame means; and the wheels about a second axis perpendicular to said plane;
  - (d) first and second turning means coupled to said second axis of the journal means for rotating said first pair of

wheels in opposite directions from each other, and said second pair of wheels in opposite directions from each other, respectively;

- (e) first and second cam means having first and second cam follower means respectively;
- (f) steering means rotatably attached to said frame means and communicating with said cam means; and,
- (g) means for coupling said first and second cam follower means to said first and second turning means, respectively, said cam means being configured in a manner to cause said first and second pairs of wheels to follow a first and second circumference, both having a common center, when said steering wheel is turned, said common center lies upon a transverse line passing approximately through the center of the vehicle.

4,957,184

## LOUDSPEAKER ENCLOSURE

Hirokazu Negishi, Surrey, England, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

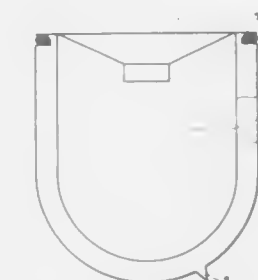
Filed Feb. 17, 1989, Ser. No. 311,861

Claims priority, application United Kingdom, Feb. 24, 1988, 8804232

Int. Cl.<sup>5</sup> H05K 5/00

U.S. Cl. 181—153

10 Claims



1. A loudspeaker enclosure, comprising:
- an inner wall member;
  - an outer wall member spaced from said inner wall member and defining a volume space therebetween, said inner and outer wall members being sealed and the volume space evacuated of air to define a vacuum space therebetween, and said inner and outer wall members defining an opening in which a loudspeaker can be arranged.

4,957,185

## ROOF SCAFFOLD

Claude J. F. Courchesne, 19 Bluebell Crescent, Ancaster, Ontario, Canada L9K 1G2, and Theodore R. Palmer, 309 Orkney Street West c/o General Delivery, Caledonia, Ontario, Canada N0A 1A0

Filed Feb. 12, 1990, Ser. No. 479,051

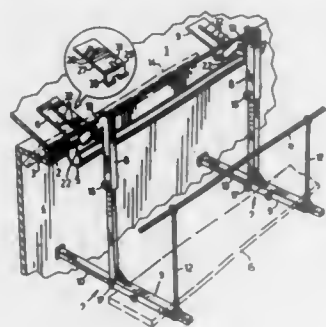
Int. Cl.<sup>5</sup> E04G 3/12

U.S. Cl. 182—150

10 Claims

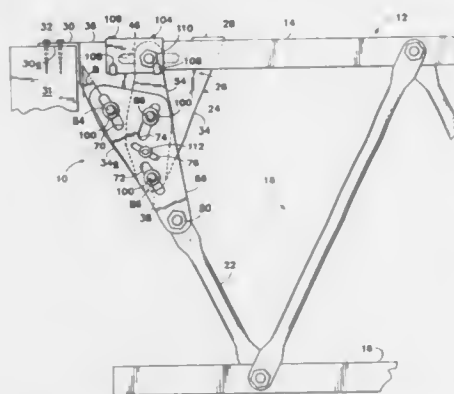
1. A scaffold support comprising a roof cleat and a bracket supported therefrom; said roof cleat comprising a flat apertured metal fastening plate connected by a hinge to a hooked end plate; said bracket comprising a vertical member having an upper end and a lower end when arranged in its operative position, said upper end joined to a downwardly projecting angle member which terminates in a pin mounted transverse to the longitudinal axis of said angle member, said lower end of said vertical member being joined to a horizontal member in the same plane as said angle member but at 180° thereto, an extension leg slidably mounted with respect to said horizontal member parallel thereto and projecting in the same direction as said angle member, means to adjustably longitudinally locate said leg with respect to said horizontal member; means to

fasten said roof cleat to the edge of the roof of a building having a wall and roof supported thereon with said hinge on the edge of said roof and the hooked end plate hanging down



vertically, whereby when said pin is hooked in the hooked end plate and said leg is adjusted to its proper length and bearing against the wall of said building, the vertical member of said bracket is maintained in its vertical position.

**4,957,186**  
**SPAN-ADJUSTABLE OPEN-WEB SUPPORT BRACKET**  
William R. Reetz, Boise, Id., assignor to T J International, Inc., Boise, Id.  
Filed Dec. 11, 1989, Ser. No. 448,323  
Int. Cl.<sup>5</sup> E04H 12/18; E04C 3/292  
U.S. Cl. 248—296 20 Claims

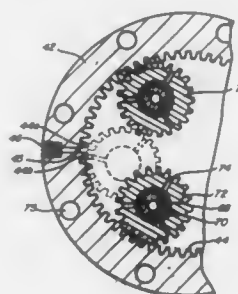


1. A span-adjustable open-web support bracket for use in a truss having an upper chord member with a slot in an end thereof, a lower chord member, and a plurality of spaced web members interconnecting the chord members, the bracket comprising:
  - a chord-length adjustment mechanism attached adjacent the end of the upper chord for adjusting the length of the upper chord;
  - a web-member length adjustment mechanism attached to a web member adjacent the chord-length adjustment mechanism; and
  - an interlock located between the mechanisms for coordinating chord length and web-member length adjustments.

**4,957,187**  
**GEAR-DRIVEN LUBRICANT CIRCULATION SYSTEM**  
Harry L. Burgess, Houston, Tex., assignor to Burgess & Associates Mfg., Inc., Houston, Tex.  
Continuation of Ser. No. 232,318, May 15, 1988, Pat. No. 4,872,530. This application Jul. 28, 1989, Ser. No. 386,999  
The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> F01M 5/00

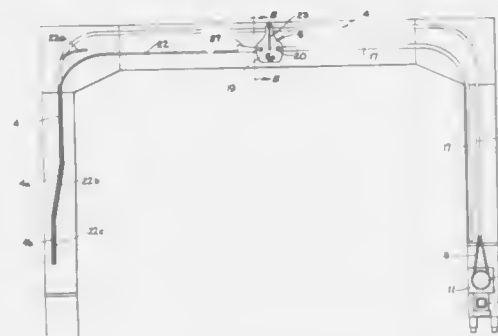
U.S. Cl. 184—6.12

12 Claims



2. In the combination of a gear box having an inner chamber containing a drive gear operatively connected and meshed with a driven gear, the improvement which comprises:
  - a. a gear box having an inner chamber having a toothed inner chamber surface segment meshing with one of said gears,
  - b. said gear box having a lubricant inlet port and a lubricant outlet port formed therein, each of said ports extending from the outside of said gear box to the hollow chamber in said gear box, said outlet port terminating at the surface of said inner chamber in a groove between two adjacent teeth of said toothed inner chamber surface segment,
  - c. a lubricant outlet line interconnected with said outlet gear box port, and
  - d. a lubricant inlet line interconnected with said inlet gear box port,
  - e. whereby, movement of said teeth of said one of said gears past said groove between said two adjacent teeth will force a pulse of lubricant from the groove between said two adjacent teeth through said outlet port and said gear box outlet line.

**4,957,188**  
**CONVEYOR SYSTEM WITH STABILIZED CONVEYOR BASKET**  
Edward F. Bavis, 201 Grandin Rd., Maineville, Ohio 45039  
Filed Sep. 27, 1988, Ser. No. 249,704  
Int. Cl.<sup>5</sup> E04H 3/04  
U.S. Cl. 186—41 15 Claims



12. In a conveyor system wherein a carrier basket is con-

veyed between first and second stations by a spaced apart pair of drive members, a carrier basket having opposing end walls, mating elongated vertical slots in said opposing end walls, a said carrier rod extending through said slots, whereby said carrier basket may be suspended between the drive member by securing the opposite ends of said carrier rod to the guide members and said carrier basket may be displaced relative to said carrier rod, and stabilizing means to prevent rocking movement of the carrier basket as it is conveyed by the drive members, said stabilizing means comprising cam tracks positioned to follow the paths of travel of the drive members, and having cam track follower means mounted on said carrier basket engagable with said cam tracks.

**4,957,189**  
**LIFTING DEVICE**  
Kenjiro Tanaka, 12-30 Chuo 3-chome, Kofu-shi, Yamanashi-ken, Japan  
Filed Aug. 18, 1989, Ser. No. 396,083  
Claims priority, application Japan, Feb. 18, 1988, 63-35567  
Int. Cl.<sup>5</sup> B66B 9/06  
U.S. Cl. 187—12 14 Claims



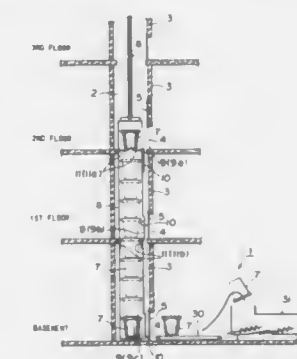
1. A lifting device comprising:
  - an outer rail composed of an outer vertical section, an outer inclined section, and an outer horizontal section, said outer vertical and inclined sections made integral via a first outer curve section and a second outer curve section, and said outer inclined and horizontal sections made integral via a third outer curve section;
  - an inner rail composed of an inner vertical section, an inner inclined section, and an inner horizontal section, said inner vertical and inclined sections made integral via a first inner curve section, and said inner inclined and horizontal sections made integral via a second inner curve section; and
  - a carrier having an upper front roller, a lower front roller, an upper rear roller, and a lower rear roller, said carrier movably fitted between said outer and inner rails.

**4,957,190**  
**APPARATUS FOR CONVEYING REFUSE CONTAINERS**  
Tomoya Tokuhito; Teruhiko Miyachi; Koshin Kikuchi, and Teruhiko Momoi, all of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Tokyo, Japan  
Filed Feb. 28, 1989, Ser. No. 316,938  
Int. Cl.<sup>5</sup> B66B 9/00  
U.S. Cl. 187—32 3 Claims

1. An apparatus for conveying refuse containers in a structure, the apparatus comprising:
  - a plurality of refuse containers;
  - a generally vertical shaft passing through a plurality of floors in the structure;
  - a longitudinally elongated cab positioned in said shaft, said elongated cab having a height which extends over at least two of the plurality of floors in the structure, the elongated cab containing said plurality of refuse containers in

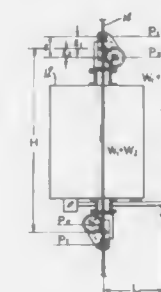
such a manner that the refuse containers are vertically aligned, and having a plurality of lateral windows as portals at least at the top and bottom of the elongated cab for the refuse containers;

first lifting means installed in the shaft for moving said elongated cab up and down in a generally vertical line throughout said shaft; and



second lifting means disposed in the elongated cab for moving said refuse containers up and down in a generally vertical line throughout the elongated cab, the second lifting means comprising an elongated guide means generally vertically extending through substantially the entire height of the cab, and holding means for holding the refuse container, the holding means being movable upward and downward with respect to said guide means.

**4,957,191**  
**GUIDE DEVICE FOR HYDRAULIC ELEVATOR**  
Yoshinori Nakanishi, Chiba, Japan, assignor to Otis Elevator Company, Farmington, Conn.  
Filed Jun. 6, 1989, Ser. No. 362,191  
Claims priority, application Japan, Jun. 9, 1988, 63-142385  
Int. Cl.<sup>5</sup> B66B 7/02  
U.S. Cl. 187—95 2 Claims

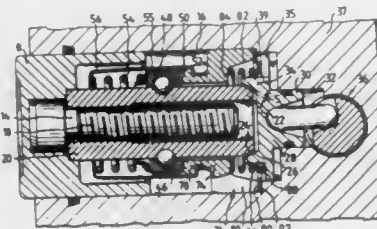


1. A guide assembly for a cantilevered hydraulic elevator for guiding movement of the elevator cab along guide rails in the elevator hoistway, said assembly comprising:
  - a. a first guide sub-assembly mounted above the cab, said first sub-assembly comprising a first stand fixed with respect to the cab; a first arm mounted on said stand, said first arm being pivotable about an axis which coincides with a vertical plane of symmetry of the guide rails; a first guide shoe mounted on one pivoting end of said first arm, said first guide shoe embracing the blade portion of said guide rail; and a first guide roller mounted on an opposite pivoting end of said first arm, said first guide roller engaging one side surface of the guide rail blade; and
  - b. a second guide sub-assembly mounted below the cab, said



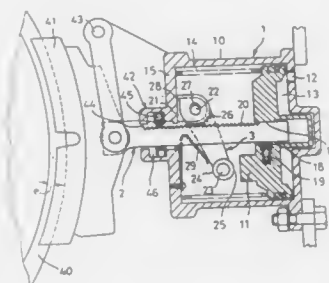
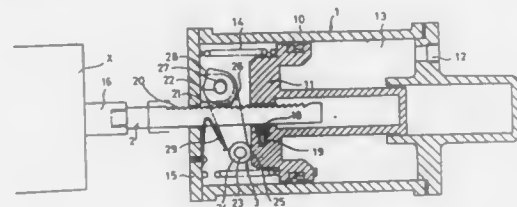
second sub-assembly comprising a second stand fixed with respect to the cab; a second arm mounted on said stand, said second arm being pivotable about an axis which coincides with said vertical plane of symmetry of the guide rails; a second guide shoe mounted on one pivoting end of said second arm, said second guide shoe embracing the blade portion of said guide rail; and a second guide roller mounted on an opposite pivoting end of said second arm, said second guide roller engaging the side surface of the guide rail blade opposite to said one side surface thereof.

**4,957,192**  
**AUTOMATIC ADJUSTING DEVICE FOR A DISC BRAKE**  
Rolf Weiler, Frankfurt am Main; Claus-Peter Panek, Steinbach, and Bodo Schmidt, Lauterbach, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany  
Continuation of Ser. No. 154,773, Feb. 10, 1988, abandoned.  
This application Apr. 6, 1989, Ser. No. 334,740  
Claims priority, application Fed. Rep. of Germany, Feb. 18, 1987, 3705041  
Int. Cl.<sup>3</sup> F16D 55/224, 65/56  
U.S. Cl. 182—71.9 7 Claims



1. An automatic adjusting device for a disc brake, with the disc brake comprising a brake piston which, for the application of a brake shoe, is displaceably arranged in a brake cylinder and which is actuatable by means of a hydraulic and a mechanical actuating device;  
said adjusting device further comprising an extensible adjusting member arranged between the brake piston and the mechanical actuating device and including two adjusting elements interconnected by way of a thread in non-self-locking engagement; and  
said adjusting device further comprising a friction clutch having conical friction surfaces for fixing the position of one of the adjusting elements upon mechanical actuation, with one of the conical friction surfaces being provided on one of the adjusting elements, while the other friction surface is provided on a mechanically actuatable clamping member, and said adjusting device further comprising a bowl-type spring retainer for a first spring, said retainer secured to the brake housing by virtue of an accommodation sleeve, said accommodation sleeve being seated in a portion of a bore of the brake housing between said retainer and said clamping member, a second spring mounted between said portion of said bore and said clamping member and engaging said accommodation sleeve and said clamping member, wherein said accommodation sleeve is comprised of separate finger-like projections having radially extending surfaces continuing into a conical surface facing the mechanical actuating device, said finger-like projections being resilient in the radial direction for press-fitted securement.

**4,957,193**  
**ACTUATING CYLINDER HAVING MECHANICAL ADVANTAGE**  
Hideo Tamamori, Kobe, Japan, assignor to Nippon Air Brake Company, Kobe, Japan  
Filed Aug. 14, 1989, Ser. No. 393,166  
Claims priority, application Japan, Aug. 22, 1988, 63-208616  
Int. Cl.<sup>3</sup> F01B 9/00; B60T 11/10  
U.S. Cl. 188—153 R 20 Claims

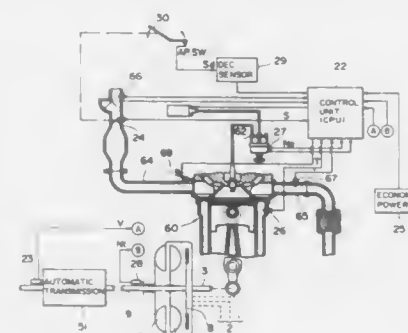


1. A fluid pressure actuating cylinder comprising:  
(a) a piston member housed in the body of said cylinder and movable from a retracted position to an operative position in response to the supply of fluid pressure thereto to provide an input force;  
(b) a push rod having one end projecting through one end wall of said cylinder body for axial movement with said piston member, said one end including an output member;  
(c) means for frictionally connecting said push rod to said piston member until such time as said push rod encounters a resistance force greater than the force exerted by said friction connecting means;  
(d) a force lever angularly disposed relative to said push rod and engageable therewith at a point intermediate the ends thereof;  
(e) a fulcrum pin on which said force lever is rotatably mounted at its one end, the other end of said force lever being engageable with said piston member to transmit said input force from said piston member to said push rod via said force lever in the absence of said frictional connection between said piston member and said push rod.

**4,957,194**  
**TORQUE CONVERTER SLIP CONTROL DEVICE**  
Kenji Sawa, Susumu Kuromida, and Keiji Bota, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan  
Filed Sep. 8, 1988, Ser. No. 242,282  
Claims priority, application Japan, Sep. 8, 1987, 62-224728; Oct. 27, 1987, 62-269210  
Int. Cl.<sup>3</sup> F16H 45/02; B60K 41/02  
U.S. Cl. 192—0.096 11 Claims

1. A control device for an automatic transmission of an internal combustion engine of a vehicle which has a torque converter, a lockup clutch and slip varying means for varying a fluid coupling efficiency of said lockup clutch so as to control

slippage allowed by the torque converter, and a fuel injection system for delivering a required quantity of fuel into said internal combustion engine, said control device comprising:  
deceleration detecting means for detecting a decelerating state of said vehicle;  
fuel injection cut-off means for cutting off an injection of fuel by said fuel injection system when said internal combustion engine is at rotational speeds lower than a predetermined fuel injection cut-off speed while said deceleration detecting means detects said vehicle in said decelerating state;  
feed-forward slip control means for controlling said slip varying means in feed-forward control to vary said fluid coupling efficiency of said lockup clutch so as to cause said torque converter to allow slippage at a rate suitable

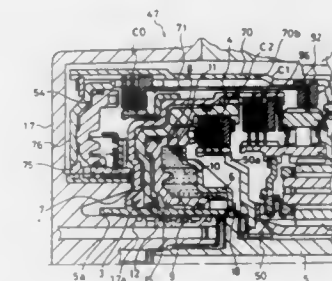


for cancelling a fluctuation of engine torque when said internal combustion engine is at rotational speeds higher than a preselected rotational speed higher than a predetermined fuel injection recovery speed at which an injection of fuel by said fuel system is recovered while said deceleration detecting means detects said vehicle in said decelerating state; and  
feed-back slip control means for controlling said slip varying means in feed-back control to vary said fluid coupling efficiency of said lockup clutch so as to make a difference of rotational speed between input and output shafts of said torque converter suitable for canceling a fluctuation of engine torque when said internal combustion engine is at rotational speeds lower than said preselected rotational speed while said deceleration detecting means detects said vehicle in said deceleration state.

**4,957,195**  
**HYDRAULIC DEVICE FOR AN AUTOMATIC TRANSMISSION**  
Takenori Kano, Anjo; Haruki Takemoto, Chiryu; Mamoru Nishi, Handa; Isao Takase, Aichi, and Fumitomo Yokoyama, Anjo, all of Japan, assignors to Aisin AW Co., Ltd., Aichi, Japan  
Filed Jan. 4, 1989, Ser. No. 293,394  
Claims priority, application Japan, Sep. 27, 1988, 63-242878  
Int. Cl.<sup>3</sup> F16D 25/10 7 Claims  
U.S. Cl. 192—106 F

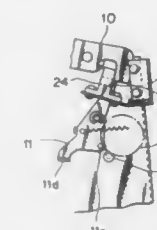
1. A hydraulic device for an automatic transmission having first, second and third rotating members, forward first speed to direct transmission stages and a reverse transmission stage comprising:  
a clutch drum coaxially situated with respect to the first rotating member and having an inner surface,  
a first piston member situated inside the clutch drum and having an inner surface,  
a first hydraulic actuator formed between the inner surface of the clutch drum and the first piston member,  
a second piston member situated inside the first piston member,  
a second hydraulic actuator formed between the inner sur-

face of the first piston member and the second piston member,  
a first clutch connected to the clutch drum, said first clutch engaging between the first rotating member and the second rotating member by means of the first hydraulic actuator while the automatic transmission is in the forward first speed to direct transmission stages,  
a second clutch connected to the first piston member, said second clutch engaging between the first rotating member and the third rotating member by means of the second hydraulic actuator while the automatic transmission is in the reverse transmission stage and the first clutch is in disengaging condition,



one centrifugal hydraulic pressure cancel plate situated adjacent to the second hydraulic actuator, said cancel plate having an inner periphery attached to the first rotating member without axial movement thereto and an outer periphery slidably and sealingly situated inside the second piston,  
one centrifugal hydraulic pressure cancel chamber defined by the second piston member and the cancel plate, and  
a spring situated between the second piston member and the cancel plate, oil in the centrifugal hydraulic pressure cancel chamber and the spring operating against the first and second piston members to remove oil therefrom when the rotating members rotate at high speed.

**4,957,196**  
**COIN-OPERATED LOCKER**  
Kenji Shiojima, and Yuji Kasai, both of Tokyo, Japan, assignors to Kokusan Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Dec. 19, 1988, Ser. No. 285,935  
Claims priority, application Japan, Dec. 28, 1987, 62-330026  
Int. Cl.<sup>3</sup> G07F 17/12 7 Claims  
U.S. Cl. 194—239



1. A coin-operated locking system for use in connection with the locking and unlocking of a closure movable mounted upon a support frame, comprising:  
first locking means movable between first locked and second unlocked position for locking and unlocking, respectively, said closure relative to said support frame;  
detector means for detecting said first locked and second unlocked positions of said first locking means, and for

generating a first signal in response to detection of said first locking means disposed at said second unlocked position;

second locking means movable between first locked and second unlocked positions for locking and unlocking, respectively, said closure relative to said support frame; sensor means for sensing the deposition of a predetermined amount of coins within said locking system and for generating a second signal in response to said sensing of said deposition of said coins within said locking system for moving said second locking means to said second unlocked position; and

timer means, responsive to said first signal of said detector means, for generating a third signal for moving said second locking means to said first locked position at a predetermined time after receiving said first signal from said detector means indicating that said first locking means is disposed at said second unlocked position.

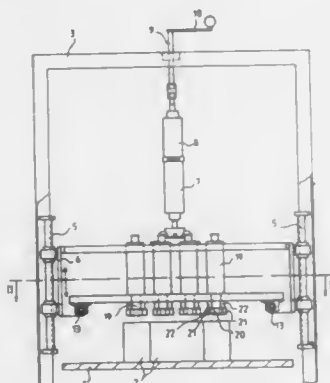
**4,957,197**  
**MACHINE FOR ARRANGING ARTICLES, SUCH AS CANS OF FOOD**

Jean Delapierre, 38, rue d'Orival, 14000 Lisieux, France  
Filed Jan. 5, 1989, Ser. No. 293,885

Claims priority, application France, Jan. 5, 1988, 88 00030  
Int. Cl.<sup>5</sup> B65G 47/24

U.S. Cl. 198—394

7 Claims



1. A machine for the orientation of articles, such as cans of food, having a moving endless belt on which the articles to be combined are disposed, such as by means of heat-shrink film, the machine comprising: a carriage movable in a reciprocating movement parallel to the direction of movement of the moving endless belt, a support means disposed on the carriage, a series of drive means disposed on the support means, each said drive means adapted to engage and rotate an article, a series of detectors each disposed on the support means near the position of one article on the endless belt, each detector having a corresponding drive means operatively associated therewith, each detector being responsive to a reference on the article, each detector and corresponding drive means adapted to control the angular positioning of the reference on the article to arrange and orientate the article by rotation thereof, the support means having two parts, each part movable parallel to the direction of motion of the moving endless belt to clamp the articles laterally within the drive means for rotation thereof, the carriage including means for moving the drive means in a direction perpendicular to the belt.

**4,957,198**  
**APPARATUS AND METHOD FOR UNLOADING BULK MATERIALS**

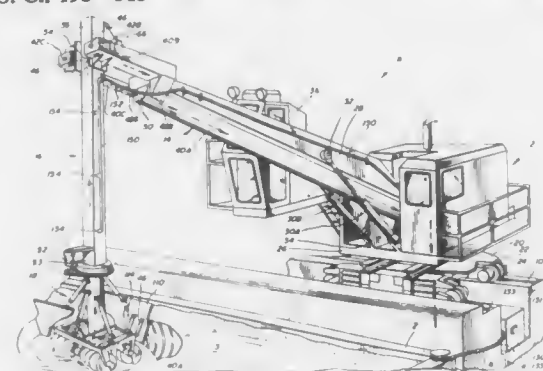
David J. Miller; Allen R. Miller, and Charles P. Miller, all of McHenry, Ill., assignors to Miller Formless Co., Inc., McHenry, Ill.

Division of Ser. No. 848,907, Apr. 4, 1986, Pat. No. 4,738,350, which is a continuation of Ser. No. 672,151, Nov. 16, 1984, abandoned, which is a continuation of Ser. No. 414,383, Sep. 2, 1982, abandoned. This application Jan. 15, 1988, Ser. No. 144,428

Int. Cl.<sup>5</sup> B65G 65/22

U.S. Cl. 198—513

25 Claims



1. Apparatus for collecting bulk materials and feeding them into a conveyor comprising a conveyor section including an auger having an exposed end portion, a pair of augers disposed with one on each side of said exposed end portion with their axes of rotation in a fixed relation to one another and generally normal to the axis of rotation of said exposed end portion for collecting said bulk material and loading it into said conveyor section, said pair of augers being mounted for joint pivoting adjustment about an axis perpendicular to the longitudinal axis of said exposed end portion, and means for controlled pivotal adjustment of said pair of augers relative to said conveyor section.

**4,957,199**  
**CONVEYOR BELT**  
Eduard A. Wokke, Floessen 7, 9204 HR Drachten, and Hans De Vries, Dollard 292, 9204 CZ Drachten, Netherlands

Continuation of Ser. No. 121,876, Nov. 17, 1987, abandoned.

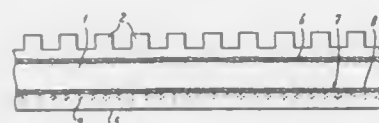
This application Apr. 14, 1989, Ser. No. 338,563

Claims priority, application Netherlands, Nov. 21, 1986, 8602967

Int. Cl.<sup>5</sup> B65G 15/34

U.S. Cl. 198—847

1 Claim



1. A conveyor belt having a ribbed upper carrying surface and an opposite lower surface and having two layers which are rigid in respect of deflection in the transverse direction as well as only one other layer providing longitudinal strength, said layers imparting transverse rigidity being spaced apart and disposed respectively adjacent said upper and lower surfaces, the lower of said layers imparting transverse rigidity being combined with said only one layer imparting longitudinal strength to form one layer consisting of longitudinal and transverse wires, at least said transverse wires being made of high modulus material.

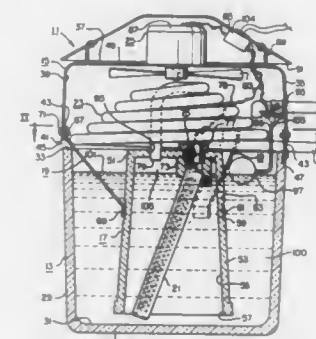
**4,957,200**  
**WATER DISTILLATION APPARATUS**  
William F. Turner, Rte. 2, Box 205-T, Stephenville, Tex. 76401, and James K. Dewa, Star Route, Box 80B, Mineral Wells, Tex. 76067

Filed Dec. 28, 1989, Ser. No. 458,330

Int. Cl.<sup>5</sup> B01D 3/02; C02F 1/04

U.S. Cl. 202—181

31 Claims



1. A distillation apparatus, comprising:

- (a) a first chamber means having bottom and side walls surrounding a first interior cavity, said first chamber means having an upper opening communicating with said first interior cavity, said first chamber means being adapted to hold a liquid;
- (b) second chamber means having top and side walls surrounding a second interior cavity, said second chamber means having a lower opening communicating with said second interior cavity, said second chamber means being located within said first chamber means first interior cavity such that said second chamber means lower opening is in proximity to said first chamber means bottom wall;
- (c) heating means for heating liquid in said distillation apparatus, said heating means being coupled to said second chamber means so as to be located inside said second interior cavity;
- (d) means defining passages for air flow in and out of said apparatus;
- (e) support means for supporting said second chamber means in said first chamber means first interior cavity such that there is no penetration of said first interior cavity below a water line when said first chamber means is filled with liquid, said support means having passages for air flow so as to allow said liquid to degassify before distillation;
- (f) condenser means located above said second chamber means, said condenser means having an inlet which communicates with the second interior cavity for receiving vapor from said liquid, and an outlet which exits said apparatus, said condenser means being supported by said support means.

31. A distillation apparatus, comprising:

- (a) a first chamber means having bottom and side walls surrounding a first interior cavity, said first chamber means having an upper opening communicating with said first interior cavity, said first chamber means being adapted to hold a liquid, said first chamber means comprising a bowl made of ceramic material;
- (b) a cover having top and side walls forming an inverted bowl;
- (c) second chamber means comprising an inverted cup so as to have top and side walls surrounding a second interior cavity, said cup bottom being open to allow communication between said first interior cavity and said second interior cavity, said cup being located in said first interior cavity such that said cup bottom opening is in proximity with said first chamber means bottom wall and said cup top wall is located above said cup bottom opening;
- (d) heating means for heating liquid in said first chamber

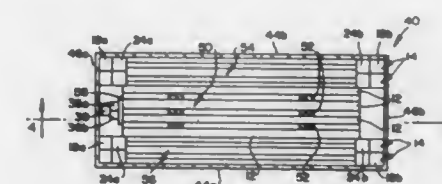
means, said heating means being located inside of said second interior cavity, said heating means being mounted to said cup so as to be immersed in said liquid in said second chamber means, said heating means continuously heating said liquid for as long as the level of said liquid is maintained within a predetermined range in said first chamber means;

- (e) support means for supporting said cover and said second chamber means, said second chamber means being supported in said first chamber means first interior cavity such that there is no penetration of said first interior cavity below a water line of said first chamber means, said cover being supported above said first chamber means such that there is a gap between said first chamber means and said cover, said cover comprising openings in its top wall to provide for air circulation within said apparatus, said support means comprising plural arms with each arm having inner and outer ends, said outer ends being coupled to said cover, said inner ends being coupled to said second chamber means;
- (f) said cup being frustum shaped with the cup bottom opening being larger than the cup top wall, said cup being made of a ceramic material, said cup side wall having an opening allowing communication between said first interior cavity and said second interior cavity, said opening being located between said cup bottom opening and said top wall such that said opening is below the liquid level of said first chamber means;
- (g) condenser means located above said second chamber means, said condenser means having an inlet which communicates with the second interior cavity for receiving vapor from said liquid, and an outlet which exits said apparatus, said condenser means being supported by said support means;
- (h) fan means for circulating air through said apparatus, said fan means located above said condenser means;
- (i) inlet means for providing undistilled liquid to said first chamber means, said inlet means being located above said first chamber means, and valve means for automatically shutting off the flow of liquid into said first chamber means when said liquid in said first chamber means reaches a predetermined level.

**4,957,201**  
**SHIPPING CARTON AND FOLDING TABLES**  
Clifford E. Wieting, P.O. Box 32480, Louisville, Ky. 40232  
Filed Feb. 12, 1990, Ser. No. 478,533  
Int. Cl.<sup>5</sup> B65D 85/00

U.S. Cl. 206—326

11 Claims



1. In a shipping carton including a plurality of folding tables therein, the folding tables having table tops and foldable leg support means, the table tops having a length greater than their width, each leg support means including two pairs of pivotally connected legs, the improvement comprising table tops detached from said leg support means, said table tops being oriented with their length dimension vertically disposed in the carton and sandwiched between at least two folded leg support means, the length dimension of said table tops being in parallel with said pair of legs.

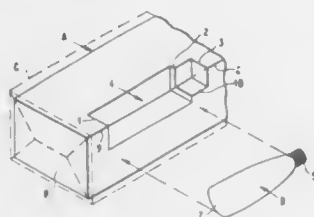


4,957,202  
COMMODITY PACKAGE WITH AUXILIARY  
CONTAINER PORTION

Kanetsugu Yoshiki, and Takamasa Urayama, both of Osaka, Japan, assignors to Sunstar Kabushiki Kaisha, Osaka, Japan  
Filed Aug. 21, 1989, Ser. No. 396,199  
Int. Cl.<sup>3</sup> B65D 5/50

U.S. Cl. 206—44.11

5 Claims



1. A commodity package comprising a body of box-shape with a rectangular cross-section, said box-shaped body being made of paper, first, second and third parallel slits formed in a corner portion of said body transversely to the longitudinal axis of said body, said slits being spaced a predetermined distance from each other along said corner portion, weakened fold lines extending parallel to each other and parallel to the longitudinal axis of the body and extending between respective ones of said slits to define two separate corner portions of said body bent inwardly of the body to form an auxiliary container portion, defined at each end by right angle intersecting sides, one of said first and third slits on opposite sides of said second slit extends from said corner portion of said body along said right angle intersecting sides to an extent less than the others of said slits so as to form an inwardly bent reduced-sized portion of said auxiliary container portion at one axial end thereof functioning as a stopper means and abutting one end of said auxiliary commodity when positioned therein to prevent rattling of the auxiliary commodity contained in said auxiliary container portion with contact being effected between edges of said reduced-sized portion of said auxiliary container portion and said one end of said auxiliary commodity when positioned within said auxiliary container portion, and a transparent cover member attached to said body to cover at least said auxiliary container portion containing the auxiliary commodity therein.

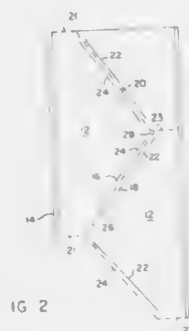
4,957,203  
GARMENT COVER

William T. Gilchrist, Jr., 935 Brookridge Dr., Camden, Ark. 71701

Filed Dec. 20, 1989, Ser. No. 453,855  
Int. Cl.<sup>3</sup> B65D 85/18

U.S. Cl. 206—286

4 Claims



4. A roll of garment covers comprising a first sheet of flexible material, a first line of perforations extending in a zig pattern lengthwise of the sheets, a selected portion of said

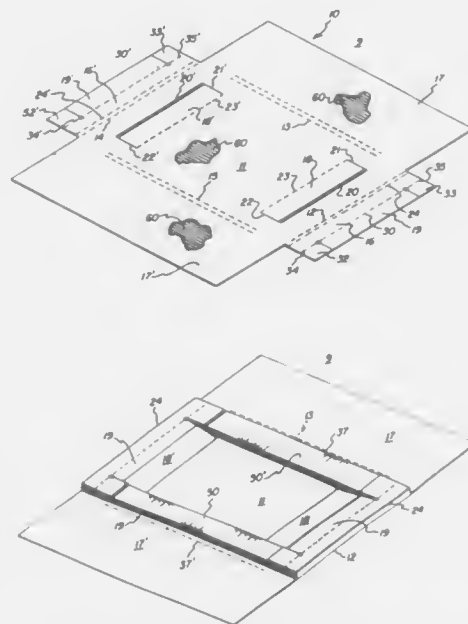
sheets being bonded together adjacent each side of said perforations, a second line of perforations extending laterally from said first line of perforations to one edge of said sheets, and a third line of perforations extending from said first line of perforations to the other edge of said sheets.

4,957,204  
CONTAINER FOR PACKAGING CARPENTER SQUARES

Ronald J. Dooley, 9 Rensselaer St., Hoosick Falls, N.Y. 12090  
Filed Sep. 15, 1989, Ser. No. 407,540  
Int. Cl.<sup>3</sup> B65D 85/28

U.S. Cl. 206—371

22 Claims



1. A container for packaging carpenter squares comprising:
  - (a) a substantially rectangular bottom panel capable of supporting carpenter squares arranged end to end in a rectangular pattern;
  - (b) a pair of tuck flaps extending from first and second edges, respectively, of said bottom panel and configured for folding over a portion of said carpenter squares, each tuck flap having an interlock flap extending therefrom configured for tucking underneath an opposing receiving flap; and
  - (c) a pair of receiving flaps contained in said bottom panel, each receiving flap being configured and positioned to receive the opposing interlock flap thereunder and hold said interlock flap in place through interaction with said interlock flap.

4,957,205  
COMPUTER DISK HOLDER

Robert D. Rose, Jr., 2635 S. Santa Fe Dr., Denver, Colo. 80223  
Filed Feb. 16, 1989, Ser. No. 311,713  
Int. Cl.<sup>3</sup> B65D 85/57

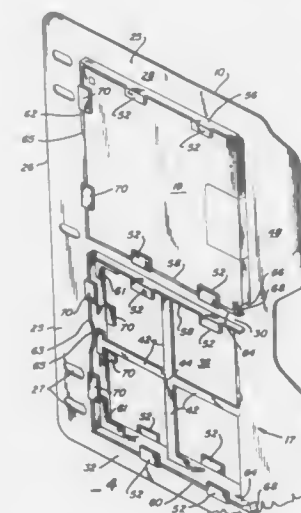
U.S. Cl. 206—444

18 Claims

1. A disk holder for storing a plurality of computer disks in a snap ring loose-leaf notebook for storing documentation and said disk holder, said disk holder comprising in combination, a generally rectangular frame adapted to be retained in the notebook and having a front surface and a back surface, said rectangular frame including a longitudinal ring member to which said notebook snap rings connect, a longitudinal tab member extending parallel to and spaced from said ring member, said ring

member and tab member being integrally joined by a transverse top member, a transverse middle member, and a transverse bottom member, said transverse members, ring member and tab member defining two compartments on each of said front and back surfaces, each said compartment having means for receiving and aligning a disk inserted therein, selected edges of said receiving means having tabs formed thereon defining means for retaining said disk in said compartment, means associated with said retaining means for contacting and biasing said disk against said retaining means whereby four disks, two mounted on either surface of said disk holder, can be held in said disk holder.

6. A disk holder for storing a plurality of computer disks in a snap ring loose-leaf notebook for storing documentation and said disk holder, said disk holder comprising, in combination, a generally rectangular frame adapted to be retained in the notebook and having a front surface and a back surface, said frame including parallel laterally extending spaced apart top, middle and bottom transverse members, parallel longitudinally extending spaced apart ring and tab members integral with said transverse members and defining therewith a top and a bottom opening on said front and back surfaces, and cross-members integral with said transverse members, ring and tab members extending across each of said openings, and each of said openings defining a compartment selectively registrable with a disk,



each compartment having means for receiving and aligning a disk inserted therein, selected edges of said receiving means having tabs formed thereon defining means for retaining said disk in said compartment, and means associated with said retaining means for contacting and biasing said disk against said retaining means, whereby disks can be retained and stored on said front and back surfaces.

9. A disk holder for storing a plurality of disks in a snap ring looseleaf notebook for storing documentation and said disk holder, said disks defining spaced holes in one surface thereof, said disk holder comprising in combination, a generally rectangular frame adapted to be retained in the notebook and having a front surface and a back surface, each of said front and back surfaces defining at least one compartment having means for receiving and aligning a disk inserted therein, means on said front and back surfaces for releasably retaining said disk in said compartment of said disk holder, and means for releasably contacting said inserted disk and biasing said disk against said retaining means, said retaining means comprising nipples formed on said front and back surfaces for engaging in said holes formed in said disks.

14. A disk holder for computer disks releasably connected to a loose-leaf notebook having snap rings for retaining documentation and said disk holder, comprising, in combination: a generally rectangular frame having a front and a back

surface and including a longitudinal ring member having elongated openings formed therein for connection to said snap rings of said notebook and an opposed parallel tab member having integral tabs projecting away therefrom, said ring member and said tab member interconnected by a transverse top member, a transverse middle member and a transverse bottom member, defining therebetween a top opening and a bottom opening in said frame;

a top guiderail, middle guiderail and bottom guiderail formed along said top, middle and bottom transverse members and on each of said front and back surfaces, defining guide means for guiding said disks into said disk holder;

first inverted L members integrally mounted to the front and back surfaces of said frame for retaining an edge of selected ones of said disks, said first L members mounted to each of said front and back surfaces along said guiderails; second inverted L members integrally mounted to the front and back surfaces of said frame for retaining a second edge of selected ones of said disks, said second L members mounted to each of said front and back surfaces along a stop member; and

bias means for engaging said disks mounted to the front and back surfaces of the frame and associated with each of said top and bottom openings near said first inverted L members, whereby said first inverted L members receive said edge of said disk as said disks engage said bias means and said second edge of said disk is received by said second inverted L members.

4,957,206  
DEVICE FOR STORING A PLURALITY OF DISHES OR  
THE LIKE IN A PLURALITY OF STACKS

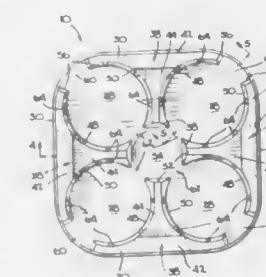
Ronald C. Banko, North Wales; Robert J. Cohn, Dallas, and John H. Welsch, Moscow, all of Pa., assignors to InterMetro Industries Corporation, Wilkes-Barre, Pa.

Continuation of Ser. No. 97,836, Sep. 17, 1987, abandoned. This application Aug. 30, 1989, Ser. No. 401,503

Int. Cl.<sup>3</sup> A47G 19/00

U.S. Cl. 211—40

41 Claims



39. A device for storing a plurality of objects, such as dishes or the like, in a plurality of stacks in a plurality of object-receiving regions, said device comprising:

means for supporting said plurality of objects and including a generally rectangular base; and

means for partitioning the space extending above said supporting means into at least four object-receiving regions, wherein said partitioning means defines a pair of slits adjacent each object-receiving region, wherein said slits in each said pair are spaced substantially diametrically opposite from each other relative to one said object-receiving region, wherein one said slit is positioned directly above each of at least two diagonally opposed corners of said base, and wherein said partitioning means partitions the space extending above and surrounding the center of said supporting means into a central open region,

said partitioning means further comprising four partition each having two object-receiving region-defining surfaces, wherein each object-receiving region is defined by

a pair of object-receiving region-defining surfaces of different partitions, wherein each partition is generally T-shaped having first and second portions, wherein said first portion forms an outer wall of said device, wherein said second portion comprises said two object-receiving region-defining surfaces, wherein an interior end of said second portion of each partition borders on said central open region and is spaced a distance from an axis perpendicular to said supporting means and extending through the center of said supporting means, wherein said interior ends of each pair of said second portions of each pair of object-receiving region-defining surfaces are spaced apart from each other, wherein the space between said interior ends of each pair of second portions of each pair of object-receiving region-defining surfaces forms one of said slits in each pair of slits in each object-receiving region, and wherein the exterior ends of each pair of second portions of each pair of object-receiving region-defining surfaces are spaced apart to form the other of said slits in each pair of slits in each object-receiving region.

4,957,207

## EXTENSIBLE HOIST FOR A NATERO VESSEL

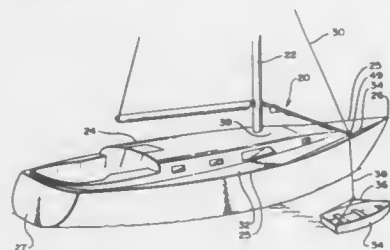
Barclay L. Thomas, 24800 Highway One, Fort Bragg, Calif. 95437

Continuation of Ser. No. 145,974, Jan. 20, 1988, abandoned, which is a continuation of Ser. No. 762,720, Aug. 5, 1985, abandoned. This application Feb. 9, 1989, Ser. No. 308,417

Int. Cl.<sup>5</sup> B66C 23/52

U.S. Cl. 212-192

5 Claims



1. An apparatus for shifting a load between spaced positions, said apparatus comprising, in combination:

- a support beam having a plurality of telescopically oriented tubular sleeve portions of progressively smaller diameter;
- a vertical support member;
- first means for coupling one end of the largest diameter one of said plurality of telescopically oriented tubular sleeve portions to said vertical support member at a first location thereon with freedom for pivotal movement about a vertical axis;
- cable support drum means mounted on said support beam, said cable support drum means having a cable secured at one end to said support drum means and wound thereabout with the opposite free end of said cable passing through said plurality of telescopically oriented tubular sleeve portions and exiting therefrom through one end of the smallest diameter one of said tubular sleeve portions, said free opposite end of said cable including means for separably attaching said cable to the load to be shifted;
- means for shifting said plurality of telescopically oriented tubular sleeve portions axially relative to one another so as to selectively elongate and shorten said support beam, said means for shifting said plurality of telescopically oriented tubular sleeve portions including:
  - a toothed rack secured to the outer surface of, and extending axially along, one of the smaller diameter tubular sleeve portions;
  - a worm gear mounted on the free end of the next larger

tubular sleeve portion and drivingly coupled to said toothed rack;

- a circular rack mounted on said support beam, said circular rack having a socket for receiving a removable winch handle;
- a pinion gear meshed with said circular rack;
- a drive shaft drivingly connected at one end to said worm gear and at its other end to said pinion gear so that upon insertion of a winch handle into said socket and rotation thereof said smaller diameter tubular sleeve portion is caused to move axially relative to said next larger tubular sleeve portion so as to elongate or shorten said support beam;
- a plurality of latch openings formed axially along the length of one of said tubular sleeve portions; and,
- at least one outwardly biased depressible latch button formed on the next smaller diameter one of said telescopically oriented tubular sleeve portions so that said next smaller diameter one of said telescopically oriented tubular sleeve portions can be shifted axially relative to the immediately adjacent outer one of said tubular sleeve portions by depressing said outwardly biased button inwardly through one of said openings and shifting said next smaller diameter tubular sleeve portion axially relative to the next adjacent outer tubular sleeve portion until said outwardly biased button snaps into a different latch opening on said adjacent outer tubular sleeve portion;
- second means coupled to said one end of said smaller diameter one of said tubular sleeve portions of said support beam for coupling said support beam to said vertical support for pivotal movement about a horizontal axis, said second coupling means being vertically spaced from said first coupling means so that said support beam can be maintained in a substantially horizontal plane at all operative lengths and pivotal positions about said vertical axis; and,
- means for controllably unwinding and winding said cable about said cable support drum means so as to permit the operator of said apparatus to shift a load between spaced positions.

4,957,208

## MULTIPLE CONTACT ELECTRICAL CONNECTOR PORTION FOR AN AUTOMATIC RAILWAY COUPLER

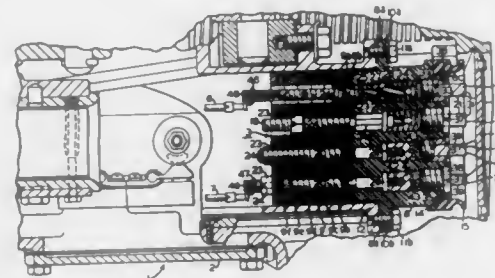
Cuong Manh Ta, Taylors, S.C., assignor to American Standard Inc., Spartanburg, S.C.

Filed May 24, 1989, Ser. No. 356,143

Int. Cl.<sup>5</sup> B61G 5/06

U.S. Cl. 213-1.3

20 Claims



1. An electrical connector portion for an automatic railway car coupler comprising, a slide frame connectable to the electrical connector portion, a multiple contact unit carried by said slide frame, said multiple contact unit includes an outer insulative block having a plurality of aligned apertures for accommodating a plurality of movable and stationary contact elements and including an inner insulative block constructed of a plurality of stacked jumper plates, each of said jumper plates having

a plurality of aligned holes for accommodating a plurality of conductive studs which are electrically connected to the respective movable and stationary contact elements and, in turn, which are electrically connected to selected train line conductors.

4,957,209

## EMERGENCY WATER BOTTLE

Stig-Aake Helin, Goeteborg, Sweden, assignor to Tansaktor KB International, Goeteborg, Sweden

Continuation of Ser. No. 6,498, Jan. 16, 1987, Pat. No.

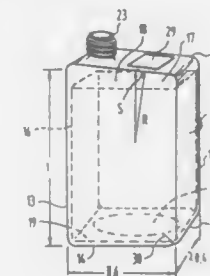
4,832,965. This application Dec. 8, 1988, Ser. No. 281,214

Claims priority, application Fed. Rep. of Germany, May 17, 1985, 8514691[U]; Dec. 19, 1985, 3545116, PCT Int'l Appl., May 16, 1986, P86/00298

Int. Cl.<sup>5</sup> B65D 1/02, 23/08

U.S. Cl. 215-1 C

17 Claims



1. A bottle used for storing an emergency water ration, said water being capable of sterilization with heat while it is present in said bottle, and said bottle being structured to resist external shock and environmental stress which comprises

- an inclined top surface, a bottom surface having a concave construction and side walls, said top surface bottom surface and side walls connecting with each other at edge having inside radii of at least 5 mm,
- a pouring spout disposed at one side of the inclined top surface adjacent to the edge thereof, said pouring spout having a neck which is connected to the inclined top surface in a smooth, curved transitional manner, and
- a locking plug adapted for engagement with said pouring spout, said bottle and said locking plug being made of high density polyethylene.

4,957,210

## CHILD RESISTANT CLOSURE

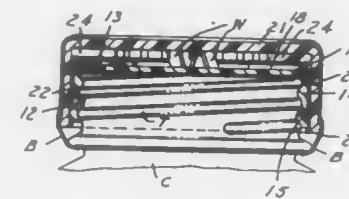
Maximillian Kusz, Waterville, Ohio, assignor to Owens-Illinois Closure Inc., Toledo, Ohio

Filed Oct. 16, 1989, Ser. No. 422,219

Int. Cl.<sup>5</sup> B65D 55/02

U.S. Cl. 215-220

2 Claims



1. A child resistant closure comprising: an inner closure and an outer closure, means for retaining the inner closure member within the outer closure,

said means permitting limited axial movement of the inner closure within the outer closure member, said inner closure member comprising a base wall, a skirt depending from the periphery of said base wall, threads formed on the inside of said skirt to engage corresponding threads formed on a container finish, and a set of radially aligned lugs formed on the top of said base wall,

said outer closure member comprising a base wall, a skirt depending from the periphery of said outer base wall, and a set of depending radial lugs integrally formed on the inside surface of said outer base wall,

said sets of lugs constructed and arranged to interengage when said panels are brought together, both sets of lugs having vertical, generally radially extending side surfaces constructed and arranged to abut each other when the outer closure member is rotated in the direction for application of the safety closure,

one of said sets of lugs having inclined, generally radially extending side surfaces, constructed and arranged to abut the edges of the other of said sets of lugs when the other closure is rotated in the direction for removal, whereby said sets of lugs will cam out of engagement when the outer closure member is rotated in the direction for removal, unless a firm downward force is applied to said outer closure member,

a tamper indicating band comprising a heat shrunk band over said outer closure and a portion of said container,

at least one flexible wing extending from one of said outer closure member and inner closure member and yieldingly resisting axial movement between said members such as to hold the outer closure member out of loosening engagement with the inner closure member when the band is heat shrunk over the closure and a portion of the container,

the force to deflect the wing being sufficient to hold the outer closure out of loosening engagement when the band is shrunk on the closure and the force being substantially less than the axial force necessary to engage the lugs and prevent the lugs from camming out of engagement in order to move the inner closure member and outer closure member into engagement after the band is removed for loosening the closure during removal of the closure from the container.

4,957,211

## VACUUM-INDICATING CLOSURE

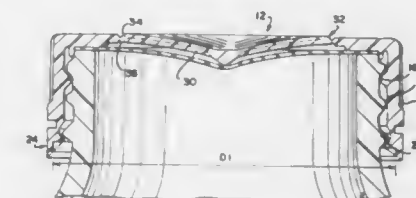
Len Ekkert, Lemont; Charles A. Webster, Oak Lawn, and Paul R. Hansen, Kildeer, all of Ill., assignors to American National Can Company, Chicago, Ill.

Filed Jul. 11, 1989, Ser. No. 378,057

Int. Cl.<sup>5</sup> B65D 41/04

U.S. Cl. 215-230

5 Claims



1. A vacuum-indicating closure comprising a top wall adapted to extend across and provide a seal for neck finish of a container and a skirt extending downwardly from a periphery of said top wall and having a member for securing said closure, the improvement comprising means defining a deflectable center portion in said top wall, said deflectable center portion having radially-extending thinned portions to divide said center portion into segments joined to each other by said thinned portions so that said center portion moves between a



generally outward convex configuration to a generally concave configuration depending upon the presence or absence of vacuum in the container.

4,957,212

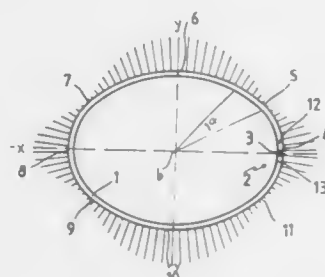
## NON-CIRCULAR PISTON RINGS

Gerhard Dück, Burscheid; Hans-Rainer Brillert, Odenthal, and Albin Mierbach, Leverkusen, all of Fed. Rep. of Germany, assignors to Goetze AG, Burscheid, Fed. Rep. of Germany. Continuation of Ser. No. 858,494, Apr. 30, 1986, abandoned. This application Oct. 26, 1988, Ser. No. 263,964. Claims priority, application Fed. Rep. of Germany, May 2, 1985, 3515659.

Int. Cl.<sup>3</sup> F16J 9/00, 9/12

U.S. Cl. 277-217

4 Claims



1. A piston ring for a non-circular engine cylinder, which cylinder has a wall contacted by the ring, the cylinder being in an engine which is in a cold state before being placed into operation, said ring having a plurality of first circumferential regions spaced apart around the circumference of said ring and each having a defined radius of curvature which differs from one first region to the next around the circumference of said ring, and a plurality of second circumferential regions each interposed between two succeeding first regions and each formed to effect a transition between the radii of curvature of the two succeeding first regions, wherein said second regions are configured for exerting on the cylinder wall a radial contact pressure which is less than that exerted by said first regions when said ring is installed in the cylinder and the engine is in its cold state.

4,957,213

## CARD FILE STOP

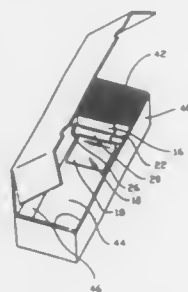
Dennis H. White, 308 Ries Rd., Ballwin, Mo. 63021, and Danny W. Schoenwalder, 157 E. Forest Parkway, Valley Park, Mo. 63088.

Filed Mar. 5, 1990, Ser. No. 488,691

Int. Cl.<sup>3</sup> B65D 1/24

U.S. Cl. 220-559

9 Claims



1. A file stop support for use in a file drawer or the like comprising a plate-like member and a tubular telescoping element, said member having a base portion and an upright

portion, said tubular telescoping element being attached to a back side of said upright portion in an orientation transverse to side walls of said drawer, said tubular telescoping element having two ends, at least one of said ends axially extending out to engage in biased relation said side walls of said drawer.

4,957,214

## MODIFICATION TO FLOATING ROOF TANK DESIGN

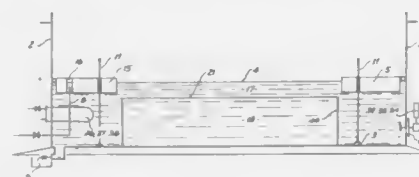
Leslie M. Lenny, Caringbah, Australia, assignor to California Texas Oil Corporation, Irving, Tex. Continuation of Ser. No. 910,298, Sep. 17, 1986, Pat. No. 4,790,447, which is a continuation of Ser. No. 723,008, Apr. 16, 1985, abandoned, which is a continuation of Ser. No. 531,506, Sep. 12, 1983, abandoned. This application Aug. 24, 1988, Ser. No. 235,606.

Claims priority, application Australia, Sep. 13, 1983, PF5853. The portion of the term of this patent subsequent to Dec. 13, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> B65D 88/40

U.S. Cl. 220-220

64 Claims



23. A floating roof storage tank, comprising:

a tank shell supported by a fixed base and a floating roof buoyantly supported by liquid stored in said tank, said roof including legs of negligible volume projecting downwardly therefrom to support said roof at a minimum operating stored liquid level in said tank;

a displacement mass located within said tank to substantially fill the volume between said base and said roof when said roof is at a minimum level, wherein said replacement mass within said tank is of substantially constant volume and configuration, said volume and configuration being geometrically determined by at least one fixed surface, the constant volume of said displacement mass reducing the volume of said stored liquid able to be stored in said tank to less than the nominal capacity of said tank.

4,957,215

## SEGMENTED NOZZLE DAM

Cliff Evans, 207 Chestnut Ridge, Bethel, Conn. 06801, and Jagdish H. Shah, 4 Beechwood Ct., Woodbury, Conn. 06798. Filed Feb. 13, 1989, Ser. No. 310,316. Int. Cl.<sup>3</sup> F16L 55/12.

U.S. Cl. 220-232

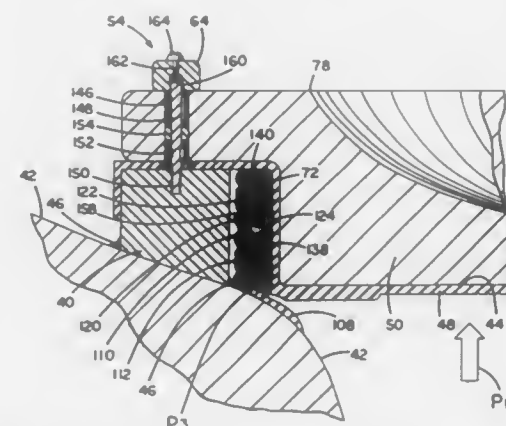
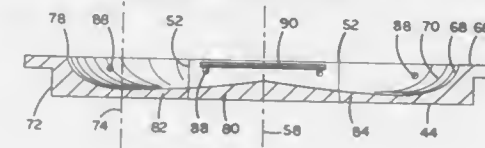
13 Claims

1. A nozzle dam for sealing a nozzle against flow of a first fluid through the nozzle, said nozzle having an inner wall forming a frustoconical opening, and a ring mounted by a bottom end about said opening, said ring being adapted for receiving fastening means around the top of said ring, the inner diameter of said ring being for receiving sealing means; said nozzle dam comprising:

a disk including a top and a bottom, said disk further comprising a first portion having a first diameter near the top, a second portion having a second diameter, and a third portion having a third diameter, said first, second and third diameters being generated on a first axis, said disk further including an annular, radial flange between said first and second diameters, the first diameter of said disk being greater in size than the inner diameter of said ring, the second diameter of said disk being less in size than the inner diameter of said ring so that an annulus for sealing

means is formed between the ring and the disk, when the disk is located on the ring with the second diameter concentric with the inner diameter of the ring,

said third diameter portion comprising a circular portion that is concentric with said first axis and thinner, measured in solid cross section, than the central portion of said disk at said first axis measured in solid cross section, said circular portion being contoured for resistance to stress from pressure of said first fluid against the disk, and for reduced disk mass within said third diameter,



said flange including openings for threaded fasteners, said openings being so located on the flanges that they may be aligned with tapped openings in the top end of said ring, for fastening said disk to said ring,

said nozzle dam further comprising sealing means expandable by a second fluid under pressure, said sealing means being located on the second diameter portion for sealing between the disk and the ring by expanding within the annulus, and

means for delivering said second pressurized fluid to the sealing means.

4,957,216

## ANCHOR FOR PLASTIC CAP

Robert L. LaBarge, Ben Avon Borough, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Apr. 17, 1989, Ser. No. 338,580

Int. Cl.<sup>3</sup> B65D 55/00

U.S. Cl. 220-379

9 Claims

1. A closure for closing the open mouth of a container comprising:

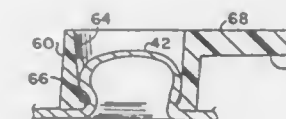
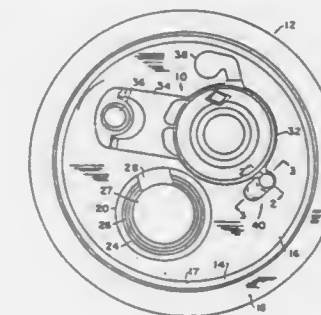
an end wall having a score line defined panel defining a pouring opening therein for dispensing of the container contents,

means around the periphery of the end wall for attaching the closure to a container,

a flexible resealing cap assembly pivotally secured to said end wall and rotatably displaceable about the locus of securement thereof for transposition immediate a first location remote from said score line defined opening panel in said end wall and a second location in overlying sealing relation with said pouring opening therein, and

means for releasably anchoring said cap assembly in interfacial abutting relation with said end wall at said first location, wherein said anchoring means includes upwardly extending button means in said end wall positioned in spaced relation from said score line defined panel therein

and from said peripheral attaching means, and a flexible sleeve member included in said cap assembly sized to



elastically surround said button means for releasable engagement therewith.

4,957,217

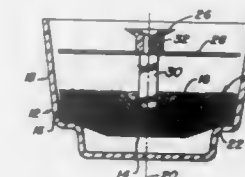
## COFFEE FILTER PAPER DISPENSER

Wilbur Ritson, 820 E. Cameron Ave., West Covina, Calif. 91790. Continuation of Ser. No. 217,371, Jul. 11, 1988, abandoned. This application Nov. 3, 1989, Ser. No. 431,688.

Int. Cl.<sup>3</sup> B65G 59/00

U.S. Cl. 221-210

11 Claims



1. A dispenser of individual coffee filter papers from a stack of such papers, wherein each filter paper has a circular plan area including a central flat area and a radially corrugated annular peripheral area, the papers being stacked with their central areas in close contact, with their peripheral areas extending outwardly and upwardly and with the corrugations thereof in nesting relation,

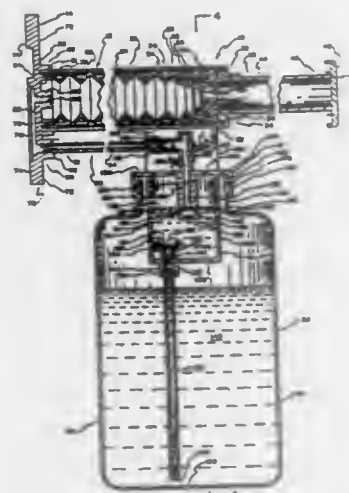
said dispenser comprising:

an open-topped container having an inner wall surface defining a cross-sectional area sized in relation to the circular plan area of the filter paper stack that frictional engagement between the inner wall surface and the outer peripheral edge surfaces of the papers is minimized, whereby the filter papers may be rotated about a central axis of the central flat areas of the papers without distortion of the papers by engagement with the container inner wall surface, and whereby individual filter papers may be drawn upwardly through the open top of the container without substantially deforming the papers,

a dust cover disposed in the container atop the stack of

filters papers, and having thereon manual engagement means for facilitating grasping of the dust cover, a central post element extending downwardly from the dust cover and having an end face engagable with the central flat area of the uppermost paper in the filter paper stack, and a contact adhesive material on the lower face of the post element to exert a gripper force on the uppermost filter paper, whereby upon manual rotation of the dust cover the uppermost paper in the stack is rotated to cause the corrugations thereof to ride over the corrugations of the next lower paper so that the corrugations of the two papers are out of phase and registration and not adhered, thus to permit ready and convenient lifting of the uppermost paper from the stack by lifting of the dust cover.

**4,957,218**  
**FOAMER AND METHOD**  
George W. Ford, Jr., Salt Lake City, Utah, assignor to Ballard Medical Products, Midvale, Utah  
Filed Jul. 28, 1986, Ser. No. 890,041  
Int. Cl.<sup>5</sup> B67D 5/58; B65D 83/00  
U.S. Cl. 222-1 **4 Claims**



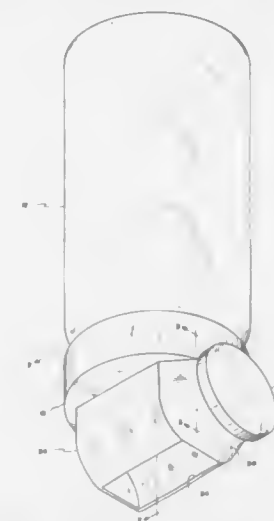
1. A method for repeatedly forming and dispensing small quantities of foam by entraining air within a foamable liquid in a foaming device successively over an extended period of time without need to replenish the supply of foamable liquid in the device, comprising the steps of:  
storing a large quantity of foamable liquid in a large container;  
transferring a small predetermined quantity of foamable liquid from the large container along a one-way fluid flow passage to an elevated small pump chamber under force of negative pressure at successive points in time;  
terminating the transferring step by flow control action after each said small predetermined quantity of foamable liquid has been accumulated within the elevated small pump chamber;  
displacing at least a substantial portion of a known amount of the foamable liquid contained within the small pump chamber from the small pump chamber to a foam-producing site as a liquid stream under force of manually-derived positive pressure;  
delivering a regulated flow of air under said force of manually-derived positive pressure to the foam-producing site; causing a confluence at the foam-producing site by continuously merging the stream of foamable liquid and the flow of air under force of said manually-derived positive pressure to produce foam at the foam-producing site;

displacing the foam along an effluent foam flow path from the foam-producing site to a foam output site;  
terminating the delivering step and the causing step, and the two displacing steps by flow control action when the known substantial portion of the small quantity of foamable liquid initially contained within the small pump chamber has been discharged from the small pump chamber to the foam-producing site.  
2. A foam-dispensing device comprising:  
a relatively large container for holding a supply of foamable liquid;  
a relatively small elevated pump chamber for selectively receiving at successive points in time a relatively small definitive amount of said foamable liquid from the large container under force of negative pressure along first flow path means comprising suction tube means and one-way flow control means;  
foam-producing means juxtaposed the large container and the pump chamber, the foam-producing means defining a juncture between (a) foam effluent means, (b) foamable liquid influent means and (c) air influent means;  
source means by which pressure is obtained;  
liquid passageway means by which a predetermined quantity of foamable liquid from the small pump chamber is selectively delivered to the foam-producing means at the liquid influent means;  
air passageway means by which the force of positive pressure from the source means is imposed upon the foamable liquid contained within the pump chamber thereby forcing flow of said predetermined quantity of foamable liquid from the pump chamber along the liquid passageway means with a controlled amount of air under said positive pressure being displaced along the air passageway means through the air influent means into the foam-producing means to foam the flowing foamable liquid as it passes through the foam-producing means;  
second flow control means accommodating imposition of the force of negative pressure through the interior of the pump chamber, through the one-way flow control means and through the interior of the suction tube means to draw another definitive amount of foamable liquid from the large container up the suction tube means, across the one-way flow control means and into the pump chamber to recharge the pump chamber with foamable liquid;  
the second flow control means terminating each said displacement of foamable liquid into the elevated pump chamber when the definitive amount of foamable liquid has been so displaced to the pump chamber.

**4,957,219**  
**MEASURING AND DISPENSING CAP**  
E. Stanley Robbins, P.O. Box 174, Killen, Ala. 35645, and Rodney W. Robbins, 207 Cherokee Rd., Nashville, Tenn. 37205  
Filed Jan. 31, 1989, Ser. No. 304,122  
Int. Cl.<sup>5</sup> G01F 11/20  
U.S. Cl. 222-39 **7 Claims**

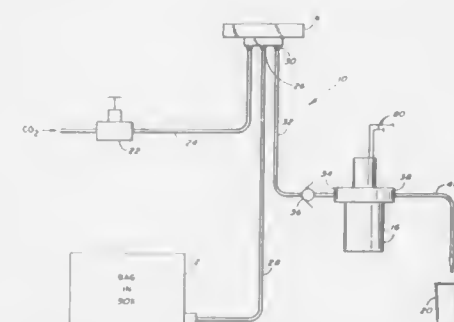
1. A metering and dispensing cap apparatus attachable across the mouth of a container comprising:  
a cap body arranged to be removably secured to said container and disposed horizontally when said container is in an inverted, vertically disposed position;  
said cap having an aperture communicating with the interior of said jar;  
an integrally formed housing mounted on the outside of said cap body enclosing said aperture and having a pair of opposed, outwardly extending end portions and inwardly curved side portions terminating in an outer rectangular aperture spaced apart from said aperture of said cap body, said housing including in each end portion a circular, shaft-receiving aperture, one of said end portions having an inner face and an outer face, said outer face having defined therein an axially disposed, spring-receiving hole;

a metering rotor disposed in said housing between said apertures with its axis perpendicular to said container mouth; said rotor having defined therein a plurality of circumferentially spaced-apart cavities of equal volumes and a central, circular opening extending axially therethrough;  
a shaft extending axially through said opening in said rotor and engaging said shaft-receiving aperture;  
a knob mounted on said shaft for turning said rotor, whereby said cavities may be sequentially filled with material in



said container upon being in communication with the interior thereof and emptied upon being in communication with said housing aperture, said knob including detent-receiving indentations in a side face opposing said spring-receiving hole;  
detent means disposed in contact with said spring so as to be biased against said knob face and to be removably forced into said indentations upon turning of said rotor; and means providing wiping action for levelling off said cavities upon being rotated.

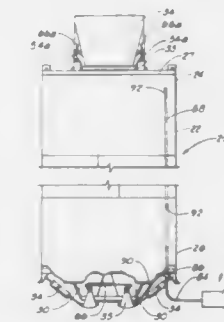
**4,957,220**  
**VENDING MACHINE LAST DRINK SENSOR AND DISPENSING APPARATUS**  
Benjamin R. Du, 32392 Via Antiba, South Laguna, Calif. 92677  
Filed Dec. 6, 1988, Ser. No. 280,679  
Int. Cl.<sup>5</sup> B67D 5/08  
U.S. Cl. 222-66 **14 Claims**



1. A beverage syrup dispensing apparatus for use in vending machines comprising:  
a bag-in-box beverage syrup container adapted to store beverage syrup therein;

a nozzle formed to dispense said beverage syrup with a proportional quantity of a mixing fluid;  
a pump disposed between said beverage syrup container and said nozzle for delivering syrup from said container to said nozzle; and  
means disposed between said pump and said nozzle for accumulating and dispensing a quantity of said syrup to said nozzle sufficient for vending at least one last beverage from said vending machine after a syrup depletion condition occurs within said bag-in-box syrup container, the syrup depletion condition occurring when said bag-in-box beverage syrup container becomes substantially empty of beverage syrup;  
wherein the syrup depletion condition causes said means to dispense at least one beverage from said vending machine.

**4,957,221**  
**AIR TIGHT STORAGE SILO**  
Stuart W. Murray, Edmond, Okla., assignor to CMI Corporation, Oklahoma City, Okla.  
Filed Jan. 3, 1989, Ser. No. 292,904  
Int. Cl.<sup>5</sup> B65D 85/00  
U.S. Cl. 222-129 **11 Claims**



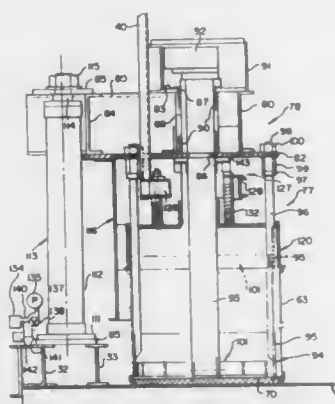
1. A silo, comprising:  
a vertically extending vessel having a receiver opening at the upper end thereof;  
a batcher, having a hopper and a hopper discharge opening, secured to the vessel above the receiver opening, with the receiver opening and the hopper discharge opening vertically aligned;  
a gate for selectively closing the receiver opening;  
a first shaft secured to the batcher;  
at least one gate arm secured to an end of the gate and pivotally secured on the first shaft, said gate arm being positioned external to a flow path formed by said receiver opening and said hopper discharge opening;  
means for swinging the gate arm about the first shaft to move the gate alternately over and away from the receiver opening and under and away from the hopper discharge opening;  
means for lowering the first shaft and the gate when the gate is over the receiver opening; and  
a deformable sealing member secured to the vessel around the receiver opening in a position to be engaged by the gate when the gate is lowered to seal off the receiver opening.

**4,957,222**  
**BARREL SCRAPER**  
John I. Rolfe, 337 Riverview Dr., Youngstown, N.Y. 14174  
Filed Feb. 8, 1989, Ser. No. 307,517  
Int. Cl.<sup>5</sup> B08B 9/38  
U.S. Cl. 222-148 **23 Claims**

1. An apparatus for removing settled out material from a barrel, said apparatus comprising a barrel support, a barrel scraper for scraping the interior of a supported barrel, means



for fixing a barrel relative to said barrel support in a preselected position, and means for effecting axial relative movement between said barrel support and said barrel scraper, said barrel support including a rigid barrel end engaging anvil, and

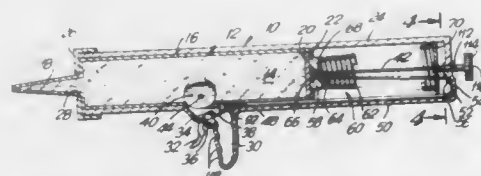


means for moving a supported barrel carried by said barrel support and said anvil relative to one another to a seat a barrel bottom on said anvil while such a barrel is still seated on said barrel support.

**4,957,223**  
**DISPENSER GUN**  
Moishe Beilush, 1431 - 52nd St., Brooklyn, N.Y. 11219  
Filed Aug. 14, 1989, Ser. No. 393,252  
Int. Cl.<sup>5</sup> B65D 88/54

U.S. Cl. 222—340

25 Claims

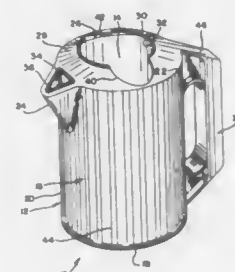


1. A dispenser gun for flowable materials comprising:  
a hollow tubular body member for receiving a cartridge of flowable material therein;  
a removable cap member disposed on a front end of said body member to hold the cartridge within said body member with a nozzle of the cartridge extending outwardly through an opening in said cap member;  
spring means disposed within a rear portion of said body member for providing a spring force upon the cartridge to dispense the flowable material from the cartridge through the nozzle;  
cable means being connected to said spring means for controlling said spring force of said spring means on the cartridge;  
retaining means for engaging said cable means in a locked position so that said cable means prevents said spring means from providing said spring force on the cartridge, and for releasing said cable means into a released position so that said cable means permits said spring means to provide said spring force upon the cartridge;  
release means for moving said retaining means out of engagement with said cable means so that said cable means is in said released position, and for permitting said retaining means to move into engagement with said cable means so that said cable means is in said locked position;  
said cable means including a cable extending at least from said retaining means to said spring means;  
said spring means including a coil spring and a pressure block secured to a forward end of said coil spring for

acting upon the cartridge, said cable being connected to said pressure block; and  
said cable extending forwardly through a first hole in said pressure block, and being looped rearwardly back through a second hole in said pressure block so that a rear end of said cable extends towards a rear wall of said body member;  
whereby the flowable material is only dispensed from the cartridge when said cable means is in said released position.

**4,957,224**  
**MULTI-SPOUTED SERVING PITCHER**  
William Kessler, Sheboygan, and Gerald J. Champeau, Manitowoc, both of Wis., assignors to The Vollrath Company, Inc., Sheboygan, Wis.  
Continuation of Ser. No. 192,489, May 11, 1988, abandoned.  
This application Sep. 14, 1989, Ser. No. 407,724  
Int. Cl.<sup>3</sup> A47G 19/14  
U.S. Cl. 222—465.1

13 Claims



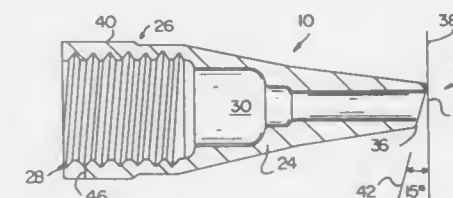
1. An apparatus adaptable for retention and delivery of a liquid, the apparatus comprising:  
a substantially planar base;  
at least one wall;  
a spill guard means for resisting spilling of said liquid; and  
a handle;  
said at least one wall terminating in an upper terminus and cooperating with said base to form a unitary liquid-retentive well; said well being substantially symmetrically disposed about a first axial plane and a second axial plane; said first axial plane being substantially perpendicular with said second axial plane;  
said at least one wall lobularly deviating to provide an integral first spout, said first spout being substantially symmetrical about said first axial plane and depending outwardly from said well;  
said handle depending from said at least one wall outwardly from said well; said handle being substantially symmetrical about said first axial plane;  
said spill guard means comprising a skirt depending inwardly over said well from said upper terminus and terminating in an inner terminus; said inner terminus presenting a first lobe and a second lobe; said first lobe and said second lobe being substantially symmetrically disposed about said second axial plane; said spill guard means further comprising communication access means for facilitating flow of said liquid from said first spout.

**4,957,225**  
**REPLACEABLE CAULKING TIP FOR USE ON CAULKING CARTRIDGES AND METHOD OF MANUFACTURE**  
Steven M. Childers, 155 W. Clover Rd., Tracy, Calif. 95376  
Continuation-in-part of Ser. No. 884,047, Jul. 10, 1986, abandoned. This application Oct. 14, 1988, Ser. No. 257,623  
Int. Cl.<sup>5</sup> B65D 25/40  
U.S. Cl. 222—568

22 Claims

1. A caulking tip for replaceable use on a tubular nozzle of a

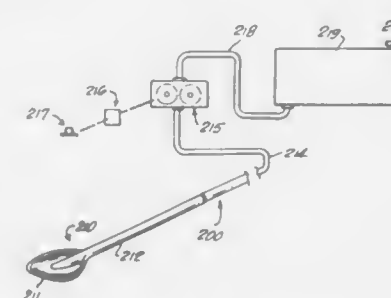
caulking cartridge or the like; said tip being adapted for caulking joints between angularly aligned surfaces; said tip comprising a tubular body having a passage therethrough and an opening at one end for attaching the caulking tip to the nozzle of the caulking cartridge and an outlet orifice at the other end;  
said caulking tip having a longitudinal axis along the length of the tubular body and said outlet orifice having an elongated planar configuration wherein the orifice has a



greater dimension in one direction than in the other, thereby forming an axis of elongation;  
said axis of elongation being on a line which is inclined from a plane perpendicular to the longitudinal axis; and  
said orifice having two sides which are substantially parallel to each other and to the axis of elongation whereby the substantially parallel sides provide an elongated length for contacting angularly aligned surfaces of a joint during a caulking procedure.

**4,957,226**  
**AUTOMATIC FOOD DISPENSING METHOD, APPARATUS AND UTENSIL**  
Dante V. Pacia, Reno, Nev., assignor to Wells Manufacturing, Verdi, N.Y.  
Filed Jun. 5, 1987, Ser. No. 58,470  
Int. Cl.<sup>5</sup> B05D 1/00  
U.S. Cl. 222—643

4 Claims

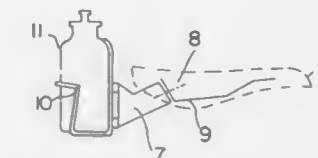


1. The method of dispensing food ingredients comprising: (1) placing the food ingredients to be dispensed in a supply container; (2) connecting a means to withdraw said food ingredients from the supply container to a pump at an inlet means; (3) connecting an outlet means of said pump to a food manipulating utensil by means of a hollow handle through which passes said food ingredients to said food manipulating utensil, said food manipulating utensil having a cavity for receiving said food ingredients; (4) activating said pump for a predetermined time thus causing a predetermined amount of said food ingredients to pass through said hollow handle and onto the cavity of the utensil so as to form a pool of food ingredient on the cavity, and then from the utensil onto a food product; (5) deactivating said pump when the desired amount of food ingredient has been transferred through said utensil; and (6) manipulating said utensil so as to place the dispensed food ingredient in the position desired with relation to the food product.

**4,957,227**  
**SADDLE MOUNTED BICYCLE WATER BOTTLE CARRIER**

James Trimble, Natick, Mass., assignor to Trimble Design Inc.  
Filed Apr. 10, 1989, Ser. No. 333,696  
Int. Cl.<sup>5</sup> B62J 7/00, 11/00  
U.S. Cl. 224—39

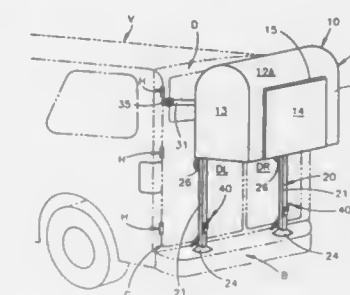
9 Claims



1. A carrier for one or more water bottles in combination with a bicycle seat saddle comprising:  
a bicycle seat saddle having support rails on an underside of the saddle;  
said support rails having ends, one of the ends of the support rails positioned at the rear of the saddle;  
a bracket having two ends, one end of the bracket attached to said one end of the support rails;  
means attached to the other end of the bracket for supporting one or more water bottles.

**4,957,228**  
**CARGO CARRIER FOR VANS**  
Daniel R. Balka, 908 Clearview Ave., Jasper, Ind. 47546  
Filed Apr. 5, 1989, Ser. No. 333,331  
Int. Cl.<sup>5</sup> B60R 9/14, 9/06  
U.S. Cl. 224—42.03 A

11 Claims



1. A removable cargo carrier for use with van-type vehicles having a body, a bumper and a rear door assembly defining a groove between the body and the door assembly, comprising:  
a cargo box including a number of walls defining an enclosure for carrying cargo and a door for providing access to said enclosure; and  
a mounting frame including:  
a pair of spaced apart elongated vertical members with means at the bottom of said pair of vertical members for abutting engagement with the bumper of the vehicle;  
attachment means for attaching said cargo box to said pair of vertical members;  
upper connecting means, proximate the top of said pair of vertical members, for connecting each of said pair of vertical members to the door assembly in a portion of the groove between the vehicle body and the door assembly at the opposite sides of the door assembly; and  
means for supporting said cargo box and its contents against the vehicle door assembly at a fulcrum point generally mid-length along said pair of elongated vertical members.

4,957,229

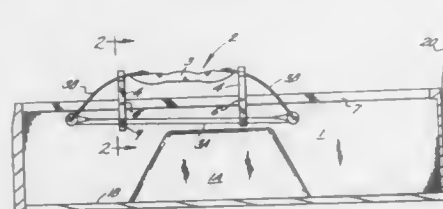
## VEHICLE MOUNTED ARCHERY BOW HOLDER

Lowell J. D. Freeman, 26255 Highpass Rd., Junction City, Oreg. 97448

Filed Jan. 2, 1990, Ser. No. 459,977

Int. Cl.<sup>3</sup> B60R 9/00, 11/00

U.S. Cl. 224—42.45 R



1. Bracket means for attachment to a truck for transporting an archery bow, said bracket means comprising, a main member adapted at spaced apart points for upright engagement with the truck, a support on said main member for abutment with the truck, and arm members on said main member and extending outwardly therefrom, one of said arm members including bow retention means, the other of said arm members including a retainer for engagement with the bowstring of the bow.

4,957,230

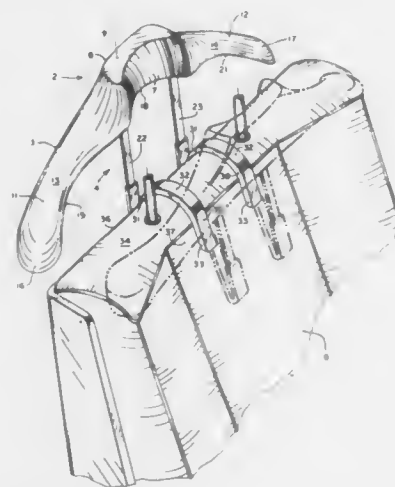
## SEAT-SUPPORTED COAT HANGER FOR AUTOMOBILES

Arthur V. Gonzales, 400 E. Remington Dr. #239, Sunnyvale, Calif. 94087

Filed Sep. 22, 1989, Ser. No. 410,828

Int. Cl.<sup>3</sup> B60R 7/04; A47C 7/64

U.S. Cl. 224—42.46 A



1. A coat hanger for use in an automobile having a cushioned seat including a back support portion having front, back and upper end surfaces for suspending a doffed coat in a wrinkle-free manner thereon, comprising:

- (a) a main body portion having upper and lower surfaces and including a central coat collar supporting section and oppositely extending coat shoulder support sections; and
- (b) means mounted on the lower surface of said main body portion adapted to detachably engage the back support comprising a pair of spaced straps each attached at one end to the main body portion and terminating at its opposite end in an inverted U-shaped clamping portion adapted

to engage the cushioned back support portion of the automobile seat.

4,957,231

## TACKLE BOX BELT

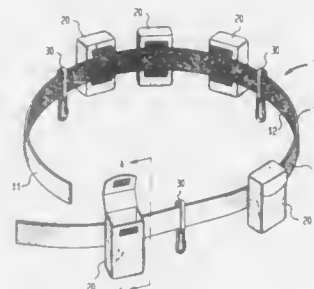
Sheila L. Kallisher, 94 N. Rockledge Dr., Livingston, N.J. 07039

Filed Oct. 13, 1989, Ser. No. 421,370

Int. Cl.<sup>3</sup> A45F 5/00

U.S. Cl. 224—151

4 Claims



1. A device for portable storage and transportation of fishing gear and personal items comprising a waist belt having selectively attachable first and second ends, one or a plurality of pockets selectively attachable to said waist belt, and one or a plurality of loop hangers selectively attachable to said waist belt, said waist belt including an outside surface formed from a hook portion of hook and loop fastener material extending for an entire length of said waist belt, and an inside surface formed from a loop portion of hook and loop tape fastener material extending for an entire length of said waist belt, said one or a plurality of pockets comprising a selectively fastenable envelope having a casing formed on the rear side of said envelope that includes an inner surface and an outer surface, the outer surface of said casing being formed from a loop portion of hook and loop tape fastener material, said one or a plurality of pockets thereby being alternatively attachable to said waist belt either by slidable engagement of said waist belt within said casing or by affixation of the outer surface of said casing with an outside surface of said waist belt.

4,957,232

## HAND WIPE HOLDER

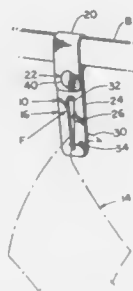
Gailen Sprague, 7759 Greenbush Ave., Van Nuys, Calif. 91402

Filed Apr. 28, 1989, Ser. No. 345,205

Int. Cl.<sup>3</sup> A45F 5/00

U.S. Cl. 224—253

3 Claims



1. A hand wipe holder, comprising: a sheet-like body having a band portion of a length to fit around the top of a person's belt and having fasteners that fasten opposite ends of said band portion together to avoid it falling off the belt;

said body having a wipe-receiving portion depending from

said band portion, said wipe-receiving portion forming a primarily vertical tapered slot with its upper slot end widest to initially receive the corner of a hand wipe and with its lower slot end narrowest to grip the hand wipe when it is forced down along the slot.

said sheet-like body being formed of flexible but tough material with said slot formed as a hole therein, said slot walls flexing apart to receive the wipe and thereafter resiliently pressing toward each other to securely hold the wipe in place.

4,957,233

## TAPE DISPENSER

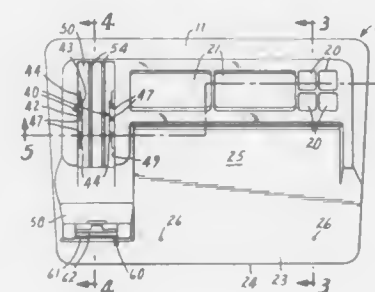
Bruce E. Samuelson, West Lakeland, Township, County of Washington, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed May 12, 1989, Ser. No. 351,716

Int. Cl.<sup>3</sup> B26F 3/02

U.S. Cl. 225—26

6 Claims



1. In a tape dispenser adapted to receive a tape roll of the type comprising a core having an axis, a cylindrical inner surface about the axis defining a through opening, and a length of tape helically wound about the core to provide a cylindrical outer surface for the tape roll, with the tape roll and core having generally planar opposite sides, said dispenser comprising a frame and means on the frame for supporting the tape roll for rotation about its axis to afford withdrawing tape from the roll in a first direction relative to the frame, the improvement wherein said means for supporting the tape roll comprises

opposed hub portions adapted to project axially into the through opening in the core from opposite sides to afford rotation of the tape roll around said hub portions, each of said hub portions including a distal plate like part elongate in said first direction and having an inner surface disposed generally parallel to and in opposition to the inner surface on the opposite hub portion, said plate like part having arcuate end surfaces disposed generally at right angles to said inner surface with one of said end surfaces facing toward said first direction and the other of said end surfaces facing away from said first direction, and cam parts on opposite sides of said plate like part defining cam surfaces having ends ending at said inner surface, said cam surfaces being disposed generally parallel to said first direction and diverging away from opposite sides of said inner surface, and

means for mounting one of said opposed hub portions for movement from a normal position spaced from the other of said hub portions to afford journalling of a said tape core on said hub portions, to a release position affording movement of a said tape roll or core between said inner surfaces of said opposed hub portions in a direction normal to the axis of said tape roll or core, and means for biasing said one hub portion to said normal position so that movement of the tape roll toward said inner surfaces of said opposed hub portions in a direction normal to the axis of the tape roll and normal to said first direction will cause the tape roll to engage said cam surfaces to move said one hub portion to said release position in opposition to said biasing means until said hub portions are aligned with and

enter the central opening in the core under the influence of said biasing means whereupon said end surfaces will retain and journal the core around said hub portions during withdrawal of tape in said first direction, and so that upon subsequent movement of said core in a direction normal to the axis of the core and normal to said first direction the core will engage said cam surfaces to move said one hub portion to said release position to afford moving said core between said inner surfaces and out of said dispenser.

4,957,234

## CUTTING DEVICE FOR ROLLS OF ADHESIVE TAPE

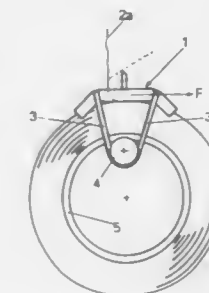
Giorgio Orlandini, Via Marinelli 39, Camerano (AN), Italy

Filed Jun. 3, 1988, Ser. No. 201,850

Int. Cl.<sup>3</sup> B65H 35/07

U.S. Cl. 225—65

3 Claims



1. Device for cutting a roll of adhesive tape wound on a reel, said device comprised of:

- a runner having a central flat section including a pair of opposite ends, two equal symmetrical inclined planes that bear lateral guiding edges, each inclined plane being positioned at a respective opposite end of the flat section, so that respective opposite end edges are defined therebetween, two transversal grooves formed along the opposite end edges where the central flat section and the inclined planes meet, a transversal cutting blade having a serrated edge protruding from the top of the flat section, the flat section having a transversal slot formed therein near the cutting blade from which the strip of adhesive tape emerges;
- a pin including a pair of ends, the pin having two circular grooves formed therein, one at each end thereof, the pin having a length, such that said grooves protrude from either side of the reel, onto which the roll of adhesive tape is wound and through which the pin is inserted;
- an elastic band, which passes over the runner the transversal grooves and is hooked at opposite sides to the two circular grooves of the pin inserted in the reel, around which the adhesive tape is wound.

4,957,235

## PAPER TRIMMER

Steven J. Beno, and Joseph R. Mango, both c/o Ideal School Supply Corporation, 2245 Delany Rd., Waukegan, Ill. 60087

Filed Mar. 22, 1989, Ser. No. 326,929

Int. Cl.<sup>3</sup> B25C 7/00

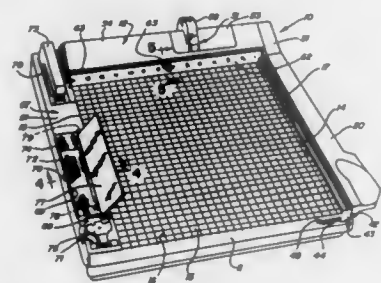
U.S. Cl. 227—156

29 Claims

1. A paper trimmer comprising:



a base defining an upper surface for supporting paper to be cut, opposite side edge portions, and a rear edge portion; a dispenser on said base rear edge portion; and



cutter means disposed at one of said side edge portions of the base for cutting a projecting portion of paper disposed on said base upper surface.

**4,957,236**  
**METHOD OF BRAZING PARTS OF Ti-AL-NB ALLOY**  
Howard Mizuhara, Hillsborough, Calif., assignor to GTE Products Corporation, Stamford, Conn.  
Division of Ser. No. 207,803, Jun. 17, 1988, Pat. No. 4,883,640.  
This application Apr. 17, 1989, Ser. No. 339,846  
Int. Cl. B23K 1/04, 35/32

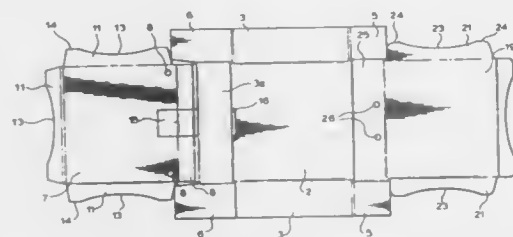
U.S. Cl. 228-263.21

1. The method of joining metal parts made of a TiAlNb alloy having a solution heat treating temperature of about 1200° C. comprising the steps of disposing a brazing alloy at the joint between the parts, the brazing alloy having a brazing temperature between about 1020° C. to 1250° C. and having a composition of, in weight percent, 37-75 titanium 5-43 niobium, 20-58 nickel and brazing the parts at a temperature of about 1020° C. to 1250° C. to form a uniform fillet at the joint.

**4,957,237**  
**BOX WITH INTERNAL PLATFORM FOR VERTICAL STACKING OF PRODUCTS**  
Louis Madonna, Toronto, and Chris Garrett, Mississauga, both of Canada, assignors to Paperboard Industries Corporation, Mississauga, Canada  
Filed Nov. 29, 1989, Ser. No. 442,672  
Int. Cl. B65D 5/48

U.S. Cl. 229-120

9 Claims



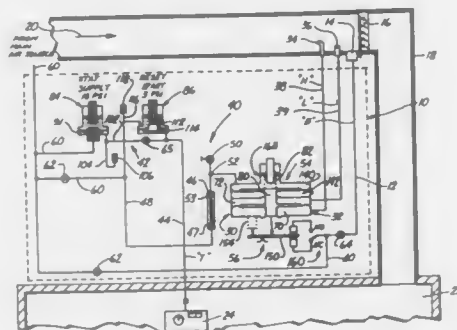
1. A box for use in carrying hot food products with internal stacking capacity and comprising a base, a box sidewall extending upwardly from said base, a top fittable with said box sidewall to close said box and at least one platform having downwardly extending spacing means for spacing said platform above said base and below said top when said top is closed for vertical stacking of products in said box, said platform being movably secured to said box for lifting said platform and exposing said base with said platform remaining attached to said box, said box being provided with venting holes through said

platform and interiorly of said box and through said box sidewall to the exterior of said box.

**4,957,238**  
**PNEUMATIC VARIABLE AIR VOLUME CONTROLLER**  
Paul E. Kreuter, Gothen, Ind., assignor to Kreuter Mfg. Co., Inc., New Paris, Ind.  
Filed Oct. 30, 1989, Ser. No. 428,951  
Int. Cl. F24F 13/14

U.S. Cl. 236-49.4

11 Claims



2. In a pneumatic variable air volume controller for controlling the supply of conditioned air through a pressure to a defined area, the controller including first means for developing a first pneumatic pressure control signal from a pneumatic source, representative of the velocity pressure of air flowing in the passage; second means for developing a second pneumatic pressure control signal from a pneumatic source responsive to the temperature in the defined area; a third means responsive to the differences between said first and second pneumatic pressure control signals for generating a pneumatic pressure output signal for driving a damper actuator to control a damper in said passage to vary the volume of air flow in the passage to tend to balance the first and second pneumatic pressure control signals against each other, the pneumatic pressure output signal resulting from a substantially linear response both to the velocity of the air flow in said passage and to the temperature in said defined area; the improvement wherein:

- (a) the first means includes a first pneumatic differential pressure comparator for developing a first pneumatic pressure control signal which varies as the square of the velocity of the air flow in the passage;
- (b) the second means includes means for using a pneumatic signal which is a linear representation of the temperature in the defined area for developing the second pneumatic pressure control signal which varies with the area temperature as the square of that temperature;
- (c) the third means includes a second differential pressure comparator for comparing these first and second pneumatic pressure control signals to generate a pneumatic pressure output signal representative of the difference between the first and second control signals for controlling a damper actuator to cause a damper to vary the volume of air flow in the passage to tend to cause the first and second pneumatic pressure control signals to come into balance;
- (d) the second means includes:
  - (1) a capillary,
  - (2) an orifice member provided with a control orifice therethrough,
  - (3) an intermediate conduit delivering a pneumatic pressure signal which is a linear representation of the temperature in the defined area into a first end of the capillary, and
  - (4) a thermostat pneumatic pressure signal conduit receiving the resulting pneumatic pressure signal from a sec-

ond end of the capillary and delivering it to a first side of the orifice member for discharge through the orifice into the atmosphere; and

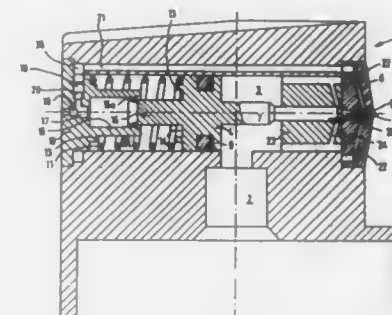
(e) the thermostat pneumatic pressure signal conduit is open to the third means to deliver the pneumatic pressure signal existing between the capillary and the control orifice to the second differential pressure comparator as the second pneumatic pressure control signal.

**4,957,239**  
**SPRAY HEAD FOR AN AEROSOL CONTAINER**  
Antonie P. Tempelman, Meeden, Netherlands, assignor to Mo-bacc B.V., Veendam, Netherlands  
Filed May 15, 1989, Ser. No. 352,015  
Claims priority, application Netherlands, May 16, 1988, 8801260

Int. Cl. B65D 83/36

U.S. Cl. 239-117

25 Claims



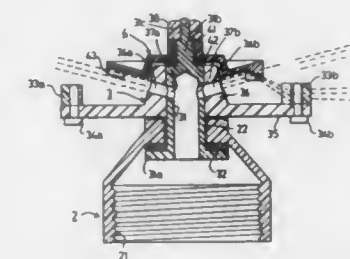
1. In a spray head for a fluid dispenser, comprising a body having a connecting duct for sealingly receiving a delivery tube stub of an aerosol valve; a spray orifice; a chamber in said body connecting said connecting duct and said spray orifice; a piston member disposed in said chamber and presenting a needle member cooperating with said spray orifice; and spring means urging said piston member to said spray orifice, said spray orifice being sealed by the end of said needle member in an inoperative position, and the piston member being arranged to move against the force exerted by said spring means under the influence of an elevated pressure prevailing in said chamber, whereby the spray orifice is cleared by said needle member, the improvement which comprises that the rear face of the piston member, which faces away from the needle member, defines a wall of at least one substantially closed space which through at least one channel is in communication with at least one point, located in or near the spray orifice, for the injection of air from said closed space into the product stream to be sprayed through said spray orifice.

**4,957,240**  
**ROTARY SPRINKLERS**  
Peretz Rosenberg, Moshav Beit Sharim, Israel  
Filed Sep. 26, 1988, Ser. No. 249,018  
Claims priority, application Israel, Oct. 1, 1987, 84068  
Int. Cl. B05B 3/02

U.S. Cl. 239-233

19 Claims

1. A rotary sprinkler including a mounting, a nozzle rotatably mounted thereon and formed with an orifice for discharging a water jet, an impact member carried by said nozzle for periodically receiving impacts effective to rotate the nozzle about its mounting, and a rotary deflector rotatably mounted with respect to said nozzle and having a circular array of a plurality of vanes in the path of the water jet effective to be impinged by the water jet and thereby to rotate the deflector, said deflector having jet-directing means in the path of the water jet at a predetermined angular position of the deflector

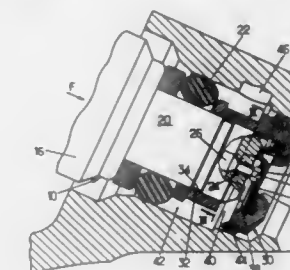


portion of the water jet to be directed against said impact member to rotate the nozzle about its mounting.

**4,957,241**  
**FUEL INJECTION DEVICE WITH AIR CHAMBER**  
Laboueffe Roger, Rueil Malmaison, France, assignor to Solex, France  
Filed Aug. 30, 1989, Ser. No. 400,540  
Claims priority, application France, Aug. 30, 1988, 88 11376  
Int. Cl. F02M 61/16; F02B 51/06

U.S. Cl. 239-409

4 Claims



1. Injection device for an internal combustion engine, comprising an electrically controlled injector having a body provided with means for removably connecting said body in a passage opening into an engine induction passage and formed with a nose of reduced diameter and a cap fitted on the nose of the injector, formed with a fuel jet outlet opening, said cap being connected on the nose of the injector in such a position that it defines an air chamber with said nose and is formed with lateral openings communicating the air chamber with a space formed between the cap and the wall of said passage, said space being for connection to an air source, wherein said injection device further comprises a spacer plate retained between the cap and the nose, formed with a central calibrated hole surrounding an outlet of the injector for constituting a calibrated fuel-air jet outlet passage and wherein said spacer plate is provided with means for retaining it between the nose and the cap in a predetermined position.

**4,957,242**  
**FLUID MIXING DEVICE HAVING A CONICAL INLET AND A NONCIRCULAR OUTLET**  
Klaus C. Schadow, Ephraim Gutmark, Kenneth J. Wilson, and Robert A. Smith, all of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
Filed Apr. 12, 1988, Ser. No. 180,751  
Int. Cl. B05B 1/02

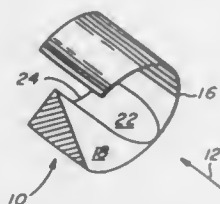
U.S. Cl. 239-590

15 Claims

1. A fluid mixing device in which a first fluid flows through the device in a predetermined direction and mixes with a sec-

ond fluid located downstream of the device, the device comprising:

- a generally conical section substantially axially aligned with said direction of flow and having a large dimension in substantially a circular orifice through which said first fluid enters, said conical section having an interior surface extending from said circular orifice and converging toward a small dimension of said conical section;
- a noncircular section having an interior surface generally parallel to said direction of flow and abruptly intersecting said interior surface of said conical section, said interior surface of said noncircular section extending from said



circular orifice and terminating in a noncircular orifice through which said first fluid exits, said noncircular orifice having an elliptical shape, said elliptical shape having a major axis dimension and a minor axis dimension, said dimensions being unequal and at substantially right angle to each other, said major axis dimension being no greater than said large dimension of said conical section and said minor axis dimension being approximately equal to said small dimension of said conical section;

means between said conical section and said noncircular section for generating axial vortices and azimuthal instabilities; and

said fluid mixing device having a fixed shape.

#### 4,957,243 SHREDDER

Toshikuni Kanagaki, Nara; Minoru Hashimoto, Yamatokoriyama; Shougo Iwai, Yamatokoriyama, and Masaru Nishijima, Hirakata, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

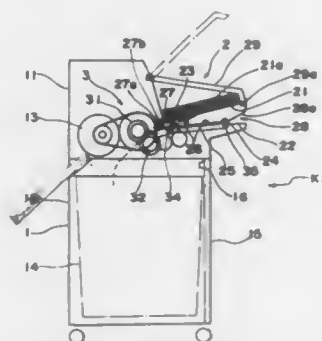
Continuation of Ser. No. 271,377, Nov. 14, 1988, abandoned, which is a continuation of Ser. No. 047,285, May 8, 1987, abandoned. This application Sep. 5, 1989, Ser. No. 403,897

Claims priority, application Japan, May 8, 1986, 61-105878; Oct. 2, 1986, 61-235980; Oct. 2, 1986, 61-235981; Oct. 2, 1986, 61-235982; Oct. 2, 1986, 61-235983

Int. Cl.<sup>5</sup> B02C 25/00

U.S. Cl. 241—34

3 Claims



1. A shredder for shredding documents, comprising: cutting means for cutting said documents;

a first document feeding portion for feeding said documents to said cutting means;

a second document feeding portion for feeding said documents to said cutting means;

document transporting means located at said first document feeding portion for transporting said documents to said cutting means;

first document detecting means for detecting the presence of said documents in said first document feeding portion and generating an output signal indicate thereof;

drive means for driving said document transporting means;

second document detecting means for detecting the presence of said documents in said second document feeding portion and generating an output signal indicate thereof; and

drive control means for controlling operation of said drive means in accordance with an output signal generated by said first document detecting means and an output signal generated by said second document detecting means, wherein said drive control means stops said drive means regardless of the output signal generated by said first document detecting means whenever said second document detecting means detects the presence of said documents in said second document feeding portion, and wherein said drive control means controls said drive means in accordance with the output signal generated by said first document detecting means whenever said second document detecting means does not detect the presence of said documents in said second document feeding portion.

#### 4,957,244 BOBBIN WINDING METHOD, AND DEVICES FOR IMPLEMENTING SAID METHOD

Luigi Colli; Roberto Badiali, and Nereo Marangone, all of Pordenone, Italy, assignors to Savio S.p.A., Pordenone, Italy

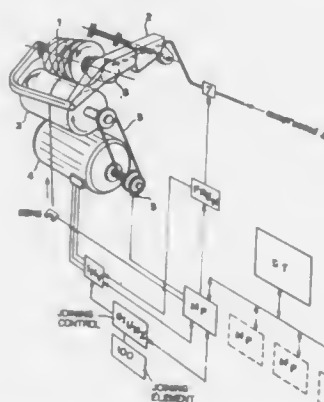
Filed Oct. 17, 1988, Ser. No. 258,372

Claims priority, application Italy, Nov. 13, 1987, 22625 A/87

Int. Cl.<sup>5</sup> B65H 54/22

U.S. Cl. 242—35.6 OR

14 Claims



1. A method for winding yarn onto a rotating bobbin driven by a drive roller and supported by a carrier arm when the yarn feed is broken, comprising:
  - (a) restoring the broken yarn feed by means of an intervention cycle wherein said cycle has a first portion and a second portion wherein said first portion comprises the steps of:
    - (1) raising the rotating bobbin from the drive roller when the yarn feed is broken;
    - (2) braking the rotating bobbin and the drive roller independently until the bobbin stops rotating wherein the rotating bobbin is braked when it is separated from the drive roller;
 and wherein said second portion comprises joining the broken yarn; and
  - (b) interposing a variable time delay between the commence-

ment of said bobbin braking step of said first portion and the commencement of said joining step of said second portion of said intervention cycle by means of a timer device wherein said variable time delay is determined by the amount of yarn wound on the bobbin, wherein the amount of yarn wound on the bobbin is determined by measuring the revolutions of the drive roller from the commencement of bobbin winding by a counter means.

#### 4,957,245

##### TEXTILE WINDING MACHINE

Hermann Spinner, Wetzikon, Switzerland, assignor to W. Schlafhorst & Co., Fed. Rep. of Germany

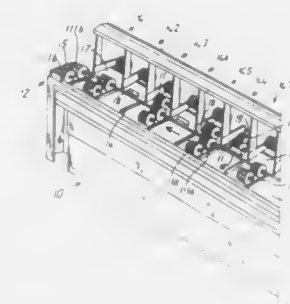
Continuation-in-part of Ser. No. 190,484, May 5, 1988, abandoned. This application Jun. 28, 1989, Ser. No. 373,149

Claims priority, application Italy, May 6, 1987, 83369 A/87

Int. Cl.<sup>5</sup> B65H 54/20, 67/06

U.S. Cl. 242—35.5 A

8 Claims



1. A textile winding machine for producing discrete pairs of cross-wound yarn packages for subsequent simultaneous drawing of the yarn of both packages of each discrete pair of packages during a twisting and doubling operation, the length of yarn drawn from one package of each respective discrete pair of packages being different from the length of yarn drawn from the other package of the respective discrete pair of packages, said textile winding machine comprising:

- a plurality of winding stations, each respective winding station producing packages in such a manner that each cross-wound yarn package has a length of yarn different than the length of yarn of the yarn package produced immediately thereafter at the same winding station;
- means for conveying packages from said winding stations, said conveying means including means for maintaining discrete pairs of packages separate from other packages during the conveying thereof; and
- means for depositing wound pairs of packages from each winding station onto said discrete package pair maintaining means of said conveying means for conveyance by said conveying means as a discrete pair of packages separate from other packages, each deposited pair of packages including a first package produced at a respective winding station and the next package produced at the same respective winding station following the production of said first package.

#### 4,957,246

##### TOILET ROLL COVER

Karen D. Kantor, 64 Peppier St., Unit 32, Waterloo, Ontario, Canada N2J 4P7

Filed Mar. 15, 1990, Ser. No. 493,762

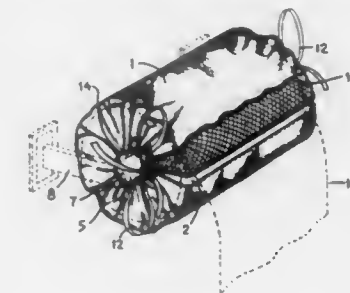
Int. Cl.<sup>5</sup> B65D 85/67

U.S. Cl. 242—55.53

4 Claims

1. A cover for a roll of toilet paper on a toilet paper suspension means, comprising a piece of material formed into a generally cylindrical shape with a longitudinal opening running substantially from one end of said generally cylindrical shape, and drawing and fastening means for pulling the material of

said generally cylindrical piece radially inwardly at said ends to form end faces each having an inner circular gap left in both



8 Claims of said end pieces to accommodate said toilet paper suspension means.

#### 4,957,247

##### FILM WINDING APPARATUS

Masao Nakamura, Machida; Norio Sakamoto, Sagami-hara, and Takashi Ito, Hachioji, all of Japan, assignors to Konica Corporation, Tokyo, Japan

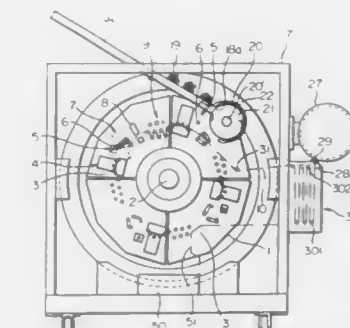
Filed Nov. 30, 1988, Ser. No. 278,100

Claims priority, application Japan, Dec. 3, 1987, 62-306731

Int. Cl.<sup>5</sup> B65H 18/10, 19/28

U.S. Cl. 242—67.1 R

4 Claims



1. A positioning device in a film winding apparatus for positioning a spool of photographic film, the spool having a core and a lateral rib formed on an external circumference of the core, around which a predetermined length of the photographic film is wound, the positioning device comprising:

- a spool chuck to hold the spool;
- a driving shaft in communication with the spool chuck for rotating the spool;
- a backstop means attached to the driving shaft for preventing the driving shaft from rotating;
- means for controlling a driving device connected with the driving shaft;
- a movable upper chute installed above a path line of the film, the movable upper chute including a stopping device which contacts the rib of the spool to stop rotation of the spool;
- means for controlling the stopping device to stop the rotation of the spool at a predetermined position;
- a movable lower chute installed below the path line of the film, the lower chute being selectively movable towards the path line of the film until the lower chute touches a lower surface of the upper chute; and
- upper and lower nip rollers installed in the vicinity of a film delivery point of the upper and lower chutes, where the upper and lower nip rollers pinch a leading part of the

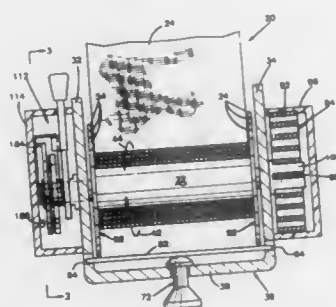


film, move the pinched leading part along the upper chute, and send the pinched leading part of the film to the spool.

# 4,957,248 SEAT BELT RETRACTOR WITH COMFORT MECHANISM

Utz H. Schmidt, Utica, Mich., assignor to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio  
Filed Feb. 9, 1989, Ser. No. 308,824  
Int. Cl.<sup>5</sup> A62B 35/00; B65H 75/48  
U.S. Cl. 242—107.7

7 Claims



1. A vehicle seat belt retractor including a spindle having seat belt webbing wound thereon, said spindle being supported for rotation in belt retraction and withdrawal directions, and means for biasing said spindle to rotate in the belt retraction direction, and further comprising:

a ratchet wheel connected to said spindle for rotation with said spindle;  
a plurality of ratchet teeth extending from said ratchet wheel;

a pawl member movable from a first position in which said pawl member is spaced from said ratchet wheel to a second position in which said pawl member engages one of said plurality of ratchet teeth on said ratchet wheel to block rotation of said ratchet wheel and said spindle in the belt retraction direction; and  
means separate from said ratchet wheel for preventing movement of said pawl member to its second position during rotation of said spindle in the belt retraction direction at a speed above a predetermined speed, comprising a cam member driven by rotation of said spindle, said cam member including a cam surface for engaging said pawl member and propelling said pawl member in a direction toward its first position during rotation of said spindle in the belt retraction direction at a speed greater than the predetermined speed, said cam member being located adjacent said ratchet wheel and rotatable about a common axis with said ratchet wheel, said cam surface including a base surface having a radius greater than the largest radial extent of the crests of said ratchet teeth, a lobe having a radial extent greater than the radius of said base surface and a recess having a radius less than the radial extent of the roots of said ratchet teeth, said pawl member being engageable with said base surface of said cam member intermediate its first and second positions and during rotation of said cam member in the belt retraction direction said pawl member being engageable with said lobe, said lobe being shaped to propel said pawl member toward its first position when said spindle rotates in the belt retraction direction above the predetermined speed and said pawl member entering said recess and moving to its second position when said spindle rotates in the belt retraction direction below the predetermined speed.

# 4,957,249 THRUST VECTOR CONTROL FLAP WITH A MERGING CONVEX, CONCAVE INNER CONTOUR, FOR JET AIRCRAFT AND METHOD FOR OPERATING THE SAME

Felix Aulehla, Weyarn, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

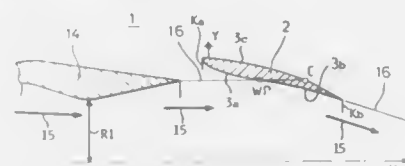
Filed Mar. 30, 1989, Ser. No. 331,269

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1988, 3811616

Int. Cl.<sup>5</sup> B64C 29/00

U.S. Cl. 244—23 D

8 Claims



1. A thrust vector control device for jet aircraft, comprising jet nozzle means for producing a propulsion jet, flap means for influencing the flow direction of said propulsion jet, hinge means for hinging said flap means in a position relative to said jet nozzle means for said influencing when said flap means are tilted into said propulsion jet, said flap means comprising a leading edge, a trailing edge, and an inner contour facing said propulsion jet between said leading and trailing edge, said inner contour having a first convex curvature near said leading edge and a second concave curvature near said trailing edge, said first convex curvature merging into said second concave curvature in a transition point, said device further comprising pressure sensor means located for sensing a pressure value dependent on a local pressure head near said inner contour of said flap means to determine a flow edge position of said propulsion jet.

# 4,957,250 DEVICE FOR INTERCEPTING AND RETAINING OF CARGO IN A TRANSPORT CABIN

Mohammad Hararat-Tehrani, Bremen, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

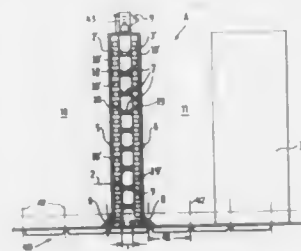
Filed Aug. 7, 1989, Ser. No. 390,622

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1988, 3827278

Int. Cl.<sup>5</sup> B64D 1/10

U.S. Cl. 244—118.1

10 Claims



6. A device for separating in a vehicle a space for cargo and for retaining cargo in said space, comprising at least two individual wall sections, mechanical friction energy absorbers responsive to compression loads for taking up impact energy, said friction energy absorbers being arranged between and connected to said individual wall sections, one of said wall sections having a first outer surface suitable to face a cabin in said vehicle, another of said wall sections having a second

outer surface suitable for taking-up impacts, wherein each of said wall sections comprises I-beams, each I-beam having an I-beam web arranged so that the I-beam webs are extending substantially in parallel to an impact direction, and wherein inner chords of said I-beams facing each other are spaced from each other at a spacing in which said energy absorbing elements are arranged.

# 4,957,251 PIPE SUPPORTING BRACKET

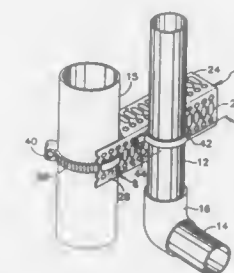
George R. Hubbard, 4425 Caminito Tecera, Del Mar, Calif. 92014

Continuation of Ser. No. 214,761, Jul. 5, 1988, abandoned. This application Aug. 8, 1989, Ser. No. 393,043

Int. Cl.<sup>5</sup> F16L 3/00

U.S. Cl. 248—68.1

8 Claims



4. A pipe supporting assembly, comprising:

a bracket of square, channels-shaped cross-section having a central web with a pair of side flanges depending from the respective opposite side edges of the central web, the central web being longer than the side edges so that it projects beyond the ends of the side flanges at least at one end of the bracket, each of the end edges of the side flanges adjacent the projecting central web portion being free and uncovered and being inclined at an obtuse angle to the projecting central web portion, and the central web being of uniform width between its opposite side edges along the entire length of the web, the central web and side flanges each having a series of openings extending along their length;

the end of the central web which projects beyond the ends of the side flanges, and the adjacent inclined free ends of the side flanges, together comprising locating means for direct engagement with a supporting member to locate the bracket against the supporting member; and  
fastener means for extending through said openings to selectively secure members against the side flanges and central web of the bracket.

# 4,957,252 SUPPORT FOR PLASTIC BAGS HAVING HANDLES

Vancil W. Watkins, 2058 Lovers Ln., Shreveport, La. 71105

Filed Jun. 26, 1989, Ser. No. 371,071

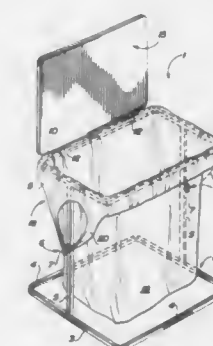
Int. Cl.<sup>5</sup> A63B 55/04

U.S. Cl. 248—97

11 Claims

1. A support for a plastic bag having integral handles, said support comprising a base characterized by a rigid, elongated base member shaped substantially in the configuration of a polygon; a pair of rigid, elongated vertical members upward-standing from fixed attachment to said base in spaced relationship; a rigid, elongated bag retainer shaped substantially in the configuration of a rectangle, said bag retainer fixedly supported by said vertical members in spaced relationship with respect to said base for receiving the plastic bag; and a pair of

downwardly-extending cleats carried by said vertical members, respectively, said cleats located between said bag retainer



# 4,957,253

## BABY BOTTLE HOLDER

William C. Roy, Judith A. Roy, both of 1548 D Apache Dr., Chula Vista, Calif. 92010, and Russell C. Edmisson, 329 Poinsettia Ave., Coronado del Mar, Calif. 92025

Continuation-in-part of Ser. No. 209,308, Jun. 21, 1988, abandoned, and a continuation-in-part of Ser. No. 280,250, Dec. 5, 1988, abandoned. This application Oct. 12, 1989, Ser. No. 420,590

Int. Cl.<sup>5</sup> A47D 15/00

U.S. Cl. 248—104

7 Claims



1. A nursing bottle support for freeing the hands of an infant-carrying person, which comprises:

a bendable, non-resilient hook section formable into an open loop shaped and dimensioned to engage the neck of the person, and a generally straight shank sized to hang against the person's chest;  
a resiliently adjustable clasp sized to fit around a nursing bottle; and  
a multi-directionally orientable means for attaching the clasp to the shank of the hook;  
wherein the clasp comprises a generally ring-shaped element made of elastomeric material, and having an orientable means on its outer periphery for rotatably connecting said element to the shank of the hook; and  
wherein said bendable hook section is made from a length of electrical cable comprising,  
a core made from a multi-strand metallic conductor; and  
a insulating sleeve surrounding the conductor.

4,957,254

## UNIVERSAL CONTAINER HOLDER

Johann L. Hill, 1005 Evergreen, Longview, Tex. 75604, and David E. Gormley, Rt. 1, Box 476, Pocola, Okla. 74902  
Filed Oct. 10, 1989, Ser. No. 418,559  
Int. Cl.<sup>5</sup> A47G 29/00

U.S. Cl. 248—207

6 Claims



1. A universal container holder for supporting a beverage container from a structure, comprising a clip adapted for mounting on the structure, said clip characterized by a support portion, engaging means carried by said support portion for engaging the structure and a pair of curved legs projecting from said support portion in spaced relationship, said curved legs having an arcuate, concave receiving surface; and a T-bar adapted for engaging said clip and supporting the beverage container in an upright configuration, said T-bar characterized by a bar tab for engaging said arcuate, concave receiving surface of said clip in articulating relationship, a bar neck extending from said bar tab and receptacle means carried by said bar neck for receiving and supporting the beverage container.

4,957,255

## VALANCE SUPPORT BRACKET

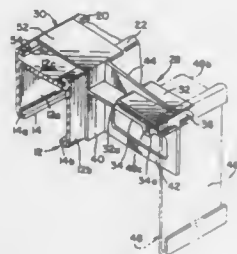
Julius F. John, Redondo Beach, Calif., assignor to Home Fashions, Inc., Santa Monica, Calif.

Filed Feb. 28, 1989, Ser. No. 316,652

Int. Cl.<sup>5</sup> E06B 9/00

U.S. Cl. 248—222.3

10 Claims



1. A valance support bracket for mounting on a headrail of a venetian blind wherein the headrail has a mounting channel defined by a pair of laterally spaced mutually facing mounting flanges extending longitudinally along an external surface, said valance support bracket comprising a valance support end portion and a headrail mounting end portion, said headrail mounting end portion including a mounting plate having a longitudinal axis and a pair of locking arms defining a pair of generally parallel locking flanges fixed to and spaced from said mounting plate in generally transverse relation thereto, one of said locking flanges having less transverse length than the other locking flange to enable insertion of said locking flanges between the mounting flanges into said mounting channel when the mounting plate is disposed with its longitudinal axis in a first angular orientation of approximately 45° relative to the longitudinal axis of the headrail, said locking arms being

further adapted to receive said mounting flanges between said locking flanges and said mounting plate for releasable locking relation with said headrail when the valance support bracket is rotated generally within the plane of said mounting plate to a second orientation wherein the longitudinal axis of said mounting plate is substantially perpendicular to the longitudinal axis of the headrail, said locking flanges having oppositely directed free ends adapted to frictionally engage the headrail when said valance support bracket is in said second orientation, and a wall fixed to said mounting plate at right angles thereto, said wall being adapted to engage a sidewall of the headrail so as to limit rotation of said support bracket during movement to said second orientation.

4,957,256

## PRICE TAG DISPLAY HOLDER AND SUPPORT ARM

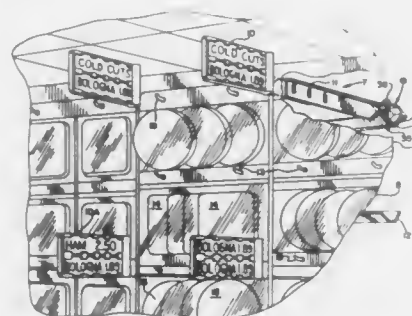
Mary B. Boeding, Madison, Wis., assignor to Oscar Mayer Foods Corporation, Madison, Wis.

Filed Dec. 4, 1989, Ser. No. 445,000

Int. Cl.<sup>5</sup> A47B 96/00

U.S. Cl. 248—225.1

21 Claims



1. A price tag display holder and support arm device in combination with a peg-bar display system for peggable packages includes, a plurality of horizontal, vertically spaced peg support bars, a plurality of horizontal package support pegs projecting at right angles in cantilever fashion from said support bars with the proximal end of each support peg supportably attached to one of said peg support bars and with peggable packages loaded on and removable from said support pegs, each said price tag display holder and support arm device comprising, a support arm mounted in cantilever fashion at its proximal end on one of said peg support bars and projecting therefrom at a right angle thereto and extending outwardly therefrom at least to the distal end of the next adjacent of said support pegs, and a price tag display holder mounted on the distal end of said support arm and extending outwardly therefrom, said peggable packages being loaded on said package support pegs in a plurality of vertically spaced horizontal rows with no appreciable space between the bottoms of said packages in a horizontal row and the tops of said packages in the subjacent horizontal row.

4,957,257

## COMPOUND CLAMP WITH ADJUSTABLE PERPENDICULAR CLAMPING COMPONENT

Luis M. Gonzalez, 8710 E. Gregory La., Des Plaines, Ill. 60016  
Filed Sep. 28, 1989, Ser. No. 412,857

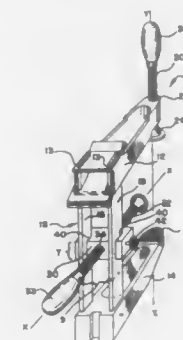
Int. Cl.<sup>5</sup> A47G 29/02

U.S. Cl. 248—231.7

6 Claims

1. A clamp comprising:  
a first clamping component defining a plane and having first clamping means for presenting a clamping force along a first clamping axis in the plane, said first clamping means including a first arm and a second arm defining a plane,

and means for moving said first arm relative to said second arm within said plane;  
a second clamping component having a second clamping axis, the second clamping axis being perpendicular to the first clamping axis; and,



means for attaching the second clamping component to the first clamping component so that the second clamping axis is in the plane of the first clamping component and is translationally adjustable along the first clamping axis independent of the clamping means of the first clamping component.

4,957,258

## STAND FOR MOTIONABLY MOUNTING ADVERTISEMENTS

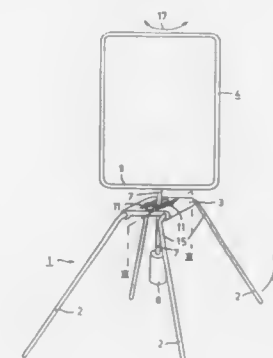
Roman Tiedemann, Vienna, Austria, assignor to Esselte Penda-flex Gesellschaft m.b.H., Vienna, Austria  
Filed Apr. 24, 1987, Ser. No. 42,062

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1986, 8611481

Int. Cl.<sup>5</sup> E04G 3/00

U.S. Cl. 248—292.1

26 Claims



1. A stand for motionably mounting advertisements such as placards or signs comprising a foot-structure to be placed on the ground and a mount receiving the advertisement and displaceably connected to the foot-structure, wherein the mount for the advertisements rests on the foot-structure by means of a pendulum bearing support having an approximately horizontal swing axis, and wherein a pendulum weight is attached to the mount or to the advertisement below the swing axis of the pendulum bearing such that said pendulum weight tends to return the advertisement to a rest position when external forces are not present, said stand further including bias return means for exerting a return force toward said rest position only after a predetermined magnitude of movement away from said rest position has been exceeded.

4,957,259

## DOUBLE HOOKED UTILITY HANGER, WITH HANGER SUSPENSION HOLE

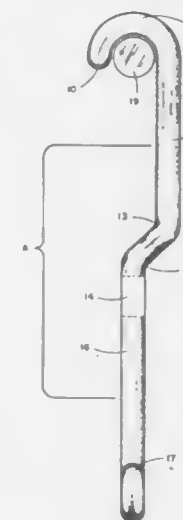
Edward J. Wolf, Jr., 4204 242nd St., SW, Mountlake Terrace, Wash. 98043

Filed Feb. 17, 1989, Ser. No. 311,869

Int. Cl.<sup>5</sup> F16B 45/00

U.S. Cl. 248—304

4 Claims



1. A hooked means for the suspension of a multiplicity of objects requiring a single attachment to a support comprising:  
a. a vertically extending connecting shaft;  
b. a top hooked attachment end extending from said connecting shaft;  
c. an offset immediately below top hooked attachment end of said connecting shaft positioned so as to align said connecting shaft and suspended load beneath attachment point;  
d. a bottom hooked suspension end extending from said connecting shaft and rotated on a 90 degree aspect from said top attachment end;  
e. a suspension hole centrally located along said connecting shaft, below the top attachment end offset, for the purpose of suspending added members of the present invention to form a vertical series of suspension points; and  
f. an offset in said connecting shaft beneath the suspension hole, so as to position the suspension end forward of the top attachment end of any subsequent member of the series suspended from the suspension hole in said connecting shaft.

4,957,260

## UNITARY MOUNTING BRACKET FOR PRESSURIZED CONTAINERS

William F. Shelley, 14 Logwood Cir., Essex Junction, Vt. 05452  
Filed Aug. 16, 1989, Ser. No. 394,712

Int. Cl.<sup>5</sup> A47K 5/00

U.S. Cl. 248—311.3

6 Claims

1. A unitary mounting bracket for a gas-pressurized canister comprising a paste to be dispensed onto an elongated object, having at its top end an elongated nipple actuator extending along the longitudinal axis of the canister, wherein movement of the actuator from the axis causes the paste to be dispensed from the tip of the actuator, and at its other end a base having a circular ridge, said bracket comprising:  
an elongated base having at least one planar surface adapted for fixation to a flat surface, said base extending along a first longitudinal axis and having at one end portion of said first longitudinal axis a spring portion constructed and arranged to mate with the circular ridge of the canister



base, and at another end portion of said first longitudinal axis a pair of arms extending approximately perpendicular to said first longitudinal axis, said arms being spaced apart along said base a distance sufficient to allow the nipple actuator to pass therebetween while said arms support the top end of the canister, wherein said arms cooperate with said spring portion to fixedly hold the canister between said arms and said spring portion, along a second longitudinal axis parallel said first longitudinal axis, and wherein the canister can be readily removed and replaced from between said arms and said spring portion;

a ring portion fixedly connected by a flexible arm to said base at a point below said arms, said ring portion defining an aperture disposed along said second longitudinal axis, said flexible arm extending at an acute angle from said base below said arms to said ring portion; wherein said nipple actuator extends through said aperture of said ring



portion along said second longitudinal axis when the canister is fixedly positioned in said base, said nipple actuator being near or adjacent a part of said ring portion positioned furthest from said first longitudinal axis, wherein said flexible arm is constructed and arranged to allow movement of said ring portion in a direction from said second longitudinal axis to said first longitudinal axis and to allow said part of said ring portion to contact and move said nipple actuator and thereby cause paste to be dispensed from the tip of the actuator;

and a wall fixedly connected to said flexible arm below said ring portion and extending in a direction parallel to and spaced from said first longitudinal axis, said wall being constructed and arranged to allow the elongated object to contact and move said wall in said direction from said second longitudinal axis to said first longitudinal axis and thereby cause said ring portion to be moved in said direction to cause dispensing of the paste.

4,957,261

## COPYHOLDER/ORGANIZER

Salvatore Cirami, 12-21 35th Ave., Apt. 4F, Long Island City, N.Y. 11106

Continuation-in-part of Ser. No. 68,460, Jul. 1, 1987, abandoned.

This application Jun. 16, 1989, Ser. No. 367,438

Int. Cl.<sup>3</sup> A47G 1/24

U.S. Cl. 248—454

14 Claims

1. For placement alongside a typewriter or desktop personal computer to support a multipage document existing on a given standard size of typewriter paper having a given width and given length and comprising loose pages having a given collation which are marked for revision and are to be set aside sequentially as revisions are completed:

a typist's copyholder/organizer proportioned for said placement and use with said given standard size of typewriter paper and providing means for storing set aside pages in a manner that retains their collation; comprising:

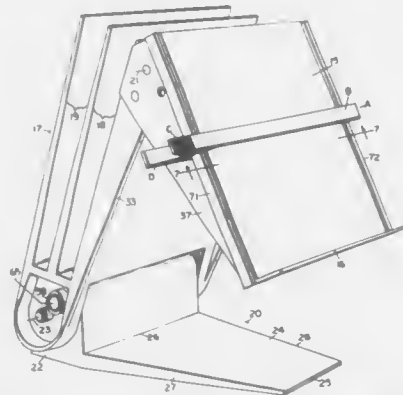
a rearwardly inclined copyboard having upper and lower

ends and a shelf projecting forwardly from its lower end for support of a given number of said loose pages; said copyboard having a given length as measured from its extreme upper end to said shelf at least equal to the length of said paper;

a forwardly inclined storage unit provided behind said copyboard for containment of set aside pages; said storage unit having upper and lower ends and comprising a floor member and first and second panels; said panels having upper and lower ends and forward and rearward sides, being spaced apart as hereinafter recited and having their lower ends fixed to said floor member, said floor member being flat and intersecting said first panel substantially perpendicularly;

the space effectively enclosed between said panels and floor member defining a storage compartment having an open top and laterally opposed open sides, to allow pages to be quickly dropped into said compartment utilizing its open top in combination with either one of its open sides, and pages to be removed by sliding them laterally out of said compartment through either one of its opposed open sides, in each mode of use said storage unit thereby providing left-handed/right-handed user convenience;

means effecting a cooperative relationship between said storage unit as defined above and said copyboard as defined above, such that as a natural consequence of pages being removed from said copyboard with the text side



facing the typist each page dropped into said compartment necessarily comes to rest leaning face down toward the inboard side of said first panel, comprising, the upper end of said copyboard being secured to the upper end of said first panel so they converge like opposed sides of a pyramid and said storage unit as a whole is thereby forwardly inclined;

means preventing interference between the top edge of any page stored in said compartment and the top edge of any page resting on said copyboard, comprising, said first panel having a given length as measured from its extreme upper end to said floor member at least equal to the length of said paper;

means providing a strike surface toward which the typist aims the lower edge of each page being set aside so as to cause each page necessarily to enter said compartment behind the last stored page, comprising:

said panels being spaced apart at their lower ends a given distance great enough for said compartment to receive said given number of pages with sufficient clearance remaining between the last of said pages and the forward side of said second panel for such last page to fall freely to said floor member;

said panels being spaced apart at their upper ends a distance at least equal to the distance which said panels are spaced apart at their lower ends;

as a consequence of the forward inclination of said storage unit, said floor member being inclined downwardly

toward said first panel and thereby causing the bottom edge of set aside pages to tend to slide toward said first panel and thereby maintain said clearance;

means providing set aside pages quickly removable through one of the opposed open sides of said compartment by tapping them out from the opposite open side, comprising, said first panel having a width at least a portion of which is less than the width of said paper.

4,957,262

## SPACE DEFINER FOR USE ON HORIZONTAL SURFACES

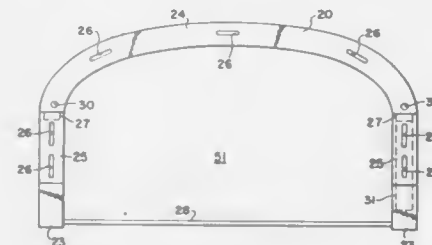
Alicia W. Kemper, Tallahassee, Fla., assignor to Innovec, Inc., Tallahassee, Fla.

Filed Aug. 5, 1988, Ser. No. 228,943

Int. Cl.<sup>3</sup> A47B 47/04

U.S. Cl. 248—460

27 Claims



1. A space definer comprising a wall with two free ends and adapted to lie on a generally horizontal flat supporting surface to define an enclosed activity area open on one side thereof facing a user, said wall including a forward wall portion and two side wall portions connected to each other to form said wall in a generally U-form, said U-form wall having an inwardly facing surface and an outwardly facing surface, at least one of said wall portions having a storage space located between said wall surfaces for accessories to be used with said space definer.

4,957,263

## UNIVERSAL CUP AND SAUCER DISPLAY

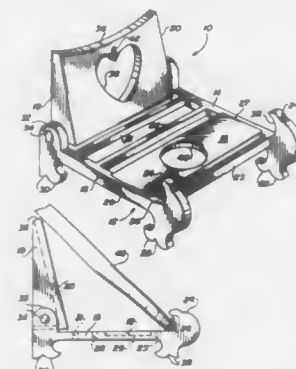
Sidney J. Leluan, Jr., 3130 E. Seneca, Tucson, Ariz. 85716

Filed Nov. 21, 1988, Ser. No. 274,360

Int. Cl.<sup>3</sup> A47B 97/04

U.S. Cl. 248—473

12 Claims



1. A universal cup and saucer display for holding a cup and saucer each singularly, and together, in a prominent display position comprising:

a pair of spaced apart parallel elongated legs;

a plurality of cross members operably attached between said spaced apart elongated legs;

a pivotal back rest operably connected to said pair of spaced apart elongated legs, said back rest adapted to support the saucer in a prominent display position; and

a removable cup insert plate situated between said pair of spaced apart legs, said cup insert plate defining a thin flat plate having an opening therethrough adapted to support a cup in said opening for prominent display whereby the cup and saucer may be simultaneously displayed, or the cup insert plate may be removed to display a saucer separately.

4,957,264

## MOUNTING BASE FOR A TELEPHONE DEVICE, SUCH AS A MOBILE TELEPHONE

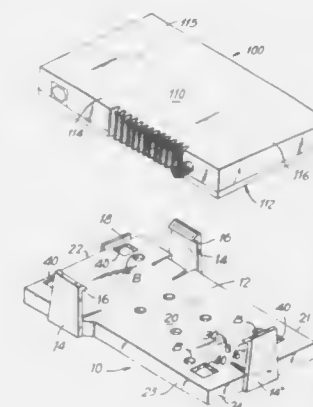
Pekka Hakanen, Turku, Finland, assignor to Nokia-Mobira Oy

Filed Feb. 8, 1989, Ser. No. 308,246

Int. Cl.<sup>3</sup> F16M 97/00

U.S. Cl. 248—510

6 Claims



1. Mounting base for a telephone device, particularly the transceiver of a mobile telephone, the transceiver having a rigid box-like enclosure, wherein the mounting base comprises a baseboard having a main surface and at least three resilient brackets extending from three sides of the baseboard and substantially perpendicular to the main surface of the baseboard, the brackets having clips at their free ends pointing inwardly over the baseboard, said brackets having a length between said main surface and said clips corresponding to thickness of said telephone device, a retainer extending from the baseboard above the main surface at the fourth side, for mounting, three sides of the transceiver enclosure are placed against the brackets with the transceiver bottom plate against the baseboard so, the bracket clips tightly snapping over the transceiver upper edges and the retainer abutting the edge on the fourth side of the transceiver.

4,957,265

## FOLDABLE OUTSIDE REAR-VIEW MIRROR FOR VEHICLES

Edwin Seltz, Neuenbuch, Fed. Rep. of Germany, assignor to Hohe KG, Kommanditgesellschaft, Fed. Rep. of Germany

Filed Dec. 19, 1988, Ser. No. 286,143

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1987, 8716720[U] Nov. 15, 1988, 8814288[U]

Int. Cl.<sup>3</sup> B60R 1/06

U.S. Cl. 248—549

12 Claims

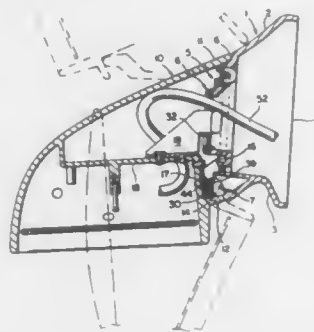
1. An outside rear-view mirror for a vehicle, said mirror comprising:

a mirror base;

a mirror housing adapted to assume a normal position for use and to be released from the normal position for use and

rock forwardly and rearwardly relative to said mirror base depending upon a direction of impact on said mirror housing and remain in the forward or rearward position relative to the normal use position until the mirror housing is manually returned to the normal use position, said mirror housing being coupled to said mirror base by a rocker, said rocker having one end mounted rotatably to the mirror base and having an opposite end mounted rotatably to said mirror housing.

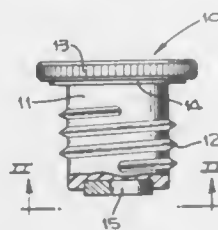
spreading means for biasing said mirror housing to a fully rearward tilted position relative to said mirror base when said mirror housing is caused to tilt rearwardly from its normal position for use,



locking means including at least one locking element caught in a trap for releasably clamping said mirror housing in its normal position for use, and

clamping means for clamping the rocker to said mirror base when said mirror housing rocks rearwardly by the bias of said spreading means, a gripping force of said locking means being less than a gripping force of said clamping means wherein said means for clamping being adapted to release a portion of said rocker when the mirror housing rocks forwardly, for allowing the rocker to follow said mirror housing.

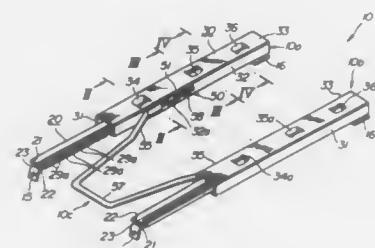
**4,957,266**  
**MAGNETIZED GAS CAP**  
John E. Ellis, 4144 1/2 Normal Ave., Los Angeles, Calif. 90029  
Filed Sep. 5, 1989, Ser. No. 402,915  
Int. Cl.<sup>3</sup> A47G 1/17  
U.S. Cl. 248—683 1 Claim



1. A gas cap for closing off the filling tube of a vehicle having a screw threaded hollow cylindrical main body portion closed off at the top by a flange of an outer diameter greater than the outer diameter of said main portion, the improvement which comprises:

magnetic means associated said cap for magnetically adhering to a metallic part of the body of the vehicle, said magnetic means including an insert of magnetic material fixedly mounted in the end of said main body portion opposite the end having said flange thereon.

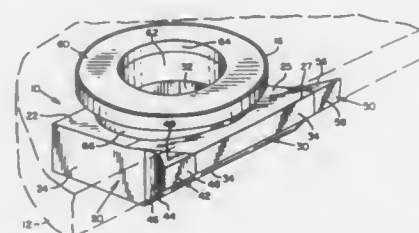
**4,957,267**  
**SEAT SLIDE DEVICE**  
Masanori Terai, Kanagawa, Japan, assignor to Ikeda Bussan Co., Ltd., Ayase, Japan  
Filed Mar. 8, 1989, Ser. No. 320,495  
Claims priority, application Japan, Jul. 28, 1988, 63-100556[U]  
Int. Cl.<sup>3</sup> F16M 13/00  
U.S. Cl. 248—430 16 Claims



1. A seat slide device comprising:  
a lower rail including a channel portion with first and second side walls;  
an upper rail including a major flat wall portion with first and second side walls longitudinally slidably disposed on said lower rail, said major flat wall portion facing said channel portion when said upper rail is properly disposed on said lower rail; and

first and second lugs integrally formed with and projecting from said major flat wall portion of said upper rail into said channel portion of said lower rail, said first and second lugs being in contact with said inner surfaces of said first and second side walls of said lower rail, respectively, wherein each lug is shaped like a plate including a major surface, said major surface facing generally parallel the inner surface of said corresponding side wall of said lower rail for guiding said upper rail in relation to said lower rail.

**4,957,268**  
**DISPOSABLE CURB INLET DRAIN FORM**  
August J. Picollo, 628 Beebe Rd., Central Point, Oreg. 97501, and Alfred N. Guillemette, 560 13th St., Gold Hill, Oreg. 97525  
Continuation of Ser. No. 56,867, Jun. 1, 1987, abandoned. This application Nov. 30, 1988, Ser. No. 282,963  
Int. Cl.<sup>3</sup> E02D 29/12; B28B 7/34  
U.S. Cl. 249—10 10 Claims

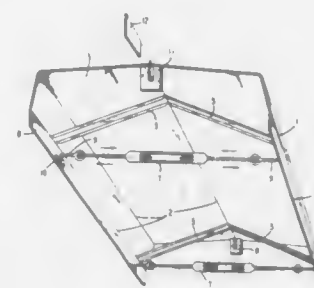


1. A drain form for forming a curb inlet drain having a main body, comprising:

a base means for forming the main body of the curb inlet drain, including inlet opening formation means for forming a drain inlet opening, wherein the inlet opening formation means includes a front portion having a flat front face and sidewalls sloped inwardly from the front face; and

a neck means for forming a manhole opening, the neck means projecting upwardly from the base means;  
wherein the base means is made of a frangible material capable of being broken into pieces and removed from the drain after curb inlet drain formation, and wherein the front portion comprises a pair of separate wing portions mounted to the base means to provide the inwardly sloped sidewalls.

**4,957,269**  
**RECOVERABLE SELF-SUPPORTABLE CRIBWORK FOR SLABS ON PREFABRICATED BEAMS**  
Jose J. N. Villarreal, Moctezuma #82-E Col. El Carmen, Coyacan, D.F. c.p. 04100, Mexico  
Filed Oct. 6, 1988, Ser. No. 254,235  
Claims priority, application Mexico, Oct. 13, 1987, 138381  
Int. Cl.<sup>3</sup> E04G 11/42  
U.S. Cl. 249—24 5 Claims

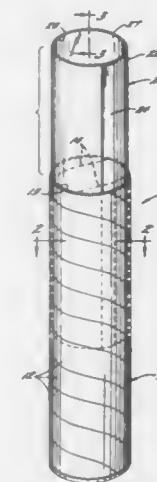


1. A recoverable self-supporting mold assembly for pouring concrete slabs on spaced parallel beams, comprising:  
a mold panel comprising sheet material formed to have a generally planar central panel portion having side wall portions depending therefrom generally normal thereto, said side wall portions being spaced and generally parallel to be received between adjacent parallel beams;  
mold panel support means disposed on and supported by said beams for receiving and supporting said wall portions;  
said mold panel having spaced substantially parallel stiffening bends therein; and  
removably tensioning means extending between said wall portions for adjusting the spacing between adjacent wall portions,  
wherein said mold panel support means comprise a plurality of elongate metal straps having a generally inverted U-shape shaped and sized to fit closely over said beams with arms of said U-shape depending downwards on opposite side of a corresponding beam, said arms having at their extremities initially reverse-bent portions forming generally U-shaped receptacles for supporting edges of said wall portions, said reverse-bent portions being disposed to be accessible to be forcibly bent downwards following setting of concrete formed over said mold panel for thereby permitting removal of said mold panels following application of said tensioning means to reduce said spacing between said adjacent wall portions of said mold panels.

**4,957,270**  
**CONCRETE COLUMN FORMING TUBE**  
Tony F. Rummage; John T. Wise; Charles D. Fehrenbach, and McCleery B. Cunningham, all of Hartsville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.  
Filed Jan. 5, 1989, Ser. No. 294,101  
Int. Cl.<sup>3</sup> E04G 13/02  
U.S. Cl. 249—48 6 Claims

1. A concrete column forming tube for receiving poured concrete therein to produce a concrete column and characterized by producing surface characteristics on the concrete

column including a paper fiber matte finish without seam lines of the forming tube; said forming tube comprising:  
an elongate rigid cylindrical tube capable of receiving concrete therein to form a column and comprising partially-overlapped spirally-wound plies of paper adhered together and defining an inside wall surface having spiral seam lines thereon; and  
a separately formed flexible cylindrical liner positioned inside said rigid tube in a generally friction-fit relationship and comprising a generally rectangular layer of paper-board material closed on itself with its longitudinal edges abuttingly arranged and defining a seam, and a sealing tape positioned on the outside of said paperboard layer along said seam for maintaining the paperboard layer in



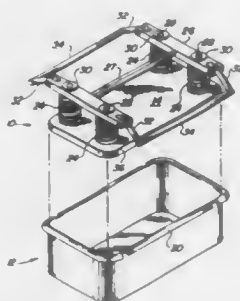
tubular form, said paperboard layer having an inside wall surface of desired paper fiber matt texture and a thickness sufficient to bridge and cover said spiral seam lines on said inside wall surface of said rigid tube to prevent the formation of seam lines on the outside surface of the produced concrete column, and a thin plastic coating layer laminated to said inside wall surface of said paperboard layer to provide a moisture-imperious inside wall surface for said forming tube and having a thickness sufficiently thinner than said paperboard layer so that said plastic coating layer assumes the desired paper fiber matt texture of said inside wall surface of said paperboard layer to produce a concrete column with a paper fiber matt finish on the outside surface.

**4,957,271**  
**CONTAINER FOR MEAT MOLDING**  
Donald L. Summers, 94 Hesterman Dr., and David J. Summers, 2003 Cardinal, both of, Glendale Heights, Ill. 60139  
Continuation-in-part of Ser. No. 170,794, Mar. 21, 1988, abandoned. This application Jun. 5, 1989, Ser. No. 361,441  
Int. Cl.<sup>3</sup> A47J 27/08; B29C 43/54; A23P 1/10  
U.S. Cl. 249—82 5 Claims

1. A mold apparatus for shaping meats having an open interior for the containment of said meat that is free from elements of said mold apparatus, said apparatus comprising:  
a rectangular mold having a pair of long and a pair of short, substantially vertical, opposing side walls and an open top;  
a cover assembly having a lid for telescopic insertion into said mold, at least three springs in contact with said lid at at least three discrete and non-colinear points, at least one attachment bar in contact with said springs at the ends of said springs opposite said lid, means for guiding said lid with respect to said attachment bar and a pair of inflexible and nonadjustable stops for preventing outward movement of the attachment bar with respect to said mold, each

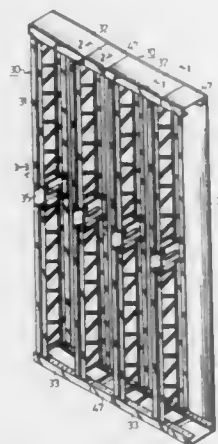


of said stops including a single support rod hinged to said attachment bar for engagement and disengagement with one sidewall of said pair of long opposing side walls, at least one of said support rods comprising an elongated support rod having a length equal to at least half the dimension of the sidewall engaged by said elongated support rod; and,



a lip on one of said long opposing side walls arranged to engage said elongated support rod and provide an extended line of rigid support over the length of said elongated support rod to prevent relative upward movement and rotation of said attachment bar said lip being provided with slot means to engageably receive one of said stops.

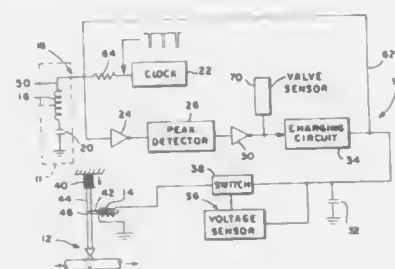
**4,957,272**  
**MODULAR CONCRETE FORM**  
Yuan-Ho Lee, No. 851, Chung-San Rd., Nan-Pao Tsun, Kuei-Jen Hsian, Tainan Hsiang, Taiwan  
Filed Jun. 23, 1989, Ser. No. 370,757  
Int. Cl.<sup>3</sup> E04G 9/02, 17/14  
U.S. Cl. 249-196 5 Claims



1. A form assembly comprising:  
form plates arranged in edge-to-edge contiguity, each of said plates having a pair of longitudinal sides and a pair of transverse sides;  
a fastening means provided along said longitudinal sides to fasten releasably said form plates;  
reinforcement channel pieces attached detachably to said form plates along said transverse sides; and  
trussed backing members extending longitudinally between said channel pieces, each of said trussed backing members having two opposite joint ends, said joint ends being detachably connected to said channel pieces, wherein each of said channel pieces includes a plate member, two opposite longitudinal backward flanges extending from two opposite sides of said plate member of said channel

piece, one of said opposite longitudinal backward flanges abutting with said form plate for connection thereto, two opposite inward flanges respectively extending from said backward flanges and defining threaded holes therein, and opposite transverse backward flanges extending from said plate member of said channel pieces between said longitudinal backward flanges.

**4,957,273**  
**REMOTE SHUT-OFF VALVE**  
Lawrence M. Sears, 3263 Glencairn Rd., Shaker Hts., Ohio 44122  
Continuation-in-part of Ser. No. 935,963, Nov. 28, 1986, Pat. No. 4,779,839. This application Apr. 25, 1988, Ser. No. 185,455  
Int. Cl.<sup>3</sup> F16K 31/02  
U.S. Cl. 251-129.04 32 Claims

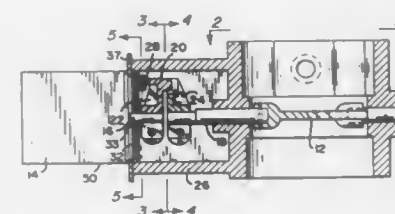


1. A system for actuating an electrical valve from a remote location comprising:  
portable means for generating a first electromagnetic signal indicative of a desire to actuate said electrical valve from a remote location;  
nonportable means for receiving said first electromagnetic signal from a remote location; and  
means for actuating said electrical valve upon the receipt of said first electromagnetic signal, said means for generating said first electromagnetic signal comprises a first portable oscillator and a first portable coil, said first portable oscillator operable to cause alternating current to flow in said first portable coil, said nonportable means for receiving said first electromagnetic signal comprising a supervisory circuit and wherein said nonportable supervisory circuit comprises a nonportable second coil and a capacitor having first and second plates, said first plate of said capacitor electrically communicating with said second coil, said second plate of said capacitor electrically communicating with ground.

**4,957,274**  
**POSITION SENSOR FOR A ROTARY VALVE**  
James A. Hood, Concord, and Paul A. Kirkpatrick, Charlotte, both of N.C., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.  
Filed Dec. 26, 1989, Ser. No. 457,131  
Int. Cl.<sup>3</sup> F16K 31/04  
U.S. Cl. 251-129.12 26 Claims

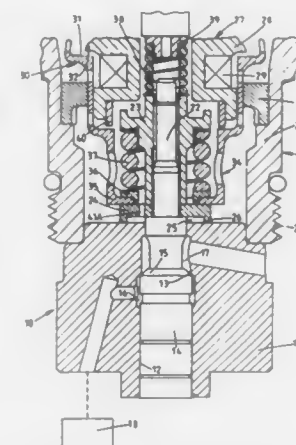
1. A system to determine a position of a rotary valve comprising:  
a stepper motor means for supplying power to open and close the rotary valve;  
a coupling means for transmitting stepper motor power to the rotary valve;  
a sensor actuator affixed to the coupling means; and  
at least one limit sensor means for determining the position

of the rotary valve by sensing the position of the sensor actuator, wherein there is no contact between the sensor



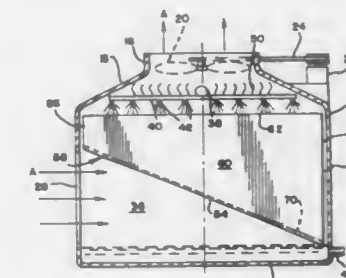
actuator and the limit sensor when the position of the rotary valve is being determined.

**4,957,275**  
**CONTROL VALVE**  
Graham D. Homes, London, England, assignor to Lucas Industries Public Limited Company, Birmingham, England  
Filed Dec. 9, 1988, Ser. No. 282,051  
Claims priority, application United Kingdom, Dec. 12, 1987, 8729087  
Int. Cl.<sup>3</sup> F16K 31/06  
U.S. Cl. 251-129.02 5 Claims



1. An electromagnetically operable spill control valve comprising a valve member slidable in a bore in a valve body, a seating in said bore, said valve member being shaped for cooperation with said seating, inlet and outlet chambers defined on opposite sides of said seating, an armature coupled to said valve member, said armature forming part of an electromagnetic actuator, which when energized draws said valve member into engagement with said seating to prevent fluid flow between said inlet and outlet chambers, resilient means acting to oppose the movement of said armature, stop means for determining the extent of movement of said valve member away from said seating under the action of said resilient means when said actuator is de-energized, an annular element disposed adjacent said valve body, an annular rim defined on said annular element, and damping means having an annular recess defined between said annular element and said valve body, said annular element having a restricted opening communicating with said recess, said annular element moving towards said valve body when said actuator is de-energized, said damping means acting to control said movement of said valve member, whereby valve member bounce is minimized.

**4,957,276**  
**TRAPEZOIDAL FILL SHEET FOR LOW SILHOUETTE COOLING TOWER**  
Bryan F. Garrish, Ellicott City, Md., assignor to Baltimore Aircoil Company, Jessup, Md.  
Division of Ser. No. 158,603, Feb. 22, 1988, Pat. No. 4,873,028.  
This application Aug. 24, 1989, Ser. No. 397,900  
Int. Cl.<sup>3</sup> B01F 3/04; F28C 1/02  
U.S. Cl. 261-112.100 2 Claims



1. An improved substantially flat fill sheet for a cooling tower, said fill sheet comprising:  
a trapezoidal face portion extending between two nonparallel edges and unequal opposite sides connected between said edges; said face portion terminating at said edges and said sides, said face portion having a surface with contours defining pathways for a fluid and said face portion including spacer projections on its said surface.

**4,957,277**  
**TUBULAR ELASTOMERIC SPRING HAVING CONTROLLABLE BREAKOVER AND SPRING RATE**  
H. N. Paton, 1218 Third Ave., Suite 1018, Seattle, Wash. 98121  
Continuation of Ser. No. 304,886, Jan. 31, 1989, abandoned, which is a continuation of Ser. No. 61,481, Jan. 15, 1987, abandoned. This application Jan. 26, 1990, Ser. No. 471,040  
Int. Cl.<sup>3</sup> F16F 3/10  
U.S. Cl. 267-33 16 Claims



1. A spring, comprising: an elastomeric tube having a wall sufficient to enable said tube to be deflected by an axial load as a free-standing column and a coil spring embedded in said tube wall and extending along the length of said tube; said tube comprising first and second traverse portions, through each of which extends a generally cylindrical inner bore, said first portion having a generally straight outer profile; and the outer surface of said second portion being provided with an annular groove, the length of which spans at least two adjacent coils of said coil spring, said annular groove being positioned along the length of said tube between one end and the mid-point thereof and at least a portion of the width of said groove having a substantially constant outside diameter less than the outside diameter of said first portion; at least said second portion being unconfined and said annular groove being so-shaped that the middle portion of said second portion bulges outwardly more than the rest of said tube, while remaining out of contact with

the rest of said tube, until said second portion buckles, without causing said tube as a whole to undergo columnar buckling, in response to a certain axial load on said tube; said tube having a load versus deflection curve which breaks over from a constant rate into a plateau region essentially simultaneously with said second portion buckling and then to a rising rate; said breakover being controllable in accordance with the shape of said second portion.

#### 4,957,278 COIL SPRING

Syoichi Komura, and Hiroyuki Toyofuku, both of Kyoto, Japan, assignors to Sanko Senzai Kogyo Kabushiki Kaisha, Kyoto, Japan

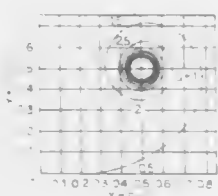
Filed Apr. 12, 1989, Ser. No. 336,476

Claims priority, application Japan, Jan. 10, 1989, 1-4095

Int. Cl.<sup>5</sup> F16F 1/10

U.S. Cl. 267—166

2 Claims



1. A coil spring, comprising:  
a strand having a width  $w$  and a thickness  $t$ , such that  $1.1 \leq c \leq 1.7$ , where  $c$  is a ratio determined according to  $c = w/t$ , wherein said strand has a cross-sectional shape defined by a plurality of partial curves, which are portions of a clothoid, as a curve whose radius varies inversely in proportion to its length, and  
wherein said partial curves are combined to form a closed loop.

#### 4,957,279 FLUIDLESS MULTI-DIRECTIONAL MOTION-DAMPING MOUNT

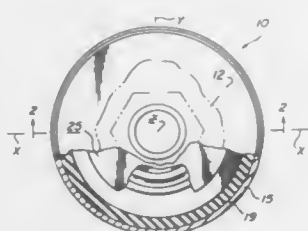
Richard P. Thora, Erie, Pa., assignor to Lord Corporation, Erie, Pa.

Filed Jul. 18, 1989, Ser. No. 381,617

Int. Cl.<sup>5</sup> F16F 3/08

U.S. Cl. 267—140.5

19 Claims



1. A mount for damping motion in at least two directions, comprising:  
a first member adapted to be connected to a first object,  
a second member adapted to be connected to a second object,  
a resilient element interposed between the members and mounting the first member for translation in a first direction alongside and relative to the second member and for motion in a second direction lateral to said first direction,

means providing a first resiliently deformable layer extending along said first direction,  
means providing a second resiliently deformable layer extending along said second direction, and  
means providing a rigid rib engaging both said first and said second resilient layers for slidably deforming said layers in response to motion of said first member relative to said second member in either or both of said directions, whereby relative motion between the members can be damped in one or more directions.

#### 4,957,280 UNIFORM SPEED PINLESS FOLDING MACHINE

Mikio Motooka, Mihara, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

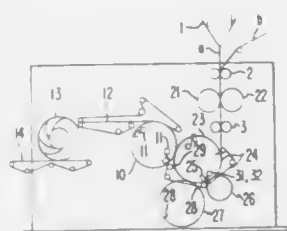
Filed Jan. 5, 1989, Ser. No. 293,831

Claims priority, application Japan, Jan. 11, 1988, 63-2433

Int. Cl.<sup>5</sup> B42C 1/04

U.S. Cl. 270—47

8 Claims



1. An apparatus for cutting into successive sheets at least one web of material supplied at a speed of movement, said apparatus comprising:  
first cutter means for receiving the web and for cutting across a portion only of the width thereof at a cutting position at which a sheet is to be formed by being cut from the sheet;  
a first drum positioned downstream of said first cutter means relative to the direction of movement of the web and adapted to receive the web about a portion of its periphery, said first drum having inwardly of said periphery thereof means for clamping the leading end of the web;  
conveyor belt means cooperating with said first drum for pressing against said portion of said periphery thereof only that portion of the width of the web cut by said first cutter means, said conveyor means traveling at the same speed as the peripheral speed of said first drum;  
means for pushing the leading end of the web into said first drum, whereupon said clamping means grips the leading end of the web; and  
second cutter means, positioned upstream of said pushing means relative to the direction of movement of the web, for cutting at the cutting position of the web that portion of the web not cut by said first cutting means, and thereby for forming a cut sheet separated from the web.

#### 4,957,281 ROTATOR CUFF THERAPEUTIC EXERCISE APPARATUS

Max D. Christolear, Jr., Dayton, Ohio, assignor to Wright State University, Dayton, Ohio

Filed Jan. 30, 1989, Ser. No. 303,139

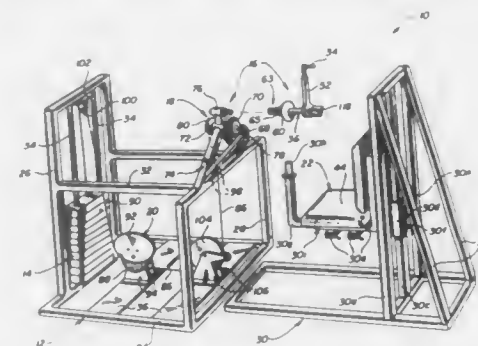
Int. Cl.<sup>5</sup> A63B 21/06

U.S. Cl. 272—117

16 Claims

1. A therapeutic exercise apparatus, comprising:  
a frame;  
at least one weight supported on said frame for movement along a working stroke from a rest position against gravitational force to a displaced position;  
an actuator mechanism mounted on said frame and adapted

to be gripped and rotated by a hand of a user, said actuator mechanism being positioned in either a first or second operating configurations for permitting a corresponding rotational working motion of the one of the user's arm whose hand grips said mechanism;  
means coupled to said frame and interconnecting said actuator mechanism and said weight for transmitting rotational motion of the arm of the user to said weight to move said weight along its working stroke;  
said motion transmitting means including a two-piece cam assembly with replaceable cams for permitting progressive comparative resistance exercising tailored to particular exercises;  
said cam assembly including a rotatable member mounted in said frame and having a central axis and a peripheral portion, a first elongated flexible motion transmitting member interconnected at one end to said actuator mechanism and attached at the other end to a location on said peripheral portion of said rotatable member such that as



said rotatable member is rotated in one or the other of clockwise and counterclockwise directions by rotation of said actuator mechanism said first flexible motion transmitting member adjacent said other end thereof will wrap about or unwrap from said peripheral portion of said rotatable member, a second elongated flexible motion transmitting member interconnected at one end to said weight, extending to said rotatable member and attached at the other end to the periphery of said rotatable member, and a contour cam member having an eccentrically-configured peripheral portion and being removably mountable on said rotatable member at said one side thereof and disposed about said central axis thereof such that as said rotatable member is rotated in one or the other of clockwise and counterclockwise directions by rotation of said actuator mechanism said second flexible motion transmitting member adjacent said other end thereof will wrap about or unwrap from said peripheral portion of said cam member.

#### 4,957,282 GYRO-CYCLE

Timothy A. Wakefield, 2294 St. Rt. 286, Williamsburg, Ohio 45176

Filed Jul. 17, 1989, Ser. No. 380,503

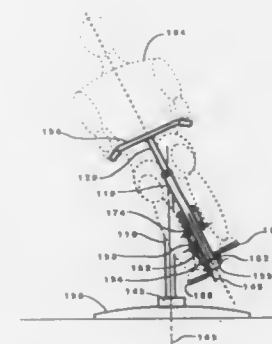
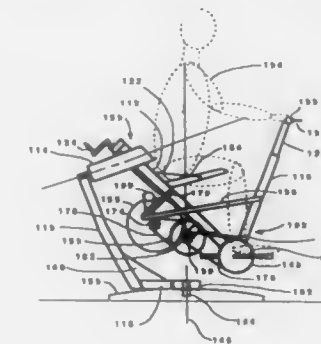
Int. Cl.<sup>5</sup> A63B 21/00

U.S. Cl. 272—73

18 Claims

1. An apparatus for exercising the limbs and torso of a user by resisting precessional torque generated by the apparatus, comprising:  
a base;  
a frame, rotatably coupled to said base for rotation about said base;  
a support member for supporting a user, rotatably coupled to said frame for rotation about the longitudinal axis of said support member;  
a mass, affixed to said support member, capable of rotation about a spin axis;

and crankshaft means operated by said user affixed to said support member, for rotating said mass,



whereby any rotation of said support member causes rotation of said frame about said base due to the precessional torque generated by said rotating mass.

#### 4,957,283 VACUUM SYSTEM FOR FEEDING SHEETS

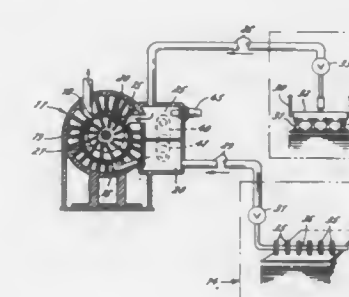
William J. Kist, Barrington, Ill., assignor to Combined Fluid Products Co., Lake Zurich, Ill.

Filed Oct. 7, 1988, Ser. No. 255,550

Int. Cl.<sup>5</sup> B65H 3/08; F16D 31/02; F04B 49/08

U.S. Cl. 271—90

16 Claims



16. A pneumatic system for a printing press comprising a pump having a primary suction port, a secondary suction port, and a discharge port, said pump being operable for generating vacuum pressures at said primary and secondary suction ports, first vacuum operated means including a vacuum operated sheet pick up device at an upstream end of the printing press,

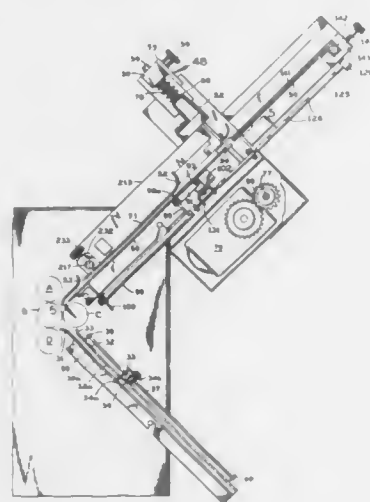


first means coupling said primary suction port to said first vacuum operated means,  
 secondary vacuum operated means including a vacuum operated sheet slow down device at a delivery end of the printing press,  
 second means coupling said secondary suction port to said second vacuum operated means, and  
 orifice means connecting said first and second coupling means.

**4,957,284**  
**APPARATUS AND METHOD FOR CONVERTING SHEET FOLDER TO BOOKLET MAKER**  
 Yvan E. Brabant, Boca Raton, Fla., assignor to Profold, Inc., Sebastian, Fla.

Filed Sep. 2, 1988, Ser. No. 239,983  
 Int. Cl.<sup>5</sup> B41L 43/12  
 U.S. Cl. 270—37

19 Claims



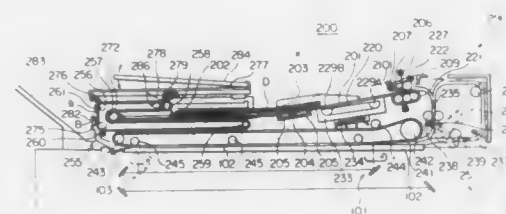
1. In combination with a folder having:  
 a pair of power-driven rollers operatively arranged to pull down between them a stapled set of sheets of paper;  
 guide members extending down from said pair of rollers on one side thereof, said guide members defining a downwardly inclined guide recess located on said one side of said pair of rollers, said guide recess having an open upper end positioned to receive the stapled set of sheets pulled down by said pair of rollers;  
 a stop member positioned in said guide recess in the path of said stapled set of sheets for engagement by the leading edge of said stapled set of sheets to prevent the continued advance of said set of sheets down into said guide recess; and a third roller positioned below one of said pair of rollers and cooperable therewith to define a fold gap through which said stapled set of sheets is pulled after said leading edge of said stapled set of sheets engages said stop member and the trailing part of the stapled set of sheets continues to be pulled down between said pair of rollers;  
 the improvement which comprises a stapling and guide unit attached to said folder above said pair of rollers, said stapling and guide means having:  
 a stapling station including a power-operated stapling mechanism located above and on said one side of said pair of rollers;  
 guide means located above and on said one side of said pair of rollers and inclined downward and forward from said stapling station toward said pair of rollers for passing a stapled set of sheets in a straight-line path from said stapling mechanism down to said pair of rollers;  
 stop means in said guide means spaced from said stapling mechanism by substantially half the length of each sheet and normally positioned for engagement by the leading

edge of a stack of sheets in said stapling station to hold said stack against movement down said guide means to said pair of rollers and to position the longitudinal midpoint of each sheet beneath said stapling mechanism;  
 and means for retracting said stop means from engagement by the leading edge of said stack of sheets when said stapling mechanism staples said stack into a stapled set of said sheets, thereby permitting said stapled set of sheets to pass down said guide means to said pair of rollers.

**4,957,285**  
**DOCUMENT FEEDER WITH SHEET EDGE REGULATING MECHANISM**  
 Yasushi Yamada, Tokyo, Japan, assignor to Konica Corporation, Tokyo, Japan

Filed Apr. 5, 1989, Ser. No. 333,399  
 Claims priority, application Japan, Apr. 7, 1988, 63-87592; Apr. 15, 1988, 63-51030[U]  
 Int. Cl.<sup>5</sup> B65H 5/00  
 U.S. Cl. 271—3.1

5 Claims



1. A document feeder for use in a copy machine comprising:  
 a document sheet stacker adapted to receive a stack of document sheets thereon;  
 separation means for separating a sheet from the bottom of the stack of document sheets and feeding the separated sheet to a copying member;  
 means for shifting the stack of document sheets from said document sheet stacker to said separation means;  
 gate means disposed between said document sheet stacker and said separation means and adapted to be lifted so as to regulate the passage of the stack of document sheets so that when said gate means is lowered, the leading edges of the document sheets in the stack come in contact with said gate means, whereby the leading edges of the documents are aligned, and while said gate means is lifted upwardly, the stack of document sheets passes under said gate means; and  
 sheet edge-regulating means attached to said gate means so that when said gate means is lifted upwardly, said sheet edge-regulating means is moved adjacent the upper surface of the stack of document sheets and regulates the leading edge of the stack of document sheets so as to pass under said gate means.

**4,957,286**  
**SEAT WITH WEIGHT MEASURING CAPABILITIES**  
 Charles A. Persons, II, Huron, and James D. Goostree, Norwalk, both of Ohio, assignors to The Faulhaber Co., Monroeville, Ohio

Continuation of Ser. No. 257,763, Oct. 14, 1988, abandoned.  
 This application Feb. 16, 1990, Ser. No. 481,787  
 Int. Cl.<sup>5</sup> A63B 23/00

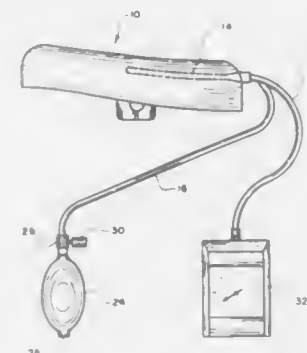
U.S. Cl. 272—73

5 Claims

1. A weight monitoring exercise device comprising:  
 a bicycle seat;  
 a seat-connecting post;  
 pedal-driven exercise means; and  
 weight monitoring means,  
 in which said bicycle seat is attached to said seat-connecting post, and said post is connected to said exercise means, wherein

said weight monitoring means comprises a compressible, gas-holding container elastomeric mounted within said seat, said seat comprising a seat cover enclosing seat cushioning material which encapsulates said container said container connected to a meter responsive to changes in the pressure of said gas, said

and means operative for ejecting said action element from said base upon the expiration of said set period of time.

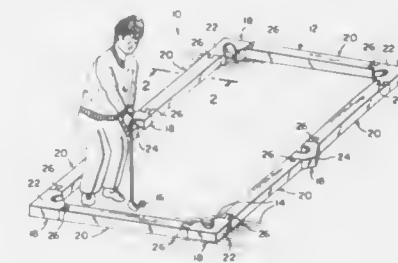


**4,957,288**  
**PUTTER POOL BILLIARD GAME**  
 Hugh B. Kantner, Box 1931, Klamath Falls, Ore. 97601, and George Spector, 233 Broadway, Rm. 3815, New York, N.Y. 10007

Filed Sep. 28, 1988, Ser. No. 250,229  
 Int. Cl.<sup>5</sup> A63D 15/00

U.S. Cl. 273—2

1 Claim

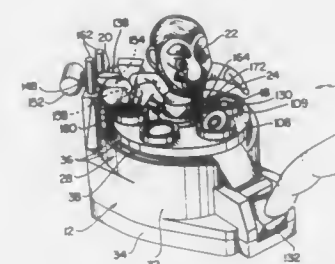


meter being mounted on said exercise means so as to be visible to an individual seated on said seat, whereby a person on said seat can observe meter reading differences occurring as the result of gas pressure changes in said container caused from body-weight loss produced by an individual exercising on said device.

**4,957,287**  
**TOY-GAME DEVICE**  
 Toshio Kobayashi, Chiba Prefecture, Japan, assignor to Asahi Corporation, Tokyo, Japan

Filed Nov. 18, 1988, Ser. No. 273,221  
 Claims priority, application Japan, Nov. 21, 1987, 62-178205  
 Int. Cl.<sup>5</sup> A63F 9/00  
 U.S. Cl. 273—1.099

7 Claims



5. A toy-game device comprising a base, a timer in said base actuatable for a set period of time, a rotatable platform on said base operatively connected to said timer for rotation during said set period of time, a plurality of substantially flat game discs receivable on said platform, receiving means having an upwardly open slot therein, retrieving means for retrieving said game discs from said platform, one of either said retrieving means or each of said game discs including magnetic means, the other of either said retrieving means or each of said game discs including magnetically responsive means, said retrieving means being operative for magnetically retrieving said game discs from said platform and for depositing them in said slot, the magnetic means or the magnetically responsive means on each of said game discs being exposed on only one side of each of said game discs, means for individually selectively turning said game discs over to position the magnetic means or the magnetically responsive means thereon in upwardly facing relation, said retrieving means being operative for retrieving only those game discs positioned on said platform so that the magnetic means or the magnetically responsive means thereon are in upwardly facing relation, an action element on said base

1. A golf putting game which comprises:  
 (a) a framework suitable for use on a flat support surface, in which said framework is in the shape of a rectangle to retain a played golf ball within the bounds of said framework;  
 (b) means disposed within said framework for capturing a golf ball during play of said game, wherein said framework includes a plurality of barrier rail segments comprising;  
 (c) four corner pockets, means interlocking, each of said corner pockets between two of said rail segments at each corner of said framework; and  
 (d) a pair of side pockets, means interlocking each of said side pockets between two of said rail segments along each long side of said framework, a plurality of flexible bumpers, each of said bumpers being triangular in cross section and disposed on the interior wall of said rail segments of said framework to provide a uniform golf ball rebound during the play of said game;  
 (e) each of said rail segments having a bottom undercut extending inwardly from the interior wall thereof;  
 (f) a rectangular felt floor mat being of a size so that its edge can be held between said bottom undercut and the flat support surface to simulate a pool table surface for the golf ball to be played upon, each of said corner pockets and each of said side pockets includes an entrance opening of predetermined waste and an inwardly inclined floor which butts against the edge of said felt floor mat so that a golf ball can be positively retained therein during the play of said game, and wherein each said side pocket has a parallel side wall at said entrance opening and wherein said inwardly inclined floor has a circular portion of larger diameter than the width of said entrance opening.

4,957,289

**BALL RETURN MECHANISM FOR A BASKETBALL GAME**

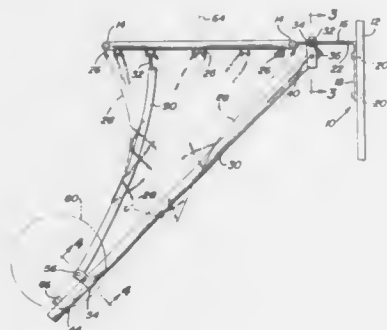
Jeffrey R. Kotlarz, 2402 Antonia La., Warren Mich. 48091

Filed Feb. 21, 1989, Ser. No. 312,958

Int. Cl.<sup>5</sup> A63B 69/00

U.S. Cl. 273—1.5 A

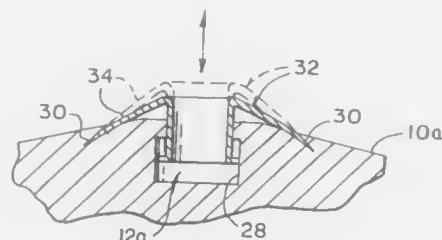
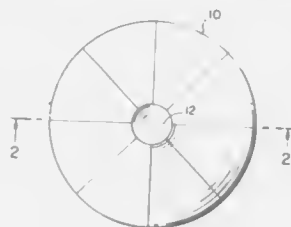
19 Claims



1. In association with a basketball goal that comprises a backboard, a circular rim horizontally oriented forward of the backboard, bracket means connecting the circular rim to the backboard, and a mechanism for deflecting a basketball forwardly in a direction away from said backboard after passage through said circular rim, said mechanism comprising:

two generally parallel rails disposed in the space below said circular rim and at an angle thereto, said rails having a length greater than the diameter of said circular rim; said rails having rear ends located a predetermined distance behind said circular rim and connected to said bracket means below the plane of said circular rim, and front ends extending downwardly away from said circular rim preferable at an angle between 30 and 60 degrees; said rails being located symmetrically in opposite transverse directions from a front-to-rear vertical plane passing through the central axis of said circular rim; and said rails being spaced apart by a distance that is less than the diameter of said basketball, whereby said basketball is caused to roll downwardly and forwardly between said rails after passage through said circular rim.

slot to change the angle of inclination of said flange relative to a playing surface and thus change the angle of



entry into said cup of a ball used during the play of the croquet game.

4,957,291

**ELECTRONIC PUZZLE**

Donald C. Miffitt, Chelmsford; Angelo Tortola, Lexington; Charles S. Sebor, Reading, and Robert L. Halliday, Lexington, all of Mass., assignors to Venture Technologies, Inc., North Billerica, Mass.

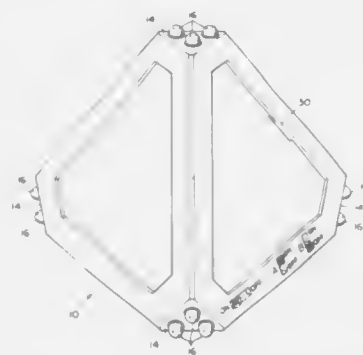
Continuation of Ser. No. 166,927, Mar. 11, 1988, abandoned.

This application Nov. 6, 1989, Ser. No. 433,389

Int. Cl.<sup>5</sup> A63F 9/06

U.S. Cl. 273—153 R

14 Claims



1. An electronic puzzle comprising:

- a puzzle body including a plurality of lightable positions, each lightable position capable of being illuminated in a plurality of colors;
- a first digital circuit for establishing color state vectors defining patterns of color changes for each lightable position, a single color state vector being assigned to a game being played;
- a second digital circuit for establishing one or more game rules, each game rule defining the application of one of said color state vectors, a single game rule being assigned to a game being played; and
- a third circuit, interconnected with said first digital circuit and said second digital circuit, for changing the color,

if required by the game rule, of at least one of said lightable positions;

whereby in response to a manipulation of said puzzle body to bring one of said lightable positions into a reference plane said first digital circuit, said second digital circuit, and said third circuit cooperate to change the color of at least one of said lightable positions to the next color, if required by the game rule, said next color being determined by the color state vector of the game being played and by the game rule of said game being played.

4,957,292

**LOOP TRANSFER GAME DEVICE**

Yasuhiro Ushiyama, OX Co., Ltd. c/o, 6-7, Furujin-machi, Takamatsu-City, Kagawa, Japan

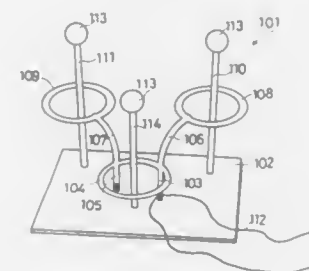
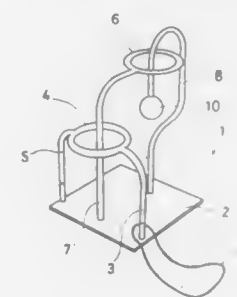
Filed Jan. 10, 1990, Ser. No. 463,206

Claims priority, application Japan, Apr. 25, 1989, 1-106943

Int. Cl.<sup>5</sup> A63F 9/08

U.S. Cl. 273—159

3 Claims



2. A loop transfer game device comprising a first pin mounted on a base member, a second pin mounted on said base member and connected to said first pin by a first annular obstruction, a couple of first and second obstruction pins fixedly mounted to said first annular obstruction, a couple of second and third annular obstructions fixedly mounted to the distal ends of said first and second obstruction pins respectively, a couple of third and fourth obstruction pins extending through the insides of said second and third annular obstructions respectively, and a loop made of flexible material and provided so as to encircle either said first or second pin.

4,957,293

**GOLF BALL MARKER AND HOLDER APPARATUS FOR MARKER**

Danny L. Byrd, 2317 W. Dobbin Rd., Phoenix, Ariz. 85041

Continuation-in-part of Ser. No. 205,474, Jun. 13, 1988,

abandoned. This application Jun. 5, 1989, Ser. No. 361,359

Int. Cl.<sup>5</sup> A63B 53/00

U.S. Cl. 273—162 D

5 Claims

1. Golf ball marker apparatus usable in combination with a putter having a shaft and a grip on the end of the shaft and a hole having a diameter in the grip, comprising, in combination:

marker means for marking the location of a golf ball on a putting green, including

a marker head, stem means secured to the marker head and adapted to extend into the green, including

a first portion adjacent to the marker head, having a first diameter,

a second portion secured to the first portion and having a second diameter which is less than the first diameter and which tapers inwardly to a third diameter remote from the first portion, and

a bottom portion on the stem means remote from the marker head having an outwardly sloping portion adjacent to the third diameter extending to a generally cylindrical portion and a conical tip remote from the outwardly sloping portion; and

anchor means for holding the marker means to the grip of the putter shaft, including

a head

an anchor stem secured to the head and extending through the hole in the grip for securing the anchor means to the



grip and having a diameter slightly greater than the diameter of the hole in the grip,

a tip portion secured to the anchor stem remote from the head and having a diameter greater than the diameter of the anchor stem,

a shoulder between the anchor stem and the tip portion and adapted to be disposed against the grip about the hole when the anchor means is secured to the grip,

a first bore in the head and anchor stem for receiving the stem means of the marker means and having an inner diameter about equal to the first diameter of the first portion of the stem means,

ridge means extending circumferentially in the first bore in the anchor stem and having an inner diameter less than the third diameter of the second portion of the stem means and defining a secondary holding element for the marker means, and

slot means extending through the anchor stem and the tip portion to allow the anchor stem and the tip portion to expand as the stem means of the marker means extends into the first bore.

4,957,294

**GOLF CLUB HEAD**

D. Clayton Long, Albany, Ga., assignor to MacGregor Golf Company, Albany, Ga.

Division of Ser. No. 66,077, Jun. 24, 1987, Pat. No. 4,802,672.

This application May 13, 1988, Ser. No. 205,682

Int. Cl.<sup>5</sup> A63B 53/04

U.S. Cl. 273—169

1 Claim

1. A golf iron head with a center of mass comprising:

a. a planar striking face;

b. a heel;

c. a toe;

d. a sole;

e. a top;

f. a hosel connected to the top adjacent to the heel; and

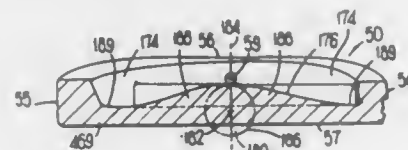
g. a backside comprising:

i. a cavity with a floor surface and sides;

ii. a longitudinal segment of a vertical elongated support



column having a circumference and an axis wherein the column is positioned behind the planar striking face and said axis is parallel to the planar face and lies within a plane that is perpendicular to the planar face and includes the center of mass; and



iii. fill material that renders the floor surface smooth and continuous between the surface of said segment and the periphery of the floor adjacent to the sides.

4,957,295

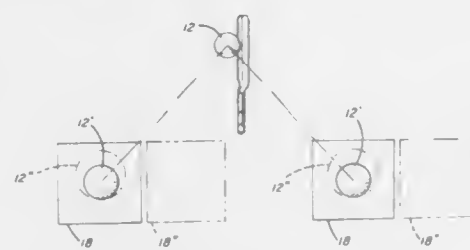
## HEAD MOVEMENT INDICATING DEVICE AND METHOD

Sam A. McConkey, 1919 Lathrop St., Fairbanks, Ak. 99701  
Filed Sep. 20, 1989, Ser. No. 410,103

Int. Cl.<sup>5</sup> A63B 69/36

U.S. Cl. 273—183 B

20 Claims



1. An optical device for determining movement of the head of a user relative to an object that the user is viewing while performing a specific task comprising:
  - a pair of spectacles worn by the user;
  - a flexible optical altering membrane substantially smaller than the lenses of said spectacles being adhesively secured to each lens of said spectacles in the area of said lens through which the user normally views said object, said optical altering membrane being selectively removable and reattachable to said spectacle lenses;
  - said optical altering membrane causing said object to appear to the user to be in a first position when viewed through said optical altering membrane and to "jump" to a second position when viewed through the portions of said spectacle lenses not covered by said membrane.

4,957,296

## GOLF BALL DISPENSER AND TEEING DEVICE

Howard M. Turnidge, Sacramento, and Theodore Talvan, Redlands, both of Calif., assignors to Howco Trust  
Continuation-in-part of Ser. No. 746,129, Jun. 18, 1985, abandoned. This application Mar. 30, 1987, Ser. No. 31,563

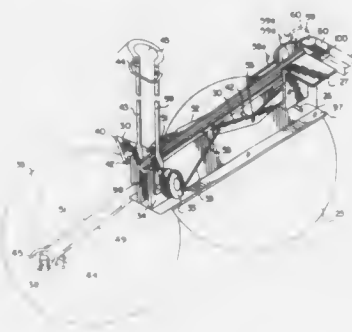
Int. Cl.<sup>5</sup> A63B 69/00

U.S. Cl. 273—201

7 Claims

1. A golf ball teeing apparatus, comprising:
  - (a) a frame structure having a golf ball track thereon, said track being linear and sloping between upper and lower ends thereof;
  - (b) receiver means, separate and in addition to said track, for receiving a golf ball from a dispenser, said receiver being movably attached to said frame and positioned at said

- upper end of said track and arranged, upon actuation thereof, to release a golf ball onto said track;
- (c) an actuator member mounted on said frame structure and movable between rest and active positions;
- (d) means coupled to said actuator member for releasing said golf ball from said receiver means onto said upper end of said track in response to movement of said actuator member from its rest to its actuated position, thereby permitting said golf ball to roll down said track;
- (e) an arm structure having first and second ends and movably mounted relative to said frame structure, said arm structure being operable between extended and retracted



- positions in response to movement of said actuator member from its rest to its active position, said arm structure in said extended position being positioned below said lower end of said track, being downwardly sloping, and forming a continuation of said lower end of said track, said first end of said arm structure being operatively and directly coupled to said lower end of said track; and
- (f) a centering member at said second end of said arm structure for receiving said golf ball from said arm structure when it forms said continuation of said track and releasing said golf ball in a predetermined horizontal alignment relative to said frame structure for depositing said golf ball onto a tee therefor.

4,957,297

## METHOD OF PLAYING GOLF AT NIGHT

Nelson F. Newcomb, and Nelson F. Newcomb, Jr., both of Windleblo Rd., Mirror Lake, N.H. 03853

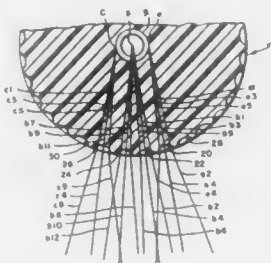
Continuation of Ser. No. 98,521, Sep. 18, 1987, Pat. No.

4,878,674, which is a continuation of Ser. No. 816,236, Jan. 6, 1986, Pat. No. 4,695,055. This application Aug. 31, 1989, Ser. No. 401,646

The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> A63B 43/06

U.S. Cl. 273—213

3 Claims



1. A method for enabling a golfer to play golf at night comprising selecting a substantially nonilluminated golf course, and using golf clubs, playing golf using a ball made of a translucent, solid plastic, the surface of which is substantially covered

with light diffusing dimples, said ball being not less than 1.680 inches in diameter nor over 1.620 ounces in weight, and said ball retaining within a diametrically extending hole, an activated chemiluminescent light stick.

4,957,298

## PERMUTATION GROUP GAMES

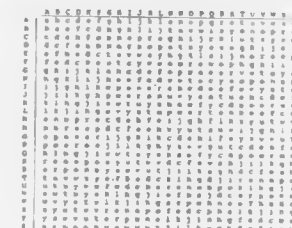
Jack Silverman, 302 W. 87th St., New York, N.Y. 10024

Filed Mar. 22, 1989, Ser. No. 327,076

Int. Cl.<sup>5</sup> A63F 3/00

U.S. Cl. 273—240

7 Claims



1. A game comprising the steps of:
  - defining a permutation group  $(X, *)$  where  $X$  is a set of symbols and  $*$  is a two argument operation on the symbols of said set, said group having closure, associativity, an identity element and an inverse for each element of the set;
  - encoding a series of plaintext symbols of the set  $X$  by replacing each plaintext symbol with a symbol pair comprising two of the three symbols  $x, y, z$  in the relation  $x*y=z$  and where  $x, y$ , and  $z$  are each elements of the set  $X$  and one of  $x, y$  and  $z$  is the plaintext symbol to be encoded; and
  - decoding the encoded symbol pairs to recover the series of plaintext symbols.

4,957,299

## BALLOON TOY AND GAME

Royest L. Richardson, 305 West Home, Flint, Mich. 48505

Filed May 1, 1989, Ser. No. 345,271

Int. Cl.<sup>5</sup> A63F 9/00

U.S. Cl. 273—409

19 Claims

1. An amusement device in combination with a game board, comprising:

- a balloon;
- a tube having a first end, a second end, main portion;
- a wing having flexibility;



- means for attaching the balloon to the first end of the tube;
- means for attaching the wing to the main portion of the tube.

4,957,300

## RECREATIONAL PROJECTILE

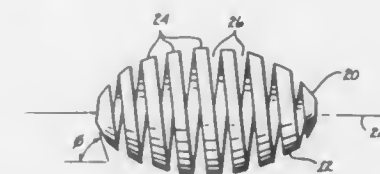
Joel C. Storry, 9443 N. 33rd Way, Phoenix, Ariz. 85028

Filed Dec. 19, 1988, Ser. No. 286,217

Int. Cl.<sup>5</sup> A63B 65/00

U.S. Cl. 273—428

4 Claims



3. A recreational projectile which displays rotational motion imparted when said projectile is thrown, said projectile comprising a lightweight strip of resilient plastic, the strip having a noncircular, elongated cross-sectional area with a width-to-thickness ratio of at least 3, the strip being coiled into a readily compressible helix defining a generally ellipsoidal volume, said strip coiled at an angle of helical advancement sufficient to create between adjacent windings of the coiled strip substantially uniform gaps of between approximately 0.125 and 0.50 inches to impart the visual impression of a rotating screw when the projectile is thrown.

4,957,301

## NON-CRUSHABLE SIDE SEAL MEMBERS FOR A ROLL-UP DOOR

Roy T. Clay, Jr., Snyder, and Donald J. Whiting, Jr., Akron, both of N.Y., assignors to Whiting Roll-Up Door Mfg., Corp., Akron, N.Y.

Filed Oct. 2, 1989, Ser. No. 416,050

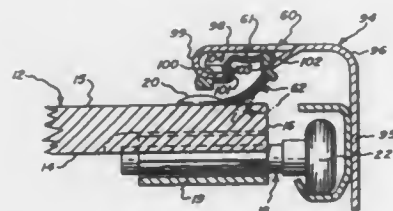
Int. Cl.<sup>5</sup> B60J 10/00

U.S. Cl. 277—12

27 Claims

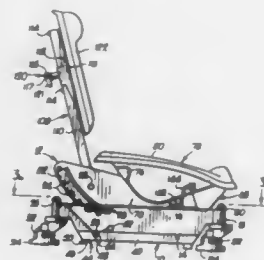
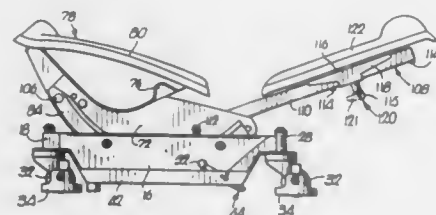
1. A seal member for sealing the gap between first and second surfaces arranged in facing relation to one another, said surfaces being mounted for movement toward and away from one another and being mounted for relative movement in substantially-parallel planes, said seal member comprising:

a first portion mounted fast to one of said surfaces, said first portion having a first abutment surface extending toward a portion of the other of said surfaces; and  
a second portion mounted on said first portion at a location spaced laterally from said first abutment surface and extending away from said first portion to flexibly engage the other of said surfaces, said abutment surface being so



positioned and arranged that said abutment surface will engage said second surface when said surfaces move toward one another to prevent said second portion from being crushed between said first portion and said other surfaces;  
whereby said second portion will not substantially impede relative movement between said surfaces in parallel planes.

**4,957,302**  
**WORKER SUPPORT APPARATUS**  
Donald J. Maxwell, Lincoln, Nebr., assignor to Eidos Corporation, David City, Nebr.  
Filed Feb. 15, 1989, Ser. No. 311,175  
Int. Cl.<sup>3</sup> B25H 5/00  
U.S. Cl. 280—32.6 18 Claims

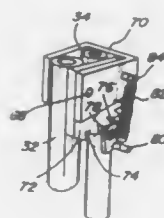
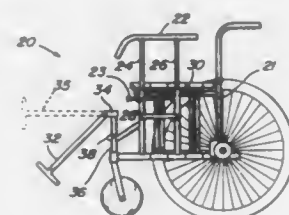


1. A low-profile positioning apparatus for selectively supporting a worker in one of a plurality of positions beneath a structure to be worked on by the worker, the apparatus comprising:  
a support structure including a pair of walls which are spaced from one another in the horizontal direction and which include opposing vertical wall surfaces;  
a seat assembly including a frame, a seat and a back support member, the frame having a width in the horizontal direction which is less than the distance by which the pair of

walls of the support structure are spaced and a pair of opposing frame surfaces extending between the opposing vertical wall surfaces of the support structure, the seat and back support member being mounted on the frame for movement with the frame;

seat assembly positioning means for permitting movement of the frame relative to the support structure along an upright arcuate path to selectively position the seat assembly in one of a plurality of positions relative to the support structure and disposed horizontally between one of the frame surfaces and an adjacent vertical wall surface; and  
back support positioning means for permitting pivotal movement of the back support member relative to the frame to selectively position the back support member in one of a plurality of positions relative to the seat.

**4,957,303**  
**FOLDABLE ADJUSTABLE WHEELCHAIR**  
Roger J. Romatz, 8520 Division, Richmond, Mich. 48062-0010  
Filed Mar. 27, 1989, Ser. No. 329,390  
Int. Cl.<sup>3</sup> A61G 5/02; B62M 1/14  
U.S. Cl. 280—250.1 13 Claims



1. A frame for use on a wheelchair that comprises:  
a main frame section;  
leg support means that are vertically adjustable with respect to said main frame section, said leg support means is pivotally mounted to a post, said post being rotatably received within said main frame section;  
said leg support means having an associated ratchet fixed thereto, said post having a dog pivotally pinned thereto, and said dog being biased to a locked position where it engages a tooth of said ratchet in order to fix said leg support means at a selected position and provide adjustability for said leg support means and said leg support means being adjusted into one of several vertical positions and in addition being rotated into one of several rotational positions with respect to said main frame section; and  
arm rest means being mounted at one of several positions with respect to said main frame section.

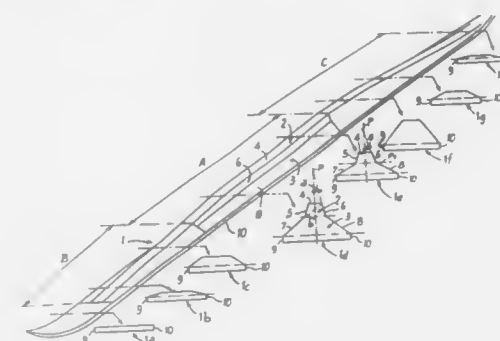
**4,957,304**  
**SKI COMPRISING A LONGITUDINAL RIB AT ITS TOP PART**

Jean-Luc Diard; Philippe Grandjacques, and Gilles Recher, all of Annecy, France, assignors to Salomon S.A., Annecy, France  
PCT No. PCT/FR88/00061, § 371 Date Oct. 5, 1988, § 102(e)  
Date Oct. 5, 1988, PCT Pub. No. WO88/05676, PCT Pub. Date Aug. 11, 1988

PCT Filed Feb. 4, 1988, Ser. No. 275,131  
Int. Cl.<sup>3</sup> A63C 5/04

U.S. Cl. 280—609

33 Claims



1. A ski, having a vertical longitudinal plane, comprising a longitudinal guidance rib having a top part, a sole, a front end part, a rear end part and a central area having a bearing portion to support and guide the sole of a shoe or boot, said central area including a first section and a second section superposed on said first section, said first section and second section each having the shape of a quadrilateral wherein the upper side of said first section and the lower side of said second section define a common imaginary line between said first section and said second section, lateral sides of said first section converging upwardly and being more inclined with respect to said vertical longitudinal plane than lateral sides of said second section, said central area including a front area extending between said bearing portion and said front end part and a rear area extending between said bearing portion and said rear end part, said front area and rear area each having the form of a single quadrilateral, said front end part and rear end part each including a flat upper surface, said front area, said rear area, and said bearing portion thereby joining the flat upper surface of said front end part and said rear end part.

**4,957,305**  
**BINDING FOR CROSS-COUNTRY SKI**  
Henry Freisinger; Karl Stritzl, both of Vienna, and Franz Lusch-nig, Traiskirchen, all of Austria, assignors to TMC Corporation, Switzerland  
Division of Ser. No. 153,835, Dec. 18, 1987, Pat. No. 4,900,053.  
This application Sep. 8, 1989, Ser. No. 404,056  
Claims priority, application Austria, Apr. 30, 1986, 1163/86  
Int. Cl.<sup>3</sup> A63C 9/081  
U.S. Cl. 280—618 3 Claims



2. A heel-holder for a safety ski binding comprising:  
a base plate adapted to be mounted to the upper surface of a ski, the base plate including a raised pin at an intermediate

portion and a first and second extension at a first end thereof;  
a pivot plate rotatable about said raised pin;  
a housing integral with the pivot plate and including a top wall and a bottom wall horizontally pivotable about the raised pin, and including a cross-pin disposed at said top wall;  
a sole-holder vertically pivotable about the cross-pin and supported by the first and second extensions, the sole holder including a hollow portion forming a control cam on an upper wall of the hollow portion;  
a snap-in device for releasing the binding provided in the housing, the snap-in device comprising a snap-in rocker pivotally mounted in the housing about a pivot pin arranged parallel to the cross pin and a control member pivotally mounted on the snap-in rocker and perpendicular to the pivot pin the control member being substantially U-shaped in configuration and including a pair of horizontal legs and a vertical leg joining the horizontal legs the snap-in rocker engaging the control cam of the sole-holder and the control member engaging at least one of the first and second base-plate extensions; and  
a spring for loading the snap-in device, the spring being capable of applying a force for releasing the binding, wherein the snap-in device reduces the spring force required for releasing the binding during both vertical pivoting of the sole-holder and horizontal pivoting of the housing.

**4,957,306**  
**LEAF WAGON**  
George Greenberg, 367 Orchard Beach, Mastic Beach, N.Y. 11951  
Continuation-in-part of Ser. No. 297,216, Jan. 17, 1989, This application Jan. 21, 1989, Ser. No. 369,641  
Int. Cl.<sup>3</sup> B62B 1/20  
U.S. Cl. 280—652 4 Claims



1. A cart for carrying leaves comprising:  
a. a first flat rectangular frame supporting a first basket with a flat bottom open at one end, enclosed by two side walls and a rear wall;  
b. a second flat rectangular frame supporting a second basket with a flat bottom having two side walls and open at both ends having a cross section identical to that of said first basket;  
c. hinge means attaching the exposed edges of the side walls at the top so that said second basket is rotatable between a first position wherein both said baskets are aligned forming said cart with the two flat bottoms arranged to form a continuous flat bottom surface in an open position and a second position wherein said second basket is resting upside down on said first basket, the side walls of both said baskets retaining their shape when said cart is folded;  
d. means mounted on opposite sides of said first frame supporting a pair of wheels;  
e. handle means extending from said first frame; and  
f. leg means extending from the rear wall of said first basket to provide additional ground support for said cart.



**4,957,307**  
**SUSPENSION FOR THE FRONT STEERED WHEELS OF A MOTOR VEHICLE**

Romolo Gandiglio, Cambiano, Italy, assignor to Fiat Auto S.P.A., Turin, Italy

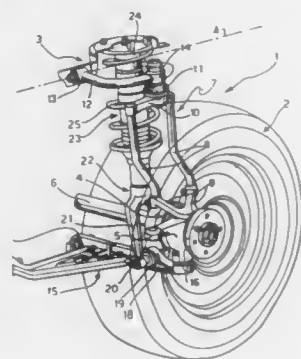
Filed Jun. 27, 1989, Ser. No. 371,920

Claims priority, application Italy, Jul. 11, 1988, 67648 A/88

Int. Cl.<sup>5</sup> B60K 17/30

U.S. Cl. 280—666

1 Claim



1. A suspension for the front steered wheels of a motor vehicle, having a frame with a longitudinal axis, comprising: a wheel provided with a wheel support, an articulation arm rigidly connected to the support and extending substantially vertically, an upper arm articulated at one end to the frame about an axis substantially parallel to the longitudinal axis of the vehicle and at the other end to the upper end of the articulation arm, a lower arm articulated at one end to the frame about an axis substantially parallel to the longitudinal axis of the vehicle and at the other end to the lower end of the wheel support and a shock-absorber with a coaxial helical spring arranged substantially vertically, with its upper end fixed to the frame and its lower end articulated to the lower arm, wherein the articulation arm is fork-shaped with two separate elements which are spaced apart in a substantially longitudinal direction.

**4,957,308**  
**REAR SUSPENSION APPARATUS FOR MOTOR VEHICLES**

Shozo Takizawa, Okazaki, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 24, 1989, Ser. No. 384,493

Claims priority, application Japan, Jul. 29, 1988, 63-190124; Jul. 29, 1988, 63-190125; Jul. 29, 1988, 63-190126; Jul. 29, 1988, 63-190127

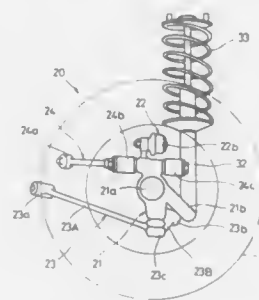
Int. Cl.<sup>5</sup> B60G 3/00

U.S. Cl. 280—666

14 Claims

1. A rear suspension apparatus for connection between a rear wheel and a vehicle body of a motor vehicle, comprising: a wheel carrier rotatably supporting the rear wheel and having an upper portion and a lower portion; an upper arm extending inward from said wheel carrier in a widthwise direction of the vehicle body, and having an outer end pivotably connected to the upper portion of said wheel carrier and an inner end pivotably connected to the vehicle body; and a lower arm assembly extending inwardly of the vehicle body from said wheel carrier, and having a plurality of inner ends pivotably connected to the vehicle body and at least one outer end pivotably connected to the lower portion of said wheel carrier and cooperating with the

outer end of said upper arm to define a center line of a virtual kingpin; and a swing arm extending from said wheel carrier inwardly of the vehicle body and obliquely at a predetermined angle to a longitudinal direction of the vehicle body, said swing



arm having two outer ends located between the outer end of said upper arm and the outer end of said lower arm assembly and pivotably connected to said wheel carrier by two pivots set apart from each other in the longitudinal direction of the vehicle body, and an inner end pivotably connected to the vehicle body.

**4,957,309**  
**PRESSURE CONTROL SYSTEM FOR SUSPENSION**  
 Osamu Komazawa, Nagoya; Shigetaka Isogai, Nishio; Shuichi Buma, Toyota; Toshio Onuma, Susono; Takashi Yonekawa, Mishima, and Katsuhiko Hattori, Nagoya, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota; Kabushiki Kaisha Toyota Chuo Kenkyusho and Aisin Seiki Kabushiki Kaisha, both of Aichi, all of Japan

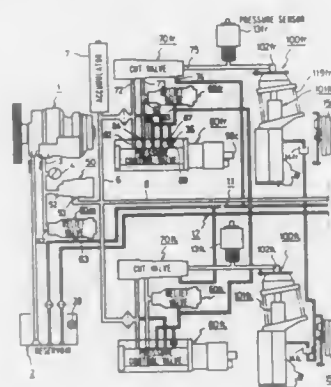
Filed Dec. 27, 1989, Ser. No. 458,240

Claims priority, application Japan, Dec. 29, 1988, 63-331365; Dec. 29, 1988, 63-331366; Jan. 31, 1989, 1-22246

Int. Cl.<sup>5</sup> B60G 11/26

U.S. Cl. 280—707

8 Claims



1. Pressure control system for suspension comprising a pressure source for supply a fluid which is drawn from a reservoir to a high pressure piping under a high pressure, which delivers a hydraulic fluid to a suspension which is adapted to extend and shrink in response to a pressure supplied thereto; and a pressure control valve including a line pressure port communicating with the high pressure piping, a low pressure port communicating with a fluid return path to the reservoir, an output port applying a pressure to the suspension, a target pressure space communicating with the line pressure port through an orifice, a spool responsive to a pressure from the output port applied to its one end to be driven in a direction to reduce a degree of communication

between the line pressure port and the output port and to increase a degree of communication between the low pressure port and the output port and also responsive to the pressure from the target pressure space applied to its other end to be driven in a direction to increase a degree of communication between the line pressure port and the output port and to reduce a degree of communication between the low pressure port and the output port, a valve element for defining a degree of communication between the target pressure space and the fluid return path to the reservoir, electrically driven drive means for driving the valve element in a direction to increase/decrease the degree of communication, and an orifice interposed in a channel between the fluid return path to the reservoir and an operating space for the valve element.

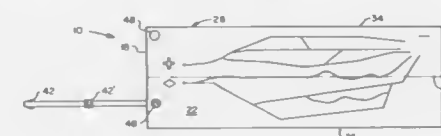
**4,957,310**  
**DETACHABLE SKI OR TERRAIN MAP**  
 Michael R. Bissonnette, P.O. Box 196, Terryville, Conn. 06786

Filed Nov. 20, 1989, Ser. No. 439,558

Int. Cl.<sup>5</sup> G09B 29/00

U.S. Cl. 283—34

14 Claims



1. A terrain map comprising: a flexible, substantially flat substrate having inner and outer surfaces, the inner surface having a terrain map depicted thereon, the substrate being foldable into a band having first and second longitudinal ends; first attachment means carried by one surface adjacent the first end of the band; second attachment means carried by said one surface adjacent the second end of the band and detachably engageable with the first attachment means; whereby as one end of the band is circled back to overlap with the other end while being wrapped around a generally cylindrical central body, the first and second attachment means can be joined to secure the terrain map to the central body.

**4,957,311**  
**DIRECT MAIL ADVERTISING SYSTEM**  
 Herman S. Geisenheimer, c/o Our Way Studio, 195 Main St., Hackensack, N.J. 07601

Continuation of Ser. No. 93,245, Sep. 4, 1987, abandoned. This application Jul. 26, 1989, Ser. No. 385,930

Int. Cl.<sup>5</sup> G09F 11/00, 11/30; G09B 12/22; B42D 15/00

U.S. Cl. 283—56

10 Claims

1. A direct mail advertising system for distribution to potential customers on a mailing list, the system comprising a plurality of cards and a mailing packet, the plurality of cards being carried in the packet, each card of the plurality including a pair of parallel longitudinal edges and perforation means extending between the longitudinal edges along a straight line perpendicular to the longitudinal edges, the perforation means for separating the card into two portions, one of the portions comprising an index card, a portion of each longitudinal edge comprising a side edge of each index card, the one portion including means for attachment to a rail type file for storage and retrieval, the means for attachment including a pair of necked apertures cut through the one portion and opening into a peripheral edge of the one portion, the one portion including reference information stored thereon, the reference information comprising directions for use of an advertiser's product in food recipe format, the other portion including means for

response usage comprising means for redemption in conjunction with the purchase of a food product, the other portion



having a surface area not substantially greater than twice the surface area of the index card.

**4,957,312**  
**SALES RECORDS**  
 Peter S. Morello, 3 Stafford St., Unit 2, Plymouth, Mass. 02360, assignor to Peter S. Morello, Plymouth, Mass.

Filed Dec. 7, 1989, Ser. No. 447,380

Int. Cl.<sup>5</sup> B42D 15/00

U.S. Cl. 283—89

7 Claims

1. A method of printing a sales record comprising a plurality of alphanumeric characters describing the sale to which the record pertains, which method comprises printing different parts of at least the majority of the characters in different colors and in which the characters are printed from ink carried on a ribbon that is automatically advanced during use and which is split in the direction of advance into contiguous split portions and carries different colors on the contiguous split portions of the ribbon.

**4,957,313**  
**EMERGENCY SUSPENSION SYSTEM FOR DRILL CASINGS**  
 Brian MacIntyre, Milngavie; Sean McAvoy, Coatbridge, and Frank Close, Airdrie, all of Scotland, assignors to Cooper Industries, Inc., Houston, Tex.

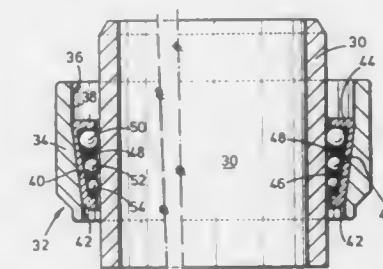
Filed Jan. 14, 1989, Ser. No. 366,766

Claims priority, application United Kingdom, Jan. 21, 1988, 8814699

Int. Cl.<sup>5</sup> F16L 21/00

U.S. Cl. 285—144

18 Claims



1. A suspension system for use in supporting a tubular member such as a drill casing for use in a wellhead, comprising an annular bowl member having an internal tapered annular surface which reduces in diameter from its upper to its lower end and a support means comprising an annular support element

arrangement at least partially formed from resilient material and a plurality of support members at least partially embedded in said resilient material and having a circular cross-section in at least one direction, said members forming a plurality of annular arrays adapted to engage said tapered annular surface and to surround said tubular member, the uppermost of said arrays comprising support members having said circular cross-section larger than that of a lowermost of said arrays.

4,957,314

## CONDUIT COUPLING ASSEMBLY

Raffaele Basile, Chicago Heights, and David A. Shotts, Naperville, both of Ill., assignors to Allied Tube & Conduit Corporation, Harvey, Ill.

Filed Oct. 13, 1989, Ser. No. 421,403

Int. Cl.<sup>5</sup> F16L 33/20

U.S. Cl. 285—355

7 Claims



1. A conduit coupling assembly for connecting the end portions of a pair of lengths of metallic tubular conduit or the like of substantially the same outside diameter in coaxial relationship, said end portions each having external threads of the same size, said coupling assembly comprising:

- an outer coupling member, annular throughout its length, having a first end including an internal screw thread sized for threading onto the end portion of one of the conduits, said outer coupling member also having a second end including an outer wall defining a cylindrical cavity, said outer wall having at least one threaded aperture there-through opening onto said cavity; and
- an annular inner coupling member having a first end for receiving said other conduit, said inner coupling member also having a second end sized for reception in said cavity and an internal screw thread sized for threading onto the end portion of the other of the conduits, said inner coupling member second end having a peripheral groove on its outer surface which can be aligned with said threaded aperture whereby upon reception of the inner coupling member second end in said cavity, said members can be joined by tightening a set screw disposed in said aperture so that said screw extends into said groove, said inner coupling member second end having a length substantially equal to the length of said cavity so that when said members are joined, said inner coupling first end extends beyond said outer coupling.

4,957,315

## AUXILIARY LOCK WITH AN EXTENSIBLE DEVICE

Jui C. Lin, 55-10, Ben-Jou Rd., Gang-San Jenn, Kaohsiung Hsien, Taiwan

Filed Nov. 22, 1989, Ser. No. 440,303

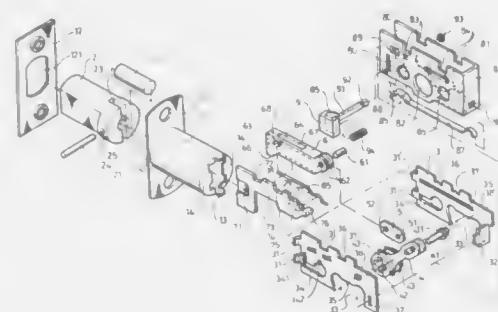
Int. Cl.<sup>5</sup> E05B 09/00

U.S. Cl. 292—337

8 Claims

1. An auxiliary lock with an extensible device comprising: a cylinder having a dead bolt reciprocable therein and having a faceplate at an outer end combinable with a lid which is provided with an opening through which the dead bolt can be extended from the cylinder a preselected length, the cylinder also having an opening in a wall at an inner end in which adjacent ends of a pair of combining plates are fixedly mounted; said dead bolt having an inner end connected with a push plate; said pair of combining plates being disposed in a case movable between advanced and retracted positions, elongated

slots in the combining plates for receiving a rotatable shaft of a pivoted moving member mounted in holes in said case, so that the shaft can move in said slots as said case is moved between its advanced and retracted positions; said shaft of said moving member being provided with a through hole for receiving a turning member of a knob; means for pivotably connecting the moving member to an adjusting member; said adjusting member being resiliently biased toward said push plate and having a shoulder portion selectively receivable in one of two spaced notches in said push plate depending upon whether the case is in its advanced or retracted position;



a resiliently biased push button mounted for reciprocable movement in the case, said push button including a slanting face for contacting the adjusting member and causing the adjusting member to move so that the shoulder portion thereof disengages from the one of the two notches in the push plate in which it is then received, said adjusting member then being movable together with the case to move the shoulder portion to the other notch in the push plate, with said shoulder portion then being received in the other notch as the resiliently biased adjusting member returns to an original position, the lock thereby being changed in its size from a short length to a long length or reversely.

4,957,316

## ARMATURE FOR ELECTROMAGNETIC LOCK

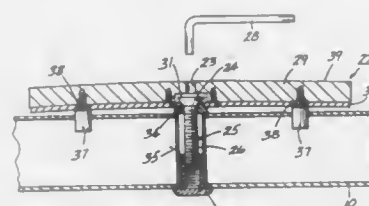
George Frolov, Farmington, Conn., assignor to Harrow Products, Inc., Grand Rapids, Mich.

Filed Apr. 19, 1989, Ser. No. 340,499

Int. Cl.<sup>5</sup> E05C 17/56

U.S. Cl. 292—251.5

8 Claims



1. An electromagnetic lock comprising an electromagnet adapted to be mounted to a door frame and an armature adapted to be mounted to a door and attracted to the electromagnet and lock said door in the frame, said armature comprising first and second plates of magnetic flux permeable material, means securing said plates together in surface contact, a device having a headed portion and a shank portion for mounting said armature to a door, said headed portion having a socket therein, said shank portion adapted to be received in and secured to the door, a recess in said first plate receiving the

headed portion, said second plate having an opening therein for said shank portion whereby said headed portion is captured between said plates, said second plate having a generally planar portion adjacent the second plate opening and extending to partially enclose the first plate recess and said second plate engaging said first plate at said recess defining portions to structurally reinforce said armature adjacent said recess, and a small passage defined through said first plate to said socket in said headed portion for receiving a turning tool, whereby said device may secure said armature to the door.

4,957,317

## DRUM LOCK DEVICE

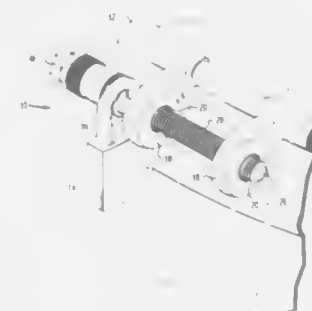
Gary P. Jakubas, Rutherford, N.J., assignor to Taurus Precision, Inc., Totowa, N.J.

Filed Apr. 27, 1990, Ser. No. 515,637

Int. Cl.<sup>5</sup> B65D 45/30

U.S. Cl. 292—256.67

20 Claims



1. A drum lock device for an open-head drum having a flanged lip at the open end with a mating lid therefor, said drum lock device comprising, in combination:

- lug-type ring closure means for annularly attaching said lid to said lip, said ring closure means having a split there-through with internally threaded lugs on either side thereof;
- a lockable bolt having an elongated and extended form with a apertured boss medial the ends thereof, said lockable bolt threadably attachable to said lugs and, upon rotation of said lockable bolt, operative to widen and narrow said split;
- a cap attached to one end of said lockable bolt;
- a shuttle wrench captively held between said cap and said apertured boss of said lockable bolt, said shuttle wrench slidably positionable between engagement with and disengagement from said lockable bolt;
- whereby, when said shuttle wrench is engaged, the rotation of the lockable bolt is enabled, and, when said shuttle wrench is disengaged the rotation of the lockable bolt is disabled.

4,957,318

## VACUUM CUP ASSEMBLY

John A. Blatt, 47 Willison, Grosse Pointe Shores, Mich. 48236, assignor to John A. Blatt, Grosse Pointe Shores, Mich.

Continuation-in-part of Ser. No. 165,154, Mar. 7, 1988, Pat. No. 4,828,306. This application Nov. 14, 1988, Ser. No. 271,178

Int. Cl.<sup>5</sup> B66C 1/02

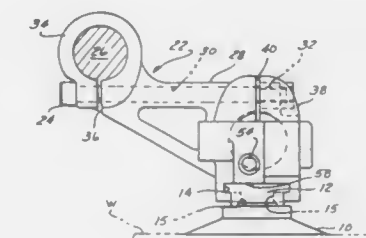
U.S. Cl. 294—64.1

19 Claims

9. A vacuum cup assembly for holding a workpiece when a source of sub-atmospheric pressure is connected to an interior space of said cup, comprising:

- a housing having a semi-hemispherical projection; and
- a mounting bracket having an elongated portion with a longitudinal bore, a first clamp disposed adjacent one end of the elongated portion and engagable with a rod-like member, a second clamp disposed adjacent another end of the elongated portion and engagable with the semi-hemispherical

pherical projection of the housing, single compression bolt means engagable through the longitudinal bore for releasably clamping the first and second clamps simultaneously, hinge means disposed on the second clamp opposite from the longitudinal bore, such that a portion of the



4,957,319

## GOLF BALL RETRIEVER

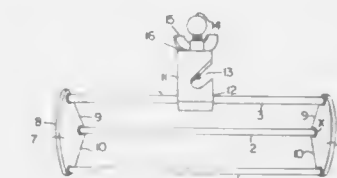
Angelo Bontempo, 19426 Riverview Ave., Rocky River, Ohio 44116

Filed Jun. 15, 1989, Ser. No. 366,643

Int. Cl.<sup>5</sup> A63B 47/02

U.S. Cl. 294—19.2

3 Claims



1. A rake-like retriever for a golf ball or balls comprising: a receptacle therefore comprising a plurality of elongated parallel rods, a pair of oppositely disposed end plates, securing means for securing each of said rods at its opposite ends to said pair of oppositely disposed end plates, the said plates having leading edges, at least two of said rods secured to said plates being spaced a distance less than the diameter of a golf ball and at least one of said rods having a leading edge disposed in spaced relation to another of said rods a distance greater than the diameter of a golf ball, an elongated handle, means for securing the said handle to one of said rods.

4,957,320

## METHODS AND APPARATUS FOR MECHANICALLY INTELLIGENT GRASPING

Nathan T. Ulrich, Philadelphia, Pa., assignor to Trustees of the University of Pennsylvania, Philadelphia, Pa.

Filed Aug. 31, 1988, Ser. No. 239,187

Int. Cl.<sup>5</sup> B25J 15/10; F16D 43/21

U.S. Cl. 294—106

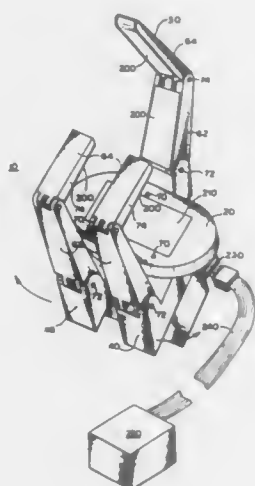
9 Claims

1. Apparatus for grasping an object, comprising:

- (a) palmar surface;
- (b) at least a first articulated member, comprising at least one rotatable joint disposed above the plane of said palmar surface, said articulated member rotatably attached to said palmar surface, said articulated member comprising:



(i) means for actuating a first rotatable joint comprised of: substantially cylindrical clutch means having screw threads on a portion thereof, said clutch means further having a substantially axial bore therein; a first substantially cylindrical shaft, disposed within the axial bore of said clutch means; means for actuating said clutch means, further comprising means for creating an adjustable frictional force between said shaft and said clutch means; a substantially cylindrical outer body portion, having means for actuating a rotating joint on a portion thereof, comprising a worm gear train, and a second substantially cylindrical shaft affixed thereto, further having a substantially axial bore therein, the axial bore having screw threads thereon; and resilient means for creating a force when displaced disposed within a portion of the substantially axial bore of said substantially cylindrical outer body portion, which transfer force from said clutch means to said outer body portion when said clutch means is threaded into said outer body portion until said clutch means urges against and displaces said resilient means, whereby, the rotation of said means for actuation is transferred to said means for actuating a rotational



joint, until said joint encounters a resistive force, causing said screw threads to unscrew said clutch means away from said resilient means, ceasing the transfer of power to a rotational joint;

(ii) a first link, having two ends, the proximal end of said first link hingably attached to said first joint, the distal end of said link defining a second rotatable joint;

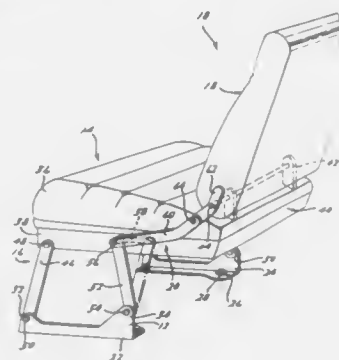
(iii) a second link, having two ends, the proximal end of said link hingably attached to said second joint; and

(iv) means for actuating said second joint affixed to said actuating means such that when said clutch mechanism ceases to transfer power to said first joint, substantially all of the actuator power is transferred to said second joint; and

(c) means for rotating said first articulated member up to at least 180° about an axis of rotation, whereby said articulated member moves relative to the perimeter of said palmar surface, whereby the relative motion of said first and second joints is compliantly coupled, such that when said first link encounters a resistive force, said means for actuating a first joint is disconnected and said second joint continues to be activated.

4,957,321  
STOWABLE VEHICLE SEAT WITH SEAT BACK POSITION CONTROLLER  
Norman G. Martin, Royal Oak, and William J. Enbank, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

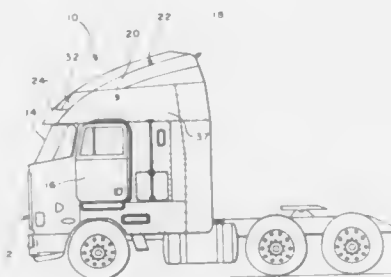
Filed Oct. 12, 1988, Ser. No. 256,447  
Int. Cl.<sup>5</sup> B60N 1/02  
U.S. Cl. 296—65.1 11 Claims



1. In a stowable seat assembly for a vehicle of the type having a horizontally positioned seat cushion, a seat back mounted on the seat cushion for pivotal movement about an axis between a substantially vertical position and a substantially horizontal stowing position and positioning linkage means having upper pivot means for pivotally mounting the positioning linkage means to the seat cushion and lower pivot means pivotally mounted with respect to the vehicle floor to permit movement of the seat cushion between a seating position elevated from the vehicle floor and a stowed position adjacent to the vehicle floor, a controller operative in response to pivotal movement of the seat back to prevent movement of the seat cushion from the seating position to the stowed position when the seat back is in the vertical position.

4,957,322  
AERODYNAMICALLY CONFIGURED CAB ROOF ASSEMBLY FOR A TRUCK  
Huston Marlowe, Orinda; Michikazu J. Tao, Castro Valley, and Virgil Pound, San Jose, all of Calif., assignors to Paccar Inc., Bellevue, Wash.

Filed Sep. 15, 1988, Ser. No. 244,797  
Int. Cl.<sup>5</sup> B62D 35/00  
U.S. Cl. 296—180.2 6 Claims

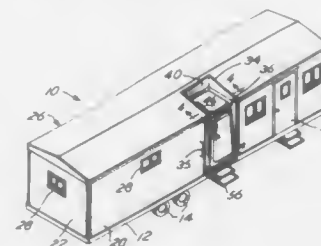


1. In a truck including a cab having a front windshield and opposite driver and passenger doors, the improvement comprising a cab roof and a separate and distinct roof fairing disengageably mounted on said cab roof so as to establish a front joint and opposite side joints between the two, said cab roof and roof fairing together presenting a combined front face which extends upward and rearward across said front joint in

a substantially smooth manner along the entire length of said front joint; said cab roof and roof fairing together presenting opposite combined side faces which extend generally vertically across said side joints in a substantially smooth manner along the entire length of each side joint, and including a sunvisor disengageably connected to and in front of said cab roof at a plurality of points and located over said front windshield so as to establish an equal plurality of substantially smooth joints between the sunvisor and roof.

4,957,323  
TRAILER WITH PORTABLE TOILET FACILITIES  
David H. Johnson, Nappanee, Ind., assignor to Commercial Structures, Inc., South Bend, Ind.

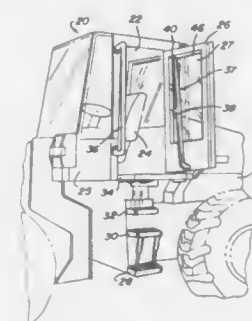
Filed Apr. 11, 1989, Ser. No. 336,467  
Int. Cl.<sup>5</sup> B60R 11/00  
U.S. Cl. 296—181 3 Claims



1. In combination, a trailer and a portable toilet facility, wherein said trailer includes an enclosed structure having side walls and a supporting floor carried by a frame, one of said side walls having a recess defined therein, said portable toilet facility removably positioned within said side wall recess and supported by a portion of said trailer floor under said side wall recess, wherein said trailer includes a roof, said recess extending through said roof.

4,957,324  
COMBINATION GUIDE RAIL DOOR HANDLE  
Robert D. Doescher, Bolingbrook, Ill., and James C. Skeel, Wausau, Wis., assignors to J.I. Case Company, Racine, Wis.

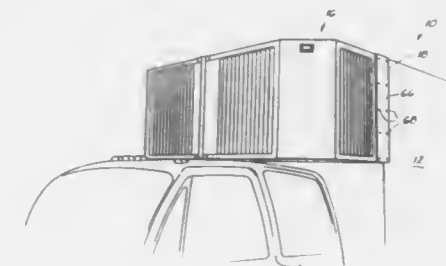
Filed Jul. 13, 1989, Ser. No. 379,296  
Int. Cl.<sup>5</sup> B60J 1/02  
U.S. Cl. 296—190 4 Claims



1. A vehicle comprising:  
a housing;  
an operator's cab area provided within said housing, said housing having a first face facing inwardly towards said cab area and a second face facing the outside environment;  
an opening through said housing leading into said cab area from the outside environment;  
a door pivotally mounted to said housing at one lateral side of the door opening for rotation about an axis at said

opening and having a first face facing into said cab area and a second face facing the outside environment, said door having a closed position blocking entry or exit of an operator between said cab area and the outside environment and being capable of pivotal movement to an open position of allow entry or exit between said cab area and the outside environment;  
a first guide rail generally vertically extending and fixedly mounted to said second face of said housing at the opposite lateral side of the door opening; and  
a second guide rail mounted to said first face of said door, said second guide rail being angled relative to said axis and angled relative to said first door face, said first and second guide rails aiding an operator in entry or exit between the cab and the outside environment.

4,957,325  
AERODYNAMICALLY ENHANCED AIR GRILL  
Thomas H. Engel, Rte. 1, Box 339B, Springhill, La. 71075  
Continuation-in-part of Ser. No. 140,475, Jan. 4, 1988, Pat. No. 4,840,442. This application May 31, 1989, Ser. No. 359,869  
Int. Cl.<sup>5</sup> B62D 35/00  
U.S. Cl. 296—180.2 18 Claims



1. An aerodynamically enhanced air grill mountable on an upper, forward portion of a vehicle comprising:  
a grill frame mounted on an upper, forwardly disposed portion of the vehicle, the grill frame having a forwardly disposed portion, a first side portion and a spatially disposed second side portion, the grill frame defining therein at least one opening in each of the forwardly disposed portion, the first side portion and the second side portion;  
an air intake grill mounted in the opening formed in the forwardly disposed portion of the grill frame, the air intake grill comprising an array of substantially vertically, spatially disposed first air foils for directing air flow toward the openings in the first and second side portions of the grill frame when air impacting the air intake grill is received therethrough;  
a first air discharge grill mounted in the opening formed in the first side portion of the grill frame, the first air discharge grill comprising an array of substantially vertically, spatially disposed second air foils adapted to deflect air passing therethrough rearwardly around an adjacently disposed first side of the vehicle; and  
a second air discharge grill mounted in the second opening formed in the second side portion of the grill frame, the second air discharge grill comprising an array of substantially vertically, spatially disposed third air foils adapted to deflect air passing therethrough rearwardly around an adjacently disposed second side of the vehicle.

4,957,326

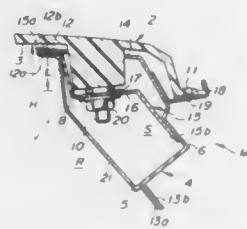
## ROOF PANEL MOUNTING STRUCTURE

Koji Chiba, Yokosuka, and Kensuke Uchida, Tokyo, both of Japan, assignors to Nissan Motor Co. Ltd., Yokohama, Japan  
Filed Oct. 11, 1989, Ser. No. 420,072

Claims priority, application Japan, Oct. 26, 1988, 63-270423  
Int. Cl.<sup>3</sup> B62D 25/06

U.S. Cl. 296-210

8 Claims



1. A roof panel mounting structure comprising:
  - a boss section projected from inner surface of a roof panel of a vehicle body;
  - a bolt fixedly inserted in said boss section;
  - a roof rail fixedly disposed under said roof panel and including inner and outer panels which are joined with each other to define a hollow;
  - means defining an opening in said outer panel, said boss section being disposed in said opening and projected into the hollow of said roof rail; and
  - a reinforcement member disposed in said roof rail and fixedly connected to at least one of said inner and outer panels of said roof rail, said bolt being fixedly secured to said reinforcement member.

4,957,327

## METHODS OF TRANSLATING A FACE SUPPORT

Harry Oppenländer, Wetter, and Heiko Druzela, Recklinghausen, both of Fed. Rep. of Germany, assignors to Klöckner-Becorit GmbH, Fed. Rep. of Germany  
Filed Jul. 19, 1989, Ser. No. 381,840

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824522

Int. Cl.<sup>3</sup> E21D 23/14

U.S. Cl. 299-11

4 Claims



1. A method of translating a face support comprising a plurality of support units initially arranged side-by-side at an initial position, the method comprising:
  - moving a first pair of alternately positioned support units a predetermined distance from the initial position;
  - moving a second pair of alternately positioned support units the predetermined distance from the initial position, one of said units of said second pair being positioned between said first pair; and
  - repeating the preceding moving steps until the entire plurality of support units is moved the predetermined distance from the initial position.

4,957,328

## HUB UNIT

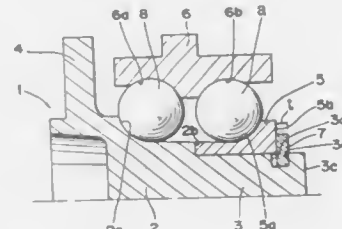
Takashi Tsutsui, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan  
Filed Mar. 15, 1989, Ser. No. 323,782

Claims priority, application Japan, Mar. 18, 1988, 63-37060[U]

Int. Cl.<sup>3</sup> B60B 27/00

U.S. Cl. 301-105 R

6 Claims



1. A hub unit comprising:
  - an outer ring member;
  - an inner ring member including a flange part to which a wheel is to be mounted, a large diameter part, a small diameter part which has an outer circumference channel extending circumferentially in an end thereof and a plurality of notches defined therein which open the outer circumference channel to an end surface of the small diameter part, and a shoulder defined between said large and said small diameter parts;
  - a sleeve disposed over the small diameter part of the inner ring member, one end of the sleeve contacting said shoulder, and the other end of said sleeve overhanging the outer circumference channel when said sleeve is disposed over said small diameter part with said one end thereof abutting said shoulder;
  - a plurality of rolling elements positioned at regular intervals between the inner circumferential surface of said outer ring member and the outer circumferential surface of said large diameter part of the inner ring member and between the inner circumferential surface of said outer ring member and the outer circumferential surface of said sleeve;
  - a ring-shaped bayonet member having a plurality of engaging parts which respectively project radially inwardly at positions corresponding to the positions of said notches defined in the inner ring member, each of said engaging parts having a tapered portion, each of said engaging parts being insertable through a respective one of said notches, said ring-shaped bayonet member having a portion thereof extending between, in a thickness-wise direction thereof, and contacting a surface of said inner ring member defining a side of said circumference channel and said other end of said sleeve,
  - said portion of the ring-shaped bayonet member including a portion of each of said engaging elements which contacts said surface of said ring member defining said side of said circumference channel, and
  - said portion of the ring-shaped bayonet member having a preassembly thickness greater than the difference between the distance from said shoulder to said surface of said inner ring member defining said side of said circumference channel and the distance from said shoulder to said other end of said sleeve, when said sleeve is disposed over said small diameter part prior to assembly of said bayonet member with said one end thereof abutting said shoulder, such that said bayonet member presses said sleeve against said shoulder and is in turn wedged between said sleeve and said surface defining said side of said circumference channel.

4,957,329

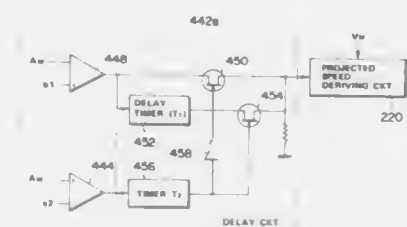
## MALFUNCTION PREVENTIVE ANTI-SKID BRAKE CONTROL SYSTEM FOR AUTOMOTIVE BRAKE SYSTEM

Toshiro Matsuda, Sagami, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Continuation of Ser. No. 886,759, Jul. 15, 1986, abandoned, which is a continuation of Ser. No. 673,200, Nov. 19, 1984, abandoned. This application Sep. 14, 1988, Ser. No. 244,655  
Claims priority, application Japan, Nov. 25, 1983, 58-220542  
Int. Cl.<sup>3</sup> B60T 8/02

U.S. Cl. 303-97

15 Claims



1. An anti-skid brake control system for an automotive brake system comprising:

- a hydraulic brake system including a wheel cylinder for applying braking pressure to a vehicle wheel, and a pressure control valve associated with said wheel cylinder for adjusting fluid pressure in said wheel cylinder, said pressure control valve being operative to increase fluid pressure in the wheel cylinder in a first position thereof, to hold the braking pressure at one of an increased or decreased level at a second position thereof, and to decrease the braking pressure at a third position thereof;
- a wheel speed sensor producing a wheel speed indicative signal having a value indicative of the wheel speed;
- a controller deriving a wheel acceleration and other brake control parameters on the basis of the wheel speed indicative signal value, said controller including first means for projecting a projected speed corresponding to a vehicle speed on the basis of said wheel speed indicative signal value at a timing at which wheel acceleration is decreased to a first threshold value, said controller selecting an operational mode of said pressure control valve on the basis of said control parameters including wheel acceleration and the projected speed derived by said first means to produce a control signal to operate said pressure control valve to one of said valve positions, and said controller further including second means for determining overrun of the wheel speed beyond the vehicle speed by comparing said wheel acceleration with a predetermined overrun threshold value, to cause a given delay in operation of said first means for deriving said projected speed after said timing at which the wheel acceleration decreases across said first threshold in a subsequent skid control cycle.

4,957,330

## BRAKING DEVICE HAVING AN AUTOMATIC FLUID PRESSURE REGULATING FUNCTION

Hirohiko Morikawa, Toyota; Hiroyoshi Kako, Nagoya; Noboru Noguchi, and Nobuyasu Nakanishi, both of Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan  
Filed Feb. 8, 1989, Ser. No. 307,481

Claims priority, application Japan, Feb. 27, 1988, 63-45423

Int. Cl.<sup>3</sup> B60T 8/64

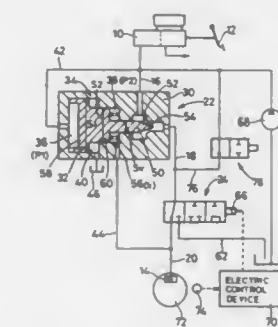
U.S. Cl. 303-115

16 Claims

1. A braking device having a function of automatically regulating a pressure of a fluid in a wheel cylinder for applying brake to a wheel of a vehicle, comprising:
  - a high-pressure hydraulic system including a hydraulic pres-

sure source, and a fluid passage connected to said hydraulic pressure source;

- a wheel-cylinder hydraulic system including said wheel cylinder, and a fluid passage connected to said wheel cylinder;
- a low-pressure hydraulic system including a reservoir and a fluid passage connected to said reservoir;
- a solenoid-operated directional control valve device for fluid communication of said wheel-cylinder hydraulic system selectively with said high-pressure hydraulic system or said low-pressure hydraulic system;



an electric control device connected to said directional control valve device for controlling the directional control valve device to thereby control the fluid pressure in said wheel cylinder; and

- a variable flow restrictor device disposed in said fluid passage of said high-pressure hydraulic system, for decreasing a rate of flow of the fluid through said fluid passage of the high-pressure hydraulic system, with an increase in a pressure difference between said high-pressure and wheel-cylinder hydraulic systems, and with an increase in a pressure in said wheel-cylinder hydraulic system.

4,957,331

## HYDRAULIC ANTI-SKID VEHICLE BRAKING SYSTEM

Robert T. Burton, Leamington Spa, and Phillip A. Taft, Solihull, both of Great Britain, assignors to Lucas Industries Public Limited Company, Birmingham, England

Continuation of Ser. No. 210,858, Jun. 24, 1988, abandoned.

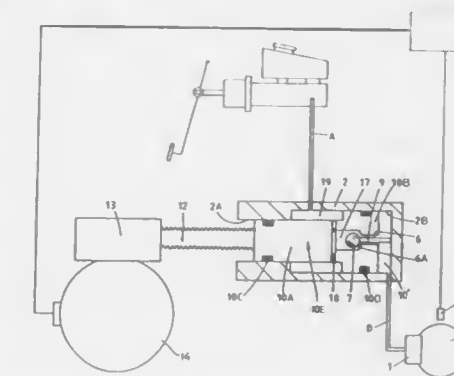
This application Jun. 15, 1989, Ser. No. 366,363

Claims priority, application United Kingdom, Jun. 27, 1987, 8715129

Int. Cl.<sup>3</sup> B60T 8/58, 8/46

U.S. Cl. 303-115

11 Claims



1. A hydraulic vehicle anti-skid braking system comprising:
  - a wheel brake actuator means;
  - a primary fluid pressure source;
  - fluid pressure conduit means connecting said primary fluid pressure source to said brake actuator means for operating



said brake actuator means by fluid pressure from said fluid pressure source;  
 skid sensing means for detecting an incipient skid condition of the wheel and emitting a signal in response thereto during running of the wheel;  
 modulator means operatively connected in said conduit means for controlling the application of fluid pressure from said fluid pressure source to said actuator, said modulator means comprising,  
 a modulator housing,  
 a cylinder in said housing having a larger diameter section and a smaller diameter section,  
 a piston operatively mounted in said cylinder for reciprocating movement, said piston having a larger diameter section and a smaller diameter section corresponding to said larger and smaller diameter sections of said cylinder, respectively,  
 a first variable volume chamber defined between one side of said piston and said cylinder, a part of said conduit means being connected between said first variable volume chamber and said brake actuator means,  
 a second chamber connected to said source of fluid pressure by another part of said conduit means and defined between a fixed end wall and cylindrical wall of said cylinder and the other side of said piston spaced from said fixed end wall, said piston having a first area subject to fluid pressure in said first chamber and a second area subject to fluid pressure in said second chamber, valve means operatively disposed between said fluid pressure source and said brake actuator means, and valve operating means responsive to operation of said stepper motor for operating said valve means between an open position and a closed position;  
 a stepper motor operatively connected to said sensing means for receiving said signal therefrom for operating said stepper motor thereby; and  
 a reversible screw thread mechanism operatively connected to said stepper motor for operation by rotation of said stepper motor, and operatively connected to said piston for reciprocating said piston to vary the volumes in said chambers so that movement of said piston outwardly of said first chamber increases the volume of said first chamber and thereby relieves fluid pressure on said brake actuating means, said stepper motor operates to return said piston to a normal operating position when no skid-condition is detected by said skid sensing means, and in the event of failure of said stepper motor when said valve means is in said closed position said piston is permitted by said reversible thread to move by pressure on said second area to open said valve means.

#### 4,957,332 TRACK WHEEL

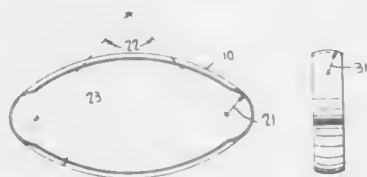
Joost Batelaan, Scarborough, Canada, assignor to National Research Council Canada/Conseil National de Recherches Canada, Ottawa, Canada

Filed May 4, 1989, Ser. No. 347,008

Claims priority, application Canada, May 5, 1988, 566076  
 Int. Cl.<sup>5</sup> B62D 55/18

U.S. Cl. 305—39

6 Claims



1. A self supporting track for mounting on a pair of load bearing rollers, said track comprising a continuous resilient

band having longitudinal curvature limiting means for resisting flattening beyond a predetermined maximum radius under load, but substantially free to bend to a smaller radius of curvature for passage around said rollers, said longitudinal curvature limiting means being defined by a preformed longitudinal and transverse curvature whereby the unmounted track defines two opposite large radius arc portions and two smaller radius arc portions, said large radius arc portions between the rollers defining an arc of between 15 to 120 degrees, in an unloaded condition.

#### 4,957,333 CABLE CARRYING METHOD AND APPARATUS FOR MODULAR COMPUTER CABINETS AND THE LIKE

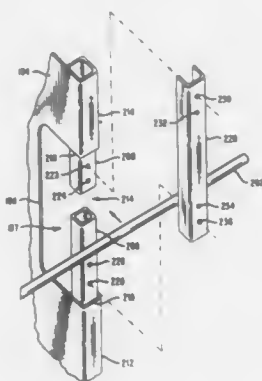
Sawyer C-Y. Hsu; Carlo V. Daleo, both of San Diego; Sidney L. Valentine, Poway; James Fratis, San Diego, and Robert W. Fischer, Jr., Lakeside, all of Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Jun. 23, 1989, Ser. No. 370,944

Int. Cl.<sup>5</sup> A47B 87/00

U.S. Cl. 312—108

8 Claims



1. A computer cabinet comprising:  
 a plurality of end walls, at least one of which has a notch at a first edge of said end wall, said notch for receiving interconnect cables which span through planes projected by said end walls;  
 a closure member corresponding to each said notch for closing said notch to prevent cable ingress or egress through said notch, but not preventing the extension of interconnect cables through said notch and through the projected planes of said end walls; and  
 structural members spanningly coupled to said first edges, but not completely covering said notch;  
 said closure members removably coupled to said structural members.

#### 4,957,334 INTERLOCK SYSTEM

Matthew L. Lakso, Westminister, Mass., assignor to Priority Mfg. Corp., Leominster, Mass.

Filed Nov. 1, 1988, Ser. No. 265,594

Int. Cl.<sup>5</sup> E05C 7/06

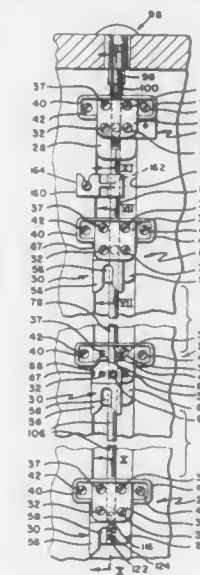
U.S. Cl. 312—221

13 Claims

1. An interlock system for a cabinet having a plurality of drawers which are each movable relative to the cabinet between an open position and a closed position, said locking system comprising:

- a latching module for each of said drawers which are arranged in a vertical series in the cabinet, each of said latching modules having:
  - a supporting base which is fixed to the cabinet,
  - a first passageway which has a first vertical axis and

which has an opening facing each adjacent latching module,  
 (3) a second passageway which intersects said first passageway and which has a second longitudinal axis which is transverse to said first longitudinal axis, said second passageway having an inner opening at said first passageway and an outer opening, and  
 (4) a first transmitter which is positioned in said second passageway for movement along said second axis, said first transmitter having a first end which has a first end surface at the inner opening of said second passageway and an opposite second end which has a second end surface at the outer opening of said second passageway, said first end surface being at an acute angle to said second axis and to said first axis,  
 (b) a plurality of vertical elongated second transmitters, each of said second transmitters having an upper end which is slidable in the first passageway of the upper one of two adjacent latching modules and a lower end which is slidable in the first passageway of the lower one of said two adjacent latching modules, said upper end having an upper end surface which is at an acute angle to said first axis and to the second axis of the upper one of said two adjacent latching modules, said lower end surface lying at the inner opening of the second passageway of the upper



one of said two adjacent latching modules, said lower end having a lower end surface which is at an acute angle to said first axis and to the second axis of the lower one of said two adjacent latching modules, said lower end surface lying at the inner opening of the second passageway of the lower one of said two adjacent latching modules,  
 (c) biasing means for urging said second transmitters upwardly and downwardly so that for each two adjacent second transmitters, the lower end of the upper of said two adjacent second transmitter abuts the upper end of the lower of said two adjacent second transmitters for yieldably maintaining the upper and lower end surfaces of the respective upper and lower second transmitters of said two adjacent second transmitters at the inner opening of the second passageway of the latching module within which said two adjacent second transmitters meet,  
 (d) an actuating lever for each of said latching modules which is pivotally mounted on the supporting base for movement between a non-actuating position and an actuating position, said actuating lever being effective to engage the second end of the corresponding first transmitter and to move the corresponding first transmitter along the second axis of its respective second passageway toward said first axis for engaging each top and bottom end surface which is at the inner opening of the latching module

and for displacing each second transmitter which corresponds to an end surface which is engaged by the first transmitter along said first axis toward the adjacent latching module into which said displaced second transmitter extends so that said displaced second transmitter blocks the inner opening of the second passageway of said adjacent latching module, thereby preventing the first transmitter of said adjacent latching module from moving toward said first axis and for preventing the corresponding actuating lever of said adjacent latching module from moving to its actuating position, and  
 (e) a transfer element for each drawer, each transfer element being fixed to its corresponding drawer, and being operatively connected to the actuating lever for its corresponding latching module for moving the corresponding actuating lever from its non-actuating position to its actuating position upon movement of the drawer from its closed position to its open position, provided that the corresponding actuating lever is not prevented from moving toward its actuating position, so that when one drawer of said cabinet is in the open position, the other drawers are prevented from being opened.

#### 4,957,335 MICROSPHERE-BASED RETROREFLECTIVE ARTICLES WITH ENHANCED RETROREFLECTIVE BRIGHTNESS

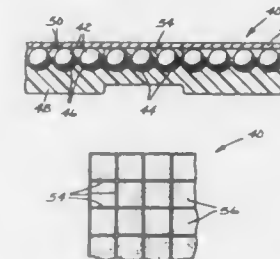
Clark G. Kuney, Jr., Hudson, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 26, 1989, Ser. No. 358,442

Int. Cl.<sup>5</sup> G02B 5/128, 5/136

U.S. Cl. 350—105

38 Claims



1. A microsphere-based retroreflective article comprising transparent microspheres having reflectors in optical association with the rear surfaces thereof, wherein said microspheres are air-incident, and have an average refractive index of at least about 1.915 and an average diameter of at least about 75 microns, said average refractive index and said average diameter also corresponding to the coordinates of a point within region D of FIG. 5, and wherein said microspheres have a diameter percent range of about 30 percent or less.

#### 4,957,336 LASER BEAM SCANNER AND ITS FABRICATING METHOD

Shin-ya Hasegawa, Machida; Masayuki Kato, Atsugi; Fumio Yamagishi, Ebina; Hiroyuki Ikeda, Yokohama, and Takefumi Inagaki, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 890,619, Jul. 30, 1986, abandoned. This application Nov. 10, 1988, Ser. No. 269,412

Claims priority, application Japan, Jul. 31, 1985, 60-168830; Jan. 25, 1986, 61-14445; Mar. 20, 1986, 61-60826; Mar. 20, 1986, 61-60833; Mar. 20, 1986, 61-60845; Mar. 20, 1986, 61-60846

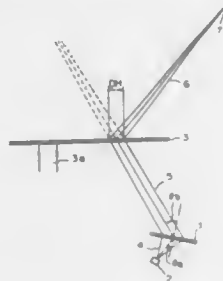
Int. Cl.<sup>5</sup> G02B 5/32, 26/10

U.S. Cl. 350—3.71

29 Claims

1. A laser beam scanner apparatus comprising:

- a beam source for generating a semiconductor laser beam having a first wavelength;
- a rotary hologram with variable spatial frequency for diffracting said semiconductor laser beam to form a scanning beam on a surface to be scanned;
- a light source and lens for generating a spherical object wave having an aberration and a second wavelength shorter than said first wavelength; and
- an aberration correcting stationary hologram formed on a stationary hologram substrate by construction beams having a wavelength shorter than a reconstruction beam, said aberration correcting stationary hologram being disposed between said beam source and said rotary hologram



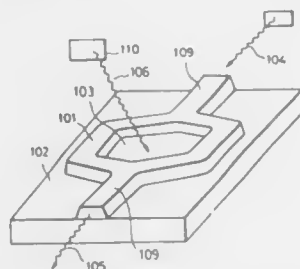
and said construction beam including the object wave, which is inclined at a non-vertical angle with respect to the stationary hologram substrate, and a reference wave which interfere on the stationary hologram substrate, so that the laser beam diffracted through said aberration correcting stationary hologram, in which a wave having a predetermined aberration is recorded, has a predetermined aberration by which an aberration of said scanning beam on the surface to be scanned shall be corrected, wherein said semiconductor laser beam diverged from said beam source irradiates said stationary hologram directly, and

wherein said reference wave is a spherical wave having a required aberration.

4,957,337

**OPTICAL QUANTUM INTERFERENCE DEVICE AND METHOD OF MODULATING LIGHT USING SAME**  
Kensuke Ogawa, Hachioji; Toshio Katsuyama, Ome, and Tadashi Fukuzawa, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 5, 1989, Ser. No. 348,216  
Claims priority, application Japan, May 6, 1988, 63-108993;  
May 25, 1988, 63-125711; Jul. 13, 1988, 63-172706  
Int. Cl.<sup>5</sup> G02B 6/10, 5/30; G01B 9/02; H01J 5/16  
U.S. Cl. 350—96.13 31 Claims



1. An optical quantum interference device comprising:  
a light source emitting light to be modulated;  
a waveguide region, having a first quantum state formed by an electron and other particle state, propagating the light to be modulated therethrough to couple with the first

quantum state forming a second quantum state and conserving therein the coherency of the second quantum state;  
means for interacting with the second quantum state to apply to said second quantum state a physical quantity to change a phase of a wavefunction of said second quantum state; and  
means for producing as an output a change in the phase of the wavefunction of said second quantum state caused by the interaction as a change in the intensity of the light subjected to the interaction thereby causing the light to be modulated.

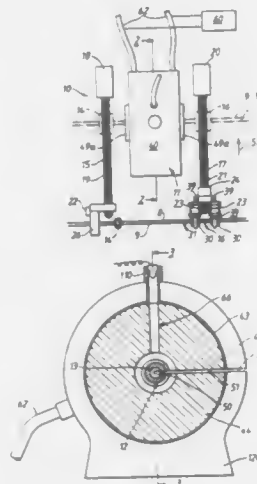
16. A method for modulating light in an optical quantum interference device comprising the steps of: receiving light to be modulated, shifting the phase of a wavefunction of the quantum state formed by the interaction of the light to be modulated and an electron to cause an interference of the quantum state, and detecting the interference as a change in the intensity of the modulated light.

4,957,338

**FABRICATION OF FIBRE OPTIC COMPONENTS**  
David A. Thorncraft, Isabella Plains; David R. Kennedy, Kam-bah; Scott C. Rashleigh, Wannassa, and Timothy P. Dabbe, Eastwood, all of Australia, assignors to The Commonwealth of Australia, Australia

PCT No. PCT/AU87/00380, § 371 Date Sep. 12, 1988, § 102(e)  
Date Sep. 12, 1988, PCT Pub. No. WO88/03661, PCT Pub. Date May 19, 1988  
PCT Filed Nov. 9, 1987, Ser. No. 259,118  
Claims priority, application Australia, Nov. 14, 1986, PH8981/86

Int. Cl.<sup>5</sup> G02B 6/26 17 Claims  
U.S. Cl. 350—96.15

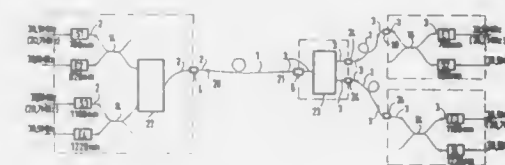


15. Apparatus for fabricating a fused fibre optic coupler, comprising:  
means for disposing two or more segments of optical fibre under longitudinal tension;  
means for heating said tensioned fibre segments;  
means for monitoring the longitudinal tension and temperature of each of said segments, directly or indirectly; and  
control means responsive to said monitoring means and controlling said heating means which control means is arranged whereby, when the tension in the segments falls to a predetermined threshold value, the heating means continues to raise the temperature of the segments a predetermined number of degrees above their temperature when their tension falls to said threshold value, to a temperature sufficient to cause the fibre segments to fuse together.

4,957,339

**OPTICAL COMMUNICATION SYSTEM, PARTICULARLY IN THE SUBSCRIBER AREA**  
Kurt Fussganger, Remseck, and Heinz G. Krimmel, Stuttgart, both of Fed. Rep. of Germany, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Jun. 7, 1989, Ser. No. 363,551  
Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819445  
Int. Cl.<sup>5</sup> G02B 6/26 15 Claims  
U.S. Cl. 350—96.15



12. Bidirectional optical communication system usable with short wavelength optical signals having predetermined wavelengths, said system comprising:

an optical waveguide transmission link comprising a waveguide having an associated cutoff wavelength above which only the fundamental mode of an optical signal can propagate, said cutoff wavelength being above said predetermined wavelengths,

a first optical transmitter disposed at a first end of the transmission link for transmitting a first said short wavelength optical signal having a first said predetermined wavelength,

a first optical receiver disposed at a second end of the transmission link for receiving said first optical signal,

a second optical transmitter disposed at the second end of the transmission link for transmitting a second said short wavelength optical signal having a second said predetermined wavelength different from said first predetermined wavelength,

a second optical receiver disposed at the first end of the transmission link for receiving said second optical signal, means for transmitting signals in a first direction from said first optical transmitter to said first optical receiver and in a second direction from said second optical transmitter to said second optical receiver using wavelength-division multiplexing, and

first and second mode filters respectively disposed at said first and second ends of the transmission link for attenuating higher-order modes other than said fundamental mode, each said mode filter comprising

four short wavelength waveguide sections each having an associated cutoff wavelength which is below said predetermined wavelengths, whereby each said short wavelength waveguide section functions as a single-mode optical waveguide at said predetermined wavelengths,

a fusion splice for permanently coupling a first end of a first said short wavelength waveguide section to said waveguide,

a wavelength-selective coupler for connecting a fourth said short wavelength waveguide section with said second and third said short wavelength waveguide sections, and

an optical connector for removably connecting a second end of the first section to an adjacent first end of the fourth section, whereby the transmission link may be removably connected to the optical transmitters and optical receivers disposed coupled to a particular end thereof,

wherein  
one transmitter-receiver pair has an operating wavelength different from that of the other transmitter-receiver pair, and  
any other optical connectors or optical couplers are lo-

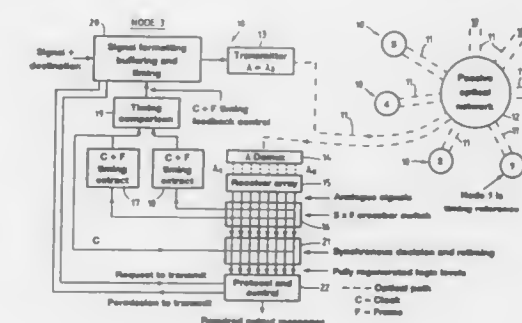
cated between short wavelength optical waveguide sections which have a cutoff wavelength below said predetermined wavelengths.

4,957,340

**SYNCHRONOUS MULTIFREQUENCY OPTICAL NETWORK**

Paul A. Kirkby, Old Harlow, Great Britain, assignor to STC PLC, London, England

Filed Nov. 6, 1989, Ser. No. 432,574  
Claims priority, application United Kingdom, Nov. 8, 1988, 8826156  
Int. Cl.<sup>5</sup> G02B 6/28; H04J 1/00, 3/00; G02F 1/00  
U.S. Cl. 350—96.16 9 Claims



1. A multi wavelength optical network comprising a plurality of nodes interconnected via a single common passive optical coupler wherein all signals transmitted over the network are synchronous at the coupler, each node receiving signals from all the nodes and each node including wavelength demultiplexing means.

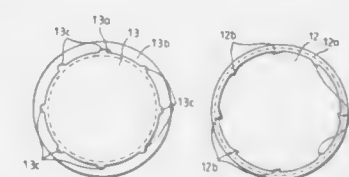
4,957,341

**INTEGRAL TYPE LENS**

Shinichi Hasegawa, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jun. 7, 1989, Ser. No. 363,580  
Claims priority, application Japan, Oct. 6, 1988, 63-130398[U]

Int. Cl.<sup>5</sup> G02B 7/02 6 Claims  
U.S. Cl. 350—254



1. An integral type lens composed of a first lens having a rim in the outer circumference thereof and a second lens disposed within the rim of this first lens and having an outside face which faces an inside face of said rim, said integral type lens comprising:

a plurality of guide projections positioned on one of said inside face and said outside face, each said guide projections having a slanting surface inclined with respect to a plane tangent to the said face on which said guide projections are positioned; and  
a plurality of contact pieces positioned on the other of said inner face and said outside face;  
said contact pieces engaging respective ones of said guide



projection slanting surfaces to conform the optical axes of said first and second lenses.

**4,957,342**  
**SINGLE-MODE OPTICAL FIBER ARRAY PACKAGE FOR OPTOELECTRONIC COMPONENTS**

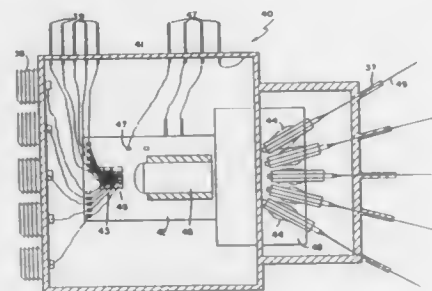
Robert A. Boudreau, Hampton, N.H., and William C. Rideout, Townsend, Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Continuation-in-part of Ser. No. 439,761, Nov. 20, 1989. This application Nov. 30, 1989, Ser. No. 444,500

Int. Cl.<sup>3</sup> G02B 6/32, 6/36

U.S. Cl. 350—96.18

49 Claims



1. A package for an optoelectronic array device having an array of optoelectronic active elements enclosed in a housing and secured to a substrate carrier having a solderable surface within said housing, said active elements optically coupled to an array of tapered single-mode optical fibers connecting said optoelectronic array device to an external device, comprising:

- a graded index lens, having a numerical aperture sufficient to access optically said active elements and having a curvature on one end closest to said optoelectronic array, secured to said substrate a fixed distance from said optoelectronic array of active elements to yield an appropriate magnification of the light beams emanating from said active elements; and
- said array of tapered single-mode optical fibers extending from within said housing to the exterior of said housing through a port thereof, said optical fibers being positioned by active alignment and secured to said substrate such that the tapered end of each of said optical fibers is optically coupled through said lens to a respective one of said active elements of said optoelectronic array and the opposite end of said optical fiber is outside said housing, and such that each optical fiber is spatially aligned at its tapered end to a respective one of the magnified light beams.

**4,957,343**  
**METHOD FOR SPLICING OPTICAL FIBERS HAVING A PLASTIC CLAD LAYER AND AN OPTICAL FIBER SUITED FOR CARRYING OUT THE METHOD**

Tsuguo Sato, and Kenichi Komura, both of Tokyo, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Oct. 30, 1989, Ser. No. 428,880

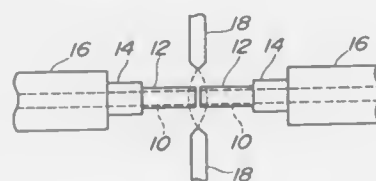
Int. Cl.<sup>3</sup> G02B 6/38, 6/02

U.S. Cl. 350—96.21

18 Claims

- 1. A method for splicing optical fibers having a clad layer made of a plastic material, comprising the steps of:
  - (a) preparing an optical fiber having a clad layer and a sheath coated in sequence around a core thereof, said clad layer being made of such a resin that a residuum thereof after pyrolysis due to a thermogravimetric analysis is smaller than a predetermined amount;
  - (b) removing the sheath at an end portion of the optical fiber, to expose the clad layer, and treating the end face of the core at the end portion of the optical fiber;
  - (c) aligning axes of two optical fibers, end portions of which

have been treated in said step (b), such that the treated end faces of the cores of the two optical fibers are opposed and close to each other; and



- (d) heating said end portions of the two optical fibers by electrical discharge, to remove the exposed clad layer by pyrolysis and fusion bond the opposed end faces of the cores to each other.

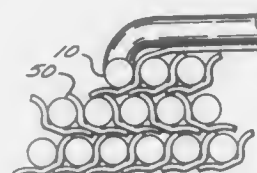
**4,957,344**  
**OPTICAL FIBER TAPE ASSEMBLY AND CANISTER**  
Ronald B. Chesler, Woodland Hills, Calif., and George W. LeCompte, Tucson, Ariz., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 18, 1989, Ser. No. 339,754

Int. Cl.<sup>3</sup> G02B 6/44; B65H 75/20, 18/28, 55/04

U.S. Cl. 350—96.23

15 Claims



- 1. An improved optical fiber assembly for selectively winding, storing and unwinding an optical fiber, comprising:
  - an optical fiber windable into a plurality of side-by-side turns; and
  - flexible support means joined to said optical fiber and extendable between side-by-side turns for contacting and maintaining said turns in side-by-side relationship during storage and unwinding of said optical fiber.

**4,957,345**  
**LIGHT ENERGY TRANSMITTING OPTICAL FIBER CABLE**

Yoichi Sakuma, Kawasaki, and Chieko Umezawa, Yokohama, both of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed Sep. 8, 1989, Ser. No. 404,632

Claims priority, application Japan, Sep. 30, 1988, 63-127089[U]; Apr. 27, 1989, 1-48847[U]

Int. Cl.<sup>3</sup> G02B 6/44

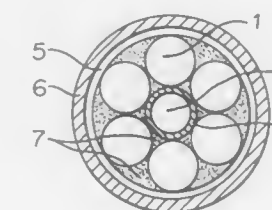
U.S. Cl. 350—96.23

7 Claims

- 1. A light energy transmitting optical fiber cable, comprising in its cross-sectional structure, a high tensile strength wire coated with a fire-retardant resin, as a core material, at least one resin-clad glass core optical fiber disposed around the core

material, a highly heat conductive material covering the optical fibers, and a fire-retardant resin covering the heat conductive

a cylindrical, flexible polymeric core having a relatively high refractive index;  
a tubular, flexible, cladding surrounding the core; and



means for establishing a relatively narrow and substantially uniform gap containing air between the outer periphery of the core and the inner periphery of the cladding.

tive material so that cable has high fire-retardant characteristics.

**4,957,346**  
**ILLUMINATION SYSTEM FOR PORTABLE COLOR IMAGER BORESCOPE**

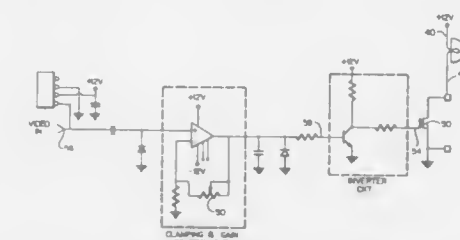
Robert J. Wood; Earl H. Slee, both of Syracuse; Gregory E. Pasik, Auburn, and Michael J. Pileski, Warners, all of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Oct. 6, 1989, Ser. No. 417,555

Int. Cl.<sup>3</sup> G02B 23/26

U.S. Cl. 350—96.26

9 Claims



- 1. In a borescope/endoscope of the type having an elongated insertion tube with a solid state image sensor in a viewing head at the distal end, a fiber optic cable extending from the distal end to the proximal end, and a control processor module at the proximal end, illumination means comprising:

lamp means operatively positioned adjacent the proximal end of the fiber optic cable for transmitting light there-through to the object to be viewed;  
a source of operating voltage for energizing said lamp means;  
control circuit means connected between said lamp means and said operating voltage source;  
video signal transmitting means connected between the viewing head and said control circuit means;  
said control circuit means being arranged to connect and disconnect said operating voltage and said lamp means at a video frequency rate in accordance with the video signal picked up by said viewing head;  
so that as the video signal decreases, the lamp is energized longer and vice-versa.

**4,957,347**  
**CLAD OPTICAL CONDUIT AND METHOD OF MANUFACTURE**  
Jamshid Zarian, Woodland Hills, Calif., assignor to Lumenyte International Corporation, Chatsworth, Calif.

Filed Jan. 30, 1989, Ser. No. 304,417

Int. Cl.<sup>3</sup> G02B 6/20

U.S. Cl. 350—96.32

11 Claims

- 1. A flexible, clad monofilament conduit comprising:

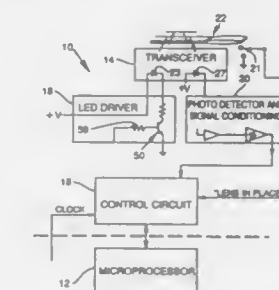
**4,957,348**  
**OPTICAL TRANSCIVER WITH MULTIPLE COMMUNICATION MODES**  
Gregory J. May, Corvallis, Oreg., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 21, 1989, Ser. No. 327,229

Int. Cl.<sup>3</sup> G02B 27/00

U.S. Cl. 350—321

12 Claims



- 12. An apparatus, comprising:
  - a computing device;
  - an optical transceiver mounted to the computing device;
  - focusing means mounted to the computing device for adjusting the focal distance of the optical transceiver;
  - processing means arranged within the computing device for implementing a plurality of communication modes of the optical transceiver, said processing means selecting a communication mode corresponding to the focal distance adjusted for by the focusing means; and
  - control circuit means arranged within the computing device to be coupled to the optical transceiver and the processing means for transmitting data therebetween, said control circuit means enabling the optical transceiver in a first communication mode to read bar codes and transmit the read bar code data to said processing means and enabling the optical transceiver in a second communication mode to communicate data with modulated light and transmit the data to and receive the data from the processing means.

1. A retrofocus type lens system comprising, in the order named from an object side:

- a first lens group having a negative refracting power; and
- a second lens group having a positive refracting power, said second lens group being constituted by a front group having a positive refracting power and a rear group which has a positive refracting power and is movable along an optical axis to perform focusing;
- said rear group having an aspherical surface, said aspherical

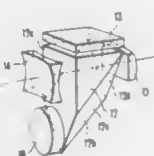


surface having a shape in which a negative surface refracting power is increased from a lens vertex to a periphery thereof, so that said aspherical surface corrects variations in coma and curvature of field when said rear group is moved to perform close distance focusing, said negative surface refracting power being defined as a difference between an incident angle and an exit angle of an arbitrary ray incident on an arbitrary point of a refracting surface.

**4,957,356**  
**FINDER DEVICE**  
Koichi Oizumi, and Takashi Matsushita, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Apr. 12, 1988, Ser. No. 180,451  
Claims priority, application Japan, Apr. 20, 1987, 62-097188; Apr. 20, 1987, 62-059644[U]; Apr. 20, 1987, 62-059645[U]; Aug. 21, 1987, 62-208610; Aug. 21, 1987, 62-127880[U]; Aug. 21, 1987, 62-127881[U]; Aug. 21, 1987, 62-127882[U]; Aug. 21, 1987, 62-127883[U]

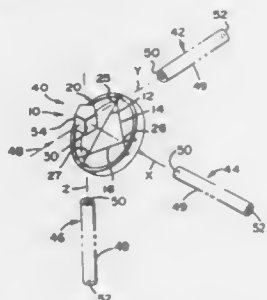
Int. Cl.<sup>3</sup> G02B 17/00

U.S. Cl. 350—574



1. A finder device comprising:  
a first lens means for waist level viewing having a positive refractive power;  
a second lens means for eye level viewing; and  
a prismatic unit having roof faces with a crest line formed therebetween for reflecting a first light beam passed through said first lens means, and a region permitting a second light beam passed through said second lens means to transmit thereacross.

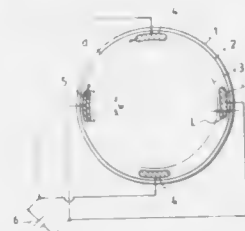
**4,957,357**  
**MULTIPLE AXIS RETICLE**  
Chris E. Baras, Mt. View, and William D. Gunter, San Jose, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.  
Filed Oct. 6, 1989, Ser. No. 418,374  
Int. Cl.<sup>3</sup> G02B 23/00; F41G 11/00  
U.S. Cl. 350—576



1. A three-axis reticle comprising a frame having an axis, three straight filaments supported by said frame, each filament occupying a different orthogonal plane, and said filaments arranged to form, as viewed along the frame axis, a triangle with a V extending from each triangle vertex.

**4,957,358**  
**ANTIFOGGING FILM AND OPTICAL ELEMENT USING THE SAME**  
Junji Terada, Tokyo, and Takeshi Sekiguchi, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Jan. 17, 1989, Ser. No. 297,349  
Claims priority, application Japan, Jan. 19, 1988, 63-008665; Jan. 26, 1988, 63-016201; Jan. 26, 1988, 63-016203  
Int. Cl.<sup>3</sup> G02B 1/10  
U.S. Cl. 350—588

6 Claims



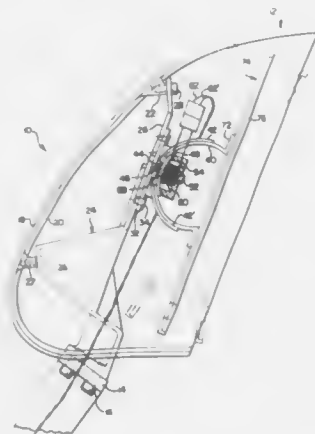
4. A photographing device for preventing a photographing lens having a plurality of lenses with optical power from fogging, comprising:  
a transparent electrically conductive film provided on a circular area of a surface of one of said lenses;  
at least a pair of electrodes provided along the edge of said circular area, wherein the following condition is satisfied:

$$1/10 \cdot R \leq \omega \leq \pi \cdot R$$

where  $R$  is a radius of said circular area,  $\omega$  is the arcuate length of each electrode, and  $d$  is a distance between the electrodes;  
a dielectric substance layer provided on said circular area for constituting a reflection preventing film; and  
means for supplying an electric current to said a pair of electrodes.

**4,957,359**  
**SPRING BIASED-MIRROR ASSEMBLY WITH ELECTROMAGNETIC RELEASE MEANS**  
James W. Kruse, New Haven, and Donald E. Riley, Ft. Wayne, both of Ind., assignors to Navistar International Transportation Corp., Chicago, Ill.  
Filed Apr. 19, 1989, Ser. No. 340,327  
Int. Cl.<sup>3</sup> B60R 1/06; G02B 5/08  
U.S. Cl. 350—637

11 Claims

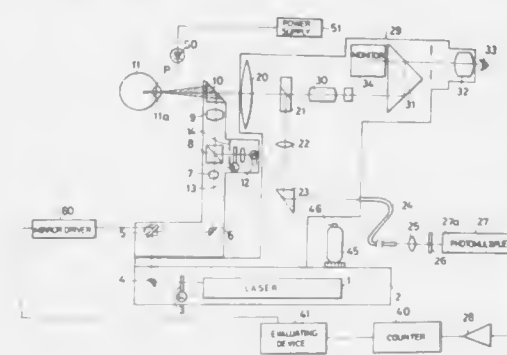


1. A mirror assembly comprising a housing opening at one end thereof, a support structure within said housing, a mirror

disposed within said housing, said mirror having a reflective surface facing outwardly of said housing, mounting means within said housing for mounting said mirror to said support structure, means fixing the orientation of said mirror, adjusting means secured between said support structure and said mirror for selectively changing the orientation of said mirror, said mounting means including a pair of nested arcuate elements arranged for movement one relative to the other, said mirror being mounted on one of said nested arcuate elements, said fixing means comprising resiliently biased clamping means arranged for immobilizing said pair of nested arcuate elements, said clamping means including a clamping element and resilient biasing means arranged to bear against said clamping element, and said adjusting means comprising an electromagnet operatively engaging said resilient biasing means, a source of electrical power, and switch means between said electromagnet and said source of electrical power for selectively energizing and deenergizing said electromagnet, said electromagnet when energized reducing the clamping force normally effected by said resilient biasing means between said nested arcuate elements an amount sufficient to permit limited movement of one of nested arcuate elements to enable change in the orientation of said mirror and when deenergized maintaining said mirror in an effectively locked orientation.

**4,957,360**  
**OPHTHALMIC DISEASE DETECTION APPARATUS**  
Koichiro Kakizawa, Okazaki, and Tadashi Ichihashi, Hino, both of Japan, assignors to Kowa Company Ltd., Japan  
Continuation of Ser. No. 926,650, Nov. 3, 1986, abandoned. This application Apr. 14, 1989, Ser. No. 338,466  
Claims priority, application Japan, Nov. 21, 1985, 60-259772  
Int. Cl.<sup>3</sup> A61B 3/10  
U.S. Cl. 351—221

6 Claims

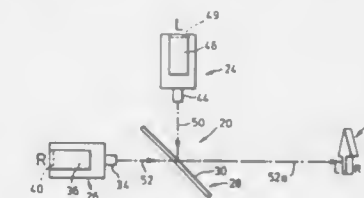


1. An apparatus for detecting ophthalmic diseases in the camera oculi of a patient's eye which contains protein due to inflammation, comprising:  
a laser source for producing a laser beam;  
means for focussing the laser beam at a selected spot in the camera oculi of the patient's eye such that the focussed laser beam is scattered by the protein in the camera oculi during a predetermined measurement interval and including means for scanning the laser beam to displace the selected spot within the camera oculi during said measurement interval;  
photoelectric converting means for receiving the light scattered from the camera oculi and operative to convert the scattered light into corresponding electric pulses when the intensity of the received scattered light is greater than a predetermined value;  
counting means for counting the number of electric pulses produced by the photoelectric converting means to thereby measure the intensity of the scattered light; and  
means for calculating the protein concentration due to the

inflammation in the camera oculi of the eye according to the measured intensity of the scattered light.

**4,957,361**  
**METHOD OF PRODUCING AND DISPLAYING A 3-D MOTION PICTURE**  
William C. Shaw, Streetsville, Canada, assignor to Imax Systems Corporation, Toronto, Canada  
Continuation of Ser. No. 32,273, Mar. 31, 1987, abandoned. This application Jun. 22, 1988, Ser. No. 209,732  
Int. Cl.<sup>3</sup> G03B 35/00  
U.S. Cl. 352—59

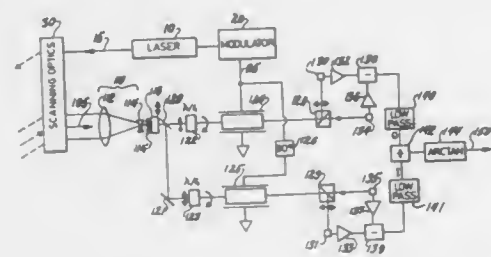
4 Claims



1. A method of producing and displaying a 3-D motion picture, which method comprises the steps of:  
(a) providing a camera rig that includes first and second motion picture cameras each having a lens defining an optical axis, and a semi-transparent mirror;  
(b) positioning the cameras and mirror in a relationship with respect to one another such that, with the rig in a datum position, the first camera is arranged with its said optical axis horizontal for recording images of a subject through the mirror along a first axis coincident with its said optical axis, the said second camera is arranged with its optical axis at a 90° angle to the optical axis of the first camera, and the mirror is disposed at the intersection of said optical axes in a plane that bisects said 90° angle and permits the second camera to record images of the same subject along as second axis that is reflected by the mirror to be coincident with said optical axis of the second camera, said first and second axes being generally parallel to and spaced from one another by a defined distance and in a common horizontal plane, whereby one of the cameras receives "left eye" images of the subject and the other camera receives "right eye" images;  
(c) making two master film negatives by exposing respective films in said cameras to subjects intended to appear in the motion picture and developing the films;  
(d) making respective prints from said master film negatives;  
(e) projecting respective left and right eye images from the two prints to provide 3-D images on a screen; and  
(f) optically coding the left and right eye images and providing a viewer with optical decoding means for ensuring that left eye images are presented to the viewer's left eye only and that right eye images are presented to the viewer's right eye only;  
the improvement comprising the combination of:  
(i) in step (b), positioning said second camera with its said optical axis vertical, and providing that said first and second cameras are of a type in which film travels generally horizontally through the camera in said datum position of the rig such that an erect subject is recorded on said film in said first camera as a series of parallel inverted images and, on said film in said second camera, as a series of images that are similar to the images on the film in the first camera, but turned laterally of the film as a result of being reflected in said mirror, said images extending transversely of the film in each camera;  
(ii) in step (d) making said prints from both of said master film negatives by contact printing; and  
(iii) prior to projecting said images in step (e), positioning the contact print made from the master film negative from the

first camera in a normal orientation for projection, and turning the contact print made from the master film negative from the second camera face for face about a longitudinal axis of the print, so that images on said print are turned laterally of the print as compared with the images as recorded during photography, whereby the images on the two prints are brought into corresponding orientations for projection.

**4,957,362**  
**METHOD AND APPARATUS FOR ELECTRO-OPTICAL PHASE DETECTION**  
Laura M. Peterson, Ann Arbor, Mich., assignor to Environmental Research Institute of Michigan, Ann Arbor, Mich.  
Filed Sep. 8, 1989, Ser. No. 404,847  
Int. Cl.<sup>5</sup> G01C 3/08; H04B 9/00; G02B 6/10  
U.S. Cl. 356—5 19 Claims

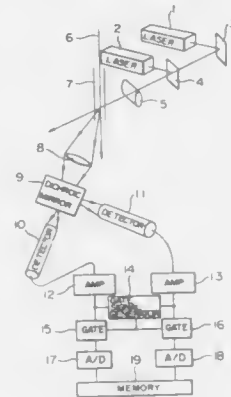


1. A method for detecting the phase difference between a reference RF signal and the modulation of a received optical beam comprising:  
modulating said received optical beam by the reference RF signal thereby producing an RF modulated first optical beam;  
detecting the first difference cross modulation in said RF modulated first optical beam between the modulation of the received optical beam and said modulation by the reference RF signal;  
generating a phase shift reference RF signal having a ninety degree phase shift from the reference RF signal;  
modulating said received optical beam by the phase shift reference RF signal thereby producing an RF modulated second optical beam;  
detecting the second difference cross modulation in said RF modulated second optical beam between the modulation of the received optical beam and said modulation by the phase shift reference RF signal;  
dividing the second difference cross modulation of said RF modulated second optical beam by the first difference cross modulation of said RF modulated first optical beam, said quotient being proportional to tangent of the phase difference to be detected.

**4,957,363**  
**APPARATUS FOR MEASURING CHARACTERISTICS OF PARTICLES IN FLUID BY DETECTING LIGHT SCATTERED AT THE PARTICLES**  
Kazuo Takeda, Kokubunji, and Yoshitoshi Ito, Ome, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Jul. 1, 1988, Ser. No. 214,515  
Claims priority, application Japan, Jul. 3, 1987, 62-165176  
Int. Cl.<sup>5</sup> G01N 15/14, 21/53  
U.S. Cl. 356—73 5 Claims

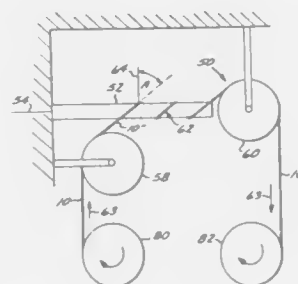
1. A particle measurement apparatus comprising:  
means for generating laser lights having wavelengths which are different from each other;  
a flow cell through which a fluid sample including particles flows;

focusing means for collecting said laser lights and for irradiating said fluid sample therewith;  
monochromator means for wavelength-separating scattered light from said particles;  
a plurality of detector means for detecting the wavelength-separated scattered light from said monochromator means; and



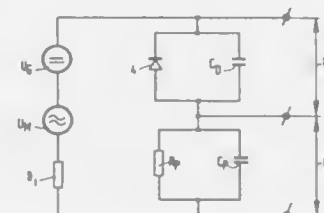
measuring means for extracting output pulse signals of said plurality of detector means which are indicative of said particles and which are coincident with each other in timing of detection so as to enable measurement of the number, size and refractive index of said particles by use of said extracted output pulse signals of said plurality of detector means.

**4,957,364**  
**HELICAL BEND PROOF TESTING OF OPTICAL FIBERS**  
Ronald B. Chesler, Woodland Hills, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
Filed Apr. 18, 1989, Ser. No. 339,845  
Int. Cl.<sup>5</sup> G01N 21/88  
U.S. Cl. 356—73.1 18 Claims



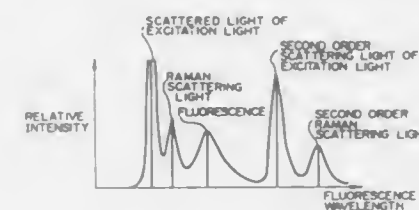
1. Apparatus for proof testing optical fibers, comprising:  
a cylindrical mandrel;  
a first guide disposed for directing an optical fiber tangential to the mandrel, the first guide being positioned at a first location along the cylindrical axis of the mandrel; and  
a second guide disposed for directing the optical fiber away from the mandrel, the second guide being positioned at a second location along the cylindrical axis of the mandrel.

**4,957,365**  
**OPTICAL METER WITH DUAL FUNCTIONS AVALANCHE PHOTODIODE**  
Ernst Brinkmeyer, Buchholz, Fed. Rep. of Germany, assignor to U.S. Philips Corp., New York, N.Y.  
Filed Dec. 12, 1988, Ser. No. 283,413  
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743678  
Int. Cl.<sup>5</sup> G01N 21/88; G01C 3/08  
U.S. Cl. 356—73.1 20 Claims



1. An optical backscattering meter arrangement comprising:  
an optical transmitter/whose transmission power is modulated (swept) with a variable frequency via an oscillator and whose transmission beam is applied to a light wave cable (LWL) via a beam splitter, an avalanche photodiode optical receiver, to which optical receiver are applied, via the beam splitter, portions of the transmission beam that are scattered back from the light wave cable (LWL), wherein a mixing signal is formed in the optical receiver from a signal proportional to the optical backscattering power and a modulation voltage having the oscillator frequency, means for evaluating said mixing signal for determining the location of the backscattering and the intensity of the backscattering, means for applying to the avalanche photodiode a bias voltage including a d.c. voltage ( $U_G$ ) modulated by the modulation voltage ( $U_M$ ), and wherein the mixing signal ( $U_p$ ) is tapped at a parallel circuit comprising an ohmic resistor ( $R_p$ ) and a capacitor ( $C_p$ ) inserted in an energizing circuit of the photodiode.

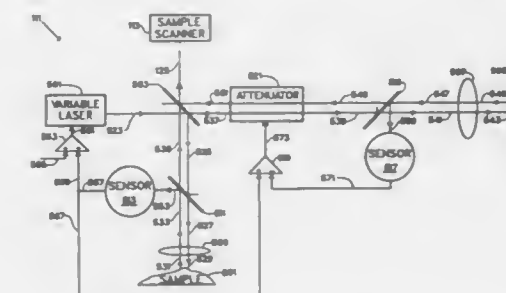
**4,957,366**  
**FLUORESCENCE SPECTROPHOTOMETER AND WAVELENGTH SETTING METHOD THEREFOR**  
Hiroyuki Koshi, Minoru Owada, both of Katsuta; Hisako Minegishi, Mito, and Takayuki Ono, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Feb. 22, 1989, Ser. No. 313,440  
Claims priority, application Japan, Feb. 24, 1988, 63-39417  
Int. Cl.<sup>5</sup> G01N 21/64  
U.S. Cl. 356—318 11 Claims



1. A fluorescence spectrophotometer comprising:  
a light source;  
an excitation side spectroscopy for separating light emitted by said light source in wavelength and projecting excitation light having a specified wavelength on a sample;  
a fluorescence side spectroscopy for separating fluorescence emitted by said sample in wavelength;  
a detector for detecting light emitted by said fluorescence side spectroscopy;  
means for storing a first spectrum, when either one of said

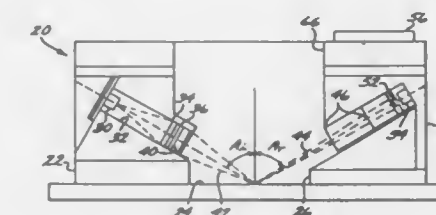
spectroscopes is fixed to an arbitrary wavelength and the wavelength of the other is scanned;  
means for storing a second spectrum, when said one of the spectroscopes is fixed to another wavelength, which is different from said arbitrary wavelength, and the wavelength of the other is scanned; and  
means for comparing said first spectrum with said second spectrum and setting said excitation or fluorescence side wavelength for the wavelength when corresponding peaks in the two spectra are approximately in accordance with each other.

**4,957,367**  
**INTERFEROMETRIC IMAGING SYSTEM**  
Lev Dulman, 2366 33rd Ave., San Francisco, Calif. 94116  
Filed May 31, 1988, Ser. No. 200,574  
Int. Cl.<sup>5</sup> G01B 9/02  
U.S. Cl. 356—359 12 Claims



7. A method of comprising the steps of:  
obtaining an interferometric image to produce a sample scan;  
converting said sample scan to a sample signal;  
generating a comparison signal corresponding to a scan of an interferometric image for said sample object;  
monitoring the position on said sample object corresponding to the current value of said comparison signal; and  
storing the position of said sample object corresponding to the current value of said sample signal and said exemplar signal so as to identify the location of possible discrepancies between said sample object and said exemplar.

**4,957,368**  
**APPARATUS AND PROCESS FOR PERFORMING ELLIPSO-METRIC MEASUREMENTS OF SURFACES**  
Tennyson Smith, Orem, Utah, assignor to Photoacoustic Technology, Inc., Westlake Village, Calif.  
Filed Mar. 16, 1989, Ser. No. 324,449  
Int. Cl.<sup>5</sup> G01J 4/00  
U.S. Cl. 356—369 16 Claims

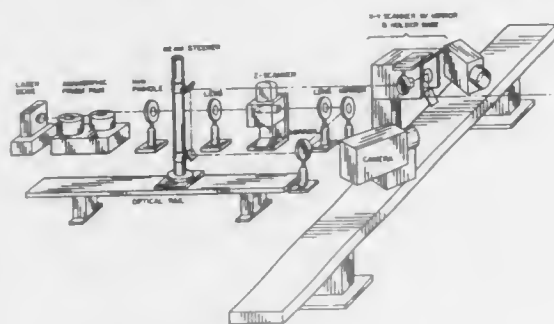


12. Surface measurement apparatus for determining the properties of a surface, comprising:  
means for measuring the properties of the surface by an ellipsometric measurement, the means including at least one pair of ellipsometric sensors, the sensors of each pair



having no moving parts and operating at the same light wavelength and angle of incidence, the sensors of each pair differing in that one sensor has a quarter wave plate in the optical path and the other sensor has no quarter wave plate in the optical path.

**4,957,369**  
**APPARATUS FOR MEASURING THREE-DIMENSIONAL SURFACE GEOMETRIES**  
 Erik K. Antonsson, Pasadena, Calif., assignor to California Institute of Technology, Pasadena, Calif.  
 Filed Jan. 23, 1989, Ser. No. 298,931  
 Int. Cl.<sup>3</sup> G01B 11/24  
 U.S. Cl. 356—376 19 Claims

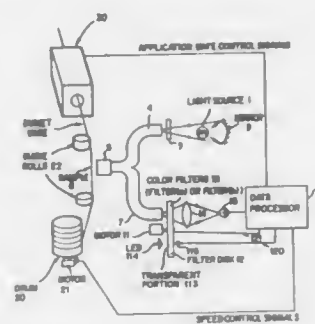


1. A three-dimensional measurement apparatus for accurately determining the precise geometric shape of an object; the apparatus comprising:  
 a source of radiation;  
 means for focusing a spot of said radiation onto said object;  
 means for scanning said focussed spot of radiation over the surface of said object;  
 a pair of detectors positioned relative to said object for receiving radiation reflected from said focussed spot on said object, each said detector providing electrical signals representing the instantaneous two-dimensional coordinates of said spot of radiation as received by each said detector;  
 means for calculating the three-dimensional coordinates of said spot of radiation on said object from said electrical signals provided by said detectors; and  
 said focussing means comprising a Z-axis optical scanner having a focal length that is continuously variable over a pre-selected range and driving means for varying said focal length within said range.

**4,957,370**  
**METHOD AND APPARATUS FOR DETERMINING THE DEGREE OF OXIDATION OF AN OXIDE COATING**  
 Mamoru Tominaga, Kawagoe; Leo Mori, and Junetsu Akiyama, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan  
 Continuation of Ser. No. 282,863, Dec. 9, 1988, abandoned, which is a continuation of Ser. No. 112,060, Oct. 26, 1987, abandoned, which is a continuation of Ser. No. 748,305, Jun. 20, 1985, abandoned. This application Sep. 6, 1989, Ser. No. 404,050  
 Claims priority, application Japan, Jun. 21, 1984, 59-127843  
 Int. Cl.<sup>3</sup> G01B 11/02 24 Claims

1. An apparatus for determining the thickness of a layer of copper oxide on an object comprising:  
 illumination means producing a light having a known spectral distribution;  
 illuminating light guide means for directing said light from said illumination means onto said object;  
 reflecting light guide means for directing reflections of said light from said object to a first area;  
 filter means mounted in said first area for filtering said re-

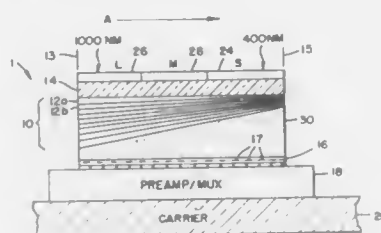
flected light received from said reflecting light guide means into two wavelength zones;  
 determining means for receiving said reflected light filtered by said filter means and for measuring the quantities of said reflected light in said two wavelength zones; and



calculating means for calculating a value representing a relationship of said reflected light quantities, and for thereby determining the thickness of said copper oxide layer on said object from a predetermined correspondence between copper oxide thicknesses and values for said relationship.

**4,957,371**  
**WEDGE-FILTER SPECTROMETER**  
 Samuel F. Pellicori, and Aram M. Mika, both of Santa Barbara, Calif., assignors to Santa Barbara Research Center, Goleta, Calif.  
 Filed Dec. 11, 1987, Ser. No. 132,227  
 Int. Cl.<sup>3</sup> G01J 3/12, 3/50 21 Claims

U.S. Cl. 356—419



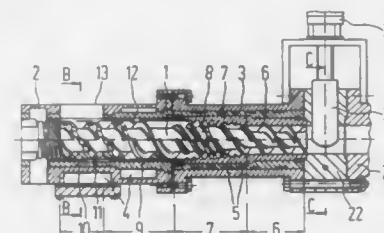
1. A wedge-filter spectrometer comprising:  
 means for spectrally dispersing an incident radiation beam, said dispersing means comprising a first plurality of layers of high (H) index of refraction material and a second plurality of layers of low (L) index of refraction material, individual ones of said H and said L layers overlying one another in a given sequence

H LL HLHLHL HH LHLHLH LL HL

each of said H and said L layers having a substantially linearly tapered thickness of substantially constant slope, said layers HH being a spacer layer having a predetermined thickness for defining a passband, the thickness being substantially equal to a length associated with a number of whole wavelengths that evenly fit within the thickness of said spacer layer; and means, optically coupled to said dispersing means, for detecting at a plurality of points within a two-dimensional area a spectrally dispersed radiation beam, the radiation beam being spectrally dispersed by said H and said L layers.

**4,957,372**  
**MEANS FOR IMPROVING THE UNIFORMITY-PERFORMANCE OF COLD FEED RUBBER-EXTRUDERS**  
 Paul Meyer, Locarno-Muralto, Switzerland, assignor to Frenkel C-D Aktiengesellschaft, Vaduz, Liechtenstein  
 Continuation of Ser. No. 331,808, Apr. 3, 1989, abandoned. This application Aug. 29, 1989, Ser. No. 401,472  
 Claims priority, application United Kingdom, Apr. 7, 1988, 8808107

U.S. Cl. 366—76 Int. Cl.<sup>3</sup> B28C 1/16 20 Claims



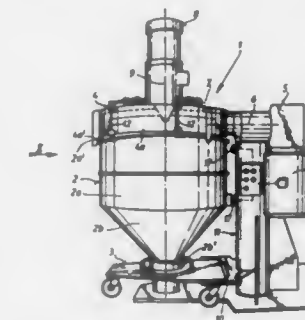
1. A cold feed extruder comprising a screw rotatably mounted in a barrel, with a feed-inlet including a feed pocket, a compression-section, a plasticizing section and an exit-section being formed by these components and a feed-roller forming a part of the feed-inlet, with the combination of:  
 providing the said screw at least over the length of the said feed-inlet with notches cut across the screw-flights at a lead-angle greater than that of these flights, for a positive pulling in and forward transport of fresh feed; providing throttling means usable for achieving a required degree of plastification and for adjusting the amount of squash-back of partly plasticised feed from the screw into the feed inlet; and providing an independently variable speed drive for the said roller in said feed-inlet, the said roller being cored for a tempering fluid, for exerting control over the supply of fresh feed; where by this combination of features the screw is kept running full at the inlet to the compression-zone and the composition of its contents as of fresh feed and of squash-back from the rolling bank is kept constant.

**4,957,373**  
**METHOD AND APPARATUS FOR MIXING BULK MATERIALS IN POWDERED OR GRANULAR FORM**  
 Michael Derksen, Lüdenscheid, and Joachim Domke, Menden, both of Fed. Rep. of Germany, assignors to Herfeld GmbH & Co. KG, Fed. Rep. of Germany  
 Filed Sep. 18, 1989, Ser. No. 408,551  
 Claims priority, application Fed. Rep. of Germany, Oct. 24, 1988, 3836216

U.S. Cl. 366—197 Int. Cl.<sup>3</sup> B01F 9/06 19 Claims

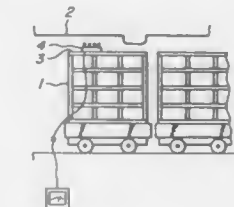
1. A method of mixing powdered or granular material contained within a mixing vessel comprising:  
 (a) rotating said vessel in one direction through substantially 180° about a substantially horizontal axis from an initial position in which said vessel has a substantially vertical axis to a mixing position;  
 (b) mixing said material in said mixing position;  
 (c) rotating said vessel in the opposite direction from said mixing position past said initial position by a predetermined angle to an intermediate position;  
 (d) maintaining said vessel in said intermediate position a predetermined period of time; and  
 (e) rotating said vessel in said one direction from said intermediate position to return said vessel to said initial position,

(f) the speed of rotation from said initial position to said mixing position being greater than the speed of rotation of



said vessel from said mixing position to said intermediate position.

**4,957,374**  
**TUNNEL FURNACE HEIGHT DETECTOR**  
 Keiji Yasuda, Niwa; Tetsuo Kamijyo, and Kazuhiro Miyahara, all of Nagoya, Japan, assignors to NGK Insulators, Ltd., Japan  
 Filed Mar. 24, 1989, Ser. No. 328,516  
 Claims priority, application Japan, Mar. 25, 1988, 63-38482  
 Int. Cl.<sup>3</sup> G01B 5/00; G01K 1/14 7 Claims



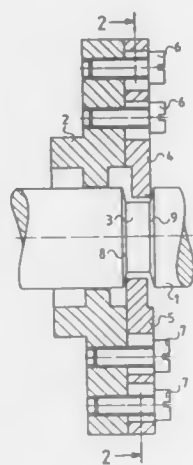
1. A tunnel furnace height detector for detecting a variable ceiling height of a tunnel furnace, comprising a plurality of detecting units arranged on a trolley traveling in said tunnel furnace, said plurality of detecting units each having a height which is progressively increases by a predetermined distance, each of said detecting units comprising:  
 a support base; and  
 a solid piece pivotally connected to said support base, said solid piece having one end to contact said ceiling and another end to open or close an electrical measuring circuit;  
 wherein said solid piece is pivoted when said one end contacts said ceiling such that said another end opens said electrical measuring circuit, and said solid piece automatically returns to a position where said another end closes said electrical measuring circuit when said one end is spaced from said ceiling.

**4,957,375**  
**APPARATUS FOR GUIDING A SHAFT**  
 Dieter Hoffmann, Buchs, Fed. Rep. of Germany, assignor to Kern & Co. AG, Aarau, Switzerland  
 Filed Oct. 10, 1989, Ser. No. 418,531  
 Claims priority, application Switzerland, Nov. 15, 1988, 4221/88

U.S. Cl. 384—247 Int. Cl.<sup>3</sup> F16C 23/02 10 Claims

1. An apparatus for guiding a shaft in a bearing comprising

a shaft having guiding surfaces around its circumference for axial guidance, and a bearing having sliders that may be fastened to the bearing and which are effective as stops for the



guiding surfaces, wherein the guiding surfaces are oblique in radial direction with respect to a reference plane at right angles to the axis of said shaft, and wherein said sliders are slideable in a radial direction along the bearing.

4,957,376

#### LINEAR BEARING WITH A HEIGHT ADJUSTMENT MECHANISM

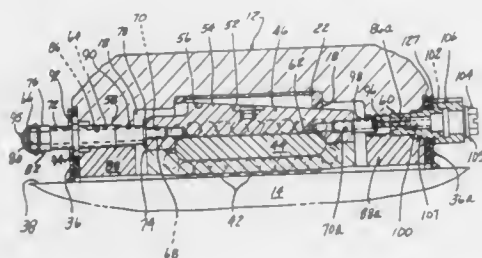
Robert E. Ward, Jr., Charlotte, N.C., assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed May 22, 1989, Ser. No. 354,958

Int. Cl.<sup>5</sup> F16C 29/06, 23/06

U.S. Cl. 384-43

6 Claims



1. In combination with a linear bearing (20) having an improved height adjustment mechanism (58) said bearing (20) installed in a recess (18) defined in a structure (12), adapted to support movement of said structure (12) in a lengthwise direction on a way surface (38), mating sloping surfaces (54, 56) fixed relative to the bearing (20) and structure (12) respectively, causing a height position change of the bearing (20) in the recess (18) upon lengthwise shifting of the bearing (20) relative to the structure (12), an adjustment mechanism (58) drivably interconnecting a wall (88) defining in part said recess (18) in said structure (12), and said bearing (20) allowing selective adjustment of the lengthwise position of said bearing (20) relative to said structure (12), said adjustment mechanism (58) characterized by an elongated stud (64) fixed at one end to said bearing (20) and extending through a bore (88) in said wall (88);

an elongated tubular adjustment bushing (72) received over said stud (64) and threaded to said bore (86) in said wall (88) and having either end protruding from either side of said wall (88), one end engaging said bearing (20); said stud (64) having an end extending through said wall (88)

and protruding beyond the other end of said bushing (72) away from said bearing (20), said protruding end of said stud (64) threaded;

a reaction element (80) threaded to said protruding end of said stud and advanced thereon to be engaged with the other end of said adjustment bushing (72) so as to prevent endwise relative movement thereof in the direction of said reaction element (80), but allowing rotation of said adjustment bushing (72);

the opposite end of said adjustment bushing (72) abutting against said bearing (20), and,

a locking element (92) selectively engageable to prevent rotation of said bushing (72) in said bore (86) in said wall (88).

6. A method of carrying out a height adjustment of a linear bearing (20) mounted in a recess (18) formed in a mounting structure (12), said structure (12) and said bearing (20) having complementarily shaped sloping surfaces (54, 56) such that upon lengthwise adjustment of the position of said bearing (20) in said recess (18), a bearing height adjustment is achieved, said method characterized by attaching an elongated stud (64) at one end to said bearing (20) extending said stud (64) through a wall (88) forming in part said recess (18), fitting an elongated tubular bushing (72) over said stud (64), and also extending said bushing (72) through a bore (86) in said wall (88) with a threaded engagement between said bore and said bushing; preventing an endwise shifting of said bushing (58) on said stud (64) by means of a reaction element threaded on the stud while allowing rotation thereon; abuttingly engaging said bushing against said bearing (20); rotating said bushing (72) in said threaded bore (86) to shift said bearing (20) in either direction to achieve a desired height adjustment of said bearing (20); thereafter locking said bushing (72) against rotation in said bore (86) to secure said adjusted bearing position.

4,957,377

#### ELECTRONIC APPARATUS HAVING A PRINTING FUNCTION

Tsutomu Takahashi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

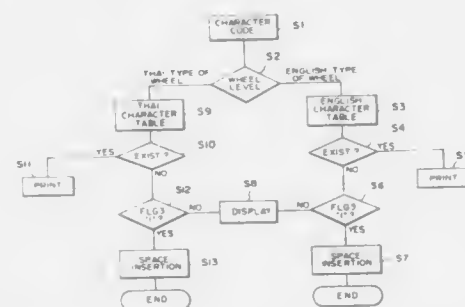
Continuation of Ser. No. 86,189, Aug. 14, 1987, abandoned, which is a continuation of Ser. No. 790,208, Oct. 22, 1985, abandoned. This application May 2, 1989, Ser. No. 346,303

Claims priority, application Japan, Oct. 31, 1984, 227980; Oct. 31, 1984, 227981; Oct. 31, 1984, 227982

Int. Cl.<sup>5</sup> B41J 27/46

U.S. Cl. 400-50

8 Claims



1. A printer comprising:  
designation means for designating characters to be printed;  
printing means for printing characters in the same order that said characters were designated by said designation means;  
judgement means for judging whether a character designated by said designation means can be printed by said printing means;  
display means for displaying a message;  
selection means for selecting in lieu of character printing either formation of a space or generation of a message on

said display means indicating that the printing of the character is impossible, said selection means operative when said judgment means judges that the printing of the character is impossible; and

control means for forming said space or generating said message in response to a selection of the selection means when said judgment means judges that the printing of the character is impossible.

4,957,378

#### PRINTING-PLATE PREPARATION APPARATUS EMPLOYED IN SCREEN PRINTING MACHINE INCLUDING A NON-ADHESIVE PLATEN SURFACE AND A MANUSCRIPT READING UNIT.

Masayuki Shima, Sendai, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

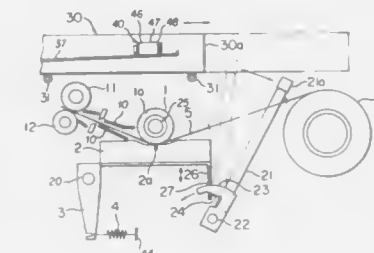
Continuation of Ser. No. 92,574, Sep. 1, 1987, abandoned. This application Oct. 21, 1988, Ser. No. 262,270

Claims priority, application Japan, Sep. 9, 1986, 61-138680

Int. Cl.<sup>5</sup> B41J 3/24

U.S. Cl. 400-120

7 Claims



1. A printing-plate preparation apparatus comprising:  
(a) a platen roller an outer layer of which is made of a non-adhesive elastic material;  
(b) a thermal printhead positioned so that, said thermal printhead can be brought into operative association with said platen roller;  
(c) a bracket swingably supported on a first axle, said thermal printhead being mounted on said bracket and said bracket being swingable back and forth between a first position in which said thermal printhead is operatively associated with said platen roller and a second position;  
(d) means for biasing said thermal printhead towards operative association with said platen roller;  
(e) a manuscript-reading unit movable back and forth between a first position and a second position; and  
(f) a pressure-release lever swingably mounted on a second axle for movement back and forth between a first position and a second position, said pressure-release lever:  
(i) being linked to said bracket so that, when said pressure-release lever moves from its first position to its second position, said bracket moves from its first position to its second position, and  
(ii) having a portion that protrudes into the path of said manuscript-reading unit such that, as said manuscript-reading unit moves from its first position to its second position, said portion contacts said pressure-release lever, causing said pressure-release lever to move from its second position to its first position.

4,957,379

#### PRINTING APPARATUS

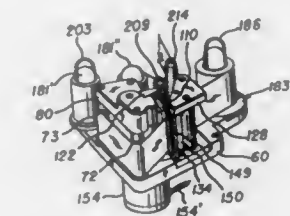
Paul H. Hamisch, Jr., Franklin, and David R. Wisecup, Xenia, both of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Jan. 11, 1989, Ser. No. 296,171

Int. Cl.<sup>5</sup> B41J 2/315, 2/32

U.S. Cl. 400-120

11 Claims



1. Printing apparatus, comprising: a platen roll having an axis of rotation, a thermal print head having thermal printing elements disposed in a straight line and cooperable with the platen roll, and means for mounting the print head, the mounting means including a stationary post generally parallel to the platen roll axis, a mounting member connected to the print head, the mounting member being pivotally supported on the post, and means for adjusting the mounting member relative to the post to bring the line of printing elements into parallel relationship with respect to the platen roll axis.

4,957,380

#### TAB ADJUST FUNCTION FOR AN ELECTRONIC TYPEWRITER TO PERMIT THE SHIFTING OF TABS FROM A FIRST TO A SECOND FORMAT

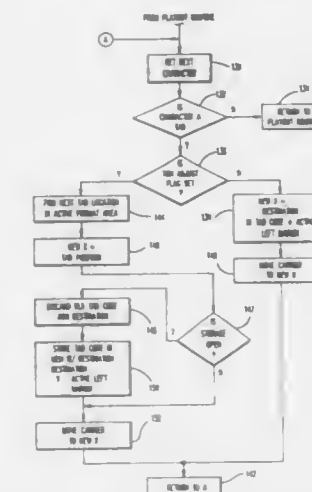
Patrick J. Gerstle, Nicholasville, Ky.; Mac A. Mathis, Austin, Tex.; David R. Smith, and Kathryn R. Stiltz, both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 14, 1988, Ser. No. 167,810

Int. Cl.<sup>5</sup> B41J 21/17

U.S. Cl. 400-279

4 Claims

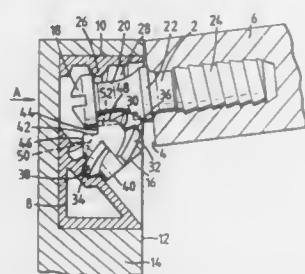




(b) a plunger adapted to be fitted over the collar of said base and adapted to have a first portion resting on said collar and adapted to be forcibly permanently attached to said collar at a second position, said plunger including means for holding an absorbent applicator such that a portion of said applicator would extend beyond said plunger and a portion of said applicator would extend below said plunger into said base, said plunger further including an extended wedge adapted to contact and break an ampule

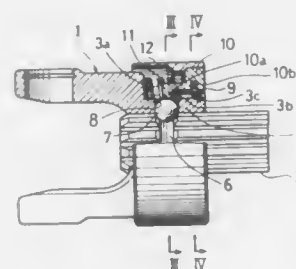
- upon said plunger being forced by pressure into its permanently attached said second position on the collar of said base;
- (c) an absorbent applicator located within said plunger and extending beyond said plunger and extending below said plunger into said base; and,
- (d) a cover adapted to be removably attached to said base, said cover having side walls and including a ledge located on said side walls which ledge is contactable with the top of said plunger such that when such cover is forcibly pushed onto the collar of said base, said plunger moves into the permanently attached second position on the collar of said base and said wedge of said plunger is movable therewith to break an ampule.

**4,957,386**  
**JOINING DEVICE**  
 David N. Harley, Bournemouth, England, and James M. Holler, Jamestown, N.Y., assignors to Titus Tool Company Limited, Buckinghamshire, England  
 Filed Jan. 4, 1988, Ser. No. 140,763  
 Int. Cl.<sup>5</sup> F16B 9/02  
 U.S. Cl. 403—231 9 Claims



1. A joining device for joining panels at right angles to each other, comprising an element having a head and a shank and adapted to be secured into one of said panels with said head and part of the shank projecting from an edge thereof, a holding member adapted to be fitted in a recess provided in a major surface of the other of said panels, said holding member comprising a plug-like body portion having an end face arranged to be exposed at said major panel surface and having an opening extending therein axially from said end face to receive and surround said head, and means for achieving snap fitting of said head in said opening, said snap fitting means including an inward projection within said opening, and a securing member pre-assembled and thereby located within said body portion and adjacent to said opening, the securing member including means forming a shoulder-forming portion which, in a predetermined rotational position of the securing member within said body portion as a result of said pre-assembly, forms a shoulder on the other side of the opening relative to the projection, a distance between the shoulder-forming portion of the securing member and the projection on the body portion being less than the diameter of said head, for thereby enabling said head to be inserted into said opening and forced between the shoulder and the projection into a snap fitting location behind the shoulder and the projection, said securing member including tightening means in said securing member and adjacent the shoulder-forming means for engaging said head, during rotation of said securing means from said predetermined rotation position, to apply a force thereto to move said head inwardly relative to said opening to tighten the joint formed by said panels.

**4,957,387**  
**SPLINE JOINT**  
 Kenji Nasu, Sanda, Japan, assignor to K.S. Sanoyas Co. Ltd., Sanda, Japan  
 Filed Jul. 29, 1988, Ser. No. 225,759  
 Claims priority, application Japan, Feb. 4, 1988, 63-14507[U]  
 Int. Cl.<sup>5</sup> B25G 3/18; F16B 21/00  
 U.S. Cl. 403—322 13 Claims

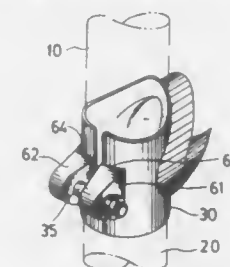


1. A spline joint comprising:  
 a shaft having an end portion having external splines, said end portion further forming a first annular groove;  
 a plurality of locking balls in rolling engagement with said first annular groove;  
 a hub having an internal portion including splines which are adapted to engage the external splines of said shaft, said hub further having a plurality of holes extending radially therethrough, the number of said holes being equal to the number of locking balls, each of said holes adapted to partially retain a locking ball which is positioned therein from a radially outward location;  
 a sliding sheath having an internal face encircling said hub, said sheath having an annular projection and a second annular groove in axially spaced relation around its locking balls in the direction of said first annular groove when said annular projection is positioned over said locking balls; and  
 a polygonal spring, the number of sides thereof being equal to the number of locking balls;  
 means for biasing said sliding sheath so that the annular projection engages the locking balls during normal joint operation where said biasing means comprises a coil spring;  
 wherein said second groove and said sliding sheath are adapted to embrace said polygonal spring so that the center of each side of said spring engages a locking ball when the second annular groove in said sliding sheath is slid into alignment with said holes through said hub.

**4,957,388**  
**BICYCLE FRAME TUBE NEW COUPLING STRUCTURE**  
 Chin-Lang Liu, No. 20, 7th Rd., Industrial Park, Taichung, Taiwan  
 Filed May 11, 1989, Ser. No. 350,282  
 Int. Cl.<sup>5</sup> B60B 27/06  
 U.S. Cl. 403—344 1 Claim

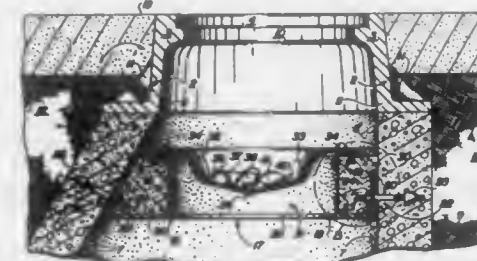
1. A bicycle frame tight coupling comprising a first tubular member having a slit along its longitudinal axis, a second tubular member axially movable and rotatable within said first tubular member, and a pair of solid lugs cooperating with a locking bolt and locking nut for tightening said first tubular member about said second tubular member and prohibiting movement therebetween, said solid lugs having large and curved front edges matching a curvature on the first tubular member and fastened to said first tubular member respectively on opposite sides of said slit by a silver brazing process, each of said solid lugs having flat side surfaces including an outer flat surface spaced from said longitudinal slit and an inner flat surface arranged directly at an edge of said longitudinal slit, said solid lugs forming a V-shaped space therebetween by said

inner flat surfaces with a base of said V-shaped space located at said longitudinal slit, each of said solid lugs having hole for receiving said locking bolt arranged at a distance from said first



tubular member, said locking nut tightening on said locking bolt and holding said second tubular member within said first tubular member by torque created directly beneath and around said front edges of said solid lugs.

**4,957,389**  
**METHOD AND APPARATUS FOR SEALING MANHOLES**  
 David L. Neathery, 1830 Willow Point, Shreveport, La. 71119  
 Filed Sep. 5, 1989, Ser. No. 402,477  
 Int. Cl.<sup>5</sup> E02D 29/14  
 U.S. Cl. 404—72 34 Claims



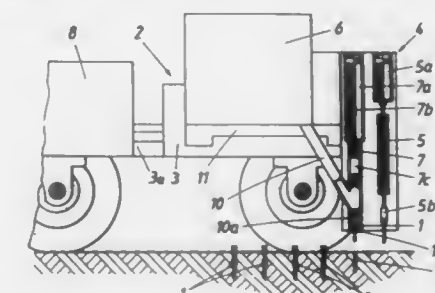
1. An apparatus for sealing a manhole comprising a base having a base leg horizontally disposed in the manhole; a base leg opening provided in said base leg for accessing the manhole below said base leg; a mount leg upward-standing from the periphery of said base leg, said mount leg substantially conforming to the configuration of the wall of the manhole; mounting means engaging said mount leg and the wall of the manhole for securing said mount leg to the wall of the manhole; a masonry seal structure seated on said base leg and engaging said mount leg; and a seal structure opening provided in said masonry seal structure, whereby water entering the manhole above said masonry seal structure and said insert means is trapped.

**4,957,390**  
**REINFORCEMENTS FOR ASPHALTIC PAVING, PROCESSES FOR MAKING SUCH REINFORCEMENTS, AND REINFORCED PAVINGS**  
 Roy Shoesmith, Midland, Canada, assignor to Bay Mills Limited, Ontario, Canada  
 Filed Nov. 4, 1987, Ser. No. 116,351  
 Int. Cl.<sup>5</sup> E01C 5/08, 11/16  
 U.S. Cl. 404—70 29 Claims

1. A prefabricated reinforcement for asphaltic paving comprising:  
 an open grid, preimpregnated with resin, comprising two sets of parallel strands of continuous filament fibers, each set of strands having openings between adjacent strands and the two sets being oriented substantially perpendicular to each other,

a coating of stable adhesive being preapplied to the grid primarily for the purpose of being activated for forming a tack coat free bond compatible with asphaltic paving, the coating being preapplied to the underside of the impregnated strands of the lower surface of the grid without closing the openings between the strands, and the grid having a strength of more than 25 kiloNewtons per meter in the direction of each set of parallel strands.

**4,957,391**  
**APPARATUS FOR SETTING MARKER PLUGS**  
 Ulrich Kalesel, Franz-Lehar-Strasse 7, A-4540 Bad Hall, Austria  
 Filed Apr. 25, 1989, Ser. No. 343,071  
 Claims priority, application Austria, Apr. 25, 1988, 1040/88  
 Int. Cl.<sup>5</sup> E01F 9/04, 9/10  
 U.S. Cl. 404—94 3 Claims



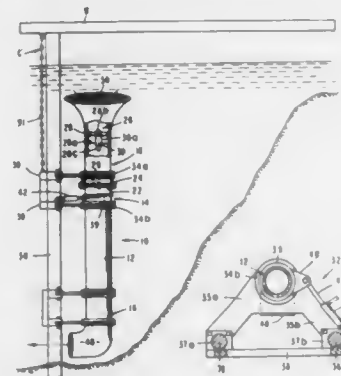
1. An apparatus for setting marker plugs for ground marking, each plug comprising a setting portion adapted to be set into the ground and a marking portion adapted to rise from the ground, the apparatus comprising:  
 (a) a self-propelled vehicle;  
 (b) drive means for propelling said vehicle relative to the ground in a direction of travel;  
 (c) a carriage mounted and movable on said vehicle in said direction of travel,  
 (2) the carriage being operatively connected to said drive means for intermittently moving said carriage relative to said vehicle and the ground in said direction of travel in steps of predetermined length; and  
 (d) a setting unit carried by said carriage and comprising  
 (1) a plug magazine,  
 (2) a piercer and  
 (3) plug setter, the plug setter leading the piercer in said direction of travel at a spacing that is equal to the length of said steps.

**4,957,392**  
**METHOD AND APPARATUS FOR THE ACTIVE PREVENTION OF SEDIMENTATION IN HARBORS AND WATERWAYS**  
 James A. Ballard, 1150 Ballard Ave., Carpinteria, Calif. 93013, and Scott A. Jenkins, 14765 Kalapana St., Poway, Calif. 92064  
 Filed Apr. 27, 1989, Ser. No. 344,079  
 Int. Cl.<sup>5</sup> E02F 3/88; E02B 3/04, 5/28  
 U.S. Cl. 405—73 3 Claims

1. An apparatus for preventing sedimentation build-up in harbor berthing area of the character having wharf fronting the berthing area, comprising a plurality of submerged, scour units disposed adjacent said wharf in side-by-side relationship, each said scour unit comprising:  
 (a) a vertical tubular member having a vertical axis including an upper end and a lower end;  
 (b) inlet means connected proximate said upper end of said tubular member for directing the flow of water into said tubular member;  
 (c) turbine means mounted interiorly of said inlet means for controllably drawing water into said inlet means, said



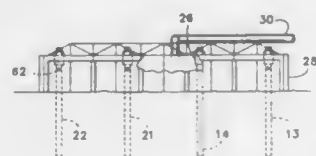
- turbine means including a rotating fan and hydraulic motor means for controllably rotating said fan;
- (d) discharge means connected proximate the lower end of said tubular member for directing the flow of water outwardly therefrom in a generally horizontal direction to produce a near bottom, scour pattern of a predetermined configuration, said scour units being arranged along said wharf so that said scour patterns produced by said discharge means overlap one another;
- (e) means for rotating each said discharge means about the vertical axis of each said tubular member, whereby each



- said discharge means produces a scour pattern spanning about 180 degrees;
- (f) operating means mounted on said wharf and operably interconnected with each said hydraulic motor means for providing hydraulic fluid for operating each said hydraulic motor means; and
- (g) means mounted on said wharf for raising and lowering each said tubular member.

**4,957,393**  
**IN SITU HEATING TO DETOXYFIC**  
**ORGANIC-CONTAMINATED SOILS**  
 James L. Buelt, Richland, and Kenton H. Oma, Richland, both of Wash., assignors to Battelle Memorial Institute, Richland, Wash.

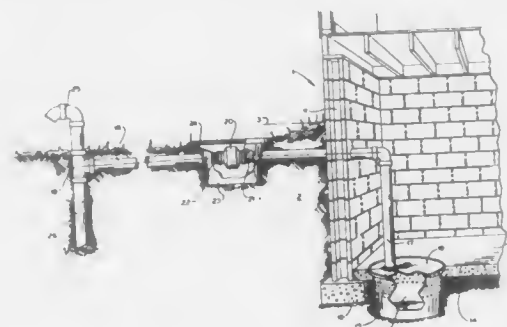
Filed Apr. 14, 1988, Ser. No. 181,635  
 Int. Cl.<sup>5</sup> E02D 3/00  
 U.S. Cl. 405-128 12 Claims



1. The method of detoxifying waste sites and the like containing hazardous volatilizable material, said method comprising:
- inserting at least two electrodes through the soil surface into the ground proximate a said waste site and at spaced points from one another in substantially encompassing array to at least a portion of said waste site,
- heating a region of ground adjacent the soil surface and therebelow to a temperature below the melting temperature thereof, said temperature being greater than 100° and less than 1200 °C., for an extended period of time in order to volatilize said material by applying a voltage between a pair of said electrodes adjacent the soil surface spanning said region for causing a current flow through said ground region therebetween of a value less than would melt the soil, and
- collecting said material, as volatilized, above ground level.

**4,957,394**  
**METHOD AND APPARATUS FOR SUB-FLOOR**  
**COLLECTION AND DISPOSAL OF RADON GAS**  
 Jerry Jarnagin, and Dennis W. Dawson, both of Canton, Ill., assignors to Radon Home Products, Inc., Canton, Ill.  
 Filed Aug. 30, 1989, Ser. No. 400,377  
 Int. Cl.<sup>5</sup> B09B 3/00

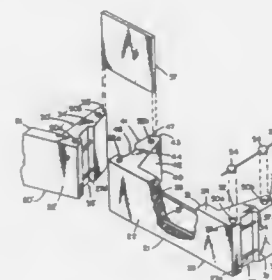
U.S. Cl. 405-128 14 Claims



1. An apparatus for collecting gas from the soil proximate a subterranean enclosure and harmlessly dispensing it in the atmosphere comprising
- collecting means disposed substantially outside the subterranean enclosure comprising a collection chamber having perforations in the walls of the chamber so the inside of the chamber is in communication with zones outside the subterranean enclosure,
- suction means comprising a fan having an intake end and an exhaust end and a resealable container within which the fan is disposed wherein said sealed container is mounted outside the subterranean enclosure and under ground level,
- a ventilation duct having one end connected to the exhaust of said suction means and a second end having access to the atmosphere,
- communication means connecting the inside of the collection chamber to the intake end of the fan thereby generating a suction in the collection chamber so that gas in the soil proximate the enclosure and collection chamber is drawn into the collection chamber, with the suction means pulling it therethrough and dispensing it harmlessly into the atmosphere remote from the enclosure.

**4,957,395**  
**PRE-CAST, REINFORCED CONCRETE RETAINING**  
**WALL SYSTEM**  
 Ned Nelson, 3 Lake Bellevue Dr., #200, Bellevue, Wash. 98005  
 Filed Jun. 19, 1989, Ser. No. 368,028  
 Int. Cl.<sup>5</sup> E02D 5/20

U.S. Cl. 405-287 17 Claims

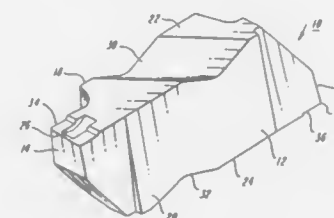


1. A retaining wall module, comprising:
- (a) a vertically disposed panel;

- (b) a pair of vertically disposed flanges, said flanges horizontally disposed at opposite ends of said panel and projecting rearwardly therefrom, said flanges each having a vertically disposed outside recess, said recess being horizontally transversely by at least one exposed rod embedded in said flanges on each side of said recess.

**4,957,396**  
**CUTTING INSERT WITH CHIP CONTROL**  
 Kenneth L. Niebauer, Raleigh, N.C., assignor to Kennametal Inc., Latrobe, Pa.  
 Filed Sep. 30, 1988, Ser. No. 252,425  
 Int. Cl.<sup>5</sup> B23P 15/28

U.S. Cl. 407-114 20 Claims



1. An improved cutting insert with chip control features comprising an insert body having end wall regions having a predetermined width and defining in part a cutting edge and sides and top and bottom walls generally perpendicular to said sides, said insert body being invertible about an axis perpendicular to said sides thereof, said insert body having cutting edges at said end wall regions, whereby in each inverted position of said insert body a respective cutting edge is presented uppermost at the same end of said insert body, said top and bottom walls of said insert body defining therein engaging means for cooperating with a toolholder clamp means; a land region extending rearwardly from each said end wall region cutting edge toward said respective top or bottom wall and defining a surface region of a predetermined width; a back ramp extending generally upwardly from each said land region to said respective top or bottom wall; and a chipbreaker means defining a depression initiating in a forward portion of the land region proximate the cutting edge and extending into said back ramp, wherein said chipbreaker means depression bisects said back ramp such that two step-like features are defined in combination by said back ramp and land region and wherein said chipbreaker means depression having a pair of generally parallel side walls which are perpendicular to the cutting edge.

**4,957,397**  
**CUTTING TOOL**  
 Mark J. Huff, P.O. Box 241, 119 E. James St., Wales, Wis. 53183

Filed Sep. 8, 1989, Ser. No. 404,836  
 Int. Cl.<sup>5</sup> B23B 51/00

U.S. Cl. 408-224 12 Claims

1. A tool for use with a rotating device for forming an opening in an object, comprising:
- an axial body portion having a relatively small number of first deep helical grooves formed therein with adjacent grooves defining an outer tip therebetween, said first grooves being oriented at a first angular relationship to the axis of said body portion, said body portion further having a relatively large number of second shallow grooves formed therein, said second grooves being formed in the outer tips disposed between adjacent first grooves and being oriented at a second angular relationship relative to the axis of said body portion opposite that of said first

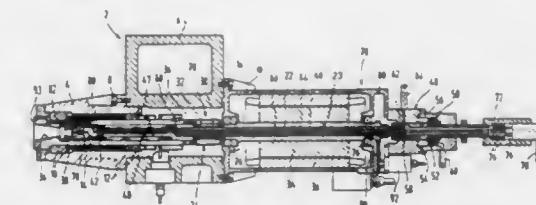
- grooves, said second grooves defining pointed outer tips at the outer periphery of said tool; and



**4,957,398**  
**TWO-SECTION TOOL SPINDLE HAVING A CHANNEL**  
**FOR CARRYING PRESSURIZED FLUID**  
 Manfred Schneider, Grossbottwar; Bernd Driesner, Penzberg, and Joerg Luetzkendorf, Ludwigsburg, all of Fed. Rep. of Germany, assignors to Friedrich Deckel Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Apr. 28, 1988, Ser. No. 187,159  
 Claims priority, application Fed. Rep. of Germany, Apr. 30, 1987, 3714562

Int. Cl.<sup>5</sup> B23C 5/10, 11/10  
 U.S. Cl. 409-136 5 Claims



1. A two-section tool spindle apparatus, comprising:
- a spindle housing;
- a two-section main tool spindle and a drive motor therefor, said two-section main tool spindle including a hollow spindle section and a motor shaft section, said spindle section being rotatably supported in said spindle housing for rotation about a rotational axis, said hollow spindle section and said motor shaft section being distinct and separate parts of said main tool spindle, said motor shaft section including means for rendering said motor shaft section an integral part of said drive motor, said main tool spindle further including coupling means for coupling one axial end of said motor shaft section to one axial end of said hollow spindle section such that said motor shaft section and said hollow spindle section are coaxially aligned and rotationally fast, said hollow spindle section including means defining a tool receiving opening therein at an axial end thereof opposite said one axial end thereof;
- a spreader bar axially movably disposed in said hollow spindle section and for rotation therewith, said spreader bar including means for releasably gripping a tool in said tool receiving opening and for facilitating a rotation thereof with said main tool spindle, said spreader bar having means defining an axially extending bore therethrough, said spreader bar being spaced radially inwardly from an inner peripheral surface of said hollow spindle section to define an axially extending first annular chamber radially between said spreader bar and said inner peripheral surface of said hollow spindle section, said first annular chamber having spring means provided therein for urging

said spreader bar axially away from said tool receiving opening;

means defining an axially extending bore through said motor shaft section, said motor shaft section including an axially extending hollow operating rod supported axially movably in said motor shaft section bore, said operating rod projecting axially beyond both axial ends of said motor shaft section, said operating rod having an axial end which is adjacent an axial end of said spreader bar, means for connecting said operating rod and said spreader bar at said adjacent axial ends thereof so that section in response to axial movement of said operating rod and said spreader bar will be axially movable in said hollow spindle section in response to axial movement of said operating rod and against said spring means toward said tool receiving opening, said motor shaft section further including an axially extending pipe disposed radially inside said hollow operating rod for conveying cooling medium therethrough;

said pipe having an axial end which is adjacent said axial end of said spreader bar, said main tool spindle including means for coupling said axial end of said pipe to said bore in said spreader bar such that said pipe is in fluid communication with said bore in said spreader bar, said pipe and said hollow operating rod being radially spaced from each other to define an axially extending second annular chamber radially therebetween;

said tool receiving opening end of said hollow spindle section including an axially facing end surface adjacent and surrounding said tool receiving opening, and means defining an auxiliary opening in said end surface adjacent said tool receiving opening;

said hollow spindle section including means for providing fluid communication between said spreader bar bore and said auxiliary opening, whereby said pipe is placed in fluid communication with said auxiliary opening; and

means for providing fluid communication between said first annular chamber and said tool receiving opening, and means for providing fluid communication between said first annular chamber and said second annular chamber, whereby said second annular chamber is placed in fluid communication with said tool receiving opening.

4,957,399

# METHOD FOR CUSHIONING A CONTAINERIZED SHIPMENT BY RAILROAD FLATCAR

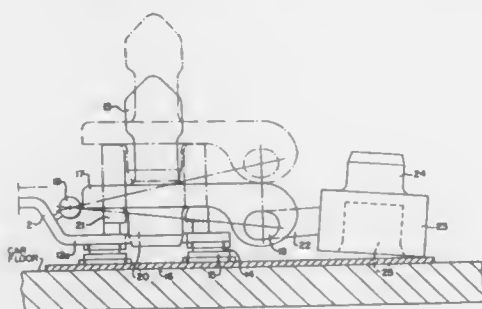
Anders Hove, Stockholm, Sweden, assignor to Buffers AB, Taby, Sweden

Division of Ser. No. 121,216, Nov. 16, 1987, abandoned. This application Sep. 13, 1989, Ser. No. 406,866

Int. Cl.<sup>3</sup> B61P 45/00; B60D 1/64

U.S. Cl. 410—87

4 Claims



1. A method for cushioning a containerized shipment by railroad flatcar against sudden accelerations and decelerations longitudinally of the flatcar due to jerking and bumping of the flatcar, comprising:

providing a railroad flatcar having a flat floor;

providing a container cushioning device which includes:

a longitudinally extending guide beam;

a plurality of longitudinally extending sliding plates;

a double-acting buffer heaving two opposite ends;

a longitudinally-extending movable beam mounted on said guide beam for limited longitudinal movement in two axially opposite directions and operatively associated with said double-action buffer for tending to damp longitudinal motion of said movable beam when said movable beam moves longitudinally in either of said axially opposite directions;

two axially spaced stops secured on said guide beam for limiting longitudinal movement of said movable beam in said two axially opposite directions;

two longitudinally spaced, transversally extending container beams secured to said movable beam for movement therewith in said two axially opposite directions; each container beam having at least one sliding block;

said container beams, among them, having a sufficient number of appropriately-spaced, upwardly-projecting pins mounted thereon, for removably engaging alternatively in all four corner fittings of an ISO container;

removably screwing the guide beam onto the flat floor of the railroad flatcar so that the guide beam extends longitudinally of the flatcar;

disposing said sliding plates on said flat floor of said railroad flatcar spaced laterally to the left and to the right of said guide beam so that each sliding block of each container beam is disposed in sliding engagement with a respective sliding plate;

removably screwing each sliding plate onto the flat floor of the railroad flatcar;

lowering an ISO container onto said container cushioning device, so that each of four corner fittings of the container is mounted on a respective said upwardly-projecting pin; and

moving the railroad flatcar bearing said container along a rail line with said device on which said container is mounted cushioning said container against sudden accelerations and decelerations longitudinally of the flatcar due to jerking and bumping of the flatcar.

4,957,400

# PICKUP TRUCK PADS FOR CARRYING LONG LOADS

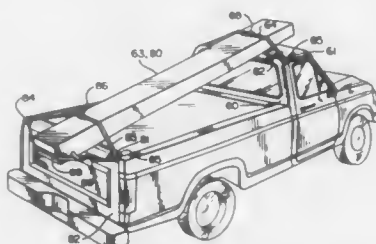
John D. K. Karp, 15 Cornsawp Rd., York, Me. 03909

Filed Apr. 13, 1989, Ser. No. 337,291

Int. Cl.<sup>3</sup> B65D 63/00; B62D 33/00; B60R 9/04

U.S. Cl. 410—110

5 Claims



1. Protective configured load carrying elastomeric foam plastic pads for a pickup truck comprising, as a set:

a cab pad comprising a configured elastomeric foam generally having a right angle shape in cross section an configured to fit the upper rear edge of the cab of a pickup truck and having a strap to secure it to said cab;

a tail gate pad comprising a configured elastomeric foam generally U shaped in cross section and configured to fit the upper edge of the tailgate of said pickup truck and having a strap to secure it to said tailgate;

clips held by said straps on either side of said pads, said clips serving to secure the pads to the vehicle and

said straps extending beyond said clips a substantial length,

permitting the straps to be secured over and hold a load resting on said pads.

4,957,401

# THREADED FASTENER HAVING MINIMIZED LENGTH AND WEIGHT AND METHOD TO MAKE IT

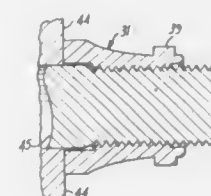
Edwin E. Hatter, Torrance, Calif., assignor to Hi-Shear Corporation, Torrance, Calif.

Continuation of Ser. No. 637,399, Aug. 3, 1984, abandoned, which is a division of Ser. No. 338,249, Jan. 11, 1982, Pat. No. 4,485,510. This application Nov. 9, 1987, Ser. No. 118,524

Int. Cl.<sup>3</sup> F16B 31/00, 37/16

U.S. Cl. 411—5

5 Claims



1. A metallic fastener pin having a central axis, a head, a cylindrical shank, a shoulder contiguous to said shank reducing in diameter, a radius at the least diameter of said shoulder, a neck, and a helical thread, in the order recited from said head, the entire pin being made of a metal alloy whose surface strength and smoothness can be increased by cold working using localized mechanical compressive forces exerted thereon, said radius extending annularly around said pin and having had said mechanical compressive forces exerted on it, and the completed product not having been subjected to any heat treatment or annealing subsequent to said exertion of said mechanical compressive forces, said helical thread having a plurality of complete threads, all of which have a crest diameter and a root diameter, said root diameter being substantially equal to the contiguous unthreaded diameter of said neck, and an incomplete thread on the order of about one half the length of a full thread convolution, said incomplete thread being characterized by a root diameter equal to the root diameter of the complete threads, and a crest diameter which reduces continuously from the crest diameter of the complete threads to the said contiguous unthreaded diameter of said neck.

4,957,402

# T-NUT WITH FURROWS

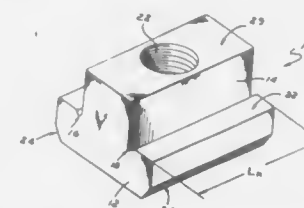
Georg D. Klein, R.F.D. 2, Lynch Rd., Monson, Mass. 01057, and Frank E. Carter, P.O. Box 39, Wales Rd., Brimfield, Mass. 01010

Filed May 5, 1989, Ser. No. 347,577

Int. Cl.<sup>3</sup> F16B 27/00, 39/00, 33/00

U.S. Cl. 411—84

5 Claims



1. In a T-nut of the type that fits into a T-slot in a machine base to screw a work bed onto the base, the improvement comprising:

a. a rigid head with a top and bottom, wherein the bottom

has a horizontal flat surface that maintains its shape when the work bed is screwed onto the base;

b. a shank that is integral with the head and which extends vertically from the horizontal flat surface, wherein the shank has a threaded vertical bore; and

c. a pair of parallel rigid furrows in the bottom of the rigid head, wherein the furrows run along opposite sides of the shank at a juncture between the shank and head, and wherein the furrows are adapted to maintain their size and shape and to straddle any burrs on a shoulder of the T-slot when the work bed is tightened in place, whereby the nut's rigid flat bottom surface sits flush against an underside of the slot and the nut's shank is squared to the base.

4,957,403

# DEMOUNTABLE PIN FOR ROTATABLY CONNECTING TOGETHER TWO ELEMENTS OF SMALL AXIAL DIMENSION, PARTICULARLY SUITABLE FOR THE LEVER MECHANISMS OF TEXTILE MACHINES

Luciano Corain, and Gianni Maitan, both of Vicenza, Italy, assignors to Nuovopignone - Industrie Meccaniche e Fonderia S.p.A., Florence, Italy

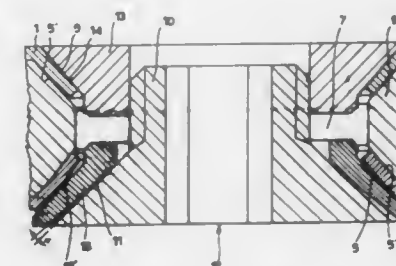
Filed Sep. 27, 1988, Ser. No. 249,658

Claims priority, application Italy, Oct. 2, 1987, 22118 A/87

Int. Cl.<sup>3</sup> F16B 33/00, 43/02

U.S. Cl. 411—368

5 Claims



1. A demountable pin for insertion through and clamping together two frusto-conical flares sandwiching an element therebetween, each of said frusto-conical flares being formed in plate cheeks, said element being rotatably connected to said plate cheeks and having a pin passage and rotation bearing, said pin passage being aligned with said rotation bearing, said pin having a bolt with a frusto-conical under-head rigidly mounted thereto and an internal through bore, said pin being detachably affixed to an end nut after said pin is inserted through said two frusto-conical flares, said end nut also having a frusto-conical under-head, the frusto-conical under-heads of both the bolt and the nut having a taper substantially equal to a taper of said frusto-conical flares of said two cheeks, said frusto-conical under-head of said bolt being engaged with a washer having a frusto-conical surface when said pin is inserted through said two frusto-conical flares, the frusto-conical surface of said washer having a taper which is greater than the taper of said frusto-conical flares of said two cheeks.

4,957,404

# FLAIL CHAIN UNLOADER FOR PARTICULATE MATERIAL

James W. Lepley, Smithville, Ohio, assignor to Flying Dutchman, Inc., Smithville, Ohio

Filed Jul. 24, 1989, Ser. No. 384,413

Int. Cl.<sup>3</sup> B65G 65/46

U.S. Cl. 414—324

18 Claims

1. An unloader for discharging particulate material from a lower outlet of an upright storage vessel, comprising:

rotating shaft means mounted in said vessel adjacent a central portion thereof projecting upwardly of said lower outlet; and

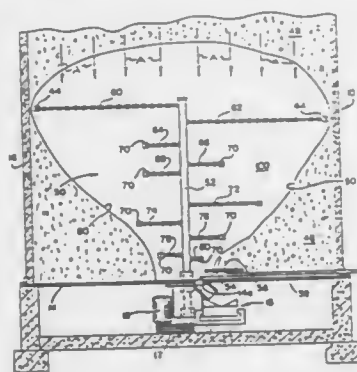


flail means secured to said shaft means for rotation therewith to loosen said particulate materials contained in said vessel to flow downwardly for discharge through said lower outlet;

said flail means including a plurality of flail chains secured at their inner ends to said shaft means at spaced apart levels above said bottom outlet;

said plurality of flail chains comprises at least one upper flail chain of maximum length secured to said shaft means adjacent an upper level of said shaft means having an outer end movable in a generally circular path closely adjacent an inside wall surface of said vessel;

at least one set of lower flail chains secured to said shaft means at spaced apart ever increasing levels above said bottom outlet, said lower set of flail chains including a lowermost chain of minimum length and at least one other lower flail chain spaced above said lowermost chain hav-



ing a greater length than said minimum length chain of said lower set of flail chains, said set of lower flail chains having lengths substantially less than said upper flail chain and increasing in length at each higher level in said set to generally match the angle of repose of said material in said vessel; and

at least one intermediate flail chain secured to said shaft means at a level spaced between said upper flail chain and said lower set of flail chains, said intermediate flail chain having a length substantially less than said upper flail chain and less than a lower flail chain of said set immediately therebelow for minimizing entanglement between said chains and movement of said upper flail chain from a downwardly hanging, at rest position, toward an outwardly extended position away from said shaft means and other flail chains upon initial rotation of said shaft means for discharging material from said vessel.

4,957,405

## APPARATUS FOR MINING

Margaret A. Roberts, Morgantown, and Harry J. Brown, Barrackville, both of W. Va., assignors to Consolidation Coal Company, Pittsburgh, Pa.

Filed Sep. 26, 1988, Ser. No. 248,661  
Int. Cl.<sup>5</sup> B65G 67/08

U.S. Cl. 414—339

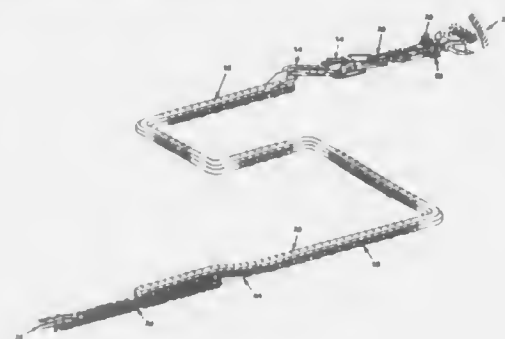
2 Claims

1. In a mining system having a self-propelled tramming conveyor for receiving mined material and depositing the material onto a cart type panel belt support structure comprising

- the conveyor being self-propelled and having a plurality of pivotally interconnected units supporting continuous conveyor carrying driven flights, said units having outboard cylinders for lowering and raising said units so that said flights tram said conveyor to transport said conveyor in the unit lowered position and convey material in the unit raised position,
- the cart type panel belt support having a plurality of pivotally interconnected mobile carts having a lower

portion supporting a continuous material conveyor and an elevated upper portion for receipt of said tramming conveyor, so that the mined material can be deposited from said conveyor onto said panel belt.

- said cart lower portion has upper and lower conveyor belt supporting rollers with said cart lower portion carrying guides for retaining mined material on said conveyor,
- said carts each having an upper portion with outboard longitudinally extending opposed rails for receipt of said



outboard cylinders enabling said cylinders to raise and lower said tramming conveyor on said carts,

- said carts also each having cross supports extending between said rails for supporting said conveyor flights in the lowered position enabling said conveyor flights to be driven along said cross supports on said carts, whereby said cylinders are positioned on said rails when said tramming conveyor is depositing material on said panel belt and said conveyor flights are inboard of said rails when said tramming conveyor is being driven on said carts.

4,957,406

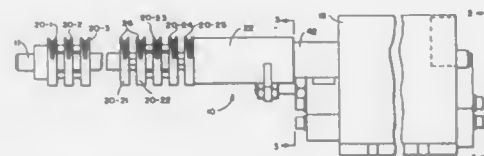
## APPARATUS FOR TRANSFERRING DISKS FROM ONE CASSETTE TO ANOTHER WITH DIFFERENT PITCH

Minoru Akagawa, Fremont, Calif., assignor to Intelmatec Corporation, Fremont, Calif.

Filed May 8, 1989, Ser. No. 349,399  
Int. Cl.<sup>5</sup> B65G 65/04

U.S. Cl. 414—416

9 Claims



1. An apparatus for transferring disks with center holes from one cassette to another having a different pitch, said apparatus comprising:

- a rod elongated in a longitudinal direction,
- an array of a plurality of serially concatenated disk-supporting pieces each which support one of said disks by an edge of the center hole thereof, one of said disk-supporting pieces at one end of said array being affixed to said rod and the rest of said disk-supporting pieces being supported by said rod slidably along said longitudinal direction,
- connecting means each connecting together one of mutually adjacent pairs of said serially concatenated disk-supporting pieces such that the separation between each mutually adjacent pair of said disk-supporting pieces is variable but cannot exceed a predetermined maximum length, and
- driving means adjacent the other end of said array for caus-

ing a closest one of said disk-supporting pieces to slidingly move along said rod, whereby said rod with said disk supporting pieces may pick up disks from one cassette, change the pitch of said disks, and then deposit the disks into another cassette.

4,957,407

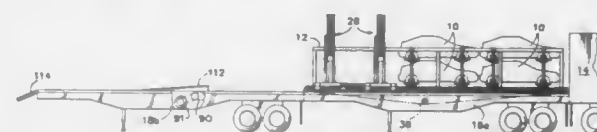
## METHOD AND APPARATUS FOR LOADING AND UNLOADING MOTOR VEHICLES FROM LIGHTWEIGHT SLEEVES WHICH ARE CARRIED IN STANDARD CARGO CONTAINERS

Peter Gearin, Portland, Oreg., assignor to G & G Intellectual Properties, Inc., Portland, Oreg.

Filed Jan. 13, 1989, Ser. No. 297,061  
Int. Cl.<sup>5</sup> B65D 88/12, 88/52

U.S. Cl. 414—498

11 Claims



10. A system for transporting vehicles, said system comprising:

- a sleeve proportioned for the receipt of a plurality of vehicles, said sleeve having an open end for the passage of vehicles thereto;
- vehicle supporting means to suspend vehicles from the sleeve in mutually spaced relationship to one another;
- a sled separate and apart from said sleeve, said sled being adapted to support at least one vehicle and proportioned for movement through the open side of the sleeve;
- means to move the sled through the open end of and into the sleeve to position a vehicle on the sled for suspension by the vehicle supporting means; and
- means for removing the vehicles from said sled and supporting it from said vehicle supporting means so that the sled may be removed from the sleeve while leaving the vehicle within the sleeve.

4,957,408

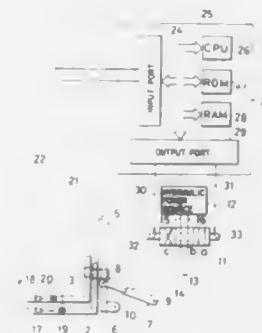
## DEVICE FOR CONTROLLING A FORK OF A FORKLIFT

Akira Ohkura, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Apr. 6, 1988, Ser. No. 178,233  
Int. Cl.<sup>5</sup> B66F 9/06

U.S. Cl. 414—635

8 Claims



- a pair of tilt sensors, each sensor mounted on a separate tip end of said prongs;
- an electronic control device having an input port and an output port, each said sensor operatively connected to said input port of said electronic control device, said electronic control device generating output signals at said output port on the basis of signals derived from said tilt sensors input to said input port;
- a shaft;
- a pair of drive mechanisms, each drive mechanism rotating a separate one of the vertical masts about said shaft, said output signals connected to said drive mechanisms for causing independent movement of the directions and amounts of rotation of each of said generally vertical masts and the tilt of each prong so that each prong is maintained at a zero angle even if the center of gravity of a load on the prongs is not evenly shared by the prongs.

4,957,409

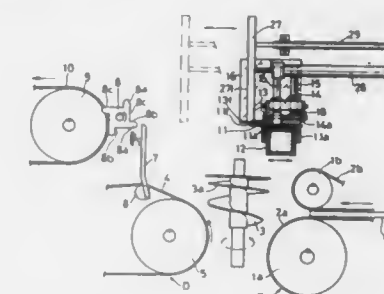
## CORRUGATED CARDBOARD BOX STACKING DEVICE IN A CORRUGATED CARDBOARD BOX MAKING MACHINE

Masuzo Fukao, Isenbata; Tadashi Sakai, Komatsu, and Kozo Murohashi, Kanazawa, all of Japan, assignors to Kabushiki Kaisha Ishikawa Seisakusho, Ltd., Kanazawa, Japan

Filed Aug. 30, 1989, Ser. No. 400,772  
Int. Cl.<sup>5</sup> B31B 3/98; B65G 57/30, 60/00; B65H 31/30

U.S. Cl. 414—788.4

3 Claims



1. A corrugated cardboard box stacking device in a corrugated cardboard box making machine, comprising:

- a feed means for feeding manufactured and folded corrugated cardboard boxes one by one in the horizontal direction;
- a front portion support means for supporting the front portion of the corrugated cardboard box fed from the feed means at a predetermined position in the longitudinal direction;
- a pair of rotary screws arranged at right and left sides for stacking the corrugated cardboard boxes in a group from a lower to an upper portion in the area between the rotary screws, said rotary screws being arranged at intermediate position between the feed means and the front portion support means in the longitudinal direction for supporting a corrugated cardboard box fed from the feed means at its both sides to raise the corrugated cardboard box into a storing space by rotation;
- a gauge plate which comes in contact with the upper surface of the rear end of the uppermost box in the group of the corrugated cardboard boxes for regulating the number of corrugated cardboard boxes to be stacked in the corrugated cardboard box storing space, which is positioned above the support means and the rotary screws;
- a kicker which moves forward and backward along the under surface of the gauge plate and pushes out the uppermost corrugated card box to advance it a little ahead of the front edge of the gauge plate;
- a count means for counting the number of the corrugated cardboard boxes moved from the storing space to a box

stacking space, which is positioned above and a little ahead of the storing space by the pushing action of the kicker and the lifting action of the rotary screws;

a pusher bar for transporting a group of the corrugated cardboard boxes in the box storing space by moving them forward when the number of the corrugated cardboard boxes stacked from below in the storing space reached a predetermined number; and

a discharge means for discharging the group of the stacked corrugated cardboard boxes conveyed by the pusher bar.

4,957,410

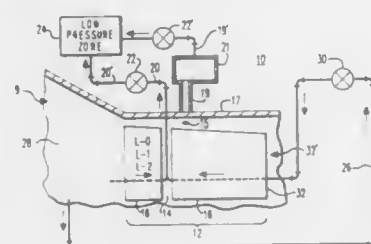
## STEAM TURBINE FLOW DIRECTION CONTROL SYSTEM

George J. Silvestri, Jr., Winter Park, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 6, 1989, Ser. No. 306,188

Int. Cl.<sup>5</sup> F01D 25/30

U.S. Cl. 415—169.1



1. In a reheat steam turbine having at least one turbine element with an impulse chamber and an exhaust stage, the steam turbine having other elements and zones wherein the pressure is lower than that of the exhaust stage, a system for reducing windage heating and resulting distress to turbine blading by prevention of Coanda-type flow, comprising:

outlet means located upstream of the exhaust stage for extraction of steam therethrough;

first duct means connecting said outlet means to a relatively low pressure zone;

first valve means connected to said duct means for controlling steam flow through said outlet means;

inlet means into the impulse chamber for introduction of exhaust steam from the exhaust stage;

second duct means connected between said inlet means and the exhaust stage; and

second valve means connected to said second duct means for controlling the flow to exhaust steam into the impulse chamber.

4,957,411

## TURBOJET ENGINE WITH FAN ROTOR BLADES HAVING TIP CLEARANCE

Patrick L. E. Girault, Boissise-le-Roi, France, assignor to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation S.N.E.C.M.A.

Filed May 11, 1988, Ser. No. 192,528

Claims priority, application France, May 13, 1987, 87 06671

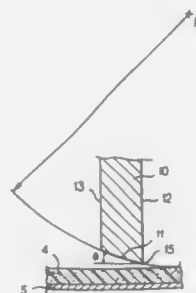
Int. Cl.<sup>5</sup> F01D 5/20

U.S. Cl. 415—173.4

2 Claims

1. A turbojet engine of the kind having a fan, said fan including an array of fan rotor blades, wherein each of said blades is mounted in said fan with a radial axis and has a radially outer tip, a convexly curved side, and a concavely curved side, said radially outer tip having a face with a radius profile having its radius of curvature centered at a point situated, on the one hand, forward of said radial axis of said blade, i.e., in a position offset on said concavely curved side of said blade relative to said radial axis, and, on the other hand, beyond the rotational axis of said engine relative to said blade so that said radius profile from said convexly curved side to said concavely

curved side of said blade forms a sharp edge on a top end portion of said concavely curved side whereby said face of said



18 Claims radially outer tip is adapted to enter an abradable lining of an inner wall of a casing of said fan.

4,957,412

## APPARATUS AND METHOD FOR SUPPORTING THE TORQUE LOAD ON A GAS TURBINE VANE

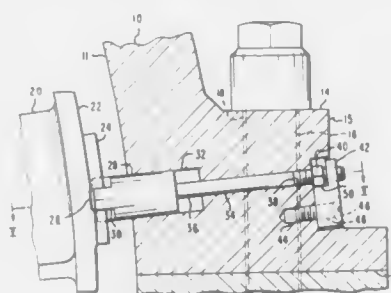
Rick A. Olson, Apopka, and Perry E. Lowe, Altamonte Springs, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 6, 1988, Ser. No. 240,292

Int. Cl.<sup>5</sup> F01D 25/24

U.S. Cl. 415—189

14 Claims



1. A gas turbine comprising:

a plurality of vanes, each of said vanes having a radially outboard end, an outer shroud being formed on said radially outboard end, each of said vanes subjected to a torque load, said torque load on each vane transmitted to its said outer shroud;

a cylinder, said cylinder retaining said vanes therein in a circular array concentric with said cylinder;

a first hole in said cylinder, said first hole extending radially from the inner surface of said cylinder through only a portion of the thickness of said cylinder, whereby said first hole has a bottom within said cylinder;

a pin, said pin having a first and second end, said pin disposed in said first hole;

means for engaging said first end of said pin with one of said outer shrouds, whereby said torque load on said outer shroud is transmitted to said cylinder; and

means for enabling the inserting and withdrawing of said pin from engagement with said outer shroud from outside of said cylinder.

4,957,413

## OMNIDIRECTIONAL VARIABLE THRUST PROPELLER

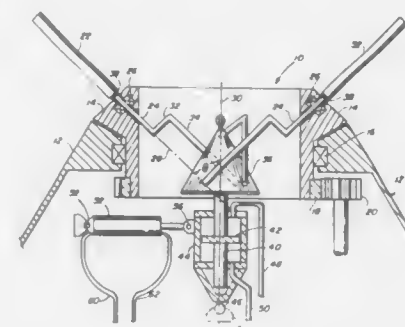
Ronald S. Reich, and Richard W. Uhrich, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 28, 1986, Ser. No. 856,262

Int. Cl.<sup>5</sup> B63H 3/00

U.S. Cl. 416—115

2 Claims



1. An omnidirectional variable thrust propeller for an undersea vehicle comprising:

a rotatable hub having a longitudinal axis;

a bearing rotatably supporting the hub in the undersea vehicle in the longitudinal axis;

a ring gear mounted on the hub and a pinion gear mounted on the undersea vehicle to rotate the hub via the ring gear;

a plurality of blades each rotatably mounted in bearing in the hub;

a plurality of shafts each having a lever and an inner end portion terminating inside the hub and, each shaft coaxially connected to a respective blade that is rotatably mounted in the hub at an acute angle to the longitudinal axis;

means mounted on the undersea vehicle and engaging the inner end portions of the blade shafts for reciprocally moving along the longitudinal axis of the hub to uniformly rotate blades in one direction when the reciprocally moving means moves longitudinally in one direction and to uniformly rotate the blades in an opposite direction when the reciprocally moving means moves longitudinally in an opposite direction thereby enabling change of the thrust force of the propeller, the reciprocally moving means includes:

a nut and screw combination;

a rod, one end of the rod being pivotally connected to the inner end portions of the shafts the other end of the rod being connected to the screw;

a sleeve mounted in a gimbal connection to the vehicle; the nut being slidably mounted in the sleeve; and

a piston to reciprocally move the nut in said sleeve;

means mounted on the undersea vehicle for pivotally mounting the reciprocally moving means thereto at a point along the longitudinal axis of the hub to enable reciprocally movement thereof at an acute angle to the longitudinal axis of the hub; and

means mounted on the undersea vehicle for selectively moving the reciprocally moving means about a pivot point to change the direction of thrust by rotating the blades nonuniformly, longitudinal movement of the reciprocally moving means along the longitudinal axis varies the blade's thrust and pivotal movement of the reciprocally movable means changes the direction of thrust.

4,957,414

## FAN AND HUB ASSEMBLY

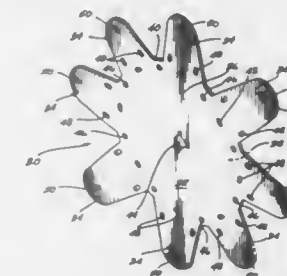
Rainer O. Willingham, Tacoma, Wash., assignor to Flex-a-lite Consolidated, Tacoma, Wash.

Filed Dec. 29, 1988, Ser. No. 291,943

Int. Cl.<sup>5</sup> F04D 29/38

U.S. Cl. 416—229 R

1 Claim



1. A method for producing a fan hub for supporting a plurality of molded plastic fan blades, comprising the steps of: forming a disc-shaped body having opposing sides, an outside edge, and a plurality of arms;

forming a plurality of openings in said disc-shaped body for permitting fluid communication from said opposing sides to facilitate attachment of the fan blades to the hub;

forming one or more openings in each of said arms, the size and position of said openings being selected to establish a predetermined resonant frequency in an assembly consisting of said fan hub and said plurality of molded plastic fan blades, said predetermined resonant frequency being different than the frequency of periodic forces that act upon said assembly when said assembly operates in its intended environment; and

thereafter molding fan blades to said disc-shaped body.

4,957,415

## POLYESTER COMPOSITE PROPELLER SPINNER AND METHOD OF MAKING SAME

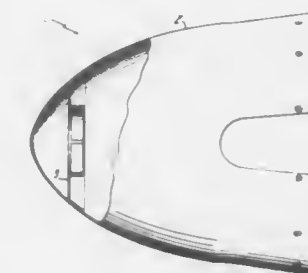
Roy D. Paul, deceased, late of Windsor (by Janice W. Paul, executrix), and Walter Pollock, West Simsbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation-in-part of Ser. No. 852,036, Apr. 14, 1986, abandoned. This application Nov. 12, 1987, Ser. No. 120,740

Int. Cl.<sup>5</sup> B29C 35/02; B63H 1/20

U.S. Cl. 416—245 R

3 Claims



1. An improved method for producing an impact hardened polyester composite propeller spinner having a conical wall, a plurality of radial internal support gussets, and means for attaching to a propeller hub, said method comprising combining a polyester resin with a plurality of glass fibers, molding to a final form, and curing, said improvement comprising:

(a) adding a vinyl terminated liquid reactive compound to said polyester resin, and



(b) combining said resin with about 35% by weight of a randomly oriented mixture of glass fibers having two fiber lengths, in a two to one ratio of long to short fibers respectively, said short fibers being about 5 cm in length and said long fibers being about 10 cm in length.

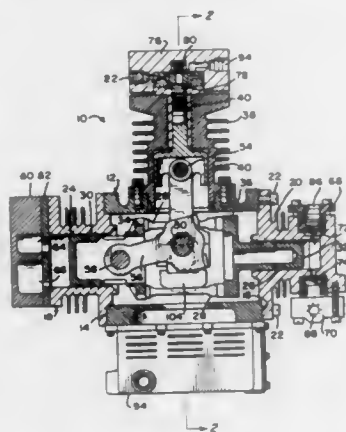
4,957,416

## GAS COMPRESSOR

Bernard F. Miller, Corning, N.Y., and John A. Sawyer, Trout Run, Pa., assignors to Dresser-Rand Company, Corning, N.Y.  
Filed Sep. 11, 1989, Ser. No. 405,249  
Int. Cl.<sup>5</sup> F04B 5/00, 27/04

U.S. Cl. 417-273

9 Claims



1. A gas compressor, comprising:

- a crankcase;
- three cylinders, removably fastened to said crankcase, opening onto said crankcase;
- a piston, reciprocally disposed, in each of said cylinders;
- means for admitting gas into, and discharging gas from, each of said cylinders;
- a crankshaft, having only a single crank, journaled in said crankcase;
- first rod means connected to two of said pistons; and
- second rod means connected to the other of said pistons;
- wherein
- both said first and second rod means are coupled to said single crank to cause coincident reciprocation of said three pistons;
- said first rod means comprises (a) a connecting rod, and (b) tie rods fastening said two of said pistons together;
- said two of said pistons each has a head and a base, and at said base thereof, a radially-extending flange or skirt; and
- said tie rods are fastened, at opposite ends thereof, to said flanges or skirts of said two of said pistons.

4,957,417

## VERTICAL OILLESS SCREW VACUUM PUMP

Noboru Tsuboi, Kakogawa, Japan, assignor to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan  
Filed Jul. 14, 1989, Ser. No. 379,936  
Int. Cl.<sup>5</sup> F04B 35/04; F01C 1/24

U.S. Cl. 417-423.13

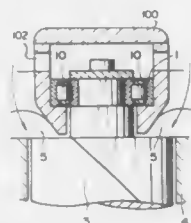
2 Claims

1. A vertical oilless screw vacuum pump comprising: a pump unit comprising:

- (a) a pump casing provided with a suction port in the upper portion thereof and a discharge port in the lower portion thereof;
- (b) a set of vertically extending meshed male and female oilless screw rotors disposed within a rotor chamber formed in the casing and having rotor shafts supported for rotation at opposite ends thereof in roller bearings on the casing, and

(c) a pair of timing gears attached to lower ends of the rotor shafts of said male and female oilless screw rotors; and

a high frequency motor driven by high-frequency power, disposed under the pump unit and having a motor casing joined to a lower end of said pump casing, said high-frequency motor having a vertically extending output shaft; wherein an upper end of the said output shaft of said high frequency motor is coupled directly with the lower end of one of said rotor shafts to drive the male and female oilless screw rotors directly, and wherein the motor casing contains a supply of oil such that said motor casing comprises an oil reservoir,



wherein the bearings supporting upper ends of the roller shafts are held in bearing casings having apertures, including a grease lubricating the bearings supporting upper ends of the rotor shafts, said grease having a vapor pressure below a desired ultimate vacuum to be achieved by the vertical oilless screw vacuum pump, wherein air flow can flow through said apertures such that the bearing supporting the upper ends of said rotor shafts are impinged by the air flow and are disposed in a suction flow path, and so are cooled.

4,957,418

## INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

Anton Pischinger, Graz, and Theodor Stipek, Hallein, both of Austria, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

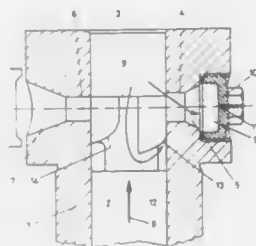
Filed Mar. 29, 1989, Ser. No. 330,389

Claims priority, application Fed. Rep. of Germany, Jun. 18, 1988, 3820706

Int. Cl.<sup>5</sup> F04B 7/04; F02B 3/00

U.S. Cl. 417-494

10 Claims



1. An injection pump for internal combustion engines, having a pump piston (2) in a pump bushing (1) a suction chamber (7) connected to said pump piston bushing, a connection (6) which connects said suction chamber to a work chamber (3) of the pump, said connection (6) is interrupted by the pump piston upon supply onset, and in which a diversion of the pump pressure at the end of supply is effected by re-opening a com-

munication with the suction chamber, in which at least one separate diversion chamber (5), defined by a pressure maintenance means located in a wall portion separating said diversion chamber (5) from said work chamber (3) is connected to the work chamber (3) via a connection bore (4), said connection bore (4) is likewise openable and closable by the pump piston (2), and a connection of said connector bore (4) with the work chamber (3) is opened earlier, at the end of pump supply, than the connection (6) to the suction chamber (7).

4,957,419

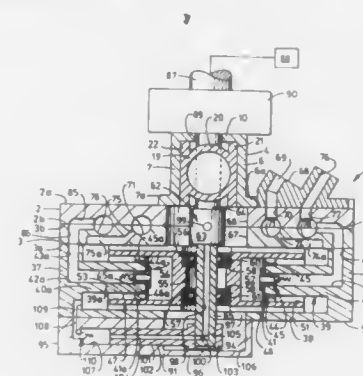
## COMPRESSOR

Anthony J. Rascov, 4304 Tobasco Rd., Cincinnati, Ohio 45244  
Filed Apr. 14, 1989, Ser. No. 337,937

Int. Cl.<sup>5</sup> F04B 1/00

U.S. Cl. 417-273

8 Claims



1. A compressor comprising first and second manifold plates having inner and outer surfaces, said manifold plates being joined together with their inner surfaces abutting in fluid tight fashion, first and second elongated cylinder housings each having side walls, end walls and an outer wall, said first and second cylinder housings being affixed in fluid tight fashion to the outer surfaces of said first and second manifold plates, respectively, and extending thereacross in directions oriented at 90° with respect to each other, first and second piston head/piston rod assemblies located in each of said cylinder housings, said first and second piston head/piston rod assemblies of each cylinder housing extending axially thereof from the cylinder housing ends in fixed and opposed relationship, first and second elongated sleeves located within said first and second cylinder housings, respectively, and being axially shiftable therein, each of said sleeves having an axial bore at each of its ends, each said axial bore receiving in fluid tight fashion one of said piston heads of its respective cylinder housing and forming a compression chamber therewith providing two compression chambers per cylinder housing, a crank comprising a crank element located in a central hole in said manifold plates and a pair of oppositely directed first and second crank pins each mounted on bearings in a central transverse hole in one of said sleeves located between said sleeve bores, means to impart rotation to said crank, said crank and its pins interconnecting said sleeves such that as said crank is rotated each crank pin rotates about its own axis and simultaneously reciprocates rectilinearly resulting in reciprocation of its respective sleeve within its respective cylinder housing providing an intake stroke and a compression stroke in sequence for each said four compression chambers, an intake port and an outlet port for said compressor, means to introduce fluid from said inlet port to each compression chamber during its intake stroke and means to deliver pressurized fluid from each compression chamber during its compression stroke to said outlet port.

4,957,420

## VANE PUMP WITH GUIDE MEANS FOR REGULATING MOVEMENT OF VANE

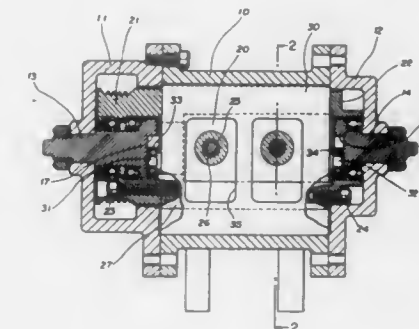
Shoichi Furuhashi, Tokyo, Japan, assignor to Nippon Piston Ring Co., Ltd., Tokyo, Japan

Filed Apr. 11, 1989, Ser. No. 336,082

Claims priority, application Japan, Apr. 27, 1988, 63-102496  
Int. Cl.<sup>5</sup> F04C 18/344

U.S. Cl. 418-255

6 Claims



1. A vane pump comprising a center housing, front and rear housings holding said center housing therebetween, a rotor eccentrically disposed in said center housing and rotatably supported by said front and rear housings, a single vane diametrically movably inserted in said rotor, a plurality of bolts and spacers, and guide means for regulating the projection of said vane out of said rotor,

said guide means comprising an axle provided centrally on each side of said vane, a circular hole formed in the inner surface of each of said front and rear housings to receive said axle and having a center just in the middle between the centers of said rotor and said center housing, and a roller bearing interposed between said axle and said circular hole to guide said axle in a circular path with a diameter equal to the eccentric radius of said rotor, said center housing having an inner surface with a cross-sectional profile that is firstly drawn by the tip of said vane when said rotor turns and then expanded by a preselected clearance, said front and rear housings being respectively provided with front and rear shafts axially aligned with said rotor, said rotor having front and rear blocks rotatably fitted on said front and rear shafts, said rotor having a pair of generally semicylindrical bodies joined to each other with the intervention of said front and rear blocks to form a vane groove therebetween, and said vane being centrally formed with a long hole having the plurality of bolts and spacers positioned therein to maintain said vane groove.

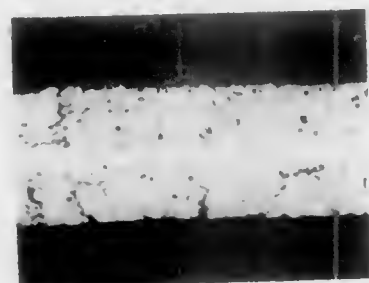
4,957,421

## METAL TREATMENT

Alfonso L. Baldi, Wynnewood, Pa., assignor to Alloy Surfaces Company, Inc., Wilmington, Del.  
Continuation-in-part of Ser. No. 289,595, Dec. 22, 1988, Ser. No. 205,387, Jun. 10, 1988, Pat. No. 4,895,609, Ser. No. 182,718, Apr. 18, 1988, Ser. No. 28,741, Mar. 23, 1987, Pat. No. 4,927,796, Ser. No. 96,368, Sep. 11, 1987, Pat. No. 4,880,483, Ser. No. 862,712, May 13, 1986, Pat. No. 4,871,708, Ser. No. 707,656, Mar. 4, 1985, Pat. No. 4,824,482, Ser. No. 685,910, Dec. 27, 1984, Pat. No. 4,920,362, Ser. No. 584,538, Feb. 28, 1984, Pat. No. 4,845,139, and Ser. No. 538,541, Oct. 3, 1983, Pat. No. 4,830,931, each is a continuation-in-part of Ser. No. 632,016, Jul. 18, 1984, abandoned, Ser. No. 571,510, Jan. 17, 1984, Pat. No. 4,537,927, Ser. No. 554,441, Nov. 22, 1983, abandoned, Ser. No. 488,103, Apr. 25, 1983, Pat. No. 4,615,920, Ser. No. 417,214, Sep. 13, 1982, abandoned, Ser. No. 281,405, Jul. 8, 1981, Pat. No. 4,708,913, and Ser. No. 172,671, Jul. 28, 1980, Pat. No. 4,435,481. This application Apr. 10, 1989, Ser. No. 335,240

Int. Cl.<sup>3</sup> B22F 7/00

U.S. Cl. 419—8



1. The process of preparing a pyrophorically modified foil, in which process a metal foil about 0.02 to about 0.05 millimeters thick has applied to its surface a layer of a mixture of powdered aluminum, iron and nickel which is then heated to cause the powders to inter-react without materially degrading the foil, to form iron and nickel aluminides having at least twice as many aluminum atoms as nickel and iron atoms and sintered to the foil, and the resulting foil is leached to remove some of the aluminum from the aluminides and thus to develop pyrophoricity.

4,957,422

## APPARATUS FOR THE MANUFACTURE OF SECTIONS OF THERMOPLASTIC RESIN REINFORCED WITH CONTINUOUS FIBERS

Michel Glemet, Serguigny, and Gilles Cognet, Bernay, both of France, assignors to Societe Atochem, Puteaus, France  
Division of Ser. No. 176,854, Apr. 4, 1988, Pat. No. 4,883,625.  
This application Sep. 11, 1989, Ser. No. 405,551  
Claims priority, application France, Apr. 9, 1987, 87 04996  
Int. Cl.<sup>3</sup> B29C 47/02

U.S. Cl. 425—114

3 Claims



1. An apparatus for the manufacture of articles of thermoplastic resin reinforced with continuous fibers which comprises a channel including a coating zone having means for coating the continuous fibers and a shaping zone downstream of said coating zone and having means for shaping the articles, wherein a baffle zone is provided upstream of and in communication with the coating zone, said baffle zone comprising a

baffle channel portion and at least one baffle extending substantially transversely into said baffle channel portion; and between the coating zone and the shaping zone, there is an impregnation zone in alignment with the exit of the coating zone and the entrance of the shaping zone, and having at least two baffles opposite to, and parallel with, each other, and extending substantially transversely into the channel; wherein the at least one baffle of the first baffle zone is substantially parallel to the at least two baffles of the impregnating zone.

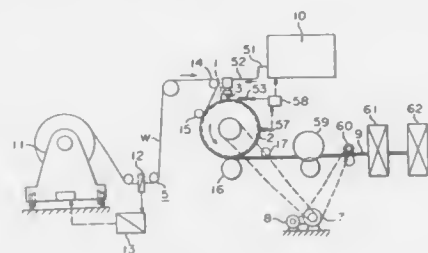
4,957,423

## SEPARATOR MANUFACTURING APPARATUS

Hisao Yokoya, Nakatsugawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Division of Ser. No. 251,365, Sep. 30, 1988, Pat. No. 4,897,026.  
This application Nov. 1, 1989, Ser. No. 430,786  
Claims priority, application Japan, Oct. 1, 1987, 62-248414; Oct. 1, 1987, 62-248413; Oct. 26, 1987, 62-269775; Oct. 26, 1987, 62-269774; Oct. 26, 1987, 62-269773  
Int. Cl.<sup>3</sup> B29C 31/04

10 Claims U.S. Cl. 425—115

15 Claims



1. A separator manufacturing apparatus which comprises:  
a transfer roller with a plurality of annular shaping grooves having a predetermined shape in cross section which are formed in the outer circumferential surface of said roller in its circumferential direction,  
a resin feeding device with a nozzle means to feed a hot-melt type resin having high adhesion properties to said annular shaping grooves of the transfer roller,  
a base paper feeding device to feed a continuous paper at a predetermined speed to a part of said outer circumferential surface of the transfer roller supplied with said resin to thereby form by transfer a plurality of ribs having a predetermined shape corresponding to the annular shaping grooves on a surface of said continuous paper, and  
a resin drop receiving device to receive resin drops from said nozzle means of the resin feeding device before feeding said resin to said annular shaping grooves.

4,957,424

## CONCRETE PIPE MAKING MACHINE

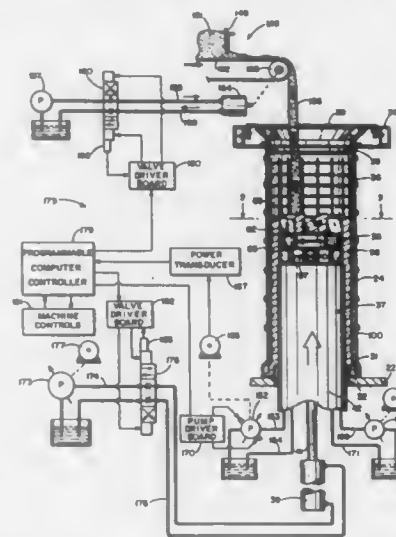
William J. Mitchell, Charles City, and Navarro T. Fosse, Nashua, both of Iowa, assignors to Hydrotile Machinery Company, Nashua, Iowa  
Filed Mar. 13, 1989, Ser. No. 322,175  
Int. Cl.<sup>3</sup> B28B 21/28

U.S. Cl. 425—145

48 Claims

45. A core and counter rotating packerhead assembly for a concrete pipe making machine comprising: a core having an axis, a side wall, and a top wall surrounding a chamber, vibrator means located within said chamber, means mounting the vibrator means on the side wall of the core whereby the vibrator means vibrates said side wall, counter rotating packerhead means located adjacent said top wall of the core, shaft means mounting the packerhead means on the core for rotation about the axis of the core, said packerhead means, comprising a first means for working concrete generally into the shape of a concrete pipe, second means for working the concrete after the

first means has worked the concrete, and drive means mounted on the core and located in said chamber for rotating the shaft



means to turn the first means in a first circumferential direction and turn the second means in a second circumferential direction opposite the first circumferential direction.

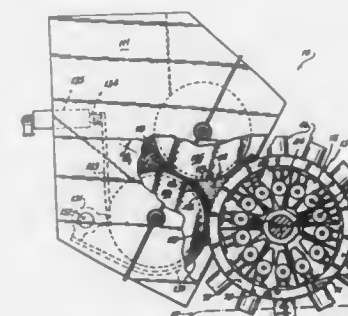
4,957,425

## APPARATUS FOR PRODUCING SHAPED PRODUCTS

Rudolph J. Fay, 6911 Wildflower Trail, Cincinnati, Ohio 45230  
Filed May 15, 1989, Ser. No. 352,404  
Int. Cl.<sup>3</sup> B29C 43/50

U.S. Cl. 425—362

23 Claims



8. A machine for producing configured products comprising  
a rotary die roll having an open interior and cavities arranged in a series of longitudinal rows and circumferential columns,  
movable dies disposed in each of said cavities, said dies being made from a porous material,  
means for introducing product into said cavities,  
means for ejecting said product from said cavities, said ejection means comprising  
means for moving said dies outwardly in said cavities until the outer surfaces of said dies are approximately flush with the surface of said roll,  
gas supply means for supplying gas at a regulated pressure to the underside of said porous material dies as said dies are moved outwardly in said die cavities, said gas being operable to eject said product from said dies and to prevent said product from sticking to and clogging the pores of said dies, and  
means for independently adjusting and presetting the gas pressure supplied to the underside of each of said po-

rous material dies so as to enable the pressure supplied to all of said porous material dies to be equalized.

16. A machine for producing configured products comprising

a rotary die roll having an open interior and cavities arranged in a series of longitudinal rows and circumferential columns,  
movable dies disposed in each of said cavities, said dies being made from a porous material,  
first means for introducing a first, non-moldable solid product into said cavities,  
second means for introducing a second moldable product into said cavities downstream of said first introducing means,  
means for ejecting said product from said cavities, said ejection means comprising  
means for moving said dies outwardly in said cavities until the outer surfaces of said dies are approximately flush with the surface of said roll, and  
gas supply means for supplying gas at a regulated pressure to the underside of said porous material dies as said dies are moved outwardly in said die cavities, said gas being operable to eject said product from said dies and to prevent said product from sticking to and clogging the pores of said dies.

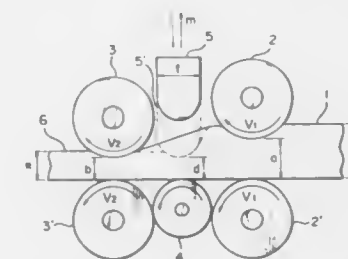
4,957,426

## APPARATUS FOR STRETCHING DOUGH

Torahiko Hayashi, Tochigi, Japan, assignor to Rheon Automatic Machinery Co., Ltd., Utsunomiya, Japan  
Filed Feb. 6, 1989, Ser. No. 307,123  
Claims priority, application Japan, Feb. 15, 1988, 63-32357  
Int. Cl.<sup>3</sup> A21C 3/02

U.S. Cl. 425—367

13 Claims



1. In an apparatus for stretching an elongated dough body having a length and a thickness, said apparatus having:  
(a) an upstream pair and a downstream pair of rollers, each pair of said rollers positioned and spaced apart from each other to provide a path for the dough body and rotating in the same direction where they face each other and at the same peripheral speed,  
(b) means for adjusting the space between said rollers in each pair so that the space between said upstream pair of rollers is wider than the space between said downstream pair of rollers, the space between said upstream rollers being less than the thickness of the dough body upstream of said upstream pair of rollers, and the space between said downstream rollers being less than the thickness of the dough body located between said upstream pair and downstream pair of rollers.  
(c) means for driving said upstream pair and said downstream pair of rollers so that the peripheral speed of said upstream pair of rollers is slower than that of said downstream pair of rollers, thereby imparting a tensile pressure along the length of the dough body,  
the improvement comprising:  
means for imparting vibrations to a portion of the dough body, said means positioned between said upstream pair and said downstream pair of rollers, said imparted vibra-



tions having an amplitude and a frequency such that a thixotropic effect occurs in the portion of the dough body, thereby allowing stretching of the dough body with said tensile pressure lower than the pressure at which the dough loses its elasticity.

4,957,427

## LIQUID FUEL PURIFYING BURNER

Jörg Füllemann, Mastrils, and Heinrich Boser, Malans, both of Switzerland, assignors to VTH AG Verfahrenstechnik Für Heizung, Liechtenstein

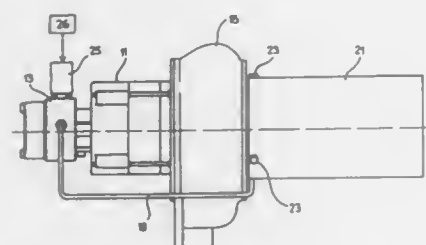
Filed Mar. 11, 1988, Ser. No. 167,300

Claims priority, application Switzerland, Mar. 13, 1987, 958/87

Int. Cl.<sup>5</sup> F23Q 3/00

U.S. Cl. 431—265

42 Claims



1. A burner comprising
  - a rotating gasifier (17), said gasifier including
    - a hollow body rotating at high speed,
    - an inlet (53) for air into the hollow body, and
    - an outlet (55) from the inside of the hollow body for a gas/air mixture;
  - means (13, 25, 19) for supplying fuel to the interior of the hollow body of the gasifier (17);
  - a drive means (11) for rotating the gasifier (17); and
  - means (21) external of the hollow body for the recirculation of hot combustion gases from the outlet (55) to the inlet (53).

4,957,428

## PROCESS FOR CONSTRUCTING FURNACES WITH OPEN CHAMBERS, FOR AVOIDING DEFORMATION THEREOF

Aristide Valassopoulos, Aix en Provence; Jean-Claude Thomas, St. Germain en Laye, and Christian Dreyer, St. Jean de Maurienne, all of France, assignors to Aluminium Pechiney, Paris, France

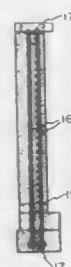
Filed Mar. 23, 1989, Ser. No. 327,703

Claims priority, application France, Apr. 8, 1988, 88 05251

Int. Cl.<sup>5</sup> F27D 7/00

U.S. Cl. 432—3

4 Claims



1. A process for constructing a furnace with open chambers for baking carbonaceous blocks, comprising arranging a plurality of chambers in a series or in two parallel series, each chamber being defined by lateral partitions and transverse partitions, disposing the plurality of chambers within an independent

concrete casing structure formed by a floor and lateral wall portions having disposed thereon a plurality of vertical buttresses and compressively prestressing said vertical buttresses in the vertical direction.

4,957,429

## METHOD AND APPARATUS FOR REMOVING VOLATILE HYDROCARBONS FROM PARTICULATE SOILS

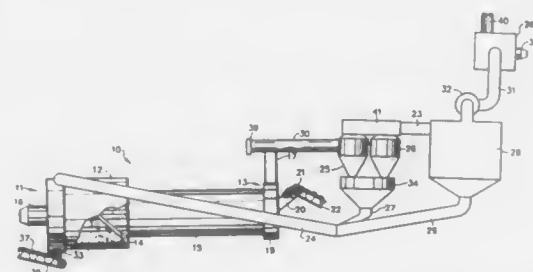
Robert L. Mendenhall, 1770 Industrial Rd., Las Vegas, Nev. 89102

Filed Aug. 18, 1989, Ser. No. 395,604

Int. Cl.<sup>5</sup> F23G 5/20; F27B 15/12

U.S. Cl. 432—14

19 Claims



1. A continuous method of removing a volatilizable organic composition from a particulate mineral composition containing said organic composition comprising:
  - introducing hot gases of combustion into a first end of a rotatable drum and directing said hot gases toward a second of said drum end,
  - introducing said particulate mineral composition comprising a mixture of coarse and fine particles into said drum adjacent said second end and rotating said drum and exposing said particles to said hot gases while advancing said particles toward said first end,
  - removing a gaseous composition from said drum comprising a mixture of said gases of combustion, volatilized organic composition, and fine particles of said mineral composition at said second end,
  - separating the fine particles of said mineral composition from said gaseous composition,
  - directing fine particles separated from said gaseous composition into said drum at a location along a drum length between said first and second second ends, mixing the fine particles with coarse particles advancing toward said first end, and continuing to heat the mixed fine and coarse particles until the concentration of volatilizable organic composition therein is less than about 100 parts per million, and
  - recovering a mixture of coarse and fine mineral composition particles adjacent said first end,

4,957,430

## LIMITING THE PRESENCE OF THE OXIDES OF NITROGEN IN REGENERATIVE HEATING SYSTEMS

James H. Goodfellow, Dewsbury, England, assignor to British Gas plc, London and Hotwork Developments Ltd., West Yorkshire, both of England

Continuation of Ser. No. 227,517, Aug. 2, 1988, abandoned, which is a continuation of Ser. No. 96,284, Sep. 14, 1987, Pat. No. 4,768,949. This application Oct. 6, 1989, Ser. No. 420,609

Claims priority, application United Kingdom, Dec. 19, 1985, 8531277; Feb. 20, 1986, 8604168

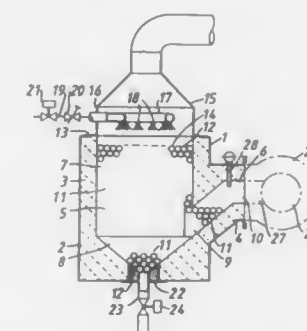
Int. Cl.<sup>5</sup> F27D 17/00; F27B 15/00; F23D 13/20

U.S. Cl. 432—28

3 Claims

1. A method for limiting the amount of nitrogen oxides in exhaust gas from a regenerator by causing water vapor to enter

a combustion chamber of the regenerator during a firing phase in a form in which the water vapor is entrained in preheated combustion air, the method comprising injecting water or water vapor into the combustion air at a point upstream of the



preheated storage bed with respect to the direction of movement of the combustion air so that the water or water vapor reaches the combustion chamber by way of the heat storage bed.

4,957,431

## HEATING MANTLE WITH A POROUS RADIATION WALL

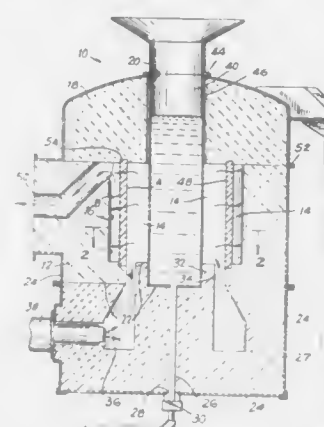
Meng-Teck Eng, Wayne, and H. Kenneth Staffin, Colonia, both of N.J., assignors to Gas Research Institute, Chicago, Ill.

Filed Jan. 1, 1989, Ser. No. 359,973

Int. Cl.<sup>5</sup> F27B 3/20

U.S. Cl. 432—31

12 Claims



1. A heating mantle for heating materials comprising:
  - a material holding means for holding said material;
  - a housing defining a chamber which substantially surrounds said material holding means;
  - a source of hot gases constructed and arranged for supplying hot gases through said chamber in a preselected path;
  - porous wall means defined between a first face directed toward said material holding means, and an opposed second face and disposed in said chamber in said path with said gases entering said porous wall means through said first face for receiving heat from said hot gases, said first face radiating heat toward said material holding means wherein said gases flow from said first face to said second face; and
  - means for exhausting said gases after said gases passed through said second face.

4,957,432

## FORCED JET CONVECTION OVEN FOR VACUUM BAGGING

Duane M. Rachal, and James R. Krone, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 91,815, Sep. 1, 1987, Pat. No. 4,915,896.

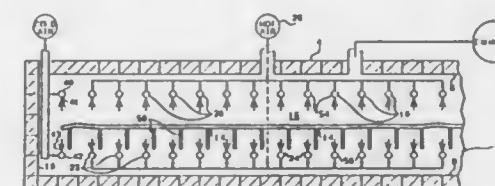
This application Aug. 23, 1989, Ser. No. 397,227

Claims priority, application Canada, May 10, 1988, 566394

Int. Cl.<sup>5</sup> F27B 5/16

U.S. Cl. 432—59

15 Claims



1. Apparatus comprising:
    - (a) an oven having an inside ceiling, inside floor, and an inside outer perimeter extending between an outer edge of the ceiling and an outer edge of the floor;
    - (b) a support having an upper surface suitable for supporting a panel, said support means being positioned in the oven with the upper surface of the support means being spaced apart from the ceiling of the oven to define a panel-receiving chamber between the upper surface of the support means and the ceiling of the oven;
    - (c) a first manifold means positioned between the upper surface of the support means and the ceiling of the oven, said first manifold means having a first multiplicity of outlets directed in the direction of the upper surface of the support means; and
    - (d) a second manifold means positioned between the upper surface of the support means and the floor of the oven, said second manifold means having a second multiplicity of outlets directed in the direction of the upper surface of the support means;
- wherein the support means comprises a plurality of parallel bars mounted across the oven floor, portions of the second manifold means are positioned between and below the parallel bars, and the first manifold means and the second manifold means each comprise a plurality of branches extending in a direction generally parallel to the plurality of parallel bars forming the support means.

4,957,433

## DRUM BAFFLE

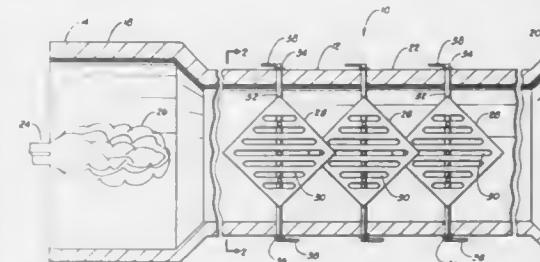
George W. Swisher, Jr., Oklahoma City, Okla., assignor to CMI Corporation, Oklahoma City, Okla.

Filed May 15, 1989, Ser. No. 351,395

Int. Cl.<sup>5</sup> F27B 7/14

U.S. Cl. 432—103

6 Claims



1. In a drum used for heating solid material being veiled through the drum with hot gases of combustion flowing through the drum, the improvement comprising:
  - at least one baffle in the drum; and

means for pivoting the baffle within the drum generally between a first position in which the baffle is parallel to the normal flow of the gases of combustion through the drum and a second position in which the baffle is perpendicular to the normal flow of the gases of combustion through the drum, wherein the means for pivoting the baffle comprising a shaft extending transversely across the drum and pivotally secured within the drum, said baffle being secured to said shaft and extending perpendicular to the axis of said shaft; and means for turning said shaft.

4,957,434

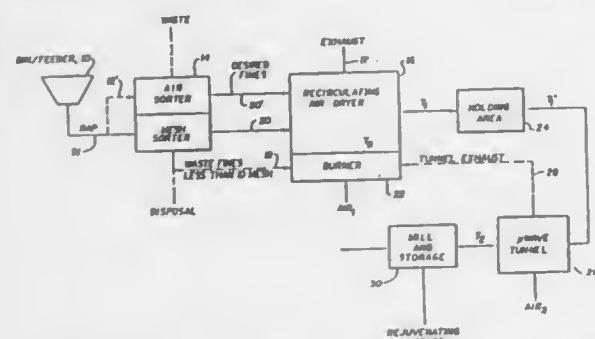
**METHOD AND APPARATUS FOR TREATING ASPHALTIC CONCRETE PAVING MATERIALS**  
John Radomsky, Cedar Park, Tex., assignor to Cyclean, Georgetown, Tex.

Filed Dec. 20, 1985, Ser. No. 811,364

Int. Cl.<sup>5</sup> F27B 7/36

U.S. Cl. 432—103

33 Claims



1. A method for heating reclaimed asphaltic concrete paving comprising the following steps in combination: placement of the reclaimed asphaltic pavement RAP in an impingement air sorter for removing fine particles which are smaller than a predetermined size; a first heating step comprising heating the remaining asphaltic paving in a recirculating air dryer to a first predetermined temperature; and a second heating step comprising heating said reclaimed asphaltic concrete in a microwave tunnel to a second predetermined temperature.

4,957,435

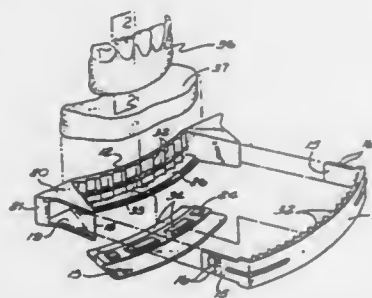
**DENTAL LABORATORY DIE TRAY**  
Vanik N. Jinolan, Obermump, Switzerland; Ray E. Morrow, and Wayne W. Whitehill, both of Arcadia, Calif., assignors to Vident, Inc., Baldwin Park, Calif.

Filed Oct. 6, 1988, Ser. No. 254,441

Int. Cl.<sup>5</sup> A61C 19/00

U.S. Cl. 433—34

11 Claims



1. In a dental laboratory die tray, the combination of: a first side member;

a second side member; and a bottom member; said first and second side members having first integrally formed interengaging means for releasably joining said first and second side members to form a housing with an open top and an open bottom and defining a space for a dental model, with said side members movable toward and away from each other, and with said first interengaging means including means defining a housing closed position and a housing partially closed position independently of said bottom member, with said side members separable from each other in a housing open position, and with said bottom member holdable between said side members when said side members are in said closed position and with said bottom member released from said side members when said side members are in said partially closed position, and said bottom member and said first and second side members having second integrally formed interengaging means for releasably joining said bottom member to said side members for closing said open bottom of said housing with said bottom member removable from and replaceable in between said side members when said side members are in said partially closed position.

4,957,436

**DENTAL PUMP SYSTEM FOR CHEMICAL CARRIES REMOVAL**

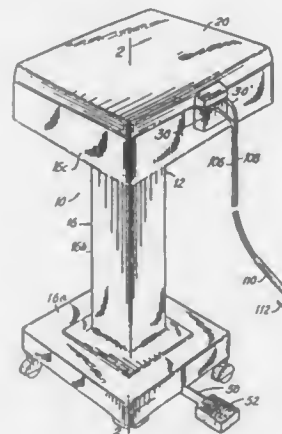
Francis E. Ryder, Arab, Ala., assignor to National Patent Development Corporation, New York, N.Y.

Filed Mar. 28, 1986, Ser. No. 845,645

Int. Cl.<sup>5</sup> A61C 3/02

U.S. Cl. 433—88

19 Claims



1. A fluid dispensing apparatus for a flexible container having an outlet opening; said apparatus comprising a frame, a first wall member mounted to said frame; a first container impinging means mounted to said frame in facing relation to said first wall member respectively; a heater means mounted to said frame for maintaining the fluid in said container at a predetermined temperature; and drive means for actuating said first container impinging means between a first condition wherein it is urged toward said first wall member for squeezing the container therebetween to urge the liquid therefrom through said outlet opening and a second condition wherein said container impinging member is in a retracted position state relative to said wall member for permitting said container to return to a relaxed state for maintaining the liquid therein, said drive means comprising resilient means for normally urging said container impinging means toward said wall member and selectively actuatable release means for driving said impinging means against said resilient means and away from said wall member.

4,957,437

**ARTIFICIAL TOOTH**

Kaizo Shimura, Yokosuka; Hiroyasu Takeschi, Tokorozawa; Masahiro Hirano, Yokozemachi, and Yohji Imai, Chiba, all of Japan, assignors to Mitsubishi Mining & Cement Co., Ltd., Tokyo, Japan

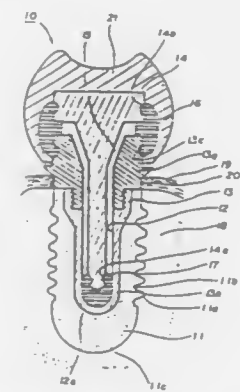
Filed Feb. 16, 1989, Ser. No. 311,539

Claims priority, application Japan, Feb. 23, 1988, 63-38752

Int. Cl.<sup>5</sup> A61C 13/28

U.S. Cl. 433—169

10 Claims



1. An artificial tooth comprising a contacting member formed of a composite material having compatibility with living tissues and disposed at an outer portion of the artificial tooth to be contacted with alveolar bone, a metal base member having an opening therein and disposed inside of and attached to said contacting member, a metal post inserted into said opening of the metal base member and at least two elastic buffer members disposed in a space between said metal base member and said metal post, said composite material having compatibility with living tissues containing 40 to 95% by weight of a calcium phosphate compound and 60 to 5% by weight of an organic polymer, each of said elastic buffer members being spaced apart for movably receiving said metal post by which pressure imposed upon the artificial tooth is transmitted, said metal base member being constituted by an upper section and a lower section removably connected to each other.

4,957,438

**DENTAL COUPLING ASSEMBLY AND METHOD FOR ITS USE**

Arthur Bax, Schilde, Belgium, assignor to CEKA N.V., Antwerpen, Belgium

PCT No. PCT/DE87/00547, § 371 Date Jul. 12, 1988, § 102(e)

Date Jul. 12, 1988, PCT Pub. No. WO88/03786, PCT Pub.

Date Jun. 2, 1988

PCT Filed Nov. 25, 1987, Ser. No. 236,360

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1986, 3640163; Mar. 9, 1987, 3707483; Nov. 23, 1987, 3739646

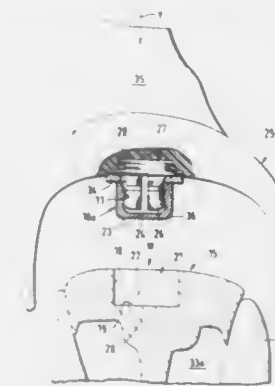
Int. Cl.<sup>5</sup> A61C 13/225

U.S. Cl. 433—180

10 Claims

1. A dental coupling assembly, comprising: a holding member having a body anchorable in a mouth and formed with an undercut-free recess opening at a face of said body, said recess being bounded by a right-circularly cylindrical internal wall directly adjoining a circular bottom wall of said recess, said bottom wall continuously spanning across a bottom of said recess, said right-circularly cylindrical wall being peripherally continuous and extending straightly over substantially a full depth of said recess from a junction with said bottom wall to said face; a retention member connectable to a dental prosthesis and formed with a plug on one side of said retention member, said plug being received in said recess and having a right-circularly cylindrical peripherally continuous external

wall extending straightly from an end of said plug to a level of said face and juxtaposed with said internal wall across an all-around cylindrical gap, said plug having a circular continuous end wall spanning continuously across said end, forming a junction with said external wall and spaced from said bottom wall across a circular gap communicating with said cylindrical gap;



- a mass of adhesive displaced by said plug to fill said gaps and settable to bond said members together while filling said gaps; and means for securing a dental prosthesis to an opposite side of said retention member.

4,957,439

**PREFABRICATED DENTAL PONTIC, PONTIC CONNECTOR AND ASSEMBLY**

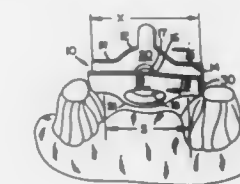
Itzhak Shohar, 50 Shlomo-Hamelech St., Tel-Aviv, Israel 64386, and Aharon E. Whiteman, 13 J.L. Perez St., Petach-Tikvah, Israel 49206

Filed Sep. 17, 1987, Ser. No. 97,824

Int. Cl.<sup>5</sup> A61C 13/12

U.S. Cl. 433—180

11 Claims



1. A prefabricated structure for forming a pontic for joining metal retainer(s) mounted on an abutment tooth or teeth adjacent an edentulous space to be filled with the pontic in the fabrication of a bridge comprising: a metal body having open spaces in said body and having a mesiodistal dimension shorter than the span between the abutment teeth separating the edentulous space and an arm extending from said metal body, said arm having a free end for engaging said metal retainer at the interproximal and a trough-like channel extending from said free end with said trough-like channel having a depth in the occluso-lingual direction greater than at least about 0.5 mm such that the trough-like channel formed by said arm permits solder to collect, flow and fill into the channel for forming a reinforced solder joint upon soldering said arm to said retainer.



4,957,440

**PROCESS FOR PREPARING NONSHRINKING PORCELAIN OPAQUE COVERING FOR DENTAL APPLIANCES**

Robert B. Hankins, 1011 W. 34th St., Austin, Tex. 78705, and  
 Reid B. Green, 1801 Wells Branch Pkwy., Apt. 409, Austin,  
 Tex. 78728

Filed Aug. 7, 1986, Ser. No. 893,920  
 Int. Cl.<sup>5</sup> A61C 5/08, 13/83; B29C 33/52

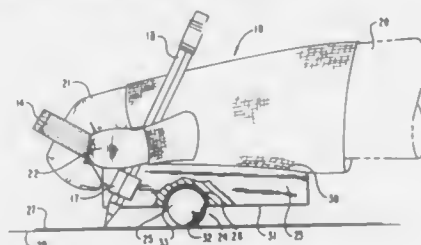
U.S. Cl. 433—201.1

1 Claim

1. A process for applying an opaque covering to the metal casting of a metal-ceramic dental restoration which comprises:

- (a) mixing about 7 parts by weight powdered opaque porcelain with about 3 parts by weight molten wax;
- (b) heating the resulting mixture to a temperature approximately 2 to 5° C. above the melting point of the wax used in forming the mixture;
- (c) applying the heated mixture to a metal casting forming the base of a dental restoration using an instrument heated to a temperature approximately 2 to 5° C. above the melting point of the wax used in forming the mixture;
- (d) substantially vaporizing the wax from the mixture by heating the coated casting to about 600° C. for about 10 minutes; and
- (e) firing the remaining porcelain in a vacuum oven at approximately 980° C. for about 10 minutes.

a stabilizing weight member having a top side and a bottom side, and a roller ball socket in said bottom side;  
 a roller ball rotatably mounted in said roller ball socket;  
 writing instrument holder means attached to said weight member, said holder means being for holding a writing instrument so that the writing end of said instrument extends beyond said bottom side;



said writing instrument holder means includes a holder protrusion extending from the side of said weight member, said holder protrusion having a writing instrument passageway; and  
 hand attachment means mounted to the top side of said weight member, said hand attachment means being for attaching said weight member to a hand.

4,957,443

**EDUCATIONAL CARD GAME SYSTEM**

Franklin B. Schwartz, 848 E. 28 St., C-9, Brooklyn, N.Y. 11210  
 Filed Jan. 5, 1989, Ser. No. 293,702

Int. Cl.<sup>5</sup> G09B 19/00; A63F 1/00

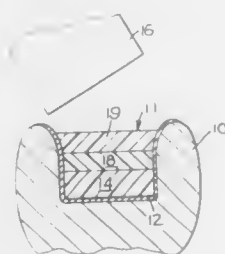
U.S. Cl. 434—188

30 Claims



1. An educational card game for entertaining a number of players comprising a deck of cards, a first definition of statements to be considered valid for the purposes of the game, and a set of rules such that:

- (a) each card of said deck has a first face identical to said first face of each other card in said deck, and a second face on which a representation appears in a first direction, and a representation appears in a second direction which is 180 degrees rotated from said first direction;
- (b) each card of said deck carrying on said second face in said first direction a representation of a first binary relation carries on said second face in said second direction a representation of a binary relation which is the mathematical inverse of said first binary relation;
- (c) each card of said deck carrying on said second face in said first direction a representation of a first binary function carries on said second face in said second direction a representation of a second binary function which, when applied to the same two arguments as said first binary function with the order of said same two arguments reversed when said second binary function is applied to them, produces the same result as said first binary function produces when applied to said same two arguments in their original order;
- (d) each card of said deck carrying on said second face in said first direction a representation of a unary function carries on said second face in said second direction a representation of the same unary function;
- (e) there exist in said deck at least two cards each of which carries on said second face in said first direction a representation of a binary relation and/or a binary function,



1. Method of enhancing the cure of a photocurable restorative material comprising the steps of:

- (a) applying to a dental substrate or model thereof a coating comprising an amount, sufficient to increase the hardness of the underside of a photocurable dental restorative after photocuring, of a fluorescent material that, when exposed to radiant energy, fluoresces at a wavelength at which the restorative material photocures;
- (b) applying a thin layer of the restorative material over the coating; and
- (c) exposing the layer to radiant energy of said wavelength to photocure the restorative material.

4,957,442

**APPARATUS AND METHOD FOR ASSISTING A DISABLED PERSON TO HAND WRITE WITH A WRITING INSTRUMENT**

Stephen J. Prater, 444 S. Fenton Ave., Indianapolis, Ind. 46219  
 Filed Oct. 24, 1989, Ser. No. 425,943

Int. Cl.<sup>5</sup> G09B 11/00; B43L 13/00, 15/00

U.S. Cl. 434—166

17 Claims

1. An apparatus for assisting the disabled to handwrite, said apparatus comprising:

- (f) there exists in said deck at least one card carrying on said second face in said first direction a representation of a binary relation which does not appear on said second face of same card in said second direction;
- (g) for each card in said deck which carries on said second face a unary function there exists at least one other card of said deck which carries on said second face the mathematical inverse of that unary function;
- (h) each card of said deck carrying on said second face in said first direction a representation of a first concept that is not a binary relation, not a binary function, and not a unary function, carries on said second face in said second direction a representation of a concept which if different from said first concept differs only for grammatical purposes;
- (i) each statement defined by said first definition of statements can be represented in at least one direction using representations carried on said second faces of at least two cards of said deck;
- (j) no card of said deck carries on said second face any representation not useful for the purpose of representing a portion of at least one statement defined by said first definition of statements;
- (k) whenever any statement defined by said first definition of statements is represented in said first direction using representations carried on said second faces of cards of said deck, a statement defined by said first definition is represented in said second direction using representations carried on said second faces of same cards of said deck; and
- (l) whenever any statement defined by said first definition of statements is represented in said second direction using said second faces of cards of said deck, a statement defined by said first definition is represented in said first direction on said second faces of same cards of said deck.

4,957,444

**TRAINING HORSE SIMULATOR**

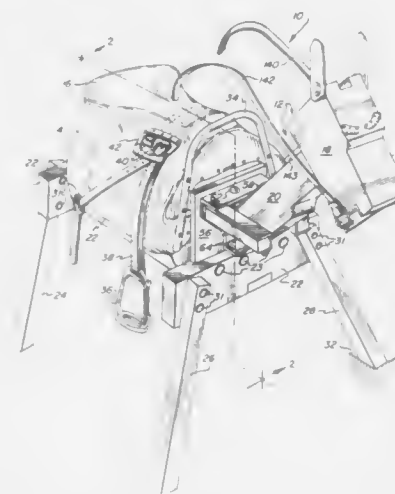
Seth A. Armen, Weston, Conn., assignor to Pegasus Therapeutic Riding, Inc., Darien, Conn.

Filed Nov. 17, 1988, Ser. No. 272,705

Int. Cl.<sup>5</sup> G09B 19/00; A63G 19/00; A63B 69/00

U.S. Cl. 434—247

8 Claims



1. A horse simulator for training a person to ride a horse, comprising:  
 a barrel for simulating a horse's back, an upper surface of the barrel being shaped to form a seat;  
 a support frame for supporting the barrel above a floor;  
 a head assembly that simulates a horse's neck and head;  
 a pivot mount pivotally attaching the head assembly to an end of the barrel;

a bit simulator mounted to the head assembly;  
 right and left reins attached to the bit simulator;  
 means incorporated in the bit simulator for generating a stop signal;  
 means incorporated in the pivot mount for generating a right and left turn signals;  
 means attached to the barrel for generating a pressure signal indicative of when sufficient pressure is applied by the person to the barrel; and  
 an indicator light coupled to the pressure signal generating means for actuation by the pressure signal, the indicator light mounted on the head assembly.

4,957,445

**LOCK-OUT ENCLOSURE FOR POWER CONNECTOR**

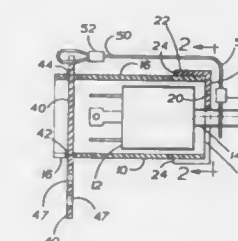
Ronald A. Burke, Jr., 6650 Loud Dr., Oscoda, Mich. 48750

Filed Apr. 18, 1989, Ser. No. 339,645

Int. Cl.<sup>5</sup> H01R 13/44

U.S. Cl. 439—134

23 Claims



1. An enclosure for a connector attached to a power supply line comprising:  
 a tube sized to be slipped over said connector;  
 a cap connectable to one end of said tube, said cap having an end wall, a cylindrical flange extending from said end wall, and a slot extending through said cylindrical flange to a central area of said end wall, said slot having a transverse width sufficient to receive said power supply line therethrough; and  
 an adhesive binding said cylindrical flange of said cap to said one end of said tube to lock said enclosure to said connector.

4,957,446

**LOCKOUT DEVICE FOR ELECTRICALLY OPERATED EQUIPMENT AND DEVICES**

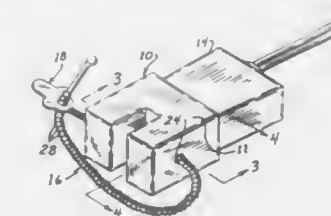
Ronald R. Belsky, 3922 W. Good Hope Rd. #5, Milwaukee, Wis. 53209

Filed Dec. 11, 1989, Ser. No. 448,696

Int. Cl.<sup>5</sup> H01R 13/44

U.S. Cl. 439—134

9 Claims



1. A lockout device for preventing the use of electrically operated equipment having a power cord with an electrical plug and at least two prongs, each of which are attached to and extending from the plug and terminating in an exposed end, each prong having a hole spaced from its exposed end, said device comprising:  
 a housing defining a first passageway, with one end of said passageway terminating in an opening disposed on an end

of said housing, the other end of said passageway terminating in an end wall within said housing, said housing defining a second passageway, said second passageway disposed substantially perpendicular to and intersecting said first passageway, said first passageway having a cross-sectional dimension sufficient to accept the prong of the electrical plug, whereby the prong of the electrical plug may be disposed in said first passageway, with the hole in the prong disposed in said second passageway, wherein said second passageway passes through each of said first passageways and said second passageway terminates in a pair of openings on substantially opposite sides of said housing; and

a latching means extending through said second passageway and through the hole in the prong so that removal of the prong from said first passageway is prevented, and said latching means having a securing means to prevent its removal from said second passageway.

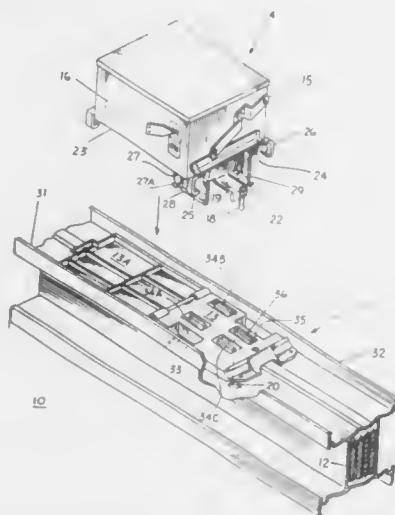
**4,957,447**  
**ELECTRIC POWER BUSWAY PLUG ALIGNMENT ARRANGEMENT**

David A. Hibbert, South Windsor, Conn.; Lynn M. Harton; John D. Anderson, both of Selmer, Tenn., and Anthony L. Richards, Southington, Conn., assignors to General Electric Company, Plainville, Conn.

Filed Aug. 31, 1989, Ser. No. 401,306  
Int. Cl.<sup>5</sup> H01R 25/16

U.S. Cl. 439—207

7 Claims



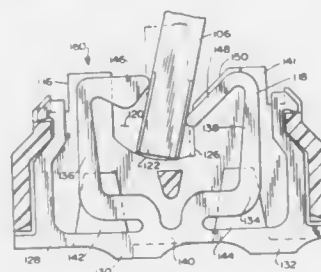
1. An electric power busway switch comprising: an electric switch enclosure having means for connecting between said switch enclosure and associated power equipment;
- a plurality of connector clips depending from a bottom of said switch enclosure and arranged for plugging onto a corresponding plurality of vertically arranged busway tabs extending from a top of a power busway enclosure said busway tabs being attached to corresponding bus conductors horizontally arranged within said busway enclosure;
- a neutral connector clip depending from said bottom and arranged for plugging onto a corresponding neutral tab extending from said top of said busway enclosure; and
- a locating pin depending from said bottom and arranged for plugging into means arranged on said busway enclosure for positioning said connector clips relative to said busway tabs.

**4,957,448**  
**LOW INSERTION FORCE, LOW BOARD STRESS ELECTRICAL CONNECTOR**  
Kenneth W. Stanovich, New Baltimore, Mich., and Kent E. Regnier, Lombard, Ill., assignors to Molex Incorporated, Lisle, Ill.

Filed Oct. 17, 1989, Ser. No. 422,703  
Int. Cl.<sup>5</sup> H01R 23/70

U.S. Cl. 439—326

10 Claims



1. In a low-insertion-force electrical connector for connecting a daughter circuit board to a mother circuit board, the daughter circuit board having an edge, first and second opposed surfaces abutting the edge, and at least one contact on one of the two opposed surfaces, the electrical connector comprising in combination:

- a. a housing having a plurality of adjacent insulating wafers spaced apart and joined by two opposing ramp means, each wafer having a wafer cavity, whereby adjacent wafers cooperatively provide a board cavity for penetration of the daughter board edge into the board cavity in the housing; and
- b. at least one contact disposed in the space between a pair of adjacent wafers, the contact having a pair of opposing contact spring means disposed in the board cavity between adjacent wafers, and a pair of cantilevered latch arms, each latch arm having an inclined latch surface for mating contact with an inclined surface of the ramp means, the inclined surfaces of the latch arms and ramp means cooperatively providing means for positioning the contact in the housing.

**4,957,449**  
**CONNECTOR HOUSING UNIT HAVING THREADED FASTENER**

Yuji Hatagishi, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan

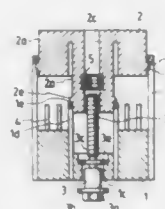
Filed Nov. 15, 1989, Ser. No. 436,986

Claims priority, application Japan, Nov. 18, 1988, 63-149744[U]

Int. Cl.<sup>5</sup> H01R 13/627

U.S. Cl. 439—364

5 Claims



1. A connector housing unit for an electrical connector having a threaded fastener, said connector housing unit comprising: a bolt disposed in a first connector housing;

a nut disposed in a second connector housing; and a tentative fastening means having a first set of component parts and a tentative stoppage means having a second set of component parts provided on said first and second connector housings and positioned such that said first set of component parts of said tentative fastening means are engaged with each other at the same time as said second set of component parts of said tentative stoppage means are engaged with each other; wherein said bolt is axially movable within a prescribed range to be engaged with said nut as said first and second connector housings remain tentatively fastened to each other.

**4,957,450**  
**ELECTRICAL CORD PLUG & SOCKET RETAINER**  
Roger Pioszak, 34306 Joel, New Baltimore, Mich. 48047  
Filed Sep. 18, 1989, Ser. No. 408,206  
Int. Cl.<sup>5</sup> H01R 13/639

U.S. Cl. 439—369

1 Claim

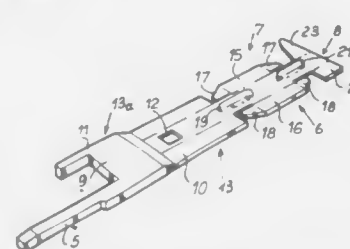


1. A retainer for releasably securing a combined plug and socket in connection in an unsupported position comprising: an elongated flexible member having opposite ends separated by a midsection; at least one slot provided in said elongated flexible member between said opposite ends and disposed midway between opposite edges defining the sides of said member; said slot lying along the central longitudinal axis of said elongated member; securement means cooperatively carried on said elongated flexible member for releasably joining said opposite ends together; said flexible member is a strap and at least two slots are provided in spaced-apart relationship for receiving passage of the plug and socket respectively whereby said strap encircles the plug and socket connection to retain and restrain separation of the plug and socket; and said securement means is a hook and pile fastener having a hook portion secured to one of said opposite ends and a pile portion carried on the other of said opposite ends.

**4,957,451**  
**MALE ELECTRICAL CONTACT**  
Léonard Nadin, L'Union, France, assignor to Labinal S.A., Mon Tigny le Bretonneux, France  
Filed Jan. 9, 1990, Ser. No. 462,225  
Claims priority, application France, Jan. 10, 1989, 89 00212  
Int. Cl.<sup>5</sup> H01R 4/24

U.S. Cl. 439—395

10 Claims



1. Male electrical contact comprising a substantially U-shaped body incorporating two side members, a center member, a bar at one end and means at the opposite end for connecting said body to an electrical conductor, wherein said contact is manu-

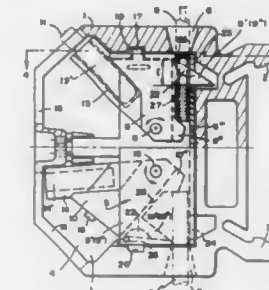
factured by bending a blank formed from a material that is a good electrical conductor and that comprises two strips of different thickness and said bar and an adjoining part of said body are formed from the thicker of said strips.

**4,957,452**  
**ELECTRICAL TERMINAL**  
Roman Bolliger, Muttetz, Switzerland, assignor to Oskar Wortz & Inhaber Hans Woretz, Muttetz, Switzerland  
Filed Nov. 9, 1989, Ser. No. 433,997  
Claims priority, application Switzerland, Dec. 14, 1988, 4613/88

U.S. Cl. 439—410

Int. Cl.<sup>5</sup> H01R 4/24

9 Claims



1. An electrical terminal including a casing of an insulating material having two openings, therein, and electrically conducting connector member for ends of two wires inserted through said two openings in said casing which connector member is located in said casing, including further electrically conducting contact members acting at the two end of said connector member and electrically connected thereto, which contact members are arranged to pivot over a movement arc operation thereof from the outside of said casing from an inoperative position into a clamping position in which they contact a respective inserted wire and retain it, said connector member comprising two side walls and a cross-piece interconnecting the two side walls such to provide a profile having a U-shaped passage for receipt of the wire ends to be inserted therein; which two contact members are each pivotally mounted to said connector member between said side walls to pivot around pivot axis and which contact members comprise two forked contact parts arranged each at an end located radially distant from one respective of said pivot axes and projecting approximately in about said movement arc, which forked contact parts enclose each a slot in alignment with said passage of the connector member, and include forked contact parts with mutually oppositely located edges of a knifelike design whereby upon a pivoting of a respective contact member into said clamping position the insulation of a wire end inserted into said connector member is cut through by said edges and a part of the cut insulation is pushed away.

**4,957,453**  
**ELECTRICAL SOCKET**  
Leonard J. Owen, Watford, England, assignor to AMP Incorporated, Harrisburg, Pa.  
Filed Nov. 6, 1989, Ser. No. 432,296  
Int. Cl.<sup>5</sup> H01R 4/24

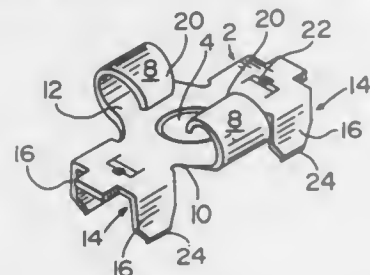
U.S. Cl. 439—422

2 Claims

1. An electrical socket for mounting on a flat, flexible conductor carrier (FFC), for the electrical connection of an electrical plug to a conductor of said conductor carrier (FFC), the socket comprising a base plate having a plug-receiving opening and a receptacle projecting from one face of the base plate, for a plug inserted through the plug-receiving opening substantially normally of the base plate, there projecting from the base plate upon each of two opposite sides of the opening, a pair of lugs which are deformable for engagement about said conductor (C); characterized in that the plug receptacle comprises a pair of contact springs, each being of substantially semicircular



shape, the contact springs presenting opposed, arcuate contact surfaces which are bowed towards each other and extend



across the plug-receiving opening to engage the plug (P) between them, the lugs projecting from the other face of the base plate.

#### 4,957,454 PIN JACK

Akihito Shichida, Higashiosaka, Japan, assignor to Hosiden Electronic Co., Ltd., Yao, Japan

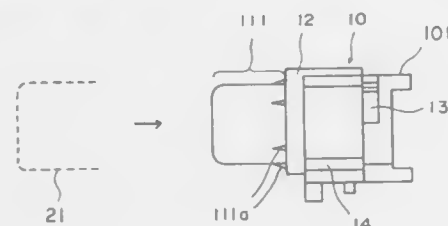
Filed Sep. 21, 1988, Ser. No. 247,193

Claims priority, application Japan, Sep. 29, 1987, 62-149125[U]

Int. Cl.<sup>5</sup> H01R 13/73

U.S. Cl. 439-544

2 Claims



1. A pin jack which comprises a body having, at a longitudinal center, a bored hole to receive a pin plug, said body made of insulating material, said pin jack comprising:

- a body base;
- a cylindrical extension integrally connected to said body base and extending outward from a front of said body base;
- a cylindrical cover made of conductive material which covers a first end of said cylindrical extension;
- prongs mounted on the body base;
- a jacket ring, having a concentric diameter larger than that of the cylindrical extension, said jacket ring covering a second end of said cylindrical extension which is toward the body base; and
- a plurality of locking elements, projecting circumferentially from the body base, which fit over said cylindrical cover.

#### 4,957,455

##### SOCKET FOR WEDGE-BASE LAMP

Kazuya Horiuchi, Mie; Kihachiro Uchida, Shizuoka; Tadashi Harada, Shizuoka, and Takeshi Izawa, Shizuoka, all of Japan, assignors to Sumitomo Wiring Systems, Limited, Mie and Koito Manufacturing Co., Ltd., Tokyo, both of Japan

Filed Apr. 18, 1989, Ser. No. 340,613

Claims priority, application Japan, Apr. 19, 1988, 63-53321[U]; Dec. 16, 1988, 623-162366[U]

Int. Cl.<sup>5</sup> H01R 13/73

U.S. Cl. 439-548

9 Claims

1. A socket for a wedge-base lamp, comprising: a generally cylindrical lamp socket body formed of an insulating material; first and second conductive terminal members positioned within said socket body for sandwiching a base portion of a

lamp and making contact with terminals of said lamp, each of said terminal members comprising first and second contacting and sandwiching members opposed to each other; a pair of first vertical walls opposed to each other and defining a lamp insertion channel, one of said first vertical walls being positioned between said first contracting and sandwiching members and the other of said first vertical walls being positioned between said second contacting and sandwiching member; four second vertical walls, a first pair of said second vertical walls being disposed on opposite sides of one of said first vertical walls, a second pair of said second vertical walls being disposed on opposite sides of the other of said first vertical walls, each of said second vertical walls being located behind a respective



one of said contacting and sandwiching members, and a top end portion of each of said contacting and sandwiching members extending above and being bent over a top end of the respective one of said second vertical walls; and a plurality of third vertical walls, a respective one of said third vertical walls being located behind each juncture between one of said first vertical walls and a respective one of said second vertical walls, said third vertical walls extending above said top end portions of said contacting and sandwiching members by a height such that a base portion of a slantingly inserted lamp abuts against inside corner portions of said third vertical walls above said first vertical walls and is prevented from interfering with said top end portions of said contacting and sandwiching members.

#### 4,957,456

##### SELF-ALIGNING RF PUSH-ON CONNECTOR

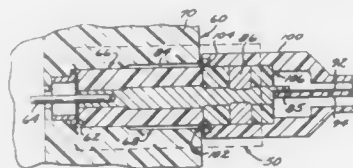
Mark Olson, Torrance, and Clifton Quan, Arcadia, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Sep. 29, 1989, Ser. No. 415,004

Int. Cl.<sup>5</sup> H01R 13/54

U.S. Cl. 439-578

7 Claims



1. A self-aligning push-on coaxial RF connector assembly, comprising:

- a female connector structure comprising a feed through conductor element supported by and extending through a dielectric member, an outer conductive structure for defining a primary opening surrounding said dielectric member and conductor element and for defining a pilot opening having a diameter somewhat larger than the diameter

of said primary opening, the pilot opening communicating with the primary opening;

a male connector structure comprising a center conductor, a dielectric sleeve member having an axial opening formed therein for receiving the center conductor, the dielectric sleeve having an exterior dimension selected so that a portion of the sleeve can be inserted snugly into the primary opening of said female structure;

means for making electrical contact between the feed through conductor element of the female structure and the center conductor of the male structure when the sleeve and conductor are fully inserted into said primary opening; and

means for compensating the perturbation due to the oversizing of the pilot opening so that the transmission line provided by the connector assembly is characterized by a substantially constant characteristic impedance over the length of the assembly.

#### 4,957,457

##### CONTROL SYSTEM FOR THE HYDRAULIC TILT FUNCTION OF A MARINE ENGINE

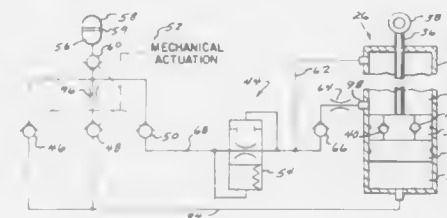
Harry C. Probst, Oshkosh, and James L. Bloemers, Fond du Lac, both of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Jul. 14, 1988, Ser. No. 219,053

Int. Cl.<sup>5</sup> B63H 5/12

U.S. Cl. 440-61

4 Claims



1. In a marine vessel having an outboard drive unit pivotally mounted thereto and a piston containing hydraulic cylinder operatively connected between the vessel and the drive unit so that pivotal movement of the drive unit results in the displacement of hydraulic fluid between a pair of fluid chambers in the cylinder, a system for controlling the movement of hydraulic fluid through the cylinder, said system comprising:

- valve means in the cylinder restricting the flow of fluid between the fluid chambers,
- bypass means allowing a less restricted flow of fluid between the fluid chambers,
- a trim valve disposed in said bypass means allowing limited flow of fluid in a first direction of piston movement when said trim valve is in an open position,
- tilt valve means disposed in said bypass means allowing unrestricted flow of fluid between the fluid chambers of the cylinder when said tilt valve means is in an open position,
- velocity sensing valve means disposed in said bypass means for sensing high velocity fluid flow caused by rapid piston movement in a second direction and moving from a normally open position to a closed position in response to said high velocity fluid flow, and
- actuating means for selectively opening and closing said trim valve and said tilt valve means.

#### 4,957,458

##### FLOW GUIDING FACE(S) FOR A SHIP

Cornelis Pronk, Drunen, Netherlands, assignor to Lips B. V., Drunen, Netherlands

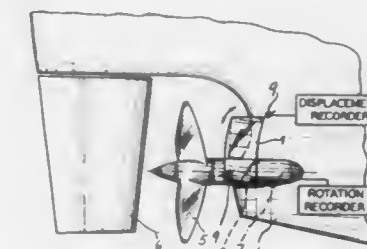
Filed Feb. 28, 1989, Ser. No. 316,975

Claims priority, application Netherlands, Mar. 1, 1988, 8800526

Int. Cl.<sup>5</sup> B63H 5/06

U.S. Cl. 440-66

7 Claims



1. A ship comprising:

- a hull having a rear end, a longitudinal axis and a screw propeller adjacent said rear end;
- said screw propeller having a centerline;
- a flow guide surface adjustably mounted to a portion of said hull in the vicinity of said rear end and in front of said propeller;
- said flow guide surface together with said hull defining an area having a center which lies above the propeller centerline; and
- said flow guide surface being adjustable about more than one axis so that a spacial angle between the longitudinal axis of the hull and a centerline of the flow guide surface may be varied.

#### 4,957,459

##### PROPELLER SHROUD WITH LOAD BEARING STRUCTURE

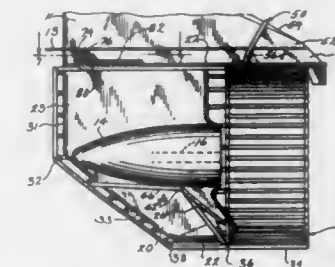
Richard H. Snyder, Oshkosh, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Aug. 23, 1989, Ser. No. 397,727

Int. Cl.<sup>5</sup> B63H 5/16

U.S. Cl. 440-72

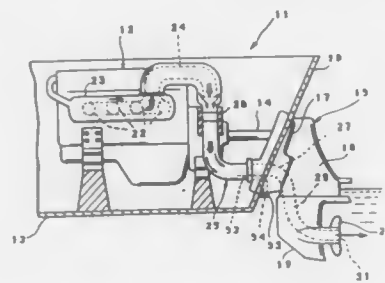
18 Claims



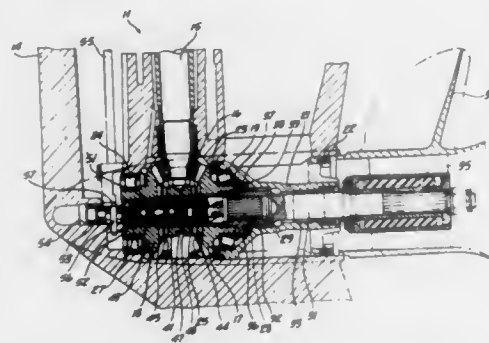
1. In a marine drive having a driveshaft housing and a gearcase having a lower submerged torpedo-shaped portion having a propeller shaft carrying a propeller at the back end thereof, and having a skeg extending downwardly from said torpedo-shaped portion, a propeller shroud comprising a cage around said gearcase and said propeller and mounted to said gearcase and having a pair of inner spokes extending inwardly and bearing against the junction of said skeg and said torpedo-shaped portion such that impact force on said cage is transmitted to said junction, wherein said gearcase has a leading strut portion above said torpedo-shaped portion, and wherein:

- said cage has a front portion with a leading edge extending

along the front of said strut-portion and said skeg, said front portion of said cage tapering rearwardly and outwardly; said cage has a rear generally cylindrical portion around said propeller and extending rearwardly from said front portion; said cage has a generally circular rib at the intersection of said front and rear portions; said spokes extend generally radially inwardly from said circular rib to said junction of said skeg and said torpedo-shaped portion.



**4,957,460**  
**THRUST BEARING ARRANGEMENT FOR MARINE OUTBOARD DRIVES**  
Norimichi Harada, and Akihiro Onoue, both of Hamamatsu, Japan, assigns to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan  
Filed Jan. 16, 1986, Ser. No. 819,759  
Claims priority, application Japan, Jan. 31, 1985, 60-15415  
Int. Cl.<sup>5</sup> B63H 5/13  
U.S. Cl. 440—83 12 Claims



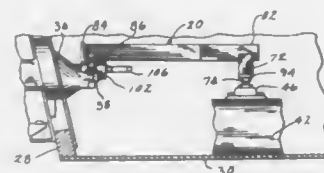
1. In a thrust bearing arrangement for the propeller shaft of a marine outboard drive comprising a lower unit outer housing, a drive shaft supported for rotation within said lower unit housing, a propeller shaft and transmission means for selectively driving said propeller shaft in a forward and reverse direction from said drive shaft, the improvement comprising a first thrust bearing for taking driving thrusts in one direction from said propeller shaft, a second thrust bearing for taking the driving thrusts in the opposite direction from said propeller shaft, and means for transmitting the thrusts from said first and second thrust bearings to said lower unit housing without the thrusts from one of said bearings passing to said outer housing through an element which transfers the thrust from the other of said bearings to said outer housing.

**4,957,461**  
**IDLING NOISE SILENCER FOR MARINE PROPULSION UNIT**  
Manabu Nakayama, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan  
Filed Dec. 2, 1988, Ser. No. 278,973  
Claims priority, application Japan, Dec. 2, 1987, 62-304771  
Int. Cl.<sup>5</sup> B63H 21/32  
U.S. Cl. 440—89 8 Claims

1. A marine outboard drive comprised of a lower unit formed with an outer casing, an exhaust passage formed within said outer casing and terminating in an outlet opening disposed slightly below the level of water in which the associated watercraft is operating other than at high speeds and above the water at high speeds, and a baffle plate fixed against movement relative to said outer casing and extending across said outlet opening for restricting the effective size thereof and redirecting the flow of exhaust gases emanating from said outlet opening for

breaking up the size of exhaust gas bubbles emanating from said outlet opening for improving gas silencing at low speeds.

**4,957,462**  
**ENGINE MOUNT INSTALLATION TOOL AND METHOD**  
James E. Erickson, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.  
Filed May 18, 1989, Ser. No. 353,875  
Int. Cl.<sup>5</sup> B63H 5/12  
U.S. Cl. 440—111 18 Claims



1. In a marine stern drive having an inboard engine, an outdrive with a gimbal bearing at the transom of a boat, and a drive coupler shaft extending through said gimbal bearing and between said outdrive and said engine, said outdrive being mounted to said transom by an inner transom plate having a pair of engine supports thereon for supporting the rear of said engine, said boat having a pair of longitudinal stringers with a pair of engine mounts thereon for supporting the front of said engine, said engine having a pair of rear mounts mounted on said rear engine supports on said inner transom plate, said engine having a pair of front supports mounted on said front engine mounts on said stringers, said front engine mounts being vertically adjustable to vary the height of the front of said engine to align said engine with said gimbal bearing, an engine mount installation tool for locating said front engine mounts horizontally on said stringers prior to installation of said engine to horizontally pre-align said front engine mounts with said front engine supports said tool including vertical alignment structure vertically locating the proper height of said front engine mounts prior to installation of said engine to pre-set the height adjustment of the front of said engine to assure proper alignment of said engine with said gimbal bearing after installation of said engine.

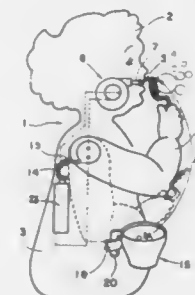
**4,957,463**  
**METHOD OF MAKING A LONG LIFE HIGH CURRENT DENSITY CATHODE FROM TUNGSTEN AND IRIIDIUM POWDERS USING A QUATERNARY COMPOUND AS THE IMPREGNANT**  
Louis E. Branovich, Howell; Bernard Smith, Ocean; Gerard L. Freeman, Freehold, and Donald W. Eckart, Wall, all of N.J., assigns to The United States of America as represented by the Secretary of the Army, Washington, D.C.  
Filed Jan. 2, 1990, Ser. No. 459,629  
Int. Cl.<sup>5</sup> H01J 9/04  
U.S. Cl. 445—50 8 Claims

1. Method of making a long life high current density cathode suitable for operation in microwave devices from tungsten and iridium powders using a quaternary compound including barium, oxygen, a metal selected from the group consisting of osmium, iridium, rhodium, and rhenium, and a metal selected from the group consisting of strontium, calcium, scandium, and titanium as the impregnant, said method including the steps of:  
(A) mixing the tungsten and iridium powders in a weight ratio of about 60 weight percent tungsten to about 39 weight percent iridium,  
(B) adding about 1 percent by weight of zirconium hydride to the mixture,  
(C) ball milling the mixture for about 8 hours,  
(D) pressing the ball milled mixture into a billet at about 48,000 psi in a die,  
(E) sintering the billet at about 1800° C. for about ½ hour in dry hydrogen of less than -100 dewpoint,  
(F) backfilling the billet with copper in dry hydrogen at about 1150° C.,  
(G) machining the billet to the desired geometry,  
(H) removing the copper by etching in nitric acid,  
(I) thoroughly rinsing in deionized water, methanol and then drying,  
(J) firing the billet in dry hydrogen to about 1400° C. for about 15 minutes,  
(K) impregnating the billet with a quaternary compound including barium, oxygen, a metal selected from the group consisting of osmium, iridium, rhodium and rhenium, and a metal selected from the group consisting of strontium, calcium, scandium, and titanium as the impregnant by firing the billet in a dry hydrogen furnace at a temperature at which the impregnant melts,  
(L) removing the billet from the furnace after the furnace is cooled, and  
(M) removing any loose pieces of impregnant from the billet.

**4,957,464**  
**DOLL WITH MEANS FOR PRODUCING SOAP BUBBLES**  
Jose L. J. Perez, Biar Alicante, Spain, assignor to Jesmar S. A., Otrera de Alcoy, Spain  
Continuation of Ser. No. 63,423, Jun. 17, 1987, Pat. No. 4,840,597. This application Mar. 31, 1989, Ser. No. 331,190  
The portion of the term of this patent subsequent to Jun. 20, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> A63H 33/00  
U.S. Cl. 446—16 16 Claims

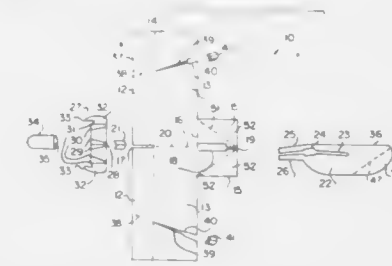
1. A bubble producing doll, comprising:  
(a) a doll body simulating a human figure with a trunk portion, a head connected to the trunk portion and having a mouth opening, a pair of arms having hand extremities with one arm pivotally mounted to the upper end of the trunk portion for up and down movement in relationship to the upper end of the trunk portion and a pair of legs connected to the lower end to the trunk portion;  
(b) a receptacle connected to the front section of the trunk portion for storing bubble making liquid;  
(c) air producing means connected to the mouth opening formed in said head through which air is impelled;  
(d) a battery-operated electrical circuit located inside the trunk portion for activating the air producing means;  
(e) switching means connected to the electrical circuit for

closing and opening the circuit and having a switching element located on the pivotally mounted arm; and  
(f) a bubble-making liquid, pick-up tool, separate from the hand extremities of the arms, and having a first handle portion connected at one end to the hand extremity of the pivotally mounted arm and a second ring-like portion extending from the other end of the tool handle portion for holding a film of the bubble making liquid; wherein the mouth opening in said head and the receptacle on the front section of the trunk portion are arranged along a circumferential arc centered at a point where said



arm is pivotally mounted on the trunk, the arc having a radius equal to the distance between said point and the second portion of said tool, and wherein after the tool is placed in the receptacle and a film of liquid is formed thereon and when the pivotally mounted arm having the tool is raised to a position near the mouth opening of the doll head through the arc, the switching element on the arm closes the electrical circuit activating the air producing means to produce and simulate a human figure blowing bubbles produced from the film on the tool.

**4,957,465**  
**MODEL AIRPLANE OR TOY GLIDER**  
Madhava dasa, P.O. Box 461, Kula, HI. 96790-0461  
Filed Apr. 8, 1988, Ser. No. 179,231  
Int. Cl.<sup>5</sup> A63H 27/18  
U.S. Cl. 446—61 4 Claims



1. A toy glider comprising:  
a wing having leading and trailing edges and formed of a semi-rigid, scoreable and foldable material, said wing having a first score line on the longitudinal centerline thereof and a second score line extending transversely across the length of said wing at approximately one third the distance from said leading edge, said second score line dividing said wing into leading edge and trailing edge panels, said leading edge panel having a slot extending inwardly from the leading edge thereof on the longitudinal centerline of said wing to said second score line; an angle setting member insertable into the slot of said leading edge panel for engaging the portions of said leading

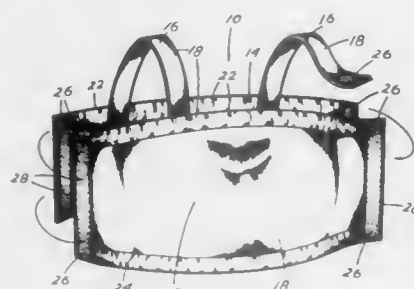


panel on opposite sides of the slot to establish the dihedral angle thereof; and  
 a fuselage formed of a semi-rigid, scoreable and foldable material, said fuselage having a body portion with a leading edge and a trailing edge, said body portion having a slot extending rearwardly from the leading edge thereof, the slot having an entry portion, a central portion and an inner portion, the width of the inner portion being substantially equal to the thickness of said material forming said wing, the central portion being of sufficiently greater width as to accommodate said angle setting member, said entry and central portions being angled relative to the inner portion whereby, in the assembled configuration of said glider, said leading edge panel of said wing is angled downwardly relative to said trailing edge panel.

**4,957,466**  
**ATHLETIC SUPPORTER FOR WOMEN**  
 Trisha L. Hopps, 585 Roberts Rd., Paradise, Calif. 95969  
 Filed Oct. 23, 1989, Ser. No. 425,684  
 Int. Cl. 5 A41C 3/00

U.S. Cl. 450—85

5 Claims



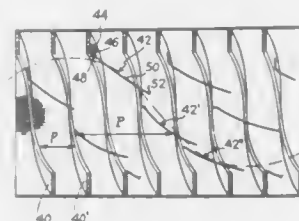
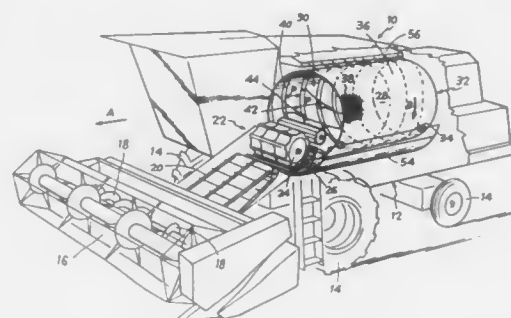
1. An athletic supporter for women adapted by pattern to be worn as an upper body covering and by structure to prevent excessive breast movement during active participation in sports, said supporter comprising in combination:

- a front panel;
- said front panel adapted to supportively cover and contour to a female breast shape by resilience in a thickened elastic filling sandwiched between encasing walls of a stretchable covering material;
- said covering material having permeative qualities for transferring sweat and heat away from a wearer's body;
- a back panel;
- said back panel adapted to contour to the back shape of a human wearer by elasticity in materials forming a double wall thereof;
- said double wall of said back panel having permeative qualities for transferring sweat and heat away from a wearer's body;
- means for attaching said front panel to said back panel adjustably sized relative to said wearer's requirements;
- means for maintaining said supporter adjustably in a breast supporting and covering position relative to said wearer's shoulders with said front panel providing said breast supporting and covering and said back panel fitted to the back of said wearer;
- means providing for tighter containment of an upper portion and of a lower portion of both said panels relative to breast size and body measurements of said wearer.

**4,957,467**  
**DEVICE FOR PRIMARY SEPARATION OF GRAIN IN A COMBINE HARVESTER FOR CEREALS**  
 Alain Zachary, Voucq, 08400 Vouziers, France  
 Filed Sep. 28, 1989, Ser. No. 413,582  
 Claims priority, application France, Oct. 14, 1988, 88 13588  
 Int. Cl. 5 A01F 12/20

U.S. Cl. 460—69

8 Claims

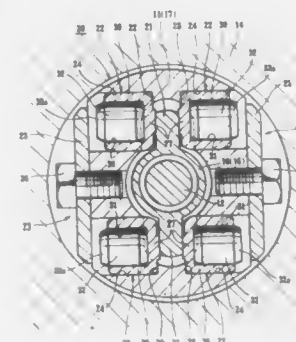


1. In a combine harvester-thresher for cereals, which comprises a chassis and ground engaging wheels, the combine having a front end and a rear end, relative to its direction of travel, and further comprising, from its front end to its rear end:

- a mower for cutting cereal crop stalks over a wide width and bringing them together into a narrower bed by means of oppositely-handed screw conveyors;
- a mown crop conveyor which raises the cereal bed from the mower;
- a thresher for receiving crop from the conveyor, said thresher comprising a fixed backing member and a threshing rotor which is rotated by a motor and transmission unit, and
- a rotary grain separator comprising a cylindrical drum having an axis extending substantially horizontally and longitudinally with respect to the chassis and rotatably mounted about said axis, the drum having an inlet orifice facing said thresher and an outlet orifice opening at the rear end of the combine, the drum comprising a cylindrical wall provided with a plurality of perforations adapted for the passage of grain therethrough, and at least one internally protruding rib fixed to the cylindrical wall and forming a helix at a first predetermined pitch extending over the entire length of the drum, the improvement wherein said drum further comprises a plurality of inwardly projecting elongate drive members fixed thereto and arranged, both longitudinally and circumferentially relative to the drum, in such a manner as to form sets of successive portions of respective helices having a second pitch which is several times greater than the first pitch.

**4,957,468**  
**HYDRAULIC REACTION FORCE APPARATUS OF POWER STEERING DEVICE**  
 Shigeru Otsuka, and Hiroshi Ohsaki, both of Higashimatsuyama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan  
 Continuation of Ser. No. 62,008, Jun. 12, 1987, abandoned. This application Oct. 12, 1988, Ser. No. 256,884  
 Claims priority, application Japan, Jun. 19, 1986, 61-141291  
 Int. Cl. 5 F16D 3/80; B62D 5/06  
 U.S. Cl. 464—27

9 Claims



1. A hydraulic reaction force apparatus of a power steering device, comprising:
- an input shaft;
  - an output shaft;
  - means for providing direct torsional coupling between said input shaft and said output shaft; and
  - means for providing a variable drag force in opposition to said direct torsional coupling means, said drag force means including:
  - reaction force arms, connected integrally with said input shaft, and projecting radially therefrom;
  - a pair of output shaft guide holes, sandwiching each of said reaction force arms, and oppositely disposed to each other in a direction perpendicular to said reaction force arms;
  - a plurality of reaction force plungers each slidably disposed in a corresponding different one of said guide holes; and
  - means for providing a hydraulic force for biasing said reaction force plungers against said reaction force arms to oppose relative rotation between said output shaft and said input shaft;
  - each of said reaction force plungers comprising
  - a metal cylindrical member having a hollow portion open at a side opposite to that of said reaction force arms; and
  - a damping member carried by said cylindrical member, said damping member having an inner end, an outer end and means for exposing said inner end and said outer end to said hydraulic force.

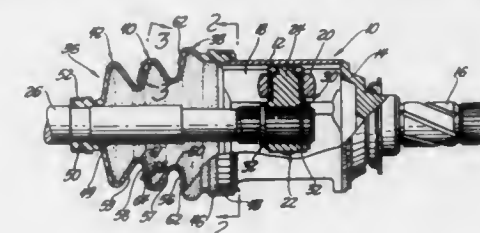
**4,957,469**  
**CONVOLUTED BOOT SEAL WITH ANTI-ABRASION SIDE WALL RIBS**  
 Donovan J. Zollinger, Saginaw, Mich., assignor to General Motors Corporation, Detroit, Mich.  
 Filed Dec. 7, 1989, Ser. No. 447,331  
 Int. Cl. 5 F16D 3/84

U.S. Cl. 464—175

4 Claims

3. A boot seal for enclosing and sealing a device operatively mounted within a housing, said boot seal defined by a generally annular body having spaced first and second attachment portions, said body being made of thin wall resilient material to have a series of convolutions extending between said first and second attachment portions, said convolutions having side walls facing one another, at least some of said side walls having a series of resilient thin wall ribs integrally formed on the radial side wall of at least one convolution which projects toward the

adjoining side walls of an adjacent convolution, said ribs terminate in contact faces normally spaced from said adjoining side wall and movable into physical contact therewith during vary-

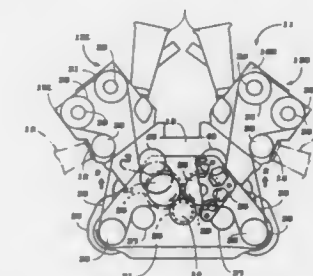


ing flexure actions of said boot seal so that said ribs can bend to eliminate direct sliding contact between said adjacent side walls and the physical wear thereof.

**4,957,470**  
**VALVE OPERATING SYSTEM FOR ENGINE**  
 Masaaki Yoshikawa, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan  
 Filed Aug. 7, 1989, Ser. No. 390,606  
 Claims priority, application Japan, Aug. 8, 1988, 63-197739  
 Int. Cl. 5 F16H 7/08

U.S. Cl. 474—101

7 Claims



1. In a flexible transmitter drive for the camshaft of an internal combustion engine comprising a sprocket, a flexible transmitter engaged with said sprocket, said flexible transmitter and said sprocket having interengaging members for transmitting a positive drive therebetween, the improvement comprising a timing retaining member juxtaposed to said sprocket on the backside of said flexible transmitter and engaged therewith in a position to prevent the interengaging members of said sprocket and said flexible transmitter from moving out of engagement.

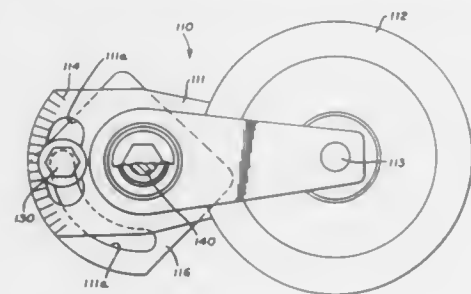
**4,957,471**  
**ADJUSTABLE LOCKED CENTER AND DYNAMIC TENSIONER**  
 Richard C. St. John, 731 Bachtel St., SE., North Canton, Ohio 44720  
 Filed Jul. 24, 1989, Ser. No. 383,630  
 Int. Cl. 5 F16H 7/08

U.S. Cl. 474—133

28 Claims

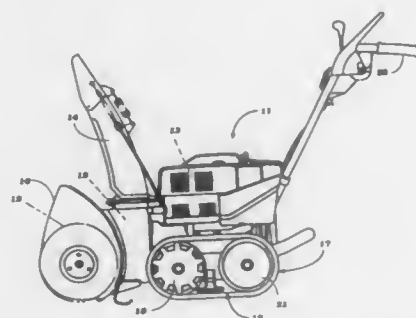
1. A method of setting tension in a belt or chain drive system using a pivoting belt tensioner, comprising the steps of:
- (a) forcing the tensioner against a stable mounting surface with a clamping load of such a magnitude that a target friction torque will be required to rotate the tensioner; and

(b) rotating the tensioner arm against the belt or chain until, when the setting torque is removed, the belt counter-



rotates the tensioner arm and the target friction torque causes the target tension to remain in the belt.

**4,957,472**  
**TRACK FOR SNOW VEHICLE**  
Tomio Nakano, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan  
Filed Aug. 1, 1989, Ser. No. 387,934  
Claims priority, application Japan, Aug. 2, 1988, 63-192091  
Int. Cl.<sup>5</sup> F16H 7/02  
U.S. Cl. 474—203 19 Claims

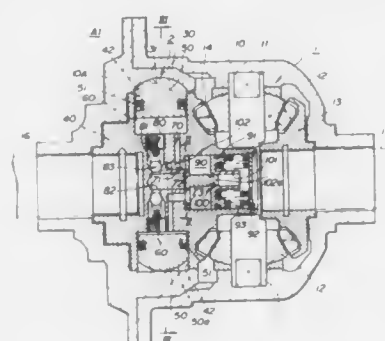


1. A drive belt for a snow vehicle or the like comprising a surface adapted to engage the snow surface and providing driving engagement therewith, a plurality of drive teeth formed on said surface and projecting therefrom for improving the traction, certain of said teeth being configured differently other of said teeth for improving traction on different types of surfaces.

**4,957,473**  
**ROTATIONAL SPEED DIFFERENTIAL RESPONSIVE TYPE TORQUE TRANSMITTING ASSEMBLY**  
Tooji Takemura, Yokohama, and Takashi Okubo, Zama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan  
Filed Nov. 7, 1988, Ser. No. 267,602  
Claims priority, application Japan, Nov. 6, 1987, 62-16994[U]; Dec. 3, 1987, 62-184485[U]  
Int. Cl.<sup>5</sup> F16H 1/44  
U.S. Cl. 475—231 11 Claims

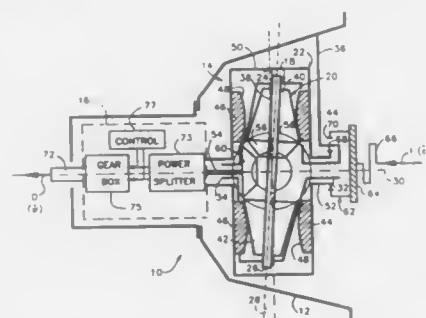
1. A rotational speed differential responsive type torque transmitting assembly, comprising:  
a first rotary element rotatable about an axis, said first rotary element including internal cam surface means;  
a second rotary element disposed in said first rotary element, said second rotary element including a rotor containing a plurality of radially outwardly opening cylinders facing said internal cam surface means;  
hydraulic means for transmitting a portion of torque from one of said first and second rotary elements to the other in

response to a rotational speed differential between said first and second rotary elements,  
said hydraulic means including pistons in said cylinders in engagement with said internal cam surface means and reciprocating in response to said rotational speed differential to define variable volume pressure chambers in said cylinders, respectively,  
said hydraulic means including an accumulator with an accumulator chamber, and hydraulic fluid passage means in fluid communication with said pressure chambers and also with said accumulator chamber, said hydraulic fluid passage means allowing discharge of hydraulic fluid from



each of said pressure chambers on the discharge stroke of the associated one of said pistons to said accumulator chamber, said hydraulic fluid passage means allowing supplying of hydraulic fluid from said accumulator chamber to each of said pressure chambers on the suction stroke of the associated one of said pistons,  
said hydraulic means including orifice means for restricting discharge of hydraulic fluid from each of the pressure chambers on the discharge stroke of the associated one of said pistons,  
said hydraulic means also including valve means for discharging a portion of hydraulic fluid from said accumulator chamber.

**4,957,474**  
**TRACTION DRIVE TRANSMISSION SYSTEM**  
Yves J. Kemper, Bloomfield Hills, Mich., assignor to Tractiontec Corporation, Bloomfield Hills, Mich.  
Continuation-in-part of Ser. No. 435,658, Nov. 13, 1989, abandoned, which is a continuation-in-part of Ser. No. 270,639, Nov. 14, 1988, abandoned. This application Mar. 22, 1990, Ser. No. 497,528  
Int. Cl.<sup>5</sup> F16H 15/56, 37/06  
U.S. Cl. 475—279 15 Claims

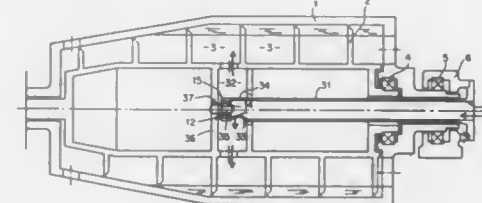


1. In a multi-range power transmission system including a rotatable system input shaft and a rotatable system output

shaft, a continuously variable transmission unit (CVT) having CVT input and CVT output shafts, the output speed of said CVT being adjustable between system input speed and a shifting speed, a four shaft compound planetary gear power splitter having a first shaft driven by said system input shaft, a second shaft driven by said CVT output shaft, a third shaft and a fourth shaft, and a multi-range output gearbox for driving said system output shaft, the improvement comprising:

means for defining said gearbox comprising a planetary gear set having a carrier shaft eccentric with respect to and connected directly to said system output shaft, an input sun gear, a ring gear and means for grounding said ring gear, said planetary gear set having a basic ratio equal to the speed of said third shaft divided by the speed of said fourth shaft when said CVT is at said shifting speed; and control means for alternately coupling said third and fourth shafts of said splitter with said gearbox to provide at least three synchronous ranges of system speed ratios, each of such ranges of system speed ratios being continuously variable by operation of said CVT between 1:1 and said shifting ratio.

**4,957,475**  
**SOLID-BOWL HELICAL CENTRIFUGE**  
Walter Kreill, Vilsbiburg, Fed. Rep. of Germany, assignor to Flottweg GmbH, Vilsbiburg, Fed. Rep. of Germany  
Filed May 4, 1989, Ser. No. 347,758  
Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816210  
Int. Cl.<sup>5</sup> B04B 1/20  
U.S. Cl. 494—53 13 Claims

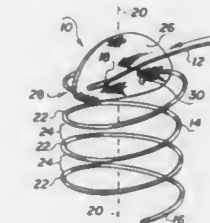


1. A solid-bowl helical centrifuge, particularly a counter-flow centrifuge, for separating a suspension; comprising: a bowl and a feed screw, a separation space being left between said screw and said bowl; a stationarily secured intake pipe for supplying the suspension from a stationary infed point outside the centrifuge to said separation space; said intake pipe extending into an intake space inside said screw; said intake pipe having an end in said intake space and resting against a component secured to said screw; a friction bearing with two halves made of ceramic material where said two halves contact each other, said component being secured to said screw by said friction bearing.

**4,957,476**  
**AFTERLOADING RADIOACTIVE SPIRAL IMPLANTER**  
Elmer R. Cano, Pittsburgh, Pa., assignor to University of Pittsburgh, Pittsburgh, Pa.  
Filed Jan. 9, 1989, Ser. No. 295,243  
Int. Cl.<sup>5</sup> A61M 36/12  
U.S. Cl. 600—7 12 Claims

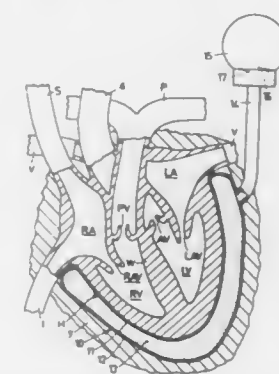
1. An apparatus for implanting a sealed radioactive source into a patient comprising:  
a hollow member substantially spiral in shape having a

sealed end, and an opening through which the radioactive source is introduced into the member, said member having



a shape that defines an axis such that the member is disposed about the axis.

**4,957,477**  
**HEART ASSIST JACKET AND METHOD OF USING IT**  
Stig S. Lundbäck, Vaxholm, Sweden, assignor to Astra Tech AB, Stockholm, Sweden  
Continuation of Ser. No. 55,302, May 22, 1987, abandoned. This application May 9, 1989, Ser. No. 349,871  
Claims priority, application Sweden, May 22, 1986, 8602335  
Int. Cl.<sup>5</sup> A61B 17/00  
U.S. Cl. 600—16 8 Claims



1. A passive heart assist device for insertion into the thoracic cavity of a patient between the thoracic wall and the heart comprising:  
a jacket having relatively moveable, connected inner and outer walls, wherein said inner wall is formed of pliable material and is adapted to fit snugly around at least the ventricular portion of the heart over the left and right ventricles; wherein said walls define a fluid-containing innerspace including a left ventricle portion and a right ventricle portion; wherein said portions are in fluid communication with one another; and means for maintaining a volume of fluid in said innerspace at all times, wherein said fluid is displaceable from one portion to the other in response to movement of one of the ventricles toward said outer wall thereby to enable the stroke volumes of the ventricles to vary as the heart beats.

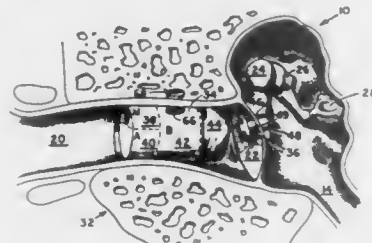
**4,957,478**  
**PARTIALLY IMPLANTABLE HEARING AID DEVICE**  
Anthony J. Maniglia, 14450 County Line Rd., Hunting Valley, Ohio 44022  
Filed Oct. 17, 1988, Ser. No. 258,788  
Int. Cl.<sup>5</sup> H04R 25/00  
U.S. Cl. 600—25 9 Claims

1. A totally concealed, partially implantable hearing device for an ear having an ossicular chain including a malleus located internally of a tympanic membrane comprising:



a replaceable outer ear canal unit, having means for generating a first magnetic field responsive to acoustic energy received by the unit, and adapted to be located inside the outer ear canal of an ear;

a magnet, having a second magnetic field, located adjacent to said unit at a distance sufficient to permit the first and second magnetic fields to interact with each other and causing the magnet to vibrate in a manner responsive to the acoustic energy received by the unit; and



means for securely attaching the magnet to an ossicular chain in the ear by mounting the magnet through an abutment with both located externally of the tympanic membrane and being connected to the malleus by connecting means extending through the tympanic membrane, wherein said connecting means includes two man-made minicavities in said malleus and said tympanic membrane, and a pair of self-tapping titanium mini-screws, each of said mini-screws inserted through a hole in the magnet and adapted to be closely received and biointegrated into said two man-made minicavities.

#### 4,957,479 INDWELLING URETERAL STENT PLACEMENT APPARATUS

Frederick D. Roemer, Bloomington, Ind., assignor to Vance Products Incorporated, Spencer, Ind.

Filed Oct. 17, 1988, Ser. No. 258,832

Int. Cl.<sup>5</sup> A61M 25/00

U.S. Cl. 604-8

8 Claims



5. A method of implanting an indwelling ureteral stent in a patient, comprising the steps of:

assembling a placement apparatus by serially disposing a tubular stent, a tubular pusher and a releasable clamp in end-to-end abutting relationship about a wire guide with the proximal end of the tubular stent adjacent the anatomi-

cally proximal end of the wire guide, wherein the stent is hollow along its entire length and includes retentive portions at each of the distal and proximal ends of the stent adapted to resiliently assume a curved shape when the wire guide is removed from the stent;

inserting the proximal end of the placement apparatus into the ureter through one of the bladder or the kidney of the patient with the clamp engaged on the wire guide;

advancing the placement apparatus along the ureter until the proximal end of the wire guide is situated within the other of the bladder or the kidney;

advancing the pusher along the wire guide, while maintaining the position of the clamp and the wire guide relative to the patient, to force the stent along the wire guide through the ureter until the retentive portion at the proximal ends of the stent is situated within the other of the bladder or the kidney and has resiliently assumed its curved shape;

retracting the wire guide from the ureter through the pusher and the stent, while maintaining the position of the pusher relative to the patient, until the flexible end of the wire guide has retracted beyond the retentive portion at the distal end of the stent and the retentive portion has resiliently assumed its curved shape within one of the bladder or the kidney to retain the stent within the ureter;

completely retracting the clamp, wire guide and pusher with the stent fully indwelling, wherein

said wire guide includes a relatively flexible tip portion of predetermined length from the proximal end of the wire guide; and

said step of serially disposing includes adjustably positioning a segment of the retentive portion at the proximal end of the stent about a portion of the predetermined length of the flexible tip so that the retentive portion begins to assume its curved shape.

#### 4,957,480 METHOD OF FACIAL TONING

Gerhard H. Morenings, Bristol, Va., assignor to Universal Health Products, Inc., Bristol, Va.

Filed Feb. 2, 1988, Ser. No. 151,566

Int. Cl.<sup>5</sup> A61N 1/30

U.S. Cl. 604-20

25 Claims



1. The method of toning the muscles and tissues of the human face by stimulating the motor nerves to cause contraction of the muscles of the human face by used of a pair of electrodes connected to a source of predetermined galvanic current and operating at a predetermined frequency and predetermined polarity, said method comprising:

continually moistening the tips of said electrodes with a liquid solution of positively and negatively charged particles and pressing said moistened tips against the skin of said human face at two different positions and while pressed against said skin moving in a predetermined manner at least one of said moistened tips relative to the other to a still different position as the charged particles penetrate into the epidermis and dermis of said face whereby the movement in said predetermined manner results in

improved penetration of the charged particles into the epidermis and dermis of said face to further tone the muscles and tissues of the human face.

#### 4,957,481 PHOTODYNAMIC THERAPEUTIC TECHNIQUE

Robert A. Gatenby, Wynnewood, Pa., assignor to U.S. Bioscience, Blue Bell, Pa.

Continuation of Ser. No. 103,319, Oct. 1, 1987, abandoned. This application Jul. 3, 1989, Ser. No. 374,823

Int. Cl.<sup>5</sup> A61N 1/30

U.S. Cl. 604-20

27 Claims

1. A method of reducing the severity of symptoms resulting from the presence of a tumor in a subject comprising:

- (1) injection of an effective amount of a photosensitive compound directly into said tumor in at least one location in said tumor;
- (2) insertion of at least one sheathed light source, completely sheathed in a clear sheath catheter, into said tumor, said light source being capable of emitting light at a wavelength which is absorbed by said photosensitive compound; and
- (3) activation of said light source whereby said light is absorbed by said photosensitive compound, thereby disrupting the tumor cells and reducing the severity of tumor-induced symptoms.

#### 4,957,482 ATHERECTOMY DEVICE WITH A POSITIVE PUMP MEANS

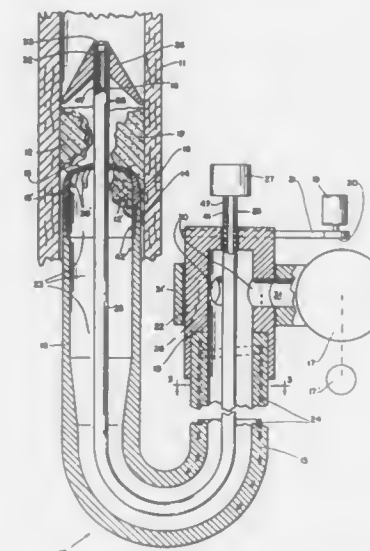
Samuel Shiber, Woburn, Mass., assignor to Surgical Systems & Instruments, Inc., Mundelein, Ill.

Continuation-in-part of Ser. No. 286,509, Dec. 19, 1988, Pat. No. 4,894,051, which is a continuation-in-part of Ser. No. 243,900, Sep. 13, 1988, Pat. No. 4,886,490, which is a continuation-in-part of Ser. No. 78,042, Jul. 27, 1987, Pat. No. 4,819,634, and a continuation-in-part of Ser. No. 205,479, Jun. 13, 1988, Pat. No. 4,883,458, and a continuation-in-part of Ser. No. 225,880, Jul. 29, 1988, Pat. No. 4,842,579, which is a continuation-in-part of Ser. No. 18,083, Feb. 24, 1987, which is a continuation-in-part of Ser. No. 874,546, Jun. 16, 1986, Pat. No. 4,732,154, which is a continuation-in-part of Ser. No. 609,846, May 14, 1984, abandoned. This application Mar. 22, 1989, Ser. No. 326,967. The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 604-22

8 Claims



1. An atherectomy system for cutting, ingesting and remov-

ing an obstruction from within a patient's artery, comprising in combination:

- a flexible guide-wire insertable into said artery,
- a flexible rotary-catheter being rotatably disposed and slidable over said flexible guide-wire,
- a blade forming a distal end of said flexible rotary-catheter having at least one tooth on its periphery which is bent inward,
- a continuous passage surrounding said flexible guide-wire for ingesting the cut obstruction material, said continuous passage being defined between said flexible rotary-catheter and said flexible guide-wire,
- coupling means at said proximal end of said flexible rotary-catheter for coupling it to a rotating means, and
- suction means connected to said continuous passage to pull said cut obstruction material proximally.

#### 4,957,483 STERILIZABLE SYRINGE

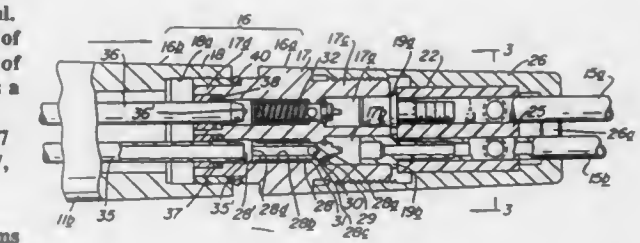
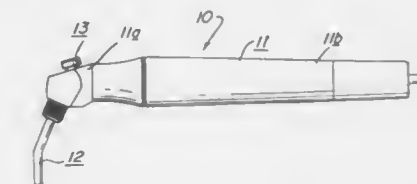
Donald I. Gonser, and Douglas M. Reinhart, both of Lancaster, Pa., assignors to Den-Tal-Ez, Inc., Audubon, Pa.

Filed Oct. 21, 1988, Ser. No. 260,932

Int. Cl.<sup>5</sup> A61C 1/08

U.S. Cl. 604-30

18 Claims



1. In a syringe having a handle with a nozzle at its proximal end portion, a normally-closed flow control valve located in said handle for controlling flow through the nozzle, a distal end portion, and means providing a fluid flow conduit extending in said handle between said valve and said distal end, the improvement comprising: coupling means for releasably coupling the distal end portion of said handle to an end portion of a flexible hose connected to a source of fluid flowable through said flow conduit means in said handle with respect to said nozzle, said coupling means including a first coupling component mountable on said hose end portion and a second coupling component carried by said distal end portion of said handle, said first and second coupling components being telescopically matingly engageable and disengageable with one another and having cooperating valving and actuator means operable automatically upon engagement to provide fluid communication between said hose and said handle when said coupling components are interconnected and upon axial disengagement to block said fluid communication, said actuator being carried by said syringe, whereby upon disconnection any fluid remaining in the conduit can be drained by opening the flow control valve to permit drainage.

4,957,484

## LYMPH ACCESS CATHETERS AND METHODS OF ADMINISTRATION

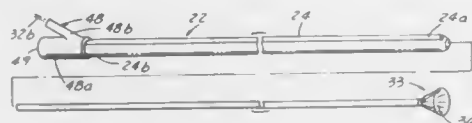
Robert Murtfeldt, LaCanada, Calif., assignor to Automedix Sciences, Inc., Torrance, Calif.

Filed Jul. 26, 1988, Ser. No. 224,395

Int. Cl.<sup>5</sup> A61M 25/01, 25/10

U.S. Cl. 604—53

20 Claims



1. A device for accessing a selected one of the thoracic duct and the right lymphatic duct to withdraw lymph fluid therefrom, comprising:

- (a) an elongated tubular member having first and second ends said tubular member having a lymph fluid drainage port located proximate said second end;
- (b) guide means slidably receivable within said tubular member for controllably orienting said first end thereof; and
- (c) lymph fluid collection and flow directing means slidably receivable within and disposed proximate said first end of said tubular member for collecting lymph fluid from a location proximate the termination of one of the thoracic duct and the right lymphatic duct and for directing the flow of the lymph fluid toward said fluid drainage port.

4,957,485

## ARRANGEMENT FOR THE INSTILLATION OF FLUIDS IN A URETHRA

Ingvar Andersson, PL 80, S-450 34 Fiskebackskil, and Jan Wadstein, Karlavägen 67, S-111 45 Stockholm, both of Sweden

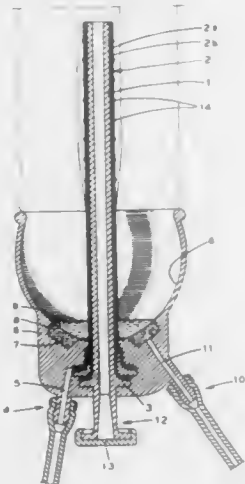
PCT No. PCT/SE87/00361, § 371 Date Feb. 7, 1989, § 102(e) Date Feb. 7, 1989, PCT Pub. No. WO88/01183, PCT Pub. Date Feb. 25, 1988

PCT Filed Aug. 18, 1987, Ser. No. 313,185

Claims priority, application Sweden, Aug. 20, 1986, 8603511 Int. Cl.<sup>5</sup> A61M 29/00

U.S. Cl. 604—96

4 Claims



1. An arrangement for the instillation of fluid in a urethra comprising:

- a tube connected to a source of fluid for instillation into the urethra, said tube having sufficient rigidity and diameter for insertion into the urethra, said tube having two ends, one end of said tube being adapted for insertion into the

urethra, the other end of said tube being adapted to remain outside of said urethra and having a flange positioned thereon, said tube having a length of about one decimeter; an inflatable sac engaging the outer surface of said tube and extending from said one end of the tube substantially the length of said tube toward said other tube end, said sac having elastic walls and having respective inflated and uninflated conditions, said sac having a generally cylindrical configuration when in its uninflated condition and having a generally conical configuration when in its inflated condition, said generally conical configuration comprising a base situated at said one end of the tube and a tip situated generally at said flange at said other end of the tube;

an adaptation piece positioned at said other end of the tube and having said flange anchored therein, said adaptation piece having a form adapted to the opening of the urethra and being aligned with said urethra so that said tube extends from said adaptation piece into said urethra;

means in fluid communication with said sac for connecting said sac with a source of air, whereby said sac may be inflated with and emptied of air; and

means in fluid communication with said adaptation piece for connecting said adaptation piece to a vacuum source for producing negative pressure between said adaptation piece and said urethra.

4,957,486

## RECTAL-STOMAL INSERT APPARATUS AND METHOD

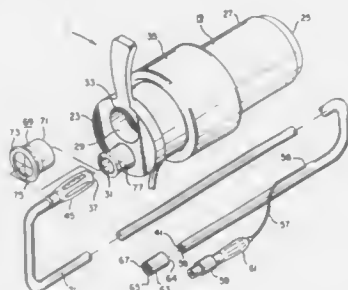
Emsley A. Davis, P.O. Box 942, McCamey, Tex. 79752

Filed Oct. 2, 1989, Ser. No. 416,064

Int. Cl.<sup>5</sup> A61M 29/00

U.S. Cl. 604—96

11 Claims



8. An apparatus for insertion into an opening of a colon of a patient, comprising:

- (a) an insertion member having an inner end to be inserted first into the opening, an opposite outer end, and an exterior surface;
- (b) said insertion member comprising a first channel extending therethrough between said outer and inner ends for receiving instrumentation, and a second channel formed separate from said first channel extending through said insertion member between said outer and inner ends;
- (c) occlusion means located around said insertion member for forming a seal between said exterior surface and the perimeter of said opening of the patient;
- (d) a tube member having inner and outer ends, said tube member having an inside channel extending between said tube member inner and outer ends, said tube member having a length between its inner and outer ends so that the tube member can be inserted into the length of the colon from said opening;
- (e) said tube member having an outside diameter that allows the insertion of said tube member into said second channel of said insertion member, said tube member being slidable within said second channel;
- (f) said tube member inside channel having a diameter that

allows the insertion therein of tool means for use in said colon, wherein said tool means are slidable within said inside channel when inserted therein;

(g) said tube member having inflatable balloon means at its inner end, said balloon means blunting the inner end of said tube member when inflated, said balloon means encompassing said tube member inner end, said tube member inner end being insertable into said second channel when said balloon means is deflated, said tube member having an inflating passage extending between said tube member outer and inner ends, said inflating passage communicating with the interior of said balloon means while being separate from said inside channel, said inflating passage outer end being adapted to receive inflation means;

(h) cap seal means having an open end and a closed end, said open end for receiving said tube member outer end, said closed end having first seal means, said first seal means for providing a seal in said inside channel while allowing said tool means to be slidable therethrough;

(i) second seal means for sealing said second channel around said tube member, said second seal means allowing said tube member to slide in said second channel.

4,957,487

## EXTERNAL MALE URINARY CATHETER AND COLLECTION SYSTEM

Frank J. Gerow, Houston, Tex., assignor to Baylor College of Medicine, Houston, Tex.

Filed Dec. 30, 1988, Ser. No. 292,559

Int. Cl.<sup>5</sup> A61M 37/00

U.S. Cl. 604—133

34 Claims



1. An external male urinary catheter and collection system, comprising

a generally tubular hollow body member having a distal closed end and a proximal open end for accommodating a portion of the male penis interiorly thereof,

a flexible thin-walled sleeve-like sealing member integrally extending from said proximal open end of said body member and oriented in concentric axial alignment therewith, said sleeve-like sealing member having a wall thickness substantially less than the wall thickness of said body member and adapted to be rolled up over the open end of the adjacent portion of said body member to permit insertion of the distal end of the male penis therein,

said sleeve-like sealing member having a predetermined substantially constant inner circumferential dimension selected for permitting said sealing member to snugly contact the exterior surface of the non-erect penile shaft when returned to the unrolled extended position,

ambulatory evacuation means that is self-contained and independently operable for producing a negative pressure therein and capable of receiving and collecting urine interiorly thereof,

a drainage tube interconnecting the distal end of said body member and said evacuation means for providing fluid communication therebetween and permitting drainage of urine from said body member interior to said evacuation means for collection,

first one-way valve means cooperating with said drainage tube for permitting fluid flow through said drainage tube

only in the direction from said body member to said evacuation means,

said negative pressure from said evacuation means being communicated through said drainage tube and first one-way valve means into the interior of said body member for cooperating with the inserted male penis for permitting it to expand to its anatomic limit in a simulation of an erection into the interior of said body member, said negative pressure introduced within said body member further acting on said thin-walled sleeve-like sealing member for collapsing said thin walls about a non-erect portion of the penile shaft and maintaining an air-tight seal therewith but not engaging the non-erect penile shaft tightly enough to restrict venous blood flow therein,

a second tube interconnecting the distal end of said body member and said evacuation means and said second tube communicating with said drainage tube through the interior of said body member,

a second one-way valve means cooperating with said second tube for permitting air flow therethrough only in the direction from said evacuation means to said body member, and

wherein said second tube and second one-way valve means cooperate with said evacuation means and body member for permitting an intermittent displacement of air there-through from said evacuation means into said body member interior in response to the intermittent drainage of urine into said evacuation means through said drainage tube and first one-way valve means, and displacing sufficient urine in said drainage tube into said evacuation means for insuring that substantially no urine remains interiorly of said body member distal end.

4,957,488

## THROUGH THE NEEDLE CATHETER DEVICE

Robert H. Cameron, Tampa, and Robert Doman, Lutz, both of Fla., assignors to Critikon, Inc., Tampa, Fla.

Filed Oct. 19, 1988, Ser. No. 259,649

Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—161

6 Claims



1. A through the needle catheter device in which a catheter is located within a needle having a proximal end and a pointed distal end for accessing a patient comprising:

a needle assembly, including a housing having a patient-facing side and means, connected to the proximal end of said needle, for withdrawing said needle into said housing and splitting said needle; and

a catheter assembly including said catheter and suitable for engagement with said needle assembly, and capable of disengaging from said needle assembly from the patient-facing side of said housing.

4,957,489

## THROUGH THE NEEDLE CATHETER INSERTION DEVICE AND TECHNIQUE

Robert H. Cameron, Tampa, and Robert Doman, Lutz, both of Fla., assignors to Critikon, Inc., Tampa, Fla.

Continuation-in-part of Ser. No. 259,649, Oct. 19, 1988. This application Oct. 20, 1988, Ser. No. 260,142

Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—161

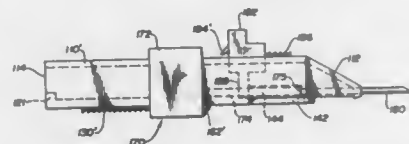
3 Claims

1. A through the needle catheter device in which a catheter



is located within a needle having a pointed distal tip comprising:

- a needle assembly including a housing, said needle, and means, mounted on said housing and connected to said needle, for irreversibly withdrawing said needle from a blood vessel and splitting the needle; and



a catheter assembly suitable for external engagement with said housing and including said catheter, wherein said housing further includes means engaging said catheter assembly for irreversibly threading said catheter to extend from the tip of said needle and into a blood vessel.

4,957,490

## INJECTION DEVICE

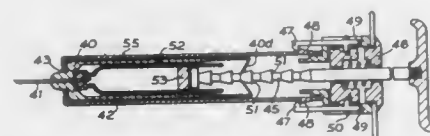
Phillip O. Byrne; Penelope R. Sisson, and Harry R. Ingham, all of Newcastle-upon-Tyne, England, assignors to National Research Development Corporation, London, England  
Filed Dec. 10, 1987, Ser. No. 131,228

Claims priority, application United Kingdom, Dec. 16, 1986, 8630016

Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—197

13 Claims



1. An injection device comprising a generally cylindrical barrel section, substantially closed at a first end thereof but having an aperture in said closed end to permit passage of an injection needle therethrough, a needle support member, an injection needle carried by said support member, said support member being dimensioned to fit within said barrel section and to move axially therein between a forward position in which said needle extends through said aperture and a rearward position in which said needle lies wholly within said barrel section, said needle support member further being shaped to receive one end of a liquid container also lying within said barrel section, a plunger, mounted at the second end of said barrel section for axial movement into and out of said liquid container, and connector means adapted to connect upon initiation of said plunger axial movement into said liquid container, said plunger to one of said liquid container and said support member, said plunger having a leading end portion, and a trailing end portion, said leading end portion being closer to said first end of said syringe barrel than said trailing end portion, said liquid container and said support member each having a leading end portion and a trailing end portion, said leading end portions of said liquid container and said support member being closer to said first end of said syringe barrel than said trailing end portion, said connector means having mutually connecting first and second members, the first member being located adjacent the leading end portion of said plunger relative to initial movement thereof into said liquid container and the second member being located at the trailing end portion of said one of said liquid container and said support member relative to said initial movement, whereby subsequent axial movement of said plunger in a direction away from said closed end of said barrel section moves said needle to said rearward position.

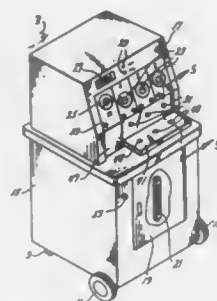
4,957,491  
COMBINATION FLUID COLLECTION AND DISPOSAL APPARATUS

Richard D. Parker, 915 Olive St., Ste. 1620, St. Louis, Mo. 63101

Continuation of Ser. No. 169,302, Mar. 17, 1988, Pat. No. 4,863,446. This application Apr. 14, 1989, Ser. No. 339,191  
Int. Cl.<sup>5</sup> A61M 1/00

U.S. Cl. 604—317

4 Claims



1. A fluid collection apparatus for collecting fluids aspirated from a patient during surgical procedure comprising: a reservoir for the temporary storage of fluids aspirated from the patient; housing for the reservoir defined by spaced apart panels including a front panel; a vacuum port in one of the panels of the housing for connection to a vacuum source; filter means for preventing aspirated fluids from the patient from entering the vacuum source; a vacuum line connecting the vacuum port to the reservoir; a plurality of suction ports in the front panel of the housing, each for connection to a suction tube for aspirating fluids from the patient; a plurality of suction lines connecting each of the suction ports to the reservoir for conducting fluid from each of the suction ports to the reservoir; a plurality of suction control means mounted one of the panels of the housing, each control means controlling the suction at a corresponding suction port and being adapted for manipulation to select a vacuum pressure for the suction port from a range of vacuum pressures; a gauge mounted on one of the panels of the housing for reading the vacuum pressure at each of the suction ports; and a drain generally adjacent the bottom of the reservoir.

4,957,492

## APPARATUS FOR COLLECTING AND HANDLING TISSUE DURING UTERINE EVACUATION PROCEDURE

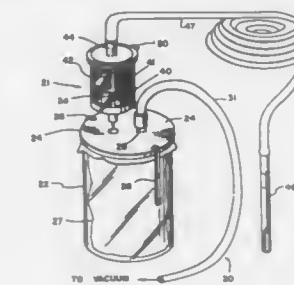
W. Patrick McVay, Doylestown, Pa., assignor to Cabot Medical Corporation, Langhorne, Pa.  
Filed Dec. 7, 1988, Ser. No. 280,946  
Int. Cl.<sup>5</sup> A61M 1/00

U.S. Cl. 604—319

4 Claims

1. In an apparatus for collecting tissue during evacuative medical procedures, wherein the apparatus includes a source of vacuum, a liquid collection bottle, a vacuum curette sized to enter a body cavity for withdrawing material during the procedure, a first hose connected between the source of vacuum and the bottle, and a second hose connected from the bottle to the vacuum curette, the improvement comprising: a tissue trap connected in the hose from the vacuum curette to the collection bottle, externally of the bottle, for trapping tissue as evacuated material is drawn from a body cavity and into the bottle, said tissue trap including a filter element for receiving and holding tissue therein while passing liquid material to the bottle, said liquid collection bottle having an open end closed by a

lid, said lid having a first fitting for attachment of the hose leading to the source of vacuum, and a second fitting for attachment of the tissue trap, said tissue trap having a fitting for complementary engagement with the fitting in the collection bottle lid to releasably hold the tissue trap to the collection bottle, said filter element held in said housing beneath a cover and removable through the open end upon removal of the cover; and including an open frame with an annular, radially outwardly directed flange thereon disposed in overlying relationship with the flange on the tissue trap housing, said housing having a removable cover on one end,



said housing further having an open end and an opposite, closed end, said cover being on said open end and said fitting being on said closed end, the open end of said tissue trap housing having a radially outwardly directed flange thereon disposed in overlying relationship with the filter element flange, thereby sandwiching the filter element flange between the housing flange and cover flange to seal and hold the filter element in place, and a releasable sealing means engaged with the housing, cover and filter element to retain them in sealed, assembled relationship to one another.

4,957,493

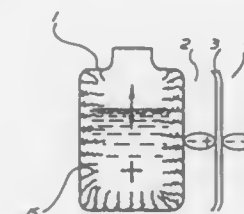
## METHOD OF AND DEVICE FOR PRESERVING BIOLOGICAL AND MEDICAL ACTION OF SUBSTANCES BASED ON ELECTRICAL CHARGE AND/OR STATE

Moysei Dobruskin, 483 Ocean Pkwy., Brooklyn, N.Y. 11218  
Continuation-in-part of Ser. No. 126,872, Nov. 30, 1987, Pat. No. 4,894,061. This application Apr. 19, 1989, Ser. No. 340,268  
The portion of the term of this patent subsequent to Jan. 16, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> A61F 2/66; A61B 19/00

U.S. Cl. 604—403

17 Claims



16. A device for preserving biological and medical action of substances based on electrical charge and/or state, comprising a container having a wall bounding an inner chamber for accommodating a substance; and means for supplying additional energy to the substance so as to prevent decrease of electric charge and/or state of the substance accommodated in the inner chamber, said means including a layer associated with said wall and

electrically charged so as to additionally charge the substance through said wall.

4,957,494

## MULTI-LAYER DELIVERY SYSTEM

Patrick S. L. Wong, Palo Alto; Felix Theeuwes, and James B. Eckenhoff, both of Los Altos, all of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

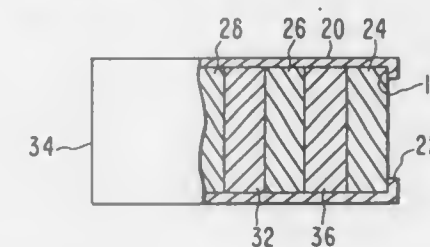
Continuation-in-part of Ser. No. 270,160, Nov. 14, 1988, abandoned, which is a continuation-in-part of Ser. No. 66,906, Jan. 25, 1987, Pat. No. 4,874,388. This application Dec. 13, 1988, Ser. No. 283,631

The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 9/24

U.S. Cl. 604—892.1

37 Claims



1. A drug dispenser for use in a fluid-containing environment comprising, in combination: a. a rigid housing having an outlet at one end thereof; b. a fluid activated driving member within a portion of said housing proximate the end of said housing opposite to said outlet and in contact with said housing, at least that portion of the housing containing the driving member having a predetermined permeation rate to the environmental fluid; c. a first set of drug layers longitudinally disposed within said housing between said driving means and said outlet; and d. a second set of layers longitudinally disposed within said housing and alternating with said first set of drug layers; wherein said first and second sets of layers are solids or semi-solids, or exhibit solid-like properties up to 31° C.; and whereby said first and second sets of layers are displaced towards said outlet by said driving member upon exposure of said dispenser to the fluid in said fluid-containing environment.

4,957,495

## DEVICE FOR SETTING THE SPINAL COLUMN

Patrick Kluger, Fichtenstr. 5, D-3590 Bad Wildungen-Reinhardshausen, Fed. Rep. of Germany  
PCT No. PCT/DE88/00208, § 371 Date Dec. 1, 1988, § 102(e) Date Dec. 1, 1988, PCT Pub. No. WO88/07357, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 31, 1988, Ser. No. 290,104

Claims priority, application Fed. Rep. of Germany, Apr. 1, 1987, 3711091

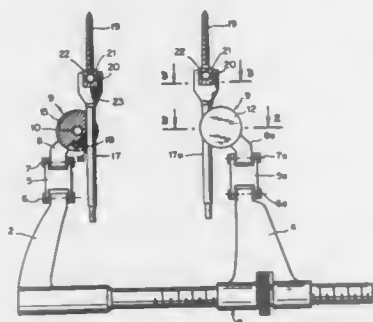
Int. Cl.<sup>5</sup> A61B 17/60

U.S. Cl. 606—58

13 Claims

1. A device for setting a spinal column with damaged vertebrae, said device comprising an axial guide member; a first arm slideably mounted for axial movement on said guide member; a second arm fixedly mounted to said guide member; a separate mid-piece hingedly connected to each of said first and second arms; and a separate bracket hingedly connected to each said mid-piece; and

a separate hollow receiving piece carried by each bracket and adjustable in two planes for receiving an extension rod adapted for connection to a bone screw, said receiving



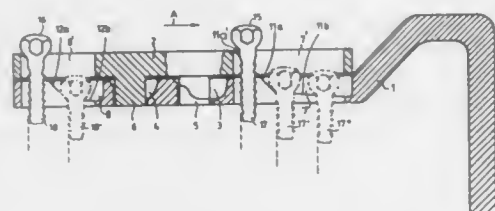
piece consisting of a cylindrical piece with a central axis having a generally tangential hole therethrough which is transverse to and offset from said central axis and means for fixing the position of said cylindrical piece.

#### 4,957,496 SLOTTED SLIDE PLATE ASSEMBLY FOR OSTEOSYNTHESIS

Joachim Schmidt, Cologne, Fed. Rep. of Germany, assignor to Mecron medizinische Produkte GmbH, Berlin, Fed. Rep. of Germany

Filed Nov. 13, 1989, Ser. No. 434,463  
Claims priority, application Fed. Rep. of Germany, Nov. 11, 1988, 3838774

Int. Cl.<sup>5</sup> A61F 2/00  
U.S. Cl. 606—70 9 Claims



1. A slotted slide plate assembly for setting bones in a fracture area and exerting a pressure in a predetermined direction to obtain a bone compression, comprising

- a first plate element having a topside and an underside; said underside being adapted for a face-to-face engagement with a bone surface;
- a first throughgoing slide slot provided in said first plate element; the first slide slot having a length oriented parallel to said predetermined direction;
- a first slide ramp bounding said first slide slot and being oriented in said predetermined direction; said first slide ramp being inclined towards said underside in said predetermined direction;
- a second plate element having a topside and an underside; said underside of said second plate element being adapted for a face-to-face engagement with the topside of said first plate element;
- fitting means in said first and second plate elements for preventing a relative displacement, in said predetermined direction, between said first and second plate elements when said first and second plate elements are in a face-to-face engagement with one another;
- a second throughgoing slide slot provided in said second plate element; the second slide slot having a length oriented parallel to said predetermined direction; said second throughgoing slide slot overlapping said first slide slot

when said first and second plate elements are in a face-to-face engagement with one another; said first and second slide slots forming a slide slot pair;

- a second slide ramp bounding said second slide slot and being oriented in said predetermined direction; said second slide ramp being inclined towards said underside of said second plate element in said predetermined direction; said first slide ramp being in alignment with and being a continuation of said second slide ramp when said first and second plate elements are in a face-to-face engagement with one another, whereby a tightening screw inserted through said slide slot pair from said top side of said second plate element slides, while being screwed into the bone, with a screw head on said second slide ramp and subsequently on said first slide ramp in said predetermined direction.

4,957,497  
DEVICE FOR OSTEOSYNTHESIS  
Thomas Hoogland; Hans E. Harder, and Klaus Behrens, all of Pfizer Inc., 235 E. 42nd St., New York, N.Y. 10017  
Continuation of Ser. No. 233,954, Aug. 18, 1988, abandoned, which is a continuation of Ser. No. 790,713, Oct. 24, 1985, abandoned. This application Jul. 13, 1989, Ser. No. 380,701  
Claims priority, application Fed. Rep. of Germany, Oct. 27, 1984, 8431616

Int. Cl.<sup>5</sup> A61F 5/04  
U.S. Cl. 606—71 2 Claims



1. A device for osteosynthesis comprising:

- an elongated bone plate having first and second longitudinal portions and having a bottom surface and an upper surface, said bottom surface being adapted to rest upon the patient's bone, said upper surface being oppositely disposed with respect to said bottom surface, with a plurality of elongated holes disposed in a longitudinally spaced arrangement for the reception of bone screws being provided in said second longitudinal portion of said bone plate, and a plurality of circular holes for the reception of bone screws being provided in said first longitudinal portion, and said first longitudinal portion being adapted to be screwed into the patient's bone on a first side of a fracture, and said second longitudinal portion being adapted to be screwed into the patient's bone on a second side of the fracture, and
- an elongated plate having an upper surface and a bottom surface which is adapted to be fitted on and slidable with respect to the upper surface of, and only on said second longitudinal portion of, said bone plate and provided with a plurality of longitudinally spaced circular holes each having a center and having a diameter approximately equal to the width of said elongated holes and a separation between two adjacent centers being substantially equal to the separation between the centers of two adjacent elongated holes, wherein said slide plate is curved in its transverse cross-section with the concave side of the slide plate being adapted to lie in close contact against said bone plate when the slide plate is fitted on the bone plate, wherein said bone plate defines a longitudinally extending channel having a channel bottom and opening towards the upper surface of the bone plate, with said elongated holes being located on said channel bottom and said slide plate being received and guided within said channel when the slide plate is fitted on the bone plate, wherein said bone plate has an approximately U-shaped transverse cross-section with the shape of said U-shaped transverse cross-section

being formed from legs having a height h, and wherein said bone plate has an upper surface exhibiting a tapered profile in the longitudinal direction with said height h of said legs of said U-shaped cross-section steadily decreasing from the center of said bone plate to the ends of said bone plate.

4,957,498  
SUTURING INSTRUMENT  
Richard B. Caspari, Maidens, Va.; Arthur F. Trott, Largo, and F. Barry Bays, Seminole, both of Fla., assignors to Concept, Inc., Largo, Fla.  
Continuation of Ser. No. 117,158, Nov. 5, 1987, Pat. No. 4,890,615. This application Nov. 7, 1989, Ser. No. 432,886  
The portion of the term of this patent subsequent to Jan. 2, 2007, has been disclaimed.  
Int. Cl.<sup>5</sup> A61B 17/00  
U.S. Cl. 606—146 8 Claims



1. A suturing instrument comprising an elongate member having a distal end and a proximal end; first and second jaws disposed at said distal end of said elongate member to be movable relative to each other, said first jaw having an opening therein and said second jaw including means for penetrating tissue to be sutured and an opening therein; means operable at said proximal end of said elongate member to move said first and second jaws from an open position spaced from each other to a closed position adjacent each other with said openings therein aligned; and means for feeding suture material through said openings in said first and second jaws whereby suture material can be passed through tissue to be sutured after penetration by said second jaw with said first and second jaws in said closed position.

4,957,499  
SURGICAL SUTURING INSTRUMENT  
Viktor A. Lipatov, ulitsa Profsojuznaya, 91, korpus 3, kv.27; Igor A. Guskov, ulitsa Tulinskaya, 10, Korpus 1, kv.80, and Nikolai N. Kanshin, ulitsa M. Filevskaya, 68, kv. 10, all of Moscow, U.S.S.R.  
PCT No. PCT/SU88/00020, § 371 Date Mar. 9, 1989, § 102(e) Date Mar. 9, 1989, PCT Pub. No. WO89/00406, PCT Pub. Date Jan. 26, 1989  
PCT Filed Jun. 27, 1988, Ser. No. 332,452  
Claims priority, application U.S.S.R., Jul. 14, 1987, 4268008  
Int. Cl.<sup>5</sup> A61B 17/00  
U.S. Cl. 606—153 13 Claims

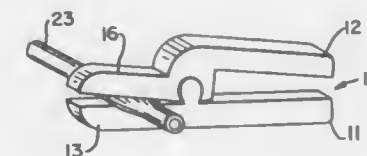
1. A surgical suturing instrument for establishing circular compression anastomoses in the organs of the digestive tract, comprising a needle arrangement (5) accommodated in a hollow body (1) and having a first ring-shaped element (6) with a plurality of holes (8), and a second ring-shaped element (7) coaxial with the first one and carrying a number of needles (9) fixed in position thereon, each of said needles corresponding to one of the holes (8) in the first ring-shaped element (6), while at least part of the needles have a locking cone (10) at the free end thereof; a rod (2) accommodated in the hollow body (1), said rod carrying at one of its ends a connecting ring (13) fixed stationary with the aid of a nut (12), the connecting ring being adapted for the needles (9) to pass through when establishing an anastomosis and those needles which have a locking cone (10) get secured in position in the connecting ring (13), a hol-

low cylindrical knife (3) having such an inside diameter that enables the nut (12) to pass freely therethrough, the knife being held to a hollow tube (4) which is arranged coaxially in the hollow body (1) and which accommodates the rod (2) located coaxially therewith, and a mechanical actuator of the hollow cylindrical knife (3) adapted to interact with the hollow tube (4), characterized in that it has a pusher (19) upon one of whose ends rests the second ring-shaped element (7) of the needle



arrangement (5), while its other end has a hollow chamfer (20) and a stop (21) which is adapted to interact with a stop (22) of the hollow body (1) so as to restrict the travel of the second ring-shaped element (7) in the course of anastomosing, a split bush (23) fitted on the hollow tube (4) and having an outside taper collar (24) adapted to engage the hollow chamfer (20) of the pusher (19) and a retainer (25) of the split bush (23) located on the hollow tube (4) inside the split bush (23).

4,957,500  
NORMALLY CLOSED CLAMP  
Marc D. Liang; Krishna Narayanan, both of Pittsburgh, and Eugene D. Ross, Southampton, all of Pa., assignors to Montefiore Hospital Association of Western Pennsylvania, Pittsburgh, Pa.  
Filed Oct. 27, 1988, Ser. No. 263,518  
Int. Cl.<sup>5</sup> A61B 17/08  
U.S. Cl. 606—157 17 Claims



1. A device for use as a normally closed clamp or a separator, said device being formed from two connected elements including:

- a base element having a base jaw member, a base handle member and a central, non-circular arcuate cam member;
- a clamping element having a clamping jaw member, a clamping handle member and a central, non-circular arcuate cam engaging member;
- said base element being secured to said clamping element by engagement of at least a portion of said central, non-circular arcuate cam engaging member with at least a portion of said central non-circular cam member;
- the said base jaw member and the said clamping jaw member having confronting surfaces which are in proximity when the said cam engaging member conforms to the surface of said arcuate cam member;
- said base handle member and said clamping handle member being spaced apart when said cam engaging member conforms to the surface of said arcuate cam member;
- the arcuate shape of said arcuate cam member and said



1. A prosthesis for ossicular reconstruction mountable between the tympanic membrane and the footplate of the middle ear comprising:
  - a spring means;
  - a lower arm having one end connected to the spring means

and a second end having means for connection to the footplate;  
an upper arm having one end connected to the spring means and a second end having means for connection to the tympanic membrane;  
said upper and lower arms defining a plane and forming an enclosed angle therebetween; and  
said spring means including an oval coil oriented substantially parallel to said plane and substantially within the enclosed angle thereby minimizing contact of the coiled spring means with the walls of the middle ear.

4,957,508

## MEDICAL TUBES

Noriaki Kaneko; Yoshimi Hirata, and Masahiro Moriaki, all of Yokohama, Japan, assignors to Ube Industries, Ltd., Yamaguchi, Japan

Filed Oct. 30, 1987, Ser. No. 114,499

Claims priority, application Japan, Oct. 31, 1986, 61-258369

Int. Cl.<sup>5</sup> A61F 2/06, 2/04

U.S. Cl. 623—12

4 Claims



1. An implantable tubular synthetic prosthesis for repairing or replacing tubular vessels which comprises a porous, high molecular weight elastomeric tube made of an elastomer selected from the group consisting of polyurethane, polyurethane urea, mixtures of polyurethane and polyurethane urea and mixtures of polyurethane and polyurethane urea with a silicone polymer, said elastomeric tube having an internal and external surface, wherein the internal surface exhibits a dilating force and the external surface exhibits a shrinking force such that the end portions of the tube dilates outwardly towards the external surface of the tube and said tube further dilating along its cut end portions to the external surface thereof when it is cut at any random position along the tube, transverse to its longitudinal direction, said dilation occurring in the area within 5 mm from said ends and cut ends, respectively, and the dilated maximum inner diameter is 1.4 times the inner diameter thereof.

4,957,509

## CERAMIC IMPLANT MATERIALS

Nobuyuki Tamari; Isao Kondoh, and Nakoto Kinoshita, all of Ikeda, Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

Continuation of Ser. No. 19,843, Feb. 27, 1987, abandoned. This application Aug. 24, 1989, Ser. No. 398,315

Claims priority, application Japan, Feb. 28, 1986, 61-44325

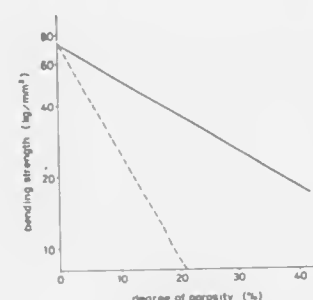
Int. Cl.<sup>5</sup> A61F 2/28

U.S. Cl. 623—16

6 Claims

1. A ceramic implant consisting essentially of a matrix comprising zirconia or silicon nitride ceramic, wherein the matrix is a porous one having a porosity of 15 to 40%, contains a substance adapted to living tissue in the pores thereof, and contains silicon carbide whiskers in the amount of 10 to 45% based on the volume of the matrix excluding the volume of the pores therein, wherein said substance adapted to living tissue is at least one compound selected from the group consisting of collagens, mucopolysaccharides and calcium phosphates, this

substance being deposited in the pores of said matrix by being applied in the form of an aqueous solution or slurry thereof and then being dried and solidified, and wherein the ceramic ma-



trix, in the case of zirconia, is in a phase selected from the group consisting of cubic, tetragonal and monoclinic, and, in the case of silicon nitride, is in a phase selected from the group consisting of trigonal and hexagonal.

4,957,510

## HIP PROSTHESIS STRUCTURE ADAPTED FOR EASY FITTING TO THE PATIENT COXO-FEMURAL ARTICULATION

Patrizio Cremascoli, Via Clemente Prudenzi, 14/16 — 20138 Milan, Italy

Filed Jul. 26, 1988, Ser. No. 224,454

Claims priority, application Italy, Aug. 3, 1987, 12023 A/87

Int. Cl.<sup>5</sup> A61F 2/36

U.S. Cl. 623—23

1 Claim



1. A hip prosthesis comprising an elongated oval cross-section stem, said stem having a first set curvature, a plurality of longitudinal extending slots formed on said stem, said stem including a first pointed end portion and an opposite enlarged second end portion, said enlarged portion having a second set curvature different from said first set curvature of said stem, a plurality of spaced bone gripping grooves formed on said enlarged end portion, an oval cross-section seat formed in said enlarged portion and a coupling element for coupling said stem to a prosthesis head, said coupling element including a middle body and two coupling element end portions integral with and on opposite ends of said middle body, one of said end portions having an oval cross-section for engaging in said seat and the other of said end portions having a frustum of cone shape, said coupling element being so designed that, as said oval cross-section end of said coupling element is engaged in said seat, said middle body and said other end portion of said coupling element provide an extension having a curvature substantially corresponding to said second set curvature of said enlarged end portion of said stem.

## CHEMICAL

4,957,511

## COAL-WATER DISPERSION AGENT

Helena Ljusberg-Wahren, Soderhamn, Sweden, assignor to Bergvik Kemi AB, Sweden

Filed Mar. 19, 1984, Ser. No. 590,830

Claims priority, application Sweden, Mar. 18, 1983, 8301502 Int. Cl.<sup>5</sup> C10L 1/32

U.S. Cl. 44—51

15 Claims

1. A coal-water dispersion comprising coal particles dispersed in water and a dispersing agent in an amount of 0.1–5% by weight of the dispersion, wherein the dispersing agent is a tall oil pitch partially esterified with a polyalkylene glycol compound mainly being composed of ethylene oxide units, and having an average molecular weight of above 600, said dispersing agent having a residual acid value higher than 3.

4,957,512

## METHOD OF CLEANING GAS FROM SOLID AND GASEOUS MATTER AND APPARATUS MATERIALIZING SAME

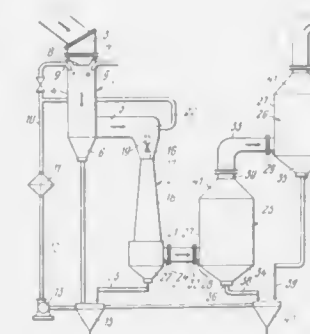
Vladimir F. Denisov, ulitsa B. Tulskaia, 2, kv. 547; Marina I. Gertseva, ulitsa Udaltsova, 4, kv. 188; Valentin E. Ziberov, ulitsa Voronezhskaya, 38/43, kv. 309, all of Moscow; Vadim K. Karapetian, ulitsa Kakhovskaya, 6, kv. 33; Norik S. Sarkisian, ulitsa Komsomolskaya, 197, kv. 12, both of Alavard; Vladimir M. Karbachinsky, ulitsa Butlerova, 2, korpus 1, kv. 11, Moscow; Oleg I. Kharlamov, Leninsky prospekt, 125, korpus 2, kv. 240, Moscow; Alexei D. Tsol, pereulok Vashetsova, 11, kv. 158, Moscow; Mark I. Tsytin, Litovskiy bulvar, 6, korpus 1, kv. 179, Moscow; Alexei A. Romanov, ulitsa Lenskaya, 3, korpus 2, kv. 423, Leningrad; Vagan D. Veranian, 1 kvartal, 13, kv. 14, Alavard; poselok Sanain; Vasily D. Khripin, Moskovskoe shosse, 39, korpus 4, kv. 13, Ryazan, and Larisa E. Shafran, Leningradskiy prospekt, 75b, kv. 121, Moscow, all of U.S.S.R.

Filed Aug. 25, 1989, Ser. No. 398,670

Int. Cl.<sup>5</sup> B03C 1/00

U.S. Cl. 55—8

17 Claims



1. A method of cleaning gas from solid and gaseous matter pursuant whereto

a gas stream is scrubbed in a first stage and in a second stage of scrubbing with a liquid in a cocurrent flow, whereby a stream of gas/liquid mixture is formed; said stream of gas/liquid mixture is cooled in the course of said scrubbing of the gas stream with the liquid, a liquid phase is separated from said stream of gas/liquid mixture which contains solid matter present in the gas, and the liquid phase is disposed of; in the course of scrubbing the gas stream with the liquid, said gas stream is admitted into said first stage of scrubbing with said liquid at a velocity of 30–40 m/s and said gas is being cooled to the temperature of its adiabatic saturation; for said second stage of scrubbing the gas stream with the liquid, said stream of gas/liquid mixture is admitted at a velocity of 50–70 m/s and said gas is cooled to 40°–50° C.; said solid and gaseous matter

contained in the gas is electrically precipitated at a field strength of 5–9 kV/cm, whereby the velocity of said stream of gas/liquid mixture is 3–4 m/s in passing through said electric field; said gas is cooled to 20°–25° C. in the course of said electrostatic precipitation of said solid and gaseous matter present in the gas.

4,957,513

METHOD OF PURIFYING A MIXED H<sub>2</sub>/H<sub>2</sub>SE VAPOR STREAM

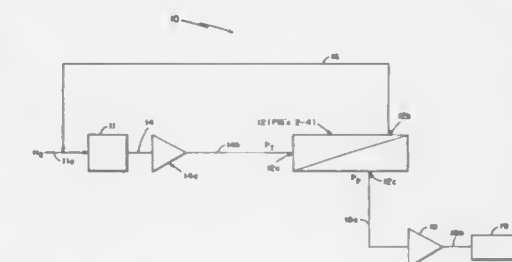
Kelly L. St. Hilaire, Hollis, N.H., assignor to Raytheon Company, Lexington, Mass.

Filed May 10, 1989, Ser. No. 349,661

Int. Cl.<sup>5</sup> B01D 53/22, 71/68

U.S. Cl. 55—16

14 Claims



1. A method of separating a mixed flow including hydrogen selenide, comprises the steps of:

introducing said mixed flow of hydrogen selenide into a compressor to provide a pressurized mixed flow having a first pressure;

feeding said pressurized mixed flow into a gas separator having a polymer membrane and a feed inlet to receive the pressurized mixed flow, a retentate outlet to provide a residual flow depleted in hydrogen selenide, and a permeate outlet to provide a flow enriched in hydrogen selenide; and

providing a pressure drop across the membrane and a compression ratio of inlet pressure (P<sub>i</sub>) to permeate pressure (P<sub>p</sub>), to extract a flow enriched in hydrogen selenide from the permeate outlet of the gas separator.

4,957,514

## HYDROGEN PURIFICATION

Timothy C. Golden; Ravi Kumar, both of Allentown, and Wilbur C. Kratz, Macungie, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Feb. 7, 1989, Ser. No. 307,438

Int. Cl.<sup>5</sup> B01D 53/04

U.S. Cl. 55—26

9 Claims

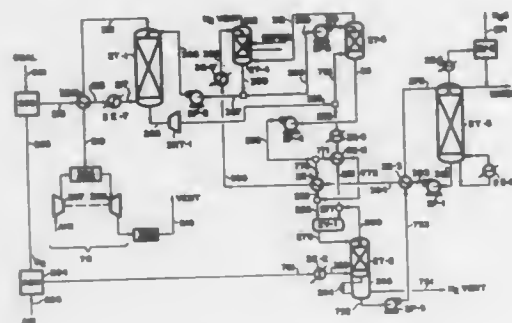
1. The pressure swing adsorption method of purifying an impure hydrogen gas stream containing a dilute contaminant of CH<sub>4</sub> which method comprises: passing said stream at superatmospheric pressure through an adsorbent bed of a zeolite obtained by replacing at least a portion of the sodium cation of sodium X-zeolite by barium ions to absorb said CH<sub>4</sub> contaminant and recovering purified hydrogen as unadsorbed effluent, depressurizing the adsorbent bed, purging the adsorbent bed with product hydrogen and repressurizing the adsorbent bed with product hydrogen.



4,957,515  
**PROCESS FOR SULFUR REMOVAL AND RECOVERY FROM FUEL GAS USING PHYSICAL SOLVENT**  
 William P. Hegarty, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.  
 Filed Nov. 3, 1988, Ser. No. 266,741  
 Int. Cl.<sup>5</sup> B01D 19/00

U.S. Cl. 55—43

3 Claims



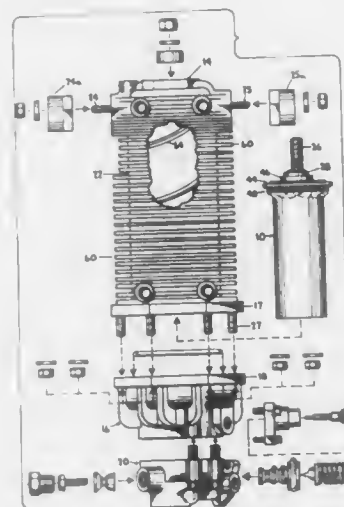
1. A process for producing a hydrogen sulfide-free fuel gas for combustion in a gas turbine to produce power using a raw fuel feed gas from an oxygen-enriched gasification, comprising the steps of:

- introducing a raw fuel feed gas from a gasification, which gas is contaminated with hydrogen sulfide and carbon dioxide, into a first separation zone;
- contacting said raw fuel feed gas with a carbon dioxide-loaded liquid solvent selective for said hydrogen sulfide in said first separation zone;
- removing a hydrogen sulfide-free, carbon dioxide-containing fuel gas from said first separation zone, combusting the fuel gas in a gas turbine and recovering power from the gas turbine;
- removing a hydrogen sulfide-rich, carbon-dioxide-containing solvent from said first separation zone, reducing said solvent in pressure and combining it with either the combined stream containing carbon dioxide and nitrogen stripping gas of step (h) or the second hydrogen sulfide-rich solvent of step (e);
- separating at least the combined stream of step (h) into a final carbon dioxide and nitrogen stream and a second hydrogen sulfide-rich solvent containing residual carbon dioxide by contacting at least the combined stream with a carbon dioxide-loaded solvent in a second separation zone;
- separating a carbon dioxide-rich stream containing residual hydrogen sulfide from said second hydrogen sulfide-rich solvent containing residual carbon dioxide;
- stripping said residual carbon dioxide containing residual hydrogen sulfide from said second hydrogen sulfide-rich solvent of step (f) with nitrogen-rich gas at a pressure below approximately 300 psia;
- combining said carbon dioxide-rich stream of step (f) and the residual carbon dioxide containing nitrogen stripping gas of step (g) to produce a combined stream containing carbon dioxide and nitrogen stripping gas;
- stripping the hydrogen sulfide from said second hydrogen sulfide-rich solvent in a regeneration zone using steam to recover a hydrogen sulfide-rich product stream and a hydrogen sulfide-lean solvent; and
- contacting the final carbon dioxide and nitrogen stream of step (e) with the hydrogen sulfide-lean solvent of step (i) in a third separation zone to recover a carbon dioxide-loaded liquid solvent for introduction in said first separation zone and to recycle carbon dioxide to said fuel gas of step (c).

4,957,516  
**INVERSE FLOW DEPTH FILTER ASSEMBLY**  
 Keith L. Daniels, Birdsboro, Pa., assignor to Reading Technologies, Inc., Reading, Pa.  
 Continuation-in-part of Ser. No. 112,256, Oct. 22, 1987, Pat. No. 4,822,387. This application Feb. 14, 1989, Ser. No. 310,729  
 The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.  
 Int. Cl.<sup>5</sup> B01D 46/00

U.S. Cl. 55—218

25 Claims



1. An inverse flow depth filter assembly with at least one gas permeable filter element, said depth filter assembly comprising: an elongated assembly housing with a top, a bottom and walls having an exterior surface and an interior surface defining an open internal cross-section, the assembly housing having gas inlet means and gas egress means communicating with said internal cross-section, the gas inlet means and the gas egress means being disposed adjacent said top, and drain means at said bottom, the top having an underside, the gas inlet means opening into the internal cross-section at a point below a point at which the gas egress means opens into the internal cross-section;

a filter cartridge comprising a generally hollow filter housing with a gas impermeable material of lesser circumference than said internal cross-section of said assembly housing and including an open, gas permeable cartridge bottom and a cartridge top with a passage leading to the gas egress means, the filter cartridge being suspended from said underside of the top said assembly housing so that a substantially annular channel is defined between said walls of the housing and said impermeable filter housing of the cartridge, a filter material being disposed in the filter housing, the filter material being a non-absorptive fibrous material operable to coalesce droplets from passing gas;

cartridge receiving means in said top of the assembly housing, including an annular lip for sealing the filter cartridge to the assembly housing between the gas inlet mean and the gas egress means, such that gas passes from the gas inlet means along the annular channel and through the filter cartridge to the gas egress means, the filter cartridge having a sectional base including continuous upright sections sealed to a collar and forming gas egress ports communicating with the gas egress means, and an annular raised collar sealed to said lip and said upright sections, and sized to form a circumferential seal with said filter housing; and,

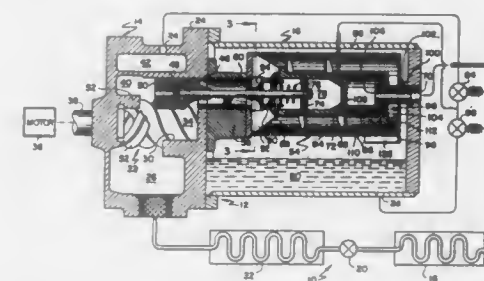
heat exchange means adapted to lower the temperature of passing gas, including a thermally conductive material disposed between the interior surface and the exterior

surface of the assembly housing for heat exchange through the assembly housing; whereby gas moves through said assembly housing along the path through said inlet means, downward through said annular channel, and upward through said filter cartridge to exit through said gas egress means, said heat exchange means being operable to condense vapor from the gas, vapor droplets and gas through the filter, said droplets and condensates collecting at the bottom of said assembly housing, to be drained from said filter assembly through said drain.

4,957,517  
**SOUND ATTENUATING LIQUID-GAS SEPARATOR**  
 Peter J. Linnert, La Crosse, Wis., assignor to American Standard Inc., New York, N.Y.  
 Filed Apr. 28, 1989, Ser. No. 345,147  
 Int. Cl.<sup>5</sup> B01D 19/00

U.S. Cl. 55—184

21 Claims



1. Oil separation apparatus for a screw compressor, comprising:

housing means, defining a sump, for storing oil which has been separated from a gas compressed within said compressor;

an oil separator element, disposed interior of said sump housing means, said separator element including a cylindrical outer shell and a cylindrical inner column between which a helical flow path is defined, said outer shell being solid along said helical flow path so that the entirety of the mixture discharged from said compressor is constrained to travel the entire length of said helical flow path within the confines of the solid portion of said outer shell and said outer shell defining at least one aperture, downstream of said helical flow path, through which oil separated from said gas passes into said sump; and

means for abating noise, including a pair of generally tubular nested members, said means for abating noise defining a flow path downstream of said helical flow path, through which gas from which oil has been separated within said separator element must pass in order to exit said housing means and a first one of said nested pair of generally tubular members penetrating said separator element without physically contacting said separator element in the location of said penetration.

4,957,518  
**ASSEMBLY USEFUL FOR RETAINING COMPONENTS SUCH AS A FILTER TO A CONTAINER AND A CORRESPONDING COMBINATION**  
 Gilbert W. Brassell, 13237 W. Eighth Ave., Golden, Colo. 80401  
 Filed Jun. 6, 1989, Ser. No. 362,152  
 Int. Cl.<sup>5</sup> B01D 53/04

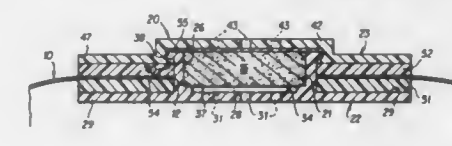
U.S. Cl. 55—316

24 Claims

1. An assembly for retaining a filter element in alignment with an opening through a wall, comprising:

a base plate for positioning on one side of the wall in alignment with the opening, the base plate having a projecting flange for passage through the opening, the projecting flange defining a sidewall of a chamber for receiving said

filter element and the projecting flange being positioned inboard of the periphery of the base plate to define a first flange portion between the periphery and the projecting flange, the base plate having a vented floor portion; a cap plate comprising a second flange portion and a vented center portion, the cap plate cooperating in fixed relation

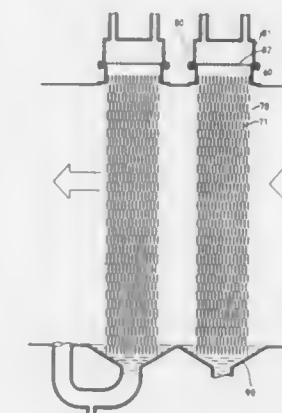


with the base plate to close the chamber containing the filter element to retain the filter element therein, with the second flange portion on the cap plate being in alignment with the first flange portion on the base plate; and sealing means disposed between the first and second flange portions for sealing engagement with opposite surfaces of the wall adjacent the opening.

4,957,519  
**AIR-CLEANING APPARATUS**  
 Chi-Shiang Chen, No. 15, Chung-Shan Rd., Su-Ao Chen, Ilan Hsien, Taiwan  
 Filed Jun. 26, 1989, Ser. No. 372,438  
 Claims priority, application Taiwan, May 4, 1989, 78103433  
 Int. Cl.<sup>5</sup> B01D 47/00

U.S. Cl. 55—233

7 Claims



1. An apparatus for removing undesired particles or gases from an exhaust discharged from an exhaust pipe, comprising: a frame support including a first lateral wall having an inlet adapted for receiving said exhaust, and a second lateral wall opposite to said first lateral wall having an outlet for expelling said exhaust;

a plurality of filtering members each being removably inserted between said first and second lateral walls, each filtering member comprising a hollow peripheral frame having a filter membrane secured thereto, said membrane having a plurality of perforations formed thereon;

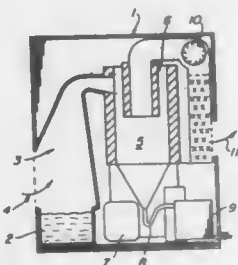
said frame support including means for supporting each of said filtering members in substantially parallel spaced relationship whereby each of said filtering members may be removed from said frame support independently of the others of said filtering members;

means for supplying a stream of a cleaning liquid and allowing said stream of cleaning liquid to flow against said filtering member and spread over a major portion of said perforations;

wherein said perforations are dimensioned such that a liquid

film is effectively formed thereon after said cleaning liquid flows over said filtering member; and means for collecting said cleaning liquid flowing over said filtering member.

**4,957,520**  
**APPARATUS FOR THE REMOVAL OF VAPORS AND VAPOR PRODUCTS**  
Michel Parmentier, Haroué, and Jean-Charles Weber, Dombasle, both of France, assignors to France Grignotage S.A.R.L., Dombasle, France  
Filed Apr. 19, 1989, Ser. No. 341,544  
Claims priority, application France, Apr. 19, 1988, 88 05324  
Int. Cl.<sup>5</sup> B01D 53/04, 53/24  
U.S. Cl. 55—269 9 Claims



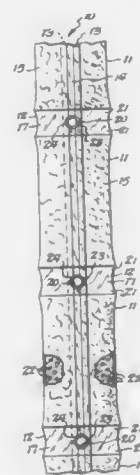
1. An apparatus requiring reduced maintenance and cleaning, for removing vapors and condensable and non-condensable products carried by said vapors for placement above a system for cooking food products in water or oil, and having a hood, a cyclone having upper and lower portions, means for recovering the condensable products and an absorption filter, said apparatus comprising:

- a hood for receiving vapors and condensable and non-condensable products carried by said vapors and communicating with upper portions of the cyclone;
- a cyclone under a partial vacuum relative to the hood for separating condensable products from non-condensable products wherein the condensable products condense against the cooled walls of the cyclone over the path of gases circulating through the cyclone thereby cleaning the walls on a continuous basis with streaming of condensed water, and wherein the non-condensable products are diverted to an absorption filter;
- an absorption filter located at an outlet of the cyclone for trapping non-condensable products; and
- recovering means in a lower portion of the cyclone for recovering condensable products including a syphon.

**4,957,521**  
**PACKET STRIP**  
John S. Cullen, and Edgard Matrak, both of Buffalo, N.Y., assignors to Multiform Desiccants, Inc., Buffalo, N.Y.  
Filed Jun. 23, 1986, Ser. No. 877,310  
Int. Cl.<sup>5</sup> B01D 53/04  
U.S. Cl. 55—387 7 Claims

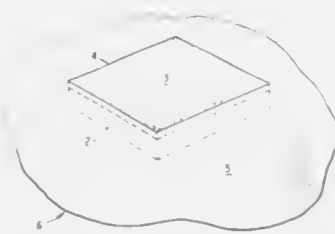
1. A strip of packets comprising a plurality of packets fabricated from a strip of heat-fusible material and oriented in end-to-end relationship, each of said packets including wall means and a fused seam and fused end portions, said fused seams of said packets being in alignment and extending longitudinally of said strip, sections on said strip between said wall means, said fused end portions of said packets being located in said sections, said fused end portions extending transversely to said fused seams for sealing the ends of said packets, said fused seams being continuous and extending through said fused end portions, said fused end portions of adjacent packets being located in end-to-end relationship, means in each of said sections for providing a line of sight therethrough for permitting a sensor to read a signal, bulk material in each of said packets,

said means in each of said sections comprising a perforation, said perforations extending through a portion of said fused



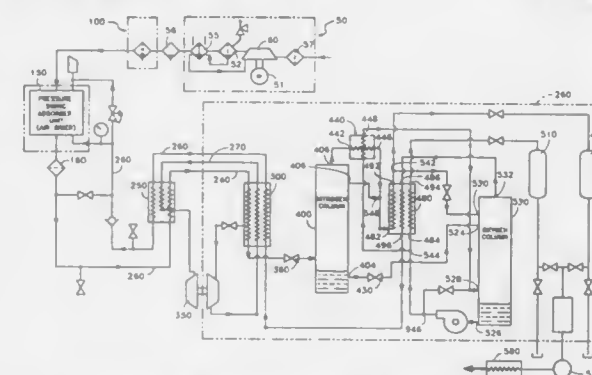
seam in each of said sections, and each of said perforations including a fused grommet-like border.

**4,957,522**  
**COMBINATION OF A FILTER AND A MATERIAL PERMEABLE TO GASES BUT IMPERMEABLE TO LIQUIDS**  
Gilbert W. Brassell, 13237 W. Eighth Ave., Golden, Colo. 80401  
Filed Jun. 6, 1989, Ser. No. 362,151  
Int. Cl.<sup>5</sup> B01D 53/04  
U.S. Cl. 55—316 4 Claims



1. In combination with a container for containing radioactive material, wherein the container vents gases to the atmosphere through an opening in the wall of the container, a filter element comprised of an activated carbon or carbon-carbon composite disposed in the opening of the container with a first surface facing into the container and a second surface interfacing the atmosphere to which the container vents for filtering out radioactive material from vent gases passing from the container, through the filter element and to the atmosphere; a layer of material completely covering the second surface of the filter element, the material being impermeable to liquid and permeable to vapor thereby allowing filtered vapor to vent from the container while preventing liquid water from entering the container through the filter element.

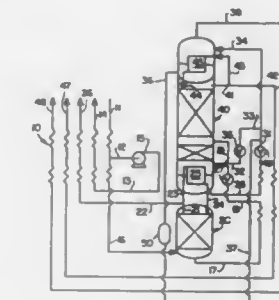
**4,957,523**  
**HIGH SPEED PRESSURE SWING ADSORPTION LIQUID OXYGEN/LIQUID NITROGEN GENERATING PLANT**  
Robert A. Zarate, Ontario; Richard E. Self, Los Alamitos, and Lee W. Smith, El Toro, all of Calif., assignors to Pacific Consolidated Industries, Orange, Calif.  
Continuation of Ser. No. 302,822, Jan. 27, 1989, abandoned. This application Oct. 19, 1989, Ser. No. 425,363  
Int. Cl.<sup>5</sup> F25J 5/00  
U.S. Cl. 62—13 9 Claims



1. A system for manufacturing liquid oxygen and liquid nitrogen from ambient air, comprising:  
an air compressor assembly including an inlet port and an outlet port, said assembly drawing ambient air containing oxygen and nitrogen through said inlet port and compressing said ambient air into a stream of compressed air and forcing said air stream through said outlet port;  
a HEPA-grade filter through which said air stream passes for removing particulate matter from said compressed air stream;  
a pressure swing adsorber having a first molecular sieve bed through which said air stream can pass after passing through said HEPA-grade filter for removing chemical impurities, water and carbon dioxide vapor from said compressed air stream;  
a first heat exchanger through which said air stream passes after passing through said first molecular sieve bed, said first heat exchanger cooling said air stream to lower the temperature of said air stream to a level where said air stream begins to partially condense;  
a turboexpander through which a portion of said air stream passes after passing through said first heat exchanger, said turboexpander cooling said portion of said air stream to lower than  $-275^{\circ}\text{F.}$  and directing said cooled portion of said air stream back through said first heat exchanger to cool said heat exchanger;  
an first expansion valve through which another portion of said air stream passes after passing through said first heat exchanger, said first expansion valve lowering the pressure of said another portion of said air stream to a temperature at which a substantial portion of the oxygen in said another portion of said air stream condenses;  
a nitrogen distillation column into which said another portion of said air stream passes after passing through said first expansion valve, said nitrogen column having a top and a bottom, said another portion of said air stream separating into condensate and vapor in said nitrogen column, said condensate falling toward the bottom of said nitrogen column and said vapor rising toward the top of said nitrogen column, wherein the portion of said vapor reaching said top of said nitrogen column contains over 95% pure nitrogen and said portion of said condensate reaching said bottom of said nitrogen column being oxygen rich;  
a second expansion valve through which said oxygen rich condensate from said bottom of said nitrogen column passes, said expansion valve cooling said oxygen rich condensate lower than  $-300^{\circ}\text{F.}$ ;  
an oxygen distillation column into which said condensate

passes after passing through said second expansion valve, said oxygen column having a top and a bottom, said condensate separating into part vapor and part condensate in said oxygen column, said part condensate falling toward the bottom of said oxygen column and said part vapor rising toward the top of said oxygen column, wherein said portion of said part condensate reaching said bottom of said oxygen column contains over 95% oxygen;  
a condenser through which said portion of said part condensate reaching said bottom of said oxygen column passes and through which said portion of said vapor reaching said top of said nitrogen column passes, said portion of said part condensate reaching said bottom of said oxygen column cooling said portion of said vapor reaching said top of said nitrogen column causing said portion of said vapor reaching said top of said nitrogen column to condense; and  
an insulating layer surrounding said first heat exchanger, said turboexpander, said nitrogen distillation column, said condenser and said oxygen distillation column.

**4,957,524**  
**AIR SEPARATION PROCESS WITH IMPROVED REBOILER LIQUID CLEANING CIRCUIT**  
Ravindra F. Pahade, Getzville; John H. Ziemer, Grand Island, and John K. Howell, Tonawanda, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.  
Filed May 15, 1989, Ser. No. 351,807  
Int. Cl.<sup>5</sup> F25J 3/02  
U.S. Cl. 62—18 13 Claims



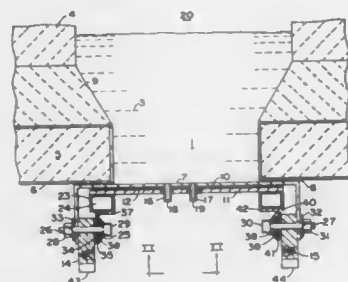
1. A method for cryogenic separation comprising:  
(A) separating a feed comprising nitrogen, oxygen and higher boiling impurities, in a column having a top condenser-reboiler, into nitrogen-rich vapor and oxygen-enriched liquid containing higher boiling impurities;  
(B) passing oxygen-enriched liquid from the column to the top condenser-reboiler;  
(C) passing oxygen-enriched liquid from the top condenser-reboiler through an adsorbent bed, transferring higher boiling impurities from the liquid to the adsorbent, and returning resulting cleaned liquid to the top condenser-reboiler; and  
(D) driving the liquid back to the top condenser-reboiler, at least in part, by combining the liquid with vapor to reduce the density of the stream passing back to the top condenser-reboiler.

**4,957,525**  
**COMPOSITE BUSHING DESIGN**  
Dean J. Gaertner, New Kensington, and Eugene J. Palamara, Butler, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.  
Filed Dec. 20, 1989, Ser. No. 453,875  
Int. Cl.<sup>5</sup> C03B 37/08  
U.S. Cl. 65—1 15 Claims

1. A glass fiber forming bushing comprising a flat, planar



precious metal plate forming the bushing bottom and having an upper and lower surface, side walls attached to said bushing bottom forming a container for molten glass, a plurality of holes in said precious metal plate, a fiber forming tip depending from each said hole and extending below the lower surface of said precious metal plate, a non-electrically conductive coating covering the lower surface of the said precious metal plate, a second metal plate essentially coextensive with said precious metal plate and providing mechanical support thereto and also provided with a plurality of holes therein, said second plate being positioned against the said precious metal plate so that the tips depending from the precious metal plate pass through



the holes in said second plate, said second metal plate having an upper and a lower surface, the upper surface of said second plate being covered with a non-electrically conductive coating which is in contact with the coating on the precious metal plate lower surface, both non-electrically conducting surface forming an insulating zone between the precious metal plate and the second metal plate, an electrically insulating air gap being provided between walls of the holes in the second metal plate and the outside of each of said tips passing through said holes to thereby isolate them electrically from said second plate, means to provide electric current to the said precious metal plate and means to pass molten glass through said glass fiber forming bushing.

4,957,526

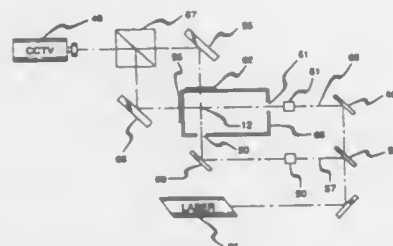
**OPTICAL FIBER COATING CONTROL PROCESS**  
Ralph E. Frazee, Jr., Bricktown, and David H. Smithgall, Sr., East Windsor, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 2, 1989, Ser. No. 381,375

Int. Cl.<sup>3</sup> C03B 37/07; C03C 25/02

U.S. Cl. 65—3.11

21 Claims



1. A method for making optical fibers comprising the steps of: drawing a light-guiding fiber from a heated body of a plastic material, coating the fiber, directing two light beams at different angles at the coated fiber, detecting forward-scattered light from the two light beams, analyzing the detected light to generate information, and using the information to modify the coating, characterized in that: the forward-scattered light is projected through two translucent screens; and light transmitted through the two screens is directed to a

light combining device where it is combined for transmission to a single detector, wherein said information is used to control the concentricity of a coating on the fiber and/or the thickness of a coating on the fiber.

4,957,527

**METHOD AND APPARATUS FOR HEAT PROCESSING GLASS BATCH MATERIALS**

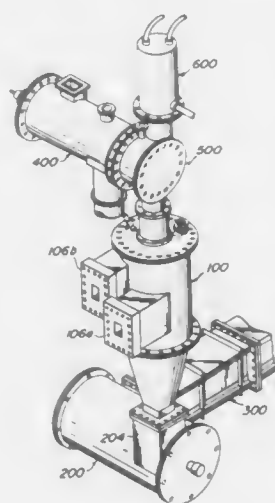
James G. Hnat, 3774 Lewis Rd., Collegeville, Pa. 19426

Filed Mar. 8, 1989, Ser. No. 320,737

Int. Cl.<sup>3</sup> C03B 3/02

U.S. Cl. 65—19

52 Claims



1. An apparatus for producing glass from glass batch materials, in the presence of a fuel and oxidant, said apparatus comprising:

cyclone glass melt reactor means for forming a liquid glass melt;  
combustion preheater means for receiving said glass batch materials, fuel and oxidant and combusting said fuel and oxidant therein and heating said glass batch materials to a temperature at least equal to the melt temperature of said glass batch materials, said combustion preheater means having an outlet connected to said cyclone glass melt reactor means; and  
inlet means for injecting said oxidant into said combustion preheater means and creating a counter rotating well-stirred region within said combustion preheater means.

23. A method of treating materials for delivery to a cyclone melter having an inlet and an outlet, said method comprising the steps of:

connecting a suspension-type cylindrical combustion preheater to the inlet of said melter, said preheater having a vertically oriented longitudinal axis and an upper and a lower end,  
introducing a first material into said preheater;  
introducing a fuel into said preheater; and  
introducing a preheated oxidant into said preheater so as to create a counter rotating, turbulent mixture of said fuel, said oxidant and said first material within the upper end of said preheater, whereby a well-stirred region of said oxidant, said first material and said fuel is created in the upper end of said preheater.

4,957,528

**METHOD AND APPARATUS FOR BENDING AND TEMPERING GLASS PLATES**

Bernard Letemps, Thourotte; Jacques Leclercq, Roisel, and Philippe Dereims, Compiègne, all of France, assignors to Saint-Gobain Vitrage, Courbevoie, France

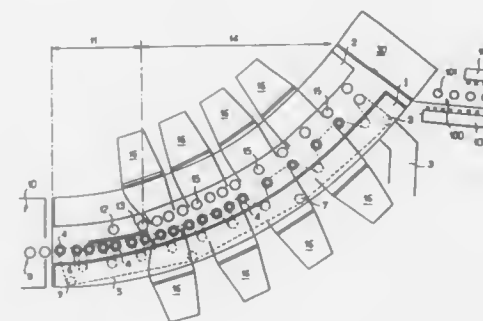
Filed Jun. 7, 1989, Ser. No. 362,654

Claims priority, application France, Jun. 7, 1988, 88 07532

Int. Cl.<sup>3</sup> C03B 23/033, 27/04

U.S. Cl. 65—104

8 Claims



1. A bending and hardening installation comprising:  
a shaping bed having means for supporting and shaping a heated glass plate moving in a conveying direction along said shaping bed, said shaping bed being curved in said conveying direction;  
an evacuation conveyor positioned downstream of said shaping bed in the conveying direction, and having a conveying direction non-coplanar with the conveying direction of said shaping bed at a downstream end of said shaping bed; and  
tilting means for tilting a glass plate exiting the downstream end of said shaping bed from said conveying direction of the downstream end of said shaping bed to said conveyor direction of said evacuation conveyor, comprising:  
a rotatable glass plate support element having an axis aligned with, and immediately downstream of, said means for supporting and shaping,  
at least one holding means spaced from the axis of said support element, said holding means being rotatable about an axis extending parallel to the axis of said support element, said axis of said holding means being rotatable as a drum about the axis of said support element and independent of rotation of said support element, said holding means being spaced from said support element such that a glass plate exiting the downstream end of said shaping bed is held between said glass plate support element and said holding means when said holding means is at a receiving position wherein the space between said support element and said holding means is aligned with the glass plate exiting said downstream end of said shaping bed, whereby the weight of a glass plate rotates the drum in a rotating direction to a drive position in which the glass plate is tilted to the conveying direction of said evacuation conveyor;  
means for periodically driving said drum in said rotating direction from said drive position to a new receiving position; and  
blowing means for blowing cooling air on a glass plate held by said tilting means.

4,957,529

**METHOD OF DECORATING GLASS AND CERAMIC ARTICLES**

Dimiter A. Dimitrov; Mincho S. Dakov, both of Plovdiv; Dancho T. Tonchev, Sofia; Hristo A. Kalafirov, Plovdiv; Todor S. Botev, Plovdiv; Krassimir E. Shterev, Plovdiv; Vladimir S. Kojuharov; Yordan I. Dimitrov, both of Sofia, and Dimiter V. Tzvetkov, Varna, all of Bulgaria, assignors to PU "Paissii Hilendarski", Plovdiv, Bulgaria

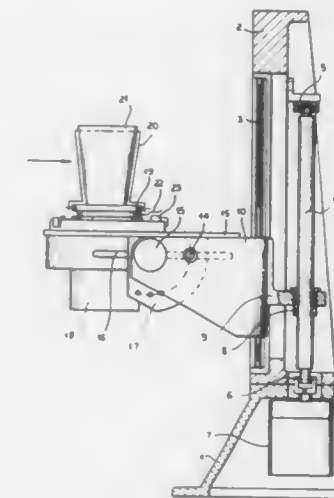
Filed Apr. 14, 1989, Ser. No. 338,959

Claims priority, application Bulgaria, May 27, 1988, 84291

Int. Cl.<sup>3</sup> C03B 23/00, 23/26; B44C 1/22

U.S. Cl. 65—112

1 Claim



1. A method of decorating a glass or ceramic article which comprises the steps of:  
(a) juxtaposing a surface of a glass or ceramic article to be decorated with a mask consisting of a polished metal foil of a thickness of 0.1 to 0.9 mm and having photolithographically reproduced therein a throughgoing image across which a raster extends with a resolution of 5 to 150 lines/cm;  
(b) directing a repetitively-pulsed cross discharge atmospheric pressure CO<sub>2</sub> laser beam with a pulse energy of 1 to 5 J, a power density of  $1 \times 10^6 \text{ W/cm}^2$  to  $6 \times 10^7 \text{ W/cm}^2$ , a pulse duration of 50 to 100 ns and an average power of 1 to 1000 W substantially perpendicular to said mask and said surface through said mask against said surface over a single shot area of 0.5 to 2 cm<sup>2</sup> to evaporatively decorate said surface; and  
(c) repetitively exposing said surface to said laser beam in step (b) while moving said article together with said mask to effect overlapping of exposed regions of 5 to 80% to impart contrast to the decorated region.

4,957,530

**APPARATUS FOR PLUNGER REPLACEMENT IN A MOLDING MACHINE WHILE THE MOLDING MACHINE IS IN OPERATION**

Sigezo Fujii; Tsuneya Uesugi, both of Nagahama, and Kiyoshi Sakamoto, Siga, all of Japan, assignors to Nippon Electric Glass Co., Ltd., Otsu, Japan

Filed May 5, 1989, Ser. No. 347,644

Claims priority, application Japan, May 11, 1988, 63-115572

Int. Cl.<sup>3</sup> C03B 11/02

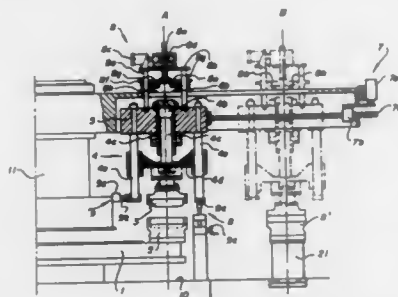
U.S. Cl. 65—172

3 Claims

1. A molding machine of a type having a plurality of molding tools arranged in equally spaced relation in a peripheral area of a rotary table adapted to be rotated intermittently so that while the intermittently rotating table is not in rotation,

glass products are press molded by plungers, the molding machine comprising:

- a plurality of ram devices, each said ram device having a plunger removably mounted thereto;
- a plurality of movable yokes each for individually supporting one of said ram devices;
- a plurality of fixed yokes provided on the rotary table and each for individually reciprocally supporting one of the movable yokes, each said fixed yoke having a reciprocating



ing means for moving said supported movable yoke and ram device between a pressing position above the molding tool and a plunger replacing position a location spaced therefrom;

- a plurality of locking means each for individually locking the supported movable yoke to the fixed yoke at the pressing position and the plunger replacing position; and
- a plurality of positioning means each for individually positioning the supported ram device at the pressing position.

4,957,531

#### APPARATUS FOR HEATING BENDING AND QUENCHING GLASS SHEETS

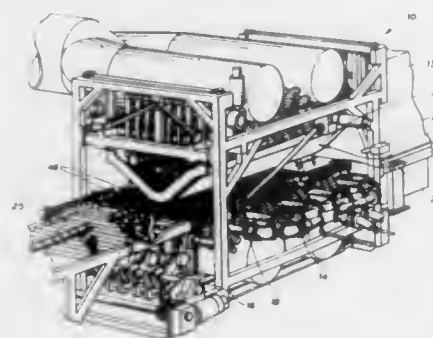
Harold A. McMaster, Woodville, Ohio, and Ben M. Balestra, Temperance, Mich., assignors to Glasstech, Inc., Perrysburg, Ohio

Continuation-in-part of Ser. No. 249,718, Sep. 27, 1988, Pat. No. 4,883,527, which is a continuation of Ser. No. 83,675, Aug. 7, 1987, Pat. No. 4,822,398. This application Jun. 19, 1989, Ser. No. 367,849

Int. Cl.<sup>3</sup> C03B 23/03

U.S. Cl. 65—273

20 Claims



1. A glass heating, bending and tempering apparatus for receiving a heated glass sheet, the apparatus comprising: a first platen; said first platen being deformable and including an actuator for deforming said platen from a planar shape to a bent shape; said first platen including a first heating means and quench openings throughout the extent thereof; said first heating means and said quench openings of the first platen being movable therewith during the deformation of the platen; said first heating means providing heat in close proximity to the heated glass sheet during the bending to maintain an optimal

glass bending temperature; and a second platen having quench openings throughout the extent thereof and opposing the first platen in spaced relationship with the glass sheet therebetween; quenching gas being supplied to the quench openings of both platens and thereby to both sides of the glass sheet to temper the bent glass sheet between the platens.

4,957,532

#### GLASS-TREATING FURNACE WITH ROLLER CONVEYOR

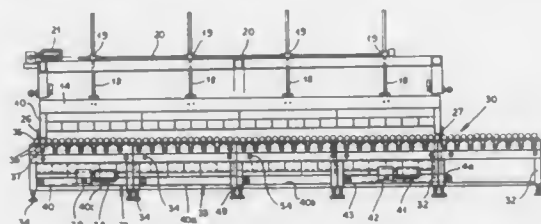
David Jacobson, Pomona, N.Y.; Robert LeGrand, Fairlawn, N.J., and Keith Gardener, Spring Valley, N.Y., assignors to Casso-Solar Corporation, Pomona, N.Y.

Filed Jun. 20, 1989, Ser. No. 369,693

Int. Cl.<sup>3</sup> C03B 35/18

U.S. Cl. 65—273

24 Claims



1. A furnace for the heat treating of glass, comprising:
  - a housing defining an elongated furnace chamber having opposite longitudinal sides and having an inlet end and an outlet end;
  - a roller conveyor extending between said inlet end and said outlet end, said roller conveyor comprising:
    - a respective row of stub rollers spaced apart along each longitudinal side of said chamber, said stub rollers having respective axes,
    - respective conveyor rollers spanning said rows of stub rollers and respectively cradled in pairs of said stub rollers at opposite ends of each of said conveyor rollers,
    - idler pulleys alternating with idler-pulley-free spaces between each two successive stub rollers along one of said longitudinal sides of said chamber, said idler pulleys lying in a further row below said row of stub rollers along said one of said longitudinal sides, and
    - an endless drive element for driving at least a multiplicity of said conveyor rollers over at least a section of the length of said chamber, said drive element overshooting the axes of each of said two successive stub rollers of said section in a respective single loop across each of said idler-pulley-free spaces and undershooting each of said pulleys in a respective loop between each of said two successive stub rollers having an idler-pulley between them, and being drivingly coupled to each of said two successive stub rollers having an idler-pulley-free space between them;
  - means for driving said element to advance a glass workpiece through said chamber; and
  - an array of infrared heaters mounted in said housing above said conveyor to heat said workpiece on said conveyor rollers.

4,957,533

#### N-PHENYLALKYLBENZAMIDE FUNGICIDES

Wendell R. Arnold, Carmel, and James D. Davenport, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

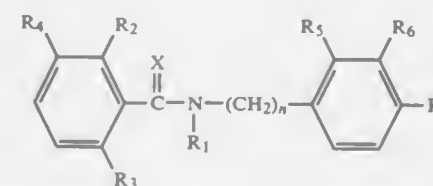
Continuation-in-part of Ser. No. 112,657, Oct. 26, 1987, abandoned. This application Sep. 1, 1988, Ser. No. 239,355

Int. Cl.<sup>3</sup> A01N 37/18, 9/20; C07C 103/76

U.S. Cl. 71—3

24 Claims

1. A compound of the formula (I):



wherein:

X=O, S, or NOH;

R<sup>1</sup> is H or CH<sub>3</sub>;

n=1, 2, or 3;

R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> are as defined in one of the following paragraphs:

- (a) R<sup>2</sup> and R<sup>3</sup> are independently Cl or Br, and R<sup>4</sup> is H;
- (b) R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> are independently Cl or Br;
- (c) R<sup>2</sup> is F, R<sup>3</sup> is Cl, and R<sup>4</sup> is H; or
- (d) R<sup>2</sup> and R<sup>3</sup> are CH<sub>3</sub> or C<sub>2</sub>H<sub>5</sub>, and R<sup>4</sup> is H; and one or R<sup>6</sup> and R<sup>7</sup> is CF<sub>3</sub>, R<sup>5</sup> and the other of R<sup>6</sup> and R<sup>7</sup> is H.

4,957,534

#### NOVEL ORGANIC FERTILIZER AND PRODUCTION THEREOF

Dawn E. Francis, 1347 Nicolet, Detroit, Mich. 48207

Continuation-in-part of Ser. No. 947,741, Dec. 30, 1986,

abandoned. This application Aug. 10, 1988, Ser. No. 230,780

Int. Cl.<sup>3</sup> C05F 11/00

U.S. Cl. 71—23

5 Claims

1. A novel biodegradable organic fertilizer consisting essentially of (A) dead leaves dried and finely ground, (B) skim milk which is dried and powdered and essentially fat free, and (C) water in an amount to give a kneadable mass, the composition being dried and granular.

4,957,535

#### NOVEL ANNULARLY-LINKED TRIAZOLE COMPOUNDS

Beat Böhner, Binningen, Switzerland; Georg Pissiotasa, Lörrach, Fed. Rep. of Germany, and Hans Moser, Magden, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

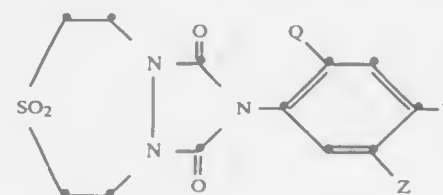
Continuation-in-part of Ser. No. 886,501, Jul. 17, 1986, Pat. No. 4,789,394. This application Sep. 29, 1988, Ser. No. 250,888

Int. Cl.<sup>3</sup> A01N 43/90; C07D 513/04

U.S. Cl. 71—76

11 Claims

1. An annularly-linked triazole compound of the formula I



wherein

Q is fluorine,

T is chlorine or bromine,

Z is a radical —XR,

X is oxygen or sulfur,

R is a C<sub>2</sub>–C<sub>6</sub>-alkenyl or C<sub>3</sub>–C<sub>6</sub>-alkynyl radical, which is unsubstituted or substituted by halogen, or is a radical —A—COXR<sub>1</sub>, in which

A is a C<sub>1</sub>–C<sub>4</sub>-alkylene bridge andR<sub>1</sub> is C<sub>1</sub>–C<sub>4</sub>-alkyl.

9. A herbicidal and plant-growth regulating composition which contains as active ingredient an effective amount of an

- annularly-linked triazole compound according to claim 1, together with inert carriers and/or other additives.

4,957,536

#### METHOD FOR INCREASING AXILLARY BRANCHING, TILLERING, FLOWERING AND YIELD OF AGRONOMIC AND HORTICULTURAL CROPS WITH CERTAIN 2-(2-IMIDAZOLIN-2-YL)-PYRIDINES AND QUINOLINES

Philip L. Orwick, Yardley, Pa., and Andrew R. Templeton, West Trenton, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 910,319, Sep. 22, 1986, abandoned, which is a continuation of Ser. No. 635,787, Jul. 30, 1984, abandoned, which is a continuation-in-part of Ser. No. 490,548, May 6, 1983, abandoned, which is a continuation-in-part of Ser. No. 255,012, Apr. 17, 1981, abandoned, which is a

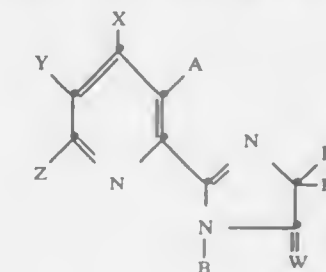
continuation-in-part of Ser. No. 155,866, Jun. 2, 1980, abandoned. This application Sep. 22, 1988, Ser. No. 249,243

Int. Cl.<sup>3</sup> A01N 43/18, 43/64, 57/00, 57/10

U.S. Cl. 71—92

9 Claims

1. A method to increase axillary branching, tillering, flowering and yield of agronomic crops and accelerate maturation of cereal crops comprising: applying to said crops plants or to soil containing the seeds other propagating organs of said plants, an effective amount of a compound having the structure:

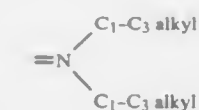


wherein

R<sub>1</sub> is C<sub>1</sub>–C<sub>4</sub>-alkyl;

R<sub>2</sub> is C<sub>1</sub>–C<sub>4</sub>-alkyl or C<sub>3</sub>–C<sub>6</sub>-cycloalkyl; and when R<sub>1</sub> and R<sub>2</sub> are taken together they may represent C<sub>3</sub>–C<sub>6</sub>-cycloalkyl optionally substituted with methyl;

A is COOR<sub>3</sub>, CONHR<sub>6</sub>, CHO, CH<sub>2</sub>OH, COCH<sub>3</sub>, COC<sub>6</sub>H<sub>5</sub>, CN, CH<sub>3</sub>, CH=NOH, CH<sub>2</sub>COOH, CONHOH, CH<sub>2</sub>CH<sub>2</sub>COOH, CHR<sub>8</sub>OH,

R<sub>3</sub> is hydrogen,

C<sub>1</sub>–C<sub>12</sub> alkyl optionally substituted with one of the following groups: C<sub>1</sub>–C<sub>3</sub> alkoxy, halogen, hydroxyl, C<sub>3</sub>–C<sub>6</sub> cycloalkyl, benzyloxy, furyl, phenyl, halo-phenyl, loweralkylphenyl, loweralkoxyphenyl, nitro-phenyl, carboxyl, loweralkoxycarbonyl, cyano or triloeralkylammonium;

C<sub>3</sub>–C<sub>12</sub> alkenyl optionally substituted with one of the following groups: C<sub>1</sub>–C<sub>3</sub> alkoxy, phenyl, halogen or



loweralkoxycarbonyl or with two C<sub>1</sub>-C<sub>3</sub> alkoxy groups or two halogen groups;  
C<sub>3</sub>-C<sub>6</sub> cycloalkyl optionally substituted with one or two C<sub>1</sub>-C<sub>3</sub> alkyl groups;  
C<sub>3</sub>-C<sub>10</sub> alkynyl optionally substituted with one or two C<sub>1</sub>-C<sub>3</sub> alkyl groups; or,  
A cation;

R<sub>6</sub> is hydrogen, hydroxyl, C<sub>3</sub>-alkenyl, C<sub>3</sub>-alkynyl or C<sub>1</sub>-C<sub>4</sub> alkyl optionally substituted with one hydroxyl or one chlorine group;

B is H, COR<sub>4</sub> or SO<sub>2</sub>R<sub>5</sub>, provided that when B is COR<sub>4</sub> or SO<sub>2</sub>R<sub>5</sub>; A is COOR<sub>3</sub> in which R<sub>3</sub> is other than H, or a salt-forming cation, CH<sub>3</sub> or CN; W is O and Y and Z are not alkylamino, hydroxyl, or hydroxyloweralkyl;

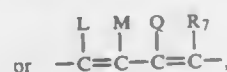
R<sub>4</sub> is C<sub>1</sub>-C<sub>11</sub> alkyl, chloromethyl or phenyl optionally substituted with one chloro, one nitro or one methoxy group;  
R<sub>5</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl or phenyl optionally substituted with one methyl group;

W is O or S;

R<sub>8</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl or phenyl;

X is hydrogen, halogen, hydroxyl or methyl, with the proviso that when Y and Z are taken together to form a ring and YZ is represented by the structure:  $-(CH_2)_n-$ , where n is 3 or 4, X is hydrogen;

Y and Z each represent members selected from the group consisting of hydrogen, halogen, C<sub>1</sub>-C<sub>6</sub> alkyl, hydroxyloweralkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, phenoxy, C<sub>1</sub>-C<sub>4</sub> haloalkyl, nitro, cyano, C<sub>1</sub>-C<sub>4</sub> alkylamino, diloweralkylamino or C<sub>1</sub>-C<sub>4</sub> alkylsulfonyl group, or phenyl optionally substituted with one C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or halogen; and, when taken together, Y and Z may form a ring in which YZ are represented by the structure:  $-(CH_2)_n-$ , where n is an integer selected from 3 and 4, provided that X is hydrogen;



where L, M, Q and R<sub>7</sub> each represent members selected from the group consisting of hydrogen, halogen, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, C<sub>1</sub>-C<sub>4</sub> alkylsulfonyl, C<sub>1</sub>-C<sub>4</sub> haloalkyl, NO<sub>2</sub>, CN, phenyl, phenoxy, amino, C<sub>1</sub>-C<sub>4</sub> alkylamino, diloweralkylamino, chlorophenyl, methylphenyl, or phenoxy substituted with one Cl, CF<sub>3</sub>, NO<sub>2</sub> or CH<sub>3</sub> group, with the proviso that only one of L, M, Q or R<sub>7</sub> may represent a substituent other than hydrogen, halogen, C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> alkoxy; and when W is O and A is CN, CH<sub>3</sub> or COOR<sub>3</sub>, provided that R<sub>3</sub> cannot be unsaturated alkyl and Y and Z cannot be alkylamino, dialkylamino or alkylthio, and the N-oxides thereof, and when R<sub>1</sub> and R<sub>2</sub> are not the same, the optical isomers thereof, and, except when R<sub>3</sub> is a salt-forming cation, the acid addition salts thereof.

4,957,537

## METHOD FOR REGULATING PLANT GROWTH

Tsutomu Teraji, Osaka; Atsushi Yamamura, Ibaraki; Yasuo Kamuro, Tsukuba; Koichi Hirai, Hanyu, and Seichi Fujii, Omiya, all of Japan, assignors to Fujisawa Pharmaceutical Company, Ltd., Osaka and Nissan Chemical Industries, Ltd., Tokyo, both of Japan

Filed Mar. 22, 1988, Ser. No. 171,799

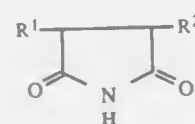
Claims priority, application Japan, Mar. 24, 1987, 62-69370

Int. Cl.<sup>5</sup> A01N 37/32

U.S. Cl. 71-95

12 Claims

1. A method for regulating plant growth which is characterized by treating a plant with an effective, regulating amount of a composition containing the compound:



wherein R<sup>1</sup> is halophenyl and R<sup>2</sup> is phenylthio, in admixture with a vehicle.

4,957,538

## CERTAIN 2-(2',3',4'-TRISUBSTITUTED BENZOYL)-1,3-CYCLOHEXANEDIONES

William J. Michaely, El Cerrito, Calif., assignor to ICI Americas Inc., Wilmington, Del.

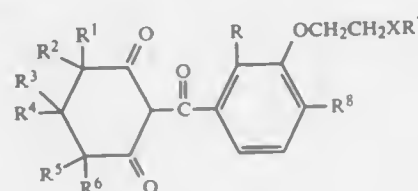
Filed Nov. 18, 1988, Ser. No. 273,371

Int. Cl.<sup>5</sup> A01N 31/14; C07C 323/65

U.S. Cl. 71-98

24 Claims

9. The method of controlling undesirable vegetation comprising applying to the area where control is desired, an herbicidally effective amount of a compound having the structural formula



wherein

X is oxygen or sulfur;

R is chlorine or bromine;

R<sup>1</sup> is hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sup>2</sup> is hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sup>3</sup> is hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sup>4</sup> hydroxy, hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl; or

R<sup>5</sup> and R<sup>6</sup> together are carbonyl (=O) with the proviso that

R<sup>1</sup>, R<sup>2</sup>, R<sup>5</sup> and R<sup>6</sup> are all C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sup>7</sup> is hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sup>8</sup> is hydrogen, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkylthio or C<sub>1</sub>-C<sub>4</sub> alkylsulfonyl;

R<sup>9</sup> is methyl or ethyl; and

R<sup>10</sup> is (1) halogen; (2) nitro; or (3) R<sup>b</sup>SO<sub>n</sub>— wherein n is the

integer 0 or 2; and R<sup>b</sup> is (a) C<sub>1</sub>-C<sub>3</sub> alkyl; and its salts.

4,957,539

## TRIAZOLES INCLUDING ALKYNYL SUBSTITUTION USEFUL AS FUNGICIDES OR AS PLANT GROWTH REGULATING AGENTS

Paul A. Worthington, Maidenhead; Patrick J. Crowley, Crowthorne, and Michael B. Gravestock, Stockport, all of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 503,545, Jun. 13, 1983, abandoned.

This application Dec. 28, 1988, Ser. No. 291,236

Claims priority, application United Kingdom, Jun. 14, 1982,

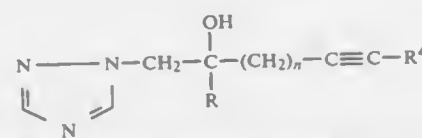
8217191; Jan. 21, 1983, 8301677

Int. Cl.<sup>5</sup> A01N 43/653; C07D 249/08

U.S. Cl. 71-92

5 Claims

1. A triazole derivative having the formula:



and stereoisomers thereof wherein R and R<sup>4</sup>, which may be the

same or different, are a straight or branched chain alkyl group containing from 1 to 6 carbon atoms and n is 1, 2, 3 or 4.

4,957,540

## CERTAIN SUBSTITUTED 3-(SUBSTITUTED OXY)-2-BENZOYL-CYCLOHEX-2-ENONES

Christopher G. Knudsen, Berkeley, and William J. Michaely, Richmond, both of Calif., assignors to ICI Americas Inc., Wilmington, Del.

Division of Ser. No. 871,989, Jun. 9, 1986, Pat. No. 4,918,236.

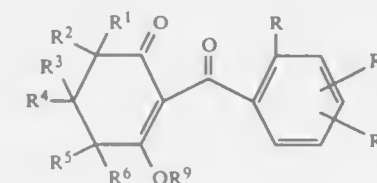
This application Dec. 19, 1989, Ser. No. 453,432

Int. Cl.<sup>5</sup> A01N 35/00

U.S. Cl. 71-123

12 Claims

1. The method of controlling undesirable vegetation comprising applying to the area where control is desired, an herbicidally effective amount of a compound having the formula



wherein

R is halogen, C<sub>1</sub>-C<sub>2</sub> alkyl, C<sub>1</sub>-C<sub>2</sub> alkoxy, nitro; cyano; C<sub>1</sub>-C<sub>2</sub> haloalkyl, or R<sup>a</sup>SO<sub>m</sub>— wherein m is 0 or 2 and R<sup>a</sup> is C<sub>1</sub>-C<sub>2</sub> alkyl;

R<sup>1</sup> is hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sup>2</sup> is hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl; or

R<sup>1</sup> and R<sup>2</sup> together are alkylene having 2 to 5 carbon atoms;

R<sup>3</sup> is hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sup>4</sup> is hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl; or

R<sup>3</sup> and R<sup>4</sup> together are oxo;

R<sup>5</sup> is hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sup>6</sup> is hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl; or

R<sup>5</sup> and R<sup>6</sup> together are alkylene having 2 to 5 carbon atoms;

R<sup>7</sup> and R<sup>8</sup> independently are (1) hydrogen; (2) halogen; (3)

C<sub>1</sub>-C<sub>4</sub> alkyl; (4) C<sub>1</sub>-C<sub>4</sub> alkoxy; (5) trifluoromethoxy; (6)

cyano; (7) nitro; (8) C<sub>1</sub>-C<sub>4</sub> haloalkyl; (9) R<sup>b</sup>SO<sub>n</sub>—

wherein n is the integer 0, 1 or 2; and R<sup>b</sup> is (a) C<sub>1</sub>-C<sub>4</sub> alkyl;

(b) C<sub>1</sub>-C<sub>4</sub> alkyl substituted with halogen or cyano; (c)

phenyl; or (d) benzyl; (10) —NR<sup>c</sup>R<sup>d</sup> wherein R<sup>c</sup> and R<sup>d</sup>

independently are hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl; (11) R<sup>c</sup>C(O)—

wherein R<sup>c</sup> is C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> alkoxy; (12)

SO<sub>2</sub>NR<sup>c</sup>R<sup>d</sup> wherein R<sup>c</sup> and R<sup>d</sup> are as defined; or (13)

—N(R<sup>c</sup>)C(O)R<sup>d</sup> wherein R<sup>c</sup> and R<sup>d</sup> are as defined; and

R<sup>9</sup> is (a) C<sub>1</sub>-C<sub>6</sub> alkyl; (b) C<sub>4</sub>-C<sub>6</sub> cycloalkyl; (c) substituted

C<sub>1</sub>-C<sub>6</sub> alkyl; (d) phenyl—SO<sub>2</sub>—; (e) substituted

phenyl—SO<sub>2</sub>—; (f) C<sub>1</sub>-C<sub>6</sub> alkyl—SO<sub>2</sub>—, optionally

substituted; (g) C<sub>1</sub>-C<sub>6</sub> alkyl—C(O)—, optionally

substituted; (h) phenyl—C(O)—, optionally

substituted; (i) benzyl; or (h) C<sub>3</sub>-C<sub>6</sub> alkenyl.

4,957,541

## CAPACITOR GRADE TANTALUM POWDER

Terrance B. Tripp, Westboro, and Richard W. Hildreth, Holliston, both of Mass., assignors to NRC, Inc., Newton, Mass.

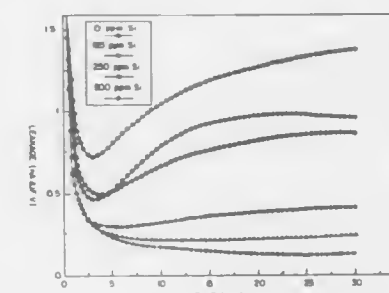
Filed Nov. 1, 1988, Ser. No. 265,498

Int. Cl.<sup>5</sup> B22F 9/24

U.S. Cl. 75-245

7 Claims

1. Improved capacitor grade tantalum powder which can be anodically formed to a low leakage product at formation temperatures selected substantially throughout the range 40°-90° C., comprising a content of silicon and phosphorous in combined concentration effecting a specific D.C. leakage (L/CV)



cv/gm in anodized pellets as made therefrom and sintered at 1,400° C. or higher.

4,957,542

## PROCESS FOR TREATING LIQUID STEELS BY INJECTING GAS THROUGH THE LADLE BOTTOM

Philippe Barthelemy, Sevres, and Christian Naturel, Brignais, both of France, assignors to Vallourec Industries, Boulogne-Billancourt and Savoie Refractaires, Venissieux, both of, France

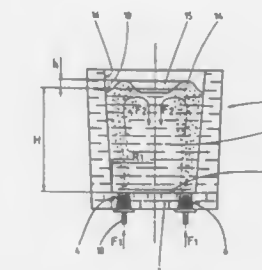
Filed Jun. 15, 1989, Ser. No. 366,501

Claims priority, application France, Jun. 17, 1988, 88 08479

Int. Cl.<sup>5</sup> C21C 7/00

U.S. Cl. 75-10.39

20 Claims



1. A process for treatment in a ladle of a liquid steel by at least one gas injected through the ladle bottom, in which the gas-metal exchange surfaces are multiplied with retention of the individuality of each small gas bubble and their low rate of rise, and with prevention of bubble coalescence, comprising the step of:

injecting said gas through injection elements, the total area of said elements being between S/10 and S/30, where S is the area of the bottom of the ladle, wherein said injection elements are disposed at a distance from the center of the bottom of the ladle which is at least equal to half the radius of the bottom of the ladle and spaced from the internal wall of the ladle by a distance which is at least equal to 1/10th of said radius and wherein the mean unitary gas flow rate per cm<sup>2</sup> of area of the injection elements is between 0.1 and 0.8 l/minute, wherein said elements are pores whose unitary cross section is less than 0.8 mm<sup>2</sup>, the total area being between 15 and 40 mm<sup>2</sup> per dm<sup>2</sup> of injection elements, or said elements are slots whose thickness is less than 0.4 mm, the total area being between 45 and 105 mm<sup>2</sup> per dm<sup>2</sup> of area of injection elements.

4,957,543

## METHOD OF FORMING NICKEL FOAM

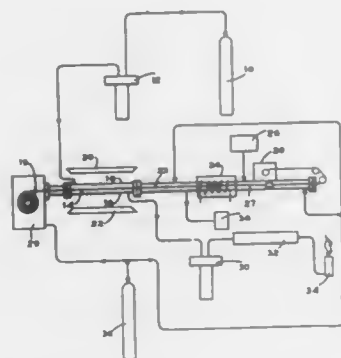
Juraj Babjak; Victor A. Ettel, and Vladimir Paserin, all of Mississauga, Canada, assignors to Inco Limited, Toronto, Canada

Filed Jun. 16, 1989, Ser. No. 368,193

Int. Cl.<sup>5</sup> C22B 5/20; B22F 1/00

U.S. Cl. 148—13

9 Claims



1. A method of forming a nickel foam comprising: placing an open-cell thermally decomposable foam structure in an atmosphere containing nickel carbonyl gas, heating said foam structure to a temperature at which said nickel carbonyl gas decomposes, decomposing nickel from said nickel carbonyl gas on said foam structure to form a nickel plated foam structure, and sintering said nickel plated foam structure to thermally decompose and remove said foam structure from said nickel plated foam structure leaving an open-cell nickel network of interconnected nickel wires to form said nickel foam.

4,957,544

## PARTIAL OXIDATION PROCESS INCLUDING THE CONCENTRATION OF VANADIUM AND NICKEL IN SEPARATE SLAG PHASES

Mitri S. Najjar, Wappingers Falls, N.Y., assignor to Texaco, Inc., White Plains, N.Y.

Filed Sep. 1, 1989, Ser. No. 401,705

Int. Cl.<sup>5</sup> C21B 3/04

U.S. Cl. 75—500

12 Claims

1. A partial oxidation process for producing synthesis gas, reducing gas, or fuel gas and two separate by-product slag materials which are respectively rich in vanadium and nickel comprising:

- (1) reacting an ash-containing fuel feedstock comprising petroleum coke and/or heavy liquid hydrocarbonaceous fuel, wherein said ash comprises compounds of V, Ni and Si, by partial oxidation in a free-flow unobstructed vertical gas generator in the presence of a free-oxygen containing gas, temperature moderator, and an iron-containing additive in the amount of about one to ten parts by weight of additive to one part by weight of the ash in said fuel feedstock and at least 5 parts by weight of iron for each part by weight of vanadium, at a temperature in the range of about 2100° F. to 3000° F. in a reducing atmosphere, a pressure in the range of about 1 to 200 atmospheres, an O/C (atomic ratio) in the range of about 0.3 to 1.5, and a H<sub>2</sub>O/fuel feedstock weight ratio in the range of about 0.1 to 5.0 to produce a hot raw effluent stream of synthesis gas, reducing gas, or fuel gas with entrained molten slag, and carbon-containing particulate material;
- (2) cooling the hot raw gas stream from (1), and separating by conventional methods coarse slag having a particle size of at least 40 mesh from fine slag and carbon-containing

particulate materials having a particle size of less than 40 mesh;

- (3) heating the coarse slag from (2) while in contact with reducing gas in a thermal reduction zone wherein an equilibrium oxygen concentration is provided in the gas phase with a partial pressure of oxygen in the range of about  $8.4 \times 10^{-20}$  to  $1.1 \times 10^{-10}$  atmosphere and at a temperature in the range of about 1900° F. to 2600° F. and above the melting point of said slag to produce a molten bath of slag comprising the following immiscible phases in wt. %:
  - (a) a dense metal phase in the amount of about 0.1 to 5.0 which precipitates to the bottom comprising a nickel-iron alloy containing about 5 to 60 wt. % of nickel;
  - (b) a sulfur encapsulated slag phase in the amount of about 5.0 to 85 that floats on said phase (a) comprising iron silicate;
  - (c) the remainder comprising vanadium-rich silicate and spinel phases comprising at least 3 wt. % vanadium which floats on said phase (b); and
- (4) separating said phases (a), (b) and (c) from each other.

4,957,545

## SMELTING REDUCTION PROCESS USING REDUCING GAS GENERATED IN PRECOMBUSTOR

Akihiko Hikosaka, Mishima; Tsuyoshi Mimura, Kobe; Tomio Suzuki, Kobe; Takeo Yoshigae, Kobe, and Shuzo Itoh, Kobe, all of Japan, assignors to Kabushiki kaisha Kobe Selko Shoe, Kobe, Japan

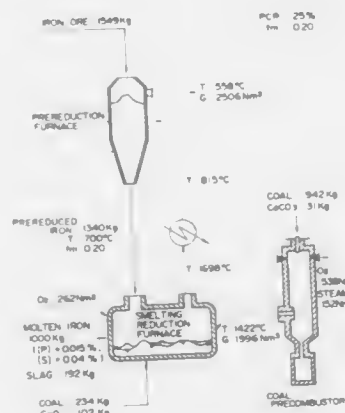
Filed Jan. 27, 1989, Ser. No. 302,612

Claims priority, application Japan, Jan. 29, 1988, 63-20168

Int. Cl.<sup>5</sup> C21B 11/08

U.S. Cl. 75—501

8 Claims



1. A smelting reduction process with a smelting reduction furnace and a precombustor, the precombustor having an upper portion and a lower portion thereon, for smelting and reducing an iron oxide material by introducing the said iron oxide material into a smelting reduction furnace together with a solid carbonaceous material, a fluxing agent and an oxygen-containing gas, said process comprising the steps of:
  - supplying primary air to the upper portion of said precombustor as a swirling flow in an amount of 0.4 to 9.0 of the stoichiometric air amount;
  - injecting pulverized carbonaceous material into the precombustor from the upper portion of said precombustor to generate high temperature reducing gas and combustion residue ash or slag;
  - separating the resulting reducing gas from the combustion residue ash or slag of said solid carbonaceous material at the lower portion of the precombustor; and
  - introducing said reducing gas into said smelting reduction furnace at a temperature of at least 1410° C. to effect secondary combustion while introducing a separate sup-

ply of oxygen-containing gas for smelting and reducing said iron material.

4,957,546

## DIRECT STEELMAKING PROCESS FROM 100% SOLID CHARGE OF MULTIPLE REDUCING AND OXIDIZING ALTERNATING PERIODS

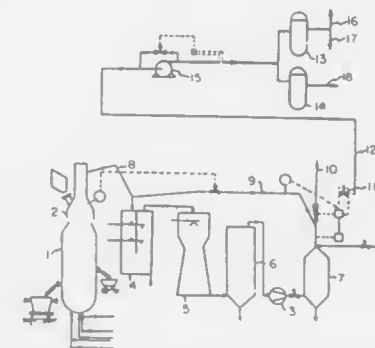
Arturo Lazcano-Navarro, Saltillo, Mexico, assignor to Instituto Mexicano de Investigaciones Siderurgicas, Saltillo, Mexico

Filed May 10, 1989, Ser. No. 349,650

Int. Cl.<sup>5</sup> C21B 11/00

U.S. Cl. 75—529

8 Claims



1. A semicontinuous process to produce steel or iron by conducting repetitive refining operations on a charge in a metallurgical vessel, said process comprising:

- (a) providing an initial quantity of molten metal in a metallurgical vessel;
- (b) conducting a reducing period on the molten metal contained in the metallurgical vessel, the reducing period including the simultaneous bottom injection into the vessel of carbonaceous material and oxygen, the carbonaceous material having a carbon (kg) to oxygen (Nm<sup>3</sup>) ratio between 1 and 2.5, so that the carbon content in the molten metal increases to between 2% to 4% by weight to provide a positive variation of carbon in the melt with respect to time ( $d(\%C)/dt > 0$ ) and thereby increasing latent heat of the melt and superheating of the melt;
- (c) conducting an oxidizing period on the molten metal, the oxidizing period including charging a quantity of solid metallic charge and fluxes into the vessel and melting the metallic charge by performing exclusively oxygen injection to provide a negative variation of carbon content in the melt with respect to time ( $d(\%C)/dt < 0$ ) to about 1% by weight to produce a mass of metal and slag wherein one reducing period and one oxidizing period constitute an operating cycle;
- (d) continuing alternating periods of reduction and oxidation, including tapping slag produced after at least 2 operating cycles and immediately after an oxidizing period, the tapping conducted through a slag notch in the vessel, the slag notch being offset by 90 from a vessel trunnion axis; and
- (e) after a mass of metal is obtained, tapping the molten metal through a steel notch in the vessel, the steel notch being offset by 180 from the slag notch and at such a height that after metal tapping a metallic ignition heel remains within the metallurgical vessel in order to initiate a succeeding series of operating cycles.

4,957,547

## PROCESS FOR CONTINUOUSLY MELTING OF STEEL

Ludwig von Bogdandy, Linz; Gerhard Mitter, Traun; Otto Köller; Luzian Pochmarski, both of Leoben; Christian Jaquemar, Puchenu, all of Austria, and Hans-Jürgen Langhammer, Plattenwerke, Fed. Rep. of Germany, assignors to Voest-Alpine Stahl Donawitz Gesellschaft mbH, Leoben-Donawitz, Austria

Filed Oct. 12, 1988, Ser. No. 256,410

Claims priority, application Austria, Oct. 13, 1987, 2709/87; Dec. 10, 1987, 3247/87

Int. Cl.<sup>5</sup> C21B 5/36

U.S. Cl. 75—567

14 Claims

1. A process for continuously producing molten steel, comprising:

- (a) adding to a converter,
- (i) at least one largely already reduced iron-containing material selected from the group consisting of scrap iron, pig iron, iron pellets and iron sponge, and
- (ii) at least one Fe—MgO—SiO<sub>2</sub> system flux;
- (b) introducing oxygen and a carbon-containing fuel into the charge comprising the iron-containing material and flux in the converter, thereby producing a melt comprising molten metal in contact with a metallurgical slag having the following composition:
  - 20–77.2% FeO
  - 10–30% SiO<sub>2</sub>
  - 2–15% Al<sub>2</sub>O<sub>3</sub>
  - 5–20% MgO
  - 0.13–6.45% MnO
  - 1–10% CaO
  - 0.1–5% Cr<sub>2</sub>O<sub>3</sub>
  - trace P+S;
- (c) pouring the resulting melt into a ladle;
- (d) conducting metallurgical steps on the melt in the ladle and thereby changing said molten metal into molten steel; and
- (e) pouring the resulting molten steel from the ladle.

4,957,548

## CERMET ALLOY

Nobuhiko Shima, Narita; Hisaaki Ida, Kumagaya, and Yusuke Iyori, Fukaya, all of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Jul. 22, 1988, Ser. No. 222,780

Claims priority, application Japan, Jul. 23, 1987, 62-183880

Int. Cl.<sup>5</sup> C22C 29/04

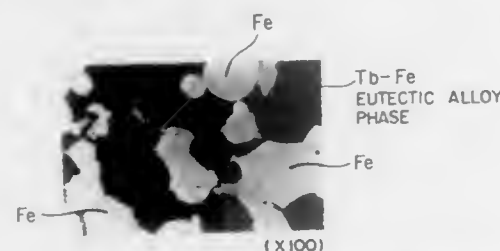
U.S. Cl. 75—238

4 Claims

1. A cermet alloy which consists essentially of 50–95% by weight of a hard phase comprising a composite carbo-nitride of tungsten and titanium and one or more elements selected from the group consisting of Groups IVa, Va and VIa elements of the Periodic Table and the balance being a binding phase of an Fe family element or elements and inevitable impurities; said hard phase containing 50% by volume or less of TiN particles or TiCN particles having  $N \geq C$  and forming no rim-and-core structure, and said composite carbo-nitride having a rim-and-core structure which comprises a core portion of the composite carbo-nitride poor in titanium and nitrogen, surrounded thereon by a rim portion of the composite carbo-nitride rich in titanium and nitrogen.



**4,957,549**  
**RARE EARTH METAL-IRON GROUP METAL TARGET, ALLOY POWDER THEREFOR AND METHOD OF PRODUCING SAME**  
 Shunichiro Matsumoto, Yasugi; Tautomu Imai; Rokuo Ichiyasu, both of Yonago, and Yoshitaka Chiba, Gyoda, all of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan  
 Filed Apr. 20, 1988, Ser. No. 183,993  
 Claims priority, application Japan, Apr. 20, 1987, 62-97057  
 Int. Cl.<sup>5</sup> B22F 3/00  
 U.S. Cl. 75-246 8 Claims



1. A target composed of at least one rare earth metal and at least one iron group metal, having a structure in which a eutectic alloy phase composed of said rare earth metal and said iron group metal and an iron group metal phase are bonded with each other via a diffusion bonding layer consisting essentially of a rare earth metal-iron group metal intermetallic compound.

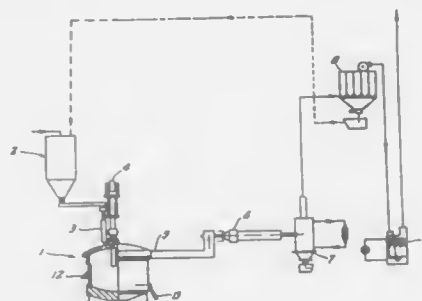
**4,957,550**  
**ULTRASONIC MACHINING TOOL FOR MACHINING ORTHODONTIC BRACKETS**  
 James F. Reher, Pomona, and Farrokh Farzin-Nia, Inglewood, both of Calif., assignors to Manufacturers Hanover Trust Co., New York, N.Y.  
 Division of Ser. No. 046,430, May 6, 1987, Pat. No. 4,838,786.  
 This application Sep. 1, 1988, Ser. No. 239,320  
 Int. Cl.<sup>5</sup> B22F 9/00  
 U.S. Cl. 75-246 1 Claim



1. A disposable ultrasonic machining tool for machining a plurality of orthodontic brackets at the same time, said tool being made of the following minimum materials by weight:

Nickel	5 percent (minimum)
Chromium	15 percent (minimum)
Cobalt	3 percent (minimum)
Graphite	.05 percent (minimum)
Miscellaneous	.1 percent
Iron	balance.

**4,957,551**  
**METHOD FOR TREATMENT OF DUST RECOVERED FROM OFF GASES IN METALLURGICAL PROCESSES**  
 Jan A. Anne, Langhus, and Thor Pedersen, Oslo, both of Norway, assignors to Elkem a/s, Norway  
 Continuation-in-part of Ser. No. 40,307, Apr. 20, 1987, abandoned. This application Jun. 20, 1988, Ser. No. 209,492  
 Claims priority, application Norway, Apr. 2, 1987, 871369  
 Int. Cl.<sup>5</sup> C22B 7/02  
 U.S. Cl. 75-657 12 Claims

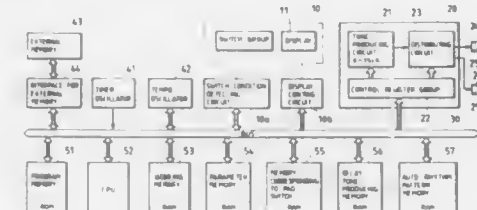


1. A method for treatment of that dust precipitated from the waste gas of a metallurgical smelting process, said dust having a high metal chloride content, said method comprising the following steps:  
 (a) admixing said dust with a reducing agent and a flux;  
 (b) introducing said admixture to an operating gas-tight metallurgical smelting furnace, said smelting furnace producing an inert slag phase, a molten metal phase and a first gas phase, said first gas phase comprising dust from said smelting furnace, including metal chlorides, and off-gases from said smelting furnace;  
 (c) tapping said furnace to remove said inert slag phase and said molten metal phase;  
 (d) removing said first gas phase from said smelting furnace;  
 (e) wet scrubbing said first gas phase to remove the metal chlorides and dust from said first gas phase and thereby producing a second gas phase and a metal chloride-containing and dust-containing first liquid phase;  
 (f) separating said first liquid phase into a dust-containing first sludge phase and a second liquid phase, said second liquid phase containing dissolved metal chlorides and residual dust;  
 (g) clarifying said second liquid phase to remove said residual dust from said second liquid phase and thereby producing a dust-containing second sludge phase and a third liquid phase containing metal chlorides;  
 (h) cooling said third liquid phase;  
 (i) bleeding a stream from said third liquid phase and removing the metal chlorides from said bleed stream and discharging the bleed stream; and  
 (j) drying said first and second dust-containing sludge phases.

**4,957,552**  
**ELECTRONIC MUSICAL INSTRUMENT WITH PLURAL MUSICAL TONES DESIGNATED BY MANIPULATORS**  
 Hiroyuki Iwase, c/o Yamaha Corporation, 10-1, Nakazawa-cho, Hamamatsu-shi, Shizuoka-ken, Japan  
 Filed Oct. 5, 1988, Ser. No. 253,964  
 Claims priority, application Japan, Oct. 7, 1987, 62-253133  
 Int. Cl.<sup>5</sup> G10H 7/00, 1/06, 1/18  
 U.S. Cl. 84-622 16 Claims

1. In an electronic musical instrument provided with plural manipulators indicating the generation of musical tones and musical tone generating means composed of plural musical tones and musical tone generating channels generating individual musical tones in accordance with the operation of said plural manipulators, the improvement comprising:

means for selectively designating a number of tones for each of said plural manipulators, said number of tones designated for each manipulator being generated by the operation of a corresponding manipulator; and



assignment control means for assigning each of said plural manipulators to said musical tone generating channels equal in number to said number of tones designated by said means for designating and controlling the generation of musical tones relative to each operated manipulator in said assigned musical tone generating channels.

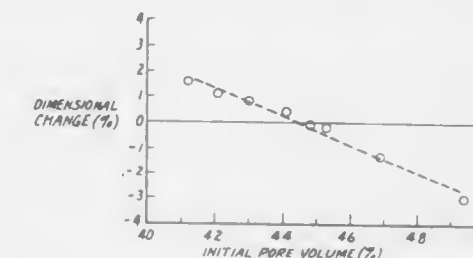
**4,957,553**  
**INK FOR INK-JET RECORDING AND INK-JET RECORDING PROCESS EMPLOYING THE SAME**  
 Shoji Koike, Yokohama, and Yasuko Tomida, Atsugi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
 Filed Dec. 1, 1987, Ser. No. 128,262  
 Claims priority, application Japan, Dec. 1, 1986, 61-287183;  
 Dec. 1, 1986, 61-287184  
 Int. Cl.<sup>5</sup> C09D 11/02  
 U.S. Cl. 106-20 14 Claims

1. An ink for ink-jet recording, comprising:  
 a coloring matter, a water-soluble organic solvent selected from the group consisting of amides, ketones, ketoalcohols, ethers, polyalkylene glycols, alkylene glycols, glycerol, lower monoalkyl ethers of polyhydric alcohols, lower dialkyl ethers of polyhydric alcohols, sulforan, N-methyl-2-pyrrolidone, 1,3-dimethyl-2-imidazolidinone, methanol, ethanol, n-propanol, n-butanol, tert-butanol and n-pentanol, 75 to 90% by weight of water, and a defoaming material having a solubility to water of at least 0.1%, wherein said defoaming material is selected from the group consisting of (i) a secondary alcohol selected from the group consisting of isopropanol, 2-butanol, 2-pentanol, 3-pentanol, 2-hexanol, 3-hexanol and 2-methyl-4-hexanol, (ii) an ethylene oxide addition product thereof, (iii) a mixture of (i) and (ii), (iv) an acetylene alcohol, and (v) an acetylene glycol, and wherein said ink has a foam stability according to JIS K 3362 of 0 mm after 5 minutes.

**4,957,554**  
**DIMENSIONALLY-CONTROLLED CERAMICS**  
 James P. Mathers, Woodbury, Minn., and Kathleen M. Humpal, River Falls, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
 Filed Aug. 16, 1989, Ser. No. 394,574  
 Int. Cl.<sup>5</sup> C04B 35/18  
 U.S. Cl. 106-35 32 Claims

1. A moldable unfired composition comprising a mixture of 12 to 27 weight percent magnesia, 27 to 45 weight percent

alumina, and 37 to 51 weight percent silicon carbide powders of agglomerates thereof, said magnesia, alumina, and silicon



carbide powders and agglomerates having an overall average particle size of at most 5.0 micrometers.

**4,957,555**  
**CEMENTING COMPOSITIONS AND METHOD**  
 John G. Wheeler, Pipe Creek, and Jose G. Garcia, San Antonio, both of Tex., assignors to Capitol Aggregates, Inc., San Antonio, Tex.  
 Filed Nov. 9, 1989, Ser. No. 434,723  
 Int. Cl.<sup>5</sup> C04B 7/21, 7/30  
 U.S. Cl. 106-716 16 Claims

1. A cementing composition for forming a low density cement slurry comprising, for each 100 parts by weight, about 33 to 67 parts by weight of a pulverulent hydraulic cement and about 67 to 33 parts by weight of shot coke particles having a particle size of from about -8 to +200 mesh (Tyler) such that when admixed with water it will form a slurry having a density of about 13 pounds/gallon or less.

**4,957,556**  
**VERY EARLY SETTING ULTRA HIGH EARLY STRENGTH CEMENT**  
 Hassan Kunbargi, 3166 Barrington #E, Los Angeles, Calif. 90066  
 Filed Jun. 8, 1989, Ser. No. 363,587  
 Int. Cl.<sup>5</sup> C04B 7/32  
 U.S. Cl. 106-693 15 Claims

1. A method for forming a very early setting, ultra high strength cement, said method comprising the steps of:  
 forming a mixture of limestone, gypsum, and one of more members from the group consisting of bauxite, kaolinite, and high alumina clay such that said mixture has an overall molar ratio of A/F greater than or equal to approximately 0.64 and an overall molar ratio S/A + F between approximately 0.35 and 0.25, where A, F and S are respectively, Al<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub> and SO<sub>3</sub>;  
 heating said mixture to an elevated temperature on the order of 1,000° C. to 1,386 2000° C. for a sufficient period of time to form a clinker having a concentration of C<sub>4</sub>A<sub>3</sub>S between 15% and 75% by weight;  
 determining the C<sub>4</sub>A<sub>3</sub>S present in said clinker; and  
 forming a final mixture of said clinker, CaO containing hydraulic cement and soluble CaSO<sub>4</sub> anhydride such that the composition of said final mixture includes a C<sub>4</sub>A<sub>3</sub>S content of 10% to 30% by weight and a soluble CaSO<sub>4</sub> anhydride content of 5% to 25% by weight.

**4,957,557**  
**SUBMICRON LIGNIN DISPERSIONS**  
 Mitchell S. Dimitri, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.  
 Filed Oct. 11, 1988, Ser. No. 255,444  
 Int. Cl.<sup>5</sup> C08L 97/02  
 U.S. Cl. 106-123.1 3 Claims

1. A carbon black composition comprised of over 15%

(a) subjecting dry-ground dehusked grains to a treatment with an enzyme mixture such that the compounds present in the grains, except starch, are hydrolyzed and solubilized said enzyme mixture having proteolytic, cellulase,



- hemicellulase, beta-glucanase and pectinase activity, and substantially no alpha-amylase activity;
- (b) optionally homogenizing the product obtained;
- (c) extracting the starch from the product obtained, leaving fibres;
- (d) concentrating the starch giving a crude starch fraction and a process water fraction;
- (e) separating proteins from the crude starch fraction obtained and
- (f) separating the protein-free crude starch fraction thus obtained into a primary and secondary starch fraction.

4,957,566

## ACID CLEANING OF DRUMS WITH INTERIOR LININGS

Ronald J. Evans, 41 Colony Rd., and Janice E. Hamilton, 30 Colony Rd., both of Gretna, La. 70053

Continuation-in-part of Ser. No. 796,159, Nov. 8, 1985, abandoned. This application Dec. 31, 1985, Ser. No. 814,976 Int. Cl.<sup>3</sup> B08B 9/00

U.S. Cl. 134—22.14

4 Claims

1. A method of economically cleaning steel drums that have an interior baked-in lining and wherein the drums have been initially previously cleaned of previous contents and dried completely, the method being useful for completely removing epoxy, phenolic, any combination of epoxy phenolic blend of linings and other linings from drums such as 55 gallon closed type drums comprising substantially the steps of initially supplying the drums from a source of supply, then preheating the drums to a temperature of about 130°F., next introducing a metered quantity of sulfuric acid of about 98% purity into the drums from a source of supply of acid, providing a pumping area, a holding area, and a storage area for the sulfuric acid, then screwing plugs into the drums so that the acid will not leak out, next revolving the drums and tilting the drums so that the interior of the drums are totally exposed to the acid, then removing the plugs and the excess acid from the drums so that remaining in the drums is only that acid that clings to the walls of the drums and that part of the lining that still clings to the walls of the drums, conveying the drums a distance to increase the time of exposure to the acid and passing the drums through a heating area to heat the drums from ambient to several hundred degrees Fahrenheit, next introducing a cleaning solution such as hot caustic soda into the drums to neutralize any acid therein, then placing chains in the interior of the drums and then moving the drums to a rocking area to move the chains back and forth on the bottom of the drums, turning the drums so that the drums are scratched by the chains, then removing the chains, next rinsing the drums of the solution therein, then syphoning out the material in the drums and drying and inspecting the drums, and finally moving the drums to a storage area.

4,957,567

FATIGUE CRACK GROWTH RESISTANT NICKEL-BASE ARTICLE AND ALLOY AND METHOD FOR MAKING  
Daniel D. Krueger, Robert D. Kinsinger, both of Cincinnati; Richard G. Menzies, Wyoming, and Carl S. Wukusick, Cincinnati, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Dec. 13, 1988, Ser. No. 284,008

Int. Cl.<sup>3</sup> C22F 1/10

U.S. Cl. 148—12.7 N

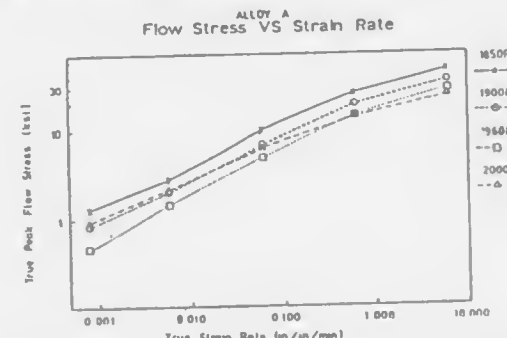
20 Claims

1. In a method of making an article from a gamma prime precipitation strengthened nickel-base superalloy having a gamma prime solvus temperature and an incipient melting temperature, the steps of:

providing a nickel-base superalloy (a) which includes a gamma prime content in the range of about 30–46 volume percent, and (b) which has a quench crack resistance to enable rapid quenching substantially without cracking from a preselected supersolvus solutioning temperature, above the gamma prime solvus temperature and below the

incipient melting temperature, to a preselected quenching temperature;

working the superalloy at preselected working conditions, including a working temperature below the gamma prime solvus, at a strain rate less than a predetermined critical strain rate,  $E_c$ , to provide a worked structure having a grain size substantially no larger than about ASTM 10, a precipitate of gamma prime, and a high temperature carbide precipitate comprising MC carbide;



heating the worked structure at the supersolvus solutioning temperature for a time sufficient to solutionize substantially all of the gamma prime but not the MC carbide, and to coarsen grains uniformly to a range of about ASTM 2–9; and

quenching the structure rapidly to the quenching temperature to reprecipitate gamma prime without substantial cracking of the structure.

4,957,568

## COMPOSITION AND PROCESS FOR ACTIVATING METAL SURFACES PRIOR TO ZINC PHOSPHATING AND PROCESS FOR MAKING SAID COMPOSITION

Helmut Endres, Peter Christophliemk, Karl-Dieter Brands, Wolf-Achim Roland, and Joerg Riesop, all of Duesseldorf, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 28, 1989, Ser. No. 345,063

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1988, 3814287

Int. Cl.<sup>3</sup> C23C 16/02

U.S. Cl. 148—254

20 Claims

2. A process for preparing polymeric titanium(IV) phosphates that are suitable for mixing with water to form a dispersion effective for activating the surfaces of metals prior to phosphating treatments, said process comprising chemically reacting a mixture comprising:

- (I) a titanium(IV) compound,
- (II) a material selected from the group consisting of phosphoric acid and alkali metal phosphates, and
- (III) water,

to produce said polymeric titanium(IV) phosphates, wherein the improvement comprises the presence in said mixture during at least a part of said reacting of an amount of titanium(IV) complexing agent that is less than the stoichiometric amount, based on the titanium(IV) content of said mixture.

4,957,569

BINDING ADDITIVE FOR EXPLOSIVE COMPOSITIONS  
Kevin H. Waldo, Mount Thorley, and Daniel A. Wasson, Singleton, both of Australia, assignors to CBS Explosives Pty Limited, New South Wales, Australia

Filed Nov. 16, 1988, Ser. No. 271,715

Claims priority, application Australia, Nov. 18, 1987, P15548 Int. Cl.<sup>3</sup> C06B 45/02

U.S. Cl. 149—21

4 Claims

1. A dry mix explosive composition, including: 50–72% (by weight) ammonium nitrate;

- 2–4% (by weight) fuel oil;
- 10–15% (by weight) bulking agent; and
- 15–20% (by weight) of a water-in-oil emulsion, comprising a water-based solution of oxidizer salts held in a disperse phase in oil.

4,957,570

## BUTT-WELDING OF PIPES

Patrick W. Jenkins, Dronfield; Edwin A. W. Dunkey, Dronfield Woodhouse, and Roy Cartwright, Dronfield, all of England, assignors to Fusion Group PLC, Dronfield, England

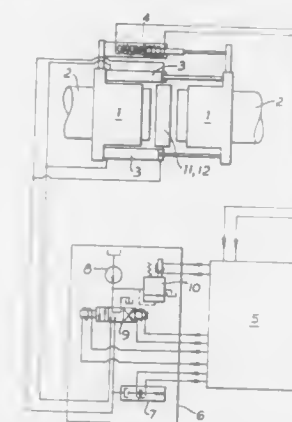
Division of Ser. No. 59,059, Jun. 8, 1987, abandoned. This application Jun. 6, 1989, Ser. No. 361,959

Claims priority, application United Kingdom, Jun. 25, 1986, 8615517

Int. Cl.<sup>3</sup> B29C 65/20

U.S. Cl. 156—64

4 Claims



1. A method for the butt-welding of pipes comprising locating the ends of pipes in respective clamps which clamps are movable towards and away from each other under hydraulic power, effecting trimming of the pipe ends against a trimmer plate in conventional manner urging the trimmed pipe ends into contact to check that the trimmed pipe ends are in contact around their full periphery, sensing the distance moved by the clamps from their position of rest to their position where the pipe ends are in contact storing the information on distance moved in microprocessor control means having been preprogrammed with an additional required clamp movement, withdrawing the clamps, inserting a heater plate between the pipe ends, moving the clamps towards each other to bring the pipe ends into contact with the heater plate and until the clamps have moved said stored distance moved plus said preprogrammed additional required clamp movement and whereby a bead of a correct required size is formed on the ends of the pipes.

4,957,571

## METHOD FOR APPLYING RECLOSABLE FASTENER TO PACKAGE

Peter C. Cipolla, El Toro, Calif., assignor to Multivac, Kansas City, Mo.

Filed Dec. 1, 1988, Ser. No. 278,586

Int. Cl.<sup>3</sup> B32B 31/08

U.S. Cl. 156—66

10 Claims

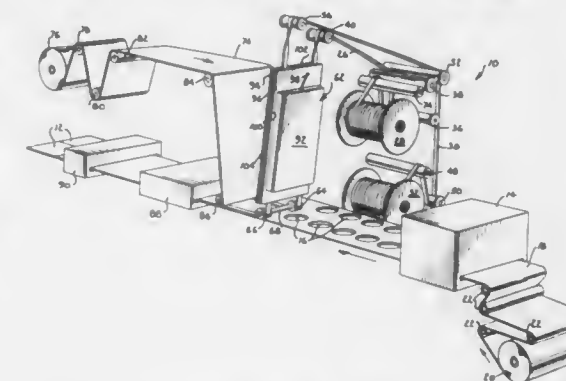
1. A method for forming a reclosable package having confronting walls, said method comprising the steps of: providing a web of sheet material from a supply source; providing an extended length of separable fastener strip from a supply source;

forming said confronting walls of said reclosable package from said web of sheet material;

directing said fastener strip along a linear path of travel toward said confronting walls;

tensioning said fastener strip in a linear direction along said path;

heating said fastener strip across its entire cross sectional dimension while said tensioning step occurs and before said fastener strip reaches said confronting walls;



continuing advancement of said fastener strip in a linear direction;

then introducing said fastener strip between the confronting walls;

sealing said fastener strip to the confronting walls; and

sealing together the confronting walls to form said reclosable package.

4,957,572

## METHOD AND APPARATUS FOR THE PRODUCTION OF A BEAD OF ORGANIC MATERIAL INTENDED TO SERVE AS A SEAL AND INSERT IN A MULTIPLE GLAZING

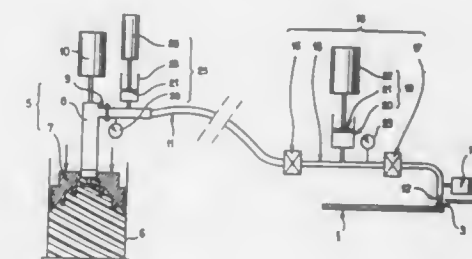
Philippe Dewitte, Thourotte; Michel Canand, Paris, and René Poix, Noyon, all of France, assignors to Saint-Gobain Vitrage, Courbevoie, France

Filed Jun. 5, 1989, Ser. No. 361,352

Claims priority, application France, Jun. 17, 1988, 88 08135 Int. Cl.<sup>3</sup> B32B 31/12

U.S. Cl. 156—109

17 Claims



12. A process for forming a uniform bead of organic material having a butyl rubber base, with a viscosity greater than 35000 poises, comprising the steps of:

using a reciprocating pump having a heating conical piston to heat and pump the organic material from a drum;

conveying the material via a pipe to an output nozzle to form the uniform bead; and

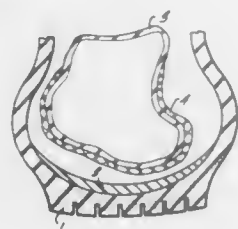
selectively storing the organic material in a lock chamber in said conduit.

15. The process of claim 12 including the step of applying said bead to a multiple glazing so as to make an insert seal for said multiple glazing.

4,957,573  
METHOD FOR PLACING AN INNER TUBE INTO A TIRE  
LINED WITH SEALANT

Edward N. Gomberg, 572 River St., Chattanooga, Tenn. 37405  
Filed Jul. 31, 1989, Ser. No. 387,675  
Int. Cl.<sup>5</sup> B29C 73/22, 73/00  
U.S. Cl. 156—115

8 Claims

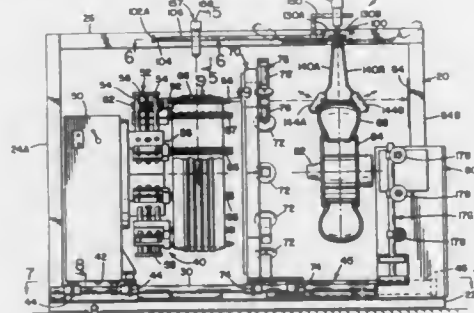


1. A method of placing an inner tube in a tire casing wherein either the inner tube or the tire casing has been lined with a layer of tacky sealant material comprising applying a layer of anti-tack material on to the sealant, or to a surface opposing the sealant, or both, said anti-tack material rendering the sealant nonadhering with respect to the opposing surface for a sufficient period of time to allow proper placement and inflation of the inner tube within the casing but permitting the sealant to regain its tacky surface after inflation of the inner tube.

4,957,574  
TREAD CENTERING METHOD AND APPARATUS  
Andrew R. Clayton, Salisbury, N.C., and Robert A. Cronin, Irvine, Calif., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio  
Filed Apr. 3, 1989, Ser. No. 331,777  
Int. Cl.<sup>5</sup> R29D 30/52

U.S. Cl. 156—126

17 Claims

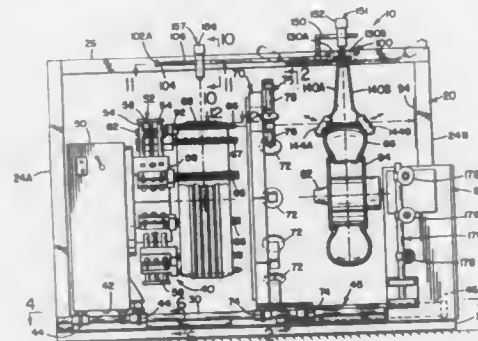


1. A method for centering an annular tread on a pneumatic tire casing, the method comprising the steps of:  
determining the location of the equatorial plane of the casing or the wheel;  
mounting the annular tread on a tread expander assembly;  
establishing a first plane location axially spaced a fixed distance from and parallel to the equatorial plane of the casing or wheel;  
positioning the tread on the tread expander assembly such that the circumferential centerline of the tread is coincident with said established first plane;  
expanding the tread as required to permit the tread to encircle the casing; and  
providing relative axial movement between said tread expander and a casing mounted on said wheel to bring the centerline of said tread and the equatorial plane of said casing mounted on said wheel into coincidence, said relative axial movement being a fixed distance equal to the fixed distance between said established first plane and the

determined equatorial plane of a casing mounted on said wheel.  
6. An apparatus for centering an annular tread on a casing having an equatorial plane, the apparatus comprising:  
a frame;  
a wheel mounted on the frame and adapted for receiving and mounting a casing;  
a tread expander adapted for receiving an annular tread at a location axially spaced from said wheel;  
means for determining the axial location of the equatorial plane of a casing mounted on said wheel;  
means for establishing a first plane location axially spaced a fixed distance from and parallel to the equatorial plane of the casing or wheel;  
means for providing relative axial movement between said tread expander and a casing mounted on said wheel to bring the circumferential centerline of a tread into coincidence with the equatorial plane of the casing, said tread being positioned on the tread expander assembly such that the circumferential centerline is coincident with said established first plane prior to relative axial movement, said relative axial movement being a fixed distance equal to the fixed distance between said established first plane and the determined equatorial plane of a casing mounted on said wheel.

4,957,575  
TREAD APPLICATION METHOD AND APPARATUS  
Robert A. Cronin, Irvine, Calif., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio  
Filed Mar. 31, 1989, Ser. No. 332,252  
Int. Cl.<sup>5</sup> B29D 30/58  
U.S. Cl. 156—126

14 Claims



1. A method for clamping an annular tread to a pneumatic tire casing, the method comprising the steps of:  
mounting the casing on a wheel;  
mounting the annular tread on a tread expander assembly, the tread expander assembly being movable along a line coincident with or parallel to the wheel rotational axis, the tread expander assembly having means expandable outwardly and retractable inwardly along the radial direction of the wheel for selectively stretching the tread by radially outward displacement of the tread at a number of spaced points on the radially inner side of the tread, thereby to expand the tread to a size sufficient to circumferentially surround the casing;  
moving the tread axially toward the casing to a position where the stretched, annular tread circumferentially surrounds and is centered on the casing;  
encircling the casing and stretched tread with a clamping assembly, the clamping assembly having a plurality of spaced clamping means and, using such assembly and without rotating the casing or tread relative to such clamping assembly, clamping the stretched tread to the casing by sequentially or simultaneously pressing on the

radially outwardmost surface of the tread at spaced clamping points, each clamping point being located between points where stretching force is applied;  
unclamping the stretched tread at the clamping points; and transferring the annular tread from the tread expander assembly axially away from the casing.

8. An apparatus for clamping an annular tread to a casing, the apparatus comprising:  
a frame;  
a wheel adapted for receiving and mounting a casing, the wheel being mounted on the frame;  
a tread expander assembly, the tread expander assembly being movable along a line coincident with or parallel to the wheel rotational axis, the tread expander assembly having means expandable outwardly and retractable inwardly along the radial direction of the wheel for selectively stretching the tread by radially outward displacement of the tread at a number of spaced points on the radially inner side of the tread, the tread expander assembly being slidable in an axial direction relative to the wheel rotational axis a distance sufficient to align the centerplane of the annular tread with the equatorial plane of the casing; and  
a clamping assembly mounted on the frame, the clamping assembly, having a plurality of spaced clamping means for clamping, without rotation of the casing or tread relative to the clamping assembly, the radially outermost surface of the tread at a plurality of spaced points, each point being located between points where the tread expander assembly applied stretching force to the tread.

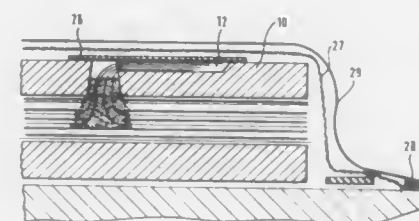
4,957,576  
METHOD FOR PROTECTING LIGHT CONDUCTIVE  
FIBER ENDS PROJECTING FROM A FIBER  
REINFORCED PART

Manfred Fischer, Bremen, and Bernd Hofer, Lemwerder, both of Fed. Rep. of Germany, assignors to MBB GMBH, Bremen, Fed. Rep. of Germany

Filed Nov. 23, 1988, Ser. No. 275,758  
Claims priority, application Fed. Rep. of Germany, Nov. 27, 1987, 3740272

Int. Cl.<sup>5</sup> B29C 63/18, 65/54; G01B 11/16  
U.S. Cl. 156—166

2 Claims



1. Method for the protection of light conductive fiber ends, the fibers being embedded as crack monitors in fiber reinforced compound material comprising the steps of:  
slipping the fiber ends into relatively short polytetrafluoroethylene hoses but being provided to be at least in part embedded in the compound material of which parts are to be made the fiber ends, projecting from the hose;  
closing an end of the hose that will be embedded with a cold curing laminate resin without filling the hose;  
partially embedding the fiber ends with enclosing polytetrafluoroethylene hoses to project from openings during assembly of the part and inserting the projecting fiber ends with said enclosing hoses in a conical bore of an assembly device;  
filling said openings and portions adjacent to the conical bore of the assembly tool with laminate resins;  
placing a protective cover onto said bore and over the poly-

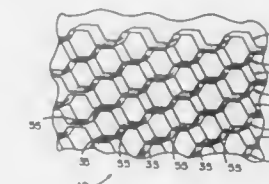
tetrafluoroethylene hose protected fiber end prior to curing of the part; and  
curing the thus prepared part in an autoclave.

4,957,577  
METHOD FOR MAKING WELDED HONEYCOMB CORE  
Fritz Huebner, Zeeland, Mich., assignor to Plascor, Inc., Zeeland, Mich.

Filed Apr. 4, 1988, Ser. No. 177,437  
Int. Cl.<sup>5</sup> B32B 3/12

U.S. Cl. 156—197

23 Claims



1. A method of fabricating a structural honeycomb core comprising:  
superimposing first and second strips of thermoplastic with the opposite lateral edges of each aligned;  
placing release substrates at first spaced locations along the length of the superimposed strips on the side of the first strip opposite the second strip;  
welding the superimposed strips to one another at the first spaced locations;  
superimposing a third strip of thermoplastic over the second strip with the lateral edges of each aligned after the welding of the first and second strips;  
placing release substrates between the second and first strips at second spaced locations between the first spaced locations;  
welding the superimposed third and second strips to one another at the second spaced locations; and  
expanding the welded strips to form a honeycomb structure.

4,957,578  
PROCESS FOR PRODUCING A PAPERBOARD  
PRODUCT FOR PREMIUM PACKAGING  
APPLICATIONS

Todd H. Huffman, Roanoke, Va.; Debora F. Massouda, Silver Spring, Md., and Thomas S. Williams, III, Covington, Va., assignors to Westvaco Corporation, New York, N.Y.

Filed Mar. 22, 1989, Ser. No. 327,516  
Int. Cl.<sup>5</sup> B29C 47/06

U.S. Cl. 156—244.11

6 Claims

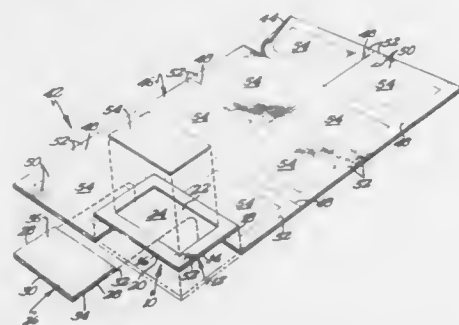
1. A process for producing a paperboard product having a brightness of at least about 83 TAPPI Brightness and a Hunter gloss of 100-plus at an angle of 60 degrees suitable for use as a premium packaging material comprising the steps:  
(a) applying a surface treatment to one surface of a paperboard substrate to improve its adhesion to a subsequent coating layer;  
(b) passing the treated paperboard into a nip formed between a chill roll and a backup roll while simultaneously extruding onto the treated surface of the paperboard a polyolefin coating selected from the group consisting of polyethylene, low density polyethylene, linear low density polyethylene, and polypropylene containing a bright, white pigment;  
(c) applying a surface treatment to the exposed surface of said polyolefin coating to improve its adhesion to a subsequent coating layer; and  
(d) passing the treated and coated paperboard into a second nip formed between a chill roll and a backup roll while



simultaneously extruding onto the treated surface of said pigmented polyolefin coating a clear coating of a polyester material selected from the group consisting of polyethylene terephthalate (PET), glycol-modified PET, acid-modified PET, polybutylene terephthalate, polycarbonate and nylon to produce a defect-free, glossy surface.

**4,957,579**  
**METHOD AND APPARATUS FOR APPLYING LIQUID ACID TO A SURFACE**

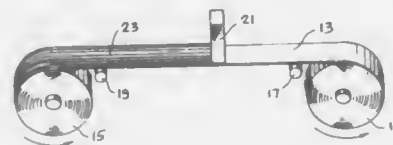
Glenn C. Knowlton, 2262 Bronson Dr., St. Paul, Minn. 55112  
Division of Ser. No. 78,038, Jul. 27, 1987, Pat. No. 4,834,803.  
This application May 26, 1989, Ser. No. 357,820  
Int. Cl.<sup>5</sup> B32B 31/18; B65B 43/00  
U.S. Cl. 156—248 4 Claims



1. Method of fabricating a pack for applying liquid acid to a treatment surface comprising the steps of:

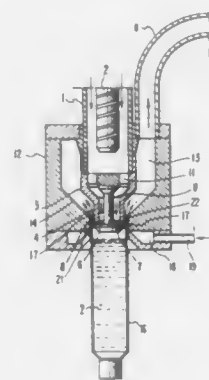
- providing a supply stock of a layered assemblage including a layer of flexible material having an inner surface, pressure sensitive adhesive located on the inner surface of the flexible material, and an adhesive covering, with the flexible material being impervious to breaking down by the liquid acid, with the pressure sensitive adhesive being impervious to breaking down by the liquid acid and having sufficient adherence to the flexible material and the treatment surface to achieve a tight seal between the flexible material and the treatment surface creating a pocket for receipt of the liquid acid to be suspended and concentrated within the pocket adjacent to the treatment surface;
- stencil cutting a first cut through the layer of flexible material, the pressure sensitive adhesive, and the adhesive covering layer, with the first cut having a perimeter defining an area;
- stencil cutting a second cut simultaneously with the first cut through the adhesive covering layer while maintaining the layer of flexible material in tact to divide the adhesive covering layer into a central portion defined by the second cut having a perimeter defining an area smaller than the perimeter and the area of the first cut and a perimeter portion defined between the first and second cuts, with the second cut being concentric and not intersecting with the first cut; and
- providing material for absorbing liquid acid and providing for carrying and uniformly spreading the liquid acid, with the absorbing material being flexible, with the absorbing material having a perimeter defining an area complementary to and substantially the same as the perimeter and area of the second cut allowing removal of the central portion of the adhesive covering from the first surface of the sheet to allow securement of the absorbing material while the perimeter portion of the adhesive covering is maintained in a covering relation for providing support for the flexible material.

**4,957,580**  
**METHOD FOR MAKING AN OPTICAL DATA CARD**  
Jerome Drexler, and Joseph B. Arnold, both of Los Altos Hills, Calif., assignors to Drexler Technology Corp., Calif.  
Division of Ser. No. 855,228, Apr. 23, 1986. This application Oct. 3, 1988, Ser. No. 252,829  
Int. Cl.<sup>5</sup> B32B 31/18; G06K 19/00  
U.S. Cl. 156—250 16 Claims



1. A method of making a wallet size data card comprising the steps of, preformatting a roll of optical recording tape with a continuous pattern of straight solid parallel lines defining a set of parallel, spaced apart, prerecorded servo tracks, adhering strips of said tape to card base material so that ends of said strip extend beyond opposite ends of the length of a data card, and cutting said strip such that ends of the strip coincide with ends of the card.

**4,957,581**  
**METHOD AND APPARATUS FOR CENTERING TUBES**  
Günter Jährg, Eggenstein-Leopoldshafen; Lutz Langenhahn, Ettlingen, and Robert Riedl, Karlsruhe, all of Fed. Rep. of Germany, assignors to IWK Verpackungstechnik GmbH, Stutensee, Fed. Rep. of Germany  
Filed Dec. 29, 1988, Ser. No. 291,586  
Claims priority, application Fed. Rep. of Germany, Dec. 29, 1987, 3744402  
Int. Cl.<sup>5</sup> B65B 7/06, 51/20, 51/32  
U.S. Cl. 156—309.9 8 Claims



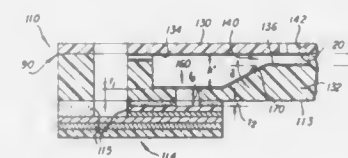
1. An apparatus for heating edges of a filling opening of a packing container by hot gas for a subsequent closing of the filling opening, with a nozzle means being introducible into the filling opening at a container open end for supplying the hot gas by a substantially radially outwardly directed gas discharge, characterized in that centering means are provided for centering the container open end without contacting the container open end including means disposed externally of the container at a position spaced axially forward of the nozzle means, as viewed in a direction of a closed end of the container, for directing a centering fluid at the container open end with a component of flow of the centering fluid in an axial direction of the container.

8. A method for centering a packing container in a device for

heating an open end of the packing container by supplied hot air for enabling a subsequent welding of edges of the open end of the container, the method comprising the step of supplying a centering gas from an external source to the exterior of the open end of the container from a position disposed forwardly, as viewed in a direction of a closed end of the container, of a point of location of the supply of hot air, and directing the centering gas so as to provide for a component of flow of the centering gas in an axial direction of the container.

**4,957,582**  
**CAPILLARY TRANSPORT ZONE COATED WITH ADHESIVE**

Richard L. Columbus, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
Filed Mar. 16, 1989, Ser. No. 324,140  
Int. Cl.<sup>5</sup> C09J 5/00  
U.S. Cl. 156—332 12 Claims



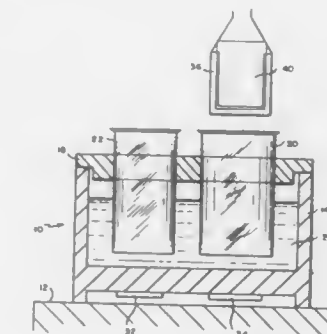
7. A method of making a device containing a liquid transport zone capable of transporting a patient sample through the zone via capillary action, said zone comprising opposing surfaces joined together so as to provide a capillary spacing between said surfaces, said surfaces comprising a supporting material having an equilibrium contact angle with serum that is outside the range of about 30° to about 80°, the method comprising the steps of

- (a) providing said supporting material configured with said opposing surfaces;
- (b) coating at least a portion of said supporting material of at least one of said surfaces with an adhesive capable of bonding together said supporting material of said surfaces, said adhesive, when cured, having an equilibrium contact angle with serum that is less than about 80° and greater than about 30°, some of the adhesive being applied in at least a portion of the area of said transport zone;
- (c) joining said supporting materials; and
- (d) curing said adhesive.

**4,957,583**  
**APPARATUS FOR ETCHING PATTERNED SUBSTRATES**  
Roy V. Buck, Oak Ridge, and Darrell P. Adams, Greensboro, both of N.C., assignors to Analog Devices, Inc., Norwood, Mass.  
Filed Apr. 28, 1989, Ser. No. 345,079  
Int. Cl.<sup>5</sup> B44C 1/22; C23F 1/02; C03C 15/00, 25/06  
U.S. Cl. 156—345 3 Claims

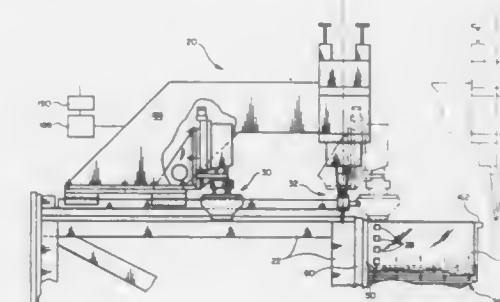
1. Apparatus for practicing the wet etching of a workpiece including a metallization layer on a substrate, comprising:
  - a first vessel at least partially filled with a coupling fluid;
  - a second vessel containing an etchant solution and having an aperture large enough to receive the workpiece therein;
  - means for suspending the second vessel in the coupling fluid of the first vessel;
  - an ultrasonic generator means coupled to the first vessel to impart ultrasonic vibrations to the coupling fluid and,

via the coupling fluid and second vessel, to the etchant solution; and



**4,957,584**  
**APPARATUS FOR FORMING ENDLESS LOOPS FROM SHEET MATERIAL**

Frank Castrignano, Fairport; James C. Foote, Jr., York; Robert E. Marowski, Rochester, and Richard D. Young, Fairport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.  
Filed May 18, 1989, Ser. No. 353,833  
Int. Cl.<sup>5</sup> B29C 65/08  
U.S. Cl. 156—361 10 Claims



1. Apparatus for splicing together opposite ends of a sheet of material to form an endless loop of such material, the sheet having identifiable features located at a predetermined relationship along the sheet, the apparatus comprising:
  - a generally cylindrical drum having first and second axially extending edges,
  - means for adjusting the drum edges relative to each other to vary the circumference of the drum,
  - means for holding the sheet on the drum with the opposite ends of the sheet being in overlapping relationship adjacent the drum edges,
  - means for sensing the relationship between the identifiable features at the overlapping ends of the sheet when the sheet is being held on the drum,
  - control means for operating the adjusting means to vary the circumference of the drum and thus adjust the relationship between the identifiable features at the overlapping ends until the predetermined relationship is obtained, and
  - means for bonding the opposite ends of the sheet together after such predetermined relationship is obtained.

4,957,591

**METHOD FOR PREPARING NEEDLE-LIKE, FIBROUS OR POROUS DIAMOND, OR AN AGGREGATE THEREOF**

Yoichiro Sato; Mutsukazu Kamo, both of Tsukuba, and Chiemi Hata, Tachikawa, all of Japan, assignors to National Institute for Research in Inorganic Materials, Tsukuba, Japan

Filed Dec. 9, 1968, Ser. No. 281,650

Claims priority, application Japan, Mar. 29, 1968, 63-75161

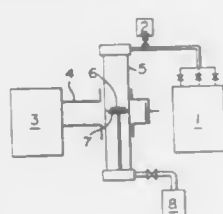
Int. Cl.<sup>7</sup> B44C 1/22; C03C 15/00, 25/06

U.S. Cl. 156—643 12 Claims

1. A method for preparing needle-like, fibrous or porous diamond, or an aggregate thereof, which comprises subjecting



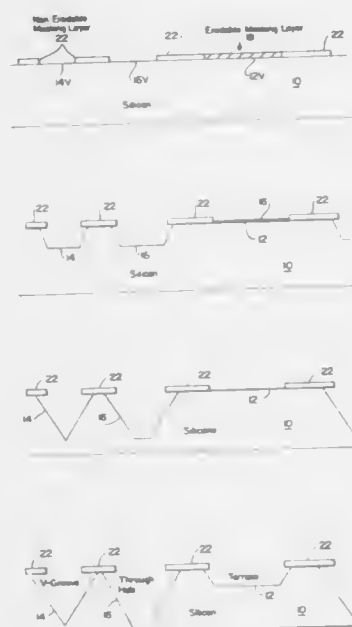
diamond synthesized by a chemical vapor deposition method to plasma treatment in a gas stream containing oxygen, carbon



dioxide, steam, hydrogen, a halogenated hydrocarbon or a halogenated carbon, for etching.

#### 4,957,592 METHOD OF USING ERODABLE MASKS TO PRODUCE PARTIALLY ETCHED STRUCTURES IN ODE WAFER STRUCTURES

James F. O'Neill, Penfield, N.Y., assignor to Xerox Corporation, Rochester, N.Y.  
Filed Dec. 27, 1989, Ser. No. 458,182  
Int. Cl.<sup>5</sup> H01L 21/306; B44C 1/22; C03C 15/00, 25/06  
U.S. Cl. 156—644 20 Claims



1. A method of fabricating an opening in a wafer comprising the steps of:  
applying an erodable first mask to a surface of the wafer;  
patterning the erodable first mask to define an erodable first mask layer at a desired location for the opening;  
applying a second mask layer over the erodable mask layer;  
patterning the second mask layer to expose the erodable first mask layer;  
anisotropically etching through the first erodable mask layer and into the wafer to form the opening to a desired depth.

#### 4,957,593 MODIFIED COMPOSITE ELECTRODES WITH RENEWABLE SURFACE FOR ELECTROCHEMICAL APPLICATIONS AND METHOD OF MAKING SAME

Brenda R. Shaw, and Kenneth E. Creasy, both of Storrs, Conn., assignors to University of Connecticut, Storrs, Conn.  
Filed Mar. 7, 1989, Ser. No. 319,971  
Int. Cl.<sup>5</sup> C25B 11/12

U.S. Cl. 204—291 11 Claims  
1. A self-supporting renewable modified composite electrode for electrochemical applications comprising a substantially homogenous structure of a composition consisting of:  
(a) 1-98 percent by weight of a non-conductive polymeric matrix;  
(b) 1-98 percent by weight of a conductive filler dispersed throughout said matrix and sufficient to provide electrical conductivity in the electrode; and  
(c) 1-98 percent by weight of a modifier dispersed throughout said matrix, said modifier providing to said electrode electroactive properties, said electrode being homogenous throughout its cross section and thereby renewable by removal of a surface portion thereof to expose a fresh portion thereof.

#### 4,957,594 PROCESS FOR PRODUCING A ZINC OR ZINC ALLOY COATED STEEL SHEET HAVING EXCELLENT SPOT WELDABILITY

Kazumasa Yamazaki; Yaichiro Mizuyama; Takashi Horita, and Shinichi Suzuki, all of Tokai, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan  
Filed Feb. 13, 1989, Ser. No. 309,260  
Claims priority, application Japan, Feb. 19, 1988, 63-35034; Aug. 9, 1988, 63-197260; Sep. 22, 1988, 63-236238  
Int. Cl.<sup>5</sup> C25D 5/00, 9/08

U.S. Cl. 204—27 4 Claims  
1. A process for producing a zinc- or zinc alloy-coated steel sheet having an excellent spot-weldability comprising the steps of:

coating a steel sheet with one or more layers wherein, at least one of said coated layers contains zinc as a major component, and  
depositing zinc on the outermost of said coated layers with a simultaneous oxidation of zinc deposited by an electrogalvanizing treatment in a plating bath containing zinc ions and 0.5 to 30% of hydrogen peroxide to form an oxidized layer on the outermost of said coated layers in an amount of from 0.03 to 3.0 g/m<sup>2</sup> in terms of the zinc content of said oxidized layer, said oxidized layer containing at least one of zinc oxide and zinc hydroxide.  
2. A process for producing a zinc- or zinc alloy-coated steel having an excellent spot-weldability, comprising the steps of:  
coating a steel sheet with one or more layers wherein, at least one of said coated layers contains zinc as a major component, and  
depositing zinc on the outermost of said coated layers with a simultaneous oxidation of zinc deposited by electrolysis using said steel sheet as a cathode in an acidic bath containing zinc ions and one or more oxidizing agents selected from the group consisting of nitric acid and nitrates to form an oxidized layer on the outermost of said coated layers in an amount of from 0.03 to 3.0 g/m<sup>2</sup> in terms of the zinc content of said oxidized layer, said oxidized layer containing at least one of zinc oxide and zinc hydroxide.  
3. A process for producing a zinc- or zinc alloy-coated steel sheet having an excellent spot-weldability, comprising the steps of:  
coating a steel sheet with one or more layers wherein, at least one of said coated layers contains zinc as a major component, and  
depositing zinc on the outermost of said coated layers with a simultaneous oxidation of zinc deposited by contacting with a solution containing zinc ions and one or more

oxidizing agents selected from the group consisting of nitric acid and nitrates to form an oxidized layer on the outermost of said coated layers in an amount of from 0.03 to 3.0 g/m<sup>2</sup> in terms of the zinc content of said oxidized layer, said oxidized layer containing at least one of zinc oxide and zinc hydroxide.

#### 4,957,595 SEPARATION OF 3-METHYL-2-BUTANONE FROM FORMIC ACID BY EXTRACTIVE DISTILLATION WITH SULFOLANE

Lloyd Berg, 1314 S. 3rd Ave., and George Bentu, both of Bozeman, Mont. 59715, assignors to Lloyd Berg, Bozeman, Mont.  
Filed Nov. 7, 1989, Ser. No. 432,864  
The portion of the term of this patent subsequent to Aug. 14, 2007, has been disclaimed.

U.S. Cl. 203—51 1 Claim  
1. A method for recovering 3-methyl-2-butanone from a mixture consisting essentially of 3-methyl-2-butanone and formic acid which comprises distilling the mixture consisting essentially of 3-methyl-2-butanone and formic acid in a rectification column in the presence of about one part of an extractive agent per part of 3-methyl-2-butanone-formic acid mixture, recovering 3-methyl-2-butanone as overhead product and obtaining the extractive agent and the formic acid from the stillpot, wherein said extractive agent comprises sulfolane and at least one material selected from the group consisting of adipic acid, azelaic acid, benzoic acid, cinnamic acid, p-tert. butyl benzoic acid, decanoic acid, ethylene glycol diacetate, glycerine triacetate, hexanoic acid, p-hydroxy benzoic acid, itaconic acid, malic acid, neodecanoic acid, m-nitrobenzoic acid, octanoic acid, isobutyl heptyl ketone, cyclohexanone, dipropylene glycol dibenzoate, diethylene glycol dimethyl ether, 2-methoxyethyl ether, glutaric acid, butyl benzoate, ethyl benzoate, methyl benzoate, 3-heptanone, diethylene glycol diethyl ether, isophorone, 4-methyl-2-pentanone, peltargonic acid, benzyl benzoate, phenyl acetate, anisole and ethylene glycol phenyl ether.

#### 4,957,596 PROCESS FOR PRODUCING COKE

Keizoo Ukita, Yokohama; Tetsuo Hamaguchi, Chigasaki, and Masaaki Inoue, Yokohama, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan  
Filed Jun. 15, 1989, Ser. No. 366,548  
Claims priority, application Japan, Jun. 17, 1988, 63-149471  
Int. Cl.<sup>5</sup> C10B 57/06

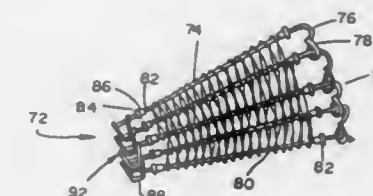
U.S. Cl. 201—20 11 Claims  
1. In a process for producing coke by carbonization of a starting coal, the improvement which comprises carbonizing a starting coal containing a bulk density improving effective amount of a bulk density improving agent comprising a water-insoluble synthetic resin having a high molecular network three-dimensionally crosslinked physically or chemically and capable of absorbing or adsorbing distilled water in an amount of 5 to 1000 times its own weight and capable of forming a hydrous gel in the presence of moisture.

#### 4,957,597 CONVEYOR BELT FOR TURN CONVEYORS

Guy L. Irwin, Oreland, Pa., assignor to I. J. White Co., Farmingdale, N.Y.

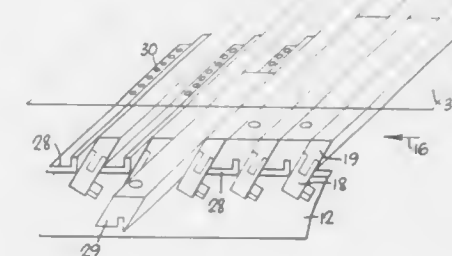
Filed Sep. 20, 1989, Ser. No. 409,691  
Int. Cl.<sup>5</sup> B65G 15/02 13 Claims  
1. A fixed radius turn conveyor belt comprising:  
a radially positioned plurality of spaced rods, said rods having inside and outside ends, said ends forming inside and outside edges, wherein a radius of said inside edge is less than a radius of said outside edge;

filaments over at least some adjacent ones of said rods covering spaces between said rods;  
links attached to said rods adjacent said inside ends, said links defining a position of said filaments relative to said inside edge, said links being effective to interact with a sprocket wheel driving said belt;



#### 4,957,598 SUCTION BOX COVER WITH MODULAR COMPONENTS

Glauco Corbellini, 33100 Via Carducci 48, Udine, Italy  
Filed Mar. 21, 1989, Ser. No. 326,384  
Claims priority, application Italy, Mar. 29, 1988, 83354 A/88  
Int. Cl.<sup>5</sup> D21F 1/52 9 Claims



1. A modular-type suction box cover having sides for supporting a wire for paper mill stock, and comprising: a frame structure including external side beams, a plurality of sliding blades including a front sliding blade, intermediate sliding blades, and a subsequent sliding blade, each blades being constructed of a carrier connected to a sliding body which contacts the wire, said blades being a sliding surface for said wire, and are supported from a plurality of shaped staffs, each shaped staff having a plurality of inclined slots, each inclined slot having a single sliding blade lodged therein, and having a small notch intersecting said slot and cooperatively associated with elastic fastening means for clamping and forcing said blade against said shaped staff, each blades being at right angles to said shaped staffs, and each said shaped staff standing the distance between and connecting said external side beams, said cover being sealed at the sides by seals and is secured by means of said beams to a lower suction box, and elastic fastening means between the intermediate sliding blades and said shaped staff, fastening means between the front sliding blade with one of said side beams, fastening means between the subsequent sliding blade with another of said side beams, fastening means between the shaped staffs with said side beams, and fastening means between the side beams with said lower suction box, all

said fastening means being releasable so that such components of said suction box cover which are modular in form may be readily assembled to and disassembled from the lower suction box for ease of repair and replacement of parts.

4,957,599

**ALKALINE EXTRACTION, PEROXIDE BLEACHING OF NONWOODY LIGNOCELLULOSIC SUBSTRATES**

Yu-Chia T. Chou, Wilmington, Del.; David F. Garrison, Mullica Hill, N.J., and William I. Lewis, Burlington, Canada, assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 181,774, Apr. 15, 1988, abandoned.  
This application Dec. 8, 1989, Ser. No. 450,908  
Int. Cl.<sup>5</sup> D21C 3/02

U.S. Cl. 162-78

1. An improved process for converting nonwoody lignocellulosic substrates into products digestible by ruminants and ingestible by humans comprising the following steps:

- forming a slurry of the substrate with aqueous alkali in an amount at least sufficient to uniformly wet the substrate, the alkali present in an amount greater than about 1 percent (calculated as sodium hydroxide) of the dry weight of the substrate, the slurry being substantially free of peroxide;
- maintaining the slurry of step (a) for a sufficient time depending on the substrate, the temperature, the alkali concentration and mixing efficiency, the temperature being about 25° to 100° C. for the alkali to uniformly wet the substrate;
- separating the wetted substrate from the aqueous alkali in the slurry; then
- forming a slurry of the wetted substrate in an alkaline peroxide solution containing about 1 to 15 wt. % peroxide based on the original dry weight of the substrate at a temperature of about 25° to 90° C. and an initial pH of about 8.5 to 11.0;
- maintaining the slurry of step (d) for a time sufficient to produce a substantially bleached, cellulosic fiber that is sufficiently delignified to expose substantially all the cellulosic and hemicellulosic components to facilitate its intended use; and
- separating the bleached fiber from the alkaline peroxide.

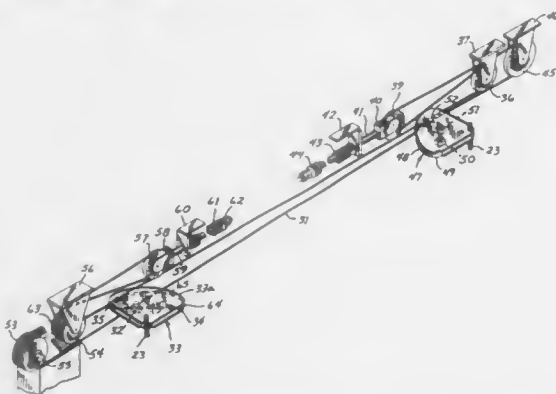
4,957,600

**BI-FOLD DOOR CONSTRUCTION**

Dennis L. Carlson, and Richard D. Cultice, Jr., both of Waukesha, Wis., assignors to Kelly Company Inc., Milwaukee, Wis.  
Filed Jun. 26, 1989, Ser. No. 371,265  
Int. Cl.<sup>5</sup> E05D 15/26

U.S. Cl. 160-199

15 Claims



1. An industrial door to enclose a doorway in a building, comprising a pair of side panels, means for pivotally connecting one side edge of each side panel to a side of the doorway, a pair of center panels, a side edge of each center panel being disposed adjacent a second side edge of a side panel, a track

extending along the upper end of the doorway, a pair of trolley means disposed to ride on the track, the upper edge of each center panel being connected to one of said trolley means and mounted for rotation relative to said trolley means about a vertical pivot axis, drive means for moving said trolley means on said track and simultaneously pivoting said panels about the respective axes to thereby move the panels between a folded open position and a closed position where said panels enclose said doorway, said drive means comprising reversible power operated means and a cable operable connected to said power operating means, a torque arm extending outwardly from the axis of each trolley means, said cable being connected to each torque arm at a location spaced from the respective axis, each torque arm being generally quadrant-shaped and each torque arm including a curved surface, said cable disposed on said curved surface, said cable means being reeved to effect movement of said trolley means in opposite directions on said track and simultaneously pivot said torque arms about the respective axes to move the panels between the open and closed positions.

4,957,601

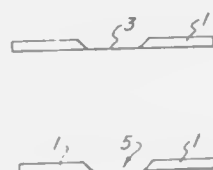
**METHOD OF FORMING AN ARRAY OF APERTURES IN AN ALUMINUM FOIL**

Jules D. Levine, Dallas, and Millard J. Jensen, Balch Springs, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 647,600, Sep. 4, 1984, abandoned. This application May 8, 1989, Ser. No. 351,256  
Int. Cl.<sup>5</sup> B44C 01/22

U.S. Cl. 156-665

14 Claims



1. A method of forming an array of apertures through an aluminum foil for use in fabrication of solar cells, comprising the steps of:

- providing a flexible aluminum foil having a thin oxide on the surface thereof,
- embossing said foil at predetermined spaced unconnected locations to provide regions of reduced thickness in said foil at the locations of said embossments, and
- etching without protective coating said aluminum foil along an entire unmasked surface of said foil to remove said regions of reduced thickness to provide apertures through said foil at said regions of reduced thickness.

4,957,602

**METHOD OF MODIFYING THE DIELECTRIC PROPERTIES OF AN ORGANIC POLYMER FILM**

Michael Blinder, Brooklyn, N.Y., and Robert J. Mammone, South Plainfield, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 12, 1989, Ser. No. 374,125  
Int. Cl.<sup>5</sup> C23C 14/48

U.S. Cl. 204-192.31

3 Claims

1. Method of modifying the dielectric properties of a vapor deposited thin film of a poly-p-xylylene comprising irradiating the vapor deposited thin film of a poly-p-xylylene with doses of ions.

4,957,603

**OPTICAL MEMORY DISC MANUFACTURE**

Michael E. Hennessey, Detroit, Mich., assignor to Producers Color Service, Inc., Southfield, Mich.

Filed Oct. 23, 1989, Ser. No. 425,285  
Int. Cl.<sup>5</sup> C23C 14/34

U.S. Cl. 204-192.27

6 Claims

1. In a process for manufacture of an optical memory disc that includes the steps of providing a PMMA disc substrate having an integral surface with information recorded thereon as a series of surface undulations, and sputter depositing a film of optically reflective metallic construction onto said surface such that said information recorded on said surface is adapted to be optically read through said substrate as a function of changes in effective reflectivity from said film caused by said surface undulations,

a method of improving adhesion between said film and said substrate comprising the steps of: (a) modifying said substrate surface by subjecting said surface to radiation in the presence of carbon at said surface, in excess of that in the surface PMMA molecular structure, as a pretreatment to said surface before sputter deposition of said metallic film so as to alter effects of degradation and depolymerization at said surface due to radiation during said sputter deposition and chemically prepare degraded and depolymerized molecules at said surface for bonding said film to that portion of said substrate underlying said surface, and (b) sputtering said metal film directly onto the substrate surface chemically modified in said step (a) so as to form a layered substrate/film structure that consists essentially of said reflective metallic film, said underlying substrate and said chemically modified substrate surface bonding said film to said underlying substrate.

4,957,604

**PRODUCTION OF A THIN X-RAY AMORPHOUS ALUMINUM NITRIDE OR ALUMINUM SILICON NITRIDE FILM ON A SURFACE**

Helmut Steinhilber, Worms, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 24, 1989, Ser. No. 300,975

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1988, 3802998

Int. Cl.<sup>5</sup> C23C 14/34

U.S. Cl. 204-192.16

13 Claims

1. A process for the production of a thin X-ray amorphous aluminum nitride film on a surface, comprising the following steps in the stated order:

- production of a sputter gas by vaporization of aluminum by reactive sputtering or reactive magnetron sputtering under reduced pressure in a process gas atmosphere consisting essentially of nitrogen and argon and one or more further noble gases selected from the group consisting of neon, krypton and xenon, the volume ratio of argon to the further noble gases being from 2:1 to 100:1 and the volume ratio of the further noble gases to nitrogen being from 2:1 to 10:1, so that the sputter gas results, and
- deposition of the aluminum nitride from the sputter gas onto the surface, resulting in the thin X-ray amorphous aluminum nitride film.

4,957,605

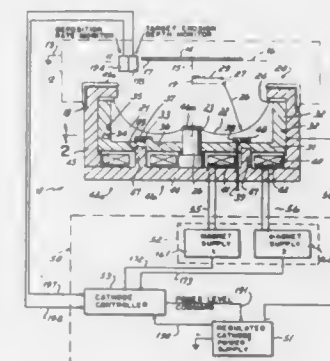
**METHOD AND APPARATUS FOR SPUTTER COATING STEPPED WAFERS**

Steven D. Hurwitz, Park Ridge, N.J.; Israel Wagner, Monsey, N.Y.; Robert Hieronymi, Rock Cavern, N.Y., and Charles Van Nutt, Monroe, N.Y., assignors to Materials Research Corporation, Orangeburg, N.Y.

Filed Apr. 17, 1989, Ser. No. 339,308  
Int. Cl.<sup>5</sup> C23C 14/35

U.S. Cl. 204-192.12

120 Claims



73. A method of depositing a desired distribution of sputtered material across the surface of a substrate and for controlling the deposition rate from different regions of a single-piece sputtering target which erode at different rates, said method comprising the steps of:

- providing a one piece sputtering target and defining a plurality of differently facing regions thereon, including a first region and a second region;
- establishing separate values for electrical parameters for each of said regions so as to cause the deposition of the sum of material sputtered from all of said regions to be of a desired distribution across the substrate surfaces;
- activating a first plasma supporting magnetic field adjacent said first target region so as to cause the emission of sputtered material, and the erosion of said target, in said first target region when said target is energized;
- energizing said target in accordance with the electrical parameter values established for said first target region while said first magnetic field is activated and other magnetic fields are deactivated;
- activating a second plasma supporting magnetic field adjacent said second target region so as to cause the emission of sputtered material, and the erosion of said target, in said second region when said target is energized; and
- energizing said target in accordance with the electrical parameter values established for said second target region while said second field is activated and other magnetic fields are deactivated.

4,957,606

**SEPARATION OF DISSOLVED AND UNDISSOLVED SUBSTANCES FROM LIQUIDS USING HIGH ENERGY DISCHARGE INITIATED SHOCK WAVES**

Christian H. A. Javan, 10053 Jody Ave., Cupertino, Calif. 95014  
Continuation-in-part of Ser. No. 78,655, Jul. 28, 1987, Pat. No. 4,917,785. This application Aug. 31, 1988, Ser. No. 239,184

Int. Cl.<sup>5</sup> B01J 3/08, 19/08

U.S. Cl. 204-164

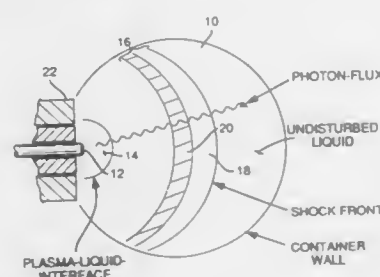
24 Claims

1. A method for removing a dissolved organic liquid from a liquid solution with water, comprising, introducing a quantity of the liquid solution into a firing chamber, discharging an electrical current across electrodes in the firing chamber, in a sudden, high-energy discharge



wherein the current arcs across the electrodes, causing a shock wave accompanied by high turbulence to be produced and to move through the liquid solution in the firing chamber, accompanied by high intensity electro-magnetic radiation which travels through the liquid solution, thereby causing the dissolved organic liquid to be at least partially ionized and to react with oxygen present to be converted to water and gases, and venting the gases from the water.

4. A method for removing a dissolved organic liquid from a liquid solution with water, comprising,



introducing a quantity of the liquid solution into a firing chamber of substantially confined volume, discharging a high energy pulse, in the range of microseconds in length, into the liquid solution, causing a shock wave accompanied by high turbulence to be produced and to move through the liquid solution in the firing chamber, accompanied by high intensity electro-magnetic radiation which travels through the liquid solution, thereby causing the dissolved organic liquid to be at least partially ionized and to react with oxygen present to be converted into water and gases, and venting the gases from the water.

4,957,607

#### METHOD FOR THE PREPARATION OF A CYCLOALKYL SILANE COMPOUND

Mikio Endo, Niigata; Minoru Takamizawa, Moogata; Toshinobu Ishihara; Tohru Kibota, both of Niigata, and Toshio Shinohara, Gumma, all of Japan, assignors to Shin Etsu Chemical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 154,691, Feb. 11, 1988, Pat. No. 4,883,569. This application Jan. 17, 1989, Ser. No. 380,350. Claims priority, application Japan, Feb. 13, 1987, 62-30994. The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B01J 19/08

U.S. Cl. 204—157.74

9 Claims

1. A method for the preparation of a cycloalkyl silane compound which comprises the steps of:  
(A) admixing an unsaturated cyclic hydrocarbon compound represented by the general formula



in which  $R^1$  is a hydrogen atom, a fluorine atom or a fluorine-substituted or unsubstituted monovalent hydrocarbon group having 1 to 8 carbon atoms, A is a divalent intramolecular bridging group selected from methylene group  $>CH_2$  and dimethylmethylene group  $>C(CH_3)_2$ , m is an integer of 4 to 8, p is zero or 1 and n is an integer given by the equation  $n=2m-2p-2$ , with a hydrogen silane compound represented by the general formula



in which  $R^2$  is an unsubstituted or substituted monovalent hydrocarbon group, X is a halogen atom or an alkoxy group and q is zero, 1 or 2, and an alcoholic complex of chloroplatinic acid prepared by heating chloroplatinic

acid in an alcohol at a temperature in the range from 50° to 80° C. for at least 4 hours to form an alcohol complex thereof; and  
(B) irradiating the reaction mixture with ultraviolet light to effect the hydrosilylation reaction between the unsaturated cyclic hydrocarbon compound and the hydrogen silane compound.

#### 4,957,608 PREPARATION OF 8-BROMOMETHYL-3-METHYLQUINOLINE COMPOUNDS

Helmut Hagen, Frankenthal; Rolf-Dieter Kohler, Edingen-Neckarhausen, and Jacques Dupuis, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
Division of Ser. No. 146,691, Jan. 21, 1988. This application Jun. 5, 1989, Ser. No. 361,504

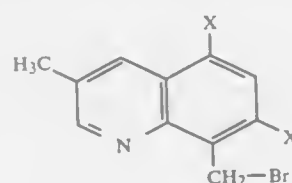
Claims priority, application Fed. Rep. of Germany, Feb. 3, 1987, 3703113

Int. Cl.<sup>5</sup> C07D 215/18; B01J 19/12

U.S. Cl. 204—157.71

9 Claims

1. A process for the production of 8-bromomethyl-3-methylquinoline compounds of the formula I



where the two radicals X denote chlorine or one of them denotes chlorine and the other hydrogen, which process comprises: reacting a corresponding 8-methylquinoline with bromine at a reaction-effective temperature in the presence of light having a sufficiently short wave length to initiate the reaction and in a reaction medium consisting essentially of an aqueous phase buffered at a pH of essentially 3-6 and an organic phase comprising a water-insoluble inert solvent which is stable to bromination.

4,957,609

#### PROCESS FOR PREPARING N-HETEROCYCLIC COMPOUNDS

Neil Godfrey, Stevenage; Ian H. Coates, Hertford; James A. Bell, Ware; David C. Humber, Ealing, and George B. Ewan, Chalfont St. Peter, all of England, assignors to Glaxo Group Limited, London, England

Continuation of Ser. No. 888,256, Jul. 23, 1986, abandoned. This application Feb. 21, 1989, Ser. No. 312,172

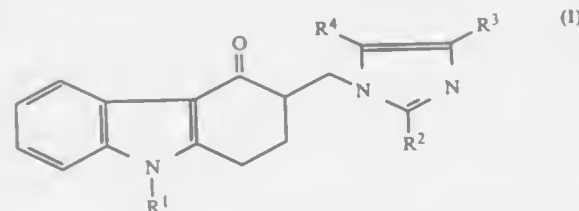
Claims priority, application United Kingdom, Jul. 24, 1985, 8518742

Int. Cl.<sup>5</sup> C07D 403/00, 209/82, 209/86

U.S. Cl. 204—157.71

10 Claims

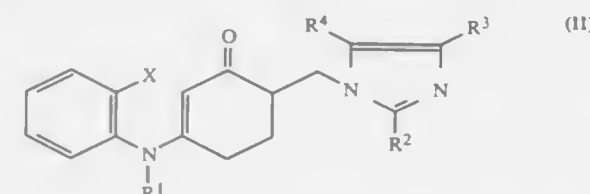
1. A process for the preparation of a compound of formula (I)



wherein

$R^1$  represents a hydrogen atom or a  $C_{1-10}$  alkyl,  $C_{3-7}$  cyclo-

alkyl,  $C_{3-7}$  cycloalkyl- $(C_{1-4})$  alkyl,  $C_{3-6}$  alkenyl,  $C_{3-10}$  alkynyl, phenyl or phenyl- $(C_{1-3})$  alkyl group, and one of the groups represented by  $R^2$ ,  $R^3$ , and  $R^4$  is a hydrogen atom or a  $C_{1-6}$  alkyl,  $C_{3-7}$  cycloalkyl,  $C_{2-6}$  alkenyl or phenyl- $(C_{1-3})$  alkyl group and each of the other two groups, which may be the same or different, represents a hydrogen atom or a  $C_{1-6}$  alkyl group;  
or a salt or protected derivative thereof which comprises the step of cyclisation of a compound of formula (II)



wherein X represents a hydrogen atom or a halogen atom and  $R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$  are as defined above, or a salt or a protected derivative thereof, and wherein the cyclisation is carried out in the presence of a palladium reagent or, alternatively, where X represents a halogen atom, the cyclisation may be carried out in the presence of a copper (I) salt or photochemically.

4,957,610

#### GENERATION OF HYDROGEN AND OXYGEN

James T. Hawkins, 2620 Downing Ave., Cincinnati, Ohio 45208

Filed Jan. 30, 1989, Ser. No. 303,115

Int. Cl.<sup>5</sup> C25C 1/02

U.S. Cl. 204—129

13 Claims

1. A method of generating hydrogen and oxygen, comprising the steps of:  
providing a reactor vessel having first and second chambers; placing an electrolytic solution in the first and second chambers;  
placing an anode in the first chamber and a cathode in the second chamber;  
connecting the anode and the cathode electrically;  
producing a solar-induced laser beam by directing sunlight onto a solar-pumped laser;  
multiplying the frequency of the laser beam to the ultraviolet frequency; and  
directing the frequency-multiplied ultraviolet light onto the anode and the cathode where oxygen is produced at the anode and hydrogen is produced at the cathode.

4,957,611

#### PROCESS AND APPARATUS FOR THE ELECTRO-DEPOSITION OF COPPER SHEETS ON THE CATHODIC SIDES OF BIPOLAR ELECTRODES MADE OF LEAD

Rinetto Collini, c/o Fiammenghi Fiammenghi Via Quattro Fontane 31, I 00184 Roma, Italy

Filed Dec. 1, 1988, Ser. No. 305,990

Claims priority, application Italy, Jun. 6, 1986, 48112 A/86

Int. Cl.<sup>5</sup> C25C 1/12, 7/00, 7/06

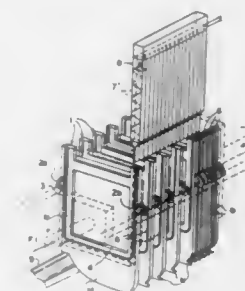
U.S. Cl. 204—106

7 Claims

1. An electrolytic process for the electrodeposition of removable copper sheets on the cathodic surfaces of bipolar lead sheet electrodes, each of said electrodes having an anodic surface directly opposite the cathodic surface thereof, said electrodes being immersed in an aqueous electrolytic solution of copper sulphate acidified by sulphuric acid, said lead sheet electrodes being arranged in series electrically with the first and last electrode in the series being connected between an electrical current source, said process including the following steps:

forming a plurality of separate similar electrolytic cells by installing each of the lead sheet electrodes in a separate modular carrying frame of a corrosion resistant and electrically non-conductive material, said frames being ar-

ranged side by side and connected together to form an integral assembly,  
continuously flowing said aqueous electrolytic solution from a distribution source thereof independently and separately through each of said cells in a flow path entering at the bottom of each cell, flowing through a discharge hole in



the upper part of each cell which also provides the discharge of oxygen to the atmosphere, and then flowing downwardly through an outlet orifice back to the distribution source, said solution being flowed through flow breaking means located in the flow path for creating discontinuities in the flow so as to prevent the formation of shunt currents or current bypasses along the flow path.

4,957,612

#### ELECTRODES FOR USE IN ELECTROCHEMICAL PROCESSES

Ray F. Stewart, Redwood City, and James C. Thompson, Los Altos, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Feb. 9, 1987, Ser. No. 12,394

Int. Cl.<sup>5</sup> C23F 13/16

U.S. Cl. 204—196

16 Claims



1. An elongate article which is suitable for use as a distributed electrode in an electrochemical process and which comprises

- (a) an elongate core which (i) is composed of a first conductive material having a first resistivity at 23°C., and (ii) does not provide any part of the electrochemically active surface of the electrode;
- (b) an elongate intermediate element which (i) is secured to and electrically surrounds the core, (ii) is composed of a second conductive material which is a conductive polymer and which has a second resistivity at 23°C., the second resistivity being at least 1200 ohm.cm and being higher than the first resistivity, (iii) does not provide any part of the electrochemically active surface of the electrode, and (iv) has a transverse resistance of at least 1 ohm.meter; and
- (c) at least one outer element which (i) is secured to and is in electrical contact with the core and the intermediate element so that all electrical paths between the core and the outer element pass through the intermediate element, (ii) is composed of a third conductive material which is a conductive polymer and which has a third resistivity of 23°C., the third resistivity being 0.01 to 300 ohm.cm, and (iii) provides at least part of the electrochemically active surface of the electrode.

4,957,613

**ADJUSTABLE-HEIGHT VERTICAL GEL SLAB ELECTROPHORESIS APPARATUS**

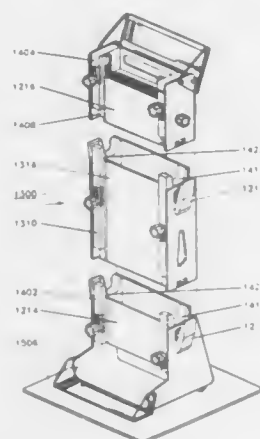
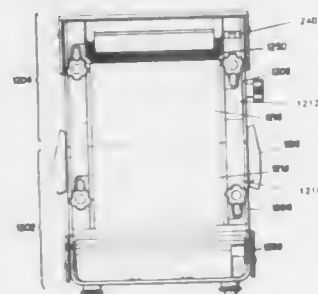
Michael Schuette, Vienna, Va., assignor to Life Technologies Inc., Gaithersburg, Md.

Continuation-in-part of Ser. No. 9,708, Feb. 2, 1987, Pat. No. 4,773,984. This application Sep. 23, 1988, Ser. No. 248,196

Int. Cl.<sup>3</sup> G01N 27/28, 27/26; B01D 57/02

U.S. Cl. 204—299 R

21 Claims



1. An adjustable-height vertical electrophoresis apparatus for use in performing electrophoresis procedures of the type in which a gel slab is maintained in a substantially vertical orientation, and adapted for use with an electrical source, which apparatus comprises:

- a) an electrophoresis gel slab mold, having a top and a bottom and defining a region shaped to contain a gel slab placed within it;
- a) frame for maintaining said electrophoresis gel slab mold and thereby any gel slab contained within in a substantially vertical position, said frame comprising an upper portion having lower edges and a lower portion, separable from said upper portion but having upper edges matching respective ones of said lower edges of said upper portion to substantially prevent wobbling or tilting of said upper portion when said upper portion is placed atop said lower portion and said frame formed thereby is vertically oriented;
- a) first buffer reservoir in said upper portion of said frame, located adjacent said top of said electrophoresis gel slab mold, a first electrode located in said first buffer reservoir and adapted to be connected to the electrical source, said first buffer reservoir being adapted to contain in its interior a first buffer solution in effective electrical contact with said first electrode and with an uppermost end of a gel slab contained within said electrophoresis gel slab mold;
- a) second buffer reservoir in said lower portion of said frame, located adjacent said bottom of said electrophoresis gel

slab mold, and a second electrode located in said second buffer reservoir and adapted to be connected to the electrical source, said second buffer reservoir being adapted to contain in its interior a second buffer solution in effective electrical contact with said second electrode and with a lowermost end of a gel slab contained within said electrophoresis gel slab mold;

means including said first and second electrodes electrically connecting said first and said second buffer solutions for applying an electrical potential across a gel slab contained within said electrophoresis gel slab mold; and a lower buffer reservoir tray located in said lower portion of said frame, and having at least two containers, a lower buffer reservoir container and an upper buffer reservoir drain container, said lower buffer reservoir container acting said second buffer reservoir, and said upper buffer reservoir drain container adapted to receive said first buffer solution through a drainage pathway connecting said first reservoir with said upper buffer reservoir drain container.

4,957,614

**ELECTROCHEMICAL DETECTION DEVICE**

Hideo Matsumura, Nara; Hirohito Nishino, Kusatsu; Hidetoshi Fukuyama, Joyo; Kazutoshi Yamazaki, Otsu, and Hiromitsu Suzuki, Ibaraki, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

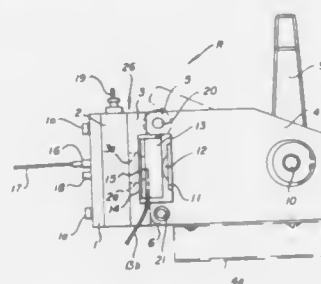
Filed Feb. 19, 1988, Ser. No. 157,564

Claims priority, application Japan, Feb. 20, 1987, 62-24833[U]; Feb. 20, 1987, 62-40531

Int. Cl.<sup>3</sup> G01N 27/28

U.S. Cl. 204—411

9 Claims



1. An electrochemical detection device comprising as one piece, a cell unit and a supporter; said cell unit comprising a cell block, gasket and working electrode, wherein said cell block contains a test solution introduction means and a test solution outlet means having a test solution outlet route both being substantially normal to the working electrode, through which the test solution flows following introduction thereof into the cell block, and reference and counter electrodes adapted to be in contact with said test solution after introduction thereof, said gasket containing an opening defining the cell which communicates with the test solution introduction and outlet means and communicating with the working electrode; said supporter containing a pressure means adapted to push the working electrode first against the gasket and then onto the cell block, and also adapted to retract the working electrode from the cell block, wherein said pressure means comprises a ball, a spring inside a sleeve horizontally disposed within said supporter, and an electrode-pushing plate disposed between the ball and the working electrode whereby upon movement of the ball, the electrode-pushing plate comes into contact with said working electrode.

4,957,615

**OXYGEN SENSOR**

Norihiko Ushizawa, Fujinomiya, and Takeshi Shimomura, Fujinomiya, both of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 8,365, Jan. 29, 1987, abandoned. This application Aug. 4, 1988, Ser. No. 228,231

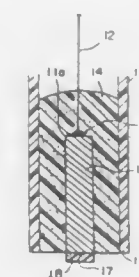
Claims priority, application Japan, Feb. 4, 1986, 61-22509

The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> G01N 27/31

U.S. Cl. 204—415

8 Claims



1. An oxygen sensor comprising: an electrically conductive substrate whose potentiometric response is substantially unaffected by the presence of oxygen gas; and an electrolytic oxidative polymeric membrane adherently and substantially uniformly coating a surface of said electrically conductive substrate, said electrolytic oxidative polymeric membrane being formed by electrolytic polymerization and comprising at least one substance selected from porphyrin compounds and metal complexes thereof.

4,957,616

**TUBE SHEET WITH REFERENCE ELECTRODE**

Frank Ansaldi, Lincoln, R.I., and Paul Fulford, Jupiter, Fla., assignors to Electrochemical Devices, Inc., Albion, R.I.

Continuation of Ser. No. 277,490, Nov. 29, 1988, abandoned, which is a continuation of Ser. No. 30,876, Mar. 26, 1987, abandoned. This application Dec. 12, 1989, Ser. No. 453,131

Int. Cl.<sup>3</sup> G01M 27/30; C23F 13/00; F28F 19/00

U.S. Cl. 204—435

23 Claims



1. A tube sheet for a shell and tube heat exchanger or condenser, comprising: a perforated sheet having a waterbox side and a shell side; a plurality of tubes each having an inside diameter, wherein said tubes are inserted through the perforations in said perforated sheet and extend on the shell side of said perforated sheet; and a reference electrode apparatus adapted to be installed from the waterbox side of the perforated sheet for use on the waterbox side of said perforated sheet, including means plugging one of said plurality of tubes at the end of said tube located proximal to said perforated sheet, said plugging means including a sealing means positioned within said tube and having an outer diameter approxi-

mately equal to the inside diameter of said tube, and a connecting means extending from said tube, a reference electrode attached to said connecting means, said reference electrode including means for referencing electrical potential measurements, a housing surrounding said referencing means, and means securing said housing to said connecting means, and a lead wire extending from said reference electrode on the waterbox side of said perforated tube sheet.

4,957,617

**FLUID CATALYTIC CRACKING**

Hartley Owen, Belle Mead, N.J., and Paul H. Schipper, Wilmington, Del., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 202,843, Jun. 6, 1988, and a continuation-in-part of Ser. No. 271,803, Nov. 15, 1988, said Ser. No. 202,843, is a division of Ser. No. 903,314, Sep. 3, 1986, Pat. No. 4,749,470, said Ser. No. 271,803, is a division of Ser. No. 903,367, Sep. 3, 1986, Pat. No. 4,787,967. This application Jan. 5, 1989, Ser. No. 293,723

Int. Cl.<sup>3</sup> C10G 11/05

U.S. Cl. 208—113

22 Claims

1. In a fluid catalytic cracking process undertaken in a vertical riser which includes a feed inlet, a catalytic inlet, and product outlet, the improvement comprising increasing olefin products at the expense of coke production by introducing a cracking catalyst at the catalyst inlet, said cracking catalyst comprising at least one component selected from the group consisting of an amorphous porous silica-alumina and crystalline porous silicate exhibiting an X-ray diffraction pattern of a large pore zeolite;

introducing a lift medium at said catalyst inlet to effect a catalyst suspension with an initial vertical velocity ranging from 20 ft./second to 50 ft./second wherein said lift medium is selected from the groups consisting of C<sub>1</sub>-C<sub>5</sub> paraffins, olefins hydrogen, and admixtures thereof; passing the catalyst suspension through the riser; creating a pressure drop within the riser downstream of said catalyst inlet to accelerate a feed to a second velocity up through the riser which exceeds said initial vertical; passing said feed, which is a hydrocarbon petroleum fraction having an initial boiling point of at least 400° F. a 50% of said feed having a boiling point of at least 500° F. and said feed having end point of at least 600° F., at said second velocity through the riser whereby said feed is contacted with said catalyst for less than one second at a temperature of at least about 1100° F., and product gasoline is separated from said catalyst suspension within one second of said contact.

4,957,618

**VERTICAL SCREENING DEVICE**

Ingmar Andren, Lindsberg, Sweden, assignor to Lindema Kommanditbolag, Lindsberg, Sweden

PCT No. PCT/SE87/00466, § 371 Date Apr. 7, 1989, § 102(e) Date Apr. 7, 1989, PCT Pub. No. WO88/03061, PCT Pub. Date May 5, 1988

PCT Filed Oct. 14, 1987, Ser. No. 347,046

Claims priority, application Sweden, Oct. 22, 1986, 8604513

Int. Cl.<sup>3</sup> B07B 1/22

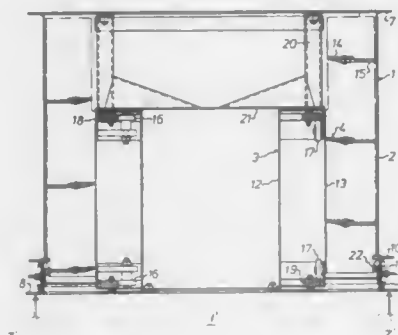
U.S. Cl. 209—303

10 Claims

1. A vertical screening device, comprising a vertical cylinder screen, a vertical feed screw received in said cylinder screen and cooperating with an interior surface thereof, bearing means received in said feed screw for supporting said feed screw, said bearing means being rotatable on a vertical axis of



said cylinder screen and fixedly connected to said cylinder screen, and connecting means including a link connecting said



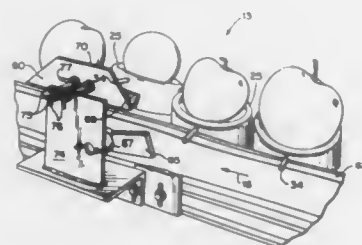
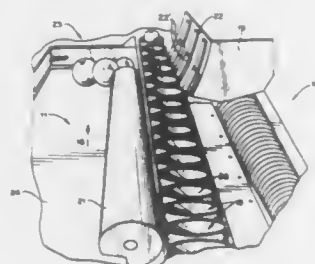
feed screw to a fixed point outside said cylinder screen for holding said feed screw stationary.

**4,957,619**  
**SELF-SINGULATING WEIGHT SIZER**  
Harry C. Powell, Jr., Faber, Va., assignor to Powell Machinery, Inc., Faber, Va.

Filed Sep. 23, 1988, Ser. No. 248,199  
Int. Cl.<sup>5</sup> B07C 5/02, 5/16

U.S. Cl. 209—539

22 Claims



1. An article sorter for sorting discrete bruisable articles, comprising:  
a continuous conveying chain elongated in a dimension of elongation;  
a plurality of discrete article supporting elements connected to said chain for linear movement therewith and pivotal movement with respect thereto;  
a plurality of stations for said continuous conveying chain and article supporting elements including: (a) a self-singulating section in which the articles are singulated onto the supporting elements, (b) an article property determining section through which the articles are carried by said supporting elements and properties thereof sensed, and (c) a discharge section in which the articles are selectively discharged at a plurality of spaced distinct locations de-

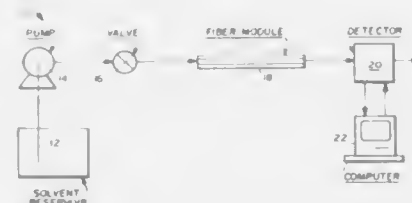
pending upon the properties thereof sensed in said article property determining section; and  
wherein said section (a) comprises a feed conveyor disposed at an angle with respect to said dimension of elongation and on one side of said article supporting elements, and a cushioning backstop disposed on the opposite side of said supporting elements from said feed conveyor, and an overflow region for allowing articles not singulated onto said supporting elements to move off of said elements and said chain and to be ultimately returned to said feed conveyor.

**4,957,620**  
**LIQUID CHROMATOGRAPHY USING MICROPOROUS HOLLOW FIBERS**  
Edward L. Cussler, Edina, Minn., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed Nov. 15, 1988, Ser. No. 271,449  
Int. Cl.<sup>5</sup> B01D 15/08

U.S. Cl. 210—635

17 Claims



1. A liquid chromatography method for separating at least solute species A and B comprising the steps of:

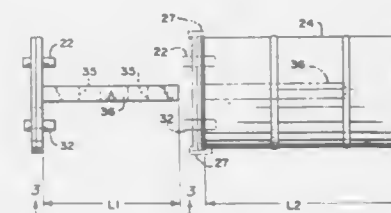
- immobilizing, within pores of a number of open celled, microporous hollow fibers having an average pore size of less than 5,000 Å, an inner diameter of from about 5 to about 1500 microns, a coefficient of variation in inner diameter of less than about 8%, and an average ratio of maximum pore density to minimum pore density around the circumference of the fiber of less than about 3:1, a solute-absorbing phase having a greater affinity for absorbing/desorbing solute species A as compared to solute species B;
- passing a carrier liquid stream through the lumens of said microporous hollow fibers; and then
- injecting a sample mixture comprised of solute species A and B into said carrier liquid stream so that a liquid mixture comprised of said carrier liquid and said solute species A and B passes through the lumens of said hollow fibers;
- allowing said solute species A to be absorbed preferentially by said immobilized solute-absorbing phase so that a first mixture comprised essentially of the carrier liquid and solute species B is initially discharged from said hollow fiber lumens; and then
- allowing the solute species A to desorb into said carrier liquid stream so as to form a second mixture comprised essentially of the carrier liquid and the solute species A which is discharged from said hollow fiber lumens subsequent to the discharge of said first mixture comprised essentially of the carrier liquid and solute species B, whereby solute species A and B are separated from said sample mixture thereof.

**4,957,621**  
**BAFFLE PLATE FOR WATER PURIFICATION RESERVOIR**  
Pete Rohloff, Riverton, Kans., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Jul. 21, 1989, Ser. No. 383,002  
Int. Cl.<sup>5</sup> B01D 21/02

U.S. Cl. 210—171

14 Claims



1. A liquid purifier reservoir for separating impurities from a liquid comprising:

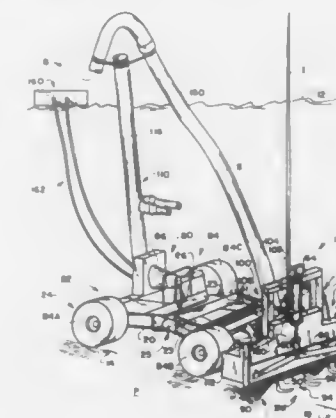
- a removable substantially vertical planar endwall attached to the reservoir;
- a substantially vertical baffle plate attached to and extending perpendicular to said removable endwall into an interior portion of said reservoir, dividing said reservoir into first and second compartments;
- input means, mounted on a first face of the endwall, for feeding the liquid into said first compartment;
- output means, mounted on said first face of the endwall, for draining the liquid from said second compartment; and
- means for providing a plurality of paths for the liquid to travel between the two compartments, wherein the liquid travels in a first direction while in said first compartment, and a second direction while in said second compartment, said first and second directions being substantially opposite to each other.

**4,957,622**  
**APPARATUS FOR REMOVING SEDIMENT FROM PONDS**  
Ken Mims, Lake Monroe, Fla., assignor to Uddo-Mims International, Inc., Edgewater, Fla.

Filed Jul. 18, 1988, Ser. No. 220,592  
Int. Cl.<sup>5</sup> B01D 21/00

U.S. Cl. 210—170

11 Claims



1. An apparatus for removing a layer of sediment which has settled on the bottom of a pond; comprising:  
a frame being submersible in the pond;  
motive means for moving said frame along the bottom of the pond;  
a hydrostatic chamber being positioned on said frame; said hydrostatic chamber having an aperture formed therein

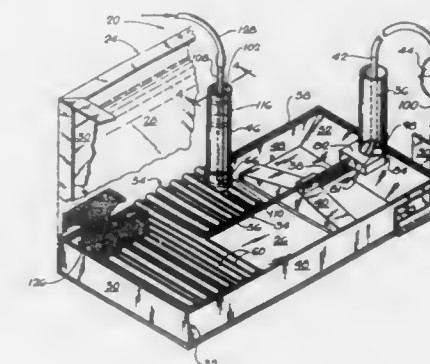
for receiving a mixture of sediment and water from the bottom of the pond;  
vent means for venting said hydrostatic chamber to atmospheric pressure;  
pump means in fluid communication with said hydrostatic chamber to create a reduced pressure in said hydrostatic chamber relative to pressure exterior to said hydrostatic chamber for drawing the sediment and water mixture through said aperture into said hydrostatic chamber to form a slurry therein and for removing said slurry from said hydrostatic chamber for disposal away from said pond;  
said aperture in said hydrostatic chamber being substantially rectangular in shape with a long side of said rectangular shape being substantially parallel to the bottom of the pond; and  
gate means extending parallel to and proximate said pond bottom for controlling the opening size of said aperture in said hydrostatic chamber and for regulating the ratio of sediment to water removed from the bottom of the pond.

**4,957,623**  
**AQUARIUM CLEANING SYSTEM USING MOVABLE UNDERGRAVEL SUCTION HEAD**  
Joseph C. Henzlik, 730 Judson Ave. #16, Highland Park, Ill. 60035

Filed Feb. 2, 1990, Ser. No. 474,515  
Int. Cl.<sup>5</sup> B01D 27/00, 29/01; A01K 63/04

U.S. Cl. 210—169

24 Claims



1. An aquarium cleaning system comprising:  
a tank having a bottom wall and side and end walls;  
an apertured floor plate disposed above the bottom wall and defining a space between the floor plate and the bottom wall of the tank;  
first guide means extending upwardly from the floor plate; a suction head located in said space and being movable therein; and  
a siphon tube extending downwardly in guided relation with the guide means and having the inner end thereof connected to and movable with the suction head.

**4,957,624**  
**METHOD OF AND ARRANGEMENT FOR PURIFYING CONTAMINATED WATER**  
Anthony Peranio, Nyack, N.Y., assignor to Purewater Sciences International, Inc., New York, N.Y.

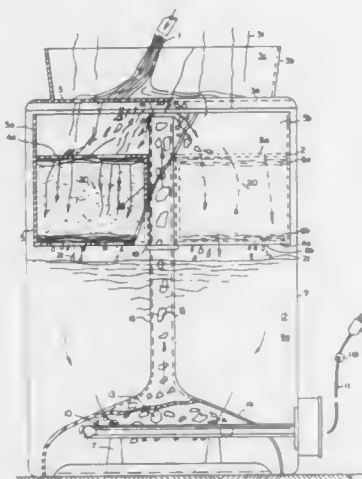
Continuation-in-part of Ser. No. 872,162, Jun. 9, 1986, abandoned. This application May 27, 1987, Ser. No. 54,571  
Int. Cl.<sup>5</sup> C02F 1/02

U.S. Cl. 210—129

34 Claims

1. An arrangement for purifying water, comprising receiving means for receiving water;

said receiving means including means for introducing water to be purified into said receiving means;  
 said receiving means further including holding means for accumulating and holding a body of water therein;  
 filtering means provided in said receiving means for filtering the water introduced into said receiving means prior to being introduced into said holding means to obtain partially-purified water;  
 said filtering means being comprised of means for adsorbing and absorbing undesirable matter from the heated water passing through said filtering means;  
 means for heating at least some of the water in said holding means to a temperature to and about the boiling point thereof;



means in said receiving means for returning the partially purified heated water to said filtering means, which, in turn, filters and returns the water passing through said filtering means to said holding means to begin a new heating and filtering cycle with attendant further purification of the partially purified water, said heating means being maintained activated until the degree of contamination of such water is dropped below a predetermined level;

said receiving means including venting means for enabling volatile matter in the water passing out of the returning means to freely pass through said venting means and into the atmosphere.

4,957,625

# CERAMIC FILTER MODULES IN SERIES WITH PISTON BACKWASH

Yoshihisa Katoh, Toyota; Takashi Ogawa; Mitsumasa Hasegawa, both of Kariya; Masashi Fujimoto, Tokoake, and Masaaki Hayashi, Anjo, all of Japan, assignors to Toshiba Ceramics Co. Ltd., Tokyo, Japan

Continuation of Ser. No. 87,290, Aug. 20, 1987, abandoned. This application Apr. 27, 1989, Ser. No. 344,498

Claims priority, application Japan, Aug. 20, 1986, 61-194595; Mar. 6, 1987, 62-51365

Int. Cl.<sup>5</sup> B01D 29/66

U.S. Cl. 210-119

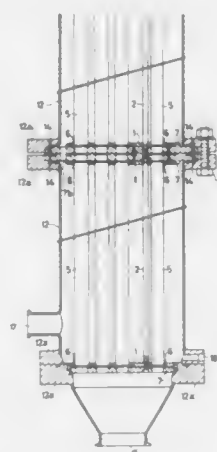
5 Claims

1. An apparatus for filtering a liquid, comprising:
  - a container for storing a liquid;
  - a filter casing containing two modules joined in series, each of the modules comprising a plural number of pipe-like ceramic filters arranged in parallel and having plural passages therein, plural end plates equal in number to the number of ceramic filters and having plural through-holes into which the ceramic filters are inserted, plural supports placed between the end plates for supporting the end plates in a fixed manner, and packings placed between the

end plates and the ceramic filters in clearances defined between the end plates and the ceramic filters so that the packings cover portions of end surfaces of the ceramic filters and provide a seal between the through-holes of the end plates and the ceramic filters, the through-holes having inner diameters greater than corresponding outer diameters of the ceramic filters;

means for connecting the container with the filter casing so that the liquid stored in the container can be supplied into the filter casing;

plural packing pressure plates for fixing the casing to the end



plates, the pressure plates having plural holes at positions corresponding to the through-holes to the end plates and applying a pushing force onto the packings so as to substantially completely seal the filters, the pressure plates having holes communicating with outer sides of the filters; a back washing device attached to the filter casing which includes a hydraulic pressure device having a piston movable in a cylinder so that the filter can be back washed with filtrate moved by the piston when the hydraulic pressure device is actuated, and the piston being designed to move back to its original position after the back washing.

4,957,626

# METHOD AND APPARATUS FOR TREATING WATER IN BEVERAGE AND ICE MACHINES

Clifford L. Ashbrook, Splcewood, and Douglas B. Scarborough, San Antonio, both of Tex., assignors to Quinetics Corporation, San Antonio, Tex.

Continuation-in-part of Ser. No. 726,429, Apr. 24, 1985, Pat. No. 4,645,606, and a continuation-in-part of Ser. No. 18,049, Feb. 24, 1987, Pat. No. 4,764,283. This application Aug. 25, 1987, Ser. No. 89,071

The portion of the term of this patent subsequent to Feb. 24, 2004, has been disclaimed.

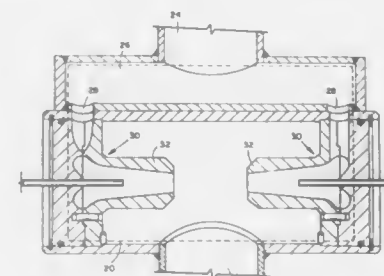
Int. Cl.<sup>5</sup> B01D 1/48

U.S. Cl. 210-695

3 Claims

1. A method for treating water in beverage and ice machines comprising the steps of:
  - pumping the water through a first vortex nozzle;
  - simultaneously pumping water through a second vortex nozzle;
  - agitating the water by spraying the water exiting the first

vortex nozzle against the water exiting the second vortex nozzle;



simultaneously magnetically affecting the water by a magnetic affecting means mounted in close proximity to the nozzles.

4,957,627

# PROCESS FOR LIQUID-SOLID CONTACT

Johannes M. H. Fortuin, Sittard; Johannes C. Göebel, Hoofddorp, and Antonius J. F. Simons, Geleen, all of Netherlands, assignors to Stamicarbon B. V., Geleen, Netherlands

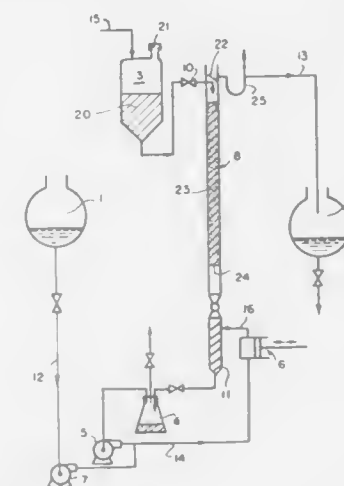
Continuation of Ser. No. 101,526, Sep. 28, 1987, abandoned. This application Apr. 7, 1989, Ser. No. 334,558

Claims priority, application Netherlands, Sep. 27, 1986, 8602447

Int. Cl.<sup>5</sup> B01D 15/02

U.S. Cl. 210-679

6 Claims



1. A process for contacting:
  - (1) a particulate solid phase, and
  - (2) a liquid phase
 in a column which comprises
  - providing at least a zone in said column filled with inert packing material, and
  - effecting countercurrent flow and contact between said solid phase and said liquid phase within said packed zone, wherein said solid phase and said liquid phase pass through said packing material, while
  - pulsating said liquid phase in said packed zone of said column to induce local turbulence therein,
  - whereby said solid phase and said liquid phase interact with each other within said zone.

4,957,628

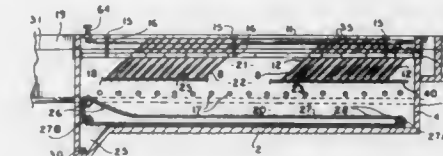
# APPARATUS FOR GRAVITY SEPARATION OF PARTICLES FROM LIQUID

Christopher R. Schulz, 46 Ancell St., Alexandria, Va. 22305  
 Filed May 19, 1989, Ser. No. 354,440

Int. Cl.<sup>5</sup> B01D 21/04

U.S. Cl. 210-519

12 Claims



1. An apparatus for sedimentation of particles from liquid comprising:
  - a basin including a pair of substantially parallel side walls, inlet and outlet means in said basin for respectively admitting and discharging liquid from said basin, said outlet means defining a top surface of liquid within said basin,
  - a plurality of substantially planar settler members having opposite ends and spanning said basin,
  - elongated support means having opposite ends and attached to said settler member ends,
  - mounting means on said basin including a top channel and bottom support member engageable with said support means opposite ends,
  - said mounting means including longitudinally displaceable means operable to vary the inclination of said support means and attached settler member ends, and
  - said longitudinally displaceable means including a roller assembly within said top channel adjacent each said settler member end.

4,957,629

# OBSTETRICAL FILTER AND TRAP

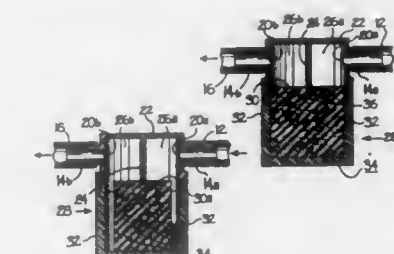
Lawrence M. Smith, and Emily M. Smith, both of P.O. Box 5877, Bend, Oreg. 97708

Filed Nov. 28, 1988, Ser. No. 277,007

Int. Cl.<sup>5</sup> B01D 35/01, 35/30

U.S. Cl. 210-443

11 Claims



1. A filter for obstetrical fluids and particulate matter, comprising:
  - a. an enclosure containing a first chamber and a second chamber;
  1. said first chamber having therein:
    - A. a solid partition having an edge, said partition forming first and second cavities in said first chamber;
    - I. said first cavity having an inlet thereinto;
    - II. said second cavity having an outlet therefrom;
  2. said second chamber containing a filter means having a surface thereon; and
  3. said edge of said partition pressing against said surface of said filter means.

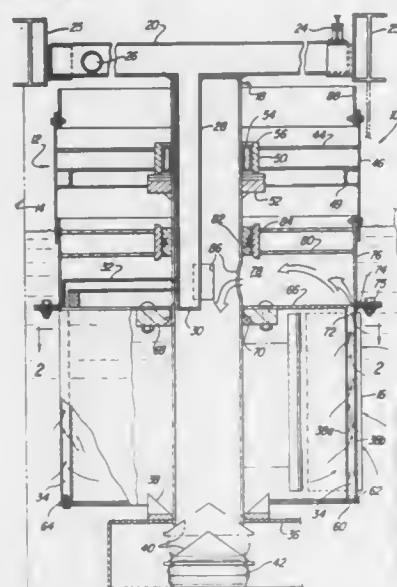


# 4,957,630 DRUM FILTER WITH DIVERGENT HOLE PERFORATED FILTER MEDIA

Jack R. Bratten, 5970 St. James Dr., West Bloomfield, Mich. 48033

Filed Dec. 27, 1988, Ser. No. 289,730  
Int. Cl.<sup>5</sup> B01D 33/04

U.S. Cl. 210—358

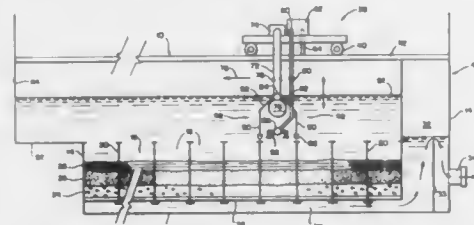


1. A drum filter comprising:  
a tank adapted to receive liquid to be filtered;  
a drum member having an outer surface disposed in said tank, said drum member having attached to a portion of its outer surface a porous filter media layer through which is drawn liquid to be filtered from said tank by flow in one direction through said filter media layer;  
means for collecting said flow of liquid after passing through said filter media layer;  
said filter media layer comprised of a thin layer of perforated metal having a pattern of substantially round holes increasing in diameter through the thickness of said layer, to diverge in said direction of flow through said filter media layer, whereby clogging of said holes tends to be cleared by said diverging shape of said holes.

4,957,631  
TRAVELING BRIDGE FILTER WITH SURFACE WASH  
Julian R. Pauwels, Thomasville, Ga., assignor to Davis Water and Waste Industries, Inc., Thomasville, Ga.  
Filed Jan. 26, 1989, Ser. No. 301,715  
Int. Cl.<sup>5</sup> B01D 24/22

U.S. Cl. 210—264

18 Claims



1. In a traveling bridge filter cleaning system including a liquid filtration tank divided into a plurality of adjacent filter cells, each of said cells containing filter media, a traveling bridge carriage located above said tank and movable along said tank, said carriage mounting a surface wash manifold and a backwash manifold within a suspended hood assembly adapted

to sealingly engage each of said cells, said surface wash manifold including a plurality of nozzles extending therefrom, said surface wash manifold and said plurality of nozzles being substantially fixed relative to said hood assembly.

# 4,957,632 VALVE CLOSING DEVICE FOR A FILTER VESSEL IN A BEVERAGE MAKER

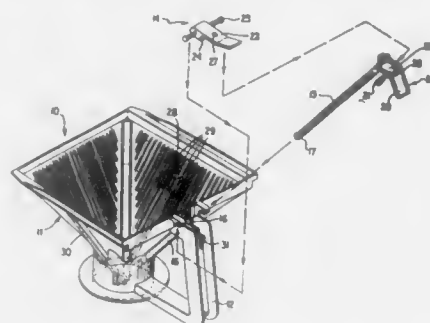
Jürgen Böckstiegel; Dieter Brindöpke, both of Minden, and Peter Ullrich, Rahden, all of Fed. Rep. of Germany, assignors to Melitta-Werke Bentz & Sohn, Minden, Fed. Rep. of Germany

Filed Sep. 21, 1988, Ser. No. 247,272  
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1987, 8712709[U]

Int. Cl.<sup>5</sup> B01D 29/085

U.S. Cl. 210—248

10 Claims



1. In a filter vessel for making coffee or tea, including:  
a vessel body adapted to accommodate liquid therein;  
means defining an outlet opening in a bottom zone of said vessel body;  
a carrying handle mounted on the vessel body;  
an assembly for selectively opening or closing said outlet opening; said assembly including  
a closing rod extending alongside said vessel body and being longitudinally movably supported thereby between first and second positions;  
a valve means mounted on said closing rod for cooperating with said outlet opening; said valve means maintaining said outlet opening open in said first position of said closing rod and said valve means maintaining said outlet opening closed in said second position of said closing rod; and

operating means arranged in an upper zone of said carrying handle and coupled to said closing rod for manually moving said closing rod into one of said position;

the improvement comprising  
(a) spring means for urging said closing rod into said first position;  
(b) an operating lever pivotally supported by said vessel body in said upper zone of said carrying handle and having a depressed position and a raised position; said operating lever forming part of said operating means;  
(c) an arm formed on said closing rod and defining an engagement face; said arm extending below said operating lever and having a free terminal length portion adjoining said engagement face;  
(d) a clamping cam carried by said operating lever; said clamping cam being in contact with said engagement face and displacing said engagement face and said closing rod towards said second position upon manual movement of said operating lever into said depressed position;  
(e) an indicator pin affixed to said free terminal length portion and oriented towards said operating lever; and  
(f) a throughgoing aperture provided in said operating lever and being in alignment with said indicator pin; said indica-

tor pin projecting into said throughgoing aperture in said depressed position of said operating lever.

# 4,957,633 FLOATATION CLARIFYING AND FLOCCULATING/PURIFICATION OF LIQUID

Oiva Sautarinen, Rysäkuja 5, 02260 Espoo, Finland

Filed Feb. 7, 1989, Ser. No. 307,732

Int. Cl.<sup>5</sup> B03D 1/00; C02F 1/24

U.S. Cl. 210—705

5 Claims



1. Method for purifying liquid of solid and dissolved impurities, comprising the steps of  
forming on top of the liquid in a basin, a sludge bed of particles containing impurities,  
conducting the thus-formed sludge bed on top of the liquid out of the basin,  
adding at least one flocculating chemical into said basin whereby said chemical becomes mixed with the remaining liquid and forms particles with impurities not removed with the sludge bed, in a lower part of the same basin, and thus flocculating said remaining liquid, and  
conducting said thus-flocculated remaining liquid out from said basin,

whereby said steps of forming the sludge bed, and flocculating the remaining liquid are all carried out in the same basin,

wherein said thus-flocculated remaining liquid is conducted out of said basin through a flow aperture situated in the lower part thereof and

comprising the additional step of  
conducting said thus-flocculated remaining liquid to additional separation treatment after removal from said basin and further comprising the additional step of introducing a water/air mixture through a distribution pipe into the liquid combining the solid and dissolved impurities as said liquid rises in an ascending channel into said basin,

whereby the air contained in said water/air mixture is distributed substantially across an entire width of said basin in the form of minute air bubbles which adhere to the impurity particles in the liquid to which liquid an initial flocculating chemical has been added to form particles of impurities and carry the same to the top surface of the liquid, thereby enhancing said formation of the sludge bed on top of the liquid and

comprising the additional step of  
enhancing said flocculating of the liquid in said basin and providing uniform flow of said liquid in the entire basin area by employing apparatus for enhancing said flocculating and providing uniform flow within said basin and wherein said at least one flocculating chemical is added into said liquid through a chemical supply pipe situated over substantially an entire width of said basin.

4,957,634  
HEAVY METAL RECOVERY PROCESS  
Joseph S. Bowers, Jr., Apt. 1309, 3310 Washington Ave., Pascagoula, Miss.

Filed Oct. 6, 1989, Ser. No. 417,883

Int. Cl.<sup>5</sup> C02F 11/14

U.S. Cl. 210—711

25 Claims

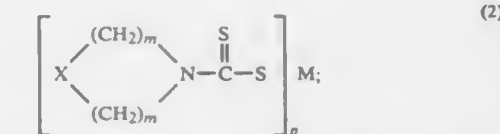
1. A process for the simultaneous recovery of heavy metal

sulfides and alkali/alkaline earth salts of N-substituted dithiocarbamic acid, comprising the step of:

contacting, in the presence of an aqueous solvent, an alkali/alkaline earth metal sulfide selected from the group consisting of sodium sulfide, potassium sulfide, magnesium sulfide and calcium sulfide, with heavy metal salts of an N-substituted dithiocarbamic acid represented by a formula selected from the group consisting of the following formulas (1) and (2):



and



wherein M represents chromium, manganese, iron, cobalt, nickel, copper, zinc, palladium, silver, cadmium, tin, platinum, gold, mercury, lead, barium, radium or uranium; R represents any alkyl, cycloalkyl, alkylaryl, or aryl; R' represents any alkyl, cycloalkyl, alkylaryl, aryl or hydrogen, and wherein R and R' may be alike or different at the same time; X represents O, N, S, N—R'' or (CH<sub>2</sub>)<sub>n</sub>; R'' represents alkyl, cycloalkyl, alkylaryl, aryl or hydrogen; m is an integer from 1 to 2; n is an integer from 1 to 2; and, p is an integer from 1 to 3.

4,957,635  
BAG FILTER  
John Dragasevich, Willowdale, Canada, assignor to GAF Chemicals Corporation, Wayne, N.J.  
Continuation-in-part of Ser. No. 157,387, Feb. 18, 1988, Pat. No. 4,842,747. This application Feb. 15, 1989, Ser. No. 311,226  
The portion of the term of this patent subsequent to Jan. 27, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> B01D 37/00

U.S. Cl. 210—767

2 Claims

1. A gravity-aided downflow filter device for a liquid containing suspended flake like particles which comprises a body member having an inner wall defining an axial, vertical, main flow passage, an upper inlet conduit and a lower exit conduit connected to the main flow passage for the liquid being treated, an annular straining filter sealingly mounted within said main flow passage so as to define a chamber between the outer surface of said straining filter and said inner wall of said body member, agitator means mounted within said main flow passage and to be spaced from said straining filter, wherein said agitator means includes an adjustable angle blade means with a drive shaft, said drive shaft being coaxial with said straining filter along a shaft axis, said drive shaft having a plurality of peripherally spaced radial arms cantilevered therefrom, each said radial arm having an elongate blade extending in an axial direction, each said blade having a pitch angle for sweeping a wave of liquid along an inner face of the straining filter.

4,957,636

## DEVICE FOR SKIMMING OIL FROM WATER

Donald L. Wilson, Croesville, Ill., and Jerry C. Trippe, Fairfax Station, Va., assignors to General Technology Applications, Inc., Manassas, Va.

Filed Sep. 27, 1989, Ser. No. 413,084  
Int. Cl.<sup>5</sup> E02B 15/04

U.S. Cl. 210—242.3

12 Claims

1. A device for removing oil from the surface of water comprising:

a frame of generally rectangular shape having a front, a back, and two sides;

two drums of equal diameter spaced apart from one another along a common axis and arranged to rotate in the same direction, said axis parallel to the front of said frame;

a collection trough forming the front of said frame and extending the full length of both said drums;

a reservoir trough extending parallel to the axis of said drums but spaced apart from the drum surfaces, said reservoir trough forming the back of said frame, said drums and said reservoir trough proportioned and arranged to provide all of the buoyancy necessary to float said device on water in an oil-removing attitude;

blade means bearing against the surface of both said drums and arranged to direct oil from said drum surfaces into said collection trough;

motive means arranged to drive said drums in a direction whereby oil floating on water is drawn backwardly beneath the drums;

channel means extending between said collection trough and said reservoir trough;

means to remove fluid from said reservoir trough.

valve, and filter means disposed immediately above said one-way valve means within said fluid flow;

lifting said container within said barrel such that said valve means closes, thereby creating a vacuum within said barrel;

using said created vacuum within said barrel to draw in said blood specimen from a blood source;

removing said needle from said membrane;

centrifuging said barrel such that said container blood specimen separates into lighter and heavier fluid components, said lighter fluid components being located closer to said container than said heavier components;

lowering said container into said lighter fluid components such that said valve means opens and said lighter fluid components flow past said filter means into said container; and

lifting said container such that said valve means closes, thereby isolating said lighter components from said heavier components.

4,957,638

## METHOD FOR SEPARATING THE CELLULAR COMPONENTS OF BLOOD SAMPLES

Ward C. Smith, Mahwah, N.J., assignor to Becton Dickinson and Company, Franklin Lakes, N.J.

Continuation of Ser. No. 112,721, Oct. 23, 1987, Pat. No.

4,844,818. This application May 9, 1989, Ser. No. 349,600

The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B01D 21/26

U.S. Cl. 210—782

36 Claims



21. A method for separating lymphocytes and monocytes from granulocytes in a sample of unseparated whole blood wherein an apparent shift in the buoyant density of the granulocytes is inhibited and any loss in the buoyant density of the granulocytes is restored, said method comprising the steps of:

(a) introducing a water insoluble, thixotropic gel-like substance into a vessel having an open end and a closed end, said thixotropic gel-like substance being positioned adjacent said closed end;

(b) introducing a chemical reagent that is adapted to alter the osmolarity of said blood resulting in a change in cell diameters and cell densities of said granulocytes into said vessel;

(c) providing within said vessel, means for preventing the absorption of water by said thixotropic gel-like substance from at least one of said chemical reagent and said sample of unseparated whole blood so as to substantially eliminate the influence of water absorption on the cell separation performance characteristics of said thixotropic gel-like substance;

(d) introducing said sample of unseparated whole blood into said vessel; and

(e) centrifuging said vessel at a force and for a sufficient length of time to cause said thixotropic gel-like substance



14. A method for separating and isolating the lighter components of a blood specimen from its heavier components comprising the steps of:

providing a device having a barrel with an upper opening and means for selectively introducing said blood specimen, using a needle through a lower end of said barrel, said introducing means comprising a piercable membrane, a container acting as a fluid plunger slidable within said barrel between upper and lower positions, said container including a lower opening and an upper opening, one-way valve means disposed on said lower opening of said container between said container and said barrel for controlling fluid flow therebetween, said valve means operating in response to the direction of container movement within said barrel wherein upward container movement opens said valve and downward container movement closes said

to flow in order to form a barrier between said lymphocytes and monocytes, and the granulocytes.

4,957,639

## METHOD FOR ENHANCING RECOVERY OF OIL AND COMPOSITIONS RELATED THERETO

J. Thomas Fox, Beaumont, Tex., assignor to Emox High Technology, Inc., Winnie, Tex.

Filed Jun. 1, 1987, Ser. No. 55,840

Int. Cl.<sup>5</sup> E21B 43/22

U.S. Cl. 252—8.554

5 Claims

1. A method for enhancing the recovery of oil from subterranean formations comprising:

(a) reacting in alkaline aqueous solution 2 to 30%, by weight, a group IA and/or IIA metal oxides or hydroxides with 2 to 30%, by weight, a silicon metal and 1 to 96%, by weight, of at least one nitrogenous organic compound selected from the group consisting of diamines, triamines, di-, tri-, tetra- amine bottoms; and mixtures thereof;

(b) introducing said solution of (a) into an oil-bearing geologic formation; and

(c) recovering said oil.

4,957,640

## CORROSION PREVENTION WITH COMPOSITIONS PREPARED FROM ORGANIC FATTY AMINES AND NITROGEN-CONTAINING AROMATIC HETEROCYCLIC COMPOUNDS

Duane S. Treybig, and Robert G. Martinez, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 168,296, Mar. 15, 1988, abandoned, which is a division of Ser. No. 787,819, Oct. 15, 1985, Pat. No. 4,761,473. This application Mar. 3, 1989, Ser. No.

318,772

Int. Cl.<sup>5</sup> E21B 41/02; C23F 11/00

U.S. Cl. 252—8.555

9 Claims

1. A method for preventing the corrosion of a metal composition in contact with a down hole well fluid, which method comprises contacting the surface of said metal composition with an effective amount of, as a corrosion inhibitor, a composition which comprises the reaction product of the components selected from the group consisting of

(A) at least one pyrazine, pyrimidine, pyridazine, quinoline, isoquinoline, cinnoline, naphthyridine, or pyridine compound, which compound(s) is (are) free of unsaturated hydrocarbon substituents, having one or more rings, at least one nitrogen atom and containing at least one group selected from

(1) carboxylic acid,  
(2) carboxylic acid ester,  
(3) acyclic carboxylic acid anhydride,  
(4) carboxylic acid halide or  
(5) combination thereof; with

(B) an organic amine having from about 1 to about 72 carbon atoms; and

(C) optionally reacted or neutralized with a mineral acid or an organic acid having from about 1 to about 36 carbon atoms; and

wherein components (A) and (B) are present in quantities which provide a ratio of —CO— groups to —NH<sub>2</sub> and/or —NH— groups of from about 0.1:1 to about 1.2:1 and component (C) is present in a quantity which provides a ratio of mineral acid or carboxylic acid to reactive amine hydrogen of the product formed from the reaction of components (A) and (B) of from about zero:1 to about 2:1.

4,957,641

## USE OF ALKOXYHYDROXY FATTY ACIDS AS CORROSION INHIBITORS IN OILS AND OIL-CONTAINING EMULSIONS

Gerhard Borggreffe, Duesseldorf; Alfred Meffert, Monheim; Bert Gruber, Duesseldorf, and Karl-Heinz Schmid, Mettmann, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Oct. 15, 1986, Ser. No. 919,098

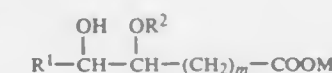
Claims priority, application Fed. Rep. of Germany, Nov. 13, 1985, 3540246

Int. Cl.<sup>5</sup> C10M 129/04, 129/26

U.S. Cl. 252—34

10 Claims

1. A process for corrosion inhibition of a metal comprising contacting said metal with an oil or oil containing emulsion containing an effective amount to inhibit corrosion of an alkoxyhydroxy fatty acid or a salt thereof having the general formula (I)



wherein

R<sup>1</sup> represents a straight chain alkyl radical or a straight chain alkenyl radical having from 6 to 8 carbon atoms,R<sup>2</sup> represents a straight chain or branched chain alkyl radical having from 1 to 18 carbon atoms, or a straight chain or branched chain alkenyl radical having from 2 to 18 carbon atoms,

M represents hydrogen or an organic ammonium radical having one or more alkyl radicals or hydroxyalkyl radicals attached to the nitrogen atom, and

m represents an integer having a value of from 3 to 13, in an amount of from about 0.01 to about 10% by weight, based on the weight of said oil or said oil-containing emulsion.

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## MAGNESIUM PHENATE DETERGENTS

John A. Cleverley, Didcot; John F. Marsh, Abingdon; Philip Skinner, Grove, and Gaynor M. Miasik, Cwmndare, all of United Kingdom, assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Dec. 27, 1988, Ser. No. 290,024

Claims priority, application United Kingdom, Dec. 29, 1987, 8730220

Int. Cl.<sup>5</sup> C10M 129/10

U.S. Cl. 252—42.7

13 Claims

1. A process for preparing a non-overbased magnesium phenate which comprises reacting a reaction mixture consisting essentially of (1) a magnesium compound (2) a phenol, a methylene bis-phenol or a sulphurised phenol, (3) an organic solvent containing one or more alcoholic hydroxyl groups, (4) a promoter selected from a ketone, diketone, and aldehyde and (5) optionally a diluent oil, said reaction mixture containing less than 0.2 wt. % of inorganic halide.

4,957,643

## LUBRICANT COMPOSITIONS

William Y. Lam, Ballwin, Mo., assignor to Ethyl Petroleum Additives, Inc., St. Louis, Mo.

Division of Ser. No. 196,507, May 20, 1988, Pat. No. 4,885,365. This application Sep. 29, 1989, Ser. No. 415,093

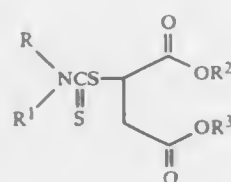
Int. Cl.<sup>5</sup> C10M 135/18

U.S. Cl. 252—47.5

7 Claims

1. A lubricating composition containing a major amount of lubricating oil and a minor antiwear-antioxidant amount of an additive compound having the general formula:





wherein:

- R is an organic radical selected from an aryl group selected from a benzene or a naphthalene group or an aralkyl group, wherein the aryl portion is selected from a benzene or a naphthalene group, in which the aryl or aralkyl groups contain up to 15 carbon atoms;
- R<sup>1</sup> is hydrogen or an organic radical selected from an alkyl group, an alkenyl group, an aryl group selected from a benzene or a naphthalene group or an aralkyl group, wherein the aryl portion is selected from a benzene or a naphthalene group, in which the alkyl or alkenyl groups contain up to 32 carbon atoms and the aryl or aralkyl groups contain up to 15 carbon atoms; or
- R and R<sup>1</sup> together with the nitrogen atom to which they are attached form a heterocyclic moiety selected from the group consisting of piperidine, morpholine and piperazine; and
- R<sup>2</sup> and R<sup>3</sup> are the same or different alkyl groups containing from 1 to 32 carbon atoms each.

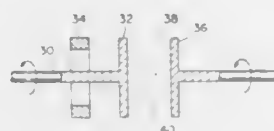
#### 4,957,644 MAGNETICALLY CONTROLLABLE COUPLINGS CONTAINING FERROFLUIDS

John T. Price, 17 High Field Ln., Madison, Conn. 06443, and Jurgen M. Kruse, 129 Florence Rd., Branford, Conn. 06405  
Continuation of Ser. No. 188,694, May 2, 1988, Pat. No. 4,849,120, which is a continuation of Ser. No. 862,765, May 13, 1986, abandoned. This application Jun. 27, 1989, Ser. No. 372,294

The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> C04B 35/00

U.S. Cl. 252—62.52

17 Claims



1. A magnetic flux transmitting ferrofluid comprising a stable suspension of magnetizable particles having a size of at least one micron, a carrier fluid, and a complexing agent, wherein the complexing agent comprises a chelating agent that forms a multiple coordinate bond with the magnetizable particles which are maintained in suspension within the carrier fluid such that the ferrofluid transmits a substantial magnetic flux without substantial separation of the particles from the carrier fluid.

#### 4,957,645 OIL SOLUBLE DISPERSANT ADDITIVES USEFUL IN OLEAGINOUS COMPOSITIONS

Jacob Emert, Brooklyn, N.Y., and Robert D. Lundberg, Bridgewater, N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Feb. 29, 1988, Ser. No. 161,904  
Int. Cl.<sup>5</sup> C10M 151/00

U.S. Cl. 252—47.5

40 Claims

1. An oil soluble composition useful as dispersant additive for lubricating oil composition comprising reaction product of:

- (1) at least one nitrogen containing adduct selected from the group consisting of oil soluble salts, amides, imides, or mixtures thereof of long chain hydrocarbyl substituted mono- or dicarboxylic acids or their anhydrides, said adduct containing at least one reactive amino group; and
  - (2) at least one polythioepoxide.
21. A lubricating oil composition comprising:
- (A) lubricating oil; and
  - (B) oil soluble dispersant comprising reaction product of
    - (1) at least one nitrogen containing adduct selected from the group consisting of oil soluble salts, amides, imides, or mixtures thereof of long chain hydrocarbyl substituted mono- or dicarboxylic acids or their anhydrides, said adduct containing at least one reactive amino group; and
    - (2) at least one polythioepoxide.

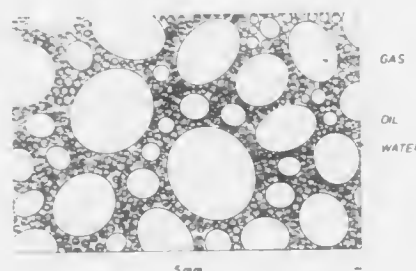
#### 4,957,646 STEAM FOAM SURFACTANTS ENRICHED IN ALPHA OLEFIN DISULFONATES FOR ENHANCED OIL RECOVERY

John K. Borchardt, and Hon C. Lau, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 26, 1987, Ser. No. 89,636  
Int. Cl.<sup>5</sup> E21B 43/22, 43/24

U.S. Cl. 252—8.554

9 Claims



1. A steam form-forming surfactant mixture, useful for recovering hydrocarbons from a reservoir, comprising: steam; olefin sulfonate surfactant, wherein the surfactant is derived from olefins with carbon numbers in the range of about 16 to 28, and wherein the surfactant contains at least about 25 % olefin disulfonate; and water.

#### 4,957,647 ACYLOXYNITROGEN PERACID PRECURSORS

Alfred G. Zielske, Pleasanton, Calif., assignor to The Clorox Company, Oakland, Calif.

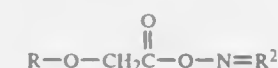
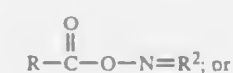
Continuation of Ser. No. 928,065, Nov. 6, 1986, abandoned. This application Apr. 14, 1989, Ser. No. 338,475

Int. Cl.<sup>5</sup> C09K 3/00

U.S. Cl. 252—186.38

9 Claims

1. A bleaching composition comprising: (a) a peracid precursor selected from either of:



wherein  $-\text{O}-\text{N}=\text{R}^2$  is a leaving group in which R<sup>2</sup> contains a carbon atom doubly bonded directly to N, and R is C<sub>5</sub> to C<sub>9</sub> alkyl; and

- (b) a bleach effective amount of a source of hydrogen peroxide.

#### 4,957,648 SPIN FIBER LUBRICANT COMPOSITIONS

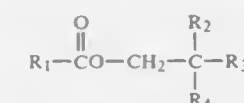
Richard Yodice, Mentor, and Gregory A. Lentz, Twinsburg, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Continuation of Ser. No. 82,769, Aug. 6, 1987, abandoned. This application Feb. 7, 1990, Ser. No. 478,060  
Int. Cl.<sup>5</sup> C10M 135/04

U.S. Cl. 252—8.6

37 Claims

1. A composition comprising (A) a liquid carrier and (B) at least one ester having the general formula



wherein R<sub>1</sub> is selected from the group consisting of alkyl groups containing from 10 to about 22 carbon atoms, alkenyl groups containing from 4 to about 50 carbon atoms, aryl groups, alkaryl groups and aralkyl groups, and R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> are straight chain hydrocarbyl groups, branched chain hydrocarbyl groups or mixtures thereof, wherein said composition has utility as a spin fiber lubricant.

#### 4,957,649 LUBRICATING OIL COMPOSITIONS AND CONCENTRATES

David E. Ripple, and William B. Chamberlin, III, both of Kirtland, Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Aug. 1, 1988, Ser. No. 226,765  
Int. Cl.<sup>5</sup> C01M 141/02

U.S. Cl. 252—32.7 E

42 Claims

1. A lubricating oil composition for internal combustion engines which comprises: (A) a major amount of oil of lubricating viscosity, and minor amounts of (B) at least one carboxylic derivative composition produced by reacting (B-1) at least one substituted succinic acylating agent with (B-2) from one equivalent up to two moles, per equivalent of acylating agent, of at least one amine compound characterized by the presence within its structure of at least one HN< group wherein said substituted succinic acylating agents consist of substituent groups and succinic groups wherein the substituent groups are derived from polyalkene, said polyalkene being characterized by an Mn value of about 1300 to about 5000 and an Mw/Mn value of about 1.5 to about 4.5, said acylating agents being characterized by the presence within their structure of an average of at least 1.3 succinic groups for each equivalent weight of substituent groups, (C) at least one partial fatty acid ester of a polyhydric alcohol, and

(D) at least one metal salt of a dihydrocarbyl dithiophosphoric acid wherein

(D-1) the dithiophosphoric acid is prepared by reacting phosphorus pentasulfide with an alcohol mixture comprising at least 10 mole percent of isopropyl alcohol, secondary butyl alcohol, or a mixture of isopropyl and secondary butyl alcohols, and at least one primary aliphatic alcohol containing from about 3 to about 13 carbon atoms, and

(D-2) the metal is a Group II metal, aluminum, tin, iron, cobalt, lead, molybdenum, manganese, nickel or copper.

#### 4,957,650 LUBRICATING OIL COMPOSITION CONTAINING DUAL ADDITIVE COMBINATION FOR LOW TEMPERATURE VISCOSITY IMPROVEMENT

Albert Rossi, Warren; John P. Szykowski, Edison, both of N.J., and Robert D. Tack, Abingdon, United Kingdom, assignors to Exxon Chemical Patents Inc., Linden, N.J.

Division of Ser. No. 231,531, Aug. 10, 1988, Pat. No. 4,826,615, which is a continuation of Ser. No. 742,576, Jan. 7, 1985, abandoned. This application Feb. 3, 1989, Ser. No. 306,535

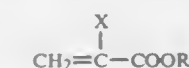
Int. Cl.<sup>5</sup> C10M 157/04

U.S. Cl. 252—51.5 A

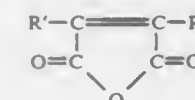
16 Claims

1. A lubricating oil composition comprising a major amount of a mineral oil of lubricating viscosity and a major amount of a dual additive combination comprising components (A) and (B) effective to lower the viscosity of said composition at temperatures between about -20° and -40° C. relative to the absence of either of Components (A) or (B), wherein:

- (1) Component A comprises at least one member selected from the group consisting of: (i) a polymeric product characterized by a number average molecular weight of from about 25,000 to about 70,000 and of the type derived from the random polymerization of a reaction mixture comprised of at least 90 mole % of at least one ester monomer represented by the structural formula:



wherein X can represent hydrogen or methyl, and R represents an aliphatic hydrocarbyl group containing from 1 to about 24 carbon atoms, and up to 10 mole % of at least one ethylenically unsaturated nitrogen containing monomer with the proviso that (a) said polymer product contains from about 0.2 to about 2% by weight nitrogen, based on the weight of the polymer; and (b) the average number of carbon atoms in the hydrocarbyl group constituting R within said polymeric product is from about 8 to about 18; and (ii) an esterified and subsequently amine treated polymeric product containing from about 0.1 to about 0.7% nitrogen by weight, based on the esterified polymeric product weight, derived from the esterification of an interpolymer of the type derived from the reaction of a monomer mixture consisting essentially of (a) styrene and (b) a carboxyl containing monomer anhydride represented by the structural formula:



wherein each R' independently can represent hydrogen or methyl; with the molar ratio of styrene to carboxyl containing monomer in said reaction mixture being from about 3:1 to about 1:1 and said unesterified inter-

polymer being characterized by a number average molecular weight of from about 25,000 to about 70,000; said esterification being characterized by that resulting from the reaction of at least 50 mole % but less than 100 mole % of the carboxyl groups present on said unesterified interpolymer with a reaction mixture comprised of at least one aliphatic monohydric alcohol containing from about 1 to about 24 carbon atoms, said amine treatment being conducted with at least one organic amine in a manner sufficient to form a salt or imide with unreacted carboxyl group of the carboxyl containing monomer; and

- (2) Component B comprises at least one member selected from the group consisting of:
- sorbitan monoesters, sorbitan diesters, sorbitan triesters, and mixtures thereof, which esters are derived from C<sub>10</sub> to C<sub>30</sub> straight chain saturated fatty acids;
  - polyoxymethylene or polyoxyethylene: esters, ethers or ether/alcohols, or ester/ether mixtures, derived from C<sub>10</sub> to C<sub>30</sub> straight chain saturated fatty acids, C<sub>10</sub> to C<sub>30</sub> saturated aliphatic alcohols, or mixtures of said fatty acids or alcohols, respectively; said polyoxymethylene segments thereof having a number average molecular weight of from about 80 to about 4,000, and said polyoxyethylene segments thereof having a number average molecular weight of from about 100 to about 5,000; and
  - polyoxymethylene or polyoxyethylene ethers of sorbitan monoesters, sorbitan diesters, sorbitan triesters or mixtures thereof, said sorbitan esters being derived from C<sub>10</sub> to C<sub>30</sub> straight chain saturated fatty acids, and said polyoxymethylene and polyoxyethylene segments thereof having number average molecular weights as described in connection with Component B-ii.

4,957,651  
MIXTURES OF PARTIAL FATTY ACID ESTERS OF  
POLYHYDRIC ALCOHOLS AND SULFURIZED  
COMPOSITIONS, AND USE AS LUBRICANT ADDITIVES  
James J. Schwind, Eastlake, Ohio, assignor to The Lubrizol  
Corporation, Wickliffe, Ohio

Filed Jan. 15, 1988, Ser. No. 144,361

Int. Cl.<sup>5</sup> C10M 135/02

U.S. Cl. 252—56 R

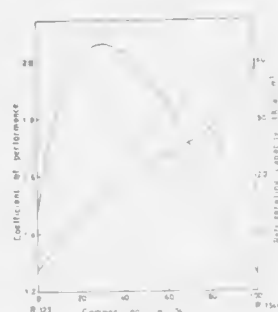
42 Claims

1. A composition comprising:
- a partial fatty acid ester of a polyhydric alcohol and
  - a cosulfurized mixture of 2 or more reactants selected from the group consisting of
- at least one fatty acid ester of a polyhydric alcohol,
  - at least one fatty acid,
  - at least one olefin, and
  - at least one fatty acid ester of a monohydric alcohol.
36. An additive concentrate for use in preparing lubricating compositions, comprising a substantially inert normally liquid organic diluent and about 1 to about 90 percent by weight of a composition comprising:
- a partial fatty acid ester of a polyhydric alcohol and
  - a cosulfurized mixture of 2 or more reactants selected from the group consisting of
- at least one fatty acid ester of a polyhydric alcohol,
  - at least one fatty acid,
  - at least one olefin, and
  - at least one fatty acid ester of a monohydric alcohol.

4,957,652  
REFRIGERANTS  
Kohji Tamura, Kawanishi; Hiroshi Kashiwagi, Settsu, and  
Masahiro Noguchi, Osaka, all of Japan, assignors to Daikin  
Industries, Ltd., Osaka, Japan  
Filed Oct. 18, 1988, Ser. No. 259,144  
Claims priority, application Japan, Oct. 19, 1987, 62-264700  
Int. Cl.<sup>5</sup> C09K 5/04

U.S. Cl. 252—67

5 Claims



1. A refrigerant comprising (1) about 10 to about 97% by weight of dichlorotrifluoroethane and (2) about 90 to about 3% by weight of at least one compound selected from the group consisting of 1,1,1,2-tetrafluoroethane, 1,1,2,2-tetrafluoroethane, 1-chloro-1,1-difluoroethane, 1,1,1-trifluoroethane and 1,1-difluoroethane.

4,957,653  
COMPOSITION CONTAINING ALKANE SULFONIC  
ACID AND FERRIC NITRATE FOR STRIPPING TIN OR  
TIN-LEAD ALLOY FROM COPPER SURFACES, AND  
METHOD FOR STRIPPING TIN OR TIN-LEAD ALLOY  
John L. Cordani, Waterbury, Conn., assignor to MacDermid,  
Incorporated, Waterbury, Conn.

Filed Apr. 7, 1989, Ser. No. 334,918

Int. Cl.<sup>5</sup> C23F 1/00; C23G 1/02; C09K 13/06; C11D 7/08

U.S. Cl. 252—142

11 Claims

1. A composition for stripping tin or tin-lead alloy, and any underlying copper-tin alloy, from a copper surface, without bringing about significant formation of sludge, precipitate or suspended by-products, comprising an aqueous solution of an alkane sulfonic acid and ferric nitrate, each in amounts effective to strip said tin or tin-lead alloy, and any said underlying copper-tin alloy, from said copper surface without bringing about significant formation of sludge, precipitate or suspended by-products wherein said amounts are from about 10 to about 1500 g/l for said alkane sulfonic acid from about 1 g/l to saturation for said ferric nitrate.

4,957,654  
METHOD FOR MAKING A STORAGE STABLE BLEND  
OF A LONG CHAIN POLYOL AND A SHORT CHAIN  
DIOL BY INCORPORATING A BISPHENOL THEREIN  
AND THE RESULTING BLEND

Timothy A. Tufts, 9283 Riverside Dr., Powell, Ohio 43065  
Continuation-in-part of Ser. No. 36,642, Apr. 10, 1987, Pat. No.  
4,786,435. This application Aug. 8, 1988, Ser. No. 229,522  
Int. Cl.<sup>5</sup> C09K 3/00

U.S. Cl. 252—182.25

16 Claims

1. A method for making a storage stable blend of a long chain polyol and a short chain diol which blend phase separates under storage, which comprises incorporating into said blend from about 5 to 20 percent of 4,4'-(1-methylethylidene) bisphenol.
12. A storage stable blend which comprises: a long chain polyol, a short chain diol, and from about 5 to 20 percent of 4,4'-(1-methylethylidene) bisphenol.

4,957,655  
COPOLYMERIC NONLINEAR OPTICAL MEDIA  
Garo Khanarian, Berkeley Heights, N.J.; Donald Raskin, New  
York, N.Y.; Alan Buckley, Berkeley Heights; Gordon W.  
Calundann, Somerset City, and Anthony J. East, Morris City,  
all of N.J., assignors to Hoechst Celanese Corp., Somerville,  
N.J.

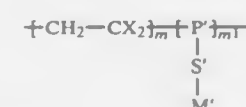
Filed Jan. 12, 1989, Ser. No. 296,259

Int. Cl.<sup>5</sup> C09K 19/52

U.S. Cl. 252—299.01

17 Claims

1. A nonlinear optical medium comprising a transparent thermoplastic polymer film characterized by a crystallographic molecular alignment in the film plane, and a net dipolar molecular orientation normal to the film plane; wherein the polymer is characterized by recurring monomeric units corresponding to the formula:



where X is a substituent selected from hydrogen, halogen, cyano, phenyl or halophenyl, and at least one X substituent is halogen or cyano; P' is a polyvinyl main chain unit; S' is a flexible spacer having a linear chain length of between about 1-20 atoms; M' is a pendant group which exhibits second order nonlinear optical susceptibility; m and m' are integers which total at least ten, and the m' monomer comprises between about 20-80 mole percent of the total m+m' monomer units.

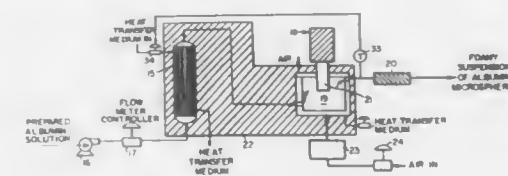
4,957,656  
CONTINUOUS SONICATION METHOD FOR  
PREPARING PROTEIN ENCAPSULATED  
MICROBUBBLES  
David Cerny, Chula Vista; Gary J. Mills, and Peter J. Westkaemper, both of San Diego, all of Calif., assignors to Molecular  
Biosystems, Inc., San Diego, Calif.

Filed Sep. 14, 1988, Ser. No. 244,844

Int. Cl.<sup>5</sup> B01J 13/02; A61K 49/00

U.S. Cl. 252—311

6 Claims



1. The method of producing an imaging agent for diagnostic use in the human circulatory system in which an aqueous solution of human serum albumin is subjected to sonication to form minute gas-center microspheres, wherein the improvement comprises:

- prior to sonication rapidly heating an aqueous solution of human serum albumin to a temperature of incipient denaturation of albumin;
- dispersing a biocompatible gas in said heated solution;
- flowing the gas-containing heated solution through a chamber enclosing an operating sonicator which provides a stationary horn immersed in the solution as it passes through said chamber; and
- with a solution residence time in said chamber of from 1 to 20 seconds forming microspheres of less than 10 microns diameter at concentrations in excess of 40×10<sup>6</sup> microspheres per milliliter of solution, the stability of said microspheres being such that said solution maintains said excess concentration for over 8 weeks at 20° to 25° C.

4,957,657  
PROCESS AND APPARATUS FOR COOLING AND  
PURIFYING A HOT GAS  
Jacob H. Stil; Adrianus J. Ooms, and Bernardus H. Mink, all of  
The Hague, Netherlands, assignors to Shell Oil Company,  
Houston, Tex.  
Continuation of Ser. No. 792,167, Oct. 25, 1985, which is a  
continuation of Ser. No. 677,894, Dec. 4, 1984, which is a  
continuation of Ser. No. 417,754, Sep. 13, 1982. This application  
Jan. 6, 1987, Ser. No. 4,287  
Claims priority, application Netherlands, Nov. 16, 1981,  
8105169

Int. Cl.<sup>5</sup> C01B 3/35

U.S. Cl. 252—373

17 Claims

1. A process for cooling and cleaning hot crude synthesis gas containing sticky slag droplets and/or particles leaving a solid hydrocarbon gasification reactor comprising
- quenching the hot crude synthesis gas leaving the reactor in an upflow direction by injection therein of a cold purified synthesis gas and coagulating the slag droplets therein to form slag particles;
  - reducing the velocity of the synthesis gas stream, and reversing the flow of the stream in a downward direction;
  - increasing the velocity of the gas stream;
  - again reversing the flow of the stream in an upflow direction, and decreasing the velocity of the gas stream;
  - indirectly cooling the gas stream; and
  - separating slag particles from the gas stream.
3. A process for cooling and purifying a hot synthesis gas flowing substantially vertically upwards from a hydrocarbon gasification reactor and containing sticky slag droplets and/or particles comprising
- injecting a cold, clean synthesis gas into the hot synthesis gas to obtain a gas mixture having a reduced temperature and coagulating the slag droplets to form slag particles;
  - reducing the velocity of the gas mixture;
  - reversing the flow of the gas mixture so that the gas mixture flows downward in a direction that is at an acute angle to the original substantially vertical upwards direction of flow;
  - increasing the velocity of the gas mixture flowing obliquely downwards;
  - cooling the gas mixture flowing obliquely downwards at an increased velocity by indirect exchange of heat;
  - reducing the velocity of the cooled gas mixture;
  - reversing the stream of the gas mixture having a reduced velocity so that the gas mixture flows upwards in substantially vertical direction and slag particles fall down;
  - further cooling the gas mixture flowing substantially vertically upwards at reduced velocity by indirect exchange of heat, while a further quantity of slag particles falls down; and
  - discharging the slag particles.

4,957,658  
PROCESS AND COMPOSITION FOR PROVIDING  
REDUCED DISCOLORATION CAUSED BY THE  
PRESENCE OF PYRITHIONE AND FERRIC ION IN  
WATER-BASED PAINTS AND PAINT BASES  
Cheryl B. French, Glastonbury, and Sigmund Breister, Hamden,  
both of Conn., assignors to Olin Corporation, Cheshire, Conn.  
Continuation-in-part of Ser. No. 91,684, Aug. 31, 1987, Pat. No.  
4,818,436. This application Feb. 24, 1989, Ser. No. 315,629  
Int. Cl.<sup>5</sup> G09K 15/32; C08K 5/36; C07C 143/90

U.S. Cl. 252—400.23

9 Claims

1. A process for reducing or inhibiting the formation of a blue discoloration in a water-based coating composition caused by the presence of ferric ion and sodium or zinc pyrithione in the composition which comprises adding thereto an alkali metal or alkaline earth metal salt of 1-hydroxyethane-1,1-diphosphonic acid.



4,957,659

**PHOTOSENSITIVE MATRIX WITH THREE DIODES PER DOT WITHOUT OPTICAL RESETTING**

Marc Berger Arques, both of Grenoble, France, assignor to Thomson-CSF, Paris, France

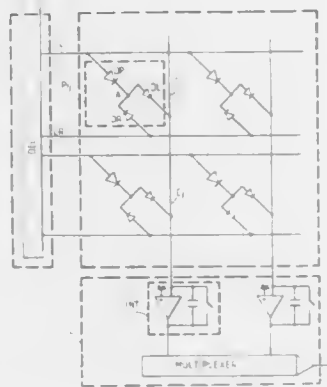
Filed Jan. 11, 1989, Ser. No. 295,555

Claims priority, application France, Jan. 15, 1988, 8800412

Int. Cl.<sup>3</sup> H01J 40/14

U.S. Cl. 250-208.1

13 Claims



1. A matrix of photosensitive dots comprising a network of photosensitive dots arranged in at least one row and in at least one column, each photosensitive dot being located at the intersection of a row and a column, wherein each photosensitive dot comprises three diodes connected to a common floating node, a first diode, being a photosensitive diode, connected between a row conductor and the floating node to generate, when it is illuminated, electrical charges at the floating node, a second diode, being a reading diode, connected between the floating node and a column conductor to enable a transfer, between this column conductor and the floating node, of a quantity of charges corresponding to the quantity of charges generated by the illumination, and a third diode, being a resetting diode, connected between the floating node and a conductor connected to a resetting voltage source, in order to reset the potential of the floating node at a chosen value after said charge transfer.

4,957,660

**ELECTRICALLY CONDUCTIVE PLASTIC MOLDINGS AND PROCESS FOR PRODUCING THE SAME**

Tadayuki Ohmae, Tadashi Sakurai, Noboru Yamaguchi, Mitsuyuki Okada, and Koichihiro Asao, all of Chiba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Apr. 29, 1988, Ser. No. 188,781

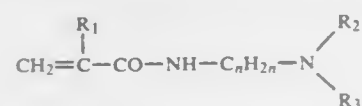
Claims priority, application Japan, Apr. 30, 1987, 62-109508

Int. Cl.<sup>3</sup> H01B 1/00

U.S. Cl. 252-500

9 Claims

1. A conductive plastic molding which is obtained by melt molding an ethylene copolymer comprising: from 40 to 90% by weight of an ethylene unit, from 10 to 60% by weight of at least one dialkylaminoalkylacrylamide comonomer unit represented by formula (I)



wherein

R<sub>1</sub> represents a hydrogen atom or a methyl group;

R<sub>2</sub> and R<sub>3</sub> each represents an alkyl group having from 1 to 4 carbon atoms; and n represents an integer of from 2 to 5, and up to 20% by weight of one or more ethylenically unsaturated comonomer units and having at least 10 parts by weight of an aqueous solution of at least one compound selected from the group consisting of an organic acid, an inorganic acid, and an inorganic metal salt into 100 parts by weight of the resulting metal molded

wherein

said organic acid is selected from the group consisting of formic acid, acetic acid, oxalic acid, tartaric acid, benzoic acid, lactic acid, acrylic acid, maleic acid, methanesulfonic acid, and benzenesulfonic acid;

said inorganic acid is selected from the group consisting of hydrochloric acid, sulfuric acid, nitric acid, phosphoric acid, pyrophosphoric acid, polyphosphoric acid, perchloric acid, hydrofluoric acid, hydrobromic acid, and hydroiodic acid; and

said inorganic metal salt is selected from the group consisting of ferrous chloride, ferric chloride, nickel chloride, ferrous sulfate, ferric sulfate, nickel sulfate, ferrous nitrate, ferric nitrate, and nickel nitrate.

4,957,661

**GRAPHITE FLUORIDE FIBER POLYMER COMPOSITE MATERIAL**

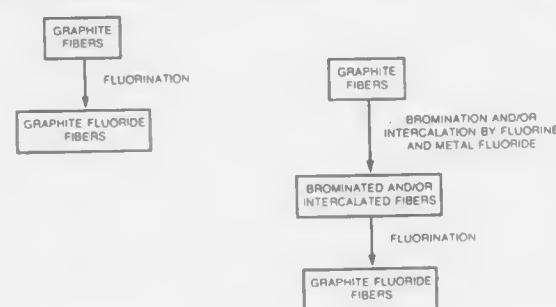
Ching-Cheh Hung, Westlake, Ohio, assignor to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 30, 1988, Ser. No. 251,499

Int. Cl.<sup>3</sup> H01B 1/06

U.S. Cl. 252-510

7 Claims



1. A method of producing graphite fluoride composites comprising the steps of brominating highly graphitized pitch-based fibers, exposing the surfaces of said fibers to fluorine gas at a fluorine partial pressure between about one-half atmosphere and about one atmosphere at a temperature between about 250° C. and about 450° C. to fluorinate the same for a time sufficient to produce an electrical resistivity in the fibers between about 10<sup>-2</sup> Ω cm to about 10<sup>11</sup> Ω cm, and combining said fluorinated fibers with a polymer which readily wets the same.

4,957,662

**METHOD FOR PURIFYING FATTY ACIDS**

Masao Suzuki, 2-25-B2-406 Kasaya-Cho, Nishinomiya City, Hyogo Pref., Japan

Filed Sep. 19, 1979, Ser. No. 76,829

Claims priority, application Japan, Sep. 27, 1978, 53-118024

Int. Cl.<sup>3</sup> C11C 1/08

U.S. Cl. 260-419

4 Claims

1. A method for purifying fatty acids, comprising contacting a fatty acid with both a reducing metal selected from tin, iron, zinc, aluminum, magnesium, copper, calcium, nickel, cobalt and an alloy of these metals in an amount of 0.01-5% by

weight based on the amount of a fatty acid to be purified, and a hydrogenation catalyst selected from palladium black, palladium on carbon, platinum oxide, nickel on kieselguhr, Raney nickel, Raney iron, Raney copper, copper-chromite, molybdenum sulfide, platinum on carbon, nickel-hardened fat and rhodium-platinum in an amount of 0.01-5% by weight based on the amount of a fatty acid to be purified, and distilling the treated fatty acid.

4,957,663

**METHOD OF MANUFACTURING OPTICAL COMPONENTS**

Renso J. M. Zwiers; Johannes M. G. Verhoeven, and Herman M. A. Amendt, all of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

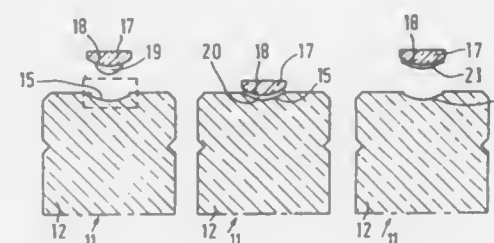
Continuation of Ser. No. 13,320, Feb. 11, 1987, abandoned. This application Mar. 2, 1989, Ser. No. 318,508

Claims priority, application Netherlands, Feb. 13, 1986, 8600354

Int. Cl.<sup>3</sup> B29C 33/40, 39/10; B29D 11/00

U.S. Cl. 264-1.4

11 Claims



1. A method of manufacturing components which comprise a supporting member of glass or a synthetic resin whose surface is provided at least partly with a synthetic resin coating layer having an accurately defined surface, in which a curable liquid monomer composition is provided between an accurately defined surface of a matrix and a surface of the supporting member, the composition is cured and the supporting member together with the cured synthetic resin layer bonded thereto is removed from the matrix,

wherein a matrix is used which is the product of a method comprising the steps of interposing a layer of a curable epoxy resin between an accurately defined surface of a mold and the refractive surface of a preform, contacting said surfaces while curing said epoxy resin to a hardened state and removing a matrix from the mold, the matrix having a layered structure and comprising a preform of glass or quartz which at the area where it contacts the curable monomer composition has a skin of cured epoxy synthetic resin the surface of which is accurately defined and is the negative of the accurately defined surface of the mold from which the matrix was produced and wherein the surface of the manufactured component is the replica of the mold from which the matrix was produced.

4,957,664

**APPARATUS FOR INJECTING AN ACCELERATING FUEL**

Yoshihiro Kohno, Hamakita, and Kazumi Iida, Iwata, both of Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha and Sanshin Kogyo Kabushiki Kaisha, Iwata, Japan

Continuation of Ser. No. 460,767, Jan. 25, 1983, abandoned. This application Dec. 7, 1984, Ser. No. 679,605

Claims priority, application Japan, Jan. 26, 1982, 57-9584

Int. Cl.<sup>3</sup> F02M 7/08

U.S. Cl. 261-34.2

4 Claims

1. An accelerating pump system for an internal combustion engine or the like comprising an accelerating pump, a storage chamber, means for delivering fuel to said storage chamber from said accelerating pump comprising a pipe extending into

said storage chamber and being open at its upper end into said storage chamber, and discharge means for delivering fuel from said storage chamber to the associated engine comprising a restricted orifice positioned in the pipe contiguous to the low-

ermost wall of the storage chamber, said means for delivering the fuel to said storage chamber delivers the fuel at a different rate than said discharge means delivers fuel from said storage chamber.

4,957,665

**AIR COOLING DEVICE FOR ELECTRIC FAN**

Run-Nin Lin, Taiwan, Taiwan, assignor to Alphacom Enterprise Co., Ltd., Taipei, Taiwan

Filed Oct. 24, 1989, Ser. No. 427,274

Int. Cl.<sup>3</sup> B01F 3/04

U.S. Cl. 261-95

5 Claims



1. An air cooling device for electric fan, including:

a front cover comprising a circular side wall having an external thread made thereon, a plurality of rectangular openings equidistantly disposed around the periphery of the front face, an inner flange at the inner side having a key made at the inner top, an oval recess having made thereon a bolt hole for connection thereto of a water inlet control knob and an elongated hole for setting therein of a water gauge, and four water bumpers made at the inner side below said bolt hole;

a back cover comprising a circular side wall having an internal thread made thereon for connection with the external thread of the circular side wall of said front cover, a plurality of rectangular openings properly set to aim at the rectangular openings of said front cover, two bolt seats respectively set at the top and the bottom each having a through-hole made thereon for insertion therethrough of a fastening knob to secure a fastening plate thereto, and an inner flange defining therein a spherical surface for receiving the center ring of the wire protective cover of an electric fan; and

a water absorbing ceramic having a circular body structure comprising a convex-concave outer wall surface and two circular grooves respectively for setting therein of the inner flanges of said front and back covers; wherein said front cover is screwed up with said back cover with the water absorbing ceramic received therein and tightly squeezed in between the inner flange of said front cover and the inner flange of said back cover to define

therein a water receiving space for filling of water, and the two fastening plates which are connected to said two bolt seats are secured to the wire front cover of an electric fan to let air flow pass through the air cooling device.

#### 4,957,666 METHOD OF PRODUCING A SLURRY OF MICROCAPSULES

Michio Kawamura; Yasunori Shimada; Koichi Inoshita; Shozo Yoshida; Toshiaki Kawanabe; Haruo Hattori, all of Iyomishima; Yukio Doi, Katashima, and Mamoru Awano, Ibaraki, all of Japan, assignors to Taio Paper Manufacturing Co., Ltd. and Showa High Polymer Co., Ltd., both of Tokyo, Japan  
Filed Sep. 13, 1988, Ser. No. 243,671

Claims priority, application Japan, Jan. 29, 1988, 63-17347  
Int. Cl.<sup>5</sup> B01J 13/02, 13/18; B41M 5/124

U.S. Cl. 264—4.7 8 Claims  
1. A method of producing a slurry of microcapsules having wall membranes comprised of an amino resin, the method comprising:

- providing an acidic aqueous solution comprised of water and an anionic polyelectrolyte which is an anionic terpolymer of acrylic acid, acrylonitrile, and polyethyleneglycol methacrylate phosphate, and which is water soluble and has a high molecular weight;
- mixing an amino compound and an aldehyde into the acidic aqueous solution in quantities sufficient to undergo polycondensation and provide an amino resin;
- adding a hydrophobic core material into the acidic aqueous solution before, during or after step (b) to emulsify and disperse the hydrophobic core material therein; and
- encapsulating the hydrophobic core material to form a slurry of microcapsules by polycondensing the amino compound and the aldehyde into an amino resin and depositing the amino resin around the hydrophobic core material to form the slurry of microcapsules.

#### 4,957,667 METHOD OF REDUCING SURFACE DEFECTS IN A POSITIVE DENTAL MODEL

James D. Hamer, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Filed Nov. 7, 1988, Ser. No. 268,258

Int. Cl.<sup>5</sup> B28B 7/36

U.S. Cl. 264—16 10 Claims

1. In a method of making a positive model of a tooth or gum comprising the steps of pouring hardenable positive impression material into a negative impression of the tooth or gum comprising a cured, vinyl polysiloxane composition, and hardening the positive impression material, the improvement comprising providing for scavenging of hydrogen gas escaping from the negative impression after pouring of the hardenable positive impression material by applying finely divided palladium over at least part of the surface of the negative impression that will contact the positive impression material before pouring the hardenable positive impression material.

#### 4,957,668 ULTRASONIC COMPACTING AND BONDING PARTICLES

Dennis L. Plackard, and William J. Chafin, both of Alexandria, Ind., assignors to General Motors Corporation, Detroit, Mich.  
Filed Dec. 7, 1988, Ser. No. 280,926

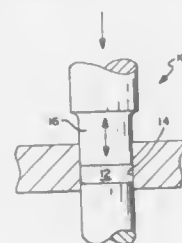
Int. Cl.<sup>5</sup> B29C 35/08; B27N 1/02; H01F 7/00

U.S. Cl. 264—23 9 Claims

1. A method of substantially concurrently compacting and bonding a plurality of solid particles together into a unified mass having a desired shape and particle content greater than about 70% by volume and the balance substantially binder comprising the steps of:

- placing a loose mixture of said particles and a thermobonding agent in a die having said desired shape, said thermobonding agent being selected from the group consisting

of thermoplastic and thermosetting materials activatable by heat to bond said particles together;  
positioning a punch in said die contiguous said mixture, said punch conforming substantially to said shape;  
applying compaction pressure to said mixture with said punch to compact said mixture into said die; and



applying sufficient ultrasonic energy to said mixture while applying said pressure to densify said particles, generate sufficient heat in said mixture to activate said thermobonding agent and effect said bonding.

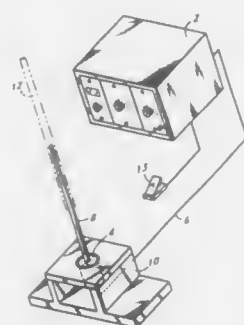
#### 4,957,669 METHOD FOR PRODUCING TUBING USEFUL AS A TAPERED VASCULAR GRAFT PROSTHESIS

Alfred E. Primm, Santa Ana, Calif., assignor to Shiley, Inc., Irvine, Calif.

Filed Apr. 6, 1989, Ser. No. 334,313

Int. Cl.<sup>5</sup> B06B 3/00; B29C 33/60, 61/00

U.S. Cl. 264—23 16 Claims



1. A method for expanding flexible tubing useful for making a vascular prosthesis tubing including the steps of: energizing an elongated ultrasound horn having a free end which increases from a cross-section smaller than an internal cross-section of said tubing to a cross-section larger than the internal cross-section of the tubing;

placing an end of said tubing on the free end of said horn and guiding said tubing further onto said horn as the horn is vibrating, whereby a portion of said tubing moved onto the larger cross-section of the horn is expanded in cross-section;

de-energizing said horn after said tubing has been expanded; maintaining said tubing on said horn for a predetermined time period to allow the expanded tubing portion to cool in its expanded state;

removing said tubing from the horn and placing it on a mandrel;

restraining the ends of said tubing in a manner to prevent the tubing from shrinking axially; and

sintering said tubing for a predetermined time at a temperature sufficient to cause the expanded tubing to shrink radially to the shape of the mandrel and to maintain such shape when removed from said mandrel.

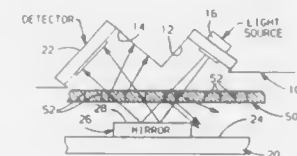
#### 4,957,670 METHOD AND APPARATUS FOR PLASTIC INJECTION MOLDING/ENCAPSULATION

Christopher S. Myers, Carlsbad, Calif., and Thomas H. Wozniak, Yardley, Pa., assignors to General Motors Corporation, Detroit, Mich. and Hughes Aircraft Company, Los Angeles, Calif.

Filed Jan. 30, 1990, Ser. No. 472,491

Int. Cl.<sup>5</sup> B29C 45/14, 45/76

U.S. Cl. 264—40.1 2 Claims



1. A mold apparatus having two mold members defining a mold cavity contained therein for use in a plastic injection molding/encapsulation process in which a glass workpiece is peripherally encapsulated with a plastic material to form a gasket comprising,

a first mold member adapted to sealingly engage a second mold member for shaping said gasket,  
a second mold member coacting with said first mold member in a closed position to define the mold cavity for shaping said gasket,

said first mold member having a light source and a detector mounted in recessed areas in a first mold surface adjacent to said mold cavity,

said second mold member having a light reflector mounted in a recessed area of a mold surface opposite to said first mold surface of said first mold member when said two mold members are in a closed position,

said mold cavity being shaped to receive a glass workpiece to peripherally encapsulate said glass workpiece in a plastic material to form the gasket,

means for closing said mold members together and means for receiving said plastic material into said mold cavity,

whereby said light source and said detector working in combination with said light reflector are capable of detecting broken glass workpieces in the mold cavity so as to shutdown the plastic injection molding process.

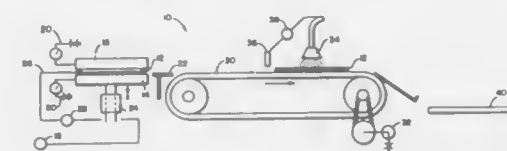
#### 4,957,671 MANUFACTURE OF PLASTIC PRODUCTS

Harold B. Morris, Newnan, Ga., assignor to M. A. Industries, Inc., Peachtree City, Ga.

Filed Jun. 11, 1985, Ser. No. 743,410

Int. Cl.<sup>5</sup> B29C 43/52, 43/58

U.S. Cl. 264—40.6 8 Claims



1. A method for manufacturing a porous plastic product which comprises:

- placing a mold constructed of a light weight highly heat conductive material and containing a moldable plastic material capable of forming a porous product within a press having a pair of platens, said platens being at a temperature above the melt temperature of the plastic material;

(b) closing the press for contact of said platens without applying pressure to said plastic material;

(c) heating the mold to a temperature which is above the melt temperature of the plastic material but below the temperature of said platens;

(d) controlling the temperature of the mold to open the press platens at the proper time such that the mold will have reached a predetermined temperature which will allow the plastic material to continue heating to a temperature which produces the desired porous properties;

(e) opening said press platens and removing the mold from said press prior to said plastic material having reached its melt temperature and at such time as said mold has reached said predetermined temperature;

(f) allowing said plastic material to continue heating to said temperature which produces the desired porous properties; and

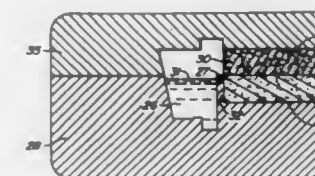
(g) cooling the mold and plastic material to provide a porous plastic product, whereby a 2 to 3 minute cycle per mold is obtained.

#### 4,957,672 METHOD OF FORMING A SEALING GASKET FOR RETICULATED FOAM FILTER

Robert W. Carter, and Robert W. Carter, both of 2745 Yosemite Dr., Belmont, Calif. 94002

Continuation-in-part of Ser. No. 128,832, Dec. 4, 1987, abandoned. This application Mar. 10, 1989, Ser. No. 322,459  
Int. Cl.<sup>5</sup> B29C 67/22

U.S. Cl. 264—45.5 14 Claims



1. A process for bonding a cellular plastic foam formed by frothing reactants to a peripheral region on a reticulated foam article, comprising:

- combining said reactants into a mixture;
- placing said mixture and said reticulated foam article into a mold cavity without contacting each other, said mold cavity being shaped to avoid distortion of said reticulated foam article in any manner which would restrict fluid flow therethrough from said peripheral region, and to permit contact of said mixture with said peripheral region only upon frothing of said mixture; and

(c) bringing said mixture to a frothing state in which a penetration-preventing skin is formed on the surface thereof, and said mixture is expanded sufficiently to contact said peripheral region, while avoiding any distortion of said reticulated foam article which would restrict fluid flow therethrough from said peripheral region, to bond thereto without penetrating into said reticulated foam article.

#### 4,957,673 MULTILAYER CERAMIC OXIDE SOLID ELECTROLYTE FOR FUEL CELLS AND ELECTROLYSIS CELLS AND METHOD FOR FABRICATION THEREOF

James E. Schroeder, Claremont, Calif., and Harlan U. Anderson, Rolla, Mo., assignors to California Institute of Technology, Pasadena, Calif.

Filed Feb. 1, 1988, Ser. No. 151,172

Int. Cl.<sup>5</sup> C04B 35/48

U.S. Cl. 264—60 20 Claims

1. A process for forming a composite tape comprising a layer



of dispersed small size stabilized zirconia particles on a layer of agglomerated lanthanum manganite which is operable when fired at a temperature of about 1300° C. for forming a ceramic structure having a first layer of sintered lanthanum manganite having no more than about 70% of theoretical density and, bonded to such first layer, a second layer of sintered stabilized zirconia having at least about 95% of theoretical density without significant migration of manganese from such first layer into such second layer, said process comprising:

- presintering lanthanum manganite powder at a predetermined elevated temperature for a predetermined period of time operable for agglomerating said powder thereby forming an agglomerated powder;
- lightly crushing said agglomerated powder thereby forming a crushed agglomerate;
- mixing said crushed agglomerate with a binder-plasticizer operable when cured for bonding particles of said crushed agglomerate together and a solvent for said binder thereby forming a first slurry, said mixing being operable for degassing said slurry without substantial breakage of said sized agglomerate;
- forming a first tape from said first slurry on a molding surface;
- while said first tape is on said molding surface, removing solvent from therefrom by evaporation and allowing said binder therein to cure and bond said sized agglomerate therein together thereby forming a bonded first tape;
- forming a mixture of small particle size stabilized zirconia powder, a dispersing agent, a second solvent for said dispersing agent, and an anti-cracking agent, said dispersing agent being operable for dispersing said zirconia powder in said mixture;
- dispersing said stabilized zirconia powder in said mixture thereby forming a dispersed small size particle second slurry;
- forming a second tape from said second slurry on said bonded first tape; and
- while said second tape is on said bonded first tape, removing an effective amount of said second solvent from said second tape by evaporation so that said second tape will not run thereby forming a composite tape having an outer surface comprising dispersed small size stabilized zirconia particles, said composite tape being operable when fired at a temperature of about 1300° C. for forming a ceramic structure having a first layer of sintered lanthanum manganite having no more than about 70% of theoretical density and, bonded to such first layer, a second layer of sintered stabilized zirconia having at least about 95% of theoretical density without significant migration of manganese from such first layer into such second layer.

4,957,674

#### METHOD FOR PRODUCING CALCIUM PHOSPHATE-BASED MATERIAL

Takeshi Ichitsuka, Yasuhiko Hirayama, and Tetsuro Ogawa, all of Tokyo, Japan, assignors to Asahi Kogyo Kogyo Kaisha, Tokyo, Japan

Filed May 11, 1988, Ser. No. 192,552

Claims priority, application Japan, May 12, 1987, 62-115180  
Int. Cl.<sup>5</sup> C04B 35/64

U.S. Cl. 264—65

7 Claims

1. A method for producing a calcium phosphate-based material comprising:

- molding a calcium phosphate powder;
- preliminarily calcining the resulting molding in a vacuum or under a reduced pressure until the relative density is 95% or more; and
- firing said molding in air, an inert gas, or nitrogen gas, wherein said preliminary calcining is carried out under a pressure of less than 1 Torr and at a temperature of from 950° to 1,100° C.

4,957,675

#### METHOD AND APPARATUS FOR PREPARING CASEINATES

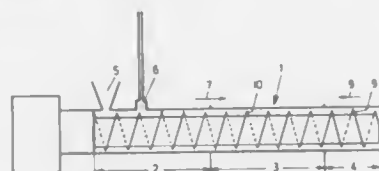
Wolfgang Oelsner, Stuttgart, Fed. Rep. of Germany, assignor to Werner & Pfleiderer GmbH, Fed. Rep. of Germany  
Filed Apr. 21, 1989, Ser. No. 341,367

Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815113

Int. Cl.<sup>5</sup> B29B 9/12; B29C 47/40

U.S. Cl. 264—118

11 Claims



- Method of preparing caseinates comprising introducing of casein, alkaline solutions, or basic salts and water into an extruder, mixing the constituents thoroughly together and subjecting the mixed components to an increase in pressure and temperature under the influence of return elements, wherein the pressure build-up under the influence of said return elements or return kneading units takes place directly in front of the discharge end of the extruder and the product is discharged freely through this end of the extruder.
- An apparatus comprising an extruder having a product feed zone, preparing caseinates comprising and introducing a casein, alkaline solutions, or basic salts and water into said extruder, said extruder having a mixing zone for mixing the constituents thoroughly together and subjecting the mixed components to an increase in pressure and temperature under the influence of return elements, and said extruder including a zone having return elements and a discharge end, wherein the return elements (9) or return kneading units are arranged directly in front of the discharge end (face 13) of the extruder (1) wherein the pressure build-up under the influence of said return elements or return kneading units takes place directly in front of the discharge end of the extruder and the product is discharged freely through this end of the extruder, and the end of the extruder (1) on the discharge side being open essentially without any reduction in cross-section relative to the free cross-section (D) of the extruder.

4,957,676

#### DETACHMENT OF TIRES FROM MOLDS

Alan Greenwood, Kent, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 23, 1989, Ser. No. 397,256

Int. Cl.<sup>5</sup> B29C 33/46

U.S. Cl. 264—102

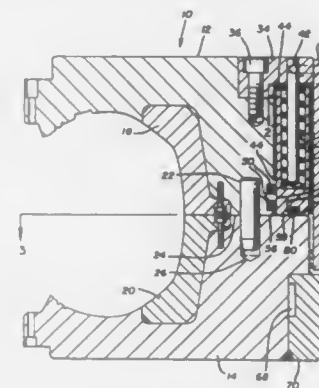
16 Claims

1. Apparatus for applying vacuum or fluid under pressure to an uncured tire and detaching a cured tire from a heated mold having a first mold section and a second mold section comprising:

- an extendible circular sleeve member slidably mounted on said first mold section having an edge portion with a sealing means for engaging an opposing surface of said second mold section upon extension of said sleeve member;
- means for opening said mold to separate said first mold section and said second mold section;
- means for simultaneously extending said sleeve member

toward said second mold section to maintain engagement of said edge portion with said opposing surface of said second mold section and sealing the space between said first mold section and said second mold section;

(d) means for communicating said vacuum or said fluid under pressure to said space between said first mold section and said second mold section so that said vacuum will remove gases from said mold and said fluid under pressure



will be communicated to the space between said cured tire and molding surfaces of said first mold section and said second mold section at the center of the tread to peel the tread away from said molding surfaces and push said cured tire away from said molding surfaces; and

(e) stop means for arresting the extension of said sleeve member and retaining said sleeve member on said first mold section.

4,957,677

#### PROCESS FOR PRODUCING COMPOSITE LAMINATE COMPRISING INSERT PART AND INJECTION-MOLDED PART

Naoyuki Katoh, Masahiro Aoki, and Takeo Tsukamoto, all of Yokkaichi, Japan, assignors to Mitsubishi Yuka Badische Co., Ltd., Yokkaichi, Japan

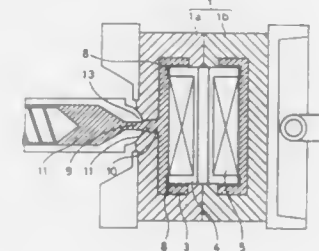
Filed Sep. 14, 1988, Ser. No. 244,106

Claims priority, application Japan, Dec. 9, 1987, 62-311731;  
Dec. 9, 1987, 62-311732; May 9, 1988, 63-112114

Int. Cl.<sup>5</sup> B29C 45/14; C09D 4/02

U.S. Cl. 264—135

7 Claims



1. A process for producing a composite laminate comprising an insert part and an injection-molded resin part, which comprises coating the insert part with a primer comprising a copolymer aqueous emulsion having a glass transition point of not higher than 20° C. which is obtained by emulsion polymerization of a monomer mixture consisting mainly of (a) from 35 to 75% by weight of an alkyl acrylate having from 1 to 8 carbon atoms in the alkyl moiety thereof, (b) from 10 to 50% by weight of an alkyl methacrylate having from 1 to 4 carbon atoms in the alkyl moiety thereof, (c) up to 15% by weight of styrene and/or acrylonitrile, the sum of the (b) and (c) components ranging from 15 to 55% by weight, (d) up to 5% by

weight of a vinyl monomer selected from the group consisting of an  $\alpha,\beta$ -unsaturated acid or an anhydride thereof, 2-hydroxyethyl (meth)acrylate, 2-hydroxypropyl (meth)acrylate, (meth)acrylamide, and methylol(meth)acrylamide, and (e) up to 30% by weight of other vinyl monomer(s), drying the primer, inserting the insert part into a cavity of an injection mold, injecting a molten resin into the cavity to thereby form the injection-molded resin part and unite the insert part and the injection-molded resin part into one body.

4,957,678

#### METHOD OF MOLDING A PIPE END PROTECTOR

Peter Budde, Waterleidingstraat 1, 3134 KC Vlaardingen, Netherlands

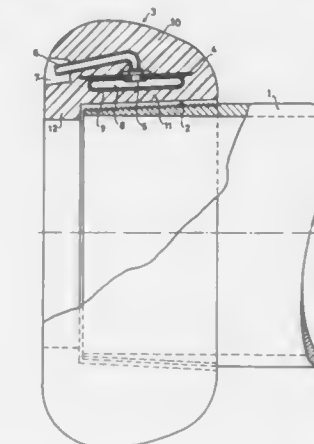
Division of Ser. No. 83,784, Aug. 21, 1987, Pat. No. 4,854,350.

This application Mar. 13, 1989, Ser. No. 322,423

Int. Cl.<sup>5</sup> B29C 39/10

U.S. Cl. 264—135

6 Claims



1. A method for manufacturing a pipe-end protector of the type having a unitary molded plastic body defining a bore for receiving the pipe-end to be protected, an expandable cavity in said body, a filling duct having an exteriorly accessible outer end in a depression formed in an end face of said body and opening into said cavity through a hole in said ring for pressurizing said cavity thereby to clamp said plastic body about said pipe-end, comprising the steps of:

centering said ring by means of said filling duct in a casting mold, covering said hole with flexible means attached to said ring for defining said expandable cavity, maintaining said outer end of said filling duct in communication with the ambient air, and then introducing into said casting mould said plastic for forming said body.

4,957,679

#### METHOD OF MAKING INTERFOLDED SHEETS OF PLASTIC FILM

Neal E. Moore, Dublin, Calif., assignor to James River II, Inc., Oakland, Calif.

Filed Jul. 24, 1989, Ser. No. 384,202

Int. Cl.<sup>5</sup> B29C 53/04, 69/00

U.S. Cl. 264—152

8 Claims

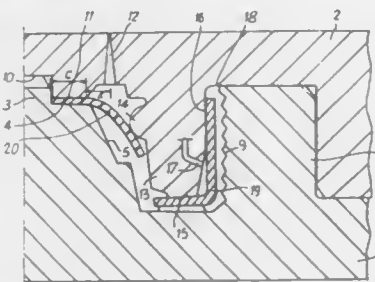
1. A method of producing interfolded sheets of plastic film containing at least eighty percent high density polyethylene comprising cutting a continuous length of the film with a knife blade into separate sheets and interfolding the sheets, the improvement wherein the film contains from about one to about twenty percent of a styrene polymer selected from the group consisting of polystyrene, poly(p-methylstyrene), rubber-modified polystyrene, and rubber-modified poly(p-methylstyrene), whereby the sheets are more completely cut by the blade

and thereby more completely and consistently separated from adjacent sheets.

4,957,680

## PROCESS OF MOLDING SEAL RINGS

Michel Saxod; Serge Devouanoux, both of Lagres; Michel Marchiset, Chailindrey, and Jean-Pierre Jaumot, Langres, all of France, assignors to Procal, Langres, France  
Filed Apr. 2, 1986, Ser. No. 847,330  
Claims priority, application France, Apr. 3, 1985, 85 05054  
Int. Cl.<sup>5</sup> B29C 45/14, 45/22, 45/38  
U.S. Cl. 264—161 5 Claims



1. A process of molding a seal ring comprising, the steps of: positioning a reinforcement in a first mold part, positioning a disc of low friction material in the first mold part, closing the mold with a second mold part to clamp a width C of between about 30% and 70% of the width of the disc between opposed clamping surfaces of the first and second mold parts, drawing a vacuum in the interior of the mold, injecting a plastic material into the mold to form a seal lip connecting the disc of low friction material to the reinforcement, opening the mold and removing the molded ring, and cutting off from the molded ring, an excess portion of the molded lip, and at least that portion of the disc which was clamped between the opposed clamping surfaces of the mold wherein said injecting step comprises injecting the plastic material through circumferentially spaced injection channels on the second mold, said injection channels being spaced radially from the portion of said disc which is clamped between the clamping surfaces of the mold parts.

4,957,681

## PREPARATION OF PHARMACEUTICAL MIXTURES

Roger Klimesch, Alsbach-Haehnlein; Gerhard Bleckmann, Lampertheim, and Lothar Schlemmer, Maxdorf, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
Filed Apr. 3, 1989, Ser. No. 331,959  
Claims priority, application Fed. Rep. of Germany, Apr. 15, 1988, 3812567

Int. Cl.<sup>5</sup> B29C 47/00, 47/60

U.S. Cl. 264—211.23

3 Claims

1. A continuous process for the preparation of a pharmaceutical mixture having at least two components, wherein the components of the mixture are continuously metered which comprises:

- continuously metering the individual components of the pharmaceutical mixture at a rate of at least 50 g/h on electronic differential metering balances having a metering accuracy of at least  $\pm 5\%$  within time intervals less than 1 minute and having screw conveyors, thereby obtaining a substantially uniformly metered mixture, and
- shaping said mixture.

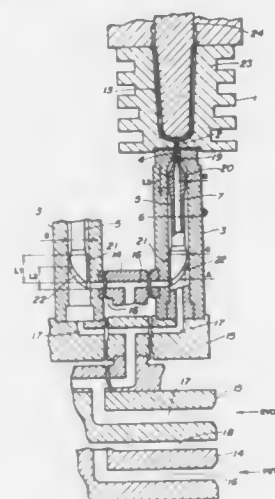
4,957,682  
METHOD OF INJECTION MOLDING A THREE-LAYERED CONTAINER

Hideori Kobayashi; Moriaki Suwabe; Nobuhiro Inakazu, and Hatsu Nagamatsu, all of Tokyo, Japan, assignors to Kamaya Kagaku Kogyo Co., Ltd., Tokyo, Japan  
Filed Jan. 17, 1989, Ser. No. 298,122

Claims priority, application Japan, Jan. 19, 1988, 63-9209; Apr. 1, 1988, 63-80448; Jun. 2, 1988, 63-136547  
Int. Cl.<sup>5</sup> B29C 45/16

U.S. Cl. 264—255

3 Claims



1. A method for manufacturing a three-layered container by injection molding, the method comprising the sequential steps of:

- preparing an injection molding apparatus adapted for injecting a first resin through an outer injection nozzle and a second resin through an inner injection nozzle disposed in the outer injection nozzle;
- injecting the first resin from the outer injection nozzle;
- ceasing injecting the first resin from the outer injection nozzle;
- injecting the second resin from the inner injection nozzle after pausing a first predetermined period of time after step (c); and
- injecting the first resin from the outer injection nozzle after a second predetermined period of time has elapsed after the start of step (d).

4,957,683

## PROCESS FOR PRODUCING A PIPE SECTION AND COMPOUND PIPE PRODUCED ACCORDING TO THIS PROCESS

Peter Hartmann, General-Willestrasse 115, Feldmeilen, Switzerland  
Continuation of Ser. No. 687,016, Dec. 28, 1984, abandoned.

This application Feb. 5, 1987, Ser. No. 11,442

Claims priority, application Switzerland, Jan. 19, 1984, 243/84

Int. Cl.<sup>5</sup> B28B 1/20

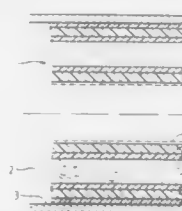
U.S. Cl. 264—256

8 Claims

1. A process for producing pipe sections in a rotary mold drum comprising:

- rotating the rotary mold drum to provide centrifugal forces to an inner mold drum surface and during rotation performing the steps of:
- introducing onto the inner mold drum surface a protective layer of moldable plastic in a liquid state, said moldable plastic being free of fiber reinforcing material;
- allowing said moldable plastic to cure to a hardened state by addition of a hardening agent;

applying a first reinforcing layer of fiber-reinforced plastic in a liquid state to said hardened protective layer;  
applying a first connecting layer of fiber free plastic in a liquid state to the first reinforcing layer;  
allowing said first connecting layer to cure to a partially hardened pasty state by addition of a hardening agent;  
applying a central layer of inorganic material to the first connecting layer while the first connecting layer is in said partially hardened pasty state;



allowing said central layer of inorganic material to partially set;  
applying a second connecting layer of fiber free plastic in a liquid state to be the central layer of inorganic material after the central layer of inorganic material is partially set;  
allowing said second connecting layer to cure to a partially hardened pasty state by addition of a hardening agent; and  
applying a second reinforcing layer of fiber-reinforced plastic in a liquid state to said partially hardened pasty second connecting layer.

4,957,684

## SOFT MOLDING METHOD

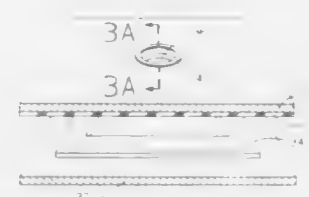
Hamid G. Kia, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 4, 1988, Ser. No. 267,359

Int. Cl.<sup>5</sup> B29C 45/16, 43/20

U.S. Cl. 264—257

7 Claims



1. In a method of compression molding glass fiber mat reinforced plastic panels having at least one appearance surface in a set of two matched mold members of which at least one member having an interior mold surface being the mirror image of the appearance surface of said panel, of the type wherein at least one glass fiber mat is first placed in the mold cavity defined by the interior mold surfaces of said mold members and a polymeric material is introduced into the cavity saturating said mat and curing into a panel under heat and pressure transmitted through said mold members clamped together, the improvement comprising

- placing at least one layer of a reusable flexible sheeting material immediately adjacent to the interior mold surface opposing the mold surface produces the appearance surface of said molded panel prior to clamping the two mold members together and applying pressure on said mold members whereby said at least one layer of flexible sheeting material acts as a stress relief layer to prevent the formation of fiber readout defects and remains in said mold members after the compression molding process.

4,957,685

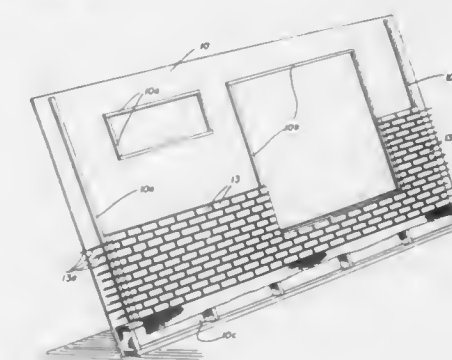
## METHOD OF MAKING A TRANSPORTABLE BRICK PANEL

Phillip H. Boot, Sydney, Australia, assignor to Panelbrick Industries PTY. Limited, New South Wales, Australia  
Continuation of Ser. No. 40,830, Apr. 21, 1987, abandoned. This application Jul. 19, 1989, Ser. No. 383,269

Claims priority, application Australia, Apr. 23, 1986, PH5586  
Int. Cl.<sup>5</sup> B29C 33/58, 39/10, 39/12

U.S. Cl. 264—261

12 Claims



1. A method of making a transportable brick panel, said method comprising the steps of:  
setting out a mold on which a brick panel is to be formed, said mold including a substantially flat bottom surface;  
laying a soft deformable membrane, for preventing contamination by particles of the overall surface areas of rough-surfaced brick faces, over said bottom surface, wherein said membrane restricts particles from passing through and being such as to form a seal around face edges of bricks placed on said membrane to thereby prevent fine cementitious particles in mortar placed between said bricks from contaminating said overall surface areas of said rough-surfaced faces of said bricks and to thereby inhibit movement of bricks placed on said membrane;  
arranging courses of brickwork in said mold on said membrane to have the weights of said bricks supported by said soft deformable membrane so that portions of said brick faces in contact with said membrane exert pressure on said membrane to thereby cause a deformation in deform said membrane due to a sudden release of pressure beyond the edges of said bricks, said deformed membrane rotating around said edges of said bricks in a hinge action so as to stabilize said bricks relative to said mold and to seal the face edges of said bricks with said deformed membrane, individual bricks being substantially evenly spaced apart with spaces between them for receiving liquid mortar in said spaces;  
arranging reinforcing bars to pass through aligned holes in columns of said bricks so as to structurally extend through to the top and bottom courses of said bricks;  
pouring liquid mortar to fill said spaces between said individual bricks and penetrate holes in said bricks;  
allowing said mortar to set thereby forming said brick panel; and  
lifting said brick panel so formed from said mold.

4,957,686

## USE OF BACTERIOPHAGES TO INHIBIT DENTAL CARIES

Alan H. Norris, 120 Saddle Mountain Rd., Rome, Ga. 30161  
Filed Feb. 6, 1990, Ser. No. 473,888

Int. Cl.<sup>5</sup> A61K 7/16, 9/68, 39/02

U.S. Cl. 424—50

10 Claims

1. A method of improved dental hygiene comprising introducing into the mouth bacteriophages parasitic to bacteria



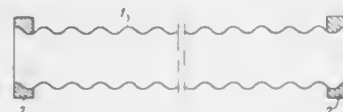
which possess the property of readily adhering to the salivary pellicle, said bacteria so providing receptor sites for other bacteria and so allowing a build up of plaque on the teeth.

4,957,687

# METHOD FOR MAKING PROFILED PLASTIC TUBES SUCH AS CORRUGATED TUBES

Bulent Akman, Ruelle de la Poterne, and Bernard de Curraize, 10, rue Barbier D'Aucourt, both of 52244 Langres, France  
Filed Nov. 7, 1984, Ser. No. 668,947

Claims priority, application France, Nov. 7, 1983, 83 17639  
Int. Cl.<sup>3</sup> B28B 7/20; B29C 49/00, 61/00; B29D 23/00  
U.S. Cl. 264—506 12 Claims



1. A method of making profiled hollow bodies from a plastic material having memory return characteristics upon heating comprising the steps of positioning a tube of memory characteristic plastic material in a hollow mold body having an internal surface corresponding to the desired external profile shape of the tube, applying internal fluid pressure to the tube while the tube is at a temperature above its softening point to deform the tube against the inner surface of the mold body, cooling the tube while within the mold body and while maintaining the internal pressure, releasing the internal pressure after cooling, removing the tube from the mold body by pulling the tube axially out of the mold body, and then heating the tube to a temperature sufficient to cause the memory characteristics of the plastic material to return the tube to substantially the same profile as the internal surface of the mold body, to thereby substantially eliminate the stretching and deformations caused by pulling the tube out of the mold body.

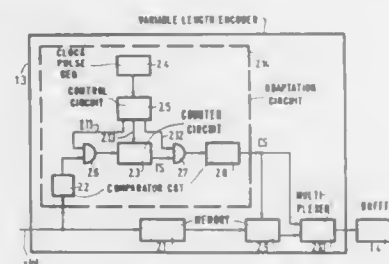
4,957,688

# SYSTEM FOR THE TRANSMISSION OF VIDEO SIGNALS WITH ADAPTIVE CODE WORD ALLOCATION, AND ALSO A TRANSMITTER AND A RECEIVER SUITABLE FOR THE SYSTEM

Peter H. N. De With, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 21, 1989, Ser. No. 326,577  
Claims priority, application Netherlands, Apr. 15, 1988, 8800988

Int. Cl.<sup>3</sup> H04N 7/12 12 Claims  
U.S. Cl. 358—133



1. A system for the transmission of a video signal from a transmitter to a receiver in a digitized form obtained by means of differential pulse code modulation (DPCM), the transmitter including a differential pulse code modulator which produces an output signal consisting of signal words, the signal words additionally being submitted in a variable-length encoding circuit to a variable-length coding operation, to generate varia-

ble-length code words, and the receiver including a variable-length decoder circuit to convert the received variable-length code words into signal words of a fixed length which are in addition applied to a differential pulse code demodulator, characterized in that the variable-length encoding circuit in the transmitter comprises:

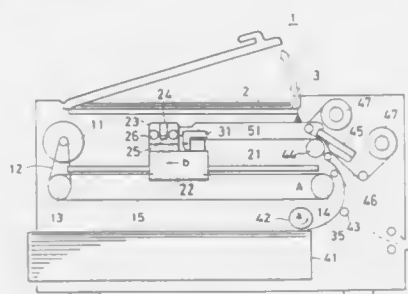
means for defining contiguous signal segments, each consisting of a sequence of consecutive signal words;  
means for defining for each signal segment a reference set consisting of a number of reference words which are related to a number of signal words which are predetermined relative to the signal segment and are correlated with the signal words of the signal segment;  
means for determining a statistical quantity from the reference set thus formed and for generating a coding book signal under the control thereof;  
means for selecting under the control of said coding book signal a coding book from a fixed set of coding books;  
means for converting for each signal segment the signal words in accordance with the selected code book into variable-length code words; and that the variable-length decoder circuit in the receiver comprises:  
means for generating for each received signal segment a decoder book signal from the received signal which corresponds to the coding book signal generated in the transmitter for the relevant signal segment;  
means for selecting a decoder book from a fixed set of decoder books under the control of said decoder book signal;  
means for converting for each received signal segment the variable-length code words in accordance with the selected decoder book into signal words.

4,957,689

# SCANNING AND PRINTING APPARATUS

Masaru Ohnishi, and Masashi Tamura, both of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 17, 1989, Ser. No. 422,690  
Claims priority, application Japan, Oct. 24, 1988, 63-267355; Nov. 7, 1988, 63-280591; Mar. 9, 1989, 64-54911  
Int. Cl.<sup>3</sup> H04N 1/23, 1/10, 1/032; G01D 15/28  
U.S. Cl. 358—296 20 Claims



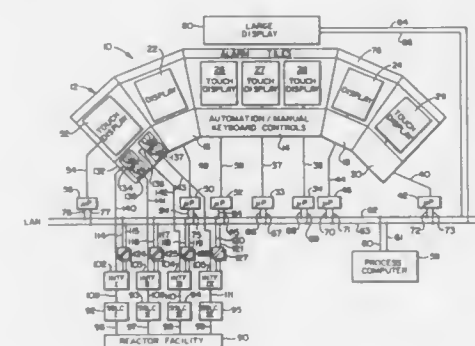
15. A scanning and printing apparatus for flatbed scanning of documents and printing of document images on a recording medium, said apparatus comprising: means for scanning a document and converting an image thereon into an electrical signal, means for driving said scanning means with linear and reciprocal motion, clamping means coupled to an reciprocally moved by said driving means for holding the recording medium to thereby move the recording medium in a reciprocal manner, and printing means for printing an image on said recording medium as said recording medium is moved by said clamping means.

4,957,690

# SYSTEM AND METHOD FOR MONITORING AND CONTROL OF SAFETY-RELATED COMPONENTS OF A NUCLEAR POWER PLANT

Larry E. Fennema, San Jose, Calif., assignor to General Electric Company, San Jose, Calif.

Filed Dec. 7, 1988, Ser. No. 280,800  
Int. Cl.<sup>3</sup> G21C 7/36  
U.S. Cl. 376—216 22 Claims



1. In a nuclear power plant installation of a variety having a controllable nuclear reactor, normal operational control means having monitor outputs and responsive to control inputs for effecting nominal mode control over said reactor, divisional operational control means including at least two independent divisions having qualified safety system logic monitoring and control devices for providing safety status parameter outputs and responsive to select safety directed inputs for providing safety mode control over said reactor, an operator manned control region including a console having an operator interface for the assertion of said control inputs and initiation of said safety directive inputs, the improved control method comprising the steps of:

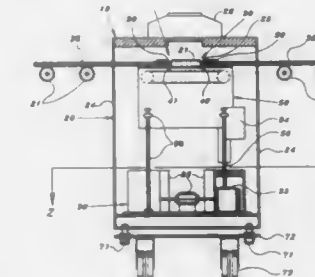
providing a display at said console responsive to display inputs to generate operator readable information;  
providing an interface network within each said division having a communications link input means for receiving said operator initiated safety directive inputs in binary format, a non-volatile memory, a display controller, input and output ports, and a logic control means for controlling said memory, display controller, communication link input means and said input and output ports;  
providing isolated communications link means between said link input means and said operator interface for transmitting said initiated safety directive inputs to said communications link input means;  
providing a directive communication link between said output port and said safety system logic, monitoring, and control devices;  
providing a library collection of accessible predetermined valid said safety directive inputs in binary format within said memory;  
responding with said logic control means to a said received operator initiated safety directive input by accessing said memory for a corresponding said valid said safety directive;  
effecting transmission of said accessed valid safety directive by said logic control means and said display controller to said display to generate operator readable information descriptive thereof; and  
effecting transmission by said logic control means of only said accessed valid safety directive from said output port through said directive communications link to said safety system control devices.

4,957,691

# APPARATUS FOR INSPECTING THE QUALITY OF NUCLEAR FUEL ROD ENDS

Raymond W. Brashler, Columbia, S.C., and Edward D. Pfau, Bostic, N.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 30, 1989, Ser. No. 359,000  
Int. Cl.<sup>3</sup> G21C 17/06 10 Claims



7. An apparatus for inspecting the quality of both ends of nuclear fuel rods and comprising  
a housing including a pair of longitudinally separated slots for receiving X-rays downwardly therethrough from an external source and so as to define first and second longitudinally spaced apart operating positions,  
means for serially guiding nuclear fuel rods longitudinally through said housing and to a first rod position wherein the forward ends of the rods are aligned below said first operating position and to a second rod position wherein the rear ends of the rods are aligned below said second operating position,  
belt conveyor assembly means for serially advancing X-ray film cartridges longitudinally through said housing and below said rods, and so that each cartridge may be selectively aligned below said first and second operating positions, said belt conveyor assembly means including a conveyor frame having two opposing side wall surfaces, at least two laterally directed support rods rotatably mounted to said opposing side wall surfaces, at least two endless conveyor belts entrained about said support rods in spaced relation to each other, at least three longitudinally spaced apart cleats mounted on each conveyor belt and so as to define first and second film cartridge receptacles extending transverse to said belts and between respective pairs of cleats so that said belts support a film cartridge positioned thereon, drive means supported by said conveyor frame and operatively engaging select ones of said support rods for selectively advancing said conveyor belt in opposite directions, and table means supported by said conveyor frame for selectively lifting the film cartridges supported by said belts and so that the conveyor belts may be advanced while the film cartridges are held stationary,  
whereby film cartridges may be serially advanced through said housing and exposed to X-rays at each of said first and second operating positions and so that each film cartridge is adapted to image each end of a given fuel rod, by initially positioning each cartridge in said first receptacle, moving the conveyor belts so that said first receptacle and cartridge are positioned in alignment with said first operating position, moving the film cartridge to said second receptacle by lifting the same from said conveyor belts while advancing the conveyor belts rearwardly, and then moving the second receptacle and cartridge into alignment with said second operating position.

4,957,692

## APPARATUS FOR HANDLING A FUEL ELEMENT SKELETON

Helfrid Lahr, Wedemark, and Bernd Pontani, Alzenau, both of Fed. Rep. of Germany, assignors to Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH, Hanover, Fed. Rep. of Germany

Division of Ser. No. 249,964, Sep. 27, 1988, Pat. No. 4,923,668.

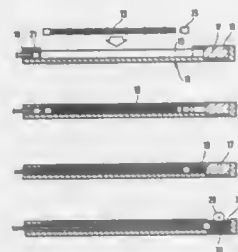
This application Nov. 20, 1989, Ser. No. 438,025

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 3733387; Feb. 2, 1988, 3802966

Int. Cl.<sup>5</sup> G21C 19/00

U.S. Cl. 376—260

3 Claims



1. A ram-type press apparatus for compacting a fuel element skeleton of an irradiated nuclear reactor fuel element from which the fuel rods have been removed, the fuel element skeleton having a predetermined uncompacted length, the ram-type press comprising:

an elongated housing having a compacting shaft for receiving the uncompacted fuel element skeleton therein;

said compacting shaft having first and second longitudinal open ends;

a removable press base part;

said housing having a seat formed therein directly adjacent said first longitudinal open end for accommodating said press base part therein;

a ram displaceably mounted in said housing so as to be movable through said second longitudinal open end and into said compacting shaft for compacting the fuel element skeleton against said press base part to form a compacted skeleton packet; and,

a transfer shaft having a receiving space therein for accommodating the compacted skeleton packet and being placeable into said seat after removal of said press base part, said transfer shaft having a receiving opening facing and aligned with said first longitudinal open end when disposed in said seat; and,

said ram being displaceably mounted so as to be further displaceable into said compacting shaft for pushing the compacted skeleton packet out of said compacting shaft and into said receiving space of said transfer shaft.

4,957,693

## PRESSURIZED WATER NUCLEAR REACTOR SYSTEM WITH HOT LEG VORTEX MITIGATOR

Louis K. S. Lau, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 3, 1989, Ser. No. 293,160

Int. Cl.<sup>5</sup> C21C 9/00

U.S. Cl. 376—298

7 Claims

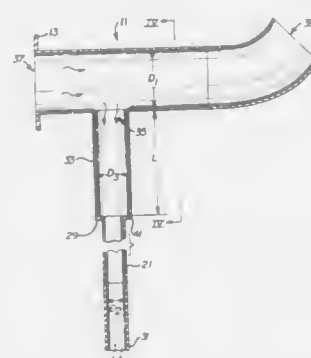
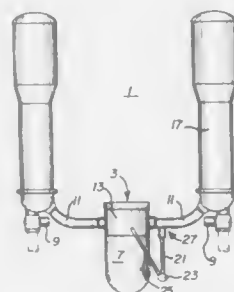
7. In a pressurized water nuclear reactor system having a reactor pressure vessel, at least one steam generator, a hot leg conduit for carrying of hot fluid from the reactor pressure vessel to said steam generator, and at least one cold leg conduit for return of cool fluid from the steam generator back to said

reactor pressure vessel, the improvement comprising a residual heat removal device wherein:

said hot leg has an inside diameter  $D_1$ ;

a first section of residual heat removal conduit is provided, having an inside diameter  $D_2$ , a first end for receipt of fluid from said hot leg, and a second end;

a second section of residual heat removal conduit is provided connected to said reactor pressure vessel;



a pump interconnects the second end of said first section of residual heat removal conduit with said second section of residual heat removal conduit; and

a step nozzle of an inside diameter  $D_3$  and a length  $L$  interconnects said hot leg to the first end of said first section of residual heat removal conduit, with  $D_3/D_1 \geq 0.55$ , with  $D_3/D_2 \geq 1.9$  and  $L/D_3 \geq 1.44$ .

4,957,694

## REMOVAL OF OBSTRUCTIONS IN THIMBLES OF NUCLEAR POWER REACTORS

Haydn C. Doughty, Bourbonnais, Ill., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 277,830, Nov. 30, 1988, Pat. No. 4,885,124.

This application Sep. 28, 1989, Ser. No. 414,160

Int. Cl.<sup>5</sup> G21C 19/00

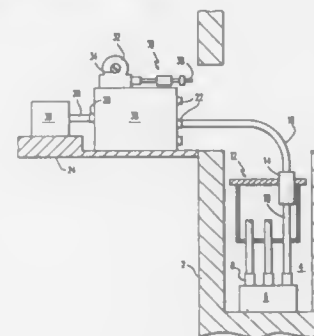
U.S. Cl. 376—310

5 Claims

1. In the operation of a power reactor having a pressure vessel containing a core and a plurality of thimbles extending into the core to provide passages for a flux detector, a movable support member located outside of the pressure vessel and carrying a plurality of tubular members each detachably connected to a respective thimble, and transfer means normally coupled to the tubular members for introducing a flux detector into a selected thimble via a respective tubular member, a method for removing obstructions from a selected thimble while the reactor remains in operation, said method comprising:

disconnecting at least the respective tubular member from the transfer means;

introducing an obstruction removal device into the respective tubular member; and



advancing the obstruction removal device through the respective tubular member and into the selected thimble to the location of the obstruction.

4,957,695

## NUCLEAR REACTOR FUEL ASSEMBLY

Matthias Rudolph, Weisendorf, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

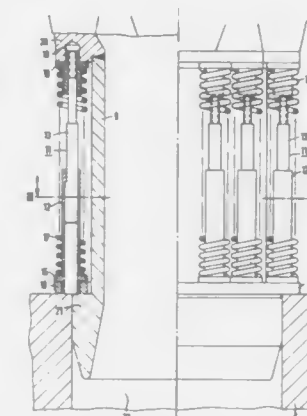
Continuation of Ser. No. 149,545, Jan. 28, 1988, abandoned. This application Dec. 4, 1989, Ser. No. 449,365

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1987, 3702506

Int. Cl.<sup>5</sup> G21C 1/01, 3/32

U.S. Cl. 376—364

6 Claims



1. In a nuclear reactor having a support structure, the improvement comprising a nuclear reactor fuel assembly having a plurality of fuel rods filled with nuclear fuel, and a fuel assembly base having a longitudinal axis, a jacket, first and second shoulders on the outside of said jacket, a resilient support element in the form of a shock-absorbing telescopic leg being parallel to said longitudinal axis and clamped between said shoulders on the outside of said jacket, said shock-absorbing telescopic leg having an upper end engaging said first shoulder and a lower end displaceable in longitudinal direction, and a ring connected to said lower end of said shock-absorbing telescopic leg, said ring being seated on said fuel assembly base coaxially with said longitudinal axis and being displaceable relative to and in longitudinal direction of said fuel assembly base, said ring forming a contact surface for mounting said ring on the support structure, and said second shoulder forming a stop surface for said lower end of said shock-absorbing telescopic leg.

4,957,696

## FUEL ELEMENT ROD FOR A WATER-COOLED NUCLEAR REACTOR

Roger L. Marechal, Sainte Genevieve des Bois, and Pierre Mauny, Jouy en Josas, both of France, assignors to Commissariat a l'Energie Atomique, France

Filed Nov. 9, 1989, Ser. No. 434,879

Claims priority, application France, Nov. 22, 1988, 88 15155

Int. Cl.<sup>5</sup> G21C 3/00

U.S. Cl. 376—419

1 Claim



1. Fuel element rod for pressurized water-cooled nuclear reactor, having a cylindrical can (2) made from an alloy transparent to neutrons and sealed at each of its ends by a plug (3, 4), namely upper plug (3) and lower plug (4), and having a first portion in which are stacked fuel material pellets (6) and a second portion or expansion chamber (5) containing a compressed spring (9) bearing at one end on the upper plug (3) and at the other end on the fuel pellet stack (6) which it maintains in position, characterized in that the spring is used both for maintaining in place the pellets and for compensating the absorption of the neutrons in said expansion chamber and it is made from hafnium.

4,957,697

## NUCLEAR FUEL ROD SUPPORT GRID WITH GENERALLY S-SHAPED SPRING STRUCTURES

Norio Wada, Ibaraki, Japan, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

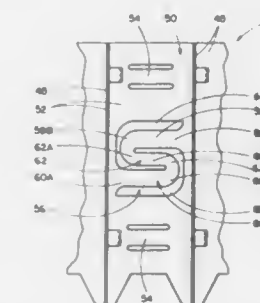
Filed Sep. 6, 1988, Ser. No. 241,427

Claims priority, application Japan, Sep. 10, 1987, 62-227169

Int. Cl.<sup>5</sup> G21C 3/34

U.S. Cl. 376—442

15 Claims



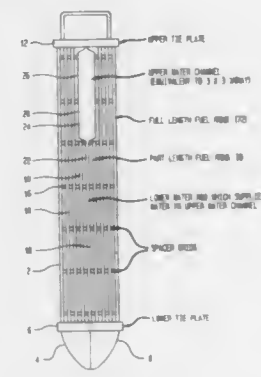
1. In a nuclear fuel rod grid including a plurality of inner and



outer straps being interleaved with one another to form a matrix of hollow cells, each cell for receiving one fuel rod and being defined by pairs of opposing wall sections of said straps which wall sections are shared with adjacent cells, each cell having a central longitudinal axis, a fuel rod engaging spring structure of resiliently yieldable material being integrally formed on each wall section of said inner straps, said spring structure comprising:

- (a) a pair of spaced apart opposite outer portions, each outer portion having an inner end and an outer end, said inner and outer ends of one outer portion being located the reverse of said inner and outer ends of the other outer portion, said outer portions being integrally attached only at their outer ends to said respective wall section so as to define a pair of opposite ends of said spring structure being the only locations at which said spring structure is attached to said respective wall section, said outer portions extending in generally transverse relation to the direction of said central longitudinal axis of said one cell; and
- (b) a middle portion having a pair of outer ends and being disposed between and in laterally spaced relation from said outer portions, said middle portion being integrally connected at its outer ends with respective inner ends of said outer portions and extending in generally transverse relation to the direction of said central longitudinal axis of said one cell;
- (c) said inner ends of said outer portions and said outer ends of said middle portion having generally arcuate configurations.

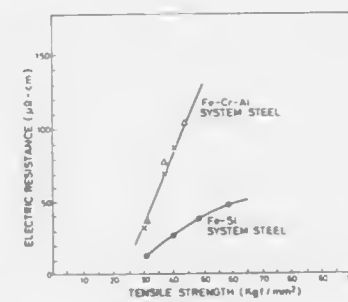
**4,957,698**  
**ADVANCED BOILING WATER REACTOR FUEL ASSEMBLY DESIGN**  
Gerald L. Ritter, Richland, Wash., assignor to Advanced Nuclear Fuels Corporation, Bellevue, Wash.  
Filed Feb. 17, 1989, Ser. No. 312,553  
Int. Cl.<sup>5</sup> G21C 3/32  
U.S. Cl. 376-444



- 1. A fuel assembly for a boiling water nuclear reactor comprising:
  - an outer flow channel;
  - a plurality of fuel rods within said outer flow channel and parallel thereto, some of said fuel rods extending the full length of said outer flow channel;
  - an inner flow channel positioned among said fuel rods and generally parallel thereto, said inner flow channel being so constructed and arranged as to admit water at its lower end and to permit water to flow substantially the entire length thereof, said inner flow channel comprising a lower portion having a substantially uniform cross section and an upper portion having a substantially uniform cross section substantially greater than that of said lower portion;

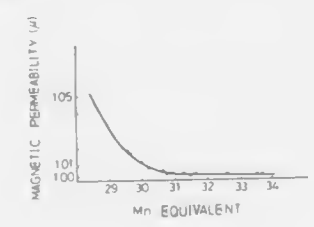
said upper portion comprising a plurality of branches connected to the upper end of said lower portion; and a plurality of partial-length fuel rods adjacent to said lower portion of said inner flow channel and extending substantially from the bottom of said assembly to the lower end of said upper portion of said inner flow channel.

**4,957,699**  
**SOFT MAGNETIC CR-AL STEEL**  
Yoshinobu Honkura, Hideki Fujii, and Koji Murata, all of Aichi, Japan, assignors to Aichi Steel Works Ltd., Aichi, Japan  
PCT No. PCT/JP88/00084, § 371 Date Apr. 28, 1989, § 102(e) Date Apr. 28, 1989, PCT Pub. No. WO89/00210, PCT Pub. Date Jan. 12, 1989  
PCT Filed Jan. 29, 1988, Ser. No. 217,001  
Claims priority, application Japan, Jun. 30, 1987, 62-162929 Int. Cl.<sup>5</sup> C22C 38/06, 38/18  
U.S. Cl. 420-41



- 4. A soft magnetic steel consisting by weight, of 0.015% or lower C+N, 0.20% or lower Si, 0.20% or lower Mn, 7 to 13% Cr, 2 to 5% Al, 0.08% or lower Ti, at least one of the ingredients selected from 0.050% or lower S, 0.050% or lower Se, and 0.030% or lower Pb; together with 0.20% or lower Zr and/or 0.030% or lower Te, and the balance of Fe with impurities having a tensile strength of 44 Kbf/mm<sup>2</sup> or lower, a limiting workability of 60% or higher, a coercive force of 0.7 Oe or lower, a magnetic flux density of 13,000 G or higher, a magnetic response with relaxation time of 0.7 msec or shorter, and an electric resistance of 90 μΩ-cm or higher.

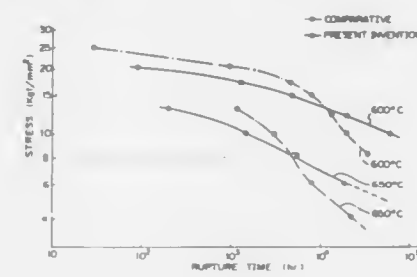
**4,957,700**  
**HIGH STRENGTH NON-MAGNETIC STAINLESS STEEL**  
Yoshinobu Honkura, Kounan, Toru Matsuo, and Kouji Murata, both of Tokai, Japan, assignors to Aichi Steel Works, Ltd., Aichi, Japan  
Continuation of Ser. No. 222,382, Jul. 19, 1988, abandoned, which is a continuation of Ser. No. 006,241, Jan. 20, 1987, abandoned, which is a continuation of Ser. No. 714,044, Mar. 18, 1985, abandoned. This application Jul. 5, 1989, Ser. No. 376,907  
Claims priority, application Japan, Mar. 20, 1984, 59-53695 Int. Cl.<sup>5</sup> C22C 38/58  
U.S. Cl. 420-59



- 1. A high strength non-magnetic stainless steel consisting essentially of, by weight, not more than 0.20% carbon, not

more than 1.00% silicon, 14-15.76% manganese, not more than 0.003% sulfur, 0.2-1.0% nickel, 15-19% chromium, 0.30-0.40% nitrogen, said carbon and said nitrogen in total constituting 0.40-0.55% and the manganese equivalent being 30-33, the remainder being iron together with impurities, said steel having a magnetic permeability of less than 1.01 after processing.

**4,957,701**  
**HIGH-STRENGTH HIGH-CR FERRITIC HEAT-RESISTANT STEEL**  
Fujimitsu Masuyama, Takashi Daikoku, both of Nagasaki; Hisao Haneda, Tokyo; Kunihiro Yoshikawa, Amagasaki; Hiroshi Teranishi, Amagasaki, and Atsuro Iseda, Amagasaki, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka and Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, both of Japan  
Division of Ser. No. 917,502, Oct. 10, 1986, Pat. No. 4,799,972. This application Aug. 15, 1988, Ser. No. 232,227  
Claims priority, application Japan, Oct. 14, 1985, 60-226993; Oct. 14, 1985, 60-226994  
Int. Cl.<sup>5</sup> C22C 38/22, 38/26, 38/24  
U.S. Cl. 420-69



- 1. A high-strength high-Cr ferritic, heat-resistant steel exhibiting improved high-temperature, long-term creep strength which corresponds to a creep rupture time of at least 2600 hrs., measured in an accelerated creep test carried out at conditions of 650° C. x 8 kgf/mm<sup>2</sup>, which consists essentially of, by weight %:

C: 0.05-0.15%,	Si: not more than 1.0%,
Mn: 0.2-1.0%,	P: not more than 0.025%,
S: not more than 0.015%,	Ni: not more than 0.8%,
Cr: 8.0-13%,	Mo: 0.5-3%,
W: 0.5-3.0%,	sol. Al: 0.005-0.04%,
N: 0.02-0.07%,	V: 0.1-0.4%,
Nb: 0.01-0.05%,	
B: 0-0.02%,	

- at least one of Ca, Ti, Zr, Y, La, and Ce each in an amount of 0-0.2%, and the balance Fe and incidental impurities, the A<sub>c1</sub> point defined by Formula (1) below being 850° C. or higher, and the Cr-equivalent defined by Formula (2) below being 17 or less.

(1)  $A_{c1} (^{\circ}C) = 765 - 500C - 450N + 30Si - 25Mn + 25Mo + 15W + 11Cr + 50V + 30Nb - 30Ni + 30 \text{ sol. Al (weight \%)}$

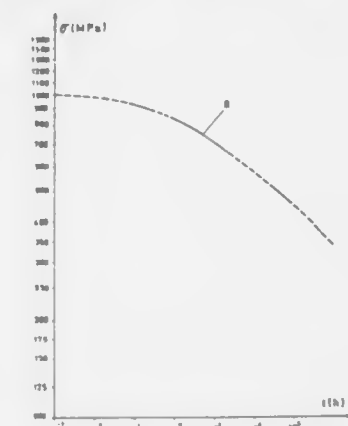
(2)  $Cr\text{-equivalent} = Cr - 40C - 30N + 6Si - 2Mn + 4Mo + 1.5W + 11V + 5Nb - 4Ni + 12 \text{ soln. Al.}$

**4,957,702**  
**AIR-COOLING DUPLEX BAINITE-MARTENSITE STEELS**  
Hongsheng Fang, Yankang Zheng, Xiyuan Chen, Donghao Chen, and Rufa Zhao, all of Beijing, China, assignors to Qinghua University, Beijing, China  
Filed Dec. 12, 1988, Ser. No. 283,491  
Claims priority, application China, Apr. 30, 1988, 88102230 Int. Cl.<sup>5</sup> C22C 38/32  
U.S. Cl. 420-104

carbon	0.15 to 0.70
manganese	2.1 to 3.5
silicon	0.1 to 2.0
boron	0.0005 to 0.005
chromium	over 1% to 2.0
tungsten	up to 1.5
molybdenum	up to 1.5
vanadium	up to 0.15
sulfur	up to 0.2
calcium	up to 0.1
titanium	up to 0.1
rare earth elements	0 to 0.2 total
iron	balance, except for incidental steelmaking impurities.

wherein the combined manganese and silicon content is at least about 3%; silicon is at least about 0.6% when carbon is less than about 0.5%, and the steel has a hardenable diameter of at least 35 mm.

**4,957,703**  
**PRECIPITATION-HARDENABLE NICKEL-BASE SUPERALLOY WITH IMPROVED MECHANICAL PROPERTIES IN THE TEMPERATURE RANGE FROM 600 TO 750 DEGREES CELSIUS**  
Peter Lawrence, Soulbury, England; Mohamed Nazmy, Fislisbach, and Markus Staabli, Dettikon, both of Switzerland, assignors to Asea Brown Boveri Ltd., Baden, Switzerland  
Filed Mar. 2, 1989, Ser. No. 318,181  
Claims priority, application Switzerland, Mar. 2, 1988, 755/88 Int. Cl.<sup>5</sup> C22C 19/05  
U.S. Cl. 420-448



- 1. A precipitation-hardenable nickel-base superalloy with improved mechanical properties in the temperature range from 600 to 750° C., consisting essentially of:
  - Cr=12-15 percent by weight
  - Co=3-4.5 percent by weight

W=1-3.5 percent by weight  
Ta=4-5.5 percent by weight  
Al=3-4.3 percent by weight  
Ti=4-5 percent by weight  
Hf=0-2.5 percent by weight  
B=0-0.02 percent by weight  
Zr=0.01-0.06 percent by weight  
C=0.05-0.07 percent by weight  
Ni=remainder.

#### 4,957,704 METHOD OF CORROSION INHIBITION USING HYDROCARBYL POLYCARBOXYLATES COMPOSITIONS

Brent R. Dohner, Conroe, Tex., assignor to Pennzoil Products Company, Houston, Tex.

Filed Aug. 9, 1988, Ser. No. 230,344

Int. Cl.<sup>3</sup> C23F 11/00; C07D 307/60

U.S. Cl. 422-14

6 Claims

1. A method for inhibiting corrosion on a metal surface, comprising contacting the metal surface with an aqueous solution including a corrosion inhibitor comprising a hydrocarbyl polycarboxylate compound formed by the reaction of water and a neutralizing agent with a hydrocarbyl poly(succinic anhydride)<sub>x</sub>, wherein R is a hydrocarbyl group derived from a crude or refined hydrocarbon wax having a melting point less than 150° F and x is an integer of from 3 to 8.

#### 4,957,705 OXYGEN GAS CONCENTRATION-DETECTING APPARATUS

Akira Uchikawa, Iseaki, Japan, assignor to Japan Electronic Control Systems Co., Ltd., Gunma, Japan

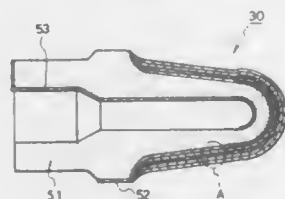
Filed Nov. 6, 1987, Ser. No. 117,516

Claims priority, application Japan, Nov. 10, 1986, 61-171348[U]; May 25, 1987, 62-125752

Int. Cl.<sup>3</sup> G01N 27/16

U.S. Cl. 422-94

14 Claims



1. An oxygen concentration-detecting apparatus comprising a ceramic substrate for generating an electromotive force between a first surface contacted with a reference gas and a second surface contacted with a gas to be detected according to the ratio of the concentration of oxygen gas O<sub>2</sub> between said two gases, a pair of electrode members formed at parts of said first and second surfaces, respectively, of said ceramic substrate, to detect said electromotive force, a first oxidation catalyst layer for promoting mainly oxidation reaction of unburnt components, which is arranged to cover said second surface of said ceramic substrate and an outer surface of the electrode member on the second surface, a laminate comprising a protecting layer of a metal oxide covering the outer surface of said ceramic substrate and a reduction catalyst layer for promoting mainly reduction reaction of nitrogen oxides NO<sub>x</sub>, and a second oxidation catalyst layer for promoting mainly oxidation reaction of hydrogen gas H<sub>2</sub>, which is arranged to cover an outer surface of said laminate.

#### 4,957,706 DEVICE FOR PRESERVING STERILITY DURING SAMPLING FROM CULTURE MEDIUM CONTAINERS

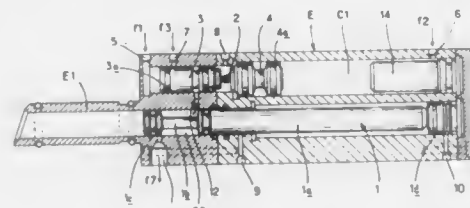
Jean-Louis Romette, Orrouy, and Joël G. Fourreau, Compiègne, both of France, assignors to Centre National de la Recherche Scientifique, Paris, France

Filed May 21, 1987, Ser. No. 52,409

Claims priority, application France, May 22, 1986, 86 07329  
Int. Cl.<sup>3</sup> G01N 1/10

U.S. Cl. 422-100

15 Claims



1. A device for preserving sterility during the taking of a sample for analysis from culture medium containers, said device comprising a holder containing a first, sampling chamber which encloses a first sliding piston fitted at one end with means for obtaining a sample for analysis, and a second dilution chamber linked to the first chamber by a duct, said second chamber being divided into two parts by a bearing means against which abut at least second and third pistons which may slide respectively on opposite sides of the bearing means, said second chamber including at least one inlet for dilution solvent.

#### 4,957,707 THERMAL HAZARD EVALUATION

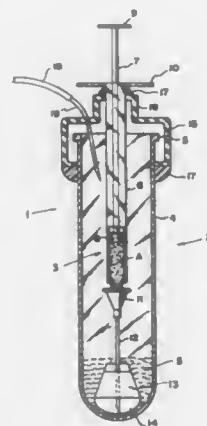
Thomas C. Hofelich, Midland, and Michael S. LaBean, Auburn, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 31, 1988, Ser. No. 238,889

Int. Cl.<sup>3</sup> B01L 3/00

U.S. Cl. 422-102

11 Claims



1. A mixing cell adapted for use in testing the reaction resulting from the mixing of different substances, said cell comprising a first container open at one end and closed at its other end for accommodating a sample of one substance; a second container for accommodating a sample of another substance, said second container occupying a position in which at least a portion thereof is accommodated within said first container; flexible and resilient means rockably mounting said second container in said position and forming a seal for the open end of said first container; operating means in communication with said second container and accessible from outside both of said

containers for discharging a substance from said second container onto a substance in said first container; and agitating means carried by said second container adjacent said other end of said first container and engageable with a substance in said first container for agitating such substance in response to rocking movement of said second container relative to said first container.

#### 4,957,708 PROCESS AND APPARATUS FOR FORMING POLYMERIC SOLUTIONS

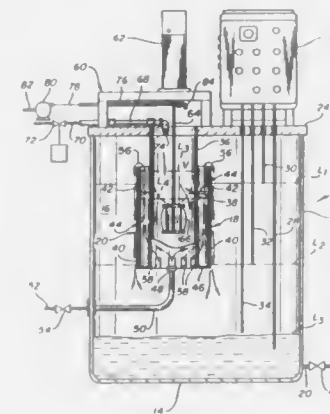
James P. Dutton, Vienna, N.J., and Ronald Beech, Zanesville, Ohio, assignors to Ashland Oil, Inc., Russell, Ky.

Continuation of Ser. No. 103,968, Oct. 5, 1987. This application Oct. 26, 1989, Ser. No. 427,459

Int. Cl.<sup>3</sup> G05D 9/00

U.S. Cl. 422-106

5 Claims



1. An apparatus for forming a polymeric solution including a vessel defining a storage chamber therein and a mixing assembly, said mixing assembly comprising:

- a cylindrically-shaped inner wall member extending downwardly into said vessel, a bottom portion of said inner wall member having slots defining orifices therein;
- a bottom member mounted to a lower portion of said inner wall member and defining a mixing chamber therein;
- a cylindrically-shaped outer wall member co-axially disposed about said inner wall member and mounted to said bottom member and defining a solution chamber, said outer wall member extending upwardly from said bottom member defining weir means;
- a source containing polymer, conduit means for introducing a polymer and conduit means for introducing solvent into said mixing chamber; and
- agitator means including an agitator member disposed in said mixing chamber at a point intermediate said bottom member and said weir means of said outer wall member for forming a vortex of said polymeric solution into which said polymer and said solvent are introduced for admixing and for causing a resulting polymeric solution to pass through said orifices in said inner wall member, through said solution chamber and overflow said weir means of said outer wall member into said storage chamber, said agitator means forming said vortex for avoiding formation of fish eyes of said polymer.

#### 4,957,709 REACTOR SYSTEM FOR OLEFIN CONVERSION AND ETHERIFICATION

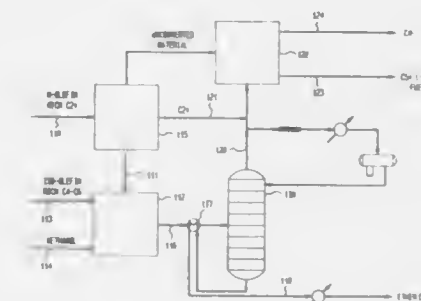
Mohsen N. Harandi, Lawrenceville, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 189,450, May 2, 1988, Pat. No. 4,886,925. This application Oct. 11, 1989, Ser. No. 419,927

Int. Cl.<sup>3</sup> B01J 14/00, 8/00

U.S. Cl. 422-134

4 Claims



1. A reactor system for producing liquid fuel mixtures from olefin-containing feedstock and lower alcohols by multistage etherification, olefin interconversion and oligomerization reactions comprising:

- first reactor means for contacting an olefinic hydrocarbon feedstock rich in C<sub>2</sub>+n-alkenes with acidic, medium pore metallosilicate catalyst in an olefin interconversion zone under mild olefin interconversion conditions to produce a reactor first effluent comprising C<sub>4</sub>-C<sub>6</sub> alkenes rich in isoalkenes, C<sub>7</sub>+olefinic gasoline boiling range hydrocarbons and unconverted hydrocarbons;
- first separation means for separating the first reactor effluent to provide a first effluent stream comprising C<sub>4</sub>-C<sub>6</sub> alkenes rich in isoalkenes, a second effluent stream comprising C<sub>7</sub>+olefinic gasoline boiling range hydrocarbons and a third effluent stream comprising unconverted hydrocarbons;
- second reactor, receivably connected to said first separation means, comprising means for reacting said first effluent stream with lower aliphatic alcohol in the presence of an acid etherification catalyst under reaction conditions effective to produce a mixture of tertiary-alkyl ethers;
- second separation means for recovering a liquid product stream rich in tertiary-alkyl ethers and recovering a light hydrocarbon fraction containing unreacted alkenes from the reaction effluent of the first reactor means along with unreacted alcohol;
- third reactor, receivably connected to said first and second separation means, comprising means for contacting the recovered light hydrocarbon and alcohol fraction from the second separation means concurrently with the second and third effluent streams from the first separation means with an acid and oxygenate conversion catalyst to convert at least a portion of said unreacted alkenes and alcohol to heavier liquid hydrocarbon product, including C<sub>10</sub>+distillate range hydrocarbons, aromatics and/or C<sub>5</sub>-C<sub>9</sub> gasoline boiling range hydrocarbons.



4,957,710

## CATALYTIC COMBUSTION TYPE EXHAUST GAS PROCESSING DEVICE AND DRYING FURNACE FOR USE IN COATING UTILIZING THE SAME

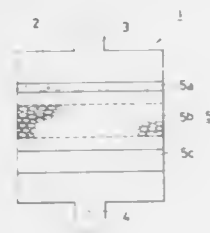
Teizi Nagai; Yasuo Tokushima; Sadao Kubota, all of Toyota; Kenichiro Suzuki, Aichi; Yoshiyasu Fujitani, Nagoya; Taisuke Yoshimoto, Nagoya; Hideaki Muraki, Nagoya, and Hideo Tachi, Aichi, all of Japan, assignors to Toyota Motor Corporation, Toyota; Kabushiki Kaisha Toyota Chou Kenkyusho, Aichi and Trinity Industrial Corp., Tokyo, all of Japan. Continuation of Ser. No. 817,722, Jan. 10, 1986, abandoned. This application Mar. 25, 1988, Ser. No. 175,671.

Claims priority, application Japan, Jan. 11, 1985, 60-1503; Jan. 11, 1985, 60-1504; Jan. 11, 1985, 60-1505.

Int. Cl.<sup>5</sup> B01J 8/04, 23/00, 23/42, 23/44

U.S. Cl. 422-171

8 Claims



1. A catalytic combustion-type processing device for exhaust gas discharged from a furnace for heating and drying a coating on an object and which exhaust gas contains volatile noxious/smelly components, said device comprising: a catalytic reactor housing comprising wall means defining a chamber having an inlet and an outlet for a gas stream following in a direction along a path; a first catalyst layer disposed in said chamber for dehydrogenating into aldehydes noxious/smelly components contained in a gas stream, said first catalyst layer comprising, in sequence along said path, a first sub-layer and a second sub-layer, each said sub-layer comprising at least one platinum group metal selected from the group consisting of platinum, palladium, and mixtures thereof, said at least one platinum group metal being carried on a support; said support, in said first sub-layer being made of heat-resistant fibers; and a second catalyst layer disposed in said chamber downstream of said second sub-layer of said first catalyst layer, said second catalyst layer comprising a copper-cerium compound carried on a support, for oxidatively decomposing said aldehydes and thereby effectively decomposing noxious/smelly components.

4,957,711

## SINGLE CRYSTAL GROWING APPARATUS

Suk K. Min; Seung C. Park, and Chul W. Han, all of Seoul, Rep. of Korea, assignors to Korea Advanced Institute of Science and Technology, Seoul, Rep. of Korea.

Filed Apr. 25, 1989, Ser. No. 344,293

Claims priority, application Rep. of Korea, Jul. 5, 1988, 8305[U]

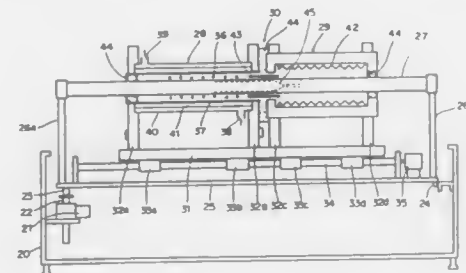
Int. Cl.<sup>5</sup> C30B 11/00, 29/40, 35/00

U.S. Cl. 422-245

12 Claims

1. A single crystal growing apparatus, which comprises a growing furnace including a high temperature part electric furnace and a low temperature part electric furnace, said growing furnace being at an outer peripheral surface of a quartz tube which supports a quartz reaction tube, the growing furnace being elongated and movable in the direction of elongation, said quartz tube being supported so as to be tiltable in a plane perpendicular to the direction of elongation, said high temperature part electric furnace having a heater wire disposed outside of the quartz tube, a cylindrical protecting quartz tube disposed outside of the heater wire, and a cylindrical double quartz tube and disposed at the outside of the protecting quartz

tube which is provided with an inlet and an outlet through an outer wall of said cylindrical double quartz tube, and a gold film deposited at an inner wall of said cylindrical double quartz



tube, said protecting quartz tube blocking direct heating of the gold film from the heater wire, said cylindrical double quartz tube having an interior between said inlet and said outlet through which cooling water or gas may circulate.

4,957,712

## APPARATUS FOR MANUFACTURING SINGLE SILICON CRYSTAL

Yoshinobu Shima; Masanori Ohmura; Akira Ohtani, and Kenji Araki, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan.

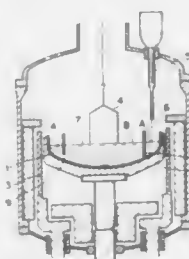
Filed Dec. 27, 1989, Ser. No. 457,322

Claims priority, application Japan, May 30, 1989, 1-136448

Int. Cl.<sup>5</sup> C30B 35/00

U.S. Cl. 422-249

9 Claims



1. An apparatus for manufacturing a single silicon crystal comprising: a quartz crucible accommodated into a graphite crucible, molten silicon being in said quartz crucible; a partition member partitioning molten silicon material in said quartz crucible into a single silicon growing portion on the inner side and a material melting portion on the outer side, said material melting portion being replenished with raw materials and a single silicon crystal being pulled from said single silicon crystal growing portion; a heater for maintaining said molten silicon material in the single silicon growing portion at a temperature appropriate for growing the single silicon crystal and for supplying heat for melting said raw materials fed into said material melting portion, said heater being arranged to surround said graphite crucible; small holes made in said partition member, said molten silicon material moving from said material melting portion to said single silicon growing portion through said small holes; and opaque quartz glass, which said partition member is made of.

4,957,713

## APPARATUS FOR GROWING SHAPED SINGLE CRYSTALS

Dmitry Y. Kravetsky, ulitsa Bibliotchnaya, 13, kv. 91; Lev M. Zatulovsky, Orlikov pereulok, 8, kv. 55; Leonid P. Egorov, ulitsa Profsojuznaya, 75, korpus 1, kv. 92; Boris B. Pelts, ulitsa Lesnaya, 63/43, kv. 157; Leonid S. Okun, ulitsa Udaltsova, 4, kv. 306; Efim A. Freiman, ulitsa 2-aya Vladimirovskaya, 15, korpus 1, kv. 53; Viktor V. Averyanov, ulitsa Energeticheskaya, 10, korpus 2, kv. 95, and Alexandr L. Alishoev, Kronshtadtsky bulvar, 13, korpus 2, kv. 168, all of Moscow, U.S.S.R.

PCT No. PCT/SU87/00118, § 371 Date Jul. 20, 1988, § 102(e) Date Jul. 20, 1988, PCT Pub. No. WO88/03968, PCT Pub. Date Jun. 2, 1988.

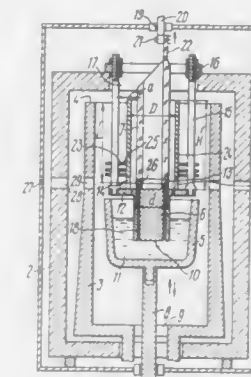
PCT Filed Oct. 23, 1987, Ser. No. 241,978

Claims priority, application U.S.S.R., Nov. 26, 1986, 4149059

Int. Cl.<sup>5</sup> C30B 15/34

U.S. Cl. 422-249

2 Claims



1. An apparatus for growing shaped single crystals of high-melting transparent metal compounds, comprising a sealed chamber housing, a heat insulating unit with a heater in the form of a sleeve accommodating a crucible mounted for axial reciprocations in the sleeve, a shape imparting member in the form of a cylinder having through capillary orifices for supplying a melt from the crucible into a zone of crystallization of a single crystal located above an upper end of the shape-imparting member which is configured to have a cross-sectional shape of the single crystal being grown and which is located below an upper extremity of the heater, and horizontally extending planar thermal shields having coaxial openings for the single crystals being grown to pass therethrough, and an auxiliary thermal shield in the form of a hollow cylinder comprised of a material having a high melting point, said thermal shield extending in the openings of the planar thermal shields coaxially therewith, said thermal shield being situated in close proximity with a crystallization front of said crystal.

4,957,714

## SOLVENT EXTRACTION PROCESS

Stephen M. Olafson; Roy G. Lewis, and Gary A. Kordosky, all of Tucson, Ariz., assignors to Henkel Corporation, Ambler, Pa.

Filed Apr. 28, 1988, Ser. No. 187,111

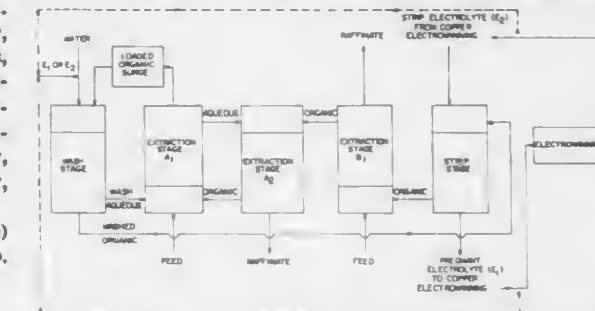
Int. Cl.<sup>5</sup> C01G 3/00

U.S. Cl. 423-24

17 Claims

1. In a solvent extraction process for recovery of copper from an aqueous feedstock containing copper and iron values wherein the feedstock is contacted with an organic phase comprising a reagent composition including an hydroxy aryl oxime extractant and in which a copper loaded organic phase is provided by extraction of said copper values from said aqueous feedstock and wherein contact between the feedstock and the organic phase is accomplished by means of at least one mixer-settler extraction stage and at least one strip stage to

provide a pregnant copper electrolyte from which the copper is electrowon to provide cathode copper and a stripped electrolyte the improvement comprising washing said copper



loaded organic phase prior to stripping said copper values therefrom with an aqueous scrub solution containing at least a portion of electrolyte thereby providing an increased copper to iron ratio by weight in said copper loaded organic phase.

4,957,715

## GAS TREATMENT PROCESS

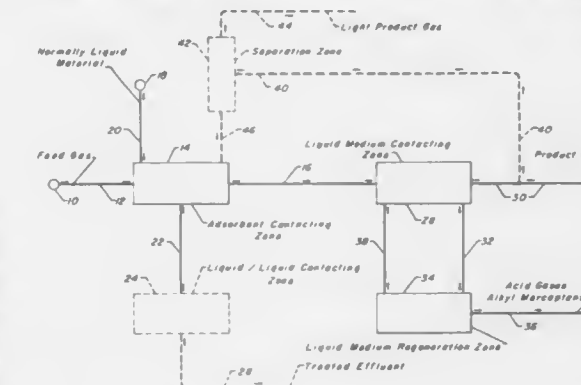
Bhadra S. Grover, Pound Ridge, N.Y., and Moez M. Nagji, Stamford, Conn., assignors to UOP, Des Plaines, Ill.

Filed Apr. 15, 1988, Ser. No. 181,780

Int. Cl.<sup>5</sup> C01B 17/16, 31/20; B01D 53/02, 11/00

U.S. Cl. 423-228

30 Claims



1. A process for the removal of carbon dioxide, hydrogen sulfide and alkyl mercaptans from a feed gas containing hydrocarbons having from 1 to about 8 carbon atoms per molecule comprising:

- (a) contacting the feed gas with an adsorbent capable of removing hydrogen sulfide and alkyl mercaptans from the feed gas at effective conditions to produce a treated gas having reduced concentrations of hydrogen sulfide and alkyl mercaptans relative to the feed gas;
- (b) contacting the treated gas with a liquid medium capable of removing carbon dioxide, hydrogen sulfide and alkyl mercaptans from the treated gas at effective conditions to produce a product gas having reduced concentrations of carbon dioxide, hydrogen sulfide and alkyl mercaptans relative to the treated gas and an acid gas-rich effluent;
- (c) separating the product gas into a low boiling fraction and a high boiling fraction, said high boiling fraction comprising at least 50% by weight of hydrocarbons having at least 4 carbon atoms per molecule;
- (d) contacting a spent adsorbent laden with hydrogen sulfide and alkyl mercaptans with a normally liquid regeneration medium comprising at least a portion of said high boiling fraction at effective desorption conditions to maintain said regeneration medium substantially in the vapor phase and produce a regenerated adsorbent and a regeneration effluent having increased concentrations of hydrogen sulfide and alkyl mercaptans; and

- (e) utilizing the regenerated adsorbent as at least a portion of the adsorbent in step (a).

**4,957,716**  
**METHOD FOR REMOVAL OF SO<sub>2</sub> AND NO<sub>x</sub> FROM COMBUSTION GASES BY METAL CHELATION AND THERMAL REDUCTION**

Joseph E. Ciechanowicz, Sunnyvale, and Patrick Maroney, Orinda, both of Calif., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Nov. 21, 1988, Ser. No. 274,514

Int. Cl.<sup>5</sup> C01B 17/00, 21/00

U.S. Cl. 423—235

11 Claims

1. A process for removal of sulfur dioxide and nitrogen oxides from a gaseous mixture comprising the steps of
- (a) contacting in a first reaction zone a gas mixture containing sulfur dioxide and nitrogen oxides with a first aqueous mixture at a pH in the range of about 4.5 to 7, said first mixture comprising a first sorbent suitable for removing of sulfur dioxide and nitrogen oxides from said gas mixture, in the presence of a metal chelating agent to convert said nitrogen oxides and sulfur dioxide to hydroxylaminedisulfonate and withdrawing said first aqueous mixture from said first reaction zone;
  - (b) mixing at least a portion of said hydroxylaminedisulfonate in a second reaction zone in an aqueous environment of a pH of 4.2 or less, thereby converting said hydroxylaminedisulfonate to ammonium ions and sulfate ions in a second aqueous solution;
  - (c) contacting said second aqueous solution with a second ammonium ion-absorbing sorbent suitable for removing ammonium ions from said second aqueous solution and separating said second sorbent from said second aqueous solution;
  - (d) eluting said second sorbent and exposing the eluted ammonium ions or ammonia to nitrogen oxides at a temperature sufficient to form nitrogen and water therefrom.

**4,957,717**  
**METHOD OF DISPOSAL OF ORGANIC CHLORINE COMPOUNDS BY COMBUSTION**

Seiichihiro Imamura, Kyoto; Sadao Terui; Kunio Sano, all of Hyogo; Kazuyoshi Nishikawa, Himeji, and Akira Inoue, Hirakata, both of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Filed Jan. 4, 1990, Ser. No. 461,120

Claims priority, application Japan, Jan. 9, 1989, 1-1161; Nov. 8, 1989, 1-292067

Int. Cl.<sup>5</sup> C01B 7/01, 3/22; B01D 53/36

U.S. Cl. 423—240

3 Claims

1. A method of disposing of organic chlorine compounds by combustion, the method comprising burning organic chlorine compounds in a gaseous atmosphere containing oxygen, the organic chlorine compounds being placed in contact with a catalyst of composite oxides selected from titanium-silicon composite oxides, titanium-zirconium composite oxides, and titanium-silicon-zirconium composite oxides, whereby the chlorine content is converted into hydrogen chloride (HCl).

**4,957,718**  
**PROCESS FOR REDUCING EMISSIONS OF SULFUR OXIDES AND COMPOSITION USEFUL IN SAME**

Jin S. Yoo, Flossmoor, Ill.; John A. Karch, Mariottsville; Alakananda A. Bhattacharyya, Colombia, both of Md., and Cecelia A. Radlowski, Riverside, Ill., assignors to UOP, Des Plaines, Ill.

Filed Nov. 24, 1987, Ser. No. 124,618

Int. Cl.<sup>5</sup> B01D 53/04

U.S. Cl. 423—244

15 Claims

1. A process for the removal of sulfur oxides from a gas which comprises (a) contacting said sulfur oxide-containing gas with at least one metal, oxygen-containing component at conditions effective to associate at least a portion of said sulfur

oxides with said component to reduce the amount of sulfur oxides in said gas; and (b) contacting said component containing associated sulfur oxides at conditions effective to reduce the amount of sulfur associated with said component, said component having an empirical formula selected from the following: (1)  $A_{1-x}M_xB_{1-y}M'_yO_{3-z}$ ; (2)  $A_2B_2O_{7-w}$ ; and (3)  $A_2M_uB_2M'_vO_{7-w}$  wherein A is selected from the group consisting of the lanthanide series metals, alkaline earth metals, sodium, potassium, cesium and mixtures thereof; M is different from A, B and M' and is selected from the group consisting of alkaline earth metals, Group VIII metals, manganese, lead, zinc, thorium, yttrium cerium and mixtures thereof; B and M' are different from each other and are independently selected from the group consisting of Group VIII metals, magnesium, titanium, manganese, copper, aluminum, niobium, tantalum, chromium, gallium, zirconium, vanadium, molybdenum, antimony, bismuth, tin, tungsten and mixtures thereof; x and y are independently in the range of 0 to 1 so that the total number of positive charges from A, M, B and M' in empirical formula (1) is within the range of about 5 to about 7, u and v are independently in the range of 0 to 2 so that the total number of positive charges for A, M, B and M' in empirical formula (3) is within the range of about 12 to about 16, z is in the range of about -0.5 to about 0.5 and w is in the range of about -1 to about 1, provided that not all of x, y and z are zero in empirical formula (1) and not all of u, v and w are zero in empirical formula (3), and further provided that when B is niobium, A is selected from sodium, potassium, cesium and mixtures thereof.

**4,957,719**  
**PROCESS FOR PREPARATION OF SYNTHETIC MAZZITE**

Toshiyuki Taga, and Senshi Kasahara, both of Shinnanyo, Japan, assignors to Tosoh Corporation, Shinnanyo, Japan

Continuation of Ser. No. 138,053, Dec. 28, 1987, abandoned.

This application Mar. 31, 1989, Ser. No. 332,422

Claims priority, application Japan, Dec. 26, 1986, 61-308889

Int. Cl.<sup>5</sup> C01B 33/28

U.S. Cl. 423—328

3 Claims

1. A process for the preparation of synthetic mazzite which comprises the steps of:
- (a) preparing a mixture of an aqueous solution of an alkali metal silicate, an aqueous solution of an alkali metal aluminate, an aqueous solution of an alkali metal hydroxide and a tetramethylammonium compound;
  - (b) heating and aging said mixture at a temperature of 25 to 50° C.;
  - (c) stirring said mixture for a period of time such that a transparent liquid phase substance is formed, said transparent liquid phase substance comprising the following oxide molar ratios:

SiO <sub>2</sub> /Al <sub>2</sub> O <sub>3</sub> =	8 to 25,
M <sub>2</sub> O/Al <sub>2</sub> O <sub>3</sub> =	7 to 30,
H <sub>2</sub> O/M <sub>2</sub> O =	10 to 14, and
TMA/SiO <sub>2</sub> =	0.05 to 0.25,

wherein M is an alkali metal cation and TMA is a tetramethylammonium ion;

- d. adding said transparent liquid phase substance to a starting mixture containing a silica source, an alumina source, and an alkali source to form a mixture comprising the following oxide molar ratios:

TMA/SiO <sub>2</sub> =	0.02 to 0.04,
SiO <sub>2</sub> /Al <sub>2</sub> O <sub>3</sub> =	5 to 30,
M <sub>2</sub> O/Al <sub>2</sub> O <sub>3</sub> =	0.5 to 10,
H <sub>2</sub> O/SiO <sub>2</sub> =	10 to 40, and

- e. crystallizing said mixture in d. at a temperature of from 90 to 140° C.

**4,957,720**  
**PROCESS FOR THE GENERATION OF MECHANICAL ENERGY IN THE AMMONIA OXIDATION STEP OF A NITRIC ACID PRODUCTION PROCESS**

Karl W. Wiegand; Michael Thiemann, and Erich Scheibler, all of Dortmund, Fed. Rep. of Germany, assignors to UHDE GmbH, Dortmund, Fed. Rep. of Germany

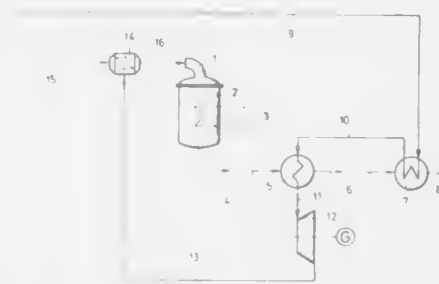
Filed Jan. 31, 1990, Ser. No. 472,754

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1989, 3903570

Int. Cl.<sup>5</sup> C01B 21/26, 21/40

U.S. Cl. 423—392

14 Claims



1. A process for generating mechanical energy in the ammonia oxidation step of a nitric acid production process, wherein the combustion of ammonia is carried out to form NO<sub>x</sub>, comprising evaporating and superheating liquid ammonia upstream of the oxidation step at a pressure which is a multiple of the combustion pressure by means of process heat of the NO<sub>x</sub> gases formed during the combustion of ammonia and then expanding the superheated ammonia in a turbine to generate mechanical energy.

**4,957,721**  
**PROCESS FOR REGENERATION OF ACTIVATED CARBON**

Jack J. Lonsinger, and Deborah A. Lonsinger, both of 508 Clayview Dr., Liberty, Mo. 64068

Filed Jun. 28, 1988, Ser. No. 212,610

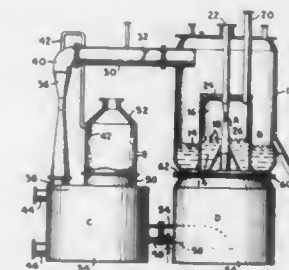
Int. Cl.<sup>5</sup> C01B 31/02

U.S. Cl. 423—461

13 Claims

1. A process for activating carbonaceous material having volatile and nonvolatile contaminants, said process comprising:
- (A) providing an activation zone wherein the reaction  $C + H_2O \rightarrow CO + H_2$  occurs;
  - (B) providing immediately adjacent said activation zone a drying zone to which gases from said activation zone are directed to remove water from said material;
  - (C) providing a gas incineration zone removed from the downstream of both said regeneration and drying zones;
  - (D) feeding a carbonaceous material to be activated to said drying zone;

- (E) drying said material to remove said volatiles and substantially all of said water;
- (F) moving said dried material directly to said activation zone without further processing;
- (G) raising the temperature in said activation zone while supplying sufficient water to effect said reaction and to volatilize and oxidize at least some of the contaminants;
- (H) directing the off gases and water vapor from steps (E) and (G) to a mixing zone where they are mixed with air;



- (I) incinerating the output from step (H) to effect oxidation of said volatilized contaminants;
- (J) directing said incinerated output from step (I) to a conditioning zone;
- (K) conditioning the output from step (I) by adding to said step (I) output fuel which when burned acts as a reductant to consume any residual oxygen present; and
- (L) returning the conditioned gas from step (I) to said activation zone.

**4,957,722**  
**PRODUCTION OF PARTIALLY CALCINED CARBONACEOUS REDUCTANT USING STEAM**

Raouf O. Loutfy, Tucson, Ariz.; Kirk R. Weisbrod, Celina, Tex., and James C. Withers, Tucson, Ariz., assignors to Aluminum Company of America, Pittsburgh, Pa.

Division of Ser. No. 684,935, Dec. 21, 1984, Pat. No. 4,836,998.

This application Apr. 3, 1989, Ser. No. 332,029

Int. Cl.<sup>5</sup> C01F 7/60, 5/32; C01B 31/02, 9/02

- U.S. Cl. 423—496
- 30 Claims
1. A method of producing chlorides by the chlorination of a material selected from the group consisting of aluminous materials and metal oxides other than aluminium oxide in the presence of a reductant comprising:
- (a) calcining a hydrogen or hydrocarbon-containing carbonaceous material with added steam at a temperature of from about 650° C. to about 1150° C. for a time period sufficient to oxidize substantially all precursors of chlorinated hydrocarbons and to form a reductant; and
  - (b) chlorinating a material selected from the group consisting of aluminous materials and metal oxides other than aluminium oxide in the presence of said reductant formed in step (a).

**4,957,723**  
**CONDUCTIVE COATING COMPOSITION COMPRISING GRAPHITE INTERCALATION COMPOUND AND PROCESS FOR PREPARING THE INTERCALATION COMPOUND**

Hiroshi Nishino, Yokohama, Japan, assignor to Arata Yamasaki and SK Kohki Co., Ltd., both of Tokyo, Japan

Filed Oct. 5, 1988, Ser. No. 253,519

Claims priority, application Japan, Oct. 6, 1987, 62-250642; Dec. 29, 1987, 62-333282; Feb. 16, 1988, 63-31759

Int. Cl.<sup>5</sup> C01B 31/02; H01B 1/06; C09C 1/56

U.S. Cl. 423—449

2 Claims

1. A process for preparing a graphite intercalation compound comprising reacting together, under substantially molten conditions, including a temperature of about 380° to 450°



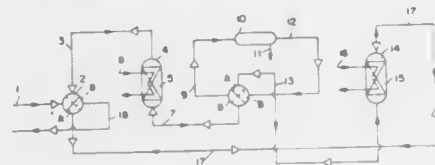
C., a dried metal chloride selected from the group consisting of copper chloride, cadmium chloride, cobalt chloride, nickel chloride and chromium chloride; a metal salt, capable of forming a molten salt by reaction with said metal chloride, selected from the group consisting of potassium chloride and sodium chloride; and graphite having a particle size of about 20 to 70 microns, in a chlorine gas atmosphere at about atmospheric pressure; wherein said metal chloride is present in an amount of at least 0.5 mole per mole of graphite, in excess of the proportion of metal chloride which would be present at the eutectic point of the molten metal salt, but not sufficient to cause a solid phase of said metal chloride in said molten reaction system.

**4,957,724**  
**PROCESS AND REACTOR FOR CATALYTIC REACTION OF H<sub>2</sub>S AND SO<sub>2</sub> TO SULFUR**

Freimut Marold, Neubiberg, and Michael Heisel, Pullach, both of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany  
Filed Mar. 21, 1988, Ser. No. 171,348

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1987, 3709031; Mar. 19, 1987, 3709048  
Int. Cl.<sup>5</sup> C01B 17/06; G05D 7/00  
U.S. Cl. 423—574 R

22 Claims



3. In a process comprising catalytically reacting in a gas stream gaseous H<sub>2</sub>S with gaseous SO<sub>2</sub> to elementary sulfur, wherein during one cycle a first fixed catalyst bed for conducting the reaction and adsorbing sulfur is operated below the sulfur dewpoint and another fixed catalyst bed is regenerated to remove the deposited sulfur in the vapor phase, the improvement which comprises using a system provided with only two fixed catalyst beds arranged in reactors with internal indirect heating and cooling means, which are cyclically switched from the reaction to the regeneration mode and vice versa, conducting the reaction between H<sub>2</sub>S and SO<sub>2</sub> in at least a part of a catalyst bed below the sulfur solids condensation point, thereby adsorbing the formed sulfur in said part of the catalyst bed.

**4,957,725**  
**VANADIUM DIOXIDE FORMED BY THE SOL-GEL PROCESS**

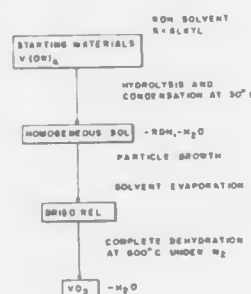
Richard S. Potember, Catonsville; Kenneth R. Speck, Baltimore, and Henry S. Hu, Derwood, all of Md., assignors to The Johns Hopkins University, Baltimore, Md.

Filed Jul. 5, 1988, Ser. No. 215,107  
Int. Cl.<sup>5</sup> C01G 31/00

26 Claims

1. A process for the deposition of a crystalline vanadium dioxide thin film comprising:  
providing a solution comprising a vanadium tetraalkoxide and solvent;  
allowing hydrolysis and condensation reactions to progressively form a homogenous sol from the solution, applying a coating of the sol to the substrate;

allowing a gel to form from the sol on the substrate by evaporating the solvent; dehydrating the gel by heat treat-



ment under an inert atmosphere to form the crystalline vanadium dioxide film.

**4,957,726**  
**PREPARATION OF AMINE ALANES AND LITHIUM ALUMINUM TETRAHYDRIDE**

Everett M. Marlett; Arcelio J. Malcolm, and Won S. Park, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Apr. 12, 1989, Ser. No. 337,086  
Int. Cl.<sup>5</sup> C01B 6/24

U.S. Cl. 423—644

25 Claims

1. A process which comprises, in combination:  
(a) reacting lithium aluminum tetrahydride and a tertiary amine such that an amine alane and lithium aluminum hexahydride are produced, and  
(b) reacting lithium aluminum hexahydride from the reaction of (a) with aluminum and hydrogen under pressure such that lithium aluminum tetrahydride is produced.

**4,957,727**  
**PROCESS FOR THE PRODUCTION OF MAGNESIUM HYDRIDES**

Borislav Bogdanovic, Mulheim/Ruhr, Fed. Rep. of Germany, assignor to Studiengesellschaft Kohle mbH, Mulheim/Ruhr, Fed. Rep. of Germany  
Continuation of Ser. No. 771,457, Aug. 30, 1985, abandoned, which is a continuation of Ser. No. 626,819, Jul. 2, 1984, Pat. No. 4,554,153, which is a continuation-in-part of Ser. No. 433,078, Oct. 6, 1982, abandoned, which is a continuation-in-part of Ser. No. 187,907, Sep. 17, 1980, abandoned, which is a continuation of Ser. No. 8,739, Feb. 2, 1979, abandoned. This application Apr. 27, 1988, Ser. No. 186,525

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1978, 2804445  
The portion of the term of this patent subsequent to Jan. 17, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C01B 6/04

U.S. Cl. 423—647

5 Claims

1. Magnesium hydride identical with that produced by reacting magnesium with hydrogen in a solvent in the presence of anthracene and a halide of a transition metal of the IVth to VIIIth sub-group of the periodic system, the hydride having a high surface area of at least about 129 m<sup>2</sup>/g and being capable of substantially complete reversible desorption of hydrogen at 300° to 315° C. and 1 mm Hg and resorption of hydrogen even at 20° C. and 1 bar.

**4,957,728**  
**KIT FOR PREPARING TC (III)-99M MYOCARDIAL IMAGING AGENTS THAT ARE EFFECTIVE IN HUMANS**

Edward A. Deutsch, and Karen F. Libson, both of Cincinnati, Ohio, assignors to University of Cincinnati, Cincinnati, Ohio Division of Ser. No. 354,491, May 19, 1989, Pat. No. 4,917,879.

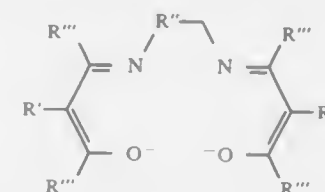
This application Jan. 11, 1990, Ser. No. 463,403

Int. Cl.<sup>5</sup> A61K 49/02; B65D 69/00

U.S. Cl. 424—1.1

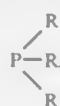
4 Claims

1. A kit for preparing a technetium 99m myocardial imaging agent, said kit comprising:  
a first and second vial, said first vial containing a lyophilized pyrogen free sterile mixture of an effective reducing agent and a ligand having the following general formula:

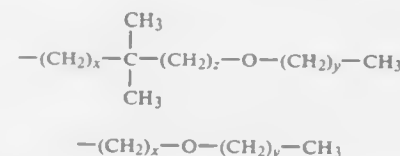


wherein R' and R''' represent H, hydroxyl, (C<sub>1</sub>-C<sub>5</sub> alkyl, C<sub>1</sub>-C<sub>5</sub> alkyl substituted by hydroxyl, ether, amide, ketone, aldehyde or nitrile groups and R'' represents C<sub>1</sub>-C<sub>4</sub> alkylene, C<sub>1</sub>-C<sub>4</sub> alkylene which may be substituted with hydroxyl, ether, amide, ketone, aldehyde or nitrile groups and

wherein said second vial contains a lyophilized, pyrogen free, sterile protected salt of a phosphine ligand, said phosphine ligand having the following general formula:



wherein R<sub>4</sub> and R<sub>5</sub> represent the same or different group



wherein X = 1-4, Y = 0-4 and Z = 0-4 and wherein R<sub>3</sub> represents the same ligands represented by R<sub>4</sub> or R<sub>5</sub> or may represent: —OCH<sub>3</sub>, —C<sub>1</sub>-C<sub>5</sub> alkyl.

**4,957,729**  
**POLYIODINATED TRIGLYCERIDE ANALOGS AS RADIOLOGIC AGENTS**

Raymond E. Counsell; Marc A. Longino; Jamey P. Weichert, and Susan P. Schwendner, all of Ann Arbor, Mich., assignors to The University of Michigan, Ann Arbor, Mich.

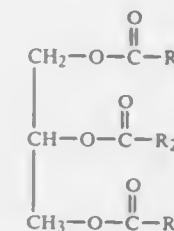
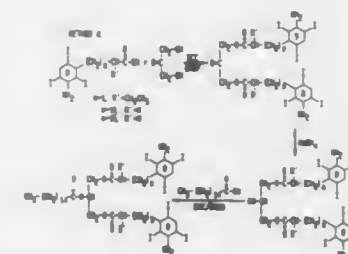
Division of Ser. No. 774,498, Sep. 10, 1985, Pat. No. 4,873,075. This application May 30, 1989, Ser. No. 358,865

Int. Cl.<sup>5</sup> C11C 3/02; A61K 49/04

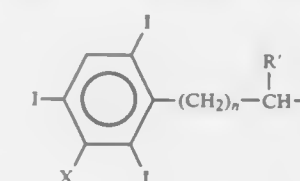
U.S. Cl. 424—5

8 Claims

1. A composition comprising an effective radiologically contrast producing amount of a radiologic agent and a carrier fro said radiologic agent:  
said radiologic agent comprising a polyiodinated triglyceride analog of the general formula:



wherein R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are each selected from the group consisting of saturated and unsaturated aliphatic hydrocarbon chains found in naturally occurring fatty acids and 3-substituted-2,4,6-triiodophenyls of the general formula:



wherein X is selected from the group consisting of H, NH<sub>2</sub> and NHCOR'', R' is selected from the group consisting of H and lower alkyls, R'' is a lower alkyl, n is an integer from 0-15 and wherein at least two of said R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are said 3-substituted 2,4,6-triiodophenyls; and said carrier comprising a lipid emulsion.

**4,957,730**  
**ANTIMYCOTIC NAIL VARNISH**  
Manfred Bohn; Walter Dittmar, both of Hofheim am Taunus; Heinz G. Peil, Bad Nauheim; Eberhard Fatterer, Kelkheim, and Karl Kraemer, Langen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 17, 1986, Ser. No. 942,699

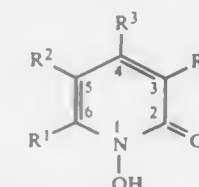
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1985, 3544983

Int. Cl.<sup>5</sup> A61K 7/043

U.S. Cl. 424—61

21 Claims

1. A nail varnish comprising a water insoluble film-forming substance and an antimycotic compound which is a 1-hydroxy-2-pyridone of the formula (I)



in which R<sup>1</sup> is a hydrocarbon group which contains from 6 to

9 carbon atoms, but said hydrocarbon group being free from olefinic and acetylenic bonds, one of the groups  $R^2$  and  $R^4$  is hydrogen and the other is hydrogen, methyl or ethyl and  $R^3$  is alkyl having up to two carbon atoms, said antimycotic ingredient being present in free form or in the form of a salt, and in an amount effective against nail mycoses.

4,957,731

## HAIR PROCESSING ADDITIVES

Michael W. Heliott, Westfield; Carmen D. Bires, Long Valley, and Robert B. Login, Oakland, all of N.J., assignors to GAF Chemicals Corporation, Wayne, N.Y.

Continuation-in-part of Ser. No. 188,522, Apr. 29, 1988, Pat. No. 4,885,158, Continuation-in-part of Ser. No. 91,149, Aug. 28, 1987, Pat. No. 4,837,013, which is a continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,990.

Continuation-in-part of Ser. No. 91,010, Aug. 28, 1987, Pat. No. 4,883,655, which is a continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,990, Continuation-in-part of Ser. No. 91,008, Aug. 28, 1987, Pat. No. 4,830,850, which is a continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,990, Continuation-in-part of Ser. No. 67,195, Jan. 29, 1987, Pat. No. 4,834,970, which is a continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,990.

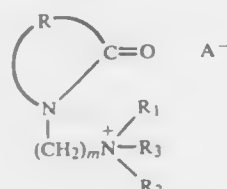
Continuation-in-part of Ser. No. 60,285, Jun. 10, 1987, Pat. No. 4,871,535, which is a continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,990, Continuation-in-part of Ser. No. 60,284, Jun. 10, 1987, Pat. No. 4,834,767, which is a continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,990. This application Apr. 19, 1989, Ser. No. 340,194

Int. Cl.<sup>5</sup> A61K 7/075, 7/135, 7/13, 7/09

U.S. Cl. 424—62

14 Claims

1. A hair treating composition containing an inert carrier, an active hair processing agent selected from the group consisting of hair bleaching agent, a hair coloring agent, a hair setting agent, a hair reducing agent employed to alter hair structure and an oxidizing agent employed to arrest the reducing action of a reducing agent used in the structural alteration of hair and an effective conditioning amount of an organic quaternized lactam having the formula



wherein m is an integer having a value of from 1 to 4; R is linear alkylene having from 3 to 8 carbon atoms and is optionally substituted with  $C_1$  to  $C_4$  alkyl;  $R_1$ ,  $R_2$  and  $R_3$  are each independently selected from the group of alkyl, alkyleneoxyalkyl, alkyleneoxyalkenyl, alkoxy, hydroxyalkyl, aryl, aralkyl, alkaryl, alkyleneamidoalkyl, alkyleneamidoalkyl, alkyleneamidoalkyl, aryleneamidoalkyl and aryleneamidoalkyl radicals, and  $R_2$  and  $R_3$ , together with the quaternized nitrogen atom can form a 5 to 14 membered heterocyclic radical containing from 1 to 2 heteroatoms selected from the group of nitrogen, sulfur and oxygen, in which case  $R_1$  can represent a double bond in the heterocyclic structure or can be any of the aforementioned groups for  $R_1$ ,  $R_2$  and  $R_3$ ; said groups  $R_1$ ,  $R_2$  and  $R_3$  each having up to 30 carbon atoms and at least one of  $R_1$ ,  $R_2$  and  $R_3$  being a radical having from 8 to 30 carbon atoms when  $R_2$  and  $R_3$  are not part of a heterocyclic moiety; and  $A^-$  is an anion derived from an oxyated sulfur compound, having the formula:



wherein  $R'$  is alkyl, alkoxy, phenyl, phenoxy, alkylenephenyl, alkylenephenoxy, phenylenealkyl or phenyleneoxyalkyl and wherein the alkyl moieties of said  $R'$  groups contain from 1 to

20 carbon atoms and said  $R'$  groups are optionally alkoxyated with from 1 to 20 units of ethyleneoxide and/or propylene oxide.

4,957,732

## SHAVING COMPOSITION FOR THE SKIN BASED ON POLYORGANO-SILOXANES CONTAINING AN ACYLOXYALKYL GROUP AND PROCESS FOR USE

Jean F. Grollier, Paris, and Alain Caudet, Boulogne-Billancourt, both of France, assignors to L'Oréal, Paris, France

Filed Dec. 28, 1989, Ser. No. 458,236

Claims priority, application France, Dec. 29, 1988, 8817433

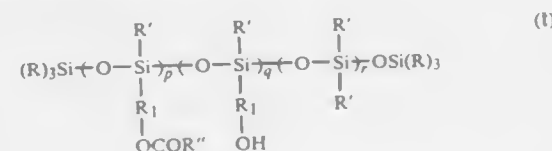
Int. Cl.<sup>5</sup> A61K 7/15

U.S. Cl. 424—73

14 Claims

1. Composition intended for shaving of the skin, characterized in that it contains, in a cosmetically acceptable medium including a foaming agent, a polyorganosiloxane containing an acyloxyalkyl group, selected

531 (i) linear compounds corresponding to the following average formula (I):



in which:

the radicals R, which may be identical or different, are selected from methyl, phenyl,  $\text{OCOR}''$  and hydroxyl radicals; only one of the radicals R per silicon atom can be OH;

the radicals  $R'$ , which may be identical or different, are selected from methyl and phenyl radicals; at least 60 mol % of all the radicals R and  $R'$  is methyl;

$R_1$  represents a divalent linear or branched alkylene group of the hydrocarbon type containing from 2 to 18 carbon atoms;

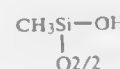
$R''$  is a  $C_8$ - $C_{20}$  alkenyl or alkyl radical;

r is a number between 1 and 120 inclusive;

p is a number between 1 and 30; and

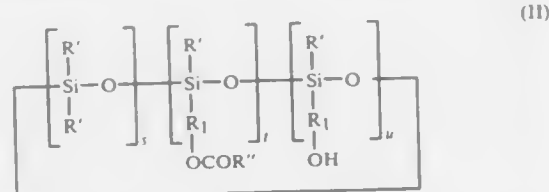
q is equal to 0 or is a number not exceeding 0.5 p, the sum p+q being between 1 and 30;

it being possible for the compounds of formula (I) optionally to contain



groups, present in proportions not exceeding 15% of the sum p+q+r; and

(ii) cyclic compounds represented by the following average formula (II):



in which:

$R'$ ,  $R''$  and  $R_1$  have the same meaning as in the formula (I);

s is a number between 0 and 20;

t is a number between 1 and 20; and

u is equal to 0 or is equal to a number not exceeding 0.5 t,

the sum t+u being between 1 and 20;

the sum s+t+u being not less than 3.

4,957,733

## PHARMACEUTICAL PRODUCTS

Martin Cole, Betchworth; Malcolm R. Boyd, and David Sutton, both of Epsom, all of England, assignors to Beecham Group P.L.C., England

Filed Nov. 30, 1987, Ser. No. 126,406

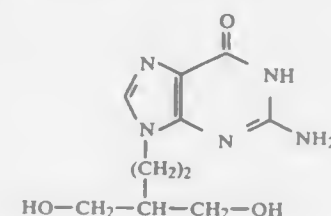
Claims priority, application United Kingdom, Dec. 2, 1986, 8628826

Int. Cl.<sup>5</sup> A61K 37/66

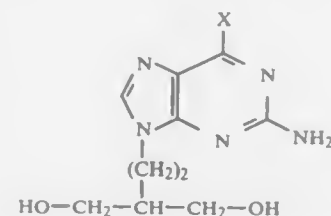
U.S. Cl. 424—85.4

7 Claims

1. A pharmaceutical composition for use in treating viral infections comprising an interferon and an antiviral effective amount of a compound of formula (A):



a pro-drug of the compound of formula (A) having the formula (B)



wherein X is hydrogen, or a pharmaceutically acceptable salt, a phosphate ester, or aryl derivative of either (A) or (B), and a pharmaceutically acceptable carrier.

4,957,735

## TARGET-SENSITIVE IMMUNOLIPOSOMES- PREPARATION AND CHARACTERIZATION

Leaf Huang, Knoxville, Tenn., assignor to The University of Tennessee Research Corporation, Knoxville, Tenn.

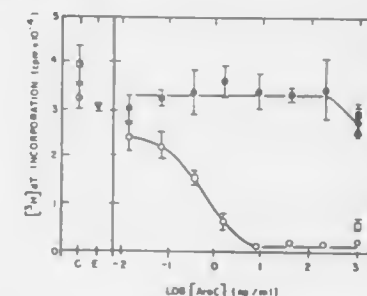
Continuation-in-part of Ser. No. 816,817, Jan. 7, 1986, abandoned, which is a continuation-in-part of Ser. No. 619,844, Jun. 12, 1984, Pat. No. 4,708,933. This application Feb. 9, 1987, Ser. No. 12,321

The portion of the term of this patent subsequent to Nov. 24, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 9/50, 39/42, 39/44

U.S. Cl. 424—85.8

20 Claims



15. A method of delivering therapeutic agents to the surface of cells in need of such treatment comprising the steps of:

- forming target sensitive immunoliposomes from phosphatidylethanolamine and a stabilizing amount of fatty acid ( $C_{12}$  to  $C_{24}$ ) derivatized antibody, said antibody having an affinity for the target cell surface;
- entrapping one or more therapeutic agents within the immunoliposomes of step (a); and
- administering the immunoliposomes prepared in step (b) to a patient in need of such treatment.

4,957,736

## COMPOSITION FOR VACCINES

Luciano Nencioni, Poggibonsi; Piero Pileri, Monteriggioni; Samuele Peppoloni, Perugia, and Sergio Silvestri, Siena, all of Italy, assignors to Sclavo S.p.A., Siena, Italy

Filed May 26, 1989, Ser. No. 357,267

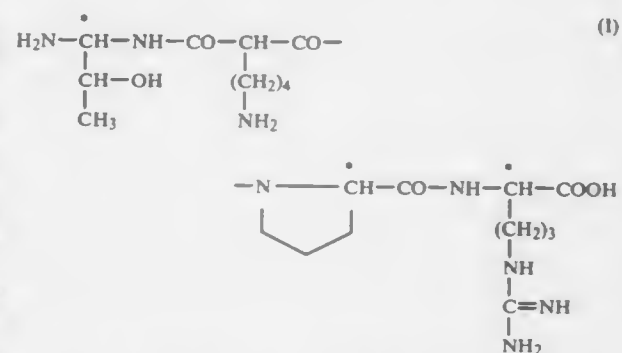
Claims priority, application Italy, Feb. 10, 1989, 19408 A/89

Int. Cl.<sup>5</sup> A61K 39/002, 39/02, 39/10, 39/12

U.S. Cl. 424—88

5 Claims

1. A vaccine comprising one or more antigens of either natural or synthetic origins, together with an adjuvant amount of a compound of formula (I)



wherein the absolute configuration of each carbon atom marked with an asterisk is the L-configuration, and the absolute configuration of the carbon atom of the malonyl residue is either the L- or the D-configuration; or with a pharmaceutically acceptable base-addition or acid-addition salt thereof.

4,957,734

## TREATMENT OF CERTAIN SKIN MALIGNANCIES AND PRE-MALIGNANT SKIN LESIONS, HERPES ZOSTER AND PSORIASIS

Daniel G. Miller, Scarsdale, N.Y., assignor to Exovir, Inc., Great Neck, N.Y.

Continuation of Ser. No. 851,885, Apr. 11, 1986, abandoned, which is a continuation of Ser. No. 651,277, Sep. 14, 1984, abandoned, which is a continuation of Ser. No. 388,260, Jun. 14, 1982, abandoned. This application Jul. 6, 1987, Ser. No. 70,592

Int. Cl.<sup>5</sup> A61K 37/66

U.S. Cl. 424—85.7

2 Claims

1. A method for the treatment of malignant and pre-malignant skin lesions and skin lesions associated with herpes zoster and psoriasis which comprises topically administering to the affected skin area an amount of a composition consisting essentially of effective amount of human leukocyte interferon and an effective antiviral amount of the non-ionic surfactant nonyl-phenoxypolyethoxyethanol and a physiologically acceptable carrier.



4,957,737

## HTLV-III (LAV) ENVELOPE PEPTIDES

Edgar P. Heimer, Sparta, and Premkumar E. Reddy, Montclair, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 160,847, Feb. 1, 1988, abandoned, which is a continuation of Ser. No. 866,817, May 27, 1986, abandoned. This application Aug. 21, 1989, Ser. No. 396,195

Int. Cl.<sup>5</sup> A61K 39/12, 37/02; C07K 7/10

U.S. Cl. 424—88

4 Claims

1. A peptide of the formula  
W-X-Ala-Arg-Ile-Leu-Ala-Val-Glu-Arg-Tyr-Leu-Lys-Asp-  
Gln-Gln-Leu-Leu-Gly-Ile-Trp-Gly-Cys-Ser-Gly-Lys-  
Leu-Ile-Cys-Thr-Thr-Ala-Val-Y-Z  
where W is H-, Cys- or Tyr, X is a bond, Y is a bond, and Z is  
—OH, —NH<sub>2</sub> or —Cys-NH<sub>2</sub>.

4,957,738

## PROTEIN COPOLYMER MALARIA VACCINE

Manuel E. Patarroyo, P.O. Box 4402, Bogota, Colombia  
Continuation-in-part of Ser. No. 3,194, Jan. 14, 1987, Pat. No.  
4,735,799. This application Dec. 29, 1987, Ser. No. 135,027

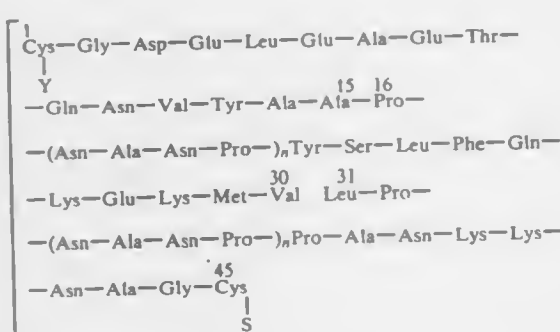
The portion of the term of this patent subsequent to Apr. 5, 2005,  
has been disclaimed.

Int. Cl.<sup>5</sup> A61K 39/00, 37/02; C07K 7/10, 7/00

U.S. Cl. 424—88

17 Claims

2. A polymeric compound of the formula



in which n is an integer from 1 to about 10 and x is an integer  
from 2 to about 50.

4,957,739

PHARMACEUTICAL COMPOSITIONS OF A 105 KD P.  
HAEMOLYTICA DERIVED ANTIGEN USEFUL FOR  
TREATMENT OF SHIPPING FEVER

Peter Berget, Pittsburgh Pa.; Michael Engler, Houston, Tex.;  
Sarah Highlander, Houston, Tex., and George Weinstock,  
Houston, Tex., assignors to Board of Regents, The University  
of Texas System, Austin, Tex.

Filed Aug. 13, 1987, Ser. No. 85,430

Int. Cl.<sup>5</sup> A61K 39/102; C07K 15/04

U.S. Cl. 424—92

6 Claims

1. A pharmaceutical composition suitable for use as a vac-  
cine comprising a therapeutically effective amount of a puri-  
fied *P. haemolytica* antigen together with a pharmaceutically  
acceptable excipient, diluent or adjuvant, the antigen being  
purified from a cell-free *P. haemolytica* culture supernatant, or  
obtained by recombinant cloning of a gene encoding the anti-  
gen, the antigen being identified as having:

- (a) binding affinity for immune sera obtained from a pasteur-  
eliosis infected cow;  
(b) an approximate reference molecular weight of 105 K  
Daltons, the molecular weight being ascertainable by SDS  
polyacrylamide gel electrophoresis and immunoblot anal-  
ysis; and  
(c) immunological cross-reactivity with a 105 K *P. haemolyt-  
ica* antigen having an amino terminal sequence of M-G-T-

R-L-T-T-L-S-N- and a carboxy terminal sequence of  
-L-S-S-L-Q-F-A-R-A-A.

4,957,740

COMPOSITION FOR PREVENTING OR ALLEVIATING  
SKIN IRRITATION BY FORMULATIONS CONTAINING  
SUPEROXIDE DISMUTASE

Martin S. Wilder, Amherst, Mass., assignor to Centerchem, Inc.,  
Tarrytown, N.Y. and Pentapharm, Ltd., Basle, Switzerland  
Continuation of Ser. No. 666,677, Oct. 31, 1984, Pat. No.  
4,695,456. This application Jun. 16, 1987, Ser. No. 63,143

Int. Cl.<sup>5</sup> A61K 37/48

U.S. Cl. 424—94.4

4 Claims

1. A topical formulation for the control of dermal chemical  
irritation, dermal inflammation or acne, comprising:  
3.0% of polyoxyethyleneglyceryl monostearate  
2.0% of glyceryl distearate  
3.0% of cetyl alcohol  
6.0% of stearic acid  
10.0% of isopropyl myristate  
5% of fatty acid triglyceride  
0.2% of p-hydroxybenzoic acid ester  
2.0% of glycerol  
2.0% of propylene glycol  
0.3% of preserving agent  
5.0% of SOD-containing tissue extract with 20,000 PIU per  
ml, and  
61.5% of demineralized water.

4,957,741

METHOD FOR THE TREATMENT OF GASTRIC ULCER  
Ahmad R. Kamarei, Lexington; Nicholas Catsimopoulos, Newton  
Center; Robert McCluer, Acton, all of Mass.; Takashi Mise,  
Yokohama, Japan, and Robert S. Sinn, New York, N.Y.,  
assignors to Anglo-Medical Corp., New York, N.Y.

Filed Aug. 2, 1988, Ser. No. 227,533

Int. Cl.<sup>5</sup> A61K 35/30, 35/12, 31/70

U.S. Cl. 424—551

3 Claims

1. Method for treating a gastric ulcer comprising administer-  
ing to a patient with a gastric ulcer an amount of a pharmaco-  
logical active mixture of bovine brain ganglioside sufficient to  
heal said ulcer.

4,957,742

## METHOD FOR PROMOTING HAIR GROWTH

David R. Knighton, Hudson, Wis., assignor to Regents of the  
University of Minnesota, Minneapolis, Minn.

Continuation-in-part of Ser. No. 39,776, Apr. 15, 1987, which is  
a continuation of Ser. No. 786,206, Oct. 10, 1985, abandoned,  
which is a continuation-in-part of Ser. No. 676,471, Nov. 29,  
1984, abandoned. This application Jan. 10, 1989, Ser. No.  
295,406

Int. Cl.<sup>5</sup> A61K 35/14

U.S. Cl. 424—532

11 Claims

1. A method of promoting hair growth comprising:  
releasing material from activated platelets; and applying a  
composition topically to tissue containing hair follicles,  
said composition comprising said material released from  
said activated platelets, said compositions being applied in  
an amount sufficient to cause growth of hair from said  
tissue.

4,957,743

## METHOD FOR TREATING HERPES

Helmut Keller, Blumenstrasse 032, D-8646 Nordhalben, Fed.  
Rep. of Germany

Filed Jul. 31, 1986, Ser. No. 892,226

Claims priority, application European Pat. Off., Jul. 31, 1985,  
85109616.4; Jul. 31, 1985, 85109617.2

Int. Cl.<sup>5</sup> A61K 35/78

U.S. Cl. 424—195.1

4 Claims

1. A method for treating herpes comprising administering to  
a host afflicted by same juice of the aqueous solution of juice  
extracted from *Dionaea muscipula*.

4,957,744

## CROSS-LINKED ESTERS OF HYALURONIC ACID

Francesco della Valle, Padova, and Aurelio Romeo, Rome, both  
of Italy, assignors to Fidia, S.p.A., Abano Terme, Italy

Filed Oct. 13, 1987, Ser. No. 106,658

Claims priority, application Italy, Oct. 13, 1986, 48546-A/86  
The portion of the term of this patent subsequent to Jul. 25,  
2006, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 31/70; C07G 3/00; C07H 1/00

U.S. Cl. 424—401

91 Claims

1. Total or partial cross-linked esters of hyaluronic acid with  
an aliphatic polyhydric alcohol, and salts of such partial esters  
with inorganic or organic bases, with the proviso that said  
cross-linked ester is not the cross-linked ester of hyaluronic  
acid with an alomethyloxirane or a bisepoxy compound  
14. A pharmaceutical composition comprising an effective  
amount of a cross-linked ester according to claim 1 together  
with a pharmaceutically acceptable carrier, excipient or dilu-  
ent.  
18. A cosmetic article comprising as a cosmetic vehicle a  
cross-linked ester or a salt thereof according to claim 1.

4,957,745

## PHARMACEUTICAL PREPARATION

Ulf E. Jonsson; John A. Sandberg, both of Mölndal, and John A.  
Sjogren, Mölntycke, all of Sweden, assignors to Aktiebolaget  
Hassle, Mölndal, Sweden

Continuation of Ser. No. 907,510, Sep. 12, 1986, abandoned. This  
application Feb. 14, 1989, Ser. No. 310,489

Claims priority, application Sweden, Oct. 11, 1985, 8504721

Int. Cl.<sup>5</sup> A61K 9/22, 9/36

U.S. Cl. 424—461

21 Claims

1. Controlled release preparation comprising a plurality of  
beads having a soluble component comprising at least 95%  
weight/weight of a salt of metoprolol which has a solubility of  
less than 600 mg/ml in water at 25° C. and a metoprolol perme-  
able polymeric membrane coating surrounding each of said  
beads, said coating consisting essentially of ethylcellulose or a  
mixture of ethylcellulose and hydroxypropylmethylcellulose  
wherein the coating is present in amounts such that the meto-  
prolol is released through the coating over a period of at least  
15 hours virtually independent of pH in the interval pH 1–8.

4,957,746

PROCESS FOR PREPARING ETOFIBRATE OR SIMILAR  
COMPOUNDS CONTAINING SUSTAINED RELEASE  
MICROGRANULES AND PRODUCTS THUS OBTAINED

Roberto Valducci, Via del Sole, 4, Savignano Sul Rubicone, Italy  
47039

Continuation of Ser. No. 746,969, Jun. 20, 1985, abandoned.

This application Sep. 22, 1988, Ser. No. 247,914

Claims priority, application Italy, Jun. 29, 1984, 3511 A/84

Int. Cl.<sup>5</sup> A61K 9/16

U.S. Cl. 424—490

18 Claims

1. A process for preparing encapsulated sustained release  
etofibrate formulations comprising:  
(a) mixing powdered etofibrate with a solvent, working  
said etofibrate and said solvent in a rotating pan;

- (b) sieving the contents of said rotating pan from step (a) to  
recover a first product comprising first microgranules;  
(c) returning said first product to said rotating pan and  
working said first product in said rotating pan;  
(d) removing the solvent from and drying the contents of  
said rotating pan from step (c)  
(e) sieving the dried contents of said rotating pan from step  
(d) to recover a second product comprising second micro-  
granules, said second microgranules having diameters  
smaller than those of said first microgranules;  
(f) placing said second product in said rotating pan and  
coating said second product with a mixture of etofibrate  
and polyethylene glycol such that the total etofibrate  
content of the coated microgranules subsequently recov-  
ered in step (g) is within the range of 89–98% by weight  
based on the weight of said microgranules said total etofi-  
brate content achieved through the serial addition of  
etofibrate with intermediate sieving and return of the  
sieving and return of the sieved material for additional  
coating with etofibrate;  
(g) sieving the contents of said rotating pan from step (f) to  
recover a third product comprising third microgranules,  
said third microgranules having diameters between 400  
and 2000 microns; and  
(h) encapsulating said third microgranules.

4,957,747

## METHOD OF TREATING AGED SKIN

Werner K. Stiefel, Coral Gables, Fla., assignor to Stiefel Labora-  
tories, Inc., Coral Gables, Fla.

Filed May 15, 1989, Ser. No. 351,825

Int. Cl.<sup>5</sup> A61K 33/08

U.S. Cl. 424—691

8 Claims

1. A method of improving the firmness and tone of aged skin  
which comprises repeatedly applying to the aged skin a fluid  
topical composition containing from about 35%–65% by  
weight of said composition a suspension of fine particles of a  
non-absorbable aluminum oxide abrasive in a topically accept-  
able aqueous base comprising sodium cocoisethionate, at least  
one emollient, and a suspending agent.

4,957,748

RUMINANT FEED, METHOD OF MAKING AND  
METHOD OF USING

Thomas S. Winowski, Mosinee, Wis., assignor to The Board of  
Regents of the University of Nebraska, Lincoln, Nebr.

Filed Mar. 23, 1987, Ser. No. 28,969

Int. Cl.<sup>5</sup> A23K 1/18

U.S. Cl. 426—2

34 Claims

1. A feed for ruminants comprising a mixture of organic  
materials including at least one reaction product of a feed  
protein and a reducing carbohydrate, wherein the percentage  
of reducing carbohydrate on feed protein is about 0.5 percent  
to about 40 percent by weight such that degradability of the  
feed protein by rumen microorganisms is reduced and there is  
no significant reduction of protein digestibility in the post  
rumen tract.

4,957,749

PROCESS FOR REMOVING OXYGEN IN FOODSTUFFS  
AND DRINKS

Jean-Paul Frieels; Charles Maschelein, and Marc Heilporn, all  
of Brussels, Belgium, assignors to Oleofina, S.A., Brussels,  
Belgium

Filed May 14, 1986, Ser. No. 863,269

Claims priority, application Luxembourg, May 22, 1985,  
85910Int. Cl.<sup>5</sup> A23L 3/00

U.S. Cl. 426—10

14 Claims

1. A process for preventing the oxidation of foodstuff mate-  
rials capable of being degraded by oxidation with molecular  
oxygen, free radical oxygen, or combinations thereof compris-

ing incorporating into said foodstuff materials an amount of an enzyme composition sufficient to reduce the oxygen content of said foodstuff materials, wherein said enzyme composition comprises an oxidase and its corresponding substrate, catalase and superoxide dismutase.

4,957,750

## MICROWAVEABLE BAKED GOODS

Stuart A. Cochran, East Windsor; David A. Cin, Cranbury, both of N.J., and Susan K. Veach, Petaluma, Calif., assignors to Kraft General Foods, Glenview, Ill.

Filed May 5, 1989, Ser. No. 348,326

Int. Cl.<sup>5</sup> A21D 2/36, 2/28

U.S. Cl. 426—19

14 Claims

1. A baked good which will have improved palatability upon microwave heating, the improvement comprising the addition of protein modifier to the dough used to produce the baked good, said protein modifier being added at a level which will provide an amount free sulfhydryl group equivalent to 180–400ppm (flour basis) of L-cysteine and effective to reduce deterioration in the palatability of the baked good upon microwave heating.

4,957,751

## METHOD OF PRODUCING RENNET CHEESE FROM RAW MILK

Hanno Lehmann; Iloi Wasen, both of Oelde, Fed. Rep. of Germany, and Hubert Pointurier, Paris, France, assignors to Westfalia Separator AG, Oelde, Fed. Rep. of Germany

Filed Jul. 10, 1989, Ser. No. 377,511

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1988, 3824167

Int. Cl.<sup>5</sup> A23C 19/00, 19/05

U.S. Cl. 426—36

8 Claims

1. In a method of producing rennet cheese from raw milk, wherein raw milk is standardized, a precipitant and cultures are added to initiate a biological reaction, and after termination of the biological reaction, cheese mass is separated from whey, and denatured cheese fines are removed from the whey by separation or decantation, the improvement wherein the cheese fines are biologically acidified in whey or water, denatured proteins are removed from the whey by separation or decantation, whereby detrimental calcium is removed along with the separated liquid, the cheese fines are suspended in water or whey, the suspension is warmed for 5 to 10 minutes at 40° to 60° C., the pH is adjusted to form 6.5 to 7.0 and with a 10% neutralization agent to form a material, the material is heated to form 80° to 90° C. for 1 to 5 minutes to form a product, and the product is returned to the raw milk before it is standardized or it is removed.

4,957,752

## PROCESS FOR PRODUCING KEFIR

Lilia N. Ivanova; Irina V. Rozhkova; Vera F. Semenkina; Tatyana N. Knyazeva, all of Moscow, and Alexandr P. Chagarovskiy, Odessa, all of U.S.S.R., assignors to Vsesojuzny Nauchno-Issledovatel'skiy i Konstruktor'skiy Institut Molochno-Promyshlennosti, Moscow, U.S.S.R.

PCT No. PCT/SU88/00088, § 371 Date Dec. 15, 1988, § 102(e) Date Dec. 15, 1988, PCT Pub. No. WO88/08252, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 20, 1988, Ser. No. 294,507

Claims priority, application U.S.S.R., Apr. 30, 1987, 4230674

Int. Cl.<sup>5</sup> A23C 9/13, 9/142

U.S. Cl. 426—43

4 Claims

1. In a process for producing Kefir from cows milk, wherein the milk is purified, normalized with respect to the dry solids content, heat treated to sanitize the milk, kefir producing microorganisms are introduced into the milk to form a milk mixture, the milk mixture is fermented, the fermented milk mixture is cooled to a storage temperature and packed, the improvement which comprises:

(a) normalizing the dry solids content of the milk by ultrafil-

tration of at least a portion of the milk, to increase the content of dry solids in the milk by from 0.5–4.0% by weight;

- (b) heat treating the normalized milk at a temperature of from 90° C. to 140° C.;
- (c) cooling the heat treated milk;
- (d) introducing a leaven comprising kefir producing microorganisms into the cooled milk;
- (e) fermenting the cooled milk mixture containing the kefir producing microorganisms at a temperature of from 18° C.–25° C. until a fermented milk mixture with a pH in the range of 4.7–5.0 is formed; and
- (f) further fermenting the fermented milk mixture with the pH in the range of 4.7–5, at a temperature of from 18°–20° C., to form a further fermented milk mixture with a pH in the range of 4.5–4.7.

4,957,753

## VACUUM PACKED GROUND COFFEE PACKAGE

Robert F. Bardsley, Harrington Park, and Eugene E. Corrigan, Edison, both of N.J., assignors to Tetley, Inc., Shelton, Conn.

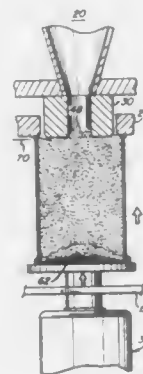
Division of Ser. No. 939,957, Dec. 20, 1986, Pat. No. 4,804,550

This application Dec. 12, 1988, Ser. No. 282,036

Int. Cl.<sup>5</sup> B65D 43/00, 81, 20; B65B 1/24

U.S. Cl. 426—111

2 Claims



1. A vacuum packed ground coffee container comprising: a hermetically sealed, thin-walled cylindrically-shaped container having a storage chamber that is filled with a desired weight of compacted ground coffee under vacuum; said container having an annular wall with a smooth outer surface and end walls, at least one of said end walls being outwardly deformable and being in pressure contact with the compacted coffee, said compacted ground coffee having been compacted in said container against said one deformable end wall in an amount sufficient such that said one end wall has an outwardly collapsed segment that expanded the volume of the container in response to the compaction of coffee and to achieve a desired rigidity of the compacted coffee, so that said vacuum packed container of ground coffee has sufficient rigidity to stiffen the container in all directions and to avoid collapse of the container walls from atmospheric pressure.

4,957,754

## CONTAINER FOR FOODS

Werner G. Munk, Vogt ueber Ravensburg; Manfred Klecker, Kuenzelsau-Morsbach, both of Fed. Rep. of Germany, and Franz Haas, Leobendorf, Austria, assignors to Suedmilch Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Dec. 17, 1987, Ser. No. 134,175

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1986, 3643199

Int. Cl.<sup>5</sup> A21D 15/08

U.S. Cl. 426—138

20 Claims

1. An edible container for food comprising a porous, vegetable material having on at least one part of its inner surface at least two different fatty impregnations, whereof at least one impregnation is a prime coat and at least one impregnation is an impermeable top glaze, wherein the prime coat has a higher setting temperature than the impermeable top glaze and the top glaze is more hydrophobic than the prime coat, and at least the impermeable top glaze is sugar-free.

4,957,755

## METHOD FOR PRODUCING MICROWAVEABLE SNACKS

D. Richard Causey, P.O. Box 1110, Windsor, Calif. 95492

Filed Apr. 18, 1990, Ser. No. 510,547

Int. Cl.<sup>5</sup> A23L 1/00

U.S. Cl. 426—242

4 Claims

1. A method for preparing pork rind snacks in a standard microwave oven comprising the steps of: combining a quantity of pork rind pellets with a quantity of an effective popping agent in a microwaveable container, and heating the combined mixture in a microwave oven so that the popping of the popping agent mechanically mixes the pork rind pellets within the heating area of the microwave oven to enhance the popping of the pork rind pellets.

4,957,756

## METHOD FOR PREPARING COOKED OR PRECOOKED BACON

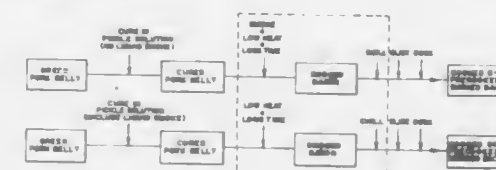
John W. Olander, Montague, and Coralie George, Stockton, both of Calif., assignors to Schreiber Foods, Inc., Green Bay, Wis.

Continuation of Ser. No. 99,182, Sep. 21, 1987, abandoned. This application May 11, 1989, Ser. No. 350,295

Int. Cl.<sup>5</sup> A23B 4/01, 4/023; A23L 1/318, 3/01

U.S. Cl. 426—243

5 Claims



1. A method of imparting the organoleptic properties of bacon, which has been processed in a smokehouse, to a green pork belly without subjecting the green pork belly to a smokehouse process, the method comprising the steps of:

- injecting pickle solution in a green pork belly to yield an injected green pork belly;
- holding the injected green pork belly at a temperature and for a time period sufficient for said pickle solution to disperse in said injected green pork belly;
- chilling the injected green pork belly;
- after chilling the injected green pork belly, cutting the injected green pork belly into slices;
- after cutting the injected green pork belly into slices subjecting said slices of pork belly to microwave radiation for a sufficient time to at least precook said pork belly such that

the weight of said slices is no more than 45% of their green weight.

4,957,757

## METHOD OF EXTENDING SHELF LIFE AND ENHANCING KEEPING QUALITY OF FRUITS

David M. Law; Peter J. Davies, and Martha A. Mutschler, all of Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Apr. 26, 1988, Ser. No. 186,321

Int. Cl.<sup>5</sup> A23B 7/00

U.S. Cl. 426—281

12 Claims

1. A method of extending the shelf life and of enhancing the keeping quality of whole ripened tomatoes which comprises the step of:

- contacting said whole ripened tomatoes with amines selected from the group consisting of:
- naturally occurring monoamines;
  - naturally occurring polyamines;
  - naturally occurring precursors of monoamines;
  - naturally occurring precursors of polyamines;
  - naturally occurring non-toxic of said naturally occurring precursors of monoamines and said naturally occurring precursors of polyamines;
  - naturally occurring metabolites of monoamines;
  - naturally occurring metabolites of polyamines;
  - naturally occurring non-toxic salts of said naturally occurring metabolites of monoamines and said naturally occurring metabolites of polyamines;
  - analogues of naturally occurring monoamines;
  - analogues of naturally occurring polyamines; and
  - analogues of said naturally occurring non-toxic salts of said naturally occurring metabolites of monoamines and said naturally occurring metabolites of polyamines.

4,957,758

## METHOD FOR REFINING OILS OR FATS

Jacob Drijfholt, Patrijzenhof 61, 1742 Be Schagen, and Johannes C. M. van den Berg, Kempenaar 03-03, 8242 Bd Lelystad, both of Netherlands

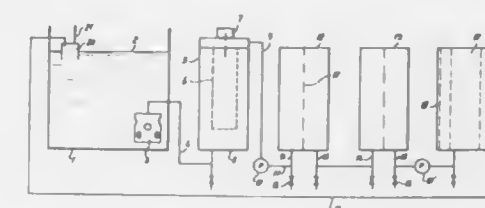
Filed Jul. 22, 1988, Ser. No. 222,863

Claims priority, application Netherlands, Jul. 24, 1987, 8701760

Int. Cl.<sup>5</sup> A23L 1/01

U.S. Cl. 426—330.6

8 Claims



1. Method for refining oils or fats which are used in a container in the heated condition for cooking an edible product therein, which refining is carried out by passing the oil or the fat through a filter comprising a series of filter stages with decreasing pore size and matching flow capacity wherein said oil or fat is sucked through the first filter stage with a vacuum not exceeding 0.5 bar, characterized in that the oil or fat content of the container is always completely passed through a filter system and back into the container within a certain time after the start of the cooking process, which time is determined by the time required to prevent the formation of free fatty acids or fatty acid oxidation products.



4,957,759

## METHOD FOR THE ULTRAPASTEURIZATION OF LIQUID WHOLE EGG PRODUCTS

Kenneth R. Swartzel; Hershell R. Ball, Jr., and Mohammad-Hossein Hamid-Samimi, all of Raleigh, N.C., assignors to North Carolina State University, Raleigh, N.C.

Continuation of Ser. No. 904,744, Sep. 8, 1986, Pat. No. 4,808,425. This application Feb. 16, 1989, Ser. No. 311,594. The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A23L 3/00

U.S. Cl. 426—399

6 Claims

1. A method of making a packaged liquid whole egg product characterized by a preselected refrigerated shelf life of about four weeks to about 36 weeks, comprising passing the liquid whole egg product as a continuous stream through a pasteurizing apparatus, during which the liquid whole egg product is heated by contacting said liquid whole egg product to a heated surface for a predetermined time and to a predetermined temperature while at least periodically subjecting said continuous stream of liquid whole egg product to turbulence, wherein the liquid whole egg product is heated for a predetermined time and to a predetermined temperature insufficient to cause more than a 5% soluble protein loss from said product, wherein the total thermal treatment received by the liquid whole egg product is described by an equivalent temperature and an equivalent time defining a point above the 5% SPL (BATCH) line of FIG. 3, and wherein said predetermined temperature and said predetermined time are chosen to impart said preselected shelf life to said liquid whole egg product, followed by aseptically packaging the liquid whole egg product.

4,957,760

## ULTRAPASTEURIZATION OF LIQUID WHOLE EGG PRODUCTS WITH DIRECT HEAT

Kenneth R. Swartzel, Raleigh; Hershell R. Ball, Jr., New Hill, and Jeffery W. Liebrecht, Raleigh, all of N.C., assignors to North Carolina State University, Raleigh, N.C.

Filed Feb. 16, 1989, Ser. No. 312,066

Int. Cl.<sup>5</sup> A23B 5/005; B65B 55/00

U.S. Cl. 426—399

18 Claims

8. A method of ultrapasteurizing a liquid whole egg product while passing the product as a continuous stream through a pasteurizing apparatus, comprising:

- heating the product to a first predetermined temperature; then
- maintaining the product at said first predetermined temperature for a first predetermined holding time; then
- heating the product to a second predetermined temperature by injecting steam under pressure into said continuous stream, wherein the injected steam pressure is greater than the backpressure of said continuous stream, and wherein the backpressure of the continuous stream is at least about 10 p.s.i. greater than atmospheric pressure; then
- maintaining the product at said second predetermined temperature for a time sufficient to cause a nine log cycle reduction of *Listeria monocytogenes* in said product; then
- cooling said product; and
- aseptically packaging said product.

4,957,761

## POTATO PRESERVATION METHOD

Douglas B. Hale, Boise, Id., assignor to Oppenheimer Companies, Boise, Id.

Continuation of Ser. No. 175,593, Mar. 29, 1988, abandoned, which is a continuation of Ser. No. 80,160, Jul. 29, 1987, abandoned, which is a continuation of Ser. No. 809,169, Dec. 16, 1985, abandoned. This application Apr. 18, 1989, Ser. No. 342,585

Int. Cl.<sup>5</sup> A23B 7/06, 7/148; A23L 1/216

U.S. Cl. 426—410

4 Claims

1. A method for preparing pre-cut uncooked potatoes for

storage at refrigeration temperatures without the addition of preservatives, which consists essentially of the steps of:

- blanching pre-peeled, pre-cut potatoes to seal the outer surface without cooking the inside of the potatoes;
- rapidly cooling said blanched potatoes to an internal temperature of below 45° F.;
- drying said cooled potatoes to remove surface moisture;
- vacuum packaging said dried, uncooked potatoes in an inert gas, said cooled potatoes being maintained at a temperature of 35° to 38° F. during said drying and vacuum packaging; and,
- storing said vacuum-packaged potatoes at 34° to 38° F.

4,957,762

## PROCESS FOR THE MANUFACTURE OF SHELF-STABLE OAT HOT CEREAL

Suja P. Finnerty, Arlington Heights, and Marvin K. Lenz, Algonquin, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed May 23, 1989, Ser. No. 356,865

Int. Cl.<sup>5</sup> A23L 1/168

U.S. Cl. 426—457

9 Claims

6. A process for manufacture of hot oat cereals, comprising the steps: subjecting oat groats having a moisture level between 8–20%, inclusive, to high-temperature hot air treatment for a period of time from about 30–90 seconds, under temperature-time conditions sufficient to drop the moisture level of the groats to between about 3%, and 6%, inclusive; adding water to the resulting groats to bring the moisture level to between 8–12% inclusive; steaming the resulting groats to a moisture level of about 14–20% and flaking the resulting steamed groats; redrying the resulting flaked groats to a moisture level of about 9–14%, and packaging the resulting product; said adding water step taking place within 100 minutes after completion of the heating step, and said steaming and flaking taking place within 48 hours after the end of said adding water step.

4,957,763

## COMPOSITE SWEETENING AGENT

Taketsugu Saita, and Junko Shindo, both of Tokyo, Japan, assignors to Kabushiki Kaisha Yakult Honsha, Tokyo, Japan

Filed May 25, 1989, Ser. No. 356,697

Claims priority, application Japan, May 30, 1988, 63-130161

Int. Cl.<sup>5</sup> A23L 1/236

U.S. Cl. 426—548

2 Claims

1. A composite sweetening agent comprising: Aspartame and a galactooligosaccharide expressed by the formula: Gal-(Gal)<sub>n</sub>-Glc wherein Gal denotes a galactose residue, Glc denotes a glucose residue and n denotes an integer from 1 to 4, in a ratio by weight of 1:17 to 1:200.

4,957,764

## METHOD OF MANUFACTURING JELLY PRODUCTS HAVING FIBROUS TEXTURE

Shigeo Okonogi; Hiroya Yuguchi, both of Tokyo; Sumio Tanai, Yokohama, and Keiji Morimoto, Matsudo, all of Japan, assignors to Morinaga Milk Industry Co., Ltd., Tokyo, Japan

Filed Dec. 30, 1988, Ser. No. 292,341

Claims priority, application Japan, Mar. 11, 1988, 63-56130

Int. Cl.<sup>5</sup> A23L 1/05

U.S. Cl. 426—573

3 Claims

1. A method of manufacturing jelly products having fibrous texture, wherein a plurality of liquid materials are separately prepared, then mixed and cooled for gelling to provide the fibrous texture for the jelly products, comprising: separately preparing

- first liquid material, the pH of which is adjusted to 4.0 or less with edible acidic means, comprising at least one proteinaceous material selected from the group consisting of those originating from eggs, milk and soya beans in a quantity resulting in the protein content in the final products to be equal to or more than 0.02 wt. %, and

4,957,767

## METHOD OF MAKING A NON-ALCOHOLIC BEER CONTAINING SPRAY-DRIED WORT

Andrianus H. Maria de Kort, Uithoorn, and Paul van Erede, Zoetermeer, both of Netherlands, assignors to Heineken Technisch Beheer B.V., Amsterdam, Netherlands

Filed Sep. 6, 1988, Ser. No. 241,076

Claims priority, application Netherlands, Sep. 8, 1987, 8702126

Int. Cl.<sup>5</sup> A23L 2/38

U.S. Cl. 426—590

15 Claims

1. Non-alcoholic beer, comprising unfermented wort reconstituted with water from wort powder, said wort powder being spray-dried wort having a maximum moisture content of 5% by weight, said reconstituted unfermented wort being free of the wortlike or green flavor characteristic of conventional wort-based non-alcoholic beers.

- a second liquid material, the pH of which results in the pH value of said first and second liquid materials when mixed to be equal to or less than 5.0, comprising at least one gum substance selected from the group consisting of xanthan gum, gum arabic and pullulane in a quantity resulting in the gum content in the mixture of said first and second liquid materials to be equal to or more than 0.02 wt. % and at least one gelling agent selected from the group consisting of agar-agar, furcellaran and carrageenan in a quantity resulting in the gelling agent content in the mixture of all the liquid materials to fall between 0.1–1.0 wt. %.

mixing said first and second liquid materials under moderate agitating condition so as to substantially eliminate turbulent flow at a temperature higher than the gelling temperature of the resultant mixture, determined by the gelling agent used, to form fibrous texture in the mixture; and

cooling the mixture to form a gel having fibrous texture.

4,957,765

## CREAM BASED LIQUEURS

Craig C. Widmar; Dale Tripp, both of New York, N.Y., and Vincent G. Ficca, Princeton Jct., N.J., assignors to Joseph E. Seagram &amp; Sons, Inc., New York, N.Y.

Continuation of Ser. No. 945,204, Dec. 22, 1986, abandoned, which is a continuation of Ser. No. 524,191, Aug. 18, 1983, abandoned. This application Nov. 9, 1987, Ser. No. 119,317

Int. Cl.<sup>5</sup> A23C 3/02, 13/12; C12G 3/06; C12H 1/18

U.S. Cl. 426—586

12 Claims

1. A method for preparing a cream liqueur having improved emulsion stability, which comprises the steps of:

- admixing alcoholic beverage, a carbohydrate, and water to form an alcoholic beverage premix;
- admixing (i) one or more compounds selected from the group consisting of citric acid and alkali metal salts thereof, (ii) caseinate, and (iii) water to form a protein premix, the amount of citric acid or its salt or salts being sufficient to maintain the pH of the cream liqueur in the range of greater than 6.60 and less than 7.00;
- admixing the protein premix from step (b) with cream having a butterfat content of from about 38 to 52% by weight to form a protein/cream phase in the globules of butterfat are coated with caseinate;
- admixing the alcoholic premix from step (a) with the protein/cream phase of step (c) to form an emulsion of butterfat globules coated with caseinate in an aqueous alcohol phase; and
- treating the emulsion from step (d) to reduce the average diameter of the butterfat globules to less than about 5 microns.

4,957,766

## PROCESS FOR MAKING BEER CONTAINING AN UNFERMENTED BEER PRODUCT

Adrianus H. Maria de Kort, Uithoorn, and Paul van Eerde, Zoetermeer, both of Netherlands, assignors to Heineken Technisch Beheer B.V., Amsterdam, Netherlands

Filed Sep. 6, 1988, Ser. No. 241,077

Claims priority, application Netherlands, Sep. 8, 1987, 8702125; Sep. 24, 1987, 8702279

Int. Cl.<sup>5</sup> C12G 3/08

U.S. Cl. 426—592

27 Claims

1. Beer having an alcohol content of maximally 3.5% by volume, characterized in that it is a mixture devoid of green flavor of (A) beer obtained by means of a conventional fermentation and (B) unfermented wort product reconstituted with water, said wort product prior to reconstitution having a dry matter content of at least 50% by weight.

4,957,768

## FOOD EMULSION

Christian E. Dutilh, Amsterdam, Netherlands, assignor to Unilever Patent Holdings B.V., London, England

Filed Feb. 16, 1989, Ser. No. 311,064

Claims priority, application European Pat. Off., Feb. 18, 1988, 88200292.6

Int. Cl.<sup>5</sup> A23D 7/00

U.S. Cl. 426—604

28 Claims

1. A heat-sterilizable water and oil emulsion, which comprises a stabilizing amount of a mixture of a lyso-phospholipid and a lipid-binding protein.

4,957,769

## ANIMAL FEED COMPOSITION AND METHOD OF MAKING SAME

Duane H. Theuninck, Elk River, Minn., and Daniel Downs, Detroit Lakes, both of Minn., assignors to Cargill, Incorporated, Minneapolis, Minn.

Division of Ser. No. 273,117, Nov. 16, 1988, Pat. No. 4,851,244, which is a continuation of Ser. No. 13,910, Feb. 12, 1987, abandoned, which is a continuation of Ser. No. 771,274, Aug. 30, 1985, abandoned. This application Apr. 14, 1989, Ser. No. 338,288

Int. Cl.<sup>5</sup> A23D 1/00

U.S. Cl. 426—74

\*3 Claims

1. A rigid animal feed block consisting essentially of: a rigidified blend of from about 30 to 80 percent by weight based upon the weight of the blend of an aqueous nutritive liquid;

from about 5 to about 40 percent by weight based upon the weight of the blend of a dry nutritive;

a colloid gel formed in an aqueous media from about 0.5 to about 15 percent by weight based upon the weight of the blend of a water soluble edible source of phosphorous and from about 1 to about 7 percent by weight based upon the weight of the blend of an edible trivalent metal salt having an ion selected from the group consisting of Fe<sup>3+</sup>, Al<sup>3+</sup> or Cr<sup>3+</sup>; and

from about 1 to about 10 percent by weight based upon the weight of the blend of magnesium oxide mixed with the colloid gel in an amount sufficient to provide magnesium hydroxide and tie up water to rigidify the blend and provide and rigid feed block having a hardness of about 10 mm to about 100 mm.

**4,957,770**  
**COATING WEIGHT MEASURING AND CONTROL APPARATUS AND METHOD**

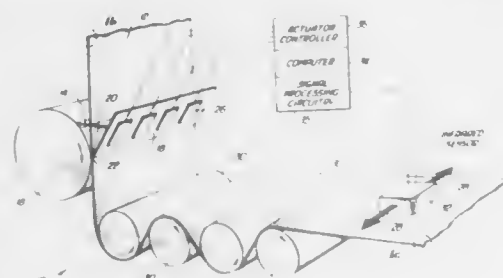
John J. Howarth, Monte Sereno, Calif., assignor to Measurex Corporation, Cupertino, Calif.

Filed Jan. 27, 1989, Ser. No. 303,451

Int. Cl.<sup>5</sup> B05C 11/10

U.S. Cl. 427-9

20 Claims



1. A coating sensor for sensing a coating material on a substrate, wherein the coating material includes at least one component, the sensor comprising:

a radiation source disposed to direct a beam of radiation into the coated substrate;

a radiation receiver disposed to detect at least a portion of the beam emerging from the coated substrate, the receiver being configured to detect the amount of radiation in first and second separate wavelength regions of the radiation spectrum and to produce first and second signals therefrom, respectively indicative of the amount of detected radiation in the first and second regions, and wherein the first region is selected for radiation which is sensitive to the amount of substrate underlying the coating and the second region is selected for radiation which is approximately equally as sensitive as radiation in the first region to the amount of substrate underlying the coating, but which is also sensitive to the one component of the coating, the sensitivity of the radiation in the first region to the one component being different than the sensitivity of the radiation in the second region to the one component.

15. A method for sensing a coating material on a substrate, wherein the coating material includes at least one component, comprising steps of:

irradiating the coated substrate with radiation including wavelengths in at least first and second separate wavelength regions of the electromagnetic spectrum;

detecting the amount of radiation emitted from the substrate and coating material in the first and second separate regions, the first and second regions being selected such that the radiation in the first region is sensitive to the amount of substrate underlying the coating material and the radiation in the second region is approximately equally as sensitive to the amount of substrate underlying the coating material as the radiation in the first region, and further wherein the radiation in the first and second regions have unequal sensitivity to the amount of the one component in the coating.

**4,957,771**  
**ION BOMBARDMENT OF INSULATOR SURFACES**

Carl L. Enloe, Bedford, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 21, 1989, Ser. No. 384,192

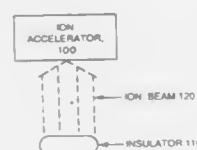
Int. Cl.<sup>5</sup> B05D 3/06

U.S. Cl. 427-38

15 Claims

1. A process for treating high-voltage insulators in order to improve their flashover strength, said process comprising the steps of:

exposing the high-voltage insulators to a beam of high-energy metal ions which are emitted by an ion accelerator; maintaining the beam of high-energy metal ions on the high-voltage insulator with a particle flux of up to approxi-



mately  $5 \times 10^{14}$  particles per second for a preselected duration; and annealing the high-voltage insulators when said maintaining step is completed.

**4,957,772**  
**METHOD FOR FORMING FUNCTIONAL DEPOSITED FILMS BY MEANS OF MICROWAVE PLASMA CHEMICAL VAPOR DEPOSITION METHOD**

Keishi Saitoh; Junichiro Hashizume, both of Nagahama; Shigehira Iida, Ueno; Tetsuya Takei, and Takayoshi Arai, both of Nagahama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

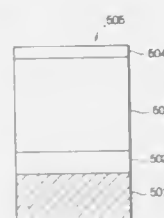
Continuation of Ser. No. 130,448, Dec. 9, 1987, abandoned. This application Dec. 21, 1988, Ser. No. 287,666

Claims priority, application Japan, Dec. 12, 1986, 61-297421; Dec. 13, 1986, 61-296994

Int. Cl.<sup>5</sup> B05D 3/06; H01L 21/20

U.S. Cl. 427-39

8 Claims



1. A microwave plasma chemical vapor deposition process for the formation of a functional deposited film on a plurality of substrates by means of a microwave plasma chemical vapor deposition conducted in a substantially enclosed film-forming chamber, said film-forming chamber comprising a circumferential wall having an end portion thereof hermetically provided with a microwave introducing window to which a waveguide extending from a microwave power source is connected, said film-forming chamber having a discharge space and a plurality of rotatable cylindrical substrate holders therein, each of said substrate holders being capable of having one of said substrates positioned thereon, said substrate holders being substantially concentrically arranged in said film-forming chamber so as to circumscribe said discharge space, said film-forming chamber being provided with means for supplying a film-forming raw material gas into said discharge space and means for evacuating said film-forming chamber, comprising: (a) generating a plasma by microwave glow discharge in said film-forming raw material gas to form said functional

deposited film while rotating each of said cylindrical substrate holders; (b) maintaining the gaseous pressure of said discharge space at a value in the range of 0.1 to 1 mTorr; and (c) applying into said discharge space a microwave power from 1.1 to 5 times the minimum microwave power required to maximize the deposition rate for a decomposed product produced from said film-forming raw material gas to form a deposited film.

**4,957,773**  
**DEPOSITION OF BORON-CONTAINING FILMS FROM DECABORANE**

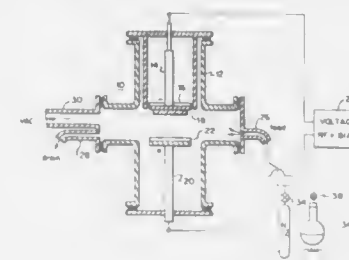
James T. Spencer, Syracuse; Peter A. Dowben, Dewitt, and Yoon G. Kim, Syracuse, all of N.Y., assignors to Syracuse University, Syracuse, N.Y.

Filed Feb. 13, 1989, Ser. No. 309,213

Int. Cl.<sup>5</sup> B05D 5/12; C23C 16/34, 16/14, 16/48

U.S. Cl. 427-39

12 Claims



1. A process for depositing a boron nitride film onto a suitable substrate comprising:

supplying into a chamber that contains the substrate a gaseous mixture of decaborane and a nitrogen-based gas whose molecules contain at least one nitrogen atom, wherein said nitrogen-based gas is provided at a partial pressure that is several times as high as the partial pressure of said decaborane, and

energizing the gaseous mixture in the chamber sufficiently to disassociate the nitrogen atoms from said molecules and to disassociate boron atoms from the decaborane, which then combine as said boron nitride film on said substrate.

**4,957,774**  
**METHOD OF HEAT-FIXING TONER IMAGE**  
Shinji Doi; Satoshi Yoshida, both of Kawasaki; Satoshi Matsunaga, Tokyo; Hiroaki Kawakami, Kawasaki; Takashige Kasuya, Tokyo; Yasuhide Goseki, and Yusuke Karami, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

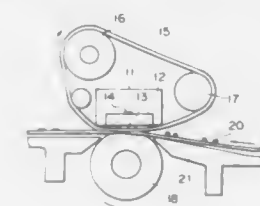
Filed Dec. 13, 1989, Ser. No. 450,256

Claims priority, application Japan, Dec. 14, 1988, 63-316758; Dec. 15, 1988, 63-315021; Dec. 15, 1988, 63-316834; Dec. 15, 1988, 63-316836; Dec. 16, 1988, 63-316133; Dec. 16, 1988, 63-316139; Dec. 21, 1988, 63-324502

Int. Cl.<sup>5</sup> H01F 10/02; B05D 3/02

U.S. Cl. 427-45.1

39 Claims



1. A method of heat-fixing a visible image of toner to a

recording medium, which comprises applying a toner image onto the recording medium, wherein

the toner to form said toner image or the resin component of the toner has the properties such that the melt viscosity  $\eta'$  measured by an overhead-type flow tester is from  $10^3$  to  $10^6$  poise at a temperature within the temperature range of from  $120^\circ\text{C}$ . to  $150^\circ\text{C}$ ., and the absolute value of the inclination of a graph is not more than  $0.50 \ln(\text{poise})/^\circ\text{C}$ . when the natural logarithms  $\ln \eta'$  of the melt viscosities at  $120^\circ\text{C}$ . and  $150^\circ\text{C}$ . are plotted with respect to the temperatures; and

heat-fixing the toner image retained on the recording medium to the recording medium by use of a heater element as stationarily supported and a pressure member that brings said recording medium into close contact with said heater element through a film interposed between them.

**4,957,775**  
**METHOD AND APPARATUS FOR REFRACTORY METAL DEPOSITION**

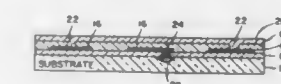
Jerry G. Black, Lincoln, and Daniel J. Ehrlich, Lexington, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 868,615, May 29, 1986, Pat. No. 4,756,927. This application Mar. 9, 1988, Ser. No. 165,927

Int. Cl.<sup>5</sup> B05D 3/06

U.S. Cl. 427-53.1

13 Claims



1. The process of providing interconnections for regions formed in substrates comprising the steps of:

(a) forming a layer on said substrate;

(b) forming openings through the layer to the substrate to regions to be interconnected;

(c) depositing a refractory metal in said openings and on said layer by pyrolysis of a mixture of an inert gas and  $\text{WF}_6$ ,  $\text{MoF}_6$  or  $\text{TiCl}_4$  and an Si containing gaseous compound using a low power laser beam to initiate and direct the interconnection pattern.

**4,957,776**  
**METHOD OF MANUFACTURING OPTICAL DISC**  
Masahiro Higuchi, Goto; Sadao Sakamoto, Ogaki, and Yoshiharu Uchihara, Anpachi, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Jan. 3, 1989, Ser. No. 293,748

Claims priority, application Japan, Jan. 14, 1988, 63-6357

Int. Cl.<sup>5</sup> B05D 3/06, 5/06

U.S. Cl. 427-54.1

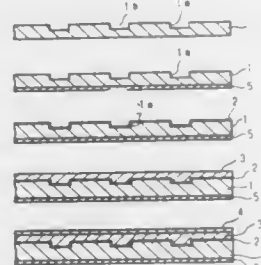
12 Claims

1. A method of manufacturing an optical disc, comprising the steps of providing a disc substrate where information is recorded on one side;

first forming a warp prevention layer on the other side of said disc substrate;



second forming a beam reflection film on said one side of said disc substrate; and  
third forming a protection film covering said beam reflection film, the step of first forming taking place before the step



of second forming so as to avoid deterioration in wettability of the other side of said disc substrate that would otherwise take place if the step of second forming were effected before the step of first forming.

#### 4,957,777 VERY LOW PRESSURE CHEMICAL VAPOR DEPOSITION PROCESS FOR DEPOSITION OF TITANIUM SILICIDE FILMS

Vida Ilderem, Puyallup, Wash.; L. Rafael Reif, Newton, and Prabha K. Tedrow, Lexington, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Oct. 12, 1989, Ser. No. 423,494

Int. Cl.<sup>5</sup> B05D 3/06; C23C 16/42

U.S. Cl. 427—55

14 Claims

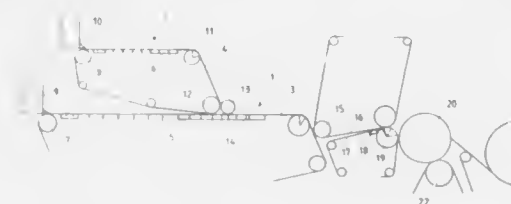


11. A method of selectively forming titanium silicide in-situ over silicon regions of a patterned substrate in a cold walled reactor comprising the steps of:

- mounting a substrate having patterned regions comprising exposed oxide regions and exposed silicon regions on a holder in the reactor;
- bringing the pressure in the reactor to a relatively low pressure of about 67 mTorr, or less;
- selectively heating the substrate with radiant thermal energy to bring the substrate to a predetermined temperature of about 600° C. at which formation of a silicon film from a known reactant will occur on the substrate; while keeping the reactor walls at a substantially lower temperature;
- introducing a gaseous silicon atom containing reactant into the reactor to form a thin polysilicon layer on the patterned substrate;
- promptly selectively heating the substrate and polysilicon layer by radiant thermal energy to bring the substrate and thin polysilicon layer to a predetermined temperature of about 730° C. suitable for formation of a titanium silicide layer while maintaining the reactor walls at a substantially lower temperature;
- introducing a gaseous silicon atom containing reactant and a gaseous titanium atom containing reactant into the reactor to form a layer of titanium silicide only over the silicon regions by initially consuming the thin polysilicon layer until the oxide regions are once again exposed and continuing the reaction until the titanium silicide is formed only over the silicon regions by supplying silicon for the continuing formation from the gaseous silicon atom con-

taining reactant without further substantial consumption of the remaining silicon in the silicon regions.

4,957,778  
METHOD OF PRODUCING CHEMICALLY SELF-COPYING OR SELF-CONTAINING PAPER  
Olavi A. Yrjälä, Espoo, Finland, assignor to A. Ahlstrom Corporation, Karhula, Finland  
Division of Ser. No. 204,309, Jun. 9, 1988, abandoned. This application Jul. 14, 1989, Ser. No. 380,036  
Claims priority, application Finland, Jun. 16, 1987, 872681  
Int. Cl.<sup>5</sup> B41M 5/16  
U.S. Cl. 427—152  
6 Claims



1. A method of producing a chemically self-copying paper intended for use in the combinations of a top sheet (CB), bottom sheet (CF) and one or more interleaving sheets (CFB) or a chemically copying, self-containing paper, said method comprising the steps of:  
couching together, while wet, two fiber layers manufactured in separate wire sections, the wire side of the upper fiber layer and the top surface of the lower fiber layer being couched together to form a couched web in which the upper fiber layer contains components inducing a color reaction; and  
conveying said couched web through a single-felted press nip formed by a felt surface a smooth surface, so that said upper fiber layer containing the components inducing the color reaction contacts said smooth surface and said lower fiber layer contacts said felt surface.

#### 4,957,779 METHOD FOR PRODUCING A PROTECTIVE LAYER ON A CERAMIC BODY

Virgil Irick, Jr., Hockessin; Jack A. Kuszyk, and Dennis J. Landini, both of Newark, all of Del., assignors to Lanxide Technology Company, LP, Newark, Del.

Filed Feb. 18, 1988, Ser. No. 157,432

Int. Cl.<sup>5</sup> B05D 3/00

U.S. Cl. 427—193

11 Claims

2. A method for producing a self-supporting ceramic composite body comprising:

- providing a parent metal body;
- positioning said parent metal adjacent to a permeable mass of filler and orienting said parent metal and said filler relative to each other so that formation of said oxidation reaction product will occur in a direction towards and into said mass of filler;
- heating said parent metal body to a temperature above its melting point but below the melting point of its oxidation reaction product to form a body of molten parent metal and, at said temperature,
  - reacting the molten parent metal with an oxidant to form an oxidation reaction product of the parent metal,
  - maintaining at least a portion of said oxidation reaction product in contact with and between said body of molten metal and said oxidant, to progressively draw molten metal from said body of molten metal through the oxidation reaction product towards the oxidant and towards and into the adjacent mass of filler so that fresh oxidation reaction product continues to form within the

- mass of filler at an interface between the oxidant and previously formed oxidation reaction product, and
- (3) continuing said reacting for a time sufficient to form a first ceramic composite body;
- (d) exposing said first ceramic composite body to an environment comprising glassy particles which causes growth of a layer from at least a portion of a surface of said first ceramic composite body; and
- (e) continuing said exposure in step (d) for a time sufficient to form a protective layer on at least a portion of said first ceramic composite body.

#### 4,957,780 INTERNAL REACTOR METHOD FOR CHEMICAL VAPOR DEPOSITION

Vinod K. Sarin, Lexington, Mass.; Charles D'Angelo, Southboro, and Helen E. Rebenne, Westboro, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

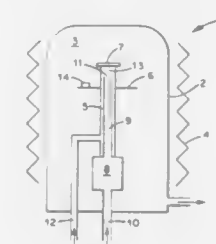
Division of Ser. No. 206,400, Jun. 14, 1988, Pat. No. 4,890,574, which is a continuation-in-part of Ser. No. 5,003, Jan. 20, 1987, Pat. No. 4,751,109. This application Sep. 15, 1989, Ser. No.

407,980

Int. Cl.<sup>5</sup> C23C 16/00

U.S. Cl. 427—255.2

6 Claims



1. A chemical vapor deposition process comprising the steps of:

- disposing an internal reactor within a chemical vapor deposition reactor comprising means for enclosing a reaction chamber and means for heating the reaction chamber, at a position relative to the heating means selected to provide control of the temperature within the internal reactor; placing at least first and second solid precursor materials in the internal reactor;
- placing a substrate in the reaction chamber;
- contacting the solid precursor materials with at least one precursor gas, reactive with the solid precursor materials to produce at least two first reactant gases; and
- directing the at least two first reactant gases to the reaction chamber to react with one or more additional reactants to form a product, and to deposit a layer of the product on the substrate.

4,957,781  
PROCESSING APPARATUS  
Masatomo Kanegae; Takayoshi Kogano, and Fumio Ito, all of Tokyo, Japan, assignors to Hitachi, Ltd.; Hitachi VLSI Engineering Corp. and Hitachi Tokyo Electronics Co., all of Tokyo, Japan  
Continuation of Ser. No. 6/888,071, Jul. 22, 1986, abandoned.

This application Jun. 2, 1988, Ser. No. 201,442

Claims priority, application Japan, Jul. 22, 1985, 60-160236

Int. Cl.<sup>5</sup> C23C 16/00

U.S. Cl. 427—255.3

64 Claims

1. A method for treating semiconductor wafers using a vertical thermal treatment furnace, the thermal treatment furnace including cylindrical heating means having a cylindrical cavity therethrough lengthwise in which the semiconductor wafers are situated during a thermal treatment in the vertical thermal treatment furnace, the cavity having an axis which

extends substantially in the vertical direction, the cavity having an opening, for loading and unloading wafers, disposed at one end thereof, the furnace also including a wafer holder for loading and unloading the wafers into and out of the cavity, the wafers being supported by the wafer holder and disposed along the axis of the cavity, the method comprising steps of:

- arranging the wafers, that are supported by the wafer holder, into a cylindrical process tube, the process tube having a diameter smaller than the cavity, the arranging the wafers in the process tube being performed with the process tube substantially outside the cavity;



- moving the wafers relative to the cavity, supported by the wafer holder, so as to position the wafers in the cavity, the wafers being moved into the cavity through the opening, both the process tube and wafers being moved to position the wafers in the cavity;
- heat-treating the wafers in the cavity at a predetermined temperature; and
- unloading the wafers in the cavity out of the cavity, through said opening.

#### 4,957,782 METHOD FOR AUTOMATIC SEQUENTIAL COATING OF WORKPIECES

Eberhard Medler, Sindelfingen; Siefried Phillippi, Calw-Hirsau; Kurt Vetter, Remseck; Ludwig Freudenreich, Ulm-Ernstingen, all of Fed. Rep. of Germany, and Othmar Lippner, Wettlingen/Schweiz, Switzerland, assignors to Behr Industrieanlagen GmbH & Co. and Daimler-Benz AG, both of, Fed. Rep. of Germany

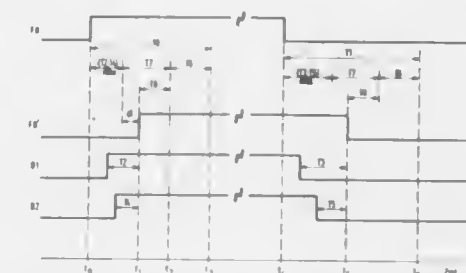
Division of Ser. No. 186,179, Apr. 26, 1988. This application Jan. 29, 1990, Ser. No. 471,419

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1987, 3713999

Int. Cl.<sup>5</sup> B05D 1/02

U.S. Cl. 427—421

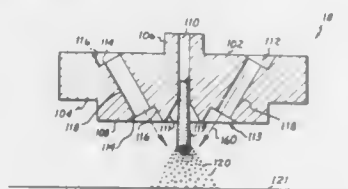
6 Claims



1. A method for automatically coating workpieces using a spraying device controlled by a stored operating program, said method comprising the steps of producing at least one switch-

ing signal for controlling a fluid flow to the spraying device at predetermined times in response to a stored predetermined delay time between the production of the switching signal and the response of the fluid flow and the relative movements between the spraying device and the workpiece; characterized by including the steps of measuring the actual delay time between the production of the switching signal and the response of the fluid flow during the coating operation; comparing the actual delay time with the stored delay time; and adjusting the stored delay time in the operating program in response to the comparison in the event the difference between the actual delay time and the stored delay time exceeds a predetermined value.

**4,957,783**  
**METHOD AND APPARATUS FOR DISPENSING DROPLETS OF MOLTEN THERMOPLASTIC ADHESIVE**  
 Gregory J. Gabryszewski, Lithonia, Ga., assignor to Nordson Corporation, Westlake, Ohio  
 Continuation-in-part of Ser. No. 254,264, Oct. 5, 1988, Pat. No. 4,911,956. This application Sep. 27, 1989, Ser. No. 411,181  
 Int. Cl.<sup>5</sup> B05D 1/02; B05B 1/08  
 U.S. Cl. 427—424 14 Claims

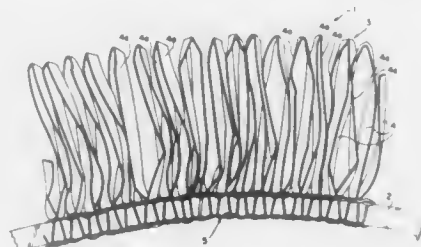


1. The method of depositing molten thermoplastic material onto a substrate, comprising:  
 ejecting a continuous stream of molten thermoplastic material from a discharge outlet, said stream having momentum in a direction toward the substrate and having an exterior surface;  
 intermittently impacting said stream of molten thermoplastic material with a jet of atomizing air which initially contacts said exterior surface of said stream to shear said stream of molten thermoplastic material into droplets;  
 controlling the energy with which said jet of atomizing air impacts said stream so that said droplets are allowed to fall onto the substrate under the influence of gravity and due to the momentum of said stream, said droplets being deposited onto the substrate in a pattern wherein said droplets are substantially uniformly spaced from one another and are of substantially uniform size.

**4,957,784**  
**MANUFACTURED ARTICLE FOR INSTANTANEOUSLY MAKING DECORATIVE BOWS AND THE LIKE**  
 Ruggero Ripamonti, Osnago, Italy, assignor to Nastroificio Lombardo S.R.L., Milan, Italy  
 Filed May 31, 1989, Ser. No. 359,990  
 Claims priority, application Italy, Feb. 28, 1989, 20647/89[U]  
 Int. Cl.<sup>5</sup> D04D 7/10 2 Claims

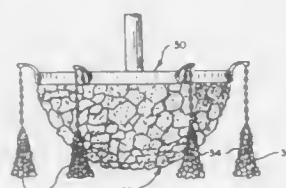
1. A manufactured article for instantaneously making decorative bows and the like, comprising:  
 a flexible support ribbon;  
 a decorative flexible band formed by ribbon-like element folded back so as to form a plurality of loops consecutively disposed in side by side relationship;  
 at least a stitching made all around the support ribbon and engaging each of said loops in the region of their ends, said stitching being slidable along the flexible support ribbon from a condition of maximum extension in which the

loops are consecutively disposed side by side, to a condition of minimum extension in which the loops are homo-



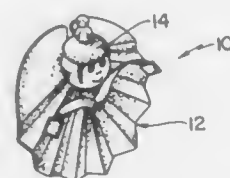
geneously gathered whereby a bow having a substantially spherical configuration is formed.

**4,957,785**  
**LIGHT TRANSMISSIVE STONE STRUCTURE AND METHOD FOR MAKING SAME**  
 Michael R. Fornadley, 208 Heston Dr., Mars, Pa. 16046  
 Filed Mar. 25, 1988, Ser. No. 173,272  
 Int. Cl.<sup>5</sup> B44F 1/06; G02B 5/08 10 Claims  
 U.S. Cl. 428—15



1. A light transmissive structure comprised of one of a transparent back and a translucent back and a light transmissive material selected from the group consisting of gems, ores and rocks mounted on said back with methacrylic adhesive which is clear and translucent after hardening will not discolor and when assembled the structure will withstand normal handling and mounting without breaking.

**4,957,786**  
**METHOD OF MAKING DOLL AND DOLL THEREBY FORMED**  
 Lorraine Barboza, 75 N. Main St., Assonet, Mass. 02702  
 Filed Jan. 30, 1990, Ser. No. 472,302  
 Int. Cl.<sup>5</sup> A63H 3/16; B32B 31/10 12 Claims  
 U.S. Cl. 428—16



1. A method of making a doll comprising the steps of:  
 (a) forming a skirt portion from a substantially circular, substantially rigid, thin, formable sheet by cutting three closely spaced substantially parallel slits in said sheet, said slits extending inwardly in said sheet to substantially the center thereof and defining a pair of elongated narrow

strips, the remainder of said sheet defining a main portion having a substantially circumferential perimeter and first and second substantially radially extending inner edges, forming said main portion into an at least partially conical configuration wherein the portions of said first and second inner edges which are adjacent said perimeter are in closely adjacent relation, and bending said strips outwardly in opposite directions in spaced relation to the outer surface of said main portion so that the connected ends of said strips and said inner edges cooperate to define an aperture in said skirt portion;

(b) forming a character figure portion including a body portion which is dimensioned and configured to be received in the interior of said main portion, a head portion and an elongated neck portion extending between said body portion and said head portion;  
 (c) assembling said character figure portion with said skirt portion so that said body portion is received in the interior of said skirt portion and said neck portion extends through said aperture to position said head portion above said skirt portion.

12. A doll formed by the method of claim 1.

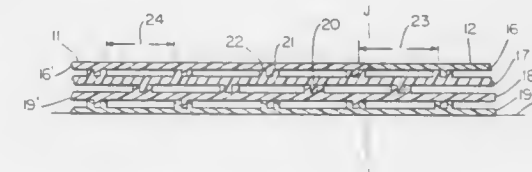
**4,957,787**  
**ARTIFICIAL FLOWER**  
 Linda P. Reinhardt, Clinton, Ohio, and W. Brent Burleson, Pittsburgh, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.  
 Continuation-in-part of Ser. No. 110,147, Oct. 19, 1987, abandoned. This application Sep. 27, 1988, Ser. No. 250,015  
 Int. Cl.<sup>5</sup> A41G 1/00; B32B 3/26 27 Claims  
 U.S. Cl. 428—24



1. In an artificial flower comprising at least one artificial petal, the improvement wherein said artificial petal comprises microporous material which comprises:

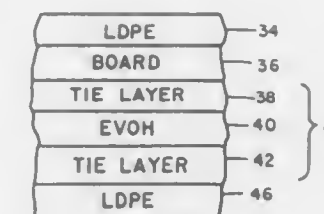
(a) a matrix consisting essentially of essentially linear ultrahigh molecular weight polyolefin which is essentially linear ultrahigh molecular weight polyethylene having an intrinsic viscosity of at least about 18 deciliters/gram, essentially linear ultrahigh molecular weight polypropylene having an intrinsic viscosity of at least about 6 deciliters/gram, or a mixture thereof; said matrix comprising regions of stretch-induced molecularly oriented ultrahigh molecular weight polyolefin distributed throughout said matrix;  
 (b) finely divided particulate substantially water-insoluble siliceous filler distributed throughout said matrix, said filler constituting from about 50 percent to about 90 percent by weight of said microporous material, and  
 (c) a network of interconnecting pores communicating throughout said microporous material, said pores constituting more than 80 percent by volume of said microporous material.

**4,957,788**  
**SHOCK RELIEVING PAD**  
 Richard C. Colonel, P.O. Box 2192, Renton, Wash. 98056, and Devere V. Lindh, 1910 Dogwood Dr., SE., Auburn, Wash. 98002  
 Continuation-in-part of Ser. No. 138,607, Dec. 28, 1987, abandoned. This application Jun. 29, 1989, Ser. No. 373,240  
 Int. Cl.<sup>5</sup> F16B 2/00 8 Claims  
 U.S. Cl. 428—33



1. A pad comprising:  
 a plurality of layers of resilient material,  
 a plurality of compression members,  
 said layers being interconnected and spaced apart by said compression members,  
 whereby said layers are combined into a stack of said layers, said stack having:  
 first and second outside layers and  
 at least one intermediate layer,  
 said layers having first and second sides and projections extending from at least one of said first and second sides of said outside layers and from said first and second sides of said at least one intermediate layer,  
 said projections being shaped and positioned such that cooperative engagement of said projections on adjacent layers comprises said compression members and such that said compression members have spaces between them and said compression members on said first side of said at least one intermediate layer are opposite said spaces on said second side of said at least one intermediate layer.

**4,957,789**  
**NON-FOIL COMPOSITE STRUCTURES FOR PACKAGING JUICE**  
 Charles E. Gibbons; Cynthia L. Tanner, and Allan A. Whillock, all of Mobile, Ala., assignors to International Paper Company, Purchase, N.Y.  
 Continuation of Ser. No. 373,964, Jun. 27, 1989, abandoned. This application Nov. 13, 1989, Ser. No. 434,636  
 Int. Cl.<sup>5</sup> B65D 85/00 42 Claims  
 U.S. Cl. 428—34.2



1. A container for liquids containing essential oils and flavors, said container having an interior and an exterior, said container constructed from a laminate comprising:  
 (a) a paperboard substrate with inner and outer surfaces, said inner surface being closer to the interior of the container than said outer surface;  
 (b) a 12 lb. outer layer of a heat-sealable low density polyethylene polymer exterior to said outer surface of said paperboard substrate;  
 (c) a coextruded sandwich layer comprising a 4.5 lb. tie

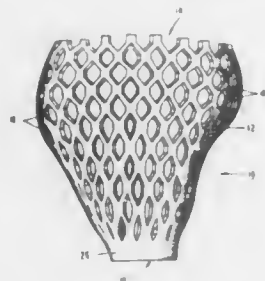


layer, a 4.0 lb. heat-sealable ethylene vinyl alcohol copolymer layer and a 4.5 lb. tie layer interior to said inner surface of said paperboard substrate; and  
(d) a product-contact layer of a 10 lb. heat-sealable low density polyethylene polymer interior to said outer surface of said inner sandwich layer of tie layer—ethylene vinyl alcohol copolymer—tie layer whereby said laminate can be heat-sealed on conventional equipment at temperatures ranging from 250° F–500° F.

**4,957,790**  
**ORIENTED POLYMERIC FILMS**  
Thomas C. Warren, Greer, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.  
Filed Dec. 21, 1987, Ser. No. 136,054  
The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.  
Int. Cl.<sup>3</sup> B65B 53/00

U.S. Cl. 428—34.9 19 Claims  
1. A multilayer heat-shrinkable (oriented) film comprising at least one layer of cross-linkable polymer, said layer (1) (originally) containing a pro-rad agent and (2) being irradiated, both being to an extent sufficient to provide an amount of cross-linking effective to accomplish an increased orientation rate.

**4,957,791**  
**PACKING SLEEVE**  
Alfred H. Richter, Arcadia, Calif., assignor to Richter Manufacturing Corporation, Pomona, Calif.  
Filed Sep. 29, 1988, Ser. No. 251,505  
Int. Cl.<sup>3</sup> B65D 33/01; B32B 3/10  
U.S. Cl. 428—35.5 15 Claims



1. A packing sleeve for protectively packaging products such as produce, the sleeve having an open inlet end, an opposed open retaining end, and a longitudinally extending body therebetween, a substantial portion of the body having a plurality of slits circumferentially spaced around the body so that the inlet end and a substantial portion of the body are radially expandable to accommodate a product having a circumference larger than the non-expanded circumference of the packing sleeve, the retaining end of the packing sleeve being substantially non-expandable so as to prevent products having a circumference larger than the non-expanded circumference of the retaining end from falling through the retaining end.

**4,957,792**  
**SELF-MOLDING HOSE AND A CONTINUOUS VULCANIZATION METHOD**  
Yokohori Shizuo; Miyamoto Kenzo, both of Hyogo; Fukushima Koji, Osaka; Tsujimoto Masami, Hyogo; Onda Kenji, Fukushima, and Sato Kan, Tokyo, all of Japan, assignors to Toyo Tire & Rubber Co., Ltd., Osaka, Japan  
Filed Nov. 8, 1988, Ser. No. 268,573  
Claims priority, application Japan, Nov. 9, 1987, 62-282700; Jul. 11, 1988, 63-173120; Aug. 3, 1988, 63-194132; Aug. 9, 1988, 63-199299  
Int. Cl.<sup>3</sup> F16L 11/12 8 Claims  
U.S. Cl. 428—36.2

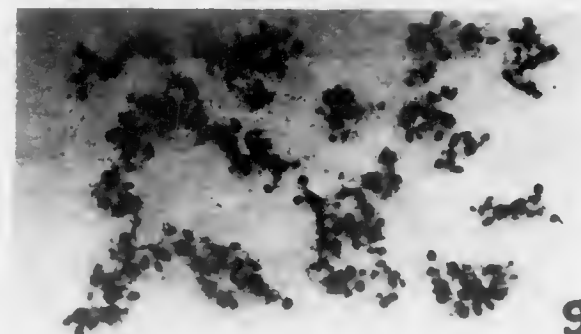


1. A self-molding hose of the type which may have any of various shapes and comprise any of various elastomers and reinforcing fabrics, said self-molding hose characterized in that said self-molding hose is made from a self-molding part comprising:  
a heat shrinkable woven fabric;  
a first vulcanized elastomer topping layer provided on top surface of said heat shrinkable woven fabric;  
a second vulcanized elastomer topping layer provided on an underside surface of said fabric, said second vulcanized elastomer topping layer being thinner than said first vulcanized elastomer topping layer; and  
an unvulcanized elastomer topping layer provided on the underside of said second vulcanized elastomer topping layer.

**4,957,793**  
**WASTE PIPE SYSTEM COMPRISING PLASTIC PIPE PARTS MADE OF THERMOPLASTIC MATERIAL WITH SOUND-PROOFING PROPERTIES**  
Ali Guettouche, Haren, and Jürgen Graafmann, Lingen, both of Fed. Rep. of Germany, assignors to Wavin B. V., Netherlands  
Continuation-in-part of Ser. No. 76,908, Jul. 23, 1987, abandoned. This application Dec. 9, 1988, Ser. No. 282,865  
Claims priority, application Netherlands, Jul. 23, 1986, 8601910  
Int. Cl.<sup>3</sup> F16L 9/22 7 Claims  
U.S. Cl. 428—36.4

1. A waste pipe system for discharging hot and cold waste water comprising a plurality of extruded or injection molded thermoplastic pipe parts, said thermoplastic material being characterized by the absence of plasticizers and selected from the group consisting of polyvinylchloride, polypropylene and acrylonitrile butadiene styrene copolymer (ABS), the inner surface of said thermoplastic pipe part coming into contact with the liquid waste, the outer surface of said thermoplastic pipe part characterized by the absence of a soundproofing casing, the level of noise in such a pipe system when conveying waste liquid through the pipes being reduced by using a pipe of thermoplastic material wherein the weight per unit area of the plastic pipe part is at least 8 kg/m<sup>2</sup> and the density is between 1.8 and 2.7 g/cm<sup>3</sup>.

**4,957,794**  
**ARAMID FLUFF**  
Thomas I. Bair, Wilmington, Del., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.  
Filed Jan. 2, 1990, Ser. No. 460,256  
Int. Cl.<sup>3</sup> B32B 5/12 17 Claims  
U.S. Cl. 428—74



1. Aramid fiber fluff comprising aramid fibers with an extended length of 0.4 to 3 centimeters and having at least two out-of-plane crimps along their length, the fluff exhibiting a density of less than 0.08 g/cc at a load of 0.26 N/cm<sup>2</sup>.

**4,957,795**  
**ABSORBENT ELASTOMERIC WOUND DRESSING**  
John E. Riedel, Hugo, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Continuation of Ser. No. 194,082, May 13, 1988, abandoned.  
This application Jan. 24, 1990, Ser. No. 469,708  
Int. Cl.<sup>3</sup> A61F 13/46; A61L 15/20; D04H 1/72; B32B 5/04, 5/08 27 Claims  
U.S. Cl. 428—74

1. An elastomeric nonwoven absorbent web comprising a nonwoven fibrous matrix of about 10 to 20 weight percent elastomeric melt-blown small diameter fibers and about 10 to 30 weight percent absorbent staple fibers or about 5 to 20 weight percent absorbent polymeric particulate material, about 30 to 60 weight percent wicking staple fibers, and about 10 to 30 weight percent crimped bulking staple fibers dispersed throughout the matrix.

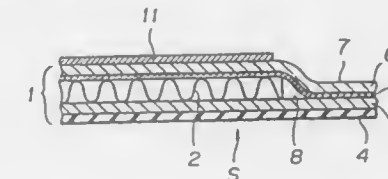
**4,957,796**  
**LINING AND COVER FOR AUTOMOBILES**  
Helmut Pelzer, Neue Strasse 5, D-5804 Herdecke-Ende, Fed. Rep. of Germany  
Filed Dec. 20, 1988, Ser. No. 286,990  
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1987, 3743509  
Int. Cl.<sup>3</sup> B32B 5/18, 7/04 6 Claims  
U.S. Cl. 428—76



1. Foot cover for placement on the floor space of motor vehicles comprising a form part made of polyurethane foam material being provided with sealing lip means extending from edges and edge portions of said form part being integral therewith and thus made of polyurethane foam; and an insert which extends into the sealing lip from the form

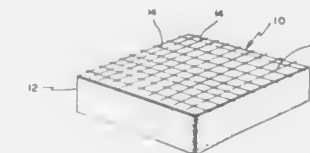
part for reinforcing the sealing lip and being embedded in the polyurethane foam material.

**4,957,797**  
**ROOF LINING STRUCTURE FOR MOTOR VEHICLE**  
Takashi Maeda; Tsuyoshi Yamashita, and Mitsuo Nakamura, all of Utsunomiya, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed May 9, 1989, Ser. No. 349,114  
Claims priority, application Japan, May 9, 1988, 63-112111; May 10, 1988, 63-112778  
Int. Cl.<sup>3</sup> B32B 7/00 12 Claims  
U.S. Cl. 428—77



1. A roof lining structure in a motor vehicle having a roof panel, comprising:  
a roof lining base member; and  
a vibration-damping layer interposed between an upper surface of said base member and a lower surface of the roof panel, said roof lining base member comprising:  
a support layer having a cellular structure;  
a first covering layer disposed on a surface of said support layer which faces a passenger compartment of the motor vehicle;  
a decorative layer disposed on a surface of said first covering layer which faces the passenger compartment; and  
a reinforcing layer disposed at least partly in said roof lining base member.

**4,957,798**  
**COMPOSITE OPEN-CELL FOAM STRUCTURE**  
John Bogdany, Oglethorpe, Ga., assignor to Resilient System, Inc., Dalton, Ga.  
Continuation-in-part of Ser. No. 163,010, Mar. 2, 1988, abandoned. This application Mar. 31, 1989, Ser. No. 331,183  
Int. Cl.<sup>3</sup> B32B 3/26 19 Claims  
U.S. Cl. 428—95



1. A carpet underlay cushion structure comprising:  
a carrier layer of open-cell, resilient polyurethane foam material, said resilient foam material being substantially completely and uniformly impregnated with a latex containing a polymer wherein said polymer is selected from the group consisting of non-carboxylated styrene-butadiene rubber, natural rubber, and a combination of styrene-butadiene and natural rubbers;  
the impregnated foam material being dried after said impregnation to produce a foamed, open-cell, resilient composite cushion structure wherein the open cells thereof partially comprise said carrier layer of polyurethane foam material.

4,957,799

**REINFORCING LAYERS FOR BIAS TIRES**

Jiro Miyamoto, Itami; Takashi Nakasai, Takarazuka, and Yukio Komai, Kanta, Japan, assignors to Toyo Tire & Rubber Co., Ltd., Osaka, Japan

Filed Aug. 31, 1988, Ser. No. 238,817  
Claims priority, application Japan, Aug. 31, 1987, 62-218154  
Int. Cl.<sup>5</sup> B60C 9/20; B32B 5/12  
U.S. Cl. 428-114



1. Reinforcing layers for bias tires including at least two cord plies disposed radially outwardly of a carcass layer, said cord plies comprising a steel cord ply and at least one ply of composite cord plies made of aramid yarns and nylon yarns and having a nominal total denier of 4,000-10,000, said composite cord ply being laminated radially outwardly of said steel cord ply, wherein a cord space is maintained between steel cords and composite cords in the range of 0.5-5.0 times the diameter of the steel cords.

4,957,800

**METHOD OF CONSTRUCTING A MONOLITHIC BLOCK HAVING AN INTERNAL GEOMETRY AND THE BLOCK RESULTING THEREFROM**

Dimitry G. Grabbe, Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 27, 1989, Ser. No. 372,406  
Int. Cl.<sup>5</sup> B32B 3/10; C09J 5/02  
U.S. Cl. 428-136



1. A method of constructing a connector block, said block including a plurality of chambers each for holding a contact member therein, comprising the steps of:  
providing a plurality of metal plates, each of said plates being formed with a plurality of apertures so situated on said plates that when said plates are stacked the apertures form said plurality of chambers;  
providing a solution of resin and catalyst in a solvent; coating each of said plates with said solution;  
allowing said solvent to evaporate from each of said plates to leave a film of resin and catalyst thereon;  
stacking said plates; and  
causing the resin and catalyst to cross-link and fuse;  
wherein the step of providing a solution of resin and catalyst in a solvent comprises choosing a ratio of resin and catalyst to solvent so that when said solvent evaporates from each of said plates there remains on each of said plates a

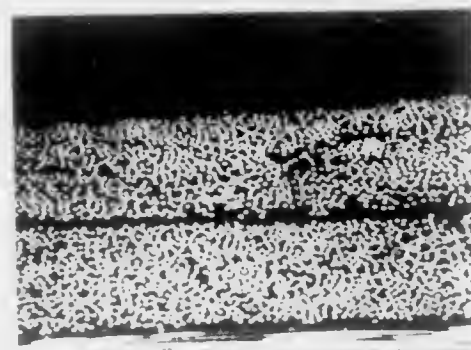
continuous film of resin and catalyst approximately 0.0002 inch thick, so that said film does not fill any of said apertures in each of said plates.

4,957,801

**ADVANCE COMPOSITES WITH THERMOPLASTIC PARTICLES AT THE INTERFACE BETWEEN LAYERS**

Artun Maranci, Westport; Steven L. Peake, Ridgefield, and Stanley S. Kaminski, Stamford, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 17, 1989, Ser. No. 353,277  
Int. Cl.<sup>5</sup> B32B 5/28, 5/30  
U.S. Cl. 428-147



1. A fiber reinforced thermosetting resin matrix prepreg having an outer resin layer apart from the reinforcing fiber at one or both surfaces of the prepreg said outer layer comprising particles of thermoplastic resin of particle size in the range from 2 to 100 microns particle diameter.

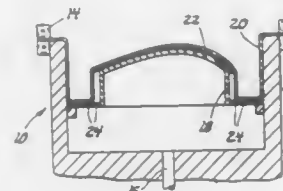
4,957,802

**ARTICLE COVERED WITH PAINTED CARRIER FILMS**

Charles C. Mentzer; Howard W. Cox, both of Birmingham, and William T. Short, Southfield, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 162,731, Mar. 1, 1988, Pat. No. 4,838,973, which is a continuation-in-part of Ser. No. 881,344, Jul. 2, 1986, abandoned. This application Aug. 4, 1988, Ser. No. 228,082. The portion of the term of this patent subsequent to Sep. 19, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B32B 7/02, 27/40  
U.S. Cl. 428-174



1. A paint coated article comprising:  
a substrate portion having front and back surfaces wherein the front surface of said substrate portion being contoured to define the exterior surface of said article,  
a facing sheet being stretched and disposed over the entire front surface of said substrate portion in a thermoforming process and contoured in detail in conformance with said contour of the front surface of said substrate portion, said facing sheet being a laminate comprising a thermoplastic sheet at least 0.05 mm thick, at least one layer of a pigmented paint containing flakes, and at least one layer of

4,957,805

**METHOD OF MAKING LAMINATED REINFORCED THERMOPLASTIC SHEETS AND ARTICLES MADE THEREFROM**

Ian S. Biggs, High Wycombe, and Bronislaw Radwan, Flackwell Heath, both of England, assignors to The Wiggins Teape Group Limited, Basingstoke, England

Continuation-in-part of Ser. No. 78,112, Jul. 27, 1987, abandoned. This application Jul. 11, 1988, Ser. No. 217,324  
Claims priority, application United Kingdom, Jul. 31, 1986, 8618727

Int. Cl.<sup>5</sup> B32B 7/08

U.S. Cl. 428-223

1. A method of making laminated reinforced thermoplastic sheets which includes preparing first and second unconsolidated porous sheets each comprising 20% to 60% by weight of reinforcing fibers having a high modulus of elasticity and 40% to 80% by weight of a thermoplastic material differing from the thermoplastic material in the other sheet, placing the sheets together so that projecting fibers from the adjacent sheets interengage in a boundary zone, and applying heat and pressure to cause the sheets to consolidate and adhere together to form a laminate in which the unconsolidated sheets are formed and dried together by making a first stock of reinforcing fibers and the first thermoplastic material in particulate form, depositing that first stock on the wire of a papermaking machine, partially draining that first stock, making a second stock of reinforcing fibers and the second thermoplastic material in particulate form, depositing that second stock on top of the partially drained first stock, draining the two stocks, and drying the two stocks together.

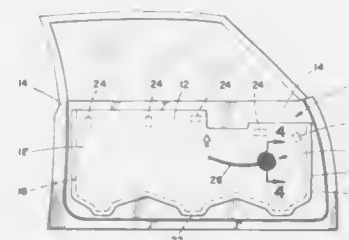
4,957,803

**WATER DEFLECTOR WITH WIRE HARNESS SEAL**

Dennis D. Foley, Inverness, Fla., assignor to The Excello Specialty Company, Cleveland, Ohio

Filed Jul. 28, 1988, Ser. No. 225,239  
Int. Cl.<sup>5</sup> B32B 3/28, 3/30, 31/18, 31/20  
U.S. Cl. 428-182

14 Claims



7. A protective deflector for application to a vehicle panel to prevent water or dust from entering the vehicle body while permitting a wire or the like to extend through said deflector comprising:

- a flexible sheet of plastic material having a peripheral shape generally matching the peripheral configuration of at least some portion of a vehicle panel;
- a laterally extending pocket in said sheet at a predetermined point corresponding to the point through which it is desired to extend said wire of the like;
- a hole formed generally at the bottom of said pocket; and, the interior of said pocket having adhesive therein for adhering the interior of said pocket to said wire of the like passed therethrough.

4,957,804

**FIBROUS SUPPORT CUSHION**

Kenneth L. Hendrix, Trinity, and Carl K. Rogers, High Point, both of N.C., assignors to Hendrix Batting Company, High Point, N.C.

Filed Oct. 14, 1988, Ser. No. 257,991  
Int. Cl.<sup>5</sup> B32B 5/08, 5/26; B68G 5/00  
U.S. Cl. 428-212

7 Claims

1. A support cushion comprising a plurality of layers of staple, polymeric batt laminated together, each of said layers comprising a combination of polyester fibers and sheath/core binder fibers bonded together in a substantially uncompressed state, said polyester fibers making up more than 50% of said batt, wherein said plurality of layers include a central layer comprising a combination of polyester fibers of a prescribed denier and sheath/core binder fibers bonded together, an uppermost and lowermost layer comprising a combination of slickened polyester fibers of a prescribed denier and sheath/core binder fibers bonded together, and at least one intermediate layer between said central layer and each of said outermost layers comprising a combination of unslickened polyester fibers of a prescribed denier and sheath/core binder fibers bonded together.

4,957,807

**NONLINEAR AROMATIC POLYAMIDE FIBER OR FIBER ASSEMBLY**

Francis P. McCullough, Jr., Lake Jackson, Tex.; Bhavenesh C. Goswami, Clemson, S.C.; R. Vernon Snelgrove, Damon, Tex., and David M. Hall, Auburn, Ala., assignors to The Dow Chemical Company, Midland, Mich.

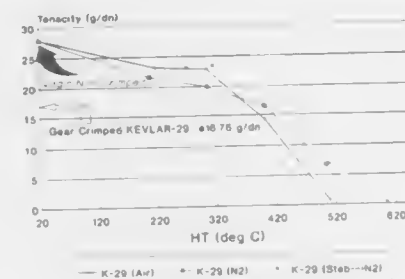
Continuation-in-part of Ser. No. 278,084, Nov. 30, 1988, abandoned, and a continuation-in-part of Ser. No. 278,081, Nov. 30, 1988. This application Nov. 21, 1989, Ser. No. 439,300  
Int. Cl.<sup>5</sup> D02G 3/00

U.S. Cl. 428-222

1. A non-carbonaceous heat set aromatic polyamide fiber having a substantially permanent non-linear configuration at



ambient temperatures with a reversible deflection ratio of greater than 1.2:1 at ambient temperatures, an aspect ratio of



greater than 10:1, and a bending strain value less than about 50%, said fiber being substantially free of V-type crimps.

4,957,808

**THERMAL STENCIL PAPER FOR MIMEOGRAPH**  
Fumiaki Arai, Mishima, and Masaru Kimura, Hirakata, both of Japan, assignors to Ricoh Company, Ltd., Tokyo and General Company Ltd., Osaka, both of Japan

Filed Sep. 9, 1988, Ser. No. 242,212

Claims priority, application Japan, Sep. 11, 1987, 62-228151  
Int. Cl.<sup>5</sup> B32B 23/08, 27/10

U.S. Cl. 428—262

12 Claims

1. A thermal stencil paper for use in a mineograph, comprising:

a laminate of a thermoplastic resin film on a porous support, with the surface of said film being provided with a layer consisting essentially of a graft polymer having branch polymer portions formed from a fluorocarbon or silicone resin prepared by copolymerizing a radically polymerizable polymer which forms the polymer branches of said graft copolymer with a radically polymerizable monomer which constitutes the backbone polymer component of said graft polymer, said radically polymerizable branched polymer component being prepared by modifying a terminal of a fluorocarbon or silicone prepolymer having a functional group at said terminus such that a radically polymerizable double bond is introduced into the polymer.

2. The thermal stencil paper of claim 1, wherein said porous support is a synthetic fiber paper, a woven or nonwoven fabric, or Japanese paper.

4,957,809

**FIBER WEB FOR COMPRESSION MOLDING**  
**STRUCTURAL SUBSTRATES FOR PANELS**

Alfred L. Davis, Thomson, Ga., assignor to Sheller-Globe Corporation, Toledo, Ohio

Division of Ser. No. 182,298, Dec. 15, 1987, Pat. No. 4,865,788, which is a continuation of Ser. No. 882,688, Jul. 7, 1986, Pat. No. 4,473,236, which is a division of Ser. No. 803,282, Dec. 2, 1985, Pat. No. 4,612,224. This application Jul. 14, 1989, Ser. No. 379,983

The portion of the term of this patent subsequent to Mar. 29, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> B32B 5/16

U.S. Cl. 428—283

5 Claims

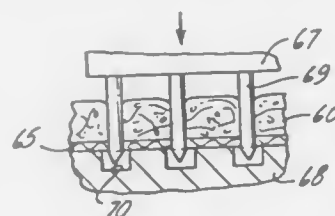
1. A fiber web for use in compression molding a panel structural substrate, comprising:

a relatively wide and thick mat formed of randomly disposed, non-woven fibers which are thoroughly intermixed;

an uncured molding plastic resin in powder form substantially uniformly dispersed and mixed within the fibers forming the mat;

and said fibers being mechanically interlocked by needling;

wherein the web may be cut to predetermined sizes and shapes for compression molding, under heat and pressure,



within close cavity molds to form stiff substrates for panels.

4,957,810

**SYNTHETIC SPONGE-TYPE ARTICLES HAVING**  
**EXCELLENT WATER RETENTION**

Bernard Eleouet, Michel Ramage, and Gilles Rongier, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 24, 1989, Ser. No. 342,176

Int. Cl.<sup>5</sup> B32B 3/26

U.S. Cl. 428—306.6

6 Claims

1. Synthetic sponge-type articles having excellent water retention properties, comprising a flexible, partially open celled foam body made of hydrophobic synthetic material, at least partially covering the cell walls of said foam body with a layer of hydrophilic absorbent material, wherein the foam body has a specific surface at least equal to about 40 cm<sup>2</sup>/cm<sup>3</sup>, and at least about 25% of its internal and external surface has an energy surface at least equal to about 73 x 10<sup>-7</sup> Newton/meter.

4,957,811

**COMPONENTS OF SILICON-INFILTRATED SILICON**  
**CARBIDE HAVING A POROUS SURFACE, AND**  
**PROCESS FOR THE PRODUCTION THEREOF**

Werner Benker, Selb; Gert Lindemann, Lichtenstein, and Jürgen Heinrich, Selb, all of Fed. Rep. of Germany, assignors to Hoechst CeramTec Aktiengesellschaft, Selb, Fed. Rep. of Germany

Filed Sep. 26, 1989, Ser. No. 415,560

Claims priority, application Fed. Rep. of Germany, Sep. 28, 1988, 3832876

Int. Cl.<sup>5</sup> B32B 9/00, 5/14; C01B 31/36

U.S. Cl. 428—312.6

8 Claims

5. A component of silicon-infiltrated silicon carbide, having a porous sliding surface, which is composed of

40-95% by weight of silicon carbide,

1-45% by weight of carbon particles of a grain size between

0.1 and 500 μm and

1-25% by weight of silicon,

at least 80% of the silicon carbide present being in the form of

primary silicon carbide having grain sizes of 1 to 100 μm.

4,957,812

**COMPOSITE MAGNETIC POWDER, METHOD FOR**  
**PRODUCING THE SAME AND RECORDING MEDIUM**  
**CONTAINING THE SAME**

Nobuyuki Aoki, Hirakata; Masaki Aoki, Minou; Hideo Torii, Higashiosaka; Keiichi Ochiai, Hirakata, and Eiji Fujii, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

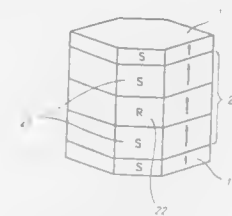
Filed Oct. 13, 1987, Ser. No. 107,454

Claims priority, application Japan, Oct. 13, 1986, 61-242425;  
Dec. 1, 1986, 61-286328; May 7, 1987, 62-111029

Int. Cl.<sup>5</sup> G11B 23/00

U.S. Cl. 428—329

2 Claims



1 Spinel structure ferrite  
2 Hexagonal ferrite  
3 Spinel structure ferrite  
4 Layer containing Mn<sup>2+</sup>, Fe<sup>3+</sup>, etc.

1. A magnetic recording medium formed by coating a composite type magnetic powder, each particle of which comprises a hexagonal ferrite and a spinel structure ferrite on a non-magnetic support together with a resin binder, wherein the hexagonal ferrite has a magnetoplumbite structure having the chemical formula MO.nFe<sub>2</sub>O<sub>3</sub> in which M is one or more metal elements selected from the group consisting of Ba, Sr, Pb and Ca and n is 5 to 6, the c(001)-plane of the hexagonal ferrite being crystallographically grown, and wherein the (111) plane of the spinel structure ferrite is crystallographically grown on the crystallographically grown C-plane of the hexagonal ferrite so that the hexagonal ferrite and the spinel structure ferrite are in a crystallographically epitaxial relation.

4,957,813

**PRESSURE-SENSITIVE TRANSFER MEMBER**

Hirohide Matsubisa, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 7, 1988, Ser. No. 241,207

Claims priority, application Japan, Sep. 8, 1987, 62-222973

Int. Cl.<sup>5</sup> B41M 5/03

U.S. Cl. 428—336

6 Claims

1. A pressure-sensitive transfer member having an ink layer comprising a pressure-sensitive transferable ink composition containing colorant material, an oil component and a resin component provided on a substrate, characterized in that the respective solubility parameters  $\delta_D$ ,  $\delta_P$  of the oil and the resin satisfy the following relationship:

$$\delta_R - 1.30 < \delta_D < \delta_R - 0.80.$$

4,957,814

**POWDER COATING COMPOSITIONS**

Robert B. Barbee, and Brian S. Phillips, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 21, 1989, Ser. No. 341,171

Int. Cl.<sup>5</sup> B32B 5/16, 15/08, 27/36

U.S. Cl. 428—402

17 Claims

1. A thermosetting coating composition in the form of a powder having an average particle size of about 10 to 300 microns comprising:

(1) a polyester having a glass transition temperature of at least 50° C., a hydroxyl number of about 20 to 200, an acid

number of 0 to about 15 and an inherent viscosity of about 0.1 to 0.5 comprised of:

(a) diacid residues comprising at least 50 mole percent terephthalic acid residues; and

(b) diol residues comprising at least 90 mole percent of 2,2-dimethyl-1,3-propanediol and 1,4-bis(2-hydroxyethoxy)benzene residues wherein the mole ratio of 2,2-dimethyl-1,3-propanediol residues to 1,4-bis(2-hydroxyethoxy)benzene residues is about 4:1 to 0.7:1; and

(2) a cross-linking effective amount of a blocked polyisocyanate compound.

4,957,815

**POLYARYLALKANE OLIGOMER COMPOSITIONS**  
**CONTAINING XYLENE UNITS, PROCESS FOR THEIR**  
**MANUFACTURE, AND PRODUCTS CONTAINING THE**  
**SAME**

Raymond Commandeur, Vizile, and Bernard Gurtner, Grenoble, both of France, assignors to Societe Atochem

Filed Jul. 1, 1988, Ser. No. 214,286

Claims priority, application France, Jul. 16, 1987, 87 10068

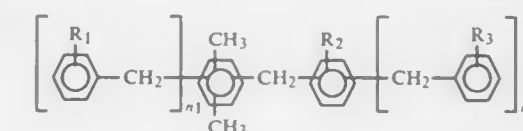
Int. Cl.<sup>5</sup> B01J 13/02; C07C 2/03, 15/08, 15/12

U.S. Cl. 428—402.2

5 Claims

1. A polyarylalkane oligomer composition consisting essentially of a mixture of at least one oligomer A and at least one oligomer B, wherein:

(a) the oligomer A is a mixture of isomers of formula:



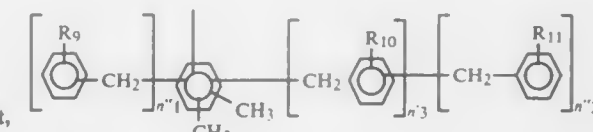
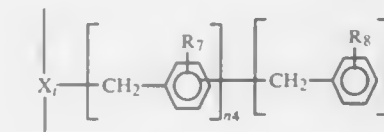
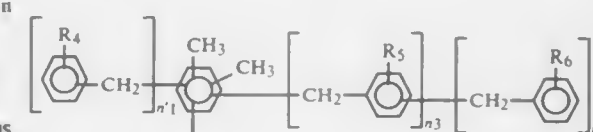
in which:

R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> are identical or different and selected from H or CH<sub>3</sub>, and

n<sub>1</sub> and n<sub>2</sub> each = 0, 1 and 2, and n<sub>1</sub> + n<sub>2</sub> ≤ 3;

each of the isomers A having the same or different substituents R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub>; and

(b) the oligomer B is a mixture of isomers of formula:



in which:

R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub>, R<sub>10</sub> and R<sub>11</sub> are identical or different and selected from H or CH<sub>3</sub>,

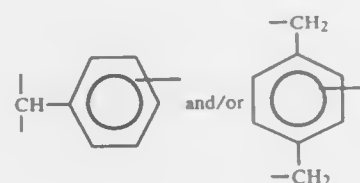
n<sub>1</sub>, n<sub>2</sub> and n<sub>4</sub> each = 0, 1 or 2,

n<sub>3</sub>, n<sub>5</sub> and n<sub>6</sub> each = 0 or 1,

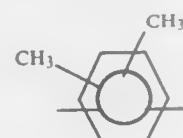
n<sub>1</sub> + n<sub>2</sub> + n<sub>3</sub> + n<sub>4</sub> + n<sub>5</sub> + n<sub>6</sub> ≤ 2,

i has the value of 1 or 2,

X<sub>i</sub> is a trivalent connecting group such as



and in which the connections towards the groups



are provided by carbon atoms not forming part of the phenyl group of  $X_1$ ; each of the isomers B having the same or different substituents  $R_4$  to  $R_{11}$ .

5. Microcapsules comprising an outer rupturable encapsulating material and encapsulated therein a color-forming material and a solvent therefor, said solvent being the composition position of any one of claims 1 to 4.

4,957,816

# POLYMERIC SUBSTRATE COATED WITH AN ELECTROCONDUCTIVE LAYER

Kelvin P. Adkins, Elmstead Market, England, assignor to Imperial Chemical Industries PLC, London, England  
Division of Ser. No. 69,701, Jun. 30, 1987, Pat. No. 4,879,064.  
This application Aug. 30, 1989, Ser. No. 400,794

Claims priority, application United Kingdom, Jul. 2, 1986, 8616186

Int. Cl.<sup>5</sup> B32B 27/38, 27/36, 27/28

U.S. Cl. 428—411.1

4 Claims



1. A coated article comprising a polymeric substrate having, on at least one surface thereof, an electroconductive layer of a composition, wherein the composition comprises a polymeric electrolyte and a polyepoxy resin in a weight ratio from 1:20 to 1:0.5, the polymeric electrolyte being a cationic electroconductive polymer capable of conducting a current through ionization.

4,957,817

# FILM, FIBER, AND MICROPOROUS MEMBRANES OF POLY(ETHERETHERKETONE)DISSOLVED IN HIGH BOILING POINT POLAR ORGANIC SOLVENTS

Chieh-Chun Chau, Midland, Mich., and Ritchie A. Wessling, Berkeley, Calif., assignors to The Dow Chemical, Midland, Mich.

Filed Nov. 25, 1988, Ser. No. 276,006

Int. Cl.<sup>5</sup> C08J 9/28

U.S. Cl. 428—436

19 Claims

1. A method of manufacture of a film of poly(oxy-1,4-phenyleneoxy-1,4-phenylene-carbonyl-1,4-phenylene) (PEEK) comprising dissolving solid PEEK in an organic polar solvent having a boiling point in a range from 141° C. to 380° C., then casting the PEEK solution on a smooth surface.

4,957,818  
MOLDED SYNTHETIC RESIN PRODUCT  
Atsushi Obayashi; Yuji Takeda, and Kazuya Kinoshita, all of Nagoya, Japan, assignors to Mitsubishi Kasei Vinyl Company, Tokyo, Japan

Filed Aug. 8, 1988, Ser. No. 229,424

Claims priority, application Japan, Aug. 14, 1987, 62-202790; Oct. 8, 1987, 62-253965; Jan. 19, 1988, 63-9386; Mar. 28, 1988, 63-73512; Mar. 28, 1988, 63-73513

Int. Cl.<sup>5</sup> B32B 7/02, 27/30; C08J 7/04

U.S. Cl. 428—451

6 Claims

1. A molded synthetic resin product comprising a synthetic resin substrate and a coating layer formed by heat treatment of a coating composition on the surface of the substrate, said coating composition comprising (A) a silane compound having a hydrolyzable group directly bonded to a silicon atom, and (B) an acrylic resin obtained by polymerizing a monomer selected from the group consisting of alkyl (meth)acrylates, or a mixture of such a monomer with an alkenyl benzene monomer, and a copolymerizable  $\alpha,\beta$ -ethylenically unsaturated monomer, wherein the ratio by weight of the silane compound (A) to the acrylic resin (B) is within a range of from 20:1 to 1:15.

4,957,819

# FRAMELESS AND CORELESS POROUS ENDOSSEOUS IMPLANT

Haruyuki Kawahara, Osaka; Seiichi Tsukamoto, Kanagawa; Yutaka Nomura, Kanagawa; Katsumi Tanaka, Kanagawa; Yasuyuki Ashiura, Kanagawa, and Motonobu Yoshimura, Kanagawa, all of Japan, assignors to Haruyuki Kawahara, Osaka and Toho Titanium Co., Ltd., Tokyo, both of Japan  
Filed May 30, 1989, Ser. No. 358,828

Claims priority, application Japan, Jun. 10, 1988, 63-144466

Int. Cl.<sup>5</sup> G22F 3/00

U.S. Cl. 428—547

6 Claims



1. A frameless and coreless porous endosseous implant comprising a porous sintered metal layer (2) having a range of relatively large pores and porous sintered metal layers (1) and (1) each having a range of relatively small pores and laminated into one body by sintering integrally with the layer (2) of relatively large pores on either side thereof, whereby said three layers (1), (2), and (1) each permit the ingrowth and penetration of two or more kinds of tissue selected from the group consisting of fibrous tissue, osteoid tissue and bone tissue in the pores thereof, said large pores having a mean size range of 50–200  $\mu$ m.

4,957,820

# LAMINATED METAL SHEET

Peter J. Heyes, Wantage, and Nicholas J. Middleton, Highworth, both of England, assignors to CMB Foodcan plc, Worcester, England

PCT No. PCT/GB88/00851, § 371 Date Jun. 9, 1989, § 102(e)  
Date Jun. 9, 1989, PCT Pub. No. WO89/03302, PCT Pub. Date Apr. 20, 1989

PCT Filed Oct. 12, 1988, Ser. No. 378,214

Claims priority, application United Kingdom, Oct. 15, 1987, 8724237

Int. Cl.<sup>5</sup> B28C 35/02; B32B 15/08

U.S. Cl. 428—623

46 Claims



46. A container or a component for a container produced from a polymer/metal/polymer laminate comprising a metal sheet having a polymer film adhered to each of its major surfaces, the polymer films having been adhered to the metal sheet by simultaneous thermal lamination, the polymer film adhered to one major surface of the metal sheet being a composite polyester film (a) comprising an inner layer (A1) of a substantially non-crystalline linear polyester having a softening point below 150° C. and a melting point above 150° C. but below 240° C. and an outer layer (A2) of a linear polyester having a melting point above 220° C., and the polymer film adhered to the other major surface of the metal sheet being a polyolefin-containing film (B) comprising a bonding resin which is an acid modified polyolefin resin containing carboxyl or anhydride groups.

4,957,822

# LAMINATED MATERIAL FOR FRICTION BEARING ELEMENTS, COMPRISING AN ANTIFRICTION LAYER OF AN ALUMINUM BASED BEARING MATERIAL

Michael Steeg, Ober-Olm; Peter Neuhaus, Hochheim/Main; Albert Roth, Frankfurt am Main, and Ulrich Engel, Bad Schwalbach, all of Fed. Rep. of Germany, assignors to Glyco-Metall-Werke Daelen & Loos GmbH, Wiesbaden, Fed. Rep. of Germany

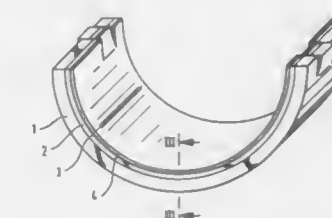
Continuation-in-part of Ser. No. 303,926, Jan. 30, 1989, which is a continuation-in-part of Ser. No. 124,617, Nov. 24, 1987, abandoned. This application Feb. 7, 1990, Ser. No. 476,522

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1986, 3640328; Sep. 3, 1987, 3729414

Int. Cl.<sup>5</sup> B32B 15/00, 15/10; F16C 33/06

U.S. Cl. 428—653

17 Claims



1. A laminate for use in forming a friction bearing constituted of a steel support layer and an anti-friction aluminum alloy layer carried by the support layer, said aluminum alloy layer having nickel in the amount of from 1% to 3% by weight and manganese in the amount of from 0.1% to 2.5% by weight, characterized in that said aluminum alloy comprises hard particles selected from the group consisting of nickel, manganese, aluminum-nickel alloy, aluminum-manganese alloy, and aluminum-nickel-manganese alloy, said hard particles being present essentially in the amount of 20–30% by weight.

4,957,823

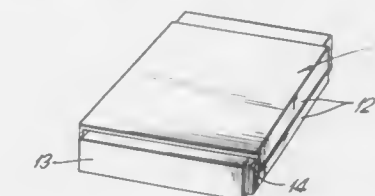
# COMPOSITE SHEET MADE OF MOLYBDENUM AND DISPERSION-STRENGTHENED COPPER

Richard D. Nicholson, Chardon, and Ronald S. Fusco, Mentor, both of Ohio, assignors to AMAX Inc., New York, N.Y.  
Filed May 30, 1989, Ser. No. 357,835

Int. Cl.<sup>5</sup> B32B 15/01

U.S. Cl. 428—663

5 Claims



4,957,821

# COMPOSITE ALUMINUM MOLYBDENUM SHEET

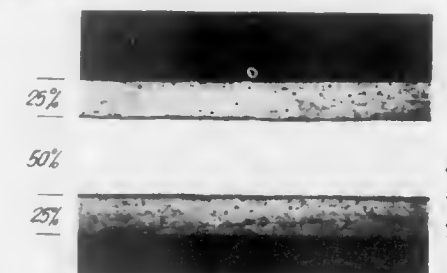
Richard D. Nicholson, Chardon, and Sandeep Jain, Mentor, both of Ohio, assignors to AMAX Inc., New York, N.Y.

Filed May 30, 1989, Ser. No. 357,836

Int. Cl.<sup>5</sup> B32B 15/01

U.S. Cl. 428—651

4 Claims



1. A roll-bonded composite sheet product having a core layer of molybdenum and layers of aluminum on each face of said molybdenum, with the interface between said molybdenum and said aluminum being sharply defined and with no detectable diffusion occurring across said interface.

1. A roll-bonded composite sheet product having at least one layer of dispersion-strengthened copper and at least one layer of molybdenum, said composite being characterized by a sharply defined, cleavage-resistant interface between said copper and said molybdenum with substantially no detectable diffusion of one metal into the other across said interface, said composite being resistant to delamination and being capable of maintaining structural integrity upon repeated high temperature firings at temperatures up to 900° C.



4,957,824  
INFORMATION STORAGE MEDIUM AND METHOD OF  
MANUFACTURING THE SAME

Hideki Ohkawa, Tokyo, Japan, assignor to Kabushiki Kaisha  
Toshiba, Kawasaki, Japan

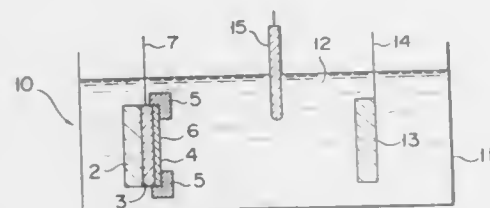
Filed Mar. 18, 1988, Ser. No. 169,982

Claims priority, application Japan, Mar. 24, 1987, 62-69506;  
May 18, 1987, 62-120660

Int. Cl.<sup>5</sup> G11B 11/00

U.S. Cl. 428—694

21 Claims



1. An information storage medium comprising:  
a substrate; and  
a magneto-optical recording layer, provided on the substrate, having an axis of easy magnetization perpendicular to a surface of said recording layer and containing a rare earth-transition metal amorphous magnetic alloy, said recording layer including a hydrogen-containing portion at its surface formed by means of a hydrogenation reaction at a surface portion of said recording layer and having a coercive force different from that of other portions of the recording layer.

4,957,825  
MAGNETIC RECORDING MEDIUM AND PROCESS FOR  
PRODUCING THE SAME

Masaaki Fotamoto, Kanagawa; Yukio Honda, Fuchu; Seiichi Asada, Kyoto; Takashi Nishimura, Kokubunji; Kazuetsu Yoshida, Kodaira, and Heigo Ishihara, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Maxell, Ltd., Osaka, both of Japan

Continuation of Ser. No. 789,824, Oct. 21, 1985, abandoned.  
This application Jan. 27, 1988, Ser. No. 149,142

Claims priority, application Japan, Oct. 22, 1984, 59-221688;  
Mar. 20, 1985, 60-54419

Int. Cl.<sup>5</sup> G11B 5/66, 11/00; B32B 9/00; G11C 13/06

U.S. Cl. 428—694

37 Claims



1. A magnetic recording medium comprising a substrate, a ferromagnetic thin film formed on substrate, a protective film formed directly on the ferromagnetic thin film, and a lubricant layer made of an organic material on said protective film, said ferromagnetic thin film and said protective film being formed continuously without exposing said ferromagnetic thin film and said protective film to air and while maintaining said ferromagnetic thin film and said protective film in a vacuum, said protective film having two layers, the first layer being made of the element Si, Ge or B, a compound of Si, Ge or B, or an alloy principally made of Si, Ge, or B and the second layer being made of the element Sn, Pb, In, Se, Te, Cu, Ag or Au, a Sn-based alloy, a Pb-based alloy, an In-based alloy, a Se-based alloy, a Te-based alloy, a Cu-based alloy, an Ag-based alloy or an Au-based alloy.

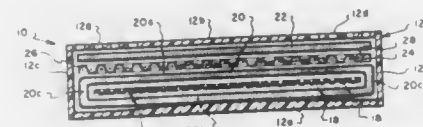
4,957,826  
RECHARGEABLE METAL-AIR BATTERY

Michael C. Cheiky, Santa Barbara, Calif., assignor to Dreisbach  
Electromotive, Inc., Santa Barbara, Calif.

Filed Apr. 25, 1989, Ser. No. 343,193

Int. Cl.<sup>5</sup> H01M 12/06

30 Claims



1. A rechargeable metal-air battery, comprising:  
metal anode means;  
porous anode separator means for retaining liquid electrolyte having first and second layers which sandwich the anode means therebetween and at least one edge which interconnects the first and second layers and said separator means extends in a continuous wrap around the anode means;  
air cathode means; and  
a liquid electrolyte completely entrained in the porous anode separator means.

4,957,827  
RECHARGEABLE ALKALINE MANGANESE CELLS  
WITH ZINC ANODES

Karl Kordesich; Josef Gsellmann, both of Graz, Austria, and Klaus Tomantschger, Mississauga, Canada, assignors to Battery Technologies Inc., Mississauga, Canada

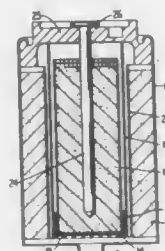
Filed Aug. 22, 1988, Ser. No. 234,926

Claims priority, application Canada, Jul. 8, 1988, 571629

Int. Cl.<sup>5</sup> H01M 10/24

U.S. Cl. 429—60

11 Claims



1. A rechargeable, alkaline, electrochemical cell comprising:  
a rechargeable manganese dioxide cathode mixed with graphite or other conductive carbon, agglomerated with a binder and contained by a metallic screen serving as an oxygen evolution catalyst carrier, and serving also to provide restrictive force against cathode expansion;  
a powdered zinc anode contained in a metallic basket;  
a separator between the cathode and the anode; and  
an alkaline electrolyte contacting the cathode and the anode through the screen, the basket and the separator;  
where said metallic basket is located at the inside of said separator, and said metallic screen is located at the outside of said separator and at the inside of said cathode.

4,957,828  
EMERGENCY BATTERY MONITOR

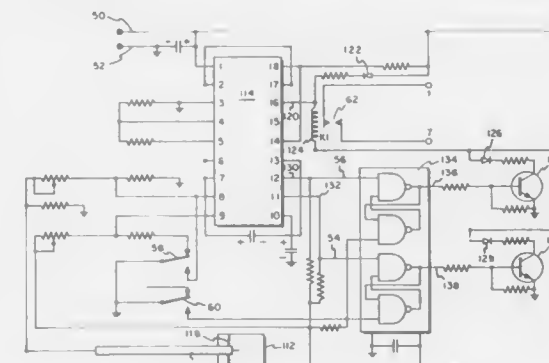
Stephen A. Garron, Elizabeth, N.J., assignor to SSMC Inc.,  
Edison, N.J.

Filed Dec. 9, 1988, Ser. No. 281,609

Int. Cl.<sup>5</sup> H01M 10/48

U.S. Cl. 429—92

6 Claims



1. An emergency battery monitor adapted for use with at least one storage battery, the battery having first and second output terminals across which an output voltage is produced, the battery, when in normal operation, exhibiting an output voltage falling within a nominal value range having maximum and minimum values, the battery having at least one cell which contains a liquid electrolyte, the electrolyte, when the battery is in normal operation, having minimum level in the cell, said monitor comprising:

first means associated with the cell, the first means being electrically conductive when the level of the electrolyte is at least equal to the minimum level and being electrically non-conductive when the level of the electrolyte falls below the minimum level; and

second means coupled to the output terminals and the first means to produce a first signal designating normal battery operation when the first means is conductive and the value of the output voltage falls within the nominal value range, the second means producing a second signal designating abnormal battery operation when the value of the output signal falls below the minimum value, and/or the first means is non-conductive, the second means producing a third signal designating abnormal battery operation when the value of the output signal exceeds the maximum value.

4,957,829  
MODULAR BATTERY PLANT SYSTEM ASSEMBLY  
COMPRISING MULTIPLE UNIT CELL MODULES

Joel T. Holl, Parsippany, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 26, 1989, Ser. No. 371,368

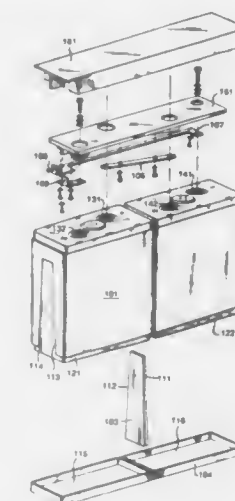
Int. Cl.<sup>5</sup> H01M 2/10

U.S. Cl. 429—99

11 Claims

1. A battery plant system, comprising:  
a plurality of unit battery cells, each unit cell including: positive and negative terminals and having keyed accepting detents in opposing sides of each unit cell, an interlocking mechanism engaging keyed accepting detents of adjacent unit battery cells for serially joining the unit battery cells into a battery cell assembly module,  
a base support for supporting the unit battery cells interlocked into a battery cell assembly module, at least first and second assembly buses for electrically joining electrical terminals of the unit battery cells and including output terminals included in the buses located at an exposed end of the battery cell assembly module to form the positive and negative output terminals of the battery cell assembly module,  
a supporting receptacle for holding a single stratum of a plurality of battery cell assembly modules,

a frame work for accepting mounting of the supporting receptacles in vertical tiers and a plurality of plant buses



connected for electrically joining the output terminals included in the assembly buses to form a battery plant.

4,957,830  
RECHARGEABLE METAL OXIDE-HYDROGEN  
BATTERY

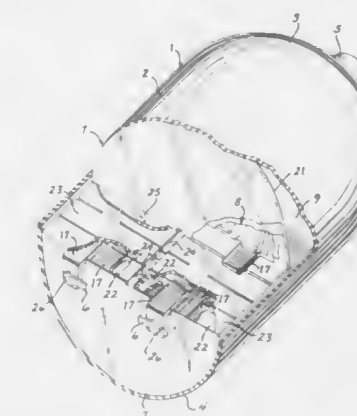
Kenneth R. Jones, Oconomowoc, Wis., assignor to Globe-Union  
Inc., Milwaukee, Wis.

Filed Apr. 7, 1989, Ser. No. 334,361

Int. Cl.<sup>5</sup> H01M 12/08

U.S. Cl. 429—101

26 Claims



1. A rechargeable metal oxide-hydrogen battery, comprising an outer generally cylindrical pressure vessel, a plurality of cell modules disposed within the vessel, each module comprising a pair of back-to-back positive electrodes, a first separating layer disposed between said positive electrodes, a negative electrode disposed adjacent each positive electrode, a second separator layer disposed between each negative electrode and the adjacent positive electrode, an electrolyte impregnated within said separator layers and in contact with said electrodes, each module being generally semi-circular in planar configuration and including a semi-circular peripheral edge disposed adjacent the inner surface of said vessel and a generally diametral edge connecting opposite ends of said semi-circular edge, and connecting means for connecting said electrodes in an external electrical circuit.

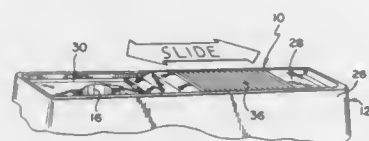
4,957,831  
CONTROL APPARATUS FOR SWITCHING A BATTERY  
PACK

Daryl S. Meredith, Cockeysville, and Scott D. Price, Pylesville, both of Md., assignors to Black & Decker, Inc., Newark, Del. Continuation of Ser. No. 164,436, Mar. 4, 1988, abandoned. This application Dec. 15, 1988, Ser. No. 285,296

Int. Cl.<sup>5</sup> H01M 2/00

U.S. Cl. 429—121

8 Claims



1. A control apparatus for rendering operable a selected one of two power receptacles, the receptacles being coupled to an electric circuit that includes a switch for selectively delivering power to the receptacles, comprising:  
means for retaining the receptacles a predetermined distance apart;  
a cover moveable on said retaining means along a line intersecting both of said power receptacles so as to selectively expose the selected one of the two power receptacles while simultaneously covering the nonselected one of the receptacles; and  
means, coupling said cover to the switch, for translating the movement of said cover into operable movement of the switch.

4,957,832  
PLASTIC SEALING ELEMENT FOR A GALVANIC  
PRIMARY CELL

Klaus Roggeberg, Ellwangen, and Horst-Udo Jose, Fichtenau-Unterdefstetten, both of Fed. Rep. of Germany, assignors to Varta Batterie Aktiengesellschaft, Hanover, Fed. Rep. of Germany

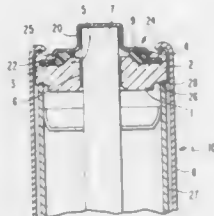
Filed Nov. 14, 1988, Ser. No. 271,021

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1987, 3742026

Int. Cl.<sup>5</sup> H01M 2/04, 2/08

U.S. Cl. 429—164

26 Claims



1. A plastic sealing element for a galvanic primary element in the form of a round cell including a metal casing, a metal housing cover and a carbon rod conductor, comprising a radially symmetrical plastic body, the upper surface of which defines a circumferential trough-shaped depression bounded by a raised rim, said raised rim including a circumferential projection for receiving edge portions of the metal housing cover and an elastomeric plastic material formed as a continuous annular bead on the trough-shaped depression.

4,957,833  
NON-AQUEOUS LIQUID ELECTROLYTE CELL  
Hideharu Daifuku, Akishima; Takashi Kitamura, Hachiohji, and Takahiro Kawagoe, Tokorozawa, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

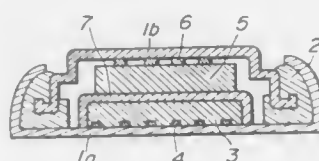
Filed Dec. 5, 1989, Ser. No. 446,424

Claims priority, application Japan, Dec. 23, 1988, 63-327355; Dec. 23, 1988, 63-327356

Int. Cl.<sup>5</sup> H01M 6/14

U.S. Cl. 429—197

9 Claims



1. A non-aqueous liquid electrolyte cell comprising  
a positive electrode having an electroconductive organic polymer as a positive electrode active material,  
a negative electrode having lithium or a lithium alloy as a negative electrode active material, and  
a non-aqueous electrolyte solution containing an electrolyte in a non-aqueous solvent mixture of a non-cyclic carbonate and a cyclic carbonate.

4,957,834  
METHOD FOR MANUFACTURING PHOTOMASK  
Shuichi Matsuda, and Yaichiro Watakabe, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

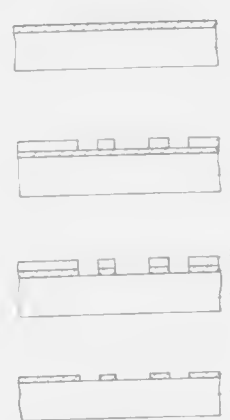
Filed Nov. 3, 1988, Ser. No. 266,706

Claims priority, application Japan, Dec. 22, 1987, 62-324417

Int. Cl.<sup>5</sup> G03F 1/00

U.S. Cl. 430—5

12 Claims



1. A method for manufacturing a photomask, comprising  
providing a transparent glass substrate, said substrate being provided with a main surface;  
forming on the main surface of the substrate a refractory metal silicide film, said silicide film having a main surface opposite the side where the silicide film contacts the main surface of the substrate;  
forming resistant films on the main surface of the silicide film, said resistant films being formed at a predetermined distance from one another to expose portions of the main surface of the silicide film; and  
plasma etching the exposed portions of the main surface of the metal silicide film in a gas mixture containing at least nitrogen gas and CF<sub>4</sub> gas.

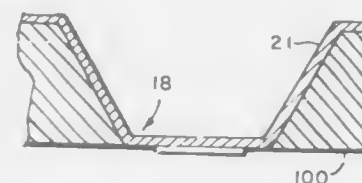
4,957,835  
MASKED ELECTRON BEAM LITHOGRAPHY  
Gary D. Aden, Redwood City, Calif., assignor to Kevex Corporation, Foster City, Calif.

Filed May 15, 1987, Ser. No. 49,839

Int. Cl.<sup>5</sup> G03F 1/00

U.S. Cl. 430—5

5 Claims



1. In a method for making a mask for flood beam electron lithography wherein the flood beam is patterned by passing through the mask and thence into the photoresist for exposure thereof, the steps of:

recessing a substrate from one side to define a recess having a frame portion closed by a bottom end wall portion of the substrate;  
forming a relatively thin membrane layer of electron permeable material overlaying the bottom end wall of the recess;  
removing the end wall material overlaying said relatively thin membrane layer of electron permeable material; and  
forming a patterned layer of electron absorber material overlaying said membrane layer of electron permeable material to define the electron mask.

4,957,837  
PHOTOSENSITIVE MEMBER FOR  
ELECTROPHOTOGRAPHY CONTAINING  
HYDRAZONE IN CHARGE TRANSPORT LAYER  
Masami Kuroda; Yonichi Nakamura, and Noboru Furusbo, all of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Oct. 13, 1988, Ser. No. 257,260

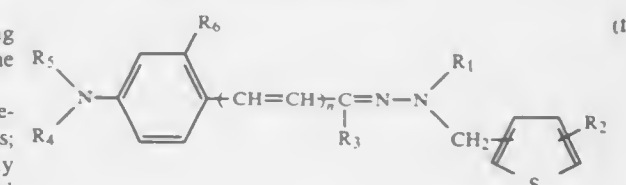
Claims priority, application Japan, Oct. 15, 1987, 62-260531; Oct. 20, 1987, 62-265112; Oct. 20, 1987, 62-265113; Oct. 21, 1987, 62-265751; Oct. 21, 1987, 62-265752

Int. Cl.<sup>5</sup> G03G 5/06

U.S. Cl. 430—59

18 Claims

1. A photosensitive member for electrophotography comprising:  
a substrate; and  
a photosensitive layer formed on said substrate and including a charge generating substance and at least one hydrazone compound as a charge transporting substance represented by the following general formula (I):



wherein R<sub>1</sub> stands for an aryl group which may have at least one substituent; each of R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub> stands for a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, a hydroxy group, a nitro group, an allyl group, an aryl group which may have at least one substituent, or an aralkyl group; and n stands for an integer of 0 or 1.

4,957,836  
ELECTROPHOTORECEPTOR USING HYDRAZONE AS  
THE CHARGE TRANSPORT MATERIAL

Tai J. Chen, Hsinchu, Taiwan, assignor to Industrial Technology Research Institute, Chutung, Hsinchu, Taiwan

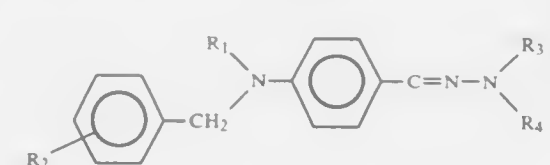
Filed May 25, 1989, Ser. No. 357,370

Int. Cl.<sup>5</sup> G03G 5/14

U.S. Cl. 430—59

13 Claims

1. An electrophotoreceptor comprising the components of:  
an electrically conductive substrate; a charge generation layer comprising a charge generation material capable of generating electron-hole pair upon exposure under a selected light; and  
a charge transport layer comprising a polymeric binder and a hydrazone compound of formula (I)



in which R<sup>1</sup> represents substituted or unsubstituted C<sub>1</sub>—C<sub>4</sub> alkyl, R<sub>2</sub> represents hydrogen, alkyl or alkoxy, R<sub>3</sub> and R<sub>4</sub> and independently represent substituted or unsubstituted alkyl group substituted or unsubstituted aryl group or substituted or Unsubstituted aralkyl group, or together with the bonded nitrogen atom represent substituted or unsubstituted aromatic heterocyclic ring.

4,957,838  
ELECTROPHOTOGRAPHIC PHOTOCONDUCTOR AND  
TRIPHENYLAMINE COMPOUNDS FOR USE IN THE  
SAME

Tamotsu Aruga, Mishima; Masaomi Sasaki, Susono, and Tomoyuki Shimada, Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 29, 1989, Ser. No. 414,480

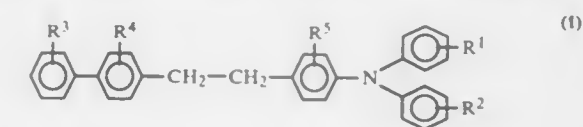
Claims priority, application Japan, Sep. 30, 1988, 63-247036; Sep. 30, 1988, 63-247039

Int. Cl.<sup>5</sup> G03G 5/06

U.S. Cl. 430—59

20 Claims

1. An electrophotographic photoconductor comprising an electroconductive support and a photoconductive layer formed thereon comprising as an effective component at least one triphenylamine compound represented by formula (I):



wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> each represent hydrogen, an alkyl group having 1 to 4 carbon atoms, an alkoxy group having 1 to 4 carbon atoms, or a halogen, which may be the same or different.



4,957,839  
ELECTROPHOTOGRAPHIC PHOTOCONDUCTOR  
HAVING A SILICONE RESIN CHARGE RETENTION  
LAYER

Takashi Rokutanzeno, Numazu; Yukio Ide, Mishima; Hiroshi Nagame, Numazu; Konichi Ohshima, Mishima; Naribito Kojima, and Shinji Nosho, both of Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan  
Continuation-in-part of Ser. No. 198,865, May 26, 1988, abandoned. This application Nov. 21, 1988, Ser. No. 274,352  
Claims priority, application Japan, May 26, 1987, 62-126941; Nov. 18, 1987, 62-292680; Nov. 20, 1987, 62-291831  
Int. Cl.<sup>5</sup> G03G 5/10

U.S. Cl. 430—66

11 Claims

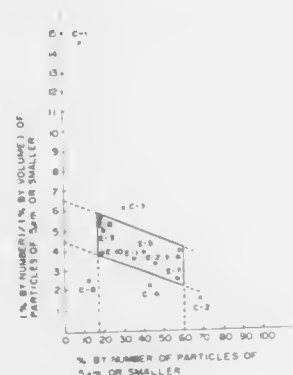
11. The electrophotographic photoconductor as claimed in claim 10, wherein said conductivity control agent is finely-divided tin oxide particles.

4,957,840  
DEVELOPER AND IMAGE FORMING DEVICE  
Kiichiro Sakashita, Inagi; Toshiaki Nakahara, Tokyo; Hirohide Tanikawa, Yokohama; Naoki Matsushige; Satoshi Yoshida, both of Kawasaki; Masatsugu Fujiwara, and Yasuo Mitsuhashi, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 25, 1988, Ser. No. 261,987  
Claims priority, application Japan, Oct. 26, 1987, 62-271119  
Int. Cl.<sup>5</sup> G03G 9/14

U.S. Cl. 430—106.6

22 Claims



1. A developer for developing electrostatic images, comprising a magnetic toner comprising a binder resin and magnetic powder, said developer containing 17-60% by number of magnetic toner particles having a particle size of 5 microns or smaller, containing 1-23% by number of magnetic toner particles having a particle size of 8-12.7 microns, and containing 2.0% by volume or less of magnetic toner particles having a particle size of 16 microns or larger;

wherein the magnetic toner has a volume-average particle size of 4-9 microns, and the magnetic toner particles having a particle size of 5 microns or smaller have a particle size distribution satisfying the following formula:

$$N/V = -0.04N + k,$$

wherein N denotes the percentage by number of magnetic toner particles having a particle size of 5 microns or smaller, V denotes the percentage by volume of magnetic toner particles having a particle size of 5 microns or smaller, k denotes a positive number of 4.5-6.5, and N denotes a positive number of 17-60.

4,957,841  
SPECIFICALLY INFLUENCING THE TRIBOELECTRIC  
EFFECT OF AZO PIGMENTS

Hans-Tobias Macholdt, Darmstadt; Alexander Sieber; Franz Schui, both of Frankfurt am Main, and Reinhold Deubel, Bad Soden am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 14, 1989, Ser. No. 407,225

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1988, 3831384

Int. Cl.<sup>5</sup> G03G 9/00, 5/00; C08K 5/00; C09K 00/00

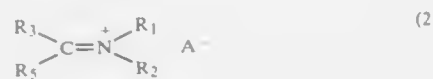
U.S. Cl. 430—110

7 Claims

1. A process for specifically influencing the triboelectric effect of azo pigments in electrophotographic toners or developers or in powders for surface coating, which comprises adding to the azo pigments at the coupling reaction stage, at the laking stage or in the course of finishing at least one saltlike cationic compound of the general formulae



and/or



and/or



wherein in the case of the general formulae (1) and (2), R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are independently of one another straight-chain or branched alkyl groups of 1 to 30 carbon atoms, oxyethyl groups of the general formula —(CH<sub>2</sub>—CH<sub>2</sub>—O)<sub>n</sub>—R, wherein R is a hydrogen atom or an alkyl(C<sub>1</sub>—C<sub>4</sub>) or an acyl group and n is a number from 1 to 10, monocyclic or polycyclic cycloaliphatic radicals of 5 to 12 carbon atoms, monocyclic or polycyclic aromatic or araliphatic radicals, which aliphatic, araliphatic and aromatic radicals may be substituted by hydroxyl, alkoxy(C<sub>1</sub>—C<sub>4</sub>)—, primary, secondary or tertiary amino groups, acid amine groups or fluorine, chlorine or bromine atoms, R<sub>5</sub> is a hydrogen, fluorine, chlorine or bromine atom or an alkyl (C<sub>1</sub>—C<sub>6</sub>)—, alkoxy (C<sub>1</sub>—C<sub>6</sub>)— or primary amino group and A<sup>—</sup> is one equivalent of an anion, and where R<sub>1</sub> and R<sub>3</sub> can be part of a ring system of 5 to 7 carbon atoms which may be interrupted by 1 or 2 heteroatoms and may contain 1 to 3 double bonds, and wherein in the case of general formula (3) R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub> and R<sub>9</sub> are independently of one another hydrogen atoms, straight-chain or branched alkyl groups of 1 to 30 carbon atoms, monocyclic or polycyclic cycloaliphatic radicals of 5 to 12 carbon atoms, oxyethyl groups of the general formula —(CH<sub>2</sub>—CH<sub>2</sub>—O)<sub>n</sub>—R, wherein n is a number from 1 to 10, or an alkyl(C<sub>1</sub>—C<sub>4</sub>) or an acyl group, also monocyclic or polycyclic aromatic radicals and/or araliphatic radicals, which aliphatic, aromatic and araliphatic radicals may be substituted by hydroxyl, alkoxy(C<sub>1</sub>—C<sub>4</sub>)—, secondary or tertiary amino groups, acid amide groups or acid imide groups, where the alkyl, cycloalkyl, aralkyl and aryl radicals for R<sub>1</sub> to R<sub>4</sub> may be substituted by fluorine, chlorine or bromine atoms, and in which X is a phosphorus, arsenic or antimony atom, although if X is an arsenic or antimony atom at least one of the radicals R<sub>6</sub> to R<sub>9</sub> is not a hydrogen atom and A<sup>—</sup> is one equivalent of an anion.

4,957,842  
LIQUID DEVELOPER FOR ELECTROSTATIC LATENT  
IMAGES USING FLUSHED PIGMENTS

Toshiyuki Fukase, Numazu; Yoshihiro Sugiyama, Mishima; Hazime Takasashi, Numazu; Kazuo Tsubuko, Numazu, and Shinichi Kuramoto, Numazu, all of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

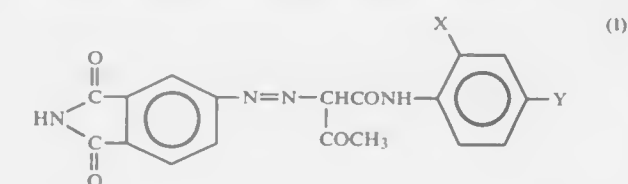
Filed Oct. 23, 1986, Ser. No. 922,235

Claims priority, application Japan, Oct. 30, 1985, 60-243495  
Int. Cl.<sup>5</sup> G03G 9/12

U.S. Cl. 430—114

11 Claims

1. In a liquid developer for developing electrostatic latent images which comprises a toner comprising a colorant and a binding agent, as the main components, dispersed in an aliphatic hydrocarbon carrier liquid, the improvement which comprises: said colorant is prepared by flushing a yellow dye or pigment having the following general formula (I).



wherein X and Y represent —H, —OCH<sub>3</sub>, —Cl, —CH<sub>3</sub>, —CH<sub>2</sub>CH<sub>3</sub>, —CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>, —OCH<sub>2</sub>CH<sub>3</sub>, —CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub> or —OCH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>, with a resin which is insoluble in the carrier liquid and has a softening point of 50°-120° C.

4,957,843  
PREVENTION OF SHORT TIME SCALE RECIPROCITY  
FAILURE BY VISCOSITY CONTROL

Jesse Hipps, Sr., Miamisburg, and Amy L. Burkholder, Kettering, both of Ohio, assignors to The Mead Corporation, Dayton, Ohio

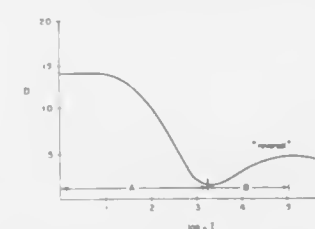
Continuation of Ser. No. 255,907, Oct. 11, 1988, abandoned.

This application Oct. 5, 1989, Ser. No. 420,632

Int. Cl.<sup>5</sup> G03C 1/72

U.S. Cl. 430—138

14 Claims



1. A method for producing images comprising the steps of: providing a substrate having front and back surfaces, said substrate having a coating comprising photosensitive microcapsules located on either of said front or back surfaces, said microcapsules having an internal phase containing an image-forming agent, a photohardenable composition comprising a free radical addition polymerizable or crosslinkable compound, a photoinitiator comprising an ionic dyeractive counter ion compound, and a viscosity modifier being a different compound than said free radical addition polymerizable or crosslinkable compound, wherein the presence of said viscosity modifier in said internal phase has the effect of shortening the reversal time of said photosensitive microcapsules; image-wise exposing said photosensitive microcapsules to actinic radiation of an intensity exceeding about 2000 ergs/cm<sup>2</sup> sec; and subjecting said microcapsules to a uni-

form rupturing force to enable said image-forming agent to form an image.

4,957,844  
LIQUID ELECTROSTATIC DEVELOPER CONTAINING  
MULTIBLOCK POLYMERS

Loretta A. G. Page, Newark, Del., assignor to DXImaging, Lionville, Pa.

Filed Mar. 31, 1989, Ser. No. 331,306

Int. Cl.<sup>5</sup> G03G 9/12

U.S. Cl. 430—115

61 Claims

1. A liquid electrostatic developer consisting essentially of  
A. nonpolar liquid having a Kauri-butanol value of less than 30, present in a major amount,  
B. thermoplastic resin particles having an average by area particle size of less than 10 μm consisting essentially of a mixture of (1) 80 to 95% by weight of a thermoplastic resin and (2) 20 to 5% by weight of a multiblock copolymer compound of the general formula:



wherein

X is a polymerized vinyl aromatic

Y is a polymerized diene, and

Z is a polymerized vinyl aromatic when n is 1 and a block copolymer of a polymerized vinyl aromatic and a polymerized diene when n is 2 to 10, the weight percentages based on the total weight of resin particles, and

C. a charge director compound.

4,957,845  
PRINTING PLATE  
Masanao Isono; Ken Kawamura; Masaya Asano; Tetuo Suzuki, and Shigeo Abiko, all of Shiga, Japan, assignors to Toray Industries, Incorporated, Tokyo, Japan

Filed May 17, 1989, Ser. No. 353,342

Claims priority, application Japan, May 18, 1988, 63-121330; May 20, 1988, 63-124684

Int. Cl.<sup>5</sup> G03C 1/52; G03F 7/021, 7/023

U.S. Cl. 430—156

17 Claims

1. A silicone overlying type, dry planographic printing plate of which image formation is done by photoirradiation, said dry planographic printing plate comprising a base substrate, a photosensitive layer, an ink-repellent layer and a protective layer in that specified order, with said protective layer covering the front side of said printing plate and being removable, and said protective layer containing a photofading material.

4,957,846  
RADIATION SENSITIVE COMPOUND AND MIXTURES  
WITH TRINUCLEAR NOVOLAK OLIGOMER WITH  
O-NAPHTHOQUINONE DIAZIDE SULFONYL GROUP  
Alfred T. Jeffries, III, Providence, R.I.; Andrew J. Blakeney, Seekonk, Mass., and Medhat A. Toukhy, Barrington, R.I., assignors to Olin Hunt Specialty Products Inc., Cheshire, Conn.

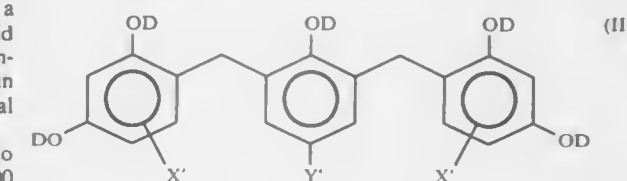
Filed Dec. 27, 1988, Ser. No. 290,009

Int. Cl.<sup>5</sup> G03C 1/54; G03F 7/023

U.S. Cl. 430—165

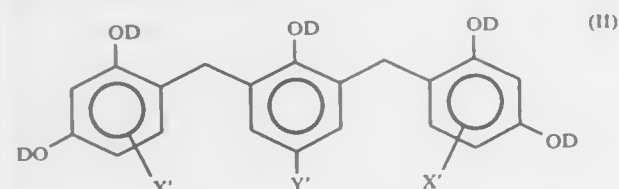
16 Claims

1. A photoactive compound of the formula II:



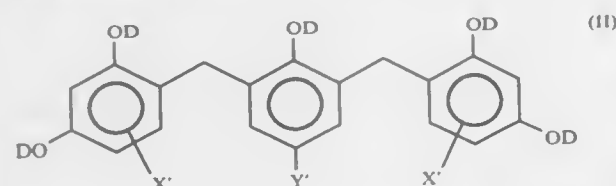
wherein each X' is selected from the group consisting of a hydrogen, OD and halide; Y' is selected from the group consisting of a lower alkyl group having 1-4 carbon atoms and a halogen atom; and D is selected from the group consisting of o-naphthoquinone diazide sulfonyl group and hydrogen; with the proviso that at least two Ds are o-naphthoquinone diazide sulfonyl groups.

6. A radiation sensitive mixture comprising an alkali-soluble binder resin and at least one photoactive compound comprising a compound of formula II:



wherein each X' is selected from the group consisting of hydrogen, OD and halide; Y' is selected from the group consisting of a lower alkyl group having 1-4 carbon atoms and halogen atom; and D is selected from the group consisting of an o-naphthoquinone diazide sulfonyl group and hydrogen; with the proviso that at least two Ds are o-naphthoquinone diazide sulfonyl groups; and wherein the amount of said binder resin being about 60% to 95% by weight and the amount of photoactive compound being from about 5% to about 40% by weight, based on the total solids content of said radiation sensitive mixture.

14. A coated substrate comprising a substrate coated with a film of a radiation sensitive mixture comprising an admixture of at least one alkali-soluble binder resin compound and at least one photoactive compound of formula II:



wherein each X' is selected from the group consisting of hydrogen, OD and halide; Y' is selected from the group consisting of a lower alkyl group having 1-4 carbon atoms and halogen atom; and D is selected from the group consisting of an o-naphthoquinone diazide sulfonyl group and hydrogen; with the proviso that at least two Ds are o-naphthoquinone diazide sulfonyl groups; and wherein the amount of said binder resin being about 60% to 95% by weight and the amount of photoactive compound being from about 5% to about 40% by weight, based on the total solid content of said light sensitive mixture.

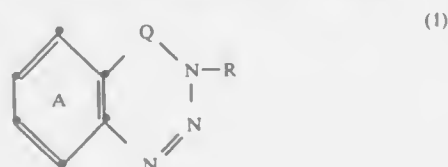
**4,957,847**  
**HEAT-SENSITIVE CYCLIC DIAZO COMPOUND**  
**CONTAINING RECORDING MATERIAL WITH**  
**BENZOTRIAZINE COMPOUND AND COUPLING**  
**COMPONENT**

Jean-Marie Adam, Rosenu, France, and Hans Baumann, Oberwil, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 2, 1988, Ser. No. 278,989  
Claims priority, application Switzerland, Dec. 11, 1987, 4849/87

**Int. Cl.<sup>5</sup> G03C 1/52, 1/58; B41M 5/30**  
**U.S. Cl. 430-170**  
1. A heat-sensitive recording material comprising a support and, on top of the said support, a heat-sensitive layer comprising a cyclic diazo component in sufficient quantity amount to react with coupling component to form color by coupling under the action of heat and a coupling component, in suffi-

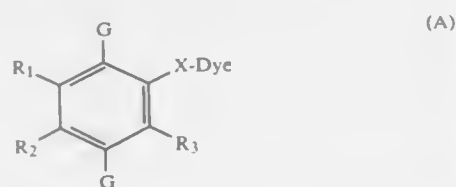
cient quantity amount to react with the cyclic diazo component to form an azo dye, said coupling component does not contain any acid group conferring solubility in water, and said diazo component and said coupling component being in admixture in a layer or alternatively in separate layers wherein heat enables color to form by coupling wherein the cyclic diazo component is a benzotriazine compound of the formula



wherein  
Q is  $-\text{CH}_2-$ ,  $-\text{CO}-$  or  $-\text{SO}_2-$ ,  
R is hydrogen, hydroxy, or alkyl or alkenyl having at most 12 carbon atoms, each unsubstituted or substituted by halogen, hydroxyl, cyano, lower alkoxy, lower alkylthio,  $\text{C}_1-\text{C}_8$ -acyloxy, lower alkoxy carbonyl or lower alkylsulfonyl, or is acyl, acyloxy or acylamino each having 1 to 10 carbon atoms, or cycloalkyl having 5 to 10 carbon atoms, or phenyl, phenylalkyl or naphthyl, each unsubstituted or ring-substituted by cyano, halogen, nitro, trifluoromethyl, lower alkyl, lower alkylthio, lower alkoxy, lower alkylcarbonyl or lower alkoxy carbonyl, or is a heterocyclic radical, and  
the benzene ring A is unsubstituted or substituted by halogen, cyano, nitro, lower alkyl, lower alkoxy, lower alkylthio, lower alkylcarbonyl or lower alkoxy carbonyl.

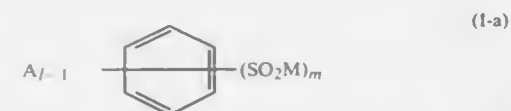
**4,957,848**  
**HEAT DEVELOPABLE COLOR LIGHT-SENSITIVE**  
**MATERIAL WITH DYE DEVELOPERS**  
Osamu Takahashi, Kolchi Koyama, and Keizo Koya, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Continuation of Ser. No. 831,675, Feb. 21, 1986, Pat. No. 4,766,056. This application May 10, 1988, Ser. No. 192,097  
Claims priority, application Japan, Feb. 21, 1985, 60-33491; Apr. 2, 1985, 60-69716; May 29, 1985, 60-116149  
The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.  
**Int. Cl.<sup>5</sup> G03C 5/54**

**U.S. Cl. 430-203**  
1. A method for forming a color image which comprises heating a color light-sensitive material after or simultaneously with image-wise exposure of said material to light, wherein the color light-sensitive material comprises a support having thereon at least one light-sensitive silver halide-containing layer, a binder, a compound represented by formula (A), and a compound or precursor thereof which reacts with an oxidized compound formed from the compound of formula (A), thereby converting the oxidized compound into a non-diffusible form, said compound of formula (A) being represented by

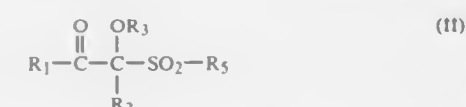


wherein R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> each represents a hydrogen atom, an alkyl group, a cycloalkyl group, an aryl group, an aralkyl group, an alkoxy group, an aryloxy group, an acylamino group, an alkylthio group, an arylthio group, or a halogen atom, provided that at least one of R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> represents a hydrogen atom; X represents a chemical bond or a divalent

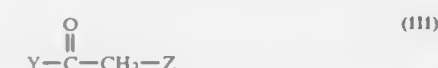
linking group; Dye represents an image-forming dye moiety; and G represents a hydroxyl group or a group capable of forming a hydroxyl group upon heating and/or by the action of a base, wherein the compound or precursor thereof which reacts with an oxidized compound formed from the compound of formula (A) is selected from the following compounds represented by formula Ia, (II), and (III) wherein said compound represented by formula (I) is represented by formula (I-a)



wherein A represents an atomic group forming a substituted or unsubstituted aromatic or heterocyclic ring condensed with the benzene ring; M represents a hydrogen atom, an ammonium ion, or a metal ion; l represents 1 or 2; and m represents an integer of 1 or more;



wherein R<sub>1</sub> represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted heterocyclic ring; R<sub>2</sub> represents a hydrogen atom, a halogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, a substituted or unsubstituted acyloxy group, or a substituted or unsubstituted sulfonyl group; R<sub>3</sub> represents a hydrogen atom or a group which can be hydrolyzed, and R<sub>5</sub> represents a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted heterocyclic ring;



wherein Y represents an aliphatic group or an aromatic group; and Z represents an electron-attractive group; provided that at least one of Y and Z contains a non-diffusing group having from 16 to 30 carbon atoms.

**4,957,849**  
**SILVER HALIDE PHOTOGRAPHIC MATERIAL AND**  
**IMAGE-FORMING METHOD USING THE SAME**  
Nobuaki Inoue, and Senzo Sasaoka, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Continuation of Ser. No. 33,375, Apr. 2, 1987, abandoned. This application Mar. 14, 1989, Ser. No. 323,059  
Claims priority, application Japan, Apr. 2, 1986, 61-77274; Jul. 1, 1986, 61-154334  
**Int. Cl.<sup>5</sup> G03C 1/08**

**U.S. Cl. 430-264**  
1. A silver halide photographic material, comprising:  
a support having provided thereon at least one silver halide emulsion layer; and  
a hydrazine derivative contained in said emulsion layer or in at least one other hydrophilic colloidal layer,  
wherein said emulsion layer comprises:  
a first monodispersed silver halide emulsion containing large monodispersed silver halide grains, wherein said large monodispersed silver halide grains are not chemically sensitized; and  
a second monodispersed silver halide emulsion containing small monodispersed silver halide grains, wherein said small monodispersed silver halide grains are chemically sensitized by means of at least one process selected from

the group consisting of a sulfur-sensitization process and a gold-sensitization process,

wherein said small and large monodispersed silver halide grains differ from each other in mean grain size, wherein the mean grain size of said small monodispersed silver halide grains is 90% or less of that of said large monodispersed silver halide grains, wherein said large and small monodispersed silver halide grains have mean grain sizes of from 0.02 to 0.5  $\mu\text{m}$ , and wherein said first monodispersed silver halide emulsion and said second monodispersed silver halide emulsion have a sensitivity difference of from 0.1 to 1.0  $\Delta \log E$ .

2. The silver halide photographic material as claimed in claim 1, wherein the sensitivity difference between the first monodispersed emulsion and the second monodispersed emulsion is 0.2 to 0.7  $\Delta \log E$ .

**4,957,850**  
**PHOTOSENSITIVE FLEXOGRAPHIC RESIN PLATE**  
Hidetomi Kusuda, Takatsuki; Katsuji Konishi, Ibaraki, and Kazunori Kanda, Yao, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan  
Continuation of Ser. No. 344,504, Apr. 27, 1989, abandoned, which is a continuation of Ser. No. 67,121, Jun. 29, 1987, abandoned. This application Feb. 12, 1990, Ser. No. 478,562  
Claims priority, application Japan, Jun. 27, 1986, 61-152009  
**Int. Cl.<sup>5</sup> G03C 1/76**

**U.S. Cl. 430-271**  
**8 Claims**

1. A photosensitive flexographic resin plate comprising a base plate and a photosensitive resin layer formed by applying thereon a resin composition which consists essentially of:

- 20 to 95% by weight of a resin having rubber elasticity selected from a group consisting of butadiene polymer, isoprene polymer, chloroprene polymer, butadiene-styrene copolymer, polystyrene-polybutadiene-polystyrene block copolymer, polystyrene-polyisoprene-polystyrene block copolymer, butadiene-(meth)acrylic acid-acrylic ester copolymer, butadiene-(meth)acrylic acid-styrene copolymer and butadiene-(meth)acrylic acid-acrylonitrile copolymer,
  - 1 to 80% by weight of an unsaturated monomer,
  - 0.01 to 10% by weight of a photopolymerization initiator and
  - 0.1 to 50% by weight of resin particles having an average particle size of about 0.01 to 6 micron which are prepared by suspension or emulsion polymerization of an ethylenically unsaturated monomer and a monomer having at least two radical-polymerizable unsaturated groups, % being based on the amount of said resin composition;
- and said resin composition, when cured by exposure to ultraviolet beams, exhibiting a JIS A hardness of 30° to 80° and an impact resilience of at least 20%.

**4,957,851**  
**IMAGE RECORDING MEDIUM COMPRISING A**  
**DIACETYLENE DERIVATIVE COMPOUND FILM AND A**  
**RADIATION ABSORBING LAYER**

Yoshinori Tomida; Hiroshi Matsuda, both of Yokohama; Kunihiro Sakai, Tokyo; Yukoo Nishimura, Sagami-hara; Takashi Nakagiri, and Toshihiko Miyazaki, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 851,090, Apr. 14, 1986, abandoned.

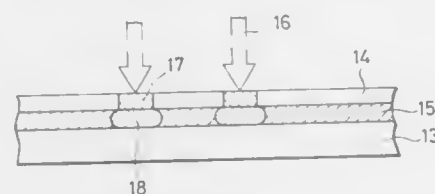
This application Sep. 6, 1988, Ser. No. 240,490  
Claims priority, application Japan, Apr. 16, 1985, 60-80852; Apr. 16, 1985, 60-80855

**Int. Cl.<sup>5</sup> G03C 1/78, 1/94, 1/68**  
**U.S. Cl. 430-272**  
**11 Claims**

1. An image-forming medium comprising a substrate, an image-forming layer provided on said substrate and a radiation-absorbing layer provided on said image-forming layer; said image-forming layer comprising a monomolecular film of a polydiacetylene derivative compound or its built-up



film, a monomer of said polydiacetylene derivative compound being represented by the formula



#### 4,957,852 HOT EMBOSsing PLATES CROSSLINKABLE BY PHOTOPOLYMERIZATION

Bernd Bronstert, Otterstadt, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 10, 1988, Ser. No. 205,343  
Claims priority, application Fed. Rep. of Germany, Jun. 13, 1987, 3719871

Int. Cl.<sup>5</sup> G03C 1/70, 5/16

U.S. Cl. 430—283 23 Claims

1. A hot embossing plate crosslinkable by photopolymerization, comprising:
  - (a) a heat-stable, dimensionally stable base; and
  - (b) a relief-forming layer which is crosslinkable by photopolymerization, soluble or dispersible in water and more than 0.8 mm thick, the relief-forming layer (b) containing:
    - (b<sub>1</sub>) one or more partially or virtually completely hydrolyzed polyvinyl alkanecarboxylates as binders, and, as further binders,
    - (b<sub>11</sub>) alkenecarboxylates, or alkenecarbonylamino-N-methylene ethers of partially or virtually completely hydrolyzed polyvinyl alkanecarboxylates, or
    - (b<sub>12</sub>) alkenecarbonylamino-N-methylene ethers of partially or virtually completely hydrolyzed graft copolymers of vinyl alkanecarboxylates and alkylene oxides, or mixtures of b<sub>11</sub> and b<sub>12</sub>; and furthermore
    - (b<sub>2</sub>) one or more alkenecarbonylamino-N-methylene ethers of polyhydric alcohols as photopolymerizable monomers; and
    - (b<sub>3</sub>) one or more photopolymerization initiators.

#### 4,957,853 SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING CYAN COUPLER AND METHOD FOR USE THEREOF

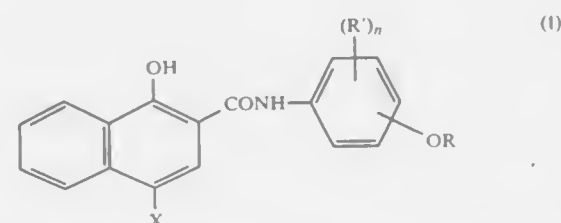
Hidetoshi Kobayashi, and Toshihiro Nishikawa, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 917,116, Oct. 8, 1986, abandoned. This application Jan. 27, 1988, Ser. No. 149,040  
Claims priority, application Japan, Oct. 8, 1985, 60-224345  
The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> G03C 7/34

U.S. Cl. 430—384 15 Claims

1. A method for producing a photographic image which comprises exposing an exposed silver halide color photographic light-sensitive material with a developer comprising an aromatic primary amine-developing agent, wherein said silver halide color photographic light-sensitive material has at least one light-sensitive silver halide emulsion layer provided on a support and said photographic material contains at least one non-diffusible, oil-soluble cyan dye-forming coupler represented by formula (I)



wherein R represents a substituted or unsubstituted branched alkyl group or an alkyl group substituted with other than an alkyl group, said R containing 6 or more carbon atoms and said R not being substituted with (1) a carboxyl group which is not substituted, (2) a sulfo group which is not substituted, (3) a carboxyl group which is substituted with a metal atom, (4) a carboxyl group which is substituted with an —NH<sub>4</sub> group, (5) a sulfo group which is substituted with a metal atom of (6) a sulfo group which is substituted with an —NH<sub>4</sub> group; X represents a hydrogen atom or a non-photographically-useful group which can be released therefrom upon coupling with an oxidized form of an aromatic primary amine developing agent; R' represents a group which can be substituted at a phenyl nucleus other than a group which can be represented by OR; and n is an integer of from 0 to 4, said coupler being incorporated into the emulsion by an oil-in-water dispersion process.

#### 4,957,854 OPTICAL RECORDING MEDIUM

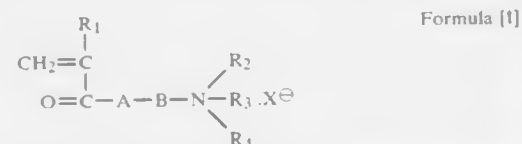
Yoshihiro Oguchi, Yokohama; Yoshio Takasu, Tama, and Kyo Miura, Sagami, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 8, 1988, Ser. No. 179,262  
Claims priority, application Japan, Apr. 13, 1987, 62-91460

Int. Cl.<sup>5</sup> G11B 7/24

U.S. Cl. 430—495 12 Claims

1. An optical recording medium comprising an organic thin film recording layer on a substrate, which performs recording of information by forming a pit with photoenergy, said organic thin film recording layer comprising an organic dye and a polymeric surfactant, wherein said polymeric surfactant is a cationic polymeric surfactant comprising a polymer having a monomer represented by the following formula [I]:



wherein R<sub>1</sub> is H or CH<sub>3</sub>; R<sub>2</sub> and R<sub>3</sub> are alkyl groups having 1 to 4 carbon atoms or hydroxyalkyl groups having 2 to 4 carbon atoms, which may be either the same or different; R<sub>4</sub> is H, an alkyl group having 1 to 4 carbon atoms, an hydroxyalkyl group having 2 to 4 carbon atoms, or a benzyl group; A is an oxygen atom or NH; B is an alkylene group having 1 to 4 carbon atoms or an hydroxyalkylene group having 2 to 4 carbon atoms; and X<sup>-</sup> is an anionic counterion.

#### 4,957,855 PHOTOGRAPHIC RECORDING MATERIAL WITH IMPROVED RAW STOCK KEEPING

Gladys L. MacIntyre, Clyde, and Roger Lok, Hilton, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 21, 1989, Ser. No. 410,693

Int. Cl.<sup>5</sup> G03C 1/34

U.S. Cl. 430—611 6 Claims

1. A photographic recording material comprising a support, a silver halide emulsion layer and from about 1.5 mmoles to about 5.0 mmoles per mole of silver of an antifogging agent

which is a combination of two compounds comprising, for each mole of 1-(3-acetamidophenyl)-5-mercaptotetrazole, from 0.3 to 4.0 mole of 1-(3-methoxyphenyl)-5-mercaptotetrazole.

#### 4,957,856 SILVER HALIDE PHOTOGRAPHIC MATERIAL

Koichi Suematsu, Shizuoka; Sumito Yamada, Kanagawa; Shigeru Ohno, Kanagawa, and Tadashi Ito, Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

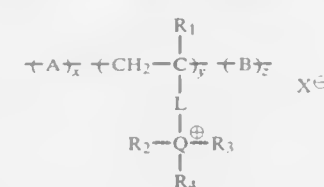
Filed Feb. 8, 1989, Ser. No. 307,704

Claims priority, application Japan, Feb. 8, 1988, 63-026978

Int. Cl.<sup>5</sup> G03C 1/84

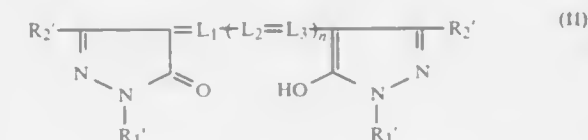
U.S. Cl. 430—518 10 Claims

1. A silver halide photographic material which comprises a support having provided thereon at least one light-sensitive silver halide emulsion layer and at least one subbing layer, wherein said at least one subbing layer comprises:
  - (a) a binder;
  - (b) a polymer represented by formula (I):



wherein A represents an ethylenic unsaturated monomer unit, R<sub>1</sub> represents a hydrogen atom or a lower alkyl group having from 1 to 6 carbon atoms, L represents a divalent group having from 1 to 12 carbon atoms, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub>, which may be the same or different, each represents an alkyl group, an aralkyl group or a hydrogen atom, Q represents nitrogen or phosphorous, provided that R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> may be linked together to form, together with Q, a cyclic structure, X<sup>-</sup> represents an anion other than iodine ion, B represents a structural unit in which copolymerizable monomers having at least two ethylenic unsaturated groups have been copolymerized, x is selected to constitute from 0 to 90 mol%, y is selected to constitute from 10 to 100 mol%, and z is selected to constitute from 0 to 90 mol%;

- (c) a dye represented by formula (II):



wherein R<sub>1</sub>' represents an aryl, alkyl, aralkyl, or heterocyclic group substituted with at least one carboxylic acid or sulfonic acid group, R<sub>2</sub>' represents a group —CONR<sub>3</sub>'R<sub>4</sub>' or a group —NR<sub>3</sub>'COR<sub>4</sub>' wherein R<sub>3</sub>' represents a hydrogen atom or an alkyl group, and R<sub>4</sub>' represents an alkyl group having a hydrophobic substituent constant π within a range from 1.60 to 3.9, L<sub>1</sub>, L<sub>2</sub>, and L<sub>3</sub> each represents a methine group, and η represents 0, 1 or 2; and

- (d) a nonionic surface active agent.

#### 4,957,857 STABILIZATION OF PRECIPITATED DISPERSIONS OF HYDROPHOBIC COUPLERS

Krishnan Chari, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 23, 1988, Ser. No. 288,922

Int. Cl.<sup>5</sup> G03C 7/25, 7/32

U.S. Cl. 430—546 24 Claims

1. A method of forming precipitated coupler dispersions comprising forming a water solution by dissolving in water a nonionic polymer and an anionic surfactant, said surfactant having a hydrophilic head group comprising sulfate or sulfonate and a hydrophobic tail group comprising between about 8 and about 20 carbon atoms, forming a solvent solution by dissolving a coupler in a basic solvent solution, combining said solvent solution and said water solution, and adding acid to form a neutral combined solution containing a dispersion of coupler particles with the proviso that said coupler dispersion does not precipitate after three weeks' storage.

#### 4,957,858 REPLICATIVE RNA REPORTER SYSTEMS

Barbara Chu, Del Mar, Calif.; Fred R. Kramer, New York, N.Y.; Paul Lizardi, Cuernavaca, Mexico, and Leslie E. Orgel, La Jolla, Calif., assignors to The Salk Institute for Biological Studies, San Diego, Calif. and The Trustees of Columbia University, New York, N.Y.

Filed Apr. 16, 1988, Ser. No. 852,692

Int. Cl.<sup>5</sup> C12Q 1/68

U.S. Cl. 435—6 45 Claims

1. A method of determining the presence of a biopolymer analyte in a sample, which method comprises
  - (i) exposing the sample to an affinity molecule for said analyte under conditions whereby binding occurs between the affinity molecule and the analyte;
  - (ii) if said affinity molecule is not itself a replicative RNA, which is a template for replication in vitro by Qβ replicase, joining, either before or after step (i), a replicative RNA, which is a template for replication in vitro by Qβ replicase, to the affinity molecule employed in step (i);
  - (iii) employing Qβ replicase to catalyze replication of replicative RNA, which (a) is a template for replication in vitro by Qβ replicase and (b) or had been joined to affinity molecule bound to analyte or is affinity molecule that had been bound to analyte; and
  - (iv) detecting RNA made by the reaction of step(iii).
27. An affinity molecule-replicative RNA hybrid wherein the affinity molecule is joined to a replicative RNA, which is a template for replication in vitro by Qβ replicase, through a first linking moiety, joined to said replicative RNA without eliminating the replicability thereof by Qβ replicase, and a second linking moiety, joined to the affinity molecule without eliminating the specificity of binding between affinity molecule and its analyte, said first and second linking moieties being covalently joined to each other or being a specific binding pair.

#### 4,957,859 ANTIBODIES FOR TRANSFORMING RAS PROTEIN

Diane Bizub, Glenside, Pa.; Elynn Fischberg-Bender, Ossing, N.Y., and Anna M. Skalka, Princeton, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Feb. 16, 1988, Ser. No. 156,133

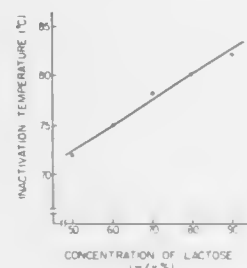
Int. Cl.<sup>5</sup> G01N 33/53, 33/543, 33/544

U.S. Cl. 435—7 11 Claims

1. A monoclonal antibody selectively binding for ras p21 TLeu61 transforming protein and non-cross reactive with any other ras p21 protein.

4,957,860

**METHOD FOR PRODUCING OLIGOSACCHARIDE**  
Tatsuhiko Kan, and Yoichi Kobayashi, both of Tokyo, Japan, assignors to Kabushiki Kaisha Yakult Honsa, Tokyo, Japan  
Filed Oct. 26, 1987, Ser. No. 112,068  
Claims priority, application Japan, Oct. 27, 1986, 61-253857  
Int. Cl.<sup>5</sup> C12P 19/04; C12N 9/38, 1/14; C07H 3/00  
U.S. Cl. 435-101 5 Claims



I. A process of producing oligosaccharides of the formula: Gal-(Gal)<sub>n</sub>-Glc, wherein Gal denotes a galactose residue, Glc represents a glucose residue and n is an integer of 1 to 4, comprising:

reacting lactose at a concentration in a reaction mixture ranging from 50 to 90% (w/v) with  $\beta$ -galactosidase derived from *Aspergillus oryzae* at a reaction temperature ranging from 55° to 83° C.

4,957,861

**PROCESS FOR THE BIOTECHNOLOGICAL PREPARATION OF POLY-D-(-)-3-HYDROXYBUTYRIC ACID**

Robert M. Lafferty, and Gerhart Braunegg, both of Graz, Austria, assignors to Petrochemie Danubia Ges.m.b.H., Manns-worth, Austria  
Continuation of Ser. No. 675,970, Nov. 23, 1984, abandoned.  
This application Nov. 20, 1987, Ser. No. 123,085  
Claims priority, application Fed. Rep. of Germany, Dec. 1, 1983, 3343576  
The portion of the term of this patent subsequent to Nov. 22, 2005, has been disclaimed.  
Int. Cl.<sup>5</sup> C12P 7/42; C12N 1/20

U.S. Cl. 435-146

14 Claims

I. A process for the biotechnological preparation of poly-D-(-)-3-hydroxybutyric acid, hereinafter referred to as PHB, which comprises aerobically culturing a strain of the microorganism *Alcaligenes latus* or a PHB-producing mutant derived from this microorganism in an aqueous nutrient medium containing sources of assimilable carbon, nitrogen and phosphorus and the amount of trace nutrients required for the growth of the microorganism, wherein the source of nitrogen is a water-soluble ammonium salt, with a complete supply of nutrients optimum for the growth of the microorganism, under unlimited growth conditions in the temperature range from 36° to 42° C. at a dissolved oxygen content of 25 to 50% of the saturation value for air and a pH value of 6.5 to 7.5, under sterile conditions, and isolating the PHE by extraction from the biomass thereby obtained.

4,957,862

**MICROBIOLOGICAL PROCESS FOR THE PREPARATION OF METHYL KETONES**

Catherine Creuly, Lempdes; Jean-Bernard Gros, Chamalieres, and Christian Larroche, Clermont-Ferrand, all of France, assignors to Sanofi, Paris, France  
Filed Feb. 21, 1990, Ser. No. 482,710  
Claims priority, application France, Feb. 27, 1989, 89 02524  
Int. Cl.<sup>5</sup> A23L 1/221; C12P 7/26; C12R 1/80, 1/685  
U.S. Cl. 435-148 14 Claims

I. A process for the preparation of C<sub>5</sub> to C<sub>10</sub> aliphatic methyl

ketones by the aerobic biotransformation of C<sub>6</sub> to C<sub>11</sub> fatty acids with spores of filamentous fungi of the genus *Amastigomycota*, wherein the reaction medium is a C<sub>8</sub> to C<sub>20</sub> aliphatic hydrocarbon or a mixture of such hydrocarbons containing at most 20% of water.

4,957,863

**METHOD OF INCREASING YIELD OF T-PA IN CELL CULTURE**

Michael A. Sanzo, St. Louis; Medora M. Hardy, Chesterfield, and Joseph Feder, St. Louis, all of Mo., assignors to Monsanto Company, St. Louis, Mo.  
Filed Jan. 26, 1988, Ser. No. 148,409  
Int. Cl.<sup>5</sup> C12N 9/64 7 Claims

U.S. Cl. 435-228

I. The method of increasing the yield of tissue plasminogen activator in culture of mammalian cells comprising introducing antibodies to the t-PA of said cells into the cell culture nutrient medium, wherein said antibodies are such that they recognize an epitope on said t-PA and, when complexed with said t-PA, effectively prevent feedback inhibition of t-PA production by said cells, allowing the cells to grow, and then recovering t-PA from the t-PA-antibody complex thus formed in the conditioned medium by exchanging antibody in the complex for t-PA antibody immobilized on an inert support.

4,957,864

**NOVEL PLASMINOGEN ACTIVATOR AND ITS PREPARATION PROCESS**

Seishi Takahashi, Yokohama, Japan, assignor to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan  
Continuation of Ser. No. 66,524, Jun. 26, 1987, abandoned, which is a continuation of Ser. No. 621,918, Jun. 13, 1984, abandoned. This application Jun. 30, 1988, Ser. No. 213,489  
Claims priority, application Japan, Oct. 29, 1982, 57-189067  
Int. Cl.<sup>5</sup> C12N 9/64 1 Claim

U.S. Cl. 435-226

I. A process for preparing a plasminogen activator having the following characteristic properties:  
(1) a main protein band obtained by sodium dodecyl sulfate-polyacrylamide gel electrophoresis having a molecular weight of approximately 70,000  $\pm$  5,000;  
(2) a main band obtained by isoelectric-point electrophoresis having a pI in the range of 7 to 9;  
(3) an immunological property of not being adsorbed by antiurokinase IgG-agarose affinity chromatography; and  
(4) a property wherein plasminogen activator hydrolyzes H-D-valyl-L-leucyl-L-lysine-p-nitroanilide dihydrochloride and H-D-isoleucyl-L-prolyl-L-arginine-p-nitroanilide dihydrochloride, but does not hydrolyze Boc-L-valyl-L-prolyl-L-arginine-4-methylcoumaryl-7-amide, carboben-zoxyl-L-phenylalanyl-L-arginine-4-methylcoumaryl-7-amide, 1-prolyl-L-phenylalanyl-L-arginine-4-methylcoumaryl-7-amide and glutaryl-glycyl-L-arginine-4-methylcoumaryl-7-amide, which process comprises:  
(i) subjecting a human blood vessel or kidney to an extraction treatment with an ammonium thiocyanate solution;  
(ii) salting the extract out with an (NH<sub>4</sub>)<sub>2</sub>SO solution, passing the resulting solution through an arginine agarose column, and then washing the column with an arginine solution to elute the adsorbed plasminogen activator thereunto;  
(iii) passing the fraction of the eluted plasminogen activator in step (ii) through a phenyl-agarose column and washing the column with an ethylene glycol solution or a nonionic surfactant solution to elute the adsorbed plasminogen activator thereunto;  
(iv) passing the fraction of the eluted plasminogen activator in step (iii) through a dextran gel column then through a fibrin-agarose column;  
(v) eluting with a NH<sub>4</sub>SCN solution; and

(vi) then recovering the plasminogen activator in the solution.

4,957,865

**CLONING OR EXPRESSION VECTORS CONTAINING THE AVIAN ERYTHROBLASTOSIS VIRUS GENOME AND CELLS TRANSFECTED BY THESE VECTORS**  
Jacques Samarut, Villeurbanne; Gérard Verdier, Fontaines S/Saone; Miloud Benchaibi, Villeurbanne; Pierre Savatier, Lyon; Didier Poncet, Lyon; Frédéric Flamant, Lyon; Jiao-Hao Xiao, Strasbourg Cedex; Pierrick Thoraval, Villeurbanne; Frédérique Chambonnet, Saint-Etienne, and Victor Nigon, Villeurbanne, all of France, assignors to Institut National de la Recherche Agronomique (INRA), Paris, France  
PCT No. PCT/FR85/00293, § 371 Date Jun. 4, 1986, § 102(e)  
Date Jun. 4, 1986, PCT Pub. No. WO86/02380, PCT Pub. Date Apr. 24, 1986

PCT Filed Oct. 15, 1985, Ser. No. 879,103

Claims priority, application France, Oct. 15, 1984, 84 15764  
Int. Cl.<sup>5</sup> C12N 7/00, 15/00; C12P 21/00

U.S. Cl. 435-235

19 Claims

I. An infectious virus for cloning or expression of a foreign gene, wherein said virus comprises all or part of the genome of an avian erythroblastosis virus, two LTR sequences from said avian retrovirus genome, at least one foreign gene situated between said LTR sequences, and two mRNA splicing sites.

4,957,866

**METHOD FOR REPRODUCING CONIFEROUS PLANTS BY SOMATIC EMBRYOGENESIS**

Pramod K. Gupta, Federal Way, and Gerald S. Pullman, Renton, both of Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Mar. 9, 1989, Ser. No. 321,035

Int. Cl.<sup>5</sup> A01H 4/00, 7/00

U.S. Cl. 435-240.4

24 Claims



I. A method for reproducing coniferous plants by somatic embryogenesis which comprises:  
placing a suitable explant on an induction culture medium with a sufficient amount of plant growth hormones and relatively low in osmoticants and growing a culture containing early stage proembryos, the osmotic potential of said induction medium being below about 175 mM/kg; and  
transferring the early stage proembryos from the induction culture to a late stage proembryo development culture medium having a sufficient amount of plant growth hormones and a significantly increased concentration of osmoticants for a sufficient time and under suitable environmental conditions for development of late stage proembryos, said development culture having an osmotic potential in the range of about 200-400 mM/kg.

4,957,867

**PRODUCTION OF CYCLOPENTENONES BY ENZYME RESOLUTION**

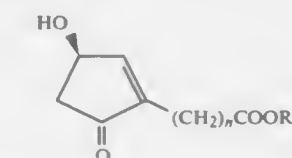
Masayoshi Minai, Moriyama; Yuji Ueda, Izumi; Takayuki Higashii, Kishiwada; Michitada Kondo, Kobe, and Seichi Kai, Nara, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan  
Filed May 29, 1987, Ser. No. 55,362  
Claims priority, application Japan, May 29, 1986, 61-125381; Nov. 5, 1986, 61-263464; Mar. 27, 1987, 62-075611; Mar. 30, 1987, 62-079297

Int. Cl.<sup>5</sup> C12P 7/62, 7/38

U.S. Cl. 435-280

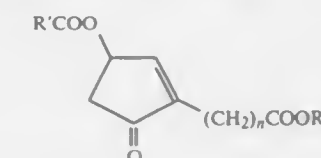
37 Claims

I. A process for preparing an optically active cyclopentenone of the formula:



(I)

wherein R is a hydrogen atom or a lower alkyl group and n is an integer of 4 to 8, which comprises contacting a di-cyclopentenone ester of the formula:



(II)

wherein R and n are each as defined above and R' is a lower alkyl group, or a lower alkyl group substituted with halogen, with an enzyme having a capability of hydrolyzing selectively either one of the d- or l-form isomers of the di-cyclopentenone ester (ii) in an aqueous medium for asymmetric hydrolysis.

4,957,868

**CYLINDRICAL HOLLOW CARRIERS FOR MICROORGANISMS MADE OF NONWOVEN FABRIC**

Yoshinori Yushina; Jun Hasegawa, and Hiromi Satoh, all of Yokohama, Japan, assignors to Chiyoda Chemical Engineering & Constructions Co., Ltd., Yokohama, Japan  
Continuation-in-part of Ser. No. 805,275, Dec. 5, 1985, abandoned. This application Aug. 31, 1988, Ser. No. 239,185  
Claims priority, application Japan, Dec. 24, 1984, 59-270719; Jun. 20, 1988, 63-150117

Int. Cl.<sup>5</sup> C12M 1/40; C12N 11/00, 11/02, 11/08

U.S. Cl. 435-288

20 Claims

II. A hollow cylindrical carrier for microorganisms having a compression weight of not less than 400 g per carrier, said carrier being made by a process which comprises subjecting a nonwoven fabric having a specific gravity of not greater than 1.0 to a surface smoothing treatment at an elevated temperature of 200° to 450° C., then pressing with a roller to give a nonwoven fabric a thickness of 1 to 5 mm and a weight per unit area of 30 to 300 mg/cm<sup>2</sup> and then forming the nonwoven fabrics into a cylindrical hollow shape; said compression weight being measured by applying a spot weight to an upper part of the cylindrical hollow shaped carrier having an outer diameter of 50 mm and a length of 50 mm and gradually increasing the weight until the upper part is brought into contact with the lower part.



4,957,869

**IMMUNOGENIC PEPTIDE CORRESPONDING TO *P. vivax* CS PROTEIN**

David E. Arnot; Vincenzo Enea; Ruth S. Nussenzweig, and Victor N. Nussenzweig, all of New York, N.Y., assignors to New York University, New York, N.Y.

Continuation of Ser. No. 754,645, Jul. 12, 1985, abandoned. This application Apr. 5, 1988, Ser. No. 180,606

Int. Cl.<sup>5</sup> C12N 15/00; C07K 5/00; C07H 15/12

U.S. Cl. 435—320

8 Claims

1. DNA encoding an immunogenic peptide said peptide comprising the amino acid sequence Asp-Arg-Ala-X-Gly-Gln-Pro-Ala-Gly repeated at least twice wherein X is independently selected from the group consisting of Asp and Ala, said peptide having the property of eliciting formation of antibodies that recognize the immunodominant epitope of the *P. vivax* circumsporozoite surface protein on the surface of sporozoites, said DNA being essentially purified; provided that said peptide is not said surface protein.

4,957,870

**DETECTION OF RETICULOCYTES, RNA AND DNA**

Linda G. Lee, Mountain View, and Chia-Huei Chen, San Jose, both of Calif., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Division of Ser. No. 81,097, Aug. 3, 1987, Pat. No. 4,883,867, which is a continuation-in-part of Ser. No. 793,813, Nov. 1, 1985, abandoned. This application Apr. 3, 1989, Ser. No. 332,657

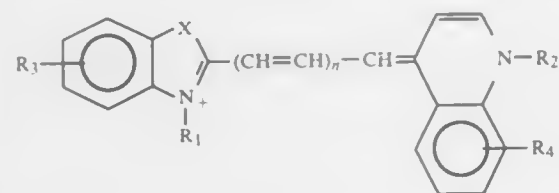
Int. Cl.<sup>5</sup> G01N 33/48, 33/00

U.S. Cl. 436—63

10 Claims

1. In a process for detecting reticulocytes, RNA or DNA in a sample, the improvement comprising:

adding to said sample a fluorescent dye having the formula



wherein:

X=O, S, Se or C(CH<sub>3</sub>)<sub>2</sub>;

R<sub>1</sub>=alkyl having from 1-6 carbons;

R<sub>2</sub>=alkyl having from 1-6 carbons;

R<sub>3</sub>=fused benzene, alkyl (having 1-6 carbons), methoxy or hydrogen;

R<sub>4</sub>=alkyl having 1-6 carbons, methoxy or hydrogen; and

n=zero or an integer from 1-6;

exciting said sample with light of excitation wavelength; and measuring fluorescence emitted from said sample.

4,957,871

**METHOD FOR DETECTING IMPURITIES IN AN OIL SAMPLE**

David J. Fisher, North Adams, Mass., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Division of Ser. No. 50,924, May 15, 1987, Pat. No. 4,873,056, which is a continuation of Ser. No. 529,154, Sep. 2, 1983, Pat. No. 4,686,192. This application Jun. 22, 1989, Ser. No. 370,231

Int. Cl.<sup>5</sup> G01N 21/03, 21/07

U.S. Cl. 436—165

14 Claims

2. A method for detecting the presence of polychlorinated biphenyl in an oil sample, utilizing a chemical test kit comprising first and second flexible containers, said first container comprising at least one breakable capsule mounted within said first container and containing an alkali metal and means for separating an aqueous layer from an oil layer into said second container, said second container comprising at least two breakable capsules mounted within said second container, one of

said capsules containing a mercury titrant and the other capsule containing a dye indicator, comprising the steps of:

- (a) introducing the oil sample into said first container;
- (b) breaking said capsule containing the alkali metal in said first container;
- (c) then shaking said first container;
- (d) adding a buffered acid solution to said first container;
- (e) then shaking said first container;
- (f) separating the aqueous layer from the oil layer by transferring the aqueous layer through said separating means into said second container;

(g) breaking said capsule containing the mercury titrant in said second container;

(h) then shaking said second container;

(i) breaking said capsule containing the dye indicator in said second container; and

(j) then shaking said second container;

(k) detecting the color of the aqueous liquid in said second container.



4,957,872

**METHOD FOR THE DETERMINATION OF REDOX REACTIONS USING IODATE TO ELIMINATE ASORBIC ACID INTERFERENCE**

Laszlo Koeber; Walter Rittersdorf, and Wolfgang Werner, all of Mannheim, Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Continuation of Ser. No. 941,406, Dec. 15, 1986, Pat. No. 4,743,559, which is a continuation of Ser. No. 779,594, Sep. 24, 1985, abandoned, which is a continuation of Ser. No. 246,807, Mar. 23, 1981, abandoned. This application Jan. 20, 1988, Ser. No. 145,901

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1980, 3012368

The portion of the term of this patent subsequent to May 10, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> G01N 1/00, 21/78

U.S. Cl. 436—175

15 Claims

1. A method for determining an analyte in a test system which contains said analyte and ascorbic acid as an interfering reducing agent utilizing a redox reagent system, said redox reagent system comprising a redox indicator which forms a visually or photometrically detectable or assessable color by means of a redox reaction, comprising:

- (a) contacting said redox reagent system with an amount of soluble iodate in excess of the amount necessary to remove ascorbic acid in said test system;
  - (b) contacting said test system to said soluble iodate and redox reagent system;
  - (c) reacting said ascorbic acid with said iodate at a pH of from 5 to 9 to eliminate said ascorbic acid as an interfering reducing agent; and
- determining in the presence of iodate in excess of the amount necessary to react with said ascorbic acid visually or photometrically detectable or assessable color as an indication of said analyte.

4,957,873

**PROCESS FOR FORMING ISOLATION TRENCHES IN SILICON SEMICONDUCTOR BODIES**

Sureshchandra M. Ojha; Paul J. Rosser, both of Harlow, and Philip B. Moynagh, Buckhurst Hill, all of Great Britain, assignors to STC PLC, London, England

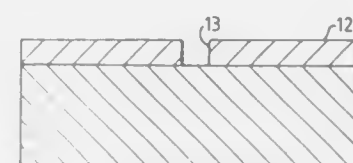
Continuation of Ser. No. 253,971, Oct. 5, 1988, abandoned. This application Sep. 21, 1989, Ser. No. 411,196

Claims priority, application United Kingdom, Oct. 7, 1987, 8723539

Int. Cl.<sup>5</sup> H01L 21/266

U.S. Cl. 437—20

2 Claims



1. A method of fabricating an oxide-filled isolation trench in a major surface of a silicon semiconductor substrate, the trench having a width of about 1 micron and having a depth exceeding its width, the method consisting of the steps of applying a mask to said surface, said mask having an opening defining the position and width of the trench, implanting phosphorus or arsenic dopant ions into the substrate via said opening to a concentration of at least  $5 \times 10^{20} \text{ cm}^{-3}$  and to a depth of about 8 microns, removing the mask, and subjecting the dopant substrate to an oxygen atmosphere at a temperature of 850° to 950° C. at a pressure of 10 to 20 atmospheres so as to convert preferentially the doped silicon to silicon oxide to depth of about 6 microns and a width of about 1 micron thereby forming the isolation trench, said preferential conversion of doped silicon to silicon oxide being confined substantially to a linear growth of oxide.

4,957,874

**SELF-ALIGNED BI-CMOS DEVICE HAVING HIGH OPERATION SPEED AND HIGH INTEGRATION DENSITY**

Katsumoto Soejima, Tokyo, Japan, assignor to NEC Corporation, Japan

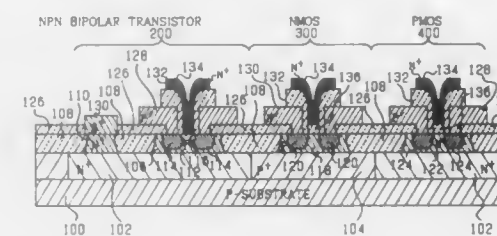
Filed Nov. 28, 1988, Ser. No. 276,781

Claims priority, application Japan, Nov. 27, 1987, 62-298996

Int. Cl.<sup>5</sup> H01L 21/00, 21/02, 21/22, 21/26

U.S. Cl. 437—31

2 Claims



1. A process for manufacturing a semiconductor device which includes at least one bipolar transistor, one N-channel MOS transistor and one P-channel transistor which are formed in the same semiconductor substrate at the same semiconductor layer level, comprising:

- preparing a substrate including a bipolar transistor section including a collector region formed in said semiconductor substrate, and a first conduction type well for a first type MOS transistor and a second conduction type well for a second type MOS transistor, the bipolar transistor section, the first conduction type well and the second conduction type well being isolated from each other and covered by

a first insulating layer formed on the principal surface of the semiconductor substrate;

selectively etching said first insulating layer to expose a portion of said bipolar transistor section and forming a first polycrystalline semiconductor layer on said first insulating layer and said exposed portion of said bipolar transistor section;

selectively doping a first impurity to a portion of said first polycrystalline semiconductor layer on said exposed portion of said bipolar transistor section and on said first conduction type well, respectively, and also selectively doping to a second impurity of a conduction type opposite to that of said first impurity, to another portion of said first polycrystalline semiconductor layer on said second conduction type well and on another portion of said bipolar transistor section, respectively;

selectively removing a portion of said first polycrystalline semiconductor layer on said first conduction type well, said second conduction type well and on said another portion of said bipolar transistor section so as to partially expose said first insulating layer;

forming a second insulating layer on said first polycrystalline semiconductor layer and a portion of said first insulating layer respectively exposed in said first conduction type well, said second conduction type well and said bipolar transistor section;

over-etching said exposed portion of said first insulating layer by using said second insulating layer as a mask so that said first insulating layer under said first polycrystalline semiconductor layer is partially removed;

filling a polycrystalline semiconductor to a space formed under said first polycrystalline semiconductor layer as the result of said over-etching and then selectively removing said filled polycrystalline semiconductor so as to leave said filled polycrystalline semiconductor under said first polycrystalline semiconductor layer;

heating said substrate so that the impurities included in said first polycrystalline semiconductor layer are respectively diffused to said first conduction type well, said second conduction type well and said bipolar transistor section; selectively doping impurity to only a portion of said bipolar transistor section which is not covered by said first polycrystalline semiconductor layer so that a base region is formed;

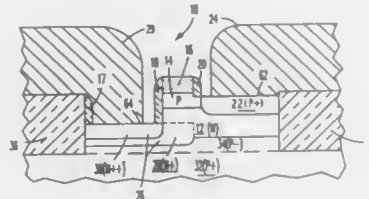
forming an oxide layer on said first conduction type well, said second conduction type well and said bipolar transistor section which are not covered by said first polycrystalline semiconductor layer so that said oxide layer formed on said first conduction type well and said second conduction type well forms a gate insulator;

selectively removing only said oxide layer on said bipolar transistor section which is not covered by said first polycrystalline semiconductor layer so that an area within said base region where an emitter region is to be formed is exposed;

depositing a second polycrystalline semiconductor layer including a predetermined conduction type of impurity, on said second insulating layer, said gate insulator on each of said first conduction type well and said second conduction type well, and said emitter formation area in said bipolar transistor section; and

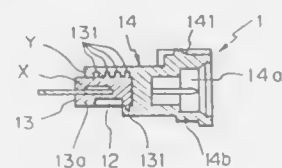
heating said substrate to cause said predetermined conduction type of impurity contained in said second polycrystalline semiconductor layer to be diffused to said emitter formation area in said bipolar transistor section so that an emitter region is formed in said bipolar transistor section.

4,957,875  
**VERTICAL BIPOLAR TRANSISTOR**  
Shah Akbar, Ithaca, N.Y.; Patricia L. Kroesen, Wallpole, Mass.;  
Selki Ogura, Hopewell Junction, and Nivo Rovedo, Lagrange-  
ville, both of N.Y., assignors to International Business Ma-  
chines Corporation, Armonk, N.Y.  
Filed Aug. 1, 1988, Ser. No. 226,738  
Int. Cl.<sup>5</sup> H01L 21/28  
U.S. Cl. 437—31



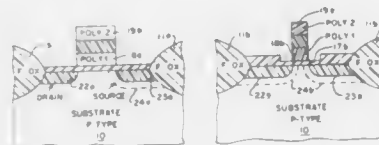
1. A method for forming a vertical bipolar transistor, comprising the steps of:  
obtaining a structure comprising a collector layer of doped semiconductor material, a base layer of doped semiconductor material disposed over said collector layer, an emitter layer of doped semiconductor material disposed over said base layer, a step of insulating material disposed over a first portion of the top surface of said emitter layer, but not over a second portion thereof, and a subcollector disposed below said collector layer in the region below said second portion of said top surface of said emitter layer;  
forming a sidewall spacer of insulating material against the sidewall of said step to thereby cover a third portion of the top surface of said emitter layer, which third portion is less than said second portion;  
removing said emitter layer and at least a nominal portion of said base layer in a first volume adjacent to said sidewall spacer;  
removing said step;  
removing said emitter layer and at least a nominal portion of said base layer in a second volume below said removed step to expose said base layer and to provide a base contact surface, and also removing additional material in said first volume in order to expose a collector contact surface in said collector layer or said subcollector which is lower relative to said base contact surface;  
removing said sidewall spacer;  
forming simultaneously a first insulator sidewall in said first volume adjacent to and in contact with one side of said emitter layer, base layer and at least a nominal portion of said collector layer and touching said collector contact surface, and a second insulator sidewall in said second volume adjacent to and in contact with another side of said emitter layer and at least a nominal portion of said base layer, and touching said base contact surface; and  
forming a collector contact interconnect on surface and forming a base contact interconnect on the top surface of said exposed base contact surface, with said collector and base contact interconnects being separated from said emitter layer by only one or more insulator layers.

4,957,876  
**RESIN SEALED SEMICONDUCTOR DEVICE AND A METHOD FOR MAKING THE SAME**  
Hiroshi Shibata; Fuyuki Maebara, both of Kariya; Akira Shin-tai, Chita, and Hidetoshi Kato, Suzuka, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan  
Division of Ser. No. 201,757, Jun. 3, 1988, Pat. No. 4,899,209.  
This application Jan. 17, 1990, Ser. No. 466,655  
Claims priority, application Japan, Jun. 5, 1987, 62-142043; Apr. 30, 1988, 63-108520  
Int. Cl.<sup>5</sup> H01L 21/64  
U.S. Cl. 437—209



1. A method of producing a resin molded IC regulator comprising:  
forming a lead frame, in which at least a first connecting terminal electrically connected to an electrical load and a second connecting terminal electrically connected to a device other than said electrical load are connected to a frame portion thereof, out of a plate made of an electric conductive material,  
mounting a monolithic IC controlling an operation of said electrical load on a conductive member and electrically connecting said monolithic IC to said lead frame,  
completely sealing said monolithic IC mounted on said conductive member and partially sealing at least a portion of said first and second connecting terminals electrically connected to said monolithic IC, with a first resin having an electrical insulating characteristic to make a first molded portion, so that said first and second connecting terminals are rigidly fixed thereby,  
separating said frame portion from said lead frame and making a second molded portion by an externally covering molding operation to cover at least a portion of said first molded portion and surround said second connecting terminal in such a way that said second connecting terminal is disposed inside a cavity provided on said second molded portion, with a second resin having an electric insulating characteristic.

4,957,877  
**PROCESS FOR SIMULTANEOUSLY FABRICATING EEPROM CELL AND FLASH EPROM CELL**  
Simon M. Tam, Redwood City, and Stefan K. C. Lai, Belmont, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.  
Filed Nov. 21, 1988, Ser. No. 274,420  
Int. Cl.<sup>5</sup> H01L 21/70  
U.S. Cl. 437—43



11. In the fabrication of a first electrically erasable programmable read-only memory cell on a substrate simultaneously with a second electrically programmable and electrically erasable memory cell formed on said substrate where said second

cell has a floating gate finger disposed over a thin oxide region from which charge is tunneled through said oxide region into a doped region formed in said substrate under a portion of said floating gate finger, improved processing for forming said doped region comprising the steps of:  
doping said substrate adjacent to said floating gate finger of said second cell with at least one dopant;  
driving the dopant under said floating gate finger thereby forming a pair of spaced-apart doped regions for facilitating the tunnelling of said charge.

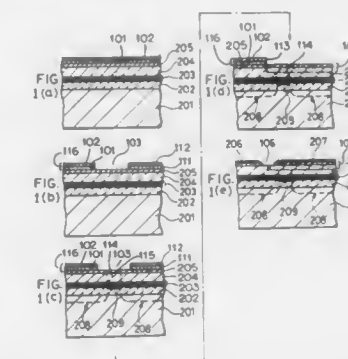
4,957,878  
**REDUCED MASK MANUFACTURE OF SEMICONDUCTOR MEMORY DEVICES**  
Tyler A. Lowrey, and Randal W. Chance, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.  
Filed May 2, 1988, Ser. No. 189,411  
The portion of the term of this patent subsequent to Oct. 3, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> H01L 21/26

U.S. Cl. 437—52  
1. Method of forming semiconductor circuit memory devices which include, as a part of each device, a plurality of memory cells and active circuit elements to control signals, the cells and active circuit elements forming a repeating pattern on the device, the method comprising:  
(a) preparing a silicon wafer and establishing the wafer as a substrate;  
(b) forming an initial oxide on the wafer;  
(c) establishing buried contact of rings in the initial oxide;  
(d) deposit a polysilicon layer on said initial oxide layer and buried contact openings, and patterning said polysilicon layer to simultaneously form gate electrodes and bitlines connected to substrate through the buried contact openings;  
(e) applying a second oxide layer over the gate electrodes and bitlines;  
(f) applying a third oxide layer on the second oxide layer;  
(g) anisotropically etching the second and third oxide layers to form oxide sidewall spacers on the gate electrodes while leaving an oxide layer on top portions of said gate electrodes;  
(h) forming capacitor plates after said anisotropic etch;  
(i) forming electrical connections between the various device regions.

4,957,879  
**METHOD OF MAKING A SEMICONDUCTOR LASER USING SUPERLATTICE DISORDERING**  
Etsuji Omura; Katsuhiko Goto; Shogo Takahashi; Harumi Namba, and Akira Takemoto, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Division of Ser. No. 304,806, Jan. 31, 1989, Pat. No. 4,888,781.  
This application Sep. 22, 1989, Ser. No. 410,896  
Claims priority, application Japan, Feb. 2, 1988, 63-23554  
Int. Cl.<sup>5</sup> H01L 21/20, 21/203

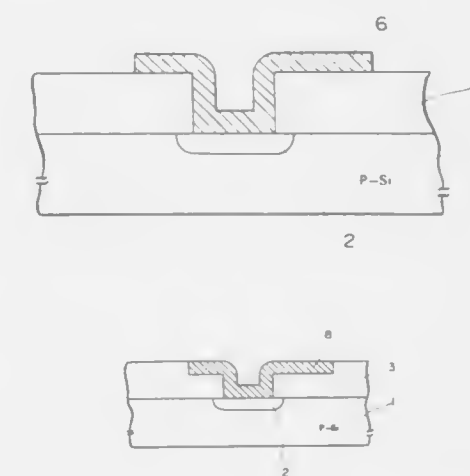
U.S. Cl. 437—129  
1. A method of producing a buried heterojunction semiconductor laser, which comprises the steps of:  
(a) successively depositing a lower cladding layer, a quantum well active layer, and an upper cladding layer of a given conductivity type on a semiconductor substrate to form a heterostructure;  
(b) disordering regions of said active layer to define a non-disordered central stripe, by conducting from above said upper cladding layer, solid phase diffusion of impurities of a conductivity type opposite that of the upper cladding layer, the solid phase diffusion also serving to invert the conductivity type of a portion of the upper cladding layer;  
(c) re-inverting the conductivity type, previously obtained during said solid phase diffusion process, of a portion of the surface of the inverted upper cladding layer, to the original conductivity type of the upper cladding layer to

form a re-inverted region in electrical contact with the portion of the upper cladding layer located above said central stripe;



(d) forming p and n electrodes on top of corresponding conductivity type areas of the upper cladding layer to establish a conductive path through said areas to the central stripe.

4,957,880  
**METHOD FOR PRODUCING SEMICONDUCTOR DEVICE INCLUDING A REFRACTORY METAL PATTERN**  
Hitoshi Itoh, Mitaka, and Takahiko Moriya, Yokosuka, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Continuation-in-part of Ser. No. 150,437, Feb. 1, 1988, abandoned, which is a continuation of Ser. No. 866,249, May 23, 1986, abandoned. This application Apr. 28, 1989, Ser. No. 346,359  
Claims priority, application Japan, May 29, 1985, 60-116275  
Int. Cl.<sup>5</sup> H01L 21/283, 21/268  
U.S. Cl. 437—192

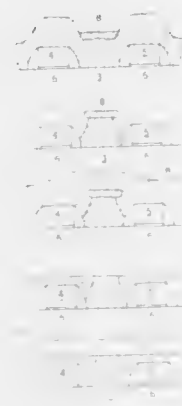


1. A method of forming a refractory metal pattern selectively on an insulating layer on a substrate comprising the steps of:  
irradiating, in a hydrogen gas free atmosphere comprising a refractory metal halide gas, on a region of said insulating layer selectively by light having a wavelength in a range of from about 200 to about 1000 nm, and  
depositing the refractory metal pattern selectively on said light-irradiated region of said insulating layer by a chemi-



cal vapor deposition (CVD) method without irradiation using a gas mixture comprising the refractory metal halide gas and hydrogen gas.

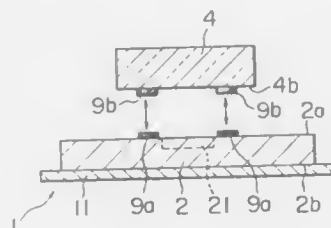
4,957,881  
FORMATION OF SELF-ALIGNED CONTACTS  
Pier L. Crotti, Landriano, Italy, assignor to SGS-Thomson Microelectronics s.r.l., Italy  
Filed Oct. 20, 1989, Ser. No. 424,450  
Claims priority, application Italy, Oct. 20, 1988, 83673 A/88  
Int. Cl.<sup>5</sup> H01L 23/522  
U.S. Cl. 437—195 1 Claim



1. A process for forming self-aligned metal-semiconductor contacts in MISFET type integrated structures which determine, during fabrication, a superficial morphology characterized by the presence of substantially parallel gate lines of a first conducting metallic material provided on the sides thereof with tapered lateral spacers of a dielectric material over the surface of a wafer of a monocrystalline semiconductor material, comprising:

- conformably depositing over said surface of the wafer a matrix layer of a second metallic material with a thickness sufficient for the bottom of valleys of said conformably deposited metal layer between two adjacent gate lines to be at a level higher than the level of peaks of said gate lines;
- depositing a layer of a planarization material over said conformably deposited matrix metallic layer;
- masking and etching said planarization material until exposing the peaks of said conformably deposited matrix metallic layer and leaving a residual layer of planarization material on the bottom of said valleys for a length defined by the mask;
- selectively etching said second metallic material using said residual layer of planarization material on the bottom of said valleys as a mask until lowering the etch edge of said second metallic material layer conformably deposited to an intermediate level down the flank of said tapered lateral spacers of dielectric material on the sides of said gate lines of said first metallic material;
- depositing a layer of dielectric material for insulating the residue of said second metallic material under each masking residue of said planarization material;
- etching said insulating layer of dielectric material and said masking residue of planarization material until exposing the peaks of said residues of said second metallic material; and
- depositing a third layer of metallic material in electrical continuity with said residue of said second metallic material through the exposed peaks thereof.

4,957,882  
METHOD FOR MANUFACTURING SEMICONDUCTOR DEVICE  
Kohji Shinomiya, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan  
Filed Mar. 8, 1989, Ser. No. 320,498  
Claims priority, application Japan, Nov. 25, 1988, 63-295996  
Int. Cl.<sup>5</sup> H01L 23/15, 31/203  
U.S. Cl. 437—209 8 Claims



1. A method for manufacturing a semiconductor device having a semiconductor chip with a light receiving element disposed in a surface of said semiconductor chip and a light transmission window for protecting said light receiving element, said light transmission window having a first surface facing said light receiving element and a second surface generally parallel to said first surface, said method comprising: applying a first of first and second liquid agents comprising a two-part adhesive to a surface of a semiconductor chip in which is disposed a light receiving element to surround said light receiving element with said first liquid agent; applying the second of said liquid agents of said two-part adhesive to a first surface of a light transmission window at a location corresponding to the first of said liquid agents as applied to said semiconductor chip; fixing said semiconductor chip and said light transmission window to each other by bringing said first and second liquid agents into contact with each other; and molding said semiconductor chip in a resin without obscuring said second surface of said light transmission window with the resin.

4,957,883  
OXYNITRIDE GLASS AND THE FIBER THEREOF  
Junya Kobayashi, Osaka; Masaaki Oota, Fukui; Katsuhiko Kada, and Hiroyoshi Minakuchi, both of Kyoto, all of Japan, assignors to Shimadzu Corporation, Kyoto, Japan  
Continuation-in-part of Ser. No. 190,385, May 5, 1988, abandoned. This application Mar. 6, 1989, Ser. No. 319,484  
Claims priority, application Japan, May 28, 1987, 62-132860; May 28, 1987, 62-132861; Sep. 7, 1987, 62-223391  
Int. Cl.<sup>5</sup> C03C 13/00, 3/062, 3/11  
U.S. Cl. 501—35 8 Claims

1. An oxynitride glass which has Si—M<sub>1</sub>—M<sub>2</sub>—O—N system and contains SiO<sub>2</sub>, Si<sub>3</sub>N<sub>4</sub> and M<sub>1</sub>O in amounts which, as mole %, satisfy the following equations (a) and (b):

$$(\text{SiO}_2 + 3\text{Si}_3\text{N}_4 + \text{M}_1\text{O}) \times 100 / (100 + 2\text{Si}_3\text{N}_4) = 65 \text{ to less than } 100 \quad (a)$$

$$(\text{SiO}_2 + 3\text{Si}_3\text{N}_4) / \text{M}_1\text{O} = 0.7 \text{ to } 2.3 \quad (b)$$

wherein M<sub>1</sub> is Ca, or Ca and Mg; M<sub>2</sub> is at least one of the metals selected from the group consisting of Al, Sr, La, Ba, Y, Ti, Zr, Ce, Na, K, Sb, B, Cr, Pb, V and Sn, said glass containing 0–40 mole % SiO<sub>2</sub>, 26–70 mole % CaO, 0–20 mole % MgO, 15–30 at % N<sub>2</sub> and over O to not more than 22 at % M<sub>2</sub>.

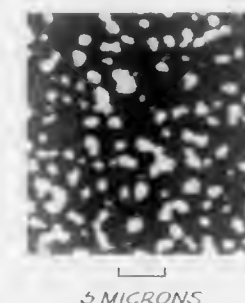
4. An oxynitride fiber which has Si—M<sub>1</sub>—M<sub>2</sub>—O—N system and contains SiO<sub>2</sub>, Si<sub>3</sub>N<sub>4</sub> and M<sub>1</sub>O in amounts which, as mole %, satisfy the following equation (a) and (b):

$$(\text{SiO}_2 + 3\text{Si}_3\text{N}_4 + \text{M}_1\text{O}) \times 100 / (100 + 2\text{Si}_3\text{N}_4) = 65 \text{ to less than } 100 \quad (a)$$

$$(\text{SiO}_2 + 3\text{Si}_3\text{N}_4) / \text{M}_1\text{O} = 0.7 \text{ to } 2.3 \quad (b)$$

wherein M<sub>1</sub> is Ca, or Ca and Mg; M<sub>2</sub> is at least one of the metal selected from the group consisting of Al, Sr, La, Ba, Y, Ti, Zr, Ce, Na, K, Sb, B, Cr, Pb, V and Sn, said glass containing 0–40 mol % SiO<sub>2</sub>, 26–70 mole % CaO, 0–20 mole % MgO, 15–30 at % N<sub>2</sub> and over O to not more than 22 at % M<sub>2</sub>.

4,957,884  
TITANIUM DIBORIDE/BORON CARBIDE COMPOSITES WITH HIGH HARDNESS AND TOUGHNESS  
Arne K. Knudsen, and William Rafaniello, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.  
Continuation-in-part of Ser. No. 43,080, Apr. 27, 1987, abandoned. This application Apr. 15, 1988, Ser. No. 181,852  
Int. Cl.<sup>5</sup> C04G 35/52  
U.S. Cl. 501—87 18 Claims



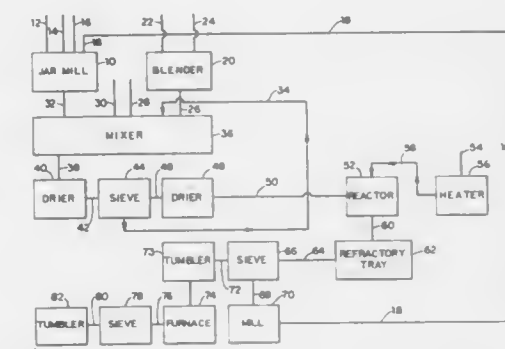
1. A powder composition consisting essentially of an intimate mixture of from more than 1 to about 99 weight percent boron carbide and from about 1 to less than 99 weight percent titanium diboride, the mixture having an average particle diameter of less than about 0.5 micron, the particles being uniformly dispersed such that electron probe analysis X-ray maps show substantially all discrete concentrations of boron carbide and titanium diboride to be less than or equal to about 0.5 micron in diameter.

4,957,885  
PROCESS FOR MAKING A SILICON CARBIDE COMPOSITION  
George T. Hida, Tonawanda, N.Y., assignor to Benchmark Structural Ceramics Corporation, Amherst, N.Y.  
Continuation-in-part of Ser. No. 254,175, Oct. 6, 1988. This application Apr. 14, 1989, Ser. No. 339,137  
The portion of the term of this patent subsequent to Aug. 14, 2007, has been disclaimed.  
Int. Cl.<sup>5</sup> C04B 35/56  
U.S. Cl. 501—89 16 Claims

1. A process for preparing a composite material comprised of silicon carbide comprising the steps of sequentially:

- providing a composite material comprised of from about 39 to about 54 percent of alpha silicon carbide and from about 46 to about 33 percent of alpha alumina, provided that least about 85 percent of such composite material is selected from the group consisting of alpha silicon carbide, alpha alumina, and mixtures thereof, wherein at least about 80 percent of such silicon carbide is comprised of silicon carbide whiskers;
- raising the temperature of said material to a temperature of from about 350 to about 500 degrees centigrade at a rate of from about 15 to about 30 degrees per minute while subjecting said material to a pressure of less than about 150 milliTorr;
- maintaining said material at said temperature of from about 350 to about 500 degrees centigrade for at least

- about 5 minutes while subjecting said material to a pressure of less than about 150 milliTorr;
- raising said material from said temperature of from about 350 to about 500 degrees centigrade to a temperature of from about 1,250 to about 1,350 degrees centigrade at a rate of from about 15 to about 25 degrees per minute while blanketing said material with an atmosphere which consists of inert gas;
- subjecting said material to said temperature of from about 1,250 to about 1,350 degrees centigrade and a pressure of from about 5 to about 15 pounds per square inch for a period of at least about 30 minutes while blanketing said material with an atmosphere consisting of inert gas;



- raising the temperature of said material to from about 1,650 to about 1,750 degrees centigrade at a rate of from about 7 to about 15 degrees per minute while subjecting said material to a pressure of from about 5 to about 15 pounds per square inch and while blanketing said material with an atmosphere consisting of inert gas;
- subjecting said material to said temperature of from about 1,650 to about 1,750 degrees centigrade for from about 30 to about 90 minutes while subjecting said material to a pressure of from about 5 to about 15 pounds per square inch and while blanketing said material with an atmosphere consisting of inert gas; and
- thereafter cooling said material.

4,957,886  
ALUMINUM OXIDE/ALUMINUM OXYNITRIDE/GROUP IVB METAL NITRIDE ABRASIVE PARTICLES DERIVED FROM A SOL-GEL PROCESS  
James P. Mathers; William P. Wood, and Thomas E. Forester, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Division of Ser. No. 183,478, Apr. 15, 1988, Pat. No. 4,855,264, which is a continuation of Ser. No. 932,941, Nov. 20, 1986, abandoned. This application Apr. 21, 1989, Ser. No. 341,802  
Int. Cl.<sup>5</sup> C04B 35/58, 35/10  
U.S. Cl. 501—96 17 Claims

1. A method of preparing a ceramic abrasive particle comprising the steps of Method I:

Method I

- preparing a mixed sol consisting essentially of an alumina precursor, carbon or chemical precursor thereof, at least one of Periodic Group IVB metal oxides or chemical precursors thereof, a water soluble organic compound as carbon stabilizing agent, and alpha-alumina as seeding agent, said components being present in proportions sufficient to provide a ceramic abrasive particle consisting essentially of
- 1 to 99 volume percent alumina oxide,
- 1 to 99 volume percent gamma-aluminum oxynitride, and
- more than 0 up to 50 volume percent of at least one of Periodic Group IVB metal nitrides,

- (b) gelling said mixed sol,  
(c) drying said resulting gelled sol to provide brittle granules,  
(d) optionally, crushing and sieving said granules to provide sized granules,  
(e) calcining said granules at a temperature of about 1400° C. in a nitrogen atmosphere to remove volatile constituents,  
(f) reaction sintering said calcined granules in a nitrogen atmosphere at a temperature of at least 1600° C. to provide the ceramic abrasive particle.

4,957,887

## MAGNESITE-CARBON REFRACTORIES

David J. Michael, White Oak; David A. Kirk, and Leigh F. Brooks, both of Pittsburgh, all of Pa., assignors to Dresser Industries, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 274,387, Nov. 21, 1988. This application Mar. 22, 1990, Ser. No. 497,428

Int. Cl.<sup>5</sup> C04B 35/04, 35/54

U.S. Cl. 501—101

31 Claims

1. A mix for forming a magnesite-carbon refractory comprising from about 8 to 30 wt. % of a high purity carbon consisting of 0-4 wt. % carbon black and the balance graphite, about 0.1 to 1 wt. % of aluminum metal, magnesium metal, or a mixture thereof, and the balance a high purity magnesite, and a carbonaceous bonding agent in an amount sufficient to bond the mix; said magnesite containing at least about 98% MgO and containing less than about 0.03% boron oxide, less than about 0.3% silica, and having a CaO/SiO<sub>2</sub> weight ratio above about 2, and said graphite having a loss on ignition of at least about 98%.

4,957,888

## METHOD OF MANUFACTURING CERAMIC POWDERS HAVING THE PEROVSKITE STRUCTURE

Hans-Wolfgang Brand; Detlef F. K. Hennings, both of Aachen; Mareike K. Klee, Hückelhoven-Brachelen, and Herbert J. Scheinemacher, Aachen, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 10, 1988, Ser. No. 230,647

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1987, 3727396

Int. Cl.<sup>5</sup> C04B 35/46, 35/48

U.S. Cl. 501—134

12 Claims

1. A method of manufacturing a ceramic powder having the perovskite structure, said method comprising forming an aqueous solution consisting essentially of water and at least one alkaline earth metal salt and at least one salt of at least one metal selected from the group consisting of zirconium and titanium, adding a strong organic base, said base being an amine, to said solution to thereby form an aqueous suspension of said salts, heating said suspension at temperatures of from 70° C. to 150° C. to form a powder reaction product, separating out the resultant powder reaction product from said suspension and then removing any water adhering to said separated powder reaction product.

4,957,889

## STABLE INTERCALATED CLAYS AND PREPARATION METHOD

John R. McCauley, Louisville, Md., assignor to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 21,972, Mar. 5, 1987, Ser. No. 154,834, Feb. 26, 1988, and Ser. No. 275,719, Nov. 23, 1988. This application Jan. 31, 1989, Ser. No. 304,319

Int. Cl.<sup>5</sup> B01J 29/04, 21/16, 23/10

U.S. Cl. 502—65

21 Claims

1. Hydrothermally-stable composition comprising an oligomer or polymer of (a) at least one pillaring metal, (b) at least one rare earth element, at least one of (c) oxygen, (d) and a halogen.

18. A catalyst comprising: (i) the composition of claim 1 as the support; and (ii) a catalytically active metal on said support and/or in the pores of said support.

4,957,890

## SURFACE TREATED PERMEABLE INORGANIC MEMBRANES AND METHOD OF MAKING SAME

Larry F. Wieserman; Karl Wefers, both of Apollo; Kathryn Cross, Murrysville; Edward S. Martin, New Kensington; H. Philip Hsieh, and William H. Quayle, both of Murrysville, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

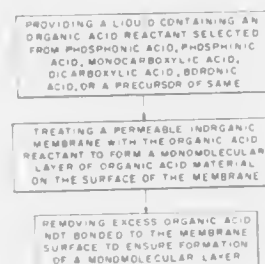
Continuation-in-part of Ser. No. 23,423, Mar. 9, 1987, Pat. No. 4,788,176, which is a continuation-in-part of Ser. No. 946,870, Dec. 29, 1986, abandoned. This application Oct. 31, 1988, Ser. No. 265,241

The portion of the term of this patent subsequent to Nov. 29, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> B01D 71/06, 71/02; B01J 20/28, 20/22

U.S. Cl. 502—4

25 Claims



1. A treated permeable inorganic membrane having a monomolecular layer of an organic material thereon and formed by treating the surface of a permeable inorganic membrane having oxide/hydroxide reactive sites with an organic acid to bond an acid group of the organic acid to the oxide/hydroxide sites on the membrane, the organic acid selected from the group consisting of:

- (a) phosphoric acid having the formula  $RPO(OH)_2$ ;  
(b) phosphinic acid having the formula  $RR'PO(OH)_2$ ; and  
(c) one or more precursors of the foregoing acids which decompose to form the acid functionality; where R comprises a 1-30 carbon-containing group, R' comprises hydrogen or a 1-30 carbon-containing group; and R'' comprises a 2-30 carbon-containing group wherein excess organic acid material not bonded to the underlying membrane surface is removed.

4,957,891

## CATALYST FOR ISOMERIZING ALKYLAROMATICS

Johann W. A. Sachtler, Des Plaines; Randy J. Lawson, Palatine, and Susan L. Lambert, Rolling Meadows, all of Ill., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 281,424, Dec. 8, 1988, Pat. No. 4,886,927, Division of Ser. No. 109,019, Oct. 16, 1987, abandoned. This application Dec. 11, 1989, Ser. No. 448,445

Int. Cl.<sup>5</sup> B01J 29/28

U.S. Cl. 502—61

4 Claims

1. A catalyst for the isomerization of a non-equilibrium C<sub>8</sub>-aromatic mixture containing xylenes and ethylbenzene comprising at least one platinum group metal and a gallium-substituted pentasil zeolite having a ZSM-5 structure in a zirconia-alumina matrix containing from about 1 to 10 wt. % zirconia, the catalyst having a matrix/zeolite weight ratio of 9:1 to 19:1.

4,957,892

## PROCESS FOR COMBUSTING SOLID SULFUR CONTAINING MATERIAL

Jin S. Yoo, Flossmoor, and John A. Jaeger, Homewood, both of Ill., assignors to UOP, Des Plaines, Ill.

Division of Ser. No. 940,619, Dec. 11, 1986, Pat. No. 4,758,418, which is a division of Ser. No. 692,448, Jan. 16, 1985, Pat. No. 4,642,178, which is a division of Ser. No. 494,604, May 16, 1983, Pat. No. 4,995,304, which is a continuation-in-part of Ser. No. 301,678, Sep. 14, 1981, abandoned, which is a

continuation-in-part of Ser. No. 173,315, Jul. 29, 1980, abandoned. This application Apr. 7, 1988, Ser. No. 178,629 The portion of the term of this patent subsequent to Jan. 22, 2002, has been disclaimed.

Int. Cl.<sup>5</sup> B01J 29/00

U.S. Cl. 502—63

29 Claims

1. A composition of matter comprising, in intimate admixture, a major amount of solid particles capable of promoting hydrocarbon conversion at hydrocarbon conversion conditions, said solid particles including at least one crystalline aluminosilicate capable of promoting said hydrocarbon conversion, and a minor amount of discrete entities having a composition different from said solid particles and comprising at least one metal-containing spinel which includes a first metal and at least two different second metals having valences higher than the valence of said first metal, one of said second metals being aluminum, and the other of said second metals being trivalent and selected from the group consisting of iron, chromium, vanadium, manganese, gallium, boron, cobalt and mixtures thereof, the atomic ratio of said first metal to said second metals in said spinel being at least about 0.17 and said spinel having a surface area in the range of about 25 m<sup>2</sup>/gm. to about 600 m<sup>2</sup>/gm.

4,957,893

## CATALYST FOR MAKING AMINES FROM ALCOHOLS

Pak Y. Fong; Kim R. Smith, and Joe D. Sauer, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 133,733, Dec. 16, 1987, which is a continuation-in-part of Ser. No. 22,095, Mar. 5, 1987, abandoned, which is a continuation-in-part of Ser. No. 22,047, Mar. 5, 1987, abandoned, which is a continuation-in-part of Ser. No. 79,522, Jul. 30, 1987, abandoned. This application Jun. 12, 1989, Ser. No. 365,213

Int. Cl.<sup>5</sup> B01J 23/02, 23/06, 23/72, 27/232

U.S. Cl. 502—174

12 Claims

1. A non-colloidal catalyst suitable for catalyzing the reaction of a mono- or di-lower alkylamine with an alcohol thereby alkylating said amine, said catalyst consisting essentially of supported or unsupported copper oxide, zinc oxide, and an alkaline earth metal base selected from the group consisting of barium oxide, barium hydroxide, barium carbonate, calcium hydroxide, calcium carbonate, magnesium hydroxide, magnesium carbonate, and mixtures thereof.

4,957,894

## PROCESS FOR MANUFACTURE OF MALEIC ANHYDRIDE CATALYSTS

Muin S. Haddad, and William S. Eryman, both of Naperville, Ill., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 225,523, Jul. 28, 1988, abandoned. This application Jul. 28, 1989, Ser. No. 387,001

Int. Cl.<sup>5</sup> B01J 27/198, 37/28; C07D 307/34

U.S. Cl. 502—209

15 Claims

1. A process for the manufacture of a catalyst that is suitable for use in the manufacture of maleic anhydride from butane, said catalyst comprising a phosphorus-vanadium mixed oxide, which process comprises reacting in a reaction zone at a temperature of about 0° C. (32° F.) to about 200° C.) a vanadium compound in an organic ether solvent having about 2 to about 10 carbon atoms with a phosphoryl halide in the presence of water or an aliphatic alcohol having from about 1 to about 8 carbon atoms, said reacting being carried out by adding said

phosphoryl halide to said vanadium compound in said organic ether solvent and forming a reaction mixture refluxing said reaction mixture, introducing an oxygen-containing gas into said reaction mixture during said reacting and said refluxing in an amount and at a rate that are sufficient to provide a first atmosphere comprising at least about 0.1 weight percent oxygen, forming a thick syrup, and drying said syrup in a drying zone in a second oxygen-containing atmosphere to form a solid catalytic material, said second atmosphere being maintained by introducing into said drying zone an oxygen-containing gas in an amount and at a rate that are sufficient to provide an atmosphere comprising at least about 0.1 weight percent oxygen.

4,957,895

## HYDROTREATING CATALYST AND PROCESS

Eugene Nebesh, Parma; Robert A. Plundo, Hudson, and Steven L. McMahon, Macedonia, all of Ohio, assignors to The Harshaw Chemical Company, Edison, N.J.

Filed May 23, 1988, Ser. No. 197,455

Int. Cl.<sup>5</sup> B01J 27/12

U.S. Cl. 502—228

32 Claims

1. A hydrotreating catalyst comprising at least one Group VI metal, metal oxide, or metal sulfide, or mixtures thereof, and at least one Group VIII metal, metal oxide, or metal sulfide, or mixtures thereof, supported on a carrier wherein (A) the catalyst comprises from about 10% to about 35% by weight of combined metal, and the atomic ratio of the Group VIII metal to Group VI metal is in the range of from about 0.5:1 to about 2:1; (B) the carrier comprises from about 0.5 to about 10 weight percent of halogen, from about 0.5 to about 5% by weight of silica, and from about 85 to about 99% of alumina; and (C) the catalyst is characterized as having a median pore radius of from about 30 to about 65 Angstroms, and a surface area of from about 115 to about 180 m<sup>2</sup>/g.

4,957,896

## CATALYST FOR PURIFICATION OF EXHAUST GASES

Shinichi Matsumoto; Toru Tanaka, both of Aichi; Yutaka Ishikawa; Shinji Matsuura, both of Shizuoka; Hirofumi Shinjoh, and Masakuni Ozawa, both of Aichi, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha Cataler Industrial Co. Ltd and Kabushiki Kaisha Toyota Chuo Kenkusho, both of Japan

Filed Mar. 15, 1989, Ser. No. 323,691

Claims priority, application Japan, Mar. 24, 1988, 63-70214 Int. Cl.<sup>5</sup> B01J 21/04, 21/06, 23/10, 23/40

U.S. Cl. 502—304

8 Claims

1. A catalyst for purification of exhaust gases comprising: a support substrate; an active alumina coating layer comprising at least one of nickel oxide and cobalt oxide formed on the surface of said support substrate; a composite oxide consisting essentially of cerium oxide and zirconium oxide formed in said active alumina coating layer; and a noble metal catalyst component comprising at least one of platinum, palladium and rhodium loaded on said active alumina coating layer.

4,957,897

## CARBONACEOUS ADSORBENTS FROM PYROLYZED POLYSULFONATED POLYMERS

Stephen G. Maroldo, Harleysville; William R. Betz, Port Matilda, and Noah Borenstein, Oreland, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 150,183, Jan. 29, 1988, Pat. No. 4,839,331. This application Feb. 7, 1989, Ser. No. 307,554

Int. Cl.<sup>5</sup> B01J 20/30, 20/20, 39/24; C01B 31/10

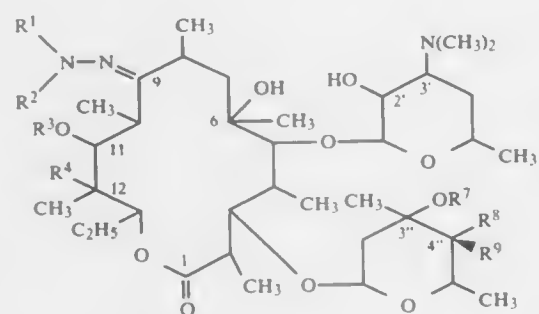
U.S. Cl. 502—432

18 Claims

1. A process for preparing carbonaceous adsorbent particles which comprises pyrolyzing, at a temperature from about 300°







wherein

R<sup>1</sup> is hydrogen or alkyl of up to 6 carbon atoms;  
R<sup>2</sup> is alkyl of 1 to 6 carbon atoms unsubstituted or substituted by heterocycl of 5 or 6 ring members, amino, alkanoylamino of 1 to 6 carbon atoms in the alkyl moiety, mono-, di- or tri-alkylamino of 1 to 6 carbon atoms in each alkyl moiety, hydroxy, alkoxy of 1 to 6 carbon atoms, mercapto, alkylthio of 1 to 6 carbon atoms, heterocyclthio of 5 or 6 ring members, phenylthio, sulphonoyl, carbamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, carboxy or a carboxyl salt or ester, alkanoyloxy of 1 to 6 carbon atoms in the alkyl moiety, phenylcarbonyloxy, heterocyclcarbonyloxy of 5 or 6 ring members, acyl, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms or phenyl or naphthyl; or R<sup>2</sup> is phenyl or naphthyl which is unsubstituted or substituted by up to three substituents selected from the group consisting of heterocycl of 5 or 6 ring members, amino, alkanoylamino of 1 to 6 carbon atoms in the alkyl moiety, mono-, di- or tri-alkylamino of 1 to 6 carbon atoms in each alkyl moiety, hydroxy, alkoxy of 1 to 6 carbon atoms, mercapto, alkylthio of 1 to 6 carbon atoms, heterocyclthio of 5 or 6 ring members, phenylthio, sulphonoyl, carbamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, carboxy or a carboxyl salt or ester, alkanoyloxy of 1 to 6 carbon atoms in the alkyl moiety, phenylcarbonyloxy, heterocyclcarbonyloxy of 5 or 6 ring members, acyl, halo, alkyl of 1 to 6 carbon atoms, phenyl, alkoxy of 1 to 6 carbon atoms, haloalkyl of 1 to 6 carbon atoms, hydroxy, amino, nitro, carboxy, alkoxy carbonyl of 1 to 6 carbon atoms, alkoxy carbonylalkyl of 1 to 6 carbon atoms in each of the alkoxy and alkyl moieties, alkanoyloxy of 1 to 6 carbon atoms in the alkyl moiety or alkanoyl of 1 to 6 carbon atoms in the alkyl moiety; or R<sup>2</sup> is heterocycl of 5 or 6 ring members;  
R<sup>3</sup> is hydrogen;  
R<sup>4</sup> is hydrogen or hydroxy;

or  
R<sup>1</sup> and R<sup>2</sup> together are straight-chain alkylene or alkenylene of 3 to 6 carbon atoms; or  
R<sup>1</sup> and R<sup>3</sup> together are methylene unsubstituted or substituted by alkyl of 1 to 6 carbon atoms, phenyl, naphthyl, furyl, pyranil, thienyl, dihydropyranil, or tetrahydrofuryl; or  
OR<sup>3</sup> and R<sup>4</sup> together are carbonate; and  
R<sup>7</sup> is hydrogen or methyl;

one of R<sup>8</sup> and R<sup>9</sup> hydrogen, hydroxy, alkoxy of 1 to 6 carbon atoms, alkanoyloxy of 1 to 6 carbon atoms in the alkoxy moiety, amino, or a group of the formula R<sup>4</sup>-SO<sub>2</sub>-O-, in which R<sup>4</sup> is a hydrocarbon, oxahydrocarbon, thiahydrocarbon or azahydrocarbon wherein the hydrocarbon is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms, phenyl, nitrophenyl, halophenyl, alkylphenyl, benzyl, nitrobenzyl, alkylbenzyl, phenoxyalkyl, nitrophenoxyalkyl or R<sup>6</sup>-CH<sub>2</sub>CH<sub>2</sub>- wherein R<sup>6</sup> is amino, carbamoyl, sulphonoyl, alkoxy or alkylthio and wherein each of the above alkyl and alkoxy moieties is of 1 to 6 carbon atoms; and the other of R<sup>8</sup> and R<sup>9</sup> is hydrogen, or R<sup>8</sup> and R<sup>9</sup> together are oxo, oxime, or acetyloxime, in combination

with a pharmaceutically acceptable carrier, in combination with a pharmaceutically acceptable carrier.

4,957,906

#### PHARMACEUTICAL COMPOSITIONS CONTAINING A DERIVATIVE OF PARA-AMINOBENZOIC ACID AS AN ACTIVE INGREDIENT

Chikao Yoshikumi, Tokyo; Yoshio Ohmura, Chiba; Fumio Hirose, Tokyo; Masanori Ikuzawa, Tokyo; Kenichi Matsunaga, Tokyo; Takayoshi Fujii, Tokyo; Minoru Ohhara, Tokyo, and Takao Ando, Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 879,508, Jun. 27, 1986, abandoned, which is a continuation of Ser. No. 686,415, Dec. 26, 1984, abandoned, which is a continuation of Ser. No. 352,858, Feb. 26, 1982, Pat. No. 4,569,842, which is a division of Ser. No. 81,190, Oct. 2, 1979, Pat. No. 4,322,408. This application Feb. 26, 1988, Ser. No. 163,204

Claims priority, application Japan, Apr. 11, 1978, 53-42576; May 26, 1978, 53-63146; Dec. 29, 1978, 53-161385; Dec. 29, 1978, 53-161386

The portion of the term of this patent subsequent to Apr. 19, 2000, has been disclaimed.

Int. Cl. A61K 31/70

U.S. Cl. 514-42

7 Claims

1. A pharmaceutical composition for parenteral administration in dosage unit form comprising 0.1 to 100 mg/kg body weight/day of p-aminobenzoic acid-N-D-mannoside, or a pharmaceutically acceptable salt thereof, effective for the treatment of tumor, and a pharmaceutically acceptable carrier.

4,957,907

#### PROCESS FOR PREPARATION OF ALOE PRODUCTS

Bill H. McAnalley, Grand Prairie, Tex., assignor to Carrington Laboratories Inc., Irving, Tex.  
Continuation of Ser. No. 144,872, Jan. 14, 1988, Pat. No. 4,851,224, which is a continuation-in-part of Ser. No. 869,261, Jun. 5, 1986, Pat. No. 4,735,935, which is a continuation-in-part of Ser. No. 810,025, Dec. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 754,859, Jul. 14, 1985, abandoned, which is a continuation-in-part of Ser. No. 750,321, Jun. 28, 1985, abandoned, which is a continuation-in-part of Ser. No. 649,967, Sep. 12, 1984, abandoned, which is a continuation of Ser. No. 375,720, May 7, 1982, abandoned. This application Jan. 25, 1989, Ser. No. 301,986

Int. Cl. A61K 31/715

U.S. Cl. 514-54

11 Claims

1. Process for extracting from the aloe plant a substantially non-degradable lyophilized polymer of linear β (1→4)-D-mannosyl units wherein randomly interspersed acetyl groups are linked to the polymer through an oxygen atom and wherein D-galactopyranose is linked to the polymer through an α (2→6) linkage at a ratio of about one D-galactopyranose residue per seventy monomer units, comprising:

- washing an aloe leaf in a bactericidal solution to remove substantially all surface dirt and bacteria;
- removing at least a first end portion from said washed leaf;
- removing rind and any remaining anthraquinone-rich sap from said leaf to produce a substantially anthraquinone-free aloe gel fillet;
- grinding and homogenizing said substantially anthraquinone-free aloe gel to produce substantially anthraquinone-free aloe juice having solubilized matter;
- filtering said ground and homogenized aloe juice to remove fibrous material;
- adjusting the pH of said aloe juice of from about 3.00 to about 3.50;
- adding a water-soluble, lower aliphatic polar solvent to the aloe juice to precipitate the active chemical substance and thereby to form a heterogeneous solution containing soluble contaminants;
- removing the water soluble, lower aliphatic polar solvent

and the solubilized matter from the heterogeneous solution to isolate the precipitated active chemical substance; and  
(i) drying the precipitated active chemical substance.

4,957,908

#### CHITOSAN PYRITHIONE AS ANTIMICROBIAL AGENT USEFUL IN PERSONAL CARE PRODUCTS

John D. Nelson, Naugatuck, Conn., assignor to Olin Corporation, Cheshire, Conn.

Filed Jan. 8, 1990, Ser. No. 461,720

Int. Cl. A61K 31/00; C07D 211/00, 213/00; C08B 37/00  
U.S. Cl. 514-55

5 Claims

4. The process of claim 3 wherein said chitosan pyrithione has a molecular weight of between about 150,000 and about 500,000.

4,957,909

#### BENZOBICYCLOALKANE DERIVATIVES AS ANTICONVULSANT NEUROPROTECTIVE AGENTS

Magid A. Abou-Gharbia, Glen Mills, Pa., and Ronald R. Notvest, Jamesburg, N.J., assignors to American Home Products Corporation, New York, N.Y.

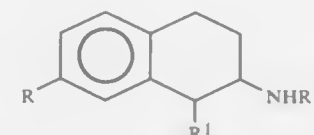
Division of Ser. No. 347,538, May 4, 1989, Pat. No. 4,924,008. This application Jan. 2, 1990, Ser. No. 459,874

Int. Cl. A61K 31/66

U.S. Cl. 514-75

7 Claims

1. A process for preventing convulsions and neurodegenerative disorders induced by overstimulation of excitatory amino acid receptors, which comprises administering to a mammal suffering from such convulsions or neurodegenerative disorders, an anticonvulsant, neuroprotective amount of an NMDA antagonist of the formula:



(CH<sub>2</sub>)<sub>n</sub>

where

R is hydrogen, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, hydroxy, alkanoyloxy of 2 to 6 carbon atoms, phenylalkoxy having 1 to 6 carbon atoms in the alkoxy moiety, halo or trifluoromethyl;  
R<sup>1</sup> is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms or phenylalkyl having 1 to 6 carbon atoms in the alkyl moiety;  
R<sup>2</sup> is hydrogen, alkyl of 1 to 6 carbon atoms, phenylalkyl having 1 to 6 carbon atoms in the alkyl moiety, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 atoms, thienylalkyl having 1 to 6 carbon atoms in the alkyl moiety or furylalkyl having 1 to 6 carbon atoms in the alkyl moiety;

and

n is one of the integers 2, 3, 4, 5 or 6;  
or a pharmaceutically acceptable salt thereof.

4,957,910

#### METHOD AND COMPOSITION FOR THE TREATMENT AND PREVENTION OF VIRAL INFECTIONS

Peter M. Sutton, Manderley; Anthony Atkinson, Twingley, and Graham Lloyd, East Gomeldon, all of England, assignors to Public Health Laboratory Service Board, London, England  
Filed Mar. 8, 1988, Ser. No. 165,300

Claims priority, application United Kingdom, Mar. 17, 1987, 8706313

Int. Cl. A61K 31/56

U.S. Cl. 514-182

14 Claims

1. A method for the treatment of patients infected with

4,957,911

#### BENZAZECINE DERIVATIVES FOR COGNITIVE AND MEMORY FUNCTIONS

Werner Aschwanden, Ettingen; René Imhof, Gipf-Oberfrick, both of Switzerland; Roland Jakob, Inzlingen, Fed. Rep. of Germany, and Emilio Kyburz, Reinach, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 154,760, Feb. 11, 1988, Pat. No. 4,876,340, which is a division of Ser. No. 121,987, Nov. 18, 1987, Pat. No. 4,749,791, which is a division of Ser. No. 5,712, Jan. 21, 1987, Pat. No. 4,732,979. This application Aug. 17, 1989, Ser. No. 395,380

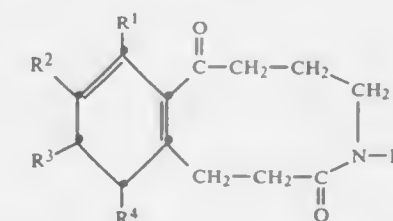
Claims priority, application Switzerland, Jan. 23, 1986, 266/86

Int. Cl. A61K 31/395; C07P 227/08

U.S. Cl. 514-183

4 Claims

1. A pharmaceutical composition which comprises a compound of the formula



wherein R<sup>1</sup> and R<sup>2</sup> are independently hydrogen or chlorine, R<sup>3</sup> is hydrogen, fluorine, chlorine, bromine or methoxy, R<sup>4</sup> is hydrogen, chlorine or methoxy, and R<sup>5</sup> is hydrogen, acetyl, propionyl, benzoyl, chlorobenzoyl, methoxybenzoyl or phenylacetyl, with the proviso that 2 or 3 of the groups R<sup>1</sup> to R<sup>4</sup> are hydrogen, and a therapeutically inert excipient.

4. A method of controlling cerebral insufficiency, comprising administering to a mammal an effective amount of a compound selected from the group consisting of  
4-acetyl-8-chloro-1,2,3,4,5,6-hexahydrobenzo[f]-quinoline;  
4-acetyl-10-chloro-1,2,3,4,5,6-hexahydrobenzo[f]-quinoline  
and  
8-chloro-4-(p-chlorobenzoyl)-1,2,3,4,5,6-hexahydrobenzo[f]-quinoline.

4,957,912

#### 7 ACYLAMIDOCARBACEPHEM ANTIBACTERIAL AGENTS

Burton G. Christensen, Scotch Plains, Ronald W. Ratcliffe, Matawan, both of N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 644,075, Aug. 24, 1984, abandoned, which is a continuation of Ser. No. 320,791, Nov. 12, 1981, abandoned, which is a continuation of Ser. No. 137,678, Apr. 7, 1980, abandoned, which is a division of Ser. No. 47,593, Jun. 8, 1979, Pat. No. 4,226,866, which is a continuation of Ser. No. 869,199, Jan. 13, 1978, abandoned, which is a continuation of Ser. No. 587,526, Jun. 16, 1975, abandoned, which is a continuation-in-part of Ser. No. 395,662, Sep. 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 303,905, Nov. 6, 1972, abandoned. This application Dec. 23, 1985, Ser. No. 812,497

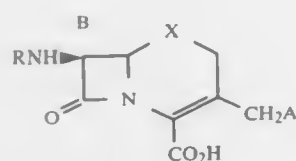
Int. Cl. C07D 471/04, 498/053, 487/04; A61K 31/545

U.S. Cl. 514-210

18 Claims

1. A compound of the formula:





and its isomers wherein R is a carboxylic acyl radical, B is H, OCH<sub>3</sub>, CH<sub>3</sub> or SR" wherein R" is lower alkyl of 1-6 carbons and phenyl; A is hydrogen, azido, halo, cyano, quaternary ammonium, hydroxy, carbamoyloxy, N-lower alkyl carbamoyloxy, N,N-di-lower alkyl carbamoyloxy, amino, mercapto, lower alkylthio, lower alkanoyloxy, aroyloxy or a 5-membered heterocyclic thio radical selected from the group consisting of 1-methyltetrazolylthio and 2-methyl-1,3,4-thiadiazolylthio, and X is the divalent radical —CH<sub>2</sub>—, and non-toxic pharmacologically acceptable salts, esters and amides thereof.

18. A method of treating bacterial infections in animals or humans comprising administering an antibacterially effective amount of a compound according to claim 1 together with a pharmaceutically acceptable carrier therefor.

4,957,913

## ANTIHYPERTENSIVE POLYCYCLIC IMIDES

Magid A. Abou-Gharbia, Glen Mills; Gary P. Stack, Merion, and Rodney W. Lappe, Phoenixville, all of Pa., assignors to American Home Products Corp., New York, N.Y.

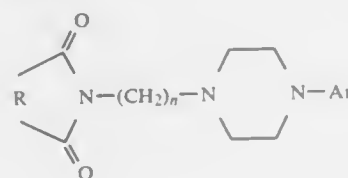
Filed Nov. 22, 1989, Ser. No. 440,573

Int. Cl.<sup>5</sup> A61K 31/50, 31/55

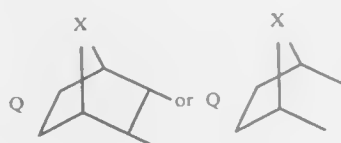
U.S. Cl. 514—216

10 Claims

1. A method for lowering blood pressure which comprises administering to a hypertensive mammal, an antihypertensive amount of a compound of the formula:

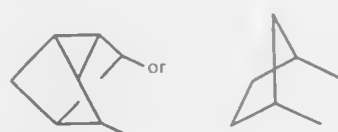


wherein  
R is



in which

X is methylene, ethylene or ethylidene and Q is alkylene of 1 to 4 carbon atoms, alkylidene of 2 to 4 carbon atoms, or Q is



in which the dotted line represents optional unsaturation; n is one of the integers 2, 3 or 4;

Ar is phenyl or phenyl substituted with halo, trifluoromethyl or alkoxy of 1 to 3 carbon atoms, or Ar is 2-pyrimidinyl or

halopyrimidin-2-yl, 2-pyrazinyl, or halo-pyrazin-2-yl, 2-pyridinyl, cyanopyridin-2-yl or halopyridin-2-yl; or a pharmaceutically acceptable salt thereof.

4,957,914

## 1,9-ALKANO-BRIDGED-2,3,4,5-TETRAHYDRO-1H-3-BENZAZEPINES

Robin D. Clark, Palo Alto; Jacob Berger, Los Altos Hills, and Klaus K. Weinhardt, San Francisco, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

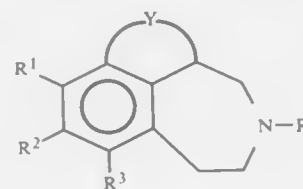
Division of Ser. No. 50,977, May 15, 1987, abandoned. This application Aug. 12, 1988, Ser. No. 231,818

Int. Cl.<sup>5</sup> C07D 223/16, 223/32, 223/18; A61K 31/55

U.S. Cl. 514—217

29 Claims

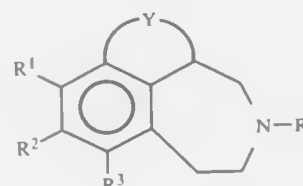
1. A compound represented by the formula:



wherein:

R is selected from the group consisting of hydrogen, cyano, lower alkyl, lower alkenyl, and aralkyl; each of R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> is independently selected from the group consisting of: hydrogen, hydroxy, halo, trifluoromethyl, nitro, lower alkoxy, lower alkyl, and lower alkylthio; and Y is lower alkylene having from two to four carbon atoms; or a pharmaceutically acceptable salt thereof.

26. A method of treating depression, anxiety or hypertension in mammals, which comprises administering to a mammal suffering therewith a therapeutically effective amount of a compound represented by the formula:



wherein:

R is selected from the group consisting of hydrogen, cyano, lower alkyl, lower alkenyl, and aralkyl; each of R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> is independently selected from the group consisting of: hydrogen, hydroxy, halo, trifluoromethyl, nitro, lower alkoxy, lower alkyl, and lower alkylthio; and Y is lower alkylene having from two to four carbon atoms; or a pharmaceutically acceptable salt thereof.

4,957,915

## BENZODIAZEPINE ANALOGS

Sun H. Kim, Chestnut Hill, and John E. Taylor, Upton, both of Mass., assignors to Biomeasure, Inc., Hopkinton, Mass.

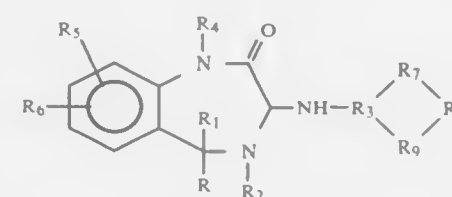
Filed Feb. 27, 1989, Ser. No. 316,463

Int. Cl.<sup>5</sup> C07D 243/14; A61K 31/55

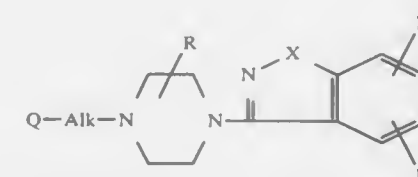
U.S. Cl. 514—221

13 Claims

1. A benzodiazepine of the formula:



(1)



(1)

where:

R represents H, alkyl, alkenyl, cycloalkyl or cycloalkenyl, each with up to 8 carbon atoms; phenylalkyl with an alkylene chain of 1 to 3 carbon atoms and optionally substituted on the phenyl radical with one or two substituents each selected from the group consisting of Cl, Br, F, CN, CF<sub>3</sub>, NO<sub>2</sub>, lower alkyl, and OCH<sub>3</sub>; or represents a phenyl radical which is optionally substituted with one or two substituents selected from the group consisting of Cl, F, Br, CN, I, CF<sub>3</sub>, NO<sub>2</sub>, lower alkyl, and OCH<sub>3</sub>, or represents a 5-membered or 6-membered heterocyclic radical with 1 or 2 heteroatoms from the group consisting of O, N and S;

R<sub>1</sub> represents H or, together with R<sub>2</sub>, forms a bond;

R<sub>2</sub> and R<sub>4</sub> independently of one another represent H or an alkyl radical with 1 to 6 carbon atoms, or represent a phenylalkyl radical with an alkyl chain of 1 to 3 carbon atoms and optionally substituted on the phenyl radical with one or two substituents each selected from the group consisting of Cl, Br, F, CN, CF<sub>3</sub>, NO<sub>2</sub>, lower alkyl, and OCH<sub>3</sub>;

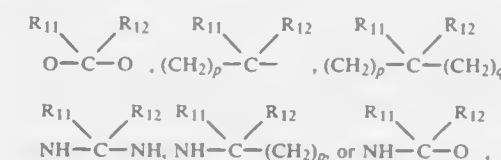
R<sub>2</sub> together with R<sub>1</sub>, forms a bond;

R<sub>5</sub> and R<sub>6</sub> independently of one another represent H, Cl, Br, F, CN, CF<sub>3</sub>, NO<sub>2</sub>, lower alkyl, or OCH<sub>3</sub>;

R<sub>3</sub> is (CH<sub>2</sub>)<sub>n</sub>CH where n is between 0 and 5 inclusive; or (CH<sub>2</sub>)<sub>n</sub>CR<sub>14</sub>—CR<sub>14</sub>; wherein R<sub>14</sub>=H or about

R<sub>7</sub> and R<sub>9</sub> are independently CH<sub>2</sub> or C=O;

R<sub>8</sub> is



p and q are independently between 0 and 4 and the sum of p and q is 4 or less;

m is between 2 and 4 inclusive; and

R<sub>11</sub> and R<sub>12</sub> are independently 4 or a lower alkyl of between 1 and 5 carbon atoms.

10. A method for treating a disorder in learning or memory which comprises administering to a patient in need thereof an amount effective therefore of the compound of claim 1.

4,957,916

## ANTIPSYCHOTIC 3-PIPERAZINYL-BENZAZOLE DERIVATIVES

Ludo E. J. Kennis, Turnhout; Jan Vandenberck, Beerse, and Josephus C. Mertens, Turnhout, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Continuation-in-part of Ser. No. 228,417, Aug. 5, 1988, abandoned. This application Jun. 14, 1989, Ser. No. 366,103

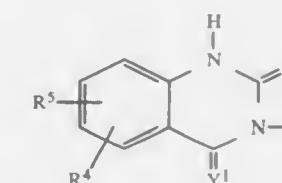
Int. Cl.<sup>5</sup> A61K 31/495; C07D 403/14, 413/14, 417/14

U.S. Cl. 514—254

15 Claims

1. A chemical compound having the formula

A pharmaceutically acceptable acid addition salt form thereof or a stereochemically isomeric form thereof, wherein R is hydrogen or C<sub>1</sub>-alkyl; R<sup>1</sup> and R<sup>2</sup> each independently are hydrogen, halo, hydroxy, C<sub>1</sub>-alkyloxy or C<sub>1</sub>-alkyl; X is O, S or NR<sup>3</sup>; said R<sup>3</sup> being hydrogen, C<sub>1</sub>-alkyl, aryl or arylC<sub>1</sub>-alkyl; Alk is C<sub>1</sub>-alkanediyl; and Q is a radical of formula



(a)

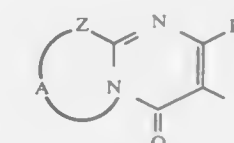
wherein

Y<sup>1</sup> and Y<sup>2</sup> each independently are O or S;

R<sup>4</sup> is hydrogen, halo, C<sub>1</sub>-alkyl, C<sub>1</sub>-alkyloxy, trifluoromethyl, nitro, cyano, hydroxy, (C<sub>1</sub>-10alkylcarbonyl)oxy, amino, mono- and di(C<sub>1</sub>-alkyl)amino, (C<sub>1</sub>-10alkylcarbonyl)amino, phenylmethoxy or azido;

R<sup>5</sup> is hydrogen or halo; or

Q is a radical of formula



(b)

wherein

R<sup>6</sup> is hydrogen or C<sub>1</sub>-alkyl;

Z is —S— or —CR<sup>7</sup>—CR<sup>8</sup>—; said R<sup>7</sup> and R<sup>8</sup> each independently being hydrogen or C<sub>1</sub>-alkyl; or Z is —CH<sub>2</sub>— wherein one hydrogen atom may be replaced by hydroxy or C<sub>1</sub>-alkyl;

A is a bivalent radical —CH<sub>2</sub>—CH<sub>2</sub>— or —CH<sub>2</sub>—CH<sub>2</sub>—CH<sub>2</sub>— wherein in the latter two radicals one or two hydrogen atoms may be replaced by C<sub>1</sub>-alkyl; or A is a bivalent radical —CR<sup>9</sup>—CR<sup>10</sup>—, wherein R<sup>9</sup> and R<sup>10</sup> each independently are hydrogen, halo, amino or C<sub>1</sub>-alkyl; or when Z is —S— then A may also be —CR<sup>11</sup>—=N—, R<sup>11</sup> being hydrogen or C<sub>1</sub>-alkyl; or when Z is —CR<sup>7</sup>—CR<sup>8</sup>—, then A also may be —O—; and

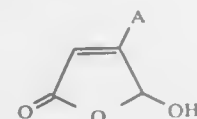
each aryl is phenyl optionally substituted with up to three substituents independently selected from C<sub>1</sub>-alkyl, C<sub>1</sub>-alkyloxy, hydroxy, halo, amino, nitro and trifluoromethyl.

11. A method of treating warm-blooded animals suffering from psychotic diseases comprising the administration to said warm-blooded animals of an antipsychotically effective amount of a chemical compound as claimed in claim 1.

4,957,917  
ANTI-INFLAMMATORY FURANONES  
Gary C. M. Lee, Laguna Hills, Calif., assignor to Allergan, Inc.,  
Irvine, Calif.

Filed Oct. 25, 1989, Ser. No. 427,201  
Int. Cl.<sup>5</sup> A61K 31/34; C07D 307/28  
U.S. Cl. 514—231.5

1. A compound of the formula:



in which:

A is  $-\text{CH}(\text{OCOR}_1)\text{CH}_2\text{CO}-\text{Y}$ ,  $-\text{CH}=\text{C}(\text{R}_2)-\text{R}$ ,  $-\text{CH}=\text{CHCO}-\text{Z}$ ,  $-\text{CH}=\text{C}(\text{R}_3)-\text{CO}_2\text{R}$ ,  $-\text{C}=\text{CR}_4$ ,  $-\text{CH}=\text{CH}(\text{CH}_2)_n\text{OX}$  or  $-\text{CH}(\text{OH})\text{CH}_2\text{CO}-\text{Y}$ ; R is  $\text{C}_1-\text{C}_{14}$  alkyl;  $\text{R}_1$  is  $\text{C}_1-\text{C}_4$  alkyl or  $\text{NHR}_7$ ;  $\text{R}_7$  is H, phenyl or  $\text{C}_1-\text{C}_4$  alkyl;  $\text{R}_2$  is halogen or  $\text{CO}_2\text{R}_5$ ;  $\text{R}_3$  is hydrogen or  $\text{CO}_2\text{H}$ ;  $\text{R}_4$  is  $\text{C}_7-\text{C}_{14}$  alkyl, phenyl,  $(\text{CH}_2)_m\text{OX}$  or  $(\text{CH}_2)_n\text{CO}_2\text{R}_5$ ;  $\text{R}_5$  is  $\text{C}_1-\text{C}_4$  alkyl; m is 4-8; n is 7-14; and X is hydrogen, acetyl,  $\text{PO}(\text{OH})_2$ ,  $\text{CO}(\text{CH}_2)_3\text{N}(\text{R}_1)_2$  or  $\text{CO}(\text{CH}_2)_3\text{N}(\text{R}_1)_2\text{HCl}$  or another pharmaceutically acceptable salt; Y is  $\text{O}-\text{C}_7-\text{C}_{14}$  alkyl or  $\text{NHR}_6$ ; Z is  $\text{C}_7-\text{C}_{14}$  alkyl, morpholine, N-methylpiperazine or  $\text{NHR}_6$ ; and  $\text{R}_6$  is  $\text{C}_7-\text{C}_{14}$  alkyl, phenylethyl,  $\text{NR}_8(\text{CH}_2)_n\text{N}(\text{R}_9)_3$ ,  $\text{NR}_8(\text{CH}_2)_n\text{N}(\text{R}_9)_3\text{HCl}$  or  $\text{NR}_8(\text{CH}_2)_n\text{CO}_2\text{H}$ ;  $\text{R}_8$  is H,  $\text{C}_1-\text{C}_3$  alkyl; n is 1-8; and  $\text{R}_9$  is H or  $\text{C}_1-\text{C}_3$  alkyl.

4,957,918  
TOPICAL TREATMENT OF BLEPHARITIS  
Neil F. Martin, Silver Spring, and Howard N. Robinson, Luther-  
ville, both of Md., assignors to Leonard Bloom and Marvin S.  
Towsend, both of Towson, Md., a part interest  
Filed Jun. 9, 1988, Ser. No. 204,547  
Int. Cl.<sup>5</sup> A61K 31/415, 31/535

U.S. Cl. 514—235.8

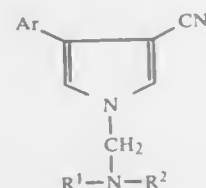
13 Claims  
1. A pharmaceutical composition, comprising:  
an amount of metronidazole effective to treat blepharitis and  
blepharoconjunctivitis in an animal or human patient; and  
a carrier for said metronidazole compound, said carrier  
suitable for topical application to ocular tissues, wherein  
said carrier includes an artificial tear composition.

4,957,919  
1-AMINOMETHYL-3-ARYL-4-CYANO-PYRROLES AND  
USE AS FUNGICIDES  
Detlef Wollweber, Wuppertal; Wolfgang Krämer, Burscheid;  
Wilhelm Brandes, Leichlingen; Stefan Dutzmann, Duessel-  
dorf, and Gerd Hänssler, Leverkusen, all of Fed. Rep. of  
Germany, assignors to Bayer Aktiengesellschaft, Leverkusen,  
Fed. Rep. of Germany

Division of Ser. No. 363,015, Jun. 8, 1989, Pat. No. 4,923,883,  
which is a division of Ser. No. 147,466, Jan. 25, 1988, Pat. No.  
4,914,122. This application Jan. 12, 1990, Ser. No. 464,463  
Claims priority, application Fed. Rep. of Germany, Jan. 31,  
1987, 3702852

Int. Cl.<sup>5</sup> A61K 31/38, 31/40; C07D 417/12, 413/12  
U.S. Cl. 514—237.2

1. A 1-aminomethyl-3-aryl-4-cyanopyrrole of the formula



in which

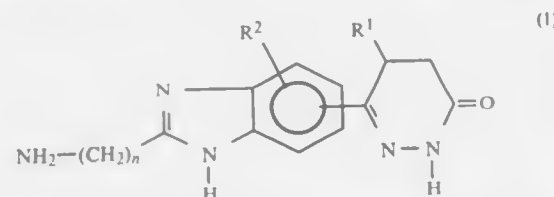
Ar represents optionally substituted phenyl,  
 $\text{R}^1$  represents optionally substituted alkyl, represents alke-  
nyl, alkynyl or cycloalkyl, or represents in each case  
optionally substituted aralkyl or aryl, and  
 $\text{R}^2$  represents in each case optionally substituted heterocyc-  
lylalkyl, heterocyclylalkenyl, heterocyclylalkynyl or  
heterocyclyl, where heterocyclyl in each case represents a  
morpholine or thiomorpholine radical.

10. A fungicidal composition comprising a fungicidally  
effective amount of a 1-aminomethyl-3-aryl-4-cyano-pyrrole  
according to claim 1 and a diluent.

4,957,920  
BENZIMIDAZOLES, AND PHARMACEUTICAL  
PREPARATIONS CONTAINING THESE COMPOUNDS  
Peter Mörsdorf, Langenzenn; Helmut Schickaneder, Eckental;  
Rolf Herter, Schwabach; Volker Pfahler, Nuremberg; Hei-  
drun Engler, Cadolzburg, and Kurt H. Ahrens, Nuremberg, all  
of Fed. Rep. of Germany, assignors to Heumann Pharma  
GmbH & Co., Nuremberg, Fed. Rep. of Germany  
Filed Mar. 15, 1988, Ser. No. 168,273  
Claims priority, application Fed. Rep. of Germany, Oct. 8,  
1987, 3734083

Int. Cl.<sup>5</sup> C07D 401/14; A61K 31/50  
U.S. Cl. 514—252

1. Benzimidazoles corresponding to the formula I



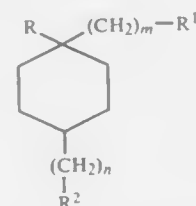
wherein the pyridazinone ring is attached in the 5- or 6-posi-  
tion of the benzimidazole ring and  $\text{R}^1$  stands for a hydrogen  
atom or a straight chained or branched  $\text{C}_1$  to  $\text{C}_4$  alkyl group,  
 $\text{R}^2$  stands for a hydrogen atom, a straight chained or branched  
 $\text{C}_1$  to  $\text{C}_4$  alkyl group, a  $\text{C}_1$  to  $\text{C}_4$  alkoxy group, a hydroxy  
group, a halogen atom, an amino group or a nitro group, and  
wherein n stands for an integer with a value from 1 to 6, and  
the pharmaceutically acceptable salts thereof.

4,957,921  
SUBSTITUTED CYCLOHEXANOLS AS CENTRAL  
NERVOUS SYSTEM AGENTS  
Bradley W. Caprathe, Redford; Juan C. Jaen, Plymouth; Sarah  
J. Smith, and Lawrence D. Wise, both of Ann Arbor, all of  
Mich., assignors to Warner-Lambert Company, Morris  
Plains, N.J.

Filed Dec. 6, 1989, Ser. No. 446,901  
Int. Cl.<sup>5</sup> A61K 31/495, 31/44, 31/445, 31/505; C07D 401/14,  
409/14

U.S. Cl. 514—252

1. A compound of Formula I



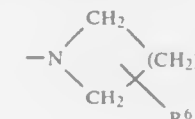
wherein

R is  $-\text{OR}^3$ , wherein  $\text{R}^3$  is hydrogen, lower alkyl, phenyl  
lower alkyl, phenyl lower alkyl substituted by one to four

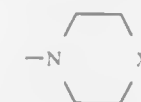
substituents selected from the group consisting of lower  
alkyl, lower alkoxy, lower thioalkoxy, halogen and triflu-  
oromethyl, lower alkanoyl, phenylcarbonyl, phenylcarbo-  
nyl substituted by one to four substituents selected from  
the group consisting of lower alkyl, lower alkoxy, lower  
thioalkoxy, halogen and trifluoromethyl, or phenyl lower  
alkanoyl, phenyl lower alkanoyl substituted by one to four  
substituents selected from the group consisting of lower  
alkyl, lower alkoxy, lower thioalkoxy, halogen and triflu-  
oromethyl,



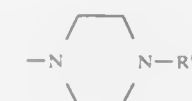
wherein  $\text{R}^4$  and  $\text{R}^5$  are each independently hydrogen,  
lower alkyl, phenyl, phenyl substituted by one to four  
substituents selected from the group consisting of lower  
alkyl, lower alkoxy, lower thioalkoxy, halogen and triflu-  
oromethyl, phenyl lower alkyl, phenyl lower alkyl substi-  
tuted by one to four substituents selected from the group  
consisting of lower alkyl, lower alkoxy, lower thioalkoxy,  
halogen and trifluoromethyl, lower alkanoyl, phenyl  
lower alkanoyl, phenyl lower alkanoyl substituted by one  
to four substituents selected from the group consisting of  
lower alkyl, lower alkoxy, lower thioalkoxy, halogen and  
trifluoromethyl, phenylcarbonyl, phenylcarbonyl substi-  
tuted by one to four substituents selected from the group  
consisting of lower alkyl, lower alkoxy, lower thioalkoxy,  
halogen and trifluoromethyl, or  $\text{R}^4$  and  $\text{R}^5$  are taken  
together with the nitrogen atom to which they are at-  
tached to form a ring denoted by



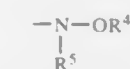
wherein p is zero or an integer from 1 to 4 and  $\text{R}^6$  is  
hydrogen or lower alkyl,



wherein X is oxygen or sulfur or

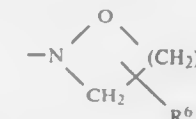


wherein  $\text{R}^6$  is as defined above, or



wherein  $\text{R}^4$  and  $\text{R}^5$  are each independently hydrogen,  
lower alkyl, phenyl, phenyl substituted by one to four  
substituents selected from the group consisting of lower  
alkyl, lower alkoxy, lower thioalkoxy, halogen and triflu-  
oromethyl, phenyl lower alkyl, phenyl lower alkyl substi-  
tuted by one to four substituents selected from the group  
consisting of lower alkyl, lower alkoxy, lower thioalkoxy,  
halogen and trifluoromethyl, lower alkanoyl, phenyl  
lower alkanoyl, phenyl lower alkanoyl substituted by one  
to four substituents selected from the group consisting of  
lower alkyl, lower alkoxy, lower thioalkoxy, halogen and

trifluoromethyl, phenylcarbonyl, phenylcarbonyl substi-  
tuted by one to four substituents selected from the group  
consisting of lower alkyl, lower alkoxy, lower thioalkoxy,  
halogen and trifluoromethyl, or  $\text{R}^4$  and  $\text{R}^5$  are taken to-  
gether with the oxygen and nitrogen atoms to which they  
are attached to form a ring denoted by

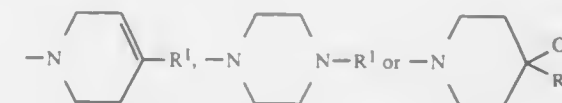


wherein q is an integer from 2 to 3 and  $\text{R}^6$  is as defined  
above;

m is zero or an integer from 1 to 2;

$\text{R}^1$  is phenyl, phenyl substituted by one to four substituents  
selected from the group consisting of lower alkyl, lower  
alkoxy, lower thioalkoxy, halogen and trifluoromethyl, 2-,  
3-, or 4-pyridinyl or 2-, 3-, or 4-pyridinyl substituted by  
lower alkyl, lower alkoxy, or halogen, 2-, 4-, or 5-  
pyrimidinyl or 2-, 4-, or 5-pyrimidinyl substituted by  
lower alkyl, lower alkoxy, or halogen, 2-pyrazinyl or  
2-pyrazinyl substituted by lower alkyl, lower alkoxy, or  
halogen, 2- or 3-thienyl or 2- or 3-thienyl substituted by  
lower alkyl or halogen, 2- or 3-furanyl or 2- or 3-furanyl  
substituted by lower alkyl or substituted by lower alkyl or  
halogen;

n is zero or an integer from 1 to 4;  
 $\text{R}^2$  is



wherein  $\text{R}^1$  is as defined above; and the corresponding cis  
and trans isomers thereof; or a pharmaceutically accept-  
able acid addition salt thereof.

5. A method of treating schizophrenia comprising adminis-  
tering to a host suffering therefrom a therapeutically effective  
amount of a compound according to claim 1 in unit dosage  
form.

4,957,922  
INFUSION SOLUTIONS OF  
1-CYCLOPROPYL-6-FLUORO-1,4-DI-HYDRO-4-OXO-7-  
(1-PIPERAZINYL)-QUINOLINE-3-CARBOXYLIC ACID  
Robert F. Lammens, Leverkusen; Hans F. Mahler, Colonge, and  
Peter Serno, Colonge, all of Fed. Rep. of Germany, assignors  
to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Ger-  
many

Continuation of Ser. No. 917,467, Oct. 10, 1986, abandoned.  
This application Mar. 29, 1989, Ser. No. 329,922  
Claims priority, application Fed. Rep. of Germany, Oct. 24,  
1985, 3537761

Int. Cl.<sup>5</sup> A61K 31/495

U.S. Cl. 514—255

13 Claims

1. An aqueous infusion solution comprising 0.015 to 0.5 g of  
an active compound, said active compound being 1-cyclopro-  
pyl-6-fluoro-1,4-dihydro-4-oxo-7-(1-piperazinyl)-quinoline-3-  
carboxylic acid, per 100 ml of aqueous solution and an amount  
of at least one physiologically tolerated acid which suffices to  
dissolve the active compound, wherein there are 1.33 to 2.2  
moles per mole of active compound, of the physiologically  
tolerated acid, the physiologically tolerated acid being selected  
from the group consisting of hydrochloric acid, methanesul-  
phonic acid, propionic acid, succinic acid, glutamic acid, citric  
acid, fumaric acid, maleic acid, tartaric acid, glutamic acid,  
gluconic acid, glucuronic acid, galacturonic acid, ascorbic



acid, phosphoric acid, nitric acid, acetic acid, malic acid, L-aspartic acid and lactic acid.

4,957,923

**DIURETIC OR ANTIHYPERTENSIVE COMPOSITION**  
Mitsuyoshi Nakashima, Hamamatsu; Mitsutaka Kanamaru, Nagoya; Akira Sugiyama, Ikoma; Masato Terakawa, Nara; Takaharu Ono, Osaka, and Haruo Hori, Amagasaki, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

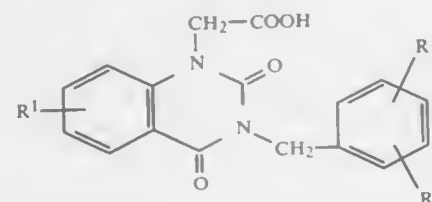
Filed Feb. 24, 1989, Ser. No. 314,886

Claims priority, application Japan, Feb. 29, 1988, 63-48005; Feb. 29, 1988, 63-48006  
Int. Cl.<sup>5</sup> A61K 31/505

U.S. Cl. 514—259

1 Claim

1. A method for treating edema or hypertension which comprises administering an effective amount of a quinazoline derivative of the formula:



wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> each is a hydrogen atom or a halogen atom or a pharmaceutically acceptable salt thereof to a human being in need of said treatment.

4,957,924

**THERAPEUTIC VALINE ESTERS OF ACYCLOVIR AND PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF**  
Lilia M. Beauchamp, Raleigh, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed Aug. 4, 1988, Ser. No. 228,377

Claims priority, application United Kingdom, Aug. 15, 1987, 8719367

Int. Cl.<sup>5</sup> A61K 31/52; C07D 473/16

U.S. Cl. 514—262

24 Claims

1. A pharmaceutically acceptable salt of 2-[(2-amino-1,6-dihydro-6-oxo-9H-purin-9-yl)methoxy]ethyl L-valinate.

17. 2-[(2-amino-1,6-dihydro-6-oxo-9H-purin-9-yl)methoxy]ethyl L-valinate hydrochloride.

18. 2-[(2-amino-1,6-dihydro-6-oxo-9H-purin-9-yl)methoxy]ethyl L-valinate.

19. A method of generating acyclovir in the plasma of a mammal, which comprises orally administering the compound 2-[(2-amino-1,6-dihydro-6-oxo-9H-purin-9-yl)methoxy]ethyl L-valinate or a pharmaceutically acceptable salt thereof to said mammal.

4,957,925

**AMINOALKOXYPHENYL DERIVATIVES, PROCESS OF PREPARATION AND COMPOSITIONS CONTAINING THE SAME**

Jean Gubin; Pierre Chatelain, both of Brussels; Marcel Descamps, Wavre, all of Belgium; Dino Nisato, Saint Georges D'Orques, France; Henri Inion, Wemmel, Belgium; Jean Lucchetti, Chastre, Belgium; Jean-Marie Mahaux, Brussels, Belgium, and Jean-Noël Vallat, Toulouse, France, assignors to Sanofi, Paris, France

Continuation-in-part of Ser. No. 6,233, Jan. 23, 1987, abandoned. This application Aug. 7, 1987, Ser. No. 82,554

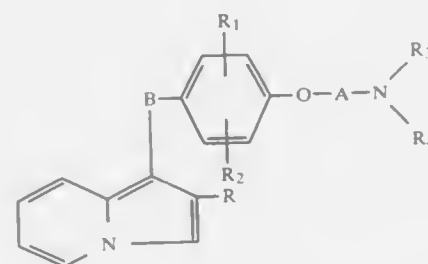
Claims priority, application France, Feb. 14, 1986, 86 02045

Int. Cl.<sup>5</sup> C07D 487/04, 237/28; A61K 31/435, 31/50

U.S. Cl. 514—299

28 Claims

1. An aminoalkoxyphenyl compound of formula:



in which:

B represents —S—, —SO— or —SO<sub>2</sub>— group,

R denotes hydrogen, a linear- or branched-alkyl radical, a cycloalkyl radical containing at most 6 carbon atoms or a phenyl group which is unsubstituted or substituted with one or more substituents, which may be identical or different, selected from halogen atoms and from lower alkyl, lower alkoxy or nitro groups,

R<sub>1</sub> and R<sub>2</sub>, which are identical or different, each denote hydrogen, a methyl or ethyl radical or a halogen,

A denotes a linear- or branched-alkylene radical having from 2 to 5 carbon atoms or a 2-hydroxypropylene radical in which the hydroxy is optionally substituted by a lower alkyl radical,

R<sub>3</sub> denotes a linear- or branched-alkyl radical or a radical of formula:



in which Alk denotes a single bond or a linear- or branched-alkylene radical having from 1 to 5 carbon atoms and R<sub>5</sub> denotes a pyridyl, phenyl, 2,3- methylenedioxyphenyl or 3,4-methylenedioxyphenyl radical or a phenyl group substituted with one or more substituents, which may be identical or different, selected from halogen atoms, lower alkyl groups or lower alkoxy groups,

R<sub>4</sub> denotes hydrogen or an alkyl radical, or R<sub>3</sub> and R<sub>4</sub>, when taken together, denote a 1,4-tetramethylene, 1,5-pentamethylene, 3-oxa-1,5-pentamethylene, 3-aza-1,5-pentamethylene, 3-methylaza-1,5-pentamethylene, 4-phenylaza-1,5-pentamethylene or —CH=CH—N=CH— radical,

as well as a pharmaceutically acceptable salt of this compound.

15. A method of treating angina pectoris, hypertension, arrhythmia and cerebral vascular insufficiency in a host in need of such treatment comprising the administration to this host of an effective dose of an aminoalkoxyphenyl derivative according to claim 1.

4,957,926

**METHOD OF TREATING HERPESVIRUSES**

Gary S. Jacob, Oxford; A. Stanley Tyms, London; Thomas W. Rademacher, and Raymond A. Dwek, both of Oxford, all of United Kingdom, assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 22, 1988, Ser. No. 288,528

Int. Cl.<sup>5</sup> A61K 31/445

U.S. Cl. 514—315

9 Claims

1. A method for the treatment of herpesvirus infections in an infected human host comprising administering to said host an effective amount to inhibit herpesvirus of 1,5-(alkylimino)-1,5-dideoxy-D-glucitol in which the alkyl group contains from one to about six carbon atoms.

4,957,927

**(DIARYLMETHOXY ALKYL)-1-PYRROLIDINES AND-PIPERIDINES HAVING CARDIOVASCULAR ACTIVITY**

Gerard Ferrand, Lyons; Jacques Barbanton, Brignais; Jean-Claude Depin, Lyons, and Gilles Chavernac, La Mulatiere, all of France, assignors to Lipha, Lyonnaise Industrielle Pharmaceutique, Lyons, France

Filed Sep. 22, 1989, Ser. No. 410,705

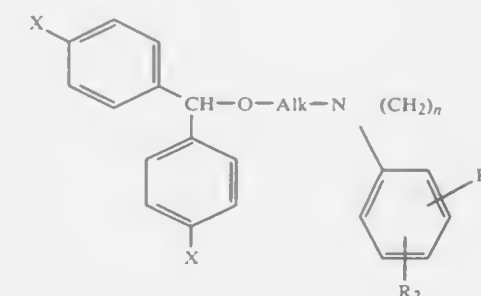
Claims priority, application France, Sep. 23, 1988, 88 12430

Int. Cl.<sup>5</sup> C07D 207/04, 211/04; A61K 31/445, 31/40

U.S. Cl. 514—428

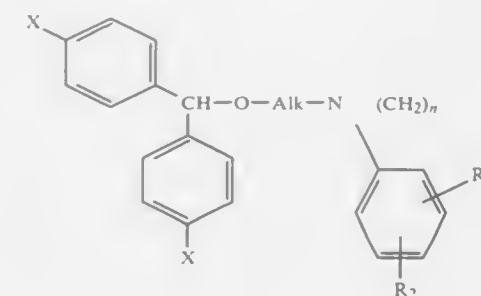
7 Claims

1. 1-[(diarylmethoxy)alkyl]pyrrolidines and piperidines having the following formula:



wherein X is selected from the group consisting of hydrogen and fluorine; Alk is selected from the group consisting of linear-chain and branched alkyl groups containing two or three carbon atoms; R<sub>1</sub> and R<sub>2</sub> are selected from the group consisting of hydrogen and linear-chain or branched alkoxy radicals having from 1 to 4 carbon atoms; n is 4 or 5; and their pharmaceutically-acceptable mineral and organic acid salts.

7. A pharmaceutical composition comprising an effective amount of a 1-[(diarylmethoxy)alkyl]pyrrolidine or piperidine having the following formula as a main active ingredient:



wherein X is selected from the group consisting of hydrogen and fluorine atom; Alk is selected from the group consisting of linear-chain and branched alkyl groups containing two or three carbon atoms; R<sub>1</sub> and R<sub>2</sub> are selected from the group consisting of hydrogen and linear-chain and branched alkoxy radicals having from 1 to 4 carbon atoms; n is 4 or 5; and their pharmaceutically-acceptable mineral acid or organic salts.

4,957,928

**HYDROGENATED 1-BENZOOXACYCLOALKYLPYRIDINECARBOXYLIC ACID COMPOUNDS**

Wolfgang Fröstl, and Armin Züst, both of Basle, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 63,188, Jun. 16, 1987, abandoned. This application Dec. 21, 1988, Ser. No. 288,332

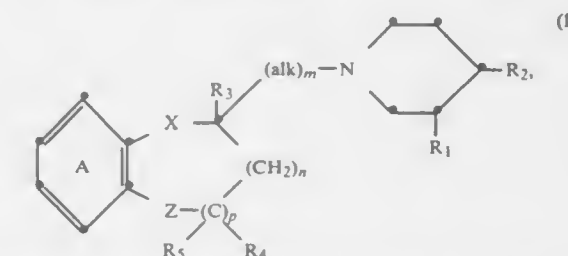
Claims priority, application Switzerland, Jun. 26, 1986, 2588/86; Dec. 23, 1987, 5008/87

Int. Cl.<sup>5</sup> C07D 405/06; A61K 31/445

U.S. Cl. 514—318

18 Claims

1. A compound of the formula



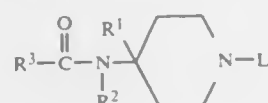
in which alk is lower alkylene or lower alkylidene, the dotted line is intended to indicate the presence of a single or a double bond between the carbon atoms carrying the substituents R<sub>1</sub> and R<sub>2</sub>, R<sub>3</sub> is hydrogen or lower alkyl, R<sub>4</sub> is lower alkyl, R<sub>5</sub> is lower alkyl, and in which (A) either R<sub>1</sub> represents carboxy, lower alkoxy, carbonyl, carbamoyl, N-lower alkylcarbamoyl, N,N-di-lower alkylcarbamoyl, hydroxymethyl, lower alkanoyloxymethyl, lower alkanesulfonyloxymethyl, benzoyloxymethyl or pyridoyloxymethyl and R<sub>2</sub> represents hydrogen, hydroxy, lower alkoxy, benzyloxy, lower alkanoyloxy, lower alkanesulfonyloxy, benzoyloxy, pyridoyloxy, amino, lower alkanoylamino, lower alkanesulfonylamino, benzoylamino or pyridoylamino, or R<sub>1</sub> represents hydrogen and R<sub>2</sub> represents carboxy, lower alkoxy, carbonyl, carbamoyl, N-lower alkylcarbamoyl, N,N-di-lower alkylcarbamoyl, hydroxymethyl, lower alkanoyloxymethyl, lower alkanesulfonyloxymethyl, benzoyloxymethyl or pyridoyloxymethyl and in which the ring A is unsubstituted or is mono- or poly-substituted by hydroxy, lower alkoxy, lower alkanoyloxy, halogen, lower alkyl or trifluoromethyl, p is 0, m is 1, and in which either each of X and Z is an oxygen atom and n is 1, or X is a methylene groups, Z is an oxygen atom and n is 1, or X is an oxygen atom, Z is a methylene group and n is 1, or X is a direct bond, Z is an oxygen atom and n is 2, with the proviso, that R<sub>2</sub> is different from carbamoyl, if R<sub>1</sub> is hydrogen, R<sub>3</sub> is hydrogen, alk is methylene, ethylene or 1,3-propylene, the ring A is unsubstituted or is monosubstituted in the 6- or 7-position or is disubstituted in the 6- and 7-position, substituents being selected from the group consisting of lower alkoxy, halogen, lower alkyl and trifluoromethyl, the dotted line is intended to indicate the presence of a single bond, each of X and Z is an oxygen atom, and n is 1, or if R<sub>1</sub> represents hydrogen, R<sub>3</sub> is hydrogen, alk represents ethylidene, the ring A is unsubstituted, the dotted line is intended to indicate the presence of a single bond, each of X and Z is an oxygen atom, and n is 1, or in which (B) either R<sub>1</sub> is carboxy, lower alkoxy, carbonyl, carbamoyl, N-lower alkylcarbamoyl, N,N-di-lower alkylcarbamoyl, N,N-tower alkylcarbamoyl, N,N-(aza)-, N,N-(oxa)- or N,N-(thia)-lower alkylcarbamoyl, hydroxymethyl, lower alkanoyloxymethyl, lower alkanesulfonyloxymethyl, benzoyloxymethyl or pyridoyloxymethyl and R<sub>2</sub> is hydrogen, hydroxy, lower alkoxy, benzyloxy, lower alkanoyloxy, lower alkanesulfonyloxy, benzoyloxy, pyridoyloxy, amino, lower alkanoylamino, lower alkanesulfonylamino, benzoylamino or pyridoylamino, or R<sub>1</sub> is hydrogen and R<sub>2</sub> is carboxy, lower alkoxy, carbonyl, carbamoyl, N-lower alkylcarbamoyl, N,N-di-lower alkylcarbamoyl, N,N-tower alkylcarbamoyl, N,N-(aza)-, N,N-(oxa)- or N,N-(thia)-lower

alkylenecarbamoyl, hydroxymethyl, lower alkanoyloxymethyl, lower alkanesulfonyloxymethyl, benzoyloxymethyl or pyridyloxymethyl, and in which the ring A is unsubstituted or is mono- or poly-substituted by hydroxy, lower alkoxy, lower alkanoyloxy, cyano, halogen, lower alkyl or by trifluoromethyl, p is 1, m is 0 or 1, Z is an oxygen atom, and in which either x is an oxygen atom or a methylene group and n is 0, or X is a direct bond and n is 1, or a tautomer thereof, in each case in free form or in form of a pharmaceutically acceptable salt.

18. A method of treating the symptoms of cerebral insufficiency in a subject in need of such treatment comprising administering to such subject a neurotrophically effective amount of a compound according to claim 1 or a tautomer thereof, in each case in free form or in the form of a pharmaceutically acceptable salt.

**4,957,929**  
**4-PHENYL-4-[N-(PHENYL)AMIDO]PIPERIDINE COMPOUNDS AND PHARMACEUTICAL COMPOSITIONS EMPLOYING SUCH COMPOUNDS**  
Linus V. Kudzma, North Bergen; H. Kenneth Spencer, Chatham, and Sherry A. Severnak, Plainfield, all of N.J., assignors to BOC, Inc., New Providence, N.J.  
Division of Ser. No. 255,180, Oct. 7, 1988, Pat. No. 4,921,864, which is a division of Ser. No. 115,284, Nov. 2, 1987, Pat. No. 4,741,121. This application Nov. 22, 1988, Ser. No. 440,933  
Int. Cl. 5 A61K 31/445; C07D 401/06

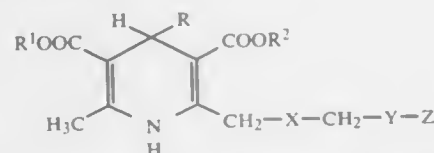
U.S. Cl. 514—326 **8 Claims**  
5. A narcotic antagonistic or analgesic composition comprising a non-toxic pharmaceutically acceptable carrier and therapeutically effective amount of a compound of the formula



optically active isomeric forms thereof, or pharmaceutically acceptable acid addition salts thereof, in which formula: R<sup>1</sup> is phenyl; R<sup>2</sup> is phenyl unsubstituted or substituted by one or more halogens; R<sup>3</sup> is a lower alkyl, lower cycloalkyl or a lower alkoxy lower alkyl; and L is 1-H-pyrazolyl lower alkyl which can be substituted in the 4 position by a halogen.

**4,957,930**  
**DIHYDROPYRIDINE DERIVATIVES**  
David Alker, Bircbington, and Peter E. Cross, Canterbury, both of England, assignors to Pfizer Inc., New York, N.Y.  
Filed Apr. 20, 1988, Ser. No. 183,817  
Claims priority, application United Kingdom, Apr. 21, 1987, 8709447  
Int. Cl. 5 C07D 211/86; A61K 31/455

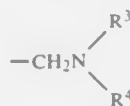
U.S. Cl. 514—356 **7 Claims**  
1. A compound of the formula



or a pharmaceutically acceptable acid addition salt thereof where

R is selected from the group consisting of phenyl, phenyl substituted by one or two substituents selected from the group consisting of halo and CF<sub>3</sub>, and 2-chloro-3-pyridyl; R<sup>1</sup> and R<sup>2</sup> are each independently methyl or ethyl; X is O or S; Y is —CH=CH— or —C=C—; and Z is

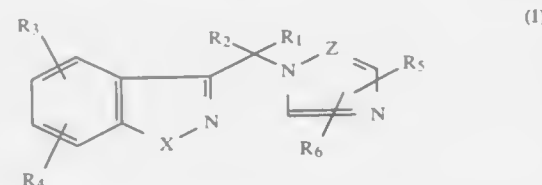
CHR<sup>5</sup>OH wherein R<sup>5</sup> is H, n-butyl, or phenyl;  
—CO<sub>2</sub>R<sup>6</sup> where R<sup>6</sup> is H;



wherein R<sup>3</sup> and R<sup>4</sup> are each independently methyl; or when taken together with the N atom to which they are attached form a pyrrolidinyl, piperidino, morpholino, piperazinyl or N(C<sub>1</sub>-C<sub>4</sub>)alkyl piperazinyl group.

**4,957,931**  
**CERTAIN 1,2-BENZISOXAZOLE AND 1,2-BENZISOTHIAZOLE DERIVATIVES**  
Robert M. Bowman, Summit, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.  
Division of Ser. No. 71,124, Jul. 8, 1987, Pat. No. 4,859,691. This application Jun. 9, 1989, Ser. No. 367,573  
Int. Cl. 5 A61K 31/425; C07D 117/06

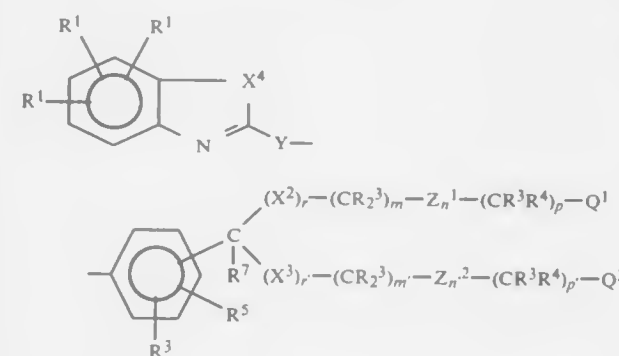
U.S. Cl. 514—373 **16 Claims**  
1. A compound of the formula



where X represents sulfur, Z represents carbon (CH) so as to complete the imidazol-1-yl ring radical or Z represents nitrogen (N) so as to complete the 1,2,4-triazol-1-yl ring radical; R<sub>1</sub> represents hydrogen, lower alkenyl, lower alkynyl, carbocyclic aryl-lower alkyl or lower alkyl; R<sub>2</sub> represents hydrogen, lower alkenyl, lower alkynyl, carbocyclic aryl-lower alkyl or lower alkyl; or R<sub>1</sub> and R<sub>2</sub> combined represents C<sub>1</sub>-C<sub>6</sub>-alkylene; or R<sub>1</sub> combined with R<sub>6</sub> located on the Z-carbon atom of the imidazolyl radical represents C<sub>2</sub>-C<sub>4</sub> alkylene; R<sub>3</sub> and R<sub>4</sub> independently represent hydrogen, lower alkyl, C<sub>5</sub>-C<sub>7</sub>-cycloalkyl, halogen, trifluoromethyl, cyano, nitro, amino, hydroxy, lower alkanoyloxy, carbocyclic aryloxy, lower alkoxy or carbocyclic aryl; or R<sub>3</sub> and R<sub>4</sub>, together when located on adjacent carbon atoms, represent lower alkylene-dioxy; or R<sub>3</sub> and R<sub>4</sub>, together when located on adjacent carbon atoms, represent 1,3-butadienylene or C<sub>3</sub>-C<sub>5</sub>-alkylene to form with the carbon atoms to which such is attached a benzo-fused or C<sub>5</sub>-C<sub>7</sub>-cycloalka-fused ring, respectively; R<sub>5</sub> located on carbon represents hydrogen, lower alkyl or hydroxy-lower alkyl; R<sub>6</sub> located on carbon represents hydrogen or lower alkyl; or when Z represents carbon, R<sub>5</sub> located on the Z-carbon atom combined with R<sub>6</sub> located on the adjacent carbon atom represents C<sub>3</sub>-C<sub>5</sub>-alkylene; carbocyclic aryl within the above definitions represents phenyl or phenyl substituted by lower alkyl, lower alkoxy, trifluoromethyl or halogen; carbocyclic aryloxy represents benzoyloxy, benzoyloxy substituted on the phenyl ring by trifluoromethyl, lower alkyl, halogen or lower alkoxy; or a pharmaceutically acceptable salt thereof.

14. A pharmaceutical composition for the treatment of convulsions in mammals comprising an anticonvulsant effective amount of a compound of claim 1 in combination with one or more pharmaceutically acceptable carriers.

**4,957,932**  
**BENZOHETERAZOLES**  
Robert N. Young, Senneville, and Robert Zamboni, Longueuil, both of Canada, assignors to Merck Frosst Canada, Inc., Kirkland, Canada  
Filed Nov. 25, 1987, Ser. No. 125,049  
Int. Cl. 5 C07D 763/56; A61K 31/42  
U.S. Cl. 514—375 **13 Claims**  
1. A compound of the formula:



wherein:

R<sup>1</sup> is H, halogen, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, —CF<sub>3</sub>, —SR<sup>2</sup>, —S(O)<sub>2</sub>R<sup>2</sup>, —S(O)<sub>2</sub>R<sup>3</sup>, —NR<sup>3</sup>R<sup>3</sup>, —OR<sup>3</sup>, —COOR<sup>3</sup>, —(C=O)R<sup>3</sup>, —C(OH)R<sup>3</sup>R<sup>3</sup>, —CN, —NO<sub>2</sub>, —N<sub>3</sub>, substituted or unsubstituted phenyl, substituted or unsubstituted benzyl, substituted or unsubstituted 2-phenethyl, or substituted or unsubstituted pyridyl;  
R<sup>2</sup> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, —CF<sub>3</sub>, substituted or unsubstituted phenyl, substituted or unsubstituted benzyl, or substituted or unsubstituted 2-phenethyl;  
R<sup>3</sup> is H or R<sup>2</sup>;  
R<sup>4</sup> is H, halogen, —NO<sub>2</sub>, —CN, —OR<sup>3</sup>, —SR<sup>3</sup>, NR<sup>3</sup>R<sup>3</sup>, or C<sub>1</sub>-C<sub>8</sub> alkyl;  
R<sup>5</sup> is H, halogen, —NO<sub>2</sub>, —N<sub>3</sub>, —CN, —SR<sup>2</sup>, —NR<sup>3</sup>R<sup>3</sup>, —OR<sup>3</sup>, C<sub>1</sub>-C<sub>8</sub> alkyl, or —(C=O)R<sup>3</sup>;  
R<sup>6</sup> is —(CH<sub>2</sub>)<sub>2</sub>—C(R<sup>7</sup>)<sub>2</sub>—(CH<sub>2</sub>)<sub>2</sub>—R<sup>8</sup> or —CH<sub>2</sub>—CONR<sup>12</sup>R<sup>12</sup>;  
R<sup>7</sup> is H or C<sub>1</sub>-C<sub>4</sub> alkyl;  
R<sup>8</sup> is

(A) a monocyclic or bicyclic heterocyclic radical containing from 3 to 12 nuclear carbon atoms and 1 or 2 nuclear heteroatoms selected from N, S or O and with each ring in the heterocyclic radical being formed of 5 or 6 atoms, or  
(B) the radical W-R<sup>9</sup>;

R<sup>9</sup> contains up to 21 carbon atoms and is (1) a hydrocarbon radical or (2) an acyl radical of an organic acyclic or monocyclic carboxylic acid containing not more than 1 heteroatom in the ring;

R<sup>10</sup> is —SR<sup>11</sup>, —OR<sup>12</sup>, or —NR<sup>12</sup>R<sup>12</sup>;

R<sup>11</sup> is C<sub>1</sub>-C<sub>6</sub> alkyl, —(C=O)R<sup>14</sup>, unsubstituted phenyl, or unsubstituted benzyl;

R<sup>12</sup> is H, R<sup>11</sup>, or two R<sup>12</sup> groups joined to the same N may form a ring of 5 or 6 members containing up to two heteroatoms chosen from O, S or N;

R<sup>13</sup> is C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>8</sub> alkenyl, C<sub>2</sub>-C<sub>8</sub> alkynyl, —CF<sub>3</sub>, or unsubstituted phenyl, benzyl, or 2-phenethyl;

R<sup>14</sup> is H or R<sup>13</sup>;

R<sup>15</sup> is R<sup>3</sup> halogen;

R<sup>16</sup> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, or OH;

m and m' are independently 0-8;

n and n' are independently 0 or 1;

p and p' are independently 0-8;

m+n+p is 1-10 when X<sup>2</sup> is O, S, S(O), or S(O)<sub>2</sub>;

m+n+p is 0-10 when X<sup>2</sup> is CR<sup>3</sup>R<sup>16</sup>;

m'+n'+p' is 1-10 when X<sup>3</sup> is O, S, S(O), or S(O)<sub>2</sub>;

m'+n'+p' is 0-10 when X<sup>3</sup> is CR<sup>3</sup>R<sup>16</sup>;

r is 0 or 1 when Z<sup>1</sup> is HET (—R<sup>3</sup>, —R<sup>5</sup>);

r is 1 when Z<sup>1</sup> is CONR<sup>3</sup>;

r' is 0 or 1 when Z<sup>2</sup> is HET(—R<sup>3</sup>, —R<sup>5</sup>);

r' is 1 when Z<sup>2</sup> is CONR<sup>3</sup>;

s is 0-3;

Q<sup>1</sup> and Q<sup>2</sup> are independently —COOR<sup>3</sup>, tetrazole, —COOR<sup>6</sup>, —CONHS(O)<sub>2</sub>R<sup>13</sup>, —CN, —CONR<sup>12</sup>R<sup>12</sup>, —CHO, —CH<sub>2</sub>OH, —COCH<sub>2</sub>OH, —NHS(O)<sub>2</sub>R<sup>13</sup>, or if Q<sup>1</sup> or Q<sup>2</sup> is COOH and R<sup>4</sup> is —OH, —SH, or —NHR<sup>3</sup> then Q<sup>1</sup> or Q<sup>2</sup> and R<sup>4</sup> and the carbons through which they are attached may form a heterocyclic ring by loss of water;

W is O, S, or —NR<sup>3</sup>;

X<sup>1</sup> is O, S, —S(O)—, —S(O)<sub>2</sub>—, —NR<sup>3</sup>, or —CR<sup>3</sup>R<sup>3</sup>—;

X<sup>2</sup> and X<sup>3</sup> are independently O, S, S(O), S(O)<sub>2</sub>, or CR<sup>3</sup>R<sup>16</sup>;

X<sup>4</sup> is O;

Y is —CR<sup>3</sup>=CR<sup>3</sup>—, —C=C—, —CR<sup>3</sup>R<sup>3</sup>—X<sup>1</sup>—, —X<sup>1</sup>—CR<sup>3</sup>R<sup>3</sup>—, —CR<sup>3</sup>R<sup>3</sup>—X<sup>1</sup>—CR<sup>3</sup>R<sup>3</sup>—,

O, S, or NR<sup>3</sup>;

Z<sup>1</sup> and Z<sup>2</sup> are independently —CONR<sup>3</sup>— or —HET(—R<sup>3</sup>, —R<sup>5</sup>)—;

HET is

substituted phenyl, benzyl, 2-phenethyl, and pyridyl mean 1 or 2 substituents on the aromatic ring selected from C<sub>1</sub>-C<sub>6</sub> alkyl, R<sup>10</sup>, NO<sub>2</sub>, SCF<sub>3</sub>, —COR<sup>7</sup>, —COR<sup>10</sup>, CN, halogen, and CF<sub>3</sub>;

and the pharmaceutically acceptable salts thereof.

**4,957,933**  
**FUNGICIDAL OXAZOLIDINONES**  
Detlef Geffken, Hamburg, Fed. Rep. of Germany, and Rayner Dennis R., Centerville, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.  
Filed Apr. 21, 1989, Ser. No. 341,741  
Int. Cl. 5 A01N 43/76

U.S. Cl. 514—376 **8 Claims**

1. A method of controlling fungus disease in plants that comprise treating the locus to be protected with a fungicidally amount of a compound of Formula I,

wherein:

A is NR<sup>4</sup>,

Q is O,

W is O or S,

R<sup>1</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>2</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>3</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>4</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>5</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>6</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>7</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>8</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>9</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>10</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>11</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>12</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>13</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>14</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>15</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>16</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>17</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>18</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>3</sub> alkyl substituted with C<sub>3</sub> to C<sub>6</sub> cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R<sub>6</sub>, and the benzylic carbon is substituted with R<sub>7</sub>;

R<sup>19</sup> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>3</sub> to C<sub>6</sub> cycloalkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl, C<sub>2</sub> to C<sub>6</sub> alkynyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl



R<sup>2</sup> is phenyl substituted with R<sup>5</sup> and R<sup>6</sup>, naphthyl substituted with 1 to 2 groups selected from R<sup>6</sup>,

C<sub>1</sub> to C<sub>2</sub> alkyl substituted with phenoxy or phenylthio, said phenoxy or phenylthio being substituted on the ring with R<sup>6</sup>,

C<sub>1</sub> to C<sub>6</sub> alkyl; or

R<sup>3</sup> is phenyl substituted with R<sup>5</sup> and R<sup>6</sup>, benzyl substituted on the benzylic carbon with a group selected from R<sup>7</sup> and substituted on the phenyl ring with R<sup>6</sup>, naphthyl substituted with R<sup>6</sup>,

R<sup>4</sup> is hydrogen, formyl, C<sub>2</sub> to C<sub>4</sub> alkylcarbonyl, C<sub>2</sub> to C<sub>4</sub> haloalkylcarbonyl, C<sub>2</sub> to C<sub>4</sub> alkoxyalkylcarbonyl, C<sub>2</sub> to C<sub>4</sub> alkoxyalkyl, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>4</sub> to C<sub>6</sub> cycloalkyl, benzyl substituted with R<sup>6</sup> on the phenyl ring and substituted with R<sup>7</sup> on the benzylic carbon, phenylaminocarbonyl where said phenyl is substituted with R<sup>6</sup>, C<sub>3</sub> to C<sub>4</sub> alkenyl, C<sub>3</sub> to C<sub>4</sub> alkynyl; or

R<sup>5</sup> is hydrogen, halogen, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>1</sub> to C<sub>6</sub> alkoxy, C<sub>3</sub> to C<sub>4</sub> alkenyloxy, C<sub>1</sub> to C<sub>5</sub> alkylthio, C<sub>1</sub> to C<sub>4</sub> haloalkylthio, C<sub>1</sub> to C<sub>4</sub> haloalkoxy, C<sub>1</sub> to C<sub>4</sub> alkylsulfonyl, C<sub>1</sub> to C<sub>4</sub> haloalkylsulfonyl, nitro, phenyl substituted with R<sup>6</sup>, phenoxy substituted with R<sup>6</sup>, phenylthio substituted with R<sup>6</sup>, cyano, C<sub>3</sub> to C<sub>4</sub> alkynyloxy, C<sub>2</sub> to C<sub>6</sub> alkoxyalkyl, C<sub>2</sub> to C<sub>6</sub> alkoxyalkoxy, phenoxy-methyl substituted on the phenyl ring with R<sup>6</sup>, benzyloxy substituted on the phenyl ring with R<sup>6</sup>, phenethyloxy substituted on the phenyl ring with R<sup>6</sup>, phenethyl substituted on the phenyl ring with R<sup>6</sup> or benzyl substituted on the phenyl ring with R<sup>6</sup>, phenoxy substituted with R<sup>6</sup>, C<sub>2</sub> to C<sub>6</sub> carboalkoxy, C<sub>5</sub> to C<sub>6</sub> cycloalkyl;

R<sup>6</sup> is hydrogen, 1 to 2 halogen, methyl, trifluoromethyl, C<sub>1</sub> to C<sub>4</sub> alkoxy, methylthio and nitro.

4,957,934

## 1,3-HETEROCYCLIC-SUBSTITUTED ALKANE

Francis T. Boyle, Congleton, England, assignor to Imperial Chemical Industries PLC, London, England  
Filed Jul. 13, 1988, Ser. No. 218,255

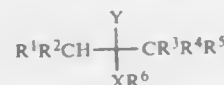
Claims priority, application United Kingdom, Jul. 15, 1987, 8716651

Int. Cl.<sup>5</sup> C07D 249/08; A61K 31/41

U.S. Cl. 514—383

9 Claims

1. A heterocyclic compound of the formula I:



wherein R<sup>1</sup> is a triazolyl radical, R<sup>5</sup> is a triazolyl radical; R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup>, which may be the same or different, are each a hydrogen atom, a 1-6C alkyl, halogenoalkyl or alkoxy radical, a 3-8C cycloalkyl radical, or a phenyl, naphthyl, phenoxy, naphthyloxy or phenyl(1-6C alkyl) radical, in each of which the aryl group optionally bears one or more substituents selected from the group consisting of halogen atoms, amino, carboxyamido, cyano and nitro radicals, 1-6C alkyl, halogenoalkyl, alkoxy, halogenoalkoxy and alkylamino radicals, 3-8C cycloalkyl radicals, di(1-6C alkyl)amino radicals and 2-6C alkoxyalkyl radicals; R<sup>6</sup> is a phenyl or naphthyl radical optionally bearing one or more substituents as defined above; X is a direct bond, a 1-4C alkylene radical, a 2-4C alkenylene or alkynylene radical, or a 1-4C oxyalkylene or thioalkylene radical wherein respectively the oxygen or sulphur atom is bonded to R<sup>6</sup> or a phenyl(2-4C-alkenylene radical in which the phenyl group bears one or more substituents as defined above for R<sup>6</sup>; and Y is a halogen atom, and provided that when X is a direct bond, Y is not halogen; and when the compound contains a basic nitrogen atom, pharmaceutically acceptable acid addition salts thereof.

4,957,935

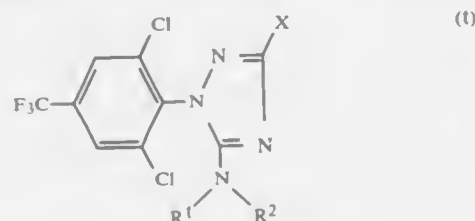
PHENYLTRIAZOLE DERIVATIVE AND INSECTICIDE  
Masahito Inamori, Shizuoka; Tetsuo Horii, Fujieda; Tomonori Shimazu, Shizuoka, and Masaji Sugaya, Shizuoka, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd. and Ihara Chemical Industry Co., Ltd., both of Tokyo, Japan  
Continuation-in-part of Ser. No. 171,777, Mar. 22, 1988, Pat. No. 4,925,864. This application Jun. 13, 1989, Ser. No. 365,437  
Claims priority, application Japan, Mar. 27, 1987, 62-73636; Nov. 11, 1987, 62-284873

Int. Cl.<sup>5</sup> A01N 43/653; C07D 249/14

U.S. Cl. 514—383

21 Claims

1. A phenyltriazole compound having the formula:



wherein X is a lower alkyl group having all or a part of hydrogen atoms substituted by fluorine atoms, and each of R<sup>1</sup> and R<sup>2</sup> which may be the same or different, is a hydrogen atom or a lower alkyl group, or R<sup>1</sup> and R<sup>2</sup> form together with the adjacent nitrogen atom a pyrrole ring or an ethoxymethylideneamino group.

4,957,936

## GLYCOCYAMIDINE DERIVATIVES

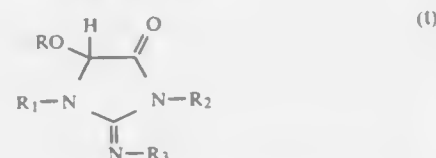
Ko Nakamura, and Kazuharu Ienaga, both of Hyogo, Japan, assignors to Nippon Zoki Pharmaceutical Co., Ltd., Osaka, Japan  
Filed Jan. 30, 1990, Ser. No. 472,494

Claims priority, application Japan, Feb. 1, 1989, 1-24669  
Int. Cl.<sup>5</sup> C07D 233/88; A61K 31/415

U.S. Cl. 514—389

4 Claims

1. A glycosylamine derivative having the formula (I) or a pharmaceutically acceptable salt thereof:



wherein R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub>, which may be the same or different, is hydrogen or a lower alkyl group, and R is hydrogen or an acetyl group.

4,957,937

SUBSTITUTED N-HYDROXYPYRAZOLES AND FUNGICIDES WHICH CONTAIN THESE COMPOUNDS  
Franz Schuetz, Ludwigshafen; Hubert Sauter, Mannheim; Siegfried Brand, Weinheim; Bernd Wenderoth, Lampertheim; Ulf Baus, Dossenheim; Wolfgang Reuther, Heidelberg; Gisela Lorenz, Neustadt, and Eberhard Ammermann, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
Filed Feb. 12, 1990, Ser. No. 478,963

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1989, 3905948  
Int. Cl.<sup>5</sup> A01N 43/56; C07D 231/12, 231/54, 231/56

U.S. Cl. 514—407

8 Claims

1. Substituted N-hydroxypyrazoles of the general formula I

4,957,939

## STERILE PHARMACEUTICAL COMPOSITIONS OF GADOLINIUM CHELATES USEFUL ENHANCING NMR IMAGING

Heinz Gries; Douwe Rosenberg, and Hanns-Joachim Weinmann, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Division of Ser. No. 573,184, Jan. 23, 1984, Pat. No. 4,647,447, which is a continuation-in-part of Ser. No. 401,594, Jul. 26, 1982, abandoned. This application Jun. 20, 1986, Ser. No. 876,497  
Claims priority, application Fed. Rep. of Germany, Jul. 24, 1981, 3129906; Jan. 21, 1983, 3302410; Jan. 11, 1984, 3401052  
The portion of the term of this patent subsequent to Mar. 3, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> C07C 229/76; C07F 9/38

U.S. Cl. 514—492

32 Claims

1. A pharmaceutical composition for enhancement of NMR imaging comprising a physiologically compatible gadolinium chelate complex and a pharmaceutically acceptable carrier, wherein said composition is sterile.

4,957,940

## BICYCLO HEPTANE AND BICYCLO OCTANE SUBSTITUTED INHIBITORS OF CHOLESTEROL SYNTHESIS

Bruce D. Roth, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

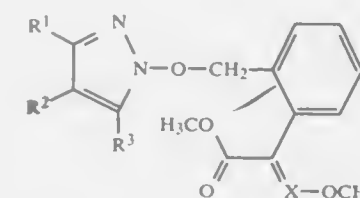
Division of Ser. No. 287,813, Dec. 4, 1988, Pat. No. 4,506,657.  
This application Nov. 21, 1989, Ser. No. 439,719

Int. Cl.<sup>5</sup> A61K 31/23, 31/20; C07C 69/753, 61/12

U.S. Cl. 514—557

7 Claims

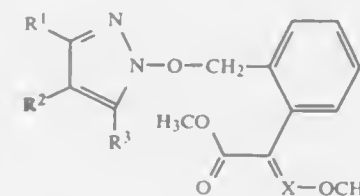
1. A compound of structural Formula IIa or Formula IIb



where

R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are identical or different and are hydrogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>2</sub>-haloalkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxyalkyl, halogen, aryl or aryl-C<sub>1</sub>-C<sub>4</sub>-alkyl, the aromatic ring being unsubstituted or substituted by one or more of the following: C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl, C<sub>1</sub>-C<sub>2</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, halogen, cyano or nitro, or R<sup>2</sup> and R<sup>3</sup> form, with the pyrazole ring, an aromatic or aliphatic ring which is unsubstituted or substituted by C<sub>1</sub>-C<sub>4</sub>-alkyl,  
X is CH or N, and the acid addition salts and metal complexes thereof which are tolerated by plants.

2. A fungicide containing an inert carrier and a fungicidally effective amount of a substituted N-hydroxypyrazole of the general formula I



where

R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are identical or different and are hydrogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>2</sub>-haloalkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxyalkyl, halogen, aryl or aryl-C<sub>1</sub>-C<sub>4</sub>-alkyl, the aromatic ring being unsubstituted or substituted by one or more of the following: C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl, C<sub>1</sub>-C<sub>2</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, halogen, cyano or nitro, or R<sup>2</sup> and R<sup>3</sup> form, with the pyrazole ring, an aromatic or aliphatic ring which is unsubstituted or substituted by C<sub>1</sub>-C<sub>4</sub>-alkyl,  
X is CH or N, or an acid addition salt or metal complex thereof tolerated by plants.

4,957,938

## NUTRITIONAL FORMULATION FOR THE TREATMENT OF RENAL DISEASE

Pamela A. Anderson, Washington Court House; Kent L. Cipollo, Westerville, and Tivadar G. Mohacsí, Columbus, all of Ohio, assignors to Abbott Laboratories, Abbott Park, Ill.

Filed Jun. 21, 1989, Ser. No. 369,163

Int. Cl.<sup>5</sup> A61K 31/40, 37/44

U.S. Cl. 514—412

12 Claims

1. A composition of matter consisting of a mixture of the following components at the following percentages by weight:

L-ornithine-α-ketoglutarate	21-24%
L-ornithine-α-ketoglutarate	21-24%
L-lysine-α-keto-β-methylvalerate	21-24%
L-histidine-α-ketoglutarate	6-8%
calcium, sodium or potassium salt of α-hydroxy-γ-methylthiobutyrate	1.5-2.5%
L-tryptophan	0.2-0.75%
L-tyrosine	16-19%
L-threonine	4-6%

wherein X is —CH<sub>2</sub>CH<sub>2</sub>— or —CH=CH—;

R<sub>1</sub> and R<sub>2</sub> independently are alkyl of from one to four carbons;

trifluoromethyl;

cyclohexylmethyl;

phenyl; or

phenyl substituted with

fluorine,

chlorine,

bromine;

hydroxy,

alkyl of from one to four carbon atoms, or

alkoxy of from one to four carbon atoms;

R<sub>3</sub>, R<sub>4</sub> and R<sub>7</sub> independently are hydrogen or alkyl of from one to four carbon atoms;

R<sub>6</sub> is alkyl of from one to four carbon atoms or phenyl;

n is the integer 1 or 2; or

a lower alkyl ester or pharmaceutically acceptable salt thereof.

7. A method of inhibiting cholesterol biosynthesis in a patient in need of said treatment comprising administering a

cholesterol synthesis inhibiting amount of a compound as

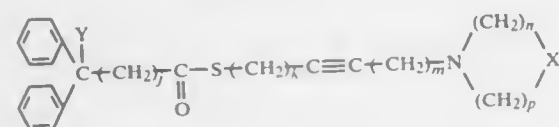
defined by claim 1 in combination with a pharmaceutically acceptable carrier.

# 4,957,941 ANTI-SPASMODIC AGENTS HAVING AN ACETYLENIC BOND

William M. Davis, Tucson, Ariz., assignor to United Pharmaceuticals, Inc., Tucson, Ariz.  
Continuation of Ser. No. 120,855, Nov. 16, 1987, abandoned, which is a continuation-in-part of Ser. No. 703,318, Feb. 20, 1985, abandoned. This application Jan. 9, 1990, Ser. No. 463,892  
Int. Cl.<sup>5</sup> A61K 31/135, 31/395, 31/40, 31/41, 31/435, 31/495, 31/535, 31/54

U.S. Cl. 514—648

1. A compound of the formula



where

Y is H or OH;

j is an integer from 0 to 4;

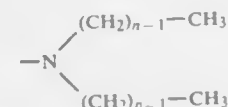
k is an integer from 0 to 4;

m is an integer from 1 to 4;

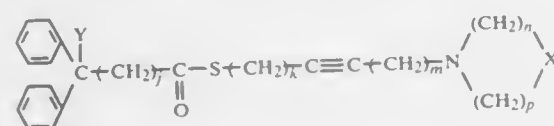
n is an integer from 1 to 4;

p is an integer from 1 to 4; and

X may be nonexistent or may be O, S, NH or CH<sub>2</sub> or salts thereof, but when X is nonexistent the terminal group in both the n-chain and the p-chain is a methyl group, whereby the —N radical is



3. A method of treating a patient suffering smooth muscle spasm comprising administering to the patient an effective amount of a compound having the formula:



where

Y is H or OH;

j is an integer from 0 to 4;

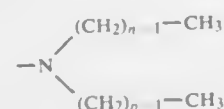
k is an integer from 0 to 4;

m is an integer from 1 to 4;

n is an integer from 1 to 4;

p is an integer from 1 to 4; and

X may be nonexistent or may be O, S, NH, or CH<sub>2</sub> or salts thereof, but when X is nonexistent the terminal group in both the n-chain and the p-chain is a methyl group, whereby the —N radical is



# 4,957,942 SEMIPERMEABLE MEMBRANE AND PROCESS FOR PREPARING SAME

Masashi Yoshida; Katsuhisa Suzuki, and Masaaki Yoshikawa, all of Tokyo, Japan, assignors to Nikkiso Co. Ltd., Tokyo, Japan

Filed May 26, 1989, Ser. No. 358,290

Claims priority, application Japan, May 28, 1988, 63-131013  
Int. Cl.<sup>5</sup> C08J 9/28

U.S. Cl. 521—62

6 Claims



1. A process for preparing a semipermeable membrane comprising the step of discharging a stock solution comprising a polyarylate resin and a polysulfone resin in a total amount ranging from 10% to 25% by weight and a core solution comprising water in an amount ranging from 25% to 80% by volume and an organic solvent into a coagulating solution.

# 4,957,943 PARTICLE-FILLED MICROPOROUS MATERIALS

Jerome W. McAllister, Hudson; Kevin E. Kinzer, Cottage Grove, both of Wis.; James S. Mrozinski, Oakdale; Eric J. Johnson, Woodbury, both of Minn., and James F. Dyrud, New Richmond, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 14, 1988, Ser. No. 258,314

Int. Cl.<sup>5</sup> C08J 9/28

U.S. Cl. 521—64

34 Claims

1. A method for preparing a particulate-filled microporous thermoplastic polymeric shaped article which comprises the steps of

- dispersing submicron or micron-sized particulate filler in a liquid compatible with the thermoplastic polymer to form a colloidal suspension of the particulate filler in the liquid, the particulate filler being substantially non-agglomerated;
- melt-blending the thermoplastic polymer with a solubilizing amount of the compatible liquid containing the dispersed particulate filler at a temperature sufficient to form a homogeneous solution;
- forming an article from the solution;
- cooling the shaped article at a rate and to a temperature sufficient to initiate thermodynamic, non-equilibrium phase separation;
- further cooling the article to solidify the thermoplastic polymer; and
- removing at least a substantial portion of the compatible liquid, said particulate filler remaining substantially entirely within the thermoplastic polymer article.

4,957,944  
URETHANE CATALYSTS  
Reinhart Schiffauer, Cross Lanes, W. Va., and Walter Buchmuller, Gutenberg, Switzerland, assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Jun. 16, 1989, Ser. No. 367,266

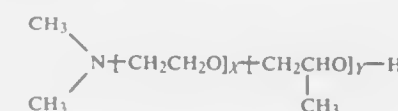
Int. Cl.<sup>5</sup> C08G 18/14

U.S. Cl. 521—115

30 Claims

1. A process for preparing a polyurethane foam which comprises reacting an organic polyisocyanate, a composition that contains an active hydrogen as measured and determined by

the Zerewitinoff method, and water in the presence of a catalytic amount of a dimethylamino alkyleneoxy isopropanol having the formula:



where X is at least 1 and Y is at least 1.

# 4,957,945 PREPARATION OF ULTRA HIGH MOLECULAR WEIGHT POLYESTER

Gerald Cohn, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio  
Division of Ser. No. 285,928, Dec. 19, 1988, Pat. No. 4,917,845, which is a continuation-in-part of Ser. No. 176,554, Apr. 1, 1988, Pat. No. 4,792,573. This application Jan. 2, 1990, Ser. No. 459,508

The portion of the term of this patent subsequent to Oct. 24, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C08G 63/00

U.S. Cl. 521—182

19 Claims

1. The porous pills made by a process which consists essentially of (1) dissolving a polyester prepolymer in a suitable organic solvent; (2) recovering the polyester prepolymer from the organic solvent to produce a porous, fibrous mass of the polyester prepolymer; and (3) compacting the porous, fibrous mass into the porous pills.

# 4,957,946 CATIONICALLY POLYMERIZABLE MIXTURES CONTAINING METALLOCENE COMPLEX SALT OF CERTAIN CARBOXYLIC OR SULFONIC ACIDS

Kurt Meier, Bioningen, Switzerland, and Roger P. Salvin, Rhein, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 3, 1988, Ser. No. 202,739

Claims priority, application Switzerland, Jun. 5, 1987, 2147/87

Int. Cl.<sup>5</sup> C08F 2/50, 4/4 R, 16/12; C08G 59/68

U.S. Cl. 522—59

10 Claims

1. A mixture containing

- an epoxy resin, a vinyl ether or a vinyl ester and
- a compound of the formula I



in which a is 1 or 2, n is 1 or 2, R<sup>1</sup> is a substituted or unsubstituted  $\zeta$ -arene, R<sup>2</sup> is a substituted or unsubstituted  $\zeta$ -arene or cyclopentadienyl anion or indenyl anion, q is an integer from 1 to 3 and X is FSO<sub>3</sub><sup>−</sup> or a q-valent anion of an organic sulfonic acid or carboxylic acid, subject to the proviso that R<sup>1</sup> can also be a polymeric, aromatic ligand and that in such a case a is a number corresponding to the average number of complexed groups in the polymer ligand.

# 4,957,947 RADIATION-CURABLE COMPOSITION FOR FORMING AN ABRASION-RESISTANT ANTISTATIC LAYER

Janglin Chen, Rochester, and Billy R. Dotson, Spencerport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

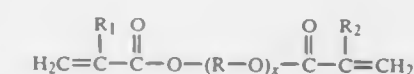
Filed Jun. 17, 1988, Ser. No. 207,816

Int. Cl.<sup>5</sup> G03C 1/82; C08F 216/12

U.S. Cl. 522—66

12 Claims

1. A radiation-curable composition useful in forming an abrasion-resistant antistatic layer, said composition consisting essentially of an alkali metal salt dissolved in a mixture of (1) a poly(alkylene glycol) diacrylate of the formula:



wherein R is an alkylene radical of 2 to 4 carbon atoms, R<sub>1</sub> and R<sub>2</sub> are independently H or CH<sub>3</sub>, and x is an integer having a value of from 3 to 50, and (2) an acrylic monomer containing at least three acrylic ester groups; said composition containing about 2 to about 20% by weight of said salt, about 15 to about 70% by weight of said poly(alkylene glycol) diacrylate and about 20 to about 80% by weight of said acrylic monomer.

# 4,957,948 BIOCIDAL PROTECTIVE COATING FOR HEAT EXCHANGER COILS

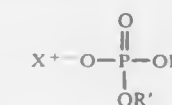
Claude E. Terry, Kennesaw, Ga., and Robert H. McIntosh, Sr., Greensboro, N.C., assignors to Interface, Inc., Atlanta, Ga.  
Continuation-in-part of Ser. No. 190,370, May 5, 1988, Pat. No. 4,908,209, which is a continuation-in-part of Ser. No. 47,561, Apr. 27, 1987, which is a continuation-in-part of Ser. No. 781,710, Oct. 2, 1985, which is a continuation-in-part of Ser. No. 635,728, Oct. 9, 1984, abandoned, which is a continuation-in-part of Ser. No. 713,445, Mar. 19, 1985, abandoned, which is a continuation-in-part of Ser. No. 736,652, May 21, 1985, Pat. No. 4,647,601, which is a continuation-in-part of Ser. No. 744,730, Jun. 13, 1985, abandoned, which is a continuation-in-part of Ser. No. 570,952, Mar. 8, 1984, Pat. No. 4,608,259, which is a continuation of Ser. No. 523,734, Aug. 16, 1983, abandoned, which is a continuation of Ser. No. 226,006, Nov. 9, 1981, abandoned, which is a continuation of Ser. No. 930,879, Aug. 4, 1978, abandoned. This application Sep. 9, 1988, Ser. No. 242,484  
Int. Cl.<sup>5</sup> B05D 1/18, 3/02

U.S. Cl. 523—122

33 Claims

1. A coating for heat exchangers, comprising:

- a water resistant organic polymeric material, wherein the material bonds to the surface of a heat exchanger; and
- a biocidally effective amount of a substituted phosphoric acid of the general formula



wherein X is selected from the group consisting of organic ions, H<sup>+</sup> Group I metals, Group II metals and transition metals, R and R' are selected from the group consisting of hydrocarbons and substituted hydrocarbons having not more than 24 carbon atoms, one of R or R', can be H, and there is at least one free hydroxyl group.

4,957,949  
THERMOCHROMIC COLOR MASTERBATCH  
Masayasu Kamada, Kusatsu; Toshihisa Maeda, Uji; Tadashi Kobayashi, Kyoto, and Goro Shimizu, Ootsu, all of Japan, assignors to Matsui Shikiso Chemical Co., Ltd., Kyoto, Japan  
Filed Oct. 28, 1988, Ser. No. 263,755

Claims priority, application Japan, Oct. 29, 1987, 62-274785; Jul. 25, 1988, 63-186137

Int. Cl.<sup>5</sup> C08K 9/04; C08L 91/06

U.S. Cl. 523—201

13 Claims

1. A thermochromic color masterbatch for use in a thermoplastic resin comprising a wax having substantially homogeneously dispersed therein a thermochromic granular material, said thermochromic granular material being a mixture of a thermochromic composition comprising 2 to 20% by weight of an electron donating chromogen, 4 to 40% by weight of an electron acceptor, and an alcohol, ester, azomethine or amide solvent having a boiling point 150° C. or higher, with 10 to 40 parts by weight of a thermosetting resin per 100 parts by





4,957,957  
POLYMER COMPOSITIONS CONTAINING AROMATIC SULFONAMIDE

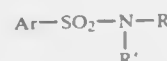
Robert A. Schleifstein, Baton Rouge, La., and David S. Pietrewicz, Elgin, S.C., assignors to Ethyl Corporation, Richmond, Va.

Filed Jun. 1, 1989, Ser. No. 359,528  
Int. Cl.<sup>5</sup> C08K 5/43

U.S. Cl. 524—169

9 Claims

1. A polyamide or polyolefin polymer composition containing a polybromoaromatic sulfonamide in quantity sufficient to improve the melt flow properties of the polymer, wherein the sulfonamide is represented by the general formula



where Ar is a bromoaromatic group having at least three bromine atoms bonded to the ring system and each R is a hydrocarbon group and each R' is hydrogen or a hydrocarbon group.

4,957,958  
AROMATIC BIS SULFONAMIDE-CONTAINING NYLON OR POLYESTER

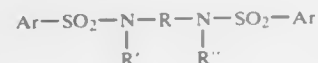
Robert A. Schleifstein, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed May 23, 1989, Ser. No. 355,559  
Int. Cl.<sup>5</sup> C08K 5/43

U.S. Cl. 524—169

11 Claims

1. A polyamide or polyester polymer containing an aromatic bis-sulfonamide wherein the aromatic bis-sulfonamide is represented by the general formula



where each Ar group is a mononuclear aryl group having 6 to 10 carbon atoms and from 1 to 5 bromine atoms, R is an alkylene, a cycloalkylene, or an arylene group having from 6 to 10 carbon atoms, and R' and R'' are identical to each other and are hydrogen or alkyl groups each having up to 12 carbon atoms.

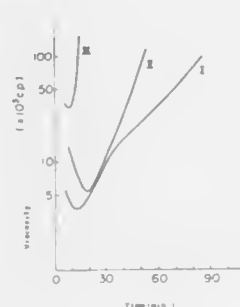
4,957,959  
PREPOLYMER COMPOSITION, PROCESS FOR ITS PRODUCTION, AND ITS USE

Yukio Matsumoto, and Nobuaki Kunii, both of Yokohama, Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan  
Filed Apr. 26, 1989, Ser. No. 343,373

Claims priority, application Japan, Apr. 26, 1988, 63-101225  
Int. Cl.<sup>5</sup> C08L 75/04

U.S. Cl. 524—196

27 Claims



1. A prepolymer composition which comprises 10 to 95% by weight of a first isocyanate-group-containing prepolymer (A) obtained by reacting an excess equivalent of an aromatic diiso-

cyanate (c) containing an isocyanate group directly bonded to the aromatic nucleus with an oxyethylene-group-containing polyoxyalkylene polyol (a) of a relatively high molecular weight; 90 to 5% by weight of a second isocyanate-group-containing prepolymer (B) obtained by reacting an excess equivalent of an organic diisocyanate (d) not containing an isocyanate group directly bonded to the aromatic nucleus with an oxyethylene-group-containing polyoxyalkylene polyol (b) of a relatively high molecular weight; and, as the case may be, an unreacted substance of diisocyanate which has been used in the production of said respective prepolymers (A) and (B), said prepolymer composition containing the isocyanate group in a range of from 3 to 15% by weight,

wherein said polyoxyalkylene polyol (a) and said polyoxyalkylene polyol (b) are either same or different each other, each consisting of at least one polyoxyalkylene polyol, and wherein said polyoxyalkylene polyol (a) and said polyoxyalkylene polyol (b) in total contain functional groups in an average number of above 2 but below 3 and have an average hydroxyl value of from 30 to 80 and an average content of the oxyethylene group of from 70 to 95% by weight.

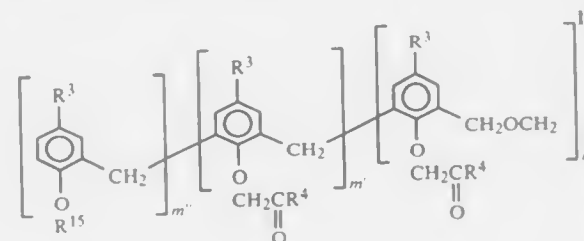
4,957,960  
ENCAPSULATING COMPOSITIONS  
Stephen J. Harris; John G. Woods, both of Dublin, Ireland; John M. Rooney, Basking Ridge, N.J.; Marueen G. MacManus, Dublin, and John Guthrie, Naas, both of Ireland, assignors to Loctite (Ireland) Ltd., Dublin, Ireland  
Division of Ser. No. 270,136, Nov. 14, 1988, Pat. No. 4,908,399, which is a continuation of Ser. No. 100,494, Sep. 24, 1987, abandoned, which is a continuation-in-part of Ser. No. 870,677, Jun. 4, 1986, Pat. No. 4,699,966, which is a continuation-in-part of Ser. No. 717,251, Mar. 28, 1985, Pat. No. 4,642,362, and Ser. No. 673,621, Nov. 21, 1984, Pat. No. 4,556,700, which is a continuation-in-part of Ser. No. 575,257, Jan. 30, 1984, abandoned, said Ser. No. 100,494, is a continuation-in-part of Ser. No. 88,945, Aug. 24, 1987, Pat. No. 4,866,198, which is a continuation-in-part of Ser. No. 914,691, Oct. 2, 1986, Pat. No. 4,718,966, which is a division of Ser. No. 776,536, Sep. 16, 1985, Pat. No. 4,636,539, which is a division of Ser. No. 673,621. This application Jan. 30, 1990, Ser. No. 472,596

Claims priority, application Ireland, Sep. 29, 1986, 2567/86 The portion of the term of this patent subsequent to Oct. 13, 2004, has been disclaimed.  
Int. Cl.<sup>5</sup> C08K 3/20

15 Claims

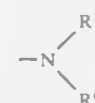
U.S. Cl. 524—243  
1. A curable composition suitable for the encapsulation of electronic devices, said composition comprising a curable silicone resin and an ion scavenger in an amount effective for reducing the level of metal ion, chloride ion or both metal ion and chloride ion extractables from said composition, said ion scavenger selected from the group consisting of:

(A) Calixarene or oxacalixarene derivatives represented by the formula



wherein  
 $m' + m'' = 0-8$ ;  
 $n = 0-8$ ;  
 $m' \geq \frac{1}{2}(m' + m'')$ ;

$3 \leq m' + m'' + n \leq 8$ ;  
if  $n = 0$ ,  $m' + m'' \geq 4$ ;  
the  $\text{R}^3$  groups are the same or different and are H, halogen, or hydrocarbyl or a substituted derivative thereof;  
 $\text{R}^4$  is hydrocarbyl, hydrocarbyloxy or a substituted derivative thereof; or  $\text{R}^4$  is



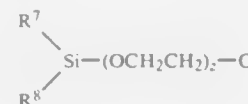
wherein

$\text{R}^5$  and  $\text{R}^6$  are the same or different and are H or hydrocarbyl or a substituted derivative thereof;

$\text{R}^{15}$  is H or hydrocarbyl or a substituted derivative thereof;

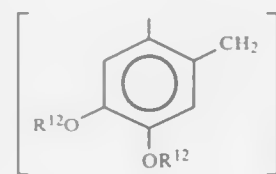
the calixarene or oxacalixarene derivative being present as a compound per se or being bound into the polymer network of the polymeric material;

(B) Silacrowns represented by the formula

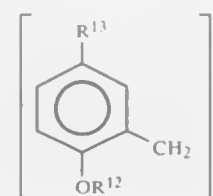


wherein  $\text{R}^7$  and  $\text{R}^8$  are the same or different and are hydrocarbyl, hydrocarbyloxy, or a nitrogen-substituted or other substituted derivative thereof;  $z$  is 3-6; and

(C) Polyalkylene ether derivatives represented by the formulae



or



wherein

$\text{R}^{12}$  is  $-(\text{R}^{10}-\text{O})_q-\text{R}^{11}$ ;

$q$  is an integer of from 2 to 25;

$\text{R}^{10}$  is a substituted or unsubstituted alkyl residue having 2 to 6 carbon atoms, the  $(\text{R}^{10}-\text{O})$  groups containing the same alkyl residue or containing different alkyl residues distributed on the chain in a random or block manner;

$\text{R}^{11}$  is hydrogen, hydrocarbyl or a substituted derivative thereof;

$\text{R}^{13}$  is hydrogen, halogen, or hydrocarbyl or a substituted derivative thereof; and

$X$  is an integer from 4 to 8.

4,957,961  
MODIFIED FLUOROPOLYMERS FOR LOW FLAME/LOW SMOKE PLENUM CABLES  
Swayambu Chandrasekaran, Mountain Lakes; Nikhil K. Kundel, Piscataway; Brij Garg, Succasunna, and Hong B. Chin, Parsippany, all of N.J., assignors to Ausimont, U.S.A., Inc., Morristown, N.J.

Filed Mar. 30, 1989, Ser. No. 332,398  
Int. Cl.<sup>5</sup> C08K 3/22; C08L 27/12

U.S. Cl. 524—405

24 Claims

1. A composition for insulating or jacketing wires or cables comprising from about 90 wt. % to about 99.8 wt. % of a fluorinated polymer and from about 0.2 wt. % to about 10 wt. % of zinc borate [ $\text{ZnCO}_3$ ].

4,957,962  
FIBER COMPOSITES  
Matthias Winkler; Peter Ittemann, both of Ludwigshafen, and Gerhard Heinz, Weisenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 271,238  
Claims priority, application Fed. Rep. of Germany, Nov. 14, 1987, 3738749

Int. Cl.<sup>5</sup> C08K 7/04, 7/14; C08L 61/18, 77/00

U.S. Cl. 524—538

10 Claims

1. A fiber reinforced composite containing:  
(1) from 80 to 30% by volume of oriented continuous reinforcing fibers, and  
(2) from 20 to 70% by volume of a highly heat-resistant thermoplastic mixture containing from 90 to 40% by weight of a polyether sulfone and from 10 to 60% by weight of one or more of a polyether ketone containing only oxo- and keto-bridging groups.

4,957,963  
SILICONE WATER BASED ELASTOMERS  
Stephanie A. Burns; Donald T. Liles, and Christine J. Schoenherr, all of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.  
Continuation of Ser. No. 229,206, Aug. 5, 1988, abandoned. This application Aug. 30, 1989, Ser. No. 401,485

Int. Cl.<sup>5</sup> C08L 83/07, 83/06; C08K 3/36

U.S. Cl. 524—837

4 Claims

1. An aqueous silicone emulsion which cures to a reinforced elastomer upon removal of the water comprising  
(A) an aqueous, anionic emulsion of crosslinkable hydroxy terminated polydiorganosiloxane having a molecular weight of greater than 50,000,  
(B) an anionic, stable dispersion of fumed silica in water, and  
(C) sufficient vinyl trialkoxy silane crosslinking system for (A).

4,957,964  
THERMOPLASTIC RESIN COMPOSITION  
Ryozi Okumura; Eiichi Terada, both of Sodegaura, and Shigemitsu Kawazoe, Ichihara, all of Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 228,784, Aug. 4, 1988, abandoned, which is a continuation of Ser. No. 838,756, Mar. 12, 1986, abandoned. This application Feb. 14, 1990, Ser. No. 481,662  
Claims priority, application Japan, Mar. 29, 1985, 60-63692  
Int. Cl.<sup>5</sup> C08L 51/04

U.S. Cl. 525—64

6 Claims

1. A thermoplastic resin composition which comprises:  
(A) from 50 to 90 parts by weight of a copolymer of styrene and maleic anhydride which contains from 1 to 30% by weight maleic anhydride;  
(B) from 50 to 10 parts by weight of a thermoplastic resin which is a copolymer of 60% to 90% by weight of butadiene rubber, 40% to 2% by weight styrene and 40% to 2% by weight of methyl methacrylate; and



(C) from 0.01 to 1.0 parts by weight of an organopolysiloxane having a viscosity of from 10 to 100,000 centistokes at 30° C. which is selected from the group consisting of dimethyl polysiloxanes, methyl phenyl polysiloxanes and diphenyl polysiloxanes.

4,957,965

## THERMOPLASTIC MOLDING MATERIALS

Christof Taubitz, Wachenheim; Klaus Muehlbach, Heppenheim; Hermann Brandt, Schifferstadt, and Klaus Boehlke, Hesse, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
Filed Aug. 5, 1988, Ser. No. 228,720

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1987, 3726283

Int. Cl.<sup>5</sup> C08L 71/12, 77/00

U.S. Cl. 525—66

4 Claims

1. A thermoplastic molding material containing, as essential components,

- (A) 5–95% by weight of a polyamide,  
(B) 5–95% by weight of a modified polyphenylene ether, prepared from  
(b<sub>1</sub>) 4.95–99.9% by weight of a polyphenylene ether,  
(b<sub>2</sub>) 90% or less by weight of a vinylaromatic polymer,  
(b<sub>3</sub>) 0.05–10% by weight of  
(b<sub>31</sub>) an  $\alpha,\beta$ -unsaturated dicarbonyl compound,  
(b<sub>4</sub>) 0–80% by weight of further graft-active monomers and  
(b<sub>5</sub>) 0.01–0.09% by weight of a free radical initiator.

4,957,966

## THERMOPLASTIC RESIN COMPOSITION

Taichi Nishio; Hiroomi Abe; Yasuhiro Suzuki; Takashi Sanada; Satoru Hosoda, all of Chiba, and Takayuki Okada, Ehime, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

Filed Jun. 7, 1988, Ser. No. 203,187

Claims priority, application Japan, Jun. 10, 1987, 62-145463

Int. Cl.<sup>5</sup> C08L 71/12, 77/00

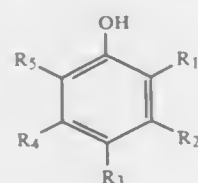
U.S. Cl. 525—66

9 Claims

1. A thermoplastic resin composition comprising a matrix of polyamide resin (E) and a disperse phase of a composition (D) which is obtained by melting and mixing the composition (D) and the polyamide resin (E),

said composition (D) being obtained by melting and mixing a polyphenylene ether (A) together with a rubber-like material (B) and a mutual compatibilizer (C),

said polyphenylene ether (A) being obtained by oxidation polymerization of at least one phenol compound represented by the formula:



wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> represent a hydrogen atom, a halogen atom or a substituted or unsubstituted hydrocarbon residue, with a proviso that at least one of them is a hydrogen atom, and said polyphenylene ether (A) having a reduced viscosity  $\eta_{sp}/c$  of 0.40–0.58 deciliter/gram,

said mutual compatibilizer (C) being reactive with said polyphenylene ether and reactive with said polyamide resin, and

said polyamide resin (E) having a number average molecular weight of 14,000–30,000 and an end amino group content of 50–90 mmole/kg,

wherein the thermoplastic resin composition constitutes 1–65 wt. % of said polyphenylene ether (A), 1–20 wt. % of said rubber-like material (B), 0.01–5 wt. % of said mutual compatibilizer (C) and 35–97.99 wt. % of said

polyamide resin (E), based on the total weight of said thermoplastic resin composition, and the weight average particle size of said disperse phase is 2 microns or less.

4,957,967

## THERMOPLASTIC RESIN COMPOSITION

Yukio Mizuno, and Takashi Maruyama, both of Chiba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jun. 22, 1989, Ser. No. 370,334

Claims priority, application Japan, Jun. 30, 1988, 63-165376

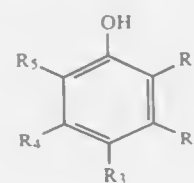
Int. Cl.<sup>5</sup> C08L 71/12, 61/28, 67/02

U.S. Cl. 525—68

5 Claims

1. A thermoplastic resin composition which comprises:

- (A) 100 parts by weight of a composition comprising 95–5% by weight of a polyphenylene ether obtained by oxidation polymerization of at least one phenol compound represented by the following formula:



wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> (which may be identical or different), each represents a hydrogen atom, a halogen atom, a hydrocarbon radical or a substituted hydrocarbon radical and at least one of them is a hydrogen atom, and 5–95% by weight of a thermoplastic polyester which is a polycondensation product of a dicarboxylic acid or its functional derivative and a diol compound or its functional derivative, and

- (B) 0.01–10 parts by weight of an amino resin obtained by modifying, with an alcohol, an addition reaction product of formaldehyde and at least one compound selected from the group consisting of melamine, guanamine and urea.

4,957,968

## ADHESIVE THERMOPLASTIC ELASTOMER BLENDS

Ashok M. Adur, Hackettstown, N.J., and Robert C. Constable, Bangor, Pa., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 9, 1988, Ser. No. 230,192

Int. Cl.<sup>5</sup> C08L 51/06, 23/26

U.S. Cl. 525—74

9 Claims

1. An adhesive thermoplastic elastomer composition consisting essentially of:

- (a) about 15 to 40 weight percent of at least one polyolefin selected from the group consisting of polyethylene, polypropylene and mixtures thereof, modified by grafting with an unsaturated an aliphatic carboxylic acid or its derivatives selected from the group consisting of acid anhydride, acid chloride, isocyanate, oxazoline, epoxide, amine and hydroxide;  
(b) about 10 to 70 weight percent of at least one other non-elastomeric polyolefin resin prepared from at least one monomer selected from the group consisting of: butene, isobutylene, octene-1, 4-methyl pentene-1, ethylene, propylene, hexene-1 or mixtures thereof; and  
(c) about 20–80 weight percent of at least one partially cured olefinic elastomer, selected from the group consisting of elastomeric ethylene-propylene copolymer, elastomeric ethylene-propylene copolymers, elastomeric ethylene-propylene terpolymers, polyisoprene, polyisobutylene, polybutadiene, and natural rubber;

wherein said partial cure of the elastomer is attained by a curing agent comprising about 1 to 99 percent of the amount necessary for a substantially complete cure.

4,957,969

## IMPROVED BLENDS OF LINEAR LOW DENSITY ETHYLENE COPOLYMERS

Pradeep P. Shirodkar, Somerset, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 10, 1989, Ser. No. 295,430

Int. Cl.<sup>5</sup> C08L 23/18, 55/02, 23/08

U.S. Cl. 525—86

19 Claims

1. A film-forming polymer blend comprising, as the polymeric components, at least 50 wt. % of a linear low density copolymer of ethylene with an olefin containing 4 to 10 carbon atoms, and about 1 to 25 wt. % in an amount to improve antiblocking properties of an ABS resin, based on the total polymer content of the blend.

4,957,970

## PACKAGE FOR COMPOUNDING RUBBER AND COMPOUNDED RUBBER

Ronald L. Holsapple, Uniontown, and John A. Kay, Stow, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 23, 1989, Ser. No. 299,869

Int. Cl.<sup>5</sup> C08L 7/00, 9/00, 9/02, 9/06

U.S. Cl. 525—99

3 Claims

1. A compounded rubber prepared from a mixture of a package of compounding ingredients for unvulcanized sulfur curable rubber and unvulcanized sulfur curable rubber wherein said package comprises sulfur curable compounding ingredients for unvulcanized rubber packaged in a protective film having a thickness in the range of about 0.5 to about 5 mils and comprising an unvulcanized syndiotactic-1,2-polybutadiene (SPBD) having at least 90 percent of its monomeric units in a syndiotactic-1,2-configuration and having a melting point in the range of about 70° C. to about 100° C. and, based on 100 parts by weight of said SPBD, about 1 to about 5 parts by weight sulfur, about 0.5 to about 3 parts by weight of at least one rubber cure accelerator and about 0.1 to about 2 parts by weight of at least one rubber cure retarder.

4,957,971

## TRANS-6-(2-(N-HETEROARYL-3,5-DISUBSTITUTED)-PYRAZOL-4-YL)-ETHYL-OR ETHENYL-TETRAHYDRO-4-HYDROXYPIRAN-2-ONE

INHIBITORS OF CHOLESTEROL BIOSYNTHESIS  
Joseph A. Picard; Bruce D. Roth, both of Ana Arbor, and Drago R. Sliskovic, Ypsilanti, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

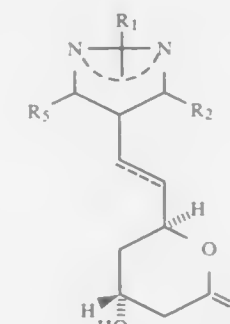
Continuation-in-part of Ser. No. 48,473, May 18, 1987, Pat. No. 4,808,621, which is a continuation-in-part of Ser. No. 882,327, Jul. 7, 1986, abandoned. This application Dec. 6, 1988, Ser. No. 280,756

Int. Cl.<sup>5</sup> C07D 403/04, 405/06; A61K 31/495, 31/505

U.S. Cl. 514—252

7 Claims

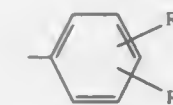
1. A compound of structural formula I



wherein R<sub>1</sub> is 2-, 4-, or 5-pyrimidinyl; or 2-pyrazinyl; and wherein R<sub>1</sub> is attached to one of the nitrogen atoms of the pyrazole nucleus;

R<sub>2</sub> is alkyl of from one to three carbon atoms or trifluoromethyl;

R<sub>5</sub> is a saturated carbocyclic ring of from four to seven carbon atoms optionally substituted with alkyl of from one to three carbon atoms; 2-norbornyl; 2-norbornenyl; bicyclo[2.2.2]octyl; or



wherein R<sub>3</sub> is alkyl of from one to three carbon atoms, chlorine or fluorine, and R<sub>4</sub> is hydrogen, alkyl of from one to three carbon atoms, chlorine, or fluorine;

or a ring-opened hydroxy acid or ester derived therefrom, N-oxides thereof or a pharmaceutically acceptable salt thereof.

4,957,972

## BLENDS OF LINEAR LOW DENSITY ETHYLENE COPOLYMERS

Pradeep P. Shirodkar, Somerset, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 3, 1988, Ser. No. 266,957

Int. Cl.<sup>5</sup> C08L 23/20, 23/18, 23/08

U.S. Cl. 525—240

17 Claims

1. A polymer blend comprising polymers consisting of a linear low density copolymer of ethylene with an olefin containing 4 to 10 carbon atoms and about 2 to 10 wt. % of an at least partially isotactic, partially crystalline butene-1 polymer comprising at least about 80 wt. % of polymerized butene-1.

4,957,973

## UNCATALYZED PROCESS FOR PREPARING "LIVING" POLYMERS

Dotsevi Y. Sogah, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 883,320, Jul. 8, 1986,

abandoned. This application Sep. 22, 1987, Ser. No. 99,745

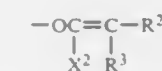
Int. Cl.<sup>5</sup> C08F 293/00, 30/08

U.S. Cl. 525—280

18 Claims

1. Polymerization process for preparing a "living" polymer, said process comprising contacting at least one polar acrylic or maleimide monomer with a tetracoordinate organosilicon polymerization initiator having at least one initiating site in the absence of a co-catalyst and at a pressure greater than about 50 MPa, wherein the initiator is of the formula (Q')<sub>3</sub>MZ<sup>1</sup>, (Q')<sub>2</sub>M(Z<sup>1</sup>)<sub>2</sub> (Z<sup>1</sup>(Q')<sub>2</sub>M)<sub>2</sub>O or (Q')<sub>3</sub>MZ<sup>2</sup> wherein:

each Q', independently, is selected from R<sup>1</sup>, OR<sup>1</sup>, SR<sup>1</sup> and N(R<sup>1</sup>)<sub>2</sub>  
M is Si;  
Z<sup>1</sup> is



Z<sup>2</sup> is —CN or —NC;  
X<sup>2</sup> is —OSi(R<sup>1</sup>)<sub>3</sub>, —R<sup>6</sup>, —OR<sup>6</sup> or —NR<sup>6</sup>R<sup>7</sup>;

R<sup>6</sup> is

- (a) a hydrocarbyl radical which is an aliphatic, alicyclic, aromatic or mixed aliphatic-aromatic radical containing up to 20 carbon atoms;  
(b) a polymeric radical containing at least 20 carbon atoms;  
(c) a radical of (a) or (b) containing one of more ether oxygen atoms within aliphatic segments thereof;  
(d) a radical of (a), (b) or (c) containing one or more func-

tional substituents that are unreactive under polymerizing conditions; or  
 (e) a radical of (a), (b), (c) or (d) containing one or more initiating sites;  
 each  $R^1$ , independently, is a hydrocarbyl radical which is an aliphatic, alicyclic, aromatic or mixed aliphatic-aromatic radical containing up to 20 carbon atoms or  $-H$ , provided that at least one  $R^1$  group is not  $-H$ ;  
 each of  $R^2$  and  $R^3$  is independently selected from  $-H$  and hydrocarbyl, defined as for  $R^6$  above, subparagraphs (a) to (e); and  
 each of  $R'$  and  $R''$  is independently selected from  $C_{1-4}$  alkyl.

4,957,974  
**GRAFT COPOLYMERS AND BLENDS THEREOF WITH POLYOLEFINS**

Casmir S. Ilenda, Hulmeville; Newman Bortnick, Oreland, both of Pa.; Roger K. Graham, Moorestown, N.J., and William J. Work, Huntingdon Valley, Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 174,648, Mar. 29, 1988, abandoned. This application Mar. 1, 1989, Ser. No. 315,501  
 Int. Cl.<sup>5</sup> C08F 255/02, 267/02

U.S. Cl. 525—301

8 Claims

1. A graft copolymer capable of imparting to a polyolefin when blended therewith a relatively high tensile modulus and high resistance to sagging without increasing melt viscosity, the copolymer comprising:

- (a) a non-polar polyolefin trunk selected from the group consisting of polyethylene, polypropylene, polybutylene, poly(4-methylpentene), copolymers of said olefins with each other, and one or more copolymers of said olefins with minor amounts of 1-alkenes, vinyl esters, vinyl chloride, (meth)acrylic ester, and (meth)acrylic acid, said trunk having a Mw of between about 50,000 and 1,000,000; and  
 (b) at least one methacrylate chain grafted with a covalent bond to said trunk having a weight ratio with said trunk of from about 1:9 to about 4:1, said chain being a polymer derived from at least about 80% of a monomer of a methacrylic ester of the formula  $CH_2=C(CH_3)COOR$ , where R is alkyl, aryl, substituted alkyl, substituted aryl, or substituted alkaryl, and less than about 20% of an acrylic or styrenic monomer copolymerizable with the methacrylic ester, said chain having a Mw of from about 20,000 to 200,000.

4,957,975  
**FLUOROELASTOMER COMPOSITION WITH LOW TENDENCY TO FOUL MOLDS**

Dana P. Carlson, Chadds Ford, Pa., and Walter W. Schmieg, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

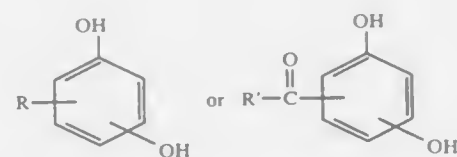
Filed Mar. 14, 1988, Ser. No. 167,868  
 Int. Cl.<sup>5</sup> C08F 8/00

U.S. Cl. 525—340

14 Claims

1. A fluoroelastomer composition that exhibits low tendency to foul mold cavities which comprises:

- (a) a fluoroelastomer comprising vinylidene fluoride units and units of at least one other fluorine-containing monomer copolymerizable with vinylidene fluoride, said monomer containing 2-7 carbon atoms and containing at least as many fluorine atoms as carbon atoms;  
 (b) a crosslinking agent selected from the group consisting of a bisphenol or a polyhydroxy phenol of the formula:



wherein R is H, or an alkyl group or aryl group and  $R'$  is an alkyl group or an aryl group,  
 (c) a divalent metal oxide or hydroxide as an acid acceptor;  
 (d) 0.2-4 parts by weight per 100 parts by weight fluoroelastomer of a crosslinking accelerator which is a quaternary ammonium salt of the formula  $R''_4N^+X^-$  wherein each  $R''$  is independently an alkyl group of 2-4 carbon atoms and  $X^-$  is selected from the group consisting of fluoride, dihydrogen phosphate, periodate, acetate, hydrogen sulfate, methane sulfonate, toluene sulfonate, or an anion of a bisphenol or a polyhydroxy phenol of (b) above.

4,957,976  
**PROCESS FOR PREPARING DIENE POLYMER RUBBERS**

Hiroyoshi Takao, Chiba; Akio Imai, Ichihara; Tomoski Seki, Ichihara, and Mitsuji Tsuji, Ichihara, all of Japan, assignors to Sumitomo Chemical Company Limited, Osaka, Japan

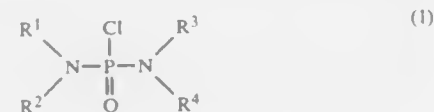
Continuation of Ser. No. 126,338, Nov. 30, 1987, abandoned. This application Sep. 29, 1989, Ser. No. 415,380

Claims priority, application Japan, Dec. 1, 1986, 61-287091; Dec. 27, 1986, 61-315210; Dec. 27, 1986, 61-315211; Jan. 28, 1987, 62-19262; Jan. 28, 1987, 62-19263; Feb. 16, 1987, 62-32782  
 Int. Cl.<sup>5</sup> C08F 8/40

U.S. Cl. 525—340

6 Claims

1. A process for preparing a modified diene polymer which comprises reacting an alkali metal-containing conjugated diene polymer with a phosphoryl chloride compound of the formula (I):



wherein each of  $R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$  is an alkyl group, said alkali metal-containing conjugated diene polymer being a living polymer having an alkali metal end prepared by a polymerization of a conjugated diene monomer or a mixture of a conjugated diene monomer and an aromatic vinyl monomer in a hydrocarbon solvent in the presence of an alkali metal-based catalyst, or a polymer to which an alkali metal is introduced by an addition reaction of a diene polymer having conjugated diene units in the polymer chain and an alkali metal-based catalyst in a hydrocarbon solvent.

4,957,977  
**VINYLAMINE COPOLYMER, FLOCCULATING AGENT ETC.**

Takaharu Itagaki, Yokohama; Mitsuaki Shiraga, Machida; Shigeru Sawayama, Yokohama, and Kohichi Satoh, Zama, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

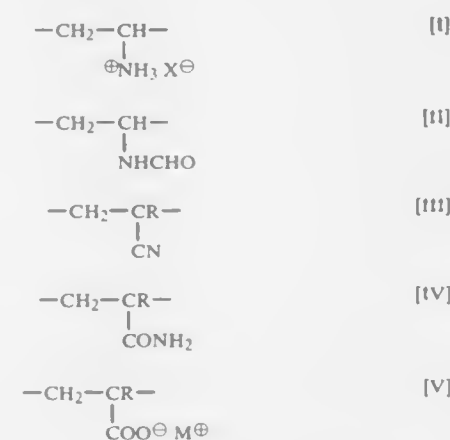
Continuation of Ser. No. 65,296, Jun. 22, 1987, abandoned. This application Jan. 25, 1990, Ser. No. 470,395

Claims priority, application Japan, Jun. 25, 1986, 61-148680  
 Int. Cl.<sup>5</sup> C08F 8/12

U.S. Cl. 525—328.4

20 Claims

1. A vinylamine copolymer having the structural units represented by the following formulas (I), (II), (III), (IV) and (V):



wherein  $X^-$  represents an anion, R represents a hydrogen atom or a methyl group,  $M^+$  represents a hydrogen ion or a monovalent cation, in which the molar fraction of the structural unit (I) is 5 to 85% by mole, the molar fraction of the structural unit (II) is 2 to 85% by mole, the molar fraction of the structural unit (III) is 5 to 80% by mole, the molar fraction of the structural unit (IV) is 0 to 40% by mole, all of said molar fractions being based on the vinylamine copolymer, and the molar fraction of the structural unit (V) is 0 to 8% by mole which is based on the total content of the structural units (III), (IV) and (V) and the total of the molar fractions of the structural units I-V is equal to 100%.

4,957,978  
**POLY(ARYL ETHER SULFONE) COMPOSITIONS HAVING IMPROVED FLOW PROPERTIES**

James E. Harris, Evans, Ga., assignor to Amoco Corporation, Chicago, Ill.

PCT No. PCT/US88/02541, § 371 Date Feb. 13, 1989, § 102(e) Date Feb. 13, 1989, PCT Pub. No. WO89/01003, PCT Pub. Date Feb. 9, 1989

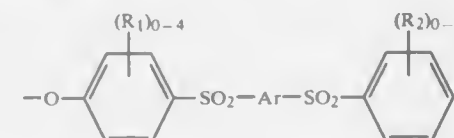
Continuation-in-part of Ser. No. 78,460, Jul. 27, 1987, Pat. No. 4,818,803. This PCT application Jul. 27, 1988, Ser. No. 344,289 The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C08G 65/48, 65/38; C08C 8/02; C08F 283/00

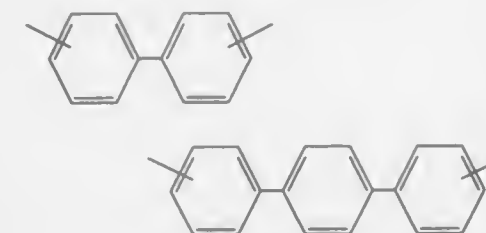
U.S. Cl. 525—390

12 Claims

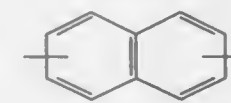
1. A poly(aryl ether sulfone) composition having improved flow properties comprising an immiscible blend of (a) from about 80 to about 99 percent by weight of a poly(aryl ether sulfone) having a second order glass transition temperature ( $T_g$ ) higher than about 240° C., which consists essentially of units of the formula:



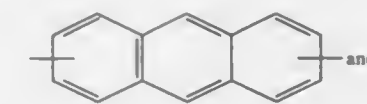
wherein Ar is selected from the group of:



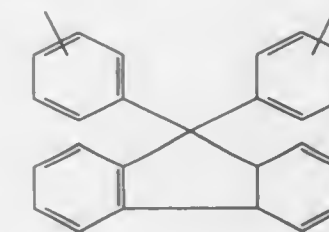
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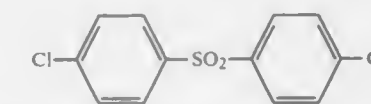
or isomers thereof



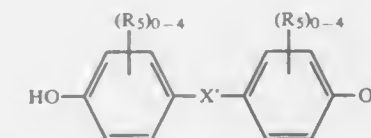
or isomers thereof



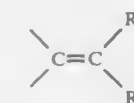
and  $R_1$  and  $R_2$  are  $C_1$  to  $C_4$  alkyl or alkoxy groups and can be the same or different, and (b) from about 1 to about 20 percent by weight of a second poly(aryl ether sulfone) having a  $T_g$  lower than about 225° C, which poly(aryl ether sulfone) is prepared by the nucleophilic polycondensation reaction of:



with bisphenols of the formula:



wherein  $X'$  is selected from the group consisting of alkylene and alkylidene radicals having up to and inclusive eight carbon atoms, cyclo-alkylene and cycloalkylidene radicals having up to and inclusive nine carbon atoms, S, CO, and the radicals:



the  $R_5$ 's are hydrogen or  $C_1$  to  $C_4$  alkyl or alkoxy radicals or halogen atoms and can be the same or different; the  $R_6$ 's are hydrogen or  $C_1$  to  $C_4$  alkyl radicals or halogen atoms and can be the same or different.



4,957,979  
METHOD OF MAKING AND USING THERMOPLASTIC  
BLOCK COPOLYMERS

Italo Albini, Pavia, Italy; Werner Gruber, Korschbroich, Fed. Rep. of Germany; Norbert Wiemers, Monheim, Fed. Rep. of Germany; Juergen Wichelhaus, Wuppertal, Fed. Rep. of Germany; Roberto Leoni, Mailand, Italy, and Angela Rossini, Mailand, Italy, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany. Continuation of Ser. No. 102,280, Sep. 28, 1987, abandoned, which is a continuation of Ser. No. 829,377, Feb. 13, 1986, abandoned. This application Dec. 5, 1988, Ser. No. 281,861. Claims priority, application Fed. Rep. of Germany, Feb. 13, 1985, 3504805.

Int. Cl.<sup>5</sup> C08G 69/48  
U.S. Cl. 525—420.5 11 Claims

1. A method of making a thermoplastic poly(amide-urethane) block copolymer having excellent flexibility at low temperatures and excellent adhesion properties, comprising reacting:

- a substantially linear polyamide having terminal groups selected from the group consisting of carboxyl and amino groups, the polyamide being obtained by reacting a dimerized fatty acid and an aliphatic or a cycloaliphatic diamine; and
  - one or more prepolymers selected from the group consisting of substantially linear, isocyanate-terminated aliphatic polyethers and reaction products of said aliphatic polyethers with 2,3-epoxy propanol;
- to form a block copolymer product containing substantially no free isocyanate groups or epoxide groups.

4,957,980  
POLYESTER RESIN COMPOSITION AND HOLLOW  
MOLDED ARTICLE THEREOF

Shigeo Kobayashi; Toshio Hiramatsu; Katsumasa Yamamoto, and Nobuhiko Ichikawa, all of Ohtsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan. Filed Aug. 8, 1988, Ser. No. 229,463.

Int. Cl.<sup>5</sup> C08L 77/00

U.S. Cl. 525—425 1 Claim

1. A polyester resin composition which comprises 100 parts by weight of a thermoplastic polyester resin (A), 1 to 100 parts by weight of a polyamide resin having metaxylylene group (B) and 0.01 to 50 parts by weight of a compatibilizing agent (C), wherein the compatibilizing agent (C) is a modified copolyester resin obtained by grafting maleic anhydride to a copolyester of terephthalic acid, ethylene glycol and cyclohexane dimethanol.

4,957,981  
INTERPENETRATING POLYMER NETWORK OF AN  
ALIPHATIC POLYOL(ALLYL CARBONATE) AND  
EPOXY RESIN

Jan André J. Schutyser, Dieren, and Tjerk O. Boonstra, Arnhem, both of Netherlands, assignors to Akzo N.V., Netherlands. Filed Feb. 1, 1990, Ser. No. 473,488.

Claims priority, application Netherlands, Feb. 10, 1989, 8900323.

Int. Cl.<sup>5</sup> C08L 47/00 2 Claims

1. A polymeric material based on an aliphatic polyol(allyl carbonate), the polymeric material comprised of an interpenetrating polymer network of a polymerizate of the aliphatic polyol(allyl carbonate) and an aliphatic or cycloaliphatic epoxy resin.

4,957,982  
PROCESS FOR REDUCING REACTOR FOULING  
DURING POLYMERIZATION IN AN AQUEOUS  
MEDIUM

Kenneth R. Geddes, Clitheroe, England, assignor to Crown Decorative Products Limited, Derby, England. Filed Jul. 6, 1988, Ser. No. 215,765.

Claims priority, application United Kingdom, Jul. 10, 1987, 8716377.

Int. Cl.<sup>5</sup> C08F 2/16, 2/22 4 Claims

1. A process for the production of emulsion, dispersion, latex or bead polymers in a water medium in a polymerization reactor wherein the reactor exposed surfaces are coated with a film of oleophobic-hydrophobic polymeric material of surface energy in the range of about 10–15 dynes/cm which is insoluble in, undamaged by, unreactive with and unwetted by the raw materials or reaction products of the process.

4,957,983  
METHOD FOR PROVIDING IMPROVED COLLOIDAL  
STABILITY AND POLYVINYL CHLORIDE USING A  
HOT CHARGE POLYMERIZATION PROCEDURE WITH  
EMULSIFIER PACKAGE

Roman B. Hawrylko, Avon Lake, Ohio, and Richard A. Widdifield, Niagara Falls, Canada, assignors to The B. F. Goodrich Company, Akron, Ohio. Filed Jun. 7, 1989, Ser. No. 362,627.

Int. Cl.<sup>5</sup> C08F 2/20 9 Claims

1. A polymerization method comprising the steps of:  
(a) forming a mixture of vinyl chloride monomer and optional vinyl chloride comonomer and water in a reaction vessel, and bringing said mixture to a reaction temperature of more than about 40° C.;  
(b) allowing an initial period of from 0 to 15 minutes to elapse;  
(c) adding an emulsifier package to said reaction vessel, said emulsifier package comprising a partially saponified polyvinyl alcohol emulsifier having a degree of saponification of from about 60 to about 90 mole percent and a methanol index at 55° C. of up to about 60 percent and a secondary emulsifier comprising a substituted cellulosic dispersant;  
(d) allowing a second period of from 0 to 15 minutes to elapse; and  
(e) adding an effective amount of a catalyst to cause said polymerization to begin.

4,957,984  
PROCESS FOR PRODUCING HIGHLY WATER  
ABSORPTIVE POLYMER

Kiichi Itoh; Takeshi Shibano; Shuhei Yada, and Shinji Tsunoi, all of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Company Limited, Tokyo, Japan. Filed Jun. 16, 1989, Ser. No. 367,312.

Claims priority, application Japan, Jun. 16, 1988, 63-149151; Jul. 22, 1988, 63-183365.

Int. Cl.<sup>5</sup> C08F 30/04 6 Claims

1. A process for producing a highly water absorptive polymer, which comprises subjecting an aqueous solution of partially neutralized sodium acrylate wherein 20 to 45% of the carboxyl group has been neutralized to its sodium salt, the concentration of said partially neutralized sodium acrylate in the aqueous solution being 55 to 80% by weight, to solution polymerization in the presence of a crosslinking agent and 0–20 mol % based on said partially neutralized sodium acrylate of at least one basic vinyl monomer selected from the group consisting of (meth)acrylamide, N,N-dimethyl(meth)acrylamide, dimethylaminoethyl(meth)acrylamide, 2-vinylpyridine, and 4-vinylpyridine with the use of a water soluble radical polymerization initiator.

4,957,985  
FLUORINE-SUBSTITUTED HYDROCARBON GROUP  
GRAFTED (METH)ACRYLATE POLYMERS

Tokinori Agou, Ohno; Takeshi Sakashita, Iwakuni; Tomoaki Shimoda, Waki; Masaru Sudo, Ohtake; Masahiro Kawabara, Waki, and Masahide Tanaka, Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan. Filed Dec. 29, 1987, Ser. No. 138,653.

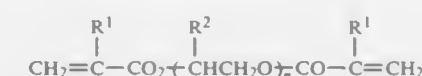
Claims priority, application Japan, May 18, 1987, 62-118956; Dec. 29, 1987, 61-312934.

Int. Cl.<sup>5</sup> C08F 265/04, 120/28, 220/28 12 Claims

1. A fluorine-containing, hydrophilic, oxygen permeable, gelled, crosslinked polymer having water swellability comprising as an essential monomer component a fluorine-containing (meth)acrylate monomer composed of a (meth)acrylate ester monomer represented by the following general formula (I)



or the following general formula (II)



wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> each represent a hydrogen atom or a methyl group, R<sup>4</sup> represents a hydrocarbon group having 1 to 30 carbon atoms or a hydrocarbon group having 1 to 30 carbon atoms which contains not more than 61 oxygen or fluorine atoms, and m and n each represent an integer of 1 to 1,000, and graft-bonded to the alkylene group in the main chain of the (meth)acrylate monomer, at least one fluorine-substituted hydrocarbon group having 1 to 30 carbon atoms and at least three fluorine atoms, per molecule of the (meth)acrylate monomer.

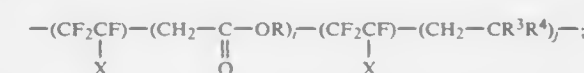
4,957,986  
PARTIALLY FLUORINATED POLYESTERS FROM  
KETENE ACETALS AND FLUORINE MONOMERS

Harry N. Cripps, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 227,139, Aug. 2, 1988. This application Dec. 15, 1989, Ser. No. 451,002.

Int. Cl.<sup>5</sup> C08F 14/22, 14/26, 14/28 7 Claims

1. A partially fluorinated polyester terpolymer of the formula:



wherein

X = F, CF<sub>3</sub>, Cl, Br, I, OCF<sub>3</sub>, OCF<sub>2</sub>CF<sub>3</sub>, OCF<sub>2</sub>CF<sub>2</sub>CF<sub>3</sub>, or OCF<sub>2</sub>CF(CF<sub>3</sub>)O(CF<sub>2</sub>)<sub>2</sub>CF<sub>3</sub>;

R = ≡(CHR<sup>1</sup>(CH<sub>2</sub>)<sub>n</sub>CHR<sup>2</sup>)—(where

n = 0–2) or —(CH<sub>2</sub>—CH—CH—CH<sub>2</sub>)—



R<sup>1</sup> and R<sup>2</sup> are independently H, C<sub>1</sub>–C<sub>4</sub> alkyl or phenyl

R<sup>3</sup> = H, C<sub>1</sub>–C<sub>4</sub> alkyl

R<sup>4</sup> = H, C<sub>1</sub>–C<sub>4</sub> alkyl, C<sub>1</sub>–C<sub>4</sub> alkoxy

0.1 ≤ i ≤ 1.9 and j = 2.

4,957,987  
ACRYLATE RESINS AS BINDERS FOR COLOR  
CONCENTRATES

Manfred Krieg, Darmstadt; Hans Lichtenstein, Babenhausen; Ludwig Hosch, Michelstadt, and Guenther Ittmann, Gross-Umstadt, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany.

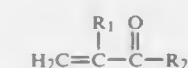
Division of Ser. No. 004,239, Jan. 2, 1987, Pat. No. 4,773,913, which is a continuation of Ser. No. 821,866, Jan. 22, 1986, abandoned, which is a continuation of Ser. No. 623,026, Jan. 21, 1989, abandoned. This application Apr. 25, 1988, Ser. No. 185,446.

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1983, 3323951.

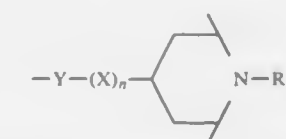
Int. Cl.<sup>5</sup> C09B 67/00; C08F 26/00 7 Claims

1. A color concentrate, suitable for dispersion in a synthetic resin for coloring the same, said concentrate consisting essentially of a colorant dispersed in a polymeric binder consisting essentially of

- 70–90 percent, by weight of the polymer, of methyl ethacrylate,
- 10–20 percent, by weight of the polymer, of methyl acrylate, and
- 0.1–10 percent, by weight of the polymer, of a free radically polymerizable monomer of the formula



wherein R<sub>1</sub> is hydrogen or methyl and R<sub>2</sub> is



wherein Y is oxygen or —NR<sub>5</sub>, X is linear or branched alkylene having 2 to 10 carbon atoms or is cycloalkyl and R<sub>5</sub> is hydrogen or alkyl having 1 to 6 carbon atoms, n is 0 or 1, and R<sub>6</sub> is hydrogen or alkyl having 1 to 6 carbon atoms.

4,957,988  
PROCESS AND POLYMERS FOR THE PRODUCTION OF  
IMAGES

Edward Irving, Cambridge, England; Beat Müller, Marly, Switzerland; Adrian Schulthess, Villars-sur-Glane, Switzerland, and Max Hunziker, Böslingen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 865,495, May 20, 1986, abandoned. This application Mar. 28, 1988, Ser. No. 178,810.

Claims priority, application United Kingdom, May 22, 1985, 8512998.

Int. Cl.<sup>5</sup> C08F 226/06, 228/02 15 Claims

1. An acrylic polymer having an average molecular weight of at least 500 which is insoluble in base but which becomes soluble in base on exposure to actinic radiation and which contains at least one residue of formula I



wherein

one of m and n denotes 1 and the other denotes 0 or 1,

X denotes either a group of formula II

$\geq C(CX_3)_2$ , or —; and  $n=0$  or 1.



**4,957,994**  
EPOXY RESINS CONTAINING IMIDO RINGS,  
PRODUCTION PROCESS THEREOF AND EPOXY RESIN  
COMPOSITIONS CONTAINING THE SAME

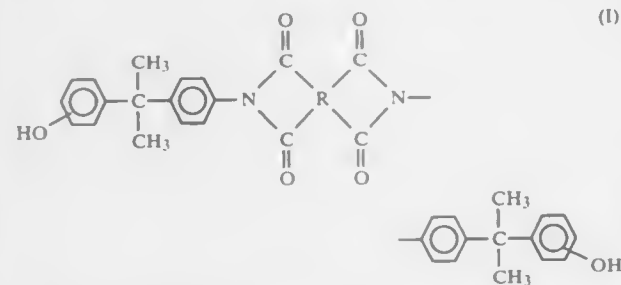
Tatsuhiko Urakami; Yoshimitsu Tanabe, both of Yokohama;  
Keizaburo Yamaguchi, Chiba, and Akihiro Yamaguchi, Kama-  
kura, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc.,  
Tokyo, Japan

Filed Aug. 15, 1989, Ser. No. 393,798

Claims priority, application Japan, Aug. 19, 1988, 63-204789  
Int. Cl.<sup>5</sup> C08G 59/26

U.S. Cl. 528—90

1. An epoxy resin obtained from an imido-ring-containing  
diphenol represented by the following formula (I):



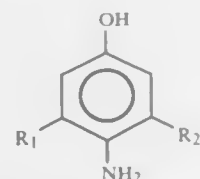
wherein R represents an aliphatic group having at least two  
carbon atoms, an alicyclic group, a monocyclic aryl group, a  
fused polycyclic aromatic group, or a non-fused polycyclic  
aromatic group formed of aromatic groups coupled together  
directly or via a linking member and the two hydroxyl groups  
are each bonded to a meta position or the para position, at least  
50% of the hydroxyl groups of molecules of said diphenol  
having been epoxidized.

**4,957,995**  
LOW-VISCOSITY EPOXY RESIN, AND  
FIBER-REINFORCED COMPOSITE MATERIAL BASED  
ON M-ALKYL TRIGLYCIDYLAMINOPHENOLS

Yasuhisa Saito, Higashiosaka; Katsuya Watanabe, Takatsuki;  
Kohichi Okuno, Izumiotsu; Kunimasa Kamio, Suita, and  
Akira Morii, Ibaraki, all of Japan, assignors to Sumitomo  
Chemical Company, Limited, Osaka, Japan  
Division of Ser. No. 174,703, Mar. 29, 1988, Pat. No. 4,900,848,  
which is a continuation-in-part of Ser. No. 96,210, Sep. 8, 1987,  
abandoned, which is a continuation of Ser. No. 909,582, Sep. 22,  
1986, abandoned. This application Sep. 5, 1989, Ser. No. 402,663  
Claims priority, application Japan, Sep. 27, 1985, 60-216044;  
Jan. 10, 1986, 61-3860; Feb. 7, 1986, 61-26601; Feb. 7, 1986,  
61-26602; Feb. 7, 1986, 61-26603  
Int. Cl.<sup>5</sup> C08G 59/10, 59/32

U.S. Cl. 528—99

1. A method for producing an epoxy resin composition  
which comprises reacting an aminophenol represented by the  
general formula



wherein R<sub>1</sub> represents a hydrogen atom or an alkyl group of 1  
to 4 carbon atoms, and R<sub>2</sub> represents an alkyl group of 1 to 4  
carbon atoms, with an epichlorohydrin to form an epoxy resin  
and mixing the epoxy resin with a curing agent.

**4,957,996**  
PREPARATION OF POLYARYLATE OF IMPROVED  
COLOR WITH COBALT SALT

Ronald R. Lamonte, Flanders, N.J., assignor to Hoechst Celan-  
ese Corporation, Somerville, N.J.

Filed Oct. 12, 1988, Ser. No. 256,408

Int. Cl.<sup>5</sup> C08G 63/32

U.S. Cl. 528—181

21 Claims

1. In a method of preparing an aromatic polyester from a  
molten reaction mixture of monomers comprising an aromatic  
dicarboxylic acid diester and a bisphenol, and wherein a poly-  
merization catalyst is added to the reaction mixture, the im-  
provement which comprises: improving the color of the  
formed aromatic polyester by adding to said molten mono-  
meric reaction mixture a cobalt salt comprising a cobalt ester  
of an aliphatic or iso-aliphatic carboxylic acid which contains  
3 to 20 carbon atoms.

**4,957,997**  
PROCESS FOR CONVERTING POLYKETONES  
CONTAINING PENDANT FUNCTIONAL GROUPS TO  
POLYESTERS

Biau-Hung Chang, West Chester, and Jack Kwiatek, Cincinnati,  
both of Ohio, assignors to Quantum Chemical Corporation,  
New York, N.Y.

Continuation-in-part of Ser. No. 416,903, Oct. 4, 1989, Pat. No.  
4,929,711. This application Feb. 16, 1990, Ser. No. 481,425

Int. Cl.<sup>5</sup> C08G 2/00

U.S. Cl. 528—220

16 Claims

1. A process for converting polyketones having pendant  
functionality to polyesters comprising contacting a polyketone  
having to a molecular weight greater than 1,000 and containing  
0.01 to 50 mole percent carbonyl group and wherein the pen-  
dant functional groups contain one or more oxygen, nitrogen,  
sulfur or halogen atoms or a combination of said atoms with an  
organic peroxyacid oxidizing agent having from 2 to 30 carbon  
atoms in an inert liquid medium at a temperature from -20° C.  
to 150° C.; the molar ratio of said oxidizing agent to carbonyl  
ranging from 0.1:1 to 30:1 and the weight ratio of said inert  
liquid medium to said polyketone ranging from 1:1 to 100:1.

**4,957,998**  
POLYMERS CONTAINING ACETAL,  
CARBOXY-ACETAL, ORTHO ESTER AND  
CARBOXYORTHIO ESTER LINKAGES

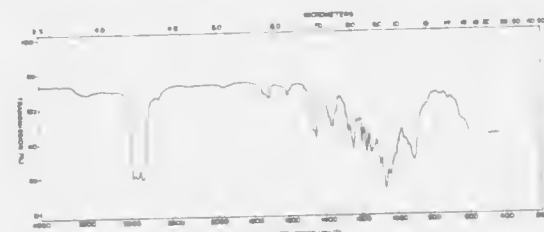
Jorge Heller, Woodside; Steve Y. W. Ng, San Francisco, and  
Donald W. H. Penhale, Menlo Park, all of Calif., assignors to  
Pharmaceutical Delivery Systems, Inc., Menlo Park, Calif.

Filed Aug. 22, 1988, Ser. No. 234,806

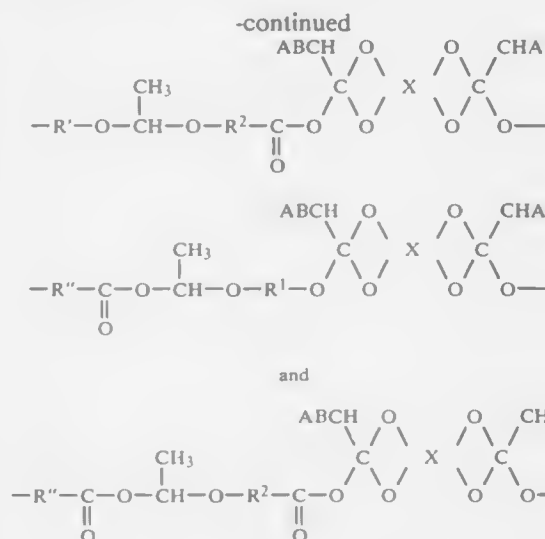
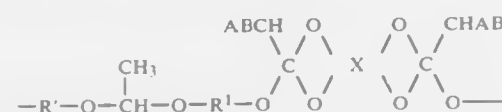
Int. Cl.<sup>5</sup> C08G 63/06, 67/00

U.S. Cl. 528—220

39 Claims



1. A linear or crosslinked biodegradable polymer containing  
a combination of the following mer units:



wherein X is a quadrivalent organic grouping, A and B may be  
the same or different and are selected from the group consist-  
ing of hydrogen, and lower alkyl, and R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup>  
may be the same or different and are selected from the group  
consisting of hydrocarbyl of 1 to 14 carbon atoms, oxyhydro-  
carbyl of 1 to 14 carbon atoms containing 1 to 4 oxy groups,  
and aryl of 1 to 4 rings, and wherein said R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup>  
are unsubstituted or substituted with one or more longer alkyl,  
amino, nitro or halogen moieties.

**4,957,999**  
PROCESS FOR CURING AMINOPLAST RESINS  
Roger Garrigue; Jack Lalo, both of Toulouse, and Andre Vignau,  
Muret, all of France, assignors to Norsolor S.A., Paris, France  
Filed Jun. 5, 1989, Ser. No. 361,085  
Claims priority, application France, Jun. 3, 1988, 8807422  
Int. Cl.<sup>5</sup> C08G 12/32

U.S. Cl. 528—230

20 Claims

1. In a process for curing an aminoplast resin liquid adhesive  
in the presence of a curing catalyst, the improvement wherein  
the curing catalyst is a hexamethylenetetramine salt of a strong  
acid.

**4,958,000**  
PROCESS FOR PREPARING POLYARYLATES  
Benito See, Belle Mead, and Ulrich A. Steiner, North Plainfield,  
both of N.J., assignors to Amoco Corporation, Chicago, Ill.  
Filed May 22, 1989, Ser. No. 354,827  
Int. Cl.<sup>5</sup> C08G 63/00, 67/00, 69/00

U.S. Cl. 528—271

18 Claims

1. A process for preparing a polyarylate having a reduced  
viscosity of from about 0.5 to greater than 1.0 dl/gm as mea-  
sured at 25° C. in a concentration of 0.50 gm polymer per 100  
ml of chloroform which process comprises the following steps:  
(a) reacting an acid anhydride derived from an aliphatic  
monocarboxylic acid containing from 2 to 8 carbon atoms  
with at least one dihydric phenol to form the correspond-  
ing diester;  
(b) after forming the diester, removing by vacuum distilla-  
tion the bulk of the residual acid anhydride, then adding  
acetic acid, then vacuum distilling to bring the anhydride  
concentration to a level low enough to enable the forma-  
tion of a polymer having a low color and good thermal  
stability; and  
(c) reacting said diester with at least one aromatic dicarbox-  
ylic acid at a temperature sufficient to form the polyary-  
late.

**4,958,001**  
DICYCLOHEXYL-3,4,3',4'-TETRACARBOXYLIC ACID  
OR DIANHYDRIDE THEREOF AND POLYAMIDE-ACID  
AND POLYIMIDE OBTAINED THEREFROM  
Toshu Kikuchi; Toshiyuki Fujita; Takayuki Saito; Mitsumasa  
Kojima; Hidetaka Sato, and Hiroshi Suzuki, all of Hitachi,  
Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo,  
Japan

Filed Oct. 3, 1988, Ser. No. 252,608

Claims priority, application Japan, Oct. 8, 1987, 62-254049;  
Dec. 17, 1987, 62-319206; May 10, 1988, 63-112967

Int. Cl.<sup>5</sup> C08G 69/26

U.S. Cl. 528—346

11 Claims

1. Dicyclohexyl-3,4,3',4'-tetracarboxylic acid.

**4,958,002**  
HIGH PURITY CRYSTALS OF  
BIPHENYLTETRACARBOXYLIC DIANHYDRIDE AND  
PROCESS FOR THEIR PREPARATION  
Katsuo Imatani; Shinichiro Yamamoto, and Genji Koga, all of  
Ube, Japan, assignors to Ube Industries, Ltd., Ube, Japan

Filed Jun. 27, 1988, Ser. No. 211,815

Claims priority, application Japan, Jun. 25, 1987, 62-159246  
Int. Cl.<sup>5</sup> C08G 69/26; C07D 307/77

U.S. Cl. 528—353

13 Claims

1. Crystals of a biphenyltetracarboxylic dianhydride pro-  
duced by dehydration of a biphenyltetracarboxylic acid, which  
contains a biphenyltricarboxylic acid or its anhydride in an  
amount of not more than 0.2 wt. %.

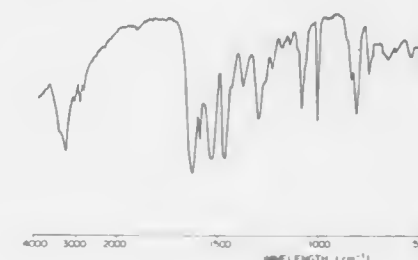
**4,958,003**  
AROMATIC SULFIDEAMIDE POLYMER AND METHOD  
FOR PRODUCING THE SAME  
Satoshi Tomagou; Toshikazu Kato; Hiroshi Inoue, and Kensuke  
Ogawara, all of Mie, Japan, assignors to Tosoh Corporation,  
Yamaguchi, Japan

Filed Dec. 23, 1988, Ser. No. 288,881

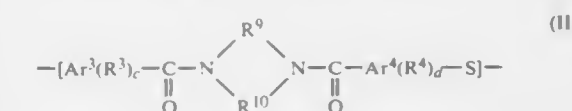
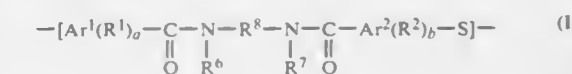
Claims priority, application Japan, Dec. 25, 1987, 62-327385  
Int. Cl.<sup>5</sup> C08G 69/42

U.S. Cl. 528—364

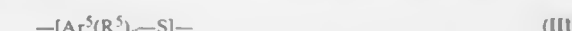
5 Claims



1. An aromatic sulfideamide polymer which comprises from  
1 to 99 mol % of repeating units represented by the following  
formula (I) and/or (II):



and from 99 to 1 mol % of repeating units represented by the  
formula (III):



wherein Ar<sup>1</sup>, Ar<sup>2</sup>, Ar<sup>3</sup>, Ar<sup>4</sup> and Ar<sup>5</sup>, which may be the same or different, each represent an aromatic ring; R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup>, which may be the same or different, each represent an alkyl group having 1 to 20 carbon atoms, a cycloalkyl group having 3 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms, an alkoxy group having 1 to 20 carbon atoms, an acyl group having 2 to 20 carbon atoms or an arylalkyl group having 7 to 20 carbon atoms, each of R<sup>6</sup> and R<sup>7</sup> optionally being hydrogen; a, b, c, d and e, which may be the same or different, each represent an integer of from 0 to 4; and R<sup>8</sup>, R<sup>9</sup> and R<sup>10</sup>, which may be the same or different, each represent an alkylene group having 1 to 20 carbon atoms, said polymer having a logarithmic viscosity  $[\eta]$  of 0.02 to 2.00, as determined by measuring the relative viscosity of polymer dissolved in a concentrated sulfuric acid solvent at 30° C. and at a polymer concentration of 0.5 g/100 ml or the relative viscosity of polymer dissolved in  $\alpha$ -chloronaphthalene at 210° C. and at a polymer concentration of 0.1 g/100 ml and computing the result in accordance with the equation:

$$[\eta] = \ln \frac{(\text{relative viscosity})}{(\text{polymer concentration})}$$

#### 4,958,004 AROMATIC SULFIDE/SULFONE POLYMER PRODUCTION

Kenneth C. Hoover; Lacey E. Scoggins, both of Bartlesville, Okla.; Wei-Tech W. Shang, Nagoya, Japan, and Afif M. Nesheiwat, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 31, 1987, Ser. No. 80,283  
Int. Cl. G08G 75/14

U.S. Cl. 528—388 13 Claims

1. A process for the production of an aromatic sulfide/sulfone polymer which comprises contacting a reaction mixture consisting essentially of:

- (1) at least one dihaloaromatic sulfone,
- (2) at least one organic amide,
- (3) at least one alkali metal hydrosulfide,
- (4) water, and
- (5) at least one member selected from the group consisting of
  - (a) alkali metal carbonates and
  - (b) mixtures of alkali metal carbonates with alkali metal hydroxides wherein said mixtures have at least about 0.5 mole percent alkali metal carbonate, under polymerization conditions of temperature and time sufficient to form said polymer, wherein the molar ratio of said organic amide to said alkali metal hydrosulfide is about 4:1 to about 16:1, and wherein the molar ratio of said water to said organic amide is about 0.6:1 to about 1.2:1.

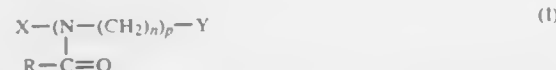
#### 4,958,005 FLUORINE-CONTAINING COMPOSITIONS AND PROCESS FOR PREPARING THE SAME FROM CYCLIC IMINOETHERS

Takeo Saegusa; Masatoshi Miyamoto, both of Kyoto, and Yoshiyuki Sano, Shiga, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Filed Sep. 20, 1988, Ser. No. 246,748  
Claims priority, application Japan, May 7, 1986, 61-105721  
Int. Cl. C08G 73/00

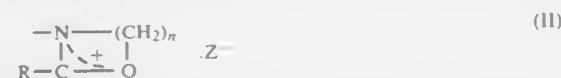
U.S. Cl. 528—408 11 Claims

1. A fluorine-containing composition represented by formula (I)

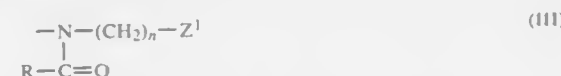


wherein X represents a group containing a polyfluoroaliphatic group having from 3 to 26 carbon atoms; R represents a hydrogen atom or an aliphatic group having from 1 to 3 carbon

atoms; n represents an integer of from 2 to 3; p represents an integer of from 1 to 100; and Y represents a group represented by formula (II) or formula (III)



wherein R represents a hydrogen atom or an aliphatic group having from 1 to 3 carbon atoms; n represents an integer of from 2 to 3; and Z represents an iodine atom, a sulfonate group, or a sulfate group,



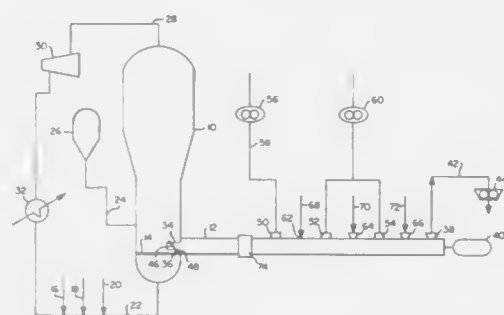
wherein R represents a hydrogen atom or an aliphatic group having from 1 to 3 carbon atoms; n represents an integer of from 2 to 3; and Z<sup>1</sup> represents an iodine atom, a bromine atom, a chlorine atom, or a hydroxyl group.

#### 4,958,006 FLUIDIZED BED PRODUCT DISCHARGE PROCESS

Robert J. Bernier, Flemington; Jorge O. Bühler-Vidal, North Brunswick; Urho S. Haapala, Middlesex, and Benjamin R. Rozenblat, Old Bridge, all of N.J., assignors to Union Carbide Chemicals and Plastics Inc., Danbury, Conn.

Filed Jun. 28, 1988, Ser. No. 213,095  
Int. Cl. C08F 6/02

U.S. Cl. 528—501 12 Claims



1. A process for the post reaction treatment of resins produced by fluidized bed polymerization of alpha olefins in a polymerization reactor which comprises:

- (a) providing a screw extruder a portion of which is disposed in said reactor in communicating contact with said fluidized bed said screw extruder being adapted to receive polymer particle resins from said fluidized bed,
- (b) removing polymerized product resin from said fluidized bed by the action of said screw extruder in communication with said fluidized bed,
- (c) melting said resin in said extruder to form molten polymer,
- (d) providing valve means for effecting a seal with said molten polymer in said extruder to provide an upstream zone from said seal into said reactor and a downstream zone from said seal in a direction away from said reactor, said seal isolating the pressure in said upstream zone from said downstream zone,
- (e) devolatilizing monomer residues and volatiles dissolved in said polymer melt by venting said monomer residues and volatiles from said extruder,
- (f) deactivating catalyst and cocatalyst residues by introducing a deactivating agent to said extruder,
- (g) adding additives in the absence of oxygen to said ex-

truder containing said polymer melt; steps (e) through (g) being conducted in said downstream zone and  
(h) discharging treated polymer product from said extruder.

#### 4,958,007 EXTRACTION OF HUMAN INTERLEUKIN-4 FROM BACTERIA

Yair Alroy, Parsippany, and Paul Leibowitz, Hackensack, both of N.J., assignors to Schering-Plough Corp., Kenilworth, N.J.  
Filed May 17, 1988, Ser. No. 194,799  
Int. Cl. C07K 3/12

U.S. Cl. 530—351 4 Claims

1. A method of extracting insoluble interleukin-4 (IL-4) from IL-4 expressing bacterial cells comprising

- (a) treating a suspension of IL-4 containing bacterial cells with an agent selected from the group consisting of toluene or an acid selected from the group consisting of phosphoric acid, hydrochloric acid, nitric acid or sulfuric acid in the presence of an enhancing agent selected from the group consisting of trichloroacetic acid or perchloric acid to deactivate the bacterial cells;
- (b) disrupting the deactivated bacterial cells by mechanical means; and
- (c) separating the insoluble IL-4 from the disruptate.

#### 4,958,008 PROCESS FOR CROSSLINKING OF COLLAGEN BY INTRODUCTION OF AZIDE GROUPS AS WELL AS TISSUES AND BIOMATERIALS OBTAINED BY USE OF THE PROCESS

Hervé Petite 118 Avenue Saint-Exupéry, 69500 Bron; Philippe Menasche, 1 rue du Regard, 75006 Paris, and Alain Huc, 26 Chemin des Fonds, 69110 Sainte Foy Les Lyon, all of France  
Filed Jul. 7, 1988, Ser. No. 216,407

Claims priority, application France, Jul. 8, 1987, 87 10317  
Int. Cl. C07K 15/20

U.S. Cl. 530—356 15 Claims

1. Process of crosslinking collagen by introducing azide groups which essentially comprises the following steps: esterification of the free acid groups of collagen, transformation of the esterified groups into hydrazide groups, transformation of the hydrazide groups into azide groups by the action of nitrous acid, and is characterized in that each step is separated by a rinsing in an aqueous salt solution.

#### 4,958,009 ANTI-HUMAN OVARIAN CANCER IMMUNOTOXINS AND METHODS OF USE THEREOF

Michael J. Bjorn, Hercules, Calif.; David J. FitzGerald, Fairfax, Va.; Arthur E. Frankel, Durham, N.C.; Walter J. Laird, Pinnole, Calif.; Ira H. Pastan, Potomac, Md.; David B. Ring, Redwood City, Calif.; Mark C. Willingham, Bethesda, Md., and Jeffrey L. Windelhake, Alameda, Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation of Ser. No. 806,320, Dec. 6, 1985, abandoned. This application Jul. 6, 1987, Ser. No. 69,867

The portion of the term of this patent subsequent to Sep. 11, 2007, has been disclaimed.

Int. Cl. C07K 15/12; A61K 39/00

U.S. Cl. 530—389 19 Claims

1. Immunotoxin comprising a cytotoxic moiety and a monoclonal antibody wherein said monoclonal antibody

- (i) binds human ovarian cancer tissue;
  - (ii) has a selectivity of about 0.11 or less;
  - (iii) is an IgG or IgM;
- said immunotoxin having at least one capability selected from the group consisting of:
- a cytotoxicity ID<sub>50</sub> of about 10nM or less against human ovarian cancer cells; retarding the rate of growth of tumors comprised of human ovarian cancer cells carried by

a mammal when said mammal is treated with said immunotoxin; or extending the survival time of a mammal bearing a tumor comprised of human ovarian cancer cells when said mammal is treated with said immunotoxin.

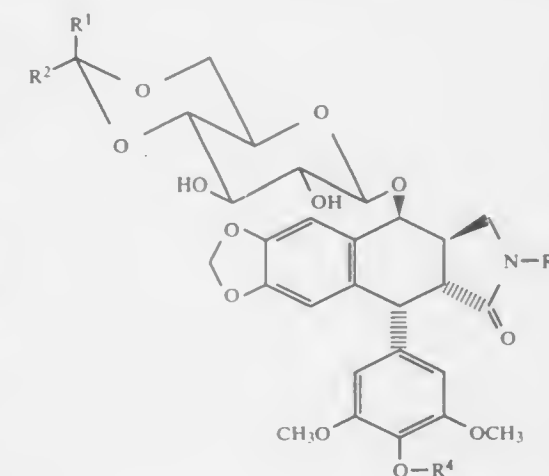
#### 4,958,010 EPIPODOPHYLLOTOXIN GLUCOSIDE LACTAM DERIVATIVES

John F. Kadow, Meriden, and Dolatrai M. Vyas, Madison, both of Conn., assignors to Bristol-Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 156,253, Feb. 16, 1988, abandoned. This application Jan. 30, 1989, Ser. No. 302,010  
Int. Cl. C07H 15/20, 17/00

U.S. Cl. 536—17.2 41 Claims

1. A compound having the formula

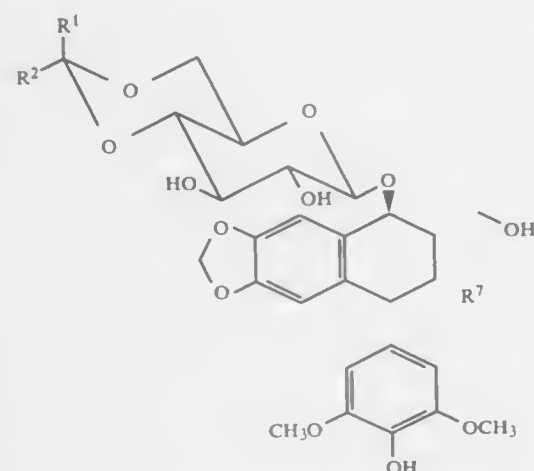


wherein

R<sup>1</sup> and R<sup>2</sup> are each C<sub>1-10</sub>alkyl; or R<sup>1</sup>, R<sup>2</sup>, and the carbon to which they are attached represent C<sub>5-6</sub>cycloalkyl; or R<sup>1</sup> is H and R<sup>2</sup> is selected from the group consisting of C<sub>1-10</sub>alkyl, C<sub>2-10</sub>alkenyl, C<sub>3-6</sub>cycloalkyl, furyl, thienyl, C<sub>6-10</sub>aryl, and C<sub>7-14</sub>aralkyl; R<sup>3</sup> is selected from the group consisting of H, —NH<sub>2</sub>, —NH—CHR<sup>5</sup>R<sup>6</sup>, and —NHCHR<sup>5</sup>R<sup>6</sup>; wherein R<sup>5</sup> and R<sup>6</sup> are same or different groups selected from the group consisting of H, C<sub>1-10</sub>alkyl, C<sub>2-10</sub>alkenyl, C<sub>3-6</sub>cycloalkyl, C<sub>6-10</sub>aryl, C<sub>7-14</sub>aralkyl, and heteroaryl; each of the above groups is unsubstituted or substituted with one or more same or different groups selected from the group consisting of C<sub>1-5</sub>alkoxy, hydroxy, amino, C<sub>1-5</sub>alkylamino, di(C<sub>1-5</sub>alkyl)amino, nitro, halogen, C<sub>1-5</sub>haloalkyl, C<sub>1-5</sub>dihaloalkyl, C<sub>1-5</sub>trihaloalkyl, cyano, C<sub>1-5</sub>alkylthio, mercapto, alkanoyl, carbamoyl, carboxy, and alkanoylamino; the substituent for aryl, aralkyl, and heteroaryl groups additionally includes C<sub>1-5</sub>alkyl; and R<sup>4</sup> is selected from the group consisting of H, alkanoyl, aroyl, aralkenyl, and P(O)(OM')(OM') wherein M and M' are independently selected from the group consisting of H, an alkali metal cation, and phenyl.

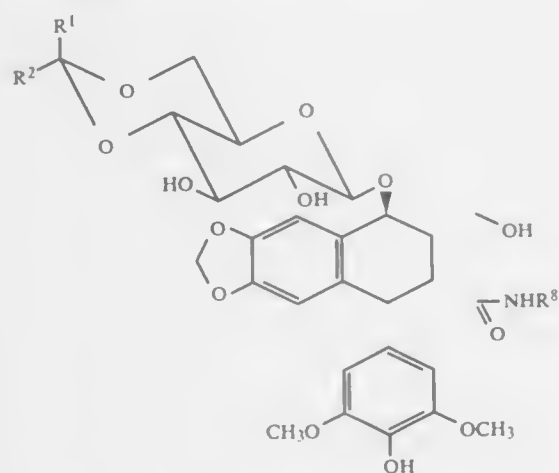
27. A compound having the formula





wherein  $R^1$  and  $R^2$  are as defined in claim 1 and  $R^7$  is  $-\text{CN}$  or  $-\text{C}(\text{O})\text{NH}_2$ .

32. An intermediate having the formula



wherein  $R^1$  and  $R^2$  are as defined in claim 1;  $R^8$  is  $-\text{NH}_2$  or  $-\text{N}=\text{CR}^5\text{R}^6$  wherein  $R^5$  and  $R^6$  are as defined in claim 1.

4,958,011

## ESTER-STABILIZED CHITIN

Maria L. Bade, Four Bowser Rd., Lexington, Mass. 02173

Continuation-in-part of Ser. No. 622,128, Jun. 19, 1984, abandoned, which is a continuation-in-part of Ser. No. 508,476, Jun. 27, 1983, abandoned. This application Jan. 17, 1986, Ser. No. 820,247

Int. Cl.<sup>5</sup> C08B 37/08

U.S. Cl. 536—20

9 Claims

1. Ester-stabilized chitin fibers, purified from a naturally occurring calcified chitin/protein matrix, said fibers being:

- (a) water insoluble;
- (b) uniformly dispersible in suspension;
- (c) sparsely esterified with an ester selected from the group consisting of sulfate, nitrate, phosphate, and formate;
- (d) highly elongated relative to their diameter;
- (e) not subject to shear in aqueous suspension;
- (f) hydrolyzed by extracellular chitinase produced by an adapted microorganism plated on agar and said ester-stabilized chitin, said hydrolysis being rapid and quantitative;
- (g) substantially mineral free, yielding substantially no ash when flamed; and
- (h) substantially free from protein upon hydrolysis.

4,958,012

## SQUID CHITIN FORMED MATERIAL

Seiichi Tokura, Sapporo; Tsuyoshi Koriyama, Hachioji; Yoshiyuki Chiba, Hachioji, and Mikio Satake, Hachioji, all of Japan, assignors to Nippon Suisan Kaisha, Ltd., Tokyo, Japan  
Filed Mar. 7, 1989, Ser. No. 319,724

Int. Cl.<sup>5</sup> C08B 37/00; A61K 31/00; D01C 3/00

U.S. Cl. 536—20

8 Claims

1. A process of preparing a squid chitin sheet comprising: grinding squid chitin, suspending the ground squid chitin in water, forming a gel of said squid chitin, suspending the gel in water, submitting the suspension to filtration to eliminate water, and drying the residue.

5. A process of preparing squid chitin fiber comprising: dissolving squid chitin in formic acid, subjecting the solution to a freeze-thaw treatment to produce a dope, defoaming the dope in vacuo, and extruding the defoamed dope into a solvent to coagulate the dope.

4,958,013

## CHOLESTERYL MODIFIED OLIGONUCLEOTIDES

Robert L. Letsinger, Wilmette, Ill., assignor to Northwestern University, Evanston, Ill.

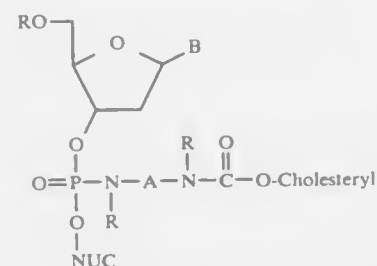
Filed Jun. 6, 1989, Ser. No. 362,200

Int. Cl.<sup>5</sup> C07H 21/00

U.S. Cl. 536—27

3 Claims

1. An oligonucleotide comprising:



wherein A is selected from the group consisting of an aliphatic alkyl, branched aliphatic alkyl, and a heteroatom containing an alkyl chain of 2 to 18 carbon atoms, R is selected from the group consisting of H and lower alkyl up to 12 carbon atoms; NUC is selected from the group consisting of a phosphorothioate oligonucleotide and B is a base.

4,958,014

## MULTI-CELLULAR CELLULOSE PARTICLE AND PROCESS FOR PREPARATION THEREOF

Junichi Shirokaze, Nobeoka, Japan, assignor to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

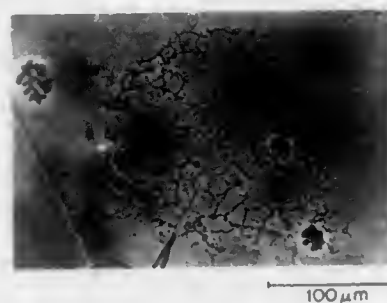
Filed Aug. 9, 1988, Ser. No. 230,092

Claims priority, application Japan, Aug. 10, 1987, 62-198285

Int. Cl.<sup>5</sup> C08J 9/28

U.S. Cl. 536—56

2 Claims



1. A multi-cellular cellulose particle comprising cells separated from one another by cell partitions in the form of mem-

branes, wherein the cells are in continuous communication with one another through openings in the partitions, and wherein least 60% by volume of the cells consist of cells having such dimensions that the largest sphere which can be fitted into each cell has a diameter of more than 2  $\mu\text{m}$ .

4,958,015

## PREPARATION OF CROSSLINKED CYCLODEXTRIN RESINS WITH ENHANCED POROSITY

Haya Zemel, and Mark B. Koch, both of Des Plaines, Ill., assignors to UOP, Des Plaines, Ill.

Filed Sep. 30, 1988, Ser. No. 249,131

Int. Cl.<sup>5</sup> C08B 37/02

U.S. Cl. 536—103

25 Claims

1. A method of making a crosslinked cyclodextrin of enhanced porosity comprising reacting a solution of the cyclodextrin with from about 1 to about 20 molar proportions of a dicarboxylic acid dihalide in the presence of a blowing agent to form a solid crosslinked resin having a reduction in apparent bulk density of at least 20% relative to the crosslinked resin prepared in the absence of the blowing agent.

4,958,016

## BIFUNCTIONAL OLIGOSACCHARIDES AND ALSO ACTIVE COMPOUNDS DERIVED THEREFROM

Antonius Kerkenaar, Blaricum; Diederik J. M. Schmedding, Driebergen, and Ronald T. M. Van Den Dool, Culemborg, all of Netherlands, assignors to Nederlandse Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek Tno, The Hague, Netherlands

Filed Jun. 3, 1988, Ser. No. 202,788

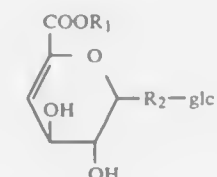
Claims priority, application Netherlands, Jun. 9, 1987, 8701342

Int. Cl.<sup>5</sup> C07H 1/00; C12N 9/88, 1/20, 1/00

U.S. Cl. 536—123

6 Claims

1. Oligosaccharides, characterized by the formula I



(I)

in which

$R_1$  represents a hydrogen atom, an alkyl group containing 1-4 carbon atoms or an alkali metal,

$R_2$  denotes a single bond or a divalent radical composed of monosaccharides, and glc represents glucose.

4,958,017

## PURIFICATION OF INOSINE FROM GUANOSINE

Shohel Fujinawa, Himeji; Yoshinori Sakamoto, Takasago, and Harumasa Iizuka, Kakogawa, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Dec. 13, 1988, Ser. No. 283,805

Claims priority, application Japan, Dec. 17, 1987, 62-320743

Int. Cl.<sup>5</sup> C07H 19/167, 19/16

U.S. Cl. 536—124

1 Claim

1. A process for purifying inosine and producing guanosine-inosine mixture from a nucleoside mixture, which comprises: preparing an aqueous fluid containing 10 to 30% by weight/volume of a nucleoside mixture, said nucleoside mixture having a total amount of inosine and guanosine of more than 95% based on dry weight and a weight ratio of guanosine/inosine of 0.5 to 1,

adjusting the aqueous fluid to a pH of 9.1 to 9.5, warming the aqueous fluid to not lower than 40° C., separating solids

containing said guanosine-inosine mixture from the fluid, and crystallizing inosine from the resulting fluid.

4,958,018

## METHOD FOR PRODUCTION OF 3-EXOMETHYLENECEPHAM DERIVATIVES

Sigeru Torii; Hideo Tanaka, both of Okayama; Masatoshi Taniguchi, Suita; Michio Sasaoka, Tokushima; Norio Saito, Tokushima; Takashi Shirot, Tokushima; Shigemitsu Nagao, Mobara; Ryo Kikuchi, Tokushima, and Yutaka Kameyama, Tokushima, all of Japan, assignors to Otsuka Kagaku Kabushiki Kaisha, Osaka, Japan

Filed May 4, 1989, Ser. No. 347,319

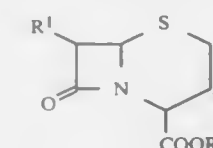
Claims priority, application Japan, May 11, 1988, 63-115711

Int. Cl.<sup>5</sup> C07D 501/04

U.S. Cl. 540—215

17 Claims

1. A method of producing a 3-exomethylenecepham derivative of the formula



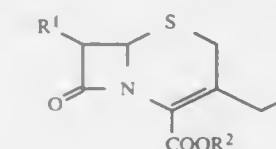
(II)

wherein

$R^1$  is an amino group or a substituted amino group selected from the group consisting of benzamido which may be nuclearly substituted by halogen, nitro, hydroxy or lower alkoxy, phenylglycylamido, amino-protected phenylglycylamido, p-hydroxyphenylglycylamido, amino-protected p-hydroxyphenylglycylamido,  $\alpha$ -sulfonylphenylacetamido,  $\alpha$ -hydroxyphenylacetamido,  $\alpha$ -carbamoylphenylacetamido, phenylacetamido which may be nuclearly substituted by lower alkoxy, halogen or hydroxy,  $\alpha$ -naphthylacetamido,  $\delta$ -naphthylacetamido, phenoxyacetamido which may be nuclearly substituted by halogen or lower alkoxy, tetrazolylacetamido, thienylacetamido, 2-aminothiazolylacetamido, amino-protected 2-aminothiazolylacetamido, furylacetamido and protected amino

wherein the protected amino group in each of said amino-protected phenylglycylamido, amino-protected p-hydroxyphenylglycylamido, amino-protected 2-aminothiazolylacetamido and protected amino is selected from the group consisting of methylcarbamato, 9-fluorenylmethylcarbamato, 2,2,2-trichloroethylcarbamato, 2-trimethylsilylethylcarbamato, 1,1-dimethylpropylcarbamato, 1,1-dimethyl-2-cyanoethylcarbamato, tertbutylcarbamato, 1-adamantylcarbamato, benzylcarbamato, p-nitrobenzylcarbamato, diphenylmethylcarbamato, phthalimido, 2,3-diphenylmaleimido, N-phenacylamino, N-methoxymethylamino, N-2-chloroethoxymethylamino, N-benzoyloxymethylamino, N-pivaloyloxymethylamino, N-benzylamino, N-o-nitrobenzylamino, N-di(p-methoxyphenyl)methylamino, N-triphenylmethylamino, N-(diphenyl-4-pyridylmethyl)amino, N-trimethylsilylamino, N-tert-butyltrimethylsilylamino, benzenesulfenamido, p-methoxybenzene sulfonamido and phenacylsulfonamido; and

$R^2$  is a carboxy-protecting group, consisting essentially of reacting a cepham derivative of the formula



(I)

wherein

$R^1$  and  $R^2$  are as defined above and X is a halogen atom, with lead metal at a temperature of about  $-20^\circ\text{C}$ . to  $80^\circ\text{C}$ . in an inert organic solvent capable of dissolving said cephem derivative and capable of remaining inert under the condition of said reaction or in a mixture of such organic solvent and water while maintaining the pH of the reaction system at about 0.1 to 8.

#### 4,958,019 INTERMEDIATES FOR SYNTHESIS OF CEPHALOSPORIN COMPOUNDS

Shigeo Shimizu, and Hiroyuki Takano, both of Mokawa, Japan, assignors to Sankei Pharmaceutical Co., Ltd., Tokyo and Nippon Pharmaceutical Development Institute Company, Ltd., Hokkaido, both of Japan

Division of Ser. No. 222,404, Jul. 21, 1988. This application May 26, 1989, Ser. No. 357,172

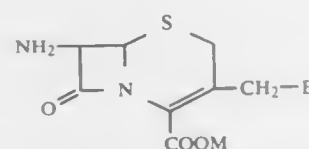
Claims priority, application Japan, Aug. 7, 1987, 62-196178

Int. Cl.<sup>5</sup> C07D 501/18; A61K 31/545

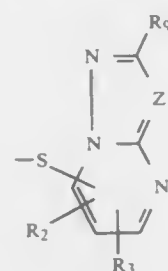
U.S. Cl. 540—226

1 Claim

1. A compound represented by the formula (II):



wherein M represents a hydrogen atom, a protective group or an eliminatable group which is easily hydrolyzable in a human body; B represents a group represented by the formula (b):



where at least one of  $R_2$ ,  $R_3$  and  $R_9$  represent a group represented by the formula:  $-A-OR_4$  where  $R_4$  represents a hydrogen or a lower alkyl group; and A represents a straight or branched alkylene group having 1 to 6 carbon atoms; and a remaining group or groups are each independently a hydrogen atom; a cyano group; a lower alkyl group which may be substituted by a halogen atom; a carbamoyl group which may be substituted by a lower alkyl group; a cycloalkyl group; or a carboxyl group which may be substituted by a protective group or an eliminatable group which is easily hydrolyzable in a human body, and also when  $R_9$  is  $-A-OR_4$ ,  $R_2$  and  $R_3$  may be combined with each other to form an alkylene group having 3 to 4 carbon atoms; and Z represents a nitrogen atom or a group represented by the formula:  $C-R_{10}$  wherein  $R_{10}$  represents a hydrogen atom, a carboxyl group or a lower alkyl group which may be substituted by a hydroxy group or a lower alkoxy group.

#### 4,958,020 PROCESS FOR PRODUCING BETA-LACTAMASE INHIBITOR

Raghavan Krishnan, Suffern; Jesse Gamble, Spring Valley, both of N.Y.; David Blum, Saddle River, N.J.; William V. Curran, Pearl River, N.Y.; Ving J. Lee, Monsey, N.Y., and Ransom B. Conrow, Pearl River, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 12, 1989, Ser. No. 350,966

Int. Cl.<sup>5</sup> C07D 499/00; A61K 31/425

U.S. Cl. 540—310

1 Claim

1. A process for producing the compound [2S-(2 $\alpha$ ,3 $\beta$ ,5 $\alpha$ )]-3-methyl-7-oxo-3-(1H-1,2,3-triazol-1-ylmethyl)-4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid, (4-nitrophenyl)methyl ester, 4,4-dioxide, which comprises reacting a solution of azidopenamsulfone, 4-methoxyphenol and vinylpropionate with a solution of bis(trimethylsilyl)acetamide and 4-methoxyphenol in toluene at  $80^\circ-100^\circ\text{C}$ . for 18–30 hours followed by filtering the resulting solution and cooling the filtrate to  $0^\circ-10^\circ\text{C}$ .

#### 4,958,021 BENZOPYRAN DERIVATIVES

Andreas Guentner; Udo Mayer, both of Frankenthal, and Andreas Oberlinner, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jul. 19, 1988, Ser. No. 221,268

Claims priority, application Fed. Rep. of Germany, Jul. 25, 1987, 3724757

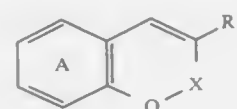
The portion of the term of this patent subsequent to Jun. 20, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C07D 311/00, 311/58, 405/04, 405/06

U.S. Cl. 544—129

1 Claim

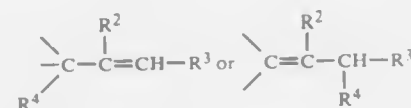
1. A benzopyran derivative of the formula I



(b)

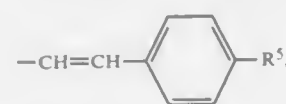
where

$R^1$  is unsubstituted  $C_1-C_8$ -alkyl, phenyl,  $C_1-C_4$ -alkoxy or halogen-substituted phenyl,  $C_1-C_5$ -alkoxy or halogen and X is the radical

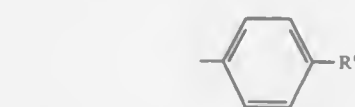


where

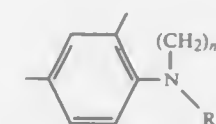
$R^2$  is hydrogen or together with  $R^1$  is unsubstituted or  $C_1-C_4$ -alkyl-substituted  $C_2-C_3$ -alkylene,  $R^3$  is  $C_1-C_4$ -alkoxyphenyl whose alkyl radical is substituted by phenyl,  $C_1-C_4$ -mono- or -bis(cyanoalkyl) amino-phenyl, naphthyl which is substituted by  $C_1-C_4$ -mono- or -di-alkylamino, phenylamino or N-( $C_1-C_4$ -alkyl)-N-phenylamino, 1- or 2-phenylindol-3-yl, the radical



the radical

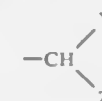


or  
the radical

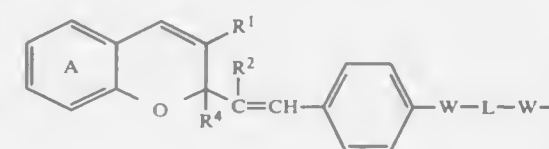


and

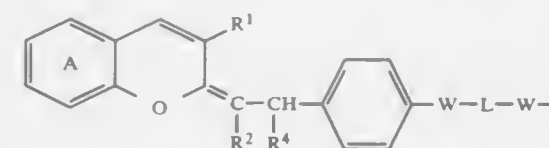
$R^4$  is hydroxyl,  $C_1-C_5$ -alkoxy, phenoxy,  $C_1-C_4$ -alkyl,  $C_1-C_4$ -alkoxy- or halogen-substituted phenoxy, phenyl-sulfonyl,  $C_1-C_4$ -alkyl- or halogen-substituted phenylsulfonyl, pyrrolidino, piperidino, morpholino, 2-(pyrrolidino, piperidino or morpholino)-cyclopent-1-en-1-yl or -cyclohex-1-en-1-yl, cyclohexane-1,3-dion-2-yl which is unsubstituted or monosubstituted or disubstituted in ring position 5 by  $C_1-C_4$ -alkyl, benzoylmethyl, cyano, nitromethyl, 2,4,6-trihydroxypyrimid-5-yl, 1-phenyl-3-methylpyrazol-5-on-4-yl, 5-hydroxy-3,4-dichlorofuran-2-yl, or the radical



where Y and Z are identical or different and each is independently acetyl, benzoyl,  $C_1-C_5$ -alkoxycarbonyl or cyano, and if Y is cyano Z can also be methyl, and where the ring A may be fused with a benzo ring or substituted by  $C_1-C_4$ -alkyl, chlorine or bromine or, in ring position 7, by hydroxyl,  $C_1-C_4$ -alkoxy,  $C_1-C_5$ -mono- or di-alkylamino which in turn may be substituted by chlorine or phenyl, pyrrolidino, piperidino or morpholino,  $R^5$  being  $C_1-C_8$ -alkyl,  $C_1-C_8$ -alkoxy, which each may be substituted by phenyl, or being  $C_5-C_7$ -cycloalkyl,  $C_5-C_7$ -cycloalkoxy,  $C_1-C_4$ -mono- or di-alkylamino, phenylamino or N-( $C_1-C_4$ -alkyl)-N-phenylamino,  $R^6$  being the radical



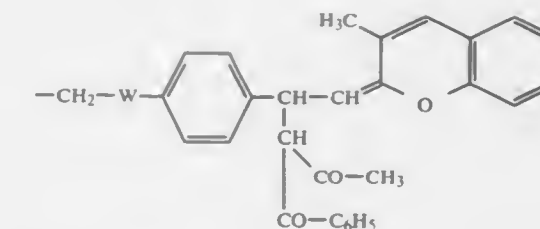
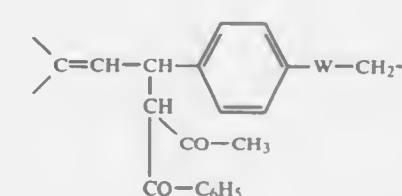
or



where  $R^1$ ,  $R^2$ ,  $R^4$  and the ring A each have the above-mentioned meanings, W is oxygen, or  $C_1-C_4$ -alkylimino, and L is  $C_2-C_6$ -alkylene or

$R^7$  being  $C_1-C_4$ -alkyl and

n being 2 or 3, with the proviso that when the ring A is unsubstituted and no benzofused and  $R^1$  is methyl and X is the radical



W is not ethylimino.

#### 4,958,022 POLYCYCLIC COMPOUNDS

Alexander Aumüller, Deidesheim; Peter Neumann, Mannheim, and Hubert Trauth, Dudenhofen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Feb. 23, 1989, Ser. No. 314,146

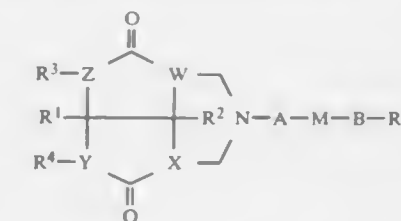
Claims priority, application Fed. Rep. of Germany, Feb. 24, 1988, 3805758

Int. Cl.<sup>5</sup> C07D 251/72, 471/18, 471/22, 487/18

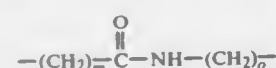
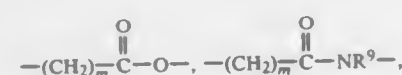
U.S. Cl. 544—180

18 Claims

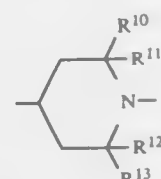
1. A polycyclic compound of the formula (I)



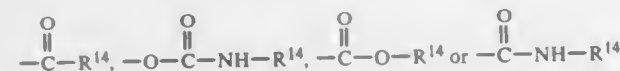
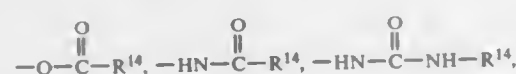




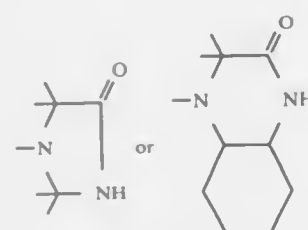
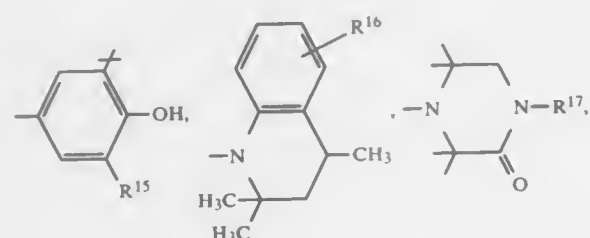
or cycloalkylene, m and o are each from 1 to 20,  $R^9$  is  $C_1$ - $C_{20}$ -alkyl,  $C_5$ - $C_{12}$ -cycloalkyl,  $C_7$ - $C_{12}$ -phenylalkyl, phenyl which is unsubstituted or monosubstituted or disubstituted by  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -alkoxy, chlorine, N,N-di- $C_1$ - $C_4$ -alkylamino,  $C_1$ - $C_4$ -alkanoylamino or phenoxy or monosubstituted by methylenedioxy or ethylenedioxy, M is a group of the formula



and can be bonded to A both with the nitrogen atom and with the carbon atom, and  $R^{10}$ ,  $R^{11}$ ,  $R^{12}$  and  $R^{13}$  independently of one another are each  $C_1$ - $C_4$ -alkyl, or  $R^{10}$  and  $R^{11}$  or  $R^{12}$  and  $R^{13}$  together form a tetramethylene or pentamethylene group, B is a chemical bond,  $C_1$ - $C_{20}$ -alkylene or  $C_7$ - $C_{18}$ -phenylalkylene or is  $C_2$ - $C_{20}$ -alkylene which is interrupted by carbonyl, carboxamide or a carboxylic ester group,  $R^5$  is hydrogen, cyano, hydroxyl,



$R^{14}$  is hydrogen,  $C_1$ - $C_{22}$ -alkyl,  $C_5$ - $C_{12}$ -cycloalkyl,  $C_5$ - $C_{16}$ -phenylalkyl or phenyl, or  $M-B-R^5$  is a group of the formulae



in which case A must not be a chemical bond and  $R^{15}$  is  $C_1$ - $C_4$ -alkyl,  $R^{16}$  is hydrogen,  $C_1$ - $C_4$ -alkyl or  $C_1$ - $C_4$ -alkoxy and  $R^{17}$  is hydrogen or  $C_1$ - $C_{12}$ -alkyl.

4,958,023  
2-PYRIDINECARBOTHIOAMIDES, PROCESSES FOR PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITIONS COMPRISING THE SAME  
William A. Kinney, Langhorne, Pa., and Nancy E. Lee, Edison, N.J., assignors to American Home Products Corporation, New York, N.Y.

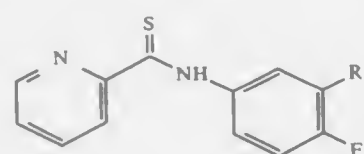
Division of Ser. No. 246,475, Sep. 19, 1988, Pat. No. 4,873,238.  
This application Jun. 29, 1989, Ser. No. 373,751

Int. Cl. 5 C07D 213/52, 295/092

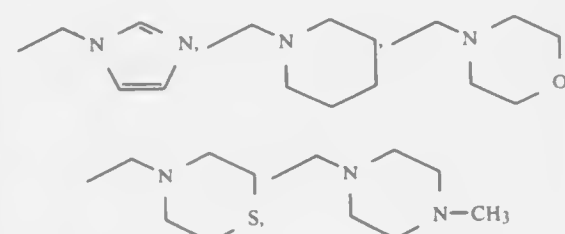
U.S. Cl. 544-58.6

1 Claim

1. The process for producing compounds of structural formula

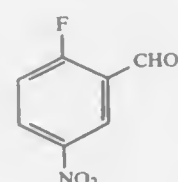


wherein  $R_1$  =



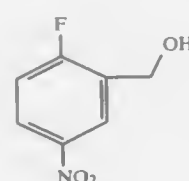
which comprises:

(a) reacting nitro aldehyde of structure



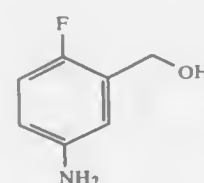
(XI)

with sodium borohydride to form the nitro alcohol of structure

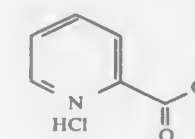


(XII)

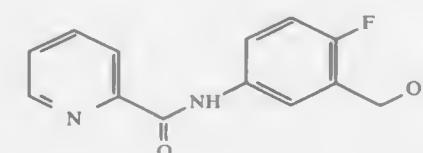
(b) reacting said nitro alcohol with stannous chloride dihydrate to afford the hydroxymethyl aniline of structure



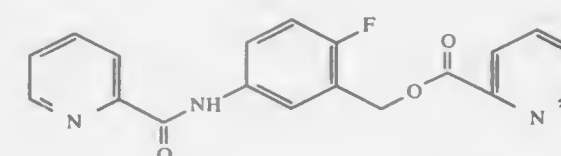
(c) reacting said hydroxymethyl aniline with two equivalents of the acid chloride derivative of (III) of structure



to yield hydroxymethyl amide of structure

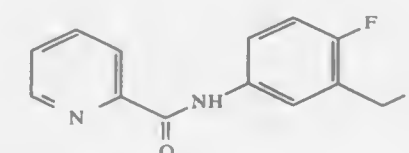


as well as amide ester of structure

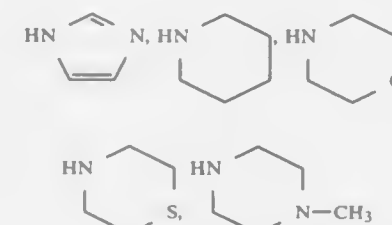


which can be converted to additional said hydroxymethyl amide with potassium carbonate in wet alcohol;

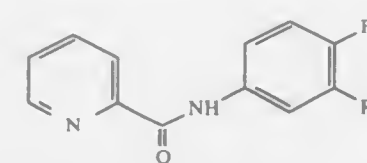
(d) reacting said hydroxymethyl amide with carbon tetrabromide and triphenylphosphine to afford the bromomethyl amide of structure



(e) reacting said bromomethyl amide with heterocycles of structure

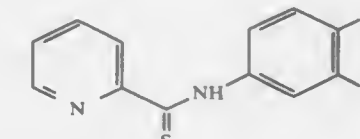


or their sodium salts to yield basic amides of structure



wherein  $R_1$  is as defined above; and

(f) reacting said basic amides with phosphorus pentasulfide in pyridine to afford basic thioamides of structure.



wherein  $R_1$  is as defined above;  
(g) and optionally treating said basic thioamides with hydrogen chloride to form the monoor dihydrochloride salt.

(X)

4,958,024  
PROCESS FOR PREPARING  
2-CARBAMOYLOXYALKYL-1,4-DIHYDROPYRIDINE  
DERIVATIVES

Tetsuji Miyano; Kunio Suzuki, both of Nagoya; Ryosuke Ushijima, and Susumu Nakagawa, both of Okazaki, all of Japan, assignors to Banyu Pharmaceutical Company, Ltd., Tokyo, Japan

Division of Ser. No. 863,984, May 16, 1986, Pat. No. 4,914,227, which is a division of Ser. No. 517,844, Jul. 27, 1983, abandoned.

This application Aug. 10, 1988, Ser. No. 230,418

Claims priority, application Japan, Aug. 6, 1982, 57-136343;

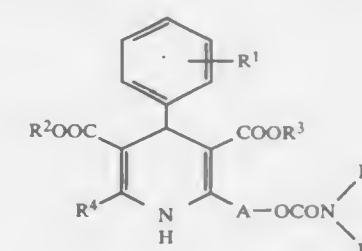
Sep. 2, 1982, 57-151706; Oct. 12, 1982, 57-177647

Int. Cl. 5 C07D 211/90, 401/12, 403/12

U.S. Cl. 546-249

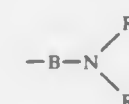
5 Claims

1. A process for preparing 2-carbamoyloxyalkyl-1,4-dihydropyridine derivative represented by the general formula:



(I)

where  $R^1$  is halogen, cyano, nitro, hydroxyl, di-lower alkyl substituted amino or lower alkoxy, each of  $R^2$  and  $R^3$  is lower alkyl,  $\beta$ -chloroethyl,  $\beta$ -bromoethyl,  $\beta$ -chloropropyl,  $\gamma$ -chloropropyl,  $\omega$ -chlorobutyl,  $\beta$ , $\beta$ -dichloroethyl, trifluoromethyl,  $\beta$ , $\beta$ , $\beta$ -trichloroethyl, lower alkenyl, lower alkynyl, phenyl, benzyl, hydroxyalkyl, lower alkoxyalkyl, lower alkenyloxyalkyl,  $\beta$ -benzyloxyethyl,  $\beta$ -phenylethoxyethyl,  $\beta$ -( $\alpha$ -methylbenzyloxy)ethyl,  $\beta$ -phenoxyethyl,  $\beta$ -pyridyloxyethyl,  $\beta$ -phenoxypropyl,  $\beta$ -phenoxybutyl or



(where B is straight-chained or branched  $C_{2-4}$  alkylene, and each of  $R^7$  and  $R^8$  is lower alkyl, benzyl or phenyl, or  $R^7$  and  $R^8$  form, together with the adjacent nitrogen atom, a heterocyclic group),  $R^4$  is hydrogen or lower alkyl, A is  $C_{1-8}$  alkylene, and each of  $R^5$  and  $R^6$  is hydrogen, lower alkyl,  $\beta$ -chloroethyl,  $\beta$ -bromoethyl,  $\beta$ -chloropropyl,  $\gamma$ -chloropropyl,  $\omega$ -chlorobutyl,  $\beta$ , $\beta$ -dichloroethyl, trifluoromethyl,  $\beta$ , $\beta$ , $\beta$ -trichloroethyl, hydroxyalkyl, cycloalkyl, benzyl or phenyl, or  $R^5$  and  $R^6$  form, together with the adjacent nitrogen atom, a heterocyclic group, which comprises:

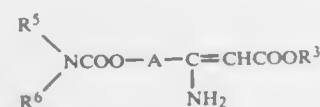
(a) reacting under cooling, at room temperature, or under warming or heating a 3-amino-3-carbamoyloxyalkylacrylic acid derivative represented by the general formula:

4,958,025

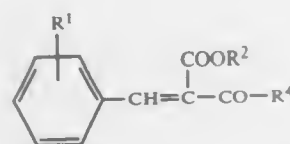
PREPARATION OF  
2-CHLORO-5-CHLOROMETHYLPYRIDINEKlaus Jelich, Wuppertal, Fed. Rep. of Germany, assignor to  
Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
Filed Dec. 4, 1989, Ser. No. 445,816Claims priority, application Fed. Rep. of Germany, Dec. 16,  
1988, 3842358Int. Cl.<sup>5</sup> C07D 213/61

U.S. Cl. 546—345

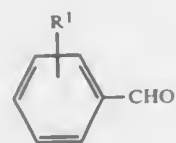
2 Claims



where  $R^3$ ,  $R^5$ ,  $R^6$  and A are as defined above, with a  
benzylidene compound represented by the general formula:



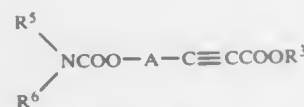
where  $R^1$ ,  $R^2$  and  $R^4$  are as defined above in water, an  
inert organic solvent, or a mixture thereof; or  
(b) reacting under cooling, or at room temperature, or under  
warming or heating the 3-amino-3-carbamoyloxyalkyl-  
acrylic acid derivative of the general formula II with an  
aldehyde compound represented by the general formula:



wherein  $R^1$  is as defined above, and a  $\beta$ -keto-ester com-  
pound represented by the general formula:



where  $R^2$  and  $R^4$  are as defined above in water, an inert  
organic solvent, or a mixture thereof; or  
(c) reacting under cooling, or at room temperature, or under  
warming or heating a 3-carbamoyloxyalkylpropionic acid  
derivative represented by the general formula:

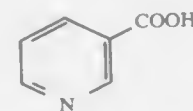


where  $R^3$ ,  $R^5$ ,  $R^6$  and A are as defined above, with the  
benzylidene compound of the general formula II and  
ammonia or its salt in water, an inert organic solvent, or a  
mixture thereof; or  
(d) reacting under cooling, or at room temperature, or under  
warming or heating the 3-carbamoyloxyalkylpropionic  
acid derivative of the general formula VI with the aldehyde  
compound of the general formula IV, the  $\beta$ -keto-  
ester compound of the general formula V and ammonia or  
its salt in water, an inert organic solvent, or a mixture  
thereof.

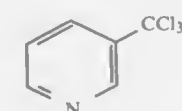
hydrogenating the pyridone aldehyde in a 4th step with molec-  
ular hydrogen in the presence of a hydrogenation catalyst to  
produce the pyridylmethanol compound of the formula



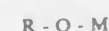
which comprises reacting nicotinic acid of the formula



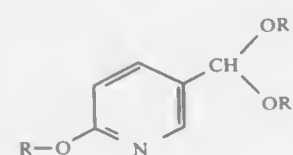
with phosphorus pentachloride to produce 3-trichloromethyl-  
pyridine of the formula



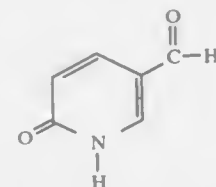
reacting the 3-trichloromethylpyridine in a 2nd step with an  
alkali metal alkoxide of the formula



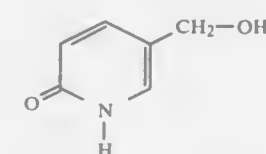
in which  
R represents alkyl and  
M represents an alkali metal cation, to produce a pyridine  
ether acetal of the formula



reacting the pyridine ether acetal in a 3rd step with dilute  
aqueous acid to produce pyridone aldehyde of the formula

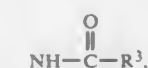


hydrogenating the pyridone aldehyde in a 4th step with molec-  
ular hydrogen in the presence of a hydrogenation catalyst to  
produce the pyridylmethanol compound of the formula



(VII)

and reducing the pyridylmethanol compound in a 5th step with  
a chlorinating agent.



$\text{NH}-\text{SO}_2-\text{CF}_3$  or  $\text{NH}-\text{SO}_2-\text{CH}_3$ , and  $X=\text{OH}$ , and one  
of X and Y is always OH, except with the proviso that X  
and Y are not simultaneously OH and  $\text{NH}-\text{SO}_2-\text{CH}_3$ ,  
and vice versa, with  $R^3$  being hydrogen or  $\text{C}_{1-4}$ -alkyl, and  
Z is H or OH, and, when Z is hydroxy, the residue A can  
also be in the tautomeric basic form,  
or an acid addition salt thereof.

4,958,026

NOVEL DOPAMINE DERIVATIVES, PROCESSES FOR  
THEIR PREPARATION, AND THEIR USE AS  
MEDICINAL AGENTSKlaus Schoellkopf, Rudolf Albrecht, Manfred Lehmann, and  
Gertrud Schröder, all of Berlin, Fed. Rep. of Germany, as-  
signors to Schering Aktiengesellschaft, Berlin and Bergkamen,  
Fed. Rep. of GermanyPCT No. PCT/DE85/00275, § 371 Date May 30, 1986, § 102(e)  
Date May 30, 1986, PCT Pub. No. WO86/01204, PCT Pub.  
Date Feb. 27, 1986

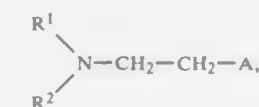
PCT Filed Aug. 14, 1985, Ser. No. 867,365

Claims priority, application Fed. Rep. of Germany, Aug. 15,  
1984, 3430310; Jul. 15, 1985, 3525563Int. Cl.<sup>5</sup> C07D 231/54, 235/02, 249/18

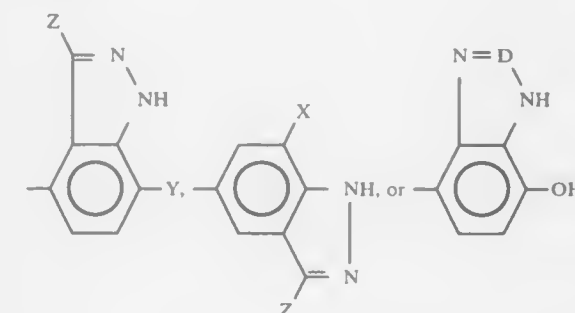
U.S. Cl. 548—259

5 Claims

1. A dopamine derivative of Formula



wherein  
A is

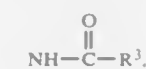


wherein

$R^1$  and  $R^2$  are identical or different, and each is hydrogen,  
 $\text{C}_{1-5}$ -alkyl or allyl,  
D is



$R_4$  is hydrogen,  $\text{C}_{1-4}$ -alkyl,  $\text{CF}_3$ , or  $\text{NH}_2$ .  
X is  $\text{NH}_2$ .



or  $\text{NH}-\text{SO}_2-\text{CF}_3$ , and  $Y=\text{OH}$ ,  
Y is  $\text{NH}_2$ .

4,958,027

5-NITRO-2-(3,5-DIAMINO-2,4,6-TRINITROPHENYL)-  
1,2,4-TRIAZOLE, ITS PREPARATION PROCESS AND  
EXPLOSIVE MATERIAL CONTAINING ITFrancois Laval, Monts, and Pascal Vignane, Tours, both of  
France, assignors to Commissariat A L'Energie Atomique,  
Paris, France

Filed Dec. 6, 1988, Ser. No. 280,555

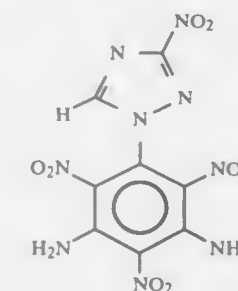
Claims priority, application France, Dec. 8, 1987, 87 17058

Int. Cl.<sup>5</sup> C07D 249/14; C06B 25/00

U.S. Cl. 548—264.8

2 Claims

1. 5-nitro-2-(3,5-diamino-2,4,6-trinitrophenyl)-1,2,4-triazole  
in accordance with formula:



4,958,028

PROCESS FOR THE PREPARATION OF  
5-SUBSTITUTED-3-PHENYL  
IMIDAZOLIDINE-2,4-DIONESMichael P. Prisbylla, Richmond, Calif., assignor to ICI Ameri-  
cas Inc., Wilmington, Del.

Division of Ser. No. 289,997, Dec. 22, 1988, Pat. No. 4,911,748.

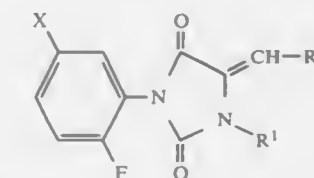
This application Jan. 8, 1990, Ser. No. 461,945

Int. Cl.<sup>5</sup> C07D 233/96, 401/06, 409/06, 405/06

U.S. Cl. 548—309

4 Claims

1. A process for the preparation of a compound of the fol-  
lowing formula



in which:

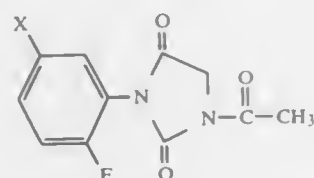
X is hydrogen or halogen;

$R^1$  is methyl or ethyl; and

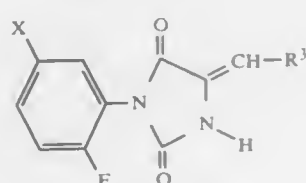
$R^3$  is  $\text{C}_{1-8}$ -alkyl,  $\text{C}_{3-6}$ -cycloalkyl, phenyl, substituted, phenyl,  
benzyl, substituted benzyl, styryl, or an aromatic hetero-  
cyclic group of 3 to 10 ring atoms; which process com-  
prises

(a) a compound having the formula



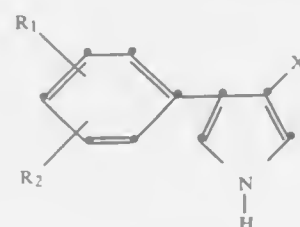


where X is as defined above, with an aldehyde of the formula  $R^3-CHO$  (V), where  $R^3$  is as defined above, to give a compound of the formula



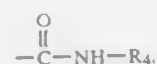
and,  
(b) reacting the compound of formula VI with a halide  $R^1-Q$ ; where Q is a halogen.

(VI)



(I)

wherein

X is cyano,  $-CO-R_3$ ,  $-CO-OR_3$  or

$R_1$  and  $R_2$  are each independently of the other hydrogen,  $C_1-C_6$ alkyl,  $C_1-C_6$ alkoxy,  $C_1-C_6$ alkylthio, nitro, cyano, halogen or  $C_1-C_6$ haloalkyl, or

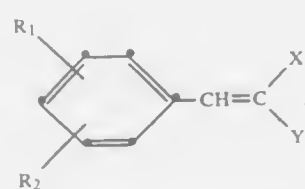
$R_1$  and  $R_2$ , when taken together, are methylenedioxy or difluoromethylenedioxy.

$R_3$  is  $C_1-C_6$ alkyl,  $C_1-C_6$ haloalkyl, phenyl or benzyl, or phenyl or benzyl which are each substituted by halogen, methyl, methoxy or methylthio,

$R_4$  is hydrogen,  $C_1-C_6$ haloalkyl, phenyl or benzyl, or phenyl or benzyl which are each substituted by halogen, methyl, methoxy or methylthio, which process comprises

(a) reacting N-(p-tolylsulfonyl)methyl formamide, in an inert solvent and in the presence of an organic base, with phosphoroyl chloride, mixing the reaction solution with water, separating the aqueous phase of the resultant two-phase mixture, and

(b) reacting the organic phase containing (p-tolylsulfonyl)methyl isocyanide direct with a compound of formula II



(II)

wherein X,  $R_1$  and  $R_2$  are as defined for formula I, Y is  $-CO-NHR_4$ ,  $-CO-R_5$  or  $-S-R_5$ ,  $R_5$  is  $C_1-C_6$ alkyl,  $C_1-C_6$ haloalkyl, phenyl or benzyl, or phenyl or benzyl which are each substituted by halogen, methyl, methoxy or methylthio, and  $R_4$  is as defined for formula I, in the presence of a base.

4,958,030

## PROCESS FOR THE PREPARATION OF 3-PHENYLPYRROLE DERIVATIVES

Rudolf W. Pflüger, Zeiningen; Jean Indermühle, Basel, and Franz Felix, Münchenstein, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 283,341, Dec. 12, 1988, abandoned. This application Oct. 11, 1989, Ser. No. 419,793

Int. Cl.<sup>5</sup> C07D 207/02

U.S. Cl. 548—526

26 Claims

1. A process for the preparation of a 3-phenylpyrrole derivative of formula I

4,958,029

## PROCESS FOR THE PRODUCTION OF ISOINDOLINE DERIVATIVES, NOVEL INTERMEDIATES AND PROCESS FOR THEIR PRODUCTION

Susumu Nakagawa, Okazaki; Satoshi Murase, Nagoya; Ryosuke Ushijima, and Yoshiaki Kato, both of Okazaki, all of Japan, assignors to Banyu Pharmaceutical Co., Ltd., Tokyo, Japan

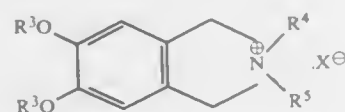
Filed Jan. 5, 1988, Ser. No. 140,996  
Claims priority, application Japan, Jan. 13, 1987, 62-5643; Jan. 13, 1987, 62-5644

Int. Cl.<sup>5</sup> C07D 209/58, 209/44

U.S. Cl. 548—430

9 Claims

1. A compound having the formula:



wherein  $R^3$  is a hydrogen atom or a hydroxyl-protecting group selected from the group consisting of an acetyl group, a methyl group, a benzyl group and an ethoxycarbonyl group, or two  $R^3$  of vicinal  $-OR^3$  groups together form a methylene group, an ethylene group, a benzyldiene group, a methoxymethyldiene group, a methoxyethyldiene group, an isopropylidene group or a carbonyl group,  $R^4$  and  $R^5$  which may be the same or different are N-protecting groups selected from the group consisting of lower alkyl groups and  $C_7-12$  aralkyl groups selected from the group consisting of benzyl, 3-methoxybenzyl, 4-methoxybenzyl, 3,4-dimethoxybenzyl,  $\alpha$ -methylbenzyl, phenethyl, 3-phenylpropyl, 1-naphthylmethyl and diphenylmethyl, and  $X^\ominus$  is an anion selected from the group consisting of halide, sulfate, hydrogen sulfate, methylsulfate, p-toluenesulfonate, methanesulfonate and trifluoroacetate.

4,958,031

## CROSSLINKING NITROMONOMERS

Clyde H. Sheppard, Bellevue, Wash., and Hyman R. Lubowitz, Rolling Hills Estates, Calif., assignors to The Boeing Company, Seattle, Wash.

Division of Ser. No. 16,703, Feb. 20, 1987, Pat. No. 4,851,495.

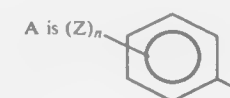
This application Jul. 5, 1988, Ser. No. 215,090

Int. Cl.<sup>5</sup> C07D 491/00

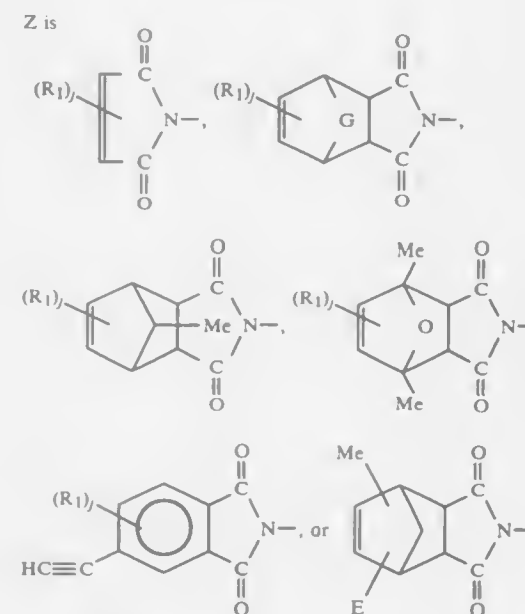
U.S. Cl. 548—431

15 Claims

1. A crosslinking nitromonomer of the formula  $A-NO_2$  wherein:



n is 2;



E is allyl or methallyl;

$R_1$  is any of lower alkyl, lower alkoxy, aryl, hydroxyl substituted aryl or halo substituted aryl;

j is 0, 1, or 2;

G is  $-CH_2-$ ,  $-O-$ ,  $-S-$ , or  $-SO_2-$ ; and

Me is methyl.

4,958,032

## N-ALKOXYLATED ETHER 2-PYRROLIDONES

Anthony J. O'Lenick, Jr., 743 Ridgeview Dr., Lilburn, Ga. 30247

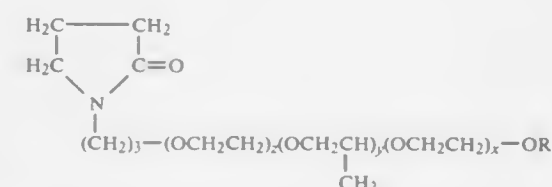
Filed Apr. 5, 1989, Ser. No. 333,539

Int. Cl.<sup>5</sup> C07D 207/27

U.S. Cl. 548—543

7 Claims

1. A substituted lactam conforming to the following formula;



wherein;

R is a alkyl having from 10 to 36 carbon atoms; x, y and z are independently integers from 0 to 50, with the proviso that the sum of x+y+z be greater than zero.

4,958,033

## PROCESS FOR PREPARING ALCOHOLS

Yukihisa Takisawa; Nobuharu Kono; Kenji Saito, and Hiroshi Yamachika, all of Osaka, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 563,524, Dec. 20, 1983, abandoned.

This application Sep. 26, 1986, Ser. No. 912,220

Claims priority, application Japan, Dec. 24, 1982, 57-230585

Int. Cl.<sup>5</sup> C07C 29/00; C07D 281/00

U.S. Cl. 549—59

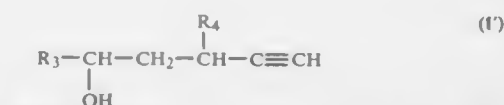
11 Claims

1. A process for preparing an alcohol of the formula:



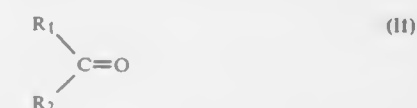
(I)

or



(I')

wherein  $R_1$  and  $R_2$  are, the same or different, each a hydrogen atom, a straight, branched or cyclic alkyl, alkenyl or alkynyl group having not more than 14 carbon atoms, a phenyl group, a naphthyl group, a benzyl group, a furyl group or a thienyl group, provided that when either one of  $R_1$  and  $R_2$  represents a hydrogen atom, the other is not a hydrogen atom,  $R_3$  is a hydrogen atom, a straight or branched alkyl group having not more than 6 carbon atoms or a phenyl group and  $R_4$  is a hydrogen atom or a methyl group, by reacting a carbonyl compound of the formula:



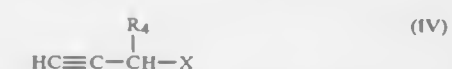
(II)

wherein  $R_1$  and  $R_2$  are each as defined above, or an oxirane of the formula:



(III)

wherein  $R_3$  is as defined above, magnesium and a propargyl halide of the formula:



(IV)

wherein X is a halogen atom and  $R_4$  is as defined above, followed by hydrolysis, wherein the carboxyl compound (II) or the oxirane compound (III) and the propargyl halide (IV) are simultaneously charged into a reaction system of magnesium in an inert solvent in the presence of zinc or a halide thereof.

4,958,034

## ALKENYL SUCCINIC ANHYDRIDES PROCESS

Paul S. Hale, and Kju H. Shin, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Nov. 13, 1989, Ser. No. 436,072

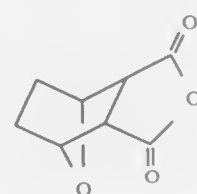
Int. Cl.<sup>5</sup> C07D 307/60

U.S. Cl. 549—255

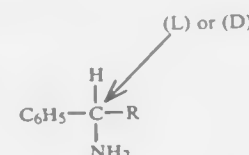
20 Claims

1. A process for making an alkenyl succinic anhydride hav-

ing reduced levels of tar and color bodies, said process comprising reacting maleic anhydride with an aliphatic olefin containing about 4-250 carbon atoms at a temperature of about 190°-250° C. in the presence of a stabilizing amount of an arylfluorophosphite, said arylfluorophosphite being characterized by having at least one substituted or unsubstituted aryloxy group and at least one fluorine atom bonded directly to a trivalent phosphorus atom.



with an optically active amine of the structure



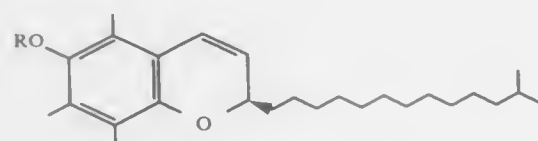
in the presence of an inert organic solvent to form the above acid compounds wherein the product formed comprises a mixture of IIA and IIB, wherein when the (D) isomer of amine C is employed as a reactant the product mixture consists of about 85 parts IIB and 15 parts IIA, and wherein when the (L) isomer of amine C is employed as a reactant the product mixture consists of about 85 parts IIA and 15 parts IIB.

**4,958,035**  
**PROCESS FOR SYNTHESIZING CHROMANES**  
Richard Barner, Witterswil, and Josef Hübscher, Nunningen, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.Y.  
Division of Ser. No. 235,257, Aug. 23, 1988, Pat. No. 4,876,369.  
This application Jun. 29, 1989, Ser. No. 373,000  
Claims priority, application Switzerland, Aug. 25, 1987, 3244/87

Int. Cl.<sup>5</sup> C07D 311/70

U.S. Cl. 549-408

1. Compound of the formula



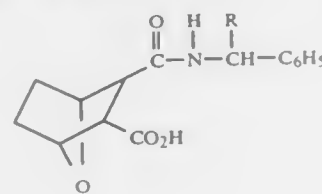
wherein OR is a hydrolyzable ether group.

**4,958,036**  
**ENANTIOMERICALLY SELECTIVE SYNTHESIS OF CERTAIN N-SUBSTITUTED-2-CARBAMYL 7-OXABICYCLO[2.2.1]HEPTANE-3-CARBOXYLIC ACIDS**  
John K. Thottathil, Trenton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.  
Division of Ser. No. 276,724, Jan. 28, 1988, Pat. No. 4,851,553, which is a division of Ser. No. 157,181, Jan. 27, 1988, Pat. No. 4,816,579, which is a division of Ser. No. 52,296, May 21, 1987, Pat. No. 4,743,697, which is a division of Ser. No. 870,564, Jun. 4, 1986, Pat. No. 4,687,865. This application Apr. 17, 1989, Ser. No. 339,037

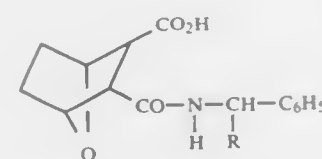
Int. Cl.<sup>5</sup> C07D 307/00

U.S. Cl. 549-463

1. A method for preparing 7-oxabicycloheptane acid compounds of the structure



or

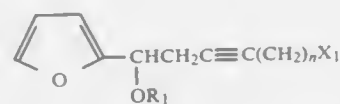


wherein R is alkyl, CO<sub>2</sub>H, or CO<sub>2</sub> alkyl, which comprises reacting mesoanhydride

**4,958,037**  
**PRECURSORS AND SYNTHESIS OF METHYL-9-OXO-11APHA, 16-DIHYDROXY-16-VINYL-5-CIS-13-TRANS-PROS-TADIENOATES**  
Middleton B. Floyd, Jr., Suffern, N.Y., assignor to American Cyanamid Company, Stamford, Conn.  
Division of Ser. No. 760,023, Jul. 29, 1985, abandoned. This application Apr. 25, 1988, Ser. No. 185,621  
Int. Cl.<sup>5</sup> C07D 307/32, 307/42, 307/54

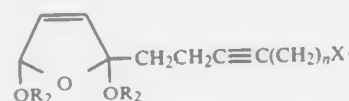
U.S. Cl. 549-476

1. A compound of the formula



wherein R<sub>1</sub> is selected from the group consisting of hydrogen and C<sub>1</sub>-C<sub>4</sub> alkyl; X<sub>1</sub> is selected from the group consisting of halogen, cyano, C<sub>1</sub>-C<sub>4</sub> alkoxy, carbonyl, carboxy and tri-(C<sub>1</sub>-C<sub>4</sub> alkoxy)methyl; and n is an integer 2-4 inclusive.

2. A compound of the formula



wherein R<sub>2</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl; X<sub>1</sub> is selected from the group consisting of halogen, cyano, C<sub>1</sub>-C<sub>4</sub> alkoxy, carbonyl, carboxy and tri-(C<sub>1</sub>-C<sub>4</sub> alkoxy)methyl; and n is an integer 2-4 inclusive.

**4,958,038**  
**ORGANOTITANIUM COMPOSITIONS USEFUL FOR CROSS-LINKING**

Kenneth C. Smeltz, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 941,076, Dec. 8, 1986, abandoned.

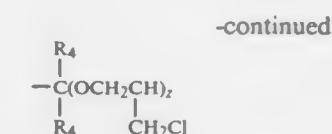
This application Mar. 20, 1989, Ser. No. 326,551

Int. Cl.<sup>5</sup> C07F 7/28

U.S. Cl. 556-55

32 Claims

1. A process which comprises (A) combining (i) glycerol, erythritol, arabitol, xylitol, sorbitol, dulcitol, mannitol, inositol, a monosaccharide, or a disaccharide, (ii) water and (iii) lactic acid, glycolic acid, malic acid, citric acid, tartaric acid, saccharic acid, gluconic acid, glyceric acid or mandelic acid to provide an aqueous solution of the polyol and the α-hydroxy carboxylic acid, and (B) then at an alkaline pH of 10 or less reacting said solution with a tetravalent titanium compound of an inorganic acid at an α-hydroxy carboxylic acid:titanium mol ratio between about 0.5:1 and about 4:1 and a polyol:titanium mol ratio between about 0.25:1 and about 2:1.



wherein n is 0 to 12, z is 1 to 50, and R<sub>4</sub> is H or lower alkyl; X is O, S or NR<sub>5</sub>, wherein R<sub>5</sub> is H or lower alkyl; R' is a monovalent fluorine-free alicyclic, aromatic or heterocyclic radical substituted with one or more of the following: —Cl, —Br, OR<sub>6</sub>, CO<sub>2</sub>R<sub>6</sub>, —Si(OR<sub>6</sub>)<sub>3</sub>, —N<sup>+</sup>(R<sub>6</sub>)<sub>3</sub> or vicinal —OH/—Cl or —OH/—Br, wherein R<sub>6</sub> is alkyl 1 to 18 carbon atoms, R'' is any substituted or unsubstituted fluorine containing fluorine-free aliphatic, alicyclic, aromatic or heterocyclic radical with a valency of at least 2 and not more than 100; m is zero or 1; p is 1 or 2; q is (3-p), i.e., either 2 or 1; r is 1 or 2; s is (2-r); and t is an integer of 2 to 100.

**4,958,039**  
**MODIFIED FLUOROCARBONYLIMINO BIURETS**  
Engelbert Pechhold, Chadds Ford, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

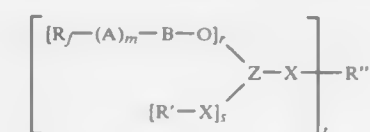
Filed Aug. 24, 1984, Ser. No. 644,089

Int. Cl.<sup>5</sup> C07F 7/10; D06M 13/28, 1/00, 13/40

U.S. Cl. 556-421

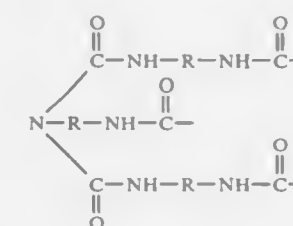
25 Claims

1. A fluorocarbonylimino biuret of the formula:



wherein

Z is a tris-(carbonylimino)biuret radical of the general formula

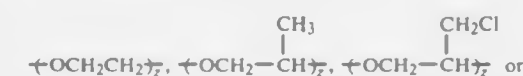


in which R is an aliphatic or cycloaliphatic residue of 4 to 20 carbon atoms, optionally substituted with alkyl or alkoxy substituents;

R<sub>1</sub> is a fully-fluorinated straight or branched aliphatic radical of 3 to 20 carbon atoms which can be interrupted by oxygen atoms;

A is a divalent radical consisting of —SO<sub>2</sub>NR<sub>3</sub>, —CONR<sub>3</sub>, —S—, or —SO<sub>2</sub>—, wherein R<sub>3</sub> is H or alkyl or 1 to 6 carbon atoms;

B is a divalent linear hydrocarbon radical —C<sub>n</sub>H<sub>2n</sub>— which can be end-capped by



**4,958,040**  
**PROCESS FOR THE PREPARATION OF DIORGANOHALOGENOSILANES**

Hirosbi Yoshioka, Tokyo; Masaaki Yamaya, Annaka; Hiromi Ohsaki, and Akira Hayashida, both of Joetsu, all of Japan, assignors to Shin-Etsu Chemical

Filed Sep. 21, 1989, Ser. No. 410,202

Claims priority, application Japan, Sep. 28, 1988, 63-243685

Int. Cl.<sup>5</sup> C07F 7/08

U.S. Cl. 556-467

17 Claims

1. A process for the preparation of a diorganohalogenosilane which comprises reacting a diorganodihalogenosilane and at least one organosilicon compound having at least one —Si—H bond in the molecule and selected from polysilanes, polycarbosilanes and polysilphenylenes in the presence of a Lewis acid.

**4,958,041**  
**METHODS FOR PRODUCING DIORGANOALKOXY-SILANES**

Jurgen Graefe, Selm-Cappenberg; Wolfram Uzick, Dortmund, and Udo Weinberg, Bergkamen, all of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Bergkamen, Fed. Rep. of Germany

Filed Jun. 26, 1989, Ser. No. 371,397

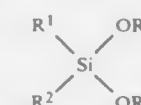
Claims priority, application Fed. Rep. of Germany, Jun. 25, 1988, 3821483

Int. Cl.<sup>5</sup> C07F 7/18

U.S. Cl. 556-480

28 Claims

1. A method of selective production of diorganodialkoxysilane having the general formula:



which comprises reacting at a temperature of about 0° to about 90° C. a tetraalkoxysilane having the formula Si(OR<sup>3</sup>)<sub>4</sub> or a monoorganotrialkoxysilane having the formula R<sup>1</sup>Si(OR<sup>3</sup>)<sub>3</sub> with an alkylating effective amount of a Grignard reagent having the formula R<sup>2</sup>MgX, wherein

X is Br, Cl or I; R<sup>1</sup> and R<sup>2</sup> are independently an alkyl group or a cycloalkyl group having 3 to 10 carbon atoms, wherein at least one of R<sup>1</sup> and R<sup>2</sup> is a branched alkyl group having the branched alkyl group at the α- or β- carbon to the Si;



a and b differ from one another and are 0 or 1, and the stereoisomers thereof.

VOL

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## ELECTRICAL

4,958,047

## MONUMENT FITTING

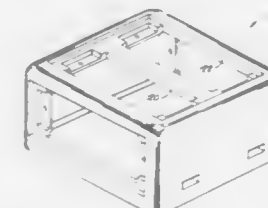
Edward C. Barte, Fairfield, Ohio, assignor to Square D Company, Palatine, Ill.

Filed Jan. 13, 1989, Ser. No. 296,631

Int. Cl.<sup>5</sup> H02G 3/08

U.S. Cl. 174—48

13 Claims



1. A monument fitting apparatus for an electrical raceway system to be placed in a floor, comprising: an elongated, rectangular parallelepiped frame having a top, a bottom, longer first and second sides, and shorter third and fourth sides; said top having a first electrical outlet mounting means defined therein for mounting an electrical outlet for top access thereto; said first and second longer sides having second and third electrical outlet mounting means defined therein, respectively, for mounting electrical outlets for side access thereto; wherein said frame is dimensioned so that when one electrical outlet is mounted in said first mounting means for top access said one electrical outlet prevents other electrical outlets from being mounted in said second and third mounting means, and when said first mounting means is empty electrical outlets can be mounted in both of said second and third mounting means for side access; and wherein said first, second and third mounting means are further characterized as providing a means for permitting electrical outlets to be relocated between top and side access positions after said monument fitting apparatus is placed in service.

4,958,048

## MODULAR ELECTRICAL SYSTEM

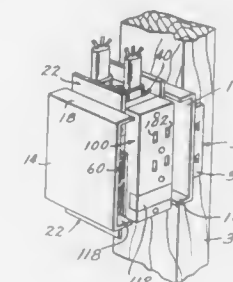
Peter D. Bell, P.O. Box 788, Merritt Island, Fla. 32952

Filed Jan. 10, 1989, Ser. No. 295,399

Int. Cl.<sup>5</sup> H02G 3/12

U.S. Cl. 174—53

25 Claims



1. A modular electrical wiring assembly including an outlet box and an electrical device slidably received within said box, said outlet box including positioning means for receiving and positioning said electrical device, and locking means on said electrical device engageable with said positioning means for a releasable fixing of said electrical device within said box and to

said positioning means, said positioning means comprising an elongate positioning panel within said box, said panel having opposed inner and outer faces, said electrical device engaging against the inner face of said positioning panel, said locking means engaging the outer face of said positioning panel and clamping said electrical device thereagainst.

4,958,049

## ELONGATED ELECTRICALLY INSULATING SUPPORT STRUCTURE AND RELEVANT PREPARATION METHOD

Massimo Alfieri; Zelindo Lodi, and Gianfranco Trevisan, all of Parma, Italy, assignors to Fidenza Vetraria S.p.A., Milan, Italy

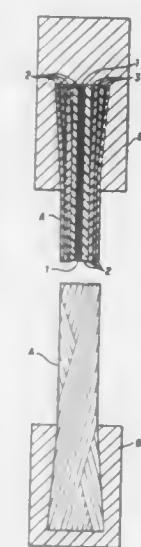
Filed Mar. 16, 1988, Ser. No. 169,040

Claims priority, application Italy, Mar. 19, 1987, 19753 A/87

Int. Cl.<sup>5</sup> H01B 17/56, 19/00

U.S. Cl. 174—209

14 Claims



1. An elongated electrically insulating support structure, made of fiberglass-reinforced resin, comprising a central cylindrical body and ends having the shape of solids having a surface of revolution, with axial symmetry, having diameters larger than the diameter of the central cylindrical body, with which they are radiused without solution of continuity, wherein said central cylindrical body and said ends consist of superimposed and crossed layers of glass filament impregnated with a thermosetting resin wound with a helical winding angle smaller than 90°, wherein the superimposed and crossed layers of glass filament impregnated with a thermosetting resin are alternated, in the vicinity of the end portions of the cylindrical element, with further layers of glass filament impregnated with a thermosetting resin wound with a winding angle larger than the helical winding angle of said superimposed and crossed layers of glass filament impregnated with a thermosetting resin.

5. A method for making an elongated electrically insulating support structure, comprising:

- (a) winding around a cylindrical element at least one continuous glass filament, impregnated with a thermosetting resin, with a helical winding angle smaller than 90°;
- (b) alternating and superimposing upon the helical windings, in the vicinity of the end portions of the cylindrical element, other windings, with a winding angle larger than the winding angle of the preceding step (a); and
- (c) polymerizing and curing the impregnating resin.



4,958,050

## FLEXIBLE PRINTED CIRCUIT BOARD

Shungi Oku, and Akikazu Kosho, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Filed May 12, 1989, Ser. No. 351,646Claims priority, application Japan, May 13, 1988, 63-63902  
Int. Cl.<sup>5</sup> H05K 1/00

U.S. Cl. 174-261

11 Claims



1. A flexible printed circuit board comprising:  
an insulating flexible substrate;  
an adhesion area on a front surface of said substrate, said adhesion area capable of being glued to a different electrical element by an anisotropic conductive adhesive;  
a plurality of first conductive terminals disposed in at least said adhesion area on the front surface of said substrate for providing external connections, said first conductive terminals in said adhesion area capable of being glued and connected to a plurality of different conductive terminals of the different electrical element by the anisotropic conductive adhesive; and  
a plurality of conductive patterns disposed on a rear surface of said substrate, said first conductive terminals in said adhesion area partly overlaying while partly not overlaying said rear conductive patterns.

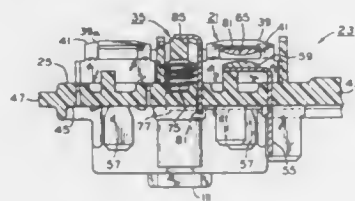
4,958,051

## TERMINAL BOARD ASSEMBLY

Lynn E. Fisher, Ft. Wayne, Ind.; Richard A. Wandler, Clinton, Iowa, and James P. Frank, Rock Falls, Ill., assignors to General Electric Company, Fort Wayne, Ind.  
Division of Ser. No. 203,904, Jan. 8, 1988, Pat. No. 4,856,152, which is a division of Ser. No. 33,975, Apr. 3, 1987, Pat. No. 4,781,726. This application Apr. 5, 1989, Ser. No. 333,537  
Int. Cl.<sup>5</sup> H01H 1/24, 35/10

U.S. Cl. 200-80 R

23 Claims



1. A terminal board assembly for a dynamoelectric machine comprising:

a body formed of a dielectric material and including a pair of generally opposite faces thereon;  
at least a pair of spaced apart bosses on said body extending from one of said opposite faces thereof, respectively;  
a pair of terminals secured to said body at least generally adjacent said bosses and including a pair of deformed portions arranged at least in part in overlaying relation with said bosses, respectively, and at least one of said terminals having an electrical connector section extending beyond the other of said opposite faces on said body;  
terminal means for securement to said body and including a contact section disposed generally in overlaying relation with said one opposite face on said body and arranged generally in spaced apart relation with said at least one terminal, and another electrical connector section on said terminal means extending beyond said other opposite face on said body;  
a contact on said contact section of said terminal means;  
a generally elongate resilient switch element having a pair of opposite ends, one of said opposite ends being connected in electrical conductive engagement with said deformed portion of said at least one terminal, and the other of said opposite ends being biased toward said contact on said contact section of said terminal means;  
another contact on said switch element at least generally adjacent said other opposite end thereof and arranged to make with and break from said first named contact;  
an actuating lever including a pair of generally opposite trunnions pivotally received between said bosses and at least said deformed portions of said at least one terminal and the other of said terminals, respectively, and extension means on said actuating lever for engagement with said switch element at least generally adjacent said other opposite end thereof; and  
resilient means biased between said body and said actuating lever for pivotally urging said actuating lever about its trunnions toward a position engaging said extension means with said switch element at least generally adjacent said other opposite end thereof to break said another contact from said first named contact.

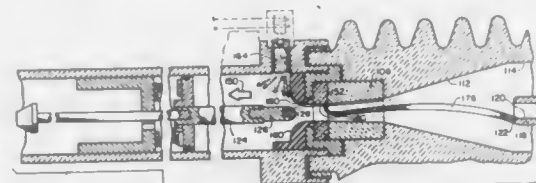
4,958,052

## ARC SEVERING AND DISPLACEMENT METHOD AND APPARATUS FOR FAULT CURRENT INTERRUPTION

William R. Mahieu, Rural Rte. 4, P.O. Box 23, Centralia, Mo. 65240  
Continuation-in-part of Ser. No. 310,794, Feb. 14, 1989, Pat. No. 4,904,977. This application Dec. 18, 1989, Ser. No. 454,705  
Int. Cl.<sup>5</sup> H01H 33/70

U.S. Cl. 200-148 R

21 Claims



1. Apparatus for interrupting currents in a high voltage network, comprising:  
a source of a dielectric gas adapted for extinguishing an electric arc;  
conduit means defining a confined channel for conveying said dielectric gas along a path from said source through the confined channel;  
a first electrode disposed in said conduit means having an exposed surface in said confined channel generally parallel to the direction of gas flow therethrough;  
a second electrode in conductive relation with said first electrode during normal operation and disposed down-

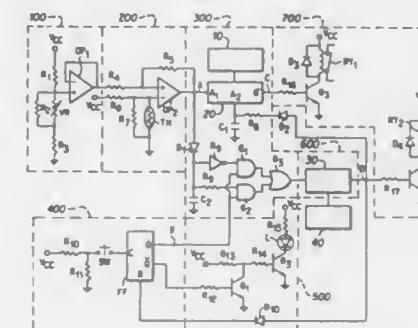
4,958,055

## CONTROL CIRCUIT FOR A REFRIGERATOR COMBINED WITH A MICROWAVE OVEN

Jae E. Shim, Kyunggi-do, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Rep. of Korea  
Filed May 17, 1989, Ser. No. 353,035  
Claims priority, application Rep. of Korea, May 17, 1988, 1988-5743Int. Cl.<sup>5</sup> H05B 6/68

U.S. Cl. 219-10.55 B

2 Claims

4,958,053  
CARRIER TAPE AND METHOD OF MANUFACTURING THE SAME

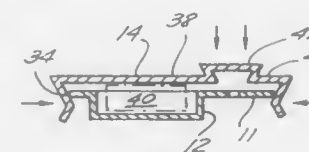
Hugo Boeckmann, Arlington Hts., and Donald Van Erden, Wildwood, both of Ill., assignors to Illinois Tool Works, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 46,259, May 4, 1987. This application May 17, 1988, Ser. No. 195,034

Int. Cl.<sup>5</sup> B65D 73/02

U.S. Cl. 206-330

14 Claims



1. A carrier tape comprising:  
an elongated base strip;  
an elongated cover strip formed of a resilient plastic material generally coextensive in length with said base strip, said cover strip having a top surface, opposed sidewalls extending downwardly from said top surface and having at least portions spaced apart from each other a distance substantially equal to the width of said base strip; and  
means integrally formed with said cover strip for biasing said sidewall portions toward each other in response to a downward force applied to said cover strip top surface.

4,958,054

## DIELECTRIC DRYING OF HOT PLASTIC FOOD EXTRUDATE

Lewis C. Keller, Watauga, and Cecil A. Bowles, Lewisville, both of Tex., assignors to Frito-Lay Inc., Dallas, Tex.

Filed Oct. 29, 1986, Ser. No. 924,551

Int. Cl.<sup>5</sup> H05B 6/62

U.S. Cl. 219-10.55 M

7 Claims



3. A method of producing an extruded food product comprising extruding a hot plastic food material from a food extruding zone at a temperature of between about 212° F. and 400° F., and dielectrically heating the extruded material in a dielectric heating zone while said material is still in a plastic state to dry said material.

4,958,056

## ELECTRODE HOLDER

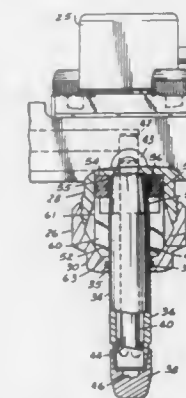
Anthony J. Tomac, Troy, Mich., assignor to C. M. Smillie &amp; Company, Ferndale, Mich.

Filed Jan. 16, 1990, Ser. No. 465,708

Int. Cl.<sup>5</sup> B23K 11/31

U.S. Cl. 219-120

15 Claims



1. An electrode combination comprising:  
an electrode holder;  
an electrode;

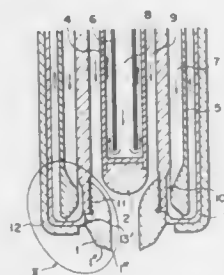
means to properly position said electrode relative to said holder;

said electrode having a tip at one axial end and a conical portion at the opposed axial end, said conical portion being of a first diameter at said opposed axial end and diverging outwardly to a second diameter, said second diameter being greater than said first diameter;

said means to properly position including said electrode holder having a cylindrical ring portion with an inner periphery and an outer periphery, said inner periphery receiving an inner O-ring in a groove, said inner periphery of said ring portion being of a third diameter, said third diameter being intermediate said first and second diameters;

said ring portion receiving said conical portion until said conical portion abuts said inner O-ring to properly position said electrode relative to said holder.

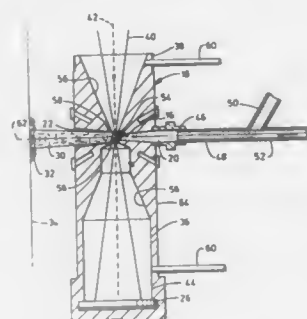
**4,958,057**  
**TRANSFER-TYPE PLASMA TORCH WITH RING-SHAPED CATHODE AND WITH PROCESSING GAS PASSAGE PROVIDED INTERIORLY OF THE CATHODE**  
 Hiroshi Shiraishi; Nobuo Tajima; Tsuyoshi Shinoda, and Nobuyoshi Hirotsu, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan  
 Filed Apr. 19, 1989, Ser. No. 340,188  
 Claims priority, application Japan, Apr. 26, 1988, 63-102992  
 Int. Cl.<sup>5</sup> B23K 9/00  
 U.S. Cl. 219—121.5 4 Claims



1. A transfer-type plasma torch which has a cathode and an ignition anode and in which, after a trigger electric discharge has been produced between the cathode and the ignition anode, an electric discharge is effected between the cathode and an object to be treated that is set as the anode, said plasma torch comprising:

- a cylindrical cathode-holding member having formed therein a space allowing for the flow of a coolant;
- an ignition anode disposed within said cathode-holding member;
- a ring-shaped cathode disposed on an inner periphery of said cathode-holding member and positioned below the tip of said ignition anode, with the tip portion of said cathode projecting downwardly from the bottom face of said cathode-holding member; and
- a gas flow passage defined by a space formed by an inner surface of said cathode-holding member and an outer surface of said ignition anode and along an inner surface of said ring-shaped cathode, said gas flow passage being the only gas flow passage, in the torch and said gas flow passage permitting introduction of a gas flow to said cathode, said gas flow passing along said inner surface of said cathode, such that said gas flow is introduced only interiorly of said cathode.

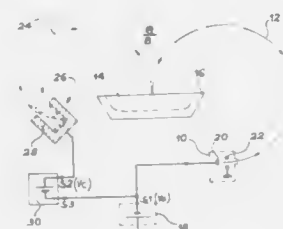
**4,958,058**  
**TRANSVERSE FLOW LASER SPRAY NOZZLE**  
 Wilbur D. Scheldt; Eric J. Whitney, both of Cincinnati, and Vanon D. Pratt, Hamilton, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio  
 Filed Feb. 8, 1989, Ser. No. 307,794  
 Int. Cl.<sup>5</sup> B23K 26/00  
 U.S. Cl. 219—121.6 18 Claims



1. Apparatus for producing a flow of a molten feed material, comprising:

- a laser heating source having a beam directed into an interaction volume, the beam having an intensity within the interaction volume sufficient to melt the feed material when introduced into the interaction volume;
- means for introducing the feed material into the interaction volume; and
- means for partially confining the molten feed material within the interaction volume and for ejecting the molten feed material from the interaction volume in a direction having a component transverse to the laser beam.

**4,958,059**  
**ELECTRONIC BOMBARDMENT EVAPORATOR EQUIPPED WITH MEANS TO RECOVER BACKSCATTERED ELECTRONS**  
 Jean-Francois Lizee, Paris, France, assignor to Commissariat a l'Energie Atomique, Paris, France  
 Filed Jun. 30, 1989, Ser. No. 374,474  
 Claims priority, application France, Jul. 6, 1988, 88 09156  
 Int. Cl.<sup>5</sup> B23K 15/00  
 U.S. Cl. 219—121.34 3 Claims

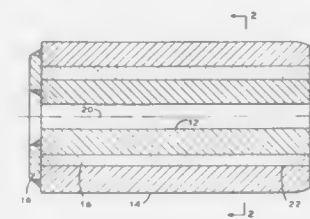


1. Electronic bombardment evaporator provided with means for recovering electrons backscattered by a target subjected to a bombardment by an electronic beam, said beam originating from an electron gun with an electrode connected to an output S1 of a first d.c. power source, said power source furnishing a negative potential Vo on its output S1, wherein it includes:

- means to collect said backscattered electrons, said means being brought to a potential Vc so that the electrons backscattered by the target are attracted by said means;
- a second d.c. power source connected via a first output S2 to

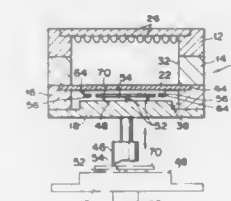
the means to collect the backscattered electrons, said first output being brought to the potential Vc, the second power source being also connected via a second output S3 to the output S1 of the first power source, the second output S3 being brought to the potential Vo.

**4,958,060**  
**CLAD METAL ELECTRODE**  
 William L. Mankins, Huntington, W. Va.; David O. Gothard, Cary, N.C., and Charles P. Hardy, Kitts Hill, Ohio, assignors to Inco Alloys International, Inc., Huntington, W. Va.  
 Division of Ser. No. 172,772, Mar. 28, 1988, Pat. No. 4,933,141.  
 This application Jul. 12, 1989, Ser. No. 378,768  
 Int. Cl.<sup>5</sup> B23K 35/02  
 U.S. Cl. 219—145.22 3 Claims



1. A clad welding electrode comprising a nickel tube, an iron rod within the nickel tube and consolidated nickel powder between the nickel tube and the iron rod bonding the nickel tube to the iron rod.

**4,958,061**  
**METHOD AND APPARATUS FOR HEAT-TREATING A SUBSTRATE**  
 Tsuyoshi Wakabayashi, Kofu, and Shigehito Ibuka, Higashiyamato, both of Japan, assignors to Tokyo Electron Limited, Tokyo, Japan  
 Filed Jun. 27, 1989, Ser. No. 371,807  
 Claims priority, application Japan, Jun. 27, 1988, 63-156679  
 Int. Cl.<sup>5</sup> H01L 21/477  
 U.S. Cl. 219—411 10 Claims



1. An apparatus for heat-treating a substrate, comprising:

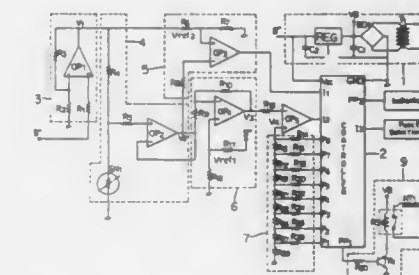
- a chamber for defining a closed space for receiving the substrate;
- an infrared-ray lamp arranged inside said chamber;
- a platen constituting part of said chamber;
- moving means for moving said platen to close and open said chamber and for simultaneously causing the substrate to be respectively loaded into said chamber and unloaded from said chamber;
- supporting means for supporting the substrate relative to said platen such that a space is defined between a reverse side of the substrate and a surface of said platen substantially opposite the reverse side of the substrate;
- a ring-like temperature security member for preventing heat dissipation from the substrate, said ring-like temperature

security member being disposed around the substrate with a narrow gap therebetween;

a quartz window plate located between said infrared-ray lamp and the substrate; and

pin means, attached to said quartz window plate, for supporting said temperature security member.

**4,958,062**  
**DRIVING CONTROL APPARATUS FOR AN ELECTRIC RANGE WITH SELF-DIAGNOSIS FUNCTION**  
 Sang Soo Han, Kyunggi-Do, Rep. of Korea, assignor to Goldstar Instrument & Electric Co., Ltd., Seoul, Rep. of Korea  
 Filed Feb. 28, 1989, Ser. No. 317,189  
 Int. Cl.<sup>5</sup> H05B 1/02  
 U.S. Cl. 219—497 11 Claims



1. A driving control apparatus for an electric range having an oven including a heating device and a self diagnosis function, comprising:

- a constant voltage circuit producing a constant voltage as an output;
- a sensor power supply coupled to said constant voltage circuit, receiving said constant voltage and producing a sensor power signal as an output;
- a temperature detector coupled to said sensor power supply, receiving said sensor power signal and producing a temperature signal as an output in accordance with a temperature in the oven;
- an over temperature detector, receiving said sensor power signal and said temperature signal, said over temperature detector comprising:
- reference signal generator receiving said sensor power signal and producing a reference signal; and
- a comparator receiving said reference signal and said temperature signal, said comparator producing an over temperature output signal having a value dependent upon an outcome of the comparison;
- a comparison circuit receiving said temperature signal and said constant voltage wherein said comparison circuit comprises:
- a second reference signal generator receiving said constant voltage and producing a second reference signal; and
- a second comparator receiving said second reference signal and said temperature signal and producing a comparison output signal having a value dependent on the result of comparing said second reference signal and said temperature signal;
- a function selection key circuit producing a function selection signal corresponding to a desired range function;
- a controller, producing a digital step pulse signal;
- a digital analog converter receiving said digital step pulse and producing a corresponding analog signal;
- a second comparison circuit receiving said comparison output signal said corresponding analog signal and producing a second comparison output signal and said corresponding analog signal and producing a second comparison output signal corresponding to a result of the comparison done by said second comparison circuit;
- said controller receives said second comparison output sig-



nal and said function selection signal and produces a power control signal and a function indication signal, said power control signal having a value dependent on said second comparison output signal, said function indication signal having a value dependent on said function selection signal;  
a heater driving circuit producing a heater driving signal to control the heating device in response to said power control signal; and  
an indicator indicating a selected range function in response to said function indication signal.

4,958,063

## DEVICE FOR COUNTING OBJECTS

Peter Hausmann, Bäretswil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

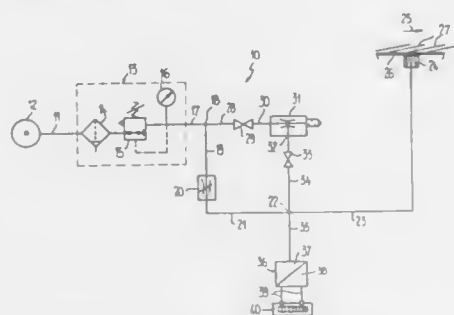
Filed Jun. 26, 1989, Ser. No. 371,393

Claims priority, application Switzerland, Jun. 29, 1988, 02476/88

Int. Cl.<sup>5</sup> G06M 1/12

U.S. Cl. 235—201 FS

7 Claims



1. An apparatus for counting articles being conveyed along a path of travel, and comprising  
air delivery line means (21,34),  
means for delivering air through said air delivery line means, a ring-jet sensor (24) mounted adjacent said path of travel and having an outlet directed toward the conveyed articles, and with said sensor being coupled to a first branch line (23),  
pressure sensor means (36) coupled to a second branch line (35) for sensing and counting pressure changes in said second branch line, and with said first and second branch lines being coupled in parallel to said air delivery line means, and  
whereby pressure changes are induced in said air delivery line means by an article being conveyed past said ring-jet sensor and such pressure changes are adapted to be sensed and counted by said pressure sensor means.

4,958,064

## BAR CODE LOCATOR FOR VIDEO SCANNER/READER SYSTEM

Robert D. Kirkpatrick, Farmers Branch, Tex., assignor to Image Recognition Equipment Corporation, Richardson, Tex.

Filed Jan. 30, 1989, Ser. No. 302,012

Int. Cl.<sup>5</sup> G07B 15/02

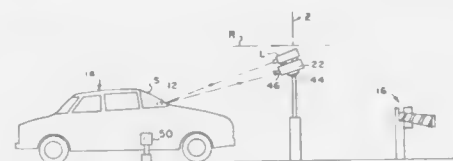
U.S. Cl. 235—384

12 Claims

1. In a reader/scanner system for automatically reading bar code data elements displayed on a carrier, the improvement comprising:

a uniquely configured target locator including a group of locator elements having predetermined and known characteristics disposed on said carrier in association with said bar code data elements, said target group including a set of serially spaced rectangles superimposed on a high contrast background, said rectangles when intersected by a line through the center of said target group defining a se-

quence of contrasting bars and spaces, said bars and spaces having predetermined widths along said centerline; and,



means responsive to the respective width ratios of said locator elements and spaces for initially detecting the presence of said target locator group and thereafter reading the bar code data elements adjacent to said target locator group.

4,958,065

## METHOD AND APPARATUS FOR CODING HEAT SENSITIVE MEDIA

Zvi Weinberger, Jerusalem, Israel, assignor to Prepaid Card Services, Inc., Pearl River, N.Y.

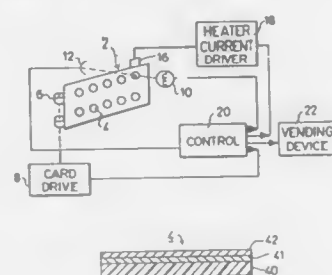
Continuation of Ser. No. 773,801, Sep. 9, 1985, abandoned. This application Aug. 1, 1988, Ser. No. 227,468

Claims priority, application Israel, Sep. 14, 1984, 72951

Int. Cl.<sup>5</sup> G06K 7/10

U.S. Cl. 235—455

24 Claims



1. A method of coding an optically-readable medium comprising:  
applying to the medium at least one coating of a heat-sensitive material to produce a specified combination of at least two optical changes as a function of time when heated to a predetermined temperature above ambient;  
heating said medium to said predetermined temperature;  
and sensing the optical changes undergone by the medium to determine whether the sensed changes match said specified combination.

4,958,066

## FINANCIAL INSTRUMENT VERIFICATION AND METHOD OF PRODUCTION

Virgle L. Hedgecoth, Pomona, Calif., assignor to Secured Transactions, Pomona, Calif.

Filed Aug. 19, 1988, Ser. No. 234,394

Int. Cl.<sup>5</sup> G06K 19/00

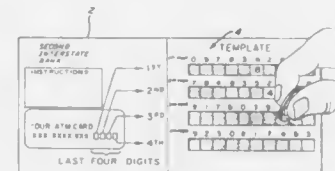
U.S. Cl. 235—487

28 Claims

1. A verification system for use at a transactional point comprising:

means for providing a dedicated ascertainable code unique to the entity involved in the transaction;  
a transactional instrument having subjectively coded symbols that are obscured from view in a matrix array with

subjectively coded visible addresses to the matrix array, and



means for selecting predetermined addresses for identifying the coded symbols for comparison with the dedicated ascertainable code to verify the transaction.

4,958,067

## METHOD AND APPARATUS FOR OPTICALLY DETECTING THE LOCATION OF A CONTROL OBJECT IN A CONTROL PANEL RECESS

Yoshiyuki Nakatomi; Toshirou Iwasa, and Hitoshi Kobayashi, all of Iwaki, Japan, assignors to Alpine Electronics Inc., Tokyo, Japan

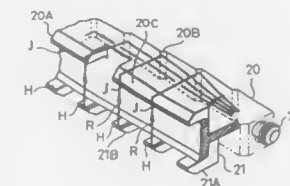
Filed Dec. 6, 1988, Ser. No. 280,766

Claims priority, application Japan, Jan. 25, 1988, 63-7784; May 18, 1988, 63-65466

Int. Cl.<sup>5</sup> G01V 9/04

U.S. Cl. 250—221

16 Claims



1. An apparatus for optically detecting the location of a control object applied to a control panel, comprising:  
a recess formed on said control panel for receiving said control object;  
a plurality of light receiving portions formed on a first inside surface of said recess and arranged in a longitudinal direction of said recess;  
a plurality of light emitting portions formed on a second inside surface of said recess opposed to said first inside surface, each light emitting portion located opposite a corresponding one of each of the light receiving portions so as to emit light to the opposite light receiving portion, whereby a plurality of light paths pass from said light emitting portions across said recess to said light receiving portions, said light paths being arranged in the longitudinal direction of said recess;  
a light generator for supplying the light to each light emitting portion;  
a detector connected to said light receiving portions for generating a signal in response to the light emitted from said light emitting portions and received by said light receiving portions; and  
a light transmitting member connected to said light receiving portions, said light transmitting member having a back surface with a plurality of stepped portions corresponding to said light receiving portions, wherein the light received by said light receiving portions is reflected by said stepped portions and is transmitted through said light transmitting member to said detector.

4,958,068

## DUAL BUMPER-LIGHT CURTAIN OBSTACLE DETECTION SENSOR

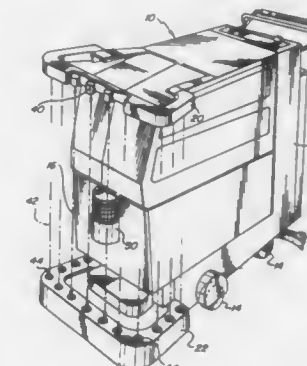
William Pong, Brookfield Center; Robert G. Stacy, and Allen J. Bancroft, both of Danbury, all of Conn., assignors to Transitions Research Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 265,784, Nov. 1, 1988, and Ser. No. 307,765, Feb. 7, 1989. This application Jul. 28, 1989, Ser. No. 387,151

Int. Cl.<sup>5</sup> G01V 9/04

U.S. Cl. 250—222.1

17 Claims



1. Obstacle detection system for an autonomous mobile vehicle comprising:  
a first bumper disposed laterally across the frontal cross section of the vehicle;  
a second bumper, spaced from the first bumper, and disposed laterally across the frontal cross section of the vehicle; and  
an array of light sources disposed on the vehicle for emitting a curtain of light beams between the first and second bumpers;  
an array of light receivers disposed on the vehicle for receiving the light beams, said light receivers providing an indication of the position of an object intruding between the first and second bumpers towards the vehicle.

4,958,069

## APPARATUS FOR DETECTING PRESENCE OR ABSENCE OF RECORDING MEDIUM IN PRINTER

Shubei Okamori, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

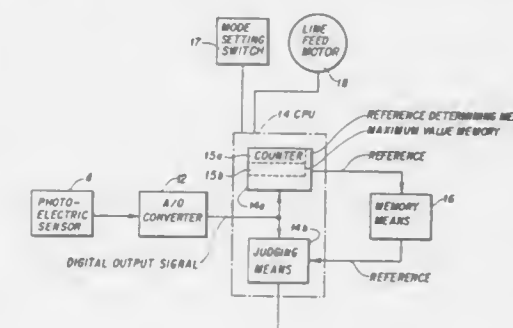
Filed Jun. 19, 1989, Ser. No. 367,959

Claims priority, application Japan, Jun. 22, 1988, 63-154056

Int. Cl.<sup>5</sup> G01N 9/04

U.S. Cl. 250—223 R

7 Claims



1. An apparatus for detecting the presence or absence of a recording medium in a printer in which the recording medium is fed along a feeding path, the apparatus comprising:  
a rotary support member for supporting the recording me-

dium, said support member having a surface whose reflectance of light is lower than that of the recording medium; a photo-electric sensor disposed adjacent to a predetermined position on the surface of said support member which partially defines the feeding path of the printer, said photo-electric sensor including a light emitting element which emits light toward said surface of the support member, and a light receiving element which receives the light reflected from said surface and which generates an output signal corresponding to an intensity of the received light; reference determining means for determining a reference based on a maximum value of said output signal which is generated by said light receiving element of said photo-electric sensor during rotation of said rotary support member by at least one turn in a reference setting mode in which the recording medium is absent at said predetermined position, said reference determining means determining said reference by adding an extra value to said maximum value of said output signal;

memory means for storing said reference determined by said reference determining means; and

judging means for comparing the output signal of said photo-electric sensor with said reference in a normal operation mode, and for judging that the recording medium is present at said predetermined position if the output signal in said normal operation mode is higher than said reference.

4,958,070

## DIGITAL ELECTRONICS FOR CONTROLLING A FIBER OPTIC SHEDDING FLOWMETER

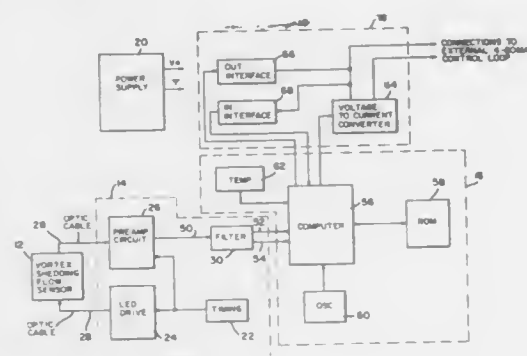
David W. Jordan, Euclid, and William L. Thompson, Montville, both of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Nov. 7, 1988, Ser. No. 267,896

Int. Cl.<sup>5</sup> H01J 40/14

U.S. Cl. 250—227.21

5 Claims



1. A digital electronics system for controlling a fiber optic vortex shedding flowmeter, comprising:
  - light emitting means;
  - light detecting means;
  - light connecting means connected to said light emitting means and said light detecting means for varying the attenuation of light from said light emitting means to said light detecting means according to a variable to be measured;
  - means for generating an electrical signal proportional to said varied attenuation of light, said generating means having a feedback circuit which eliminates an average peak value of said light attenuation to generate said electrical signal proportional to the modulation of said light signal;
  - filter circuit means for dividing said electrical signal into at least two output signals with said output signals being offset in time, said filter circuit means having means for

comparing each output signal with a predetermined reference level for eliminating signal noise;

and computer means in communication with said output signals for determining the measured variable therefrom and for correcting the measured variable according to process variables.

4,958,071

## A JOYSTICK INCLUDING AN OPTICAL ENCODER WITH FILM STRIPS IN SLIDING CONTACT

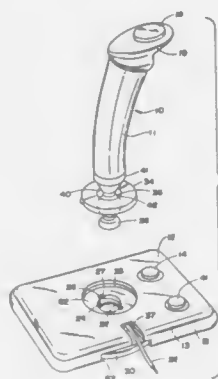
Dennis Scott-Jackson, and Harry Skibbe, both of Burnaby, Canada, assignors to Advanced Gravis Computer Technology, Ltd., Burnaby, Canada

Filed Jan. 13, 1989, Ser. No. 296,784

Int. Cl.<sup>5</sup> G01D 5/34; G01V 9/04

U.S. Cl. 250—229

21 Claims



16. A joystick, comprising:
  - (a) a casing;
  - (b) a lever pivotally coupled to said casing and pivotal about a point along the length thereof;
  - (c) a pair of optical encoders coupled to said lever so as to respond to a component of pivotal movement of said lever in each of two orthogonal planes with a first one of said pair providing a number of output pulses proportional to an angle of pivoting in one of said planes and a second one of said pair a number of output pulses proportional to an angle of pivoting in another of said planes wherein each encoder includes:
    - (d) a base;
    - (e) a rotor rotatably attached to said base and coupled to said lever;
    - (f) a pair of window chambers affixed to said base;
    - (g) a reticle mounted on said base in a cylindrically disposed position traversing each of said window chambers and having alternating transparent and opaque areas;
    - (h) a moving unit mounted on said rotor, cylindrically disposed to, concentric with and juxtaposed to said reticle having alternating transparent and opaque areas substantially matching those of said reticle but spaced such that alternating opaque and transparent regions of said moving unit and said reticle come into and out of alignment and such that as said moving unit is moved past said reticle, a periodic variation of light transmitted through said reticle and moving unit results with the transparent regions of said moving unit becoming fully aligned with those of said reticle in one of said windows and 90 degrees out of full alignment in another of said windows;
    - (i) light emitting means in each of said chambers for directing light onto said reticle and moving unit; and
    - (j) light sensing means in said window chambers for detecting light from a corresponding one of said light emitting means after its transmission through said reticle and moving unit;

wherein each of said reticle and moving unit are photographic

film strips with alternating exposed and unexposed bands transverse to the length of the strips corresponding to said opaque and transparent regions, respectively, wherein the bands on one of said film strips being of equal dimensions and equispaced and having the same dimensions and spacing as those on another of said film strips and said film strips are in sliding contact with one another so that reflections from surfaces of the film strips due to air gaps between the strips is substantially reduced.

4,958,072

## REMOTE FIBER OPTIC ANGULAR-ORIENTATION SENSOR USING PHASE DETECTION OF TWO ORTHOGONAL OSCILLATING POLARIZATION VECTORS

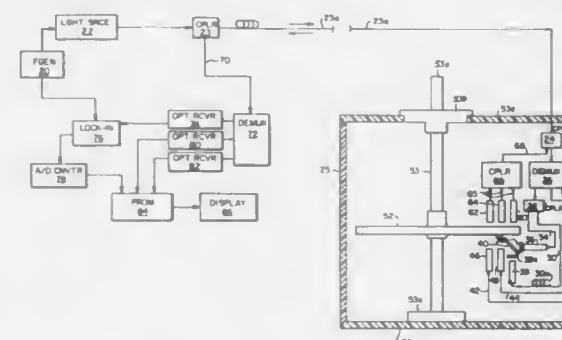
Thomas Hoffer, Monterey; Michael R. Brininstool, San Diego, both of Calif.; Jeffrey T. Newmaster, Portsmouth, R.I., and Steven L. Garrett, Pebble Beach, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 7, 1988, Ser. No. 241,534

Int. Cl.<sup>5</sup> G01C 17/26; G02F 1/01

U.S. Cl. 250—231.13

26 Claims



1. A sensor for remotely detecting an angular position of a rotatable code wheel comprising:
  - first means for generating first and second modulated polarized light beams each having a first center wavelength, said first light beam being polarized orthogonally to said second light beam, said first light beam having a phase lag with respect to said second light beam, and for combining said first and second light beams into a composite polarized light beam;
  - second means positioned proximate to said first means for receiving said composite polarized light beam;
  - a code wheel rotatable about an axis, said code wheel having a first polarization filter, said code wheel interposed between said first means and said second means so that said composite polarized light beam is transmitted through said polarization filter; and
  - third means operably connected to said second means for providing an output corresponding to said angular position of said code wheel by comparing a phase relationship between said composite polarized light beam and a reference signal.

4,958,073

## APPARATUS FOR FINE SPATIAL RESOLUTION MEASUREMENTS OF EARTH FORMATIONS

Arthur J. Becker, Ridgefield, Conn.; Joel L. Groves, Leonia, N.J., and Charles C. Watson, Danbury, Conn., assignors to Schlumberger Technology Corporation, New York, N.Y.

Filed Dec. 8, 1988, Ser. No. 281,577

Int. Cl.<sup>5</sup> G01V 5/04, 5/12

U.S. Cl. 250—269

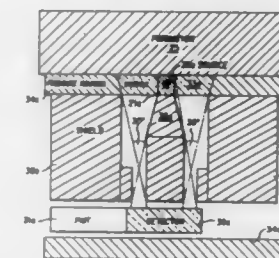
36 Claims

1. An apparatus for obtaining indications of at least one characteristic of an earth formation traversed by a borehole, comprising:

(a) a source means for irradiating said formation with photons capable of Compton scattering in said formation; and

(b) a detector means for detecting photons Compton scattered by said formation,

said source means positioned at a first location on said apparatus and arranged such that photons from said source means enter said formation, and said detector means posi-



tioned at a second location on said apparatus and arranged such that photons having Compton scattered enter said apparatus for detection by said detector means, wherein said first and second locations are in such close proximity and said source and detector means are so arranged such that said detector provides a non-negative response to an increase of density in said earth formation for densities and Pe factors typical of earth formations.

4,958,074

## APPARATUS AND METHOD FOR INSPECTING A MASK

Edward Wolf, Ithaca, N.Y.; Ernst Hammel, and Christian Traher, both of Vienna, Austria, assignors to Oesterreichische Investitionskredit Aktiengesellschaft and Ims Ionen Mikrofabrikations Systeme Gesellschaft M.B.H., both of Vienna, Austria

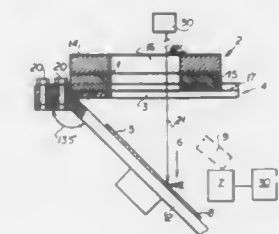
Filed Jul. 13, 1988, Ser. No. 216,822

Claims priority, application Austria, Jul. 13, 1987, 1766187

Int. Cl.<sup>5</sup> H01J 37/26

U.S. Cl. 250—309

23 Claims



1. An apparatus for inspecting masks for X-ray or corpuscular beam lithography, wherein the X-ray lithography masks are provided with a pattern of X-ray opaque regions and the corpuscular beam lithography masks are provided with a pattern of apertures, comprising
  - a stage for supporting said mask to be inspected disposed in the path of a corpuscular inspection beam projected from a beam source arranged above said stage, said stage including a stage aperture also disposed in said beam path and being movable through a series of positions to expose said pattern progressively to said beam;
  - an emitter surface for emitting secondary radiation disposed in said beam path below said stage aperture, said secondary radiation resulting from the impingement of said inspection beam transmitted through said mask onto said emitter surface;
  - a detector disposed to generate signals corresponding to said secondary radiation; and



an image storage device for receiving and storing the signals generated by said detector.

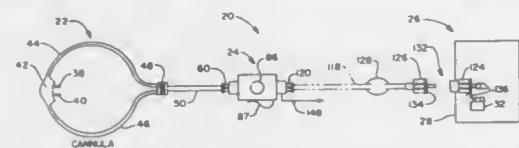
#### 4,958,075 GAS ANALYZER

Leslie E. Mace, Mercer Island; Daniel W. Knodle, Seattle; Lawrence L. Labuda, Issaquah, all of Wash., and Philip F. Nuzzo, Wallingford, Conn., assignors to NTC Technology Inc., Wilmington, Del.

Continuation of Ser. No. 107,267, Oct. 9, 1987, abandoned. This application Dec. 14, 1989, Ser. No. 453,227  
Int. Cl.<sup>5</sup> A61B 5/097; G01N 21/05, 21/61

U.S. Cl. 250—343

16 Claims



1. A system for effecting and monitoring the flow of a gas mixture through a gas analyzer sampling device comprising: a first line for connecting the input of the sampling device to the source of the gases being monitored, pump means, a second line for connecting the output of the sampling device to said pump means, and first and second complementary control means mounted on said sampling unit and operatively connected to said pump means which is operable to keep said pump means from being turned on unless a sampling unit having said first control means is connected to said pump means.

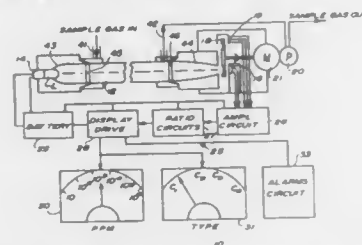
#### 4,958,076

SELECTIVE NATURAL GAS DETECTING APPARATUS  
Ulrich Bonne, Hopkins, and Robert J. Matthys, Minneapolis, both of Minn., assignors to Gas Research Institute, Chicago, Ill.

Filed Feb. 10, 1989, Ser. No. 308,469  
Int. Cl.<sup>5</sup> G01N 21/61

U.S. Cl. 250—343

19 Claims



1. A selective gas detecting apparatus for determining a concentration and type or average type of hydrocarbon gas in a gas sample based upon absorption of infrared radiation by the gas sample, comprising: sampling means for passing infrared radiation through the gas sample, infrared radiation detecting means for detecting infrared radiation passed through the gas sample and producing in a first signal channel a first measurement signal indicative of a first wavelength absorbed by the gas sample, and producing in a second signal channel a second measurement signal indicative of a second wavelength absorbed by the gas sample, processing circuit means including first circuit means responsive to said first measurement signal for providing a first output signal corresponding to an indication of a first total concentration of hydrocarbons in the gas sample, second circuit means responsive to said second measurement signal for providing a second output signal corresponding to an indication of a second total concentration of hydrocarbons in the gas sample, first function generating circuit means for receiving said first output signal and providing a first absorbance signal corresponding to a natural logarithm of said first output signal and indicative of absorbance by said gas sample of infrared radiation at said first wavelength, second function generating circuit means for receiving said second output signal and providing a second absorbance signal corresponding to the natural logarithm of said second output

signal and indicative of absorbance by the gas sample of infrared radiation at said second wavelength, ratio determining means responsive to said first and second absorbance signals for providing a ratio signal corresponding to the ratio of said first and second absorbance signals, said ratio signal being indicative of the type or average type of hydrocarbon in the gas sample, and display means responsive to said first absorbance signal and said ratio signal for providing and indication of the concentration and type or average type of hydrocarbon gas in the gas sample, respectively.

#### 4,958,077

#### METHOD AND APPARATUS FOR DISPLAYING MOVING OBJECTS

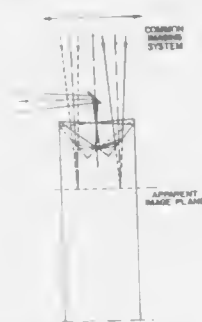
Josef F. Menke, Foerdstrasse 27, D-2392 Gluecksburg, Fed. Rep. of Germany

Filed Aug. 31, 1988, Ser. No. 238,734  
Claims priority, application Fed. Rep. of Germany, Aug. 31, 1987, 3729059

Int. Cl.<sup>5</sup> G01J 5/14

U.S. Cl. 250—347

4 Claims



1. A method for displaying moving objects comprising:  
(a) conducting a line scan of an object with a prismatic rotating wheel, the prismatic rotating wheel periphery including a plurality of adjacent, recessed, and oppositely reflecting triplet mirror surfaces;  
(b) said prismatic rotating wheel oppositely reflecting triplet mirror surfaces alternately deflecting a first signature scan and a second signature scan of said object with a minimum mutual time shift in first and second directions respectively, onto a single detector;  
(c) time delaying said first signature scan by an intermediate storage so that it is simultaneously available with said second signature scan;  
(d) determining the difference of said signature scans; and  
(e) defining the remaining uncanceled individual signals in said storage as coordinates of said object and presenting these coordinates in electronic form as output signals for defining position coordinates of said object.

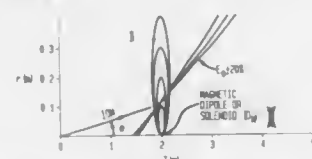
#### 4,958,078

LARGE APERTURE ION-OPTICAL LENS SYSTEM  
Fred D. Becchetti, Ann Arbor, Mich., assignor to The University of Michigan, Ann Arbor, Mich.

Filed Jan. 5, 1989, Ser. No. 293,694  
Int. Cl.<sup>5</sup> H01J 37/10

U.S. Cl. 250—396 R

14 Claims



1. A lens system for an energy beam, the lens system comprising:  
focusing means for receiving the energy beam and focusing

same toward an axis which extends through said focusing means and which defines a general direction of propagation of the energy beam; and  
defocusing means having an exterior and an interior, and arranged in a predetermined axial relationship with respect to said focusing means, the energy beam being propagated along a path which substantially surrounds said exterior of said defocusing means, for defocusing the energy beam away from said axis.

#### 4,958,079

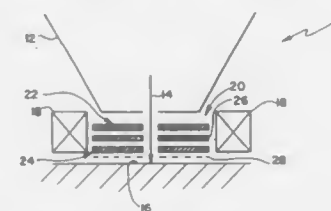
#### DETECTOR FOR SCANNING ELECTRON MICROSCOPY APPARATUS

John W. Gray, Ware, Mass., assignor to Galileo Electro-Optics Corp., Sturbridge, Mass.

Filed Feb. 21, 1989, Ser. No. 313,022  
Int. Cl.<sup>5</sup> H01J 37/244

U.S. Cl. 250—397

8 Claims



1. Scanning electron microscopy apparatus employing a detector to detect emission of electrons resulting from the impingement of electrons of an electron beam on an object being viewed, said apparatus comprising  
an electron beam source providing said electron beam, a magnet providing a magnetic field to direct said electron beam to said object,  
a first microchannel plate having a first hole through it aligned with said electron beam, a first surface directed toward said electron beam source, said first surface being biased for receiving low energy electrons that have been emitted from said object and directed through said hole by said magnetic field, and a second surface on the opposite side of said first microchannel plate that is biased for discharge of multiplied electrons, and  
a first anode facing said second surface, said first anode being positioned to collect electrons discharged from said second surface.

#### 4,958,080

#### LUTETIUM ORTHOSILICATE SINGLE CRYSTAL SCINTILLATOR DETECTOR

Charles L. Melcher, West Redding, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Continuation of Ser. No. 254,353, Oct. 6, 1988, abandoned. This application Aug. 4, 1989, Ser. No. 389,502  
Int. Cl.<sup>5</sup> C09K 11/79; G01J 1/58

U.S. Cl. 250—483.1

2 Claims

1. A gamma ray or x-ray detector, comprising: a scintillator composed of a transparent single crystal of cerium-activated lutetium oxyorthosilicate having the general formulation  $Ce_{2x}Lu_{2(1-x)}SiO_5$ , where  $x$  is within the range of from approximately  $2 \times 10^{-4}$  to approximately  $3 \times 10^{-2}$ , and  
a photodetector optically coupled to the scintillator for producing an electrical signal in response to the emission of a light pulse by the scintillator.

#### 4,958,081 FOCUSING COLLIMATOR AND METHOD FOR MAKING IT

Ronald E. Malm, Chicago, and William R. Geth, Hoffman Estates, both of Ill., assignors to Siemens GammaSource, Inc., Hoffman Estates, Ill.

Filed Aug. 14, 1985, Ser. No. 765,611  
Int. Cl.<sup>5</sup> G21K 1/02

U.S. Cl. 250—505.1

2 Claims



1. A method of manufacturing a focusing corrugated strip type collimator in which all foci lie in a single central stacking plane which is perpendicular to all of the strips, comprising procuring a plurality of corrugated strips which are shaped in cross-section within said central stacking plane as different parts of different radial sectors of a common predetermined annulus;  
stacking the strips on a flat surface; and  
bonding the strips together.

#### 4,958,082

#### POSITION MEASURING APPARATUS

Susumu Makinouchi, and Toshikazu Umatate, both of Kawasaki, Japan, assignors to Nikon Corporation, Tokyo, Japan

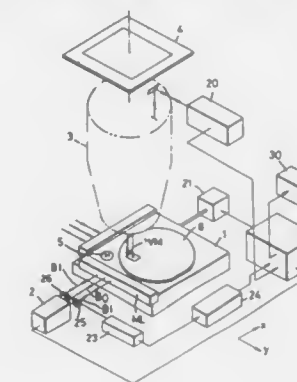
Filed Aug. 25, 1988, Ser. No. 236,206

Claims priority, application Japan, Aug. 31, 1987, 62-217261  
Int. Cl.<sup>5</sup> G01N 21/86

U.S. Cl. 250—548

18 Claims

1. An exposure apparatus for exposing a pattern on a substrate to be exposed having a predetermined mark formed thereon, including  
a) stage means for supporting said substrate to be exposed thereon;  
b) moving means capable of moving said stage means in a direction along a predetermined surface;  
c) mark detecting means for applying a light beam to said substrate to be exposed and detecting said predetermined mark;  
d) position detecting means for outputting a position signal conforming to the position of said stage means on said predetermined surface;  
e) producing means for detecting information regarding rotation of said stage means along said predetermined surface and producing an information signal; and  
f) correcting means for correcting on the basis of said information signal said position signal when said mark detecting means detects said predetermined mark.







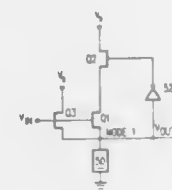
4,958,089  
**HIGH OUTPUT DRIVE FET BUFFER FOR PROVIDING HIGH INITIAL CURRENT TO A SUBSEQUENT STAGE**  
Mark F. Fitzpatrick, San Jose, and Gary R. Gouldsberry, Cupertino, both of Calif., assignors to Gazelle Microcircuits, Inc., Santa Clara, Calif.

Filed Dec. 20, 1988, Ser. No. 287,320

Int. Cl.<sup>5</sup> H03K 19/017

U.S. Cl. 307—448

27 Claims



1. A buffer comprising:

- a first transistor having a control terminal connected to receive an input signal, said first transistor having second and third terminals;
- a second transistor having a third terminal coupled to said second terminal of said first transistor and a second terminal coupled to receive a first voltage;
- a load device having a first terminal coupled to said third terminal of said first transistor and a second terminal coupled to a second voltage; and
- a first inverter means coupled between said first terminal of said load device and a control terminal of said second transistor, said first inverter means also for providing a first output signal, said first transistor and said second transistor being of the same conductivity type so as to exhibit complementary logical conducting states after said first inverter means has inverted a signal applied to said first terminal of said load device and applied an inverted signal to said control terminal of said second transistor.

4,958,090  
**NON-CURRENT HOGGING DUAL PHASE SPLITTER TTL CIRCUIT**

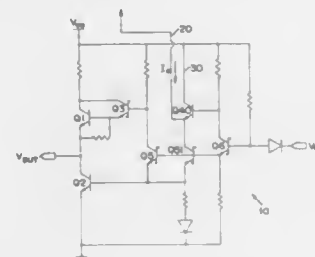
Lars G. Jansson, Long Island, Me., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Mar. 6, 1989, Ser. No. 320,281

Int. Cl.<sup>5</sup> H03K 3/286, 19/003, 19/088

U.S. Cl. 307—456

25 Claims



1. A TTL circuit having dual transistor elements with respective base and emitter nodes coupled in current mirror configuration, said dual transistor elements having separately coupled collector nodes coupled respectively to separate collector current sources, comprising:

- a low impedance current sourcing active transistor element operatively coupled in emitter follower configuration in parallel with one of the collector current sources at a

collector node of one of the dual transistor elements, said emitter follower configuration active transistor element supplying compensating collector current for mirroring of the currents at the respective emitter nodes of the dual transistor elements substantially without base drive current hogging between the dual transistor elements.

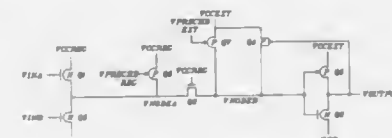
4,958,091  
**CMOS VOLTAGE CONVERTER**  
Gregory N. Roberts, Boise, Id., assignor to Micron Technology, Inc., Boise, Id.

Filed Jun. 6, 1988, Ser. No. 202,962

Int. Cl.<sup>5</sup> H03K 19/20, 17/687

U.S. Cl. 307—451

8 Claims



1. In a circuit which provides a logic signal in high and low states, in which the low logic signal state approximates a common potential and the high state approximates a first high potential, an output circuit which provides high and low output signals for responding to said high and low logic signal states, with the low output signal approximating a common potential and the high output signal approximating a second high potential, in which the difference between the potentials of the high and low output signals of the output circuit is greater than the difference in potentials between the high and low logic signal states, the circuit further comprising:

- (a) a first inverter providing a first inverted output of the logic signal at a range of potentials approximating the high and low signals of the logic circuit, the first inverter circuit having power connections between a common potential and a regulated potential, the regulated potential approximating the first high potential;
- (b) a second inverter having power connections between the common potential and external potential corresponding to the second high potential;
- (c) an isolating transistor connecting the first and second inverters;
- (d) means to conduct a high biasing potential to the second inverter in response to a low output of the second inverter, wherein a low level output of the first inverter initiates a low level signal provided through the isolating transistor to the second inverter and a high level output of the first inverter initiates a high level signal to the second inverter;
- (e) the isolating transistor being biased to isolate the high level output of the first inverter from the second inverter after said initiation;
- (f) a precharge signal generator responsive to a clocking signal and providing a predetermined biasing potential during a clock inactive signal;
- (g) the isolating transistor being connected to gate current from an output of the first inverter to the input of the second inverter;
- (h) the means to conduct the high biasing potential being an inverting transistor which is gated on by the low output of the second inverter and which gates current at a predetermined biasing potential to an input of the second inverter;
- (i) a circuit responsive to the clocking signal to conduct the regulating potential to an output of the first inverter during the clock inactive cycle; and
- (j) a precharge biasing circuit, responsive to the predetermined biasing potential to gate the second high potential to the input to the second inverter during the clock inactive cycle of the clock in order to bias the input of the

second inverter to a predetermined level prior to the gating on by the isolating transistor.

4,958,092  
**INTEGRATED CIRCUIT DEVICE HAVING ROW STRUCTURE WITH CLOCK DRIVER AT END OF EACH ROW**

Shigeru Tanaka, Fujisawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

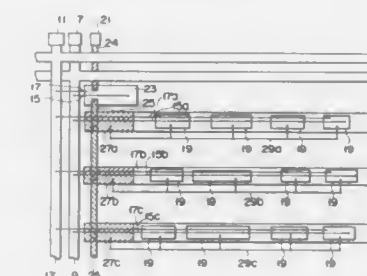
Filed Mar. 28, 1989, Ser. No. 329,908

Claims priority, application Japan, Mar. 29, 1988, 63-73285

Int. Cl.<sup>5</sup> H03K 3/26, 19/02; G06F 15/066

U.S. Cl. 307—480

4 Claims



1. An integrated circuit device comprising:

- a primary power supply wiring connected to a power supply;
- a primary ground wiring connected to a ground terminal, for holding a reference potential;
- primary clock driver means, for receiving a clock signal from a clock signal input terminal;
- a first clock signal input wiring for connecting said clock signal input terminal to said primary clock driver means;
- a first row including a first secondary clock driver arranged at one end of said first row to be adjacent to a primary power supply wiring and a primary ground wiring, said first secondary clock driver having a clock signal input terminal connected to said primary clock driver means, a power supply terminal connected to said primary power supply wiring, and a ground terminal connected to said primary ground wiring;
- a first secondary power supply wiring for connecting said primary power supply wiring to said power supply terminal of said first secondary clock driver in said first row, and to said power supply terminals of said first group of logic elements;
- a first secondary ground wiring for connecting said primary ground wiring to said ground terminal of said first secondary clock driver in said first row, and to said ground terminals of said logic elements;
- a second row arranged parallel to a longitudinal direction of said first row, said second row including a second secondary clock driver arranged at one end of said second row to be adjacent to said primary power supply wiring and said primary ground wiring, said second secondary clock driver having a clock signal input terminal connected to said primary clock driver means, a power supply terminal connected to said primary power supply wiring, and a ground terminal connected to said primary ground wiring, and a second group of a plurality of logic elements, which switch synchronously with the input clock signal, each having a power supply terminal and a ground terminal respectively connected to said primary power supply wiring and said primary ground wiring;
- a second secondary power supply wiring for connecting said primary power supply wiring to said power supply terminal of said second secondary clock driver in said second row, and to said power supply terminals of said second group of logic elements;
- a second secondary ground wiring for connecting said primary ground wiring to said ground terminal of said second secondary clock driver in said second row, and to said ground terminals of said logic elements.

- a second secondary clock driver in said second row, and to said power supply terminals of said second group of logic elements;
- a second secondary ground wiring for connecting said primary ground wiring to said ground terminal of said second secondary clock driver in said second row and to said ground terminals of said logic elements;
- a second clock signal input wiring for connecting the input terminals of said first and second secondary clock drivers and to an output terminal of said primary clock driver means;
- a first clock signal wiring for connecting said first secondary clock driver means in said first row to said logic elements; and
- a second clock signal wiring for connecting said second secondary clock driver means in said second row to said logic elements.

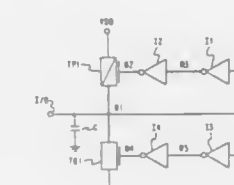
4,958,093  
**VOLTAGE CLAMPING CIRCUITS WITH HIGH CURRENT CAPABILITY**  
Julie S. Kosson, Burlington, Vt., and Michael J. McLennan, Lafayette, Ind., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 25, 1989, Ser. No. 356,917

Int. Cl.<sup>5</sup> H03K 5/08

U.S. Cl. 307—540

31 Claims



1. A voltage clamping circuit comprising a voltage source having first and second reference potential terminals, first and second transistors, each having a control electrode, serially connected between said first and second reference potential terminals of said voltage source, first control means connected from a common point between said first and second transistors to the control electrode of said first transistor, and second control means connected from the common point between said first and second transistors to the control electrode of said second transistor, said second control means having characteristics differing from those of said first control means such that said first and second control means are actuated at different levels of voltage applied thereto.

4,958,094  
**EMITTER FOLLOWER CIRCUIT WITH MOSFET**  
Yasuhiro Ishii, Tokyo, and Isao Fukushima, Yokohama, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

PCT No. PCT/JP88/00923, § 371 Date Jun. 28, 1989, § 102(e)

Date Jun. 28, 1989, PCT Pub. No. WO89/02677, PCT Pub. Date Mar. 23, 1989

PCT Filed Sep. 13, 1988, Ser. No. 391,605

Claims priority, application Japan, Sep. 17, 1987, 62-233190

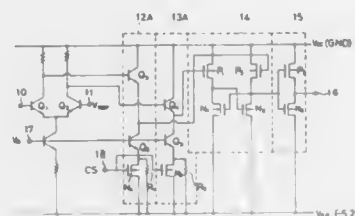
Int. Cl.<sup>5</sup> H03K 17/16

U.S. Cl. 307—570

3 Claims

1. An emitter follower circuit comprising an emitter follower transistor and a current source coupled to the emitter of said emitter follower transistor, said current source including a MOS transistor, said emitter follower circuit being switched

between active and inactive states by switching said MOS transistor by a control signal, characterized in that said emitter follower circuit comprises current path means provided between the source and



drain of said MOS transistor, for providing a resistance considerably larger than a resistance of the MOS transistor provided during conducting, when the MOS transistor is at least cut off and for passing an extremely small current therethrough at that time.

4,958,095

**STARTER-ALTERNATOR FOR A VEHICLE ENGINE**

Hiroyasu Uchida, Hiroshima; Kazuhiko Ueda, Higashihiroshima, and Hiroyuki Oda, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

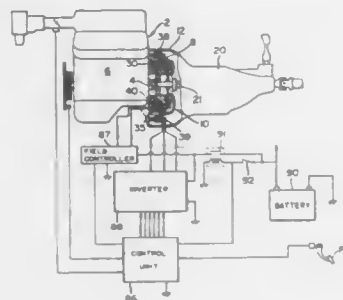
Filed Jun. 10, 1988, Ser. No. 205,188

Claims priority, application Japan, Jun. 10, 1987, 62-145748

Int. Cl.<sup>5</sup> H02K 9/00

U.S. Cl. 310—59

25 Claims



1. A starter-alternator of a vehicle of the type being disposed between a vehicle engine having an output shaft and a transmission comprising:

- a rotary field pole member coupled to the output shaft of the vehicle engine and having two series of crow-poles which are interspaced, one series of crow-poles all forming N poles and the other series of crow-poles all forming S poles;
- a field winding mounted radially inside the two series of crow-poles;
- a stator winding mounted on the two series of crow-poles;
- a housing accommodating therein the rotary field pole, the field winding and the stator winding and connecting the vehicle engine and the transmission, said housing being provided with an air passage embedded in a wall thereof for taking in fresh air and directing it to cool at least one of the stator winding and the field winding and an air outlet for discharging air wherein said air passage is provided with an air intake opening facing to the front of the vehicle engine and plurality of air nozzles directing air for the air passage to blow air on and cool the stator winding.

4,958,096

**GOVERNOR AND MOTOR ASSEMBLY**

Paul T. Kachuk, Ft. Wayne, Ind., assignor to Flint & Walling, Inc., Kendallville, Ind.

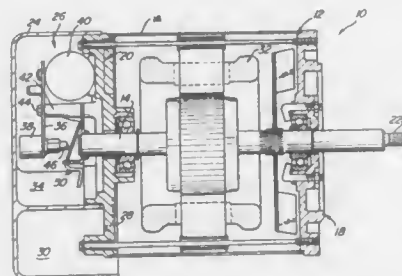
Division of Ser. No. 137,847, Dec. 21, 1987, Pat. No. 4,885,440.

This application Jun. 16, 1989, Ser. No. 367,152

Int. Cl.<sup>5</sup> H02K 11/00; H01H 35/10

U.S. Cl. 310—68 E

7 Claims



1. An improved electric motor assembly having a motor housing with a stator assembly disposed therein and a rotor shaft extending therethrough, one end of said rotor shaft extending through an end wall of said housing into an end bell of said motor assembly, said end bell having a control assembly for said motor, said control assembly comprising:

- a terminal board fixedly secured to said end wall of said motor housing;
- a switch mounted to said terminal board, said switch including an actuator pin extending axially inward from said terminal board;
- a capacitor positionally captured between said terminal board and said end wall of said motor housing; and
- a centrifugal governor mounted to said one end of said rotor shaft to rotate therewith, said governor engaging said actuator pin of said switch wherein said switch is actuatable in accordance with the centrifugal force generated by said rotor shaft and acting upon said governor.

4,958,097

**STARTER WITH FLEXING SOLENOID LEVER**

Malcolm C. Woodward, Warley, and Barry Twilton, Solihull, both of England, assignors to Magneti Marelli Electrical Limited, Great Britain

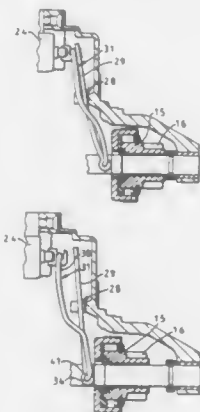
Filed Jun. 27, 1989, Ser. No. 372,069

Claims priority, application United Kingdom, Jun. 28, 1988, 88153663

Int. Cl.<sup>5</sup> H02K 7/20; F02N 11/00, 15/06

U.S. Cl. 310—83

7 Claims



1. A starter motor, for use with an internal combustion engine, comprising an electric motor, a shaft rotated by the

4,958,099

**BRUSHLESS MOTOR**

Tatsuo Chigira, Yokohama, and Akira Kurosawa, Yokozoe, both of Japan, assignors to Canon Kabushiki Kaisha and Canon Denshi Kabushiki Kaisha, both of Tokyo, Japan

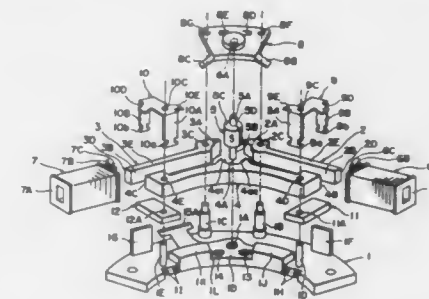
Filed Aug. 26, 1988, Ser. No. 236,850

Claims priority, application Japan, Sep. 3, 1987, 62-134935[U]; Sep. 17, 1987, 62-142030[U]; Sep. 17, 1987, 62-142031[U]; Sep. 17, 1987, 62-142032[U]; Nov. 16, 1987, 62-174792[U]; Nov. 16, 1987, 62-174793[U]

Int. Cl.<sup>5</sup> H02K 1/12

U.S. Cl. 310—254

7 Claims



1. A motor comprising:

- a magnet rotor having a rotational shaft; and
- first, second and third stator members arranged around an outer periphery of said magnet rotor while keeping a uniform air gap,
- said first stator member being formed as a shaft and having a first arc-shaped magnetic pole portion having an opening angle of about 90° and a coil supporting portion around which a first field coil is wound at one end of the first stator member,
- said second stator member being formed as a shaft and having a second arc-shaped magnetic pole portion having an opening angle of about 90° and a coil supporting portion around which a second field coil is wound at one end of the second stator member, and
- said third stator member having third and fourth continuous magnetic pole portions having an opening angle smaller than 180° in a central portion of the third stator member and contacting portions which are in contact with edges of said coil supporting portions of the first and second stator members at both ends of said third and fourth magnetic pole portions, and magnetic circuits constructed by each of the magnetic pole portions of the first and second stator members and each of the magnetic pole portions of the third stator member through said contacting portions, respectively;
- a base plate having a member for determining an axially supporting position of said magnet rotor and assembling positions of said first, second, and third stator members; first and second pin members adapted to be fitted into holes formed near each of the first and second magnetic pole portions of the first and second stator members; and third and fourth pin members adapted to be fitted into holes formed near said contacting portions of said third stator member.

4,958,100

**ACTUATED TRUSS SYSTEM**

Edward F. Crawley, Arlington, and Nesbitt Hagood, Cambridge, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

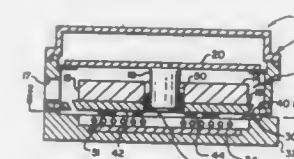
Filed Feb. 22, 1989, Ser. No. 313,952

Int. Cl.<sup>5</sup> H01L 41/08

U.S. Cl. 310—328

20 Claims

1. A truss member comprising an elongate cylindrical shell having first and second end-

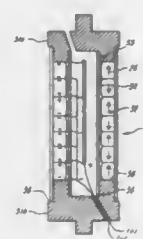


1. A rotary device comprising:

- a rotor which comprises a first element of a planar motor, said rotor including a radially-extending thrust surface;
- means for supporting said rotor for rotational movement, said supporting means including a second element of a planar motor, one of said elements being a printed motor coil and the other element being a generally planar multipolar permanent magnet which is adapted to interact with a field produced by said coil to drive said rotor, said supporting means having a radially-extending bearing surface arranged opposite said thrust surface; and
- means on one of said radially-extending surfaces for receiving a fluid upon rotation of said rotor and for controlling said fluid such that the fluid exerts an axial force on the rotor of a magnitude sufficient to displace said rotor in an axial direction.



pieces adapted to couple to a truss structure and place said shell in load-bearing relation to the structure, said shell being formed of a composite material,  
a plurality of cylindrical elements of Piezoelectric material axially juxtaposed in said shell to form a load bearing inner column extending between said first and second end-pieces, and



conductive means for interconnecting a circuit with opposed faces of the cylindrical elements to actuate said piezoelectric elements, and  
wherein said cylindrical shell is fitted about and bonded to said plurality of cylindrical elements to form a radially-varying axially-homogeneous truss member.

4,958,101

## PIEZOELECTRIC ACTUATOR

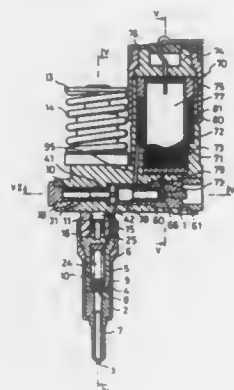
Takeshi Takahashi, Mishima, and Takashi Yamamoto, Susono, both of Japan, assignors to Toyota Jidosha Kahushiki Kaisha, Japan

Filed Jul. 28, 1989, Ser. No. 387,616  
Claims priority, application Japan, Aug. 29, 1988, 63-112146[U]; Sep. 21, 1988, 63-234820; Sep. 21, 1988, 63-122689[U]

Int. Cl.<sup>5</sup> H01L 41/08

U.S. Cl. 310—328

15 Claims



1. A piezoelectric actuator comprising:  
a housing having a piston bore formed therein;  
a piston having a first outer wall portion slidably inserted into said piston bore and having a second outer wall portion positioned outside of said piston bore, said piston having at one side thereof an end face which defines a variable volume chamber within said piston bore;  
a piezoelectric element supported between said housing and the other side of said piston; and  
a hollow cylindrical resilient member fitted onto said second outer wall portion of said piston and inserted between said housing and said piston to apply a compression load onto said piezoelectric element via said piston, said hollow cylindrical resilient member having a plurality of slots formed on an outer circumferential wall thereof and ar-

ranged in a point of symmetry about an axis of said hollow cylindrical resilient member.

4,958,102

## THREE WAY GAS DISCHARGE LAMP

William E. Wilson, Clifton; Edward W. Morton, Teaneck, and Daniel W. O'Mullan, Bloomfield, all of N.J., assignors to North American Philips Corporation, New York, N.Y.

Division of Ser. No. 686,871, Dec. 27, 1984, Pat. No. 4,748,368.

This application Nov. 4, 1987, Ser. No. 117,598

The portion of the term of this patent subsequent to May 31, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> H01J 61/34, 61/92

U.S. Cl. 313—1

4 Claims



1. A three-way lamp comprising a housing having first, second and third terminals arranged thereon as provided on a three-way incandescent lamp, said lamp including two gas discharge light tubes, each tube having two electrodes, one tube having its electrodes separately connected to said first and third terminals, the other tube having its electrodes separately connected to said second and third terminals.

4,958,103

## HID LAMP WITH MULTIPLE DISCHARGE DEVICES

Cornelis A. Jacobs, Turnhout, Belgium; Norman R. King, Bath, and Dale E. Bradham, Elmira, both of N.Y., assignors to North American Philips Corp., New York, N.Y.

Filed Dec. 21, 1988, Ser. No. 289,281

Int. Cl.<sup>5</sup> H01J 61/34, 61/54

U.S. Cl. 313—25

12 Claims



1. In a high intensity electric discharge lamp having an outer envelope, a pair of elongated discharge devices within said outer envelope, and means for applying a voltage to initially operate one of said discharge devices and to operate the other of said discharge devices after a momentary power interruption during lamp operation and the previously operative discharge device fails to restart, the improvement comprising:  
each of said discharge devices having one end operative at a higher temperature than the other end; and  
mounting means for mounting said discharge devices laterally adjacent to each other with the higher temperature end of one proximate the lower temperature end of the other discharge device for heating the lower temperature end of an inoperative discharge device with the higher

temperature end of the operative discharge device to facilitate starting of the inoperative discharge device.

4,958,104

## DISPLAY DEVICE HAVING FIRST AND SECOND COLD CATHODES

Hidetoshi Suzuki; Mitsuru Yamamoto, both of Atsugi; Toshiaki Majima, Tokyo, and Ichiro Nomura, Yamato, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

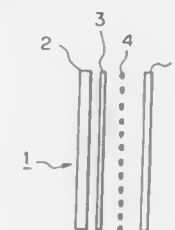
Continuation of Ser. No. 86,804, Aug. 19, 1987, abandoned. This application Jun. 29, 1989, Ser. No. 373,636

Claims priority, application Japan, Aug. 20, 1986, 61-192817; Aug. 20, 1986, 61-192818; Aug. 20, 1986, 61-192819

Int. Cl.<sup>5</sup> H01J 31/48, 29/70

U.S. Cl. 313—495

10 Claims



1. A storage-type image display device, comprising:  
a plurality of cold cathodes provided on a surface side of a substrate, said cold cathodes comprising a plurality of first cold cathodes and a plurality of second cold cathodes;  
image display means disposed proximate to said cold cathodes and having a space therebetween; and  
a storage plate having a plurality of holes therein being disposed between said cold cathodes and said image display and having a space on either side thereof, wherein said plurality of first cold cathodes emits electron rays impinging on said storage plate, and said plurality of second cathodes emits electron rays impinging on a surface of said image display means, and said storage plate having a plurality of holes being arranged so that the electron rays emitted from said second cathodes may pass through the holes, and wherein said plurality of first and second cold cathodes are arranged two-dimensionally and further comprising a driving signal line for driving said plurality of first and second cold cathodes, said driving signal line having a matrix electrode structure comprising a first electrode group and a second electrode group disposed orthogonal to said first electrode group, wherein said first electrode group connects first and second cold cathodes, and wherein said second electrode group connects only cold cathodes of one of said plurality of first cold cathodes and said plurality of second cathodes.

4,958,105

## ROW DRIVER FOR EL PANELS AND THE LIKE WITH INDUCTANCE COUPLING

Edward L. Young, Shelton, and Mohan L. Kapoor, Orange, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 9, 1988, Ser. No. 282,787

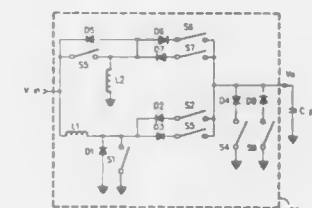
Int. Cl.<sup>5</sup> G09G 3/30

U.S. Cl. 315—169.3

15 Claims

1. In an electrical display panel system, including—  
a display panel having row and column electrodes, said panel being capable of displaying indicia thereon in response to appropriate electrical signals to said row and column electrodes from a row driver and column driver, respectively;  
at least one electrical power source ( $V_{in}$ );

a column driver connected to a power source capable of electrically driving said column electrodes; and  
an output load, including said row electrodes ( $C_{panel}$ ) of said panel, which load is essentially capacitive;  
a row driver capable of electrically driving said row electrodes, said row driver being powered by said power source; and  
row switches causing the drive signals from said row driver to be sequentially pulsed to said row electrodes;  
the improvement in said row driver comprising:  
an inductor being provided between the row driver power source and the row electrode panel load;  
a first switch ( $S_1$  of FIG. 4;  $S_1$  or  $S_5$  of FIG. 6) with unidirectional current flow ( $D_1$  of FIGS. 4 & 6) being connected to one end of said inductor and to a common voltage reference level, with said power source ( $V_{in}$ ) being connected to the other end of said inductor; said first switch when closed allowing said power source to provide a current flow through said inductor, storing electrical energy in it;  
a second switch ( $S_3$  of FIG. 4;  $S_3$  or  $S_7$  of FIG. 6) with



unidirectional current flow ( $D_3$ ;  $D_3$  or  $D_7$ ) being connected in series between the same end of said inductor as said first switch and the essentially capacitive row electrode load ( $C_{panel}$ ) of the panel, which in turn is connected to said common voltage reference level; the opening of said first switch and closing of said second switch causing the electrical energy in said inductor to be provided to said capacitive row electrode load through said second switch, driving and charging said capacitive row electrode load;  
a third switch ( $S_2$  of FIG. 4;  $S_2$  or  $S_6$  of FIG. 6) with unidirectional current flow ( $D_2$ ;  $D_2$  or  $D_6$ ) being connected in series between the same end of said inductor as said first switch and the essentially capacitive row electrode load ( $C_{panel}$ ) of the panel; the opening of said second switch and the closing of said third switch allowing the charged electrical energy in said inductor to be provided back from said capacitive row electrode load to said inductor through said third switch, re-energizing said inductor; the opening of said third switch allowing the energy in the re-energized inductor to be dumped back to said row driver power source.

4,958,106

## HIGH-PRESSURE SODIUM DISCHARGE LAMP

Machiel A. M. Hendrix; Johannes A. M. Scheepers, and Nicolaas H. G. Reijnders, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 24, 1989, Ser. No. 301,573

Claims priority, application Netherlands, Feb. 10, 1988, 8800319

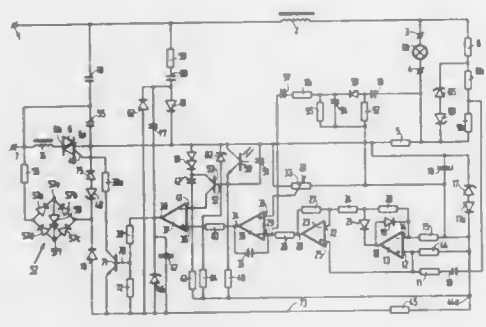
Int. Cl.<sup>5</sup> H05B 37/02

U.S. Cl. 315—208

3 Claims

1. A circuit arrangement for operating a high-pressure sodium lamp comprising: two lamp connection points for connection of the high-pressure sodium lamp, a controlled main switching element having a control electrode connected to a control circuit, a measuring impedance connected in series

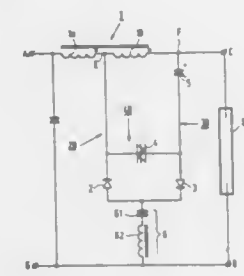
with a lamp connection point and a second measuring impedance connected parallel to the lamp connection points, means further connecting said measuring impedances to the control



circuit and a combination of a resistor and a capacitor connected in series arrangement with one of the lamp connection points and further connected to the control circuit.

**4,958,107**  
**SWITCHING ARRANGEMENT FOR HID LAMPS**  
Charles B. Mattas, Glenview, Ill.; Egbert Van Zanten, Eindhoven, Netherlands, and Stefan P. Szuba, Parkridge, Ill., assignors to North America Philips Corporation, New York, N.Y.  
Continuation-in-part of Ser. No. 334,658, Apr. 6, 1989, abandoned. This application Sep. 19, 1989, Ser. No. 409,493  
Claims priority, application Netherlands, Apr. 13, 1988, 8800952

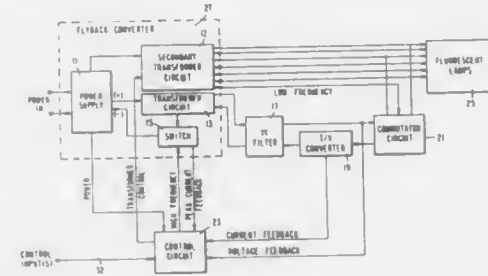
Int. Cl.<sup>5</sup> H05B 41/14, 37/02  
U.S. Cl. 315—289 19 Claims



1. An apparatus for starting and operating a high intensity discharge lamp comprising:
  - a pair of input terminals for supplying a high frequency voltage to the apparatus,
  - a pair of output terminals for connection to a high intensity discharge lamp,
  - means including a step-up transformer for coupling said input terminals to said output terminals, and
  - a voltage multiplier circuit coupled to a primary winding of said step-up transformer, said voltage multiplier circuit comprising:
    - a relatively resistance free impedance means,
    - a first capacitor and a first rectifier element connected in a first series circuit with said impedance means to said primary winding,
    - a second capacitor and a second rectifier element connected in a second series circuit with said impedance means to said primary winding, and
    - a voltage responsive switching device connected in a further closed loop series circuit with the second capacitor and said primary winding, whereby when said second capacitor is charged to the breakdown voltage of the switching device the switching device turns on to provide a rapid discharge path for the second capacitor via said primary winding thereby to induce a high voltage pulse in a sec-

ondary winding of the transformer for igniting a discharge lamp connected to said output terminals.

**4,958,108**  
**UNIVERSAL FLUORESCENT LAMP BALLAST**  
Jeffrey A. Jorgensen, Bothell, Wash., assignor to Avtech Corporation, Seattle, Wash.  
Filed Feb. 14, 1989, Ser. No. 310,610  
Int. Cl.<sup>5</sup> H05B 41/36 15 Claims  
U.S. Cl. 315—307

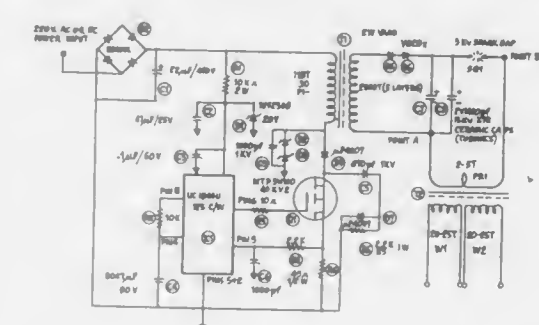


1. A ballast for controlling the operation of a gas discharge lamp comprising:
  - converter means connectible to a source of power for selectively converting at a first frequency said source power into direct current power;
  - commutator means operatively connected to said converter means for converting at a second frequency said direct current power therefrom to alternating current power, said commutator means connectible to said gas discharge lamp to provide said alternating current power at said second frequency thereto to cause said gas discharge lamp to emit light;
  - sensing means connected proximate to said commutator means for sensing power to said gas discharge lamp through said commutator means, and providing lamp power feedback representative thereof; and
  - control means connected to said converter means, said commutator means, and said sensing means, said control means including input means connected to said converter means for causing said converter means to commence conversion of said source power into direct current power, and said control means including lamp power feedback responsive means responsive to said lamp power feedback to start said gas discharge lamp in accordance with the starting power requirements thereof and operate said gas discharge lamp in accordance with the operating power requirements thereof.

**4,958,109**  
**SOLID STATE IGNITOR**  
Daniel Naum, 2048 Midvale Dr., San Diego, Calif. 92105  
Filed Sep. 22, 1988, Ser. No. 247,727  
Int. Cl.<sup>5</sup> H05B 41/36 10 Claims  
U.S. Cl. 315—307

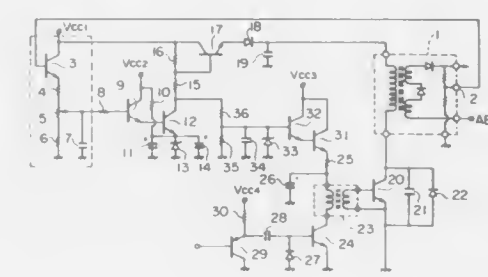
1. An ignitor circuit for producing a high-voltage arc current for igniting an arc lamp or the like comprising:
  - (a) a DC power source;
  - (b) a flyback transformer having a primary coil and a flux-coupled secondary coil;
  - (c) a switching device in series with said primary coil and said power source such that the opening of said switching device interrupts the current in said primary coil;
  - (d) a solid state current-sensing controller operatively connected to said primary coil and having an oscillator which produces a periodic output voltage to said switching device to open same upon said controller sensing current in said primary coil substantially equal to the saturation current therein; and,

(e) a second-stage circuit connected to said secondary coil for conditioning the power induced in said secondary coil



to produce a high voltage arc-crossing current to ignite an arc lamp.

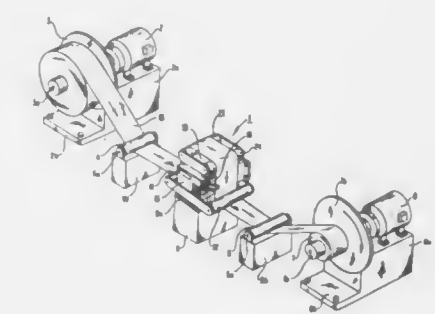
**4,958,110**  
**TELEVISION RECEIVER**  
Akihiko Hayase, Takatsuki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Filed Jan. 25, 1990, Ser. No. 470,133  
Claims priority, application Japan, Jan. 31, 1989, 1-21419  
Int. Cl.<sup>5</sup> H01J 29/70, 29/76 1 Claim  
U.S. Cl. 315—408



1. A television receiver comprising:
  - a fly-back transformer for supplying a high voltage to a cathode ray tube; a circuit for detecting a high voltage produced by said fly-back transformer; a comparison circuit for comparing the voltage detected by said high voltage detection circuit with a reference voltage; a voltage control circuit for controlling the magnitude of a voltage supplied to said fly-back transformer in accordance with a control signal produced by said comparison circuit; an output circuit including an output transistor for driving said fly-back transformer to generate the high voltage; a drive circuit for driving said output circuit; and a voltage control circuit for controlling a supply voltage to said drive circuit in accordance with the control signal produced by said comparison circuit.

**4,958,111**  
**TENSION AND WEB GUIDING SYSTEM**  
Noel J. Gago, 28 Midway Ct., Rockaway, N.J. 07866  
Filed Sep. 8, 1989, Ser. No. 404,774  
Int. Cl.<sup>5</sup> B65H 59/38 26 Claims  
U.S. Cl. 318—6

1. A system for controlling the tension of a tape or web as it passes over a series of rollers, said system comprising in combination an unwind roller for accommodating a spool of tape or web in unwinding relation at unwind end of said system, and a windup roller for winding up said tape or web at the windup end; means for controlling the tension of said web or tape on said unwind rollers at said unwind end;
  - and means comprising a windup motor for controlling the rate of rotation of said windup roller at said windup end;
  - a frame comprising at least one pair of bearing arms supporting a pair of freely rotating rollers interposed in the path of said tape or web as it passes between said unwind roller and said windup roller;
  - a flexible plate disposed in fixed relation at two of its opposite edges to said bearing arms in a plane substantially parallel to the plane of said passing tape or web and in substantially tangential relation to the underside of said



freely rotating rollers, said plate being suspended to flex in response to the pressure exerted by said web or tape as it passes over said freely rotating rollers;

- a control circuit mounted in said frame and connected in energy transfer relations with said windup motor and said means for controlling tension at said unwind end;
- pressure sensitive means connected to said plate and responsive to the changes in pressure to send a signal to said control circuit to change the rotational speed of said windup motor and to control the tension at said unwind end.



(g) applying the new current instruction values to the inverter to drive the motor.





4,958,121

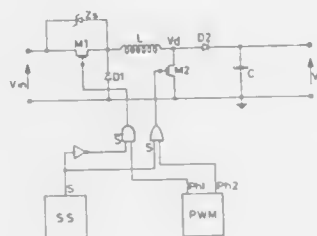
## PROTECTION OF POWER CONVERTERS FROM VOLTAGE SPIKES

Andrea Cuomo; Claudio Diazzi, both of Milano, Italy, and Klaus Rischmuller, Aix en Provence, France, assignors to SGS-Thomson Microelectronics s.r.l., Brianza, Italy  
 Filed Nov. 30, 1989, Ser. No. 444,553  
 Claims priority, application Italy, Nov. 30, 1988, 83685 A/88  
 Int. Cl.<sup>5</sup> H02M 3/158

U.S. Cl. 323-224

7 Claims

1. In a power converter circuit operating in a switching mode and comprising an inductance, a first analog switch connected substantially in series with said inductance between a terminal of the latter and a power distribution rail and a second analog switch connected between the other terminal of the inductance and a common potential node of the circuit and wherein said analog switches are driven respectively by a first and a second driving signals generated by a Pulse Width Modulation control circuit;



a circuit arrangement for protecting the circuit from voltage spikes occurring on said power distribution rail, comprising:  
 a protection voltage limiting device functionally connected across said first analog switch;  
 at least a spike sensor capable of generating a logic signal in presence of a voltage spike on the power distribution rail; logic means for driving said first and second analog switches capable of opening said first analog switch and closing said second analog switch when said spike sensor generates said logic signal in presence of a voltage spike.

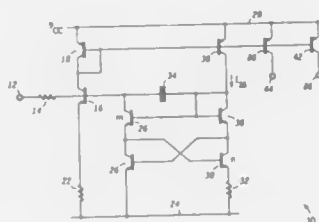
4,958,122

## CURRENT SOURCE REGULATOR

William E. Main, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.  
 Filed Dec. 18, 1989, Ser. No. 452,080  
 Int. Cl.<sup>5</sup> G05F 3/22

U.S. Cl. 323-315

11 Claims



1. A current source regulator including at least one output transistor having a base, an emitter coupled to a first source of operating potential and a collector for providing an output current of a predetermined magnitude proportional to absolute temperature, comprising:

- a first transistor having a base, an emitter and a collector, said base being responsive to an enable signal, said emitter being coupled to a second source of operating potential;
- a second transistor having a base, an emitter and a collector, said base being coupled to said collector of said first transistor and to the base of the output transistor, said emitter being coupled to the first source of operating potential; and
- a feedback circuit coupled between said collector of said second transistor and said base of said first transistor for developing a potential at said base of said first transistor to control the potential developed at said base of said second transistor such that the current flowing through the latter is proportional to absolute temperature which also maintains the predetermined magnitude of the output current proportional to absolute temperature.

4,958,123

## CIRCUIT ARRANGEMENT FOR PROCESSING SAMPLED ANALOGUE ELECTRICAL SIGNALS

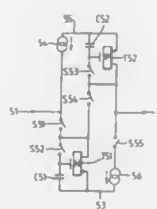
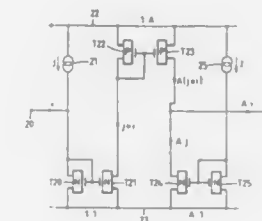
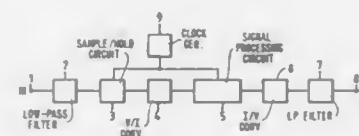
John B. Hughes, Hove, England, assignor to U.S. Philips Corporation, New York, N.Y.  
 Filed Dec. 16, 1988, Ser. No. 286,600  
 Claims priority, application United Kingdom, Dec. 23, 1987, 8729987; Jul. 6, 1988, 8816072  
 Int. Cl.<sup>5</sup> G05F 3/24

U.S. Cl. 323-316

47 Claims

1. A circuit arrangement for processing samples analog electrical current signals comprising: means for combining, in predetermined proportions, an input sample current in a present sample period with current derived from input sample current in one or more preceding sample periods, and means for deriving a processed output signal from the combined current produced by the combining means in successive sample periods; wherein the circuit arrangement further comprises a plurality of circuit modules, each circuit module having a current input for receiving a bidirectional input signal current and a current output for supplying a bidirectional output signal current, means for adding a bias current to the bidirectional input signal current to produce a unidirectional current for

processing by the circuit module, and means for subtracting a suitably scaled bias current from a processed unidirectional



current to produce a bidirectional signal current at the current output of the circuit module.

4,958,124

## MULTI-CHANNEL VOLTAGE DETECTOR

Musubu Koishi; Shinichiro Aoshima, and Yntaka Tsuchiya, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

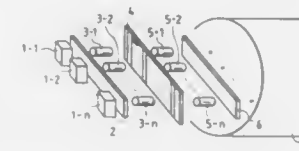
Filed Sep. 16, 1988, Ser. No. 245,253

Claims priority, application Japan, Sep. 18, 1987, 62-235367

Int. Cl.<sup>5</sup> G01R 29/12, 31/00; G01B 9/02

U.S. Cl. 324-96

15 Claims



1. A multi-channel voltage detector for detecting multi-channel electrical signals comprising:  
 electro-optic conversion means provided thereon with a plurality of electrical circuits for receiving corresponding multi-channel electrical signals and for supplying voltages to corresponding locations on said electro-optic conversion means to change the refractive index at each of said locations according to the supplied voltages;  
 light supplying means for supplying at least one light beam having a predetermined polarization to each of said locations, said light beam being transmitted through said elec-

tro-optic conversion means at each of said locations to provide emergent light beams corresponding to each of said locations and each of said emergent light beams having a polarization different from said predetermined polarization in accordance with the change in the refractive index of said corresponding location; and  
 photodetecting means for converting the changes in polarization of said emergent light beams to the changes in optical intensity thereof and for simultaneously detecting said changes in optical intensity of said emergent light beams in parallel, thereby simultaneously detecting said multi-channel electrical signals in parallel.

4,958,125

## METHOD AND APPARATUS FOR DETERMINING CHARACTERISTICS OF THE MOVEMENT OF A ROTATING DRILL STRING INCLUDING ROTATION SPEED AND LATERAL SHOCKS

Stuart Jardine, Cambridge, England; Dominic McCann, Paris, France, and Marc Lesage, Missouri City, Tex., assignors to Anadrill, Inc., Sugar Land, Tex.

Filed Nov. 22, 1989, Ser. No. 441,683

Claims priority, application United Kingdom, Dec. 3, 1988, 8828286

Int. Cl.<sup>5</sup> G01P 3/42, 15/00; E21B 47/00

U.S. Cl. 324-162

12 Claims



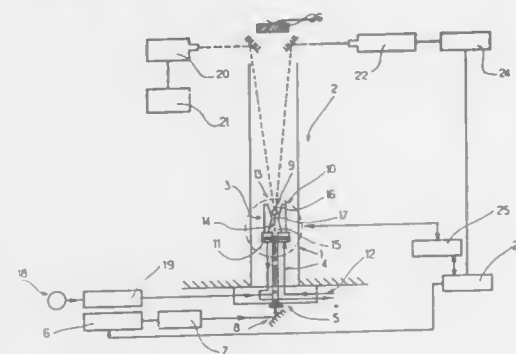
6. An apparatus for determining at least one characteristic of the movement of a rotating drill string, said apparatus comprising:

- (a) means for measuring the centripetal acceleration of said drill string at at least two opposite ends of a drill string diameter, thereby obtaining two centripetal acceleration signals ac1 and ac2;
- (b) means for combining said signals ac1 and ac2 so as to obtain a combined signal dependent on only one characteristic of said movement of said drill string; and
- (c) means for deriving said characteristic from said combined signal.

4,958,126  
PROBE FOR MAGNETIC RESONANCE  
SPECTROMETRIC MEASURES AT VERY HIGH  
TEMPERATURES

Christian Brevard, Wissembourg; Jean-Pierre Coutures, Orleans; Dominique Massiot, Orleans; Jean-Claude Rifflet, Orleans, and Francis Taulelle, Bourg La Reine, all of France, assignors to Sadis Bruker Spectrospin, S.A., Wissembourg, France

Filed Mar. 1, 1989, Ser. No. 317,508  
Claims priority, application France, Mar. 1, 1988, 88-02740  
Int. Cl.<sup>5</sup> G01R 33/20  
U.S. Cl. 324—318 15 Claims

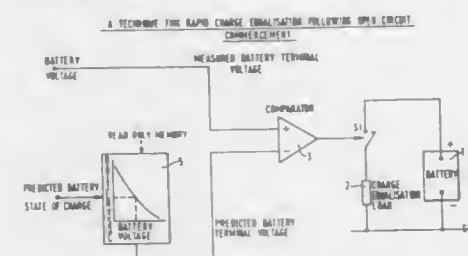


1. Improved probe for spectrometric measurements of magnetic resonance at very high temperatures comprising a resonator (3) with hollow body containing a sample (9) to be analyzed, characterized by the fact that a coherent light beam is used as the means of heating the sample (9) together with levitation within the interior volume of the resonator as the means of decoupling the aforesaid sample (9) from its surroundings.

4,958,127  
METHOD AND APPARATUS FOR DETERMINING THE  
STATE OF CHARGE OF A BATTERY

Malcolm Williams, West Midlands; Carmichael Mackie, and Peter W. Barbour, both of Warwickshire, all of United Kingdom, assignors to BL Technology Limited, Lighthorne, England

Filed Jun. 2, 1986, Ser. No. 870,188  
Claims priority, application United Kingdom, Jun. 19, 1985, 8515462  
Int. Cl.<sup>5</sup> G01N 27/46  
U.S. Cl. 324—426 20 Claims



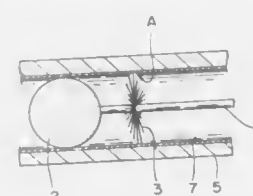
1. A method of determining the state of charge of a battery which is subjected to repeated cycles of partial charge and discharge including the steps of (1) selecting a quiescent interval during which substantially no charging or discharging current flows through the battery (2) applying for a short period of time, during said quiescent interval, a specific predetermined load to the battery to produce a desired discharging current flow through the battery to accelerate stabilization of the charge distribution in the battery (3) removing said load

to thereby allow stabilization of the charge distribution in the battery to continue for a predetermined time delay of at least two hours and (4) measuring the terminal voltage of the battery after said time delay and evaluating the state of charge of the battery by comparing the measured voltage with known data on the relationships between the terminal voltage and the state of charge of the battery.

4,958,128  
METHOD OF EXAMINING AN INSIDE  
SURFACE-COATED METALLIC PIPE AND APPARATUS

Takaharu Tomoyasu, and Kanji Miyamoto, both of Ichihara, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Nov. 21, 1989, Ser. No. 439,705  
Claims priority, application Japan, Nov. 22, 1988, 63-295345  
Int. Cl.<sup>5</sup> B61B 13/08; G01N 27/02  
U.S. Cl. 324—559 5 Claims

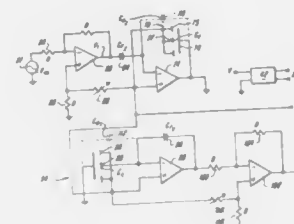


3. An apparatus for detecting a poorly coated portion of an inside surface of a metal pipe coated with insulation coat, comprising:  
a plurality of pigs provided on a conductor at predetermined intervals;  
a running element provided with a plurality of electrode needles extending radially on said conductor and positioned between the plurality of pigs; and  
a pressure adjusting apparatus for generating a pressure difference in front of and back of said running element inside said pipe, said pressure adjusting apparatus being connected to the pipe into which the running element is to be inserted.

4,958,129  
PREALIGNER PROBE

Noel S. Poduje, Needham Heights, and Roy E. Mallory, Bedford, both of Mass., assignors to ADE Corporation, Bedford, Mass.

Filed Mar. 7, 1989, Ser. No. 320,237  
Int. Cl.<sup>5</sup> G01R 27/26  
U.S. Cl. 324—661 19 Claims

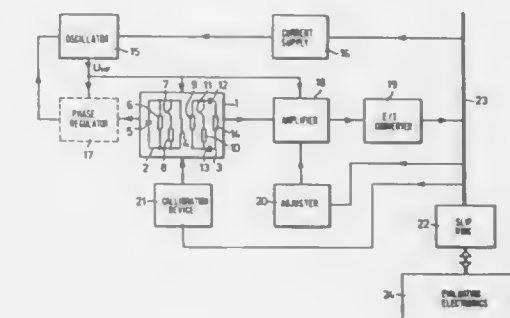


1. A system for capacitive edge detection of a supported member comprising:  
a member where the position of an edge of said member is to be detected;

4,958,131  
CIRCUIT ARRANGEMENT FOR THE COMBINED  
APPLICATION OF AN INDUCTIVE AND  
CAPACITATIVE DEVICE FOR THE NON-DESTRUCTIVE  
MEASUREMENT OF THE OHMIC RESISTANCE OF  
THIN LAYERS

Gernot Thoma, Hanau, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

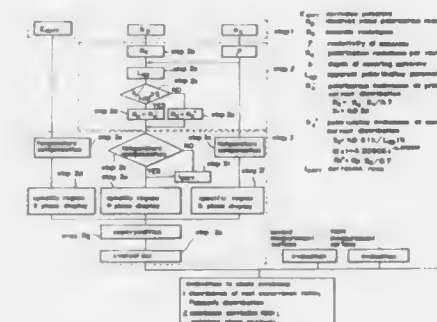
Filed Apr. 27, 1989, Ser. No. 345,032  
Claims priority, application Fed. Rep. of Germany, Apr. 30, 1988, 3815010  
Int. Cl.<sup>5</sup> G01B 7/08; G01R 33/20  
U.S. Cl. 324—708 13 Claims



4,958,130  
EVALUATION METHOD OF CORROSION OF STEEL  
MATERIAL EMBEDDED IN CONCRETE

Noriyasu Mochizuki, Hannon, and Hiroji Nakauchi, Okegawa, both of Japan, assignors to Nakagawa Corrosion Protecting Co., Ltd., Tokyo, Japan

Filed Mar. 23, 1989, Ser. No. 327,992  
Claims priority, application Japan, Apr. 4, 1988, 63-81347  
Int. Cl.<sup>5</sup> G01N 17/02  
U.S. Cl. 324—700 3 Claims



1. An evaluation method of corrosion of a steel material embedded in a concrete comprising:

the step of measuring a corrosion potential  $E_{corr}$  of the steel material at each of a plurality of measuring points on the surface of the concrete positioned over the steel material by use of a reference electrode locatable or disposed at each measuring point, and of measuring the polarization resistance  $R_p$  of the steel material and the concrete resistance  $R_s$  at each measuring point by applying electric current to the steel material through a sensor including a counter electrode and a reference electrode locatable or disposed at each of said plurality of measuring points; the step of converting the measured values of said polarization resistance  $R_p$  and concrete resistance  $R_s$  at each of said measuring points to a real polarization resistance  $R_c$  and resistivity  $\rho$  of the concrete; and a step of evaluating the state of corrosion of said steel material on the basis of and by combining three parameters, at each measuring point, of said corrosion potential  $E_{corr}$ , real polarization resistance  $R_c$  and resistivity  $\rho$ .

4,958,132  
COMPLEMENTARY  
METAL-OXIDE-SEMICONDUCTOR TRANSLATOR

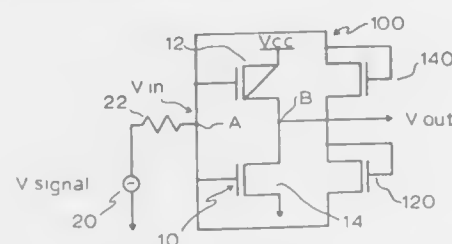
William C. Plants, Santa Clara, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed May 9, 1989, Ser. No. 349,116  
Int. Cl.<sup>5</sup> H03F 1/34  
U.S. Cl. 330—110 8 Claims

1. A complementary metal-oxide semiconductor translator comprising:  
means for amplifying an input signal having an input node and an output node;  
a first MOSFET transistor connected between said input node and said output node for clamping a first feedback



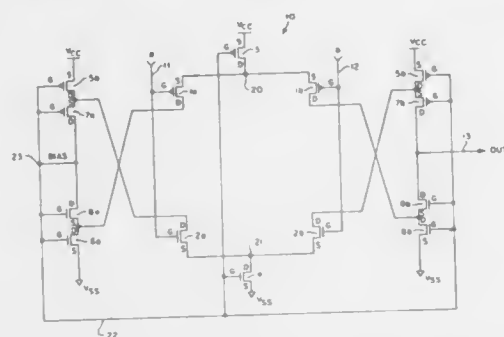
signal from said output node to said input node of said means for amplifying an input signal; and



second clamp means for clamping a second signal from said input node to said output node of said means for amplifying an input signal.

**4,958,133**  
CMOS COMPLEMENTARY SELF-BIASED  
DIFFERENTIAL AMPLIFIER WITH RAIL-TO-RAIL  
COMMON-MODE INPUT-VOLTAGE RANGE  
Mel Bazes, Haifa, Israel, assignor to Intel Corporation, Santa Clara, Calif.

Filed Nov. 13, 1989, Ser. No. 434,339  
Int. Cl.<sup>5</sup> H03F 3/45  
U.S. Cl. 330—253 8 Claims



1. A differential amplifier having an improved common-mode input-voltage range for providing common-mode rejection while providing differential-mode amplification through said extended range, comprising:

- a first, second, third, and fourth transistors coupled in series between a first voltage and a second voltage and having their gates coupled together to a junction of said second and third transistors which junction forming a bias node;
- a fifth, sixth, seventh, and eighth transistors also coupled in series said first voltage and said second voltage, and also having their gates coupled together to the gates of said first, second, third, and fourth transistors;
- a ninth transistor coupled between said first voltage and a first node;
- a tenth transistor coupled between a second node and said second voltage;
- said ninth and tenth transistors having their gates coupled together to the gates of said first, second, third, and fourth transistors;
- an eleventh transistor coupled between said first node and the junction of said third and fourth transistors;
- a twelfth transistor coupled between said second node and the junction of said first and second transistors;
- said eleventh and twelfth transistors having their gates coupled together to receive a first differential input signal;
- a thirteenth transistor coupled between said first node and a junction of said seventh and eighth transistors;

a fourteenth transistor coupled between said second node and a junction of said fifth and sixth transistors;

said thirteenth and fourteenth transistors having their gates coupled together to receive a second differential input signal;

said biasing node providing a negative feedback in order to compensate for circuit variations;

said biasing node also providing for common-mode rejection, but providing differential-mode amplification.

**4,958,134**  
NOISE SUPPRESSION DEVICE COMPRISING A  
TOROID WINDING  
Takao Sawa; Masami Okamura; Taiju Yamada; Takao Kusaka, all of Yokohama, and Hiroshi Sasaki, Chigasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Aug. 31, 1988, Ser. No. 238,721  
Claims priority, application Japan, Sep. 4, 1987, 62-220341; Sep. 4, 1987, 62-220342; Sep. 4, 1987, 62-220343; Sep. 22, 1987, 62-236142

Int. Cl.<sup>5</sup> H03H 7/01  
U.S. Cl. 333—12 8 Claims



1. A toroid-shaped noise suppression device comprising: at least one member selected from the group consisting of plural windings of an amorphous magnetic alloy ribbon and a plurality of laminated ring-shaped pieces formed from an amorphous magnetic alloy ribbon, and said member having a circular through-hole adapted to receive one of an electrical line and a lead, a largest cross-sectional length of said line or lead being L, said ribbon and said through-hole forming a circular shaped device having an average diameter Do that is an arithmetic means value of the outer diameter of the device and the diameter of the through-hole, wherein  $L < Do \leq 5L$  and L is smaller than the diameter of the through-hole, said amorphous magnetic alloy ribbon comprising an amorphous magnetic alloy represented by the formula:

$$(M_1 - aM'_1)100 - bVb \quad (1)$$

wherein M represents at least one element selected from the group consisting of Fe and Co; M' represents at least one element selected from the group consisting of Ti, V, Cr, Mn, Ni, Cu, Zr, Nb, Mo, Ta and W; Y represents at least one element selected from the group consisting of B, Si, C and P; and a and b represents numbers satisfying  $0 \leq a \leq 0.15$  and  $10 \leq b \leq 35$ , respectively.

**4,958,135**  
HIGH RATING MOLDED CASE MULTIPOLE CIRCUIT  
BREAKER

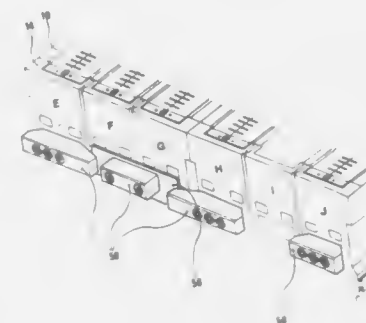
Pierre Baginski, Grenoble; Jean-Pierre Nebon, St. Martin le Vinoux, and Marc Bur, Grenoble, all of France, assignors to Merlin Gerin, France

Filed Dec. 5, 1988, Ser. No. 279,456  
Claims priority, application France, Dec. 10, 1987, 87 17446  
Int. Cl.<sup>5</sup> H01H 75/00

U.S. Cl. 335—8 10 Claims

1. A low-voltage multipole circuit breaker, for high current intensities, comprising a plurality of poles juxtaposed inside an insulating molded case, each pole comprising a pair of separable contacts, an arc chute, a pair of contact terminal pads connected to the separable contacts and protruding outwards from the case, and a current transformer disposed around one of the contact terminal pads and whose output is connected to

a trip device common to the different poles, each pair of contact terminal pads being connected to a pair of connecting strips designed to be connected to a phase of a mains system to be protected, wherein each connecting strip of at least one of the pairs of connecting strips designed to be connected to one of the main phases, is connected to at least two adjacent

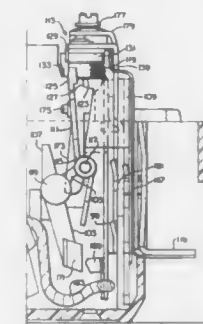


twinned poles, electrically arranged in parallel, each connecting strip of at least one of the pairs of connecting strips associated with another pole of the circuit breaker having a width such that it extends laterally beyond said pole and partially overlaps the immediately adjacent pole, so that the circuit breaker can be used for a higher rating than that of the individual standard poles which make it up.

**4,958,136**  
CIRCUIT BREAKER WITH INDIVIDUAL GAP  
ADJUSTMENT AT HIGH AND LOW SETTINGS OF  
MAGNETIC TRIP

Alfred E. Maier, Chippewa Township, Beaver County, Pa.; Antonio W. M. Cabral, Ilha do Governador, and Carlos P. S. E. Silva, Rio de Janeiro, both of Brazil, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 8, 1989, Ser. No. 320,647  
Int. Cl.<sup>5</sup> H01H 75/10  
U.S. Cl. 335—42 9 Claims



4,958,138

## RESISTIVE POSITION INDICATOR

Jerzy Hawranek, Vargarda, and Karl P. Jakobsson, Alingsas, both of Sweden, assignors to General Engineering (Netherlands) BV, Utrecht, Netherlands

PCT No. PCT/SE87/00283, § 371 Date Apr. 27, 1988, § 102(e) Date Apr. 27, 1988, PCT Pub. No. WO88/00326, PCT Pub. Date Jan. 14, 1988

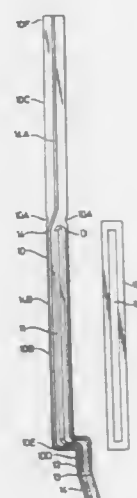
PCT Filed Jan. 17, 1987, Ser. No. 187,447

Claims priority, application Sweden, Jun. 27, 1986, 8602892

Int. Cl. H01C 10/10

U.S. Cl. 338—114

8 Claims



1. A resistive position indicator comprising: an insulating substrate; a first area of conductive material on said substrate comprising an elongated resistive element; a second area of conductive material on said substrate comprising an elongated conductor, extending substantially parallel with said resistive element, and being connected thereto at one end; a respective terminal provided at the other end of said resistive element and of said conductor adjacent one end of said substrate; a third elongated area of conductive material on said substrate, extending substantially parallel with said first and second areas and having a terminal at the same end of said substrate as the other terminals; a tap means, connected to said third area, for contacting said resistive element at a contact point which is movable along the resistive element and divides the resistive element into two portions so that the resistance ratio between the two portions of the resistance element can be varied between wide limits, said tap means including an elongated area of low resistivity electrically conducting material which is applied to an insulating supporting substrate, extending parallel to and slightly spaced from said substrate carrying said first, second, and third areas of conductive material, and which has a contact portion positioned in front of, parallel to, and slightly spaced from said resistive element and defining an air gap between said resistive element and said contact portion; and at least one of said substrate and said supporting substrate consisting of a flexible foil so that adjacent points on said contact portion of said tap means and on said resistive element can be brought into contact, and close said air gap between said resistive element and said contact portion, at any point along said resistive element by means of a compressive force on said flexible foil to establish said contact point.

4,958,139

## METHOD AND APPARATUS FOR AUTOMATICALLY CALIBRATING THE GAIN AND OFFSET OF A TIME-SHIFTED DIGITIZING CHANNEL

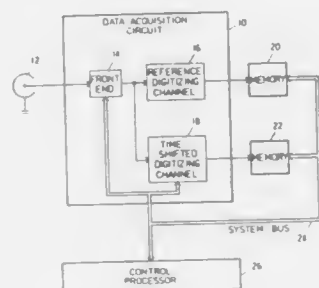
James R. Hyatt, Madison, Wis., assignor to Nicolet Instrument Corporation, Madison, Wis.

Filed Jun. 23, 1988, Ser. No. 210,234

Int. Cl. H03M 7/00

U.S. Cl. 340—122

28 Claims



1. A time-shifted digitizing channel, disposed in parallel with a reference digitizing channel within a data acquisition circuit of the type which digitizes and stores values of a signal in a first memory via the reference digitizing channel and in a second memory via the time-shifted digitizing channel, which comprises:

- (a) a sample-and-hold circuit for receiving the signal;
- (b) a variable-offset amplifier disposed to receive the signal from the sample-and-hold circuit, the amplifier having an offset input controlled by an offset controller; and
- (c) an analog-to-digital converter connected between the variable-offset amplifier and the second memory, the converter having a reference input controlled by a gain controller.

4,958,140

## COMPARATOR UNIT FOR DATA DISCRIMINATION

Sadahiro Yasuda, and Yukihiro Nishiguchi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Mar. 17, 1989, Ser. No. 324,814

Claims priority, application Japan, Mar. 18, 1988, 63-66453

Int. Cl. G06F 7/04

U.S. Cl. 340—146.2

7 Claims



1. A comparator unit for discriminating a plurality of predetermined input data bit groups from a plurality of input data bit groups, each input data bit group consisting of a plurality of input data bits, comprising:

- (a) a first data register operative to store one of said input data bit groups;
- (b) a second data register operative to store a reference data

bit group consisting of a plurality of reference data bits and identical in bit string with one of said predetermined input data bit groups;

(c) a third data register operative to store a masking data bit group having at least one mask data bit; and

(d) a comparator circuit having a first logical circuit, a second logical circuit and a third logical circuit, said first logical circuit being operative to compare said one of said input data bit groups with said reference data bit group for producing a consistent data bit group representative of the consistency between the input data bits and the corresponding reference data bits, said second logical circuit being responsive to said masking data bit group and operative to convert said inconsistent data bit group into said consistent data bit group when said part of said input data bits is specified by said mask data bit, said third logical circuit being responsive to said consistent data bit group for producing a detecting signal.

4,958,141

## REAL TIME RANK ORDERING LOGIC CIRCUIT

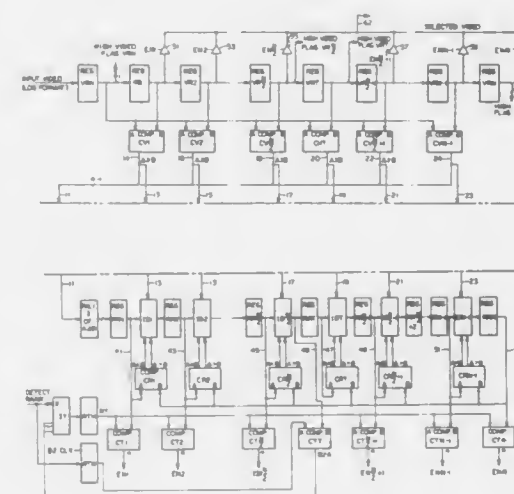
Ronald L. Engelsman, Anaheim, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 15, 1988, Ser. No. 220,138

Int. Cl. G06F 7/02

U.S. Cl. 340—146.2

22 Claims



1. A number ranking circuit for receiving a series of samples and ranking a selected set of said samples by magnitude, comprising:

- a plurality of sample register means for receiving said series of samples and for sequentially storing and shifting a selected set of said samples to be ranked such that new samples of said series are sequentially received and stored by said plurality of sample register means containing one of the samples in said set;
- means for comparing the magnitude of each sample other than a last received sample in said set to the magnitude of the last received sample and producing a series of outputs;
- means for summing said series of outputs to determine the initial rank of said last received sample;
- rank register means for storing said initial rank and subsequent ranks assigned to each sample in said set;
- means for adjusting the rank assigned to each sample in said rank register means in response to each new sample received by said plurality of sample register means; and

means for determining which of said plurality of sample register means contains a sample of a selected rank.

4,958,142

## VEHICLE THEFT DETERRENT

Carol L. Sayers, Glengarry, Miowera Road, North Tarramurra NSW, Australia 2074

PCT No. PCT/AU88/00450, § 371 Date May 15, 1989, § 102(e) Date May 15, 1989, PCT Pub. No. WO89/05018, PCT Pub. Date Jun. 1, 1989

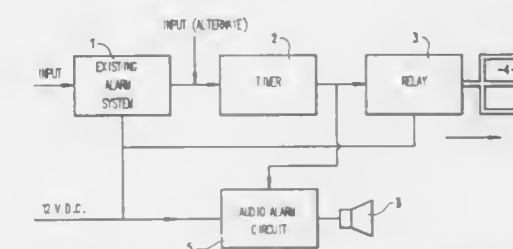
PCT Filed Nov. 18, 1988, Ser. No. 363,517

Claims priority, application Australia, Nov. 20, 1987, 15534/87

Int. Cl. B60R 25/10

U.S. Cl. 340—426

7 Claims



1. A motor vehicle theft deterrent device for use in a vehicle having an existing electrical vehicle alarm and a sound system component, comprising:

- a pressurized cylinder filled with a discomfort causing substance;
- a valve for selectively releasing said substance from said cylinder;
- a solenoid operatively connected for actuating said valve; distribution nozzle means connected to said valve for distributing said substance within a vehicle to deter an intruder;
- a two-stage timer operatively connected for actuation by said existing vehicle alarm to count first and second predetermined time periods;
- an audible alarm operatively connected for actuation by said timer;
- relay means operative upon expiration of said first predetermined time period for energizing said solenoid to open said valve, causing release of said substance from said cylinder and simultaneously activate said audible alarm;
- said relay means operative to de-energize said solenoid upon expiration of said second predetermined time period to close said valve and stop release of said substance from said cylinder and simultaneously deactivate said audible alarm;
- a magnetic proximity switch disposed adjacent said sound system component, said magnetic proximity switch operably connected to energize said solenoid and audible alarm upon movement of said sound system component, causing immediate release of said substance from said cylinder; and
- reset switch means operative to disable said two-stage timer prior to expiration of said first predetermined time period.

4,958,143

## SYNCHRONIZED PULSE-ENHANCED DUAL LIGHT SOURCE

Robert J. Knauff, Marketbouse, Suite 405, 289 E. 5th St., St. Paul, Minn. 55101

Filed Mar. 1, 1989, Ser. No. 317,648

Int. Cl. B60Q 1/44

U.S. Cl. 340—479

19 Claims

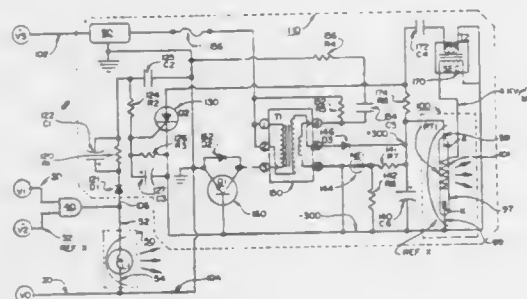
1. Apparatus for enhancing an intermittent low intensity light source that is powered by a drive signal comprising:

- a. a high intensity light source optically coupled with said



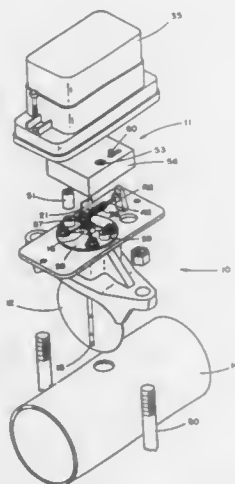
low intensity light source so that at least some light from both sources is projected in a desired direction, said high intensity light having an instantaneous intensity that significantly exceeds the peak intensity of the low intensity light source; and

b. pulse means connected to said high intensity light source and responsive to said drive signal for pulsing said high



intensity light source to produce a light pulse before the low intensity light source achieves any substantial percentage of its peak intensity, said light pulse occurring in such close time proximity to the peak intensity of the low intensity light source that persistence of vision in the human eye causes the two light sources to blend together visually.

**4,958,144**  
**WATER-FLOW DETECTOR**  
Herbert C. Griess, Lincoln, Nebr., assignor to Pittway Corporation, Northbrook, Ill.  
Continuation of Ser. No. 787,311, Oct. 15, 1985, Pat. No. 4,791,414. This application Apr. 15, 1988, Ser. No. 178,018. The portion of the term of this patent subsequent to Dec. 13, 2005, has been disclaimed.  
Int. Cl.<sup>5</sup> G08B 21/00  
U.S. Cl. 340—606 8 Claims



1. A water-flow detector for detecting a change from a no flow to a flow condition comprising:  
a source of radiation;  
radiation detector means for producing an electrical output related to the radiation incident upon it in a no flow condition;  
pivotal means responsive to said waterflow for interrupting at least a portion of said radiation passing from said

radiation source to said detector means in a flow condition; and  
means responsive to said electrical output for generating an alarm signal indicative of a flow condition, said means including means for delaying generation of said signal for a sufficient time after said water-flow is detected to avoid nuisance alarms due to transient flow conditions and means for providing said indication upon failure of either said radiation source or said detector means in the no flow condition.

**4,958,145**  
**BACK INCLINE INDICATOR**  
James A. Morris, Milwaukie, Oreg., assignor to Safety Operating Systems, Inc., Lake Oswego, Oreg.  
Filed May 5, 1989, Ser. No. 348,212  
Int. Cl.<sup>5</sup> G08B 21/00  
U.S. Cl. 340—689 5 Claims

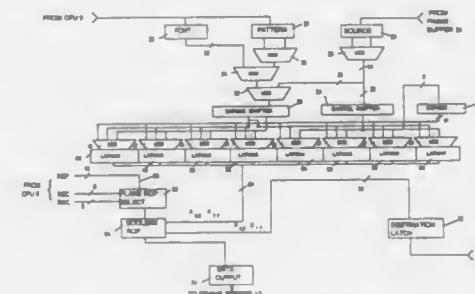


1. A back incline indicator for indicating whenever the back of a user is bent beyond an acceptable limit, comprising:  
(a) a hollow casing having a side plate,  
(b) attaching means on the casing for securing the casing to the back of a shirt collar of a user with the side plate resting against the back of the user,  
(c) electric audio signal means in the casing having an electric circuit including a source of electric potential, and  
(d) electric tilt switch means in said electric circuit and mounted in said casing for closing said electric circuit and activating said signal means when said casing side plate is disposed in a plane which forms with a vertical line an included angle of a predetermined magnitude and for opening said circuit and deactivating said signal means when said casing side plate is disposed in a plane which forms with a vertical line an included angle of less than said predetermined magnitude.

**4,958,146**  
**MULTIPLEXOR IMPLEMENTATION FOR RASTER OPERATIONS INCLUDING FOREGROUND AND BACKGROUND COLORS**  
Curtis Priem, Fremont; Chris Malachowsky, Santa Clara, both of Calif., and Thomas Webber, Lynn, Mass., assignors to Sun Microsystems, Inc., Mountain View, Calif.  
Filed Oct. 14, 1988, Ser. No. 257,853  
Int. Cl.<sup>5</sup> G09G 5/40  
U.S. Cl. 340—703 7 Claims

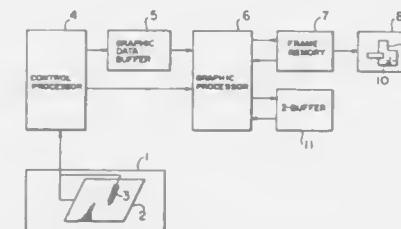
1. An apparatus including a central processing unit for generating control signals including background color control signals and foreground color control signals, said apparatus for performing Boolean raster operations on source and destination data for storage in a frame buffer memory for a plurality of planes, said source data being selected from one of a font register, a pattern register and a source block register, said destination data being selected from said frame buffer, said apparatus comprising:  
(a) source data select means coupled to said font register,

pattern register and source block register for selecting source data;  
(b) plane Boolean raster operation select means coupled to said central processing unit for selecting a Boolean raster operation to be performed for each of said plurality of planes using said foreground color and background color control signals generated by said central processing unit;



(c) Boolean raster operation circuit means coupled to said plane Boolean raster operation select means, said source data select means and said frame buffer for performing the selected Boolean raster operation for each of said plurality of planes on said source data and said destination data for storage in said frame buffer.

**4,958,147**  
**GRAPHIC DISPLAY PROCESSING SYSTEM AND DISPLAYED PATTERN PICKING METHOD USED IN THE SAME**  
Seichi Kanema, Yokohama; Misato Nio, Hitachi; Yasushi Fukunaga, Hitachi, and Takehiko Nishida, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Jul. 22, 1988, Ser. No. 222,848  
Claims priority, application Japan, Jul. 23, 1987, 62-182324  
Int. Cl.<sup>5</sup> G09G 5/00  
U.S. Cl. 340—706 12 Claims

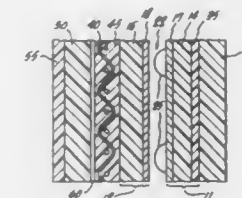


1. A displayed-pattern picking method used in a graphic display processing system, said system including graphic data buffer means for storing command groups comprising graphic data indicative of display patterns wherein the graphic data includes a display color command and a geometrical form command, an image memory for storing display color data of picture elements displayed on raster-scan type display means, and a graphic processor for reading out the command group from the graphic data buffer means, for calculating display color data corresponding to graphic data within a specified display region, and for writing the calculated display color data in the image memory, said method comprising the steps of:

making a list of specific ones of the display color data stored in the image memory which are included in a specific pattern pick region, by the graphic processor;  
comparing display color commands of the graphic data which are successively read out of the graphic data buffer

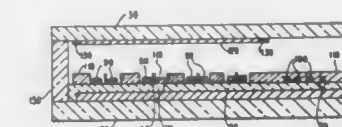
means, with the list by the graphic processor, to select a display color command pattern pick region;  
checking whether or not the selected display color command indicates a pattern intersecting with the pattern pick region, by the graphic processor; and,  
determining by conventional pick processing whether the geometrical form command associated with the selected display color command comprise graphic data picked for display processing.

**4,958,148**  
**CONTRAST ENHANCING TRANSPARENT TOUCH PANEL DEVICE**  
Jan B. Olson, Marina del Rey, Calif., assignor to Elmwood Sensors, Inc., Pawtucket, R.I.  
Continuation of Ser. No. 715,241, Mar. 22, 1985, abandoned.  
This application Jan. 22, 1988, Ser. No. 147,627  
Int. Cl.<sup>5</sup> G09B 7/00  
U.S. Cl. 340—712 60 Claims



1. A contrast enhancing, substantially transparent touch panel device comprising:  
(a) a transparent touch panel comprising:  
(i) a first transparent, electrically conductive layer;  
(ii) a flexible second transparent electrically conductive layer facing, spaced apart from, parallel to, and in close proximity to the first conductive layer, the second conductive layer being selectively displaceable so as to contact the first conductive layer at selected points;  
(b) a front transparent, flexible, protective layer; and  
(c) an antiglare layer held in place by and embedded within a flexible and transparent adhesive, the adhesive being in liquid form when applied and having been cured in situ, the antiglare layer comprising a flexible and transparent fine mesh microwave screen formed of fine dark-colored filaments.

**4,958,149**  
**DISPLAY PANEL**  
Edgar L. Harvey, Jamesburg, N.J., assignor to Telegenix, Inc., Cherry Hill, N.J.  
Filed Nov. 20, 1985, Ser. No. 799,822  
Int. Cl.<sup>5</sup> G09B 3/14  
U.S. Cl. 340—715 14 Claims



1. A display panel comprising an envelope made up of a glass face plate and a glass base plate sealed together hermetically to form an envelope which is filled with an ionizable gas for supporting cathode glow,  
a group of cathode segments disposed adjacent to said base plate and adapted to be energized in different combinations to display different characters,

each cathode segment including two cathode members disposed close to and parallel to each other and denoted as first and second bars, means electrically connecting to a contact pad each cathode bar whereby identical energizing signal sources can be connected to the two cathode bars of each cathode segment so that both bars of a cathode segment can be energized simultaneously to produce a glow along each bar and the glow of one bar blends with the glow of the other bar to produce, in effect, a doubly wide area of cathode glow; or if a first cathode bar of a segment does not turn on and glow, the second cathode bar of the same segment will turn on and glow and provide a correct display, and anode means disposed in operative relation with said group of cathode segments.

#### 4,958,150 DISPLAY DEVICES AND DISPLAY ELEMENTS THEREOF

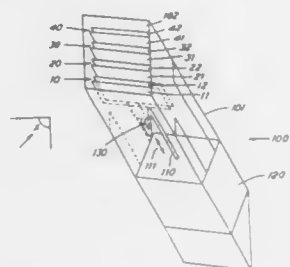
Rad H. Dabbaj, Flat 4, 3 Westbourne Crescent, London, United Kingdom W2 3DB

Filed Nov. 18, 1988, Ser. No. 274,230

Int. Cl. G09G 3/34

U.S. Cl. 340—783

18 Claims



1. A display device comprising a plurality of pixels arranged to form a matrix covering an area, and control means for individually setting the properties of each pixel whereby desired information can be displayed over said area, characterized by light reflective pixels which each comprise a plurality of sets of two or more vanes arranged one behind the other with a forward surface of each set visible from the front, the vanes within each set lying in closely adjacent parallel planes, the sets being also parallel but displaced in parallel planes; driving means for conjointly driving a selected group of corresponding vanes in each set, except the foremost, so that the vane forward surfaces are selectively viewable from the front; the vanes in at least one group being colored with a respective plain color which is different from that of the vanes in at least one other group.

#### 4,958,151 DISPLAY CONTROL CIRCUIT

Hiroshi Ushiki, Yokohama, and Tetsuaki Iwasaki, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki and Tosbac Computer System Company Limited, Tokyo, both of Japan

Filed Aug. 28, 1985, Ser. No. 770,171

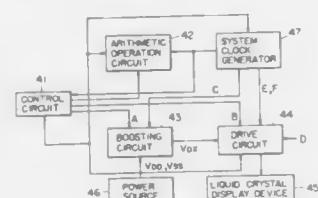
Claims priority, application Japan, Sep. 25, 1984, 59-200081  
Int. Cl. G09G 3/36

U.S. Cl. 340—784

5 Claims

1. A display control circuit for reducing power consumption comprising:  
an arithmetic operation circuit for performing a designated arithmetic operation;  
a liquid crystal display device;  
a drive circuit responsive to results of said arithmetic operation for driving said liquid crystal display device;  
a boosting circuit receiving a voltage from a power source,

boosting said voltage and supplying the boosted voltage to said drive circuit; and  
a control circuit controlling said arithmetic operation circuit and causing interruption of the operation of the boosting



circuit during the period in which said arithmetic operation circuit is carrying out the arithmetic operation, whereby said control circuit reduces power consumption during the period of said arithmetic operation.

#### 4,958,152 DISPLAY DEVICE AND METHOD OF DRIVING SUCH A DEVICE

Karel E. Kuijk, and Martinus V. C. Stroomer, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

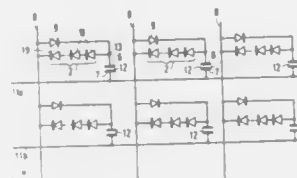
Filed Jun. 16, 1988, Ser. No. 208,208

Claims priority, application Netherlands, Jun. 18, 1987, 8701420; Jan. 28, 1988, 8800204; Mar. 22, 1988, 8800704

Int. Cl. G09G 3/36

U.S. Cl. 340—784

16 Claims



1. A display device comprising an electro-optical display medium between two supporting plates, a system of picture elements arranged in rows and columns, with each picture element being formed by picture electrodes arranged on the facing surfaces of the supporting plates, and a system of row and column electrodes for presenting selection and data signals by means of which a voltage can be presented across the picture elements for the purpose of picture display, at least a first branch arranged between each picture electrode and a row or column electrode and including at least one non-linear switching element, and a second branch arranged between each picture electrode and the row or column electrode and including at least one non-linear switching element which is arranged anti-parallel to the non-linear switching element in the first branch, characterized in that the threshold voltage of the second branch is different from the threshold voltage of the first branch, so that prior to presenting a picture display signal by means of the second branch, the picture elements may be charged or discharged by means of the first branch to a voltage beyond or on the limit of the voltage range to be used for picture display.

#### 4,958,153 METHOD AND APPARATUS FOR PRIORITY CONTROL OF INCOMING CALLS AT ISDN TERMINALS

Hatsuho Murata, and Hiroshi Ikeda, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

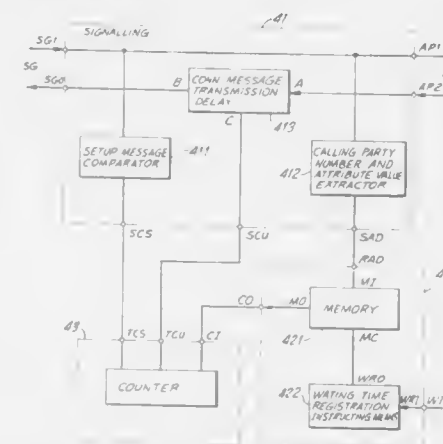
Filed Apr. 6, 1988, Ser. No. 178,131

Claims priority, application Japan, Apr. 8, 1987, 62-84877

Int. Cl. H04Q 1/00

U.S. Cl. 340—825.5

4 Claims



3. A circuit for controlling a priority order in which a terminal connected to an interface of an integrated service digital network (ISDN) answers a SETUP message indicating an incoming call of an ISDN, the circuit comprising:

priority order setting means for establishing a desired priority order, the priority order setting means including a memory storing at least one of waiting time set values, each of the waiting time set values corresponding to a type of a telecommunication service attribute which is given to the terminal of the ISDN;

timer means for timing an interval which begins when the SETUP message arrives at the network and which ends at one of the waiting time set values corresponding to the type of the telecommunication service attribute of an arrived SETUP message; and

signalling processing means for sending an ISDN CONNECT message when said timer means has timed said interval and when the terminal has capabilities to accept the SETUP message.

#### 4,958,154 SYSTEM FOR WIRELESS REMOTE ACTUATION OF DIFFERING SIREN PROGRAMS

Günter Luber; Wolfgang Heuer, both of Hildesheim; Hans O. Maly, Alfeld; Uwe Mätzold, Salzgitter, and Rudolf Messerschmidt, Sibbesse, all of Fed. Rep. of Germany, assignors to Blaupunkt-Werke GmbH, Hildesheim, Fed. Rep. of Germany

Filed Jul. 12, 1989, Ser. No. 378,634

Claims priority, application Fed. Rep. of Germany, Jul. 14, 1988, 3823824

Int. Cl. H04Q 7/00; G08B 1/08, 27/00

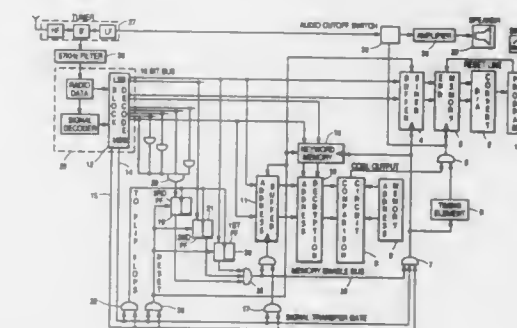
U.S. Cl. 340—825.690

7 Claims

1. System for wireless remote actuation of siren programs, comprising

a siren program unit (1);  
an end memory (3) having an output connected to said program unit (1);  
a siren buffer memory (4) for storing a siren program to be generated, connected to inputs of said end memory (3);  
a first transfer-enable gate (5) having an output connected to a transfer-enable input of said end memory (3);  
a comparison circuit (8) having a coincidence output connected to a first input of said transfer-enable gate (5);  
a timing element (6) having an output connected to a second input of said transfer-enable gate (5);  
an address memory (9) storing an address characteristic of

said siren program unit (1), individually, and having outputs connected to said comparison circuit (8);  
an address decryption circuit (10) having outputs connected to said comparison circuit (8);  
a block decoder (12) having inputs connected to a source (25, 26, 27) of groups of four blocks of data and outputs connected, via an address buffer memory (11, 31), to a first input of said address decryption circuit (10);  
a keyword buffer memory (13) having outputs connected to a second input of said address decryption circuit (10);



a second transfer-enable gate (7), responsive to a fourth one of said data blocks, having an output connected to a transfer-enable input of said siren buffer memory (4) and to a transfer-enable input of said keyword buffer memory (13);  
a third transfer-enable gate (17), responsive to a third one of said data blocks, having an output connected to a transfer-enable input of said address buffer memory (11);  
and wherein said source of groups of data words is a remote signal reception means (25, 26, 27).

#### 4,958,155 ULTRA FAST DIGITAL-TO-ANALOG CONVERTER WITH INDEPENDENT BIT CURRENT SOURCE CALIBRATION

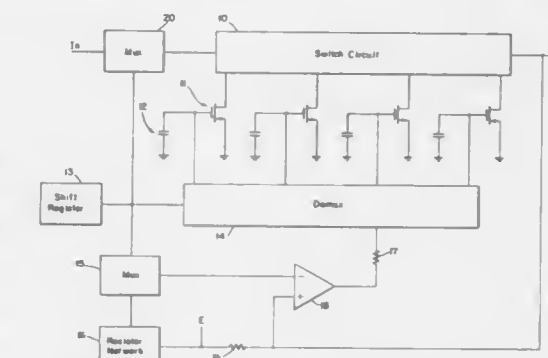
Zdzislaw Gulczynski, P.O. Box 441, Winchester, Mass. 01890

Filed Jan. 31, 1989, Ser. No. 304,507

Int. Cl. H03M 1/10, 1/06

U.S. Cl. 341—120

18 Claims

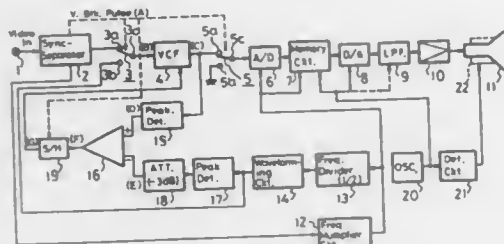


1. Digital-to-analog converter for converting input code into output signal, comprising:  
a plurality of capacitive means for storing base signals;  
a reference means for providing a reference code and reference signal corresponding thereto;  
a multiplexer means for selecting the input code or reference code;  
a plurality of current source means for providing the output signal in response to the base signals and to code selected by the multiplexer means;  
a comparator means for comparing the output signal against reference signal and providing a corrective signal; and



a demultiplexer means for applying the corrective signal to one of the capacitive means in response to the reference code.

**4,958,156**  
**A/D CONVERTER CIRCUIT FOR VIDEO SIGNALS HAVING DIFFERENT TIME FREQUENCIES**  
 Naotaka Ando, Saitama, and Shigeto Funado, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan  
 Filed Apr. 5, 1988, Ser. No. 178,025  
 Claims priority, application Japan, Apr. 9, 1987, 62-37562  
 Int. Cl.<sup>5</sup> H03M 1/12  
 U.S. Cl. 341-123 7 Claims

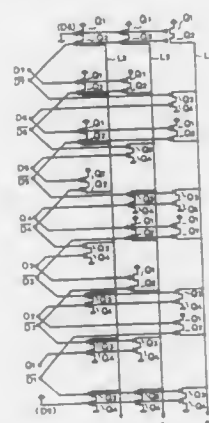


1. An A/D converter circuit comprising:
  - (a) an input terminal supplied with an input video signal;
  - (b) a variable filter connected to said input terminal;
  - (c) A/D converting means connected to said variable filter;
  - (d) sampling frequency generating means for supplying a sampling signal of a variable frequency to said A/D converting means;
  - (e) control means for controlling the cutoff frequency of said variable filter in response to the frequency of said sampling signal;
  - (f) dividing means for producing a divided-frequency signal of said sampling signal;
  - (g) first switching means connected between said input terminal and said variable filter, said first switching means supplying said divided-frequency signal and said sampling signal to said variable filter during a blanking period of said video signal; and
  - (h) level comparing means for comparing the levels of the divided-frequency signal and the output signal from said variable filter during said blanking period, said control means being responsive to the output signal of said level comparing means for controlling the cutoff frequency of said variable filter.

**4,958,157**  
**ENCODER CIRCUIT WITH SERIES CONNECTED OUTPUT SWITCHING TRANSISTORS**  
 Takahiro Miki, and Shiro Hosotani, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
 Filed Feb. 14, 1989, Ser. No. 310,112  
 Claims priority, application Japan, Feb. 15, 1988, 63-33232  
 Int. Cl.<sup>5</sup> H03M 1/00 3 Claims

1. An encoder circuit for converting a plurality of parallel-supplied input signals into encoded data in the form of a predetermined output signal by sensing a critical level at which the input signal changes between its high and low levels, and supplying the encoded output signal on a plurality of output lines, said encoder circuit comprising:
  - a plurality of transistor pairs provided between each of said output lines and a source of a predetermined potential level,
  - each of said transistor pairs comprising
  - a first transistor which is supplied with an inverted value of

one of the two successive input signals in said parallel-supplied input signals; and  
 a second transistor having the same conductivity type as said



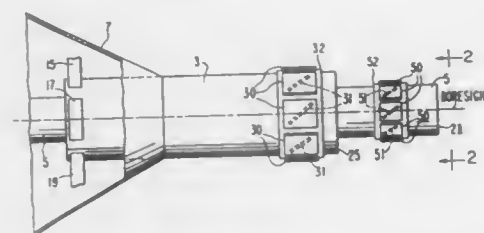
respectively, comparing means for comparing at each sample period  $T$  the signs of  $b_1(nT)$ ,  $b_1[(n-1)T]$ ,  $b_2(nT)$ ,  $b_2[(n-1)T]$  and calculating means for calculating increments on the basis of the said comparisons and deriving, by means of successive increments/decrements during the period  $\Delta t$ , the number of times  $m$ , calculated algebraically, that the vector  $F_b$  of which  $F_{b1}$  and  $F_{b2}$  are the components on two perpendicular axes has travelled quarter turns in a given direction of rotation, whilst  $m$  is proportional to the altitude to be measured in accordance with the equation:

$$h = \frac{mc}{8(f_2 - f_1)}$$

#### 4,958,162 NEAR ISOTROPIC CIRCULARLY POLARIZED ANTENNA

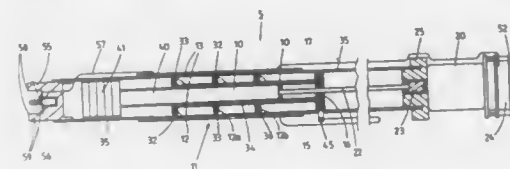
Thomas E. Roberts, Saratoga, and Yeongming Hwang, Los Altos Hill, both of Calif., assignors to Ford Aerospace Corporation, Newport Beach, Calif.

Filed Sep. 6, 1988, Ser. No. 240,665  
Int. Cl. H01Q 1/38, 21/20  
U.S. Cl. 343—700 MS 3 Claims



1. An antenna adapted for circularly polarized electromagnetic energy, comprising:
  - a first hollow, electrically conductive cylinder elongated along a cylindrical axis and closed at one end thereof by a short circuiting electrically conductive wall, wherein circularly polarized electromagnetic energy propagates within said cylinder;
  - positioned, generally equispaced circumferentially, around an outer surface of the cylinder at substantially the same axial distance therealong, a plurality of electrically conductive radiating patches each having a curvature that conforms to the curvature of said outer surface;
  - a dielectric layer juxtaposed between said patches and said outer surface for providing electrical insulation therebetween; and
  - coupling means situated along said outer surface beneath each patch for coupling electromagnetic energy within the cylinder to each patch and to regions outside the cylinder; wherein
  - electromagnetic energy outside the cylinder forms a constructive radiation pattern via interaction between the patches and coupling means, so that electromagnetic energy surrounding the cylinder is circularly polarized over a substantial portion of any sphere having a center positioned at the center of said end;
  - the coupling means comprises an elongated narrow aperture associated with each patch;
  - each patch has the shape of a rectangular near square; and
  - the long axis of each aperture makes nearly a 45° angle with respect to each side of its associated near square rectangular patch.

4,958,163  
MEANS FOR TUNING AN ANTENNA  
Peter F. Leonard, 11 Cole Street, Klemzig, Australia 5087, assignor to Peter F. Leonard and Leonie A. Leonard, both of Klemzig, Australia  
Filed Feb. 1, 1989, Ser. No. 305,292  
Claims priority, application Australia, Feb. 1, 1988, PI6518  
Int. Cl. H01Q 9/00 7 Claims  
U.S. Cl. 343—745



7. An antenna tuning assembly comprising a circular helically wound tuning coil having a curved inner surface, a rod assembly located coaxially within the tuning coil and slidably positionable along a longitudinal axis of the tuning coil, said rod assembly comprising a support means, at least one resilient wiper means on said support means, said resilient wiper means having an outer surface curved with a same radius of curvature, and in a same plane as the curved inner surface of the tuning coil, the resilience of the wiper means urging the outer surface of the wiper means to conform with, and into contact with a plurality of points of contact extending around a circumference of the curved inner surface of the tuning coil, wherein the tuning coil comprises a helical winding of wire having at least two wires in parallel helix form along a top portion of a length of the coil and a single helix form along a remaining portion of the coil length, whereby continuous tuning of the antenna tuning assembly can be effected by positioning the wiper along the tuning coil.

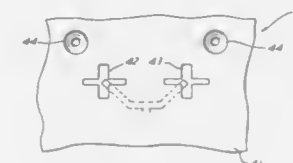
4,958,164  
LOW PROFILE, BROAD BAND MONOPOLE ANTENNA  
John R. Lewis, Jr., Chapin, S.C., assignor to Shakespeare Company, Newberry, S.C.  
Continuation of Ser. No. 849,884, Apr. 9, 1986, Pat. No. 4,890,116. This application May 15, 1989, Ser. No. 351,652  
The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.  
Int. Cl. H01Q 9/00 2 Claims  
U.S. Cl. 343—749



1. A low-profile, monopole antenna operable over a predetermined broad band and connected to a transmission line, comprising:

a radiator including means for providing a series capacitance;  
network means for substantially coupling and matching the impedance of the antenna with the impedance of the transmission line to which it is connected, said network means operatively connected to said radiator; and,  
resistance means for minimizing the antenna's voltage standing wave ratio (VSWR) over lower frequencies in said broad band to make tuning unnecessary and gain approximate that of a one-quarter wavelength monopole over substantially all frequencies in said broad band, said resistance means electrically connected in series with said radiator.

4,958,165  
CIRCULAR POLARIZATION ANTENNA  
Walter J. Axford, Chalfont St. Peter, and Satwinder S. Chana, Hayes, both of England, assignors to Thorn EMI plc, London, England  
Filed Jun. 9, 1988, Ser. No. 204,562  
Claims priority, application United Kingdom, Jun. 9, 1987, 8713489; Jun. 23, 1987, 8714717; Oct. 28, 1987, 8725249; Nov. 6, 1987, 8726082; Dec. 7, 1987, 8728534  
Int. Cl. H01Q 13/00 2 Claims  
U.S. Cl. 343—770

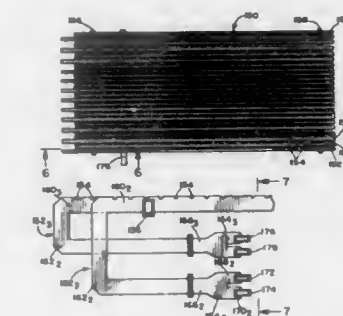


1. An antenna comprising an antenna element having: an electrically conductive front plate having at least one slot, which slot comprises at least one pair of orthogonal slots of differing dimensions to provide transfer of circularly-polarised signals through the said slots; a first array of spacer elements on one side of the front plate, said spacer elements comprising indentations of the surface profile of the one side of the front plate such that corresponding protrusions are formed around and aligned with said indentations on the other side of the front plate; an electrically conductive back plate having a second array of spacer elements on one side of the back plate, arranged to correspondingly align with and face towards said first array, a feed conductor arrangement supported on a dielectric substrate placed between said front plate and said back plate to allow pairs of corresponding spacer elements on each of said plates to support said substrate, the feed conductor arranged to be situated intermediate successive spacer elements.

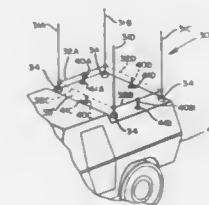
4,958,166  
AMPLITUDE MONOPULSE SLOTTED ARRAY  
John T. Branigan, Claremont, and Michael W. Wronski, Upland, both of Calif., assignors to General Dynamics Corp., Pomona Division, Pomona, Calif.  
Filed Aug. 22, 1988, Ser. No. 196,696  
Int. Cl. H01Q 13/10 12 Claims  
U.S. Cl. 343—771

1. A traveling wave antenna having a far field antenna of pattern substantially four separate beams, comprising:
  - a first array of radiating waveguides, each of said first array radiating waveguides having a near end and a far end, with radiating slots formed therebetween;
  - a second array of radiating waveguides, each of said second

array radiating waveguides having a near end and a far end with radiating slots formed therebetween, said first and second array radiating slots interleaved in a planar spaced parallel relationship, the near end of said first array and the near end of said second array lying substantially in a common plane orthogonal to a plane defined by said first and second arrays;  
first and second pairs of feed waveguides corresponding to



4,958,167  
ULTRA-BROADBAND IMPEDANCE MATCHED  
ELECTRICALLY SMALL COMPLEMENTARY SIGNAL  
RADIATING STRUCTURES USING THIN WIRE  
ELEMENTS AND AN IMPEDANCE OPTIMIZING FEED  
CIRCUIT  
Klaus G. Schroeder, 104 County Line Rd., Lansdale, Pa. 19446  
Continuation-in-part of Ser. No. 97,522, Sep. 16, 1987, Pat. No. 4,750,000. This application Jun. 7, 1988, Ser. No. 204,085  
Int. Cl. H01Q 21/00 7 Claims  
U.S. Cl. 343—853



1. An antenna system including an electrically complementary pair element group comprising:
  - electrically complementary pair elements mounted on a conductive material ground plane; with at least one of said electrically complementary pair elements an equivalent sheet monopole simulated by dual radiating whips; insulation mounting means mounting said dual radiating whips to extend upward away from and insulated from said ground plane; a horizontal feed bar interconnecting said dual radiating whips; signal power feed means connected through opening means in said ground plane to the center portion of said horizontal feed bar interconnecting said dual radiating whips; and hybrid feed circuit means connected to feed signal power to both said elements of said electrically complementary pair elements mounted on said

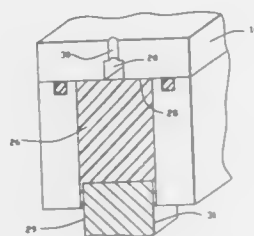


conductive material ground plane; wherein said electrically complementary pair elements are configured in an endfire complementary element structure, with a set of feed cables leading from the feed hybrid to the front element and to the rear element of said endfire complementary element structure of such average length  $(L_1 + L_2)/2$  is equal to an optimum number selected to achieve a maximum impedance bandwidth and a minimum mismatch (VSWR) over a maximum frequency range; wherein said optimum average length is every other odd multiple of an eighth of a wavelength such that  $L_{avg} = (2N + 1) \times \lambda_0/8$ , where  $N = 2, 4, 6$  etc. and where  $\lambda_0$  is the wavelength at the center of the band.

**4,958,168**  
**INKJET DROP GENERATOR**  
Mark Culpepper, Jonesboro, La., assignor to Ricoh Company, Ltd., Japan and Ricoh Corporation, San Jose, Calif.  
Continuation-in-part of Ser. No. 859,480, May 5, 1986, Pat. No. 4,703,330. This application Mar. 19, 1987, Ser. No. 27,869. The portion of the term of this patent subsequent to Oct. 27, 2004, has been disclaimed.  
Int. Cl.<sup>3</sup> G01D 15/18

U.S. Cl. 346—75

6 Claims

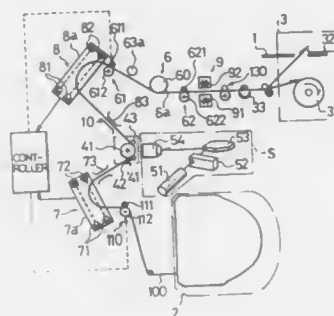


1. A drop generator for causing a plurality of ink streams to break up synchronously into droplets in order that the droplets may be charged and deflected for the purpose of printing, comprising

- a nozzle plate comprising a plurality of nozzles spaced along a line from which ink is jetted,
- a housing supporting said nozzle plate and defining an acoustic cavity having first and second openings,
- a solid material filling said acoustic cavity for transmitting acoustic disturbances from said first opening to said second opening,
- disturbance means comprising an acoustic transducer operable at a given frequency to produce said disturbances, said transducer being bonded to said acoustic cavity filling material at said first cavity opening,
- means for defining an ink channel across said second opening, said channel receiving said disturbances that are transmitted through said acoustic cavity material, and
- means for supplying ink to said ink channel, whereby said disturbances cause said ink in said channel to be synchronously propelled through said openings in said nozzle plate.

**4,958,169**  
**FILM HANDLING FOR A LASER RECORDER**  
Shuji Mochizuki, Yamanashi; Masayuki Mino, Toyokawa; Yutaka Tanaka, Kawasaki, and Kyoji Tachikawa, Yamanashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka and Nisca Corporation, Yamanashi, both of Japan  
Division of Ser. No. 41,079, Apr. 21, 1987, Pat. No. 4,814,793.  
This application Sep. 26, 1988, Ser. No. 248,944  
Claims priority, application Japan, Apr. 22, 1986, 61-92865; Apr. 22, 1986, 61-92866; Apr. 26, 1986, 61-97415; Apr. 26, 1986, 61-97416; Apr. 26, 1986, 61-97417; Apr. 26, 1986, 61-97418; Apr. 26, 1986, 61-97419; Apr. 26, 1986, 61-63463  
Int. Cl.<sup>3</sup> G01D 15/14; B41J 2/47  
U.S. Cl. 346—108

6 Claims



1. A laser recorder, comprising:
- a film feed unit;
  - a film take-up unit;
  - driving means for driving a film drawn out of said film feed unit; and
  - image information recording means for radiating a laser beam in a width direction of the film that is driven by said driving means;
- wherein said driving means comprises:
- a main driving roller;
  - a plurality of pressure rollers for contacting said main driving roller through the film;
  - a slackened film release mechanism for separating at least one pressure roller from said main driving roller and film for a predetermined time and then contacting the one pressure roller with the film and main driving roller; and
  - a controller for interlocking a start of said main driving roller with a start of said slackened film release mechanism.

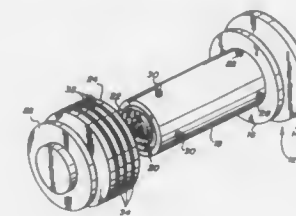
**4,958,170**  
**MULTIPLE FILM WIDTH TRANSPORT ADAPTOR**  
Bernard A. Schwartz, Tommy L. Tew, and Marvin E. Janda, all of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed Sep. 30, 1988, Ser. No. 251,603  
Int. Cl.<sup>3</sup> G03B 17/26, 13/14; B65H 19/04  
U.S. Cl. 346—136

2 Claims

1. A film supply adapter for use in a laser plotter having a cylindrical housing and a film roll holder at each end, said adapter comprising:
- a cylindrical assembly having a first end adapted to be removably connected to one of the film roll holders and a second end including a threaded hollow center area;
  - a rod having an axis and one end threaded for insertion into said threaded hollow center area of said cylindrical assembly;
  - flange means fixed to the other end of said rod and configured for receiving one end of a film roll; and

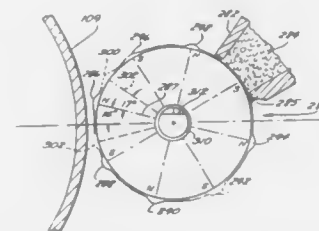
a cylinder having o-rings about its circumference adapted to fit tightly against the inside surface of said cylindrical



housing and center hole means for receiving and supporting said rod and permitting axial rotation of said rod.

**4,958,171**  
**PRINTING APPARATUS AND METHOD**  
Alfred L. Fulton; Kishor M. Lakhan; Scott D. Sampson, and Kent Lowman, all of Huntsville, Ala., assignors to SCI Systems, Inc., Huntsville, Ala.  
Division of Ser. No. 51,046, May 15, 1987. This application Mar. 22, 1989, Ser. No. 327,024  
Int. Cl.<sup>3</sup> G01D 15/00  
U.S. Cl. 346—153.1

4 Claims



1. A printer for printing vehicular transportation documents said printer comprising, in combination, a print engine, feeder means for feeding document forms to be printed into said print engine, and control means for controlling the printing of vehicular transportation passenger information on said forms by said print engine, in which said print engine includes a drum for receiving and retaining latent electrostatic images, a rotary magnetic toner brush for developing said latent images by producing a plurality of outwardly-extending lobes of toner material, and drive means responsive to said control means for rotating said lobes to a first position in which none is sufficiently near said drum to apply toner thereto in the areas which will not contact any form for printing thereon, and for rotating said lobes to a second position in which at least one lobe is close to said drum so as to develop latent images on areas of the drum which will contact forms.

**4,958,172**  
**CHARGE TRANSFER IMAGING CARTRIDGE**  
Robert S. McCallum, Terra Cotta; Brian McIntosh, Toronto, and Hemant Gandhi, Mississauga, all of Canada, assignors to Delphax Systems, Mississauga, Canada  
Filed Aug. 22, 1989, Ser. No. 336,167  
Claims priority, application Canada, Apr. 11, 1988, 563828  
Int. Cl.<sup>3</sup> G01D 15/00

U.S. Cl. 346—159

6 Claims

1. A charge transfer imaging cartridge comprising:
- a dielectric substrate;
  - first electrodes extending in a first direction along one side of

the substrate, said electrodes being continuous and without perforation;

second electrodes extending in a second direction, the second electrodes defining apertures having edges where the first and second electrodes cross; and



a continuous and imperforate dielectric layer separating the first and second electrodes, the layer being of a polymeric material containing particulate filler of a dielectric

**4,958,173**  
**TONER RECEPTIVE COATING**  
John J. Fitch, Natick; Tim Parker, Shrewsbury; Alfred T. Bouchard, Jr., Blackstone, and Mary Sullivan, Marlborough, all of Mass., assignors to Denalson Manufacturing Company, Framingham, Mass.  
Continuation of Ser. No. 376,888, Jul. 6, 1989. This application Nov. 30, 1989, Ser. No. 444,119  
Int. Cl.<sup>3</sup> G01D 15/06; G03G 13/20, 19/00

U.S. Cl. 346—160.1

23 Claims

14. A method of transferring a toned image from a dielectric imaging cylinder of an ion deposition printer to a paper substrate wherein dry magnetic toner is employed as the toning medium, comprising the steps of:

- (a) applying a toner receptive coating to the paper substrate to form a coated paper substrate,
  - (b) passing the coated paper between a pressure nip roller and a dielectric imaging cylinder having a toned image thereon, the pressure nip roller operating at a temperature below the softening temperature of the toner whereupon the toned image is transferred to the coated paper substrate,
  - (c) not exposing the transferred toned image on the paper substrate to a step of heat fusing,
- said receptive coating comprising a blend of particulate mineral filler and particulate polymeric wax filler, said receptive coating having the property of causing sufficient adherence of the transferred toned image thereto and sufficient smudge resistance, thus obviating the need to subject the transferred toned image to a step of heat fusing.

**4,958,174**  
**DATA RECORDING DEVICE FOR CAMERA**  
Tetsuro Goto, Funabashi, and Kocho Miura, Yokohama, both of Japan, assignors to Nikon Corporation, Tokyo, Japan  
Filed Sep. 5, 1989, Ser. No. 403,295

Claims priority, application Japan, Sep. 6, 1988, 63-117073[U]; Sep. 6, 1988, 63-117074[U]; Sep. 6, 1988, 63-223255  
Int. Cl.<sup>3</sup> G03B 17/24

U.S. Cl. 354—106

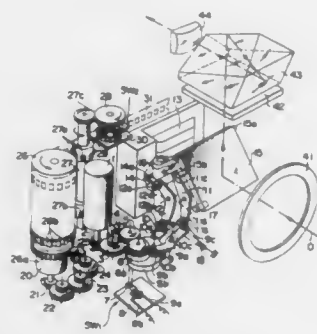
4 Claims



1. A camera data recording device comprising:

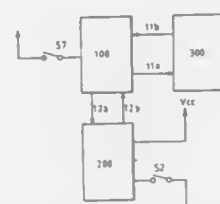
means for setting at least one of a plurality of control modes concerning with a plurality of predetermined camera functions;  
 means for selecting one mode from a plurality of data recording modes each enabling a selective recording of a plurality of fundamental data when said control mode is not set by said setting means, and selecting one mode from a plurality of setting modes concerning with the setting data associated with said control mode and one mode from said data recording modes when one of a plurality of control modes is set by said setting means; and  
 means for recording said data on a film in response to said data recording mode or said setting mode.

**4,958,175**  
**MOTOR DRIVEN CAMERA**  
 Yasuo Asakura; Toshiyuki Toyofuku, both of Hachioji, and Yuji Imai, Higashiyamato, all of Japan, assignors to Olympus Optical Co., Ltd., Japan  
 Filed Feb. 16, 1989, Ser. No. 311,634  
 Claims priority, application Japan, Feb. 18, 1988, 63-35527; Feb. 18, 1988, 63-35528; Jul. 8, 1988, 63-170251; Aug. 30, 1988, 63-215380  
 Int. Cl.<sup>5</sup> G03B 1/12  
 U.S. Cl. 354—152 35 Claims



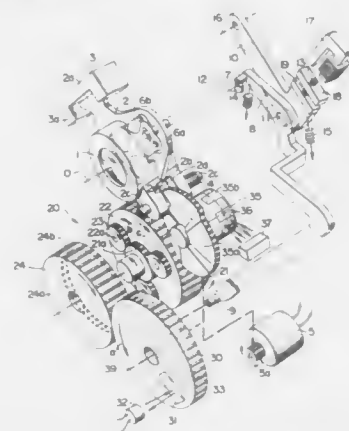
1. A motor driven camera comprising:  
 a first motor for performing a film winding operation;  
 a second motor for performing a shutter charging operation;  
 control means operable to switch between a concurrent drive mode in which said first and second motors are concurrently driven and a sequential drive mode in which said first and second motors are sequentially driven, the control means choosing the concurrent drive mode subsequent to the completion of a shutter operation;  
 means for detecting a film winding rate;  
 switching means for determining that the winding rate detected by the detecting means is below a given rate and for switching the control means to the sequential drive mode if the detected rate is below the given rate;  
 and sustaining means which is set in accordance with the switching operation of the switching means to maintain the control means in the sequential drive mode when it is set.

**4,958,176**  
**DRIVING MOTOR CIRCUIT ARRANGED N COUNTER CIRCUIT FOR CAMERA DEVICE**  
 Bon J. Ku, and Hyun W. Jung, both of Changwon, Rep. of Korea, assignors to Samsung Aerospace Industries, Ltd., Changwon, Rep. of Korea  
 Filed Dec. 6, 1988, Ser. No. 280,503  
 Claims priority, application Rep. of Korea, Dec. 18, 1987, 8714510  
 Int. Cl.<sup>5</sup> G03B 1/12  
 U.S. Cl. 354—173.11 8 Claims



1. A camera device having arranged therein a driving motor circuit for a film automatic transfer device, said driving motor circuit including counter circuit means for inputting a frame transfer signal as the film is transferred frame by frame once the back cover of the camera is closed, and for outputting a counter signal until the film is transferred by three frames switch means for outputting a film winding signal in response to at least the counter signal of said counter circuit means; and a driving motor unit for performing film winding and for simultaneously performing film rewinding once the film winding is completed, said driving motor unit including means responsive to the film winding signal for actuating film winding.

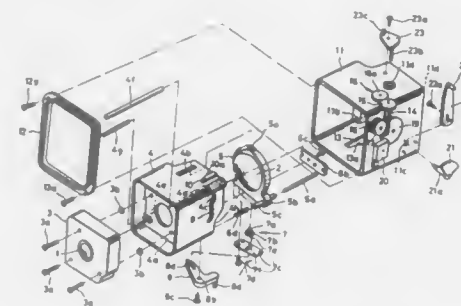
**4,958,177**  
**ROTATIONAL DRIVE MECHANISM**  
 Horoshi Akitake, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Japan  
 Filed Oct. 13, 1988, Ser. No. 257,508  
 Claims priority, application Japan, Oct. 15, 1987, 62-260891; Nov. 30, 1987, 62-301968  
 Int. Cl.<sup>5</sup> G03B 1/18  
 U.S. Cl. 354—195.1 33 Claims



1. A rotational drive mechanism comprising:  
 a drive source adapted to rotate in either direction;  
 a differential gearing means driven by the drive source and including a pair of output gears, the differential gearing means operating in a manner such that one of the output gears which carries a smaller load is rotated from the drive source;  
 a first mechanism designed for rotation in a predetermined

direction and requiring a constant magnitude of drive, the first mechanism being connected to one of the output gears of the differential gearing means;  
 a second mechanism requiring a drive of varying magnitude during its rotation in either direction, the second mechanism being connected to the other output gear of the differential gearing means, the motion of the second mechanism being inhibited when it carries a load greater than the load applied to the first mechanism or while the first mechanism is being driven;  
 solenoid means;  
 a displacement member urged in a direction away from the solenoid means and movable between a position in which it is urged away from the solenoid means, another position in which it is held attracted by the solenoid means and an overcharged position in which it is pressed against the solenoid means beyond the attracted position;  
 an engaging portion of the first mechanism and located to be in opposing relationship with the displacement member, the engaging portion engaging the displacement member when the latter assumes its attracted position to block the rotation of the first mechanism and being disengaged from the displacement member as it moves away from the solenoid when the solenoid ceases to hold it attracted; and  
 charging means disposed for abutment against the displacement member to press it to its overcharged position so that the displacement member is firmly held attracted by the solenoid, the charging means being operative when released from abutment against the displacement member to move the displacement member to its attracted position under the urging influence to engage it with the engaging portion.

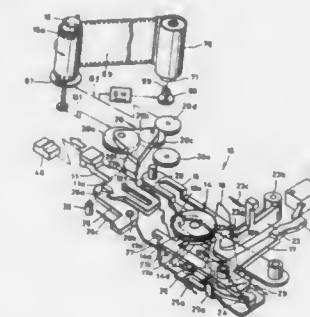
**4,958,178**  
**COLLAPSIBLE MOUNTING TYPE CAMERA WITH ZOOM LENS**  
 Toshio Yoshida; Masayoshi Hirai; Tetuo Nishizawa, all of Saitama, and Masashi Takamura, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
 Filed Nov. 16, 1988, Ser. No. 272,524  
 Claims priority, application Japan, Nov. 16, 1987, 62-288839  
 Int. Cl.<sup>5</sup> G03B 1/18  
 U.S. Cl. 354—195.12 14 Claims



1. A camera with a zoom lens comprising:  
 a zoom lens system having at least front and rear lens means having a common optical axis;  
 a movable lens barrel holding said front lens means and being axially movable rearwardly and forwardly relative to a camera body;  
 means for causing said axial movement of said movable lens barrel while changing the relative position between said front and rear lens means by cooperatively shifting said rear lens means along said axis relative to said front lens means between first and second positions in both of which positions said rear lens means lies on said axis so as to change said zoom lens system between the longest and the shortest focal length respectively, said causing means

permitting said movable lens barrel to be moved rearwardly beyond a position wherein said zoom lens system provides said shortest focal length while maintaining said rear lens means in said second position, thereby allowing said movable lens barrel to retract at least almost fully within said camera body; and  
 means preventing rotation of said movable lens barrel and said front and rear lens means during said axial movements thereof.

**4,958,179**  
**CAMERA WITH CHANGEABLE FOCAL LENGTH**  
 Hiroshi Komatsuzaki; Kazuo Kamata, both of Tokyo; Akio Ohmiya; Syunji Nishimura, both of Saitama; Yoshihito Umeda, Yamanashi; Noriya Mochizuki, Yamanashi, and Eiji Furuya, Yamanashi, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa and Nihon Seimitsu Kogyo Kabushiki Kaisha, Yamanashi, both of Japan  
 Filed Dec. 27, 1988, Ser. No. 291,450  
 Claims priority, application Japan, Dec. 25, 1987, 62-328806; Dec. 26, 1987, 62-198153[U]; Jan. 12, 1988, 63-4445  
 Int. Cl.<sup>5</sup> G03B 1/18  
 U.S. Cl. 354—195.12 23 Claims



1. A focal length changeable camera with a taking lens system which is driven by a motor and is changed to provide at least two different focal lengths, namely, relatively long and relatively short, said camera comprising:  
 a motor switch for turning on and off said motor;  
 rotatable changing means driven by said motor;  
 lever displacing means provided on said rotatable changing means;  
 a motor switching lever engageable with said lever displacing means for switching said motor switch; and  
 a focal length changing member for changing the focal length of said taking lens system upon rotation of said rotatable changing means.

**4,958,180**  
**FOCUS DETECTING DEVICE AND AUXILIARY ILLUMINATING DEVICE THEREFOR**  
 Toru Matsui, and Hiroshi Ueda, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
 Filed May 20, 1988, Ser. No. 196,290  
 Claims priority, application Japan, May 23, 1987, 62-125027; May 23, 1987, 62-125028; May 23, 1987, 62-125029  
 Int. Cl.<sup>5</sup> G03B 3/00; G01J 1/00  
 U.S. Cl. 354—403 10 Claims

1. Focus detecting device for detecting a focus condition of a photographic lens, comprising:



light receiving means for receiving light coming from a plurality of focus detecting areas through the photographic lens to produce output signals used for detecting the focus condition of the photographic lens, said plurality of focus detecting areas including at least one axial focus detecting area located on an optical axis of the photographic lens and at least one off-axial focus detecting area located away from the optical axis of the photographic lens; and illuminating means for illuminating the plurality of focus detecting areas, including;

light emitting means for emitting light; and contrast projecting means for projecting a predetermined projection pattern onto the plurality of focus detecting areas by the light emitted by the light emitting means, including a projecting pattern plate in which the predetermined projection pattern is formed, and a projection lens for projecting the predetermined projection pattern onto the plurality of focus detecting areas, said projection pattern plate being curved in accordance with characteristic of astigmatism generated by the projection lens.

#### 4,958,181 CAMERA SYSTEM

Norio Ishikawa, Osaka; Masaaki Nakai, Krawachinagano; Masayasu Hirano, Nishinomiya; Akihiko Fujino; Hiroshi Ootsuka, both of Sakai; Takeshi Egawa, Osaka, and Kunio Kawamura, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 122,243, Nov. 8, 1987, Pat. No. 4,855,779.

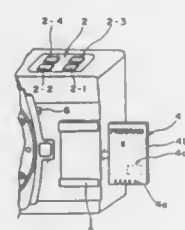
This application Nov. 30, 1988, Ser. No. 278,033

Claims priority, application Japan, Nov. 19, 1986, 61-275546; Nov. 19, 1986, 61-275547; Nov. 19, 1986, 61-275548; Nov. 19, 1986, 61-275549; Nov. 19, 1986, 61-275550; Nov. 19, 1986, 61-275551; Nov. 19, 1986, 61-275552

Int. Cl.<sup>5</sup> G03B 7/00

U.S. Cl. 354-412

6 Claims



1. A camera on which an external device, having a data output means for outputting through first electrical terminals data relating to a camera operation mode, is detachably mounted;

the camera comprising;

second electrical terminals adapted to be connected to the first electrical terminals of the external device;

data input means for inputting the data fed from the external device through the first and second electrical terminals;

storage means for storing the data having been input to the data input means; and

control means for controlling and executing the camera operation according to the data stored in the storage means regardless of whether the external device is mounted on the camera or not.

#### 4,958,182 ARRANGEMENT FOR DETERMINING CAMERA SETTING

Stig O. Fröberg, and Lars O. Bengtson, both of Göteborg, Sweden, assignors to Victor Hasselblad Aktiebolag, Göteborg, Sweden

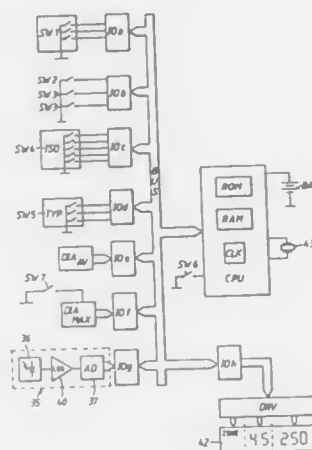
Filed Sep. 14, 1988, Ser. No. 244,264

Claims priority, application Sweden, Sep. 15, 1987, 8703554

Int. Cl.<sup>5</sup> G03B 17/18

U.S. Cl. 354-412

13 Claims



1. A camera system including arrangements for determining camera setting comprising a camera housing, a lens provided with an adjustable diaphragm, and a viewfinder, as well as:

central processing means;

digital input/output means and digital bus means for conveying digital address and data signals between the central processing means and the input/output means;

reference point selection means for registering an illumination of a reference portion of a photographic subject;

diaphragm data means for generating first and second diaphragm data signals, and for applying said diaphragm data signals to said central processing means, said diaphragm data means comprising:

(a) first diaphragm setting means for generating said first diaphragm data signals corresponding to a current setting of the adjustable diaphragm;

(b) second diaphragm setting means for generating said second diaphragm data signals corresponding to a maximum possible opening of the diaphragm; and

light-measuring means for measuring light intensity from a chosen measurement portion of a photographic subject, said measurement portion being represented in a measurement field of the viewfinder, for generating electrical light strength signals corresponding to said light intensity, and for applying said light strength signals to said central processing means;

maneuverable development type selection means for generating development data signals corresponding to a plurality of development types, and for applying said development data signals to said central processing means;

means, including a maneuverable film-sensitivity selector, for generating and applying film sensitivity data signals to said central processing means;

display means;

zone selection means for selectively generating zone selection signals and for applying said zone selection signals to said central processing means;

said reference point selection means, said diaphragm data means, said light-measuring means, said means for applying film sensitivity data signals to said central processing means, said display means, and said maneuverable development type selection means, each being electrically connected to said input/output means;

said central processing means including means:

(a) for generating the digital address signals for arbitrary addressing of said input/output means;

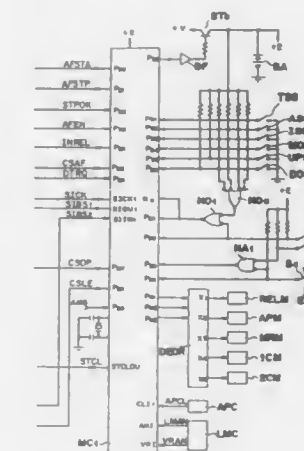
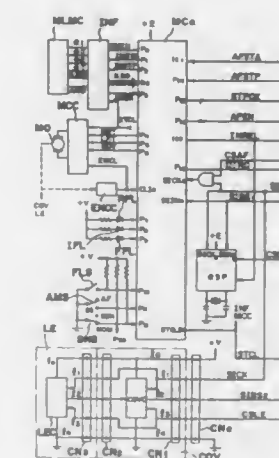
(b) for calculating and transferring to said display means, and for displaying:

(i) a calculated shutter speed for representing, upon film exposure and in accordance with a chosen development type, chosen by means of said maneuverable development data type means, a reference portion of the photographic subject, chosen by means of said reference point selection means, in a reference zone, chosen by means of said zone selection means;

(ii) a first zone value corresponding to said reference zone as long as said reference portion is represented in said measurement field, and

(iii) a second zone value corresponding to a comparison zone when a comparison portion, different from the reference portion, of the photographic subject, is represented in said measurement field.

electromechanical converting means with the decoded data representing one of the mechanisms to be driven and



none of the electromechanical converting means with the decoded data being the specified data.

#### 4,958,183

#### CONTROL DEVICE FOR USE IN A CAMERA SYSTEM

Yasuaki Akada, Sakai; Norio Ishikawa, Osaka; Takeshi Egawa, Sennan, and Nobuyuki Taniguchi, Tondabayashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 59,579, Jun. 8, 1987, Pat. No. 4,827,299, which is a division of Ser. No. 764,742, Aug. 9, 1985, Pat. No. 4,671,640. This application Feb. 3, 1989, Ser. No. 306,771

Claims priority, application Japan, Aug. 9, 1984, 59-167105; Sep. 6, 1984, 59-187109; Nov. 19, 1984, 59-243994

Int. Cl.<sup>5</sup> G03B 7/00

U.S. Cl. 354-412

3 Claims

1. A control device for use in a camera, comprising:

first number m of electromechanical converting means for driving mechanisms of the camera, the first number being greater than one;

a microcomputer for carrying out an exposure calculation operation and a sequence control of the camera exposure and having a second number n, which is less than the first number m, of output ports, said microcomputer sequentially determining, with the progress of the sequence control, one of the mechanisms of the camera and outputting from the output ports n bits of control data to cause the corresponding electromechanical converting means to operate, the n bits of control data being a specified code data when no mechanism is necessary to be driven, and

a decoder driver IC to which the first number m of the electromechanical converting means are connected through m number of output signal lines, and which decodes the n bits of control data and selectively drives, based on the decoded data, one of the corresponding

#### 4,958,184

#### DISPLAY DEVICE FOR USE IN A CAMERA

Shuji Izumi, Sakai; Masaaki Nakai, Kawachinagano; Manabu Inoue, Kobe; Akihiko Fujino, Sakai; Kunio Kawamura, Sakai; Yuji Takarabe, Sakai, and Masatake Niwa, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 196,298, May 20, 1988, abandoned, which is a division of Ser. No. 808,251, Dec. 12, 1985, Pat. No. 4,847,651. This application Feb. 9, 1989, Ser. No. 308,991

Claims priority, application Japan, Dec. 14, 1984, 59-264940; Apr. 2, 1985, 60-70619; Apr. 2, 1985, 60-70620; Apr. 2, 1985, 60-70621; Apr. 18, 1985, 60-84197; Apr. 18, 1985, 60-84198; Apr. 23, 1985, 60-88304; Apr. 23, 1985, 60-88305; Apr. 24, 1985, 60-89595; Apr. 24, 1985, 60-89596; Apr. 25, 1985, 60-90217; Sep. 6, 1985, 60-198244

Int. Cl.<sup>5</sup> G03B 17/18, 17/20

U.S. Cl. 354-474

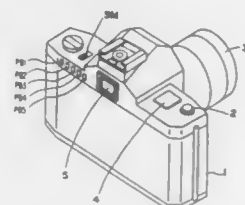
9 Claims

1. A display device for use in a camera provided with a plurality of exposure control modes including a shutter time priority automatic exposure control mode and a diaphragm aperture priority automatic exposure control mode, said display device comprising:

a first display part for displaying a shutter time value;

a second display part for displaying a diaphragm aperture value;

- a third display part for indicating the shutter time priority automatic exposure control mode; and  
a fourth display part for indicating the diaphragm aperture



priority automatic exposure control mode, said first display part, said third display part, said fourth display part and said second display part being arranged in the order thereof and in a row.

4,958,185

## PHOTOGRAPHING APPARATUS

Osamu Kamiya, Machida, and Yasutomo Fujiyama, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

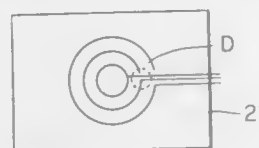
Continuation of Ser. No. 16,994, Feb. 19, 1987, which is a continuation of Ser. No. 851,270, Apr. 10, 1986, which is a continuation of Ser. No. 635,517, Jul. 30, 1984. This application Jun. 7, 1988, Ser. No. 206,987

Claims priority, application Japan, Aug. 3, 1983, 58-142206 The portion of this patent subsequent to Apr. 19, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> G03B 7/099

U.S. Cl. 354-478

7 Claims



1. A photographing apparatus comprising:  
an optical system including at least one optical element for forming an image of an object to be photographed on a light-receiving medium;  
a plurality of metering photoelectric conversion elements each having a pattern thereon, said photoelectric conversion elements being provided on or in the vicinity of a focal surface of an optical element in said optical system in an optical path through which a light beam from the object is directed to the eye of a user of the photographing apparatus, and the size and shape of the pattern on each of said photoelectric conversion elements being selected so as to be indiscernible to the human eye; and  
means for selectively outputting information from said photoelectric conversion elements.

4,958,186

## IMAGE RECORDING APPARATUS

Minoru Sashida, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 4, 1988, Ser. No. 190,256

Claims priority, application Japan, May 12, 1987, 62-113468; Jul. 28, 1987, 62-186677

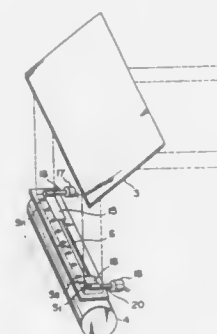
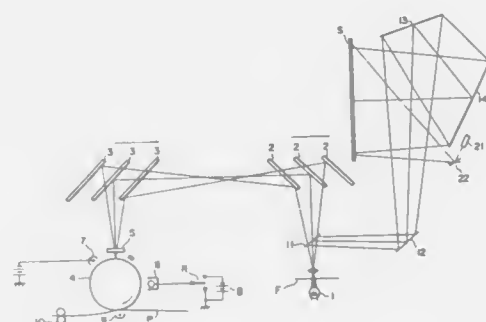
Int. Cl.<sup>3</sup> G03B 27/52

U.S. Cl. 355-41

9 Claims

1. An image recording apparatus for recording an image of an image carrier on a recording medium, comprising:  
projection means for projecting the image of the image carrier onto a screen;

display means for displaying a light spot at a desired position on the screen;  
pressure-responsive position inputting means disposed on the screen, the inputting means, when depressed, providing information corresponding to the location of the depressed position; and



control means for controlling the display means in response to the information provided by the inputting means to display the light spot at a portion on the screen corresponding to the pressed position.

4,958,187

## IMAGE FORMING APPARATUS FOR SCANNING BOTH SIDES OF AN ORIGINAL AND PRODUCING A DUPLEX COPY

Hiroaki Tsuchiya, and Kimio Nakahata, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

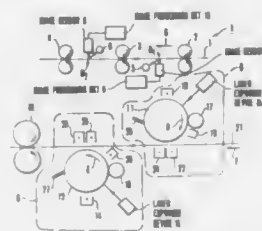
Filed Feb. 9, 1988, Ser. No. 153,919

Claims priority, application Japan, Feb. 13, 1987, 62-029547; Feb. 17, 1987, 62-032351

Int. Cl.<sup>3</sup> G03G 21/00

U.S. Cl. 355-202

8 Claims



1. An image forming apparatus capable of forming images on

a first side of a moving transfer member and on a second side thereof reverse to said first side, respectively, comprising:

first image forming means including a first image bearing member, means for forming on the first image bearing member a first toner image corresponding to a first information signal, and first transfer means for transferring said first toner image to the first side of said transfer member at a first transfer station;

second image forming means including a second image bearing member, means for forming on the second image bearing member a second toner image corresponding to a second information signal, and second transfer means for transferring said second toner image to the second side of said transfer member at a second transfer station located on the downstream side of said first transfer station in a moving direction of said transfer member; and

reading means for reading a first side of a moving original to form said first information signal and for reading a second, opposite, side of the moving original to form said second information signal, said reading means being arranged to begin to read the second side of said original at a point of time after another point of time at which reading the first side of said original begins;

wherein the moving speed of said transfer member is different from the moving speed of the original; and

wherein a length of time required by said transfer member to move from said first transfer station to said second transfer station is equal to a length of time between said point of time at which reading said first side of the original begins and said point of time at which reading said second side begins.

4,958,188

## IMAGE FORMING APPARATUS WITH ONE RESET SWITCH FOR RESETTNG ONE TYPE OF TROUBLE AND A SECOND RESET SWITCH FOR RESETTNG A SECOND TYPE OF TROUBLE

Hirohisa Miyamoto, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

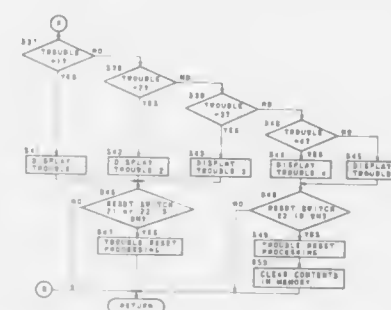
Filed Dec. 27, 1988, Ser. No. 290,218

Claims priority, application Japan, Dec. 28, 1987, 62-336321

Int. Cl.<sup>3</sup> G03G 21/00

U.S. Cl. 355-206

9 Claims



1. An image forming apparatus comprising:  
image processing means including a plurality of discrete operating elements cooperable with one another;  
trouble detecting means for detecting trouble occurring in each of said elements;  
apparatus stop means for putting said apparatus in an inoperative state when said trouble is detected;  
a first switch operable by an operator;  
a second switch provided at a different position from said first switch;  
discriminating means for discriminating between a first kind of said trouble and a second kind thereof; and  
releasing means for releasing said inoperative state in response to said first switch when said first kind of trouble

occurs, and for releasing said inoperative state in response to said second switch when said second kind of trouble occurs.

4,958,189

## AUTOMATIC EXPOSURE CONTROL SYSTEM OF IMAGE DUPLICATING APPARATUS

Keiji Yoshida, Aichi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 123,938, Nov. 23, 1987, abandoned.

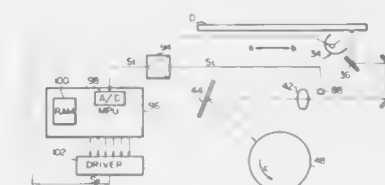
This application Oct. 5, 1989, Ser. No. 418,912

Claims priority, application Japan, Nov. 28, 1986, 61-285386

Int. Cl.<sup>3</sup> G03G 21/00

U.S. Cl. 355-208

8 Claims



1. An electrophotographic image duplicating apparatus, a photosensitive recording medium on which images on a document are to be reproduced, optical scanning means of the slot exposure type by which the images on said document are to be scanned by illumination with light and are to be projected onto said recording medium through a predetermined path of light, and an automatic exposure control system which comprises:

- (a) detecting means located in said path of light for detecting the density of the images on said document from the intensity of the light reflected from said document and producing a first signal representative of the detected image density;
- (b) activating means for activating said scanning means to illuminate said document, said activating means being operable either in a real-time automatic exposure control mode having an illumination value variable on a real-time basis and based on said first signal or in a premonitored automatic exposure control mode in which the illumination value is determined on the basis of said first signal produced while said scanning means is preliminarily scanning said document;
- (c) automatic discriminating means for determining whether an adequate response time for variation of the scanning means illumination of the scanned images can be accomplished in accordance with the image density represented by the first signal and for producing a second signal indicative of whether or not said illumination value is adjustable in a real-time automatic exposure control mode, and said activating means whereby when said second signal indicates that said illumination value is adjustable in said real-time automatic exposure control mode, said activating means activates said scanning mode, and said real-time automatic exposure control mode, and when said second signal indicates that said illumination value is not adjustable in said real-time automatic exposure control mode, said activating means activates said scanning means in said premonitored automatic exposure control mode.



1. A developing device for developing an electrostatic latent image on an image support member, comprising:

- a plurality of developing units for supplying different colored developers to the image support member, each said developing unit having a developing roll which is rotatively driven for supplying the developer to the image support member and a developer stirring means which is rotatively driven for stirring and supplying the developer to the developing roll;
- a driving source for rotatively driving the developing roll and the developer stirring means;
- a driving force transmitting means provided between the

driving source and both the developing roll and the developer stirring means for transmitting a driving force from the driving source to the developing roll and the developer stirring means;

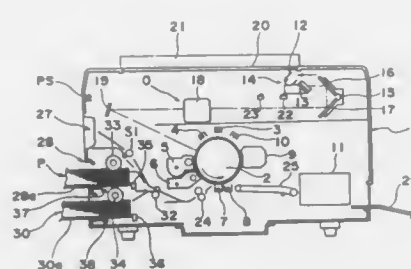
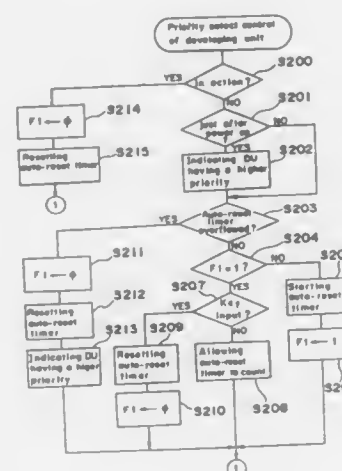
a disconnecting means provided at a transmission part to the developing roll in the driving force transmitting means for disconnecting or connecting only a driving force transmission from the driving source to the developing roll;

a position switching means for switching over positions of each developing unit between a developer supply location adjacent to the image support member and a developer non-supply position away from the image support member; and

an interlocking means for actuating the disconnecting means to disconnect the driving force transmission when a developing unit is in the developer non-supply position or to connect the driving force transmission when the developing unit is in the developer supply location.

**A PREDETERMINED DEVELOPING UNIT**  
**Keiji Kusumoto, Osaka, Japan, assignor to Minolta Camera**  
**Kabushiki Kaisha, Osaka, Japan**  
**Filed Jun. 7, 1988, Ser. No. 202,494**  
**Claims priority, application Japan, Jun. 8, 1987, 62-142931**  
**Int. Cl.<sup>3</sup> G03G 15/06**

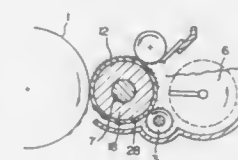
**U.S. Cl. 355—245** **13 Claims**



1. An image forming apparatus comprising:  
a photoconductor,  
first developing means for developing a latent image formed  
on the photoconductor with first developer,  
second developing means for developing a latent image  
formed on the photoconductor with second developer  
and

selection means for selecting said first developing means if both of the first and second developers are alike and selecting said second developing means if the first developer and the second one are different from each other when a power supply source for the image forming apparatus is switched on.

**4,958,193**  
**MEMBER FOR DEVELOPING ELECTROSTATIC**  
**LATENT IMAGES**  
**Kazuo Nojima, and Yasuo Hirano, both of Numazu, Japan,**  
**assignors to Ricoh Company, Ltd., Tokyo, Japan**  
**Division of Ser. No. 199,868, May 27, 1988. This application**  
**Jun. 12, 1989, Ser. No. 364,324**  
**Claims priority, application Japan, May 30, 1987, 62-133438;**  
**Nov. 9, 1987, 62-283855**  
**Int. Cl.<sup>5</sup> G03G 15/06**



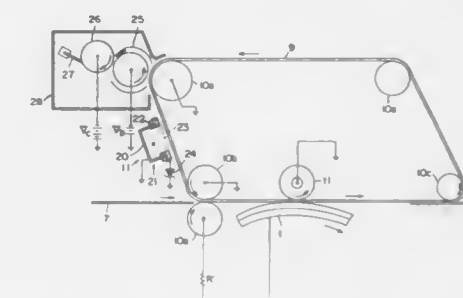
1. A development apparatus for developing latent electrostatic images to visible images comprising:
  - a developer holding means for holding a developer comprising a one-component non-magnetic toner;
  - a development member for developing electrostatic latent images to visible images, comprising:
    - a support,
    - a first coating layer, formed on said support, having a volume resistivity of  $10^6$  to  $10^{11}$   $\Omega$ -cm and comprising an elastic material which comprises as a base material a material selected from the group consisting of (i) nitrile rubber, (ii) epichlorohydrin rubber, (iii) a mixture of nitrile rubber and epichlorohydrin rubber, (iv) urethane resin, (v) silicone resin, and (vi) fluoroplastic, and
    - a second coating layer, formed on said first coating layer, having a volume resistivity of  $10^6$  to  $10^{11}$   $\Omega$ -cm and an elongation ratio of 10% to 50% , and comprising a flexible resin;
  - a developer supplying means for supplying said developer to said development member; and
  - a developer layer regulating means for regulating the thickness of a layer of said developer on said development member.

Shozo Kaieda, Hachioji, and Hideo Okajima, Tama, both of Japan, assignors to Kentek Information Systems, Inc., Allendale, N.J.

Filed Feb. 28, 1989, Ser. No. 316,511  
Claims priority, application Japan, Jan. 12, 1989, 1-32811  
Int. Cl.<sup>5</sup> G03G 15/14

U.S. Cl. 355—277 8 Claims  
7. An electrophotographic image forming apparatus of the duplex type capable of forming an image on a first recording surface of a record paper, and an image on a second recording surface of said record paper, comprising  
an image forming member;  
transfer belt means disposed opposite said image forming member for transferring charged toner from said image forming member onto said record paper;

means for driving said transfer belt means in synchronization with said image forming member;  
means for pressing said transfer belt means against said image forming member;  
corona charging means disposed opposite said transfer belt means for charging said transfer belt means with a charge opposite in polarity to the charge on said toner;  
a grid electrode disposed between said corona charging means and said transfer belt means;  
first and second biasing sources connectable to said grid electrode for biasing said grid electrode at first and second



potentials respectively, said second potential being larger in absolute magnitude than said first potential; and change-over circuit means for changing over the connection between said grid electrode and said first and second biasing sources, so that said first biasing source is connected to said grid electrode when said transfer belt means transfers said charged toner onto said first recording surface of said record paper, and so that said second biasing source is connected to said grid electrode when said transfer belt means transfers charged toner onto said second recording surface of record paper.

4,958,195  
METHOD AND APPARATUS FOR FUSING ENVELOPES  
Rowland V. D. Firth, III; Quay C. Hunter, Jr.; Ronald A. Kohlin, and William W. Sitton, all of Charlotte, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.  
Filed Aug. 25, 1989, Ser. No. 398,868  
Int. Cl.<sup>5</sup> G03G 15/20

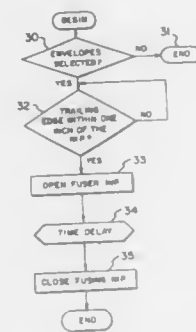
U.S. Cl. 355—290 26 Claims

6. A method for fusing xerographic toner to the flat surface of paper or paper-like envelopes by the use of an electrophotographic reproduction device having a pressure fuser, said envelopes being fed through said reproduction device in a manner to have a leading edge and a trailing edge, comprising the steps of

determining if toner images are to be reproduced on envelopes by operation of said reproduction device, and

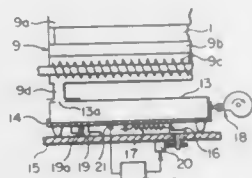
if toner images to be reproduced on envelopes, releasing the pressure of said pressure fuser after the majority of said envelope extending from said leading edge to said trailing

edge has passed through said pressure fuser, but before the trailing edge of said envelope has passed through said



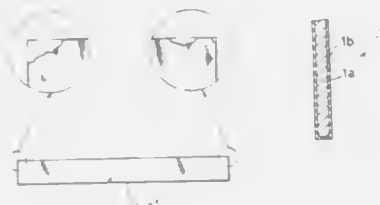
pressure fuser, to thereby release pressure from said envelope before said trailing edge exits said pressure fuser.

**4,958,196**  
**TONER RECOVERY DEVICE**  
Masaki Fujii; Hitoshi Tamura; Kaninori Suzuki, all of Hachioji, and Noboru Hatakeyama, Sagamiyama, all of Japan, assignors to Konica Corporation, Tokyo, Japan  
Filed Nov. 8, 1988, Ser. No. 268,414  
Claims priority, application Japan, Nov. 10, 1987, 62-282187  
Int. Cl.<sup>5</sup> G03G 21/00  
U.S. Cl. 355-298 2 Claims



1. A toner recovery device, wherein toner on the surface of an image carrying member of an image forming apparatus is removed by a cleaning member and collected in a container, the image forming apparatus including a stationary member having a toner inlet end and an opposite end, the device comprising:  
driving means for reciprocatingly moving the container along the stationary member; and  
bumper means fixed to the stationary member for colliding with the container when the container moves towards the opposite end for applying negative acceleration to stop the movement of the container.

**4,958,197**  
**CLEANING BLADE WITH A SURFACE ACTIVE ANTISTATIC AGENT**  
Hiroshi Kinashi, Kyoto; Itaru Kawabata, Kashiwara; Hidenobu Yamane; Yoshiharu Tsujimoto, both of Yamatokoriyama; Shioya Gotoh, Wakayama, and Masayoshi Nawa, Wakayama, all of Japan, assignors to Sharp Kabushiki Kaisha and Kao Corporation, both of Osaka, Japan  
Filed Oct. 26, 1988, Ser. No. 262,953  
Claims priority, application Japan, Oct. 30, 1987, 62-277041; Oct. 30, 1987, 62-277042  
Int. Cl.<sup>5</sup> G03G 21/00  
U.S. Cl. 355-299 14 Claims

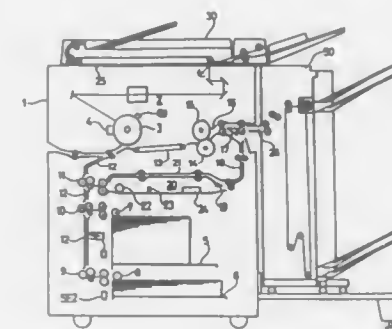
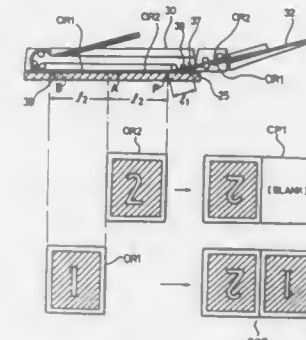


1. A cleaning blade for an image forming apparatus that includes an image-receiving photosensitive surface into contact with which the blade is movable for cleaning toner from the photosensitive surface, said cleaning blade comprising:  
a rubber elastomer; and  
a surface active antistatic agent forming a unitary part of said blade and disposed for contact with the photosensitive surface when said blade is moved into contact with said photosensitive surface so as to prevent an accumulation of electric charges on said cleaning blade and thereby facilitate maintenance of a layer of toner particles on said blade for imparting to the blade sufficient lubrication to minimize damage to the blade as the blade contacts the photosensitive surface.

**4,958,198**  
**AUTOMATIC DOCUMENT FEEDER AND A COPYING APPARATUS EQUIPPED WITH SUCH AN AUTOMATIC DOCUMENT FEEDER**  
Wataru Hamakawa, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Continuation of Ser. No. 328,062, Mar. 23, 1989, Pat. No. 4,914,472, which is a continuation of Ser. No. 184,662, Apr. 21, 1988, which is a division of Ser. No. 95,954, Sep. 14, 1987, Pat. No. 4,831,413. This application Oct. 13, 1989, Ser. No. 421,408  
Claims priority, application Japan, Sep. 18, 1986, 61-217954  
Int. Cl.<sup>5</sup> G03G 21/00; G03B 27/32  
U.S. Cl. 355-309 12 Claims

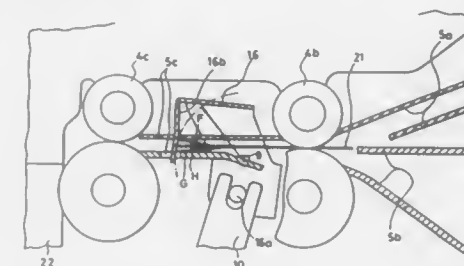
1. In a copying apparatus comprising a document feeding means for feeding a document to an exposure station and for discharging the document from the exposure station after exposure, image forming means for forming an image of the document on a copy sheet, sheet feeding means for feeding a copy sheet to the image forming means, and sheet re-feeding means for re-feeding the copy sheet having said image formed thereon to said image forming means, a method for controlling the copying apparatus comprising the steps of:  
feeding a first document to said exposure station;  
feeding a copy sheet to said image forming means;  
forming said image of the first document on a half area of one surface of the copy sheet;  
discharging said first document from the exposure station and feeding a second document to the exposure station;  
re-feeding said copy sheet to said image forming means; and

forming an image of the second document on the other half area of said one surface of the copy sheet;



the image of the first document and the image of the second document thereby being formed side by side on said copy sheet.

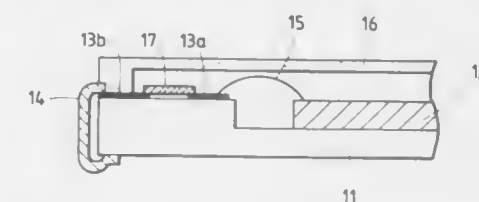
**4,958,199**  
**PRINTING APPARATUS WITH REGISTRATION POSITIONING PLATE**  
Hideaki Yamashita; Tadashi Hayamizu, and Kiichiro Tanaka, all of Fukuoka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan  
Filed Oct. 19, 1988, Ser. No. 259,825  
Claims priority, application Japan, Oct. 20, 1987, 62-264478  
Int. Cl.<sup>5</sup> G03G 21/00  
U.S. Cl. 355-317 2 Claims



1. A printing apparatus comprising:  
(A) a photoconductor;  
(B) carrying means for carrying a recording medium by frictional force to said photoconductor in relation to rotation of said photoconductor; and  
(C) a positioning plate which is supported to be shifted by a plunger between two positions; a first position being that which temporarily stops carrying of said recording me-

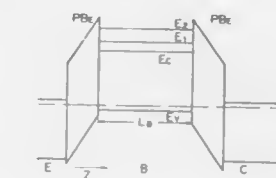
dium for position alignment by touching the edge of said recording medium and a second position being that which allows carrying freely of said recording medium, a touching part of said positioning plate to said recording medium is curved as an arc having its axis on the axis of swing of said positioning plate.

**4,958,200**  
**OVERCURRENT PROTECTION CIRCUIT FOR SEMICONDUCTOR DEVICE**  
Takeshi Sekiguchi, Kanagawa, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan  
Filed Jul. 20, 1988, Ser. No. 221,599  
Claims priority, application Japan, Jul. 21, 1987, 62-181553; Jul. 21, 1987, 62-181554; Jul. 21, 1987, 62-181555  
Int. Cl.<sup>5</sup> H01L 39/22, 23/48, 23/02  
U.S. Cl. 357-5 4 Claims



1. A semiconductor device, comprising:  
a semiconductor package;  
a semiconductor chip, having electrode pads, disposed inside of said package;  
outer terminals disposed on the outside of said package; and  
current flow paths electrically connecting said electrode pads with said outer terminals, at least portion of said current flow paths being made of a superconducting material maintained at a temperature lower than the critical temperature of said superconducting material and having a critical current value that is lower than the maximum allowable current value of said semiconductor chip so that the electrical resistance value of said superconducting material will change from zero to a finite value before the maximum allowable current value of said semiconductor chip is reached so as to cause a voltage drop across said superconducting material thus reducing the power dissipated by said semiconductor chip.

**4,958,201**  
**RESONANT TUNNELING MINORITY CARRIER TRANSISTOR**  
Takashi Mimura, Machida, Japan, assignor to Fujitsu Limited, Kawasaki, Japan  
Continuation of Ser. No. 722,053, Apr. 11, 1985, abandoned.  
This application Jun. 5, 1987, Ser. No. 59,216  
Claims priority, application Japan, Apr. 17, 1984, 59-075885; Apr. 17, 1984, 59-075886; May 31, 1984, 59-109436  
Int. Cl.<sup>5</sup> H01L 29/205, 29/72  
U.S. Cl. 357-16 39 Claims



1. A semiconductor device comprising:



- an n-type collector region having a conduction band having a first electron energy level;
- a collector barrier region formed contacting said collector region, having a thickness capable of allowing tunneling therethrough, having a conduction band having a second electron energy level higher than said first electron energy level;
- a base region formed of a semiconductor having a p-type conductivity, formed contacting said collector barrier region, having a base width capable of generating discrete energy levels for minority carriers in said base region, and having a conduction band having a third electron energy level lower than said second electron energy level;
- an emitter barrier region formed contacting said base region, having a thickness capable of allowing tunneling therethrough, and having a conduction band having a fourth electron energy level higher than said third electron energy level;
- an n-type emitter region formed contacting said emitter barrier region, for supplying minority carriers to said base region through said emitter barrier region and having a conduction band having a fifth electron energy level lower than said fourth electron energy level;
- a first potential barrier to said minority carriers existing between said collector region and said base region;
- a second potential barrier to said minority carriers existing between said base region and said emitter region; and
- bias means for controlling the relative potentials of said emitter and base regions such that said minority carriers are transferred by tunneling from said emitter region via at least one of said discrete energy levels in said base region to said collector region.

4,958,202

# SEMICONDUCTOR LIGHT-EMITTING DEVICE AND METHOD OF MANUFACTURING THE SAME

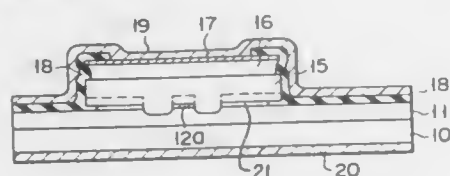
Jun'ichi Kinoshita; Motoyasu Morinaga, both of Yokohama; Hideto Furuyama, Tokyo, and Yazo Hirayama, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 95,114, Sep. 11, 1987. This application Jul. 20, 1989, Ser. No. 382,345

Claims priority, application Japan, Sep. 12, 1986, 61-213800; Sep. 16, 1986, 61-215814; Sep. 30, 1986, 61-231852  
Int. Cl.<sup>3</sup> H01L 33/00, 27/14

U.S. Cl. 357-17

6 Claims



6. A semiconductor light-emitting device comprising:
- a substrate having a first semiconductor layer of a first conductivity type;
- a mesa portion having a second semiconductor layer of a second conductivity type provided above said first semiconductor layer;

conductor layer, the first and second semiconductor layers forming two material etched spaces therebetween;

an elongated active region formed between said first and second semiconductor layers and between the material etched spaces, the active region having a predetermined width and comprising a semiconductor having an energy gap narrower than that of said first and second semiconductor layers, and contributing to emission of light;

two elongated semiconductor regions located at both sides in a width direction of said active region and having an energy gap wider than that of the active region, each semiconductor region including an inner surface contacted with the active region, and an etching stop outer surface which defines one side of said material etched space and prevents the active region from being etched away; and

first and second electrodes respectively provided on said substrate and said mesa portion.

4,958,203

# HIGH ELECTRON MOBILITY TRANSISTOR

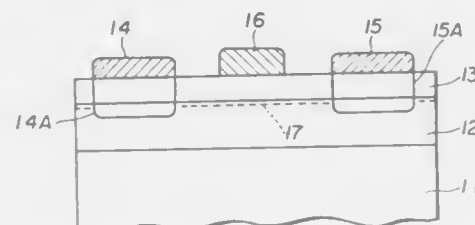
Masahiko Takikawa, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 2, 1987, Ser. No. 115,925

Claims priority, application Japan, Oct. 31, 1986, 61-258147  
Int. Cl.<sup>3</sup> H01L 29/80

U.S. Cl. 357-22

4 Claims



1. A high electron mobility transistor comprising:
- a semiinsulating substrate;
- an undoped channel layer having an electron affinity, an energy gap and being formed on said semiinsulating substrate, said channel layer comprising an undoped III-IV family compound;
- a doped carrier supplying layer formed on said undoped channel layer, said doped carrier supplying layer comprising doped cadmium zinc sulfide (CdZnS) which forms a lattice matching layer with said undoped channel layer and has an electron affinity smaller than that of said undoped channel layer and an energy gap greater than that of said undoped channel layer; and
- source, drain and gate electrodes formed on said doped carrier supplying layer.

4,958,204

# JUNCTION FIELD-EFFECT TRANSISTOR WITH A NOVEL GATE

Richard A. Blanchard, Los Altos, and Adrian I. Cogan, San Jose, both of Calif., assignors to Siliconix Incorporated, Santa Clara, Calif.

Continuation of Ser. No. 112,843, Oct. 23, 1987, abandoned.  
This application Dec. 21, 1989, Ser. No. 453,367

Int. Cl.<sup>3</sup> H01L 29/80

U.S. Cl. 357-22

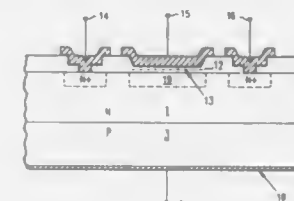
7 Claims

1. A junction field effect transistor comprising:
- a semiconductor substrate of a first conductivity type;
- a semiconductor region of a second conductivity type opposite the first conductivity type formed overlying the substrate and having a principal surface;
- a source region of the second conductivity type being more

heavily doped than the semiconductor region, and formed in the semiconductor region and extending to the principal surface;

a drain region of the second conductivity type being more heavily doped than the semiconductor region, and formed in the semiconductor region and extending to the principal surface;

an insulating layer including charged ions therein overlying a portion of the principal surface between the source region and drain region;



- a first conductive gate electrode overlying the insulating layer; and
- a second conductive gate electrode formed on a surface of the semiconductor substrate;
- whereby application of a voltage to the first and second conductive gate electrode induces a depletion region in a portion of the semiconductor region underlying the insulating layer.

4,958,205

# THIN FILM TRANSISTOR ARRAY AND METHOD OF MANUFACTURING THE SAME

Mamoru Takeda, Hirakata; Ichiro Yamashita, Katano, and Isamu Kitahiro, Yawata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 845,120, Mar. 27, 1986, abandoned.

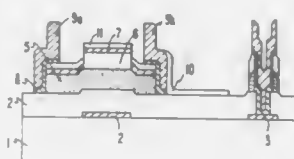
This application Apr. 29, 1988, Ser. No. 188,623

Claims priority, application Japan, Mar. 29, 1985, 60-63413; Mar. 29, 1985, 60-63414

Int. Cl.<sup>3</sup> H01L 27/12, 29/78, 23/48

U.S. Cl. 357-23.7

5 Claims



1. A thin film transistor array comprising:
- a transparent insulating substrate;
- a gate electrode disposed on said substrate and having a predetermined pattern;
- a gate insulating layer disposed on said substrate and covering said gate electrode;
- a semiconductor layer disposed on said gate insulating layer;
- a protective insulating layer disposed on a portion of said semiconductor layer and having a pattern that is the same as that of said gate electrode, the protective insulating layer disposed on said semiconductor layer overlying the gate electrode disposed on the substrate with said patterns thereof aligned;
- an impurity-doped semiconductor layer part of which is disposed on said semiconductor layer and part of which is disposed on said protective insulating layer, the part of said impurity-doped semiconductor layer disposed on said semiconductor layer being isolated from the part of said

impurity-doped semiconductor layer disposed on said protective insulating layer;

a metal layer disposed on said impurity-doped semiconductor layer; and

source and drain electrodes disposed on said metal layer beside, but not extending into an area directly above a thin film transistor channel portion of the transistor array.

4,958,206

# DIFFUSED BIT LINE TRENCH CAPACITOR DRAM CELL

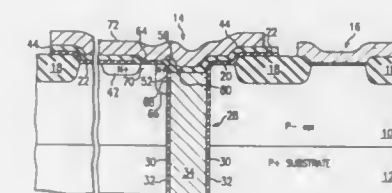
Clarence W. Teag; Robert R. Doering, and Dirk Anderson, all of Plano, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 28, 1988, Ser. No. 212,452

Int. Cl.<sup>3</sup> H01L 29/78, 29/06, 27/12

U.S. Cl. 357-23.6

15 Claims



1. A memory cell formed in a semiconductor layer of a first conductivity type, comprising:
- a trench formed into a face of said semiconductor layer, said face substantially planar about said trench;
- sidewalls of said trench having a storage insulator formed thereon to define a trench hole;
- a conductive capacitor electrode formed in said trench hole and having an upper surface;
- a portion of said storage insulator removed from a selected side of said sidewalls to create a gap extending downwardly from said upper surface by a predetermined depth;
- a conductive plug formed in said gap to electrically couple said electrode to said semiconductor layer; and
- a pass gate transistor, a diffused region of said transistor formed to be of a second conductivity type and formed in said semiconductor layer adjacent said plug.

4,958,207

# FLOATING DIODE GAIN COMPRESSION

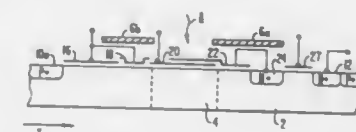
Paul P. Suni, San Mateo, and David D. Wen, Santa Clara, both of Calif., assignors to Loral Fairchild Corporation, Syoset, N.Y.

Filed Mar. 17, 1989, Ser. No. 324,923

Int. Cl.<sup>3</sup> H01L 29/78, 27/14, 31/00; G11C 19/28

U.S. Cl. 357-24

15 Claims



1. Imaging apparatus in a semiconductor substrate comprising:
- a mobile charge generation area in said substrate;
- an overflow barrier in said substrate adjacent said charge generation area;
- an overflow collection area in said substrate adjacent said overflow barrier, said overflow collection area retaining

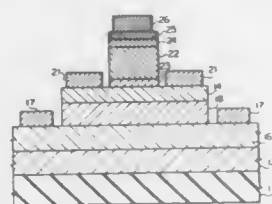
said overflowed charge and connected to said overflow barrier so that when mobile charge carriers enter the collection area said overflow barrier is adjusted to permit less mobile charge from overflowing said barrier; a shift register for receiving charge from said mobile charge generation area; and reset apparatus for draining charge away from said overflow collection area.

**4,958,208**  
**BIPOLAR TRANSISTOR WITH ABRUPT POTENTIAL DISCONTINUITY IN COLLECTOR REGION**  
Shin-Ichi Tanaka, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Aug. 8, 1988, Ser. No. 230,592  
Claims priority, application Japan, Aug. 12, 1987, 62-202107; Aug. 31, 1987, 62-218820; Dec. 4, 1987, 62-308147  
Int. Cl.<sup>5</sup> H01L 29/72

U.S. Cl. 357—34

28 Claims



1. A bipolar transistor comprising:
  - (a) an emitter region having a first conductivity type;
  - (b) a base region having a second conductivity type opposite in polarity to said first conductivity type, an emitter-base junction formed between said emitter region and said base region; and
  - (c) a collector region having a first collector section formed of a first compound semiconductor material and a second collector section formed of a second semiconductor material of said first conductivity type, a base-collector region formed between said base region and said first collector section, an abrupt potential discontinuity formed between said first collector section and said second collector section due to a difference in electron affinity between said first and second compound semiconductor materials, wherein said second semiconductor material is smaller than said first semiconductor material in a bandgap at said abrupt potential discontinuity, said first and second collector section being formed of a non-doped gallium arsenide and an n type indium arsenide, respectively.

**4,958,209**  
**VARICAP DIODE STRUCTURE**  
George H. S. Rokos, Herts, Great Britain, assignor to STC plc, London, England

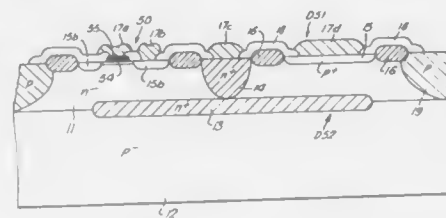
Filed May 5, 1989, Ser. No. 348,256  
Claims priority, application United Kingdom, May 10, 1988, 8810972

Int. Cl.<sup>5</sup> H01L 29/92, 29/06, 29/72, 27/02  
U.S. Cl. 357—34

2 Claims

1. An integrated circuit incorporating a varicap diode structure adjacent a polysilicon emitter bipolar transistor in a common device region, the circuit including:
  - (1) a lightly doped p-type semiconductor substrate having a lightly doped n-type epitaxial layer disposed on a major surface thereof;
  - (2) a heavily doped n-type layer disposed between the substrate and the epitaxial layer and providing a buried layer, said buried layer forming a pn junction with the substrate whereby to provide a first varicap diode;
  - (3) a heavily doped n-type sinker extending through the

epitaxial layer to the buried layer and providing electrical contact to a central region thereof;  
(4) heavily doped p<sup>+</sup>-type regions disposed in the surface of the epitaxial layer and each forming a pn junction therewith, one said p<sup>+</sup>-type region providing a second varicap diode and a further said p<sup>+</sup>-type region forming a base contact of the bipolar transistor, said p<sup>+</sup>-type regions having been formed simultaneously via a polysilicon mask,

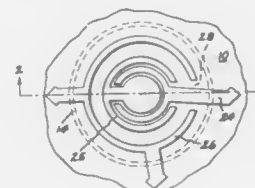


- (5) a shallow lightly doped p-type region disposed in the surface of the epitaxial layer and contiguous with the further p<sup>+</sup>-type region, said shallow p-type region providing a base of said bipolar transistor;
- (6) a polysilicon body disposed on said shallow p-type region and providing the emitter of said bipolar transistor said polysilicon body comprising part of said polysilicon mask, and
- (7) a metallisation pattern providing contact to the polysilicon emitter body, the n<sup>+</sup>-type sinker and said one and said further p<sup>+</sup>-type regions.

**4,958,210**  
**HIGH VOLTAGE INTEGRATED CIRCUITS**  
Surinder Krishna, Ballston Lake, N.Y.; Manuel L. Toranzo, Jr., Richardson, Tex., and Michael S. Adler, Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.  
Continuation of Ser. No. 514,752, Jul. 18, 1983, abandoned, which is a continuation of Ser. No. 2,378, Jan. 10, 1979, abandoned, which is a continuation of Ser. No. 870,217, Jan. 17, 1978, abandoned, which is a continuation of Ser. No. 703,095, Jul. 6, 1976, abandoned. This application Nov. 20, 1989, Ser. No. 440,457

Int. Cl.<sup>5</sup> H01L 29/72, 27/04, 29/34, 23/48  
U.S. Cl. 357—34

10 Claims



1. A monolithic integrated circuit including a semiconductor substrate with an epitaxial layer thereover, said layer having an active semiconductor device formed therein and electrically isolated from other devices in said layer, said active semiconductor device including electrode means insulatingly overlying said layer and conducting a selected region of said active semiconductor device, and a region of higher conductivity than said layer substantially enclosing said selected region except a region of lower conductivity lying substantially directly beneath said electrode means, said electrode means thereby not crossing said higher conductivity region and thereby avoiding premature avalanche breakdown in the semiconductor device of said monolithic integrated circuit upon

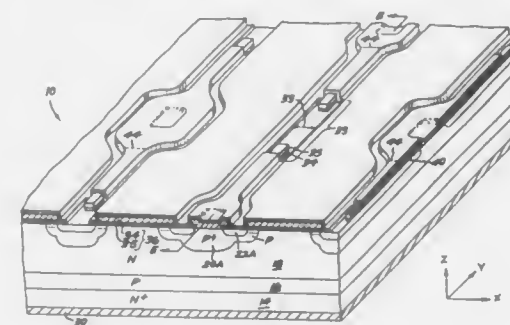
application of bias voltages to said device via said electrode means.

**4,958,211**  
**MCT PROVIDING TURN-OFF CONTROL OF ARBITRARILY LARGE CURRENTS**  
Victor A. Temple, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 1, 1988, Ser. No. 239,678  
Int. Cl.<sup>5</sup> H01L 29/74

U.S. Cl. 357—38

39 Claims

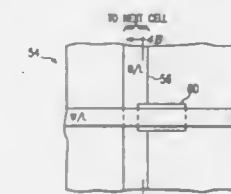


1. A MOS controlled thyristor comprising:
  - first and second power electrodes;
  - a body of semiconductor material having first and second opposed major surfaces, said body including:
    - a first emitter region of one type conductivity extending to said first major surface,
    - a first base region of opposite type conductivity disposed adjacent to and forming a first PN junction with said first emitter region,
    - a second base region of said one type conductivity disposed adjacent to and forming a second PN junction with said first base region,
    - a second emitter region of said opposite type conductivity disposed adjacent to and forming a third PN junction with said second base region, extending to said second major surface of said body and disposed in ohmic contact with said second power electrode,
    - a source region of one type conductivity disposed within said second emitter region, extending to said second major surface of said body and disposed in ohmic contact with said second power electrode,
    - said second emitter region including:
      - a first relatively high doping concentration portion, and
      - a channel portion having a lower doping concentration, said channel portion being disposed adjacent to said second surface and extending between said source and second base regions;
  - an insulated gate electrode disposed on said second major surface and extending from said source region to said second base region across said channel portion of said second emitter region for controlling the conduction of one type conductivity carriers through said channel portion of said second emitter region between said source region and said second base region;
  - said second base region, said channel region and said source region comprising a turn-off FET, said turn-off FET exhibiting a first resistance R<sub>1</sub> between said second base region and said second power electrode; and
  - a resistor disposed in the current path between said first portion of said second emitter region and said second power electrode, said resistor having a second resistance R<sub>2</sub>, R<sub>2</sub> ≥ R<sub>1</sub>/10.

**4,958,212**  
**TRENCH MEMORY CELL**  
Clarence W. Teng, Plano; William F. Richardson, Richardson; Robert R. Doering, Plano; Ashwin H. Shah, Dallas; Bing W. Shen, Richardson, all of Tex., and Mark Bordelon, Melbourne Beach, Fla., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 30, 1988, Ser. No. 292,285  
Int. Cl.<sup>5</sup> H01L 29/34, 27/04, 29/78  
U.S. Cl. 357—54

14 Claims



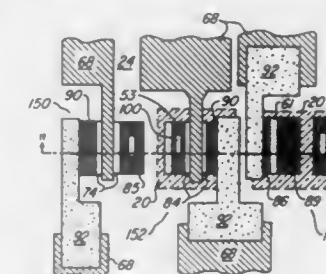
1. A memory cell, comprising:
  - a semiconductor substrate having a trench formed therein;
  - a conductor overlying said trench and extending into said trench; and
  - a conductive region including a linear portion extending primarily tangentially to but not overlapping said trench.

**4,958,213**  
**METHOD FOR FORMING A TRANSISTOR BASE REGION UNDER THICK OXIDE**  
Robert H. Eklund, Plano, and Robert H. Havemann, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 129,271, Dec. 7, 1987, abandoned. This application Jun. 12, 1989, Ser. No. 366,224  
Int. Cl.<sup>5</sup> H01L 29/04, 27/02

U.S. Cl. 357—59

11 Claims

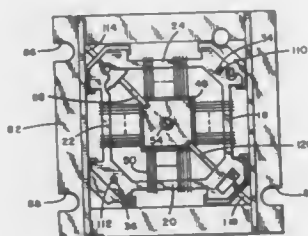


1. An integrated circuit structure formed into a semiconductor body, comprising:
  - a MOS transistor body, comprising:
    - a source region of a first conductivity type diffused into said semiconductor body;
    - a drain region of said first conductivity type diffused into said semiconductor body;
    - a gate dielectric overlying a channel region disposed between said source and drain regions; and
    - a gate electrode, comprising doped polycrystalline silicon and overlying said gate dielectric; and
  - a bipolar transistor, comprising:
    - a collector region of a second conductivity type disposed within said semiconductor body at a distance away from said MOS transistor;
    - a base region of said first conductivity type disposed within said collector region;



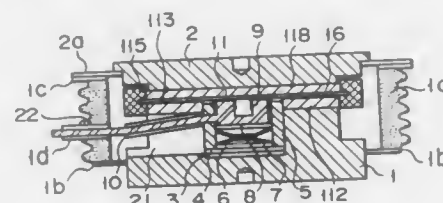
an emitter region of said second conductivity type disposed within said base region;  
a base dielectric in contact with said base and emitter regions, the thickness of said base dielectric being greater than the thickness of said gate dielectric of said MOS transistor;  
an emitter electrode comprising doped polycrystalline silicon and in contact with said base dielectric, and making contact to said emitter region through a contact via formed through said base dielectric; and  
a base contact region of said first conductivity type disposed within said base region, said base contact region having substantially the same depth as said source and drain regions of said MOS transistor and being self-aligned to said emitter electrode; and  
wherein the portion of said emitter electrode in contact with said base dielectric has substantially the same thickness and conductivity as said gate electrode.

4,958,214  
**PROTECTIVE CARRIER FOR SEMICONDUCTOR PACKAGES**  
Richard D. Ries, St. Paul; Dewey W. Smith, Fridley, and Spero Payton, Golden Valley, all of Minn., assignors to Control Data Corporation, Minneapolis, Minn.  
Filed Apr. 22, 1988, Ser. No. 184,780  
Int. Cl.<sup>5</sup> H01L 23/54, 23/12  
U.S. Cl. 357-74 12 Claims



1. A carrier assembly for releasably supporting a semiconductor package including a package body and a plurality of leads extended from the body, said carrier assembly including:  
a rigid carrier, and a retaining means mounted movably with respect to said carrier for releasably securing a semiconductor package against movement in a longitudinal direction relative to the carrier, with a plurality of electrically conductive leads of said semiconductor package disposed at least proximate a selected surface of said carrier, said leads having end portions remote from a package body of said semiconductor package;  
a lead interconnection means, attached to said leads at the end portions thereof, for substantially fixing said end portions with respect to one another; and  
a first registration means integral with said lead interconnection means, and a second registration means integral with said carrier, said first and second, registration means positioned to engage one another to releasably secure said interconnection means against transverse movement relative to said carrier and thereby cooperate with said retaining means to positionally align said end portions of said leads with respect to said carrier.

4,958,215  
**PRESS-CONTACT FLAT TYPE SEMICONDUCTOR DEVICE**  
Shinjiro Kojima, Chigasaki; Hideo Matsuda; Masami Iwasaki, both of Yokohama, and Yoshinari Uetake, Sagami-hara, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Jul. 25, 1989, Ser. No. 384,801  
Claims priority, application Japan, Aug. 9, 1988, 63-198558  
Int. Cl.<sup>5</sup> H01L 23/42, 23/44, 23/46, 23/48  
U.S. Cl. 357-79 1 Claim

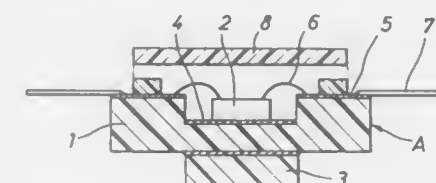


1. A press contact flat-type semiconductor device including an anode electrode post, a cathode post and a hollow insulating cylinder sandwiched therebetween, the semiconductor device comprising:  
a gate electrode connection section provided on a side of the hollow insulating cylinder;  
a disc disposed between the cathode electrode post and the anode electrode post, the disc comprising a metal selected from the group consisting of molybdenum and tungsten;  
a pellet disposed between the disc and the cathode electrode post, the pellet including an anode electrode and a cathode electrode located on the anode electrode post and the cathode electrode post, respectively, and a gate electrode disposed on a central portion of the pellet;  
a first, relatively thin metal sheet comprising soft copper disposed between the pellet and the cathode electrode post;  
a second metal sheet comprising hard copper disposed between the first metal sheet and the cathode electrode post, wherein the anode electrode post, the metal disc, the pellet, the first metal sheet, the second metal sheet and the cathode electrode post are disposed in pressing contact with each other without the respective surfaces thereof being joined;  
a gate lead disposed between the cathode electrode post and the gate electrode of the pellet, the gate lead being electrically insulated from the cathode electrode post; and  
an elastic body disposed between the cathode electrode post and the gate electrode of the pellet, the gate lead and the elastic body being disposed in pressing contact with each other.

4,958,216  
**PACKAGE FOR HOUSING SEMICONDUCTOR ELEMENTS**  
Jun Tanaka; Hitoshi Oikawa; Yoshinobu Kunitomo, and Masami Terasawa, all of Kokubu, Japan, assignors to Kyocera Corporation, Kyoto, Japan  
Filed May 24, 1988, Ser. No. 198,111  
Claims priority, application Japan, Mar. 23, 1987, 62-69554; May 25, 1987, 62-127398; May 30, 1987, 62-136995  
Int. Cl.<sup>5</sup> H01C 23/30 16 Claims

1. A package for housing at least one semiconductor element, which comprises an insulating substrate having in the interior thereof a cavity for attaching and housing the semiconductor elements and a lid member covering said cavity, wherein the insulating substrate is composed of a mullite sintered body comprising 70 to 95% by weight of mullite and 5 to

30% by weight, as the total content, of silica (SiO<sub>2</sub>) and at least one member selected from the group consisting of magnesia (MgO) and calcia (CaO), and SiO<sub>2</sub>, MgO and CaO are present in the following composition expressed by % by weight based on the three components:

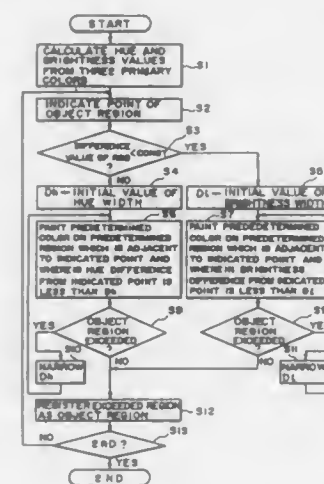


$$100 > \text{SiO}_2 \geq 60,$$

$$40 \geq \text{MgO} \geq 0 \text{ and}$$

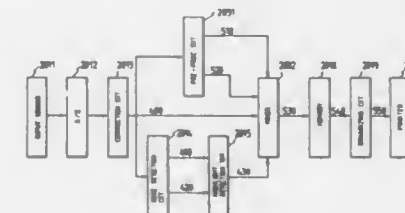
$$40 \geq \text{CaO} \geq 0.$$

4,958,217  
**IMAGE PROCESSING APPARATUS AND METHOD CAPABLE OF EXTRACTING A PARTICULAR IMAGE AREA USING EITHER HUE OR BRIGHTNESS**  
Hiroyuki Kimura; Takeshi Kobayashi, both of Yokohama; Makoto Katsuma, Wako; Kazunobu Urushihara, Inagi; Susumu Matsumura, Yokohama, and Hiroshi Ohmura, Wako, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 17,587, Feb. 24, 1987, abandoned. This application Jul. 27, 1989, Ser. No. 386,004  
Claims priority, application Japan, Feb. 27, 1986, 61-040424  
Int. Cl.<sup>5</sup> H04N 1/46  
U.S. Cl. 358-75 24 Claims



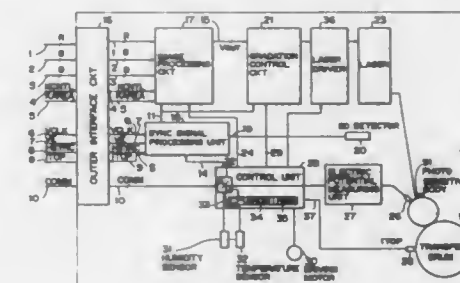
1. An image processing apparatus comprising:  
input means for entering color image information;  
designation means for designating a particular hue value in said color image information; and  
extraction means for extracting an image area from said color image information, based on said particular hue value, said particular hue value being determined from the hue value of a particular position in said color image information.

4,958,218  
**IMAGE PROCESSING METHOD AND APPARATUS WITH DOT-PROCESSING**  
Akihiro Katayama, Kawasaki, and Hidefumi Ohsawa, Urawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Dec. 15, 1988, Ser. No. 284,603  
Claims priority, application Japan, Dec. 16, 1987, 62-319810; Dec. 16, 1987, 62-319811; Dec. 28, 1987, 62-334974  
Int. Cl.<sup>5</sup> H04N 1/46  
U.S. Cl. 358-75 25 Claims



1. An image processing apparatus comprising:  
input means for inputting plural color image data;  
first processing means for performing a dotting process on each of the color image data input by said input means such that density data of plural pixels are processed to concentrate a density to a predetermined pixel in a predetermined area consisting of said density data of plural pixels;  
second processing means for quantizing the color image data dotting-processed by said first processing means; and  
outputting means for outputting a color image obtained by said second processing means,  
wherein said first processing means performs the dotting process by changing for each color a position of the predetermined pixel in the predetermined area to which the density is concentrated such that a dot position of each output color image does not overlap with others, and  
wherein said second processing means quantizes the color image data in which the density is concentrated on the pixel position in said predetermined area, the pixel position for each color being different from others.

4,958,219  
**COLOR IMAGE FORMING APPARATUS**  
Toshihiro Kadowaki, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Jan. 18, 1989, Ser. No. 298,352  
Claims priority, application Japan, Jan. 19, 1988, 63-010137  
Int. Cl.<sup>5</sup> H04N 1/46 50 Claims



1. A color image forming apparatus comprising:  
(a) input means for entering plural input color component

signals and an output color component control signal, wherein said output color component control signal is input independently of said input color component signals; (b) process means for processing said plural input color component signals for obtaining plural output color component signals for obtaining plural output color component signals specific to the apparatus; and (c) control means for controlling the output color component signals from said process means, according to said output color component control signal.

4,958,220

# COLOR IMAGING APPARATUS PRODUCING VISUALLY MATCHED DISPLAYS OF PERCEPTUALLY DISTINCT REPRODUCED IMAGES

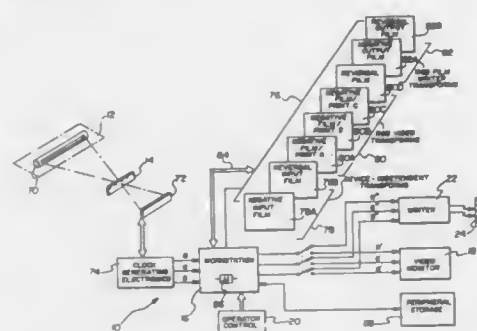
Paula J. Alessi, Webster; William H. Faul, Pittsford; Edward J. Giorgianni, Rochester; Donald A. Koop, Macedon, and Thomas E. Madden, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 27, 1988, Ser. No. 290,676

Int. Cl.<sup>5</sup> H04N 1/46

U.S. Cl. 358—76

6 Claims



1. In color image reproduction apparatus including a video monitor for displaying a reproduced image to appear on any of a variety of image-receptive output media in which perceptible color of the reproduced image varies from one type of output medium to the next, wherein the improvement comprises:

control means coupled to said video monitor and arranged for manipulating a first set of signals corresponding to an original input image, to produce a second set of signals corresponding to a reproduced image relating to a modification of the original image, said control means further being arranged for showing on said video monitor a series of displays of the reproduced image with each reproduced image shown being visually matched to the reproduced image as it would appear on a particular one of the image-receptive output media.

4,958,221

# DIGITAL COLOR COPYING MACHINE COMPRISING A TEST MODE FOR MAKING A COLOR ADJUSTMENT

Toshio Tsuboi; Shigeru Moriya, and Keiji Nakatani, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Nov. 7, 1989, Ser. No. 432,586

Claims priority, application Japan, Nov. 8, 1988, 63-283246; Nov. 8, 1988, 63-283247

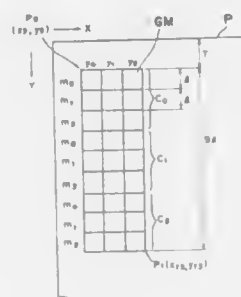
Int. Cl.<sup>5</sup> H04N 1/46

U.S. Cl. 358—80

26 Claims

1. A digital color copying machine comprising: image reading means for scanning an original document image and generating image data; color correcting means for making a color correction for the image data generated by said image reading means; image forming means for forming the original document

image on a recording medium in response to the image data generated by said color correcting means; area indicating means for indicating a partial area of the original document image; memory means for storing the image data corresponding to the partial area indicated by said area indicating means; inputting means for manually inputting the number of test images to be formed; and



control means for controlling said image forming means so as to form plural test images of the indicated partial area of said number having different color balances on said recording medium by reading out said image data stored in said memory means and applying said read out image data to said color correcting means.

4,958,222

# SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

Hiroshi Takakura, Kawasaki; Tetsuya Iida, Yokohama, and Junko Goto, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

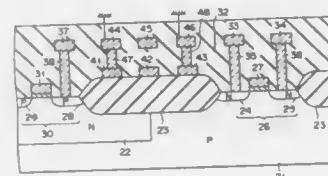
Filed Jun. 9, 1989, Ser. No. 363,759

Claims priority, application Japan, Jun. 10, 1988, 63-141769

Int. Cl.<sup>5</sup> H01L 25/04, 23/48, 29/52, 29/46

U.S. Cl. 357—84

8 Claims



1. A semiconductor integrated circuit device comprising: a semiconductor body; an insulating layer formed on the semiconductor body; a first conductive layer disposed within the insulating layer; a first wiring constituting part of the first conductive layer and extending through the interior of the insulating layer in a predetermined direction, the first wiring being used for transmission of a first predetermined signal; second and third wirings constituting part of the first conductive layer and extending through the interior of the insulating layer in parallel to the first wiring, the second and third wirings being located on respective sides of the first wiring while each being isolated therefrom by a predetermined distance, the second and third wirings for being maintained at first and second predetermined potentials, respectively; a second conductive layer disposed within the insulating layer; a fourth wiring constituting part of the second conductive layer and extending through the interior of the insulating layer in parallel to the first wiring, the fourth wiring being

located above the first wiring while being isolated therefrom by a predetermined distance, the fourth wiring being used for transmission of a second predetermined signal; a fifth wiring constituting part of the second conductive layer and extending through the interior of the insulating layer in parallel to the second wiring, said fifth wiring being located above the second wiring while being isolated therefrom by a predetermined distance, the fifth wire being located on a side of the fourth wiring while being isolated therefrom by a predetermined distance, and the fifth wiring being maintained at a third predetermined potential; a sixth wiring constituting part of the second conductive layer and extending through the interior of the insulating layer in parallel to the third wiring, the sixth wiring being located above the third wiring while being isolated therefrom by a predetermined distance, the sixth wiring being located on a side of the fourth wiring while being isolated therefrom by a predetermined distance, and the sixth wiring being maintained at a fourth predetermined potential;

a seventh wiring constituting part of the second conductive layer, said seventh wiring being located on a side of the fifth wiring which is opposite to the side where the fourth wiring is located and being isolated therefrom by a predetermined distance, the seventh wiring extending through the interior of the insulating layer in parallel to the fifth wiring and being used for transmission of a third predetermined signal;

an eighth wiring constituting part of the second conductive layer, the eighth wiring being located on a side of the sixth wiring which is opposite to the side where the fourth wiring is located and being isolated from the sixth wiring by a predetermined distance, the eighth wiring extending through the interior of the insulating layer in parallel to the sixth wiring and being used for transmission of a fourth predetermined signal;

a first connecting electrode located between the second and fifth wirings and extending parallel thereto, the first connecting electrode electrically connecting the second and fifth wirings; and

a second connecting electrode located between the third and sixth wirings and extending parallel thereto, the second connecting electrode electrically connecting the third and sixth wirings.

4,958,223

# INSPECTION OF CONTAINER FINISH

John W. Juvinall, Ottawa Lake, Mich., and Robert C. Redmond, Toledo, Ohio, assignors to Owens-Brockway Glass Container Inc., Toledo, Ohio

Division of Ser. No. 245,236, Sep. 16, 1988. This application Dec. 11, 1989, Ser. No. 448,531

Int. Cl.<sup>5</sup> H04N 5/335

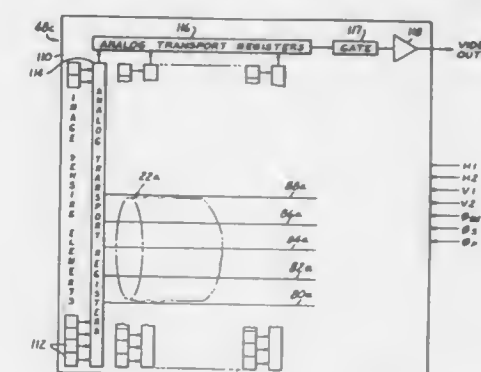
U.S. Cl. 358—106

12 Claims

1. A high-speed computer-controlled camera system comprising:

a camera including an image array sensor containing a matrix of CCD image sensing elements arranged in a row-and-column array, a plurality of first transport registers each connected in sequence to sensing elements in one of said rows and responsive to first clock signals for loading information for associated said elements, a second transport register connected to said first transport registers in sequence for receiving image information therefrom, said first transport registers being collectively responsive to second clock signals for loading information into said second transport register corresponding to each column of said image sensing elements in sequence, output means for receiving said information from said second transport register, said second transport register being responsive to third clock signals for transmitting information in sequence to said output means, said output means being

responsive to fourth clock signals for providing a video output signal from said sensor, and image processing means including input means responsive to input control signals for selectively receiving and storing image data in said video output signal, and means for



selectively and independently generating said first, second, third and fourth clock signals and said input control signal for selectively integrating image data by row and column at said sensor, downloading image data from said sensor to said image processing means, and receiving and storing image data at said image processing means.

4,958,224

# FORCED CORRELATION/MIXED MODE TRACKING SYSTEM

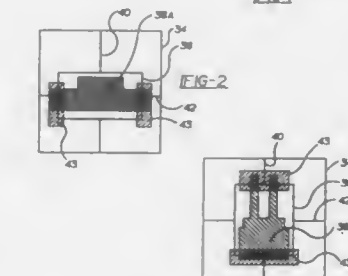
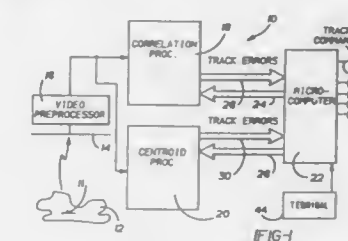
Robert G. Lepore, Simi Valley; Hannelore G. Hansen, Sepulveda, and Vivien Y. Steinman, Chatsworth, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 15, 1989, Ser. No. 394,024

Int. Cl.<sup>5</sup> H04N 7/18

U.S. Cl. 358—126

7 Claims



1. A tracking system comprising: a detector for providing video image signals of a scene containing a target and background clutter; means for digitizing the video image signals into binary pixels; a centroid processor capable of generating track error signals along a horizontal and vertical axes as a function of the centroid of objects in the scene; a correlation processor capable of generating track error



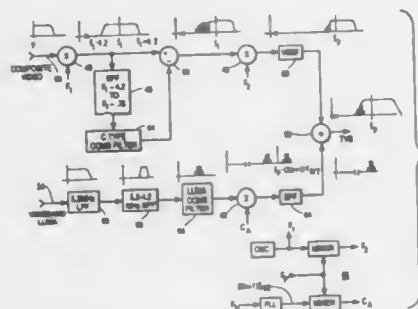


4,958,230

**METHOD OF TRANSMITTING AUXILIARY INFORMATION IN A TELEVISION SIGNAL**  
Krishnamurthy Jonnalagadda, Plainsboro, James J. Gibson, and Theodor M. Wagner, both of Princeton, all of N.J., assignors to General Electric Company, Princeton, N.J.  
Filed Aug. 11, 1989, Ser. No. 392,820  
Int. Cl.<sup>5</sup> H04N 7/00

U.S. Cl. 358—186

14 Claims



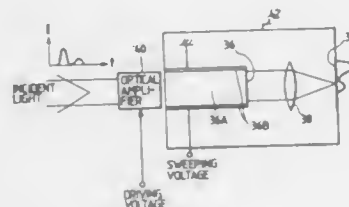
1. Apparatus for augmenting a television signal having information occurring at a horizontal line rate  $f_H$ , with an auxiliary signal, said apparatus comprising:  
respective means for providing a video signal and an auxiliary signal;  
means for providing a picture carrier of frequency  $f_p$ ;  
means responsive to said picture carrier and said video signal for generating a vestigial sideband modulated RF video signal;  
means responsive to said picture carrier and said auxiliary signal for generating an RF auxiliary signal having an RF carrier outside of the frequency spectrum occupied by said vestigial sideband modulated RF video signal, and having a sideband representing said auxiliary signal, occurring in the frequency spectrum occupied by the vestigial sideband of said vestigial sideband RF video signal; and  
means for including said sideband of said RF auxiliary signal exclusive of said RF carrier, in the vestigial sideband spectrum of said RF video signal.

4,958,231

**ELECTRO-OPTICAL STREAK CAMERA**  
Yutaka Tsuchiya, Shizuoka, Japan, assignor to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan  
Filed May 12, 1989, Ser. No. 351,159  
Claims priority, application Japan, May 13, 1988, 63-116734  
Int. Cl.<sup>5</sup> H04N 5/30

U.S. Cl. 358—211

22 Claims



1. An electro-optical streak camera for measuring a light signal comprising:  
an optical amplifier for amplifying the light signal under measurement to provide an amplified light signal;  
an electro-optical deflector for deflecting the amplified light signal; and

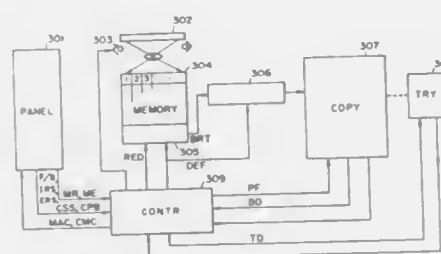
means for detecting the deflected light signal.

4,958,232

**PROCESS APPARATUS FOR PROCESSING MEMORY WHICH STORES INFORMATION**  
Susumu Sugiura, Yamato; Tadashi Sato, Kokubunji, and Norio Nakajima, Hachioji, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 159,547, Feb. 22, 1988, abandoned, which is a continuation of Ser. No. 45,233, May 4, 1987, which is a continuation of Ser. No. 910,785, Sep. 23, 1986, abandoned, which is a continuation of Ser. No. 842,712, Mar. 19, 1986, abandoned, which is a continuation of Ser. No. 775,116, Sep. 12, 1985, abandoned, which is a continuation of Ser. No. 706,974, Mar. 1, 1985, abandoned, which is a continuation of Ser. No. 586,646, Mar. 7, 1984, Pat. No. 4,505,576, which is a continuation of Ser. No. 390,025, Jun. 18, 1982, which is a continuation of Ser. No. 201,537, Oct. 28, 1980, abandoned. This application Jun. 21, 1989, Ser. No. 369,619  
Claims priority, application Japan, Oct. 30, 1979, 54-140783  
Int. Cl.<sup>5</sup> G03G 15/00

U.S. Cl. 358—300

32 Claims

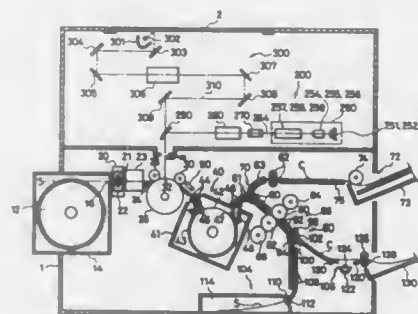


1. An image processing apparatus for handling a memory capable of storing a plurality of image informations comprising:  
(a) storage means for causing said memory to store the image informations as page information;  
(b) read out means for sequentially reading out and outputting the page information stored in said memory therefrom; and  
(c) control means for controlling said storage means and said read out means so as to provide control such that plural pages of image information are stored in said memory means and the plural pages of image information stored in said memory are sequentially read out therefrom, wherein said control means comprises:  
(A) counting means for sequentially counting the number corresponding to the pages of the image information stored by said storage means;  
(B) second storage means for storing the number counted by said counting means; and  
(C) read out control means for providing control such that read out of the plural pages of image information stored in said memory is performed based on the number stored in said second storage means so as to sequentially read out the plural pages of image information stored in said memory therefrom at the time of read out from said memory by said read out means.

4,958,233

**DIGITAL AND ANALOG IMAGE RECORDING APPARATUS**  
Yoshihara Okino, Kanagawa, Japan, assignor to Fujii Photo Film Co., Ltd., Kanagawa, Japan  
Filed Apr. 15, 1988, Ser. No. 181,953  
Claims priority, application Japan, Apr. 15, 1987, 62-90646  
Int. Cl.<sup>5</sup> G01D 15/14; H04N 1/21; G03B 41/00  
U.S. Cl. 358—302

8 Claims

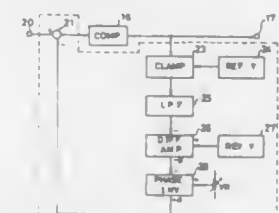


1. An image recording apparatus, comprising:  
a photosensitive material developable into three colors;  
an analog exposure unit comprising a source of visible light directed at an original and a first set of optics for directing light reflected from said original to said photosensitive material; and  
a digital exposure unit comprising first and second respective light sources, individually modulated by first and second image signals, and respectively emitting modulated first and second beams of infrared radiation in first and second wavelength bands and a second set of optics for combining and directing said first and second beams to said photosensitive material, wherein said photosensitive material is developable into first and second colors in response to application of said first and second wavelength bands of said first and second beams, respectively, and wherein said light reflected from said original and said first beam simultaneously irradiate said photosensitive material.

4,958,234

**DISTORTION ELIMINATING CIRCUIT**  
Hirohisa Yamaguchi, Tokyo, and Akira Mashimo, Tokorozawa, both of Japan, assignors to Teac Corporation, Japan  
Filed Oct. 18, 1988, Ser. No. 259,152  
Claims priority, application Japan, Oct. 21, 1987, 62-265555  
Int. Cl.<sup>5</sup> H04N 9/87  
U.S. Cl. 358—327

9 Claims



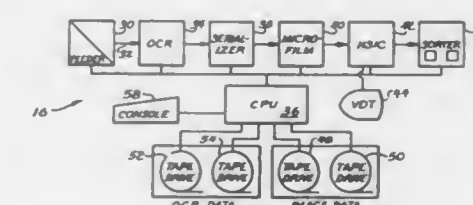
1. A distortion eliminating circuit for eliminating a harmonic distortion from an input frequency modulated signal containing the harmonic distortion comprising:  
comparator means supplied with said input frequency modulated signal and for producing a signal of output pulses corresponding to the input frequency modulated signal

containing the harmonic distortion by shaping the input frequency modulated signal on the basis of comparison with a predetermined reference voltage;  
smoothing means supplied with said output pulses from the comparator means for obtaining a d.c. output signal having a level corresponding to an average level of said output pulses by filtering the output pulses of the comparator means;  
detection means supplied with said d.c. output signal from the smoothing means and detecting a d.c. component corresponding to the harmonic distortion in said frequency modulated signal; and  
mixing means supplied with said d.c. component and further with said input frequency modulated signal for producing second frequency modulated signal having an adjusted level by mixing said d.c. component to the input frequency modulated signal and for supplying said second frequency modulated signal to said comparator means, said comparator means being supplied with said second frequency modulated signal and producing a second output pulses from which the effect of the harmonic distortion is eliminated.

4,958,235

**SYSTEM AND METHOD FOR RAPIDLY CONVEYING DOCUMENT IMAGES BETWEEN DISTANT LOCATIONS**  
Richard L. Sims, London; Billy S. Baker, Corbin; Randy G. Dotson; Robert J. York, both of Somerset, and Joey A. Herrell, London, all of Ky., assignors to Appalachian Computer Services, London, Ky.  
Filed Jan. 5, 1989, Ser. No. 293,923  
Int. Cl.<sup>5</sup> H04N 1/00  
U.S. Cl. 358—402

30 Claims



1. A system for rapidly conveying the images contained on each of a plurality of documents from a first location to a second location distant from said first location, said system comprising:  
record generating means for generating a record for each document at said first location, said record including computer readable control data and a digital bit map representative of the image of each document; said record generating means including:  
optical character recognition means for reading a portion of each document and producing computer readable control data representative thereof;  
scanning means for scanning said documents to provide a serial bit map representative of the images of each document; and  
combining means for combining said control data and said serial bit map into said record;  
first recording means coupled to said record generating means for recording said records on a first storage medium;  
first reading means also at said first location for reading said records from said first storage medium;  
transmission means coupled to said first reading means for transmitting said records from said first location to said second location;  
receiving means at said second location for receiving said records  
second recording means coupled to said receiving means for recording said records on a second storage medium;



second reading means at said second location for reading said records from said second storage medium; and means for reproducing said images contained on said documents coupled to said second reading means responsive to said retrieval serial bit map of digital data.

**4,958,236**  
**IMAGE PROCESSING METHOD AND APPARATUS THEREFOR**

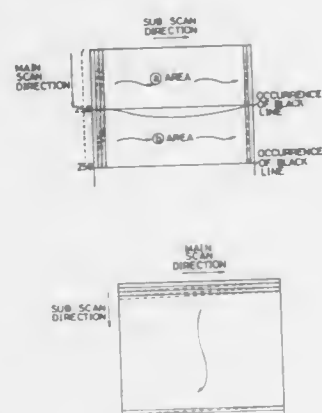
Nao Nagashima, Yokohama; Hiroyuki Ichikawa, Tokyo, and Akihiro Katayama, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 8, 1988, Ser. No. 203,880  
Claims priority, application Japan, Jun. 11, 1987, 62-146311; Jun. 11, 1987, 62-146312; Jun. 11, 1987, 62-146313; Jun. 11, 1987, 62-146314; Jun. 11, 1987, 62-146315; Jun. 11, 1987, 62-146316; Jun. 11, 1987, 62-146317

Int. Cl.<sup>3</sup> H04N 1/40

U.S. Cl. 358—445

70 Claims



1. An image processing apparatus comprising: reading means for reading an image by dividing the image into plural areas, and for providing image data; and process means for performing a quantization process on the image data obtained from said reading means to obtain record data to be used in a recording, wherein said process means performs, in the recording, a quantization process of the image data to give continuity to the plural areas read by said reading means.

**4,958,237**  
**METHOD OF MAKING ENLARGED PRINTS BY SUBDIVIDING AN ORIGINAL IMAGE AND INTERPOLATING THE SUBDIVIDED IMAGE**

Kazufumi Kubota, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

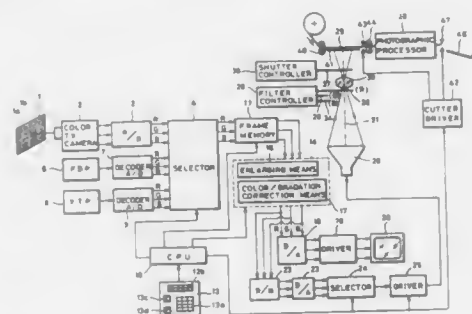
Filed Nov. 9, 1988, Ser. No. 269,086  
Claims priority, application Japan, Nov. 9, 1987, 62-282515  
Int. Cl.<sup>3</sup> H04M 1/393

U.S. Cl. 358—451

15 Claims

1. A method of making a large size of print, comprising the steps of:  
storing video signals of an image of an original in memory areas of a memory, wherein said memory areas correspond to a matrix of smaller divisions of said original;  
dividing said image of said original into said smaller divisions by reading said video signals from said memory areas of said memory, respectively;  
processing said video signals read out from each of said memory areas for enlargement;  
making a hard copy of an enlarged image of each of said

smaller divisions of said original in response to said processed video signals; and



arranging said hard copies of said enlarged images of all said smaller divisions of said original to thereby form a large print of said original.

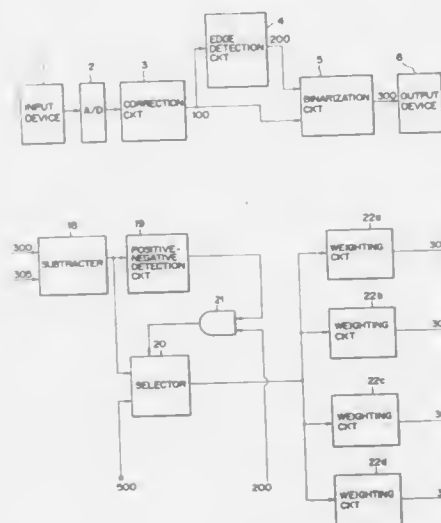
**4,958,238**  
**IMAGE PROCESSING METHOD AND APPARATUS WITH CONDITIONAL CORRECTION OF ERROR DATA**

Akihiro Katayama, Kawasaki, and Hideo Ohsawa, Kawaguchi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 6, 1989, Ser. No. 319,057  
Claims priority, application Japan, Mar. 8, 1988, 63-054621  
Int. Cl.<sup>3</sup> H04N 1/40

U.S. Cl. 358—456

23 Claims



1. An image processing apparatus comprising:  
input means for inputting image data indicative of a concentration of an image;  
binarizing means for binarizing the image data input by said input means;  
correction means for correcting error data generated when the image data is binarized by said binarizing means;  
control means for controlling whether or not correction of the error data is to be performed by said correction means; and  
state detecting means for detecting a state of the error data, wherein said control means controls said correction means, in accordance with a detection result obtained by said state detecting means, such that said correction means performs correction of the error data in a portion other

than an edge portion of the image and does not perform correction of the error data in the edge portion of the image.

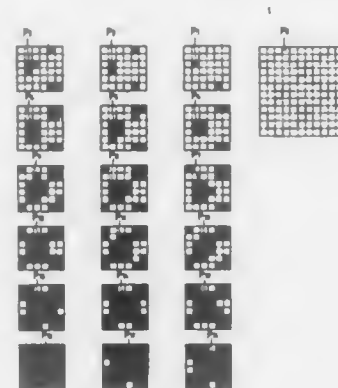
**4,958,239**  
**METHOD OF GRADATION AND SELECTION OF MICRO PICTURE ELEMENTS THEREFOR IN A PICTURE DISPLAY**

Kunio Yamada; Shigeru Tsukada, and Masao Seki, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Feb. 22, 1989, Ser. No. 313,416  
Claims priority, application Japan, Feb. 25, 1988, 63-43101  
Int. Cl.<sup>3</sup> G03F 3/08

U.S. Cl. 358—457

2 Claims



2. A picture display method wherein a picture signal is reproduced as a picture image comprising a plurality of contiguous dots wherein each dot is represented by a corresponding picture element having a small area and each of the picture elements is further divided into micro picture elements each having a micro area and wherein a dot is printed as a selected one of a plurality of different gradations wherein each gradation is represented by coloring selected ones of the micro picture elements of the picture element corresponding to the dot, the method comprising the steps of:

converting the picture signal into a corresponding set of digital picture signals, each of said digital picture signals having a value indicating an image intensity;  
storing for every possible gradation of a picture element a pattern of micro picture elements to be colored wherein the number of colored micro picture elements of contiguous elements that are in point-contact with each other is not larger than two;  
selecting for each of said digital picture signals a gradation corresponding to the image intensity value thereof; and  
forming on a recording medium a dot for each of said selected gradations to form a representation of the picture signal.

**4,958,240**  
**ORIGINAL READING APPARATUS APPLYING A LAMP VOLTAGE TO CORRECT LAMP BLACKENING**

Shunichi Abe, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

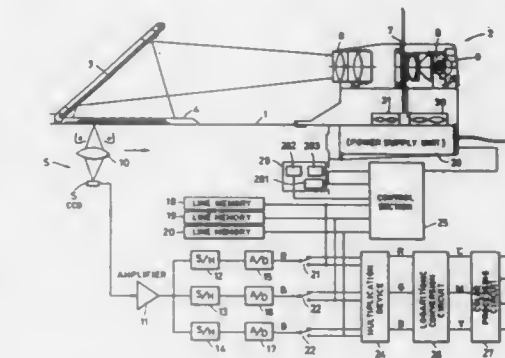
Filed May 25, 1988, Ser. No. 198,515  
Claims priority, application Japan, May 25, 1987, 62-127798  
Int. Cl.<sup>3</sup> H04M 1/04

U.S. Cl. 358—475

9 Claims

1. An original reading apparatus comprising:  
a lamp for illuminating an original;  
reading means for reading an image formed on the original illuminated by said lamp; and  
control means adapted to apply to said lamp a first predetermined voltage after reading of the image formed on the

original has been completed, if a voltage applied to said lamp at the time of the original image reading is lower



than a second predetermined voltage, said first predetermined voltage being higher than said voltage applied to said lamp at the time of the original image reading.

**4,958,241**  
**IMAGE INPUT APPARATUS**

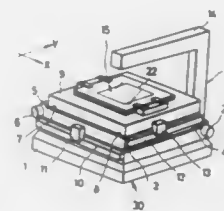
Fumio Ohtomo; Hiroyuki Frusho; Shinichi Nakamura, and Toshifumi Mihashi, all of Tokyo, Japan, assignors to Kabushiki Kaisha Topcon, Tokyo, Japan

Filed Jun. 9, 1989, Ser. No. 363,762  
Claims priority, application Japan, Jun. 16, 1988, 63-146802; Jun. 16, 1988, 63-146803

Int. Cl.<sup>3</sup> H04M 1/04

U.S. Cl. 358—487

21 Claims

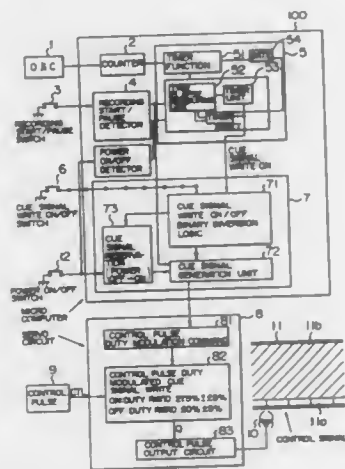


1. An image input apparatus for converting an image on an image source into digital information, comprising:  
an image sensor located at a position relative to the image source, the image sensor having a photosensitive surface of a predetermined size;  
first means for projecting two-dimensional image segments into which the image is divided, in a predetermined sequence onto the photosensitive surface of the image sensor, each of the image segments having a size corresponding to the predetermined size of the photosensitive surface;  
the image sensor converting an image segment projected on the photosensitive surface into an electric signal;  
second means for converting the electric signal into digital information of an array of pixels regarding the projected image segment;  
the second means including means for minifying the converted digital information at a predetermined minification ratio to form minimized information of a sampled image of the image segment in such a manner that a value of one of each of  $N \times N$  arrays of pixels may be sampled to form the sampled image and then the sampled image may be formed by averaging the value of each of  $N \times N$  arrays of pixels; and

third means including means for holding the relative position between the image source and the image sensor for an interval of time required for the second means to convert the electric signal into the digital information.

**4,958,242**  
**CUE SIGNAL RECORDING CONTROL SYSTEM FOR VIDEO TAPE RECORDER**  
Morio Aoki, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 12, 1989, Ser. No. 364,460  
Claims priority, application Japan, Jun. 15, 1988, 63-145706  
Int. Cl.<sup>5</sup> G11B 5/02, 27/02  
U.S. Cl. 360—27 7 Claims



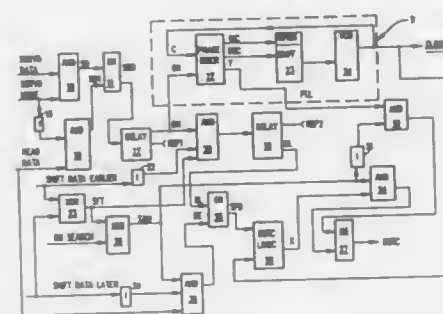
1. A cue signal recording system for a video tape recording apparatus comprising means for generating a cue signal; means for recording the cue signal generating means on a control track of a video tape when recording is enabled; and control means for activating said cue signal generating means only upon occurrence of a predetermined event, said control means including a timer function unit, a detector unit for detecting the recording mode and a mode other than said recording mode, a date change unit responsive to the detector unit for delivering a cue signal write ON command signal when a change of data occurs, and a cue signal generation unit responsive to the output of said data change unit to deliver a cue signal.

**4,958,243**  
**PHASE DISCRIMINATION AND DATA SEPARATION METHOD AND APPARATUS**  
Shin C. Chen, San Jose, and Lionel D. Provazek, Campbell, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 15, 1988, Ser. No. 245,100  
Int. Cl.<sup>5</sup> G11B 5/09 11 Claims

U.S. Cl. 360—51  
1. A method of maintaining read data pulses standardized to a data-synchronized clock, comprising the steps of: delaying the read data pulses a preselected time interval to provide data normal pulses, applying the data normal pulses to a phase-locked loop (PLL) to provide and define the clock, responsive to a control signal indicative of a potentially uncorrectable error, selectively, according to a preselected choice, generating data early pulses corresponding to the read data or generating data late pulses corresponding to further delayed read data pulses, and

selectively clocking out according to said choice bits corresponding to the data early or data late pulses to error

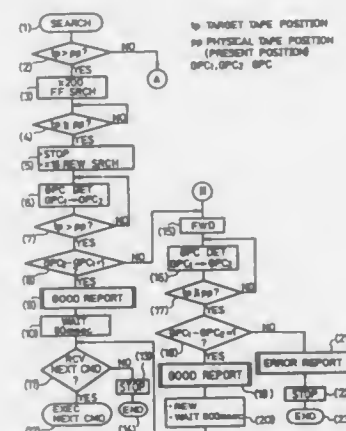


correction circuitry in an attempt to render the error correctable.

**4,958,244**  
**METHOD OF POSITION DETECTION ON A RECORDING MEDIUM**  
Yoshizumi Inazawa, Kanagawa, Japan; Brian Milthorpe, Bristol, United Kingdom, and Bruce Thompson, Ft. Collins, Colo., assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 5, 1989, Ser. No. 294,053  
Claims priority, application United Kingdom, Jan. 8, 1988, 8800352  
Int. Cl.<sup>5</sup> G11B 27/19 10 Claims

U.S. Cl. 360—72.1

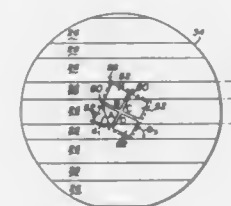


1. A search method for locating a target position on a recording medium on which a plurality of position signals are recorded at intervals, comprising the steps of:

- (a) driving the recording medium in first one direction while detecting the recorded position signals from a position which is fixed relative to the recording medium,
- (b) reversing the direction of recording medium travel when a predetermined recorded position signal corresponding to the target position is detected,
- (c) decreasing the travel speed of the recording medium until the predetermined recorded position signal is again detected,
- (d) repeating steps a-c, inclusive, a predetermined number of times so as to detect the target position on the recording medium, and wherein
- (e) after it is detected that the target position has been last passed, generated a good report signal, without stopping and pausing the recording medium, indicating that the target position has been searched.

**4,958,245**  
**APPARATUS AND METHOD FOR OPTICAL SERVO CONTROL WITH MEDIA HAVING INFORMATION STORAGE AND SERVO CONTROL REGIONS OF DIFFERENT REFLECTIVITIES**  
Maxim Roth, Cupertino; Jimmy D. Godwin, San Jose, and Roger O. Williams, Fremont, all of Calif., assignors to Insite Peripherals, Inc., San Jose, Calif.

Filed Apr. 7, 1988, Ser. No. 178,542  
Int. Cl.<sup>5</sup> G11B 5/596  
U.S. Cl. 360—77.03 33 Claims



1. An apparatus for extracting servo control information from a magnetic information storage medium containing a plurality of reflective areas and a plurality of nonreflective areas which comprises:

- a light source for illuminating a plurality of reflective areas having a first width, and a plurality of nonreflective areas having a second width, on a surface of a magnetic medium;
- a collection lens for focusing an image of at least one of said reflective areas and at least one of said nonreflective areas; and
- a photodetector comprising a first cell, a second cell, a third cell and a fourth cell, said first through fourth cells functioning to generate a first output signal, a second output signal, a third output signal and a fourth output signal, respectively, in response to illumination of said first through fourth cells by said image, and each of said first through fourth cells having approximately identical shapes, said shapes causing said first through fourth output signals to vary continuously as said image moves relative to said first through fourth cells.

**4,958,246**  
**DEVICE OF MULTI-CHANNEL ROTARY HEAD TYPE HAVING FUNCTION TO DISCRIMINATE RECORDED STATE**

Suzumu Kozuki, Tokyo; Hiroyuki Takimoto, Kanagawa; Motokazu Kashida, Tokyo; Koji Takahashi, and Kenichi Nagasawa, both of Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

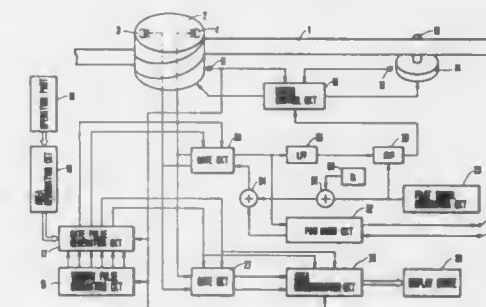
Continuation of Ser. No. 775,495, Sep. 12, 1985, abandoned. This application Dec. 19, 1988, Ser. No. 287,567

Claims priority, application Japan, Dec. 17, 1984, 59-265664; Dec. 17, 1984, 59-265665; Dec. 17, 1984, 59-254666  
Int. Cl.<sup>5</sup> G11B 5/584, 5/09 25 Claims

U.S. Cl. 360—77.15  
1. A rotary head type recording and/or reproducing apparatus, comprising:

- (a) head means for recording and/or reproducing information signals individual in or from a plurality of parallel areas extending in the longitudinal direction of a tape-shaped record bearing medium, said head medium, said head means including a rotary head which is arranged to trace said medium in such a manner as to obliquely traverse said plurality of areas;
- (b) first detection means for at least plurality detecting signals produced from said rotary head;

- (c) second detection means for detecting the rotating phase of said rotary head; and
- (d) discriminating means for outputting a plurality binary signals which respectively indicate a recording condition

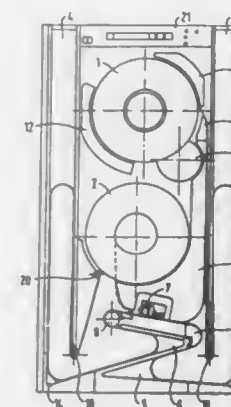


of each of at least two of said plurality of areas according to outputs of said first and second detection means one level of said binary signals indicating that said information signals are recorded, another level of said binary signals indicating that said information signals are not recorded.

**4,958,247**  
**MAGNETIC TAPE RECORDER HAVING TAPE BUFFER VACUUM CHAMBERS AND ANTE CHAMBERS**  
Winfried Gottwald, Krailing, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 573,027, Jan. 23, 1984, abandoned. This application Sep. 23, 1986, Ser. No. 910,822  
Claims priority, application Fed. Rep. of Germany, Jan. 25, 1983, 3302334  
Int. Cl.<sup>5</sup> G11B 15/58, 5/008 6 Claims

U.S. Cl. 360—90

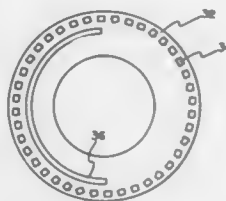


1. A compact magnetic tape recorder affording high speed operation and comprising an upper tape supply reel and a lower tape take-up reel both disposed for rotation and mounted on a longitudinally extended base member, the supply reel disposed longitudinally above the take-up reel, pair of first and second vacuum column buffer chambers disposed at respective opposed lateral sides of said base member and both having downwardly facing open ends, said supply and take-up reels disposed between said buffer chambers, a magnetic head assembly disposed on said base member in between said buffer chambers and longitudinally underlying said take-up reel, a single drive capstan disposed adjacent said magnetic head assembly on said base member, a pair of first and second longitudinally overlapped vacuum antechambers disposed on said base member beneath said magnetic head assembly in between



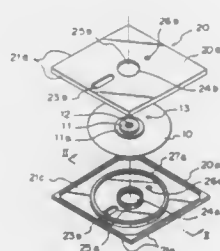
said buffer chambers and partly above said downwardly facing open ends of said buffer chambers, said first and second antechambers having respective openings.

**4,958,248**  
**REFLECTIVE TACHOMETER/HEADWHEEL ASSEMBLY FOR A ROTARY HEAD SCANNER**  
Milan V. Trecka, Pasadena, Calif., assignor to Datatape Incorporated, Pasadena, Calif.  
Filed Dec. 19, 1988, Ser. No. 286,426  
Int. Cl.<sup>5</sup> G11B 5/52, 21/02  
U.S. Cl. 360—107 **3 Claims**



1. Rotary magnetic head scanner apparatus, comprising: a headwheel mounted for rotation about a rotational axis; wherein said headwheel has an annular slot on one side thereof; at least one magnetic head assembly mounted on the periphery of said headwheel; an annular reflective tachometer mounted in said annular slot on said one side of said headwheel; and a radiation source and a radiation sensor mounted on said one side of said headwheel, adjacent to said reflective which is reflected from said reflective tachometer to said radiation sensor, and wherein said sensor develops a signal, in response thereto, which is a function of the rotational position and/or rotational speed of said rotating magnetic heads.

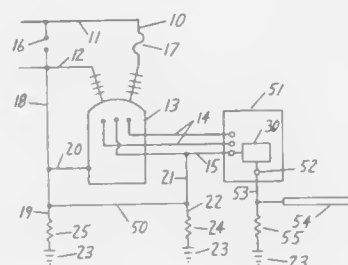
**4,958,249**  
**MAGNETIC RECORDING DISK CARTRIDGE**  
Sadao Kadokura, Hachioji; Kazuhiro Kamel, and Yoshihisa Watanura, both of Hino, all of Japan, assignors to Teijin Limited, Osaka, Japan  
Filed Jul. 18, 1988, Ser. No. 220,272  
Claims priority, application Japan, Jul. 16, 1987, 62-175981; Sep. 22, 1987, 62-236303  
Int. Cl.<sup>5</sup> G11B 23/03  
U.S. Cl. 360—133 **25 Claims**



1. A magnetic recording disk cartridge comprising: a rigid casing means having first and second inner faces confronting one another, and a planar spacing defined between said first and second inner faces; a magnetic recording disk encased in said planar spacing of said rigid casing means to be rotatable about an axis per-

pendicular to said first and second inner faces of said rigid casing means; and a stationary ring-form means for aerodynamically maintaining said magnetic recording disk at an axially middle position of said planar spacing of said rigid casing means when said magnetic recording disk is rotated in said planar spacing, said stationary ring-form means being made of a sliding material and comprising at least a pair of first and second rings arranged within the rigid casing means to confront at least an outer peripheral portion of the magnetic recording disk from both sides thereof, to thereby aerodynamically suppress fluctuation of said magnetic recording disk during the rotation thereof.

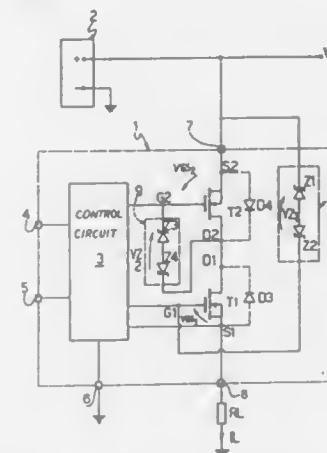
**4,958,250**  
**VOLTAGE ISOLATION APPARATUS FOR SERVICE TRANSFORMERS**  
Edward J. Kotski, 124 Pleasantview Rd., Hackettstown, N.J. 07840  
Filed Aug. 19, 1985, Ser. No. 767,108  
Int. Cl.<sup>5</sup> H02H 7/10  
U.S. Cl. 361—40 **6 Claims**



1. In an electrical power distribution system having a service transformer with primary terminals to which a primary high voltage line and neutral line are connected and secondary terminals to which a high voltage line and a neutral line are connected, a primary grounding line connected between the primary neutral line and ground, and a secondary grounding line connected from the secondary neutral line to ground, the improvement comprising:

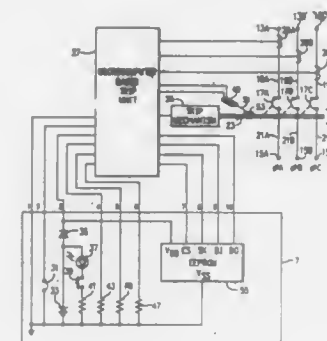
- (a) a pair of high speed triggerable electronic switches connected in parallel with opposite directions of polarity, the parallel combination connected in series with an inductor, the resulting series-parallel combination connected in parallel with a varistor between first and second terminals connected, respectively, to the primary and secondary neutral lines of the transformer, the impedance of each of the switches being normally high in both directions of conduction, and each having a triggering input terminal such that when a triggering pulse is applied to the terminal, the electronic switch provides low impedance theracross in its forward direction of current flow; and
- (b) means responsive to the voltage across the first and second terminals for applying triggering signals to the triggering inputs of the electronic switches such that a respective one of the switches is triggered to conduct in its forward direction when the voltage across the first and second terminals in the respective switch in the forward direction of conduction is greater than a preselected voltage level.

**4,958,251**  
**GUARDED ELECTRONIC CIRCUIT FROM REVERSAL OF ITS SUPPLY BATTERY POLARITY**  
Carlo Cini, Cornaredo, and Bruno Murari, Monza, both of Italy, assignors to SGS-Thomson Microelectronics S.r.l., Milan, Italy  
Filed Jun. 23, 1989, Ser. No. 370,445  
Claims priority, application Italy, Jul. 5, 1988, 21235 A/88  
Int. Cl.<sup>5</sup> H02M 3/12  
U.S. Cl. 361—84 **12 Claims**



1. An electronic circuit guarded against reversal of its supply battery polarity, comprising a first power transistor connected between one pole of said battery and in series with an electric load connected to ground and functioning to drive said electric load to ground, and a second protection transistor connected in series between said pole and the first transistor and becoming non-conducting upon a reversal of the battery polarity.

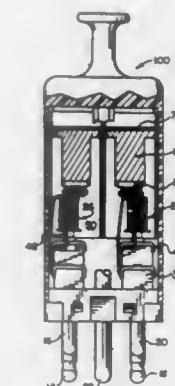
**4,958,252**  
**CIRCUIT BREAKER WITH RATING PLUG HAVING MEMORY**  
William J. Murphy, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Jan. 16, 1990, Ser. No. 465,663  
Int. Cl.<sup>5</sup> H02H 3/08  
U.S. Cl. 361—93 **15 Claims**



1. A circuit breaker for an electrical circuit comprising: an operating mechanism for interrupting current in the electrical circuit when operated; a trip device including a microprocessor which monitors the current in the electrical circuit and generates a trip by automatically operating the operating mechanism to interrupt the current in the electrical circuit when the current exceeds a selectable value; a removable rating plug having means establishing the se-

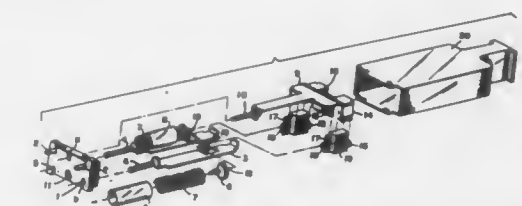
lectable value of the current at which the trip device trips the operating mechanism, and a nonvolatile memory, said microprocessor in said trip device including means generating service data and writing said service data to the non-volatile memory in the removable rating plug.

**4,958,253**  
**LINE PROTECTOR FOR A COMMUNICATIONS CIRCUIT**  
Alexander G. Gilberts, Algonquin, and Wayne Rust, Berwyn, both of Ill., assignors to Reliance Comm/Tec Corporation, Chicago, Ill.  
Filed Oct. 25, 1989, Ser. No. 426,791  
Int. Cl.<sup>5</sup> H02H 9/06  
U.S. Cl. 361—119 **9 Claims**



1. A line protector for a communications circuit comprising: (a) means for connection to ground; (b) a solid state overvoltage arrester having first and second electrodes, said first electrode connected to first and second line terminals; and (c) a conductive pedestal having a first end, said first end receiving said second electrode, and a second end in contact with said ground connection means.

**4,958,254**  
**FIVE PIN PROTECTOR MODULE FOR TELEPHONE CIRCUITS**  
Dan Kidd, Cornish; John J. Naplorkowski, Cape Elizabeth, and Bruce D. Atkinson, Sebago Lake, all of Me., assignors to GTE Products Corp., Stamford, Conn.  
Filed Mar. 31, 1989, Ser. No. 330,852  
Int. Cl.<sup>5</sup> H02H 1/04  
U.S. Cl. 361—119 **3 Claims**



1. A protector module for telephone circuits comprising a cover on an insulative base, the insulative base having first and second input pins, first and second output pins and a grounding pin all extending therefrom; a grounding member disposed within the cover and connected to the grounding pin; a bidirectional voltage sensitive switch (BVSS) disposed within the cover, the BVSS having a first and a second terminal protruding therefrom; an electrically conductive arm connected to the

first input pin and establishing electrical connection between said first input pin and the first terminal of the BVSS; the second terminal of the BVSS being electrically connected to the grounding member; the electrical current path between the first input pin and the first output pin comprising the electrically conductive arm, a current- and/or heat-responsive assembly and an electrically conductive spring; the BVSS having a predetermined closing voltage so that a surge voltage at the first input pin exceeding said predetermined closing voltage will be conducted to the grounding pin instead of to the first output pin; the electrical current path between the first input pin and the first terminal of the BVSS including a metal pin on the current- and/or heat-responsive assembly which is in contact with said first terminal; the first terminal of the BVSS being a heat sink plate; and a sleeve being attached to the heat sink plate, the metal pin extending into the sleeve.

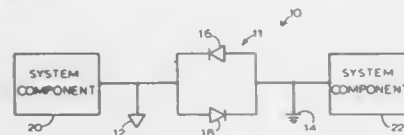
**4,958,255**  
**ELECTROSTATIC DISCHARGE AND ELECTROMAGNETIC INTERFERENCE PROTECTION CIRCUIT**

Thomas B. Pritchard, Vancouver, Wash., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 28, 1988, Ser. No. 291,489  
Int. Cl.<sup>5</sup> H05F 3/00

U.S. Cl. 361—212

14 Claims



1. In an electronic system:  
a first ground;

a second ground; and

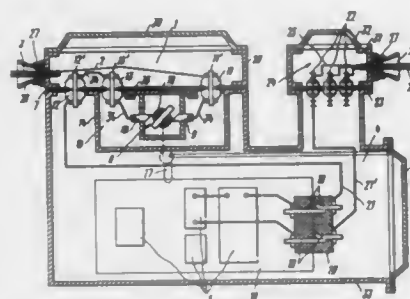
a conductive protection circuit including discharge means connected between said two grounds for conducting electrostatic discharge between said two grounds while providing isolation of electromagnetic interference potentials.

**4,958,256**  
**FLAME-PROOF ELECTRIC DEVICE**  
Alexandr I. Parkhomenko; Vitaly S. Dzjuban, and Eduard P. Moskalov, all of Donetsk, U.S.S.R. assignor to Vsesojuznag Nauchno-Issledovatel'sky Proektiro-Konstruktsionnyy I Tekhnologicheskyy Institut Vozdukhosudarstvennogo I Rukodelnogo Elek Trodovodovariga, Donetsk, U.S.S.R.

Filed Sep. 26, 1989, Ser. No. 412,675  
Int. Cl.<sup>5</sup> H02B 1/04

U.S. Cl. 361—331

7 Claims



1. A flame-proof electric device, comprising:  
a flame-proof lead-in chamber for a power supply cable with a current-conducting core;  
an electric circuitry made up of components of said electric circuitry;

a flame-proof component chamber accommodating therein said components of said electric circuitry;  
a lid on said flame-proof component chamber;  
a flame-proof partition separating said flame-proof lead-in chamber and said flame-proof component chamber;  
an interlocking disconnecting switch mounted on said flame-proof partition, having at least one input terminal and at least one output terminal;  
at least one first lead-through current-conducting terminal mounted on said flame-proof partition for electric connection of said current-conducting core of said power supply cable with said input terminal of said interlocking disconnecting switch, said first lead-through current conducting terminal including insulating parts;  
at least one second lead-through current-conducting terminal mounted on said flame-proof partition, said at least one second lead-through current-conducting terminal including insulating parts;  
at least one third lead-through current-conducting terminal mounted on said flame-proof partition, said at least one third lead-through current-conducting terminal including insulating parts;  
said output terminal of said interlocking disconnecting switch being connected with said components of said electric circuitry within said flame-proof component chamber via a serial connection of said third and second lead-through current-conducting terminals;  
an actuating mechanism operatively connected with said interlocking disconnecting switch and said lid of said flame-proof component chamber;  
a flame-proof casing secured on said flame-proof partition;  
a flame-proof compartment defined by said flame-proof casing, said first and second lead-through current-conducting terminals and said flame-proof partition;  
said interlocking disconnecting switch being accommodated within said flame-proof compartment.

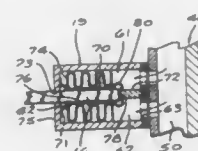
**4,958,257**  
**HEAT CONDUCTING INTERFACE FOR ELECTRONIC MODULE**

Gerhard Wenke, Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 29, 1989, Ser. No. 329,996  
Int. Cl.<sup>5</sup> H05K 7/20

U.S. Cl. 361—385

11 Claims



1. Heat conducting interface apparatus including an electronic module having a body supporting one or more electronic components, heat pipe means within the body in thermal communication with said components, and condenser means at least at one end of the body in thermal communication with the heat pipe means, said interface apparatus comprising:  
a housing having inlet means and outlet means in fluid communication with a liquid coolant supply;  
a flexible, highly heat conductive heat exchange member within said housing receiving said condenser means and having at least one highly heat conductive panel, said heat exchange member and said housing in combination forming at least one liquid coolant circulation chamber in thermal communication with said heat exchange member whereby flexible movement of said heat exchange member occurs in response to elevated fluid pressure within said liquid coolant circulation chamber, wherein said heat exchange member comprises two highly heat conductive

panels separating two liquid coolant circulation chambers in said housing.

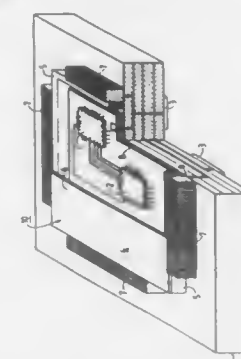
**4,958,258**  
**MODULAR HYBRID MICROELECTRONIC STRUCTURES WITH HIGH DENSITY OF INTEGRATION**

Stephane Charruau, Eysines, France, assignor to Thomson CSF, Paris, France

Filed Dec. 21, 1988, Ser. No. 287,285  
Int. Cl.<sup>5</sup> H05K 1/18, 7/20

U.S. Cl. 361—386

15 Claims



1. A modular, hybrid microelectronic structure with high integration density, comprising active, encapsulated microelectronic components mounted on at least one face of a thick-layer substrate, said structure comprising:  
a first multilayer substrate having on a first face at least one encapsulated microelectronic component, and a first density of individual wiring patterns; and  
supported by a second face of said first substrate, a second multilayer substrate having at least one high integration density component, and a second density of individual wiring pattern of greater density than the first wiring pattern density of the first substrate.

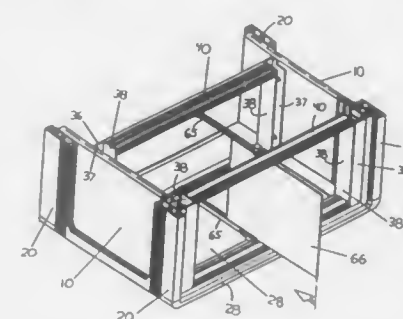
**4,958,259**  
**MULTI-PURPOSE HOUSING**  
Franco Berg, Garbsen, and Claus-Dieter Bovermann, Breidenbach-Niederdielen, both of Fed. Rep. of Germany, assignors to Rittal-Werk Rudolf Loh GmbH & Co., KG, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 102,096, Sep. 29, 1987. This application Dec. 14, 1989, Ser. No. 451,334  
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1986, 3633284

Int. Cl.<sup>5</sup> H05K 5/00

U.S. Cl. 361—394

20 Claims



1. Multi-purpose housing for electrotechnical equipment comprising two identical side walls attached to a top wall and a bottom wall, and attachment means for installation of a component holder, cross supports, slide rails has flange supports

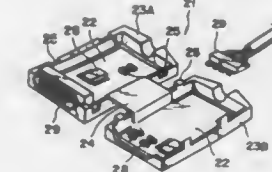
and for attachment of a back wall, a door or an inspection window, wherein each said side wall comprises a side wall component with a corner unit mounted at each terminal vertical side wall of said side wall component; said side wall components have inner surfaces provided with vertically continuous T-grooves spaced at equal intervals from one another; said T-grooves have an inner groove base, and along at least a portion of the vertical height of said T-grooves, said inner groove base has an opening and makes a transition into a continuous screw channel which is generally round in cross section; said corner units are provided with at least one vertically continuous T-groove corresponding to and offset from said T-grooves in said side wall components; and connecting strips with tapped holes and closing strips are insertable into said side wall component T-grooves and said corner unit T-grooves.

**4,958,260**  
**MOLDED CIRCUIT BOARD**  
Kenzo Kobayashi, Ichihara, and Hirokazu Shiroishi, Hiratsuka, both of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 311,462  
Int. Cl.<sup>5</sup> H05K 1/00

U.S. Cl. 361—398

4 Claims



1. A molded circuit board comprising:  
a circuit film having a desired circuit pattern formed thereon; and  
a plurality of resin moldings formed on one side of said circuit film, said resin moldings being molded and spaced at specified distances from adjacent moldings so as to be integrated with and formed in one molding operation with said circuit film, said plurality of resin moldings thus forming at least one molding-free portion being capable of being assembled into a box with only said at least one molding-free portion of said circuit film being bent during assembly into a box.

**4,958,261**  
**DEVICE FOR THE MECHANICAL SHIELDING OF PRINTED CIRCUIT BOARDS, IN PARTICULAR COLOR TELEVISION SET PRINTED CIRCUIT BOARDS**

Dominique Huerre, Angers, France, assignor to Societe Electronique De La Region Pays De Loire, Paris, France

Filed May 8, 1989, Ser. No. 348,512

Claims priority, application France, May 10, 1988, 88 06279  
Int. Cl.<sup>5</sup> H05K 7/02

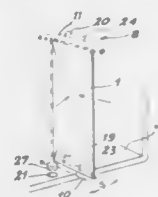
U.S. Cl. 361—417

6 Claims

1. A device for the mechanical shielding of a printed circuit board, in particular a color television set printed circuit board, placed in a casing with a detachable, lateral partition, one of the sides of the board being close to and parallel to said detachable partition, said shielding device comprising a U-shaped strap having a central part and two arms clamping the board on the three sides that are not closed to said detachable partition, said strap having at least two L-shaped lugs respectively associated with a respective one of said two arms which each



freely enter corresponding holes made in the bottom of the casing, each end of said U-shaped strap working together with

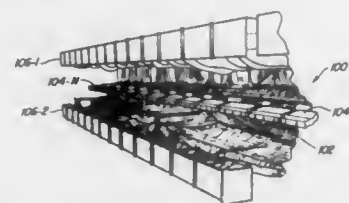


a respective guiding and holding device with limited pivoting, formed on said detachable partition.

**4,958,262**  
**APPARATUS AND METHOD FOR FACILITATING DOUBLE BLOCKING AT A DISTRIBUTING FRAME IN A TELEPHONE CENTRAL OFFICE**  
Harold G. Wilkie, Jr., Flat Rock, Mich., assignor to Michigan Bell Telephone Company, Detroit, Mich.  
Filed Feb. 12, 1988, Ser. No. 155,230  
Int. Cl.<sup>3</sup> H01R 9/00

U.S. Cl. 361-426

20 Claims



1. A method of mounting a new connector block in front of an existing connector block mounted at a distributing frame in a telephone central office, the existing connector block having a connector block housing and a terminal field mounted to the housing and normally lying in a first predetermined plane at the distributing frame, the terminal field being rotatable with respect to the housing, the method comprising:

- rotating the terminal field of the existing connector block away from the first predetermined plane such that the terminal field will be accessible by lying in a second predetermined plane at a preselected angle to the first predetermined plane;
- placing an adaptor bracket having first and second surfaces between the rotated terminal field and a surface of the connector block housing such that the first surface abuts the surface of the housing and the second surface extends at the preselected angle to the first predetermined plane and abuts the terminal field to maintain the terminal field at the preselected angle; and
- placing and supporting said new connector block in front of said existing connector block in a manner allowing continued accessibility to the terminal field of said existing connector block as disposed in said second predetermined plane.

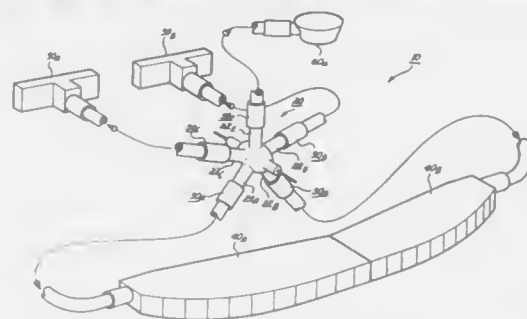
**4,958,263**  
**CENTRALIZED LIGHTING SYSTEM EMPLOYING A HIGH BRIGHTNESS LIGHT SOURCE**  
John M. Daveport, Lyndhurst; William W. Finch, Richmond Heights; Richard L. Hansler, Pepper Pike; Richard C. Nagle, Euclid, and Ronald S. White, Mentor, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.  
Filed Nov. 2, 1988, Ser. No. 266,129  
Int. Cl.<sup>3</sup> F21V 7/04

U.S. Cl. 362-32

37 Claims

- 1. A light source for vehicles comprising:
  - (a) an envelope formed of a light transmissive material and containing light generating means, and
  - (b) light guide means formed of a light transmissive material and merged onto the outer surface of said envelope with-

out substantially altering the shape of said envelope and without substantially extending into said envelope, said light guide means having parameters that are selected

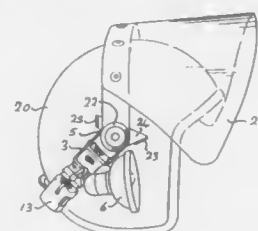


to provide forward, rearward or interior illumination for said vehicle developed by said light generating means.

**4,958,264**  
**HELMET LAMP**  
Jean J. Evendon, 12 Springdale, Barkham Wood, Wokingham, Berkshire RG11 4RZ, England, assignor to Jean J. Evendon, Wokingham, England  
Filed Sep. 8, 1989, Ser. No. 404,406  
Int. Cl.<sup>3</sup> F21L 15/14

U.S. Cl. 362-106

15 Claims



- 1. A lamp for use with a protective helmet having a pivotable visor, the lamp comprising a band extending around a back portion of the helmet and securing means at each end of the band releasably secured to pivots of the visor and a light source mounted on the band.

**4,958,265**  
**SYMMETRICAL COLOR CHANGER SYSTEM**  
Dennis Solomon, Yarmouth Port, Mass., assignor to Altman Stage Lighting Co., Inc., Yonkers, N.Y.  
Continuation of Ser. No. 164,397, Mar. 4, 1988, Pat. No. 4,897,770. This application Aug. 15, 1989, Ser. No. 393,979  
Int. Cl.<sup>3</sup> F21V 9/00

U.S. Cl. 362-293

17 Claims



- 1. A color changer system including a source of white light forming a light beam having a beam axis of propagation and a beam aperture through which the light beam passes, the beam aperture having a center coaxial with the axis of propagation, comprising, in combination, oppositely disposed color filter means positioned adjacent to the beam aperture, said oppositely disposed color filter means including first color filter means positioned adjacent to the beam aperture and second color filter means positioned adjacent to

the beam aperture in substantially the same plane as that of said first color filter means, said first and second color filter means being simultaneously movable across the beam aperture orthogonal to the beam aperture and being adapted to meet in a mid position relative to the center of said beam aperture,

said first and second color filter means further including a plurality of progressive variable filter regions ranging as percents of color filtering capacity relative to a particular color and ranging between 10% and 50% in 10% incremental ranges, each large enough in area to cover the beam aperture area, and the color densities of each filtering region differing from one another but being evenly distributed throughout each filtering region; wherein selected lightwaves are deleted in predetermined amounts in accordance with the positions of said first and second color filter means across said beam aperture so as to enhance said particular color contained in said light beam; and said first and second color filter means being simultaneously movable into the light beam symmetrical to the beam axis of propagation so that distribution of color saturation of the light beam is symmetrical about the center of the beam aperture during movement of said first and second color filter means, whereby a generally even level of color saturation across the beam aperture is achieved during movement of said oppositely disposed color filter means.

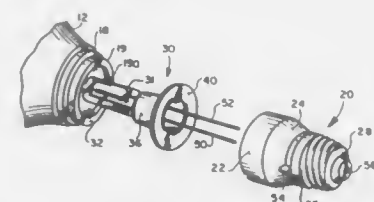
**4,958,266**  
**LAMP HAVING AN IMPROVED BULB MOUNTING MEMBER**  
Robert C. Sorensen, Burr Ridge, and Thomas S. Hendrickson, Crestwood, both of Ill., assignors to RCS Industries, Inc., Alsip, Ill.

Filed Jan. 2, 1990, Ser. No. 459,967

Int. Cl.<sup>3</sup> F21V 7/02

U.S. Cl. 362-310

11 Claims



- 1. A lamp comprising an outer envelope defining a space, said outer envelope including front and rear portions and an opening through said rear portion, a one-piece bulb mounting member including a hollow post and a radially outwardly extending flange formed at one end thereof, said flange being adjacent to said rear portion and said post protruding through said opening and into said space, a bulb secured to the other end of said post and including lead wires extending through the interior of said post, and a lamp base secured to said rear portion and electrically connected to said lead wires.

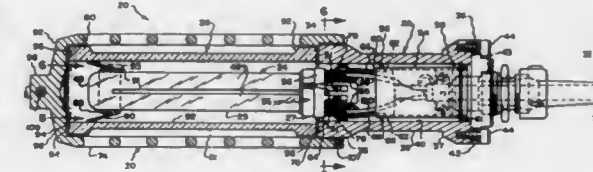
**4,958,267**  
**PORTABLE LAMP**  
Karl A. Baake, Angola, N.Y., assignor to K & H Industries, Inc., Angola, N.Y.  
Division of Ser. No. 177,127, Apr. 4, 1988, Pat. No. 4,885,670. This application Nov. 20, 1989, Ser. No. 439,438  
Int. Cl.<sup>3</sup> F21L 15/12

U.S. Cl. 362-399

4 Claims

- 1. A portable electric lamp comprising: an elongated hand grip having two opposite ends; an electric light-generating portion attached to so as to extend from one end of the hand grip; conducting means for supplying electric power to the light-generating portion including a power cord routed through

the other end of the hand grip for operative connection with the light-generating portion; and



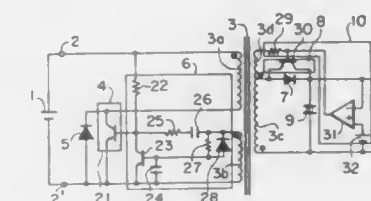
an amount of magnesite base cement positioned in said hand grip and interposed between the light-generating portion and a section of the power cord entering said other end of the hand grip.

**4,958,268**  
**SWITCHING POWER SUPPLY**  
Nobuyoshi Nagagata, Kadoma, and Osamu Hiromura, Yawata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Filed Apr. 5, 1989, Ser. No. 333,310  
Claims priority, application Japan, Apr. 5, 1988, 63-83327; Apr. 28, 1988, 63-106392; Jun. 9, 1988, 63-142117; Dec. 12, 1988, 63-313387

Int. Cl.<sup>3</sup> H02M 3/335

U.S. Cl. 363-116

10 Claims



- 1. A switching power supply comprising: first switching means connected to receive an applied input voltage and for providing an output at which said input voltage is switched on and off; a transformer having a primary winding connected to the output of said first switching means; first rectifying and smoothing means connected to a secondary winding of said transformer; and second switching means operative alternately with respect to said first switching means for releasing the output of said first rectifying and smoothing means back to said secondary winding of said transformer during the off-period of said first switching means, whereby the output of said first rectifying and smoothing means which is applied to said secondary winding is released back to said primary winding of said transformer, and wherein said second switching means is controlled by the output of said first rectifying and smoothing means.

**4,958,269**  
**CURRENT CONTROL FOR MICROPROCESSOR MOTOR DRIVE**  
David Gritter, Racine, Wis., assignor to Eaton Corporation, Cleveland, Ohio  
Filed Jul. 27, 1988, Ser. No. 225,091  
Int. Cl.<sup>3</sup> H02D 5/40; H02P 1/26

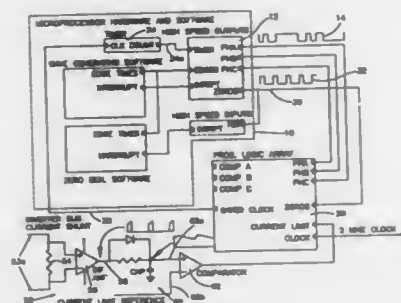
U.S. Cl. 364-153

14 Claims

- 1. A motor control for controlling energization of a multiple phase alternating current motor having multiple motor windings comprising:
  - (a) a programmable controller for providing a shaped, time varying digital energization signal for each phase wherein

the state of the time varying digital energization signal corresponds to an energization state of a motor winding corresponding to that phase;

- (b) a current control circuit for monitoring motor current supplied to said motor, comparing said motor current with a threshold, and generating a modulation output to reduce the frequency and voltage of energization signals coupled to said motor when the motor current exceeds the threshold; and

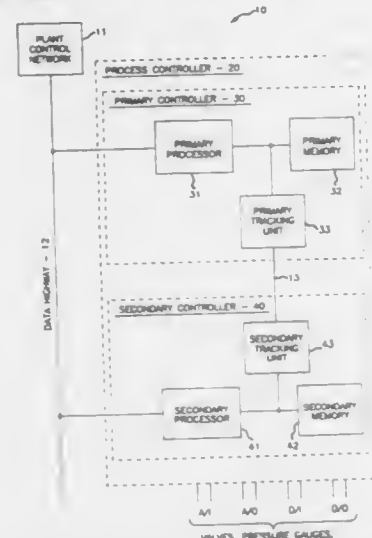


- (c) logic circuitry coupled to the programmable controller and the current control circuit for receiving both the time varying digital energization signals from the programmable controller and the modulation output of said current control circuit and for producing a resultant motor control output for controlling energization of the motor windings, said resultant motor control output reducing motor energization voltage across the motor windings to zero and preventing change in motor energization signals for a duration corresponding to the degree to which the motor current exceeds the threshold.

#### 4,958,270 METHOD FOR CONTROL DATA BASE UPDATING OF A REDUNDANT PROCESSOR IN A PROCESS CONTROL SYSTEM

Paul F. McLaughlin, Hatfield, and Pankaj H. Mody, Horsham, both of Pa., assignors to Honeywell Inc., Minneapolis, Minn.  
Filed Jan. 23, 1989, Ser. No. 299,859  
Int. Cl.<sup>5</sup> G06F 11/20

U.S. Cl. 364—187



1. In a process control system having a process controller, said process controller including a first and second controller, one of said controllers being designated as a primary controller and the other being designated as a secondary controller, each controller having a corresponding image of a data base, and

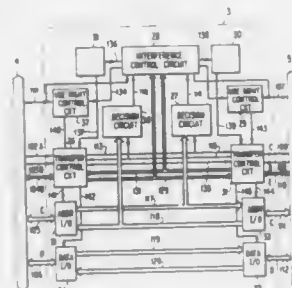
wherein the primary controller is performing predefined control functions of the process control system, a method for updating the data base associated with the secondary controller comprising the steps of:

- performing a predefined control function;
- updating the data base associated with the primary controller as a result of performing the predefined control function;
- capturing predetermined information being stored in the primary data base simultaneously with the step of updating;
- repeating steps (a) through (c) until all the predefined control functions have been performed; and
- transferring the predetermined information captured in step (c) to the secondary controller.

4,958,271  
TRANSFER CONTROL EQUIPMENT  
Shouki Yoshida, and Setsuo Shimada, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan  
Continuation-in-part of Ser. No. 806,861, Dec. 9, 1985, abandoned. This application Oct. 11, 1988, Ser. No. 255,898  
Claims priority, application Japan, Dec. 7, 1984, 59-257637; Mar. 1, 1985, 60-41396; Mar. 1, 1985, 60-41397  
Int. Cl.<sup>5</sup> G06F 13/42

U.S. Cl. 364—200

9 Claims



1. A transfer control unit connected to a plurality of common buses which together form an asynchronous communication system that permits the buses to be selectively operable in synchronism with each other, each of at least a first and second of said common buses having respective bus cycles and being connected to a respective central processing unit (CPU) and one or more respective peripheral units, each of said respective peripheral units having a unit address and being operative to generate transfer requests, said transfer control unit being able to read data, including input/output instructions, from at least one of said central processing units or write said data into at least one of said central processing units and one of said peripheral units, said transfer control unit comprising:

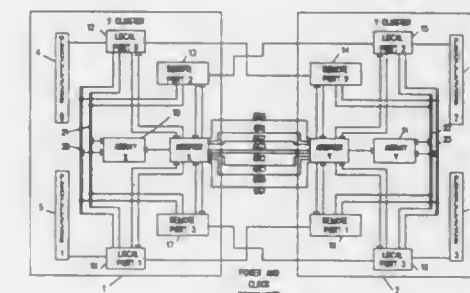
decision means, comprising a detection circuit for detecting signals on a bus, connected to at least said first and second common buses and operative for identifying a transfer request, comprising an input/output instruction, on at least one of said first and second common buses and for generating a first transfer request signal; and transmission means coupled between at least said first and second common buses for transmitting during one bus cycle of said first common bus a unit address, data and a control signal, for executing the input/output instruction detected by said detection circuit, to said second common bus, said transmission means comprising a first send line and a first reply line connected to said first common bus and a second send line and a second reply line connected to said second common bus, and being operative to carry send and reply signals which identify at least an existence

of transfer requests on said first bus and establish said synchronism between said first and second buses; time supervisor means responsive to a first transfer request signal and connected at least to said first common bus and said second common bus for supervising the time required to transfer data by said first common bus, during a first predetermined time beginning with an input of said first transfer request signal, and for generating and sending a second transfer request signal to said second common bus for facilitating the establishment of a link between said first and second bus systems via said transmission means, if there has been a passage of said first predetermined time without a generation of any response signal on said first common bus to said first transfer request; and minimum time assuring means operative in connection with said transmission means for assuring that there is sufficient time for a sending of data and address signals to said second common bus, said sufficient time being greater than a second predetermined time beginning with a change of address and data sending control signals on said second common bus, in order to compensate for a case when there is a response to said first transfer request on said first common bus after a second transfer is input on said first bus.

4,958,273  
MULTIPROCESSOR SYSTEM ARCHITECTURE WITH HIGH AVAILABILITY  
Patrick E. Anderson, San Jose, Calif.; Roland J. Buxton, Tucson, Ariz.; William T. Higgins, San Jose, Calif.; Ronald J. Hruby, San Jose, Calif.; and Serge Mirabehn, San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 26, 1987, Ser. No. 89,372  
Int. Cl.<sup>5</sup> G06F 15/16, 13/14, 11/00  
U.S. Cl. 364—200

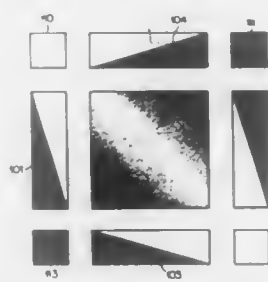
10 Claims



4,958,272  
APPARATUS AND SYSTEM FOR GENERATING SMOOTH SHADED CONTINUOUS TONE IMAGES  
Warren K. Wake, Nashua, N.H., assignor to Xyvision Design Systems, Inc., Wakefield, Mass.

Filed Feb. 17, 1988, Ser. No. 157,457  
Int. Cl.<sup>5</sup> G06F 15/62  
U.S. Cl. 364—518

16 Claims



1. In combination in a system for generating a smooth shaded continuous tone image comprising: input means for entering user selected perimeter constraint information comprising curve shape and color data, data processing means for determining a surface map of intensity, I (X, Y), based on said perimeter constraint information, and further generating the continuous tone image as a two-dimensional matrix of image pixels each pixel characterized by an intensity level derived from said surface map, with position defined by matrix coordinates in the continuous tone image, iterative review means permitting modification of said perimeter constraint information in developing the smooth shaded continuous tone image and memory means for storing the continuous tone image.

1. A multiprocessor system of the kind in which each processor accesses common system information asynchronously, the information being updateable by more than one processor simultaneously and dynamically, the system comprising:

two processor clusters each comprising at least two processors, each cluster operating on a separate clock and power boundary, an array in each cluster having definable, lockable regions therein for storing said system information, a plurality of local ports and a plurality of remote ports in each cluster coupled to the array for enabling execution of array operations in that cluster; each processor in each cluster being connected to a respective local port, each local port having at least one register for storing address, data, control and status information and each local port being coupled to a corresponding one of said remote ports in the other cluster for communication therewith; each remote port having at least one register, each such register being connected to a corresponding register in the respective coupled local port of the other cluster, said at least one register storing said address, data, control and status information for causing array operations to be executed selectively in either cluster or in both of said clusters concurrently; and an arbiter in each cluster connected to the local ports and remote ports therein, each arbiter being coupled to its corresponding array for controlling access thereto and operation thereof, each arbiter communicating with the arbiter of the other cluster for arbitrating global operations, including dual mode TEST AND SET and UNCONDITIONAL SET operations, to its own array and the other (remote) array, and each arbiter comprising means for executing read/write operations in unused array cycles between the TEST portion and the SET portion of a TEST AND SET operation.



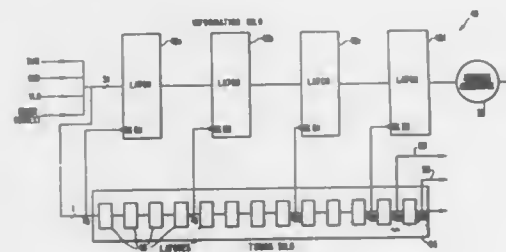
4,958,274  
SYSTEM WITH A N STAGES TIMING SILO AND P  
STAGES INFORMATION SILO FOR SOLOING  
INFORMATION

Todd A. Dutton, Westboro, and Walter A. Beach, Bedford, both  
of Mass., assignors to Digital Equipment Corporation, May-  
nard, Mass.

Filed Jan. 1, 1988, Ser. No. 201,481  
Int. Cl.<sup>5</sup> G06F 9/315

U.S. Cl. 364-200

21 Claims



11. A vector processor comprising:  
vector registers for storing data;

a first logic unit coupled to said vector registers, said first  
logic unit sending logical results to said vector register an  
integer number q cycles after receiving input from said  
vector registers;

a second logic unit coupled to said vector registers, said  
second logic unit sending multiplication results to said  
vector registers an integer number x cycles after receiving  
input from said vector registers;

a vector controller coupled to said vector registers and to  
said first and second logic units, said vector controller  
generating information for a particular command concu-  
rently with said vector registers sending operands to one  
of said first and second logic units corresponding to said  
particular command;

a timing silo coupled to said vector controller having an  
integer number n of timing state devices forming a set  
sequentially connected for receiving and siloing a series of  
bits from said vector controller wherein at least one of  
said bits is an enabling bit; and

an information silo coupled between said vector controller  
and said vector registers having an integer number p of  
information state devices forming a set sequentially con-  
nected for receiving and siloing information from said  
vector controller, said p information state devices having  
device enables coupled to different locations in said timing  
silo wherein each said different location is separated from  
another one of said different locations by a plurality of  
said timing state devices such that said enabling bit at a  
particular location in said timing silo enables one of said p  
information state devices which is coupled to said particu-  
lar location to receive said information from a previous  
information state device, wherein p is greater than one and  
is equal to or less than one half the value of n.

4,958,275  
INSTRUCTION DECODER FOR A VARIABLE BYTE  
PROCESSOR

Hiroshi Yokouchi, Tokyo, Japan, assignor to Oki Electric In-  
dustry Co., Ltd., Tokyo, Japan

Filed Jan. 6, 1988, Ser. No. 141,234

Claims priority, application Japan, Jan. 12, 1987, 62-3305  
Int. Cl.<sup>5</sup> G06F 9/32

U.S. Cl. 364-200

2 Claims

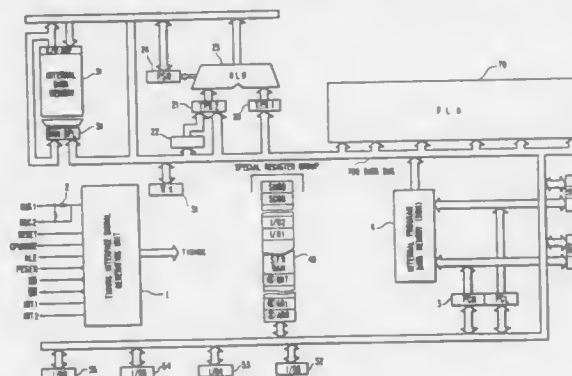
1. An instruction decoder for a variable byte processor, the  
variable byte processor of the type which is processed by an  
instruction containing a first byte representing an operation

code and a second byte representing an operand address, said  
instruction decoder comprising:

an instruction register for reading an instruction of the sec-  
ond byte, and connected to a data bus;

a first programmable logic array means, connected to said  
instruction register, for reading an instruction from said  
instruction register to control the general operation of the  
variable byte processor, and for providing a consecutive  
execution mode signal upon the reception of a consecutive  
execution instruction specifying a sequential repetition of  
a same instruction for operands stored at different internal  
operand addresses;

a consecutive instruction execution cycle monitoring means,  
connected to the data bus, which is set for a set value  
indicating a number of consecutive instruction execution  
cycles when the consecutive execution mode signal is  
provided, for counting the number of execution cycles



every time an execution cycle is completed, and for pro-  
viding a count completion signal upon a coincidence of  
the count of the execution cycles with the set value;  
register/counters means, connected to the consecutive in-  
struction execution cycle monitoring means, for increas-  
ing a count by one every time one execution cycle of the  
instruction is completed and for providing different ad-  
dresses, respectively;

a second programmable logic array means for receiving  
outputs of said register/counters means and for specifying  
data at different operand addresses sequentially; and

a read inhibiting means, connected to said instruction reg-  
ister, for inhibiting said instruction register from reading a  
new instruction from the data bus during a time period  
extending from a moment when said consecutive execu-  
tion mode signal is provided to a moment when the count  
completion signal is provided.

4,958,276  
SINGLE CHIP PROCESSOR

Atsushi Kiochi, Kunitachi; Kenji Kaneko, Sagami-hara; Jun  
Ishida; Tetsuya Nakagawa, both of Koganei; Yoshimune  
Hagiwara, Hachioji; Takashi Akazawa, Musashimurayama,  
and Tomoru Sato, Kodaira, all of Japan, assignors to Hitachi,  
Ltd. and Hitachi VLSI Engineering Corporation, both of  
Tokyo, Japan

Filed Dec. 4, 1987, Ser. No. 128,585

Claims priority, application Japan, Dec. 12, 1986, 61-297036  
Int. Cl.<sup>5</sup> G06F 5/06

U.S. Cl. 364-200

10 Claims

1. A single chip processor to be coupled to an external  
program memory which stores instructions, comprising:

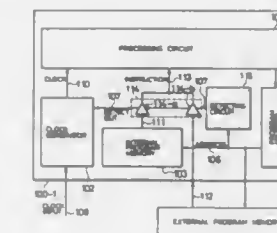
(a) a processing circuit;

(b) an internal program memory for storing instructions;

(c) a program counter for generating addresses for an access  
to said external program memory and said internal pro-  
gram memory in response to a signal from said processing  
circuit;

(d) detecting means for determining whether an address  
generated by said program counter is an address for read-

ing an instruction from said external program memory or  
an address for reading an instruction from said internal  
program memory; and



(e) means for varying the instruction cycle time of said single  
chip processor in accordance with the result of the deter-  
mination by said detecting means.

4,958,277  
QUEUED SERIAL PERIPHERAL INTERFACE FOR USE  
IN A DATA PROCESSING SYSTEM

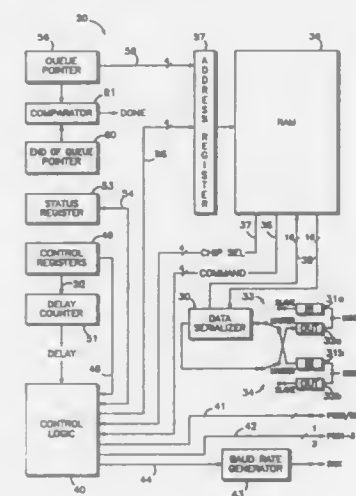
Susan C. Hill; Joseph Jelemensky; Mark R. Heene, all of Aus-  
tin; Stanley E. Groves, Round Rock, all of Tex., and Daniel N.  
DeBrito, Carmel, Ind., assignors to Motorola, Inc., Schaumb-  
urg, Ill.

Continuation of Ser. No. 77,469, Jul. 24, 1987, abandoned. This  
application Apr. 21, 1989, Ser. No. 342,651

Int. Cl.<sup>5</sup> G06F 3/00, 13/00, 13/12

U.S. Cl. 364-200

18 Claims



1. A microcomputer comprising a central processing unit  
and a serial data communication apparatus, the serial data  
communication apparatus further comprising:

a first memory coupled to the central processing unit, said  
first memory having a first predetermined number of  
storage locations;

transfer means coupled to said first memory for executing  
serial data transfers between the serial data communica-  
tion apparatus and at least one other device coupled  
thereto, the transfer means further comprising:

means for retrieving data from said first memory at a first  
one of said first predetermined number of storage loca-  
tions;

means for transmitting said retrieved data to said at least  
one other device;

means for receiving data from said at least one other  
device; and

means for storing said received data in said first memory  
at a second one of said first predetermined number of  
storage locations;

a second memory coupled to the central processing unit, said  
second memory having a second predetermined number of  
storage locations;

queue pointer means coupled to said first memory means for  
maintaining a queue pointer value which specifies said  
first one of said first predetermined number of storage  
locations; and

control means coupled to said central processing unit, said  
transfer means, said first and second memories and said  
queue pointer means for responding to a first state of an  
enable bit stored in said second memory at a first one of  
said second predetermined number of storage locations by  
directing said transfer means to execute one of said serial  
data transfers and by incrementing said queue pointer  
value and for responding to a second state of said enable  
bit by disabling said transfer means;

the serial data communication apparatus is characterized in  
that:

said control means is further responsive to the central pro-  
cessing unit, while said enable bit is in said first state, to  
modify said queue pointer value by replacing said queue  
pointer value with a new queue pointer value provided by  
the central processing unit instead of incrementing said  
queue pointer value.

4,958,278  
METHOD FOR LOADING DATA OR PROGRAM TO A  
PLURALITY OF TERMINAL STATIONS

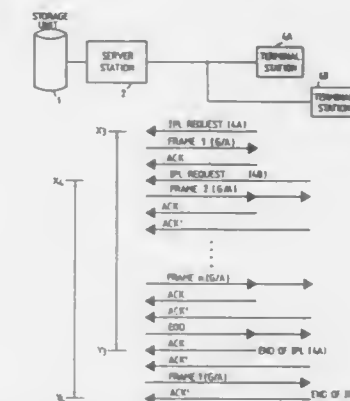
Shinichi Meguro, Kanagawa, Japan, assignor to International  
Business Machines Corporation, Armonk, N.Y.

Filed Apr. 8, 1988, Ser. No. 179,361

Claims priority, application Japan, May 11, 1987, 62-112683  
Int. Cl.<sup>5</sup> G06F 15/16

U.S. Cl. 364-200

2 Claims



1. An apparatus for loading data or a program from a server  
station to each of a plurality of terminal stations in response to  
individual requests from said terminal stations comprising:

means for generating and transmitting from one terminal  
station to the server station a request message for loading  
of data or a program;

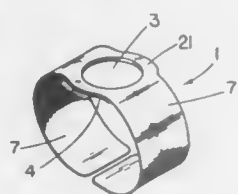
means for initiating transmission from said server station to  
said one terminal station and other terminal stations the  
data or the program;

means for receiving, at another terminal station, the data or  
the program which is being transmitted from said server  
station; only if said another terminal station issues a re-  
quest to said server station for loading of the data or the  
program during loading of the data or the program for  
said one terminal station; and

means for retransmitting from said server station portions of the data or the program not received by said another terminal station after completion of loading of the data or the program for said one terminal station.

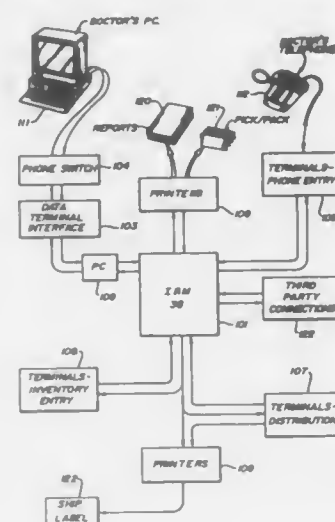
whereby portions of the data or program sent by said server station before said another terminal station issued the request for loading are sent by said means for retransmitting from said server station to said another terminal station following the initial transmission such that said one terminal station and said another terminal station can receive data simultaneously when said another terminal station issues a request during transmission to said one terminal station.

**4,958,279**  
**ASSEMBLY COMPRISING A CASE FIXED ON A SUPPORT**  
 Francois Proelochs, Forel, Switzerland, assignor to Epoque Watch S.A., Switzerland  
 Filed Feb. 11, 1988, Ser. No. 154,948  
 Claims priority, application Switzerland, Feb. 13, 1987, 551/87  
 Int. Cl.<sup>5</sup> G04B 37/00; A45C 11/10  
 U.S. Cl. 368—282



1. An assembly comprising a case (8, 9) fixed on a support (19), characterized in that the case and the support comprise cooperation holding means (3, 19) for assuring a detachable fixing of the case on the support, the support being provided in the form of a rigid bracelet (1), having a flat part (21) comprising an opening (3) into which the case is detachably fixable, the bracelet, including said opening, being first completely covered with a removable and interchangeable sheath (1a) made of an elastic fabric or a thin synthetic or natural elastic material, such that the sheath is interposed between the case and the opening as the case is detachably fixed therein.

**4,958,280**  
**APPARATUS AND METHOD FOR SATISFYING DISPOSABLE CONTACT LENS PRESCRIPTIONS**  
 Thomas E. Pauly, Jeffrey C. Van Doren, John P. Hennessy, and James M. Christiansen, all of Jacksonville, Fla., assignors to Vistakon, Inc., Jacksonville, Fla.  
 Filed Jul. 10, 1987, Ser. No. 72,184  
 Int. Cl.<sup>5</sup> G06F 15/20  
 U.S. Cl. 364—403

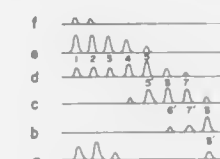


1. An integrated system for initial and ongoing supply of prescription disposable contact lenses comprising: central computer means including plural file storage means said plural means being respectively dedicated to predetermined data files; means, associated and communicating with said central computer means, for automated processing of prescription orders and prescription changes; distributed computing means useful by respective prescribing parties for communicating with said means for automated processing; and manually operable terminal means, associated and communicating with said central computer means, for manual processing of prescription orders and prescription changes; said central computer means further including means operable on predetermined periodicity, for initiating prescription refills for standing orders, and means for automatically integrating prescription changes with said prescription orders, and prescription refills.

**4,958,281**  
**SIGNAL PROCESSING METHOD FOR DETERMINING BASE SEQUENCE OF NUCLEIC ACID**  
 Makoto Hara, Kanagawa, Japan, assignor to Fujii Photo Film Co., Ltd., Kanagawa, Japan  
 Filed Oct. 10, 1986, Ser. No. 917,609  
 Claims priority, application Japan, Oct. 11, 1985, 60-226091  
 The portion of the term of this patent subsequent to Jan. 31, 2006, has been disclaimed.  
 Int. Cl.<sup>5</sup> G01N 33/58  
 U.S. Cl. 364—413.01

1. A signal processing method for determining base sequence of nucleic acids by subjecting digital signals to signal processing, said digital signals corresponding to an autoradiograph of plural distorted resolved rows which are formed by resolving a mixture of base-specific DNA fragments or base-specific RNA fragments labeled with a radioactive element in a one-dimensional resolving direction on a support medium, which comprises the steps of:

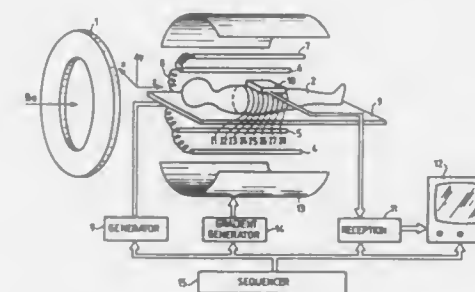
- (1) preparing at least two one-dimensional waveforms composed of signal position along the resolving direction and signal level for each band;
- (2) detecting a position where the signal level is maximum on one of the one-dimensional waveforms;
- (3) comparing the detected maximum signal level position on the one one-dimensional waveform with signal levels at corresponding positions on adjacent one-dimensional



waveforms to determine a maximum position on the one-dimensional waveform having the highest signal level to be a band position;

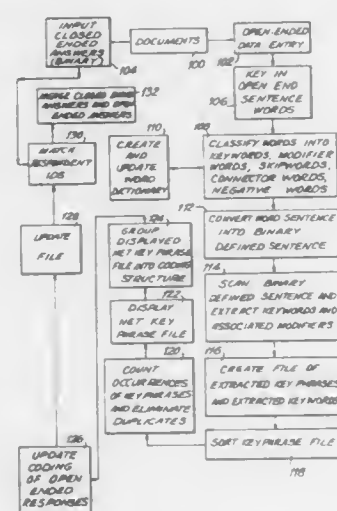
- (4) detecting a subsequent position where the signal level is maximum on said one-dimensional waveform having the band position; and
- (5) repeating in order the steps (3) and (4) to thereby determine all band positions on the resolved rows.

**4,958,282**  
**3-D IMAGE RECONSTRUCTION USING FOURIER TRANSFORMATION WITH DIFFERING RESOLUTIONS OF IMAGE AXES**  
 Yves Barjhoux, Gif sur Yvette, France, assignor to General Electric CGR S.A., Paris, France  
 Filed Jul. 6, 1988, Ser. No. 215,812  
 Claims priority, application France, Jul. 10, 1987, 87 09814  
 Int. Cl.<sup>5</sup> G01N 24/08; G01R 33/20  
 U.S. Cl. 364—413.13





answer to said data processor; means for classifying said words comprising said input open-ended respondent answer into corresponding word types selected from a group of word types comprising keywords, modifier words, skip words, connector words and negative words, said keywords comprising words which are keys to conveying a true meaning of said input open-ended respondent answer, said modifier words comprising words attached to said keywords in said input open-ended respondent answer to form key phrases, said skip words comprising words unimportant to said conveying of said true meaning of said input open-ended respondent answer, said connector words comprising words which are conjunctions which connect said key phrases within said input open-ended respondent answer, said negative words comprising words which turn said key phrases into negative statements in said input open-ended respondent answers; means for updating said word dictionary means for converting said words comprising said input open-ended respondent answer into corresponding binary coded words, said word dictionary comprising dictio-



nary words stored as corresponding binary coded words, said converting means comprising means for converting said input words into said corresponding binary coded words corresponding to said binary coded words stored as said updated dictionary words for providing a binary defined sentence corresponding to said input open-ended respondent answer; means for scanning said corresponding binary defined sentence and extracting said keywords and said modifier words associated with said keywords in said corresponding binary defined sentence; means for creating a retrievable file comprising key phrases formed from said extracted keywords and said extracted associated modifier words, and said keywords per se; means for sorting said key phrases in said created file; means for counting occurrences of said sorted key phrases and eliminating duplicates in said sorted key phrases for providing a net key phrase file, said net key phrase file being displayable on said associated display means; means for grouping said displayed net key phrases into a coding structure; and means for storing said coding structure in said data processor system.

4,958,285

**NATURAL LANGUAGE PROCESSING SYSTEM**  
Masasuke Tominaga, Kawasaki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 3, 1988, Ser. No. 201,998

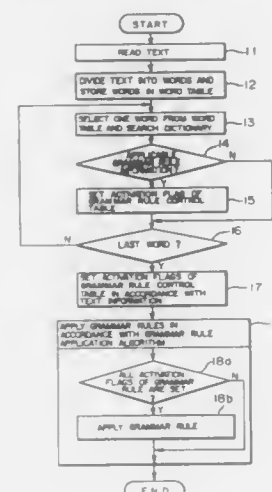
Claims priority, application Japan, Jun. 5, 1987, 62-141108  
Int. Cl.<sup>7</sup> G06F 15/38

U.S. Cl. 364-419

11 Claims

9. A natural language processing method comprising the steps of:

reading information of an original text;  
dividing the input original text into words and storing the words in a search word table;  
selecting one of the words in the search word table, searching a dictionary memory by using the selected word as a search key, and storing searched dictionary information in a word information table;  
determining whether information on applicability of grammar rules is included in the dictionary information stored in the word information table;  
when the information on the applicability of the grammar rules is included, starting a processing program for controlling activating flags to each of the grammar rules



stored in a grammar rule control table in accordance with applicable grammar rule information;  
when the information on the applicability of the grammar rules is not included, skipping the start step of the processing program;  
executing the above steps for each of other words in the search word table;  
activating the grammar rules in the grammar rule control table in accordance with the information of the original text; and  
processing the original text in accordance with a predetermined application algorithm of the grammar rules by taking a result of the activating process of the grammar rules into account.

4,958,286

**TIME-VARIANT FILTER COEFFICIENTS**  
Wallace H. Meyer, Jr., Bellaire, Tex., assignor to Western Atlas International, Inc., Houston, Tex.

Filed Jun. 27, 1988, Ser. No. 212,345

Int. Cl.<sup>7</sup> G01V 3/18

U.S. Cl. 364-422

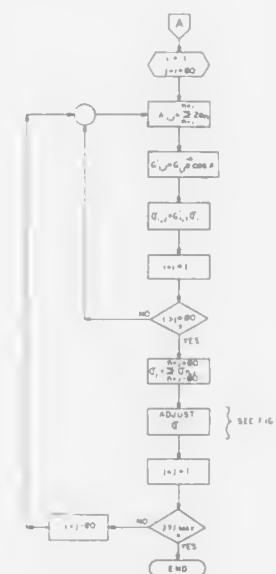
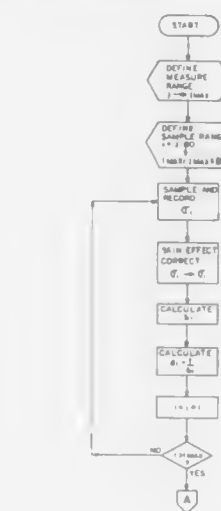
20 Claims

18. A method for making an induction log, comprising:  
(a) providing an induction logging tool having at least one transmitter coil and at least one receiver coil;  
(b) suspending the logging tool in a borehole;  
(c) generating an electrical signal in the transmitter coil, whereby an electrical signal is induced in the receiver coil;  
(d) identifying a plurality of sample points at predetermined intervals along the axis of the borehole;  
(e) moving the logging tool axially through the borehole to a sample point;  
(e1) measuring and recording the electrical signal in the receiver coil at the sample point;  
(e2) calculating a skin-effect corrected conductivity at the sample point;

(f) selecting a measure point within the borehole and a set of sample points;

(f1) for each selected sample point, generating a modified vertical geometrical factor as a function of distance in skin depths between the sample point and the measure point;

(f2) convolving at each selected sample point the modified geometrical factor generated in said step (f1) with the skin-effect conductivity calculated in said step (e2) to obtain an approximation for each sample point of an



elementary electrical signal contributed by the sample point at the measure point;  
(f3) summing the approximations obtained according to step (f2) to obtain an approximation of the electrical signal recorded in the receiver coil at the measure point;  
(f4) calculating an approximation for true conductivity at the measure point as a function of the sum obtained in said step (f3); and  
(g) repeating said step (f) for a plurality of measure points to obtain a log of formation conductivity as a function of borehole depth.

4,958,287

**ELECTRONIC CONTROL SYSTEM FOR AUTOMATIC VEHICLE TRANSMISSION**

Toshiya Sagimura, Numazu, and Hiroshi Yoshimura, Hiroshima, both of Japan, assignors to Isuzu Motors Limited, Tokyo, Japan

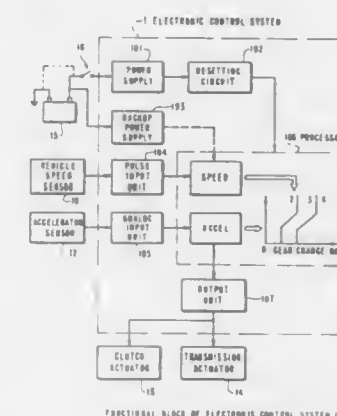
Filed Jun. 17, 1988, Ser. No. 207,958

Claims priority, application Japan, Jun. 20, 1987, 62-152429

Int. Cl.<sup>7</sup> B60K 41/08, 28/10

U.S. Cl. 364-424.1

4 Claims



1. An electronic control system, connected to a power supply having an output voltage, for controlling an automatic transmission mounted on a vehicle based on vehicle speed data of the vehicle indicated by a vehicle speed sensor and an accelerator position signal from an accelerator depression sensor, said electronic control system comprising:

gear position determining a gear position of the automatic transmission based on the vehicle speed data and the accelerator position signal;  
resetting means for detecting the output voltage of the power supply and for generating a reset signal to reset said electronic control system when the output voltage of the power supply is cut off;  
counter means for counting a first predetermined period of time after said electronic control system is reset by the reset signal;  
memory means for storing the vehicle speed data occurring immediately before the output voltage of the power supply is cut off; and  
control means for supplying the vehicle speed data and the accelerator position signal to said gear position determining means, and for supplying the vehicle speed data stored in said memory means and the accelerator position signal to said gear position determining means during the first predetermined period of time counted by said counter means.

4,958,288

**SYSTEM AND METHOD FOR AUTOMATICALLY CONTROLLING A VEHICLE SPEED TO A DESIRED CRUISING SPEED**

Hiroshi Takahashi, Komae, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jun. 30, 1988, Ser. No. 213,927

Claims priority, application Japan, Jul. 1, 1987, 62-162221

Int. Cl.<sup>7</sup> B60K 31/00

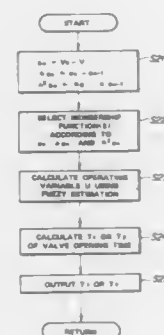
U.S. Cl. 364-426.04

21 Claims

1. A system for automatically controlling the speed of a vehicle at a target cruising speed, comprising:

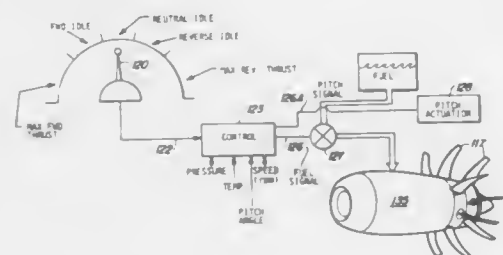
(a) first means for monitoring the speed of the vehicle;  
(b) second means for setting the target cruising speed at which the vehicle cruises during a run of the vehicle according to a vehicle driver's decision;

- (c) third means for controlling the vehicular engine output according to a controlled variable set for each predetermined interval of time, so that the monitored vehicle speed coincides with the target cruising speed set by the second means;
- (d) fourth means for storing a group of input/output membership functions for deriving the controlled variable in a fuzzy estimation, each stored membership function being correctable;



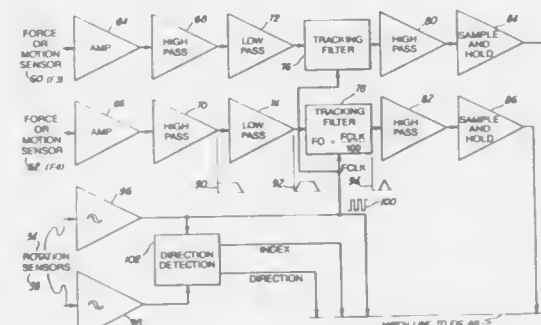
- (e) fifth means for setting the controlled variable in the third means, using one of the membership functions retrieved from the fourth means on the basis of the monitored vehicle speed and the target cruising speed; and
- (f) sixth means for deriving a change rate of the vehicle speed on the basis of the monitored vehicle speed and correcting any one or more of the membership functions stored in the fourth means and used for setting the controlled vehicle by the fifth means under a predetermined condition on the basis of the monitored vehicle speed and said set controlled variable.

**4,958,289**  
**AIRCRAFT PROPELLER SPEED CONTROL**  
 Michael J. Sam; George W. Bennett; Steven A. Merrell, and Neil Walker, all of Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio  
 Filed Dec. 14, 1988, Ser. No. 284,261  
 Int. Cl. B64C 11/44  
 U.S. Cl. 364—431.01 22 Claims



1. A system for controlling an aircraft propeller driven by an engine, comprising:
- means for detecting a reverse signal demanding a reversal in thrust and
  - means for placing a limit on fuel flow to the engine in response to the reverse signal.

**4,958,290**  
**BALANCER**  
 Paul W. Kendall, Milpitas, and Gregory H. Parrott, Cupertino, both of Calif., assignors to Accu Industries, Inc., Ashland, Va.  
 Filed Nov. 18, 1988, Ser. No. 273,959  
 Int. Cl. G01M 1/22  
 U.S. Cl. 364—463 20 Claims

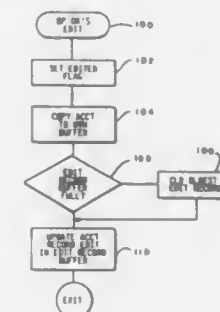


1. A balancer for measuring imbalance in a vehicle wheel at any desired rotational speed, comprising:
- a shaft to which the wheel may be connected so that the wheel is substantially axially aligned with the shaft;
  - a frame for supporting the shaft so that the shaft is free to rotate;
  - two transducer means for sensing forces imposed by the shaft and for providing signals that correspond to such forces as the wheel rotates, both of which transducer means are located on the same side of the wheel;
  - position and speed indicating means for sensing and providing signals that correspond to the angular position and speed of the wheel;
  - two tracking filter means, each for receiving the signals from a transducer means and speed signals from the position and speed indicating means, the center frequency of which tracking filter means may be adjusted to correspond to the speed signals;
  - parameter adjustment means of adjusting the gains of the signals from the transducer means in order to compensate for the width of the wheel and the distance of the wheel from the transducers;
  - normalizing means for adjusting the gains of the signals from the transducer means in order to compensate for the difference of their distances from the wheel; and
  - computing means for receiving signals from the transducer means via the tracking means and from the position and speed indicating means, for computing the imbalance of the wheel, and for indicating the size of weight which must be attached and the position at which it must be attached, in order to balance the wheel.

**4,958,291**  
**SYSTEM FOR ACCOUNTING FOR POSTAGE EXPENDED BY A POSTAGE METER HAVING SECURITY DURING EDITING OF ACCOUNTS**  
 John R. Mamone, 30 Reut Dr., Stratford, Conn. 06497; Neale C. Hutcheson, 205 Park St., Stratford, Conn. 06840; Joseph D. Mallozzi, 112 Teeter Rock Rd.; Edward P. Daniels, 350 Stonehouse Rd., both of Trumbull, Conn. 06611, and Chikou Cheng, 313 Main Ave., Norwalk, Conn. 06851  
 Filed Dec. 26, 1985, Ser. No. 813,457  
 Int. Cl. G06F 15/20  
 U.S. Cl. 364—464.02 21 Claims

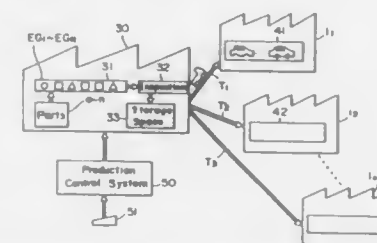
12. A postage metering and accounting system, comprising:
- data entry means for entry by an operator of commands and information, said information including postal information,

- information, said postal information including account numbers;
- a memory for storing program data and account records, said account records each corresponding to one of said account numbers, said memory further comprising a non-volatile memory for storing said account records;
  - interface means for interfacing to a postage meter, said postage meter being connected to said interface
  - processing means further comprising a CPU connected to said data entry means, said memory, and said interface, and responsive to said program data for:
  - responding to entry of an item of said postal information corresponding to a particular batch of mail to transmit signals through said interface to set said postage meter, and responding to signals received through said interface specifying postage expended to update one of said account records corresponding to one of said account numbers specified by said item; and,
  - responding to entry of an edit command to edit a selected one of said account records by, first setting a flag in said non-volatile memory to indicate that said selected account record is being edited, then creating a second copy of said selected account record in a pre-selected portion of said non-volatile memory, the receiving editing information through said data entry means and updating said selected account record in accordance with said editing data, and then resetting said flag.



- age meter, and responding to signals received through said interface specifying postage expended to update one of said account records corresponding to one of said account numbers specified by said item; and,
- responding to entry of an edit command to edit a selected one of said account records by, first setting a flag in said non-volatile memory to indicate that said selected account record is being edited, then creating a second copy of said selected account record in a pre-selected portion of said non-volatile memory, the receiving editing information through said data entry means and updating said selected account record in accordance with said editing data, and then resetting said flag.

**4,958,292**  
**PRODUCTION CONTROL SYSTEM FOR MIXED PRODUCTION LINE**  
 Kuniya Kaneko; Harumichi Wakiyama, both of Toyota; Tadashi Naito, Nagoya, and Toshihiro Ando, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan  
 Filed Apr. 19, 1988, Ser. No. 183,704  
 Claims priority, application Japan, Apr. 22, 1987, 62-099070  
 Int. Cl. G06F 15/24, 15/46  
 U.S. Cl. 364—468 9 Claims



1. A production control system for use in a production factory to deliver a required number of parts corresponding to a plurality of different types of products to each of plural destinations which are spaced from said production factory and require different transport times, said system having means for providing a schedule of parts corresponding to each type of

product to the production line of said production factory, said system comprising:

means for recording correcting data corresponding to the progress of said parts in said production line;

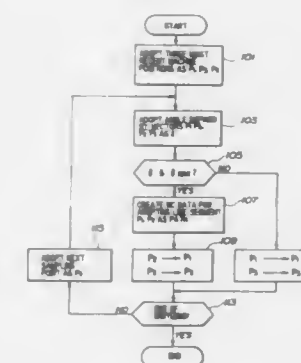
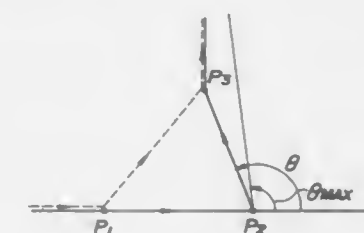
means for recording the required number of part, the different types of products, schedule times of shipping said parts, and parts correcting means for correcting said required number of parts based on said correcting data;

means for recording transport time correcting data for each product to its respective destination;

transport time correcting means for further correcting said required number of parts based on said transport time correcting data; and

final production plan scheduling means for providing the corrected required number of parts, and a corrected schedule for shipping products to said destination.

**4,958,293**  
**DIGITIZING METHOD**  
 Kunio Tanaka; Yasushi Onishi, and Yoshihiro Itsubo, all of Tokyo, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan  
 PCT No. PCT/JP88/00219, § 371 Date Oct. 27, 1988, § 102(e)  
 Date Oct. 27, 1988, PCT Pub. No. WO88/06753, PCT Pub. Date Sep. 7, 1988  
 PCT Filed Feb. 29, 1988, Ser. No. 269,744  
 Claims priority, application Japan, Mar. 3, 1987, 62-048312  
 Int. Cl. G05B 19/00  
 U.S. Cl. 364—474.03 9 Claims



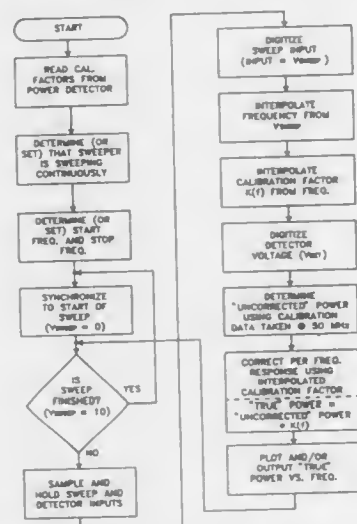
1. A digitizing method for moving a contractor along a model on the basis of tracer control and digitizing probe position data upon accepting the probe position data as a predetermined reference, said method comprising the steps of:
- computing an angle  $\theta$  between a vector  $P_1P_2$  and a vector  $P_2P_3$  where  $P_1$ ,  $P_2$  and  $P_3$  are first, second and third probe position data points consecutively received from the probe position data in the order of acceptance;
  - comparing the angle  $\theta$  with a present angle  $\theta_{max}$ ;
  - digitizing the second probe position data point  $P_2$  unless said comparing in step (b) indicates the angle  $\theta$  is larger than the angle  $\theta_{max}$ ; and



(d) machining a workpiece in accordance with the digitized probe position data.

**4,958,294**  
**SWEPT MICROWAVE POWER MEASUREMENT SYSTEM AND METHOD**  
Bret A. Herscher, Mt. Vlen, and Paul R. Munro, Sunnyvale, both of Calif., assignors to Wavetek Microwave, Inc., Sunnyvale, Calif.  
Filed Apr. 1, 1988, Ser. No. 176,729  
Int. Cl.<sup>5</sup> G01R 19/00; G06F 15/46  
U.S. Cl. 364-483

29 Claims



1. A method for determining a swept absolute power level ( $P_{abs}$ ) of an input signal within a scalar analyzer comprising the steps of:

- providing a detector calibrated at a plurality of predetermined frequencies ( $n$ ) over a range of  $F_{min}$  to  $F_{max}$ ; storing a predetermined calibration factor ( $K(F_n)$ ) for said detector at each of said predetermined frequencies  $n$ ;
- determining a frequency ( $F_{in}$ ) of said input signal;
- interpolating a calibration factor  $K(F_{in})$  of said input signal wherein said calibration factor  $K(F_{in})$  is one of said predetermined calibration factors ( $K(F_n)$ );
- establishing an apparent power level ( $P_{app}$ ) of said input signal with respect to said calibration factor of a predetermined frequency standard; and
- correcting said apparent power level  $P_{app}$  to said swept absolute power level  $P_{abs}$  by application of  $K(F_{in})$ .

**4,958,295**  
**ANALYZING APPARATUS AND METHOD FOR ANALYSIS OF LIQUID SAMPLES**

David L. Davidson, Newark, Del.; George B. Parrent, Jr., Chelmsford; Roland W. Gubisch, Lexington, both of Mass., and Harold Hauer, Wilmington, Del., assignors to Hercules Incorporated, Wilmington, Del.  
Continuation of Ser. No. 249,261, Sep. 22, 1988, abandoned, which is a continuation of Ser. No. 865,889, May 21, 1986, abandoned. This application Sep. 19, 1989, Ser. No. 409,277  
Int. Cl.<sup>5</sup> G01N 30/04

8 Claims

1. An analyzing apparatus for detecting the properties and composition of injected liquid sample in a non-air segmented liquid stream, comprising in combination in a flow system:
- a supply means for providing liquid samples, reactants and reagents to said system;
  - conduit means for receiving liquid samples, reactants and reagents from said supply means;
  - vacuum means connected to and for creating a force for

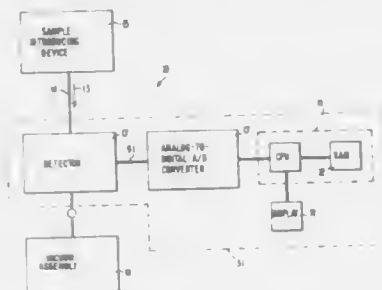
driving said liquid samples, reactants and reagents from said supply means through said conduits and through a detector with a combination of valves controlling the vacuum force on said liquid samples, reactants and reagents to form a non-air segmented, integral liquid stream of non-continuous flow;

said liquid stream consisting essentially of samples, reactants or reagents in the absence of air segments in the stream whereby liquid integral segments interface with each other, said apparatus including:

means for injecting into said stream a sample so as to provide an interfacial zone of a step pulse fashioned of said liquid in the non-air segmented, integral stream of non-continuous flow;

means for observing properties of at least one concentration of a dispersed liquid at an interfacial zone of a step pulse and providing data in digital signals correlated to said observed properties;

means for the observation of known property values of an



injected standard being drawn through a detector which means generates signals representing parameter values characteristic of the flow system, summarized in digital form and processing said generated signals to evaluate properties of the dispersed liquid at the interfacial zone of samples so fashioned and drawn through said detector;

means for performing in a computer calculation from the data obtained from the known specimen by mathematical evaluation to determine algebraic model parameters which characterize the flow system;

storage means for storing digital signals and said model parameter values characteristic of the flow system in digital form;

means for repetitively performing calculations in the computer on said data obtained from the interfacial zones of injected liquid samples to obtain values of a property of each sample; and

means responsive to said characteristic values of the model parameters for rapidly recording property values of the samples.

**4,958,296**  
**WATER-LEAKAGE DETECTING APPARATUS AND METHOD WHICH ARE LITTLE INFLUENCED BY NOISE**

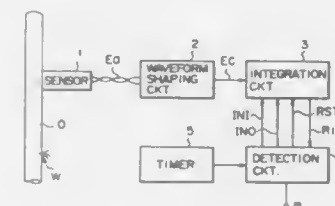
Susuma Saitoh; Syozo Taniguchi; Akio Enomoto, and Teruyoshi Matsuzawa, all of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Continuation of Ser. No. 222,410, Jul. 21, 1988, abandoned. This application Jan. 31, 1990, Ser. No. 472,434  
Claims priority, application Japan, Jul. 22, 1987, 62-180939  
Int. Cl.<sup>5</sup> G01M 3/08

18 Claims

1. A water leakage detecting apparatus comprising:
- vibration detection means for detecting a vibration generated due to water leakage;
  - integration means, connected to said detection means, for integrating over a predetermined time period each time

interval for which a vibration level of the vibration detected by said detection means exceeds a predetermined value, said integration means performing the integration over a plurality of said predetermined time periods to obtain a plurality of integration values; and

determination means for receiving the plurality of integration values calculated by said integration means, for se-



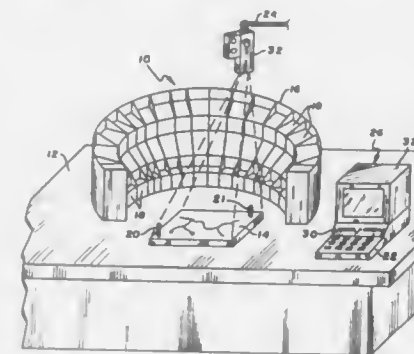
lecting a minimum value of the plurality of integration values as an integration value obtained when an influence of noise is minimum, for comparing the selected minimum value with a preset reference value, and for, when the minimum value exceeds the reference value, determining a presence of water leakage, and when the minimum value is smaller than the reference value, determining an absence of water leakage.

**4,958,297**  
**APPARATUS FOR INTERFACING VIDEO INFORMATION AND COMPUTER-GENERATED GRAPHICS ON A VISUAL DISPLAY TERMINAL**  
James K. Hansen, Minnetrista, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jul. 17, 1986, Ser. No. 887,901  
Int. Cl.<sup>5</sup> G06F 15/42

U.S. Cl. 364-518

4 Claims



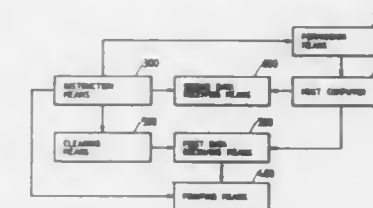
1. A system for facilitating the manufacture of finished subassemblies from component parts at a work station, comprising:

- (a) a video camera positioned to view the area in said work station where said subassemblies are to be constructed;
- (b) personal computing means located at said work station including manual data entry means and having an internal memory, an address bus, a data bus, a monitor output and a visual display terminal connected to said monitor output;
- (c) external memory means addressable by said personal computing means for storing prestored data defining the positioning and the sequence of operations to be followed in selecting and joining said component parts in fabricating said subassemblies; and
- (d) selector means for coupling said video camera and said monitor output of said personal computing means to said visual display terminal for effectively simultaneously displaying both the pictorial image of said area in said work

station being observed by said video camera and alpha-numeric and graphics information originating at said personal computing means on said visual display terminal.

**4,958,298**  
**PRINTING APPARATUS HAVING MEANS FOR CLEARING UNWANTED PRINT DATA STORED IN AN INPUT BUFFER AND ABOLISHING ENSUING RESIDUAL PRINT DATA**  
Yuji Okamoto, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan  
Filed Jul. 15, 1988, Ser. No. 219,383  
Claims priority, application Japan, Jul. 16, 1987, 62-177872  
Int. Cl.<sup>5</sup> G06F 15/00  
U.S. Cl. 364-519

5 Claims



1. A printing apparatus of the type in which printing is carried out in accordance with data transmitted from a host computer wherein said host computer transmits a predetermined amount of data to said printing apparatus, comprising:

- a first data receiving and storing means for receiving the data transmitted from a host computer and storing the same;
- a printing means for carrying out printing in accordance with the data stored in said first data receiving and storing means;
- an instruction means for issuing an instruction to halt the printing being carried out by said printing means, said printing means halting the printing in response to said instruction;
- a clearing means responsive to said instruction for clearing said data stored in said first data receiving and storing means;
- a second data receiving means for receiving the data transmitted from a host computer, said second data receiving means being activated only when said instruction is issued, wherein said first data receiving and storing means is deactivated when said second data receiving means is activated; and
- a permission means for permitting a host computer to transmit a residual ensuing data of said predetermined amount of data to the second data receiving means, said permission means generating a permission signal when said instruction is issued, and wherein a host computer starts transmission of the residual ensuing data when said permission signal is received.

**4,958,299**  
**CONTROL DEVICE FOR USE WITH A DRAWING OUTPUT UNIT**

Yukihisa Akada, Iwatsuki, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan  
Filed Jan. 6, 1989, Ser. No. 294,267  
Claims priority, application Japan, Jun. 13, 1988, 63-145506  
Int. Cl.<sup>5</sup> G06F 3/14

U.S. Cl. 364-520

11 Claims

1. A control device for use with a drawing output unit for controlling the outputting of drawings, comprising:
- image storing means for storing a plurality of image data of a set of drawings into predetermined memory areas in accordance with output sizes of the image data;

1. A computer which provides a video signal for a display comprising:

- a central processing unit (CPU) which executes a program to provide said video signal for said display;
- first and second random-access memories (RAMs) coupled to said CPU, both of said memories storing video data, and said CPU accessing said first RAM at a first rate and said second RAM at a second rate, said second rate being faster than said first rate;
- video circuits coupled to said first and second RAM, and to said display for generating said video signal from said video data stored in said first RAM for said display, said



1. A method of digitizing the output signal from a Fourier transform spectrometer, comprising the steps of:

- communicating an analog voltage level representing the output signal to a summing node;
- superimposing random noise fluctuations having an average value of zero on the analog voltage level at the summing node to provide a fluctuating voltage signal centered at the analog voltage level and having a duration of at least a predetermined time interval;
- sampling the fluctuating voltage signal a plurality of  $N$  times during the time interval to provide a plurality of  $N$  voltages;
- communicating the  $N$  voltages, one at a time, to the input of an A/D converter having a given resolution to provide  $N$  digitized values; and
- averaging the  $N$  digitized values to provide an output with a digitization error reduced by a factor of  $N^{\frac{1}{2}}$ .

4,958,309

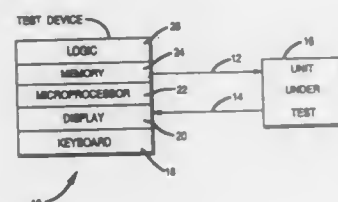
## APPARATUS AND METHOD FOR CHANGING FREQUENCIES

Randy J. Turkal, Warnock, Ohio, assignor to NRC Corporation, Dayton, Ohio

Filed Jan. 30, 1989, Ser. No. 304,050  
Int. Cl.<sup>5</sup> G05B 19/02

U.S. Cl. 364—580

14 Claims



1. Frequency control apparatus for providing a selected one of two frequencies to a microprocessor comprising, in combination:

- first frequency generating means capable of generating a signal having a first frequency;
- second frequency generating means capable of generating a signal having a second frequency;
- a microprocessor to which signals of said first frequency or said second frequency are selectively applied;
- logic circuit means for selectively gating a signal from either said first frequency generating means or said second frequency generating means to said microprocessor;
- flip-flop means for controlling said logic circuit means and having a first input coupled to an output of said microprocessor;
- address decoder means controlled by said microprocessor and coupled to a second input of said flip-flop means;
- memory means coupled to said microprocessor to provide data to said microprocessor for control thereof; and
- reset means controlled by said address decoder means and coupled to said microprocessor for resetting said microprocessor.

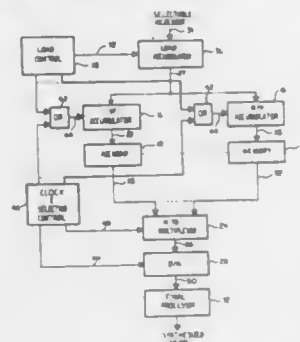
4,958,310

## DIGITAL FREQUENCY SYNTHESIZER HAVING MULTIPLE PROCESSING PATHS

Bar-Glora Goldberg, 8401 Aero Dr., San Diego, Calif. 92123  
Filed Nov. 19, 1987, Ser. No. 122,946Int. Cl.<sup>5</sup> G06F 1/02

U.S. Cl. 364—718

10 Claims



1. A frequency synthesizer comprising:

- (a) a plurality of processing paths to provide synthesis information in real-time about a signal being synthesized, each path providing a portion of the total information required to synthesize the signal, each processing path comprising:
  - (1) a selectable-increment counting means for producing a progressive series of counts in response to a train of clock signals, and
  - (2) a memory means containing a

- plurality of data words and operative to recall and output a data word in response to and associated with each count, each data word containing signal synthesis information about a signal being synthesized,
- (b) means for time ordering the information from the processing paths into an ordered data word stream,
- (c) a means for converting the data word stream into the signal being synthesized,
- (d) means for progressively offsetting the counts in the respective paths' counting means at the start of synthesis in relation to each other by integer multiples of an increment derived from the frequency of the signal being synthesized, and
- (e) means for providing during synthesis a constant increment for all of the paths' counting means equal to the number of paths times the derived increment.

4,958,311

## COMPOSITE FINITE IMPULSE RESPONSE DIGITAL FILTER

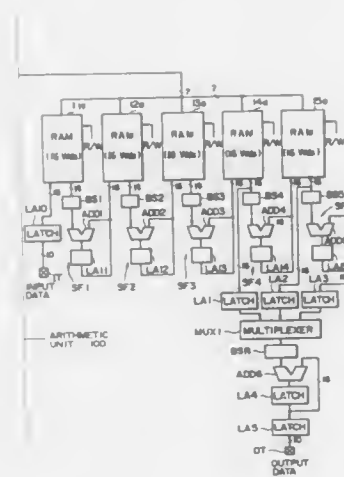
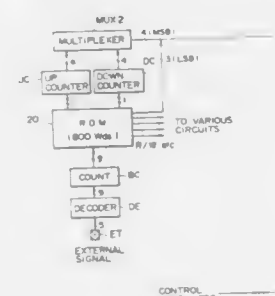
Yukio Kadowaki, Mino; Shigeki Matsuoka, Suita, and Shogo Nakamura, Matsudo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 27, 1989, Ser. No. 328,970

Claims priority, application Japan, Mar. 25, 1988, 63-72788  
Int. Cl.<sup>5</sup> G06F 15/31

U.S. Cl. 364—724.01

5 Claims



1. A composite finite impulse response digital filter including a cascade arrangement of sub-filters, and a first latch for storing data input into a first one of said sub-filters, each of said sub-filters comprising:

- a barrel shifter which in the case of the first sub-filter in the cascade shifts data output from said first latch and in the case of each other sub-filter in the cascade shifts data output from the preceding sub-filter in the cascade, wherein each barrel shifter shifts the respective data input thereto to a selected one of the least significant bit side and

- the most significant bit side of the data over a number of shifts corresponding to a first control signal;
- first adding means having first and second input terminals for adding data input into the first input terminal from the respective barrel shifter and data input into the second input terminal; and
- second storing means for temporarily storing data output from said first adding means and outputting said data thus stored to the second input terminal of said first adding means and also, in the case of all but the last sub-filter in the cascade, to an input terminal of the next sub-filter in the cascade;
- wherein an output terminal of a preceding sub-filter is connected to an input terminal of the next sub-filter to have said sub-filters connected in series; and
- said digital filter including a multiplying and adding means for multiplying data output from each of a selected number of said sub-filters by a multiplier factor corresponding to a second control signal and adding the thus multiplied data to produce added data which in turn are output as output data of said cascade.

4,958,313

## CMOS PARALLEL-SERIAL MULTIPLICATION CIRCUIT AND MULTIPLYING AND ADDING STAGES THEREOF

Arnold Uhlenhoff, Emmendingen, Fed. Rep. of Germany, assignor to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany

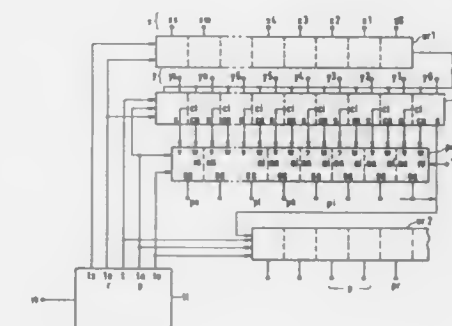
Filed Feb. 6, 1989, Ser. No. 307,125

Claims priority, application European Pat. Off., Mar. 19, 1988, 88104413

Int. Cl.<sup>5</sup> G06F 7/52

U.S. Cl. 364—757

20 Claims



## DIGITAL MULTIPLIER CIRCUIT AND A DIGITAL MULTIPLIER-ACCUMULATOR CIRCUIT WHICH PRELOADS AND ACCUMULATES SUBRESULTS

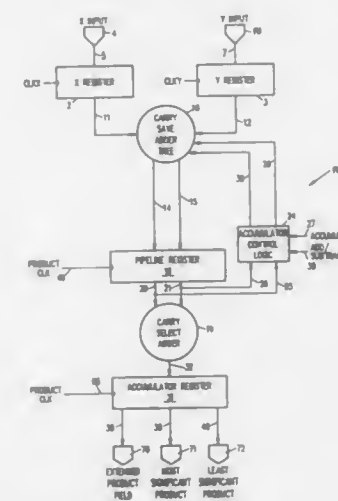
Peng-Huat Ang, Los Altos, and Charles C. Stearns, Palo Alto, both of Calif., assignors to LSI Logic Corporation, Milpitas, Calif.

Filed Nov. 9, 1987, Ser. No. 118,496

Int. Cl.<sup>5</sup> G06F 7/48

U.S. Cl. 364—754

9 Claims



- 6. A digital multiplier-accumulator circuit comprising:
  - first and second input registers, each having an input and an output;
  - a carry save adder tree circuit having a first input circuit connected to the output of said first and second input registers, and having a second input circuit, and an output circuit;
  - a pipeline register having an input and an output;
  - means connecting the input of said pipeline register to the output circuit of said carry save adder tree;
  - accumulator control logic means having an input connected to the output of said pipeline register, and having an output connected to said second input circuit of said carry save adder tree;

- 1. An integrated multiplication circuit, for binary multiplication of a multiplicand of M bits and a multiplier of N bits where M and N are positive integers, comprising:
  - an input shift register receiving the M bits of the multiplicand in parallel and reading out the M bits serially when clocked by an internal clock signal;
  - a single chain having a plurality of multiplying stages, wherein each multiplying stage receives a respective one of the N bits of the multiplier at one input and each of the M bits of the multiplicand in succession at another input, and performs partial product multiplications successively between said respective one bit of the multiplier and each of the M bits of the multiplicand when they are serially read-out from said input shift register so as to output respectively-derived sum and carry bit outputs;
  - a parallel adder having a plurality of adding stages corresponding to respective ones of said plurality of multiplying stages, wherein each adding stage receives in parallel the sum bit output of one of said multiplying stages at one input and the carry bit output of a next adjacent one of said multiplying stages at an other input, and adds the received inputs successively and outputs a respective sum bit output;
  - an output shift register for serially receiving the sum bit outputs from said parallel adder when clocked by said internal clock signal; and
  - a clock driver for providing said internal clock signal for clocking the operation of said multiplication circuit in accordance therewith.



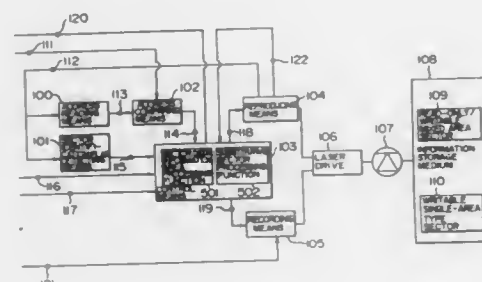
# 4,958,314 INFORMATION RECORDING/REPRODUCING APPARATUS

Yoshihiko Imai, Hirakata; Yoshio Nakano, Takatsuki; Makoto Ando, Itami; Yoshiyuki Iwamura, Ibaraki, and Takashi Ishida, Kadoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 11, 1987, Ser. No. 13,407  
Claims priority, application Japan, Feb. 18, 1986, 61-34527;  
Feb. 18, 1986, 61-34528; Jan. 20, 1986, 61-145102

Int. Cl.<sup>5</sup> G11B 19/02  
U.S. Cl. 364—900

9 Claims



1. An information recording/reproducing apparatus comprising:

an information storage medium having a plurality of tracks divided into a plurality of sectors of first and second types, a first type sector having a sector identification section, a read/write data section and a read-only data section, and a second type sector having a sector identification section and a read/write data section, said sector identification section of each type sector including a sector type identification flag for identification of the respective sector type and a record state identification flag for identification of record state of the respective type sector as a "not-updated" state or as an "already-updated" state; reproducing means for reproducing information from said first and second type sectors; recording means for recording information into said first and second type sectors; and control means for controlling said reproducing means in an information reproducing mode so that:

- information is reproduced from said read-only data section of a selected said first type sector when a selected first type sector is detected as having a "not-updated" state,
- information is reproduced from said read/write data section of a selected first type sector when a selected first type sector is detected as having an "already-updated" state, and
- information is reproduced from said read-only data section of a selected second type sector when said second type sector is detected;

said control means controlling said recording means in an information recording mode so as to change information in said sector identification section of a selected first type sector into information representing a "first type sector" and an "already-updated" state and to record information into said read/write data section of a selected first type sector when the information in the sector identification section thereof represents the "first type sector", and to record information into said read/write data section in a selected second type sector when the information in said sector identification section of a selected second type sector represents the "second type sector".

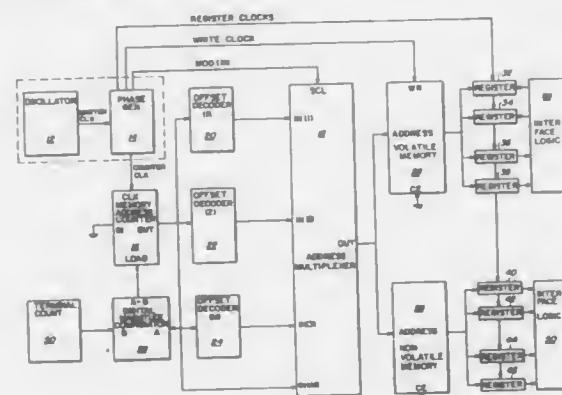
# 4,958,315 SOLID STATE ELECTRONIC EMULATOR OF A MULTIPLE TRACK MOTOR DRIVEN ROTATING MAGNETIC MEMORY

Kris S. Balch, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 2, 1985, Ser. No. 751,350  
Int. Cl.<sup>5</sup> G06F 3/00, 12/00

U.S. Cl. 364—900

17 Claims



1. A system for emulating the memory characteristics of a motor-driven rotating magnetic drum memory having a plurality of data storage channels on said drum and multiple magnetic heads per data storage channel, each of said data storage channels being positioned circumferentially adjacent to at least one of said other data storage channels comprising:

- means for emulating said multiple magnetic heads per each said data storage channel on said magnetic drum and for emulating a physical separation between each of said multiple magnetic heads per each said data storage channel comprising:
- a clock;
  - first means connected to said clock for electronically emulating the rotational timing characteristics of said rotating magnetic drum memory and for generating a series of data address signals;
  - second means connected to said first means for receiving said series of data address signals and for changing each of said series of data address signals by a predetermined amount to thereby generate a new series of data address signals;
  - third means connected to said second means for electronically emulating said plurality of data storage channels; and
  - fourth means connected to said third means for electronically emulating said multiple magnetic heads.

# 4,958,316 STATIC RANDOM ACCESS MEMORY

Kiyofumi Ochi, Yokohama; Masataka Matsui, Tokyo, and Osamu Ozawa, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

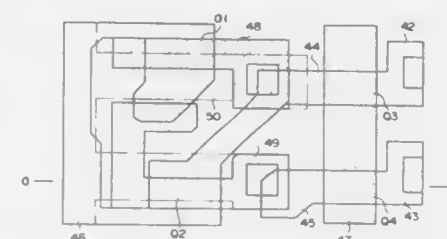
Filed Dec. 22, 1988, Ser. No. 288,199  
Claims priority, application Japan, Dec. 23, 1987, 62-325688  
Int. Cl.<sup>5</sup> G11C 13/00

U.S. Cl. 365—63

8 Claims

2. A static random access memory comprising:
- a semiconductor substrate;
  - a well region formed in the substrate and containing at least one memory cell;
  - bias-voltage generating means connected to the well region

for generating a bias voltage to be applied to the well region; and



a bonding pad formed on the substrate, to which a control signal for controlling the bias-voltage generated by the bias-voltage generating means is supplied.

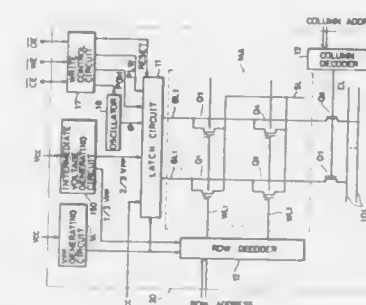
# 4,958,317 NONVOLATILE SEMICONDUCTOR MEMORY DEVICE AND A WRITING METHOD USING ELECTRON TUNNELING

Yasushi Terada; Kazuo Kobayashi, and Takeshi Nakayama, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 27, 1988, Ser. No. 224,743  
Claims priority, application Japan, Jul. 27, 1987, 62-187962  
Int. Cl.<sup>5</sup> G11C 7/00, 16/02

U.S. Cl. 365—104

10 Claims



1. A nonvolatile semiconductor memory device comprising a memory cell array in which a plurality of word lines and a plurality of bit lines are arranged intersecting with each other, a memory cell being arranged at each of the intersections of the word lines and bit lines, each memory cell formed of one memory transistor having a floating gate, a word line connected to each control gate electrode of each of the memory transistors in the same row and a bit line connected to each drain electrode of each of the memory transistors in the same column, for storing information in each memory cell in a non-volatile manner, said device comprising:

- means for generating a high voltage selected to be higher than the ground voltage and sufficient to generate electron tunneling in said memory transistor;
- means for generating at least one intermediate voltage selected to be higher than the ground voltage and lower than said high voltage, with at least one of the differences between the intermediate voltage and the ground voltage and between the intermediate voltage and said high voltage being insufficient to generate electron tunneling in said memory transistor;
- latch means for storing data for at least one of said word lines to be written in said memory transistor; and
- data writing means for simultaneously writing data stored in said latch means in said plurality of memory transistors connected to a word line selected by an address signal, by

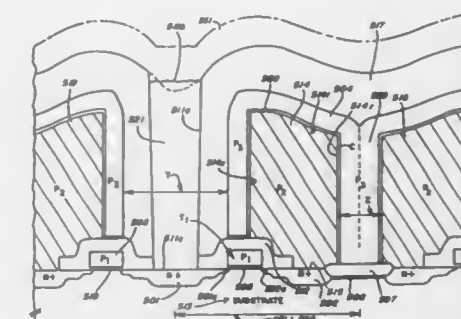
applying the ground voltage, said high voltage and said intermediate voltage to said word line and said bit line such that the electron tunneling is generated only in the memory transistor specified by the externally inputted address signal and the stored content of said latch means in data writing.

# 4,958,318 SIDEWALL CAPACITOR DRAM CELL

Eliyahu Harari, 2320 Friars La., Los Altos, Calif. 94022  
Filed Jul. 8, 1988, Ser. No. 216,873

Int. Cl.<sup>5</sup> G11C 7/00, 11/24; H01L 29/78  
U.S. Cl. 365—149

53 Claims



1. A semiconductor storage capacitor structure comprising: a semiconductor substrate having a top surface; a first conductive layer formed above said top surface of said semiconductor substrate, and serving as first electrode of said capacitor, said first conductive layer having a top surface; a trench formed into said first layer but not into said semiconductor substrate, said trench having substantially vertical sidewalls positioned above said top surface of said semiconductor substrate; a layer of storage dielectric formed on said sidewalls of said trench and on at least a portion of said top surface of said first conductive layer; and a second conductive layer formed on said layer of dielectric and serving as a second electrode of said capacitor, wherein the capacitance from said sidewalls is at least as large as the capacitance from said top surface of said first conductive layer.

# 4,958,319 ADDRESS AMPLIFIER CIRCUIT HAVING AUTOMATIC INTERLOCK AND PROTECTION AGAINST MULTIPLE ADDRESSING FOR USE IN STATIC GAAS RAMS

Paul-Werner von Basse, Wolfratshausen; Jean-Marc Dorta, Munich; Andrea Herlitzke, Munich; Dieter Kohlert, Munich, and Ulrich Schaper, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 19, 1989, Ser. No. 409,578  
Claims priority, application Fed. Rep. of Germany, Oct. 14, 1988, 3835116

Int. Cl.<sup>5</sup> G11C 11/00

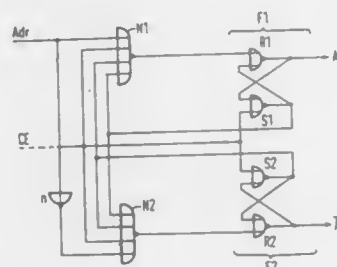
U.S. Cl. 365—154

2 Claims

1. An address amplifier circuit for static RAMs having an address signal line (ADR), a first output signal line (A) and a second output signal line (A'), comprising:

- a first flip flop (F1) having a first reset logic element (R1) and a first set logic element (S1), and a second flip flop (F2) having a second reset logic element (R2) and a second set logic element (S2);

a first NOR logic element (N1) and a second NOR logic element (N2);  
a chip-enable signal line (CE) connected respectively to first inputs of the first NOR logic element (N1), of the second NOR logic element (N2), of the first set logic element (S1) and of the second set logic element (S2);  
the address signal line (ADR) connected to a second input of the first NOR logic element (N1) and, via an inverter (n), to a second input of the second NOR logic element (N2);  
outputs of the first set logic element (S1) and of the second



set logic element (S2) respectively connected to third and fourth inputs of the first NOR logic element (N1) and of the second NOR logic element (N2);  
an output of the first NOR logic element (N1) connected to a first input of the first reset logic element (R1) and an output of the second NOR logic element (N2) connected to a first input of the second reset logic element (R2); and  
an output of the first reset logic element (R1) connected to the first output signal line (A) and an output of the second reset logic element (R2) connected to the second output signal line (A).

4,958,320

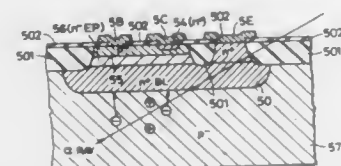
## RADIATION RESISTANT BIPOLAR MEMORY

Noriyuki Homma, Kodaira; Tohru Nakamura, Tanashi; Kazuo Nakazato, Kokubunji; Motoaki Matsumoto, Ome; Tetsuya Hayashida, Hinodemachi; Masaharu Kubo, Hachioji, and Kazuhiko Sagara, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Continuation of Ser. No. 42,696, Apr. 27, 1987, which is a continuation-in-part of Ser. No. 792,286, Oct. 28, 1985. This application Jun. 2, 1989, Ser. No. 361,633  
Claims priority, application Japan, Oct. 29, 1984, 59-225738; Oct. 29, 1984, 59-225737; Oct. 29, 1984, 59-225736; Oct. 31, 1984, 59-227730; Mar. 20, 1985, 60-54404; Apr. 30, 1986, 61-97929

Int. Cl.<sup>5</sup> G11C 11/40

U.S. Cl. 365-174

30 Claims



1. A semiconductor device comprising:  
a semiconductor substrate;  
memory cells, each of which comprises first and second inverse-mode bipolar transistors cross-coupled with each other, provided on the semiconductor substrate, and first and second load devices provided on the semiconductor substrate;  
word lines for selecting the memory cells, provided on the semiconductor substrate;

bit lines for reading and writing information of the memory cells, provided on the semiconductor substrate; and  
coupling devices for electrically coupling the bit lines and memory cells, provided on the semiconductor substrate  
wherein:  
the first inverse-mode bipolar transistors comprise buried layers,  
the second inverse-mode bipolar transistors comprise buried layers,  
the first load devices comprise buried layers,  
the second load devices comprise buried layers,  
the buried layers of the first inverse-mode bipolar transistors are isolated from the buried layers of the first and second load devices,  
the buried layers of the second inverse-mode bipolar transistors are isolated from the buried layers of the first and second load devices;  
the first inverse-mode bipolar transistors employ the buried layers as emitters, and  
the second inverse-mode bipolar transistors employ the buried layers as emitters.

4,958,321

## ONE TRANSISTOR FLASH EPROM CELL

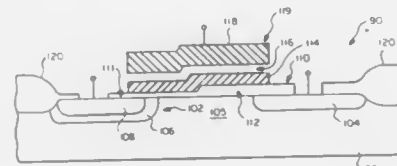
Chi Chang, Redwood City, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Sep. 22, 1988, Ser. No. 247,887

Int. Cl.<sup>5</sup> G11C 11/40

U.S. Cl. 365-185

27 Claims



1. An electrically programmable and erasable semiconductor device, provided on a substrate, comprising:  
a drain region provided in the substrate;  
a source region provided in the substrate, said source region comprising a first lightly doped source region and a second heavily doped source region provided in said first source region and being spaced from said drain region to define a channel region therebetween;  
dielectric means for limiting tunnelling during programming and allowing tunnelling during erasing, said dielectric means comprising a tunnelling dielectric having a first thickness provided on a portion of said source region and a gate oxide having a second thickness greater than said first thickness provided on a portion of said channel and a portion of said drain region;  
a floating gate provided on said dielectric means;  
an inter-gate dielectric provided on said floating gate; and  
a control gate provided on said inter-gate dielectric.

4,958,322

## SEMICONDUCTOR PSEUDO MEMORY MODULE

Ryuichi Kosugi, and Tsugio Tabaru, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 6, 1989, Ser. No. 376,067

Claims priority, application Japan, Jul. 6, 1988, 63-168424

Int. Cl.<sup>5</sup> G11C 13/00

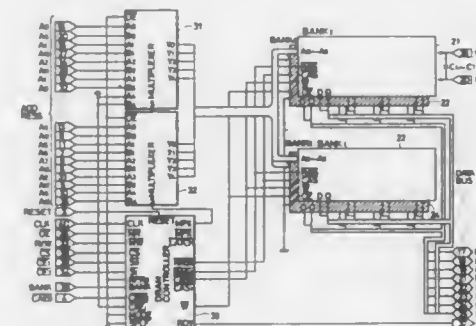
U.S. Cl. 365-189.01

4 Claims

1. A semiconductor pseudo memory module in which func-

tions of a static random access memory are provided by a dynamic random access memory, comprising:

- a multilayer wiring substrate having external connection terminals;
- a plurality of dynamic random access memory devices mounted on said substrate;
- a semiconductor multiplexing device mounted on said substrate for converting address signals applied to said con-



nection terminals into address signals compatible to said dynamic random access memory devices; and  
a semiconductor refresh control device mounted on said substrate and responsive to signals applied to said external dynamic random access memory;  
at least two of said dynamic random access memory devices, said multiplexing device and said refresh control device being interconnected through multiple wiring layers of said substrate.

4,958,323

## SEMICONDUCTOR FILE MEMORY

Ken Sugawara, Ibaraki; Katsujiro Nakamura, Toride; Mikio Matoba, Ibaraki, and Shigeru Sakairi, Tsukuba, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

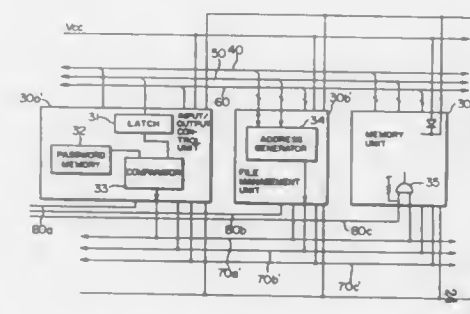
Filed Sep. 13, 1988, Ser. No. 243,837

Claims priority, application Japan, Sep. 14, 1987, 62-230070

Int. Cl.<sup>5</sup> G11C 13/00

U.S. Cl. 365-189.01

5 Claims



1. A semiconductor file memory, used as an external memory for an information processor such as an arithmetic processor, comprising:

- interface means for transacting data with said information processor;
- a plurality of memory units each including semiconductor memory devices mounted on a substrate and having identical terminal assignments in connection commonly to a bus of said interface means through a connector;
- a control circuit unit having identical terminal assignments as said connectors of said memory units and operating to control said memory units by taking the place of at least one of said memory units; and  
a selection circuit for selecting one of said memory units or

said control circuit unit which has taken the place of a memory unit in response to a signal from said interface means.

4,958,324

## METHOD FOR THE TESTING OF ELECTRICALLY PROGRAMMABLE MEMORY CELLS, AND CORRESPONDING INTEGRATED CIRCUIT

Jean Devin, Aix En Provence, France, assignor to SGS-Thomson Microelectronics SA, Gentilly, France

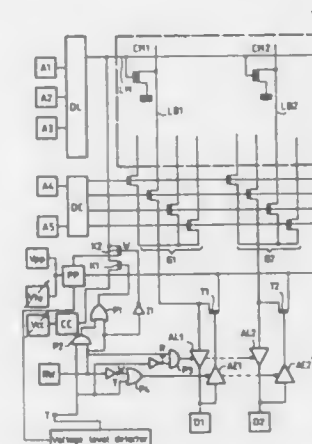
Filed Nov. 9, 1988, Ser. No. 269,169

Claims priority, application France, Nov. 24, 1987, 87-16236

Int. Cl.<sup>5</sup> G11C 13/00; G06F 11/00

U.S. Cl. 365-201

9 Claims



1. A method for the testing of an electrically programmable memory comprising cells addressable in reading in programming mode by word lines, the binary state of the cells being capable of being read or written from bit lines, and a programming terminal being provided to receive and apply, to a bit line, a higher programming voltage than the voltages applied in reading mode, wherein said method, in order to test a cell, a read voltage is applied to a word line, the bit line is connected to the programming terminal, said programming terminal is connected to a source of test voltage with a much lower value than that of the programming voltage and a current flowing between this terminal and the test voltage source is measured.

4,958,325

## LOW NOISE SEMICONDUCTOR MEMORY

Yoshinobu Nakagome, Albany, Calif.; Kiyoo Itoh, Higashikurume, Japan; Masakazu Aoki, Tokorozawa, Japan; Shin-ichi Ikenaga, Koganei, Japan; Masashi Horiguchi, Kokubunji, Japan, and Hitoshi Tanaka, Tachikawa, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 31, 1988, Ser. No. 238,375

Claims priority, application Japan, Sep. 4, 1987, 62-220224; Sep. 18, 1987, 62-232116

Int. Cl.<sup>5</sup> G11C 7/00, 7/02, 11/40A

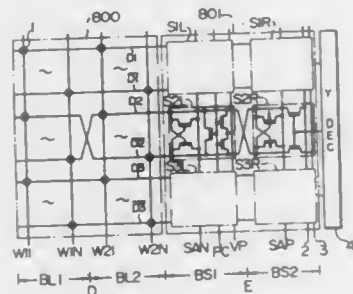
U.S. Cl. 365-206

26 Claims

1. A semiconductor memory comprising:  
a plurality of pairs of data lines arranged in substantially parallel relationship with each other, respective pairs having substantially the same electric characteristics;  
a plurality of word lines arranged to extend perpendicularly to said data line pairs;  
at least one memory cell connected to at least one of intersections of said word lines with data lines of said pairs; and  
a plurality of sense amplifier means for differentially detecting signals appearing on each data line pair, said amplifier means electrically connected to said data line pairs,



wherein each of the plurality of sense amplifier means comprises a first sense amplifier that drives one of the data lines in the pair to a low-level voltage and a second sense amplifier that drives the other of the data lines in the pair to a high-level voltage, and the data lines of at least one of



said plural data line pairs are transposed in location at a predetermined place along a length of said data line pair, and, said sense amplifier means is operative to change symmetrically voltage on one of the data lines of a pair to a high-level voltage and voltage on the other of the data lines of the pair to a low-level voltage.

#### 4,958,326 SEMICONDUCTOR MEMORY DEVICE HAVING A FUNCTION OF SIMULTANEOUSLY CLEARING PART OF MEMORY DATA

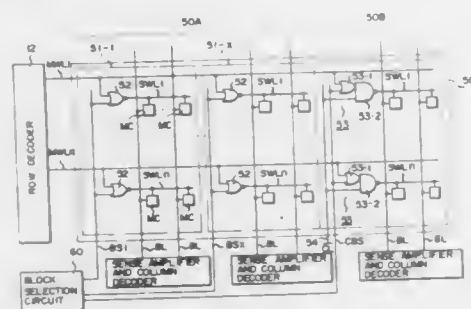
Takayasu Sakurai, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 22, 1988, Ser. No. 274,555

Claims priority, application Japan, Nov. 30, 1987, 62-302678  
Int. Cl.<sup>3</sup> G11C 7/00

U.S. Cl. 365—218

19 Claims



1. A semiconductor memory device comprising:  
a first memory cell array section having memory cells arranged in a matrix form;  
row decoder means for selecting rows of the memory cells in said first memory cell array section;  
first column decoder means for selecting columns of the memory cells in said first memory cell array section;  
a second memory cell array section having memory cells arranged in a matrix form whose rows correspond to those of said first memory cell array section;  
second column decoder means for selecting columns of the memory cells in said second memory cell array section;  
said second column decoder means selecting one of the columns in said second memory cell array section in the normal operation mode when none of the columns of the memory cells in said first memory cell array section is selected by said first column decoder means, selecting none of the columns of said second memory cell array section when any one of the columns of the memory cells in said first memory cell array section is selected by said first column decoder means, and selecting all of the col-

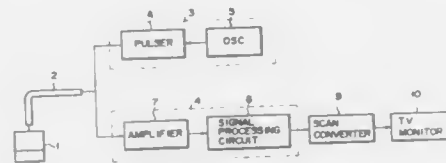
umns of said second memory cell array section when the same data is simultaneously written into all the memory cells in said second memory cell array section; and  
logic gate means, provided between corresponding rows of the memory cells of said first and second memory cell array sections, for connecting the rows of the memory cells in said first memory cell array section to respective rows of the memory cells in said second memory cell array section in the normal operation mode so as to permit an output from said row decoder means to be transmitted to said second memory cell section, and for setting each of the rows of the memory cells in said second memory cell array section to a selected level when the same data simultaneously written into all the memory cells in said second memory cell array section.

#### 4,958,327 ULTRASONIC IMAGING APPARATUS

Shiroh Saitoh, Yokohama; Mamoru Izumi, Tokyo; Syuzi Suzuki, and Kazuhide Abe, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Aug. 31, 1988, Ser. No. 238,399  
Claims priority, application Japan, Aug. 31, 1987, 62-216660  
Int. Cl.<sup>3</sup> G01S 15/00

U.S. Cl. 367—7

14 Claims



1. An ultrasonic imaging apparatus comprising:  
ultrasonic transducer means for outputting an ultrasonic beam and converting an echo of the ultrasonic beam into an echo signal;  
transmitting means for supplying a drive signal to said ultrasonic transducer means to cause said ultrasonic transducer means to output the ultrasonic beam;  
receiving means for receiving the echo signal output from said ultrasonic transducer means and converting the echo signal into an image signal; and  
cable means, having a predetermined capacitive impedance, for coupling said ultrasonic transducer means to said transmitting and receiving means so as to transmit the drive and echo signals,  
wherein said ultrasonic transducer means comprises an ultrasonic transducer having a capacitive impedance of about 70 to 120 ohms lower than that of said cable means and is coupled without an impedance converter to said transmitting and receiving means.

#### 4,958,328 MARINE WALKAWAY VERTICAL SEISMIC PROFILING

Steven A. Stubblefield, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Jul. 24, 1989, Ser. No. 383,472

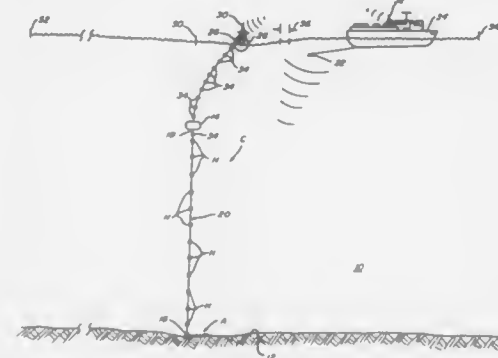
Int. Cl.<sup>3</sup> G01V 1/38

U.S. Cl. 367—15

11 Claims

1. A method of marine vertical seismic profiling, comprising the steps of:  
(a) locating a marine seismic cable having plural hydrophones in a substantially vertical position in a body of water;  
(b) towing a seismic source behind a vessel along a seismic line of profile past the seismic cable;  
(c) activating the seismic source at periodic intervals corresponding to shotpoint intervals to emit seismic waves into subsurface formations beneath the body of water;

(d) sensing the response of the subsurface formations to the emitted seismic waves with the plural hydrophones; and



(e) recording the sensed response of the hydrophones as seismic data.

#### 4,958,329 HYDROPHONE AND ARRAY THEREOF

Richard A. Marschall, 42 Glenwood Dr., Smithtown, N.Y. 11787  
Filed Feb. 13, 1989, Ser. No. 310,301  
Int. Cl.<sup>3</sup> G01V 1/38

U.S. Cl. 367—20

16 Claims



1. A low noise hydrophone of the type towed by a cable comprising:  
a hydrodynamically smooth shape, having a nose section further comprising a smoothly increasing cross-sectional diameter from a point of attachment to said towing cable to a point of maximum cross-sectional diameter, having a smoothly decreasing cross-sectional diameter from said point of maximum cross-sectional diameter to a point of attachment to a tail bridle, defining a tail section thereof; said point of maximal cross-sectional diameter being located substantially closer to said tail bridle attachment than to said point of attachment to said towing cable; and  
an active hydrophone acoustic sensor within said hydrophone being located substantially forward of said point of maximal cross-sectional diameter.

#### 4,958,330 WIDE ANGULAR DIVERSITY SYNTHETIC APERTURE SONAR

Francis J. Higgins, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 3, 1980, Ser. No. 208,086

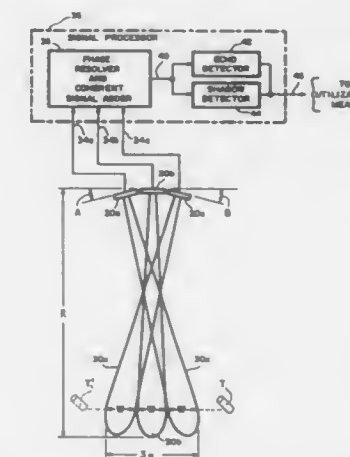
Int. Cl.<sup>3</sup> G01S 15/00

U.S. Cl. 367—88

8 Claims

1. A side-looking sonar apparatus comprising:  
vehicle means for travel along a path of forward movement;  
a plurality of electro-acoustic transducers carried by said vehicle and each adapted to generate a plurality of electrical signals corresponding to received acoustic energy reflected within corresponding ones of a plurality of response beams each having a narrow fore-and-aft dimension;  
said transducers being disposed at small angles relative to one another, whereby said beams cross one another at an intermediate location between their origin and the maxi-

mum range of said apparatus, and the distal portions of said beams lie adjacent to one another, whereby an object in the range of said distal positions is swept successively by said beams; and



signal processing means, responsive to said plurality of electrical signals, for combination thereof to provide output signals characteristic of the presence of said objects.

#### 4,958,331 TOWED SONAR RECEIVING ARRAY

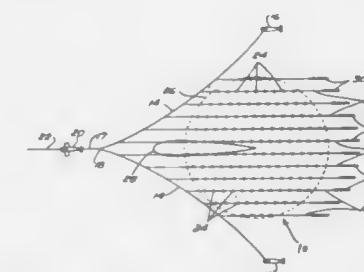
William F. Wardle, Mystic, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 25, 1974, Ser. No. 446,573

Int. Cl.<sup>3</sup> G01S 15/00

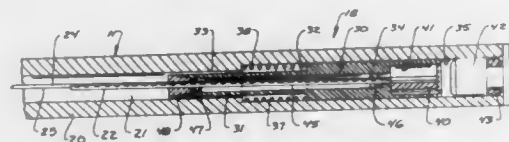
U.S. Cl. 367—130

8 Claims



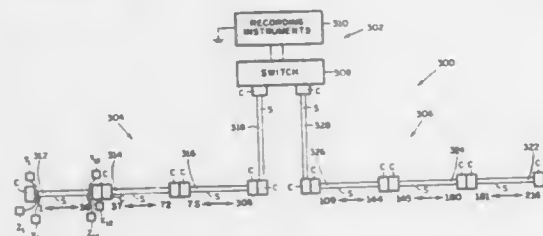
1. A sonar surveillance configuration suitable for towing comprising:  
a plurality of receiving devices arranged in a populated circle with random spacing between said receiving devices;  
control means connected to said receiving devices for maintaining the arranged configuration, said control means further comprises a pair of spreader lines connected to each other at one end, a pair of paravanes connected to the respective other ends of said spreader lines for positioning said spreader lines, and a plurality of spaced lines connected to said spreader lines and arranged so that said spaced lines are parallel to each other when towed; and  
towing means suitable for being connected to said control means.

**4,958,332**  
**DAMPING DEVICE FOR SONIC WAVEGUIDES**  
 Jacob Tellerman, Bayside, N.Y., assignor to MTS Systems Corporation, Eden Prairie, Minn.  
 Filed Sep. 11, 1989, Ser. No. 405,473  
 Int. Cl. H04R 15/00  
 U.S. Cl. 367-140 12 Claims



1. A damping device for a vibrating elongated member comprising a housing having an interior chamber, said elongated member comprising a magnetostrictive waveguide having vibrations induced therein, means mounting said housing on said elongated member with the interior chamber open to the elongated member, and a filling of viscous material in said interior chamber having a desired mass density and coupled to the elongated member for absorbing energy of vibrations of said elongated member within said chamber.

**4,958,333**  
**SHIELDING FOR SEISMIC CABLES**  
 John T. O'Brien, San Antonio, Tex., assignor to Southwest Research Institute, San Antonio, Tex.  
 Filed Jan. 12, 1989, Ser. No. 297,453  
 Int. Cl. H01B 11/06  
 U.S. Cl. 367-154 6 Claims

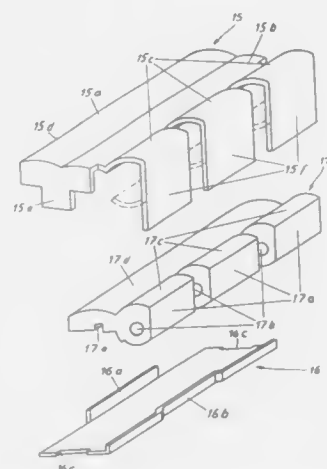
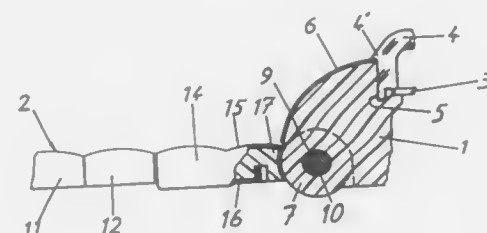


2. A method for shielding a seismic cable in a seismic data acquisition system utilizing a plurality of sensors, wherein said cable has a plurality of wire pairs therein, comprising the steps of:  
 selectively activating selected ones of said wire pairs; and simultaneously grounding other ones of said wire pairs such that said grounded wire pairs are distributed in a substantially uniform manner across a cross-section of said cable.

**4,958,334**  
**BRACELET OF METALLIC CONSTRUCTION AND WATCH PROVIDED WITH SUCH A BRACELET**  
 Laurent Grosjean, Neuchâtel, Switzerland, assignor to ETA SA Fabriques d'Ebauches, Grenchen, Switzerland  
 Filed Aug. 23, 1989, Ser. No. 397,733  
 Claims priority, application Switzerland, Aug. 24, 1988, 03143/88  
 Int. Cl. G04B 37/00  
 U.S. Cl. 368-282 8 Claims

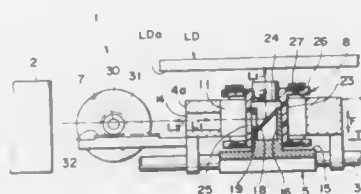
1. A watch including a case body of plastic material and a bracelet including two strands each of which is coupled to the case body by a hinge, said hinge including a first hinge knuckle integral with the case body and formed of the same material

and a second hinge knuckle of plastic material, said bracelet being of metal, said second hinge knuckle being rigidly fixed to



and confined within a hollow metallic link forming a metallic end part of the bracelet.

**4,958,335**  
**OPTICAL HEAD ASSEMBLY WITH A MINIMUM OF INERTIA AND FEASIBLE FOR HIGH-HIGH-SPEED ACCESS**  
 Takayuki Takeda, Hiroshi Masaki, and Isamu Nose, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Japan  
 Filed Dec. 19, 1988, Ser. No. 286,723  
 Claims priority, application Japan, Dec. 23, 1987, 62-324138; Dec. 23, 1987, 62-324139  
 Int. Cl. G11B 7/12  
 U.S. Cl. 369-44.14 12 Claims

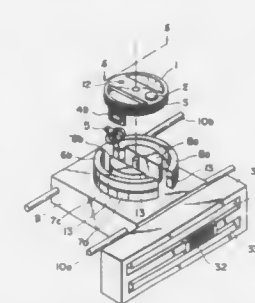


1. An optical head assembly for use with an optical disk apparatus for focusing a light beam issuing in a track traversing direction which is substantially parallel to a radial direction of an optical disk onto a recording medium surface of said optical disk from a focusing direction which is substantially perpendicular to said recording medium surface, and guiding a reflection from said recording medium surface along a same path as but

in the opposite direction to the light beam to record and/or reproduce information out of said optical disk, said assembly comprising:

magnetic circuit means comprising permanent magnets each being elongate in the track traversing direction and a yoke for forming a magnetic circuit which conducts a magnetic field generated by said permanent magnets, said yoke being provided with a first through hole extending throughout said yoke in the focusing direction, magnetic gaps located at opposite sides of said first through hole in the track traversing direction and each accommodating respective one of said permanent magnets, and a second through hole for admitting the light beam issuing in the track traversing direction to guide the light beam to said first through hole, said first through hole and said magnetic gaps each having a cross-section which is relatively long in the track traversing direction;  
 beam deflecting means loosely fitted in said first through hole for deflecting in the focusing direction the light beam which is incident to said beam deflecting means via said second through hole;  
 a carriage supporting said beam deflecting means;  
 an objective lens for focusing the light beam deflected by said beam deflecting means in the focusing direction onto said recording medium surface;  
 a lens holder holding said objective lens and mounted on said carriage movably in the focusing direction;  
 guide members supporting said magnetic circuit means and said carriage movably in the track traversing direction along said recording medium surface;  
 a focusing coil wound around said lens holder and partly contained in said magnetic gaps for, when a current is fed through said focusing coil, transporting said lens holder in the focusing direction in cooperation with the magnetic field which is developed by said permanent magnets;  
 tracking coils wound around said lens holder and partly contained in said magnetic gaps for, when a current is fed through said tracking coils, transporting said lens holder in the track traversing direction in cooperation with the magnetic field which is developed by said permanent magnets; and  
 drive means connected to said magnetic circuit means for transporting said magnetic circuit means in the track traversing direction along said recording medium surface with said magnetic circuit means being guided by said guide means.

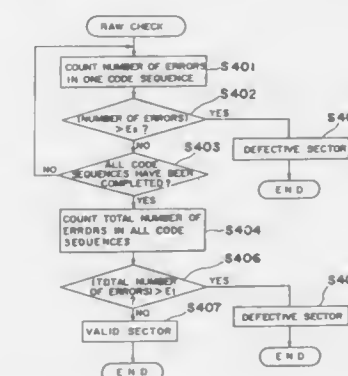
**4,958,336**  
**OPTICAL HEAD DEVICE**  
 Yasuo Suzuki, Tokyo, and Toru Tatsuno, Fuchu, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
 Continuation of Ser. No. 922,855, Oct. 24, 1986, abandoned.  
 This application Mar. 13, 1989, Ser. No. 323,224  
 Claims priority, application Japan, Nov. 8, 1985, 60-249016  
 Int. Cl. G11B 7/08  
 U.S. Cl. 369-44.21 4 Claims



1. An optical head comprising:  
 a light source for emitting a light beam;  
 an optical member for guiding the light beam emitted from

said light source to an object to be irradiated, said optical member having an optical axis;  
 a single member optical head body in which said optical member is installed;  
 a support shaft directly secured to said optical head body by being pressed therein, said support shaft being secured substantially free from inclination with respect to the optical axis of said optical member;  
 an objective holding member movably supported by said support shaft;  
 an objective for condensing the light beam passing through said optical member onto the object, said objective being held by said objective holding member;  
 drive means for moving said objective relative to said optical head body; and  
 a motor for moving said optical head body.

**4,958,337**  
**DISK RECORDING CHECKING METHOD FOR DETERMINING IF A DISK IS DEFECTIVE BY THE NUMBER OF ERRORS PRESENT**  
 Toshihiro Yamanaka, Ikoma; Nobuyuki Horie, Yamatokoriyama; Shozou Kobayashi; Toshihisa Deguchi, both of Nara; Takeshi Yamaguchi, Tenri; Shigemi Maeda, Yamatokoriyama; Yoshiki Nishio, Tenri, and Teruki Sugiura, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
 Continuation of Ser. No. 16,932, Feb. 20, 1987, abandoned. This application Apr. 28, 1989, Ser. No. 344,530  
 Claims priority, application Japan, Feb. 20, 1986, 61-36067; Feb. 26, 1986, 61-40801; Feb. 26, 1986, 61-40803  
 Int. Cl. G11B 19/00  
 U.S. Cl. 369-58 7 Claims



1. A disk recording error checking method, comprising the steps of:  
 (a) establishing a predetermined number of acceptable errors;  
 (b) writing data onto a disk in a form of sectors, each sector being formed of code sequences, each code sequence including a data portion and a parity portion;  
 (c) reading a complete sector of data from the disk immediately after completing said step (b);  
 (d) counting a number of errors in one individual code sequence of the read sector;  
 (e) determining if the number of errors counted in said step (d) is greater than the predetermined number of acceptable errors established in said step (a);  
 (f) determining if all of the code sequences of the read sector have been processed by said steps (d) and (e) only when said step (e) has determined that the number of errors counted in said step (d) is not greater than the predetermined number of acceptable errors;  
 (g) repeating said steps (d), (e), and (f) only when said step (f)



has determined that all of the code sequences of the read sector have not been processed;

(h) indicating that the read sector of said step (c) is valid only when said step (f) has determined that all of the code sequences of the read sector have been processed; and

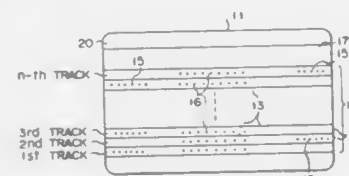
(i) setting the predetermined number of accepted errors to a value less than a number of correctable errors in each individual code sequence.

**4,958,339**  
**OPTICAL CARD WITH INCREASED DATA STORAGE CAPACITY AND RECORDING/REPRODUCING APPARATUS THEREFOR**

Ikuro Koyama, Tokyo, and Hajime Ohata, Yamato, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 3, 1989, Ser. No. 293,048  
Claims priority, application Japan, Jan. 7, 1988, 63-738; Jan. 13, 1988, 63-5120

Int. Cl.<sup>5</sup> G11B 3/74, 7/20  
U.S. Cl. 369—98 12 Claims

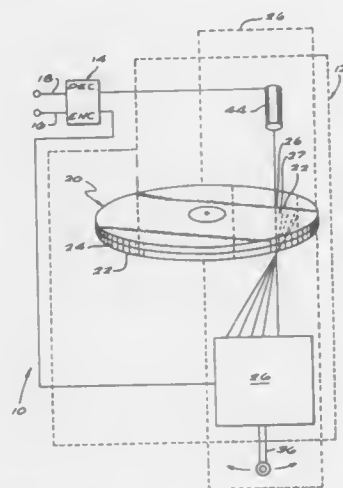


**4,958,338**  
**HIERARCHICALLY MULTIPLEXED OPTICAL RECORDING SYSTEM FOR STORAGE OF DIGITAL DATA**

William P. Miller, 581 Alta Vista Dr., Sierra Madre, Calif. 91024

Continuation-in-part of Ser. No. 936,237, Dec. 1, 1986, abandoned. This application Sep. 1, 1988, Ser. No. 239,617  
Int. Cl.<sup>5</sup> G11B 7/125

U.S. Cl. 369—59 7 Claims



1. A data storage system for converting a series of discrete units of incoming signal data into a single unit of stored information at a specific location of a data storing medium comprising:

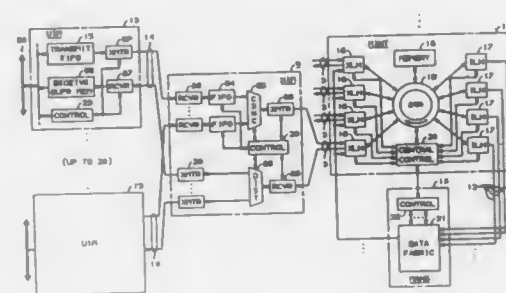
means for producing energy having a plurality of independently variable properties susceptible to recordation; means responsive to the units of incoming signal data for quantizing at least some of the variable properties at at least one of a plurality of quantization levels and in accordance with a hierarchical order between the properties and between the levels of each such property so that each recordable data value of the incoming signal corresponds to a respective unique combination of quantized properties; and means for recording the combination of quantized properties in a superimposed manner at the same storage location on the data-storing media.

**4,958,341**  
**INTEGRATED PACKETIZED VOICE AND DATA SWITCHING SYSTEM**

Jayant G. Hemmady, William P. Lidinsky, Scott B. Steele, all of Naperville; Werner Ulrich, Glen Ellyn, and Ronald C. Weddige, Western Springs, all of Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 31, 1988, Ser. No. 175,547

Int. Cl.<sup>5</sup> H04Q 11/04  
U.S. Cl. 370—60.1 9 Claims



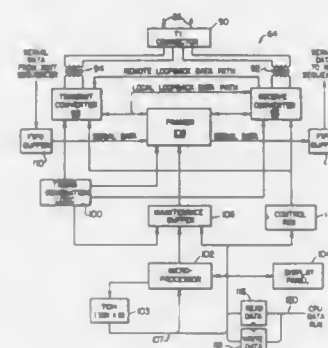
1. A system for switching voice signals comprising: means for converting said voice signals into voice packets; and means, connected to said means for converting, for packet switching said voice packets, comprising: a plurality of input packet handlers and a plurality of output packet handlers; memory access means for controlling storing and reading of said voice packets, comprising a plurality of memory access controllers for storing consecutive words of a voice packet in consecutive members of a plurality of memory modules; and means for distributing said voice packets from said plurality of input packet handlers to said plurality of memory ac-

cess controllers, for chaining packets to be transmitted to a common group of destinations, and for distributing said chained voice packets form said plurality of memory access controllers to said plurality of output packet handlers.

**4,958,342**  
**ADAPTIVE DIGITAL NETWORK INTERFACE**  
Stephen J. Williams, Denver, Colo., and Elden D. Traster, Richardson, Tex., assignors to Aristacom International, Inc., San Francisco, Calif.

Continuation of Ser. No. 234,262, Aug. 19, 1988, Pat. No. 4,935,925, which is a continuation of Ser. No. 24,345, Mar. 11, 1987, Pat. No. 4,882,727. This application Nov. 9, 1989, Ser. No. 435,276

Int. Cl.<sup>5</sup> H04J 3/06  
U.S. Cl. 370—79 26 Claims



1. A method of serially transmitting data bits over a plurality of time-multiplexed channels on a digital telecommunication circuit, comprising the steps of:

determining one or more time intervals associated with a first channel and one or more time intervals associated with a second channel;

transmitting data bits associated with said first channel during one or more of said time intervals associated with said first channel;

generating a non-data bit in response and subsequent to a predetermined pattern of transmitted data bits;

transmitting said non-data bit prior to transmitting a next data bit; and

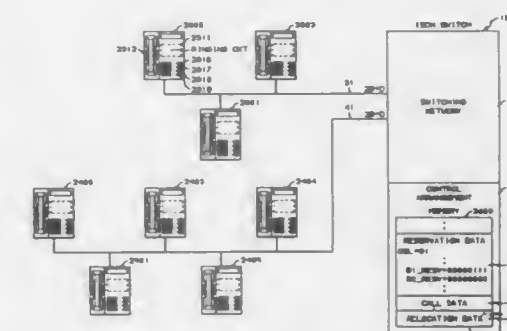
transmitting data associated with said second channel after transmitting a predetermined number of data and non-data bits associated with said first channel.

**4,958,343**  
**COMMUNICATION CHANNEL RESERVATION**  
Gabriela M. Abramovici, Naperville; Rolfe E. Buhrke, Westchester; Bopai Chandramouli, Aurora; Robert B. Dianda, Wheaton; Leo R. Katzenstein, Naperville; Thomas M. O'Connor, Naperville; Timothy G. Rinker, Naperville, and Susan J. Tripp, Warrenville, all of Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 30, 1988, Ser. No. 278,067  
Int. Cl.<sup>5</sup> H04L 5/22  
U.S. Cl. 370—85.1 55 Claims

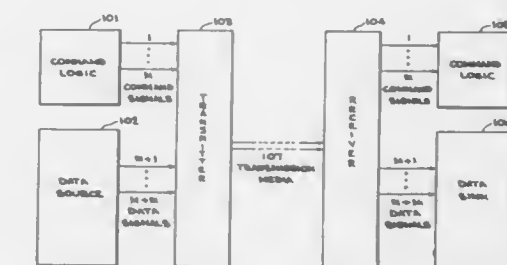
1. A method for a switching system connectable to a plurality of terminals by a single line comprising a plurality of communication channels, said method comprising receiving an incoming call and reserving one of said plu-

ality of channels, said reserving being for a multiple number of said terminals and for use in answering and



**4,958,344**  
**SYSTEM FOR TRANSMITTING AND RECEIVING ASYNCHRONOUS NONHOMOGENEOUS VARIABLE WIDTH PARALLEL DATA OVER A SYNCHRONOUS HIGH SPEED SERIAL TRANSMISSION MEDIA**  
Paul H. Scott, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 250,977, Sep. 23, 1988, abandoned, which is a continuation of Ser. No. 810,946, Dec. 18, 1985, abandoned. This application May 23, 1989, Ser. No. 355,890  
Int. Cl.<sup>5</sup> H04J 3/04, 3/22  
U.S. Cl. 370—112 171 Claims



1. A system which utilizes a synchronous serial transmission media to transmit data between a data source that generates asynchronous nonhomogeneous variable width parallel data pattern inputs, and a data sink that accepts parallel data pattern outputs corresponding to said inputs, comprising:

(a) transmitter means responsive to each of said parallel data pattern inputs, for synchronously transmitting a serial data pattern representative of a given input over said media; and

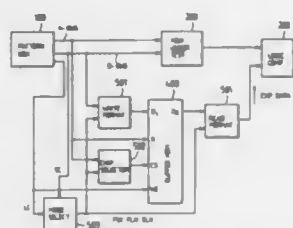
(b) receiver means, responsive to data transmitted over said media, for generating said parallel data pattern outputs.

**4,958,345**  
**MEMORY TESTING DEVICE**  
Kenichi Fujisaki, Gyoda, Japan, assignor to Advantest Corporation, Tokyo, Japan

Filed Dec. 21, 1988, Ser. No. 287,139  
Claims priority, application Japan, Dec. 29, 1987, 62-335812  
Int. Cl.<sup>5</sup> G06F 11/00 15 Claims

1. A memory testing device for testing a memory capable of effecting a write operation and a read operation in a pixel mode, a plane mode and a block mode, comprising:

pattern generating means for generating an address and data for supply to the memory under test;  
 buffer memory means which, letting the number of bits to be written in and read out of each address of the memory under test be represented by W, has  $W^2$  individual memory chips which define a matrix with W rows and W columns;  
 mode select means for generating a mode select signal for selecting and specifying the same mode as used in the memory under test for each of write and read operations;  
 chip select means, responsive to the mode select signal, for selecting the memory chips so that data generated by said pattern generating means is written in said buffer memory means in the same mode as used in the memory under test



and so that data stored in said buffer memory means is read out in the same mode as used in the memory under test;  
 write format means responsive to the mode select signal from said mode select means, for writing the same data as in the memory under test into said buffer memory means in the same mode as in the memory under test;  
 read format means responsive to the mode select signal, for reading said buffer memory means in the same mode as in the memory under test; and  
 logical comparison means which receives, as expected value data, the data output from said read format means, for comparing the data output from said read format means with data read out of the memory under test.

4,958,346

## MEMORY TESTING DEVICE

Kenichi Fujisaki, Gyoda, Japan, assignor to Advantest Corporation, Tokyo, Japan

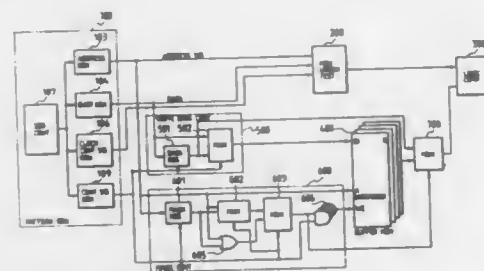
Filed Dec. 30, 1988, Ser. No. 292,100

Claims priority, application Japan, Jan. 11, 1988, 63-4181

Int. Cl.<sup>5</sup> G06F 11/00

U.S. Cl. 371-21.3

1 Claim



1. A memory testing device for testing a memory under test having a flash write mode, comprising:

- a pattern generator for generating an address and data, including flash write data and mask data, for input into the memory under test which produces read out data, said pattern generator also generating control signals;
- a buffer memory coupled to said pattern generator and having a data input terminal and at least the same storage

capacity as the memory under test, said buffer memory being accessed by the address from said pattern generator;  
 a data register, coupled to said pattern generator, for storing, in response to one of the control signals generated by said pattern generator, the flash write data generated by said pattern generator;  
 a first multiplexer, coupled to said buffer memory, said pattern generator and said data register for selecting, in response to one of the control signals from said pattern generator, one of the flash write data stored in said data register and the data generated by said pattern generator, and for providing the selected data to the data input terminal of said buffer memory;  
 a logical comparator, coupled to the memory under test and said buffer memory, for receiving, as an expected value, data read out of said buffer memory, and for making a logical comparison between the data read out of said buffer memory and the read out data from the memory under test;  
 a mask controller including a mask data register, coupled to said pattern generator, for storing, in response to one of the control signals from said pattern generator, the mask data which is input to the memory under test by said pattern generator, and mask control means for prohibiting writing of the output data from said first multiplexer into said buffer memory for bits corresponding to the mask data stored in said mask data register; and  
 a second multiplexer, coupled to said data register, said buffer memory, and said logical comparator, for selectively providing bits corresponding to one of the flash write data stored in said data register and the read-out data from said buffer memory in accordance with logical states of the corresponding bits of the mask data from said mask controller, the output data from said second multiplexer being provided as the expected value to said logical comparator;  
 said pattern generator including control signal generating means, coupled to said mask control means, for generating, as one of the control signals, a read/write control signal and providing it to said buffer memory via said mask control means for effecting read/write control of said buffer memory, so that, during each test cycle the readout of the row address area of the memory under test into which the flash write data has been written, the output expected value of said second multiplexer and the data read out of the memory under test are subjected to logical comparison by said logical comparator in a first half of each test cycle, and the data written in the data register while inhibiting the write of data in said buffer memory at each bit specified by the mask data from said mask controller is written into said buffer memory in a second half of each test cycle.

4,958,347

## APPARATUS, METHOD AND DATA STRUCTURE FOR VALIDATION OF KERNEL DATA BUS

Bruce T. White, Woodinville; John D. Polstra, Seattle, and Craig V. Johnson, Everett, all of Wash., assignors to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Nov. 23, 1988, Ser. No. 275,185

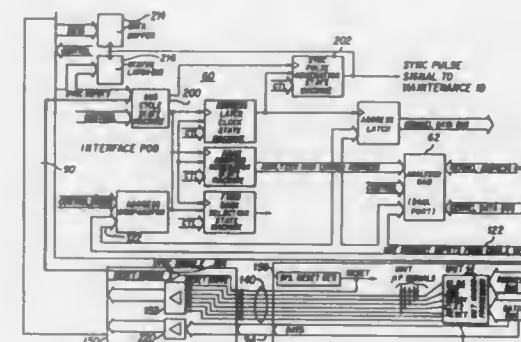
Int. Cl.<sup>5</sup> G01R 31/28

U.S. Cl. 371-29.5

10 Claims

1. A method for validation of the data bus of a micro-processor based unit under test (UUT) comprising the steps of  
 (a.) performing a load operation of a first bit pattern containing a number of bits equal to one-half the number of lines in at least a portion of said data bus over a first plurality of lines in said data bus,  
 (b.) performing a load operation of a second bit pattern which is the complement of said first bit pattern over a second plurality of bus lines of said data bus lines,  
 (c.) comparing said first and second bit patterns to determine whether said second bit pattern is the complement of said

second bit pattern to determine if said second bit pattern is not the complement of said first bit pattern,  
 (d.) performing a load operation of a third bit pattern containing a number of bits equal to one-half the number of lines in at least a portion of said data bus over a third plurality of lines in said data bus,



(e.) performing a load operation of a fourth bit pattern which is not the complement of said third bit pattern over a fourth plurality of bus lines of said data bus lines,  
 (f.) comparing said third and fourth bit patterns to determine if said fourth bit pattern is not the complement of said third bit pattern, and  
 (g.) validating said data bus based upon the results of steps (c.) and (f.).

4,958,348

## HYPERSYSTOLIC REED-SOLOMON DECODER

Elwyn R. Berlekamp, Berkeley; Gadriel Seroussi, Cupertino, and Po Tong, Alameda, all of Calif., assignors to Eastman Kodak Company, Rochester, N.Y.

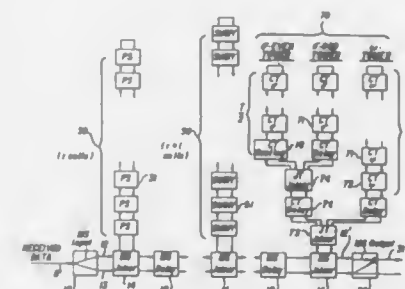
Continuation-in-part of Ser. No. 155,244, Feb. 12, 1988,

abandoned. This application Nov. 21, 1988, Ser. No. 274,120

Int. Cl.<sup>5</sup> G06F 11/10

U.S. Cl. 371-37.1

4 Claims



1. A hypersystolic apparatus for operating upon a serialized Reed-Solomon encoded information stream, said stream possibly corrupted by errors and comprising sequential symbol blocks each of length N symbols and redundancy r for correcting as many as T=errata encountered in each said symbol block of said information stream, comprising

- (a) data stream splitter for producing a copy of said information stream whereby first and second information streams are initially identical for separate processing and said information streams are initially synchronized, each said information stream comprising consecutive blocks of said N symbols, each said symbol comprising m bits,
- (b) dual channel digital delay line means for propagating each of said first and second information streams along respective channels to error corrector means, said channel supporting said second information stream further comprising a plurality of joiner means for diverting said sec-

ond information stream onto respective propagation paths comprising first, second and third folded hypersystolic arrays and returning said second information stream from said lateral propagation paths to said respective channel of said digital delay line, whereby said second information stream is processed in each of said hypersystolic arrays to produce a stream of error corrector information,  
 (c) said first hypersystolic array defining a first lateral folded data path for processing said second information stream to evolve same to a stream of r power sum symmetric functions S of each said Reed-Solomon symbol block,  
 (d) said second hypersystolic array defining said second lateral path for receiving said serialized power sum symmetric functions and determining solutions of the key equation therefor, to obtain serialized polynomials  $\omega(z)$  and  $\sigma(z)$  of minimum degree satisfying

$$(1 + S(z))\sigma(z) = \omega(z) \text{ mod } z^r$$

where said  $\sigma(z)$  comprise coefficients of the error location polynomial, said  $\omega(z)$  comprise the error evaluator polynomial, said second data stream modified by said second hypersystolic array to comprise T+1 coefficients of said polynomial  $\sigma$  and T coefficients of said polynomial  $\omega$ ,  
 (e) said third hypersystolic array being for receiving said polynomial coefficients  $\sigma$  and  $\omega$  and producing therefrom a serialized stream of correction information for return to said second channel of said dual channel digital delay line, said correction information stream being synchronized with said first information stream,  
 (f) corrector means for linearly combining each datum of said first information stream with the respective datum of said correction stream to produce a corrected data stream.

4,958,349

## HIGH DATA RATE BCH DECODER

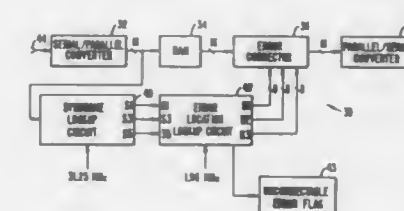
Robert M. Tanner, Capitola; Richard Koralek; Frank Chethik, both of Palo Alto; Stephen B. Lengel, Cupertino, and David H. Miller, Sacramento, all of Calif., assignors to Ford Aerospace Corporation, Newport Beach, Calif.

Filed Nov. 1, 1988, Ser. No. 265,625

Int. Cl.<sup>5</sup> G06F 11/10

U.S. Cl. 371-37.1

22 Claims



1. An apparatus for decoding in linear error correcting code, said decoding being at data speeds greater than direct computation capabilities of error computation circuitry, said apparatus comprising:

- first register means for temporarily storing a complete representation of an input code word;
- means for determining at least one syndrome to identify errors in said input code word;
- means coupled to said syndrome determining means for identifying from said at least one syndrome a corresponding error location in said input code word by table look-up to maximize processing speed, said error location identifying means including a first memory means storing a cyclic invariant representation of error patterns for each syndrome to minimize the size of said memory means for use by table look-up; and
- means coupled to said error location identifying means and



to said first register means for correcting said input code word from said at least one syndrome.

#### 4,958,350 ERROR DETECTING/CORRECTION CODE AND APPARATUS

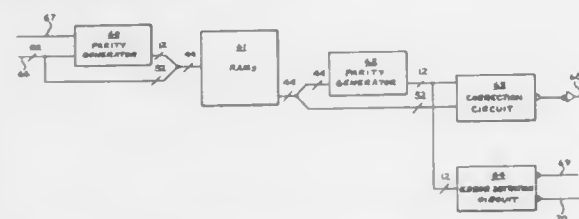
Wm. Spencer Worley, III, San Jose; Eitan Fenson, Los Altos, and James R. Weatherford, San Jose, all of Calif., assignors to Stardent Computer, Inc., Sunnyvale, Calif.

Filed Mar. 2, 1988, Ser. No. 163,616

Int. Cl.<sup>5</sup> G06F 11/10

U.S. Cl. 371—37.4

33 Claims U.S. Cl. 371—40.1



24. An improved method for detecting and correcting errors in binary coded information, said method detecting and correcting all single bit errors in an information word, said method further detecting all two-bit errors and detecting inversion of any number of bits received from a single circuit, said method comprising the steps of:

- receiving a plurality of binary codes comprising an information word;
- grouping said plurality of binary codes;
- generating a parity code for each of said groups of binary codes;
- said plurality of binary codes being grouped such that for any three of said parity codes there is either a single of said binary codes or none of said binary codes which affects each of said three parity codes;
- said plurality of binary codes further being grouped such that for any four of said parity codes none of said binary codes affects each of said four parity codes;
- said plurality of binary codes further being grouped such that any single of said binary codes affects the value of three of said parity codes;
- said plurality of binary codes being stored in a first plurality of circuits and said parity codes being stored in at least one second circuit;
- said plurality of binary codes further being grouped on said circuits such that any single of said binary codes affects no more than three of said parity code elements;
- receiving said plurality of binary codes and said parity codes from said first plurality of circuits and said at least one second circuit;
- generating syndrome codes based on said plurality of binary codes and said parity codes wherein one of said syndrome codes is generated for each group of binary codes; said syndrome codes representative of a parity value for said group of binary codes and a parity code;
- grouping said syndrome codes into a plurality of groups;
- determining whether:
  - (a) a single of said syndrome codes in each of said groups of syndrome codes is in a first predetermined state;
  - (b) a single of a first of said groups of syndrome codes is in a first predetermined state and each of the remaining of said syndrome codes is in a second predetermined state;
- either condition (a) or condition (b) indicating a correctable error has occurred;
- determining whether:
  - (c) a non-correctable error has occurred by examining whether one or more of said syndrome codes is in said first predetermined state and whether a correctable error has occurred.

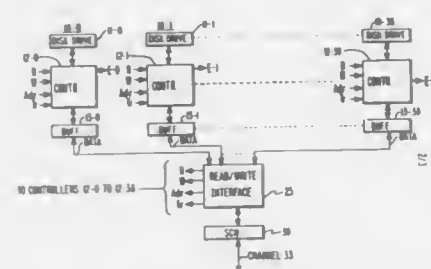
#### 4,958,351 HIGH CAPACITY MULTIPLE-DISK STORAGE METHOD AND APPARATUS HAVING UNUSUALLY HIGH FAULT TOLERANCE LEVEL AND HIGH BANDPASS

Laurence P. Flora, Covina, and Gary V. Ruby, Pasadena, both of Calif., assignors to Unisys Corp. (Formerly Burroughs Corp.), Detroit, Mich.

Continuation-in-part of Ser. No. 825,495, Feb. 3, 1986, abandoned, which is a continuation-in-part of Ser. No. 825,174, Feb. 3, 1986, Pat. No. 4,722,085. This application Apr. 1, 1988, Ser. No. 176,480

Int. Cl.<sup>5</sup> G06F 11/10

28 Claims



1. A method for accessing a large quantity of digital data in a manner so as to achieve a high fault tolerance level as well as a high bandpass, said method comprising:
  - providing a set of separably operable disk drive means each including at least one rotatable disk and cooperating head means;
  - receiving data to be written on said disk drive means as data digits;
  - generating error check digits in response to said data digits;
  - writing data on said set of separably operable disk drive means in the form of data words each comprised of data digits and at least one associated error check digit chosen so as to permit an error in a data word to be determinable, said data words being stored in said set of disk drive means such that each disk drive means stores at least one digit of each data word;
  - reading data from said set of disk drive means as a plurality of data words;
  - error detecting and correcting data words read from said set of disk drive means using the associated error check digits; and
  - producing electrical signals corresponding to the data digits of a data word after said error correcting;
- said method including providing caching of data stored on said set of disk means using a cache memory constructed and arranged to operate in a manner such that data words are stored in said cache memory and accessed therefrom in correspondence with the manner in which data words are stored on said set of disk means.

#### 4,958,352 SEMICONDUCTOR MEMORY DEVICE WITH ERROR CHECK AND CORRECTING FUNCTION

Kenji Noguchi; Tsuyoshi Toyama; Shinichi Kobayashi; Nobuaki Andoh, and Kenji Kohda, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1988, Ser. No. 253,001

Claims priority, application Japan, Oct. 5, 1987, 62-251930

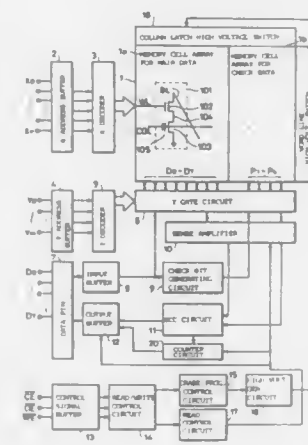
Int. Cl.<sup>5</sup> G06F 11/10

U.S. Cl. 371—40.1

15 Claims

1. A semiconductor memory device having a function for checking and correcting bit errors, comprising:
  - storing means for storing information of a plurality of bits,
  - error check and correcting means for checking and correcting bit errors of the information stored in said storing means,

said error check and correcting means generating a predetermined count signal every time it corrects a bit error, counting means for counting said predetermined count signal generated from said error check and correcting means and



#### 4,958,353 DEVICE FOR CALCULATING THE PARITY BITS OF A SUM OF TWO NUMBERS

Alain Grelner, Paris; Xiaowei Sun, Pantin, and Michel Thill, Les Clayes-Sous-Bois, all of France, assignors to Bull S.A., Paris, France

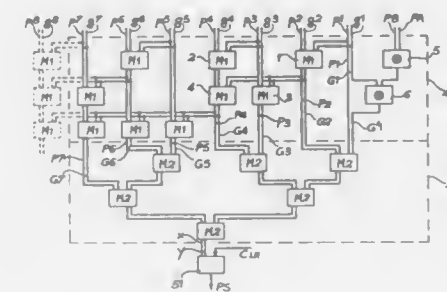
Filed Feb. 17, 1989, Ser. No. 311,736

Claims priority, application France, Feb. 18, 1988, 88 01910

Int. Cl.<sup>5</sup> G06F 11/10

U.S. Cl. 371—49.4

21 Claims



1. A system for calculating the parity bit (PC associated with at least one group of m consecutive bits extracted from the carry word (C) appearing at the time of the addition of two binary numbers (A, B), said numbers each including at least one group of m bits, the groups belonging respectively to said numbers (A, B) and to the carry word (C) comprising respective bits of the same significance, said groups extracted from said numbers (A, B) being formed respectively by bits  $a_m, \dots, a_n, \dots, a_2, a_1$  and bits  $b_m, \dots, b_n, \dots, b_2, b_1$ , where the subscript i indicates the significance in the group of the associated bit ( $a_i, b_i$ ), said system being characterized in that it comprises:
  - first means (11) for calculating, for every i included between 1 and m-1, the values:

$$P_i = a_i \oplus b_i$$

$$p_i = a_i \oplus b_i$$

where  $\oplus$  indicates the EXCLUSIVE OR operation.

first operator means (41a) for calculating, for every i included between 1 and m-1, the values  $P_i$  and the values  $G_i$  verifying the following recurring logical equations:

$$P_i = p_i \oplus P_{i-1}, \text{ with } P_1 = p_1$$

$$G_i = g_i \oplus p_i \oplus G_{i-1}, \text{ with } G_1 = g_1$$

second operator means (41b) for calculating the values Y and X, where

$$Y = G_1 \oplus G_2 \oplus \dots \oplus G_{m-1}$$

$$X = P_1 \oplus P_2 \oplus \dots \oplus P_{m-1}$$

and third operator means (51) for calculating the value PC where

$$PC = Y \oplus c_{in} \oplus X^*$$

where  $c_{in}$  is the least significant carry bit of the group, and where  $X^*$  is the complement of X.

#### 4,958,354 APPARATUS FOR STABILIZING THE INTENSITY OF LIGHT

Tsuneyuki Urakami; Shinichiro Aoshima, and Yutaka Tsuchiya, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

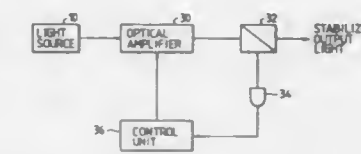
Filed May 8, 1989, Ser. No. 348,450

Claims priority, application Japan, May 26, 1988, 63-129194

Int. Cl.<sup>5</sup> H01S 3/13

U.S. Cl. 372—29

5 Claims



1. An apparatus for stabilizing intensity of light emitted from a light source to produce substantially constant-intensity light, comprising:

- an optical amplifier, having a gain which is adjustable by a controlling electrical signal, for amplifying incident light emitted from said light source;
- beam splitting means for branching said amplified incident light emitted from said light source into stabilized output light and feedback light;
- light intensity detecting means for converting said feedback light into an electrical signal; and
- control means for producing said control electrical signal in accordance with said electrical signal converted from said feedback light.

#### 4,958,355 HIGH PERFORMANCE ANGLED STRIPE SUPERLUMINESCENT DIODE

Gerard A. Alphonse, Princeton, and Stephen L. Palfrey, Metuchen, both of N.J., assignors to RCA Inc., Vaudreuil, Canada

Filed Mar. 29, 1989, Ser. No. 330,033

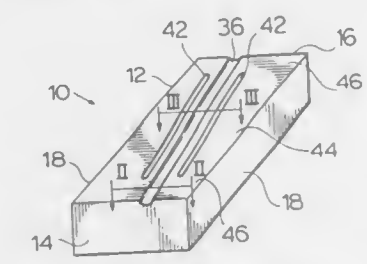
Int. Cl.<sup>5</sup> H01S 3/19

U.S. Cl. 372—45

14 Claims

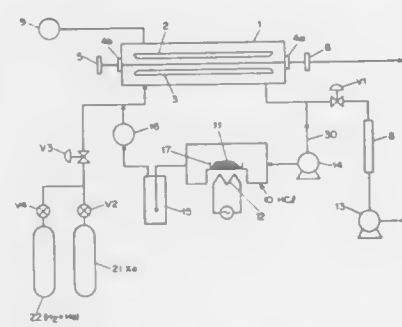
1. A super luminescent light emitting device comprising:
  - a semiconductor body having spaced first and second op-

posed end faces with an active region extending therebetween, the body including a central region and two opposing end regions extending a predetermined distance from the end faces to the central region;  
gain guiding means comprising a linear strip of material adjacent to a side of the active region extending between the end faces and inclined along its longitudinal axis at a predetermined angle relative to a direction normal to at least one of the end faces;  
an optical beam path extending between the end faces at the active region parallel to the longitudinal axis of the gain



guiding means, the optical beam path having end lateral boundaries at each of the end regions whose lateral carrier and optical confinement is determined by the gain guiding means to allow light reflected at the end faces to be refracted out of the optical beam path; and,  
index guiding means extending over the central region on opposite sides of the gain guiding means parallel to the longitudinal axis of the gain guiding means, the index guiding means determining central lateral boundaries for the optical beam path to provide lateral carrier and optical confinement for the optical beam path in the central region.

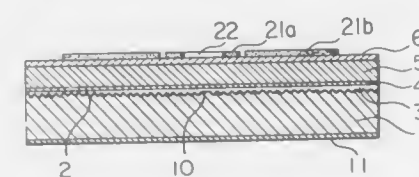
**4,958,356**  
**EXCIMER LASER APPARATUS**  
Ryohei Tanuma, Kanawa, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan  
Filed Oct. 4, 1989, Ser. No. 416,964  
Claims priority, application Japan, Oct. 4, 1988, 63-250152  
Int. Cl.<sup>5</sup> H01S 3/22  
U.S. Cl. 372-59 8 Claims



1. A rare gas halide excimer laser comprising  
(a) a chamber defining a laser cavity;  
(b) means for supplying the rare gas and hydrogen gas to the cavity;  
(c) a gas recirculation loop defining a flow path extending from and contiguous with a first end of the laser cavity to a second end of the laser cavity;  
(d) gas flow control means effective to cause gas to flow out of the laser cavity through the flow path defined by the recirculation loop and back into the laser cavity; and  
(e) a hydrogen chloride generator disposed within the recirculation loop such that gas flow through the loop passes

through the hydrogen chloride generator, said hydrogen chloride generator comprising means for producing hydrogen chloride gas from hydrogen gas present in the gas flow and a reactant in the chamber.

**4,958,357**  
**GRATING-COUPLED SURFACE EMITTING LASER AND METHOD FOR THE MODULATION THEREOF**  
Junichi Kinoshita, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Dec. 19, 1988, Ser. No. 286,027  
Claims priority, application Japan, Dec. 19, 1987, 62-321707; Apr. 11, 1988, 63-88697; Jun. 10, 1988, 63-141622  
Int. Cl.<sup>5</sup> H01S 3/10  
U.S. Cl. 372-96 7 Claims

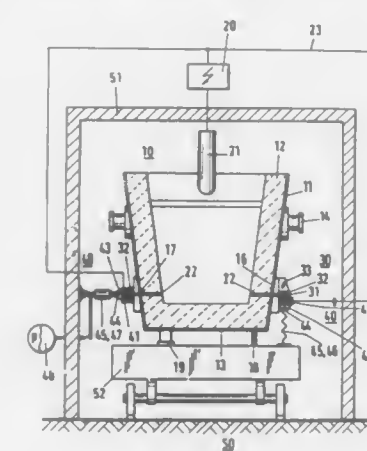


1. A grating-coupled surface emitting laser, comprising:  
a crystalline active layer structure including  
a wave-guiding layer, and  
a second or higher-order grating extending along a laser cavity of said crystalline active structure, said laser cavity being defined as a length along which light propagation is permitted;  
two electrodes, sandwiching said crystalline active layer structure, for exciting said crystalline active layer structure;  
at least one window, on either of said electrodes, for obtaining an output beam from a surface of said crystalline active layer structure as radiation modes which are produced by two counter-running guided light waves; and  
phase-shifting means for providing an effect of shifting a phase of said grating to cause said radiation modes to interfere constructively in a region of said crystalline active structure corresponding to said window.

**4,958,358**  
**APPARATUS FOR THE THERMAL TREATMENT OF A METALLIC MELT**  
Schunk Eckart, Düsseldorf, Fed. Rep. of Germany, assignor to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany  
Filed May 17, 1989, Ser. No. 352,934  
Claims priority, application Fed. Rep. of Germany, May 18, 1988, 3817379  
Int. Cl.<sup>5</sup> H05B 7/00  
U.S. Cl. 373-72 20 Claims

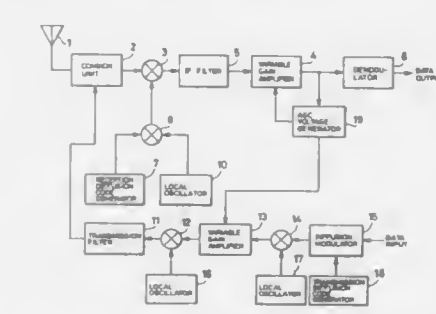
1. An apparatus for the thermal treatment of a metallic melt comprising:  
a metallurgical vessel (10) for receiving said melt, said vessel having an outer jacket (11);  
D.C. arc heating means for heating said melt comprising at least one electrode (21) positioned above said melt and at least one counterelectrode (22) in contact with said melt; first means (30) on said outer jacket and connected to said counterelectrode for transferring electrical energy to said counterelectrode, said transfer means comprising a first contact plane (31);  
second means (40) for directly transferring electrical energy to said first transfer means (30), said second transfer means (40) comprising a support element (43) and detachably mounted thereto a structural part (44) having a second contact plane (41); and means (45,44) operatively con-

nected to said second transfer means for mechanically positioning said contact plane of said second transfer



means in electrical energy conducting relation with said contact plane of said first transfer means.

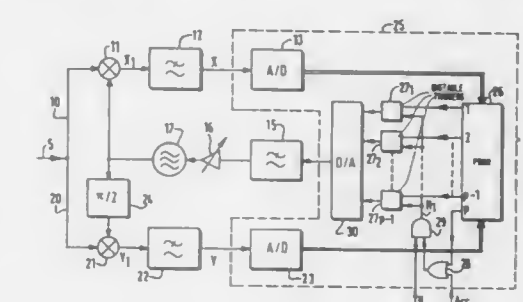
**4,958,359**  
**COMMUNICATION APPARATUS**  
Ichiro Kato, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Jun. 7, 1988, Ser. No. 203,084  
Claims priority, application Japan, Jun. 9, 1987, 62-142155  
Int. Cl.<sup>5</sup> H04K 1/02  
U.S. Cl. 375-1 15 Claims



9. A spectrum diffusion communication apparatus comprising:  
receiving means for receiving a signal;  
first conversion means for converting the signal received by said receiving means in accordance with a first diffusion code, said first diffusion code being determined on the basis of a diffusion code used in transmission by a partner station;  
control signal generating means for generating a control signal corresponding to an output level of said first conversion means;  
second conversion means for converting the signal received by said receiving means in accordance with a second diffusion code, said second diffusion code being determined on the basis of another diffusion code used in transmission by the partner station;  
demodulation means for demodulating source data from the output of said second conversion means;  
third conversion means for correlating data to be transmitted to a third diffusion code;  
transmission means for transmitting the output of said third conversion means to the partner station; and  
transmission control means for controlling a transmission level of said transmission means in accordance with the

control signal generated by said control signal generating means.

**4,958,360**  
**CIRCUIT FOR RECOVERING THE CARRIER IN DIGITAL TRANSMISSION SYSTEMS**  
Hikmet Sari, Creteil, France, assignor to U.S. Philips Corporation, New York, N.Y.  
Continuation of Ser. No. 249,614, Sep. 26, 1988, abandoned. This application Oct. 11, 1989, Ser. No. 420,681  
Claims priority, application France, Sep. 25, 1987, 87 13292  
Int. Cl.<sup>5</sup> H04L 27/06  
U.S. Cl. 375-97 20 Claims

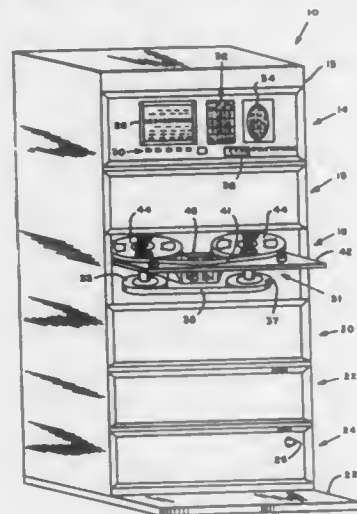


1. A circuit for recovering a carrier from a digitally modulated wave having a phase symmetry  $2\lambda/M$ , where M is an integer representing a symmetry order of a modulation scheme of said digitally modulated signal, said modulation scheme corresponding to a signal constellation having states, which states are representable using a graphic representation in polar coordinates by a function  $F(A, \Phi)$ , where A and  $\Phi$  represent modulus and phase, respectively, of the states in the signal constellation, the circuit comprising:  
(a) a voltage-controlled oscillator having an output for supplying an output signal which represents said carrier and a control input for receiving an error signal  $\epsilon(\phi)$  for changing a phase of the oscillator to adjust it to a phase of said digitally modulated wave, the phase  $\phi$  being the phase difference between signal points of received digitally modulated wave and corresponding states, idealized ones of said signal points being states of said signal constellation;  
(b) a first channel for in-phase demodulation;  
(c) a second channel for quadrature-phase demodulation;  
(d) phase comparing means, coupled to outputs of the first and second channels and to receive a basic recovered clock signal H, for determining and validating a comparator signal, the phase comparing means alternatively operating as phase detector and as a frequency detector and comprising means for selecting received signal points using selection zones, said selection zones being defined with respect to said graphic representation as located around certain states of the signal constellation, said selection zones appearing in said graphic representation as ring segments;  
(e) means for producing a variable rate sampling clock signal which reproduces the basic clock signal H by discarding certain edges, said producing means:  
(i) when the circuit is in acquisition mode (unlocked), validating the basic clock signal H only for the selection zones; and  
(ii) when the circuit is in permanent mode (locked), validating all edges of the clock signal H for forming the sampling clock signal;  
said sampling clock signal being supplied to the comparing means to control validating of the comparator signal; and  
(f) means for converting the comparator signal to the error signal  $\epsilon(\phi)$ .



- (a) recording means for recording signals from each of said channels;
- (b) control means for controlling the operation of said recording means;
- (c) said recording means further comprising a plurality of record amplifiers, each of said record amplifiers amplifying one of said signals received on one of said channels, and each of said record amplifiers generating a channel active signal when the associated channel is active;
- (d) addressable switch means for switching at least one of said channel active signals to said control means, said addressable switch means being responsive to said control means to select said at least one channel active signal; whereby the said control means monitors activity on selected channels; and,
- (e) wherein said control means further comprises display

means for displaying, in a first display mode, the active or inactive state of each of said channels, said state being



determined in accordance with the corresponding state of the associated channel active signal.

4,958,368

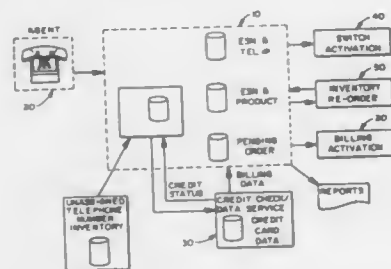
## CUSTOMER ACTIVATION SYSTEM

Terry S. Parker, Spring, Tex., assignor to GTE Mobilnet Incorporated, Houston, Tex.

Filed Oct. 31, 1988, Ser. No. 265,183

Int. Cl.<sup>3</sup> H04M 1/57

U.S. Cl. 379-91



1. A Customer Activation System for expeditiously providing a CMR customer access to CMR service, the System comprising:

- a regional processor programmed to:
- (a) accept information identifying the CMR customer;
- (b) obtain a credit check of the CMR customer;
- (c) assign a telephone number to the CMR customer; and
- (d) insert and activate the telephone number in a cellular switch.

4,958,369

## KEY TELEPHONE SYSTEM ACCOMMODATING BOTH DIGITAL AND ANALOG TELEPHONE NETWORKS

Shinji Tsuchida, Zama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 20, 1989, Ser. No. 425,022

Claims priority, application Japan, Oct. 24, 1988, 63-266148

Int. Cl.<sup>3</sup> H04M 1/00, 1/72

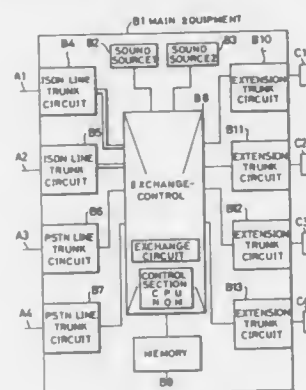
U.S. Cl. 379-156

7 Claims

1. A key telephone system in which both a line in a digital network and a public switched analog telephone network are accommodated as external lines in the main equipment of the

system, and in which extension telephone sets connected to at least two extension lines are each able to call out another terminal over an external line which may be either the digital line or the analog line, comprising:

- a determining means for determining which type is the external line acquired in response to a calling-out com-



mand from one of said extension telephone sets, whether it is the digital line or the analog line; and an informing means for informing, on the basis of the result of the determination of said determining means, said extension telephone set of the type of the acquired external line.

4,958,370

## CONTROL SYSTEM FOR A PLURALITY OF TELEPHONE SETS

Masanobu Shimanuki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

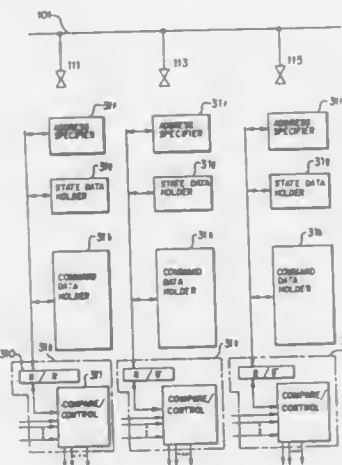
Filed Apr. 4, 1988, Ser. No. 177,170

Claims priority, application Japan, Apr. 3, 1987, 62-81085

Int. Cl.<sup>3</sup> H04M 1/00

U.S. Cl. 379-157

12 Claims



1. A control system for a plurality of telephone sets connected as branched at one end to a central office line, each of the telephone sets being defined as a predetermined telephone set and comprising:

- control information inputting means for inputting a control information data sequence indicative of a request to other telephone sets connected as branched to the central office line to perform a desired control operation and indicative of at least one of the other telephone sets of said plurality of telephone sets being requested;

control signal sending means for sending to the central office line an output control signal for controlling the other telephone sets connected as branched to the central office line corresponding to the control information data sequence inputted into the control information inputting means;

control signal receiving means for receiving an input control signal sent from any other one of said telephone sets via the central office line; and

control means for performing a predetermined operation corresponding to a control information data sequence contained in the input control signal received by the control signal receiving means.

4,958,371

## METHOD AND APPARATUS FOR DETERMINING WHEN A TELEPHONE HANDSET IS OFF-HOOK

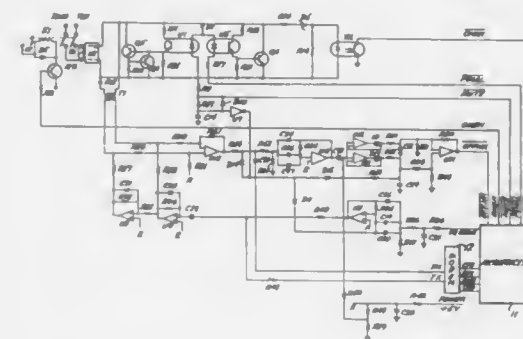
Joseph A. Damoci, Beltsville; Matthew F. Kern, Catonsville, both of Md.; Russell J. Welsh, and John D. Fourdraine, both of Toronto, Canada, assignors to Control Data Corporation, Minneapolis, Minn.

Filed Apr. 19, 1988, Ser. No. 183,065

Int. Cl.<sup>3</sup> H04M 11/00

U.S. Cl. 379-377

5 Claims



3. A method of operating an automatic telecommunication system including a central location and at least one remote location and wherein a data reporting system including a modem is situated at the remote location for establishing data communications with the central location over the switched telephone network, comprising the steps of determining prior to initiating communication with the central location whether a telephone at the remote location is off-hook and inhibiting communications with the central location is a telephone is off-hook, and further comprising the step of determining during the time that communications are established with the central location whether a telephone at the remote location goes off-hook includes generating a test signal and applying the test signal between ring and tip of a telephone line, providing the first and second integrator means having respectively short and relatively long integration time constants for integrating the test signal, comparing the integrated signal outputs of said first and second integrators, whereby a substantial difference between the integrated signal outputs of said first and second integrators is indicative that an additional load has been placed between tip and ring of the telephone line, corresponding to a telephone going off hook.

4,958,372

## HEARING PROTECTOR UTILIZING AURAL REFLEX MECHANISM

Norman L. Carter, East Roseville, Australia, assignor to The Commonwealth of Australia, Phillip, Australia

Filed Mar. 25, 1989, Ser. No. 327,740

Claims priority, application Australia, Oct. 12, 1987, P14832

Int. Cl.<sup>3</sup> A61F 11/02

U.S. Cl. 381-72

4 Claims



1. A method of enhancing the protection of hearing in an environment where brief, intense sounds are produced, said method comprising the steps of

- (a) supplying each person in the environment with an electronic earmuff having (i) a protective shell adapted to surround the ear of a wearer of the earmuff, (ii) a microphone outside the protective shell, and (iii) an automatic gain control system for controlling the level of signals from the microphone, the output of the automatic gain control system being input to a loudspeaker mounted within the protective shell; the electronic earmuff also including a wireless receiver having its output connected to said loudspeaker; and

- (b) transmitting, immediately before the production of a brief, intense sound, a radio frequency signal that is received by said wireless receiver, said radio frequency signal being modulated so that, upon its receipt by said wireless receiver, the wireless receiver produces an output signal which causes said loudspeaker to generate a loud but non-damaging sound adjacent to the ear of said wearer of the earmuff;

whereby the middle ear muscles of the wearer of the earmuff are contracted immediately prior to the reception, by said wearer, of the brief, intense sound.

4,958,373

## DEFECT-RECOGNITION PROCESSING APPARATUS

Tohru Usami; Hiroyuki Kamijo, both of Yokohama; Takao Ohta, Tokyo, and Masanobu Ogino, Yokosuka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

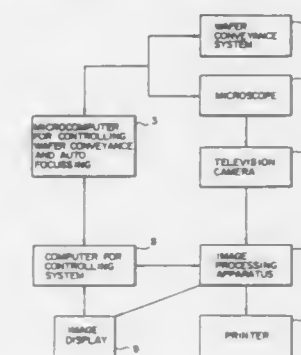
Filed Mar. 29, 1988, Ser. No. 174,879

Claims priority, application Japan, Mar. 31, 1987, 62-78659

Int. Cl.<sup>3</sup> G06K 9/00

U.S. Cl. 382-8

14 Claims



1. A defect-recognition processing apparatus comprising: image converting means for converting, into an image, sur-



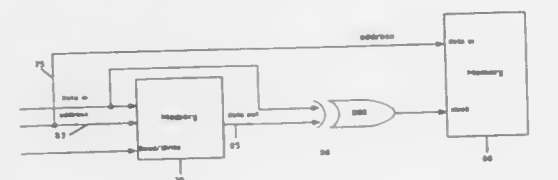
supplying means, coupled to said first through said N-th memory areas and to said signal producing means, for

supplying each of said input characters in response to said selection signal to said specific memory area to cause said specific memory area to produce said character match signal, and

activating means, coupled to said first through said N-th processing sections and to said signal producing means, for activating one of said through said N-th processing sections as a particular processing section associated with said specific memory area to cause said particular processing section to process character match signals supplied from said specific memory area into said string match signal, and

each of said first through said N-th processing sections further including a plurality of stages corresponding to memory locations in each of said memory areas, and each of said stages including holding means for holding a delimiter signal, representative of a delimiter of a string of said memorized characters, in each of said memory areas.

**4,958,378**  
**METHOD AND APPARATUS FOR DETECTING CHANGES IN RASTER DATA**  
 Alan E. Bell, Westford, Mass., assignor to Sun Microsystems, Inc., Mountain View, Calif.  
 Filed Apr. 26, 1989, Ser. No. 343,866  
 Int. Cl.<sup>5</sup> G06K 9/00  
 U.S. Cl. 382-34 32 Claims



1. In a computer graphics system for the generation and display of raster data images comprising a central processing unit (CPU) coupled to a memory means, said CPU further being coupled to a display means for the display of a raster data image, said raster data image comprising a plurality of pixels, each pixel identified at an X-Y coordinate location within the raster data image, a method for comparing a first and a second raster data image in real time wherein a pixel at a specific X-Y coordinate location in the second raster data image is compared to a pixel at the specific X-Y coordinate location in the first raster data image as each pixel of the second raster data image is generated, said method comprising the steps of:

writing the first raster data image into memory such that each pixel data representative of a pixel at a predetermined X-Y coordinate location in the image is written to predetermined memory location;

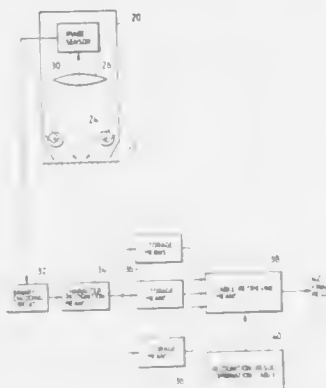
receiving a pixel data of the second image being generated, said pixel data representative of a pixel located at a specific X-Y coordinate location in the second raster data image;

reading the first raster data image stored in memory to retrieve pixel data corresponding to a pixel in the first raster data image at the specific X-Y coordinate location; inputting to a comparator circuit the pixel data read from

memory and the pixel data of the second raster data image received; and

if the comparator output indicates that the pixel data read from memory and the pixel data of the second raster data image are not the same, recording the identification of the X-Y coordinate location of the pixel data to indicate that the pixel data has changed.

**4,958,379**  
**OPTICAL CHARACTER READER FOR OUTPUTTING A CHARACTER FROM COMBINATIONS OF POSSIBLE REPRESENTATIONS OF THE CHARACTER**  
 Mikio Yamaguchi, and Naoki Maeda, both of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan  
 Filed Jan. 3, 1989, Ser. No. 292,930  
 Claims priority, application Japan, Jan. 4, 1988, 63-531  
 Int. Cl.<sup>5</sup> G06K 9/22  
 U.S. Cl. 382-59 10 Claims



1. An apparatus for reading a character from a surface comprising:

a light source directed upon said surface;

an image sensor for detecting during a scanning operation light directed from said surface, said image sensor outputting a signal in response to said light directed from said surface during said scanning operation;

recognition means, responsive to said signal, for determining a corresponding result of recognition during a scan from a predetermined set of recognizable characters; and

character determining means for determining said character from said surface, responsive to a plurality of said results of recognition during a corresponding plurality of scans, said character determining means comprising:

combination storing means for outputting said character, said combination storing means storing only combinations of recognition predetermined to be possible representations of said character, and

retrieving means for retrieving said character from said combination storing means when said plurality of results of recognition corresponds to one of said predetermined combinations of recognition.

**4,958,380**  
**FAULT CURRENT LIMITER FOR DC MOTOR DRIVE SYSTEM**  
 Serge L. Scuccato, Peterborough, and Andrew C. Stevenson, Baillieboro, both of Canada, assignors to General Electric Canada Inc., Mississauga, Canada  
 Filed May 10, 1989, Ser. No. 349,609  
 Claims priority, application Canada, May 19, 1988, 567250  
 Int. Cl.<sup>5</sup> A02P 3/14  
 U.S. Cl. 388-806 4 Claims

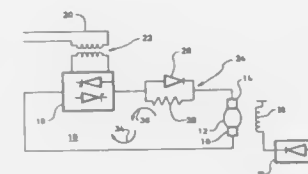
1. A direct current motor drive system comprising:

a direct current motor operable in a forward motoring mode receiving current from a power source and in a reverse

inversion mode providing inversion current to the power source;

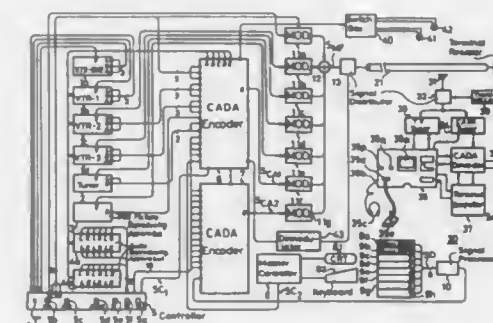
converter means for controlling motor operation, the converter means converting alternating current, received from the power source, to direct current and supplying direct current across terminals of the motor when operating in the forward motoring mode; and,

inversion fault current limiting means for limiting inversion fault currents associated with motor operation in the reverse inversion mode without effecting the supply of current to the motor in the forward motoring mode, the



inversion fault current limiting means being electrically connected in series between the converter means and one armature terminal of the motor, the inversion fault current limiting means including diode switch means connected in parallel with resistance means, the diode switch means conducting during the forward motoring mode to permit the flow of direct current therethrough from the converter means to the motor, and the diode switch means not conducting when the motor is operating in the reverse inversion mode so as to direct inversion current through the resistance means and thereby limit the flow of inversion fault currents.

**4,958,381**  
**TWO WAY COMMUNICATION SYSTEM**  
 Masakatsu Toyoshima, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan  
 Filed Jan. 26, 1988, Ser. No. 148,591  
 Claims priority, application Japan, Feb. 17, 1987, 62-33945; Feb. 26, 1987, 62-43438; Feb. 26, 1987, 62-43437  
 Int. Cl.<sup>5</sup> H04H 1/06  
 U.S. Cl. 455-4 10 Claims



1. A two way communication system, comprising:

(a) a head end apparatus comprising means for generating a polling command signal, and means for receiving a polling answer signal;

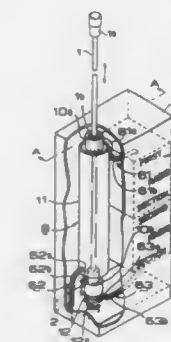
(b) a plurality of terminal units each comprising means for decoding said polling command signal, means for generating said polling answer signal in response to said polling command signal, and means for selectively generating a random access signal at each of the terminal units;

(c) means for sending each said polling answer signal to the head end apparatus in a first channel and for sending at

least one of said random access signals to the head end apparatus in a second channel; and

(d) means for sending said polling command signal from the head apparatus to each of said terminal units; wherein said means (c) sends at least one of said random access signals in said second channel when said polling command signal is not supplied to the decoding means.

**4,958,382**  
**RADIO TRANSCEIVER APPARATUS FOR CHANGING OVER BETWEEN ANTENNAS**  
 Yasuhito Imanishi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Hyogo, Japan  
 Filed Mar. 1, 1989, Ser. No. 317,520  
 Claims priority, application Japan, Jun. 17, 1988, 63-148372  
 Int. Cl.<sup>5</sup> H04B 7/08  
 U.S. Cl. 455-277 22 Claims



1. A radio frequency transceiver apparatus comprising:

a housing for containing the components of the apparatus;

a movable antenna having a body portion and a first distal end movable between an extended position spaced from said housing and a retracted position adjacent said housing, said movable antenna having a second distal end movable within said housing;

an internal antenna disposed within said housing;

transceiver means having a first configuration for processing low level RF signals and a second configuration for processing RF signals of a high level relative to said low level;

switch means having portions integral with the body portion of said movable antenna for selectively interconnecting said movable antenna and internal antenna to said first and second configurations of the transceiver means in response to movement of said movable antenna between said extended and retracted positions;

coupling means for directly connecting said body portion of the movable antenna to said transceiver means to provide a low loss RF signal path from said movable and internal antennas to said transceiver means; and

said switch means including first and second fixed electrical contacts for operative connection to first and second spaced movable contacts provided on said movable antenna, said first and second fixed contacts being connected to said coupling means, said second movable contact being connected to said first fixed contact when said movable antenna is in said extended position and said first and second movable contacts being connected to said first and second contacts, respectively, in said retracted position, a third movable contact supported by said housing for coupling said internal antenna to said second fixed contact when said movable antenna is in said extended position and separating said internal antenna from said second fixed contact when the movable antenna is in said retracted position.



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## DESIGN PATENTS

GRANTED SEP. 18, 1990

### ERRATA

For CLASS	See PATENT NO.
D10-024 .....	310,634
D06-500 .....	310,636
D21-074 .....	310,685
D24-023 .....	310,731

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## DESIGNS

SEPTEMBER 18, 1990

310,595

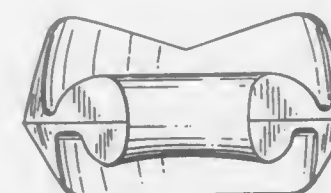
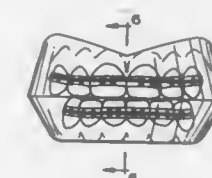
### CONFECTIONARY

Charles K. Sawyer, 26940 Lime City Rd., Perrysburg, Ohio 43551

Filed Jul. 6, 1987, Ser. No. 69,932

Term of patent 14 years

U.S. Cl. D1-108



310,597

### BIB

Daniel C. Long, and Dale G. Welch, both of Newton, N.C., assignors to Unico Products, Newton, N.C.

Continuation-in-part of Ser. No. 112,758, Oct. 23, 1987, abandoned. This application Jan. 21, 1988, Ser. No. 146,774

Term of patent 14 years

U.S. Cl. D2-229



310,596

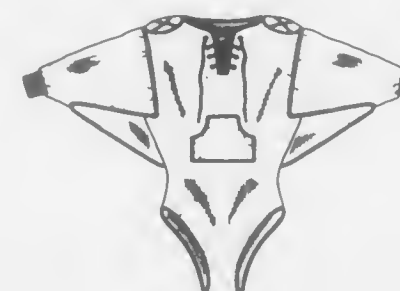
### CAPED LEOTARD

Annette Burger, 6209 Mazwood Rd., Rockville, Md. 20852

Filed Feb. 24, 1989, Ser. No. 314,412

Term of patent 14 years

U.S. Cl. D2-29





310,598

**BLOCKER SOLE WITH TAP INSERT**

Craig C. Cummings, Nashville, Tenn., assignor to Acme Boot Co., Inc., Clarksville, Tenn.

Filed May 31, 1989, Ser. No. 359,079

Term of patent 14 years

U.S. Cl. D2—318



310,599

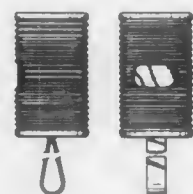
**UMBRELLA HANDLE**

Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio

Filed Dec. 19, 1988, Ser. No. 286,537

Term of patent 14 years

U.S. Cl. D3—12



310,600

**SEPARABLE KEY CHAIN**

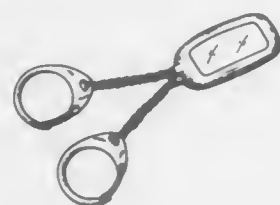
Siegfried Hölterseid, Hückelhoven, Fed. Rep. of Germany, assignor to Walter Henkels GmbH, Fed. Rep. of Germany

Filed Mar. 21, 1988, Ser. No. 171,520

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1988, MR183

Term of patent 14 years

U.S. Cl. D3—62



310,601

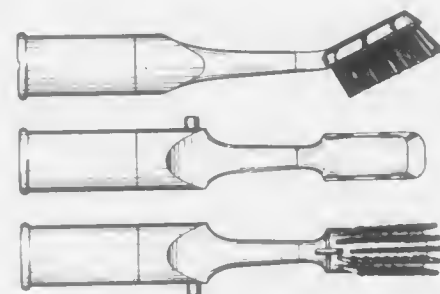
**SOAP DISPENSER COMBINED WITH A BRUSH**

Ole Byriel, Jyllinge, Denmark, assignor to Eveline A/S, Denmark

Filed Mar. 28, 1988, Ser. No. 174,327

Term of patent 14 years

U.S. Cl. D4—114



310,602

**MULTIPLE PICTURE FRAME**

George Hatzipanagos, M.S. Sovereign of the Sea, 5th Floor, 1007 North America Way, Miami, Fla. 33132

Filed Oct. 14, 1986, Ser. No. 918,873

Term of patent 14 years

U.S. Cl. D6—301



310,603

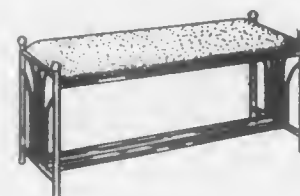
**VANITY BENCH**

H. Thomas Keller, High Point, N.C., assignor to Rosalco, Inc., Louisville, Ky.

Division of Ser. No. 238,511, Aug. 31, 1988. This application Mar. 29, 1989, Ser. No. 320,371

Term of patent 14 years

U.S. Cl. D6—349



310,604

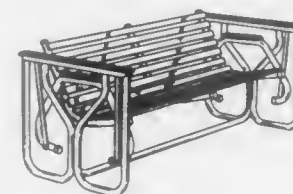
**GLIDER**

Charles Pomeroy, and John T. Bycraft, both of South Bend, Ind., assignors to Jack-Post Corporation, Buchanan, Mich.

Continuation of Ser. No. 766,765, Aug. 16, 1985. This application Nov. 5, 1987, Ser. No. 119,245

Term of patent 14 years

U.S. Cl. D6—347



310,605

**COLLAPSIBLE CHAIR**

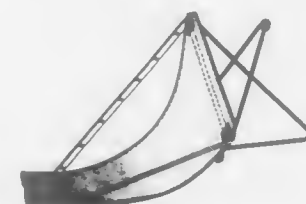
Sun E. Kwon, Seoul, Rep. of Korea, assignor to Total Design Corporation, Seoul, Rep. of Korea

Filed Mar. 5, 1987, Ser. No. 22,353

Claims priority, application Rep. of Korea, Jan. 8, 1987, 87-74

Term of patent 14 years

U.S. Cl. D6—368



310,606

**VANITY CHAIR**

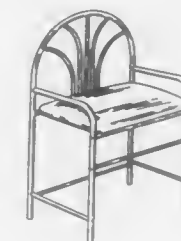
H. Thomas Keller, High Point, N.C., assignor to Rosalco, Inc., Louisville, Ky.

Division of Ser. No. 238,511, Aug. 31, 1988. This application

Mar. 29, 1989, Ser. No. 320,372

Term of patent 14 years

U.S. Cl. D6—380



310,607

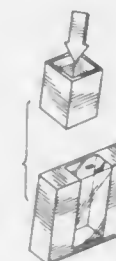
**PROMOTIONAL CONTENT KIOSK**

Lawrence T. Penna, 1500 NW. 49th St., Suite 500, Fort Lauderdale, Fla. 33309

Filed Jan. 29, 1988, Ser. No. 149,873

Term of patent 14 years

U.S. Cl. D6—481



310,608

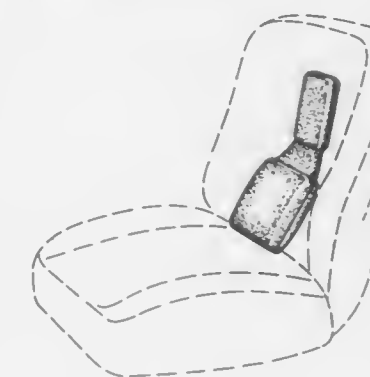
**DRIVER'S SUPPORT CUSHION**

John Axell, Bend, Oreg., assignor to Spine-O-Pedic Cushions, Inc., Bend, Oreg.

Filed Jan. 25, 1988, Ser. No. 148,238

Term of patent 14 years

U.S. Cl. D6—601



310,609

**ORTHOPEDIC CERVICAL PILLOW**

George J. Burkhardt, 531 Howard Rd., Cherry Hill, N.J. 08034

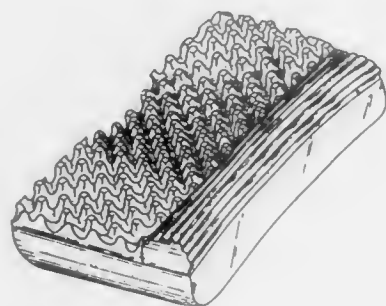
Filed Apr. 6, 1988, Ser. No. 178,086

Term of patent 14 years

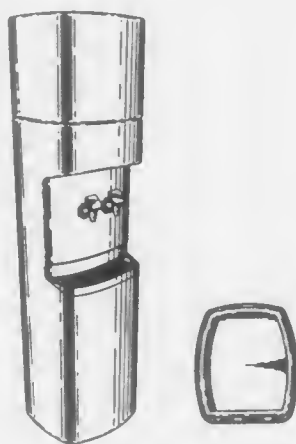
U.S. Cl. D6—601



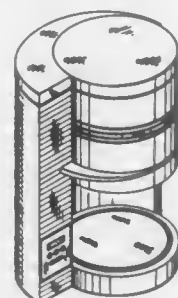
310,610  
ANTI-SNORING PILLOW  
Linda H. Dixon, Ross, Calif., assignor to E.R. Carpenter Company, Inc., Richmond, Va.  
Continuation of Ser. No. 190,847, May 6, 1988. This application  
Apr. 24, 1989, Ser. No. 342,426  
Term of patent 14 years  
U.S. Cl. D6—601



310,612  
WATER REFRIGERATION AND DISPENSING UNIT  
André Desrosiers, Montreal, Canada, assignor to André Desrosiers Designer Industriel (ADDD) Inc., Montreal, Canada  
Filed Mar. 18, 1987, Ser. No. 27,233  
Term of patent 14 years  
U.S. Cl. D7—307



310,613  
COFFEE MAKER OR SIMILAR ARTICLE  
Tsann-Kuen Wu, Tainan Hsien, Taiwan, assignor to Tsann Kuen Enterprise Co., Ltd., Taiwan, Taiwan  
Filed Feb. 10, 1988, Ser. No. 154,622  
Term of patent 14 years  
U.S. Cl. D7—309



310,611  
TACO HOLDER OR THE LIKE  
Robert W. Pittman, 637 Caithen St., Rock Hill, S.C. 29730  
Filed Aug. 12, 1986, Ser. No. 895,751  
Term of patent 14 years  
U.S. Cl. D7—504



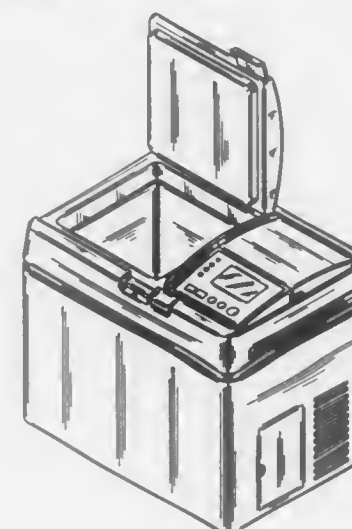
310,614  
CONTAINER FOR LIQUID FOODSTUFFS  
Ambrogio Pozzi, Gallarate, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy  
Filed Oct. 16, 1987, Ser. No. 109,252  
Claims priority, application Italy, Apr. 27, 1987, 21464/87[U]  
Term of patent 14 years  
U.S. Cl. D7—317



310,616  
MICROWAVE OVEN  
Kanji Murai, Kanagawa, and Jun Matsumoto, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan  
Filed May 2, 1988, Ser. No. 189,596  
Claims priority, application Japan, Nov. 17, 1987, 62-46759  
Term of patent 14 years  
U.S. Cl. D7—351



310,615  
BREAD BAKING MACHINE  
Isao Kitai, Kenichi Matsuda, and Mikio Ogasawara, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan  
Filed Feb. 16, 1988, Ser. No. 156,235  
Claims priority, application Japan, Aug. 17, 1987, 62-33482  
Term of patent 14 years  
U.S. Cl. D7—348



310,617  
FOODSTUFFS CONTAINER  
Ambrogio Pozzi, Gallarate, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy  
Filed Oct. 16, 1987, Ser. No. 109,426  
Claims priority, application Italy, Apr. 27, 1987, 21464/87[U]  
Term of patent 14 years  
U.S. Cl. D7—538





310,618

## BEVERAGE CONTAINER HOLDER

Nancy C. Ritchel, 12747 Leader, Houston, Tex. 77072, and Daniel D. Friel, Winward Rd., Greenville, Del. 19807  
Benny G. Ritchel, 22014 Calderbrook, Katy, Tex. 77449  
Filed Feb. 26, 1987, Ser. No. 19,495

Term of patent 14 years

U.S. Cl. D7—617

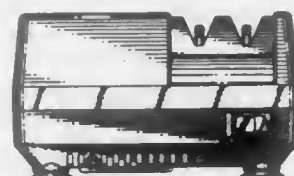
U.S. Cl. D8—93



310,620

## KNIFE SHARPENER

Filed Feb. 1, 1988, Ser. No. 150,924  
Term of patent 14 years



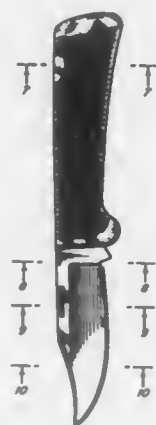
310,621

## FOLDING KNIFE

Lynn C. Thompson, 987 Sand Piper Ct., Ventura, Calif. 93001  
Filed Oct. 26, 1987, Ser. No. 112,426

The portion of the term of this patent subsequent to Mar. 5, 2003, has been disclaimed.  
Term of patent 14 years

U.S. Cl. D8—99



310,619

## GOLF COURSE BUNKER RAKE HEAD

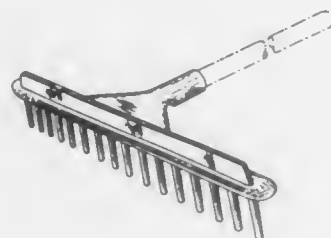
Ulf Schade, Neu-Ulm, Fed. Rep. of Germany, assignor to Firma Technobross Menne GmbH, Munderkingen, Fed. Rep. of Germany

Filed Aug. 19, 1988, Ser. No. 234,435

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1988, 599/88

Term of patent 14 years

U.S. Cl. D8—13



310,622

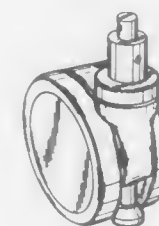
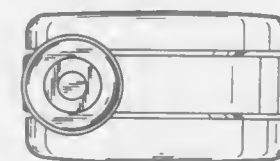
## CASTOR

Stafford T. Screea, Stourbridge, England, assignor to Colson Castors (Europe) Limited, West Midlands, England  
Filed Jul. 21, 1986, Ser. No. 888,390

Claims priority, application United Kingdom, Jan. 21, 1986, 1031733

Term of patent 14 years

U.S. Cl. D8—375



310,624

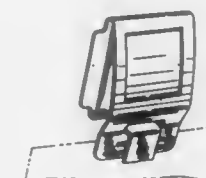
## RETAINING CLIP

Raymond J. Gradecki, Mundelein; Gerald R. Sorensen, Elgin, and Daniel J. Finkiewicz, Elk Grove Village, all of Ill., assignors to National Creative Merchandising Corp., Arlington Heights, Ill.

Filed Nov. 14, 1988, Ser. No. 271,070

Term of patent 14 years

U.S. Cl. D8—395



310,623

## BRACKET FOR CLOSET SHELF SUPPORT ROD

Ernesto E. Aranibar, Miami, Fla., assignor to Shelfco, Inc., Ft. Lauderdale, Fla.

Filed Feb. 1, 1988, Ser. No. 150,726

Term of patent 14 years

U.S. Cl. D8—380



310,625

## PACKING BAG FOR DISPOSABLE CAMERA

Takuya Arai, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 24, 1986, Ser. No. 934,452

Claims priority, application Japan, May 23, 1986, 61-19618

Term of patent 14 years

U.S. Cl. D9—305



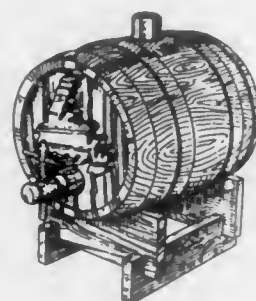
310,626  
BOTTLE FOR PERFUME, TOILET WATER OR THE  
LIKE  
Pierre Dinand, Levallois-Perret, France, assignor to Etablisse-  
ments Bernard Lalande, France  
Filed May 12, 1986, Ser. No. 862,589  
Claims priority, application France, Nov. 26, 1985, 855 572  
Term of patent 14 years  
U.S. Cl. D9—322



310,628  
CONTAINER  
Adrien P. Rayner, Malmesbury, England, assignor to CMB  
Packaging (UK) Limited, England  
Filed Jan. 20, 1987, Ser. No. 4,701  
Claims priority, application United Kingdom, Jul. 23, 1986,  
1035564  
Term of patent 14 years  
U.S. Cl. D9—352



310,627  
BEVERAGE CONTAINER  
Andrew V. Manuel, P.O. Box 12, Portugal Cove, Newfoundland,  
Canada (A0A 3K0)  
Filed Mar. 21, 1988, Ser. No. 174,681  
Claims priority, application Canada, Dec. 31, 1987, 3-12-87-6  
Term of patent 14 years  
U.S. Cl. D9—325



310,629  
VACUUM FURNACE BOTTLE  
Gregory C. Hoffman, San Marcos, Calif., assignor to Air Prod-  
ucts and Chemicals Inc., Allentown, Pa.  
Filed Feb. 2, 1987, Ser. No. 10,159  
Term of patent 14 years  
U.S. Cl. D9—352



310,630  
BOTTLE WITH CLOSURE  
Francois Thieffry, Paris, France, assignor to Societe D'Etudes  
de Chimie et de Therapie Appliquees, laboratoires de Cos-  
metologie Yves Rocher, France  
Filed Dec. 30, 1986, Ser. No. 947,968  
Claims priority, application France, Sep. 18, 1986, 864,863  
Term of patent 14 years  
U.S. Cl. D9—384



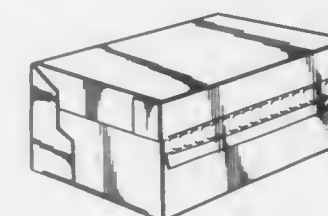
310,631  
BOTTLE  
Raymond H. Davis, Geneva, Ill., and Corby K. Mathisen, Alli-  
son Park, Pa., assignors to H. J. Heinz Company, Pittsburgh,  
Pa.  
Filed Jul. 7, 1986, Ser. No. 882,694  
Term of patent 14 years  
U.S. Cl. D9—404



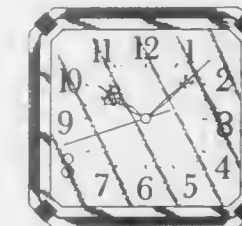
310,632  
BOTTLE  
Stanley Hutton, West Brattleboro, Vt., assignor to Geka Brush  
Corporation, Brattleboro, Vt.  
Filed May 19, 1987, Ser. No. 51,301  
Term of patent 14 years  
U.S. Cl. D9—412



310,633  
ICE CREAM CARTON  
Richard E. DePaul, Williamsburg, Va., and Frank G. Capuano,  
Rochester, N.Y., assignors to Somerville Packaging Corpora-  
tion, Newport News, Va.  
Filed Dec. 28, 1987, Ser. No. 138,026  
The portion of the term of this patent subsequent to Dec. 15,  
2001, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D9—416



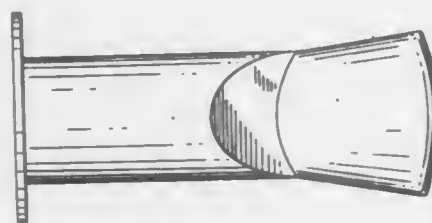
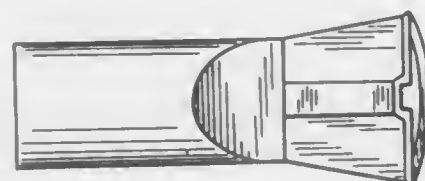
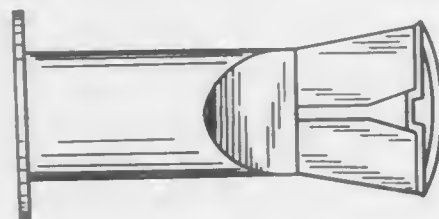
310,634  
CLOCK  
Kelko Nomura, Tokyo, Japan, assignor to Seikosha Co., Ltd.,  
Japan  
Filed Sep. 10, 1986, Ser. No. 905,943  
Claims priority, application Japan, Mar. 14, 1986, 61-9200  
Term of patent 14 years  
U.S. Cl. D10—24





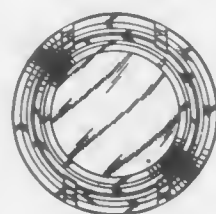
310,635  
NOZZLE TIP FOR A DISPENSER OF SEALANT OR ADHESIVE  
Dave E. Schultz, South Bend, and Ron F. Riede, Granger, both of Ind., assignors to Uniroyal Plastics Company, Inc., Mishawaka, Ind.

Filed Nov. 2, 1987, Ser. No. 116,137  
Term of patent 14 years  
U.S. Cl. D9—447



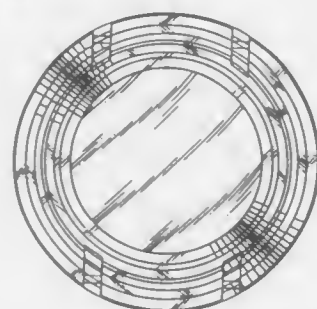
310,637  
CASE FOR A WATCH  
Hisako Sugano, Tokyo, Japan, assignor to Seikoosha Co., Ltd., Japan

Filed Nov. 26, 1986, Ser. No. 935,556  
Claims priority, application Japan, May 29, 1986, 61-20662  
Term of patent 14 years  
U.S. Cl. D10—30



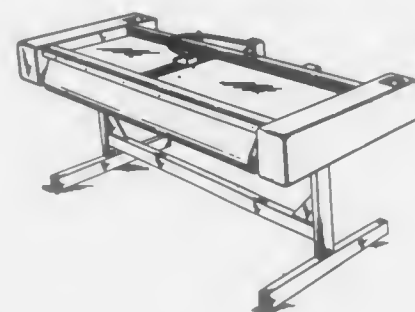
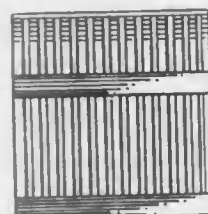
310,638  
CASE FOR A WATCH  
Hisako Sugano, Tokyo, Japan, assignor to Seikoosha Co., Ltd., Japan

Filed Nov. 26, 1986, Ser. No. 935,559  
Claims priority, application Japan, May 29, 1986, 61-20661  
Term of patent 14 years  
U.S. Cl. D10—30



310,636  
END STANDARD FOR A SEAT  
Gerald P. Skalka, Washington, D.C., assignor to Victor Stanley, Inc., Dunkirk, Md.

Filed May 28, 1987, Ser. No. 58,027  
Term of patent 14 years  
U.S. Cl. D6—500



310,639  
X, Y PLOTTER  
Heinz J. Gerber, West Hartford, Conn., assignor to Gerber Garment Technology, Inc., Tolland, Conn.

Filed May 17, 1988, Ser. No. 194,864  
Term of patent 14 years  
U.S. Cl. D10—46

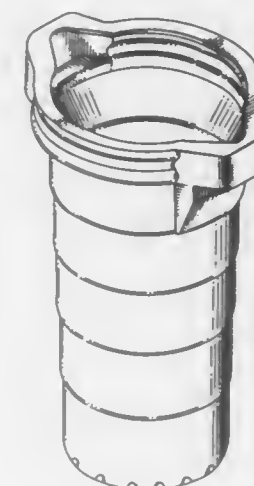
310,640  
COMBINED POSTAL AND SHIPPING SCALE  
George H. Woods, Fairfield; Richard Runney, and Kenneth A. Schulz, both of Bethel, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Jul. 30, 1987, Ser. No. 79,864  
Term of patent 14 years  
U.S. Cl. D10—91



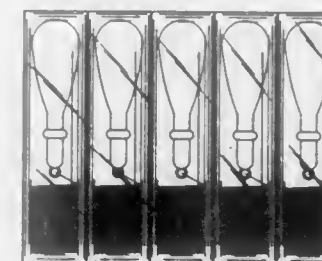
310,642  
TRAFFIC CHANNELIZER OR THE LIKE  
Jack H. Kulp, San Juan Capistrano, assignor to Traffix Devices, Inc., San Clemente, Calif.

Filed Feb. 25, 1988, Ser. No. 160,087  
Term of patent 14 years  
U.S. Cl. D10—109



310,641  
PACKAGE OF RESCUE BALLOON KITS  
David L. Miller, 8440 Steven Ave. S., Bloomington, Minn. 55420, and Gene Vatsedal, 328 NW. 8 St., Fairbault, Minn. 55021

Filed Aug. 21, 1987, Ser. No. 87,906  
Term of patent 14 years  
U.S. Cl. D10—109



310,643  
PLANTER  
Aturo Morando, Stockton, Calif., assignor to Loweli's Statuary, Inc., Stockton, Calif.

Filed Feb. 8, 1988, Ser. No. 153,659  
Term of patent 14 years  
U.S. Cl. D11—148

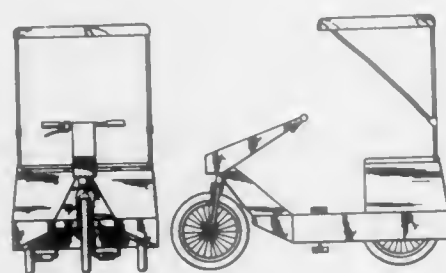


310,644  
TRICYCLE

Richard L. Koehler, P.O. Box 566, St. James City, Fla. 33956,  
and Willie E. Koehler, both of 7632 Ivywood Dr., Indianap-  
olis, Ind. 46250

Filed Oct. 30, 1987, Ser. No. 114,383  
Term of patent 14 years

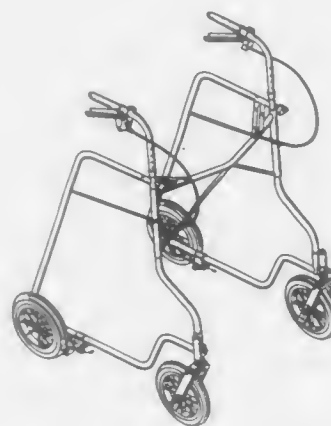
U.S. Cl. D12—112

310,646  
FOLDABLE ROLLING WALKER

Eric P. Rose, Canoga Park, Calif., assignor to Guardian Prod-  
ucts, Inc., Arleta, Calif.

Filed Jan. 11, 1988, Ser. No. 141,896  
Term of patent 14 years

U.S. Cl. D12—130

310,645  
CONVERTIBLE BABY STROLLER

Francois Julien, Biarritz, France, assignor to Baby Relax, Ang-  
let, France

Filed May 3, 1988, Ser. No. 189,854  
Claims priority, application France, Nov. 3, 1987, 786502

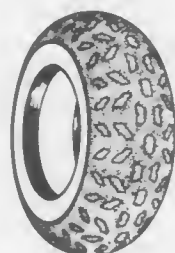
Term of patent 14 years  
U.S. Cl. D12—129

310,647  
AUTOMOBILE TIRE

Akihito Monts, Hyogo, Japan, assignor to Sumitomo Rubber  
Industries, Ltd., Hyogo, Japan

Filed Oct. 13, 1987, Ser. No. 106,770  
Claims priority, application Japan, Apr. 13, 1987, 62-14467  
Term of patent 14 years

U.S. Cl. D12—146

310,648  
TIRE

Giancarlo Armellini, Nova Milanese, Italy, assignor to Pirelli  
Coordinamento Pneumatici S.p.A., Italy

Filed Dec. 7, 1987, Ser. No. 129,671  
Claims priority, application Italy, Jan. 26, 1987, 21905/87[U]  
Term of patent 14 years

U.S. Cl. D12—146



## 310,651

## FINGER GRIP FOR BICYCLE BRAKE LEVERS

Robert D. Grow, 2708 Green Bay Way, Sacramento, Calif.  
95826

Filed Feb. 19, 1988, Ser. No. 157,530  
Term of patent 14 years

U.S. Cl. D12—179



## 310,652

## SIDE VISOR FOR AUTOMOBILE

Yoichi Nagata, Chigasaki, Japan, assignor to Nagata Kogyo  
Kabushiki Kaisha, Japan

Filed Mar. 4, 1988, Ser. No. 164,004  
Claims priority, application Japan, Oct. 29, 1987, 62-44197  
Term of patent 14 years

U.S. Cl. D12—191

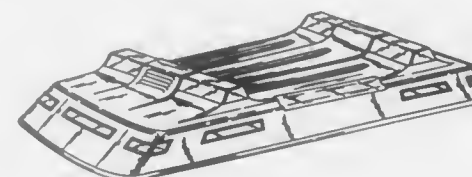


## 310,649

## ROOF MODULE FOR EMERGENCY VEHICLES

Richard D. Lee, P.O. Box 15635, Columbus, Ohio 43215  
Filed Feb. 18, 1988, Ser. No. 157,311

Term of patent 14 years  
U.S. Cl. D12—156

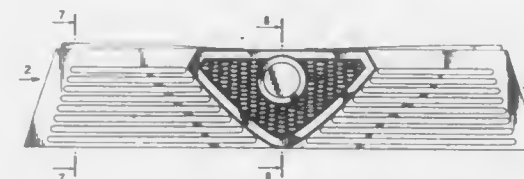


## 310,650

## FRONT GRILL FOR AN AUTOMOTIVE VEHICLE

Ermanno Cressoni, Arese, Italy, assignor to Alfa Romeo Auto  
S.p.A., Naples, Italy

Filed Apr. 30, 1985, Ser. No. 729,139  
Claims priority, application Italy, Oct. 31, 1984, 23665/84[U]  
Term of patent 14 years  
U.S. Cl. D12—163



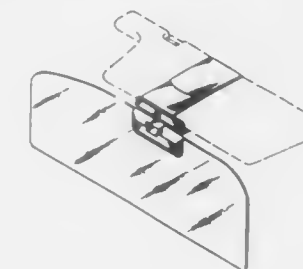
## 310,653

## SUNVISOR FOR VEHICLES

Genya Aizawa, Hayashicho Mansion 201, 30-2 Sendagi 5-chome,  
Bunkyo-ku, Tokyo, and Kakuhisa Oso, 10-45, Chiyogakita  
6-chome, Aso-ku, Kawasaki-shi, Kanagawa, both of Japan

Filed Apr. 6, 1988, Ser. No. 178,289  
Claims priority, application Japan, Oct. 7, 1987, 62-040771  
Term of patent 14 years

U.S. Cl. D12—191





310,654

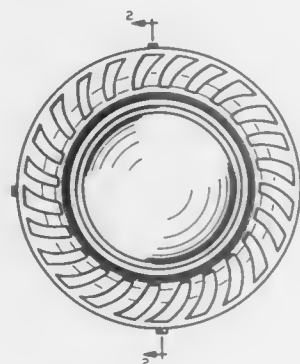
## STROLLER WHEEL HUB CAP

Harry J. Giambrone, Kettering, Ohio, assignor to Spalding & Evenflo Companies, Inc., Tampa, Fla.

Filed Oct. 13, 1988, Ser. No. 257,239

Term of patent 14 years

U.S. Cl. D12—211



310,655

## BICYCLE WHEEL SPOKE

Yoo H. Choe, No. B-310, Central Heights Villa, 203-1, Oksu-Dong, Sungdong-Ku, Seoul, Rep. of Korea

Filed Apr. 22, 1988, Ser. No. 184,753

Term of patent 14 years

U.S. Cl. D12—213



310,657

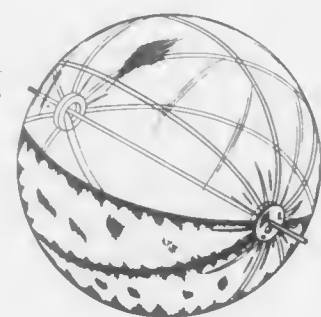
## INFLATABLE, REFLECTIVE SOLAR OVEN

Rodney Bradford, 1210 Kennamer Dr., SE., Huntsville, Ala. 35801, and Lott W. Brantley, 117 Ninth Ave., Arab, Ala. 35016

Filed Jun. 22, 1987, Ser. No. 64,800

Term of patent 14 years

U.S. Cl. D13—102



310,658

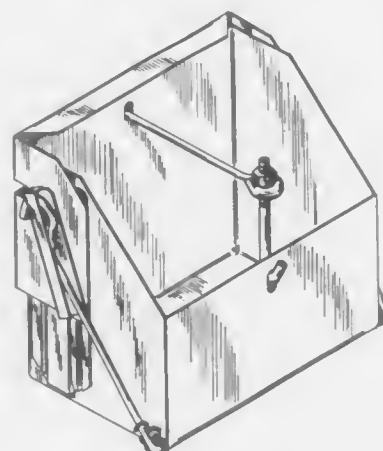
## VEHICLE BATTERY HOLDER

Lynn A. Balek, Mason City, Iowa, assignor to LTL Industries Ltd., Mason City, Iowa

Filed Feb. 29, 1988, Ser. No. 161,672

Term of patent 14 years

U.S. Cl. D13—119



310,656

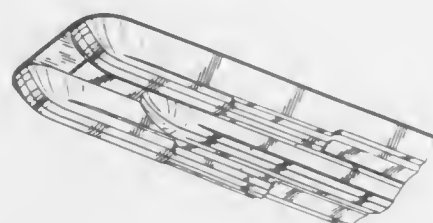
## PONTON BOAT EXTERIOR HULL

Perry P. Paine, Jr., Ste. 300, First American Center, 200 E. Broadway, P.O. Box 415, Maryville, Tenn. 37803-0415

Filed Mar. 4, 1988, Ser. No. 163,893

Term of patent 14 years

U.S. Cl. D12—300



310,659

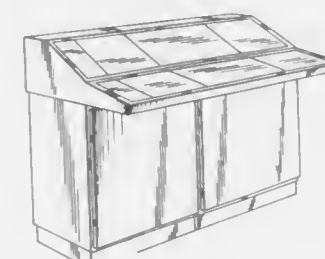
## CONSOLE FOR THE OPERATION OF MACHINERY

Alfred Schott, Radebeul; Roland Reichenberger, Coswig; Volker Eichler, Weinboehla, and Horst Schulz, Dresden, all of German Democratic Rep., assignors to VEB Kombinat Polygraph "Werner Lamberz", Leipzig, German Democratic Rep.

Filed Sep. 8, 1986, Ser. No. 905,669

Term of patent 14 years

U.S. Cl. D13—163



310,660

## KEYBOARD FOR PROGRAMMABLE CONTROLLER

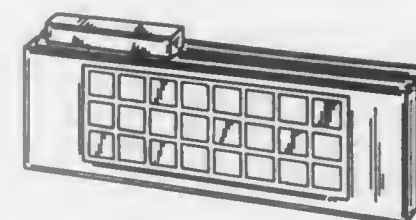
Katsuhiko Ishida, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan

Filed Feb. 6, 1989, Ser. No. 307,582

Claims priority, application Japan, Sep. 7, 1988, 63-35297

Term of patent 14 years

U.S. Cl. D14—100



310,662

## TERMINAL FOR SIGNAL PROCESSING IN TEXTILE LABORATORIES

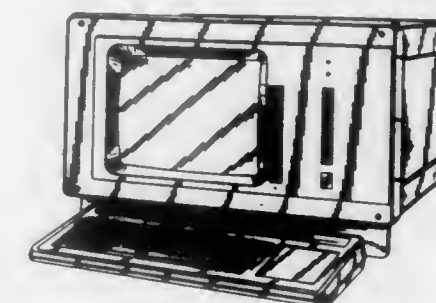
Hans-Rudolf Fellmann, Wagen, and Christophe Apothéoz, Maschwanden, both of Switzerland, assignors to Zellweger Uster Ltd., Uster, Switzerland

Filed Mar. 24, 1987, Ser. No. 29,600

Claims priority, application Switzerland, Sep. 26, 1986, 115437

Term of patent 14 years

U.S. Cl. D14—106



310,663

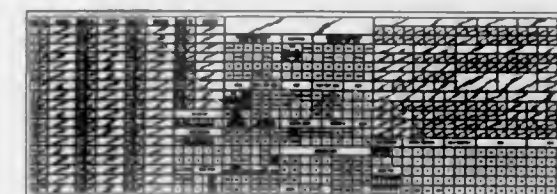
## COMPUTER AIDED DESIGN MATRIX MENU FOR OVERLAYING A DIGITIZING TABLET

Wayne C. Fedawa, 8470 Tree Top Ct., N., Apt. 1032, Miamisburg, Ohio 45342

Filed Sep. 29, 1987, Ser. No. 102,092

Term of patent 14 years

U.S. Cl. D14—114



310,664

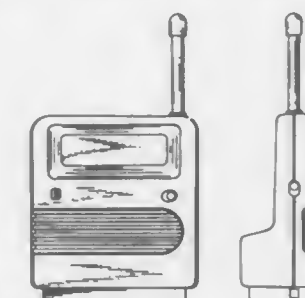
## MONITOR RECEIVER

Patrick J. Murphy, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Oct. 11, 1988, Ser. No. 256,278

Term of patent 14 years

U.S. Cl. D14—137



310,661

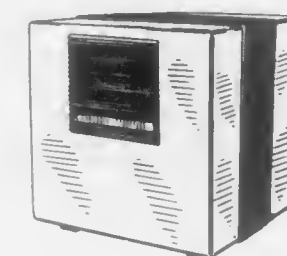
## CENTRAL PROCESSING UNIT FOR COMPUTER

Hartmut Esslinger, Los Gatos, Calif., assignor to NeXT, Inc., Redwood City, Calif.

Filed Jun. 30, 1988, Ser. No. 214,153

Term of patent 14 years

U.S. Cl. D14—102



310,665

## CONTROLLER HOUSING

Duane D. Fortune, Noblesville, Ind.; Richard M. Joffe, Palisades Park, N.J.; Henry J. Mack, Jr., Levittown; John N. McGarvey, Drexel Hill, both of Pa., and Michael P. Zambelli, Maplewood, N.J., assignors to AT&T Company, Murray Hill, N.J.

Filed Apr. 6, 1987, Ser. No. 34,183  
Term of patent 14 years

U.S. Cl. D14—140



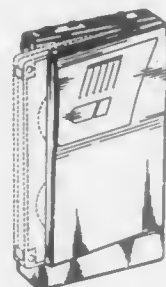
310,667

## COMBINED TAPE PLAYER AND TUNER

Masahiko Kobayashi, Kamakura, and Kazuharu Yamamoto, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 11, 1988, Ser. No. 166,618  
Claims priority, application Japan, Sep. 24, 1987, 62-38495  
Term of patent 14 years

U.S. Cl. D14—163



310,668

## COMBINED RADIO, CASSETTE TAPE RECORDER AND DIGITAL AUDIO DISK PLAYER

Toshio Takada, Odawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 8, 1988, Ser. No. 179,130  
Claims priority, application Japan, Aug. 21, 1987, 62-33666  
Term of patent 14 years

U.S. Cl. D14—163

310,666  
COMBINED RADIO AND CASSETTE TAPE RECORDER  
Kazuharu Yamamoto, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed May 13, 1988, Ser. No. 193,642  
Claims priority, application Japan, Nov. 17, 1987, 62-46755  
Term of patent 14 years  
U.S. Cl. D14—163



310,669

## COMBINED TAPE PLAYER AND RADIO TUNER

Takashi Sogabe, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed May 17, 1988, Ser. No. 195,013  
Claims priority, application Japan, Nov. 17, 1987, 62-47047  
Term of patent 14 years

U.S. Cl. D14—163



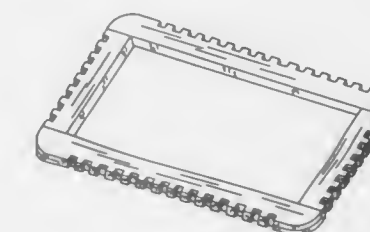
310,672

## LOOM FRAME OR SIMILAR ARTICLE

Philip R. Harvey, and Jean S. Harvey, both of P.O. Box 416, Mill St., Fontana, Wis. 53125

Filed Feb. 29, 1988, Ser. No. 161,713  
Term of patent 14 years

U.S. Cl. D15—66



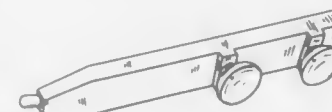
310,670

## WINDSHIELD MOUNT RADIO ANTENNA

Jack W. Sheriff, La Jolla, Calif., assignor to Modublox & Co., Inc., La Jolla, Calif.

Filed Jan. 11, 1988, Ser. No. 142,415  
Term of patent 14 years

U.S. Cl. D14—230



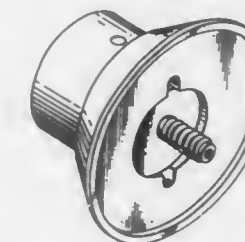
310,673

## SCREW CHUCK

Jerry Glaser, 8341 Delgany Ave., Playa Del Rey, Calif. 90293

Filed Jan. 16, 1988, Ser. No. 207,448  
Term of patent 14 years

U.S. Cl. D15—140



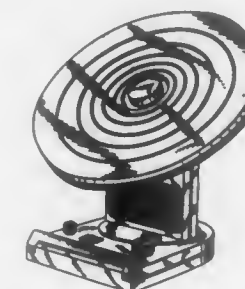
310,671

## INDOOR FM ANTENNA

Reinhold Weins, 921 Ridge Ave., Evanston, Ill. 60202

Filed May 26, 1988, Ser. No. 199,304  
Term of patent 14 years

U.S. Cl. D14—230



310,674

## COMBINATION MIXING TANK AND A PANEL UNIT

Robert J. Poterala, 140 Rocky Point, Greenville, S.C. 29615

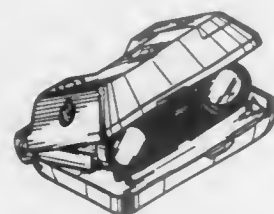
Filed Feb. 16, 1988, Ser. No. 156,100  
Term of patent 14 years

U.S. Cl. D15—199

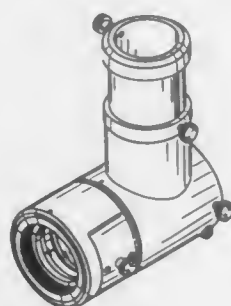




310,675  
COMBINED FOLDING BINOCULARS AND AM/FM  
RADIO  
Lu Huang C., 7F-10, No. 311, Chung Hsiao E. Rd., Sec. 4,  
Taipei, Taiwan  
Filed Aug. 5, 1987, Ser. No. 82,068  
Term of patent 14 years  
U.S. Cl. D16—133



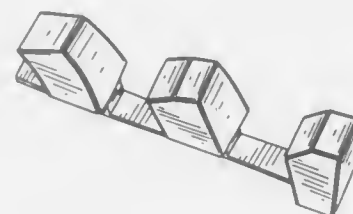
310,676  
MULTIPLE FUNCTION IMAGE SWITCHING  
ATTACHMENT FOR A TELESCOPE OR SIMILAR  
ARTICLE  
Jeffrey R. Charles, P.O. Box 1892, Camp Verde, Ariz. 86322  
Filed Feb. 10, 1988, Ser. No. 155,003  
Term of patent 14 years  
U.S. Cl. D16—134



310,677  
SUPPORT BASE FOR A CAMERA OR SIMILAR  
ARTICLE  
Noble M. Stidham, Jr.; Victor J. Polyak, and Steve A. Stadel-  
man, all of P.O. Box 1094, Lubbock, Tex. 79408  
Filed Jul. 13, 1987, Ser. No. 72,993  
Term of patent 14 years  
U.S. Cl. D16—242



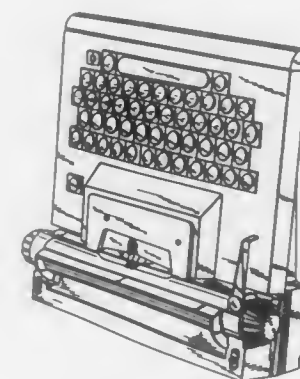
310,678  
KEY UNIT FOR A KEYBOARD MUSICAL INSTRUMENT  
Kanpei Takefaji, 27-13-704, Sendagaya 4-chome, Shibuya-ku,  
Tokyo, and Ritsuko Takefaji, 1-1-208, Kamata 1-chome, Oh-  
ta-ku, Tokyo, both of Japan  
Filed Jan. 25, 1988, Ser. No. 147,911  
Claims priority, application Japan, Jul. 30, 1987, 62-31088  
Term of patent 14 years  
U.S. Cl. D17—9



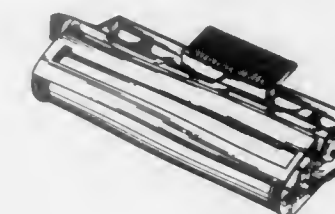
310,679  
ELECTRONIC WIND INSTRUMENT  
Yasuhiro Kira, Hamamatsu, Japan, assignor to Nippon Gakki  
Seizo Kabushiki Kaisha, Japan  
Filed Aug. 14, 1987, Ser. No. 86,032  
Claims priority, application Japan, Feb. 18, 1987, 62-5895  
Term of patent 14 years  
U.S. Cl. D17—10



310,680  
ELECTRONIC TYPEWRITER  
Vid Bratasevec, Izola, Yugoslavia, assignor to Proizvodnja in  
prodaja igrac, pisal, kovinskih in plasticnih izdelkov  
"Mehano", p.o., Izola, Yugoslavia  
Filed Feb. 23, 1988, Ser. No. 159,571  
Claims priority, application Yugoslavia, Sep. 28, 1987, M  
604/87  
Term of patent 14 years  
U.S. Cl. D18—1

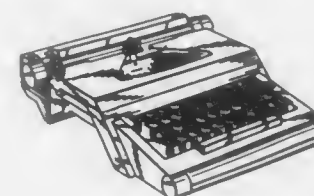


310,682  
PHOTOCONDUCTOR CARTRIDGE FOR COMPUTER  
OUTPUT PRINTERS  
Yoshitaka Tsumuro, Tokyo, Japan, assignor to NEC Corpora-  
tion, Tokyo, Japan  
Filed Apr. 17, 1987, Ser. No. 39,486  
Claims priority, application Japan, Oct. 17, 1986, 61-41199  
Term of patent 14 years  
U.S. Cl. D18—40



310,683  
TONER CASE FOR ELECTROPHOTOGRAPHIC COPIER  
Minoru Aoyama, Tokyo, Japan, assignor to Canon Kabushiki  
Kaisha, Tokyo, Japan  
Filed Nov. 26, 1986, Ser. No. 935,541  
Claims priority, application Japan, May 28, 1986, 61-20639  
Term of patent 14 years  
U.S. Cl. D18—43

310,681  
TYPEWRITER  
Vid Bratasevec, Koper, Yugoslavia, assignor to Proizvodnja in  
Prodaja Igrac, Pisal, Kovinskih in Plasticnih Izdelkov  
"Mehano", P.O., Izola, Yugoslavia  
Filed Jul. 19, 1988, Ser. No. 221,172  
Claims priority, application Yugoslavia, Jan. 28, 1988, M  
57/88  
Term of patent 14 years  
U.S. Cl. D18—1



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OFFICIAL GAZETTE

SEPTEMBER 18, 1990

310,684  
**PEN CAP OR SIMILAR ARTICLE**  
 Kunio Itoh, Funabashi, Japan, assignor to Pentel Kabushiki Kaisha, Japan  
 Filed Nov. 26, 1986, Ser. No. 935,558  
 Term of patent 14 years  
 U.S. Cl. D19—57



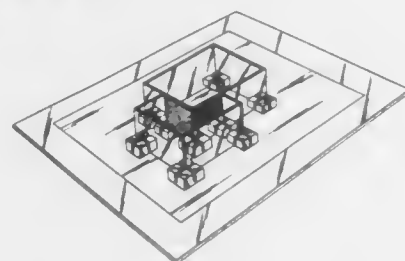
310,687  
**TAPE APPLICATOR**  
 Abner Berracasa, Pully, Switzerland, assignor to Capitol Trading S.A., Lausanne, Switzerland  
 Filed May 11, 1987, Ser. No. 48,121  
 Claims priority, application Switzerland, Nov. 21, 1986, 115,573  
 Term of patent 14 years  
 U.S. Cl. D19—69



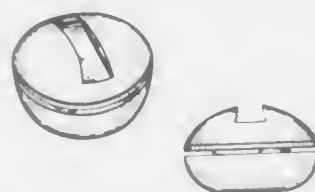
310,685  
**SIMULATIVE TOY COASTER**  
 Jeffery A. Berger, 3709 Lisa Ln., Mesquite, Tex. 75150  
 Filed Feb. 22, 1989, Ser. No. 313,730  
 Term of patent 14 years  
 U.S. Cl. D21—74



310,686  
**ARCHITECTURAL LEARNING DEVICE**  
 Timothy L. Tacquard, and Patricia B. Gillfillan, both of Laguna Niguel, Calif., assignors to Patall Enterprises, Inc., Laguna Niguel, Calif.  
 Filed Feb. 13, 1987, Ser. No. 14,732  
 Term of patent 14 years  
 U.S. Cl. D19—62



310,688  
**NOTEPAPER DISPENSER**  
 David C. Windorski, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
 Filed Apr. 3, 1987, Ser. No. 34,323  
 Term of patent 14 years  
 U.S. Cl. D19—86

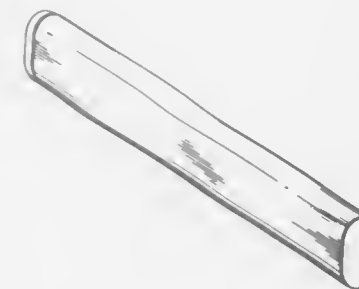
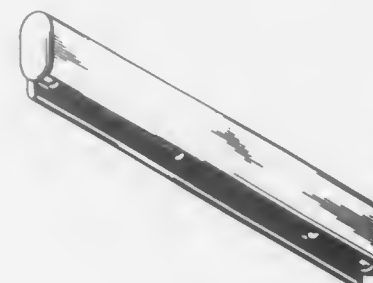


SEPTEMBER 18, 1990

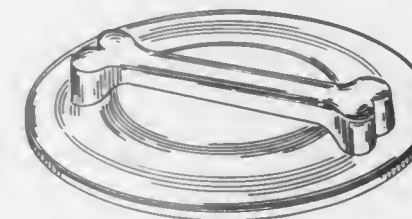
U.S. PATENT AND TRADEMARK OFFICE

1801

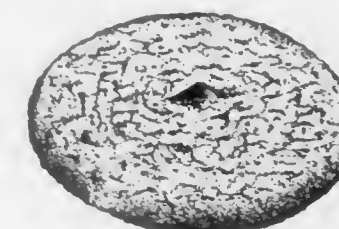
310,689  
**HOLDER FOR SHEET MATERIAL**  
 Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.  
 Filed Dec. 22, 1986, Ser. No. 944,620  
 Term of patent 14 years  
 U.S. Cl. D19—90



310,691  
**AERIAL TOY**  
 Herbert R. Axelrod, 211 W. Sylvania Ave., Neptune, N.J. 07753  
 Filed Dec. 22, 1987, Ser. No. 136,922  
 Term of patent 14 years  
 U.S. Cl. D21—86



310,692  
**AERIAL TOY**  
 Michael Harker, 2180 John Adams Pkwy., Idaho Falls, Id. 83401  
 Filed Mar. 2, 1988, Ser. No. 163,403  
 Term of patent 14 years  
 U.S. Cl. D21—86



310,690  
**SIGN**  
 Kevin Walsh, 95 Louis St., Whippany, N.J. 07981  
 Filed May 13, 1988, Ser. No. 194,004  
 Term of patent 14 years  
 U.S. Cl. D20—29



310,693  
**SPINNING TOY**  
 Egbert Campbell, 6642 Mather Dr., Marrero, La. 70072  
 Filed Mar. 22, 1988, Ser. No. 171,540  
 Term of patent 14 years  
 U.S. Cl. D21—96





310,694

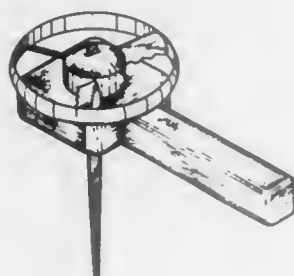
## SPINNING TOY ASSEMBLY

Cecilio Gonzalez, HC 35 - Box 6458, San Lorenzo, P.R. 00754;  
Carlos Gonzalez, 39 Poplar Gardens, Apartment B, Rochester, N.Y. 14606; Michael Masul, Calle CJ8, Jardines de Caques, and Phillip M. Czechowski, D-10, Calle-1, Altos de la Fuente, both of Caques, P.R. 00625

Filed Jul. 11, 1988, Ser. No. 216,987

Term of patent 14 years

U.S. Cl. D21-96



310,696

## MOTOR DRIVEN TOY CACTUS

Yasuta Satoh, Nagareyama, and Shinya Saitoh, Tokyo, both of Japan, assignors to Takara Co., Ltd., Tokyo, Japan

Filed Sep. 12, 1989, Ser. No. 406,130

Claims priority, application Japan, Jun. 12, 1989, 1-21657  
Term of patent 14 years

U.S. Cl. D21-150



310,697

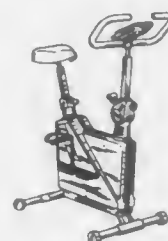
## BICYCLE EXERCISER

Joe Kagayama, Osaka, Japan, assignor to Tsuyama Mfg. Co., Ltd., Osaka, Japan

Filed Apr. 25, 1988, Ser. No. 185,820

Claims priority, application Japan, Oct. 20, 1987, 62-42800  
Term of patent 14 years

U.S. Cl. D21-194



310,695

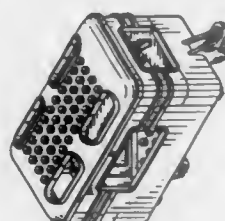
## TOY TRAILER

Phillip M. Kushner, Greve Strand, and Steen Kyster, Cph. N., both of Denmark, assignors to Interlego A.G., Switzerland

Filed Dec. 2, 1987, Ser. No. 127,877

Term of patent 14 years

U.S. Cl. D21-140



310,698

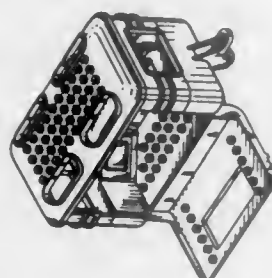
## UPRIGHT HOOP UNIT FOR A LAWN GOLF GAME

Hal W. Cooper, 1111 Trisha Ave., Des Moines, Iowa 50313

Filed Jul. 27, 1987, Ser. No. 78,273

Term of patent 14 years

U.S. Cl. D21-202



310,699

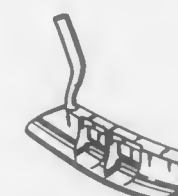
## GOLF PUTTER HEAD

Richard Parente, 877 Stevens Ave., Apt. 4109, Solana Beach, Calif. 92075, and Richard De La Cruz, Lazy 8 Ranch Hwy. 76, Pauma Valley, Calif. 92061

Filed Jan. 12, 1987, Ser. No. 2,504

Term of patent 14 years

U.S. Cl. D21-219



310,700

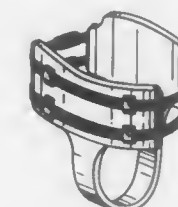
## BOUYANT BELT

Robert S. Jones, Indianapolis, Ind., assignor to Bobber Tech, Inc., Warsaw, Ind.

Filed Feb. 1, 1988, Ser. No. 150,721

Term of patent 14 years

U.S. Cl. D21-238



310,701

## TAMPER RESISTANT BAIT TRAY OR SIMILAR ARTICLE

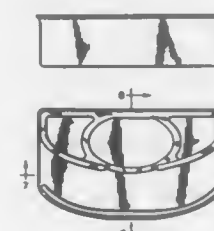
Bryan E. Petersen, Westwood, and Michael Kanceljak, Bloomington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 1, 1987, Ser. No. 54,152

The portion of the term of this patent subsequent to Sep. 18, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D22-119



310,702

## TAMPER RESISTANT BAIT TRAY OR SIMILAR ARTICLE

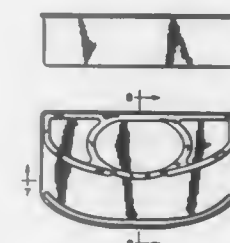
Bryan E. Petersen, Westwood, and Michael Kanceljak, Bloomington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 1, 1987, Ser. No. 54,156

The portion of the term of this patent subsequent to Sep. 18, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D22-119



310,703

## INSECT GUARD

Charles R. Johnson, 6786 Pembroke, San Antonio, Tex. 78240

Filed Apr. 11, 1988, Ser. No. 180,273

The portion of the term of this patent subsequent to May 24, 2002, has been disclaimed.

Term of patent 14 years

U.S. Cl. D22-122



310,704

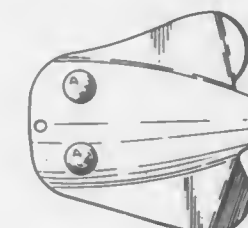
## FISHING LURE

John S. Nicosia, Sr., deceased, late of New Britain, Conn., and by John S. Nicosia, Jr., executor, 37 Barberry Dr., Burlington, Conn. 06013

Filed Mar. 30, 1988, Ser. No. 176,388

Term of patent 14 years

U.S. Cl. D22-130



310,705

## FISHING LURE

Robert W. Skripko, 102 San Luis Way, Placentia, Calif. 92670

Filed Mar. 7, 1988, Ser. No. 165,199

Term of patent 14 years

U.S. Cl. D22—133



310,706

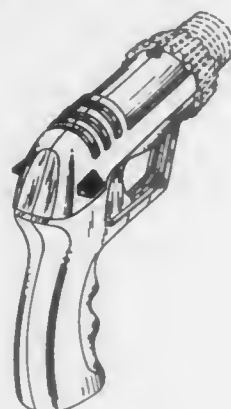
## HOSE NOZZLE

Lawrence P. Herea, Peoria, Ill., and Ronald G. Hayes, Batavia, Ohio, assignors to L. R. Nelson Company, Peoria, Ill.

Filed Jan. 23, 1986, Ser. No. 877,400

Term of patent 14 years

U.S. Cl. D23—226



310,707

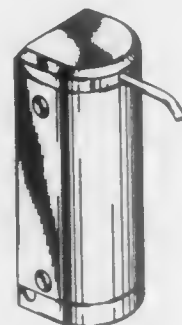
## PORTABLE WATER PURIFIER FOR HOME USE

Raymond R. Sedman, Redwood, Calif., assignor to United Environmental Technologies, Paoli, Pa.

Filed Jan. 28, 1988, Ser. No. 149,615

Term of patent 14 years

U.S. Cl. D23—209



310,708

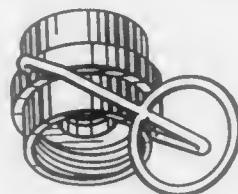
## COMBINED REVERSIBLE SPRINKLER NOZZLE AND SUPPORT RING

Robert W. Hengesbach, 7886 Munson Rd., Mentor, Ohio 44060

Division of Ser. No. 224,249, Jul. 26, 1988, which is a continuation of Ser. No. 20,684, Mar. 2, 1987, which is a continuation-in-part of Ser. No. 674,272, Nov. 23, 1984, which is a continuation-in-part of Ser. No. 461,874, Jan. 28, 1983, Pat. No. D. 282,392. This application Sep. 28, 1989, Ser. No. 414,067

Term of patent 14 years

U.S. Cl. D23—213



310,709

## FAUCET HANDLE

Franz W. Jana, Offenbach Am Main, Fed. Rep. of Germany, assignor to Jado Bathroom and Hardware Manufacturing Corp., Camarillo, Calif.

Filed May 22, 1987, Ser. No. 52,957

Term of patent 14 years

U.S. Cl. D23—250



310,710

## SHOWER ENCLOSURE

Keith L. Poulsen, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.

Filed Jan. 12, 1987, Ser. No. 2,254

Term of patent 14 years

U.S. Cl. D23—283



310,711

## COVER FOR A TRANSPORT REFRIGERATION UNIT

Dennis E. Welch, St. Paul, and William L. Waldechmidt, Farmington, both of Minn., assignors to Thermo King Corporation, Minneapolis, Minn.

Filed May 23, 1988, Ser. No. 197,178

Term of patent 14 years

U.S. Cl. D23—325



310,712

## FAN HEATER

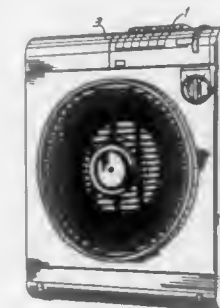
Miguel L. Del Fresno, Elbar, Spain, assignor to Oficina de Investigacion Agrupada, S.A., Guipuzcoa, Spain

Filed Dec. 20, 1988, Ser. No. 287,962

Claims priority, application Spain, Jun. 21, 1988, 116.270

Term of patent 14 years

U.S. Cl. D23—335



310,713

## FAN HOUSING WITH FILTER COMPARTMENT

Max Klein, Shrewsbury, N.J., assignor to Tech Paper, Inc., Pittsfield, Mass.

Filed Apr. 28, 1988, Ser. No. 187,585

Term of patent 14 years

U.S. Cl. D23—381



310,714

## TEMPOROMANDIBULAR JOINT DISC SCISSORS

Franklin M. Dolwick, Gainesville, Fla., assignor to Walter Lorenz Surgical Instruments, Inc., Jacksonville, Fla.

Filed Aug. 13, 1987, Ser. No. 84,746

Term of patent 14 years

U.S. Cl. D24—10



310,715

## DENTAL HANDPIECE

Reinhard Stralhammer, Heppenheim, and Werner Schuss, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Division of Ser. No. 106,432, Oct. 6, 1987, Pat. No. Des. 305,935. This application Nov. 22, 1989, Ser. No. 455,731

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1987, MR10/17183

Term of patent 14 years

U.S. Cl. D24—12



310,716

## PACIFIER TETHER

Norma L. Trask, 8752 Hazard Ave., Westminster, Calif. 92683

Filed Jul. 31, 1987, Ser. No. 79,904

Term of patent 14 years

U.S. Cl. D24—34





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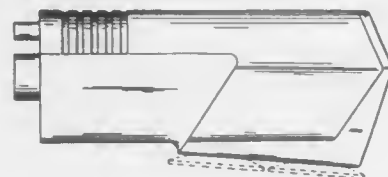
1806

OFFICIAL GAZETTE

SEPTEMBER 18, 1990

310,717  
**WATER JET FOR PRODUCING WHIRLPOOL ACTION  
 IN BATHTUBS**  
 Luc Helligenstein, Francois Geneve, and Stephen Melamed, all  
 of Chicago, Ill., assignors to Associated Mills Inc., Chicago,  
 Ill.

Filed Dec. 28, 1987, Ser. No. 138,691  
 Term of patent 14 years  
 U.S. Cl. D24—38



310,718  
**CHILD'S TEETHER**  
 Kristine M. Robison, 4041 Medical Dr., Suite 108, San Antonio,  
 Tex. 78229

Filed Jan. 26, 1989, Ser. No. 371,414  
 Term of patent 14 years  
 U.S. Cl. D24—45



310,719  
**BABY BOTTLE**  
 William P. Donovan, 28 Quailcrest Rd., East Lyme, Conn.  
 06333

Filed Mar. 18, 1988, Ser. No. 169,769  
 Term of patent 14 years  
 U.S. Cl. D24—47



310,720  
**BABY WEANING AID**  
 Rhea A. Nielson, 1687 N. 2900 West, Clinton, Utah 84015  
 Filed Feb. 27, 1989, Ser. No. 316,170  
 Term of patent 14 years  
 U.S. Cl. D24—47



310,721  
**NOSE TUBE ANCHORING STRIP**  
 Arthur A. Belsang, III, Des Moines, Iowa, assignor to Genetic  
 Laboratories, Inc., St. Paul, Minn.  
 Filed Feb. 16, 1988, Ser. No. 156,073  
 Term of patent 14 years  
 U.S. Cl. D24—49



SEPTEMBER 18, 1990

U.S. PATENT AND TRADEMARK OFFICE

1807

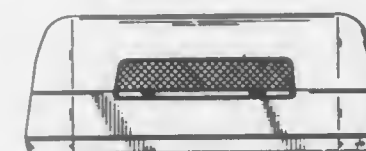
310,722  
**CANNULA FOR WITHDRAWING A TEST SAMPLE  
 FROM A TEST TUBE**  
 Bengt-Inge Brodén, Gärfarivägen 3, S-532 00 Skara, Sweden  
 Filed Jan. 16, 1989, Ser. No. 367,517  
 Claims priority, application Sweden, Dec. 22, 1988, 88-2956  
 Term of patent 14 years  
 U.S. Cl. D24—51



310,723  
**ATOMIZER**  
 Cheng-Yuan Su, No. 124, Sec. 4, Tung Ta Road, Hsinchu, Tai-  
 wan  
 Filed May 23, 1988, Ser. No. 197,813  
 Term of patent 14 years  
 U.S. Cl. D24—62



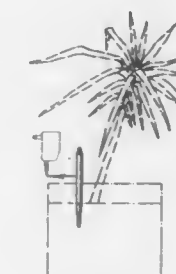
310,724  
**UV LAMP FOR CURING FINGERNAIL COATINGS**  
 Ron Jackson, Salt Lake City, Utah, assignor to Pacific Research  
 & Development Corp., Salt Lake City, Utah  
 Filed Jul. 17, 1989, Ser. No. 380,643  
 Term of patent 14 years  
 U.S. Cl. D24—68



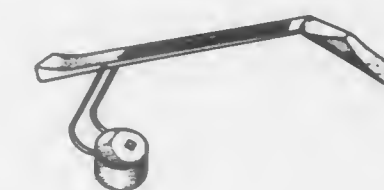
310,725  
**HALOGEN LAMP**  
 Futomi Hayakawa, and Tadashi Nawata, both of Tokyo, Japan,  
 assignors to Kabushiki Kaisha Hybec, Tokyo, Japan  
 Filed Jan. 5, 1988, Ser. No. 141,614  
 Term of patent 14 years  
 U.S. Cl. D26—2



310,726  
**DECORATIVE LAMP FOR POTTED PLANT**  
 John W. McCallough, c/o Cobra Industries Inc., 3 N. Ridge  
 Ave., Troy, Ohio 45373  
 Filed May 8, 1987, Ser. No. 48,450  
 Term of patent 14 years  
 U.S. Cl. D26—49



310,727  
**LAMP**  
 James Lu, 6FL-3, No. 512, Sec. 4, Chungshiao E. Rd., Taipei,  
 Taiwan, R.O.C.  
 Filed Jan. 17, 1989, Ser. No. 297,316  
 Term of patent 14 years  
 U.S. Cl. D26—63



310,728

## DESK LAMP OR SIMILAR ARTICLE

James Lu, 6F-3, No. 512, Sec. 4, Chung-Hsiao E. Rd., Taipei, Taiwan, Taiwan

Filed Feb. 8, 1988, Ser. No. 153,339  
Term of patent 14 years

U.S. Cl. D26—65



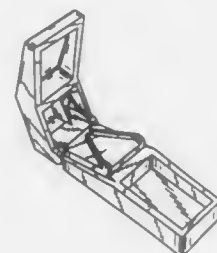
310,731

## PILL SPLITTER

Nathan S. Lieptz, Beachwood, Ohio, assignor to LGS Corporation, South Euclid, Ohio

Filed Dec. 15, 1986, Ser. No. 941,944  
Term of patent 14 years

U.S. Cl. D24—23



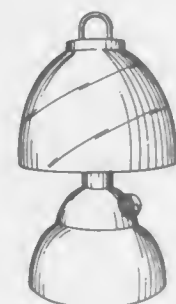
310,729

## BATTERY POWERED LAMP

David K. Stearns, Derby, Kans., assignor to Coleman Outdoor Products, Inc., Wichita, Kans.

Filed Jan. 4, 1988, Ser. No. 140,423  
Term of patent 14 years

U.S. Cl. D26—110



310,732

## ELECTRIC SHAVER

Hans T. Meelen, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 9, 1988, Ser. No. 165,876  
Claims priority, application Netherlands, Sep. 11, 1987, 62512-00

Term of patent 14 years

U.S. Cl. D28—49



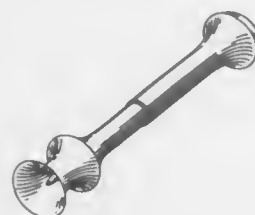
310,730

## CIGAR VENTILATOR

Henry A. Stelck, 7049 Wilson Terr., Morton Grove, Ill. 60053, and Edward R. Anton, 110 Harvey Ave., Grayslake, Ill. 60030

Filed Apr. 30, 1987, Ser. No. 45,048  
Term of patent 14 years

U.S. Cl. D27—195



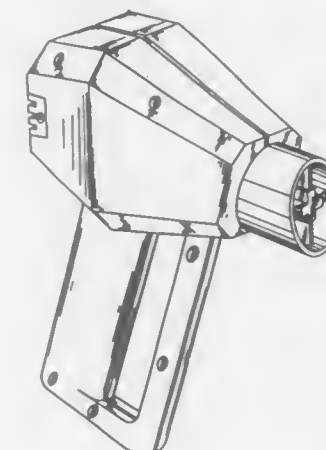
310,733

## HAIR BLOWER

Ralph J. Gelinas, Tarzana, Calif., assignor to Triune Research Corporation, Calabasas, Calif.

Filed Feb. 10, 1988, Ser. No. 154,605  
Term of patent 14 years

U.S. Cl. D28—13



310,734

## HAIR TRIMMER

George P. Gallanis, Sterling, Ill., assignor to Wahl Clipper Corporation, Sterling, Ill.

Filed Aug. 3, 1987, Ser. No. 80,574  
Term of patent 14 years

U.S. Cl. D28—53



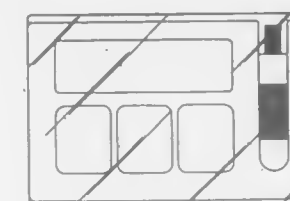
310,735

## COSMETIC CONTAINER

Dario Ferrari, Milan, Italy, assignor to Intercos Italia S.p.A., Italy

Filed May 4, 1988, Ser. No. 190,211  
Claims priority, application Italy, Nov. 20, 1987, 22748/87[U]  
Term of patent 14 years

U.S. Cl. D28—76



310,736

## COSMETIC CASE

Karens Bakic, Varese, Italy, assignor to Cosmede Anstalt, Vaduz, Liechtenstein

Filed Dec. 3, 1987, Ser. No. 128,473  
Claims priority, application Fed. Rep. of Germany, Jun. 16, 1987, URA838/87

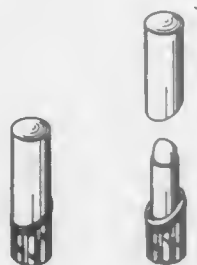
Term of patent 14 years

U.S. Cl. D28—82

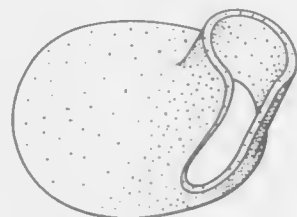
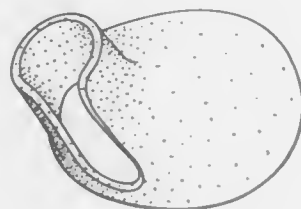




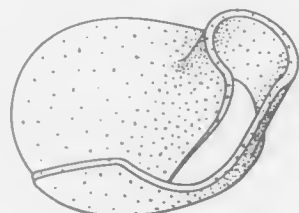
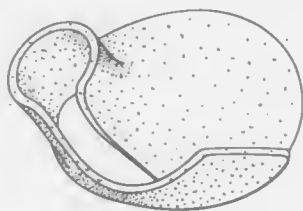
**310,737**  
**COSMETIC STICK CONTAINER**  
 Karena Bakic, Varese, Italy, assignor to Cosmede Anstalt, Vaduz, Liechtenstein  
 Filed Jan. 14, 1988, Ser. No. 143,697  
 Claims priority, application Fed. Rep. of Germany, Jul. 28, 1987, URA1061/87  
 Term of patent 14 years  
 U.S. Cl. D28—88



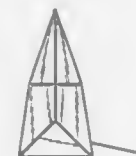
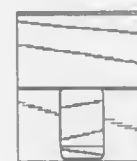
**310,738**  
**THUMB PROTECTOR**  
 Michael G. Brown, P.O. Box 8249, Houston, Tex. 77387  
 Filed Dec. 21, 1987, Ser. No. 135,996  
 Term of patent 14 years  
 U.S. Cl. D29—20



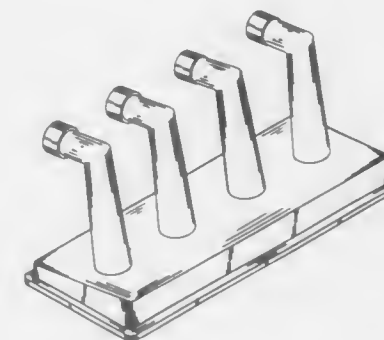
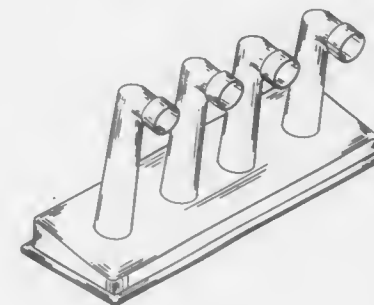
**310,739**  
**WEB FOR A BASEBALL GLOVE**  
 Robert L. Clevenhagen, Ava, Mo., assignor to Figgie International Inc., Richmond, Va.  
 Filed Apr. 15, 1988, Ser. No. 182,039  
 Term of patent 14 years  
 U.S. Cl. D29—21



**310,740**  
**DISPOSABLE PET LITTER HOUSING**  
 Susan N. Mannschreck, Rte. 4, Box 100, Atoka, Okla. 74525  
 Filed Jul. 12, 1989, Ser. No. 379,159  
 Term of patent 14 years  
 U.S. Cl. D30—161



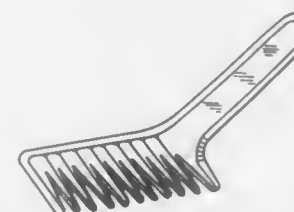
**310,742**  
**BOOT AND SHOE DRYER**  
 Douglas Johnson, 639 E. 1275, Shelley, Id. 83274  
 Filed Jul. 23, 1987, Ser. No. 77,779  
 Term of patent 14 years  
 U.S. Cl. D32—58



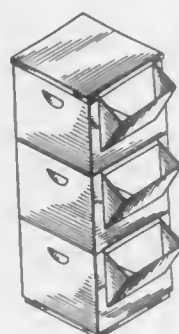
**310,743**  
**LOTTERY TICKET SCRAPER**  
 Gregory J. Riddle, 1137 W. Dianron Rd., Palmdale, Calif. 93551  
 Filed Feb. 25, 1988, Ser. No. 160,105  
 Term of patent 14 years  
 U.S. Cl. D32—46



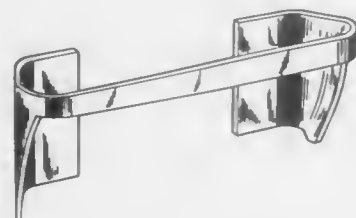
**310,741**  
**LITTER REMOVAL TOOL OR THE LIKE**  
 Phillip J. Moses, 1091 Galesmoore Ct., Westlake Village, Calif. 91361  
 Filed Jan. 25, 1988, Ser. No. 148,220  
 Term of patent 14 years  
 U.S. Cl. D30—162



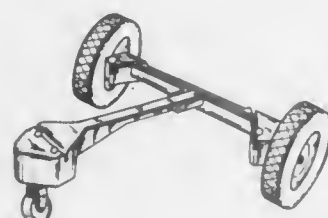
310,744  
REFUSE CONTAINER  
Sylvester J. Fletcher, P.O. Box, Greendell, N.J. 07839, and  
Kermit J. Lee, 104 Berkley Dr., Syracuse, N.Y. 13210  
Filed Aug. 14, 1987, Ser. No. 85,133  
Term of patent 14 years  
U.S. Cl. D34—1



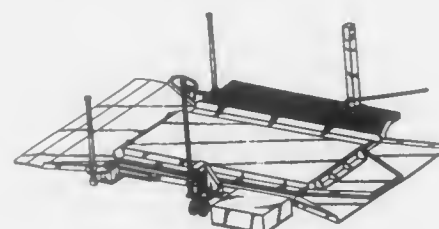
310,745  
BAG HOLDER  
Patrick Cross, 5 Molope Road, Randpark Ridge Ext. 1, Rand-  
burg 2194, Johannesburg, South Africa  
Filed Dec. 23, 1987, Ser. No. 142,887  
Claims priority, application South Africa, Jun. 26, 1987,  
0485/87  
Term of patent 14 years  
U.S. Cl. D34—6



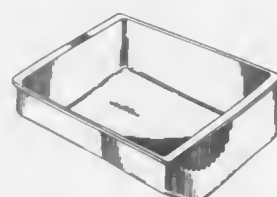
310,746  
DOLLY  
Robert C. Berfield, Jersey Shore, and Craig A. Seasholtz, Avis,  
both of Pa., assignors to Shop-Vac Corporation, Williamsport,  
Pa.  
Filed Jan. 20, 1987, Ser. No. 4,682  
Term of patent 14 years  
U.S. Cl. D34—23



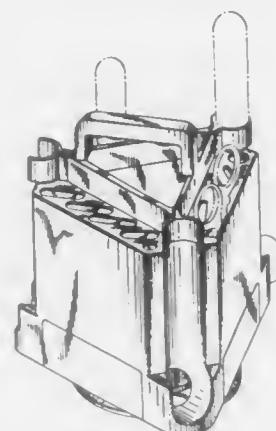
310,747  
CONTAINER TRANSFER LIFT  
Shunji Isogai, Hekinan, Japan, assignor to Soglyasu Industries  
Co., Ltd., Takahama, Japan  
Filed Nov. 16, 1988, Ser. No. 272,204  
Claims priority, application Japan, Aug. 2, 1988, 63-30969  
Term of patent 14 years  
U.S. Cl. D34—28



310,748  
PARTS DRAWER  
Donald Embree, Copley, and David L. Hamann, Cincinnati, both  
of Ohio, assignors to Rubbermaid Incorporated, Wooster,  
Ohio  
Filed Aug. 10, 1988, Ser. No. 230,506  
Term of patent 14 years  
U.S. Cl. D34—40



310,749  
TOOL CADDY  
Jane Ancona, and Bruce Ancona, both of New York, N.Y.,  
assignors to M. Kamenstein, Inc., White Plains, N.Y.  
Filed Dec. 5, 1989, Ser. No. 446,171  
Term of patent 14 years  
U.S. Cl. D34—44



## LIST OF PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 18TH DAY OF SEPTEMBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name  
(in accordance with city and telephone directory practice).

- A. Ahlstrom Corporation: See—  
Yrjala, Olavi A., 4,957,778, Cl. 427-152.000.  
A. O. Smith Corporation: See—  
Pottebaum, Joseph R., 4,958,118, Cl. 318-727.000.  
Aaron, James R.: See—  
Gwin, Hal S.; and Aaron, James R., 4,957,139, Cl. 137-556.000.  
Abbott Laboratories: See—  
Anderson, Pamela A.; Cipollo, Kent L.; and Mohacs, Tivadar G.,  
4,957,938, Cl. 514-412.000.  
Abe, Hiroomi: See—  
Nishio, Taichi; Abe, Hiroomi; Suzuki, Yasuro; Sanada, Takashi;  
Hosoda, Satoru; and Okada, Takayuki, 4,957,966, Cl. 525-66.000.  
Abe, Kazuhide: See—  
Saitoh, Shiroh; Izumi, Mamoru; Suzuki, Syuzi; and Abe, Kazuhide,  
4,958,327, Cl. 367-7.000.  
Abe, Shunichi, to Canon Kabushiki Kaisha. Original reading apparatus  
applying a lamp voltage to correct lamp blackening. 4,958,240, Cl.  
358-475.000.  
Abe, Yasunao: See—  
Kondo, Masao; and Abe, Yasunao, 4,957,031, Cl. 84-613.000.  
Abiko, Shigeo: See—  
Isono, Masanao; Kawamura, Ken; Asano, Masaya; Suzuki, Tetuo;  
and Abiko, Shigeo, 4,957,845, Cl. 430-156.000.  
Abou-Gharbia, Magid A.; and Notvest, Ronald R., to American Home  
Products Corporation. Benzobicycloalkane derivatives as anticonvul-  
sant neuroprotective agents. 4,957,909, Cl. 514-75.000.  
Abou-Gharbia, Magid A.; Stack, Gary P.; and Lappe, Rodney W., to  
American Home Products Corp. Antihypertensive polycyclic imides.  
4,957,913, Cl. 514-216.000.  
Abramovici, Gabriela M.; Buhrke, Rolfe E.; Chandramouli, Bopsi;  
Danda, Robert B.; Katzenstein, Leo R.; O'Connor, Thomas M.;  
Rinker, Timothy G.; and Tripp, Susan J., to AT&T Bell Labora-  
tories. Communication channel reservation. 4,958,343, Cl. 370-85.100.  
ACC Automation, Inc.: See—  
Daughenbaugh, Gary, 4,957,059, Cl. 118-423.000.  
Accu Industries, Inc.: See—  
Kendall, Paul W.; and Parrott, Gregory H., 4,958,290, Cl.  
364-463.000.  
Adam, Jean-Marie; and Baumann, Hans, to Ciba-Geigy Corporation.  
Heat-sensitive cyclic diazo compound containing recording material  
with benzotriazine compound and coupling component. 4,957,847,  
Cl. 430-170.000.  
Adams, Darrell P.: See—  
Buck, Roy V.; and Adams, Darrell P., 4,957,583, Cl. 156-345.000.  
Adams, Marvin, to Meltzer Industries Corporation. Garment having  
seamless body. 4,956,879, Cl. 2-80.000.  
ADE Corporation: See—  
Poduje, Noel S.; and Mallory, Roy E., 4,958,129, Cl. 324-661.000.  
Adeka Argus Chemical Co., Ltd.: See—  
Iizuka, Shunichi; Sakamaki, Yoshiyuki; and Shimoyama, Noriyuki,  
4,957,954, Cl. 524-102.000.  
Kikkawa, Kazumi; and Takahashi, Hiroshi, 4,957,953, Cl.  
524-99.000.  
Aden, Gary D., to Kevex Corporation. Masked electron beam lithogra-  
phy. 4,957,835, Cl. 430-5.000.  
Adkins, Joey B.: See—  
Carlo, Louis D.; and Adkins, Joey B., 4,958,084, Cl. 307-10.200.  
Adkins, Kelvin P., to Imperial Chemical Industries PLC. Polymeric  
substrate coated with an electroconductive layer. 4,957,816, Cl.  
428-411.100.  
Adler, Michael S.: See—  
Krishna, Surinder; Torreno, Manuel L., Jr.; and Adler, Michael S.,  
4,958,210, Cl. 357-34.000.  
Adolph Coors Company: See—  
Williams, Warren R., 4,956,990, Cl. 72-349.000.  
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Adhesive thermoplastic elastomer blends. 4,957,968, Cl. 525-74.000.  
Advanced Gravis Computer Technology, Ltd.: See—  
Scott-Jackson, Dennis; and Skibbe, Harry, 4,958,071, Cl.  
250-229.000.  
Advanced Micro Devices, Inc.: See—  
Chang, Chi, 4,958,321, Cl. 365-185.000.  
Plants, William C., 4,958,132, Cl. 330-110.000.  
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Advanced Nuclear Fuels Corporation: See—  
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Fujisaki, Kenichi, 4,958,346, Cl. 371-21.300.  
AG Communication Systems Corporation: See—  
Zaremba, Norman S.; and Beyer, John P., 4,956,911, Cl. 29-721.000.
- Agafonov, Andrei V.: See—  
Bukatov, Alexandr S.; Iofis, Naum A.; Egorov, Jury G.; Dobrova,  
Natalya B.; Kostretsov, Anatoly S.; and Agafonov, Andrei V.,  
4,957,503, Cl. 623-2.000.  
Agency of Industrial Science and Technology: See—  
Sakuma, Kuniharu; Honda, Hiroshi; Machata, Koukichi; and  
Aikawa, Takayuki, 4,957,054, Cl. 112-262.200.  
Tamari, Nobuyuki; Kondoh, Isao; and Kinoshita, Nakoto,  
4,957,509, Cl. 623-16.000.  
AGF Manufacturing, Inc.: See—  
McHugh, George J., 4,957,123, Cl. 134-167.000.  
Agou, Tokinori; Sakashita, Takeshi; Shimoda, Tomoaki; Sudo, Masaru;  
Kuwabara, Masahiro; and Tanaka, Masahide, to Mitsui Petrochemi-  
cal Industries, Ltd. Fluorine-substituted hydrocarbon group grafted  
(meth)acrylate polymers. 4,957,985, Cl. 526-246.000.  
Ahrens, Kurt H.: See—  
Morsdorf, Peter; Schickaneder, Helmut; Herter, Rolf; Pfahler,  
Volker; Engler, Heidrun; and Ahrens, Kurt H., 4,957,920, Cl.  
514-252.000.  
Aichi Steel Works Ltd.: See—  
Honkura, Yoshinobu; Fujii, Hideki; and Murata, Koji, 4,957,699,  
Cl. 420-41.000.  
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Air Products and Chemicals, Inc.: See—  
Golden, Timothy C.; Kumar, Ravi; and Kratz, Wilbur C.,  
4,957,514, Cl. 55-26.000.  
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Aisin AW Co., Ltd.: See—  
Kano, Takenori; Takemoto, Haruki; Niimi, Mamoru; Takase, Isao;  
and Yokoyama, Fumitomo, 4,957,195, Cl. 192-106.00F.  
Aisin Seiki Kabushiki Kaisha: See—  
Komazawa, Osamu; Isogai, Shigetaka; Buma, Shuuichi; Onuma,  
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Cl. 280-707.000.  
Akada, Yasuaki; Ishikawa, Norio; Egawa, Takeshi; and Taniguchi,  
Nobuyuki, to Minolta Camera Kabushiki Kaisha. Control device for  
use in a camera system. 4,958,183, Cl. 354-412.000.  
Akada, Yukihisa, to Fuji Xerox Co., Ltd. Control device for use with a  
drawing output unit. 4,958,299, Cl. 364-520.000.  
Akagawa, Minoru, to Intelmatec Corporation. Apparatus for transfer-  
ring disks from one cassette to another with different pitch. 4,957,406,  
Cl. 414-416.000.  
Akazawa, Takashi: See—  
Kiuchi, Atsushi; Kaneko, Kenji; Ishida, Jun; Nakagawa, Tetsuya;  
Hagiwara, Yoshimune; Akazawa, Takashi; and Sato, Tomoru,  
4,958,276, Cl. 364-200.000.  
Akbar, Shah; Kroesen, Patricia L.; Ogura, Seiki; and Rovedo, Nivo, to  
International Business Machines Corporation. Vertical bipolar tran-  
sistor. 4,957,875, Cl. 437-31.000.  
Akiniev, Teodor S. Method of controlling mechanical resonance hand.  
4,958,113, Cl. 318-568.180.  
Akins, Edward A. Feeder for animals. 4,957,067, Cl. 119-60.000.  
Akitake, Horoshi, to Olympus Optical Co., Ltd. Rotational drive mech-  
anism. 4,958,177, Cl. 354-195.100.  
Akiyama, Junetsu: See—  
Tominaga, Mamoru; Mori, Leo; and Akiyama, Junetsu, 4,957,370,  
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Akman, Bulent; and de Curraize, Bernard. Method for making profiled  
plastic tubes such as corrugated tubes. 4,957,687, Cl. 264-506.000.  
Aktiebolaget Hassle: See—  
Jonsson, Ulf E.; Sandberg, John A.; and Sjogren, John A.,  
4,957,745, Cl. 424-461.000.  
Akzo N.V.: See—  
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Schutyser, Jan Andre J.; and Boonstra, Tjerk O., 4,957,981, Cl.  
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Albini, Italo; Gruber, Werner; Wiemers, Norbert; Wichelhaus, Juergen;  
Leoni, Roberto; and Rossini, Angela, to Henkel Kommanditgesell-  
schaft auf Aktien. Method of making and using thermoplastic block  
copolymers. 4,957,979, Cl. 525-420.500.  
Albrecht, James O. Saw mount for use on a conventional workshop  
table. 4,957,024, Cl. 83-471.300.  
Albrecht, Rudolf: See—  
Schoellkopf, Klaus; Albrecht, Rudolf; Lehmann, Manfred; and  
Schroeder, Gertrud, 4,958,026, Cl. 548-259.000.  
Alcatel N.V.: See—  
Fussg, Kurt, ml/a/ nger; and Krimmel, Heinz G., 4,957,339, Cl.  
350-96.150.



- Alessi, Paula J.; Faul, William H.; Giorgianni, Edward J.; Koop, Donald A.; and Madden, Thomas E., to Eastman Kodak Company. Color imaging apparatus producing visually matched displays of perceptually distinct reproduced images. 4,958,220, Cl. 358-76.000.
- Alfa-Laval Agri Inc.: See—  
Neff, Clayton; and Chowdhury, Mofazzal H., 4,957,065, Cl. 119-14.370.
- Alfieri, Massimo; Lodi, Zelindo; and Trevisan, Gianfranco, to Fidenza Vetraria S.p.A. Elongated electrically insulating support structure and relevant preparation method. 4,958,049, Cl. 174-209.000.
- Alfred Teves GmbH: See—  
Weiler, Rolf; Panek, Claus-Peter; and Schmidt, Bodo, 4,957,192, Cl. 188-71.900.
- Alich, Thomas; Flisikowski, Peter; and Peemoller, Horst, to U.S. Philips Corporation. Patient support for diagnostic apparatus. 4,956,885, Cl. 5-431.000.
- Alishoev, Alexandr L.: See—  
Kravetsky, Dmitry Y.; Zatulovsky, Lev M.; Egorov, Leonid P.; Pelta, Boris B.; Okun, Leonid S.; Freiman, Efim A.; Averyanov, Viktor V.; and Alishoev, Alexandr L., 4,957,713, Cl. 422-249.000.
- Alker, David; and Cross, Peter E., to Pfizer Inc. Dihydropyridine derivatives. 4,957,930, Cl. 514-356.000.
- Alko Ltd.: See—  
Lehmussaari, Aantti; and van der Ham, Wim, 4,957,565, Cl. 127-68.000.
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- Barbier, Jose E.: See—  
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- FitzGerald, David J.: See—  
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- Fitzner, Arthur O., to Brunswick Corporation. Voltage regulators for permanent magnet alternators. 4,958,119, Cl. 322-91.000.
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- Flex Technologies, Inc.: See—  
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- Flint & Walling, Inc.: See—  
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- Floyd, Middleton B., Jr., to American Cyanamid Company. Precursors and synthesis of methyl-9-oxo-11alpha, 16-dihydroxy-16-vinyl-5-cis-13-trans-prostadienoates. 4,958,037, Cl. 549-476.000.
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- Fochrenbach, Charles D.: See—  
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- Foley, Dennis D., to Excello Specialty Company. The. Water deflector with wire harness seal. 4,957,803, Cl. 428-182.000.
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- Fornadley, Michael R. Light transmissive stone structure and method for making same. 4,957,785, Cl. 428-15.000.
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- Foster, C. Mackay: See—  
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- Frankel, Arthur E.: See—  
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- Fratis, James: See—  
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- Freeman, Lowell J. D. Vehicle mounted archery bow holder. 4,957,229, Cl. 224-42.45R.

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- Fuji Electric Co., Ltd.: See—  
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- Fujinawa, Shohei; Sakamoto, Yoshinori; and Iizuka, Harumasa, to Takeda Chemical Industries, Ltd. Purification of inosine from guano-sine. 4,958,017, Cl. 536-124.000.
- Fujino, Akihiko: See—  
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- Fujitsu Limited: See—  
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- Ishii, Yasuhiro; and Fukushi, Isao, 4,958,094, Cl. 307-570.000.
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- Fukao, Masuzo; Sakai, Tadashi; and Murohashi, Kozo, to Kabushiki Kaisha Ishikawa Seisakusho, Ltd. Corrugated cardboard box stack-ing device in a corrugated cardboard box making machine. 4,957,409, Cl. 414-788.400.
- Fukase, Toshiyuki; Sugiyama, Yoshihiro; Takanashi, Hazime; Tsubuko, Kazuo; and Kuramoto, Shinichi, to Ricoh Co., Ltd. Liquid developer for electrostatic latent images using flushed pigments. 4,957,842, Cl. 430-114.000.
- Fukunaga, Yasushi: See—  
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- Fukushi, Isao: See—  
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- Fukuyama, Yukihiro: See—  
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- Fulton, Alfred L.; Lakhani, Kishor M.; Sampson, Scott D.; and Low-man, Kent, to SCI Systems, Inc. Printing apparatus and method. 4,958,171, Cl. 346-153.100.
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- Furuto, Yuuji: See—  
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- Goldstar Instrument & Electric Co., Ltd.: See—  
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- Griess, Herbert C., to Pittway Corporation. Water-flow detector, 4,958,144, Cl. 340-606.000.
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Delpy, David T.; Hiruma, Hideo; and Suzuki, Susumu, 4,957,000, Cl. 73-622.000.
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Ito, Hiroshi; Kugo, Masaru; and Kurosawa, Michiaki, 4,957,350, Cl. 350-336.000.
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- Futamoto, Masaaki; Honda, Yukio; Asada, Seiichi; Nishimura, Takashi; Yoshida, Kazuetsu; and Ishihara, Heigo, 4,957,825, Cl. 428-694.000.
- Homma, Noriyuki; Nakamura, Tohru; Nakazato, Kazuo; Matsumoto, Motoaki; Hayashida, Tetsuya; Kubo, Masaharu; and Sagara, Kazuhiko, 4,958,320, Cl. 365-174.000.
- Kanegae, Masatomo; Kogano, Takayoshi; and Ito, Fumio, 4,957,781, Cl. 427-255.300.
- Kanema, Seiichi; Nio, Misato; Fukunaga, Yasushi; and Nishida, Takehiko, 4,958,147, Cl. 340-706.000.
- Kiuchi, Atsushi; Kaneko, Kenji; Ishida, Jun; Nakagawa, Tetsuya; Hagiwara, Yoshimune; Akazawa, Takashi; and Sato, Tomoru, 4,958,276, Cl. 364-200.000.
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- Ogawa, Kensuke; Katsuyama, Toshio; and Fukuzawa, Tadashi, 4,957,337, Cl. 350-96.130.
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- Takeda, Kazuo; and Ito, Yoshitoshi, 4,957,363, Cl. 356-73.000.
- Tominaga, Masasuke, 4,958,285, Cl. 364-419.000.
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- Shima, Nobuhiko; Ida, Hisaaki; and Iyori, Yusuke, 4,957,548, Cl. 75-238.000.
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- Macholdt, Hans-Tobias; Sieber, Alexander; Schui, Franz; and Deubel, Reinhold, 4,957,841, Cl. 430-110.000.
- Staendeke, Horst; and Scharf, Daniel, 4,957,950, Cl. 523-205.000.
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Cussler, Edward L., 4,957,620, Cl. 210-635.000.
- Khanarian, Garo; Raskin, Donald; Buckley, Alan; Calundann, Gordon W.; and East, Anthony J., 4,957,655, Cl. 252-299.010.
- Lamonte, Ronald R., 4,957,996, Cl. 528-181.000.
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- Barner, Richard; and Hubscher, Josef, 4,958,035, Cl. 549-408.000.
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- Hofmeister, Werner: See—  
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Seitz, Edwin, 4,957,265, Cl. 248-549.000.
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John, Julius F., 4,957,255, Cl. 248-222.300.
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- Sasajima, Koji; and Yamaguchi, Kouji, 4,956,972, Cl. 60-327.000.
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- McLaughlin, Paul F.; and Mody, Pankaj H., 4,958,270, Cl. 364-187.000.
- Wyatt, Michael A., 4,958,159, Cl. 341-144.000.
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- Hopps, Trisha L. Athletic supporter for women. 4,957,466, Cl. 450-85.000.
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Sakai, Kiyoharu; and Hori, Masaaki, 4,957,381, Cl. 400-621.000.



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- Horie, Nobuyuki: See—  
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- Horita, Takashi: See—  
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- Hosiden Electronic Co., Ltd.: See—  
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- Hosotani, Shiro: See—  
Miki, Takahiro; and Hosotani, Shiro, 4,958,157, Cl. 341-133.000.
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- Howland, Mark W. Engine protection system, 4,957,080, Cl. 123-198.000.
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Pickering, James A.; Johnston, Joseph R.; and Fisher, Thomas A., 4,957,094, Cl. 124-24.100.
- Hruby, Ronda J.: See—  
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- Hsieh, H. Philip: See—  
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- Hu, Ming C. Gauge developer, 4,956,924, Cl. 33-561.100.
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- Huber, James V.; Scott, Kurt P.; and Leber, Rudolph J., to Atlas Electric Devices Co. Weathering testing system, 4,957,011, Cl. 73-865.600.
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Barner, Richard; and Hubscher, Josef, 4,958,035, Cl. 549-408.000.
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Petite, Hervé; Menasche, Philippe; and Huc, Alain, 4,958,008, Cl. 530-356.000.
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Chesler, Ronald B.; and LeCompte, George W., 4,957,344, Cl. 350-96.230.
- Chesler, Ronald B., 4,957,364, Cl. 356-73.100.
- Engelsman, Ronald L., 4,958,141, Cl. 340-146.200.
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- Olson, Mark; and Quan, Clifton, 4,957,456, Cl. 439-578.000.
- Rosen, Robert A.; and Krikorian, Kapriel A., 4,958,361, Cl. 375-102.000.
- Wenke, Gerhard, 4,958,257, Cl. 361-385.000.
- Hughes, John B., to U.S. Philips Corporation. Circuit arrangement for processing sampled analogue electrical signals, 4,958,123, Cl. 323-316.000.
- Humber, David C.: See—  
Godfrey, Neil; Coates, Ian H.; Bell, James A.; Humber, David C.; and Ewan, George B., 4,957,609, Cl. 204-157.710.
- Humpal, Kathleen M.: See—  
Mathers, James P.; and Humpal, Kathleen M., 4,957,554, Cl. 106-35.000.
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- Hunt, Eric, to Beecham Group p.l.c. 9-(N'-substituted hydrazone) derivatives of erythromycins, 4,957,905, Cl. 514-29.000.
- Hunter, Quay C., Jr.: See—  
Firth, Rowland V. D., III; Hunter, Quay C., Jr.; Kohlin, Ronald A.; and Sifton, William W., 4,958,195, Cl. 355-290.000.
- Hunziker, Max: See—  
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- Hurwitt, Steven D.; Wagner, Israel; Hieronymi, Robert; and Van Nutt, Charles, to Materials Research Corporation. Method and apparatus for sputter coating stepped wafers, 4,957,605, Cl. 204-192.120.
- Hutcheson, Neale C.: See—  
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- Hwang, Dye-Shuh. Modular box spring mattress, 4,956,884, Cl. 5-246.000.
- Hwang, Yeongming: See—  
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Mitchell, William J.; and Fosse, Navarro T., 4,957,424, Cl. 425-145.000.
- I. J. White Co.: See—  
Irwin, Guy L., 4,957,597, Cl. 198-831.000.
- Ibiden Co., Ltd.: See—  
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Nagashima, Naoki; Ichikawa, Hiroyuki; and Katayama, Akihiro, 4,958,236, Cl. 358-445.000.
- Ichikawa, Nobuhiko: See—  
Kobayashi, Shigeo; Hiramatsu, Toshio; Yamamoto, Katsumasa; and Ichikawa, Nobuhiko, 4,957,980, Cl. 525-425.000.
- Ichitsuka, Takeshi; Hirayama, Yasuhiko; and Ogawa, Tetsuro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Method for producing calcium phosphate-based material, 4,957,674, Cl. 264-65.000.
- Ichiyasu, Rokuo: See—  
Matsumoto, Shunichiro; Inui, Tsutomu; Ichiyasu, Rokuo; and Chiba, Yoshitaka, 4,957,549, Cl. 75-246.000.
- ICI Americas Inc.: See—  
Knudsen, Christopher G.; and Michaely, William J., 4,957,540, Cl. 71-123.000.
- Michaely, William J., 4,957,538, Cl. 71-98.000.
- Prisbylla, Michael P., 4,958,028, Cl. 548-309.000.
- Ida, Hisaaki: See—  
Shima, Nobuhiko; Ida, Hisaaki; and Iyori, Yusuke, 4,957,548, Cl. 75-238.000.
- Ide, Yukio: See—  
Rokutanzone, Takashi; Ide, Yukio; Nagame, Hiroshi; Ohshima, Kouichi; Kojima, Narihito; and Noshio, Shinji, 4,957,839, Cl. 430-66.000.
- Idemitsu Petrochemical Co., Ltd.: See—  
Okumura, Ryozo; Terada, Eiichi; and Kawazoe, Shigemi, 4,957,964, Cl. 525-64.000.

- Ienaga, Kazuharu: See—  
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- Ihara Chemical Industry Co., Ltd.: See—  
Inamori, Masahito; Horii, Tetsuo; Shimazu, Tomonori; and Sugaya, Masaji, 4,957,935, Cl. 514-383.000.
- Iida, Kazumi: See—  
Kohno, Yoshihiro; and Iida, Kazumi, 4,957,664, Cl. 261-34.200.
- Iida, Shigehira: See—  
Saitoh, Keishi; Hashizume, Junichiro; Iida, Shigehira; Takei, Tetsuya; and Arai, Takayoshi, 4,957,772, Cl. 427-39.000.
- Iida, Tetsuya: See—  
Takakura, Hiroshi; Iida, Tetsuya; and Goto, Junkei, 4,958,222, Cl. 357-84.000.
- Iida, Yukinari, to Precision Fukuhara Works, Ltd. Circular knitting machine with multiple number of feeds, 4,956,981, Cl. 66-20.000.
- IIT Research Institute: See—  
Roark, Steven D., 4,957,164, Cl. 166-263.000.
- Iizuka, Harumasa: See—  
Fujinawa, Shohei; Sakamoto, Yoshinori; and Iizuka, Harumasa, 4,958,017, Cl. 536-124.000.
- Iizuka, Shunichi; Sakamaki, Yoshiyuki; and Shimoyama, Noriyuki, to Adeka Argus Chemical Co., Ltd. Stabilizer compositions for polyvinyl chloride resins and stabilized polyvinyl chloride resin compositions, 4,957,954, Cl. 524-102.000.
- Ikeda Bussan Co., Ltd.: See—  
Tan, Kenichi; and Mizuno, Shoji, 4,957,102, Cl. 128-68.000.
- Terai, Masanori, 4,957,267, Cl. 248-430.000.
- Ikeda, Hiroshi: See—  
Murata, Hatsuho; and Ikeda, Hiroshi, 4,958,153, Cl. 340-825.500.
- Ikeda, Hiroyuki: See—  
Hasegawa, Shin-ya; Kato, Masayuki; Yamagishi, Fumio; Ikeda, Hiroyuki; and Inagaki, Takefumi, 4,957,336, Cl. 350-3.710.
- Ikenaga, Shin'ichi: See—  
Nakagome, Yoshinobu; Itoh, Kiyoo; Aoki, Masakazu; Ikenaga, Shin'ichi; Horiguchi, Masashi; and Tanaka, Hitoshi, 4,958,325, Cl. 365-206.000.
- Ikuzawa, Masanori: See—  
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,957,906, Cl. 514-42.000.
- Ilderem, Veda; Reif, L. Rafael; and Tedrow, Prabha K., to Massachusetts Institute of Technology. Very low pressure chemical vapor deposition process for deposition of titanium silicide films, 4,957,777, Cl. 427-55.000.
- Ilenda, Casimir S.; Bortnick, Newman; Graham, Roger K.; and Work, William J., to Rohm and Haas Company. Graft copolymers and blends thereof with polyolefins, 4,957,974, Cl. 525-301.000.
- Illinois Tool Works, Inc.: See—  
Boeckmann, Hugo; and Van Erden, Donald, 4,958,053, Cl. 206-330.000.
- Image Recognition Equipment Corporation: See—  
Kirkpatrick, Robert D., 4,958,064, Cl. 235-384.000.
- Imai, Akio: See—  
Takao, Hiroyoshi; Imai, Akio; Seki, Tomoski; and Tsuji, Mitsuji, 4,957,976, Cl. 525-340.000.
- Imai, Yohji: See—  
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- Imai, Yoshihiko; Nakano, Yoshio; Ando, Makoto; Iwamura, Yoshiyuki; and Ishida, Takashi, to Matsushita Electric Industrial Co., Ltd. Information recording/reproducing apparatus, 4,958,314, Cl. 364-900.000.
- Imai, Yuji: See—  
Asakura, Yasuo; Toyofuku, Toshiyuki; and Imai, Yuji, 4,958,175, Cl. 354-152.000.
- Imamura, Seiichiro; Terui, Sadao; Sano, Kunio; Nishikawa, Kazuyoshi; and Inoue, Akira, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Method of disposal of organic chlorine compounds by combustion, 4,957,717, Cl. 423-240.000.
- Imanishi, Yasuhiro, to Mitsubishi Denki Kabushiki Kaisha. Radio transceiver apparatus for changing over between antennas, 4,958,382, Cl. 455-277.000.
- Imatani, Katsuo; Yamamoto, Shinichiro; and Koga, Genji, to Ube Industries, Ltd. High purity crystals of biphenyltetracarboxylic dianhydride and process for their preparation, 4,958,002, Cl. 528-353.000.
- Imax Systems Corporation: See—  
Shaw, William C., 4,957,361, Cl. 352-59.000.
- IMDEC S.A.: See—  
Silvestrini, Jesus A.; and Barbier, Jose E., 4,957,043, Cl. 99-472.000.
- Imhof, Rene: See—  
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- Imperial Chemical Industries PLC: See—  
Adkins, Kelvin P., 4,957,816, Cl. 428-411.100.
- Boyle, Francis T., 4,957,934, Cl. 514-383.000.
- Shaw, Gordon; and Lopez-Meron, Jose, 4,958,042, Cl. 588-363.000.
- Worthington, Paul A.; Crowley, Patrick J.; and Gravestock, Michael B., 4,957,539, Cl. 71-92.000.
- Ims Ionen Mikrofabrikations Systeme Gesellschaft M.B.H.: See—  
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- Inagaki, Takefumi: See—  
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- Inakazu, Nobuhiro: See—  
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- Inamori, Masahito; Horii, Tetsuo; Shimazu, Tomonori; and Sugaya, Masaji, to Kumiai Chemical Industry Co., Ltd.; and Ihara Chemical Industry Co., Ltd. Phenyltriazole derivative and insecticide, 4,957,935, Cl. 514-383.000.
- Inazawa, Yoshizumi; Milthorp, Brian; and Thompson, Bruce, to Sony Corporation. Method of position detection on a recording medium, 4,958,244, Cl. 360-72.100.
- Inco Alloys International, Inc.: See—  
Mankins, William L.; Gothard, David O.; and Hardy, Charles P., 4,958,060, Cl. 219-145.220.
- Inco Limited: See—  
Babjak, Juraj; Ettel, Victor A.; and Paserin, Vladimir, 4,957,543, Cl. 148-13.000.
- Indermuhle, Jean: See—  
Pfluger, Rudolf W.; Indermuhle, Jean; and Felix, Franz, 4,958,030, Cl. 548-526.000.
- Industrial Technology Research Institute: See—  
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- Ing. h.c.F. Porsche AG: See—  
Burst, Hermann; Duwel, Klaus-Roger; Scheyhing, Ulrich; Pross, Walter; and Petri, Horst, 4,956,979, Cl. 62-244.000.
- Ingersoll-Kand Company: See—  
Hood, James A.; and Kirkpatrick, Paul A., 4,957,274, Cl. 251-129.120.
- Rohloff, Pete, 4,957,621, Cl. 210-171.000.
- Ingham, Harry R.: See—  
Byrne, Phillip O.; Sisson, Penelope R.; and Ingham, Harry R., 4,957,490, Cl. 604-197.000.
- Inion, Henri: See—  
Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Hamaux, Jean-Marie; and Vallat, Jean-Noel, 4,957,925, Cl. 514-299.000.
- Innocenti, Franco: See—  
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- Innovac, Inc.: See—  
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- Inoshita, Koichi: See—  
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- Inoue, Akira: See—  
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- Inoue, Hiroshi: See—  
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- Inoue, Kensei; Hanaoka, Takashi; and Konno, Tsuneo, to Honda Giken Kogyo Kabushiki Kaisha. Valve operating mechanism for an internal combustion engine, 4,957,076, Cl. 123-90.160.
- Inoue, Manabu: See—  
Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, 4,958,184, Cl. 354-474.000.
- Inoue, Masaaki: See—  
Ukita, Keizoo; Hamaguchi, Tetsuo; and Inoue, Masaaki, 4,957,596, Cl. 201-20.000.
- Inoue, Nobuaki; and Sasaoka, Senzo, to Fuji Photo Film Co., Ltd. Silver halide photographic material and image-forming method using the same, 4,957,849, Cl. 430-264.000.
- Inoue, Susumu: See—  
Mizoguchi, Masaaki; Inoue, Susumu; Otsuka, Tatsuo; and Isoyama, Eizo, 4,957,159, Cl. 165-133.000.
- Inoue, Takeshi; Hikichi, Tadasu; Fukuyama, Yukihiko; and Kondo, Akihiro, to Kao Corporation. Hair cosmetic composition, 4,957,992, Cl. 526-324.000.
- Insite Peripherals, Inc.: See—  
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- Institut Francais du Pétrole: See—  
Cholet, Henri; and Chanton, Edmond, 4,957,161, Cl. 166-105.000.
- Etourmy, Noel; and Laurent, Jean, 4,957,162, Cl. 166-212.000.
- Institut National de la Recherche Agronomique (INRA): See—  
Samarut, Jacques; Verdier, Gerard; Benchaibi, Miloud; Savatier, Pierre; Poncet, Didier; Flamant, Frederic; Xiao, Jiao-Hao; Thoraval, Pierrick; Chambonnet, Frederique; and Nigon, Victor, 4,957,865, Cl. 435-235.000.
- Institut National de la Sante et de la Recherche Medicale, I.N.S.E.R.M.: See—  
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- Instituto Mexicano de Investigaciones Siderurgicas: See—  
Lazcano-Navarro, Arturo, 4,957,546, Cl. 75-529.000.
- Intel Corporation: See—  
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- Tam, Simon M.; and Lai, Stefan K. C., 4,957,877, Cl. 437-43.000.
- Intelmatec Corporation: See—  
Akagawa, Minoru, 4,957,406, Cl. 414-416.000.
- Interface, Inc.: See—  
Terry, Claude E.; and McIntosh, Robert H., Sr., 4,957,948, Cl. 523-122.000.
- InterMetro Industries Corporation: See—  
Banko, Ronald C.; Cohn, Robert J.; and Welsch, John H., 4,957,206, Cl. 211-40.000.

- International Business Machines Corporation: See—  
Akbar, Shah; Kroesen, Patricia L.; Ogura, Seiki; and Rovedo, Nivo, 4,957,875, Cl. 437-31.000.  
Anderson, Patrick E.; Buntin, Roland J.; Higgins, William T.; Hruby, Ronda J.; and Mirabeau, Serge, 4,958,273, Cl. 364-200.000.  
Chen, Shin C.; and Provazek, Lionel D., 4,958,243, Cl. 360-51.000.  
Firth, Rowland V. D., III; Hunter, Quay C., Jr.; Kohlin, Ronald A.; and Sittion, William W., 4,958,195, Cl. 355-290.000.  
Gerstle, Patrick J.; Mathis, Mac A.; Smith, David R.; and Stitz, Kathryn R., 4,957,380, Cl. 400-279.000.  
Kosson, Julie S.; and McLennan, Michael J., 4,958,093, Cl. 307-540.000.  
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International Paper Company: See—  
Gibbons, Charles E.; Tanner, Cynthia L.; and Whillock, Allan A., 4,957,789, Cl. 428-34.200.  
Inui, Tsutomu: See—  
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Iofis, Naum A.: See—  
Bukator, Alexandr S.; Iofis, Naum A.; Egorov, Jury G.; Dobrova, Natalya B.; Kostretsov, Anatoly S.; and Agafonov, Andrei V., 4,957,503, Cl. 623-2.000.  
Irick, Virgil, Jr.; Kuszyk, Jack A.; and Landini, Dennis J., to Lanxide Technology Company, L.P. Method for producing a protective layer on a ceramic body, 4,957,779, Cl. 427-193.000.  
Irving, Edward; Muller, Beat; Schulthess, Adrian; and Hunziker, Max, to Ciba-Geigy Corporation. Process and polymers for the production of images, 4,957,988, Cl. 526-259.000.  
Irwin, Guy L., to I. J. White Co. Conveyor belt for turn conveyors, 4,957,597, Cl. 198-831.000.  
Iseda, Atsuro: See—  
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Ishida, Jun: See—  
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Ishida, Takashi: See—  
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Ishihara, Heigo: See—  
Futamoto, Masaaki; Honda, Yukio; Asada, Seiichi; Nishimura, Takashi; Yoshida, Kazetsu; and Ishihara, Heigo, 4,957,825, Cl. 428-694.000.  
Ishihara, Toshinobu: See—  
Endo, Mikio; Takamizawa, Minoru; Ishihara, Toshinobu; Kubota, Tohru; and Shinohara, Toshio, 4,957,607, Cl. 204-157.740.  
Ishii, Yasuhiro; and Fukushima, Isao, to Fujitsu Limited. Emitter follower circuit with MOSFET, 4,958,094, Cl. 307-570.000.  
Ishikawa, Haruo: See—  
Nakakura, Hirofumi; Shibata, Morio; Ishikawa, Haruo; Nakano, Akihisa; Hirota, Hiromi; and Oyabu, Hajime, 4,957,040, Cl. 99-348.000.  
Ishikawa, Keiichi; and Asatsuke, Shoji, to Honda Giken Kogyo Kabushiki Kaisha. Holding means and binding means for selector gear servo valve in a hydraulic transmission, 4,957,015, Cl. 74-335.000.  
Ishikawa, Norio; Nakai, Masaaki; Hirano, Masayasu; Fujino, Akihiko; Ootsuka, Hiroshi; Egawa, Takeshi; and Kawamura, Kunio, to Minolta Camera Kabushiki Kaisha. Camera system, 4,958,181, Cl. 354-412.000.  
Ishikawa, Norio: See—  
Akada, Yasuaki; Ishikawa, Norio; Egawa, Takeshi; and Taniguchi, Nobuyuki, 4,958,183, Cl. 354-412.000.  
Ishikawa, Yutaka: See—  
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Ishiwata, Ichiro, to Nippon Air Brake Co., Ltd. Hydraulic pressure control valve for use with brake master cylinder, 4,957,140, Cl. 137-505.250.  
Isogai, Shigetaka: See—  
Komazawa, Osamu; Isogai, Shigetaka; Buma, Shuichi; Onuma, Toshio; Yonekawa, Takashi; and Hattori, Katsuhiko, 4,957,309, Cl. 280-707.000.  
Isone, Masanao; Kawamura, Ken; Asano, Masaya; Suzuki, Tetuo; and Abiko, Shigeo, to Toray Industries, Incorporated. Printing plate, 4,957,845, Cl. 430-156.000.  
Isover Saint-Gobain: See—  
Tiesler, Hartmut; and Schirmeisen, Joseph, 4,957,559, Cl. 106-170.000.  
Isoyama, Eizo: See—  
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Isuzu Motors Limited: See—  
Sugimura, Toshiya; and Yoshimura, Hiroshi, 4,958,287, Cl. 364-424.100.  
Itagaki, Takaharu; Shiraga, Mitsuki; Sawayama, Shigeru; and Satoh, Kohichi, to Mitsubishi Kasei Corporation. Vinylamine copolymer, flocculating agent etc., 4,957,977, Cl. 525-328.400.  
Ito, Fumio: See—  
Kanegae, Masamoto; Kogano, Takayoshi; and Ito, Fumio, 4,957,781, Cl. 427-255.300.  
Ito, Hiroshi; Kugo, Masaru; and Kurosawa, Michiaki, to Hitachi, Ltd.; and Hitachi Automotive Engineering. Liquid crystal display device, 4,957,350, Cl. 350-336.000.  
Ito, Kengo: See—  
Yasuda, Akio; and Ito, Kengo, 4,957,352, Cl. 350-353.000.  
Ito, Masazumi, to Minolta Camera Kabushiki Kaisha. Image forming apparatus, 4,958,190, Cl. 355-228.000.  
Ito, Tadashi: See—  
Suematsu, Koichi; Yamada, Sumito; Ohno, Shigeru; and Ito, Tadashi, 4,957,856, Cl. 430-518.000.  
Ito, Takashi: See—  
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Ito, Toshio; and Tanahashi, Toshio, to Toyota Jidosha Kabushiki Kaisha. Combustion chamber of an engine, 4,957,081, Cl. 123-302.000.  
Ito, Yasuaki; Suzuki, Takehiko; and Shimike, Hirokazu, to Canon Kabushiki Kaisha. Projection exposure apparatus and method of correcting projection error, 4,958,160, Cl. 355-53.000.  
Ito, Yoshitoshi: See—  
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Itoh, Hitoshi; and Moriya, Takahiko, to Kabushiki Kaisha Toshiba. Method for producing semiconductor device including a refractory metal pattern, 4,957,880, Cl. 437-192.000.  
Itoh, Kiuchi; Shibano, Takeshi; Yada, Shuhei; and Tsunoi, Shinji, to Mitsubishi Petrochemical Company Limited. Process for producing highly water absorptive polymer, 4,957,984, Cl. 526-240.000.  
Itoh, Kiyoo: See—  
Nakagome, Yoshinobu; Itoh, Kiyoo; Aoki, Masakazu; Ikenaga, Shin'ichi; Horiguchi, Masashi; and Tanaka, Hitoshi, 4,958,325, Cl. 365-206.000.  
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Hikosaka, Akihiko; Mimura, Tsuyoshi; Suzuki, Tomio; Yoshigae, Takeo; and Itoh, Shuzo, 4,957,545, Cl. 75-501.000.  
Itsubo, Yoshihiro: See—  
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Iuchi, Munenori, to Sumitomo Rubber Industries, Ltd. Pneumatic tire tread with plural overlapping narrow grooves in shoulder, 4,957,149, Cl. 152-209.00R.  
Ivanova, Lilia N.; Rozhkova, Irina V.; Semenikhina, Vera F.; Knyazeva, Tatyana N.; and Chagarovsky, Alexandr P., to Vsesojuzny Nauchno-Issledovatel'skiy i Konstruktorskiy Institut Molochnoi Promyshlennosti. Process for producing kefir, 4,957,752, Cl. 426-43.000.  
Iwai, Shougo: See—  
Kanagaki, Toshikuni; Hashimoto, Minoru; Iwai, Shougo; and Nishijima, Masaru, 4,957,243, Cl. 241-34.000.  
Iwamura, Yoshiyuki: See—  
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Iwasa, Toshiro: See—  
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Iwasa, Yoshio: See—  
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Iwasaki, Masami: See—  
Kojima, Shinjiro; Matsuda, Hideo; Iwasaki, Masami; and Uetake, Yoshinari, 4,958,215, Cl. 357-79.000.  
Iwasaki, Tetsuaki: See—  
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Iwase, Hiroyuki, to Yamaha Corporation, JPX. Electronic musical instrument with plural musical tones designated by manipulators, 4,957,552, Cl. 84-622.000.  
Iwase, Takatoshi: See—  
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IWK Verpackungstechnik GmbH: See—  
Jahrig, Gunter; Langenhahn, Lutz; and Riedl, Robert, 4,957,581, Cl. 156-309.900.  
Iyori, Yusuke: See—  
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Izawa, Takeshi: See—  
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Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, to Minolta Camera Kabushiki Kaisha. Display device for use in a camera, 4,958,184, Cl. 354-474.000.  
J.I. Case Company: See—  
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Jacob, Gary S.; Tyms, A. Stanley; Rademacher, Thomas W.; and Dwek, Raymond A., to Monsanto Company. Method of treating herpesviruses, 4,957,926, Cl. 514-315.000.

- Jacobs, Cornelis A.; King, Norman R.; and Bradham, Dale E., to North American Philips Corp. HID lamp with multiple discharge devices, 4,958,103, Cl. 313-25.000.  
Jacobson, David; LeGrand, Robert; and Gardener, Keith, to Casso-Solar Corporation. Glass-treating furnace with roller conveyor, 4,957,532, Cl. 65-273.000.  
Jacobson, Klas; and Johansson, Hakan, to ASEA Brown Boveri AB. Method of manufacturing an object from superconductive material, 4,957,901, Cl. 505-1.000.  
Jaeger, John A.: See—  
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Jaen, Juan C.: See—  
Caprathe, Bradley W.; Jaen, Juan C.; Smith, Sarah J.; and Wise, Lawrence D., 4,957,921, Cl. 514-252.000.  
Jahrig, Gunter; Langenhahn, Lutz; and Riedl, Robert, to IWK Verpackungstechnik GmbH. Method and apparatus for centering tubes, 4,957,581, Cl. 156-309.900.  
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Nicholson, Richard D.; and Jain, Sandeep, 4,957,821, Cl. 428-651.000.  
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Janda, Marvin E.: See—  
Schwartz, Bernard A.; Tew, Tommy L.; and Janda, Marvin E., 4,958,170, Cl. 346-136.000.  
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Kennis, Ludo E. J.; Vandenberg, Jan; and Mertens, Josephus C., 4,957,916, Cl. 514-254.000.  
Jansson, Lars G., to National Semiconductor Corporation. Non-current hogging dual phase splitter TTL circuit, 4,958,090, Cl. 307-456.000.  
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Bailard, James A.; and Jenkins, Scott A., 4,957,392, Cl. 405-73.000.  
Jensen, Millard J.: See—  
Levine, Jules D.; and Jensen, Millard J., 4,957,601, Cl. 156-665.000.  
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Perez, Jose L. J., 4,957,464, Cl. 446-16.000.  
Jidosha Kiki Co., Ltd.: See—  
Otsuka, Shigeru; and Ohsaki, Hiroshi, 4,957,468, Cl. 464-27.000.  
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Jacobson, Klas; and Johansson, Hakan, 4,957,901, Cl. 505-1.000.  
John A. Blatt: See—  
Blatt, John A., 4,957,318, Cl. 294-64.100.  
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White, Bruce T.; Polstra, John D.; and Johnson, Craig V., 4,958,347, Cl. 371-29.500.  
John, Julius F., to Home Fashions, Inc. Valance support bracket, 4,957,255, Cl. 248-222.300.  
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White, Bruce T.; Polstra, John D.; and Johnson, Craig V., 4,958,347, Cl. 371-29.500.  
Johnson, David H., to Commercial Structures, Inc. Trailer with portable toilet facilities, 4,957,323, Cl. 296-181.000.  
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Johnson, Stephen N., to Nordson Corporation. Method of sealing a shrink wrap package, 4,956,963, Cl. 53-442.000.  
Johnston, Joseph R.: See—  
Pickering, James A.; Johnston, Joseph R.; and Fisher, Thomas A., 4,957,094, Cl. 124-24.100.  
Jones, Kenneth R., to Globe-Union Inc. Rechargeable metal oxide-hydrogen battery, 4,957,830, Cl. 429-101.000.  
Jones, Martha W., Executrix: See—  
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Jordan, David W.; and Thompson, William L., to Babcock & Wilcox Company, The. Digital electronics for controlling a fiber optic shedding flowmeter, 4,958,070, Cl. 250-227.210.  
Jorgensen, Jeffrey A., to Avtech Corporation. Universal fluorescent lamp ballast, 4,958,108, Cl. 315-307.000.  
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Joseph E. Seagram & Sons, Inc.: See—  
Widmar, Craig C.; Tripp, Dale; and Ficca, Vincent G., 4,957,765, Cl. 426-586.000.  
Journée, Maurice A., to Paul Journée S.A. Double channel blade for a windshield wiper, 4,956,890, Cl. 15-250.360.  
Julius Blum Gesellschaft m.b.H.: See—  
Maier, Friedrich; Dubach, Fredi; Rock, Erich; and Brustle, Klaus, 4,956,956, Cl. 52-584.000.  
Jung, Hyun W.: See—  
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Juvan, Christian H. A. Separation of dissolved and undissolved substances from liquids using high energy discharge initiated shock waves, 4,957,606, Cl. 204-164.000.  
Juvinal, John W.; and Redmond, Robert C., to Owens-Brockway Glass Container Inc. Inspection of container finish, 4,958,223, Cl. 358-106.000.  
K & H Industries, Inc.: See—  
Baake, Karl A., 4,958,267, Cl. 362-399.000.  
K.S. Sanoyas Co. Ltd.: See—  
Nasu, Kenji, 4,957,387, Cl. 403-322.000.  
Kabushiki Kaisha Ishikawa Seisakusho, Ltd.: See—  
Fukao, Masuzo; Sakai, Tadashi; and Murohashi, Kozo, 4,957,409, Cl. 414-788.400.  
Kabushiki Kaisha Kobe Seiko Sho: See—  
Tsuboi, Noboru, 4,957,417, Cl. 417-423.130.  
Kabushiki Kaisha Kobe Seiko Shoe: See—  
Hikosaka, Akihiko; Mimura, Tsuyoshi; Suzuki, Tomio; Yoshigae, Takeo; and Itoh, Shuzo, 4,957,545, Cl. 75-501.000.  
Kabushiki Kaisha Komatsu Seisakusho: See—  
Kubo, Kazuo, 4,957,019, Cl. 74-665.00H.  
Kabushiki Kaisha Tokai Rika Denki Seisakusho: See—  
Okamura, Naokatsu; Yamaguchi, Noboru; Masuda, Shuji; and Kanou, Noboru, 4,956,983, Cl. 70-241.000.  
Kabushiki Kaisha Topcon: See—  
Ohtomo, Fumio; Frusho, Hiroyuki; Nakamura, Shinichi; and Mihasi, Toshifumi, 4,958,241, Cl. 358-487.000.  
Kabushiki Kaisha Toshiba: See—  
Itoh, Hitoshi; and Moriya, Takahiko, 4,957,880, Cl. 437-192.000.  
Kinoshita, Jun'ichi; Morinaga, Motoyasu; Furuyama, Hideto; and Hirayama, Yuzo, 4,958,202, Cl. 357-17.000.  
Kinoshita, Junichi, 4,958,357, Cl. 372-96.000.  
Kobayashi, Hironobu, 4,958,301, Cl. 364-521.000.  
Kojima, Shinjiro; Matsuda, Hideo; Iwasaki, Masami; and Uetake, Yoshinari, 4,958,215, Cl. 357-79.000.  
Koyama, Ikuro; and Ohata, Hajime, 4,958,339, Cl. 369-98.000.  
Nishimura, Seikichi, 4,958,307, Cl. 364-551.010.  
Ochii, Kiyofumi; Matsui, Masataka; and Ozawa, Osamu, 4,958,316, Cl. 365-63.000.  
Ohkawa, Hideki, 4,957,824, Cl. 428-694.000.  
Saitoh, Shiroh; Izumi, Mamoru; Suzuki, Syuzi; and Abe, Kazuhide, 4,958,327, Cl. 367-7.000.  
Saitoh, Susumu; Taniguchi, Syozo; Enomoto, Akio; and Matsuzawa, Teruyoshi, 4,958,296, Cl. 364-509.000.  
Sakurai, Takayasu, 4,958,326, Cl. 365-218.000.



- Sawa, Takao; Okamura, Masami; Yamada, Taiju; Kusaka, Takao; and Sasaki, Hiroshi, 4,958,134, Cl. 333-12.000.
- Shimamura, Masanobu, 4,958,370, Cl. 379-157.000.
- Takakura, Hiroshi; Iida, Tetsuya; and Goto, Junkei, 4,958,222, Cl. 357-84.000.
- Tanaka, Shigeru, 4,958,092, Cl. 307-480.000.
- Tawara, Kiyoshi; Ema, Takehiro; and Nishihara, Eitaro, 4,958,283, Cl. 364-413.130.
- Tominaga, Mamoru; Mori, Leo; and Akiyama, Junetsu, 4,957,370, Cl. 356-381.000.
- Usami, Toshiro; Kamijo, Hiroyuki; Ohta, Takao; and Ogino, Masanobu, 4,958,373, Cl. 382-8.000.
- Ushiki, Hiroshi; and Iwasaki, Tetsuaki, 4,958,151, Cl. 340-784.000.
- Kabushiki Kaisha Toyota Chou Kenkyusho: See—
- Nagai, Teizi; Tokushima, Yasuo; Kubota, Sadao; Suzuki, Kenichi; Fujitani, Yoshiyasu; Yoshimoto, Taisuke; Muraki, Hideaki; and Tachi, Hideo, 4,957,710, Cl. 422-171.000.
- Kabushiki Kaisha Toyota Chuo Kenkyusho: See—
- Matsumoto, Shinichi; Tanaka, Toru; Ishikawa, Yutaka; Matsuura, Shinji; Shinjoh, Hirofumi; and Ozawa, Masakuni, 4,957,896, Cl. 502-304.000.
- Kabushiki Kaisha Toyota Chuo Kenkyusho: See—
- Komazawa, Osamu; Isogai, Shigetaka; Buma, Shuichi; Onuma, Toshio; Yonekawa, Takashi; and Hattori, Katsuhiko, 4,957,309, Cl. 280-707.000.
- Kabushiki Kaisha Yakult Honsha: See—
- Kan, Tatsuhiko; and Kobayashi, Yoichi, 4,957,860, Cl. 435-101.000.
- Saita, Taketsugu; and Shindo, Junko, 4,957,763, Cl. 426-548.000.
- Kachuk, Paul T., to Flint & Walling, Inc. Governor and motor assembly, 4,958,096, Cl. 310-68.00E.
- Kada, Katsuhiko: See—
- Kobayashi, Junya; Oota, Masaaki; Kada, Katsuhiko; and Minakuchi, Hiroyoshi, 4,957,883, Cl. 501-35.000.
- Kadokura, Sadao; Kamei, Kazuhiro; and Watamura, Yoshihisa, to Teijin Limited. Magnetic recording disk cartridge, 4,958,249, Cl. 360-133.000.
- Kadow, John F.; and Vyas, Dolatnai M., to Bristol-Myers Company. Epipodophyllotoxin glucoside lactam derivatives, 4,958,010, Cl. 536-17.200.
- Kadowaki, Toshihiro, to Canon Kabushiki Kaisha. Color image forming apparatus, 4,958,219, Cl. 358-75.000.
- Kadowaki, Yukio; Matsuo, Shigeki; and Nakamura, Shogo, to Ricoh Company, Ltd. Composite finite impulse response digital filter, 4,958,311, Cl. 364-724.010.
- Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Youichi, to Kotobuki & Co., Ltd. Mechanical pencil, 4,957,384, Cl. 401-65.000.
- Kahonen, Matti. Action for a wind instrument, 4,957,029, Cl. 84-384.000.
- Kai, Seichi: See—
- Minai, Masayoshi; Ueda, Yuji; Higashii, Takayuki; Kondo, Michitaka; and Kai, Seichi, 4,957,867, Cl. 435-280.000.
- Kaieda, Shozo; and Okajima, Hideo, to Kentek Information Systems, Inc. Transferring device and an image forming apparatus, 4,958,194, Cl. 355-277.000.
- Kaji, Reichi: See—
- Ohkawa, Tsuyoshi; and Kaji, Reichi, 4,957,078, Cl. 123-90.310.
- Kakizawa, Koichiro; and Ichihashi, Tadashi, to Kowa Company Ltd. Ophthalmic disease detection apparatus, 4,957,360, Cl. 351-221.000.
- Kako, Hiroyoshi: See—
- Morioka, Hirohiko; Kako, Hiroyoshi; Noguchi, Noboru; and Nakanishi, Nobuyasu, 4,957,330, Cl. 303-115.000.
- Kalafirov, Hristo A.: See—
- Dimitrov, Dimitar A.; Dakov, Mincho S.; Tonchev, Dancho T.; Kalafirov, Hristo A.; Botev, Todor S.; Shirev, Krassimir E.; Kojuharov, Vladimir S.; Dimitrov, Yordan I.; and Tzvetkov, Dimitar V., 4,957,529, Cl. 65-112.000.
- Kalany, Robert M.: See—
- Jones, Wickliffe, deceased; Scarpa, Eric W.; Greenwell, Joseph D.; Nease, Mark R.; Kalany, Robert M.; and Myers, Michael E., 4,956,964, Cl. 53-570.000.
- Kalisher, Sheila L. Tackle box belt, 4,957,231, Cl. 224-151.000.
- Kamada, Masayasu; Maeda, Toshihisa; Kobayashi, Tadashi; and Shimizu, Goro, to Matsui Shikiso Chemical Co., Ltd. Thermochromic color masterbatch, 4,957,949, Cl. 523-201.000.
- Kamarei, Ahmad R.; Catsimopoulos, Nicholas; McCluer, Robert; Mise, Takashi; and Sinn, Robert S., to Anglo-Medical Corp. Method for the treatment of gastric ulcer, 4,957,741, Cl. 424-551.000.
- Kamata, Kazuo: See—
- Komatsuzaki, Hiroshi; Kamata, Kazuo; Ohmiya, Akio; Nishimura, Syunji; Umeda, Yoshihiro; Mochizuki, Noriya; and Furuya, Eiji, 4,958,179, Cl. 354-195.120.
- Kamaya Kagaku Kogyo Co., Ltd.: See—
- Kobayashi, Hidenori; Suwabe, Moriaki; Inakazu, Nobuhiro; and Nagamatsu, Hatsu, 4,957,682, Cl. 264-255.000.
- Kamei, Kazuhiro: See—
- Kadokura, Sadao; Kamei, Kazuhiro; and Watamura, Yoshihisa, 4,958,249, Cl. 360-133.000.
- Kameyama, Yutaka: See—
- Torii, Sigeru; Tanaka, Hideo; Taniguchi, Masatoshi; Sasaoka, Michio; Saito, Norio; Shiroi, Takashi; Nagao, Shigemitsu; Kikuchi, Ryo; and Kameyama, Yutaka, 4,958,018, Cl. 540-215.000.
- Kamijo, Hiroyuki: See—
- Usami, Toshiro; Kamijo, Hiroyuki; Ohta, Takao; and Ogino, Masanobu, 4,958,373, Cl. 382-8.000.
- Kamijyo, Tetsuo: See—
- Yasuda, Keiji; Kamijyo, Tetsuo; and Miyahara, Kazuhiro, 4,957,374, Cl. 374-142.000.
- Kaminski, Stanley S.: See—
- Maranci, Artun; Peake, Steven L.; and Kaminski, Stanley S., 4,957,801, Cl. 428-147.000.
- Kamio, Kunimasa: See—
- Saito, Yasuhisa; Watanabe, Katsuya; Okuno, Kohichi; Kamio, Kunimasa; and Morii, Akira, 4,957,995, Cl. 528-99.000.
- Kamiya, Osamu; and Fujiyama, Yasutomo, to Canon Kabushiki Kaisha. Photographing apparatus, 4,958,185, Cl. 354-478.000.
- Kamiya, Osamu: See—
- Ando, Kenji; Kamiya, Osamu; Sugata, Masao; Kurihara, Noriko; Sugata, Hiroyuki; Den, Tohru; Kimura, Toshiaki; Hamamoto, Takashi; Haruta, Masahiro; and Osabe, Kuniji, 4,957,061, Cl. 118-719.000.
- Kamo, Mutsukazu: See—
- Sato, Yoichiro; Kamo, Mutsukazu; and Hata, Chiemi, 4,957,591, Cl. 156-643.000.
- Kamuro, Yasuo: See—
- Teraji, Tsutomu; Yamamura, Atsushi; Kamuro, Yasuo; Hirai, Koichi; and Fujii, Seichi, 4,957,537, Cl. 71-95.000.
- Kan, Sato: See—
- Shizuo, Yokohori; Kenzo, Miyamoto; Koji, Fukushima; Masami, Tsujimoto; Kenji, Onda; and Kan, Sato, 4,957,792, Cl. 428-36.200.
- Kan, Tatsuhiko; and Kobayashi, Yoichi, to Kabushiki Kaisha Yakult Honsha. Method for producing oligosaccharide, 4,957,860, Cl. 435-101.000.
- Kanagaki, Toshikuni; Hashimoto, Minoru; Iwai, Shougo; and Nishijima, Masaru, to Sharp Kabushiki Kaisha. Shredder, 4,957,243, Cl. 241-34.000.
- Kanamaru, Mitsutaka: See—
- Nakashima, Mitsuyoshi; Kanamaru, Mitsutaka; Sugiyama, Akira; Terakawa, Masato; Ono, Takaharu; and Horiai, Haruo, 4,957,923, Cl. 514-259.000.
- Kanda, Kazunori: See—
- Kusuda, Hidefumi; Konishi, Katsuji; and Kanda, Kazunori, 4,957,850, Cl. 430-271.000.
- Kanegae, Masamoto; Kogano, Takayoshi; and Ito, Fumio, to Hitachi, Ltd.; Hitachi VLSI Engineering Corp.; and Hitachi Tokyo Electronics Co. Processing apparatus, 4,957,781, Cl. 427-255.300.
- Kaneko, Kenji: See—
- Kiuchi, Atsushi; Kaneko, Kenji; Ishida, Jun; Nakagawa, Tetsuya; Hagiwara, Yoshimune; Akazawa, Takashi; and Sato, Tomoru, 4,958,276, Cl. 364-200.000.
- Kaneko, Kuniya; Wakiyama, Harumichi; Naito, Tadashi; and Ando, Toshihiro, to Toyota Jidosha Kabushiki Kaisha. Production control system for mixed production line, 4,958,292, Cl. 364-468.000.
- Kaneko, Noriaki; Hirata, Yoshimi; and Moriaki, Masahiro, to Ube Industries, Ltd. Medical tubes, 4,957,508, Cl. 623-12.000.
- Kanema, Seichi; Nio, Misato; Fukunaga, Yasushi; and Nishida, Takehiko, to Hitachi, Ltd. Graphic display processing system and displayed pattern picking method used in the same, 4,958,147, Cl. 340-706.000.
- Kannankeril, Charles P., to Sealed Air Corporation. Laminated sheet for protecting underground vertical walls, 4,956,951, Cl. 52-169.500.
- Kanno, Yoshiaki: See—
- Sasaki, Takeo; and Kanno, Yoshiaki, 4,957,086, Cl. 123-478.000.
- Kano, Takenori; Takemoto, Haruki; Niimi, Mamoru; Takase, Isao; and Yokoyama, Fumitomo, to Aisin AW Co., Ltd. Hydraulic device for an automatic transmission, 4,957,195, Cl. 192-106.00F.
- Kanou, Noboru: See—
- Okamura, Naokatsu; Yamaguchi, Noboru; Masuda, Shuji; and Kanou, Noboru, 4,956,983, Cl. 70-241.000.
- Kanshin, Nikolaevich N.: See—
- Lipatov, Viktor A.; Guskov, Igor A.; and Kanshin, Nikolaevich N., 4,957,499, Cl. 606-153.000.
- Kantner, Hugh B.; and Spector, George. Putter pool billiard game, 4,957,288, Cl. 273-2.000.
- Kantor, Karen D. Toilet roll cover, 4,957,246, Cl. 242-55.530.
- Kao Corporation: See—
- Inoue, Takeshi; Hikichi, Tadasu; Fukuyama, Yukihiro; and Kondo, Akihiro, 4,957,992, Cl. 526-324.000.
- Kinashi, Hiroshi; Kawabata, Itaru; Yamane, Hidenobu; Tsujimoto, Yoshiharu; Gotoh, Shinya; and Nawa, Masayoshi, 4,958,197, Cl. 355-299.000.
- Kapoor, Mohan L.: See—
- Young, Edward L.; and Kapoor, Mohan L., 4,958,105, Cl. 315-169.300.
- Karami, Yusuke: See—
- Doi, Shinji; Yoshida, Satoshi; Matsunaga, Satoshi; Kawakami, Hiroaki; Kasuya, Takahige; Goseki, Yasuhide; and Karami, Yusuke, 4,957,774, Cl. 427-45.100.
- Karapetian, Vadim K.: See—
- Denisov, Vladimir F.; Gertseva, Marina I.; Ziberov, Valentin E.; Karapetian, Vadim K.; Sarkisian, Norik S.; Karbachinsky, Vladimir M.; Kharlamov, Oleg I.; Tsoi, Alexei D.; Tsysin, Mark I.; Romanov, Alexei A.; Veranian, Vagan D.; Khrpin, Vasily D.; and Shafra, Larisa E., 4,957,512, Cl. 55-8.000.
- Karbachinsky, Vladimir M.: See—
- Denisov, Vladimir F.; Gertseva, Marina I.; Ziberov, Valentin E.; Karapetian, Vadim K.; Sarkisian, Norik S.; Karbachinsky, Vladimir M.; Kharlamov, Oleg I.; Tsoi, Alexei D.; Tsysin, Mark I.; Romanov, Alexei A.; Veranian, Vagan D.; Khrpin, Vasily D.; and Shafra, Larisa E., 4,957,512, Cl. 55-8.000.

- Karch, John A.: See—
- Yoo, Jin S.; Karch, John A.; Bhattacharyya, Alakananda A.; and Radlowski, Cecelia A., 4,957,718, Cl. 423-244.000.
- Karp, John D. K. Pickup truck pads for carrying long loads, 4,957,400, Cl. 410-110.000.
- Kasahara, Izumi: See—
- Tokita, Masakazu; and Kasahara, Izumi, 4,958,374, Cl. 382-8.000.
- Kasahara, Senshi: See—
- Taga, Toshiyuki; and Kasahara, Senshi, 4,957,719, Cl. 423-328.000.
- Kasai, Yuji: See—
- Shiojima, Kenji; and Kasai, Yuji, 4,957,196, Cl. 194-239.000.
- Kashida, Motokazu: See—
- Kozuki, Suzumu; Takimoto, Hiroyuki; Kashida, Motokazu; Takahashi, Koji; and Nagasawa, Kenichi, 4,958,246, Cl. 360-77.150.
- Kashiwagi, Hiroshi: See—
- Tamura, Kohji; Kashiwagi, Hiroshi; and Noguchi, Masahiro, 4,957,652, Cl. 252-67.000.
- Kasuya, Takahige: See—
- Doi, Shinji; Yoshida, Satoshi; Matsunaga, Satoshi; Kawakami, Hiroaki; Kasuya, Takahige; Goseki, Yasuhide; and Karami, Yusuke, 4,957,774, Cl. 427-45.100.
- Katayama, Akihiro; and Ohsawa, Hidefumi, to Canon Kabushiki Kaisha. Image processing method and apparatus with dot-processing, 4,958,218, Cl. 358-75.000.
- Katayama, Akihiro; and Ohsawa, Hidefumi, to Canon Kabushiki Kaisha. Image processing method and apparatus with conditional correction of error data, 4,958,238, Cl. 358-456.000.
- Katayama, Akihiro: See—
- Nagashima, Nao; Ichikawa, Hiroyuki; and Katayama, Akihiro, 4,958,236, Cl. 358-445.000.
- Kato, Hidetoshi: See—
- Shibata, Hiroshi; Maehara, Fuyuki; Shintai, Akira; and Kato, Hidetoshi, 4,957,876, Cl. 437-209.000.
- Kato, Ichiro, to Canon Kabushiki Kaisha. Communication apparatus, 4,958,359, Cl. 375-1.000.
- Kato, Masayuki: See—
- Hasegawa, Shin-ya; Kato, Masayuki; Yamagishi, Fumio; Ikeda, Hiroyuki; and Inagaki, Takefumi, 4,957,336, Cl. 350-3.710.
- Kato, Takatsugu: See—
- Takahashi, Takao; Kato, Takatsugu; and Terushima, Shigeru, 4,957,143, Cl. 139-190.000.
- Kato, Toshikazu: See—
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- Katzenstein, Leo R.: See—
- Abramovici, Gabriela M.; Buhrke, Rolf E.; Chandramouli, Bopsi; Dianda, Robert B.; Katzenstein, Leo R.; O'Connor, Thomas M.; Rinker, Timothy G.; and Tripp, Susan J., 4,958,343, Cl. 370-85.100.
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- Maier-Laxhuber, Peter; and Kaubek, Fritz, 4,956,977, Cl. 62-106.000.
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- Kawagoe, Takahiro: See—
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- Kawai, Noboyuki: See—
- Yamada, Takanobu; Kawai, Noboyuki; and Kinoshita, Takeru, 4,958,191, Cl. 355-245.000.
- Kawakami, Hiroaki: See—
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- Kawamura, Kunio: See—
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- Kawazoe, Shigemi: See—
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- Kawneer Company, Inc.: See—
- Touton, Charles P., III, 4,956,940, Cl. 49-388.000.
- Kay, John A.: See—
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- Keldany, Rachid; and Shaw, Keith J., to Ametex AG. Apparatus for producing a wound plastic tube, 4,957,586, Cl. 156-428.000.
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- Carlson, Dennis L.; and Cultice, Richard D., Jr., 4,957,600, Cl. 160-199.000.
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- Kemper, Yves J., to Tractontec Corporation. Traction drive transmission system, 4,957,474, Cl. 475-279.000.
- Kendall, Paul W.; and Parrott, Gregory H., to Accu Industries, Inc. Balancer, 4,958,290, Cl. 364-463.000.
- Kenji, Onda: See—
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- Kennametal Inc.: See—
- Niebauer, Kenneth L., 4,957,396, Cl. 407-114.000.
- Kennedy, David R.: See—
- Thomcraft, David A.; Kennedy, David R.; Rashleigh, Scott C.; and Dabbs, Timothy P., 4,957,338, Cl. 350-96.150.
- Kennis, Ludo E. J.; Vandenberg, Jan; and Mertens, Josephus C., to Janssen Pharmaceutica N.V. Antipsychotic 3-piperazinylbenzazole derivatives, 4,957,916, Cl. 514-254.000.
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- Hoffmann, Dieter, 4,957,375, Cl. 384-247.000.
- Kern, Matthew F.: See—
- Damoci, Joseph A.; Kern, Matthew F.; Welsh, Russell J.; and Fourdraine, John D., 4,958,371, Cl. 379-377.000.
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- Kharlamov, Oleg I.: See—
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- Khatanzevsky, Egor V.: See—
- Boguslavsky, Alexandr M.; Semenikhin, Viktor F.; Chergikalo, Vladimir I.; Rozenman, Lev I.; Tregub, Yakov K.; Risman, Arkady I.; Topolsky, Yankel M.; Khatanzevsky, Egor V.; and Rubin, Eduard A., 4,957,058, Cl. 118-323.000.
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- Kim, Sung B. Combination lock mechanism and method. 4,956,985, Cl. 70-313.000.
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- Kinnan, Frank R., to Underground Technologies, Inc. Method and apparatus for subsoil drilling. 4,957,173, Cl. 175-61.000.
- Kinney, William A.; and Lee, Nancy E., to American Home Products Corporation. 2-pyridinecarbothioamides, processes for preparation thereof and pharmaceutical compositions comprising the same. 4,958,023, Cl. 544-58.600.
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- Kinoshita, Junichi, to Kabushiki Kaisha Toshiba. Grating-coupled surface emitting laser and method for the modulation thereof. 4,958,357, Cl. 372-96.000.
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- Kirk, Karl L., to Emerson Electric Co. Portable drain cleaning apparatus. 4,956,889, Cl. 15-104.330.
- Kirkby, Paul A., to STC PLC. Synchronous multifrequency optical network. 4,957,340, Cl. 350-96.160.
- Kirkpatrick, Paul A.: See—  
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- Kirkpatrick, Robert D., to Image Recognition Equipment Corporation. Bar code locator for video scanner/reader system. 4,958,064, Cl. 235-384.000.
- Kishino, Kohji: See—  
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- Kissinger, Robert D.: See—  
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- Kist, William J., to Combined Fluid Products Co. Vacuum system for feeding sheets. 4,957,283, Cl. 271-90.000.
- Kitahiro, Isamu: See—  
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- Klecker, Manfred: See—  
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- Kluger, Patrick. Device for setting the spinal column. 4,957,495, Cl. 606-58.000.
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- Knapp, Volker: See—  
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- Knighton, David R., to University of Minnesota, Regents of the. Method for promoting hair growth. 4,957,742, Cl. 424-532.000.
- Knodle, Daniel W.: See—  
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- Knoll AG: See—  
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- Koaladesign S.r.l.: See—  
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- Kobayashi, Hidenori; Suwabe, Moriaki; Inakazu, Nobuhiro; and Nagamatsu, Hatsuo, to Kamaya Kagaku Kogyo Co., Ltd. Method of injection molding a three-layered container. 4,957,682, Cl. 264-255.000.
- Kobayashi, Hidetoshi; and Nishikawa, Toshihiro, to Fuji Photo Film Co., Ltd. Silver halide color photographic light-sensitive material containing cyan coupler and method for use thereof. 4,957,853, Cl. 430-384.000.
- Kobayashi, Hironobu, to Kabushiki Kaisha Toshiba. Method of and apparatus for converting attributes of display data into desired colors in accordance with relation. 4,958,301, Cl. 364-521.000.
- Kobayashi, Hitoshi: See—  
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- Kobayashi, Kazuo: See—  
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- Kobayashi, Shozou: See—  
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- Kobayashi, Yoichi: See—  
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- Koeber, Laszlo; Rittersdorf, Walter; and Werner, Wolfgang, to Boehringer Mannheim GmbH. Method for the determination of redox reactions using iodate to eliminate ascorbic acid interference. 4,957,872, Cl. 436-175.000.
- Koga, Genji: See—  
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- Kogano, Takayoshi: See—  
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- Kohlert, Dieter: See—  
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- Koike, Shoji; and Tomida, Yasuko, to Canon Kabushiki Kaisha. Ink for ink-jet recording and ink-jet recording process employing the same. 4,957,553, Cl. 106-20.000.
- Koishi, Musubu; Aoshima, Shinichiro; and Tsuchiya, Yutaka, to Hamamatsu Photonics Kabushiki Kaisha. Multi-channel voltage detector. 4,958,124, Cl. 324-96.000.
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- Koji, Fukushima: See—  
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- Koma, Norihiko, to Nippon Kokan Kabushiki Kaisha. Offshore fish cage for farming fish. 4,957,064, Cl. 119-3.000.
- Komai, Yukio: See—  
Miyamoto, Jiro; Nakasai, Takeshi; and Komai, Yukio, 4,957,799, Cl. 428-114.000.
- Komatsuzaki, Hiroshi; Kamata, Kazuo; Ohmiya, Akio; Nishimura, Sunji; Umeda, Yoshihito; Mochizuki, Noriya; and Furuya, Eiji, to Fuji Photo Film Co., Ltd.; and Nihon Seimitsu Kogyo Kabushiki Kaisha. Camera with changeable focal length. 4,958,179, Cl. 354-195.120.
- Komazawa, Osamu; Isogai, Shigetaka; Buma, Shuichi; Onuma, Toshio; Yonekawa, Takashi; and Hattori, Katsuhiko, to Toyota Jidosha Kabushiki Kaisha; Kabushiki Kaisha Toyota Chuo Kenkyusho; and Aisin Seiki Kabushiki Kaisha. Pressure control system for suspension. 4,957,309, Cl. 280-707.000.
- Komori, Takahiro: See—  
Fujihara, Kazuo; and Komori, Takahiro, 4,957,036, Cl. 98-2.000.
- Komura, Kenichi: See—  
Sato, Tsuguo; and Komura, Kenichi, 4,957,343, Cl. 350-96.210.
- Komura, Syoichi; and Toyofuku, Hiroyuki, to Sanko Senzai Kogyo Kabushiki Kaisha. Coil spring. 4,957,278, Cl. 267-166.000.
- Kondo, Akihiro: See—  
Inoue, Takeshi; Hikichi, Tadasu; Fukuyama, Yukihiro; and Kondo, Akihiro, 4,957,992, Cl. 526-324.000.
- Kondo, Masao; and Abe, Yasunao, to Yamaha Corporation. Automatic music playing apparatus having plural tone generating channels separately assignable to the parts of a musical piece. 4,957,031, Cl. 84-613.000.
- Kondo, Michitada: See—  
Minai, Masayoshi; Ueda, Yuji; Higashii, Takayuki; Kondo, Michitada; and Kai, Seichi, 4,957,867, Cl. 435-280.000.
- Kondoh, Isao: See—  
Tamari, Nobuyuki; Kondoh, Isao; and Kinoshita, Nakoto, 4,957,509, Cl. 623-16.000.
- Konica Corporation: See—  
Fujii, Masaki; Tamura, Hitoshi; Suzuki, Kuninori; and Hatakeyama, Noboru, 4,958,196, Cl. 355-298.000.
- Nakamura, Masao; Sakamoto, Norio; and Ito, Takashi, 4,957,247, Cl. 242-67.10R.
- Yamada, Yasushi, 4,957,285, Cl. 271-3.100.
- Konishi, Katsuji: See—  
Kusuda, Hidefumi; Konishi, Katsuji; and Kanda, Kazunori, 4,957,850, Cl. 430-271.000.
- Konno, Tsuneo: See—  
Inoue, Kazuo; Hanaoka, Takashi; and Konno, Tsuneo, 4,957,076, Cl. 123-90.160.
- Kono, Nobuharu: See—  
Takisawa, Yukihisa; Kono, Nobuharu; Saito, Kenji; and Yamachika, Hiroshi, 4,958,033, Cl. 549-59.000.
- Koop, Donald A.: See—  
Alessi, Paula J.; Faul, William H.; Giorgianni, Edward J.; Koop, Donald A.; and Madden, Thomas E., 4,958,220, Cl. 358-76.000.
- Koralek, Richard: See—  
Tanner, Robert M.; Koralek, Richard; Chethik, Frank; Lengel, Stephen B.; and Miller, David H., 4,958,349, Cl. 371-37.100.
- Kordes, Karl; Gsellmann, Josef; and Tomantscher, Klaus, to Battery Technologies Inc. Rechargeable alkaline manganese cells with zinc anodes. 4,957,827, Cl. 429-60.000.
- Kordosky, Gary A.: See—  
Olafson, Stephen M.; Lewis, Roy G.; and Kordosky, Gary A., 4,957,714, Cl. 423-24.000.
- Korea Advanced Institute of Science and Technology: See—  
Min, Suk K.; Park, Seung C.; and Han, Chul W., 4,957,711, Cl. 422-245.000.
- Koriyama, Tsuyoshi: See—  
Tokura, Seichi; Koriyama, Tsuyoshi; Chiba, Yoshiyuki; and Satake, Mikio, 4,958,012, Cl. 536-20.000.
- Koshi, Kiyoyuki; Owada, Minoru; Mingishi, Hisako; and Ono, Takayuki, to Hitachi, Ltd. Fluorescence spectrophotometer and wavelength setting method thereof. 4,957,366, Cl. 356-318.000.
- Koshiba, Mitsunobu; Harita, Yoshiyuki; Furuto, Yuuji; Roland, Bruno; and Lombaerts, Ria, to Japan Synthetic Rubber Co., Ltd.; and UCB Societe Anonyme. Method for high temperature reaction process. 4,957,588, Cl. 156-628.000.
- Koshimoto, Naohide: See—  
Nakatani, Shigeki; Koshimoto, Naohide; and Sugimoto, Hiroyuki, 4,957,079, Cl. 123-90.340.
- Kosho, Akikazu: See—  
Oku, Shungi; and Kosho, Akikazu, 4,958,050, Cl. 174-261.000.
- Koskol, Joseph E.; Santucci, Robert J.; and Rosanio, Louis G., Jr., to Du Pont de Nemours, E. I., and Company. Apparatus and process for forming a wad of yarn. 4,956,901, Cl. 28-255.000.
- Kosson, Julie S.; and McLennan, Michael J., to International Business Machines Corporation. Voltage clamping circuits with high current capability. 4,958,093, Cl. 307-540.000.
- Kostopoulos, George P. Paint roller cover applicator cleaning apparatus. 4,957,127, Cl. 134-117.000.
- Kostretsov, Anatoly S.: See—  
Bukatov, Alexandr S.; Iofis, Naum A.; Egorov, Jury G.; Dobrova, Natalya B.; Kostretsov, Anatoly S.; and Agafonov, Andrei V., 4,957,503, Cl. 623-2.000.
- Kosugi, Ryuichi; and Tabaru, Tsugio, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor pseudo memory module. 4,958,322, Cl. 365-189.010.
- Kotlarz, Jeffery R. Ball return mechanism for a basketball game. 4,957,289, Cl. 273-1.50A.
- Kotobuki & Co., Ltd.: See—  
Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Youichi, 4,957,384, Cl. 401-65.000.
- Kotski, Edward J. Voltage isolation apparatus for service transformers. 4,958,250, Cl. 361-40.000.
- Kowa Company Ltd.: See—  
Kakizawa, Koichiro; and Ichihashi, Tadashi, 4,957,360, Cl. 351-221.000.



Koya, Keizo: See—  
Takahashi, Osamu; Koyama, Koichi; and Koya, Keizo, 4,957,848, Cl. 430-203.000.  
Koyama, Ikuo; and Ohata, Hajime, to Kabushiki Kaisha Toshiba. Optical card with increased data storage capacity and recording/reproducing apparatus therefor. 4,958,339, Cl. 369-98.000.  
Koyama, Koichi: See—  
Takahashi, Osamu; Koyama, Koichi; and Koya, Keizo, 4,957,848, Cl. 430-203.000.  
Koyo Seiko Co., Ltd.: See—  
Tsutsui, Takashi, 4,957,328, Cl. 301-105.00R.  
Kozuki, Suzumu; Takimoto, Hiroyuki; Kashida, Motokazu; Takahashi, Koji; and Nagasawa, Kenichi, to Canon Kabushiki Kaisha. Device of multi-channel rotary head type having function to discriminate recorded state. 4,958,246, Cl. 360-77.150.  
Kraemer, Karl: See—  
Bohn, Manfred; Dittmar, Walter; Peil, Heinz G.; Futterer, Eberhard; and Kraemer, Karl, 4,957,730, Cl. 424-61.000.  
Kraft General Foods: See—  
Cochran, Stuart A.; Cin, David A.; and Veach, Susan K., 4,957,750, Cl. 426-19.000.  
Kraft, Kenneth N.; and Allen, R. Craig, to George Koch Sons, Inc. Fluid removing apparatus. 4,957,129, Cl. 134-151.000.  
Kral, Stephen F.; Barclay, John A.; Claybaker, Peter; and Jaeger, Steven R., to Astronautics Corporation of America. Magnetic refrigeration apparatus for He II production. 4,956,976, Cl. 62-51.300.  
Kramer, Fred R.: See—  
Chu, Barbara; Kramer, Fred R.; Lizardi, Paul; and Orgel, Leslie E., 4,957,858, Cl. 435-6.000.  
Kramer, Manfred; and Sitter, Erhard, to Robert Bosch GmbH. Fuel injection apparatus for internal combustion engines. 4,957,084, Cl. 123-447.000.  
Kramer, Wolfgang: See—  
Wollweber, Detlef; Kramer, Wolfgang; Brandes, Wilhelm; Dutzmann, Stefan; and Hanssler, Gerd, 4,957,919, Cl. 514-237.200.  
Kratz, Wilbur C.: See—  
Golden, Timothy C.; Kumar, Ravi; and Kratz, Wilbur C., 4,957,514, Cl. 55-26.000.  
Krause, Klaus: See—  
Wagner, Wolf-Dietrich; Springer, Willi; Meissner, Ludwig; Bonfert, Helmut; Bottcher, Michael; Hardt, Thomas; Klumpp, Rolf; Krause, Klaus; Peters, Arndt; Plattner, Ernst; Strobel, Wolfgang; Waller, Wolfgang; and Wiemann, Gunter, 4,957,068, Cl. 123-41.82R.  
Kravetsky, Dmitry Y.; Zatulovsky, Lev M.; Egorov, Leonid P.; Pelts, Boris B.; Okun, Leonid S.; Freiman, Efim A.; Averyanov, Viktor V.; and Alishoev, Alexandr L. Apparatus for growing shaped single crystals. 4,957,713, Cl. 422-249.000.  
Kreil, Walter, to Flottweg GmbH. Solid-bowl helical centrifuge. 4,957,475, Cl. 494-53.000.  
Kreuter Mfg. Co., Inc.: See—  
Kreuter, Paul E., 4,957,238, Cl. 236-49.400.  
Kreuter, Paul E., to Kreuter Mfg. Co., Inc. Pneumatic variable air volume controller. 4,957,238, Cl. 236-49.400.  
Krieg, Manfred; Lichtenstein, Hans; Hosch, Ludwig; and Ittmann, Guenther, to Rohm GmbH. Acrylate resins as binders for color concentrates. 4,957,987, Cl. 526-258.000.  
Krikorian, Kapriel A.: See—  
Rosen, Robert A.; and Krikorian, Kapriel A., 4,958,361, Cl. 375-102.000.  
Krimmel, Heinz G.: See—  
Fussg Kurt, ml/a nger; and Krimmel, Heinz G., 4,957,339, Cl. 350-96.150.  
Krishna, Surinder; Torreno, Manuel L., Jr.; and Adler, Michael S., to General Electric Company. High voltage integrated circuits. 4,958,210, Cl. 357-34.000.  
Krishnan, Raghavan; Gamble, Jesse; Blum, David; Curran, William V.; Lee, Ving J.; and Conrow, Ransom B., to American Cyanamid Company. Process for producing beta-lactamase inhibitor. 4,958,020, Cl. 540-310.000.  
Kroesen, Gerardus M. W.: See—  
Schuurmans, Hubertus J. A.; Werner, Jan; Schram, Daniel C.; and Kroesen, Gerardus M. W., 4,957,062, Cl. 118-723.000.  
Kroesen, Patricia L.: See—  
Akbar, Shah; Kroesen, Patricia L.; Ogura, Seiki; and Rovedo, Nivo, 4,957,875, Cl. 437-31.000.  
Kronberger, Maximilian: See—  
Rathmayr, Heinz; Kronberger, Maximilian; and Drummer, Eugen, 4,957,090, Cl. 123-501.000.  
Krone, James R.: See—  
Rachal, Duane M.; and Krone, James R., 4,957,432, Cl. 432-59.000.  
Krueger, Daniel D.; Kissinger, Robert D.; Menzies, Richard G.; and Wukusick, Carl S., to General Electric Company. Fatigue crack growth resistant nickel-base article and alloy and method for making. 4,957,567, Cl. 148-12.70N.  
Krumm, Herbert: See—  
Eskam, Armin; Frye, Gunter; and Krumm, Herbert, 4,957,035, Cl. 89-8.000.  
Kruse, James W.; and Riley, Donald E., to Navistar International Transportation Corp. Spring biased mirror assembly with electromagnetic release means. 4,957,359, Cl. 350-637.000.  
Kruse, Jurgen M.: See—  
Price, John T.; and Kruse, Jurgen M., 4,957,644, Cl. 252-62.520.  
Ku, Bon J.; and Jung, Hyun W., to Samsung Aerospace Industries, Ltd. Driving motor circuit arranged N counter circuit for camera device. 4,958,176, Cl. 354-173.110.

Kubena, Edwin, Jr.: See—  
Whitfill, Donald L.; Kubena, Edwin, Jr.; Cantu, Terry S.; and Sooter, Matthew C., 4,957,174, Cl. 175-72.000.  
Kubo, Kazuo, to Kabushiki Kaisha Komatsu Seisakusho. Power transmission device of a press machine. 4,957,019, Cl. 74-665.00H.  
Kubo, Masaharu: See—  
Homma, Noriyuki; Nakamura, Tooru; Nakazato, Kazuo; Matsumoto, Motoaki; Hayashida, Tetsuya; Kubo, Masaharu; and Sagara, Kazuhiko, 4,958,320, Cl. 365-174.000.  
Kubota, Kazufumi, to Fuji Photo Film Co., Ltd. Method of making enlarged prints by subdividing an original image and interpolating the subdivided image. 4,958,237, Cl. 358-451.000.  
Kubota, Sadao: See—  
Nagai, Teizi; Tokushima, Yasuo; Kubota, Sadao; Suzuki, Kenichirou; Fujitani, Yoshiyasu; Yoshimoto, Taisuke; Muraki, Hideaki; and Tachi, Hideo, 4,957,710, Cl. 422-171.000.  
Kubota, Tooru: See—  
Endo, Mikio; Takamizawa, Minoru; Ishihara, Toshinobu; Kubota, Tooru; and Shinohara, Toshio, 4,957,607, Cl. 204-157.740.  
Kudzman, Linas V.; Spencer, H. Kenneth; and Severnak, Sherry A., to BOC, Inc. 4-phenyl-4-[N-(phenyl)amido]piperidine compounds and pharmaceutical compositions employing such compounds. 4,957,929, Cl. 514-326.000.  
Kugo, Masaru: See—  
Ito, Hiroshi; Kugo, Masaru; and Kurosawa, Michiaki, 4,957,350, Cl. 350-336.000.  
Kuhlman, Howard W., to General Motors Corporation. Releasable connector for closure operating mechanism. 4,956,939, Cl. 49-347.000.  
Kuijk, Karel E.; and Stroomer, Martinus V. C., to U.S. Philips Corporation. Display device and method of driving such a device. 4,958,152, Cl. 340-784.000.  
Kumar, Ravi: See—  
Golden, Timothy C.; Kumar, Ravi; and Kratz, Wilbur C., 4,957,514, Cl. 55-26.000.  
Kumiai Chemical Industry Co., Ltd.: See—  
Inamori, Masahito; Horii, Tetsuo; Shimazu, Tomonori; and Sugaya, Masaji, 4,957,935, Cl. 514-383.000.  
Kunbargi, Hassan. Very early setting ultra high early strength cement. 4,957,556, Cl. 106-693.000.  
Kundel, Nikhil K.: See—  
Chandrasekaran, Swayambu; Kundel, Nikhil K.; Garg, Brij; and Chin, Hong B., 4,957,961, Cl. 524-405.000.  
Kuney, Clark G., Jr., to Minnesota Mining and Manufacturing Company. Microsphere-based retroreflective articles with enhanced retroreflective brightness. 4,957,335, Cl. 350-105.000.  
Kunii, Nobuaki: See—  
Matsumoto, Yukio; and Kunii, Nobuaki, 4,957,959, Cl. 524-196.000.  
Kunitomo, Yoshinobu: See—  
Tanaka, Jun; Oikawa, Hitoshi; Kunitomo, Yoshinobu; and Terasawa, Masami, 4,958,216, Cl. 357-73.000.  
Kuramoto, Shinichi: See—  
Fukase, Toshiyuki; Sugiyama, Yoshihiro; Takanashi, Hazime; Tsuboko, Kazuo; and Kuramoto, Shinichi, 4,957,842, Cl. 430-114.000.  
Kureha Kagaku Kogyo Kabushiki Kaisha: See—  
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,957,906, Cl. 514-42.000.  
Kurihara, Noriko: See—  
Ando, Kenji; Kamiya, Osamu; Sugata, Masao; Kurihara, Noriko; Sugata, Hiroyuki; Den, Tooru; Kimura, Toshiaki; Hamamoto, Takashi; Haruta, Masahiro; and Osabe, Kuniji, 4,957,061, Cl. 118-719.000.  
Kuroda, Masami; Nakamura, Youichi; and Furusho, Noboru, to Fuji Electric Co., Ltd. Photosensitive member for electrophotography containing hydrazone in charge transport layer. 4,957,837, Cl. 430-59.000.  
Kuromida, Susumu: See—  
Sawa, Kenji; Kuromida, Susumu; and Bota, Keiji, 4,957,194, Cl. 192-0.096.  
Kurosawa, Akira: See—  
Chigira, Tatsuo; and Kurosawa, Akira, 4,958,099, Cl. 310-254.000.  
Kurosawa, Michiaki: See—  
Ito, Hiroshi; Kugo, Masaru; and Kurosawa, Michiaki, 4,957,350, Cl. 350-336.000.  
Kurth, Paul A. Femoral compression device for post-catheterization hemostasis. 4,957,105, Cl. 128-96.100.  
Kusaka, Takao: See—  
Sawa, Takao; Okamura, Masami; Yamada, Taiju; Kusaka, Takao; and Sasaki, Hiroshi, 4,958,134, Cl. 333-12.000.  
Kusuda, Hidefumi; Konishi, Katsuji; and Kanda, Kazunori, to Nippon Paint Co., Ltd. Photosensitive flexographic resin plate. 4,957,850, Cl. 430-271.000.  
Kusumoto, Keiji, to Minolta Camera Kabushiki Kaisha. Image forming apparatus having plural developing units and a device for selecting a predetermined developing unit. 4,958,192, Cl. 355-245.000.  
Kusz, Maximilian, to Owens-Illinois Closure Inc. Child resistant closure. 4,957,210, Cl. 215-220.000.  
Kuszyk, Jack A.: See—  
Irick, Virgil, Jr.; Kuszyk, Jack A.; and Landini, Dennis J., 4,957,779, Cl. 427-193.000.  
Kutsuki, Tetsuo, to Matsushita Electric Industrial Co., Ltd. Automatic frequency change device. 4,958,228, Cl. 358-158.000.  
Kutz, Giora, to Azimuth Ltd. Device for determining true bearing during daytime. 4,956,920, Cl. 33-268.000.

Kuwabara, Masahiro: See—  
Agou, Tokinori; Sakashita, Takeshi; Shimoda, Tomoaki; Sudo, Masaru; Kuwabara, Masahiro; and Tanaka, Masahide, 4,957,985, Cl. 526-246.000.  
Kwiatek, Jack: See—  
Chang, Biau-Hung; and Kwiatek, Jack, 4,957,997, Cl. 528-220.000.  
Kyburz, Emilio: See—  
Aschwenden, Werner; Imhof, Rene; Jakob, Roland; and Kyburz, Emilio, 4,957,911, Cl. 514-183.000.  
Kyocera Corporation: See—  
Tanaka, Jun; Oikawa, Hitoshi; Kunitomo, Yoshinobu; and Terasawa, Masami, 4,958,216, Cl. 357-73.000.  
LaBarge, Robert L., to Aluminum Company of America. Anchor for plastic cap. 4,957,216, Cl. 220-379.000.  
LaBean, Michael S.: See—  
Hofelich, Thomas C.; and LaBean, Michael S., 4,957,707, Cl. 422-102.000.  
Labinal S.A.: See—  
Nadin, Leonard, 4,957,451, Cl. 439-395.000.  
Labuda, Lawrence L.: See—  
Mace, Leslie E.; Knodle, Daniel W.; Labuda, Lawrence L.; and Nuzzo, Philip F., 4,958,075, Cl. 250-343.000.  
Lafferty, Robert M.; and Braunneg, Gerhart, to Petrochemie Danubia Ges.m.b.H. Process for the biotechnological preparation of poly-D-(-)-3-hydroxybutyric acid. 4,957,861, Cl. 435-146.000.  
Lahille, Michel A.; and Dibie, Alain J., to Biomat, S.A.R.L. Antibiotic filter. 4,957,501, Cl. 606-200.000.  
Lahr, Helfrid; and Pontani, Bernd, to Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH. Apparatus for handling a fuel element skeleton. 4,957,692, Cl. 376-260.000.  
Lai, Stefan K. C.: See—  
Tam, Simon M.; and Lai, Stefan K. C., 4,957,877, Cl. 437-43.000.  
Laird, Walter J.: See—  
Bjorn, Michael J.; FitzGerald, David J.; Frankel, Arthur E.; Laird, Walter J.; Pastan, Ira H.; Ring, David B.; Willingham, Mark C.; and Windelhaake, Jeffrey L., 4,958,009, Cl. 530-389.000.  
Lakhani, Kishor M.: See—  
Fulton, Alfred L.; Lakhani, Kishor M.; Sampson, Scott D.; and Lowman, Kent, 4,958,171, Cl. 346-153.100.  
Lakso, Matthew L., to Priority Mfg. Corp. Interlock system. 4,957,334, Cl. 312-221.000.  
Lalo, Jack: See—  
Garrigue, Roger; Lalo, Jack; and Vignau, Andre, 4,957,999, Cl. 528-230.000.  
Lam, William Y., to Ethyl Petroleum Additives, Inc. Lubricant compositions. 4,957,643, Cl. 252-47.500.  
Lambert, Susan L.: See—  
Sachtler, Johann W. A.; Lawson, Randy J.; and Lambert, Susan L., 4,957,891, Cl. 502-61.000.  
Lammens, Robert F.; Mahler, Hans F.; and Serno, Peter, to Bayer Aktiengesellschaft. Infusion solutions of 1-cyclopropyl-6-fluoro-1,4-dihydro-4-oxo-7-(1-piperazinyl)-quinoline-3-carboxylic acid. 4,957,922, Cl. 514-255.000.  
Lammers, Bryan G.; and Blaha, Kenneth V., to Caterpillar Inc. Guard assembly for a vehicle. 4,957,180, Cl. 180-69.100.  
Lamotte, Ronald R., to Hoechst Celanese Corporation. Preparation of polyarylate of improved color with cobalt salt. 4,957,996, Cl. 528-181.000.  
Landini, Dennis J.: See—  
Irick, Virgil, Jr.; Kuszyk, Jack A.; and Landini, Dennis J., 4,957,779, Cl. 427-193.000.  
Lane, Dale. Shower fixture. 4,956,883, Cl. 4-605.000.  
Langenhahn, Lutz: See—  
Jahrig, Gunter; Langenhahn, Lutz; and Riedl, Robert, 4,957,581, Cl. 156-309.900.  
Langhammer, Hans-Jurgen: See—  
von Bogdandy, Ludwig; Mitter, Gerhard; Koller, Otto; Pochmarski, Lutz; Jaquemar, Christian; and Langhammer, Hans-Jurgen, 4,957,347, Cl. 75-567.000.  
Lanoue, Paul D.: See—  
Planchard, David C.; and Lanoue, Paul D., 4,956,974, Cl. 62-6.000.  
Lanxide Technology Company, LP: See—  
Irick, Virgil, Jr.; Kuszyk, Jack A.; and Landini, Dennis J., 4,957,779, Cl. 427-193.000.  
Lappe, Rodney W.: See—  
Abou-Gharbia, Magid A.; Stack, Gary P.; and Lappe, Rodney W., 4,957,913, Cl. 514-216.000.  
Larrocche, Christian: See—  
Creuly, Catherine; Gros, Jean-Bernard; and Larrocche, Christian, 4,957,862, Cl. 435-148.000.  
Lau, Hon C.: See—  
Borchardt, John K.; and Lau, Hon C., 4,957,646, Cl. 252-8.554.  
Lau, Louis K. S., to Westinghouse Electric Corp. Pressurized water nuclear reactor system with hot leg vortex mitigator. 4,957,693, Cl. 376-298.000.  
Laurent, Jean: See—  
Etourmy, Noel; and Laurent, Jean, 4,957,162, Cl. 166-212.000.  
Laval, Francois; and Vignane, Pascal, to Commissariat A L'Energie Atomique. 5-nitro-2-(3,5-diamino-2,4,6-trinitrophenyl)-1,2,4-triazole, its preparation process and explosive material containing it. 4,958,027, Cl. 548-264.800.  
Law, David M.; Davies, Peter J.; and Mutschler, Martha A., to Cornell Research Foundation, Inc. Method of extending shelf life and enhancing keeping quality of fruits. 4,957,757, Cl. 426-281.000.  
Lawrence, Peter; Nazmy, Mohamed; and Staubli, Markus, to Asea Brown Boveri Ltd. Precipitation-hardenable nickel-base superalloy

with improved mechanical properties in the temperature range from 600 to 750 degrees celsius. 4,957,703, Cl. 420-448.000.  
Lawson, Randy J.: See—  
Sachtler, Johann W. A.; Lawson, Randy J.; and Lambert, Susan L., 4,957,891, Cl. 502-61.000.  
Lazcano-Navarro, Arturo, to Instituto Mexicano de Investigaciones Siderurgicas. Direct steelmaking process from 100% solid charge of multiple reducing and oxidizing alternating periods. 4,957,546, Cl. 75-529.000.  
Leber, Rudolph J.: See—  
Huber, James V.; Scott, Kurt P.; and Leber, Rudolph J., 4,957,011, Cl. 73-865.600.  
Leclercq, Jacques: See—  
Letemps, Bernard; Leclercq, Jacques; and Dereims, Philippe, 4,957,528, Cl. 65-104.000.  
LeCompte, George W.: See—  
Chesler, Ronald B.; and LeCompte, George W., 4,957,344, Cl. 350-96.230.  
Lee, Chien H. Cleaning apparatus for contact lenses. 4,957,130, Cl. 134-158.000.  
Lee, Chung J., to Occidental Chemical Corporation. Novel polyimidesiloxanes and methods for their preparation and use. 4,957,993, Cl. 528-26.000.  
Lee, Gary C. M., to Allergan, Inc. Anti-inflammatory furanones. 4,957,917, Cl. 514-231.500.  
Lee, Linda G.; and Chen, Chia-Huei, to Becton, Dickinson and Company. Detection of Reticulocytes, RNA and DNA. 4,957,870, Cl. 436-63.000.  
Lee, Nancy E.: See—  
Kinney, William A.; and Lee, Nancy E., 4,958,023, Cl. 544-58.600.  
Lee, Ving J.: See—  
Krishnan, Raghavan; Gamble, Jesse; Blum, David; Curran, William V.; Lee, Ving J.; and Conrow, Ransom B., 4,958,020, Cl. 540-310.000.  
Lee, Yuan-Ho. Modular concrete form. 4,957,272, Cl. 249-196.000.  
LeGrand, Robert: See—  
Jacobson, David; LeGrand, Robert; and Gardener, Keith, 4,957,532, Cl. 65-273.000.  
Lehmann, Hanno; Wasen, Illo; and Pointurier, Hubert, to Westfalia Separator AG. Method of producing rennet cheese from raw milk. 4,957,751, Cl. 426-36.000.  
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- Maier, Friedrich; Dubach, Fredi; Rock, Erich; and Brustle, Klaus, to Julius Blum Gesellschaft m.b.H. Connector for connecting two elements, 4,956,956, Cl. 52-584.000.
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- Hayase, Akihiko, 4,958,110, Cl. 315-408.000.
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Guentner, Andreas; Mayer, Udo; and Oberlinner, Andreas, 4,958,021, Cl. 544-129.000.
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- McAnally, Bill H., to Carrington Laboratories Inc. Process for preparation of aloe products, 4,957,907, Cl. 514-54.000.
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- McBride, Edward F.: See—  
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- McConkey, Sam A. Head movement indicating device and method, 4,957,295, Cl. 273-183.000.
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- McDonald, Henry H. Annulated spring forceps for intra-ocular lens implantation method, 4,957,505, Cl. 623-6.000.
- McHugh, George J., to AGF Manufacturing, Inc. Device for cleaning a drain, 4,957,123, Cl. 134-167.000.
- McIntosh, Brian: See—  
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- McIntosh, Robert H., Sr.: See—  
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- McKinlay, Peter R.; and Tsegalakoff, Christos, to Amcor Limited. Testing apparatus, 4,957,004, Cl. 73-842.000.
- McLaughlin, Paul F.; and Mody, Pankaj H., to Honeywell Inc. Method for control data base updating of a redundant processor in a process control system, 4,958,270, Cl. 364-187.000.
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- McMaster, Harold A.; and Balestra, Ben M., to Glasstech, Inc. Apparatus for heating bending and quenching glass sheets, 4,957,531, Cl. 65-273.000.
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- Measurix Corporation: See—  
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- Mecon medizinische Produkte GmbH: See—  
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- Medler, Eberhard; Phillipi, Siegfried; Vetter, Kurt; Freudenreich, Ludwig; and Lippuner, Othmar, to Behr Industrieanlagen GmbH & Co.; and Daimler-Benz AG. Method for automatic sequential coating of workpieces, 4,957,782, Cl. 427-421.000.
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- Meier, Kurt; and Salvin, Roger P., to Ciga-Geigy Corporation. Cationically polymerizable mixtures containing metallocene complex salt of certain carboxylic or sulfonic acids, 4,957,946, Cl. 522-59.000.
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- Merck Frosst Canada, Inc.: See—  
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- Merriman, Richard A., Jr.: See—  
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- Mertens, Josephus C.: See—  
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- Messerschmidt, Rudolf: See—  
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- Meyer, Wallace H., Jr., to Western Atlas International, Inc. Time-variant filter coefficients, 4,958,286, Cl. 364-422.000.
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- Michael, William J., to ICI Americas Inc. Certain 2-(2',3',4'-trisubstituted benzoyl)-1,3-cyclohexanediones, 4,957,538, Cl. 71-98.000.
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- Lowrey, Tyler A.; and Chance, Randal W., 4,957,878, Cl. 437-52.000.
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- Miller, Daniel G., to Exovir, Inc. Treatment of certain skin malignancies and pre-malignant skin lesions, herpes zoster and psoriasis. 4,957,734, Cl. 424-85.700.
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- Miller, William P. Hierarchically multiplexed optical recording system for storage of digital data. 4,958,338, Cl. 369-59.000.
- Miller, William R.: See—  
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- Mills, Lester: See—  
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- Mills, Nigel G., to Toledo Scale Corporation. Weigh-in-motion scale. 4,957,178, Cl. 177-134.000.
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- Mimura, Tsuyoshi: See—  
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- Minegishi, Hisako: See—  
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Ooms, Adrianus J.; and Mink, Bernardus H., 4,957,657, Cl. 252-373.000.
- Minnesota Mining and Manufacturing Company: See—  
Bryan, Thomas T., 4,957,441, Cl. 433-228.100.
- Eleouet, Bernard; Ramage, Michel; and Rongier, Gilles, 4,957,810, Cl. 428-306.600.
- Hamer, James D., 4,957,667, Cl. 264-16.000.
- Kuney, Clark G., Jr., 4,957,335, Cl. 350-105.000.
- Mathers, James P.; and Humpal, Kathleen M., 4,957,554, Cl. 106-35.000.
- Mathers, James P.; Wood, William P.; and Forester, Thomas E., 4,957,886, Cl. 501-96.000.
- McAllister, Jerome W.; Kinzer, Kevin E.; Mrozinski, James S.; Johnson, Eric J.; and Dyrud, James F., 4,957,943, Cl. 521-64.000.
- Riedel, John E., 4,957,795, Cl. 428-74.000.
- Samuelson, Bruce E., 4,957,233, Cl. 225-26.000.
- Mino, Masayuki: See—  
Mochizuki, Shuji; Mino, Masayuki; Tanaka, Yutaka; and Tachikawa, Kyoji, 4,958,169, Cl. 346-108.000.
- Minolta Camera Co., Ltd.: See—  
Yamada, Takanobu; Kawai, Noboyuki; and Kinoshita, Takeru, 4,958,191, Cl. 355-245.000.
- Minolta Camera Kabushiki Kaisha: See—  
Akada, Yasuaki; Ishikawa, Norio; Egawa, Takeshi; and Taniguchi, Nobuyuki, 4,958,183, Cl. 354-412.000.
- Hamakawa, Wataru, 4,958,198, Cl. 355-309.000.
- Ishikawa, Norio; Nakai, Masaaki; Hirano, Masayasu; Fujino, Akihiko; Ootsuka, Hiroshi; Egawa, Takeshi; and Kawamura, Kunio, 4,958,181, Cl. 354-412.000.
- Ito, Masazumi, 4,958,190, Cl. 355-228.000.
- Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, 4,958,184, Cl. 354-474.000.
- Kusumoto, Keiji, 4,958,192, Cl. 355-245.000.
- Matsui, Toru; and Ueda, Hiroshi, 4,958,180, Cl. 354-403.000.
- Miyamoto, Hirohisa, 4,958,188, Cl. 355-206.000.
- Mochizuki, Shuji; Mino, Masayuki; Tanaka, Yutaka; and Tachikawa, Kyoji, 4,958,169, Cl. 346-108.000.
- Oku, Shungi; and Koshio, Akikazu, 4,958,050, Cl. 174-261.000.
- Tsuboi, Toshio; Moriya, Shigeru; and Nakatani, Keiji, 4,958,221, Cl. 358-80.000.
- Yoshida, Keiji, 4,958,189, Cl. 355-208.000.
- Mintel, Thomas E.: See—  
Misevich, Kenneth W.; and Mintel, Thomas E., 4,956,927, Cl. 36-32.00R.
- Miodownik, Saul: See—  
Groeger, Jeffrey; and Miodownik, Saul, 4,957,109, Cl. 128-640.000.
- Mirabeau, Serge: See—  
Anderson, Patrick E.; Buntin, Roland J.; Higgins, William T.; Hruby, Ronda J.; and Mirabeau, Serge, 4,958,273, Cl. 364-200.000.
- Mise, Takashi: See—  
Kamarei, Ahmad R.; Catsimopoulos, Nicholas; McCluer, Robert; Mise, Takashi; and Sinn, Robert S., 4,957,741, Cl. 424-551.000.
- Misevich, Kenneth W.; and Mintel, Thomas E., to Colgate-Palmolive Company. Monolithic outsole. 4,956,927, Cl. 36-32.00R.
- Mr. Gasket Co.: See—  
Carlo, Louis D.; and Adkins, Joey B., 4,958,084, Cl. 307-10.200.
- Mitchell, William J.; and Fosse, Navarro T., to Hydrotile Machinery Company. Concrete pipe making machine. 4,957,424, Cl. 425-145.000.
- Mitsubishi Denki Kabushiki Kaisha: See—  
Hirose, Kenji, 4,958,116, Cl. 318-800.000.
- Imanishi, Yasuhiro, 4,958,382, Cl. 455-277.000.
- Kosugi, Ryuichi; and Tabaru, Tsugio, 4,958,322, Cl. 365-189.010.
- Matsuda, Shuichi; and Watakabe, Yaichiro, 4,957,834, Cl. 430-5.000.
- Miki, Takahiro; and Hosotani, Shiro, 4,958,157, Cl. 341-133.000.
- Morishita, Mitsuharu; Uota, Kosaku; and Yasukawa, Takeshi, 4,957,182, Cl. 180-79.100.
- Noguchi, Kenji; Toyama, Tsuyoshi; Kobayashi, Shinichi; Andoh, Nobuaki; and Kohda, Kenji, 4,958,352, Cl. 371-40.100.
- Ogawa, Masaharu, 4,958,114, Cl. 318-616.000.
- Ohnishi, Masaru; and Tamura, Masashi, 4,957,689, Cl. 358-296.000.
- Omura, Etsuji; Goto, Katsuhiko; Takahashi, Shogo; Namba, Harumi; and Takemoto, Akira, 4,957,879, Cl. 437-129.000.
- Sasaki, Takeo; and Kanno, Yoshiaki, 4,957,086, Cl. 123-478.000.
- Shinomiya, Kohji, 4,957,882, Cl. 437-209.000.
- Terada, Yasushi; Kobayashi, Kazuo; and Nakayama, Takeshi, 4,958,317, Cl. 365-104.000.
- Yokoya, Hisao, 4,957,423, Cl. 425-115.000.
- Mitsubishi Jidosha Kogyo Kabushiki Kaisha: See—  
Takizawa, Shozo, 4,957,308, Cl. 280-666.000.
- Mitsubishi Jukogyo Kabushiki Kaisha: See—  
Masuyama, Fujimitsu; Daikoku, Takashi; Hancda, Hisao; Yoshikama, Kunihiro; Teranishi, Hiroshi; and Iseda, Atsuro, 4,957,701, Cl. 420-69.000.
- Motooka, Mikio, 4,957,280, Cl. 270-47.000.
- Mitsubishi Kasei Corporation: See—  
Itagaki, Takaharu; Shiraga, Mitsuaki; Sawayama, Shigeru; and Satoh, Kohichi, 4,957,977, Cl. 525-328.400.
- Mitsubishi Kasei Vinyl Company: See—  
Obayashi, Atsushi; Takeda, Yuji; and Kinoshita, Kazuya, 4,957,818, Cl. 428-451.000.
- Mitsubishi Mining & Cement Co., Ltd.: See—  
Shimura, Kaizo; Takeuchi, Hiroyasu; Hirano, Masahiro; and Imai, Yohji, 4,957,437, Cl. 433-169.000.
- Mitsubishi Petrochemical Company Limited: See—  
Itoh, Kiichi; Shibano, Takeshi; Yada, Shuhei; and Tsunoi, Shinji, 4,957,984, Cl. 526-240.000.
- Mitsubishi Yuka Badische Co., Ltd.: See—  
Katoh, Naoyuki; Aoki, Masahiro; and Tsukamoto, Takeo, 4,957,677, Cl. 264-135.000.
- Mitsuhashi, Masaru: See—  
Okitsu, Nobuyuki; Mitsuhashi, Masaru; and Iwasa, Yoshio, 4,957,077, Cl. 123-90.310.
- Mitsuhashi, Yasuo: See—  
Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, 4,957,840, Cl. 430-106.600.

- Mitsui Petrochemical Industries, Ltd.: See—  
Agou, Tokinori; Sakashita, Takeshi; Shimoda, Tomoaki; Sudo, Masaru; Kuwabara, Masahiro; and Tanaka, Masahide, 4,957,985, Cl. 526-246.000.
- Tomoyasu, Takaharu; and Miyamoto, Kanji, 4,958,128, Cl. 324-559.000.
- Mitsui Toatsu Chemicals, Incorporated: See—  
Takahashi, Seishi, 4,957,864, Cl. 435-226.000.
- Urakami, Tatsuhiko; Tanabe, Yoshimitsu; Yamaguchi, Keizaburo; and Yamaguchi, Akihiro, 4,957,994, Cl. 528-90.000.
- Mitsuya, Yoshihide: See—  
Kageyama, Hidechi; Mitsuya, Yoshihide; and Nakazato, Youichi, 4,957,384, Cl. 401-65.000.
- Mitter, Gerhard: See—  
von Bogdandy, Ludwig; Mitter, Gerhard; Koller, Otto; Pochmar-ski, Luzian; Jaquemar, Christian; and Langhammer, Hans-Jur-gen, 4,957,547, Cl. 75-567.000.
- Miura, Koshio: See—  
Goto, Ryoichi; and Miura, Koshio, 4,958,174, Cl. 354-106.000.
- Miura, Kyo: See—  
Oguchi, Yoshihiro; Takasu, Yoshio; and Miura, Kyo, 4,957,854, Cl. 430-495.000.
- Miwa, Hiroaki: See—  
Sudo, Ryoichi; Kobata, Makoto; Miwa, Hiroaki; and Tajima, Tetsuo, 4,957,990, Cl. 526-282.000.
- Miyahara, Kazuhiro: See—  
Yasuda, Keiji; Kamijyo, Tetsuo; and Miyahara, Kazuhiro, 4,957,374, Cl. 374-142.000.
- Miyamoto, Hirohisa, to Minolta Camera Kabushiki Kaisha. Image forming apparatus with one reset switch for resetting one type of trouble and a second reset switch for resetting a second type of trouble. 4,958,188, Cl. 355-206.000.
- Miyamoto, Jiro; Nakasai, Takashi; and Komai, Yukio, to Toyo Tire & Rubber Co., Ltd. Reinforcing layers for bias tires. 4,957,799, Cl. 428-114.000.
- Miyamoto, Kanji: See—  
Tomoyasu, Takaharu; and Miyamoto, Kanji, 4,958,128, Cl. 324-559.000.
- Miyamoto, Masatoshi: See—  
Saegusa, Takeo; Miyamoto, Masatoshi; and Sano, Yoshiyuki, 4,958,005, Cl. 528-408.000.
- Miyamura, Masashi; and Kawano, Nobuyuki, to Toyox Co., Ltd. Hose clamping device. 4,956,898, Cl. 24-274.00R.
- Miyano, Tetsuji; Suzuki, Kunio; Ushijima, Ryosuke; and Nakagawa, Susumu, to Banyu Pharmaceutical Company, Ltd. Process for preparing 2-carbamoyloxyalkyl-1,4-dihydropyridine derivatives. 4,958,024, Cl. 546-249.000.
- Miyauchi, Teruhiko: See—  
Tokuhiko, Tomoya; Miyauchi, Teruhiko; Kikuchi, Koshin; and Momoi, Teruhiko, 4,957,190, Cl. 187-32.000.
- Miyazaki, Toshihiko: See—  
Tomida, Yoshinori; Matsuda, Hiroshi; Sakai, Kunihiro; Nishimura, Yukuo; Nakagiri, Takashi; and Miyazaki, Toshihiko, 4,957,851, Cl. 430-272.000.
- Mizoguchi, Masaaki; Inoue, Susumu; Otsuka, Tatsuo; and Isoyama, Eizo, to Showa Aluminum Corporation. Aluminum heat exchanger provided with fins having hydrophilic coating. 4,957,159, Cl. 165-133.000.
- Mizuhara, Howard, to GTE Products Corporation. Method of brazing parts of Ti-Al-Nb alloy. 4,957,236, Cl. 228-263.210.
- Mizuma, Takashi: See—  
Yamada, Kiyoshige; Mizuma, Takashi; and Kishino, Kohji, 4,956,943, Cl. 49-503.000.
- Mizuno, Shoji: See—  
Tan, Kenichi; and Mizuno, Shoji, 4,957,102, Cl. 128-68.000.
- Mizuno, Yukio; and Maruyama, Takashi, to Sumitomo Chemical Company, Limited. Thermoplastic resin composition. 4,957,967, Cl. 525-68.000.
- Mizuyama, Yaichiro: See—  
Yamazaki, Kazumasa; Mizuyama, Yaichiro; Horita, Takashi; and Suzuki, Shinichi, 4,957,594, Cl. 204-27.000.
- Mobacc B.V.: See—  
Tempelman, Antonie P., 4,957,239, Cl. 239-117.000.
- Mobil Oil Corporation: See—  
Harandi, Mohsen N., 4,957,709, Cl. 422-134.000.
- Owen, Hartley; and Schipper, Paul H., 4,957,617, Cl. 208-113.000.
- Shirodhar, Pradeep P., 4,957,969, Cl. 525-86.000.
- Shirodhar, Pradeep P., 4,957,972, Cl. 525-240.000.
- Mochizuki, Noriya: See—  
Komatsuzaki, Hiroshi; Kamata, Kazuo; Ohmiya, Akio; Nishimura, Syunji; Umeda, Yoshihito; Mochizuki, Noriya; and Furuya, Eiji, 4,958,179, Cl. 354-195.120.
- Mochizuki, Noriyasu; and Nakauchi, Hiroji, to Nakagawa Corrosion Protecting Co., Ltd. Evaluation method of corrosion of steel material embedded in concrete. 4,958,130, Cl. 324-700.000.
- Mochizuki, Shuji; Mino, Masayuki; Tanaka, Yutaka; and Tachikawa, Kyoji, to Minolta Camera Kabushiki Kaisha; and Nisca Corporation. Film handling for a laser recorder. 4,958,169, Cl. 346-108.000.
- Mody, Pankaj H.: See—  
McLaughlin, Paul F.; and Mody, Pankaj H., 4,958,270, Cl. 364-187.000.
- Mohacsi, Tivadar G.: See—  
Anderson, Pamela A.; Cipollo, Kent L.; and Mohacsi, Tivadar G., 4,957,938, Cl. 514-412.000.
- Molecular Biosystems, Inc.: See—  
Cerny, David; Mills, Gary J.; and Westkaemper, Peter J., 4,957,656, Cl. 252-311.000.
- Molex Incorporated: See—  
Stanevich, Kenneth W.; and Regnier, Kent E., 4,957,448, Cl. 439-326.000.
- Momoi, Teruhiko: See—  
Tokuhiko, Tomoya; Miyauchi, Teruhiko; Kikuchi, Koshin; and Momoi, Teruhiko, 4,957,190, Cl. 187-32.000.
- Monarch Marking Systems, Inc.: See—  
Hamisch, Paul H., Jr.; and Wisecup, David R., 4,957,379, Cl. 400-120.000.
- Monceret, Arthur. Adjustable plier. 4,957,020, Cl. 81-414.000.
- Monsanto Company: See—  
Adur, Ashok M.; and Constable, Robert C., 4,957,968, Cl. 525-74.000.
- Jacob, Gary S.; Tyms, A. Stanley; Rademacher, Thomas W.; and Dwek, Raymond A., 4,957,926, Cl. 514-315.000.
- Sanzo, Michael A.; Hardy, Medora M.; and Feder, Joseph, 4,957,863, Cl. 435-228.000.
- Montefiore Hospital Association of Western Pennsylvania: See—  
Liang, Marc D.; Narayanan, Krishna; and Ross, Eugene D., 4,957,500, Cl. 606-157.000.
- Mooney, Lillian A. Template. 4,957,124, Cl. 132-200.000.
- Moore, Neal E., to James River II, Inc. Method of making interfolded sheets of plastic film. 4,957,679, Cl. 264-152.000.
- Moore, Robin B., to Apple Computer, Inc. Computer with interface for fast and slow memory circuits. 4,958,304, Cl. 364-521.000.
- Morello, Peter S., to Morello, Peter S. Sales records. 4,957,312, Cl. 283-89.000.
- Morenings, Gerhard H., to Universal Health Products, Inc. Method of facial toning. 4,957,480, Cl. 604-20.000.
- Mori, Leo: See—  
Tominaga, Mamoru; Mori, Leo; and Akiyama, Junetsu, 4,957,370, Cl. 356-381.000.
- Morii, Akira: See—  
Saito, Yasuhisa; Watanabe, Katsuya; Okuno, Kohichi; Kamio, Kunimasa; and Morii, Akira, 4,957,995, Cl. 528-99.000.
- Morikawa, Hirohiko; Kako, Hiroyoshi; Noguchi, Noboru; and Nakanishi, Nobuyasu, to Toyota Jidosha Kabushiki Kaisha. Braking device having an automatic fluid pressure regulating function. 4,957,330, Cl. 303-115.000.
- Morikawa, Koji, to Fuji Jukogyo Kabushiki Kaisha. Fuel injection control system for a two-cycle engine. 4,957,089, Cl. 123-486.000.
- Morimoto, Keiji: See—  
Okonogi, Shigeo; Yuguchi, Hiroya; Tanai, Sumio; and Morimoto, Keiji, 4,957,764, Cl. 426-573.000.
- Morinaga Milk Industry Co., Ltd.: See—  
Okonogi, Shigeo; Yuguchi, Hiroya; Tanai, Sumio; and Morimoto, Keiji, 4,957,764, Cl. 426-573.000.
- Morinaga, Motoyasu: See—  
Kinoshita, Jun'ichi; Morinaga, Motoyasu; Furuyama, Hideto; and Hirayama, Yuzo, 4,958,202, Cl. 357-17.000.
- Morishita, Mitsuharu; Uota, Kosaku; and Yasukawa, Takeshi, to Mitsubishi Denki Kabushiki Kaisha. Electric power steering apparatus. 4,957,182, Cl. 180-79.100.
- Moriwaki, Masahiro: See—  
Kaneko, Noriaki; Hirata, Yoshimi; and Moriwaki, Masahiro, 4,957,508, Cl. 623-12.000.
- Moriya, Shigeru: See—  
Tsuboi, Toshio; Moriya, Shigeru; and Nakatani, Keiji, 4,958,221, Cl. 358-80.000.
- Moriya, Takahiko: See—  
Itoh, Hitoshi; and Moriya, Takahiko, 4,957,880, Cl. 437-192.000.
- Morris, Brian G., to United States of America, National Aeronautics and Space Administration. Tank gauging apparatus and method. 4,956,996, Cl. 73-149.000.
- Morris, Harold B., to M. A. Industries, Inc. Manufacture of plastic products. 4,957,671, Cl. 264-40.600.
- Morris, James A., to Safety Operating Systems, Inc. Back incline indicator. 4,958,145, Cl. 340-689.000.
- Morrison, Ward D.; and Michaud, Arthur A., to Cannon Industries, Inc. Pneumatic drill. 4,957,171, Cl. 173-104.000.
- Morrow, Ray E.: See—  
Jinoian, Vanik N.; Morrow, Ray E.; and Whitehill, Wayne W., 4,957,435, Cl. 433-34.000.
- Morsdorf, Peter; Schickaneder, Helmut; Herter, Rolf; Pfahler, Volker; Engler, Heidrun; and Ahrens, Kurt H., to Heumann Pharma GmbH & Co. Benzimidazoles, and pharmaceutical preparations containing these compounds. 4,957,920, Cl. 514-252.000.
- Morse, Mark J.; and Dominey, Andrew E., to Eastman Kodak Company. Method for making a light-tight cassette. 4,956,908, Cl. 29-438.000.
- Morton, Edward W.: See—  
Wilson, William E.; Morton, Edward W.; and O'Mullan, Daniel W., 4,958,102, Cl. 313-1.000.
- Morton Thiokol, Inc.: See—  
Smith, Bradley W., 4,956,971, Cl. 60-245.000.
- Moser, Hans: See—  
Bohner, Beat; Pissiotasa, Georg; and Moser, Hans, 4,957,535, Cl. 71-76.000.
- Moskalev, Eduard P.: See—  
Parkhomenko, Alexandr I.; Dzjuban, Vitaly S.; and Moskalev, Eduard P., 4,958,256, Cl. 361-331.000.
- Motooka, Mikio, to Mitsubishi Jukogyo Kabushiki Kaisha. Uniform speed pinless folding machine. 4,957,280, Cl. 270-47.000.



Motorola, Inc.: See—  
Hill, Susan C.; Jelemensky, Joseph; Heene, Mark R.; Groves, Stanley E.; and DeBrito, Daniel N., 4,958,277, Cl. 364-200.000.  
Main, William E., 4,958,122, Cl. 323-315.000.  
Wang, Karl L.; and Feng, Taisheng, 4,958,086, Cl. 307-296.800.  
Mouri, Toyohiko: See—  
Oshita, Saichiro; and Mouri, Toyohiko, 4,957,181, Cl. 180-79.100.  
Moynagh, Philip B.: See—  
Ojha, Sureshchandra M.; Rosser, Paul J.; and Moynagh, Philip B., 4,957,873, Cl. 437-20.000.  
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McAllister, Jerome W.; Kinzer, Kevin E.; Mrozinski, James S.; Johnson, Eric J.; and Dyrud, James F., 4,957,943, Cl. 521-64.000.  
MTS Systems Corporation: See—  
Tellerman, Jacob, 4,958,332, Cl. 367-140.000.  
Mudge, Paul R.: See—  
Pangrazi, Ronald; Walker, James L.; and Mudge, Paul R., 4,957,806, Cl. 428-224.000.  
Muehlbach, Klaus: See—  
Taubitz, Christof; Muehlbach, Klaus; Brandt, Hermann; and Boehlke, Klaus, 4,957,965, Cl. 525-66.000.  
Muijs, Cornelis G. M.: See—  
De Busscher, Cyriel R. J.; Muijs, Cornelis G. M.; and Verweider, Gery G. R., 4,956,967, Cl. 56-341.000.  
Muller, Beat: See—  
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Muller, Kurt: See—  
Dreyfuss, Wilfried; Remp, Thomas E.; and Muller, Kurt, 4,957,141, Cl. 138-89.000.  
Mullett, Paul W.; and Voth, Elmer D., to Excel Industries, Inc. 4-wheel coordinated steering multi-purpose tractor, 4,957,183, Cl. 180-234.000.  
Multiform Desiccants, Inc.: See—  
Cullen, John S.; and Matrak, Edgard, 4,957,521, Cl. 55-387.000.  
Multivac: See—  
Cipolla, Peter C., 4,957,571, Cl. 156-66.000.  
Munk, Werner G.; Klecker, Manfred; and Haas, Franz, to Suedmilch Aktiengesellschaft. Container for foods, 4,957,754, Cl. 426-138.000.  
Munro, Paul R.: See—  
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Muraki, Hideaki: See—  
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Murari, Bruno: See—  
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Murase, Satoshi: See—  
Nakagawa, Susumu; Murase, Satoshi; Ushijima, Ryosuke; and Kato, Yoshiaki, 4,958,029, Cl. 548-430.000.  
Murata, Hatsuho; and Ikeda, Hiroshi, to NEC Corporation. Method and apparatus for priority control of incoming calls at ISDN terminals, 4,958,153, Cl. 340-825.500.  
Murata, Koji: See—  
Honkura, Yoshinobu; Fujii, Hideki; and Murata, Koji, 4,957,699, Cl. 420-41.000.  
Murata, Kouji: See—  
Honkura, Yoshinobu; Matsuo, Toru; and Murata, Kouji, 4,957,700, Cl. 420-59.000.  
Murohashi, Kozo: See—  
Fukao, Masuzo; Sakai, Tadashi; and Murohashi, Kozo, 4,957,409, Cl. 414-788.400.  
Murphy, William J., to Westinghouse Electric Corp. Circuit breaker with rating plug having memory, 4,958,252, Cl. 361-93.000.  
Murray, Stuart W., to CMI Corporation. Air tight storage silo, 4,957,221, Cl. 222-129.000.  
Murfeldt, Robert, to Automedix Sciences, Inc. Lymph access catheters and methods of administration, 4,957,484, Cl. 604-53.000.  
Mutschler, Martha A.: See—  
Law, David M.; Davies, Peter J.; and Mutschler, Martha A., 4,957,757, Cl. 426-281.000.  
Myers, Christopher S.; and Wozniak, Thomas H., to General Motors Corporation; and Hughes Aircraft Company. Method and apparatus for plastic injection molding/encapsulation, 4,957,670, Cl. 264-40.100.  
Myers, Michael E.: See—  
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Nabisco Brands, Inc.: See—  
van Lengerich, Bernhard H., 4,957,041, Cl. 99-353.000.  
van Lengerich, Bernhard H., 4,957,042, Cl. 99-353.000.  
Nadin, Leonard, to Labinal S.A. Male electrical contact, 4,957,451, Cl. 439-395.000.  
Nagagata, Nobuyoshi; and Hiromura, Osamu, to Matsushita Electric Industrial Co., Ltd. Switching power supply, 4,958,268, Cl. 363-16.000.  
Nagai, Teizi; Tokushima, Yasuo; Kubota, Sadao; Suzuki, Kenichiro; Fujitani, Yoshiyasu; Yoshimoto, Taisuke; Muraki, Hideaki; and Tachi, Hideo, to Toyota Motor Corporation; Kabushiki Kaisha Toyota Chou Kenkyusho; and Trinity Industrial Corp. Catalytic combustion type exhaust gas processing device and drying furnace for use in coating utilizing the same, 4,957,710, Cl. 422-171.000.  
Nagamatsu, Hatsuho: See—  
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Nagame, Hiroshi: See—  
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Torii, Sigeru; Tanaka, Hideo; Taniguchi, Masatoshi; Sasaoka, Michio; Saito, Norio; Shiroy, Takashi; Nagao, Shigemitsu; Kikuchi, Ryo; and Kameyama, Yutaka, 4,958,018, Cl. 540-215.000.  
Nagasaki, Munetaka: See—  
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Nagasawa, Kenichi: See—  
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Nagashima, Naor; Ichikawa, Hiroyuki; and Katayama, Akihiro, to Canon Kabushiki Kaisha. Image processing method and apparatus therefor, 4,958,236, Cl. 358-445.000.  
Nagji, Moez M.: See—  
Grover, Bhadra S.; and Nagji, Moez M., 4,957,715, Cl. 423-228.000.  
Nagle, Richard C.: See—  
Davenport, John M.; Finch, William W.; Hansler, Richard L.; Nagle, Richard C.; and White, Ronald S., 4,958,263, Cl. 362-32.000.  
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Nakagome, Yoshinobu; Itoh, Kiyoo; Aoki, Masakazu; Ikenaga, Shin'ichi; Horiguchi, Masashi; and Tanaka, Hitoshi, to Hitachi, Ltd. Low noise semiconductor memory, 4,958,325, Cl. 365-206.000.  
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Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, 4,958,184, Cl. 354-474.000.  
Nakajima, Kazuto, to Matsushita Electric Industrial Co., Ltd. Method of forming a collar for heating exchanger fin and die for use therein, 4,956,989, Cl. 72-327.000.  
Nakajima, Norio: See—  
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Nakakura, Hirofumi; Shibata, Morio; Ishikawa, Haruo; Nakano, Akihisa; Hirota, Hiromi; and Oyabu, Hajime, to Matsushita Electric Industrial Co., Ltd. Apparatus for making bread, 4,957,040, Cl. 99-348.000.  
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Nakamura, Kazuhiro; Yoshioka, Tatsuya; Sawada, Ryoji; and Nakamura, Tomoji, to Sanshin Kogyo Kabushiki Kaisha. Vessel speed detecting device, 4,956,997, Cl. 73-182.000.  
Nakamura, Ko; and Ienaga, Kazuharu, to Nippon Zoki Pharmaceutical Co., Ltd. Glycocyamidine derivatives, 4,957,936, Cl. 514-389.000.  
Nakamura, Masao; Sakamoto, Norio; and Ito, Takashi, to Konica Corporation. Film winding apparatus, 4,957,247, Cl. 242-67.10R.  
Nakamura, Mitsuo: See—  
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Nakamura, Nobuo: See—  
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- Newmaster, Jeffrey T.: See—  
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- Ng, Steve Y. W.: See—  
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- NGK Insulators, Ltd.: See—  
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- Nicholson, Richard D.; and Fusco, Ronald S., to AMAX Inc. Composite sheet made of molybdenum and dispersion-strengthened copper, 4,957,823, Cl. 428-663.000.
- Nicolet Instrument Corporation: See—  
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- Niebauer, Kenneth L., to Kennametal Inc. Cutting insert with chip control, 4,957,396, Cl. 407-114.000.
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- Niimi, Mamoru: See—  
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- Nikkiso Co. Ltd.: See—  
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- Nikon Corporation: See—  
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- Nikor Corp.: See—  
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- Nippon Air Brake Company: See—  
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- Nippon Air Brake Co., Ltd.: See—  
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- Nippon Electric Glass Co., Ltd.: See—  
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- Nippon Hybrid Technologies Co., Ltd.: See—  
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- Nippon Kokan Kabushiki Kaisha: See—  
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- Nippon Paint Co., Ltd.: See—  
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- Nishiguchi, Yukihiko: See—  
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- Nishihara, Eitaro: See—  
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- Nishijima, Masaru: See—  
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- Nishikawa, Kazuyoshi: See—  
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- Nishimura, Takashi: See—  
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- Nishino, Hirohito: See—  
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- Nishio, Taichi; Abe, Hiroomi; Suzuki, Yasuro; Sanada, Takashi; Hosoda, Satoru; and Okada, Takayuki, to Sumitomo Chemical Company, Ltd. Thermoplastic resin composition, 4,957,966, Cl. 525-66.000.
- Nishioka, Yoshiki: See—  
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- Matsuda, Toshiro, 4,957,329, Cl. 303-97.000.
- Matsuo, Isaya; Urabe, Suehiro; and Fujisawa, Eiichi, 4,957,071, Cl. 123-52.00MV.
- Okitsu, Nobuyuki; Mitsuhashi, Masaru; and Iwasa, Yoshio, 4,957,077, Cl. 123-90.310.
- Ota, Tadaki, 4,957,087, Cl. 123-479.000.
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- Takemura, Tooji; and Okubo, Takashi, 4,957,473, Cl. 475-231.000.
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- Niwa, Masatake: See—  
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- NKK Corporation: See—  
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- Nodari, Nereo: See—  
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- Noguchi, Kenji; Toyama, Tsuyoshi; Kobayashi, Shinichi; Andoh, Nobuaki; and Kohda, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device with error check and correcting function, 4,958,352, Cl. 371-40.100.
- Noguchi, Masahiro: See—  
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- Noguchi, Noboru: See—  
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- Nohl, Andre; and White, Landy B., to Spectra-Physics, Inc. Pushloop liquid sampling method, 4,957,009, Cl. 73-864.840.
- Nojima, Kazuo; and Hirano, Yasuo, to Ricoh Company, Ltd. Member for developing electrostatic latent images, 4,958,193, Cl. 355-259.000.
- Nokia-Mobira Oy: See—  
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- Nomura, Ichiro: See—  
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- Nomura, Yutaka: See—  
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- Noonan, Denis E., to Grumman Aerospace Corporation. Variable depth cold working tool, 4,956,991, Cl. 72-370.000.
- Nordson Corporation: See—  
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- Johnson, Stephen N., 4,956,963, Cl. 53-442.000.
- Norris, Alan H. Use of bacteriophages to inhibit dental caries, 4,957,686, Cl. 424-50.000.
- Norsolor S.A.: See—  
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- North America Philips Corporation: See—  
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- North American Philips Corp.: See—  
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- Wilson, William E.; Morton, Edward W.; and O'Mullan, Daniel W., 4,958,102, Cl. 313-1.000.
- North Carolina State University: See—  
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- Nose, Isamu: See—  
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- Nosho, Shinji: See—  
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- NPB Group, Inc.: See—  
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- NRC Corporation: See—  
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- NRC, Inc.: See—  
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- NTC Technology Inc.: See—  
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- Nuovopignone - Industrie Meccaniche e Fonderia S.p.A.: See—  
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- Nussenzeig, Ruth S.: See—  
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- Nussenzeig, Victor N.: See—  
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- O'Brien, John T., to Southwest Research Institute. Shielding for seismic cables, 4,958,333, Cl. 367-154.000.
- Occidental Chemical Corporation: See—  
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- Ochiai, Keichi: See—  
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- Ochiai, Kiyofumi; Matsui, Masataka; and Ozawa, Osamu, to Kabushiki Kaisha Toshiba. Static random access memory, 4,958,316, Cl. 365-63.000.
- O'Connor, Thomas M.: See—  
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- Oda, Hiroyuki: See—  
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- Oelsner, Wolfgang, to Werner & Pfleiderer GmbH. Method and apparatus for preparing caseinates, 4,957,675, Cl. 264-118.000.
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- Ofria, Lawrence E.; and Lyndhurst, Francis R., to Thunder Power, Inc. Engine air-fuel intake pipe manifold, 4,957,070, Cl. 123-52.00MB.
- Ogawa, Kensuke; Katsuyama, Toshio; and Fukuzawa, Tadashi, to Hitachi, Ltd. Optical quantum interference device and method of modulating light using same, 4,957,337, Cl. 350-96.130.
- Ogawa, Masaharu, to Mitsubishi Denki Kabushiki Kaisha. Feedback controller, 4,958,114, Cl. 318-616.000.
- Ogawa, Takashi: See—  
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- Ogino, Masanobu: See—  
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- Oguchi, Yoshihiro; Takasu, Yoshio; and Miura, Kyo, to Canon Kabushiki Kaisha. Optical recording medium, 4,957,854, Cl. 430-495.000.
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- Ohkawa, Hideki, to Kabushiki Kaisha Toshiba. Information storage medium and method of manufacturing the same, 4,957,824, Cl. 428-694.000.
- Ohkawa, Tsuyoshi; and Kaji, Reichi, to Yamaha Katsudoki Kabushiki Kaisha. V-type multi-cylinder engine, 4,957,078, Cl. 123-90.310.
- Ohkura, Akira, to Toyota Jidosha Kabushiki Kaisha. Device for controlling a fork of a forklift, 4,957,408, Cl. 414-635.000.
- Ohmae, Tadayuki; Sakurai, Tadashi; Yamaguchi, Noboru; Okada, Mitsuyuki; and Asao, Kouichiro, to Sumitomo Chemical Company, Limited. Electrically conductive plastic moldings and process for producing the same, 4,957,660, Cl. 252-500.000.
- Ohmatsu, Toshikazu. Expansion joint device for use in interior designs, 4,956,955, Cl. 52-396.000.
- Ohmiya, Akio: See—  
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- Ohsawa, Hidefumi: See—  
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- Ohta, Norio: See—  
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- Ohta, Takao: See—  
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- Ohzu, Hayao: See—  
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- Oizumi, Kouji; and Matsushita, Takashi, to Canon Kabushiki Kaisha. Finder device, 4,957,356, Cl. 350-574.000.
- Ojha, Sureshchandra M.; Rosser, Paul J.; and Moynagh, Philip B., to STC PLC. Process for forming isolation trenches in silicon semiconductor bodies, 4,957,873, Cl. 437-20.000.



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Okamoto, Yuji, to Brother Kogyo Kabushiki Kaisha. Printing apparatus having means for clearing unwanted print data stored in an input buffer and abolishing ensuing residual print data. 4,958,298, Cl. 364-519.000.  
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Okitsu, Nobuyuki; Mitsuhashi, Masaru; and Iwasa, Yoshio, to Nissan Motor Co., Ltd. Camshaft driving arrangement for double overhead camshaft engine. 4,957,077, Cl. 123-90.310.  
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Page, Loretta A. G., to DXImaging. Liquid electrostatic developer containing multiblock polymers. 4,957,844, Cl. 430-115.000.  
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- Quan, Clifton: See—  
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- Sakai, Kiyoharu; and Hori, Masaaki, to Brother Kogyo Kabushiki Kaisha. Paper feeding and cutting control device in a recording apparatus. 4,957,381, Cl. 400-621.000.
- Sakai, Kunihiko: See—  
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- Sakai, Tadashi: See—  
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- Sakairi, Shigeru: See—  
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- Sakamaki, Yoshiyuki: See—  
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- Sakamoto, Nagahiro, to Hoya Corporation. Inspecting apparatus capable of accurately inspecting an object. 4,958,083, Cl. 250-572.000.
- Sakamoto, Norio: See—  
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- Sakamoto, Sadao: See—  
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- Sakamoto, Yoshinori: See—  
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- Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, to Canon Kabushiki Kaisha. Developer and image forming device. 4,957,840, Cl. 430-106.600.
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- Sakuma, Yoichi; and Umezawa, Chieko, to Asahi Glass Company Ltd. Light energy transmitting optical fiber cable. 4,957,345, Cl. 350-96.230.
- Sakurai, Tadashi: See—  
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Diard, Jean-Luc; Grandjacques, Philippe; and Recher, Gilles, 4,957,304, Cl. 280-609.000.
- Salvin, Roger P.: See—  
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- Samarut, Jacques; Verdier, Gerard; Benchaibi, Miloud; Savatier, Pierre; Poncet, Didier; Flamant, Frederic; Xiao, Jiao-Hao; Thoraval, Pier-rick; Chambonnet, Frederique; and Nigon, Victor, to Institut National de la Recherche Agronomique (INRA). Cloning or expression vectors containing the avian erythroblastosis virus genome and cells transfected by these vectors. 4,957,865, Cl. 435-235.000.
- Sampson, Scott D.: See—  
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- Samsung Aerospace Industries, Ltd.: See—  
Ku, Bon J.; and Jung, Hyun W., 4,958,176, Cl. 354-173.110.
- Samsung Electronics Co., Ltd.: See—  
Shim, Jae E., 4,958,055, Cl. 219-10.55B.
- Samuelson, Bruce E., to Minnesota Mining and Manufacturing Company. Tape dispenser. 4,957,233, Cl. 225-26.000.
- Sanada, Takashi: See—  
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- Sandberg, John A.: See—  
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- Sanden Corporation: See—  
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- Sander, Willy M.: See—  
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- Sandre, Giovanni: See—  
Neri, Carlo; Nodari, Nereo; Bersanetti, Erik; and Sandre, Giovanni, 4,957,956, Cl. 524-120.000.
- Sankei Pharmaceutical Co., Ltd.: See—  
Shimizu, Shigeo; and Takano, Hiroyuki, 4,958,019, Cl. 540-226.000.
- Sanko Senzai Kogyo Kabushiki Kaisha: See—  
Komura, Syoichi; and Toyofuku, Hiroyuki, 4,957,278, Cl. 267-166.000.
- Sano, Kunio: See—  
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- Sano, Yoshiyuki: See—  
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- Sanofi: See—  
Creuly, Catherine; Gros, Jean-Bernard; and Larroche, Christian, 4,957,862, Cl. 435-148.000.
- Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; and Vallat, Jean-Noel, 4,957,925, Cl. 514-299.000.
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Harada, Norimichi; and Onoue, Akihiro, 4,957,460, Cl. 440-83.000.
- Sanshin Kogyo Kabushiki Kaisha: See—  
Kohno, Yoshihiro; and Iida, Kazumi, 4,957,664, Cl. 261-34.200.
- Nakamura, Kazuhiro; Yoshioka, Tatsuya; Sawada, Ryoji; and Nakamura, Tomoji, 4,956,997, Cl. 73-182.000.
- Nakayama, Manabu, 4,957,461, Cl. 440-89.000.
- Santa Barbara Research Center: See—  
Pellicori, Samuel F.; and Mika, Aram M., 4,957,371, Cl. 356-419.000.
- Santucci, Robert J.: See—  
Koskol, Joseph E.; Santucci, Robert J.; and Rosanio, Louis G., Jr., 4,956,901, Cl. 28-255.000.
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- Sari, Hikmet, to U.S. Philips Corporation. Circuit for recovering the carrier in digital transmission systems. 4,958,360, Cl. 375-97.000.
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- Sarkisian, Norik S.: See—  
Denisov, Vladimir F.; Gertseva, Marina I.; Ziberov, Valentin E.; Karapetian, Vadim K.; Sarkisian, Norik S.; Karbachinsky, Vladimir M.; Kharlamov, Oleg I.; Tsoi, Alexei D.; Tsypin, Mark I.; Romanov, Alexei A.; Veranian, Vagan D.; Khripin, Vasily D.; and Shafran, Larisa E., 4,957,512, Cl. 55-8.000.
- Sarkozi, Jeff. Self adjustable neck support pillow. 4,956,886, Cl. 5-437.000.
- Sarraf, Sanwal P., to Eastman Kodak Company. Rotary device. 4,958,098, Cl. 310-156.000.
- Sasajima, Koji; and Yamaguchi, Kouji, to Honda Giken Kogyo Kabushiki Kaisha. Method of controlling speed reduction ratio for a continuously variable speed transmission. 4,956,972, Cl. 60-327.000.
- Sasaki, Hiroshi: See—  
Sawa, Takao; Okamura, Masami; Yamada, Taiju; Kusaka, Takao; and Sasaki, Hiroshi, 4,958,134, Cl. 333-12.000.
- Sasaki, Masaomi: See—  
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- Sasaoka, Michio: See—  
Torii, Sigeru; Tanaka, Hideo; Taniguchi, Masatoshi; Sasaoka, Michio; Saito, Norio; Shiroy, Takashi; Nagao, Shigemitsu; Kikuchi, Ryo; and Kameyama, Yutaka, 4,958,018, Cl. 540-215.000.
- Sasaoka, Senzo: See—  
Inoue, Nobuaki; and Sasaoka, Senzo, 4,957,849, Cl. 430-264.000.
- Sashida, Minoru, to Canon Kabushiki Kaisha. Image recording apparatus. 4,958,186, Cl. 355-41.000.
- Sasib, S.P.A.: See—  
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- Sato, Haruo, to Nikor Corp. Retrofocus type lens system. 4,957,355, Cl. 350-432.000.
- Sato, Hidetaka: See—  
Kikuchi, Tohru; Fujita, Toshiyuki; Saito, Takayuki; Kojima, Mitsumasa; Sato, Hidetaka; and Suzuki, Hiroshi, 4,958,001, Cl. 528-346.000.
- Sato, Tadashi: See—  
Sugiura, Susumu; Sato, Tadashi; and Nakajima, Nono, 4,958,232, Cl. 358-300.000.
- Sato, Tomoru: See—  
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- Sato, Tsuguo; and Komura, Kenichi, to Furukawa Electric Co., Ltd., The. Method for splicing optical fibers having a plastic clad layer and an optical fiber suited for carrying out the method. 4,957,343, Cl. 350-96.210.
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Yushina, Yoshinori; Hasegawa, Jun; and Satoh, Hiromi, 4,957,868, Cl. 435-288.000.
- Satoh, Kohichi: See—  
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- Satterfield, Nathaniel J.; Ellis, J. Gregg; and Hesch, Leonard T., Jr., to Harris Corporation. Flatpack preparation machine. 4,957,146, Cl. 140-105.000.
- Sauer, Joe D.: See—  
Fong, Pak Y.; Smith, Kim R.; and Sauer, Joe D., 4,957,893, Cl. 502-174.000.
- Saunders, Sam C.: See—  
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- Sauter, Hubert: See—  
Schuetz, Franz; Sauter, Hubert; Brand, Siegfert; Wenderoth, Bernd; Baus, Ulf; Reuther, Wolfgang; Lorenz, Gisela; and Ammermann, Eberhard, 4,957,937, Cl. 514-407.000.
- Savatier, Pierre: See—  
Samarut, Jacques; Verdier, Gerard; Benchaibi, Miloud; Savatier, Pierre; Poncet, Didier; Flamant, Frederic; Xiao, Jiao-Hao; Thoraval, Pier-rick; Chambonnet, Frederique; and Nigon, Victor, 4,957,865, Cl. 435-235.000.
- Savio S.p.A.: See—  
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- Savoie Refractaires: See—  
Barthelemy, Philippe; and Naturel, Christian, 4,957,542, Cl. 75-10.390.
- Sawa, Kenji; Kuromida, Susumu; and Bota, Keiji, to Mazda Motor Corporation. Torque converter slip control device. 4,957,194, Cl. 192-0.096.
- Sawa, Takao; Okamura, Masami; Yamada, Taiju; Kusaka, Takao; and Sasaki, Hiroshi, to Kabushiki Kaisha Toshiba. Noise suppression device comprising a toroid winding. 4,958,134, Cl. 333-12.000.
- Sawada, Ryoji: See—  
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- Sawayama, Shigeru: See—  
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- Sawyer, John A.: See—  
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- Saxod, Michel; Devouassoux, Serge; Marchiset, Michel; and Jaumot, Jean-Pierre, to Procal. Process of molding seal rings. 4,957,680, Cl. 264-161.000.
- Sayers, Carol L. Vehicle theft deterrent. 4,958,142, Cl. 340-426.000.
- Scarborough, Douglas B.: See—  
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- Scarpa, Eric W.: See—  
Jones, Wickliffe, deceased; Scarpa, Eric W.; Greenwell, Joseph D.; Nease, Mark R.; Kalany, Robert M.; and Myers, Michael E., 4,956,964, Cl. 53-570.000.
- Schadow, Klaus C.; Gutmark, Ephraim; Wilson, Kenneth J.; and Smith, Robert A., to United States of America, Navy. Fluid mixing device having a conical inlet and a noncircular outlet. 4,957,242, Cl. 239-590.000.
- Schaper, Ulrich: See—  
von Basse, Paul-Werner; Dortu, Jean-Marc; Herlitzeck, Andrea; Kohler, Dieter; and Schaper, Ulrich, 4,958,319, Cl. 365-154.000.
- Scharf, Daniel: See—  
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- Scheepers, Johannes A. M.: See—  
Hendrix, Machiel A. M.; Scheepers, Johannes A. M.; and Reijnders, Nicolaas H. G., 4,958,106, Cl. 315-208.000.
- Scheibler, Erich: See—  
Wiegand, Karl W.; Thiemann, Michael; and Scheibler, Erich, 4,957,720, Cl. 423-392.000.
- Scheidt, Wilbur D.; Whitney, Eric J.; and Pratt, Vanon D., to General Electric Company. Transverse flow laser spray nozzle. 4,958,058, Cl. 219-121.600.
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Brand, Hans-Wolfgang; Hennings, Detlef F. K.; Klee, Mareike K.; and Scheinmacher, Herbert J., 4,957,888, Cl. 501-134.000.
- Schering Aktiengesellschaft: See—  
Graefe, Jurgen; Uziel, Wolfram; and Weinberg, Udo, 4,958,041, Cl. 556-480.000.
- Gries, Heinz; Rosenberg, Douwe; and Weinmann, Hanns-Joachim, 4,957,939, Cl. 514-492.000.
- Schering Aktiengesellschaft: See—  
Schoellkopf, Klaus; Albrecht, Rudolf; Lehmann, Manfred; and Schroeder, Gertrud, 4,958,026, Cl. 548-259.000.
- Schering-Plough Corp.: See—  
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- Scheyhing, Ulrich: See—  
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- Schickaneder, Helmut: See—  
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- Schiffauer, Reinhard; and Buchmuller, Walter, to Union Carbide Chemicals and Plastics Company Inc. Urethane catalysts. 4,957,944, Cl. 521-115.000.
- Schilling, Peter, to Westvaco Corporation. Cationic aqueous bituminous emulsion-aggregate slurries. 4,957,560, Cl. 106-277.000.
- Schipper, Paul H.: See—  
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- Schirmeisen, Joseph: See—  
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- Schleifstein, Robert A.; and Pietrewicz, David S., to Ethyl Corporation. Polymer compositions containing aromatic sulfonamide. 4,957,957, Cl. 524-169.000.
- Schleifstein, Robert A., to Ethyl Corporation. Aromatic bis sulfonamide-containing nylon or polyester. 4,957,958, Cl. 524-169.000.
- Schlemmer, Lothar: See—  
Klimesch, Roger; Bleckmann, Gerhard; and Schlemmer, Lothar, 4,957,681, Cl. 264-211.230.
- Schlumberger Technology Corporation: See—  
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- Melcher, Charles L., 4,958,080, Cl. 250-483.100.
- Schmedding, Diederik J. M.: See—  
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- Schmid, Karl-Heinz: See—  
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- Schmidt, Bodo: See—  
Weiler, Rolf; Panek, Claus-Peter; and Schmidt, Bodo, 4,957,192, Cl. 188-71.900.
- Schmidt, Joachim, to Mecron medizinische Produkte GmbH. Slotted slide plate assembly for osteosynthesis. 4,957,496, Cl. 606-70.000.
- Schmidt, Utz H., to TRW Vehicle Safety Systems Inc. Seat belt retractor with comfort mechanism. 4,957,248, Cl. 242-107.700.
- Schmiegel, Walter W.: See—  
Carlson, Dana P.; and Schmiegel, Walter W., 4,957,975, Cl. 525-340.000.
- Schneider, Manfred; Driesner, Bernd; and Luetzkendorf, Joerg, to Friedrich Deckel Aktiengesellschaft. Two-section tool spindle having a channel for carrying pressurized fluid. 4,957,398, Cl. 409-136.000.
- Schoellkopf, Klaus; Albrecht, Rudolf; Lehmann, Manfred; and Schroeder, Gertrud, to Schering Aktiengesellschaft. Novel dopamine deriva-
- tives, processes for their preparation, and their use as medicinal agents. 4,958,026, Cl. 548-259.000.
- Schoendorfer, Donald W.; and Miller, William R., to Sudor Partners. Method and apparatus for determination of chemical species in body fluid. 4,957,108, Cl. 128-632.000.
- Schoenherr, Christine J.: See—  
Burns, Stephanie A.; Liles, Donald T.; and Schoenherr, Christine J., 4,957,963, Cl. 524-837.000.
- Schoenwalder, Danny W.: See—  
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- Schram, Daniel C.: See—  
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- Schreiber Foods, Inc.: See—  
Olander, John W.; and George, Coralie, 4,957,756, Cl. 426-243.000.
- Schreiber, Herbert: See—  
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- Schriewer, Michael: See—  
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- Schroeder, Gertrud: See—  
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- Schroeder, Harry, to Siemens Aktiengesellschaft. Electromagnetic relay. 4,958,137, Cl. 335-128.000.
- Schroeder, James E.; and Anderson, Harlan U., to California Institute of Technology. Multilayer ceramic oxide solid electrolyte for fuel cells and electrolysis cells and method for fabrication thereof. 4,957,673, Cl. 264-60.000.
- Schroeder, Klaus G. Ultra-broadband impedance matched electrically small complementary signal radiating structures using thin wire elements and an impedance optimizing feed circuit. 4,958,167, Cl. 343-853.000.
- Schuette, Michael, to Life Technologies Inc. Adjustable-height vertical gel slab electrophoresis apparatus. 4,957,613, Cl. 204-299.00R.
- Schuetz, Franz; Sauter, Hubert; Brand, Siegfert; Wenderoth, Bernd; Baus, Ulf; Reuther, Wolfgang; Lorenz, Gisela; and Ammermann, Eberhard, to BASF Aktiengesellschaft. Substituted N-hydroxy-pyrazoles and fungicides which contain these compounds. 4,957,937, Cl. 514-407.000.
- Schui, Franz: See—  
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- Schulthess, Adrian: See—  
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- Schultz, Roger L., to Halliburton Co. Retractable fluid control valve with damping. 4,957,167, Cl. 166-319.000.
- Schulz, Christopher R. Apparatus for gravity separation of particles from liquid. 4,957,628, Cl. 210-519.000.
- Schutysse, Jan Andre J.; and Boonstra, Tjerk O., to Akzo N.V. Interpenetrating polymer network of an aliphatic poly(allyl carbonate) and epoxy resin. 4,957,981, Cl. 525-529.000.
- Schuurmans, Hubertus J. A.; Werner, Jan; Schram, Daniel C.; and Kroesen, Gerardus M. W., to Shell Oil Company. Apparatus for plasma surface treating and preparation of membrane layers. 4,957,062, Cl. 118-723.000.
- Schwartz, Bernard A.; Tew, Tommy L.; and Janda, Marvin E., to Conoco Inc. Multiple film width transport adaptor. 4,958,170, Cl. 346-136.000.
- Schwartz, Franklin B. Educational card game system. 4,957,443, Cl. 434-188.000.
- Schwendner, Susan P.: See—  
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- Schwind, James J., to Lubrizol Corporation. The Mixtures of partial fatty acid esters of polyhydric alcohols and sulfurized compositions, and use as lubricant additives. 4,957,651, Cl. 252-56.00R.
- SCI Systems, Inc.: See—  
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- Sclavo S.p.A.: See—  
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- Scofield, Christopher L.: See—  
Reilly, Douglas L.; Scofield, Christopher L.; Cooper, Leon N.; and Elbaum, Charles, 4,958,375, Cl. 382-14.000.
- Scoggins, Lacey E.: See—  
Hoover, Kenneth C.; Scoggins, Lacey E.; Shang, Wei-Tech W.; and Nesheiwat, Afif M., 4,958,004, Cl. 528-388.000.
- Scott-Jackson, Dennis; and Skibbe, Harry, to Advanced Gravis Computer Technology, Ltd. A joystick including an optical encoder with film strips in sliding contact. 4,958,071, Cl. 250-229.000.
- Scott, Kurt P.: See—  
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- Scott, Paul H., to Advanced Micro Devices, Inc. System for transmitting and receiving asynchronous nonhomogeneous variable width parallel data over a synchronous high speed serial transmission media. 4,958,344, Cl. 370-112.000.
- Souccato, Serge L.; and Stevenson, Andrew C., to General Electric Canada Inc. Fault current limiter for DC motor drive system. 4,958,380, Cl. 388-806.000.
- Sealed Air Corporation: See—  
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- Sears, Lawrence M. Remote shut-off valve. 4,957,273, Cl. 251-129.040.  
Sebor, Charles S.: See—  
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Secured Transactions: See—  
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See, Benito; and Steiner, Ulrich A., to Amoco Corporation. Process for preparing polyarylates. 4,958,000, Cl. 528-271.000.  
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Pimm, Alfred E., 4,957,669, Cl. 264-23.000.

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Silverman, Jack. Permutation group games. 4,957,298, Cl. 273-240.000.

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Sitter, Erhard: See—  
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Firth, Rowland V. D., III; Hunter, Quay C., Jr.; Kohlin, Ronald A.; and Sitton, William W., 4,958,195, Cl. 355-290.000.

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Small, Thomas L.: See—  
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- Smith, Sarah J.: See—  
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- Smith, Tennyson, to Photoacoustic Technology, Inc. Apparatus and process for performing ellipsometric measurements of surfaces. 4,957,368, Cl. 356-369.000.
- Smith, Ward C., to Becton Dickinson and Company. Method for separating the cellular components of blood samples. 4,957,638, Cl. 210-782.000.
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- Snelgrove, R. Vernon: See—  
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- Snyder, Richard H., to Brunswick Corporation. Propeller shroud with load bearing structure. 4,957,459, Cl. 440-72.000.
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- S.A. des Etablissements Staubli (France): See—  
Houlon, Louis, 4,957,142, Cl. 139-88.000.
- Societe Atochem: See—  
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- Glemet, Michel; and Cognet, Gilles, 4,957,422, Cl. 425-114.000.
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- Societe Nationale d'Etude et de Construction de Moteurs d'Aviation S.N.E.C.M.A.: See—  
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- Solomon, Dennis, to Altman Stage Lighting Co., Inc. Symmetrical color changer system. 4,958,265, Cl. 362-293.000.
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- Inazawa, Yoshizumi; Milthorp, Brian; and Thompson, Bruce, 4,958,244, Cl. 360-72.100.
- Toyoshima, Masakatsu, 4,958,381, Cl. 455-4.000.
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- Ojha, Sureshchandra M.; Rosser, Paul J.; and Moynagh, Philip B., 4,957,873, Cl. 437-20.000.
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- Stein, Brandy L.: See—  
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- Stubblefield, Steven A., to Texaco Inc. Marine walkaway vertical seismic profiling. 4,958,328, Cl. 367-15.000.
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- Sugiura, Teruki: See—  
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- Takarabe, Yuji: See—  
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- Tedrow, Prabha K.: See—  
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- Thorn EMI Electronics Limited: See—  
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- Tomagou, Satoshi; Kato, Toshikazu; Inoue, Hiroshi; and Ogawara, Kensuke, 4,958,003, Cl. 528-364.000.
- Toukhy, Medhat A.: See—  
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- Touton, Charles P., III, to Kawneer Company, Inc. Bottom offset door pivot and spline threshold. 4,956,940, Cl. 49-388.000.
- Townsend Engineering Company: See—  
Townsend, Ray T., 4,956,893, Cl. 17-34.000.
- Townsend, Ray T., to Townsend Engineering Company. Apparatus for encasing a product. 4,956,893, Cl. 17-34.000.
- Townsend, Marvin S.: See—  
Martin, Neil F.; and Robinson, Howard N., 4,957,918, Cl. 514-235.800.
- Toyama, Tsuyoshi: See—  
Noguchi, Kenji; Toyama, Tsuyoshi; Kobayashi, Shinichi; Andoh, Nobuaki; and Kohda, Kenji, 4,958,352, Cl. 371-40.100.
- Toyoko Boreki Kabushiki Kaisha: See—  
Kobayashi, Shigeo; Hiramatsu, Toshio; Yamamoto, Katsumasa; and Ichikawa, Nobuhiko, 4,957,980, Cl. 525-425.000.
- Toyoko Suisan Kikai Co., Ltd.: See—  
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- Toyoko Tire & Rubber Co., Ltd.: See—  
Miyamoto, Jiro; Nakasai, Takashi; and Komai, Yukio, 4,957,799, Cl. 428-114.000.
- Shizuo, Yokohori; Kenzo, Miyamoto; Koji, Fukushima; Masami, Tsujimoto; Kenji, Onda; and Kan, Sato, 4,957,792, Cl. 428-36.000.

- Toyota Gosei Co., Ltd.: See—  
Fujihara, Kazuo; and Komori, Takahiro, 4,957,036, Cl. 98-2.000.
- Toyoda Koki Kabushiki Kaisha: See—  
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- Toyofuku, Hiroyuki: See—  
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- Toyofuku, Toshiyuki: See—  
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- Toyoshima, Masakatsu, to Sony Corporation. Two way communication system. 4,958,381, Cl. 455-4.000.
- Toyota Jidosha Kabushiki Kaisha: See—  
Ito, Toshio; and Tanahashi, Toshio, 4,957,081, Cl. 123-302.000.
- Kaneko, Kuniya; Wakiyama, Harumichi; Naito, Tadashi; and Ando, Toshihiro, 4,958,292, Cl. 364-468.000.
- Komazawa, Osamu; Isogai, Shigetaka; Buma, Shuichi; Onuma, Toshio; Yonekawa, Takashi; and Hattori, Katsuhiko, 4,957,309, Cl. 280-707.000.
- Morikawa, Hirohiko; Kako, Hiroyoshi; Noguchi, Noboru; and Nakanishi, Nobuyasu, 4,957,330, Cl. 303-115.000.
- Ohkura, Akira, 4,957,408, Cl. 414-635.000.
- Takahashi, Takeshi; and Yamamoto, Takashi, 4,958,101, Cl. 310-328.000.
- Toyota Jidosha Kabushiki Kaisha Cataler Industrial Co. Ltd.: See—  
Matsumoto, Shinichi; Tanaka, Toru; Ishikawa, Yutaka; Matsuura, Shinji; Shinjoh, Hirofumi; and Ozawa, Masakuni, 4,957,896, Cl. 502-304.000.
- Toyota Motor Corporation: See—  
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- Toyo Co., Ltd.: See—  
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- Tracker Marine Corporation: See—  
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- Tractontec Corporation: See—  
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- Traher, Christian: See—  
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- Transitions Research Corporation: See—  
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- Traster, Elden D.: See—  
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- Trauth, Hubert: See—  
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- Trcka, Milan V., to Datapac Incorporated. Reflective tachometer/headwheel assembly for a rotary head scanner. 4,958,248, Cl. 360-107.000.
- Tregub, Yakov K.: See—  
Boguslavsky, Alexandr M.; Semenikhin, Viktor F.; Chergikalo, Vladimir I.; Rozenman, Lev I.; Tregub, Yakov K.; Risman, Arkady I.; Topopolsky, Yankel M.; Khatanzeisky, Egor V.; and Rubin, Eduard A., 4,957,058, Cl. 118-323.000.
- Trenczek, Gerhard: See—  
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- Trevisan, Gianfranco: See—  
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- Treybig, Duane S.; and Martinez, Robert G., to Dow Chemical Company, The. Corrosion prevention with compositions prepared from organic fatty amines and nitrogen-containing aromatic heterocyclic compounds. 4,957,640, Cl. 252-8.555.
- Trimble Design Inc.: See—  
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- Trimble, James, to Trimble Design Inc. Saddle mounted bicycle water bottle carrier. 4,957,227, Cl. 224-39.000.
- Trinity Industrial Corp.: See—  
Nagai, Teizi; Tokushima, Yasuo; Kubota, Sadao; Suzuki, Kenichirou; Fujitani, Yoshiyasu; Yoshimoto, Taisuke; Muraki, Hideaki; and Tachi, Hideo, 4,957,710, Cl. 422-171.000.
- Tripp, Dale: See—  
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- Tripp, Susan J.: See—  
Abramovici, Gabriela M.; Buhrke, Rolfe E.; Chandramouli, Bopshi; Dianda, Robert B.; Katzenstein, Leo R.; O'Connor, Thomas M.; Rinker, Timothy G.; and Tripp, Susan J., 4,958,343, Cl. 370-85.100.
- Tripp, Terrance B.; and Hildreth, Richard W., to NRC, Inc. Capacitor grade tantalum powder. 4,957,541, Cl. 75-245.000.
- Tripp, Jerry C.: See—  
Wilson, Donald L.; and Tripp, Jerry C., 4,957,636, Cl. 210-242.300.
- Trnka, Zdenek. Cooling system for continuous casting machines. 4,957,155, Cl. 164-482.000.
- Troncoso, Vincent F. Vehicle license plate cover. 4,956,930, Cl. 40-209.000.

- Trott, Arthur F.: See—  
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- TRW Vehicle Safety Systems Inc.: See—  
Schmidt, Utz H., 4,957,248, Cl. 242-107.700.
- Tseglakoff, Christos: See—  
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- Tsoi, Alexei D.: See—  
Denisov, Vladimir F.; Gertseva, Marina I.; Ziberov, Valentin E.; Karapetian, Vadim K.; Sarkisian, Norik S.; Karbachinsky, Vladimir M.; Kharlamov, Oleg I.; Tsoi, Alexei D.; Taysin, Mark I.; Romanov, Alexei A.; Veranian, Vagan D.; Khripin, Vasily D.; and Shafran, Larisa E., 4,957,512, Cl. 55-8.000.
- Tsuboi, Noboru, to Kabushiki Kaisha Kobe Seiko Sho. Vertical oilless screw vacuum pump. 4,957,417, Cl. 417-423.130.
- Tsuboi, Toshio; Moriya, Shigeru; and Nakatani, Keiji, to Minolta Camera Kabushiki Kaisha. Digital color copying machine comprising a test mode for making a color adjustment. 4,958,221, Cl. 358-80.000.
- Tsuboko, Kazuo: See—  
Fukase, Toshiyuki; Sugiyama, Yoshihiro; Takanashi, Hazime; Tsuboko, Kazuo; and Kuramoto, Shinichi, 4,957,842, Cl. 430-114.000.
- Tsuchida, Shinji, to Canon Kabushiki Kaisha. Key telephone system accommodating both digital and analog telephone networks. 4,958,369, Cl. 379-156.000.
- Tsuchiya, Hiroaki; and Nakahata, Kimio, to Canon Kabushiki Kaisha. Image forming apparatus for scanning both sides of an original and producing a duplex copy. 4,958,187, Cl. 355-202.000.
- Tsuchiya, Yoshitane: See—  
Ando, Manabu; Nakamura, Nobuo; Tsuchiya, Yoshitane; Fuse, Hirotsuka; Watanabe, Kazuo; and Shinoda, Koushi, 4,956,944, Cl. 51-165.710.
- Tsuchiya, Yutaka, to Hamamatsu Photonics Kabushiki Kaisha. Electro-optical streak camera. 4,958,231, Cl. 358-211.000.
- Tsuchiya, Yutaka: See—  
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- Urakami, Tsuneyuki; Aoshima, Shinichiro; and Tsuchiya, Yutaka, 4,958,354, Cl. 372-29.000.
- Tsuji, Mitsui: See—  
Takao, Hiroyoshi; Imai, Akio; Seki, Tomoski; and Tsuji, Mitsui, 4,957,976, Cl. 525-340.000.
- Tsujimoto, Yoshiharu: See—  
Kinashi, Hiroshi; Kawabata, Itaru; Yamane, Hidenobu; Tsujimoto, Yoshiharu; Gotoh, Shinya; and Nawa, Masayoshi, 4,958,197, Cl. 355-299.000.
- Tsuijuchi, Toshio; Ohta, Norio; and Yoshimura, Masatomo, to Toyoda Koki Kabushiki Kaisha. Numerically controlled grinding machine. 4,956,946, Cl. 51-165.710.
- Tsukada, Shigeru: See—  
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- Tsukamoto, Seiichi: See—  
Kawahara, Haruyuki; Tsukamoto, Seiichi; Nomura, Yutaka; Tanaka, Katsumi; Ashiura, Yasuyuki; and Yoshimura, Motonobu, 4,957,819, Cl. 428-547.000.
- Tsukamoto, Takeo: See—  
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- Tsunoi, Shinji: See—  
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- Tsutsui, Takashi, to Koyo Seiko Co., Ltd. Hub unit. 4,957,328, Cl. 301-105.000.
- Tsysin, Mark I.: See—  
Denisov, Vladimir F.; Gertseva, Marina I.; Ziberov, Valentin E.; Karapetian, Vadim K.; Sarkisian, Norik S.; Karbachinsky, Vladimir M.; Kharlamov, Oleg I.; Tsoi, Alexei D.; Taysin, Mark I.; Romanov, Alexei A.; Veranian, Vagan D.; Khripin, Vasily D.; and Shafran, Larisa E., 4,957,512, Cl. 55-8.000.
- Tubbesing, Robert A.; and Carter, Bruce D., to Greenstreak Plastics Products Co. Roof ridge ventilator. 4,957,037, Cl. 98-42.210.
- Tufts, Timothy A. Method for making a storage stable blend of a long chain polyol and a short chain diol by incorporating a bisphenol therein and the resulting blend. 4,957,654, Cl. 252-182.250.
- Turek, Douglas E., to Du Pont Canada Inc. Method of predicting yarn caterpillar length. 4,956,902, Cl. 28-257.000.
- Turkal, Randy J., to NRC Corporation. Apparatus and method for changing frequencies. 4,958,309, Cl. 364-580.000.
- Turner, William F.; and Dewes, James K. Water distillation apparatus. 4,957,200, Cl. 202-181.000.
- Turnidge, Howard M.; and Talvan, Theodore, to Howco Trust. Golf ball dispenser and teeing device. 4,957,296, Cl. 273-201.000.
- Twilton, Barry: See—  
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- Tyms, A. Stanley: See—  
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- Tzvetkov, Dimitar V.: See—  
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- Ube Industries, Ltd.: See—  
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- UCB Societe Anonyme: See—  
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- Uchida, Hiroyasu; Ueda, Kazuhiko; and Oda, Hiroyuki, to Mazda Motor Corporation. Starter-alternator for a vehicle engine. 4,958,095, Cl. 310-59.000.
- Uchida, Kensuke: See—  
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- Uchida, Kihachiro: See—  
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- Uchiyama, Yoshiharu: See—  
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- Uchikawa, Akira, to Japan Electronic Control Systems Co., Ltd. Oxygen gas concentration-detecting apparatus. 4,957,705, Cl. 422-94.000.
- Udo-Mims International, Inc.: See—  
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- Ueda, Hiroshi; and Ueda, Tomonao. Temporary solidifier for playing with sand. 4,957,558, Cl. 106-137.000.
- Ueda, Hiroshi: See—  
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- Ueda, Kazuhiko: See—  
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- Ueda, Tomoaki, to Daikin Industries, Ltd. Polygon filling control apparatus. 4,958,300, Cl. 364-521.000.
- Ueda, Tomonao: See—  
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- Ueda, Yuji: See—  
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- Uesugi, Tsuneya: See—  
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- Uetake, Yoshinari: See—  
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- UHDE GmbH: See—  
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- Uhlenhoff, Arnold, to Deutsche ITT Industries GmbH. CMOS parallel-serial multiplication circuit and multiplying and adding stages thereof. 4,958,313, Cl. 364-757.000.
- Uhrich, Richard W.: See—  
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- Ukita, Keizoro; Hamaguchi, Tetsuo; and Inoue, Masaaki, to Nippon Zeon Co., Ltd. Process for producing coke. 4,957,596, Cl. 201-20.000.
- Ullrich, Peter: See—  
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- Ullrich, Nathan T., to University of Pennsylvania, Trustees of the Methods and apparatus for mechanically intelligent grasping. 4,957,320, Cl. 294-106.000.
- Ullrich, Werner: See—  
Hemmady, Jayant G.; Lidinsky, William P.; Steele, Scott B.; Ullrich, Werner; and Weddige, Ronald C., 4,958,341, Cl. 370-60.100.
- Umatate, Toshikazu: See—  
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- Umeda, Yoshihito: See—  
Komatsu, Kazuo; Kamata, Kazuo; Ohmiya, Akio; Nishimura, Syunji; Umeda, Yoshihito; Mochizuki, Noriya; and Furuya, Eiji, 4,958,179, Cl. 354-195.120.
- Umezawa, Chieko: See—  
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- Umezawa, Hidetsugu: See—  
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- Underground Technologies, Inc.: See—  
Kinnam, Frank R., 4,957,173, Cl. 175-61.000.
- Underhill, Kenneth R., to Ford New Holland, Inc. Round baler with mechanism for dispensing wrapping material. 4,956,968, Cl. 56-341.000.
- Undin, Hans, to C. A. Weidmuller GmbH & Co. Manual tool drivable by a rotary motor. 4,956,992, Cl. 72-451.000.
- Unilever Patent Holdings B.V.: See—  
Dutilh, Christian E., 4,957,768, Cl. 426-604.000.
- Union Carbide Chemicals and Plastics Company Inc.: See—  
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- Union Carbide Chemicals and Plastics Inc.: See—  
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- Union Carbide Corporation: See—  
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- Pahade, Ravindra F.; Ziemer, John H.; and Howell, John K., 4,957,524, Cl. 62-18.000.
- Unisys Corp. (Formerly Burroughs Corp.): See—  
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- United Pharmaceuticals, Inc.: See—  
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- U.S. Bioscience: See—  
Gatenby, Robert A., 4,957,481, Cl. 604-20.000.
- United States of America  
Air Force: See—  
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- Army: See—  
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- Branovich, Louis E.; Smith, Bernard; Freeman, Gerard L.; and Eckart, Donald W., 4,957,463, Cl. 445-50.000.
- Srouf, Nassy, 4,957,132, Cl. 137-14.000.
- Tasdemiroglu, Server, 4,957,034, Cl. 89-36.020.
- National Aeronautics and Space Administration: See—  
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- Cuddihy, Edward F.; and Willis, Paul B., 4,957,012, Cl. 73-866.000.
- Gwin, Hal S.; and Aaron, James R., 4,957,139, Cl. 137-556.000.
- Hung, Ching-Cheh, 4,957,661, Cl. 252-510.000.
- Morris, Brian G., 4,956,996, Cl. 73-149.000.
- Navy: See—  
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- Cherry, Christopher R., 4,957,027, Cl. 89-1.140.
- Higgins, Francis J., 4,958,330, Cl. 367-88.000.
- Hoffler, Thomas; Brininstool, Michael R.; Newmaster, Jeffrey T.; and Garrett, Steven L., 4,958,072, Cl. 250-231.130.
- Reich, Ronald S.; and Uhrich, Richard W., 4,957,413, Cl. 416-115.000.
- Schadow, Klaus C.; Gutmark, Ephraim; Wilson, Kenneth J.; and Smith, Robert A., 4,957,242, Cl. 239-590.000.
- Wardle, William F., 4,958,331, Cl. 367-130.000.
- U.S. Philips Corporation: See—  
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- Allezard, Roland, 4,958,161, Cl. 342-122.000.
- Brand, Hans-Wolfgang; Hennings, Detlef F. K.; Klee, Mareike K.; and Scheinmayer, Herbert J., 4,957,888, Cl. 501-134.000.
- Brinkmeyer, Ernst, 4,957,365, Cl. 356-73.100.
- De With, Peter H. N., 4,957,688, Cl. 358-133.000.
- Heijman, Maritza G. J.; and Zalm, Peter C., 4,957,899, Cl. 505-1.000.
- Hendrix, Machiel A. M.; Scheepers, Johannes A. M.; and Reijnders, Nicolaas H. G., 4,958,106, Cl. 315-208.000.
- Hughes, John B., 4,958,123, Cl. 323-316.000.
- Kuijk, Karel E.; and Stroome, Martinus V. C., 4,958,152, Cl. 340-784.000.
- Meijer, Egbert W.; Havinga, Edsko E.; and Rikken, Gerardus L. J. A., 4,958,087, Cl. 307-425.000.
- Sari, Hikmet, 4,958,360, Cl. 375-97.000.
- Zwiers, Renso J. M.; Verhoeven, Johannes M. G.; and Amendt, Herman M. A., 4,957,663, Cl. 264-1.400.
- United Technologies Corporation: See—  
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- Young, Edward L.; and Kapoor, Mohan L., 4,958,105, Cl. 315-169.300.
- Universal Health Products, Inc.: See—  
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- University of Cincinnati: See—  
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- University of Connecticut: See—  
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- University of Michigan, The: See—  
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- Counsell, Raymond E.; Longino, Marc A.; Weichert, Jamey P.; and Schwendner, Susan P., 4,957,729, Cl. 424-5.000.
- University of Minnesota, Regents of the: See—  
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- University of Nebraska, The Board of Regents of the: See—  
Winowski, Thomas S., 4,957,748, Cl. 426-2.000.
- University of Pennsylvania, Trustees of the: See—  
Ullrich, Nathan T., 4,957,320, Cl. 294-106.000.
- University of Pittsburgh: See—  
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- University of Tennessee Research Corporation, The: See—  
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- UOP: See—  
Grover, Bhadra S.; and Nagji, Moez M., 4,957,715, Cl. 423-228.000.
- McCauley, John R., 4,957,889, Cl. 502-65.000.
- Sachtler, Johann W. A.; Lawson, Randy J.; and Lambert, Susan L., 4,957,891, Cl. 502-61.000.
- Yoo, Jin S.; Karch, John A.; Bhattacharya, Alakananda A.; and Radlowski, Cecelia A., 4,957,718, Cl. 423-244.000.
- Yoo, Jin S.; and Jaeger, John A., 4,957,892, Cl. 502-63.000.
- Zemel, Haya; and Koch, Mark B., 4,958,015, Cl. 536-103.000.
- Uota, Kosaku: See—  
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- Upjohn Company, The: See—  
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- Urabe, Suehiro: See—  
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- Urakami, Tatsuhiro; Tanabe, Yoshimitsu; Yamaguchi, Keizaburo; and Yamaguchi, Akihiro, to Mitsui Toatsu Chemicals, Inc. Epoxy resins containing imido rings, production process thereof and epoxy resin compositions containing the same. 4,957,994, Cl. 528-90.000.
- Urakami, Tsuneyuki; Aoshima, Shinichiro; and Tsuchiya, Yutaka, to Hamamatsu Photonics Kabushiki Kaisha. Apparatus for stabilizing the intensity of light. 4,958,354, Cl. 372-29.000.
- Urayama, Takanaga: See—  
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- Urushihara, Kazunobu: See—  
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- Yoshida, Kazutsu: See—  
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- Yoshikama, Kunihiko: See—  
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- Yoshiki, Kanetsugu; and Urayama, Takanaga, to Sunstar Kabushiki Kaisha. Commodity package with auxiliary container portion. 4,957,202, Cl. 206-44.110.
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- Yoshimoto, Taisuke: See—  
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- Yoshimura, Hiroshi: See—  
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- Yoshimura, Masatomo: See—  
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- Yoshimura, Motonobu: See—  
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- Yoshioka, Tatsuya: See—  
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- Young, David E.; and Davis, Kenneth P., to Protectair Limited. Ortho-paedic body jackets. 4,957,103, Cl. 128-78.000.
- Young, Edward L.; and Kapoor, Mohan L., to United Technologies Corporation. Row driver for EL panels and the like with inductance coupling. 4,958,105, Cl. 315-169.300.
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- Young, Robert N.; and Zamboni, Robert, to Merck Frosst Canada, Inc. Benzoheterazoles. 4,957,932, Cl. 514-375.000.
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- Zachary, Alain. Device for primary separation of grain in a combine harvester for cereals. 4,957,467, Cl. 460-69.000.
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- Zamboni, Robert: See—  
Young, Robert N.; and Zamboni, Robert, 4,957,932, Cl. 514-375.000.
- Zarate, Robert A.; Self, Richard E.; and Smith, Lee W., to Pacific Consolidated Industries. High speed pressure swing adsorption liquid oxygen/liquid nitrogen generating plant. 4,957,523, Cl. 62-13.000.
- Zaremba, Norman S.; and Beyer, John P., to AG Communication Systems Corporation. Tool for repairing surface mounted compo-nents on printed circuit board. 4,956,911, Cl. 29-721.000.
- Zarian, Jamshid, to Lumenyte International Corporation. Clad optical conduit and method of manufacture. 4,957,347, Cl. 350-96.320.
- Zatulovsky, Lev M.: See—  
Kravetsky, Dmitry Y.; Zatulovsky, Lev M.; Egorov, Leonid P.; Pelts, Boris B.; Okun, Leonid S.; Freiman, Efim A.; Averyanov, Viktor V.; and Alishev, Alexandr L., 4,957,713, Cl. 422-249.000.
- Zemel, Haya; and Koch, Mark B., to UOP. Preparation of crosslinked cyclodextrin resins with enhanced porosity. 4,958,015, Cl. 536-103.000.
- Zeng, Kun; Wu, Jinrong; Yang, Sen; Yu, Zhenfen; and Zhu, Jiude. Diagnostic apparatus for intrinsic fluorescence of malignant tumor. 4,957,114, Cl. 128-665.000.
- Zerillo, Michael A. Drapery actuator operated by lamp timer and hand-held wireless remote control. 4,958,112, Cl. 318-280.000.
- Zhao, Rufa: See—  
Fang, Hongsheng; Zheng, Yankang; Chen, Xiuyun; Chen, Dong-hao; and Zhao, Rufa, 4,957,702, Cl. 420-104.000.
- Zheng, Yankang: See—  
Fang, Hongsheng; Zheng, Yankang; Chen, Xiuyun; Chen, Dong-hao; and Zhao, Rufa, 4,957,702, Cl. 420-104.000.
- Zhu, Jiude: See—  
Zeng, Kun; Wu, Jinrong; Yang, Sen; Yu, Zhenfen; and Zhu, Jiude, 4,957,114, Cl. 128-665.000.
- Ziberov, Valentin E.: See—  
Denisov, Vladimir F.; Gertseva, Marina I.; Ziberov, Valentin E.; Karapetian, Vadim K.; Sarkisian, Norik S.; Karbachinsky, Vladi-mir M.; Kharlamov, Oleg I.; Tsoi, Alexei D.; Tsysin, Mark I.; Romanov, Alexei A.; Veranian, Vagan D.; Khrpin, Vasily D.; and Shafra, Larisa E., 4,957,512, Cl. 55-8.000.
- Ziegler, George: See—  
Bishop, Lawrence C.; and Ziegler, George, 4,958,284, Cl. 364-419.000.
- Zielske, Alfred G., to Clorox Company. The. Acyloxynitrogen peracid precursors. 4,957,647, Cl. 252-186.380.
- Ziemer, John H.: See—  
Pahade, Ravindra F.; Ziemer, John H.; and Howell, John K., 4,957,524, Cl. 62-18.000.
- Zollinger, Donovan J., to General Motors Corporation. Convoluted boot seal with anti-abrasion side wall ribs. 4,957,469, Cl. 464-175.000.
- Zorgnotti, Adrian W. Improvements to obviate pure venous impo-tence. 4,957,104, Cl. 128-79.000.
- Zust, Armin: See—  
Frostl, Wolfgang; and Zust, Armin, 4,957,928, Cl. 514-318.000.
- Zwiers, Renso J. M.; Verhoeven, Johannes M. G.; and Amendt, Her-man M. A., to U.S. Philips Corp. Method of manufacturing optical components. 4,957,663, Cl. 264-1.400.

## LIST OF REISSUE PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 18TH DAY OF SEPTEMBER, 1990

NOTE—Arranged in accordance with the first significant character or word of the name  
(in accordance with city and telephone directory practice).

- Abe, Toyohiko: See—  
Kohtoh, Noriaki; Abe, Toyohiko; and Fukuro, Hiroyoshi, Re. 33,342, Cl. 528-351.000.
- ASQ Technology, Inc.: See—  
Lee, Steven N.; and Kim, Jae Y., Re. 33,341, Cl. 414-404.000.
- Automotive Products plc: See—  
Bainbridge, Wilfred N.; and Young, Alastair J., Re. 33,336, Cl. 74-330.000.
- Bainbridge, Wilfred N.; and Young, Alastair J., to Automotive Products plc. Change speed transmission. Re. 33,336, Cl. 74-330.000.
- Bitter, Lowell E.; and Lundgren, Bryan L., to Donnelly Corporation. Crack detector for electrically conductive windshield. Re. 33,343, Cl. 219-509.000.
- Bober, Vincent J.: See—  
Sylvester, Robert D., Jr.; Horn, Paul C.; and Bober, Vincent J., Re. 33,345, Cl. 336-180.000.
- C. & E. Fein GmbH & Co.: See—  
Gentscher, Josef; and Rudolf, Boris, Re. 33,335, Cl. 51-168.000.
- Coca-Cola Company, The: See—  
Sedam, Jason K., Re. 33,338, Cl. 222-88.000.
- Digitext, Inc.: See—  
Lefler, Jerrold P.; and Woodard, Scott, Re. 33,337, Cl. 178-21.000.
- Donnelly Corporation: See—  
Bitter, Lowell E.; and Lundgren, Bryan L., Re. 33,343, Cl. 219-509.000.
- Finnigan Corporation: See—  
Stafford, George C., Re. 33,344, Cl. 250-281.000.
- Fujitsu Limited: See—  
Tsukada, Tetsuo; Shimobuchi, Hideyuki; and Yoshikawa, Takahiro, Re. 33,340, Cl. 400-196.100.
- Fukuro, Hiroyoshi: See—  
Kohtoh, Noriaki; Abe, Toyohiko; and Fukuro, Hiroyoshi, Re. 33,342, Cl. 528-351.000.
- Gentscher, Josef; and Rudolf, Boris, to C. & E. Fein GmbH & Co. Device for attaching a tool. Re. 33,335, Cl. 51-168.000.
- GFS Manufacturing Company, Inc.: See—  
Sylvester, Robert D., Jr.; Horn, Paul C.; and Bober, Vincent J., Re. 33,345, Cl. 336-180.000.
- Heidrich, Klaus; Krewitt, Alfred; Loos, Kurt; and Ipithan, Fritz, to Kabelschlepp Gesellschaft mit Beschränkter Haftung. Chain for supporting energy conveying means, and chain link therefor. Re. 33,339, Cl. 248-51.000.
- Horn, Paul C.: See—  
Sylvester, Robert D., Jr.; Horn, Paul C.; and Bober, Vincent J., Re. 33,345, Cl. 336-180.000.
- Ipithan, Fritz: See—  
Heidrich, Klaus; Krewitt, Alfred; Loos, Kurt; and Ipithan, Fritz, Re. 33,339, Cl. 248-51.000.
- Kabelschlepp Gesellschaft mit Beschränkter Haftung: See—  
Heidrich, Klaus; Krewitt, Alfred; Loos, Kurt; and Ipithan, Fritz, Re. 33,339, Cl. 248-51.000.
- Kim, Jae Y.: See—  
Lee, Steven N.; and Kim, Jae Y., Re. 33,341, Cl. 414-404.000.
- Kohtoh, Noriaki; Abe, Toyohiko; and Fukuro, Hiroyoshi, to Nissan Chemical Industries Ltd. Liquid crystal aligning agent from tetracarboxylic acid dianhydride, diamine and monoamine. Re. 33,342, Cl. 528-351.000.
- Krewitt, Alfred: See—  
Heidrich, Klaus; Krewitt, Alfred; Loos, Kurt; and Ipithan, Fritz, Re. 33,339, Cl. 248-51.000.
- Lee, Steven N.; and Kim, Jae Y., to ASQ Technology, Inc. Wafer transfer apparatus. Re. 33,341, Cl. 414-404.000.
- Lefler, Jerrold P.; and Woodard, Scott, to Digitext, Inc. Stenographic translation system. Re. 33,337, Cl. 178-21.000.
- Loos, Kurt: See—  
Heidrich, Klaus; Krewitt, Alfred; Loos, Kurt; and Ipithan, Fritz, Re. 33,339, Cl. 248-51.000.
- Lundgren, Bryan L.: See—  
Bitter, Lowell E.; and Lundgren, Bryan L., Re. 33,343, Cl. 219-509.000.
- Nelson, James A., to Ryko Manufacturing Company. Vehicle wash and dryer. Re. 33,334, Cl. 15-302.000.
- Nissan Chemical Industries Ltd.: See—  
Kohtoh, Noriaki; Abe, Toyohiko; and Fukuro, Hiroyoshi, Re. 33,342, Cl. 528-351.000.
- Rudolf, Boris: See—  
Gentscher, Josef; and Rudolf, Boris, Re. 33,335, Cl. 51-168.000.
- Ryko Manufacturing Company: See—  
Nelson, James A., Re. 33,334, Cl. 15-302.000.
- Sedam, Jason K., to Coca-Cola Company, The. Membrane seal and knife combination for a post-mix beverage dispensing system. Re. 33,338, Cl. 222-88.000.
- Shimobuchi, Hideyuki: See—  
Tsukada, Tetsuo; Shimobuchi, Hideyuki; and Yoshikawa, Takahiro, Re. 33,340, Cl. 400-196.100.
- Stafford, George C., to Finnigan Corporation. Apparatus and method for detecting negative ions. Re. 33,344, Cl. 250-281.000.
- Sylvester, Robert D., Jr.; Horn, Paul C.; and Bober, Vincent J., to GFS Manufacturing Company, Inc. Toroid transformers and secondary windings. Re. 33,345, Cl. 336-180.000.
- Tsukada, Tetsuo; Shimobuchi, Hideyuki; and Yoshikawa, Takahiro, to Fujitsu Limited. Color printer having apparatus for shifting ink ribbon. Re. 33,340, Cl. 400-196.100.
- Woodard, Scott: See—  
Lefler, Jerrold P.; and Woodard, Scott, Re. 33,337, Cl. 178-21.000.
- Yoshikawa, Takahiro: See—  
Tsukada, Tetsuo; Shimobuchi, Hideyuki; and Yoshikawa, Takahiro, Re. 33,340, Cl. 400-196.100.
- Young, Alastair J.: See—  
Bainbridge, Wilfred N.; and Young, Alastair J., Re. 33,336, Cl. 74-330.000.

## LIST OF REEXAMINATION PATENTEEES

TO WHOM

CERTIFICATES WERE ISSUED

- Ferguson, James L. Light modulator demodulator and method of communication employing the same. B1 1,032,521, 9-18-90, Cl. 350-334.000.
- Ferguson, James L. Method and apparatus for converting phase-modulated light to amplitude-modulated light and communication method and apparatus employing the same. B1 4,540,243, 9-18-90, Cl. 350-337.000.
- Jung, Werner, to Katrapat AG. Device for carrying flexible cables or pipes from a fixed connection point to a mobile consumer by means of a flexible tube. B1 3,957,084, 9-18-90, Cl. 138-136.000.
- Katrapat AG: See—  
Jung, Werner, B1 3,957,084, Cl. 138-136.000.

## LIST OF DESIGN PATENTEEES

- Acme Boot Co., Inc.: See—  
Cummings, Craig C., 310,598, Cl. D2-318.000.
- Air Products and Chemicals Inc.: See—  
Hoffman, Gregory C., 310,629, Cl. D9-352.000.
- Aizawa, Genya; and Ono, Kakuhi. Sunvisor for vehicles. 310,653, 9-18-90, Cl. D12-213.000.
- Alfa Romeo Auto S.p.A.: See—  
Cressoni, Ermanno, 310,650, Cl. D12-163.000.
- American Cyanamid Company: See—  
Petersen, Bryan E.; and Kanceljak, Michael, 310,701, Cl. D22-119.000.
- Petersen, Bryan E.; and Kanceljak, Michael, 310,702, Cl. D22-119.000.
- Ancona, Bruce: See—  
Ancona, Jan; and Ancona, Bruce, 310,749, Cl. D34-44.000.
- Ancona, Jan; and Ancona, Bruce, to M. Kamenstein, Inc. Tool caddy. 310,749, 9-18-90, Cl. D34-44.000.
- Andre Desrosiers Designer Industriel (ADDI) Inc.: See—  
Desrosiers, Andre, 310,612, Cl. D7-307.000.
- Anton, Edward R.: See—  
Sielck, Henry A.; and Anton, Edward R., 310,730, Cl. D27-195.000.
- Aoyama, Minoru, to Canon Kabushiki Kaisha. Toner case for electrophotographic copier. 310,683, 9-18-90, Cl. D18-43.000.
- Apotheloz, Christophe: See—  
Fellmann, Hans-Rudolf; and Apotheloz, Christophe, 310,662, Cl. D14-106.000.
- Arai, Takuya, to Fuji Photo Film Co., Ltd. Packing bag for disposable camera. 310,625, 9-18-90, Cl. D9-305.000.
- Aranibar, Ernesto E., to Shelfco, Inc. Bracket for closet shelf support rod. 310,623, 9-18-90, Cl. D8-380.000.
- Armellini, Giancarlo, to Pirelli Coordinamento Pneumatici S.p.A. Tire. 310,648, 9-18-90, Cl. D12-146.000.
- Associated Mills Inc.: See—  
Heiligenstein, Luc; Geneve, Francois; and Melamed, Stephen, 310,717, Cl. D24-38.000.
- AT&T Company: See—  
Fortune, Duane D.; Joffe, Richard M.; Mack, Henry J., Jr.; McGarvey, John N.; and Zambelli, Michael P., 310,665, Cl. D14-140.000.
- Axell, John, to Spine-O-Pedic Cushions, Inc. Driver's support cushion. 310,608, 9-18-90, Cl. D6-601.000.
- Axelrod, Herbert R. Aerial toy. 310,691, 9-18-90, Cl. D21-86.000.
- Baby Relax: See—  
Julien, Francois, 310,645, Cl. D12-129.000.
- Bakic, Karena, to Cosmede Anstalt. Cosmetic case. 310,736, 9-18-90, Cl. D28-82.000.
- Bakic, Karena, to Cosmede Anstalt. Cosmetic stick container. 310,737, 9-18-90, Cl. D28-88.000.
- Balek, Lynn A., to LTL Industries Ltd. Vehicle battery holder. 310,658, 9-18-90, Cl. D13-119.000.
- Beisang, Arthur A., III, to Genetic Laboratories, Inc. Nose tube anchoring strip. 310,721, 9-18-90, Cl. D24-49.000.
- Berfield, Robert C.; and Seasholtz, Craig A., to Shop-Vac Corporation. Dolly. 310,746, 9-18-90, Cl. D34-23.000.
- Berger, Jeffery A. Simulative toy coaster. 310,685, 9-18-90, Cl. D21-74.000.
- Berracasa, Abner, to Capitol Trading S.A. Tape applicator. 310,687, 9-18-90, Cl. D19-69.000.
- Bobber Tech, Inc.: See—  
Jones, Robert S., 310,700, Cl. D21-238.000.
- Bradford, Rodney; and Brantley, Lott W. Inflatable, reflective solar oven. 310,657, 9-18-90, Cl. D13-102.000.
- Brantley, Lott W.: See—  
Bradford, Rodney; and Brantley, Lott W., 310,657, Cl. D13-102.000.
- Bratasevec, Vid, to Proizvodnja in prodaja igrac, pisal, kovinskih in plasticnih izdelkov "Mehano", p.o. Electronic typewriter. 310,680, 9-18-90, Cl. D18-1.000.
- Bratasevec, Vid, to Proizvodnja in Prodaja Igrac, Pisal, Kovinskih in Plasticnih Izdelkov "Mehano", P.O. Typewriter. 310,681, 9-18-90, Cl. D18-1.000.
- Broden, Bengt-Inge. Cannula for withdrawing a test sample from a test tube. 310,722, 9-18-90, Cl. D24-51.000.
- Brown, Michael G. Thumb protector. 310,738, 9-18-90, Cl. D29-20.000.
- Burger, Annette. Caped leotard. 310,596, 9-18-90, Cl. D2-29.000.
- Burkhardt, George J. Orthopedic cervical pillow. 310,609, 9-18-90, Cl. D6-601.000.
- Bycraft, John T.: See—  
Pomeroy, Charles; and Bycraft, John T., 310,604, Cl. D6-347.000.
- Byriel, Ole, to Eveline A/S. Soap dispenser combined with a brush. 310,601, 9-18-90, Cl. D4-114.000.
- Cain, Ann S., to 'totes', incorporated. Umbrella handle. 310,599, 9-18-90, Cl. D3-12.000.
- Campbell, Egbert. Spinning toy. 310,693, 9-18-90, Cl. D21-96.000.
- Canon Kabushiki Kaisha: See—  
Aoyama, Minoru, 310,683, Cl. D18-43.000.
- Capitol Trading S.A.: See—  
Berracasa, Abner, 310,687, Cl. D19-69.000.
- Capuano, Frank G.: See—  
DePaul, Richard E.; and Capuano, Frank G., 310,633, Cl. D9-416.000.
- Charles, Jeffrey R. Multiple function image switching attachment for a telescope or similar article. 310,676, 9-18-90, Cl. D16-134.000.
- Choe, Yoo H. Bicycle wheel spoke. 310,655, 9-18-90, Cl. D12-213.000.
- Clevenhagen, Robert L., to Figgie International Inc. Web for a baseball glove. 310,739, 9-18-90, Cl. D29-21.000.
- CMB Packaging (UK) Limited: See—  
Rayner, Adrian P., 310,628, Cl. D9-352.000.
- Coleman Outdoor Products, Inc.: See—  
Stearns, David K., 310,729, Cl. D26-110.000.
- Colson Castors (Europe) Limited: See—  
Screen, Stafford T., 310,622, Cl. D8-375.000.
- Cooper, Hal W. Upright hoop unit for a lawn golf game. 310,698, 9-18-90, Cl. D21-202.000.
- Cosmede Anstalt: See—  
Bakic, Karena, 310,736, Cl. D28-82.000.
- Bakic, Karena, 310,737, Cl. D28-88.000.
- Cressoni, Ermanno, to Alfa Romeo Auto S.p.A. Front grill for an automotive vehicle. 310,650, 9-18-90, Cl. D12-163.000.
- Cross, Patrick. Bag holder. 310,745, 9-18-90, Cl. D34-6.000.
- Cummings, Craig C., to Acme Boot Co., Inc. Blocker sole with tap insert. 310,598, 9-18-90, Cl. D2-318.000.
- Czechowski, Phillip M.: See—  
Gonzalez, Cecilio; Gonzalez, Carlos; Massi, Michael; and Czechowski, Phillip M., 310,694, Cl. D21-96.000.
- Davis, Raymond H.; and Mathisen, Corby K., to H. J. Heinz Company. Bottle. 310,631, 9-18-90, Cl. D9-404.000.
- De La Cruz, Richard: See—  
Parente, Richard; and De La Cruz, Richard, 310,699, Cl. D21-219.000.
- Del Fresno, Miguel L., to Oficina de Investigacion Agrupada, S.A. Fan heater. 310,712, 9-18-90, Cl. D23-335.000.
- DePaul, Richard E.; and Capuano, Frank G., to Somerville Packaging Corporation. Ice cream carton. 310,633, 9-18-90, Cl. D9-416.000.
- Desrosiers, Andre, to Andre Desrosiers Designer Industriel (ADDI) Inc. Water refrigeration and dispensing unit. 310,612, 9-18-90, Cl. D7-307.000.
- Dinand, Pierre, to Etablissements Bernard Lalande. Bottle for perfume, toilet water or the like. 310,626, 9-18-90, Cl. D9-322.000.
- Dixon, Linda H., to E.R. Carpenter Company, Inc. Anti-snoring pillow. 310,610, 9-18-90, Cl. D6-601.000.
- Dolwick, Franklin M., to Walter Lorenz Surgical Instruments, Inc. Temporomandibular joint disc scissors. 310,714, 9-18-90, Cl. D24-10.000.
- Donovan, William P. Baby bottle. 310,719, 9-18-90, Cl. D24-47.000.
- E.R. Carpenter Company, Inc.: See—  
Dixon, Linda H., 310,610, Cl. D6-601.000.
- Eichler, Volker: See—  
Schott, Alfred; Reichenberger, Roland; Eichler, Volker; and Schulz, Horst, 310,659, Cl. D13-163.000.
- Eldon Industries, Inc.: See—  
Evenson, Mel, 310,689, Cl. D19-90.000.
- Embrece, Donald; and Hamann, David L., to Rubbermaid Incorporated. Parts drawer. 310,748, 9-18-90, Cl. D34-40.000.
- Esslinger, Hartmut, to NeXT, Inc. Central processing unit for computer. 310,661, 9-18-90, Cl. D14-102.000.
- Etablissements Bernard Lalande: See—  
Dinand, Pierre, 310,626, Cl. D9-322.000.
- Eveline A/S: See—  
Byriel, Ole, 310,601, Cl. D4-114.000.
- Evenson, Mel, to Eldon Industries, Inc. Holder for sheet material. 310,689, 9-18-90, Cl. D19-90.000.
- Fedawa, Wayne C. Computer aided design matrix menu for overlaying a digitizing tablet. 310,663, 9-18-90, Cl. D14-114.000.
- Fellmann, Hans-Rudolf; and Apotheloz, Christophe, to Zellweger Uster Ltd. Terminal for signal processing in textile laboratories. 310,662, 9-18-90, Cl. D14-106.000.
- Ferrari, Dario, to Intercos Italia S.p.A. Cosmetic container. 310,735, 9-18-90, Cl. D28-76.000.
- Figgie International Inc.: See—  
Clevenhagen, Robert L., 310,739, Cl. D29-21.000.
- Finkiewicz, Daniel J.: See—  
Gradecki, Raymond J.; Sorensen, Gerald R.; and Finkiewicz, Daniel J., 310,624, Cl. D8-395.000.
- Fletcher, Sylvester J.; and Lee, Kermit J. Refuse container. 310,744, 9-18-90, Cl. D34-1.000.
- Fortune, Duane D.; Joffe, Richard M.; Mack, Henry J., Jr.; McGarvey, John N.; and Zambelli, Michael P., to AT&T Company. Controller housing. 310,665, 9-18-90, Cl. D14-140.000.
- Fratelli Guzzini S.p.A.: See—  
Pozzi, Ambrogio, 310,614, Cl. D7-317.000.
- Pozzi, Ambrogio, 310,617, Cl. D7-538.000.
- Friel, Daniel D. Knife sharpener. 310,620, 9-18-90, Cl. D8-93.000.
- Fuji Photo Film Co., Ltd.: See—  
Arai, Takuya, 310,625, Cl. D9-305.000.
- Gallanis, George P., to Wahl Clipper Corporation. Hair trimmer. 310,734, 9-18-90, Cl. D28-53.000.
- Geka Brush Corporation: See—  
Hutton, Stanley, 310,632, Cl. D9-412.000.
- Gelinas, Ralph J., to Triune Research Corporation. Hair blower. 310,733, 9-18-90, Cl. D28-13.000.
- Genetic Laboratories, Inc.: See—  
Beisang, Arthur A., III, 310,721, Cl. D24-49.000.



- Geneve, Francois: See—  
Heiligenstein, Luc; Geneve, Francois; and Melamed, Stephen, 310,717, Cl. D24-38.000.
- Gerber Garment Technology, Inc.: See—  
Gerber, Heinz J., 310,639, Cl. D10-46.000.
- Gerber, Heinz J., to Gerber Garment Technology, Inc. X, Y plotter. 310,639, 9-18-90, Cl. D10-46.000.
- Giambrone, Harry J., to Spalding & Evenflo Companies, Inc. Stroller wheel hub cap. 310,654, 9-18-90, Cl. D12-211.000.
- Gillfillan, Patricia B.: See—  
Tacquard, Timothy L.; and Gillfillan, Patricia B., 310,686, Cl. D19-62.000.
- Glaser, Jerry. Screw chuck. 310,673, 9-18-90, Cl. D15-140.000.
- Gonzalez, Carlos: See—  
Gonzalez, Cecilio; Gonzalez, Carlos; Massi, Michael; and Czechowski, Phillip M., 310,694, Cl. D21-96.000.
- Gonzalez, Cecilio; Gonzalez, Carlos; Massi, Michael; and Czechowski, Phillip M. Spinning toy assembly. 310,694, 9-18-90, Cl. D21-96.000.
- Gradecki, Raymond J.; Sorensen, Gerald R.; and Finkiewicz, Daniel J., to National Creative Merchandising Corp. Retaining clip. 310,624, 9-18-90, Cl. D8-395.000.
- Grow, Robert D. Finger grip for bicycle brake levers. 310,651, 9-18-90, Cl. D12-179.000.
- Guardian Products, Inc.: See—  
Rose, Eric P., 310,646, Cl. D12-130.000.
- H. J. Heinz Company: See—  
Davis, Raymond H.; and Mathisen, Corby K., 310,631, Cl. D9-404.000.
- Hamann, David L.: See—  
Embree, Donald; and Hamann, David L., 310,748, Cl. D34-40.000.
- Harker, Michael. Aerial toy. 310,692, 9-18-90, Cl. D21-86.000.
- Harvey, Jean S.: See—  
Harvey, Philip R.; and Harvey, Jean S., 310,672, Cl. D15-66.000.
- Harvey, Philip R.; and Harvey, Jean S. Loom frame or similar article. 310,672, 9-18-90, Cl. D15-66.000.
- Hatzipapanagos, George. Multiple picture frame. 310,602, 9-18-90, Cl. D6-301.000.
- Hayakawa, Futomi; and Nawata, Tadashi, to Kabushiki Kaisha Hybec. Halogen lamp. 310,725, 9-18-90, Cl. D26-2.000.
- Hayes, Ronald G.: See—  
Heren, Lawrence P.; and Hayes, Ronald G., 310,706, Cl. D23-226.000.
- Heiligenstein, Luc; Geneve, Francois; and Melamed, Stephen, to Associated Mills Inc. Water jet for producing whirlpool action in bathtubs. 310,717, 9-18-90, Cl. D24-38.000.
- Hengesbach, Robert W. Combined reversible sprinkler nozzle and support ring. 310,708, 9-18-90, Cl. D23-213.000.
- Heren, Lawrence P.; and Hayes, Ronald G., to L. R. Nelson Company. Hose nozzle. 310,706, 9-18-90, Cl. D23-226.000.
- Hoffman, Gregory C., to Air Products and Chemicals Inc. Vacuum furnace bottle. 310,629, 9-18-90, Cl. D9-352.000.
- Holterscheidt, Siegfried, to Walter Henkels GmbH. Separable key chain. 310,600, 9-18-90, Cl. D3-62.000.
- Hutton, Stanley, to Geka Brush Corporation. Bottle. 310,632, 9-18-90, Cl. D9-412.000.
- Intercos Italia S.p.A.: See—  
Ferrari, Dario, 310,735, Cl. D28-76.000.
- Interlego A.G.: See—  
Kushner, Philip M.; and Kyster, Steen, 310,695, Cl. D21-140.000.
- Ishida, Katsuhiko, to Sharp Corporation. Keyboard for programmable controller. 310,660, 9-18-90, Cl. D14-100.000.
- Isogai, Shunji, to Sugiyasu Industries Co., Ltd. Container transfer lift. 310,747, 9-18-90, Cl. D14-28.000.
- Itoh, Kunio, to Pentel Kabushiki Kaisha. Pen cap or similar article. 310,684, 9-18-90, Cl. D19-57.000.
- Jack-Post Corporation: See—  
Pomeroy, Charles; and Bycraft, John T., 310,604, Cl. D6-347.000.
- Jackson, Ron, to Pacific Research & Development Corp. UV lamp for curing fingernail coatings. 310,724, 9-18-90, Cl. D24-68.000.
- Jado Bathroom and Hardware Manufacturing Corp.: See—  
Jans, Franz W., 310,709, Cl. D23-230.000.
- Jans, Franz W., to Jado Bathroom and Hardware Manufacturing Corp. Faucet handle. 310,709, 9-18-90, Cl. D23-250.000.
- Joffe, Richard M.: See—  
Fortune, Duane D.; Joffe, Richard M.; Mack, Henry J., Jr.; McGarvey, John N.; and Zambelli, Michael P., 310,665, Cl. D14-140.000.
- Johnson, Charles R. Insect guard. 310,703, 9-18-90, Cl. D22-122.000.
- Johnson, Douglas. Boot and shoe dryer. 310,742, 9-18-90, Cl. D32-58.000.
- Jones, Robert S., to Bobber Tech, Inc. Bouyant belt. 310,700, 9-18-90, Cl. D21-238.000.
- Julien, Francois, to Baby Relax. Convertible baby stroller. 310,645, 9-18-90, Cl. D12-129.000.
- Kabushiki Kaisha Hybec: See—  
Hayakawa, Futomi; and Nawata, Tadashi, 310,725, Cl. D26-2.000.
- Kabushiki Kaisha Toshiba: See—  
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- Murai, Kanji; and Matsumoto, Jun, 310,616, Cl. D7-351.000.
- Takada, Toshio, 310,668, Cl. D14-163.000.
- Yamamoto, Kazuharu, 310,666, Cl. D14-163.000.
- Kagayama, Joe, to Tsuyama Mfg. Co., Ltd. Bicycle exerciser. 310,697, 9-18-90, Cl. D21-194.000.
- Kanceljak, Michael: See—  
Petersen, Bryan E.; and Kanceljak, Michael, 310,701, Cl. D22-119.000.
- Petersen, Bryan E.; and Kanceljak, Michael, 310,702, Cl. D22-119.000.
- Keller, H. Thomas, to Rosalco, Inc. Vanity bench. 310,603, 9-18-90, Cl. D6-349.000.
- Keller, H. Thomas, to Rosalco, Inc. Vanity chair. 310,606, 9-18-90, Cl. D6-380.000.
- Kira, Yasuhiro, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic wind instrument. 310,679, 9-18-90, Cl. D17-10.000.
- Kitai, Isao; Matsuda, Kenichi; and Ogasawara, Mikio, to Sharp Corporation. Bread baking machine. 310,615, 9-18-90, Cl. D7-348.000.
- Klein, Max, to Tech Paper, Inc. Fan housing with filter compartment. 310,713, 9-18-90, Cl. D23-381.000.
- Kobayashi, Masahiko; and Yamamoto, Kazuharu, to Kabushiki Kaisha Toshiba. Combined tape player and tuner. 310,667, 9-18-90, Cl. D14-163.000.
- Koehler, Richard L.; and Koehler, Willie E. Tricycle. 310,644, 9-18-90, Cl. D12-112.000.
- Koehler, Willie E.: See—  
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- Kohler Co.: See—  
Poulson, Keith L., 310,710, Cl. D23-283.000.
- Kulp, Jack H., to Traffix Devices, Inc. Traffic channelizer or the like. 310,642, 9-18-90, Cl. D10-109.000.
- Kushner, Philip M.; and Kyster, Steen, to Interlego A.G. Toy trailer. 310,695, 9-18-90, Cl. D21-140.000.
- Kwon, Sun E., to Total Design Corporation. Collapsible chair. 310,605, 9-18-90, Cl. D6-368.000.
- Kyster, Steen: See—  
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- L. R. Nelson Company: See—  
Heren, Lawrence P.; and Hayes, Ronald G., 310,706, Cl. D23-226.000.
- Lee, Kermit J.: See—  
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- Lee, Richard D. Roof module for emergency vehicles. 310,649, 9-18-90, Cl. D12-156.000.
- LGS Corporation: See—  
Liepitz, Nathan S., 310,731, Cl. D24-23.000.
- Liepitz, Nathan S., to LGS Corporation. Pill splitter. 310,731, 9-18-90, Cl. D24-23.000.
- Lomeli's Statuary, Inc.: See—  
Morando, Aturo, 310,643, Cl. D11-148.000.
- Long, Daniel C.; and Welch, Dale G., to Unico Products. Bib. 310,597, 9-18-90, Cl. D2-229.000.
- LTL Industries Ltd.: See—  
Balek, Lynn A., 310,658, Cl. D13-119.000.
- Lu Huang C. Combined folding binoculars and AM/FM radio. 310,675, 9-18-90, Cl. D16-133.000.
- Lu, James. Lamp. 310,727, 9-18-90, Cl. D26-63.000.
- Lu, James. Desk lamp or similar article. 310,728, 9-18-90, Cl. D26-65.000.
- M. Kamenstein, Inc.: See—  
Ancona, Jane; and Ancona, Bruce, 310,749, Cl. D34-44.000.
- Mack, Henry J., Jr.: See—  
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- Mannschreck, Susan N. Disposable pet litter housing. 310,740, 9-18-90, Cl. D30-161.000.
- Manuel, Andrew V. Beverage container. 310,627, 9-18-90, Cl. D9-325.000.
- Massi, Michael: See—  
Gonzalez, Cecilio; Gonzalez, Carlos; Massi, Michael; and Czechowski, Phillip M., 310,694, Cl. D21-96.000.
- Mathisen, Corby K.: See—  
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- Matsuda, Kenichi: See—  
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- Matsumoto, Jun: See—  
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- McCullough, John W. Decorative lamp for potted plant. 310,726, 9-18-90, Cl. D26-49.000.
- McGarvey, John N.: See—  
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- Meelen, Hans T., to U.S. Philips Corporation. Electric shaver. 310,732, 9-18-90, Cl. D28-49.000.
- Melamed, Stephen: See—  
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- Miller, David L.; and Vatnsdal, Gene. Package of rescue balloon kits. 310,641, 9-18-90, Cl. D10-109.000.
- Minnesota Mining and Manufacturing Company: See—  
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- Modulbox & Co., Inc.: See—  
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- Monta, Akihito, to Sumitomo Rubber Industries, Ltd. Automobile tire. 310,647, 9-18-90, Cl. D12-146.000.

- Morando, Aturo, to Lomeli's Statuary, Inc. Planter. 310,643, 9-18-90, Cl. D11-148.000.
- Moses, Phillip J. Litter removal tool or the like. 310,741, 9-18-90, Cl. D30-162.000.
- Murai, Kanji; and Matsumoto, Jun, to Kabushiki Kaisha Toshiba. Microwave oven. 310,616, 9-18-90, Cl. D7-351.000.
- Murphy, Patrick J., to Quaker Oats Company, The. Monitor receiver. 310,664, 9-18-90, Cl. D14-137.000.
- Nagata Kogyo Kabushiki Kaisha: See—  
Nagata, Yoichi, 310,652, Cl. D12-191.000.
- Nagata, Yoichi, to Nagata Kogyo Kabushiki Kaisha. Side visor for automobile. 310,652, 9-18-90, Cl. D12-191.000.
- National Creative Merchandising Corp.: See—  
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- Nawata, Tadashi: See—  
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- NEC Corporation: See—  
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- NeXT, Inc.: See—  
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- Nicosia, John S., Jr., executor: See—  
Nicosia, John S., Sr., deceased; and Nicosia, John S., Jr., executor, 310,704, Cl. D22-130.000.
- Nicosia, John S., Sr., deceased; and by Nicosia, John S., Jr., executor. Fishing lure. 310,704, 9-18-90, Cl. D22-130.000.
- Nielson, Rhea A. Baby weaning aid. 310,720, 9-18-90, Cl. D24-47.000.
- Nippon Gakki Seizo Kabushiki Kaisha: See—  
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- Nomura, Keiko, to Seikosha Co., Ltd. Clock. 310,634, 9-18-90, Cl. D10-24.000.
- Oficina de Investigacion Agrupada, S.A.: See—  
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- Ogasawara, Mikio: See—  
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- Ono, Kakuhisa: See—  
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- Pacific Research & Development Corp.: See—  
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- Paine, Perry P., Jr. Pontoon boat exterior hull. 310,656, 9-18-90, Cl. D12-300.000.
- Parente, Richard; and De La Cruz, Richard. Golf putter head. 310,699, 9-18-90, Cl. D21-219.000.
- Patal Enterprises, Inc.: See—  
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- Penna, Lawrence T. Promotional content kiosk. 310,607, 9-18-90, Cl. D6-481.000.
- Pentel Kabushiki Kaisha: See—  
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- Petersen, Bryan E.; and Kanceljak, Michael, to American Cyanamid Company. Tamper resistant bait tray or similar article. 310,701, 9-18-90, Cl. D22-119.000.
- Petersen, Bryan E.; and Kanceljak, Michael, to American Cyanamid Company. Tamper resistant bait tray or similar article. 310,702, 9-18-90, Cl. D22-119.000.
- Pirelli Coordinamento Pneumatici S.p.A.: See—  
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- Pitney Bowes Inc.: See—  
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- Pittman, Robert W. Taco holder or the like. 310,611, 9-18-90, Cl. D7-504.000.
- Polyak, Victor J.: See—  
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- Pomeroy, Charles; and Bycraft, John T., to Jack-Post Corporation. Glider. 310,604, 9-18-90, Cl. D6-347.000.
- Poterale, Robert J. Combination mixing tank and a panel unit. 310,674, 9-18-90, Cl. D15-199.000.
- Poulson, Keith L., to Kohler Co. Shower enclosure. 310,710, 9-18-90, Cl. D23-283.000.
- Pozzi, Ambrogio, to Fratelli Guzzini S.p.A. Container for liquid food-stuffs. 310,614, 9-18-90, Cl. D7-317.000.
- Pozzi, Ambrogio, to Fratelli Guzzini S.p.A. Foodstuffs container. 310,617, 9-18-90, Cl. D7-538.000.
- Proizvodnja in prodaja igrac, pisal, kovinskih in plasticnih izdelkov "Mehano", p.o.: See—  
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- Proizvodnja in prodaja igrac, pisal, kovinskih in plasticnih izdelkov "Mehano", P.O.: See—  
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- Quaker Oats Company, The: See—  
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- Rayner, Adrien P., to CMB Packaging (UK) Limited. Container. 310,628, 9-18-90, Cl. D9-352.000.
- Reichenberger, Roland: See—  
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- Riddle, Gregory J. Lottery ticket scraper. 310,743, 9-18-90, Cl. D32-46.000.
- Riede, Ron F.: See—  
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- Ritchel, Benny G.: See—  
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- Ritchel, Nancy C.; and Ritchel, Benny G. Beverage container holder. 310,618, 9-18-90, Cl. D7-617.000.
- Robison, Kristine M. Child's teether. 310,718, 9-18-90, Cl. D24-45.000.
- Rosalco, Inc.: See—  
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- Keller, H. Thomas, 310,606, Cl. D6-380.000.
- Rose, Eric P., to Guardian Products, Inc. Foldable rolling walker. 310,646, 9-18-90, Cl. D12-130.000.
- Rubbermaid Incorporated: See—  
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- Rumsey, Richard: See—  
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- Satoh, Yasuta; and Saitoh, Shinya, to Takara Co., Ltd. Motor driven toy cactus. 310,696, 9-18-90, Cl. D21-150.000.
- Sawyer, Charles K. Confectionary. 310,595, 9-18-90, Cl. D1-108.000.
- Schade, Uli, to Technobross Menne GmbH, Firma. Golf course bunker rake head. 310,619, 9-18-90, Cl. D8-13.000.
- Schott, Alfred; Reichenberger, Roland; Eichler, Volker; and Schulz, Horst, to VEB Kombinat Polygraph "Werner Lamberz". Console for the operation of machinery. 310,659, 9-18-90, Cl. D13-163.000.
- Schultz, Dave E.; and Riede, Ron F., to Uniroyal Plastics Company, Inc. Nozzle tip for a dispenser of sealant or adhesive. 310,635, 9-18-90, Cl. D9-447.000.
- Schulz, Horst: See—  
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- Schulz, Kenneth A.: See—  
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- Schuss, Werner: See—  
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- Screen, Stafford T., to Colson Castors (Europe) Limited. Castor. 310,622, 9-18-90, Cl. D8-375.000.
- Seasholtz, Craig A.: See—  
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- Sedman, Raymond R., to United Environmental Technologies. Portable water purifier for home use. 310,707, 9-18-90, Cl. D23-209.000.
- Seikosha Co., Ltd.: See—  
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- Sugano, Hisako, 310,638, Cl. D10-30.000.
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- Kitai, Isao; Matsuda, Kenichi; and Ogasawara, Mikio, 310,615, Cl. D7-348.000.
- Shelfco, Inc.: See—  
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- Sheriff, Jack W., to Modulbox & Co., Inc. Windshield mount radio antenna. 310,670, 9-18-90, Cl. D14-230.000.
- Shop-Vac Corporation: See—  
Berfield, Robert C.; and Seasholtz, Craig A., 310,746, Cl. D34-23.000.
- Sielck, Henry A.; and Anton, Edward R. Cigar ventilator. 310,730, 9-18-90, Cl. D27-195.000.
- Siemens Aktiengesellschaft: See—  
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- Skalka, Gerald P., to Victor Stanley, Inc. End standard for a seat. 310,636, 9-18-90, Cl. D6-500.000.
- Skripko, Robert W. Fishing lure. 310,705, 9-18-90, Cl. D22-133.000.
- Societe D'Etudes de Chimie et de Therapie Appliquees, laboratoires de Cosmetologie Yves Rocher: See—  
Thieffry, Francois, 310,630, Cl. D9-384.000.
- Sogabe, Takashi, to Sony Corporation. Combined tape player and radio tuner. 310,669, 9-18-90, Cl. D14-163.000.
- Somerville Packaging Corporation: See—  
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- Sony Corporation: See—  
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- Sorensen, Gerald R.: See—  
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- Spalding & Evenflo Companies, Inc.: See—  
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- Spine-O-Pedic Cushions, Inc.: See—  
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- Stearns, David K., to Coleman Outdoor Products, Inc. Battery powered lamp. 310,729, 9-18-90, Cl. D12-12.000.
- Stidham, Noble M., Jr.; Polyak, Victor J.; and Stadelman, Steve A. Support base for a camera or similar article. 310,677, 9-18-90, Cl. D16-242.000.
- Straihammer, Reinhard; and Schuss, Werner, to Siemens Aktiengesellschaft. Dental handpiece. 310,715, 9-18-90, Cl. D24-12.000.
- Su, Cheng-Yuan. Atomizer. 310,723, 9-18-90, Cl. D24-62.000.
- Sugano, Hisako, to Seikosha Co., Ltd. Case for a watch. 310,637, 9-18-90, Cl. D10-30.000.

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Takefuji, Kanpei; and Takefuji, Ritsuko, 310,678, Cl. D17-9.000.  
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Klein, Max, 310,713, Cl. D23-381.000.  
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Schade, Uli, 310,619, Cl. D8-13.000.  
Thermo King Corporation: See—  
Welch, Dennis E.; and Waldschmidt, William L., 310,711, Cl. D23-325.000.  
Thieffry, Francois, to Societe D'Etudes de Chimie et de Therapie Appliquees, laboratoires de Cosmetologie Yves Rocher. Bottle with closure. 310,630, 9-18-90, Cl. D9-384.000.  
Thompson, Lynn C. Folding knife. 310,621, 9-18-90, Cl. D8-99.000.  
Total Design Corporation: See—  
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Triune Research Corporation: See—  
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Callahan's Greenhouses, Inc.: See—  
Callahan, Betty C., 7,332, Cl. 74.000.  
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Weiss, Reinhold. Indoor FM antenna. 310,671, 9-18-90, Cl. D14-230.000.  
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Windsorski, David C., to Minnesota Mining and Manufacturing Company. Notepaper dispenser. 310,688, 9-18-90, Cl. D19-86.000.  
Woods, George H.; Rumsey, Richard; and Schulz, Kenneth A., to Pitney Bowes Inc. Combined postal and shipping scale. 310,640, 9-18-90, Cl. D10-91.000.  
Wu, Tsann-Kuen, to Tsann Kuen Enterprise Co., Ltd. Coffee maker or similar article. 310,613, 9-18-90, Cl. D7-309.000.  
Yamamoto, Kazuharu, to Kabushiki Kaisha Toshiba. Combined radio and cassette tape recorder. 310,666, 9-18-90, Cl. D14-163.000.  
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Kobayashi, Masahiko; and Yamamoto, Kazuharu, 310,667, Cl. D14-163.000.  
Zambelli, Michael P.: See—  
Fortune, Duane D.; Joffe, Richard M.; Mack, Henry J., Jr.; McGarvey, John N.; and Zambelli, Michael P., 310,665, Cl. D14-140.000.  
Zellweger Uster Ltd.: See—  
Fellmann, Hans-Rudolf; and Apotheloz, Christophe, 310,662, Cl. D14-106.000.

## CLASSIFICATION OF PATENTS

ISSUED SEPTEMBER 18, 1990

NOTE.—First number, class; second number, subclass; third number, patent number

67	CLASS 2	105	4,956,935	CLASS 66	43.01	4,957,033	CLASS 124	CLASS 152		
80	4,956,878	51	4,957,511	20	4,956,981	4,957,028	20.1	4,957,092	209 R	4,957,149
	4,956,879			CLASS 70	2	4,957,036	24.1	4,957,093	454	4,957,150
413	4,956,880	17	4,956,936	59	4,956,982	42.21	89	4,957,094		4,957,151
517	4,956,881	67	4,956,937	241	4,956,983	87		4,957,095		
580	4,956,882	CLASS 49		277	4,956,984	CLASS 99				
605	4,956,883	313	4,956,985	CLASS 71	340	4,957,039	39 H	4,957,096	64	4,957,150
		28	4,956,938	3	4,957,533	348	373	4,957,097	66	4,957,151
246	4,956,884	347	4,956,939	23	4,957,534	353	531	4,957,098	109	4,957,152
431	4,956,885	381	4,956,954	76	4,957,535				115	4,957,153
437	4,956,886	388	4,956,940	92	4,957,536	472		4,957,042	126	4,957,154
		440	4,956,941	CLASS 73	4,957,537	4,957,043	38	4,957,043		4,957,155
158	4,956,887	502	4,956,942	95	4,957,537	CLASS 101	46.3	4,957,564	166	4,957,156
		503	4,956,943	98	4,957,538	35	68	4,957,565	197	4,957,157
		123	4,957,540	CLASS 72	4,957,540	123			244.11	4,957,158
86 A	4,956,888	165.71	4,956,944	71	4,956,986	CLASS 102	24 A	4,957,099	250	4,957,159
		165.93	4,956,945	185	4,956,987	489		4,957,100	309.9	4,957,160
104.33	4,956,889	168	Re.33.335	208	4,956,988	CLASS 104	66	4,957,101	332	4,957,161
250.36	4,956,890	CLASS 52		327	4,956,989	204	68	4,957,102	345	4,957,162
302	Re.33.334	1	4,956,947	349	4,956,990	CLASS 106	79	4,957,103	361	4,957,163
320	4,956,891	16	4,956,948	370	4,956,991	20	96.1	4,957,104	382	4,957,164
339	4,956,892	38	4,956,949	451	4,956,992	35	201.19	4,957,105	428	4,957,165
		94	4,956,950	CLASS 73	38	4,956,993	204.21	4,957,106	495	4,957,166
34	4,956,893	169.5	4,956,951	81	4,956,994	137	632	4,957,107	628	4,957,167
58	4,956,894	207	4,956,952	146	4,956,995	170	640	4,957,108	643	4,957,168
		239	4,956,953	149	4,956,996	277	642	4,957,109	644	4,957,169
305	4,956,896	396	4,956,955	182	4,956,997	286.3	662.06	4,957,110	665	4,957,170
		584	4,956,956	457	4,956,998	453		4,957,111		
		605	4,956,958	587	4,956,999	693	665	4,957,112		
3 J	4,956,895	CLASS 53	622	4,957,000	716	4,957,555		4,957,113	CLASS 160	
134 P	4,956,897	716	4,957,001	622	4,957,001	CLASS 110	696	4,957,114	199	4,957,171
274 R	4,956,898	118	4,956,959	761	4,957,002	234	731	4,957,115	345	4,957,172
488	4,956,899	176	4,956,960	818	4,957,003	235	785	4,957,116		
606	4,956,900	433	4,956,961	842	4,957,004	346	832	4,957,117	CLASS 162	
		442	4,956,962	861.38	4,957,005	121.12	849	4,957,118	78	4,957,173
255	4,956,901	570	4,956,963	861.65	4,957,006	147	897	4,957,119	363	4,957,174
257	4,956,902	CLASS 55	864.83	864.84	4,957,007	237		4,957,120		
		8	4,957,012	865.5	4,957,008	262.2	281	4,957,121	7.1	4,957,175
237	4,956,904	16	4,957,013	865.6	4,957,009	CLASS 114	CLASS 132	4,957,122	476	4,957,176
281.1	4,956,905	26	4,957,014	866	4,957,010	219	200	4,957,123	482	4,957,177
426.5	4,956,907	43	4,957,015	89.15	4,957,011	343	309	4,957,124	504	4,957,178
438	4,956,908	184	4,957,016	89.22	4,957,012	CLASS 116		4,957,125	CLASS 165	
451	4,956,909	218	4,957,017	330	4,957,013	22 A	22.14	4,957,126	104.27	4,957,179
593	4,956,910	233	4,957,018	335	4,957,014	CLASS 118	57 R	4,957,127	110	4,957,180
631	4,956,911	269	4,957,019	336 R	4,957,015	323	117	4,957,128	133	4,957,181
721	4,956,912	316	4,957,020	502.4	4,957,016	423	118	4,957,129	160	4,957,182
730	4,956,913	387	4,957,021	531	4,957,017	699	151	4,957,130	105	4,957,183
884	4,956,914	CLASS 56	565 H	565 H	4,957,018	719	158	4,957,131	212	4,957,184
892.1	4,956,915	15.1	4,956,965	10.39	4,957,019	723	167 C	4,957,132	263	4,957,185
		181	4,956,966	238	4,957,020	CLASS 119	14	4,957,133	273	4,957,186
28	4,956,916	341	4,956,967	245	4,957,021	1	240	4,957,134	319	4,957,187
326	4,956,917	CLASS 57	4,956,968	246	4,957,022	3	268	4,957,135		
387	4,956,918	281	4,956,969	500	4,957,023	14.37	454.6	4,957,136	4	4,957,188
		334	4,956,970	501	4,957,024	39	505.25	4,957,137	CLASS 168	
32.2	4,956,919	CLASS 60		529	4,957,025	60	549	4,957,138	4	4,957,189
268	4,956,920	245	4,956,971	567	4,957,026	CLASS 123	556	4,957,139	37	4,957,190
304	4,956,921	327	4,956,972	657	4,957,027	41.82 R			CLASS 172	
366	4,956,922	605.2	4,956,973	CLASS 81	57.44	48 B	89	4,957,141	372	4,957,170
558	4,956,923			57.44	4,957,021	52 MB	136	4,957,142		
561.1	4,956,924	CLASS 62		414	4,957,022	52 MV		4,957,143	104	4,957,171
810	4,956,925	6	4,956,974	CLASS 83	16	4,957,022	88	4,957,144	48	4,957,172
		13	4,957,523	372	4,957,023	79 C	190	4,957,145	53	4,957,173
111	4,956,926	18	4,957,524	471.3	4,957,024	90.11	434	4,957,146	48	4,957,174
32 R	4,956,927	50.7	4,956,975	607	4,957,025	90.12		4,957,147	209	4,957,175
		51.3	4,956,976	870	4,957,026	90.16			261	4,957,176
107	4,956,928	106	4,956,977	384	4,957,027	90.31	105	4,957,148	CLASS 175	
136	4,956,929	239	4,956,978	604	4,957,028	198 D			61	4,957,177
		244	4,956,979	613	4,957,029	302	83	4,957,149		
		342	4,956,980	622	4,957,030	334		4,957,150	72	4,957,178
209	4,956,930	CLASS 65		4,957,031	447	4,957,081			94	4,957,179
633	4,956,931	1	4,957,525	4,957,032	447	4,957,082	252 R	4,957,151	CLASS 177	
		3.11	4,957,526	4,957,033	478	4,957,083			59	4,957,176
		19	4,957,527	4,957,034	478	4,957,084	12.7 N	4,957,152	134	4,957,177
74	4,956,932	104	4,957,528	4,957,035	480	4,957,085		4,957,153	211	4,957,178
		112	4,957,529	4,957,036	501	4,957,086	254	4,957,154		
42.31	4,956,934	72	4,957,530	1.14	4,957,037	486		4,957,155	CLASS 179	
42.5	4,956,935	273	4,957,531	8	4,957,038	602		4,957,156	21	4,957,179
			4,957,532	36.02	4,957,039	501		4,957,157		



CLASS 190	CLASS 211	311.3	4,957,260	CLASS 271	25	4,958,103	96.16	4,957,340
69.1	4,957,180	40	4,957,206	3.1	4,957,285	4,958,104	96.18	4,957,342
79.1	4,957,181	192	4,957,207	90	4,957,283	CLASS 315	96.21	4,957,343
234	4,957,182	460	4,957,262	169.3	4,958,105	96.23	4,957,344	
4,957,183	4,957,263	473	4,957,263	208	4,958,106	96.26	4,957,346	
CLASS 181	CLASS 212	510	4,957,264	289	4,958,107	96.32	4,957,347	
153	4,957,184	549	4,957,265	307	4,958,108	105	4,957,348	
CLASS 182	CLASS 213	683	4,957,266	408	4,958,109	254	4,957,349	
150	4,957,185	10	4,957,268	CLASS 273	4,958,110	333	4,957,349	
CLASS 184	CLASS 215	24	4,957,269	1.099	4,957,287	334	BI Re.32.521	
6.12	4,957,187	220	4,957,210	1.5 A	4,957,288	336	4,957,350	
CLASS 186	CLASS 219	230	4,957,211	2	4,957,289	337	BI 4,540,243	
41	4,957,188	10.55 R	4,958,055	56	4,957,290	348	4,957,351	
CLASS 187	CLASS 221	10.55 M	4,958,054	153 R	4,957,291	353	4,957,352	
12	4,957,189	120	4,958,056	159	4,957,292	431	4,957,354	
32	4,957,190	121.34	4,958,059	162 D	4,957,293	432	4,957,355	
95	4,957,191	121.5	4,958,057	183 B	4,957,294	574	4,957,356	
CLASS 188	CLASS 222	121.6	4,958,058	201	4,957,295	576	4,957,357	
71.9	4,957,192	145.22	4,958,060	213	4,957,296	588	4,957,358	
153 R	4,957,193	411	4,958,061	240	4,957,297	637	4,957,359	
0.096	4,957,194	497	4,958,062	409	4,957,298	CLASS 322	CLASS 351	
106 F	4,957,195	509	Re.33.343	428	4,957,299	91	4,958,119	
239	4,957,196	220	4,957,214	CLASS 277	4,957,300	224	4,958,121	
CLASS 194	CLASS 220	232	4,957,215	12	4,957,301	315	4,958,122	
CLASS 196	CLASS 221	379	4,957,216	217	4,957,302	316	4,958,123	
394	4,957,197	559	4,957,213	CLASS 280	4,957,303	96	4,958,124	
513	4,957,198	347	4,958,077	32.6	4,957,302	162	4,958,125	
831	4,957,199	396 R	4,958,078	250.1	4,957,303	318	4,958,126	
847	4,957,199	483.1	4,958,080	609	4,957,304	426	4,958,127	
CLASS 200	CLASS 222	505.1	4,958,081	618	4,957,305	559	4,958,128	
80 R	4,958,051	548	4,958,082	652	4,957,306	661	4,958,129	
148 R	4,958,052	572	4,958,083	707	4,957,307	700	4,958,130	
CLASS 201	CLASS 223	129.02	4,957,275	707	4,957,309	708	4,958,131	
20	4,957,196	129.04	4,957,273	CLASS 283	4,958,120	155	4,958,120	
CLASS 202	CLASS 224	129.12	4,957,274	34	4,957,310	CLASS 330	4,958,133	
181	4,957,200	56	4,957,311	89	4,957,312	110	4,958,132	
CLASS 203	CLASS 225	8.554	4,957,279	CLASS 285	4,957,313	253	4,958,133	
51	4,957,195	8.555	4,957,280	144	4,957,313	CLASS 333	41	
CLASS 204	CLASS 226	8.6	4,957,281	355	4,957,314	12	4,958,134	
27	4,957,197	32.7 E	4,957,282	CLASS 292	4,957,315	8	4,958,135	
106	4,957,200	34	4,957,283	251.5	4,957,316	42	4,958,136	
129	4,957,201	42.03 A	4,957,284	256.67	4,957,317	128	4,958,137	
157.71	4,957,202	42.45 R	4,957,285	337	4,957,315	CLASS 336	259	
164	4,957,203	42.46 A	4,957,286	CLASS 294	4,957,319	180	Re.33.345	
192.12	4,957,204	47.5	4,957,287	19.2	4,957,319	CLASS 338	290	
192.16	4,957,205	51.5 A	4,957,288	64.1	4,957,318	114	4,958,138	
192.27	4,957,206	56 R	4,957,289	106	4,957,320	CLASS 340	299	
192.31	4,957,207	62.52	4,957,290	CLASS 296	4,957,321	122	4,958,139	
196	4,957,208	142	4,957,291	65.1	4,957,321	146.2	4,958,140	
291	4,957,209	186.38	4,957,292	180.2	4,957,322	426	4,958,142	
299 R	4,957,210	299.01	4,957,293	181	4,957,323	479	4,958,143	
411	4,957,211	311	4,957,294	190	4,957,324	606	4,958,144	
415	4,957,212	373	4,957,295	210	4,957,325	689	4,958,145	
435	4,957,213	400.23	4,957,296	CLASS 299	4,957,326	703	4,958,146	
CLASS 206	CLASS 228	500	4,957,297	11	4,957,327	706	4,958,147	
44.11	4,957,202	510	4,957,298	CLASS 301	4,957,328	712	4,958,148	
286	4,957,203	CLASS 260	4,957,260	105 R	4,957,329	715	4,958,149	
326	4,957,204	34.2	4,957,261	CLASS 303	4,957,330	783	4,958,150	
330	4,958,053	95	4,957,262	97	4,957,331	784	4,958,151	
371	4,957,205	112.100	4,957,263	115	4,957,332	825.5	4,958,152	
444	4,957,206	1.4	4,957,264	CLASS 305	4,957,333	825.690	4,958,154	
CLASS 208	CLASS 229	4.7	4,957,265	39	4,957,334	CLASS 341	5	
113	4,957,217	16	4,957,266	10.2	4,958,084	120	4,958,155	
CLASS 209	CLASS 230	262	4,958,085	262	4,958,085	123	4,958,156	
303	4,957,218	296.8	4,958,086	443	4,958,087	133	4,958,157	
539	4,957,219	443	4,958,088	448	4,958,088	144	4,958,158	
CLASS 210	CLASS 231	60	4,957,267	448	4,958,089	CLASS 342	38	
119	4,957,220	65	4,957,268	451	4,958,091	700 MS	4,958,162	
129	4,957,221	102	4,957,269	456	4,958,090	745	4,958,163	
169	4,957,222	118	4,957,270	480	4,958,092	749	4,958,164	
170	4,957,223	135	4,957,271	540	4,958,093	770	4,958,165	
171	4,957,224	152	4,957,272	570	4,958,094	771	4,958,166	
242.3	4,957,225	161	4,957,273	CLASS 310	4,958,095	853	4,958,167	
248	4,957,226	211.23	4,957,274	59	4,958,096	75	4,958,168	
264	4,957,227	255	4,957,275	68 E	4,958,097	108	4,958,169	
358	4,957,228	256	4,957,276	83	4,958,098	136	4,958,170	
443	4,957,229	257	4,957,277	156	4,958,099	153.1	4,958,171	
519	4,957,230	261	4,957,278	254	4,958,100	159	4,958,172	
635	4,957,231	506	4,957,279	328	4,958,101	160.1	4,958,173	
679	4,957,232	CLASS 267	4,957,277	CLASS 312	4,957,333	CLASS 350	136	
695	4,957,233	33	4,957,278	108	4,957,334	3.71	4,957,336	
705	4,957,234	140.5	4,957,279	221	4,957,335	96.13	4,957,337	
711	4,957,235	166	4,957,280	CLASS 313	4,958,102	96.15	4,957,338	
767	4,957,236	37	4,957,281	1	4,958,102	4,957,339	180	
782	4,957,237	47	4,957,282				4,958,220	

211	4,958,231	218	4,958,326	196.1	Re.33.340	592	4,957,725	411.1	4,957,816	207	4,957,447
296	4,957,689	CLASS 366		279	4,957,380	644	4,957,726	436	4,957,817	326	4,957,448
300	4,958,232	76	4,957,372	621	4,957,381	647	4,957,727	451	4,957,818	364	4,957,449
302	4,958,233	197	4,957,373	656	4,957,382	CLASS 424		547	4,957,819	369	4,957,450
327	4,958,234	CLASS 367		CLASS 401		1.1	4,957,728	623	4,957,820	395	4,957,451
402	4,958,235	55	4,957,383	55	4,957,383	5	4,957,729	651	4,957,821	410	4,957,452
445	4,958,236	7	4,958,327	65	4,957,384	50	4,957,730	653	4,957,822	422	4,957,453
451	4,958,237	15	4,958,328	132	4,957,385	61	4,957,731	663	4,957,823	544	4,957,454
456	4,958,238	20	4,958,329	73	4,957,386	62	4,957,732	694	4,957,824	548	4,957,455
457	4,958,239	88	4,958,330	CLASS 403		73	4,957,733	4,957,825	578	4,957,456	
475	4,958,240	130	4,958,331	231	4,957,386	85.4	4,957,733	CLASS 429	CLASS 440		
487	4,958,241	140	4,958,332	322	4,957,387	85.7	4,957,734	27	4,957,826	61	4,957,457
CLASS 360		154	4,958,333	344	4,957,388	85.8	4,957,735	60	4,957,827	66	4,957,458
27	4,958,242	CLASS 368		CLASS 404		88	4,957,736	92	4,957,828	72	4,957,459
51	4,958,243	282	4,958,279	70	4,957,390	92	4,957,737	99	4,957,829	83	4,957,460
72.1	4,958,244	72	4,958,334	72	4,957,389	94	4,957,738	101	4,957,830	89	4,957,461
77.03	4,958,245	94	4,957,391	94	4,957,391	195.1	4,957,743	121	4,957,831	111	4,957,462
77.15	4,958,246	CLASS 369		CLASS 405		401	4,957,744	164	4,957,832	CLASS 445	
90	4,958,247	44.14	4,958,335	401	4,957,392	461	4,957,745	197	4,957,833	50	4,957,463
107	4,958,248	44.21	4,958,336	490	4,957,393	532	4,957,746	CLASS 430	CLASS 446		
133	4,958,249	58	4,958,337	532	4,957,394	551	4,957,747	5	4,957,834	16	4,957,464
CLASS 361		98	4,958,338	551	4,957,395	691	4,957,747	59	4,957,835	61	4,957,465
40	4,958,250	CLASS 370		CLASS 407		CLASS 425		59	4,957,836	CLASS 450	
84	4,958,251	60.1	4,958,341	114	4,957,396	114	4,957,837	66	4,957,837	85	4,957,466
93	4,958,252	79	4,958,342	114	4,957,396	115	4,957,838	106.6	4,957,838	CLASS 455	
119	4,958,253	112	4,958,343	224	4,957,397	115	4,957,839	110	4,957,839	4	4,958,381
212	4,958,254	85.1	4,958,344	CLASS 408		145	4,957,840	110	4,957,840	277	4,958,382
331	4,958,255	212	4,958,344	CLASS 409		362	4,957,841	114	4,957,841	CLASS 460	
385	4,958,257	21.3	4,958,345	136	4,957,398	367	4,957,842	115	4,957,842	69	4,957,467
386	4,958,258	29.5	4,958,346	CLASS 410		CLASS 426		138	4,957,843	CLASS 464	
394	4,958,259	37.1	4,958,347	87	4,957,399	2	4,957,748	156	4,957,844	27	4,957,468
398	4,958,260	37.1	4,958,348	110	4,957,400	10	4,957,749	165	4,957,845	175	4,957,469
417	4,958,261	37.4	4,958,349	CLASS 411		39	4,957,750	170	4,957,846	20	4,957,470
426	4,958,262	40.1	4,958,351	CLASS 412		16	4,957,751	203	4,957,847	CLASS 474	
32	4,958,263	49.4	4,958,352	5	4,957,401	43	4,957,752	264	4,957,848	101	4,957,471
106	4,958,264	368	4,958,353	84	4,957,402	74	4,957,753	271	4,957,849	133	4,957,472
293	4,958,265	CLASS 372		368	4,957,403	111	4,957,754	272	4,957,850	203	4,957,473
310	4,958,266	29	4,958,354	CLASS 413		138	4,957,755	283	4,957,851	CLASS 475	
399	4,958,267	45	4,958,355	8	4,956,906	242	4,957,756	384	4,957,852	231	4,957,474
CLASS 363		59	4,958,356	CLASS 414		281	4,957,757	384	4,957,853	CLASS 494	
16	4,958,268	96	4,958,357	324	4,957,404	330.6	4,957,758	495	4,957,854	53	4,957,475
CLASS 364		CLASS 373		339	4,957,405	399	4,957,759	518	4,957,855	CLASS 501	
153	4,958,269	72	4,958,358	404	Re.33.341	457	4,957,760	546	4,957,856	CLASS 502	
187	4,958,270	CLASS 374		404	4,957,406	458	4,957,761	611	4,957,857	CLASS 503	
200	4,958,271	142	4,957,374	498	4,957,407	547	4,957,762	265	4,957,858	CLASS 504	
4,958,273		CLASS 375		635	4,957,408	573	4,957,763	3	4,957,859	CLASS 505	
4,958,274		788.4	4,957,409	586	4,957,409	586	4,957,764	4	4,957,860	CLASS 506	
4,958,275		1	4,958,359	590	4,957,410	592	4,957,765	5	4,957,861	CLASS 507	
4,958,276		97	4,958,360	590	4,957,411	592	4,957,766	6	4,957,862	CLASS 508	
4,958,277		102	4,958,361	604	4,957,412	604	4,957,767	7	4,957,863	CLASS 509	
4,958,278		CLASS 376		CLASS 415		CLASS 427		8	4,957,864	CLASS 510	
4,958,280		216	4,957,690	9	4,957,413	9	4,957,770	9	4,957,865	CLASS 511	
413.01	4,958,281	285	4,957,691	38	4,957,414	38	4,957,771	10	4,957,866	CLASS 512	
413.13	4,958,282	240	4,957,692	39	4,957,415	39	4,957,772	11	4,957,867	CLASS 513	
419	4,958,284	298	4,957,693	45.1	4,957,416	45.1	4,957,773	12	4,957,868	CLASS 514	
422	4,958,285	310	4,957,694	53.1	4,957,417	53.1	4,957,774	13	4,957,869	CLASS 515	
424.1	4,958,286	364	4,957,695	54.1	4,957,418	54.1	4,957,775	14	4,957,870	CLASS 516	
426.04	4,958,288	419	4,957,696	273	4,957,419	273	4,957,776	15	4,957,871	CLASS 517	
431.01	4,958,289	442	4,957,697	423.13	4,957,420	423.13	4,957,777	16	4,957,872	CLASS 518	
463	4,958,290	494	4,957,698	494	4,957,421	494	4,957,778	17	4,957,873	CLASS 519	
464.02	4,958,291	CLASS 377		CLASS 416		CLASS 428		18	4,957,874	CLASS 520	
468	4,958,292	20	4,958,362	255	4,957,422	255	4,957,779	19	4,957,875	CLASS 521	
474.03	4,958,293	CLASS 378		CLASS 417		CLASS 429		20	4,957,876	CLASS 522	
483	4,958,294	85	4,958,363	CLASS 418		CLASS 430		21	4,957,877	CLASS 523	
497	4,958,295	122	4,958,364	CLASS 419		CLASS 431		22	4,957,878	CLASS 524	
509	4,958,296	144	4,958,364	CLASS 420		CLASS 432		23	4,957,879	CLASS 525	
518	4,958,272	CLASS 379		CLASS 421		CLASS 433		24	4,957,880	CLASS 526	
519	4,958,297	74	4,958,366	CLASS 422		CLASS 434		25	4,957,881	CLASS 527	
520	4,958,299	84	4,958,367	CLASS 423		CLASS 435		26	4,957,882	CLASS 528	
521	4,958,300	91	4,958,368	CLASS 424		CLASS 436		27	4,957,883	CLASS 529	
522	4,958,301	156	4,958,369	CLASS 425		CLASS 437		28	4,957,884	CLASS 530	
550	4,958,302	357	4,958,370	CLASS 426		CLASS 438		29	4,957,885	CLASS 531	
551.01	4,958,307	100	4,958,372	CLASS 427		CLASS 439		30	4,957,886	CLASS 532	
574	4,958,308	102	4,957,707	CLASS 428		CLASS 440		31	4,957,887	CLASS 533	
580	4,958,309	106	4,957,708	CLASS 429		CLASS 441		32	4,957,888	CLASS 534	
718	4,958,310	134	4,957,709	CLASS 430		CLASS 442		33	4,957,889	CLASS 535	
724.01	4,958,311	171	4,957,710	CLASS 431		CLASS 443		34	4,957,890	CLASS 536	
754	4,958,312	245	4,957,711	CLASS 432		CLASS 444		35	4,957,891	CLASS 537	
757	4,958,313	249	4,957,712	CLASS 433		CLASS 445		36	4,957,892	CLASS 538	
900	4,958,314	CLASS 423		CLASS 434		CLASS 446		37	4,957,893	CLASS 539	
CLASS 365		CLASS 384		CLASS 435		CLASS 447		38	4,957,894	CLASS 540	
63	4,958,316	24	4,957,713	CLASS 436		CLASS 448		39	4,957,895	CLASS 541	
104	4,958,317	228	4,957,714	CLASS 437		CLASS 449		40	4,957,896	CLASS 542	
149	4,958,318	235	4,957,715	CLASS 438		CLASS 450		41	4,957,897	CLASS 543	
154	4,958,319	240	4,957,716	CLASS 439		CLASS 451		42	4,957,898	CLASS 544	
174	4,958,320	244	4,957,717	CLASS 440		CLASS 452		43	4,957,899	CLASS 545	
185	4,958,321	328	4,957,718	CLASS 441		CLASS 453		44	4,957,900	CLASS 546	
189.01	4,958,322	392	4,957,719	CLASS 442		CLASS 454		45	4,957,901	CLASS 547	
201	4,958,323	449	4,957,720	CLASS 443		CLASS 455		46	4,957,902	CLASS 548	
206	4,958,324	461	4,957,721	CLASS 444		CLASS 456		47	4,957,903	CLASS 549	
206	4,958,325	496	4,957,722	CLASS 445		CLASS 457		48	4,957,904	CLASS 550	
		574 R	4,957,723	CLASS 446		CLASS 458		49	4,957,905	CLASS 551	
			4,957,724	CLASS 447		CLASS 459		50	4,957,906	CLASS 552	
				CLASS 448		CLASS 460		51	4,957,907	CLASS 553	
				CLASS 449		CLASS 461		52	4,957,908	CLASS 554	
				CLASS 450		CLASS 462		53	4,957,909	CLASS 555	
				CLASS 451		CLASS 463		54	4,957,910	CLASS 556	
				CLASS 452		CLASS 464		55	4,957,911	CLASS 557	
				CLASS 453		CLASS 465		56	4,957,912	CLASS 558	
				CLASS 454		CLASS 466		57	4,957,913	CLASS 559	
				CLASS 455		CLASS 467		58	4,957,914	CLASS 560	
				CLASS 456		CLASS 468		59	4,957,915	CLASS 561	
				CLASS 457		CLASS 469		60	4,957,916	CLASS 562	
				CLASS 458		CLASS 470		61	4,957,917	CLASS 563	
				CLASS 459		CLASS 471		62	4,957,918	CLASS 564	
				CLASS 460		CLASS 472		63	4,957,919	CLASS 565	
				CLASS 461		CLASS 473		64	4,957,920	CLASS 566	
				CLASS 462		CLASS 4					

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## CLASSIFICATION OF PATENTS

356	4,957,930	114	4,957,955	246	4,957,985	20	4,958,011	255	4,958,034	53	4,957,484		
373	4,957,931	120	4,957,956	247	4,957,986		4,958,012	408	4,958,035	95	4,957,117		
375	4,957,932	169	4,957,957	258	4,957,987	27	4,958,013	463	4,958,036	96	4,957,485		
376	4,957,933		4,957,958	259	4,957,988	56	4,958,014	476	4,958,037		4,957,486		
383	4,957,934	196	4,957,959	279	4,957,989	103	4,958,015	CLASS 556			133	4,957,487	
	4,957,935	243	4,957,960	282	4,957,990	123	4,958,016	55	4,958,038	161	4,957,488		
389	4,957,936	405	4,957,961	295	4,957,991	124	4,958,017	421	4,958,039	197	4,957,490		
407	4,957,937	538	4,957,962	324	4,957,992	CLASS 540			467	4,958,040	317	4,957,491	
412	4,957,938	837	4,957,963	CLASS 528			215	4,958,018	480	4,958,041	319	4,957,492	
428	4,957,927	CLASS 525			26	4,957,993	226	4,958,019	CLASS 558			403	4,957,493
492	4,957,939	64	4,957,964	90	4,957,994	310	4,958,020	403	4,958,043	892.1	4,957,494		
557	4,957,940	66	4,957,965	99	4,957,995	CLASS 544			431	4,958,044	CLASS 606		
648	4,957,941		4,957,966	181	4,957,996	58.6	4,958,023	CLASS 560			58	4,957,495	
		68	4,957,967	220	4,957,997	129	4,958,021	20	4,958,045	70	4,957,496		
62	4,957,942	74	4,957,968	230	4,957,999	180	4,958,022	142	4,958,046	71	4,957,497		
64	4,957,943	86	4,957,969	271	4,958,000	CLASS 546			146	4,957,498	153	4,957,499	
115	4,957,944	99	4,957,970	346	4,958,001	249	4,958,024	363	4,958,042	157	4,957,500		
182	4,957,945	240	4,957,972	351	Re.33.342	345	4,958,025	CLASS 600			200	4,957,501	
		280	4,957,973	353	4,958,002	CLASS 548			223	4,957,502	CLASS 623		
59	4,957,946	301	4,957,974	364	4,958,003	259	4,958,026	7	4,957,476	2	4,957,503		
66	4,957,947	328.4	4,957,977	388	4,958,004	264.8	4,958,027	16	4,957,477	3	4,957,504		
		340	4,957,975	408	4,958,005	309	4,958,028	25	4,957,478	6	4,957,505		
			4,957,976	501	4,958,006	430	4,958,029	8	4,957,479	10	4,957,506		
122	4,957,948	390	4,957,978			431	4,958,031	20	4,957,480	12	4,957,507		
201	4,957,949	420.5	4,957,979	CLASS 530			526	4,958,030	22	4,957,481	16	4,957,508	
205	4,957,950	425	4,957,980	351	4,958,007	543	4,958,032	30	4,957,483	23	4,957,510		
401	4,957,951	529	4,957,981	356	4,958,008	CLASS 536							
402	4,957,952			389	4,958,009	59	4,958,033	CLASS 549					
		62	4,957,982										
99	4,957,953	200	4,957,983	CLASS 526									
102	4,957,954	240	4,957,984	17.2	4,958,010								

## CLASSIFICATION OF DESIGNS

D1—	108	310,595	93	310,620	146	310,647	140	310,673	219	310,699	68	310,724			
D2—	29	310,596	99	310,621		310,648	199	310,674	238	310,700	2	310,725			
	229	310,597	375	310,622	156	310,649	133	310,675	D22—	119	310,701	49	310,726		
	318	310,598	380	310,623	163	310,650	134	310,676			310,702	63	310,727		
D3—	12	310,599	395	310,624	179	310,651	242	310,677		122	310,703	65	310,728		
	62	310,600	305	310,625	191	310,652	9	310,678		130	310,704	110	310,729		
D4—	114	310,601	322	310,626		310,653	10	310,679		133	310,705	D27—	195	310,730	
D6—	301	310,602	325	310,627	211	310,654	D18—	1	310,680	D23—	209	310,707	13	310,733	
	347	310,604	352	310,628	213	310,655		310,681		213	310,708	D28—	49	310,732	
	349	310,603		310,629	300	310,656		310,682		226	310,706	53	310,734		
	368	310,605	384	310,630	D13—	102	310,657	40	310,683		250	310,709	76	310,735	
	380	310,606	404	310,631		310,658	D19—	57	310,684		283	310,710	82	310,736	
	481	310,607	412	310,632	163	310,659		310,686		325	310,711	88	310,737		
	500	310,608	416	310,633	D14—	100	310,660	69	310,687		335	310,712	D29—	20	310,738
	601	310,636	447	310,635		310,661	86	310,688		381	310,713	21	310,739		
		310,609		310,634		310,662		310,689	D24—	10	310,714				
		310,610	24	310,637		310,663	D30—	29	310,690		12	310,715	D30—	161	310,740
D7—	307	310,612		310,638		310,664	D21—	74	310,685		23	310,731		162	310,741
	309	310,613	46	310,639		310,665		310,691		34	310,716	D32—	46	310,743	
	317	310,614	91	310,640	163	310,666	86	310,692		38	310,717		58	310,742	
	348	310,615	109	310,641		310,667		310,693		45	310,718	D34—	1	310,744	
	351	310,616		310,642		310,668	96	310,694		47	310,719		6	310,745	
	504	310,611		310,643		310,669		310,695			310,720		23	310,746	
	538	310,617	D11—	148	310,643			150	310,696		49	310,721	28	310,747	
	617	310,618	D12—	112	310,644	230	310,670		310,697		51	310,722	40	310,748	
D8—	13	310,619		129	310,645		310,671		310,698		62	310,723	44	310,749	
				130	310,646	D15—	66	310,672							

## CLASSIFICATION OF PLANTS

P.—	10	7,326										
	34	7,327	7,328	68	7,329	69	7,330	7,331	74	7,332		

GEOGRAPHICAL INDEX  
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

01	4,956,942	4,957,266	4,958,066	4,957,316	4,956,940	4,958,341
	4,957,020	4,957,296	4,958,072	4,957,415	4,956,948	4,958,343
	4,957,139	4,957,322	4,958,089	4,957,444	4,956,962	4,956,995
	4,957,219	4,957,333	4,958,109	4,957,447	4,956,975	4,957,073
	4,957,436	4,957,344	4,958,132	4,957,593	4,957,120	4,957,124
	4,957,789	4,957,347	4,958,141	4,957,644	4,957,294	4,957,129
	4,958,171	4,957,357	4,958,146	4,957,653	4,957,631	4,957,228
02	4,957,295	4,957,364	4,958,148	4,957,658	4,957,671	4,957,238
04	4,957,006	4,957,367	4,958,162	4,957,801	4,957,686	4,957,332
	4,957,121	4,957,369	4,958,166	4,957,908	4,957,783	4,957,359
	4,957,263	4,957,371	4,958,204	4,957,910	4,957,798	4,957,442
	4,957,293	4,957,392	4,958,207	4,958,068	4,957,809	4,957,479
	4,957,300	4,957,401	4,958,224	4,958,073	4,957,948	4,957,533
	4,957,714	4,957,406	4,958,243	4,958,080	4,957,978	4,957,668
	4,957,722	4,957,413	4,958,245	4,958,105	4,958,032	4,958,051
	4,957,941	4,957,456	4,958,248	4,958,291	4,957,465	4,958,096
	4,958,122	4,957,466	4,958,257	4,958,331	4,957,186	Re.33.334
05	4,957,203	4,957,484	4,958,273	4,958,367	4,957,761	4,956,892
06	Re.33.337	4,957,494	4,958,290	4,956,901	4,957,878	4,956,893
	Re.33.341	4,957,505	4,958,294	4,957,599	4,958,088	4,956,914
	Re.33.344	4,957,523	4,958,304	4,957,779	4,958,091	4,956,959
	4,956,886	4,957,538	4,958,310	4,957,794	4,956,905	4,956,960
	4,956,888	4,957,540	4,958,312	4,957,844	4,956,911	4,957,424
	4,956,923	4,957,550	4,958,315	4,957,973	4,956,993	4,957,563
	4,956,932	4,957,556	4,958,318	4,957,986	4,957,011	4,957,065
	4,956,953	4,957,571	4,958,321	4,958,038	4,957,025	4,957,183
	4,957,001	4,957,575	4,958,325	4,958,295	4,957,026	4,957,621
	4,957,009	4,957,580	4,958,338	4,956,919	4,957,091	4,956,909
	4,957,012	4,957,606	4,958,344	4,956,926	4,957,180	4,956,935
	4,957,018	4,957,612	4,958,348	4,956,952	4,957,198	4,957,201
	4,957,044	4,957,647	4,958,349	4,957,007	4,957,211	4,957,380
	4,957,063	4,957,656	4,958,350	4,957,008	4,957,235	4,958,235
	4,957,070	4,957,669	4,958,351	4,957,262	4,957,257	4,957,002
	4,957,092	4,957,670	4,958,361	4,957,284	4,957,271	4,957,252
	4,957,105	4,957,672	4,958,363	4,957,290	4,957,283	4,957,325
	4,957,108	4,957,673	1,032,521	4,957,410	4,957,314	4,957,389
	4,957,125	4,957,679	4,956,916	4,957,412	4,957,324	4,957,566
	4,957,134	4,957,690	4,956,930	4,957,488	4,957,394	4,957,726
	4,957,147	4,957,716	4,956,931	4,957,489	4,957,623	4,957,893
	4,957,157	4,957,755	4,956,990	4,957,504	4,957,636	4,957,957
	4,957,160	4,957,756	4,957,166	4,957,622	4,957,694	4,957,958
	4,957,170	4,957,770	4,957,205	4,957,626	4,957,718	4,958,034
	4,957,207	4,957,791	4,957,518	4,957,747	4,957,762	4,958,168
	4,957,217	4,957,826	4,957,522	4,957,803	4,957,891	4,957,400
	4,957,220	4,957,835	4,958,302	4,957,952	4,957,892	4,958,090
	4,957,225	4,957,858	4,958,342	4,958,048	4,957,894	4,958,234
	4,957,230	4,957,870	4,956,927	4,958,159	4,958,013	4,957,027
	4,957,232	4,957,877	4,956,958	4,958,159	4,958,015	4,957,110
	4,957,236	4,957,914	4,956,999	4,958,280	4,958,053	4,957,276
	4,957,242	4,957,917	4,957,127	4,958,305	4,958,081	4,957,325
	4,957,251	4,957,998	4,957,179	4,958,330	4,958,107	4,957,732
	4,957,253	4,958,009	4,957,215	Re.33.338	4,958,253	4,957,831
	4,957,255	4,958,028	4,957,310	4,956,882	4,958,266	4,957,889
				4,956,883		



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## GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

4,957,918	4,957,117	4,958,007	4,957,804	4,957,123	4,957,601
4,958,371	4,957,233	4,958,036	4,957,924	4,957,131	4,957,639
4,956,974	4,957,441	4,958,102	4,958,195	4,957,169	4,957,640
4,957,010	4,957,554	4,958,111	4,956,889	4,957,206	4,957,646
4,957,055	4,957,579	4,958,115	4,956,910	4,957,216	4,957,704
4,957,113	4,957,620	4,958,149	4,956,964	4,957,279	4,957,807
4,957,115	4,957,667	4,958,226	4,956,965	4,957,320	4,957,902
4,957,227	4,957,769	4,958,227	4,957,017	4,957,421	4,957,907
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4,957,312	4,957,810	4,958,250	4,957,177	4,957,481	4,958,064
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4,957,402	4,958,076	4,956,896	4,957,188	4,957,492	4,958,206
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4,957,740	4,958,297	4,956,991	4,957,281	4,957,515	4,958,277
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4,956,891	4,957,961	4,957,274	4,956,912	4,957,486	4,957,943
4,956,934	4,957,968	4,957,376	4,956,913	4,957,487	4,958,117
4,956,938	4,957,969	4,957,396	4,956,928	4,957,555	4,958,118
4,956,947	4,957,972	4,957,574	4,956,954	4,957,585	4,958,119
4,956,978	4,957,996	4,957,583	4,956,968	4,957,590	4,958,139
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4,600,813	06/524,774	7/15/86	4,600,964	06/705,014	7/15/86
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4,600,900	06/715,833	7/15/86	4,601,042	06/596,255	7/15/86
4,600,923	06/607,078	7/15/86	4,601,045	06/637,362	7/15/86
4,600,945	06/480,907	7/15/86	4,601,059	06/595,912	7/15/86

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**4,620,196**, Re. S. N. 07/564,696, Filed Aug. 7, 1990, Cl. 346, METHOD AND APPARATUS FOR HIGH RESOLUTION INK JET PRINTING, Carl H. Hertz, et al., Owner of Record: Inventor, Attorney or Agent: Toby H. Kusmer, Ex. Gp.: 216

**4,942,085**, Re. S. N. 07/570,193, Filed Aug. 20, 1990, Cl. 428/288, METHOD OF MANUFACTURING A SAG-RESISTANT BONDED PARTICULATE ARTICLE, Gerald J. Guerro et al., Owner of Record: American Cyanamid Co., Stamford, Conn., Attorney or Agent: Steven H. Flynn, Ex. Gp.: 154

## REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**Re. 31,852**, Reexam. No. 90/002,115, Requested Aug. 24, 1990, Cl. 370/090, DATA TRANSMISSION, Olof Soderblom, Owner of Record: Willemijn Houdstermaatschappij, Rotterdam, Netherlands, Attorney or Agent: George Vande Sande, Pollock, Vande Sande & Priddy, Washington, D.C., Ex. Gp.: 263, Requester: Arnold, White & Durkee, Houston, Tex.

**4,198,094**, Reexam. No. 90/002,112, Requested Aug. 20, 1990, Cl. 297/306, WORKING CHAIR, Anders Bjerknes, et al., Owner of Record: Anders Bjerknes & Reudi A Porta, Oslo, Norway, Attorney or Agent: Shugrue, Mion, Zinn, MacPeak & Seas, Washington, D.C., Ex. Gp.: 357, Requester: Sit-Rite Group, Inc., Evergreen, Colo.

**4,522,828**, Reexam. No. 90/002,111, Requested Aug. 17, 1990, Cl. 514/646, THERAPEUTIC AGENTS, James E. Jefferey, et al., Owner of Record: The Boots Co., Plc., Nottingham, England, Attorney or Agent: Ostrolenk, Faber, Gerb & Soffen, New York, N. Y., Ex. Gp.: 124, Requester: Owner

**4,552,899**, Reexam. No. 90/002,116, Requested Aug. 24, 1990, Cl. 514/568, COUGH/COLD MIXTURES COMPRISING NON-STEROIDAL ANTI-INFLAMMATORY DRUGS, Abraham Sunshine, et al., Owner of Record: Analgesic Associates, Larchmont, N.Y., Attorney or Agent: Norman H. Stepno, Burns, Doane, Swecker & Mathis, Alexandria, Va., Ex. Gp.: 125, Requester: Owner

**4,572,600**, Reexam. No. 90/002,113, Requested Aug. 20, 1990, Cl. 339/14R, ELECTRICAL CONNECTOR FOR TRANSDUCER SUPPRESSION, Gerald R. Nieman, Owner of Record: ITT Corp., New York, N.Y., Attorney or Agent: T. L. Peterson, ITT Western Region, Woodland Hills, Calif., Ex. Gp.: 322, Requester: Thomas L. Peterson, ITT Corp., Santa Ana, Calif.

**4,854,473**, Reexam. No. 90/002,114, Requested Aug. 17, 1990, Cl. 220/335, SINGLE-PIECE SNAP HINGE CLOSURE, Werner F. Dunbach, Owner of Record: Alfatech, A.G., Dietlikon, Switzerland, Attorney or Agent: Thomas W. Speckman, Chicago, Ill., Ex. Gp.: 241, Requester: John Kurucz, Kane, Dalsimer, Sullivan, Kurucz, et al., New York, N.Y.

## Errata

The following registration number appeared in the "Trademark Registrations Renewed" section of the Trademark Official Gazette of February 27, 1990 for a renewal term of ten years.  
TM 178 840,269 February 27, 1990

Subsequently, the certificate of registration bearing the above-identified registration number was renewed for a term of 20 years, from December 12, 1987 to December 12, 2007. Hence, the registration remains active.

August 27, 1990

JEFFREY M. SAMUELS  
Assistant Commissioner  
for Trademarks

## Notice of Petition for Reinstatement

Edwin H. Crabtree of Denver, Colorado, and formerly of Wichita, Kansas, whose registration number is 26,720, and who has been suspended pursuant to 35 U.S.C. § 32 for a period of at least three years, has filed a petition for reinstatement. Granting of reinstatement is subject to, *inter alia*, establishing to the satisfaction of the Director of Enrollment and Discipline that granting the petition is not contrary to the public interest, and that the suspended or excluded practitioner has complied with the provisions of 37 CFR § 10.158 during his period of suspension or exclusion. 37 CFR § 10.160. Accordingly, information bearing upon Edwin H. Crabtree's good moral character and reputation is material to his eligibility for reinstatement. Any information tending to affect the eligibility of Edwin H. Crabtree on moral, ethical, or other grounds should be furnished to the Director in a written communication addressed to the Commissioner of Patents and Trademarks, Box OED, Washington, D.C. 20231 on or before November 9, 1990.

August 29, 1990

CAMERON WEIFFENBACH  
Director  
Office of Enrollment and  
Discipline

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**Suspension**

David A. Maxon of Warren, Michigan, whose registration number is 21,131, has been suspended from practice before the Patent and Trademark Office beginning September 2, 1990 for

a period of two (2) years. This action is taken under the provisions of 35 U.S.C. 32.

August 27, 1990

CAMERON WEIFFENBACH, *Director*  
*Office of Enrollment and Discipline***Status of PTO Services**

The following is an update of the status of PTO services for August 1990:

Service Item	FY 1990 Goal (Calendar Days)*	Monthly Average (Calendar Days)*
Filing Receipts:		
Patents	22	18
Trademarks	30	68
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	16 Hours
Window Coupons	5	1
Mail Coupons	12	5
Letter Orders	16	12
Electronic Ordering Service (EOS)	11	2
Certified Copies:		
Trademark Registrations	21	21
Applications-As-Filed	17	7
File-Wrapper/Contents	N/A	8
Walk-up Certification	1	1
Patent Application Expedited	5	3
Trademark Search Library:		
Filing Pending Marks	23	52
Filing Reg. Certificates	Issue Date+2 days	On Goal
Filing Temp. Drawings	8	12
Assignments:		
Recording Patent-New Applications	20**	13
Recording Patent-Mail Room Recpts.	20	21
Return Patents-New Applications	34**	34
Return Patents-Mail Room Recpts.	34	40
Recording Trademarks	20	16
Returning Trademark Documents	34	29
Avg. Days from Issue Fee Payment to Issue Date	90-100	92
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	1 Day Late
Patent Copies Available	95% on Issue Date	88% on Issue Date
Trademark Copies Available	95% on Issue Date	99% on Issue Date

\* Unless otherwise noted.

\*\* Goal reflects the number of days from the date the filing receipt is mailed.

August 31, 1990

THERESA A. BRELSFORD  
*Assistant Commissioner*  
*for Administration*



## PATENT NOTICES

## Certificates of Correction For Week of September 25, 1990

D. 299,138	4,844,604	4,863,012	4,872,303
D. 303,156	4,845,015	4,863,333	4,873,094
4,598,525	4,845,458	4,863,460	4,873,370
4,626,418	4,846,951	4,863,724	4,873,503
4,627,019	4,847,732	4,864,012	4,873,849
4,636,582	4,848,907	4,864,019	4,873,987
4,713,337	4,849,428	4,864,471	4,874,083
4,758,041	4,849,699	4,865,036	4,874,449
4,774,099	4,851,714	4,865,911	4,874,768
4,781,797	4,852,183	4,866,899	4,874,950
4,782,096	4,853,756	4,867,139	4,875,090
4,794,425	4,854,753	4,867,422	4,875,399
4,797,900	4,854,860	4,867,822	4,875,597
4,810,693	4,855,021	4,868,032	4,875,636
4,816,484	4,856,406	4,869,083	4,875,896
4,822,234	4,856,443	4,869,147	4,876,152
4,823,852	4,857,084	4,869,364	4,876,497
4,823,936	4,857,585	4,869,770	4,876,999
4,823,941	4,858,334	4,869,817	4,877,114
4,824,034	4,859,431	4,869,963	4,877,161
4,824,684	4,859,738	4,870,102	4,877,226
4,825,727	4,860,010	4,870,214	4,877,578
4,826,271	4,860,611	4,870,215	4,877,933
4,828,729	4,860,632	4,870,216	4,877,972
4,830,432	4,860,991	4,870,221	4,878,197
4,835,275	4,861,218	4,870,395	4,878,522
4,835,517	4,861,450	4,870,702	4,878,598
4,837,253	4,861,834	4,870,961	4,878,656
4,837,632	4,861,933	4,871,119	4,878,965
4,838,752	4,862,108	4,871,758	4,879,177
4,839,228	4,862,199	4,871,842	4,879,248
4,839,447	4,862,456	4,872,037	4,886,045
4,844,190	4,862,958	4,872,080	4,886,468

## Disclaimers

4,938,735.—*James L. Mitchell*, Springfield, Mo.; *Daniel P. Bexten*, Columbus, Miss. BELT TENSIONING SYSTEM, TENSIONER AND PARTS THEREFOR AND METHODS OF MAKING THE SAME. Patent dated July 3, 1990. Disclaimer filed April 30, 1990, by the assignee, Dayco Products, Inc.

The term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

4,938,127.—*Bernhard H. van Lengerich*, Ringwood, N.J. EXTRUDER AND CONTINUOUS MIXER ARRANGEMENT FOR PRODUCING AN AT LEAST PARTIALLY BAKED PRODUCT HAVING A COOKIE-LIKE CRUMB STRUCTURE INCLUDING A POST-EXTRUSION RADIO FREQUENCY DEVICE. Patent dated July 3, 1990. Disclaimer filed March 30, 1990, by the assignee, Nabisco Brands, Inc.

The term of this patent subsequent to August 21, 2007, has been disclaimed.

4,935,606.—*Frederick J. Geary*, Holland, Mich. METHOD OF OPERATING GAS FURNACE IGNITER. Patent dated June 19, 1990. Disclaimer filed April 16, 1990, by the assignee, Robertshaw Controls Co.

The term of this patent subsequent to February 28, 2006, has been disclaimed.

## Dedication

3,946,358.—*Charles Donald Bateman*, Bellevue, Wash. AIR-CRAFT GROUND PROXIMITY WARNING INSTRUMENT. Patent dated March 23, 1976. Dedication filed July 9, 1990, by the assignee, Sunstrand Data Control, Inc.

Hereby dedicates to the Public the remaining term of said patent.

## Disclaimers and Dedications

4,813,630.—*Sidney H. Conn*, Statesville, N. C. ELECTRICALLY NON-CONDUCTIVE SUSPENSION CABLES FOR HOT AIR BALLOONS. Patent dated Mar. 21, 1989. Disclaimer and Dedication filed June 18, 1990, by the inventor.

Hereby disclaims and dedicates to the Public claims 1 through 6, 13 through 18, 20 through 25, 32 through 37 and 39 of said patent.

4,820,690.—*Harold Gregory*, Macclesfield; *Keith G. McCullagh*, Princes Risborough, both of United Kingdom. DUODENAL AND GASTRIC ULCER TREATMENT WITH ORAL UROGASTRONE. Patent dated April 11, 1989. Disclaimer and Dedication filed Feb. 26, 1990, by the assignee, G.D. Searle & Co., Ltd.

Hereby disclaims and dedicates to the Public the remaining term of said patent.

4,910,367.—*Donald J. Akers*, Chicago; *Douglas J. Walker*, Orland Park, both of Ill. VISIBLE BREAK SWITCH. Patent dated Mar. 20, 1990. Disclaimer and Dedication filed July 30, 1990, by the assignee, Joslyn Corp.

Hereby disclaims and dedicates to the Public the remaining term of said patent.

4,922,199.—*Ronald D. Fukui*, Portage, Mich.; *Wataru Ichikawa*, Fuchu; *Kazuya Sakamoto*, Akishima, all of Japan. ROTARY POSITION TRANSDUCER HAVING HINGED CIRCUIT BOARDS. Patent dated May 1, 1990. Disclaimer and Dedication filed May 21, 1990, by the assignees, Enprotech Corp. and SG Co., Ltd.

Hereby disclaims and dedicates to the Public the remaining term of said patent.

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## PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner  
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner  
CONDITION OF PATENT APPLICATIONS AS OF July 28, 1990

## PATENT EXAMINING GROUPS

Actual Filing Date of Oldest  
New Case Awaiting Action

## CHEMICAL EXAMINING GROUPS

GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY,  
AND ENGINEERING, GROUP 110—D. E. TALBERT, Director ..... 7-7-87  
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director ..... 11-21-88  
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP—130  
BARRY S. RICHMAN, Director ..... 5-12-88  
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND  
COMPOSITIONS, GROUP 150—J. O. THOMAS, Director ..... 8-3-88  
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director ..... 1-28-87

## ELECTRICAL EXAMINING GROUPS

INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly,  
Director ..... 10-15-87  
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INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director ..... 3-8-88  
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BLIX, Director ..... 12-22-88  
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ,  
Director ..... 8-29-88  
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STEWART LEVY, Acting Director ..... 4-22-88  
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## MECHANICAL EXAMINING GROUPS

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MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION,  
GROUP 330—J. J. LOVE, Director ..... 10-25-88  
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director ..... 3-16-89  
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—  
A. L. SMITH, Director ..... 8-15-89

**Expiration of patents:** The patents within the range of numbers indicated below expire during July 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents	Numbers 3,742,517 to 3,750,191 inclusive
Plant Patents	3,370 to 3,384 inclusive

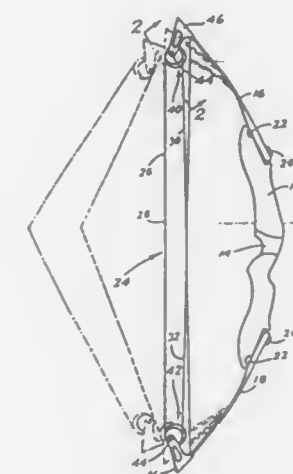
1118 OG 50

## REEXAMINATIONS

SEPTEMBER 25, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,060,066 (1356th)  
COMPOUND ARCHERY BOW WITH ECCENTRIC CAM  
ELEMENTS  
Donald S. Kudlacek, 3412 Oak St., Longview, Wash. 98632  
Reexamination Request No. 90/001,881, Nov. 3, 1989.  
Reexamination Certificate for Patent No. 4,060,066, issued Nov.  
29, 1977, Ser. No. 639,649, Dec. 11, 1975.  
Int. Cl.<sup>3</sup> F41B 5/10  
U.S. Cl. 124—25.6

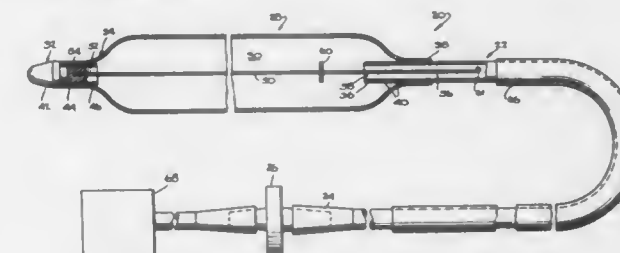


AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1 and 2 is confirmed.

1. A compound archery bow comprising:
  - a. a handle member,
  - b. a pair of bow limbs projecting from opposite ends of the handle member,
  - c. a pair of cam members each comprising a pair of cam elements of different diameters secured together eccentrically and having a common pivot axis which is eccentric with respect to both cam elements,
  - d. a pivot member on the outer end of each limb pivotally mounting one of the cam members on said pivot axis which is eccentric with respect to both cam elements, and
  - e. a bow string having a medial working stretch segment for projecting an arrow and opposite end segments each extending therefrom and wrapped first over the peripheral surface of the larger diameter cam element of the associated cam member, thence over the peripheral surface of the smaller diameter cam element and being secured to the cam member, and thence extending from the smaller diameter cam element of the associated cam member to attachment with the opposed limb.

B1 4,261,339 (1357th)  
BALLOON CATHETER WITH ROTATABLE SUPPORT  
Bruce L. Hanson, Wayne, N.J., and Sidney Wolvek, Brooklyn, N.Y., assignors to Datascope Corp.  
Reexamination Request Nos. 90/001,131, Dec. 1, 1986 and 90/001,686, Jan. 6, 1989.  
Reexamination Certificate for Patent No. 4,261,339, issued Apr. 14, 1981, Ser. No. 883,513, Mar. 6, 1978.  
Int. Cl.<sup>3</sup> A61M 25/10  
U.S. Cl. 606—194



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-21 and 23-36 is confirmed.

Claim 22 is cancelled.

1. A catheter comprising an inflatable and deflatable chamber having a proximal end and a distal end, said chamber in use being adapted to have substantially the same surface area when inflated and when deflated, a catheter tube portion connected at or adjacent an end thereof to the proximal end of said chamber and having a passage communicating with the interior of said chamber for admitting fluid into and withdrawing fluid from said chamber, support means for supporting said chamber extending in said chamber from the distal end thereof to said catheter tube portion and terminating in said catheter tube portion, said support means being non-rotatably connected to one of said ends of said chamber and rotatably coupled to the other of said ends of said chamber to permit relative angular motion between said support means and said chamber when said chamber is twisted about its longitudinal axis such that a configuration of said catheter may be obtained in which said chamber is wrapped about said support means, whereby insertion of said catheter into a body passageway or the like is aided.

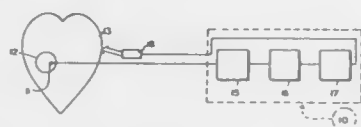
B1 4,436,092 (1358th)  
EXERCISE RESPONSIVE CARDIAC PACEMAKER  
William A. Cook, Bloomington; Neal E. Fearnot, and Leslie A. Geddes, both of West Lafayette, all of Ind., assignors to Purdue Research Foundation, Lafayette, Ind.  
Reexamination Request No. 90/001,612, Oct. 3, 1988.  
Reexamination Certificate for Patent No. 4,436,092, issued Mar. 13, 1984, Ser. No. 379,667, May 19, 1982.  
Int. Cl.<sup>3</sup> A61N 1/365  
U.S. Cl. 128—419 PG

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1 and 7 are determined to be patentable as amended.

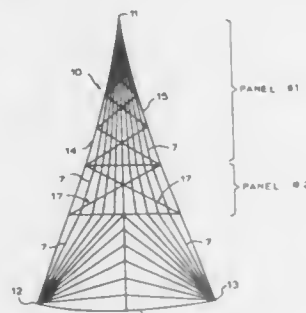
Claims 2-6 and 8-9, dependent on an amended claim, are determined to be patentable.

1. A cardiac pacemaker [including means] for [variably] controlling the stimulation rate of the heart according to the level of muscular exertion in the body, comprising:
  - a temperature sensing means for sensing a non-ambient body temperature, said non-ambient body temperature related by an algorithm to heart rate in a normally functioning heart, said temperature sensing means producing an output signal;



an algorithm implementing means connected to said temperature sensing means for implementing said output signal by an algorithm which represents the mathematical function between said non-ambient body temperature and heart rate in a normally functioning heart; and  
[a cardiac pacemaker] variable rate control means connected to said algorithm implementing means and responsive thereto in order to variably control the stimulation rate of said heart.

B1 4,708,080 (1359th)  
**COMPOSITE THREAD LINE SAILS**  
Peter G. Conrad, Old Lyme, Conn., assignor to CTL, Inc.  
Reexamination Request No. 90/001,795, Jan. 22, 1989.  
Reexamination Certificate for Patent No. 4,708,080, issued Nov. 24, 1987, Ser. No. 873,188, Jan. 11, 1986.  
Int. Cl.<sup>3</sup> B63H 9/06  
U.S. Cl. 114-103



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1, 2, 4-11, 16 & 17 is confirmed.

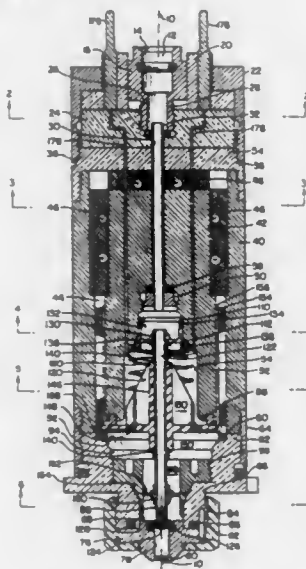
Claims 3, 12-15 are determined to be patentable as amended.

New claims 18-30 are added and determined to be patentable.

1. A composite sail having a head, a tack and a clew, which in use and for an intended purpose has principal stress lines, said sail comprised of a plurality of panels, each of said panels joined to an adjacent panel therefor, each of said panels comprised of a laminate of at least two layers wherein between said layers nonwoven, force-bearing thread material is predeterminedly disposed along said principal stress lines for said panel in said sail.

minedly disposed along said principal stress lines for said panel in said sail.

B1 4,848,725 (1360th)  
**VALVE CONSTRUCTION**  
Edward C. Tibbals, Jr., Jamestown, N.C., assignor to Interface, Inc., La Grange, Calif.  
Reexamination Request No. 90/001,921, Jan. 8, 1990.  
Reexamination Certificate for Patent No. 4,848,725, issued Jul. 18, 1989, Ser. No. 140,546, Jan. 4, 1988.  
Int. Cl.<sup>3</sup> F16K 31/08  
U.S. Cl. 251-129.02



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-20 is confirmed.

New claim 21 is added and determined to be patentable.

1. In a valve assembly for control of fluid flow having fluid inlet port means, fluid outlet port means, a valve seat associated with said fluid outlet port means, the improvement comprising:
  - a valve stem supported by elastically deformable diaphragm means to permit selective displacement thereof along a predetermined lineal axis intermediate a first limiting position in sealing relation with said valve seat for preventing fluid flow therepast for discharge through said outlet port means and a second limiting position remote from said valve seat for permitting fluid flow therepast for discharge through said outlet port means,
  - a pair of fixed magnetic pole elements disposed coaxial with said lineal axis and in concentric spaced relation to each other,
  - flux generating means for establishing a substantially constant magnetic flux between said pair of pole elements in a direction substantially perpendicular to said lineal axis,
  - an armature assembly mounted on said valve stem and displaceable in direction to said lineal axis for displacing said valve stem between its first and second limiting positions, said armature assembly including a coil member capable of carrying electrical current disposed in said magnetic flux intermediate said pair of fixed magnetic pole elements and means for regulating the magnitude, duration and direction of electrical current flow through said coil member to control the speed and direction of displacement of said armature assembly relative to said first and second positions.

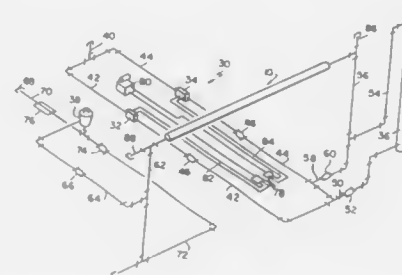
## REISSUES

SEPTEMBER 25, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,346  
**PROCESS AND APPARATUS FOR TESTING FLUIDS FOR FOULING**  
James G. Kaudsen, Corvallis, Oreg., and Nicholas J. Brindak, Auburn, N.Y., assignors to Drew Chemical Corporation, Boonton, N.J.  
Original No. 4,339,945, dated Jul. 20, 1982, Ser. No. 202,351, Oct. 30, 1980. Application for reissue Feb. 23, 1989, Ser. No. 313,825

Int. Cl.<sup>3</sup> G01N 17/00  
U.S. Cl. 73-61.2 18 Claims



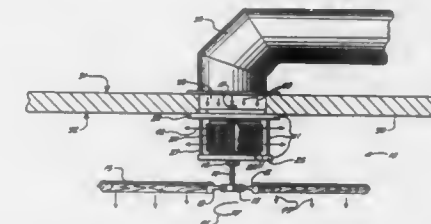
1. An apparatus for testing a fluid to monitor and record fouling data together with other parameters which comprises:
  - a piping assembly including a fluid inlet and outlet [means] and a heat transfer test assembly, said heat transfer test assembly including a heating member [including] with a heating element disposed within a conduit means having a passageway for said fluid;
  - means for measuring temperature of said fluid entering said heat transfer test assembly;
  - means for supplying electrical energy of a preselect quantity to said heating element;
  - means for measuring a wall temperature of said heating element;
  - flow means for measuring velocity of said fluid through said conduit means;
  - means for measuring [a parameter selected from the group consisting of] parameters of said fluid comprising corrosion, pH and conductivity; and
  - means for simultaneously recording said preselect quantity of electrical energy to said heating element, said measured temperature of said fluid, said measured wall temperature of said heating member, said measured velocity of said fluid through said piping assembly and said measured [parameter] parameters.

Re. 33,347  
**AIR-DRIVEN CEILING FAN**  
Johnny Johnson, III, 1815 Halsey Ave., New Orleans, La. 70114  
Original No. 4,598,632, dated Jul. 8, 1986, Ser. No. 428,889, Sep. 30, 1982. Application for reissue Jul. 8, 1988, Ser. No. 216,952

Int. Cl.<sup>3</sup> F24F 13/06  
U.S. Cl. 98-40.05 7 Claims

5. An air-driven fan apparatus comprising:
  - (a) a housing;
  - (b) means for positioning the housing adjacent an opening in the ceiling of a room, the opening having duct work means positioned thereabove, the duct work means communicating with the opening for providing air flow through the opening into the room along an air flow path;
  - (c) blower means disposed in the housing to receive air flow from

the duct work means, the blower means including a plurality of spaced-apart vanes which surround the opening so that air flow between the duct work means and the room passes through the vanes before entering the room, the vanes being



shaped and positioned such that the blower means rotates when air flows from the duct work means through the vanes into the room; and  
(d) means to direct the air flow laterally out of the blower.

Re. 33,348  
**BONE SCREW**  
Jerry L. Lower, Bourbon, Ind., assignor to Zimmer, Inc., Warsaw, Ind.  
Original No. 4,640,271, dated Feb. 3, 1987, Ser. No. 795,963, Nov. 7, 1985. Application for reissue Jan. 10, 1988, Ser. No. 205,128

Int. Cl.<sup>3</sup> A61B 17/58  
U.S. Cl. 606-65 16 Claims



11. A bone screw for connecting portions of bone across a fracture therebetween, comprising:
  - (a) a shaft comprising a leading end portion including a first set of threads and an elongated unthreaded portion extending therefrom;
  - (b) a sleeve member having an inner surface surrounding the elongated unthreaded portion and being freely slidable relative to the unthreaded portion of the shaft, the bone screw not having any resilient means between the sleeve member and the unthreaded portion, the sleeve member including a second set of threads thereon; and
  - (c) a means for driving the bone screw.

Re. 33,349  
**CONTROLLING SULFIDE SCAVENGER CONTENT OF DRILLING FLUID**  
Stephen D. Matza, Stafford; William E. Ellington, and Henry C. Fleming, III, both of Houston, all of Tex., assignors to Shell Oil Company, Houston, Tex.  
Original No. 4,658,914, dated Apr. 21, 1987, Ser. No. 784,422, Oct. 4, 1985. Continuation-in-part of Ser. No. 609,611, May 14, 1984, abandoned. Application for reissue Feb. 19, 1988, Ser. No. 158,828

Int. Cl.<sup>3</sup> E21B 44/00, 47/10; G01N 31/02, 33/24  
U.S. Cl. 175-40 11 Claims

1. In a process for drilling a well with a water based drilling



fluid containing zinc based scavengers for controlling encountered sulfide ions, in which process analyses are made for monitoring and controlling the amount of scavenger in the drilling fluid, an improved process for controlling the adequacy of the scavenging capability, comprising:

mixing one part by volume of a sample of circulating drilling fluid with about 4 to 10 parts by volume of a selective solvent for zinc ions, with said solvent [containing a kind and amount of buffering material] providing a pH of about 4 to 6, and being capable of dissolving substantially all of the zinc present in the drilling fluid except for zinc ions combined into [precipitated molecules of] zinc sulfides;

separating the resulting solution from undissolved solids; determining the amount of zinc in the solids-free solution in order to determine the proportion of the unspent zinc based sulfide scavenger in the circulating drilling fluid; and

adjusting the proportion of the scavenger in the drilling fluid to the extent required to provide enough for scavenging a selected amount of encountered sulfide ions without providing enough to impair the rheology of the drilling fluid.

Re. 33,350

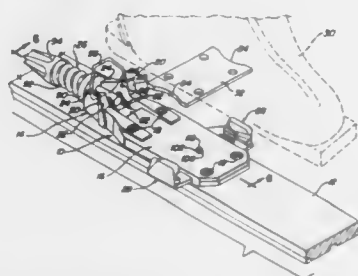
# SKI BINDING HAVING PRESET MEANS AND DETENT TRIGGER FOR SAID PRESET MEANS

Original No. 4,063,752, dated Dec. 20, 1977, Ser. No. 677,787, Apr. 16, 1976. Application for reissue Dec. 19, 1979, Ser. No. 105,287

Int. Cl.<sup>5</sup> A63C 9/086

U.S. Cl. 280—624

30 Claims



1. A ski binding adapted to releasably secure a ski to an associated ski boot comprising:

a first binding component in the form of a substantially rigid latch receiving member provided with at least one latch receiver formation;

and a second binding component in the form of a substantially rigid latch mounting body;

one of said components being constructed for permanent connection to a ski boot and the other component being constructed for permanent connection to a ski;

latch means movably mounted on the body for movement between inoperative position substantially free of the latch receiving member and operative position in latching engagement with the receiver formation;

a resilient force unit carried by the body and adjustable between a no-load condition and a loading condition;

link means connecting the force unit to the latch means and movable to transmit the force of the force unit to the latch means to yieldingly urge the latter into operative position;

and a detent trigger mounted on the body and movable between a first interfering position engaging the link means to restrain it against movement in the latching direction in response to the urging of the force unit in loading condition and a second non-interfering position;

the trigger being settable in the first position to restrain the link means against latching movement and being actuable by a skier upon placing his boot in skiing position on

the ski to move to the second position and release the link means to allow it to move and transmit the force of the force unit to the latching means and yieldingly urge it into latching engagement with the receiver formation.

Re. 33,351

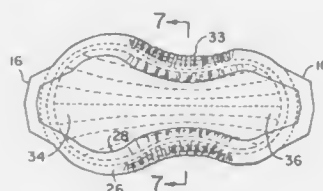
# MENSTRUAL AND INCONTINENCE PAD

Elissa D. Papajohn, 65 Montague St., Brooklyn, N.Y. 11201  
Original No. 4,758,241, dated Jul. 19, 1988, Ser. No. 63,413, Jan. 18, 1987. Application for reissue Nov. 22, 1989, Ser. No. 440,507

Int. Cl.<sup>5</sup> A61F 13/16

U.S. Cl. 604—387

2 Claims



2. A sanitary napkin having a substantially oblong body formed of a plurality of vertically stacked layers comprising an underply of fluid impervious material, an intermediate ply of absorbent material, an upperply of highly fluid pervious material, and a peripheral binding ply of fluid impervious material having an inner and outer peripheral edge and defining a central opening into the body, said plies being secured together about their outer peripheral edge and including an elastomeric member along each of the longitudinal side edges of the body, which resiliently contracts the body in the longitudinal direction drawing the body into a cup shape providing a deep compartment for retaining fluid between said underply and said intermediate ply and at the same time, raising the inner peripheral edge of said binding ply to form a continuous encircling wall against the flow of fluid from the compartment.

Re. 33,352

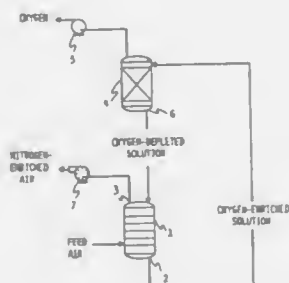
# ABSORPTION PROCESS FOR PRODUCING OXYGEN AND NITROGEN AND SOLUTION THEREFOR

Ian C. Roman, Wilmington, Del., and Richard W. Baker, Palo Alto, Calif., assignors to Bend Research, Inc., Bend, Oreg.  
Original No. 4,451,270, dated May 29, 1984, Ser. No. 393,711, Jun. 30, 1982. Application for reissue Apr. 1, 1986, Ser. No. 848,032

Int. Cl.<sup>5</sup> B01D 19/00

U.S. Cl. 55—38

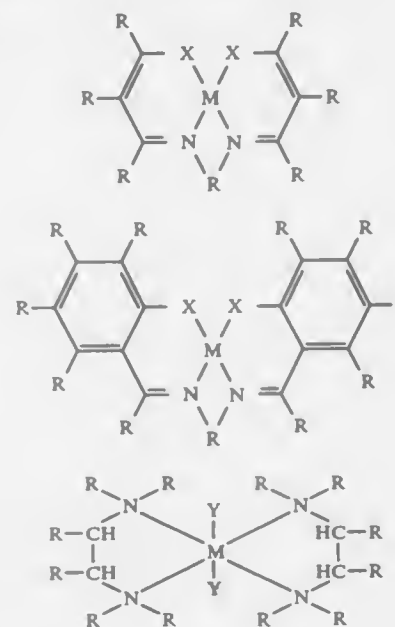
27 Claims



36. A process for the separation and purification of oxygen comprising:

(a) bringing a gaseous, oxygen-containing feed stream into contact with a solution containing a solvent or solvent mixture, an axial base and an oxygen carrier, said solvent or solvent mixture being capable of dissolving the axial base and

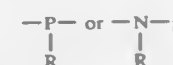
the oxygen carrier when they are present together, said axial base being capable of providing a coordinating atom to the oxygen carrier, and said oxygen carrier being a metal-containing complex having any of the structures



wherein

M is a metal selected from cobalt, iron, copper, nickel, manganese, ruthenium or rhodium;

X is —O—, —S—,



R is hydrogen, alkyl, aryl, halogen, alkoxy or a nitrogen-containing moiety; and

Y is halide, nitrate, thiocyanate or cyanide;

said solution absorbing oxygen from said gaseous oxygen-containing feed stream;

(b) desorbing oxygen from said solution to a gaseous product stream; and

(c) collecting oxygen from the product stream after the oxygen has been desorbed.

Re. 33,353

# THIN FILM SURGICAL DRESSING WITH DELIVERY SYSTEM

Steven B. Heinecke, New Richmond, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Original No. 4,598,004, dated Jul. 1, 1986, Ser. No. 695,042, Jan. 24, 1985. Application for reissue May 31, 1989, Ser. No. 359,833

Int. Cl.<sup>5</sup> C09J 7/02; A61F 13/02

U.S. Cl. 428—40

11 Claims



1. An adhesive composite comprising a backing wherein at least one edge of the backing is a delivery strip which is separable by perforations from the remainder of the backing;

a pressure sensitive adhesive coated on at least a portion of one surface of the backing; and

a liner which is adhered to the delivery strip with sufficient tenacity to result in separation along the perforations of the delivery strip from the remainder of the backing before the liner separates from the delivery strip and which liner is releasably adhered to the remainder of the backing, wherein the liner is strip coated with releasing agent such that the portion contacting the delivery strip is free of releasing agent and the portion contacting the remainder of the film has releasing agent.

Re. 33,354

# PROCESS FOR USING ESTER PLASTICIZED POLYURETHANES FOR SEALING ELECTRICAL DEVICES

William J. Downey, Linden; Melvin Brauer, East Brunswick, and Jerry C. Chao, Bayonne, all of N.J., assignors to Cas-Chem, Inc., Bayonne, N.J.

Original No. 4,705,724, dated Nov. 10, 1987, Ser. No. 945,981, Dec. 24, 1986. Division of Ser. No. 837,554, Mar. 3, 1986, Pat. No. 4,666,968, which is a continuation-in-part of Ser. No. 713,377, Mar. 19, 1985, abandoned. Application for reissue Oct. 30, 1989, Ser. No. 429,118

The portion of the term of this patent subsequent to Nov. 10, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> B32B 27/04, 27/06, 27/22, 27/40

U.S. Cl. 428—375

22 Claims

1. A process for providing a fluid impervious protective seal around an insulated electrical device which comprises introducing the components of a polyurethane gel composition comprising about 10 to 90 parts by weight of the liquid reaction product of an organic polyisocyanate and a polyol having an equivalent weight above 250 in the presence of about 90 to 10 parts by weight of an ester plasticizer compound having a total solubility parameter of [between about 8.3 and 8.9 or] between about 9.1 and [9.7] 10.1 into a confined space surrounding the section of a device to be protected and allowing said composition to cure to a gel.

Re. 33,355

# AGENT FOR ABSORBING AND RELEASING WATER VAPOR

Hiroshi Itoh, Yokohama; Toshimi Nakagawa, Fujisawa; Atsuhiko Nitta, Yokohama; Tomio Tanaka, Tokyo; Hideo Kamio, Odawara; Ryosuke Enoshita, Nagoya; Tamotsu Uejima, Tokai; Takahiro Ouchi, Tokyo; Kazuki Abe, and Sadao Kobayashi, both of Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Original No. 4,683,258, dated Jul. 28, 1987, Ser. No. 820,887, Jan. 17, 1986. Continuation of Ser. No. 724,163, Apr. 17, 1985, abandoned. Application for reissue May 16, 1988, Ser. No. 194,965

Claims priority, application Japan, Oct. 22, 1983, 58-197875; May 28, 1984, 59-106468; May 28, 1984, 59-106550; May 28, 1984, 59-106551; May 28, 1984, 59-106554; May 28, 1984, 59-106463

Int. Cl.<sup>5</sup> C08K 3/18; B05D 5/06

U.S. Cl. 524—434

14 Claims

1. A process of humidity control by contacting humid gas with an agent for absorbing and releasing water vapor, said agent comprising the combination of:

(A) from 95 to 3 wt. % of a water insolubilized product prepared from:

(a) a homopolymer of a monomer selected from the group consisting of N-alkyl- and N-alkylene-substituted (meth)acrylamides of formula (I):





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## PLANT PATENTS

GRANTED SEPTEMBER 25, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,333

## ROSE PLANT TANCRESOR

Hans Evers, Ueterson, Fed. Rep. of Germany, assignor to Jackson & Perkins Company, Medford, Oreg.  
Filed Mar. 6, 1989, Ser. No. 319,648  
Int. Cl.<sup>3</sup> A01H 5/00

U.S. Cl. Pkt.—20

1 Claim

1. A new and distinct variety of rose plant of the Hybrid Tea class substantially as herein shown and described, characterized particularly as to novelty by the unique combination of outstanding vigor, upright habit of growth, leathery foliage, thick petals and abundant large red flowers.

7,334

## ROSE PLANT—MEICHEVIL VARIETY

Marie-Louise Meilland, deceased, late of Antibes (by Jean-Pierre Le Naour, legal representative), assignor to The Conard-Pyle Company, West Grove, Pa.  
Filed Mar. 9, 1989, Ser. No. 321,142  
Int. Cl.<sup>3</sup> A01H 5/00

U.S. Cl. Pkt.—28

1 Claim

1. A new and distinct variety of Floribunda rose plant characterized by the following combination of characteristics:

- (a) forms in abundance attractive semi-double blossoms which are cardinal in coloration and exhibit an exceptionally long vase life,
- (b) exhibits a semi-erect growth habit,
- (c) exhibits vigorous vegetation, and
- (d) is particularly well suited for cut flower production;

substantially as herein shown and described.

7,335

## PLUM TREE, "FIRST BEAUT"

Charles H. Neufeld, 38250 Road 52, Kingsburg, Calif. 93631  
Filed Sep. 11, 1989, Ser. No. 405,771  
Int. Cl.<sup>3</sup> A01H 5/00

U.S. Cl. Pkt.—38

1 Claim

1. A new and distinct variety of plum tree to be denominated variety as First Beaut substantially as illustrated and described and which is characterized principally as to novelty by its production of fruit which are somewhat similar in their overall appearance and other physical characteristics to the fruit produced by the Red Beaut plum tree (U.S. Plant Pat. No. 2,539) from which it was derived as a chance mutation, but which is distinguished therefrom by producing fruit which are ripe for commercial harvesting and shipment approximately five days earlier than the fruit produced by the Red Beaut plum tree.

7,336

## PEACH TREE (SNOW DIAMOND)

Mitchell Langford; Rose M. Langford, both of Reedley, and Vernon Langford, Woodlake, all of Calif., assignors to Plumcot, Inc., Calif.

Filed May 22, 1989, Ser. No. 355,647

Int. Cl.<sup>3</sup> A01H 5/00

U.S. Cl. Pkt.—42

1 Claim

1. A new and distinct variety of peach tree, substantially as illustrated and described, which bears whiteflesh freestone fruit that is large and uniform in size, mostly red in skin color, firm in texture, and which most nearly resembles the Babcock (unpatented) variety, but is distinguished from and an improvement of that variety by bearing fruit that has a higher degree of red skin color, has a smaller stone, matures approximately two weeks later, and is very much firmer and more suitable for long distance shipping by the commercial grower.

7,337

## PRUNUS PERSICA SPRAGUE PEACH BUSH

James W. Sprague, 1605 S. Mountain Ave., Apt. 5, Ontario, Calif. 91761

Filed Feb. 26, 1990, Ser. No. 484,839

Int. Cl.<sup>3</sup> A01H 5/00

U.S. Cl. Pkt.—43

1 Claim

1. A new and distinct variety of *Prunus persica* as described and shown herein characterized particularly by the short, bushy shape of its trees and by the firmness and substantially virus-free nature of its fruit.

7,338

## DISTINCT VARIETY OF POINSETTIA NAMED H-477/86 RED

Alexander Hrebaniuk, R.D. -190 1, Box 118, Sugar Run, Pa. 18846

Filed Apr. 17, 1989, Ser. No. 338,951

Int. Cl.<sup>3</sup> A01H 5/00

U.S. Cl. Pkt.—86

1 Claim

1. A new and distinct variety of Poinsettia plant as herein shown and described, particularly characterized by its dark green leaves, bright red bracts, triple form, prolific bract development, large bloom size, and good shipping characteristics.

7,339

## SHIITAKE MUSHROOM PLANT NAMED 'HOKKEN 601'

Sadayuki Inoue, Miha, and Sumio Aynsawa, Utsunomiya, both of Japan, assignors to Hokken Sangyo Co., Ltd., Tochigi, Japan

Filed Jul. 18, 1988, Ser. No. 217,564

Claims priority, application Japan, Jul. 20, 1987, 2384

Int. Cl.<sup>3</sup> A01H 15/00

U.S. Cl. Pkt.—89

1 Claim

1. A new and distinct variety of shiitake mushroom substantially as shown and described.

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PATENTS  
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For CLASS	See PATENT NO.
004-236 .....	4,958,387
019-098 .....	4,958,404
043-124 .....	4,958,456
037-094 .....	4,958,457
052-169 .....	4,958,465
091-420 .....	4,958,548
606-194 .....	4,958,643
160-348 .....	4,958,646
181-129 .....	4,958,697
187-101 .....	4,958,707
222-460 .....	4,958,741
192-085 .....	4,958,753
280-696 .....	4,958,863
604-044 .....	4,958,901
404-040 .....	4,958,964
514-021 .....	4,959,096
260-402 .....	4,959,187
514-021 .....	4,959,213
435-172 .....	4,959,327
558-161 .....	4,959,455
361-310 .....	4,959,652
346-140 .....	4,959,673
346-140 .....	4,959,674
364-401 .....	4,959,686
357-016 .....	4,959,694
324-418 .....	4,959,784
381-010 .....	4,959,859
346-140 .....	4,959,863



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## PATENTS

GRANTED SEPTEMBER 25, 1990

## GENERAL AND MECHANICAL

4,958,383

## SNAP-ON TIE WITH SLIDER SIMULATING WINDSOR KNOT

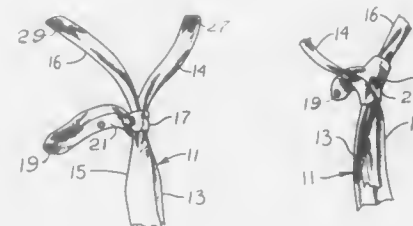
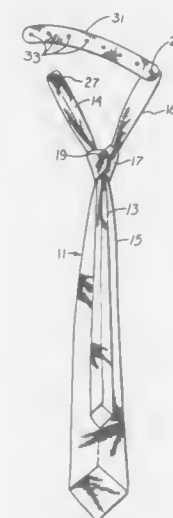
Richard A. Thompson, Harrison, Ark., assignor to Robert R. Keegan, Fayetteville, Ark.

Filed Feb. 9, 1989, Ser. No. 309,823

Int. Cl.<sup>3</sup> A41D 25/10

U.S. Cl. 2—150

15 Claims



4. A necktie for simulating a windsor knot comprising a first portion of necktie material, a second portion of necktie material, means for fastening said first and second portions together at the neck of a wearer, a flexible flat strip of material between three and ten inches long and with a maximum width of from three-quarters inch to two inches, a first fastener secured on said strip near an end thereof, a second fastener forming a fastener pair with said first fastener secured on said strip, a third fastener near an end of said strip, and a fourth fastener forming a fastener pair with said third fastener secured on said strip, said fourth fastener being offset from the center of the width of the strip, whereby said flexible flat strip may be arranged around said portions of necktie material in simulation of a windsor knot and secured by joining said second fastener to said first fastener and joining said fourth fastener to said third fastener.

4,958,384

## SAFETY GLOVE

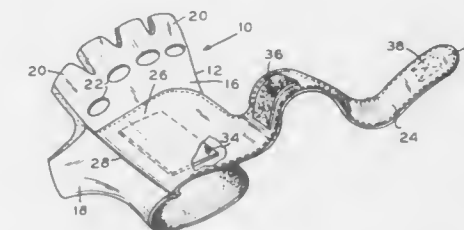
David P. McCrane, 1740 Main St., St. Helena, Calif. 94574

Filed Nov. 22, 1988, Ser. No. 274,987

Int. Cl.<sup>3</sup> A41D 19/00

U.S. Cl. 2—162

10 Claims



1. A protective safety glove for use by people engaged in active sports or an industrial job activity to protect against hyperextension of the ligaments and tendons in the wrist, said glove comprising the combination of a glove body having a palm portion joined with a back portion to fit about the person's hand, means forming receptacles for the thumb and fingers of the hand, a substantially inextensible wrist strap for releasably holding the glove body on the person's hand and wrist, said strap having a major axis extending from a first end portion to a second end portion, attachment means for fixedly attaching said first end portion to said glove body along a seam which extends in a direction substantially transverse to said major axis for optimal resistance of tension forces along the major axis when the strap is wrapped around the wrist, said first end portion of the strap overlying substantially the back of said hand with a first width which extends from a region adjacent the wrist of the hand to a region adjacent the knuckles of the hand, with the remaining portion of the strap having a second width less than said first width, the strap having a length along its major axis sufficient to form a wrap about the wrist in the range of substantially one and one-half to three turns as required by the particular sport or job activity.

4,958,385

## HAIR DRESSING HEADBAND

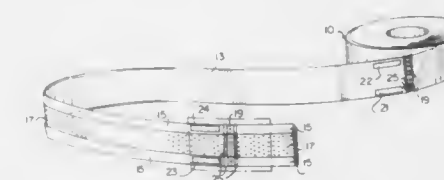
Robert C. Rushton, Jr., 739 Barry Dr., Springfield, Pa. 19064

Filed Mar. 27, 1989, Ser. No. 329,275

Int. Cl.<sup>3</sup> A41D 13/00

U.S. Cl. 2—174

25 Claims



1. A headband device for placement about a person's head for absorbing liquids used with hair dressing treatments, comprising:

- a fluid impervious barrier layer formed into a strip extending for a distance greater than the circumference of the head, said strip having a width sufficient to define an absorbent holding region and a sealing region;
- a moisture pervious fibrous stock sized to cover the absorbent holding region of said strip and having an inside facing region adjacent said absorbent holding region and an outside contact region for contacting the person's head;

an adhesive layer applied to at least one of said absorbent holding region and inside facing region;  
a layer of superabsorbent material held in place by said adhesive;  
means for bonding said sealing region of said strip at least to said fibrous stock along the length of the strip, to restrict flow of liquids on a person's head to said absorbent region only through said fibrous stock; and  
adjustable means for fastening said strip to a person's head to present said fibrous stock in contact therewith.

4,958,386

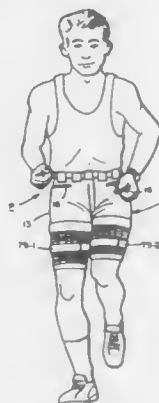
## AEROBIC PANTS

Marc-Henri Louis-Jeune, P.O. Box 501, Allston, Mass. 02134  
Filed Jul. 14, 1988, Ser. No. 219,447

Int. Cl.<sup>5</sup> A41D 1/06

U.S. Cl. 2—227

9 Claims



## 1. Athletic legwear comprising:

- a. a pair of pants having an exterior surface,
- b. a plurality of pocket assemblies, each pocket assembly having one or more pockets adapted to hold securely therein one or more weights, and
- c. means for removably attaching each of said pocket assemblies to said exterior surface of said pair of pants above the knee and below the waist of the wearer.

4,958,387

ADJUSTABLE HINGE ASSEMBLY FOR MOUNTING A SEAT AND/OR COVER TO A SANITARY FIXTURE  
Claudio Fatt, Milan, Italy, assignor to American Standard Inc., New York, N.Y.

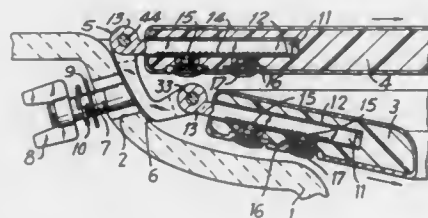
Filed May 26, 1989, Ser. No. 357,756

Claims priority, application Italy, Jun. 8, 1988, 34852/88[U]

Int. Cl.<sup>5</sup> A47K 3/12

U.S. Cl. 4—236

7 Claims



1. An adjustable hinge assembly adapted to be fastened to a sanitary fixture, such as a bidet or a toilet, said hinge assembly comprising:

- a fixed hinge element to be mounted on the upper rear flat

region of said fixture, and an articulating hinge element mounted to said fixed hinge element;  
said articulating hinge element having an elongated bar, one end of which is pivotally mounted to said fixed hinge, the other end being insertable into a correspondingly shaped well-like chamber formed in a seat and/or cover for said fixture; and  
means formed on said elongated bar to cooperate with a latch member adapted to be transversely mounted on said seat and/or cover to releasably and adjustably fix said articulating member at a desired insertion depth in said well-like chamber so that the front section of the seat and/or cover match the peripheral profile of the front upper rim of said fixture whereby said seat and/or cover can be adjusted with respect to said fixture and can be interchanged with a like seat and/or cover.

4,958,388

## SOCKS WITH SIZE INDICATING STRIPES

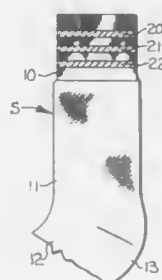
James J. Madden, III, Loudonville, N.Y., assignor to Ballston Knitting Company, Inc., Ballston Spa, N.Y.

Filed May 17, 1989, Ser. No. 353,034

Int. Cl.<sup>5</sup> A41B 11/00

U.S. Cl. 2—239

5 Claims



1. Socks each including integrally knit cuff, leg and foot portions, said socks being knit in a variety of sizes and substantially throughout with circular courses of a particular color of yarn, each of said socks including one or more size indicating stripes extending completely around and in a particular location in one of said sock portions, said size indicating stripes being knit in a plurality of the circular courses and of a yarn contrasting in color with said particular color of yarn, and wherein the number of said size indicating stripes of contrasting color yarn constitutes means for indicating and selecting to a prospective customer at the point of sale the size of the particular sock in which said size indicating stripes are knit so that the size of the particular sock is easily recognizable by the number of said size indicating stripes knit in the particular location in one of said sock portions.

4,958,389

## PORTABLE/DISPOSABLE SHOWER-BATH

Rawlings H. Hammett, P.O. Box 307, Grandview, Mo. 64030

Filed Feb. 21, 1989, Ser. No. 313,181

Int. Cl.<sup>5</sup> A61H 33/00; A47K 3/06

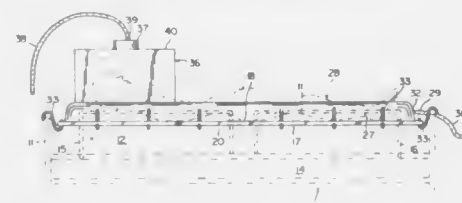
U.S. Cl. 4—547

2 Claims

1. A bed covering device adapted for bathing a patient in a hospital type bed having safety rails and a mattress whose top surface is bounded laterally by left and right sides and head and foot extremities, said device comprising of:

- (a) a compliant rectangular, waterproof sheet having upper and lower surfaces, a perimeter extending beyond the lateral boundaries of a mattress with which the covering device is interactive, and defined by head and foot extremities and left and right sides,
- (b) a number of grommets apertures evenly spaced about said perimeter,

- (c) a splash cuff bonded to said upper surface and extending upright therefrom, said cuff having a perimeter adapted to surround said patient, and accommodating at least one penetrating drain port,
- (d) at least one drain hose having a proximal extremity adapted to engage said drain port, and a distal extremity positionable at a convenient disposal site,



- (e) multiple securing means having inside and outside extremities, said inside extremities engaging said grommets apertures, and said outside extremities being adapted to engage said safety rails, and
- (f) a removable folding shower hood disposed vertically above said sheet within the perimeter of said splash cuff, said hood being configured to be placed over and surround a patient's head wherein said hood is equipped with means for spraying water upon the head of the patient.

4,958,390

## REST COT ASSEMBLY

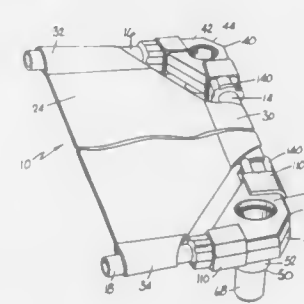
David L. Mendenhall, Wilsonville, Oreg., assignor to Holbrook-Patterson, Inc., Coldwater, Mich.

Filed Nov. 4, 1988, Ser. No. 267,525

Int. Cl.<sup>5</sup> A47C 19/00

U.S. Cl. 5—110

24 Claims



## 11. A rest cot comprising:

- a substantially rectangular frame comprising a plurality of elongate structural support members secured together;
  - a flexible support panel suspended from said frame; and
  - a corner piece positioned at each corner of said frame for securing said structural support member together, said corner piece comprising:
- a body portion;
  - a first attachment section for receiving one of said support members of said cot;
  - a second attachment section for receiving another of said support members of said cot, said first attachment section being positioned relative to said second attachment section so that a support member received by said first attachment section is perpendicular to a support member received by said second attachment section;
  - a leg positioned between said first and second attachment sections and extending downwardly from said body portion, said leg comprising a first tubular section extending through said body portion and opening at the top of said body portion, and a second tubular section secured to and extending downwardly from said first

tubular section, said second tubular section having a diameter less than that of said first tubular section, said second tubular section of one corner piece being adapted to fit within said first tubular section of another corner piece; and

a wall between said first and second tubular sections of said leg, said wall having at least one orifice there-through.

4,958,391

## SWAY BED SUPPORT FRAME

Byron Egeland, General Delivery, Medicine Hat, Alberta, Canada T1A 7E4

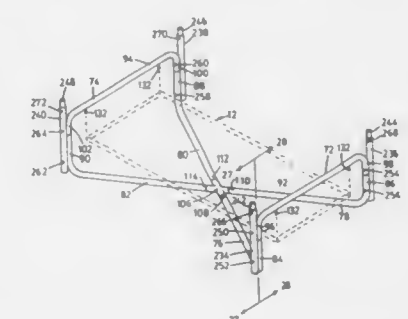
Filed Jan. 23, 1989, Ser. No. 299,535

Claims priority, application Canada, May 4, 1988, 565948; Oct. 5, 1988, 579394

Int. Cl.<sup>5</sup> A45F 3/24

U.S. Cl. 5—127

9 Claims



1. A support structure for swaying support of a bed frame, comprising:
- four horizontal lower support members (76,78,80,82) extending diagonally inward to a center position;
  - means (106,108,110,112,114) rigidly connecting inner ends of said lower support members at said center position;
  - a lower corner member (84,86,88,90) extending upwardly at an outer end of each lower support, integral with the lower support member;
  - two spaced parallel upper support members (92, 94) each having an integral downwardly extending upper corner member (96,98,100,102) at each end;
  - means (104) rigidly connecting a lower end of each downwardly extending upper corner member to an upper end of a respective lower corner member;
  - first, spaced apart, attachment means (132) on each upper support member;
  - said first attachment means being adapted for attachment of suspension means for a rectangular bed frame.

4,958,392

## COMBINATION RECLINING HEADBOARD AND TABLE FOR A BED

Charles L. Cannady, 38 Stokes Rd., Pineville, La. 71360

Filed May 7, 1990, Ser. No. 519,799

Int. Cl.<sup>5</sup> A47C 20/04

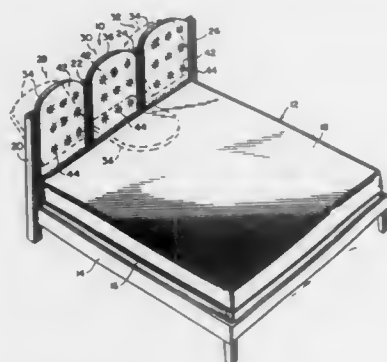
U.S. Cl. 5—507

7 Claims

1. A combination reclining headboard and table for a bed having a frame, box spring and mattress comprising:
- (a) four head posts, spaced apart and secured to the frame at the head, thus dividing it into three sections;
  - (b) a pair of headboard panels, each sized to fit between two of said head posts at the first and third sections of the head of the frame;
  - (c) a table panel sized to fit between two of said head posts at the second section of the head of the frame;
  - (d) means for adjustably moving each of said headboard panels from a vertical position to a rearwardly reclined



position between two of said head posts at the first and third sections of the head of the frame so that a person on the mattress can rest against one of said headboard panels when it is placed in the rearwardly reclined position; and



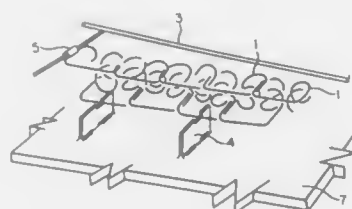
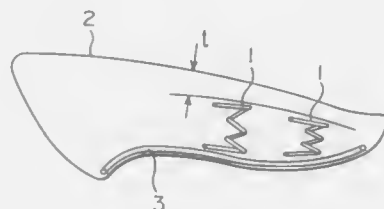
(c) means for adjustably moving said table panel from a vertical position to a forward horizontal position over the mattress between two of said head posts at the second section of the head of the frame so that a person can place various items on said table panel.

**4,958,393**  
**ORTHOPEDIC CRADLE**  
Arie Brecher, Eilat St. 23, Holon 58310, Israel  
Filed Dec. 16, 1985, Ser. No. 809,303  
Claims priority, application Israel, Dec. 27, 1984, 73956  
Int. Cl.<sup>5</sup> A47C 20/00  
U.S. Cl. 5—431 19 Claims



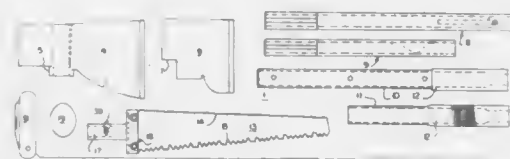
1. An orthopedic cradle for supporting an infant in a horizontal position while aiding in the prevention of hip articulation disorders in the infant, said cradle being of the basket-type and including: a bottom wall for resting on a horizontal surface, a foot wall at the foot end of the cradle, a head wall at the head end of the cradle, and a pair of side walls joined to said bottom, foot and head walls; said foot, head and side walls being of sufficient height to define a compartment for holding the infant, independently of any other holding means, against falling out when the infant is received therein in a substantially horizontal position with the infant's head adjacent to the head wall and the infant's feet adjacent to the foot wall; characterized in that said cradle further includes a post secured at its lower end to the bottom wall at an intermediate location thereof on its central longitudinal axis, and a transverse bar joined at its mid-portion to the upper end of said post and at its opposite ends to said pair of side walls, said post and transverse bar defining a pair of sockets for receiving the two legs of the infant with the post spreading the two legs apart to force the infant to lie horizontally in a wide open-legged position; said post having a width transversely of the cradle sufficient to spread apart the legs of the infant to an angle of between 60° to 90° with respect to the longitudinal axis of the infant's torso.

**4,958,394**  
**SEAT CUSHION FOR VEHICLE AND METHOD OF MAKING THE SAME**  
Muneharu Urai, and Hiroshi Suzuki, both of Akishima, Japan, assignors to Tachi-S Co., Ltd., Akishima, Japan  
Filed Jan. 11, 1987, Ser. No. 60,412  
Int. Cl.<sup>5</sup> A47C 25/00  
U.S. Cl. 5—475 8 Claims



5. A method of making a seat cushion comprising the steps of integrally molding of block of foamed polyurethane in a mold with at least one endless coiled metal spring member formed by coiling a spring metal wire having a small diameter, said spring member being positioned relative to said mold at the location of a seat base portion or each of side portions of said seat cushion by means of spring retainers disposed relative to said mold and in a position relative to each of said at least one spring member so as to retain said at least one spring member at a predetermined distance from the upper surface of said base portion or each of said side portions of said seat cushion.

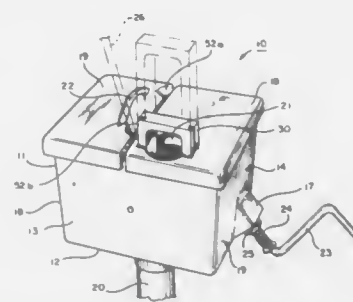
**4,958,395**  
**OUTDOOR CUTTING KIT APPARATUS**  
Arthur C. Busskohl, 50 Greenhouse Rd., Newcastle, Wyo. 82701  
Filed Sep. 5, 1989, Ser. No. 402,818  
Int. Cl.<sup>5</sup> B25F 1/00  
U.S. Cl. 7—145 5 Claims



1. A cutting tool assembly for various cutting functions including cutting of wood, animals and other outdoor elements, comprising at least one ax head having a tubular hub having a handle opening to receive a handle projecting from one end of the hub and terminating adjacent the opposite end of the hub, a saw blade having a handle coupling shaft member secured to one end and projecting longitudinally therefrom, said shaft member having a diameter corresponding to the hub opening, a two piece handle assembly including a first head handle having a tubular handle portion of a diameter corresponding to the diameter of said hub opening and a coupling end portion, said coupling end portion and said tubular hub

having securement means for releasably connecting said handle to said hub, the outer end of said handle being a tubular member having an opening adapted to telescope onto the shaft member of said saw blade and having securement means for releasably connected to said saw blade whereby said handle unit is adapted for selectively completing the ax and the saw for use, said head opening of said ax having an internal cylindrical opening of a constant diameter and a longitudinally extended tapered keyway extending throughout the total length of said cylindrical opening to prevent outward movement of the head from said handle.

**4,958,396**  
**GOLF CLUB AND GOLF BALL CLEANING DEVICE**  
Thomas L. Butler, 4321 Elmwood Dr., and Albert Stellar, 8501 Twilight Dr. W.3, both of Fort Worth, Tex. 76116  
Filed Jan. 26, 1989, Ser. No. 371,626  
Int. Cl.<sup>5</sup> A63B 57/00, 47/04; A46B 13/08  
U.S. Cl. 15—21.2 1 Claim



1. A cleaning device for golf clubs and golf balls comprising: a housing having an open top and first and second lid sections, said first lid section hinged to an edge of said housing opening and covering a first portion of the open top, and said second lid section fixed to said housing and covering a second portion of the open top, said first lid section having opening means to receive a golf club handle when said first lid section is closed, said second lid section having an opening for receiving a golf ball carrier means having a golf ball carried thereby; a brush means rotatably mounted in said housing adjacent to the bottom portion thereof, and means to rotate and induce simultaneous reciprocating movement of said brush means along the longitudinal axis of said means of rotation; golf club support means mounted in said bottom portion under said first lid section and including means for biasing a golf club toward said brush means; means connecting said first lid section to said biasing means to move said biasing means away from said brush when said first lid section is pivoted open and to permit the biasing means to move toward the brush means when the lid is closed whereby when said first lid section is open a golf club is positioned on said support means and upon closing said lid the biasing means moves said golf club into the path of said rotating brush means to clean said golf club; and a ball carrier means mounted in the opening of said second lid section and positioned to move a golf ball into the path of said rotary brush means to clean said golf ball.

**4,958,397**  
**POWER RAIN GUTTER CLEANING TOOL**  
Timothy J. Ryan, 3201 Carmel Rd., Charlotte, N.C. 28226  
Filed Jan. 9, 1989, Ser. No. 294,686  
Int. Cl.<sup>5</sup> A47L 25/00; A46B 13/02  
U.S. Cl. 15—93.1 6 Claims

1. A hand held tool for cleaning pine needles and other debris from a rain gutter by an operator standing on the ground said tool comprising:  
(A) a handle consisting of a vertical tubular section adapted

to fit snugly over a pole, and a horizontal section, cylindrical in shape, in which batteries, battery charger input jack, on/off switch and motor direction switch are nestled into the inner framework of said horizontal section,

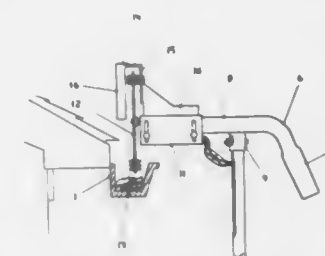
(B) a pole consisting of an upper and lower section joined by a threaded squeeze fit coupling,

(C) a crossarm which is basically tubular in cross section containing a cylindrical connector perpendicular to said crossarm such that said pole can be attached to said connector by means of a thumbscrew and wingnut with said crossarm and pole forming a "T" shape when seen in cross section,

(D) said crossarm at a point near one end bending approximately 70 degrees towards the ground and, a few inches after said bend, being molded from its tubular shape to a flat rectangularly shaped dislodge blade,

(E) said crossarm at the opposite end to said dislodge blade being molded into a housing which contains an electric motor, gears and shafts nestled in the internal framework of said housing,

(F) said housing being roughly boxlike in shape with a front panel extending upward above a top panel of said housing approximately 4 inches and with front portions of two side

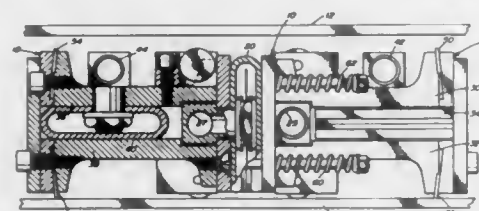


panels extending upward to form a right triangularly shaped buttress with an upper part of the front panel,  
(G) said housing had threaded holes in bottom corners of the left and right sides to which a roughly "U" shaped sheet of plastic forming bottom and side portions is bolted with such sheet forming a guide and having its bottom portion parallel to the bottom panel of the housing,  
(H) a motor shaft extending from said housing and being threaded on its outer surface at its tip and is bored and threaded at this same tip such that a disk can be attached to said shaft,  
(I) a disk mounted on said shaft and comprised of a semi-rigid plastic body from which semi-rigid plastic spikes protrude both parallel to and perpendicular to said body,  
(J) a guard comprising a half-circle shaped fence section parallel to the disk and a bracket section which in cross section is shaped like a roughly inverted "U" with one leg cut short and a second longer leg attached to the upper part of the front panel of the housing and the shorter leg attaching to the fence section with the top half of the disk fitting between the longer leg and the fence section,  
(K) two wires located in the interior of the pole which connect the electric motor and the circuitry in the pole handle.

**4,958,398**  
**ROBOT CLEANER FOR USE BETWEEN PARALLEL PLATENS**  
Charles J. Schmidt, P.O. Box 757, Dibioli, Tex. 75941  
Filed Aug. 7, 1989, Ser. No. 389,912  
Int. Cl.<sup>5</sup> B23D 79/02 8 Claims

6. A robot cleaner for insertion between first and second spaced and parallel press platens for cleaning the platens comprising:

a body having first and second sections connected together but movable relative to each other, first air bladder actuating means connected between said first and second sections for moving said sections away and toward each other for moving said sections in a direction parallel to said first and second platens when said body is positioned between said first and second platens, said first section having first and second sides connected together but movable relative to each other, second air bladder actuating means connected between said first and second sides for moving said first and second sides transverse to said first and second platens when the body is positioned between said first and second platens, said second section having third and fourth sides connected together but movable relative to each other,



third air bladder actuating means connected between said third and fourth sides for moving said third and fourth sides transverse to said first and second platens when the body is positioned between said first and said second platens, a scraper blade on each of the sides for engaging one of the platens when the sides are moved transversely by the second and third bladder actuating means, and control means connected to the first, second and third actuating means for engaging the first and second platens with the blades of one section while engaging the first and second platens with the blades of the other section with a greater force than the blades of the one section, and moving the one section to and across the first and second platens.

4,958,399

## TROWEL ASSEMBLY

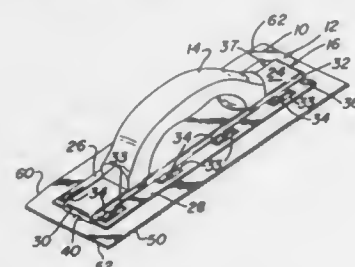
Hugh F. Toal, Jackson; Nicholas J. Careyote, Bordentown, both of N.J., and Michael A. Saplenza, Yardley, Pa., assignors to Congoleum Corporation, Lawrenceville, N.J.

Filed Jan. 16, 1989, Ser. No. 367,200

Int. Cl.<sup>3</sup> B05C 11/04, 17/10

U.S. Cl. 15—104 S

9 Claims



1. A trowel assembly, comprising a blade and a blade holder having a handle portion and a rail portion securing said handle to said blade, wherein:

said rail is wider than said handle portion but narrower than said blade, and is provided with a two-dimensional array of spring-clip receiving openings; said blade is of a resilient material and provided with an array of punched-up spring clips congruent with said

array of openings whereby said array of springs and said array of clips may be aligned so that said clips extend through said openings, and said blade and rail are slidable relatively to each other along a predetermined direction to cause said clips to grasp said blade and secure it to said rail; and detent means acting between said blade and said rail to hold said blade against disengagement of said clips from said blade during normal use but releasable by application of a separating force to permit slidable removal of said blade from said rail.

4,958,400

## LINE CLEANING APPARATUS

Masahiko Sugita, 8-24, Atago 3-Chome, Niiiza-ahi, Saitama Prefecture 352, Japan

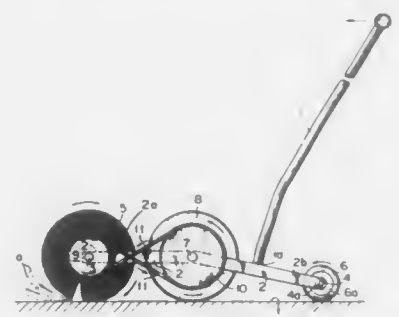
Filed Sep. 1, 1989, Ser. No. 401,852

Claims priority, application Japan, Jun. 30, 1989, 1-77514[U]

Int. Cl.<sup>3</sup> E01H 1/05

U.S. Cl. 15—79.1

2 Claims



1. An apparatus to be advanced along a boundary line of preset width associated with a playing surface of a game to thereby clean the line, said apparatus comprising:

a frame having (i) a pair of frame members each of which includes a central portion and leading and trailing arm portions which extend in generally opposite directions from said central portion, said leading arm portion having a forwardmost end, and said trailing arm portion having a rearwardmost end, and (ii) a cross brace rigidly connected to and between said pair of frame members so as to laterally separate each said frame member one from the other, wherein said leading arm portions of said pair of frame members are substantially parallel to one another, whereas said trailing arm portions of said frame members converge toward one another;

roller brush means having a brush-mounting shaft for rotatably mounting said roller brush means transversely between said pair of frame members at said forwardmost end of said leading arm portions thereof for cleaning a boundary line associated with a game's playing surface;

primary and secondary roller means for supporting said frame means for movements over the boundary line to be cleaned, said primary roller means including a roller-mounting shaft for rotatably mounting said primary roller means transversely between said pair of frame members at said central location between said forwardmost and rearwardmost ends thereof, and said secondary roller means being rotatably mounted transversely between said trailing arm portions of said pair of frame members at said rearwardmost end thereof so as to be mounted rearwardly of said primary roller means; and wherein

said roller brush means and said primary roller means each establish an axial dimension corresponding to the preset width of said boundary line, and wherein said secondary roller brush means establishes an axial dimension which is less than said axial dimension of said roller

brush means said primary roller means, and thus less than the preset width of said boundary line; said apparatus further comprising pulley means operatively interconnecting said primary roller means and said brush means, said pulley means, during a boundary line-cleaning operation in which said primary roller means is rotatably advanced along a boundary line to be cleaned, for responsively rotating said roller brush means in a rotational direction which causes debris on said boundary line to be brushed forwardly of said roller brush means, whereby said boundary line is cleaned, and wherein said pulley means includes:

(a) a pair of pulley wheels fixedly mounted at a respective end of said brush-mounting shaft and said roller mounting shaft so as to be rotatably supported thereby, wherein each said pulley wheel is positioned laterally adjacent to an exterior side of a respective one of said frame members, wherein said respective one of said frame members is located between said pair of pulley wheels, on the one hand, and said roller brush means and said primary roller means on the other hand; and (b) a belt that extends around said pair of pulley wheels, in a configuration such that the belt crosses between the same to form a figure eight.

4,958,401

## UNIVERSAL TOOL FOR SOLDERING AND DE-SOLDERING APPARATUS

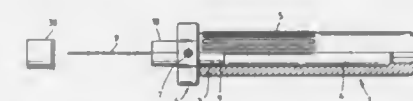
Jurgen Kurz, Welkersheim, Fed. Rep. of Germany, assignor to Cooper Industries, Inc., Houston, Tex.

Filed Aug. 25, 1988, Ser. No. 220,760

Int. Cl.<sup>3</sup> B08B 9/02

U.S. Cl. 15—104.16

16 Claims



1. A universal tool for soldering and de-soldering equipment, comprising:

an elongated hollow handle having axially directed socket openings on either end; a plurality of cleaning needles; and a holder for removably mounting said needles to said handle, said holder having: a plurality of segments constructed and arranged to mount said cleaning needles, wherein each of said segments is adapted for mounting one of said cleaning needles and wherein said segments are rotatable one with respect to the other; and an insertion piece formable by the rotation of said segments for removably mounting of said holder in one of said axially directed socket openings in said elongated hollow handle.

4,958,402

## BRISTLE ARTICLE

Georg Wehrauch, Wald-Michelbach, Fed. Rep. of Germany, assignor to Coronet-Werke Helarich Schlerf GmbH, Wald-Michelbach, Fed. Rep. of Germany

Filed May 19, 1988, Ser. No. 195,794

Claims priority, application Fed. Rep. of Germany, May 23, 1987, 3717475

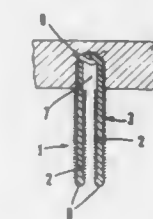
Int. Cl.<sup>3</sup> A46B 3/00, 15/00

U.S. Cl. 15—159 A

32 Claims

1. Bristle article comprising holder means, at least one ther-

mally stabilized stretched plastic monofilament bristle, and flocked short projecting fibers adhesively coated to at least a



portion of an axial length of the at least one thermally stabilized stretched plastic monofilament bristle.

4,958,403

## BAR-B-QUE GRILL SCRAPER

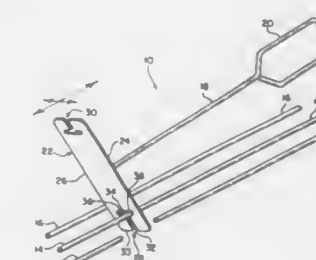
LaVerne L. Martin, 438 N. 5 St., Chariton, Iowa 50049

Filed May 17, 1989, Ser. No. 353,043

Int. Cl.<sup>3</sup> A47L 17/06

U.S. Cl. 15—236.07

9 Claims



1. A tool for scraping a grill having a plurality of spaced apart parallel grill rods comprising:

a generally T-shaped implement including an elongated handle and a substantially flat scraper member at one end of said handle disposed transversely to the handle, said scraper member including at least one T-shaped opening including a first slot having an open end centrally along one edge of said scraper member and a first cross slot transversely intersecting said first slot at an end of said first slot opposite said open end of said first slot, the first cross slot extending an equal distance across said first slot and having opposite closed ends substantially conforming to a predetermined grill rod transverse cross sectional shape and size, such that opposite sides of said grill rod can be scraped in each of said opposite closed ends.

4,958,404

## CARD FOR PRODUCING FIBROUS WEBS ETC.

Werner Lascaga, Duellmen, Fed. Rep. of Germany, assignor to Hergeth Hollingsworth GmbH, Duellmen, Fed. Rep. of Germany

Filed Sep. 30, 1988, Ser. No. 252,335

Claims priority, application Fed. Rep. of Germany, Oct. 10, 1987, 3734313

Int. Cl.<sup>3</sup> D01G 15/74, 15/28

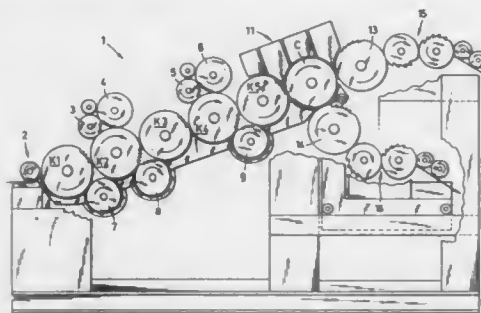
U.S. Cl. 19—96

6 Claims

1. A textile card for producing fibrous webs and random webs of textile fibers comprising a series of cylinders fitted with metallic wire which rotate relative to each other in a predetermined sense, and a plurality of worker rollers coordinated with said cylinders, a fiber intake and, at least one take-off roller, said worker rollers including a trough shaped cover which includes trough-shaped plates, and said cover containing an opening for regulating the air current between said rollers and said cover, characterized in that said trough-shaped

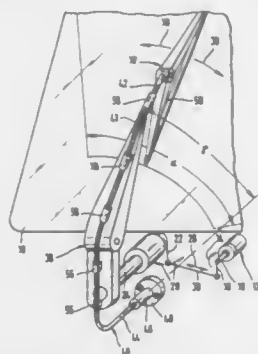


cover of said worker rollers is formed of a plurality of trough sections arranged in spaced series relationship, and means for



opening said trough sections to provide a desired air flow around said cylinder and rollers.

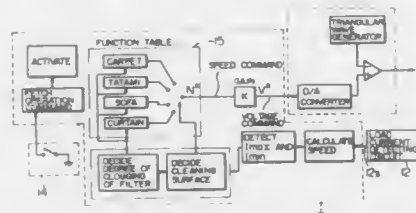
**4,958,405**  
**WIPER DEVICE FOR A CURVED WINDSHIELD OF A VEHICLE**  
Gerd Kühnbauch, Bühlertal, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
Filed May 15, 1989, Ser. No. 353,073  
Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824489  
Int. Cl.<sup>5</sup> B60S 1/44  
U.S. Cl. 15—250.33 5 Claims



1. A wiper device for a windshield of a vehicle, said wiper device comprising an oscillating wiper arm having a free end; a wiping blade connected with said wiper arm at said free end of said wiper arm and pivotable about a pivot axis as a result of an oscillating movement of said wiper arm, said pivot axis being spaced from the windshield and extending substantially parallel thereto; and an elongate flexible member fixed at one end thereof and having at the other end thereof a pivot shaft defining said pivot axis and displaceable with said wiper arm and connected with said wiping blade for transforming the oscillating movement ( $\alpha$ ) of said wiper arm into a pivotal movement of said wiper blade, said one end and said pivot axis defining first and second longitudinal axes, respectively, said pivot axis forming an angle ( $\gamma$ ) with said first axis less than  $180^\circ$ .

**4,958,406**  
**METHOD AND APPARATUS FOR OPERATING VACUUM CLEANER**

Hiemori Toyoshima; Fumio Jyoraku; Yoshitaro Ishii; Kazuo Takara, all of Hitachi; Haruo Koharagi; Syuji Watanabe, both of Ibaraki; Koaichi Saito, Kitaiharaki; Kunio Miyashita, Hitachi; Toshiro Endo, Hitachiota, and Wakichiro Hishi, Nagareyama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Dec. 14, 1988, Ser. No. 284,382  
Claims priority, application Japan, Dec. 15, 1987, 62-316885; Mar. 7, 1988, 63-51488  
Int. Cl.<sup>5</sup> A47L 9/28  
U.S. Cl. 15—319 10 Claims



8. A vacuum cleaner comprising:  
an electric blower for collecting dust in a dust chamber through a suction port, said electric blower creating a suction pressure;  
blower control means for controlling a rotational speed of said electric blower;  
control rule generating means for generating a plurality of control rules for controlling the operation of said vacuum cleaner;  
means for selecting one of said plurality of control rules generated by said control rule generating means; and  
signal processing means for processing said selected one of said plurality of operation control rules and for outputting a control signal to said blower control means so as to control operation of said electric blower in accordance with said selected control rule.

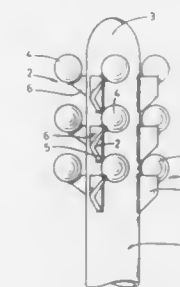
**4,958,407**  
**AUXILIARY TOOL HANDLE**  
Samuel V. Johnson, 32 Cherry Tree Rd., Loudonville, N.Y. 12211  
Continuation-in-part of Ser. No. 200,451, May 31, 1988. This application Aug. 21, 1989, Ser. No. 396,549  
Int. Cl.<sup>5</sup> B25G 1/00  
U.S. Cl. 16—114 R 20 Claims



1. An auxiliary tool handle for attaching to an elongated tool handle comprising:  
a plurality of loop shaped member sized to receive at least 4 of a user's fingers  
said members having a first end and a second end, said ends being capable of adjoining the elongated tool handle,

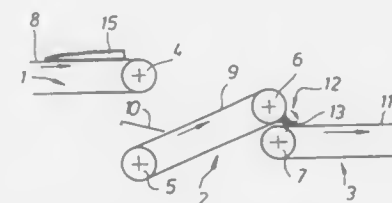
a handle attachment means at each of said ends capable of releasably securing each of said members to the elongated tool handle,  
said first and second ends of each of said members extending substantially parallel to the elongated tool handle when said member is attached to said handle  
said first end extending away from an area bounded by the perimeter of said member and  
said second end extending to form a lower boundary for said area bounded by the perimeter of said member.

**4,958,408**  
**DEVICE FOR REMOVING THE CRAW OF SLAUGHTERED POULTRY**  
Cornelis Meyn, Haal 62, 1511 As Oostzaan, Netherlands  
Filed Jul. 10, 1989, Ser. No. 377,899  
Claims priority, application Netherlands, Aug. 8, 1988, 8801970  
Int. Cl.<sup>5</sup> A22C 21/00  
U.S. Cl. 17—11 20 Claims



1. Device for removing the craw of slaughtered poultry, especially turkeys, comprising a rotatable mandrel adapted to be moved via the opening in the belly through the neck of the poultry and projections positioned thereon extending in the direction of rotation and the direction of motion of the mandrel, characterized in that each projection is provided with a blunt outer end defining the outer limitation of the device.

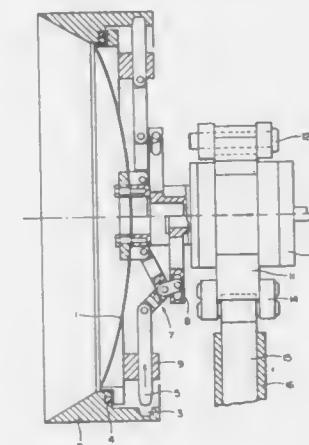
**4,958,409**  
**METHOD AND APPARATUS FOR TURNING OVER AND STRETCHING FISH FILLETS**  
Horst K. H. Braeger, and Hugo Pontow, both of Lübeck, Fed. Rep. of Germany, assignors to Nordischer Maschinenbau Rud. Baader GmbH & Co., Lübeck, Fed. Rep. of Germany  
Filed Nov. 7, 1989, Ser. No. 433,023  
Claims priority, application Fed. Rep. of Germany, Nov. 10, 1988, 3838154  
Int. Cl.<sup>5</sup> A22B 5/00  
U.S. Cl. 17—24 11 Claims



1. A method for the automatic turning over of fish fillets defining a longitudinal axis, with each fillet being conveyed lying in a flat position and in the direction of its longitudinal axis and being transferred to a lower-lying, actively conveying plane, wherein each fillet

(a) is deflected into a substantially vertical position whilst a turnover moment is imparted thereon,  
(b) is brought into a free fall, and  
(c) is then caught at its leading end and conveyed on accompanied by engagement on the part following said leading end of the fillet.

**4,958,410**  
**MACHINE FOR MEAT TREATMENT AND MACERATION WITH AUTOMATIC LOADING AND UNLOADING**  
Narciso C. Lagares, Besalu, Spain, assignor to Metalquima, S.A., Gerona, Spain  
Filed Mar. 22, 1989, Ser. No. 327,268  
Int. Cl.<sup>5</sup> A22C 9/00  
U.S. Cl. 17—25 3 Claims

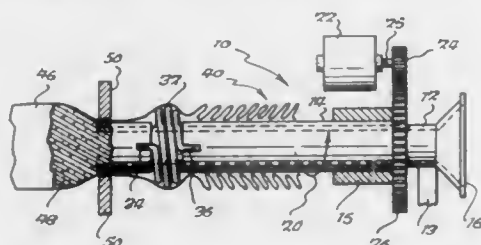


1. In a machine for meat treatment and maceration with automatic loading and unloading having a frame, a drum rotatably mounted on its symmetry axis on the frame, an internal chamber in the drum, and a loading and unloading hood inlet opening defined in one end of the internal chamber, a closing door-lid engaging against said loading and unloading hood inlet, a supporting structure on the frame and independent of the drum for supporting the closing door-lid, means for rotatably supporting the closing door-lid on said supporting structure, means for positioning said closing door-lid in said drum inlet and for separating said closing door-lid therefrom, and driving assembly means for fitting and locking said door-lid in tight closing engagement in the drum hood inlet in any position of rotation, the improvement comprising:  
means on said supporting structure assembly for releasably gripping said driving assembly means so that said driving assembly means is released and said door-lid is freely rotatable on said supporting structure when said door-lid is fitted and locked to said hood inlet to allow rotation of the door-lid with the drum, and said driving assembly means is locked on said supporting structure during opening and closing of said hood-inlet by said door-lid for loading and unloading of the drum.

**4,958,411**  
**DUAL TUBE STUFFING HORN WITH EXPANDING SPRING FOR SIZE CONTROL**  
Thomas R. Stanley, Kansas City, Mo., assignor to Teepak, Inc., Westchester, Ill.  
Filed Dec. 11, 1989, Ser. No. 448,793  
Int. Cl.<sup>5</sup> A22C 11/02  
U.S. Cl. 17—41 13 Claims

1. A filling horn for a food stuffing apparatus, which comprises an inner tubular body, an outer tubular body at least in-part coaxially mounted on said inner tubular body, at least

one of said tubular bodies being movable relative to the other, and a spring member circumferentially coiled around at least

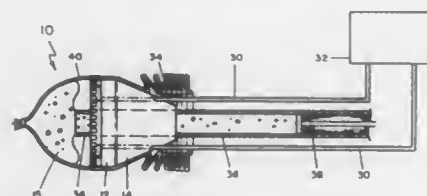


one of said tubular bodies and adapted to expand radially upon movement of one of said tubular bodies.

**4,958,412**  
**METHOD AND APPARATUS FOR COATING A FOOD PRODUCT**  
Tom G. Stanek, Smyrna, Ga., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.  
Filed Dec. 9, 1988, Ser. No. 282,794  
Int. Cl.<sup>5</sup> A22C 11/02

U.S. Cl. 17-41

15 Claims



1. In a sizing ring suitable for use with a tubular casing and a stuffing horn, the sizing ring comprising a cylindrical sleeve having

- (i) an outer diameter substantially corresponding to the inside diameter of the casing,
- (ii) an inner diameter slightly greater than the outside diameter of the stuffing horn, and
- (iii) two parallel, lateral faces defining the lateral thickness of the sleeve, the improvement comprising:
  - (a) at least one channel within the sleeve, said channel having a first end and a second end, the first end terminating in an orifice at one of the lateral faces of the sleeve; and
  - (b) an annular groove located at an outer extremity of the sleeve, in communication with the second end of the channel, and intermediate the lateral faces of the sleeve.

**4,958,413**  
**DRIVE MECHANISM FOR A FEED ROLL OF A COMBING MACHINE**  
Heinz Clement, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland  
Filed Dec. 16, 1988, Ser. No. 285,215  
Claims priority, application Switzerland, Dec. 24, 1987, 5059/87

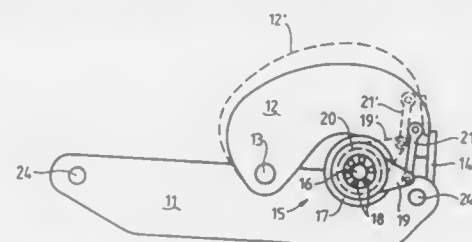
Int. Cl.<sup>5</sup> D01G 19/18

U.S. Cl. 19-115 R

7 Claims

1. A drive mechanism for a feed roll of a combing machine, said mechanism comprising
- at least one pivotally mounted arm movable between a raised position and a lowered position and adapted to carry a top nipper thereon;
  - a freewheel having an inner member adapted to be secured to a feed roll for rotation thereof, an outer member concentric to and rotatable about said inner member and a plurality of locking elements between said members, said elements being movable in response to rotation of said outer member to move between one of a release position

allowing free rotation of said outer member relative to said inner member and a locking position locking said members together; and means connecting said outer member to said arm for rotation

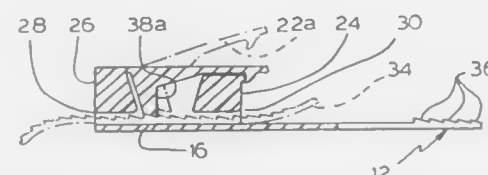


of said outer member in response to movement of said arm between said positions thereof, said means including a lug secured to and extending from said outer member and a link pivotally connected between and to said lug and said arm.

**4,958,414**  
**REUSABLE TIE-ALL OR BUNDLE FASTENER**  
Edward J. Benoit, 28 Guérin Street, Boucherville, Canada J4B 1Z7  
Filed Dec. 5, 1989, Ser. No. 446,299  
Int. Cl.<sup>5</sup> B65D 63/00

U.S. Cl. 24-16 PB

4 Claims



1. A strap fastener for retaining and supporting a bundle of elongated elements, comprising:

- an elongated semi-flexible, elastic strap member defining a top wall, a bottom wall, two side edges, and first and second opposite end sections, the top wall of said strap member defining a first end section in register with said strap first end section and having a series of successively spaced, transverse serrations or grooves;
- a casing, extending outwardly from and anchored to a second end section of said strap member top wall opposite said first end section, and defining a through-channel adjacent said strap member top wall and substantially parallel thereto and forming a first free end mouth and a second opposite mouth;
- said strap member first end section constituting a free end section releasably engaged through said first mouth, into said channel, and escaping through said second mouth so that said strap member forms a loop wherein said bundle of elements are destined to engage through said loop;
- said casing defining a first free end section and an opposite second end section, two side walls transversely integral to said strap member wherein said channel extends therebetween; an elongated, semi-flexible, elastic tongue, defining a first end section, integral to said casing side walls about said casing first end section, and an opposite second free end section or lip, movable away from or towards said channel hingedly about said tongue first end section; said tongue being prebiased to a position substantially parallel to said channel, wherein the tongue is laterally shielded by said casing side walls therebetween;
- said lip extending beyond the level of said second mouth, for

clearing said casing side walls and thus facilitating manual handling thereof;

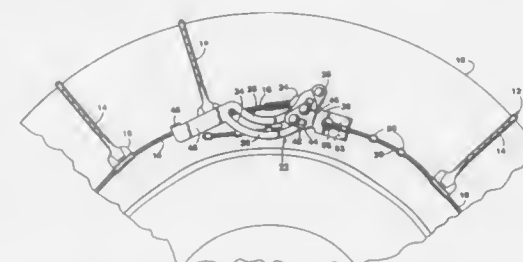
a tooth, depending from an intermediate section of said tongue and directed toward said channel but extending short of said strap member top wall, said tooth defining a free end edge extending partially into said channel and matingly releasably engaged with a selected registering one of said strap serrations; said interengaged tooth free end edge and strap serration being of such a shape as to retain said strap member first end section into said channel against the unlooping bias from the looped said semi-flexible elastic strap member, once the latter has been pulled tightly around said bundle of elements;

wherein release of said tooth from said selected strap serration is possible only upon pivotal motion of said tongue lip away from said channel;

and further including releasable snap lock means, to prevent pivotal motion of said tongue lip away from said channel.

**4,958,415**  
**CONNECTOR FOR LATERAL CABLE OF TIRE CHAINS**  
Eric Johnson, Vancouver, Wash., assignor to Quality Chain Corp., Portland, Oreg.  
Filed Jun. 7, 1989, Ser. No. 363,624  
Int. Cl.<sup>5</sup> A44B 21/00; B60C 27/10  
U.S. Cl. 24-69 TT

12 Claims



1. Connecting apparatus for interconnecting the opposite ends of a lateral cable of a set of tire chains comprising:
- (a) anchor means fixedly attached to said lateral cable proximate a tail end portion thereof;
  - (b) tensioning lever means pivotally interconnected with a head end portion of said lateral cable and free to rotate from a releasing position in which said lever means extends away from said head end portion of said lateral cable to a tensioning position in which said lever means extends generally alongside said head end portion of said lateral cable;
  - (c) means defining an arcuate cam associated with said tensioning lever means said cam including a cam slot; and
  - (d) clasp means for engaging said anchor means, said clasp means being attached to said lever means in engagement with said cam slot and being free to follow said arcuate cam by movement along said cam slot in response to application of tension to said clasp means by said tail end portion of said lateral cable.

**4,958,416**  
**SHOULDER HARNESS STRAP ADJUSTER AND COMFORT CLIP**  
Dan Frishling, 355 Donlin La., Newbury Park, Calif. 91320  
Filed Jun. 29, 1989, Ser. No. 374,085  
Int. Cl.<sup>5</sup> A44B 11/25

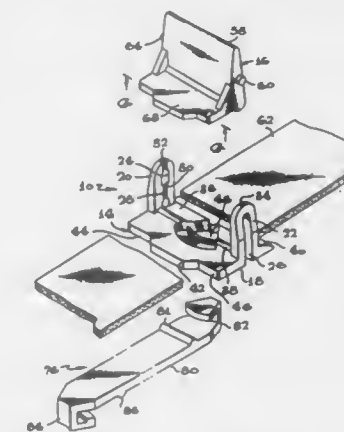
U.S. Cl. 24-170

7 Claims

1. A shoulder harness strap and adjuster comprising:
- a first comfort clip for attachment to the shoulder harness strap of an automotive seat belt assembly at a point adjacent the user's shoulder;
  - a second comfort clip for attachment to the lap belt strap of

an automotive seat belt assembly at a point adjacent the hip of the user;

at least one of said comfort clips comprising a base together with first and second arms extending upward from said base, said arms spaced sufficiently apart to receive therebetween the corresponding strap, together with a latch mounted on said arms and cooperating with said base so that, in a latched position, the strap is clamped between said latch and said base and, in an unlatched position, said comfort clip is free to move with respect to the strap, said arms having slots therein extending through said base and



upward through said arms to define a pivot pin receptacle, and pivot pins on said latch to be received in said receptacle so that said latch can pivot with respect to said base and said arms; and

a rod interconnecting said first and second comfort clips to limit the distance between said comfort clips so that said first comfort clip holds the shoulder harness strap over the shoulder of the user, an arcuate slot in said base and a connector body on said rod for engagement in said slot so as to permit limited angular motion between said base and said rod to aid in alignment.

**4,958,417**  
**ATTACHMENT DEVICE FOR STRAP END**  
An C. Chou, No. 212, Yung-An St., Tainan, Taiwan  
Filed Mar. 28, 1990, Ser. No. 500,183  
Int. Cl.<sup>5</sup> A44C 5/18; F16B 1/00  
U.S. Cl. 24-265 R

1 Claim



1. An attachment device for strap end comprising:
- an elongated clasp member made of deformable material and having a flat bottom formed with a plurality of openings and opposed arcuate side walls defining a space therebetween;
  - a securing piece having a plate body formed with a plurality of openings and dimensioned to be located in the space defined in the clasp member over the flat bottom of the clasp member to define a passageway along a longitudinal direction between the securing piece and clasp member for extension of an overlapped section of a strap with openings of the securing piece corresponding the openings of the clasp member; and
  - a plurality of rivets for insertions through corresponding openings of the securing piece and clasp member, each



having a flattening top end and a bottom end shaped to pierce the overlapped section of the strap and being flattened under the flat bottom of the clamp member through a pressing operation.

4,958,418

## LACE TIGHTENING APPARATUS

Pierre Dufour, Menthon-St-Bernard, France, assignor to Salomon S.A., Annecy, France

Filed Jan. 19, 1989, Ser. No. 367,748

Claims priority, application France, Jan. 23, 1988, 88 08460

Int. Cl.<sup>5</sup> A43B 11/00

U.S. Cl. 24—713.6

24 Claims



1. A lace tightening apparatus for tightening two opposite portions against one another comprising:
  - at least one eyelet mounted on each of said two opposite portions which are to be traversed by a lace, the two opposite eyelets being positioned substantially in a single lacing plane that also contains the lace which passes through the eyelets; and
  - each said eyelet being inclined with respect to said lacing plane at an angle such that the lace is in contact with each said eyelet only at two opposite points which are spaced from one another in the longitudinal direction of the lace, each of said opposite points being a tangent point between a surface of said lace and a surface of said eyelet.

4,958,419

## DUAL LOOP HOSE CLAMP

John E. Heckethorn, Dyersburg, and Danny J. Whittle, Newbern, both of Tenn., assignors to 3900 Corp., Baltimore, Md.

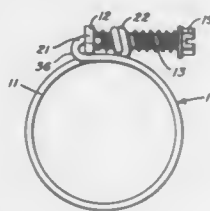
Continuation of Ser. No. 581,122, Feb. 17, 1984, abandoned.

This application Feb. 14, 1986, Ser. No. 829,224

Int. Cl.<sup>5</sup> A44B 1/04

U.S. Cl. 24—283

9 Claims



1. A low profile hose clamp comprising:
  - (a) a single length of wire curved upon itself to form a pair of laterally spaced hose encircling loops, and comprising the following portions, in sequence:
    - (1) a first unattached end portion;
    - (2) a first transition portion;
    - (3) a first loop portion;
    - (4) a connecting portion bent to define a coiled, screw-receiving nut section of approximately one and one-half turns, and having a longitudinal axis;
    - (5) a second loop portion laterally spaced from said first loop portion;
    - (6) a second transition portion; and
    - (7) a second unattached end portion; said transition portions and said loop portions being in close overlapping association;
  - (b) an actuating plate having at least two spaced holes

therein in a plane normal to the longitudinal axis of said nut section, each of said unattached end portions being bent backwardly toward said nut section and received within one of said holes in the actuating plate; and

(c) a large diameter actuating screw having shallow, widely spaced flat-bottom threads, said screw passing through and in threaded engagement with said nut section, one end of said screw engaging against said actuating plate between the holes therein.

4,958,420

## PLUG-TYPE CLASP FOR PIECES OF JEWELRY

Georg Bunz, Obere Bergstr. 16, D-7544 Döbel, Fed. Rep. of Germany

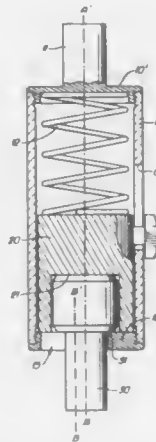
Filed Jan. 30, 1990, Ser. No. 472,026

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1989, 3903342

Int. Cl.<sup>5</sup> A44C 11/00; F16B 1/00

U.S. Cl. 24—653

8 Claims



1. A plug-type clasp for securing together the ends of a piece of jewelry, said clasp comprising: a housing having a central longitudinal axis and a front end and a rear end, said ends being spaced apart along the central longitudinal axis of said housing; a sleeve installed in said housing for movement in the direction of the central longitudinal axis of said housing, said sleeve having a front end which faces said front end of said housing, and said sleeve being provided with a receiving opening which extends from said front end of said sleeve and which has a central longitudinal axis that lies parallel to the central longitudinal axis of said housing; spring means disposed in said housing and acting on said sleeve for urging said sleeve toward said front end of said housing; cover means disposed at said front end of said housing and defining a passage opening having a central longitudinal axis which is laterally offset from the central longitudinal axis of said receiving opening; and connecting means including a connecting part, said connecting part being configured to be capable of passing through said passage opening when said connecting part has a first position and to be capable of passing into said receiving opening when said connecting part has a second position, the first and second positions being offset transverse to the central longitudinal axis of said housing by a distance such that when said connecting part is in the first position it is prevented from entering said receiving opening and when said connecting part is in the second position it is prevented by said cover means from passing through said passage opening, wherein said sleeve is displaceable along the longitudinal axis of said housing, against the urging of said spring means, between a locking position for holding said connecting part in said receiving opening and a release position for permitting said connecting part to move to its second position for passage through said passage opening.

4,958,421

## METHOD FOR ASSEMBLING A VENETIAN BLIND

Robbert E. Spangenberg, Oosterhout, Netherlands, assignor to Hunter Douglas International N.V., Caracao, Netherlands Antilles

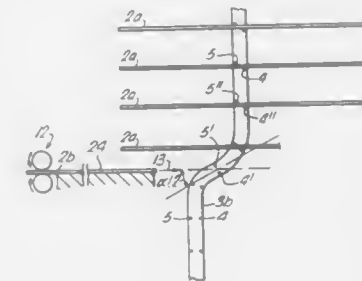
Filed Nov. 22, 1988, Ser. No. 274,519

Claims priority, application Netherlands, Dec. 2, 1987, 8702890

Int. Cl.<sup>5</sup> B23P 19/04

U.S. Cl. 29—24.5

5 Claims



1. A method for interlacing a plurality of slats with a plurality of ladder means to form a venetian blind, each slat having a given width and a given depth, defining a cross section, the ladder means comprising a pair of horizontally spaced, parallel, longitudinally extending side members, the side members being in the form of tapes, and a plurality of longitudinally spaced cross connections, one cross connection being provided for each slat, each cross connection including at least a first and a second cross element, the first cross element being spaced from the second cross element along the width of the tape side members, the mutual spacing between the cross elements of any given cross connection, as measured in the plane joining the longitudinal axes of the cross elements, being greater than the given depth of a slat, wherein the height of the projection of every pair of first and second cross elements on a plane through the longitudinal axes of the side members ranges between zero and slightly greater than the given depth of the slats and the distance between the side members of the ladder means is slightly greater than the given width of the slats, the interlacing of each slat comprising the steps of:
  - (a) supplying a slat along a feed path perpendicular to the cross section of the slat;
  - (b) providing at least two said ladder means, wherein the mutual spacing between the cross elements of each ladder means defines an interlacing opening;
  - (c) intermittently moving the side members longitudinally and stepwise in a laterally stretched condition to sequentially position consecutive cross connections at a location of interlacing, at which the slat enters the interlacing opening;
  - (d) guiding the side members so that, at least at the interlacing location, the side members of each ladder means are each positioned so that the longitudinal axis of each side member forms an acute angle with the longitudinal axis of the feed path, such that the projection of the interlacing opening on a plane perpendicular to the longitudinal axis of the feed path is larger than the cross section of the slat; and
  - (e) feeding the slat through the interlacing opening.

4,958,422

## WEAR-RESISTANT COMPOUND ROLL

Masahiko Oshima, Takumi Ohata, and Toshiyuki Hatori, all of Kitakyusyu, Japan, assignors to 501 Hitachi Metals, Ltd., Japan

PCT No. PCT/JP88/00304, § 371 Date Nov. 22, 1988, § 102(e) Date Nov. 22, 1988, PCT Pub. No. WO88/07594, PCT Pub. Date Oct. 6, 1988

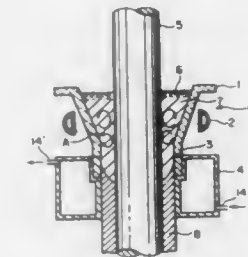
PCT Filed Mar. 24, 1988, Ser. No. 320,644

Claims priority, application Japan, Mar. 24, 1987, 62-69666

Int. Cl.<sup>5</sup> B21B 31/08

U.S. Cl. 29—129.5

8 Claims



1. A wear-resistant compound roll comprising a steel core shaft having a tensile strength of 55 kg/mm<sup>2</sup> or more and an elongation of 1.0% or more, and an outer layer on said sheet having a surface with a Shore hardness of 70 or more and made of an iron-base alloy having a composition consisting essentially, by weight, of 1.5–3.5% C, 0.3–3.0% Si, 0.3–1.5% Mn, 2–7% Cr, 9% or less Mo, 20% or less W, 3–15% V and balance substantially Fe; said outer layer being metallurgically bonded to said steel shaft by a shell casting method comprising using a composite mold comprising a refractory mold and a cooling mold provided under said refractory mold, supplying a melt of said iron-base alloy around said steel shaft in said refractory mold, keeping said melt in said refractory mold while heating and stirring it by an induction coil at a temperature in the range between a first temperature at which primary crystals are precipitated from said melt and a second temperature up to 100° C. higher than said first temperature, moving said steel shaft downwardly concentrically with said composite mold, thereby solidifying said melt by contact with said cooling mold and bonding solidified melt to said steel shaft; and a boundary layer between said outer layer and said shaft, said boundary layer having a tensile strength at least as high as that of the weaker of said outer layer and said shaft.

4,958,423

## WATER-SUPPLYING CORD AND A TOOL FOR INSERTING A HOSE IN IT

Hideobu Mori, Tokyo, Japan, assignor to Osada Electric Co., Ltd., Tokyo, Japan

Division of Ser. No. 192,811, May 11, 1988. This application Aug. 24, 1989, Ser. No. 396,198

Claims priority, application Japan, Oct. 2, 1987, 62-152110; Dec. 31, 1987, 62-200773

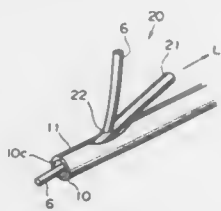
Int. Cl.<sup>5</sup> B23P 19/02

U.S. Cl. 29—235

5 Claims

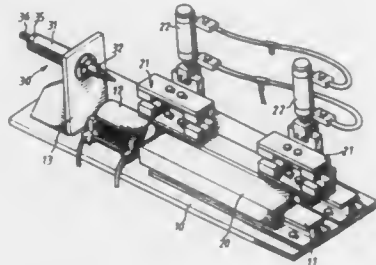
1. A hose insertion tool adapted to be used for inserting an elongated element within a passageway of a tube having a resiliently closed rift leading to said passageway, said hose insertion tool comprising: an elongated tool body having a longitudinal axis, said body having one longitudinal end with a passage which opens up onto said one longitudinal end and which extends longitudinally into said body, said body having an outer wall extending longitudinally from said one longitudinal end, a groove in said body between one side of said outer wall and said passage, a guide channel in said body between an opposite side of said outer wall and said passage, said guide channel having a channel axis extending at an acute angle

relative to said longitudinal axis, said one longitudinal end of said body being insertable in said rift by temporarily separating



said rift and moving said tool body along said rift while simultaneously feeding said elongated element through said guide channel into said passageway of said tube.

**4,958,424**  
**DEVICE FOR FITTING A HOSEL ON A CLUB SHAFT**  
Paul K. H. Hsu, 1 FL, No. 1-2, Lane 30, Sec. 2, Hsing Sheng S. Rd., Taipei, Taiwan  
Filed Oct. 26, 1989, Ser. No. 426,981  
Int. Cl.<sup>5</sup> B23P 19/04  
U.S. Cl. 29—252 1 Claim



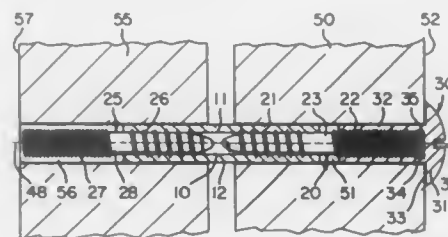
1. A device for fitting a hosel on a club shaft, comprising:
  - a base;
  - two rails being parallel to each other and mounted on said base;
  - a holder seat having a flat upper surface being engaged with said two rails and being slidable on said two rails along a length of said rails;
  - a horizontal pneumatic cylinder being mounted on said base at a first end of said two rails and in alignment with a middle portion of said base, said horizontal pneumatic cylinder having a piston with an exposed end connected to said holder seat, said holder seat being actuated by said horizontal pneumatic cylinder to slide on said two rails along the length of said rails via said piston;
  - two holders being parallel to each other and provided above said holder seat for holding a club shaft, each of said two holders consisting of a fixed lower part mounted on said flat upper surface of said holder seat and a movable upper part actuated by two corresponding vertical pneumatic cylinders to move in a vertical orientation; said two movable upper parts mating with corresponding said fixed lower parts to hold the club shaft during the fitting of a hosel on said club shaft;
  - a vertical plate being mounted on said base adjacent a first end of said horizontal pneumatic cylinder, said vertical plate having a hole with its center positioned in alignment with a longitudinal axis of said club shaft placed on said two lower parts of said two holders;
  - an assembling cylinder being fixed onto said vertical wall with a second end inserted in said hole, said assembling cylinder being substantially a hollow cylinder having a casing and a first end as well as said second end, said first end of said assembling cylinder being sealed by a cap, said

cap having an inner threaded hole for a positioning screw to pass therethrough, said positioning screw penetrating into an interior of said assembling cylinder and thereby defining an inserted portion of said positioning screw and being lengthwise movable within said assembling cylinder, a fastening nut being provided on an outer side of said cap to fix said positioning screw and determine a position of said positioning screw;

said assembling cylinder further having a flange formed on a periphery of said second end thereof, said assembling cylinder being fixed onto said vertical plate via said flange by screws, said assembling cylinder having a rod slidably received therein, said rod comprising a block having a first side and a second side, a first projection protruding from said first side of said block and a second projection protruding from said second side of said block, said first projection having an outside diameter smaller than an inside diameter of said assembling cylinder, a return spring being provided between said first end of said block and an inner wall of said cap wherein said first projection and said inserted portion of said positioning screw are accommodated in said return spring, a third projection protruding from said second projection and forming a shoulder portion therebetween;

said second projection having an outside diameter the same as a diameter of a narrower end of said hosel, said rod being partially restrained in said assembling cylinder by a thrust cap, said thrust cap being fixed to said flange by screws, a recess having a corresponding shape to a larger end of said hosel being centrally formed on said thrust cap at a first side thereof for a larger end of said hosel to abut therein, a bore being centrally formed in said recess and having a diameter the same as an outside diameter of said second projection, said third projection having a tapering portion to pass through said hosel and said club shaft such that said hosel and said club shaft respectively cover said second projection and said third projection, said rod being restrained in said assembling cylinder such that said second side of said block abuts an inner surface of said thrust cap and said return spring is neutrally positioned between said first side of said block and said inner wall of said cap, said return spring being pressed in response to a horizontal movement of said holder seat actuated by said horizontal pneumatic cylinder till said first projection is stopped by said inserted portion during the fitting of said hosel on said club shaft, said return spring pushing said rod back to its original position after the fitting of said hosel on said club shaft.

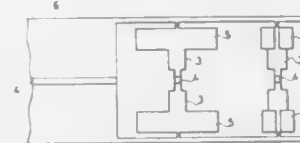
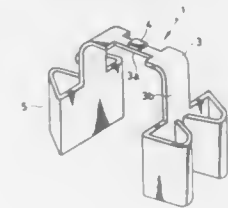
**4,958,425**  
**KNOCK-DOWN FURNITURE COUPLING DEVICE**  
Daniel Gomes, P.O. Box 117, Worcester, N.Y. 12197  
Division of Ser. No. 888,763, Jul. 22, 1986, Pat. No. 4,743,068.  
This application May 10, 1988, Ser. No. 191,897  
Int. Cl.<sup>5</sup> B23P 19/04  
U.S. Cl. 29—433 6 Claims



1. An assembly for coupling a plurality of pieces, comprising:
  - an aligned bore extending through each of said plurality of

pieces, said plurality of pieces comprising at least a first end piece and a second end piece:  
an axially stretchable tube made from an elastomeric material, said tube having an interior surface at least partially therethrough, passing through said aligned bore; and  
means for removably securing said stretchable tube to, an in axial tension between, each of said first and second end pieces, thereby holding each of said pieces in a fixed longitudinal relationship, while permitting relative rotation between each of the said plurality of pieces.

**4,958,426**  
**FUSE TERMINAL MANUFACTURING METHOD**  
Takayoshi Endo, and Yauji Hatagishi, both of Shizuoka, Japan, assigns to Yazaki Corporation, Japan  
Division of Ser. No. 238,470, Aug. 31, 1988, abandoned. This application Oct. 20, 1989, Ser. No. 424,610  
Claims priority, application Japan, Sep. 1, 1987, 62-216298  
Int. Cl.<sup>5</sup> H01H 69/02  
U.S. Cl. 29—623 3 Claims

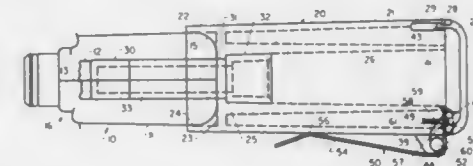


1. A method of manufacturing a fuse terminal formed with a pair of opposing contact portions and a fused portion connected between the opposing contact portions, which comprises the steps of:
  - (a) fixing low fusing point metal material at a middle portion of a fusible conductor sheet material along a longitudinal direction thereof;
  - (b) punching the fusible conductor sheet material provided with the low fusing point metal material into a development shape of the fuse terminal in such a way that the low fusing point material is located at the fused portion of the fuse terminal;
  - (c) bending the punched fusible conductor sheet material into a fuse terminal shape; and
  - (d) cutting off the punched and bent fusible conductor from the sheet material.

**4,958,427**  
**TELEPHONE WIRE TERMINATION BLADE STORAGE COMPARTMENT**  
Terry L. Smith, Westlake Village, and William D. Krietzman, Lancaster, both of Calif., assigns to Harris Corporation, Melbourne, Fla.  
Filed Jul. 26, 1988, Ser. No. 224,382  
Int. Cl.<sup>5</sup> H01R 43/00  
U.S. Cl. 27—566.4 16 Claims

1. For use with a blade termination tool having a handle with an accessible internal bore, a blade storage device attachable to said tool comprising:
  - a housing having at least one closable compartment of a size and shape for storing therein a plurality of blades upon which said tool operates; and
  - means, coupled with said housing, for attaching said housing to said tool by way of the externally accessible internal

bore of said handle, and wherein said housing contains a plurality of compartments extending in parallel with one another in the direction of the longitudinal direction of said handle, and wherein said attaching means is accessible by way of one of said compartments, and wherein said



attaching means comprises a pin having a head portion engageable with said one of said compartments and a shank extending externally of said housing and being sized and of a length to be inserted in the internal bore of said handle.

**4,958,428**  
**PROCESS AND AN ARRANGEMENT FOR PRODUCING A SUPPORTING BODY FOR A CATALYTIC REACTOR**  
Bohumil Humpolík, Ludwigburg, Fed. Rep. of Germany, assignor to Süddeutsche Kühlturbine Julius Fr. Behr GmbH & Co. KG, Fed. Rep. of Germany  
Continuation of Ser. No. 264,018, Oct. 28, 1988, abandoned.  
This application Oct. 30, 1989, Ser. No. 430,897  
Claims priority, application Fed. Rep. of Germany, Nov. 13, 1987, 3738537  
Int. Cl.<sup>5</sup> B21D 53/00  
U.S. Cl. 29—890 22 Claims



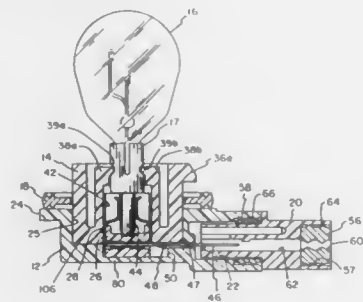
1. A process for producing a supporting body for a catalytic reactor for purifying exhaust gas, particularly of internal-combustion engines in motor vehicles, comprising at least one of winding or folding at least one of corrugated or corrugated-and-smooth metal strips to form adjacent layers, fastening said layers in a casing tube, and providing slots extending transversely to the longitudinal direction of said strips, wherein the slots are first made in the form of incisions directly in the metal strips without removing material, and wherein the metal strips are only then subsequently wound up or folded to the final shape and are then slid into the casing tube, said slots allowing expansion of said layers.

**4,958,429**  
**METHOD OF MAKING LOW PROFILE LAMP SOCKET ASSEMBLY**  
John A. Forish, Fort Wayne, and John J. Rogers, Hantertown, both of Ind., assigns to Zanxx, Inc., Avilla, Ind.  
Division of Ser. No. 352,965, May 17, 1989. This application Jul. 20, 1989, Ser. No. 383,163  
Int. Cl.<sup>5</sup> H01R 33/09  
U.S. Cl. 29—877 13 Claims

1. A method of making a lamp socket assembly comprising:
  - providing a housing having a cavity therein, said cavity defining an end wall of said housing, a body member means for holding a bulb, and an insulative contact insert means for receiving an electrical contact;



inserting said contact insert means with said electrical contact into said cavity;



inserting said body member means into said cavity; and welding said body member means to said housing.

4,958,430

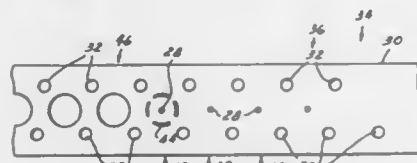
**MANUFACTURING PROCESS FOR MANUFACTURING THIN EDGE ORIFICE DISKS FOR FUEL INJECTORS**  
John H. Grieb, and J. Michael Joseph, both of Newport News, Va., assignors to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.

Continuation of Ser. No. 139,128, Dec. 23, 1987, abandoned, which is a continuation of Ser. No. 937,658, Dec. 4, 1986, abandoned. This application Feb. 2, 1989, Ser. No. 306,597. The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B23P 17/00

U.S. Cl. 29—888.02

4 Claims



1. A process for manufacturing a thin edge orifice flat disk for fuel injectors comprising the steps of:  
procuring a strip of thin flat stock;  
maintaining the flatness of the thin stock;  
punching in the stock wherein each aperture has a wall equal to the thickness of the thin flat stock;  
punching in the stock the orifice in the correct relationship to the apertures, wherein each orifice has a wall equal to the thickness of the thin flat stock;  
coining an edge of the wall of the orifice;  
punching the outside perimeter of the disk in relationship to the apertures and the orifice; and then removing the disk from the thin flat stock.

4,958,431

**MORE CREEP RESISTANT TURBINE ROTOR, AND PROCEDURES FOR REPAIR WELDING OF LOW ALLOY FERROUS TURBINE COMPONENTS**

Robert E. Clark, Orlando, Fla., and Dennis R. Amos, Rock Hill, S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 168,097, Mar. 14, 1983, Pat. No. 4,897,519. This application Mar. 20, 1989, Ser. No. 325,759

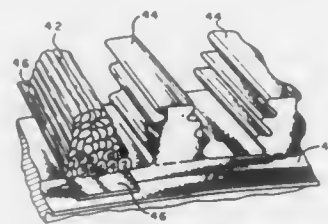
Int. Cl.<sup>5</sup> B22D 6/00

U.S. Cl. 29—889.1

5 Claims

1. In a steam turbine system having a rotor comprising a Cr-Mo-V alloy having less than about 6 wt. % alloying ingredients for securing blades, the improvement comprising:  
a plurality of layered weldments, including at least two

spaced apart weldments, disposed on said rotor, each of said weldments consisting essentially of a ferrous alloy comprising about 7.0 to 11.0 wt. % Cr and about 0.1 to 3.0



wt. % Mo said weldments forming a build-up on said rotor which can be machined into a blade-retaining device, said rotor being relatively free of cracking resulting from the welding process.

4,958,432

**ROTARY HAIR TRIMMER**

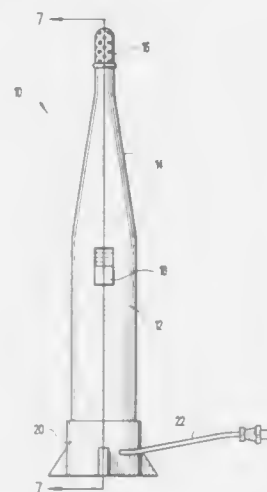
Willie J. Marshall, 7131 Paseo Blvd., Kansas City, Mo. 64132

Filed Oct. 26, 1989, Ser. No. 426,673

Int. Cl.<sup>5</sup> B26B 19/00

U.S. Cl. 30—29.5

20 Claims



11. A rotary hair trimmer, comprising:  
a housing;  
a rotary electric motor in said housing;  
an output shaft connected to said motor and extending exteriorly of said housing;  
means for selectively supplying electric current to said motor;  
a cutting head secured to a free end of said output shaft;  
said cutting head having a generally cylindrical shape and including a plurality of circumferentially spaced blades; and  
a plurality of arcuate segment blades forming a hemispherical zone on an end of said cutting head.

4,958,433

**CABLE STRIPPING TOOL**

Lars-Olov Persson, Alvdalen, Sweden, assignor to Pressmaster Tool AB, Alvdalen, Sweden

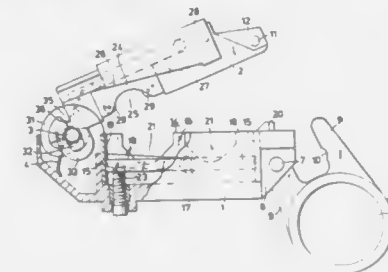
Filed Nov. 16, 1989, Ser. No. 437,390

Claims priority, application Sweden, Nov. 16, 1988, 8804138

Int. Cl.<sup>5</sup> B26B 17/00

U.S. Cl. 30—91.2

3 Claims



1. A tool for stripping insulation from electric cables, including two elongated jaws which are hinged together at one end thereof and which can be latched in a mutually swung-together position, and in which one tool jaw carries in spaced relationship with its opposite ends at least one cutting blade which extends substantially in the direction of the longitudinal axis of the jaw, and a cable support means for accommodating a cable to be stripped substantially perpendicularly to said blade, and in which the other jaw carries a counter-support means intended for supporting co-action with a cable located on the cable support means, said counter-support means being moveable in a controlled fashion relative to the associated jaw towards and away from the opposing jaw in the swung-together position of said jaws, wherein when in their swung-together position, the jaws can be moved apart to a limited extent at said one end thereof, against the action of a spring bias.

4,958,434

**HOLDING DEVICE AND SHEARING DEVICE USED IN CONCERT FOR HAND HELD SHEARING OF THIN-WALL TUBES**

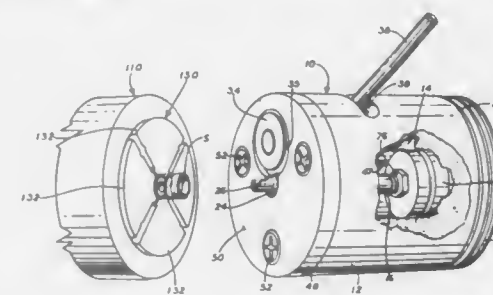
Charles F. Marschner, 414 The Circle, Longwood, Fla. 32779

Filed Dec. 22, 1989, Ser. No. 455,281

Int. Cl.<sup>5</sup> A24C 5/12

U.S. Cl. 30—101

25 Claims



1. Hand operable apparatus for shearing thin-wall sleeve members to a precise, selected length without causing sidewall collapse, said apparatus comprising:  
an elongate, generally cylindrical body having a partially hollow interior,  
an elongate support mandrel mounted in a cantilever manner on the longitudinal centerline within said cylindrical body,

one end of said support mandrel being supported adjacent one end of said generally cylindrical body, the other end of said support mandrel being free and of a diameter such that the end of a thin-walled sleeve member to be cut to length can be closely received thereon, cutoff means operatively mounted by support means on said generally cylindrical body adjacent the free end of said support mandrel, said cutoff means being manipulated by means of a finger operated lever, said cutoff means being operable toward said support means to bring cutoff means into contact with the sleeve member at a selected location.

4,958,435

**RIPPING SCISSORS**

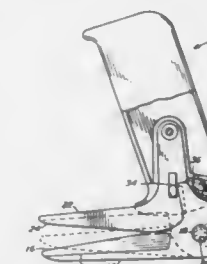
Jeffrey W. Grubbs, and David S. Chapin, both of Raleigh, N.C., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Dec. 9, 1988, Ser. No. 282,236

Int. Cl.<sup>5</sup> B26B 13/00

U.S. Cl. 30—248

17 Claims



1. A device for cutting fabric or the like comprising:  
a substantially horizontal fixed blade having a cutting edge and a pivot hole;  
a moving blade having a cutting edge and a pivot hole;  
a handle rigidly affixed to said moving blade to form an acute angle therewith;  
means for attaching said substantially horizontal fixed blade to said moving blade at said pivot holes;  
means for biasing said substantially horizontal fixed blade to an open position with respect to said moving blade; and  
means to prevent pivoting of the moving blade and the horizontal fixed blade towards each other to a point past a certain adjustable limit.

4,958,436

**TRAILER HITCH GUIDE**

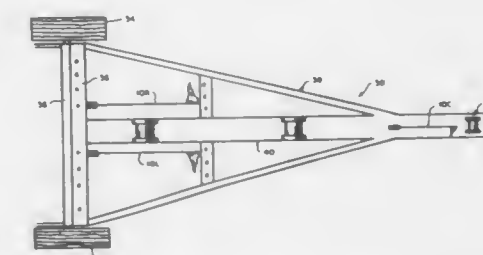
Karl J. Tusche, R.D. #1, Box 347, Easton, Pa. 18042

Filed May 4, 1989, Ser. No. 347,230

Int. Cl.<sup>5</sup> B60Q 1/26

U.S. Cl. 33—264

2 Claims

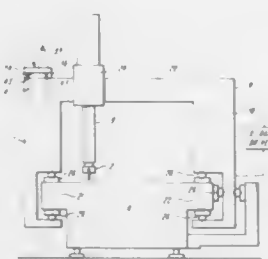


1. A trailer hitch guide device for visually assisting a driver in maneuvering a vehicle having a centerline and a first engageable portion of a trailer hitch mounted thereon to a position relative to a trailer having a centerline and a second en-

gaging portion of such trailer hitch so as to align the trailer hitch portions in position to be removably engaged to couple the trailer to the vehicle, comprising:

- a plurality of visual guides mounted on a structural element of the trailer, said visual guides being located on the trailer in positions to be visible to the vehicle driver and being positioned to be used by that driver in aligning the vehicle engageable portion of the trailer hitch with the second engageable portion of the trailer hitch, two of said visual guides being positioned adjacent to the centerline of the trailer and being located on opposite sides of that trailer centerline, each of said visual guides including
  - (1) a bracket which is mounted on the trailer,
  - (2) a spring mounted on said bracket,
  - (3) a rod connected at one end thereof to said spring to be flexibly mounted on the trailer, and
  - (4) a visible indicator connected to said rod,
 said rod flexible mounting being arranged to permit said rod to move from a first position which is essentially co-planar with the trailer structural element to a second position which is essentially upright with respect to said first position; and
- a third visual guide mounted on the trailer between the trailer hitch mounted second engaging portion and said two visual guides and forming a triangle with said two visual guides, with said visual guides forming an isosceles triangle, said isosceles triangle including equal legs extending from said third visual guide to each of said two visual guides, and
- a transparent guide template mounted on a rear view mirror of the vehicle, said template including
  - (1) guide lines for use by the driver in determining the planar position of the vehicle with respect to the trailer,
  - (2) second guide lines for use by the driver in determining the out-of-plane position of the vehicle with respect to the trailer, and
  - (3) means for mounting said guide template on said rear view mirror.

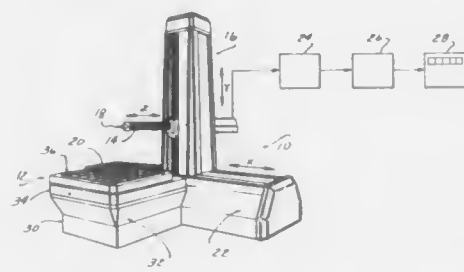
**4,958,437**  
**COORDINATE MEASURING MACHINE WITH VIBRATION DAMPER**  
 Israel F. Helms, Coventry, R.I., assignor to Brown & Sharpe Manufacturing Company, North Kingstown, R.I.  
 Filed Feb. 10, 1989, Ser. No. 309,692  
 Int. Cl.<sup>5</sup> G01B 21/04, 5/03, 7/03  
 U.S. Cl. 33—503 13 Claims



1. A vibration damper for a precision positioning apparatus including a base, a pair of spaced rails disposed on the base, two supports, one support riding on each of said rails, a bridge extending between the supports, and means associated with one of said rails for driving the bridge and supports along said rails, said vibration damper comprising:
  - a block having a substantial mass; and
  - means for supporting said block only on one side of said block above a center of gravity of said block at a fixed position spaced from the driving means, said supporting means comprising a low resiliency material having a re-

bound resilience less than 20 percent as measured by the pendulum method.

**4,958,438**  
**ROTARY TABLE FOR A COORDINATE MEASURING MACHINE AND METHOD OF DETERMINING THE AXIS OF TABLE ROTATION**  
 Thomas L. Hemmels, Dayton, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio  
 Filed Mar. 30, 1989, Ser. No. 332,077  
 Int. Cl.<sup>5</sup> G01B 5/03  
 U.S. Cl. 33—503 10 Claims

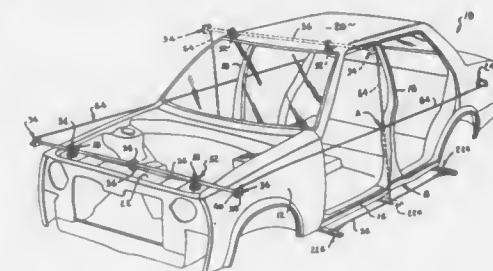


1. In combination, a coordinate measuring machine (10) having a probe tip (18) movable along three orthogonal axes (X, Y, Z) within a measuring envelop, distance transducers (24) generating electrical signals corresponding to said movement to enable measurements to be made by moving said probe tip (18) between points on a workpiece (W), a workpiece support table (12) having a top plate (36) supported on a table base (40), said table top plate (36) providing a supporting surface (20) for a workpiece (W) located within said measuring envelop to enable access by said probe tip (18), bearing means (116, 128, 136) supporting said table top plate for rotation about an axis (a) and drive means (38) for rotating said table top plate (36) about said axis characterized by:
  - a retractable datum ball assembly (140) including a locating feature (144), means (142) fixing said datum ball assembly (140) relative to said table base (40) adjacent said table top plate (36), means (146) for selectively extending and retracting said locating feature (144) between an up position above said table surface (20) and within said measuring envelop and a down position below said table surface (20) and outside said measuring envelop, said locating surface (144) positioned to be accessible by said probe tip (18) when in said up position;
  - and locating means (178, 182) acting on said datum ball assembly to locate said locating feature in space within said measuring envelop above said table in a predetermined, precisely repeatable relationship with said table axis of rotation whenever said locating feature is extended to said up position.

**4,958,439**  
**METHOD AND DEVICE FOR ALIGNING VEHICLE FRAME**  
 Freddie H. Dehn, R.R. 2, Ray County, Mo.  
 Filed Nov. 30, 1989, Ser. No. 444,005  
 Int. Cl.<sup>5</sup> G01B 5/25  
 U.S. Cl. 33—608 15 Claims

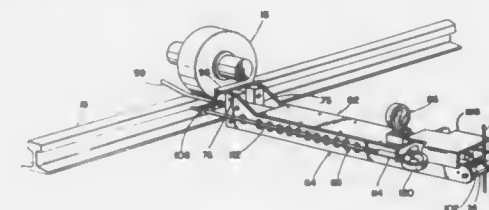
1. Apparatus for determining the extent of damage to a vehicle body, said apparatus comprising:
  - first and second means adapted to be coupled with said vehicle body on one side for holding a first string in spaced relationship to said body;
  - first string means adapted to be drawn taut between said first and second holding means;
  - third and fourth means for holding a second string in spaced relationship to said body and adapted to be coupled with

said vehicle body on the opposite side from said one side at a location corresponding to the location of said first and second means on said one side; and



second string means adapted to be drawn taut between said third and fourth holding means.

**4,958,440**  
**STACKER ALIGNMENT DEVICE**  
 George R. Pipes, Salt Lake City, Utah, assignor to Eaton Corporation, Cleveland, Ohio  
 Filed Apr. 17, 1989, Ser. No. 338,672  
 Int. Cl.<sup>5</sup> G01B 5/255; G01D 21/00  
 U.S. Cl. 33—645 14 Claims

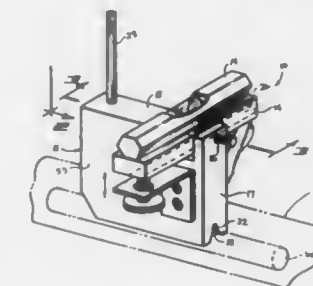


1. Apparatus for determining the alignment of a wheel or a rail-supported vehicle with respect to the rail comprising a base member, means for maintaining a surface of said base member in contact with a surface of said wheel perpendicular to its axis of rotation, an elongated first bar mounted at one end to said base member for pivotal movement about an axis parallel to said surface of said base member, means for selectively fixing said first bar relative to said base member in a position perpendicular to said surface of said base member, means fixed to the opposite end of said first bar operable to indicate the angular orientation of said first bar relative to horizontal when said surface of said base member is in contact with said wheel and said first bar is in said fixed position, and first and second guide rods extending outward from said base member in position to straddle said wheel, at least one of said guide rods curving upward and outward such that contact of the rod with the rail causes the apparatus to move upward in relation to the rail when the apparatus is moved toward the rail.

**4,958,441**  
**CENTER PUNCH BLOCK DEVICE**  
 Richard S. Bigelow, 1404 Pamlico Blvd., Chesapeake, Va. 23320  
 Filed Apr. 17, 1989, Ser. No. 339,227  
 Int. Cl.<sup>5</sup> B25D 5/00  
 U.S. Cl. 33—670 7 Claims

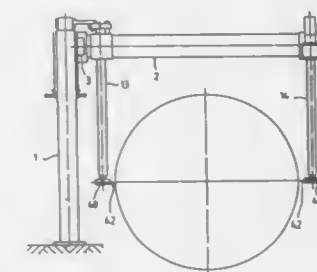
1. A centering device for imparting an indicator mark medially of an upper surface of an elongate workpiece secured to an underlying support surface, said device comprising,
  - a body member including an upper surface spaced from a bottom surface, and
  - a forward wall orthogonally oriented to the upper surface and the bottom surface, and
  - a rear wall parallel to the forward wall, and

a right side surface orthogonally oriented to the upper surface spaced from a left side surface; said upper surface including a slot, and an elongate indicator means pivotally mounted in said slot for indication of the relative ridge of the support, and adjustment means for pivoting said indicator means relative to said slot, and a work receiving further slot coextensively formed within said bottom surface, and a punch extending through said body member extending outwardly of said upper surface at one end and extending orthogonally into said further slot at its other end, and



wherein said slot is formed through said upper surface and is orthogonally oriented relative to the bottom surface and associated further slot, and wherein said adjustment means includes a support beam pivotally mounted within said slot and spaced above a floor defining a lowermost end of said slot, and said support beam having secured thereto a level indicator aligned with said support beam, and a pivot pin orthogonally directed through said forward wall and through said support beam to pivotally mount said support beam and indicator relative to the floor.

**4,958,442**  
**MEASURING DEVICE, SPECIFICALLY FOR MEASURING THE DIAMETER OF ROLLS ON ROLL GRINDERS**  
 Roland Eckhardt, Giengen, Fed. Rep. of Germany, assignor to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany  
 Filed Aug. 21, 1989, Ser. No. 396,440  
 Claims priority, application Fed. Rep. of Germany, Aug. 19, 1988, 3828181  
 Int. Cl.<sup>5</sup> G01B 5/08, 3/38  
 U.S. Cl. 33—783 4 Claims



1. A measuring device for a roll grinder comprising:
  - a vertical column having a longitudinal axis;
  - a boom supported by said column and mounted thereto so as to be swivelable about the longitudinal axis of said column;
  - a rotatable arm mounted to said column for rotation about the axis of said column;



a guide arm mounted to said rotatable arm and articulated therewith, said guide arm extending parallel to said boom; a cross beam mounted to said column via said guide arm and said boom that said boom, rotatable arm, guide arm and an interposing section of the cross beam form a parallel crank drive, said cross beam further being mounted so as to be swivelable parallel to said rotatable arm in a horizontal plane extending perpendicularly to said column, said cross beam supporting a first vertical measuring support bar near said column disposed parallel to the axis of said column, and supporting a second vertical measuring support bar away from said column disposed parallel to the axis of said column, said first and second vertical measuring support bars being supported for vertical displacement parallel to the axis of said column through a respective rotary coupling each, said cross beam further supporting said vertical measuring support bars for horizontal displacement perpendicular to the axis of said column; and a clamping device disposed at the mounting of said rotatable arm to said column for clamping said rotatable arm to said column against rotation.

4,958,443

## METHOD AND APPARATUS FOR TREATING BULK MATERIAL

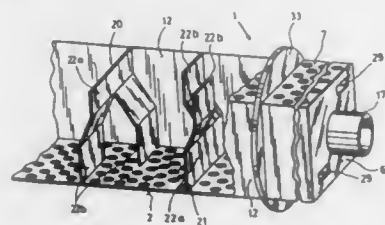
Walter Hauser, Kirchstrasse 8, 9532 Rickenbach; Hans-Ulrich Pfaffhauser, Sonnenbergstrasse 16, 9524 Zuzwil, and Karl Benz, In der Breilt 28, 9244 Niederuzwil, all of Switzerland  
Filed Feb. 28, 1989, Ser. No. 317,183

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 3808282

Int. Cl.<sup>5</sup> F26B 17/00

U.S. Cl. 34—57 D

41 Claims



1. A method for treating bulk material by means of a gas, the method comprising the steps of introducing the bulk material to be treated into a container having at least one wall being at least partially perforated; causing the gas to flow through the at least partially perforated wall of the container to provoke a fluidization of the material; rotating the container about an axis.

4,958,444

## APPARATUS FOR DRYING A FIBRE WEB

Paavo Rantakorpi, Tampere; Jukka Lehtinen, Helsinki, and Pekka Majaniemi, Pirkkala, all of Finland, assignors to Oy Tampella AB, Tampere, Finland

Filed May 8, 1989, Ser. No. 348,858

Claims priority, application Finland, May 18, 1988, 882337

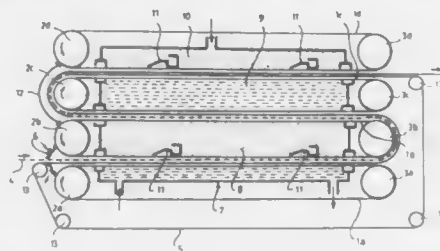
Int. Cl.<sup>5</sup> F26B 19/00

U.S. Cl. 34—71

7 Claims

7. An arrangement for mounting rolls (2a-2d; 3a-3d) in a drying apparatus comprising at least two endless, air-tight bands (1a-1d) with good thermal conductivity, which bands are arranged to move around said rolls (2a-2d and 3a-3d) on top of each other in a direction perpendicular to the surface of a web (4) in such a manner that said bands (1a, 1b; 1c, 1d) are substantially parallel and adjacent with each other between the rolls (2a, 3a; 2b, 3b; 2c, 3c; 2d, 3d) to form at least two drying zones positioned on top of each other, the web (4) and the drying felt (5; 5', 5'') being led between two bands (1a, 1a;

1b, 1c; 1c, 1d) in such a manner that the web (4) makes contact with the surface of one band (1b, 1d) and the drying felt (5; 5', 5'') with the surface of the other band (1a, 1c), characterized in that two rolls (2a, 2b; 2b, 2c; 2c, 2d, 3a, 3b, 3c; 3c, 3d) immediately on top of each other in a direction transverse to the surface of the web (4) are mounted in the direction of movement of the web (4) in such a manner that their axes are at a distance (L) from each other.



ately on top of each other in a direction transverse to the surface of the web (4) are mounted in the direction of movement of the web (4) in such a manner that their axes are at a distance (L) from each other.

4,958,445

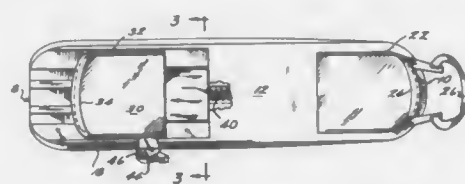
## WALKING SOLE ACCESSORY FOR A SKI BOOT

Gregory J. Brisco, 106 Woodlyn Ave. #3, Glenide, Pa. 19038  
Filed Jun. 30, 1989, Ser. No. 375,202

Int. Cl.<sup>5</sup> A43B 5/04

U.S. Cl. 36—7.5

4 Claims



1. A walking sole accessory for a ski boot, comprising: a sole longitudinally extending from a toe end to a heel end and having a convex bottom surface, an outer side panel, an inner side panel, and a flat top surface for engaging a bottom surface of a ski boot, said sole having a nonuniform thickness between the flat top surface and the convex bottom surface wherein the thickness is dependent upon longitudinal distance from the toe end of the sole, a row of locking teeth disposed along the outer side panel of the sole and near the toe end of the sole, a row of locking teeth disposed along the outer side panel of the sole and near the toe end of the sole, first boot gripping means rigidly mounted on the top surface of the sole, second boot gripping means slideably mounted on the top surface of the sole, resilient means for biasing the second boot gripping means towards the first gripping means, a locking lever rotatably mounted on the second gripping means and including a projection for releasably engaging the locking teeth.

4,958,446

## FOOTWEAR AND ADAPTION THEREOF FOR PRODUCTION OF ADVERTISING MESSAGE

James G. Brown, 44 Harding Boulevard, Scarborough, Ontario, Canada M1N 3C9

Filed Oct. 26, 1988, Ser. No. 262,580

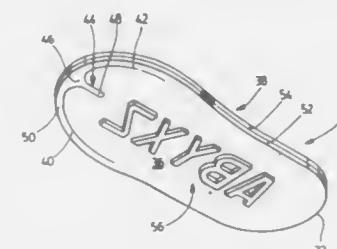
Int. Cl.<sup>5</sup> A43B 3/12

U.S. Cl. 36—11.5

4 Claims

1. A sandal formed of sheet material with a pair of opposing faces and a peripheral side edge, a pair of blind-ended slits being formed in a forward portion of the sheet material inset from the peripheral side edge and extending between the op-

posing faces, the slits being shaped to define in the sheet material an elongate stem with a forward stem portion and a rear stem portion which is hinged to the rest of the sheet material and to define in the sheet material a strap integral with the forward stem portion and extending laterally to either side of the forward stem portion, the sheet material being sufficiently



flexible that the stem and strap can be raised by hand from the general plane of the sheet material, the stem being dimensioned to be received between the toes of a wearer's foot and the strap being shaped to overlay the wearer's foot and to retain the sandal to the wearer's foot when the stem is received between the wearer's toes.

4,958,447

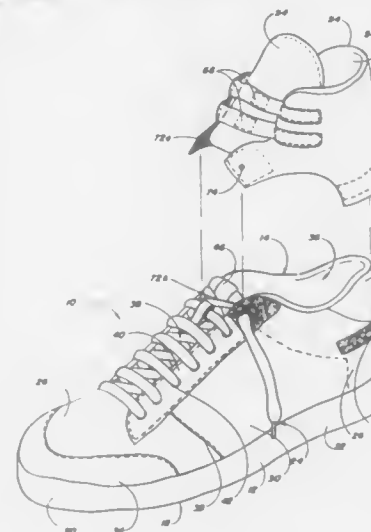
## ATHLETIC SHOE WITH BREAK-AWAY HIGH TOP

Tony L. DuPree, 2413 Skyline Dr., Box 7, Garner, N.C. 27529  
Filed Jun. 23, 1989, Ser. No. 370,762

Int. Cl.<sup>5</sup> A43B 3/24

U.S. Cl. 36—101

5 Claims



1. A convertible athletic shoe comprising:

- (a) a sole portion;
- (b) an upper fixed to the sole portion including a heel portion, side portions and a toe portion, wherein the upper defines an ankle opening and a tongue opening and wherein the upper includes a lace border adjacent the tongue opening having a series of lace holes formed therein;
- (c) a shoe lace threaded through the lace holes in the upper for securing the shoe to the wearer's foot when the lace is tied;
- (d) a detachable high top releasably secured to the upper for converting the shoe from a low top shoe to a high top shoe, the high top including an ankle cuff adapted to wrap around the wearer's ankle, wherein the ankle cuff includes a lower edge portion which overlaps the heel portion of the upper and a pair of connecting straps having at least

one lace opening formed therein, wherein the connecting straps extend generally forwardly from the ankle cuff and overlap the lace border of the upper so that at least one lace opening in each connecting strap aligns with at least one lace hole in the upper, and wherein the shoe lace can be threaded through the lace opening in the connecting strap to aid in securing the detachable high top to the upper; and

(e) cooperative fastening means including first and second fastener components attached respectively to the heel portion of the upper and the lower edge portion of the ankle cuff for releasably securing the high top to the upper.

4,958,448

## SKI BOOT WITH INSERT PIECE

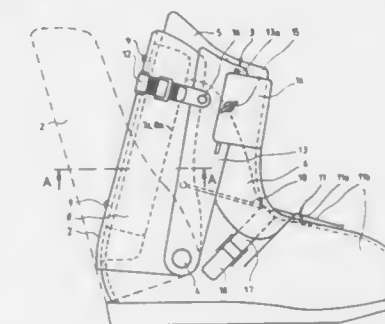
Andreas Wenzel, Gamprin, Liechtenstein, assignor to Fire-Generation Establishment, Gamprin, Liechtenstein  
Filed Feb. 6, 1989, Ser. No. 306,948

Claims priority, application Switzerland, Feb. 12, 1988, 00502/88

Int. Cl.<sup>5</sup> A43B 5/04, 7/14

U.S. Cl. 36—119

10 Claims



1. A ski boot, comprising:

- a lower shell (1) which encloses at least a foot of a skier;
- a longitudinal shaft having a rear portion (2) and a front portion (3), the shaft being arranged so as to enclose the skier's lower leg, the rear portion (2) of the shaft enclosing a back part of the lower leg and the front portion (3) enclosing a front part of the lower leg, the rear portion (2) and the front portion (3) of the shaft being connected with the lower shell (1) in an articulated manner, and the rear portion (2) and the lower shell (1) overlap at least partially;
- a clamping device (10, 11) for producing an inclination position of the rear portion (2) of the shell; and
- stops provided at the lower shell (1) and at the rear portion (2) of the shaft so as to define the inclination position of the rear portion (2), the lower shell (1) having, in an area enclosing the lower leg, a cut out portion (7) which extends from an upper end of the shell shaft along a greater part of the shaft length and is open toward the rear portion (2) of the shaft, and an exchangeable insert piece (8, 19) at the rear portion (2) of the shaft which is assigned to the cut out portion (7), the stops being formed by flanks (76a, 8a19a) of the cut out portion (7) and of the insert piece (8, 19) which extend in the longitudinal direction of the shaft.

4,958,449

## APPARATUS FOR COVERING DRILLING MUD LIQUIDS IN A SURFACE DEPRESSION

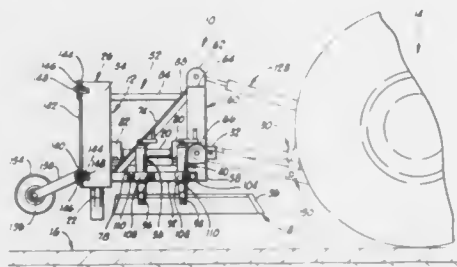
Paul L. Prater, Rte. 2, Box 50, Marlow, Okla. 73055

Filed Dec. 19, 1988, Ser. No. 286,242

Int. Cl.<sup>5</sup> E02F 3/24, 3/18

U.S. Cl. 37-93

3 Claims



1. A soil-projecting apparatus which is attachable to the rear of a self-propelled vehicle for forward travel, comprising:
  - a frame connectable to said vehicle;
  - a drive shaft member supported on said frame and extending longitudinally of said vehicle, said drive shaft member being connectable to and rotatable with a power take-off of said vehicle;
  - a wheel portion connected to said drive shaft member;
  - a plurality of soil-engaging scoops angularly spaced around said wheel portion and attached thereto;
  - a wheel case mounted on said frame for substantially enclosing said wheel portion and at least a portion of said scoops;
  - a plurality of elongated blade members independently adjustably mounted to said frame and adapted for engaging soil and displacing said soil toward said scoops as said vehicle moves along a ground surface; and
  - an adjustably directed chute attached to said wheelcase for directing soil projected from said scoops.

4,958,450

## PROTECTIVE HOLDER FOR HOLDING THIN OR SUBSTANTIALLY THIN ITEMS

Paul J. Roberg, 51 Surrey La., Tenafly, N.J. 07670

Filed Sep. 20, 1988, Ser. No. 246,699

Int. Cl.<sup>5</sup> B65D 27/22

U.S. Cl. 40-159

2 Claims



1. A holder for thin items comprising: a backing sheet having a length, and a width; a plurality of strips having a length, a width substantially equal to the width of said backing sheet, each of said strips having an upper edge and a lower edge, said strips being connected to said backing sheet along a longitudinal connection line running substantially parallel to each of

said strip edges spaced from said lower edge a distance which is less than the distance said longitudinal connection line is spaced from said upper edge, and said strips each being connected to said backing sheet along a plurality of transverse connection lines running substantially transverse to said longitudinal connection line, each transverse connection line extending toward the upper edge of the corresponding strip from adjacent said longitudinal connection line of a corresponding strip and terminating at a location spaced from said upper edge of the corresponding strip, each of said plurality of strips being located along the length of said backing sheet, such that strips positioned between upper and lower adjacent strips have upper and lower overlapping portions, said upper overlapping portion being defined between the location of termination of said transverse connection lines and the upper edge of the corresponding strip, said lower overlapping portion being defined between the longitudinal connection of the corresponding strip and the lower edge of the corresponding strip, said lower overlapping portion being positionable to overlap said upper overlapping portion of an adjacent strip and said lower overlapping portion being positionable to underlap said upper overlapping portion of the adjacent strip.

4,958,451

## MOTORCYCLE LICENSE PLATE MOUNTING MECHANISM

Masato Iwakura, Saitama, and Hiroshi Nakano, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

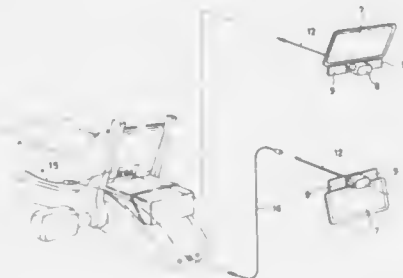
Continuation of Ser. No. 418,958, Sep. 16, 1982, abandoned. This application Sep. 26, 1985, Ser. No. 780,240

Claims priority, application Japan, Sep. 19, 1981, 56-148252

Int. Cl.<sup>5</sup> G09F 13/02

U.S. Cl. 40-204

9 Claims



1. A motorcycle license plate mounting mechanism, comprising: a license plate adapted to be attached to the body of the motorcycle, the attachment position of said license plate being changeable, said body providing separated mounting locations for said license plate; license plate mounting means engageable at said mounting positions, a lamp for illuminating said license plate, wiring means for said lamp and a wiring harness engaging said wiring means.

4,958,452

## ANIMAL IDENTIFICATION EAR TAG ASSEMBLY

Lloyd Tate, Georgetown, Tex., assignor to Zoecon Corporation, Dallas, Tex.

Filed Sep. 27, 1989, Ser. No. 413,327

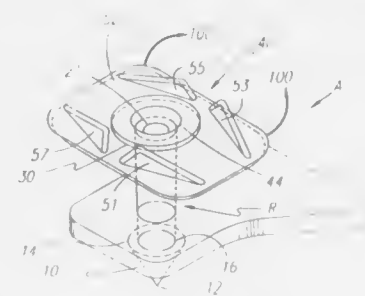
Int. Cl.<sup>5</sup> G09F 3/00; F16B 43/00

U.S. Cl. 40-301

9 Claims

1. An animal ear tag assembly comprising: a rivet having a stem portion, a conical head portion located at one distal end of said stem portion, and a disk portion located at the other distal end of said stem portion; an identification tag slidably mounted on said stem portion and adjacent to said head portion when said assembly is applied to an animal; and a flexible base slid-

ably mounted on said stem portion and adjacent to said disk portion when said assembly is applied to an animal, said base having a plurality of elongated reinforcement ramps located on



an outer side of said base nearest said disk portion, said ramps having sufficient height and thickness to provide protection for said disk.

4,958,453

## MULTIDOCUMENT HOLDER WITH ARTICULATING LINE GUIDE

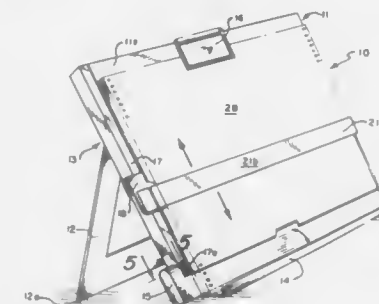
Robert J. Mangler, Chicago; Anne J. Marsland, Schaumburg; George O. Podd, Chicago, and Russell Schweizer, Crystal Lake, all of Ill., assignors to Wilson Jones Company, Chicago, Ill.

Filed May 2, 1989, Ser. No. 346,047

Int. Cl.<sup>5</sup> B41J 11/64

U.S. Cl. 40-352

9 Claims



1. A copyholder having a planar body including a stack holding surface and a body side section, a stand to support the planar body at an angle to a support surface and a pivotable line guide comprising:
  - a. the stack holding surface sized to hold an object having a top surface;
  - b. an elongated block means pivotably connected to the body side through pivot means having an axis parallel to the surface of the planar body, such block means having an effective length equal to the maximum thickness of the objects that the holding surface can accommodate;
  - c. an arm pivotably mounted on the block means for movement in a vertical plan; and
  - d. a line guide including line guide surface slidably connected on the arm for adjustable movement thereon; whereby the elongated block means and the arm can be pivoted to place the line guide surfaces parallel to the top surface of the object.

4,958,454

## DATA RECORDER

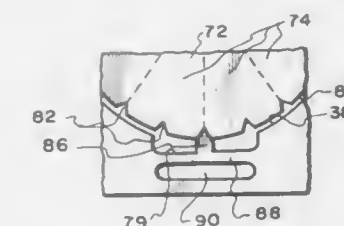
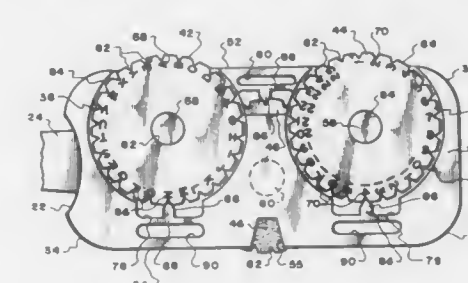
Mary K. Chan, 252 N. Crimea St., Ventura, Calif. 93001, and Victor Osaka, 11925 Louise Ave., Los Angeles, Calif. 90066

Continuation of Ser. No. 117,973, Nov. 9, 1987, abandoned. This application Jul. 17, 1989, Ser. No. 380,249

Int. Cl.<sup>5</sup> G09F 11/04

U.S. Cl. 40-495

8 Claims



1. An information recording device comprising in combination:
  - a body in the form of a thin plate having a pair of generally flat opposite surfaces, said body having first and second side-by-side spaced apart recessed wheel wells formed in one of said opposite surfaces with portions of said first and second wheel wells being open at a first edge of said body, said body also having a third recessed wheel well formed in the other of said opposite surfaces with a portion of said third wheel well being open at an opposite second edge of said body, said third recessed wheel well having at least a section overlapping at least one of said first and second recessed wheel wells, each of said recessed wheel wells being annular in shape and defining a central hub on said respective one and the other of said opposite surfaces;
  - first, second and third wheels each carrying a plurality of indicia information on an outer circumferential band and having a central aperture for rotatably mounting said wheel in the corresponding one of said wheel wells on said hub thereof with a portion of said wheel extending from said respective one of said first and opposite second edges of said body at said open portion of said wheel well;
  - first and second flat covers assembled together with said body therebetween such that said flat covers fit generally flush against said flat opposite surfaces of said body and over said respective wheels disposed in said respective wheel wells, said covers also being disposed over the respective exposed outer circumferential bands of said wheels and each having an aperture of a size limited to view a single indicia on said band of said respective wheel; and
  - means formed on an edge of each wheel and on said body adjacent said respective wheel wells for indexing and locking each of said wheels in a set position with a selected indicia positioned adjacent said respective first and second edges of said body and exposed through said respective apertures of said covers.



4,958,455

## PIVOTLESS WHEEL INDICIA DISPLAY DEVICE

Roger V. Jacobsen, Chicago, Ill., assignor to Gary Jacobsen, Bensenville, Ill.

Filed May 16, 1989, Ser. No. 352,768

Int. Cl.<sup>3</sup> G09F 11/04

U.S. Cl. 40—495

12 Claims



1. An indicia display device comprising: rotatable wheel means having said indicia fixed thereon, circular pocket means for pivotlessly mounting said rotatable wheel means for rotation in said pocket means, and a viewing opening in said device through which selected indicia appear, said device being formed from a single sheet of material which is divided into a plurality of panels, said panels being folded over and overlapping each other to form said circular pocket means.

4,958,456

## INSECT ERADICATION

James J. Chaudoin, Norco, and Michael R. Linford, Villa Park, both of Calif., assignors to Isothermics Incorporated, Long Beach, Calif.

Filed Jan. 16, 1990, Ser. No. 465,431

Int. Cl.<sup>3</sup> A01M 1/20

U.S. Cl. 43—124

11 Claims

1. The method of killing insects in spaces and on surfaces comprising:

- (a) dispersing boric acid into spaces and onto surfaces known or believed to be inhabited by insects to be killed; and, thereafter;
- (b) heating the spaces and surfaces onto which boric acid has been dispersed to a temperature of at least about 110° F. for a period of at least about one-half hour or greater until substantially all insects in said spaces and on such surfaces are dead.

4,958,457

## TRENCH DIGGING OR ROOT CUTTING DEVICE

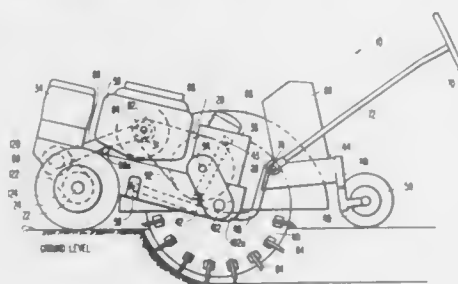
David Doskocil, 1227 Fulbright Avenue, Redlands, Calif. 92373

Filed Mar. 3, 1989, Ser. No. 318,584

Int. Cl.<sup>3</sup> E02F 5/08

U.S. Cl. 37—94

17 Claims



1. An apparatus for ditch digging or root pruning comprising:

a frame having a main frame portion and a secondary frame portion;  
a main wheel axis having at least two main wheels rotatably mounted on opposite sides of the main frame portion establishing a wheel width;  
a secondary wheel axis having at least a secondary wheel supported on the secondary frame portion;  
a motor mounted on the frame;  
a cutting wheel rotatably mounted on the frame and operably connected to the motor, the cutting wheel rotating in a substantially vertical plane located outside the wheel width, wherein the main frame portion and the secondary frame portion are pivotally connected about a horizontal pivot axis which is (a) perpendicular to the plane of the cutting wheel and (b) positioned between the main wheel axis and the secondary wheel axis; and  
means for pivoting the main frame portion relative to the secondary frame portion about the horizontal pivot axis, such that the pivoting of the frame portions raises or lowers both the cutting wheel and the horizontal pivot axis.

4,958,458

## POSTER DISPLAY DEVICE WITH LONGITUDINAL RETENTION OF FRAME SECTIONS BY INSERTS

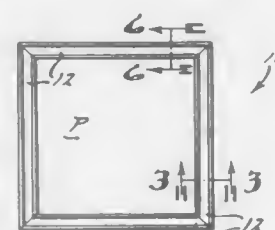
David U. Hillstrom, Novi; Randall Palmer, Farmington Hills, and Brian J. Hillstrom, Walled Lake, all of Mich., assignors to Marketing Displays, Inc., Farmington Hills, Mich.

Continuation-in-part of Ser. No. 25,398, Mar. 13, 1987. This application Feb. 23, 1989, Ser. No. 315,400

Int. Cl.<sup>3</sup> A47G 1/06; G09F 1/12

U.S. Cl. 40—156

33 Claims



1. In a display holder having a plurality of elongated frame sections forming a frame structure for receiving and holding a display piece, each of said sections having a pair of elongated front and back members adapted to be assembled in a longitudinally aligned interconnected arrangement with one another, the improvement wherein a first of said elongated front and back members has an opening formed therein and an elongated rod member insertably received in said opening, said rod member interlockingly engaging the other of said elongated front and back members in order to substantially prevent longitudinal movement of said front and back members relative to one another when in said aligned interconnected arrangement.

4,958,459

## LETTER LACE

Orlando D. Davidson, 409 Harrison Rd., Fredericksburg, Va. 22401

Filed Jan. 6, 1989, Ser. No. 293,974

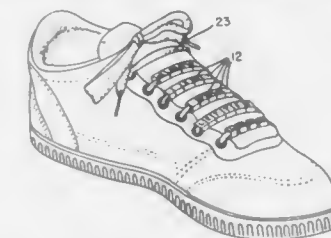
Int. Cl.<sup>3</sup> G09F 23/00

U.S. Cl. 40—636

7 Claims

1. An indicia carrying attachment comprising: an elongated, unitary body member having parallel frontal and rear surfaces joined by at least one pair of opposite transverse surfaces, longitudinal opening extending linearly through said body member having a configuration corresponding approximately to a shoe lace; indicia carried by said frontal surface; a longitudinal slit located in said rear surface and having a dimension

approximate to the width of said lace; whereby said indicia carrying attachment may be selectively attached to said lace by



sliding said lace edgewise through said slit, and thereafter rotating said attachment about said lace until said frontal surface is parallel with the horizontal plane of said lace.

4,958,460

## METHOD OF GROWING AND HARVESTING MICROORGANISMS

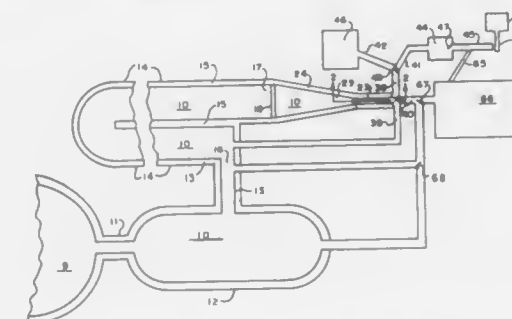
Jay P. Nielson, Salt Lake City, and Paul A. Sturm, Ogden, both of Utah, assignors to Algae Farms, Salt Lake City, Utah

Filed May 9, 1988, Ser. No. 191,993

Int. Cl.<sup>3</sup> A01G 33/00

U.S. Cl. 47—1400

7 Claims



1. A process for the reproduction and harvesting of algae of the genus *Dunaliella* and associated bacteria, comprising the steps of:

- providing a culture zone of a saline liquid growth medium having a cross-sectional width to depth ratio of at least about 500 to 1 and a length allowing sufficient production of algae for harvest;
- providing a harvest zone having a cross-sectional width to depth ratio of about within the ranges of 1 to 1 and 1 to 4;
- providing a graduated transition zone fluidly communicating said culture zone and said harvest zone;
- exposing said production, transition, and harvest zones to light to allow said algae to agglomerate and remain near the surface of said medium;
- flowing the medium through said culture, transition, and harvest zones, whereby said agglomerated algae is concentrated into a horizontal band having vertical depth at the surface of the medium; and,
- separating said band from the remainder of said medium to effect harvest of said algae.

4,958,461

## FLORAL HOLDER AND DISPLAY

Jay L. Aldrich, Miami, Fla., assignor to Sterling Bouquet, Miami, Fla.

Filed Jan. 3, 1989, Ser. No. 293,052

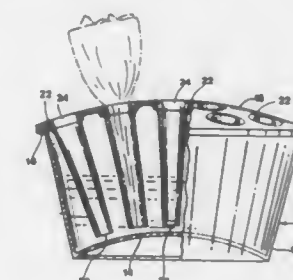
Int. Cl.<sup>3</sup> A01G 5/00

U.S. Cl. 47—41.01

12 Claims

1. A device for holding and displaying a plurality of floral bouquets which comprises:

a bucket deep enough to contain flower stems, said bucket having a convexly curved inner bottom wall;  
a convexly curved lid shaped and dimensioned to removably fit on said bucket, said lid being formed with a plurality of spaced apart openings thereon; and



a plurality of conical sleeves supported by said lid and extending downward from said lid and contained within said bucket when said lid is mounted on said bucket, each sleeve having an upper open end in communication with a separate one of said lid openings, each sleeve having an open lower end in communication with the interior of said bucket when said lid is mounted on said bucket.

4,958,462

## LOCKING PIVOT SHOE

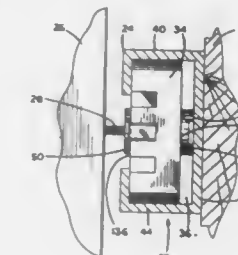
Rex D. Cross, No. 1 Old Church Rd., Greenwich, Conn. 06830

Filed Jun. 5, 1989, Ser. No. 361,528

Int. Cl.<sup>3</sup> E05D 15/22

U.S. Cl. 49—181

10 Claims



1. In an improved pivot shoe assembly for sliding an item along a track, rotating the item about an axis that is generally normal to the track, and by said rotation through rotation transmission means to a pivot shoe, locking the pivot shoe at a predetermined location along the track, said track comprising a first wall, a second wall attached to the first wall, a third wall generally opposed to and spaced from the second wall and attached to said first wall, and a fourth wall generally opposed to and spaced from the first wall, and attached to the second and third walls, said first, second, third, and fourth walls including first, second, third, and fourth inner faces respectively which define a channel for receiving the pivot shoe; the improvement comprising:

said pivot shoe comprising a body for simultaneous locking of said shoe against the four inner faces, said body including a first, a second, a third, and a fourth side of said body, a first portion of said body and a second portion of said body, said first side facing said first inner face, said second side facing said second inner face, said third side facing said third inner face, said fourth side facing said fourth inner face, and said first and second portions being oriented longitudinally with the track when said body is located within said track, said first portion comprising: a first leg and a second leg, said

first and second legs defining a separation zone between them for divergent movement of said legs, and further defining between them within said separation zone, a passage in the body for receiving a barrel cam, a barrel cam having a first end and a second end, mounted in said passage for rotation by said rotation transmission means about an axis that is generally normal to said first wall, said barrel cam and said body defining between them an axial thrust cam for forcing said first end away from the first side of said body for engaging the first inner face of said track and for forcing said body into engagement with said fourth inner face of said track when the pivot shoe is located in the channel, for resisting sliding of said pivot shoe along the track when the barrel cam is rotated over a first angle of a predetermined angular range, said axial thrust cam also being for permitting retreat of said first end of said barrel cam from the first inner face of said track and said body from said fourth inner face when the barrel cam is rotated over a second angle of said predetermined angular range.

said barrel cam and said first leg defining between them a radial thrust cam for forcing said leg away from the axis of said barrel cam for engaging a one of the second and third inner faces of the track by said first leg and the other of the second and third faces by the body when the pivot shoe is located in the channel, for resisting sliding of said pivot shoe along the track when the barrel cam is rotated over a third angle of said predetermined angular range, said radial thrust cam also being for permitting retreat of said first leg and said body from said engagement with the second and third inner faces of the track when said barrel cam is rotated over a fourth angle of said predetermined angular range.

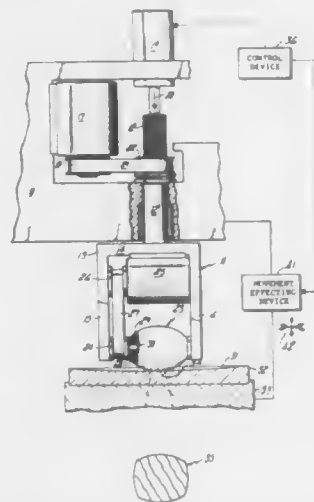
said first and third angles of said predetermined angular range generally coinciding.

#### 4,958,463 OPTICAL SURFACE QUALITY IMPROVING ARRANGEMENT

Arthur E. Hess, Palm Beach Gardens, Fla., and Gregory M. Sanger, New Fairfield, Conn., assignors to United Technologies Corporation, Hartford, Conn.  
Continuation of Ser. No. 203,195, Jun. 6, 1988, abandoned. This application Nov. 22, 1989, Ser. No. 442,484  
Int. Cl.<sup>3</sup> B24B 7/00

U.S. Cl. 51—72 R

7 Claims



1. An arrangement for controlled removing material from an effective surface of a workpiece, comprising:  
a support;  
a mounting member mounted on said support for movement

relative thereto at least in a predetermined direction toward, and opposite to said predetermined direction away from, the effective surface;  
a working member mounted on said mounting member for rotation about a rotational axis that extends substantially normal to said predetermined direction, and having an outer circumferential surface that is centered on said rotational axis;  
means for rotating said working member about said rotational axis relative to said mounting member;  
means for applying to said working member a pressing force acting in said predetermined direction relative to said support so that successive regions of said outer circumferential surface of said working member act on respective infinitesimally small localities of a predetermined zone of the effective surface of the workpiece during the rotation of said working member with respective local pressures dependent on the magnitude of said pressing force and sufficient to remove material from the workpiece;  
means for effecting relative movement between said mounting member and the workpiece at least along a plane normal to said predetermined direction with attendant movement of the predetermined zone over the effective surface; and  
means for controlling said applying and effecting means, including means for so varying, while said working member is in continuous material-removing contact with the effective surface, at least one of said pressing force applied by said applying means and a speed of said relative movement effected by said effecting means in dependence on the instantaneous position of said predetermined zone on said effective surface that, wherein said working member has at least a portion situated immediately within said outer circumferential surface and being elastically deformable, to be deformed when said applying means applies said pressing force to said mounting member so that said outer circumferential surface of said working member is in area contact with the predetermined zone of the effective surface of the workpiece, and wherein said outer circumferential surface of said working member follows an arcuate course as considered axially of said working member prior to deformation, such said successive regions of said outer circumferential surface of said working member remove the material of the workpiece from different areas of the effective surface to such different depths as needed to bring the effective surface to its desired configuration.

#### 4,958,464 LAPPING MACHINE

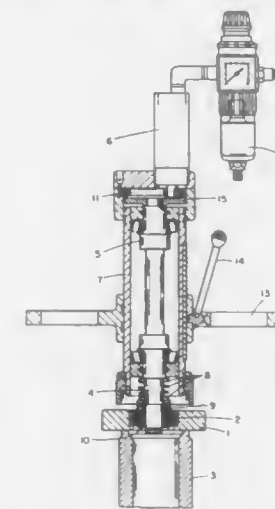
Alfredo S. Menendez, Calle Hermanos Machado, No. 18-1\*, 24009 Leoa, Spain  
Filed Jun. 19, 1989, Ser. No. 367,869  
Claims priority, application Spain, May 24, 1989, 8901765  
Int. Cl.<sup>3</sup> B24B 19/00

U.S. Cl. 51—241 VS

1 Claim

1. A machine for lapping the body seat of a security valve or a pressure relief valve which comprises motor (6) in the upper part thereof, axle (5), a crown gear (11) and a pinion (15) connected to said motor and to said axle for driving said axle when the machine is in operation and the motor is actuated, a lapping disc (1) adapted to lap said valve seat (3) with uniform pressure, the lower part of said axle having part (4) eccentrically disposed thereto, a ball joint (2) positioned above said valve seat; a spring (8) positioned above said ball joint, said spring applying force upon said lapping disc when the machine is in operation to maintain contact between said lapping disc and said valve seat, said lapping disc being capable of frontward-backward motion and an eccentric circular motion, a tubular member (7) exterior to said axle positioned under said motor, a flange (13) for attachment to said body of said valve, a lever (14) connected to said flange, said lever connecting said

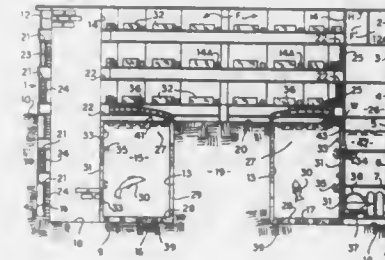
tubular member to said flange, said frontward-backward motion being produced by said part (4) eccentric with respect to



#### 4,958,465 COMBINED ABOVE AND BELOW GRADE DWELLING WITH MARINE HABITAT

Jacques S. Levy, 1015 33rd St., NW., Washington, D.C. 20007  
Filed Sep. 27, 1989, Ser. No. 413,128  
The portion of the term of this patent subsequent to Jun. 13, 2006, has been disclaimed.  
Int. Cl.<sup>3</sup> E02D 27/00; B63B 35/00  
U.S. Cl. 52—169.1

3 Claims



1. An on-shore structural installation for the cohabitation of humans and marine life comprising:  
a housing assembly including a plurality of vertically or horizontally stacked levels having a continuous inside wall and outside wall, each said level provided with a plurality of adjacently connected individual units at least some of which comprise independent living quarters, one or more said levels defining lowermost levels and disposed within an excavation below ground level, one or more other ones of said levels defining uppermost levels disposed above ground level, a plurality of walkways exteriorly of both said housing assembly inside and outside walls each joining adjacent ones of said individual units on a respective said level, doors in said housing assembly walls providing communication between said units and said walkways, a water containment located juxtaposed said housing assembly inside wall and disposed laterally adjacent at least one of said levels disposed below ground level, windows within said housing assembly inside wall permitting occupants within said units in at least one of said

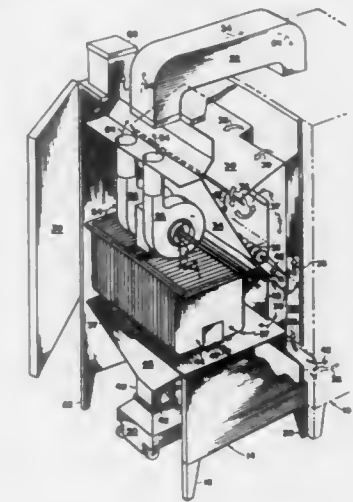
levels below ground level to view at their level into water within said water containment, access means for movement of humans exteriorly of said housing assembly outside wall and connecting to all said walkways above and below ground level and accessible from ground level, access means for movement of humans exteriorly of said housing assembly inside wall and connecting to all said walkways above ground level, at least one passage disposed between adjacent ones of said units and extending between said inside and outside walls, said access means permitting occupants of the housing assembly to move between all said levels, and said access means permitting occupants to have direct entry into water within said containment.

#### 4,958,466 EXHAUST GAS MEDIA SEPARATOR WITH RECYCLING AND DUST COLLECTION

Roger A. Howells, Orefield, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.  
Filed Mar. 14, 1989, Ser. No. 323,537  
Int. Cl.<sup>3</sup> B24C 9/00

U.S. Cl. 51—425

3 Claims



1. An apparatus for recovering blasting media and separating dust from a cryogenic carrier gas for reintroduction into a blast treating chamber comprising in combination:  
an insulated enclosure containing means to withdraw cold carrier gas with blasting media and other particles entrained therein from said blast treating chamber and introduce said withdrawn cold carrier gas and blasting media into an inlet in said insulated enclosure;  
a system of baffles disposed in the path of said cold carrier gas containing entrained media to effect a velocity loss of said media causing said media to separate from said cold carrier gas and a hopper for collecting media said hopper containing means including a motorized auger communicating with a conduit which in turn is connected to said blasting media inlet in said insulated enclosure for returning said media to said blast treating chamber for reuse;  
means within said insulated enclosure to remove fine particles entrained in said cold carrier gas;  
means to return said cold carrier gas to said blast treating chamber in order to recover refrigeration from said cold carrier gas in said blast treating chamber; and  
means to exhaust excess cleaned carrier gas from said apparatus to ambient temperature.

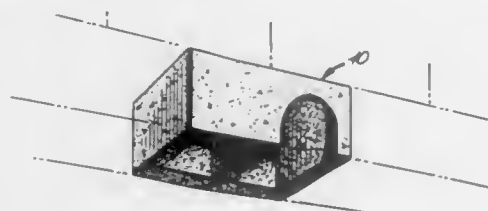


**4,958,467**  
BORING APPARATUS AND METHOD OF MODIFYING  
CONCRETE BLOCKS

Samuel R. Becker, 4336 Eastwood Dr., Sarasota, Fla. 34232  
Filed Feb. 8, 1990, Ser. No. 477,330  
Int. Cl.<sup>5</sup> E04B 1/60

U.S. Cl. 52—127.7

3 Claims



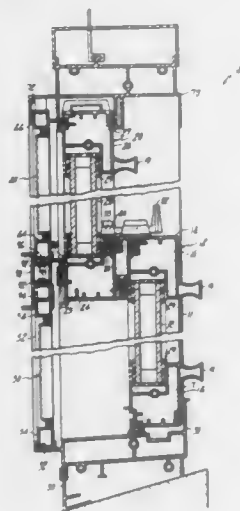
1. A rectangular concrete block comprising: upright parallel side and end walls, said side walls spaced apart by said end walls, and at least one interior transverse partition which forms at least two upright cavities through said block;
- a cylindrical inspection hole formed into one said side wall in alignment and registry with one said cavity;
- said inspection hole having an axis at an acute angle with respect to vertical and having a diameter generally equal to the length of said cavity;
- said inspection hole offset vertically with regard to said side wall, extending from through one horizontal edge margin of said side wall toward, but not to, the other horizontal edge margin of said side wall.

**4,958,468**  
COMBINATION SUPPORT AND ATTACHMENT BAR  
FOR A WINDOW

William A. Nolan, Louisville, Ky., assignor to United Technologies Automotive, Inc., Dearborn, Mich.  
Filed May 7, 1986, Ser. No. 860,716  
Int. Cl.<sup>5</sup> E06B 1/04

U.S. Cl. 52—204

10 Claims



1. A window assembly including a frame which comprises: a sash assembly mounted for sliding movement within the frame including: a glass portion;

a top rail for receiving the glass portion, said top rail defining a central cavity;

a plastic meeting rail for receiving the glass portion, said meeting rail defining a central cavity including an extension portion extending therefrom and including means for a fastener to extend through the meeting rail to the extension portion of the central cavity;

two vertical rails for receiving the glass portion, said rails collectively encasing the glass portion; and

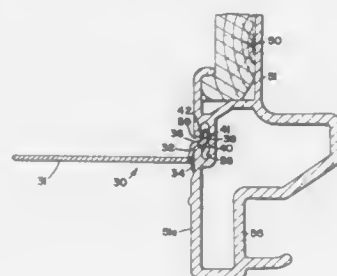
a first rigid structural support sized to fit within the cavity defined by the meeting rail, said support engaging the meeting rail to form an integrated structural unit and said support including fastener receiving means positioned to project into the extension portion of the cavity such that a fastener may extend through the meeting rail and engage the fastener receiving means of the support.

**4,958,469**  
COLLAPSIBLE WINDOW FLANGE APPARATUS  
David D. Plummer, Hodson, Wis., assignor to Andersen Corporation, Bayport, Minn.

Filed May 16, 1989, Ser. No. 352,355  
Int. Cl.<sup>5</sup> E06B 1/04

U.S. Cl. 52—213

28 Claims

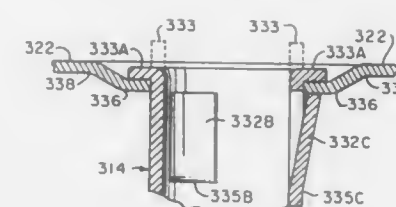
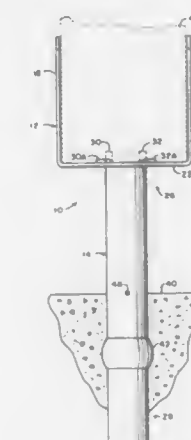


1. A detachable flange for a window or door frame of the type having a longitudinally extending retainer groove formed below an outer surface of the frame and accessible along its length through a longitudinal access port extending from the outer surface of the frame, comprising:
  - (a) an elongate generally planar strip member having a length as determined by the longitudinal length of the frame to which the flange is to be attached and first and second longitudinally extending edges defining therebetween the width of said strip member;
  - (b) a seat extension extending at an angle to the general plane of said strip member and connected thereto along the longitudinal length of the first edge of said strip member, said seat extension extending between said strip member and a third edge;
  - (c) attachment means forming an extension of said seat extension for detachably securing said seat extension and strip member to a window frame, said attachment means being sized and configured to matingly engage the retainer groove through the access port in a manner such that while retainably engaged by said groove, said strip member and seat extension are rotatably movable between operative and collapsed positions, when in said collapsed position said strip member lying generally parallel to that portion of the frame to which it is attached when in said operative position, said strip member projecting outwardly from said frame with said seat extension being seated against said frame; and
  - (d) wherein said strip member and said seat extension are configured such that their orientation relative to one another does not change in operative use.

**4,958,470**  
ELEVATED POST ANCHOR  
Chris M. Haa, Fremont; Vernal V. Long, and Douglas T. Silver, both of Danville, Ill., assignors to Silver Metal Products, Inc., Calif.

Filed Jan. 24, 1989, Ser. No. 301,416  
Int. Cl.<sup>5</sup> E02D 27/00

U.S. Cl. 52—296



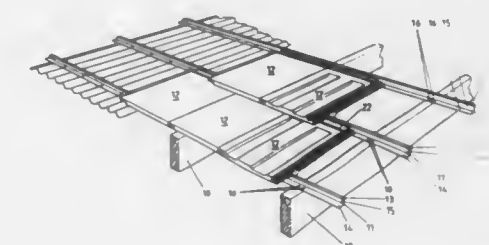
1. An elevated structural support comprising: a concrete base;
- a support member having an upper end and a lower end, said lower end adapted to be embedded in said concrete base;
- a generally U-shaped bracket member;
- a structural member adapted to be supported by said U-shaped member;
- means for connecting said upper end of said support member to said generally U-shaped bracket member, said means comprising: means defining a generally circular hole in said generally U-shaped bracket member, said hole having a diameter approximately equal to the outside diameter of said support shaft;
- at least one generally rectangular tab, integrally connected to said support member proximate its upper end and disposed below the top edge of said support member, said generally rectangular tab projecting radially outwardly, said tab having a top edge adapted to engage the underside of said U-shaped bracket member proximate the peripheral edge of said circular hole;
- the top edge of said of said support member being deformed radially outwardly along the top surface of said U-shaped bracket member about the peripheral edge of said circular hole;
- means proximate the lower end of said support member for increasing the resistance of said support member to movement in said concrete base due to the weight of said structural member on said U-shaped bracket member.

**4,958,471**  
ROOF TILE SECURING MEANS  
Richard Waddington, 75 Milan Terrace, Stirling, South Australia, 5152, Australia

Filed Sep. 15, 1989, Ser. No. 407,965  
Claims priority, application Australia, Sep. 7, 1988, PJ0281  
Int. Cl.<sup>5</sup> E04D 1/34

4 Claims U.S. Cl. 52—546

11 Claims



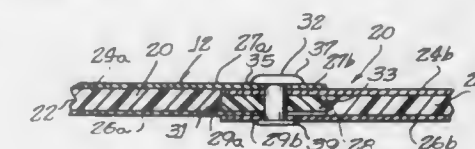
1. Improved roof tile securing means for securing roof tiles to a roof structure comprising a plurality of elongate tile support battens each having an upstanding web, a thin upper flange extending to one side of said web, and a lower flange extending to the other side of said web, the flanges being approximately parallel, securing means for securing said tile support battens to the roof structure in spaced apart parallel relationship, wherein each said roof tile has an upper end portion supported on the upper surface of said lower flange of one tile support batten, and a lower end portion which is supported by the upper flange of an adjacent lower batten, said lower end portion overlapping the upper end portion of an adjacent lower tile,
- slot forming walls forming an upper flange locating slot on the underside of said roof tile near to and facing in the direction of its lower end portion, said upper flange of each said batten being arranged to snugly engage within a respective said slot, such that with the upper flange so engaged, the lower end portion of each tile is restrained against upward lifting movement, and the upper end portion of each tile being coplanar with the lower end portion thereof, and said upper end portion being free of any ribs thereat such that interlocking between the battens and the underside of the roof tiles occurs only at the lower end portion of the tiles.

**4,958,472**  
COMPOSITE TRAILER SIDEWALL  
Rodney P. Ehrlich, Monticello, Ind., assignor to Wabash National Corporation, Lafayette, Ind.

Filed May 30, 1989, Ser. No. 358,665  
Int. Cl.<sup>5</sup> E04C 1/00, 2/32

U.S. Cl. 52—584

9 Claims



1. A sidewall for use in a trailer body or the like, said sidewall comprising at least one core member sandwiched and bonded between at least a pair of first skin members having overlapping edges and at least a pair of second skin members having overlapping edges, and joiner means abutting adjacent core members and being covered by said overlapping edges of said first and second skin members, said first and second skin members including a plurality of vertically spaced apertures adjacent each edge of said skin member and said joiner means

including a plurality of vertically spaced apertures, said apertures of said joinder means aligning with said apertures in said first and second skin members and said fastener means extending through said apertures in said joinder means and said first and second skin members thereby securing said skin members to said joinder means.

4,958,473

# FRAME, ANGLE MEMBER FOR USE IN THE FRAME AND METHOD OF MAKING JOINT PORTION OF THE ANGLE MEMBER

Hironami Iyoda, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

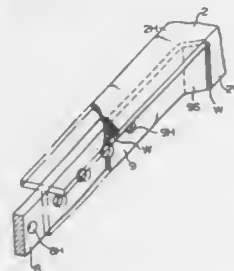
Filed Jun. 2, 1989, Ser. No. 360,220

Claims priority, application Japan, Jun. 6, 1988, 63-137556

Int. Cl.<sup>5</sup> B66B 23/00

U.S. Cl. 52—646

13 Claims



1. A frame including at least two frame sections each comprising upper and lower members extending longitudinally of said frame and in parallel with each other and connecting members interconnecting said upper and lower members, said upper member having a substantially inverted L-shaped cross section, said lower member having a substantially L-shaped cross section, each of said upper and lower members of each frame section including a joint portion, said frame further including means for coupling the joint portions of said upper and lower members of said frame sections together, wherein the joint portion of said upper member of each frame section has a substantially T-shaped cross section, the joint portion of said lower member of each frame section has a substantially inverted T-shaped cross section and wherein said coupling means comprise elongated and rectangular coupling members respectively attached to side faces of vertical webs of the T-shaped joint portions of the upper members of said frame sections and to side faces of vertical webs of the inverted T-shaped joint portions of said lower members of said frame sections, and means for fastening said coupling members to associated vertical webs.

4,958,474

# TRUSS STRUCTURE

Adams, Louis R., Ojai, Calif., assignor to Astro Aerospace Corporation, Carpinteria, Calif.

Continuation of Ser. No. 51,743, May 18, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,074

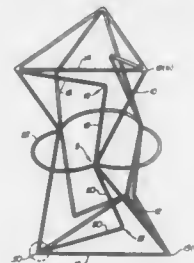
Int. Cl.<sup>5</sup> E04H 12/18

U.S. Cl. 52—646

16 Claims

1. A truss structure movable between a collapsed position and a deployed position, having:  
at least one frame unit, each frame unit comprised of three rigid batten, longeron, and diagonal members and three non-rigid batten members;  
the three rigid batten members being connected at their end points so as to form an equilateral triangle;  
each longeron being pivotally connected at a first end to an associated rigid batten member at each point of the triangle such that the longeron pivots about an axis perpendicular to the plane defined by its deployed and collapsed longitudinal axes and such that, in the deployed position,

each longeron is perpendicular to the plane defined by the triangle;  
each diagonal being hinged approximately at its mid-point and being hinged at its end points to the longeron and the associated rigid batten member, with each hinge approximately parallel to those of the longeron;  
the non-rigid batten members being joined at the diagonal-longitudinal junction of one frame unit to the diagonal-longitudinal junction of an adjacent frame unit; and  
each non-rigid batten member having two ends and having a fully extended length, measured linearly from one end to



the other end, and a deformed length, measured linearly from one end to the other end upon deformation of the non-rigid batten member, wherein the fully extended length is greater than the deformed length;  
wherein each non-rigid batten member is dimensioned for allowing the non-rigid batten members to achieve their fully extended length upon the truss structure being in the collapsed position and for allowing the non-rigid batten members to deform and achieve their deformed length upon the truss structure being moved to a position intermediate the collapsed and deployed positions.

4,958,475

# BRICK SUPPORTING STRUCTURES

Peter J. Pollina, 1150 Hylan Blvd., Staten Island, N.Y. 10305

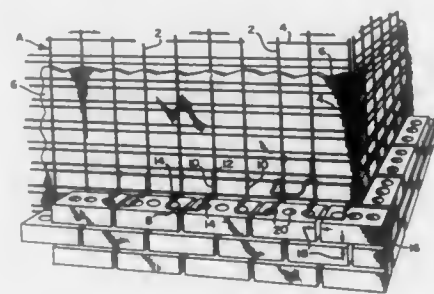
Continuation of Ser. No. 54,514, May 27, 1987, Pat. No.

4,765,115. This application Aug. 18, 1988, Ser. No. 233,538

Int. Cl.<sup>5</sup> E04B 1/38

U.S. Cl. 52—712

4 Claims



1. A brick laying form comprising:

- (a) a pre-fabricated wire support structure having a shape generally corresponding to the shape of a completed masonry structure.
- (b) said wire support structure including at least two longitudinally extending parallel wires or rods disposed in a preselected configuration,
- (c) said wire support structure including a plurality of unequally spaced-apart transversely extending wire cross ties intersecting said longitudinally extending wires or rods,
- (d) the distances between successive adjacent cross ties serving as a guide in placing bricks and mortar between

adjacent rows of bricks during fabrication of the masonry structure,

- (e) a hanger connected with each cross tie which includes a generally U-shaped main body portion and a pair of spaced-apart legs extending perpendicularly from opposite ends of a U-shaped body portion and terminating as hook portions,
- (f) two adjacent hangers forming an interlocked support pair connected to said wire support structure which each have a main body portion for engaging a brick therebetween from two opposite faces thereof,
- (g) the leg portions of each of said hangers laying adjacent to a third intermediate side of said brick with said hook portions of one hanger being opposed to hook portions of said other of said hangers, and
- (h) a resilient connecting element engaging each of said portions of said hangers to lock said hangers to said brick.

4,958,476

# ADAPTIVE ARCHITECTURAL COVER PANEL SYSTEM

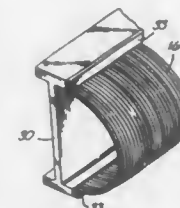
Rodman W. Kotter, 10815 Molony Rd., Calver City, Calif. 90230

Division of Ser. No. 174,516, Mar. 28, 1988, abandoned. This application May 19, 1989, Ser. No. 355,788

Int. Cl.<sup>5</sup> E04G 21/14

U.S. Cl. 52—745

5 Claims



1. A method for covering the structural support members of an underlying structure, comprising attaching to said support members a plurality of contiguously arranged architectural cover panels of flexible material having a generally convex cross-section with corrugations formed therein extending transverse to a longitudinal axis of the panels, said corrugations enabling said cover panels to conform to the dimensions and surface curvature of the support members, said cover panels having edge portions formed along the longitudinal sides of said flexible material with corrugations formed therein oriented generally parallel to and intersecting the corrugations of said convex cross-section portion of the flexible material.

4,958,477

# APPARATUS FOR THE PRODUCTION OF MEAT PRODUCTS

Bruno Winkler, Weinheim-Oberflockenbach, Fed. Rep. of Germany, assignor to Naturis-Werk Becker & Co., Weinheim-Bergstrasse, Fed. Rep. of Germany

Division of Ser. No. 63,715, Jun. 15, 1987, Pat. No. 4,910,034, which is a continuation of Ser. No. 770,412, Aug. 28, 1985, abandoned. This application Oct. 27, 1989, Ser. No. 428,360

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1984, 3431521

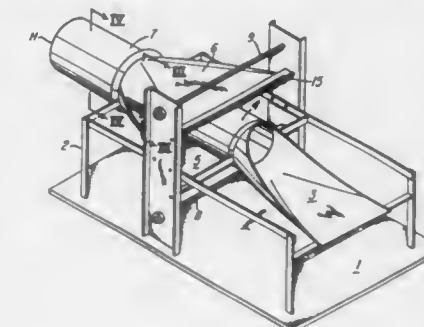
Int. Cl.<sup>5</sup> A22C 13/00

U.S. Cl. 53—138 R

15 Claims

1. An apparatus for wrapping compact meat products, which comprises:  
a feed tray for receiving said meat products;  
a guide tube, having a first and a second end, with said first end receiving said feed tray;  
a second tube which fits over said second end of said guide tube; and  
upper and lower film guides respectively positioned above and below said guide tube, each of said guides tapering

conically toward said second end of said guide tube with one of said film guides fitting into said second tube, and



the other of said film guides, in the form of a partial cylindrical shell, extending into said second tube.

4,958,478

# APPARATUS FOR STORING AND SUPPLYING END CLOSURES FOR ENVELOPES OF CYLINDRICAL COMMODITIES

Jakob Hannen, Willich, Fed. Rep. of Germany; Jozef-Franc Zajec, Velden, Netherlands, and Stephan Plesen, Krefeld, Fed. Rep. of Germany, assignors to Kleinewefers GmbH, Krefeld, Fed. Rep. of Germany

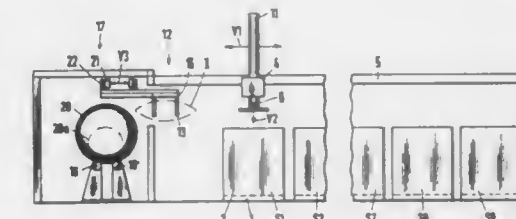
Filed Feb. 8, 1989, Ser. No. 306,548

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1988, 3903874

Int. Cl.<sup>5</sup> B65B 11/04

U.S. Cl. 53—415

34 Claims



1. Apparatus for storing and manipulating different flat components, particularly disc-shaped end walls, of envelopes for substantially cylindrical objects of the type having a peripheral surface and two end faces flanking the peripheral surface, such as rolls of paper and the like, comprising a battery of depositories for different components; a positioning unit having means for maintaining discrete objects in such positions that the end faces of an object in said positioning unit are accessible; transporting means including guide means defining an elongated path extending from said maintaining means along the depositories of said battery, and conveyor means mounted for movement along said path to transport components from selected depositories of said battery toward said maintaining means, the depositories of said battery forming two rows which flank said path; and means for changing the orientation of components between said maintaining means and said depositories.



4,958,479

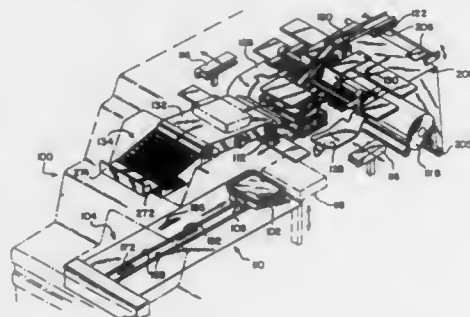
**PACKAGE WRAPPING METHOD AND MACHINE**  
Fritz F. Treiber, Centerville, Ohio, assignor to Hobart Corporation, Troy, Ohio

Continuation-in-part of Ser. No. 96,879, Sep. 15, 1987, Pat. No. 4,813,211. This application Jan. 9, 1989, Ser. No. 295,170. The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B65B 11/18, 57/04

U.S. Cl. 53—441

8 Claims



1. A method for wrapping packages in stretch film comprising the following steps:  
designating the length of a package;  
operating a conveyor to carry said package to an elevator of a wrapping station and to locate said package at a registration position on one side of said elevator;  
gripping a free end of a continuous source of stretch film on the side of said elevator opposite to said one side and drawing said free end over said elevator to a defined position beyond said registration position;  
operating side clamps to engage the lateral edges of the film over said elevator;  
elevating said package into said film to stretch said film and draw any additional film required by the height of said package from said continuous source of stretch film;  
moving a horizontal bar into contact with said film at a location between said package and said film source to form a loop of film and pull from said film source a second length of additional film corresponding to the designated length of said package;  
cutting said film to produce a sheet of film of suitable length for the height and length of said package;  
releasing said side clamps from engagement with said film, and  
folding said sheet of film under said package.

4,958,480

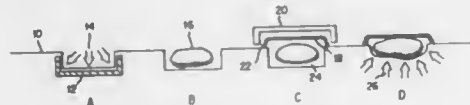
**HIGH PROFILE SHRINK PACKAGE**

John J. Warner, Greer, S.C., assignor to W. R. Grace & Co., Conn., Duncan, S.C.

Continuation-in-part of Ser. No. 255,075, Oct. 7, 1988, abandoned. This application Sep. 1, 1989, Ser. No. 402,273. Int. Cl.<sup>5</sup> B65B 11/52, 11/58, 31/02, 53/02

U.S. Cl. 53—433

3 Claims



1. A method of packaging a product comprising:  
(a) drawing a thermoplastic, thermoformable shrinkable bottom web into a thermoforming die to form a cavity;  
(b) inserting the product into the cavity;

- (c) moving the thermoformed bottom web and product to a vacuum chamber;
- (d) placing a preformed tray, upside down, in the chamber on top of the web to define an unsealed package, the tray having a heat sealable thermoplastic layer adhered thereto along a surface of the tray facing the thermoformable web;
- (e) sealing the tray directly to the bottom web under vacuum;
- (f) shrinking the bottom web; and
- (g) turning the packing right side up such that the shrunken bottom web becomes the top of the final package.

4,958,481

**BOX-CORDING APPARATUS**

Sam H. Kim, 43-3, Myungju-dong, Kangneung-si, Kangwon-do, Rep. of Korea

PCT No. PCT/KR88/00005, § 371 Date Oct. 18, 1988, § 102(e) Date Oct. 18, 1988, PCT Pub. No. WO88/06124, PCT Pub. Date Aug. 25, 1988

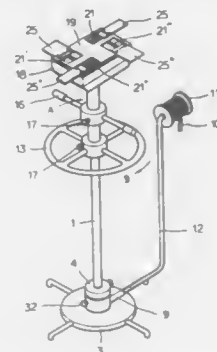
PCT Filed Feb. 19, 1988, Ser. No. 264,279

Claims priority, application Rep. of Korea, Feb. 20, 1987, 1987-1974

Int. Cl.<sup>5</sup> B65B 13/02, 67/00

U.S. Cl. 53—592

6 Claims



1. A box-cording apparatus comprising:  
frame means having a base frame on which a box to be corded is loaded and support members slidably installed on said base frame;  
driving means for moving said support members back and forth;  
frame rotating means having a shaft fixed to said base frame, control means for the rotation of said shaft and a base for supporting said shaft; and  
wherein said base frame comprises an upper base plate having a first set of guide channels formed thereon in four directions for slidably receiving said support member, a middle base plate having a second set of guide channels on which catching jaws are formed, and a lower base plate attached onto said middle base plate and having guide holes formed thereon through which guide pins are placed, said guide pins being connected to guide pieces which are fixed to said support members and slidably received within said second set of guide channels, the width of said second set of guide channels being a little larger than that of said first set thereof and both of said first and second sets thereof defining guide grooves for slidably receiving said guide pieces.

4,958,482

**MOWING MACHINE**

Teodoro Soldavini, Via Leonardo da Vinci 48D, 20062 Cassanese d'Adda (Milano), Italy

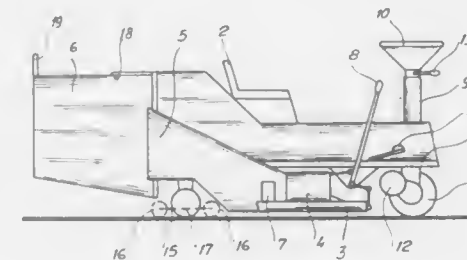
Filed May 22, 1989, Ser. No. 354,926

Claims priority, application Italy, May 25, 1988, 20735 A/88

Int. Cl.<sup>5</sup> A01D 34/03

U.S. Cl. 56—14.3

4 Claims



1. An improved seating-operator mowing machine comprising a frame supporting a casing having a bottom, a grass cutting assembly coupled to said bottom and an operator seat, a front steering column rotatably supporting a driven front roller and two load bearing spaced parallel rear rollers extending transversely of said mowing machine and swingably mounted about a middle axis.

4,958,483

**ROPE GUIDE**

Richard A. Heismann, Collierville, Tenn., assignor to The Toro Company, Minneapolis, Minn.

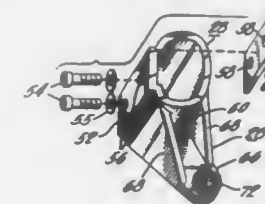
Continuation of Ser. No. 230,907, Aug. 11, 1988, abandoned.

This application Feb. 27, 1990, Ser. No. 489,734

Int. Cl.<sup>5</sup> A01D 34/67

U.S. Cl. 56—17.5

8 Claims



1. In combination, an extruded member having a substantially C-shaped cross-section and hence a longitudinal opening in one side thereof, and a rope guide for attachment to said member, said guide comprising:  
a tubular body portion having an inner wall configuration similar to the exterior wall configuration of said member to receive said member therewithin in close-fitting, sliding relation  
means for selectively securing said body portion to said member, said means comprising a threaded element within said member and screw means threadedly connecting said body portion with said threaded element, said screw means passing through the opening in said member, an arm portion extending outwardly from said body portion, and  
an aperture in said arm portion for receiving and guiding a rope passing therethrough.

4,958,484

**VEGETATION CUTTING BLADES ASSEMBLY**

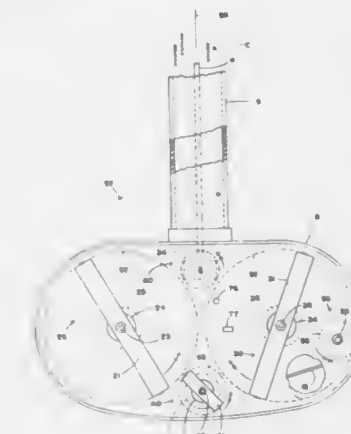
Garry W. Busboom, Beatrice, Nebr., assignor to Exmark Manufacturing Company Incorporated, Beatrice, Nebr.

Filed Jul. 28, 1989, Ser. No. 386,155

Int. Cl.<sup>5</sup> A01D 34/68

U.S. Cl. 56—255

3 Claims



1. In combination with vegetation cutting apparatus of the type comprising a directionally longitudinally extending drive-shaft frontally actuatably connected to a gearbox mounted to a directionally transversely extending housing deck for a plurality of horizontal rotary cutting blades and further comprising a vegetation cuttings chute communicating with a medial portion of and extending horizontally rearwardly from said housing deck along a directionally longitudinal central-axis, a housed cutting blades assembly rotatably actuated from said gearbox and arrayed to cut a continuously directionally transversely extending swath of growing vegetation, said improvement comprising:

- (A) a rightward cutter blade centrally attached to a vertical rightward shaft rotatably secured to a rightwardly transversely offset portion of said housing deck and carrying a rightward sheave, the periphery of said rightward cutter blade circumscribing a rightward circle located predominately transversely rightwardly of said longitudinal central-axis;
- (B) a leftward cutter blade centrally attached to a vertical leftward shaft rotatably secured to a leftwardly transversely offset portion of said housing deck and transversely aligned with said rightward shaft, said leftward shaft carrying a leftward sheave, the periphery of said leftward cutter blade circumscribing a leftward circle located predominately transversely leftwardly of said longitudinal central-axis and in adjacent non-intersecting relationship with said rightward circle, the diameter of said leftward circle being substantially equal to that for said rightward circle;
- (C) a medial cutter blade centrally attached to a vertical medial shaft rotatably secured to a central forward portion of said housing deck and carrying a medial sheave, the periphery of said medial cutter blade circumscribing a medial circle located at said longitudinal central-axis and being disposed mainly forwardly of and in adjacent non-intersecting relationship with said rightward and leftward circles, the diameter for said medial circle not exceeding one-half that of said rightward circle;
- (D) a reversing sheave that is located forwardly from and transversely offset from said transversely aligned rightward and leftward shafts; and
- (E) endless belt type transmission means emanating from a gearbox sheave and trained with each of said sheaves, and so as to rotate the rightward and leftward cutter blades in opposite angular directions and respectively angularly

toward said longitudinally horizontally rearwardly extending cuttings chute.

#### 4,958,485 CORESPUN YARN FOR FIRE RESISTANT SAFETY APPAREL

Terry G. Montgomery, Matthews, N.C., and William G. Martin, Fort Mill, S.C., assignors to Springs Industries, Inc., Fort Mill, S.C.

Filed Dec. 22, 1988, Ser. No. 288,682  
Int. Cl.<sup>5</sup> D02G 3/02, 3/04, 3/36  
U.S. Cl. 57—210

8 Claims



1. A corespun yarn for forming fire resistant safety apparel comprising

- a core of high temperature resistant staple fibers selected from the group consisting of aramid fibers and polybenzimidazole fibers,
- a core wrapper of low temperature resistant staple fibers surrounding and covering said core,
- an outer sheath of low temperature resistant staple fibers surrounding and covering said core wrapper, and wherein the fibers of said core and said core wrapper extend primarily in an axial or longitudinal direction along said corespun yarn, and wherein said fibers of said outer sheath extend primarily in a circumferential direction around said corespun yarn.

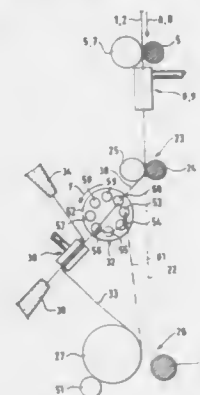
#### 4,958,486 PROCESS AND AN ARRANGEMENT FOR PIECING AN AIR-SPUN YARN

Fritz Stahlecker, Bad Überkingen, Fed. Rep. of Germany, assignor to Hans Stahlecker, Fed. Rep. of Germany, a part interest

Filed May 11, 1989, Ser. No. 350,520  
Claims priority, application Fed. Rep. of Germany, May 20, 1988, 3817222

Int. Cl.<sup>5</sup> D01H 1/15, 15/00  
U.S. Cl. 57—261

17 Claims



1. Arrangement for piecing air-spun yarn supplied by a spinning unit with a previously spun yarn end withdrawn from a partially wound spool package, comprising:

yarn piecing means for piecing yarn ends together, new yarn feeding means for feeding a newly spun yarn end to the yarn piecing means, old yarn feeding means for feeding a previously spun yarn end from a partially wound spool package to the yarn piecing means, yarn storage means for storing the newly spun yarn supplied continuously by a spinning unit during the piecing operation, said yarn storage means including means for forming a plurality of yarn loops therein, and spool package drive control means for driving the spool package at higher than normal spinning operating speeds for a short interval after the piecing operation so as to wind up the excessive length of the yarn stored in the yarn storage means, wherein the yarn storage means contains several suction pipes which can be activated successively, wherein the suction pipes are mounted in a rotatable holding device which is rotationally driven by a turning drive which operates in a timed manner, and wherein control means are provided for activating the suction pipes and for controlling the turning drive.

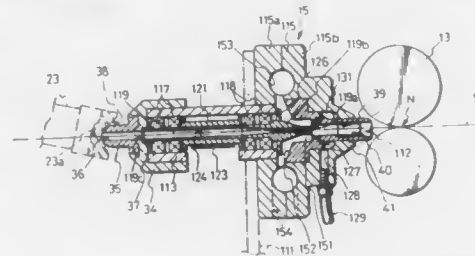
#### 4,958,487 APPARATUS FOR PRODUCING SPUN YARN

Baro Suganuma, Nagakakyō; Shinichi Nishimura, Ohtsu, and Akihiko Takeshita, Kyoto, all of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Oct. 28, 1988, Ser. No. 263,710  
Claims priority, application Japan, Oct. 29, 1987, 62-274452; Oct. 29, 1987, 62-274453

Int. Cl.<sup>5</sup> D01H 1/115  
U.S. Cl. 57—328

15 Claims



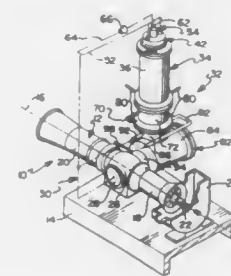
1. An apparatus for producing a spun yarn, comprising: a rotary pipe having an entrance and an exit and defining a sliver path for passing a sliver therethrough, a rotational support for rotatably supporting the rotary pipe, a rotary plate integral with the rotary pipe and spaced from the entrance of the rotary pipe, a casing for covering the rotary pipe and the rotary plate, a guide path for introducing and guiding a sliver to the entrance of the rotary pipe, a jetting nozzle opening onto the entrance of the rotary pipe, and a pair of dam members disposed in the guide path for introducing a substantially flattened, untwisted sliver to the entrance of the rotary pipe, each dam member being disposed on an opposite side of the guide path and at a different distance from the entrance of the rotary pipe, wherein the guide path defines an inner diameter, wherein each dam member has a height which is smaller than one-half the inner diameter of the guide path, and wherein the dam members define a slit-shaped sliver path within the guide path.

#### 4,958,488 COMBUSTION SYSTEM

Colin Wilkes, Lebanon; Hakam C. Mongia, Carmel, and Peter C. Tramm, Indianapolis, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 17, 1989, Ser. No. 339,449  
Int. Cl.<sup>5</sup> F02C 7/00  
U.S. Cl. 60—39.55

2 Claims



1. In combination with a source of compressed air and a source of one of a gaseous and a liquid fuel, a combustion system comprising: a rich zone combustor, means connecting said rich zone combustor to said source of compressed air and to said source of one of said gaseous and said liquid fuel, said fuel being burned in a primary portion of said compressed air in said rich zone combustor at an equivalence ratio exceeding 1 and at on the order of about 2800 degrees F. whereby rapid formation of oxides of nitrogen is inhibited and a continuous stream of combustible hot gas issues from said rich zone combustor, a quench stage connected to said rich zone combustor having a throat portion therein receiving said continuous stream of combustible hot gases, means on said quench stage defining a curtain of one of water and steam stretching across said throat portion and intercepting all of said continuous stream of combustible hot gas to reduce the temperature of said continuous stream of combustible hot gas from on the order of about 2800 degrees F. entering said quench stage to on the order of about 1900 degrees F. exiting said quench stage, a lean zone combustor connected to said quench stage receiving therefrom the total outflow of said quenched combustible hot gas and to said source of compressed air operative to mix said quenched combustible hot gas and a secondary portion of said compressed air to initiate spontaneous combustion of said quenched combustible hot gas in said lean zone combustor at an equivalent ratio of less than 1, said spontaneous combustion generating a continuous stream of non-combustible hot gas motive fluid at a temperature not exceeding about 3000° F., and duct means connected to said lean zone combustor for transporting said non-combustible hot gas motive fluid to a consuming device.

#### 4,958,489 MEANS FOR CONTROLLING AUGMENTOR LINER COOLANT FLOW PRESSURE IN A MIXED FLOW, VARIABLE CYCLE GAS TURBINE ENGINE

John R. Simmons, Montgomery, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 57,642, Jun. 8, 1987, Pat. No. 4,813,229, which is a continuation of Ser. No. 708,181, Mar. 4, 1985, abandoned. This application Sep. 9, 1988, Ser. No. 242,238

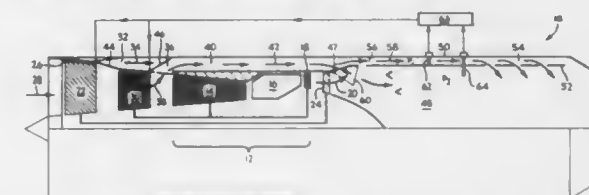
Int. Cl.<sup>5</sup> F02K 3/075, 3/10  
U.S. Cl. 60—226.3

16 Claims

1. A gas turbine engine comprising: a core engine for generating a gas flow; a front fan for pressurizing air;

an aft fan for further pressurizing air discharged from the front fan; a bypass duct including a first bypass duct inlet which directs a first bypass airflow around the aft fan into said bypass duct, a second bypass duct inlet which directs a second bypass airflow from the aft fan into said bypass duct;

an augmentor aft of said core engine; an exhaust duct surrounding said augmentor;



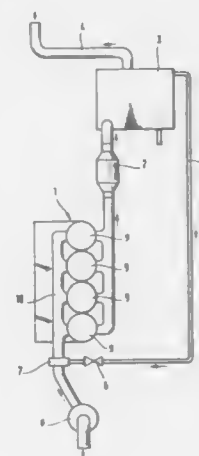
a cooling liner positioned within said exhaust duct so as to form a cooling plenum therebetween; means for receiving a portion of said bypass flow into said plenum; means for mixing said bypass flow with said gas flow; a first sensing means for sensing a control pressure in said exhaust duct; and a varying means for modulating the flow pressure in said bypass duct as a function of at least said control pressure.

#### 4,958,490 METHOD FOR REDUCING NITRIC OXIDE EMISSIONS IN EXHAUST GASES FROM DIESEL ENGINES

Harri J. Harjunpää, Outokumpu, Finland, assignor to Outokumpu Oy, Helsinki, Finland

Continuation of Ser. No. 129,451, Dec. 7, 1987, abandoned. This application Aug. 14, 1989, Ser. No. 393,125  
Int. Cl.<sup>5</sup> F02M 25/06  
U.S. Cl. 60—274

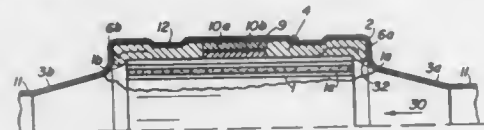
3 Claims



1. A method for reducing the nitric oxide emissions of exhaust gases from a diesel engine by additions of water into an engine combustion chamber of said diesel engine and by recirculating exhaust gases, comprising conducting exhaust gases created in the engine into a wet cleaner for washing and cooling the gases, returning washed and cooled gases from the wet cleaner to a suction system of the engine, and maintaining constant the relationship by volume between a total gas volume of the engine and the volume of recirculated exhaust gases.



4,958,491  
**ARRANGEMENT FOR HOLDING A CATALYST IN A HOUSING IN AN EXHAUST SYSTEM OF A LIQUID FUEL-OPERATED MOTOR**  
 Georg Wirth, Kirchheim/Teck, and Siegfried Wirth, Esslingen, both of Fed. Rep. of Germany, assignors to J. Eberspächer, Esslingen, Fed. Rep. of Germany  
 Filed Mar. 28, 1988, Ser. No. 174,121  
 Claims priority, application Fed. Rep. of Germany, Mar. 28, 1987, 3710299  
 Int. Cl.<sup>5</sup> F01N 3/28  
 U.S. Cl. 60—299 13 Claims



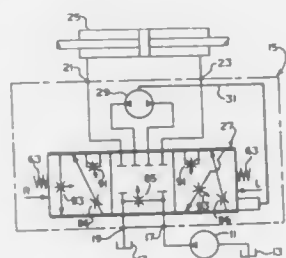
1. A device for holding a monolith catalyst in a housing, comprising a knitted mass of metallic material surrounding the catalyst, said knitted mass including areas of obliquely deformed impressions formed in said areas on each side of said mass and including a sealing strip portion between said deformed areas, said sealing strip portion being free of deformed impressions.

4,958,492  
**METHOD OF CONTROLLING CLUTCH OPERATION FOR A VEHICLE AND METHOD OF DETERMINING CLUTCH ENGAGEMENT COMPLETION**  
 Kazuya Maki, Aichi; Yoshikazu Ishikawa; Kouji Yamaguchi, both of Saitama, and Koji Sasajima, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Sep. 21, 1988, Ser. No. 247,410  
 Claims priority, application Japan, Sep. 21, 1987, 62-236812; Sep. 21, 1987, 62-236806; Sep. 21, 1987, 62-236811; Oct. 12, 1987, 62-256717; Oct. 14, 1987, 62-259224  
 Int. Cl.<sup>5</sup> F16H 61/46  
 U.S. Cl. 60—327 9 Claims



1. A method of controlling clutch operation, for a vehicle having a transmission which transmits engine power to wheels and clutch means which controls an actual power transmitted through said transmission comprising the steps of:  
 setting a reference capacity of said clutch means corresponding to a parameter representing vehicle speed and a parameter representing a driver's intention of acceleration; and controlling said actual power transmission through said transmission by adjusting the capacity of said clutch means so as to coincide with said reference capacity.

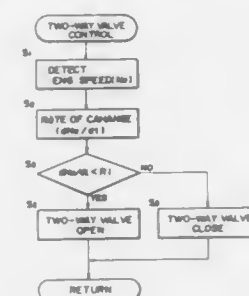
4,958,493  
**OPEN-CENTER STEERING CONTROL UNIT WITH FLOW AMPLIFICATION**  
 Herman P. Schutten, Bayside, Wis.; Dwight B. Stephenson, Savage, and Donald M. Haarstad, Chaska, both of Minn., assignors to Eaton Corporation, Cleveland, Ohio  
 Continuation-in-part of Ser. No. 254,067, Oct. 6, 1988, Pat. No. 4,862,690. This application Mar. 20, 1989, Ser. No. 325,721  
 Int. Cl.<sup>5</sup> F16D 31/02  
 U.S. Cl. 60—384 16 Claims



1. An open-center controller operable to control the flow of fluid from a source of fluid to a fluid pressure operated device; said controller being of the type including housing means defining a fluid inlet port for connection to the source of fluid, a return port for connection to a reservoir, and first and second control fluid ports for connection to the fluid pressure operated device; valve means disposed in said housing means and defining a neutral position and a first operating position; said housing means and said valve means cooperating to define a neutral fluid path communicating between said inlet port and said return port, and including a variable neutral orifice having its maximum flow area when said valve means is in said neutral position, and a decreasing flow area as said valve means is displaced from said neutral position toward said first operating position; said housing means and said valve means cooperating to define a main fluid path communicating between said inlet port and said first control fluid port, and between said second control fluid port and said return port when said valve means is in said first operating position; fluid actuated means for imparting follow-up movement to said valve means proportional to the volume of fluid flow through said fluid actuated means, said fluid actuated means being disposed in series flow relationship in said main fluid path between said inlet port and said first control fluid port; said main fluid path including a first, fixed flow control orifice disposed between said inlet port and said fluid actuated means, a second, variable flow control orifice disposed between said first flow control orifice and said fluid actuated means, and a third, variable flow control orifice disposed between said fluid actuated means and said first control fluid port, said second and third flow control orifices having minimum flow areas when said valve means is in said neutral position, and increasing flow areas as said valve means is displaced from said neutral position toward said first operating position; characterized by:

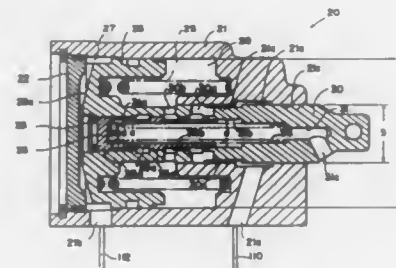
- said housing means and said valve means cooperating to define an amplification fluid path in parallel with said main fluid path, said amplification fluid path being in fluid communication with said main fluid path at a first location disposed between said fluid inlet port and said first, fixed flow control orifice, and at a second location disposed between said third, variable flow control orifice and said first control fluid port;
- said amplification fluid path including a variable amplification orifice having its minimum flow area when said valve means is in said neutral position, and an increasing flow area as said valve means is displaced from said neutral position toward said first operating position; and
- said variable amplification orifice begins to open at substantially the same time as said second and third, variable flow control orifices begin to open.

4,958,494  
**CONTROLLER FOR CONTINUOUSLY VARIABLE SPEED TRANSMISSION**  
 Kazuya Maki, Aichi, and Kouji Yamaguchi, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Sep. 30, 1988, Ser. No. 252,642  
 Claims priority, application Japan, Oct. 14, 1987, 62-259226  
 Int. Cl.<sup>5</sup> F16H 61/40  
 U.S. Cl. 60—468 24 Claims



8. A controller in a continuously variable transmission having a hydraulic pump and a hydraulic motor interconnected by a closed hydraulic circuit, said closed hydraulic circuit having a first hydraulic line connecting an input port of said hydraulic motor with an outlet port of said hydraulic pump and a second hydraulic line connecting an outlet port of said hydraulic motor with an input port of said hydraulic pump, and an engine for driving said hydraulic pump, comprising,  
 a bypass line communicating with said first hydraulic line and with said second hydraulic line, and  
 control means for selectively opening said bypass line when the reduction rate of the engine speed of said engine exceeds a given value.

4,958,495  
**HYDRAULIC DIFFERENTIAL CYLINDER**  
 Kouji Yamaguchi, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Nov. 4, 1988, Ser. No. 267,078  
 Claims priority, application Japan, Nov. 5, 1987, 62-169360[U]  
 Int. Cl.<sup>5</sup> F15B 13/042  
 U.S. Cl. 60—468 12 Claims

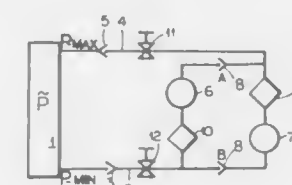


1. A hydraulic differential cylinder comprising a cylinder, a piston slidably fitted in a cylinder chamber defined in said cylinder, a piston rod with two ends, one end of the piston rod being coupled to said piston and the other end of the piston rod projecting out of said cylinder, and an inner valve disposed in said piston rod, said cylinder chamber being divided by said piston into a rod-side cylinder chamber in which said piston rod is disposed and a head-side cylinder chamber into which a piston head surface of said piston faces, said rod-side cylinder chamber being connected via said inner valve to a constant hydraulic pressure source for supplying working fluid of a

substantially constant pressure, said head-side cylinder chamber being connected to a control hydraulic pressure source for supplying working fluid of a controlled pressure which is lower than said constant pressure, said inner valve being actuated based on a hydraulic pressure in said head-side cylinder chamber,

wherein, said inner valve is opened to connect said constant hydraulic pressure source to said rod-side cylinder chamber when the controlled pressure supplied in said head-side cylinder chamber is lower than a critical hydraulic pressure, and said inner valve is closed to shut off the supply of fluid from said constant hydraulic pressure source to said rod-side cylinder chamber and to connect said rod-side cylinder chamber with a drain when the controlled pressure supplied in said head-side cylinder chamber is higher than said critical hydraulic pressure.

4,958,496  
**MULTI-BOTTLE, NO COMPRESSOR, MEAN PRESSURE CONTROL SYSTEM FOR A STIRLING ENGINE**  
 John A. Corey, Melrose, N.Y., assignor to Mechanical Technology Incorporated, Latham, N.Y.  
 Filed Jan. 4, 1990, Ser. No. 460,826  
 Int. Cl.<sup>5</sup> F02G 1/04  
 U.S. Cl. 60—521 4 Claims



1. A mean pressure control system for a Stirling engine, comprising:  
 at least one high pressure tank;  
 at least one low pressure tank;  
 said high pressure tank and said low pressure tank each including a check valve to prevent backflow of gas from one tank to the other during operation;  
 at least one inlet regulator for each said low pressure tank adapted to open when said engine has a maximum pressure level lower than that of the next higher pressure tank;  
 at least one outlet regulator for each said high pressure tank adapted to open when next lower pressure tank has a minimum pressure level higher than that of said engine;  
 a maximum pressure supply line including a first valve connecting said engine to said high pressure tank and to said inlet regulator;  
 a minimum pressure supply line including a second valve connecting said engine to said low pressure tank valve and to said outlet regulator so that when said first valve is open gas is transferred through said maximum pressure supply line from said engine to said high pressure tank until said engine pressure level drops below that of said high pressure tank thereby opening said inlet regulators so that gas is then transferred from said engine to said low pressure tank; and wherein said second valve is opened gas is supplied through said minimum pressure supply line from said low pressure tank to said engine until said engine pressure level is above that of said low pressure tank thereby opening said outlet regulator so that gas is transferred through said minimum pressure supply line from said high pressure tank to said engine.

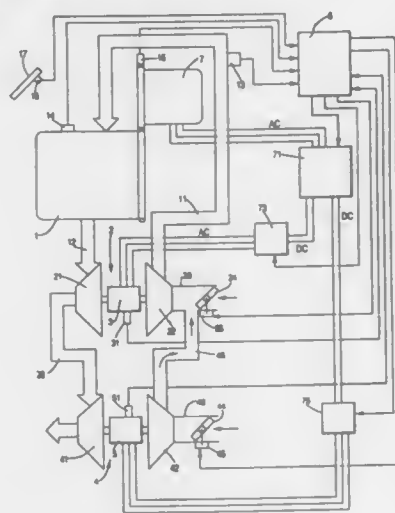
4,958,497

DRIVE SYSTEM FOR TURBOCHARGERS WITH  
ROTARY ELECTRIC MACHINES

Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Ceramics Research Institute Co., Ltd., Kanagawa, Japan  
Filed Jul. 17, 1989, Ser. No. 390,316  
Claims priority, application Japan, Jul. 18, 1988, 63-178722  
Int. Cl.<sup>5</sup> F02B 37/04

U.S. Cl. 60—608

6 Claims



1. A turbocharger drive system combined with an internal combustion engine, comprising:  
means for detecting the load on the internal combustion engine;  
means for detecting the rotational speed of the internal combustion engine;  
means for detecting the boost pressure of the internal combustion engine;  
means for storing the boost pressure corresponding to the detected load on the internal combustion engine;  
a plurality of turbochargers having series-connected exhaust turbines, respectively, and series-connected compressors, respectively;  
a plurality of rotary electric machines mounted respectively on rotatable shafts of said turbochargers;  
a single rotary electric machine drivable by an output shaft of the internal combustion engine;  
means for driving said single rotary electric machine as an electric generator;  
means for calculating the difference between the boost pressure corresponding to the detected load and the detected boost pressure;  
means for driving said plurality of rotary electric machines as electric motors successively from the rotary electric machine combined with the turbocharger closest to the internal combustion engine as said difference increases when said detected boost pressure is lower than said boost pressure corresponding to said detected load; and  
means for supplying electric power from said electric generator to said motors.

4,958,498

## CRYOGENIC STORAGE DEVICE

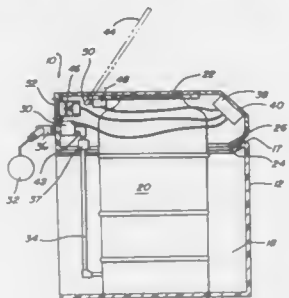
James L. Brothers, Warren, Mich., assignor to Custom Biogenic Systems, Warren, Mich.  
Filed Jan. 23, 1990, Ser. No. 468,851  
Int. Cl.<sup>5</sup> F25B 19/00

U.S. Cl. 62—51.1

5 Claims

1. A cryogenic storage device comprising:  
a housing having a lower part and an upper part, said lower

housing part having an interior chamber and an open upper end,  
a cryogenic storage tank insertable into said interior chamber of said lower housing part so that an upper end of said storage tank is adjacent said upper end of said lower housing part and adjacent said upper housing part said storage tank having a fill line,  
means for detachably securing said housing parts together so that said upper housing part overlies said storage tank,



valve means contained in said upper housing part, said valve means adapted to be fluidly connected between an external source of coolant and said storage tank fill line,  
circuit means for controlling actuation of said valve means, said circuit means being contained within said upper housing part so that, upon detachment of said valve means from said fill line, said upper housing part is detachable from said lower housing part and said storage tank.

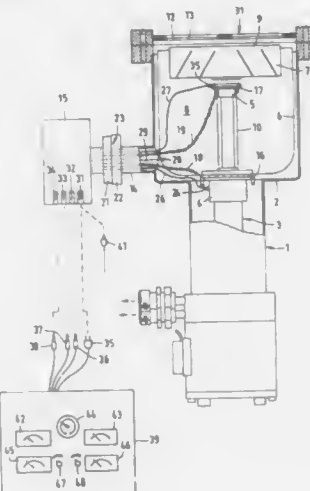
4,958,499

METHOD AND APPARATUS FOR CHECKING THE  
OPERATION OF A REFRIGERATOR-OPERATED  
CRYOGENIC PUMP

Hans-Ulrich Haefner, Cologne; Manfred Klotz, Kahl/Main, and Wilhelm Strasser, Bergisch Gladbach, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Fed. Rep. of Germany  
Filed Apr. 13, 1989, Ser. No. 337,670  
Claims priority, application European Pat. Off., Apr. 13, 1988, 88105857

Int. Cl.<sup>5</sup> B01D 8/00  
U.S. Cl. 62—55.5

11 Claims



1. A method for checking the operation of a refrigerator-operated cryogenic pump having a cold head with at least one refrigerating unit that is equipped with a pump surface, com-

prising the steps of: interrogating various data of the cryogenic pump under different operating conditions; and comparing the interrogated data to rated data, at least one of the interrogated data being a net refrigerating power of the refrigerating unit which is measured and compared to a rated value.

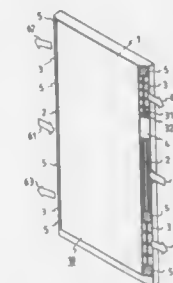
4,958,500

AIR CONDITIONER AND AIR CONDITIONING  
METHOD

Shigeaki Kuroda; Kensaku Oguni, both of Shimizu; Takao Sen-shu, Shizuoka; Hirokiyo Terada, Shizuoka; Makoto Nagai, Yaizu, and Masamichi Hanada, Shimizu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Apr. 20, 1989, Ser. No. 340,684  
Int. Cl.<sup>5</sup> F25D 17/06

U.S. Cl. 62—89

10 Claims



9. An air conditioning method, the method comprising the steps of:  
during a cooling operation, drawing air into an air conditioner means from a lower part on each side thereof, cooling the air, and discharging the cooled air forwardly slantwise from and upper part of the air conditioner means and on each side thereof; and  
during a heating operation, drawing the air into the air conditioner means from and upper part thereof and on each side thereof, heating the air, and discharging the heated air forwardly slantwise from the lower part of the air conditioner means and on each side thereof.

4,958,501

## REFRIGERANT CHARGING APPARATUS

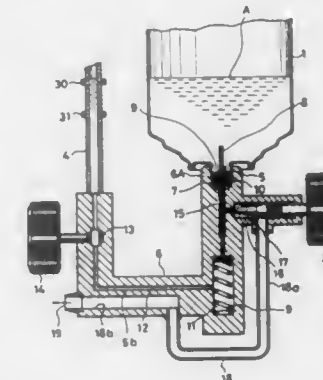
Genichi Nakano, Kaho; Sadao Higami, Ikeda, and Yasutaka Hashimoto, Yawata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd.; Fukuoka Teisan Co., Ltd. and Dengon Co., Ltd., all of Osaka, Japan  
Filed Jul. 11, 1989, Ser. No. 378,282  
Claims priority, application Japan, Jul. 11, 1988, 63-172150

Int. Cl.<sup>5</sup> F25B 45/00  
U.S. Cl. 62—125

8 Claims

1. A refrigerant charging apparatus comprising:  
a frame part for holding a refrigerant can including a refrigerant therein;  
a conduit which includes a first can-opening part and has at least first and second inner passages therethrough, said first can-opening part including a first can-opener for opening one end of said refrigerant can and making communication between said refrigerant can and said inner passages;  
a second can-opening part which has an inner passage therethrough and includes a second can-opener for opening the other end of said refrigerant can and making communication between said refrigerant can and said inner passage; and  
a level indicator, one end of which is communicated with one of said inner passages of the conduit and the other end of which is communicated with said inner passage of the

second can-opening part, for indicating a level of said refrigerant, wherein  
the first inner passage leads said refrigerant to an outlet from the conduit, and the second inner passage leads said refrigerant to said indicator, wherein



said first inner passage has an expansion part for expanding said refrigerant, said expansion part being disposed away from said second inner passage, while after the expansion part the first inner passage is disposed near said second inner passage.

4,958,502

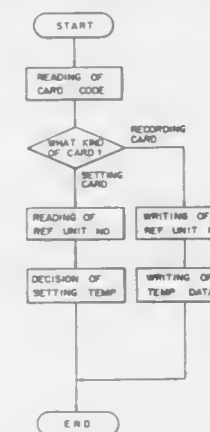
## CONTROLLER FOR A REFRIGERATION UNIT

Shinji Satoh; Kanji Isomichi; Hiroshi Ogawa; Toshio Yamashita, and Nobuhiro Funahashi, all of Aichi, Japan, assignors to Mitsubishi Jukogyo K.K., Tokyo, Japan  
Continuation of Ser. No. 293,814, Jan. 5, 1989, abandoned. This application Oct. 10, 1989, Ser. No. 421,299

Claims priority, application Japan, Jan. 5, 1988, 63-500  
Int. Cl.<sup>5</sup> F25B 49/00

U.S. Cl. 62—126

3 Claims



1. A controller of a refrigerating unit which controls the refrigerating unit so that a temperature detected by controlled temperature detection means is equal to a setting temperature, comprising means for storing the temperature detected by said detection means, a card data input-output unit for reading data from a card and writing data in the card, card data reading means for reading the card data from said input-output unit, means for discriminating whether the card is a setting card or a recording card on the basis of the card data read by said reading means, setting temperature decision means for deciding the setting temperature on the basis of the card data when said discriminating means discriminates that the card is the



setting card, and card data writing means for reading the data stored in said storing means and writing the data in the recording card through said card data input-output unit when said discriminating means discriminates that the card is the recording card.

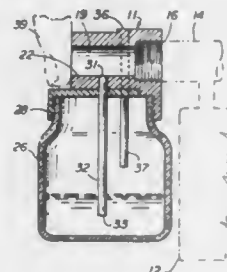
#### 4,958,503 GAS DETECTOR AND METHOD FOR REFRIGERATION SYSTEMS

Mark S. Thompson, 1923 Jefferson, Redwood City, Calif. 94061  
Filed Aug. 30, 1989, Ser. No. 400,473

Int. Cl.<sup>5</sup> G01F 13/00

U.S. Cl. 62—129

8 Claims



1. In a device for detecting the presence of gas in a system evacuated by a vacuum pump: a body having a main passageway with an inlet opening adapted for connection to an exhaust outlet of the vacuum pump and a discharge opening through which exhaust from the pump is normally discharged, said main passageway being of substantially the same cross-sectional dimension as the exhaust outlet of the vacuum pump, a reservoir of liquid in which bubbling can be observed, and a second passageway of substantially smaller cross-sectional dimension than the main passageway extending between the main passageway and a position in the liquid below the surface of the liquid, the discharge opening of the main passageway being adapted to be blocked manually by a person using the device to temporarily divert the exhaust from the vacuum pump through the second passageway and the liquid to produce bubbling in the liquid in the event that gas is present in the exhaust.

#### 4,958,504 AIR CONDITIONING APPARATUS FOR USE IN AUTOMOBILE

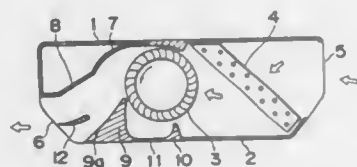
Toru Ichikawa, Kusatsu; Hideo Nishikata; Nobuo Kagoroku, both of Otsu, and Shotaro Ito, Shiga, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Filed Jun. 16, 1989, Ser. No. 368,997

Claims priority, application Japan, Jun. 17, 1988, 63-150726

Int. Cl.<sup>5</sup> B60H 1/32

U.S. Cl. 62—244

7 Claims



1. An air conditioning apparatus for an automobile, comprising:  
an upper casing and a lower casing, said casings being assembled together and having a downstream end portion with a discharge port therein and an upstream end portion with an intake port therein;  
said lower casing having: a horizontal cross-flow fan rotat-

ably mounted therein between the ends thereof and for rotation around a horizontal axis transversely of the direction from the intake port to the discharge port and for receiving air through a portion of the outer periphery thereof facing the upstream end portion and discharging the air, after it has passed through said fan, out of the other side of the fan,

a lower diffuser extending from said fan to the discharge port,  
a first stabilizer provided below said fan and on the side thereof toward said lower diffuser,  
a second stabilizer provided below said fan and on the side thereof toward said upstream end portion, said first and second stabilizers defining between them a recessed portion open toward said fan;  
said upper casing having a downstream guide having a curved surface having a center of the radius of curvature to the side of said fan and extending from said fan toward said discharge port, and  
an upper diffuser forming a continuation of said downstream guide and extending on an extension line of said downstream guide to said discharge port and, together with said lower diffuser, defining a discharge passage from said fan to said discharge port which is gradually divergent toward said discharge port.

#### 4,958,505 ICE COOLED BEVERAGE DISPENSER AND METHOD OF MAKING SAME

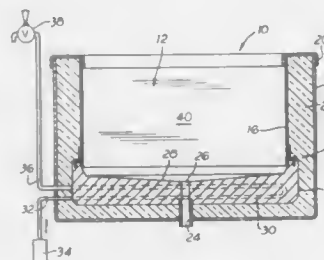
Craig A. Swanson, San Antonio, Tex., assignor to Schneider Metal Manufacturing Co., Mason City, Iowa

Filed Apr. 12, 1988, Ser. No. 180,513

Int. Cl.<sup>5</sup> B67D 5/62

U.S. Cl. 62—398

15 Claims



1. An ice cooled beverage dispenser comprising  
(a) a cast metal cold plate having an upper surface for support of ice thereon in thermal exchange relationship, and at least one beverage coil through the plate, said coil having an inlet connectible to a source of beverage and an outlet connectible to a dispensing valve;  
(b) a tubular liner mounted to said cold plate and extending upright therefrom, the interior surface of said liner and the upper surface of the cold plate jointly forming an ice bin atop of the cold plate;  
(c) an upright cold plate rim around the perimeter of the cold plate upper surface and around the outside of a bottom edge of the liner, said rim being spaced upward of said upper surface;  
(d) a generally L-shaped bracket having an upright flange fastened to the outside of the liner adjacent to said bottom edge, and an outboard flange extending outward from the liner; and  
(e) a plurality of spaced apart fasteners outside of said liner and through said outboard flange and into said upright rim, said fasteners securing said outboard flange to said rim, and thereby securing said liner bottom edge within said rim.

#### 4,958,506 CONTAINER FOR TRANSPORTING GRAFTS

Jacques R. J. Guilhem, 28 rue du Commandant Henry Vesco, 78 310 Sainte-Adresse, and Roger L. L. Wengler, 37 rue Mac Orlan, 76 600 Le Havre, both of France

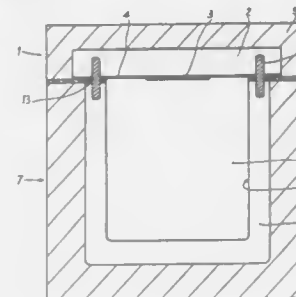
Filed Mar. 6, 1989, Ser. No. 319,294

Claims priority, application France, Mar. 7, 1988, 88 02845

Int. Cl.<sup>5</sup> F25D 3/08

U.S. Cl. 62—457.2

15 Claims



1. A container for transporting grafts at 4° C. comprising:  
a vessel;  
a lid movable between a vessel-closing position and a vessel-opening position;  
insulating means for thermally insulating the vessel and lid from an exterior medium;  
means for defining a peripheral volume of water in the vessel including a layer located in an upper part of the volume of water;  
a thermal source at a constant temperature below 4° C. and superjacent the layer of water; and  
a thermal exchange located in an upper part of the container for providing a thermal exchange between the thermal source and the layer of water to maintain the volume of water at substantially 4° C.

#### 4,958,507 PROCESS FOR MAKING SOCKS

Jacky Allaire, Vailly, and Wasil Kozlowskyj, Saint Andre Les Vergers, both of France, assignors to Devanlay, Troyes, France

Filed Nov. 21, 1988, Ser. No. 273,804

Claims priority, application France, Nov. 19, 1987, 87 16027

Int. Cl.<sup>5</sup> D04B 9/56

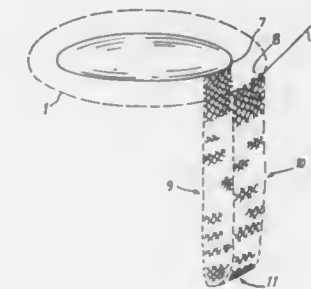
U.S. Cl. 66—19

2 Claims

1. A process for making a sock having two layers on a monocyliner circular knitting machine having a central transfer plate, a needle cylinder disposed outside of and around said transfer plate, said needle cylinder comprising a plurality of knitting needles, said process comprising the following successive steps:

(a) knitting a first course of yarn corresponding to the end of the first layer of said sock;  
(b) transferring said first course of yarn to said central transfer plate where said first course of yarn is maintained in standby;  
(c) using said knitting needles to knit additional courses of yarn while said first course continues to be maintained in standby by said central transfer plate, said additional courses representing, successively, the foot, heel and top portions of the inner layer of said sock and thereafter, the top, heel and foot portions of the outer layer of said sock, whereby during said knitting, said additional courses of yarn will hang down from said central transfer plate and said needle cylinder;  
(d) transferring said first course of yarn to said plurality of knitting needles and using said knitting needles to joint together said inner and outer layers, whereby the space

between said inner and outer layers of said sock is closed off at a point corresponding to the tip of said sock;  
(e) using said plurality of needles to knit additional courses of yarn, said additional courses of yarn providing a single cylindrical terminal layer extending said inner and outer



layers, said terminal layer corresponding to the tip of said sock; and  
(f) removing said piece of cylindrical knitted material from said monocyliner circular knitting machine and connecting together said terminal layer whereby the tip of said sock is closed.

#### 4,958,508 DOUBLE HOOK-BOLT MORTISE LOCK

Emily M. Y. Lin, No. 112, Sze Chuan Rd., Sec. 1, Panchiao City, Taipei Hsien, Taiwan

Filed Oct. 30, 1989, Ser. No. 428,982

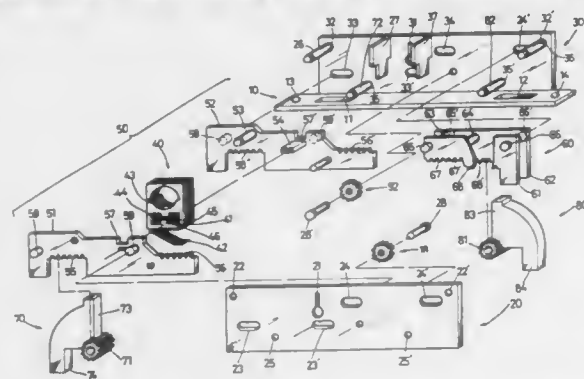
Int. Cl.<sup>5</sup> E05B 25/02

U.S. Cl. 70—352

7 Claims

1. A lock comprising a hollow casing having two spaced slots (11 and 12) therein; separate lock bolts (70 or 80) swingably mounted within the casing adjacent the two slots for movement between retracted positions located entirely within the casing and operating positions extending through the associated slots; a tumbler plate assembly (40) centrally located within said casing between said slots; said tumbler plate assembly comprising a number of individual plates slidably arranged within the casing for movement to a depressed position in response to insertion of a key through the plate assembly; a first bolt actuator (50) slidably arranged within the casing for rectilinear movement transversely across the motion path of the tumbler plate assembly; said first actuator having a notch means (57) therein adapted to engage a key inserted into the

lock casing, whereby key rotation is then effective to move said first actuator; said first actuator having a drive connection (55,71) with one of the lock bolts; a second bolt actuator (60) slidably arranged within the casing for rectilinear movement transverse to the motion path of the tumbler plate assembly; said second actuator having a second drive connection (68,81)



with the other lock bolt; rotary pinion gear means (91,92) within said casing; first rock means (56) carried on said first actuator in meshed engagement with said pinion gear means; and second rock means (67) carried on said second actuator in meshed engagement with said pinion gear means, whereby said first actuator serves as a drive means for the second actuator.

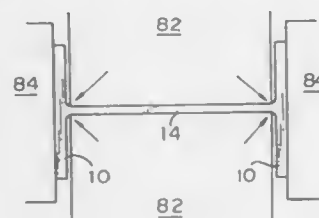
#### 4,958,509 ROLLING METHOD FOR PARALLEL-FLANGE STEEL SHAPES

Yoshiaki Kusaba, Kobe; Hiroyuki Matoba, and Tsuneo Yamada, both of Ibaragi, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Sep. 19, 1989, Ser. No. 409,303  
Claims priority, application Japan, Sep. 20, 1988, 63-235388  
Int. Cl.<sup>3</sup> B21B 1/08

U.S. Cl. 72-225

19 Claims



1. A rolling method for parallel-flange steel shapes comprising:

rough rolling a rolling material in a breakdown mill so as to form a web and two flanges connected to ends of the web; performing intermediate rolling so as to reduce the flanges to substantially their final dimensions; and performing finishing rolling in universal finishing mill so as to reduce web height between outer surfaces of the flanges by rolling the outer surfaces of the flanges with vertical rolls without inner surfaces of the flanges contacting lateral surfaces of horizontal rolls of the universal finishing mill.

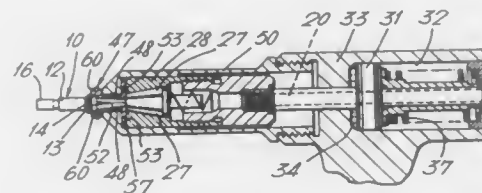
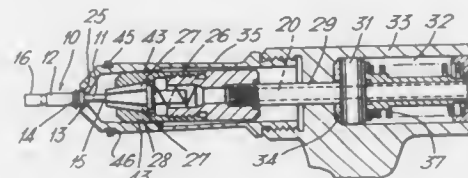
#### 4,958,510 FASTENER INSTALLATION APPARATUS

Keith Denham, Welwyn Garden City; Donald S. Savage, St. Albans, and John A. Shortland, Welwyn Garden City, all of England, assignors to Ardel Systems Limited, Welwyn Garden City, England

Filed Jul. 26, 1989, Ser. No. 385,064  
Claims priority, application United Kingdom, Jul. 29, 1988, 8818078

Int. Cl.<sup>3</sup> B21J 15/20  
U.S. Cl. 72-391.4

14 Claims



1. Fastener installation apparatus for installing a fastener of the type comprising a first member, a second member, and a third member, the fastener being installed by the application of force to the second member relative to the first member, the reaction to the force on the second member being applied to the first member through the third member, the third member being free from the first and second members on completion of the installation of the fastener;

which fastener installation apparatus comprises:

a first part for engaging the third member to transmit reaction force thereby to the first member, a second part for engaging the second member thereby to apply force thereto relative to the first member, and resilient temporary retaining means having resilience in a direction toward the free third member for resiliently gripping the free third member and actuated in response to a fastener installation operation by the fastener installation apparatus for temporarily retaining the free third member on the installation apparatus on completion of installation of the fastener due to the resilience of said temporary retaining means, whereby the free third member is not substantially deformed.

#### 4,958,511 METHOD AND APPARATUS FOR WEAR TESTING ANODIZED SURFACES

Leon Marcus, Tonawanda, N.Y., assignor to General Motors Corporation, Detroit, Mich.

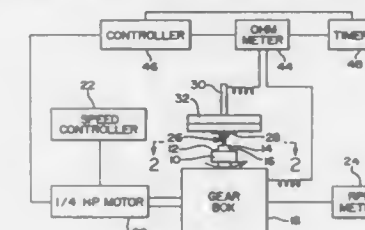
Filed Dec. 21, 1989, Ser. No. 454,474  
Int. Cl.<sup>3</sup> G01N 3/56

U.S. Cl. 73-7

10 Claims

6. A wear test apparatus for testing the anodized surface coating on an electrically conductive substrate comprising: means for rotating the substrate about an axis, a stylus for contacting the anodized surface coating at a point spaced from the axis of rotation, means for applying force to the anodized surface coating

through the stylus so that during part rotation the stylus wears a path through the surface coating, electrical means for testing continuity between the stylus



and the conductive substrate to determine when the stylus contacts the substrate, and means for measuring the time required by the stylus to wear through the anodized surface coating.

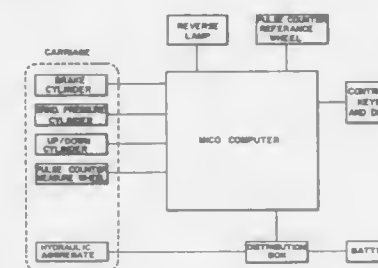
#### 4,958,512 METHOD AND A DEVICE FOR USE IN DETERMINING CONDITIONS OF RUNWAY FRICTION AND BRAKING

Oddvard Johnsen, Elkesvingen 8, N-3400 Lier, Norway

Filed Apr. 4, 1989, Ser. No. 333,425  
Claims priority, application Norway, Apr. 7, 1988, 881513  
Int. Cl.<sup>3</sup> G01N 19/02

U.S. Cl. 73-9

1 Claim



1. A method of determining maximum runway friction from the sense of change of the coefficient of friction under actual conditions, comprising measurement and recording of forces acting on a braked wheel rolling on a runway, characterized in that a vertical force, and a horizontal force are exerted on a rolling wheel, said horizontal force being provided by wheel braking, that said forces are recorded directly, the friction coefficient between said rolling wheel and the runway and a sense of change thereof are determined solely on the basis of the recorded force values, and that the braking force is continuously changed to find a peak of a curve defined by friction coefficient versus slip values, which corresponds to the maximum coefficient of friction between the runway and said wheel under actual conditions.

#### 4,958,513 GAS DETECTING DEVICE

Sasumu Yasunaga, Osaka, and Kazuo Okino, Hyogo, both of Japan, assignors to Figaro Engineering, Inc., Osaka, Japan

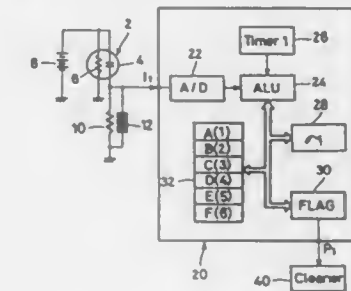
Filed Feb. 2, 1989, Ser. No. 305,172  
Claims priority, application Japan, Feb. 4, 1988, 63-25302  
Int. Cl.<sup>3</sup> G01N 27/00

U.S. Cl. 73-23.2

4 Claims

1. A gas detecting device adapted to detect a gas from relative variations in the output of a gas sensor, the device being characterized in that it comprises: means for detecting a sensor output remaining substantially constant with time, means for sampling the sensor output at about the time said means produces a signal that the sensor output is substan-

tially constant and storing the sensor output as a reference output, and



means for detecting the gas from variations in the sensor output relative to the reference output.

#### 4,958,514 GAS SENSING ELEMENT

Akio Takami; Toshitaka Matsura, and Keizo Furusaki, all of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Continuation of Ser. No. 83,018, Aug. 3, 1987, abandoned, which is a continuation of Ser. No. 786,576, Oct. 4, 1985, abandoned. This application Nov. 17, 1988, Ser. No. 273,621

Claims priority, application Japan, Oct. 13, 1984, 59-215044  
Int. Cl.<sup>3</sup> G01N 27/04

U.S. Cl. 73-25.03

3 Claims



1. A gas sensing element comprising: a ceramic substrate having the heater incorporated therein, an electrode layer formed on said ceramic substrate which provides an electrode disposed on the surface of the ceramic substrates; a first functional layer having a high gas sensitivity that overlies said ceramic substrate and said electrode layer and cover said electrode and which contains a transition metal oxide of one or more members selected from the group consisting of TiO<sub>2</sub>, AnO, SnO<sub>2</sub>, Nb<sub>2</sub>O<sub>5</sub>, and CeO<sub>2</sub> as a main component; and a second functional layer that has a high durability and that overlies said first functional layer and which contains 1 to 30 wt% of ZrO<sub>2</sub> containing no less than 5 mol% of Y<sub>2</sub>O<sub>3</sub> as an anti-sintering agent and has a transition metal oxide of one or more members selected from the group consisting of TiO<sub>2</sub>, ZnO, SnO<sub>2</sub>, Nb<sub>2</sub>O<sub>5</sub>, and CeO<sub>2</sub> as a main component, such that said gas sensing element is capable of operation at a temperature of 350° C. and deterioration of the sensing characteristics of the functional layers due to re-sintering is prevented without causing an increase in bulk resistivity.



4,958,515

## SPARK PLUG WITH A MEASUREMENT DEVICE

Gerhard Brüggen, Stuttgart; Winfried Keiper, Korntal-Münchingen, and Leo Steinke, Waiblingen-Hegnach, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE87/00348, § 371 Date Jan. 25, 1989, § 102(e) Date Jan. 25, 1989, PCT Pub. No. WO88/02108, PCT Pub. Date Mar. 24, 1988

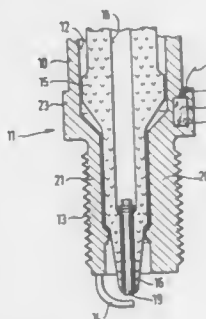
PCT Filed Aug. 8, 1987, Ser. No. 314,580

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1986, 3631243

Int. Cl.<sup>5</sup> G01M 15/00

U.S. Cl. 73-116

7 Claims



1. A spark plug for use in an internal combustion engine having a motor block and mechanically movable parts, said spark plug comprising spark-producing means; a housing for supporting said spark-producing means and having a wall; means for mounting said housing in an engine block of an internal combustion engine so that movements of the mechanically movable parts of the internal combustion engine are transmitted to the engine block and from the latter are transmitted to said housing; and a movement sensor located in said wall of said housing for sensing movements of said housing which have been transmitted to the latter from the mechanically movable parts of the internal combustion engine through the engine block.

4,958,516

## METHOD AND MEANS FOR DETERMINING AIR MASS IN A CRANKCASE SCAVENGED TWO-STROKE ENGINE

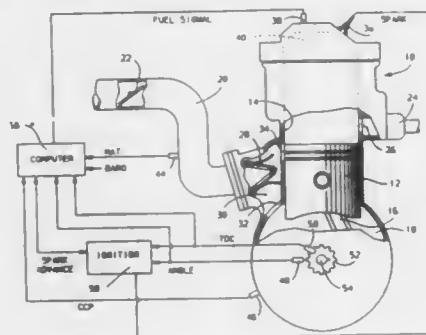
Steven D. Stiles, Clarkston; Paul E. Reinke, Rochester, and Aparicio J. Gomez, Birmingham, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 377,383, Jul. 10, 1989, Pat. No. 4,920,790. This application Feb. 8, 1990, Ser. No. 478,124

Int. Cl.<sup>5</sup> G01M 15/00

U.S. Cl. 73-118.2

5 Claims



1. In a crankcase scavenged two-stroke engine characterized by an operating cycle including portions during which air is

inducted into a crankcase chamber of the engine, is thereafter compressed within the crankcase chamber while trapped in the crankcase chamber as the crankcase chamber undergoes shrinking volume, and is then transferred to the combustion chamber; a method for determining the mass of air transferred to the combustion chamber comprising the steps of: determining a portion of the operating cycle at which inducted air is trapped in the crankcase; determining the pressure P of the air mass M within the crankcase chamber during the determined portion of the operating cycle; determining the volume V of the crankcase chamber during the determined portion of the operating cycle; determining the temperature T of the air mass within the crankcase chamber during the determined portion of the operating cycle; and deriving an indication of the mass of air transferred to the combustion chamber in accordance with a predetermined function of derived pressure P, volume V and temperature T.

4,958,517

## APPARATUS FOR MEASURING WEIGHT, TORQUE AND SIDE FORCE ON A DRILL BIT

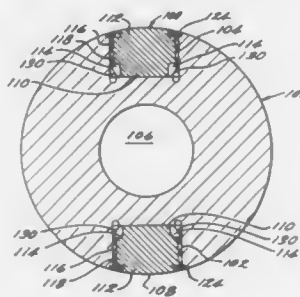
Robert Maron, Cromwell, Conn., assignor to Teleco Oilfield Services Inc., Meriden, Conn.

Filed Aug. 7, 1989, Ser. No. 390,155

Int. Cl.<sup>5</sup> E21B 47/00

U.S. Cl. 73-151

24 Claims



1. Apparatus for measuring at least one load applied to a drill bit during the drilling of a well, including: drillstring sub means adapted to be connected in a drillstring above the drill bit; a pair of diametrically opposite openings extending only partially through the wall of said sub from an outer surface of said sub means; plug means in each of said openings, said plug means cooperating with said openings to define an atmospheric chamber means in each of said openings; weight sensor means in each of said opening for generating an output in response to at least the parameter of weight on the drill bit; and said weight sensor means including first weight sensor means positioned at a first predetermined position and in a first predetermined orientation in each opening to sense the effects of weight; and second weight sensor means in each opening positioned at a second predetermined position relative to the first sensor means and in a second orientation relative to the orientation of said first sensor means to cancel the effect of pressure differential across said drillstring sub.

4,958,518

## SENSOR FOR DETERMINING LIQUID LEVEL IN A CONTAINER

Josef Duenst, Siegfried Willner, both of Lichtenfels, and Ralph Schroepel, Nuenmarkt, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

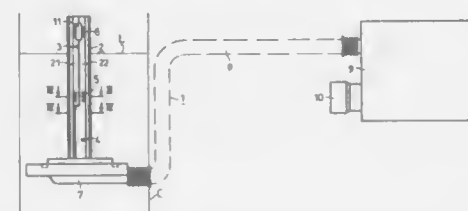
Filed Oct. 18, 1988, Ser. No. 259,518

Claims priority, application Fed. Rep. of Germany, Oct. 19, 1987, 3735666; Jul. 21, 1988, 3825047

Int. Cl.<sup>5</sup> G01F 23/28

U.S. Cl. 73-290 V

10 Claims



1. Sensor means for determining liquid level in a container, comprising: a tubular housing in said container and having a fastening flange, an interior of said tubular housing defining an interior space in communication with a surrounding space via upper and lower compensating openings; means defining a measured distance which transversely penetrates said interior space of said tubular housing, said means including a pair of ultrasound transducers arranged in an interior wall of said housing; drive and evaluation electronics connected to said means defining a measuring distance via electrical leads that extend in said housing wall to said ultrasound transducers; and said tubular housing being composed of two half shells of plastic joined to one another and defining said interior space, each of said half shells surrounds one of said ultrasound transducers of said measured distance means including said electrical leads, said half shells having wall parts engaging into one another in a region below said measured distance means to form a narrow channel proceeding in an axial direction of said tubular housing, said narrow channel connecting said interior space of said housing to said lower compensating opening.

4,958,519

## VELOCIMETER

Paul W. Whaley, Lincoln, Nebr., assignor to The Board of Regents of the University of Nebraska, Lincoln, Nebr.

Continuation-in-part of Ser. No. 342,098, Jan. 25, 1982, abandoned. This application Mar. 31, 1986, Ser. No. 845,490

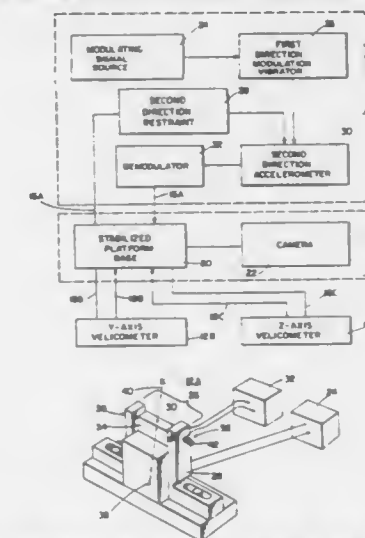
Int. Cl.<sup>5</sup> G01C 19/56

U.S. Cl. 73-505

16 Claims

1. A method of obtaining a signal representing motion of an object in a curved path about an axis comprising the steps of: periodically moving a point on a sensing means mounted to the object for movement therewith along a predetermined path different from said curved path for a number of cycles of periodic motion, wherein at least a portion of the predetermined path is in a first direction at an angle to said curved path, whereby forces of reaction to Coriolis acceleration are exerted on said sensing means; sensing the forces created by Coriolis acceleration of a point on said sensing means that moves along the predetermined path and converting the sensed forces of reaction to an electrical signal; wherein: (a) said sensing of the forces created by Coriolis acceleration is in a second direction at an angle to said first direction and to the curved path; and (b) said sensing and converting to an electrical signal occurs while said sensing means is prevented from being

moved with respect to said object by forces by Coriolis acceleration and of angular acceleration at an angle to said predetermined path by a distance that is more than two percent of the length of the movement of the sensing means along the predetermined path during one cycle of



the movement of the sensing means along the predetermined path and the forces of reaction of said Coriolis and angular acceleration are passed to said object from said sensing means; and using said electrical signal as a measure of the angular velocity of said object about said axis.

4,958,520

## DIGITAL PIEZORESISTIVE PRESSURE TRANSDUCER

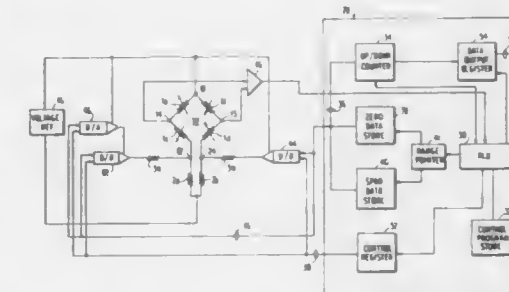
Craig S. Trommler, Romoland, and Mark D. Finefrock, Riverside, both of Calif., assignors to Bourns Instruments, Inc., Riverside, Calif.

Filed Nov. 1, 1989, Ser. No. 431,366

Int. Cl.<sup>5</sup> G01L 7/08, 9/06

U.S. Cl. 73-727

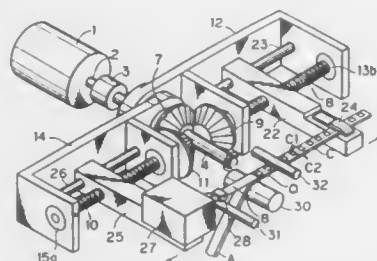
8 Claims



3. A piezoresistive transducer comprising in combination, a bridge circuit with a pressure responsive piezoresistive element in at least one arm of said bridge, said bridge having a pair of output terminals; a comparator having an input and an output; means coupling said bridge output terminals to said comparator input; said comparator output having one characteristic state when the potential of one bridge terminal is greater than the other and another characteristic state when it is less than that of the other; means responsive to said comparator output to generate a series of digital values; feedback means for coupling said digital values to said

bridge to drive said bridge to balance, said feedback means including a feedback digital to analog converter;  
said feedback converter having a reference potential input the magnitude of which determines the magnitude of incremental change in analog output for an incremental change in digital input;  
means to store a set of digital values for establishing a zero point for said transducer;  
means to store a set of digital values for establishing a span for said transducer;  
means including a digital to analog converter to couple zero point values to said bridge to establish a potential of one of said bridge output terminals relative to the potential of the other;  
means including a digital to analog converter to couple said span values to said feedback converter reference potential input to establish an incremental change in analog output of said feedback converter for an incremental change in digital input.

**4,958,521**  
**METHOD AND APPARATUS FOR MEASURING A FORCE REQUIRED FOR STRIPPING ADHERED TAPE**  
Kazuhiko Morimoto, and Tsuneo Taki, both of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Japan  
Filed Dec. 4, 1989, Ser. No. 445,751  
Claims priority, application Japan, Dec. 5, 1988, 63-307641  
Int. Cl.<sup>3</sup> G01N 3/08  
U.S. Cl. 73-827 26 Claims

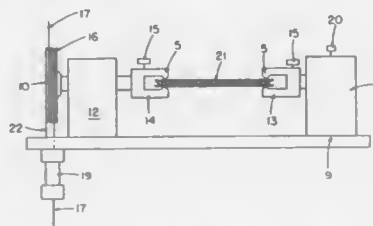


1. A method of measuring a force required for stripping a second tape adhered to a first tape from said first tape, comprising the steps of:  
stripping an initial portion of said second tape from a corresponding initial portion of said first tape;  
bending said second tape portion to form a prescribed stripping angle with respect to said initial portion of said second tape;  
moving said portion of said first tape released from said second tape and said portion of said second tape stripped from said first tape in opposite directions from each other at the same speed along loci of linear movement respectively while maintaining said stripping angle substantially constant; and  
measuring a tensile force acting on said second tape during said movement thereby to determine the force required for stripping said second tape from said first tape.

**4,958,522**  
**SHEAR STIFFNESS TESTER**  
Peter R. McKinlay, South Melbourne, Australia, assignor to Amcor Limited, South Melbourne, Australia  
Filed Feb. 6, 1989, Ser. No. 307,411  
Claims priority, application Australia, Feb. 10, 1988, P16679  
Int. Cl.<sup>3</sup> G01N 3/22  
U.S. Cl. 73-847 4 Claims

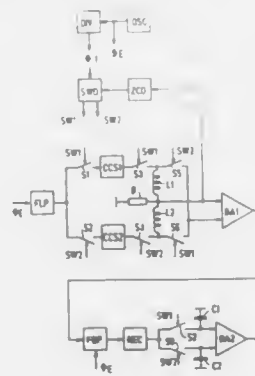
1. A method of determining the shear stiffness of corrugated paperboard as an aid in processing corrugated paperboard, consisting of subjecting a sample of corrugated paperboard to a twisting force and a) measuring the initial angle of twist for

a given load; or b) measuring the change in the angle of twist over time under a constant load; or c) measuring the force required to achieve an initial angle of twist; or d) measuring the change over time in the force required to maintain a given angle of twist and wherein a sample of said corrugated paper-



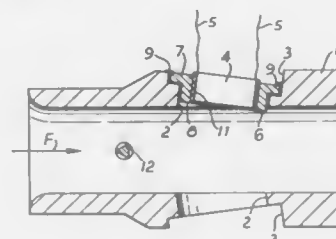
board is placed between two jaws and the Shear stiffness (S) is determined according to the equation  $M = K\theta$  wherein M is the twisting torque,  $\theta$  is the angle of jaw rotation and K is the proportionality constant  $K = 4a^3/3L$  wherein a = width of the sample and L is the distance between said jaws.

**4,958,523**  
**APPARATUS FOR MEASURING THE FLOW RATE OF ELECTRICALLY CONDUCTIVE LIQUIDS**  
Joachim Knaak, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Interatom GmbH, Bergisch Gladbach, Fed. Rep. of Germany  
Filed Jun. 9, 1989, Ser. No. 364,813  
Claims priority, application Fed. Rep. of Germany, Jun. 21, 1988, 3820936  
Int. Cl.<sup>3</sup> G01F 1/58; G21C 17/032  
U.S. Cl. 73-861.11 8 Claims



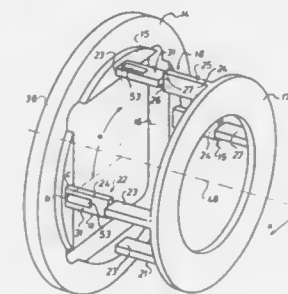
1. Apparatus for measuring the flow rate of electrically conductive liquids, comprising two coils disposed in succession as seen in the flow direction of a liquid, means for switching said coils in alternation as a primary and a secondary coil, means for exciting one of said coils with an alternating current as the primary coil, and means for measuring voltage induced by the excitation in the other of said coils as the secondary coil.

**4,958,524**  
**FLOW METER**  
Timothy Bonner, 8 Thunwood, Sherfield Park, Chichester, Basingstoke, Hampshire, and John R. C. Carthays, 11 Little Basing, Old Basing, Nr. Basingstoke, Hampshire, both of England  
Filed May 5, 1989, Ser. No. 348,692  
Claims priority, application United Kingdom, May 10, 1988, 3810987  
Int. Cl.<sup>3</sup> G01F 1/32, 1/66  
U.S. Cl. 73-861.18 7 Claims



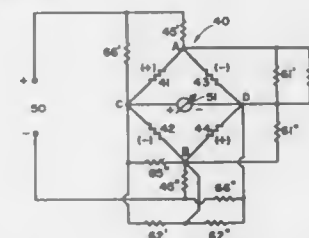
1. A flow meter as defined herein comprising a metallic conduit through which, in use, fluid flow takes place, and ultrasonic transducer means mounted in a wall of the conduit and operable to sense the presence of fluid in the conduit, the transducer means being mounted in the conduit wall in metallic mounting means which are spaced from said wall but sealed thereto by welding.

**4,958,525**  
**WEB TENSION MEASURING ASSEMBLY**  
Horst-Walter Hamer, and Gerda E. Hamer, both of Würzburg, Fed. Rep. of Germany, assignors to Koenig & Bauer Aktiengesellschaft, Würzburg, Fed. Rep. of Germany  
Filed Jun. 19, 1989, Ser. No. 367,747  
Claims priority, application Fed. Rep. of Germany, Jul. 2, 1988, 3822486  
Int. Cl.<sup>3</sup> G01L 5/10  
U.S. Cl. 073-862.48 9 Claims



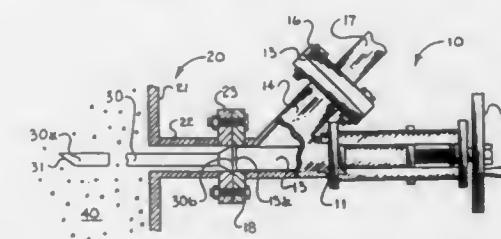
1. A web tension measuring assembly useable to measure tension in a web on a cylinder of a rotary printing machine, said web tension measuring assembly comprising:  
means for supporting at least a first end of said cylinder in a measuring cage;  
a flanged ring and a retainer ring included in said measuring cage; and  
a plurality of flexional beams connecting said flanged ring and said retainer ring, each of said flexional beams including first and second parallelepipeds, each first parallelepiped being arranged crossed to each second parallelepiped in each flexional beam.

**4,958,526**  
**FORCE MEASURING DEVICE WITH ZERO ADJUSTMENT**  
Rolf P. Haggstrom, East Walpole, Mass., assignor to Flintab AB, Västerås, Sweden  
Filed Oct. 10, 1989, Ser. No. 419,391  
Int. Cl.<sup>3</sup> G01L 1/22, 25/00  
U.S. Cl. 73-862.67 3 Claims



3. A method for zero adjustment of a strain gage bridge in a load cell arrangement having four strain gage means and a pair of temperature compensation resistors connected between each end of a first, diagonal in said bridge and a power supply for said bridge, a second diagonal of said strain gage bridge providing an output signal, the method comprising the steps of:  
(a) measuring the output signal at zero mechanical load on said load cell arrangement at two different ambient temperatures,  
(b) determining a value for a first pair of substantially equal resistors to be connected as shunts across a pair of opposing arms of the strain gage bridge to make the temperature variation of the signal at zero load independent of temperature, and connecting such a first pair of resistors in the circuit;  
(c) determining a value for a second pair of substantially equal resistors to be connected between opposite terminals of the power supply and opposite ends of the second diagonal of the strain gage bridge to make the output signal zero when there is no mechanical load on the load cell, and connecting the second pair of resistors in the circuit.

**4,958,527**  
**SAMPLE VALVE ASSEMBLY FOR ON-LINE SAMPLING OF GRANULAR MATERIALS**  
Mark C. Covillion, Mt. Clemens, Mich., assignor to The Dow Chemical Company, Midland, Mich.  
Filed Jun. 14, 1989, Ser. No. 366,815  
Int. Cl.<sup>3</sup> G01N 1/08, 1/14  
U.S. Cl. 73-863.86 10 Claims

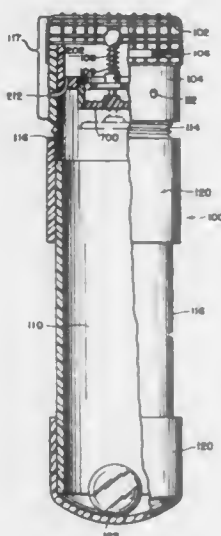


1. A horizontal sample valve assembly for removing a sample from a bed of solid granular material contained in a vessel comprising:  
a. a sampling passage in said vessel having means for mounting thereon a sampling valve;  
b. the sampling valve mounted to said sampling passage, said sampling valve having a horizontally disposed body which houses therein, a horizontally disposed valve shaft which is in operable attachment to a drive means at its



outward end, with its inward end operable for sealing the valve shaft against a valve seat when the valve is in the closed position against the sampling passage;  
 said valve assembly also having an effluent conduit member branched from the valve body and which communicates with the interior of the valve body near the valve seat when the valve shaft is in the open position;  
 c. an extractor tube of a predetermined length to having an end at the valve seat of the sampling valve shaft, and a distal end positioned within the bed of solid granular material; and  
 d. a means for extracting a sample of the solid granular material through said extractor tube, said effluent conduit member, and said sampling valve.

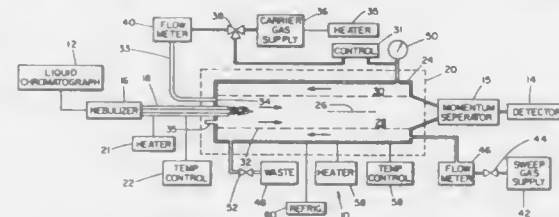
**4,958,528**  
**RUNOFF WATER TRAP**  
 John M. Garrison, 3133 Waits, Ft. Worth, Tex. 76109  
 Continuation of Ser. No. 169,220, Mar. 16, 1988, abandoned.  
 This application Mar. 16, 1989, Ser. No. 325,050  
 Int. Cl. 5 G01N 1/12  
 U.S. Cl. 73-864.63



1. A liquid collection device, comprising:  
 first means defining a cavity for storing a quantity of liquid, said first means formed with an opening at one end through which said liquid is received, and a closed second end, said one end including screw thread means formed thereon for allowing said first means to be connected to an disconnected from a second structure;  
 second means, forming said second structure and removably coupled to said screw thread means at said one end of said first means, for automatically blocking said opening of said first means when said first means stores more than a predetermined quantity of said liquid, said second means consisting of at least one mechanical structure, and at least one of said mechanical structures is responsive to a level of liquid, said level causing said opening to be blocked; and  
 third means, adapted to be disposed to receive a liquid stream, for automatically allowing liquid flow into said first means only after preventing an initial amount of said liquid stream from entering said first means, said third means consisting of at least one mechanical structure.

**4,958,529**  
**INTERFACE FOR COUPLING LIQUID CHROMATOGRAPHY TO SOLID OR GAS PHASE DETECTORS**  
 Marvin L. Vestal, Houston, Tex., assignor to Vestec Corporation, Houston, Tex.

Filed Nov. 22, 1989, Ser. No. 440,230  
 The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.  
 Int. Cl. 5 G01N 1/00  
 U.S. Cl. 73-864.81



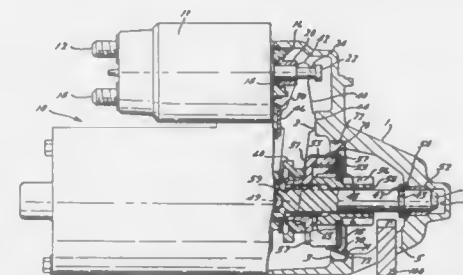
1. An improved interface for receiving effluent including sample solute of interest and solvent from a liquid chromatographic device, and for outputting sample particles of interest to a detector for analysis of a sample, the interface comprising:  
 a gas diffusion device including a cell housing having an aerosol input port and an aerosol discharge port;  
 spraying means for passing the chromatographic effluent through the aerosol input port and for discharging the chromatographic effluent as an aerosol into the cell housing;  
 a gas diffusion membrane within the cell housing separating the cell housing into an aerosol flow chamber and an adjoining sweep gas flow chamber, the aerosol flow chamber being in fluid communication with both the aerosol input port and the aerosol discharge port for receiving and transmitting the aerosol to the detector, the sweep gas flow chamber having a sweep gas input port and a sweep gas discharge port for passing sweep gas through the sweep gas chamber in a direction counter to the flow of aerosol through the aerosol flow chamber; and  
 sweep gas supply means for passing a sweep gas through the sweep gas flow chamber while the aerosol is passed through the aerosol flow chamber, such that solvent vapor released from the aerosol discharged by the spraying means is diffused from the aerosol flow chamber through the membrane and to the sweep gas flow chamber, and is removed from the gas diffusion device by the sweep gas.

**4,958,530**  
**MOISTURE SEAL FOR A TRANSLATABLE PINION GEAR ASSEMBLY IN A STARTER MOTOR**  
 James E. Jaseck, Dearborn, and Eric A. Feresbetian, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 31, 1989, Ser. No. 401,724  
 Int. Cl. 5 F02N 15/06  
 U.S. Cl. 74-7 A

1. A starter motor for an engine having a driven gear comprising:  
 an electric motor;  
 an output shaft mounted for rotation about its axis by said electric motor;  
 a pinion gear, having a first portion containing a plurality of gear teeth for engaging said driven gear and a shank portion adjacent thereto, mounted on said output shaft for slidable movement along said output shaft between a first position in which the gear teeth are out of engagement with said driven gear and a second position in which the gear teeth are engaged with said driven gear;  
 an overriding clutch mounted on said output shaft for rota-

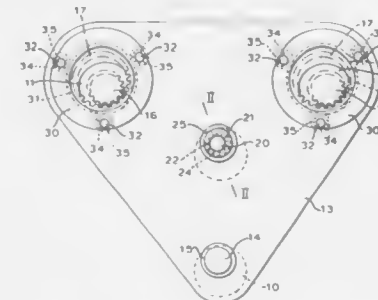
tion therewith and engaged with said pinion gear for slidable movement therewith to provide a frictional one way rotational engagement with said pinion gear;  
 a housing for said motor containing an internal portion surround the overriding clutch and defining a space between said housing and said clutch to allow movement of said clutch with said pinion gear both along, and in rotation with, said output shaft;



an annular shaped member retained on said internal portion of said housing having an annular lip portion extending to said space defined between said housing and said clutch; and  
 cylindrical sealing member mounted on said clutch having an outwardly extending flange for contacting said annular lip portion when said pinion gear is in said first position and for breaking contact with said annular lip portion when said pinion gear is moved from its first position.

**4,958,531**  
**MECHANISM FOR TRANSMITTING ROTATIONAL MOTION FROM ONE SHAFT TO ANOTHER**  
 Bryan N. V. Parsons, Stoney Stanton, England, assignor to Jaguar Cars Limited, England  
 Filed Jul. 14, 1989, Ser. No. 379,908  
 Claims priority, application United Kingdom, Jul. 20, 1988, 8817218

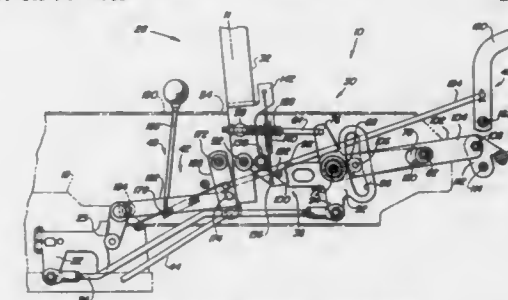
Int. Cl. 5 F16H 37/06, 21/12, 1/32  
 U.S. Cl. 74-63



1. A mechanism for transmitting rotational motion from one shaft to another comprising a link which is constrained to move in an orbital path, an input shaft being connected to the link so that rotation of the input shaft will cause the link to move in its orbital path and a second shaft parallel to said input shaft, said second shaft being connected to the link so that orbital motion of the link will cause the second shaft to rotate; at least one of said shafts being connected to the link by a mounting which is capable of movement in the plane of the link, said mounting making frictional engagement with the link so that when a lateral stress above a predetermined value is applied between the shaft and link, the mounting will move laterally to relieve the stress, said predetermined value being above the lateral stresses experienced during normal operation of the mechanism.

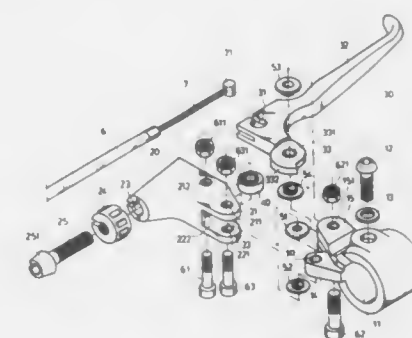
**4,958,532**  
**DOUBLE ACTION BRAKE HANDLE STRUCTURE**  
 A Ping Lin, 4-5, Shih Pai Village, Chang Hwa City, Chang Hwa County, Taiwan  
 Filed Apr. 27, 1989, Ser. No. 343,793  
 Int. Cl. 5 G05G 11/00

U.S. Cl. 74-489



1. A double action brake handle comprising  
 a mount adapted to be positioned on a chassis, said mount including an inner hole therein and an outer hole therein,  
 a brake cable retainer having a first hole and a second hole therein,  
 a brake handle having a front recess for securing a brake cable end member, a cam surface thereon, and a hole therethrough,  
 a first fastener means connecting said brake cable retainer to said mount through said first hole on said brake cable retainer and said inner hole of said mount and allowing said brake cable retainer to rotate relative to said mount,  
 a second fastener means connecting said brake handle to said mount through said hole of said brake handle and said outer hole of said mount and allowing said brake handle to rotate relative to said mount,  
 a third fastener means holding a roller concentrically and axially with said second hole of said brake cable retainer and in contact with said cam surface of said brake handle, and  
 said cam surface being configured so that when said brake handle is depressed, said brake cable retainer will be caused to rotate in the opposite direction.

**4,958,533**  
**VARIABLE POSITIVE DRIVE TRANSMISSION**  
 Roger Macpherson, 185 Pleasant Way, Penfield, N.Y. 14526  
 Filed May 26, 1989, Ser. No. 357,407  
 Int. Cl. 5 F16H 3/10  
 U.S. Cl. 74-333



1. A variable speed transmission comprising:  
 a first shaft having a first series of coaxially spaced gears mounted for rotation therewith;  
 a second shaft having a second series of coaxially spaced gears in mesh with said first series of gears;

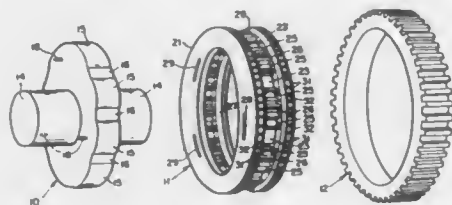
said first and second series of gears defining respective gear pairs of progressively varying gear ratio for selectively transmitting power from one of said shafts to the other; a series of two-way roller clutches interposed between respective gear members of said second series of gears and said second shaft, said roller clutches being engageable for rotatively coupling said respective gear members to said second shaft and being disengageable for permitting relative rotation between said respective gear members and said second shaft; each of said roller clutches including a cam disk having a plurality of recesses formed in its peripheral surface and a roller retainer circumferentially supporting a plurality of rollers within respective recesses in said cam disk; and an externally controlled actuator connected to each of said retainers for indexing said roller retainers together with said plurality of rollers between respective limit positions within said recesses, one of said limit positions enabling engagement of said roller clutches in response to one direction of relative rotation between said respective gear members and said second shaft and the other of said limit positions enabling engagement of said roller clutches in response to an opposite direction of relative rotation between said respective gear members and said second shaft.

4,958,534

**SHIFT DEVICE FOR HYDRAULIC TRANSMISSION**  
Kazuyoshi Takada; Tadashi Takayama; Takao Suzuki, and Haruhiko Nakano, all of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan  
Filed Jul. 19, 1989, Ser. No. 382,090  
Claims priority, application Japan, Jul. 21, 1988, 63-180405  
Int. Cl.<sup>5</sup> G05G 5/06, 7/00

U.S. Cl. 74—475

12 Claims



1. A control mechanism for a hydrostatic transmission having a control shaft rotatable between a neutral position and a drive position, a shift control member movable between a neutral position and a drive position, linkage means operatively connecting said shift control member to said control shaft for rotating said control shaft between its neutral and drive positions in response to movement of said control member between its neutral and drive positions, detent means for releasably retaining said control shaft in its neutral position and means for adjusting the position for at least a portion of said detent means for adjusting the neutral position of said control shaft.

4,958,535

**TRANSMISSION CONTROL STRUCTURE INCLUDING A COMBINATION DIRECTION AND CRUISE CONTROL AND A BRAKE INTERLOCK**

James A. Swartzendruber, West Bend, Wis., assignor to Deere & Company, Moline, Ill.

Filed Mar. 15, 1989, Ser. No. 324,363

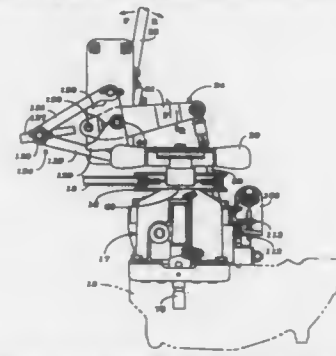
Int. Cl.<sup>5</sup> C09G 11/00

U.S. Cl. 74—481

23 Claims

1. Direction and speed ratio control structure for a hydrostatic transmission having a control arm movable from a neutral position through first and second ranges of positions corre-

sponding to forward and reverse speed ratio ranges, respectively, of the transmission, the control comprising: a shuttle member operably connected to the control arm; a movable control link connected to and positionable with respect to the shuttle member between first and second positions; a movable speed ratio control; means connecting the speed ratio control to the control link for operating the shuttle member to move the control arm over the first range of first positions corresponding to the forward range of speed ratios when the control link is in the first position and the speed ratio control is moved in a



preselected direction, and to move the control arm over the second range of positions corresponding to the reverse range of speed ratios when the link is in the second position and the speed ratio control is moved in said preselected direction; and

direction control means comprising a single lever movable between forward and reverse selecting positions and connected to the control link for moving the link between the first and second positions, respectively, said lever also movable to a cruise control position for selectively maintaining the transmission in a preselected forward speed ratio.

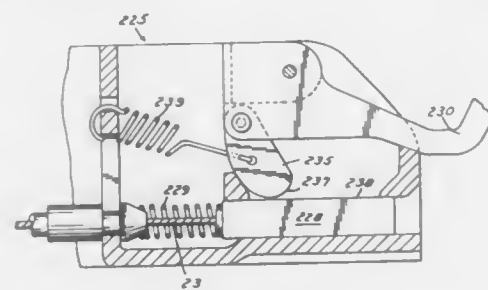
4,958,536

**CABLE CONTROL SYSTEM**

John M. Baumgarten, W. Bloomfield, Mich., assignor to Babcock Industries, Inc., Fairfield, Conn.  
Filed Mar. 22, 1989, Ser. No. 326,926  
Int. Cl.<sup>5</sup> F16C 1/10

U.S. Cl. 74—501.5 R

40 Claims



1. A cable control system comprising:

a spring loaded latch, a cable having a strand attached at one end and to said latch, means for maintaining tension on said strand in a direction away from said latch, control means adjacent the other end of said strand and adapted in one position to engage said strand and place a tension on said strand to release said latch and in another position to release said strand such that said means for applying tension to said strand adjusts the tension on said strand,

said control means including a member on said other end of said strand, a bracket, a lever pivoted to said bracket, said bracket defining a track for said member on said other end of said strand, an arm pivoted to said lever, a stop on said bracket holding said arm out of engagement with said member, and means yieldingly urging said arm toward said stop, said lever being operable to move said arm into engagement with said member.

4,958,537

**TRANSMISSION CASING COVER WITH TUBULAR CONDUIT CAST IN SITU**

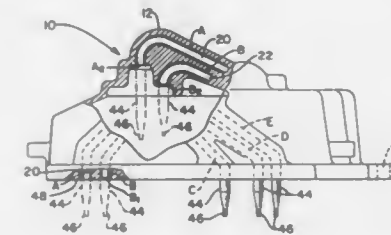
Rodney A. Diehl, Mt. Pleasant; Robert L. Uhrman, Jr., Brentwood, both of Tenn.; Robert G. Bishop, Troy, Mich., and Donald B. Campbell, Franklin, Tenn., assignors to Saturn Corporation, Troy, Mich.

Filed Feb. 20, 1990, Ser. No. 481,533

Int. Cl.<sup>5</sup> F16H 57/02; F02F 7/00

U.S. Cl. 74—606 R

5 Claims



1. A cover in combination with a vehicle transmission casing, said cover comprising: a cast metallic body portion; said body portion having a plurality of port locations for interconnecting with a hydraulic system associated with the vehicle transmission; a plurality of conduits formed to predetermined configurations; a selected plurality of said formed conduits conjoined in a unitary manifold; said unitary manifold being encapsulated within said body portion of the cover; each said conduit within said manifold having opposed ends which communicate with selected port locations in said body portion to effect communication between said port locations.

4,958,538

**METHOD AND APPARATUS FOR CONTROLLING LINE PRESSURE OF CONTINUOUSLY VARIABLE TRANSMISSION SYSTEM**

Yoshinori Yamashita; Sadaaki Hirano; Katsunaki Murano, all of Shizuoka; Takumi Tatsuami, and Hiroaki Yamamoto, both of Hyogo, all of Japan, assignors to Suzaki Jidosha Kogyo Kabushiki, Shizuoka and Mitsubishi Denki Kabushiki Kaisha, Tokyo, both of Japan

Filed Aug. 8, 1988, Ser. No. 229,900

Claims priority, application Japan, Aug. 10, 1987, 62-199415

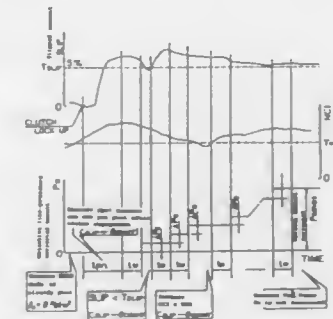
Int. Cl.<sup>5</sup> B60K 41/22, 41/14

U.S. Cl. 74—866

9 Claims

1. A method of controlling line pressure of a continuously variable transmission system, said transmission system being controlled by either expanding or contracting the width of the channel between a stationary pulley member and a movable pulley member which is movable toward and away from said stationary pulley member in order to either expand or contract the radius of rotation of a belt wound on said pulley members for eventually varying the transmission ratio, in which the method includes the steps of: controlling line pressure by raising it by a specific amount in the presence of predetermined conditions when slipping of a clutch is detected during a drive mode so that optimum clutch engagement can eventually be

implemented; and detecting of said presence of said predetermined conditions, said detecting step including the steps of: detecting of the occurrence of slipping of said clutch during said drive mode at a specific slipping rate higher than a lower limit value, and



detecting that the duration of said clutch slipping lasts for a specific period of time after passing of a certain period from the engagement of the clutch when the vehicle runs at a speed other than at a specific low speed below a predetermined velocity.

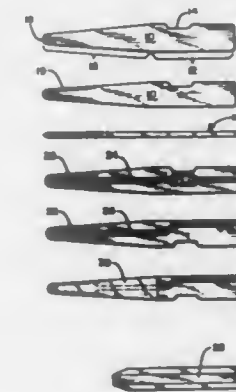
4,958,539

**METHOD OF MAKING AN ELECTROSURGICAL SPATULA BLADE**

Peter Stasz, Moundsview; Jeffrey J. Solberg, Northfield, and Scott R. Grabinger, Maple Grove, all of Minn., assignors to Everest Medical Corporation, Brooklyn Center, Minn.  
Division of Ser. No. 161,776, Feb. 29, 1988, Pat. No. 4,862,890.  
This application Jan. 2, 1989, Ser. No. 360,856  
Int. Cl.<sup>5</sup> B21K 11/00

U.S. Cl. 76—104.1

3 Claims



1. A method of fabricating an electrosurgical blade comprising the steps of:

- (a) forming a thin, flat substrate of a desired shape from a ceramic material;
- (b) grinding a taper along a selected portion of the major surfaces of said substrate leading to the edge of said substrate;
- (c) depositing a pattern of metallization on each side pattern extending over the tapered portion; and
- (d) backgrinding the substrate to form a blunt edge surface face of metallization which extends between said tapered portions of said major surfaces.



4,958,540

## IMPACT TOOL HANDLE

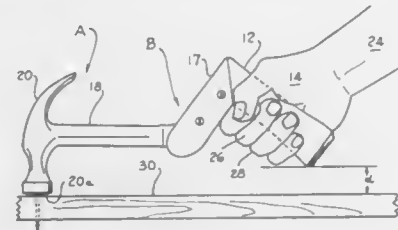
Curtis E. Davis, 1462 Tammany Dr., Seneca, S.C. 29678

Filed Sep. 25, 1989, Ser. No. 411,997

Int. Cl.<sup>5</sup> B25D 1/04; B25G 1/10

U.S. Cl. 81—20

8 Claims



1. An impact tool having an impact handle and an impact head wherein said impact handle comprises:  
a first shank which provides a grip for said handle;  
a second shank extending from said first shank which is integrally connected to said first shank;  
a first angle between said first and second shanks;  
a third shank extending from said second shank which is integral with said second shank;  
a second angle between said second and third shanks;  
an elongated impact body carried by said third shank extending transverse to said third shank; and  
said impact head carried at a free end of said impact body said impact head having an impact surface lying in a plane substantially parallel to a longitudinal axis of said third shank.

4,958,541

## ELECTRONIC TORQUE WRENCH WITH TACTILE INDICATION

Jeffrey R. Annis, Waukesha; Timm R. Herman, Kenosha, and Ronald T. Strobel, South Milwaukee, all of Wis., assignors to Snap-on Tools Corporation, Kenosha, Wis.

Filed Oct. 13, 1989, Ser. No. 421,407

Int. Cl.<sup>5</sup> B25B 23/144

U.S. Cl. 81—479

20 Claims



1. In a torque wrench having sensing apparatus for producing an output signal when the torque transmitted to an associated workpiece equals or exceeds a predetermined torque level, the improvement comprising: generating means for producing a repetitive cyclical tactile indication, and control means responsive to said output signal for activating said generating means.

4,958,542

## FIBERGLASS TUBE END TAPERING DEVICE

Oliver C. Skerrett, P.O. Box 249, Cedar Mt., N.C. 28718

Filed Aug. 30, 1988, Ser. No. 238,148

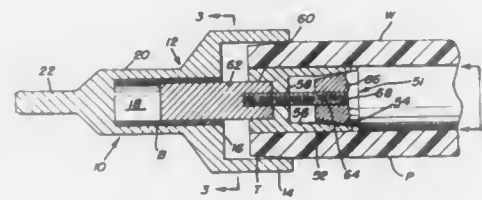
Int. Cl.<sup>5</sup> B23B 3/22

U.S. Cl. 82—113

5 Claims

1. A pipe end tapering apparatus for reducing the end section of a pipe to provide close tolerance connections with pipe couplings and fittings comprising:  
an expandable mandrel assembly for inserting in a pipe end and expanded to give a stable centered stationary means to support a tapering apparatus means, said mandrel assembly

bly has a shaft means projecting from the end of a pipe to support a tapering apparatus means;  
a cylindrical tapering apparatus means rotatably and reciprocally supported on said shaft means projecting from the end of the pipe end, said cylindrical tapering apparatus having a cup shaped body with a first end and a second end;  
said cup shaped body having an end wall in said first end, a protruding shaft extending from said end wall and centered on said end wall and projecting from said cup shaped body;  
said shaft protruding from said end wall having a bore extending through said end wall into said shaft to support said cylindrical tapering apparatus means on said mandrel assembly projecting shaft means, and a reduced end on said shaft for connection to a means for rotating and advancing said cylindrical tapering apparatus means on said mandrel shaft to taper the end of a pipe;



said cup shaped body having a segmented cylindrical wall means with openings separating each segment and a cutting blade mounting means on each segment;  
a cutting blade means for mounting on said mounting means, said cutting blade means has a cutting edge which projects into said cup shaped body to shave a taper on the outside surface of a pipe end;  
said cutting blade means having an elongated body where said cutting edge being an angled edge on said elongated body with one end of said elongated body being narrower than the other to provide said angled edge to produce a tapered end on said pipe, mounting means on said cutting blade means for connection with said mounting means on said segmented cylindrical wall means; and  
said second end of said cylindrical cup shaped body being of larger diameter than the pipe end section to fit over said end section as said tapering apparatus shaves a taper on the end section by rotation in a forward movement.

4,958,543

## OVERHEAD LOADER AND RELATED MECHANISMS FOR HIGH SPEED AUTOMATIC LATHES AND THE LIKE

George Newton, New Milford, and Douglas A. Parzuchowski, Danbury, both of Conn., assignors to The Dunham Tool Co., Inc., New Fairfield, Conn.

Filed Dec. 29, 1988, Ser. No. 291,493

Int. Cl.<sup>5</sup> B23B 13/00

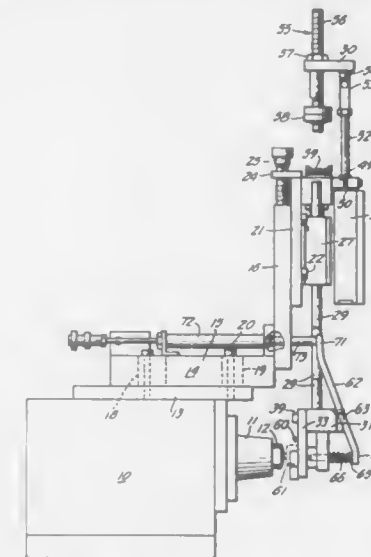
U.S. Cl. 82—124

12 Claims

1. An overhead loader for a high speed automatic lathe or the like having a spindle housing, a work-holding spindle rotatably mounted in said housing, and a gripping chuck carried by said spindle, said loader comprising

- (a) a mounting bracket member mounted on said spindle housing and having a portion extending above said spindle,
- (b) means providing for adjustable positioning of said mounting bracket member in the direction of the spindle axis,
- (c) a workpiece positioning mechanism mounted on said mounting bracket member,
- (d) means providing for adjustable locating of said positioning mechanism on said mounting bracket member for movement toward and away from said spindle axis,

- (e) said workpiece positioning mechanism including a workpiece receiving cradle and vertically reciprocal guide means for moving said cradle from an elevated position, for receiving a workpiece from a workpiece supply during machining operations of said lathe or the like, to an extended position, in which said workpiece is aligned with said spindle axis,
- (f) first actuator means connected to said guide means for



controllably raising and lowering said guide means and said cradle,

- (g) stop means cooperating with said guide means for establishing the upper and lower limit positions of said cradle,
- (h) at least one of said stop means being adjustable to provide for adjustment of the stroke of said first actuator means,
- (i) injector actuator means operative when said cradle is in its lower limit position to inject a workpiece from said cradle and into said gripping chuck.

4,958,544

## RADIAL ARM SAW

Kouichi Miyamoto, Hiroshima, Japan, assignor to Ryobi Ltd., Hiroshima, Japan

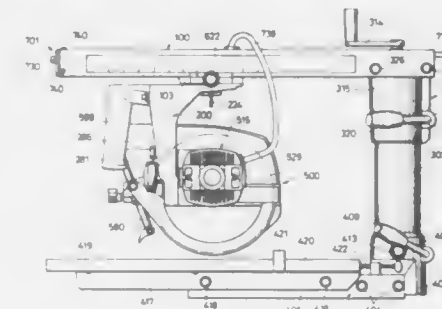
Filed Apr. 14, 1987, Ser. No. 38,265

Claims priority, application Japan, Apr. 14, 1986, 61-56601[U]; Apr. 14, 1986, 61-56602[U]; Apr. 14, 1986, 61-56603[U]; Apr. 16, 1986, 61-57988[U]; Apr. 21, 1986, 61-60843[U]; Apr. 21, 1986, 61-60844[U]; Apr. 25, 1986, 61-63590[U]; Apr. 30, 1986, 61-66513[U]; Apr. 30, 1986, 61-66514[U]; Apr. 30, 1986, 61-66515[U]

Int. Cl.<sup>5</sup> B27B 5/20; B23D 45/02

U.S. Cl. 83—471.3

12 Claims



1. A radial arm saw, comprising:

a base;  
a column extending vertically from said base;  
a vertical position adjuster vertically adjustable on said column;  
a guide arm extending horizontally from and supported by said vertical position adjuster, said guide arm having a generally inverted U-shape with a top wall and two side walls, each of said side walls having matching L-shaped grooves running longitudinally along inner sides of said two side walls of said guide arm, extensions of lower surfaces of said grooves intersecting substantially vertically below a centerline of said guide arm;  
a saw member including a motor to which a saw blade is connectable;  
holding means for holding said saw member to said guide arm, said holding means being slidable on said guide arm at a portion away from said vertical position adjuster, said holding means including a bearing holder and bearings symmetrically mounted on lateral sides of said bearing holder, engaging said grooves and rotatably mounted on axles aligned with said lower surfaces of said grooves, wherein said holding means further includes means for adjustably moving said bearings along directions of their respective axles, so that when said bearings are moved toward said holding means, a distance between said bearings and said grooves increases.

4,958,545

## PUNCHING AND SHEARING MACHINE WITH VARIABLE CUTTING ANGLE

Eugenio Lezotti, Via Petrarca 6, 41049 Sassuolo, (Province of Modena), Italy

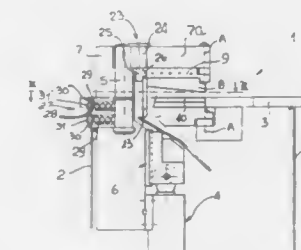
Filed Oct. 7, 1988, Ser. No. 254,746

Claims priority, application Italy, Oct. 13, 1987, 40134 A/87

Int. Cl.<sup>5</sup> B26D 5/12, 7/26

U.S. Cl. 83—559

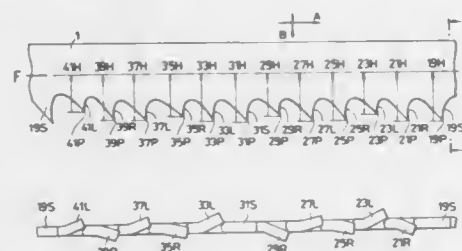
16 Claims



1. Punching and shearing machine with variable cutting angle comprising a substantially horizontal worktable, guide means associated with said worktable, hydraulic means associated with a lower side of said worktable, a frame supporting said worktable, a head which moves substantially vertically with respect to said worktable, said head being actuated by said hydraulic means and guided by said guide means, said head being substantially C-shaped and having at least one first blade, at least one second blade associated with said worktable, said second blade being counterposed to said first blade for shearing therewith, adjustable elastic means, said head being automatically controlled by said adjustable elastic means for regulating a maximum value of shear force for said first blade and further determining a play between said first blade and said second blade, according to thickness and mechanical resistance of material being processed, wherein said head has an upper extension, said at least one first blade comprising at least two upper blades, said upper extension of said head supporting said at least two upper blades, said at least two upper blades having shearing ends directed towards said worktable, said upper blades being mounted on at least two respective first upper sectors which rotate about a vertical axis, said at least one second blade comprising at least two horizontal lower counter-

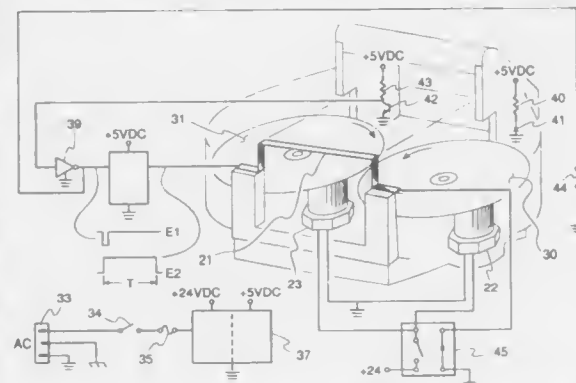
blades, said at least two horizontal lower counter blades being supported by said worktable by means of at least two second respective lower sectors which rotate about said vertical axis, connection means being provided for connecting said upper sectors with said lower sectors, said connection means thereby allowing for a simultaneous positioning of said upper sectors and said lower sectors, positioning means being provided to position said upper sectors and said lower sectors during a single-step rotation, lower locking means being provided for locking said lower sectors, upper locking means being provided for locking said upper sectors, once a final position has been reached, wherein said connection means comprise at least one pair of vertical prismatic columns which, at a first end, are rigidly coupled to said upper sectors and, at a second end, have hollow seats, said second end being below said worktable, said connection means further comprise at least one pair of supports rigidly associated with said lower locking means, at least one pair of cylindrical heads rigidly associated with said supports, said cylindrical heads having tabs with shaped cross sections protruding at a perimeter therefrom, said hollow seats being adapted to accommodate said tabs, and in a rotation configuration, said lower locking means pushing radially on said supports to create a perfect insertion coupling between said tabs and said hollow seats, thereby causing said upper sectors to be rigidly associated with said lower sectors.

**4,958,546**  
**SAW BLADE**  
Sumio Yoshida, Oso; Yoshikazu Takegawa, Miki; Susumu Tsujimoto, Oso, and Katsuhiko Kawabata, Takasago, all of Japan, assignors to Amada Company, Limited, Japan  
Division of Ser. No. 87,392, Aug. 18, 1987, which is a division of Ser. No. 847,731, Apr. 3, 1986. This application Mar. 2, 1989, Ser. No. 317,860  
Claims priority, application Japan, Apr. 3, 1985, 60-069239; Dec. 12, 1985, 60-277842; Dec. 26, 1985, 60-291894  
Int. Cl. B27B 33/02  
U.S. Cl. 83-848 14 Claims



1. A saw blade for cutting metallic materials comprising a combination of a right-set tooth, which is bent to the right, a left-set tooth which is bent to the left in relation to the running direction of the saw blade, and an unset tooth which is not bent, and further comprising:  
a first pattern wherein the teeth are positioned in the running direction in the order of right set tooth, unset tooth, left-set tooth; and  
a second pattern wherein the teeth are positioned in the running direction in the order of left-set tooth, unset tooth, right-set tooth; and  
an odd number greater than one of additional set teeth positioned between said first and second patterns, wherein said additional set teeth are positioned such that right-set teeth and left-set teeth are adjacent each other.

**4,958,547**  
**WORK ACTIVATED SMALL BREAD SLICING MACHINE**  
George J. Low, 300 Plum Space 91, Capitola, Calif. 95010  
Filed Jan. 19, 1989, Ser. No. 298,960  
Int. Cl. B26D 3/30  
U.S. Cl. 83-873 5 Claims

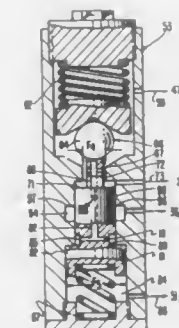
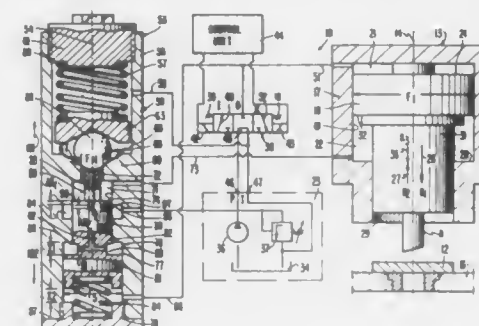


1. A device for slicing single and multiple small bread items such as bagels, buns, and rolls, comprising:  
a housing;  
an inclined chute having a sliding surface for guiding said bread items;  
first and second rotary knives defining a cutting plane substantially parallel to the sliding surface;  
first and second knife motors for actuating said knives;  
first and second walls located at an upper end of said chute, each of said walls mounted on opposed sides of said chute;  
first and second knife shields located at the lower end of said chute adjacent said knives, each of said shields mounted on one of said opposed sides of said chute;  
first and second cowling posts mounted adjacent each of said shields;  
a knife cowling mounted on both said cowling posts, wherein the knives are located between the knife cowling and sliding surface;  
an electrical control circuit for the activation of said motors, the control circuit comprising a work sensing transmitter mounted on one of said walls and a work sensing receiver mounted on the other of said walls, said transmitter and receiver configured to sense the presence of said small bread item on the chute and to activate the motors when said bread item is sensed;  
the control circuit further comprising a metal strip mounted on said cowling and forming a cowling interlock with said posts, said cowling interlock providing an electrical continuity between said posts so as to permit activation of said motors and for preventing the activation of said motors when said cowling is removed from said device.

**4,958,548**  
**HYDRAULIC DRIVE MECHANISM**  
Eckehart Schulze, Stahlbühlstr. 36, 7251 Weissach 2, Fed. Rep. of Germany  
PCT No. PCT/DE88/00635, § 371 Date Jun. 16, 1989, § 102(e) Date Jun. 16, 1989, PCT Pub. No. WO89/03484, PCT Pub. Date Apr. 20, 1989  
PCT Filed Oct. 15, 1988, Ser. No. 368,318  
Claims priority, application Fed. Rep. of Germany, Oct. 16, 1987, 3735123  
Int. Cl. F15B 11/08  
U.S. Cl. 91-420 8 Claims

1. Hydraulic drive mechanism for a machine element executing, during a course of a machining cycle of a workpiece, a rapid feed movement leading to the workplace, thereupon, with a same travel direction, a working stroke and subsequently a rapid retraction stroke leading back into an initial

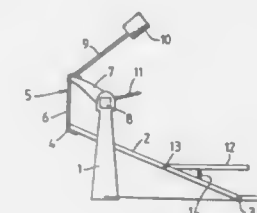
position, the hydraulic drive mechanism including a double-acting hydrocylinder means constructed as a differential cylinder means reciprocally accommodating a differential piston having large and small piston areas defining large and small drive pressure chambers, said hydrocylinder means being adapted to provide a rapid feed operation of the machine element by jointly applying an output pressure of a pressure supply unit, and alternative pressurization and a pressure relief thereby making it possible to control an under-load and working feed of the machine element at increased feeding power, as well as rapid retraction operation; a pressure-controlled area switching valve means for switching from rapid to under-load feed operation, said switching valve means, once a drive pressure in the drive pressure chambers of the hydrocylinder means exceeds a threshold value corresponding to a high percentage of a maximum output pressure of the pressure supply unit, effecting switchover of the hydrocylinder means from a differential operation to a unilateral pressure application to the large piston area of the differential piston of the hydro-



cylinder means and pressure relief of the small piston area of the differential piston of the hydrocylinder means, said switching valve means comprising a check valve means adapted to be acted upon in an opening direction by operating pressure ambient in the small drive pressure chamber of the hydrocylinder means, a valve body, a pretensioned closing spring means for urging the valve body into a closed position by a closing force equivalent to a fraction of an opening pressure of the output pressure of the pressure supply unit, said switching valve means further comprising a pressure-controlled slide valve with a valve body constructed as a stepped piston having a large and small piston step, a slightly pretensioned returned spring means for urging the valve body of the switching valve means into contact with the valve body of the check valve means and, in the closed position of the check valve means, is retained in a functional position wherein the small drive pressure chamber of the hydrocylinder means is exposed to the output pressure of the pressure supply unit and, in the open position of the check valve means, enters into a position wherein the small drive pressure chamber is pressure relieved,

the large piston step of the stepped piston is acted upon by the pressure ambient in the large drive pressure chamber of the hydrocylinder means; and wherein a ratio of an effective area of the large piston step of the stepped piston to a cross-sectional area bounded by a valve seat of the check valve means, within which the valve body of the check valve means is acted upon in the opening direction by the pressure ambient in the small drive pressure chamber is larger by a defined fraction than a ratio of the large piston area defining the large drive pressure chamber of the hydrocylinder means to the small piston area, defining the small drive pressure chamber.

**4,958,549**  
**PEDAL MECHANISM FOR A BASS DRUM**  
Vuk Vukovic, 142 Inchmery Rd., Catford, London SE6, England  
Continuation of Ser. No. 189,465, May 2, 1988, abandoned. This application Jul. 18, 1989, Ser. No. 380,775  
Claims priority, application United Kingdom, May 15, 1987, 8711483  
Int. Cl. G10D 13/04  
U.S. Cl. 84-422.1 15 Claims



1. A pedal mechanism for a base drum, said mechanism comprising:  
a primary platform, support means coupled to said primary platform for supporting said primary platform for pivotal movement about a first axis of rotation;  
a beater ball, said beater ball being moveable between an at-rest position and an operative position, said operative position being defined as that position when said beater ball is in contact with the base drum with which said mechanism cooperates;  
coupling means for connecting said beater ball to said primary platform, said primary platform being moveable about said first axis to move said beater ball between said at-rest position and said operative position, and  
a second platform supported for pivotal movement relative to said primary platform, said secondary platform being moveable about a second axis of rotation, said second axis being generally parallel to said first axis, said secondary platform co-operating with said primary platform and forming an angle with said primary platform where said secondary platform cooperates with said primary platform, said secondary platform pivoting relative to said primary platform and about said second axis so that said co-operation between said secondary platform and said primary platform causes said primary platform to pivot about said first axis and move said beater ball from said at-rest position to said operative position whereby said beater ball moves into contact with said drum when said primary platform is urged by the sole area of the user's foot thereby causing said primary platform to pivot about said first axis or when said secondary platform is urged by the heel area of the user's foot thereby causing said secondary platform to pivot about said second axis.

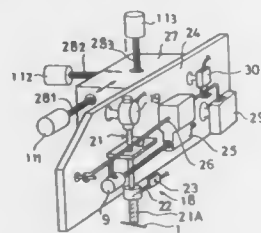


**4,958,550**  
**TUNING METHOD AND APPARATUS FOR KEYBOARD MUSICAL INSTRUMENT**

Hidemori Kugimoto, Hamamatsu, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan  
Filed Sep. 13, 1988, Ser. No. 244,049  
Claims priority, application Japan, Sep. 14, 1987, 67-228484  
Int. Cl.<sup>5</sup> G10G 7/02

U.S. Cl. 84-454

4 Claims



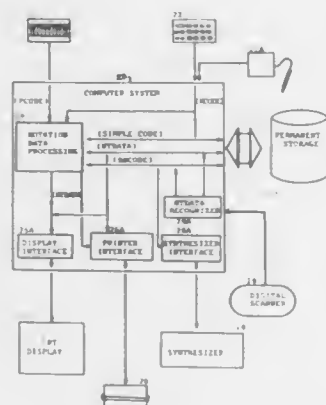
1. A tuning apparatus for a keyboard musical instrument comprising:

- load-applying means arranged such that a load-use weight which is movable by a first servomotor is attached to one end of a balance, said balance being pivotally supported at the other end thereof on a first support member which is movable by a second servomotor, and that a load is applied to a string set up in place from the front end of a load-applying member which engages said balance;
- measuring means for measuring the displacement of the string at said load-applying member when said load-applying means is in operation; said measuring means being attached to said first support member;
- calculation means for calculating a deviation between a displacement value of the string measured by said measuring means and a displacement value of the string preselected to produce a predetermined frequency of vibration; and
- a rotating member for rotating a tuning pin by a third servomotor until the deviation calculated by said calculation means is reduced to zero, said rotating member being attached to a second support member which is movable by a fourth servomotor.

**4,958,551**  
**COMPUTERIZED MUSIC NOTATION SYSTEM**

Philip Y. F. Lai, 35 W. 64th St., New York, N.Y. 10023  
Continuation of Ser. No. 44,839, Apr. 30, 1987, abandoned. This application Mar. 30, 1989, Ser. No. 332,412  
Int. Cl.<sup>5</sup> G09B 15/04; G10G 3/04; G10H 7/00  
U.S. Cl. 84-462

32 Claims



1. A computerized music notation system comprising:  
(a) first input means for entering a series of pitch codes

representing respective pitches which are to be designated as occurring in a series of basic music intervals of a music piece;

- (b) second input means for entering, separately and independently of said first input, a series of relative rhythm codes for designating respective types of rhythm elements, including said pitches, as occurring in the basic music intervals of the music piece, wherein said relative rhythm codes include at least a series of main division codes, each of which represents a respective main division rhythm element designated as occurring in a basic music interval, and interposed demarcation codes each of which delimits a respective one of the basic music intervals of the music piece, wherein the rhythm codes for each basic music interval includes one or more main division codes and a demarcation code delimiting each said basic music interval;
- (c) third input means for selecting a desired interval duration value to be assigned to each of the basic music intervals corresponding to a selected time signature for a desired music notation output for the music piece;
- (d) computer means connected to said first, second, and third input means and having: (1) programmed counting means for counting the number of main division codes occurring in each basic music interval, as delimited by a respective demarcation code, from said rhythm codes entered through said second input; and (2) programmed duration assigning means for assigning a fixed duration value to each of the main division rhythm elements in each respective basic music interval, said fixed duration value being based upon said selected interval duration value assigned to the basic music intervals divided by the number of main division codes counted by said programmed counting means as occurring in each said basic music interval; and
- (e) output means for providing a music notation output in the selected time signature based upon the rhythm codes designating the rhythm elements including pitches in the basic music intervals of the music piece, the pitch codes representing pitches for the respective rhythm elements, and the fixed duration values assigned to the respective rhythm elements by said computer means.

**4,958,552**  
**APPARATUS FOR EXTRACTING ENVELOPE DATA FROM AN INPUT WAVEFORM SIGNAL AND FOR APPROXIMATING THE EXTRACTED ENVELOPE DATA**  
Junichi Minamitaka, Fussa; Kenji Sato, Sagami-hara, and Mayumi Ito, Akishima, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

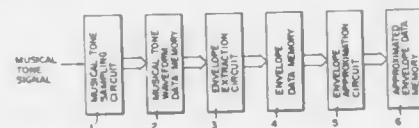
Continuation of Ser. No. 117,082, Nov. 3, 1987, abandoned. This application Sep. 14, 1989, Ser. No. 408,412

Claims priority, application Japan, Nov. 6, 1986, 61-264205; Nov. 6, 1986, 61-264206; Nov. 6, 1986, 61-264207; Nov. 6, 1986, 61-170531[U]; Nov. 6, 1986, 61-170532[U]; Nov. 6, 1986, 61-170533[U]; Nov. 6, 1986, 61-170534[U]; Nov. 6, 1986, 61-170535[U]; Nov. 6, 1986, 61-170536[U]; Nov. 6, 1986, 61-170537[U]; Nov. 6, 1986, 61-170538[U]; Nov. 6, 1986, 61-170539[U]

Int. Cl.<sup>5</sup> G10H 1/057, 7/08

U.S. Cl. 84-603

24 Claims



18. An envelope approximating apparatus which approximates an envelope waveform described by envelope data, in the form of a limited number of function waveforms whose

characteristic changes at switching points, said apparatus comprising:

- function data generating means for generating function data corresponding to said limited number of function waveforms;
- computing means coupled to said function data generating means for computing an evaluation value corresponding to an error between said function data and the envelope data representative of said envelope waveforms and
- switching point deciding means coupled to said computing means for deciding a switching point to be provided between successive ones of the limited number of function waveforms, for optimizing said evaluation value in accordance with the limited number of function waveforms.

**4,958,553**  
**HYDRAULIC CONTROLLER**

Katsumi Ueno, Saitama, Japan, assignor to Diesel KIKI Co., Ltd., Tokyo, Japan

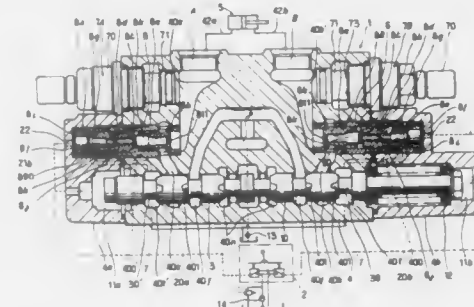
Filed Apr. 20, 1989, Ser. No. 341,357

Claims priority, application Japan, Apr. 22, 1988, 63-53538; Apr. 22, 1988, 63-53539

Int. Cl.<sup>5</sup> F15B 13/042

U.S. Cl. 91-447

11 Claims



1. In a hydraulic controller equipped with a directional control valve disposed on a system connecting an actuator from an oil hydraulic pump, the directional control valve having a main spool running through a valve body, the main spool being operated on an external pilot oil pressure, the improvement characterized in that:

two sets of cylinder passages 40a, 40a' and 40b, 40b' of a separate structure are formed on the valve body 4, horizontal tunnels 6, 6 are formed so as to intersect each set of the cylinder passages 40a, 40a' and 40b, 40b', nonleak valves 8A, 8B are mounted on the horizontal tunnels 6, 6 each;

said nonleak valves 8A, 8B are equipped each with a main passage poppet 8b having a switching nose and a throttle 811 on the nose, a spring 8c for energizing it normally to a close side, a pilot poppet 8e for controlling pressure of a spring chamber 8k with the spring disposed therein, a piston 8f for operating the pilot poppet 8e;

the nonleak valves 8A, 8B have a passage structure whereby a load pressure oil from a cylinder port is shut up around the pilot poppet 8e by way of the throttle 811, the spring chamber 8k and the horizontal tunnel 6, when a main spool 3 is neutral;

pilot passages 20a, 20b leading to an end portion of a main spool 1 from an oil pressure pilot valve communicate partly with the piston 8f of the nonleak valves 8A, 8B, and when a pilot oil pressure is applied to the main spool 1, the pilot oil pressure works on the piston 8f concurrently.

**4,958,554**  
**FIRE PROTECTION FILTER**

Michael M. Spaeth, Lindwurmstrasse 10/VII, D-8000 Munich, Fed. Rep. of Germany

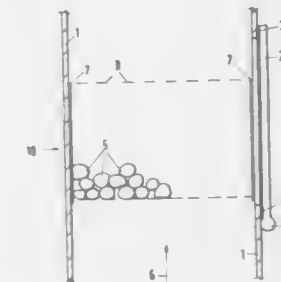
Filed Jun. 12, 1989, Ser. No. 364,125

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1988, 3819832

Int. Cl.<sup>5</sup> F24F 11/00

U.S. Cl. 98-1

23 Claims



1. A fire protection filter for a ventilation duct comprising a lattice of at least one layer made of an air permeable, highly thermally conductive, expanded aluminum foil less than 0.01 mm thick, said lattice being adapted to be mounted transverse to the direction of flow in the ventilation duct and having a length along the direction of flow sufficient to prevent flames from going through said lattice without significantly impeding the flow.

**4,958,555**  
**SIGHT PROOF, DRAINABLE BLADE LOUVER ASSEMBLY**

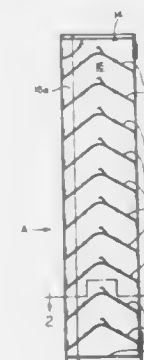
Gary J. Lentz, Bradner, and Michael J. Almoguer, Toledo, both of Ohio, assignors to Mestek, Inc., Westfield, Mass.

Filed Oct. 23, 1989, Ser. No. 425,699

Int. Cl.<sup>5</sup> F24F 13/08

U.S. Cl. 98-121.1

10 Claims



1. A sight proof, drainable louver assembly for the flow of air therethrough from an inlet to an outlet, said louver assembly comprising:

a plurality of spaced apart louver blades, said blades being arranged in a generally vertically extending stack; and frame means surrounding and engaging said louver blades; each of said louver blades having a configuration, in vertical cross-section, similar to an inverted V, with an inclined, first portion which extends upwardly in the direction of the flow of air through said louver assembly, and an inclined second portion which extends downwardly from said first portion in the direction of the flow of air through said louver assembly, said first portion having a flange

portion which extends generally vertically upwardly from a leading edge thereof partly to the blade thereabove and a lip which extends inwardly and downwardly from a free, upper edge of said flange portion of said first portion partly to said first portion of said blade; adjacent blades in said stack being spaced sufficiently closely to block a direct line of sight through said louver assembly.

4,958,556

## FILLED CRACKER MAKING APPARATUS

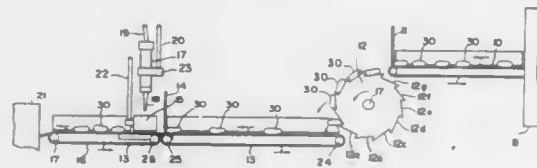
Agostino Aquino, Patterson, N.J., and Karl U. Lang, Port Jervis, N.Y., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed May 16, 1989, Ser. No. 352,205

Int. Cl.<sup>5</sup> A21C 9/06

U.S. Cl. 99—355

10 Claims



1. An apparatus for producing filled hard biscuit products comprising:
  - (a) means to mix a dough;
  - (b) means to form said mixed dough into a plurality of dough forms;
  - (c) oven means to bake said dough forms to produce essentially hollow baked forms wherein the baked forms have a top surface and a bottom surface;
  - (d) first conveyor means to convey said baked forms from the oven means;
  - (e) a baked form inverter means to receive the baked forms from said first conveyor means and to invert the baked forms;
  - (f) second conveyor means to convey the inverted baked forms from the inverter means;
  - (g) a holding means to receive the inverted baked forms from the second conveyor means; and
  - (h) a plurality of filling needles that move vertically downwardly and upwardly and fill each inverted baked form in said holding means wherein said holding means holds said inverted baked forms in a stationary position during filling and releases the filled baked forms when the filling needles move upwardly.

4,958,557

## RENDERED FAT SEPARATOR

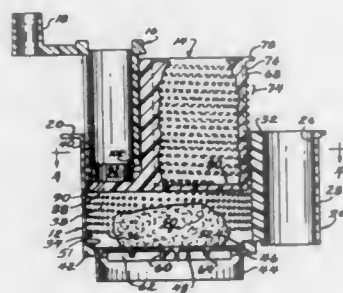
Jeffrey Flala, P.O. Box 302, Brookfield, Ill.

Filed Oct. 17, 1989, Ser. No. 422,687

Int. Cl.<sup>5</sup> A47J 19/00; B30B 9/02

U.S. Cl. 99—495

11 Claims



1. An apparatus for separating rendered fat from cooked

food, comprising a perforate bowl means for receiving the food, rotary press means for applying a force to said food to squeeze out said rendered fat, engageable means intercoupling said rotary press means with said bowl means to provide a travel path for said rotary press means toward said food, and driving sprocket means cooperatively engaged with said bowl-like means, the engageable means and said rotary press means for forcing said rotary press means against said food to extract a substantial amount of said rendered fat.

4,958,558

## ADJUSTING SYSTEM FOR THE GAP WIDTH OF SUPPORT ROLL PAIRS IN A DOUBLE-BELT PRESS

Rupert Harreither, Baden, Austria, assignor to Austria Metall Aktiengesellschaft, Braunau, Austria

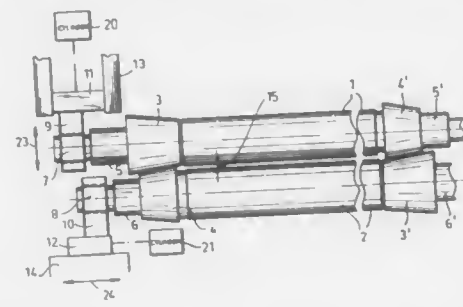
Filed Sep. 27, 1989, Ser. No. 413,529

Claims priority, application Austria, Sep. 27, 1988, 2375/88

Int. Cl.<sup>5</sup> B30B 13/00, 5/06

U.S. Cl. 100—41

7 Claims



1. An adjusting apparatus for a double-belt press, comprising:
  - a pair of support rolls;
  - respective bearings journaling said rolls for rotation about generally parallel axes;
  - respective generally conical formations at each end of each of said rolls bearing radially upon the conical formations of the other roll, the conical formations of each roll tapering in the same direction; and
  - means for relatively shifting the bearings of said rolls whereby axial regions at which the conical formations of the two rolls bear upon one another are shifted to vary the width of a gap formed between said rolls.

4,958,559

## CYLINDER PRESS DRIVE ASSEMBLY

Henry J. Bubley, Deerfield, Ill.; Joseph Glotzbach, Chasute, Kans., and Phil Moter, Deerfield, Ill., assignors to American Screen Printing Company, Chicago, Ill.

Filed Oct. 4, 1988, Ser. No. 253,122

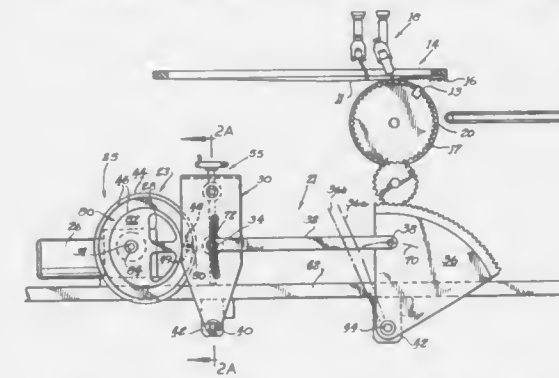
Int. Cl.<sup>5</sup> B41L 13/16

U.S. Cl. 101—123

6 Claims

1. In a screen printing cylinder press for screen printing on a sheet, the combination comprising:
  - a cylinder mounted for rotating in the press and having a gripper thereon to grip a sheet,
  - a screen printing means including a movable screen printing carriage for screen printing on the sheet,
  - connecting means connected to the cylinder to oscillate the same through a stroke of a given length, and
  - a cam means having a predetermined profile cam surface and a cam follower for following the cam surface and connected to the connecting means to actuate the latter to turn the cylinder and to reciprocate this screen printing means,
  - said cam profile surface providing a displacement and velocity curve characteristic to turn the cylinder to its maxi-

mum rotational velocity in less than fifty percent of the turning time in each direction and for decelerating the adjacent to, and cooperable with a rotatable ink fountain roller, said assembly comprising:



cylinder over a time period greater than fifty percent of rotating travel time in each direction.

4,958,560

## PRINTING SCREEN AND METHOD OF PRINTING A NON-ABSORBENT SUBSTRATE

Terence W. Collins, St. Helens, England, assignor to Pilkington plc, Merseyside, England

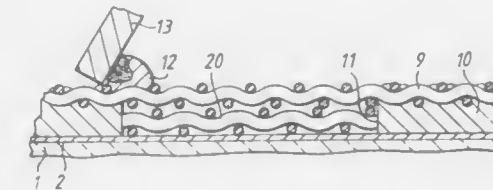
Filed Mar. 1, 1988, Ser. No. 162,683

Claims priority, application United Kingdom, Mar. 4, 1987, 8705075

Int. Cl.<sup>5</sup> B41F 15/36; B05D 1/32

U.S. Cl. 101—128.21

18 Claims



1. An improved method of screen printing a patterned ink layer on a hard non-absorbent substrate using a screen with a patterned coating on its surface facing the substrate, said method comprising the steps of providing between the screen surface and the substrate local support distributed over at least one area in which a patterned ink layer of increased thickness is required thereby enhancing ink retention in said at least one area, the at least one area comprising only a part of the patterned ink layer printed by said screen, applying ink to said screen and printing the patterned ink layer on said substrate through said screen, whereby the ink layer in said at least one area is thicker than in another area of the ink layer.

4,958,561

## INKING BAR FOR FLUSH INKING UNIT

Heinrich K. Grosshanser, Willi A. P. Kutzner, and Georg Schneider, all of Würzburg, Fed. Rep. of Germany, assignors to Koenig & Bauer Aktiengesellschaft, Würzburg, Fed. Rep. of Germany

Filed Nov. 1, 1988, Ser. No. 265,568

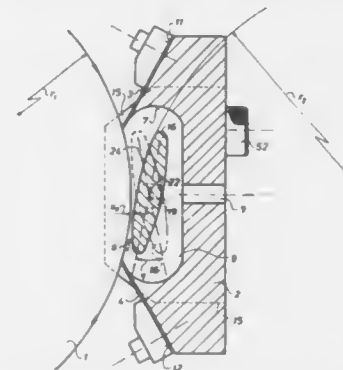
Claims priority, application Fed. Rep. of Germany, Nov. 5, 1987, 3737531

Int. Cl.<sup>5</sup> B41F 31/04, 31/06; B41L 27/08

U.S. Cl. 101—363

7 Claims

1. An inking bar assembly for a flush inking unit of a rotary printing press, said inking bar assembly being positionable



a profiled body having a generally non-circular cross-sectional shape and being positioned within said ink distributing chamber to facilitate unrestricted flow of ink around said profile body to said ink fountain roller, said profiled body having an elongated axis which is generally parallel to said axis of rotation of said ink fountain roller; axially extending support journals at first and second ends of said profiled body; and means engaging each of said axially extending support journals to support said profiled body in said ink distributing chamber for pivotal movement about said elongated axis of said profiled body to vary an amount of angulation between a peripheral surface of said profiled body and said periphery of said ink fountain roller.

4,958,562

## PRINTING MEMBER WITH AN ORGANIC PLASTIC SURFACE AND METHOD FOR IMAGING

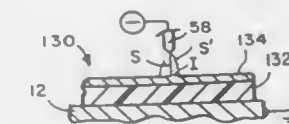
Thomas E. Lewis, E. Hampstead; Bradley W. Davidson, Merrimack; Richard A. Williams, Hampstead, all of N.H.; Michael T. Nowak, Gardner, Mass., and John F. Kline, Hudson, N.H., assignors to Prestek, Inc., Hudson, N.H.

Division of Ser. No. 234,475, Aug. 19, 1988, Pat. No. 4,911,075. This application Sep. 21, 1989, Ser. No. 411,095

Int. Cl.<sup>5</sup> B41N 1/08; B41C 1/10

U.S. Cl. 101—457

11 Claims



1. The method of making a printing member for a press without dampening comprising the steps of:
  - coating a conductive metal body with an organic plastic layer having an exposed surface which is highly oleophobic;
  - spacing a movable point electrode opposite selected image points on said surface, and



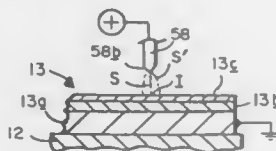
establishing a potential difference between said electrode and said conductive metal body to produce spark discharges between said electrode and said printing member at said image points without contacting said surface and without penetrating through said body so that there is thermal transformation of said surface structure which renders said surface oleophilic at said image points.

**4,958,563**  
**LITHOGRAPHY PLATE WITH A CHROMIUM SURFACE AND METHOD FOR IMAGING**

Thomas E. Lewis, E. Hampstead; Bradley W. Davidson, Merrimack; Richard A. Williams, Hampstead, all of N.H.; Michael T. Nowak, Gardner, Mass., and John F. Kline, Hudson, N.H., assignors to Presstek, Inc., Hudson, N.H.

Division of Ser. No. 234,475, Aug. 19, 1988, Pat. No. 4,911,075. This application Sep. 21, 1989, Ser. No. 410,327

Int. Cl.<sup>5</sup> B41N 1/08; B41C 1/10  
U.S. Cl. 101—458 16 Claims



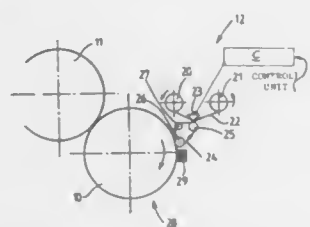
1. A method of making a printing member for a press with dampening comprising the steps of:  
forming a metal body with an exposed surface of chromium metal having a grained surface structure with capillaries making said surface hydrophilic, and  
heating without contact said surface at selected image points thereon to transform the surface structure to render said surface nonwater-retaining at said image points.

**4,958,564**  
**METHOD AND SYSTEM FOR PREPARING A PLANOGRAPHIC PRINTING FORM**

Hartmut Fuhrmann, Karlsruhe, and Reinhard Plaschka, Neuried, both of Fed. Rep. of Germany, assignors to Man Roland Druckmaschine AG, Offenbach am Main, Fed. Rep. of Germany

Filed Oct. 5, 1989, Ser. No. 417,299  
Claims priority, application Fed. Rep. of Germany, Oct. 8, 1988, 3834270

Int. Cl.<sup>5</sup> B41C 1/05, 1/10  
U.S. Cl. 101—467 14 Claims



1. Method of making a planographic printing form (10) comprising the steps of  
providing a thermo transfer element (22) having ink-accepting surface areas;  
providing an auxiliary transfer element (24, 24', 35);  
contacting said thermo transfer element and said auxiliary transfer element;  
selectively thermally transferring thermally affectable material from said thermo transfer element to the auxiliary

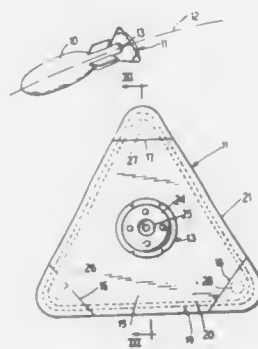
transfer element under control of a control unit (C) in accordance with an image to be printed; and  
transferring said thermally affectable material from one of said elements to said printing form.

**4,958,565**  
**INFLATABLE DECELERATOR**

Mark A. Koch, Sioux Falls, S. Dak., assignor to Raven Industries, Inc., Sioux Falls, S. Dak.

Filed May 25, 1988, Ser. No. 198,512  
Int. Cl.<sup>5</sup> B64D 17/80, 19/00

U.S. Cl. 102—386 11 Claims



11. A decelerator structure for attachment to a munition to be deployed from an aircraft comprising in combination:  
a first equilateral triangularly shaped section of fabric with rounded apexes and straight sides between said apexes;  
a second equilateral triangularly shaped section of fabric with rounded apexes and straight sides between said apexes being of equal size and shape to the first section;  
means defining openings at the apex of the second section; scoops at the apexes facing inwardly directing a flow of air through said opening means;  
attachment means centrally located in the second section of fabric; and  
stitching extending around the entire periphery of the fabric sections and joining the fabric sections and spaced inwardly from the outer edge of the sections of fabric so that the projecting outer edge constitutes a turbulence generator enhancing stability of the decelerator structure.

**4,958,566**  
**BRAKING MECHANISM FOR ROTATING FLYING OBJECTS**

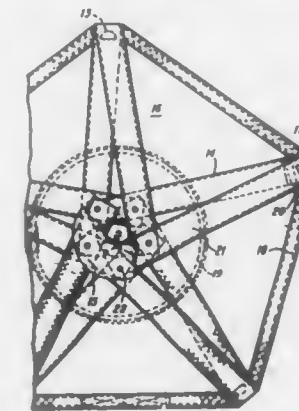
Gerhard Siebrand, Quickborn, and Bruno Stürzenbecher, Norderstedt, both of Fed. Rep. of Germany, assignors to Autoflug GmbH, Rellingen, Fed. Rep. of Germany

Filed Dec. 9, 1988, Ser. No. 282,029  
Claims priority, application Fed. Rep. of Germany, Dec. 10, 1987, 3741779

Int. Cl.<sup>5</sup> F42B 10/56  
U.S. Cl. 102—400 11 Claims

1. A braking mechanism for centrally taking up load arising especially from a rotating flying object with such load being taken up by an apex of the braking mechanism involving problems distinguishable from problems encountered with a parachute that has load taken up along an outer edge of the parachute via lines therewith so that an apex of the parachute is in no way connected with load of any flying object, said braking mechanism including a planar fabric sheet having an outer rim and a central attachment base portion that can be secured to said flying object, with said fabric sheet being adapted to be stored in a folded-up readiness state in said flying object and, when released and unfolded, being adapted to form a braking surface that encircles said flying object; said braking mechanism further comprises:

a plurality of radial reinforcing strips that each extend radially between said central attachment base portion and said outer rim and are distributed about the periphery of said braking mechanism, whereby each of said reinforcing strips extends from said central attachment base portion to said outer rim and back to said central attachment base portion to at least partially form two layers and to form



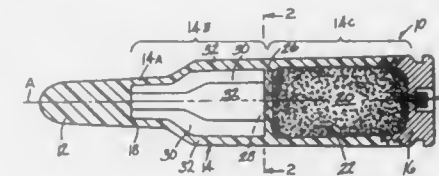
loop-like pockets at said outer rim of said fabric sheet of said braking mechanism, with centrifugal weights being disposed in said pockets, said central attachment base portion taking up load of the rotating flying object transmitted thereto via the braking surface that encircles said flying object and such load is thus transmitted to the apex of the braking mechanism.

**4,958,567**  
**TRAINING CARTRIDGE WITH IMPROVED CASE FOR FIXING PROPELLANT POSITION IN POWDER CHAMBER**

Richard H. Olson, Florissant, Mo., assignor to Olin Corporation, Stamford, Conn.

Filed Apr. 10, 1989, Ser. No. 335,330  
Int. Cl.<sup>5</sup> F42B 8/02

U.S. Cl. 102—444 19 Claims



1. A training cartridge, comprising:  
(a) a front bullet;  
(b) a rear base for mounting a primer being operable for effecting ignition of a propellant charge;  
(c) a middle case having tandemly-arranged and integrally connected leading and trailing portions;  
(d) said trailing portion of said case being in the form of a cylindrical wall connected at its rearward end to said base and therewith defining a powder chamber closed at its rearward end and extending forwardly of said base for housing the propellant charge;  
(e) said leading portion of said case integrally connected to said bullet so as to have a one-piece construction therewith; and  
(f) a rupturable closure wall integrally connected to said case at the location of merger of said trailing and leading portions thereof, said wall extending transversely across said case for closing a forward end of said powder chamber, said location of said closure wall being preselected to tailor the internal volume of said powder chamber to

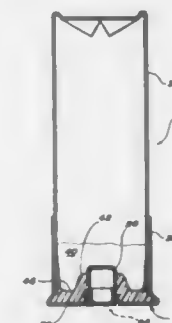
generally equal that of the quantity of said propellant charge so as to retain said propellant charge in a fixed position in said powder chamber adjacent said base regardless of the elevation of said training cartridge.

**4,958,568**  
**MAXIMUM VOLUME REIFENHAUSER SHOTSHELL**

Morris C. Buemann, Florissant, Mo., assignor to Olin Corporation, Chesire, Conn.

Filed Aug. 28, 1989, Ser. No. 399,210  
Int. Cl.<sup>5</sup> F42B 5/30

U.S. Cl. 102—466 11 Claims



7. A shotshell comprising: a biaxially oriented tubular casing wall made of a high density polyethylene having a pair of open ends; and

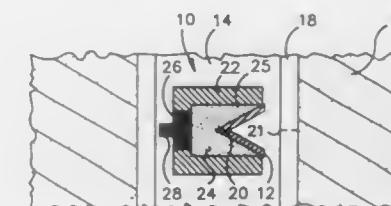
an injection molded basewad made of said high density polyethylene molded in place at one of said open ends so as to close and seal said end, said basewad having an axially extending annular skirt portion having a radial thickness generally less than said casing wall fused to the inside surface of said tubular casing so as to bond said skirt portion of said basewad to said wall while maintaining said biaxial orientation of said tubular casing wall adjacent said skirt portion, a central hub portion for supporting a primer, and an annular web portion about said hub portion spacing and supporting said skirt portion from said hub portion, said web portion having an axial thickness less than 0.15 inches.

**4,958,569**  
**WROUGHT COPPER ALLOY-SHAPED CHARGE LINER**

Frank N. Mandigo, North Branford, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Mar. 26, 1990, Ser. No. 499,934  
Int. Cl.<sup>5</sup> F42B 10/00

U.S. Cl. 102—476 18 Claims



1. A wrought metal liner for a shaped charge device, said liner being shaped so as to comprise upon detonation of said device and formed from a multiple phase alloy having:  
a ductile metal matrix and  
a discrete second phase dispersed in said matrix wherein said second phase has a melting temperature less than the temperature reached by said liner following detonation.

# 4,958,570 BULLET ASSEMBLY AND METHOD OF MAKING THE SAME

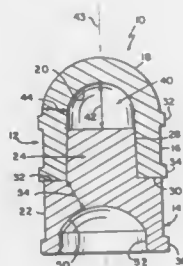
David A. Harris, 601 W. 6th St., Greenfield, Ind. 46140

Filed Sep. 8, 1989, Ser. No. 405,207

Int. Cl.<sup>5</sup> F42B 12/02, 30/02

U.S. Cl. 102—517

7 Claims



1. A bullet assembly comprising a two piece projectile consisting of:

- a hollow cylindrical nose member having an outer and inner surface defining a hollow generally cylindrical body portion and a hemispherical end nose portion wherein a cross-section of the hollow cylindrical nose member defines a substantially U-shape with the hemispherical nose portion forming a bight of the U-shape cross-section;
- a solid base member having a cylindrical body portion with an outer surface of equal diameter to a diameter of the outer surface of the cylindrical nose member and a tapered solid projection portion which is located within a cavity defined by the hollow in the generally cylindrical body portion of the nose member;

wherein the nose and base members are made from the same material;

wherein the solid projection portion of the base member is axially separated from the inner surface of the hemispherical end of the nose member to define a hollow region between the solid projection and the inner surface of the hemispherical end of the nose member;

wherein the inner surface of the cylindrical body portion of the nose member has a substantial identical taper with the taper of the solid projection so as to provide a tight fit therebetween;

wherein the solid projection is axially centered on the solid base member with its taper being axially inwardly displaced from the outer diameters of the outer surfaces of the nose and base members;

wherein an open end of the nose member abuts a flat annular ledge on the base member that extends between the taper of the projection and the outer surface of the base member to provide a close fit therebetween; and

wherein a thickness between the inner and outer surfaces of the hemispherical end nose portion of the nose member at the hollow region is substantially constant.

4,958,571

## CONTINUOUS-FIBER REINFORCEMENT SABOT

Lawrence J. Puckett, Churchville, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 13, 1989, Ser. No. 406,932

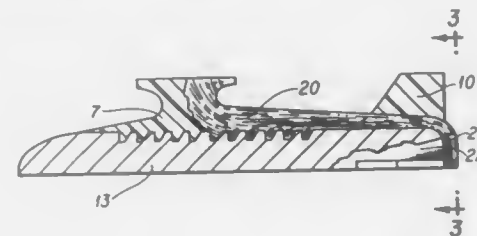
Int. Cl.<sup>5</sup> F42B 14/06

U.S. Cl. 102—522

1 Claim

1. A sabot for a projectile, said projectile having a high ratio of length to diameter, having a base and having buttress grooves thereon;

wherein said sabot comprises grooves which mesh with said buttress grooves of said projectile; and



wherein said sabot is comprised of continuous filaments which wrap around the projectile base and diverge into the buttress grooves of said projectile.

4,958,572

## NON-RICOCHETING PROJECTILE AND METHOD OF MAKING SAME

Yvan Martel, Loretteville, Canada, assignor to Her Majesty the Queen in Right of Canada, as represented by the Minister of National Defence of Her Majesty's Canadian Government, Canada

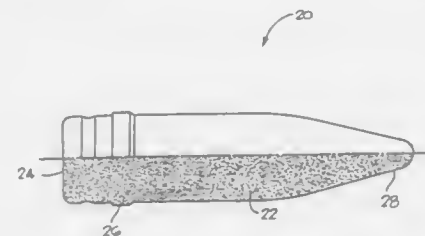
Filed Sep. 12, 1989, Ser. No. 406,304

Claims priority, application Canada, Feb. 24, 1989, 592121

Int. Cl.<sup>5</sup> F42B 13/20

U.S. Cl. 102—529

10 Claims



1. A practice projectile for use with military aircraft and the like for training pilots in attacking ground targets, said projectile comprising:

- a unitary and solid body formed from sintered sponge iron powder having a uniformly distributed porosity throughout and having a sintered density equivalent to the apparent density of a projectile to be simulated.

4,958,573

## REHABILITATION MACHINE HAVING ITS FEED AND DISCHARGE OF MATERIALS AT ITS LEADING END IN THE DIRECTION OF ITS ADVANCE

Flavio Mancini, Brescia, Italy, assignor to Danieli & C. Officine Meccaniche S.p.A. and ITI/CLM Impianti Tecnici Industriali S.p.A., both of Buttrio, Italy

Filed Jul. 18, 1988, Ser. No. 220,686

Claims priority, application Italy, Aug. 7, 1987, 83434 A/87

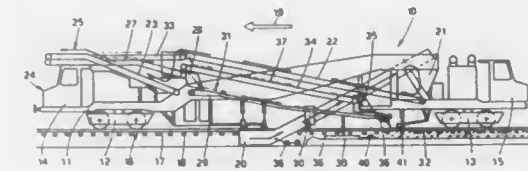
Int. Cl.<sup>5</sup> E01B 29/05

U.S. Cl. 104—2

9 Claims

1. A rehabilitation apparatus for railway road beds, comprising a rehabilitation machine including: a leading end and a trailing end relative to the direction of advance of the rehabilitation machine; a front bogie at the leading end and a rear bogie at the trailing end; a framework resting on said front and rear bogies; a cab at each said end for driving the rehabilitation machine; a hopper connected to the framework; an excavation chain for transferring excavated material through the hopper, and an elevator for receiving the excavated material transferred from the excavation chain through the hopper; and,

located at one said end, a first conveyor for delivering a mixture of aggregate materials, a second conveyor for delivering



metalling, and discharge conveyors for discharging excavated material from the machine.

4,958,574

## CABLE TRANSPORT SYSTEM WITH GARAGING OF CARRIERS

Bernd Meindl, Hard, Austria, assignor to Konrad Doppelmayr & Sohn Maschinenfabrik Gesellschaft m.b.H. & Co. KG, Wolfurt, Austria

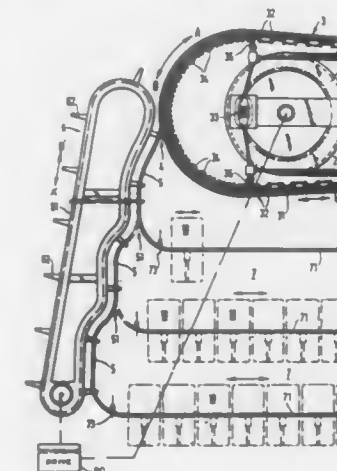
Filed Nov. 17, 1989, Ser. No. 438,707

Claims priority, application Austria, Nov. 18, 1988, 2831/88

Int. Cl.<sup>5</sup> B61J 3/02; B61K 1/00

U.S. Cl. 104—88

10 Claims



1. A cable conveyance, comprising:

- a cable transporter having a transport cable, guide means for defining a path for said cable, drive means for displacing said cable, a plurality of carriers couplable to and decouplable from said cable, and a guide rail receiving carriers decoupled from said cable for disembarking and boarding of passengers and returning decoupled carriers to said cable for recoupling thereto; and

means for garaging of said carriers, said means for garaging of said carriers including:

- means forming a storage region for receiving carriers to be garaged,

a transport rail between said guide rail and said region and a drive associated with said transport rail for advancing carriers from said guide rail to said region,

at least one storage rail in said region having an end turned toward said transport rail and receiving said carriers therefrom and an opposite end remote from said transport rail,

means for mounting said storage rail to enable it to swing about a substantially horizontal axis between a position in which said storage rail is inclined downwardly away from said transport rail and said carriers move onto said storage rail by gravity and a position in which said storage rail is inclined downwardly toward said trans-

port rail and said carriers move toward said transport rail by gravity, and means connected with said drive for reversing same to advance carriers from said storage rail to said guide rail along said transport rail.

4,958,575

## TRANSIT VEHICLE APPARATUS AND METHOD FOR SOLAR INDUCTION MONORAILS

Mark J. Antosh, 4009 N. Stone Ave., Tucson, Ariz. 85705

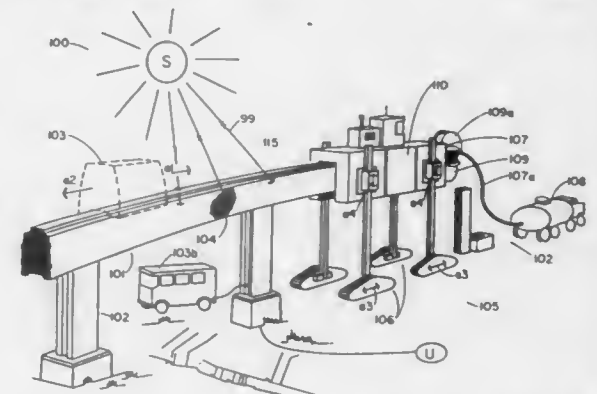
Division of Ser. No. 174,422, Mar. 28, 1988, Pat. No. 4,885,995.

This application Dec. 7, 1989, Ser. No. 447,196

Int. Cl.<sup>5</sup> B60L 8/00, 13/10

U.S. Cl. 104—288

5 Claims



1. A transit vehicle apparatus adapted to be propelled along a solar energy collecting monorail structure, said transit vehicle apparatus comprising:

- (a) a transverse flux motor means for magnetically coupling said monorail structure, drawing electrical energy converted by said monorail structure and producing propulsion and levitation forces, which provide power to said apparatus being propelled along said monorail structure;
- (b) a fiber optical control means for communicating with said solar energy collecting monorail structure;
- (c) a floor member having an omega-shaped bottom portion that conforms to an upper rail portion of said solar energy collecting monorail structure, said transverse flux motor means being housed in said omega-shaped bottom portion; and
- (d) a monorail skid roller means for providing low friction contact between said transit vehicle apparatus and said solar energy collecting monorail structure.

4,958,576

## FOLD-AWAY TABLE

Kurt Kaner, Ulm/Dona, Fed. Rep. of Germany, assignor to Karl Kaner Fahrzeugwerke GmbH, Ulm, Fed. Rep. of Germany

Filed Jul. 10, 1989, Ser. No. 377,609

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1988, 8809005

Int. Cl.<sup>5</sup> A47B 41/04

U.S. Cl. 108—35

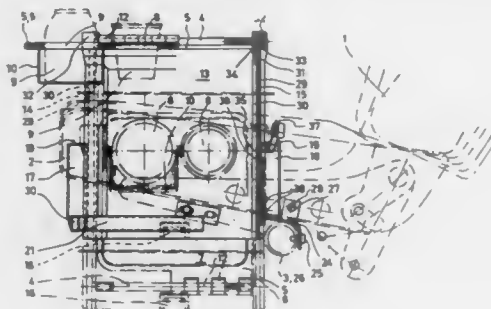
25 Claims

1. A fold-away table for a vehicle seat having a seat frame, said table comprising:

- a mounting base defining a stationary guide structure;
- means for securing said mounting base to the seat frame at a location disposed laterally from the seat with said guide structure lying in a vertical plane;
- a carrier defining a housing structure with an open top, said carrier being mounted on said guide structure for displacement in said vertical plane between a lowered storage position and a raised use position;
- a substantially horizontal pivot axis;
- means for mounting said pivot axis on said carrier for dis-



placement in said vertical plane between a lowered position located within said housing structure at the lower end thereof, and a raised position at the open top of said housing structure; and  
at least one table element mounted on said pivot axis for pivotal movement between a folded position lying in said



vertical plane, and an unfolded position extending laterally from said vertical plane, said table element when in said folded position being arranged to be lowered with said pivot axis into said housing, whereupon said carrier may then be lowered on said guide structure to said storage position.

4,958,577

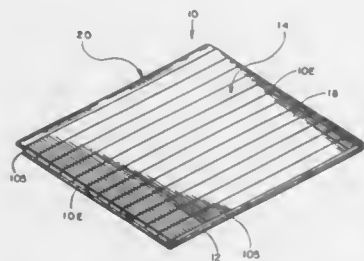
ROLL-UP LAP TRAY

Richard Demajo, 640 E. 14th St., and James Piera, 710 E. 13th St., both of, New York, N.Y. 10009

Filed Jan. 14, 1989, Ser. No. 365,683

Int. Cl.<sup>5</sup> A47B 23/00

U.S. Cl. 108—43



1. A roll-up lap tray comprising:

- (A) a layer of flexible material having a first surface and a second surface, said layer of flexible material being rectangular in peripheral shape and having ends and sides with said ends intersecting said sides to form corners of said rectangular shape, said flexible material having a length dimension as measured between said ends and a width dimension as measured between said sides with said length dimension being greater than said width dimension, said flexible material further including a diagonal dimension as measured between opposite corners across the center of said rectangular shape;
- (B) a plurality of slats mounted on said flexible material first surface, all of said slats extending lengthwise of said flexible material and each slat having a length that is essentially equal to said flexible material length dimension, all of said slats being independent of each other so that said flexible material can be rolled into a cylindrical shape;
- (C) a pivot pin connected to one of said slats and extending through said layer of flexible material at the center thereof;
- (D) a brace assembly connected to said pivot pin and being

located adjacent to said flexible material second surface and including

- (1) two brace elements, each brace element including ends and each brace element being pivotally connected to said pivot pin intermediate to said ends, and each brace element having a length dimension as measured between said brace element ends which is just slightly less than said diagonal dimension and longer than said length of said flexible material, each brace element further including a snap-receiving chamber defined near each end, one of said brace elements being located immediately adjacent to said layer of flexible material and being located between said layer of flexible material and the other brace element;
- (2) snap elements on selected ones of said slats and which extend through said flexible material and being located adjacent to each said corner so that said brace elements form an X-shape with said brace elements extending transversely across said slats when said snap elements are received in said snap-receiving chambers;
- (3) a third brace element which includes ends and which is pivotally connected to said pivot pin intermediate to the ends of said third brace element, said third brace element having a length dimension as measured between the ends of said third brace element which is essentially equal to said flexible material width dimension, and
- (4) a lip element attached to one of said slats and extending along one side edge of said flexible material for essentially the entire length of said flexible material; and
- (E) a carrying container which includes a hollow, cylindrical body having a blind-ended bore defined therein and a handle on said cylindrical body.

4,958,578

DRUMMED WASTE INCINERATION

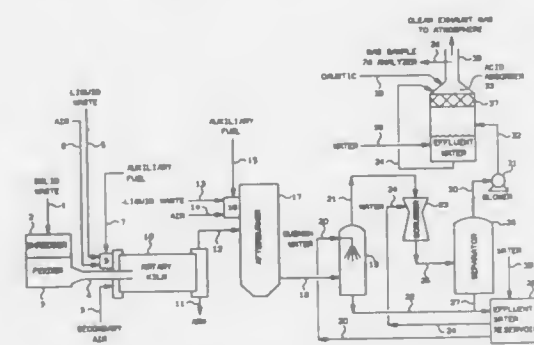
Clarence G. Houser, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 8,975, Jan. 30, 1987, abandoned. This application Aug. 30, 1988, Ser. No. 238,502

Int. Cl.<sup>5</sup> A47J 36/00, 36/24

U.S. Cl. 110—246

49 Claims



1. Apparatus for the disposal of waste material kept within metal container, said apparatus comprising:

- a shredder for the metal container;
- first conveyor means for introducing the metal container, holding the waste material, into said shredder;
- means for producing a mixture of waste material and metal shreds;
- a primary combustion chamber for the mixture of waste material and metal shreds;
- second conveyor means for feeding said mixture of waste material and metal shreds from said shredder into said primary combustion chamber;
- means for burning said mixture of waste material and metal shreds in said primary combustion chamber wherein ash,

decontaminated metal shreds, and primary combustion gases containing combustible residue material, are produced in said primary combustion chamber;

a secondary combustion chamber for the primary combustion gases;

first conduit means, in fluid flow communication between said primary combustion chamber and said secondary combustion chamber, for introducing the primary combustion gases into said secondary combustion chamber, said first conduit means defining a flow path from said primary combustion chamber to said secondary combustion chamber;

means for withdrawing ash and decontaminated metal shreds from said primary combustion chamber;

means for burning combustible residue, contained in the primary combustion gases, in said secondary combustion chamber, wherein hot secondary combustion gases containing entrained ash and particulates are produced in said secondary combustion chamber; and

means for introducing liquid waste material into said secondary combustion chamber.

4,958,579

SEWING DEVICE FOR MATTRESSES OR CUSHIONS

Antonius M. De Weers, Middenhavenstraat 5, 1976 CK, IJmuiden, Netherlands

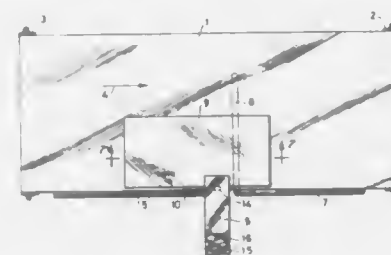
Filed Feb. 24, 1989, Ser. No. 314,933

Claims priority, application Netherlands, Feb. 26, 1988, 8800505

Int. Cl.<sup>5</sup> D05B 11/00, 21/00

U.S. Cl. 112—2.1

9 Claims



1. Device for sewing with a sewing needle, along the edges of a mattress or cushion, cover material covering the top and bottom of the mattress to cover material covering the sides of the mattress, comprising supporting face means which is movable for moving the mattress relative to said sewing needle, said sewing needle adapted to be pushed through the cover material which covers the edge area of the top or bottom of the mattress and the cover material which covers the adjacent edge area of the side of the mattress, which mattress is resting on said supporting face means, a swingable arm adapted to be swung between a position parallel to and a position essentially perpendicular to the direction of movement of said supporting face means, whereby, in the latter position, at least the part of said arm near the swivel point is lying beyond said sewing needle in the direction of movement of said supporting face means, first sensor means located near the swivel point for detecting a hindmost mattress corner in the direction of movement of said supporting face means, and holding means for holding the mattress at said corner; said sensor means and the drive units for said sewing needle, said supporting face means, said holding means and said swingable arm being connected to a control device means for stopping said sewing needle and said supporting face means on detection of a mattress corner and for bringing said holding means and said swingable arm into said operating position so that the mattress can be swung about the held corner, and means for subsequently returning said holding means and said arm to the idle position again.

4,958,580

SEWING MACHINE LATERAL FEED APPARATUS

Yutaka Asaba, Tokyo, and Masaharu Chikamura, Kawasaki City, both of Japan, assignors to Juki Corporation, Tokyo, Japan

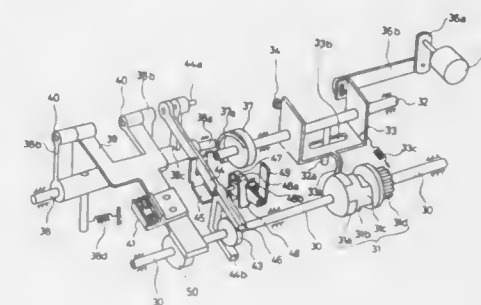
Filed Jan. 27, 1989, Ser. No. 303,535

Claims priority, application Japan, Jan. 29, 1988, 63-11799

Int. Cl.<sup>5</sup> D05B 27/02

U.S. Cl. 112—314

4 Claims



1. In a sewing machine, an apparatus for moving a feed dog in a lateral direction, comprising:  
a frame;  
a first shaft rotatably mounted on said frame to extend in said lateral direction;  
a second shaft mounted on said frame to extend in said lateral direction;  
a cam follower mounted on said first shaft;  
cam means for rotating said cam follower about said first shaft;  
means for transmitting rotation of said cam follower to said first shaft;  
converting means including a face cam secured to said first shaft to engage with an end of said second shaft for converting rotation of said first shaft into axial movement of said second shaft;  
a feed dog bracket rotatably mounted on said second shaft for mounting a feed dog thereon.

4,958,581

SAILBOARD APPARATUS

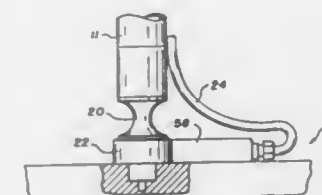
Ian Denison, 1210 West King Edward Ave., Vancouver, British Columbia, Canada V6H 1Z7

Filed Jan. 27, 1989, Ser. No. 303,475

Int. Cl.<sup>5</sup> B63H 9/10

U.S. Cl. 114—93

4 Claims



1. In a sailboard provided with a mast the improvement comprising:  
force responsive means connected to said mast and said sailboard for providing first and second output signals corresponding to the shearing forces acting between said mast and said sailboard in the longitudinal direction of said sailboard and in the transverse direction of said sailboard, respectively;  
indicator means responsive to said first and second output

signals for providing indications representing said shearing forces;  
said force responsive means comprising means connecting said mast to said sailboard;  
means for forming a universal joint between said mast and said sailboard; and  
means connecting said mast to said universal joint;  
said force responsive means comprising means connecting said universal joint to said sailboard.

4,958,582

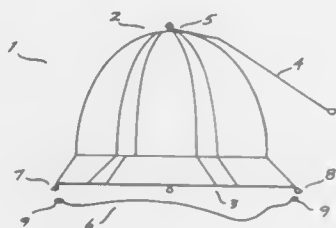
# SPINNAKER SAIL FOR KAYAKS, CANOES OR OTHER SMALL WATER CRAFT

James L. Vermillion, SR-1 Box 2425, Chugiak, Ak. 99567, and Sally M. Forrest, 1385 Bay Laurel Dr., Menlo Park, Calif. 94025

Filed Jan. 1, 1987, Ser. No. 55,943  
Int. Cl.<sup>5</sup> B63H 9/04

U.S. Cl. 114—103

11 Claims



1. an improved spinnaker sail for kayaks and other small watercraft comprising:

- a. a sail, having a top and a bottom, and having a generally triangular shape, said sail being oriented such that the base of the triangle is at the bottom of the sail, said bottom of said sail also having a first corner located at one end of said bottom of said sail, and a second corner, located at the opposite end of said bottom of said sail;
- b. a mast;
- c. anchor means to removably secure said mast to said kayak or small watercraft;
- d. a sheet having a first clip and a second clip, said clips being located at opposite ends of said sheet, said first clip being removably attached to the first corner and said second clip being removably attached to the second corner of said bottom of said sail, thereby forming a loop, said sheet being used to secure said bottom of said sail and to restrain said sail from freely moving in the wind;
- e. a backstay fixedly attached to the top of said sail, said backstay being used to secure said top portion of said sail to said water craft, said backstay also being slidably connected to said mast and fixedly attached to the rear portion of said kayak or said watercraft, such that said backstay exerts a vertical compression force on said mast when the sail is fully loaded;
- f. clip means to slidably fasten said backstay to said mast, said clip means being such that said backstay can be quickly inserted therein and removed therefrom without disassembly of said mast.

4,958,583

# WATER SKI SAFETY APPARATUS

Bruce T. Renouard, 4430 Cedarbrush Dr., Dallas, Tex. 75229  
Filed Apr. 10, 1989, Ser. No. 333,780

Int. Cl.<sup>5</sup> A63C 15/06

U.S. Cl. 114—253

13 Claims

1. Water ski safety apparatus for use with a boat, comprising:  
a first coupler for connecting the apparatus to a handle;  
a second coupler for connecting the apparatus to the boat;

deceleration means for decelerating said apparatus when the apparatus is caused to move toward the boat; and  
wherein a first rope extends between the handle and a first end of said apparatus, a second rope extends between the



boat and a second end of the apparatus, and said deceleration means includes actuation means for actuating the deceleration means, said actuation means being responsive to a reduction in tension placed on said apparatus by said first and second ropes.

4,958,584

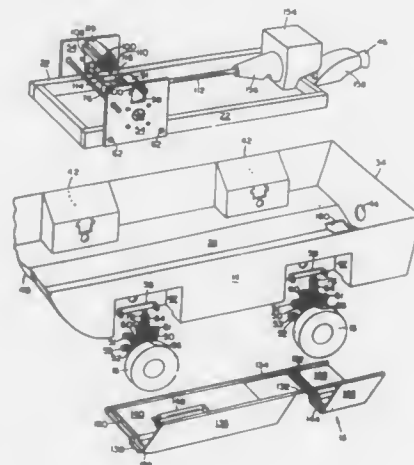
# AMPHIBIOUS VEHICLE HAVING AN EFFICIENT WATER-BORNE OPERATIONAL MODE

Roger L. Williamson, San Antonio, Tex., assignor to MPV, Inc., San Antonio, Tex.

Continuation-in-part of Ser. No. 127,800, Dec. 2, 1987, Pat. No. 4,838,194. This application Feb. 9, 1989, Ser. No. 310,207  
Int. Cl.<sup>5</sup> B60F 3/00

U.S. Cl. 114—270

16 Claims



1. An amphibious vehicle comprising:  
a body having an interior portion and wheel wells;  
at least three wheels located within said wheel wells; suspension means for attaching said wheels to said body, each wheel having one of said suspension means wherein said suspension means comprises:  
at least one support member having first and second ends, said first end being pivotally mounted to said body, and said second end being pivotally mounted to one of said wheels;  
a shock absorber member having first and second ends, said first end of said shock absorber member being attached to said second end of said support member, and said second end of said shock absorber member being attached to a retraction means.  
means for steering said wheels;  
engine/transmission means for impelling at least one of said wheels;  
means for retracting said wheels from a lowered position to a raised position, and for lowering said wheels from said raised position to said lowered position wherein said retraction means comprises:  
a linkage member having first and second ends, said first

end of said linkage member being attached to said second end of said shock absorber member;  
means for imparting horizontal motion to said linkage member, said second end of said linkage member being attached to said imparting means, whereby lateral movement of said linkage member causes said shock absorber member to raise said support member, which in turn raises said wheel, wherein said linkage member has a threaded aperture at said second end, and said means for imparting horizontal motion to said linkage member comprises:  
a worm gear having first and second ends, said first end being inserted into said threaded aperture of said linkage member;  
a motor, rotatably coupled to said second end of said worm gear, whereby energization of said motor causes said worm gear to rotate, said rotation force being converted to translational force by the action of said first end of said worm gear in said threaded aperture of said linkage member;

hull means for covering said wheel wells when said wheels are in said raised position, wherein said hull means comprises:  
a front hull section;  
a rear hull section; wherein said front and rear hull sections each have means for sealing said wheel wells, thereby substantially preventing water from entering said wheel wells;  
means for connecting said front and rear hull sections, said front and rear hull sections being slidably attached to said side of said body whereby, when said front and rear hull sections are in a first position, said wheel wells are exposed and said wheels may contact a supporting roadway and, when said front and rear hull sections are in a second position, corresponding to said raised position of said wheels, said front and rear hull sections cover said wheel wells;

means for moving said front and rear hull sections between said first and second positions wherein said means for moving said front and rear hull sections comprises a double action hydraulic cylinder;  
a plurality of linkage housings, each integral with a vertical mounting plate attached to said body, one of said linkage housings for each of said wheels, said linkage member having a rectangular cross-section, said linkage housing further having a rectangular cross-section therein for passage of said linkage member therethrough, said linkage housing providing support of and a track for said linkage member; and  
means for propelling the vehicle in water.

4,958,585

# BOAT HULL

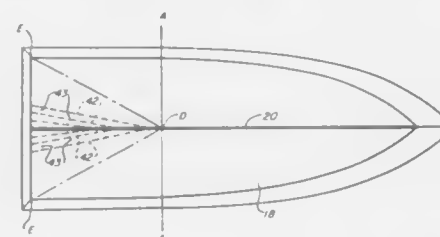
James D. Caldwell, Jr., Cloud, Fla., assignor to Skeeter Products, Inc., Kilgore, Tex.

Filed Jul. 11, 1988, Ser. No. 217,472

Int. Cl.<sup>5</sup> B63B 1/18

U.S. Cl. 114—271

16 Claims



1. A boat hull having a bottom surface which is generally V-shaped in transverse cross section, said bottom surface having a keel, a stern end and a bow end, said bottom surface further having a deadrise angle that progressively increases

from said stern end to a vertical plane forward at said stern end, each transverse cross section of said bottom surface between said stern end and said forward vertical plane being convex, and wherein that portion of said bottom surface extending from a first location, corresponding to the intersection of said keel with said forward vertical plane, to a plurality of second locations, corresponding to the intersection of an edge of the bottom surface with said stern end, is shaped so that the lift to the hull is constant at any point along plural water travel lines, extending along the bottom surface of said hull from said first location to said plurality of second locations, which water travel lines are traversed by water during forward movement of said boat hull through the water.

4,958,586

# FOLDING ANCHOR

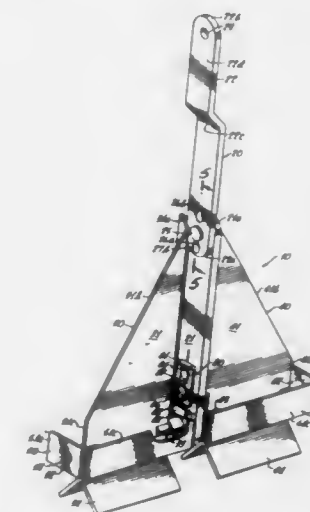
John S. Stupakis, Orange, Calif., assignor to JSS Scientific Corporation, Orange, Calif.

Filed Nov. 3, 1988, Ser. No. 266,801

Int. Cl.<sup>5</sup> B63B 21/44

U.S. Cl. 114—297

23 Claims



1. An anchor comprising:  
first and second fluke retaining assemblies, each of said retaining assemblies including a generally identical generally C-shaped retaining member having first and second oppositely disposed generally parallel short legs and an interconnecting elongate bight portion;  
hinge means secured to the distal ends of a short leg of each of said retaining members for enabling pivoting of said retaining members between a first folded position and a second unfolded position, said retaining members in said first position having the distal ends of the other short arms in edge abutting relation to define a generally rectangular opening, and said retaining members in said second position having the short legs with the hinge in generally parallel spaced relation;  
shank means having a bar-shaped end of a thickness approximately equal to the spacing between adjacent short legs with said first and second retaining members pivoted to said first position;  
means for attaching said end of said shank means in surface abutting relation to the exterior of a short leg for enabling said one end to be in surface abutting relation with the exterior of the adjacent short leg with said retaining members in said first position;  
first and second fluke assemblies, each of said fluke assemblies being coupled for pivoting between the short legs of one of said retaining members for pivoting about an axis



generally parallel to the elongate bight portion, with the pivot axis of one of said fluke assemblies being in axial alignment with the pivot axis of the other fluke assembly with said retaining members pivoted to said first position; and means for locking said retaining members in said first position.

4,958,587

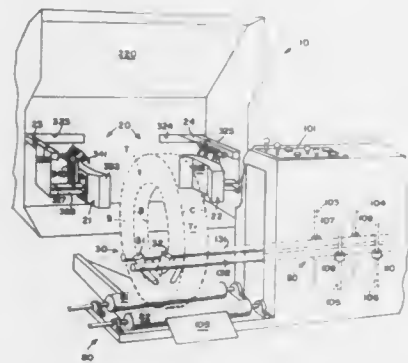
# APPARATUS FOR EXTERIORLY PAINTING AND INTERIORLY COATING TIRES

Robert D. Fogal, Sr.; Robert D. Fogal, Jr., and George E. D. Morgan, all of Chambersburg, Pa., assignors to International Marketing, Inc., Chambersburg, Pa.

Filed Jun. 29, 1989, Ser. No. 373,361  
Int. Cl.<sup>5</sup> B05C 1/02; B05B 13/06

U.S. Cl. 118—206

29 Claims



1. Apparatus for painting the exterior sidewall surfaces of a tire comprising means for rotating a tire about its axis, a carriage, said carriage including first and second paint applicator carrying arms carrying respective first and second paint applicators for applying paint to exterior sidewall surfaces of a tire during the rotation thereof, said paint applicator carrying arms being disposed in generally parallel relationship to each other, first means mounting said paint applicator carrying arms upon said carriage for reciprocal sliding movement toward and away from each other in a first reciprocal movement direction, first means for selectively moving said paint applicator carrying arms toward and away from each other in said first direction thereby accommodating tires of different width between said paint applicators, second means mounting said paint applicator carrying arms upon said carriage for reciprocal sliding movement in a second reciprocal movement direction generally normal to said first direction and to said tire axis, second means for selectively reciprocally moving said paint applicator carrying arms toward and away from said tire axis in said second direction thereby accommodating tires of different diameters between said paint applicators, and third means for selectively reciprocally moving said carriage in a third reciprocal movement direction generally normal to said second direction thereby accommodating tires of different heights.

4,958,588

# SOLDER-COATING FIXTURE AND ARRANGEMENT

Steven Hutchinson, Centereach, and Leonard Bruno, Islip, both of N.Y., assignors to United Technologies Corporation, Hartford, Conn.

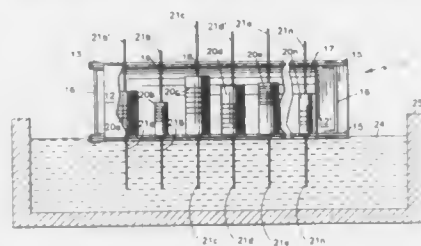
Filed Apr. 28, 1989, Ser. No. 344,785  
Int. Cl.<sup>5</sup> B05C 3/02

U.S. Cl. 118—423

10 Claims

1. A fixture for solder-coating respective end portions of elongated components that are loaded in the fixture in a molten solder bath, comprising means for maintaining the fixture afloat in a predetermined

position on an upper surface of the molten solder bath even when fully loaded, including at least one solid supporting wall having at least one opening therein for the passage of one of the end portions of a respective component therethrough and kept from sinking into the molten solder bath solely by surface tension effective between said solid supporting wall and the molten solder bath in said predetermined position of the fixture; and



means for holding the respective component on said supporting wall in a position in which the respective end portion thereof passes through said opening and, when the fixture floats in said predetermined position on the molten solder bath, into the molten solder bath to a depth necessary for the molten solder to coat the respective end portion to the desired extent.

4,958,589

# CONTINUOUS MELT-PLATING APPARATUS

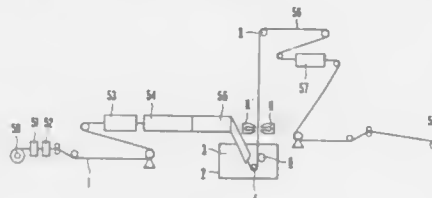
Masatoshi Homma; Tetsuo Yamaguchi, both of Hitachi, and Tameyuki Hasegawa, Hiratsuka, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 28, 1989, Ser. No. 329,821

Claims priority, application Japan, Mar. 30, 1988, 63-74361  
Int. Cl.<sup>5</sup> B05C 3/12

U.S. Cl. 118—672

8 Claims



1. A continuous melt-plating apparatus having: a plating melt bath, a sink roller disposed in the plating melt of said plating melt bath for conveying a steel strip wound thereon and serving as a material to be plated, gas wiping nozzles located above said plating melt bath and respectively disposed adjacent to a front surface and a rear surface of said steel strip so as to blow off and wipe off part of the plating melt attached to the front surface and rear surface of said steel strip to adjust the plating thereon to a desired thickness the continuous melt-plating apparatus comprising: a guide roller having at least a part thereof immersed in said plating melt bath, and disposed on the opposite side of said steel strip from said sink roller, between said nozzle and said sink roller, and adjustment means for bending said guide roller in the widthwise direction thereof so as to be capable of pushing said steel strip with a force varied in the widthwise direction of said steel strip.

4,958,590

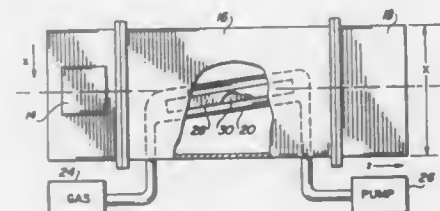
# MICROWAVE TRAVELING-WAVE DIAMOND PRODUCTION DEVICE AND METHOD

Robert R. Goforth, Encinitas, Calif., assignor to General Atomics, San Diego, Calif.

Filed Sep. 6, 1989, Ser. No. 403,335  
Int. Cl.<sup>5</sup> C23C 16/50

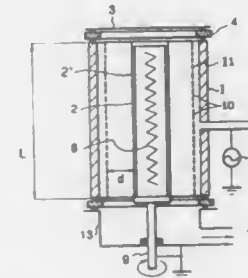
U.S. Cl. 118—723

22 Claims



1. Apparatus for depositing diamond comprising: a waveguide structure, said waveguide structure including an elongate waveguide section having a first end, a second end, and a length therebetween, and defining a substantially internal uniform cross section at all points along the length of the section; a reaction tube disposed within said waveguide section; at least one substrate plate disposed within said tube and extending substantially in the longitudinal direction thereof; means for maintaining a gaseous mixture within said tube at a prescribed pressure, said gaseous mixture having a composition that promotes the deposition of diamond on said at least one substrate when exposed to said microwave energy; means for applying microwave energy at the first end of said waveguide section for causing a traveling wave of microwave energy to pass lengthwise through said waveguide section to create plasma in said gaseous mixture, heating said gaseous mixture and said at least one substrate, said traveling wave being propagated in a TE<sub>mn</sub> mode wherein the transverse electric field thereof has a magnitude that varies within a given cross section of the waveguide section from zero at the waveguide structure to at least one maxima within said cross section, and wherein said at least one maximum decreases in amplitude with distance from the first end of the waveguide section; and said reaction tube extending generally in the longitudinal direction of said waveguide section but obliquely thereof with the interior of said tube in a region of substantially constant power absorption through said waveguide section.

introducing film forming raw material into said film, forming space, a power source electrically connected to said cathode and said anode capable of creating discharge in said film forming space, and an exhausting means for removing gases from said film forming space, wherein the improvement comprises



4,958,592

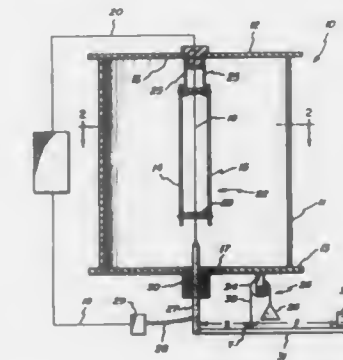
# RESISTANCE HEATER FOR DIAMOND PRODUCTION BY CVD

Thomas R. Anthony, Schenectady; Robert C. DeVries, Burnt Hills; Richard A. Engler; Robert H. Ettinger, both of Schenectady, and James F. Fleischer, Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 22, 1988, Ser. No. 234,773  
Int. Cl.<sup>5</sup> C23C 16/46

U.S. Cl. 118—724

8 Claims



# APPARATUS FOR FORMING A FUNCTIONAL DEPOSITED FILM BY MEANS OF PLASMA CHEMICAL VAPOR DEPOSITION

Itaru Yamazaki, Nagahama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 71,335, Jul. 2, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,202

Claims priority, application Japan, Jul. 4, 1986, 61-157611  
Int. Cl.<sup>5</sup> C23C 16/50

U.S. Cl. 118—723

1 Claim

1. In a capacitive-coupled type plasma chemical vapor deposition apparatus for forming a light receiving layer on a cylindrical substrate so as to produce a photosensitive member for use in electrophotography, which includes a substantially enclosed deposition chamber having a film forming space surrounded by a circumferential wall functioning as a cathode, means for receiving a cylindrical substrate which functions as an anode in the film forming space disposed on at least one of an upper wall and a bottom wall, a gas supplying means for

1. An apparatus adapted for use in the practice of a CVD process comprising in combination (a) a reaction chamber having opposite upper and lower closed end walls, (b) a gas inlet and exhaust means in said end walls to introduce a gas into said chamber and to withdraw gas therefrom, (c) a vertical pair of parallel spaced apart planar oppositely facing substrate surfaces suspended from the upper closed end wall of the reaction chamber and positioned in said reaction chamber so that gas from said gas inlet means may flow between said surfaces and exit from said gas exhaust means, (d) vertical heater means positioned between said substrate surfaces and spaced therefrom a predetermined distance coextensive with said surfaces to heat the gas flowing between said surfaces, and

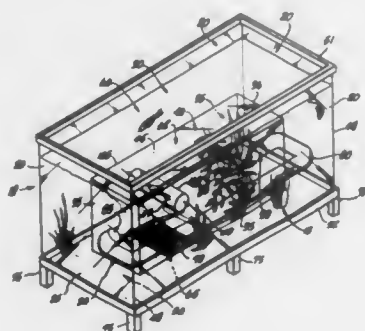
(e) weight balancing means, for maintaining the spaced relationship of the vertical heater means from the surfaces, suspended from the upper closed end wall of the reaction chamber by means of a cable passing over a pulley member attached to the lower closed end wall of the reaction chamber.

#### 4,958,593 VIVARIUM

James P. Huriburt, 8874 Cypress Ave., and Michael R. Lagasse, 17333 Valley Blvd., both of Fontana, Calif. 92335  
Filed Jun. 20, 1988, Ser. No. 209,333  
Int. Cl.<sup>3</sup> A01K 63/00

U.S. Cl. 119—5

9 Claims



1. A vivarium comprising:

- (a) a bottom wall;
- (b) upstanding, substantially transparent outer side walls which in cooperation with the bottom wall form an outer container;
- (c) upstanding, substantially transparent inner side walls which in cooperation with the bottom wall form a single inner container, the inner container also having an enclosing top wall, such that the inner container is not in fluid communication with the outer container; and
- (d) at least one substantially transparent tube member forming a dry tube, the said at least one dry tube connecting an opening at one portion of the inner side walls to another opening at another portion of the inner side walls, with the said at least one dry tube extending through the space between the inner container and the outer container, the inside of the said at least one dry tube being in fluid communication with the inside of the inner container; wherein the top of the outer side walls extend higher than the top wall of the inner container; the space between the inner container and the outer container is adapted to for use as an aquarium, capable of being filled with water to a level above the top of the inner container; a portion of the bottom wall inside the inner container having at least one access opening therethrough; the inside of the inner container being in fluid communication with the atmosphere; and the inner container being adapted for use as a terrarium.

#### 4,958,594

##### MODULAR TACK ROOM

Billy H. Swagerty, Eugene, Oreg., assignor to Carl E. O'Bryant and Linda K. O'Bryant, both of Veneta, Oreg.  
Filed Dec. 20, 1989, Ser. No. 453,701  
Int. Cl.<sup>3</sup> A01K 29/00; B60P 3/04

U.S. Cl. 119—7

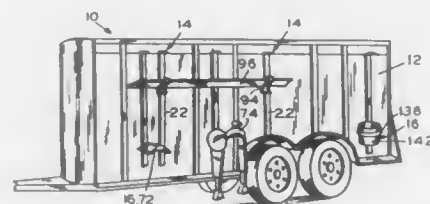
11 Claims

1. A modular tack room, comprising:

- a. a wall hanger assembly which includes:
  - (1) an elongated vertical member having a top and bottom, and a front, a back and two sides;
  - (2) a plurality of receiving clip members attached to the vertical member at its front and extending upwards in a

substantially parallel relationship to the vertical member, the plurality of receiving clip members being spaced along the length of the vertical member;

- (3) a horizontal member attached to the top, and extending to the front, of the vertical member and, said horizontal member having connecting means formed therein; and
- (4) a L-shaped member, having on a horizontal, first leg, connecting means formed for adjustable connection with the connecting means of said horizontal member atop the vertical member, and being formed so that when said connecting means are joined, a vertical, second leg of the L-shaped member will extend downwards a spaced distance from the back of the vertical member, an available adjustment of said adjustable connection being the amount of said spaced distance between the second leg of the L-shaped member and the back of the vertical member;
- (5) wherein a clamp-type arrangement is formed between the L-shaped member and the back of the vertical member so as to grip the upper portion of a wall and allow the elongated vertical member with receiving clips to hang therefrom;



b. at least one hanging component, with an inner end and an outer end, having means of mounting said inner end to the front of the vertical member, which include:

- (1) a vertical mounting plate of thickness less than the space between the receiving clip member and the front of the vertical member, so as to fit downward between the upwardly extending receiving clip member and the front of the vertical member;
- (2) two guide members, attached to and extending horizontally from the vertical mounting plate, which are laterally separated from each other by a space slightly greater than the width of the vertical member, so that with the vertical mounting plate inserted into the receiving clip space, the guide members embrace the sides of the vertical member, so as to limit lateral movement and rotation of the hanging component; and
- (3) a lower support member, positioned below the engagement of the mounting plate and the receiving clip and formed to contact the front of the vertical member and thus provide support against the levered weight of the hanging component any load thereon.

#### 4,958,595

##### DISPOSABLE BIRD FEEDER

Elaine A. Richman, 6102 Ivydene Ter., Baltimore, Md. 21209, and Darrell D. Fish, Baltimore, Md., assignors to Elaine A. Richman, Baltimore, Md.  
Filed Nov. 3, 1989, Ser. No. 431,085  
Int. Cl.<sup>3</sup> A01K 39/01

U.S. Cl. 119—52.2

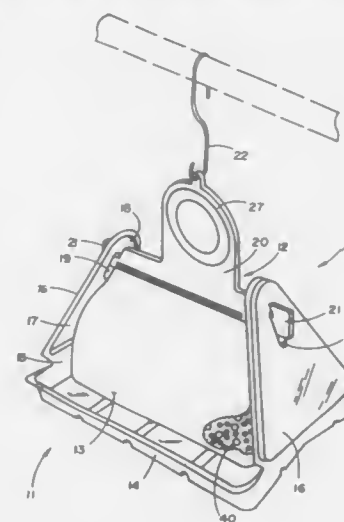
30 Claims

1. A disposable bird feeder which is compact, easily assembled, and may be discarded when the feed is consumed, comprised of:

- a substantially flat tray including a pair of spaced-apart opposite side walls, the side walls being flexibly joined to the tray such that side walls may be laid out flat for storage and may be folded to form upwardly-extending side

walls, each of the side walls having a lower portion integrally joined to the tray and an upper portion located above the tray;

- a central section including a horizontal member having respective opposite ends, each of said opposite ends being joined to a respective upper portion of a respective side wall of the tray, thereby supporting the tray from the central section, the central section further including



means thereon for supporting the disposable bird feeder; and

- a separate pouch of bird feed supported by the central section independently of the side walls and of the tray, the pouch depending from the central section between the side walls and above the tray, wherein the pouch may be punctured to allow release of the bird feed from the pouch and onto the tray.

#### 4,958,596

##### PET GROOMING KIT WITH APPLICATOR

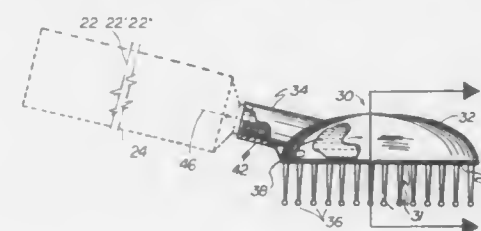
Katalin Belan, 2450 NE. 135th St., #705, North Miami, Fla. 33181

Filed Dec. 26, 1989, Ser. No. 457,149

Int. Cl.<sup>3</sup> A01K 13/00

U.S. Cl. 119—86

9 Claims



1. A pet grooming kit for use in applying shampoo, flea pesticides and other related liquid substances to an animal's coat, comprising:

- a. A portable carrying case including an interior compartment and an exterior shell structure having a handle attached thereto,
- b. a plurality of containers formed of a flexible material, for containment of a liquid therein, each of said containers having an elongate body with a threaded tubular spout formed at an upper distal end thereof,
- c. a liquid applicator means including a head portion and a tubular neck portion having a threaded interior surface

adapted for threaded engagement with said threaded tubular spout, said head portion including a hollow interior defining a reservoir for receiving liquid from a container,

- d. said tubular neck portion on said liquid applicator means being formed and configured for liquid receiving engagement with said tubular spout on each of said plurality of containers,
- e. a plurality of bristles connected to an extending outwardly from a bottom surface of said head portion in perpendicular relation thereto, said plurality of bristles arranged in a plurality of rows in spaced relation throughout the bottom surface,
- f. each of said bristles including an interior vein extending axially through the entire length of a bristle and in liquid receiving relation to the hollow interior of said liquid applicator means and being structured to permit passage of liquid therethrough, and
- g. liquid disbursing means including a hollow sphere disposed on a distal end of each of said plurality of bristles in liquid receiving relation to said interior vein, said hollow sphere including a plurality of small apertures structured and configured to evenly disburse the liquid in a multi-directional manner as the liquid exits from within the vein.

#### 4,958,597

##### PET RESTRAINT

Richard C. Mildner, 1040 San Dequito Dr., Encinitas, Calif. 92024

Filed Dec. 4, 1989, Ser. No. 444,991

Int. Cl.<sup>3</sup> A01K 1/00

U.S. Cl. 119—109

2 Claims



1. A pet restraint comprising:

- (a) a leash having an upper and lower end and a clip on its lower end for clipping onto the collar of a pet;
- (b) the upper end of said leash branching into two leash portions of substantially equal lengths;
- (c) the upper ends of said leash portions having means to engage respectively restraints on the opposite sides of the bed of a pickup truck;
- (d) means releasably fastening said leash portions together along at least portions of their length such that said restraint mode can be used in a leash mode;
- (e) said means to engage at least one of said leash portions being a loop for use as a hand grip in said leash mode;
- (f) said means to restrain on each of said leash portions being a loop, and said loops overlying one another when in said leash mode to define a double-stranded hand grip grippable by a single hand; and,
- (g) said means releasably fastening said leash portions comprising mating patches of hook-and-loop fastener material mounted on respective opposite surfaces of said leash portions.

#### 4,958,598

##### ENGINE EMISSIONS CONTROL APPARATUS AND METHOD

Dwayne Fosco, Radcliffe, Iowa, assignor to Midwest Power Concepts, Ltd., Radcliffe, Iowa

Filed Oct. 10, 1989, Ser. No. 419,254

Int. Cl.<sup>3</sup> F02B 75/12

U.S. Cl. 123—1 A

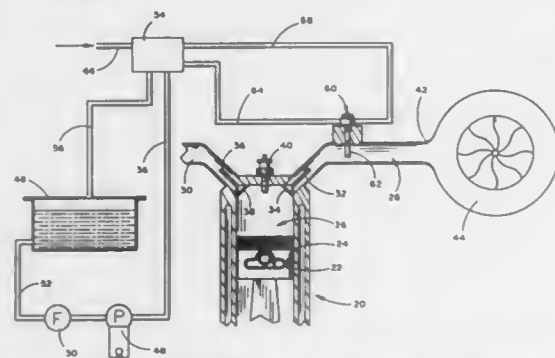
16 Claims

1. Apparatus for reducing the emissions of a diesel engine, comprising:

- (a) a hydrous alcohol fuel of between about 33 percent and



about 70 percent alcohol by volume and between about 30 percent and 67 percent water by volume;  
(b) a fuel injector for delivering said hydrous alcohol fuel for combustion in the engine; and



(c) means for controlling the delivery of said fuel to the engine in response to operating conditions of the engine, such that said fuel is delivered for combustion only when the engine is being operated to increase the rate of engine revolutions and when the engine is being operated substantially to maintain the rate of engine revolutions.

4,958,599

## COOLING DEVICE FOR ENGINE

Yoshiharu Yokoyama, and Shigeru Akiyama, both of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Sep. 11, 1989, Ser. No. 405,472

Int. Cl. F01P 11/20

U.S. Cl. 123—41.5

6 Claims



1. In a cooling system for an internal combustion engine mounted within a casing and powering an electrical generator, said internal combustion engine having a cooling jacket, a heat exchanger, conduit means for communicating liquid flow between said engine cooling jacket and said heat exchanger, the improvement comprising an elastic expansion chamber supported directly by said casing and communicating said cooling system for receiving and containing the varying volumes of coolant as the coolant expands and contracts due to temperature variations.

4,958,600

## LIQUID COOLING SYSTEM FOR A SUPERCHARGED INTERNAL COMBUSTION ENGINE

Ingo Janthur, Rueselsheim, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

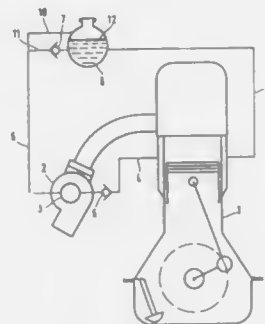
Filed Feb. 2, 1990, Ser. No. 474,286

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1989, 3904801

Int. Cl. F01P 7/14

U.S. Cl. 123—41.31

2 Claims



1. A liquid cooling system for an internal combustion engine having a cooling circuit arranged for forced circulation cooling during engine operation, a turbosupercharger for charging the engine and connected to the engine cooling circuit via an inlet flow pipe and a return flow pipe, and an expansion tank for cooling liquid in the cooling system in which the cooling circuit is adapted to contain a predetermined amount of liquid so as to define a desired cooling liquid level in the expansion tank, characterized in that the inlet flow pipe (4) of the turbosupercharger (2) contains a check valve (5) and a return flow pipe (6) of the turbosupercharger (2) connects with a first branch pipe (10) flowing into the expansion tank (8) above the cooling liquid level (12) and a second branch pipe (11) flowing into the expansion tank (8) below the cooling liquid level (12) and containing a check valve (7).

4,958,601

## VALVED PISTON WITH ROCKER ARM JOURNALED TO PISTON

H. Clayton Lyons, P.O. Box 1737, Brookings, Oreg. 97415

Filed Sep. 19, 1988, Ser. No. 249,873

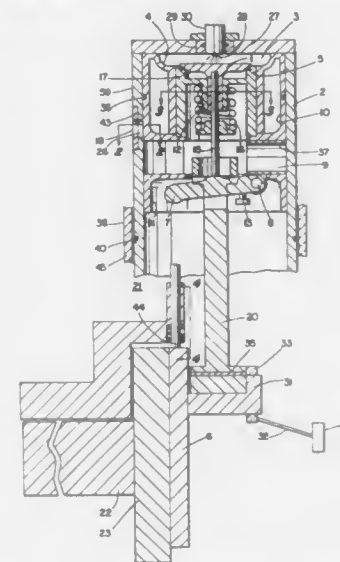
Int. Cl. F01L 11/00

U.S. Cl. 123—47 R

3 Claims

1. In a two cycle internal combustion engine the combination of,  
cylinder,  
a movable piston in the cylinder,  
an intake valve in the head of the piston,  
at least one push pin impinging on said intake valve,

a rocker arm journaled to the piston and engaging an end of said push pin, and



cam means engaging the rocker arm and operative to pivotally move said arm whereby said push pin is moved vertically to sequentially open and close said intake valve.

4,958,602

## INTERNAL COMBUSTION ENGINE

Klaus Höppner, Marbach; Reinhard Friedrich, Waiblingen, and Hermann Weiss, Steinheim, all of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

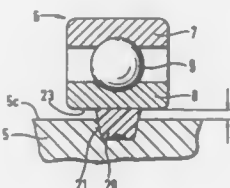
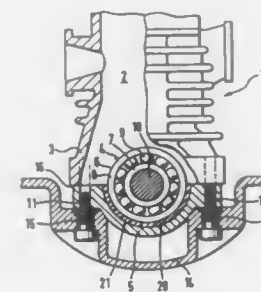
Filed Oct. 20, 1989, Ser. No. 424,821

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1988, 3836272

Int. Cl. F02F 7/00

U.S. Cl. 123—195 C

16 Claims



1. An internal combustion engine such as a two-stroke engine for portable handheld tools such as a motor-driven chain saw, cutoff machine, brushcutter or the like, the internal combustion engine including a crankshaft and comprising:

an engine block including a cylinder and crankcase upper part extending from said cylinder;  
a bearing cover connected to said crankcase upper part so as to define a partition interface therebetween;  
said crankcase upper part and said bearing cover conjointly defining a bearing seat at said interface;  
a crankshaft bearing seated in said bearing seat for rotatably journaling the crankshaft therein;  
said bearing cover being made of a material having a thermal expansion coefficient greater than said bearing thereby causing a clearance to develop between said cover and said bearing in the presence of heat developed in the engine during the operation thereof;  
receiving space means formed to extend over at least a portion of said bearing seat so as to define a receiving space between said bearing cover and said bearing;  
an annular segment disposed in said receiving space; and  
said annular segment having a thermal expansion coefficient selected so as to cause said annular segment to expand during operation of the engine and fill out said clearance thereby applying a holding force to said bearing.

4,958,603

## BRACE FOR CONNECTING AN AUXILIARY COMPONENT TO AN INTERNAL COMBUSTION ENGINE

Karl-Heinz Heimer, Trebur, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 5, 1990, Ser. No. 474,867

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1989, 8902070[U]

Int. Cl. F16M 13/00; F02B 67/00

U.S. Cl. 123—195 A

5 Claims



1. Brace for connecting an auxiliary component such as a generator to an internal combustion engine wherein the brace is provided with recesses in respective regions having respective brace attachment points for accepting respective attachment elements that can be connected to each of the component and engine and are braced between a head of the attachment element and the respective auxiliary component and engine, characterized in that the brace in the region of each attachment point between the head of the attachment element and the brace as well as between the brace and the respective component and engine has, in each case, a spherical segment adjacent to the brace and a ball cup on the head and adjacent to the respective component and engine, the spherical segment on a side thereof turned towards the attached ball cup having an arch directed towards it, the ball cup having a corresponding matching arch, and each of the spherical segments and the respective ball cups having recesses for accepting the attachment element, the recesses in the spherical segments being

larger than the size of the part of the attachment element that penetrates them, and the recess of at least one brace attachment point in its longitudinal direction being greater in size than that part of the attachment element penetrating it.

4,958,604

### DIRECT FUEL INJECTION TYPE SPARK IGNITION INTERNAL COMBUSTION ENGINE

Eiji Hashimoto, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

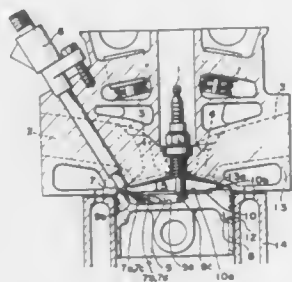
Filed Jan. 30, 1989, Ser. No. 303,940

Claims priority, application Japan, Feb. 10, 1988, 63-27693; Feb. 12, 1988, 63-16266

Int. Cl.<sup>5</sup> F02B 23/10

U.S. Cl. 123—276

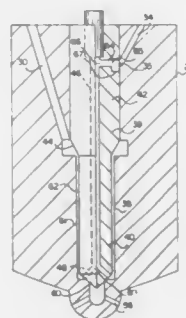
17 Claims



1. A direct fuel injection type spark ignition internal combustion engine comprising:

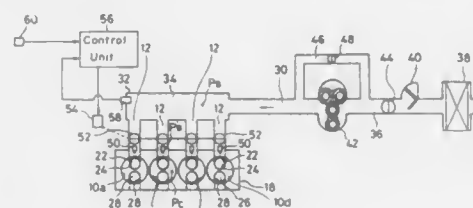
- a piston/cylinder structure including a cylinder, a piston reciprocally movable in the cylinder, and a cylinder head located above the cylinder; the piston including a shallow dish portion and a deep dish portion formed in a top portion of the piston; an inside surface of the cylinder, an upper surface of the piston including surfaces of the shallow and deep dish portions and a lower surface of the cylinder head defining a combustion chamber therein; the piston/cylinder structure further including two intake ports and at least one exhaust port formed in the cylinder head and communicating with the combustion chamber; spark plug located close to an axis of the combustion chamber and coupled to the cylinder head so as to protrude into the combustion chamber from the lower surface of the cylinder head;
- a fuel injection nozzle located at a radially outer portion of the combustion chamber, a fuel injection direction and fuel injection timing of the fuel injection nozzle being predetermined for high and low engine load operation, the fuel injection nozzle having at least one fuel injection hole for injecting a fuel to be injected toward the shallow dish portion at an early stage of an injection period of a fuel injection timing in the high engine load operation, toward the deep dish portion at a late stage of the injection period of the fuel injection timing in the high engine load operation and during an entire stage of an injection period of a fuel injection timing in the low engine load operation, and wherein an axis of the shallow dish portion and an axis of the deep dish portion are offset from an axis of the piston on the side close to the fuel injection nozzle, the axis of the deep dish portion being offset further from the axis of the piston than the axis of the shallow dish portion.

4,958,605  
FUEL INJECTION NOZZLE  
Glenn B. O'Neal; Quentin A. Baker; Henry E. Mecredy, III, all of San Antonio, Tex., and Daniele Terna, Milan, Italy, assignors to Euron S.p.A., Milan, Italy  
Filed Apr. 10, 1989, Ser. No. 335,282  
Int. Cl.<sup>5</sup> F02B 3/10; F02M 45/08, 61/06  
U.S. Cl. 123—300 17 Claims



1. A fuel injection nozzle for an engine having at least one compression-ignition combustion chamber comprising:
  - (a) a first intake means for receiving a charge of a first fuel and a second intake means for receiving a charge of a second fuel;
  - (b) a cavity having respective openings for receiving said first and second charged fuels from the respective intake means;
  - (c) valve means movable within the cavity and adapted to sealingly engage a wall of the cavity to form at least one collection zone for collecting said fuels received from said openings and to disengage from the wall of the cavity to thereby release said fuels, said valve means comprising means for conveying one of said fuels from one of said openings to said collection zone; and
  - (d) injection means adapted to receive the fuels from the at least one collection zone and to release said fuels into said combustion chamber.

4,958,606  
SUPERCHARGED ENGINE  
Mitsuo Hitomi; Junso Sasaki; Akira Takai, all of Hiroshima; Kazuaki Umezono, and Fumio Hinatake, both of Aki, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan  
Filed Nov. 27, 1987, Ser. No. 125,982  
Claims priority, application Japan, Nov. 27, 1986, 61-282624; Nov. 27, 1986, 61-282625; Feb. 9, 1987, 62-27947  
Int. Cl.<sup>5</sup> F01L 1/34; F02D 39/08  
U.S. Cl. 123—316 40 Claims



1. A supercharged engine comprising:
  - a cylinder;
  - a piston slidably received in said cylinder and reciprocally movable therein, said piston and said cylinder defining a combustion chamber therebetween,

the engine having a geometric compression ratio of at least 8.5;

a crank rotatably mounted in the engine and operatively connected to said piston, said crank limiting reciprocal movement of said piston within said cylinder between a top dead center position and a bottom dead center position, and said crank rotating as said piston reciprocates in said cylinder;

an engine output means operatively connected to said crank for generating an engine output from the rotation of said crank;

an intake port means open to said combustion chamber, and through which charges of intake air pass to said combustion chamber;

an intake passage open to said intake port means;

a mechanical supercharger operatively disposed in said intake passage and connected to said engine output means so as to be driven by the engine output for pressurizing the charges of intake air supplied to said combustion chamber through said intake port means;

an intake valve operatively disposed in said intake port means for opening and closing to open and close said intake port means;

an exhaust port means open to said combustion chamber and through which exhaust gases generated in said chamber are discharged therefrom;

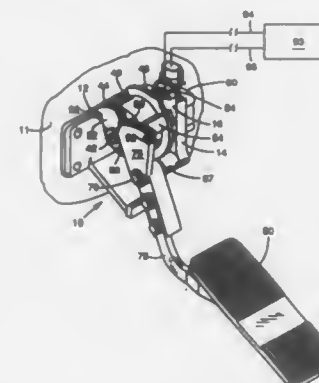
an exhaust valve operatively disposed in said exhaust port means for opening and closing to open and close said exhaust port means;

the opening and closing of said valves being based on a valve lift of 1 mm, and the engine having a valve timing which can be operatively established to satisfy the equation

$$Y \cong -1.75X + 10$$

wherein Y is the timing of the closing of said intake port means as represented by the crank angle taken between when the piston is at the bottom dead center position and when the intake valve is closed, and X is an overlap angle representing a time period during which both said intake valve and said exhaust valve are open and equal to the crank angle taken between when the intake valve is open and when the exhaust valve is closed.

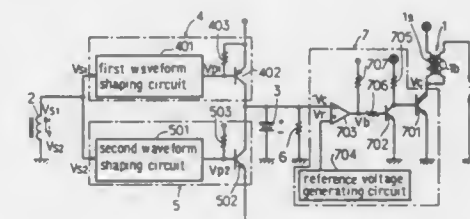
4,958,607  
FOOT PEDAL ARRANGEMENT FOR ELECTRONIC THROTTLE CONTROL OF TRUCK ENGINES  
Chester E. Lundberg, Sherwood, Oreg., assignor to Williams Controls, Inc., Portland, Oreg.  
Filed Apr. 18, 1989, Ser. No. 340,234  
Int. Cl.<sup>5</sup> F02D 11/10; G05G 1/14  
U.S. Cl. 123—399 8 Claims



1. A foot pedal arrangement for controlling the throttle of an internal combustion engine in a vehicle comprising: a configured integral support structure having a base adapted for

mounting onto the upright wall of a vehicle cab, a foot pedal pivotally mounted on the support structure, a throttle controlling computer, and monitoring means connected to the computer, said monitoring means mounted to the support structure, linear coupling means coupling the monitoring means and foot pedal whereby pivotal movement of the foot pedal is linearly monitored by the monitoring means for proportionate input to the computer for controlling engine throttle, said foot pedal, monitoring means and coupling means being mounted on the support structure for unitized mounting thereof onto the upright wall of a vehicle cab.

4,958,608  
IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINE  
Akihiko Saito, Numazu, and Hideki Yukawa, Susono, both of Japan, assignors to Kokusan Denki Company, Ltd., Numazu, Japan  
Filed Apr. 14, 1989, Ser. No. 338,058  
Claims priority, application Japan, Apr. 27, 1988, 63-57077[U]  
Int. Cl.<sup>5</sup> F02P 5/155  
U.S. Cl. 123—427 8 Claims



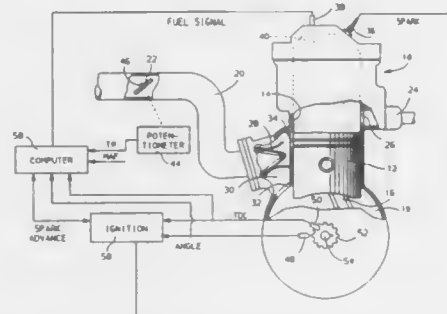
1. An ignition system for an internal combustion engine comprising:
  - at least one ignition coil;
  - a signal coil for generating a first signal at a position of which a phase is advanced relative to an ignition position of the internal combustion engine and a second signal at said ignition position;
  - a control capacitor;
  - a charging circuit for charging said control capacitor when said first signal is generated;
  - a discharge circuit for causing discharge of said control capacitor when said second signal is generated;
  - a discharge resistor connected in parallel with said control capacitor;
  - a switch circuit for controlling a primary current which is turned on to cause a primary current to flow from a power supply to said ignition coil when a voltage across said control capacitor rises and turned off to interrupt said primary current when said voltage falls.

4,958,609  
FUEL INJECTION TIMING CONTROL FOR A CRANKCASE SCAVENGED TWO-STROKE ENGINE  
Douglas E. Trombley, Warren; Kenneth J. Buslepp, Utica; Cathy C. Lillie, and Marcel R. Waackel, both of Mt. Clemens, all of Mich., assignors to General Motors Corporation, Detroit, Mich.  
Filed Dec. 18, 1989, Ser. No. 451,834  
Int. Cl.<sup>5</sup> F02D 41/04; F02M 51/00  
U.S. Cl. 123—478 14 Claims

1. In a crankcase scavenged two-stroke engine having timed direct cylinder fuel injection and a movable throttle valve for regulating engine intake air, a method for improving the response of engine output torque to a change in throttle position comprising:
  - measuring throttle position;



deriving an indication of the time rate of change in throttle position; and



adjusting fuel injection timing as a function of measured throttle position and time rate of change in throttle position.

4,958,610

## FUEL INJECTION SYSTEM

Tadahiro Yamamoto, and Ken Ota, both of Yokosuka, Japan, assigns to Nissan Motor Company, Ltd., Japan

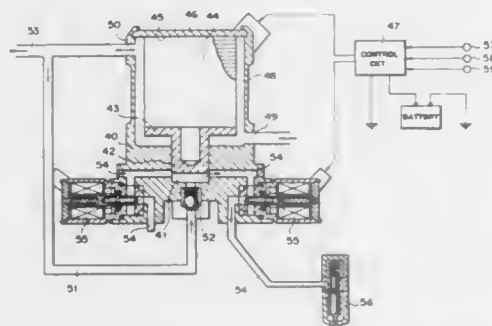
Filed Jan. 10, 1989, Ser. No. 295,620

Claims priority, application Japan, Jan. 11, 1988, 63-3320

Int. Cl.<sup>3</sup> F02M 51/04, 41/02, 57/02

U.S. Cl. 123—478

9 Claims



1. A fuel injection system including a plurality of fuel injection valves and a fuel tank, the fuel injection system comprising:

- a pump body formed with a cylinder and including a cylindrical wall and an end wall which cooperate with each other to define said cylinder;
- a plunger slidably disposed in said cylinder;
- an actuator mounted within said pump body, said actuator comprising a piezoelectric element of a laminated type and so constructed and arranged as to reciprocate said plunger in said cylinder as said actuator extends and contracts;
- means for providing a fuel return passage having one end communicating with said pump body and an opposite end communicating with the fuel tank;
- means for providing a fuel supply passage having one end connected to said fuel return passage and an opposite end communicating with said cylinder;
- means for preventing fuel from flowing out of said cylinder toward said fuel return passage through said fuel supply passage;
- said pump body being formed with a plurality of fuel delivery passages having one end thereof communicating with said cylinder;
- a plurality, corresponding in number to said plurality of fuel delivery passages, of solenoid valves mounted to said

pump body to close said plurality of fuel delivery passages, respectively; and  
means for controlling said actuator and said plurality of solenoid valves.

4,958,611

## AIR-FUEL RATIO CONTROLLER OF INTERNAL COMBUSTION ENGINE

Masanobu Uchinami; Toshihisa Takahashi, both of Himeji; Hitoshi Inoue, Amagasaki; Takahiro Moronaga, and Shinichi Nishida, both of Himeji, all of Japan, assigns to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

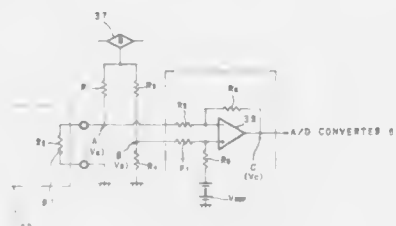
Filed Mar. 1, 1989, Ser. No. 317,486

Claims priority, application Japan, Mar. 1, 1988, 63-49085

Int. Cl.<sup>3</sup> F02D 41/22

U.S. Cl. 123—479

1 Claim



1. An air fuel (A/F) ratio controller of an internal combustion engine comprising:

- a wide-range A/F ratio sensor which is composed of the following: an oxygen sensor for generating a specific voltage responsive to the difference of oxygen concentration between atmosphere and exhaust gas inside of said internal combustion engine, an oxygen pump for letting pump current flow so that said voltage is a predetermined value, and a heater for heating said oxygen sensor and oxygen pump;
- an A/F ratio detection device for detecting A/F ratio of fuel-mixed vapor supplied to said engine in accordance with said pump current;
- a controller for executing feedback control of a quantity of fuel to be supplied to said engine so that the detected A/F ratio is an objective value;
- abnormal-condition detection means for detecting occurrence of an abnormal condition in said heater on the basis of the resistance value of said heater; and
- feedback-stop means for stopping said feedback control to said engine when said abnormal condition is detected in said heater, wherein said abnormal-condition detection means of said heater is substantially composed of a Wheatstone bridge circuit which includes said heater, and wherein said means detects whether or not equilibrium of signals outputted from said bridge circuit deviates by more than a predetermined value, and if an unbalance by more than said predetermined value is detected, said means stops execution of feedback control of fuel quantity to be supplied to said engine.

4,958,612

## AIR-FUEL RATIO CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

Akira Kato, and Toru Yano, both of Wako, Japan, assigns to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Jun. 19, 1989, Ser. No. 368,377

Claims priority, application Japan, Jun. 30, 1988, 63-162858

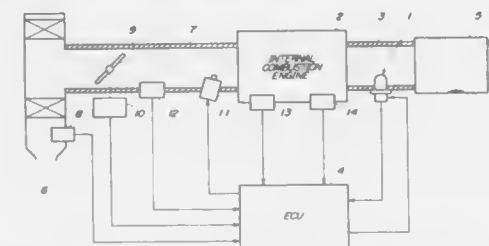
Int. Cl.<sup>3</sup> F02D 41/14

U.S. Cl. 123—489

11 Claims

1. In an air-fuel ratio control method for an internal combustion engine having an exhaust gas-ingredient concentration sensor provided in an exhaust system thereof and generating an

output proportional to the concentration of an ingredient contained in exhaust gases emitted from said engine, wherein the air-fuel ratio of a mixture supplied to said engine is controlled to a desired air-fuel ratio corresponding to an operating condition in which said engine is operating, in a feedback manner responsive to the output of said sensor, and supply of fuel to said engine is interrupted while said engine is in a predetermined decelerating condition,  
the improvement comprising the steps of;



progressively decreasing said desired air-fuel ratio from a value larger than a value corresponding to the operating condition of said engine to the latter value after said engine leaves said predetermined decelerating condition, and  
controlling the air-fuel ratio of said mixture supplied to said engine to the progressively decreased air-fuel ratio in said feedback manner.

4,958,613

## INTERNAL COMBUSTION ENGINE WITH CRANKCASE VENTILATION SYSTEM

Toyoki Hiraoka, Tokyo; Yuichi Murakami, and Nobuyuki Okitsu, both of Yokohama, all of Japan, assigns to Nissan Motor Co., Ltd., Yokohama City, Japan

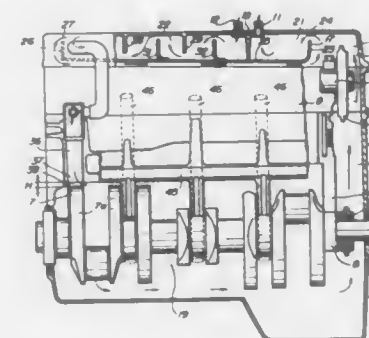
Filed Oct. 4, 1989, Ser. No. 417,622

Claims priority, application Japan, Oct. 18, 1988, 63-135580[U]

Int. Cl.<sup>3</sup> F02M 25/00

U.S. Cl. 123—572

10 Claims



- 1. An internal combustion engine comprising:
  - a rocker cover secured to a cylinder head and defining therein a chamber;
  - means defining a first passage through which fresh air is introduced into the rocker cover chamber;
  - a crankcase defining therein a chamber;
  - means defining a second passage through which said rocker cover chamber is in communication with an air intake passage;
  - a crankshaft rotatably supported and including a counterweight, said counterweight being disposed within said crankcase chamber and having a peripheral surface; and
  - means defining a fresh air suction port through which said rocker cover chamber is in communication with said

crankcase chamber, said fresh air suction port having a first end which opens to said crankcase chamber and is located in the vicinity of the peripheral surface of said counterweight.

4,958,614

## FEED DEVICE FOR AN INTERNAL COMBUSTION ENGINE

Sergio Truzzi, Cialiano; Emilio Oldani, Cerro Maggiore, and Ugo Malter, Milan, all of Italy, assigns to Alfa Romeo S.p.A., Arese, Italy

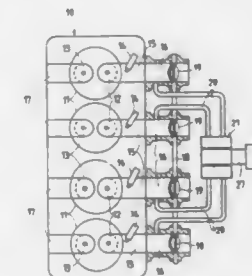
Filed Feb. 14, 1990, Ser. No. 480,012

Claims priority, application Italy, Feb. 17, 1989, 19478 A/89

Int. Cl.<sup>3</sup> F02D 9/00

U.S. Cl. 123—585

7 Claims



1. A feed device for an internal combustion engine, comprising first feed ducts (15, 16) for the cylinders (11), at least two throttle valves (19) for said first ducts, and second ducts (20) connected to a common manifold (27) communicating with the external environment and with said first ducts (15, 16) so as to short-circuit said at least two throttle valves (19), said manifold (27) being provided with valve means (28) for regulating the feed flow to the engine when said throttle valves (19) are in their maximum closure position, characterized in that feed ports (25) for said second ducts (20) are also provided, said feed ports (25) being engaged with non-return valve means (23) which allow the feed fluid to flow from said common manifold (27) to said first feed ducts (15, 16) for the cylinders (11) but which intercept back flow from said first ducts (15, 16) to said common manifold (27).

4,958,615

## SIGNAL GENERATOR FOR AN INTERNAL COMBUSTION ENGINE

Yutaka Ohashi, Himeji, Japan, assigns to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

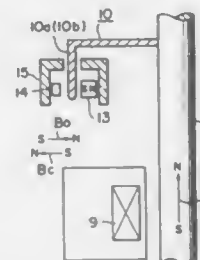
Filed Oct. 12, 1989, Ser. No. 420,402

Claims priority, application Japan, Oct. 12, 1988, 63-254761

Int. Cl.<sup>3</sup> F02P 7/07

U.S. Cl. 123—617

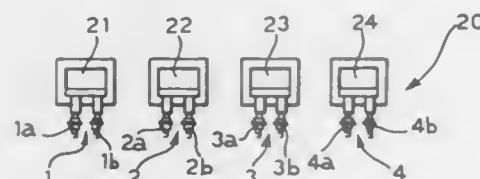
5 Claims



- 1. A signal generator comprising:
  - a Hall element;
  - a magnet which is separated from the Hall element by a gap

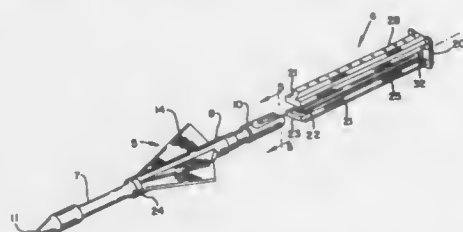
and which generates a magnetic field which acts on the Hall element;  
a distributor shaft;  
a magnetic vane which is secured to the distributor shaft and passes through the gap between the Hall element and the magnet when the distributor shaft is rotated; and  
an ignition coil which generates a magnetic field when current passes through the ignition coil, wherein the magnetic field which is generated by the ignition coil combines subtractively with the magnetic field generated by the magnet in the vicinity of the Hall element.

**4,958,616**  
**MULTIPLE-SPARK IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES, PARTICULARLY FOR MOTOR VEHICLES**  
Vittorio Di Nanzio, and Eraldo Giaccardi, both of Turin, Italy, assignors to Fiat Auto S.p.A., Turin, Italy  
Filed May 30, 1989, Ser. No. 358,054  
Claims priority, application Italy, Jun. 6, 1988, 67520 A/88  
Int. Cl.<sup>5</sup> F02P 15/02, 3/04  
U.S. Cl. 123—635 1 Claim



1. An ignition system for an internal combustion engine having at least one cylinder,  
a pair of ignition plugs associated with each cylinder and a single compact energizing means associated with each pair of ignition plugs and mounted directly on each pair of ignition plugs respectively in direct electrical contact therewith to provide transmission of ignition energy directly from each energizing means to each pair of ignition plugs respectively, substantially without any transmission loss;  
wherein each energizing means comprises electrical transformer means having a secondary winding connected to each pair of ignition plugs respectively.

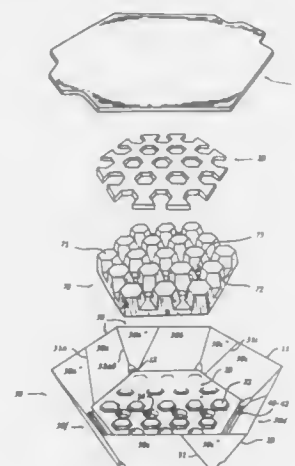
**4,958,617**  
**ARCHERY ARROW AND SABOT**  
Jeffrey R. Anderson, 162 Slocum Lake Rd., Wauconda, Ill. 60084  
Continuation-in-part of Ser. No. 80,019, Jul. 31, 1987, Pat. No. 4,829,974. This application Mar. 23, 1989, Ser. No. 327,769  
Int. Cl.<sup>5</sup> F41B 5/00; A63B 65/02  
U.S. Cl. 124—24.1 11 Claims



1. An archery arrow comprising a shaft having a point at one end and a nock on the opposite end and fletching consisting of blades located rearwardly of the center of gravity of the arrow, the trailing edges of two opposing blades being bent so as

to induce axial spin in flight, and said arrow having a length not exceeding about 7 inches.

**4,958,618**  
**FOLDING DISPOSABLE COOKERY UNIT**  
Peter Davidson, P.O. Box 3731, Stanford, Calif. 94309  
Continuation-in-part of Ser. No. 296,529, Jan. 12, 1989, abandoned. This application Dec. 8, 1989, Ser. No. 447,887  
Int. Cl.<sup>5</sup> F24C 1/16  
U.S. Cl. 126—9 B 32 Claims



1. A foldable firebox body comprising:  
a bottom panel for supporting a fuel in the region above the top surface thereof, and  
a plurality of side panels sequentially hingedly connected together around said bottom panel and each side panel hingedly connected to said bottom panel, each of said side panels having at least two panel portions and having a hinge means for folding said panel portions in overlapping relationship  
whereby said side panel portions can be folded to a body closed position with said side panel portions overlapping and substantially enclosing said region above said bottom panel and said side panel portions can be folded to a body open position with said side panels projecting outwardly and upwardly from said bottom panel for supporting a cooking surface.

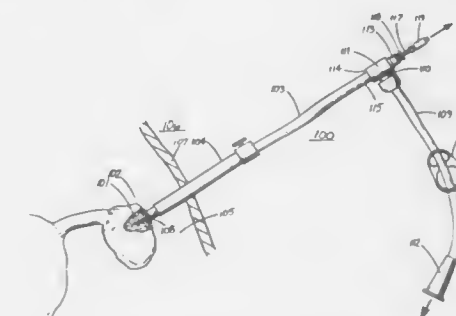
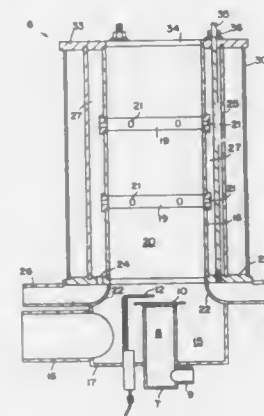
**4,958,619**  
**PORTABLE, FLUELESS, LOW NOX, LOW CO SPACE HEATER**  
Alan Kardas, Chicago, Ill., assignor to Institute of Gas Technology, Chicago, Ill.  
Continuation-in-part of Ser. No. 222,062, Jul. 8, 1988, Pat. No. 4,846,679. This application May 18, 1989, Ser. No. 353,790  
Int. Cl.<sup>5</sup> F24C 3/00  
U.S. Cl. 126—85 R 17 Claims

1. A flueless, portable space heater comprising: a fuel chamber having a fuel inlet and fuel distributing means, fuel swirling means for generating a swirling fuel flow;  
a primary air chamber, primary air swirling means for generating a counter-swirling primary air flow with respect to said swirling fuel flow, said primary air swirling means having a cross-sectional area permitting only laminar flow of said counter-swirling primary air flow, said fuel distributing means discharging said swirling fuel flow into said counter-swirling primary air flow forming a fuel/air mixture, ignition means for igniting said fuel/air mixture;  
at least one combustion chamber wall forming a combustion chamber sealably secured to and in communication with said primary air swirling means, secondary air inlet means,

said combustion chamber in communication with said secondary air inlet means, said secondary air inlet means comprising said at least one combustion chamber wall having a plurality of secondary air supply holes, an intermediate shell surrounding said at least one combustion chamber wall, said intermediate shell forming a space between said intermediate shell and said at least one combustion chamber wall, a top and a bottom sealing said space, a secondary air inlet in communication with said

a radial thickness greater than the radial thickness of the sleeve.

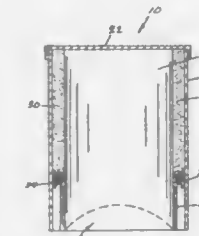
**4,958,621**  
**ENDOSCOPIC ASPIRATION INSTRUMENT**  
Howard C. Topel, Deerfield, Ill., and Thomas L. Foster, Poland, Ind., assignors to Vance Products Incorporated, Spencer, Ind.  
Filed Apr. 4, 1990, Ser. No. 505,082  
Int. Cl.<sup>5</sup> A61B 1/00 20 Claims



space, said bottom having at least one bottom plate through hole, at least one secondary air inlet tube sealably secured to said bottom and in communication with said at least one bottom plate through hole, each said bottom plate through hole in communication with said space between said intermediate shell and said at least one combustion chamber wall; and  
an outer protective shell surrounding and supportably spaced from said at least one combustion chamber wall of said combustion chamber.

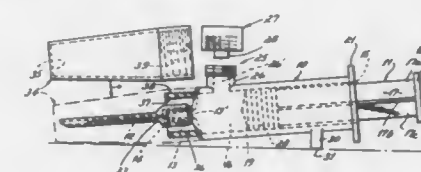
1. An endoscopic instrument comprising:  
a first elongated member having a first distal end, a first proximal end, and a first longitudinal passageway extending between said first ends, said first proximal end having first and second access ports, said first access port having access to said first passageway; and  
a positioning device positioned within said first passageway a predetermined distance from said first distal end and having a positioning passageway capable of receiving an aspiration needle inserted through said second access port.

**4,958,620**  
**WATER HEATER CONSTRUCTION**  
Thomas E. Nelson, Anchorage, Ky., assignor to Sotech, Inc., Shelbyville, Ky.  
Division of Ser. No. 8,564, Jan. 29, 1987, Pat. No. 4,736,509.  
This application Mar. 1, 1988, Ser. No. 162,504  
Int. Cl.<sup>5</sup> E01C 19/45; F24N 1/00  
U.S. Cl. 126—344 10 Claims



1. A water heater device comprising:  
a water tank;  
an outer shell concentrically located over the water tank defining an annular space therebetween;  
an annular sleeve of insulation material located in the annular space extending from approximately the bottom end of the water heater device upwardly longitudinally thereof a predetermined distance less than the entire height of the water heater device; and  
an annular cuff of insulation material located proximate the top end of the annular sleeve and folded back over the convex outer surface of the sleeve, the annular cuff having

**4,958,622**  
**HYPODERMIC SYRINGE FOR TAKING AND TRANSPORTING A SPECIMEN**  
William M. Selenke, 18 Gambier Cir., Cincinnati, Ohio 45218  
Filed May 11, 1983, Ser. No. 493,435  
Int. Cl.<sup>5</sup> A61B 5/14 31 Claims



1. A hypodermic syringe for obtaining and transporting a fluid specimen comprising  
a barrel having a narrowed opening at a forward end and a plunger opening at a rearward end and an interior chamber defined within said barrel,  
a plunger sized to pass through the plunger opening into the interior chamber of said barrel,  
means for accessing the interior chamber of said barrel located at a point proximate the narrowed opening, said accessing means comprising an extension which defines a hollow shaft communicating with the interior chamber, the extension being canted at an angle relative to and extending from said barrel,  
a substantially fluid-tight closure means for said accessing means, and  
means for supporting the syringe in a skewed position with respect to horizontal located at a point proximate the



rearward end of said barrel, such that when the syringe is placed on a horizontal surface with said supporting means in contact with the horizontal surface the syringe is inclined with the rearward end elevated relative to the forward end with the extension of said accessing means being substantially perpendicular to the horizontal surface.

4,958,623

# PROTECTIVE DEVICE FOR ENDOSCOPISTS, IN PARTICULAR FOR URETHRAL USE

Francesco Rocco, Via Fogazzaro, 20, 20135 Milan, Italy

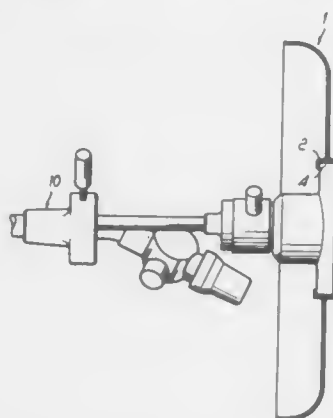
Filed Oct. 10, 1989, Ser. No. 419,034

Claims priority, application Italy, Oct. 24, 1988, 22054/88[U]

Int. Cl.<sup>5</sup> A61B 1/00

U.S. Cl. 128—7

2 Claims



1. A protective device for endoscopists, specifically designed for urethral use, comprising a disc-shaped plate-like screen to be applied about an eye-piece of an optical detecting device to be inserted into a catheter to display a patient operating field, wherein said screen is provided with a curved peripheral edge defining a peripheral concave portion of said screen and with a central resiliently yieldable ring member having a substantially reversed-U cross-section, said ring member being adapted to be engaged with a peripheral portion of said eye-piece so as to prevent said screen from axially moving.

4,958,624

# INTERCHANGEABLE LARYNGEAL BLADE

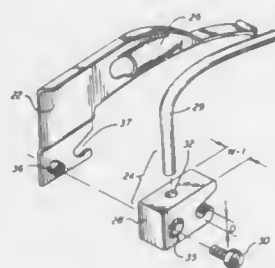
R. Douglas Stone, Camillus, and Thomas W. Turner, Marcellus, both of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Mar. 31, 1989, Ser. No. 331,164

Int. Cl.<sup>5</sup> A61B 1/06

U.S. Cl. 128—11

10 Claims



6. In a set of non-interchangeable fiber optic and incandescent type light laryngoscopes that have a handle and remov-

able blade-light assembly with mutually exclusive interlocking mounting mechanisms the combination of:

a fiber optic type handle adapted to operatively receive a fiber optic light type blade-light assembly,  
an incandescent light type handle adapted to operatively receive an incandescent light type blade-light assembly,  
a fiber optic light sub-assembly comprising a light tube and a first integral base means, said first base means adapted to operatively and exclusively engage a fiber optic type handle,  
an incandescent light sub-assembly comprising a light tube and a second integral base means, said second base means adapted to operatively and exclusively engage an incandescent light type handle,  
a metallic blade having a light sub-assembly engaging member, and  
fastening means for selectively securing said metallic blade to one of said light sub-assemblies,  
so that when said metallic blade is secured to said fiber optic light sub-assembly a fiber optic type removable blade-light assembly is provided which will operatively mount on said fiber optic handle to form a fiber optic laryngoscope and when secured to said incandescent type light sub-assembly an incandescent type removable blade-light assembly is provided which will operatively mount on said incandescent type light handle to form an incandescent light laryngoscope.

4,958,625

# BIOPSY NEEDLE INSTRUMENT

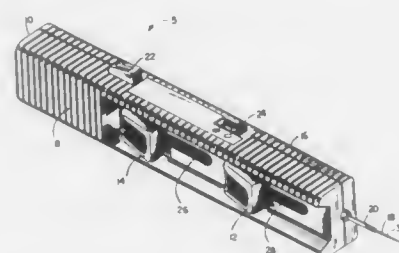
James S. Bates; Thomas P. Clement, both of Bloomington, and Darrell W. White, Spencer, all of Ind., assignors to Boston Scientific Corporation, Watertown, Mass.

Filed Jul. 18, 1989, Ser. No. 381,780

Int. Cl.<sup>5</sup> A61B 10/00

U.S. Cl. 128—754

15 Claims



1. A biopsy needle instrument comprising:  
a housing defining a first cavity and a second cavity, extending from said housing, an axially elongated stylet having a distal end and a proximal end and defining a side-facing notch adjacent said distal end and a cannula coaxially disposed about said stylet, said cannula having a distal end and a proximal end,  
said stylet mounted for axial movement relative to said housing and relative to said cannula between a first, retracted position and a second, extended position,  
said cannula mounted for axial movement relative to said housing and relative to said stylet between a first, retracted position and a second, extended position,  
stylet retaining means at the proximal end of said stylet and disposed in said first cavity,  
cannula retaining means at the proximal end of said cannula and disposed in said second cavity,  
means for biasing said stylet distally toward said second, extended position,  
means for biasing said cannula distally toward said second, extended position,  
stylet latch means for retaining said stylet in said first, retracted position,

cannula latch means for retaining said cannula in said first retracted position,  
means for retracting said stylet from said second, extended position to said first, retracted position for engagement of said stylet latch means to retain said stylet in retracted position against the means for biasing the stylet distally,  
separate and discrete means for retracting said cannula from said second, extended position to said first, retracted position for engagement of said cannula latch means to retain said cannula in retracted position against the means for biasing the cannula distally, and  
means for releasing said stylet latch means to allow said stylet to move from said first, retracted position to said second, extended position and thereafter releasing said cannula latch means to allow said cannula to move from said first, retracted position to said second, extended position.

4,958,626

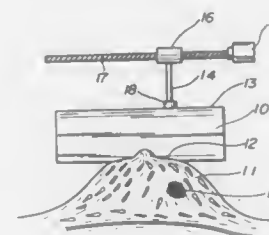
# METHOD FOR APPLYING ELECTROMAGNETIC WAVE AND ULTRASONIC WAVE THERAPIES

Masao Nambu, Yokohama; Tsutomu Watarai, Tokyo; Tomoyuki Sakamoto, Kokubunjimachi, and Kazuo Akiyama, Yachiyō, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan  
Continuation-in-part of Ser. No. 39,504, Apr. 17, 1987, abandoned. This application Feb. 29, 1988, Ser. No. 165,417  
Claims priority, application Japan, Apr. 22, 1986, 61-91228

Int. Cl.<sup>5</sup> A61B 17/00; A61N 5/00

U.S. Cl. 128—24 A

12 Claims



1. A method for applying electromagnetic wave therapy comprising applying to a surface of a human body a material simulating a living tissue made of a frozen and thawed polyvinyl alcohol hydrogel of high water content having soft reversible elasticity and shape-retaining properties, pressing said material onto the surface of the human body so that said material is intimately contacted with said surface of the human body with substantially no spaces present therebetween, generating as electromagnetic wave and irradiating said wave to the human body through said material.

4,958,627

# THERAPEUTIC BED

Kl D. Park, 920 H Street NE., Washington, D.C. 20002

Filed Jun. 30, 1988, Ser. No. 213,890

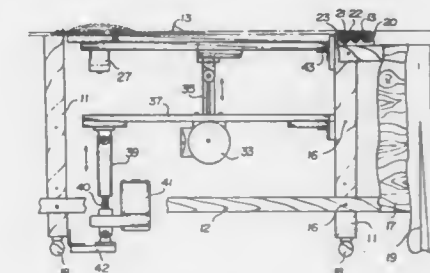
Int. Cl.<sup>5</sup> A61H 1/00

U.S. Cl. 128—33

4 Claims

1. A therapeutic bed for the human body comprising:  
bed frames,  
connecting members attached to the top of said bed frames, a pair of brackets attached to said connecting members, said brackets comprising a plurality of separate partitions which alternatively extend from an edge of said brackets for defining spaces therebetween and a plurality of slots which are disposed at ends of said alternate separate partitions,  
a flexible wire passing through said spaces and said slots of said brackets on alternate opposite sides of the bed frames of the therapeutic bed in a serpentine configuration,

a vibrating motor attached to said flexible wires for vibrating, and  
a motor having a cam and mounted to a longitudinal motor support which includes hinges at one end and a motor support adjusting member at the other end thereof, said cam being provided with a cam arm connected to said



cam and an intermittent hitting plate for hitting a bed floor formed by said flexible wires, whereby the flexible wires of the therapeutic bed treat and massage desired regions of the human body disposed thereon, said motor support adjusting member including a two-way motor, an adjusting screw stand connected to said two-way motor, and a tubular support for receiving said adjusting screw stand.

4,958,628

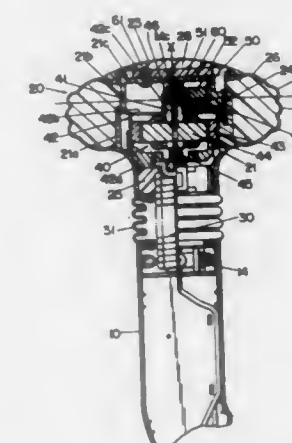
# HAND-HELD VIBRATORY MASSAGER

Hiromori Iwamoto, and Shigeyuki Ikeda, both of Hikone, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan  
Continuation of Ser. No. 82,174, Aug. 6, 1987, Pat. No. 4,825,853. This application Apr. 27, 1989, Ser. No. 343,634  
Claims priority, application Japan, Aug. 20, 1986, 61-194719

The portion of the term of this patent subsequent to May 2, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> A61H 1/00

U.S. Cl. 128—36

6 Claims



1. A hand-held vibratory massager comprising  
an elongated hand grip;  
an applicator head including a core barrel having a base and a top portion;  
a resilient coupling connecting said base to an end of said hand grip and permitting limited movement of said applicator head in substantially all directions relative to said hand grip;  
a drive motor mounted internally of said base, said drive motor having an output shaft extending into said top portion of said applicator head;  
an eccentric flyweight mounted internally of said top por-

tion on the output shaft of said motor in eccentric relation thereto for providing a vibratory motion to said applicator head upon rotation of said output shaft; and  
a counterweight fixed to said top portion of said applicator head on the opposite side of said flyweight from said motor;  
whereby said counterweight counterbalances the weight of said motor and other components of said applicator head located on the side of said flyweight opposite from said counterweight and reduces countershaking of the hand grip as a reaction to said vibratory motion of said applicator head.

4,958,629

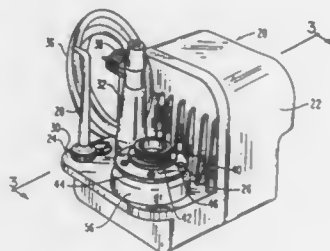
## WATER-POWERED ORAL HYGIENE DEVICE

Steven L. Peace, and John E. Petrovic, both of Fort Collins, Colo., assignors to Teledyne Industries, Inc., Fort Collins, Colo.

Filed Jan. 21, 1988, Ser. No. 209,302  
Int. Cl.<sup>5</sup> A61H 9/00

U.S. Cl. 128—66

12 Claims



1. An oral hygiene device comprising:  
a housing;  
an inlet in said housing for receiving water from a source at a pressure subject to variation;  
a regulator, within said housing, coupled to said inlet and responsive to said water from said inlet to accommodate said variation and develop automatically a stream of said water at a constant pressure;  
a turbine having a rotor mounted within said housing for rotation;  
a plurality of impellers successively spaced peripherally around said rotor;  
a nozzle mounted in said housing and coupled to said regulator for directing said stream against said impellers to rotate said rotor;  
a pump disposed within said housing and having a piston mounted for reciprocation within a cylinder;  
means responsive to rotation of said rotor for driving said piston in reciprocation;  
a head disposed over one end of said cylinder;  
means responsive to water from said stream deflected by said impellers for enabling movement of said piston away from said head to draw water into said cylinder;  
means for enabling said water in said cylinder to exit from said cylinder, upon movement of said piston toward said head, as a series of pulses;  
and means coupled to said head for delivering said pulses from said housing.

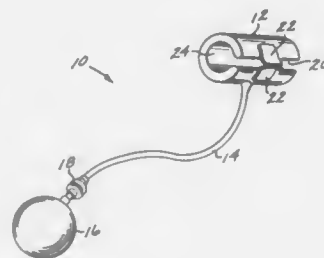
4,958,630  
METHOD AND APPARATUS FOR TREATING IMPOTENCE

Robert F. Rosenbluth, Laguna Niguel, and Brian J. Cox, Lake Forest, both of Calif., assignors to Advanced Surgical Intervention, Inc.

Filed Oct. 6, 1989, Ser. No. 418,286  
Int. Cl.<sup>5</sup> A61F 2/26

U.S. Cl. 128—79

29 Claims



5. A device for treating impotence in a human patient, comprising:  
an inflatable cuff, implantable in the patient so as to receive and engage a penile vein or a crus of a corpus cavernosum of the patient; and  
cuff actuation means, implantable in the patient, and operable by the patient, for selectively inflating and deflating the cuff, thereby selectively and reversibly restricting the blood flow through the vein or crus, the cuff actuation means comprising:  
a fluid-filled squeeze bulb;  
conduit means for providing fluid communication between the bulb and the cuff; and  
valving means for allowing the flow of fluid through the conduit means from the bulb to the cuff in response to the collapsing of the bulb due to the application of external pressure thereto, the valving means including a housing defining a fluid flow path between the bulb and the conduit means, and a valve element in the housing, movable between a first position in which the valve element is closed against a valve seat, thereby closing the fluid flow path, and a second position opening the fluid flow path, the valve element being movable from the first position to the second position in response to the pressure-induced collapsing of the bulb;  
biasing means in the housing and engageable against the valve element, for biasing the valve element against the valve seat; and  
manual valve actuation means, operably associated with the valving means, for selectively moving the valve element from the first position to the second position in response to manual operation, thereby to allow the flow of fluid through the conduit means from the cuff to the bulb, the manual valve actuation means comprising:  
means defining a flexible portion of the housing;  
a push-button seated in the housing so as to be manually operable, the push-button including a protuberance that is engageable against the flexible portion; and  
valve element engagement means disposed on the flexible portion so as to be operably engageable against the valve element to displace the valve element from the valve seat in response to the flexing of the flexible portion when the push-button is operated to engage the protuberance against the flexible portion.

4,958,631

## SELF ADJUSTING, SOFT NECK SUPPORT COLLAR

Jeff Sarkozl, 1117 N. Avila Pl., Orange, Calif. 92669

Filed Oct. 2, 1989, Ser. No. 415,872

Int. Cl.<sup>5</sup> A61F 5/00

U.S. Cl. 128—87 B

6 Claims



1. A self adjusting, soft, neck support collar, comprising:  
(a) an upper, tubular-shaped element providing an outer, woven cloth covering material and an interior which contains a soft fill material, the tubular-shaped element defining tapered ends which are adapted for closure under a user's chin by closure elements mounted at each end, to thereby form a ring which fits upwardly around a user's neck; and  
(b) a lower, tubular-shaped element providing an outer, woven cloth covering material, and shaped to form an interior which contains a soft fill material, the lower tubular-shaped element being adapted for closure at each end by closure elements to form a ring which fits around the lower portion of the user's neck, the upper tubular element resting on and being joined to the lower tubular element along a portion of their lengths so that the closure portions of each tubular element are offset from each other, the closure portion of the lower tubular element being positioned rearwardly on the neck of the user; whereby,  
i. the tapered closure portion of the upper element and adjacent lower, tubular element define a chin support for the user; and  
ii. the soft fill materials of the upper and lower tubular elements interiors function to: 1. impart a flexible support for the user's neck and chin which self adjusts for different shapes, sizes and weights of the user's neck and chin regions; 2. maintain a resilient support which increases as the user's neck and chin deviate from an erect position, during motion; and, 3. self adjust to the user in a rest position.

4,958,632

## ADAPTABLE, DIGITAL COMPUTER CONTROLLED CARDIAC PACEMAKER

Stephen R. Duggan, Rosemount, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 926,303, Jul. 20, 1978, abandoned. This application Mar. 5, 1980, Ser. No. 127,308

Int. Cl.<sup>5</sup> A61N 1/36

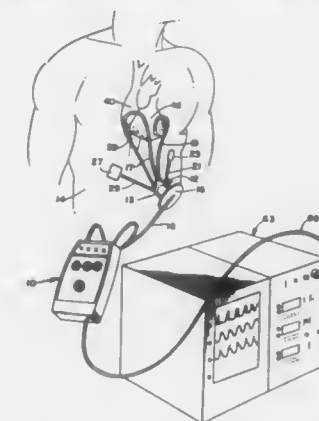
U.S. Cl. 128—419 PG

54 Claims

1. Body implantable electrical apparatus coupled via a plurality of leads to body tissue, said apparatus comprising:  
(a) means for applying electrical pulses via the leads to the body tissue;  
(b) memory means including at least first and second storage portions, each storage portion storing a distinct set of instructions;  
(c) control means for selectively executing one of the sets of instructions stored in said memory means, and comprising addressing means for accessing one of said first and second storage portions and a microprocessor for selectively applying addresses from said addressing means to said

memory to control the execution of a selected program, said control means coupled to said applying means to effect control of the electrical pulses;

(d) means for selectively changing the address of said addressing means, whereby a different set of instructions is addressed by said addressing means and the instructions of the addressed set executed in order by said control means, whereby the character of the electrical pulses applied to the body tissue is changed accordingly; and



4,958,633

## VALVE FOR RESPIRATOR

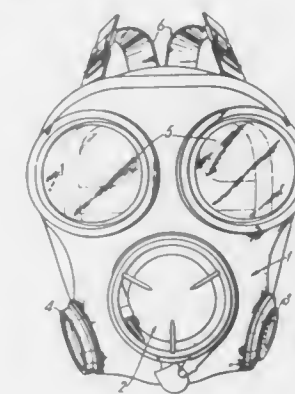
Cyril N. E. Angell, Trowbridge, United Kingdom, assignor to Avon Industrial Polymers Limited, Melksham, England  
Continuation of Ser. No. 795,916, Nov. 7, 1985, abandoned. This application May 9, 1989, Ser. No. 349,923

Claims priority, application United Kingdom, Nov. 13, 1984, 8428640

Int. Cl.<sup>5</sup> A62B 7/00

U.S. Cl. 128—201.19

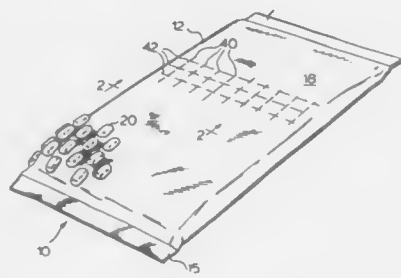
15 Claims



1. A respirator comprising a facepiece having a gas inlet and a gas outlet, an outlet valve assembly for permitting flow of gas outwardly only at the gas outlet, an inlet valve assembly for permitting flow of gas inwardly only at the gas inlet, at least the outlet valve assembly comprising a valve member and a



valve seat, said valve member comprising a disc of elastomeric material, the disc having a periphery and a central portion, securing means at the central portion of the disc for securing that portion stationary in the valve assembly, part of the periphery of the disc being for sealing contact against the seat of the valve assembly to prohibit gas passage in the non-permitted direction, an annular channel in the disc between the central portion and the periphery thereof, said disc being continuously conical between said channel and said periphery whereby the part on the periphery is positively biased towards said sealing contact with the seat of the valve assembly but the rate of increase of resistance to gas flow in the permitted direction lessens above a predetermined value of flow, said outlet comprising a speech transmitter with a sound passage there-through, said sound passage having an inner upstream end and an outer downstream end relative to the permitted direction of flow of gas outwardly from the facepiece, the said outlet valve assembly being in said sound passage with said disc of elastomeric material across the passage, the passage comprising wall means defining a convolute portion of the passage of cross-section increasing progressively in the downstream direction of permitted flow and having at least two substantial reversals of direction, and defining a further portion of the passage which is progressively convergent in the downstream direction of permitted flow, said convolute portion of the passage being downstream of the progressively convergent portion relative to the direction of permitted flow.



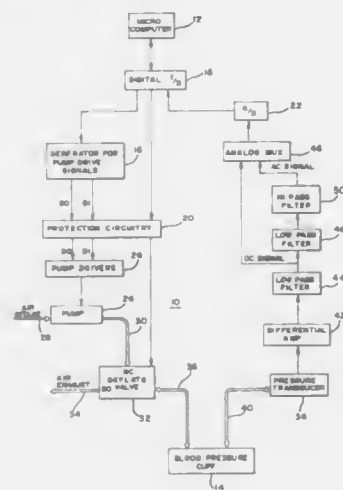
- (i) being open to the interior of said bag  
(ii) cumulatively having a volume of not greater than about 3% of the total volume of said liquid composition contained within said bag.

4,958,636

**VITAL SIGNS MONITOR PUMPING SYSTEM**  
Thomas Blandino, Madison, and Ruth L. Starr, Evansville, both of Wis., assignors to Criticare Systems, Inc., Waukesha, Wis.  
Filed Oct. 5, 1988, Ser. No. 253,712  
Int. Cl.<sup>5</sup> A61B 5/00

U.S. Cl. 128—630

21 Claims



1. In a vital signs monitor of the type comprising a measuring chamber and means for measuring a parameter of a fluid contained in the measuring chamber, wherein the parameter varies as a function of fluid pressure and is indicative of a vital sign of a patient, a system for controlling fluid pressure in the chamber comprising:

a variable pumping rate pump connected to the measuring chamber to control pressure in the measuring chamber, said pump comprising a pumping member mounted to oscillate through a stroke and operative to pump fluid into the measuring chamber in response to oscillation of the pumping member, and an electromagnet coupled to the pumping member to drive the pumping member through the stroke in response to a drive signal;

a drive signal generator which generates the drive signal for the pump at a fixed frequency and a variable energy per cycle of the drive signal, wherein the drive signal is applied to the electromagnet and the energy per cycle of the

4,958,634

**LIMACON GEOMETRY BALLOON ANGIOPLASTY CATHETER SYSTEMS AND METHOD OF MAKING SAME**

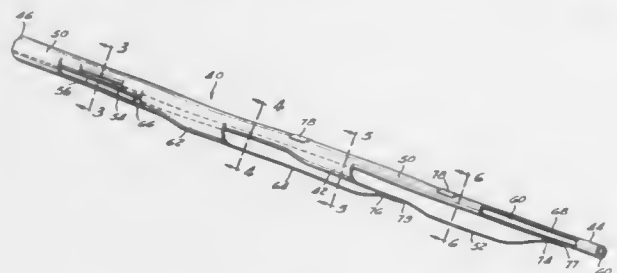
G. David Jang, 204 E. South St., Redlands, Calif. 92373

Filed May 6, 1987, Ser. No. 47,049

Int. Cl.<sup>5</sup> A61M 29/02

U.S. Cl. 606—194

25 Claims



1. An angioplasty catheter, comprising:  
a catheter shaft having a proximal end and a distal end;  
first and second independently inflatable and independently deflatable angioplasty balloons at the distal end of said catheter, each said balloon having a balloon wall and having a length and a maximum inflated diameter, wherein said balloons and said distal end of said catheter shaft comprise a single, integral, monolithic piece of polymer material and wherein said balloons are eccentrically positioned with respect to each other, wherein said first balloon has a maximum inflated diameter less than that of said second balloon and is at least partially inside said second balloon.

4,958,635

**THERAPEUTIC TEMPERATURE PACK**  
Frank L. Roberts, Willowdale, Canada, assignor to Bio-Support Industries Ltd., Toronto, Canada

Filed Mar. 21, 1989, Ser. No. 326,839

Int. Cl.<sup>5</sup> A61F 7/02

U.S. Cl. 128—403

12 Claims

1. In a temperature pack for therapeutic use comprising a sealed envelope-like bag of flexible sheet plastic material, said bag having an interior, and a thickened aqueous liquid compo-

sition contained within said interior of said bag, the improvement wherein said plastic sheet material is embossed to form a large plurality of small blisters on at least medial portions of at least one major surface of said bag, said blisters

drive signal affects the length of the stroke and therefore the pumping rate of the pump.

16. In a blood pressure monitor of the type that includes an occluding cuff and means for monitoring pressure variations in the cuff in a measuring frequency range to determine a blood pressure parameter of a patient, a system for supplying a smoothly increasing pressure to the cuff comprising:

a variable pumping rate pump connected to the cuff to inflate the cuff, said pump comprising a pumping member and means for driving the pumping member through a stroke in response to a drive signal which has at least one variable parameter, wherein the pumping rate of the pump varies as a function of the variable parameter;  
control means for periodically generating the drive signal with a selected driving frequency such that the variable parameter is varied over time to cause the pump to gradually increase the pressure in the cuff, said selected driving frequency being outside of and greater than the measuring frequency range to prevent the strokes of the pump from causing pressure variations in the cuff in the measuring frequency range.

4,958,637

**MR EXAMINING APPARATUS OF HEART BEAT SYNCHRONOUS TYPE**

Toshiaki Aritomi, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

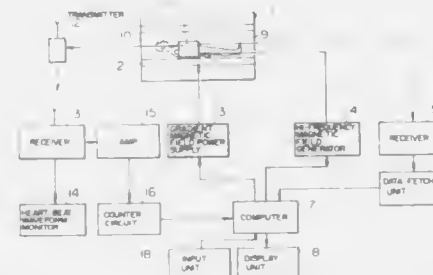
Filed Dec. 2, 1988, Ser. No. 278,843

Claims priority, application Japan, Dec. 4, 1987, 62-307030

Int. Cl.<sup>5</sup> A61B 5/05

U.S. Cl. 128—653 A

15 Claims



1. A magnetic resonance examining apparatus of heart beat synchronous type for imaging multiphase images in synchronism with a heart beat of a subject, said apparatus comprising:  
means for detecting a heart beat waveform of the subject;  
means for generating a synchronizing signal synchronous with the heart beat waveform detected by said detecting means;  
means for measuring a repetition period of said heart beat waveform on the basis of the synchronizing signal applied from said synchronizing signal generating means;  
input means for inputting a previously stored setting of a repetition time for spin excitation of the subject;  
means responsive to said measuring means and said input means for computing a corrected repetition time close to said spin excitation repetition time on the basis of data of said heart beam waveform repetition period supplied from said measuring means and the setting of said spin excitation repetition time supplied from said input means, said corrected repetition time having a value which, when multiplied by a factor of N (N: an integer), becomes equal to that of said heart beat waveform repetition period;  
means for setting a plurality of imaging phases so as to form nuclear magnetic resonance images; and  
means for effecting spin excitation of the subject according to the corrected repetition period;  
means for setting a plurality of imaging phases so as to form nuclear magnetic resonance images; and  
means for effecting spin excitation of the subject according

to the corrected repetition time computed by said corrected repetition time computing means and acquiring a nuclear magnetic resonance signal for each of the imaging phases set by said imaging phase setting means.

4,958,638

**NON-CONTACT VITAL SIGNS MONITOR**

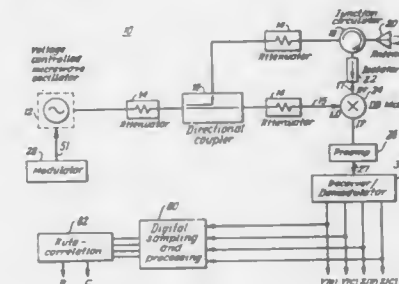
Steven M. Sharpe, Atlanta; Joseph Seals, Stone Mountain; Anita H. MacDonald, Tucker, and Scott R. Crowgey, Avondale Estates, all of Ga., assignors to Georgia Tech Research Corporation, Atlanta, Ga.

Filed Jun. 30, 1988, Ser. No. 213,783

Int. Cl.<sup>5</sup> A61B 5/02, 5/08

U.S. Cl. 128—653 R

21 Claims



1. An apparatus for measuring simultaneously the heart and respiration rates of a subject comprising:  
transmitting means for directing a beam of frequency modulated, continuous wave radio frequency energy towards a body portion of said subject;  
receiving means for receiving said frequency modulated beam as a motion-related, phase modulated reflected signal from said body portion; and  
signal processing means for extracting the heart and respiration rates from said phase modulated reflected signal.

4,958,639

**ULTRASONIC THERAPEUTICAL APPARATUS**

Naoki Uchiyama, Hachioji, Japan; Akio Nakada, Garden City Park, N.Y.; Akihiro Taguchi, Hamburg, Fed. Rep. of Germany; Shinji Hatta; Synichi Takayama; Takashi Tsukaya; Sakae Takehana; Naomi Sekino, and Masanaki Hayashi, all of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Japan

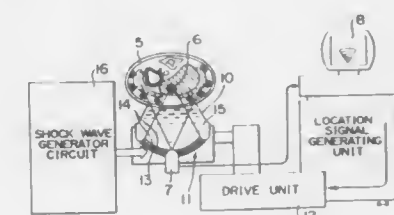
Continuation of Ser. No. 106,498, Oct. 8, 1987, abandoned. This application Nov. 8, 1989, Ser. No. 434,569

Claims priority, application Japan, Oct. 29, 1986, 61-257524; Oct. 30, 1986, 61-259331; Nov. 26, 1986, 61-282979; Nov. 26, 1986, 61-280980

Int. Cl.<sup>5</sup> A61B 8/14, 17/22

U.S. Cl. 128—660.03

13 Claims

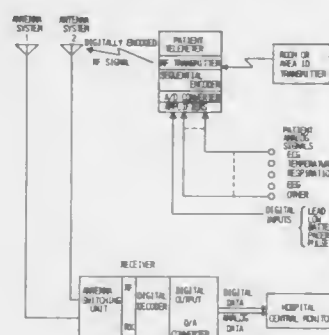


1. An ultrasonic therapeutic apparatus, comprising:  
(a) observation means for:  
(1) continuously observing an area within a patient's body;

1. A medical radio telemetry system for remotely monitoring patients, said system comprising a plurality of patient telemeters, each telemeter adapted to be mounted on a patient and having a transmitter and data collection means for obtaining patient data said transmitter being connected to said data collection means each transmitter having a transmitting antenna



system, room locator means for producing signals indicative of patient location, said data collection means including receiving means to receive said signals from the room locator transmitter means, said data collection means obtaining analog signals from the patient said collection means including means for converting said analog signals to digital signals for transmission via said transmitting antenna system, each transmitter having at least two channels, said medical telemetry system



having a receiving antenna system, a receiver and display means, said receiving antenna system being capable of receiving signals from the transmitters of the telemeters and being connected to transfer said digital signals to said receiver, said receiver being connected to means for converting said signals from digital signals to analog signals, if desired, for transfer to the display means, the transmitter, receiver and the transmitting and receiving antenna systems each having a power source.

4,958,646

## METHOD FOR DRAPING CURTAINS

Christer Hannershg, Hölviksmas, Sweden, assignor to AB A.S.-vensson & Co., Malmö, Sweden

Continuation-in-part of Ser. No. 114,655, Oct. 28, 1987, abandoned. This application Jun. 22, 1989, Ser. No. 370,340  
Claims priority, application Fed. Rep. of Germany, Oct. 29, 1986, 3636845; European Pat. Off., Oct. 12, 1987, 265759

Int. Cl.<sup>5</sup> A47H 13/14

U.S. Cl. 160—348

4 Claims



1. A method for draping curtains comprising the steps of:
  - (a) attaching two holders to an upright wall, each holder having a C-shaped member positioned between and joining two prongs terminating in a curved surface portion at an upper end thereof, the C-shaped member being affixed to a bar member at an end of the C-shaped member opposite its opening, said bar member having means to attach the holder to a wall;
  - (b) placing a lengthwise folded curtain forming material defining a plurality of layers thereof over each bar member;
  - (c) pulling an upper layer of said lengthwise folded curtain forming material forwardly through the prongs of each holder; and
  - (d) pulling said upper layer of said curtain forming material rearwardly and upwardly over said curved surface por-

tions of each holder to form two fabric rosettes and a draping arc between the fabric rosettes.

4,958,647

## APPLICATOR FOR CONTINUOUS APPLICATION OF HAIR DYE

Peter Busch, Erkrath, and Klaus Thiele, Langenfeld, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Düsseldorf-Holthausen, Fed. Rep. of Germany

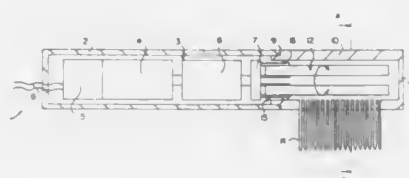
Filed Feb. 7, 1989, Ser. No. 307,440

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1988, 3803692

Int. Cl.<sup>5</sup> A45D 24/42

U.S. Cl. 132—119.1

6 Claims



1. An applicator for the continuous application of a hair dye to the head hair of human beings comprises a tubular element containing a first absorbent material serving as a reservoir hair dye, and teeth of a second absorbent material inserted into said tubular element in a non-contacting manner with said first absorbent material, wherein for the transfer of the hair dye from the reservoir to the teeth, the reservoir is connected to a rotation mechanism.

4,958,648

## HAIR ROLLER AND HEAT SOURCE THEREFOR

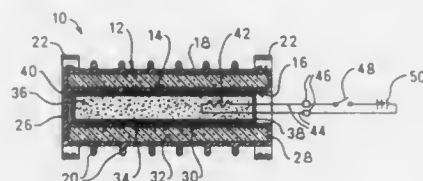
Booker W. Morey, 2512 Cowper St., Palo Alto, Calif. 94301

Filed Oct. 26, 1988, Ser. No. 263,234

Int. Cl.<sup>5</sup> A45D 2/36

U.S. Cl. 132—220

19 Claims



1. A hair roller assembly comprising,
  - a tubular roller member having a heatable inner surface and an outer surface suitable for winding hair therearound,
  - a container having a substantially rigid outer wall slidably engaged with the inner surface of the roller member for insertion into and removal from inside the tubular roller member, said container outer wall being in heat transferring relationship with the heatable inner surface of the roller member when the container is inserted in the roller member,
  - heat source means comprising consumable heat source material enclosed inside said container which is useable only once for generating heat when activated,
  - means inside the container for activating the consumable heat source material inside said container,
  - means under user control for controlling activation of the consumable material by the activating means for initializing consumption of the consumable heat source material for generation of heat inside said container, which heat is

transferred through the container wall to the heatable inner surface of the roller member for heating the roller member and hair wound thereon to an elevated temperature for a period of time for curling the hair, said container with consumable heat source material contained therein being removable from the roller member after use for reuse of the roller member with another container with consumable heat source material and activating means enclosed therein.

4,958,649

## APPARATUS FOR TREATING ARTICLES WITH A GASEOUS AND/OR LIQUID MEDIUM

Lajos Pethö, Lámoges, France, assignor to Kahlvitrut AB, Stockholm, Sweden

PCT No. PCT/SE89/00052, § 371 Date Oct. 16, 1989, § 102(e)

Date Oct. 16, 1989, PCT Pub. No. WO89/07457, PCT Pub.

Date Aug. 24, 1989

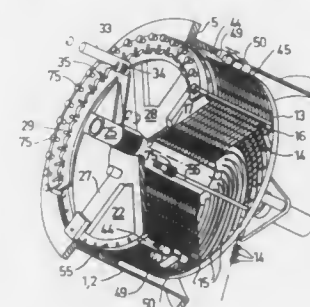
PCT Filed Feb. 9, 1989, Ser. No. 424,234

Claims priority, application Sweden, Feb. 16, 1988, 8800525

Int. Cl.<sup>5</sup> B08B 3/00

U.S. Cl. 134—159

7 Claims



1. Apparatus for treating a plurality of articles with at least one fluid medium, said apparatus comprising a substantially cylindrical chamber which is provided with an article inlet opening and an article outlet opening, and further including at least one article holder device mounted in the chamber and intended for holding an ordered array of articles to be treated, each holder device has the form of a circular plate which has mounted thereon guide devices which comprise partition walls which are so arranged as to define channels or compartments in which the articles are arranged in rows along evolving lines extending from the centre of the plate to the periphery thereof; the plate being arranged to be rotated stepwise about a horizontal axis which is concentric with the cylindrical chamber and perpendicular to the plate, such that the channels can be brought singly into communication with the article inlet opening or the article outlet opening.

4,958,650

## WALKING AND SKIING AID

Hal J. Dale, 7 S. Arizona, Dillon, Mont. 59725

Filed Dec. 5, 1988, Ser. No. 279,879

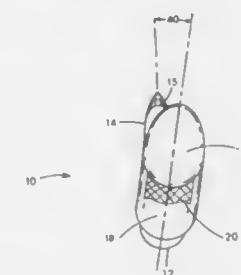
Int. Cl.<sup>5</sup> A45B 1/00

U.S. Cl. 135—65

11 Claims

1. A walking and skiing aid comprising:
  - an elongated rod having a handgrip adapted to be held in one of the right or left hand by a person having a direction of travel, said rod further having a n upper end portion, a middle portion, and a lower end portion, and wherein said upper end portion is angled forwardly relative to said direction of travel and canted inwardly towards said person from said middle portion when said hand grip is

held in said one of said right or left hand and said lower end portion is angled forwardly towards said direction of



travel when said hand grip is held in said one of said right or left hand.

4,958,651

## IMPACT CUSHIONING AND AVOIDING DEVICE

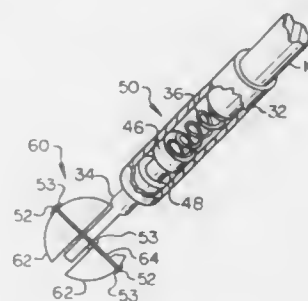
Emile G. Najm, 1281 Whitmore, Bloomfield Hills, Mich. 48013

Filed May 9, 1989, Ser. No. 349,166

Int. Cl.<sup>5</sup> A45B 9/04

U.S. Cl. 135—82

9 Claims



1. An impact cushion readily attachable to a mobility cane of the type utilized by the visually impaired to investigate the surface of the ground prior to stepping on that portion of the ground, the mobility cane having a cane, and a handle attached to the top end of the cane, said impact cushion softening the shock when the movement of the cane is suddenly blocked, said impact cushion comprising:

a sleeve having a first end and a second end, said first end adaptable telescopically about one end of the cane, a shaft telescopically received within said second end of said sleeve and moveable relative to the sleeve, a spring means disposed within said sleeve for resiliently urging said shaft telescopically outwardly relative to said second end of said sleeve, a bushing attached to said second end of said sleeve for retaining said shaft slidable inside said sleeve.

4,958,652

## PORTABLE SUN SHADE

Rachel Maya, 441 N. Carson Ave., Los Angeles, Calif. 90036

Continuation-in-part of Ser. No. 159,811, Feb. 24, 1988, Pat. No.

4,823,822. This application Mar. 28, 1989, Ser. No. 329,540

The portion of the term of this patent subsequent to Apr. 25,

2006, has been disclaimed.

Int. Cl.<sup>5</sup> E04H 15/00

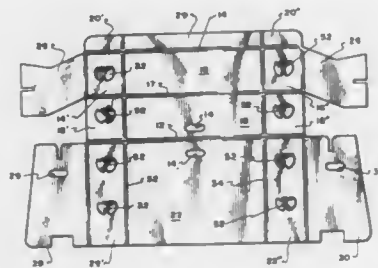
U.S. Cl. 135—87

6 Claims

1. A portable apparatus for use as shelter for protection against sunshine and wind comprising:

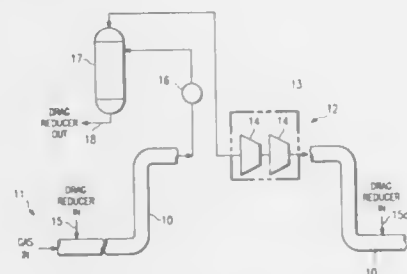
a homogeneous sheet of lightweight material having creases forming hinges connecting a roof panel, a back panel and side panel means; said side panel means when folded at approximately right angles to said back panel holding said

homogeneous sheet in a upright position, means for securing said side panel means at said approximately right angles to said back panel; said means for securing said side panel means at said approximately right angles to said back panel comprising interlocking means for interlocking said side panel means with said roof panel to hold said side panel means substantially at right angles to said roof panel; said roof panel and back panel being approximately equal



in area; said side panels constructed to fold flat against said roof panel and said back panel respectively so that said roof panel and back panel can be folded inward against each other with said side panels inside; whereby said homogeneous sheet of lightweight material may be held upright to form a shelter by interlocking side panel means with said roof panel and folded into a flat rectangular shape which can be easily carried when not in use.

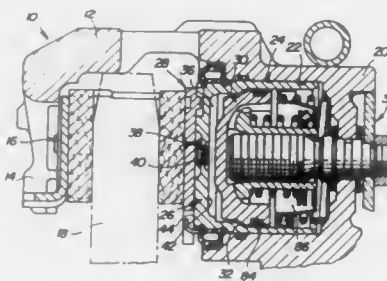
**4,958,653**  
**DRAG REDUCTION METHOD FOR GAS PIPELINES**  
Frank E. Lowther, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.  
Filed Jan. 29, 1990, Ser. No. 471,584  
Int. Cl.<sup>5</sup> F17D 1/17  
U.S. Cl. 137-13 10 Claims



1. A method of reducing drag for a gas flowing in a pipeline between a first point and a second point, said method comprising:

inputting gas at a constant pressure into said pipeline at said first point to establish gas flow in said pipeline between said first and second points;  
injecting a drag reducer into said gas flow at said first point; monitoring the flowrate of said gas at said second point; and adjusting the injection rate of said drag reducer at said first point until a maximum flowrate of said gas is reached at said second point.

**4,958,654**  
**CHECK VALVE WITH EPHEMERAL SEAL**  
Charles T. Hoffman, Jr., Springboro, Ohio; John W. Altenburger, Dearborn, Mich., and John A. Ramos, Utica, Mich., assignors to General Motors Corporation, Detroit, Mich.  
Filed Jul. 3, 1989, Ser. No. 375,326  
Int. Cl.<sup>5</sup> F16K 17/40  
U.S. Cl. 137-72 2 Claims



1. A method of inhibiting the opening of a normally closed check valve and removing that inhibition upon the attainment of a predetermined check valve operating condition, said method comprising the steps of:

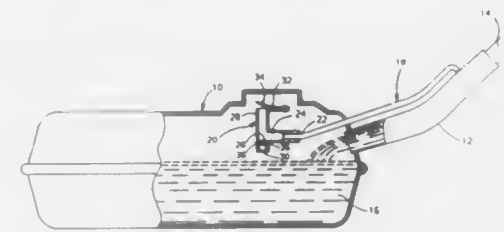
- (1) assembling mechanism including a normally closed check valve in operative relation and applying a high viscosity ephemeral seal material to an entry chamber of the check valve during such assembly so as to inhibit the opening of the check valve to permit fluid flow through when a differential fluid pressure is applied to one side of the check valve normally tending to so open the check valve;
- (2) applying a subatmospheric air pressure to the exit side of the check valve to establish an air pressure differential across the check valve and the ephemeral seal material in excess of the air pressure differential required to open the check valve when no ephemeral seal material is present, bleeding air from that side and from other portions of the assembled mechanism while blocking the opening of the normally closed check valve with the ephemeral seal material;
- (3) charging a portion of the assembled mechanism with a hydraulic fluid while keeping the hydraulic fluid physically separated from the check valve and the ephemeral seal material;
- (4) and afterward operating the assembled mechanism in a manner to create the predetermined check valve operating condition in which sufficient heat is applied to the ephemeral seal material in the check valve entry chamber to cause the ephemeral seal material to reach a temperature above which the ephemeral seal material becomes sufficiently viscous to flow out of and away from the check valve entry chamber and so removing the ephemeral seal material from the check valve entry chamber, thus removing the inhibition to the opening of the check valve at an air pressure differential acting thereacross which is substantially less than the air pressure differential established across the check valve and the ephemeral seal material in step (2).

**4,958,655**  
**MULTIPLE FILL LEVEL VEHICLE FUEL SYSTEM**  
Michael J. Danek, Laingsburg, Mich., assignor to General Motors Corporation, Detroit, Mich.  
Filed Feb. 20, 1990, Ser. No. 482,133  
Int. Cl.<sup>5</sup> F16K 24/04  
U.S. Cl. 137-80 3 Claims

1. In a vehicle fuel tank of the type having a vent pipe for venting said tank as it is filled, a temperature responsive valve

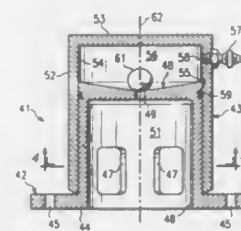
for providing two different fuel fill levels in said tank, said valve comprising,

a pair of inlets opening to said vent pipe at different levels within said tank,  
a fuel level responsive seal for closing off one of said inlets when fuel reaches the level of said first inlet, and,



a temperature responsive seal for closing off the other of said inlets when the temperature in said tank is beyond a predetermined threshold,  
whereby, the fuel level may be selectively switched from the level of one of said inlets to the other by allowing tank venting to occur until fuel reaches the level of one inlet or the other depending on whether the tank temperature is beyond said threshold.

**4,958,656**  
**PRESSURE RELIEF VALVE**  
Ajitkumar G. Patel, Oxford, Ohio, assignor to Dresser Industries, Inc., Dallas, Tex.  
Filed Jun. 29, 1989, Ser. No. 374,081  
Int. Cl.<sup>5</sup> F16K 17/12, 31/124  
U.S. Cl. 137-467 21 Claims

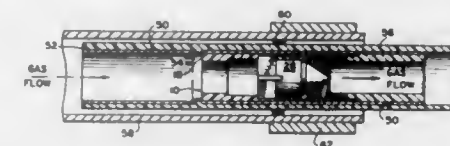


1. A relief valve adapted to be joined to a pressurized fluid container to protect the fluid container against internal fluid pressure above a predetermined value, the relief valve comprising:

- a valve body having first and second ends spaced apart from each other along the longitudinal axis of the valve body, the valve body having a first chamber formed therein, the valve body having an outer wall surface extending around the periphery of the valve body between the first and second ends of the valve body, the outer wall surface of the valve body having at least one fluid pressure relief opening therein which is in fluid communication with said first chamber, the first end of said valve body having an opening therein in fluid communication with said first chamber and adapted to provide fluid passage into said first chamber from said pressurized fluid container, the second end of the valve body having an opening therein in fluid communication with said first chamber, the area of the opening in the second end of the valve body being substantially smaller than the area of the second end of the valve body;
- a valve sleeve member closed at one end by a cap wall and open at the opposite end, the valve sleeve member having an inner wall surface which corresponds to said outer wall surface of the valve body so as to permit the valve sleeve member to encompass the outer wall surface of the valve body with the inner wall surface of the valve sleeve mem-

ber being in slidable engagement with the outer wall surface of the valve body between a closed position and an open position with the relative motion therebetween being at least generally parallel to the longitudinal axis of the valve body so that in closed position said at least one fluid pressure relief opening is at least substantially sealed by the valve sleeve member and in said open position said at least one fluid pressure relief opening is not blocked by the valve sleeve member, a second chamber located within said valve sleeve member and being at least generally defined by the second end of the valve body, said cap wall and said inner wall surface of the valve sleeve member; a pressure actuable element positioned to block said opening in the second end of the valve body when the fluid pressure in said first chamber in the valve body is below said predetermined value and to unblock said opening in the second end of the valve body when the fluid pressure in said first chamber in the valve body is above said predetermined value, thereby permitting fluid to pass from the pressurized fluid container through said first chamber and the opening in the second end of the valve body into said second chamber when the fluid pressure in the pressurized fluid container exceeds said predetermined value, with the resulting increase in pressure against the cap wall of the valve sleeve member causing the movement of the valve sleeve member from said closed position to said open position to thereby vent fluid from the pressurized fluid container through said first chamber and said at least one fluid pressure relief opening in the outer wall surface of the valve body, wherein said pressure actuable element is a rotatable body having dimensions greater than the corresponding dimensions of said opening in the second end of the valve body.

**4,958,657**  
**GAS SUPPLY SAFETY DEVICE**  
Thomas E. Hagan, and John B. McGowan, Sr., both of Malvern, Pa., assignors to Umac Incorporated, Exton, Pa.  
Filed May 11, 1989, Ser. No. 350,351  
Int. Cl.<sup>5</sup> F16K 17/30  
U.S. Cl. 137-513.5 17 Claims



3. In a combustible gas supply line for passing a continuous or intermittent supply of natural or other consumer gas from a source thereof to a combustible-gas user, comprising a gas supply pipe having opposite ends and a safety flow limiter spaced along said pipe, the improvement wherein said safety flow limiter has a modular construction comprising:

- a cylindrical shell having a generally uniform outer wall surface of consistent outer diameter, said gas supply pipe being unitary and having an inner diameter substantially equal to the outer diameter of said shell, and said shell being fixed within said unitary gas supply pipe between the ends thereof;
- said cylindrical shell having an internal wall surface defining an internal passageway extending axially therethrough, and an annular valve-seat along said passageway;
- a valve head member positioned within said passageway and capable of axial movement between said valve-seat and an upstream position, and said valve head having an annular surface for mating with said annular valve-seat, a body portion extending upstream from said annular surface, and guiding fin means upstream from said body portion for radially centering said valve head within said passageway;



a coil spring for biasing said valve head toward said upstream position and away from said valve seat; and means to permit bleed-by flow of combustible gas past said flow limiter when said annular surface of said valve head is in mating relationship with said annular valve-seat.

4,958,658

## MASS FLOW STABILIZED

John P. Zajac, San Jose, Calif., assignor to Tegal Corporation, Petaluma, Calif.

Filed Jan. 25, 1987, Ser. No. 66,801

Int. Cl.<sup>5</sup> E03B 5/00

U.S. Cl. 137—613

2 Claims



1. In a gas delivery system wherein a mass flow controller is connected in a gas line between a source of gas and a device in which the gas is used, the improvement comprising a mass flow stabilizer interposed in said line for dampening small pressure fluctuations, said mass flow stabilizer comprising restriction means connected to said source, wherein said restriction means is characterized by a flow rate slightly greater than that of said mass flow controller, and chamber means connected to said restriction means and said mass flow controller.

4,958,659

## PRESSURING AND PURGING APPARATUS

Dennis S. Dowdall, Morden, England, assignor to Teletron Limited, Surrey, England

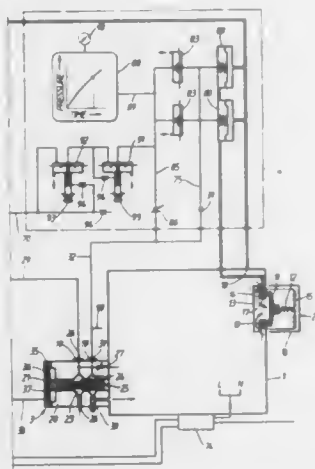
Filed Oct. 17, 1989, Ser. No. 422,422

Claims priority, application United Kingdom, Oct. 17, 1988, 8824276

Int. Cl.<sup>5</sup> B65D 25/00

U.S. Cl. 137—624.12

21 Claims



1. An apparatus for pressurizing and purging with gas the interior of an enclosure, comprising purge valve means for controlling communication between a source of pressurized gas and the enclosure interior for gas to enter the enclosure either at a relatively high flow rate for purging or at a substantially reduced flow rate for maintaining a positive pressure in the enclosure, and pneumatically operable control means for operating the purge control valve, whereby gas initially enters the enclosure at said reduced flow rate, upon the enclosure pressure reaching a given pressure level the purge valve means is opened for gas to enter the enclosure at said high flow rate,

and the purge valve means is closed so that gas enters the enclosure at the reduced flow rate again after the purging gas flow has been established for a certain time, wherein the purge valve means comprises a valve body adapted to be mounted directly on a wall the enclosure with port means provided in a face of the valve body registering with orifice means in said wall for communicating the pressurizing and purging apparatus directly with the enclosure interior, and the valve body carries the pneumatic control means and constitutes a manifold providing communication between different parts of the control means and communication thereof with the chamber enclosure.

4,958,660

## CLOSED LOOP FUNCTION SELECTOR VALVE

Daniel A. Eke, 234 Amber Lake Dr.; Alan B. Eke, 179 Bellevue Rd., both of Fairmont, Minn. 56031, and Earl W. Johnson, R.R. 1, Dunnell, Minn. 56127

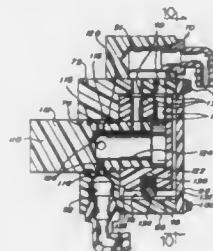
Continuation of Ser. No. 121,299, Nov. 15, 1987, abandoned.

This application Feb. 6, 1990, Ser. No. 476,134

Int. Cl.<sup>5</sup> F16K 11/12; A47K 3/22

U.S. Cl. 137—625.23

6 Claims



1. A closed loop function selector valve which directs hydraulic fluid pressure to any one of several hydraulic related devices wherein the low pressure drains or returns of all of the devices are directed back through the valve, comprising

- a hollow valve body having at least two function selector ports therein hydraulically connected to any of the devices, a high pressure line input port and a valve drain output port;
- a selector moveably seated within the valve body having a line pressurized chamber within the valve body which is in constant flow communication with the hydraulic pressure directed into the valve by way of the line input port;
- a chamber exit port within the selector arranged to be alignable with one of the function selector ports for flow communication therewith while the other function selector port is in flow communication with the valve drain output port within the valve body; and
- detent means on the selector diametrically opposing the chamber exit port and within said valve body for releasably interlocking the selector into any one of its operational positions wherein the chamber exit port is in communication with one of the two function selector ports.

4,958,661

## CHECK VALVE

Ludwig K. Holtermann, Old Saybrook, and Leighton Lee, II, Guilford, both of Conn., assignors to The Lee Company, Westbrook, Conn.

Filed Aug. 8, 1989, Ser. No. 391,142

Int. Cl.<sup>5</sup> F16K 15/14

U.S. Cl. 137—843

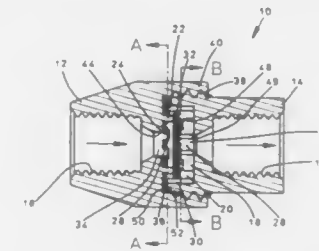
5 Claims

1. A flow control valve comprising:

- housing means having an inlet end and an outlet end and defining an axial flow passage therebetween comprising an inlet flow passage and an outlet flow passage and a central chamber of increased diameter intermediate be-

tween and communicating with both the inlet flow passage and the outlet flow passage;

- valve seat means comprising an annular ridge with a full radius rounded surface protruding toward the outlet end, concentric with and surrounding the opening through which the inlet flow passage communicates with the central chamber;
- A flexible disc comprised of an elastomeric material transversely positioned across the central chamber and releasably engageable with the valve seat means to prevent the flow of fluid media through the flow passage from the outlet end to the inlet end;
- means for prebiasing the disc against the valve seat means comprising a plurality of coaxial, angularly displaced tubular sectors with inside radii about equal to that of the



outlet flow passage, forming a discontinuous annulus that surrounds and extends toward the inlet end from the opening of the outlet flow passage into the central chamber, wherein axially extending slots separate the sectors of the disc prebiasing means and define means for providing fluid communication between the outlet flow passage and the central chamber, and the disc prebiasing means further comprise shoulders that protrude radially outward from the disc prebiasing means for limiting the axially downstream and radially inward deformation of the disc; and

- support means for preventing the central portion of the disc from being forced into the inlet flow passage, the support means partially surrounding the opening of the inlet flow passage into the central chamber radially central to the valve seat means and protruding toward the outlet end of the valve.

4,958,662

## PICK EXTRACTING DEVICE WITH ROTATIVE DRIVE

Yujiro Takegawa, Uchinada, Japan, assignor to Tsudakoma Corporation, Kanazawa, Japan

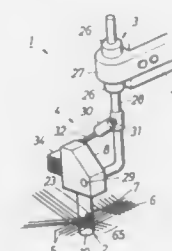
Filed Apr. 6, 1989, Ser. No. 334,865

Claims priority, application Japan, Apr. 6, 1988, 63-84570

Int. Cl.<sup>5</sup> D03D 49/00

U.S. Cl. 139—116.2

4 Claims



1. A weft yarn extracting device comprising:

- an extracting means for gripping one end of a weft yarn to be extracted and for winding the weft yarn to extract same from a cloth fell;
- a first shifting means for shifting the extracting means be-

tween a standby position where the extracting means is kept standing by and an operating position where the extracting means grips the weft yarn; and

- a second shifting means for shifting the extracting means located at the operating position away from the cloth fell; wherein said extracting means comprises: a holding member; a tubular case attached to the holding member; a rotary tube rotatably supported in the tubular case and provided with an axial bore; a nozzle axially slidably and rotatably supported in the tubular case opposite to the rotary tube so as to be moved axially toward and away from the rotary tube and including means for of jetting air to suck the weft yarn into the interior of the tubular case and to eject the weft yarn extracted from the cloth fell; and a rotative driving means for rotating the rotary tube and the nozzle.

4,958,663

## WOVEN MULTI-LAYER ANGLE INTERLOCK FABRICS HAVING FILL WEAVER YARNS INTERWOVEN WITH RELATIVELY STRAIGHT EXTENDING WARP YARNS

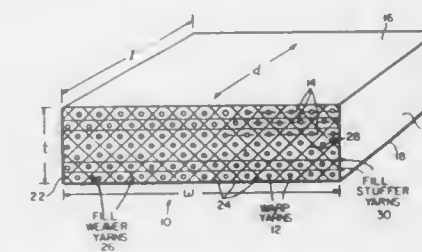
Wilbur T. Miller, Dominic P. Calamito, both of Rancho Palos Verdes, and Richard H. Pasch, Huntington Beach, all of Calif., assignors to Hiteco, Cleveland, Ohio

Filed Aug. 15, 1988, Ser. No. 232,450

Int. Cl.<sup>5</sup> D03D 11/00, 13/00

U.S. Cl. 139—384 R

20 Claims



1. A woven fabric having a thickness between opposite broad surfaces and comprising a plurality of warp yarns extending generally in a common direction and arranged into a plurality of warp yarn layers between the opposite broad surfaces of the fabric and a plurality of fill yarns extending through the thickness of the fabric from one of the opposite board surfaces to the other of the opposite broad surfaces and being interwoven with the plurality of warp yarns, the fill yarns being arranged into generally planar fill yarn sheets which extend through the thickness of the fabric and form acute angles with the plurality of warp yarn layers and with the opposite broad surfaces.

4,958,664

## AIR JET LOOM WITH A JACQUARD FRAME AND A VARIABLE DRAWING-IN WIDTH

Othmar Oppl, Hergensweiler, Fed. Rep. of Germany; Wilhelm Rupp, Hoerbranz, Austria, and Adnan Wahhood, Bodolz, Fed. Rep. of Germany, assignors to Lindauer Dornier Gesellschaft GmbH, Lindau/Bodensee, Fed. Rep. of Germany

Filed Mar. 14, 1989, Ser. No. 323,441

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1988, 3809631

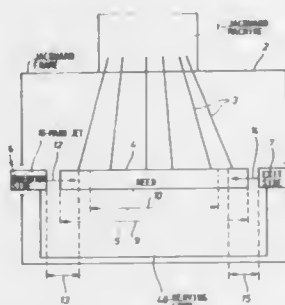
Int. Cl.<sup>5</sup> D03D 47/30, 47/40

U.S. Cl. 139—435.1

9 Claims

1. An air jet weaving loom comprising changeable length reed means (4, 5) arranged centrally in said weaving loom, a jacquard machine (1) arranged above and symmetrically to a center of said reed means, said jacquard machine providing harness threads (3) to a centered and symmetric drawing-in width of said reed means, weft thread insertion means on an

insertion side of said loom for inserting a weft thread into a loom shed, position adjustable weft thread catch means on an exit side of said air jet weaving loom, means for adjusting the position of said weft thread insertion means back and forth in the weft thread insertion direction (12) on the air jet weaving loom (48), so that adjustments on said insertion side and on said exit side together maintain said drawing-in width centered and

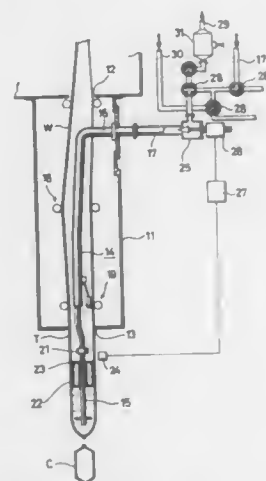


symmetric independently of a changed length of said reed means, said air jet weaving loom further comprising weft thread scissors (36), auxiliary selvage means (51) for forming a selvage (53), a weft thread clamp, and means for movably and adjustably mounting said scissors, said auxiliary selvage means, and said weft thread clamp on said weft thread insertion side for maintaining said drawing-in width centered and symmetric.

**4,958,665**  
**APPARATUS FOR ADJUSTING LEVEL OF LIQUID TO BE FILLED INTO PACKAGING TUBE**  
Fumiyuki Iwano, Tokushima, Japan, assignor to Shikoku Kakoki Co., Ltd., Itano, Japan  
Filed Nov. 16, 1988, Ser. No. 271,789  
Claims priority, application Japan, Nov. 20, 1987, 62-177705[U]

Int. Cl.<sup>5</sup> B65B 3/30  
U.S. Cl. 141—95

5 Claims



1. In a packaging machine having a vertical portion of a filling pipe adapted to be enclosed by a packaging tube formed from a web of packaging material, and fill a liquid into the tube to a predetermined level from a lower end opening of the vertical portion, an apparatus for adjusting the level of the liquid to be filled into the packaging tube, comprising:  
a flow control valve for controlling the flow of the liquid to be supplied to the filling pipe,

a float slidably suspended by the filling pipe into the liquid filled in the tube,  
a magnet attached to the float,  
a magnetic sensor for detecting from outside the tube variations in the intensity of magnetism due to the upward or downward movement of the magnet to produce an output signal, and  
a control unit for controlling the setting of the flow control valve in accordance with the output signal of the magnetic sensor.

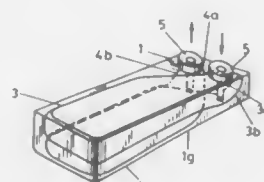
**4,958,666**  
**STORAGE CANISTER FOR PROCESS LIQUIDS FOR USE IN AN APPARATUS FOR WET PROCESSING OF PHOTOGRAPHIC MATERIAL**

Franz Kocourek; Hans Ketterer; Alfons Kastl, and Rudolf Loistl, all of Munich, Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 28, 1988, Ser. No. 277,003  
Claims priority, application Fed. Rep. of Germany, Dec. 17, 1987, 3742821

Int. Cl.<sup>5</sup> B65B 3/17  
U.S. Cl. 141—114

9 Claims



1. A device for storing process liquids such as baths for the wet processing of photographic materials, comprising a flat, rectangular receptacle defining two opposite broad sides each having two opposite narrow edges, one of said broad sides having two apertures arranged side by side near to one of said narrow edges; two pouches of an elastic, leakage proof material arranged one above the other in said receptacle, one of said pouches being expandable while the other pouch being collapsible to such an extent that their combined volumes correspond approximately to the volume of said receptacle; each of said pouches having a converging end portion terminating at said one narrow edge opposite an assigned aperture; said converging neck portions crossing one another and being formed, respectively, with an open neck part extending toward the assigned aperture and being closed by a control valve passing through the aperture; and said control valves being fastened to said one broad side.

**4,958,667**  
**TUBE HOLDER FOR TUBE FILLING MACHINES**  
Weasley J. Rece, California, Ky.; Martin M. Wildmoser, Florence, both of Ky., and Eric W. Scarpa, Cincinnati, Ohio, assignors to R. A. Jones & Co., Inc., Covington, Ky.  
Filed Jul. 17, 1989, Ser. No. 380,307

Int. Cl.<sup>5</sup> B65G 47/24

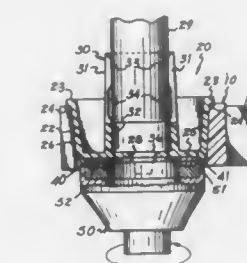
U.S. Cl. 141—165

5 Claims

5. A tube holder which is receivable by a circular rotator having a serrated rim and a central magnet comprising:  
a plastic cup-shaped section having a bottom wall which has an underside,  
a plastic gripper for holding said tube projecting upwardly from said bottom wall,  
a serrated rim projecting downwardly from said bottom wall, and

a ring of magnetically-attractable material secured to the underside of said bottom wall,

extend at angles substantially less than 90° with respect to said coaxial.



**4,958,669**  
**DEVICE FOR FILLING SPECIFIED AMOUNT OF LIQUID**  
Shobei Ohta, Tokushima, Japan, assignor to Shikoku Kakoki Co., Ltd., Tokushima, Japan  
Continuation of Ser. No. 180,921, Apr. 13, 1988, abandoned.  
This application Jul. 28, 1989, Ser. No. 385,957  
Claims priority, application Japan, Apr. 14, 1987, 62-56505[U]

Int. Cl.<sup>5</sup> B67C 3/20; B65B 3/12  
U.S. Cl. 141—311 A

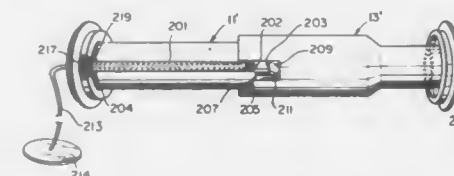
12 Claims

said rim being engageable by a mating serrated rim of a rotator that has a central magnet that holds said holder onto said rotator.

**4,958,668**  
**VARIABLE FLOW VALVE EQUIPPED SAFETY SPOUT**  
Leandre Vachon, l'Aéroport, Thetford Mines, 2549 Chemi De, Quebec, Canada  
Continuation-in-part of Ser. No. 561,454, Dec. 14, 1983, abandoned. This application Mar. 5, 1986, Ser. No. 836,520  
Int. Cl.<sup>5</sup> B67C 3/00

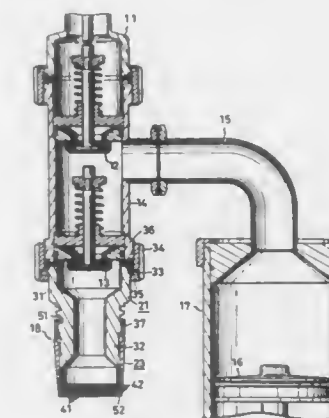
U.S. Cl. 141—291

10 Claims



1. A detachable pouring spout for transferring liquid from a filling container to a receiving container, comprising:

- (a) an inlet tube for receiving liquid from the filling container, said inlet tube having an inlet portion provided with means for attaching said inlet tube to the filling container, and a main portion;
  - (b) an outlet tube operatively coupled to said inlet tube for guiding liquid therefrom into the receiving container, said outlet tube having a collar-like portion telescopically mounted onto said main portion of said inlet tube, and a short outlet portion of smaller diameter than said inlet tube;
  - (c) a valve comprising a valve head; means for connecting said valve head to said outlet tube, said connecting means comprising an apertured plate extending across a lowermost end of said collar-like portion of said outlet tube and a pin having one end connected to a central portion of said apertured plate and another end connected to said valve head; and a valve seat disposed at substantially a lowermost end of said main portion of said inlet tube, whereby spillage of liquid contained in the spout is prevented;
  - (d) a spring mounted within said collar-like portion of said outlet tube between the apertured plate and the lowermost end of the main portion of said inlet tube for biasing said valve in a normally closed position; and
  - (e) at least one stop responsive to an upward force and mounted externally on a surface of said lowermost end of said collar-like portion of said outlet tube for opening said valve,
- wherein the main portion of the inlet tube and the collar-like portion of the outlet tube have a coaxial and wherein both the inlet portion of the outlet tube and the outlet portion of the outlet tube downstream of the valve



1. A plurality of perforated plates for use in a liquid filling device, said plurality of perforated plates arranged adjacent one another, each of said perforated plates, comprising a plurality of warp portions and weft portions so as to provide a plurality of fine perforations therebetween, said plurality of warp portions and weft portions being directly connected to each other at intersection points so as to prevent overlapping of said plurality of warp and weft portions to thereby allow effective cleaning and sterilizing of said plurality of perforated plates; and a spacer arranged within a spacing between adjacent perforated plates; wherein an opening ratio of each of said plurality of perforated plates is substantially 50 percent or more to thereby prevent liquid from flowing therethrough by gravity through surface tension of said liquid against said plurality of warp portions and weft portions, said opening ratio of each of said plurality of perforated plates being the ratio of the total volume of openings of said plate to the total volume, inclusive of said openings, of said plate.

**4,958,670**  
**TREE FELLING APPARATUS**  
Calvin S. Johnson, Union Grove, N.C., assignor to CTR Manufacturing, Inc., Union Grove, N.C.  
Filed Feb. 5, 1990, Ser. No. 475,133  
Int. Cl.<sup>5</sup> A01G 23/08; B27B 17/08

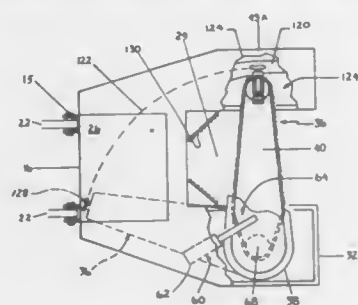
U.S. Cl. 144—34 R

14 Claims

1. An apparatus for felling trees, comprising a generally U-shaped base means having a main body and a pair of arm members extending from said main body in laterally spaced relation defining therebetween an open cutting area for receiving a trunk portion of a tree to be felled, and saw means pivotally mounted to one of said arm members for tree cutting movement through said cutting area between a retracted position extending from said one arm member toward said main body and a cutting position extending through said cutting area from said one arm member toward the other said arm member, said saw means having a guide portion at a distal end radially outwardly from the pivot mounting location of said saw means,



said other arm member including saw tracking means for defining a tracking area for confined receipt of said guide portion of

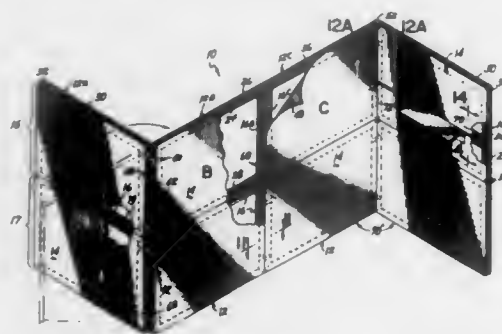


said saw means during tree cutting movement thereof for limiting deflection of said saw means which may be caused by reactive forces exerted by a tree being cut.

#### 4,958,671 FOLDABLE DISPLAY SYSTEM WITH CONTINUOUS DISPLAY SURFACE

Thomas A. Bove, 1154 Herschel Ave., Cincinnati, Ohio 45208  
Filed Sep. 12, 1989, Ser. No. 406,369

Int. Cl.<sup>5</sup> A47G 5/00  
U.S. Cl. 160—135 26 Claims



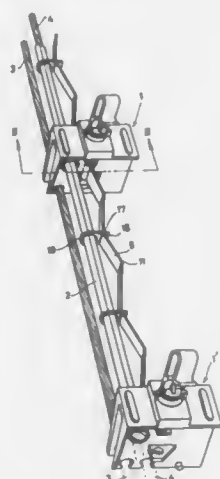
1. A portable display system comprising: a plurality of display panels having front and rear surfaces; a plurality of vertical and horizontal frame elements defining an array of panel support frames, each said frame element having inner and outer edges, front and rear surfaces and opposite ends, at least said front surface of each said frame element having a front channel therein, means joining each said frame element at its opposite ends to two perpendicularly adjacent frame elements so as to form a rectangular panel support frame; means hingedly joining adjacent vertical frame elements of said panel support frames such that said array of support frames is reconfigurable from a folded, portable position to an unfolded, display position; and means for releasably securing each said display panel to a panel support frame with the peripheral edges of said panel and the outer edges of said frame being in aligned registration with each other so as to provide a substantially continuous and unbroken display surface when said array of support frames is in an unfolded, display position, said securing means including a first member located in said front channel and a second member attached to the rear surface of said display panel, said second member adapted to seat in said front channel and being located relative to the peripheral edges of said panel such that when said second member is seated in said front channel, said peripheral edges of said panel are in

said aligned registration with said outer edges of said panel support frame, said first and second members being magnetically attractive to each other to releasably secure said display panel to said support frame in aligned registration therewith.

#### 4,958,672 SUSPENSION SYSTEM FOR VERTICAL BLINDS

Pieter N. Meyer, Kromme Akkers 1, 4171 BM Herwijnen, Netherlands  
Filed May 11, 1988, Ser. No. 192,481  
Claims priority, application Netherlands, Jan. 8, 1988, 8800049

Int. Cl.<sup>5</sup> E06B 9/36  
U.S. Cl. 160—168.1 4 Claims



1. In a vertical blind suspension system having a track partially open at one side with slides disposed therein and having slat-suspending hooks depending through the partially open side and a non-circular drive rod disposed in the track and connected to the slides in such manner that the slides are movable along the drive rod and the slat suspension hooks are rotated by rotating the drive rod and a cord system disposed within the track and connected to an end slide and operable in opposite directions for displacing the slides along the track; the suspension system characterized by accordion-folded strips of flexible material having a predetermined length; each of said accordion-folded strips being disposed within the track and connected at opposite ends to each adjacent slide for distension to space said slides apart along said predetermined length and drawing them along the track in response to operation of the cord system in one direction and being collapsible upon themselves to stack the slides together in response to operation of the cord system in the opposite direction; each accordion-folded strip including a plurality of bending points intermediate its opposite ends; and attachment means for loosely slidably attaching at least one of said bending points of said accordion-folded strip to the drive rod for suspension therefrom.

#### 4,958,673 PAPERMAKING MACHINE AND A SEAMED PAPERMAKER'S FABRIC

Marcel Dufour, Saint Yrieix, France, assignor to Asten Group, Inc., Charleston, S.C.  
Continuation of Ser. No. 822,292, Jan. 24, 1986, Pat. No. 4,683,624. This application Feb. 12, 1987, Ser. No. 14,026  
Claims priority, application France, Sep. 11, 1985, 85 0234  
Int. Cl.<sup>5</sup> D21F 7/10

U.S. Cl. 162—358 3 Claims

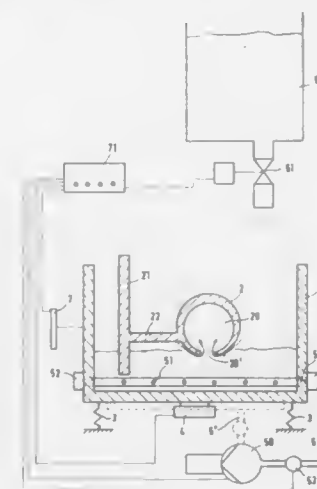


1. The combination of a seamed wet press felt and a paper-making machine having a least one pair of pressure rollers through which the paper sheet must be transported, said wet press felt having a base fabric with end loops which are intermeshed and joined in the seam and a layer of batt material which was needed to the base fabric and cut adjacent the seam area prior to installation on the machine and then refelted after installation so as to eradicate the cut and provide a batt layer having a continuous, homogenous paper supporting surface throughout its length.

#### 4,958,674 FULL MOLD CASTING PROCESS AND DEVICE

Joachim Bolle, Ingolstadt, Fed. Rep. of Germany, assignor to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Fed. Rep. of Germany  
Continuation of Ser. No. 163,385, Mar. 2, 1988, abandoned. This application Mar. 5, 1990, Ser. No. 489,839  
Claims priority, application Fed. Rep. of Germany, Mar. 9, 1987, 3707467

Int. Cl.<sup>5</sup> B22C 9/04, 15/22  
U.S. Cl. 164—456 18 Claims



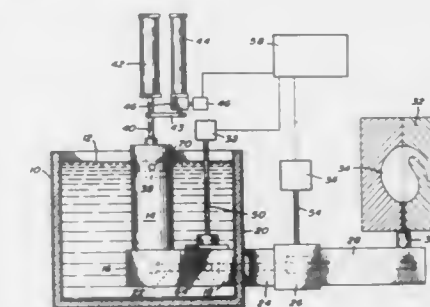
1. A full mold metal casting process, comprising the following steps:  
(a) supporting at least one model which is composed of a thermally decomposable material which has at least one cavity therein and which has only one opening on a lower surface of said model, within a molding box above the bottom of said molding box;  
(b) filling said box with sand until it reaches the level of said opening in said model;

(c) maintaining the level of said sand at the level of said opening until said cavity is filled with sand;  
(d) creating a pressure differential wherein the pressure in said sand is different than the pressure outside of said sand to cause said sand to flow into, and to fill said cavity; and  
(e) maintaining said pressure differential and the level of said sand constant until said cavity is filled so that the flow path of the sand into said cavity is not submerged in the sand itself until said cavity is completely filled.  
13. A full mold metal casting device, comprising:  
(a) a molding box for holding sand;  
(b) means for supporting a positive model composed of a thermally decomposable material which has only one cavity opening in a lower surface of said model at a level above the bottom of said box;  
(c) means for filling said box with sand to the level of said opening in said cavity;  
(d) means for creating a pressure differential wherein the pressure within said sand is lower than the pressure within said box above said sand; and  
(e) control means for controlling and maintaining the level of said sand at the level of said opening, and for maintaining said pressure differential until said cavity is filled so that the flow path of sand into said cavity is not submerged until said cavity is completely filled with sand.

#### 4,958,675 METHOD FOR CASTING METAL ALLOYS WITH LOW MELTING TEMPERATURES

Thomas F. Kidd, Canliac, Canada, assignor to Electrovert Ltd., Toronto, Canada  
Filed Nov. 8, 1988, Ser. No. 268,492

Int. Cl.<sup>5</sup> B22D 17/00  
U.S. Cl. 164—120 3 Claims



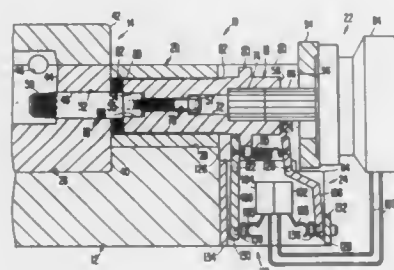
1. In a method of producing a casting from a molten metal alloy having a melting point below about 350° C., including an injection cylinder having an injection piston therein, and means to raise and lower the piston in the cylinder, the injection cylinder having an injection passageway containing molten metal alloy, passing through a molten metal alloy tank to inject molten metal alloy from the tank into a die, the improvement comprising the steps of:  
closing the passageway from the injection cylinder to the die;  
filling the injection cylinder with molten metal alloy from the tank through a valve port located in the injection passageway at an elevation lower than the cylinder, by raising the piston in the cylinder;  
closing the valve port in the injection passageway and opening the passageway from the injection cylinder to the die;  
lowering the piston in the cylinder after the passageway is open so no prepressurization occurs in the cylinder or passageway prior to injection, the piston being lowered at a controlled rate so that substantially no pressure occurs in the die during injection, and  
applying pressure to the piston after the injection step to pressurize the molten metal alloy in the die during solidification of the casting.

**4,958,676**  
**DIE CASTING APPARATUS FOR CASTING ARTICLES WITH AN INTERNALLY THREADED BORE**  
 Robert J. Kuntz, Macungie, Pa., assignor to Hubbell Incorporated, Orange, Conn.

Filed May 30, 1989, Ser. No. 358,071  
 Int. Cl.<sup>3</sup> B22D 17/24

U.S. Cl. 164—340

16 Claims



16. A die casting apparatus for casting an article with an internally screw-threaded bore, comprising:

- a support;
- a die, coupled to said support, having a first opening, a second opening and a cavity therein for receiving casting material through said first opening;
- a core pin having first and second ends, said first end having external threads with a predetermined pitch thereon, said core pin being slidably coupled to said die for axial movement of said first end of said core pin into and out of said cavity via said second opening;
- driving means, coupled to said support and said core pin, for rotating and for moving said core pin into and out of said cavity, said driving means including
- a movable member fixedly coupled to said core pin for axial movement therewith and having a first set of threads with a pitch identical to said pitch of said core pin threads,
- a stationary member having a second set of threads with a pitch identical to said pitch of said core pin threads and threadedly engaged with said first set of threads, and
- power means, coupled to said movable member, for rotating said movable member and said core pin relative to said stationary member and for moving said core pin into and out of said cavity; and
- control means, coupled to said support, for limiting axial movement of said core pin into and out of said cavity, said control means including
- a forward limit switch and a rearward limit switch, both rigidly coupled to said support,
- a forward switch assembly having a first link, pivotally coupled to said support, with a first end and a second end,
- said first end of said first link engagable with said movable member and said second end of said first link engagable with said forward limit switch to limit the movement of said core pin relative to said cavity, and
- a rearward switch assembly having a second link pivotally couple to said support, with a first end and a second end, said first end of said second link engagable with said movable member and said second end of said second link engagable with said rearward limit switch to limit the movement of said core pin relative to said cavity.

**4,958,677**  
**ROLLING INSTALLATION FOR AND ROLLING METHOD OF CONTINUOUS CAST STRIP**  
 Tomoaki Kimura, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 203,106, Jun. 7, 1988, Pat. No. 4,846,254. This application Jul. 7, 1989, Ser. No. 376,648  
 Claims priority, application Japan, Jun. 11, 1987, 62-146042  
 The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.  
 Int. Cl.<sup>3</sup> B21B 1/46

U.S. Cl. 164—452

12 Claims



1. A method of rolling a continuous cast strip to reduce its width, comprising the steps of:

- forming the continuous cast strip by a continuous casting machine;
- before cutting the cast strip, delivering the cast strip to a width-reduction rolling mill through a looper arranged between the continuous casting machine and the width-reduction rolling mill, including forming a loop amount of the cast strip with said looper; and
- rolling the cast strip to reduce its width while applying a longitudinal tension to the cast strip as it passes through the width-reduction rolling mill by applying a braking force to hold the cast strip on the upstream side of the width-reduction rolling mill and by exerting a driving force on the cast strip on the downstream side of the width-reduction rolling mill.

**4,958,678**  
**METHOD FOR PRODUCING REINFORCED BLOCK MATERIAL OF METAL OR THE LIKE**

Yuzo Kawamura, and Sigeo Nakagawa, both of Otsu, Japan, assignors to Yugenkaisha Idearesearch, Shiga and Matsuo Sangyo Co., Ltd., Osaka, both of, Japan

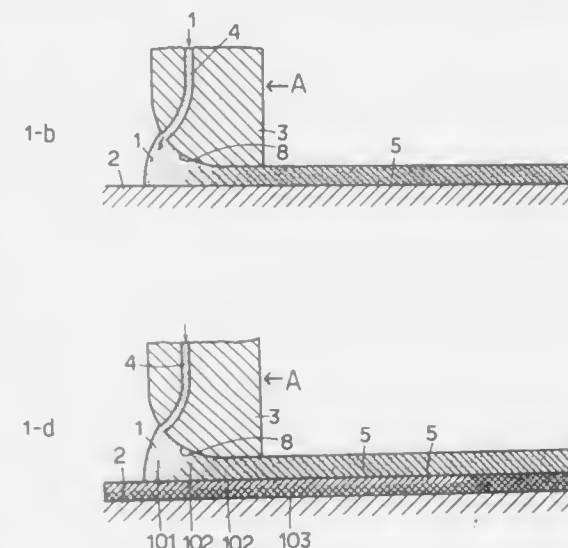
Filed Dec. 23, 1988, Ser. No. 288,892  
 Claims priority, application Japan, Dec. 27, 1987, 62-331843  
 Int. Cl.<sup>3</sup> B22D 11/00

U.S. Cl. 164—461

1 Claim

1. A method for producing a crystalline reinforced block material, wherein a crystalline material in molten state at a high temperature is laminated in thin film form on a base material, and while dissipating heat in the direction of said base material and rapidly cooling said crystalline material, simultaneously applying high pressure and large shearing force to said crystalline material by a pressing means to cool and solidify said crystalline material into a thin film form on said base material to provide an underlying thin layer, and further laminates of said crystalline material in molten state at a high temperature are further laminated in a thin film form on said underlying thin layer surface in molten state or semisolidified state, one film after the other on the immediately proceeding laminated thin layer and while dissipating heat in the direction of said underlying thin layer to rapidly cool the crystalline material, high pressure and large shearing force are simultaneously applied to said crystalline material being laminated to cool and solidify

said crystalline material into a thin film form on said immediately proceeding laminated thin layer to unite, cool and solid-



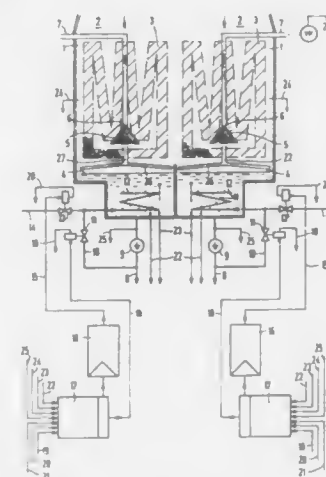
ify said applied laminate and form a block body of said crystalline material on said base material.

**4,958,679**  
**CONDENSER FOR THE WATER-STEAM LOOP OF A POWER PLANT, IN PARTICULAR A NUCLEAR POWER PLANT**

Armin Drosdzik, Essen; Harry Sauer, Eckenhaide, and Walter Zoerner, Balesdorf-Igelendorf, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed May 3, 1988, Ser. No. 189,765  
 Claims priority, application Fed. Rep. of Germany, May 4, 1987, 3714788; May 25, 1987, 3717521  
 Int. Cl.<sup>3</sup> F28B 11/00; G01D 5/00; F22D 1/50  
 U.S. Cl. 165—13

12 Claims



1. Condenser for the water-steam loop of a power plant, comprising:

- a condensate-filled lower portion, a heating pipe system disposed in said lower portion, nozzles disposed on said heating pipe system through which heating condensate or heating steam is forced into the condensate for heating the

condensate and thereby expelling dissolved gases from the condensate;

- a heating valve connected to said heating pipe system, a proportional regulator connected to said heating valve for adjusting heating output of said heating pipe system through the quantity of hot condensate or hot steam;
  - a measurement variable converter connected to said proportional regulator and having means for acting upon said proportional regulator at least as a function of oxygen content of the condensate and as a function of subcooling of the condensate, the subcooling being equal to the difference between the temperature of the condensate and the temperature of condensation of steam to be condensed; and
  - a vacuum pump communicating with said lower portion for removing expelled gases by suction;
- said measurement variable converter feeding a measurement result to said proportional regulator causing opening of said heating valve only as long as said vacuum pump is in operation.

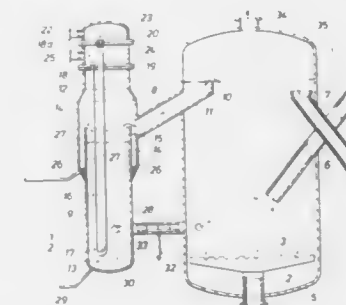
**4,958,680**  
**APPARATUS FOR PARTICULATE SOLIDS REGENERATION**

Peter H. Barnes, The Hague, and Johannes L. Nooyen, Amsterdam, both of Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Jun. 30, 1988, Ser. No. 213,750  
 Claims priority, application United Kingdom, Jul. 9, 1987, 8716160

Int. Cl.<sup>3</sup> B01J 38/30, 38/32  
 U.S. Cl. 165—104.18

6 Claims



1. Apparatus for particulate solids regeneration which comprises a substantially upright regenerator housing containing fluidization means arranged below spent-solids inlet means and regenerated-solids outlet means and having fluid in- and outlet means, and further comprising at least one external heat exchanger housing connected to the regenerator housing by means of at least two solids outlet tubes for flow of catalyst particles to said regenerator housing and containing heat exchanger means comprising a plurality of tubes with closed lower end parts and open upper end parts mounted in a tube sheet and in communication with the regenerator housing via solids inlet means and said two solids outlet means in which apparatus at least one solids outlet means directly connect a lower section of the heat exchanger housing with a section of the regenerator housing above the fluidization means.



4,958,681

HEAT EXCHANGER WITH BYPASS CHANNEL  
LOUVERED FINS

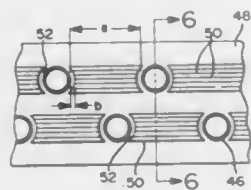
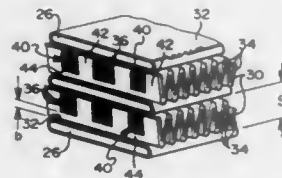
Durgaprasad S. Kadle, Getzville, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 14, 1989, Ser. No. 393,157

Int. Cl.<sup>5</sup> F28D 1/04; F28F 1/32

U.S. Cl. 165—151

2 Claims



1. A heat exchanger having a plurality of round tubes and a plurality of wrap-around multilouver fins between the tubes and thermally coupled to the tubes for enhancing the heat transfer capacity of the heat exchanger, the fins comprising louvers and plain sections, the louvers being placed between pair of tubes and spaced from those on an adjacent fin section and also spaced from the tubes by arcuate plain sections of uniform width serving as arcuate bypass channels of uniform width, the ratio of the width of the arcuate bypass channels to the distance between adjacent tubes having an optimum value, the louvers having the effect of increasing heat transfer and increasing air side pressure drop of the heat exchanger such that the curve of heat transfer versus air side pressure drop increases as the said ratio decreases, the curve having a knee above which a decreasing ratio yields an insignificant increase in heat transfer, the said optimum value of said ratio being at the knee of the curve to thereby optimize the heat transfer property without invoking high air side pressure drop.

4,958,683

METHOD AND APPARATUS FOR TREATING WELLS  
George W. Alford, 1954 Old Daytona Rd., Daytona Beach, Fla. 32014, and William C. Rogers, 1843 Jarrett Dr., Lawrenceville, Ga. 30245

Filed Apr. 11, 1989, Ser. No. 336,087

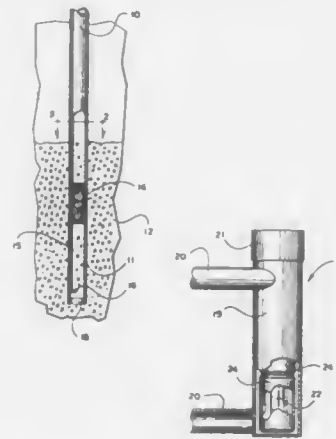
Int. Cl.<sup>5</sup> E21B 37/08

U.S. Cl. 166—247

10 Claims

1. Apparatus for treating a well, said well including a well casing, and a well screen at the lower end of said casing, the arrangement being that liquid enters said well casing through said well screen, and said liquid is moved up said well casing, said apparatus including a carrier held within said well casing adjacent to said well screen, said carrier including at least one container, said container having a radiation source therein for

irradiating said well screen sufficiently to prevent growth of bacteria thereon, and further including means for providing



generally free oxygen within said liquid for producing oxygen radicals on irradiation by said radiation source.

4,958,684

## STEAM INJECTION PROFILING

Tanh V. Nguyen, Fullerton, Calif.; C. Brent Davenport, Houston, Tex.; Christopher E. Stevens, Lemoore, Calif.; John C. Reis, Yorba Linda, Calif., and Ralph S. Millhone, Brea, Calif., assignors to Chevron Research Company, San Francisco, Calif.

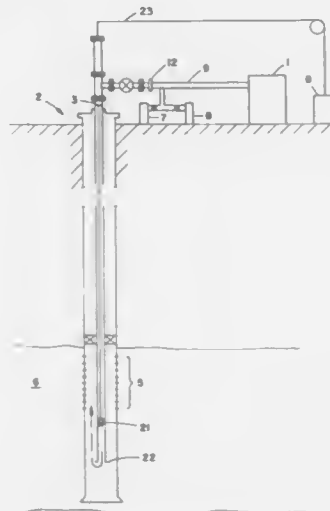
Continuation of Ser. No. 146,770, Jan. 22, 1988, Pat. No. 4,817,713, which is a continuation of Ser. No. 88,465, Aug. 19, 1987, Pat. No. 4,793,414, which is a continuation of Ser. No. 935,662, Nov. 26, 1986, abandoned. This application Mar. 13, 1989, Ser. No. 322,582

The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> E21B 43/24, 47/00

U.S. Cl. 166—252

6 Claims



1. A method of determining vapor phase stream profiles in a steam injection well comprising the steps of:  
a. positioning at least two spaced apart gamma ray detectors in the steam injection well at a first location and a second location including detectors;  
b. injecting an irradiated, thermally stable vapor phase tracer into the steam entering the steam injection well;

4,958,686

SUBSEA WELL COMPLETION SYSTEM AND METHOD  
OF OPERATION

Samuel W. Patch, Houston, Tex., assignor to Norman A. Nelson, Houston, Tex., a part interest

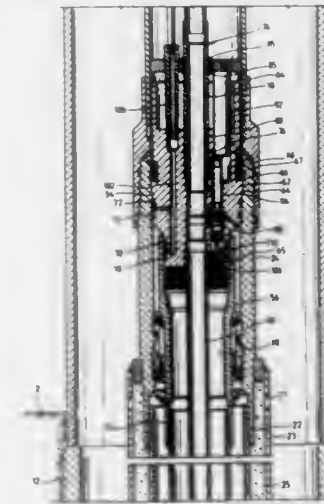
Filed Aug. 30, 1989, Ser. No. 400,427

Int. Cl.<sup>5</sup> E21B 33/043, 34/14

U.S. Cl. 166—348

5 Claims

c. determining a first transmit time with said spaced apart gamma ray detectors;  
d. moving the second gamma ray detector to a third location;  
e. repeating steps b. and c.; and  
f. calculating an amount of vapor entering a formation between said second location and said third location based on said vapor transit times.  
3. A method of determining the downhole steam quality at a location in a steam injection well comprising the steps of:  
(a) inserting a well logging tool into a steam injection well at a first location, said logging tool further comprising dual gamma ray detectors;  
(b) measuring with a mass flow meter a mass flow rate of steam entering the steam injection well;  
(c) determining downhole steam pressure at said first location;  
(d) injecting an irradiated, thermally stable vapor base tracer into the steam injection well;  
(e) determining a vapor transmit time in said steam injection well with said dual gamma ray detectors;  
(f) calculating the downhole steam quality at said first location, based upon said mass flow rate and vapor transit time and vapor density at said first location, said vapor density being based upon said downhole steam pressure at said first location.



1. In a subsea well completion system having at least two casing strings with a casing annulus therebetween, a tubing hanger assembly sealably engaging said two casing strings and supporting at least one production tubing string, one of the production tubing string forming a tubing annulus with a casing, said tubing hanger including passageways extending from its top through the hanger to one or more of the tubing annulus, the casing annulus, and the sealing engagement of the tubing hanger with the two casing strings, at least one of the passageways includes a vertically extending seal bore at the top and a normally closed check valve for normally preventing upward vertical flow therethrough, said check valve having a stinger extending into the seal bore which, when actuated, opens the check valve, a tree adapter for connection to the tubing hanger assembly and for receiving a valve tree, said tree adapter including a seal sub for engaging said seal bore, said adapter having a side port connected to said sub for externally communicating through the sub to said seal bore the improvement comprising, wherein said sub is slidably supported from the tree adapter and sealably engages the seal bore when the adapter is connected to the tubing hanger and means extending externally of the tree adapter for moving the sub relative to the stinger for opening and closing the check valve.

4,958,687

## FIRE DAMPER

Katsuyoshi Nakagawa, Osaka, Japan, assignor to Daito Tech Kabushiki Kaisha, Osaka, Japan

Filed Oct. 31, 1989, Ser. No. 429,424

Claims priority, application Japan, Dec. 15, 1988, 63-162944

Int. Cl.<sup>5</sup> F24F 7/00

U.S. Cl. 169—60

5 Claims

1. A fire damper comprising:

- a duct;
- a flap provided in the duct and supported by the duct in a rotatable manner about an axis crossing the duct and urged elastically in a rotating direction;
- a leaf spring an end of which is fixed to the flap;
- an engaging member capable of engaging with the leaf spring so as to stop rotation of the flap; and
- a heat detecting and actuating element made of form mem-

4,958,685

METHOD FOR PLUGGING LOST CIRCULATION AREAS  
AND LOST CIRCULATION MATERIAL TO BE USED  
THEREFOR

Takeshi Hihara, Zushi; Masahide Yanagiya, and Kazuhito Ono, both of Yokosuka, all of Japan, assignors to Toho Kagaku Kogyo Co., Ltd., Japan

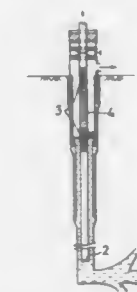
Filed May 24, 1989, Ser. No. 356,348

Claims priority, application Japan, May 27, 1988, 63-128186

Int. Cl.<sup>5</sup> E21B 33/138

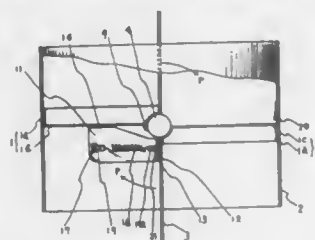
U.S. Cl. 166—291

5 Claims



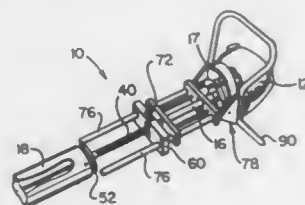
1. A method for plugging the areas of lost circulation occurred during the drilling of a well with the use of a drilling mud circulated through a drilling pipe, which method comprises injecting through the pipe (i) a mineral oil, (ii) a lost circulation material comprising a hydrophilic polyurethane prepolymer and a water-soluble solvent containing no active hydrogen atoms and hardly miscible with the mineral oil, and then (iii) the same mineral oil, so as to allow the urethane prepolymer to come down through the pipe in a manner sandwiched by the mineral oil functioning as a spacer and to penetrate into the lost circulation areas, at which the prepolymer reacts with water and plugs the areas through its polymerization.

ory alloy which has an end fixed with the flap and has another end fixed to the leaf spring at a position near a free



end thereof so that the member deforms the leaf spring when the member shrinks under heating.

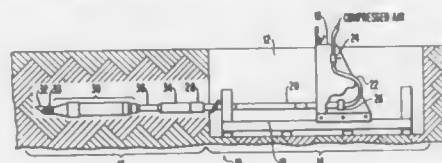
**4,958,688**  
**POWER DRIVEN GOLF HOLE CUTTING APPARATUS**  
Brett Marrow, P.O. Box 7136, Ancaster, Ontario, Canada L9G 3L4, and Jim Harris, 1276 Shaver Road, Ancaster, Ontario, Canada (L9G 3L1)  
Filed Jun. 20, 1988, Ser. No. 206,591  
Claims priority, application Canada, Jun. 29, 1987, 540787  
Int. Cl.<sup>3</sup> E21B 12/06; A01B 45/00  
U.S. Cl. 172-22 15 Claims



1. A power driven golf hole cutting apparatus comprising:
  - (a) an engine;
  - (b) an elongated shaft having first and second ends and operatively connected at or near said first end to be driven in rotation by said engine;
  - (c) a cutter head operatively connected to said second end of said shaft whereby said cutter head is driven in rotation by said shaft, said cutter head comprising a somewhat elongated cylindrical member having upper and open lower ends, said lower end having a cutting edge, and wherein the outside diameter of said cylindrical member defines the inside diameter of a hole cut by said apparatus;
  - (d) plunger means within said cutter head and movable between a first position proximate the top of said cutter head to a second position proximate the bottom thereof, said plunger means comprising a plunger plate which is freely movable axially within said cutter head and control means operatively connected to said plunger plate and extending upwardly from said plunger plate through the upper end of said cutter head; and
  - (e) power transfer means for selectively transferring the rotation of said shaft to linear motion of said control means to thereby cause said control means to move said plunger means downwardly from said first to said second position.

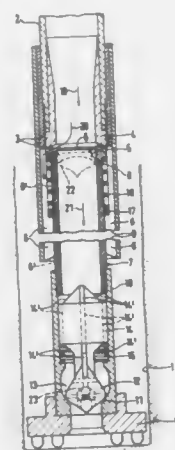
**4,958,689**  
**METHOD OF PROVIDING A HIGH PRESSURE SURGE OF WORKING FLUID TO AN UNDERGROUND PERCUSSIVE MOLE**

Douglas W. Lee, Enid, Okla., assignor to Gas Research Institute, Chicago, Ill.  
Division of Ser. No. 292,243, Dec. 30, 1988. This application Nov. 17, 1989, Ser. No. 437,831  
Int. Cl.<sup>3</sup> E21B 4/14  
U.S. Cl. 175-19 1 Claim



1. A method of providing a high pressure surge of working fluid to an underground percussive mole connected to a rigid drill string having a downhole end and a surface end, the method comprising the steps of:
  - connecting a downhole valve between the percussive mole and the downhole end of the drill string;
  - pulling on the rigid drill string to close the downhole valve;
  - charging the drill string with working fluid until a desired pressure is reached;
  - pushing on the rigid drill string to open the downhole valve and release a high pressure surge of working fluid to the percussive mole.

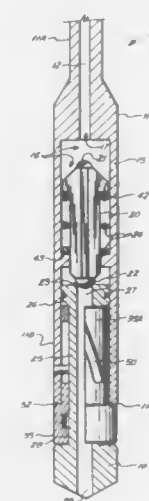
**4,958,690**  
**DRILLING DEVICE WITH HYDRAULIC PERCUSSION GENERATOR FOR EARTH DRILLING PURPOSES**  
Ivan J. Cyphelly, Cadrefin, Switzerland, assignor to Salzgitte Maschinenbau GmbH, Salzgitte, Fed. Rep. of Germany  
PCT No. PCT/EP88/00085, § 371 Date Oct. 24, 1988, § 102(e) Date Oct. 24, 1988, PCT Pub. No. WO88/06673, PCT Pub. Date Sep. 7, 1988  
PCT Filed Feb. 5, 1988, Ser. No. 272,743  
Claims priority, application Switzerland, Feb. 25, 1987, 707/87  
Int. Cl.<sup>3</sup> E21B 1/00  
U.S. Cl. 175-296 10 Claims



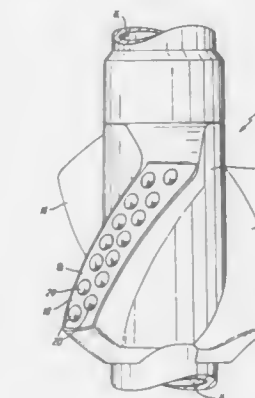
1. A drilling device for earth-drilling a borehole and comprising:
  - a drilling tool;
  - a percussion generator for applying an oscillating percussion force to said drilling tool; and
  - a drill pipe extending into the borehole for conducting a

liquid flow thereinto for actuating said generator, said drill pipe having a lower mouth;  
said percussion generator including:  
a longitudinally movable impulse tube located beneath said drill pipe and having an upper end defining an upper mouth and a lower end, said drilling tool being mounted to said lower end of said impulse tube;  
throttle means located between said upper and lower mouths for controlling a ratio of outside and inside portions of said liquid flow flowing on the one hand outside of said impulse tube directly into said borehole and on the other hand inside of said impulse tube in accordance with a longitudinal position of said impulse tube relative to said drill tube;  
first spring means for biasing said impulse tube relative to said drill pipe into a position in which said outside portion of said liquid flow is reduced;  
a thrust valve arranged at said lower end of said impulse tube for controlling the oscillating percussion force applied to said drilling tool, said thrust valve having a first portion extending into said lower end of said impulse tube and a second portion extending to the borehole outside of said impulse tube, said thrust valve having a first axial length and said impulse tube having a second axial length which is substantially greater than said first axial length of said valve; and  
second spring means for biasing said thrust valve to an open position thereof.

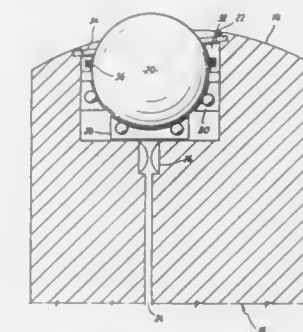
**4,958,691**  
**FLUID OPERATED VIBRATORY JAR WITH ROTATING BIT**  
James Hipp, 110 Lietmeyer St., New Iberia, La. 70560  
Filed Jun. 16, 1989, Ser. No. 367,341  
Int. Cl.<sup>3</sup> E21B 1/00, 4/14  
U.S. Cl. 175-296 13 Claims



1. A well tool for use with an elongated pipe string that can load the tool transmitting impact thereto and with a flow bore for transmitting pressurized fluid to the tool comprising:
  - (a) a housing having means for connecting said tool in fluid communication with the lower end of a pipe string and defining at least one fluid chamber therein for receiving pressurized fluid transmitted from the pipe string thereto;
  - (b) tubular stem means having a flow channel therethrough communicating with the fluid chamber, the stem means telescopically received by said housing for relative reciprocal movement therewith between a first "pressured up" unloaded position and a second "impact" loaded position;
  - (c) an impact receptive working member attached during use to one end of said tubular stem means for movement therewith between said first and second positions, wherein



**4,958,692**  
**DOWNHOLE STABILIZERS**  
Charles A. Anderson, 78A Stanley Street, Aberdeen AB1 6UQ, Great Britain  
Filed Mar. 14, 1989, Ser. No. 323,575  
Claims priority, application United Kingdom, Mar. 15, 1988, 8806109  
Int. Cl.<sup>3</sup> E21B 17/10  
U.S. Cl. 175-323 7 Claims



1. A downhole stabiliser comprising a generally cylindrical body having a through bore, said body peripherally mounting



a plurality of radially extending blades each also extending along the axial length of the body and having outer edge surfaces defining a periphery of said stabiliser, said blades having gaps therebetween allowing passage of fluid past the exterior of said stabiliser, said stabiliser mounting a plurality of omnidirectional rolling-element bearings each individually mounted in a respective pocket on the periphery of the radially extending blades said pockets being distributed in a number of arrays.

4,958,693

## ELECTRONIC COUNTING BALANCE

Takatoshi Muraoka, Toyonaka; Nishio Akira, Takatsuki, and Tomohiro Tsuji, Uji, all of Japan, assignors to Shimadzu Corporation, Kyoto, Japan

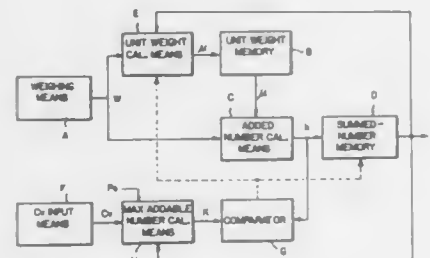
Filed Jan. 18, 1989, Ser. No. 298,567

Claims priority, application Japan, Jan. 18, 1988, 63-9302; Jan. 18, 1988, 63-9303

Int. Cl.<sup>3</sup> G01G 13/00

U.S. Cl. 177-25.17

8 Claims



1. An electronic counting balance for counting the number of items whose individual weight values are scattered statistically, said electronic counting scale comprising:

- a weighing means for measuring a total weight of items loaded thereon;
- a unit weight calculating means for calculating an average weight of items loaded on said weighing means;
- a unit weight memory for storing said average weight calculated by said unit weight calculating means;
- an added number calculating means for calculating the number of items replenished on said weighing means;
- a summed number memory for additively storing the number of items calculated by said added number calculating means;
- a maximum addable number calculating means for calculating, from a known coefficient-of-variation of item weight and a total number of items additively stored in said summed number memory, a maximum addable number of items which, if not exceeded by the number of items replenished on said weighing means, enables said added number calculating means to perform, at a probability not less than a predetermined probability  $P_0$ , an error-free calculation of the number of items replenished on said weighing means;
- a comparator for comparing the number of items calculated by said added number calculating means with said maximum addable number of items, said comparator output-

ting, only when the number of items calculated by said added number calculating means does not exceed said maximum addable number of items, first and second instruction signals respectively to said unit weight calculating means and said summed number memory, said first instruction signal causing said unit weight calculating means to calculate a new average weight of items and to store said new average weight of items in said unit weight memory, and said second instruction signal causing said summed number memory to additively store the number of items calculated by said number calculating means; whereby the number of items counted by said scale is determined and displayed.

4,958,694

## WEIGHING DEVICE

Adrianus J. van den Nieuwelaar, Gemert, and Petrus C. H. Janssen, Wilbertoord, both of Netherlands, assignors to Stork PMT B.V., Netherlands

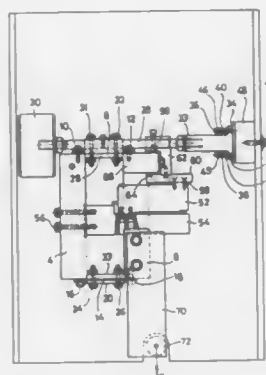
Filed Dec. 1, 1988, Ser. No. 278,608

Claims priority, application Netherlands, Dec. 1, 1987, 8702888

Int. Cl.<sup>3</sup> G01G 19/00, 19/02

U.S. Cl. 177-145

3 Claims



1. Weighing device for articles which are carried along a transport track in which movement of articles is temporarily interrupted during determination of the weight, comprising a frame, a weight measuring cell carried on the frame, a movable member which is loaded by the weight of the article and positioned to act upon the cell when weight is applied to the movable member, the movable member comprises a tilting arm coupled to a part of the device which is movable and is loaded by the weight to be determined, the tilting arm having a first free end which carries an armature plate transverse thereto, the plate being displaceable outwardly along the tilting arm; and controllable locking means which is selectively operable to draw on the movable member and prevent the member from moving and is freeable to permit the member to move when loaded by weight; the locking means comprising a spring under tension urging the arm inwardly and a cooperating electromagnetic carrier by the frame for drawing the armature plate to displace outwardly.

4,958,695

## VARIABLE ASSIST POWER STEERING SYSTEM

Koh Uchida, Sagamihara, and Takashi Kurihara, Atsugi, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Dec. 28, 1987, Ser. No. 138,479

Claims priority, application Japan, Dec. 27, 1986, 61-313518

Int. Cl.<sup>3</sup> B62D 5/83

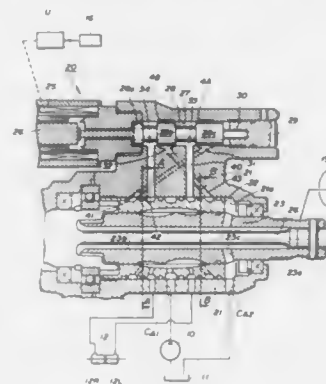
U.S. Cl. 180-142

13 Claims

12. A variable assist power steering system for vehicles

including a hydraulic fluid source, a fluid reservoir, and a hydraulic pressure operated power cylinder adapted to be connected to a steering linkage, comprising:

- a control valve including valve elements relatively displaceable in response to a predetermined variable to define therebetween two parallel fluid flow paths connected between the fluid source and the fluid reservoir to produce a pressure difference in the power cylinder in response to said predetermined variable; wherein
- said valve elements define a first pair of main variable flow orifices, one disposed in a first of said two parallel fluid flow paths at an upstream portion between the hydraulic fluid source and the power cylinder and the other in a second of said two parallel fluid flow paths at a downstream portion between the power cylinder and the fluid reservoir, said valve elements also define a second pair of main variable flow orifices, one disposed in said second of said two parallel fluid flow paths at an upstream portion between the hydraulic fluid source and the power cylinder



der and the other in said first of said two parallel fluid flow paths at a downstream portion between the power cylinder and the fluid reservoir, said first pair of main variable flow orifices having orifice areas which are decreased as said valve elements relatively displace in one direction, said second pair of main variable flow orifices having orifice areas which are decreased as said valve elements relatively displace in an opposite direction; and wherein said control valve comprises bypass paths, each being connected in parallel to one of said upstream portions of said two parallel fluid flow paths, each bypass path including an auxiliary variable flow orifice that has an orifice area which is variable in response to said predetermined variable and an externally controlled variable flow orifice valve connected in series with said auxiliary variable flow orifice, said externally controlled variable flow orifice having an orifice area which is variable in response to a second predetermined variable which is different from said predetermined variable.

4,958,696

## SWITCHING ARRANGEMENT FOR THE HYDRAULIC DRIVE MEANS OF A FULL-TRACK VEHICLE

Karl Lerchbaum, Fohnsdorf, Austria, assignor to Voest-Alpine Maschinenbau Gesellschaft m.b.H., Linz, Austria

Filed Feb. 8, 1989, Ser. No. 307,523

Claims priority, application Austria, Feb. 10, 1988, 286/88

Int. Cl.<sup>3</sup> B62D 11/02; F15B 11/16

U.S. Cl. 180-6.7

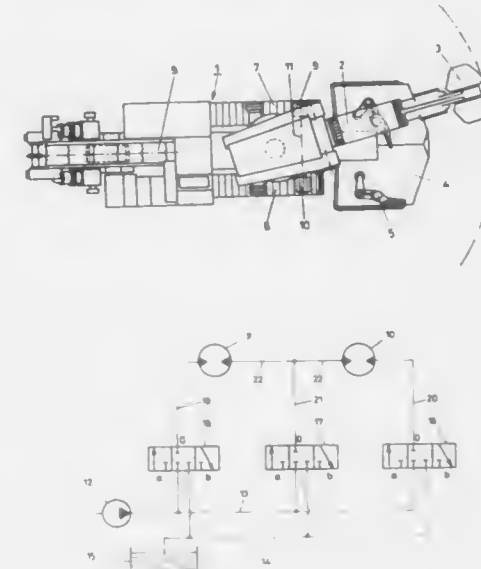
3 Claims

1. A track-laying vehicle, comprising:

- a chassis having a longitudinal axis and two laterally opposite sides;
- a pair of endless, ground-engaging tracks respectively arranged at said opposite sides of said chassis and operatively supporting said chassis;
- a first hydraulically operated motor means carried by said vehicle and operatively associated with one of said tracks, for selectively moving said track in a sense to tend to

advance the respective side of said chassis in a forward direction, moving said one track in a sense to tend to advance the respective side of said chassis in a rearward direction, and not moving said one track;

- a second hydraulically operated motor means carried by said vehicle and operatively associated with the other of said tracks, for selectively moving said other track in a sense to tend to advance the respective side of said chassis in a forward direction, moving said other track in a sense to tend to advance the respective side of said chassis in a rearward direction, and not moving said other track;
- a hydraulic pump having an inlet side, a side connected to a supply of hydraulic fluid, and an outlet side;
- supply conduit means arranged for alternatively connecting said pump in series and in parallel with said outlet side of said hydraulic pump;
- a plurality of multi-way valve means incorporated in said conduit means;
- return conduit means arranged connecting said multi-way valve means to a sump for spent hydraulic fluid;



said multi-way valve means being arranged to selectively interconnect said hydraulic pump, through said supply conduit means, with said first and second hydraulically operated motor means for selectively alternatively operating said motor means in each of the following modes:

- (a) both said motor means are connected in series with one another with said hydraulic pump and rotated in a sense to advance both tracks forward;
- (b) both said motor means are connected in series with one another with said hydraulic pump and rotated in a sense to advance both tracks rearward;
- (c) both said motor means are connected in parallel with one another with said hydraulic pump and rotated in a sense to advance said one track forward and said other track rearward; and
- (d) both said motor means are connected in parallel with one another with said hydraulic pump and rotated in a sense to advance said one track rearward and said other track forward;

said multi-way valve means being further arranged to selectively interconnect said hydraulic pump, through said supply conduit means, with said first and second hydraulically operated motor means such that, when both said motor means are connected in parallel with one another to said hydraulic pump, flow of hydraulic fluid to either of said motor means can be selectively cut-off for moving one but not the other, or the other but not the one track, forward or backward.

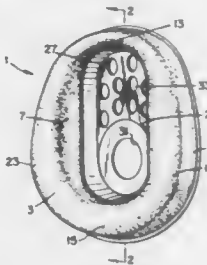
4,958,697

**ANATOMICALLY SHAPED EARSEALS FOR HEADSETS**  
Harold G. Moody, Hopedale, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 11, 1989, Ser. No. 405,823  
Int. Cl. A42B 3/16; H04R 25/00

U.S. Cl. 181-129

2 Claims



1. An anatomically shaped resilient earseal for attachment to headset earcups with nearly flat flanges, said earseal being generally donut-shaped to define an elliptical opening, said earseal having a top, a bottom and an inner facing surface for contacting a head of a wearer of said earseal, said inner facing surface being thinner at said top than at said bottom, and having a variable cross section that creates an inwardly extending profile which matches an anatomical configuration of the head around an ear of the wearer, said elliptical opening containing a diaphragm having a plurality of holes therethrough for permitting externally produced sound to be transmitted through said diaphragm and having an earphone retainer attached about an aperture in said diaphragm.

4,958,698

**METHOD FOR STEERING A MOTOR VEHICLE**  
Jochem Kirschner, Bischofsheim, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

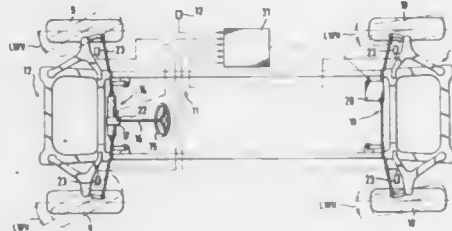
Filed Feb. 27, 1989, Ser. No. 315,675

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1988, 3807842

Int. Cl. B62D 6/00

U.S. Cl. 180-140

16 Claims



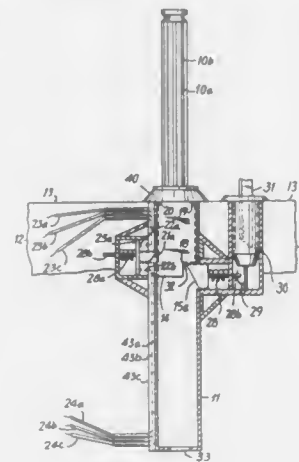
1. In a method of steering a motor vehicle with a conventionally steerable front axle and a steerable rear axle wherein vehicle speed and front wheel steering angle are detected in order to turn rear wheels in dependence on vehicle speed and front wheel steering angle, the improvement comprising the steps of, determining a limit steering angle (LWVgr) corresponding to a fraction of the maximum value of transverse acceleration before slip for the front wheel steering angle (LMV) at a vehicle speed (Vst) above a predetermined minimum vehicle speed (Vo) actually traveled at any given time, continuously comparing the actual front wheel steering angle (LWVst) with the limit steering angle (LWVgr), and turning the rear wheels in the same direction when the actual front wheel steering angle (LWVst) becomes greater than or equal to the limit steering angle (LWVgr).

4,958,699

**ANTI AUTO THEFT RETRACTABLE POLE**  
George G. Tchilinguirian, 46-12 218 St., Bayside, N.Y. 11361  
Filed Jul. 22, 1988, Ser. No. 192,968  
Int. Cl. B60R 25/10

U.S. Cl. 180-287

20 Claims



1. An anti-theft device for a motor vehicle wherein said motor vehicle has an electrical battery and an ignition electrically connected by ignition wires forming an ignition connection; said anti-theft device comprising a pole member; a housing for said pole member; said housing having a bottom and a cover; said cover defining a pole aperture configured and dimensioned so as to allow at least a portion of said pole member to pass therethrough in reciprocating motion; a portion of said pole member being visible when a portion of said pole member is extending through said pole aperture; an electrical switch means electrically connected to said ignition wires; said electrical switch means having an on position so as to maintain said ignition connection and an off position so as to disconnect said ignition connection and being configured and dimensioned so as to be in said on position when said pole member is resting at the bottom of said housing and to be in said off position when at least a portion of said pole member is protruding through said pole aperture; and a locking means so as to lock said pole member in a position where at least a portion of said pole member is protruding through said pole aperture.

4,958,700

**PROTECTIVE FACILITY FOR SUPPRESSING NOISE PRODUCED AT HIGH GAS FLOWS BY ENGINES INSTALLED ON AIRCRAFT**

Horst Schafhaupt, Egenhofen, Fed. Rep. of Germany, assignor to Rheinhold & Mahla GmbH, Fed. Rep. of Germany  
PCT No. PCT/DE88/00409, § 371 Date Apr. 17, 1989, § 102(e) Date Apr. 17, 1989, PCT Pub. No. WO89/00130, PCT Pub. Date Jan. 12, 1989

PCT Filed Jul. 1, 1988, Ser. No. 331,529

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1987, 3722112

Int. Cl. B64F 1/26

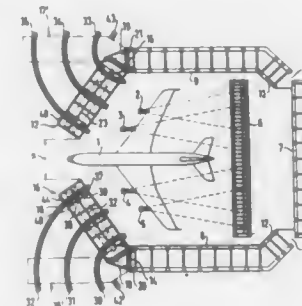
U.S. Cl. 181-218

3 Claims

1. Protective means for soundproofing large, high-speed gas flows, especially of aircraft engines, comprising: sound permeable, directing elements in a form of a mesh lattice erected behind the engines, said elements being obliquely inclined; an approximately horseshoe-shaped sound absorption wall having two legs, a back, inside and outside faces, said legs each having an end, said wall being approximately twice

as high as said directing elements, said wall located behind said directing elements, said wall being substantially rectangular in cross-section, having front edges located at the end of each the legs; and, a pair of pivotable gates covered with sound absorption material pivotally attached at said front edges of said

thereof, whereby the baffle crease defined in the upper external shell is configured to prevent accumulation of foreign materials.



horseshoe-shaped sound absorption wall, said gates being pivotable approximately 60° inward leaving a gap for a nose of an aircraft when completely pivoted inward wherein the gates are movable on a plurality of rails running concentrically about said front edges configured as arcs of a circle about said front edges.

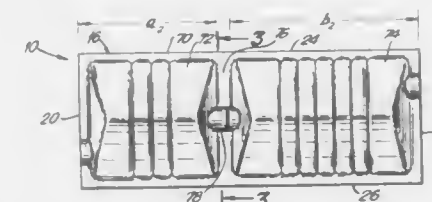
4,958,701

**STAMP FORMED MUFFLER WITH POCKET-FREE BAFFLE CREASE**

Walter G. Moring, III, Toledo, Ohio, assignor to AP Parts Manufacturing Company, Toledo, Ohio  
Filed Mar. 26, 1990, Ser. No. 499,995  
Int. Cl. F01N 7/18

U.S. Cl. 181-282

14 Claims



1. An exhaust muffler comprising upper and lower internal plates disposed in face-to-face relationship with one another, each of said internal plates being formed to define an array of channels therein, said channels being disposed to define an array of tubes between said internal plates with said array of tubes defining at least one inlet to the muffler and at least one outlet from the muffler, said upper internal plate including at least one pair of channels disposed in spaced apart end-to-end relationship, said pair of channels being disposed in register with a continuous channel formed in the lower internal plate such that at least one of said tubes of said muffler is defined by the continuous channel of the lower internal plate and the pair of spaced apart channels of the upper internal plate, said muffler further comprising an upper external shell formed to define a peripheral portion and a plurality of chambers extending upwardly from said peripheral portion, said chambers being separated from one another by a baffle crease connecting spaced apart locations on the peripheral portion of said upper external shell, said peripheral portion of said upper external shell being securely connected to at least one of said internal plates such that the chambers thereof surround selected channels of the upper internal plate, said baffle crease being formed to be in face-to-face abutting contact with portions of said upper internal plate, including portions of said upper internal plate disposed between the pair of spaced apart channels

4,958,702

**CONNECTING ARRANGEMENT FOR HORIZONTAL SCAFFOLDING SUPPORTS**

Ruth Langer, Im Weinberg 13, D-7129 Guegligen (Baden-Wuerttemberg), Fed. Rep. of Germany

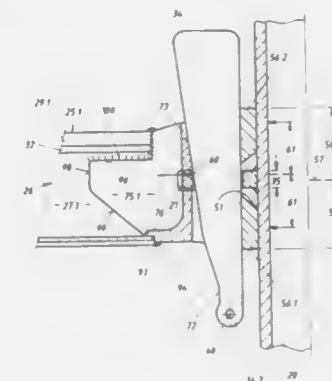
Filed Jul. 21, 1989, Ser. No. 382,499

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1988, 3824823

Int. Cl. B66B 7/02

U.S. Cl. 187-95

5 Claims



1. A connecting arrangement for horizontally support scaffolding platforms supported by spaced vertically extending support pole means each including a substantially horizontally disposed perforated disk means, and connecting head means for forming a scaffolding support releasably lockable on said perforated disk means, said connecting head means are fashioned of a cast-light metal material and include a connecting area substantially corresponding to an open area of a light metal U-shaped beam means forming a spanning member of the scaffolding, inwardly directed welding flap means are provided along an interior surface of the connecting head means for enabling a formation of a weld seam along a seam edge extending parallel to a supporting edge web means of the U-shaped beam means, said welding flap means being beveled inwardly at one end thereof and being adapted to abut a bottom surface of the U-shaped beam member for forming a reinforcement, a welding and web means provided on an area of the connecting head means abutting a lower horizontal web means of the U-shaped beam means, and disk slot means tapering in an area of an inner base portion thereof so as to have a thickness substantially corresponding to a thickness of the perforated disk means so as to enable the same to be accommodated in the disk slot means, and wherein reinforcing means are provided at least in an area of the disk slot means for reinforcing the connector head means.

4,958,703

**SPOT-TYPE DISC BRAKE**

Eckard Op Den Camp, Koblenz, Fed. Rep. of Germany, assignor to Lucas Industries public limited company, Birmingham, England

Filed Jul. 10, 1989, Ser. No. 377,445

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1988, 8809123[U]

Int. Cl. F16D 55/224

U.S. Cl. 188-73.31

7 Claims

1. A spot-type brake comprising: a brake support (10) mounted on a first side of a brake disc

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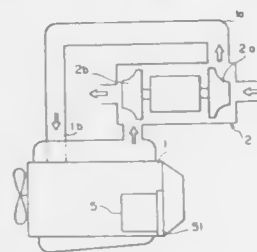
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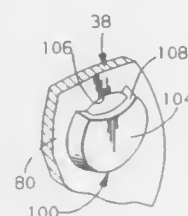


wherein said generator comprises a DC generator, said means for supplying electric power to said rotary electric means having a voltage converter for increasing the voltage of DC electric power generated by said DC generator,



tor, and an inverter for converting the DC electric power with the voltage increased by said voltage converter to AC electric power having a predetermined frequency and supplying the AC electric power to said rotary electric machine.

**4,958,709**  
**INTEGRALLY FORMED WIPER AND ORIFICE FOR A PUMP PLATE OF A VISCOUS FLUID CLUTCH**  
Lawrence C. Kennedy, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.  
Filed Aug. 25, 1989, Ser. No. 398,590  
Int. Cl.<sup>5</sup> F16D 35/02  
U.S. Cl. 192—58 B

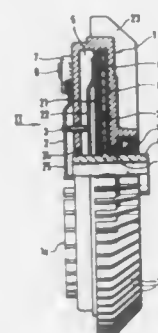


1. A pump plate assembly for separating a pumping chamber and a reservoir of a viscous fluid clutch, wherein the pumping chamber receives fluid from a shear zone, the pump plate assembly comprising:

- (a) a plate member of a preselected thickness having a front surface in communication with the reservoir and a rear surface in communication with the pumping chamber;
- (b) wiper means integrally formed on the plate member and projecting into the pumping chamber, the wiper means including a ring-like wall terminating in a planar body provided a preselected distance from the rear surface of the plate member, whereby the wall and body define a depression in the plate member having a depth greater than the thickness of the plate member and in fluid communication with the reservoir; and
- (c) inlet means formed on the wiper means to provide an orifice for permitting the passage of fluid from the pumping chamber to the reservoir, the inlet means including:
  - (i) an aperture provided in the wall oriented in the direction of oncoming fluid in the pumping chamber thereby providing a planar fluid path from the rear surface of the plate member to the depression formed by the wiper means; and
  - (ii) a concave arcuate surface in the body and the wall adjacent the aperture for creating a fluid dam in the pumping chamber.

**4,958,710**  
**FLUID FRICTION CLUTCH WITH A TEMPERATURE CONTROL**  
Hans Martin, Stuttgart, and Gerhard Stütz, Renningen, both of Fed. Rep. of Germany, assignors to Sueddeutsche Kuehlerfabrik, Fed. Rep. of Germany  
Filed Aug. 25, 1989, Ser. No. 398,443  
Claims priority, application Fed. Rep. of Germany, Aug. 30, 1988, 3829322

Int. Cl.<sup>5</sup> F16D 35/02  
U.S. Cl. 192—58 B



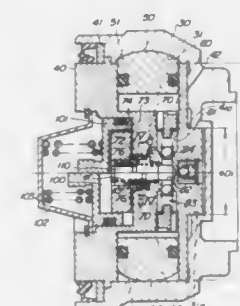
1. A fluid-friction clutch comprising
- a housing and a clutch disk within said housing, said housing and said clutch disk serving as input and output elements for the clutch;
  - a storage chamber in said housing;
  - a working chamber in said housing separated from said storage chamber by a partition in the housing;
  - a valve communicating shearing fluid from the storage chamber through the partition to the working chamber;
  - cooling ribs with projections extending radially inwardly on a side of said housing;
  - an actuating pin coupled to the valve and controlling the opening of the valve;
  - a bimetallic strip mounted on said housing and coupled to the actuating pin to control movement of the actuating pin against an elastic force, ends of said bimetallic strip extending under said projections and being held under said projections by the elastic force; and
  - a shoe with good sliding characteristics that is formfittingly slid on a part of the ribs, the shoe including means interposed between the ends of the bimetallic strip and the projections for allowing relative sliding movement of the bimetallic strip to the projections and for maintaining a separation of the bimetallic strip from the projections.

**4,958,711**  
**ROTATIONAL SPEED DIFFERENTIAL RESPONSIVE TYPE JOINT**  
Takashi Okubo, Zama, and Toji Takemura, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan  
Filed Sep. 30, 1988, Ser. No. 251,175  
Claims priority, application Japan, Oct. 2, 1987, 62-151237  
Int. Cl.<sup>5</sup> F16D 31/02

- U.S. Cl. 192—60
1. A torque transmitting assembly comprising:
- a first rotary member;
  - a second rotary member disposed in said first rotary member;
  - hydraulic fluid means for transmitting at least a portion of the input torque from one of said first rotary member and said second rotary member to the other in response to a rotational speed differential occurring between said first and said second rotary members,
  - said hydraulic fluid means including an internal cam surface

formed on said first rotary member and surrounding said second rotary member, pistons mounted in said second rotary member in slidable direct contact with said cam surface and reciprocable in response to said rotational speed differential to define variable volume chambers in said second rotary member, and means for restricting flow of hydraulic fluid discharge from each of said variable volume chambers on the discharge stroke of the associ-

clutch plates which are supported by the driven member so as to move in the same direction as the driving clutch plates in the oil chamber in order to selectively come into engagement with, and disengagement from the corresponding driving clutch plates, and actuating means for bringing the driving clutch plates and the driven clutch plates into engagement with each other.

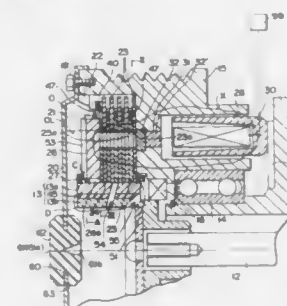


**4,958,713**  
**THERMAL BARRIER FOR CLUTCH (BRAKE) ACTUATION ELEMENT (TUBE)**  
James M. Latako, North Royalton, Ohio, assignor to Eaton Corporation, Cleveland, Ohio  
Filed Jul. 3, 1989, Ser. No. 375,328  
Int. Cl.<sup>5</sup> F16D 25/04, 13/10, 69/04  
U.S. Cl. 192—88 B

ated one of said pistons for transmitting torque through said direct contact between said pistons and said cam surface; and

means responsive to a temperature of the hydraulic fluid discharged from variable volume chambers for automatically preventing said rotational speed differential between said first and second rotary members when said temperature of the hydraulic fluid is higher than a predetermined temperature value.

**4,958,712**  
**WET CLUTCH DEVICE**  
Tatsumi Suganuma; Shigehiro Nozue; Tatsuhiko Fukuoka; Naoto Noguchi, and Akira Takenaka, all of Toyota, Japan, assignors to Taiho Kogyo Co. Ltd., Toyota, Japan  
Filed Jun. 28, 1988, Ser. No. 212,682  
Claims priority, application Japan, Jun. 29, 1987, 62-163177; Nov. 30, 1987, 62-301938  
Int. Cl.<sup>5</sup> F16D 13/72  
U.S. Cl. 192—70.12



29. A wet clutch device for selectively transmitting the rotation of a rotatable driving member to a rotatable driven member which is rotatable relative to the driving member, said device comprising an oil chamber which is adapted to enclose a predetermined amount of oil and which is defined by the driving and driven members and a cover which is secured to one of the driving and driven members, said cover having an oil feeding hole through which the oil can be fed in the oil chamber and a plug which is detachably connected to the oil feeding hole of the cover to close the oil chamber, wherein said plug has an air hole which opens when the internal pressure in the oil chamber is above a predetermined value, driving clutch plates which are supported by the driving member so as to move in a predetermined direction in the oil chamber, driven

clutch plates which are supported by the driven member so as to move in the same direction as the driving clutch plates in the oil chamber in order to selectively come into engagement with, and disengagement from the corresponding driving clutch plates, and actuating means for bringing the driving clutch plates and the driven clutch plates into engagement with each other.

1. A fluid expandable coupling comprising an input member, an output member rotatable relative to said input member about an axis of rotation, an annular fluid expandable tube element connected to one of the input and output members, said tube element including an exterior surface which moves radially upon expansion of the tube element to operatively connect said input and output members, a plurality of spaced-apart friction shoes connected to the exterior of said exterior surface of said tube element for radial movement therewith, a drum assembly connected to the other of said input and output members, said friction shoes being movable radially with said exterior surface of said tube element when said tube element is expanded to frictionally engage the drum assembly and operatively connect the input and output members, said friction shoes generating heat upon engagement of said friction shoes with the drum and wherein the coupling includes a thermal barrier to retard the transfer of heat generated by the friction shoes to the tube element, said thermal barrier comprising a fabric layer which retards the transfer of heat from the friction shoes toward the tube element and which adds mechanical strength to the tube element to prevent excess elongation of the tube element and extrusion of the tube element between said spaced-apart adjacent friction shoes when the tube element is expanded, and wherein said fabric has a coefficient of thermal conductivity of approximately

$$\frac{0.3 \text{ BTU} \times \text{in.}}{\text{hr.} \times \text{ft.}^2 \text{ } ^\circ\text{F}}$$

or less.



4,958,714

**ADJUSTING DEVICE FOR A TWIN-PLATE CLUTCH**  
Richard D. Cooke, Warwick, and Charles Higginbottom, Leamington Spa, both of United Kingdom, assignors to Automotive Products plc, England

PCT No. PCT/GB87/00802, § 371 Date May 8, 1989, § 102(e) Date May 8, 1989, PCT Pub. No. WO88/03613, PCT Pub. Date May 19, 1988

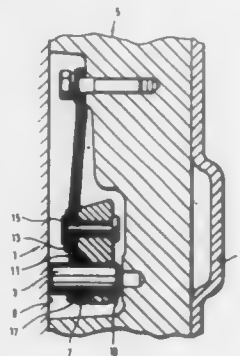
PCT Filed Nov. 11, 1987, Ser. No. 358,336

Claims priority, application United Kingdom, Nov. 12, 1986, 8627045; Mar. 20, 1987, 8706626; Sep. 9, 1987, 8721156

Int. Cl.<sup>3</sup> F16D 13/75

U.S. Cl. 192—111 A

13 Claims



1. An automatic adjusting device for a twin-plate clutch comprising:

a pin (9, 39, 69, 116, 139) mounted on an intermediate pressure plate (7, 37, 67, 94, 135) of the clutch so as to be slidable along an axis parallel to the axis of rotation of the clutch, the intermediate pressure plate being positioned adjacent to a clutch disc and being operative so as to be selectively frictionally engageable therewith;

first and second abutments provided adjacent to the pin, the first abutment providing a stop for determining adjustment of the pin relative to the intermediate pressure plate and the second abutment providing a stop for determining a disengaged position of the intermediate pressure plate;

a plate (11, 43, 73, 120, 144) mounted on the pin by way of an aperture provided in the plate, which aperture is dimensioned such that the plate is tiltable relative to the pin;

a third abutment provided on the intermediate pressure plate and engageable with the tiltable plate, the third abutment defining an axis about which the plate is tiltable; and  
a resilient member (17, 47, 81, 122, 150, 160) urging the tiltable plate in the axial direction of the clutch towards the third abutment so as to cause the plate to tilt and to engage the pin, permitting adjustment of the pin relative to the intermediate pressure plate when the pin is urged against the first abutment and inhibiting movement of the pin relative to the intermediate pressure plate when the pin is urged against the second abutment.

4,958,715

**TRANSPORT SYSTEM FOR CURRENCY VALIDATOR**  
Vladimir Suris, Mayfield Hts., Ohio, assignor to Ardac, Inc. (Dixie-Narco, Inc.), Eastlake, Ohio

Filed Mar. 20, 1989, Ser. No. 325,990

Int. Cl.<sup>3</sup> G07F 7/04; B07C 5/00

U.S. Cl. 194—206

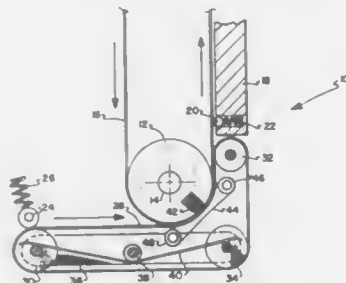
8 Claims

1. A magnetic reading head system for a currency validator, comprising:

a transport system for moving a note along a note path, said note path being characterized by an area of directional change; and  
a magnetic reading head positioned at said area of direc-

tional change and adapted for contacting engagement with a note transported therealong;

said transport system comprising:  
a pair of first belts in spaced apart parallel relation, each rotatable about one of a pair of first pulley assemblies; and  
a pair of second belts in spaced apart parallel relation, each rotatable about one of a pair of second pulley assemblies, a first portion of each of said second belts moving in a generally horizontal direction, a second portion of each of said second belts moving in a generally vertical direction,



said area of directional change being interposed between said first and second portions, respective ones of said first and second belts being in surface contacting engagement with each other at said second portions and area of directional change and adapted for receipt of a note therebetween; and  
a third belt interposed between said pairs of first and second belts at said area of directional change, said third belt in contacting engagement with said magnetic reading head and rotatable about a third pulley assembly,

4,958,716

**APPARATUS FOR CONVEYING ARTICLES**

Yukito Matsuo; Tsuyoshi Ishida, both of Yokohama, and Masanori Iwamoto, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

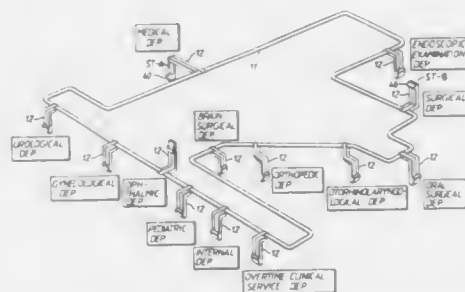
Filed Oct. 2, 1987, Ser. No. 103,733

Claims priority, application Japan, Oct. 9, 1986, 61-239158; Oct. 9, 1986, 61-239159

Int. Cl.<sup>3</sup> B65G 47/74

U.S. Cl. 198—346.1

45 Claims



1. An apparatus for conveying reusable carrier cases each said carrier case having a cover and containing articles, said apparatus, comprising:

a main conveyance path;  
carrier bodies propelled along said main conveyance path for conveying said carrier cases therein, said carrier cases removably insertable in said carrier bodies;

a first input/output means located along said main conveyance path for receiving carrier cases transferred from said main conveyance path and for supplying carrier cases to

4,958,718

**ARTICLE CENTERING DEVICE**

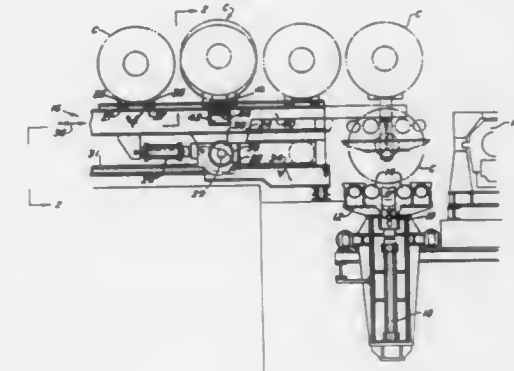
Winfried F. Schmiedberg, Pittsburgh, Pa., assignor to SMS Engineering Incorporated, Pittsburgh, Pa.

Filed Jul. 12, 1989, Ser. No. 378,694

Int. Cl.<sup>3</sup> B65G 47/26

U.S. Cl. 198—456

11 Claims



4,958,717

**SKID CONVEYOR SYSTEM**

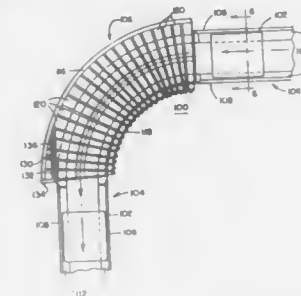
John D. Everhart, Veneta, Oreg., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Mar. 1, 1989, Ser. No. 317,738

Int. Cl.<sup>3</sup> B65G 47/24

U.S. Cl. 198—416

7 Claims



1. A conveyor system for carrying skids supporting products to be assembled along an assembly line including a number of assembly stations, said conveyor system comprising:

straight sections of driven belt conveyors having inlet ends and outlet ends and skid positioning inner and outer rails extending above the surface of the belt conveyors on either side thereof, said rails being spaced to receive said skids therebetween to position said skids across said belt conveyors; and

arcuate sections of driven roller conveyors having inlet ends and outlet ends and a skid retaining rail extending above the surface of said roller conveyors on the outer side thereof for preventing skids from falling from said roller conveyors, said roller conveyors being positioned between sections of said belt conveyors to couple sections of said belt conveyors which are angularly oriented relative to one another, being wider than said belt conveyors to accommodate rotation of said skids as they are carried around said roller conveyors and comprising skid orienting means positioned adjacent said outlet ends of said roller conveyors, said skid orienting means comprising a partial chord member extending from the skid retaining rail of said arcuate roller conveyor to a point adjacent and substantially aligned with the outer rail of the inlet end of a straight belt conveyor section to which skids are to be passed for squaring said kids relative to said belt conveyors whereby skids carried along said conveyor system are smoothly conveyed from said arcuate roller conveyors to said straight belt conveyors in spite of angular misorientation of said skids along said arcuate roller conveyors which misorientation would otherwise cause jamming of said skids upon attempted entry into said straight belt conveyors.

1. The combination of a walking beam conveyor and a workpiece measuring and centering device,

the conveyor including cooperative stationary and moveable workpiece supporting means,

means for raising, lowering and longitudinally moving said moveable walking beam supporting means relative to said stationary supporting means such that in one position said moveable supporting means falls below a workpiece supported by said stationary supporting means and in a second position above said stationary supporting means, whereby in the latter case the workpiece is lifted off said stationary supporting means, said longitudinal movement being in a given path of travel,

said moveable workpiece supporting means having an opening arranged transverse of said path of travel,

the device including a workpiece supporting means constructed and arranged to pass into said opening from one side of the conveyor when said moveable walking beam supporting means is in said second position, and for receiving and supporting a workpiece from said moveable walking beam supporting means,

the device including a workpiece measuring means arranged so that when the device is traversed into said opening with a workpiece carried by said moveable walking beam supporting means a measurement is made of a selected portion of the workpiece,

means for moving the workpiece supporting means of the device to and from the conveyor, and

control means for determining from said measurement any off center condition of said workpiece relative to a given data position and for effecting an operation of said means for moving said supporting means of the device to center said workpiece when the workpiece is transferred from said moveable walking beam supporting means to said supporting means of the device.

4,958,719

## APPARATUS FOR SCRAPING SOLID MATERIALS FROM A CONVEYOR SURFACE

Roland Houticoolon, Leichlingen, and Hermann Kloettchen, Duesseldorf, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

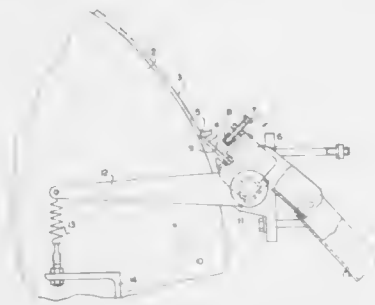
Filed Aug. 26, 1988, Ser. No. 237,267

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1987, 3728580

Int. Cl.<sup>3</sup> B65G 45/00

U.S. Cl. 198—635

3 Claims



1. An apparatus for scraping removable solid materials from a wide conveyor surface, comprising an elongate blade holder member, a plurality of individual blades having scraping edges, means for engaging said blades in alignment within said holder member to provide a segmented elongate scraping blade edge for engagement with the wide conveyor surface, said blade holder member having an edge formed therein to enable rotatably or pivotally engaging the individual blades therewithin, and individual adjustable compression means attached to said blade holder member for adjustably fastening the individual blades within the blade holder member in a rotated or pivoted position and provide an elongate segmented blade edge, said adjustable compression means comprising at least one adjustable screw and flexible member for each of the individual blades, each said screw threadably engaging the blade holder member and with the flexible member applying a compressive force against a said individual blade to fasten said blade within the holder, whereby the blade edge segments are individually and independently adjustable to conform to conveyor surface irregularities.

4,958,720

## SCREW CONVEYOR COUPLING APPARATUS

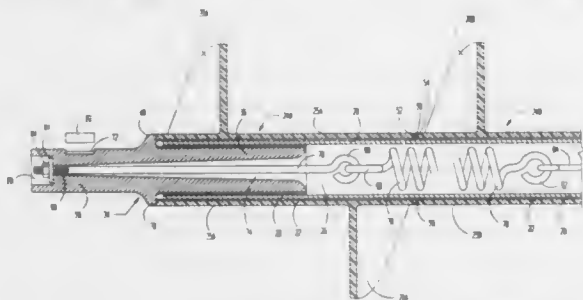
James M. Lapeyre, New Orleans; Peter G. Weber, LaPlace, and Christopher G. Greve, Covington, all of La., assignors to The Laitram Corporation, Harahan, La.

Division of Ser. No. 332,392, Apr. 3, 1989, which is a continuation of Ser. No. 58,393, Jun. 5, 1987, abandoned. This application May 22, 1989, Ser. No. 354,803

Int. Cl.<sup>3</sup> B65G 33/32

U.S. Cl. 198—666

7 Claims



1. Screw conveying apparatus including a modular screw conveyor having a multiplicity of integrally formed modules,

said modular screw conveyor also including a combination axial member extending a selected length, and a flight member helically encircling more than 360° of said combination axial member and extending said selective length, said apparatus comprising:

at least two substantially similar integrally molded plastic modules, each module including an elongated axial member extending between a pair of ends and defining an aperture having a cross-section of a first non-circular shape extending coaxially therethrough, each module further including a flight member which helically encircles not more than 360° of said axial member and extends between said pair of ends, at least one end of one of said at least two modules formed to cooperate with an adjacent end of the other one of said at least two modules; said multiplicity of modules being aligned coaxially such that, except for modules on the extreme ends, each end of each module is in axial confronting relationship with an end of an adjacent module and such that said aperture of each of said multiplicity is in register with the aperture of an adjacent module so as to define a modular screw conveyor having an elongated aperture of a non-circular cross-section extending said selected length and including a flight member which encircles more than 360° of said combination axial member and substantially extends the length of said aligned modules;

an elongated drive shaft having a perimeter cross-section of a second non-circular shape extending axially through and cooperating with the in-register apertures of said aligned multiplicity of modules such that rotation of said drive shaft causes rotation of said screw conveyor, said drive shaft further including an aperture extending coaxially from at least one end of, and into said drive shaft, said aperture in said drive shaft being smaller than said perimeter cross-section and having a cross-section of a third non-circular shape;

a journal plug having a mounting end and a drive end and defining an aperture extending axially therethrough, said mounting end of said journal plug defining a size and shape such that rotation of said journal plug causes rotation of said drive shaft; an attaching means having a first portion connected to said journal plug and a second portion extending coaxially within said aperture of said journal plug; and tension means attached to said second portion for applying an axial force to said attaching means in a direction so as to resiliently maintain said journal plug within said aperture of said drive shaft.

4,958,721

## INCLINED BUCKET ELEVATOR

Chris R. Redford, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Jun. 24, 1988, Ser. No. 211,360

Int. Cl.<sup>3</sup> B65G 17/36

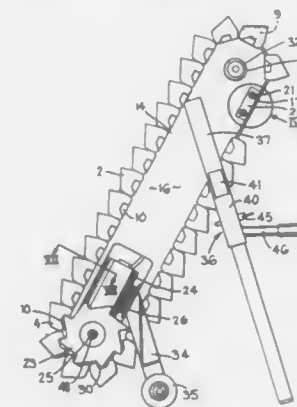
U.S. Cl. 198—710

13 Claims

1. A bucket elevator comprising: a stationary guide track defining an endless path; a series of movable buckets slidably mounted on said track for movement through said path, each bucket being free from fixed mechanical connection to the

other buckets and said track and having a slot provided with two lip members which slidably engage said guide track; and

a plurality of types of lead frames having different widths can be transferred.



drive means drivably engageable with said buckets for moving said buckets in series through said path.

4,958,722

## TRANSFER APPARATUS FOR LEAD FRAME

Hiroaki Kobayashi, Yokohama, and Kenji Hashimoto, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

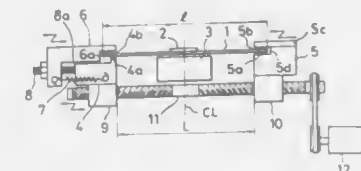
Filed Aug. 25, 1989, Ser. No. 398,505

Claims priority, application Japan, Aug. 25, 1988, 63-211422

Int. Cl.<sup>3</sup> B65G 19/28

U.S. Cl. 198—735.3

6 Claims



1. A transfer apparatus for a lead frame, the lead frame having side edges, the transfer apparatus comprising: a pair of parallel guide means for engaging with a lead frame and for supporting it; driving means for moving at least one of said guide means toward and away from the other guide means in the widthwise direction of the lead frame; and transfer means for transferring said lead frame to a longitudinal direction thereof; at least one of said guide means having a first guide rail which is driven by said driving means in the widthwise direction of said lead frame and a second guide rail which is movable in the widthwise direction of said lead frame so as to change the position to said second guide rail with respect to said first guide rail, and having biasing means for biasing said second guide rail toward said first guide rail; said driving means comprising a driving unit for driving said first guide rail, memory means for previously storing therein the data regarding the width of said lead frame, and a control unit for controlling said driving unit in response to said data, whereby said lead frame is transferred in the longitudinal direction while maintaining a predetermined gap between each of the side edges of said lead frame and each of said guide means and, furthermore, one of said guide means is driven by said driving means to move toward or away from the other guide means so that

4,958,723

## ROLLER TRACK

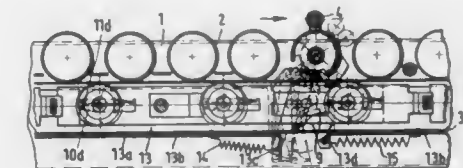
Edgar Bonifer, Muenster; Walter Duttine, Offenbach, and Hartwig Reckemeier, Maintal, all of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany. Continuation of Ser. No. 777,034, Sep. 17, 1985, abandoned. This application Feb. 22, 1989, Ser. No. 315,336

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1984, 3434092; Jun. 21, 1985, 3522177

Int. Cl.<sup>3</sup> B65G 13/06

U.S. Cl. 198—781

24 Claims



1. Roller track arranged in sections in that individual groups of carrier rollers can be selectively drivably connected to and disconnected from a drive belt for section stop-and-go operation permitting a buffer storage location for each section, there being vertically displaceable belt rollers for engaging the belt to obtain driving connection to and disconnection from carrier rollers, the improvement comprising:

a plurality of control rollers each having oppositely situated peripheral openings and mounted for undergoing turning motion; means for respectively mounting eccentrically the belt rollers in the control rollers so that depending upon the angular position of the control rollers on account of any turning motion the respective belt rollers are lifted or lowered for engagement with or disengagement from the belt;

a plurality of control bars arranged pairwise in operatively overlapping relation such that respective two of the bars function to disengage the belt from each roller track section;

control cams respectively coupled to the control rollers and being in engagement with at least one control bar for triggering turning of the control roller to change the disposition of respective control roller to temporarily engage the belt so that the belt turns the control roller over a particular angle and turns it into a position in which the belt roller therein and the belt are lowered away from the carrier rollers;

an actuator bar for each roller section and being coupled to one of said control bars which extends also into the respective adjacent upstream section, so that the actuator bar as well as an adjacent upstream actuator bar, upon being turned down by loads, cause said one control bar to initiate turning of the control rollers such that the respective belt roller and the belt therein disengage from the carrier rollers of the respective section, the belt provides for said turning of the control roller by frictional engagement so that the belt itself will disengage from the carrier rollers of the buffer station and the carrier rollers of said section;

spring means connected to the control bars to obtain control operations of one section in response to an operating state of the respective next downstream section so that the load on the carrier rollers of said one section can be stopped if there is a load on that next downstream station; and brake means actuated by the control rollers in response to disengagement of the belt from the carrier rollers to stop the carrier rolls.



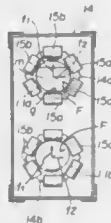
4,958,724

## TUBULAR BELT CONVEYOR

Kunio Hashimoto, Kitakyushu, Japan, assignor to Kabushiki Kaisha Nihon Pipe Conveyor, Kitakyushu, Japan  
 Filed May 23, 1989, Ser. No. 355,662  
 Claims priority, application Japan, May 24, 1988, 63-124991  
 Int. Cl.<sup>5</sup> B65G 15/08

U.S. Cl. 198—819

8 Claims



1. In a tubular belt conveyor having an endless belt and a plurality of supporting frame mounted at predetermined intervals along the length of the endless belt for guiding the endless belt along a prescribed path having changes of direction, each of the supporting frames being provided in the upper and lower portions thereof with an upper belt passageway and a lower belt passageway respectively, and with a plurality of smooth belt-retaining rollers circumferentially disposed around each of the belt passageways to allow the endless belt to roll up into a tube to wrap and convey a loaded material; the improvement comprising at least one supporting frame positioned along the path at a change of direction thereof having at least one grooved friction roller disposed at that circumferential position which takes a greater load resulting from the change in direction and the weight of the materials being conveyed than do the other belt retaining rollers within the supporting frame, whereby said grooved roller is located at a position other than the lowermost support position.

4,958,725

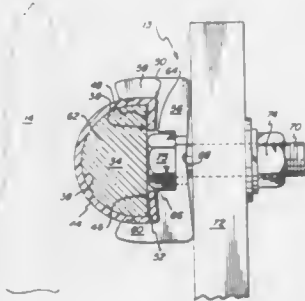
## CONVEYOR GUIDE RAILING ASSEMBLY

Alan J. Meade, Lynchburg, and Paul W. Smith, Forest, both of Va., assignors to Simplimatic Engineering Company, Lynchburg, Va.

Filed Sep. 12, 1988, Ser. No. 243,434  
 Int. Cl.<sup>5</sup> B65G 15/00

U.S. Cl. 198—836.1

10 Claims



1. An improved guide railing assembly for a conveyor system, said assembly comprising:  
 (a) an elongated railing for providing lateral support to articles being conveyed along a path defined by said conveyor, said railing having a curved surface for facing towards said path, said railing further having a relatively flat surface for facing away from said path, said curved surface joining said flat surface along two junctions ex-

tending parallel to said path, said railing having a substantially half-moon shaped cross-section; and  
 (b) a generally U-shaped clamp having a pair of gripping fingers corresponding to the legs of said U, said fingers being curved toward each other in a shape substantially corresponding to the curvature of said curved surface, said fingers being spaced apart a sufficient distance to receive therebetween at least said railing, the bottom portion of said U being generally concave and forming an aperture therethrough for receiving means for fastening said clamp to a support member associated with said conveyor, said clamp being spring-like to respond to a tightening of said fastening means by tending to flatten the bottom of said U and force said fingers towards each other in a gripping fashion on a portion of said curved surface of said railing therein, whereby said railing can be reliably retained by said clamp in a preselected position relative to said conveyor path.

4,958,726

## CURVED APRON CONVEYOR

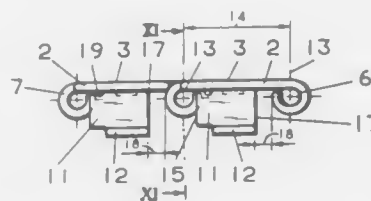
Jürgen Fett, Atzelgift; Karl G. Oelschläger, Hagen, and Wolfgang Bannert, Fröndenberg-Dellwig, all of Fed. Rep. of Germany, assignors to Rexnord Kette GmbH & Co. KG, Fed. Rep. of Germany

Filed Apr. 4, 1989, Ser. No. 333,429  
 Claims priority, application Fed. Rep. of Germany, May 28, 1988, 3818231

Int. Cl.<sup>5</sup> B65G 17/06

U.S. Cl. 198—852

9 Claims



1. A curved apron conveyor comprising a plurality of plate members, engaging with one another at their neighbouring side edges with hinge eyes, connected to one another by means of hinge pins and having guiding surfaces that cooperate with guide rails, wherein said guiding surfaces that cooperate with guide rails, wherein said guiding surfaces are arranged off-center of said plate members in relation to the conveying direction, said guiding surfaces each having a front edge and a rear edge, said hinge eyes comprising a double front hinge eye and a single rear hinge eye, said front edge contacting said double front hinge eye so as to provide additional lateral stability of the guiding surface relative to the front hinge eye, and said rear edge, spaced from said rear hinge eye, forming an open space therebetween so that said conveyor has a self-cleaning effect.

4,958,727

## SHOWCASE FOR STORING AND DISPLAYING POST-TYPE EARRINGS

Margaret A. Bergeron, 12298 Sawgrass Ct., West Palm Beach, Fla. 33414

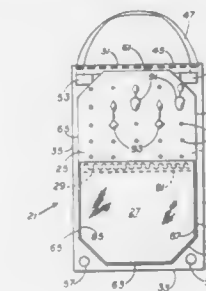
Filed Sep. 11, 1989, Ser. No. 405,240  
 Int. Cl.<sup>5</sup> B65D 75/30, 85/30

U.S. Cl. 206—6.1

5 Claims

1. A hangable showcase for displaying large, dangly post-type earrings, comprising:  
 a flexible rectangular cover sheet having a top cover sheet edge and a bottom cover sheet edge defining a cover length therebetween; side cover sheet edges defining a cover sheet width therebetween, said cover sheet having a cover sheet fold therein about half way between and

substantially parallel to said top and bottom cover sheet edges;  
 a flexible, substantially-rectangular perforated mounting sheet adapted for receiving and holding the posts of said post-type earrings, said mounting sheet having a top mounting sheet edge and a bottom mounting sheet edge defining a mounting sheet length, and side mounting sheet edges defining a mounting sheet width therebetween, said mounting sheet having a mounting sheet fold therein about half way between and substantially parallel to said top and bottom mounting sheet edges;  
 a flexible, substantially-rectangular spacer sheet having a top spacer sheet edge and a bottom spacer sheet edge defining a spacer sheet length therebetween; and side spacer sheet edges defining a spacer sheet width therebetween, said spacer sheet having a spacer sheet fold therein adjacent to said top spacer sheet edge and substantially parallel to said top and bottom spacer sheet edges;



said mounting sheet fold being superimposed on said cover sheet fold and said spacer sheet fold being superimposed on said mounting sheet fold, said cover sheet, mounting sheet and spacer sheet being permanently attached along said superimposed folds;  
 a first hook-and-loop closure pair attached in opposed positions to said mounting sheet across the width thereof adjacent to said top mounting sheet edge, and to said cover sheet across the width thereof adjacent to said top cover sheet edge;  
 a second hook-and-loop closure pair attached in opposed positions to said cover sheet adjacent to said top and bottom cover sheet edges and adjacent to one of said cover sheet sides;  
 a third hook-and-loop closure pair attached in opposed positions to said cover sheet adjacent to said top and bottom cover sheet edges and adjacent to the other of said cover sheet sides.

4,958,728

## FILING SYSTEM

Darwin Effendi, 8605 Saffron Place, Burnaby, B.C., Canada  
 V5A 4H8

Filed Oct. 2, 1989, Ser. No. 415,606  
 Int. Cl.<sup>5</sup> B65D 5/44

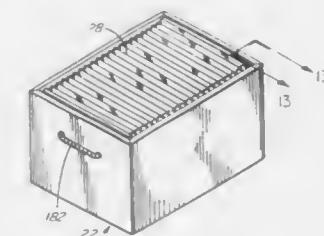
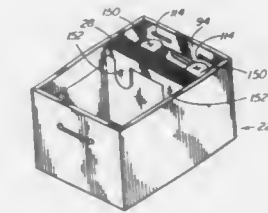
U.S. Cl. 206—44 B

16 Claims

1. An apparatus for filing documents, comprising:  
 a box-like container having opposite sides, opposite ends, a top opening and a bottom;  
 a cover for the container which removably closes the said top opening;  
 an expandable file folder having a plurality of divisions and being of a size which fully occupies the interior of the container and extends from one end of the container to another end thereof when in an expanded condition; and  
 releasable connecting means for releasably connecting the file folder to the ends of the container, the said ends being spaced apart at a fixed distance which is sufficient to maintain the folder in the expanded condition within the container.

13. An apparatus for filing documents, comprising:  
 a box-like container having opposite sides, opposite ends, a top opening and a bottom;  
 a cover for the container which removably closes the said top opening, the cover being rectangular and having sides and ends; and  
 an expandable file folder having a plurality of divisions and being of a size which fully occupies the interior of the container and extends from one end of the container to another end thereof when expanded;  
 releasable connecting means for releasably connecting the file folder to the ends of the container to maintain the folder in the expanded condition within the container, and the apparatus having a knocked-down condition wherein the container is folded, the file folder is collapsed, and the folded container and collapsed folder are removably received within the cover.

15. An apparatus for filing documents, comprising:



a box-like container having opposite sides, opposite ends, a top openings and a bottom;  
 a cover for the container which removably closes the said top opening;  
 an expandable file folder having a plurality of divisions and being of a size which fully occupies the interior of the container and extends from one end of the container to another end thereof when expanded; and  
 releasable connecting means for releasably connecting the file folder to the ends of the container to maintain the folder in the expanded condition within the container;  
 the releasable connecting means including each end of the container having at least one elongated horizontal slot located adjacent an upper portion of the respective end, and the expandable file folder has a rectangular end panel at each end thereof, the end panel having at least one elongated downwardly extending tab located adjacent an upper portion thereof and adapted to fit within the elongated slot.

4,958,729

## BALL GLOVE CONDITIONING BAG

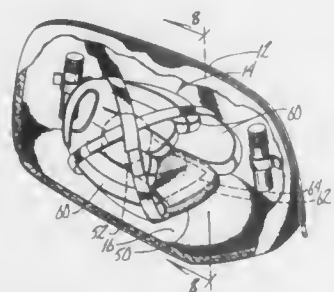
Robert L. Wright, Des Moines, Iowa, assignor to Creative Athletic Products & Services, Inc., Des Moines, Iowa  
 Continuation-in-part of Ser. No. 371,748, Jun. 27, 1989, Pat. No. 4,883,170. This application Nov. 27, 1989, Ser. No. 441,878  
 Int. Cl.<sup>5</sup> B65D 85/18, 81/22

U.S. Cl. 206—315.1

9 Claims

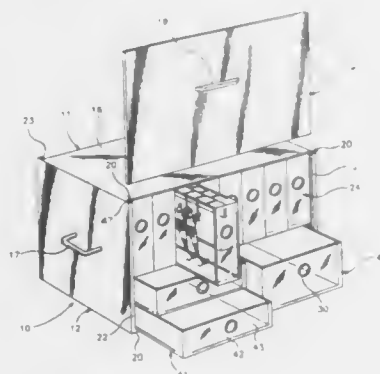
1. A ball glove and glove conditioning bag comprising,

a bag having a chamber defined by a bottom wall and side walls,  
and an access opening into said bag,  
a ball glove in said chamber,  
fastening means in said bag for holding said glove stationary  
and substantially centered between said side walls,  
a conditioning fluid applicator in the pocket of said glove,



said applicator, including a tube of conditioning fluid  
absorbent material, said tube having an open end and a  
closed end and said a ball is disposed in said closed end  
of said tube, and  
said fastening means holding said glove in a wrapped-  
around-said-ball relationship whereby conditioning fluid  
may be transferred from said applicator to said glove.

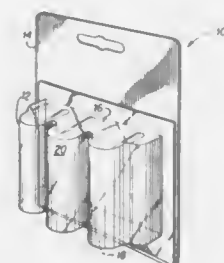
**4,958,730**  
**COMPARTMENTED SUPPORTED FISHING LURE  
TACKLE BOX**  
Arthur L. Buntin, 6103 Horton Dr., La Mesa, Calif. 92042  
Filed Mar. 12, 1990, Ser. No. 491,950  
Int. Cl. 5 A01K 97/06  
U.S. Cl. 206—315.110 9 Claims



1. A tackle box comprising:
  - a. an enclosure having two opposing side panels and a rear panel, a removable front panel opposite the rear panel, a bottom panel and a top panel opposite the bottom panel;
  - b. a first front panel retaining means on a front of the enclosure to retain the front panel in place over a front opening of the enclosure;
  - c. a plurality of lure storage drawers slidably disposed within the enclosure;
  - d. the lure storage drawers comprising a first side section and a second side section parallel to and diametrically opposing each other, and having both side sections attached to a top section and a bottom section, parallel to the top section, to form a rectangular lure enclosure;
  - e. a first drawer pull means in the second side section of the lure storage drawers to facilitate slidable movement of the lure storage drawers;

- f. a longitudinal slot in an upper surface of the top section having lateral slots extending therefrom;
- g. lateral slits through the top section connected to the lateral slots;
- h. a retainer support in the longitudinal slot;
- i. a plurality of elastic retainers with one end attached to the retainer support and placed in the lateral slots and having a length longer than the lateral slots;
- j. the elastic retainers passing down through the lateral slits into the rectangular lure enclosure;
- k. an attachment means on an end of the elastic retainers to attach a lure; and
- l. a lure holding bar parallel to the bottom section of the lure storage drawer and with one end of the lure holding bar attached to the first side section and the other end attached to the second side section and traversing a distance between the first and second side section of the lure storage drawer.

**4,958,731**  
**BATTERY PACKAGE**  
Victor A. Calcerano, Carmel, N.Y., assignor to Duracell Inc., Bethel, Conn.  
Filed Nov. 22, 1989, Ser. No. 440,144  
Int. Cl. 5 B65D 73/00  
U.S. Cl. 206—333 14 Claims

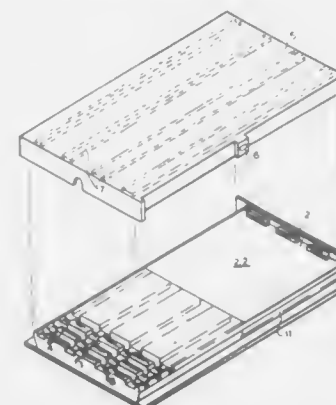


1. A package for the sale and display of a plurality of cylindrical objects in at least two rows, one behind the other; wherein the first, front row has fewer objects than the next row; said package comprising a blister having a top, a bottom, and a contoured portion between said top and said bottom; and wherein said blister has an open back for loading said cylindrical objects into the blister; said contoured portion of the blister being shaped to receive a first row of objects in which none of the objects touch each other, and said contoured portion including means to prevent nesting between the objects in the first row objects being loaded into said next row.

**4,958,732**  
**SLIDE-TOP DRILL-BIT STORAGE BOX**  
Georg Rau, Glengen-Hohenhemmingen, and Günter H. Budert, Bachhagel, both of Fed. Rep. of Germany, assignors to Firma Georg Knoblauch, Glengen/Brenz, Fed. Rep. of Germany  
Filed Nov. 16, 1989, Ser. No. 437,827  
Claims priority, application Fed. Rep. of Germany, Nov. 26, 1988, 3839993; European Pat. Off., May 12, 1989, 89108568.0  
Int. Cl. 5 B65D 85/24

- U.S. Cl. 206—379 11 Claims
1. A storage case for elongated objects, the case comprising:
    - a generally flat base part formed with an array of parallel and longitudinally extending grooves separated by longitudinally extending ridges, the grooves all being open longitudinally at one end and closed longitudinally at the opposite end, whereby the objects can be held in the grooves; and
    - a generally flat cover part engaged over the base part and covering the grooves, the cover part having one transversely extending edge lip overreaching the open ends of

the grooves and formed with a longitudinally throughgoing aperture of generally the same transverse width as the grooves, the cover part being slidable transversely along the base part for alignment of the aperture with the open



end of each of the grooves, one of the parts being formed with a transversely extending notch formation open toward the other part and the other part being formed with a transversely extending rib formation generally complementary to and fitting into the notch formation.

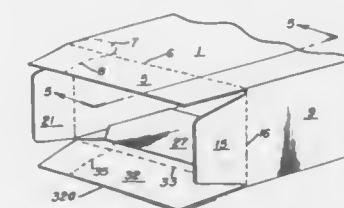
**4,958,733**  
**CONTAINER FOR ACCOMMODATING STRING-LIKE  
ARTICLES AND TAKING OUT THE SAME**  
Yoshiji Masuda, Osaka, Japan, assignor to Eiwa Industry Co., Ltd., Osaka, Japan  
Filed Jan. 19, 1990, Ser. No. 467,249  
Claims priority, application Japan, Jan. 20, 1989, 1-5314  
Int. Cl. 5 B65D 85/67  
U.S. Cl. 206—409 5 Claims



1. A container for accommodating string-like articles and taking-out the same comprising:
  - a polygonal cylinder having a bottom plate which is formed by bending one extended portion of one side of the cylinder normal to the side of the cylinder and fastening the same by inserting the end thereof in the cylinder;
  - the first cover plate which is formed by folding flat a flap extending from the upper end of one side opposite to the bottom plate inside the cylinder, bending normal to the side to reach the opposite side and bending again upward along said side;
  - the second cover plate which is formed by folding flat another flap extending from the upper end of another side opposite to the first side inside the cylinder, bending nor-

mal to the side to reach the first side and bending again upward along said side;  
whereby the first and the second cover plates overlap each other in such a manner as the upper cover plate avoids the lower cover plate from opening upward;  
a slit provided on the upper edge of the cylinder;  
a cutter mounted at the bottom of the slit; and  
two holes provided at the center of each cover plate, through which the string-like articles is drawn out from the roll thereof accommodated in the chamber formed by the bottom plate and the cover plate.

**4,958,734**  
**END LOADED CARTON HAVING A TRIPLE PLY WALL**  
Prentice J. Wood, Hapeville, and Rodney K. Calvert, Dunwoody, both of Ga., assignors to The Mead Corporation, Dayton, Ohio  
Filed Oct. 10, 1989, Ser. No. 419,319  
Int. Cl. 5 B65D 71/06  
U.S. Cl. 206—435 5 Claims



1. An end loaded carton for packaging a plurality of cans arranged in side by side relation, said carton comprising foldably joined top, bottom and side walls forming a tubular structure and having end closure panels, one wall of the carton being of double ply construction having inner and outer panels and being in engagement with the ends of the packaged cans, the inner ply of said one wall including a thickening panel foldably joined to an end edge of said inner ply which is spaced inwardly from the adjacent end edge of said outer ply, said thickening panel being folded into flat face contacting relation with said inner ply to form a three ply wall in engagement with the can ends.

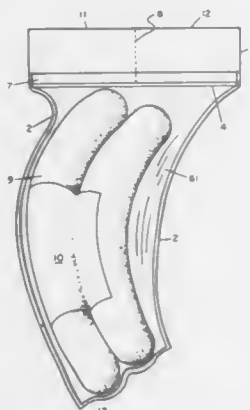
4. An end loaded carton for packaging a plurality of cans arranged in side by side relation, said carton comprising foldably joined top, bottom and side walls forming a tubular structure and having end closure panels, one wall of the carton being of double ply construction having inner and outer panels and being in engagement with the ends of the packaged cans, and a pair of thickening panels foldably joined to said inner ply along transverse spaced apart fold lines and being folded into flat face contacting relation with said inner ply to form a three ply wall in engagement with the can ends.

**4,958,735**  
**EASY OPEN, HEMETICALLY SEALED, DISPLAY  
PACKAGE MADE FROM HEAT SHRINKABLE FILM**  
Robert A. Odabashian, Greer, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.  
Filed Jun. 28, 1985, Ser. No. 749,961  
Int. Cl. 5 B65D 65/00 1 Claim

- U.S. Cl. 206—497
1. A display package comprising:
    - (a) a product;
    - (b) a receptacle formed from a single sheet of heat-shrinkable, single-fold, flexible, heat sealable, gas barrier, thermoplastic sheet material, said receptacle comprising:
      1. a shrunken portion, wherein the sheet material is shrunken and conforms generally and closely to the shape of the product;
      2. an unshrunk portion having a fold line which forms

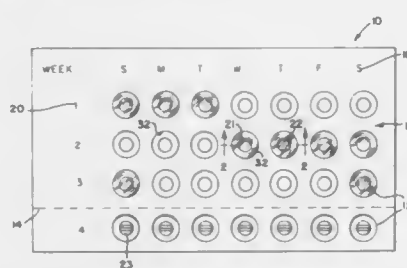


- one end of the receptacle, and the unshrunk portion being separated from the shrunk portion by a heat seal parallel to and spaced apart from the fold line and having a line of weakness perpendicular to the seal along which an opening tear may be initiated;
3. the sides of said receptacle being formed by heat seals which seal the respective side edges of the sheet together; and



4. the mouth of the receptacle being closed by a heat seal thereby hermetically enclosing the product within the shrunk portion; and
- (c) a strip of non-shrinkable thermoplastic material adhered to said unshrunk portion, said strip having a line of weakness corresponding to the line of weakness in the unshrunk portion of the receptacle and dividing said strip into two manually grippable sections that serve as tear tabs to open said package.

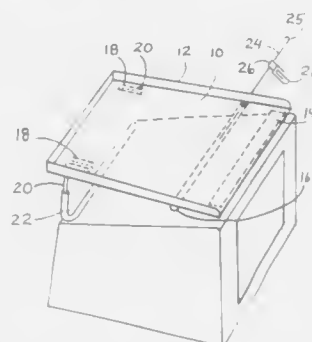
**4,958,736**  
**PACKAGE FOR ORAL CONTRACEPTIVE TABLET**  
 John E. Urheim, Lincolnshire, Ill., assignor to Gynex, Inc., Deerfield, Ill.  
 Filed Mar. 18, 1986, Ser. No. 840,774  
 Int. Cl.<sup>5</sup> B65D 83/04  
 U.S. Cl. 206—531 8 Claims



1. An integral package for sequential daily oral administration of pharmacologically active contraceptive tablets comprising:
- a carrier sheet provided with an array of 28 compartments arranged in four substantially parallel rows of seven substantially parallel columns, three adjacent rows having an active tablet in each of said compartments, a fourth row having a placebo tablet in each compartment, a pressure rupturable cover over each of said compartments, and a single line of severability in said sheet, said line being situated between and substantially parallel to said row of placebo tablet containing compartments and an adjacent row of active tablets, said carrier sheet defining, on each side of said line, an integral region free of any other lines of severability between said compartments, whereby said

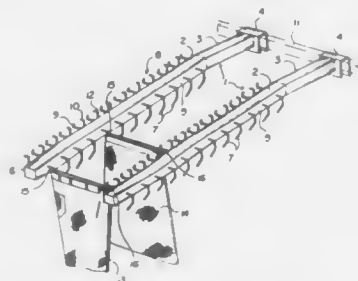
fourth row of placebo tablet containing compartments can be readily separated from said three rows of active tablet containing compartments.

**4,958,737**  
**CRT OR COMPUTER MONITOR ACCESSORY TRAY**  
 Abraham E. Auerbach, HCR 2648, Oracle, Ariz. 85623  
 Filed Jan. 18, 1990, Ser. No. 467,008  
 Int. Cl.<sup>5</sup> A47F 5/12, 7/00  
 U.S. Cl. 206—557 20 Claims



1. A tray for placement atop a computer monitor for holding items in the space above said monitor without allowing such items to fall or block the air vents in the top of such monitor, comprising:
- a tray having a flat upper surface and means for causing objects placed in said tray to resist falling off a plurality of sides of said tray,
- means associated with the undersurface of said tray for enabling said tray to be placed on top of any computer monitor within a range of sizes and shapes without falling off said monitor and without blocking any air vents on the top of said monitor, said means comprising a friction surface at the front of said undersurface of said tray and an adjustable wire support at the rear of said undersurface of said tray.

**4,958,738**  
**CLOTHING RACK AND HANGER COMPOSITE STRUCTURE**  
 Daniel S. Lee, 1537 Melton Rd., Lutherville, Md. 21093  
 Filed Oct. 26, 1989, Ser. No. 426,725  
 Int. Cl.<sup>5</sup> A47F 5/00  
 U.S. Cl. 211—89 6 Claims



1. A clothing rack and hanger composite structure comprising:
- at least two main racks with each having an extension rack extending therefrom, said extension rack extending from the main rack at an angle so as to provide a slight bending

form for giving a slight slope to said rack and hanger composite structure,

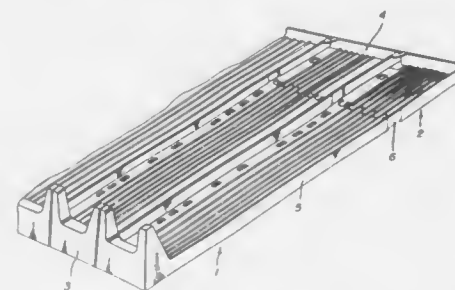
a plurality of hook hangers mounted on one side of said main rack, said hook hangers having a C-shaped configuration, respectively,

a plurality of squeezing hangers mounted on the other side of said main rack, said squeezing hangers defining a plurality of V-shaped configurations adjacent to each other for forming a plurality of squeezing spaces between said squeezing hangers,

said hook hangers being disposed so as to be aligned with said squeezing spaces formed between said squeezing hangers for hanging clothes between the hook hangers of one main rack and the squeezing spaces of the other main rack in a straight manner,

a channel engagement attached to one end of said extension rack for engaging the rack and hanger composite structure with a rail support, whereby clothes such as pants, skirts, and the like can be tightly attached to and easily removed from the rack and hanger composite structure.

**4,958,739**  
**COMPOSITE ORGANIZER AND GRAVITY FEED SHELF**  
 William S. Spamer, Roswell, Ga., assignor to The Mead Corporation, Dayton, Ohio  
 Continuation-in-part of Ser. No. 391,424, Aug. 9, 1989. This application Oct. 2, 1989, Ser. No. 416,057  
 Int. Cl.<sup>5</sup> A47F 5/00  
 U.S. Cl. 211—153 12 Claims



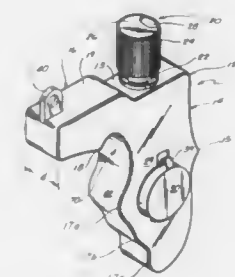
1. A composite shelf arranged for mounting on a flat surface for supporting and displaying articles and comprising a main support unit including a main rectangular planar element having front, rear and opposed side edges, an auxiliary support unit including an auxiliary rectangular planar element having front, rear and opposed side edges one edge of which is of a configuration which is complementary to one edge of said main rectangular planar element, a first plurality of spaced projections formed along said one edge of said main planar element and disposed in the plane thereof, and a plurality of spaced projections formed along said one edge of said auxiliary planar element and in the plane thereof and interspersed between said spaced projections formed along said one edge of said main planar element.

**4,958,740**  
**BOTTLE FOR CONTAINING AND DISPENSING A PLURALITY OF DIFFERENT CONTENTS**  
 Eugene R. Wilkerson, Destin, Fla., assignor to Florida Isles Enterprises, Inc., Destin, Fla.  
 Filed Aug. 29, 1989, Ser. No. 399,842  
 Int. Cl.<sup>5</sup> B65D 1/04, 23/10, 41/04, 41/16  
 U.S. Cl. 215—6 11 Claims

1. A bottle for containing and dispensing liquid and solid substances comprising:
- (a) a main body portion defining opposing sidewalls, said sidewalls having concave and convex surfaces thereby establishing a hand grip portion;
- (b) a handle portion integrally formed with the upper por-

tion of one of said sidewalls of said main body portion, said handle portion projecting laterally outwardly from said one of said sidewalls, said main body portion and handle portion communicating and thereby forming a first containing means of said bottle, said handle portion having concave and convex surfaces, thereby establishing a hand grip portion, the web of said handle portion including a smooth continuous concave surface contiguous with said upper portion of said one of said sidewalls of said main body portion;

(c) a neck portion having a passageway therethrough provided in the upper surface of said main body portion

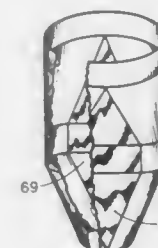


through which a first substance may be introduced into or removed from said first containing means formed by said main body portion and said integral handle portion;

(d) closure means for said passageway adapted to be selectively applied to or removed from said neck portion; and,

(e) a second containing means including an annular recess provided in the surface of said main body portion, said recess having a raised annular neck portion integral therewith and raised above said surface of said main body portion, and removable closure means therefor formed to sealably adapt to said neck portion, said closure means being fixedly connected to said raised annular neck portion.

**4,958,741**  
**MODULAR MASS-FLOW BIN**  
 Jerry R. Johanson, San Luis Obispo, Calif., assignor to Jr Johanson, Inc., San Luis Obispo, Calif.  
 Filed Jun. 14, 1989, Ser. No. 365,916  
 Int. Cl.<sup>5</sup> B65D 25/14  
 U.S. Cl. 220—83 21 Claims



1. A bin module comprising:
- a first section that extends upwardly from a circular lower edge of diameter d to an oval-shaped upper edge, the major axis of the oval-shaped upper edge exceeding the diameter of the circular lower edge;
- a second section that extends upwardly from an oval-shaped lower edge that is attached to the upper edge of said first section to an oval-shaped upper edge, the major and minor axes of the upper edge not exceeding the major and minor axes of the lower edge, the vertical height of said second section being h<sub>1</sub>;

a third section that extends upwardly from an oval-shaped lower edge that is attached to the upper edge of said second section to a circular upper edge, the diameter of the circular upper edge exceeding the minor axis of the oval-shaped lower edge; and,  
a fourth section that extends upwardly from a circular lower edge that is attached to the upper edge of said third section to a circular upper edge the diameter of which does not exceed the diameter of the lower edge, the vertical height of said fourth section being  $h_2$ .

4,958,742

## CONTAINER WITH SAFETY VALVE

Ernst Berwald, Bergkamen-Heil, and Winfried Lewé, Kamen, both of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Bergkamen, Fed. Rep. of Germany

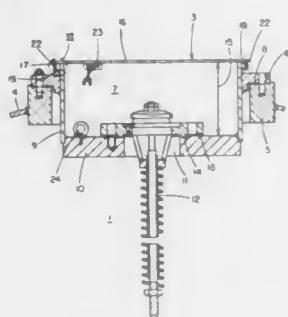
Filed Jul. 7, 1988, Ser. No. 216,370

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1987, 3723645

Int. Cl.<sup>5</sup> F16K 15/02

U.S. Cl. 220—209

10 Claims



1. A pressure relief assembly for a container for the receipt of liquids, said container having a cylindrical element fixed in an opening for accommodating said pressure relief assembly, said element extending perpendicular to a wall of said container, said pressure relief assembly comprising a cylindrically shaped housing, said housing being provided with a removable cover frictionally secured to a first end of said cylindrical housing and a bottom wall fixedly and non-removably secured to a second end of said cylindrical housing, a circumferential mounting flange secured to the outer circumference of said cylindrical housing adjacent said first end, said bottom wall of said cylindrical housing being provided with an opening for mounting a relief valve which extends outwardly into said container from said pressure relief assembly; wherein said relief valve extends into said assembly less than half the length of said cylindrical housing, said relief valve being secured to a mounting plate through a sealing gasket to said bottom wall, said mounting plate having a diameter greater than said opening in said bottom wall.

4,958,743

## CLOSE OUT FITTING

Randall C. Hatton, 3910 Middlegate St., Westlake, Calif. 91361, and Gerald W. Tyree, 8870 O'Melveny, San Valley, Calif. 91352

Continuation of Ser. No. 132,760, Dec. 14, 1987, abandoned.

This application May 18, 1989, Ser. No. 357,628

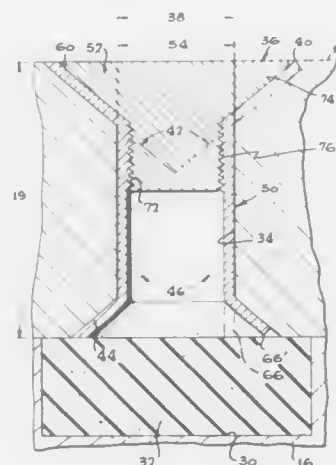
Int. Cl.<sup>5</sup> B65D 41/04

U.S. Cl. 220—288

4 Claims

1. In a structure, the combination of:  
a structural element, the structural element having a material injecting port extending from a first surface to a second surface thereof, said port countersunk at both its ends;  
a hollow tubular sleeve installed in said port, said sleeve having flared ends in contact with said countersunk ends of said port, and flush with said first and second surfaces

of said structural element, a length equal to the length of said port and internal threads located between said flared ends; and



a plug having external threads in removable engagement with said internal threads of said sleeve.

4,958,744

## CONTAINER CLOSURE

Peter K. Bayly, Euroa, Australia, assignor to Kingsley Nominees Pty. Ltd., Blackburn, Australia

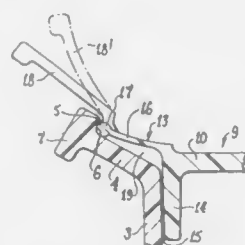
Filed Apr. 11, 1989, Ser. No. 336,054

Claims priority, application Australia, Apr. 12, 1988, P17705

Int. Cl.<sup>5</sup> B65D 51/12

U.S. Cl. 220—305

13 Claims



1. A closure for the open mouth of a container having an internal sealing surface which defines or is adjacent to said open mouth and against which said closure engages to close said open mouth, said closure comprising, a main body, sealing means extending radially outwardly from around the periphery of the main body, said sealing means including a sealing edge which is engageable with said sealing surface and a resiliently flexible web connecting said sealing edge to said main body, said web being movable between a sealing condition and a relaxed condition, a diameter of the sealing edge in the sealing condition being less than a diameter of the sealing edge when the web is in the relaxed condition, said web being movable to said sealing condition when said closure operatively closes said open mouth, the resilience of the web material being such that said sealing edge is thereby pressed against said sealing surface, said main body being considerably less flexible than said web, said main body carrying a locating means on the operatively inner side thereof to facilitate locating said closure relative to said open mouth, said location means comprising a guide wall connected to the lower side of said main body around the radially outer edge portion thereof, said guide wall projecting into said container when said closure is in said sealing condition.

4,958,745

## CONNECTOR TANK MEANS FOR CAP FOR MOUTH OF TANK

Isao Masuda, Tachikawa; Toshio Taomo, Tokyo, and Fujio Sasaki, Mita, all of Japan, assignors to Kioritz Corporation, Yokyo, Japan

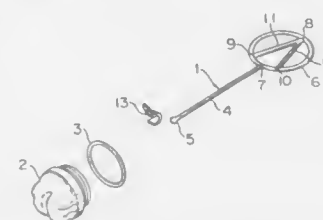
Continuation of Ser. No. 848,855, Apr. 4, 1986, abandoned. This application Jul. 2, 1987, Ser. No. 70,873

Claims priority, application Japan, Apr. 23, 1985, 60-60440

Int. Cl.<sup>5</sup> B65D 55/16

U.S. Cl. 220—375

1 Claim



1. Connector means formed as a unitary structure for a cap of a mouth of a tank comprising:  
an elongated portion connected at one end thereof to the cap; and  
an engaging member connected to an opposite end of said elongated portion and located inside the tank for engagement with the inner side of the mouth of the tank; wherein the improvement resides in that said engaging member comprises:  
an annular portion formed of elastic material connected to the opposite end of said elongated portion; and  
a plurality of beam-like portions formed integrally with said annular portion and arranged substantially in the form of the letter V in said annular position, said annular portion being bendable along said beam-like portions in an arrow-like form only in a direction to be inserted into the mouth of said tank.

4,958,746

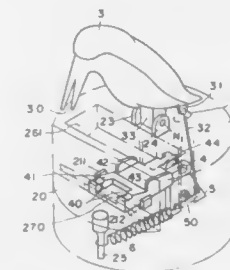
## TOOTH-PICK DISPENSER

Ching K. Wu, Room 2, 11F, Shoel-Yuan Road, Taipei, Taiwan  
Filed Aug. 16, 1989, Ser. No. 394,477

Int. Cl.<sup>5</sup> A24F 15/04; G07F 11/00

U.S. Cl. 221—24

1 Claim



1. A tooth-pick dispenser comprising  
a substantially cylindrical housing having a perforated top and a cut-off portion defined by a vertical side wall extending downwardly from the top and a horizontal side wall parallel to the top;  
a tooth-pick filling opening formed in the top of the housing close to the cut-off portion and adapted to fill tooth-picks into the housing;  
an opening formed in the vertical side wall and spaced from the top of the housing;  
a tooth-pick chamber in the housing having means for supporting tooth-picks and for delivering them downwardly one at a time;  
a drawer member disposed in the opening of the vertical side wall for reciprocation between a tooth-pick receiving position in the housing and a tooth-pick delivery position exterior of the housing and having a slot cut longitudinally from a rear end thereof and means for catching a tooth-pick delivered from the chamber in the housing and conveying it to the delivery position;  
at least a projector extending upwardly from a mid portion of the drawer member for pushing tooth-picks stacked in the chamber toward the vertical side wall when the drawer member moves from the receiving position to the delivery position;  
guide means abutting lateral sides of the drawer member for guiding the reciprocating movement of the drawer member;  
a pick up device having a structure simulating the appearance of a seagull having a supporting member extending downwardly from a flank portion thereof, a head portion spaced from the supporting member and provided with a tooth-pick pickup means extending forwardly outwardly and having an opening diverging outwardly from the head portion and a tail portion opposite to the head portion; means for pivotally supporting the pickup device on the top of the housing whereby the seagull pickup device may be manually oscillated between a lower pickup position and a raised dispensing position; an angular member having three corner portions, and rotatably mounted on a supporter in the housing;  
means for pivotally supporting a first corner portion of the angular member to the rear end of the drawer member in the slot thereof;  
a link pivotally interconnecting the tail portion of the seagull pickup device and a second corner portion of the angular member so as to effect synchronized movement thereof upon actuation of said seagull pickup device;  
a spring member with two ends pivotally interconnecting a third corner portion of the angular member and an arm extending downwardly from the horizontal side wall of the housing; and  
whereby, when said seagull pickup device is swung to the pickup position, said link and angular member will operate to move said drawer member to the exterior delivery position and the projector on the drawer member will push the tooth-picks stacked in the chamber to move toward the vertical side wall of the housing, and when said seagull pickup device is released, said link and angular member will be operated by the spring member to fully retract said drawer member to its inner receiving position and swing the seagull pickup device to its raised dispensing position.

4,958,747

## BOTTLED WATER DISPENSER

Kerney T. Sheets, P.O. Box 771, Babin Rd., Duplessis, La. 70728

Filed Aug. 15, 1988, Ser. No. 232,842

Int. Cl.<sup>5</sup> B67D 5/08

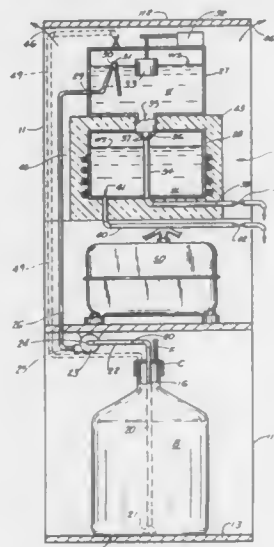
U.S. Cl. 222—67

7 Claims

1. A water dispensing apparatus for use with large narrow-mouth bottles comprising:  
(a) a cabinet having a lower end portion with an expanded spacial area adapted to receive a large water bottle having a narrow-mouth portion and for supporting the bottle in an upright position wherein the narrow open mouth is at an upper position during use;  
(b) a suction flowline positioned to withdraw fluid from the bottle via the narrow open mouth;  
(c) pump means for transmitting fluid from the contents of the bottle via the suction flowline in a generally upwardly direction, the pump including suction and discharge portions.



- tions, said suction portion communicating with said bottle through said suction flowline;
- (d) pump discharge flowline means communicating with the discharge portion of the pump for transmitting fluid from the pump;
- (e) a first, non-insulated ambient temperature water reservoir means, positioned generally vertically above the water bottle area of the cabinet and receiving flow from the pump via the discharge line;
- (f) a second, refrigerated and insulated water reservoir means, positioned generally vertically above the bottle



- and in close proximity to the first reservoir means for maintaining the water therein cold at a refrigerated generally constant temperature, below ambient temperature;
- (g) a third flowline means extending from the first reservoir to the second reservoir for transmitting ambient temperature water to the second reservoir, and including a duct portion which carries ambient water; and
- (h) a pair of spigots mounted on the cabinet for respectively dispensing ambient and cooled water and including flowlines that communicate respectively with the duct for ambient water and with the second cold reservoir.

**4,958,748**  
**ADHESIVE CONTAINER/FEEDER**  
 Masaaki Otake, Ohmiya, Japan, assignor to Sekisui-Iko Co., Ltd., Tokyo, Japan  
 Filed Jul. 7, 1989, Ser. No. 376,736  
 Int. Cl.<sup>5</sup> B65D 37/00  
 U.S. Cl. 222—131



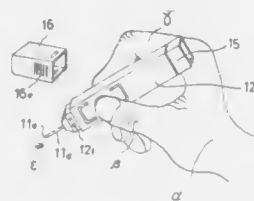
1. An adhesive applicator device comprising an elastic container filled with liquid adhesive, said container having an outlet nozzle, a case accommodating said container such that said outlet nozzle projects from said case, said case having a pair of diametrically opposed window openings, push button means comprising opposed push button projections extending into said window openings, said push button means further

comprising biasing means connected to and extending from said push button projections for biasing said push button projections outwardly into said window openings, whereby said liquid adhesive is discharged from said outlet nozzle one drop at a time by manually pushing said opposed push button projections from an initial position to a displaced position against the bias of said biasing means, said push button projections being returned to said initial position by said biasing means when said manual pushing is discontinued.

**4,958,749**  
**APPLIANCE FOR SIMULTANEOUSLY DISPENSING BOTH FREE-FLOWING AND POURABLE SUBSTANCES**  
 Werner Kuenzel, Langenfeld, and Peter Vierkoetter, Leverkusen, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Oct. 7, 1988, Ser. No. 254,909  
 Claims priority, application Fed. Rep. of Germany, Oct. 9, 1987, 3734132

Int. Cl.<sup>5</sup> A47G 19/30  
 U.S. Cl. 222—133 7 Claims



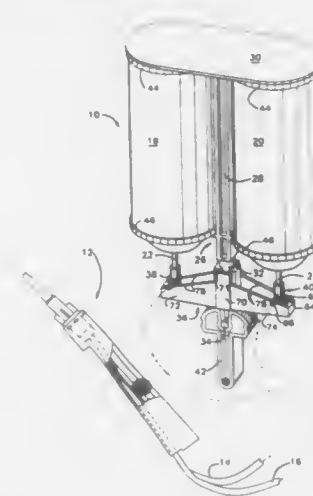
1. An appliance including integral first and second receptacles for storing and substantially simultaneously dispensing through first and second pouring openings via tilting of said appliance to initiate a dispensing cycle, a free-flowing substance at a predetermined flow rate, and a pourable substance, respectively, wherein the improvement comprises dosing element means in said second receptacle for isolating and limiting to a predetermined quantity the pourable substance dispensed in each dispensing cycle, whereby immediately after the predetermined quantity of said pourable substance is dispensed said appliance is turned upright for terminating the flow of said free-flowing substance, thereby substantially obtaining a predetermined quantity and dose or mixture of said free-flowing and pourable substances.

**4,958,750**  
**DISPOSABLE FOAM DISPENSING APPARATUS**  
 Steven H. Palmert, Brookfield, Wis., and Robert F. Ziems, McLean, Va., assignors to Two-Part Foam Propellants, Inc., Cudahy, Wis.  
 Filed Nov. 21, 1989, Ser. No. 439,874  
 Int. Cl.<sup>5</sup> B67D 5/52  
 U.S. Cl. 222—135

- 7 Claims  
 1. In a disposable foam dispensing kit for simultaneously discharging separate fluid components of a resin system from a pair of pressurized cylindrical cans each having axially projecting rims at opposite ends and an axially movable valve stem projecting axially from the center of one end, each of said valve stems being operative to release a fluid component upon axial movement inwardly on the axis of said cans, respectively, retaining means for positioning said cans in parallel relationship with the valve stems of each can extending in laterally spaced parallel relationship, means for simultaneously actuating said valve stems to release the fluid components from both cans, discharge nozzle means for mixing the fluid components

of the resin system and discharging same as foam, and fluid conduit means extending between said valve stems and said discharge nozzle means, the improvement comprising:

- a single carrier component to define said retention means, said carrier component comprising a single central post having spaced rim engaging projections to receive and retain the rims of both cans by snap action, said post extending as a tongue portion between the laterally spaced parallel valve stems of the cans retained by said carrier;



- a cam fulcrum at the projecting end of said tongue portion; bridge means slidably receivable over said cam fulcrum and said tongue portion to engage the ends of the valve stems projecting from both said cans retained by said carrier; and  
 a cam lever connected to said cam fulcrum to advance said bridge means against the ends of said valve stems upon pivotal movement of said cam lever about said cam fulcrum.

**4,958,751**  
**SUB-GINGIVAL MEDICAMENT APPLICATOR**  
 John P. Cartis, Bloomsbury, and James H. Kemp, Piscataway, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Apr. 14, 1989, Ser. No. 338,259  
 Int. Cl.<sup>5</sup> B67D 1/07; A61M 37/00, 31/00  
 U.S. Cl. 222—192 3 Claims

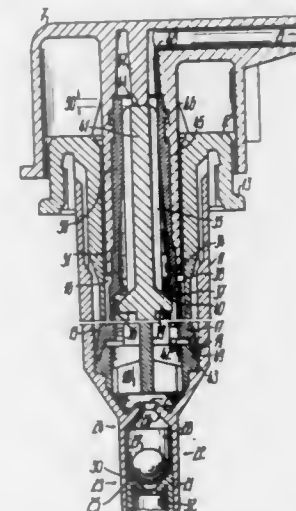


1. A sub-lingual medicament applicator comprising an aerosol container having a filling of gingival medicament and a non-toxic propellant, said container having an outlet opening and a valve for controlling fluid flow through said opening,

actuator means on said container for said valve, and a wand secured to said container in alignment with said opening, said wand having a flexible end piece having a discharge port, and said wand having a passage therethrough from said opening to said port, and means in said end piece to cause vibration thereof.

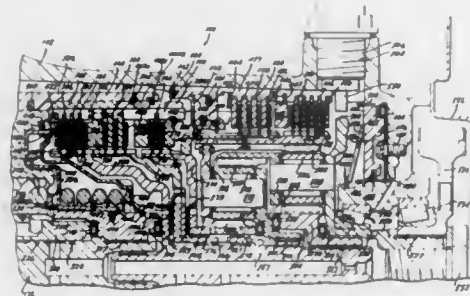
**4,958,752**  
**INVENTION BUMP FOR LIQUID MEDIA**  
 Leo Maerte, Sipplingen, Fed. Rep. of Germany, and Michael Wolter, Landschlacht, Switzerland, assignors to Erich Pfeiffer GmbH & Co. KG., Fed. Rep. of Germany  
 Continuation of Ser. No. 885,505, Apr. 23, 1986, Pat. No. 4,776,498. This application Aug. 3, 1988, Ser. No. 227,652  
 Claims priority, application Fed. Rep. of Germany, May 15, 1985, 3717558

Int. Cl.<sup>5</sup> B05B 11/02  
 U.S. Cl. 222—321 17 Claims



1. A delivery apparatus for discharging liquid media and the like from a storage chamber in an inverted position, said apparatus comprising:  
 a thrust piston having a cylinder and a piston unit for defining a pump chamber therein, said cylinder and said piston unit being displaceable with respect to each other over a pump stroke;  
 a discharge passage being provided for discharging the media from the piston pump and the cylinder having suction passage means for filling the piston pump with media in the inverted position;  
 an air pressure compensating duct in the cylinder of said piston pump for controlling the pressure in the storage chamber; and  
 a slide control element for closing said air compensating duct over at least a part of the pump stroke, wherein said piston unit has a piston lip slidably engaging the cylinder, said piston lip forming the slide control element both for closing the air compensating duct and for closing the suction passage for the inverted position.

4,958,753  
**CLUTCH REACTION AND PRESSURE PLATES IN AN AUTOMATIC TRANSMISSION**  
 Thomas D. Nogle, Troy; Berthold Martin, Utica, and Thomas M. O'Brien, Redford, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.  
 Continuation of Ser. No. 189,492, Apr. 29, 1988, abandoned.  
 This application Nov. 3, 1989, Ser. No. 432,311  
 Int. Cl.<sup>5</sup> F16D 25/063  
 U.S. Cl. 192—85 AA 4 Claims



1. In a vehicle transmission housing enclosing, a rotating input member, an output member, a gear assembly for changing the ratio of torque between the input member and the output member, a plurality of clutch and brake assemblies for coupling the input member to predetermined members of the gear assembly and for coupling predetermined members of the gear assembly to the transmission housing, a fluid actuating device movable axially to engage and disengage at least one said clutch assembly, a reaction member disposed on one side of at least one said clutch assembly, a plate assembly comprising:

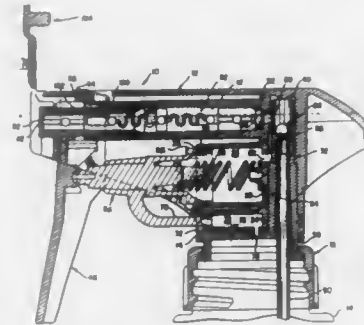
a plate member disposed on another side of at least one said clutch assembly and secured to the fluid actuating device to allow the fluid actuating device to sandwich at least one said clutch assembly between said reaction member and the plate member of the fluid actuating device; and web means integral with said plate member to increase the axial rigidity of said plate member to restrict clutch deflection, said web means comprising a web portion spaced radially from said plate member and being integral with said plate member at a plurality of locations circumferentially about the perimeter of said plate member, said web portion being secured to the fluid actuating device and being moveable axially relative to at least one said clutch assembly.

4,958,754  
**DISPENSER OR SPRAYER WITH VENT SYSTEM**  
 Stephen R. Dennis, St. Charles, Mo., assignor to Continental Sprayers, Inc., St. Peters, Mo.  
 Filed Mar. 1, 1989, Ser. No. 317,568  
 Int. Cl.<sup>5</sup> B67D 5/40  
 U.S. Cl. 222—383 46 Claims

1. A dispenser adapted to be attached to a container for holding a fluent material to be dispensed to the ambient comprising:

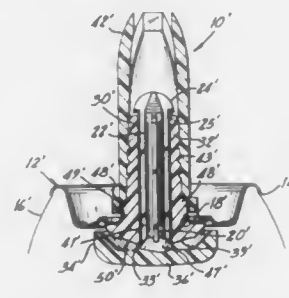
- (a) a housing adapted to be attached to the container;
- (b) a first outwardly opening bore, having an outer and inner end, located within said housing and having an outlet for dispensing the fluent material;
- (c) a second outwardly opening bore, having an outer and inner end, located within said housing and having a first piston shiftable within the second bore;
- (d) operating means for shifting the first piston within the second bore between a non-pumping and pumping position;
- (e) a third outwardly opening bore, having an outer and

inner end, located within said housing and having venting means for permitting communication between the container and the ambient, wherein said first, second, and third bores each have a center axis, and said center axes of said bores are both offset and parallel relative to each other;



(f) a second piston shiftable within said third bore for sealing the venting means when in a non-pumping position and allowing communication between the container and the ambient when said second piston moves from said non-pumping position toward said pumping position, said second piston being operably connected to said operating means.

4,958,755  
**VALVE FOR PRESSURIZED DISPENSING CANS**  
 William Gerstung, Santa Clarita, Calif., assignor to Gerstung Enterprises, Inc., Miami, Fla.  
 Continuation-in-part of Ser. No. 171,070, Mar. 21, 1988, Pat. No. 4,856,684, and a continuation of Ser. No. 113,995, Oct. 29, 1987, abandoned, and Ser. No. 34,679, Apr. 6, 1987, abandoned.  
 This application Jul. 17, 1989, Ser. No. 380,562  
 Int. Cl.<sup>5</sup> B65D 83/46  
 U.S. Cl. 222—402.23 5 Claims



1. An improved valve for attachment to the open upper end of a container for controlling discharge of pressurized, flowable material from the container, said valve including sealing means effective for preventing "blow-by" and oozing through a range of pressures, from an initial, elevated pressure to a lower pressure when the flowable material is substantially discharged from the container, said valve comprising, in combination:

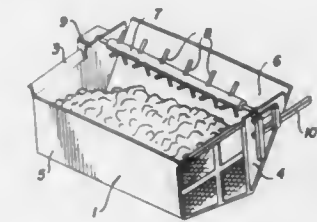
- a) a generally horizontally extending can connector of rigid material adapted to sealingly close said container about the open upper end, said connector having a vertical opening extending therethrough bound by an edge;
- b) a valve stem of rigid material comprising a generally horizontal base positioned below said connector and said opening, and said stem including a generally vertical rod extending upwardly from said base and through said opening, said rod including an upper distal end comprising a

peripherally extending expanded open work head defining a surface said valve stem base, and said base having a generally conical portion having a surface extending upwardly and converging from said base to said rod, and said base having an upper axially facing surface including said conical portion surface, and said base further including an inverted skirt peripherally mounted thereon;

- c) a flexible, resilient, tubular grommet having an axial through passageway, said grommet including a lower portion defining an inverted dome-shaped axially downwardly facing surface having a lip about the passageway, and said grommet further including an upper axially extending portion surrounding said valve stem, said grommet extending up through said connector opening and being disposed around said valve stem base closely adjacent said inverted dome-shaped surface, said grommet having an upper face about said passageway and said surface of said valve stem head facing said valve stem base being sized to normally dwell on said upper grommet face, said lip of said grommet being at the lowermost point if said downwardly facing surface confronting the upper surface of said valve stem base, said grommet and valve stem being sized and configured with the lip in a normal position in close adjacent relation to said conical surface;
- d) mutually interengaging means on the grommet and on said connector to sealingly close about the edge of said vertical opening;
- e) said grommet lip comprising a sealing ring in said passageway in sealing engagement with said generally conical surface of said rod when said valve is installed in closing relation of the open upper end of a pressurized container and axially upwardly directed forces are exerted on said valve stem base, said grommet lip comprising an annular, deformable, pointed grommet portion of generally triangular transverse cross-section as seen in elevation with the apex of said grommet portion defining a generally radially, inwardly and downwardly pointed, distally weakened, lip portion for sealing engagement with said conical portion if said rod, said inverted dome-shaped axially downwardly facing surface and lip apex being effective to deformingly and sealingly contact said upper axially facing surface including said conical portion surface when the container is under elevated, initial pressure to prevent "blow-by" of pressurized liquid and to eliminate entrapment of entrained solids between said grommet and valve stem, and as the pressure is reduced on removal of the flowable material from the container, said inverted dome-shaped axially downwardly facing surface and said pointed distally weakened portion are adapted to gradually relax returning toward is normal position with the apex of said lip portion maintaining sealing contact with the conical portion; and

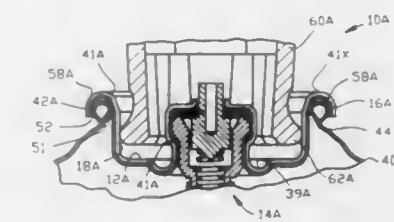
- f) an open-topped vertically extending cover releasably secured to the tubular portion of said grommet above said connector opening for removal of said cover and cleaning of said rod, rod head, cover and grommet, said cover being of rigid material and having an inside surface closely adjacent the upper vertically extending tubular grommet, so that when the cover is tilted sideways by finger pressure, said grommet will yieldingly tilt together with said rigid valve stem from said vertical position causing a corresponding tilt of said stem base and rod out of sealing engagement of the apex of said grommet lip and said upwardly facing surface including said conical portion surface of said rod for temporarily dispensing pressurized flowable material from said container, the elasticity of said grommet automatically returning said stem to a sealing position with aid of the lip again being in sealing engagement of said conical portion upon removal of said tilting pressure.

4,958,756  
**COTTON BASKET UNLOADING REGULATOR**  
 Gerald Conway, Rte. 1, Box 105, Itta Bena, Miss. 38941  
 Filed Dec. 20, 1988, Ser. No. 286,804  
 Int. Cl.<sup>5</sup> B65D 83/00  
 U.S. Cl. 222—164 4 Claims



1. A cotton basket for delivering cotton to a cotton trailer comprising, a container having a pair of side walls, a rear wall interconnecting the side walls on one side thereof, an inclined discharge wall interconnecting the side walls on the opposite side thereof, a bottom wall interconnecting the bottom edge of the rear wall and inclined discharge wall, a pair of outwardly extending arms mounted on the side walls for supporting the cotton basket when the cotton basket is lifted to dump cotton into a cotton trailer, means mounted between the upper ends of the side walls for breaking up wads of cotton, regulating the thickness of cotton delivered to a cotton trailer and terminating the flow of cotton into a cotton trailer, said means comprising a rotatable shaft having a plurality of elongated fingers on said shaft, said elongated fingers extending between one third and one half the distance between the axis of the rotatable shaft and the upper edge of the inclined discharge wall, and motor means mounted on the side wall adjacent said shaft for driving said rotatable shaft independently of movement of the cotton basket.

4,958,757  
**FERRULE FOR SEALING WITH A CONTAINER**  
 James E. Greenebaum, II, Highland Park, Ill., assignor to Pittway Corporation, Cary, Ill.  
 Continuation-in-part of Ser. No. 862,282, May 12, 1986, Pat. No. 4,813,576, which is a continuation-in-part of Ser. No. 733,207, May 13, 1985, Pat. No. 4,792,067. This application Dec. 19, 1988, Ser. No. 286,966  
 The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.  
 Int. Cl.<sup>5</sup> B65D 83/14  
 U.S. Cl. 222—394 18 Claims



1. An improved ferrule for sealing with a container of a dispensing device, the container having an annular bead extending about an opening in the container with the annular bead having an outer bead periphery defining an inner bead surface and an outer bead surface, the inner bead surface being generally planar and with the outer bead surface being generally annular and with the outer bead surface being established generally normal to the inner bead surface, comprising in combination:

a ferrule comprising a central region and a peripheral rim;



said central region of said ferrule being established for receiving the dispensing device for providing controlled fluid flow between the interior and exterior of the container; said peripheral rim of said ferrule extending outwardly of said central region;

said peripheral rim of said ferrule having an inner peripheral region being generally planar and located proximate said central region;

said peripheral rim of said ferrule having an outer peripheral region being generally annular and located remote said central region;

said outer peripheral region of said ferrule being established generally normal to the said planar inner peripheral region of said ferrule;

said inner peripheral region and said outer peripheral region of said ferrule being established for cooperating with the inner bead surface and the outer bead surface of the container;

a bevel integrally formed in said ferrule between said inner peripheral region and said outer peripheral region for inhibiting said inner peripheral region of said ferrule from fully contacting the inner bead surface of the annular bead of the container when said ferrule is disposed upon the container;

said bevel of said ferrule being deformed when said ferrule is sealed to the annular bead of the container to approximate the general shape of the outer bead periphery of the annular bead and to move said inner peripheral region of said ferrule proximate the inner bead surface to provide a sealing engagement between said ferrule and the container.

4,958,758

## MULTI-LOOPED CANE RETAINING STRAP

Jerome E. Tipple, and Margie K. Tipple, both of Rte. #1, Box 212, Lagro, Ind. 46941

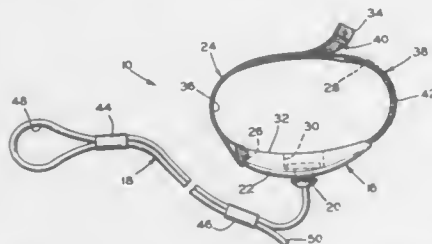
Continuation of Ser. No. 109,404, Oct. 19, 1987, abandoned.

This application Apr. 19, 1989, Ser. No. 341,280

Int. Cl.<sup>5</sup> A45F 5/00

U.S. Cl. 224—267

11 Claims



1. A multi-looped cane retaining strap for releasable connection at one end to a cane, and at the opposite end to a wrist of a cane user, said strap comprising:

- a molded plastic elongated body having a curved rear face adapted to conform to and extend longitudinally from side to side of a user's wrist;
- a longitudinally extending stiffening member formed at one end of said body, and a transverse slot formed in an opposite end of said body;
- a flexible strip of material having one end enclosing and attached to said stiffening member at said one end of said body;
- a nose means attached to an opposite end of said strip;
- a releasable fastening means attached to said strip for maintaining said flexible strip of material in a loop;
- a flexible cord;
- a pair of spaced apart fasteners slidably attached to said cord, said cord being doubled back on itself to form a loop therein, one of said fasteners selectively determining a length of said cord and the other of said fasteners selectively determining a size of said loop; and

swivel means rotatably attached to said body and attached to an end of said cord opposite said loop in said cord.

4,958,759

## COMBINED BOOK COVER BOOK CARRIER

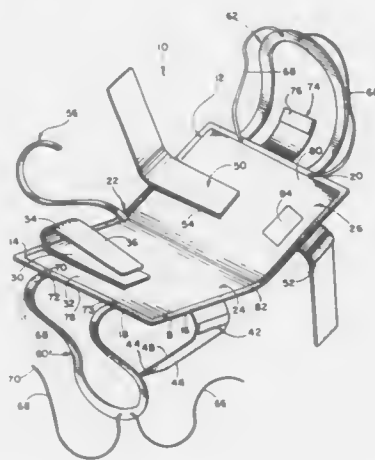
Irene Jarvis, P.O. Box 021770, Brooklyn, N.Y. 11202

Filed May 17, 1989, Ser. No. 352,886

Int. Cl.<sup>5</sup> A45F 5/12

U.S. Cl. 224—151

2 Claims



1. A combined book cover and book carrier comprising:

- (A) a body having
  - (1) first and second side edges and a length dimension as measured between said first and second side edges,
  - (2) first and second end edges and a width dimension as measured between said first and second end edges,
  - (3) an inner surface,
  - (4) an outer surface, and
  - (5) a foldable spine section located intermediate said end edges and extending from said first side edge to said second side edge and dividing said body into first and second portions, said spine section being foldable to permit said first section to be placed on top of said second section;
- (B) a book holding means including
  - (1) first, second, third and fourth straps attached to said body, with said first and second straps being identical and said third and fourth straps being identical,
  - (2) each of said first and second straps being elongate and including an upper surface and a lower surface with fastener means being positioned on said lower surface, said body including fastener means on said body inner surface, and the fastener means on said first and second straps being attached to said body inner surface by said body fastener means,
  - (3) each of said third and fourth straps being elongate and being connected to said body adjacent to said body second side and having an upper surface and a lower surface, and having fastener means on said strap upper surface, said third and fourth straps being located approximately intermediate between said spine section and a corresponding one of said body end edges, and having the fastener means on said third and fourth straps co-operating with the fastener means on said first and second straps to releasably couple said third and fourth straps to said first and second straps;
- (C) a book mark including an elongate strap attached at one end thereof to said body adjacent to said spine section;
- (D) carrying means which includes
  - (1) first and second handles each attached to said body adjacent to said body end edges to form loops,
  - (2) first second, third and fourth elongate extension straps each fixedly attached at one end thereof to said handles

near the middle of said handles, and each having fastener means on another end thereof, and

(3) fastener means on said body adjacent to said handle for co-operating with said fastener means on said extension straps to releasably hold said extension straps in place; and

(E) closing fastener means on said body and including

(1) a strap attached at one end thereof to said body second end edge and having fastener means thereon, and

(2) fastener means on said body adjacent to said body first end edge for co-operating with the fastener means on said closing fastening means strap.

4,958,760

## MULTI-PURPOSE CARRIER FOR SKIS AND THE LIKE

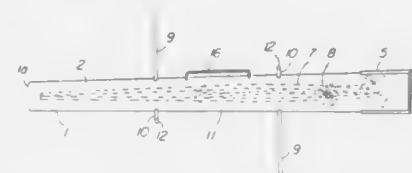
Ethel Mulé, and Charles Mulé, both of 5407 Windermere Court, Burlington, Ontario, Canada L7L 3M8

Filed Jan. 9, 1989, Ser. No. 363,995

Int. Cl.<sup>5</sup> A45F 4/02

U.S. Cl. 224—153

8 Claims



1. A carrier bag adapted to carry longitudinally extending articles on a parallel bar roof rack and convertible to the format of a back-pack comprising:

- (a) a bag of foldable fabric material having upper and lower longitudinally extending face portions, with a centrally located central panel portion, and edge portions joining said face portions, said edge portion being openable at one end to permit insertion of articles such as skis;
- (b) a pair of straps of extended length, each attached at one of their respective attachment ends to opposite sides of said central panel portion of said bag proximate said edge portions, said attachment positions being diagonally displaced from each other across said central panel portion;
- (c) a pair of complementary connector means attached to opposite sides of said central panel, said connector means being proximately located to said central panel and being adapted to releasably connect to said straps, said connector means further being diagonally spaced from each other across said central panel portion and attached to said central panel portion at points opposite the attachment positions of said straps; and
- (d) fastener means on said face portions adapted to hold the outer portions of said bag on either side of said central panel in position when folded in nested fashion to rest against said central panel,

whereby said carrier bag may be alternatively attached to a parallel bar roof rack by joining said straps to the complementary connector means located directly opposite to the attachment ends of said straps, and may be converted to the format of a back-pack by joining said straps to the respective complementary connector means located on the same side of said central panel portion as the attachment positions of each respective strap.

4,958,761

## DEBRIS DEFLECTOR FOR TRANSPORTED CYCLE

Allen Tenney, Box 75, Saddleback, Bend, Oreg. 97701

Continuation-in-part of Ser. No. 150,732, Feb. 1, 1988,

abandoned. This application Jun. 2, 1989, Ser. No. 360,290

Int. Cl.<sup>5</sup> B60R 27/00; B62J 23/00

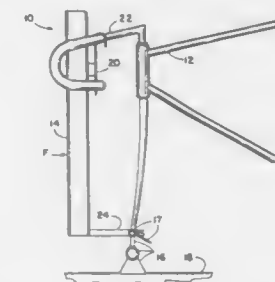
U.S. Cl. 224—316

8 Claims

2. Apparatus for transporting and producing a cycle on a cycle rack, said cycle having a frame and handlebars with a

cross member portion and having its front wheel removed, said apparatus comprising in combination:

- (a) a cycle rack with a quick-release means for engaging the forks of a cycle;
- (b) a generally arcuate continuous rigid shield of lightweight plastic material substantially coextensive with the height of said cycle frame and having an upper portion and a lower portion adapted to be positioned in front of said frame and handlebars;



- (c) rigid hook-shaped hanger means rigidly secured to said upper portion of said shield for rigid engagement with the cross member portion of said handlebars of said cycle;
- (d) rigid bracket means rigidly secured to said lower portion of said shield for engagement with said quick-release means of said cycle rack; and
- (e) said hanger means and said bracket means being sized and shaped such that said shield is positioned at least partially in the space normally occupied by said front wheel when mounted on said cycle.

4,958,762

## ULTRASONIC WIRE BONDER

Yasuhiko Shimizu, Hiroaki Kobayashi, and Osamu Matsumoto, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

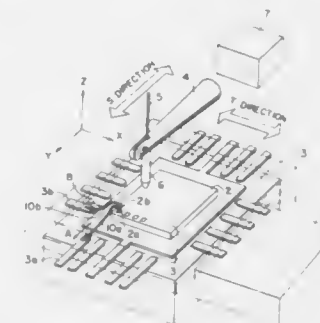
Filed Aug. 25, 1989, Ser. No. 398,438

Claims priority, application Japan, Aug. 25, 1988, 63-211423

Int. Cl.<sup>5</sup> B23K 20/10

U.S. Cl. 228—1.1

5 Claims



1. An ultrasonic wire bonder for bonding a wire to a semiconductor chip and a lead frame respectively mounted on a workpiece support base, comprising:

- first ultrasonic wave applying means for applying a first ultrasonic wave to the wire by propagating ultrasonic energy generated from an ultrasonic oscillator via an ultrasonic horn and capillary; and
- second ultrasonic wave applying means for applying a second ultrasonic wave to the workpiece support base, said second ultrasonic wave having the direction of vibration orthogonal to that of said first ultrasonic wave and the vibration energy of said second ultrasonic wave being

controllable independently from said first ultrasonic wave applying means.

4,958,763

## METHOD OF SOLDERING ALUMINUM

Amaranth P. Divecha, Falls Church; William A. Ferrando, Arlington, both of Va.; Philip W. Hesse, Ellicott City, Md., and Subhash D. Karmarkar, Great Falls, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 29, 1989, Ser. No. 401,197

Int. Cl.<sup>3</sup> B23K 1/20, 103/10

U.S. Cl. 228—193

13 Claims

1. A process for preparing aluminum materials for soldering which comprises the following steps in order:

- (1) coating the surface of an aluminum material selected from the group consisting of aluminum and aluminum alloys with molten  $\text{AgNO}_3$  at a temperature above the melting point of  $\text{AgNO}_3$  but below the decomposition temperature of  $\text{AgNO}_3$ ;
- (2) heating the  $\text{AgNO}_3$  and aluminum material at a temperature of from the decomposition temperature of  $\text{AgNO}_3$  to about  $550^\circ\text{C}$ . to decompose the  $\text{AgNO}_3$  and form a thin layer of silver metal on the surface of the aluminum material; and
- (3) further heating the silver coated aluminum material at a temperature of from about  $570^\circ\text{C}$ . to just less than the melting point of aluminum to produce an inter-diffusion layer of silver and aluminum.

4,958,764

## DIE-BONDING METHOD OF PELLETS

Buji Hamada, Innohima; Kyoichi Ago, Kurashiki, and Kazufumi Hatano, Okayama, all of Japan, assignors to Rohm Co., Ltd., Kyoto, Japan

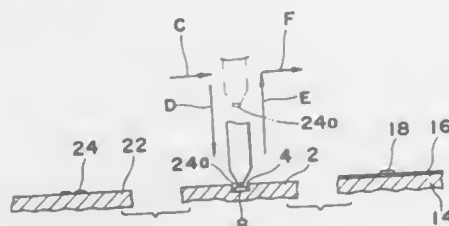
Filed Dec. 11, 1989, Ser. No. 448,277

Claims priority, application Japan, Dec. 12, 1988, 63-314247

Int. Cl.<sup>3</sup> B23K 37/047; H05K 3/34

U.S. Cl. 228—248

3 Claims



1. A die-bonding method for pellets, which comprises:
  - a first step for causing a first paste to adhere to a forward end of a needle,
  - a second step for lowering the needle from above a pellet located at a first position so as to cause the first paste stuck to the forward end of the needle at said first step, to adhere to the upper portion of said pellet, and also to displace the pellet in a state where said pellet is held at the forward end of the needle by an adhesive force of the first paste,
  - a third step for lowering the lower portion of said pellet held by the first paste at the forward end of said needle, onto a predetermined portion of a frame applied with a second paste, and
  - a fourth step for raising said needle after said third step.

4,958,765

## DEVICES FOR CONTROLLING AND REGULATING THE GAS SUPPLY TO THE BURNER OF A BOILER OR SIMILAR

Joseph Le Mer, St. Thegonnee, and Bernard Martel, Chatou, both of France, assignors to Chaffoteaux et Maury, Montrouge, France

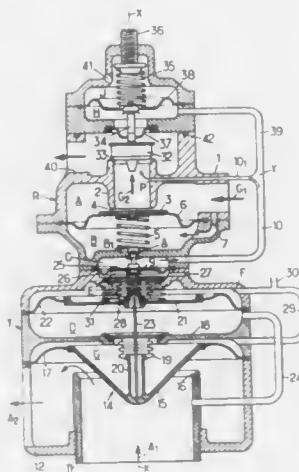
Filed Oct. 26, 1989, Ser. No. 427,516

Claims priority, application France, Nov. 16, 1988, 88 14882

Int. Cl.<sup>3</sup> F23N 1/10

U.S. Cl. 236—20 R

8 Claims



1. Device for controlling and regulating a pressurized fuel gas supplied to a gas burner for heating water flowing through a boiler or similar, comprising a conduit for the pressurized gas, which conduit has an inlet (1), an outlet (2) and a piloted regulator (R) comprising a gas valve (3) urged against a seat (4) by a spring (5) and fast with a sealed membrane (6) which separates a sealed chamber into two compartments, one of these compartments (A) being connected directly to the inlet and comprising the seat of the valve and the other compartment (B) being connected both to the inlet through a calibrated restriction (7) and to the outlet through a leak valve (8) set to a certain pressure by a calibration spring (9), characterized in that said device further comprises means for supplying the burner (U) not only with a flow of pressurized gas but also with a flow of pressurized air, the gas flow being slaved to that of the air so that a combustion of the air-gas mixture in the burner is permanently practically complete, said supplying means comprising an air conduit for the pressurized air, with an inlet (11), an outlet (12) and an intermediate air valve (14) and being adapted so as to slave an opening of the leak valve (8) of the piloted regulator (R) to the air flow through said air conduit, which opening varies in the same direction as said air flow and means for applying to the fuel gas stream leaving the piloted regulator a slight counter pressure as a function of a pressure prevailing downstream of the leak valve (8), which counter pressure varies in an opposite direction to said pressure.

4,958,766

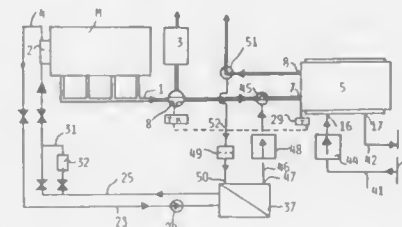
## APPLIANCE FOR HEATING MOTOR VEHICLES, MAINLY BUSES DRIVEN WITH INTERNAL COMBUSTION ENGINE

László P. Tóth; Endré Kiss; Endre Pásztor; Győray Purebl; Ágoston Kórmendy; Gyula Mares; Géza E. Yos, and Béla Horváth, all of Budapest, Hungary, assignors to Budapesti Muszaki Egyetem; Mogurt Gepjarmu Kulkereskedelmi Valalat and Ikarus Karosszeria es Jarmagyar, all of, Hungary

Filed Jan. 9, 1989, Ser. No. 295,221

Int. Cl.<sup>3</sup> B60H 1/02

U.S. Cl. 237—12.3 B



1. An appliance for heating motor vehicles, mainly buses driven by an internal combustion engine, utilizing cooling water and exhaust gases of said engine as a heat source, said engine having a cooling circuit for circulation of the cooling water and a fuel filter, said appliance comprising:

- (a) a heat accumulator for accumulating heat energy of the exhaust gases and the cooling water, said heat accumulator being in heat transfer connection with an exhaust pipe of said engine, and being in connection with said cooling circuit of said engine; and
- (b) a pump for circulating said cooling water in an extended cooling circuit of said engine, said extended cooling circuit including said heat accumulator, said fuel filter and at least one heater of the vehicle, said pump being operated independently from said engine.

4,958,767

## PROCESS AND DEVICE FOR INJECTING A MATTER IN FLUID FORM INTO A HOT GASEOUS FLOW AND APPARATUS CARRYING OUT THIS PROCESS

Maxime Labrot; Jean Feuillerat, both of Bordeaux, and Yves Valvy, Issac, all of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France

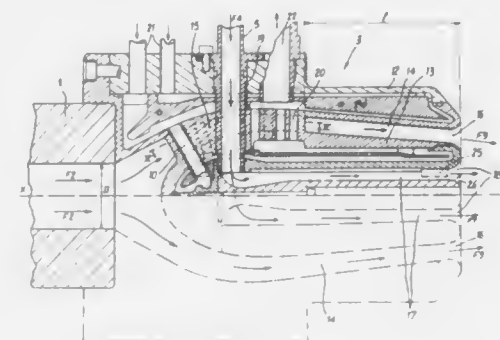
Filed Apr. 29, 1988, Ser. No. 188,425

Claims priority, application France, Apr. 29, 1987, 87 06084

Int. Cl.<sup>3</sup> B05B 1/24, 17/04

U.S. Cl. 239—13

13 Claims



9. A process for injecting at least one fluid stream into a plasma stream comprising the steps of:

- (a) forming a substantially annular plasma envelope from a

plasma stream, wherein said plasma envelope is disposed coaxially with the plasma stream, and  
(b) injecting a fluid stream into said plasma stream coaxially to the annular envelope, whereby said fluid stream is substantially contained by the annular envelope of plasma for a predetermined distance and subsequently forming a homogeneous stream of plasmas and fluid.

4,958,768

## ARTIFICIAL POTTED FLOWER

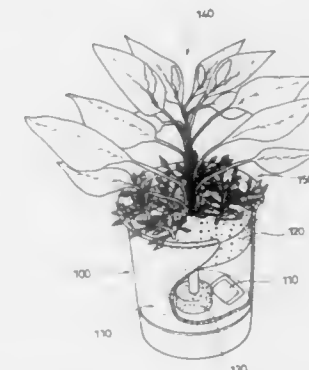
Yoshiko Ishihara, 8-7, Mori Minami 1-chome, Higashinadaku, Kobe, Japan

Filed Nov. 21, 1988, Ser. No. 274,237

Int. Cl.<sup>3</sup> A61L 9/04; A01N 25/04

U.S. Cl. 239—34

3 Claims



1. An artificial potted flower comprising an artificial flower, a vessel in which the artificial flower is planted, a pack consisting of a casing of water soluble film and, contained therein, a mixture of a powdery deodorant and a powdery water-absorbent synthetic resin, said pack being disposed within said vessel, a cover plate of porous synthetic resin fitted in a top portion of said vessel, and a support means for supporting said artificial flower said support means being disposed in the bottom portion of said vessel in such a manner that a stalk portion of said artificial flower may be passed through said cover plate and secured rigidly to said support means.

4,958,769

## COMPRESSED O-RING SPRAY GUN NEEDLE VALVE SEAL

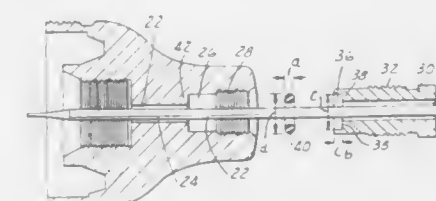
Duane C. Schowiak, Novi, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 27, 1988, Ser. No. 289,854

Int. Cl.<sup>3</sup> B05B 7/02, 15/02

U.S. Cl. 239—114

2 Claims



1. A seal for a needle valve stem in a paint spray gun used to dispense a two component paint, said seal being provided on an outside cylindrical sliding portion of said needle valve stem and being interposed between said needle valve stem and body of said spray gun, said seal comprising a resilient O-ring, said O-ring being made from a material having a low solvent resis-



tance and a low coefficient of friction, being mechanically, radially and annularly compressed into an annular well in a bore surrounding said needle valve stem, and being compressed between said annular recess and said annular well by a cylindrical compression means, said O-ring (a) having in its uncompressed state (i) an inner diameter larger than the outer diameter of said needle valve stem, (ii) an annular width greater than the width of said annular recess, and (iii) an outer diameter greater than the inner diameter of said annular well and (b) providing in its compressed state a snug seal against said annular well and a snug seal against the outside diameter of said needle valve stem.

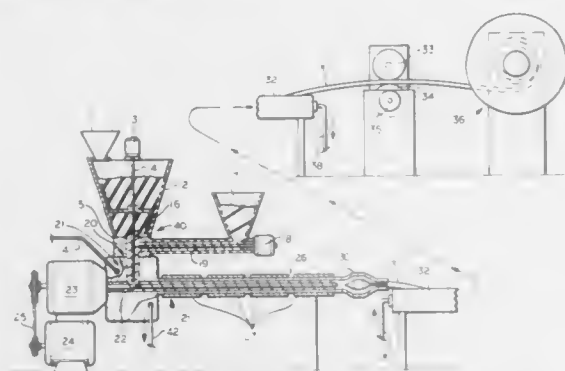
**4,958,770**  
**PROCESS FOR MAKING UNIFORM POROSITY**  
**FLEXIBLE IRRIGATION PIPE**

William S. Mitchell, McKenzie, Tenn., assignor to Precision Porous Pipe, Inc., McKenzie, Tenn.

Filed May 3, 1989, Ser. No. 346,637  
Int. Cl.<sup>5</sup> A01G 27/00

U.S. Cl. 239—145

14 Claims



1. The process for forming lengthy flexible porous irrigation pipe having a porosity which is essentially uniform throughout its length comprising the steps of extruding from an unvented extruder through an annular extruder die an intimate mixture of (a) pre-vulcanized elastomeric particles consisting of ground crumb rubber from vehicle tire treads in major amount and (b) low-density polyethylene particles in granular form as a binder in minor amount, both said elastomeric particles and polyethylene particles being essentially moisture-free, forming a continuous length of extruded pipe from said moisture-free intimate mixture, passing the newly-formed extruded pipe through a lengthy water bath to slowly cool the pipe into final form, and controlling the rate of delivery of said newly-formed pipe from said extruder die and through said water bath at essentially the same rate, said pipe exhibiting a porosity of less than about 5 percent variation in fluid delivery throughout its length.

12. As an article of manufacture, the lengthy flexible porous irrigation pipe having a porosity of less than about 5 percent fluid delivery variation throughout its length made in accordance with the process of claim 1, said pipe being formed from an essentially moisture-free mixture of elastomeric particles and polyethylene particles.

**4,958,771**  
**INJECTION NOZZLE**

Edward D. Klomp, Mount Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

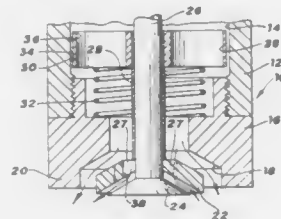
Filed Jun. 21, 1989, Ser. No. 369,507  
Int. Cl.<sup>5</sup> F02M 61/08; B05B 1/32

U.S. Cl. 239—453

1 Claim

1. An injection nozzle having an inlet, a valve head, a valve seat, a flow splitter interposed between the valve head and the valve seat, and an operating disc responsive to pressure in the inlet and connected to the flow splitter for varying the position of the flow splitter between the valve seat and the valve head,

said operating disc maintaining the flow splitter engaged with the valve seat under low flow conditions, engaged with the valve head under high flow conditions, and spaced from both the valve seat and the valve head under intermediate flow conditions, and wherein said operating disc has a flange upstream thereof cooperating with said inlet to keep said operat-



ing disc aligned in said inlet, said valve head has a valve stem, and said operating disc is connected to said flow splitter by a tube that guides said valve stem to keep said valve head aligned with said valve seat, said tube being radially spaced from said inlet to permit flow around said tube to said valve head, valve seat, and flow splitter.

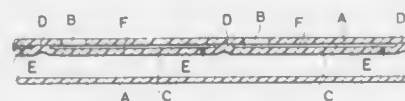
**4,958,772**  
**SPRINKLER LINE FOR LOCALIZED IRRIGATION**  
Augusto Fabbri, Quartiano di Mulazzano, and Aldino Rivi, Ferrara, both of Italy, assignors to Enlchem Agricoltura S.p.A., Palermo, Italy

Continuation of Ser. No. 784,818, Oct. 4, 1985, abandoned. This application Dec. 21, 1989, Ser. No. 455,939

Claims priority, application Italy, Oct. 15, 1984, 23151 A/84  
Int. Cl.<sup>5</sup> B05B 15/00

U.S. Cl. 239—542

5 Claims



1. A disposable drip irrigation system for localized distribution of water, comprising:

a flexible hose for receiving pressurized water, said hose having a plurality of outlet apertures spaced equidistant from each other and extending along the length of said hose; a plurality of flexible membranes arranged within said hose to cover said outlet apertures, said membranes being attached along its entire periphery to the inner wall of said hose in generally spaced relation thereto so as to define a relatively narrow water passageway as compared to that defined by said flexible hose;

at least one slot approximately equal in length to the diameter of the outlet aperture in each of said membranes oriented in staggered relationship to said outlet apertures and being of an area so as to provide a sufficient pressure drop across said membrane to effectuate a collapse and adherence of said membrane to the inner wall of said hose when pressurized water is fed to said hose, wherein the attachment of the membranes to the inner wall of the hose are in close proximity to the outlet aperture in the hose at one end and to the slot in the membrane at the other end.

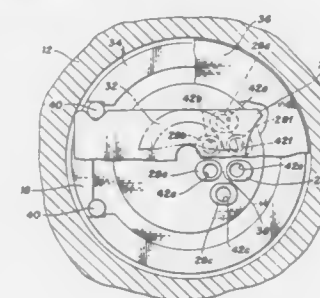
**4,958,773**  
**FUEL INJECTION**

Ernest R. Stettner, Spencerport; Donald D. Stoltzman, Henrietta, and Robert S. Taylor, Fairport, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 21, 1980, Ser. No. 369,505  
Int. Cl.<sup>5</sup> F16K 31/02

U.S. Cl. 239—584

1 Claim



1. An injector comprising a distributor having a plurality of outlet passages and an orifice at the entrance of each of said passages and a valve seat surrounding each of said orifices, a tapered valve biased to engage said valve seats to interrupt fuel delivery through said outlet passages, a valve actuator adapted to pivotally displace said valve from said valve seats to allow fuel delivery through said passages, said valve pivoting about one end thereof as it is displaced whereby the lift of said valve from the valve seat furthest from said end of said valve is greater than the lift of said valve from the valve seat closest to said end of said valve, and wherein said orifices are sized to compensate for the difference in lift of the valve from the associated valve seats, the orifice associated with the valve seat closest to said end of said valve being larger than the orifice associated with the valve seat furthest from said end of said valve.

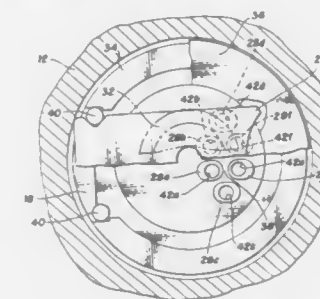
**4,958,774**  
**FUEL INJECTION**

Roland S. Taylor, Fairport, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 21, 1989, Ser. No. 369,599  
Int. Cl.<sup>5</sup> F16K 31/02

U.S. Cl. 239—584

2 Claims

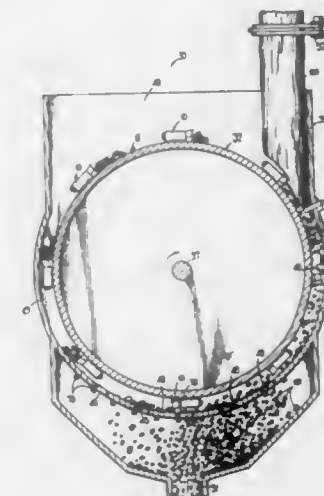


1. An injector comprising a distributor having a plurality of outlet passages and a valve seat surrounding each of said passages, a tapered valve biased to engage said valve seats to interrupt fuel delivery through said outlet passages, a valve actuator adapted to pivotally displace said valve from said valve seats to allow fuel delivery through said passages, and wherein said valve seats are clustered asymmetrically with respect to the central axis of the injector adjacent one end of said valve, and said valve is constrained against rotation on said distributor.

**4,958,775**  
**GRATE KNIFE FOR USE WITH WINGED CUTTING**  
**KNIFE FOR PRODUCING WOOD CHIPS OR FLAKES**  
Stanley Arasmitz, 5146 Big Texas Valley Rd., Rome, Ga. 31064  
Division of Ser. No. 124,043, Nov. 23, 1987, Pat. No. 4,802,631, and Ser. No. 917,855, Oct. 14, 1986, Pat. No. 4,776,375, and a continuation-in-part of Ser. No. 278,737, Dec. 2, 1988, Pat. No. 4,874,024. This application Oct. 13, 1989, Ser. No. 421,618  
Int. Cl.<sup>5</sup> B02C 17/02

U.S. Cl. 241—88.1

11 Claims



3. A wood processing element for reducing the size of a wood member passing across a separating grate defining a filtering slot, comprising:

means defining at least one cutting edge for engaging said wood member such that a portion is removed therefrom; means defining at least one breakup ledge; and means for attaching said wood processing element to said separating grate wherein said breakup ledge is positioned relative to said slot and said breakup ledge interferes with said wood portion as said portion passes through said filtering slot.

**4,958,776**  
**CENTRIFUGAL-FORCE VIBRATORY GRINDING MACHINE**

Henning D. Walther, Haan, Fed. Rep. of Germany, assignor to Carl Kurt Walther GmbH & Co. KG, Wuppertal, Fed. Rep. of Germany

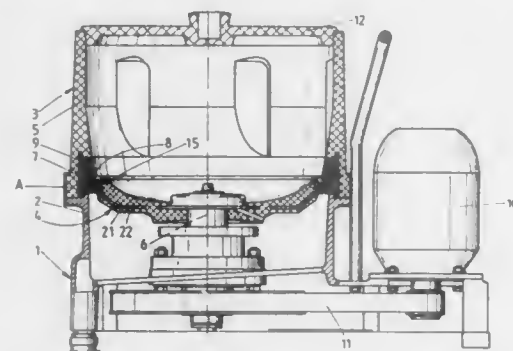
Filed Apr. 20, 1989, Ser. No. 341,152  
Int. Cl.<sup>5</sup> B02C 27/14

U.S. Cl. 241—171

25 Claims

1. A centrifugal-force vibratory grinding machine comprising a container which receives filling material consisting of workpieces and working bodies, the container being formed of two components of which one component is a wall of the container and the second component is a bottom of the container, the bottom of the container being rotatable relative to the container wall around an axis of the container, there being a separating gap between the bottom and the wall of the container; at least one discharge element for the removal of particles of filling material which have entered into said gap, said discharge element engaging into the space of the separating gap; and wherein said discharge element is fixed to one of said container components for movement relative to the other of said container components during rotation of the container bottom; and

said discharge element has an edge positioned for engagement with the particles which have entered into said gap,



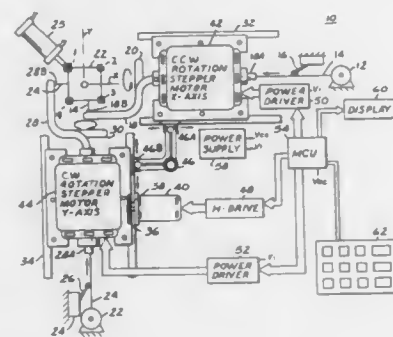
said edge being inclined relative to a plane of rotation of said bottom for deflecting the particles out of said gap.

**4,958,777**  
**WINDING MACHINE FOR WOVEN CROSSED-COIL AIR CORE GAUGE**

Paul A. Markow, Huntsville, and William Nolle, Hazel Green, both of Ala., assignors to Acustar, Inc., Troy, Mich.  
Filed Nov. 13, 1989, Ser. No. 435,214  
Int. Cl.<sup>5</sup> H02K 15/00

U.S. Cl. 242-7.11

6 Claims



1. Winding system for weaving a pair of orthogonally positioned stator coils about a non-metallic, coil-bobbin, square frame, the frame having four corner posts, four side walls and a central region containing a non-metallic rotor chamber housing a permanent magnet rotor, the rotor having a shaft extending from a centroid of the rotor and through a port of the chamber in the direction of the posts, said system comprising:

- (a) holding means for fixedly holding the frame by a first post and for positioning the shaft perpendicular to an origin of an X-Y coordinate-axis plane, with the first, second, third and fourth posts (counting in a clockwise manner about the origin) positioned at a location in a quadrant bound by a positive Y and a negative X axis, a positive Y and a positive X axis, a negative Y and a positive X axis, and a negative Y and a negative X axis respectively;
- (b) first winding means for winding a first length of wire about a perimeter of the frame in a spiral-type, counter-clockwise motion from said first post in a positive X axis direction to within the location of said second and third posts and then in a negative X axis direction towards said first and fourth posts;
- (c) second winding means for winding a second length of wire about a perimeter of the frame in a spiral-type, clockwise motion from said fourth post in a positive Y axis direction to within the location of said first and third posts

and then in a negative Y axis direction towards said third and fourth posts;

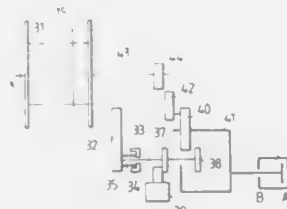
- (d) reciprocation means coupled to said first and second winding means for synchronizing movement of said winding means such that said first winding means causes a portion of a coil winding to locate at a bottom region of the frame in line with the origin while said second winding means causes a portion of another coil winding to locate at a top region of the frame about the shaft; and
- (e) computing means connected to said first and second winding means and said reciprocating means for providing logic control signals for controlling the operation of said first and second winding means and said reciprocating means.

**4,958,778**  
**DEVICE FOR CONTINUOUSLY WINDING A WIRE-LIKE ELEMENT**

Satoshi Tanaka, Kanagawa, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan  
Filed Jul. 11, 1989, Ser. No. 378,974  
Claims priority, application Japan, Jul. 12, 1988, 63-171925  
Int. Cl.<sup>5</sup> B65H 67/052

U.S. Cl. 242-25 A

5 Claims



1. A device for continuously winding a wire-like element comprising:  
first and second bobbins on which the wire-like element is wound;  
first and second cam plates movable towards the first and second bobbins respectively, at respective specified times for switching winding between bobbins;  
first and second movable shafts supporting the first and second cam plates respectively;  
means for urging each of the first and second shafts toward their respective bobbins so as to move the respective cam plates into contact with their respective bobbins so as to switch winding from one bobbin to the other; and  
first and second trigger mechanisms associated with each movable shaft for limiting the movement of the shaft.

**4,958,779**  
**METHOD FOR RESTORING YARN CONTINUITY DURING BOBBIN WINDING, AND DEVICES FOR ITS IMPLEMENTATION**

Luigi Colli; Roberto Badiali, and Nereo Marangone, all of Pordenone, Italy, assignors to Savio S.p.A., Pordenone, Italy  
Filed Sep. 19, 1988, Ser. No. 246,411  
Claims priority, application Italy, Nov. 13, 1987, 22622 A/87  
Int. Cl.<sup>5</sup> B65H 54/22

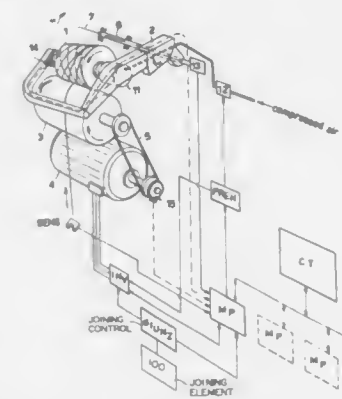
U.S. Cl. 242-035.6 R

22 Claims

1. A method for winding yarn onto a rotating bobbin driven by a drive roller and supported by a carrier arm when the yarn feed is broken, comprising:

- (a) restoring the broken yarn feed by means of an intervention cycle wherein said cycle has a first portion and a second portion wherein said first portion comprises the steps of:

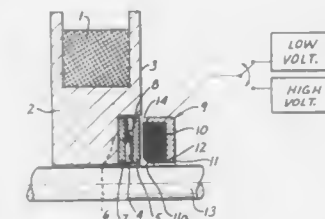
- (1) raising the rotating bobbin from the drive roller when the yarn feed is broken;
- (2) braking the rotating bobbin and the drive roller independently until the bobbin stops rotating wherein the rotating bobbin is braked when it is raised from the drive roller; and  
wherein said second portion comprises joining the broken yarn; and



- (b) interposing a variable time delay between the commencement of said bobbin braking step of said first portion and the commencement of said joining step of said second portion of said intervention cycle by means of a timer device wherein said variable time delay is determined by the amount of yarn wound on the bobbin, wherein the amount of yarn wound on the bobbin is determined by; measuring the diameter of the bobbin by measuring the angular displacement of the carrier arm.

**4,958,780**  
**SPOOL DRIVING AND BRAKING**  
Rainer Bruenn, Essel; Rolf Heisterhagen, Hanover; Wolfram Klebl, Isenrothen, and Harry Staschewski, Langenhagen, all of Fed. Rep. of Germany, assignors to Kabelmetal Electro GmbH, Hanover, Fed. Rep. of Germany  
Filed Apr. 10, 1989, Ser. No. 335,572  
Claims priority, application Fed. Rep. of Germany, Apr. 9, 1988, 3811876  
Int. Cl.<sup>5</sup> B65H 49/18, 54/44, 59/04  
U.S. Cl. 242-47

5 Claims



1. In combination with a spool upon which elongated stock such as ribbon, wire, thread etc. is to be wound and from which the elongated stock is to be unwound; an electromagnetic device including an electromagnet and a cooperating armature, further including a yoke that is part of the electromagnet, the device is to be used selectively as a brake and as a clutch, the improvement comprising:  
a shaft connected to the electromagnet for rotation therewith, the spool being rotatably arranged around the shaft;  
means for connecting the armature to the spool for rotation with the spool, while permitting axial displacement of the armature relative to the spool;  
means defining a permanent, magnetically effective gap

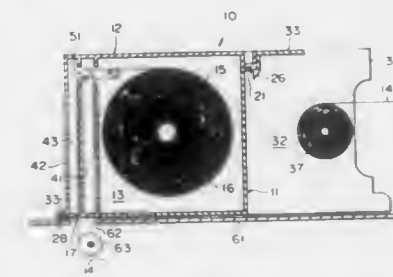
between said yoke and said armature to remain effective as a gap in the energized state of the electromagnet;  
means for applying a first, predetermined and relatively high voltage to the electromagnet so that positive coupling obtains between the electromagnet and the armature and therefore between said shaft as connected to the electromagnet; and the armature as being connected to the spool, whereby rotation of the shaft rotates the spool, and  
means for applying a second predetermined voltage, lower than the first voltage, to the electromagnet so that a brake force becomes effective between the electromagnet and the shaft on one hand, and the armature with the spool on the other hand.

**4,958,781**  
**CASSETTE FOR PHOTO-SENSITIVE RECORDING MEDIUM**

Masashi Ueda; Kazumasa Makino, both of Nagoya; Yumio Matsumoto, Kasugai; Akira Sago, Nagoya; Kiyoharu Hayakawa, Ama, and Osamu Takagi, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan  
Filed Dec. 2, 1988, Ser. No. 279,445  
Claims priority, application Japan, Dec. 15, 1987, 62-191007; May 30, 1988, 63-72826; May 30, 1988, 63-72827  
Int. Cl.<sup>5</sup> G03B 1/04

U.S. Cl. 242-71.7

19 Claims



1. A cassette for accommodating therein a photosensitive recording medium, said cassette comprising:  
a pair of cassette halves formed of a synthetic resin, said pair of cassette halves being united together to form a rectangular parallelepiped cassette body having six walls and having defined therein an accommodating chamber for said recording medium;  
a drawing opening formed in an outer surface of said cassette body, said recording medium being drawn out of said accommodating chamber through said drawing opening; and  
and optically inert, substantially straight feed passage defined by cooperation of a wall section of one of said pair of cassette halves with a wall section of the other of said pair of cassette halves when said cassette halves are united together, said wall sections forming one of said cassette body six walls, said feed passage having one end thereof communicating with said accommodating chamber and the other end communicating with said drawing opening such that said recording medium passes through said feed passage when said recording medium is drawn out of said accommodating chamber through said drawing opening.



4,958,782

## REELED TAPE SUPPLY

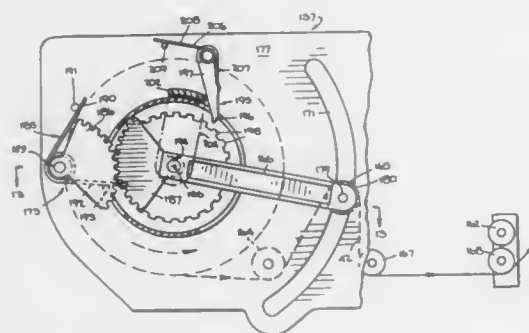
Hugh S. Dannatt, Bethel; Thomas W. Alesi, Jr., New Fairfield, and Walter J. Kulpa, Trumbull, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 28, 1988, Ser. No. 291,480

Int. Cl.<sup>5</sup> B65H 23/06, 23/16

U.S. Cl. 242—75.43

10 Claims



1. A tape supply for supplying tape under constant tension comprising:

means for mounting a reel of tape for rotation of said reel about an axis thereof as tape is withdrawn therefrom;  
a lever mounted to pivot about said axis;  
a surface mounted to an end of said lever so that tape withdrawn from said reel passes over said surface;  
said lever being pivoted to move said surface in opposite directions transverse to said axis;  
a torsion spring having a first end fixed against movement and a second end;  
means coupling said second end of said spring to said lever such that:

(a) said spring urges said lever in a first of said opposite directions to apply tension to tape passing over said surface,  
(b) said lever moves in a second of said opposite directions in response to an increase in tension on said tape, thereby torsioning said spring, and  
(c) said lever moves in said first direction in response to a decrease in tension on said tape, thereby relieving said torsioning of said spring.

said coupling means, in a range of torsioning of said spring, compensating for the increase in torque produced by the torsioning of said spring, whereby said surface applies a constant tension to said tape in a given range of pivoted positions of said lever.

4,958,783

CABLE OR WIRE GUIDE FOR A GUIDE SYSTEM  
Pascal Guichard, Aantun, France, assignor to Alcatel N.V., Amsterdam, Netherlands

Filed Aug. 2, 1989, Ser. No. 388,959

Claims priority, application France, Aug. 3, 1988, 88 10484

Int. Cl.<sup>5</sup> B65H 57/00

U.S. Cl. 242—157 R

2 Claims

1. A guide for guiding a cable onto a reel along a normal advance axis lying in a guide plane perpendicular to a rotational axis defined by the reel, wherein the guide comprises:

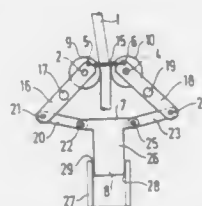
first and second fixed shafts disposed symmetrically about said guide plane,

first and second rocker arms symmetrically configured with respect to each other and each having a first end and a second end, as well as an intermediate bearing rotationally mounted to a respective one of said fixed shafts

first and second rollers each carried at a respective first end of a respective one of said rocker arms

a spring connected between the two first ends of the rocker arms for urging said first ends towards each other,  
a slideway symmetrically disposed with respect to said advance plane

a slide having a head portion and a tail portion, with the tail portion slidably engaged with a small amount of play in the slideway so as to constrain said head portion to travel substantially along a slide axis lying in said guide plane,



first and second connecting rods symmetrically configured with respect to each other and each having a first end and a second end, with each said first end hinged to said head portion of the slide and with each said second end hinged to a respective second end of a respect said rocker arm, whereby the rollers remain symmetrically disposed about said guide plane and bear against any cable passing therebetween even if the cable is angularly offset relative to said guide plane, and the rollers are free to move apart from each other whenever an enlarged cable diameter is encountered.

4,958,784

## COLLAPSIBLE SPOOL HOLDER FOR FISHING LINE

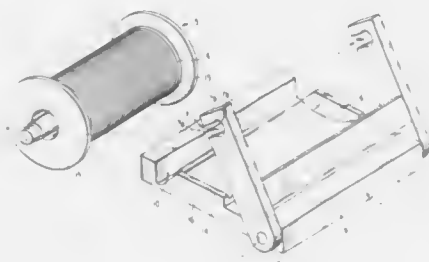
David Totten, 3125 S. Virginia, #3, Reno, Nev. 89502

Filed Aug. 31, 1989, Ser. No. 401,123

Int. Cl.<sup>5</sup> B65H 49/20

U.S. Cl. 242—129.6

5 Claims



1. A collapsible spool holder comprising a planar base plate, a pair of pivot arms pivotably mounted at one end to said base plate at one end thereof for pivoting into upwardly oblique position, to respective opposite sides of said base plate, a shaft removably mounted to the ends of said arms remote from said pivot connection to said base, said shaft projectable through a hollow spool bearing fishing line for rotatably mounting said spool to the ends of said arms, and wherein said base plate includes a concave groove within the upper face thereof positioned to receive the spool and support the spool for rotation about its axis to facilitate unwinding of the fishing line from the periphery of the spool received within the concave groove under gravity influence causing the arms to rotate downwardly towards the base plate due to the weight of the spool and the fishing line thereon.

4,958,785

## FISHING REEL DRAG MECHANISM

Atsuhito Aoki, Hiroshima, Japan, assignor to Ryobi Ltd., Hiroshima, Japan

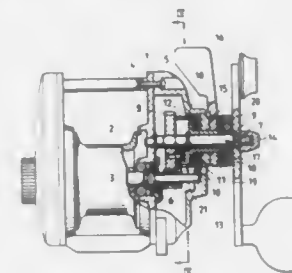
Filed Nov. 16, 1988, Ser. No. 271,964

Claims priority, application Japan, Nov. 26, 1987, 62-180869

Int. Cl.<sup>5</sup> A01K 89/033

U.S. Cl. 242—295

5 Claims



1. A fishing reel comprising:

a frame-like body;  
a side cover attached to the frame-like body;  
a spool shaft having opposite ends, being supported at both ends;  
a spool supported by said spool shaft;  
a pinion fitted on said spool shaft;  
a master gear engaging the pinion and mounted on a master gear shaft, one end of said master gear shaft rotatably secured adjacent said frame-like body;  
a handle for rotating said master gear shaft at an end of said master gear shaft opposite said frame-like body, the handle being spaced a predetermined distance away from said side cover;  
a generally cylindrical bearing for supporting said master gear shaft, said generally cylindrical bearing including a flange portion;  
a ratchet rotatably disposed on said cylindrical bearing;  
drag control means for generating and controlling a reel braking force during unwinding of fishline wound on said spool, said drag control means including:  
(a) a plurality of washer members for holding said ratchet between said cylindrical bearing and said side cover and for producing a frictional force therebetween;  
(b) a control lever rotatably mounted on said cylindrical bearing for adjusting said reel braking force, said control lever comprising a first cam portion;  
(c) a second cam portion disposed in opposing relationship to and engaging said first cam portion such that the frictional force produced by said washer members is adjusted by rotating said control lever;  
(d) a presetting nut threadably engaging said cylindrical bearing for adjusting the reel braking force on the spool, said presetting nut being disposed between said control lever and said handle and including a spring washer; and  
(e) means for engaging said ratchet with said master gear.

4,958,786

ACTIVE CONTROL MECHANISM FOR A HELICOPTER  
Koji Ogawa, Ashiya, and Hikoichi Machida, Toyonaka, both of Japan, assignors to Sumitomo Precision Products Co., Ltd., Amagasaki, Japan

Continuation of Ser. No. 148,872, Jan. 27, 1988, abandoned. This application Oct. 18, 1989, Ser. No. 423,695

Claims priority, application Japan, Feb. 3, 1987, 62-22784; Feb. 3, 1987, 62-22785

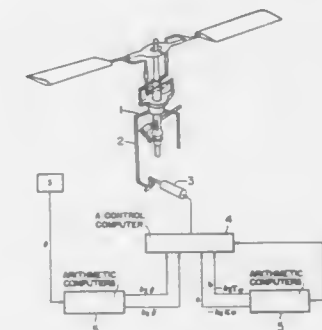
Int. Cl.<sup>5</sup> B64C 11/34

U.S. Cl. 244—17.13

6 Claims

1. In a cyclic pitch control mechanism of a helicopter, an active control mechanism having a lower swash plate, comprising:

an actuator of the control mechanism;  
means for providing a cyclic pitch control signal input;  
means for providing a first signal proportional to the angular acceleration of an attitude angle  $\theta$  of the helicopter;  
means for providing a second signal compensatory to said first signal and proportional to a cyclic pitch control signal input  $\Psi$  of a pilot;



means for providing a third signal of the cyclic pitch control signal input  $\Psi$  of a pilot; and  
said means for providing a cyclic pitch control signal input being responsive to said first, second and third signals for controlling said actuator and swash plate.

4,958,787

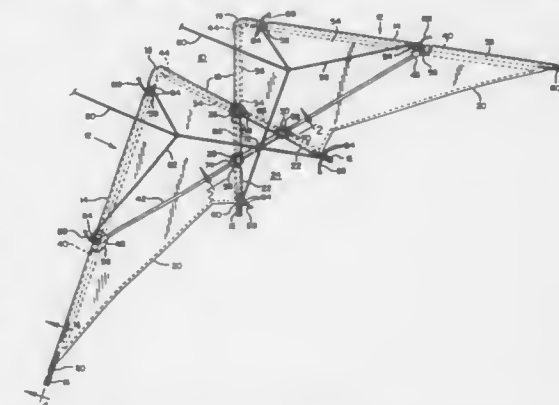
## KITE

Duane M. Sterling, 213 NW. Couch St., Portland, Oreg. 97209  
Filed Mar. 9, 1989, Ser. No. 321,290

Int. Cl.<sup>5</sup> A63H 27/08

U.S. Cl. 244—153 R

9 Claims



1. A kite construction comprising:

a pair of identical wing sections,  
frame means at the front of each wing section extending outwardly to a side tip at a rearwardly directed angle and forming leading edges for the kite;  
said frame means also including a pair of inwardly disposed extensions leading rearwardly from respective leading edges at spaced points and at an angle to define the sides of a triangular space between said leading edges;  
said pair of extensions extending across each other at an angle and forming two sides of a triangle in said frame means;  
said frame means also including a laterally extending spreader bar connected to intermediate portions of the leading edge of said front frame means and crossing said pair of extensions to form a closed frame reinforcing triangle;  
connectors securing said pair of extensions and said spreader bar together in triangular relation;

a sail portion on said kite fitted on said frame means and forming a trailing edge;  
and bridle means arranged for attachment to a fly line.

4,958,788

## ORBIT CONTROL SYSTEM FOR A SATELLITE

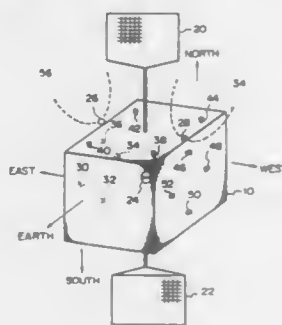
Takakazu Namera, and Naoto Ogura, both of Tokyo, Japan, assigns to NEC Corporation, Japan

Continuation of Ser. No. 339,961, Apr. 18, 1989, abandoned, which is a continuation-in-part of Ser. No. 66,091, Jun. 24, 1987, abandoned. This application Oct. 16, 1989, Ser. No. 423,618

Claims priority, application Japan, Jun. 26, 1986, 61-150221  
Int. Cl.<sup>3</sup> B64G 1/26

U.S. Cl. 244-169

5 Claims



1. A system for controlling orbit of a satellite which has a plurality of gas jet thrusters, comprising:  
a sensing means for sensing an attitude of the satellite;  
a setting means for setting up a predetermined evaluation value in response to an output of said sensing means;  
OFF control means for turning OFF an orbital control thruster when, at least during a predetermined period of time after the initiation of orbit control, the evaluation value exceeds a given value of a threshold A which is sequentially varied to prevent an attitude error angle of the satellite from becoming excessively high; and  
ON control means for turning ON said orbital control thruster when, at least during said predetermined period of time, the evaluation value after said orbital control thruster has been turned OFF becomes smaller than a given value of a threshold B which is sequentially varied to prevent an attitude error angle of the satellite from becoming excessively high.

4,958,789

## HOSE FITTING FIXING CONSTRUCTION

Terumitsu Shigeki, Nagoya, and Kenichi Mitsui, Ichinomiya, both of Japan, assigns to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Mar. 14, 1989, Ser. No. 323,409

Claims priority, application Japan, Mar. 31, 1988, 63-43378;  
Jul. 5, 1988, 63-89367

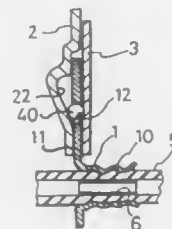
Int. Cl.<sup>3</sup> F16L 5/00

U.S. Cl. 248-56

13 Claims

1. A hose fitting fixing construction comprising:  
a hose fitting comprising a cylindrical sleeve for receiving a hose and a plate-shaped flange having an engagement dent defined therein, said flange extending radially from an outer peripheral surface of said sleeve;  
a plate-shaped bracket extending from a mounting portion,

said bracket defining an engagement space for slidably receiving said flange; and  
an engagement member disposed in said engagement space of said bracket, said bracket, engagement space and engagement member being so constructed and arranged that said engagement member is disposed in said space so as to be movable therewithin but confined to said engagement



space, said engagement member being sized and shaped and disposed within said engagement space so as to be engagable with said engagement dent of said flange when said flange is inserted into said engagement space, thereby retaining said flange in said bracket by cooperative engagement of said engagement dent, engagement member and said bracket.

4,958,790

## CABLE BOOT

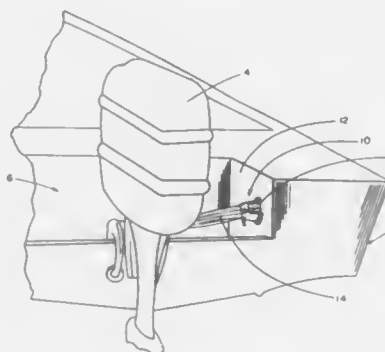
Charles D. Nix, 1578 Slaughter Rd., Madison, Ala. 35758, and Johnny P. Baker, 782 Burwell Rd., Harvest, Ala. 35749

Filed May 5, 1989, Ser. No. 349,118

Int. Cl.<sup>3</sup> F16L 5/00

U.S. Cl. 248-56

9 Claims



1. The combination comprising a panel separating first and second compartments of a structure, said panel including an annular edge defining a hole in communication with each of said compartments, a hollow boot mounted on said panel within said second compartment generally concentrically of said hole, said boot being adaptable to receive one or more cables or wires passing from said first compartment to said second compartment, said boot including a generally cylindrical body section, a base connected to a first end of said body section, and means on a second end of said body section for closing the boot tightly and snugly around said one or more cables, hoses and/or wires, said means for closing said boot comprising a series of spaced slits in said second end of said body section and a drawstring interlaced between the walls of said slits.

4,958,791

## TYING MEANS

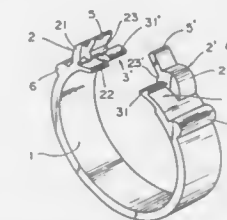
Tohinoobu Nakamura, Tokyo, Japan, assignor to Shinagawa Shoko Co., Ltd., Tokyo, Japan

Filed Apr. 5, 1989, Ser. No. 333,247

Int. Cl.<sup>3</sup> F16L 3/08

U.S. Cl. 248-74.1

9 Claims



1. A belt-like clamping device comprising a belt-like annular member having a first and second proximal end, each proximal end having an outward-facing engaging hook and an inward-facing receiving hook laterally juxtaposed to a respective outward facing engaging hook, said inward-facing receiving hooks comprising raised upper members, so that when the first proximal end is brought into engagement with the second proximal end:

the outward-facing engaging hook of the first proximal end engages the inward-facing receiving hook of the second proximal end and

the outward-facing engaging hook of the second proximal end engages the inward-facing receiving hook of the first proximal end and

said raised upper members of said inward-facing receiving hooks being laterally juxtaposed to prevent lateral movement of the first and second proximal ends when said ends are engaged.

4,958,792

## CLIP FOR SUPPORTING CONDUIT AND THE LIKE

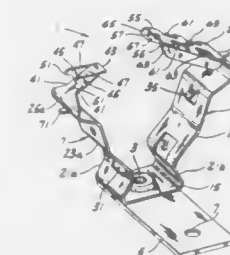
Eric R. Rinderer, Highland, Ill., assignor to B-Line Systems, Inc., Highland, Ill.

Filed May 9, 1989, Ser. No. 349,254

Int. Cl.<sup>3</sup> F16L 3/08

U.S. Cl. 248-74.2

19 Claims



1. A clip for supporting conduit and like members, comprising a base and first and second resilient arms extending outwardly from the base for holding a conduit or like member therebetween, said arms having outer end portions bent to extend generally toward one another, said arms being resiliently biased toward a release position in which they are spaced apart and being resiliently movable against said bias to a first support position in which the arms are closer together with their outer end portions in overlapping relation and with the arms in position to embrace a conduit or like member of a first diameter, and from said first support position to a second support position in which the arms are even closer together with their outer end portions in overlapping relation and with the arms in position to embrace a conduit or like member of a second diameter smaller than said first diameter, the outer end portion of said first arm having detent means thereon, the outer end portion of the second arm being formed and configured at a first location for engagement by said detent means to releasably lock the arms in said first support position and formed and

configured at a second location for engagement by said detent means to releasably lock the arms in said second support position, and means for restricting movement of the arms as they move toward one another from said first support position to said second support position to movement wherein said detent means moves along a path from said first location to said second location, said restricting means being so formed as to prevent said detent means from deviating from said path even if the arms are subjected to forces tending to cause deviation of said detent means from said path.

4,958,793

## STANCHION

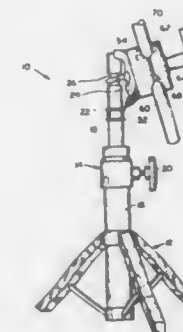
Norman B. Hess, 12611 Neon Way, Granada Hills, Calif. 91344

Filed May 1, 1989, Ser. No. 345,281

Int. Cl.<sup>3</sup> F16M 13/00

U.S. Cl. 248-122

9 Claims



1. A stanchion supporting a structure in a spaced relationship above a supporting surface in an established position, said stanchion comprising:

a base adapted to be located on a supporting surface;

a longitudinally adjustable tube assembly mounted on said base, said longitudinally adjustable tube assembly terminating at an upper end;

a universal joint mounted on said upper end, said universal joint including a clamping rod, said clamping rod engaging with said longitudinally adjustable tube assembly, said clamping rod being pivotable within a horizontal plane extending transverse to said longitudinally adjustable tube assembly;

said universal joint including a pair of clamp members, said clamp members being pivotally mounted on said clamping rod;

a mounting rod located between said clamp members, said mounting rod being movable within a substantially vertical plane, the structure being adapted to be mounted on said mounting rod;

a ball member mounted on and carried by said clamping rod, said ball member located between said longitudinally adjustable tube assembly and said clamp members, said ball member having a spherical exterior surface, said clamp members being mounted on said spherical exterior surface, said clamp members being moved in said horizontal plane along with said clamping rod, said clamp members being movable on said spherical exterior surface, said universal joint including a means for permitting limited tilting movement of said clamping rod and said clamp members as well as said mounting rod relative to said horizontal plane; and

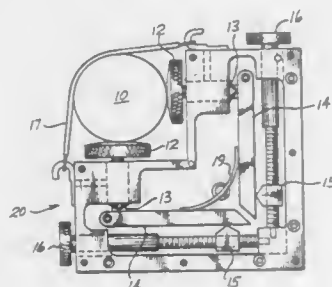
a handle mounted on said clamping rod, said handle to be movable between a loosened position and a tightened position, with said handle in said loosened position said clamping rod being movable within said horizontal plane and said mounting rod being movable within said vertical plane and said clamping rod being tiltable, with said handle in said tightened position said mounting rod being fixedly located.



**4,958,794**  
**DUAL PURPOSE ALIGNMENT BRACKET FOR USE WITH LASER OR OPTICAL SCOPE**  
 Richard A. Brewer, Buckley, Wash., assignor to The Boeing Company, Seattle, Wash.  
 Filed Feb. 1, 1989, Ser. No. 305,242  
 Int. Cl.<sup>5</sup> G02B 7/00

U.S. Cl. 248—183

1 Claim

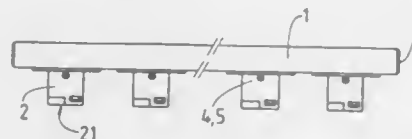


1. An alignment bracket assembly (20) for use with an instrument (10), said alignment bracket assembly (20) comprising in combination:  
 means (17) for securing said instrument (10) against a pair of coarse adjustment screws (12);  
 a pair of sine bars (14);  
 a pair of coarse adjustment sockets (13);  
 said pair of coarse adjustment sockets (13) disposed against said pair of sine bars (14);  
 said pair of coarse adjustment screws (12) threaded into said pair of coarse adjustment sockets (13);  
 a pair of wedge elements (15);  
 a pair of fine adjustment screws (16); and,  
 said pair of sine bars (14) pivotally disposed and cooperative with said wedge elements (15) translatable by means of said fine adjustment screws (16) through coarse adjustment screws (12).

**4,958,795**  
**FITTING FOR THE SORTING OF PLANS IN A VERTICAL FILING CABINET**  
 Alain Bruneau, Montferriand Le Chateau, France, assignor to Alpie S.A., Besancon, France  
 Filed Jun. 13, 1989, Ser. No. 365,492  
 Claims priority, application France, Jun. 30, 1988, 88 09105  
 Int. Cl.<sup>5</sup> A47H 1/10

U.S. Cl. 248—317

10 Claims

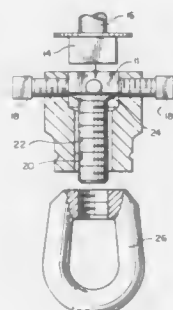


1. A fitting for sorting of plans in a vertical filing cabinet with suspension pins, comprising:  
 a tubular profiled member (1) with a support tenon (12) extending downwardly;  
 a plurality of teeth (2), each tooth (2) consisting of two half teeth, each half tooth including an opening (35) and a corresponding coupling tenon (36), said opening and said coupling tenon cooperating to interlock the two half teeth, with the coupling tenon of one tooth being disposed in the corresponding opening of the other half teeth; and  
 means (4,5) for fastening said teeth to said support tenon by urging said half teeth toward each other.

**4,958,796**  
**COUPLING OR CONNECTOR FOR SECURING A LOAD-BEARING SUPPORT TO A HEAD OF A BOLT**  
 John Bernosky, Rte. 1, Box 247A, Mt. Morris, Pa. 15349  
 Filed Oct. 12, 1989, Ser. No. 420,312  
 Int. Cl.<sup>5</sup> F16L 3/00

U.S. Cl. 248—317

17 Claims

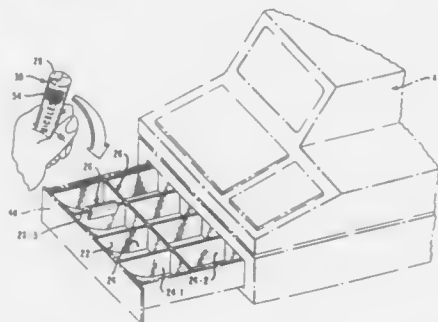


1. A coupler or connector body for heavy load-bearing supports which comprises:  
 a body having an upper portion and a lower portion,  
 an axially aligned opening in said upper portion of said body having a size compatible with a bolt head to which said coupler is to be secured, and  
 at least one pair of oppositely disposed radially directed threaded bolts or screws that pass through radially directed threaded holes in said upper portion of said body to said axially aligned opening therein to secure said coupler to said bolt head.

**4,958,797**  
**COIN ROLL BREAK DEVICE FOR PROTECTING A TRAY WALL OF A COMPARTMENT OF A TILL TRAY**  
 Dale R. Lyons, Buford, Ga., assignor to NCR Corporation, Dayton, Ohio  
 Filed Jun. 7, 1989, Ser. No. 363,028  
 Int. Cl.<sup>5</sup> A47B 88/00

U.S. Cl. 248—345.1

5 Claims



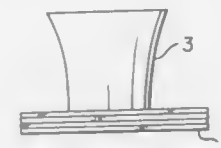
1. A till tray for use in a cash drawer of a business machine, said till tray comprising:  
 at least one compartment with each compartment having a tray wall and with each tray wall having first and second opposed surfaces and an upper exposed edge joining said first and second opposed surfaces; and  
 protection means mounted on said upper exposed edge of said tray wall of one of said at least one compartment which facilitates the breaking of a coin roll having a wrapper thereon and protecting said tray wall from damage when a user breaks open said coin roll by impacting said coin roll against said protection means;  
 said protection means including a generally U-shaped body

having a first leg portion, a second leg portion, and a joining portion having a striking surface joining said first and second leg portions, said striking surface being substantially rigid for breaking the wrapper of the coin roll when the coin roll is impacted thereagainst;  
 said first leg portion and said second leg portion being resiliently biased towards each other so as to accommodate tray walls of varying thicknesses and to facilitate said protection means gripping said first and second opposed surfaces when said protection means is mounted on said upper exposed edge; and  
 said first leg portion and said second leg portion each having a plurality of grippers thereon which become operatively engaged with the first and second opposed surfaces of said tray wall when said protection means is mounted on the upper exposed edge of said tray wall.

**4,958,798**  
**COCKTAIL NAPKIN**  
 Julie W. Parker, 2379 Neil Ave., Columbus, Ohio 43202  
 Filed Jul. 10, 1986, Ser. No. 884,022  
 Int. Cl.<sup>5</sup> A47G 11/00

U.S. Cl. 248—346.1

4 Claims

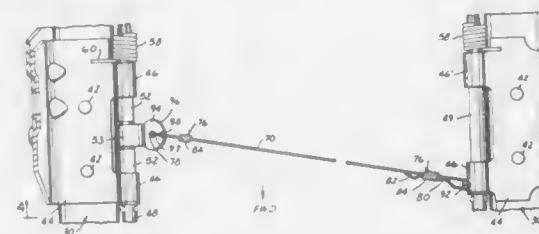


1. A cocktail napkin adapted to serve as a coaster for a cocktail glass,  
 said napkin comprising a body of absorbent paper with an upper porous surface of water repellant material which when the base of a cocktail glass is rested thereon conducts condensed moisture from said base into said absorbent body and prevents the formation of a layer or film of water between said base and the napkin and thereby prevents sticking of the napkin to said base.

**4,958,799**  
**SEAT TRACK LATCH ANTI-RATTLE RELEASE WIRE**  
 Mitchell J. Clauw, Sterling Heights; Neal G. Stupera, Fraser; Theodore W. Tobin, and Dennis M. Viscome, both of Taylor, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.  
 Filed Dec. 18, 1989, Ser. No. 451,902  
 Int. Cl.<sup>5</sup> F16M 13/00

U.S. Cl. 248—430

1 Claim



1. A vehicle seat support mechanism for support a seat on a vehicle so that the position of the seat is adjustable fore and aft, comprising:  
 laterally spaced first and second parallel track assemblies mounting the seat on the vehicle for longitudinal movement to a plurality of fore and aft adjusted positions;  
 said first track assembly including a first lower guide rail mounted to the vehicle and a first upper slide rail slidable on said first lower guide rail to the fore and aft positions

and a second lower guide rail mounted to the vehicle and a second upper slide rail slidable on said second lower guide rail to the fore and aft positions;  
 a first latch member which locks said first slide rail to said first guide rail when said first latch member is in a lock position, and unlocks said first slide rail so that said first slide rail is slidable relative to said first guide rail when said first latch member is in an unlock position;  
 a second latch member which locks said second slide rail to said second guide rail when said second latch member is in a lock position, and unlocks said second slide rail so that said second slide rail is slidable relative to said second guide rail when said second latch member is in an unlock position;  
 an operating bar being connected with said first latch member so that said first latch member can be moved to the unlock position by said operating means,  
 a transversely extending release wire connected between said operating bar and said second latch member, for transmitting motion from said operating bar to said second latch means so that said second latch means is moved to the unlock position together with said first latch means by movement of said operating bar,  
 said release wire having identical hair-pin connectors integrally formed at each end thereof, each said connector formed a return-bend enlarged loop portion adapted for hooked engagement with aperture means in an associated first and second latch plate for simultaneous operation of said first and second latch members each said loop portion terminating on a linear resilient tail portion formed with a raised bump, each said tail portion normally defining an acute angle with said release wire, and a pair of retainer members slidably disposed on said wire whereby each of said retainer members adapted to capture a tail portion of its associated connector upon the tail portion being flexed juxtaposed said release wire, and whereby each said hair-pin connector lying on a common plane that includes said release wire, the improvement wherein,  
 said first track assembly latch plate having a disk-shaped upstanding portion lying in a longitudinally extending plane sloped upwardly and toward said second track assembly,  
 said disk-shaped portion having a central connector hole therein, said disk-shaped portion defining a semi-circular periphery concentric with said central hole, said disk-shaped portion formed with a radial upwardly opening notch therein at an upper and outermost point along its periphery,  
 said second track assembly latch plate having a transversely extending, vertically disposed connector flange extending toward said first track assembly, said connector flange having a connector hole oriented with its principal axis disposed longitudinally and parallel with the second track assembly;  
 whereby upon said one hair-pin connector being connected in a generally vertically oriented manner to said disk-shaped portion with the release wire linear portion nested in said radial notch and its tail portion extending through said disk-shaped portion central opening, such that said other hair-pin connector being connected in a generally horizontally oriented manner to said connector flange hole thereby imparting a predetermined twisting torque of substantially 90° in said release wire so as to resiliently bias each said connector into positive contact with its associated track assembly mounting providing a rattle-free attachment of each said hair-pin connector.

4,958,800

## LOCKING HINGE MECHANISM

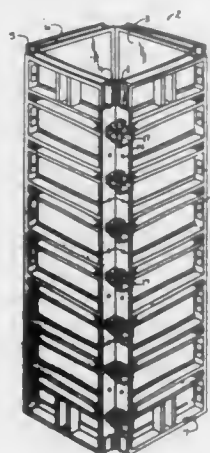
Michael G. Carlson, Lenexa, Kans., assignor to Western Forms, Inc., Kansas City, Mo.

Filed Jul. 6, 1989, Ser. No. 376,318

Int. Cl.<sup>3</sup> E05D 11/10; E04G 17/04

U.S. Cl. 249—219.1

6 Claims



1. A locking hinge mechanism for concrete forms comprising:

- a. first and second parallel hinge strips respectively having means for attachment to side rails of adjoining concrete forms;
- b. each of said hinge strips having confronting beveled edges at a selected angle for establishing a closed angular relationship of said hinge strips when swung together;
- c. a plurality of hinge means offset from said beveled edges and connecting said hinge strips together; and
- d. each said hinge means including means for wedging said hinges means together to swing said hinge strips together and exerting increasing compressive force on said confronting beveled edges as said means for wedging is advanced, said means for wedging said hinge means affixing said hinge strips to said closed angular relationship.

4,958,801

## VALVE CONSTRUCTION AND METHOD OF MAKING THE SAME

Harvey J. Shopsky, Latrobe, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Sep. 19, 1989, Ser. No. 409,243

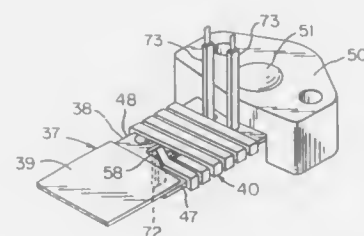
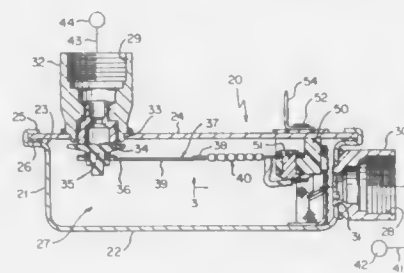
Int. Cl.<sup>3</sup> F16K 31/70, 31/02

U.S. Cl. 251—11

10 Claims

1. In a valve construction comprising a housing means provided with a chamber therein and with an inlet leading to said chamber and an outlet leading from said chamber, a valve seat carried by said housing means and leading to said outlet, a movable bimetallic lever means carried by said housing means and having an operating bimetallic part, a heater wire means disposed in coiled relation about said operating part to heat the same when an electrical current flows through said heater wire means, and a valve member carried by said bimetallic lever means for opening and closing said valve seat under the control of said operating part of said bimetallic lever means, said operating part of said bimetallic lever means having a fastening means operatively interconnected to said heater wire means to tend to hold said heater wire means in said coiled relation on said operating part of said bimetallic lever means, said heater wire means comprising a length of said wire means doubled upon itself to define a looped end and a pair of free ends adjacent each other with said looped end being said part of said heater wire means that is operatively interconnected to said fastening means of said bimetallic lever means, the improve-

ment wherein said operating part of said bimetallic lever means has an opening means passing therethrough and receiving said



looped end of said wire means therethrough whereby said opening means comprises said fastening means of said operating part of said bimetallic lever means.

4,958,802

## STOP VALVE

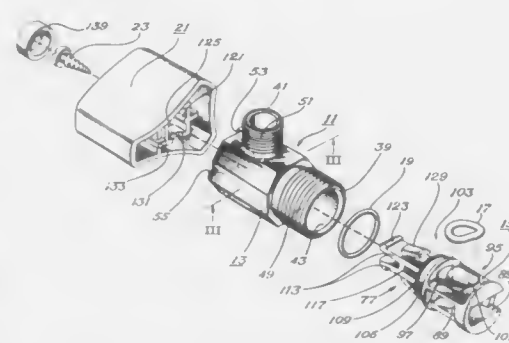
David T. Underwood, Richardson, Tex., assignor to United States Brass Corporation, Plano, Tex.

Filed Apr. 7, 1988, Ser. No. 178,475

Int. Cl.<sup>3</sup> F16K 5/04

U.S. Cl. 251—310

3 Claims



1. A plumbing valve, comprising:

- a metal valve body having first and second ends and a cylindrical cavity which has a side wall and a first end wall, said first end wall having an opening for receiving a portion of a valve stem, with said valve body having an inlet opening communicating with said cylindrical cavity and a cylindrical outlet opening communicating with said cylindrical cavity, said outlet opening having a side wall which intersects said cylindrical cavity side wall, said intersection of said outlet opening side wall and said cylindrical cavity side wall being chamfered;
- said valve stem having a handle portion and a cylindrical cavity portion, said cylindrical cavity portion of said valve stem being located in said cylindrical cavity such that said valve stem protrudes from said cylindrical cavity

through said first end wall opening wherein said handle portion is adapted to coact with handle means, said valve stem being made of plastic and being rotatable so as to move between open and closed positions, said cylindrical cavity portion having stem seal means for sealing around said valve stem adjacent to said first end wall opening and outlet seal means for sealing off said outlet opening from said inlet opening when said valve stem is in the closed position, said outlet seal means comprising a seal ring, said valve stem having a passage that allows communication between said inlet and outlet openings when said valve stem is in the open position, wherein when said valve stem is moved to and from the closed position, said outlet seal ring means is moved across said intersection of said outlet opening and said cylindrical cavity in a contiguous manner;

said stem seal means comprises an O-ring having an inside diameter and said valve stem cylindrical cavity portion further comprises stem O-ring retainer means, said stem O-ring retainer means comprising: a cylindrical surface which is coaxial with the axis of rotation of said valve stem and which receives the stem O-ring; a shoulder portion positioned adjacent to said cylindrical surface and sized to so as to retain said stem O-ring on said cylindrical surface; and a flange portion positioned adjacent to said cylindrical surface such that said cylindrical surface is interposed between said shoulder portion and said flange portion, said flange portion having a diameter that is slightly larger than the inside diameter of said stem O-ring such that said stem O-ring is assembled onto the stem cylindrical surface by way of said flange portion without said stem O-ring being unduly stretched as it passes over said flange portion;

said flange portion being positioned with respect to said cylindrical surface so that when water pressure is applied to said valve, said stem O-ring will be forced toward said flange portion, said flange portion having an inclined surface that is contiguous with said cylindrical surface, wherein said inclined surface forces said stem O-ring outwardly when said stem O-ring is forced toward said flange portion.

4,958,803

## AUTOMATIC FLUID VALVE

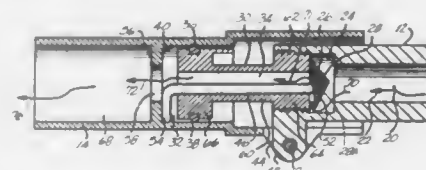
Gilmore H. Chappell, 407 S. Almonesson Rd., Depford, N.J. 08096

Continuation-in-part of Ser. No. 97,132, Sep. 16, 1987, abandoned, and a continuation-in-part of Ser. No. 263,958, Oct. 26, 1988, Pat. No. 4,895,468, which is a continuation of Ser. No. 45,323, May 4, 1987, abandoned, and a continuation-in-part of Ser. No. 282,987, Dec. 2, 1988, abandoned, which is a continuation of Ser. No. 165,636, Mar. 8, 1988, abandoned, and a continuation-in-part of Ser. No. 163,066, Mar. 2, 1988, abandoned, and a continuation-in-part of Ser. No. 163,065, Mar. 2, 1988, Pat. No. 4,361,156, This application Feb. 6, 1989, Ser. No. 307,004

Int. Cl.<sup>3</sup> F16K 51/00

U.S. Cl. 251—342

56 Claims



1. A fluid valve comprising:

- a fluid conduit having a first end and a second end;
- a baffle within the conduit between the first and second ends having a first face oriented towards the first conduit end

and a second face oriented towards the second conduit end;

- a baffle seat within the conduit between the baffle and the second conduit end arranged so that when the second baffle face rests against the seat, fluid flow from the first conduit end to the second conduit end through the conduit is substantially blocked; and
- an operating element between the baffle and the second conduit end having a baffle end within the conduit and an operating end, the baffle end of the operating element being movable relative to the baffle and operative for separating the baffle from the baffle seat.

4,958,804

## LAWN MOWER SERVICE LIFT

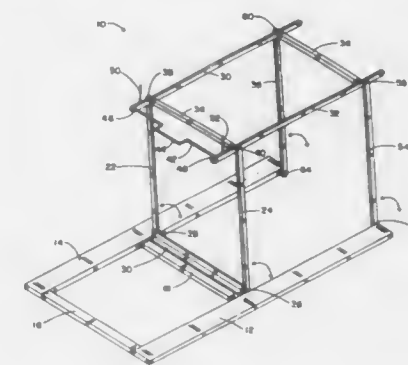
Robert R. Lenius, 1524 Weise, Green Bay, Wis. 54302, and Steven M. Barlament, 1836 Lenwood Ave., Green Bay, Wis. 54313

Filed Jun. 7, 1989, Ser. No. 362,588

Int. Cl.<sup>3</sup> B66F 3/00

U.S. Cl. 254—120

1 Claim



1. A lawn mower service lift, comprising:

- an open ended rectangular base frame formed by two parallel side rails connected by a transverse end rail and an intermediate transverse support rail;
- a rectangular support frame;
- a pair of vertically upstanding stop members secured adjacent one end of said support frame for positioning a lawn mower thereon;
- four struts each having a first end pivotally connected adjacent a corner portion of said support frame and a second end pivotally connected to said base frame, said four struts forming a parallelogram linkage and mounting said support frame for movement through said open end of said base frame between raised and lowered positions;
- said support frame lying between said parallel side rails of said base frame in said lowered position, said base frame side rails spaced apart a predetermined distance to form a guide track for alignment of a lawn mower on said support frame;
- an upstanding transverse stop rail secured between two of said four pivotal struts, said stop rail dimensioned to abut said intermediate transverse support rail in an over center position to maintain said support frame in said raised position;
- and
- a handle pivotally secured to said support frame for movement about a pivot axis parallel to pivot axes of each of said four pivotal struts, to facilitate manual movement of said support frame between said raised and lowered position.



4,958,805

## WINDLASS FOR OFFSHORE STRUCTURES

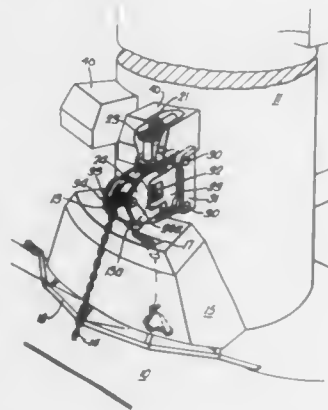
Robert Williamsson, Västra Palmgrensgatan 75, S-42177 Västra Frölunda, Sweden

Continuation of Ser. No. 192,006, May 9, 1988, abandoned. This application Nov. 30, 1989, Ser. No. 443,021

Int. Cl.<sup>5</sup> B63B 21/16; B66D 1/72

U.S. Cl. 254—332

6 Claims



1. In an offshore platform or the like adapted to be anchored in the sea and providing therewith an operating water line (OD), the combination comprising:

- (a) a platform deck support leg (11) extending through said operating water line when the platform is anchored,
- (b) a chain storing box (15) mounted exteriorly of said leg and adapted to be submerged below said operating water line, and with said box being filled with water so as not to contribute to the buoyancy of said offshore platform,
- (c) a chain wheel (13) disposed above said box and rotatable about a horizontal mount and adapted to receive an anchor chain (14) extending from said box,
- (d) means (29) mounting said chain wheel to the exterior of said leg so that said chain wheel is submerged below said operating water line and so that an anchor chain extending between said storing box and chain wheel is disposed below said operating water line,
- (e) a vertical shaft (22) disposed adjacent said chain wheel below said operating water line,
- (f) said mounting means (d) including a wheel housing (24) mounting said chain wheel for pivotal movement about said vertical shaft,
- (g) and at least partially submerged drive means to rotate said chain wheel (13) about said horizontal mount.

4,958,806

## SNOWSTORM GUARD FENCE STRUCTURES AND JET ROOFS

Akira Sato, and Masatoshi Ono, both of Niigata, Japan, assignors to Nihon Samicon Co., Ltd., Japan

Filed Dec. 14, 1988, Ser. No. 284,310

Int. Cl.<sup>5</sup> E01F 7/02

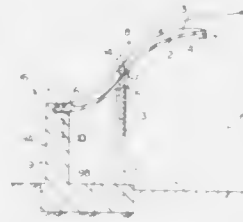
U.S. Cl. 256—12.5

14 Claims

5. A snow fence to be disposed along the side of a road and the like, comprising:

- an L-shaped substructural pile having a forward horizontal part, a rearward horizontal part, an upper vertical part, and a lower vertical part, said forward horizontal part being closest to the road;
- a principal beam, having a top face and a bottom face, a forward edge and a rearward edge, and a center, said bottom face having a rib disposed from said forward edge to said rearward edge, binder parts at said forward and said rearward edges, and between said center and said rearward edge, and also between said center and said rearward edge, being fixedly attached at said rearward edge to

said upper vertical part of said L-shaped substructural pile, with a generally upward slope and with a section extending from said binder part located between said center and said forward edge to said binder part located at said forward edge having a slight downward arc, and extending to near middle of the road; and,



a pole having upper and lower ends, said lower end being buried in said forward horizontal part of said L-shaped substructural pile and said upper end being fixedly attached at said center of said principal beam through said rib.

4,958,807

## DECORATIVE POSTS FOR CROWD CONTROL

Glenn J. Wylie, 81 Kelfield Street, Unit 5, Rexdale, Ontario, Canada N9W 5H3

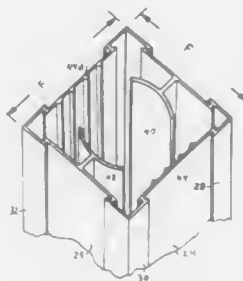
Division of Ser. No. 854,445, Apr. 21, 1986, Pat. No. 4,854,548.

This application Jul. 27, 1989, Ser. No. 386,390

Int. Cl.<sup>5</sup> E04H 17/14

U.S. Cl. 256—65

4 Claims



- 1. A rail structure, said rail structure comprising a rectangular extruded member,
- at least a pair of inwardly extending locking means extending from opposing walls of said extruded member,
- a plurality of parallel, longitudinally extending, inwardly directed wedge shaped locking means on at least a pair of said inwardly extending locking means,
- wherein each of said inwardly extending locking means comprises a "U" shaped channel forming member having its base parallel to the wall from which it extends and its side walls extending inwardly from the walls of said rectangular member, said wedge shaped locking means being spaced on said base of said "U" shaped channel forming member.

4,958,808

## APPARATUS FOR PRODUCING SPONGE IRON OR PIG IRON

Rolf Haak, Düsseldorf, Fed. Rep. of Germany, assignor to Deutsche Voest-Alpine Industrieanlagenbau GmbH, Düsseldorf, Fed. Rep. of Germany

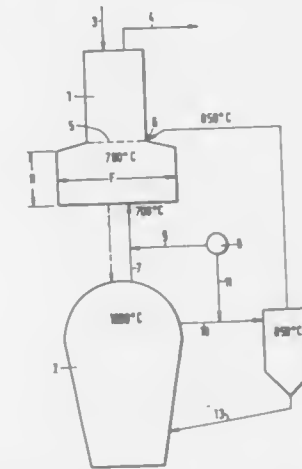
Division of Ser. No. 6/786,691, Oct. 11, 1985, Pat. No. 4,854,967. This application May 1, 1989, Ser. No. 345,882

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1984, 3437913

Int. Cl.<sup>5</sup> F27B 1/02

U.S. Cl. 266—154

4 Claims



- 1. An apparatus for producing sponge iron from iron ore comprising: a melt-down gasifier or coal-to-gas plant, a shaft furnace having a top portion of a first cross section, an inlet in said top portion for introducing iron ore thereinto and an outlet for removing top gas therefrom; a base portion of a second cross section larger than said first cross section and having an outlet for sponge iron; a bustle plane between said top and base portions; first means at said bustle plane for introducing a first quantity of reducing gas containing CO from said melt-down gasifier or coal-to-gas plant into said furnace with a first temperature of from 750° to 900° C.; second means connected to said base portion for introducing thereinto a second quantity of reducing gas containing CO also from the gasifier or coal-to-gas plant with a second temperature in a range of from 650° C. to 750° C. at said second temperature CO being separated into carbon and carbon dioxide to thereby carbonize iron ore in said base portion to form sponge iron.

4,958,809

## LIQUID METAL LAUNDER

Patrick P. Wal, and Steven Rogers, both of Banbury, England, assignors to Alcan International Limited, Montreal, Canada

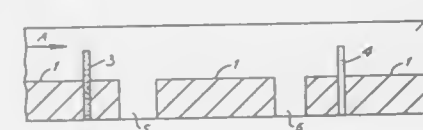
Division of Ser. No. 187,270, Apr. 28, 1988. This application Aug. 2, 1989, Ser. No. 388,436

Claims priority, application United Kingdom, Apr. 28, 1987, 8709999

Int. Cl.<sup>5</sup> C21C 1/00

U.S. Cl. 266—229

10 Claims



- 1. A liquid metal launder comprising a horizontal base and

side walls providing a confined flow path for flow of liquid metal therealong;

flow restricting means extending upwardly from and across the flow path to resist the flow of molten metal therealong; and

a particle receptacle at a predetermined distance downstream of said flow restricting means, the arrangement comprising means for shedding of vortices downstream of the flow restricting means so that particles having a predetermined range of thermal velocities are agglomerated into clusters of particles for deposition in the receptacle.

4,958,810

## HYDRAULIC ENGINE MOUNT WITH DOMED ORIFICE PLATE

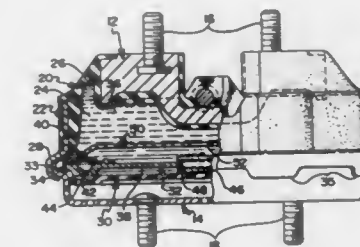
Thomas P. Gold, W. Chester; James P. Hamberg, Beaver Creek; Darren K. Maness, Dayton, and Richard A. Muzechuk, Kettering, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 7, 1989, Ser. No. 390,307

Int. Cl.<sup>5</sup> F16F 9/34

U.S. Cl. 267—140.1

3 Claims



- 1. A hydraulic mount assembly, comprising: a pair of mounting members;
- a hollow body connected to said mounting members;
- a resilient diaphragm closing said hollow body and forming therewith a closed cavity that is filled with liquid;
- means for partitioning said cavity into a primary chamber and a secondary chamber enclosed by said diaphragm;
- an orifice track in said partitioning means connecting said chambers so as to effect damping;
- an orifice plate spaced from and coextensive with said partitioning means and spanning said primary chamber;
- an orifice of fixed size in said orifice plate in series communication with said orifice track for passively reducing the liquid flow between said chambers at higher operating frequencies so as to reduce dynamic rate.

4,958,811

## HYDRAULICALLY DAMPING ELASTIC BEARING

Heinz Brenner, Ahrweiler, and Horst Reuter, Oberbachem, both of Fed. Rep. of Germany, assignors to Boge AG, Eltorf, Fed. Rep. of Germany

Filed May 26, 1989, Ser. No. 358,393

Claims priority, application Fed. Rep. of Germany, May 30, 1988, 3818287

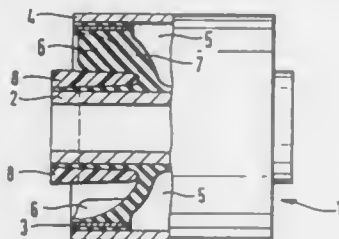
Int. Cl.<sup>5</sup> F16F 5/00

U.S. Cl. 267—140.1

4 Claims

- 1. A hydraulically damping elastic bearing comprising: an outer tubular member;
- an inner tubular member disposed radially inwardly of said outer tubular member to be separated therefrom;
- an elastic member disposed between said inner tubular member and said outer tubular member;
- said elastic member having at least one chamber filled with a damping medium;
- at least one elastic radial stop means mounted to extend at

least partially between said outer tubular member and said inner tubular member;  
 said at least one elastic radial stop means being disposed outside of and displaced from said chamber of said elastic member;  
 said outer tubular member and said inner tubular member having corresponding first ends and corresponding second ends;  
 said at least one elastic radial stop means being disposed at at least one of said first ends and said second ends;  
 said at least one elastic radial stop means extending from said outer tubular member toward said inner tubular member;  
 said at least one elastic radial stop means including an extended end which is radially spaced from said inner tubular member by a predetermined radial distance; and



said bearing further including wedge means disposed between said extended end of said at least one elastic radial stop means and said inner tubular member, wherein said wedge means is selectively removable and includes a radial height, said radial height is selected to be at least one of greater than said predetermined radial distance and less than said predetermined radial distance, said radial height being greater than said predetermined radial distance causes said at least one elastic radial stop means to be resiliently deformed by said wedge means to produce a radial force on said inner tubular member and said outer tubular member, and said radial height being less than said predetermined radial distance is for limiting a movement of said extended end of said at least one elastic radial stop means toward said inner tubular member prior to any resilient deformation of said at least one elastic radial stop means.

4,958,812

## SUSPENSION SPRING SYSTEM

Franz J. Wolf, and Hubert Pletsch, both of Bad Soden-Salmünster, Fed. Rep. of Germany, assigns to WOCO Franz-Josef Wolf & Co., Fed. Rep. of Germany  
 PCT No. PCT/EP87/00660, § 371 Date Jun. 28, 1988, § 102(e) Date Jun. 28, 1988, PCT Pub. No. WO88/03618, PCT Pub. Date May 19, 1988

PCT Filed Nov. 3, 1987, Ser. No. 223,083

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1986, 3637294

Int. Cl.<sup>3</sup> F16F 3/08

U.S. Cl. 267—294

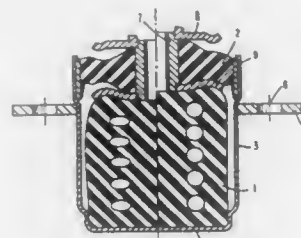
25 Claims

11. A suspension spring system comprising:  
 a housing;

a load supporting member at least partially positioned within said housing and movable with respect to said housing;  
 a suspension spring located in said housing, said suspension spring comprising a soft rubber spring having a plurality of cavities located therein, said suspension spring being compressible in an axial direction; and

disc-shaped bistable control spring means located in said housing for influencing and controlling the spring characteristics of said suspension spring, said disc-shaped bistable control spring means comprising at least one pressure spring, said disc-shaped bistable control spring means being radially compressed within said housing so as to be pre-stressed, said disc-shaped bistable control spring means being shiftable between two different final positions

in response to movement of said load supporting member, both of said final positions being stable and being located along the axis of compression of said suspension spring; and  
 at least one end stop means associated with said disc-shaped



bistable control spring means for limiting an effective spring stroke of said disc-shaped bistable control spring means, said end stop means comprising a disc attached to said load supporting member and extending in a direction transverse to the direction of compression of said suspension spring.

4,958,813

## DIE CLAMP

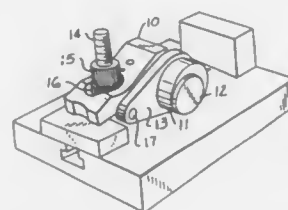
Henry Dykstra, Milford, Mich., assignor to Delaware Capital Formation, Inc., Wilmington, Del.

Filed Sep. 28, 1989, Ser. No. 413,700

Int. Cl.<sup>3</sup> B23Q 3/08

U.S. Cl. 269—32

12 Claims



1. Power clamp for mounting on T-slotted support surface comprising clamp arm with clamping end, intermediate adjustable T-bolt fulcrum means for anchoring said clamp arm to said support surface at adjustable clamping levels, and hydraulic cylinder fluid power actuated piston with ramp surface means for reacting against said support surface to raise the other arm end and thereby effect clamping engagement with a member interposed between said clamping end and said support surface, including locking pin extending longitudinally of said clamp arm interposed between said other arm end and said piston.

4,958,814

## INTERVAL LOCATOR

Brian A. Johnson, 519 Green St., Perry, Mich. 48872

Filed Oct. 13, 1989, Ser. No. 420,889

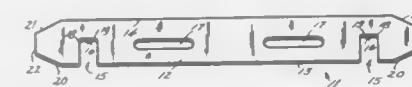
Int. Cl.<sup>3</sup> B25B 3/00; E04G 21/18; G01C 5/00

U.S. Cl. 269—43

5 Claims

1. An interval locator for building components comprising: an elongate, relatively flat, thin and rigid integral planar plate and two or more notches further comprising a base; said notches being on one of the elongate edges of said plate in relatively regular intervals each of said notches having a hardened punch point extending from the base and centered on said

base of each of said notches in a planar attitude with said plate; and at least one integral opening through said plate defining a



hand grip means; and said punch points defining interval center location points for adjacent building components.

4,958,815

## TABLE EQUIPMENT

Katsunobu Ueda, and Mitsuo Sumiya, both of Yokohama, Japan, assigns to Kabushiki Kaisha Toshiba, Kawasaki, Japan

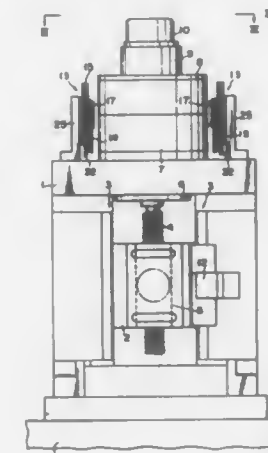
Filed Jan. 23, 1989, Ser. No. 300,596

Claims priority, application Japan, Feb. 2, 1988, 63-21214

Int. Cl.<sup>3</sup> B23Q 3/18

U.S. Cl. 269—58

7 Claims



1. Table equipment having a table for supporting an object to be positioned accurately and in short time cycles, comprising:

a frame;  
 a table for supporting an object, and movable relative to said frame;  
 a guide for guiding said table on said frame, in a line inclined to the horizontal plane;  
 a power source for driving said table along said guide; connecting means for drivingly connecting said driving power source with said table; and  
 means for applying to said table a force to counterbalance said table and said object supported thereon and including a counterweight lighter than the total weight of said table and said object supported thereon;  
 said frame having a vertical fluid chamber means for dampening the vibration generated by the force applying means, including, mounted on said frame containing a viscous fluid for movingly receiving said counterweight, thereby causing said table to move smoothly.

4,958,816

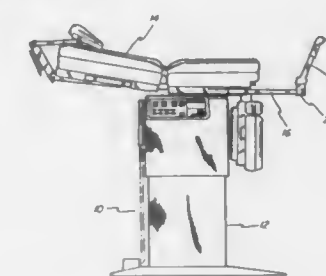
STIRRUP ASSEMBLY FOR EXAMINATION TABLE  
 David B. Chaney, Powell; John H. Oldiges, Minister, and Bart L. Milbourn, Versailles, all of Ohio, assigns to Midmark Corporation, Versailles, Ohio

Filed Nov. 20, 1989, Ser. No. 438,383

Int. Cl.<sup>3</sup> A61G 13/00

U.S. Cl. 269—328

14 Claims



1. In combination with an examination table, a stirrup assembly including a housing mounted in said table, a limb support bar extending through said housing and a stirrup fixed to an outer end of said limb support bar, the improvement comprising:

a pivot boss mounted in said housing for rotational movement about a substantially vertical axis,  
 means defining an opening through said pivot boss slidably receiving said limb support bar for longitudinal movement thereof,  
 a locking shoe carried by said pivot boss for rotational movement with said pivot boss, and  
 locking means carried by said locking shoe and engageable with portions of said housing for fixing said limb support bar against pivotal movement about said vertical axis.

4,958,817

## OPERATING TABLE

Rudolf Heller, Zürich, and Alfred Michel, Dietlikon, both of Switzerland, assigns to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany

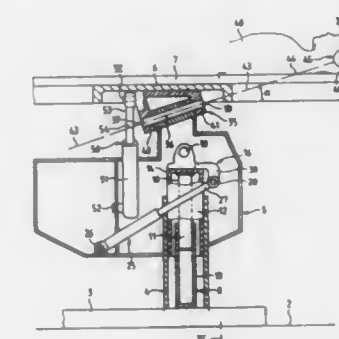
Filed Oct. 13, 1989, Ser. No. 421,086

Claims priority, application Switzerland, Nov. 4, 1988, 04105/88

Int. Cl.<sup>3</sup> A61G 13/00

U.S. Cl. 269—323

4 Claims



1. An operating table, in particular for microsurgery of the throat, nose or ears of a patient, comprising:  
 means defining a rolling axis;  
 a patient rest structure;  
 said patient rest structure having a predetermined longitudinal direction;  
 said rolling axis being disposed essentially within a verti-



cal plane which is substantially parallel to said predetermined longitudinal direction of the patient rest structure;

means for supporting said patient rest structure during rolling movements such that a surgical operating site remains essentially at the same location during said rolling movements;

said means defining said rolling axis including table rolling bearing means having a predetermined longitudinal axis;

said table rolling bearing means being inclined at a predetermined angle to said patient rest structure;

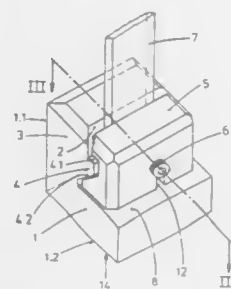
said predetermined longitudinal axis of said table rolling bearing means extending through a predetermined central point which is located in said surgical operating site and substantially disposed in said vertical plane; and

means for supporting said patient rest structure during pitching movements such that said surgical operating site remains essentially at the same location during said pitching movements.

**4,958,818**  
**CLAMPING BLOCK**  
Beat Buchter, Hallau, Switzerland, assignor to Buchter Formenbau AG, Switzerland

Filed Jul. 31, 1989, Ser. No. 387,535  
Claims priority, application Switzerland, Aug. 11, 1988, 3035/88

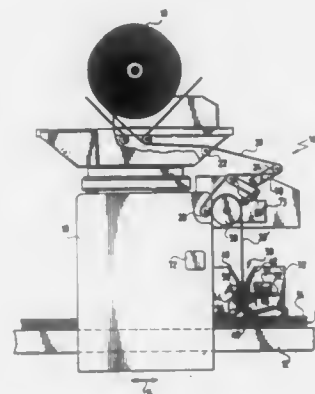
Int. Cl.<sup>5</sup> B23Q 3/02  
U.S. Cl. 269—136 6 Claims



1. A clamping block for clamping workpieces or tools comprising: an essentially L-shaped block base having a first leg and a second leg, said first leg and said second leg being of about equal length, said first leg having a fixed clamping jaw thereon, said fixed clamping jaw having a front face including a first clamping surface and a projecting support portion, said support portion having a clamping reference surface and a wedge-shaped control surface, and said second leg having a moveable clamping jaw connected thereto, said moveable clamping jaw including a second clamping surface opposite and parallel to said first clamping surface of said fixed clamping jaw and a wedge surface complementary and opposite to said control surface of said fixed clamping jaw, said second leg also including first guidance means for the approximately parallel guidance of said moveable clamping jaw relative to said front face of said fixed clamping jaw, a top face perpendicular to said front face of said fixed clamping jaw and second guidance means for the lateral and transverse guidance of said moveable clamping jaw relative to said top face of said second leg, said second guidance means including a pin and at least one spring element protruding perpendicularly from said top face; and clamping screw means for displacing said moveable clamping jaw relative to said block base, whereby said wedge surface of said moveable clamping jaw may be brought into contact with said control surface of said fixed clamping jaw.

**4,958,819**  
**LAYING MACHINE**  
Rolf Jung, Waiblingen, Fed. Rep. of Germany, assignor to Krauss u. Reichert GmbH & Co., Fed. Rep. of Germany  
Filed Dec. 19, 1988, Ser. No. 286,424  
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744034

Int. Cl.<sup>5</sup> B65H 29/46  
U.S. Cl. 270—31 17 Claims



1. Laying machine for laying out a fabric web, comprising: a fabric web guide mechanism which draws the fabric web off a fabric reel and lays it out as a fabric layer; said web guide mechanism including a fabric feed device which feeds said fabric web in accordance with the speed of said laying machine; and a tension relief control means which by means of at least one non-contacting sensing barrier detects a fabric web loop formed in the course of guidance of said fabric web with respect to its deviations from a normal size; said fabric web loop being arranged between said fabric feed device and said laid-out fabric layer, in that said fabric web loop is formed by a bend of a free-falling fabric web piece in a direction extending transversely to the direction of fall whereby said sensing barrier detects a change in the length of the arc of said bend through displacement of said freely hanging bend; and said sensing barrier extending at an acute angle to the surface formed by said fabric web.

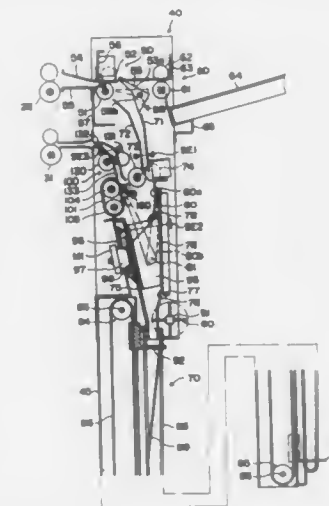
**4,958,820**  
**SHEET STORING APPARATUS FOR COPYING MACHINE**  
Akiyoshi Johdai, Kelchi Kinoshita, Hiroki Yamashita, and Toshio Matsui, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Filed Aug. 17, 1988, Ser. No. 233,324  
Claims priority, application Japan, Aug. 20, 1987, 62-207646; Aug. 20, 1987, 62-207647; Aug. 20, 1987, 62-207649; Aug. 20, 1987, 62-207650; Aug. 20, 1987, 62-207651  
Int. Cl.<sup>5</sup> B65H 39/00

U.S. Cl. 270—52 19 Claims

1. A sheet storing apparatus for storing sheets having an image formed thereon by an image forming apparatus in substantially vertically placed condition, comprising: a receiving roller member for receiving each of the sheets discharged from said image forming apparatus and transporting the sheets substantially downward; a bottom plate member for regulating the front end of each of the sheets transported downward by said receiving roller member so that the sheets are substantially vertically held thereon; and guide means for guiding each of the sheets transported

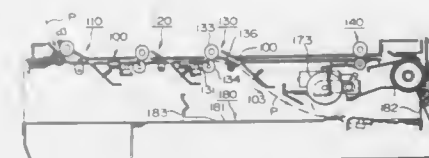
downward to said bottom plate member, said guide means including a first guide member which acts on both sides of

shifted downward onto the recording sheets to be aligned when said sheets enter said tray.



the sheets and a second guide member which acts on the center portion of the sheets, thereby curving the sheets.

**4,958,821**  
**RECORDING SHEET STACKING APPARATUS IN IMAGE RECORDING SYSTEM**  
Akira Kosugi, and Konichi Hanada, both of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan  
Filed Aug. 18, 1988, Ser. No. 234,025  
Claims priority, application Japan, Aug. 25, 1987, 62-211690  
Int. Cl.<sup>5</sup> B65H 5/22; G03G 21/00  
U.S. Cl. 271—3.1 1 Claim

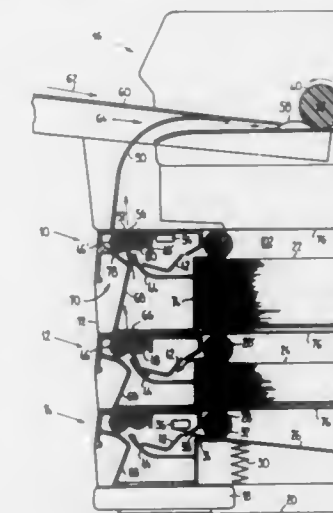


1. A sheet stacking apparatus for use in an image recording system in which a feeding means feeds recording sheets to an image forming means to record a first image on a first side of said sheets, a conveying means conveys the recording sheets with the first image recorded thereon to a sheet stacking apparatus, and said feeding means delivers said recording sheets from said sheet stacking apparatus to said image forming means to form a second image on a second side of said sheets, said sheet stacking apparatus comprising:

- a sheet stacking means having a tray for receiving said recording sheets thereon;
- a stopper provided on said tray to stop said recording sheets and align the leading edges of said recording sheets;
- a bumper roller which is capable of retractably shifting to a downward position to be in pressure contact with said recording sheets and transport said recording sheets by rotary motion of said roller so that the leading edges thereof reaches said stopper and, an upward position to detach from said recording sheets when said leading edges reach said stopper;
- a sensor located upstream from said roller for detecting the passage of said recording sheets through said conveying means and;
- a control means for controlling the position of said roller in response to a signal from said sensor so that said roller is

**4,958,822**  
**SHEET FEEDERS**  
Albert Rutishauser, and Thomas Rutishauser, both of Uerikon, Switzerland, assignors to Rutishauser Data AG  
Filed Mar. 2, 1989, Ser. No. 317,853  
Claims priority, application Switzerland, Mar. 7, 1988, 00839/88

Int. Cl.<sup>5</sup> B65H 3/44, 1/04  
U.S. Cl. 271—9 9 Claims



1. A single-sheet feeder for a copier or printer, the sheet feeder comprising at least two magazines for receiving a stack of sheets each arranged substantially horizontally and superimposed one on another, each magazine comprising a single-sheet feed mechanism and means defining a substantially vertical sheet conveying path provided internally thereof, the individual conveying paths combining to provide an overall conveying path for the sheet feeder, the means defining the substantially vertical sheet conveying path in each of the magazines comprising channel means and each magazine comprising deflection means operable, in use, to deflect a sheet from a substantially horizontal sheet conveying direction imparted by the single-sheet feed mechanism to the substantially vertical sheet conveying path, and further comprises common conveying means located after the deflection means and the channel means in the conveying direction, thereby to convey sheets arriving from the deflection means or from the channel means, the conveying means of each magazine being drive-connected to a single drive, and the single-sheet feed mechanisms being coupled to the single drive via respective controllable clutches, the drive comprising a motor coupled to the conveying means via a one-way coupling.

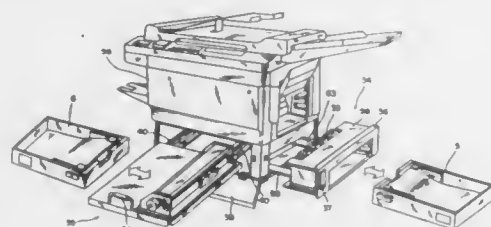
**4,958,823**  
**PAPER FEEDING STAND**  
Hiroshi Iwaki, Ichinomiya, Yoshiharu Mita, Himeji, Jiro Miyazaki, Ogaki, Akihiko Suto, Anpachi, Satoshi Hirose, Anpachi, and Tadashi Renbutsu, Anpachi, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan  
Filed Dec. 12, 1988, Ser. No. 283,535  
Claims priority, application Japan, Dec. 19, 1987, 62-322226; Dec. 19, 1987, 62-322227

Int. Cl.<sup>5</sup> B65H 3/06  
U.S. Cl. 271—9 18 Claims

1. A paper feeding stand on which a recording apparatus is

mounted and which feeds paper to said recording apparatus comprising:

- a frame;
- means for mounting said recording apparatus on said frame;
- a paper feeding part disposed within said frame for holding and feeding the paper to said recording apparatus;
- a paper feeding roller unit which is provided at the position



opposing a paper entry portion of said recording apparatus, said paper feeding roller unit feeding the paper delivered from said paper feeding part to said recording apparatus according to the rotation thereof; and moving means for making said paper feeding part and said paper feeding roller unit movable with respect to said frame in the direction parallel to the feeding direction of the paper from said paper feeding part.

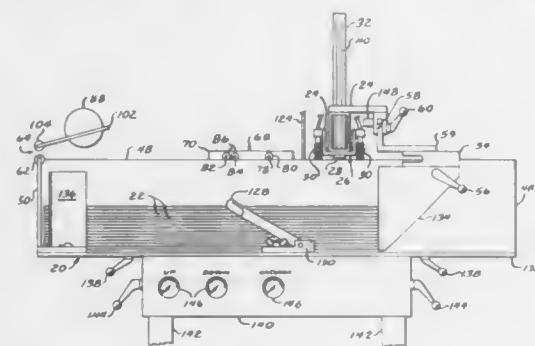
4,958,824

**AUTOMATIC STRIP AND SHEET LOADER SYSTEM**  
Samuel P. Willits, Barrington; Samuel Meiri, Skokie, and Jon C. Mackerheide, Arlington Heights, all of Ill., assignors to Spar-tanica, Ltd., Rolling Meadows, Ill.

Filed Nov. 9, 1988, Ser. No. 269,777  
Int. Cl.<sup>5</sup> B65H 3/08

U.S. Cl. 271-11

20 Claims



1. A system for successively feeding the topmost sheet of plural stacked sheets on command, comprising magazine means for supporting said plural stacked sheets, said magazine means comprising base means, a back wall and a forward wall, pickup head means adjustably mounted on said magazine means for separating and lifting one end of said topmost sheet from the remaining plural stacked sheets, separator means mounted on said magazine means and movable between a home position and a forward position beneath said topmost sheet to complete the separation of said topmost sheet from the remaining plural stacked sheets and thereby support the forward end of said topmost sheet in a raised position, drive roll means adjustably mounted on said magazine means and contacting said raised forward end of said topmost sheet and responsive to a commanded demand control signal to drive said topmost sheet from said magazine means, and control system means connected to said pickup head means,

said separator means and said drive roll means for sequentially effecting their operation in response to demand and start control signals in accord with predetermined instructions and conditions.

4,958,825

**PAPER LET-OUT APPARATUS**

Ryuichi Onomoto, Kusatsu; Masato Nishikawa, Kyoto; Masaji Ishida, Otsu, and Sachiro Arimoto, Kyoto, all of Japan, assignors to Omron Tateisi Electronics Company, Kyoto, Japan

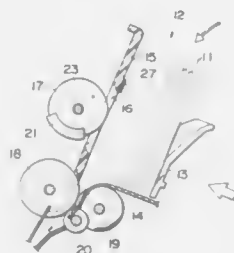
Filed Feb. 10, 1989, Ser. No. 308,775

Claims priority, application Japan, Feb. 13, 1988, 63-31677

Int. Cl.<sup>5</sup> B65H 3/06

U.S. Cl. 271-119

5 Claims



1. A paper let-out apparatus, comprising:
  - (a) a paper accommodating section for accommodating paper sheets in superimposed condition;
  - (b) a receiving plate forming a wall at one side of said paper accommodating section and formed with a window opened in a part of said receiving plate;
  - (c) a pushing member forming a wall at the other side of said paper accommodating section for urging said accommodated paper toward said receiving plate;
  - (d) a let-out roller, disposed outside said paper accommodating section to face said window, for discharging an end-most sheet of paper;
  - (e) a friction member provided to a part of a periphery of said let-out roller to project from said periphery and to protrude inside said paper accommodating section through said window when said let-out roller is rotated;
  - (f) a separation roller disposed near a let-out port of said paper accommodating section and comprising a peripheral surface having a first coefficient of friction with a magnitude to facilitate slippage of paper contacting therewith; and
  - (g) a friction roller disposed in facing relationship with said separation roller and comprising a peripheral surface having a second coefficient of friction with a magnitude greater than that of said first coefficient of friction.

4,958,826

**PAPER FEED SYSTEM HAVING A PRESSURE PLATE THAT RESILIENTLY URGES A PLURALITY OF ELONGATED BEARING, SPRING BIASED IDLER ROLLERS AGAINST ASSOCIATED DRIVE ROLLERS FOR FEEDING A SHEET OF PAPER THEREBETWEEN**  
Phillip L. Chen, Rancho Palos Verdes, Calif., assignor to Microtek Lab., Inc., Torrance, Calif.

Filed Aug. 8, 1988, Ser. No. 230,157

Int. Cl.<sup>5</sup> B65H 3/52, 5/02

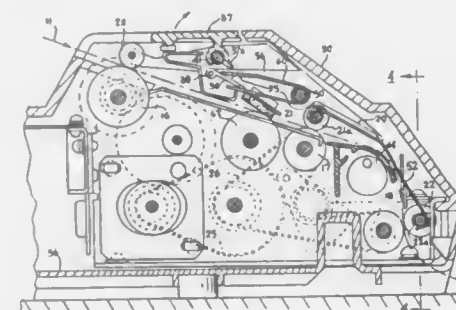
U.S. Cl. 271-124

5 Claims

1. In a paper feed system for feeding sheets of paper along a predetermined path, said system including a plurality of pinch rollers formed by pairs of drive rollers and idler rollers, each of said idler rollers being rotatably supported on a support shaft, the improvement being means for resiliently urging said idler rollers towards said drive rollers to drive a sheet of paper

therebetween and means for releasing the idler rollers from said resilient urging comprising:

- elongated bearing means for supporting each of said idler rollers for limited freedom of motion along an axis normal to the rotation axis thereof,
- a pressure plate,
- pivotal support means for pivotally supporting said pressure plate for motion about a predetermined pivot axis substantially parallel to the rotation axes of said idler rollers,
- said pressure plate including spring means abutting against each of said idler roller support shafts at points spaced laterally from and on one side of said pivot axis,



spring means for resiliently urging said pressure plate pivotally about said support means to cause said pressure plate spring means to urge each of said idler rollers against its associated drive roller, and a release lever,

said release lever having a first position whereat it does not drive said pressure plate and a second position whereat it drives against said pressure plate at a point therealong spaced laterally from and on the side of said pivot axis opposite to said one side thereof so as to drive said plate out of engagement with said idler rollers thereby permitting said idler rollers to move freely in their elongated bearings away from their associated drive rollers.

4,958,827

**SHEET EJECTOR**

Tamaki Kaneko, Fujisawa, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

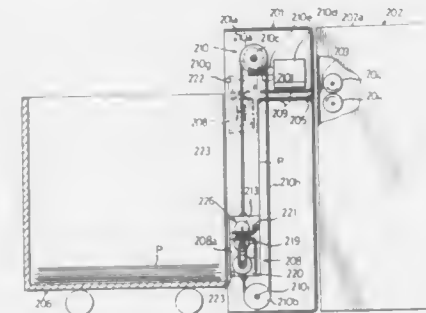
Continuation of Ser. No. 31,463, Mar. 30, 1987, abandoned. This application Sep. 5, 1989, Ser. No. 403,851

Claims priority, application Japan, Aug. 20, 1986, 61-194156; Aug. 20, 1986, 61-194157; Sep. 5, 1986, 61-209249

Int. Cl.<sup>5</sup> B65H 29/22

U.S. Cl. 271-176

5 Claims



1. A sheet ejector for transporting sheets discharged from a sheet handling apparatus to a sheet tray having a sheet receiving plane arranged substantially horizontally comprising: a movable member vertically movable from a wait position corresponding to a sheet discharge port of said sheet

handling apparatus toward said sheet receiving plane of said sheet tray;

- a pair of rollers, a drive device for said rollers and stopping means for said rollers which are disposed on said movable member for holding a sheet discharged from said sheet handling apparatus and for discharging the sheet to said sheet tray by rotating;
- means for discharging sheets from said sheet handling apparatus so that said discharged sheet is held by said pair of rollers on said movable member positioned in said wait position;
- means for transporting said movable member to a position in which said pair of rollers are located above an uppermost sheet of sheets stacked on said sheet tray while holding the sheets by said pair of rollers; and
- means for rotating said pair of rollers to discharge the sheet.

4,958,828

**SHEETS HANDLING DEVICE**

Naomasa Saito, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

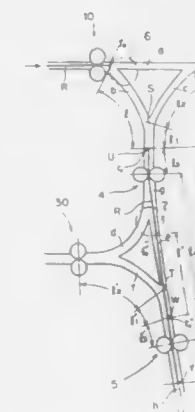
Filed Apr. 28, 1989, Ser. No. 345,123

Claims priority, application Japan, May 1, 1988, 63-107917; May 1, 1988, 63-107918

Int. Cl.<sup>5</sup> B65H 29/00

U.S. Cl. 271-186

17 Claims



1. A sheets handling device comprising:
  - a receiving section for receiving a sheet from an image-forming apparatus;
  - a discharging section for discharging the sheet out of the device;
  - a return section for feeding back the sheet to the image-forming apparatus;
  - a discharge path for leading the sheet from the receiving section to the discharging section;
  - a first, a second, a third and a fourth reverse path consecutively connected to the receiving section;
  - a return path for returning the sheet from the second reverse path to the discharging section;
  - a composite path for leading the sheet from the second reverse path to the return section;
  - a double-face path for returning the sheet from the fourth reverse path to the return section;
  - a first means for guiding the sheet from the receiving section to the discharge path or the first reverse path;
  - a second means for guiding the sheet from the second reverse path to the third reverse path or the composite path;
  - a 1st-sheet feeder capable of rotation in either direction, disposed in the second reverse path; and
  - a 2nd-sheet feeder capable of rotation in either direction, disposed in the fourth reverse path.



4,958,829

**ADJUSTABLE FEED ROLLS FOR FEEDING SHEETS**

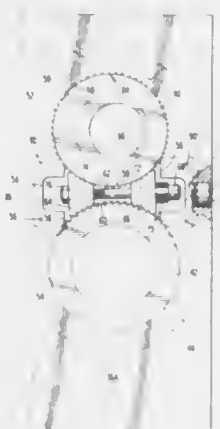
William F. Ward, Jr., Hampstead, Md., assignor to The Ward Machinery Company, Cockeysville, Md.

Filed Feb. 1, 1989, Ser. No. 305,808

Int. Cl.<sup>5</sup> B65H 5/06

U.S. Cl. 271-273

16 Claims



1. Apparatus, comprising:  
a pair of rotatable feed rolls;  
one of said rolls being eccentrically mounted in rotatably adjustable bearing housings, adjustable rotation of said bearing housings moving said one feed roll towards or away from the other feed roll;  
means for pre-loading said bearing housings in a direction away from said other feed roll; and  
said preloading means comprising wedges acting upon said bearing housings and resilient means for resiliently loading said wedges against said bearing housings.

4,958,830

**EXERCISE APPARATUS**

Jack D. Huggins, 212 Country Club Cir., and John Pannel, 11508 Surrey La., both of Midwest City, Okla. 73110

Filed Nov. 25, 1988, Ser. No. 276,014

Int. Cl.<sup>5</sup> A63B 22/12

U.S. Cl. 272-69

4 Claims



1. An exercise apparatus comprising:  
an elongated housing;  
means for supporting the elongated housing generally vertically;  
at least one elongated bar;  
means for slidably supporting the bar movement along the length of the elongated housing;  
a foot support secured to the bar; and means for moving the bar along the length of the elongated housing;  
wherein the means for moving one of the bars comprises:  
a chain having one end secured to a lower portion of the bar;

a horizontal shaft rotatably mounted on a support;  
a sprocket secured to the horizontal shaft;  
an arm, having one end extending radially from the horizontal shaft and secured thereto, wherein the other end of the chain is secured to a portion of the arm extending beyond the horizontal shaft; and means for rotating the sprocket.

4,958,831

**STATIONARY EXERCISING BICYCLE APPARATUS**

Sang-Sup Kim, 178 E. Columbia, Des Plaines, Ill. 60016

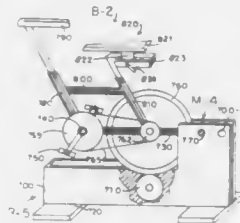
Continuation of Ser. No. 56,856, Jun. 1, 1987, Pat. No. 4,925,183. This application Apr. 26, 1989, Ser. No. 344,015

The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> A63B 21/00

U.S. Cl. 272-73

13 Claims



1. A stationary exercise bicycle apparatus, comprising the combination of  
a bike unit having a frame, pedals supported rotatably relative to the frame, a single wheel supported rotatably relative to the frame; drive means connecting the pedal means to the wheel, a seat, and means supporting the seat relative to the frame;  
a road device unit having a stationary frame structure, and a non-powered substantially free-wheeling rotatable means supported to move relative to the frame structure;  
motion coordinator means coupling said bike unit frame relative to the road device unit frame structure, with said wheel frictionally coupled to roll relative to the rotatable means and vertically overlying and supported on the rotatable means;  
said motion coordinator means having pivot means for mounting the bike unit frame relative to the road device unit frame structure at a location rearwardly spaced both from the seat and from the contact region between the wheel and rotatable means, to provide that the bike unit wheel transmits a force against the rotatable means that is related to the weight of the rider sitting on the seat and to the moment arm distances between the pivot means, seat and the contact region, respectively;  
whereby the degree of difficulty in having the rider manually move the pedals to rotate the wheel and rotatable means, is automatically varied responsive to the weight of the rider on the bike unit, and whereby the wheel and rotatable means rolling against one another is operable to transmit feedback vibrations to the bike unit frame and seat; and  
said pivot means being provided with alternative operative positions, effective to change the moment arm distances for selectively increasing or decreasing the force transmitted between the bike unit wheel and rotatable means.

4,958,832

**STATIONARY EXERCISING BICYCLE APPARATUS**

Sang-Sup Kim, 178 E. Columbia, Des Plaines, Ill. 60016

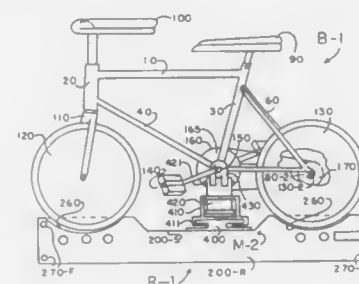
Continuation-in-part of Ser. No. 56,856, Jan. 1, 1987, Pat. No. 4,925,183. This application Apr. 26, 1989, Ser. No. 344,016

The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> A63B 21/00

U.S. Cl. 272-73

12 Claims



1. Indoor exercising apparatus for use with a conventional bike unit having front steering and rear drive wheels spaced apart on a wheel base, and pedals supported rotatably between the front and rear wheels, the exercising apparatus comprising the combination of  
a road device unit having stationary laterally spaced sides and a non-powered substantially free-wheeling endless treadmill defining an exposed upper run extended laterally between the spaced sides and longitudinally a distance greater than the wheel base of the bike unit;  
motion coordinator means coupling said bike unit and road device together, with both wheels simultaneously supported on the upper treadmill run; and  
said motion coordinator means comprising:  
rail means extended generally between the laterally spaced sides, with clearance overlying the upper run of the endless treadmill and underlying the bike unit proximate the rotatable pedals; and  
a pair of laterally rigid telescoping members, means securing one end of one telescoping member firmly relative to the bike unit proximate the rotatable pedals, means guiding the opposite end of the other telescoping member for free movement along the rail means and laterally of the endless treadmill, means allowing substantial relative rotation of the securing and guiding means about the longitudinal axis of the telescoping members, and means allowing only limited tilting of the telescoping members relative to the rail means;  
whereby said motion coordinator means is operable to hold the bike unit substantially fixed longitudinally on the treadmill while allowing lateral steering and limited tilting of the bike unit relative to the treadmill, to simulate riding the bike unit on a real road surface.

4,958,833

**APPARATUS FOR ADJUSTING THE RESTING HEIGHTS OF FREE-MOVING BARBELLS ON WEIGHT-TRAINING RACKS OR STANDS**

Vernon L. Stater, 1140 Kimberly Pl., Redlands, Calif. 92373

Filed Oct. 28, 1988, Ser. No. 264,144

Int. Cl.<sup>5</sup> A63B 21/072

U.S. Cl. 272-123

2 Claims

1. A device for adjusting the rest height of upright standards in a weight-training rack or stand utilizing a free-moving barbell, comprising:  
a weight-training rack or stand with associated upright standards for supporting a free-moving barbell;  
support plugs;

at least one hole in each upright standard into which a said support plug slidably fits; and  
means for retaining said plugs in said standards to support said barbell including pockets located within said standards and behind said holes, said support plugs being slidably positionable in said pockets and extending out-



wardly of said pockets when positioned therein to support said barbell, said pockets and said support plugs slidably positionable therein being both angled such that the angle formed by the intersection of each said upright standard and the extended portion of each said support plug is less than 90°.

4,958,834

**GOLF CLUB ASSEMBLY**

Robert E. Colbert, 2905 S. Wooddale, Jackson, Mich. 49203

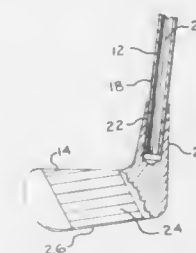
Continuation of Ser. No. 194,168, May 16, 1988. This

application Nov. 20, 1989, Ser. No. 438,972

Int. Cl.<sup>5</sup> A63B 53/00; B23P 11/00

U.S. Cl. 273-77 A

10 Claims



7. In a set of golf clubs consisting of a plurality of golf clubs wherein each club consists of an elongated shaft having a lower end and a club head affixed to the shaft lower end, the shaft having a circumference including an elongated longitudinal seam inherently resulting from the shaft manufacture and the assembled golf club having a front side defined by the direction of club movement during the striking of a golf ball and a rear side 180° opposite to the front side, characterized by the orientation of the shaft seam of each shaft of each golf club of the set being substantially identically oriented to its associated club head face.

4,958,835

## GAME PLAYING SYSTEM

Koichi Tashiro; Shinichiro Okamoto, both of Kawasaki, and Tatsuro Okamoto, Yokohama, all of Japan, assignors to Namco Ltd, Tokyo, Japan

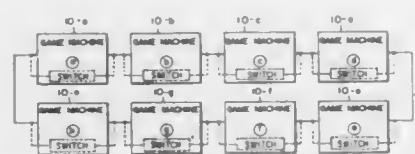
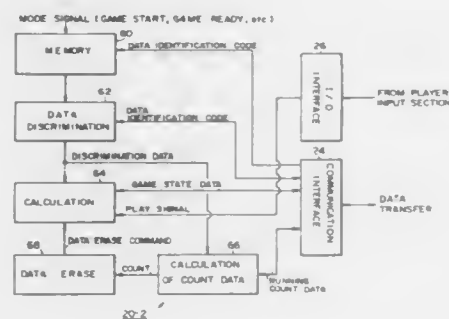
Filed Sep. 29, 1988, Ser. No. 250,569

Claims priority, application Japan, Oct. 3, 1987, 62-250259

Int. Cl.<sup>5</sup> A63F 9/22

U.S. Cl. 273—85 G

7 Claims



1. A game playing system comprising a plurality of independent game machines, each of said game machines being playable in a single-player game and a multi-player game with the other game machines simultaneously in the same game space by the reception and transmission of data between one player's game machine and the other game machines through data transmission lines which connect said game machines together into a loop, each of said game machines comprising:

communication interface means for performing the reception and transmission of data between the one player's game machine and the other game machines through said data transmission lines,

said data including game state data representative of the progress of the game for each of said game machines, data identification codes representative of each game machine corresponding to said game state data, and running count data incremented at each time when said game state data passes through a respective one of said game machines; and

game calculating means for performing the reception and transmission of data between the one player's game machine and the other game machines through the communication interface means to make a calculation of the game in a common game space, said game calculating means comprising:

a data discriminating section means for checking, at each time when data are transmitted to the one player's game machine, a data identification code included in said transmitted data to discriminate whether or not said transmitted data belongs to the one player's game machine;

a count data calculating section means for clearing running count data and transmitting the cleared running count data to a next game machine when data belonging to the one player's game machine are transmitted to the one player's game machine, and for incrementing the running count data and transmitting the incremented running count data to the next game machine when data relating to any one of the other game machines are transmitted to the one player's game machine; and

a data erasing section means for discriminating whether or

not the running count data is higher than a given reference level each time data are transmitted to the one player's game machine, and for forcedly clearing the game state data if the running count data is higher than the reference level, whereby even if there is created any abnormality in any one of the game machines defining said loop, the remaining game machines can be normally played in the game.

4,958,836

## GOLF SIMULATOR

Kuniharu Onozuka, Kanagawa, and Takashi Yoshino, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

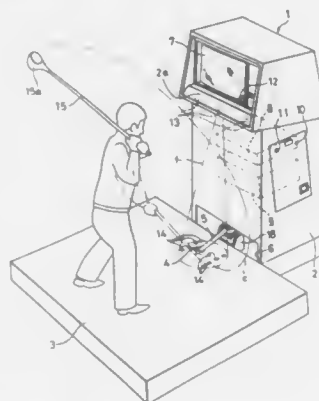
Filed Dec. 15, 1989, Ser. No. 451,149

Claims priority, application Japan, Dec. 27, 1988, 63-329682

Int. Cl.<sup>5</sup> A63B 69/36

U.S. Cl. 273—184 R

9 Claims



1. A golf simulator having a housing in which a display and a reproducing device are accommodated, and an arm to the distal end of which a ball is secured, comprising:

a bed plate which supports a horizontal shaft;

a swingable bed rotatable on the horizontal shaft, and having another shaft which makes a right angle with the horizontal shaft, and to which the proximal end of the arm is rotatably secured; and

drive means for driving the swingable bed so as to enable the swingable bed to be selectively positioned in either of a first state in which the arm slants toward spacing downwardly from the horizontal line at the distal end thereof due to forward inclination of the shaft of the swingable bed with respect to the vertical line, and slants toward approaching the front side of the housing, and a second state in which the arm slants toward spacing upwardly from the horizontal line at the distal end thereof due to backward inclination of the shaft of the swingable bed with respect to the vertical line.

4,958,837

## TRAVEL GAME WITH A GAME BOARD DISPLAY SCREEN AND ELECTRONIC CARD READER

Faye Y. Russell, 1642 E. 84th St., Chicago, Ill. 60617

Filed Jun. 23, 1989, Ser. No. 369,738

Int. Cl.<sup>5</sup> A63F 3/00, 9/18

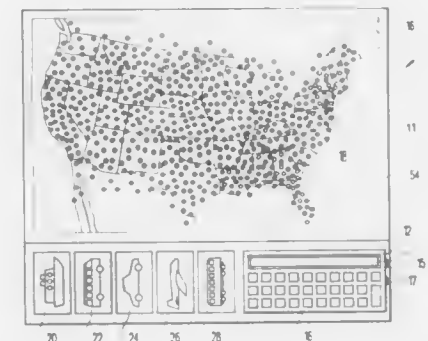
U.S. Cl. 273—237

8 Claims

1. A travel game, comprising:

display means; programmed control means operatively connected to said display means for producing a geographic map display; said programmed control means operatively to display travel routes between selected geographic locations; a plurality of groups of travel mode cards, each group of cards bearing indicia representing a different mode of travel;

game marker pieces for representing player travel movement along said travel routes; a rotationally mounted globe having indicia representing movement increments for selection by a stationary indicator for randomly determining movement of said game marker pieces along said travel routes;



means for selecting travel route origins and destinations; means for posing questions regarding travel route landmarks; means for assessing time and score awards and penalties; and score keeping means for tabulating said time and score awards and penalties.

4,958,838

## SNAP-ON DART FLIGHT

Charles W. Farler, 4503 Woodbine Ave., Dayton, Ohio 45420

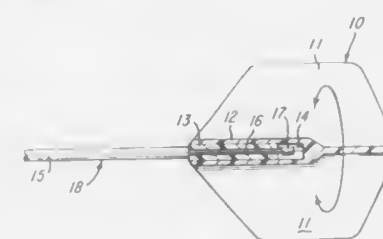
Continuation-in-part of Ser. No. 868,804, May 27, 1986,

abandoned. This application Oct. 14, 1986, Ser. No. 918,720

Int. Cl.<sup>5</sup> A63B 65/02

U.S. Cl. 273—423

7 Claims



1. A snap-on removably attached dart flight comprised of a flight bushing tube located along the central axis of said flight, a plurality of vanes or fins equally spaced around said flight bushing tube and an axial cavity whose inner diameter has one or more respective recess(es) and/or extension(s) whose distance(s) and shape conform substantially to those respective extension(s) and/or recess(es) mating portion(s) of a flight shaft and capable of engaging in a slip-fit union therewith yet leave a gap or a space therebetween permitting said flight to be free to rotate 360 degrees, clockwise or counter-clockwise, around such shaft and wherein said flight is characterized in that no portion of the means of flight attachment is external to any external surface of said flight.

4,958,839

## DISC CLAMP EMPLOYING RESILIENT CONE FOR SPREADING BALLS

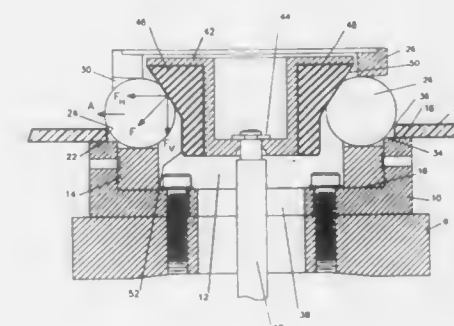
Nahum Guzik, Mountain View, and Vinod Rao, Fremont, both of Calif., assignors to Guzik Technical Enterprises, Inc., San Jose, Calif.

Filed Jul. 12, 1988, Ser. No. 217,875

Int. Cl.<sup>5</sup> B23B 31/40; G11B 25/04

U.S. Cl. 279—2 R

15 Claims



1. A clamping mechanism for a computer hard disc having a predetermined thickness and a central opening, comprising:

a disc support having a cylindrical opening, side walls, a bottom wall, an upper surface for supporting a hard disc to be clamped, and a central opening in said bottom wall, said cylindrical opening of said disc support having a diameter substantially equal to said central opening of said hard disc;

a cylindrical retainer slidably inserted into said cylindrical opening of said support and resting upon said bottom wall of said disc support,

said retainer having more than three through openings in a side wall thereof, said openings being uniformly spaced in a circumferential direction, said openings having axes located higher than the upper surface of said support; when said disc rests on said upper surface of said support;

a plurality of rigid balls slidably located in said respective through openings of said retainer, said balls having diameters exceeding the thickness of said side wall of said retainer;

a pull rod capable of moving in the longitudinal direction, said pull rod having an upper end which passes through said central opening of said bottom wall into said cylindrical retainer;

a conical element rigidly attached to said upper end of said pull rod, said conical element having a continuous outer conical surface which is resilient and softer than said balls, said conical element having a larger diameter end and a smaller diameter end, said larger diameter end located above said balls and said smaller diameter end facing said bottom wall of said support,

said conical element and said pull rod being moveable between upper and lower positions and being shaped such that when said pull rod and said conical element are in their upper position, the conical surface of said conical element rests upon said balls, and such that when said pull rod and said conical element are pulled down to their lower position, said conical surface will wedge and hold said balls outwardly to positions where they lock said hard disc onto said support.



4,958,840

**SELF DISENGAGING KEYLESS CHUCK**

Bernhard Palm, Brookfield, Wis., assignor to Milwaukee Electric Tool Corporation, Brookfield, Wis.

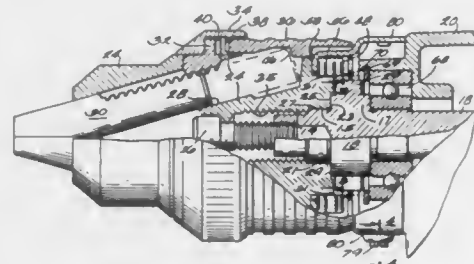
Filed May 27, 1988, Ser. No. 199,842

The portion of the term of this patent subsequent to Jul. 28, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> B23B 31/12

U.S. Cl. 279—62

6 Claims



1. A chuck comprising,
  - a chuck body having an axis of rotation and a front, three jaws mounted on said body on axes converging forwardly and inclined relative to said axis of rotation and equally spaced around the body, said axes being positioned relative to the axis of the chuck body so that the jaws move inwardly on said converging axes toward a fully closed position and outwardly on said axes towards a fully open position,
  - a split nut mounted on said body for rotation relative to said body and encircling said jaws, said split nut having a threaded connection with the jaws whereby said jaws move on said inclined axes between said fully closed position and said fully open position in response to relative rotation between said body and said split nut,
  - a retainer having a press fit on said split nut to retain said split nut assembled,
  - a sleeve having an inside and an outside and mounted on said body for axial movement relative to said body,
  - first and second interference members,
  - said first interference members being integral with said sleeve,
  - said second interference members facing rearwardly and being integral with said split nut and being engaged by said first interference members as said sleeve moves axially forwardly on said body,
  - said outside of said sleeve being manually engaged to move said sleeve axially,
  - said jaws being engageable with said inside of said sleeve as the jaws approach said fully open position so that the sleeve is moved rearwardly to disengage said first interference members from said second interference members.

4,958,841

**GARMENT HANGER CADDY CART**

Cletus F. Keen, 2736 S. Punta Del Este Dr., Los Angeles, Calif. 91745

Filed Jun. 26, 1989, Ser. No. 371,066

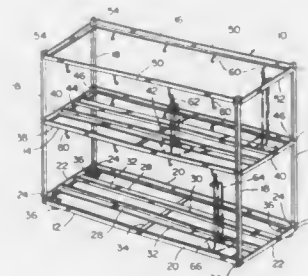
Int. Cl.<sup>5</sup> B62B 3/10

U.S. Cl. 280—47.35

9 Claims

1. A cart for supporting and transporting a plurality of hanger caddies of the type including lower horizontal base portions having front and rear margins and upper loop portions, said cart including a horizontally elongated lower frame incorporating a pair of first elongated, longitudinally extending, laterally spaced apart and upwardly and inwardly opening lower angle members, a pair of transverse low end members extending between and interconnecting the corresponding ends of said angle members, a pair of second elongated, longitudinally extending and upwardly and outwardly opening

angle members extending between and supported from longitudinal mid-portions of said transverse end members and spaced inwardly of said pair of first angle members, said cart also including two pairs of opposite end corner uprights between lower portions of which said lower angle members and low end members extend and are secured, a pair of opposite side, horizontally elongated, longitudinally extending and laterally spaced apart upper side members supported from and extending between upper portions of said corner uprights above said



first lower angle members and a pair of upper transverse end members supported from and extending between said upper portions of the corresponding opposite end uprights, said upper side members each including downwardly projecting and upwardly opening hook members spaced longitudinally therealong over which to engage the loop portions of hanger caddies having their base portions supported from, spanning between and spaced along the corresponding first and second angle members of said cart.

4,958,842

**CONVERTIBLE TOY KIT**

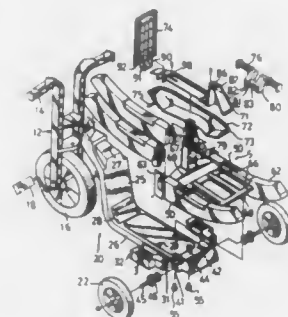
Morgan Chang, No. 291, Sec. 1, Chang Nan Rd., Chang Hua City, Taiwan

Filed Apr. 18, 1989, Ser. No. 340,131

Int. Cl.<sup>5</sup> B62K 13/00

U.S. Cl. 280—7.1

8 Claims



1. A convertible toy kit comprising:

- a scooter including a front portion having a pair of handles on an upper end thereof and a front wheel on a lower end thereof; a pair of driving pedals pivoted on an axle of said front wheel; a front plate having a front end thereof vertically and pivotally connected to a center portion of said front portion so that said front portion is rotatable relative to said foot plate about a vertical axis; a pair of wheel assemblies provided on a rear end of said foot plate; and at least one set of female retainers provided on said foot plate; and
- a rocking horse including a base portion and a seat portion; said base portion having a pair of parallel and foldable bars, each of said parallel bars including two halves pivot-

ally connected together, one half of each of said parallel bars being fixed together by several lateral bars and an other half thereof being foldable to abut said one half, one set of male retainers being provided on said lateral bars; said seat portion being fixed on said base portion; said rocking horse being fixable on said scooter via said female retainers and said male retainers.

4,958,843

**MULTI-PURPOSE SPEED-AWAY TOY COASTER VEHICLE AND METHOD THEREFOR**

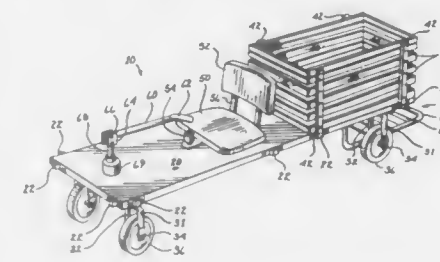
Millard S. Cole, 1333 Linden Rd., Prescott, Ariz. 86301

Filed Feb. 2, 1990, Ser. No. 473,820

Int. Cl.<sup>5</sup> B62B 3/02

U.S. Cl. 280—30

1 Claim



1. A multi-configuration toy vehicle, comprising:

- a frame having a horizontal bed approximately five feet constructed of rigid and resilient material for withstanding loads during normal riding and hauling by playful children, said horizontal bed having multiple bracket means, along a perimeter thereof, for receiving and firmly holding in place attachments for said frame;
- an inverted U-shaped front wheel axis bracket having two legs and being rotatably anchored to an underside of a front of said bed, each leg of said front bracket extending downward and bifurcating to form a fork capable of supporting an axle means and a roller bearing wheel;
- an inverted U-shaped rear wheel axis bracket having two legs and being rigidly anchored to an underside of a back of said bed, each leg of said rear bracket extending downward and bifurcating to form a fork capable of supporting an axle means and a roller bearing wheel;
- a steering assembly comprising a handle bar to control the direction of motion of said toy vehicle, said handle bar being capable of assuming any position from horizontal to vertical by being pivotally attached to two parallel plates affixed to a vertical pipe that is firmly and rotatably held in place through said bed by a sleeve and that is tightly fastened to a receiving collar located in a middle of said front wheel axis bracket, a friction plate coupled to said steering assembly to protect said bed from potential damage caused by wear due to steering rotation of said front wheel axis bracket;
- a horizontal platform attached to and protruding backward from the underside of said bed, said platform being provided for standing while riding in the back of said toy vehicle;
- a front seat with a back for attachment to a top front portion of said bed;
- a back seat with a back for attachment to a top rear portion of said bed, handle bar means comprising one of said back seat having a frame extending upward to form a handle bar for the rider on said platform in the back of said bed and a vertical handle bar means for attachment on a top rear portion of said bed to provide stability for a rider on said platform;
- two side rails equal in length to the length of said bed, each of said side rails consisting of rigid horizontal staves equipped with and held together by vertical pegs for

holding the side rail in place in said brackets along the sides of said bed;  
one back rail equal in length to the width of said bed, said back rail consisting of rigid horizontal staves equipped with and held together by vertical pegs for holding the back rail in place in said brackets along the back of said bed.

4,958,844

**LOAD BEARING STRUCTURAL MEMBER AND FRAME STRUCTURE**

John P. Hancock, Egham, England, assignor to British Alcan Aluminium PLC, Buckinghamshire, England

PCT No. PCT/GB87/00100, § 371 Date Sep. 14, 1988, § 102(e) Date Sep. 14, 1988, PCT Pub. No. WO87/04679, PCT Pub. Date Aug. 13, 1987

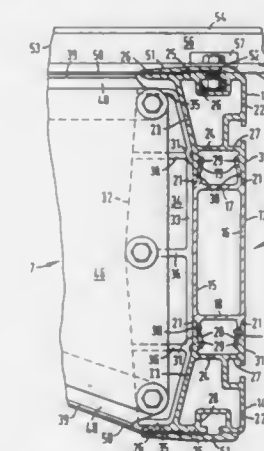
PCT Filed Feb. 10, 1987, Ser. No. 246,302

Claims priority, application United Kingdom, Feb. 10, 1986, 8603235

Int. Cl.<sup>5</sup> B62D 21/02

U.S. Cl. 280—185

8 Claims



1. A load bearing member comprising at least first and second hollow extrusions of light metal alloy, a pair of limbs having tips thereon projecting from said first extrusion and each having a first, inner surface thereon, said second extrusion having at least one part to extend between said limbs which part has a pair of second outer surfaces thereon to engage said first surfaces, inner ends of each of said second surfaces terminating in an outwardly directed shoulder, the respective first and second surfaces being mated together with a layer of adhesive therebetween, said mating occurring by relative linear movement of the extrusions in a single direction until the tips approach the shoulders at an angle between each pair of mated surfaces and said single direction of 5° to 15°, and means for ensuring that the layer of adhesive extends between the shoulders and the tips wherein said means for ensuring comprises at least one of each pair of mating surfaces formed with a recess communicating with a space between the associated shoulder and tip to ensure that the relative movement of extrusions in said single direction forces adhesive from the recess through the space.

4,958,845

**EXTENDABLE TRAILER APPARATUS**

Donald J. Parks, 7310 W. Hazelwood, Phoenix, Ariz. 85033

Continuation-in-part of Ser. No. 245,027, Sep. 16, 1988, abandoned. This application Jun. 19, 1989, Ser. No. 355,493

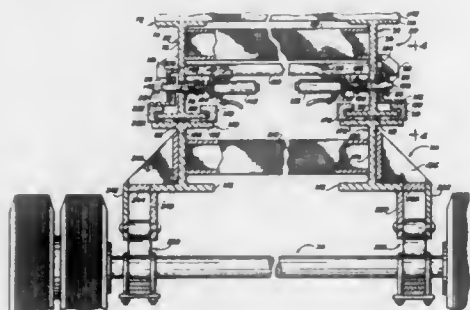
Int. Cl.<sup>5</sup> B62D 53/08

U.S. Cl. 280—407.1

13 Claims

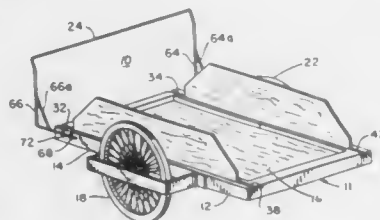
1. Extendable trailer apparatus, comprising in combination:

first frame means for supporting a load to be hauled having a first overall length, including bed means on which the load is disposed, first beam means secured to the bed means for supporting the bed means and the load, and second beam means spaced apart from and disposed generally parallel to the first beam means and secured to the bed means for supporting the bed means and the load with the first beam means; second frame means movable relative to the first frame means between an open and a closed position, including third beam means having a first full length and disposed adjacent to the first beam means for movement relative to the first beam means, fourth beam means having a second full length and disposed adjacent to the second beam means for movement relative to the second beam means,



slider means secured to the third and fourth beam means and extending substantially the first and second full lengths of the third and fourth beam means for guiding the first and third beam means and the second and fourth beam means as the third and fourth beam means move relative to the first and second beam means and on which the first and second beam means are disposed, wherein the first frame means further includes first slide bar means secured to the first and second beam means and slidable on the third and fourth beam means as the first and second frame means move relative to each other between the open and closed positions and the first third beam means includes webs with which the first slide bar means is aligned, and wheel and axle means operatively secured to the third and fourth beam means for supporting the first and second frame means; and locking means for securing the first and second frame means together.

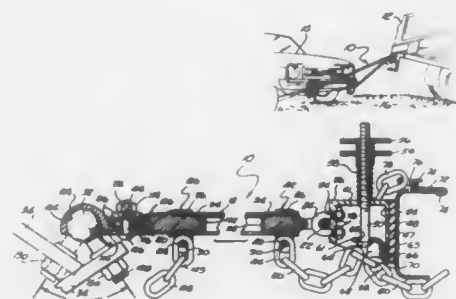
**4,958,846**  
**LEAF WAGON**  
George Greenberg, 367 Orchard La., Mastic Beach, N.Y. 11951  
Filed Jan. 17, 1989, Ser. No. 297,216  
Int. Cl.<sup>5</sup> B62B 1/20  
U.S. Cl. 280—652 6 Claims



5. In a carrier for hauling material, a first frame, said first frame formed with a horizontal slot for removably receiving a base, and vertical slots for removably receiving side walls so

that by inserting a base in the horizontal slot and side walls in the vertical slots, material can be maintained in said structure, first and second truss-like frames attached to the sides of said first frame and extending over a portion of the length of said carrier, said truss-like frames comprising spaced parallel rods connected by vertical struts to lower parallel rods, a wheel removably mounted between said parallel rods of each truss-like frame so that the carrier can be easily pulled along the ground, a second frame identical to said first frame so as to fully enclose said base, said truss-like frames overlapping said first and second frames, each of said truss-like frames including a pair of slots in the form of an inverted V and a bicycle wheel supported within each said V.

**4,958,847**  
**TOW BAR ASSEMBLY**  
Gregory J. Williams, 523 1/2 E. Sixth St., Reno, Nev. 89512  
Filed Sep. 23, 1988, Ser. No. 248,738  
Int. Cl.<sup>5</sup> B60D 1/167  
U.S. Cl. 280—502 20 Claims

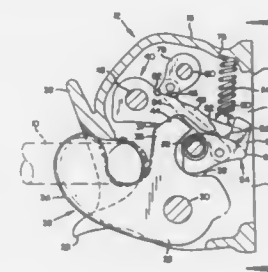


1. A tow bar assembly for use with a tow vehicle having an undercarriage supporting structure used to tow a disabled vehicle comprising:  
two elongated tow bars, each of said bars having first and second ends;  
housing means pivotally engaged to each of said first ends of said tow bars for removably clamping said tow bar assembly to said disabled vehicle;  
a ball member mounted on said supporting structure of said tow truck;  
socket means engaged to said second ends of said tow bars for removably and rotatably engaging said tow bar assembly to said ball member on said supporting structure of said tow vehicle; and  
rotating latch means rotatably and directly engaged to said socket means for removably securing said socket means to said ball member on said supporting structure, said rotating latch means including a single integral member rotatably and directly engaged to said socket means and adapted to rotate so that said integral member will come into contact with said ball member in order to removably secure said socket means to said ball member.

**4,958,848**  
**PINTLE TYPE TRAILER COUPLING**  
Boyd B. Nash, 811 N. 51 Ave., Yakima, Wash. 98908  
Filed May 1, 1989, Ser. No. 345,282  
Int. Cl.<sup>5</sup> B60D 1/00  
U.S. Cl. 280—509 6 Claims

1. A trailer coupling component comprising:  
(a) a housing,  
(b) a pintle hook pivotally mounted in the housing and extending outwardly for coupling to a cooperating eye mounted on a towing vehicle,  
(c) the pintle hook being shiftable between open and closed

positions and having a body portion, a hook portion and a radially extending arm portion having a stop surface,  
(d) a first detent pivotally mounted on the housing a spaced distance from the pintle hook body portion and shiftable between an advanced position when the pintle hook is closed, and a retracted position when the pintle hook is open,  
(e) the first detent having a body portion having a stop surface in abutting contact with the stop surface of the pintle hook arm when the pintle hook is in its closed position and the first detent is in its advanced position,  
(f) the first detent having also an associated operating lever adjacent the pintle hook body,



(g) resilient means biasing the lever toward the advanced position of the first detent, and  
(h) cam means mounted in the housing between the pintle hook body and the lever and, cooperating with the resilient means, operable to shift the lever and associated first detent between their advanced and retracted positions, the cam means comprising a cam shaft rotatably mounted on the housing, and a cam body mounted on the cam shaft and having a cam surface in camming engagement with the adjacent surface of the lever, the cam shaft being axially slidable with reference to the housing and including lock means on the cam shaft for locking the cam means in the advanced position of the first detent.

**4,958,849**  
**MOUNTING ASSEMBLY AND METHOD FOR A DAMPER**  
William D. Pinch, Dearborn; Douglas A. Dolengowski, Troy, both of Mich.; R. Kevin Longard, Brentwood, Tenn., and Raj K. Gopwani, Utica, Mich., assignors to Saturn Corporation, Troy, Mich.  
Filed Jun. 19, 1989, Ser. No. 368,686  
Int. Cl.<sup>5</sup> B60G 5/00  
U.S. Cl. 280—668 8 Claims

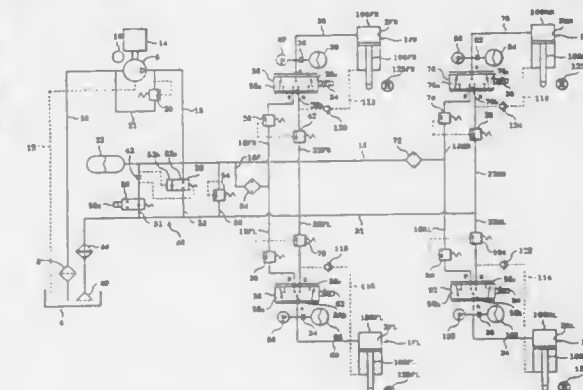
1. A cap for receiving and mounting a strut to vehicle support structure having an opening, comprising:  
(a) a planar body having upper and lower surfaces and an opening therethrough;  
(b) an annular wall encircling the opening and projecting from the upper surface of the body; and  
(c) resilient tab means provided at the termination of the wall, the tab means having a lateral dimension greater

than the complementary dimension of the opening in the vehicle support structure and including a sloped surface



for engagement with the boundary of the opening in the vehicle support structure.

**4,958,850**  
**HYDRAULIC CIRCUIT SYSTEM FOR A VEHICLE HEIGHT CONTROL DEVICE**  
Shouichi Buma, Toyota, and Hiroyuki Ikemoto, Nagoya, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan  
Filed Feb. 28, 1989, Ser. No. 316,918  
Claims priority, application Japan, Mar. 3, 1988, 63-50167; Nov. 10, 1988, 63-284278  
Int. Cl.<sup>5</sup> B60G 21/06, 17/015  
U.S. Cl. 280—714 11 Claims



1. A hydraulic circuit system for a vehicle height control device equipped in a vehicle having a plurality of vehicle wheels, comprising:

a plurality of actuators which are provided corresponding to the vehicle wheels and are adapted to increase and decrease the vehicle heights at locations corresponding to the associated vehicle wheels as respective results of the supply and the discharge of working fluid to and from their working fluid chambers;  
a working fluid supply passage means for supplying working fluid to said working fluid chambers;  
a working fluid discharge passage means for discharging working fluid from said working fluid chambers;  
a bypass valve means for selectively communicating said working fluid supply passage means and said working fluid discharge passage means with each other;  
a plurality of control valve means which are provided in said working fluid supply passage means and said working fluid discharge passage means between said bypass valve means and said associated actuators, and which are



adapted to control the supply and the discharge of working fluid to and from said working fluid chambers, respectively;

a plurality of cut-off valve means which are provided in said working fluid supply passage means and said working fluid discharge passage means between said bypass valve means and said associated actuators, and which are adapted to remain in their closed position to shut down the fluid communication of said associated supply and discharge passage means at intermediate portions thereof between said bypass valve means and said working fluid chambers so long as the pressure within said supply passage means is not more than a predetermine value.

4,958,851

## AIR BAG FIRING CIRCUIT

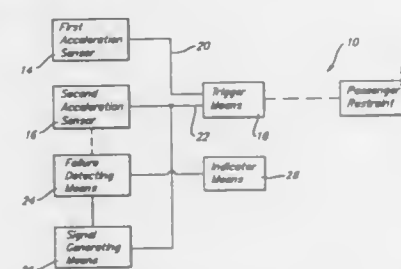
Leonard W. Behr, Pontiac, and Craig W. White, Grosse Pointe, both of Mich., assignors to Automotive Systems Laboratory, Inc., Farmington Hills, Mich.

Filed May 1, 1989, Ser. No. 344,291

Int. Cl.<sup>5</sup> B60R 21/32

U.S. Cl. 280—735

28 Claims



1. In a control circuit for a vehicle passenger restraint comprising first signal-generating means for generating a first output signal in response to an acceleration input exceeding a first threshold; second signal-generating means for generating a second output signal in response to an acceleration input exceeding a second threshold; and trigger means, in communication with said first and second signal-generating means, for actuating said vehicle passenger restraint upon simultaneous receipt of said first and second signals therefrom; the improvement comprising failure detecting means for detecting a failure of said second signal-generating means to properly respond to acceleration; and third signal-generating means responsive to said failure detecting means, in communication with said trigger means, for generating said second signal upon failure of said second signal-generating means.

4,958,852

## TILT STEERING DEVICE

Masahito Kohno, and Yoshiyuki Nakamura, both of Osaka, Japan, assignors to Koyo Seiko Co., Ltd., Osaka, Japan

Filed Sep. 6, 1989, Ser. No. 403,423

Claims priority, application Japan, Sep. 8, 1988, 63-225426; Nov. 17, 1988, 63-292022

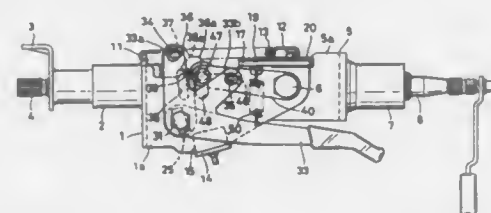
Int. Cl.<sup>5</sup> B62D 1/18

U.S. Cl. 280—775

8 Claims

1. A tilt steering device comprising a fixed bracket fixed to the body of a vehicle and supporting a lower steering shaft thereon by a lower column, a tilt bracket pivoted upwardly or downwardly to the fixed bracket and supporting an upper steering shaft thereon by an upper column, the upper steering shaft being connected to the lower steering shaft by a universal joint, a spring provided between the fixed bracket and the tilt

bracket and biasing the tilt bracket into an upward pivotal movement, a pivot member secured to the fixed bracket, a stopper member pivotally movably attached to the pivot member and selectively movable to a usual operation position or a retraction position, engaging means provided between the tilt bracket and the stopper member to hold the tilt bracket in an operation position against the spring when the stopper member is in its operation position or to permit the tilt bracket to be pivotally moved to an upward retracted position by the spring



when the stopper member is in its retraction position, a retraction control lever pivotally movably attached to the pivot member so as to be selectively movable to an operation position or a retraction position, and change-over means provided between the control lever and the stopper member for holding the stopper member in its operation position when the control lever is in its operation position or permitting the stopper member to move to its retraction position when the control lever is in its retraction position.

4,958,853

## SAFETY BELT WITH HIGH LOAD INDICATOR

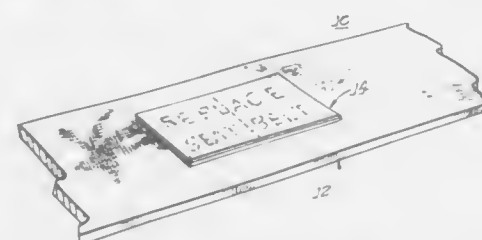
Gerald A. Doty, Crown Point, Ind., assignor to Gateway Industries, Inc., Olympia Fields, Ill.

Filed Jan. 24, 1989, Ser. No. 301,161

Int. Cl.<sup>5</sup> B60R 22/12

U.S. Cl. 280—801

14 Claims



1. A seat belt for restraining a passenger in a vehicle and having a force indicator, said belt comprising: a strap of a woven fabric having a predetermined fixed length, which fabric elongates at a belt-applied tensile stress, said belt length increasing from said fixed length only due to elongation of the fabric under tensile loads applied thereto; a laminate for informing a user of belt elongation beyond a predetermined elongation of the belt; said laminate having a means for indicating an applied force above a predetermined level and an outer, relatively frangible layer; a means for securing said laminate to said belt; said laminate mounted on said belt and secured thereon by said securing means; said relatively frangible outer layer having a tensile strength to rupture at a predetermined elongation of the fabric of said strap to expose said underlying label and inform a user that the strap has been stressed by a tensile load at least equal to a predetermined stress level relative to said predetermined elongation.

4,958,854

## LOCKING DEVICE FOR A PRE-TENSIONER FOR A VEHICLE SAFETY BELT

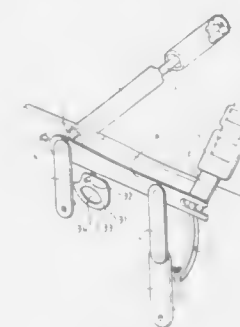
Lars Y. Haland, Falsterbo, Sweden, assignor to General Engineering (Netherlands) B.V., Utrecht, Netherlands

Filed May 3, 1989, Ser. No. 346,765

Claims priority, application Sweden, May 4, 1988, 8801690 Int. Cl.<sup>5</sup> B60R 22/36, 22/46

U.S. Cl. 280—806

9 Claims



1. A pre-tensioner for a safety belt or safety harness in a motor vehicle, the pre-tensioner incorporating a triggering mechanism which is responsive to deceleration of the motor vehicle and which is mounted on a movable seat in the vehicle, wherein a locking device is provided to prevent unintentional triggering of the pretensioner on adjustment of the position of the seat, said locking device comprising pendulum means adapted, as a result of its inertia, to swing, during acceleration of the seat on forward movement thereof, from a position of rest in which the pendulum means does not prevent triggering of the pretensioner into a locking position in which the pendulum means is situated in the path of a movable part of the pre-tensioner, thus preventing triggering of the pre-tensioner.

4,958,855

## PHOTO FINISHER WALLET

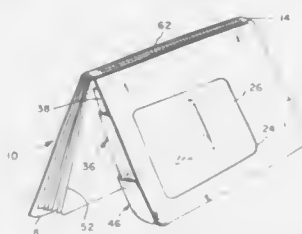
Robert D. Shipp, Bel Air, Calif., assignor to Rembrandt Photo Services, Los Angeles, Calif.

Filed Feb. 13, 1989, Ser. No. 310,308

Int. Cl.<sup>5</sup> B42D 7/00

U.S. Cl. 281—45

17 Claims



1. A photo finisher wallet for accommodating a stack of at least twelve photographic prints of predetermined dimensions, comprising the combination of:

- a flexible cover sheet foldable along a middle portion to form a front cover and a rear cover;
- cover pocket means on the inner surface of at least one of said covers for storing the stack of photographic prints; and
- a plurality of leaves, each leaf of said plurality affixed along an edge thereof to said cover sheet middle portion to form a spine and contained within said covers when said cover sheet is folded, each said leaf including on at least one side thereof a single transparent pocket of approximately said

predetermined dimensions occupying approximately the entire area of said leaf and the prints insertable in said pockets, the dimensions of each of said covers being slightly greater than the dimensions of said leaves, and the dimension of said at least one cover perpendicular to said spine being sufficiently greater than the predetermined dimension of the prints perpendicular to said spine when the stack is stored in said cover pocket means and said cover sheet is folded such that the stack is precluded from interfering with said leaves in the vicinity of said spine.

4,958,856

## PRESSURE ENERGIZED SEALING JOINT

Wilhelmus H. P. M. Heijnen, TA Assen, Netherlands, assignor to Shell Internationale Research Maatschappij B.V., The Hague, Netherlands

Filed Feb. 2, 1989, Ser. No. 333,927

Claims priority, application United Kingdom, Feb. 2, 1988, 8802238

Int. Cl.<sup>5</sup> F16L 55/00

U.S. Cl. 285—14

10 Claims



1. A pressure energized sealing joint for use in a conduit system where during operation an elevated fluid pressure (P<sub>1</sub>) exists at one side of the system, the joint comprising:

- a pair of co-axial tubular metal sections and mechanical fastening means, said tubular metal sections having intermeshing tapered edges which are clamped against each other by said mechanical fastening means, thereby establishing a conical contact area between the tapered surfaces of said edges;
- a first of said tubular sections having a tapered edge which is during operation of the device at one side thereof exposed to said elevated pressure and which has at a mid point M of said conical contact area a wall thickness (t<sub>m</sub>) which is smaller than the wall thickness (t<sub>mm</sub>) of the adjacent tapered edge of a second tubular section at said mid point M, the ratio between (t<sub>mm</sub>) and (t<sub>m</sub>) being selected in conjunction with the ratio between the elevated pressure (P<sub>1</sub>) at one side of the system and a pressure (P<sub>2</sub>) at the other side of the system in accordance with the expression:  $t_{mm}/t_m \geq (P_2/P_1)^2$ .

4,958,857

## WELDING SEAL ASSEMBLY

Thomas G. Sixsmith, El Toro, Calif., assignor to R&G Sloane Manufacturing Co., Sun Valley, Calif.

Filed Jan. 30, 1989, Ser. No. 304,327

Int. Cl.<sup>5</sup> F16L 13/02, 47/02

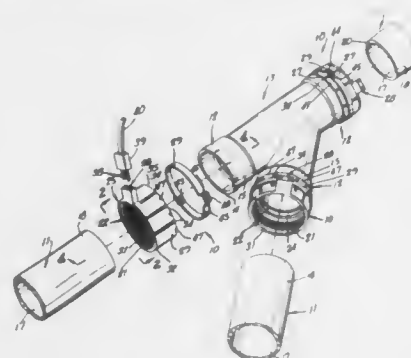
U.S. Cl. 285—21

22 Claims

1. For use in a joint comprising a pipe and a socket element

composed of thermoplastic material and telescoped together with the pipe within the socket element, an improved welding seal assembly comprising:

- a welding sleeve of thermoplastic material to be disposed between the pipe and the socket element and having an embedded electrical heating coil, said sleeve having an inside diameter sized to receive the pipe with a sliding fit;
- a mounting collar for holding said welding sleeve in place in the joint, comprising a ring-like body extending around one end of said welding sleeve and having an inside diameter approximately the same as the inside diameter of the sleeve, and a radially compressible annular flange on said body spaced outwardly from said sleeve by an amount approximately equal to the thickness of the socket ele-



ment, one end of said welding sleeve being secured to said body in coaxial relation with said flange whereby said collar and said sleeve define an annular seat for receiving one end of the socket element;

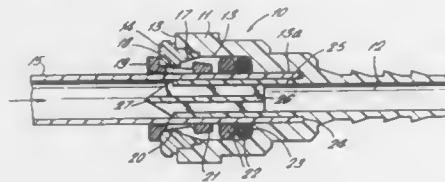
an electrical socket on the outer side of said collar having electrical connectors for connection to a power source, said electrical heating coil having ends constituting electrical leads that extend from said sleeve into said collar and are connected to said electrical connectors; and

a clamp ring extending loosely around said flange and including means for adjusting the size of the ring from a loose, released condition to a tightened, engaged position thereby to compress said flange around said joint and tighten the pipe and the socket element against said welding sleeve.

**4,958,858**  
**TUBE COUPLINGS**  
John D. Guest, "Iona" Cannon Hill Way, Bray, Maidenhead, Berkshire, United Kingdom  
Filed Mar. 22, 1989, Ser. No. 327,309  
Claims priority, application European Pat. Off., Mar. 25, 1988, 88302710.4

Int. Cl.<sup>5</sup> F16L 35/00  
U.S. Cl. 285—24

2 Claims



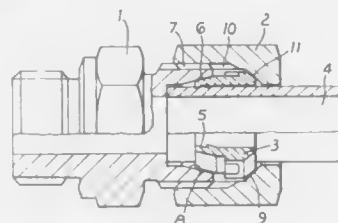
1. A tube coupling comprising a body having a throughway open at one end to receive a tube to be secured therein, a sleeve mounted concentrically out one end thereof in the throughway and extending in the throughway towards said one end of the body with a clearance between the sleeve and throughway to receive said tube to be coupled to the body, a collet disposed in

said one end of the throughway having plurality of resilient fingers biased to engage the outer surface of a tube to be located in the body, a cam surface on the body adjacent to and tapering towards said open end to act on the resilient fingers and compress the fingers against the tube and a cruciform extending along and against the invention of the sleeve to support the sleeve where it is engaged by the resilient fingers and projecting from said other end of the sleeve to taper to a point spaced from the end of the sleeve, the tapered end of the cruciform extending to the outer periphery of the sleeve and free to engage an end of a tube to assist in guiding a tube over the end of the sleeve as it is inserted into the throughway.

**4,958,859**  
**PRE-ASSEMBLY MUFF FOR THE CUTTING OR CLAMPING RING OF A PIPE COUPLING**  
Mathias Konrad, and Wolfgang Weber, both of Lohmar, Fed. Rep. of Germany, assignors to Jean Walterscheid GmbH, Lohmar, Fed. Rep. of Germany  
Filed May 1, 1989, Ser. No. 345,782  
Claims priority, application Fed. Rep. of Germany, Jun. 9, 1988, 3819635

Int. Cl.<sup>5</sup> F16L 35/00  
U.S. Cl. 285—39

2 Claims

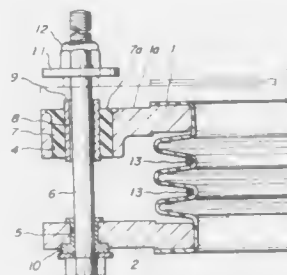


1. A pre-assembly muff for fitting a cutting or clamping ring of a pipe coupling on a pipe, which comprises an inner cone which is designed to support the ring slid onto the pipe and into which the ring may be pressed, wherein the inner cone has been provided with several layers of wear-resistant coatings and wherein the several layers of wear-resistant coatings are colored so that consecutive layers are recognizable from one another.

**4,958,860**  
**VIBRO-ISOLATING JOINT**  
Yasuo Akitsu, Handa, Japan, assignor to NGK Insulators, Ltd., Japan  
Filed Jun. 5, 1989, Ser. No. 361,361  
Claims priority, application Japan, Jan. 10, 1988, 63-144420  
Int. Cl.<sup>5</sup> F16L 11/12

U.S. Cl. 285—49

11 Claims

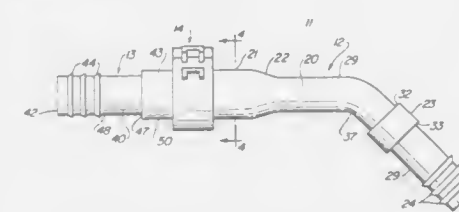


1. A vibro-isolating joint, comprising: two rigid annular flange members, each having a plurality of through holes arranged in an axially spaced manner;

- a flexible cylindrical member interposed between said flanges;
  - a plurality of limiting bolts extending through opposed through holes in said flange members, each bolt being provided with an adjustable lock nut;
  - a plurality of cylindrical elastomer bodies, each retained in each of the through holes in at least one of said flange members; and
  - a plurality of hollow sleeve members, each being concentrically integrated with each of said elastomer bodies, said hollow sleeve members having one end which protrudes from one end of said elastomer bodies;
- wherein the lock nuts arranged on the limiting bolts contact the protruded ends of the hollow sleeve members when said flexible cylindrical member expands and forces said flange members away from each other.

**4,958,861**  
**TUBE COUPLING**  
Jerry W. Hamilton, Desoto, Tex., assignor to Atco Products, Inc., Ferris, Tex.  
Filed May 23, 1988, Ser. No. 197,672  
Int. Cl.<sup>5</sup> F16L 55/00  
U.S. Cl. 285—175

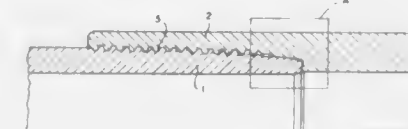
10 Claims



1. A tube coupling comprising: first and second tubular members; a bell end on the first tubular member; a pin end on the second tubular member; an annular ridge on each of said tubular members, said ridges being juxtaposed when said pin end of said second tubular member is inserted into said bell end of said first tubular member; a deformable band having a longitudinally extending groove formed therein; a connector loop on one end of said band; and a plurality of projections on the other end of said band, said projections being spaced at predetermined intervals along the length of said band, said connector loop and said projection cooperating to detachably secure said band to encircle said juxtaposed ridges such that said ridges extend into said longitudinally extending groove to prevent relative movement of said tubular members, said band being severable adjacent each of said projections for allowing said band to be adaptable to encircle and secure tubular members of varying diameters.

**4,958,862**  
**HERMETIC METAL PIPE JOINT**  
Cataldo Cappelli, Dalmine, and Norberto Morlotti, Bergamo, both of Italy, assignors to Dalmine SpA, Milan, Italy  
Filed Sep. 29, 1989, Ser. No. 414,925  
Claims priority, application Italy, Oct. 3, 1988, 48411 A/88  
Int. Cl.<sup>5</sup> F16L 25/00  
U.S. Cl. 285—334

4 Claims

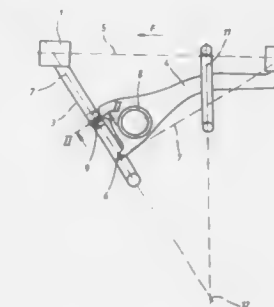


1. Hermetic metal pipe joint, comprising a male element with at least one external tapered thread and a female element with complementary internal threads, an end part of said male

element beyond each thread having a conical seal surface and said female element having a conical seal surface with the same taper as that of said conical surface of the male element, the two said conical surfaces on said male and female elements mating upon tightening of the joint, the length of the seal surface of the female element along the generatrix being greater than that of the corresponding seal surface of the male element, said two seal surfaces of the male and female elements having a taper in the range 6.25 to 9.25% relative to the axis of the conical seal surface, the length of the surface of the male element which comes into contact with the corresponding surface of the female element being between 0.5 and 2.5 mm.

**4,958,863**  
**TRIANGULAR SWINGING ARM FOR WHEEL SUSPENSIONS OF MOTOR VEHICLES**  
Peter Tattermusch, Eslingen, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany  
Filed Jan. 26, 1989, Ser. No. 302,317  
Claims priority, application Fed. Rep. of Germany, Feb. 4, 1988, 3803216  
Int. Cl.<sup>5</sup> B60G 7/00, 3/20  
U.S. Cl. 280—696

7 Claims



1. Triangular swinging arm arrangement for wheel suspensions of motor vehicles, in particular passenger vehicles, said triangular swinging arm being supported against vehicle bodywork via a bearing spring and being constructed of two mutually angled arms, which are each provided with articulated mountings on the bodywork and one of which forms a supporting arm and is connected in articulated fashion in the vicinity of the wheel to the other arm, on which the wheel carrier is articulated, wherein the supporting arm carries a spring and is additionally supported yieldingly against the other arm in a manner laterally offset with respect to a connecting line between articulated mountings on the other arm and the bodywork.

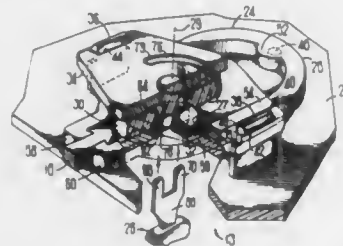
**4,958,864**  
**LOCK TO PREVENT CASUAL THEFT**  
Roy Fischer, Scottsdale, and Paul F. Fair, Phoenix, both of Ariz., assignors to Kimberly-Clark Corporation, Neenah, Wis.  
Continuation-in-part of Ser. No. 334,512, Apr. 6, 1989, abandoned. This application Sep. 11, 1989, Ser. No. 405,483  
Int. Cl.<sup>5</sup> E05C 7/00  
U.S. Cl. 292—19

6 Claims

1. A lock comprising:
  - a. a first wall having a catch attached thereto;
  - b. a second wall having:
    - i. a bore with a bore axis;
    - ii. mounting brackets positioned about the bore; and
    - iii. a post positioned adjacent the bore;
  - c. a release spring having coupling means at one end for engaging the post and having a latch at its other end for engaging the catch;
  - d. a cam rotatable about the bore axis and having:
    - i. a keyway for accepting a key; and



- ii. a cam surface for engaging the release spring and thereby disengaging the latch;



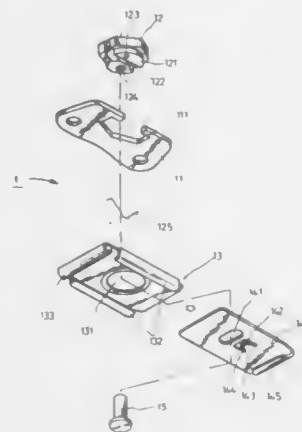
- c. a retainer plate extending between and engaging the mounting brackets to hold the rotatable cam in place against an axial force exerted on the cam by insertion of the key into the keyway of the cam.

**4,958,865**  
**CLAMPING SYSTEM**  
Jin J. Cheng, No. 42, Lane 28, Jen Hsing St., San Chong City, Taiwan

Filed Aug. 18, 1988, Ser. No. 233,604  
Int. Cl.<sup>5</sup> E05C 3/16

U.S. Cl. 292—111

4 Claims U.S. Cl. 292—245



1. An improved clamping system for releaseably securing two external members each to the other, comprising:
- (a) a hook member fixedly secured to one of said external members;
  - (b) chassis means fixedly secured to the other of said external members, said chassis means including a U-shaped supporting frame and a spring member extending through said supporting frame;
  - (c) means for clamping each of said external members to the other, said clamping means including a rotative displacement member having a disk shaped lower portion member, said disk member having a downwardly open horizontal groove formed therein for insertion of opposing ear members of a butterfly shaped operating plate member, an elongated spring member is positionally located substantially entirely within said horizontal groove and being compressively mounted on said opposing ear members for providing a biasing force on said opposing ear members for positioning said butterfly operating plate member, said disk member being divided by said groove into a first section having a concavely shaped recess and a second section having an opening formed therethrough, said opening formed in said second section being located eccentric to a rotational axis of said rotative displacement member, said clamping means further including a bridge

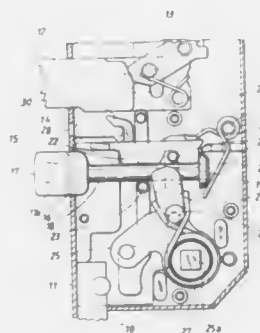
plate member having a central opening and a curved bottom wall for passing over one arm of said chassis spring member, said bridge plate member being in sliding engagement with a sliding plate member having a curved end portion for engaging said hook member and a slot formed through said sliding plate member, said slot, central opening, and opening formed in said second section of said disk member being vertically aligned for insert therethrough of an insertion pin member, said sliding plate member further including a U-shaped opening defining a spring tongue having a raised portion for removable insert into said concavely shaped recess in said disk member.

**4,958,866**  
**DOORLEAF LOCK**  
Ingmar Larsson, Askim, Sweden, assignor to Fixfabriken AB, Goteborg, Sweden

Filed Mar. 20, 1989, Ser. No. 325,953  
Claims priority, application Sweden, Mar. 21, 1988, 8801014-5  
Int. Cl.<sup>5</sup> E05B 15/00

U.S. Cl. 292—245

1 Claim



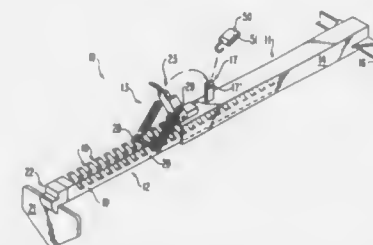
1. A doorleaf lock, having a lock mechanism for governing a locking bolt and a catch bolt, which is controllable by means of a door handle, said catch bolt, in a neutral position defined by a spring means, extending with a non-circular bolt head through a non-circular opening in the lock front wall, abutting a catch means, and being displaceable into the lock, against the action of said spring means, during manipulation of said handle, wherein said catch means is accessible via a second opening in the front wall, and displaceable from its catch position by manipulation from the outside via the second opening so that the catch bolt, after said manipulation of the catch means, can be displaced with its bolt head out of the non-circular opening to the outside of the lock, enabling a turning of the catch bolt around its longitudinal axis, wherein the catch means is pivotable around a pivot axis, which extends across the longitudinal axes of the bolts and the plane of the lock housing, wherein the pivot axis is placed adjacent the second opening; wherein the spring means comprises a hair pin spring, one limb of which rests against a foot section formed at the inner end of the bolt in the lock, and the second limb abuts the catch means keeping it in a neutral position in parallel with the longitudinal axis of the catch bolt while a ledge on the catch means forms a stop surface for the foot section; and wherein the catch means and an extension portion internal of the lock and constructed to cooperate with the catch means form a partition wall which is horizontally oriented when the lock is in an installed position.

**4,958,867**  
**LOCKING DEVICE FOR WASHERS AND DRYERS**  
Phillip A. Champagne, 16650 SE. Bel-Air Dr., Clackamas, Oreg. 97015

Filed Jan. 31, 1990, Ser. No. 473,021  
Int. Cl.<sup>5</sup> E05C 19/18

U.S. Cl. 292—259 R

8 Claims



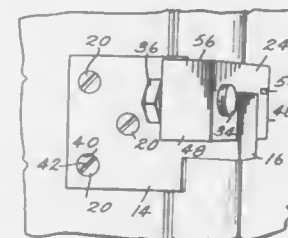
1. A washer and dryer lock device for use with both front and top loading washers and dryers having a hinged door wherein the lock device comprises:
- a sleeve unit including an elongated hollow sleeve member having a downwardly depending flange element formed on one end and a catch element formed on top of the sleeve member at a location proximate to but spaced from the other end of the sleeve member;
  - a shaft unit including an elongated toothed shaft member having one end dimensioned to be received in the hollow sleeve member and further provided with a downwardly depending friction pad element secured to the other end of the shaft member; and
  - a lock unit operatively attached to the sleeve unit and provided with a pivoted latch member having a pair of spring elements operatively engaged on one end to the latch member and attached on their other end to a latch rod wherein the latch rod is dimensioned to be releasably received by the toothed shaft member.

**4,958,868**  
**DOOR BAR**  
Mitchell L. Watrous, Jr., 1032 Highland Park Drive, Somerset, Pa. 15501

Filed Nov. 24, 1989, Ser. No. 440,708  
Int. Cl.<sup>5</sup> E05C 19/18

U.S. Cl. 292—291

7 Claims



1. A door bar for use in combination with a door and a door frame for maintaining the door in a closed position with respect to the frame, said door bar comprising: 'a plate member defining a first substantially planar element of first predetermined thickness and a second substantially planar element of second predetermined thickness attached at substantially a right angle to said first element, said first planar element partially positioned between said door and said frame when said plate member is attached to said frame;
- said first planar element defining a plurality of openings therein and means in operative relationship with said plate member, including a plurality of screws for extending into said frame through said openings, for attaching said plate

member to said door frame with said second element spaced apart from said door frame;

a bar member defining first and second opposed and substantially parallel rectangular face surfaces, third and fourth opposed and substantially parallel rectangular top and bottom surfaces, fifth and sixth opposed and substantially parallel rectangular end surfaces, and a first slot, said slot having a width greater than said first predetermined thickness for enabling said bar member to be removably mounted onto said plate member between said door-door frame and said second element;

said first slot cut into said bar member from said fourth or bottom surface and said first slot extending completely through said bar member between said first and second face surfaces;

stop means adjustably attached to said bar member for contacting said door when said bar member is positioned onto said plate member with said first slot receiving said first element and when said door is in a closed position with respect to said frame; and

said bar member further defining a threaded opening extending completely through said bar member and wherein said stop means includes a bolt-like member comprising a threaded shaft element for threadably engaging said opening and a head element attached to a first end of said shaft element for contacting said door when said door is in a closed position with respect to said frame.

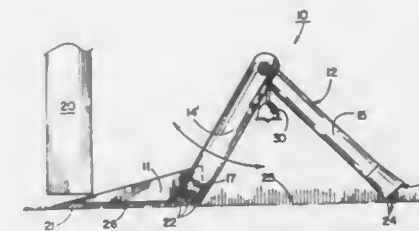
**4,958,869**  
**SECURITY STOP**  
Dwight S. Bisher, 5106 Wadena Ct., Greensboro, N.C. 27407

Filed Jan. 19, 1990, Ser. No. 467,553

Int. Cl.<sup>5</sup> E05C 17/54

U.S. Cl. 292—339

6 Claims



1. A security stop comprising: a wedge-shaped base, said base having an uneven friction producing surface, a pivotable frame, said frame comprising a pair of parallel members and a longitudinal member, said parallel members each having first and second ends, said first ends comprising gripper teeth, said longitudinal member and said base pivotally joined between said pair of parallel members at opposite ends thereof, whereby said wedge-shaped base can be placed at the bottom of a door between the door and the threshold with the longitudinal member contacting the floor to thereby prevent opening of the door.

**4,958,870**  
**COMBINATION BUMPER AND TIRE STORAGE COMPARTMENT WITH TIRE LOCK MECHANISM**  
Bernie Carter, 7123 Thrush View #30, San Antonio, Tex. 78209

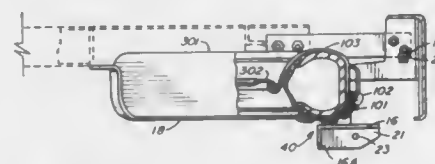
Continuation-in-part of Ser. No. 251,307, Sep. 30, 1988, Pat. No. 4,896,910. This application Oct. 10, 1989, Ser. No. 419,145  
Int. Cl.<sup>5</sup> B62D 43/00

U.S. Cl. 293—106

7 Claims

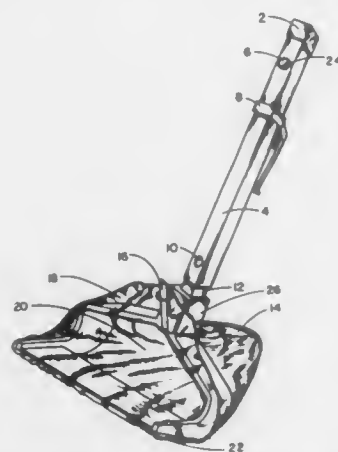
1. A combination vehicle bumper and tire storage compartment with tire lock comprising:
- (a) a U shaped cross bar attachable main frame members of said vehicle near the rear of said vehicle;
  - (b) at least two straps attached by one end to said cross bar and attachable at the other end to a cross member of the

- frame of said vehicle, said straps shaped to conform to the shape of a tire;
- (c) a step bumper attachable to the main frame members of said vehicle by means of extensions extending from the inside of said step bumper, said extensions having first pin apertures for receiving hinge pins;
- (d) a door in the step of said step bumper comprising:
- a rectangular box like structure open at the rear and top, and having side members, a bottom member and a front member;
  - hinge members extending from each of side members and aligned with the inside surface of said extensions,



- said hinge members having second pin apertures for receiving hinge pins; and
- hinge pins passed through said first and second pin apertures to rotatably secure said door to said extensions;
- (e) a locking member having a reverse hook for engagement with an opening in a spare tire within said storage compartment, an arcuate section extending over said spare tire and a loop section extending downward toward said cross bar; and
- (f) a chain member attached to said cross bar and attachable to said locking member to secure said locking mechanism in place.

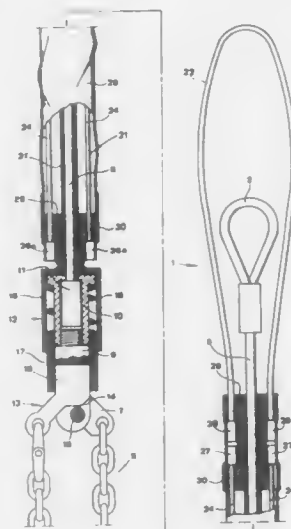
**4,958,871**  
**HAND TOOL FOR PICKING UP ANIMAL DROPPINGS**  
 James W. Hemans, 10124 53rd Ave. West, Everett, Wash. 98204  
 Filed Apr. 17, 1989, Ser. No. 339,309  
 Int. Cl.<sup>3</sup> A01K 29/00; E01H 1/12  
 U.S. Cl. 294-1.4



1. In combination, a hand operated device for picking up animal feces that includes a plastic, telescoping, locking, two-piece, square in cross-section handle and, rigidly affixed to one end of said handle, a plastic scooping device consisting of a horizontally positioned, solid plastic, tapered in height cross section, blade attached at both ends by vertically positioned supports from the ends of said horizontally positioned blade, providing a means for a central opening between said blade and vertical supports and the end of the handle to which said vertical supports are attached, so a plastic fold-lock-top sandwich bag, consisting of a smaller pocket attached on the oppo-

site side of a larger pocket with a flap attached which is as wide as the larger pocket opening, fits its larger pocket through said central opening in said scooping device acting as a means for a receptacle for the animal feces,

**4,958,872**  
**TENSILE FORCE TRANSMITTING DEVICE, IN PARTICULAR A LIFTING DEVICE**  
 Håkan Norlén, Box 58, S-830 05 Järpen, Sweden  
 PCT No. PCT/SE88/00233, § 371 Date Dec. 12, 1988, § 102(e) Date Dec. 12, 1988, PCT Pub. No. WO88/08810, PCT Pub. Date Nov. 17, 1988  
 PCT Filed May 5, 1988, Ser. No. 288,010  
 Claims priority, application Norway, May 8, 1987, 871920  
 Int. Cl.<sup>3</sup> B66C 1/12  
 U.S. Cl. 294-75



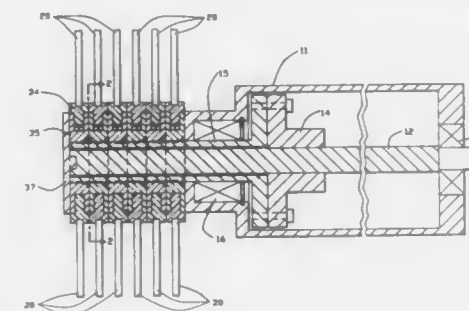
1. A device for transmitting tensile force, in particular a lifting device, comprising, at a first end portion, a first engagement member (2) adapted for engagement with a first coupling member (4), an intermediate portion (5) and a second end portion (6) adapted to form an attachment loop by the free end (13) of the second end portion being, by means of a spring loaded locking member (12), releasably locked to a locking mechanism at the end of the intermediate portion adjacent the second end portion (6), the locking member (12) being, by means of a connection arrangement (21) extending along the intermediate portion of the device, in a tensile force transmitting manner connected to a second engagement member (22, 35), which is adapted for engagement with a second coupling member (23, 36) and which upon being subjected to tensile force transmits this tensile force via the connection arrangement to the locking member (12) and thereby actuates the locking member to release the free end (13) of the second end portion so as to open the attachment loop, the intermediate portion (5) and the connection arrangement (21) being at least in part surrounded by an elongated casing (29), the intermediate portion (5) and the connection arrangement (21) comprising an elongated flexible section and the casing (29) being flexible and surrounding said section.

**4,958,873**  
**MULTI-DISK CLAMP END EFFECTOR**  
 Minoru Akagawa, Fremont, Calif., assignor to Intelmatec Corporation, Fremont, Calif.  
 Filed Oct. 17, 1988, Ser. No. 251,786  
 Int. Cl.<sup>3</sup> B66C 1/54  
 U.S. Cl. 294-93

1. A multi-disk clamp end effector for loading and sequentially unloading a plurality of disks, comprising

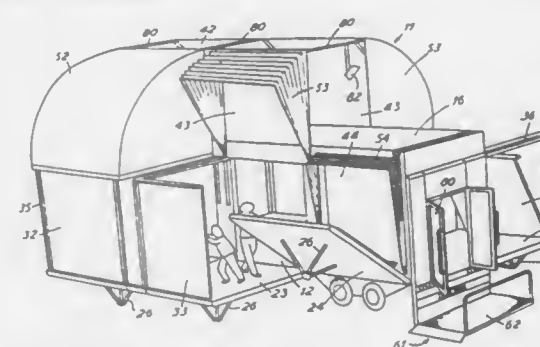
8 Claims

- a supporting structure,
- a tubular member slidably supported by said supporting structure, said tubular member having an external side surface and being longitudinally slidably with respect to said supporting structure, and
- a plurality of holder means for removably securing disks individually to said tubular member, each of said holder means being disposed around said tubular member and attached to an annular disk and centripetally pressing said



side surface of said tubular member, each of said holder means including an elastic ring disposed around said tubular member and a plurality of arms extending radially from said tubular member, each of said arms having an end piece securely attachable to an inner rim of said annular disk and an inner piece securely attached to said end piece, said elastic ring applying a centripetal force to press said inner piece to said external side surface of said tubular member.

**4,958,874**  
**MOBILE EXHIBITION UNIT**  
 Leslie J. Hegedus, 24 Culross St., London, England W1Y 3HE  
 Filed Nov. 17, 1988, Ser. No. 272,624  
 Claims priority, application United Kingdom, Nov. 20, 1987, 8727251; Mar. 15, 1988, 8806078  
 Int. Cl.<sup>3</sup> B60P 3/025  
 U.S. Cl. 296-26



1. A mobile unit comprising:

an elongate floor;

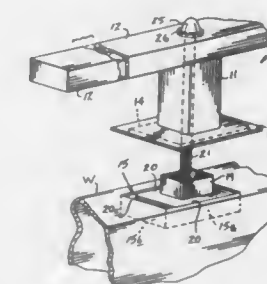
an elongate roof, said roof being stationary relative to said floor;

two generally parallel elongate side-walls, each said side-wall comprising at least two panels, said panels being pivotable relative to said elongate floor to provide an expanded unit with floor areas additional to said elongate floor and at each side thereof; and

at least one side-roof portion, each said side-roof portion being mounted on an upwardly slidable structural member and unfolding from said trailer to cover at least part of said additional floor areas.

**4,958,875**  
**TRUCK POCKET RAIL ATTACHMENT**  
 Larry A. Zamzow, 14000 Renaissance Ct., Apt. 2028-0, Austin, Tex. 78728  
 Filed Nov. 14, 1988, Ser. No. 272,062  
 Int. Cl.<sup>3</sup> B62D 33/02, 33/077  
 U.S. Cl. 296-32

3 Claims



1. A truck pocket rail attachment apparatus for use in combination with sidewalls of a truck bed, said sidewalls including a plurality of spaced pockets formed in the sidewalls with each pocket including a rectangular opening and further including a cavity of rectangular cross-sectional configuration with side walls and end walls of a predetermined height, and said side walls of a greater lineal length than said end walls, said apparatus comprising,

an upper portion including an upper vertical hollow post means with a top wall for positioning of an elongate horizontal rail thereon, and

said upper post means including a lower terminal end integrally secured to a positioning plate means for overlying said opening, and

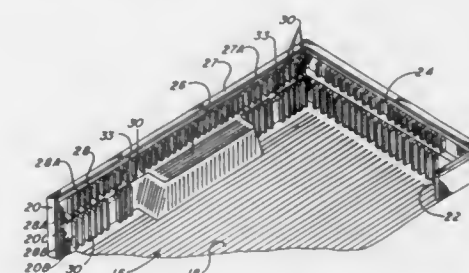
a lower portion including a depth post of a height greater than said predetermined height, and

a rectangular latch plate means integrally secured to a lower end of said depth post of an area substantially equal to said opening for rotation relative to said upper portion to engage lower terminal edges of said side walls, and

connecting means for securing said horizontal rail, said upper portion, and said lower portion together.

**4,958,876**  
**VEHICLE CARGO BED LINER**  
 Joseph Diaco, 16 Holden Rd., Cherry Hill, N.J., and Todd R. Kennedy, Box 486, Hanover, Pa. 17331  
 Continuation-in-part of Ser. No. 312,571, Feb. 21, 1989, and a continuation-in-part of Ser. No. 237,049, Aug. 29, 1988, abandoned. This application Mar. 13, 1990, Ser. No. 492,904  
 Int. Cl.<sup>3</sup> B62D 33/00  
 U.S. Cl. 296-39.2

44 Claims



1. A protective liner for a vehicle cargo bed, said protective liner permitting structure positioned in the vehicle cargo bed to be supported and affixed in position in the cargo bed, said liner comprising:



a liner floor portion positionable upon the floor of the vehicle cargo bed, said liner floor portion having elevated portions formed thereupon to conform to wheel wells protruding from the vehicle cargo bed floor;

liner sidewall portions extending upwardly from opposite sides of the liner floor portion, one of each of said liner sidewall portions being positionable against one of a pair of opposite sidewalls of the vehicle cargo bed;

a liner frontwall portion extending upwardly from a front end of the liner floor portion, said liner frontwall portion being positionable against a frontwall of the vehicle cargo bed; and

a plurality of spaced apart, vertically extend ridge members protruding in a common plan from the liner sidewall portions for at least a substantially part of the entire height thereof whereby gaps separating adjacent ones of the ridge members of each liner sidewall portion form cooperative opposed load locks of a depth sufficient to receive opposite ends of the structure positioned in the vehicle cargo bed in order to affix the structure against movement in a direction parallel to said liner sidewall portion in the vehicle cargo bed.

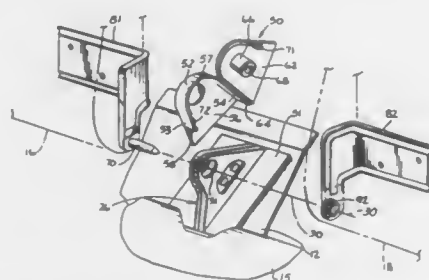
**4,958,877**  
**COMPOSITE PIVOT BUSHING AND COVER FOR VEHICLE SEAT HINGE BRACKET**

James P. Lezotte, Redford, and Wilbur E. Schwartz, Jr., Dearborn Heights, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Aug. 1, 1989, Ser. No. 387,912  
Int. Cl.<sup>3</sup> B60N 1/02

U.S. Cl. 296-65.1

4 Claims



1. A composite cover and pivot bushing device for releasably enclosing a hinge bracket mounted on a vehicle body, said hinge bracket having a through bore which receives hinge pivot pin for rotation about a pivot axis, said composite device comprising:

- a one piece molded synthetic resin housing having a top wall and an open lower end disposed oppositely thereto, a front end wall and an oppositely disposed aft. end wall extending, downwardly from said top wall, a side wall and an oppositely disposed pivotal side closure extending downwardly from said top wall in spaced apart relation to one another, said walls and said side closure being correspondingly dimensioned and configured to define a chamber which encloses said hinge bracket;
- said side wall integrally connected to a peripheral edge of said top wall disposed and structured for integral, interconnecting relation between said front and aft end walls, said side wall having a central circular opening with its center aligned on said pivot axis;
- said pivotal side closure having a cylindrically-shaped tubular pivot bushing having an axial passageway, said pivot bushing extending through said hinge bracket bore and having a predetermined axial dimension such that its free end is positioned with an annular clearance within said side wall central opening;
- said pivotal side closure being integrally joined to an adjacent

cent one edge of said aft end wall along its axis of rotation by an integral flexible hinge web; and

means for releasably locking said side closure in a closed position parallel to said side wall whereby said pivot bushing is captured in said hinge bracket bore with its axial passageway aligned on said pivot axis.

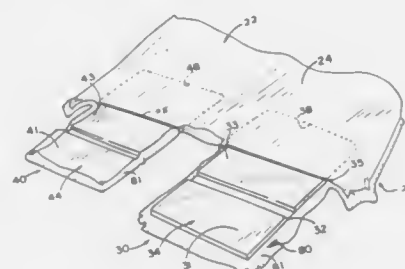
**4,958,878**  
**HEADLINER WITH INTEGRAL VISOR**

Gordon Kempfers, Hamilton, Mich., assignor to Prince Corporation, Holland, Mich.

Filed Aug. 21, 1989, Ser. No. 396,224  
Int. Cl.<sup>3</sup> B60J 3/00

U.S. Cl. 296-97.5

13 Claims



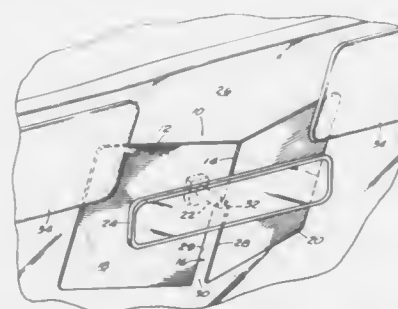
1. An integral headliner and visor construction comprising: a headliner body formed in the shape of a vehicle headliner; at least one generally rectangular panel defining a visor and positioned adjacent an edge of the headliner in a location adjacent a vehicle window where the headliner is installed in a vehicle; and

a flexible integral covering for the exterior surface of said headliner and said panel, to define a flexible joint between said panel and headliner for said visor.

**4,958,879**  
**AUTO SUN VISOR**  
Julius H. Gillum, 11668 Onyx St., Cypress, Calif. 90630  
Filed Oct. 5, 1988, Ser. No. 253,732  
Int. Cl.<sup>3</sup> B60J 3/00

U.S. Cl. 296-97.6

4 Claims



1. A portable sun visor adapted to be carried on an arm of a rearview mirror of an automotive vehicle, comprising

an essentially rectangular member having a length ranging between about 12 and about 16 inches and a width ranging between about 6 and about 8 inches, said member having a generally flat, rigid, thin, and opaque body, with said member having a central latitudinal axis and opposed longitudinal edges,

a hinge element formed in the member by folding the member about the central latitudinal axis of the member to

divide said member into two sections which are mirror images of each other so that, upon folding the two sections about the hinge element, said sections are in registration with each other, and

an elongated slot in the member lying along the central latitudinal axis of the member, with said slot having a longitudinal axis and said latitudinal axis being along the longitudinal axis of the slot, and said slot having at one end an entry mouth along one of the longitudinal edges of the member and terminating at another end in a stop end within the body of the member,

said slot having a width ranging between about five eighths and about seven eighths of an inch and a length in excess of fifty percent of the width of the member but less than seventy percent of the width of the member to provide a third section between the other longitudinal edge and the stop end to enable the sun visor to be balanced when said sun visor is placed on the arm of the rearview mirror, with the third section above the arm and said stop end engaging the arm of the rearview mirror to support the body of the member when the member is placed on the arm.

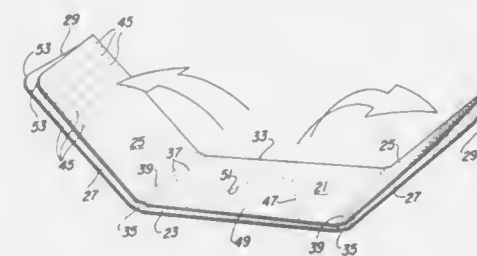
**4,958,880**  
**MOTOR VEHICLE SUNSHIELD**

Dean J. Champagne, 7001 Chicago Rd., Warren, Mich. 48092  
Continuation of Ser. No. 267,799, Nov. 7, 1988, Pat. No. 4,878,708. This application Sep. 22, 1989, Ser. No. 410,851  
The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> B60J 3/00

U.S. Cl. 296-97.7

4 Claims



1. In a motor vehicle having a windshield, a dashboard, and a pair of spaced end pillars:

a collapsible sunshield of a corrugated cardboard resilient material having top and bottom edges and a thickness, including a pair of generally symmetrical planar top and bottom sections of the same height having a single horizontal fold line midway of said top and bottom edges; each section including non-symmetrical central, first and second end panels of general rectangular shape arranged on transverse, laterally spaced parallel fold lines, the panels of both sections being the same height;

the sunshield extending closely adjacent and along said windshield substantially over its height and length with the respective end panels at their ends compressively anchored against said pillars and said bottom section being self-supported upon and along said dashboard and extending upwardly to cover a portion of said windshield;

one of said top and bottom sections being foldable upon said horizontal fold line so as to be superimposed over the other of said sections;

the superimposed first end panels of the top and bottom sections being foldable on said transverse fold lines over the superimposed central panel of the top and bottom sections; and

the superimposed second end panels of the top and bottom sections being foldable on said transverse fold lines over said superimposed first end panels so as to compactly

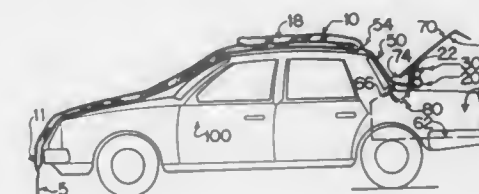
overlie the superimposed central panels of said top and bottom sections.

**4,958,881**  
**THEFT PROOF PROTECTIVE COVERING FOR PARKED VEHICLE**

Israel Piro, 4461 Mammoth Ave., Sherman Oaks, Calif. 91423  
Filed May 31, 1989, Ser. No. 359,645  
Int. Cl.<sup>3</sup> B60J 11/00

U.S. Cl. 296-98

24 Claims



1. An assembly for covering a vehicle having a trunk including a forward upper portion and a trunk lid attached at one end by a pair of spaced apart hinges to the upper top end of the trunk, with a gap located between the end of the trunk lid to which the hinges are attached and the upper top of the trunk and extending between the pair of spaced apart hinges, comprising:

- a protective vehicle cover having an interior surface which lies adjacent to and covers the exterior surface of the vehicle;
- a rotatable retaining means affixed to said pair of spaced apart hinges and resting within the trunk when the trunk lid is in the closed position and moving with the hinges to an exposed position when the trunk lid is opened; and
- an interconnecting member having two ends, with one end attached along a transverse line of the interior surface of said protective vehicle cover and the second end attached to said rotatable retaining means, the interconnecting member extending through the gap;
- whereby when not in use, said protective vehicle cover can be folded up and inserted and retained in said trunk by rotation of said rotatable retaining means causing said vehicle cover to pass through said gap in an opened trunk and when in use, said interconnecting means serves to retain said vehicle cover on said vehicle and prevent theft of the vehicle cover when the trunk is closed.

**4,958,882**  
**FOLDING TOP FOR VEHICLES**  
Eugen Kolb, Stuttgart, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Weissach, Fed. Rep. of Germany  
Filed Jul. 31, 1989, Ser. No. 387,526

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1988, 3825790

Int. Cl.<sup>3</sup> B60J 7/12

U.S. Cl. 296-108

12 Claims



1. A folding top for vehicles, particularly passenger cars,

having a front folding top frame and a rear folding top frame and a parallelogram linkage which engages at the rear folding top frame, the parallelogram linkage comprising a main bow and a control lever which are both pivotally connected to a vehicle body, a frameless viewing window extending adjacent to the rear folding top frame, wherein a rear, approximately upright extending edge of the viewing window, in a sealing manner, is in operative connection with a pillar section which is connected with the rear folding top frame by means of a diagonally extending rotating shaft, and wherein the pillar section interacts flexibly, by means of a connecting member, with the control lever in such a manner that, during a swivelling-back of the folding top, a free end of the pillar section carries out a forcibly controlled movement toward an inside of the vehicle body.

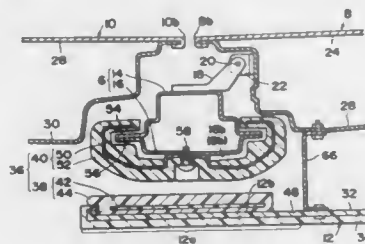
4,958,883

**AUTOMOTIVE DOOR TRIM MOUNTING STRUCTURE**  
Tetsuhiro Iwaki, Aki, and Hazime Sefaku, Hiroshima, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 31, 1989, Ser. No. 386,592  
Claims priority, application Japan, Jul. 29, 1988, 63-99875[U]  
Int. Cl.<sup>5</sup> B60J 5/00

U.S. Cl. 296—152

19 Claims



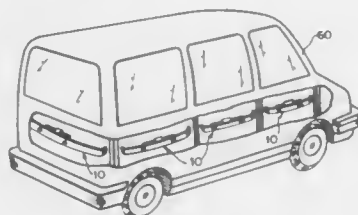
1. An automotive door trim structure comprising: a center pillar disposed between a front door and a rear door and having said rear door hinged to be opened and closed; and a rear door trim including a main body portion mounted to an interior side of said rear door to cover said interior side, and an extension formed at a front end of said main body portion, said extension extending toward said front door so as to cover an interior side of said center pillar.

4,958,884

**VEHICLE SAFETY BAR ASSEMBLY**  
Peter N. Gold, 465 N. Wood Rd., Rockville Centre, N.Y. 11570  
Filed Oct. 6, 1989, Ser. No. 417,917  
Int. Cl.<sup>5</sup> B62D 31/00

U.S. Cl. 296—188

11 Claims



1. An impact-absorbing vehicle safety bar assembly, mountable within a vehicle panel of the type comprising an outer wall and an inner wall connected via a pair of spaced-apart sidewalls to define an internal cavity which panel is supported between a pair of car pillars, comprising:

a generally normally-bowed, resilient, curvilinear bar having two opposite ends; and  
means for mounting said bar within the vehicle panel cavity so that it horizontally spans the cavity of said panel and is

outwardly bowed with respect to the vehicle interior whereby, upon impact, said bar tends to deform from its normally bowed condition to a flattened condition, as a result of which its ends are pressed against the sidewalls of the vehicle panel and, in turn, the vehicle pillar, thereby transferring the external impact load laterally towards its ends and, in turn, to said vehicle panel sidewalls and pillars.

4,958,885

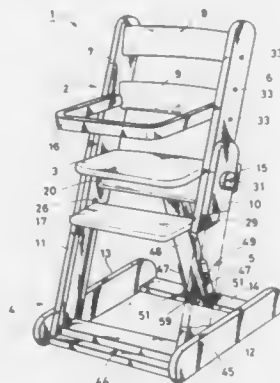
**HIGH CHAIR**

Kenzo Kasei, Osaka, Japan, assignor to Aprica Kasei Kabushikikaisha, Osaka, Japan

Filed Jun. 30, 1986, Ser. No. 880,164  
Claims priority, application Japan, Jul. 19, 1985, 60-111291  
Int. Cl.<sup>5</sup> A47C 4/00

U.S. Cl. 297—55

9 Claims



1. A foldable high chair for a child, comprising a seat structure for supporting a child, a support structure for carrying said seat structure, and a position fixing device connected to said support structure for holding said support structure in a raised position for using said chair, said seat structure comprising two flat backrest frame members having first outer surfaces facing away from each other, a seat hinged to and between said two flat backrest frame members, said seat having lateral edges extending in parallel to said two flat backrest frame members in a folded condition of said chair, said first cross means interconnecting said two flat backrest frame members for forming a seat and backrest first frame having a given width between said first outer surfaces, said support structure comprising two flat support frame members having second inner surfaces facing toward each other, second cross means interconnecting said flat support frame members for forming a support structure second frame having a clearance between said second inner surfaces sufficient for receiving said given width of said first frame in said second frame with a sliding fit between said first outer surfaces and said second inner surfaces, and elevation control means (31, 35) operatively arranged for cooperation with said first and second frames for fixing an elevational position of said first frame relative to said second frame, said first frame and said second frame extending upwardly at a same given angle relative to the horizontal so that both frames are in line with each other.

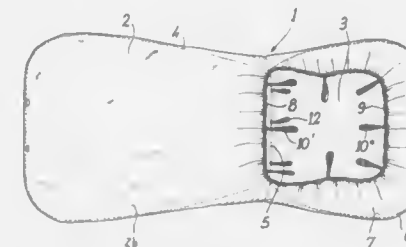
4,958,886

**ELASTIC FOLDABLE COVERS FOR MOTORCAR SEATS**  
Anna Barattini, No. 64, Via S. Maria in Monticelli, and Anna M. Rossi, No. 35, Via Filippo Marchetti, both of Rome, Italy

Filed Aug. 11, 1989, Ser. No. 392,282  
Claims priority, application Italy, Sep. 21, 1988, 35914/88[U]  
Int. Cl.<sup>5</sup> A47C 31/11

U.S. Cl. 297—229

10 Claims



1. A car seat cover comprising:

a seat back cover portion including a front portion having first and second sides and upper and lower edges, and a rear portion having first and second sides and upper and lower edges, said front portion being connected to said rear portion by a first continuous seam extending along said first and second sides and said upper edges of both of said front and rear portions;

a seat cushion cover portion, having first and second sides and front and rear ends, connected to said front portion by a second continuous seam extending along said lower edge of said front portion and said rear end of said seat cushion cover portion; and

a seat bottom cover portion, having first and second sides and a front end, connected to said seat cushion cover portion by a third continuous seam extending along said first and second sides and said front ends of both said seat bottom cover portion and said seat cushion cover portion, each of said first, second and third continuous seams having a first and a second end, each first end being joined with the other first ends at a first common point and each second end being joined with the other second ends at a second common point.

4,958,887

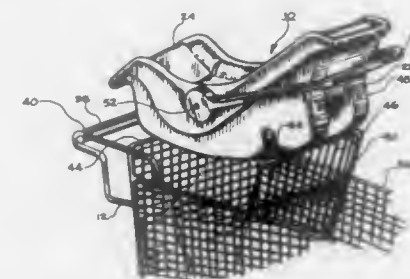
**INFANT CARRIER WITH HOOKS FOR USE WITH SHOPPING CARTS**

Paul K. Meeker, Aurora, Ohio, assignor to Spalding & Evenflo Co., Inc., Tampa, Fla.

Filed May 30, 1989, Ser. No. 358,965  
Int. Cl.<sup>5</sup> A47D 1/10

U.S. Cl. 297—250

4 Claims



1. An infant carrier adapted to be releasably mounted onto a shopping cart and positively secured thereto comprising in combination:

a main body portion for receiving a child and having a head

end and a foot end and a central section therebetween and having side walls with generally vertically extending recesses on the exterior surfaces of the sidewalls and having pockets on the interior surfaces of the sidewalls; a button positioned within each recess, each button adapted for movement by an operator and with a projection extending inwardly thereof; a hook positioned within each pocket, each hook having an aperture for receiving one of said projections for movement of the hook with the button for coupling the hooks with a support wire of a shopping cart; and spring means coupling each projection with the base for urging the button and hook to the retracted position to thereby positively secure the hook and carrier with respect to the shopping cart.

4,958,888

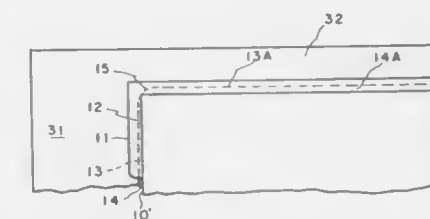
**LOW STRESS CONCENTRATION CUTOUT COUNTERTOP**

Aron Livnah, Glen Mills, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 4, 1989, Ser. No. 389,480  
Int. Cl.<sup>5</sup> A47B 96/18

U.S. Cl. 312—140.3

7 Claims



1. A countertop having a cutout portion for inserting an appliance which has a flange overlapping the edges of the cutout to support the appliance and hide the cutout, with clearance between the appliance and the edges, said countertop being substantially horizontally oriented, said countertop having four sides, one pair of said sides defining opposite edges of said cutout being narrower than the other wider pair of said sides, each of said corners having a smooth curved cutout portion extending into the wider side to reduce the stress riser effect of the corners, said curved portion being of a size, shape and position that maximizes its effective stress-relief effect while remaining within the portion of the edge to be covered by the appliance flange.

4,958,889

**THREE-POSITION CLOSURE PANEL**

Dennis J. Boyle, Menlo Park, and Craig F. Sampson, Palo Alto, both of Calif., assignors to Dynabook Technologies Corporation, Westlake Village, Calif.

Filed Mar. 6, 1989, Ser. No. 319,180  
Int. Cl.<sup>5</sup> A47B 21/00

U.S. Cl. 312—208

6 Claims



1. A portable computer comprising:



a chassis having a housing formed of oppositely spaced upper and lower panels having generally rectangularly disposed front, rear and side edges and a peripheral wall extending between and interconnecting said front, rear and side edges of said panels;

a plate mounted on said housing for pivotal movement from a position substantially overlying a rear portion of said peripheral wall that extends between said panel rear edges to a position extending said plate below the level of said lower panel for raising the rear of said housing with respect to the front thereof; and

means for mounting said plate on said housing including oppositely extending pivot pins in said plate adjacent a longitudinal edge of said plate, journal openings in said peripheral wall rear portion mounting said pins for pivotal movement, position-determining cam means including angularly spaced flats formed on said plate, and follower means mounted on said housing cooperable with said cam means for retaining said plate in selected angularly spaced positions.

4,958,890

## REFRIGERATOR CABINET FLANGE REINFORCEMENT BAR

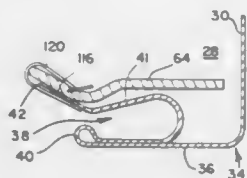
Vincent P. Anderson, Center Township, Vanderburgh County, Ind., and Rexford W. Cordill, Galesburg, Ill., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Oct. 30, 1989, Ser. No. 429,792

Int. Cl.<sup>5</sup> A47B 81/00

U.S. Cl. 312—214

19 Claims



1. In a refrigeration apparatus cabinet including a liner forming a space to be refrigerated, said liner having an outwardly turned edge, and an outer shell having opposite sidewalls connected to a top wall, each wall including a turned front edge portion connecting a rear returned portion double reverse bent to form an inwardly opening channel receiving said turned edge of the liner, a cabinet reinforcement comprising:

- a pair of elongate flange reinforcement bars each positioned rearwardly of said shell returned portion for one of said sidewalls; and
- a body of adhesive disposed between each of said reinforcement bars and its associated shell returned portion defining means for retaining said reinforcement bars in said cabinet.

4,958,891

## SPLIT DRAWER ASSEMBLY

Marc D. Taylor, Columbus, Ohio, and Duane Beardsley, Berrien Springs, Mich., assignors to Artromick International, Inc., Columbus, Ohio

Filed May 5, 1989, Ser. No. 348,193

Int. Cl.<sup>5</sup> A47B 81/00

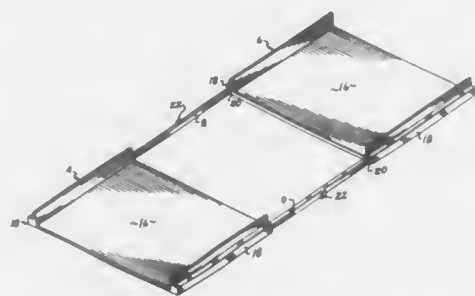
U.S. Cl. 312—287

11 Claims

1. A storage platform for insertion into a frame with slots therein allowing access to the platform from either end of the frame, comprising:

- a first section having a platform surface, guides on each side of said platform surface which cooperate with slots in said frame, and a channel within at least one said guide;
- a second section opposed to said first section having a platform surface, guides on each side of said platform surface

which cooperate with slots in said frame, and a channel within at least one said guide mateable end-on with said channel of said first section; and



a tubular member inserted into each set of said mating channels of said first and second sections, secured therein and slidable within said mating channels, having tabs near both ends thereof to limit travel of said first section relative to said second section.

4,958,892

## DIFFRACTION COHERENCE FILTER

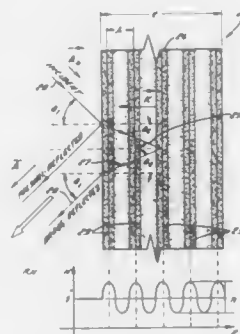
Tomasz P. Jansson, and Joanna L. Jansson, both of Torrance, Calif., assignors to Physical Optics Corporation, Torrance, Calif.

Filed Oct. 18, 1988, Ser. No. 259,304

Int. Cl.<sup>5</sup> G03H 1/02

U.S. Cl. 350—3.6

4 Claims



2. A method for constructing a diffraction coherence filter from holographic media, said method comprising the steps of: forming a first layer from the holographic medium; transmitting electromagnetic energy through said first layer; reflecting from a surface adjacent said first layer the electromagnetic energy transmitted through said first layer back into the holographic medium of said first layer to form a standing wave pattern therein such that an interference pattern is established in the holographic medium; forming a second layer comprised of a holographic medium and positioning said second layer at a predetermined distance from said first layer; transmitting electromagnetic energy through said second layer; reflecting from a surface adjacent said first layer said electromagnetic energy transmitted through said second layer from said first layer back into the holographic medium of said second layer to create said interference pattern in the holographic medium of said second layer; and repeating said steps of forming layers comprised of holographic medium and transmitting electromagnetic energy through said layers so formed for reflection from the preceding layer of holographic medium back into said layer so formed to create said interference patterns until a

predetermined number of layers of holographic medium with interference patterns established therein have been formed.

4,958,893

## SEMICONDUCTOR LASER BEAM SOURCE APPARATUS

Masaru Noguchi, and Masafumi Yamamoto, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

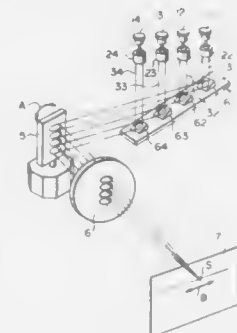
Filed Mar. 7, 1986, Ser. No. 837,224

Claims priority, application Japan, Mar. 11, 1985, 60-48076

Int. Cl.<sup>5</sup> G02B 26/08

U.S. Cl. 350—6.6

6 Claims



1. A semiconductor laser beam source apparatus in which laser beams emitted by a plurality of semiconductor lasers, collimated and made parallel to each other are coalesced by a converging lens, wherein said laser beams are respectively reflected by a plurality of reflecting mirrors having reflecting surfaces parallel to each other and guided to said converging lens, and said reflecting mirrors respectively have a mounting surface at a predetermined angle with respect to the reflecting surface and are secured to a common plane.

4,958,894

## BOUNCING OSCILLATING SCANNING DEVICE FOR LASER SCANNING APPARATUS

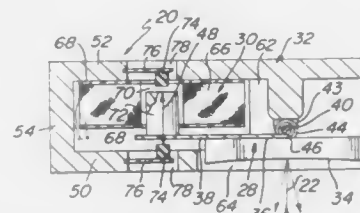
Carl H. Khowles, Moorestown, N.J., assignor to Metrologic Instruments, Inc., Bellmawr, N.J.

Filed Jan. 23, 1989, Ser. No. 300,018

Int. Cl.<sup>5</sup> G02B 26/10

U.S. Cl. 350—6.6

37 Claims



1. A beam sweeping apparatus for use in a scanning device, said apparatus comprising a movable member arranged to be oscillated about an axis in an arc for sweeping a beam of light in a predetermined path, said arc having a pair of end points, a pair of stop members located adjacent said movable member to establish the limits of the excursion of said movable member and thereby define said end points of said arc, and reversible moving means comprising energizable means operative to be periodically energized by discrete pulses of electrical energy, one of said discrete pulses causing said movable member to

move in one rotational direction until a portion of said movable member engages one of said stop members, whereupon said one stop member prevents further excursion of said movable member in said one rotational direction, said movable member then moving in the opposite rotational direction until a portion of said movable member engages the other of said stop members, whereupon said other of said stop members prevents further excursion of said movable member in said other rotational direction, said moving means then being energized by another of said discrete pulses of electrical energy to again move said movable member in said one rotational direction.

4,958,895

## OPTICAL WAVEGUIDES

Paul J. Wells, Cambridgeshire, and David Bloor, Breatwood, both of United Kingdom, assignors to GEC-Marconi Limited, Stanmore, United Kingdom

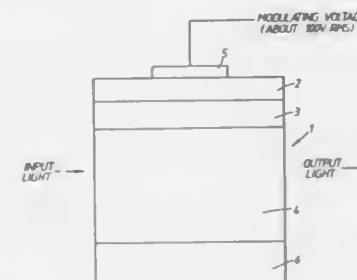
Filed Jun. 23, 1989, Ser. No. 370,307

Claims priority, application United Kingdom, Jun. 24, 1988, 8815087

Int. Cl.<sup>5</sup> G02B 6/10

U.S. Cl. 350—96.12

16 Claims



1. A thin film optical waveguide, comprising a polymeric waveguiding film supported on a substrate, the film comprising a polymer selected from the group consisting of homopolymers of vinylpyridine, homopolymers of derivatives of vinylpyridine in which the pyridine heterocyclic nucleus is substituted, copolymers containing a major proportion of vinylpyridine, and copolymers containing a major proportion of a derivative of vinylpyridine in which the pyridine heterocyclic nucleus is substituted.

4,958,896

## OPTICAL MULTI-GATE ELEMENT WITH AN ACOUSTO-OPTICAL MODULATOR

Ernst Brinkmeyer, Buchholz; Manfred Fuchs, Hamburg; Wolfgang Brennecke, Hamburg, and Wilhelm Dargatz, Hamburg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.

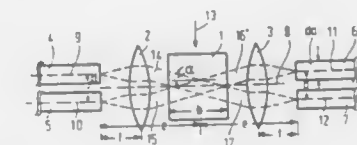
Filed Nov. 4, 1988, Ser. No. 267,158

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1987, 3737634

Int. Cl.<sup>5</sup> G02B 6/10

U.S. Cl. 350—96.13

26 Claims



1. Optical multi-port element with an acousto-optical modulator (AOM), which exhibits at one side at least two optical waveguides having end surfaces disposed in the focal plane of

a lens situated between the optical waveguides and the acousto-optical modulator, comprising a single lens disposed at least on one side of the AOM with its optical axis parallel to the transmission axis of the AOM, and in that the optical waveguides are disposed with their axes parallel to one another and spaced from the optical axis of the lens, the distance,  $d$ , between the axes of the optical waveguides being chosen so that light beams emanating from said waveguides and impinging said lens are directed by the lens to the active region of the AOM at the Bragg angle,  $\alpha$ , with respect to said AOM optical axis.

4,958,897

# THIN FILM OPTICAL COMPONENT FOR USE IN OPTICAL TRANSMISSION LINES AND METHOD OF MANUFACTURING THE SAME

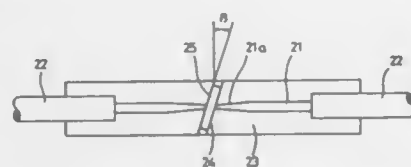
Hirohiko Yanagawa; Toshihiro Ochiai; Hirokazu Hayakawa, and Hidehisa Miyazawa, all of Ichihara, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan  
Filed Jun. 16, 1989, Ser. No. 367,769

Claims priority, application Japan, Jun. 29, 1988, 63-159357; Oct. 27, 1988, 63-269551

Int. Cl.<sup>5</sup> G02B 6/26

U.S. Cl. 350—96.15

10 Claims



1. An optical component for use in optical transmission lines, comprising:
  - an optical fiber having a spot-size enlarged portion in which a spot size is enlarged at an intermediate portion of the optical fiber; and
  - an optical member comprising a thin film element arranged across said spot-size enlarged portion of the optical fiber, said thin film element including means for optically operating on light transmitted to said spot-size enlarged portion of the optical fiber.

4,958,898

# SILICON DOUBLE-INJECTION ELECTRO-OPTIC MODULATOR WITH INSULATED-GATE AND METHOD OF USING SAME

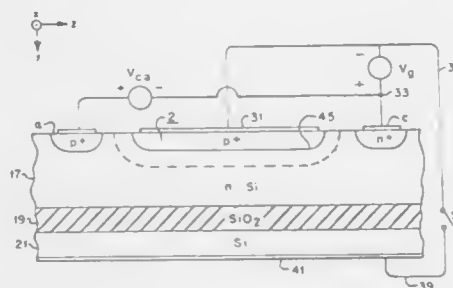
Lionel Friedman, Holden, and Richard A. Soref, Newton Centre, both of Mass., assignors to The United States of America as Represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 15, 1989, Ser. No. 323,738

Int. Cl.<sup>5</sup> G02B 6/10; H01L 29/06

U.S. Cl. 350—96.14

39 Claims



1. Apparatus for changing the refractive index of a light

transmitting semiconductor waveguide having a longitudinal axis comprising:

- (a) a light transmitting semiconductor waveguide;
  - (b) injection means for producing a flow of free carriers along a carrier conduction channel within said light transmitting semiconductor waveguide; and
  - (c) gate control means for controlling the effective cross-sectional area of said carrier conduction channel by inducing at least one depletion region within said light transmitting semiconductor waveguide.
20. A method of phase modulating a light beam comprising the steps of:
- (a) propagating a light beam along the longitudinal axis of a light transmitting semiconductor waveguide;
  - (b) injecting a flow of free carriers into said light transmitting semiconductor waveguide, overlapping the lowest-order fundamental guided mode optical field of said light beam;
  - (c) producing at least one depletion region within said light transmitting semiconductor waveguide adjacent to said flow of free carriers; and
  - (d) altering the size of said depletion region for controlling the effective cross-sectional area of said flow of free carriers.

4,958,899

# ANNULAR OPTICAL FIBER SUPPORT WITH RADIAL GAS JETS

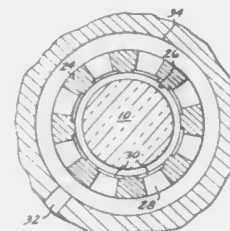
James R. Rochester, Tucson, Ariz., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 21, 1989, Ser. No. 454,348

Int. Cl.<sup>5</sup> G02B 6/26, 6/00; B23Q 3/00, 3/08

U.S. Cl. 350—96.20

17 Claims



10. Apparatus for stabilizing the position of an optical fiber, comprising:

- a housing base having an outwardly facing recess therein and a bore extending through the housing base from the bottom of the recess;
- a housing plate retainer having an outwardly facing recess therein and a bore extending through the housing base from the bottom of the recess, the housing plate retainer being removably attached to the housing base such that the bore of the housing base is aligned with the bore of the housing plate retainer;
- a flow control plate having a bore therethrough, the flow control plate being captured between the housing plate retainer and the housing base at a location such that the bore of the flow control plate is aligned with the bore of the housing base and the bore of the housing plate retainer to form a bore through the entire apparatus, the thickness of the flow control plate being selected such that a portion of the housing plate retainer is spaced apart from the facing portion of the housing base to form an annular plenum around the flow control plate, the flow control plate further having a plurality of etched gas passages therein extending radially from the annular plenum to the bore; and

means for providing a flow of gas to the annular plenum.

4,958,900

# MULTI-FIBER HOLDER FOR OUTPUT COUPLER AND METHODS USING SAME

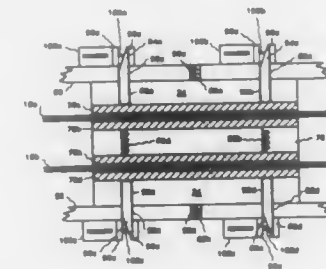
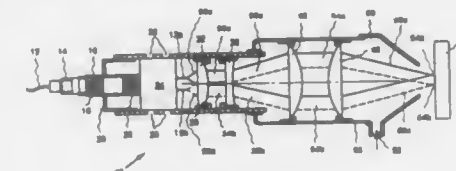
Angel L. Ortiz, Jr., Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 27, 1989, Ser. No. 329,159

Int. Cl.<sup>5</sup> G02B 6/32

U.S. Cl. 350—96.18

19 Claims



1. A holder for use with a plurality of optical fibers, each optical fiber including an output end portion and an output end, said holder comprising:

- a body having a central bore for receiving each fiber output end portion, said body including at least one hole; and
- means, disposed in said bore, for adjusting the orientation of at least one optical fiber output end portion with respect to each other optical fiber output end portion thereby adjusting the relative orientation of the output end of the one optical fiber relative to each other output end of each other optical fiber, said adjusting means comprising a screw disposed in said hole and extending into said bore and a spring disposed in said bore for urging the one fiber towards said screw whereby adjusting an extent to which said screw extends into said bore causes a change in the relative orientation of the one optical fiber output end.

4,958,901

# METHOD FOR MAKING A MULTI-LUMEN EPIDURAL-SPINAL NEEDLE AND TIP AND STOCK CONFIGURATION FOR THE SAME

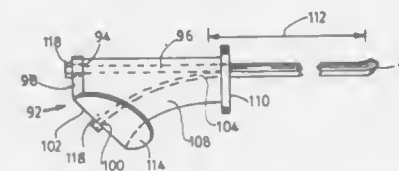
Dennis W. Coombs, Etna, N.H., assignor to Neurodelivery Technology, Inc., Tempe, Ariz.

Continuation-in-part of Ser. No. 72,428, Jul. 13, 1987, Pat. No. 4,808,157. This application Feb. 27, 1989, Ser. No. 316,037

Int. Cl.<sup>5</sup> A61M 3/00

U.S. Cl. 604—44

18 Claims



7. An improved needle stock for a epidural-spinal needle having a bonded region where an epidural lumen and an introducer lumen are bonded and an unbonded region where the lumina diverge, the improvement comprising:

- a face plate having first reference surface with a first passage

there through and a second reference surface with a second passage there through, said second reference surface being inclined with respect to the first reference surface such that the epidural lumen will pass through said first reference surface substantially normal to said first reference surface and the introducer lumen will pass through said second reference surface substantially normal to said second reference surface.

4,958,902

# OPTICAL SPACE TRANSMISSION APPARATUS

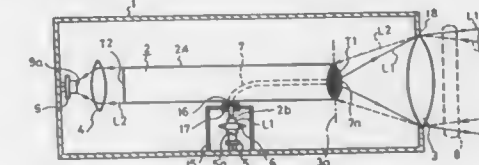
Yujiro Ito, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan  
PCT No. PCT/JP88/00198, § 371 Date Oct. 25, 1988, § 102(e) Date Oct. 25, 1988, PCT Pub. No. WO88/06740, PCT Pub. Date Sep. 7, 1988

PCT Filed Feb. 25, 1988, Ser. No. 269,661

Claims priority, application Japan, Feb. 27, 1987, 62-28483  
Int. Cl.<sup>5</sup> G02B 6/32

U.S. Cl. 350—96.18

7 Claims



1. An optical space transmission apparatus for use in conjunction with an optical space transmission line over which light information signals can be sent or received, and being of the type which includes a light emitting element for generating light signals to be transmitted over the optical space transmission line, a light receiving element for detecting light received from the optical space transmission line, a transmission/reception common lens which is optically coupled to the optical space transmission line, and a transmission/reception light splitter optically connecting the transmission/reception common lens with the light emitting element and the light receiving element, wherein the improvement comprises that the transmission/reception light splitter includes at least one optical fiber and in that one end portion of the optical fiber is positioned near the focal plane of the transmission/reception common lens and near, or on its optical axis, and the other end of the optical fiber is optically coupled to the light emitting element whereby light transmitted or received by the apparatus is spatially split near the end portion of the optical fiber which is closest to the transmission/reception common lens.

4,958,903

# SPLICE CLOSURE

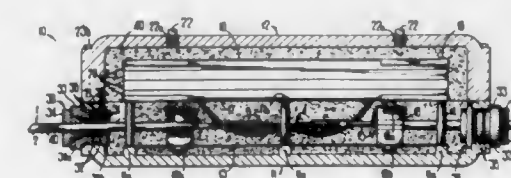
Gary S. Cobb, Norcross, and Phillip M. Thomas, Lake City, both of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 9, 1988, Ser. No. 282,811

Int. Cl.<sup>5</sup> G02B 6/36, 7/26

U.S. Cl. 350—96.20

6 Claims



1. A cable splice closure comprising:
  - an upper housing;
  - a lower housing having end portions comprising:



circular cable entrances to the lower housing interior; and a plurality of fixed mounting means extending from the surface of said lower housing interior; an end-seal assembly for introducing a cable into said lower housing interior and sealing each of said entrances, each said assembly comprising: insert means having an axial passage and an exterior surface extending through said lower housing entrance; first sealing means disposed on said exterior surface and contacting said lower housing entrance; second sealing means for contacting a cable contained in said passage; locking means mounted into said passage and having an axial passage and an interior end, for compressing said second sealing means onto a cable; and retaining means engaging said insert means exterior surface and said lower housing end portions; means secured to said lower housing fixed mounting means for containing in layered relation a plurality of splices; and means for anchoring to the interior floor mounting means for housing, respective ends of a cable extending through said insert means axial passage.

4,958,904

## OPTICAL SLIP RING

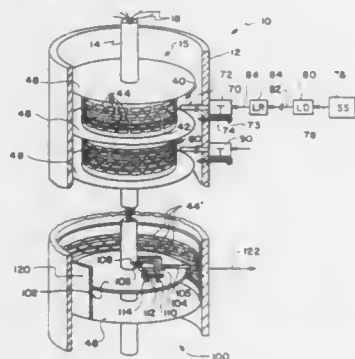
John M. Rawski, Maple Grove, Minn., assignor to Honeywell, Inc., Minneapolis, Minn.

Filed Oct. 23, 1987, Ser. No. 112,317

Int. Cl.<sup>5</sup> G02B 6/36

U.S. Cl. 350—96.20

17 Claims



1. An optical slip ring comprising: first and second relatively rotatable members; a source of first frequency, binary coded pulses; a single optical fiber having a first end connected to the source to receive the pulses and having a second end operable to transmit a beam of radiation which fluctuates at the first frequency in accordance with the binary code; a plurality of radiation detectors connected in parallel and spaced on the first member in a pattern of alternate rows of detectors with each row being offset from adjacent rows so that at least one of the detectors will receive the beam when the members are rotating, regardless of their relative position; and adjustable means mounting the fiber on the second member to adjust the distance between the second end of the fiber and the detectors to restrict the spread of the beam.

#### 4,958,905 METHOD AND APPARATUS FOR FORMING HIGH STRENGTH SPLICES IN OPTICAL FIBERS

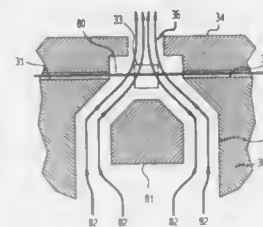
Arthur R. Tynes, 120 Bruce Rd., Red Bank, N.J. 07701, and Eric W. Mies, 25 Canyon Woods, Matawan, N.J. 07747

Filed Jan. 19, 1989, Ser. No. 368,260

Int. Cl.<sup>5</sup> G02B 6/38

U.S. Cl. 350—96.21

16 Claims



1. A method for splicing a pair of silicon based optical fibers comprising the steps of: holding an end of each of two optical fibers to be spliced in a corresponding one of a pair of longitudinally-spaced coaxially-aligned grooves formed in a heat treating holder; coaxially aligning the ends of said fibers held in the heat treating holder; heating said fiber ends situated in a region between said grooves in said heat treating holder to a temperature sufficiently high to fuse said fibers together; and directing, simultaneously with said heating, a flowing non-reactive or inert gas through said region over the ends of the fibers in order to remove evaporated silicon therefrom.

4,958,907

## COMPUTER SCREEN MAGNIFIER

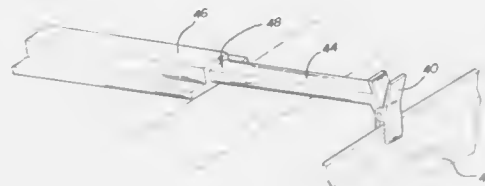
Dale G. Davis, 8228 Paige, Warren, Mich. 48089

Filed Jan. 17, 1989, Ser. No. 297,038

Int. Cl.<sup>5</sup> G02B 7/02

U.S. Cl. 350—243

4 Claims



1. A holder for adjustable positioning a flat sheet magnifier proximate a video display terminal comprising: mounting means for retaining said magnifier, said mounting means including a spring biased clamping device for securely holding said magnifier thereto; and means for supporting and extensibly positioning said mounting means in a predetermined, spaced-apart relationship with said terminal, said means including at least one support arm having said clamping device disposed at one end thereof, and a flat, rectangular retaining block securely affixed to said terminal.

#### 4,958,908 BANDWIDTH-PRESERVING BRILLOUIN PHASE CONJUGATE MIRROR AND METHOD

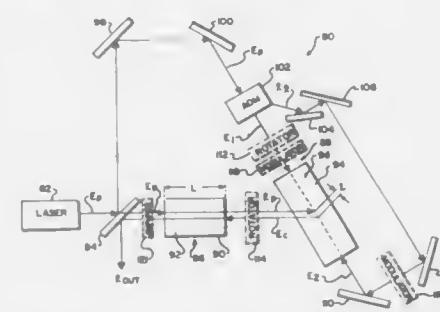
Davis A. Rockwell, Santa Monica; Richard C. Lind, Woodland Hills, and David M. Pepper, Malibu, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 15, 1989, Ser. No. 323,649

Int. Cl.<sup>5</sup> G02B 27/10

U.S. Cl. 350—311

19 Claims



1. A method of generating a narrow bandwidth output optical beam as a phase conjugated reflection of a narrow bandwidth input optical beam, comprising the steps of: (a) splitting a narrow bandwidth coherent optical beam from a laser source into a first component constituting the input beam and second and third components constituting first and second reference beams respectively; (b) applying the input beam through a Brillouin amplifier to a four wave mixer, which includes a nonlinear medium, to generate a phase conjugated optical seed beam in counter-propagation with the input beam; (c) downshifting the frequency while preserving the narrow bandwidth of either the first or second reference beam by a Stokes frequency of the nonlinear medium in the four wave mixer; (d) directing the first and second reference beams into the four wave mixer in counterpropagation with each other; and (e) applying the seed beam to the Brillouin amplifier to transfer energy from the input beam to the seed beam and thereby amplify the seed beam to constitute the output beam.

4,958,909

#### METHOD OF ADJUSTING LIGHT SOURCE POSITION IN CONVERGENCE DEVICE EMPLOYING SPHEROIDAL MIRROR

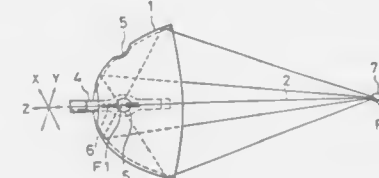
Nobuhiko Kubo, Hino, Japan, assignor to Yamashita Denso Corporation, Tokyo, Japan

Filed Nov. 30, 1989, Ser. No. 443,309

Int. Cl.<sup>5</sup> G02B 5/10

U.S. Cl. 350—320

2 Claims



1. A method of adjusting a light source position in a convergence device having a spheroidal mirror and a discharge tube disposed within said spheroidal mirror, such that the vicinity of a tip of a cathode of the discharge tube is generally aligned with a first focal point of the spheroidal mirror whereby light

from the discharge tube converges at a second focal point, and wherein two peep holes are provided in the spheroidal mirror at locations corresponding to a plane surface including said first focal point and perpendicular to an optical axis of the spheroidal mirror, wherein in said peep holes are offset by 90 degrees with respect to one another in said plane surface, said method including the steps of: projecting light from a point source or an optical fiber light guide from said second focal point toward said spheroidal mirror, such that said projected light converges at said first focal point, when said discharge tube is off; observing said projected light and said discharge tube through said two peep holes; and adjusting the position of the discharge tube based upon the observed position of the projected light and the discharge tube from said two peep holes, such that the vicinity of the tip of the cathode of the discharge tube is aligned with said first focal point.

4,958,910

## RADIATION PULSE GENERATION

James R. Taylor, London, Great Britain; Anderson S. L. Gomes, Recife, and Artur D. Gouveia-Neto, Macio, both of Brazil, assignors to British Telecommunications public limited company, Great Britain

PCT No. PCT/GB88/00260, § 371 Date Jan. 31, 1989, § 102(e) Date Jan. 31, 1989, PCT Pub. No. WO88/08150, PCT Pub. Date Oct. 20, 1988

PCT Filed Mar. 31, 1988, Ser. No. 282,219

Claims priority, application United Kingdom, Apr. 6, 1987, 8708148

Int. Cl.<sup>5</sup> G02B 27/00, 6/26

U.S. Cl. 350—321

8 Claims



1. A radiation pulse generating assembly comprising: a radiation generator for generating pulses of radiation; a waveguide into which pulses of radiation at working intensities from the radiation generator are coupled, the waveguide causing the radiation pulses to undergo Raman scattering to generate reduced width pulses with wavelengths lying within a Raman spectrum; and filtering means into which the reduced width pulses are coupled for selecting reduced width pulses within a desired wavelength band.

4,958,911

#### LIQUID CRYSTAL DISPLAY MODULE HAVING HOUSING OF C-SHAPED CROSS SECTION

John L. Beiswenger, Salem, Wis., and Darrell N. Chelcun, Buffalo Grove, Ill., assignors to Jonnad, Inc., Chicago, Ill.

Filed Oct. 19, 1988, Ser. No. 259,802

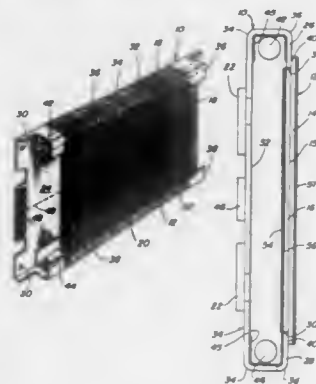
Int. Cl.<sup>5</sup> G02F 1/13; H03K 5/02

U.S. Cl. 350—331 R

34 Claims

13. A liquid crystal display module which comprises: a liquid crystal display comprising liquid crystal material entrapped in a substantially planar area; a housing of essentially C-shaped cross-section, said liquid

crystal display being attached to opposed ends of the C-shaped cross-section of said housing;  
 electronic control means positioned on said housing, said electronic control means being carried on the side of said housing which is opposed to said liquid crystal display;  
 conductor means carried by said housing and providing electronic communication between said electronic control



means and said liquid crystal display; at least part of said conductor means extending about an exterior curved surface portion of said housing defined by said C-shaped cross-section; and  
 said housing carrying, within said C-shaped cross-section, light producing means comprising at least one light source to provide back illumination of said liquid crystal display.

4,958,912

## IMAGE FORMING APPARATUS

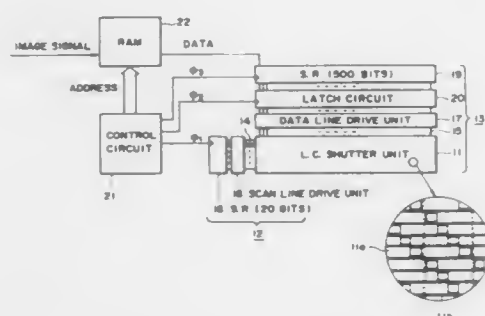
Yutaka Inaba, Kawaguchi; Hideyuki Kawagishi, Fujisawa; Makoto Kojima, Hino, and Shuzo Kaneko, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Japan  
 Filed Jul. 6, 1988, Ser. No. 215,791

Claims priority, application Japan, Jul. 7, 1987, 62-167835; Jul. 31, 1987, 62-191864

Int. Cl.<sup>5</sup> G02F 1/13; G09G 3/00

U.S. Cl. 350—333

16 Claims



1. An image forming apparatus comprising:  
 a light source;

an optical shutter unit comprising a pair of parallel substrates respectively having a plurality of scanning electrodes and a plurality of data electrodes disposed to intersect with each other to form a matrix electrode structure on opposite surfaces thereof and a ferroelectric liquid crystal disposed between said pair of substrates so as to form respective microshutters at each intersection of said scanning electrodes and said data electrodes, wherein said microshutters are arranged in a plurality of rows corresponding to said plurality of scanning electrodes;

an optical system for forming an image at a desired position with light transmitted through said optical shutter unit;  
 a photosensitive member;  
 a scanning line drive circuit for applying scanning voltage signals to said plurality of scanning electrodes so as to sequentially select at least one scanning electrode in a prescribed cycle;  
 a data line drive circuit for applying data voltage signals to said plurality of data electrodes in synchronism with said scanning voltage signal;  
 means for applying first image data to first ones of said microshutters on a first particular scanning electrode in a first scanning cycle and applying second image data associated with said first image data to provide desired gradation of the image to second ones of said microshutters on a second particular scanning electrode in a subsequent second scanning cycle;  
 means for controlling the scanning line drive circuit to provide different opening periods to said microshutters in respective rows; and  
 means for moving said photosensitive member so that a particular position on said photosensitive member corresponds to said first particular scanning electrode in the first scanning cycle, the particular position further corresponding to said second particular scanning electrode in the second scanning cycle.

4,958,913

## MAGNIFIER LENS ASSEMBLY

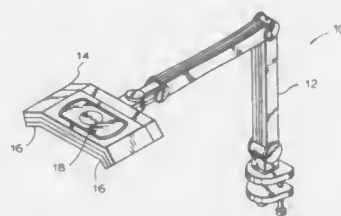
Irving Schaffer, Fairfield, Conn., assignor to Luxo Lamp Corporation, Port Chester, N.Y.

Filed Oct. 31, 1988, Ser. No. 265,042

Int. Cl.<sup>5</sup> G02B 7/02; F23Q 3/00

U.S. Cl. 350—252

12 Claims



1. A magnifier lens assembly mounted within a lamp head comprising:

a barrel housing; and  
 first, second and third lenses, each of said lenses having a convex surface, an opposing substantially planar surface and a center axis of symmetry of said convex surface;  
 said first, second and third lenses being mounted successively and coaxially within said barrel housing with the convex surface of said first lens facing the convex surface of said second lens, and the substantially planar surface of said second lens facing the convex surface of said third lens, and

means cooperating with said housing for securing the lenses in relatively fixed relation to each other and for securing said magnifier lens assembly within said lamp head; each of said first, second and third lenses being a circular plano-convex lens; said lamp head including a relatively flat mounting surface therein cooperating with said securing means for securing said assembly to the lamp head; said mounting surface having an opening formed therein; and said mounting surface being a sheet of transparent material.

4,958,914

## OPTICAL INTENSITY-TO-POSITION MAPPING AND LIGHT DEFLECTOR APPARATUS AND METHOD

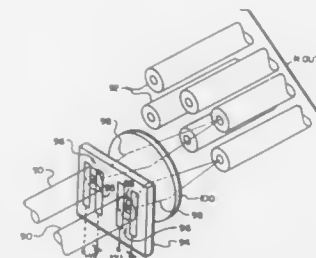
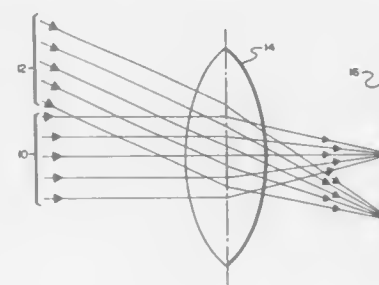
Yuri Owechko, Newbury Park, and Bernard H. Soffer, Pacific Palisades, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 879,719, Jun. 27, 1986, abandoned, and a continuation-in-part of Ser. No. 900,053, Aug. 25, 1986, abandoned. This application May 24, 1988, Ser. No. 198,018

Int. Cl.<sup>5</sup> G02F 1/13

U.S. Cl. 350—342

7 Claims



1. An optical intensity mapping apparatus comprising:  
 an array of modules formed from an electro-optic material comprising liquid crystals, said array of modules comprising an array of voltage gradient modules established in a layer of the electro-optic material,  
 means for establishing a variable spatial voltage gradient across the layer of electro-optic material in a gradient direction transverse to the input light so as to establish said array of voltage gradient modules, comprising an array of interdigitated electrodes on one side of the layer of electro-optic material, a counter electrode on the other side of the layer of electro-optic material, and voltage source means for applying voltages to the interdigitated electrodes and the counter electrode to establish spatial voltage gradients therebetween, the counter electrode comprising a substantially continuous electrode opposed to the array of interdigitated electrodes,  
 the voltage source means being connected to supply a first voltage to alternate electrodes of the interdigitated electrodes, and a second voltage in common to the intervening interdigitated electrodes and to the counter electrode,  
 means for receiving an input light beam whose optical intensity varies as a function of position within the beam,  
 means for spatially and temporally varying the voltage gradient of each module of said array of modules in accordance with the optical intensities at corresponding locations in the beam, said means for spatially and temporally varying comprising a layer of voltage modification material between the counter electrode and the electro-optic material, the voltage modification material being adapted to modify the module voltage gradients across the electro-optic layer in accordance with the optical intensities of the

received light at locations corresponding to the respective modules,  
 means for producing optical outputs from each module in directions which vary in accordance with the variations in the voltage gradient, such that the input optical intensities are mapped onto the directions of the optical outputs from each of the modules, and  
 focusing means in the path of the optical outputs adapted to focus the directionally-mapped outputs to a positional mapping of the input beam intensities.

4,958,915

## LIQUID CRYSTAL APPARATUS HAVING LIGHT QUANTITY OF THE BACKLIGHT IN SYNCHRONISM WITH WRITING SIGNALS

Shinjiro Okada, Kawasaki; Tohru Takahashi, Tokyo; Hideyuki Kawagishi, Tokyo; Yutaka Inaba, Kawaguchi, and Osamu Taniguchi, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Japan

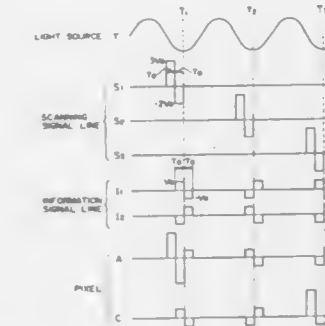
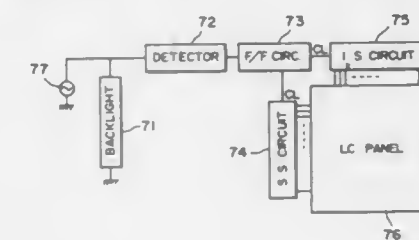
Continuation of Ser. No. 881,384, Jul. 2, 1986, abandoned. This application Feb. 13, 1989, Ser. No. 309,974

Claims priority, application Japan, Jul. 12, 1985, 60-152320; Oct. 21, 1985, 60-233563; Oct. 21, 1985, 60-233564; Oct. 21, 1985, 60-233565; Oct. 29, 1985, 60-240663

Int. Cl.<sup>5</sup> G02F 1/133

U.S. Cl. 350—345

16 Claims



1. A liquid crystal apparatus, comprising:

a liquid crystal panel comprising a plurality of scanning lines, a plurality of information signal lines, and an plurality of picture elements disposed along each of the scanning lines and comprising a ferroelectric liquid crystal;  
 a backlight disposed behind the liquid crystal panel for illuminating the liquid crystal panel, said backlight changing the light quantity emitted therefrom with the lapse of time at least between a low level and a high level; and  
 means for synchronizing the low level of the light quantity of the backlight with a writing period when a selection scanning signal is sequentially applied to said scanning lines in phase with information signals to provide a writing voltage signal of one or the other polarity exceeding a threshold of the ferroelectric liquid crystal, a nonwriting voltage not exceeding the threshold being applied in a



nonwriting period when at least one of the selection scanning signal and the information signal is not applied to the signal lines, and wherein the light quantity assumes the high level when both the selection scanning signal and the information signal are not applied to the signal lines.

4,958,916

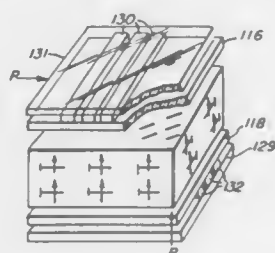
# **SURFACE STABILIZED FERROELECTRIC LIQUID CRYSTAL DEVICES**

Noel A. Clark, 3106 Kittrell Court, Boulder, Colo. 80303, and Sven T. Lagerwall, 30 Snackvagen, Goteborg, Sweden Division of Ser. No. 225,464, Jul. 28, 1988, Pat. No. 4,840,463, which is a division of Ser. No. 88,482, Aug. 19, 1987, Pat. No. 4,813,767, which is a continuation of Ser. No. 797,021, Nov. 12, 1985, abandoned, which is a division of Ser. No. 511,733, Jul. 7, 1983, Pat. No. 4,563,059, which is a continuation-in-part of Ser. No. 456,844, Jan. 10, 1983, abandoned, which is a continuation of Ser. No. 110,451, Jan. 8, 1980, Pat. No. 4,367,924. This application Mar. 3, 1989, Ser. No. 318,762 The portion of the term of this patent subsequent to Jan. 11, 2000, has been disclaimed.

Int. Cl.<sup>3</sup> G02F 1/13

U.S. Cl. 350—350 S

12 Claims



1. A liquid crystal device comprising:

a pair of substrates; and

a ferroelectric liquid crystal having a plurality of layers each comprised of a plurality of molecules, each molecule having a long axis, the long axes of said molecules in a bulk forming helices, said ferroelectric liquid crystal being disposed between said pair of substrates which are spaced by a distance sufficiently small to suppress the formation of said helices, said plurality of layers being aligned parallel to each other in one direction within the planes of said substrates, and said substrates and said ferroelectric liquid crystals causing an orientation state of said molecular long axes which corresponds to any of a plurality of different stable states.

4,958,917

# **ELECTROCHROMIC DEVICE FOR CONTROLLING TRANSMITTANCE OF LIGHT**

Chikara Hashimoto, Omiya; Hiroshi Inaba, Matsusaka; Kiyoshi Nakase, Mje, and Yukitoshi Yanagida, Matsusaka, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Jan. 23, 1989, Ser. No. 299,418

Claims priority, application Japan, Jan. 29, 1988, 63-9684[U] Int. Cl.<sup>3</sup> G02F 1/01

U.S. Cl. 350—357

3 Claims

1. An electrochromic device for controlling transmittance of light, comprising:

a transparent inner substrate with a transparent electrode layer coated on each side thereof;

first and second electrochromic layers which are formed on the electrode layers on the two opposite sides of said inner substrate, respectively, and are formed of one of a first electrochromic material which takes on a characteristic color in its electrochemically oxidized state and a second

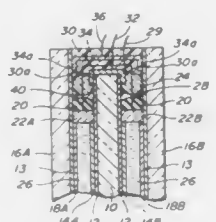
electrochromic material which takes on a characteristic color in its electrochemically reduced state;

a transparent first outer substrate which is coated with a transparent electrode layer and is arranged opposite to and spaced from said inner substrate such that the electrode layer of the outer substrate faces the first electrochromic layer, the outer substrate being dimensioned larger than said inner substrate;

a transparent second outer substrate which is coated with a transparent electrode layer and is arranged opposite to and spaced from said inner substrate such that the electrode layer of the second outer substrate faces the second electrochromic layer, the second outer substrate being dimensioned larger than said inner substrate;

third and fourth electrochromic layers which are formed on said electrode layer on said first outer substrate and said electrode layer on said second outer substrate, respectively, and are formed of the other of said first and second electrochromic materials;

a first peripheral seal formed of a butyl rubber base adhesive composition disposed in the space between the inner substrate and each of the first and second outer substrates so as to hold the inner substrate and the first and second outer substrates in the opposite and spaced arrangement and airtightly define a first space between the inner sub-



strate and the first outer substrate and a second space between the inner substrate and the second outer substrate and forming a peripheral gap between the first and second outer substrates, a peripheral region of the inner substrate protruding into said peripheral gap;

an electrolyte liquid which fills up said first space and said second space;

a first connector which is an angled strip of a sheet metal having two parallel leg portions and is fitted on said inner substrate such that said two parallel legs are respectively fixed to the transparent electrode layers on the two opposite sides of said inner substrate;

a second connector which is an angled strip of a sheet metal having two parallel leg portions and is fitted into a marginal region of the space between said first and second outer substrates such that said two parallel leg portions are respectively fixed to the transparent electrode layer on said first outer substrate and the transparent electrode layer on said second outer substrate;

a second seal formed of polysulfide rubber filling said peripheral gap such that said first connector and at least said leg portions of said second connector are embedded in the second seal;

a first lead which extends outward from said first connector through said first and second seals; and

a second lead which extends outward from said second connector.

4,958,918

# **OPTICAL SIGNAL CONTROL METHOD AND APPARATUS**

Nigel G. Walker, Ipswich, England, assignor to British Telecommunications public limited company, United Kingdom PCT No. PCT/GB88/00282, § 371 Date Jan. 3, 1989, § 102(e) Date Jan. 3, 1989, PCT Pub. No. WO88/08147, PCT Pub. Date Oct. 20, 1988

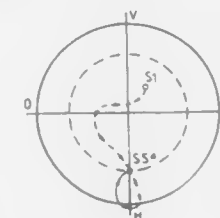
PCT Filed Apr. 13, 1988, Ser. No. 294,069

Claims priority, application United Kingdom, Apr. 16, 1987, 8709247

Int. Cl.<sup>3</sup> G02F 1/07, 1/09

U.S. Cl. 350—378

35 Claims



3. Apparatus for processing one or more optical signals to produce a desired polarisation transformation comprising:

at least one variable birefringent device adapted to provide a rotation of variable amount on the Poincaré sphere about an axis, or effective axis, of rotation which itself may be varied in direction in a plane which passes through the origin of the Poincaré sphere and

control means adapted to vary the amount of rotation on the Poincaré sphere produced by the birefringent device, and to vary the direction of the axis or effective axis about which the rotation takes place, so as to achieve the desired polarisation transformation;

and wherein said control means is arranged to vary the direction of the axis of rotation on the Poincaré sphere in such a manner as to prevent substantially the magnitude of the birefringence introduced by the device exceeding  $2\pi$  or a chosen multiple of  $2\pi$ .

4,958,919

# **COLOR-CORRECTED OPTICAL SYSTEMS WITH LIQUID LENS ELEMENTS**

Robert D. Sigler, Cupertino, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

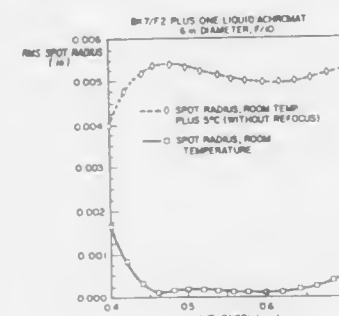
Continuation of Ser. No. 260,106, Oct. 20, 1988, abandoned.

This application Dec. 11, 1989, Ser. No. 449,439

Int. Cl.<sup>3</sup> G02B 1/06

U.S. Cl. 350—418

7 Claims



1. A color-corrected optical system comprising a plurality of refractive elements, a first one of said refractive elements consisting of a substantially rigid optical material, a second one of said refractive elements consisting of a substantially fluidal

optical material, said optical materials including at least one material having a substantially normal dispersion and at least one material having a substantially abnormal dispersion, said optical materials being compatible with each other so as to enable color correction to be achieved for at least three wavelengths.

4,958,920

# **PROCESS AND APPARATUS FOR THE AUTOMATIC FOCUSING OF MICROSCOPES**

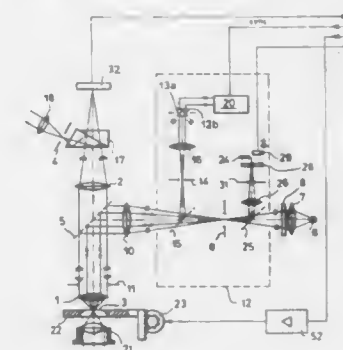
Reinhard Jorgens, Oberkochen, and Bernd Faltermeyer, Aalen, both of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Fed. Rep. of Germany Filed Aug. 18, 1989, Ser. No. 395,769

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1988, 3828381

Int. Cl.<sup>3</sup> G02B 21/26; G01J 1/20

U.S. Cl. 350—530

12 Claims



1. A method for the automatic focusing of a microscope having a stage for holding an object to be viewed by an objective lens, said stage and said lens being movably adjustable relative to each other by a focusing drive, and also having both active and passive focusing apparatus, comprising the steps of:

- activating said active focusing apparatus to generate a first focusing signal;
- operating said focusing drive in response to said first signal to adjust the distance between lens and stage to a first focus position;
- activating said passive focusing apparatus to generate a second focusing signal having a varying value;
- operating said focusing drive to vary the distance between stage and lens from said first focus position by moving one relative to the other through a search pass; and
- stopping said focusing drive at a final focusing position responsive to a predetermined value of said second signal.

4,958,921

# **LIGHT-DRIVEN PHASE SHIFTER**

James W. Early, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 19, 1986, Ser. No. 909,746

Int. Cl.<sup>3</sup> G02B 5/172, 6/36

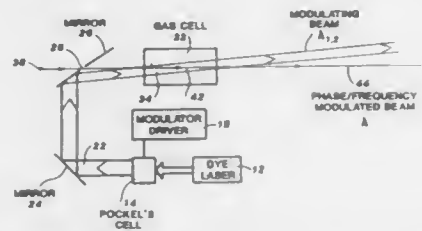
U.S. Cl. 350—354

7 Claims

1. A light driven phase shifter, comprising: a modulating chamber having a gas with at least three electron energy states including a ground state, a metastable state, and a transition state having a transition energy from said metastable state, corresponding to a first light wavelength;

first light means for illuminating said modulating chamber with modulating light at said first wavelength along a first beam path, said first beam path defining a volume of said

gas having an index of refraction determinable by an intensity of said first light means;  
second light means for illuminating said modulating chamber with a transmission light beam along a second beam



path traversing at least a portion of said first beam path;  
and  
means for varying said intensity of said first light means effective to vary said gas index of refraction for phase shifting said transmission light.

4,958,922

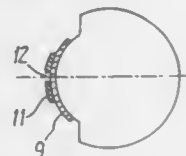
## UNIVERSAL VISION CORRECTOR

Paul Binh, 17, rue Dailly, 92210 Saint-Cloud, and Paul Blanié, 282, rue St-Jacques, 75006 Paris, both of France  
Continuation of Ser. No. 133,258, Dec. 14, 1987, abandoned, which is a continuation of Ser. No. 752,193, Jun. 24, 1985, abandoned. This application Mar. 6, 1989, Ser. No. 319,904  
Claims priority, application France, Oct. 28, 1983, 831244; Jul. 19, 1984, 8411447; Oct. 12, 1984, 8400388; PCT Int'l Appl., Oct. 26, 1984, PCT/FR84/00244

Int. Cl.<sup>5</sup> G02C 7/16

U.S. Cl. 351-46

38 Claims



1. An apparatus for correcting vision using at least one lens, comprising: at least one transparent zone situated on the axis of vision of each said lens, said transparent zone having a surface area of between about 0.2 and 3.5 mm<sup>2</sup>; and at least one opaque zone surrounding said transparent zone, said opaque zone having an average diameter of between about 3 and 8 mm.

4,958,923

## APPARATUS FOR DECORATING AN EYEGLASS FRAME

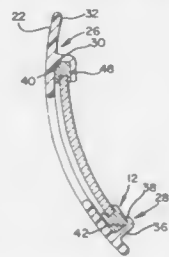
Andrew S. Rosenson, 3705 W. Greenwood, Skokie, Ill. 60076  
Filed Feb. 24, 1989, Ser. No. 315,150  
Int. Cl.<sup>5</sup> G02C 11/02, 7/08, 1/04

U.S. Cl. 351-52

14 Claims

1. An apparatus for decorating an eyeglass frame, said eyeglass frame having a width and a height, said width being greater than said height; said eyeglass frame further having a frame member defining a pair of eyepiece receiving means for receiving lenses; said eyeglass frame further having an edge and a plurality of protuberances arrayed along said edge; the apparatus comprising a decorative frame member having integral engagement means for removably affixing said decorative frame member to said eyeglass frame, said engagement means comprising at least one upper engagement member and at least one lower engagement member, said at least one upper engagement member comprising a channel depending from a first face of said decorative frame, said channel having a width appropriate for nestingly engaging said eyeglass frame, said channel also having a groove for receiving said plurality of protuberances when said decorative frame is affixed to said eyeglass frame, said at least one lower engagement member depending from said first face and configured for snappingly engaging said eyeglass frame when said eyeglass frame is nestingly engaged in said channel and said decorative frame member is

urged against said eyeglass frame, with at least said one upper engagement member and said at least one lower engagement



4,958,924

## LOW VISION EYE GLASSES

William S. Parker, 3210 Corrine Dr., Orlando, Fla. 32803  
Continuation-in-part of Ser. No. 777,829, Sep. 9, 1985, Pat. No. 4,772,113. This application Sep. 1, 1988, Ser. No. 239,449  
The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> G02C 7/06, 7/08

U.S. Cl. 351-57

8 Claims



1. A method of enhancing visual acuity in a person suffering from severe vision deterioration due to loss of light response in portions of the person's retina, the method comprising the steps of:

- converging image bearing light rays from an object being viewed to form a magnified image of the object;
- diverging the magnified image to correct for magnification; focusing the diverged image onto optically responsive portions of a person's retina;
- directing additional ambient light onto the person's retina for enhancing image response by:
  - providing a diverging lens; and
  - forming a prism ring circumscribing a surface of the diverging lens and positioned so as to direct ambient light toward the person's retina.

4,958,925

## EYE MOVEMENT MEASUREMENT DEVICE WITH MULTIPLE LIGHT EMITTING AND DETECTING ELEMENTS

Jan K. Ober, Poznan, Poland, and Per Udden, Hofstrasse 1, CH-6064 Kerns, Switzerland, assignors to Per Udden, Kerns, Switzerland

Filed Sep. 14, 1988, Ser. No. 244,160

Claims priority, application Sweden, Sep. 21, 1987, 8703639

Int. Cl.<sup>5</sup> A61B 3/14

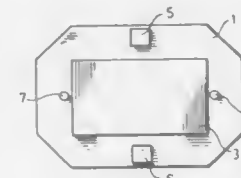
U.S. Cl. 351-210

8 Claims

1. A device for measuring the movements of an eye, comprising:

- a supporting frame having an aperture;
- a first pair of light emitting elements arranged on opposite sides of said supporting frame and located in a first plane;
- a first pair of light detecting elements arranged on opposite sides of said supporting frame and located in a second plane which is orthogonal to said first plane; and

wherein said first pair of light emitting elements and said first pair of light detecting elements are arranged symmetri-



cally about said eye and cooperate in detecting movement of said eye.

4,958,926

## CLOSED LOOP CONTROL SYSTEM FOR LASER

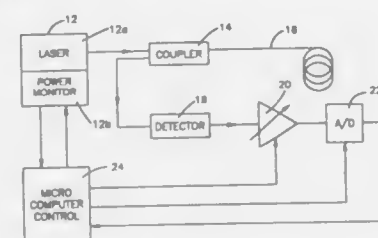
George Bu-Abud, Plano, Tex., assignor to Reliance Comm/Tec Corporation, Chicago, Ill.

Filed Oct. 31, 1988, Ser. No. 264,356

Int. Cl.<sup>5</sup> G01N 21/88; H01S 3/133

U.S. Cl. 356-73.1

17 Claims



1. An instrument comprising:

- laser means responsive to a current pulse for generating output light to an optical fiber;
- means for detecting light from said fiber when said laser means output light is connected to said fiber and generating an electrical signal having an amplitude whose range is related to the intensity range of said light;
- means having a predetermined operating range and an adjustable gain for providing an output signal having an amplitude range which is said electrical signal amplitude range multiplied by said adjustable gain;
- means for determining when said output signal amplitude range is not substantially equal to said predetermined operating range; and
- means responsive to said determining means for continuously controlling said adjustable gain and the amplitude of said current pulse to thereby change said output signal amplitude range so that it is substantially equal to said predetermined operating range.

4,958,927

## OPTICAL ANGLE MEASURING INSTRUMENT

Gerd Finster, Hamburg, Fed. Rep. of Germany, assignor to C. Plath Fabrik Nautischer Instrumente, Del.X

Filed Jan. 23, 1989, Ser. No. 299,873

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1988, 3801553

Int. Cl.<sup>5</sup> G01B 11/26; G01C 1/08

U.S. Cl. 356-140

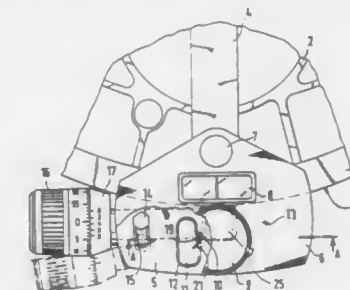
8 Claims

1. In an optical angle measuring instrument of the type that includes an alidade that is pivotally mounted on a limb and has a free end, a measuring drum that is pivotally articulated on the free end of the alidade perpendicularly to the axis of an alidade bearing and having a drum screw engaged to a limb tooth, the improvement comprising:

- a manually rotatable switching member;
- said member being mounted on said alidade and rigidly

connected to a switching pin passing through a slot in an alidade plate;

- said pin being located eccentrically with respect to a switching member mount;
- said pin being so located that said drum screw, under the action of a stop element, is switchable between two stable



4,958,928

## PHOTODIODE ARRAY SPECTROMETER

Hubert Kuderer, Waldbraun, Fed. Rep. of Germany, assignor to Hewlett-Packard Company, Palo Alto, Calif.

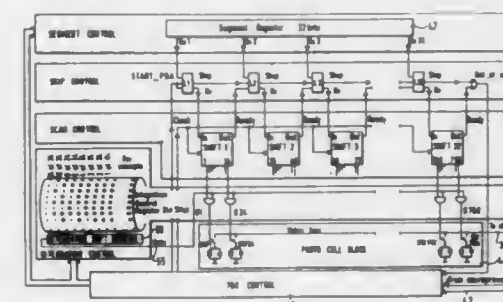
Filed Apr. 14, 1989, Ser. No. 338,265

Claims priority, application European Pat. Off., Aug. 17, 1988, 8811346.6

Int. Cl.<sup>5</sup> G01J 3/18, 3/42

U.S. Cl. 356-328

8 Claims



1. Spectrometer for determining the spectral composition of a polychromatic beam of radiation, comprising:

- an array of photosensitive elements (1, 2, . . . , n) with each element intercepting a different wavelength range of the polychromatic beam of radiation,
- a plurality of transfer switches (SW1, . . . , SWn), each switch being connected to a photosensitive element, having a control input terminal for controlling the opening and closing of the switch, and having an output terminal, and
- read-out circuitry connected to the transfer switches for opening or closing the transfer switches and for generating during a read-out cycle signals indicative of the amount of radiation intercepted by the photosensitive elements,

characterized in that the read-out circuitry comprises a switch control circuit (41,43,44,45,46) which is designed for controlling the transfer switches (SW1, . . . , SWn) in



selectable groups (SW1-SW24; SW25-SW48; . . . ) of switches such that during a read-out cycle only selected groups of photosensitive elements (1-24; 25-48; . . . n) are read out, with such selected groups comprising less than the whole array of photosensitive elements.

4,958,929

## OPTICAL FIBER SENSOR

Michio Kondo, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

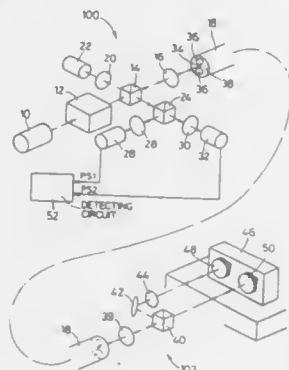
Filed Feb. 6, 1989, Ser. No. 306,165

Claims priority, application Japan, Feb. 10, 1988, 63-29313

Int. Cl.<sup>3</sup> G01B 9/02

U.S. Cl. 356-345

8 Claims



1. An optical fiber sensor comprising: optical fiber means for transmitting a first and a second linearly polarized laser beam in a first and a second transmission mode which have mutually perpendicular polarization planes, such that said polarization planes are maintained;
- a light-transmitter/receiver portion for producing said first and second linearly polarized beams such that said beams have different frequencies, and directing said first and second linearly polarized beams to said optical fiber means so that the beams are transmitted in said respective two transmission modes in a first direction from a proximal end of the optical fiber means to a distal end thereof, said light transmitter/receiver portion receiving and detecting a reference and a measuring beam which have been returned through said optical fiber means in a second direction from said distal end toward said proximal end;
- a sensor head portion operable to receive said first and second linearly polarized beams transmitted through said optical fiber means in said first direction, and split the received beams into said reference and measuring beams, such that each of said reference and measuring beams consists of two components having mutually perpendicular polarization planes corresponding to those of said first and second linearly polarized beams, said sensor head portion causing a transmission parameter of at least said measuring beam to be influenced by a change of an external subject, combining the reference and measuring beams, and returning the combined beams to said light transmitter/receiver portion through said optical fiber means in said second direction; and
- said sensor head portion including means for rotating by 90 degrees the polarization planes of said two components of one of said reference and measuring beams, in opposite directions, before said reference and measuring beams are combined and are incident upon said distal end of said optical fiber means in said second direction, for transmission through said optical fiber means in said second direction.

4,958,930

## APPARATUS FOR MONITORING THICKNESS VARIATIONS IN A FILM WEB

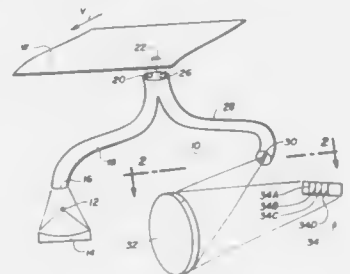
Charles W. Robertson, Jr., Centerville, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 11, 1985, Ser. No. 807,517

Int. Cl.<sup>3</sup> G01B 9/02

U.S. Cl. 356-357

7 Claims



1. An inspection apparatus for monitoring, on-line, variations in thickness of a traveling web comprising: a polychromatic radiation source; means for directing radiation from the source onto a predetermined portion of the web as the same moves with respect to the source to generate an interference fringe pattern by the interferometric action of the surfaces of the web; and means for monitoring a predetermined one of fringes in the pattern and for generating an electrical signal the amplitude and polarity of which are functionally related to the magnitude and direction, respectively, of the displacement of the fringe thereby to provide an indication as to corresponding variations in web thickness.

4,958,931

## SYSTEM UTILIZING AN ACHROMATIC NULL LENS FOR CORRECTING ABERRATIONS IN A SPHERICAL WAVEFRONT

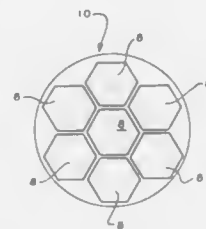
Berge Tatian, Middlesex, Mass., assignor to Litton Systems, Inc., Lexington, Mass.

Filed Apr. 14, 1989, Ser. No. 338,826

Int. Cl.<sup>3</sup> G01B 9/02

U.S. Cl. 356-360

18 Claims



1. A wavefront correction system for correcting the spherical aberrations in a polychromatic wavefront of light caused by reflecting the wavefront off a concave aspherical reflecting surface, the system comprising: a light source for generating an original wavefront of polychromatic light; an achromatic null lens to which the wavefront is directed, the null lens comprising a zero power lens combination and a concave mirror arranged such that the light entering the null lens passes through the zero power lens combination, reflects off the mirror, and is refocused back through the zero power lens combination to exit the null lens;

a concave aspherical reflecting surface in the path of the light exiting the null lens such that the light reflects off the concave aspherical reflecting surface, and retraces the path, passing a second time through the null lens, the light being once again refocused by the null lens and; means for reflecting light from said null lens toward said concave aspherical reflecting surface and for directing at least a portion of the light exiting from said null lens after being reflected from said concave aspherical reflecting surface toward an interferometer.

4,958,932

## OPTICAL MEASURING APPARATUS

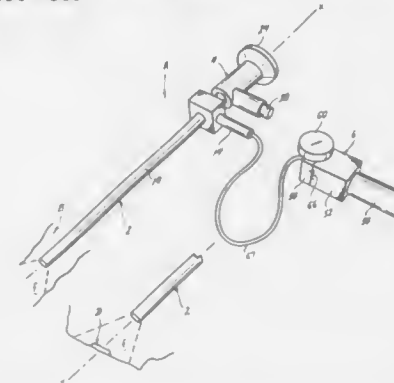
Jerry T. Kegelman; Joseph C. Krowitz, and Rodney Lusk, all of St. Louis County, Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Aug. 18, 1988, Ser. No. 234,169

Int. Cl.<sup>3</sup> G01B 11/00

U.S. Cl. 356-383

22 Claims



1. A measuring apparatus for measuring the distance between two locations on a surface without actually contacting the surface at those locations, said measuring apparatus comprising: a scope through which one may look to observe the surface, that scope having a distal end which is presented toward the surface to be observed and a proximal end that is located remote from the surface, the scope further having an optical axis and providing a field of view which lies beyond its distal end, the scope displaying reference marks within the field of view; a source of light; optical measuring means for projecting light derived from the source of light into the field of view to at least two regions spaced around the optical axis, for within each region presenting the light at localized areas spaced differently from the optical axis, for changing the localized areas at which the light is presented in each region, and for correlating the localized areas with units of linear measure, so that when the light at two localized areas is reflected from the surface within the field of view and the localized areas align with the reference marks, the distance between the two localized areas from which the light is reflected is known.

4,958,933

## COOLER-EXTRUDER DEVICE

Paul Zakich, 721 Cliffside Dr., Akron, Ohio 44313

Filed Nov. 25, 1988, Ser. No. 275,923

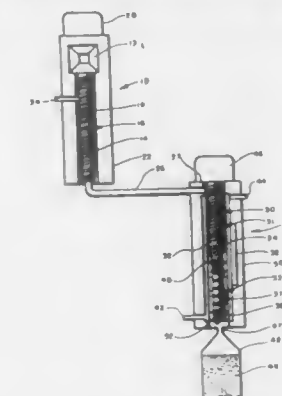
Int. Cl.<sup>3</sup> B29B 1/06

U.S. Cl. 366-81

13 Claims

1. A cooler-extruder employing a compound feed screw which includes a flights' section adjacent to a wiper section, and which is positioned in a first barrel to propel plastic material in said first barrel through said flights' section, and then through said wiper section, wherein said flights' section comprises a helical spiral ridge which forms an integral part of, and around a rotatable shaft, and said wiper section comprises a plurality of wiper blade assemblies tangentially mounted on pairs of spaced apart, raised circular ridges on said shaft, adjacent wiper assemblies being mounted radially displaced relative to each other, and wherein said first barrel is provided

with means for cooling the material being propelled there-through, said cooler-extruder being in communication with a primary foam extruder wherein a blowing agent is introduced



into melted plastic being propelled by a feed screw through a second barrel of said primary extruder, after which the plastic material is introduced into said cooler-extruder.

4,958,934

## METHOD AND APPARATUS FOR CONTINUOUS MELTING OF GELLED SUBSTANCE

Hirokazu Saito; Seichi Yukawa; Takashi Sato; Kiyoyuki Ushirokozi; Nobutoshi Aoyagi; Tomio Suzuki, and Minoru Tanaka, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

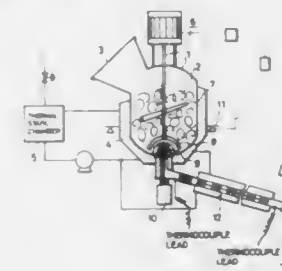
Filed May 4, 1987, Ser. No. 45,992

Claims priority, application Japan, May 2, 1986, 61-100998

Int. Cl.<sup>3</sup> B01F 15/06

U.S. Cl. 366-145

7 Claims

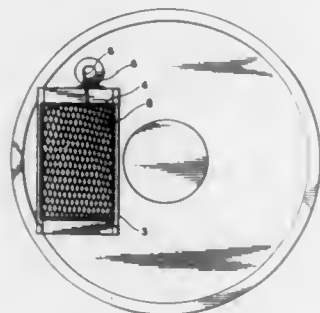


1. A continuous method for melting a gelled substance, comprising the steps of: charging a gelled substance into a tank; heating walls of said tank; agitating a central portion of said gelled substance charged into said tank, thereby imparting motion to an entire portion of said charged gelled substance; continuously separating a melt from the charged gelled substance by the combination of separately agitating a portion of said charged gelled substance located in an area around a melt discharge port and a separation screen, and simultaneously filtering said melt from said gelled substance using said screen; discharging said melt through said discharge port; measuring a flow of said melt out of said tank; and in response to said measuring step, controlling the rate of agitation of said gelled substance in said two agitating steps.

**4,958,935**  
**METHOD OF BREAKING UP BUNDLES OF ADHERENT HARD FIBERS AND AN OSCILLATING SCREEN**  
 Bygg S. Axelsson, Box 3100, S-780 64 Lima, Sweden  
 Filed Sep. 29, 1988, Ser. No. 250,925  
 Int. Cl.<sup>3</sup> B01F 11/00

U.S. Cl. 366—154

20 Claims



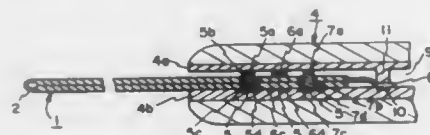
7. A method of breaking up bundles of adherent hard fibers, particularly steel fibers for defibering them to produce defibered or individualized fibers, and feeding said defibered or individualized fibers to a mixing device, the method comprising:

- vibrating said bundles of adhering fibers on an oscillating screen to obtain separated fibers;
- passing said separated fibers being aligned in a plane parallel to the plane of said screen through oblong openings of said screen, through which openings in the main only one fiber at a time can pass; and
- supplying by means of gravity and oscillating force said individual fibers to said mixing device spread over a large area, said area being larger than the areas of said screen.

**4,958,936**  
**ELECTRIC THERMOMETER**  
 Tamaki Sakamoto, Otokuni; Toshiyuki Kobayashi, Kyoto; Norihito Yamamoto, Shiga, and Tamio Miyake, Otokuni, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan  
 Continuation of Ser. No. 744,422, Jun. 13, 1985, abandoned.  
 This application Jan. 27, 1987, Ser. No. 8,078  
 Claims priority, application Japan, Jun. 13, 1984, 59-121032  
 Int. Cl.<sup>3</sup> G01K 15/00

U.S. Cl. 374—1

8 Claims



1. An electronic thermometer, comprising:
  - (a) temperature sensing means incorporating a temperature sensor element;
  - (b) temperature measuring and processing means including a measuring unit for determining temperature on the basis of a signal output from said temperature sensing means and a display unit for displaying the temperature determined by said measuring unit;
  - (c) code means in the form of a plurality of perforations for recording information of a temperature characteristic of said temperature sensor element in said temperature sensing means;
  - (d) reading means including resilient contacting means for reading said information of the temperature characteristic

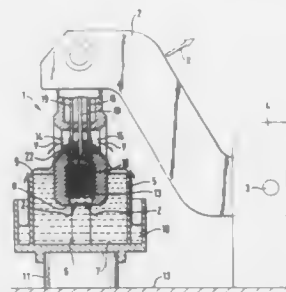
from said code means wherein at least some of said resilient contacting means pass through said perforations;  
 (e) means for correcting the temperature determined by said measuring and processing means in accordance with the information of the temperature characteristic read out from said code means; and  
 (f) means for switching on and off said reading means when said temperature sensing means is physically combined with said measuring and processing means.

**4,958,937**  
**METHOD AND DEVICE FOR DETERMINING THE BOILING TEMPERATURE**  
 Peter Lohberg, Friedrichsdorf; Arno May; Hans J. Krause, both of Goettingen; Dietmar Oberdorfer, and Ulrich Plugniet, both of Goettingen, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt Am Main, Fed. Rep. of Germany

Filed Jul. 14, 1988, Ser. No. 234,670  
 Int. Cl.<sup>3</sup> G01N 25/08

U.S. Cl. 374—16

10 Claims



1. A device for determining the boiling temperature of a test liquid comprising a probe and measuring means, said probe including a measuring unit with a temperature sensor, the probe being immersible in said test liquid to a predetermined depth, means for supporting said probe to maintain said predetermined depth of said probe in said liquid, said probe including a supply opening through which liquid enters the measuring unit and forms a liquid level directly beneath the temperature sensor, means in thermal contact with said test liquid for heating said test liquid to a boiling temperature to cause ebullition of said test liquid in a boiling zone on top of said liquid level, in which the boiling temperature is detected by said temperature sensor a condensation zone in the measuring unit in which condensate forms above the boiling zone, said condensation zone being connected with the atmosphere by way of discharge openings for the condensate, wherein the heating means is inserted into the supply opening and wherein the probe is arranged on a tiltable arm extending through which are electric junction wires for the temperature sensor and for the heating means.

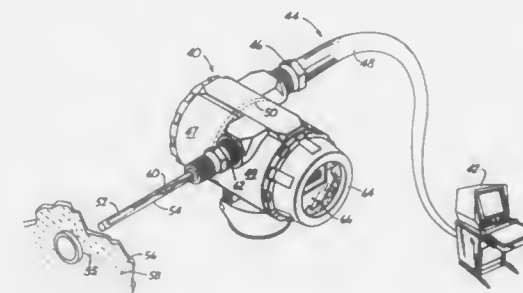
**4,958,938**  
**TEMPERATURE TRANSMITTER WITH INTEGRAL SECONDARY SEAL**  
 Bradley N. Schwartz, Lakeville; Stanley Kugler, Golden Valley, and Donald W. Selg, Mendota Heights, all of Minn., assignors to Rosemount Inc., Eden Prairie, Minn.  
 Filed Jun. 5, 1989, Ser. No. 361,239  
 Int. Cl.<sup>3</sup> G01K 1/08, 1/10

U.S. Cl. 374—208

9 Claims

1. A temperature transmitter connectable to a first conduit subject to fluid contamination which contains a lead from a temperature sensor and also connectable to a second conduit which conveys an output lead to a location remote from the transmitter, comprising:
  - wall means disposed in the transmitter for sealingly dividing

the transmitter into first and second compartments, the first compartment opening to the first conduit for receiving the lead from the temperature sensor, and the second compartment opening to the second conduit for receiving the output lead;  
 converter means, disposed in the first compartment and having converter terminals receiving the lead from the



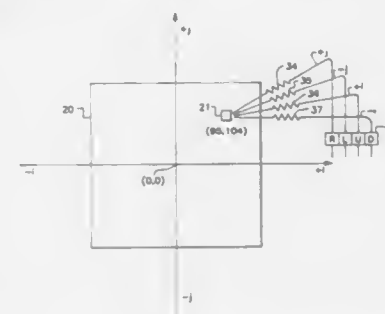
temperature sensor, and an electric converter circuit for providing an output representing temperature; and feedthrough means sealingly passing through the wall means and having conductors electrically insulated from the wall for conducting the output to the output lead such that the transmitter blocks flow of the fluid contamination to the second conduit and to the remote location.

**4,958,939**  
**CENTERING SCHEME FOR PATTERN RECOGNITION**  
 Tariq Samad, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 14, 1988, Ser. No. 270,183  
 Int. Cl.<sup>3</sup> G06K 9/00

U.S. Cl. 382—35

4 Claims



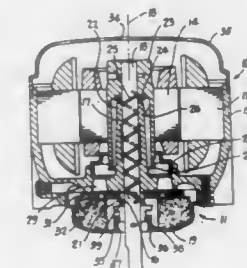
1. A camera assembly, comprising, a movable camera unit of the type used for image acquisition which has (1) adjusting means for the up, down, left and right movements of a field of view window thereof relative to an image and (2) a two dimensional window projection on the focal plane thereof comprising an array of photo-sensitive transducer elements which convert sensed optical values to voltages for representing acquired image data in the form of pixels, said array of transducer elements being logically arranged in the form of a two-dimensional matrix with an "i" and "j" axes cartesian coordinates format, said transducer elements having output voltages  $i_i, j_j$ , neural type weight means for each of said transducer elements having respective weight values corresponding to the "i" and "j" coordinate values related thereto, camera movement shift means comprising right, left, up and down shift units with all of said shift units being connected via said weight means to each of said transducer elements, said shift units being connected respectively to said camera unit adjusting means and having output shift signals derived from said output volt-

ages and said "i" and "j" coordinate values for iteratively moving said camera unit in directions relative to said pattern to effect at least substantial centering of said pattern relative to said field of view window, said weight values being positive values corresponding to the absolute values of said coordinate values.

**4,958,940**  
**ELECTRIC MOTOR LUBRICATION**  
 Wayne J. Morrill, 3448 S. Washington Rd., Ft. Wayne, Ind. 46804 (Judith A. Morrill, Conservator)  
 Continuation-in-part of Ser. No. 220,982, Jul. 15, 1988, which is a continuation of Ser. No. 945,813, Dec. 24, 1986, abandoned.  
 This application Mar. 8, 1989, Ser. No. 320,767  
 Int. Cl.<sup>3</sup> F16C 17/02

U.S. Cl. 384—398

14 Claims



1. A lubrication system for a bearing of an electric motor comprising, in combination:
  - a stator;
  - a bearing fixed relative to said stator and having a shaft aperture;
  - an oil reservoir for said bearing;
  - a rotor having a shaft journaled in said bearing shaft aperture and coaxially disposed to cooperate with said stator;
  - an oil access hole in said bearing for access of oil from said oil reservoir to the circumferential surface of said shaft;
  - a generally helical oil groove in the external surface of said shaft extending from said oil access hole longitudinally into said bearing;
  - first and second edges on said oil access hole:
  - said first edge being a first counterclockwise plow edge on the downstream edge relative to a counterclockwise rotational direction of said shaft;
  - said second edge being a first clockwise plow edge on the downstream edge relative to a clockwise rotational direction of said shaft and
  - each said plow edge being disposed at an angle relative to the shaft axis to have a component of force directing oil longitudinally into said bearing for said counterclockwise and clockwise rotational directions, respectively.

**4,958,941**  
**SUPPORT UNIT**  
 Yoshifumi Imanari, Shibukawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan  
 Filed Feb. 23, 1990, Ser. No. 484,111  
 Claims priority, application Japan, Mar. 6, 1989, 1-25318[U]  
 Int. Cl.<sup>3</sup> F16C 33/58

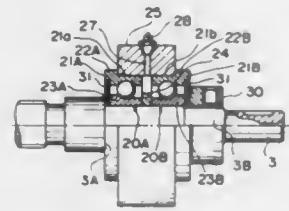
U.S. Cl. 384—474

4 Claims

1. A support unit comprising:
  - a housing having an aperture formed therein for receiving a fixing bolt;
  - an angular ball bearing having an outer race and an inner race assembled in said housing, the inner race of said bearing being held by a step portion of a supported shaft to receive a load in a direction of thrust;
  - a flange formed on an outer peripheral surface of the outer



race of said bearing, said flange being adapted to abut against one end face of said housing to fix the outer race in position; and



a nut engaging said supported shaft for clamping the inner race of said bearing to fix the inner race in position.

4,958,942

## OIL SEAL ASSEMBLY

Shiro Shimizu, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan

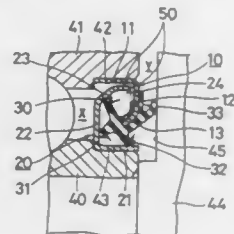
Filed Sep. 20, 1989, Ser. No. 409,696

Claims priority, application Japan, Ser. 26, 1988, 63-125530[U]

Int. Cl. F16C 33/78

U.S. Cl. 384-486

12 Claims



1. An oil seal assembly comprising inner and outer annular members rotatable relative to each other and disposed generally concentrically with each other with a certain distance therebetween, and an elastic annular sealing member bonded to said outer annular member and in sliding contact with said inner annular member to seal annular cavities between said inner and outer annular members,

said oil seal assembly further comprising:

said outer annular member having a cylindrical portion and an annular flange portion extending from one end of said cylindrical portion radially inwardly,

said inner annular member having an inner cylindrical portion, an annular flange portion extending from an inner end of said inner cylindrical portion, the inner cylindrical portion being opposed to said cylindrical portion of said outer annular member, and said inner annular member having an outer cylindrical portion extending from an outer peripheral surface of said inner annular flange portion in an axial direction and having a certain distance from an inner peripheral surface of said cylindrical portion of said outer annular member in the radial direction,

said elastic annular sealing member having a plurality of seal lips bonded to the inner peripheral portion of said annular flange portion of said outer annular member, a first one of said seal lips being in slidable contact with at least an outer peripheral surface of said inner cylindrical portion of said inner annular member, a second one of said seal lips being in slidable contact with an inner peripheral surface of said annular flange portion of said inner annular member, and a third one of said seal lips extending in a direction generally perpendicular to the first seal lip and generally parallel to the second seal lip, said third seal lip further generally being positioned on an opposite side of the outer annular member than the second lip, and

a narrow space being formed between an end face of said

outer cylindrical portion of said inner annular member and the inner peripheral surface of said flange portion of said outer annular member.

7. A rolling bearing assembly comprising:

an inner ring;

an outer ring disposed concentrically with said inner ring so that an annular cavity is formed therebetween said outer ring being readily separable from said inner ring;

a plurality of rolling elements disposed within said annular cavity for rotation of said rings relative to each other;

means for sealing said annular cavity, said sealing means includes an outer annular member fixed into the end portion of an inner peripheral surface of said outer ring, an inner annular member fixed onto the end portion of an outer peripheral surface of said inner ring, and an elastic annular sealing member bonded to said outer annular member and in slidable contact with at least said inner annular member to seal annular cavities between said inner and outer annular members;

said outer annular member having a cylindrical portion fitted to a stepped portion formed on the end portion of said inner peripheral surface of said outer ring, and an annular flange portion extending from an outer end of said cylindrical portion radially inwardly,

said inner annular member having an inner cylindrical portion fitted to a stepped portion formed on the end portion of the outer peripheral surface of said inner ring, an annular flange portion extending from an inner end of said inner cylindrical portion radially outwardly, and an outer cylindrical portion extending from an outer peripheral portion of said annular flange portion extending in an axial direction and being concentric with said inner cylindrical portion and having a certain distance from an inner peripheral surface of said cylindrical portion of said outer annular member in the radial direction,

said elastic annular sealing member having a plurality of seal lips bonded to the inner peripheral portion of said annular flange portion of said outer annular member, a first one of said seal lips being in slidable contact with at least an outer peripheral surface of said cylindrical portion of said inner annular member, and a second one of said seal lips being in slidable contact with an inner peripheral surface of said annular flange of said inner annular member and a third one of said seal lips being in slidable contact with an end face of a member attached to the inner ring and wherein the second and third seal lips extend in directions which are generally perpendicular to a direction in which said first seal lip extends and said third seal lip is generally positioned on an opposite side of the outer annular member than the second lip, and

a narrow space being formed between an end face of said outer cylindrical portion of said inner annular member and the inner peripheral surface of said cylindrical portion of said outer annular member.

4,958,943

## BALL BEARING

Tsutomu Nakanishi, Kunitachi, Japan, assignor to C.S.U. Ltd., Tokyo, Japan

Continuation of Ser. No. 920,692, Oct. 17, 1986, abandoned.

This application Jan. 5, 1989, Ser. No. 293,934

Claims priority, application Japan, Oct. 25, 1985, 60-165494; Dec. 16, 1985, 60-194142; Mar. 14, 1986, 61-37145; Jun. 25, 1986, 61-98070

Int. Cl. F16C 33/60

U.S. Cl. 384-488

13 Claims

1. A ball bearing for a floppy disc comprising:

a shaft having an outer periphery with a groove of part circular cross-section,

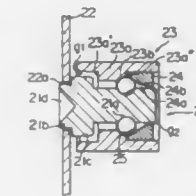
a plurality of balls partly received in said groove,

a ring-shaped outer race, and

a bearing race,

said outer race and said bearing race being separate from said shaft and surrounding the outer periphery of said shaft in spaced relation, said outer race and bearing race respectively having inner peripheral surfaces forming ball rolling surfaces in contact with said balls to bear against the balls engaged within said groove,

said shaft including a cylindrical portion of larger diameter surrounded by said outer race to form a gap between said portion of larger diameter and said outer race to protect the balls from entry of dust;



said bearing race having an outer peripheral surface inserted into and secured to the inner peripheral surface of said outer race for rotatably supporting said balls against the ball rolling surface of the outer race and against the groove in the shaft; and

said outer race having first and second end portions of larger diameter and a central portion of smaller diameter so that a central step is formed in the outer race, said central step having one corner formed with a tapered surface to constitute said ball rolling surface of the outer race.

4,958,944

## BEARING FOR WHEEL MOUNT

Heinrich Hofmann, Schweinfurt, and Manfred Tröster, Bad Kissingen, both of Fed. Rep. of Germany, assignors to FAG Kugelfischer Georg Schäfer (KGaA), Fed. Rep. of Germany

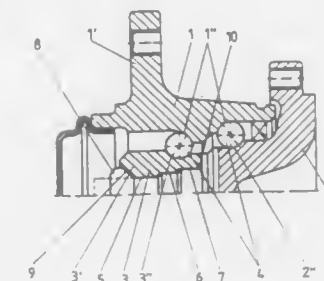
Filed Dec. 21, 1989, Ser. No. 454,073

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1989, 3902141

Int. Cl. F16C 33/58

U.S. Cl. 384-512

11 Claims



1. A wheel mount comprising

an outer ring for defining the outer races of two rows of bearing rolling elements;

an axially more inward axle journal having an exterior periphery which defines a first inner race for one of the rows of rolling elements and cooperating with a respective first one of the outer races defined inside the outer ring;

axially outward of the first inner race, a separate inner ring having an external periphery with a second inner race defined thereon for cooperating with a respective second one of the outer races on the interior of the outer ring for the second row of rolling elements;

The separate inner ring having an axially inner end which is axially pressed against the axle journal; the separate inner ring having an internal bore, and the axle journal includ-

ing a pin which is generally complementary in shape to the internal bore of the inner ring and projects through the internal bore;

the separate inner ring having a radially widened region at the axially more outward region thereof, and the internal bore of the separate ring having the smallest diameter at the widened region; axially inward of the widened region, the internal bore having defined in it a plurality of steps of gradually greater diameter from step to step axially inward, and the axle journal having cooperating, correspondingly shaped steps defined on it shaped for force fitting the inner ring on the correspondingly shaped axle journal.

4,958,945

## SPINDLE UNIT

Tsutomu Nakanishi, Kunitachi, Japan, assignor to C.S.U. Ltd., Tokyo, Japan

Continuation of Ser. No. 920,700, Oct. 17, 1986, abandoned.

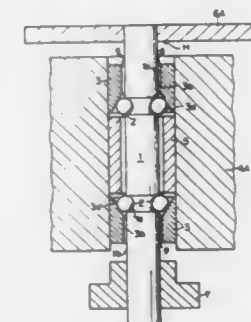
This application Apr. 6, 1989, Ser. No. 344,674

Claims priority, application Japan, Oct. 25, 1985, 60-162972; Nov. 27, 1985, 60-183385; Dec. 6, 1985, 60-188660; Apr. 15, 1986, 61-57328; May 21, 1986, 61-77195

Int. Cl. F16C 19/08

U.S. Cl. 384-512

19 Claims



1. A spindle unit comprising a cylindrical shaft having an outer peripheral surface with an annular groove provided therein, said groove having a part circular cross section, a plurality of spherical balls partly received in said groove and partly projecting therefrom, said balls being rotatable in said groove, an annular race adjacent to said groove and having a tapered surface bearing against the balls partly projecting from the adjacent groove to hold the balls within the groove, means by which said race applies the tapered surface thereof against said balls with pressure to retain the balls in said groove, a bearing housing in which said race is supported, said bearing housing having a cylindrical outer surface, said shaft having opposite ends projecting from said housing, and rotor means fixed on each of the ends of the shaft projecting from the housing for rotation with said shaft, the rotor means on one of said ends comprising a pulley.

4,958,946

## SEPARATION FOR BALL BEARINGS

Horst Voll, Harsfurt, Fed. Rep. of Germany, assignor to FAG Kugelfischer Georg Schäfer (KGaA), Fed. Rep. of Germany

Filed Jan. 17, 1990, Ser. No. 466,471

Claims priority, application Fed. Rep. of Germany, Jan. 18, 1989, 3901250

Int. Cl. F16C 33/42

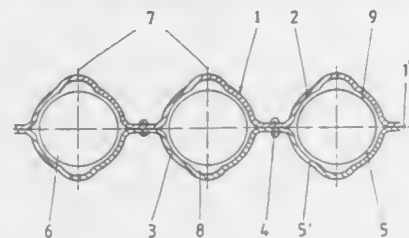
U.S. Cl. 384-523

9 Claims

1. A separator for a row of ball bearings, wherein the separator has a plurality of pockets defined in it, and each pocket is for receiving a respective ball of the ball bearing; the separator

having a length dimension, each pocket extending into the separator across the length dimension;

each pocket being shaped for defining a deeper recess in the pocket in the vicinity of a pole of the respective bearing ball which is supported in and rotates in the pocket, and the recess being so shaped and of such depth that the interior surface of the separator at the pocket recess is spaced a greater distance from the bearing ball in the



pocket than the interior surface is spaced from the bearing ball away from the pole of the ball;  
in the remaining region of the interior surface of the separator at the pocket, the interior surface being shaped so as to be spaced from the bearing ball and to define a generally wedge-shaped slot, and the interior surface being close enough to the bearing ball that in the wedge-shaped slot, a hydrodynamic lubricating film can build up.

4,958,947

## AXIAL ROLLING BEARING

Heinz Peter, Dittelbrunn, and Rainer Schurger, Schwanfeld, both of Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

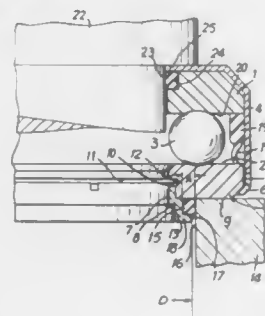
Filed Jul. 31, 1989, Ser. No. 387,709

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1988, 8809903

Int. Cl.<sup>5</sup> F16C 19/10

U.S. Cl. 384—609

7 Claims



1. An axial rolling bearing comprising:

- a housing ring having an outer face and a fastening rim portion located axially beyond the outer face of the housing ring;
- a sleeve fitted into the housing ring and cooperating with said fastening rim, said sleeve having an axial portion that includes a radial rim;
- a flexible ring, said radial rim having a maximum diameter that is smaller than the maximum diameter of said flexible ring when said flexible ring is mounted on said sleeve;
- a housing for said rolling bearing; and
- said flexible ring providing a predetermined radial tension between the axial portion of the sleeve and the housing.

4,958,948

## SYSTEM FOR DRIVING A BRUSHLESS MOTOR

Toshiaki Selma, Yonago; Susumu Yamamoto, Takatsuki, and Hiromitsu Nakano, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

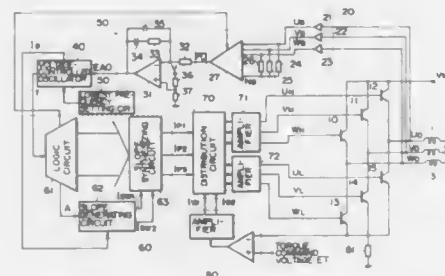
Filed Oct. 3, 1989, Ser. No. 416,538

Claims priority, application Japan, Oct. 7, 1988, 63-254066

Int. Cl.<sup>5</sup> H02D 5/16

U.S. Cl. 388—812

2 Claims



1. A system for driving a brushless motor comprising: motor drive coils belonging to a plurality of phases respectively;
- a plurality of pairs of drive transistors connected to said drive coils respectively;
- a distribution circuit for sequentially distributing drive-coil energization switching signals to said plural drive transistors respectively;
- a slope synthesizer for smoothing leading and trailing slope portions of said drive-coil energization switching signals so as to apply the smoothed energization switching signals to said drive transistors respectively through said distribution circuit;
- a voltage-controlled oscillator for supplying a signal having a suitable frequency as an input to said slope synthesizer;
- a phase error detector for detecting the phase difference between counter-electromotive voltages induced in said drive coils and said drive-coil energization switching signals in a drive-coil energization pause period; and
- an error amplifier for amplifying the output signal of said phase error detector and applying the amplified phase error signal as an input to said voltage-controlled oscillator.

4,958,949

## DRIVE ELEMENT FOR PLATENS OF TYPEWRITERS OR SIMILAR OFFICE MACHINES

Johannes Haftmann, Schwabach, and Rudolf Schmeikal, Hemhofen, both of Fed. Rep. of Germany, assignors to TA Triumph-Adler Aktiengesellschaft, Nuremberg, Fed. Rep. of Germany

Filed Apr. 27, 1989, Ser. No. 343,698

Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815066

Int. Cl.<sup>5</sup> B41J 19/80

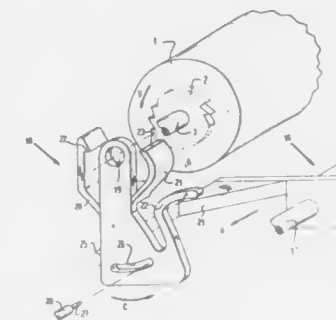
U.S. Cl. 400—314

8 Claims

1. A drive device for the platen of an office imprinting machine having a movable type-carrier carriage, the platen having a line-space wheel fast therewith, the device comprising a drive element pivotally mounted on the shaft of the platen, the drive element having a resilient arm engageable with a fixed abutment acting in use to urge the drive element into a normal position of rest, the drive element also having at least one ratchet co-operable with the said ratchet, the drive element having transport element engageable by a part of the carriage so that at the end of carriage movement in one direction the said carriage part engages the said element and displaces the drive element angularly against the action of the resilient arm, which returns the drive element to its rest position.

tion upon return movement of the carriage, the said ratchet effecting rotation of the platen and wheel through one line-

paper feeding lever and at the other end thereof with said angle member to urge said paper feeding lever.



4,958,951

## HOT WAX HAIR REMOVER APPARATUS

Samuel J. Mann, Englewood, N.J., assignor to Inverness Corporation, Fairlawn, N.J.

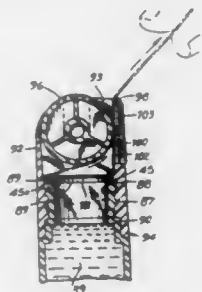
Continuation of Ser. No. 716,289, Mar. 26, 1985, Pat. No. 4,773,784, which is a continuation-in-part of Ser. No. 344,135, Jan. 29, 1982, abandoned. This application Jul. 26, 1988, Ser. No. 225,105

The portion of the term of this patent subsequent to Sep. 27, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A45D 40/00, 40/26, 34/04

U.S. Cl. 401—1

6 Claims



space in the course of movement of the drive element away from and back to its position of rest.

4,958,950

## PAPER FEEDER FOR PRINTER

Yousuke Kobayashi, and Keiichi Fukazawa, both of Hiroshima, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

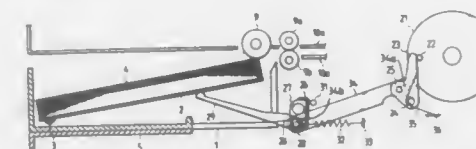
Filed Mar. 30, 1989, Ser. No. 330,690

Claims priority, application Japan, Apr. 21, 1988, 63-100491

Int. Cl.<sup>5</sup> B41J 13/03

U.S. Cl. 400—629

5 Claims



1. A paper feeder for a printer comprising: a tray having a stage on which papers to be fed are stacked, the stage being movable between predetermined first and second positions;
- a platen rotatable in a first direction and in a reverse direction;
- a motor connected to rotate said platen by producing motive power;
- means for transmitting the motive power of said motor to position said stage at the predetermined first position for paper feeding operation when said platen rotates in the reverse direction; and
- a paper feeding means having a feeding roller for feeding an uppermost one of said papers during the feeding operation, the predetermined first position of said stage bringing the uppermost paper into contact with said feeding roller; wherein said transmitting means comprises: a first pin connected to said platen;
- a first fulcrum;
- a lever rotatably supported at said first fulcrum and urged by said first pin, the lever having a second pin mounted thereon;
- a second fulcrum;
- an angle member having first and second ends rotatably supported at the first end by said second fulcrum;
- a shaft connected to the second end of said angle member;
- a link having first and second ends engaged at the first end thereof with said lever by said second pin and at the second end thereof with said angle member;
- a paper feeding lever rotatable about said shaft in accordance with the rotation of said platen in the reverse direction to urge said stage to the predetermined first position; and
- a first torsion spring engaged at one end thereof with said

1. A wax applicator for use with a heating sleeve for dispensing a depilatory wax for removal of hair from skin comprising a reservoir means for holding said depilatory wax, said reservoir means including a neck having an opening therein through which said depilatory wax can flow, said reservoir means defining a container configured to be disposed into a heating sleeve, said depilatory wax being normally disposed in a substantially solid state when at room temperature and being disposed into a flowable state by the force of gravity when the dispenser is disposed in a heating sleeve and is heated above a predetermined temperature of 112.2° F., a human's threshold temperature of thermally evoked pain, a dispenser head, said dispenser head including a roller seated within a plurality of surrounding housing walls forming a housing, so that a surface of said roller in facing relationship with a first housing wall which has a predetermined clearance therebetween for limiting the thickness of the flowable hot wax that is dispensed by gravity so that the thickness of the waxed dispensed thereby does not exceed 0.8mm, said housing further supporting a strut means, said strut means defining an opening so that said strut means is securable to said neck of said reservoir means to permit gravity to cause said wax to flow through said opening in said neck and said opening in said strut means into contact with said roller when said wax is heated so that a layer of heated wax not exceeding 0.8mm is dispensed by said roller wherein a second housing wall in facing relationship with said roller is spaced at a distance greater than 0.8mm to permit wax remaining on said roller to be carried by said roller and re-metered on the next revolution of said roller.

4,958,952

## CABLE SECURING DEVICE

Lance G. Willett, 12407 Kathryn St., Maple Ridge, British Columbia, Canada (V2X 8X8)

Filed Sep. 27, 1989, Ser. No. 413,126

Int. Cl.<sup>5</sup> B41J 1/54, 3/36; B41B 27/26; A47F 7/00

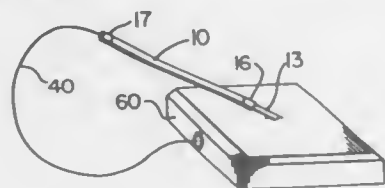
U.S. Cl. 401—131

10 Claims

6. A pen and pen base set, comprising: (a) a pen and means connecting same to one end of a securing cable;



- (b) an elongated cylindrical plug and means connecting same to an opposed end of said cable;  
 (c) a wire mesh grip secured within a cylindrical hole extending into said base, said grip being sized within said hole for longitudinally receiving and grippingly engaging said plug; and,



- (d) a release key having an elongated tubular wall sized for sliding longitudinally over said plug within said hole while pushing said wire mesh grip backwardly over said plug for releasing the grip of said wire mesh grip on said plug.

4,958,953

## EXPANDABLE CONNECTOR TO AXIALLY JOIN TUBULAR DEVICES

Georges Charondiere, 1 rue Jules Ferry, Bonson 42160 Andrezieux Boutheon, France

Filed Apr. 19, 1989, Ser. No. 340,465

Claims priority, application France, Apr. 27, 1988, 88 05944

Int. Cl.<sup>5</sup> F16B 7/00

U.S. Cl. 403—297

2 Claims



1. A connector for fixedly securing end portions of at least two tubular means and being positionable within bores of each of said end portion of each said tubular means comprising an elongated first half shell and an elongated second half shell and being dimensioned to fit internally of said end portions of said two tubular means, each of said half shells having an elongated axially disposed recessed wall, said first half shell and said second half shell when in connector use being in confronting relationship whereby the recessed wall of said first half shell and the recessed wall of said second half shell define a void, an inflatable casing positioned in said void and being dimensioned to exert substantially uniform pressure against each of said recessed walls of each of said half shells thereby radially forceably thrusting apart each half shell internally of said end portions of said at least two tubular means to frictionally engage the said connector to the internal end portions of said two tubular means and thereby effectuating connection of said tubular means, said half shells together having a substantially centrally located radially extending flange dimensioned larger

than said bores of each said end portion of each of said tubular means, said flange of at least one said half shell having a transverse bore to communicate internally of said void and said casing having a valve passing through said transverse bore to provide access internally of said casing whereby said casing may be pressurized through said valve.

4,958,954

## HORIZONTAL REFLECTIVE HIGHWAY MARKER

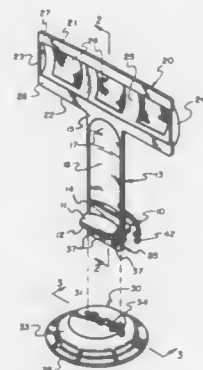
Donald W. Schmanski, and Michael M. Leigh, both of Carson City, Nev., assignors to Carsonite International, Carson City, Nev.

Filed Dec. 5, 1988, Ser. No. 279,675

Int. Cl.<sup>5</sup> E01F 9/00

U.S. Cl. 404—10

5 Claims



1. A delineator device having high visibility and utility for attachment to a paving surface, said device comprising a non-tubular, insertable delineator body of one piece construction including:

- (a) a base member including a plate with upper and lower faces, said base member including a projecting tab section vertically coupled to the lower face of the base at one end and extending downward therefrom;  
 (b) a vertical support member having a top end and a bottom end and an intermediate section including an elongated concavo-convex structure configured to face toward on-coming traffic when mounted at the paving surface, said bottom end being integrally formed with the upper face of the base in vertical orientation;  
 (c) a horizontal member integrally formed with the top end of the vertical support member and having a top edge and a bottom edge, opposing distal sides and an interior section intermediate between the top and bottom edges and between the opposing distal sides and which includes an elongated concavo-convex structure configured to face toward on-coming traffic when mounted at the paving surface;  
 (d) a receiving base member adapted for direct attachment at the paving surface and having a top face and a substantially flat bottom face and an intermediate support body having a length sufficient to vertically support the length of the tab section and attached delineator device and including a slotted portion configured to receive the tab section therein with a snug fit;  
 (e) means for locking the tab section within the slotted portion to retain the device in position at the paving surface, said locking means comprising at least one horizontal slide-lock member projecting from the tab section of each side thereof, said support body including a horizontal slide-track channel formed in size and configuration to first receive the slide-lock members in a vertical insert position and to provide a second locking position which is lateral of the insert position top form a slide path and provide a tight fit for the slide-lock members.

4,958,955

## METHODS AND APPARATUS FOR DISPENSING, MIXING AND APPLYING COATING CONSTITUENTS TO TRAFFIC SURFACES USING TANDEM OPERATED SETS OF ROTARY TOOLS

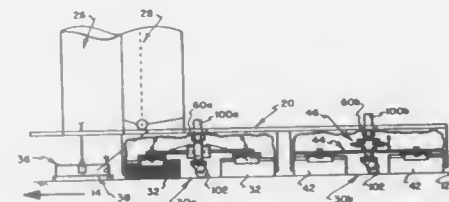
Alexander Laditka, 4741 Dalebridge #C-10, Warrensville Hts., Ohio 44128

Continuation of Ser. No. 213,449, Jun. 28, 1988, abandoned, which is a continuation of Ser. No. 85,253, Aug. 11, 1987, abandoned, which is a continuation of Ser. No. 892,337, Aug. 1, 1986, abandoned, which is a continuation-in-part of Ser. No. 532,742, Sep. 16, 1986, Pat. No. 4,603,999, which is a continuation-in-part of Ser. No. 408,484, Aug. 16, 1982, Pat. No. 4,477,203. This application Jun. 19, 1989, Ser. No. 368,084

The portion of the term of this patent subsequent to Oct. 16, 2001, has been disclaimed.  
Int. Cl.<sup>5</sup> E01C 7/06

U.S. Cl. 404—75

33 Claims



1. A method of applying to a traffic surface a coating composition consisting of plural ingredients, wherein the method comprises the steps of:

- (a) depositing a plurality of ingredients from a plurality of individual supply sources upon a traffic surface to be coated, with the deposits of at least selected ones of the ingredients being made in relatively close proximity to each other to facilitate the formation of a deposit mixture;  
 (b) bringing into contact with the deposited ingredients a plurality of rotary stirring tools, with each of the rotary stirring tools including an associated rotary structure having associated depending blades that are arranged in an array about an associated axis that extends substantially normal to the traffic surface, with the axes of the rotary stirring tool begin spaced horizontally from one another to position the rotary stirring tools in relatively close proximity to each other for rotation in tandem to cooperatively effect mixing and application of the deposited ingredients to form a coating on the traffic surface, and with at least selected ones of the rotary stirring tools each having means connecting its associated blades to its associated rotary structure so that, when the associated rotary structure and blades are rotated about the associated axis, the blades are permitted to move a limited amount relatively toward and away from the rotary structure, and to rock relative to the rotary structure about other axes that extend substantially parallel to the traffic surface;  
 (c) rotating the plurality of rotary stirring tools about their associated axes with the blades of the selected ones of the rotary stirring being urged into substantially continuous contact with the traffic surface and with the deposited ingredients to effect a rapid mixing of the ingredients to a condition of uniform consistency; and  
 (d) smoothing the mixed ingredients to the traffic surface by continuing rotation of the plurality of rotary stirring tools about said axes, with the blades of the selected ones of the rotary stirring tools moving relative to their movements to the contour of the traffic surface and to substantially maintain contact with the traffic surface.

4,958,956

## SUBMERGED FLEXIBLE WAVE RESTRAINING STRUCTURE AND A METHOD OF CONSTRUCTING IT

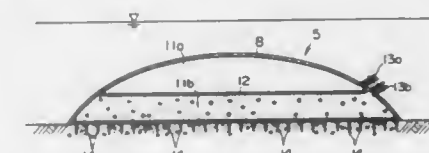
Masahiro Tanaka; Takumi Ohyama; Akibiko Hirayama; Tetsushi Kiyokawa; Seiji Ichii; Yutaka Katsura; Tadashi Owo, and Katsunori Shimizu, all of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Tokyo, Japan

Filed Sep. 23, 1987, Ser. No. 99,958

Int. Cl.<sup>5</sup> E02B 3/04

U.S. Cl. 405—23

7 Claims



1. A wave reducing structure for reducing waves on a liquid surface from propagating over a certain border, comprising at least one energy absorbing means, constructed submergedly on a bottom of the liquid beneath the border, for absorbing the energy of waves, the energy absorbing means having at least one resilient body which is deformable when a pressure distribution around it changes as the waves pass over the resilient body, each said at least one resilient body comprising at least one substantially hermetic pliant bag which is expanded by a fluid contained therein, said fluid being comprised of the surrounding ambient liquid, said pliant bag being provided with at least one diaphragm separating an inner area of the pliant bag into closed chambers, a height of the resilient body being between 0.2 to 0.8 times the depth of the liquid surrounding the at least one resilient body.

4,958,957

## SYSTEM FOR UNDERGROUND STORAGE AND DELIVERY OF LIQUID PRODUCT, AND RECOVERY OF LEAKAGE

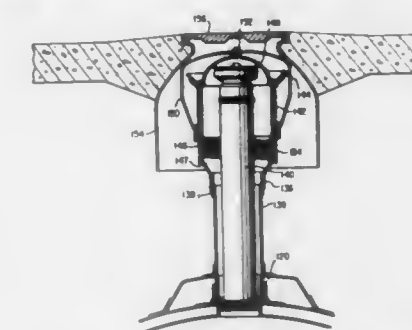
Robin Berg, Hudson, Wis., Lawrence Mohns, Media, Pa., and Richard Oswald, Elverson, Pa. assignors to Sun Refining &amp; Marketing Company, Philadelphia, Pa.

Filed Mar. 1, 1989, Ser. No. 317,565

Int. Cl.<sup>5</sup> B65G 5/00

U.S. Cl. 405—55

12 Claims



11. A system for the underground storage of liquid products and delivery of said product to an above-ground dispensing means, comprising: an underground storage tank provided with at least first and second fittings, to remove a means for filling said storage tank and means for pumping product from said storage tank to said dispensing means, respectively, both said fittings being entirely contained within trapezoidal secondary containment chamber mounted on and sealed to said storage tank, said containment chamber comprising a plurality of drain holes at its lowest points, as installed, fill means comprising an adapter in sealed communication with said first

fitting, said adapter bearing an outer containment pipe which, together with said containment chamber completely encloses a riser for attachment to a means for delivering a product to said riser, said riser being in fluid communication with said storage tank,

means for pumping product from said storage tank to said above-ground dispensing means, said means for pumping being in fluid communication with said above-ground dispensing means.

4,958,958

# SUBTERRANEAN HEAT INSULATED PIPE SYSTEM WITH A BENDING, AND A METHOD OF ESTABLISHING SUCH A SYSTEM

Hans N. Pedersen, Horsens, Denmark, assignor to I. C. Moller A/S, Fredericia, Denmark

Continuation of Ser. No. 115,412, Nov. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 661,946, May 18, 1984, abandoned. This application Apr. 21, 1989, Ser. No. 341,747

Claims priority, application Denmark, May 20, 1983, 2251/83 Int. Cl.<sup>3</sup> F16L 1/02

U.S. Cl. 405—154

22 Claims



1. A subterranean heat insulated pipe system for conveying a fluid having a temperature deviating from an ambient temperature surrounding the heat insulated pipe system, the heat insulated pipe system being surrounded by a stiff insulation foam, the pipe system comprising at least two straight pipe lengths, at least one angle bending pipe length means for interconnecting the straight pipe lengths so as to form a first bending run beneath, for example, a street crossing, characterized in that the angle bending pipe length means has a radius of curvature substantially just sufficiently small enough to condition the bending to be fully self stabilized solely in and by engagement with the earth without any additional anchoring means against expansion and contraction forces resulting from internal temperature changes in the pipe system.

4,958,959

# METHOD OF RELINING SEWERS AND WATER LINES WITHOUT EXCAVATION

Henri S. St. Onge, Scarborough, Canada, assignor to Duratron Systems Limited, Scarborough, Canada

Continuation of Ser. No. 892,875, Jan. 13, 1986, Pat. No. 4,796,669, which is a continuation of Ser. No. 284,442, Jul. 17, 1981, abandoned. This application Jan. 9, 1989, Ser. No. 294,754 The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> F16L 1/036

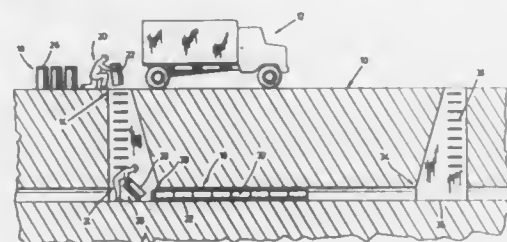
U.S. Cl. 405—184

6 Claims

1. A method of relining a buried pipeline with interconnectable plastic pipe sections of an appropriate diameter for insertion within the buried pipeline, each section having a male connection at one end and a female connection at the other end with said female connection and male connection being sized to cooperate with an opposite connection and form a locked fit

between said connections such that said connections cannot be inadvertently axially withdrawn one from the other, said method comprising bringing short pipe sections to an open end of the buried pipeline,

aligning an individual pipe section with the buried pipeline such that the pipe section is on grade with the buried pipeline,



effecting a connection between any pipe section previously immediately inserted in said pipeline to form the locked fit between the sections,

forcing said connected pipe sections into the buried pipeline by either pulling or pushing said sections in preparation for the insertion of the next pipe section into the buried pipeline.

4,958,960

# WELL CONDUCTOR SUPPORT STRUCTURE AND METHOD FOR USING

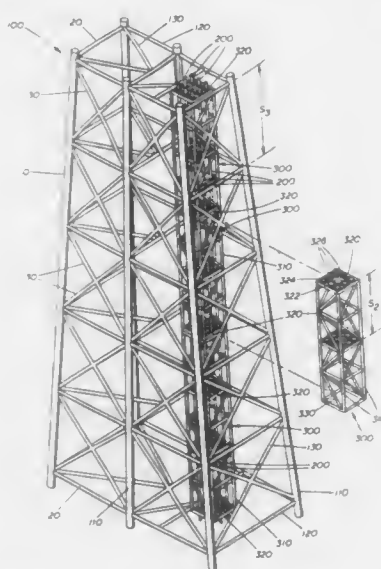
James W. Turner, and M. Sidney Glasscock, both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed May 22, 1989, Ser. No. 354,943

Int. Cl.<sup>3</sup> E02B 17/00

U.S. Cl. 405—195

16 Claims



1. A conductor support module for supporting well conductors of an offshore platform, said conductor support module being separate from but integrable with the jacket of said offshore platform, said conductor support module comprising:

- a plurality of substantially parallel vertical support members; and
- a plurality of horizontal conductor support members attached to said vertical support members, the vertical spacing between adjacent horizontal conductor support members being determined by the lateral support requirements of said well conductors;

whereby lateral loads on said well conductors are transferred from said well conductors to said conductor support module and thereby to said offshore platform.

4,958,961

# ANCHORING ARRANGEMENT FOR A ROD-SHAPED TENSION MEMBER FORMED OF FIBER REINFORCED COMPOSITE MATERIAL

Thomas Herbst, Weesling, and Dieter Jungwirth, Bad Heilbrunn, both of Fed. Rep. of Germany, assignors to Dyckerhoff & Widmann Aktiengesellschaft, Munich, Fed. Rep. of Germany

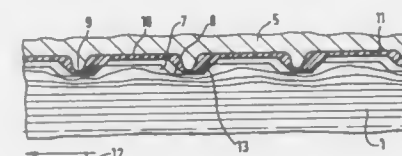
Filed Oct. 10, 1989, Ser. No. 419,151

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1988, 3834266

Int. Cl.<sup>3</sup> E02B 1/00; E04C 3/10

U.S. Cl. 405—260

9 Claims



1. Anchoring arrangement for anchoring a rod-shaped tension member formed of a fiber reinforced composite material for use as an anchor element in foundation and mining construction or as a reinforcing member for concrete and prestressed construction, said tension member has an outside surface with a helical thread formed thereon, an anchoring member having an inside surface with a helical thread formed therein arranged to interfit with the thread on said tension member and disposed in radially spaced relation thereto, and an intermediate layer located between and in engagement with the thread on said tension member and the thread on said anchoring member, and said intermediate layer is formed of a material affording large deformations relative to said tension member and anchoring member at slight increases in stress when overloads act on the tension member.

4,958,962

# METHODS OF MODIFYING THE STRUCTURAL INTEGRITY OF SUBTERRANEAN EARTH SITUS

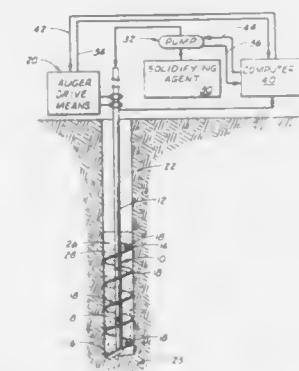
Verne L. Schellhorn, Gualala, Calif., assignor to Halliburton Company, Duncan, Okla.

Filed Jun. 28, 1989, Ser. No. 373,351

Int. Cl.<sup>3</sup> E02D 3/12

U.S. Cl. 405—267

13 Claims



1. A method of strengthening and improving the load bearing capacity of material in a subterranean earth situs comprising:

advancing a soil processing tool into said situs to break said material into pieces; and

while advancing said soil processing tool into said situs, introducing a solidifying agent into said pieces from said tool at a velocity in the range of from about 300 ft./sec. to about 2500 ft./sec. to hydraulically divide said pieces into very fine particles and admix said solidifying agent with said particles whereby a uniform admixture of said solidifying agent and said material is achieved; and allowing said admixture of said solidifying agent and said material to harden.

4,958,963

# MOBILE WORK STATION FOR PODIATRIST

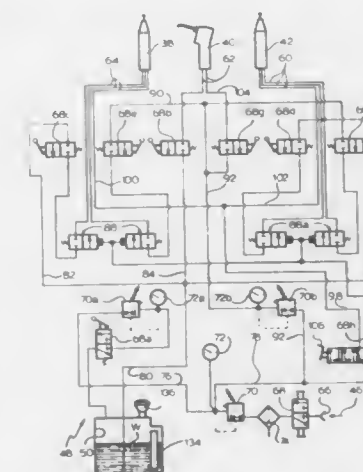
Ronald Perrault, 3, avenue des Sapins, Notre-Dame des Prairies, Province de Québec, J6E 1C3, Canada

Filed Nov. 24, 1989, Ser. No. 440,748

Int. Cl.<sup>3</sup> A61C 1/02

U.S. Cl. 408—56

1 Claim



1. A work station for podiatrist comprising:

- (a) a large, rigid frame;
- (b) compressed air feed means, having an outlet integral to said frame;
- (c) a water-containing tank, integral to said frame;
- (d) at least a first and second turbine drill members, to be connected to the compressed air feed means outlet and water tank, and movable away from the frame;
- (e) at least one spray gun, to be connected also to the compressed air feed means and water tank, movable away from the frame;
- (f) a pneumatic tubing network, operatively connecting said drill members and spray gun to said compressed air feed means outlet and water tank, said network defining a main line means, feeding water from said water tank to each drill member and spray gun through a corresponding one of a first series of water lines, and also feeding pressurized air from said compressed air feed means outlet to each drill member and spray gun through a corresponding one of a second series of air lines; wherein operation of each drill member and spray gun is controlled by the flow of water and/or air therethrough;
- (g) a number of pneumatically operating, manually controlled, non electromagnetic valve members, including at least one for each said water line and at least one for each said air line;
- (h) a foot-pedal actuated, pneumatically operating, non-electromagnetic valve member, operatively connected through connecting means to each said drill member, for controlling operation thereof; wherein said work station works solely by pneumatic forces, with positively no electrical current of any kind being present therewithin,



whereby there is no danger whatsoever of electrocution through use of water therein; and wherein the flow of air and water through each said drill members and spray gun is monitored independently of each other by said valve members, at continuous, variable rates.

4,958,964

## SEMIRIGID FLOATING PAVEMENT

Javier B. Soto, and Domingo F. Llamas, both of Calle Ramón Gordillo Nr. 5, 46010 Valencia, Spain

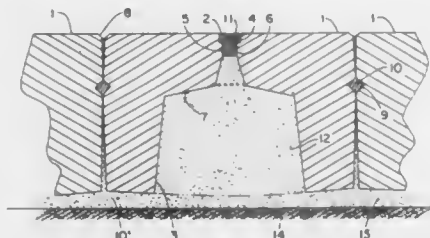
Filed Aug. 12, 1988, Ser. No. 231,876

Claims priority, application Spain, Aug. 13, 1987, 8702395

Int. Cl.<sup>3</sup> E01C 5/00

U.S. Cl. 404—40

6 Claims



1. A semirigid floating pavement comprising at least two independent pieces in the form of paving blocks laterally placed back to back to form a surface of variable width, characterized in that each one of the pieces is formed by molded blocks of a resistant material, each of said pieces having a flat upper surface, a base and an inner recess which opens at said base and is connected with the upper surface through an orifice; said base being formed by one or more planes inclined toward a geometric axis of the piece, the back to back pieces having adjacent outer lateral walls which are inclined relative to each other so as to allow a certain movement between the pieces, wherein each one of the outer lateral walls is provided with a channel, said channel housing an elastic joint of union and support between the pieces.

4,958,965

## TOOL FOR METAL CUTTING

Bengt N. G. Strand, and Sven L. Eklund, both of Fagersta, Sweden, assignors to Seco Tools AB, Fagersta, Sweden

Division of Ser. No. 204,284, Jun. 9, 1988, Pat. No. 4,850,759.

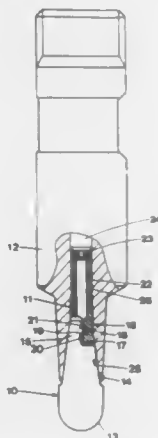
This application Jun. 15, 1989, Ser. No. 365,903

Claims priority, application Sweden, Jul. 8, 1987, 87027990

Int. Cl.<sup>3</sup> B23B 51/00, 31/10

U.S. Cl. 408—226

7 Claims



1. A cutter adapted to be rotated about a front-to-rear ex-

tending longitudinal axis and comprising a front portion having a cutting edge and a rear portion for mounting said cutter, said rear portion having a conical outer periphery, the shortest radius of which is defined by a rearmost end of said rear portion, said rear portion including a hook-shaped projection formed by a laterally open recess in said outer periphery, said recess including a generally rearwardly facing first surface extending laterally inwardly from said outer periphery, a generally laterally outwardly facing second surface extending rearwardly from a laterally inner end of said first surface, a third surface facing generally toward said first surface and extending generally laterally outwardly from a rear end of said second surface, a laterally outer end of said third surface disposed laterally inwardly of an imaginary extension of said outer periphery.

4,958,966

## TOOL HOLDER BUSHING

Edward A. Andrews, 379 Executive Dr., Troy, Mich. 48063

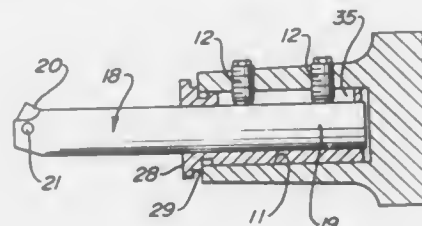
Division of Ser. No. 292,328, Dec. 30, 1988, Pat. No. 4,896,892.

This application Dec. 4, 1989, Ser. No. 445,995

Int. Cl.<sup>3</sup> B23B 31/04

U.S. Cl. 408—239 A

6 Claims



1. A tool holder bushing for mounting an elongated tool shank coaxially within an elongated socket bore formed within a tool holder, machining turret and the like elements of a machine tool, comprising:

an elongated, cylindrically shaped tube whose length is considerably greater than its diameter, having an outer end and inner end, an exterior diameter and an interior diameter;

means for enabling retention of the bushing tube within the socket, said retention means axially positioned about said tube;

rim means adapted for engaging a surface defining an opening of the socket, said rim means formed with said outer end of said tube, and channel means formed annularly about said tube adjacent said rim means; and

one of the exterior and interior diameters being dimensioned in accordance with the inch measuring system and the other being dimensioned in accordance with the metric system, wherein a socket and a tool which are of differing dimensional measuring systems may be optionally used together to mount the tool upon a machine tool.

4,958,967

## SPINDLE FEED MECHANISM FOR A MACHINE TOOL

Sakashi Adachi, Numazu, Japan, assignor to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 12, 1989, Ser. No. 406,613

Claims priority, application Japan, Sep. 22, 1988, 63-237922

Int. Cl.<sup>3</sup> B23C 1/06; B23B 39/00

U.S. Cl. 409—185

4 Claims

1. A spindlehead for a machine tool comprising:

(a) a casing defining a linear guideway;

(b) a spindle sleeve mounted to the casing for reciprocating movement out of and into the casing along the linear guideway;

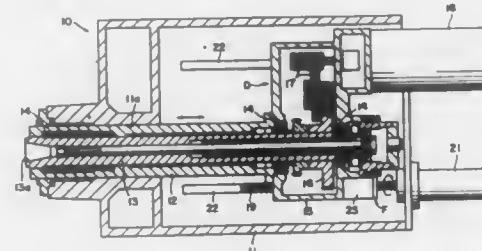
(c) a spindle rotatably mounted within the spindle sleeve and

restrained from axial displacement relative to the same for joint axial movement with the spindle sleeve out of and into the casing;

(d) fixed guide means mounted to the casing;

(e) spindle drive means coupled to the spindle for imparting rotation thereto, the spindle drive means jointly reciprocating with the spindle and the spindle sleeve relative to the casing and having at least a portion slidably engaged with the guide means for linear displacement along the guideway; and

(f) feed means mounted to the casing for linearly reciprocating the spindle and the spindle sleeve and the spindle drive means relative to the casing.



4,958,968

## ADAPTER FOR MACHINE-TOOL SPINDLE

Rainer von Haas, Geesthacht, and Willi Jester, Herten, both of Fed. Rep. of Germany, assignors to Krupp Widia GmbH, Essen, Fed. Rep. of Germany

Filed Oct. 23, 1989, Ser. No. 425,711

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1988, 3835879

Int. Cl.<sup>3</sup> B23C 1/04

U.S. Cl. 409—232

15 Claims



1. In combination with:

a machine spindle

rotatable about an axis

formed with an axially centered forwardly flared large-diameter seat,

provided in the seat with at least two axially and radially displaceable spindle jaws,

having an axially displaceable actuating rod axially coupled with the jaws, and

formed with cam formations engageable with the jaws to move same together on axial rearward displacement; and

a tool

normally also centered on the axis, and

formed with an axially centered rearwardly tapered small-

diameter stem substantially smaller than the seat; an adapter comprising:

an adapter body normally centered on the axis and formed with

a forwardly open small-diameter adapter seat complementary with the tool stem,

a rearwardly projecting adapter stem snugly receivable in the large-diameter seat of the spindle,

a flange flatly engageable with the front end of the spindle when the adapter stem is in the spindle seat, and

at least one rearwardly projecting tongue having a radially deflectable rear end engageable between a respective one of the jaws and the spindle when the adapter stem is in the spindle seat to press the one jaw radially inward;

a connector rod axially limitedly displaceable in the adapter body between a front position and a rear position and having a rear end formed as a head engageable by the jaws;

at least one locking member engageable between the rod and the tool stem to lock the tool in the adapter seat when the connector rod is in the rear position.

4,958,969

## ADAPTER SLEEVE

Rudolf Och, Nuremberg, Fed. Rep. of Germany, assignor to Firma Freco Verzahnungslehren GmbH, Altdorf, Fed. Rep. of Germany

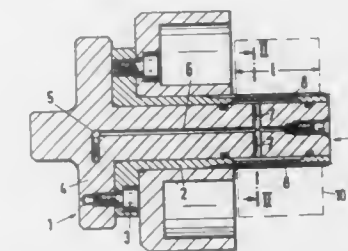
Filed Sep. 29, 1989, Ser. No. 414,758

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1988, 8812608[U]

Int. Cl.<sup>3</sup> B23C 5/26; B23B 31/40

U.S. Cl. 409—234

12 Claims



6. A compressible adapter sleeve made of one of titanium and an unhardened titanium alloy, for an hydraulic lathe chuck which is operated by fluid pressure, said sleeve having an outer side with spaces arranged so as to conduct the fluid which is or will be under pressure, and having an inner side formed so as to push inwards against an object to be clamped, the inner side of the adapter sleeve comprising a hard layer.

4,958,970

## GRADUATED-LOAD SPRING WASHER SYSTEM FOR SCREWS AND THREADED FASTENERS

James D. Rose, and William H. Sader, III, both of Canoga Park, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 17, 1988, Ser. No. 233,291

Int. Cl.<sup>3</sup> F16B 31/02

U.S. Cl. 411—12

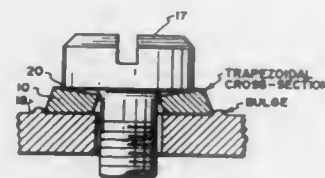
8 Claims

1. A graduated-load spring washer system for screws and threaded fasteners to maintain a tailored preload and screw-locking force on a sandwiched joint to prevent loosening before, during and after joint thickness changes caused by material stress relaxation, creep and wear, comprising:

a. A threaded fastener means and a graduated-load spring washer;

b. said threaded fastener means, having a head, being opera-

- ble to apply compressive load forces to said graduated-load spring washer and said sandwiched joint when tightened;
- c. said graduated-load spring washer comprising a deflection coil spring of slightly less than one coil;
- d. said coil spring having an upper surface that is in contact with the outer circumference of the head of said fastener means throughout the tightening process whereby the contact between the head and said upper surface of the coil spring is spaced inwardly from the outer circumference of the coil spring;
- e. said coil spring having a lower surface that provides a gap between the lower surface of said coil spring and the surface of said sandwiched joint, said lower surface pressed flat against said surface of said sandwiched joint when said graduated-load spring washer is fully compressed;
- f. said coil spring having an outer peripheral surface and an inner peripheral surface, said outer peripheral surface determining the greater thickness of said graduated-load spring washer;



- g. the opposite ends of said slightly less than one coil spring having a specially contoured configuration which prevents marring and minimizes damage of external surfaces of the sandwiched joint;
- wherein a precise preloading of force is applied by said threaded fastener means to said graduated-load spring washer at a position directly below said outer circumference of said head of said threaded fastener means and onto said upper surface of said graduated-load spring washer when said threaded fastener is tightened to flatten said graduated-load spring washer coil against the sandwiched joint, thereby maintaining a large anti-unscrewing force, spring force and centering force applied in opposition to forces that cause joint separation, thus keeping the sandwiched joint compressively loaded although large joint-thickness changes occur; and without degrading fatigue capability of the fastener means or causing structural configuration changes that make the fastener means susceptible to overload failure.

4,958,971

**BREAK-STEM BLIND RIVET**

Raymond D. Lacey, Essendon, and William D. Bradley, Welwyn Garden City, both of England, assignors to Avdel Limited, Hertfordshire, England

Continuation of Ser. No. 147,907, Jan. 25, 1988, abandoned. This application Sep. 14, 1989, Ser. No. 407,707

Claims priority, application United Kingdom, Jan. 30, 1987, 8702155

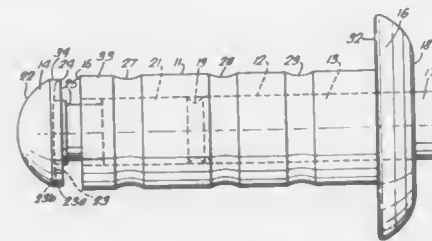
Int. Cl. F16B 13/04

U.S. Cl. 411—38

10 Claims

1. A blind break-stem rivet comprising a deformable tubular shell having a bore inside it, and a stem extending along the bore and having a head adjacent one end of the shell; the shell being formed with a plurality of circumferential zones of modified strength spaced apart along the shell; in which the spacing between each zone and the next progressively decreases as the distance along the shell from the said one end thereof increases,

wherein each of said zones of modified strength is a single rolled groove having a width to depth ratio greater than 5,



whereby said rivet has a large grip range and good clamp-up.

4,958,972

**BREAKABLE COMPOSITE DRILL SCREW**

Katsumi Shinjo, Osaka, Japan, assignor to Yugen Kaisha Shinjoseisakusho, Osaka, Japan

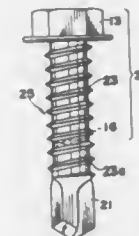
Filed Nov. 1, 1989, Ser. No. 430,845

Claims priority, application Japan, Nov. 25, 1988, 63-297334

Int. Cl. F16B 25/00, 31/00

U.S. Cl. 411—387

2 Claims



1. A breakable composite screw comprising: a first shank made of an austenitic stainless steel; a driving head extending from one end of the first shank and engageable with a screw driving tool; a flat surface formed at the other end of the first shank in a direction perpendicular to an axis of the first shank; a second shank made of a low-carbon steel and being of the same diameter D as the first shank; a welding lug protruding centrally from an end of the second shank; the second shank being fixedly adjoined to the flat surface by projection-welding by means of the welding lug to thereby provide a break zone at the other end of the first shank; a drill bit formed by cold forging at an end of the second shank; a continuous thread which is formed by thread-rolling so as to extend around both outer cylindrical peripheries of the first shank and second shank wherein a portion extending from the break zone to the drill bit is hardened or quenched.

4,958,973

**INTERNAL-PRESSURE-BEARING FEMALE SCREW**

Nobuyuki Sugimura, 308, Mabase, Shimizu-shi, Shizuoka-ken, Japan

Filed Jan. 9, 1988, Ser. No. 204,196

Claims priority, application Japan, Mar. 23, 1988, 63-68669

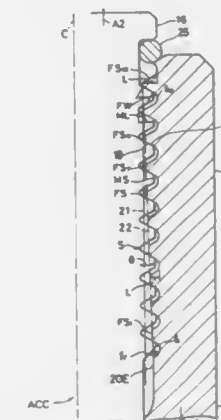
Int. Cl. F16B 35/04; F16L 25/00

U.S. Cl. 411—423

5 Claims

1. An internal-pressure-bearing female screw formed on the inside of an opening of a vessel main body where an internal pressure varies and formed to be mated with a male screw to form a screw connection adapted to be applied with a varying composite load due to variation of an internal pressure, said male and female screws having threads, said threads having valleys and heights, characterized in that the thread contact heights of said female screw are formed so as to be successively lowered along the direction of the center of the vessel main

body, the distance from female thread valley bottom to female thread valley bottom being substantially constant, and a line



connecting said female thread valley bottoms being substantially parallel with a line connecting male thread valley bottoms.

4,958,974

**DAMPED BINDING APPARATUS**

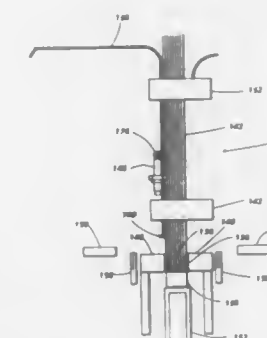
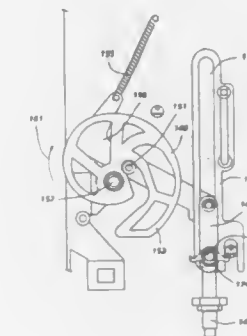
Richard C. Schenk, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 7, 1989, Ser. No. 389,932

Int. Cl. B42C 9/00

U.S. Cl. 412—37

18 Claims



1. An apparatus for binding a set of sheets by applying a strip having an adhesive on one surface thereof to one edge of the set, including:
- means for supporting and heating the strip to soften the adhesive thereon;
- means for moving said supporting means and the set of

sheets relative to one another so as to press one edge of the set of sheets into the adhesive on the strip;

means for controlling the depth of penetration of said one edge of the set of sheets into the adhesive on the strip so as to form a layer of adhesive between said one edge of the set and the strip having a predetermined thickness; and

means for damping said moving means to absorb a substantial portion of the kinetic energy of the set of sheets as the set of sheets contacts the adhesive on the strip reducing deflection and distortion of the set of sheets.

4,958,975

**CART WHEEL CONTROL FOR HOISTWAY CAR**

Angelo M. Vaccaro, Charlotte, N.C., and Robin C. Morse, Elizabethtown, N.Y., assignors to The Peele Company, Bay Shore, N.Y.

Division of Ser. No. 909,036, Sep. 18, 1986, Pat. No. 4,787,802, which is a continuation-in-part of Ser. No. 803,103, Nov. 27, 1985, abandoned. This application Sep. 20, 1988, Ser. No. 246,788

Int. Cl. B65G 1/04

U.S. Cl. 414—259

6 Claims



1. An automatic cart lift system for moving wheeled carts between levels, comprising a car vertically movable in a hoistway, the car having a platform indexable with the levels, an automatic transfer device on the platform, said transfer device having a horizontal slot adjacent the plane of the platform, a wheeled cart supported by a multiplicity of wheels including a swiveled set adjacent one end and movable on and off the platform, said cart having a bottom wall and guide means depending below the bottom wall, said guide means being arranged to pass horizontally into the slot of the transfer device, the guide means with reference to the direction of cart travel on and off the platform having a first portion adjacent the center of the cart and a second portion adjacent an end of the cart such that said first and second portions are spaced from each other a distance in the order of one-half the length of the cart whereby the cart is laterally guided on and off the platform by interengagement between the guide means and the slot at points spaced a relatively large distance in the direction of travel so that a tendency of the cart to yaw on said swivel wheels is resisted.

4,958,976

**DEVICE FOR THE STORAGE, INSERTION, AND REMOVAL OF CONTAINERS**

Ernst Hauser, Bowil, Switzerland, assignor to Ascom Antelca AG., Gmütligen, Switzerland

Filed Feb. 17, 1989, Ser. No. 311,733

Claims priority, application Switzerland, Mar. 14, 1988, 961/88

Int. Cl. E05G 1/08

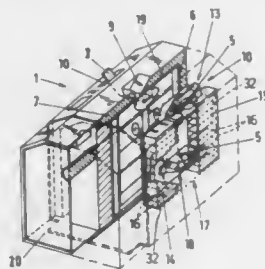
U.S. Cl. 414—331

16 Claims

1. Device for the storage, insertion, and removal of containers in and, respectively, from a secured space (6), comprising safe including a safe housing (1) surrounding the safe interior secured space (6), and a safe door (20); said safe housing (1) having a first opening lockable by said safe door (20) and at least one second opening (10); at least one rack (14, 15) having a plurality of storage sites (16) therein arranged in tiers in superimposed relationship; a plurality of containers (5) inserted in said storage sites (16) of said rack (14, 15), said rack (14, 15) having a wall (32),



each of said containers (5) positioned adjacent to said wall (32);  
said first opening lockable by said safe door (20) being so vast that said at least one rack (14, 15) can be inserted in and, respectively, removed from said interior secured space of said safe housing (1) through said first opening; said at least one second opening (10) being smaller than said first opening and dimensioned for the individual issuance and introduction of said containers (5) or container contents, respectively;  
conveying means (18, 13) connected in said interior secured space (6) in said safe housing (1) for individually convey-



ing said containers (5) from said storage sites (16) of said rack (14, 15) to said second opening (10) and back again; means (17, 19) adapted for carrying said at least one rack (14, 15) to an operation place in said safe housing (1) in proximity to said conveying means (18, 13) and, respectively, away therefrom; and  
locking means on said at least one rack operative to lock said plurality of containers in said at least one rack upon removal of said at least one rack from said operation place in said safe housing, and to unlock said plurality of containers from said at least one rack upon positioning said at least one rack on said operation place.

4,958,977

## SYSTEM FOR THE TRANSPORT OF BULK COMMODITIES

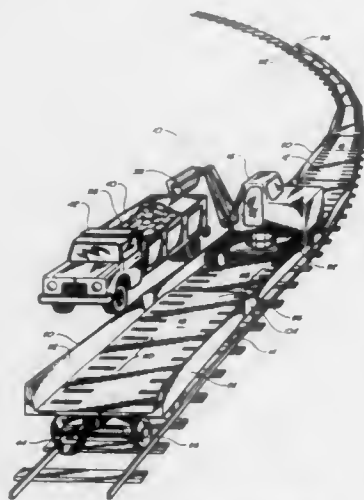
Edwin deS. Sneed, P.O. Box 1000, Georgetown, Tex. 78627

Filed Jan. 27, 1989, Ser. No. 302,380

Int. Cl.<sup>5</sup> B65G 67/02

U.S. Cl. 414—339

12 Claims



1. A material transport system comprising:  
a material container means for receiving material to be transported, said material container means having a generally flat floor extending between a pair of side walls, said

material container means comprising a plurality of railroad cars, said flat floor extending through said plurality of railroad cars, each of said railroad cars being articulated to an adjacent car;  
motive means connected to said material container means for allowing said material container means to move from one place to another; and  
unloader means positioned within said material container means for unloading material from said material container means, said unloader means comprising:  
tractor means extending between said side walls of said material container means, said tractor means for selectively moving said unloader means longitudinally along said floor; and  
a shovel articulated to said tractor means, said shovel having a size for fitting between said side walls, said shovel for passing material from between said side walls to a location external of said material container means, said floor of said material container means being in frictional relationship with said tractor means of said unloader, said floor having a plurality of slots formed transversely therein for engaging a portion of said tractor means.

4,958,978

## ARTICULATED DUMPING VEHICLE

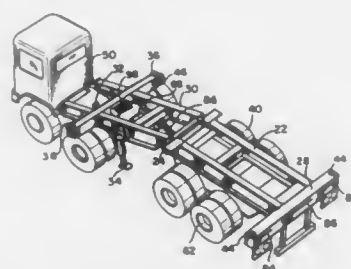
Joseph Shedleski, Levittown, Pa., assignor to George E. Wilkinson, Bensalem, Pa.

Filed Sep. 12, 1988, Ser. No. 243,475

Int. Cl.<sup>5</sup> B60P 1/14

U.S. Cl. 414—483

10 Claims



1. A vehicle for transporting a removable container, comprising:  
a trailer chassis carried on at least one ground engaging means supporting the chassis above a ground surface and spacing an upper surface of the chassis above said ground surface, said upper surface of the chassis being contoured to complement a lower surface of the container when the container is placed on the chassis, the chassis having a rigid fore section and a rigid aft section, the fore section being connectable to a tractor by a king pin defining a substantially vertical articulation axis between the tractor and the vehicle, the fore and aft sections being normally aligned co-linearly with both said fore section and said aft section directly bearing the container thereon, said fore and aft sections being articulated to one another at a knuckle defining a horizontal articulation axis between said fore and aft sections, the knuckle being free to pivot only in a direction causing the fore and aft sections to become inclined downwardly from the knuckle;  
means for at least temporarily fixing the container to the aft section of the chassis; and,  
articulation drive means attached to the fore section and to the aft section at points spaced from the articulation axis of the knuckle, the articulation drive means being controllably operable to force the fore and aft sections to pivot around the knuckle, thereby lifting the knuckle relative to the fore and aft sections and tilting the container aft, said articulation drive means including a winch with a reel

mounted to one of the fore section and the aft section and a line wound on the reel, the line being fixed to the other of said fore section and said aft section, the winch shortening the line between the fore section and the aft section to tilt the container.

4,958,979

## ARRANGEMENT FOR A LIFT ADAPTED TO A MOTOR VEHICLE

Ingemar Svensson, Bentzel's 22, 44300 Lerum, Sweden

PCT No. PCT/SE87/00523, § 371 Date Apr. 19, 1989, § 102(e)

Date Apr. 19, 1989, PCT Pub. No. WO88/03484, PCT Pub.

Date May 19, 1988

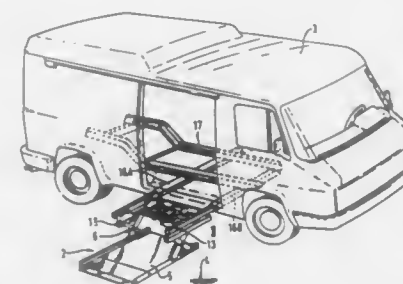
PCT Filed Nov. 9, 1987, Ser. No. 346,834

Claims priority, application Sweden, Nov. 10, 1986, 8604797-4

Int. Cl.<sup>5</sup> B60P 1/44

U.S. Cl. 414—549

7 Claims



1. Vehicle lift arrangement, comprising: a lifting platform, a scissor mechanism, a power source located beneath said platform when said platform is in a raised position and located above said platform when said platform is in a lowered position, said lifting platform attached by said scissor mechanism to said power source, a frame for supporting said lifting platform, said frame being movable between a withdrawn storage position close to the vehicle and an extended lifting position away from the vehicle, a support link having a first and a second end, said support link forming part of said scissor mechanism and being movably engaged with said lifting platform and with said frame, and a guide link having a first and a second end, said guide link being in movable engagement with said platform and said frame.

4,958,980

## QUICK CONNECT/DISCONNECT WHEEL CRADLE ARRANGEMENT FOR WHEEL LIFT TOWING SYSTEMS

Gerald E. Holmes, Chattanooga, Tenn., and Fleming V. Cannon, Jr., Flintstone, Ga., assignors to Century Wrecker Corporation, Ooltewah, Tenn.

Division of Ser. No. 152,517, Feb. 5, 1988, abandoned. This application Nov. 7, 1988, Ser. No. 268,562

Int. Cl.<sup>5</sup> B60P 3/12

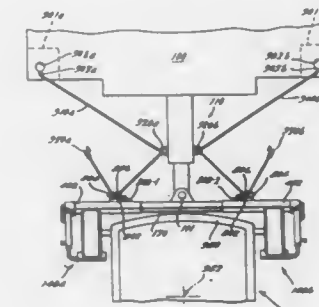
U.S. Cl. 414—563

12 Claims

1. In a wheel lift towing system including a towing vehicle having a front end and a rear end and having a tow bar pivotally coupled to a cross arm for carrying wheel engaging cradles at opposite end portions thereof, said tow bar extending rearwardly from said towing vehicle in a direction substantially horizontally and substantially along the longitudinal axis of said towing vehicle, an arrangement for coupling a back-up safety line, such as a safety chain, between the towing vehicle and a towed vehicle situated in said wheel engaging cradles, the arrangement comprising:

a first storage compartment in the rear end of said towing vehicle having a keyhole shaped aperture therein for lengthwise receiving and latching of an unused portion of a first safety line;

first guide means positioned on said tow bar and having an aperture through which the first safety line is routed; and



4,958,981

## ATTACHMENT CONNECTOR ASSEMBLY FOR HYDRAULIC SHOVEL TYPE EXCAVATOR

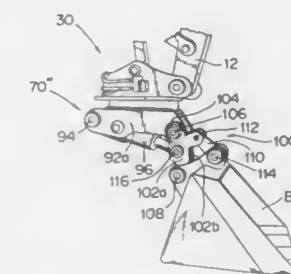
Masatoshi Uchikashi, 223, Oaza Michibe, Mikazaki-machi, Ogi-gun, Saga-ken, Japan

Filed Dec. 20, 1988, Ser. No. 286,711

Int. Cl.<sup>5</sup> E02F 3/36

U.S. Cl. 414—694

3 Claims



1. An attachment connector assembly for use with a hydraulic shovel type excavator including a stick arm or dipper stick wherein the attachment consists of a bucket with a suspension structure comprising a pair of bracket means having first and second sets of aligned, spaced apart holes formed therein, said connector assembly comprising:

connector head means connected to the excavator stick arm or dipper stick for controlled pivotal movement about a first axis;

rotating means mounted to the connector head means for rotation relative thereto about a second axis under the control of drive means operatively associated with the rotating means, the second axis extending substantially transverse to the first axis; and

a mounting structure comprising a fitting plate member removably secured to the rotating means, a pair of parallel hollow boss means disposed in spaced apart relationship relative to each other and secured to the fitting plate, and a pair of leg means pivotally connected at respective one ends thereof through pivot pin means to one of the boss means at opposite sides thereof and having a hollow tubular member integrally joined to respective other ends of the leg means;

said bucket adapted to be attached to the mounting structure by means of a first mounting pin extending through the hollow tubular member of the mounting structure and the first set of the aligned holes of the bucket suspension

structure and a second mounting pin extending through the other boss means of the mounting structure and the second set of the aligned holes of the bucket suspension structure;

said leg means each having a length selected to accommodate any variations in the spacing between the first and second sets of the aligned holes of the bracket means of the bucket suspension structure.

4,958,962

## DEVICE FOR TRANSFERRING ITEMS

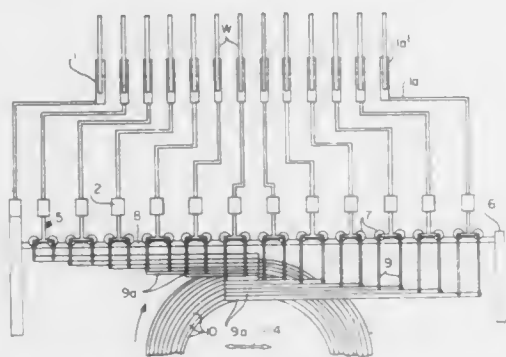
Gérard Champet, Saint Just Saint Rambert, and Gilles Charpille, Saint Etienne, both of France, assignors to Centre Stephanos de Recherches Mécaniques Hydromécanique et Frottement, France

Filed Feb. 24, 1989, Ser. No. 315,265

Claims priority, application France, Feb. 26, 1988, 88 02888  
Int. Cl.<sup>3</sup> B65G 65/00

U.S. Cl. 414—751

5 Claims



1. A device for transferring a plurality of vertically positioned spaced wafers from a first support means to a second remote support means comprising:

said first support means having a separate gripping means for each wafer;

each of said gripping means including upright clamping means adapted and constructed to releasably clamp separately each of said wafers therebetween;

each of said gripping means being mounted on a separate spaced wheeled movable carriage means;

each of said carriage means mounted on a track means horizontally mounted on said first support means;

each of said carriage means being affixed to separate rack means;

rotatably driven cog gear means comprising a plurality of cog wheels each of a different diameter and a different pitch being mounted axially one to the other;

each of said rack means being operatively connected individually to one of said cog wheels whereby said carriage means may be given translation motion when said cog gear means is rotated;

said first support means having moving means whereby said support means is capable of being separately moved horizontally and vertically.

4,958,963

## INDEXING CONVEYOR FOR WORKPIECE BLANKS

Alfred C. Flach, Clarkston, Mich., assignor to Oaklan Engineering, Inc., Pontiac, Mich.

Division of Ser. No. 223,529, Jul. 25, 1988, abandoned. This application Jul. 3, 1989, Ser. No. 375,000

Int. Cl.<sup>3</sup> B65G 57/30

U.S. Cl. 414—795.3

8 Claims

1. Apparatus for stacking preformed workpiece blanks comprising:

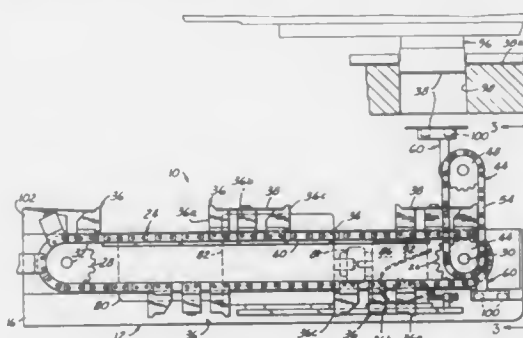
conveyor means for indexing transporting preformed workpiece blanks to a stacker station,

a pair of opposed support means carried above said conveyor means at said workpiece station, said pair of support means being separated by a gap to permit stacking of workpiece blanks therebetween,

finger means slidably carried by each of said support means for lateral motion with respect to said gap, each of said finger means having cam surface means facing said conveyor means,

spring means urging each said finger means into said gap, and

means positioned beneath said conveyor means at said stacker station for raising a workpiece blank against force of said cam surfaces so as to urge said finger means against said spring means out of said gap and permit entry of the workpiece blank between said support means, said finger means being urged by said spring means into said gap to support the workpiece blank between said support means,



said conveyor means comprising a vertical conveyor including a first pair of vertically spaced sprockets, an endless first chain trained in a loop over said vertically spaced sprockets, and a workpiece finger cantilevered from said first chain, said workpiece finger being constructed to receive a workpiece blank and to convey said workpiece blank in a vertical direction as a function of motion of said first chain,

a horizontal conveyor including a second pair of horizontally spaced sprockets, an endless second chain trained in a loop over said horizontally spaced sprockets and a workpiece hand carried by said second chain, said workpiece hand being constructed to receive a workpiece blank and to convey said workpiece blank in a horizontal direction as a function of motion of said second chain, and drive means including means coupling one sprocket in each of said pairs of sprockets to a common drive mechanism and synchronizing motion of said chains such that workpieces are transmitted between said finger and said hand at the point of intersection between said horizontal and vertical directions.

4,958,984

## FUEL PUMP HAVING IMPROVED SHAFT/IMPELLER COUPLING

Tomio Aoi, and Toshhiro Kameda, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 8, 1989, Ser. No. 349,184

Claims priority, application Japan, May 25, 1988, 63-68956[U]

Int. Cl.<sup>3</sup> F04D 29/18, 29/20

U.S. Cl. 415—55.1

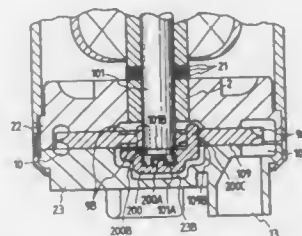
1 Claim

1. In a fuel pump of the type comprising a pump casing having a pump chamber therein, an impeller disposed in the pump chamber, a rotatable main shaft one end of which is connected to the center of the impeller to rotate said impeller,

and a means for driving the main shaft, the improvement comprising

a coupler engaging mechanically with both the impeller and the main shaft to prevent rotation of said impeller relative to said main shaft;

said impeller having a central hole defined at the center thereof for receiving the main shaft, said impeller also having at least one pin hole therein spaced from said central hole;



a first engaging portion formed on an end surface of the main shaft adjacent the portion of said main shaft which engages said central hole; and

a pin formed integrally with the coupler and engaging with said pin hole in said impeller, said coupler also having a second engaging portion which engages with said first engaging portion on said main shaft, the cross section of each of said first and second engaging portions being noncircular in a plane perpendicular to said main shaft.

4,958,985

## PERFORMANCE LOW PRESSURE END BLADING

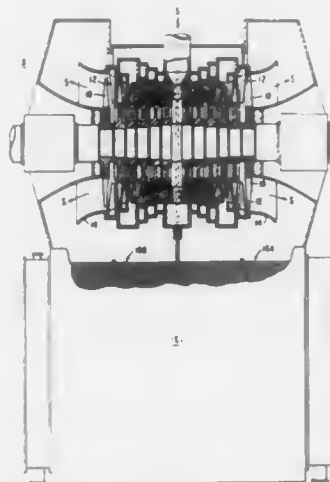
Joseph Davis, Maitland, and George J. Silvestri, Jr., Winter Park, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 1, 1989, Ser. No. 317,495

Int. Cl.<sup>3</sup> F04D 29/56

U.S. Cl. 415—101

5 Claims



1. A method for optimizing thermodynamic performance of a steam turbine by matching a last stage blade flow area to condenser pressure without changing blade sizing and shape comprising the step of adjusting blade angular orientation to set the gaging for an optimum flow area for the designed condenser pressure.

4,958,986

## CENTRIFUGAL ACTION TURBINE

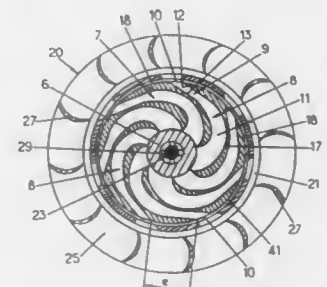
Pierre Boussuges, 4, rue Béranger, F-38000 Grenoble, France  
PCT No. PCT/FR88/00061, § 371 Date Dec. 15, 1988, § 102(e)  
Date Dec. 15, 1988, PCT Pub. No. WO88/06239, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 16, 1988, Ser. No. 297,861

Claims priority, application France, Feb. 20, 1987, 87 02251  
Int. Cl.<sup>3</sup> F01B 25/06; F03B 3/18

U.S. Cl. 415—188

18 Claims



1. Centrifugal action turbine comprising:

an axial fluid supply pipe;

a distributor placed at one end of said fluid supply pipe and adapted to form centrifugal jets of fluid deviated with respect to the radial direction and spaced in the peripheral direction;

a bucket rotor disposed concentrically to and around said distributor, said rotor including inner channels having inlets facing the peripheral surface of the distributor such that said jets pass through the rotor and cause rotation thereof;

said jets being formed through continuously convergent deviating channels within said distributor, said channels of the distributor having inlets turned toward the fluid supply pipe and outlets at the peripheral surface of the distributor;

said rotor being spaced a distance from the peripheral surface of the distributor such that jets flowing out of the distributor and through the rotor are aerated between the distributor and the rotor;

an obturator disposed between the distributor and the rotor, said obturator being movable to adjust the cross-section of the outlets of the channels of the distributor.

4,958,987

## MATERIALS HANDLING FAN IMPELLER

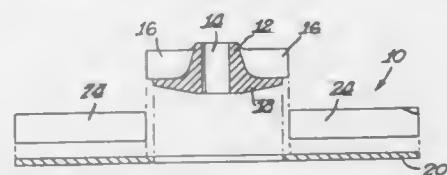
John G. S. Billingsley, Newark, Del., assignor to Precision Cutters, Inc., Phillipsburg, N.J.

Filed Jul. 20, 1989, Ser. No. 382,298

Int. Cl.<sup>3</sup> F01D 5/14

U.S. Cl. 416—213 A

7 Claims



1. In a materials handling fan, an impeller comprising a central thickened hub, said hub including an axial bore for receiving a drive shaft therein, a web section perpendicular to said bore, and a plurality of blades mounted perpendicular to said web and radially extending from said hub, an annular backplate distinct from and secured to the periphery of said web to extend the effective diameter of the assembly and a



plurality of blade extensions secured to the backplate and to the hub blades.

4,958,988

**MOTOR DRIVEN PUMP FOR PUMPING VISCOUS SOLUTIONS**

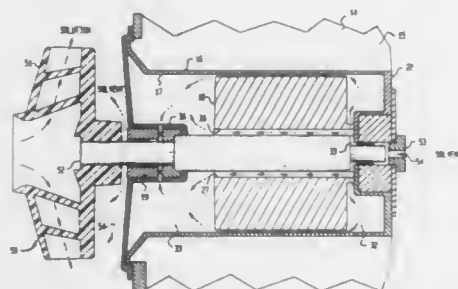
Mordechai Regev, Nes Ziona, Israel, assignor to Ormat Turbines, Ltd., Yavne, Israel

Continuation of Ser. No. 780,597, Sep. 26, 1985, abandoned. This application Jun. 17, 1987, Ser. No. 63,755

Int. Cl.<sup>3</sup> F04B 17/00

U.S. Cl. 417—53

17 Claims



11. A method for lubricating a bearing of a motor driven pump that pumps a solution of a solute in a solvent, said method comprising the step of applying only pressurized solvent to said bearing whereby the solvent leaks through said bearing, lubricates the same, and prevents said solution from entering said bearing.

4,958,989

**DIGITAL FLUID CONTROL OF A PRESSURE COMPENSATED PUMP**

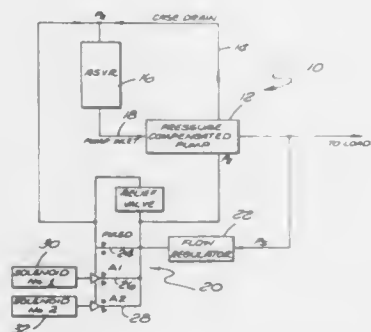
William Frantz, Northridge, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 30, 1989, Ser. No. 428,717

Int. Cl.<sup>3</sup> F04B 1/26

U.S. Cl. 417—222

10 Claims



1. An apparatus for selecting and controlling the output of a pressure compensated pump during operation, comprising:

(a) a pressure compensated pump having a servovalve assembly including a compensator valve spring and a compensating piston, said pressure compensated pump further having a control inlet in fluid communication with said inlet, said control inlet for introducing a digitally selected reference fluid pressure ( $P_E$ ), said  $P_E$  and said spring cooperating to establish a reference force, opposed by an output pressure of the pump, said reference force for positioning said piston within said servovalve assembly

depending on the selected  $P_E$ , thus controlling the output of said pump; and  
(b) means for producing said  $P_E$  in response to user selected digital commands.

4,958,990

**MOTOR-COMPRESSOR WITH MEANS TO REDUCE NOISE**

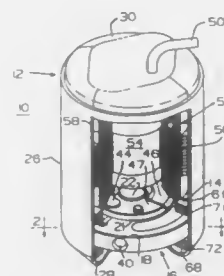
James F. Gordon; Owen H. Scheldorf, both of Louisville, Ky., and Gary O. Scheldorf, Greenville, Ind., assignors to General Electric Company, Louisville, Ky.

Filed Sep. 29, 1989, Ser. No. 414,369

Int. Cl.<sup>3</sup> F04B 39/12; F04C 29/00

U.S. Cl. 417—410

6 Claims



1. A hermetically sealed compressor unit including:  
a hermetically sealed casing having a side wall with a cylindrical inner surface; an electric motor positioned within said casing and including a stator with a cylindrical outer wall having an interfering fit with said casing side wall inner surface;  
a rotary compressor positioned within said casing to be driven by said motor, said compressor including a cylinder spaced from said motor and having a cylindrical outer wall; said cylinder outer wall being welded to said casing side wall at selected points spaced around said side wall; and  
at least one stiffening ring positioned adjacent said cylinder; said at least one ring including a cylindrical outer wall with a larger diameter than said cylinder outer wall and having an interfering fit with said casing side wall inner surface.

4,958,991

**SCROLL TYPE COMPRESSOR WITH DISCHARGE THROUGH DRIVE SHAFT**

Kazuto Kikuchi, Saitama, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Feb. 28, 1989, Ser. No. 316,805

Claims priority, application Japan, Feb. 29, 1988, 63-44497

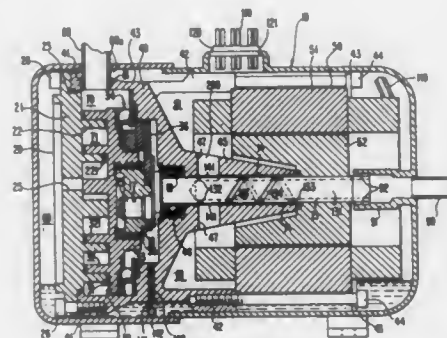
Int. Cl.<sup>3</sup> F04C 18/04, 29/02

U.S. Cl. 418—55.6

18 Claims

1. In a scroll type compressor with a hermetically sealed housing, said compressor comprising a fixed scroll disposed within said housing, said fixed scroll having a first end plate from which a first spiral element extends, an orbiting scroll having a second end plate from which a second spiral element extends, said first and second spiral elements interfitting at an angular and radial offset to form a plurality of line contacts which define at least one pair of sealed off fluid pockets, a drive mechanism operatively connected to said orbiting scroll to effect orbital motion of said orbiting scroll, a rotation preventing means for preventing the rotation of said orbiting scroll during orbital motion whereby the volume of said fluid pockets changes to compress fluid in said pockets, said drive mechanism including a drive shaft rotatably supported within an inner block member, said inner block member fixedly secured to said housing, said first end plate of said fixed scroll

and said inner block member forming a suction chamber therebetween, a discharge chamber formed exterior to the suction chamber between the outer surfaces of said first end plate and said inner block member and the interior surfaces of said housing, said first and second spiral elements disposed in said suction chamber, the improvement comprising:



said drive shaft having an axial bore and at least one radial bore extending through the surface of said drive shaft and linking said axial bore to said discharge chamber, said housing having an outlet, said axial bore having an opening isolated from said discharge chamber, said opening coupled to said outlet.

4,958,992

**VARIABLE CAPACITY SWIVELLING VANE PUMP**  
Gerhard Winiger, Zollbrück, Switzerland, assignor to Notron Engineering, Zollbrück, Switzerland

PCT No. PCT/CH87/00140, § 371 Date Jan. 16, 1988, § 102(e) Date Jan. 16, 1988, PCT Pub. No. WO88/03229, PCT Pub. Date May 5, 1988

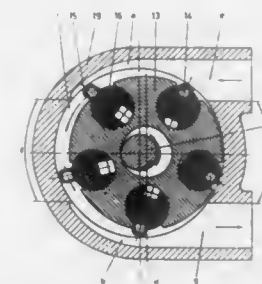
PCT Filed Oct. 13, 1987, Ser. No. 219,068

Claims priority, application Switzerland, Oct. 27, 1986, 4252/86-6

Int. Cl.<sup>3</sup> F04C 2/344, 15/00

U.S. Cl. 418—29

23 Claims



1. A variable capacity swivelling vane pump for conveying a medium having a pump casing, an inlet, an outlet, a pump channel with suction chamber, a sealing chamber, an outlet chamber, and a central shaft, said pump having a radially adjustable rotor with vanes, said rotor mounted on a rotor support for rotation in an eccentric manner within said sealing chamber, said vanes sealing said suction chamber during the rotation of the rotor, characterized in that said rotor rotates within a rotor cage in an eccentric manner about said shaft, said rotor cage having an internal circumferential surface, said rotor including rotatable vane receivers having said vanes mounted for reciprocal movement within for maintaining contact with said internal circumferential surface during the rotation of said rotor by a swivelling-stroke movement and accordingly seal the entire of said internal circumferential

surface without said rotor support coming into contact with the medium conveyed.

4,958,993

**SCROLL COMPRESSOR WITH THRUST SUPPORT MEANS**

Katsuharu Fujio, Koga, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

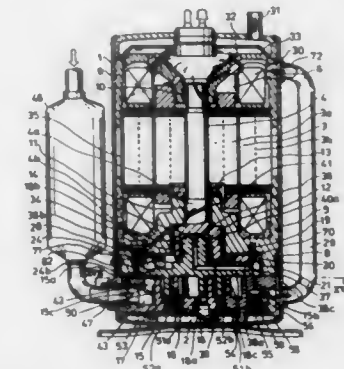
Filed Dec. 28, 1988, Ser. No. 291,233

Claims priority, application Japan, Dec. 28, 1987, 62-332005; Jun. 28, 1988, 63-159990; Jun. 28, 1988, 63-159996

Int. Cl.<sup>3</sup> F04C 18/04, 29/02

U.S. Cl. 418—55.3

13 Claims



1. A scroll compressor comprising:  
a stationary member;  
a first scroll member held by said stationary member;  
a second scroll member which is orbitally held from said stationary member and to be engaged with said first scroll member, to form compression chambers;  
driving means which is held by said stationary member and makes orbiting motion to drive said second scroll member; supporting means which is movably held and urged from said stationary member to support thrust force of said second scroll member against said first scroll member within a predetermined stroke in an axial direction of said scroll members, the smallest gap between said supporting means and said first scroll member being larger than thickness of a part of said second scroll member put therebetween; and  
rotation-prevention means which is movably held by said supporting means and engaged with said second scroll member to prevent said second scroll member from rotating.

4,958,994

**GEAR MACHINE FOR A PUMP OR ENGINE HAVING BEARING MEMBERS WITH CIRCUMFERENTIAL RELIEF GROOVES**

Klaus Griese, Kupferzell; Claus Jöns, Sachsenheim; Karl-Heinz Müller, Vaihingen; Rudolf Müller, Remseck, and Werner Mühlbauer, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE88/00007, § 371 Date Jan. 26, 1989, § 102(e) Date Jan. 26, 1989, PCT Pub. No. WO88/05501, PCT Pub. Date Jul. 28, 1988

PCT Filed Jan. 7, 1988, Ser. No. 378,181

Claims priority, application Fed. Rep. of Germany, Jan. 16, 1987, 3701099

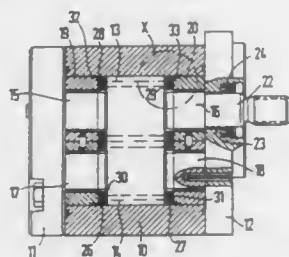
Int. Cl.<sup>3</sup> F04C 2/18, 15/00

U.S. Cl. 418—132

5 Claims

1. A gear machine having a high-pressure side and a low-pressure side, comprising two meshing gears having two opposing lateral surfaces, a plurality of shaft journals on which

said gears are mounted, each of said meshing gears being mounted on at least one of said shaft journals, a plurality of bearing members in which said shaft journals are supported, a sealing plate located between at least one of said lateral surfaces of said gears and an adjacent one of said bearing members and a seal arrangement located between each of said sealing plates and said adjacent bearing member, said sealing plate and said seal arrangement being structured so that said sealing plate



is brought into sealing contact with said lateral surface of said gear by an axially-acting pressure field formed between said sealing plate and said bearing member and so that said seal arrangement acts to limit said axially-acting pressure field, each of said bearing members having a circumferentially-extending relief groove in its outer circumference spaced from the adjacent said sealing plate which connects and communicates with said low-pressure side of said gear machine when said gear machine is under load.

4,958,995

#### VANE PUMP WITH ANNULAR RECESSES TO CONTROL VANE EXTENSION

Hiroshi Sakamaki; Yukio Horikoshi; Takeshi Jinouchi, and Kenji Tanazawa, all of Sakado, Japan, assignors to Eagle Industry Co., Ltd., Tokyo, Japan

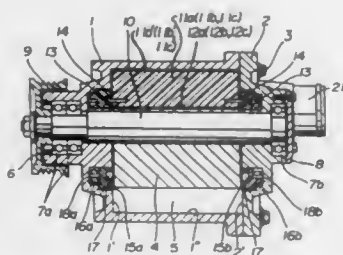
Continuation-in-part of Ser. No. 75,006, Jul. 17, 1987, abandoned, and a continuation-in-part of Ser. No. 110,919, Oct. 21, 1987, abandoned, and a continuation-in-part of Ser. No. 113,568, Oct. 26, 1987, abandoned, and a continuation-in-part of Ser. No. 115,677, Oct. 30, 1987, abandoned. This application May 23, 1988, Ser. No. 197,548

Claims priority, application Japan, Jul. 22, 1986, 61-170903; Jul. 22, 1986, 61-111490[U]; Oct. 23, 1986, 61-161610[U]; Oct. 23, 1986, 61-161609[U]; Nov. 4, 1986, 61-168147[U]; Nov. 4, 1986, 61-168145; Nov. 14, 1986, 61-269961; Nov. 14, 1986, 61-269960[U]; Nov. 17, 1986, 61-271934; Nov. 21, 1986, 61-178288[U]; Nov. 21, 1986, 61-178287[U]; Nov. 21, 1986, 61-276689; Nov. 21, 1986, 61-276690; Dec. 3, 1986, 61-185571[U]

Int. Cl.<sup>3</sup> F04C 2/344

U.S. Cl. 418—152

19 Claims



1. A vane pump comprising a housing means having a rotor chamber, said rotor chamber having an inner annular surface, a rotor means rotatably mounted in said rotor chamber, said inner annular surface having a chamber axis which is eccentric relative to the axis of rotation of said rotor means, said rotor

means having a plurality of generally radially disposed vane slots, a plurality of vane means slidably mounted in said vane slots and operable to define variable volume chambers for effecting a pumping action as said rotor means rotates and said vane means move generally radially in and out of said vane slots, said vane means having longitudinal ends, projection means projection from said longitudinal ends, said housing means having an annular channel coaxial with said chamber axis, said housing means having a housing portion disposed radially inwardly of said channel and having an outer peripheral surface defining an inner peripheral surface of said channel, said channel having an outer peripheral surface and a bottom surface, both formed by said housing means, said outer peripheral surface being spaced radially outwardly of said inner peripheral surface, annular ring means disposed in said channel, bearing means within said channel rotatably supporting said ring means within said channel, said ring means having inner and outer peripheral surfaces juxtaposed to the respective inner and outer peripheral surfaces of said channel, said ring means having a bottom surface juxtaposed to said bottom surface of said channel, with said chamber axis, annular ring means disposed in said channel, bearing means within said channel rotatably supporting said ring means within said channel, said ring means having an annular groove coaxial with said chamber axis, said groove having an inner cylindrical surface disposed to be engaged by said projection means such that during rotation of said rotor means, the resulting centrifugal force urges said vane means radially outwardly of the respective vane slot such that said projection means engages said inner cylindrical surface, said inner cylindrical surface being disposed to limit the extent of outward radial movement of said vane means from its respective vane slot to preclude sliding contact between said vane means and said inner annular surface of said housing means, said channel having inner and outer peripheral surfaces and a bottom surface, said ring means having inner and outer peripheral surfaces juxtaposed to the respective inner and outer peripheral surfaces of said channel, said ring means having an outer end surface juxtaposed to said bottom surface of said channel, said ring means having an intermediate peripheral surface disposed radially intermediate said inner and outer peripheral surface of said ring means, said ring means having an intermediate transverse surface axially intermediate said outer and inner end surfaces, said bearing means being disposed between said intermediate peripheral surface of said ring means and said inner peripheral surface of said channel and between said intermediate transverse surface of said ring means and said bottom surface of said channel.

4,958,996

#### ROTARY DEVICE HAVING INTER-ENGAGING INTERNAL AND EXTERNAL TEETH

Sylvain Janssen, Neuilly; Claude Fouineaud, Montrouge, and Gérard Lagarde, Longjumeau, all of France, assignors to Schlumberger Industries, S.A., Montrouge, France

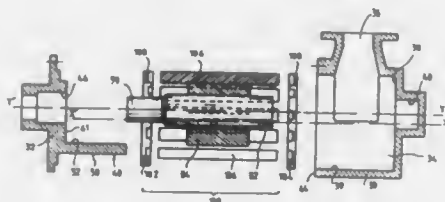
Filed May 23, 1989, Ser. No. 355,581

Claims priority, application France, May 25, 1988, 88 06920

Int. Cl.<sup>3</sup> F04C 2/10

U.S. Cl. 418—152

4 Claims



1. A rotary device for interacting with a flow of liquid, the device comprising:

a casing having a cavity defined by a substantially cylindrical side wall, said cavity being in communication with an inlet opening and an outlet opening, said casing containing:

a first rotary member having a first axis of rotation (YY') and external teeth; and

a second rotary member surrounding the external teeth of said first rotary member and guided to rotate about a second axis (XX') parallel to the first axis, said second member comprising two circular rings mounted inside said casing to occupy two respective planes perpendicular to said first axis (YY'), and a plurality of longitudinal components mounted between said rings to lie parallel with the second axis (XX'), each of said longitudinal components having a transverse cross-section in the shape of a gear tooth for meshing with the teeth of said first member, said rings having regularly spaced-apart, radially outwardly opening notches around their peripheries in order to receive the ends of said longitudinal components, said longitudinal components being freely engaged within said notches to allow a slidable fit between said components and said rings, and being radially maintained within said notches by said cylindrical side wall.

4,958,998

#### GLASSLIKE CARBON COMPOSITE MATERIAL AND METHOD OF PREPARING THE SAME

Michihide Yamauchi, Osaka; Hiroyuki Nagamori, Tochigi; Masanobu Wakasa, and Atsushi Ishikawa, both of Wakayama, all of Japan, assignors to Kao Corporation, Tokyo, Japan

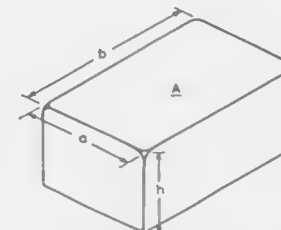
Filed Nov. 10, 1987, Ser. No. 119,002

Claims priority, application Japan, Nov. 10, 1986, 61-268444; Sep. 9, 1987, 62-227115

Int. Cl.<sup>3</sup> C01B 31/00

U.S. Cl. 423—445

5 Claims



1. A glasslike carbon composition material comprising: a glasslike carbon material which containing no graphite as the principal component; and ultrafine particles as a reinforcing component having an average particle size of 1  $\mu\text{m}$  or less, said particles being of one or more compounds selected from the group consisting of metal oxides, metal nitrides, metal carbides and metal borides, the proportion of said ultrafine particles being in the range of 0.5% to 20% of the volume of said glasslike carbon material.

4,958,997

#### TWO-STAGE GEAR PUMP WITH IMPROVED SPUR GEAR MOUNTING

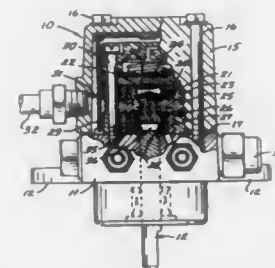
Frank L. Harwath, Rockford, Ill., assignor to Suntec Industries Incorporated, Rockford, Ill.

Filed Sep. 27, 1989, Ser. No. 413,121

Int. Cl.<sup>3</sup> F04C 2/10; F16B 3/00

U.S. Cl. 418—171

4 Claims U.S. Cl. 425—110



1. A gear pump comprising a body, an elongated shaft rotatably supported by said body and having an axially facing free end, a gear telescoped onto the free end portion of said shaft with a press fit, a slot formed radially through the free end portion of said shaft and opening axially out of the free end of said shaft, said slot extending along said shaft at least to a point within said gear and terminating in a closed end, said slot dividing the free end portion of said shaft into two cantilevered halves, a key disposed within said slot and having means engageable with said gear to positively couple said gear and said shaft for rotation in unison, and an annular groove formed circumferentially around the outer periphery of said shaft at the closed end of said slot to reduce stress on said two cantilevered halves of said shaft, the closed end of said slot being located between the ends of said grooves.

4,958,999

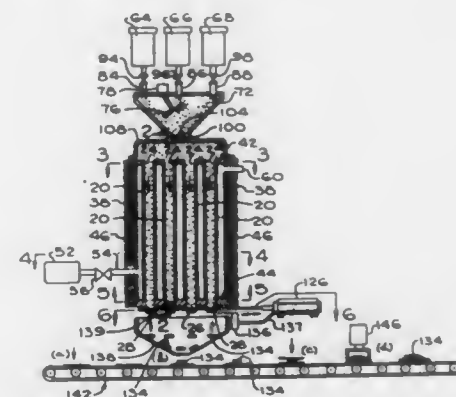
#### APPARATUS FOR PRODUCING POLYMERIZED PLUGS

Cristina Liacomb, Milford, Pa., and Anthony J. Buzzelli, Wallkill, N.Y., assignors to Dow Corning Corporation, Midland, Mich.

Filed Dec. 19, 1988, Ser. No. 286,471

Int. Cl.<sup>3</sup> B29C 35/04, 39/30

2 Claims



2. An apparatus for producing polymerized plugs having a circumferential sleeve, comprising: at least one flexible sleeve having polymerization starting materials encased within said sleeve; a plurality of reaction tubes, the reaction tubes having an inlet opening and an outlet opening, the inlet opening being at a higher elevation than the outlet opening, whereby said flexible sleeve can be passed through said inlet opening and will travel through said tube to said outlet opening at least in part by gravity feed; means for heating the reaction tubes, comprising means for



contacting said tubes with a hot fluid, whereby said starting materials within said sleeve will polymerize as they travel through said reaction tubes, said means for contacting said tubes with a hot fluid comprising an enclosure having a fluid inlet communicating with a source of said hot fluid, and a fluid outlet, the tubes being disposed at least in part within said enclosure, whereby the tubes will be contacted by hot fluid travelling from said fluid inlet to said fluid outlet, said tubes being detachably mounted within said enclosure, whereby tubes of differing inside diameter can be mounted within the enclosure to produce plugs having differing diameters; and cutting means for cutting said sleeve into plugs of predetermined length as the sleeve exits the outlet opening.

4,959,000

## RETRACTABLE PIN MOLD

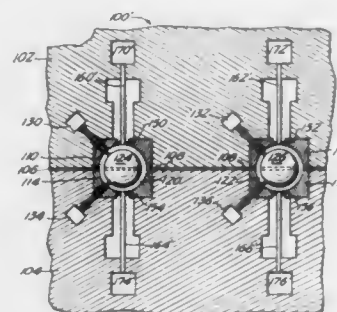
John P. Giza, Acushnet, Mass., assignor to Acushnet Company, New Bedford, Mass.

Filed Oct. 31, 1989, Ser. No. 429,522

Int. Cl.<sup>3</sup> B29C 45/14, 45/36, 45/72

U.S. Cl. 425—116

2 Claims



1. In a golf ball retractable pin mold having a top mold plate having a plurality of top half molds therein and a bottom mold plate having a plurality of bottom half molds therein, said plurality of top half molds in said top plate in registration with said plurality of bottom half molds in said bottom mold plate and each of said top and bottom half molds forming a substantially spherically shaped mold cavity, each of said top half molds and said bottom half molds joining at the equator of the spherically shaped mold cavity, the improvement comprising: (a) a gate positioned at the pole of each top half mold and at the pole of each bottom half mold; and (b) a valve at each gate to control the flow of fluid into each spherically shaped mold cavity.

4,959,001

## BLOW MOLDING MACHINE WITH ACCUMULATOR WAITING TIME CONTROL

Jacques A. E. Langlois, Vellmar; Heinrich M. G. Bergmann, and Wolfgang Nuhn, both of Kassel, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 21, 1989, Ser. No. 326,581

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1988, 3809856

Int. Cl.<sup>3</sup> B29C 49/04

U.S. Cl. 425—147

10 Claims

1. A blow molding machine for the blow molding of articles, comprising:

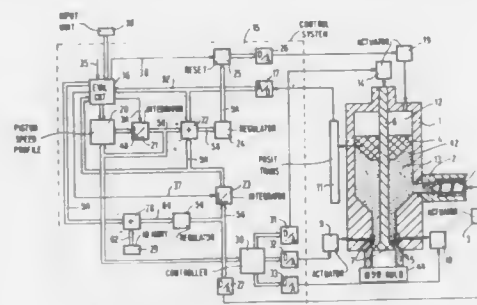
an accumulator head, which is connected to an extruder having a controllable rotational speed for supplying a flow of synthetic material for filling the accumulator head, and from which in a filled condition a discharge piston discharges the synthetic material in a discharge stroke through an annular slit-shaped discharge opening to produce a preform having a wall thickness; and a blow mold means for receiving the preform and forming a

blown article from the preform in a blow molding sequence; and

a control means which after completion of a last prior blow molding sequence and the filling of the accumulator head, derives a piston positioning signal for regulating the position of the discharge piston in a next discharge stroke, said control means comprising:

actual position measuring means for measuring the actual position of the discharge piston;

means responsive to the actual position measuring means for forming a comparative signal from the difference between the actual position and a set position of the discharge piston, the set position being determined by set point values for an initial piston position and a final piston position, respectively corresponding to a set point accumulator head contents level and a set point accumulator head cushion for said synthetic material, and by integration



from a previously specified discharge piston speed set point profile provided for a desired wall thickness profile of the preform

means for forming an influx signal which corresponds to the change in volume of synthetic material flowing from the extruder (2) to replace the discharged contents of the accumulator head (1) and for superimposing said influx signal on said comparative signal;

means for using an influx signal value determined at the end of a last prior discharge stroke for correcting the set point values for the initial piston position and the final piston position for the next discharge stroke; and

means for controlling the rotational speed of the extruder (2) in a manner for producing a predetermined waiting time between completion of the last prior blow molding sequence and reaching a set point contents level at said accumulator head.

4,959,002

## INSERTS FOR INJECTION MOLD MACHINE

Ronald E. Pleasant, 665 N. Detroit Street, Kenton, Ohio 43326

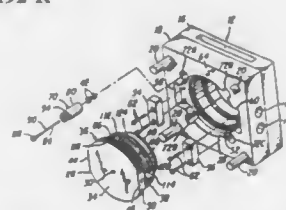
Division of Ser. No. 89,274, Aug. 25, 1987, Pat. No. 4,828,479.

This application May 8, 1989, Ser. No. 348,714

Int. Cl.<sup>3</sup> B29C 45/40

U.S. Cl. 425—192 R

15 Claims



1. A quick-changeover mold insert for use in an injection molding machine, said machine having a pair of relatively movable mold sides forming a mold cavity therebetween, said mold sides being separable to expose confronting parts of said mold sides, one of said mold sides comprising a mold plate

having a surface confronting the other mold side which surface is exposed when said mold sides are separated, said mold plate having an insert-receiving hole adapted to receive a mold insert, and said machine having insert retainer and lifter means on said mold plate for clamping said mold insert to said mold plate and for lifting said mold insert partly out of said insert-receiving hole, said mold insert comprising:

a generally cylindrical, one-piece body stepped along its length, said body comprising longitudinally-adjacent sections of different diameters including a first diameter locking groove section having an outer peripheral surface, an end face, and locking means forming locking groove segments at portions of said outer peripheral surface, said locking groove segments being engageable by said insert retainer and lifter means for clamping said mold insert to said mold plate with said end face confronting the other mold side and also for partly removing said mold insert from said mold plate, and said sections further comprising a second diameter liquid channel section, said liquid channel section having a liquid channel groove extending substantially completely therearound, said liquid channel section being smaller in diameter than said locking groove section, and a pair of axially spaced O-ring seal-receiving groove means for partly receiving O-rings located on opposite sides of said liquid channel groove.

4,959,003

## DEVICE FOR DIE-CASTING OF CONCRETE GOODS SUCH AS BLOCK STONES IN A CELLULAR MOLD

Agner R. Gregersen, Viborg, Denmark, assignor to KVM Industri maskiner A/S, Kjellerup, Denmark

PCT No. PCT/DK88/00032, § 371 Date Oct. 24, 1988, § 102(e)

Date Oct. 24, 1988, PCT Pub. No. WO88/06084, PCT Pub.

Date Aug. 25, 1988

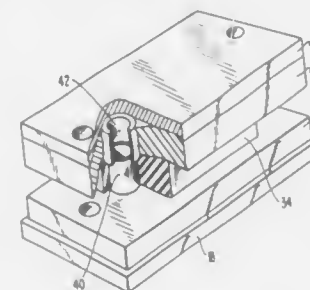
PCT Filed Feb. 23, 1988, Ser. No. 263,795

Claims priority, application Denmark, Feb. 23, 1987, 899/87

Int. Cl.<sup>3</sup> B28B 1/08, 3/02, 13/02; B30B 5/00

U.S. Cl. 425—346

4 Claims



1. A system for die casting of concrete goods, comprising a cellular casting mold having a plurality of cells and means for supplying concrete thereto for filling the cells and a superjacent dolly including a common base member having a plurality of resiliently yielding, protruding piston portions, each piston portion having at its lower end a load plate of a shape corresponding to the cross sectional shape of a corresponding cell, which load plates are pressable down into the cells for compressing the concrete therein, and which piston portions are mutually axially movable for providing that the load plates assume variable final levels due to differently compressible cell fillings, and wherein each of the piston portions comprises the load plate having a thrust pad fixed thereto, upon which thrust pad a resiliently compressible unit is fixed, and upon which resiliently compressible unit a plate member is fixed, which plate member is for mounting the resiliently yielding piston portions onto the common base member of the dolly by means of a lower carrier plate of the dolly.

4,959,004

## PAD-FORMING DEVICE WITH HOLD-DOWN KNOCKOUT PIN

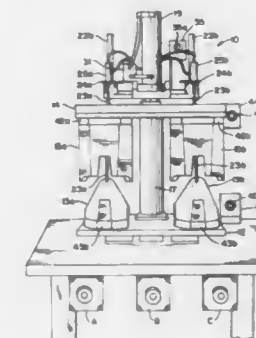
Stanley M. Nowakowski, Cranford, N.J., assignor to Sarc-Cast Pattern Works, Inc., Cranford, N.J.

Filed Nov. 30, 1988, Ser. No. 278,042

Int. Cl.<sup>3</sup> B29C 51/30

U.S. Cl. 425—397

16 Claims



1. A pad-forming device for shaping a piece of resilient material, said pad-forming device comprising:

- a shaping member;
- a molding member vertically oriented with respect to said shaping member, said shaping member and said molding member being movable relative to one another between an open position wherein said members are remote from one another and a closed position wherein said members are juxtaposed with one another;
- a hold-down element; and
- hold-down engagement means for positioning said hold-down element at an advanced position wherein said hold-down element lies at a distance from said shaping member while said members are in said open position so that the piece of resilient material can be inserted and held between said hold-down element and said shaping member prior to movement of said members to said closed position, said hold-down element having vertical play means for providing a range of free upward vertical movement so that when in said advanced position, said hold-down element can be moved upwardly through said range to accommodate pieces of resilient material having different thicknesses.

4,959,005

## SELF-ALIGNING MOLD FOR INJECTION MOLDING OF HOLLOW PLASTIC PRODUCTS

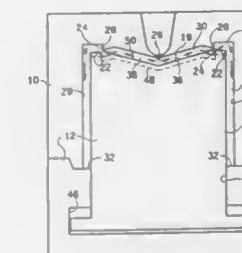
Jens O. Sorensen, Rancho Santa Fe, Calif., assignor to Primtec, Rancho Santa Fe, Calif.

Filed Feb. 23, 1989, Ser. No. 314,436

Int. Cl.<sup>3</sup> B29C 45/04

U.S. Cl. 425—577

29 Claims



18. A mold for injection molding, laminating and controlling

the dimensions of a hollow plastic product having a rim, a base and a side wall therebetween, comprising

- a first mold part and a second mold part, which when assembled by axial movement with respect to each other, define a first mold cavity for forming said plastic product;
- a third mold part, which, when assembled with the first mold part by axial movement with respect to each other while the first mold part is retaining a first layer of said plastic product formed by plastic material inserted into the first mold cavity, defines a second mold cavity for forming a second layer of said plastic product;
- wherein the base-forming portion of the first layer of plastic material retained by the first mold part includes a brink or a labrum formed in the first mold cavity by said second mold part, with said brink of said labrum protruding in a direction toward the third mold part, and the base-forming portion of the third mold part includes a labrum or a brink respectively that protrudes in a direction toward the first mold part to define a throttle situated between said brink and said labrum, the throttle having a variable width, which at any throttle position is defined by the distance between said brink and said labrum; and
- wherein the throttle width varies when the first and third mold parts are not axially aligned to thereby, during injection, admit more material into the side wall-forming portion of the second mold cavity that is the thinnest as a result of said axial misalignment, for the purpose of forcing the first mold parts into axial alignment.

23. A mold for injection molding and laminating a hollow plastic product having a rim, a base and a side wall therebetween, comprising

- a first mold part and a second mold part, which when assembled by axial movement with respect to each other, define a first mold cavity for forming said plastic product;
- wherein the first mold cavity includes primary flow channels for directing injected plastic material from the base-forming portion of the first mold cavity toward the rim-forming portion of the first mold cavity, with the first mold cavity thickness at the primary flow channels being generally thicker than the prevailing mold cavity thickness between the primary flow channels;
- the mold further comprising
- a third mold part, which, when assembled with the first mold part by axial movement with respect to each other while the first mold part is retaining a first layer of said plastic product formed by plastic material inserted into the first mold cavity, defines a second mold cavity for forming a second layer of said plastic product;
- wherein the first layer of plastic material is so shaped by the first mold cavity as to define secondary flow channels in the second mold cavity for directing plastic material injected into the second mold cavity from the base-forming portion of the second mold cavity toward the rim-forming portion of the second mold cavity.

4,959,006

#### APPARATUS RELATING TO A PREFORM WITH GEODESIC REINFORCEMENT RING

Frederick J. Feddersen, Londonderry, and Jiza J. Cheng, Manchester, both of N.H., assignors to FMT Holdings, Incorporated, Londonderry, N.H.

Continuation-in-part of Ser. No. 420,143, Oct. 11, 1989, which is a continuation-in-part of Ser. No. 373,046, Jun. 28, 1989. This application Nov. 22, 1989, Ser. No. 441,065

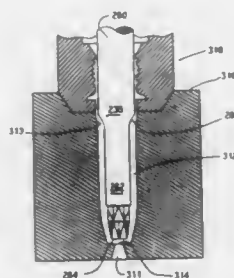
Int. Cl.<sup>3</sup> B29C 45/26, 49/06

U.S. Cl. 425—533

11 Claims

1. A plastic mold-core rod combination for forming an injection molded preform for producing blow molded plastic containers which comprises: a female preform mold having an interior surface and a core rod having an exterior surface together defining a mold cavity having the shape of the preform, said preform having a neck portion defining an opening; a tubular sidewall portion depending therefrom; and an integral base structure depending from the tubular sidewall por-

tion to a closed end; said preform having an outside wall face and an inside wall face, with at least one of the inside wall face and the outside wall face of the base structure having integrally formed thereon a plurality of filets, extending longitudinally of the preform and contacting one another to define a continuous reinforcing ring of varying thickness spaced from the closed



end and circumscribing the base structure, wherein said filets decrease progressively in width and radial thickness at least from said reinforcing ring toward said closed end, the preform being capable of forming a blow molded plastic bottle with a bottom portion having a continuous reinforcing ring of circumferentially continuous alterations in wall thickness with a regularly undulating cross-section along said circumference.

4,959,007

#### INSERT-TYPE ROTARY CORE MOLD APPARATUS

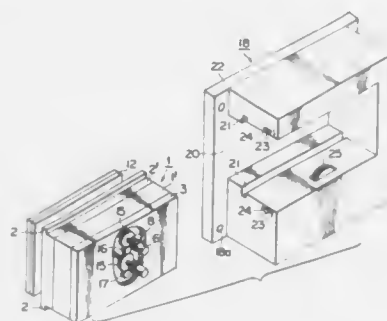
Kazuhiko Okayama, Chiba, Japan, assignor to Sumitomo Heavy Industries Ltd., Tokyo, Japan

Filed May 3, 1989, Ser. No. 346,843

Int. Cl.<sup>3</sup> B29C 45/38

U.S. Cl. 425—577

4 Claims



1. A rotary-core mold apparatus comprising: an insert holder mounted on a first platen of a molding machine;
- a mold having a cavity facing the insert holder, said mold being secured to a second platen of said molding machine, one of said first and second platens being stationary and a remaining platen being movable;
- an insert mounted detachably on said insert holder;
- a rotary core supported rotatably by said insert, said rotary core being adapted to project inside said cavity of said mold when said mold is clamped to said insert holder which has said insert mounted thereon;
- a driving source provided on said insert holder; and
- a rotation transmitting mechanism which is provided on said insert and is operatively connected to said driving source when said insert is mounted in said holder, so as to rotate said rotary core.

4,959,008

#### PRE-PATTERNED CIRCUIT BOARD DEVICE-ATTACH ADHESIVE TRANSFER SYSTEM

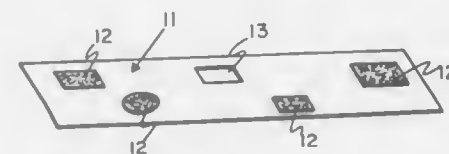
William M. Wasulko, Anderson, S.C., assignor to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Apr. 30, 1984, Ser. No. 605,523

Int. Cl.<sup>3</sup> A61F 13/02; H05K 1/02; B44C 1/17

U.S. Cl. 428—40

26 Claims



1. A circuit board device attach tape which comprises:

- (a) a support film; and
- (b) a pattern of curable conductive adhesive releasably affixed to one side of support film, the adhesive pattern being of a size and shape so that when brought into contact with a circuit board, the adhesive is in a pattern suitable for later attachment thereon of surface mounted devices to the circuit board.

4,959,010

#### AUTOMATICALLY REGULATED COMBUSTION PROCESS

Heinz Bartscher, Andreas Schmidt-Ott, and Hans-Christoph Siegmann, all of Zurich, Switzerland, assignors to Matter & Siegmann AG, Wohlen, Switzerland

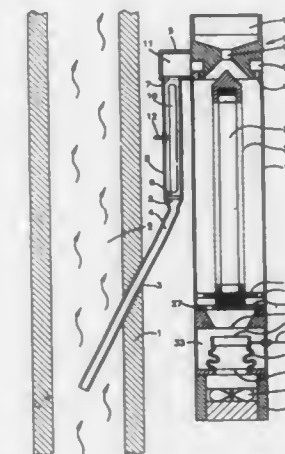
Filed Aug. 20, 1984, Ser. No. 642,346

Claims priority, application Fed. Rep. of Germany, Aug. 24, 1983, 3330509

Int. Cl.<sup>3</sup> F23N 5/00

U.S. Cl. 431—12

9 Claims



1. A combustion process comprising the steps of mixing an organic fuel with an oxygen-containing gas in an adjustable ratio, burning said fuel-gas mixture and thereby producing an exhaust gas containing a plurality of finely dispersed aerosol particles, collecting at least a part of said exhaust gas containing said finely dispersed aerosol particles and exposing said collected exhaust gas and thereby also said finely dispersed aerosol particles at least intermittently to an ultraviolet radiation source, thereby generating positive and negative charge carriers in said exhaust gas solely by means of photoelectrically charging said aerosol particles contained in said exhaust gas, detecting said positive or negative charge carriers to produce a measurement value which reflects the amount of charge of said positive or negative charge carriers, generating a control signal from said measurement value, and adjusting said ratio of said oxygen-containing gas and said fuel to an optimal value in response to said control signal.

4,959,011

#### ELECTRIC IGNITION SYSTEM

Karl E. Nilsson, Ottobrunn, Fed. Rep. of Germany, assignor to Bayern-Chemie, Gesellschaft für flugchemische Antriebe mbH, Aschau, Fed. Rep. of Germany

Filed Nov. 4, 1988, Ser. No. 267,529

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1987, 3738436

Int. Cl.<sup>3</sup> F23Q 7/06

U.S. Cl. 431—263

9 Claims

1. An electric ignition system comprising: an ignitor;
- a base including an electrical contact, said electrical contact being in electrical contact with said ignitor;
- a sleeve, said sleeve at least partially surrounding said base and being secured to said base so as to define a cavity, said ignitor being enclosed in said cavity by said sleeve and said base;
- a primary ignition powder, said primary ignition powder and said ignitor substantially filling said cavity;
- a jacket enclosing said base and said sleeve, said jacket comprising:

4,959,009

#### PULSE BURNER AND METHOD OF OPERATION

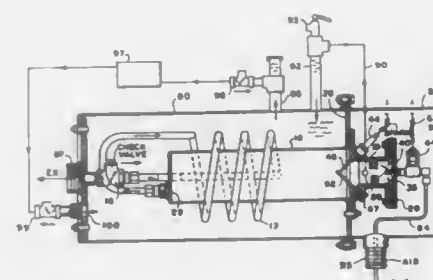
Klaus H. Hemsath, Toledo, Ohio, assignor to Indugas, Inc., Toledo, Ohio

Filed Jun. 26, 1989, Ser. No. 371,002

Int. Cl.<sup>3</sup> F23C 11/00

U.S. Cl. 431—1

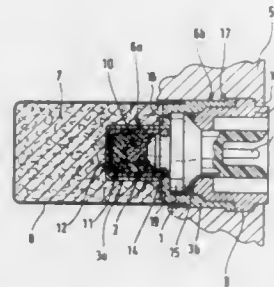
42 Claims



1. A method for generating periodic combustions in a combustion chamber having a one-way combustion air inlet, a one-way or restricted exhaust outlet and an externally actuated fuel inlet, said method comprising the steps of:
- (a) admitting combustion air into said chamber during a first, finite period;
- (b) thereafter admitting fuel into said chamber during a second timed, finite period;
- (c) mixing, igniting and combusting said fuel with said combustion air during said second time period;
- (d) thereafter beginning the first period by exhausting the products of combustion through said outlet, and
- (e) commencing said first timed period immediately upon expiration of said second time period whereby steps a through d are cyclically repeated.

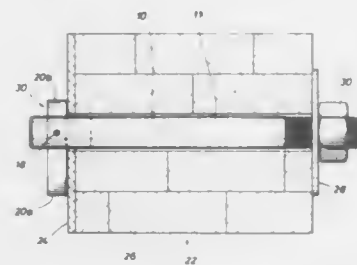


a first cylindrical portion including a window and a large axially extending circumferential surface and having a predetermined diameter, said first cylindrical portion being in contact with said sleeve;  
a second cylindrical portion including a large axially extending circumferential surface having a predetermined diameter larger than the diameter of said first cylindrical portion;



and a step extending radially and connecting said first cylindrical portion to said second cylindrical portion; wherein said first cylindrical portion encloses said sleeve, said primary ignition powder and said ignitor, and said base is form fitted with said second cylindrical portion and in abutment with said radially extending step;  
at least one fastening means, said fastening means retaining said base within said second cylindrical portion.

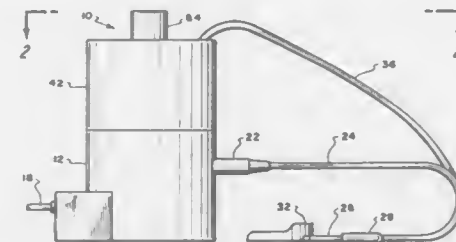
**4,959,012**  
**APPARATUS FOR REPAIRING BRICK/REFRACTORY IN A PROCESS HEATER**  
Gary L. Perfetti, Collinsville, Ill., assignor to Shell Oil Company, Houston, Tex.  
Filed Sep. 14, 1989, Ser. No. 407,505  
Int. Cl.<sup>5</sup> F27D 23/00  
U.S. Cl. 432-76 2 Claims



1. An apparatus for securing loose wall brick or refractory lining in a process heater comprising:  
a tension rod, having a threaded end and a slotted end, for insertion into a hole drilled in the wall of said process heater at the location of said loose wall brick;  
a pivot plate pivotally secured in said slotted end such that, when said slot is in a vertical position and said pivot plate is unrestrained, said pivot plate will pivot to a vertical position whereby it may be pulled against the outside of said process heater and prevent removal of said tension rod from said hole;  
a pressure plate which may be placed over said threaded end of said tension rod and into contact with said wall brick; and  
a nut threaded on said threaded end of said tension rod and against said pressure plate whereby said nut can be tightened thereby applying pressure on said heater wall which

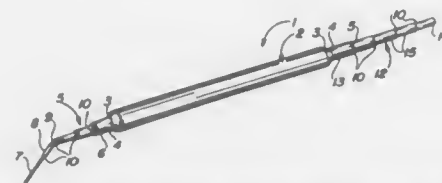
is between said pivot plate and said pressure plate and preventing further movement of said brick.

**4,959,013**  
**RECYCLING, LIQUID MEDIUM TEMPERATURE ALTERING APPARATUS**  
Fred W. Reynolds, San Pedro, Calif., assignor to Sol Gingi-Pak, A Division of Belpo Co., Inc., Camarillo, Calif.  
Filed Aug. 29, 1988, Ser. No. 237,373  
Int. Cl.<sup>5</sup> A61C 9/00  
U.S. Cl. 433-35 5 Claims



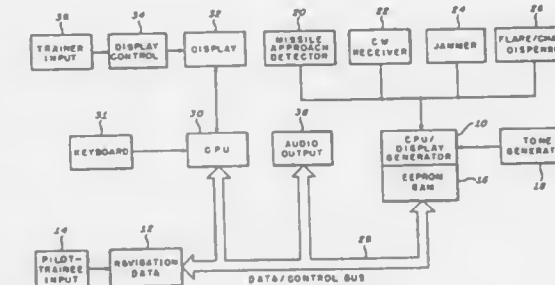
1. An apparatus for subjecting an exterior structure to a change in temperature comprising:  
an exterior structure to be changed in temperature, said exterior structure having a liquid passage arrangement;  
a housing, a pump connected to said housing, a conduit assembly connecting said pump and said liquid passage arrangement;  
a liquid, said pump for moving said liquid through said conduit assembly and said passage arrangement;  
a reservoir, said liquid to be contained within said reservoir, said reservoir being connected by connecting means to said housing, said conduit assembly connecting with said reservoir, said conduit assembly and said pump and said reservoir and said liquid passage arrangement forming a closed liquid conducting system; and  
said reservoir being removably mounted directly on said housing.

**4,959,014**  
**DENTAL SPACE MEASURING INSTRUMENT**  
John J. Sheridan, 1401 Lake St., Unit E-8, Metairie, La. 70005  
Filed May 30, 1989, Ser. No. 358,597  
Int. Cl.<sup>5</sup> A61C 19/04  
U.S. Cl. 433-72 24 Claims



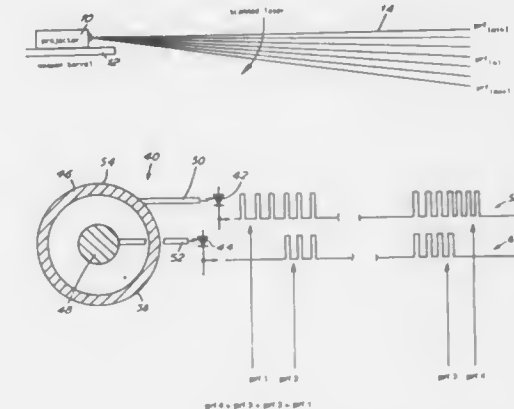
1. A dental space measuring instrument for measuring the spacing between teeth, comprising handle means and at least one first straight portion extending from said handle means and an angulated portion extending from said first straight portion in angular relationship, said first straight portion and said angulated portion further defined by a first plurality of graduated measuring means adapted for insertion between the teeth and measuring the spacing.

**4,959,015**  
**SYSTEM AND SIMULATOR FOR IN-FLIGHT THREAT AND COUNTERMEASURES TRAINING**  
John E. Rasinaki, and Christian P. Delong, both of Albuquerque, N. Mex., assignors to Honeywell, Inc., Minneapolis, Minn.  
Filed Dec. 19, 1988, Ser. No. 286,116  
Int. Cl.<sup>5</sup> G01S 7/40; G09B 9/40  
U.S. Cl. 434-2 9 Claims



1. An operator training system and simulator for training in aircraft threat warning and countermeasures, said aircraft having a plurality of sensors for detecting electromagnetic emissions and active elements for countering detected threats, comprising:  
(1) countermeasures integration terminal unit, coupled to control said sensors and said active elements, for selectively providing digital data corresponding to a normal cockpit instrument display or to a given threat scenario, said terminal unit further comprising:  
(a) flight programmable digital data storage means for receiving data representative of predetermined threat scenarios,  
(b) digital image data processor means for generating displayable symbols representative of said threat scenario and corresponding to a normal cockpit instrument display,  
(2) trainer input control means for manually generating digital data in order to select a predetermined threat scenario or a normal cockpit instrument display,  
(3) display means coupled to receive data from said data storage means and to display scenarios or a cockpit instrument display as selected by said control means,  
(4) a computer processor circuit responsive to said control means for controlling said display means,  
(5) an audio-frequency generator circuit controlled by information from said computer processor circuit for producing audible signals corresponding to said threat scenario, and  
(6) data input means responsive to navigational data and pilot trainee input data for entering information to said computer processor circuit varying in response to the simulated conditions provided through the execution of a selected threat scenario, and for interactively controlling said display means according to said responses,  
said training system and simulator further comprising means for coupling said sensors and said active elements to said computer processor circuit for indicating an operational status thereof on said display, and for inhibiting generation of said threat scenario when at least one of said sensors or said active elements is in an operational status indicative of reception of said electromagnetic emissions or actuation of said active elements.

**4,959,016**  
**WEAPON TRAINING SYSTEMS**  
Ian R. Lawrence, 2 Main Avenue, Enfield, Middlesex, EN1 1 DA, England  
Filed Jun. 27, 1989, Ser. No. 371,766  
Claims priority, application United Kingdom, Jun. 27, 1988, 8815226  
Int. Cl.<sup>5</sup> F41G 1/00  
U.S. Cl. 434-22 8 Claims

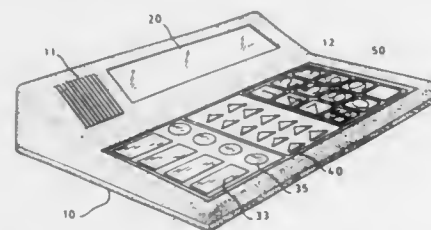


1. A weapon training system for simulating the use of a weapon against a target, the system comprising:  
a source of electromagnetic radiation adapted to be secured to the weapon, said source being arranged to produce a narrow beam of radiation which is directed generally along the aiming line of the weapon;  
means for scanning said beam in a predetermined direction transversely of said aiming line;  
means for modulating the beam at a frequency which is a function of the angular position of said beam along said scan direction; and  
detector means adapted to be secured to the target, for receiving the beam when the weapon is aimed at the target;  
wherein the detector means has an entry aperture which is extended by a predetermined amount along the direction of scan of the beam;  
and further comprising a circuit coupled to the output of the detector means and responsive to the respective modulation frequencies of the beam at the start and at the end of the illumination of the entry aperture of the detector means by the beam to compute the range from the weapon to the target.

**4,959,017**  
**ELECTRONIC LEARNING DEVICE FOR TEACHING HOW TO HANDLE MONEY**  
Barbara J. Thompson, Jesse Urser, Jr., and William Holmes, Jr.; all of Knox County, Tenn., assignors to Tutor Toys, Inc., Knoxville, Tenn.  
Filed Feb. 15, 1989, Ser. No. 311,124  
Int. Cl.<sup>5</sup> G09B 19/18  
U.S. Cl. 434-110 16 Claims

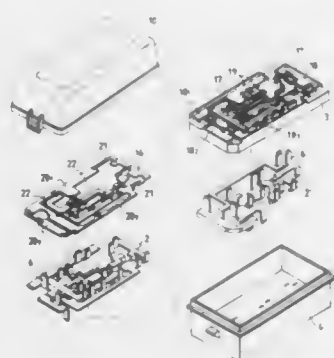
1. An electronic learning device for teaching monetary management skills involving currency and coins, comprising:  
student input means for generating input codes representative of monetary values and of selected monetary management skills;  
interrogation means responsive to said input codes generated by said student input means to request said student to engage in a selected money transaction problem, wherein each money transaction problem has a plurality of possible correct responses;

comparison means for receiving, and being responsive to, specific codes generated by said input means in response to said request to determine if said specific codes corresponds to one of a plurality of possible correct student responses to said money transaction problem; and



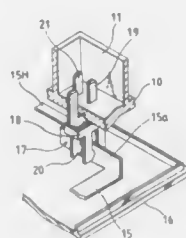
means connected to said interrogation means and said comparison means to communicate with said student said request and comment on the appropriateness of said response by said student to said money transaction problems.

**4,959,018**  
**ELECTRIC CONNECTION BOX**  
Masaki Yamamoto, Hisashi Sato, and Keiichi Ozaki, all of Kosei, Japan, assignors to Yazaki Corporation, Tokyo, Japan  
Filed Jun. 28, 1989, Ser. No. 372,595  
Claims priority, application Japan, Jul. 15, 1988, 63-93070[U]  
Int. Cl.<sup>5</sup> H01R 13/52  
U.S. Cl. 439—76 4 Claims



1. In an electric connection box of the type having at least one layer of bus bars disposed on an insulating base plate to form a circuit board, said circuit board being within said connection box; the improvement comprising:  
means on said base plate defining grooves within which lie the bus bars of said at least one layer of bus bars;  
said grooves having a pattern corresponding to the pattern of said bus bars of said at least one layer;  
said means comprising walls surrounding said bus bars; and  
waterproof elements individually covering said bus bars within said grooves.

**4,959,019**  
**ELECTRIC CONNECTION BOX**  
Eiji Shimochi, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan  
Continuation-in-part of Ser. No. 358,227, May 30, 1989. This application Aug. 30, 1989, Ser. No. 400,628  
Claims priority, application Japan, May 31, 1988, 63-131708; Aug. 30, 1988, 63-213792  
Int. Cl.<sup>5</sup> H01R 9/09, 25/00  
U.S. Cl. 439—76 4 Claims

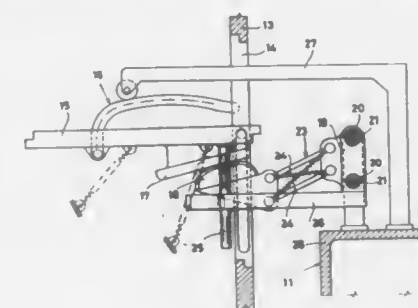


1. In an electric connection box of the type having a pair of upper and lower cases connected together to provide a casing, one of said upper and lower cases having an electrically insulating housing; a wiring assembly accommodated within said casing and including an electrically insulating plate and a plurality of bus bars mounted on said insulating plate; and external connection terminals electrically connected to said bus bars and having respective contact portions received within said insulating housing;  
the improvement comprising, each of said external connection terminals including a base portion, a plurality of said contact portions formed integrally with said base portion and extending into said housing, and a bus bar-gripping portion formed integrally with said base portion press-fitted relative to said bus bar;  
wherein said contact portions extend perpendicularly upward from the plane of said base portion at one end of said base portion, and said bus bar-gripping portion extends from the other end of said base portion; said bus bar-gripping portion including two sets of opposed holder sections for gripping said bus bar portion; each said holder section having two legs with a separation therebetween facing downward relative to said base portion; and each said holder section being joined to said other end of said base portion by a bent portion.

**4,959,020**  
**ELECTRICAL CONNECTOR SYSTEM FOR AUTOMATED STORAGE**  
Gaetano Di Rosa, Pino Torinese, Italy, assignor to Fata Automazione S.p.A., Turin, Italy  
Filed Jan. 31, 1989, Ser. No. 304,536  
Claims priority, application Italy, Feb. 8, 1988, 19341 A/88  
Int. Cl.<sup>5</sup> H01R 13/60  
U.S. Cl. 439—138 7 Claims

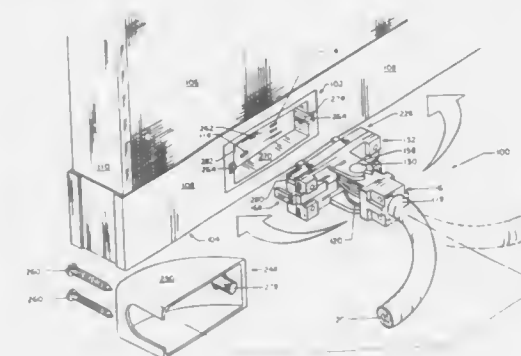
1. A storage system for self-refrigerated containers of the type in which the containers are housed in a cell of a cellular store, which system comprises:  
(a) at least one self-refrigerated container having at least one first electrical contact means for connecting a refrigeration unit therein to an external electric power source;  
(b) a corresponding cell for housing said container, said cell having a support member provided with at least one second electrical contact means for connecting said electric power source to said first electrical contact means and having guide means for supporting said container in said cell;  
(c) said first and said second electrical contact means being positioned in said container and said cell, respectively, so

that when said container is inserted in said cell and rests on said guide means said electrical contact means mutually



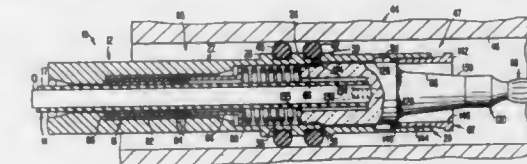
engage for providing an electrical connection between the external electric power source and said refrigeration unit.

**4,959,021**  
**PIVOTABLE POWER FEED CONNECTOR**  
Norman R. Byrne, 2736 Honey Creek, NE., Ada, Mich. 49301  
Continuation-in-part of Ser. No. 180,377, Apr. 12, 1988, abandoned, which is a continuation-in-part of Ser. No. 56,256, May 26, 1987, abandoned, which is a continuation of Ser. No. 826,198, Feb. 5, 1986, abandoned. This application Jul. 31, 1989, Ser. No. 388,696  
Int. Cl.<sup>5</sup> H01R 35/00  
U.S. Cl. 439—310 35 Claims



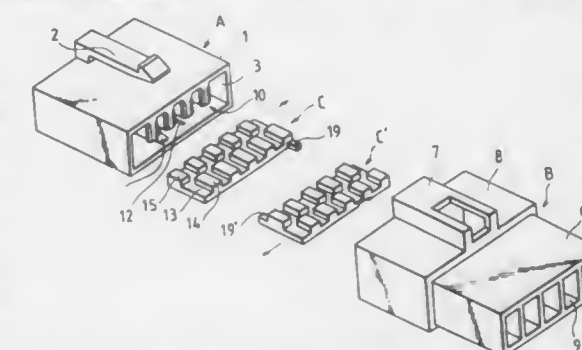
1. A power feed assembly adapted to supply electrical power and/or ground voltages to an electrical receptacle means, said electrical receptacle means adapted to be located in or on a wall panel or support surface or the like, and connectable to various types of electrical apparatus or to other receptacle means, said power feed assembly comprising:  
pivotal connector means adapted to be secured to a conduit or cable having at least one conductor capable of carrying electrical power or ground voltage prior to any electrical connection to said electrical receptacle means;  
pivot block means pivotably connectable to said pivotal connector means for providing a pivot connection relative to said conduit or cable;  
contact block means connectable to said pivot block means and having at least one prong terminal electrically connectable to said at least one conductor;  
protective cover means adapted to be slidably secured to said contact block means for selectively covering said at least one prong terminal; and  
means for selectively locking said pivotal connector means in a fixed position relative to said pivot block means.

**4,959,022**  
**ELECTRICAL CONNECTOR FOR HIGH PRESSURE APPLICATIONS WITH RAPID PRESSURE TRANSIENTS**  
David H. Neuroth, Hamden, Conn., assignor to Hubbell Incorporated, Orange, Conn.  
Filed Aug. 30, 1989, Ser. No. 400,684  
Int. Cl.<sup>5</sup> H01R 13/40  
U.S. Cl. 439—589 26 Claims



1. An electrical cable connector, the combination comprising:  
an electrical cable including an electrical conductor having a layer of elastomeric insulation thereon;  
a hollow housing receiving a portion of said electrical cable therein and having an inner surface; and  
means, located in said housing, for sealing the space between said inner surface of said housing and said electrical cable to prevent said conductor from being exposed to outside fluid,  
said means for sealing comprising  
an annular sealing element surrounding said electrical cable, having a generally U-shaped longitudinal cross section, and including first and second concentric leg portions extending generally axially in said housing, said first leg portion engaging and sealing against said inner surface of said housing and said second leg portion engaging and sealing against said elastomeric insulation of said electrical cable, and  
positioning means, coupled to said housing, for axially restraining said sealing element with said housing.

**4,959,023**  
**ELECTRICAL CONNECTOR**  
Hiroshi Watanabe, and Katsuaki Terada, both of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan  
Filed Aug. 3, 1989, Ser. No. 389,147  
Claims priority, application Japan, Aug. 8, 1988, 63-196124  
Int. Cl.<sup>5</sup> H01R 13/40  
U.S. Cl. 439—595 9 Claims



1. An electrical connector comprising:  
an electrically-insulative housing having front and rear open ends and at least one terminal-receiving chamber, said housing having a slot therein adjacent to said front open end thereof;  
at least one contact terminal inserted into said chamber from said rear open end of said housing; and  
a spacer inserted into said slot in such a manner that said spacer can be slidably moved perpendicularly to the axis of said contact terminal to a locked position, said spacer having a terminal-retaining portion which engages said



contact terminal when said spacer is in said locked position to thereby prevent said contact terminal from being withdrawn from said chamber, in which said spacer has a lock-confirming tongue at a front corner portion thereof, said lock-confirming tongue being adapted to be engaged with a spacer inserted into an open front end of a mating connector, the lock-confirming tongue being received in a space formed between the spacer of the mating connector and an inner wall of the mating connector, and when one of said spacer and the spacer of the mating connector is not disposed in their respective locked positions, the engagement between the two connectors being prevented.

4,959,024

## SHIELDING DEVICE FOR ELECTRIC PLUG CONNECTORS

Franz Czeschka, Rechberghausen, Fed. Rep. of Germany, assignor to ERNI Elektroapparate GmbH, Adelberg, Fed. Rep. of Germany

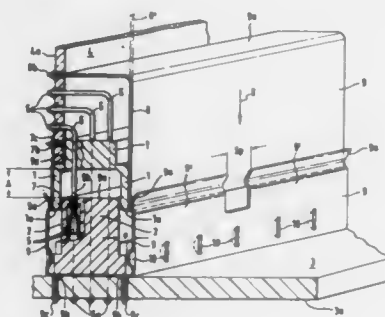
Filed Oct. 5, 1989, Ser. No. 417,524

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1988, 3834182

Int. Cl.<sup>5</sup> H01R 13/648

U.S. Cl. 439—607

12 Claims



1. Shielded connector for connecting a first board to a second board, such as printed circuit boards, said shielded connector comprising:

- a first connector housing;
- said first connector housing for being installed on the first board;
- said first connector housing including first electrical contacts therein which are for being electrically connected to the first board;
- a second connector housing;
- said second connector housing for being installed on the second board;
- said second connector housing including second electric contacts therein which are for being electrically connected to the second board;
- said first connector housing being for mating with said second connector housing for causing said first electric contacts to mate with said second electric contacts;
- first means for shielding said first electrical connector housing and said first electric contacts therein;
- said first means for shielding including a first shielding device at one side of said first connector housing and a second shielding device at the other side of said first connector housing;
- said first shielding device and said second shielding device being respectively electrically connected to the first board;
- a second means for shielding said second connector housing and said second electric contacts therein;
- said second means for shielding including a third shielding device at one side of said second connector housing and a fourth shielding device at the other side of said second connector housing;
- said third shielding device and said fourth shielding device

being respectively electrically connected to the second board; and

said first shielding device for being in overlapping electrical contact with said third shielding device and said second shielding device for being in overlapping electrical contact with said fourth shielding device when said first connector housing and said second connector housing are mated for causing said first electric contacts to mate with said second electric contacts.

4,959,025

## ELECTRICAL APPARATUS PLUG

Walter Eberhard, Horgen, and André Simmler, Wädenswil, both of Switzerland, assignors to Feller AG, Horgen, Switzerland

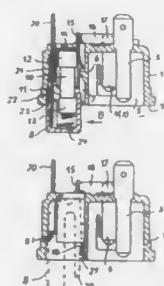
Filed Aug. 28, 1989, Ser. No. 398,933

Claims priority, application Switzerland, Sep. 9, 1988, 386/88

Int. Cl.<sup>5</sup> H01R 33/95

U.S. Cl. 439—622

6 Claims



1. An electrical apparatus plug connecting module comprising in combination:

- a base of an insulating material and a plurality of contact terminal members anchored therein in a first compartment and intended for electrical coupling of a power line cable plug to said terminal members, and having a safety fuse holder in a separate compartment in the base adjacent to the first compartment into which a fuse carrier is insertable and from which the fuse carrier is withdrawable in a guided manner, and
- a fuse carrier of an insulating material intended for holding two safety fuse cartridges when inserted into the separate compartment, said fuse carrier being shaped to project above an open top side of said first compartment and said separate compartment, said fuse carrier further being provided on a side facing said contact terminal members anchored in said first compartment with a manually operable operating lever extending above the open top side of said separate compartment, said operating lever providing a manually accessible yielding tongue integral with said fuse carrier and carrying a manually operable first detent member formed on said operating lever for cooperating with a second detent member formed on a partition wall between the separate compartment and the first compartment so that the yielding tongue is manually operable only if said plug is removed from said first compartment thereby to allow manual access to the operating lever for withdrawing of said fuse carrier out of said base after moving the detent members away from one another.

4,959,026

## POWER DISTRIBUTION ADAPTER

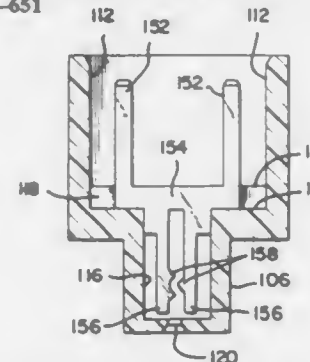
Earl R. Kreinberg, Phoenix, Ariz., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 235,391, Aug. 23, 1988, abandoned, which is a division of Ser. No. 65,239, Jun. 22, 1987, Pat. No. 4,790,760. This application Oct. 11, 1989, Ser. No. 423,541

Int. Cl.<sup>5</sup> H01R 25/00

U.S. Cl. 439—651

4 Claims



1. An electrical adapter for distributing power to a plurality of devices mounted on a panel and at least electrically connected to respective arrays of electrical pins extending from the panel for electrical connection therewith by electrical power means, comprising:

- an insulative housing having a cable face and an opposing panel face, said housing including a plug-receiving cavity along said cable face to receive therein plug portions of first and second connectors terminating first and second cable means; and
  - a plurality of electrical contacts secured in said housing extending between said cable face and said panel face thereof, each said contact having a commoning bar, a receptacle section extending forwardly from said commoning bar and adapted to be matable with a respective said pin and exposed along said panel face for electrical connection therewith, and a pair of post sections coextending in parallel rearwardly from said commoning bar and disposed within said plug-receiving cavity;
- first and second ones of said post sections of said pairs of post sections being aligned in respective first and second rows within said plug-receiving cavity for electrical connection with respective corresponding contact sections of respective rows of terminal means terminated to respective first and second electrical cables and disposed within respective first and second housing means of said first and second cable connectors therefor,
- whereby the adapter is pluggable to a pin array of the device and in turn defines two like post arrays similar to said device pin array by said first and second post sections in said plug-receiving cavity to receive therein plug portions of both first and second housings side-by-side into a common end so that the first cable can transmit power into the assembly by a connector otherwise matable with said device pin array, and the assembly can both distribute power to the device and transmit power to the second cable for distribution to other devices.

4,959,027

## FUEL INJECTOR ADAPTOR

Steven Z. Muzalay, Huntington Beach, Calif., assignor to ITT Corporation, New York, N.Y.

Filed Feb. 20, 1990, Ser. No. 481,409

Int. Cl.<sup>5</sup> H01R 25/00

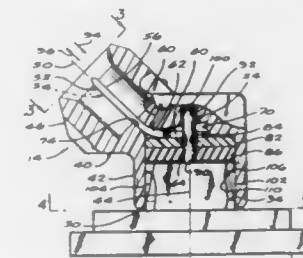
U.S. Cl. 439—655

11 Claims

1. A fuel injector adaptor for coupling the electrical terminals of a straight fuel injector to a connector that extends at an incline, comprising:

an adaptor housing which has a lower part that opens downwardly along a first axis and an upper part that opens at an upward incline along a second axis;

a pair of plate-like contacts each having an upper contact part lying in said upper housing part and extending substantially parallel to said second axis, and having a lower



contact part lying in said lower housing part and extending substantially perpendicular to said first axis, each lower contact part having walls forming a hole for receiving a fuel injector terminal, and each contact having a bent middle part.

4,959,028

## ELECTRICAL POWER CONNECTOR

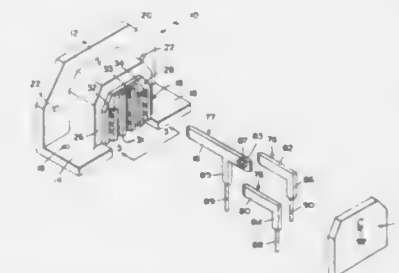
Antonio A. Garay, Roselle; Tedford H. Spanling, Chicago, and Robert L. Valleau, Des Plaines, all of Ill., assignors to Switchcraft Inc., Chicago, Ill.

Filed Apr. 12, 1989, Ser. No. 336,488

Int. Cl.<sup>5</sup> H01R 13/41

U.S. Cl. 439—733

12 Claims



1. An electrical connector comprising:

- a dielectric body including a housing having therein a cavity and having a wall defining a peripheral portion of said cavity, said wall having respective first pluralities of surface portions defining respective first opening means extended through said wall and into communication with said cavity for permitting passage of respective first portions of respective contact members through said wall and into said cavity, each of said respective first pluralities of surface portions including a respective first surface portion of said wall having a respective first integral projection extended into said respective first opening means; and
- said wall having an outer surface with respective second pluralities of surface portions defining respective second opening means in said outer surface for receiving therein respective second portions of said respective contact members, each of said respective second pluralities of surface portions including respective second surface portion of said wall having an integral projection extended into said respective second opening means.

4,959,029

## ELECTRICAL CONTACT

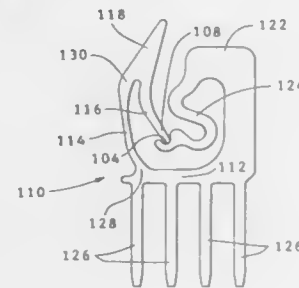
Dimitry G. Grabbe, Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 18, 1989, Ser. No. 395,621

Int. Cl.<sup>5</sup> H01R 4/48

U.S. Cl. 439—862

11 Claims



1. An electrical contact (110) for providing an electrical path between a first contact portion (130) and a second contact portion (126) and providing a contact force at said first contact portion (130), characterized by:

- a base (112) having said second contact portion (126) projecting therefrom;
  - a first beam (114) having first and second ends and said first contact portion (130), said first beam first end being attached to said base;
  - a second beam (116) having first and second ends, said second beam first end being attached to said first beam second end, said second beam second end extending toward said base (112);
  - a third beam (124) having first and second ends, said third beam first end being attached to said first beam second end, said third beam second end being attached to said base; and
  - spring means (124, 114, 116, 118) for resiliently coupling said first contact portion (130) to said base (112);
- said first and second beams being configured to convert contact induced movement of said first contact portion in a first direction to movement of said second beam second end in a second direction transverse to said first direction, said spring means applying a resisting force to said second beam second end in a third direction opposite said second direction, the extent of said movement of said second beam second end being substantially less than the extent of said contact induced movement so that said spring means remains within its elastic limit.

4,959,030

## ELECTRICAL CONNECTOR FOR CONNECTING TWO FLAT CABLES TO A CIRCUIT BOARD

Yu Tatebe, Hiroshi Yasui, Yukio Matsuyama, and Hiroji Takahashi, all of Tokyo, Japan, assignors to Japan Aviation Electronics Industry, Limited and NEC Corporation, both of Japan

Continuation of Ser. No. 233,206, Aug. 17, 1988, abandoned.

This application Feb. 28, 1990, Ser. No. 488,400

Claims priority, application Japan, Aug. 19, 1987, 62-125116[U]; Aug. 19, 1987, 62-125117[U]; Sep. 4, 1987, 62-134645[U]

Int. Cl.<sup>5</sup> H01R 9/07, 9/09

U.S. Cl. 439—67

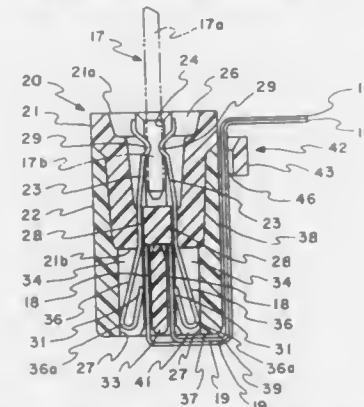
13 Claims

1. An electrical connector for connecting first and second flat cables to a circuit board having front side conductors and rear side conductors, each of said first and said second flat cables having a cable end and a remaining portion extended from said cable end, said connector comprising:

- an insulator housing with a specific outer surface;
- first and second groups of contact members held in said insulator housing and arranged in first and second spaced

parallel contact rows, with a space between said first and said second rows for receiving said circuit board therein to make electrical connections between said first and said second contact member groups and said front and said rear side conductors, said contact members of said first and said second groups having terminal portions for electrically and mechanically making connections with said cable ends of said first and said second flat cables, respectively, said remaining portion of each of said first and said second flat cables having a particular portion outside of said insulator housing;

restriction means for restricting said particular portion to extend along said specific outer surface;



mechanical coupling means for coupling said restriction means to said insulator housing, said restriction means being opposite to said specific outer surface with a single gap left between said restriction means and said specific outer surface, said single gap enabling said cable to extend therethrough in order to make said particular portion extend along said specific outer surface; and

fastening means made of insulation and coupled to said insulator housing between said first and second terminal portions for tightly pressing said cable ends against said first and said second terminal portions.

4,959,031

## EASILY REMOVEABLE BATTERY TERMINAL

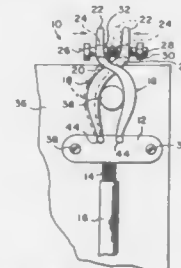
Arthur Ruiz, 1701 Newport Rd., Croydon, Pa. 19020, and George Spector, 233 Broadway, New York, N.Y. 10007

Filed Feb. 23, 1990, Ser. No. 484,061

Int. Cl.<sup>5</sup> H01R 4/48, 4/42

U.S. Cl. 439—759

4 Claims



1. A battery terminal post clamp comprising:
- (a) a pair of mounting plates;
  - (b) means for attaching said mounting plates together so that an electrical conductor of a battery cable can fit and be gripped between said mounting plates;
  - (c) a pair of inwardly curved arms having crossed end portions;
  - (d) means for pivotally connecting each said arm at its lower end on one said mounting plate in a spaced apart relationship to other said arm;
  - (e) a pair of finger engaging portions, each having an aper-

- ture therethrough and affixed to one said crossed end portion of one said arm;
- (f) a guide bolt having a threaded shank extending through each aperture in each said finger engaging portion;
- (g) a guide nut threaded onto end of said shank of said guide bolt for holding said guide bolt thereon; and
- (h) a coil compression spring arranged on said shank of said guide bolt between said finger engaging portions so as to urge said finger engaging portions apart causing said arms to move towards each other to grip a terminal post on a battery until a person squeezes said finger engaging portions together to compress said spring and thereby disengage said arms from the terminal post.

4,959,032

## WATER CRAFT WITH GUIDE FINS

Hans Langenberg, and Jürgen Wessel, both of Hamburg, Fed. Rep. of Germany, assignors to Blohm + Voss AG, Hamburg, Fed. Rep. of Germany

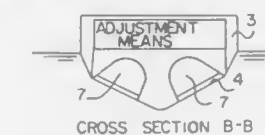
Continuation-in-part of Ser. No. 121,312, Nov. 16, 1987, Pat. No. 4,843,989. This application Sep. 8, 1988, Ser. No. 241,974

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1987, 3730008

Int. Cl.<sup>5</sup> B63H 5/16

U.S. Cl. 440—66

6 Claims



1. A hull for a water vessel, said hull comprising: an elongated displacement body, said elongated displacement body having a bow extremity and a stern extremity, said elongated displacement body having a major longitudinal and normally horizontal axis and a transverse and normally perpendicular axis, the length of said elongated displacement body along said major longitudinal axis being substantially equal to L;
- propeller means for propelling said elongated displacement body through water, said propeller means being disposed near said stern extremity of said elongated displacement body; and
- at least one guide vane provided on said elongated displacement body;
- said at least one guide vane being located at a distance between about  $\frac{1}{4}L$  and about  $\frac{1}{2}L$  from said propeller means towards said bow extremity; and
- said at least one guide vane comprising means for optimizing the flow of water to said propeller means;
- wherein said elongated displacement body comprises a tunnel hull having at least one inwardly concave depression formed therein and extending forward from said propeller means, and wherein said at least one guide vane is disposed so as to bridge across said at least one inwardly concave depression.

4,959,033

## MARINE PROPULSION DEVICE COVER ARRANGEMENT

Gerald F. Bland, Glenview, Ill.; Michael W. Freitag, Kenosha, Wis., and Martin J. Mondek, Wonder Lake, Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed May 12, 1989, Ser. No. 351,865

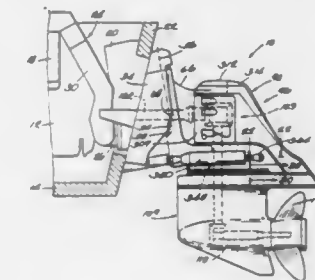
Int. Cl.<sup>5</sup> B63H 21/14

U.S. Cl. 440—76

13 Claims

1. A stern drive unit comprising a metal upper gear housing which is adapted to be mounted on the transom of a boat for pivotal movement relative thereto about a generally vertical steering axis and about a generally horizontal pivot axis, and

which includes a rear portion, a generally vertical drive shaft rotatably supported by said upper gear housing and adapted to be driven by an engine, a lower gear housing fixed to said upper gear housing for common movement therewith, a propeller shaft which is rotatably supported by said lower gear housing, which is driven by said vertical drive shaft, and which



is adapted to have mounted thereon a propeller, and plastic cover means which covers more than a majority of said upper gear housing and which includes first and second plastic cover members respectively covering said first and second side portions of said upper gear housing, and a third plastic cover member covering said rear portion of said upper gear housing.

4,959,034

## PUNCTURE DISC INFLATION VALVE WITH IMPROVED CUTTING BAYONET

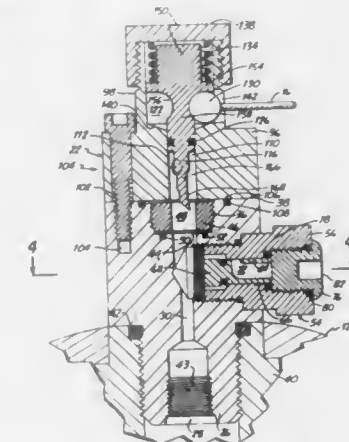
Lloyd G. Wass, 1670 Blackhawk Cove, Eagan, Minn. 55122

Filed Oct. 25, 1988, Ser. No. 262,273

Int. Cl.<sup>5</sup> B63B 35/58

U.S. Cl. 441—41

10 Claims



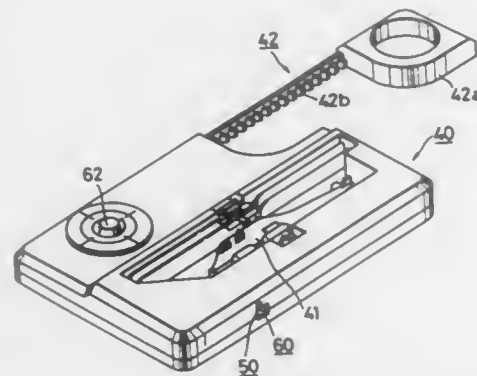
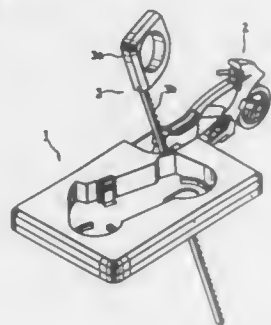
1. For use in a puncture disc inflation valve, a bayonet for puncturing a puncture disc, the bayonet comprising:
- a cutting head having a back face formed in the shape of a cone with a central axis;
  - a planar cutting face disposed across a widening end of the cutting head and intersecting the central axis at between a 40° and a 50° angle for forming a cutting edge between the cutting face and the back face;
  - a lead point of the cutting edge where the intersection between the cutting face and the back face is furthest removed from the central axis;
  - a relief portion in the back face in the cutting head opposite the lead point; and
  - a terminating edge between the cutting face and the relief portion forming end points to the cutting edge.



4,959,035

**MINIATURE STORAGE CONTAINER FOR A MANUALLY PROPELLED TOY MEMBER**  
 Keiichi Muraaki, Tokyo, Japan, assignor to Sega Enterprises, Ltd., Tokyo, Japan

Filed Nov. 4, 1988, Ser. No. 267,036  
 Claims priority, application Japan, Mar. 10, 1988, 63-31988  
 Int. Cl.<sup>3</sup> A63H 1/04, 17/21, 27/133, 29/00  
 U.S. Cl. 446—40 11 Claims



1. An improved storage container for a manually propelled toy member comprising:  
 a thin flat housing member configured to be of a size approximating the user's hand, the housing member having a cavity for retainably storing the toy member, and means in the housing member, at a position apart from the cavity, for transmitting a propulsion force to the toy member including a removable flexible power rack.

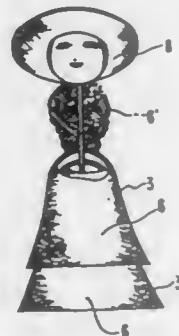
4,959,036

**DOLL ASSEMBLED OF PREFABRICATED WEAVE SECTIONS OF RUSH STALKS**

Chang-Am Koh, Room No. 1107, 27-dong, Woosung Apt. 101-2, Jamsil-dong, Kangdong-ku, Seoul, Rep. of Korea  
 Filed Feb. 29, 1984, Ser. No. 584,919

Claims priority, application Rep. of Korea, Apr. 16, 1983, 3429/83; Jul. 15, 1983, 6312/83; Sep. 26, 1983, 8344/83  
 Int. Cl.<sup>3</sup> A63H 3/36 18 Claims

U.S. Cl. 446—385



1. An assembled rush stalk doll comprising a doll body

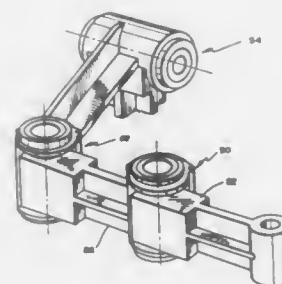
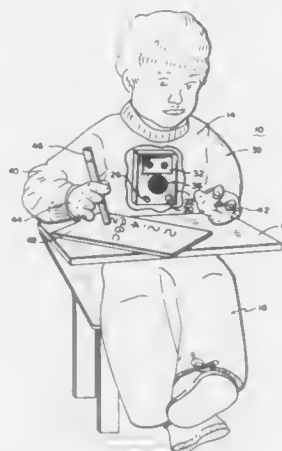
having a shoulder portion or an upper portion formed of woven warp rush stalk threads and weft rush stalk threads, both the warp and weft rush stalk threads having extended strands, some of the strands formed into arms and other of the strands formed into other body portions in a desired shape, and a separate head section being fitted to the top of the doll body.

4,959,037

**WRITING DOLL**

Henry Garfinkel, 31 Dogwood Rd., Searingtown, N.Y. 11507

Filed Feb. 9, 1989, Ser. No. 308,020  
 Int. Cl.<sup>3</sup> A63H 3/28, 33/24, 33/33; B43L 13/00  
 U.S. Cl. 446—299 16 Claims



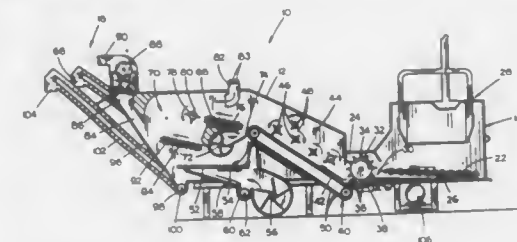
1. A writing doll having portions defining a head and appendages comprising:  
 at least one appendage having a portion adapted to hold a writing stylus;  
 a first motion control means mounted in said at least one appendage near said stylus holding portion for moving said stylus holding portion along a generally planar writing surface in an arcuate direction;  
 a second motion control means for oscillating said stylus holding portion about a horizontal axis for at least lifting said stylus holding portion out of writing engagement with said generally planar writing surface;  
 a third motion control means mounted in said at least one appendage between said first and said second motion control means for moving said first motion control means and said stylus holding portion along said generally planar writing surface in a second arcuate direction; and  
 means responsive to electronically stored data for providing control signals for operation of each said motion control means.

4,959,038

**MILKWEED PROCESSING MACHINE**

George Ragdale, Ogallala, Nebr., assignor to Natural Fibers Corp., Ogallala, Nebr.

Filed Jun. 30, 1989, Ser. No. 373,889  
 Int. Cl.<sup>3</sup> A01F 11/00, 12/385, 12/48  
 U.S. Cl. 460—149 3 Claims



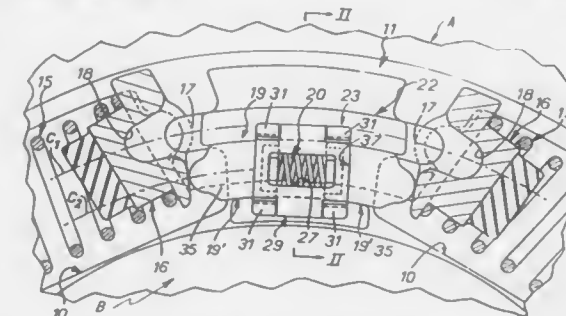
1. A method for removing floss from milkweed pods, comprising the steps of:  
 providing a milkweed pod processing machine having a housing with an inlet and an outlet;  
 introducing a plurality of milkweed pods into said housing inlet;  
 conveying said pods to a cracking chamber;  
 cracking open said pods to expose the floss therein;  
 conveying said cracked pods to a picking chamber;  
 picking milkweed floss from said pods; and  
 forcing air over said picked pods to carry said floss to said housing outlet.

4,959,039

**TORSION DAMPING DEVICE, IN PARTICULAR FOR A FLYWHEEL TYPE TRANSMISSION OF AN AUTOMOTIVE VEHICLE**

Jacky Naudin, Erment, France, assignor to Valeo, Paris, France  
 Filed Dec. 15, 1989, Ser. No. 451,181

Claims priority, application France, Dec. 28, 1988, 88 17339  
 Int. Cl.<sup>3</sup> F16D 3/14; F16F 15/12  
 U.S. Cl. 464—66 9 Claims



1. A torsion damping device comprising two coaxial parts, means mounting said coaxial parts for relative rotation with respect to each other, and means defining a predetermined range of angular displacement whereby to limit the extent of said relative rotation, one of said coaxial parts having a plurality of through openings formed therein and the other of the said coaxial parts having arms, the device further including a plurality of main resilient members each of which is disposed in a respective one of the said through openings in said one coaxial part whereby to engage with the said arms either directly or indirectly, the device further including centering means associated with at least one of the said arms, wherein the said centering means include a spacer member, extending circumferentially between two consecutive ones of said through openings of said one coaxial part, and a resilient centering member arranged between the said spacer member and the appropriate said arm, the said spacer member being divided into two centering fingers separate from each other, with one centering finger corresponding to each of the associated said through

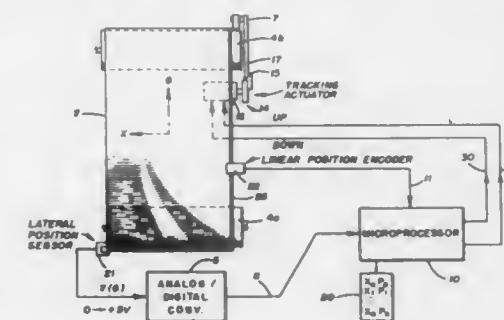
openings, and with the resilient centering member extending from one of the said centering fingers to the other.

4,959,040

**METHOD AND APPARATUS FOR PRECISELY POSITIONING AND STABILIZING A CONTINUOUS BELT OR WEB OR THE LIKE**

Deane Gardner, Cupertino, and George Fellingham, San Jose, both of Calif., assignors to Rastergraphics Inc., Sunnyvale, Calif.

Filed Apr. 21, 1989, Ser. No. 341,799  
 Int. Cl.<sup>3</sup> F16H 7/18  
 U.S. Cl. 474—103 12 Claims



1. An apparatus for improved tracking and control of a traveling belt or web or the like supported and driven by at least one roller means comprising:  
 means for establishing a reference array of belt positions relative to a position fixed with respect to an ideal axis of travel for said belt at precise positional intervals along the entire length of said belt;  
 control means for sensing at each positional interval the displacement of said belt from said ideal axis of travel and for providing a corrective feedback signal representative of the displacement difference between said sensed position and a corresponding element of said reference array;  
 tracking actuator means responsive to said corrective feedback signal for moving the angle of said roller to thereby maintain said belt in a substantially invariant position with respect to its ideal axis of travel.

4,959,041

**TENSIONER FOR A CHAIN, A BELT OR THE LIKE**

Juji Ojima, Aikawa; Kazuo Ishii, and Fumio Numakura, both of Miyata, all of Japan, assignors to NHK Spring Co., Ltd., Yokohama, Japan

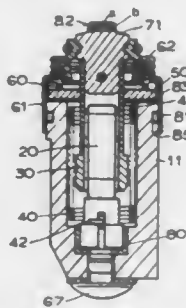
Continuation of Ser. No. 268,918, Nov. 9, 1988. This application Sep. 27, 1989, Ser. No. 413,093

Claims priority, application Japan, Nov. 9, 1987, 62-282648; Aug. 31, 1988, 63-216794; Aug. 31, 1988, 63-216796; Aug. 31, 1988, 63-216797; Aug. 31, 1988, 63-216798  
 Int. Cl.<sup>3</sup> F16H 7/08 6 Claims

U.S. Cl. 474—111

1. A tensioner for a chain, or a belt comprising:  
 a casing,  
 a male screw member and a female screw member installed within the casing in a screwed state,  
 a spring which provides a rotation force to said male screw member,  
 a bearing into which the female screw member is inserted so that the female screw member may advance in an axial

direction by rotation of the male screw member while constraining the rotation of said female member, and



a supporting member which supports the male screw member rotatively between said male screw member and the casing.

#### 4,959,042 LAYOUT OF AUXILIARY MECHANISMS FOR AN ENGINE

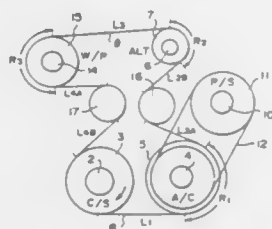
Hideki Tanaka, and Kyotchi Umemura, both of Hiroshima, Japan, assigns to Mazda Motor Corporation, Hiroshima, Japan

Filed May 12, 1989, Ser. No. 350,992  
Claims priority, application Japan, May 13, 1988, 63-116402; May 13, 1988, 63-116403

Int. Cl.<sup>5</sup> F16H 7/12

U.S. Cl. 474—134

24 Claims



1. A layout of auxiliary mechanisms for an engine which are driven by a first auxiliary mechanism driving belt passed around a crankshaft pulley integrally mounted on the crankshaft of the engine and auxiliary mechanism pulleys integrally provided on the respective auxiliary mechanisms, characterized in that the auxiliary mechanisms are arranged in the order of rotational inertia force so that the rotational inertia force of the auxiliary mechanism nearest to the crankshaft pulley as seen toward the tight side of the first auxiliary mechanism driving belt from the crankshaft pulley is the largest.

4,959,043  
MULTI-PINION DIFFERENTIAL ASSEMBLY  
James R. Klotz, Mt. Clemens; Steven A. Mikel, Farmington Hills; John A. Frai, Walled Lake, and Berthold Martin, Utica, all of Mich., assigns to Chrysler Corporation, Highland Park, Mich.

Filed Aug. 29, 1989, Ser. No. 400,203

Int. Cl.<sup>5</sup> F16H 1/38

U.S. Cl. 475—230

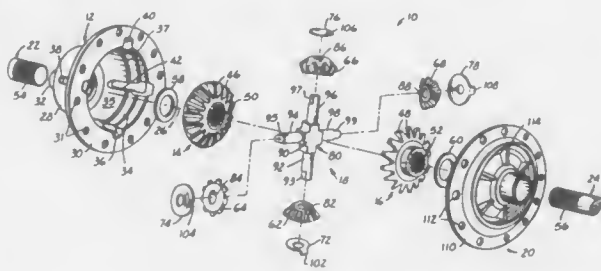
2 Claims

1. A differential gear assembly comprising:  
a pair of axially aligned axle shafts with their adjacent inner end portions extending into a hollow casing which is rotated about a longitudinal axis aligned with the shaft axis;  
said casing having a bell-shaped hub formed with a base at its lower end and an axially opposite enlarged upper exterior open end having a predetermined internal diameter concentrically disposed about said longitudinal axis, said

upper open end defined by a peripheral radial flange, said casing hub defining an internal surface formed with a central internal surface portion thereof having a substantially uninterrupted spherical curvature symmetrically disposed about said longitudinal axis, said central internal spherical surface portion having its center of curvature on said longitudinal axis so as to be defined by a radius of curvature radiating from said center of curvature, said central internal spherical surface portion defining an interior hub lip forming a central internal access opening concentric with and spaced an axial distance below said exterior upper open end, said central internal access opening positioned a predetermined distance above said center of curvature and having an internal diameter a predetermined dimension smaller than said exterior upper open end internal diameter;

said casing hub formed with at least three uniformly spaced elongated through slots having an upper open end and a closed lower end, each said slot having its open upper end in said radial flange and extending vertically downwardly a predetermined axial extent such that each said slot closed lower end terminates in said central internal surface portion intermediate said center of curvature and said casing bell-shaped hub base;

a pair of upper and lower bevel side gears adapted to be positioned in spaced opposed relationship within said casing hub and symmetrically disposed with respect to a horizontal plane that includes said central internal spherical surface portion center of curvature, such that said upper and lower bevel side gears are rotatable about said longitudinal axis;



an integrally formed one-piece pinion spider having at least three uniformly spaced stub pins of predetermined radial dimension, each said stub pin vertically located in an associated one of said slots with its principal axis positioned substantially in said horizontal plane intermediate each said slot upper open end and closed lower end, whereby oil is free to flow through each said slot both above and below its associated stub pin providing lubrication to the interior of said casing;

at least three symmetrically spaced bevel pinion gears with each pinion gear slidably positioned on an associated stub pin of said spider to a predetermined radially innermost initial pinion gear assembly position contacting an inner stop shoulder on its associated stub pin, and with each said spider stump pin inserted in an associated axial slot upper open end enabling said pinion gears to pass vertically downwardly through said interior hub lip central internal access opening after fitting through said casing upper open end;

and thereafter each said pinion gear subsequently sliding radially outwardly from its stop shoulder in a gravity induced manner on its associated stub pin a predetermined distance so as to assume an axially floating working position, wherein each said pinion gear is in meshing engagement with said pair of opposed upper and lower bevel side gears such that said pinion gears are free to seek their own backlash therewith; and end cover plate having a peripheral flange, means securing said peripheral flange to said casing upper open end radial flange and cooperating

therewith to retain said bevel side gears, said bevel pinion gears and said cross-shaft spider in assembled relationship with said casing hub; and

concave bearing washers positioned between each said pinion gear and said hub central spherical surface portion, each said washer outer periphery formed with a radially outwardly extending positioning tab of predetermined radial length so as to be received in the upper open end of an associated axial slot during initial installation of said spider and pinion gears, each said tab being trapped against disengagement from its associated axial slot with said pinion gears in their working position thereby preventing relative rotation between each said washer and said casing hub central spherical portion.

#### 4,959,044 FILM TENSION COMPENSATION DEVICE FOR BAG MAKING MACHINE

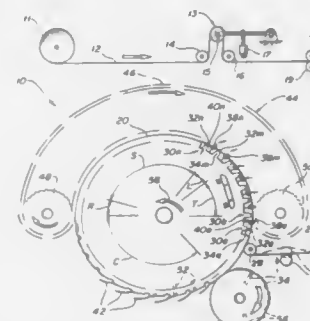
David A. Smith, Midland; Herbert B. Geiger, Bay City, and R. Douglas Behr, Midland, all of Mich., assigns to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 188,884, May 2, 1988, Pat. No. 4,902,374. This application Apr. 7, 1989, Ser. No. 334,412

Int. Cl.<sup>5</sup> B23B 23/10, 23/16

U.S. Cl. 493—194

23 Claims



1. An apparatus for the continuous production of bags of differing widths from a folded web of thermoplastic material comprising:

- a rotatable drum having a plurality of sever and seal stations located about the outer periphery thereof for forming individual bags;
- a source of a continuous folded web of thermoplastic material;
- means for continuously feeding said folded web of thermoplastic material onto the surface of said drum and past said sever and seal stations;
- means for tucking said web of material inwardly or outwardly from said outer periphery of said drum; and
- film tension compensation means for maintaining a constant length of travel for said web of material between said source and said sever and seal stations, said film tension compensation means including displacing means located between said web source and said drum for deflecting said web of material to cause a periodic change in the path length of said web, and means in combination with said displacing means for moving said displacing means in synchronous relationship with said tucking means to maintain a constant net length of travel for said web between said source and the point at which said web is severed, whereby a substantially constant tension is maintained on said web.

4,959,045  
FILTER SOCKS  
Philip J. Hartley, 24 Ardoyne House, Pembroke Park, Ballisbridge, Dublin 4, Ireland, and James Walshe, 120 The Coppice, Woodfarm Acres, Palmerston, Dublin, Ireland  
Continuation of Ser. No. 809,943, Dec. 17, 1985, abandoned.  
This application Dec. 19, 1988, Ser. No. 286,314  
Claims priority, application Ireland, Dec. 21, 1984, 3339/84  
Int. Cl.<sup>5</sup> B01D 27/06; B31D 5/04  
U.S. Cl. 493—254

4 Claims



1. A method of making a filter sock which comprises cutting a panel member having opposite substantially parallel free edges, doubling the panel member over along a line substantially parallel to the said free edges to form a panel with two leaves of which a first leaf is wider than a second leaf, folding the free edge of the first leaf around the free edge of the second leaf such that said panel exhibits substantially constant width along its length, stitching all together the free edges of each of the leaves and that portion of the second leaf on the side opposite to its folded over free edge to form a tube having an axis substantially parallel to said stitched free edges and an open mouth at each end, closing one mouth of the tube by folding each of the leaves along a traverse fold line in the direction of the second open mouth of the tube thereby forming a hem and securing the hem to the leaves by stitching.

#### 4,959,046 APPARATUS FOR FEEDING ADHESIVE COATED STITCHES TO CONTINUOUS FORMS FOR BINDING THE FORMS

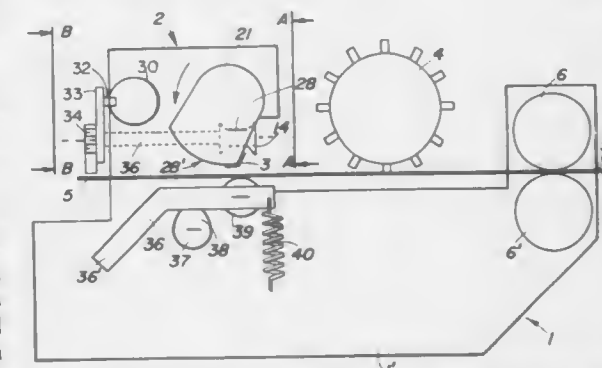
Lari Brunetto, and Luciano Mercatelli, both of Florence, Italy, assigns to Officina Meccanica Giuseppe Conti, Florence, Italy

Filed Jun. 24, 1988, Ser. No. 211,429

Int. Cl.<sup>5</sup> B65H 35/00, 35/07

U.S. Cl. 493—382

2 Claims



1. An apparatus for feeding separate strips of adhesive tape for binders of continuous perforated forms for tabulating machines, comprising: sprocket wheel means for inserting the leading end of a cut adhesive tape strip into a selected hole of the perforations provided at a margin of the continuous perforated forms and a means for fixing the leading end of each cut



adhesive tape strip under the continuous perforated forms; a pair of overhanging rolls, each overhanging roll having a horizontal axis substantially parallel to an advancement direction of the forms, said overhanging rolls driving the adhesive tape; ratchet means having a cam element connected to said overhanging rolls to drive said overhanging rolls with intermittent advancement; cutting head means, vertically rotating over the path of feed of said forms, said cutting head means having at least one eccentric cutting edge and a concentric back portion to cut the adhesive tape, said cutting head means cutting a strip of adhesive tape and then positioning the cut adhesive tape strip above said continuous forms facing said cutting head means; rubber-coated counter-pressure roll means movable for lifting the continuous forms and for contacting and engaging the trailing end of the cut adhesive tape strip with the lifted form, said ratchet means driving said head in synchronism with the advancement of the forms to be bound and in synchronism with the advancement of the adhesive tape; and, means to cause the lifting of the counter-pressure roll in synchronism with the rotation of said cutting head means.

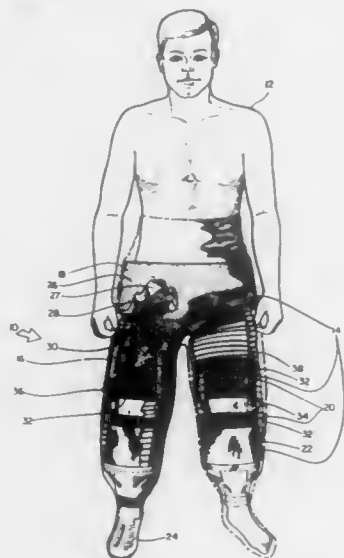
4,959,047

**FLEXIBLE LOWER BODY NEGATIVE PRESSURE TROUSERS FOR -G<sub>z</sub> ACCELERATION PROTECTION**  
Lloyd D. Tripp, Jr., Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 10, 1989, Ser. No. 335,621  
Int. Cl.<sup>5</sup> A61H 31/00, 7/00

U.S. Cl. 600—19

9 Claims U.S. Cl. 604—9



1. An anti-G suit for wear by an aircrew member, comprising:

- (a) a frame, comprising:
  - (i) a rigid abdominal frame section, having generally the shape of a pair of briefs, for generally surrounding in a spaced relationship the abdominal area of the aircrew member;
  - (ii) a pair of mid-leg frame sections, each mid-leg frame section comprising a pair of spaced rigid bands for generally surrounding in a spaced relationship part of each leg of the aircrew member, wherein each pair of rigid bands are attached to each other by hinge means for providing flexibility at the knee of the aircrew member; and,
  - (iii) a pair of generally cylindrical rigid calf frame sections, each calf frame section for generally surrounding in a spaced relationship a calf of the aircrew member;
- (b) a pair of gas impermeable boots for covering each foot of the aircrew member;

- (c) a gas impermeable fabric covering the frame to form generally the shape of a pair of trousers;
  - (d) gas permeable pad means, covering generally the inside of the rigid abdominal frame section and extending for a distance down through the inside of the anti-G suit, for providing comfort and for allowing a generally free flow of gas between the aircrew member and the inside of the anti-G suit;
  - (e) means for sealing the portion of the gas impermeable fabric extending above the abdominal frame to the body of the aircrew member to form a substantially gas impermeable seal;
  - (f) means for sealing the portion of the gas impermeable fabric extending below the calf frames to the boots to form a substantially gas impermeable seal; and,
  - (g) connecting means for operatively interconnecting the inside of the anti-G suit to a source of negative pressure.
6. A method for protecting an aircrew member from the adverse effects of negative G<sub>z</sub> acceleration, comprising the step of, in an aircraft undergoing negative G<sub>z</sub> acceleration, applying a negative pressure to the lower body of the aircrew member.

4,959,048

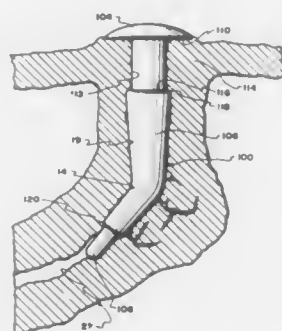
**LACRIMAL DUCT OCCLUDER**

Edmund V. Seder, Santa Barbara, and William F. Sardi, Monrovia, both of Calif., assignors to Helix Medical, Inc., Santa Barbara, Calif.

Filed Jan. 17, 1989, Ser. No. 297,564  
Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—9

17 Claims



1. A reversible, flexible lacrimal duct occluder adapted to enter the punctum opening and block a canaliculus canal having a vertical canaliculus connected to a horizontal canaliculus comprising in combination

- a low profile cap having a width larger than the punctum opening;
- a shaft having distal end and a proximal end connected to the cap;
- a rounded tip connected to the distal end of the shaft; and
- at least one rearwardly tapered conical ramp section mounted on said shaft between said ends and the diameter of the ramp being sufficient to block said canal and the distance between said ends being greater than the length of the vertical canaliculus such that the shaft bends and enters the horizontal canaliculus.

4,959,049

**TIP FOR A PHACOEMULSIFICATION NEEDLE**

Heinz J. Smirnov, 1307 Brookstone Ln., Duncanville, Tex. 75137

Filed Sep. 11, 1989, Ser. No. 405,525  
Int. Cl.<sup>5</sup> A61B 17/20

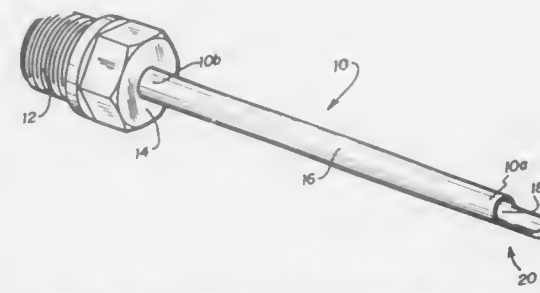
U.S. Cl. 604—22

3 Claims

1. In a phacoemulsification needle with a proximal end attachable to a phacoemulsification device and a distal end insertable into material to be emulsified; the needle having a

central longitudinal axis extending from the proximal end to the distal end; the phacoemulsification device oscillating the needle in the direction of the central longitudinal axis; a bore within the needle concentric to the central longitudinal axis thereof, thereby forming a lumen, the lumen having needle sidewalls therearound, having inner and outer surfaces with an opening at the proximal and distal ends of the needle, an improved tip comprising:

- a tip formed by the distal opening which when viewed from an angle perpendicular to the central longitudinal axis has a side view comprising:
- a top wall located at a needle sidewall on one side of the central longitudinal axis and terminating in a top wall end face disposed in a plane generally perpendicular to the central longitudinal axis, said top wall end face including a cutting surface for cutting the material to be emulsified in the direction of needle oscillation;



- a bottom wall located at a needle sidewall on the opposite side of the central longitudinal axis and extending distal of said top wall end face to form a tip projection;
- an end wall disposed generally perpendicular to said tip projection and disposed in a plane generally parallel to the plane of said top wall end face;
- an arcuate portion interconnecting said tip projection and said end wall; and
- a tip projection sidewall extending from the needle sidewall to said end wall and from said tip projection to the height of said end wall and terminating in a tip projection sidewall face, said tip projection sidewall face being generally parallel to said top wall end face and generally perpendicular to said top wall end face and further including a cutting surface for cutting the material to be emulsified in a direction generally perpendicular to the cuts made by said top wall end face as the needle is moved generally perpendicular to the direction of needle oscillation through the material to be emulsified.

4,959,050

**IN-LINE INFILTRATION DETECTION APPARATUS AND METHOD**

Donald E. Bobo, Jr., Orange, Calif., assignor to Baxter International Inc., Deerfield, Ill.

Filed Sep. 26, 1988, Ser. No. 249,065  
Int. Cl.<sup>5</sup> A61M 5/00

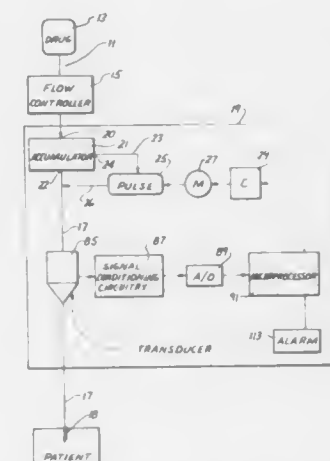
U.S. Cl. 604—49

53 Claims

1. An apparatus for detecting whether a fluid is being properly supplied to a patient through conduit means by a flow controller which is located upstream from the detection apparatus and which infuses fluid in a normal delivery pattern at any of a plurality of selected infusion rates through conduit means to the patient, comprising:

- (a) means for diverting and accumulating a predetermined volume of the upstream flow from the flow controller for use as a test pulse;
- (b) means for delivering the test pulse of the fluid through the conduit means to the patient with the test pulse being distinguishable from the normal delivery pattern and with the test pulse creating a pressure wave response in the conduit means;
- (c) means for determining the area between a baseline and at

least a portion of a pressure versus time curve representing the pressure wave response; and



(d) means responsive to the magnitude of said area for detecting if the fluid is being improperly supplied by the conduit means to the patient.

4,959,051

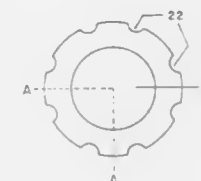
**DUAL CHAMBERED ORAL DOSAGE DELIVERY CONTAINER**

Richard A. Glass, Richmond, Va.; Robert F. Ryer, II, Red Lion, and Deborah T. Tomcania, Harrisburg, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Oct. 13, 1989, Ser. No. 421,038  
Int. Cl.<sup>5</sup> A61J 7/00

U.S. Cl. 604—77

12 Claims



1. A dual chambered container for delivery of a liquid medicament comprising a hollow, bottom chamber provided with an orifice on its upper surface, said bottom chamber being partially, externally threaded on the orifice side and cooperatively connected thereby to matching, internally disposed female threads of a retaining ring through which retaining ring a sealed, resilient teat is centrally disposed and secured by is base flange which is sealed between said bottom chamber and said retaining ring to form a second chamber in said teat, said chambers being separated by a stopper, and said being provided with (1) a removable, outwardly projecting tip, which when removed opens the nipple orifice through which said liquid medicament discharge is regulated, and (2) an enlarged, internal lower region extending to the open externally flanged base.

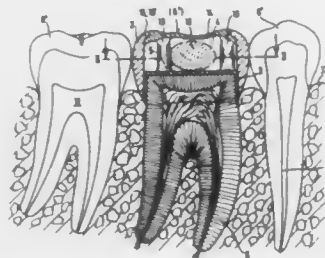
4,959,052

**APPLICATOR FOR DISPENSING ACTIVE SUBSTANCES**  
 Kirsten Cox, Brüggem, Fed. Rep. of Germany, assignor to Georg Wiegner, Viersen II, Fed. Rep. of Germany  
 Continuation of Ser. No. 3,120, Jan. 14, 1987, abandoned. This application Apr. 24, 1989, Ser. No. 342,645

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1986, 3601787

Int. Cl.<sup>5</sup> A61J 7/00; A61G 17/02  
 U.S. Cl. 604—77

24 Claims



1. An oral applicator for the application of an active substance to a user having an oral cavity comprising: a hollow structure corresponding substantially in shape and dimensions to an external form of a double crown of one or more natural teeth and adapted to contain the active substance, wherein said double crown is comprised of an inner crown adapted for engagement with a cut-away tooth stump and of an outer crown placed thereon, said hollow structure having one or more passage openings adapted for the controlled release of certain amounts of the active substance to the oral cavity, the one or more passage openings being at least one of a buccal, palatal or lingual portion for the passage of saliva and of the active substance dissolved therein.

4,959,053

# **AUTOMATIC STOPPING DEVICE FOR THE INTRAVENOUS DRIP**

Cheng-Huang Jang, 5 Alley 39, Lane 81, Leou Chyan West Rd., Gang-Shan Jen, Kaohsiung Hsien, Taiwan

Filed Dec. 17, 1987, Ser. No. 134,064

Int. Cl.<sup>5</sup> A61M 1/00

U.S. Cl. 604—127

5 Claims



1. A flow control device for an intravenous drip system, comprising:

a dripping vessel of elongated generally cylindrical shape, the vessel being of a soft easily squeezable material, the said vessel having an upper opening adapted to be connected to a cap and a lower opening adapted to be connected to a connecting tube which leads to a patient which is to receive the intravenous liquid, a cap of a material harder than the material of the dripping

vessel, said cap adhered to said upper opening, the cap having a pointed bar projecting away from the dripping vessel and adapted to be inserted into a medicine bottle containing solution, said pointed bar having a solution passageway for the flow of liquid from the medicine bottle to the dripping vessel,

a valve element contained within the dripping vessel, said valve element being an elongated downwardly pointed cone of a buoyancy such that it floats in the liquid, the diameter of the top of the cone being less than the inside diameter of the dripping vessel such that liquid can flow around the said top, the valve element being of such a length, and of such a converging diameter that after a liquid reaches a predetermined level in the dripping vessel, a portion of the cone blocks the said lower opening while the said top is sufficiently far above the blocked lower opening that there is room between said lower openings and said top for the vessel to be squeezed by the fingers of the operator to force the valve element upward, while some residual liquid is still contained within the lower portion of the dripping vessel, to concurrently (1) force air up through the cap into the bottle to enhance initiation of liquid flow from the bottle downwardly into the dripping vessel and (2) raise the valve element to open the lower opening to allow the residual liquid to immediately commence flowing down through the lower opening.

4,959,054

# **PHARMACEUTICALLY PROTECTED PERCUTANEOUS DEVICES**

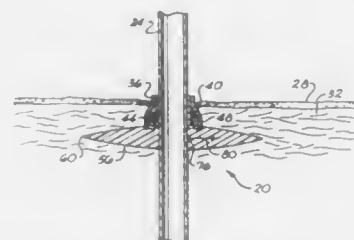
Günther Heimke, Clemson; Andreas F. von Recum, Six Mile, and Arun Shanbhag, Spartanburg, all of S.C., assignors to Clemson University, Clemson, S.C.

Filed Nov. 23, 1988, Ser. No. 276,156

Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—175

20 Claims



1. A percutaneous device for implantation into a living host such as a human being or an animal, comprising:

- a conduit for leading through the skin of the human being or animal into the body of same;
- means for dispensing a bioreactive agent during the useful life of the percutaneous device in the living host, said dispensing means contacting said conduit and at least partly surrounding said conduit, said dispensing means having a predetermined size and maintaining said size during dispensing of said agent;
- a flange surrounding said conduit and extending radially outwardly therefrom to a free edge of said flange and having a thickness gradually decreasing as an imaginary point moves through said flange radially outwardly to said free edge of said flange, said flange supporting said dispensing means;
- said dispensing means including means for permitting said dispensing means to be refilled with said bioreactive agent while the device remains implanted in the living host, said refilling permitting means including a portion of said dispensing means capable of penetration by an instrument for introducing said agent into said dispensing means

- and resealing after any such penetration by such instrument;
- said dispensing means having a subcutaneous tissue interfacing surface, said surface being permeable to said bioreactive agent to permit said agent to be diffused through said subcutaneous tissue interfacing surface and into the tissue adjacent said surface; and
  - said subcutaneous tissue interfacing surface of said dispensing means having a permeability coefficient such that permeability increases with an increase in temperature.

4,959,055

# **RETAINER FOR A PERCUTANEOUS TUBE**

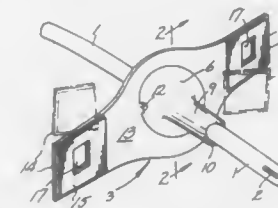
Janice L. Hillyer, 2880 Emerald St., Eugene, Oreg. 97403

Filed Mar. 13, 1989, Ser. No. 322,283

Int. Cl.<sup>5</sup> A61M 25/02

U.S. Cl. 604—179

5 Claims



1. A retainer for flexible tube entering an opening in the human body and comprising in combination, a base for disposition adjacent an opening in the body, flexible attachment means on said base and adapted for attachment to the exterior of the body, a conical projection on said base of a highly resilient nature including an end segment, said conical projection for partial insertion into the body opening so as to surfacially engage body tissue defining said opening to provide a seal therewith, said end segment having an annular edge for frictional engagement with the tube outer wall to retain same against axial displacement, said base and said conical projection defining a circular groove, said flexible attachment means having an inner edge rotatably confined in said groove.

4,959,056

# **DIGITAL DISPENSER**

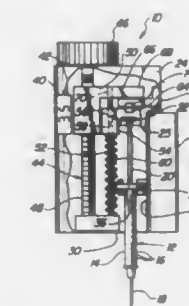
Mitchell Dombrowski, Grosse Pointe Farms, and Robert Welch, Plymouth, both of Mich., assignors to Wayne State University, Detroit, Mich.

Filed Jun. 14, 1988, Ser. No. 206,607

Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—186

12 Claims



1. An aid device (10) of the type for use with a syringe (12) including a barrel (14) for containing a medicant therein and supporting a needle (18) thereon and a plunger (20) having one

end operatively disposed within the barrel (14) and a second end including a cap portion (22), said device (10) comprising: housing means (24) including a chamber (28) having a length defining an axis, said housing means (24) having a base portion (30); barrel holder means (34) fixedly mounted within said housing means (24) for holding the barrel (14) of the syringe (12) in a fixed position parallel to said axis while exposing the needle (18) from said housing means (24); plunger holder means (25) mounted within said housing (24) and movable therein along said axis relative to said barrel holder means (34) for holding the plunger (20) and moving the plunger (20) axially relative to the barrel (14); digital readout means operatively connected to said plunger holder means (25) for projecting a digital output quantitating the amount of medicant drawn into the barrel (14) by movement of the plunger (20) axially away from the base portion (30); actuator means operatively connected to said plunger holder means (25) for moving said plunger holder means (25) relative to said barrel holder means (34), said actuator means including a vernier screw (44) having a head portion (46) disposed outside of said housing means (24) and a threaded portion (48) extending parallel relative to said axis, said plunger holder means (25) including follower means (50) threadedly connected to said threaded portion (48) for operatively connecting said plunger holder means (25) to said threaded portion (48) whereby turning of said head portion (46) in one direction moves said plunger holder means (25) away from said base portion (30) for drawing the plunger (20) from the barrel (14) and drawing medication into the barrel (14); and release means for operatively releasing said plunger holder means (25) from said threaded portion (48) and biasing means (52) for forcing said plunger holder means (25) towards said base portion (30) along said axis when said release means releases said plunger holder means (25) whereby the plunger (20) is forced into the barrel (14) to eject medication therefrom.

4,959,057

# **CATHETER FOR ORGAN PERFUSION**

Thomas Lang, Hamburg, Fed. Rep. of Germany, assignor to Fresenius Ag, Guckenssteinweg, Fed. Rep. of Germany

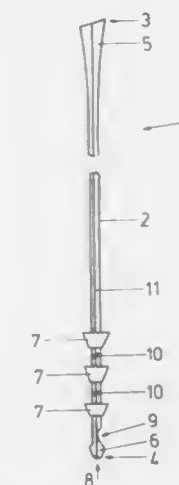
Filed Mar. 23, 1989, Ser. No. 327,941

Claims priority, application Fed. Rep. of Germany, May 28, 1988, 8807003[U]

Int. Cl.<sup>5</sup> A61M 25/00

U.S. Cl. 604—264

5 Claims



1. A catheter for vessel perfusion including an elongated tubular shank having proximal and distal ends, characterized in that the distal end is atraumatically enlarged in the form of a bead, a first sealing ring concentric with the shank is fixedly carried by the shank and closely spaced in the proximal direction from the distal end, a second sealing ring concentric with



the shank is fixedly carried by the shank and closely spaced in the proximal direction from the first ring, and each sealing ring is of conical form widening in the proximal direction, and a lateral opening is provided in the wall of the shank intermediate the distal end and the first ring.

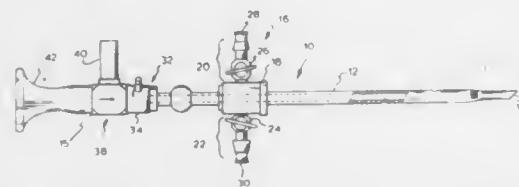
4,959,058

**CANNULA HAVING SIDE OPENING**

Gary K. Michelson, 438 Sherman Canal, Venice, Calif. 90291  
Continuation-in-part of Ser. No. 324,727, Mar. 17, 1989. This application Apr. 24, 1989, Ser. No. 341,850  
Int. Cl.<sup>5</sup> A61M 25/00

U.S. Cl. 604—280

10 Claims



1. A cannula for use with an endoscopic surgical instrument comprising:

- a hollow tubular member defining an inside and an outside for surrounding an endoscopic element, said hollow tubular member having a first diameter portion and a second narrow diameter supporting portion having a diameter narrower than the inside diameter of said first diameter portion proximate one end of said hollow tubular member for supporting an endoscopic element with said cannula, said narrow diameter portion in close fitting, free sliding engagement with said endoscopic element, and openings through said hollow tubular member permitting the flow of fluid through said openings from the inside of said cannula to the outside of said cannula.

4,959,059

**LOW FRICTION MULTILAYER PAD**

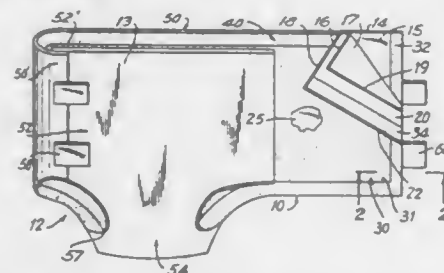
Kasriel Ellender, New York, and Mille Stand, Croton-on-Hudson, both of N.Y., assignors to Senecare Enterprises, Inc., New York, N.Y.

Filed Jan. 17, 1989, Ser. No. 297,977

Int. Cl.<sup>5</sup> A61F 13/16

U.S. Cl. 604—358

18 Claims



1. A pad for preventing and treating pressure sores on a person's body and for managing discharged body fluids, comprising:

- an outer first layer formed of thin, nonporous, moisture-proof, flexible sheet material having a smooth outer side for abutting a supporting surface, and having a smooth other side;
- a second layer formed of soft, porous, moisture absorbent material superimposed on said other side of said first layer to absorb and retain said fluids;
- a third layer formed of thin, porous, smooth, fibrous sheet material superimposed on said second layer for passing

said fluids through pores in said third layer to said second layer for absorption thereby;

- a fourth layer composed of dry, slippery material formed as an extremely thin filmy coating on said third layer, said coating having sufficient body to reduce the coefficient of friction of said third layer, and having sufficient thinness to leave said pores in said third layer unclogged to pass said fluids therethrough;
- a fifth layer formed of lubricating material applied to said third and fourth layers and effective to provide a very slippery surface thereat to minimize sliding friction and shear forces between said person's body and said supporting surface, said fifth layer being so applied that said pores in said third layer remain unclogged so that said fluids can pass freely to and through said pores to said second layer for absorption thereby; and
- means nondetachably bonding together registering marginal areas of said first, second and third layers in a continuous seam all around their joined peripheries to allow limited sliding movement between unbonded areas of said layers, while said first, second, third, fourth and fifth layers cooperate to minimize sliding friction and shear forces between said person's body and said supporting surface with said pad disposed therebetween.

4,959,060

**BODY FLUID-ADSORBING ARTICLE**

Tadao Shimomura, Toyonaka; Nobuyuki Harada, and Kunihiro Ishizaki, both of Suita, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan  
Continuation of Ser. No. 121,275, Nov. 16, 1987, abandoned.

This application Dec. 12, 1989, Ser. No. 449,456

Claims priority, application Japan, Nov. 17, 1986, 61-271963; Dec. 16, 1986, 61-297517; Dec. 17, 1986, 61-298986

Int. Cl.<sup>5</sup> A61F 13/00

U.S. Cl. 604—368

21 Claims

1. A body fluid-adsorbing article comprising at least one absorbent member which forms a swelled gel when a body fluid is absorbed, comprising 50 to 99% by weight of a fibrous material and 50 to 1% by weight of an absorbent polymer wherein said absorbent polymer is at least one member selected from the group consisting of hydrolyzed starch-acrylonitrile graft polymer, partially neutralized starch-acrylic acid graft polymer, saponified vinyl acetate-acrylic ester copolymer, hydrolyzed acrylonitrile copolymers, cross-linked hydrolyzed acrylonitrile copolymers, hydrolyzed acrylamide copolymers, cross-linked hydrolyzed acrylamide copolymers, partially neutralized polyacrylic acid, cross-linked partially neutralized polyacrylic acid, and isobutylene-maleic anhydride copolymer, said absorbent member containing at least one species compound (A) selected from the group consisting of sulfur-containing reducing agents, antioxidants, and oxidizing agents, wherein said sulfur-containing reducing agent is at least one member selected from the group consisting of thiosulfates, sulfurous acid, sulfites, hydrogen sulfites dithionites, hydrosulfides, and mercaptans, and said compound (A) being present in a physical mixture with said absorbent polymer in an amount capable of preventing the swelled gel of the absorbent polymer from being deteriorated or decomposed with an elapse of time.

4,959,061

**HYDROPHILIC POLYMER BASED ON ACRYLIC ACID AND ALKALI METAL ACRYLATE, ITS METHOD OF PREPARATION AND ITS APPLICATION AS AN ABSORBENT, IN PARTICULAR OF A PHYSIOLOGICAL SOLUTION**

Jean Cabestany, Stains, France, assignor to Societe Francaise Hoescht, Puteaux, France

Filed Apr. 1, 1988, Ser. No. 176,193

Claims priority, application France, Apr. 14, 1987, 87 05250  
Int. Cl.<sup>5</sup> A61F 13/16

U.S. Cl. 604—368

10 Claims

1. A cross-linked hydrophilic polymer which is insoluble in water which is based on acrylic acid and alkali metal acrylate, having a high degree of absorbency in respect of a saline physiological solution, of the order of 50 to 70 gr per gram, and which is solely composed of 20% to 45% of acrylic acid, in molar proportions, and 80% to 55% of potassium acrylate, in molar proportions, to the exclusion of any other monomer.

4,959,062

**INTEGRATED SOFT SHELL RESERVOIR**

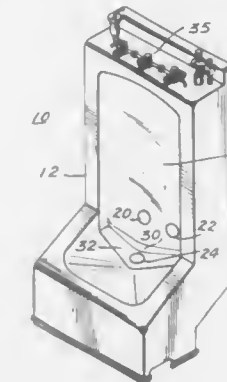
Barry Gellman, Billerica, Mass., assignor to C. R. Bard, Inc., Murray Hill, N.J.

Filed Feb. 23, 1989, Ser. No. 313,862

Int. Cl.<sup>5</sup> A61B 19/00

U.S. Cl. 604—403

3 Claims



1. A fluid reservoir, comprising:

- a rigid shell with an open face and an inner surface, said shell including: a top, a funnel shaped bottom including a lowermost point, and an interconnecting wall portion between said top and said bottom, an outlet opening defined through said funnel shaped bottom at said lowermost point for drainage of fluid from said reservoir, a peripheral edge extending around the open face of said shell, inlet means in said shell for introduction of fluid into said reservoir;
- a flexible membrane sealingly secured to said peripheral edge and extending across said open face and in overlying relation to said inner surface of said shell and defining therewith a fluid receiving chamber for reception of fluid introduced into said reservoir, said membrane being selectively expandable relative to said shell inner surface upon introduction of fluid, and intimately conformable with the inner surface of said shell upon drainage of fluid through said outlet opening, said membrane upon drainage of fluid through said outlet opening overlying and sealing said outlet opening, and
- means on said funnel shaped bottom for precluding sealing of said outlet opening until a complete drainage of fluid from said chamber between said shell inner surface and said membrane, said means for precluding sealing of said outlet opening including a ridge on said inner surface in said funnel shaped bottom adjacent to said outlet opening and extending beyond said outlet opening for selective

support of said membrane above said outlet opening immediately adjacent thereto as fluid is drained and until drainage is complete, wherein said ridge tapers from a maximum height, relative to said inner surface, adjacent said outlet opening to opposed outer ridge ends merging with said inner surface laterally of said outlet opening and adjacent said wall portion.

4,959,063

**SPINAL NEEDLE WITH OPTICAL FIBER MEANS FOR RADIATING A LASER BEAM**

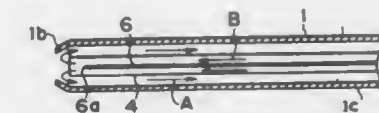
Toeshio Kojima, Tokyo, Japan, assignor to Onoda Research Institute, Ltd., Tokyo, Japan

Filed Sep. 14, 1988, Ser. No. 244,437

Claims priority, application Japan, May 12, 1988, 63-63175  
Int. Cl.<sup>5</sup> A61B 17/36

U.S. Cl. 606—15

15 Claims



1. A spinal needle insertable into the vertebral pulp to a treatment site comprising a hollow first cylinder means having an open distal end disposable at said treatment site, a second cylinder means disposed within said first cylinder means, said first cylinder means having an inner diameter greater than the outer diameter of said second cylinder means to thereby define a first flow passage between said first and second cylinder means, optical fiber means disposed within said second cylinder means for radiating a laser beam through said open distal end of said first cylinder means to said treatment site, said second cylinder means having an inner diameter greater than the outer diameter of said optical fiber means to thereby define a second flow passage between said second cylinder means and said optical fiber means, fluid introduction means on said second cylinder means for introducing a fluid into said second flow passage, said second cylinder means having an open distal end terminating within said first cylinder means juxtaposed to said open distal end of said first cylinder means such that said fluid passes from said open distal end of said second cylinder means into said first cylinder means and is evacuated through said first passage means, said open distal end of said first cylinder means receiving gas generated at said treatment site when the vertebral pulp is evaporated by radiating said laser beam onto said treatment site, said generated gas being evacuated through said first flow passage, said distal end of said first cylinder means having a converging section which converges radially inwardly to define a taper to facilitate insertion and penetration of said spinal needle into a person's body to said treatment site.

4,959,064

**DYNAMIC TENSION BONE SCREW**

John A. Engelhardt, Warsaw, Ind., assignor to Boehringer Mannheim Corporation, Indianapolis, Ind.

Filed Oct. 7, 1988, Ser. No. 255,154

Int. Cl.<sup>5</sup> A61F 5/04; F16B 43/02; A61C 8/00

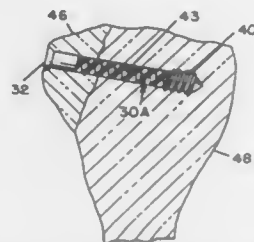
U.S. Cl. 606—65

5 Claims

1. A dynamic fixation screw constructed wholly from an elongated screw having a longitudinal axis for rejoining fracture fragments of a bone in their approximate original mutual dispositions comprising:

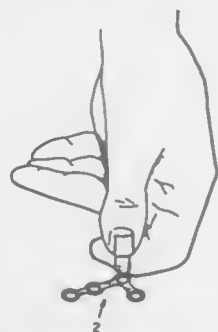
- a threaded distal end member for threaded engagement with one of the bone fragments;
- a head member at a proximal end for engagement with another of the bone fragments; and
- a threaded shank member of reduced outer diameter inter-

mediate said distal end member and said head member, said elongated screw having a bore therein coaxial with said longitudinal axis extending through said head member and said shank member and having a diameter that slightly exceeds the root diameter of the threads in said



threaded shank member thereby resulting in a spring member integral with said distal end member and with said head member for drawing the bone fragments together in a manner which continuously adjusts the force being applied to the bone according to the stress relaxation manifested by the bone.

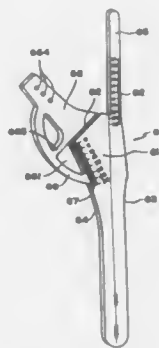
**4,959,065**  
**BONE PLATE WITH POSITIONING MEMBER**  
G. William Arnett, Santa Barbara; Rick A. Buss, Camarillo, and Robert A. Bruce, Ventura, all of Calif., assignors to Tech-medica, Inc., Camarillo, Calif.  
Filed Jul. 14, 1989, Ser. No. 379,993  
Int. Cl.<sup>5</sup> A61F 5/04  
U.S. Cl. 606—69 20 Claims



1. A bone plate for use in bone fractures comprising the combination of:  
a generally planar plate of inert material having at least two spaced openings adapted to receive fasteners for securing said plate, said plate having a generally flat surface adapted to be placed adjacent to the bone to which said plate is to be affixed and the opposed surface thereof being generally flat with rounded edges, said plate having a readily removable positioning member which is of sufficient size to manipulate and ready said bone plate for fixation, said positioning member being adapted for quick and easy separation from said bone plate after fixation of said bone plate and intended to be removed after fixation, and said positioning member not having any of said spaced openings therein.

**4,959,066**  
**FEMORAL OSTEOTOMY GUIDE ASSEMBLY**  
Harold K. Dunn, Salt Lake City, Utah; Mark A. Lazzeri, and Jeffrey M. Ondria, both of Warsaw, Ind., assignors to Zimmer, Inc., Warsaw, Ind.  
Filed Feb. 24, 1989, Ser. No. 315,101  
Int. Cl.<sup>5</sup> A61B 17/56  
U.S. Cl. 606—89 31 Claims  
1. An osteotomy guide assembly for femoral neck osteotomy comprising a means for attaching the assembly to the proximal

portion of a femur, a transverse support bar extending from said attachment means and a saw guide means which is attached to the support bar by a single locking means, and



wherein said single locking means provides for positional adjustment of the saw guide means relative to the support bar in at least two different linear directions.

**4,959,067**  
**MANUAL SURGICAL SEPARATOR STRUCTURE AND METHOD**  
George H. Muller, Ann Arbor, Mich., assignor to Joseph J. Berke, Detroit and A.I.R. Foundation, Ann Arbor, both of Mich., a part interest  
Continuation-in-part of Ser. No. 582,971, Nov. 21, 1983, Pat. No. 4,709,697. This application Nov. 5, 1987, Ser. No. 117,051  
The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.  
Int. Cl.<sup>5</sup> A61B 17/00  
U.S. Cl. 606—190 19 Claims



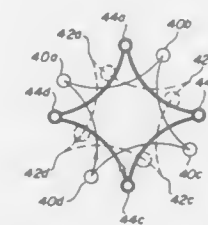
1. Surgical separator structure comprising an elongated shaft constructed of a non-helical shaped member extending straight in the direction of elongation for most of its length including a handle at one end, a transversely directionally universally, easily flexed other end, and a tip at the other end for displacing or separating tissue on contact therewith.

**4,959,068**  
**STERILE SURGICAL NEEDLE HAVING DARK NON-REFLECTIVE SURFACE**  
Lee Bendel, Lebanon, and Florence Stoffel, Ringoes, both of N.J., assignors to Ethicon, Inc., Somerville, N.J.  
Division of Ser. No. 160,226, Feb. 25, 1988, Pat. No. 4,905,615, which is a continuation-in-part of Ser. No. 926,759, Nov. 4, 1986, abandoned, which is a continuation-in-part of Ser. No. 632,343, Jul. 19, 1984, abandoned. This application Jul. 27, 1989, Ser. No. 385,510  
Int. Cl.<sup>5</sup> A61B 17/00  
U.S. Cl. 606—222 5 Claims



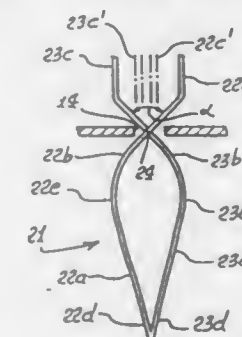
1. A method of manufacturing sterile surgical needles having uniform non-reflective black surfaces, said surfaces being non-flaking, said method comprising:  
(a) selecting a needle containing chromium, said needle having a desired configuration and sharpness,  
(b) treating the surface of said needle by electropolishing to activate the needle surface to allow the chromium to form oxides,  
(c) submersing said treated needle in a solution of sulfuric acid potassium dichromate, and water,  
(d) maintaining the temperature of the solution in excess of 100° C. while the needle is submersed,  
(e) maintaining the needle in said heated solution for a sufficient length of time to uniformly darken the surface whereby said surface is non-reflective,  
(f) removing the needle from the bath, and  
(g) sterilizing the needle.

**4,959,069**  
**BRAIDED SURGICAL SUTURES**  
Karl W. Brennan, Somerset; Alison M. Skinner, Long Valley, both of N.J., and Gregory Weaver, New Hope, Pa., assignors to Ethicon, Inc., Somerville, N.J.  
Filed Oct. 20, 1989, Ser. No. 424,622  
Int. Cl.<sup>5</sup> A61B 17/00  
U.S. Cl. 606—228 17 Claims



1. A braided surgical suture in which a plurality of surgically compatible filaments are woven in a spiral braid by moving filament dispensers to different positions around a closed loop, wherein an individual dispenser in the loop is moved from its current position to a succeeding position which is at least two positions removed from said current position.

**4,959,070**  
**INTRAOCULAR LENS IMPLANTATION**  
Henry H. McDonald, 65 N. Madison, Suite 810, Pasadena, Calif. 91101  
Continuation of Ser. No. 42,881, Apr. 27, 1987, Pat. No. 4,813,957. This application Jan. 27, 1989, Ser. No. 302,209  
Int. Cl.<sup>5</sup> A61F 2/16; A61B 17/28  
U.S. Cl. 623—6 2 Claims



1. A surgical forceps useful for eye surgery wherein an incision is made in the eye coroscleral tissue, the incision being less than about 3 mm in width, said forceps comprising:  
(a) a first arm extending generally forwardly to merge with a first diagonal portion defined by said arm, said diagonal portion extending forwardly and rightwardly, and a first blade carried by said first diagonal portion,  
(b) a second arm extending generally forwardly to merge with a second diagonal portion defined by the second arm, said second diagonal portion extending forwardly and leftwardly, and a second blade carried by said second diagonal portion,  
(c) said first and second diagonal portions together defining a cross-over locus adapted to be shifted away from the blades as the blades are expanded relatively away from one another in the eye,  
(d) whereby motion may be transmitted from the arms to the blades facilitating expanding of the blades while the cross-over point is maintained in or proximate said incision,  
(e) the overall cross-dimension of the diagonal portions of the arms at the cross-over locus at all times during blade expansion being less than about 3 millimeters,  
(f) the forceps having a first position in which a plastic lens is folded into flattened U-shape and is clamped between the blades, the forceps manipulated to introduce the blades and folded lens through the incision and into an eye lens zone from which a natural lens has been removed, the cross-over locus then located at or closely proximate said incision,  
(g) the forceps having a second position in which the blades are expanded apart wider than the width of the incision, and to an extent in excess of about 7 mm, thereby releasing the plastic lens by unfolding to accommodate to said zone, the cross-over locus at that time maintained located at or proximate said incision,  
(h) the forceps having a third position in which the blades are relatively closed together in said eye zone, with the cross-over locus at that time maintained at or proximate said incision, to accommodate withdrawal of the relatively closed together blades from said zone and via the incision,  
(i) each blade having a concave surface portion to match or approximately match the surface convex curvature of a plastic molded lens, and a second surface portion to match or approximately match the outer surface of a plastic molded lens haptic, and including said plastic lens folded upon itself into U-shape and retained between said blade first portion and second portion,  
(j) said blades extending forwardly relative to said diagonal portions.

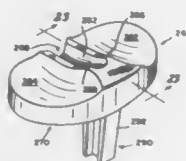


4,959,071

**PARTIALLY STABILIZED KNEE PROSTHESIS**  
David R. Brown, and Jeff L. Martin, both of Warsaw, Ind., assignors to Biomet, Inc., Warsaw, Ind.  
Continuation-in-part of Ser. No. 151,659, Feb. 3, 1988, Pat. No. 4,892,547. This application Feb. 3, 1989, Ser. No. 305,713  
Int. Cl.<sup>5</sup> A61F 2/38

U.S. Cl. 623—20

14 Claims



1. A knee joint prosthesis, comprising:

a femoral component having a pair of spaced-apart condylar bearing portions, an anterior intercondylar portion, a posterior intercondylar portion, and an intercondylar opening between the anterior intercondylar portion and the posterior intercondylar portion, the posterior intercondylar portion having an exterior surface with a raised ridge thereon that extends along the exterior surface of the posterior intercondylar portion generally parallel to the spaced apart condylar bearing portions, the femoral components having an interior contour which closely matches an exterior contour of the end of the femur after the femur has been prepared to receive the femoral component, the interior contour of the femoral component being at least partially defined by generally horizontal superior surfaces of the condylar bearing portions and by the intercondylar opening, the intercondylar opening lying in a common plane with, and inferiorly to, said horizontal superior surfaces of the condylar bearing portions,

a tibial component having a pair of spaced-apart bearing surfaces for supporting the condylar bearing portions of the femoral component and having an intercondylar portion including a posterior intercondylar portion between the bearing surfaces of the tibial component, the posterior intercondylar portion of the tibial component having a groove formed therein which extends therethrough generally parallel to the spaced-apart condylar bearing portions of the femoral component when the spaced-apart condylar bearing portions of the femoral component are supported by the bearing portions of the tibial component, wherein the ridge of the femoral component is received in the groove of the tibial component when the intercondylar bearing portions of the femoral component are supported on the bearing portions of the tibial component, the ridge rotatably slides in the groove when the knee flexes and the ridge and groove coact to reduce anterior movement of the femoral component as the knee flexes; and wherein the intercondylar portion of the tibial component does not extend all the way through the intercondylar opening of the femoral component.

4,959,072

**IMPLANT FOR STRENGTHENING THE EDGE OF A HIP BONE**

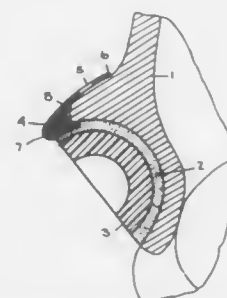
Erwin W. Moscher, Basel, and Otto Frey, Winterthur, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur and Protek AG, Berne, both of, Switzerland  
Filed Dec. 27, 1988, Ser. No. 290,439

Claims priority, application Switzerland, Jan. 14, 1988, 0131/88

Int. Cl.<sup>5</sup> A61F 2/34

U.S. Cl. 623—22

7 Claims



1. An implant for strengthening the edge of a hip bone comprising a multi-layer porous wire mesh formed into a shell of part cylindrical shape, said shell defining a first portion of trough shape to receive spongiosa therein and a fixing strip extending from said first portion and having apertures therein for fixing screws to be threaded into a hip bone.

4,959,073

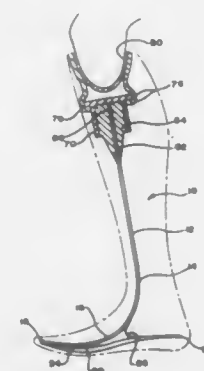
**FOOT PROSTHESIS AND METHOD OF MAKING SAME**  
John Merlette, 1208 E. Mockingbird Ln., Sandy, Utah 84070

Filed Jan. 6, 1988, Ser. No. 202,821

Int. Cl.<sup>5</sup> A61F 2/66

U.S. Cl. 623—55

15 Claims



1. A foot prosthesis comprising an elongate composite main member having a leg section, a toe section, and a heel member, one end of said leg section being adapted to be connected to an amputation socket, the other end smoothly curving forwardly into the toe section which extends forwardly of the leg section to a toe end and then curving sharply rearwardly and extending rearwardly from the toe end substantially along and generally adjacent to the toe section to a point of divergence from where the heel member continues rearwardly to a heel tip while the toe section curves upwardly to the leg section; and resilient material adhered between the toe section and the heel member substantially through the area where the two are generally adjacent to restrain and control relative movement between the adjacent toe section and heel member.

4,959,074

**METHOD OF HYDROPHILIC COATING OF PLASTICS**  
Gergory Halpern, Wilson Park Dr., Tarrytown, N.Y. 10591; Charles Campbell, Highwood Pl., Alpine, N.J. 07620; Ellington M. Beavers, 931 Coates Rd., Meadowbrook, Pa. 19046, and Hui Y. Chen, 42-01 Auburndale Ln., Flushing, N.Y. 11358

Division of Ser. No. 643,598, Aug. 23, 1984, Pat. No. 4,801,475. This application May 25, 1988, Ser. No. 198,356

Int. Cl.<sup>5</sup> B05D 3/04; A61F 2/16

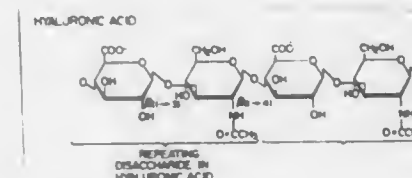
U.S. Cl. 623—66

1 Claim

1. An optically clear plastic having at least one exterior surface with a hydrophilic coating immobilized by crosslinking, comprising:

(a) a first coating of an aqueous solution of mucopolysaccharide which is dried by applying a water-miscible solvent

from the group consisting of acetone, methyl alcohol, methyl ethyl ketone and ethyl alcohol; and



(b) a second coating of a solution of catalyzed organic-soluble aliphatic polyisocyanate, applied as a crosslinker and immobilizer.

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## CHEMICAL

4,959,075

SILICATE- AND MAGNESIUM-FREE STABILIZER  
HYDROGEN PEROXIDE MIXTURES FOR BLEACHING  
PROCESSES

Bernad D. Baehr, Neuen; Ulrich Rall, Langenfeld; Hildegard van Delden, Hilden, and Wolfgang Lilotte, Moenchengladbach, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf, Fed. Rep. of Germany Division of Ser. No. 290,881, Dec. 22, 1988, Pat. No. 4,880,566, which is a continuation of Ser. No. 945,921, Dec. 23, 1986, abandoned. This application Sep. 7, 1989, Ser. No. 404,140 Claims priority, application Fed. Rep. of Germany, Dec. 23, 1985, 3545909

Int. Cl.<sup>5</sup> D06L 3/02, 3/04

U.S. Cl. 8—111

12 Claims

1. A process for bleaching cellulose fibers and mixtures of cellulose and synthetic fibers comprising contacting said fibers with an aqueous stabilized 35% by weight 35 weight hydrogen peroxide solution wherein said hydrogen peroxide solution is stabilized with a silicate-free and magnesium-free stabilizer mixture comprising:

- (A) polyhydroxy- and/or hydroxycarboxylic acid, and their alkali metal ammonium salts;
- (B) polyacrylic acid, and said acid in partially neutralized form; and
- (C) polyamine and/or amine polyphosphonic acid, and their alkali metal and/or ammonium salts;

with the proviso that the ratio by weight of components A:B:C is 1 to 6:0.2 to 1:0.4 to 4.

4,959,076

SYNTHETIC ROSEWOOD AND METHOD OF  
PRODUCTION THEREOF

Philip C. Rolfs, 629 S. Shore Dr., P.O. Box 175, Portage, Mich. 49081

Continuation-in-part of Ser. No. 206,190, Jan. 10, 1988, Pat. No. 4,840,637, which is a continuation of Ser. No. 933,478, Nov. 21, 1986, abandoned. This application May 11, 1989, Ser. No. 350,510

Int. Cl.<sup>5</sup> D06P 3/60

U.S. Cl. 8—402

24 Claims

1. A method of treating wood of the genus *Juglans* to change its color completely and throughout the entire structure and substance thereof essentially to various shades of dark brown with conspicuous black streaks, thereby providing a rosewood substitute, comprising the following steps:

- placing the starting wood into a vacuum/pressure vessel,
- drawing a vacuum in the vessel,
- allowing the vessel to stand until essentially all the extractable water and air is extracted from the wood,
- introducing an aqueous solution of an iron salt having a concentration not greater than about eighteen percent (18%) by weight into the vessel, while maintaining the vacuum therein,
- thereafter applying an elevated pressure inside of the vessel, allowing the vessel to stand until essentially the maximum possible amount of iron salt solution is absorbed by said wood,
- releasing the pressure in the vessel,
- draining fluid from the vessel,
- removing the wood from the vessel,
- washing the wood with water, and
- drying the thus-treated wood at an elevated temperature of about 130° F. to about 180° F. to produce a synthetic rosewood product.

4,959,077

## FUELS FOR GASOLINE ENGINES

Franz-Dieter Martischus, Neustadt; Hans P. Rath, Gruenstadt; Hans-Henning Vogel, Frankenthal; Norbert Greif, Bobenheim; Kurt Oppenlander, Ludwigshafen; Walter Denzinger, Speyer, and Heinrich Hartmann, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 12, 1988, Ser. No. 243,072

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1987, 3730885; Oct. 1, 1987, 3733172

Int. Cl.<sup>5</sup> C10L 1/18, 1/22

U.S. Cl. 44—62

3 Claims

1. A fuel for four-stroke gasoline engines which comprises gasoline and from 10 to 2,000 ppm by weight of a copolymer of an olefin of from 2 to 40 carbon atoms and/or a cycloolefin of from 3 to 10 carbon atoms with maleic anhydride having a total molecular weight of from 500 to 20,000 g per mole, the carboxyl groups on the copolymer having been wholly or partly converted with an alkali metal to form an alkali metal salt and the remaining carboxyl groups having been converted with an alcohol and/or an amine of up to 50 carbon atoms into the corresponding ester and/or amide groups and/or ammonium salts.

4,959,078

## HOT-GAS COOLING PLANT

Georg Ziegler, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

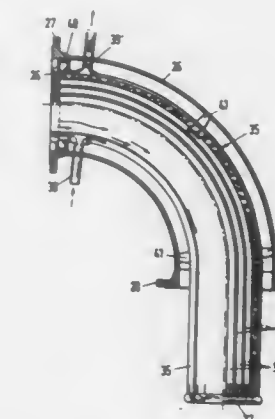
Filed Oct. 3, 1989, Ser. No. 416,542

Claims priority, application Switzerland, Oct. 26, 1988, 03986/88

Int. Cl.<sup>5</sup> C10J 3/82, 3/84, 3/86

U.S. Cl. 48—128

11 Claims





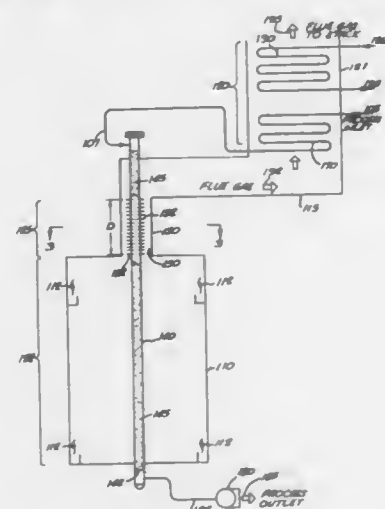
for releasable connection to a flange on each respective pressure vessel;  
a plurality of tubes in said gas outlet line for conveying a coolant therethrough and bent to follow said curved axis to cool said gas outlet line;  
an annular collector within a gas intake end of said gas outlet line in communication with said bent tubes, each bent tube being in communication with at least one other bent tube at a gas exhaust end of said gas outlet line; and  
partitions in said collector for dividing said collector into two chambers, one of said chambers being in communication with some of said bent tubes and a coolant supply and the other of said chambers being in communication with others of said bent tubes and a coolant outlet.

#### 4,959,079 STEAM REFORMING PROCESS WITH LOW FIRED DUTY

Bernard J. Grotz, Pasadena, and Vito Frankini, Arcadia, both of Calif., assignors to Santa Fe Brass Inc., Alhambra, Calif.  
Continuation of Ser. No. 112,722, Oct. 23, 1987, abandoned.  
This application May 9, 1989, Ser. No. 351,313  
Int. Cl.<sup>5</sup> C01B 3/34

U.S. Cl. 48—198.7

9 Claims



1. A method for the production of hydrogen from a hydrocarbon stream in a steam reforming furnace for a hydrogen or ammonia plant, said furnace having a radiant section and a convection section, the width of the furnace in the convection section being substantially narrower than the width of the radiant section to provide enhanced velocity to the flue gas, the furnace containing a plurality of reforming catalyst-containing single pass tubes, the portion of each of said tubes within said radiant section being filled with reforming catalyst, comprising the steps of:

- preheating the hydrocarbon stream;
- introducing, heating and reacting the hydrocarbon stream and steam in said tubes within said convection section of the furnace wherein a portion of the catalyst-filled tubes have an extended surface integral with or attached to an outer surface of said tubes within the convection section to enhance convection heat transfer to the hydrocarbon stream within the catalyst-filled tube; and thereafter
- heating the hydrocarbon stream in said radiant section of the furnace in another portion of said tubes having a substantially bare outer surface within the radiant section thereby causing the hydrocarbon and steam to flow through the tubes in a direction countercurrent to the flow of flue gas through the furnace.

#### 4,959,080 PROCESS FOR GASIFICATION OF COAL UTILIZING REACTOR PROTECTED INTERNALLY WITH SLAG COALESCING MATERIALS

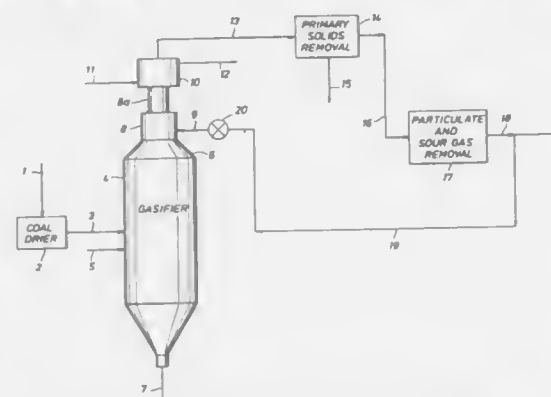
Charles V. Sternling, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jun. 29, 1989, Ser. No. 372,806

Int. Cl.<sup>5</sup> C10J 3/46, 3/72

U.S. Cl. 48—210

6 Claims



1. A process for the gasification of coal comprising oxidizing coal under conditions to produce hot synthesis gas containing flyslag and having a temperature of from about 1050° C. to about 1800° C., the oxidizing being carried out in a reactor comprising a vessel or tube having an inner reaction space bounded by a wall surface or surfaces protected by a refractory liner between the space and at least a portion of the wall surface or surfaces, the surface of the liner defining the reaction zone of the reactor being coated or lined with at least two contiguous layers of different slag coalescing materials, the layers of materials being arranged in order of increasing melting point of the respective materials toward the internal reaction space of the reactor vessel or tube.

#### 4,959,081 SEALING AND TRIMMING

Lionel Mathellier, Chartres, France, assignor to Draftex Industries Limited, Edinburgh, Scotland

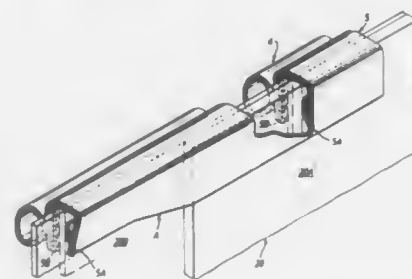
Filed Aug. 2, 1989, Ser. No. 388,987

Claims priority, application United Kingdom, Aug. 9, 1988, 8818887

Int. Cl.<sup>5</sup> E06B 7/16

U.S. Cl. 49—490

9 Claims



1. A channel-shaped strip for embracingly gripping a support member of known variable thickness, the channel of the strip having, prior to fitment to the support member, a width which varies along the length of the strip in a predetermined manner so as to match the known variation in thickness of the support member.

#### 4,959,082 POLYCARBONATE GAS SEPARATION MEMBRANES CONTAINING SUBSTITUTED BENZENES AND PROCESSES FOR MAKING AND USING THE SAME

Wadeh Admassu, Concord, and Daniel O. Clark, Benicia, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 20, 1989, Ser. No. 383,952

Int. Cl.<sup>5</sup> B01D 53/22, 71/50

U.S. Cl. 55—16

25 Claims

1. A process for separating gases using a semi-permeable gas separation membrane comprising:

- A. contacting one side of a semi-permeable membrane with a feed gas mixture under pressure, wherein the membrane divides a separation chamber into a high pressure side into which the feed gas mixture is fed and a low pressure side;
- B. maintaining a pressure differential across the membrane under conditions such that at least one component of the gas mixture selectively permeates through the membrane from the high pressure side to the low pressure side of the membrane;
- C. removing from the low pressure side of the membrane permeated gas which is enriched in at least one faster permeating component of the gas mixture; and
- D. removing from the high pressure side of the membrane non-permeated gas which is depleted in at least one faster permeating component of the gas mixture;

wherein the membrane comprises a thin discriminating layer of a polycarbonate gas separation membrane containing at least one substituted benzene in an amount effective to interact with the polycarbonate polymer and increase the gas flux and/or gas selectivity of the membrane by at least about 10 percent without causing a significant decrease in the tensile strength of the membrane.

5. A semi-permeable gas separation membrane comprising a thin discriminating layer of a polycarbonate polymer containing at least one substituted benzene in an amount effective to interact with the polycarbonate polymer and increase the gas flux and/or gas selectivity of the membrane by at least about 10 percent without causing a significant decrease in the tensile strength of the membrane.

#### 4,959,083 SEPARATION OF GAS MIXTURES

Michael E. Garrett, Woking, United Kingdom, assignor to The BOC Group plc, Windlesham, England

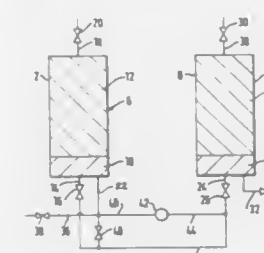
Filed May 8, 1989, Ser. No. 348,547

Claims priority, application United Kingdom, May 27, 1988, 8812642

Int. Cl.<sup>5</sup> B01D 53/04

U.S. Cl. 55—26

7 Claims



1. A method of separating oxygen from air comprising repeatedly performing the following sequence of steps:

- (a) passing compressed air into a first bed of adsorbent that adsorbs oxygen more rapidly than nitrogen and argon, and discharging from the first bed unadsorbed gas comprising nitrogen and a part of the argon content of the compressed air;

- (b) stopping the passage of the compressed air into the first bed;
- (c) placing the first bed in communication with a second bed of adsorbent that is able to effect a separation as between nitrogen and oxygen and having a lower initial pressure than the first bed so that the pressures in the first and second beds tend toward equalization to initiate desorption of adsorbed oxygen in the first bed with the decrease in pressure therein, to cause a gas mixture to flow from the first bed to the second bed, the gas mixture including two major components comprising the desorbed oxygen and nitrogen present in the unadsorbed gas remaining in the first bed after passage of the compressed air thereto is stopped, and to initiate adsorption of one of the major components in the second bed with the increase in pressure therein;
- (d) recompressing at least some of the gas mixture;
- (e) passing the recompressed gas mixture into the second bed to raise the pressure in the second bed to a higher value than that of the first bed; and
- (f) producing product oxygen from the second bed via withdrawing gas not adsorbed in the second bed, and then regenerating said second bed by desorbing gas therefrom and causing the desorbed gas to flow out of the second bed.

#### 4,959,084 COMBINED AIR AND WATER POLLUTION CONTROL SYSTEM

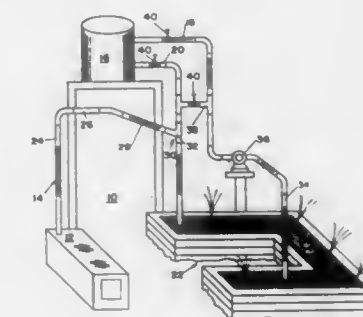
Billy C. Wolverton, and Lamont R. Jarrell, both of Picayune, Miss., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 26, 1989, Ser. No. 357,938

Int. Cl.<sup>5</sup> B01D 53/04

U.S. Cl. 55—68

15 Claims



1. A process for removing pollutants from a source of polluted air and from a source of waste fluid comprising: combining said polluted air and said waste fluid by continuously flowing said waste fluid past said source of polluted air for entrainment of said polluted air into said waste fluid; circulating said combined polluted air and said waste fluid through a filter for removal of pollutants from said air and waste fluid; and, re-circulating the filtered waste fluid past said source of polluted air for entrainment of additional said polluted air into said fluid.

**4,959,085**  
**PROCESS AND INSTALLATION FOR THE TREATMENT**  
**OF A STREAM OF GAS CONTAINING PYROPHORIC**  
**DUST**

Maurits C. Van Camp, Mortsel; Philippe M. Wattel, Berchem, and André L. Delvaux, Wilrijk, all of Belgium, assignors to Metallurgie Hoboken-Overpelt, Hoboken, Belgium

Filed Feb. 22, 1989, Ser. No. 313,512

Claims priority, application Belgium, Mar. 9, 1988, 08800257  
 Int. Cl.<sup>5</sup> B01D 47/06

U.S. Cl. 55—72

23 Claims



1. A process for treating a stream of exhaust gas containing oxygen and pyrophoric dust, comprising the steps of:
  - (a) continuously taking care that the stream of exhaust gas shall be mixed with turbulence and have for at least 1 second a temperature of at least 270° C., while keeping the temperature of gas below 500° C., and
  - (b) sending the stream of exhaust gas resulting from step (a) through a bag filter, step (a) being carried out prior to step (b).
15. The process according to claim 1 wherein the exhaust gas from step (a) is cooled before being sent through said bag filter.

**4,959,086**  
**REMOVING HYDROGEN SULPHIDE FROM A GAS**  
**MIXTURE**

Johannes F. Van Baar, and Walterus J. Van Lith, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 20, 1989, Ser. No. 424,649

Claims priority, application United Kingdom, Oct. 25, 1988, 8824943

Int. Cl.<sup>5</sup> B01D 53/14

U.S. Cl. 55—73

11 Claims

1. A process for removing hydrogen sulphide from a gas mixture including hydrogen sulphide comprising contacting the gas mixture with a liquid absorbent composition comprising an aminopyridine.

**4,959,087**  
**AIR CONDITIONING SYSTEM FILTER WITH**  
**VARIABLE RATE SCENT RELEASE**

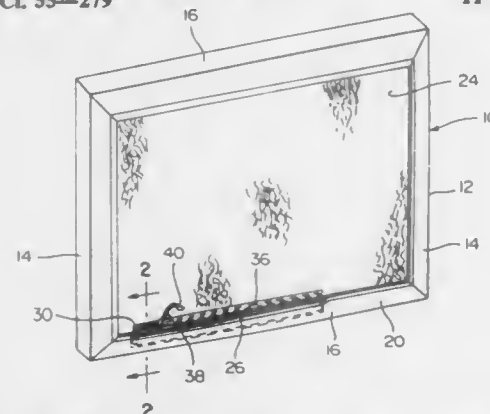
James Kapparnaros, 1205 Powers Run Rd., Pittsburgh, Pa. 15237

Filed Jun. 14, 1989, Ser. No. 365,830

Int. Cl.<sup>5</sup> A61L 9/04

U.S. Cl. 55—279

11 Claims



1. An air filter including a generally rectangular, panel-like batt of filter material supported from a surrounding rectangular

lar frame incorporating four sides, each of said sides being generally U-shaped in cross section including a pair of opposite side elongated flanges extending therealong and interconnected along one pair of corresponding longitudinal margins by a bight portion extending therebetween with said frame sides opening inwardly of the periphery of said frame and each frame side receiving the corresponding marginal edge of said batt between the opposing surfaces of the other pair of longitudinal margins of the opposite side flanges thereof, an elongated scented material bar extending longitudinally along one of said frame sides and stationarily supported between one of said side flanges of said one frame side and the opposing marginal edge portion of said batt with a major portion of said bar disposed between said side flanges of said one frame side, said scented bar including at least one exposed surface thereof facing outwardly from between said side flanges inwardly of said frame.

**4,959,088**  
**METHOD OF PRODUCING NITRIC ACID AND**  
**REFRIGERATION**

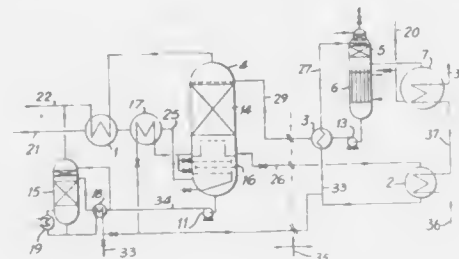
Andrija Fuderer, Residencial Mediterrani 2, 17210 Calella de Palafrugell, Spain

Filed Apr. 14, 1989, Ser. No. 339,238

Int. Cl.<sup>5</sup> F25J 1/02

U.S. Cl. 62—23

19 Claims



1. A method of producing nitric acid and refrigeration, said method comprising the steps of:
  - evaporating liquid ammonia to obtain ammonia vapor whereby refrigeration is produced;
  - absorbing the ammonia vapor by a lean ammonia solution to obtain a rich ammonia solution;
  - stripping ammonia from the rich ammonia solution with air whereby an air-ammonia mixture, a lean ammonia solution, and additional refrigeration are produced; and
  - using a portion of the lean ammonia solution produced as a result of stripping the rich ammonia solution with air for absorbing further ammonia vapor obtained as a result of evaporation of further liquid ammonia, to obtain a further rich ammonia solution for producing a further air-ammonia mixture.

**4,959,089**  
**PROCESS FOR PREPARING A BARIUM TITANATE**  
**FILM**

Atit Bhargava, and Robert L. Snyder, both of Alfred, N.Y., assignors to Alfred University, Alfred, N.Y.

Filed May 3, 1988, Ser. No. 189,797

Int. Cl.<sup>5</sup> C03C 10/02

U.S. Cl. 65—33

20 Claims

1. A process for preparing a tetragonal barium titanate film with a thickness of from about 0.1 millimeter to about 1.5 millimeters, comprising the steps of sequentially:
  - (a) providing a batch comprising from about 46 to about 54 mole percent of a barium compound, from about 18 to about 32 mole percent of a titanium compound, and from about 32 to about 18 mole percent of a boron compound, wherein each of said compounds is calculated on the oxide basis in mole percent and wherein:

1. said barium compound is selected from the group consisting of barium oxide, barium carbonate, barium nitrate, barium oxalate, barium hydroxide, barium peroxide, barium per-hydrate oxide, barium acetate, and mixtures thereof;
2. said titanium compound is selected from the group consisting of titanium dioxide, titanium monoxide, titanium sesquioxide, titanium oxalate, and mixtures thereof;
3. said boron compound is selected from the group consisting of boron oxide, boric acid, metaboric acid, tetraboric acid, and mixtures thereof;
4. said titanium compound, and said boron compound contains less than about 0.1 percent by weight, of impurities, and said barium compound contains less than 1.0 percent, by weight, of impurities;
- (b) melting said batch at a temperature of from about 1300 to about 1400 degrees centigrade for from about 25 to about 40 minutes until it is molten;
- (c) reducing the temperature of the molten batch from the temperature of the melt to ambient temperature in a period of less than about 30 seconds, thereby producing glass;
- (d) placing the glass upon a surface of a polycrystalline isostructural substrate, thereby producing a substrate/glass assembly;
- (e) subjecting the substrate/glass assembly to a temperature of from about 1150 to about 1250 degrees centigrade for from about 10 to 30 minutes until the glass becomes molten and flows over the surface of the substrate;
- (f) reducing the temperature of the assembly to from about 950 to about 1,050 degrees centigrade; and
- (g) maintaining the temperature of the assembly at from about 950 to about 1,050 degrees centigrade for from about 25 to about 60 minutes.

**4,959,090**  
**GLASS ENAMEL COATING COMPOSITIONS**  
 Barry P. Reinherz, Lawrence, Pa., assignor to Ciba-Geigy Corporation, Ardley, N.Y.  
 Division of Ser. No. 250,460, Sep. 28, 1988, abandoned. This application Jul. 25, 1989, Ser. No. 386,033  
 Int. Cl.<sup>5</sup> C03C 17/04

U.S. Cl. 65—60.4

13 Claims

1. In the method for forming a glass enamel coated glass sheet, the glass enamel composition comprising a glass frit system and a vehicle therefor, wherein the glass enamel composition is coated onto the glass sheet, the coated glass sheet is heated to soften the sheet, to remove the volatiles in said enamel and to bond the remainder of the enamel to the sheet, the softened glass sheet is contacted with a fibrous material covered forming die, the forming die is removed and the glass sheet is cooled; the improvement comprising incorporating into the enamel composition from about 2–75%, by weight, of a finely divided metal powder selected from the group consisting of chromium, chromium carbide, cobalt, copper, stainless steel, nickel, silicon, titanium, tungsten and tellurium metal powders and mixtures thereof.

**4,959,091**  
**METHOD FOR INCREASING THE YIELD OF CROPS**  
 Atruhiko Kumura, Chiba; Rynichi Ishii, Tokyo; Bing-Shan Luo, Chiba; Metro Adachi; Kenji Hamada, both of Kanagawa, and Fumio Fujita, Kanagawa, all of Japan, assignors to National Federation of Agricultural Co-Operative Associations and Nissan Chemical Industries, both of Tokyo, Japan  
 Filed Sep. 19, 1985, Ser. No. 777,746

Claims priority, application Japan, Sep. 20, 1984, 59-195658; May 31, 1985, 60-116537

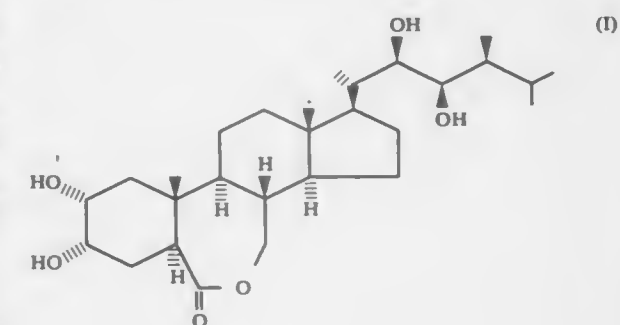
Int. Cl.<sup>5</sup> A01N 43/22

U.S. Cl. 71—77

17 Claims

1. A method for increasing the yield of crops, which comprises treating

gramineous crops during a flower ripening period with an effective amount of (2a, 3a, 22R, 23R)-tetrahydroxy-24S-methyl-B-homo-7-oxa-5a-chloestan-6-one of the formula I:



**4,959,092**  
**SUBSTITUTED PHENYL (OR PYRIDYL) UREA**  
**COMPOUND AND HERBICIDAL COMPOSITION**  
**CONTAINING THE SAME AS ACTIVE INGREDIENT**  
 Hiroki Ohta, Kokubunji; Katsutoshi Sato, Machida; Susumu Matsumoto, Yokohama; Kazuo Ishii; Yasuko Miura, both of Tokyo; Hisao Watanabe, Yokohama; Seichi Suzuki; Yoichi Umei, both of Tokyo, and Hiroshi Hanabe, Yokohama, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed May 25, 1988, Ser. No. 196,287

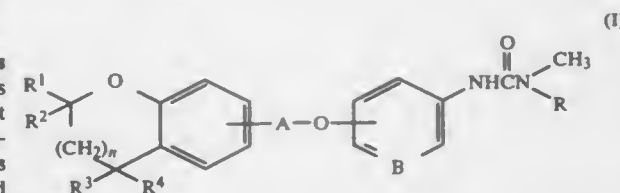
Claims priority, application Japan, Jun. 3, 1987, 62-139399; Dec. 11, 1987, 62-313718; Dec. 11, 1987, 62-313720; Dec. 14, 1987, 62-315858; Dec. 14, 1987, 63-315860

Int. Cl.<sup>5</sup> C07D 307/79; A01N 43/12

U.S. Cl. 71—88

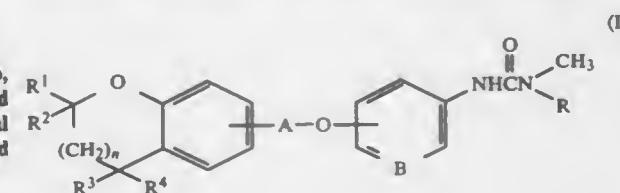
27 Claims

1. A compound represented by the following general formula (I):



wherein A represents an ethylene group or an isopropylene group; B represents a nitrogen atom or CH; R represents a hydrogen atom, a lower alkyl group or a lower alkoxy group; R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> independently represent a hydrogen atom or a methyl group; and n is 0 or 1.

19. A method of controlling the growth of weeds, which method comprises applying a herbicidally effective amount of compound represented by the following general formula:



wherein A represents an ethylene group or an isopropylene group; B represents a nitrogen atom or CH; R represents a hydrogen atom, a lower alkyl group or a lower alkoxy group; R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> independently represent a hydrogen atom or a methyl group; and n is 0 or 1.



4,959,093

**(22R,23R,24S)-22,23-EPOXY-2 $\alpha$ ,3 $\alpha$ -ISOPROPYLIDENE-DIOXY-B-HOMO-7-OXA-5 $\alpha$ -STIGMASTAN-6-ONE AND PLANT GROWTH REGULATING METHOD CONTAINING THE SAME**

Yasuo Kamuro; Toshihito Kakiuchi, both of Tsukuba, and Suguru Takatsudo, Joetsu, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Dec. 22, 1988, Ser. No. 288,563

Claims priority, application Japan, Dec. 24, 1987, 62-329228  
Int. Cl.<sup>5</sup> A01N 43/30

U.S. Cl. 71—88

1 Claim

1. A method for regulating the growth of plants comprising spraying onto said plant an effective regulating amount of a plant growth regulating composition comprising as an active ingredient, an effective regulating amount of (22R,23R,24S)-22,23-epoxy-2 $\alpha$ ,3 $\alpha$ -isopropylidenedioxy-B-homo-7-oxa-5 $\alpha$ -stigmastan-6-one and an agrochemically acceptable vehicle.

4,959,094

**1-CHLOROPYRIMIDINYL-1H-1,2,4-TRIAZOLE-3-SULPHONAMIDES AS HERBICIDES**

Peter Wegner; Martin Krüger; Gerhard Johann; Reinhart Ruesch; Richard Rees, all of Berlin, Fed. Rep. of Germany; John Head, Stortford, and Graham Rowson, Hurdon, both of England, assignors to Schering Aktiengesellschaft, Fed. Rep. of Germany

Filed Apr. 19, 1989, Ser. No. 340,484

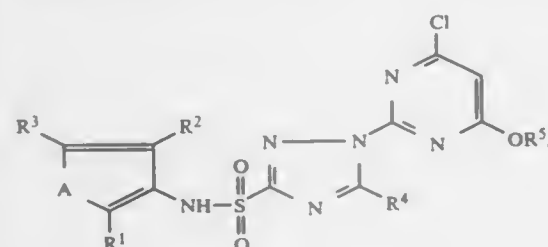
Claims priority, application Fed. Rep. of Germany, Apr. 20, 1988, 3813885

Int. Cl.<sup>5</sup> C07D 403/04, 409/14; A01N 43/54, 43/653

U.S. Cl. 71—92

16 Claims

1. 1-Chloropyrimidinyl-1H-1,2,4-triazole-3-sulphonamide of formula I



in which

A is —S— or —CH=CH—;

R<sup>1</sup> is halogen, methyl, trifluoromethyl, methoxy, difluoromethoxy, nitro or methoxycarbonyl;R<sup>2</sup> is hydrogen, halogen, methyl, methoxy, allyloxy or propargyloxy;R<sup>3</sup> is hydrogen or methyl;R<sup>4</sup> is hydrogen, methyl or methoxymethyl; andR<sup>5</sup> is C<sub>1</sub>-C<sub>4</sub>-alkyl.

3. A method of combating weeds which comprises applying to the weeds or their locus a herbicidally effective amount of a compound according to claim 1.

4,959,095

**HERBICIDAL O-CARBOMETHOXYsulfonylurea**

Siew H. Chang, Kuala Lumpur, Malaysia, assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 125,302, Nov. 25, 1987, abandoned.

This application Oct. 19, 1988, Ser. No. 258,555

Int. Cl.<sup>5</sup> A01N 43/64

U.S. Cl. 71—93

4 Claims

1. A method for controlling undesired weeds in plantation crops which comprises applying to the locus of the weeds a herbicidally effective amount of methyl 2-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]amino]sulfonyl]ben-

zoate, the plantation crops selected from the group consisting of coffee, cocoa, oil palm, rubber, banana and citrus.

4,959,096

**COMPOSITIONS FOR PROTECTING PLANTS AGAINST DISEASE**

Helmut Zondler, Bottmingen, and Walter Kunz, Oberwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 17, 1989, Ser. No. 324,876

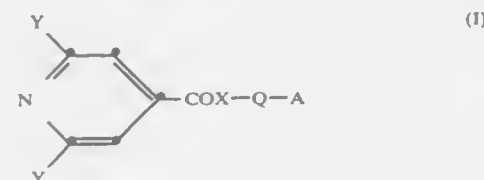
Claims priority, application Switzerland, Mar. 25, 1988, 1140/88

Int. Cl.<sup>5</sup> A61K 31/455; C07D 211/86

U.S. Cl. 514—356

8 Claims

I. A compound of formula I



in which

Y is halogen;

X is oxygen or sulfur;

Q is C<sub>1</sub>-C<sub>3</sub>alkylene, propenylene, C<sub>1</sub>-C<sub>3</sub>alkylene mono- or di-substituted by R, or propenylene mono- or di-substituted by R;

R is C<sub>1</sub>-C<sub>4</sub>alkyl, C<sub>1</sub>-C<sub>4</sub>haloalkyl having from 1 to 3 halogen atoms, cyano, C<sub>2</sub>-C<sub>5</sub>alkoxycarbonyl, C<sub>3</sub>-C<sub>6</sub>cycloalkyl, phenyl, or phenyl substituted by C<sub>1</sub>-C<sub>4</sub>alkyl, C<sub>1</sub>-C<sub>4</sub>alkoxy, halogen, trifluoromethyl, trichloromethyl, nitro or by cyano, or benzoyl or benzoyl substituted by C<sub>1</sub>-C<sub>4</sub>alkyl, C<sub>1</sub>-C<sub>4</sub>alkoxy, trifluoromethyl, trichloromethyl, nitro or by cyano;

A is phenyl, biphenyl, phenoxyphenyl, naphthyl, pyridyl, furyl, thienyl, imidazolyl or triazolyl, each of these radicals being unsubstituted or substituted by halogen, C<sub>1</sub>-C<sub>4</sub>alkyl, C<sub>1</sub>-C<sub>3</sub>alkoxy, C<sub>1</sub>-C<sub>3</sub>haloalkoxy having from 1 to 3 halogen atoms, trifluoromethyl, nitro or by cyano; with the proviso (1) that if A is imidazolyl or triazolyl R may not be phenyl or benzoyl, and (2) that A and the R substituent in Q may together contain no more than 3 rings.

4,959,097

**23-PHENYLSTEROIDS**

Sei-ichi Hayashi; Tadashi Hohjoh, both of Saitama; Atsuhiko Shida, Ibaraki, and Nobuo Ikekawa, Tokyo, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha and Tama Biochemical Co., Ltd., both of Tokyo, Japan

Division of Ser. No. 163,526, Mar. 3, 1988, Pat. No. 4,886,544.

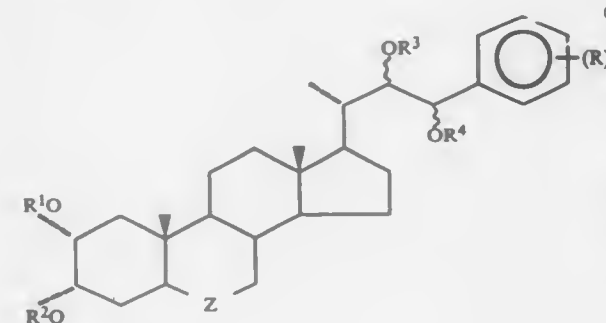
This application Oct. 4, 1989, Ser. No. 416,926

Claims priority, application Japan, Mar. 17, 1987, 62-59934  
Int. Cl.<sup>5</sup> A01N 31/00; C07J 9/00, 41/00

U.S. Cl. 71—112

5 Claims

1. A steroidal compound represented by the formula:

wherein  
Z represents

n represents an integer of 1 to 3,  
R represents hydrogen, halogen, CF<sub>3</sub>, lower alkyl, lower alkoxy or —CO<sub>2</sub>R', wherein R' represents hydrogen, alkali metal or lower alkyl, and  
R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> represent hydrogen or acyl, respectively, with the proviso that when n is 2 or 3, R may represent substituents which may be independent each from one or more of the others.

4,959,098

**N-SUBSTITUTED 3,4,5,6-TETRAHYDROPHthalimide DERIVATIVES**

Barbara Schwalge, Ludwigshafen; Peter Plath, Frankenthal; Karl Eicken, Wachenheim; Lothar Rueb, Speyer; Bruno W. erzer, Otterstadt; Karl-Otto Westphalen, Speyer, and Norbert Meyer, Ladenburg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 2, 1989, Ser. No. 360,864

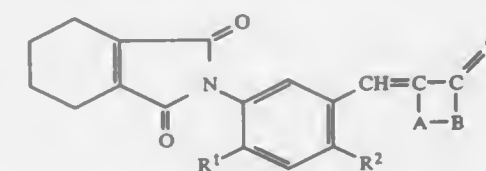
Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819464

Int. Cl.<sup>5</sup> A01N 43/36; C07D 209/48

U.S. Cl. 71—95

9 Claims

1. An N-aryltetrahydrophthalimide compound of the formula I



where R<sup>1</sup> is hydrogen or halogen, R<sup>2</sup> is halogen, A is a C<sub>2</sub>-C<sub>4</sub>-alkylene or C<sub>2</sub>-C<sub>4</sub>-alkenylene bridge which may carry from one to three C<sub>1</sub>-C<sub>3</sub>-alkyl groups and B is oxygen or sulfur.

4,959,099

**TAPER ROLLING OF METAL**

Alexander I. Wilson, Sheffield, England, assignor to Ian Wilson Technology Limited, Sheffield, England

Filed Feb. 9, 1989, Ser. No. 308,835

Claims priority, application United Kingdom, Jan. 14, 1988, 8800792

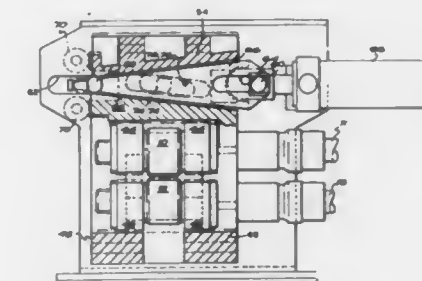
Int. Cl.<sup>5</sup> B21B 31/30

U.S. Cl. 72—244

11 Claims

1. Apparatus for the taper rolling of metal, the apparatus including at least a pair of main rolls mounted for rotation in a

roll housing and defining a roll gap through which a work-piece blank can be drawn by a drawbar arrangement, control means being provided whereby, simultaneously, the spacing between the rolls can be varied in accordance with the linear movement of the workpiece, in which respective pairs of roll chocks for upper and lower rolls defining the roll gap are located by a mechanism for ensuring that the pass line remains at a fixed height throughout the rolling operation, said mechanism including a horizontally disposed wedge member having oppositely directed inclined surfaces constrained to move along a horizontal path under the influence of the control means, the roll chocks for one of the main rolls abutting against



one inclined surface of the wedge member and the roll chocks for the other of the main rolls being carried in a sash-like frame having upstanding slide plates of which are slidably mounted for vertical adjustment in the roll housing and a cross block of which abuts against the other inclined surface of the wedge member, whereby, despite the pairs of roll chocks not being located on opposite sides of the wedge member, one of the pair of roll chocks abuts against one inclined surface of said wedge member and the other pair of roll chocks in effect abuts against the other inclined surface of said wedge member so that movement of said wedge member along said horizontal path moves both said main rolls either towards or away from one another while maintaining said pass line at said fixed height.

4,959,100

**RECOVERY OF NON-FERROUS METALS FROM DROSS**

Ghyslain Dube; Jean-Paul Hunt; Serge Lavoie, and Wesley D. Stevens, all of Jonquiere, Canada, assignors to Alcan International Limited, Montreal, Canada

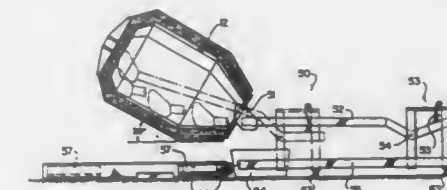
Continuation-in-part of Ser. No. 255,060, Oct. 7, 1988. This application Dec. 19, 1988, Ser. No. 286,386

Claims priority, application Canada, Dec. 22, 1987, 555114; Oct. 7, 1988, 579628

Int. Cl.<sup>5</sup> C22B 21/00

U.S. Cl. 75—10.19

54 Claims



1. A process for recovering a non-ferrous metal from a dross containing the same, which comprises:  
introducing the dross into a rotary furnace having a refractory lining;  
heating the dross to a temperature above the melting point of the metal by directing a plasma torch into the furnace;  
rotating the furnace in a manner selected from the group

consisting of continuous rotation and intermittent rotation;  
removing the molten metal thereby separated from a solid dross residue; and  
wherein the dross contains aluminum and wherein the plasma torch introduces different gases into the furnace at different stages of the heating of the dross according to the following scheme:  
(a) start of heating (from about 20° C. : air  
(b) when the aluminum becomes molten (about 660° C) : N<sub>2</sub>  
(c) when the dross is heated to about 850° C. : N<sub>2</sub>  
(d) when the temperature of dross rises from: Ar about 850° C. to about 1000° C. (without applied power).

4,959,101

## PROCESS FOR DEGASSING ALUMINUM MELTS WITH SULFUR HEXAFLUORIDE

James R. MacNeal, Painesville; Timothy P. Rack, Solon, and Ronald R. Corns, Maumee, all of Ohio, assignors to AGA AB, Cleveland, Ohio

Continuation of Ser. No. 67,949, Jan. 29, 1987, abandoned. This application Sep. 28, 1988, Ser. No. 251,959  
Int. Cl.<sup>3</sup> C22B 21/06

U.S. Cl. 75—685

11 Claims

1. A process for purifying melts of aluminum alloys containing magnesium by removing solid particle impurities including aluminum oxides and gaseous impurities from the melt without substantially altering the concentration of the magnesium in the melt, comprising the step of bubbling through the melt a treating gas consisting of an inert gas containing gaseous sulfur hexafluoride in a concentration up to about 10 percent by volume sulfur hexafluoride in order to remove the gaseous impurities and the solid particle impurities from the melt to a surface thereof, thus leaving the melt in the purified condition.

4,959,102

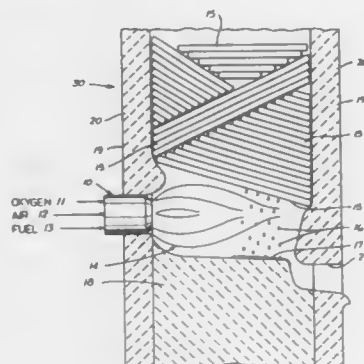
## METHOD FOR MELTING AND REFINING COPPER METAL

James H. Clarkson; Kenneth R. Rhodes; Bruce E. Betterton, all of Carroll County, and Richard B. Foster, Coweta County, all of Ga., assignors to Southwire Company, Carrollton, Ga.

Filed Mar. 8, 1989, Ser. No. 320,427  
Int. Cl.<sup>3</sup> C22B 15/14

U.S. Cl. 75—649

12 Claims



1. A method of melting and refining copper, said copper containing impurities, in a shaft furnace comprising the steps of:

- providing a source of oxygen;
- providing a source of air;
- providing a source of fuel;
- transferring measured quantities of said oxygen, air and fuel, from their respective sources, to a combustion point;
- burning said oxygen, air, and fuel at said combustion point

under conditions that will produce an oxidizing flame and free oxygen;  
directing said flame onto copper contained within the shaft furnace so that the metal melts to form a pool of molten copper; and  
refining said impure copper by oxidizing said impurities with said free oxygen.

4,959,103

## CORROSION INHIBITING AQUEOUS, ACIDIC COMPOSITIONS COMPRISING METAL-CHELATING O-HYDROXYBENZYLAMINE COMPOUND

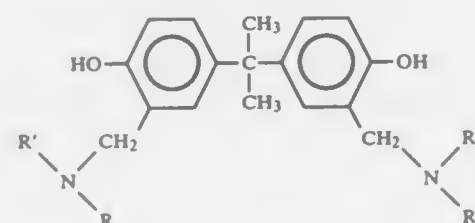
Walter O. Siegl, Dearborn, and Mohinder S. Chattha, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 247,227, Sep. 21, 1988, Pat. No. 4,917,729, which is a division of Ser. No. 5,181, Jan. 20, 1987, Pat. No. 4,792,355. This application Aug. 9, 1989, Ser. No. 390,954  
Int. Cl.<sup>3</sup> C23F 11/04

U.S. Cl. 106—14.16

9 Claims

1. A method for inhibiting corrosion of a corrodible metal substrate, said method comprising:  
contacting said metal substrate with an acidic, aqueous composition having a pH between about 2 and about 6 and consisting essentially of at least about 0.01 weight percent of water-soluble or water-dispersible metal-chelating compound, for a time sufficient to deposit a corrosion preventative coating comprising water-insoluble metal-chelate compound, wherein said metal-chelating compound is selected from compounds having the general chemical formula:



wherein R is selected from hydroxy ethyl and hydroxy propyl moieties which may be substituted with non-interfering functionality and R' is H, alkyl, aryl or hydroxy alkyl.

4,959,104

## SELF-HARDENABLE MATERIAL

Shinji Iino; Minoru Oshima, both of Yamaguchi; Shinya Kitoh, Kanagawa, and Toshiaki Kobayashi, Kanagawa, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc. and Lion Corporation, both of Tokyo, Japan

Continuation of Ser. No. 916,603, Oct. 8, 1986, abandoned. This application Dec. 20, 1988, Ser. No. 287,695

Claims priority, application Japan, Oct. 11, 1985, 60-226357  
Int. Cl.<sup>3</sup> C04B 12/02

U.S. Cl. 106—85

8 Claims

1. A self-hardenable material consisting essentially of calcium phosphate having a g atom ratio of Ca/P of 1.3 to 2.0, a difficultly water-soluble inorganic fluoride, an acid and water, the ratio of said calcium phosphate to said difficultly water-soluble fluoride being within the range of g atom ratio of Ca/F of 4.2 to 60, said acid being included in a ratio of  $2 \times 10^{-5}$  mol/g to  $1.2 \times 10^{-3}$  mol/g relative to calcium phosphate, said water being within a mole ratio of H<sub>2</sub>O/PO<sub>4</sub> of  $\frac{1}{4}$  to 50, said acid being selected from the group consisting of organic acids of formic acid, acetic acid, propionic acid, glycolic acid, lactic acid, citric acid, saccharic acid, ascorbic acid, glutamic acid, asparagic acid, oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, pyruvic acid, acetoacetic acid, levulinic acid, salicylic acid, benzoic acid, phthalic acid and their alkali metal,

alkaline earth metal or ammonium salts, and their acid anhydrides or acid chlorides; and inorganic acids and their alkali metal, alkaline earth metal or ammonium salts, and said calcium phosphate being capable of converting to fluorapatite on hardening.

6. A fluoro-apatite hardened product obtained by hardening a composition consisting essentially of calcium phosphate having a g atom ratio of Ca/P of 1.3 to 2.0, a difficultly water-soluble inorganic fluoride, an acid and water, the ratio of said calcium phosphate to said difficultly water-soluble fluoride being within the range of g atom ratio of Ca/F of 4.2 to 60, said acid being included in a ratio of  $2 \times 10^{-5}$  mol/g to  $1.2 \times 10^{-3}$  mol/g relative to calcium phosphate, said water being within a mole ratio of H<sub>2</sub>O/PO<sub>4</sub> of  $\frac{1}{4}$  to 50, said acid being selected from the group consisting of organic acids of formic acid, acetic acid, propionic acid, glycolic acid, lactic acid, citric acid, saccharic acid, ascorbic acid, glutamic acid, asparagic acid, oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, pyruvic acid, acetoacetic acid, levulinic acid, salicylic acid, benzoic acid, phthalic acid and their alkali metal, alkaline earth metal or ammonium salts, and their acid anhydrides or acid chlorides; and inorganic acids and their alkali metal, alkaline earth metal or ammonium salts.

4,959,105

## ALUMINIUM CLEANING COMPOSITION AND PROCESS

Fred Neidiffer, P.O. Box 2497, Capistrano Beach, Calif. 92624; Charles E. Fox, and Patry E. Fox, both of Rte. #1, Box 87, Durant, Iowa 52747

Continuation-in-part of Ser. No. 251,299, Sep. 30, 1988. This application Mar. 14, 1990, Ser. No. 493,415  
Int. Cl.<sup>3</sup> B08B 3/08

U.S. Cl. 134—3

22 Claims

16. A process for cleaning debris from the surface of an aluminum-containing article comprising:  
contacting a debris-laden aluminum containing article with a composition at conditions effective to do at least one of the following: (1) remove at least a portion of said debris from said aluminum-containing article and (2) condition at least a portion of said debris for removal from said aluminum containing article, said composition comprising water; at least one polycarboxylic acid component selected from the group consisting of polycarboxylic acids, salts of polycarboxylic acids and mixtures thereof; at least one acidic component in an amount effective to increase the solubility of said polycarboxylic acid component in said composition; and at least one acid acting enzyme in an amount effective to at least facilitate the removal of debris from said aluminum-containing article; and  
recovering said aluminum-containing article having at least a portion of said debris removed therefrom.

4,959,106

## PHOTOVOLTAIC ELEMENT WITH A SEMICONDUCTOR LAYER COMPRISING NON-SINGLE CRYSTAL MATERIAL CONTAINING AT LEAST ZN, SE AND H IN AN AMOUNT OF 1 TO 4 ATOMIC %

Katsumi Nakagawa, Nagahama; Masahiro Kanai, Tokyo; Shunichi Ishihara; Kozo Arao, both of Hikone; Yasushi Fujioke, Nagahama; Akira Sakai, Nagahama, and Tsutomu Murakami, Nagahama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 222,093, Jul. 20, 1988, abandoned. This application Aug. 28, 1989, Ser. No. 399,396

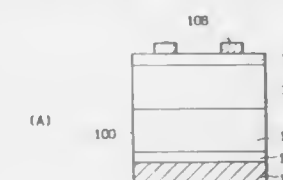
Claims priority, application Japan, Jul. 21, 1987, 62-179927; Aug. 19, 1987, 62-205916; Aug. 19, 1987, 62-205917  
Int. Cl.<sup>3</sup> H01L 31/06, 31/0392, 31/0368

U.S. Cl. 136—258

9 Claims

1. A photovoltaic element which generates photoelectromotive force by the contact of a p-type semiconductor layer with an n-type semiconductor layer, characterized in that one of said semiconductor layers is a film composed of zinc atoms,

selenium atoms, and at least hydrogen atoms, said film containing a p-type or n-type doping agent, containing 1 to 4 atomic% of hydrogen atoms, and also containing crystal grains in a ratio of 65 to 85 vol% per unit volume, and the other of said semi-



conductor layers is film represented by the general formula ZnA, where A denotes an oxygen atom, sulfur atom, or selenium atom, or any one of the general formulas ZnTe, ZnSe<sub>1-y</sub>Te<sub>y</sub> (where 0 < y < 1), and CdTe.

4,959,107

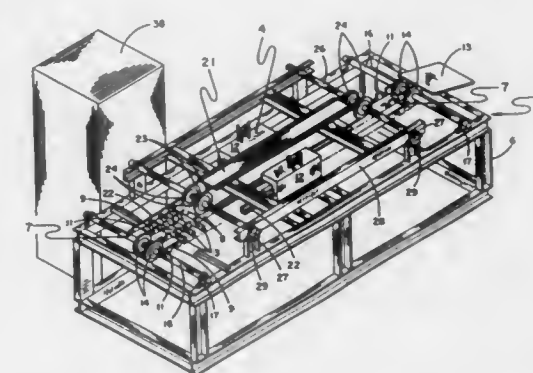
## METHOD AND APPARATUS FOR TREATING LADDER RUNGS FOR FORMING ASSEMBLY WITH LADDER RAILS

Claude R. Wallick, Jr.; Thomas J. Schmitt, both of Jefferson, Ky.; Bruce E. Bogart, Floyd, Ind., and John L. Krebs, Washington, Wis., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Apr. 3, 1989, Ser. No. 331,822  
Int. Cl.<sup>3</sup> C22F 1/04

U.S. Cl. 148—13

35 Claims



1. A method of treating ladder rungs for subsequent forming assembly with ladder rails comprising:

moving a plurality of ladder rungs with their longitudinal axis in selected spaced parallel relation in a path having the longitudinal axis thereof extending substantially normal to said longitudinal axis of said rungs and adjacent a longitudinally extending through passage bearing zone so that only preselected areas of said rungs pass through said heating zone through passage; and,  
controlling the residence time of movement and heated temperature of said preselected rung areas as they pass through said through passage heating zone to selectively soften said preselected rung areas to a state of desired forming hardness in accordance with the physical properties of said rungs without melting said rungs and without changing the physical properties of the remaining areas of the rungs.



4,959,108

**EXPLOSIVE COMPOSITIONS AND METHOD UTILIZING BULKING AND GASSING AGENTS**Kevin H. Waldo, Wales, Australia, assignor to Submarine and Surface Blaster Pty. Limited, Mount Thorley, Australia  
Filed May 26, 1989, Ser. No. 357,282Claims priority, application Australia, May 26, 1988, PI8506  
Int. Cl.<sup>5</sup> C06B 45/00

U.S. Cl. 149—2

10 Claims

1. A method of preparing an explosive composition, comprising adding an inert bulking agent to said composition so as to increase weight and density thereof and thereafter introducing gas so as to decrease said density.

4,959,109

**APPARATUS AND PROCESS FOR PREPARING BELTS**

Eugene A. Swain, Webster, N.Y.; Marvin Menzies, Lexington, Mass.; Edward A. Agranat, Weston, Mass.; Henry R. Cofek, Westford, Mass., and Daniel J. Fisher, Chelmsford, Mass., assignors to Xerox Corporation, Stamford, Conn.

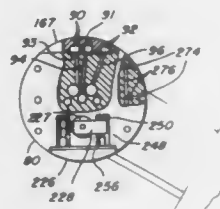
Continuation of Ser. No. 845,205, Mar. 27, 1986, abandoned.

This application Jan. 30, 1989, Ser. No. 374,598

Int. Cl.<sup>5</sup> B32B 31/18

U.S. Cl. 156—73.4

20 Claims



1. Apparatus for fabricating electrostatographic imaging belts comprising a wrapping station, a welding station, at least a first rotatable mandrel and a second rotatable mandrel, said first rotatable mandrel and said second rotatable mandrel each comprising a cylinder having at least one first opening or one first series of openings extending axially along said outer surface of said cylinder and at least one second opening or second series of openings extending axially along said outer surface of said cylinder, said second opening or second series of openings being adjacent to and circumferentially spaced on said cylinder from said first opening or first series of openings, means to support said first rotatable mandrel, means to support said second rotatable mandrel, transporting means for conveying rotatable mandrels to and from said wrapping station and said welding station along an arc of a circular path lying in an imaginary plane extending through and parallel to the axis of said first rotatable mandrel and said second rotatable mandrel each being substantially perpendicular to imaginary lines radially emanating from the center of said circular path, said welding station comprising a welding means, means for supplying the leading edge of a web from a web supply roll to said wrapping station, said transporting means being adapted to position the axis of said first rotatable mandrel parallel to said leading edge of said web at said wrapping station, pick up means adapted to grip only said leading edge and position said leading edge of said web on and parallel to said first opening or first series of openings on said first rotatable mandrel conveyed to said wrapping station by said transporting means, means to form a partial vacuum within said first opening or first series of openings to secure said leading edge of said web on said first rotatable mandrel, means to rotate said first rotatable mandrel at said wrapping station about one revolution whereby said web is wrapped around said first rotatable mandrel, means to sever said web to form a trailing edge whereby said trailing edge of said web on said first rotatable mandrel at said wrapping station overlaps said leading

edge of said web to form a first belt having a seam, means to form a partial vacuum within said second opening or second series of openings to secure the area of said web adjacent said trailing edge to said first rotatable mandrel, means to activate said transporting means to simultaneously convey said first rotatable mandrel wrapped with said first belt having said seam to said welding station and convey said second rotatable mandrel to said wrapping station for wrapping with a second belt, and means to weld said seam on said first belt at said welding station at substantially the same time as said second rotatable mandrel is wrapped at said wrapping station with said second belt.

4,959,110

**METHOD FOR LINING THE INNER SURFACE OF A CYLINDRICAL OR DOMED CYLINDRICAL MEMBER WITH AN ELASTOMERIC MATERIAL**

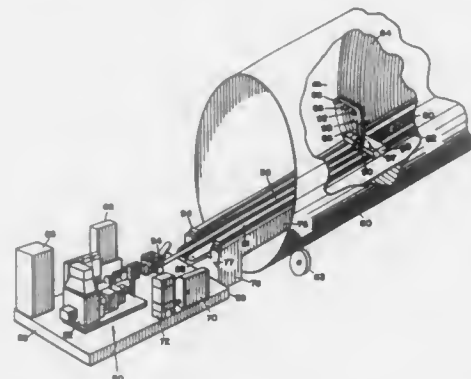
Peter G. Russell, Ogden, Utah, assignor to Morton Thiokol Inc., Chicago, Ill.

Filed May 11, 1988, Ser. No. 193,309

Int. Cl.<sup>5</sup> B29C 53/58, 63/08

U.S. Cl. 156—187

8 Claims



1. A method for lining the inner surface of a generally cylindrical member with an elastomeric material comprises the steps of:

- rotating the generally cylindrical member about its rotational axis;
  - providing within the generally cylindrical member a head for applying a continuous strip of tacky elastomeric material to the inner surface of the generally cylindrical member as it rotates;
  - transporting a continuous strip of tacky elastomeric material to the head for application to the inner surface of the generally cylindrical member as it rotates;
  - applying the strip of tacky elastomeric material to the inner surface of the generally cylindrical member as it rotates;
  - moving the head axially as the strip is applied to form a layer of elastomeric material over the inner surface of the generally cylindrical member;
  - removing the head from within the generally cylindrical member; and
  - curing the applied elastomeric material,
- the method further comprises providing an elevated platform which extends axially through the generally cylindrical member, providing a support member for the head, moving the support member axially along said platform, and conveying the elastomeric strip to said head from outside the generally cylindrical member.

4,959,111

**HEAVY GAS-FILLED MULTILAYER INSULATION PANELS AND METHOD OF MANUFACTURE THEREOF**

Richard W. Kruck, Soda Township, Berrien County, and Omer N. Car, St. Joseph Township, Berrien County, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

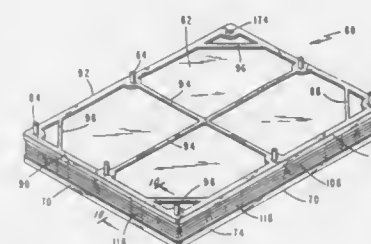
Division of Ser. No. 897,978, Aug. 19, 1986, Pat. No. 4,808,457.

This application Nov. 4, 1988, Ser. No. 267,330

Int. Cl.<sup>5</sup> B32B 31/10; F25D 23/06

U.S. Cl. 156—145

7 Claims U.S. Cl. 156—248



1. A method of manufacturing a self-contained, gas-filled, thermal insulation panel which is characterized by having a first transverse frame member with a plurality of orthogonal extensions on one side thereof for locating and retaining an alternating succession of parallel thin sheets each provided with sheet apertures disposed in correspondence with said extensions and interlocking peripheral gaskets each provided with gasket apertures in correspondence with the sheet apertures to form thin transversely extensive gas-filled cavities, and a second transverse frame member provided with frame apertures disposed in correspondence with said extension of the first frame member and thus affixable to the extensions, with the framed assembly thus formed being contained in a hermetically sealed envelope forming the outer skin of the panel, comprising the steps of:

- locating a first thin sheet by receiving said extensions of said first transverse member through said sheet apertures of the first thin sheet for location and stretched out retention of the first thin sheet thereby on said first transverse frame member;
- locating a gasket on said first thin sheet for retention on said first transverse frame member with said extensions received through the gasket apertures, and applying a force to said gasket to interlock said first gasket with said first frame member to firmly grip and securely stretch said first thin sheet therebetween;
- repeating the preceding two steps for locating successive thin sheets and interlocking successive gaskets each with a previously located gasket, until a desired number of unsealed cavities thus formed between adjacent thin sheets is obtained;
- locating said second frame member by receiving said extensions through said frame apertures, in interlocking relationship with the last located gasket therebelow to firmly grip the last located thin sheet thereon;
- affixing said second frame member to said received orthogonal extensions of said first frame member to form said framed assembly;
- filling said cavities with a heavier-than-air gas; and
- enveloping said framed assembly in a hermetically sealed envelope to retain said gas within said cavities.

4,959,112

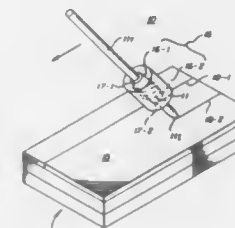
**SELECTIVE SCRIBING OF MATERIALS**

Frank B. Ellis, Jr., Princeton; Alan E. Delahdy, Rocky Hill; Jonathan Allen, Tittusville, and Hermann Volttrauer, Englewood, all of N.J., assignors to Chronar Corp., Lawrenceville, N.J.

Continuation-in-part of Ser. No. 671,199, Nov. 14, 1984, abandoned. This application Jan. 21, 1987, Ser. No. 5,616

Int. Cl.<sup>5</sup> B32B 31/18

16 Claims



- The method of patterning the surface of a conductive material which comprises the steps of
  - bringing a heated and rounded tip into contact with the surface of said material;
  - moving said heated and rounded tip over said material in contact therewith in accordance with a prescribed pattern to produce a line of separation of said material along said surface; and
  - applying a momentary voltage to straddle said line of separation and eliminate any shards therealong.

4,959,113

**METHOD AND COMPOSITION FOR POLISHING METAL SURFACES**

John V. H. Roberts, Newark, Del., assignor to Rodex, Inc., Newark, Del.

Filed Jul. 31, 1989, Ser. No. 387,474

Int. Cl.<sup>5</sup> B44C 1/22; C23F 1/00; C03C 15/06, 25/06

U.S. Cl. 156—636

20 Claims

- A method for polishing a metal surface comprising
  - providing an aqueous polishing composition comprising water, an abrasive agent and a salt, wherein the salt is the reaction product of a reaction selected from the group consisting of a reaction between an acid and a base and a reaction between an acid and a metal, wherein the salt includes a cationic component and an anionic component, the cationic component being selected from the group consisting of ionized elements which will not deposit by electroless plating on the metal surface being polished;
  - applying the composition to a metal surface to be polished; and
  - polishing the metal surface.

4,959,114

**PROCESS FOR PRODUCING FLATTENED GUSSETED TUBING FROM FLAT PLASTIC FILM**Friedhelm Mundus, Lengerich, Fed. Rep. of Germany, assignor to Windmoller & Holcher, Lengerich, Fed. Rep. of Germany  
Filed Jun. 21, 1989, Ser. No. 368,720

Claims priority, application Fed. Rep. of Germany, Jun. 21, 1988, 3820941

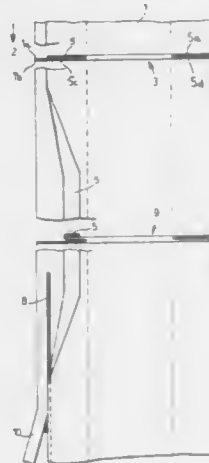
Int. Cl.<sup>5</sup> B32B 31/16

U.S. Cl. 156—204

3 Claims

- A process for producing flattened gusseted tubing from a flat continuous film of synthetic thermoplastic which comprises forming lengthwise edge gussets in the film with lateral marginal portions of the film being superposed adjacent to an outer edge of a covering gusset of the film, reversely folding a

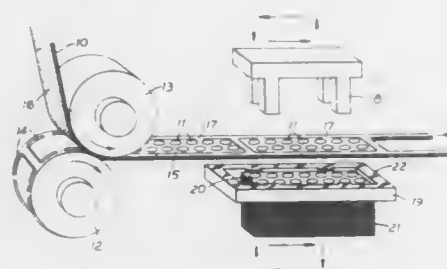
portion of the covering gusset in on itself, providing the marginal portions with a longitudinal seam weld in a region of the film which in plan view was substantially aligned with an outer



edge of the covering gusset before the gusset was reversely folded, and then unfolding the reversely folded portion of the gusset.

**4,959,115**  
**METHOD OF PRODUCING BLOCKS OF SELF-ADHESIVE LABELS OR THE LIKE AND OF APPLYING THE LABELS TO A BODY**  
Robert M. Lacy, 76 The Wynding, Bedlington, Northumberland, England (NE22 6HW)  
Filed Dec. 21, 1988, Ser. No. 287,499  
Claims priority, application United Kingdom, Dec. 23, 1987, 8729929

Int. Cl.<sup>5</sup> B32B 31/18  
U.S. Cl. 156—264

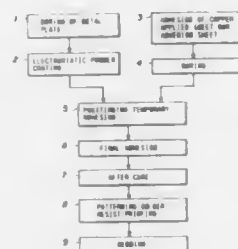


1. A method of producing blocks of self-adhesive products, which method comprises feeding continuously to a cutting device a continuous flexible web having on a first face thereof a multiplicity of repeated images overlaid by a release coating and further having on a second face thereof a pressure-sensitive adhesive coating, cutting from the web a succession of cut sheets each having at least two said images thereon, forming a stack of superimposed cut sheets, and subsequently cutting said stack to form at least two blocks of superimposed self-adhesive products, each said product having a single said image thereon.

**4,959,116**  
**PRODUCTION OF METAL BASE LAMINATE PLATE INCLUDING APPLYING AN INSULATOR FILM BY POWDER COATING**  
Masato Tsuji, Iwaki, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1989, Ser. No. 307,862  
Claims priority, application Japan, Mar. 24, 1988, 63-68201  
Int. Cl.<sup>5</sup> B29C 65/18, 65/52  
U.S. Cl. 156—283

3 Claims

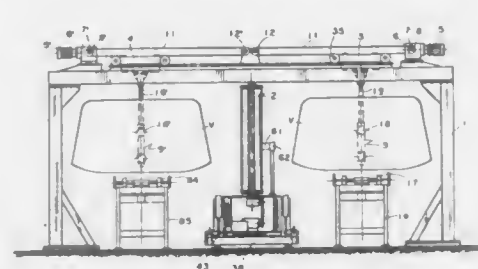


1. A process of producing a metal base laminate plate, comprising the steps of applying an insulator film by powder coating to a metal plate having a through-hole formed therein to form a metal base plate, placing a film base plate having a heat resisting property in position on said metal base plate with a thermosetting adhering sheet interposed therebetween to form a layered body, pressurizing and heating only part of said layered body to temporarily adhere said metal base plate and said film base plate to each other, and introducing said layered body in a predetermined orientation into a pair of pressuring and heating rollers to finally adhere said metal base plate and said film base plate to each other.

**4,959,117**  
**APPARATUS FOR THE PRESSING OF LAMINATED GLASS/PLASTIC COMPOSITES**  
Vittore De Leonibus, and Carmine Pascale, both of Vasto, Italy, assignors to Societa Italiana Vetro - SIV S.p.A., San Salvo, Italy

Filed Oct. 31, 1988, Ser. No. 264,881  
Claims priority, application Italy, Nov. 5, 1987, 48579 A/87  
Int. Cl.<sup>5</sup> B30B 3/04, 15/30, 15/32  
U.S. Cl. 156—497

13 Claims



1. An apparatus for pressing a laminated glass/plastic composite having side wings sharply bent in a direction of concavity of said glass/plastic composite, comprising a press device rotatable about a substantially vertical axis for pressing said glass/plastic composite, means for moving said glass/plastic composite from a substantially horizontal delivery position to said press device, and means for moving said glass/plastic composite from said press device after said glass/plastic composite has been pressed, wherein:

each said means for moving said glass/plastic composite

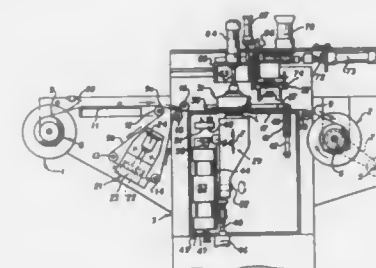
includes a vertically disposed suction cup unit and a vertical supporting shaft supporting said suction cup unit; each said suction cup unit being rotatable about a vertical axis of said respective supporting shaft, whereby said glass/plastic composite can be moved to said press device to enter said press device in a substantially vertical position and at a predetermined entry angle, and moved from said press device in said substantially vertical position.

**4,959,118**  
**APPARATUS FOR APPLYING A PROTECTIVE FILM ON ONE FACE OF A SERIES OF OPHTHALMIC LENSES**  
Patrick Herbin, Morlaincourt, and Jean-Claude Lacroix, Ligay-en-Barrois, both of France, assignors to Essilor International (Compagnie Generale d'Optique), Creteil, France  
Division of Ser. No. 173,291, Mar. 25, 1988, Pat. No. 4,826,548.

This application Feb. 2, 1989, Ser. No. 305,091  
Claims priority, application France, Mar. 30, 1987, 87 04375  
Int. Cl.<sup>5</sup> B32B 31/00

U.S. Cl. 156—512

9 Claims



1. Apparatus for sticking a protective film on a face of a series of ophthalmic lenses, said apparatus comprising:

- a pay-out spool carrying a roll of composite tape comprising an adhesive tape having an adhesive face and a strippable backing tape covering said adhesive face;
- a first set of guide rolls for guiding the composite tape along a predetermined path;
- a second set of guide rolls for guiding the strippable backing tape of the composite tape along a loop path going away from said predetermined path and returning thereto;
- a punch device placed on said loop path for punching a series of holes in the strippable backing tape, said series of holes having a predetermined diameter greater than a lens diameter of said series of ophthalmic lenses, whereby, after the punched strippable backing tape and the adhesive tape are brought together downstream of said loop path, each hole in the punched strippable backing tape leaves a round portion of the adhesive face of the adhesive tape exposed;
- a lens support situated on one side of the predetermined path of the composite tape adjacent to the punched strippable backing tape and downstream from said loop path;
- a thrust buffer situated on the other side of said predetermined path and in register with the lens support;
- at least one of said lens support and said thrust buffer being mounted to move perpendicularly to said predetermined path;
- at least one actuator means connected to one of said lens support and said thrust buffer for pressing the composite tape therebetween and for applying the exposed round portion of the adhesive face of the adhesive tape through a hole in the punched strippable backing tape onto a lens carried by the lens support;
- a cutting device situated on said predetermined path of the composite tape downstream from the loop path for cutting out from the adhesive tape the round portion thereof which has adhered to the lens; and

(j) drive means acting on the composite tape in order to displace it along said predetermined path.

**4,959,119**  
**METHOD FOR FORMING THROUGH HOLES IN A POLYIMIDE SUBSTRATE**

Thomas D. Lantzer, Faquay-Varina, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
Filed Nov. 29, 1989, Ser. No. 443,301

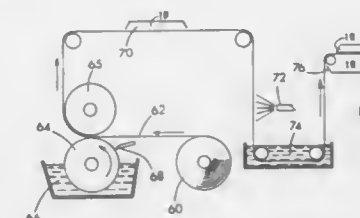
Int. Cl.<sup>5</sup> B44C 1/22; C23F 1/02; C03C 15/00; B29C 37/00  
U.S. Cl. 156—644

1. A method of forming at least one through hole with an electrically conductive wall in a polyimide substrate to connect electrically conductive surface portions on opposite sides of the substrate with an initial step of forming at least one hole in the substrate by employment of a carbon dioxide laser for polyimide removal wherein

- the carbon dioxide laser is employed at an average energy density in a range of from 18,000 to 45,000 watts per square inch,
- a predominant oxygen containing atmosphere is present,
- a carbon dioxide laser beam is defocused in polyimide removal,
- a portion of the carbon dioxide beam passes through the polyimide substrate prior to complete hole formation onto a reflective surface which deflects at least 70% of the beam striking the reflective surface into the polyimide substrate to aid in hole formation, and
- relative motion is present between the laser source and the polyimide substrate for at least a portion of the hole formation.

**4,959,120**  
**DEMETALLIZATION OF METAL FILMS**  
David Wilson, Mississauga, Canada, assignor to Golden Valley Microwave Foods, Inc., Edina, Minn.  
Filed Jan. 21, 1989, Ser. No. 369,193  
Int. Cl.<sup>5</sup> B44C 1/22; C23F 1/02; C03C 15/00, 25/06  
U.S. Cl. 156—651

14 Claims



1. A process to produce a metal coated article having a metal film with gradations in light transmission thereon, said method comprising, providing a nonconductive substrate having a thin metal film thereon, removing different amounts of the metal film from different portions of the substrate to provide differences in the amount of metal film remaining in the different portions thereof whereby the different portions of the metal film exhibit differences in optical density.

**4,959,121**  
**METHOD FOR TREATING A POLYIMIDE SURFACE FOR SUBSEQUENT PLATING THEREON**  
William V. Damas, Essex Junction, Vt., and Donald F. Foast, Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 5, 1990, Ser. No. 461,579  
Int. Cl.<sup>5</sup> B44C 1/22; B29C 37/00; C03C 15/00, 25/06  
U.S. Cl. 156—668

18 Claims

1. A method for pretreating a polyimide surface in prepara-



tion for an adhesion promotion treatment and subsequent metallization on the surface, comprising the steps of:

- (A) contacting the polyimide surface with an aqueous solution of nitric acid having a concentration of about 35 to about 70% by weight or an aqueous solution of hydrochloric acid having a concentration of about 10 to about 38% by weight;
- (B) rinsing the acid-treated polyimide surface with water so as to substantially remove the acid from the surface of the polyimide;
- (C) contacting the rinsed polyimide surface with a mild etching agent, resulting in the formation of a residual film on the polyimide surface;
- (D) contacting the etched polyimide surface with a basic solution, and
- (E) removing the residual film formed on the surface of the polyimide after contact with the mild etching agent in step (C).

4,959,122

#### APPARATUS FOR TREATING PHOTOGRAPHIC PROCESS WASTE LIQUOR

Masayuki Kurematsu; Shigeharu Koboshi; Nobutaka Gotu, and Naoki Takabayashi, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

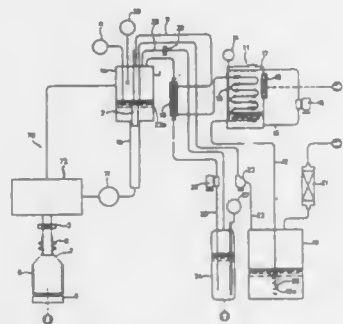
Filed Oct. 26, 1988, Ser. No. 262,965

Claims priority, application Japan, Nov. 1, 1987, 62-276414; Nov. 29, 1987, 62-301363; Nov. 29, 1987, 62-301364

Int. Cl.<sup>3</sup> B01D 1/00, 35/00

U.S. Cl. 159—42

9 Claims



1. An apparatus for treating a photographic process waste liquid comprising an evaporating means wherein the photographic process waste liquor is concentrated by evaporation; heating means for heating said waste liquor with the formation of a precipitate;
  - a precipitate separating means for separating the precipitate from the concentrated waste liquor;
  - a circulation system to feed the concentrated waste liquor through the precipitate separating means and thereafter return said concentrated waste liquor to the evaporating means; and
  - a discharging means for discharging the precipitate separated at said precipitate separating means from said precipitate separating means;
- wherein the evaporating means is provided with a taper-shaped section for immediate removal of precipitate so that thermal decomposition of the precipitate and generation of undesirable odors is avoided.

4,959,123

#### PROCESS FOR DEINKING PRINTED WASTE PAPER

Klaus Lehmann; Andreas Domach, both of Illertissen, and Hans Hawel, Voehringen, all of Fed. Rep. of Germany, assignors to Chemische Fabrik Griesau GmbH, Illertissen, Fed. Rep. of Germany

Filed Feb. 2, 1988, Ser. No. 151,387

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1987, 3702978

Int. Cl.<sup>3</sup> D12C 5/02

U.S. Cl. 162—5

12 Claims

1. In a process for deinking printing waste paper pulp by treatment of the pulp with an alkaline solution containing an alkali metal silicate, an oxidative bleach, a dispersant, and either a higher fatty acid, a resinic acid or a mixture thereof, followed by separation of the resulting detached printing ink particles from the pulp fiber suspension by flotation, the improvement wherein the higher fatty acid, resinic acid, or mixture thereof is added to the solution in the form of a finely divided alkaline earth metal salt in an oil-in-water dispersion which is liquid at room temperatures.

4,959,124

#### METHOD OF BLEACHING KRAFT PULP IN A DZED SEQUENCE

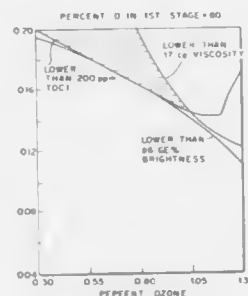
Ted Y. Tsai, Harriman, N.Y., assignor to International Paper Company, Tuxedo, N.Y.

Filed May 5, 1989, Ser. No. 348,606

Int. Cl.<sup>3</sup> D21C 9/14, 9/153

U.S. Cl. 162—65

6 Claims



1. A method for the bleaching of cellulosic kraft pulp for use in making a paper comprising a bleaching sequence which includes not more than four stages including chlorine dioxide bleaching as the first stage, ozone bleaching as the second stage, wherein the pulp is passed directly from the chlorine dioxide bleaching stage to the ozone bleaching stage without an intervening extraction stage, an alkaline extraction as the third stage, and chlorine dioxide bleaching as the final stage, said stages being carried out in the order listed, said first stage chlorination being at a chlorination factor of between about 0.04 and about 0.22% based on oven-dried pulp and the quantity of ozone employed in said second stage being between about 0.3% and about 1.1% based on oven-dried pulp, to thereby produce a pulp that contains less than about 200 ppm total organic chlorine and which exhibits a G. E. brightness in excess of about 80%.

4,959,125

#### SOFT TISSUE PAPER CONTAINING NONCATIONIC SURFACTANT

Wolfgang U. Spendel, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Dec. 5, 1988, Ser. No. 280,119

Int. Cl.<sup>3</sup> D21F 9/02; D21H 5/24

U.S. Cl. 162—158

5 Claims

1. Tissue paper having a basis weight of from about 10 to

about 65 grams per square meter, and density of about 0.6 grams or less per cubic centimeter, said paper comprising cellulosic fibers, an effective amount of an alkyl glycoside surfactant, said effective amount of alkyl glycoside surfactant being from about 0.01% to about 2.0% alkyl glycoside surfactant based on the dry fiber weight of said tissue paper, and an effective amount of a starch binder material, said effective amount of starch being from about 0.01% to about 2.0% based on the dry fiber weight of said tissue paper.

4,959,126

#### PROCESS FOR DECKING A DELAYED COKER

Wawel Tong, LaoYang; Deyu Sun, ShenYang; Qingyuan Zhang, LaoYang; Lielai Wu, LaoYang; Shicheng Zhou, LaoYang; Shande Yu, Shanghai; Daoji Du, and Shili Yang, both of LaoYang, all of China, assignors to LaoYang Petrochemical Engineering Corporation SINOPEC (LPEC), LiTun, Long-MenZhen, LaoYang, China and Institut Français du Pétrole, Rueil Malmaison, France

Filed May 25, 1988, Ser. No. 198,809

Claims priority, application China, May 25, 1987, 87103735; Apr. 25, 1988, 881025143

Int. Cl.<sup>3</sup> C10B 33/00

U.S. Cl. 201—2

11 Claims

1. A process for decking at least one residual oil delayed coke reactor comprising: pumping water at high pressure through a flexible pipeline suspended vertically with respect to the reactor by channeling the water through a path passing axially through an axis of a hollow drive shaft of a reel around which the flexible pipeline is looped and then channeling the water radially of the drive shaft and into a first end of the flexible pipeline; ejecting the water from a nozzle array connected to a second end of the flexible pipeline in a downward direction with respect to the axis of the reactor at a first pressure while unreeling the flexible pipeline from the reel to drill a hole through the coke in the coke reactor; changing the water pressure from a first pressure to a second pressure; and ejecting the water from the nozzle array in a lateral direction at the second pressure to cut and discharge coke lining the bore from the reactor while reeling the flexible pipeline on the reel.

4,959,127

#### SYSTEM FOR DESALINIZATION OF SALTWATER

Claus G. Michna, 4 Toby Ln., Brookfield Center, Conn. 06805

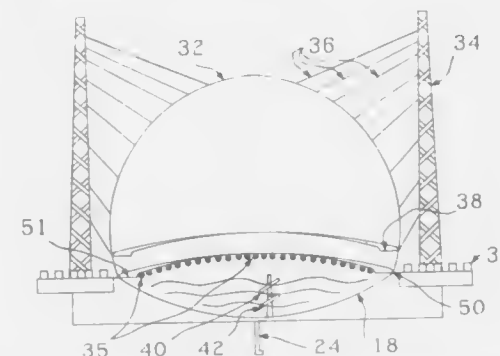
Continuation-in-part of Ser. No. 904,542, Sep. 8, 1986,

abandoned. This application Jun. 22, 1987, Ser. No. 64,400

Int. Cl.<sup>3</sup> C02F 1/14

U.S. Cl. 202—177

4 Claims



1. A system for desalinating saltwater comprising: an anchored platform container having an opening, a saltwater input valve and a fresh water output valve, wherein said platform container has a honeycomb wavebreaker

therein to stabilize the level of the saltwater therein and thereby prevent the container from capsizing; a pan positioned in said opening including a first gutter, which surrounds said pan, spray nozzles attached thereto to both clean said pan and fill said pan with saltwater, and level sensor means for controlling the level of saltwater in said pan;

A preheating coil surrounding said platform container for preheating saltwater before it enters said platform container; and

a supported, collapsible plastic dome skin covering the opening of said platform container, said dome skin consists of skin sections of outer and inner plastic layers fused to a wire mesh sandwiched therebetween, whereby a single wire mesh reinforced skin is formed, and whereby solar ray heat is transmitted through the plastic dome and maintained within said dome to raise the temperature therein sufficiently higher than the temperature outside said dome to vaporize the saltwater and condense therefrom fresh water.

4,959,128

#### SEPARATION OF STYRENE FROM ETHYL BENZENE BY EXTRACTIVE DISTILLATION

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715, assignor to Lloyd Berg, Bozeman, Mont.

Filed Feb. 26, 1990, Ser. No. 484,413

Int. Cl.<sup>3</sup> B01D 3/40; C07C 7/08

U.S. Cl. 203—57

1 Claim

1. A method for recovering ethyl benzene from mixtures of ethyl benzene and styrene which comprises distilling a mixture of ethyl benzene and styrene in a rectification column in the presence of about one part of an extractive agent per part of ethyl benzene—styrene mixture, recovering ethyl benzene as overhead and styrene and the extractive agent from the stillpot, wherein said extractive agent is one member selected from the group consisting of adiponitrile, 1,5-dicyanopentane, methyl glutaronitrile, nitrobenzene, 2-nitrotoluene and 3-nitrotoluene.

4,959,129

#### CONTINUOUS PLATING METHOD AND APPARATUS

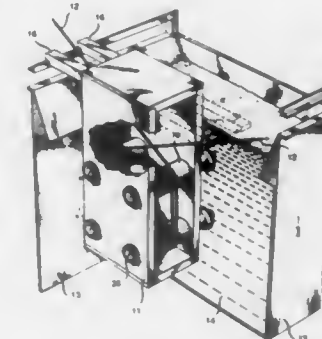
Harold E. Fuchs, and Robert E. McNamara, both of Kansas City, Mo., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 23, 1989, Ser. No. 355,708

Int. Cl.<sup>3</sup> C25D 7/06, 17/00

U.S. Cl. 204—28

16 Claims



1. A method for plating an elongated article comprising: wrapping the article around a plurality of essentially cylindrical members to form a plurality of loops, each cylindrical member including a plurality of grooves of varying depths in its outer surface in which the article is positioned;

completely immersing the members within a plating solution; and  
rotating the members at a prescribed speed while said members and article are immersed within the plating solution so as to control the thickness of plating on said article.

4,959,130

# ULTRAMICROELECTRODE, PROCESS FOR MAKING SAME AND ITS APPLICATION

Mira Josowicz, Robert Koch Str. 20, and Karin Potje-Kamloth, Rathaus-Str. 2, both of 8012 Ottobrunn, Fed. Rep. of Germany

Filed May 15, 1989, Ser. No. 353,076

Claims priority, application Fed. Rep. of Germany, May 13, 1988, 3816458

Int. Cl.<sup>3</sup> G01N 27/30, 27/333; C25D 9/02  
U.S. Cl. 204—32.1



1. In an electrode having a wire made of noble metal and/or carbon and an insulating layer applied thereon, the improvement wherein said insulating layer is made from a compound selected from the group consisting of substituted poly(1,4-phenylene) ethers, poly(1,4-phenylene) thioethers and poly(1,4-aniline)s, whose plurality of phenyl groups are cross-linked at their ortho-positions by alkylene groups with from two to ten carbon atoms.

11. A process for making an electrode comprising a wire made of a noble metal or carbon and an insulating layer thereon comprising the steps of:

- depositing a polymer layer anodically on said wire made of said noble metal and/or carbon by electrochemical polymerization of monomers selected from the group consisting of phenol-, thiophenol-, aniline-containing monomers and their combinations, which contain in an ortho-position unsaturated aliphatic groups with 2 to 10 carbon atoms, from an electrolytic bath having an alkaline medium, which contains an amine and an adhesion promoting agent; and
- cross-linking said polymer layer to form said insulating layer.

4,959,131

# GAS PHASE CO<sub>2</sub> REDUCTION TO HYDROCARBONS AT SOLID POLYMER ELECTROLYTE CELLS

Ronald L. Cook, Aurora, and Anthony F. Sammella, Naperville, both of Ill., assignors to Gas Research Institute, Chicago, Ill.

Filed Oct. 14, 1988, Ser. No. 257,727

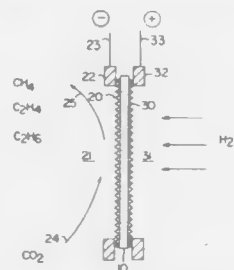
Int. Cl.<sup>3</sup> C25B 3/04

U.S. Cl. 204—59 R

26 Claims

1. A process for gas phase electrochemical reduction of at least one of CO<sub>2</sub> and CO to gaseous hydrocarbon products at solid polymer electrolyte cells, said process comprising: passing a current between a cathode in contact with one side of a hydrogen ion conducting solid polymer electrolyte and an anode in ionic communication with the opposite side of said solid polymer electrolyte, said cathode comprising a metal electrocatalyst deposited on said electrolyte and capable of providing adsorption sites for at least one of CO<sub>2</sub> and CO and chemisorbed hydrogen species and faradaically generated hydrogen species in proximity to said at least one of adsorbed CO<sub>2</sub> and CO; passing at least one of gaseous CO<sub>2</sub> and CO in contact with said cathode; passing hydrogen ions through said

solid polymer electrolyte reducing at least a portion of said CO<sub>2</sub> and CO to gaseous hydrocarbon products comprising



CH<sub>4</sub> and C<sub>2</sub>H<sub>4</sub> at said solid polymer electrolyte/cathode interface; and removing said gaseous hydrocarbon products from the region of said cathode.

4,959,132

# PREPARING IN SITU ELECTROCATALYTIC FILMS IN SOLID POLYMER ELECTROLYTE MEMBRANES, COMPOSITE MICROELECTRODE STRUCTURES PRODUCED THEREBY AND CHLORALKALI PROCESS UTILIZING THE SAME

Peter S. Fedkiw, Jr., Raleigh, N.C., assignor to North Carolina State University, Raleigh, N.C.

Filed May 18, 1988, Ser. No. 195,218

Int. Cl.<sup>3</sup> C25B 1/00, 1/26

U.S. Cl. 204—101

24 Claims

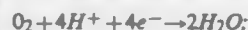


23. A chloralkali process of the type wherein respective anode and cathode reaction zones are separated by a solid polymer electrolyte membrane, said process comprising the steps of:

- providing a cathode reaction zone suitable for conducting a gas phase reaction therein;
- providing an anode reaction zone suitable for conducting a liquid phase reaction therein;
- providing, in the space between the anode and cathode reaction zones, a bi-polar structure comprising a solid polymer electrolyte membrane with a thin, porous, electronically conductive, high-surface-area metallic electrocatalytic film of metal particles formed in situ within the ionomer matrix at each surface thereof, where the particles are in electrical contact with one another;
- connecting the films of the bi-polar structure to a power supply so that one film serves as the anode and one film serves as the cathode;
- introducing acidified brine into the anode reaction zone;
- introducing an oxygen containing gas into the cathode reaction zone;
- conducting the following half cell reaction at the anode:



conducting the following half cell reaction at the cathode:



utilizing the high surface area of contact between the ionomer matrix of the solid polymer electrolyte and the electrodes to facilitate the reactions;

removing chlorine gas and spent brine from the anode reaction zone; and  
removing H<sub>2</sub>O plus any excess gas from the cathode reaction zone.

4,959,133

# FIELD INVERSION ELECTROBLOTTING & ELECTROELUTION

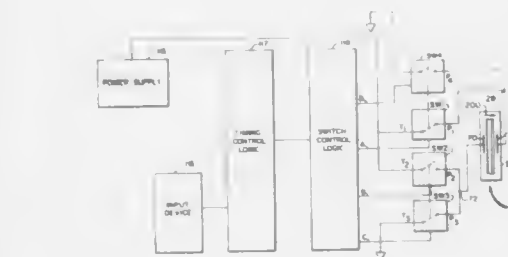
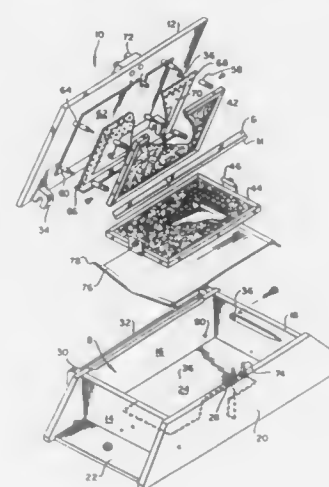
Mark W. Adcock, Guilford, Conn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 23, 1989, Ser. No. 299,868

Int. Cl.<sup>3</sup> G01N 27/28, 27/26; B01D 57/02

U.S. Cl. 204—182.8

2 Claims



1. A method of transferring separated nucleic acids or proteins from an electrophoresis gel to a membrane, comprising the steps of

- placing a gel with already-separated nucleic acids or proteins in contact with a membrane to which the acids or proteins are to be transferred;
- positioning the contacted gel and membrane between two oppositely disposed electrodes;
- applying to one of said two electrodes for a time T<sub>1</sub>, a charge +V<sub>1</sub>, and on the other electrode a charge -V<sub>1</sub>, the electrode closest to said gel having the voltage with the same sign as the net charge on the nucleic acid or the protein;
- for a time T<sub>2</sub> that is the same or different from time T<sub>1</sub>, placing a charge on said one and on said other electrodes of a value -V<sub>2</sub> and +V<sub>2</sub>, respectively, where |V<sub>1</sub>| and |V<sub>2</sub>|, and T<sub>1</sub> and T<sub>2</sub>, are selected in magnitude to assure a net migration of the separated nucleic acid or protein from the gel to the membrane; and
- repeating steps (c) and (d) until the transfer is complete.

4,959,134

# PROCESS AND APPARATUS FOR ELECTROPHORETIC DETERMINATION OF PRIMARY STRUCTURE OF NUCLEIC ACIDS

Valery N. Grom; Evgeny V. Kozhanov, both of Alma-Ata; Murat A. Aitkhozhin, deceased, late of Alma-Ata (by Galina T. Darkanbaeva, administrator); David R. Beritashvili, Moscow; Evgeny N. Tverdokhlebov, Moscow, and Georgy P. Georgiev, Moscow, all of U.S.S.R., assignors to Institut Molekulyarnoy Biologii i Biokhimi Akademii Nauk KazSSR, Alma-ata, U.S.S.R.

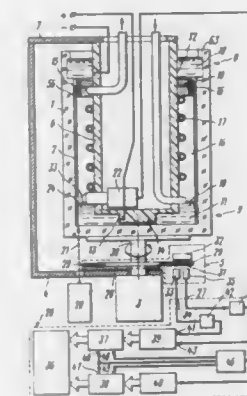
Filed Nov. 17, 1988, Ser. No. 272,622

Claims priority, application U.S.S.R., Nov. 27, 1987, 4329887[U]

Int. Cl.<sup>3</sup> G01N 27/26

U.S. Cl. 204—182.8

16 Claims



1. A process for electrophoretic determination of the primary structure of a nucleic acid comprising:

- preparing samples of a nucleic acid in the form of fragments of its polymeric chain containing tags;
- placing the samples into recesses located on a circumference of an end face of a gel in a shape of a hollow cylinder;
- applying an electrical potential to the end faces of the hollow cylinder for an electrophoretic separation of said fragments in the direction of passage of an electric current in accordance with the size of said fragments;
- maintaining said gel at a constant temperature level at which movement of said fragments is effected without their chemical combination at hydrogen bonds, by providing a layer of a temperature controlled non-polar liquid, located on one side of a lateral surface of the hollow cylinder, and wherein the non-polar liquid layer is of a height about equal to the height of the hollow cylinder;
- recording said fragments according to their tags by rotating said gel shaped as a hollow cylinder around its axis to determine a relative position of said fragments in said gel to determine the sequence of nucleotides in the nucleic acid molecule.

5. An apparatus for the electrophoretic determination of the primary structure of nucleic acids comprising:

- a cylindrically-shaped cuvette formed from a dielectric material vertically mounted as a first sleeve; a gel shaped as a hollow cylinder placed adjacent a bottom and a side wall of the first sleeve;
- a drive for rotation of said first sleeve around an axis thereof connected with the first sleeve;
- a platform on which said drive is mounted;
- a first chamber and a second chamber positioned in the upper and lower parts of the first sleeve and communicating with the first sleeve;
- a second sleeve formed from a dielectric material having a side wall and a bottom fixedly mounted coaxially with the first sleeve on said platform, said side walls and said bottoms of the first and the second sleeves forming the first and the second chambers;



- (f) a first and a second electrode solution, the first electrode solution being located between said bottom and said side walls of the first and second sleeves in the region adjacent to said bottom of said sleeves, in contact with the gel and the second electrode solution located in the upper part of the first and second sleeves between their side walls in contact with the gel;
- (g) a first and a second annular electrode positioned coaxially with the first and second sleeves; the first annular electrode being in contact with the first electrode solution and the second annular electrode being in contact with the second electrode solution;
- (h) a source of electric potential to which the first and second annular electrodes are connected;
- (i) a means for controlling the temperature of the gel comprising a non-polar liquid positioned between the first and the second electrode solutions in the region between said side walls of the first and second sleeves and a heat-exchanger means located in said non-polar liquid, the first electrode solution having a higher density than the density of said non-polar liquid and the second electrode solution being located above said non-polar liquid having a lower density than the non-polar liquid;
- (j) a source of a monochromatic radiation with its light beam directed into the gel for exciting a fluorescent radiation;
- (k) a detector of the fluorescent radiation having a sensor facing the region of said gel illuminated by said source; the detector having an output;
- (l) a recording unit having an information input and an address input, to the information input of which unit said output of said detector is connected;
- (m) a sensor of the turn angle of the first sleeve having an output connected to said address input of said recording unit.

4,959,135

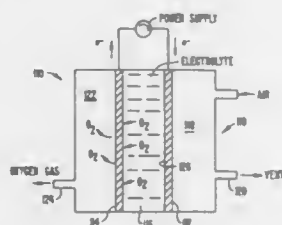
## POLYALKYLAMINE COMPLEXES FOR LIGAND EXTRACTION AND GENERATION

Brace D. Zeuner, Berkeley; Joseph P. Ciccone, Davis; Emory S. De Castro, Hercules; Larrie A. Deardurff, Corte Medera, and John B. Kerr, Oakland, all of Calif., assignors to Aquanautics Corporation, Alameda, Calif.

Continuation-in-part of Ser. No. 18,891, Feb. 25, 1987, abandoned. This application Feb. 3, 1989, Ser. No. 306,730 Int. Cl.<sup>5</sup> C25B 1/02

U.S. Cl. 204—129

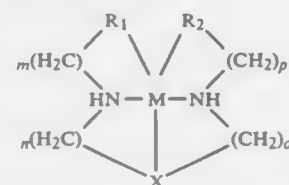
25 Claims



20. A method for extracting a ligand from a first fluid environment, the method comprising the steps of:
- contacting the first fluid environment containing ligand with a first surface of a first ligand-permeable membrane having a first surface and a second surface wherein the membrane separates the environment from an interior space of a container;
  - contacting an aqueous carrier fluid with the second surface of the membrane wherein the carrier fluid is confined in the container and the carrier fluid contains a carrier compound, whereby at least a portion of a ligand which diffuses through the membrane binds to the carrier compound to give bound ligand complex;
  - transporting the carrier fluid containing the bound ligand complex to a first electrode compartment of an electro-

chemical cell which forms a second portion of the container;

- electrochemically modulating the carrier compound to an oxidation state having relatively less binding affinity for ligand, thereby releasing free ligand into the carrier fluid and producing a non-binding state carrier compound;
- removing ligand from the carrier fluid to give a ligand depleted carrier fluid;
- transporting the ligand depleted carrier fluid containing the non-binding state carrier compound to a second electrode compartment of an electrochemical cell which forms a third portion of the container; and
- electrochemically modifying the non-binding state carrier compound to reform the binding state carrier compound; wherein, the carrier compound comprises a metallic complex of a polyalkylamine having the general formula:



where,

each of R<sub>1</sub> and R<sub>2</sub> is independently an organic group including a nitrogen atom coordinated to M;

each of m, n, o, and p is independently 1, 2, 3, or 4;

X is selected from the group consisting of 2,6-pyridyl, substituted 2,6-pyridyl, 2,4-imidazolyl, substituted 2,4-imidazolyl and;



and  
M is a transition metal ion.

4,959,136

## METHOD FOR MAKING AN AMORPHOUS ALUMINUM-NITROGEN ALLOY LAYER

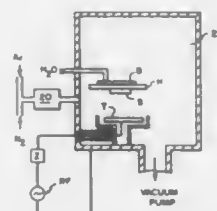
Tukaram K. Hatwar, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 908,365, Sep. 17, 1986, Pat. No. 4,719,154. This application Jun. 29, 1987, Ser. No. 67,758

Int. Cl.<sup>5</sup> C23C 14/34

U.S. Cl. 204—192.15

2 Claims



1. A method for producing an amorphous layer of an aluminum nitrogen alloy on a substrate, said method comprising the steps of:

- disposing said substrate in close proximity to an aluminum target in a low pressure atmosphere of nitrogen and an inert gas;
- reactive sputtering an aluminum nitrogen alloy onto said substrate at a rate exceeding 15 nanometers/min. while maintaining (i) the nitrogen to inert gas ratio between

about 30 and 50%, (ii) the substrate temperature at less than about 80° C., (iii) the sputtering power between about 600 and 1000 Watts, (iv) the nitrogen flow rate between about 3 and 6 sccm, and (v) the total sputtering pressure between about 1 and 15 mTorr.

4,959,137

## ELECTROCOATING SYSTEM WITH MULTISTAGE VOLTAGE APPLICATION TO PREVENT ELECTRODE COATING

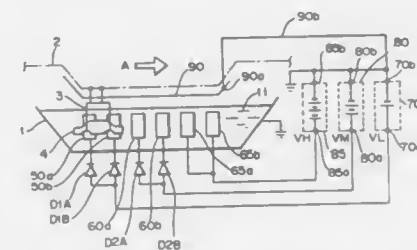
Isamu Matsuo, and Noboru Sato, both of Mie, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 24, 1989, Ser. No. 342,522

Claims priority, application Japan, Jan. 24, 1989, 1-14380 Int. Cl.<sup>5</sup> C25D 13/22

U.S. Cl. 204—299 EC

6 Claims



1. An electrocoating system with multistage voltage application, comprising:
- an electrocoating bath filled with a coating material and having inlet and outlet sides;
  - feed means for supporting and moving an object to be immersed and coated in said electrocoating bath so that the object will function as an electrode;
  - electrode means including a plurality of voltage-application stages arranged successively from said inlet to outlet sides of said electrocoating bath, each of said stages having at least one electrode arranged along a path of travel of an object as moved by said feed means;
  - power supply means for applying different, independently variable voltages through said stages, respectively; and
  - diode means for preventing said electrodes of said stages from being electrocoated with the coating material, said diode means including a plurality of diodes which are forward-connected respectively between said power supply means and each of said electrodes of said stages other than those stages to which a maximum voltage is applied by said power supply means.

4,959,138

## MEASURING PROBE FOR THE POTENTIOMETRIC DETERMINATION OF ION CONCENTRATIONS

Heinz-Jürgen Brinkmann, Frankfurt am Main, Fed. Rep. of Germany; Hans W. Bühler, Wädenswil, Switzerland, and Albert Lohrum, Frankfurt am Main, Fed. Rep. of Germany, assignors to Ingold Messtechnik AG, Urdorf, Switzerland

Continuation-in-part of Ser. No. 646,300, Aug. 31, 1984. This application Aug. 15, 1988, Ser. No. 232,007

Claims priority, application Switzerland, Sep. 7, 1983, 4889/83

Int. Cl.<sup>5</sup> G01N 27/30

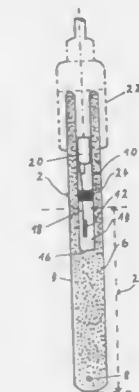
U.S. Cl. 204—414

30 Claims

1. A measuring probe for the potentiometric determination of ion concentrations, comprising:
- a reference element containing an electrode immersed in an electrolyte and assuming a predetermined electrode potential;
  - an electrolyte providing electrolytic conductive connection

between said reference element and a sample solution to be investigated by means of the measuring probe;

- a housing of electrically insulating material;
- said housing being provided with at least one hollow space for containing said reference element and said electrolyte; the housing having at least one aperture via which said electrolyte may be brought into contact with said sample solution located outside the housing;
- said electrolyte comprising an ion-permeable microporous polymer gel formed in situ in said housing and filling said at least one hollow space;
- said ion-permeable microporous polymer gel comprising a polymer polymerized in situ in said housing in a suspension of silica gel in a saturated aqueous solution of a neutral salt containing suspended neutral salt particles;
- said silica gel incorporated in said ion-permeable microporous polymer gel rendering the measuring probe pressure resistant to pressures in excess of 10 bars;



said predetermined electrode potential of said electrode being negligibly variable with pressure and pressure variations in the range of environmental pressure in excess of 10 bars due to the presence of said silica gel;

said silica gel adsorbing xeno-ions and thereby rendering said predetermined electrode potential substantially independent of the presence of such xeno-ions in said electrolyte as the result of diffusion from sample solutions investigated using the measuring probe;

the neutral salt forming said saturated aqueous solution containing ions having predetermined transport numbers; and

said neutral salt particles suspended in said saturated aqueous solution being substantially homogeneously distributed throughout said ion-permeable microporous polymer gel and containing ions having transport numbers which are substantially the same as said predetermined transport numbers of said neutral salt dissolved in said saturated aqueous solution.

4,959,139

BINDER PITCH AND METHOD OF PREPARATION

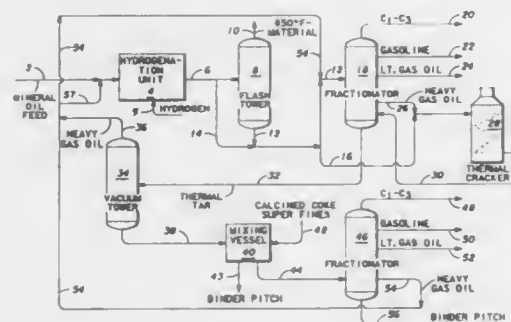
Dave L. Blakeburn, II; Ta-Wei Fu, and Keith M. Roussel, all of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed Jan. 9, 1989, Ser. No. 295,425  
Int. Cl.<sup>5</sup> C10C 1/00, 3/00

15 Claims

1. A process for the preparation of binder pitch which comprises:
- subjecting a petroleum aromatic mineral oil to hydro-treating;
  - subjecting the hydrotreated product to thermal cracking;
  - subjecting thermal tar from the thermal cracking to distillation, and

- (d) combining topped thermal tar obtained from step (c) with finely subdivided calcined premium coke particles



having an average diameter between about 1 and about 40 microns to form a binder pitch.

4,959,140

## TWO-CATALYST HYDROCRACKING PROCESS

Simon G. Kukes, Naperville; Louis C. Gutberlet, Wheaton, both of Ill., and Albert L. Hensley, Munster, Ind., assignors to Amoco Corporation, Chicago, Ill.

Filed Mar. 27, 1989, Ser. No. 328,577

The portion of the term of this patent subsequent to Oct. 24, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> C10G 65/10

U.S. Cl. 208—59

11 Claims

1. A process for hydrocracking a hydrocarbon feedstock with hydrogen at hydrocracking conversion conditions in a plurality of reaction zones in series which comprises:

- contacting said feedstock in a first reaction zone with a first reaction zone catalyst comprising a nickel component and a tungsten component deposited on a support component consisting essentially of an alumina component and a  $\gamma$  zeolite; and
- contacting the effluent from said first reaction zone in a second reaction zone with a second reaction zone catalyst comprising a cobalt component and a molybdenum component deposited on a support component consisting essentially of an alumina component and a  $\gamma$  zeolite.

4,959,141

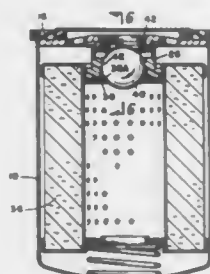
FUEL FILTER WITH POSITIVE WATER SHUTOFF  
Robert D. Anderson, Tulsa, Okla., assignor to Facet Quantek, Inc., Tulsa, Okla.

Filed Aug. 14, 1989, Ser. No. 393,222

Int. Cl.<sup>3</sup> B01D 27/10

U.S. Cl. 210—109

7 Claims



1. A fuel filter having improved means of preventing water and particulate contaminant from passing therethrough comprising:

- a cannister having a closed and an opened end;
- a plate secured to the cannister open end and having a cen-

tral fuel outlet opening therein and at least one fuel inlet opening spaced from said outlet opening;

- a rigid tubular fuel pervious member within said cannister having an upper and lower end, the upper tubular end being in sealed communication with said central fuel outlet opening;

flexible filter media surrounding the outer tubular surface of said rigid tubular fluid pervious member through which fuel freely passes but which resists the passage of particulate matter and water;

- a first washer member having an opening therethrough secured concentrically to the tubular member lower end, the first washer member being of thin deformable material;

a ball within said cannister and normally in engagement with said first washer member as fuel flows through the filter, the ball having a diameter greater than the internal diameter of said first washer member and thereby serving to close the lower end of said tubular member;

an annular seat member having closed communication between said central fuel outlet opening and the interior of said tubular member at said upper end, the annular seat being closed to fuel flow when engaged by said ball;

- a second washer member supported concentrically adjacent to and spaced from said annular seat member, the second washer member being of thin deformable material and having an opening therethrough normally of diameter slightly less than the diameter of said ball, said second washer member being deformable to permit said ball to pass when a predetermined fuel pressure drop develops across said flexible filter media to thereby engage said annular seat member to block further fuel flow through the filter, the second washer member serving to thereafter retain said ball adjacent said annular seat member even in the absence of fuel pressure.

4,959,142

## WATER TREATING APPARATUS

Fumio Dempo, Saitama, Japan, assignor to Aoi Fukuda and Kiyoko Suzuki, both of, Japan

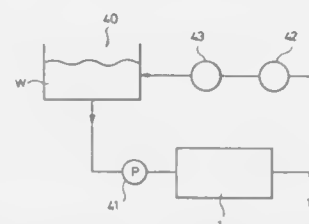
Filed Jun. 23, 1988, Ser. No. 210,639

Claims priority, application Japan, Jan. 29, 1988, 63-17438

Int. Cl.<sup>3</sup> C02F 9/00

U.S. Cl. 210—167

8 Claims



1. A water treating apparatus for sterilizing and purifying water from a water tank, comprising a circulating type water pipe connected to withdraw water from said water tank outside the water tank and return the water to the water tank; an ozone supply apparatus, a filtering apparatus, and an ultraviolet-light irradiating apparatus being provided in series in the water pipe for treating the withdrawn water before its return to said tank; said ozone supply apparatus being provided with a main pipe situated in the course of the water pipe and having an upstream side for receiving the main water flow from said water tank, and a downstream side for discharging flow; a flow separating pipe having a base end being connected to the upstream side of the main pipe to divert a thereby separated flow therefrom, and the forward end of said flow separating pipe being inserted to be re-entrant into the central section of the main pipe from the downstream side of the main pipe so that part of the flow separating pipe may extend in parallel

with the main pipe toward the upstream side of the main pipe, and the separated flow taken from said base end may be discharged from said forward end against the main water flow in the main pipe;

- a magnetic treating section for magnetically treating the main water flow by a plurality of magnets arranged to be exposed to the main water being provided in the upstream side of said main pipe;

said flow separating pipe being provided with a pressurizing section for pressurizing the separated flow for discharging same from said forward end, an ozone injecting section for injecting ozone into the separated flow, and a primary mixing section for mixing the injected ozone into the separated flow; and

- a secondary mixing section for mixing the separated flow that is discharged and with which the ozone has been mixed and the main water flow is provided in the downstream side of the main pipe.

4,959,143

## OIL SPILL RECOVERY VESSEL

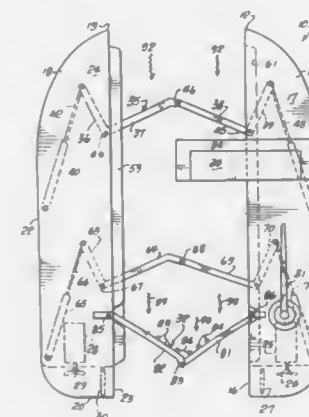
Chester A. Koster, 13120-D La Jolla Cir., La Mirada, Calif. 90638

Filed Mar. 26, 1990, Ser. No. 498,726

Int. Cl.<sup>3</sup> C02B 15/04

U.S. Cl. 210—242.3

15 Claims



1. An oil spill recovery vessel for removing oil spills from the water surface and storing the collected oil, said vessel comprising:

- a first hull half including a bow, a stern, a bottom, an outer side, and an inner side, said first hull half being watertight and including propeller, rudder and diesel engine means and including means for separating oil from water and for expelling separated water therefrom;

a second hull half movably connected to said first hull half, said second hull half also including a bow, a stern, a bottom, an outer side, and an inner side, said second hull half being watertight and including propeller, rudder and diesel engine means;

expandable connection means affixed to said first hull half and to said second hull half, said expandable connection means having a contracted position wherein said first hull half and said second hull half are tightly held together and an expanded position wherein said first hull half and said second hull half are completely separated both at the bow and at the stern so that water and oil may pass between the hull halves with little disturbance;

deployable oil skimming means positionable between said first hull half and said second hull half when said expandable connection means is in an expanded position, said deployable oil skimming means having a water and oil inlet located between said first and second hull halves and

at least one water and oil outlet located within said means for separating oil from water in said first hull half.

4,959,144

## COOKING OIL FILTRATION DEVICE HAVING LOCKING MEANS AND PERIPHERAL CHANNEL MEANS

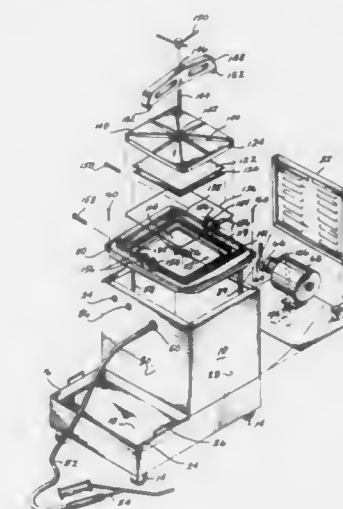
Robin D. Bernard, Bothell, and John G. Gardner, Woodinville, both of Wash., assignors to Filtercorp, Inc., Bothell, Wash.

Filed Jan. 30, 1989, Ser. No. 303,854

Int. Cl.<sup>3</sup> B01D 35/30

U.S. Cl. 210—232

3 Claims



2. Apparatus for filtering cooking oil comprising: a reservoir for holding hot cooking oil to be filtered; means defining a pressure chamber; pump means adapted to draw cooking oil from said reservoir and pump said oil to said pressure chamber means; and filter pad means of substantially uniform thickness and porosity comprising at least fiber and charcoal bound by a resin positioned within said pressure chamber means such that said cooking oil is forced therethrough under positive pressure;

said pressure chamber means including means for supporting said filter pad means positioned on the downstream side of said pad means; cover means positioned above said pad means including downwardly extending lip means adapted to bear against the peripheral edge of said pad means to prevent oil from passing around said pad means; and means for locking said cover means in place to seal said chamber means and hold said pad means against said support means, said means for locking cover means to seal said pressure chamber means including screw means and a bar means fixed to span the top of said cover means; said screw means being threaded through said bar means and being adapted to bear against said cover means to seal said pressure chamber means as said screw means is rotated downwardly through said bar means.

4,959,145

## GAS Baffle DEVICE FOR ON-SITE WASTE DISPOSAL SYSTEMS

Theodore W. Meyers, Inverness, Ill., assignor to Tuf-Tite, Inc., Barrington, Ill.

Filed Nov. 13, 1989, Ser. No. 435,600

Int. Cl.<sup>3</sup> B01D 21/00; C02F 1/40

U.S. Cl. 210—532.2

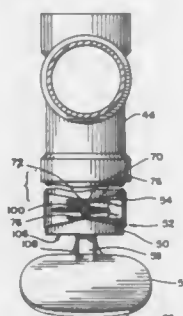
10 Claims

1. A gas baffle apparatus for use in an on-site waste disposal



tank so as to prevent entry of unwanted substances into the leach field, said gas baffle comprising:

- a mounting strap securely fastened to an outlet line of an on-site waste disposal tank, said outlet line having an outlet opening;
- a gas baffle plate carried by said mounting strap and nor-

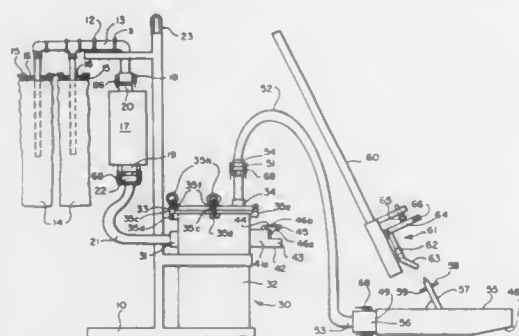


mally maintained thereby adjacent said outlet opening at an angle relative to the horizontal, said gas baffle plate operable to receive and deflect rising gas bubbles and any solid particulates so that said bubbles and particulates do not enter said outlet opening, said gas baffle plate further operable to be temporarily flexibly bent out of the way when engaged by any cleaning apparatus.

**4,959,146**  
**REMOTELY OPERATED SUBMERSIBLE UNDERWATER SUCTION APPARATUS**  
Louis L. Kristan, 2111 Brentwood Dr., Idaho Falls, Id. 83402  
Filed Jan. 21, 1988, Ser. No. 146,506  
Int. Cl.<sup>5</sup> B01D 29/10

U.S. Cl. 210—237

10 Claims



1. A method for the treatment of the circulating water which collects surplus paint in a paint spray booth which comprises treating this water with a clay-free paint detackifying agent containing an effective detackifying amount of a water-dispersible clay-free inorganic oxide chosen from the group consisting of the oxides of titanium, manganese, iron, and aluminum, which inorganic oxides have a dry average particle size less than 25 microns, thereby forming a nontacky surplus paint sludge, and then collecting and separating said non-tacky sludge from the circulating water.

**4,959,148**  
**METHOD AND APPARATUS FOR SPECIFIC AFFINITY ENHANCED TRANSPORT BIOREACTOR**  
William T. Clark, III, No. 13, Park La., Folsom, La. 70437  
Filed Jan. 23, 1989, Ser. No. 299,446  
Int. Cl.<sup>5</sup> B01D 15/08

U.S. Cl. 210—635

67 Claims

1. A bioreactor capable of retaining therapeutic reactants and reaction products while confining reaction within the bioreactor comprising:

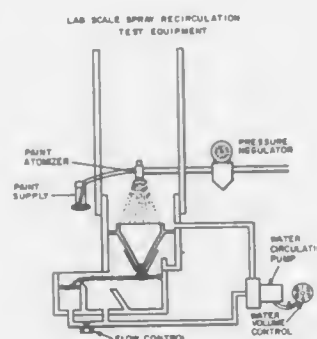
- a chamber; a hydrogel polymer within said chamber; and a bioreactant within said chamber, said bioreactant having

means for remotely removing the irradiated debris from said filter means while said filter means is underwater.

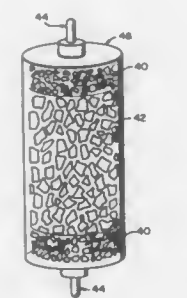
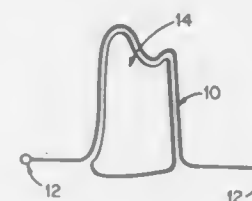
**4,959,147**  
**PAINT DETACKIFICATION USING INORGANIC PARTICLES**  
Shu-Jen W. Huang, and Claudia V. Stenger, both of Naperville, Ill., assignors to Nalco Chemical Company, Naperville, Ill.  
Filed Nov. 7, 1988, Ser. No. 267,597  
Int. Cl.<sup>5</sup> C02F 1/52

U.S. Cl. 210—712

3 Claims



been quenched by a displaceable surrogate material so that said hydrogel polymer forms around the bioreactant with



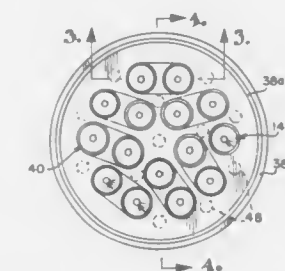
**4,959,149**  
**MULTIPLE TUBE SERIES MEMBRANE FILTRATION MODULE AND METHOD OF PREPARING SAME**  
Joseph J. Raneri, Woburn, Mass., assignor to Koch Industries, Inc., Wichita, Kans.

Filed Jun. 15, 1989, Ser. No. 366,433

Int. Cl.<sup>5</sup> B01D 61/14, 61/18

U.S. Cl. 210—636

6 Claims



1. A method of preparing a filtration module which includes a plurality of filtration tubules coupled in series which tubules are cleanable by sponge ball scouring, said method comprising the steps of:

- providing a hollow elongated filtration vessel having first and second open ends and means for removing permeate therefrom;
- providing first and second mold members each being adapted to be received in one of said open ends and configured to present a mold for an end plug which presents a portion of a plurality of distinct unitary U-shaped couplings each of which couples an adjacent pair of said tubules in fluid tight relationship and is characterized by an absence of uneven surfaces which cause hang up of said sponge balls;
- placing open of said mold members in one of said ends;
- positioning a plurality of said filtration tubules in said vessel and joining said tubules with said one mold member;
- placing the other of said mold members in the other of said

ends and joining said tubules with said second mold member;

orienting said vessel to a vertical position;

introducing a moldable material into the bottom end of said vessel to at least partially surround one of said mold members and said tubules;

allowing said material to harden to present one of said end plugs;

orienting said vessel to a second vertical position with the ends thereof rotated 180° from said first position;

introducing a moldable material into the bottom end of said vessel when the latter is in said second vertical position to at least partially surround the other of said mold members and said tubules;

allowing said material to harden to present the other of said end plugs;

removing said mold members from the ends of said vessel; and

covering the ends of said plugs with first and second end plates which complete said U-shaped couplings.

**4,959,150**  
**FLUID TREATMENT SYSTEM HAVING LOW AFFINITY FOR PROTEINACEOUS MATERIALS**  
Peter J. Degen, Huntington, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

Filed Sep. 26, 1988, Ser. No. 249,321

Int. Cl.<sup>5</sup> B01D 69/02

U.S. Cl. 210—638

27 Claims

23. A method of filtering a fluid containing a proteinaceous material with a minimal loss of the proteinaceous material, comprising:

- introducing a fluid containing a proteinaceous material to a filtration system having a low affinity for amide group-containing materials, which filtration system comprises
- (a) a porous structure,
- (b) fluid contacting components including means to retain said porous structure, and
- (c) a surface-modifying polymeric material having a low affinity for amide group-containing materials formed in situ and bonded directly to the surface of said porous structure and said fluid contacting components; and passing said fluid through said porous structure.

**4,959,151**  
**PERVAPORATION METHOD OF SEPARATING LIQUID ORGANIC COMPOUND MIXTURE THROUGH AROMATIC IMIDE POLYMER ASYMMETRIC MEMBRANE**

Masayuki Nakatani, Makoto Matsuo, and Yoshihiro Kusuki, all of Ichihara, Japan, assignors to UBE Industries, Yamaguchi, Japan

Filed Sep. 26, 1989, Ser. No. 412,892

Claims priority, application Japan, Sep. 27, 1988, 63-239838; Oct. 7, 1988, 63-252052; Oct. 7, 1988, 63-25053; Oct. 7, 1988, 63-252054; Oct. 7, 1988, 63-252055; Oct. 7, 1988, 63-252056

Int. Cl.<sup>5</sup> E01D 61/36

U.S. Cl. 210—640

18 Claims

1. A method comprising: separating a liquid organic compound mixture which forms azeotropes, by pervaporation, further by,

bringing a mixture of two or more types of organic compounds in the state of a liquid into contact with one face of an aromatic imide polymer asymmetric membrane which comprises a solvent soluble polymerization product of:

(A) an aromatic tetracarboxylic acid component comprising

(a) 70 to 100 molar % of at least one principal member selected from the group consisting of biphenyl tetracarboxylic acids, diphenylether tetracarboxylic acids, and dianhydrides, esters and salts of the above-mentioned acids, and

- (b) 0 to 30 molar % of at least one additional member selected from the group consisting of aromatic tetracarboxylic acids, and dianhydrides, esters and salts of those acids which are different from the above-mentioned compounds for the principal member; with
- (B) an aromatic diamine component comprising at least one member selected from the group consisting of:
- (c) an ingredient comprising:
- (i) 85 to 100 molar % of at least one principal member selected from aromatic diamines having 2 to 3 benzene ring structures, and
- (ii) 0 to 15 molar % of at least one member selected from aromatic diamines other than the above-mentioned diamines (i) for the principal member;
- (d) an ingredient comprising:
- (iii) 15 to 100 molar % of at least one member selected from the group consisting of 9,10-di(aminophenyl)anthracene compounds, di(aminophenoxy) diphenylsulfone compounds, di(aminophenoxy)biphenyl compounds, and di(aminophenoxy) diphenylalkane compounds,
- (iv) 0 to 85 molar % of at least one member selected from aromatic diamines having 2 to 3 benzene ring structures, and
- (v) 0 to 15 molar % of at least one member selected from aromatic diamines having one member selected from the group consisting of one benzene ring structure and one pyridine ring structure; and
- (e) an ingredient comprising:
- (vi) 15 to 50 molar % of at least one member selected from aromatic diamines having one member selected from the group consisting of one benzene ring structure and one pyridine ring structure, and
- (vii) 50 to 85 molar % of at least one member selected from aromatic diamines having 2 to 3 benzene ring structures,

exposing the opposite face of the aromatic imide polymer asymmetric membrane to an atmosphere under a reduced pressure, to cause at least one type of the organic compound in the mixture to selectively permeate through the asymmetric membrane and the permeated organic compound to be vaporized; and

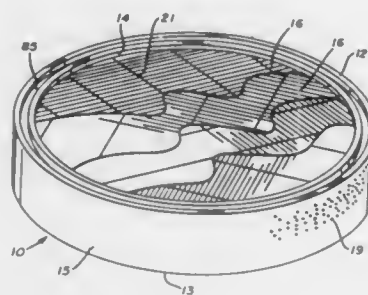
collecting the permeated and vaporized organic compound.

#### 4,959,152 HOLLOW FIBER SEPARATION MODULE AND METHOD FOR THE USE THEREOF

Randall W. Nichols, North Olmsted, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio  
Filed Mar. 24, 1989, Ser. No. 328,335  
Int. Cl.<sup>5</sup> B01D 61/18

U.S. Cl. 210—651

29 Claims



18. A method for the separation of fluid feedstreams into permeate and retentate portions comprising the steps of: providing a separate module having a feedstream inlet and a retentate chamber, connected by a plurality of wafers in axial alignment, each said wafer comprising a mat of hollow fibers arranged chord-wise of said wafer and in a plurality of flat layers, each said layer having a

plurality of straight hollow fibers in adjacent, parallel alignment with axial flow space therebetween; and continuous peripheral support means encompassing the ends of said hollow fibers; directing said feedstream through said feedstream inlet over said wafers and axially therethrough; separating said feedstream into a permeate portion, which permeates said hollow fibers and flows radially through said peripheral support means into said permeate chamber, and a retentate portion, which passes around said hollow fibers and axially into said retentate chamber; and removing said permeate and said retentate from said module.

4,959,153

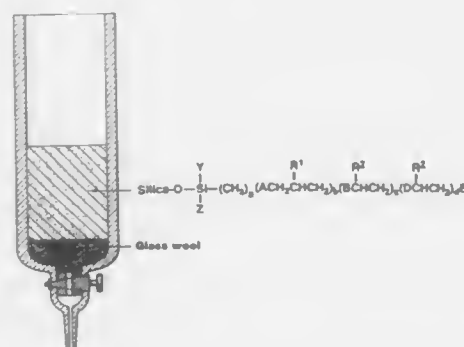
PROCESS OF REMOVING IONS FROM SOLUTIONS BY FORMING A COMPLEX WITH A SULFUR CONTAINING HYDROCARBON COVALENTLY BONDED TO SILICA  
Jerald S. Bradshaw; Byron J. Tarbet; Krzysztof E. Krakowiak; Jan F. Blernat; Ronald L. Bruening, and Reed M. Izatt, all of Provo, Utah, assignors to Brigham Young University, Provo, Utah

Filed Jul. 13, 1988, Ser. No. 218,156

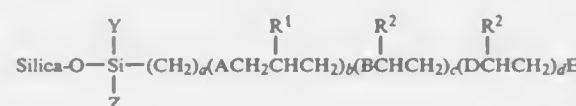
Int. Cl.<sup>5</sup> B01D 15/00

U.S. Cl. 210—670

12 Claims



1. A process of removing desirable ions from a mixture thereof in solution with other ions, said process comprising complexing the desired ions in said solution with a compound comprising silica covalently bonded to a sulfur-containing hydrocarbon, said compound having the formula:



wherein

- A, B, and D are selected from the group consisting of O, OCH<sub>2</sub>, S and SCH<sub>2</sub>, but B or D must be S or SCH<sub>2</sub>; E is selected from the group consisting of H, SH, OH, lower alkyl and S(CH<sub>2</sub>CH(R<sup>1</sup>))CH<sub>2</sub>O(CH<sub>2</sub>)<sub>n</sub>SiYZ(O-silica); Y and Z are selected from the group consisting of Cl, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>, O-silica, methyl, ethyl and halogenated substituents thereof; R<sup>1</sup> is selected from the group consisting of H, SH, OH, lower alkyl, phenyl, naphthyl and pyridyl; R<sup>2</sup> is selected from the group consisting of H and lower alkyl; silica is selected from sand and silica gel; and a is an integer from 2 to about 10; b is an integer of 0 or 1; c is an integer of 1 to about 5; d is an integer of 0 to about 5, breaking said complex to liberate the complexed ions, dissolving said liberated ions in a receiving liquid, and

recovering said ions from said receiving liquid.

4,959,154

#### METHOD FOR OIL SPILL CLEANUP

John J. Simmons, 220 Avenue "B" W., Bismarck, N. Dak. 58501  
Filed Apr. 12, 1989, Ser. No. 336,687  
Int. Cl.<sup>5</sup> C02F 1/28

U.S. Cl. 210—680

13 Claims

1. A method for containment and collection of oil on a surface comprising the steps of:
- (a) placing wood chips in contact with oil on said surface, said wood chips being selected from the group consisting of hot-oil dried wood chips having a water content of less than about 30% and an oil content of between about 1 to about 25% by weight, and hot-wax dried wood chips having a water content of less than about 20% and a wax content between about 1 and 25% by weight; and
- (b) allowing said wood chips to pickup said oil.

4,959,155

METHOD FOR THE PURIFICATION OF FLUIDS SUCH AS WATER, AQUEOUS FLUIDS AND FUEL FLUIDS  
Luis Gomez, 299 Alhambra Circle, Suite 309, Coral Gables, Fla. 33134

Filed May 23, 1989, Ser. No. 355,704

Int. Cl.<sup>5</sup> B01D 15/00; C23F 11/18

U.S. Cl. 210—687

6 Claims

3. A method for the purification of a fluid selected from the group consisting of water, aqueous fluids and fuel fluids which comprises contacting said fluid with an alloy, wherein said alloy comprises from about 20 to 28% zinc; from about 0.5 to 8% nickel; from about 0.005 to 2.5% aluminum; from about 7 to 15% manganese; and from about 1.3 to 4.5% tin, said percentages being based on the total alloy.

4,959,156

#### BLOCK CO-POLYMERS USEFUL AS AQUEOUS DISPERSANTS

Donald L. Lickel, Wallingford, Conn.; Michael L. Rosin, Dellwood, Minn., and Ming Shen, Guilford, Conn., assignors to Olin Corporation, Chesire, Conn.  
Division of Ser. No. 79,554, Jul. 30, 1987, Pat. No. 4,847,410.  
This application Apr. 10, 1989, Ser. No. 335,656  
Int. Cl.<sup>5</sup> C02F 5/12, 1/00

U.S. Cl. 210—701

8 Claims

1. A method of inhibiting water-scale formation in an aqueous composition comprising adding to said aqueous composition a liquid acrylic acid/acetate-capped polyethylene glycol-monoallyl ether co-polymer prepared by a process which comprises the steps of:

- (a) reacting an acetylating agent with an allyl ether of polyethylene glycol to produce an acetate-capped polyethylene glycol-monoallyl ether, and
- (b) reacting said acetate-capped polyethylene glycol-monoallyl ether with an acrylic compound selected from the group consisting of acrylic acid, methacrylic acid, and mixtures thereof, in a solvent-free reaction to produce said liquid acrylic acid/acetate-capped polyethylene glycol-monoallyl ether co-polymer.

4,959,157

#### WASTEWATER DISINFECTION WITH A COMBINATION OF BIOCIDES

Robert J. Karbowski, Sanford, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 18, 1988, Ser. No. 272,854

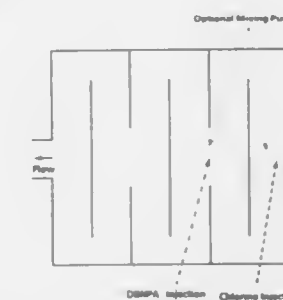
Int. Cl.<sup>5</sup> C02F 1/50

U.S. Cl. 210—752

4 Claims

1. A process for disinfecting wastewater which comprises: (a) contacting the wastewater with a sufficient amount of chlorine to satisfy the chlorine demand and to provide a

residual level of chlorine of from about 0.005 to about 0.05 mg/L and



- (b) contacting the chlorine-treated wastewater with an effective amount of 2,2-dibromo-3-nitropropionamide to disinfect the wastewater.

4,959,158

#### METHOD FOR SEPARATING DISPARATE COMPONENTS IN A FLUID STREAM

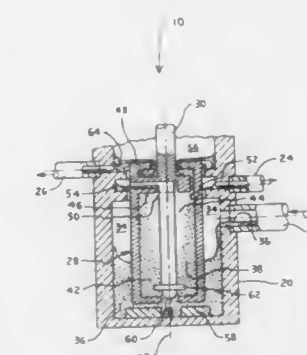
David H. Meikrantz, Idaho Falls, Id., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 30, 1989, Ser. No. 330,589

Int. Cl.<sup>5</sup> B04B 11/00

U.S. Cl. 210—787

1 Claim



1. A method of centrifugally separating disparate components in a separator having a housing, a waste-stream inlet port, a rotor spinning within said housing, a separating zone within said rotor, and radially oriented outlet apertures adjacent the top of the rotor to differentially permit the exit of the disparate components from said rotor, the improvement comprising: introducing a mixed component waste stream radially into the separator housing through at least one waste-stream inlet port and into an annular space surrounding and adjacent to said rotor, the mixed component waste stream comprising a mixture of water and a water insoluble hydrocarbon petroleum-based product selected from the group consisting of gasoline, diesel fuel, crude oil, motor oil and pump oil; discharging the water of the mixed component waste stream radially from a radially outward outlet aperture in the top of said rotor and discharging the petroleum-based product of the mixed component waste stream radially from a radially inward outlet aperture in the top of said rotor; and controlling the rate of component discharge from the separator by utilizing the apertures as weirs.



4,959,159

## BALL AND SOCKET ATTACHMENT FOR FLUID SPRAY GUN PLUNGER

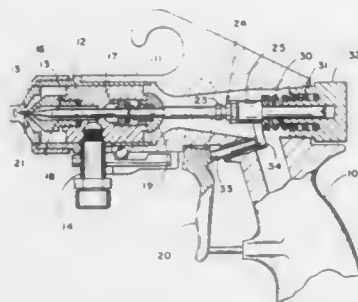
Roy D. Mattson, 2194 Deer Pass Trail, White Bear Lake, Minn. 55110

Filed Jul. 27, 1989, Ser. No. 386,154

Int. Cl.<sup>3</sup> B05B 7/02

U.S. Cl. 239—526

2 Claims



1. In a fluid spray gun having a fluid inlet, an air inlet, a hollow barrel with a fluid exit port and air outlets at one end, a handle attached to the other end of the barrel and trigger means attached to the barrel near the handle, the improvement comprising:

an elongated plunger extending along the barrel from the handle, said plunger having a pointed end for opening and closing the fluid exit port as the plunger is longitudinally moved;

a ball member attached to the other end of said plunger;

a socket;

means coupling the gun trigger means to said socket for moving said socket back and forth along the barrel in response to the operation of said trigger means;

said socket comprising a chamber for holding said ball member substantially freely rotatable, said socket having a pair of lips defining an opening through which said ball member is insertable into said socket chamber, said lips being resiliently yieldable to permit said ball member to be forcibly inserted into and removed from said socket chamber through said opening yet grasping said ball member when inserted into the socket chamber such that said plunger is moved directly with the back and forth motion of said socket in line with the fluid exit port.

4,959,160

## PROCESS FOR THE TREATMENT OF CONTAMINATED EMULSION

Alan W. Lake, Sandton, South Africa, assignor to Iscor Limited, Pretoria and Scientific Construction CC., Bryanston, both of, South Africa

Filed Apr. 13, 1988, Ser. No. 180,993

Claims priority, application South Africa, Apr. 15, 1987, 87/2706

Int. Cl.<sup>3</sup> B01D 17/04

U.S. Cl. 252—340

18 Claims

1. A process for the resolution of an emulsion which comprises an internal water phase, an external fat and/or oil containing phase and a finely divided metal contaminant which comprises:

- mixing a contaminated emulsion with a volume of water sufficient to increase the total water content to at least 50% on a mass to mass basis, if the water content of the emulsion relative to that of the rest of the emulsion is less than 50% on a mass to mass basis;
- adding to the emulsion at least one of a suitable emulsifier and demulsifier;
- mixing the emulsion with a short-chain organic acid to lower the pH from to 3-5 and;
- allowing the emulsion to settle out into an upper layer

comprising the external phase; a lower water layer and a bottom precipitate comprising the contaminant.

4,959,161

## CORROSION INHIBITING COMPOSITION

Brian G. Cibley, Wilmslow, England, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 6, 1988, Ser. No. 191,090

Claims priority, application United Kingdom, May 15, 1982, 8711534

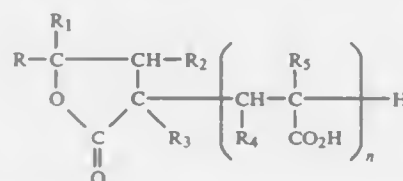
Int. Cl.<sup>3</sup> C23F 11/10; C07D 307/02

U.S. Cl. 252—396

11 Claims

1. A composition, in contact with a corrodible metal surface, which composition comprises:

- an aqueous-based or oil-based system; and
- as inhibitor for protecting the metal surface against corrosion, an effective amount of at least one compound having the formula I:



as well as salts or partial esters thereof wherein:

n is 0 or an integer ranging from 1 to 20;

R is a straight or branched chain C<sub>4</sub>-C<sub>30</sub>alkyl group, a straight or branched chain C<sub>4</sub>-C<sub>30</sub>alkyl group interrupted by one, two or three oxygen atoms or substituted by one, two or three hydroxy groups, a C<sub>5</sub>-C<sub>12</sub>cycloalkyl group, a C<sub>6</sub>-C<sub>10</sub>aryl group, C<sub>6</sub>-C<sub>10</sub>aryl group substituted by one, two or three C<sub>1</sub>-C<sub>12</sub>alkyl groups, a C<sub>7</sub>-C<sub>13</sub>aralkyl group or a C<sub>7</sub>-C<sub>13</sub>aralkyl group which is substituted by a hydroxyl group;

R<sub>1</sub> is H or a straight- or branched chain C<sub>1</sub>-C<sub>4</sub>alkyl group;

R<sub>2</sub> is H, a straight or branched chain C<sub>1</sub>-C<sub>4</sub>alkyl group or CO<sub>2</sub>H;

R<sub>3</sub> is H, straight or branched chain C<sub>1</sub>-C<sub>4</sub>alkyl group, —CH<sub>2</sub>CO<sub>2</sub>H or —CH<sub>2</sub>CH<sub>2</sub>CO<sub>2</sub>H;

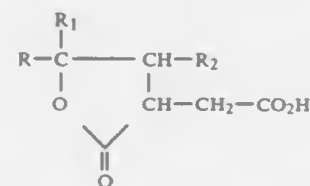
R<sub>4</sub> is H, a straight or branched chain C<sub>1</sub>-C<sub>4</sub>alkyl or CO<sub>2</sub>H;

R<sub>5</sub> is H, a straight or branched chain C<sub>1</sub>-C<sub>4</sub>alkyl group, CH<sub>2</sub>CO<sub>2</sub>H or CH<sub>2</sub>CH<sub>2</sub>CO<sub>2</sub>H; with the following provisions

when n is zero R<sub>2</sub> is CO<sub>2</sub>H;

when n is an integer from 1 to 20 at least one group R<sub>4</sub> is CO<sub>2</sub>H;

compositions comprising an oil-based system and a compound having the formula



wherein R, R<sub>1</sub> and R<sub>2</sub> are hydrogen or alkyl radicals, having a total number from 10 to 38 C-atoms, are excluded.

4,959,162

## COLLOIDAL POLYPYRROLE

Steven P. Armes, Los Alamos, and Mahmoud Aldissi, Santa Fe, both of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 3, 1989, Ser. No. 305,816

Int. Cl.<sup>3</sup> H01B 1/06

U.S. Cl. 252—519

19 Claims

1. A processable, electrically conductive polymer composition comprising:

colloidal particles of from about 30 to about 500 nanometers of an oxidized, polymerized aromatic heterocyclic of an oxidized, polymerized aromatic heterocyclic monomer selected from the group consisting of pyrrole, N-substituted pyrrole, and beta-substituted pyrrole;

a stabilizing effective amount of a vinyl pyridine-containing polymer selected from the group consisting of poly(2-vinyl pyridine), poly(3-vinyl pyridine), poly(3-vinyl pyridine), poly(4-vinyl pyridine), a copolymer of 2-vinyl pyridine and a hydrophobic copolymerizable monomer, a copolymer of 3-vinyl pyridine and a hydrophobic copolymerizable monomer, and a copolymer of 4-vinyl pyridine and a hydrophobic copolymerizable monomer, said amount effective to prevent precipitation of said electrically conductive polymer composition; and,

dopant anions remaining from oxidant used in oxidatively polymerizing the aromatic heterocyclic monomer.

4,959,163

## POLYAMPHOLYTES-HIGH TEMPERATURE POLYMERS AND METHOD OF USE

Marlin D. Holtmeyer, and Charles V. Hunt, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Nov. 3, 1988, Ser. No. 267,489

Int. Cl.<sup>3</sup> E21B 43/26

U.S. Cl. 252—8,551

16 Claims

12. A method of fracturing a subterranean formation comprising:

providing a polyampholyte that is the polymerization product of a mixture of monomers comprising at least one from each of the following groups:

Group I: acrylamide (AM), partially hydrolyzed acrylamide, N,N-dimethylacrylamide, N-substituted - (N'-dialkylaminoalkyl) acrylamides, aminoalkylacrylates, dialkylaminoalkylacrylates or mixtures thereof;

Group II: 2-acrylamido-2-methylpropane sulfonic acid, sodium salt (AMPS®), vinylphosphonic acid (VPA), partially hydrolyzed acrylamide or mixtures thereof; and

methacrylamidopropyl dimethyl-2,3-dihydroxypropyl ammonium sulfate (MAPDMDHPAS);

provided that partially hydrolyzed acrylamide may be selected from Group I or Group II, but not both;

wherein said Group I monomer is present in the amount of at least 80 mole percent, but less than 98 mole percent; wherein said Group II monomer is present in the amount of at least 10 mole percent to 1 mole percent; and wherein said MAPDMDHPAS is present in the amount of at least 10 mole percent to 1 mole percent;

inverting said polyampholyte using a surfactant to form a viscous aqueous liquid;

buffering said aqueous liquid with pH modifying substances selected from the group comprising admixtures of ammonium acetate and acetic acid; potassium bithalate; admixtures of formic acid and sodium bicarbonate in an amount sufficient to adjust the pH to range of about 4 to 6.5;

admixing said polyampholyte in aqueous liquid with a cross-linking agent selected from the group comprising zirconium lactate, zirconium lactate/malate, and zirconium dimalate; and

injecting said fluid in a mixture with or without a particulate

agent into said formation at a rate and pressure sufficient to fracture said formation.

4,959,164

## ROCK FRAGMENTATION METHOD

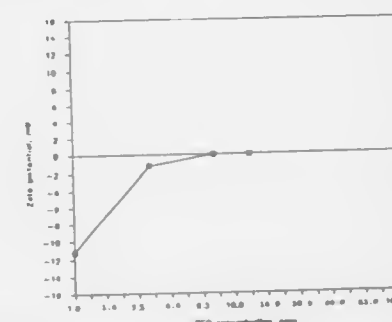
William H. Engelmann, Minneapolis; Pamela J. Watson, Inver Grove Heights; Patrick A. Tuzinski, Minneapolis; John E. Pahlman, Bloomington, and Saman E. Khalafalla, Minneapolis, all of Minn., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Jun. 27, 1988, Ser. No. 211,650

Int. Cl.<sup>3</sup> C09K 7/02

U.S. Cl. 252—8.51

5 Claims



4. A method of decreasing the concentration of anionic or cationic water-soluble oils in drilling and cutting fluids requisite for lubrication of drill bits, drill steel and cutting tools while increasing the drilling or cutting rate comprising the steps of:

- determining the minimum concentration of a water-soluble oil needed for lubrication in a drilling or cutting fluid containing a material selected from the group consisting of water-soluble, high-molecular-weight, non-ionic polymers;
- determining the zero surface charge (ZSC) concentration of the material selected from the group consisting of water-soluble, high-molecular-weight, nonionic polymers in a drilling or cutting fluid for a solid when the fluid contains the water-soluble oil; and
- adding the requisite amount of a material selected from the group consisting of water-soluble, high-molecular-weight, nonionic polyalkene oxide polymers.

4,959,165

## WELL COMPLETION AND SERVICING FLUID

R. Leroy Grimley, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Oct. 28, 1988, Ser. No. 263,841

Int. Cl.<sup>3</sup> E21B 33/13, 43/11

U.S. Cl. 252—8,551

4 Claims

1. A well completion and servicing fluid for controlling formation pressure during completion or servicing of a well, said fluid consisting essentially of:

- an aqueous solution of calcium chloride,
  - a solid weighting agent suspended in said solution and being selected from the group consisting of zinc, zinc oxide, and mixtures thereof; and
  - a viscosifier dissolved in said solution in an amount effective to suspend said weighting agent;
- said fluid having a density of greater than 15 pounds per gallon and being substantially free of bromide ions and being substantially free of solid material which is not soluble in hydrochloric acid.

4,959,166

## FLUID COMPOSITION FOR USE IN VISCOUS COUPLING

Hiromu Minamitani, Saitama; Norio Yano, Chiba; Atsushi Ikezawa, Kanagawa; Toshio Kanayama, Kanagawa; Takashi Ushijima, Kanagawa; Masao Teraoka, Tochigi, and Osamu Ishikawa, Tochigi, all of Japan, assignors to Cosmo Oil Co., Ltd., Tokyo; Dow Corning Kabushiki Kaisha, Kanagawa and Tochigifujisangyo Kabushiki Kaisha, Tochigi, all of Japan

Filed May 27, 1988, Ser. No. 199,827

Claims priority, application Japan, May 30, 1987, 62-136610; Feb. 26, 1988, 63-41913

Int. Cl.<sup>3</sup> C10M 109/50

U.S. Cl. 252—327 E

9 Claims

1. A fluid composition for use in a viscous coupling that comprises: (A) from 90% to 99.99% by weight of a base oil consisting essentially of a polyorganosiloxane fluid that is represented by an average unit formula.

(a):



where  $R_1$  is selected from the group consisting of a monovalent hydrocarbon group and a monovalent halogenated hydrocarbon group, and  $a$  is a number of 1.9 to 2.1, and which has a viscosity of from about 500 to about 500,000 centistokes at 25° C., and (B) at least one component selected from the group consisting of sulfur and sulfur compounds (b) to (g) listed below being added in a minor amount to said base oil:

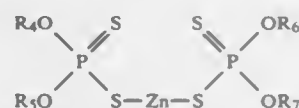
(b) a hydrocarbon sulfide represented by the formula:



where  $R_2$  is a monovalent hydrocarbon group,  $R_3$  is a divalent hydrocarbon group,  $x$  is an integer of 1 or more and may be the same or different in the recurring units, and  $n$  is 0 or an integer of 1 or more;

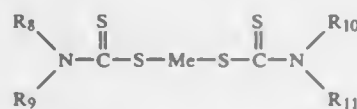
(c) a sulfurized oil or fat which is the reaction product of an oil or fat and sulfur;

(d) a zinc dithiophosphate represented by the formula:



where  $R_4$ ,  $R_5$ ,  $R_6$  and  $R_7$  which may be the same or different are each a monovalent hydrocarbon group;

(e) a dialkyldithiocarbamic acid metal salt represented by the formula:



where  $R_8$ ,  $R_9$ ,  $R_{10}$  and  $R_{11}$  which may be the same or different are each an alkyl group, and  $Me$  is a metal selected from the group consisting of Zn, Pb, Mo and Sb;

(f) elemental sulfur; and

(g) a sulfurized hydrocarbon compound represented by the general formula:



wherein  $R_{12}$  and  $R_{13}$  are each of divalent hydrocarbon group,  $x$  is an integer of 1 or more and may be the same or different in the recurring units, and  $n$  is 0 or an integer of 1 or more.

4,959,167

## ASYMMETRIC DISULFIDES IN LUBRICANT COMPOSITIONS

Henri Dubas, Marly, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 2, 1989, Ser. No. 305,834

Claims priority, application Switzerland, Feb. 12, 1988, 516/88-8

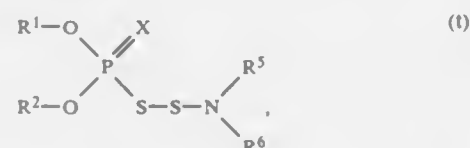
Int. Cl.<sup>3</sup> C10M 135/20

U.S. Cl. 252—32.7 E

15 Claims

1. A composition comprising:

- (a) at least one substrate selected from the group consisting of a lubricant and a hydraulic fluid and  
(b) an amount effective to provide high pressure and antiwear action and to reduce corrosion of at least one compound of the formula



in which  $R^1$  and  $R^2$  are identical or different and are each an alkyl group having 1 to 30 C atoms, an unsubstituted or  $C_1$ - $C_8$ -alkyl-substituted cycloalkyl group having 5 to 12 C atoms, or an unsubstituted or  $C_1$ - $C_{12}$ -alkyl-substituted  $C_6$ - $C_{10}$ -aryl group, or  $R^1$  and  $R^2$  together are an unsubstituted or  $C_1$ - $C_{12}$ -alkyl-substituted alkylene group having 2 to 20 C atoms or an arylene group having 6 to 20 C atoms, and  $R^5$  and  $R^6$  are identical or different and are each an alkyl group having 1 to 30 C atoms, or  $R^5$  and  $R^6$  together are an unsubstituted or  $C_1$ - $C_{12}$ -alkyl-substituted alkylene group having 2 to 20 C atoms or an alkylene group which has 2 to 10 C atoms and is interrupted by  $-O-$ ,  $-S-$  or  $-NR^9-$ , in which  $R^9$  is H or  $C_1$ - $C_4$ -alkyl, and  $X$  is O or S.

4,959,168

## SULFURIZED COMPOSITIONS, AND ADDITIVE CONCENTRATES AND LUBRICATING OILS CONTAINING SAME

Calvin W. Schroeck, Eastlake, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Filed Jan. 15, 1988, Ser. No. 144,369

Int. Cl.<sup>3</sup> C10M 135/02

U.S. Cl. 252—48.6

41 Claims

1. A sulfurized composition prepared by reacting at an elevated temperature a sulfurizing agent with a mixture of reactants comprising:

- (A) at least one partial fatty acid ester of a polyhydric alcohol, and  
(B) (2) at least one fatty acid.

24. A sulfurized composition prepared by reacting at 100°–210° C. a sulfurizing agent comprising elemental sulfur with a mixture of reactants comprising:

- (A) about 10 to about 90 percent by weight of at least one partial fatty acid ester of a polyhydric alcohol,  
(B) (2) at least one fatty acid, and  
(B) at least one member of the group consisting of  
(1) at least one fatty acid ester of a polyhydric alcohol, which fatty acid ester is different from the partial fatty acid ester (A),  
(3) at least one olefin, and  
(4) at least one fatty acid ester of a monohydric alcohol.

4,959,169

## ESTERIFIED POLYGLYCOL LUBRICANTS FOR REFRIGERATION COMPRESSORS

Philip W. McGraw, Lake Jackson; Eldon L. Ward, Angleton, and Michael W. Edens, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 20, 1989, Ser. No. 425,621

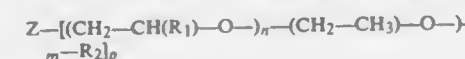
Int. Cl.<sup>3</sup> C10M 105/34, 105/38

U.S. Cl. 252—68

24 Claims

1. Fluid compositions for use in compression refrigeration which have an upper solution critical temperature equal to or greater than about 35° C. comprising

- (A) a refrigerant selected from the group consisting of hydrofluorocarbons and hydrochlorofluorocarbons and  
(B) a lubricant composition which comprises polyether polyols or polyether alcohols which have a viscosity between 25 and 150 centistokes at 38° C. and where greater than about 30% of the hydroxyl groups of said polyols or alcohols are esterified wherein said esterified polyether polyols or polyether alcohols have the formula



where

$Z$  is the residue of a compound having 1–8 active hydrogens,  $R_1$  is hydrogen, ethyl, or mixtures thereof,

$R_2$  is an alkanoyl group of 2 to 6 carbon atoms or hydrogen,  $n$  is 0 or a positive number,

$m$  is a positive number,

$n+m$  is a number having a value which will give an esterified polyether polyol or polyether alcohol with a number average molecular weight range from about 400 to about 2500,

$p$  is an integer having a value equal to the number of active hydrogens of  $Z$ .

4,959,170

## RINSING COMPOSITION FREE FROM PHOSPHATE Hannajörg Ulrich, Erfstadt, and Lothar Westermann, Cologne, both of Fed. Rep. of Germany, assignors to Hoechst AG, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 80,961, Aug. 3, 1987, abandoned. This application Nov. 21, 1988, Ser. No. 274,691

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1986, 3627773

Int. Cl.<sup>3</sup> C11D 3/12, 7/20

U.S. Cl. 252—135

7 Claims

1. An improved rinsing composition for cleaning of hard surfaces and for preventing depositions thereon, said composition consisting essentially of:

as a builder, 30–50 weight-% of a crystalline layer sodium silicate of the general formula  $NaMSi_xO_{2x+1-y}H_2O$ , in which  $M$  stands for sodium or hydrogen,  $x$  stands for a number from 1.9 to 4 and  $y$  stands for a number from 0 to 20,

as a co-builder, 0.1–7.5 weight-% of at least one substance selected from the group consisting of hydroxymethylene carboxylates, maleic acid anhydride, ethylene vinyl ether or maleic acid anhydride/acrylic acid copolymers or the sodium salts thereof,

0–45 weight-% of a filler,

10–25 weight-% of an alkali carrier,

1–2 weight-% of a surfactant, and

1–5 weight-% of an active chlorine carrier,

said composition being free of phosphate.

4,959,171

## SYNDET SOAP CAKES (SOAP BARS) HAVING IMPROVED PROPERTIES

Giovanni Pantini, Milan, and Susanna Savonelli, Voghera, both of Italy, assignors to Anisimont S.r.l., Milan, Italy

Filed Aug. 22, 1989, Ser. No. 396,635

Claims priority, application Italy, Aug. 26, 1988, 21756 A/88

Int. Cl.<sup>3</sup> C11D 9/28, 17/00; C08F 12/20, 214/00

U.S. Cl. 252—174

5 Claims



1. Syndet bars containing besides the usual components of said cakes, from 0.001 to 10% by weight of perfluoropolyethers having end perfluoroalkyl groups to reduce cracking of said bars.

4,959,172

## LIQUID CRYSTAL COMPOSITION CONTAINING A PLEOCHROIC AZO TYPE COMPOUND

Konoe Miura, Yokohama; Tetsuo Ozawa, Hadano, and Keiko Yoneyama, Machida, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Jun. 2, 1988, Ser. No. 201,528

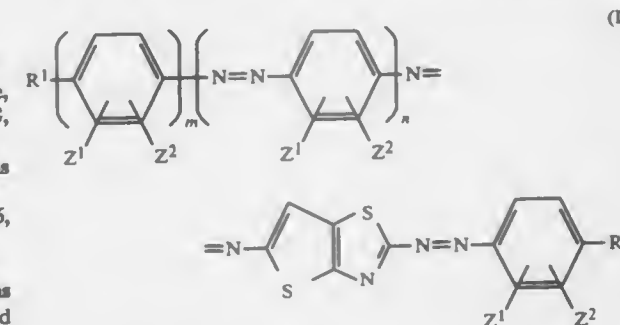
Claims priority, application Japan, Jun. 4, 1987, 62-140584; Oct. 19, 1987, 62-263563

Int. Cl.<sup>3</sup> C09K 19/00

U.S. Cl. 252—299.1

13 Claims

1. A liquid crystal composition suitable for a guest-host liquid crystal device comprising a solution of a liquid crystal substance and a pleochroic dye, said pleochroic dye comprising at least one azo type compound having the formula (I),



wherein  $R^1$  represents a hydrogen atom; an alkyl radical having 1 to 3 carbon atoms substituted with a phenyl radical which is substituted by a member of the group consisting of an alkyl radical having 1 to 8 carbon atoms, an alkoxy radical having 1 to 8 carbon atoms and, a chlorine atom; an alkyl radical having 1 to 8 carbon atoms which may be substituted by an alkoxy radical having 1 to 8 carbon atoms; an alkoxy radical having 1 to 3 carbon atoms substituted by a phenyl radical which is substituted by a member of the group consisting of an alkyl radical having 1 to 8 carbon atoms, an alkoxy radical having 1 to 8 carbon atoms and a chlorine atom; an alkoxy radical having 1 to 8 carbon atoms which may be substituted by an alkyl radical having 1 to 8 carbon atoms; a cyclohexyl group which may be substituted by either an alkyl radical having 1 to 8 carbon atoms or  $-\text{COOR}^3$ ,

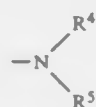
wherein  $R^3$  represents an alkyl radical having 1 to 8 carbon



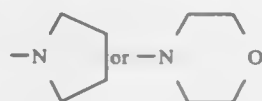
atoms which may be substituted by an alkoxy radical having 1 to 8 carbon atoms; a cyclohexyl radical substituted by an alkyl radical having 1 to 8 carbon atoms; a phenyl radical substituted by an alkoxy radical having 1 to 8 carbon atoms; or a phenyl radical substituted by an alkyl radical having 1 to 8 carbon atoms,



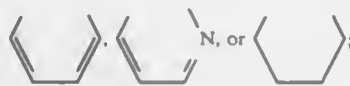
wherein  $\text{R}^4$  represents an alkyl radical having 1 to 3 carbon atoms, optionally substituted by a phenyl radical which is substituted by a substituent selected from the group consisting of an alkyl radical having 1 to 8 carbon atoms, an alkoxy radical having 1 to 8 carbon atoms, or a chlorine atom; or



wherein  $\text{R}^4$  represents an alkyl radical having 1 to 8 carbon atoms, and  $\text{R}^5$  represents an alkyl radical having 1 to 8 carbon atoms, or an alkyl radical having 1 to 3 carbon atoms substituted by a phenyl radical which is substituted by an alkyl radical having 1 to 8 carbon atoms,  $\text{R}^4$  and  $\text{R}^5$  being optionally connected to form



$\text{Z}^1$  and  $\text{Z}^2$  each represent a hydrogen atom, a chlorine atom, an alkyl radical having 1 to 3 carbon atoms, or an alkoxy radical having 1 to 3 carbon atoms, or  $\text{Z}^1$  and  $\text{Z}^2$  are connected to form a fused ring of the formula:



$m$  is 1 or 2; and  $n$  is 0 or 1.

4,959,173

## OPTICALLY ACTIVE ESTER COMPOUND

Toshihiro Shibata, Saitama; Norio Kurosawa, Tokyo, and Masaki Kimura, Saitama, all of Japan, assignors to Adeka Argus Chemical Co., Ltd., Tokyo, Japan

Filed Sep. 8, 1988, Ser. No. 242,177

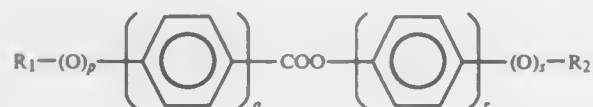
Claims priority, application Japan, Sep. 29, 1987, 62-244780; Jan. 8, 1988, 63-2226; Apr. 1, 1988, 63-81609

Int. Cl.<sup>5</sup> C09K 19/12

U.S. Cl. 252—299.65

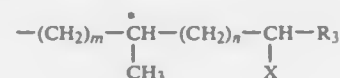
10 Claims

1. An optically active ester of the formula



wherein  $p$  is 0 or 1,  $q$  is 1 or 2,  $r$  is 1 or 2,  $q+r$  is 3,  $s$  is 0 or 1, and  $\text{R}_1$  and  $\text{R}_2$  are each independently selected from the group

consisting of  $\text{C}_6\text{--}18$  straight chain alkyl and an optically active group of the formula



and in which  $m$  is 2 to 5,  $n$  is 1 or 2,  $\text{X}$  is hydrogen or chlorine,  $\text{R}_3$  is hydrogen or  $\text{C}_{1\text{--}11}$  straight chain alkyl, and  $\text{C}^\cdot$  represents a chiral carbon atom, and when  $n$  is 1 and  $\text{X}$  is hydrogen,  $\text{R}_3$  is  $\text{C}_{1\text{--}11}$  straight chain alkyl; one of  $\text{R}_1$  and  $\text{R}_2$  being a said optically active group and the other of  $\text{R}_1$  and  $\text{R}_2$  being a said  $\text{C}_6\text{--}18$  straight chain alkyl group; and when  $q$  is 2 and  $r$  is 1 and  $\text{R}_1$  is  $\text{C}_6\text{--}18$  straight chain alkyl,  $p$  is 1; and when  $q$  is 1 and  $r$  is 2 and  $\text{R}_2$  is a said optically active group,  $s$  is 1.

4,959,174

## PHOSPHOR WHICH EMITS LIGHT BY THE EXCITATION OF X-RAY

Shigeharu Nakajima; Genichi Shinomiya; Mizuho Takeda, and Satoru Chikutei, all of Anan, Japan, assignors to Nichia Kagaku Kogyo K.K., Tokushima, Japan

Continuation of Ser. No. 219,792, Jul. 14, 1988, abandoned, which is a continuation of Ser. No. 823,299, Jan. 28, 1986, abandoned. This application Mar. 16, 1989, Ser. No. 324,570

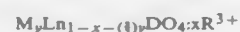
Claims priority, application Japan, May 18, 1985, 60-106636; Sep. 6, 1985, 60-198052

Int. Cl.<sup>5</sup> C09K 11/78

U.S. Cl. 252—301.6 R

1 Claim

1. A phosphor which emits light by the excitation of X-rays, and has a composition represented by the formula:



where:

$\text{M}$  is Cd,

$\text{Ln}$  is at least one rare earth element selected from the group consisting of Y, Gd and La,

$\text{D}$  is Ta, or Ta and Nb,

$\text{R}$  is an activator metal of Tm,

$y$  is a value in the range of  $1 \times 10^{-5} \leq y \leq 6 \times 10^{-1}$

$x$  is a value in the range of  $0 \leq x \leq 0.05$ ,

said phosphor being obtained by a process comprising admixing an oxide of  $\text{Ln}$  in an amount corresponding to

$1-x-(y)$  parts by mol of  $\text{Ln}$ , an oxide of  $\text{D}$  in an amount corresponding to one part by mol of  $\text{D}$ , an oxide of  $\text{R}$  in an amount corresponding to  $x$  parts by mol of  $\text{R}$  and a carbonate of  $\text{M}$  in an amount corresponding to  $y$  parts by mol of  $\text{M}$  to prepare an admixture, and

firing said admixture at a temperature sufficient to provide a phosphor having said composition and

wherein said phosphor exhibits a smaller afterglow than the same phosphors absent  $\text{M}$ .

4,959,175

## SOLUTION FOR DIALYSES AND USE OF PEPTIDES BASED ON GLYCINE FOR PREPARING IT

Hippocrates Yatizidis, Athens, Greece, assignor to Pierre Fabre Medicament, Paris, France

Filed Jan. 25, 1988, Ser. No. 147,424

Claims priority, application Greece, Jan. 27, 1987, 870129

Int. Cl.<sup>5</sup> A61M 1/14, 1/28; A61K 33/10, 37/18

U.S. Cl. 252—364

7 Claims

1. A method of stabilizing an aqueous dialytic solution of electrolytes including bicarbonate ions comprising incorporating in said solution a peptide based on glycine, and selected from the group consisting of di-, tri-, tetra-, penta- and hexaglycine, said glycine being incorporated in an amount effective to substantially prevent the precipitation of carbonates.

4,959,176

## HIGH RESOLUTION NON CORROSIVE AMINO ACID ANALYSIS BUFFER SOLUTIONS

Robert H. Slocum, Portola Valley; Patrick L. Y. Lee, Belmont, and Vivian Arrizon-Lopez, San Jose, all of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Apr. 29, 1988, Ser. No. 187,702

Int. Cl.<sup>5</sup> G01N 30/96; C23F 11/04

U.S. Cl. 252—389.53

9 Claims

1. An aqueous buffer solution for separating the components of a mixed amino acid sample by the ion exchange method which is essentially halogen free and comprising alkali metal salts of tribasic organic acids, alkali metal nitrates, nitric acid and a mold inhibiting agent.

4,959,177

## REDUCING STRESS CORROSION CRACKING IN TREATING GASES WITH ALKANOL AMINES

Hans U. Schutt, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 106,824, Oct. 9, 1987, abandoned. This application Aug. 16, 1989, Ser. No. 395,202

Int. Cl.<sup>5</sup> C23F 11/10

U.S. Cl. 252—391

18 Claims

1. A process for reducing stress corrosion cracking of metal weldments in the presence of an aqueous alkanol amine solution which consists of adding to the aqueous alkanol amine solution an effective amount of a stress corrosion cracking inhibitor consisting of a sulfiding agent selected from elemental sulfur or sulfide ion yielding compound.

10. A process for reducing stress corrosion cracking of metal weldments in the absence of hydrogen sulfide during gas treating with an aqueous alkanol amine gas treating solvent solution which consists of adding to the aqueous alkanol amine solution an effective amount of a stress corrosion inhibitor consisting of a sulfiding agent selected from elemental sulfur or a sulfide ion yielding compound.

4,959,178

## ACTINIC RADIATION-CURABLE CONDUCTIVE POLYMER THICK FILM COMPOSITIONS AND THEIR USE THEREOF

Richard L. Frentzel, Chino Hills, and Noel C. Peralta, Glendora, both of Calif., assignors to Advanced Products Inc., Cheshire, Conn.

Filed Jan. 27, 1987, Ser. No. 6,837

Int. Cl.<sup>5</sup> C09D 5/24; C08K 3/08; C08F 2/50

U.S. Cl. 252—514

23 Claims

1. An actinic radiation curable polymer thick film composition comprising by weight:

(a) about 10 to about 20 parts of at least one mono-functional unsaturated monomer capable of being polymerized by actinic radiation;

(b) about 2.5 to about 8 parts of at least one thermoplastic polymer having a glass transition value of above about 100° F. and not capable of being substantially cross-linked with polymerized monomer (a) and said polymer (b) is dissolved in monomer (a);

(c) about 68 to about 85 parts of conductive metal particles; and

(d) about 0.1 to about 5 parts of at least one actinic radiation polymerization initiator.

4,959,179

## STABILIZED ENZYMES LIQUID DETERGENT COMPOSITION CONTAINING LIPASE AND PROTEASE

Michael P. Aronson, West Nyack, N.Y.; Martin S. Cardinall, Millington, and Jack T. McCown, Cresskill, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Filed Jan. 30, 1989, Ser. No. 304,394

Int. Cl.<sup>5</sup> C11D 3/386

U.S. Cl. 252—135

6 Claims

1. An enzymatic liquid detergent and cleaning composition

comprising, in a liquid medium, from 0–90% by weight of a detergent-active compound, a proteolytic enzyme and a lipolytic enzyme, said lipolytic enzyme being selected from the group consisting of fungal lipases obtainable from *Humicola lanuginosa* and *Thermomyces lanuginosus*, and bacterial lipases which show a positive immunological cross-reaction with the antibody of the lipase, produced by *Chromobacter viscosum* var. *lipolyticum* NRRL-B3673, and an enzyme stabilizing system comprising a mixture of a polyol containing only C, H and O atoms and containing at least two hydroxyl groups and a boron compound which is capable of reacting with said polyol, wherein said polyol has a first binding constant with said boron compound of at least 500 l/mole and a second binding constant of at least 1,000 l<sup>2</sup>/mole<sup>2</sup>, and wherein the weight ratio of said polyol to said boron compound is greater than 1.0.

4,959,180

## COLLOIDAL POLYANILINE

Steven P. Armes, Los Alamos, and Mahmood Aldissi, Santa Fe, both of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 3, 1989, Ser. No. 305,817

Int. Cl.<sup>5</sup> H01B 1/00, 1/06

U.S. Cl. 252—519

12 Claims

1. A processable, electrically conductive polymer composition comprising:

colloidal particles of an oxidized, polymerized amino-substituted aromatic monomer selected from the group consisting of aniline or substituted anilines;

a stabilizing effective amount of a random copolymer containing amino-benzene moieties as said chain substituents said amount effective to prevent precipitation of said electrically conductive polymer composition; and dopant anions.

4,959,181

## ION EXCHANGE USING HYDROUS URANIUM DIOXIDE

David A. White, and Paul Danson, both of London, United Kingdom, assignors to British Nuclear Fuels PLC, Warrington, United Kingdom

Division of Ser. No. 112,458, Oct. 26, 1987, abandoned.

This application Mar. 20, 1989, Ser. No. 326,487

Claims priority, application United Kingdom, Oct. 27, 1986, 8625657

Int. Cl.<sup>5</sup> C01G 43/01; C02F 1/42

U.S. Cl. 252—625

3 Claims

1. A method of carrying out ion exchange on a solution, comprising contacting the solution with an ion-exchange material consisting essentially of solid hydrous uranium dioxide which is in a form suitable for carrying out ion exchange.

4,959,182

## METHOD AND COMPOSITIONS PROVIDING ENHANCED CHEMILUMINESCENCE FROM 1,2-DIOXETANES

Arthur P. Schaap, Detroit, Mich., assignor to Board of Governors of Wayne State University, Detroit, Mich.

Division of Ser. No. 224,681, Jul. 27, 1988, which is a continuation-in-part of Ser. No. 887,139, Jul. 17, 1986. This application Mar. 1, 1989, Ser. No. 317,585

Int. Cl.<sup>5</sup> C09K 3/00; C12Q 1/68, 1/00, 1/44

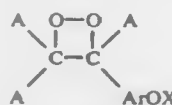
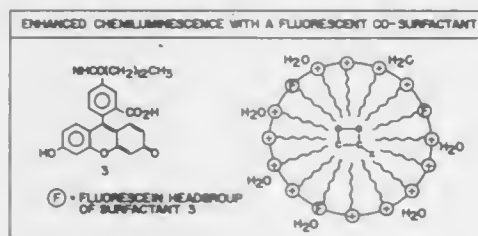
U.S. Cl. 252—700

36 Claims

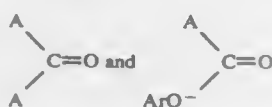
1. A method for generating light which comprises:

(a) providing in a setting where the light is to be produced a fluorescent compound dispersed in or on one of a surfactant, a micelle, liposome, reversed micelle, microemulsion film, including a monolayer or a polymer which brings the fluorescent compound into a closely spaced relationship with and in admixture with a 1,2-dioxetane which is stable

in the setting where light is to be produced of the formula



wherein ArOX represents an aryl group substituted with an X-oxy group which forms an oxide intermediate 1,2-dioxetane compound when triggered by removing X with an activating agent so that the intermediate 1,2-dioxetane compound decomposes and releases electronic energy to form light and two carbonyl containing compounds of the formula



wherein X is a chemically labile group which is removed by the activating agent to form the unstable oxide intermediate 1,2-dioxetane and wherein A are passive organic groups which allow the light to be produced by the 1,2-dioxetane when X is removed; and  
(b) triggering the stable 1,2-dioxetane with the activating agent wherein the fluorescent compound accepts the electronic energy generated upon decomposition of the oxide intermediate light than is produced by the triggering of the dioxetane alone.

4,959,183

## AERATION APPARATUS

Graeme J. Jameson, 34 Curzon Rd., New Lambton, Australia NSW 2305

Continuation of Ser. No. 132,935, Dec. 15, 1987, abandoned.

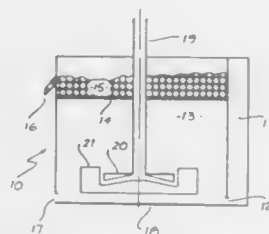
This application Nov. 28, 1989, Ser. No. 443,068

Claims priority, application Australia, Dec. 16, 1986, PH09531

Int. Cl.<sup>3</sup> B03D 1/16

U.S. Cl. 261—87

8 Claims



1. Aeration apparatus for aerating a given liquid, comprising a rotor mounted at the lower end of a hollow drive shaft, means to rotate the rotor, means for receiving and containing such liquid with said

rotor immersed therein and with the drive shaft extending substantially vertically upwardly from the rotor, the rotor comprising a disc located in a plane at right angles to the axis of the shaft and having a plurality of blades depending downwardly from the lower face of the disc, the interior of the hollow drive shaft opening to the area beneath the disc such that when the rotor is rotated in the liquid by the drive shaft, and air is forced down the hollow drive shaft to issue on the underside of the rotor, the air is broken up into bubbles by the blades on the rotor, the blades being straight and extending continuously radially outwardly on the underside of the disc from the shaft opening to the periphery of the disc, and the height of the blades increasing continuously with distance from the shaft opening.

4,959,184

## METHOD OF PRODUCING SKIN-COVERED FOAMED PLASTIC ARTICLE

Mikio Akai, and Masami Mori, both of Ayase, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan

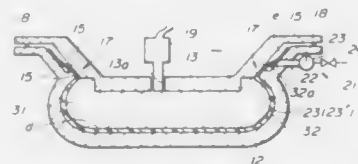
Filed Oct. 20, 1988, Ser. No. 260,218

Claims priority, application Japan, Oct. 31, 1987, 62-276811

Int. Cl.<sup>3</sup> B29C 67/22

U.S. Cl. 264—40.3

9 Claims



1. A method of producing a skin-covered foamed plastic article, comprising the steps of:  
(a) preparing a lower mold which has a cavity formed therein;  
(b) putting a bag-shaped outer skin member into said cavity, said skin member having a porous inner layer;  
(c) sealingly closing said cavity;  
(d) pouring a foamable material for the foamed plastic article into the bag-shaped outer skin member, said material being capable of impregnating said inner layer, said material foaming in said cavity and causing pressure in said cavity to gradually increase;  
(e) curing said material to provide said article;  
(f) allowing pressure in said cavity to increase to a first pressure;  
(g) venting gas in said cavity after said first pressure is attained so that a second, lower pressure results; and  
(h) allowing pressure in said cavity to return to said first pressure after venting, thereby controlling said pressure such that said curing is carried out under a certain pressure condition which will provide for even penetration of said material into said inner layer.

4,959,185

## PROCESS FOR PRODUCING ACOUSTIC CARBON DIAPHRAGM

Yoshihisa Suda, Maebashi, Japan, assignor to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Filed Sep. 1, 1988, Ser. No. 239,268

Int. Cl.<sup>3</sup> B29C 41/02; C01B 31/02

U.S. Cl. 264—81

4 Claims

1. A process for producing an acoustic diaphragm of carbonaceous material, comprising the steps of:  
uniformly depositing by a vapor phase technique thermally decomposed carbon generated by thermal decomposition of a carbon-generating material introduced together with

a carrier gas on a surface layer of a diaphragm-shaped base material, and separating the obtained thermally decomposed carbon deposit from the diaphragm-shaped base material, said carbon-generating material being selected from the group consisting of benzene, ethylene chloride and ethane chloride.

4,959,186

## EXTRUSION PROCESS AND SINGLE-, DUAL- OR MULTIPLE-SCREW EXTRUDER

Rüdiger Dollhopf, Herbolzheim, and Bernd Nandzik, Gundelfingen, both of Fed. Rep. of Germany, assignors to Rhodia AG, Freiburg, Fed. Rep. of Germany

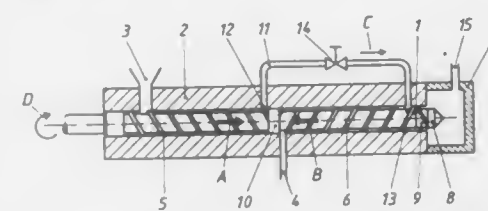
Filed Sep. 22, 1988, Ser. No. 247,792

Claims priority, application Fed. Rep. of Germany, May 27, 1988, 3817941

Int. Cl.<sup>3</sup> B29C 47/76

U.S. Cl. 264—102

17 Claims



1. The process of extruding a polymer which consists of guiding said polymer along a rotating single screw which in the first section is left handed and in the second section is right handed, or in the first section is right handed and in the second section is left handed or

a rotating dual screw, one of the screws being in the first section left handed and in the second section right handed, the other screw being in the first section left handed and in the second section right handed or one of the screws being in the first section right handed and in the second section left handed, the other screw being in the first section right handed and in the second section left handed or one of the screws being in the first section left handed and in the second section right handed, the other screw being in the first section right handed and in the second section left handed or one of the screws being in the first section right handed and in the second section left handed, the other screw being in the first section left handed and in the second section right handed,

each of said sections having an inlet and an outlet; the end of said screw or screws being provided with at least a short portion (9, 20), which is left handed or right handed when the last section of the screw or screws is right handed or left handed respectively, whereby the polymer is introduced into the first section, travels in the first section in the direction A and in the second section in the direction B opposite to said direction A, wherein blocking, sealing or throttling is applied between the section in which the polymer is guided in the direction A and the section in which the polymer is guided in the direction B, transferring the polymer from the outlet of said first section to the inlet of said second section by means of a by-pass line, reverse degasifying in a degasification zone at the end of said screw or screws whereby there is not direct contact between the reverse degasifying zone and the polymer, whereby the polymer flows away from said degasifying zone, removing the polymer from said second section at a location between said first and second sections, said short portion being located adjacent said degasification zone, discharging the polymer which has overflowed in said short portion (9, 20) adjacent said degasifying zone during a shutdown whereby when the process is restarted after a shutdown, said polymer

which has overflowed is prevented from returning to the polymer being extruded.

7. An extruder for extruding a polymer, the extruder comprising

a rotatable single screw which in the first section is left handed and in the second section is right handed, or in the first section is right handed and in the second section is left handed or

a rotatable dual screw, one of the screws being in the first section left handed and in the second section right handed, the other screw being in the first section left handed and in the second section right handed or

one of the screws being in the first section right handed and in the second section left handed, the other screw being in the first section right handed and in the second section left handed or

one of the screws being in the first section left handed and in the second section right handed, the other screw being in the first section left handed and in the second section left handed or

one of the screws being in the first section right handed and in the second section left handed, the other screw being in the first section left handed and in the second section right handed,

each of said sections having a polymer-charging means and a polymer-discharging means, the extruder further comprising a housing within which said screw rotates or said screws rotate, a drive, a transmission, by-pass line which is arranged for transferring the polymer from the polymer-discharging means of said first section to the polymer-charging means of said second section, a throttling, regulating or metering element located between the first section and the second section or two throttling, regulating or metering elements located between the first sections and the second sections when the screw is a rotatable dual screw and the screws are both in the first section left handed or right handed and in the second section both right handed or left handed respectively, reverse-degasifying means located at the end of said screw or screws whereby the polymer is carried away along said screw or screws, said reverse-degasifying means having no direct contact with the polymer, a short threaded portion (9, 20) adjacent said reverse degasifying means which is left handed or right handed when the last section of the screw or screws is right handed or left handed respectively, whereby the polymer being processed is guided away from said reverse degasifying means and the polymer-discharging means of said second section is provided at a location between said first and second sections.

4,959,187

## GLYCOLATE ESTER PERACID PRECURSORS

Ronald A. Fong, Modesto; Sheldon N. Lewis, Lafayette; Richard J. Wiersema, Tracy, and Alfred G. Zielke, Pleasanton, all of Calif., assignors to The Clorox Company, Oakland, Calif.

Division of Ser. No. 928,070, Nov. 6, 1986, Pat. No. 4,778,618.

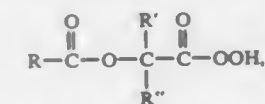
This application Oct. 14, 1988, Ser. No. 258,226

Int. Cl.<sup>3</sup> C07C 309/29, 69/78, 409/26

U.S. Cl. 260—402

20 Claims

1. A peracid of the structure



wherein R is C<sub>1-20</sub> linear or branched alkyl, alkoxyalkyl, cycloalkyl, aryl, alkyl substituted aryl; and R' and R'' are independently H, C<sub>1-20</sub> alkyl, aryl, C<sub>1-20</sub> alkyl, aryl, C<sub>1-20</sub> alkylaryl, aryl substituted with OH, CO<sub>2</sub> or SO<sub>3</sub>, and NR<sup>+</sup><sub>3</sub>, wherein R<sup>+</sup> is C<sub>1-30</sub> alkyl.

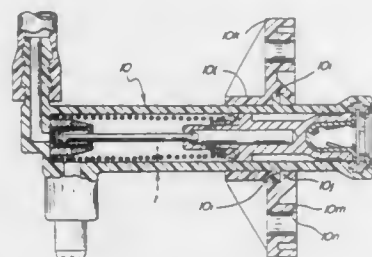


# 4,959,188

## METHOD FOR FORMING A HYDRAULIC CYLINDER ASSEMBLY

Keith V. Leigh-Monstevens, Troy, Mich., assignor to Automotive Products plc, Warwickshire, England  
Continuation of Ser. No. 177,313, Apr. 4, 1988, abandoned. This application Jul. 17, 1989, Ser. No. 380,764

Int. Cl.<sup>5</sup> B29C 41/20, 45/14  
U.S. Cl. 264—255 23 Claims



1. A method of forming a hydraulic cylinder assembly of the type including a main body cylinder defining a central axial bore, a piston assembly mounted for reciprocal stroking axial movement in the bore and an external integral appendage on said main body cylinder, said method comprising:

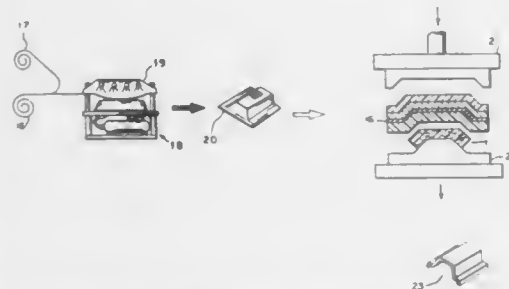
- (A) forming said main body cylinder with a cylindrical wall having a radial thickness  $t$  and an axial length  $l$  while simultaneously forming an external wall on the exterior periphery of said cylindrical wall extending totally around the circumference of said cylindrical wall and extending radially outwardly from said exterior periphery and having an axial thickness substantially less than  $l$  and not substantially exceeding  $t$ ; and
- (B) forming an appendage and securing said appendage to said external wall in a molding operation to form an external axial wall thickness at the juncture of said appendage with said cylinder body having a value substantially less than  $l$  and substantially exceeding  $t$ .

# 4,959,189

## PROCESS FOR FORMING A COMPOSITE STRUCTURE OF THERMOPLASTIC POLYMER AND SHEET MOLDING COMPOUND

Frank Rohrbacher, Wilmington, Del.; Patrick L. Spain, Lowell, Ind., and Roger A. Fahsing, Park Forest, Ill., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
Filed Sep. 26, 1988, Ser. No. 249,152

Int. Cl.<sup>5</sup> B29C 43/18  
U.S. Cl. 264—510 27 Claims



1. A process for making a rigid composite structure with a thermoplastic polymeric surface comprising the following steps:

- a. thermoforaming a thermoplastic polymeric sheet into a three dimensional thermoformed structure, said thermoplastic polymeric sheet having a primary glass transition

temperature at least  $10^\circ$  C. greater than a temperature of molding in step (e) below;

- b. opening a mold having an upper die and lower die with opposing molding surfaces cooperating to define a mold cavity with one of the dies having a shape corresponding to the three dimensional thermoformed structure;
- c. placing the thermoformed structure of step (a) and a charge of a thermosettable sheet molding compound comprising polyester resin, polymerizable monomers, filler pigments and glass fibers on the molding surface of one of the dies;
- d. closing the mold so that the dies compress the charge causing it to fill the mold cavity and come into adherence with the thermoformed structure;
- e. molding the charge and thermoformed structure under heat and pressure to adhere the sheet molding compound to the thermoformed structure and to cure the sheet molding compound, wherein heating of the mold is at least  $10^\circ$  C. below the glass transition temperature of the thermoplastic polymeric sheet; and
- f. opening the dies and removing the resulting composite structure having the thermoformed structure firmly adhered to the cured sheet molding compound.

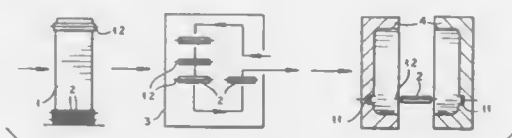
# 4,959,190

## PROCESS FOR MAKING A PLASTIC CONTAINER BY BLOW MOLDING

Pierre Pfeiffer, Drulingen; Benoit Cheval, Saverne, and Paul Sigwalt, Drulingen, all of France, assignors to Sotralentz S.A., Drulingen, France

Filed Dec. 16, 1988, Ser. No. 285,901  
Claims priority, application Fed. Rep. of Germany, Dec. 18, 1987, 3742993

Int. Cl.<sup>5</sup> B29C 49/04, 49/20  
U.S. Cl. 264—516 4 Claims



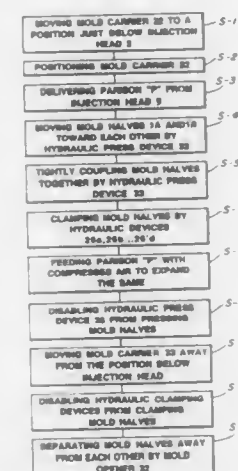
1. A process for blow molding a container, comprising:
  - (a) storing a multiplicity of unsorted injection molded one-piece hoop rings of thermoplastic material having outwardly projecting annular collars and which can deviate from a planar shape;
  - (b) successively transferring the unsorted injection molded one-piece hoop rings of thermoplastic material having outwardly projecting annular collars stored in step (a) to a preheating station and heating each of said hoop rings at said station to a temperature sufficient to relieve stress in each hoop ring, to make the respective hoop ring planar and to enable subsequent blow molding to impart to each hoop ring a circularity correction;
  - (c) engaging the collar of the respective hoop ring, preheated in step (b) to said temperature, with a manipulator and transferring the hoop ring engaged by the manipulator into an open blow mold having holding means for retaining the preheated ring in said open blow mold;
  - (d) feeding a tube of thermoplastic material into said open blow mold and through said preheated ring retained in the open blow mold;
  - (e) closing said blow mold to squeeze off a section of said tube in said blow mold;
  - (f) blow-molding said section of said tube in said blow mold by inflating said section with pressurized air to form said container, to correct circularity of the ring in said blow mold, and to secure said ring to said container; and
  - (g) removing the container formed in step (f) from the blow mold.

# 4,959,191

## METHOD FOR BLOW MOLDING LARGE HOLLOW BODIES

Masanori Yoshioka, Tokyo, and Masafumi Kozai, Yokohama, both of Japan, assignors to Nissan Motor Company, Ltd., Japan

Filed Sep. 29, 1989, Ser. No. 414,545  
Int. Cl.<sup>5</sup> B29C 33/24, 49/04, 49/32, 49/56  
U.S. Cl. 264—529 3 Claims



1. A method for blow molding a hollow body, comprising:
  - (a) moving mold halves to a first position just below a material injection head while keeping said mold halves separated;
  - (b) injecting a fluidized plastic material from said injection head to produce a tubular parison between the separated mold halves at said first position;
  - (c) moving said mold halves toward each other with said parison therebetween and coupling them together with a first given pressing force, the coupled mold halves defining a cavity and said parison being pinched by the coupled mold halves;
  - (d) then clamping said mold halves together with a second given pressing force;
  - (e) feeding the interior of said parison with compressed air to expand the same into engagement with walls of the cavity of the coupled mold halves, said compressed air being set at a first given magnitude;
  - (f) reducing the magnitude of said compressed air to a second given magnitude;
  - (g) then removing said first given pressing force applied to said mold halves at the step (c) while maintaining the coupling of said mold halves with said second clamping force;
  - (h) moving the clamped mold halves from said first position to a second position which is at a distance from said first position; and then
  - (i) removing said second given pressing force applied to said mold halves at the step (d).

# 4,959,192

## NOZZLE DAM TRANSLOCATING SYSTEM

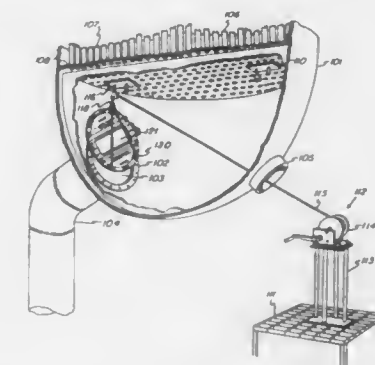
Mark H. Trundle, Signal Mountain, Tenn., and William C. Jones, Tannell Hill, Ga., assignors to Tennessee Valley Authority, Muscle Shoals, Ala.

Filed Jun. 13, 1989, Ser. No. 365,641  
Int. Cl.<sup>5</sup> G21C 19/00 9 Claims

1. A nozzle dam translocating system for remotely relocating nozzle dam means from outside the confines of nuclear reactor steam generator channel head means to coupled association with nozzle holddown ring means within the confines of said channel head means and for the converse thereof to

thereby substantially minimize personnel exposure to radiation and/or radioactive contamination environment within said channel head means, said system comprising:

- (a) nuclear reactor steam generator channel head means having manway means and nozzle holddown ring means provided on the lower wall thereof, and tubesheet means generally defining a horizontal plane comprising the upper boundary thereof;
- (b) tubesheet tackle means adapted for remote location and attachment to a first predetermined situs, said first predetermined situs disposed on said tubesheet means;
- (c) lifting means adapted for operative association with both said tubesheet tackle means and a second predetermined situs, said second situs located outside the confines of said channel head means;
- (d) nozzle dam means adapted in folded mode for introduction through said manway means and into said channel head means;
- (e) nozzle dam strapping means adapted for securing to said nozzle dam means either prior or subsequent to introduction thereof through said open manway means and into said channel head means, and further adapted for coupling with said lifting means and said tubesheet tackle means, whereby subsequent actuating of said lifting means elevates said folded nozzle dam means adapted in folded



- mode to effect the unfolding thereof to the full open position and the continued actuating of said lifting means translocates said fully opened nozzle dam means until the center point thereof is substantially vertically disposed over the center point of said nozzle holddown ring means and in juxtaposition therewith;
- (f) remote determination orientation means adapted for inspection and/or adjustment of said nozzle dam means relative to the angular rotation, or the horizontal vector displacement, or both, of said nozzle dam means relative to said nozzle holddown ring means;
- (g) bolt starting tool means adapted for remotely securing, at least temporarily, said nozzle dam means and later mentioned nozzle dam center section means, to said nozzle holddown ring means;
- (h) nozzle dam center section means adapted for introduction through said manway means and into said channel head means and further adapted for remote operative association with at least a portion of said nozzle dam strapping means whereby coupling of said nozzle dam strapping means with said lifting means and the subsequent actuating thereof effects positioning and engagement of said center section means with said nozzle dam means; and
- (i) torquing means adapted for securing said nozzle dam means to said nozzle holddown ring and said nozzle dam center section to said nozzle holddown ring.

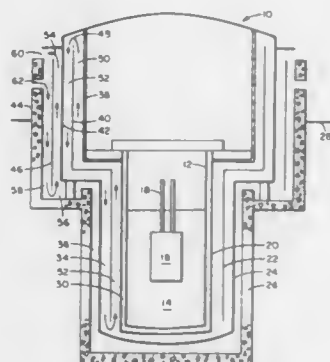
4,959,193  
INDIRECT PASSIVE COOLING SYSTEM FOR LIQUID  
METAL COOLED NUCLEAR REACTORS

Anstein Hunsbott, Los Gatos, and Charles E. Boardman, Saratoga, both of Calif., assignors to General Electric Company, San Jose, Calif.

Filed May 11, 1989, Ser. No. 350,187  
Int. Cl.<sup>3</sup> G21C 15/18

U.S. Cl. 376—299

15 Claims



10. A passive cooling system for liquid metal cooled nuclear reactors having a pool of liquid metal coolant with the heat generating fissionable fuel core substantially immersed in said pool of liquid metal coolant, the passive cooling system including a combination of spaced apart side-by-side partitions in generally concentric arrangement and providing for intermediate fluid circulation and heat transfer therebetween, comprising:

- a reactor vessel for containing a pool of liquid metal coolant with a fuel core substantially immersed therein, a sidewall of the reactor vessel forming an innermost first partition;
- a guard vessel substantially surrounding the reactor vessel in spaced apart relation having a side wall forming a second partition;
- a containment vessel substantially surrounding the guard vessel in spaced apart relation having a side wall forming an outermost third partition;
- a concrete silo substantially surrounding the containment vessel in spaced apart relation;
- a multiplicity of baffles extending between the first and second partitions formed by the side walls of the spaced apart reactor and guard vessels dividing the space intermediate said partitions into several channels for fluid circulation and in open communication adjacent to the lowermost portion of said vessels whereby the fluid circulating channels are interconnected;
- a closed circulating fluid flow course for recirculating fluid coolant in a recycling path comprising between the first and second partitions formed by the side walls of the spaced apart reactor and guard vessels; and
- a second circulating fluid flow course open to the ambient atmosphere adjoining at least a portion of the closed circulating flow course extending above the reactor vessel and consisting of at least one downcomer duct having an opening to the atmosphere in an upper area thereof and at least one adjacent riser duct having an opening to the atmosphere in an upper area thereof, said riser duct abutting at least a portion of the closed circulating flow course extending above the reactor vessel, the adjacent downcomer and rise ducts being joined together in fluid communication in their lower areas to provide an open circuit for the passage of ambient air from the atmosphere into and downward through a downcomer duct and around back up through a riser duct and out into the atmosphere.

4,959,194  
HIGH STRENGTH URANIUM-TUNGSTEN ALLOY  
PROCESS

Paul S. Dunn, Santa Fe; Haskell Sheinberg; Billy M. Hogan, both of Los Alamos, all of N. Mex.; Homer D. Lewis, Bayfield, Colo., and James M. Dickinson, Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 28, 1989, Ser. No. 329,901

Int. Cl.<sup>3</sup> B22F 7/00

U.S. Cl. 419—46

15 Claims

1. A method for making an alloy having a coherent shape which is comprised of uranium and tungsten where the amount of tungsten present in the alloy is from about 4 wt % to about 35 wt %, said method comprising:

- a. placing tungsten powder and uranium in a container;
- b. heating said uranium and tungsten to a temperature which is above the melting point of uranium and below the melting point of tungsten to form a molten mixture containing tungsten powder;
- c. holding said molten mixture at said temperature for a sufficiently long time period to effect degassing and homogenization of the mixture; and
- d. discharging said molten mixture from said container into a mold.

4,959,195  
METHOD OF FORMING LARGE-SIZED ALUMINUM  
ALLOY PRODUCT

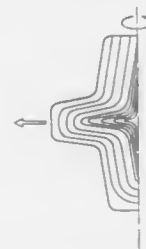
Jun Kusui, Yokaichi; Masahiko Kawai, Nara; Yusuke Odani, Higashiosaka, and Yoshinobu Takeda, Suita, all of Japan, assignors to Sumitomo Electric Industries, Ltd. and Toyo Aluminium Kabushiki Kaisha, both of Japan

Filed May 4, 1989, Ser. No. 347,879

Claims priority, application Japan, May 12, 1988, 63-115625  
Int. Cl.<sup>3</sup> B22F 1/00

U.S. Cl. 419—67

7 Claims



1. A process for preparing a large-sized P/M aluminum alloy produce comprising:

- extruding, at a temperature between 350 and 500° C. and at an extrusion ratio of 2 to 5, aluminum alloy powder consisting essentially of (a) 5 to 30% by weight of Si, (b) 0.5 to 10% by weight of at least one species selected from the group consisting of Cu, Mg, Fe, Ni, Cr, Mn, Mo, Zr and V with the proviso that the total amount of these species cannot exceed 30% by weight, and (c) aluminum in a remaining amount; and
- forging the extruded material at a temperature of 400° to 530° C.

4,959,196  
DEVICE FOR BLOOD SAMPLING AND ANALYSIS

Claude Molsson, Nogent le Phaye, France, assignor to Bioval-  
lea, Monastier Sur Garonne, France

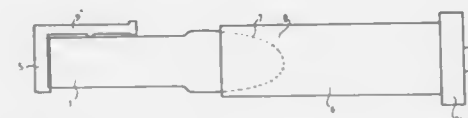
Filed Dec. 20, 1988, Ser. No. 286,798

Claims priority, application France, Dec. 21, 1987, 87 17811

Int. Cl.<sup>3</sup> G01N 21/75, 33/72; A61B 5/14, 5/20

U.S. Cl. 422—68,05

11 Claims



1. A device for sampling blood and evaluating desired concentrations of substances therein, comprising:

- an auto-pricker;
- a plurality of strips, said strips including a reactive area having a color which varies according to the concentration of the substance being evaluated;
- a reflectometer comprising:
  - (a) reading system means for supplying information about said reactive area;
  - (b) processing system means for receiving and processing said information supplied by said reading system means, said processing system means comprising microprocessor and read-only memory means for converting said information supplied by said reading system into the desired concentration; and
  - (c) display system means for directly displaying the desired concentration; and
- magazine means for holding said strips, said magazine means being integral with said auto-pricker and having holder means for receiving one of said strips externally of said reflectometer before said one of said strips has received the sampled blood;
- said auto-pricker being separable from said reflectometer during pricking, and said auto-pricker and said reflectometer including first integration means for integrating said auto-pricker and said reflectometer when at rest and second integration means for integrating said auto-pricker and said reflectometer during reading of the color of said reactive area.

4,959,197  
FILTER CANISTER FOR IMMUNOASSAYS

Bharat S. Parekh, Pleasant Hill; William F. Link, Richmond, Stephen R. Coates, Orinda, and George B. La Motte III, Larkspur, all of Calif., assignors to Bio-Rad Laboratories, Inc., Hercules, Calif.

Filed Sep. 7, 1988, Ser. No. 241,444

Int. Cl.<sup>3</sup> B01L 11/00, 3/00; C12M 1/16, 1/20

U.S. Cl. 422—101

5 Claims

1. A canister for holding a fluid-permeable membrane for use in a biospecific binding assay, comprising:

- a cup-shaped receptacle closed at the bottom and sides and open at the top;
- a fluid-permeable membrane;
- a cap shaped to mate with said receptacle, said cap having a central opening sized to receive said fluid-permeable membrane and surrounded by a raised surface;
- removable means for securing said fluid-permeable membrane to said cap across said opening; and
- means for venting the interior of said receptacle to the atmosphere when said cap and said receptacle are joined.

4,959,198  
DOWNWARDLY FORCED PARTICLE BED FOR GAS  
CONTACTING

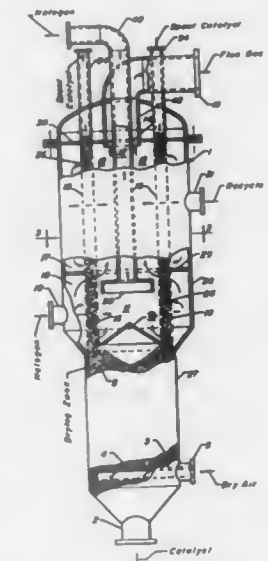
William J. Kovacs, Hoffman Estates, Ill., assignor to UOP, Des Plaines, Ill.

Filed Oct. 26, 1989, Ser. No. 426,907

Int. Cl.<sup>3</sup> B01J 8/12

U.S. Cl. 422—220

6 Claims



1. Apparatus for contacting particles and simultaneously withdrawing said particles, said apparatus comprising:

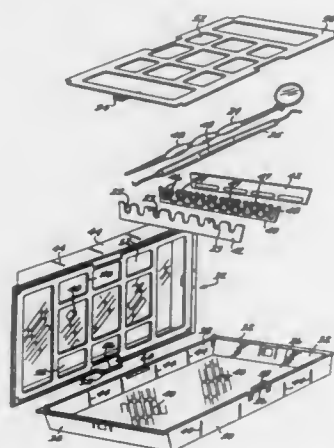
- (a) a vessel;
- (b) a fluid inlet;
- (c) a fluid outlet;
- (d) an inlet screen and an outlet screen disposed vertically within said vessel defining a particle chamber and arranged to confine a vertically-elongated bed of particles through which fluid passes;
- (e) a plurality of outlet apertures defined by said outlet screen and arranged such that the open cross sectional area provided by said outlet apertures varies progressively along the length of said outlet screen, the top of said outlet screen has a minimum open cross sectional area and the bottom of said outlet screen has a maximum open cross sectional area, such that the total resistance to fluid flow of said outlet screen varies from a maximum at the top of the outlet screen to a minimum at the bottom of the outlet screen;
- (f) a plurality of inlet apertures defined by said inlet screen and arranged such that the open cross sectional area provided by said inlet apertures varies progressively along the length of said inlet screen, the top of said inlet screen has a maximum open cross sectional area, the bottom of said inlet screen has a minimum open cross sectional area, such that the total resistance to fluid flow of said inlet screen varies from a minimum resistance at the top of the inlet screen to a maximum resistance at the bottom of the inlet screen, and the upper extent of said inlet apertures are located above the upper extent of said outlet screen apertures by a fixed offset distance;
- (g) a fluid collection chamber defined in part by at least one of said vessel and said outlet screen;
- (h) a fluid distribution chamber defined in part by at least one of said vessel and said inlet screen;
- (i) means for adding particles to the top of said particle chamber; and
- (j) means of withdrawing particles from the bottom of said particle chamber.



4,959,199  
**AUTOCLAVABLE MODULAR CASSETTE AND TRAY FOR HOLDING DENTAL INSTRUMENTS**  
 Charles A. Brewer, 105 Via Wazler, Newport Beach, Calif. 92660

Filed Feb. 19, 1988, Ser. No. 157,879  
 Int. Cl.<sup>5</sup> A61L 2/20; B65D 45/16, 51/16  
 U.S. Cl. 422—300

20 Claims



11. An autoclavable modular cassette for holding dental instruments comprising:

two substantially identical trays, the trays having hinge means for removably assembling the trays to one another, each tray having a main plate having a plurality of apertures where through a liquid can be sprayed into and can be drained out of the tray, and at least a pair of parallel side walls, disposed on opposite edges of the main plates; a plurality of ribs which are mounted into each tray to occupy substantially parallel positions therein substantially transverse to the general longitudinal axis of the tray, and extending substantially from side wall to side wall, one of the trays including clamping means for holding a plurality of elongated dental instruments in positions substantially transverse to the ribs, the clamping means including substantially Y shaped posts protruding upwardly from one of the ribs;

the trays and the ribs being made of autoclavable plastic material whereby a separate set of dental instruments can be placed into each tray, and whereby the assembled trays forming on the enclosure containing two sets of dental instruments can be cleaned with liquid and ultrasound and can be autoclaved.

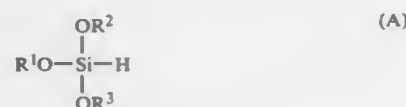
4,959,200  
**PROCESS FOR MANUFACTURING SILANE**  
 Shin-ichi Inaba, and Hideki Nagahama, both of Minamata, Japan, assignors to Chisso Corporation, Japan

Filed Feb. 4, 1988, Ser. No. 152,306  
 Claims priority, application Japan, Feb. 10, 1987, 62-28768  
 Int. Cl.<sup>5</sup> C01B 33/04

U.S. Cl. 423—347

17 Claims

1. A process for manufacturing silane comprising subjecting a trialkoxysilane in the gaseous state, said trialkoxysilane represented by the general formula (A)



wherein each of R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> is an alkyl group having 1 to 3 carbon atoms, to a disproportionation reaction in a phase consisting of the gaseous phase by

supplying said trialkoxysilane to a reaction zone containing a catalyst which is an oxide of a metal in the third period of the periodic table.

4,959,201  
**GREEN DIAMOND AND METHOD OF PRODUCING THE SAME**

Shuichi Satoh, and Kazuwo Tsuji, both of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Dec. 30, 1988, Ser. No. 292,754  
 Claims priority, application Japan, Jan. 13, 1988, 63-5573  
 Int. Cl.<sup>5</sup> C01B 31/06

U.S. Cl. 423—446

10 Claims

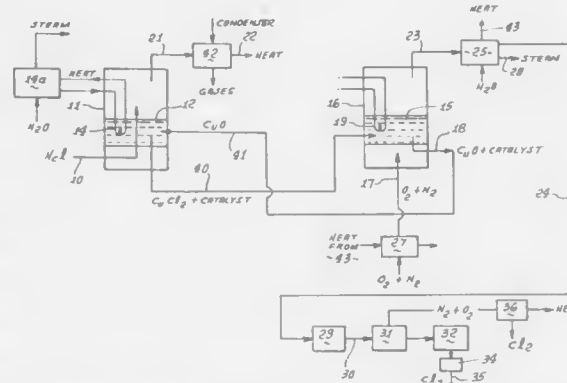
1. A green diamond comprising Ib-type diamond crystals with a nitrogen content within the range of  $5 \times 10^{16}$  to  $3 \times 10^{19}$  atoms/cm<sup>3</sup>, an absorption coefficient of H2 centers at a wavelength of 800 nm is 0.3 to 6 cm<sup>-1</sup>, an absorption coefficient of Ib type nitrogen at a wavelength of 500 nm within the range of 0.05 to 1.5 cm<sup>-1</sup>, and absorption coefficients of H3 centers, H4 centers, N-V centers and GR1 centers in the visible range of not more than 0.2 cm<sup>-1</sup>, said diamond having a brilliant green transparency.

4,959,202  
**RECOVERY OF CHLORINE FROM HYDROGEN CHLORIDE BY CARRIER CATALYST PROCESS**  
 Ronald G. Minet, South Pasadena; Theodore T. Tsotsis, Huntington Beach, and Sidney W. Benson, Brentwood, all of Calif., assignors to Medalect Incorporated, South Pasadena, Calif.

Filed May 31, 1989, Ser. No. 359,630  
 Int. Cl.<sup>5</sup> G01B 7/04

U.S. Cl. 423—502

14 Claims



1. In a process of recovering chlorine from a stream of hydrogen chloride, the steps that include:

- providing a first fluidized bed of a carrier catalyst cupric oxide in a first reaction zone within a first reactor,
- supplying hydrogen chloride in a first stream to said zone for fluidizing said first bed and for exothermic reaction with cupric oxide in said bed to produce cupric chloride, water and heat, removing cupric chloride from said zone in a second stream, and removing water from said zone and removing heat from said zone,
- feeding said second stream to a second reaction zone within a second reactor, and providing a second fluidized bed of cupric chloride in said second reaction zone, and
- supplying oxygen in a third stream to said second zone for fluidizing said second bed and for endothermic reaction with cupric chloride in said second bed at elevated temperatures between 300° and 360° C. to produce cupric oxide and chlorine, removing chlorine from said second zone in a fourth stream, and removing cupric oxide from said second bed for re-use as a catalyst to produce cupric

chloride, by direct recycling to the first fluidized bed of said cupric oxide removed from the second fluidized bed.

4,959,203  
**PREPARATION OF COPPER ARSENATE**  
 Susan B. Knoerr, Castlegar, Canada, and Robert G. Robins, Lindfield, Australia, assignors to Cominco Ltd., Vancouver, Canada

Filed Aug. 28, 1989, Ser. No. 399,195  
 Int. Cl.<sup>5</sup> C01G 28/02, 3/00

U.S. Cl. 423—602

12 Claims

1. In a method for the preparation of copper arsenate comprising the steps of adding a solution of water soluble arsenate to a copper sulfate solution, at least one of the arsenate solution and the copper sulfate solution containing sludge-forming impurities, to form a copper and arsenic-containing solution without precipitating copper arsenate, the amount of copper and the amount of arsenic in said copper and arsenic-containing solution being such that copper arsenate can be formed; causing said impurities to precipitate at a value of pH less than about 2.2 at which said sludge-forming impurities precipitate and in which copper arsenate does not precipitate; separating precipitated impurities from said copper and arsenic-containing solution; neutralizing said copper and arsenic-containing solution in a precipitation to precipitate copper arsenate; and recovering copper arsenate substantially free from said sludge-forming impurities, and having a water content, the improvement comprising lowering said water content by adding to said copper and arsenic-containing solution an amount of chromium, soluble in said copper and arsenic-containing solution in the range of about 0.005 to 0.250 gram of chromium per liter of said copper and arsenic-containing solution.

4,959,204  
**ORAL COMPOSITIONS**  
 Leslie D. Ryan, Millville, Ohio, assignor to The Proctor & Gamble Company, Cincinnati, Ohio  
 Continuation of Ser. No. 625,267, Jun. 27, 1984, Pat. No. 4,663,154, which is a continuation of Ser. No. 492,520, May 9, 1983, Pat. No. 4,472,373. This application Feb. 2, 1987, Ser. No. 10,253

The portion of the term of this patent subsequent to May 4, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 7/22

U.S. Cl. 424—54

2 Claims

1. A method of inhibiting plaque comprising the step of contacting plaque in the oral cavity with an effective amount of composition comprising a dentifrice carrier suitable for use in the oral cavity and from about 0.05% to about 7% of an antimicrobial selected from the group consisting of the fluoride, chloride, bromide and iodide salts of N-tetradecyl-4-ethyl pyridinium.

4,959,205  
**COMPOSITION AND METHOD FOR TREATMENT OF DERMAL INFLAMMATION**  
 Maureen Brunner, San Francisco, and Howard Palefsky, Atherton, both of Calif., assignors to Collagen Corporation, Palo Alto, Calif.

Filed Mar. 23, 1989, Ser. No. 327,488  
 Int. Cl.<sup>5</sup> A61K 7/40, 7/42, 31/56

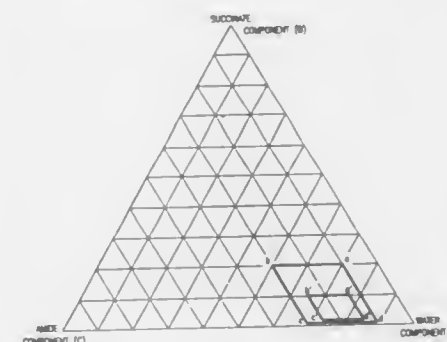
U.S. Cl. 424—59

6 Claims

1. A topical composition for treating dermal inflammation, comprising:  
 0.25%–0.5% hydrocortisone;  
 an effective protective amount of a water-soluble sunscreen agent; and  
 a pharmaceutically acceptable carrier.

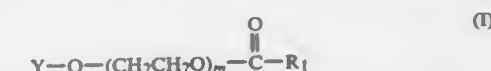
4,959,206  
**PEARLING AGENT DISPERSION**  
 Angel R. Noguera, Barcelona; Carlos C. Planella, Sant Cugat del Valles, and Masaki Itabashi, Barcelona, all of Spain, assignors to KAO Corporation, Tokyo, Japan  
 Filed Dec. 23, 1988, Ser. No. 289,251  
 Claims priority, application Japan, Dec. 28, 1987, 62-332792  
 Int. Cl.<sup>5</sup> A61K 7/06; B01J 13/00  
 U.S. Cl. 424—70

4 Claims



1. A pearling agent dispersion comprising as essential components:

(A) 10 to 40% by weight of a fatty acid glycolic ester represented by the following formula (I):

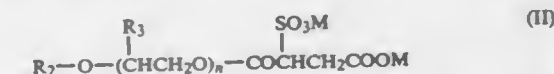


wherein R<sub>1</sub> represents a linear or branched, saturated or unsaturated hydrocarbon group of a C<sub>13-21</sub> carbon atom content, Y represents a hydrogen atom or a

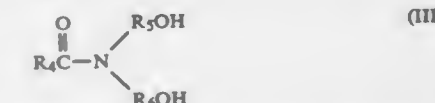


group, m indicates a value of 1–3, which is the average number of ethylene oxide group addition moles,

(B) 0.8 to 16% by weight of an alkylsulfosuccinate or a polyoxyalkylenealkylsulfosuccinate represented by the following formula (II):



wherein R<sub>2</sub> represents a linear or branched alkyl group of a C<sub>8-20</sub> carbon atom content, R<sub>3</sub> represents a hydrogen atom or a methyl group, M represents an alkali metal, an alkaline earth metal, an ammonium ion, an alkyl group-substituted ammonium with the alkyl group having a C<sub>1-3</sub> carbon atom content, or a hydroxy alkyl group-substituted ammonium with the hydroxy alkyl group having a C<sub>2-3</sub> carbon atom content, n is a value of 0 to 8, which is the average number of addition moles,  
 (C) 8 to 24% by weight of a fatty acid dialkanol amide of the following formula (III):



wherein R<sub>4</sub> represents a linear or branched, saturated or unsaturated hydrocarbon group of a C<sub>7-17</sub> carbon atom

content, and  $R_5$  and  $R_6$  independently represent a group  $-C_2H_4$  or  $-C_3H_6$ , and

(D) 50 to 81% by weight of water; and wherein the ratio of the components (B), (C), and (D) lies within a region defined by straight lines linking the following four points of a three-component trigonometric diagram:

a'[(B)=10 : (C)=13 : (D)=77],  
b'[(B)=10 : (C)=25 : (D)=65]  
c'[(B)=2 : (C)=25 : (D)=73], and  
d'[(B)=2 : (C)=13 : (D)=85].

4,959,207

# DEODORANT COMPOSITION, DEODORANT RESIN COMPOSITION AND DEODORANT RESIN SHAPED ARTICLE

Tsunehisa Ueda, Zushi; Kouji Miyazaki, Yokohama; Tadao Natsuume, Yokohama, and Yoshiaki Miki, Yokohama, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan  
Filed Mar. 2, 1988, Ser. No. 163,087

Claims priority, application Japan, Mar. 2, 1987, 62-47337; Mar. 2, 1987, 62-47339; Aug. 7, 1987, 62-197566; Sep. 10, 1987, 62-227378; Sep. 11, 1987, 62-228051

Int. Cl.<sup>3</sup> A61L 2/18

U.S. Cl. 424—76.1

12 Claims

1. A deodorant composition comprising (A) a compound having an acid anhydride group in the molecule selected from the group consisting of (1) a polymer having units derived from an alpha, beta-unsaturated dicarboxylic acid anhydride, (2) a Diels-Alder addition reaction product of an alpha, beta-unsaturated dicarboxylic acid anhydride with an olefin its derivative, and (3) an anhydride of an aliphatic, alicyclic or aromatic monocarboxylic or polycarboxylic acid anhydride, and (4) an ene reaction product of an alpha, beta-unsaturated dicarboxylic acid anhydride with an olefin and its derivative, and (B) a copper salt of an inorganic acid or a copper salt of a monomeric organic acid; and when the compound (A) having an acid anhydride group in the molecule is the polymer (1) having units derived from an alpha, beta-unsaturated dicarboxylic acid anhydride, said polymer is a homopolymer of an alpha, beta-unsaturated dicarboxylic acid anhydride, a copolymer of an alpha, beta-unsaturated dicarboxylic acid anhydride with a monomer copolymerizable therewith selected from the group consisting of styrene, alpha-methylstyrene, vinyltoluene, isobutene, 1-butene, 2-butene, 1-pentene, 2-pentene, 2-methyl-1-butene, 2-methyl-2-butene, 1-hexene, 2,2,4-trimethyl-1-pentene, 2,2,4-trimethyl-2-pentene, 1-decene, 1-octadecene, cyclopentene, cyclohexene, cyclooctene, butadiene, isoprene and piperylene, or said homopolymer or copolymer in which a portion of said acid anhydride groups are converted to carboxyl groups.

4,959,208

# ACTIVE AGENT DELIVERY DEVICE

Paritosh M. Chakrabarti, Pittsburgh, Pa.; John M. Denison, Westmount, Canada; Harlan B. Johnson, Rittman; Malcolm Korach, Akron, both of Ohio; Dennis D. Leatherman, Pittsburgh, Pa.; Linda P. Reinhardt, Lake Charles, La.; Richard A. Schwarz, Akron, and Robert B. Simmons, Norton, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.  
Continuation-in-part of Ser. No. 250,015, Sep. 27, 1988, which is a continuation-in-part of Ser. No. 110,147, Oct. 19, 1987, abandoned. This application Oct. 28, 1988, Ser. No. 264,242

The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> A61K 31/74, 31/765, 9/50, 9/14

U.S. Cl. 424—78

14 Claims

1. An active agent delivery device which releases active agent over a prolonged period of time comprising:

(a) microporous material comprising:

(1) a matrix consisting essentially of essentially linear ultrahigh molecular weight polyolefin which is essentially linear ultrahigh molecular weight polyethylene having an intrinsic viscosity of at least about 18 decili-

ters/gram, essentially linear ultrahigh molecular weight polypropylene having an intrinsic viscosity of at least about 6 deciliters/gram, or a mixture thereof,

(2) finely divided particulate substantially water-insoluble filler, of which at least about 50 percent by weight is siliceous, distributed throughout said matrix, said filler constituting from about 50 percent to about 90 percent by weight of said microporous material, and

(3) a network of interconnecting pores communicating throughout said microporous material, said pores constituting more than 35 percent by volume of said microporous material.

(b) a releasable active agent or precursor thereof associated with at least a portion of said filler.

4,959,209

# USE OF N,N-DIETHYL-M-TOLUAMIDE AND/OR THE ETHYL ESTER OF 2-METHYL-3-PENTENOIC ACID AS INSECT ATTRACTANTS

Richard A. Wilson, Westfield, N.J.; Jerry F. Butler, Gainesville, Fla.; Donald Withycombe, Lincroft, N.J.; Braja D. Mookherjee, Holmdel, N.J.; Ira Katz, West Long Branch, N.J., and Kenneth R. Schrankel, Tinton Falls, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.  
Continuation of Ser. No. 213,683, Jun. 30, 1988, Pat. No. 4,880,625, which is a continuation of Ser. No. 26,979, Mar. 17, 1987, Pat. No. 4,808,403. This application Aug. 28, 1989, Ser. No. 399,825

The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> A01N 25/00

U.S. Cl. 424—81

5 Claims

1. A method of attracting *Musca domestica* L. (Diptera: Muscidae) to an insect trap comprising the step of exposing the environment surrounding said trap to an insect attractant-containing polymer which consists of a mixture of a polymer and from about 1% up to about 45% by weight of said polymer of a composition of matter selected from the group consisting of:

(i) N,N-diethyl-m-toluamide;  
(ii) the mixture of N,N-diethyl-m-toluamide and the ethyl ester of 2-methyl-3-pentenoic acid;  
(iii) a mixture of N,N-diethyl-m-toluamide and dimethyl disulfide; and  
(iv) a mixture of N,N-diethyl-m-toluamide, the ethyl ester of 2-methyl-3-pentenoic acid and dimethyl disulfide  
said polymer being compatible with said composition of matter.

4,959,210

# TREATMENT OF GENITAL WARTS WITH A COMBINATION OF LIQUID NITROGEN AND RECOMBINANT DNA HUMAN ALPHA INTERFERON

Kenneth A. Smiles, Windsor, N.J.; Edwin A. Peets, New York, and Daniel J. Tanner, Brooklyn, both of N.Y., assignors to Schering Corporation, Kenilworth, N.J.  
Filed Nov. 1, 1988, Ser. No. 265,612

Int. Cl.<sup>3</sup> A61K 37/66

U.S. Cl. 424—85.7

10 Claims

1. A method of treating condylomata acuminata infections in patients in need of such treatment comprising administering to each lesion an effective amount of a cryosurgical agent, followed by administration to each lesion immediately thereafter an effective amount of human alpha interferon.

4,959,211

# PROCESS FOR THE PRODUCTION ON AN ANTIVIRAL VACCINE, PARTICULARLY ANTI-FOOT AND MOUTH DISEASE VACCINE

Jorge H. Lombardo, Itzvingo 865, 1244 Moreno; Eduardo E. Smolko, Rioja 2897, (1636) Olivos, Buenos Aires; Rodolfo A. Ugalde, Chile 740, Haedo Buenos Aires 1706, and Scholein Rivenson, Vidt 2027, 4th-10-Buenos Aires, all of Argentina  
Filed Apr. 22, 1988, Ser. No. 184,784

Claims priority, application Argentina, Apr. 28, 1987, 307406  
Int. Cl.<sup>3</sup> A01N 63/00

U.S. Cl. 424—93

17 Claims

1. A process for preparing an antiviral vaccine, particularly anti-foot and mouth disease vaccine, which process comprises the steps of:

(a) radiating an animal free of active virus with ionizing radiations;  
(b) innoculating active virus into said animal;  
(c) maintaining the animal under controlled sterile conditions and under antibiotic administration until a high viral proliferation is obtained;  
(d) after animal's death, cooling the cadaver;  
(e) withdrawing skin and viscerae from the animal cadaver;  
(f) crushing the soft portions of the remaining parts of the cadaver with the aid of a saline solution in order to obtain a visually homogeneous mixture;  
(g) mechanically separating an active viral suspension from said mixture;  
(h) transforming the active viral suspension into an inactive viral suspension through the application of ionizing radiation on said suspensions, which are maintained at a temperature substantially lower than 0° C.; and  
(i) formulating the vaccine from said inactive viral suspension.

4,959,212

# OXIDIZING-ENERGIZING COMPOSITION AND METHOD FOR THE TREATMENT OF DIABETES

Alexandra Stancesco, 1184 Main St., Apt. 75, River Edge, N.J. 07661; Apostol Spiliadis, 5-D Patton Dr., Bloomfield, N.J. 07003, and Theodore Damas, 977 Waterloo Street, Ontario, London, Canada N 6 A 2 x 4  
Filed Jun. 22, 1988, Ser. No. 209,877

Int. Cl.<sup>3</sup> A61K 37/62, 31/52, 31/505

U.S. Cl. 424—94.1

21 Claims

1. A non-toxic, oxidizing energizing composition suitable for use as an accelerator of the carbohydrate oxidative degradation metabolic process or of the direct oxidation of glucose which consists essentially of, by weight, (A) 10% to 95% of flavine adenine dinucleotide coenzyme (FAD) and (B) 5% to 90% of a coenzyme or enzyme selected from the group consisting of flavine mononucleotide coenzyme (FMN), ubiquinone coenzyme (UBQ), uridine 5'-triphosphate coenzyme (UTP), triphosphopyridine nucleotide coenzyme (TPN), diphosphopyridine nucleotide coenzyme (DPN), adenosine triphosphate coenzyme (ATP), uridine diphosphate glucose coenzyme (UDPG), guanosine 5'-triphosphate coenzyme (GTP), glucose oxidase enzyme (GOD) and mixtures thereof; and, (C) 0% to less than 50% of an enzyme selected from the group consisting of fructosediphosphate aldolase, phosphofructokinase, hexokinase, glucokinase, glucose 6-phosphate dehydrogenase, glucose phosphate isomerase, D-glucose-phosphotransferase and mixtures thereof, said composition being effective to reduce the blood glucose concentration in a human body afflicted with diabetes.

4,959,213

# PHARMACEUTICAL COMPOSITION FOR TREATMENT AND/OR PREVENTION OF DISEASES OF THE SKIN INVOLVING AN INFLAMMATORY PROCESS

Joel Brod, and Michel Kermiel, both of Paris, France, assignors to L'Oreal, Paris, France  
Continuation-in-part of Ser. No. 717,182, Mar. 14, 1985, abandoned. This application Sep. 14, 1987, Ser. No. 95,897  
Claims priority, application Luxembourg, Nov. 9, 1983, 85081  
Int. Cl.<sup>3</sup> A61K 37/102, 35/36; C07K 15/20

U.S. Cl. 514—21

6 Claims

1. A pharmaceutical composition for the treatment and prevention of erythema and acne comprising in a pharmaceutically acceptable carrier from about 1 to about 10 weight percent, based on the total weight of said composition, of a delipidized and purified keratin polymer obtained from an animal starting material comprising keratin, said keratin polymer (a) being freed from cells, (b) containing from about 90 to about 95 weight percent keratin material based on the total weight of said keratin polymer and (c) containing at most 0.1 weight percent lipid based on the total weight of said keratin polymer.

4,959,214

# PROCESSES FOR PREPARATION OF ALOE PRODUCTS PRODUCTS PRODUCED THEREBY AND COMPOSITIONS THEREOF

Bill H. McAnalley, Grand Prairie, Tex., assignor to Carrington Laboratories Inc., Irving, Tex.

Division of Ser. No. 136,193, Dec. 27, 1987, Pat. No. 4,917,890, which is a division of Ser. No. 869,261, Jan. 6, 1986, Pat. No. 4,735,935, which is a continuation-in-part of Ser. No. 810,025, Dec. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 754,859, Jul. 12, 1985, abandoned, which is a continuation-in-part of Ser. No. 750,321, Jan. 28, 1985, abandoned, which is a continuation-in-part of Ser. No. 649,967, Sep. 12, 1984, abandoned, which is a continuation of Ser. No. 375,720, May 7, 1982, abandoned. This application Jan. 23, 1989, Ser. No. 301,030

Int. Cl.<sup>3</sup> A61K 35/78

U.S. Cl. 424—195.1

15 Claims

1. A product, comprising: an ethanol precipitation of substantially anthraquinone-free juice of the aloe plant wherein said precipitation product is substantially nondegradable and lyophilized.

4,959,215

# IFOSFAMIDE-MESNA LYOPHILIZATE AND PROCESS FOR ITS PREPARATION

Dieter Sauerbier, Werther; Otto Isaac, Hannau, and Wolfgang P. Brade, Wehrheim, all of Fed. Rep. of Germany, assignors to Asta Pharma AG, Frankfurt am Main, Fed. Rep. of Germany  
Filed Mar. 20, 1989, Ser. No. 325,883

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1988, 3809337

Int. Cl.<sup>3</sup> A61K 9/00

U.S. Cl. 424—422

8 Claims

1. A lyophilized preparation consisting of ifosfamide, 0.05–1.0 parts by weight of sodium-2-mercaptoethane sulfonate and 0.1 to 17 parts by weight of a hexitol, the mesna and hexitol being in each case based on one part by weight of ifosfamide, as well as 0 to 16.9 parts by weight, based on 1 part by weight of ifosfamide, or pharmaceutical auxiliary substances.



4,959,216

**CONTRACEPTIVE METHODS AND DELIVERY SYSTEMS THEREOF**

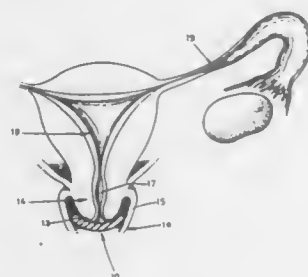
Brian Daunter, Bellbowrie, Australia, assignor to University of Queensland, Queensland, Australia

Continuation-in-part of Ser. No. 819,510, Dec. 18, 1985, abandoned. This application Dec. 17, 1987, Ser. No. 134,263

Claims priority, application Australia, Apr. 19, 1984, PG4658

Int. Cl.<sup>3</sup> A61K 33/34; A61M 31/00

U.S. Cl. 424—430



18. A contraceptive preparation for living animals to be introduced into the vaginal and/or cervical regions of the female reproductive system, said contraceptive preparation comprising (i) a metal chelate and (ii) a suitable reducing agent, wherein said preparation, when introduced into said regions, releases metal ions which complex with the cervical mucus to form an impenetrable barrier to spermatozoa.

4,959,217

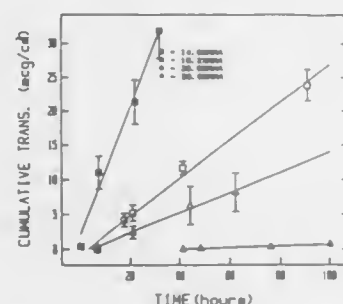
**DELAYED/SUSTAINED RELEASE OF MACROMOLECULES**

Lynda M. Sanders, Palo Alto, Calif., and Abraham Domb, Brookline, Mass., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed May 22, 1986, Ser. No. 866,042

Int. Cl.<sup>3</sup> A61K 9/24

U.S. Cl. 424—473



1. A drug delivery device for the controlled administration of a macromolecular drug, said device comprising:

- a pharmaceutically acceptable carrier;
- a macromolecular drug having a molecular weight greater than about 1,000 mixed with said carrier; and
- an initially partially-hydrated, non-biodegradable, hydrogel rate-limiting membrane, wherein said membrane:
  - comprises a homopolymer or a copolymer material surrounding said carrier and drug, and
  - has an initial water content such that it is substantially non-permeable to said macromolecular drug.

4,959,218

**METHOD FOR DELIVERING SOMATOTROPIN TO AN ANIMAL**

James B. Eckenhoff, Los Altos; Judy A. Magruder, Mt. View; Richard Cortese, Cupertino; John R. Peery, Palo Alto, and Jeremy C. Wright, Los Altos, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Division of Ser. No. 173,209, Mar. 25, 1988, Pat. No. 4,855,141.

This application Dec. 28, 1988, Ser. No. 291,930

The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> A61M 31/00

U.S. Cl. 424—473

2 Claims



1. A method for delivering a somatotropin to an animal comprising an aqueous-biological fluid, wherein the method comprises:

- admitting into the animal a delivery device comprising:
  - a wall;
  - an internal space defined by the wall;
  - a somatotropin protected from the aqueous-biological fluid in the internal space;
  - exit means for connecting the exterior and the interior of the device;
  - means in the space for occupying the space occupied by the somatotropin; and,
- delivering the somatotropin by the means occupying space and thereby displacing the somatotropin through the exit means to the animal.

4,959,219

**COATING BARRIERS COMPRISING ETHYL CELLULOSE**

San-Laung Chow, and Yegnaswami Raghunathan, both of Perinton, N.Y., assignors to Fisons Corporation, Rochester, N.Y.

Filed Aug. 15, 1988, Ser. No. 231,933

Int. Cl.<sup>3</sup> A61K 9/36, 9/62

U.S. Cl. 424—480

19 Claims

1. An extended-release pharmaceutical composition comprised of individually coated phenylpropanolaminedivinylbenzene sulfonic acid cationic exchange resin particles, the improvement wherein the coating is comprised of (a) ethyl cellulose and (b) from about 1.6% to about 8% by weight corn oil or acetylated monoglycerides with congealing temperatures below about 23° C., based upon the weight of the coated particles.

4,959,220

**ANTISEPTIC-CONTAINING ALGINATE IMPRESSION MATERIAL**

Tameyuki Yamamoto, Kamakura, and Masao Abiru, Omiya, both of Japan, assignors to G-C Dental Industrial Corporation, Tokyo, Japan

Filed Oct. 12, 1988, Ser. No. 256,566

Claims priority, application Japan, Oct. 12, 1987, 62-254623

Int. Cl.<sup>3</sup> A61K 9/16

U.S. Cl. 424—490

16 Claims

1. An antiseptic-containing alginate impression material which contains 0.01 to 7 parts by weight of an antiseptic mate-

rial per 100 parts by weight of cured product of dental alginate impression material, wherein said antiseptic material is either encapsulated in a microcapsule or clathrated in a cyclodextrin.

4,959,221

**PEST EXTERMINATING COMPOSITION**

Iris Holmes, 27 Greenbriar, Princeton Community Village, Princeton, N.J. 08540

Filed Nov. 14, 1988, Ser. No. 270,139

Int. Cl.<sup>3</sup> A01N 59/14

U.S. Cl. 424—659

7 Claims

1. A pest exterminating composition particularly usable for controlling of roaches and mice which comprises:

- powdered boric acid of from 1% to 75% by weight;
- powdered sugar of from 1% to 75% by weight; and
- a dried shredded coconut component of from 1% to 50% by weight, said coconut component being dried to remove oils therefrom.

4,959,222

**MAGNESIUM ADDITIVE FOR NUTRIENTS, FEED, AND MEDICAMENTS**

Karl J. Nadland, Lier, and Mari A. Kleppe, Tranby, both of Norway, assignors to Collett-Marwell Hange A/S, Asker, Norway

Filed Sep. 23, 1988, Ser. No. 248,419

Claims priority, application Norway, Sep. 28, 1987, 874067

Int. Cl.<sup>3</sup> A61K 33/08, 33/06, 31/19

U.S. Cl. 424—692

11 Claims

1. An organoleptically acceptable mineral granulate for human consumption in medicaments or as a food additive that consists essentially of a granulating liquid and a mixture of magnesium salts, wherein said mixture contains magnesium lactate and water soluble, acidic, substantially dibasic magnesium citrate, wherein the amount of the magnesium citrate equals from 1 to 40% by weight of the total magnesium in said granulate, the amount of said liquid is sufficient to form said granulate, and the amount of magnesium lactate and dibasic magnesium citrate in said granulate are sufficient to render compositions to which said granulate is added organoleptically acceptable.

4,959,223

**RUMINANT ANIMAL FEEDSTUFFS**

Johannes A. C. Van Ooyen, Glessenburg, Netherlands, assignor to BP Chemicals Limited, London, England

Filed Apr. 20, 1989, Ser. No. 340,905

Claims priority, application United Kingdom, Apr. 21, 1988, 8809455

Int. Cl.<sup>3</sup> A23K 1/22

U.S. Cl. 426—2

11 Claims

1. A ruminant animal feedstuff comprising a feed concentrate and an amount of a basic salt of propionic acid having a pH of 8–14 effective to improve milk production.

4,959,225

**SYNERGISTIC SWEETENING COMPOSITIONS CONTAINING CHLORODEOXY Sugars AND MALTITOL AND METHODS FOR PREPARING SAME**

Lucy L. Wong, Jackson Heights, N.Y.; Steven M. Faust, Stanhope, and Subraman R. Cherukuri, Towaco, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 28, 1988, Ser. No. 264,248

Int. Cl.<sup>3</sup> A23L 1/236; A23G 3/30

U.S. Cl. 426—3

52 Claims

1. A synergistic sweetening composition having a delayed and enhanced sweetness effect which comprises a chlorodeoxy sugar derivative and a bulking agent comprising at least about 50% maltitol.

4,959,226

**METHOD OF OPTIMIZING TEXTURE AND PROCESSABILITY OF CHEWING GUMS AND COMPOSITIONS MADE THEREFROM**

Albert H. Chapdelaine, Naperville; Vasek J. Kures, Willow Springs, and Ronald T. Grey, Chicago, all of Ill., assignors to Wm. Wrigley Jr. Company, Chicago, Ill.

Continuation-in-part of Ser. No. 25,939, Mar. 16, 1987, Pat. No. 4,803,083. This application Feb. 6, 1989, Ser. No. 307,013

The portion of the term of this patent subsequent to Feb. 7, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> A23G 3/30

U.S. Cl. 426—3

19 Claims

1. In a process of developing a new or reformulated chewing gum composition containing gum base, bulking and/or sweetening agents including powdered sorbitol, plasticizers and optional fillers, flavors, colors and processing aids, comprising the steps of

- making a sample batch of a gum composition,
- evaluating the texture and processability of the sample and
- producing and evaluating subsequent sample batches with different amounts of ingredients until acceptable texture and processability characteristics are obtained, the improvement comprising:
  - using at least two different sorbitol powders in one or more of the sample batches, wherein the sorbitol powders produce statistically significant differences in at least one of the values selected from the group consisting of Taber and Instron hardness when made into gums of the same formula, and
  - varying the ratio between the at least two sorbitol powders in subsequent sample batches to improve the texture and processability characteristics of the gum formulation.

4,959,227

**HIGH DIETARY FIBER LOW LACTOSE LIQUID FOOD AND A METHOD OF PRODUCING SAME**

Moh. S. Amer, 3177 Padaro La., Carpinteria, Calif. 93013

Filed Feb. 17, 1987, Ser. No. 15,303

Int. Cl.<sup>3</sup> A23C 9/12

U.S. Cl. 426—35

7 Claims

1. A liquid ready-to-ingest non-fat or low fat food product prepared from a composition comprising, approximately by weight, 71.5 to 89.5% of skim milk, 2 to 10% of non-fat milk solids, 0.5 to 7% of dietary fiber material, no more than 1% of fat, and lactase enzyme within the range of 0.02 to 5% by weight of the lactose in the composition sufficient to hydrolyze at least 75% of such lactose to glucose and galactose.

4,959,228

**MEASUREMENT OF SPECIFIC GRAVITY DURING FERMENTATION**

Damir M. J. Skrgatic, Edinburgh; James C. Mitchinson, Dunfermline, and John A. Graham, Edinburgh, all of Great Britain, assignors to Acumet Precision Instruments Limited, Edinburgh, Scotland

Continuation of Ser. No. 70,849, Jul. 31, 1987, abandoned. This application Nov. 13, 1989, Ser. No. 436,096

Claims priority, application United Kingdom, Oct. 29, 1985, 8526628

Int. Cl.<sup>3</sup> C12C 11/00; G01N 9/00

U.S. Cl. 426—11

6 Claims

1. A method of determining the specific gravity of a fermentable liquor during fermentation having more than two components and consisting of variable proportions of water, alcohol, dissolved fermentable sugars, yeast solids, and carbon dioxide, the method comprising the steps of fermenting the liquor: establishing a set of data defining the relationship, at a standard temperature, between constant sonic velocities in fermentable liquors of varying original gravities, measur-

ing the original gravity of a given fermentable liquor before fermentation thereof commences.  
fermenting said given fermentable liquor,  
measuring the velocity of sound in said given fermentable liquor at a given point in time following commencement of fermentation of said given fermentable liquor,  
measuring the temperature of said given fermentable liquor at said point in time, and  
deriving from said measured velocity and said measured temperature and said set of data the specific gravity of said given fermentable liquor at said given point in time.

4,959,229

## CHEESE MANUFACTURE

Malireddy S. Reddy, ADFAC Labs, Inc., 1250 S. Parker Rd., Denver, Colo. 80231; John Mullen, Ty Mawr, Llandyfryd, Llanerchymedd, Gwynedd, Wales; Clinton J. Washam, 309 Fairway Dr., Columbus, Wis. 53925; C. Gordon Brown, and Charles C. Hunt, both of Bunge Foods Corp., 3582 McCall Pl., N.E., Atlanta, Ga. 30340

Continuation-in-part of Ser. No. 283,208, Dec. 12, 1988, abandoned. This application Mar. 20, 1990, Ser. No. 496,245  
Int. Cl.<sup>5</sup> A23C 19/02, 19/076

U.S. Cl. 426—39 38 Claims

1. A method of making cheese comprising:  
preconditioning cold, raw milk by lowering the pH to pH 6.0 to 6.6 prior to heat treating;  
heat treating the preconditioned milk at about 162° F. to about 190° F.;  
cooling the heat treated milk;  
post-acidifying the cooled milk to pH 4.9 to 6.0;  
inoculating the post-acidified milk with starter culture; and  
ripening, treating with a coagulating agent to form a curd; cutting and cooking.

4,959,230

## COMPOSITION FOR EXTENDING SHELF LIFE OF FRUITS AND VEGETABLES

Clement R. Wynn, Hillsdale, N.J.; Michael T. McGuire, Elmhurst, and John R. Frost, North Tarrytown, both of N.Y., assignors to Kraft General Foods, Inc., Glenview, Ill.

Filed Sep. 27, 1988, Ser. No. 249,750  
Int. Cl.<sup>5</sup> A23B 7/16

U.S. Cl. 426—102 22 Claims

1. A sulfite-free coating composition for reducing deterioration and extending the shelf life of fresh fruits and vegetables comprising an edible, organic acid antidiscoloring agent selected from the group consisting of ascorbic acid, isoascorbic acid, citric acid, fumaric acid, tartaric acid and malic acid, an edible thixotropic gum selected from the group consisting of xanthan gum, guar gum, gum tragacanth, carrageenan gum, alginate gum, and karaya gum, and an edible maltodextrin bulk filler, the weight ratio of the edible gum to the edible acid being from about 1:1 to 30:1, and the weight ratio of the maltodextrin bulk filler to the edible acid being from about 0.1:1 to 10:1.

4,959,231

## MICROWAVE FOOD PACKAGING

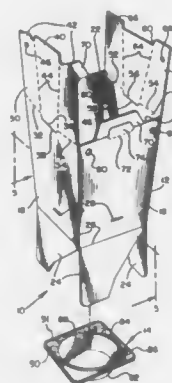
Robert B. Lahey, Eales, and N. Bruce Graham, Arlington, both of Tex., assignors to Marquee Foods, Incorporated, Arlington, Tex.

Filed Nov. 30, 1988, Ser. No. 278,177  
Int. Cl.<sup>5</sup> B65D 21/00

U.S. Cl. 426—111 13 Claims

1. A microwave popcorn package for storing and transporting a serving of corn to be popped and for containing the corn during and after popping, comprising:  
(a) a popped corn box having a reclosable top;  
(b) a raw corn container of smaller volume than the box located in the bottom of the box, the container having a

top opening surrounded by a flange engaging the inner walls of the popped corn box;  
(c) a serving of popping corn in the container and



(d) a flexible film sealing the top of the raw corn container by adhering to the container flange surrounding the top opening, a portion of the film seal being releasable from the flange upon heating of the corn.

4,959,232

## PROCESS FOR MAKING LIQUID SMOKE COMPOSITIONS AND RESIN TREATED LIQUID SMOKE COMPOSITIONS

Gary Underwood, Manitowoc, Wis., assignor to Red Arrow Products Company, Inc., Manitowoc, Wis.

Filed Apr. 26, 1989, Ser. No. 343,928  
Int. Cl.<sup>5</sup> A23L 1/221

U.S. Cl. 426—271 19 Claims

1. A process for making a high browning, reduced flavor liquid smoke composition comprising the step of:  
contacting an aqueous liquid smoke solution of about 4 to 40 brix with both a polymeric nonionic resin and a polymeric ion resin to produce a composition having reduced phenol and basic constituents, a browning index from about 8 to about 12, and a phenol content of about 2 to about 12 mg/ml.

4,959,233

## EMULSIFIER AND A METHOD FOR ITS PREPARATION

Herbert W. D. Schou, deceased, late of Juelsminde (by Gudrun Schou, heiress), and Jack A. Dreyer, Horsens, both of Denmark, assignors to NEXUS ApS, Juelsminde, Denmark

PCT No. PCT/DK86/00059, § 371 Date Jan. 23, 1987, § 102(e) Date Jan. 23, 1987, PCT Pub. No. WO86/06937, PCT Pub. Date Dec. 4, 1986

PCT Filed May 29, 1986, Ser. No. 19,245  
Claims priority, application Denmark, May 31, 1985, 2446/85

The portion of the term of this patent subsequent to May 31, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> A23L 1/035; A23P 1/12

U.S. Cl. 426—443 4 Claims

1. A method for preparing a free-flowing emulsifier product containing a polyglycerol partial fatty acid ester emulsifier comprising polyglycerol which is monesterified or diesterified with saturated fatty acid moieties, in which the fatty acid moieties are selected so that the average number of carbon atoms in the acid moieties is in the range between 13.0 and 16.5, which method comprises mixing the emulsifier with a particulate carrier and subjecting the resulting mixture to extrusion.

4,959,234

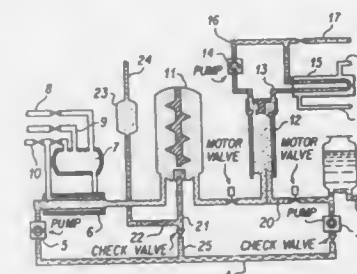
## METHOD FOR IMPROVING THE TASTE, TEXTURE AND MOUTH FEEL OF A LIQUID DAIRY PRODUCT AND FOR CONCENTRATING SAME

Salah H. Ahmed, Elk Grove Village, and Anthony J. Lukas, Downers Grove, both of Ill., assignors to Electric Power Research Institute, Palo Alto, Calif.

Filed Nov. 17, 1988, Ser. No. 272,282  
Int. Cl.<sup>5</sup> A23C 1/06, 19/05

U.S. Cl. 426—580

37 Claims



1. A method for improving the taste, texture and mouth feel of a liquid dairy product and for concentrating the liquid dairy product, comprising:

- (1) disposing the liquid dairy product in a scraped surface heat exchanger and cooling the liquid dairy product therein to a temperature at or below its freezing point to provide a cooled liquid dairy product;
- (2) passing the cooled liquid dairy product to a recrystallizer and crystallizing ice crystals from said cooled liquid dairy product to produce a mixture of concentrated product and ice crystals;
- (3) passing the concentrated product and ice crystals to a vertically disposed, vertically elongated ice scrapper wherein the ice crystals are mechanically worked and separating a portion of said ice crystals from the upper part of the ice scrapper and from said mixture in said ice scrapper and heating the separated ice crystals to form a melt thereof;
- (4) passing the melt into the ice scrapper near the upper part thereof and washing the said mixture in said ice scrapper with the said melt to form a washed mixture of the concentrated product and the ice crystals in the said ice scrapper;
- (5) separating the remaining ice crystals from the washed mixture and recovering the concentrated product; and wherein the amount of ice crystals formed in the crystallizing step is sufficient that the recovered product has a solids content of at least about 20.

4,959,235

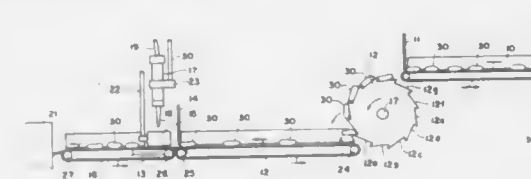
## FILLED CRACKER MAKING PROCESS

Agostino Aquino, Paterson, N.J., and Karl U. Lang, Port Jarvis, N.Y., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed Sep. 6, 1988, Ser. No. 240,198  
Int. Cl.<sup>5</sup> A21D 8/06

U.S. Cl. 426—281

9 Claims



1. A method producing filled hard biscuit products comprising  
(a) baking a plurality of pieces of a dough adapted to expand

during baking to yield a plurality of baking forms having an essentially hollow center;  
(b) conveying said plurality of baked forms to a device to invert said baked forms;  
(c) aligning said plurality of baked forms into lines and conveying said baked forms in a plurality of channels to an indexing mold;  
(d) simultaneously inverting each line of said baked forms;  
(e) piercing an upper portion of each of said inverted baked forms with a needle to fill said inverted baked forms with a filling, and  
(f) filling each of said inverted baked forms.

4,959,236

## PROCESS FOR REMOVING PELLICLE FROM NUT MEATS

Robert E. Gunnerson, Manteca, and Richard C. Bruno, Lodi, both of Calif., assignors to Sun-Diamond Growers of California, Stockton, Calif.

Filed Jul. 11, 1989, Ser. No. 378,346  
Int. Cl.<sup>5</sup> A23L 1/00

U.S. Cl. 426—288

16 Claims

1. A process for removing pellicle from nut kernels which comprises:

- (a) immersing said nut kernels in a composition comprising a mixture of a vegetable oil and a wetting agent in water at ambient temperature, to soften and loosen said pellicle;
- (b) removing said nut kernels from said composition and draining said nut kernels;
- (c) exposing said nut kernels to a force of ambient temperature water, to remove said pellicle; and  
(d) separating said nut kernels from said pellicle.

4,959,237

## REVERSE OSMOSIS CONCENTRATION OF JUICE PRODUCTS WITH IMPROVED FLAVOR

James B. Walker, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 7, 1989, Ser. No. 362,719  
Int. Cl.<sup>5</sup> A23L 2/04

U.S. Cl. 426—330.5

15 Claims

1. A membrane process for preparing a concentrated superior-tasting food juice comprising the steps of:

- (a) feeding a clarified serum to a multistage reverse osmosis (RO) system, wherein the serum is fed at a trans-membrane pressure of 1000 psig or greater to the first stage of the system which comprises one or more RO units having high-rejection polyamide membranes in which the retentate of one unit is fed to the subsequent unit if there are more than one; and  
(b) feeding the retentate from the last of the high-rejection RO units at a trans-membrane pressure of 1000 psig or greater to the second stage which comprises one or more RO units having low-rejection membranes, wherein the retentate of each low-rejection RO unit is fed to the subsequent unit if there are more than one and wherein all permeates from the second stage are ultimately recycled to the first stage.

4,959,238

## PROCESS FOR THE PRODUCTION OF TEXTURIZED ANIMAL PROTEIN

Simon R. Hall, Melton Mowbray, and Garry D. Wills, Denton, both of England, assignors to Mars GB Ltd., England

Filed Sep. 26, 1988, Ser. No. 249,590

Claims priority, application United Kingdom, Sep. 29, 1987, 8722836

Int. Cl.<sup>5</sup> A23J 3/26; A23L 1/31

U.S. Cl. 426—447

8 Claims

1. A process for the production of textured animal protein product comprising reducing the amount of gelatin, hydrolysable collagen or both in animal meal, forming a heated pressu-



rised wet mass of the animal meal, and reducing the pressure and temperature surrounding the mass so that the textured animal protein product has a measurable gelatin content of less than 10% of the dry solids of the product.

4,959,239

**PROCESS FOR PREPARING AN EDIBLE DISPERSION**  
Peter B. Ernsting, Delft; Jan Van Heteren, and Tjaard R. J. Niemeyer, both of Vlaardingen, all of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed Nov. 2, 1988, Ser. No. 266,046

Claims priority, application United Kingdom, Nov. 4, 1987, 8725803

Int. Cl. A23D 3/02

U.S. Cl. 426—603

4 Claims

1. A process for preparing an edible plastified dispersion comprising from 40–80 wt% of a continuous fat phase and from 60–20 wt% of a dispersed aqueous phase, which process comprises the steps of:

- churning cream to obtain butter and buttermilk,
- working the buttermilk obtained in step (a) with a non-dairy fat to obtain a water-in-oil emulsion, and
- mixing the emulsion obtained in step (b) with butter obtained in step (a) under working conditions of sufficiently low shear that the granular structure of the butter is preserved.

4,959,240

**POTATO-BASED FOODSTUFF**

David J. Aulik, Channel Islands Harbor, and Robert E. Christensen, Camarillo, both of Calif., assignors to Horizons International Foods, Inc., Burlington, Mass.

Continuation-in-part of Ser. No. 17,140, Feb. 20, 1987, abandoned. This application Oct. 14, 1987, Ser. No. 108,722

Int. Cl. A23L 1/216, 1/217

U.S. Cl. 426—637

15 Claims

1. A foodstuff comprising:

- between about 10 and about 45 percent of a fibrous non-potato vegetable protein having aligned bundles of fibers;
- between about 6 and about 90 percent of a nonfibrous potato material.

4,959,241

**SURFACING METHOD**

Wayne M. Thomas, and Edward D. Nicholas, both of Suffolk, England, assignors to The Welding Institute, Cambridge, England

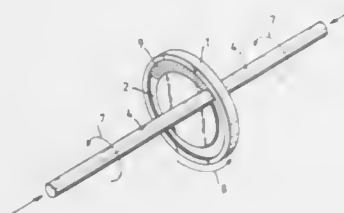
Filed Apr. 10, 1989, Ser. No. 335,820

Claims priority, application United Kingdom, Apr. 11, 1988, 8808479

Int. Cl. B05D 1/40

U.S. Cl. 427—11

34 Claims



1. A method of providing a material surface on a substrate, the method comprising applying a consumable member to said substrate under pressure; moving said member and substrate relative to one another along a path and generating heat at the interface between said member and said substrate so that material is laid down on said substrate along said path, wherein said member comprises an outer body of a first material which

contains an insert of a second material different from said first material which is laid down onto said substrate.

4,959,242

**METHOD FOR FORMING A THIN FILM**

Hiroki Itoh, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Division of Ser. No. 113,165, Oct. 27, 1987, Pat. No. 4,805,555.

This application Aug. 30, 1988, Ser. No. 238,114

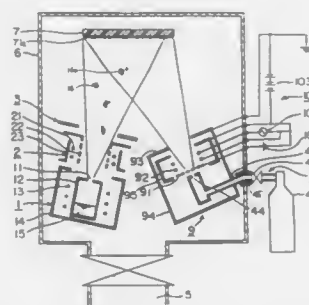
Claims priority, application Japan, Oct. 29, 1986, 61-255848;

Mar. 13, 1987, 62-56686; May 8, 1987, 62-110613

Int. Cl. B05D 3/06

U.S. Cl. 427—38

12 Claims



1. A method for forming a thin film comprising:

- generating a beam of electrons by heating a filament to emit electrons and electrostatically attracting the electrons toward a charged electrode to form the beam of electrons; activating reactive gases by irradiating said reactive gases in a relatively low vacuum with the electron beam as said reactive gases are directed toward a substrate disposed in a relatively high vacuum;
- forming vapors including atomic clusters and non-clustered atomic particles of a material that is to be deposited on said substrate;
- partially ionizing said clusters and said non-clustered atomic particles to form cluster ions and non-clustered ions, respectively;
- simultaneously with directing said activated reactive gases toward said substrate, directing said cluster ions, said non-clustered ions, and non-ionized clusters and non-clustered atomic particles toward said substrate which is surrounded with said activated reactive gases; and reacting said cluster ions, said non-clustered ions, and said non-ionized clusters and non-clustered atomic particles with said activated reactive gases to deposit a thin film on said substrate.

4,959,243

**PRODUCTION OF A SHEET-LIKE, MULTILAYER MAGNETO-OPTICAL RECORDING MATERIAL**

Helmut Steininger, Worms, Fed. Rep. of Germany, and , assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 24, 1989, Ser. No. 300,849

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1988, 3803013

Int. Cl. H01F 10/02

U.S. Cl. 427—48

3 Claims

1. A process for the production of a magneto-optical recording element comprising

- an optically transparent dimensionally stable substrate,
- a thermally alterable recording layer consisting of an amorphous lanthanide/transition metal alloy, and
- a film consisting essentially of multiple separate carbide, nitride and/or oxide layers, at least on that side of the recording layer (B) which faces away from the substrate (A),

the said lanthanide/transition metal alloy being applied via the gas phase to the surface of the said substrate (A) or to the surface of a film (C) already present on the substrate (A) or of another film already present, resulting in the said recording layer (B), which process comprises:

- applying a 30–500 nm thick film (C<sub>1</sub>) to surface of the recording layer (B) or to the surface of a further layer already present on the recording layer (B), said film (C<sub>1</sub>) having the following specifications:

- the film (C<sub>1</sub>) consists of two or more components;
- the said components are contained in three or more separate element and element carbide, nitride and oxide layers, each consisting of one or more of these components;

- the components of the element layer or layers are selected from the group consisting of the elements boron, aluminum, gallium, indium, silicon, germanium, tin, lead, antimony, bismuth, magnesium, titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum, tungsten, iron, cobalt, zinc, cadmium, lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium and thorium;

- the components of the element carbide, nitride and oxide layer or layers are selected from the group consisting of the carbides, nitrides and oxides of the said elements (C<sub>13</sub>);

- directly adjacent layers consisting of the said carbides, nitrides and/or oxides (C<sub>14</sub>) differ in composition from one another;

- two or more of the layers consisting of the said carbides, nitrides and/or oxides (C<sub>14</sub>) are separated from one another by one or more 0.1–30 nm thick layers consisting of one or more of the elements (C<sub>13</sub>); and

- that layer which is directly adjacent to the said recording layer (B) or which faces it always consists of the said carbides, nitrides and/or oxides (C<sub>14</sub>); said film (C<sub>1</sub>) being applied by carrying out the following two process steps (11) and (12) several times:

- application of one or more layers consisting of one or more of the said carbides, nitrides and oxides (C<sub>14</sub>) of the said elements (C<sub>13</sub>) via the gas phase, resulting in one or more separate layers (C<sub>14</sub>), and

- application of one or more 0.1–30 nm thick layers consisting of one or more of the elements (C<sub>13</sub>), resulting in one or more element layers (C<sub>13</sub>), followed by

- reacting the said element layer or layers (C<sub>13</sub>) of the said film (C<sub>1</sub>) with a reactant selected from the group consisting of oxygen, nitrogen and carbon, and thereafter induction of a defined magnetization, oriented at right angles to the surface, in the said recording layer (B).

4,959,244

**TEMPERATURE MEASUREMENT AND CONTROL FOR PHOTOHERMAL PROCESSES**

Carl M. Penney, Saratoga Springs, N.Y., and Tushar S. Chande, Pittsburgh, Pa., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 27, 1989, Ser. No. 329,054

Int. Cl. B05D 3/06

U.S. Cl. 427—53.1

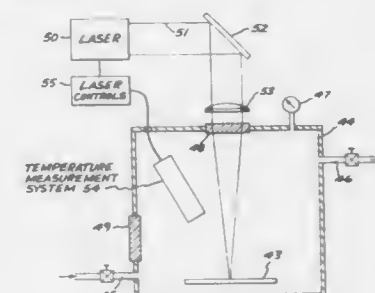
2 Claims

1. A method of controlling a radiation assisted chemical vapor deposition process comprising:

- delivering radiation to a portion of the surface of a workpiece to cause deposition of gaseous chemical reactants onto the workpiece by radiation heating;

- sensing the workpiece surface temperature resulting from said radiation by detecting thermal emission from said workpiece toward the short wavelength edge of the ther-

mal emission spectrum and deriving therefrom a surface temperature signal; and



utilizing the sensed surface temperature to control said radiation and deposition process.

4,959,245

**METHOD OF MODIFYING A SURFACE OF A BODY USING ELECTROMAGNETIC RADIATION**

Peter J. Dobson, South Croydon, and James H. Neave, Hordsham, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

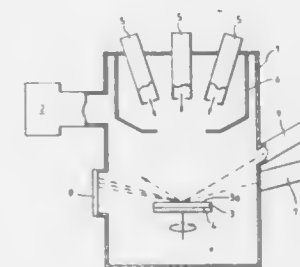
Filed Sep. 16, 1988, Ser. No. 245,861

Claims priority, application United Kingdom, Oct. 16, 1987, 8724318

Int. Cl. B05D 3/06

U.S. Cl. 427—53.1

26 Claims



1. A method of modifying a surface of a body comprising the steps of

- providing a body having a surface,
- supplying gaseous material onto said surface to form at least one layer of said material on said surface, and
- treating said at least one layer by directing a beam of electromagnetic radiation to said layer within  $\pm 5^\circ$  of Brewster's angle for said at least one layer to grow at least one smoothed epitaxial layer of said material on said surface.

4,959,246

**SCREEN PRINTING PROCESS AND APPARATUS AND ELECTRICAL PRINTED CIRCUITS OBTAINED THEREWITH**

Camille D. Cleemput, Wondelgem - Gent, Belgium, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Jun. 6, 1984, Ser. No. 617,853

Claims priority, application Belgium, Jun. 6, 1983, 2/60122

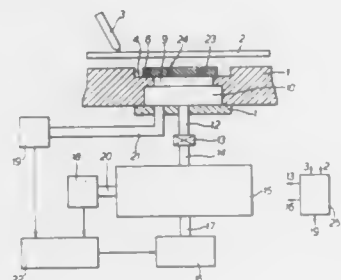
Int. Cl. C23C 26/00

U.S. Cl. 427—97

3 Claims

1. Screen printing process which comprises the steps of: applying an electrically conductive paste through a screen and by means of a movable squeegee to a surface of a substrate provided with at least one hole extending between said surface and another surface of said substrate; and exerting an under-

pressure on said another surface so as to coat at least part of the inner wall of said hole with said paste; characterized in that said underpressure is substantially constant and equal to a first value between limits of 10 gr/cm<sup>2</sup> and 200 gr/cm<sup>2</sup>, in that said



underpressure is obtained from a vacuum vat, and in that said underpressure is realized in a vacuum chamber located next to said substrate and communicating with said vacuum vat, said vacuum vat having a volume which is relatively large with respect to that of said vacuum chamber.

4,959,247

## ELECTROCHROMIC COATING AND METHOD FOR MAKING SAME

Frank H. Moser, and Niall R. Lynam, both of Holland, Mich., assignors to Donnelly Corporation, Holland, Mich.

Filed Dec. 14, 1987, Ser. No. 132,196

Int. Cl.<sup>5</sup> B05D 5/12, 5/06

U.S. Cl. 427—126.5

42 Claims

1. A method for preparing an electrochromic coating on a substrate, consisting essentially of:

- forming a coating solution by contacting at least one transition metal nitrate compound with at least one monohydric alcohol having from 1 to 5 carbon atoms;
- coating the surface of said substrate with said coating solution to provide a coating thereon of a desired thickness; and
- firing said coating to an electrochromically active state.

4,959,248

## PROCESS FOR IMPARTING STAIN RESISTANCE TO FIBERS AND TO ANTI-STAINING AGENTS FOR USE IN THE PROCESS

Bryce C. Oxenrider, Florham Park, and Frederick R. Hopf, Parsippany, both of N.J., assignors to Allied-Signal, Morris Township, Morris County, N.J.

Filed Nov. 20, 1987, Ser. No. 123,406

Int. Cl.<sup>5</sup> D02G 3/00

U.S. Cl. 427—385.5

37 Claims

1. A process for imparting stain resisting properties to fibers formed from thermoplastic polymers, said process comprising:

- (a) treating said fibers with a composition comprising an effective carrier and a stain resisting effective amount of one or more condensation products of the Formula I:

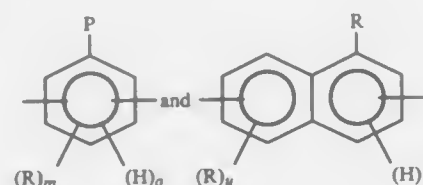


Formula I

and

- (b) annealing said treated fiber; wherein:

Z is a divalent moiety of the formulas:



wherein:

P is a hydrogen, —OH or a moiety of the formula —X—OH;

m and o are the same or different and are positive whole numbers from 0 to 3 with the proviso that the sum of o and m at each occurrence is equal to 3;

u and v are the same or different at each occurrence and are positive whole numbers from 0 to 5 with the proviso that the sum of u and v at each occurrence is 5;

—X— is a divalent organic radical;

R is the same or different at each occurrence and is selected from the group consisting of alkyl, aryloxy, alkoxy, aryl, hydroxy, and methylol; and

n is a positive whole number.

4,959,249

## SELF-CROSSLINKING VINYL ESTER DISPERSIONS HAVING A REDUCED FORMALDEHYDE CONTENT OR CONTAINING NO FORMALDEHYDE FOR STRENGTHENING TEXTILE FIBER STRUCTURES

Bernd Schilling, Schopenhauerweg 10; Gerhard Brink, Inden Gruben Nr. 131/32, both of 8263 Burghausen; Ingo Harder, Kollmunzerstrasse 21a, 8261 Mehring/Od, and Hubert Wiest, Wettersteinstrasse 26, 8023 Pallach, all of Fed. Rep. of Germany

Division of Ser. No. 221,729, Jul. 20, 1988, abandoned. This application Oct. 18, 1989, Ser. No. 423,002

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727181

Int. Cl.<sup>5</sup> C08F 218/08, 130/08; C08G 77/20; C09D 143/04

U.S. Cl. 427—387

4 Claims

1. A process for strengthening a textile fiber structure which comprises:

- (1) applying to said textile fiber structure from about 20–40 % of a self-crosslinking vinyl ester copolymer aqueous dispersion, based on the weight of copolymer and textile fiber structure, said dispersion having a reduced formaldehyde content or containing no formaldehyde for strengthening textile fiber structures, and comprised of:
  - (a) 40–99% by weight of vinyl esters of branched or linear carboxylic acids having 1 to 12 carbon atoms,
  - (b) 1–6% by weight of vinyltrialkoxysilanes and/or alkylvinyltrialkoxysilanes containing branched or linear alkyl or alkoxy radicals having 1 to 4 carbon atoms,
  - (c) 0–40% by weight of ethylene,
  - (d) 0–10% by weight of ethylenically unsaturated, hydroxyalkyl-functional compounds,
  - (e) 0–10% by weight of ethylenically unsaturated carboxylic acids,
  - (f) 0–5% by weight of amides, N-alkylamides and/or N-alkoxyalkylamides of ethylenically unsaturated carboxylic acids, and
  - (g) 0–1% by weight of ethylenically polyunsaturated compounds, and
- (2) crosslinking the copolymer under conditions suitable for film formation.

3. The process of claim 1, wherein the copolymer is crosslinked by heating to a temperature of from about 50 to about 150° C.

4,959,250

## SIMULATED MARBLE

Gordon McKinnon, 119 S. Oregon Ave., Tampa, Fla. 33606

Continuation-in-part of Ser. No. 861,233, May 7, 1986, Pat. No. 4,721,634. This application Nov. 19, 1987, Ser. No. 122,398

The portion of the term of this patent subsequent to Jan. 26, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> B44F 9/04; B05D 3/12, 5/00; B32B 3/10

U.S. Cl. 428—15

19 Claims



1. A process for covering a substrate with a simulated marble surface comprising:

- mixing cement and sand to form a first mixture;
- adding an aqueous solution of an adhesive resin to the first mixture to create a first liquid mortar;
- mixing cement and sand to form a second mixture;
- adding an aqueous solution of an adhesive resin to the second mixture to create a second liquid mortar;
- adding and mixing a contrasting pigment to each one of the first and second mortars such that color of the first mortar contrasts with the color of the second mortar;
- applying the first liquid mortar onto the substrate to form a first textured coat on the substrate;
- applying the second liquid mortar onto randomly spaced portions of the first coating prior to the complete curing of the first coating enabling the first and second coatings to form a unitary textured covering for the substrate with the contrasting pigment being randomly spaced in the textured unitary covering with the textured unitary coating having a lower layer and an upper layer with the lower layer comprising the first and second liquid mortar and the upper layer comprising the second liquid mortar;
- allowing the contrasting pigment in each of the first and second liquid mortars to commingle with the other of the first and second liquid mortars to enable the contrasting pigmented areas of the first mortar to blend with the contrasting pigmented areas of the second mortar; and
- troweling substantially only the blended upper layer of the unitary textured covering on the substrate to simulate a marble surface.

4,959,251

## ELASTIC PATCH FOR HOLES IN WALLS

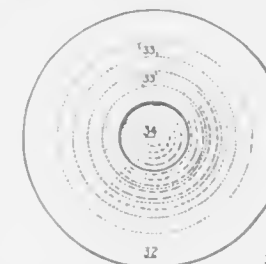
R. Larry Owens, 5121 E. Shore Dr., Conyers, Ga. 30208, and Paul G. McClellan, 1795 Mackinaw Pl., Smyrna, Ga. 30080

Continuation-in-part of Ser. No. 95,433, Sep. 11, 1987, abandoned. This application Oct. 26, 1988, Ser. No. 262,703

Int. Cl.<sup>5</sup> B32B 7/06, 7/12, 3/02

U.S. Cl. 428—41

5 Claims



1. A patch for a hole in a wall comprising:

- (a) a generally flat elastic body portion having its greatest thickness in the mid-section thereof, the body portion

tapering to its minimum thickness at least one edge of the body portion;

- (b) a pressure sensitive adhesive layer attached to said body portion;
- (c) a protective cover, attached to the exposed surface of said adhesive layer, which is perforated delineating sections of the cover so that a region of the adhesive layer can be uncovered which is larger than the hole.

4,959,252

## HIGHLY ORIENTED THERMOTROPIC OPTICAL DISC MEMBER

Claude Bonnebat, Pontault-Combault; Jean-Pierre Quentin, Lyon, and Alain Morin, Villeurbanne, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Continuation-in-part of Ser. No. 102,475, Sep. 29, 1990, abandoned. This application Oct. 10, 1989, Ser. No. 418,966

Claims priority, application France, Sep. 29, 1986, 86 13715

Int. Cl.<sup>5</sup> G11B 23/00

U.S. Cl. 428—64

14 Claims



1. A dimensionally stable, circular, rigid and planar substrate, adapted for use as a support substrate for a radiation sensitive layer for an optical disc, said substrate having an external diameter of from 60 mm to 360 mm, a thickness of from 0.5 mm to 4 mm, a relative density of less than 1.8, a modulus of elasticity in the radial direction of from 9000 MPa to 18000 MPa, a coefficient of heat expansion in the radial injection which is less than 30 m/m/°C., a deformation temperature under load of at least 150° C., and, on part or all of at least one of its faces, an etching made at the time of the injection molding operation consisting of a groove in the form of a spiral or of concentric tracks, with a pitch of between 0.4 and 1 μm; said substrate being formed by injection molding a thermotropic aromatic polyester polymer having a flow temperature ranging from 200° to 350° C. and an inherent viscosity of at least 1 dl/g in a mold fitted with a central injection system under the following conditions: (1) temperature of the molten polymer of from 280° to 350° C.; (2) injection pressure of from 80 MPa to 160 MPa; (3) a temperature of the mold walls which ranges from 100° to 200° C.; (4) an injection time which ranges from 2 to 10 seconds and (5) a holding pressure after injection which ranges from 40 MPa to 120 MPa, whereby said substrate is substantially perfectly smooth on the non-etched parts of its faces as reflected in a surface roughness of less than 0.05 μm and is substantially perfectly planar as reflected in a warp angle of less than 1 × 10<sup>-5</sup> radian.

4,959,253

## BACKING MATERIAL FOR CARPET UNDERLAY

William H. Tough, Tayport, Scotland, assignor to Scott & Fyfe Limited, Fife, Scotland

Division of Ser. No. 272,433, Nov. 17, 1988. This application Aug. 31, 1989, Ser. No. 400,347

Claims priority, application United Kingdom, Nov. 24, 1987, 87.27449

Int. Cl.<sup>5</sup> B32B 3/28

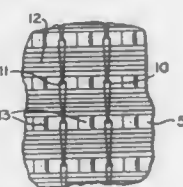
U.S. Cl. 428—102

7 Claims

1. A backing material for a carpet underlay which comprises a sheet of crepe paper, parallel rows of stitches formed in the



crepe paper sheet such that the stitches substantially restrict the extensibility of the crepe paper sheet, and rows of projec-



tions embossed in the crepe paper sheet between the rows of stitches without puncturing the paper sheet.

4,959,254

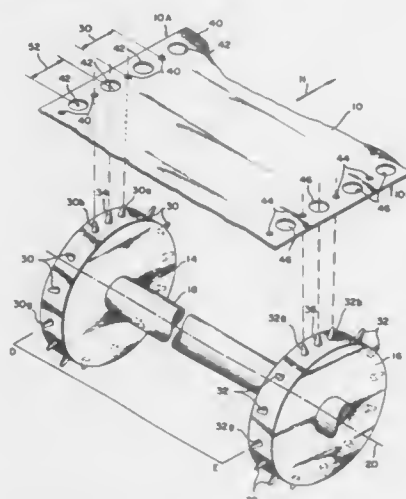
## WEB WITH AUXILIARY HOLES

Joseph W. Coburn, Jr., 953 Princewood Ave., Lakewood, N.J. 08701

Filed Dec. 6, 1989, Ser. No. 446,860  
Int. Cl.<sup>5</sup> B32B 3/10

U.S. Cl. 428—131

2 Claims



1. A web for feeding on a pair of feed sprockets rotatable about a common axis and each sprocket provided with a plurality of radially outwardly extending standard feed pins uniformly spaced from each other circumferentially of said sprocket, each standard feed pin on each sprocket associated with a standard feed pin on the other sprocket and associated standard feed pins lying in substantially the same plane containing said common axis, at least one of said sprockets provided with at least one radially outwardly extending additional pin positioned intermediate an adjacent pair of said standard feed pins, said additional pin having a predetermined circumferential location between said adjacent pair of standard feed pins and having a predetermined circumferential location on said one sprocket, comprising:

a longitudinally extending web provided with two longitudinally extending side edge portions each provided with a plurality of standard feed holes uniformly spaced from each other and for receiving said standard feed pins to feed said web longitudinally upon rotation of said sprockets; and

each of said side edge portions also provided with a plurality of auxiliary holes larger than said standard feed holes, one of said auxiliary holes located intermediate each pair of adjacent standard feed holes on each of said side edge portions to permit said auxiliary holes to receive said additional pin during feeding of said web regardless of the circumferential location of said additional pin on said one

sprocket, and said auxiliary holes sufficiently large to receive said additional pin during feeding of said web regardless of the circumferential location of said additional pin between said pair of adjacent standard feed pins.

4,959,255

## CERAMIC SUBSTRATES AND METHOD OF MANUFACTURING THE SAME

Go Suzuki, Nagoya, Japan, assignor to NGK Insulators, Ltd., Japan

PCT No. PCT/JP88/00383, § 371 Date Aug. 31, 1988, § 102(e) Date Aug. 31, 1988, PCT Pub. No. WO88/07983, PCT Pub. Date Oct. 20, 1988

PCT Filed Apr. 16, 1988, Ser. No. 251,700

Claims priority, application Japan, Apr. 16, 1987, 62-92060  
Int. Cl.<sup>5</sup> B32B 3/10

U.S. Cl. 428—143

5 Claims



1. A ceramic substrate provided with an electrolessly plated layer on a surface thereof, comprising:  
a dense ceramic body; and  
a plurality of granular protruding portions formed on a surface of said dense ceramic body thereby defining a plurality of spaces between said granular protruding portions, said spaces having necked portions at points adjacent mid-sections of said granular protruding portions and base portions at points adjacent said dense ceramic body; wherein said base portions of said spaces are substantially wider than said necked portions thereof, such that said granular protruding portions provide anchoring means for said electrolessly plated layer, and said necked portions each have a length which is less than twice a thickness of said electrolessly plated layer.

4,959,256

## ENAMEL COATING CHARGED WITH GLASS BEADS FOR THE BOTTOM OF COOKING UTENSILS AND UTENSILS COATED IN THIS MANNER

Henri Piera, Annecy, France, assignor to SEB S.A., Selongey, France

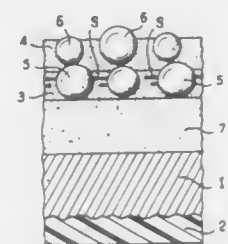
Filed Dec. 27, 1988, Ser. No. 291,452

Claims priority, application France, Dec. 30, 1987, 87 18380; Dec. 30, 1987, 87 18381; Dec. 30, 1987, 87 18382

Int. Cl.<sup>5</sup> B32B 19/04, 17/06

U.S. Cl. 428—144

10 Claims



1. A cooking utensil having a bottom (1) entirely covered by a first enamel layer (7) which supports a second continuous enamel layer (3) which supports a non-continuous third enamel layer (4) constituting a raised surface decoration and applied by screen process after drying of the first layer, these three

layers (7, 3, 4) being obtained from an enamel frit and being fired simultaneously, wherein the second and third enamel layers (3, 4) contain glass beads (5, 6), at least a certain number of which have a diameter of greater value than the thickness of said enamel layers and project from the surface of said layers, a certain number of beads (6) of the non-continuous third layer (4) being applied on beads (5) of the second layer (3) and wherein the second enamel layer (3) contains mica flakes (9) which are covered with a member selected from the group consisting of TiO<sub>2</sub>, Fe<sub>2</sub>O<sub>3</sub> and a mixture thereof and which are oriented in a direction parallel to each other and to the surface of said layer and partly overlap each other, said third layer being free from said flakes.

4,959,257

## TRANSPARENCIES

Arabinda Mukherjee, Edgeware, England, assignor to Lucas Industries public limited company, Birmingham, England

Filed Jul. 12, 1988, Ser. No. 217,934

Claims priority, application United Kingdom, Jul. 17, 1987, 8716854

Int. Cl.<sup>5</sup> B32B 3/26, 15/04

U.S. Cl. 428—156

10 Claims

1. A transparency comprising a transparent substrate having an electrically conductive de-misting and/or de-icing metal film thereon and electrical supply contacts connected to said metal film for conducting electricity therethrough, with the optional inclusion of a transparent resin layer between said substrate and said electrically conductive metal layer; and a sputtered layer containing an oxide of indium is provided on said electrically conducting metal film, wherein the thickness of said metal film varies over the surface of the transparency so that the power dissipation of said metal film is uniform over the area of the substrate.

4,959,258

## JOINED METAL-CERAMIC ASSEMBLY METHOD OF PREPARING THE SAME

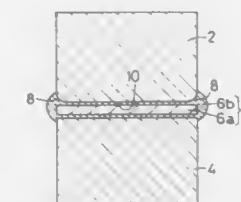
Akihiko Yoshida, Iwakura, and Naohito Yamada, Nagoya, both of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Dec. 22, 1988, Ser. No. 288,423

Claims priority, application Japan, Dec. 28, 1987, 62-335246  
Int. Cl.<sup>5</sup> B32B 15/04

U.S. Cl. 428—192

10 Claims



1. A joined metal-ceramic assembly, comprising:

a ceramic member;

a metallic member; and

an intermediate layer interposed between said ceramic member and said metallic member for abuttingly joining said ceramic member and said metallic member, said intermediate layer consisting of:

(i) a metallic intermediate portion;

(ii) a first brazing metal layer formed on a surface of said metallic intermediate portion; and

(iii) a second brazing metal layer formed on an opposite surface of said metallic intermediate portion;

wherein a joining surface of said ceramic member, at which said ceramic member is joined with said intermediate layer, includes a rounded peripheral portion having a substantially arcuate cross-sectional shape and at least half

of said rounded peripheral portion is bonded to said first brazing metal layer.

4,959,259

## METHOD FOR THE PROTECTION AGAINST WATER OF A LAMINATED RESIN WALL, AND A PROTECTED LAMINATED RESIN WALL THUS OBTAINED

Vincent Guilbaud, Charve, France, assignor to Chantiers Bénéteau S.A., Saint Hilaire De Riez, France

Filed Oct. 18, 1988, Ser. No. 259,147

Claims priority, application France, Aug. 24, 1988, 88 11180  
Int. Cl.<sup>5</sup> B32B 7/02, 27/08

U.S. Cl. 428—215

13 Claims

6. A structure for prolonged contact with water, comprising a laminated resin wall formed from a substrate whose outer surface is placed in contact with water, said outer surface having coated thereon a barrier layer of polymerized resin consisting essentially of at least one member selected from the group consisting of bisphenolic polyesters and unsaturated isophthalic polyesters, said layer having a thickness of 0.30 to 0.45 mm, and a gel coat resin layer coating said barrier resin layer, said gel coat resin layer having a thickness of 0.30 to 0.45 mm and a lower steric space requirement than said barrier resin.

4,959,260

## MESH FABRIC FOR PRINTING SCREEN

Haruo Tomoyasu, Chobe Tango, both of Katsuyama; Takuo Omote, and Yoshinori Kato, both of Fukui, all of Japan, assignors to Nihon Tokushu Orimono Co., Ltd., Fukui and Kanebo Ltd., Tokyo, both of Japan

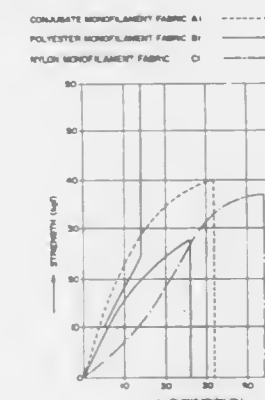
PCT No. PCT/JP87/00601, § 371 Date Dec. 19, 1988, § 102(e) Date Dec. 19, 1988, PCT Pub. No. WO88/06103, PCT Pub. Date Aug. 25, 1988

PCT Filed Aug. 10, 1987, Ser. No. 269,186

Claims priority, application Japan, Feb. 17, 1987, 62-35252  
Int. Cl.<sup>5</sup> B32B 7/00

U.S. Cl. 428—255

11 Claims



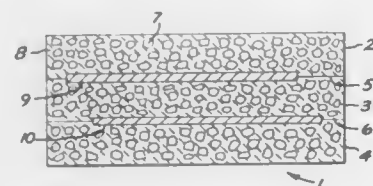
1. A mesh fabric useful for a printing screen consisting essentially of conjugate filaments, each of said conjugate filaments being composed of a sheath and a core, said sheath being formed of a material having high adhesive property to an emulsion and a resin used for making the screen, said core being formed of a material having high dimensional stability and elastic recovery property, said mesh fabric having a breaking elongation of from 15 to 40 % and a breaking strength of not less than 25 kgf, and having a correlation between the strength Y (kgf) and the elongation X (%) in the elongation range of not less than 5%, in the stress-strain curve of the mesh fabric by the labelled strip method at the specimen width of 5 cm and the grip interval of 20 cm satisfying the following formula:

$$Y \geq (X+1) \times 5/3.$$

**4,959,261**  
**FLUORINATED NON-GRAPHITIC CARBONACEOUS FILMS AND FOAMS**  
 Francis P. McCullough, Jr., and Leo R. Novak, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 21, 1989, Ser. No. 383,837  
 Int. Cl.<sup>3</sup> B32B 3/26, 9/00  
 U.S. Cl. 428—312.2 12 Claims  
 1. A film or foam structure comprising a non-flammable nongraphitic carbonaceous film or foam having an LOI greater than 40 and at least a partially fluorinated surface.

**4,959,262**  
**ZINC OXIDE VARISTOR STRUCTURE**  
 Richard J. Charles, Schenectady, and Achuta R. Gaddipati, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.  
 Filed Aug. 31, 1988, Ser. No. 238,791  
 Int. Cl.<sup>3</sup> B32B 7/00 18 Claims  
 U.S. Cl. 428—329



1. A composite useful for forming a varistor device comprised of a multi-layer varistor matrix containing a plurality of continuous metallizations comprised of at least a first and second metallization, said varistor matrix being comprised of at least three layers with a portion of each matrix layer being directly bonded to another matrix layer, said matrix totally surrounding and being directly bonded to each metallization, said metallizations being separated from each other by at least substantially a layer of matrix, each said metallization being present at substantially a region between two layers of matrix, said first and second metallizations being offset from each other, at least one of said first and second metallizations being overlapping, said varistor matrix being comprised of zinc oxide grains isolated from each other by continuous amorphous glassy phase, said metallizations being comprised of elemental silver, said composite having a porosity of less than about 10%.

**4,959,263**  
**MAGNETIC RECORDING MEDIUM**  
 Masashi Aonuma, Tsutomu Okita, Hiroshi Hashimoto, Hiroaki Araki, Kiyotaka Fukino, and Kiyomi Ejiri, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

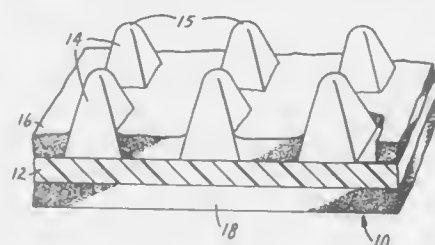
Filed May 18, 1988, Ser. No. 195,224  
 Claims priority, application Japan, May 18, 1987, 62-120549; Jul. 20, 1987, 62-179141  
 Int. Cl.<sup>3</sup> G11B 23/00 5 Claims

U.S. Cl. 428—329  
 1. A magnetic recording medium comprising a nonmagnetic support having thereon a magnetic layer containing a binder which is crosslinkable or polymerizable by radiation irradiation and ferromagnetic particles, said ferromagnetic particles being metal or metal alloy particles mainly comprising iron having a crystal size of 300Å or less, having an atomic ratio of oxygen atoms to iron atoms of from 1.6 to 3.0 on the surface of said particles, and said magnetic layer having been irradiated with radiation.

**4,959,264**  
**RELEASE PAPER FOR MAKING ARTIFICIAL LEATHER**  
 Paul Dunk, Slough, Berkshire; Roger M. Hindia, and Peter J. Miles, both of Buckinghamshire, all of England, assignors to The Wiggins Teape Group Limited, Basingstoke, England  
 Filed Jan. 5, 1988, Ser. No. 141,078  
 Claims priority, application United Kingdom, Jan. 6, 1987, 8700106

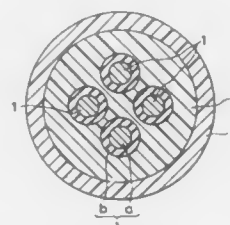
Int. Cl.<sup>3</sup> B32B 5/16; B41M 3/12 9 Claims  
 U.S. Cl. 428—331  
 1. A release paper for the manufacture of artificial leather, comprising a paper having a release coating essentially of a flexible poly (4-methyl pentene-1) resin loaded with particulate mineral filler.

**4,959,265**  
**PRESSURE-SENSITIVE ADHESIVE TAPE FASTENER FOR RELEASABLY ATTACHING AN OBJECT TO A FABRIC**  
 Leigh E. Wood, Woodbury, and Allen L. Noreen, Lake Elmo, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
 Filed Apr. 17, 1989, Ser. No. 338,324  
 Int. Cl.<sup>3</sup> A61F 13/16; C09U 7/02; B32B 3/06 13 Claims  
 U.S. Cl. 428—343



1. Pressure-sensitive adhesive tape fastener comprising  
 (a) a backing having an array of upstanding stems distributed across at least one face, having bases adjacent said at least one face and projecting outwardly from said face to a tip adapted to penetrate a foraminous substrate and wherein the height of the stem is the distance between the base and the outermost point on said tip, and  
 (b) a pressure-sensitive adhesive layer on said face partially filling the spaces between the stems where the average adhesive depth is less than the average height of the stems.

**4,959,266**  
**URETHANE-RESIN COATED ELECTRICAL WIRE HAVING AN INTERMEDIATE LAYER**  
 Keiji Ueno, Osaka, and Ikujiro Uda, Tochigi, both of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan  
 Filed Aug. 18, 1986, Ser. No. 898,167  
 Claims priority, application Japan, Aug. 23, 1985, 60-129446[U]  
 Int. Cl.<sup>3</sup> B32B 27/00 6 Claims  
 U.S. Cl. 428—383



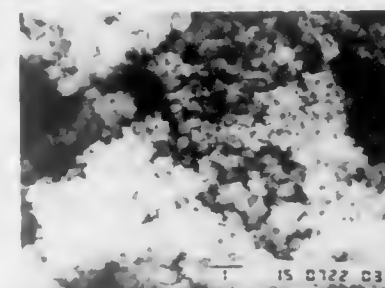
1. An electrical wire, comprising:  
 a stranded core of two or more twisted conductors, each conductor being surrounded by a respective insulation layer;

a thermoplastic resin coating layer covering said stranded core and comprising a thermoplastic resin having a melt index of 0.2 or greater; and  
 an extrusion-coated urethane resin coating layer covering said thermoplastic resin coating layer, wherein said urethane resin coating layer is made of a composition comprising a thermoplastic urethane resin and a polyfunctional monomer selected from the group consisting of trimethylolpropane triacrylate, trimethylolpropane trimethacrylate and triacrylformal and is crosslinked by radiation.

**4,959,267**  
**FIBER REINFORCED RUBBER PRODUCTS**  
 Howard C. H. Ng, Kingston, and Frederick J. Hunter, Oakville, both of Canada, assignors to Du Pont Canada Inc., Mississauga, Canada  
 Filed Nov. 23, 1988, Ser. No. 276,077  
 Int. Cl.<sup>3</sup> B32B 9/00, 15/00, 23/00; D02G 3/00 11 Claims  
 U.S. Cl. 428—390

1. A reinforcing material for use in manufacturing fiber reinforced rubber products comprising a thermoplastic fiber coated with a first layer of a cured guanide compound and coated thereover a second layer of adhesive for bonding the fiber to rubber.

**4,959,268**  
**POLYMER CONTAINING AMORPHOUS ALUMINOSILICATE PARTICLES AND PROCESS FOR PRODUCING THE SAME**  
 Zenji Hagiwara, Shiga; Satoshi Ando, Osaka; Kunio Ichihashi, Osaka, and Akira Dono, Osaka, all of Japan, assignors to Zenji Hagiwara, Saiga and Kanebo Ltd., Tokyo, both of Japan  
 Filed Jul. 14, 1987, Ser. No. 73,448  
 Claims priority, application Japan, Jul. 16, 1986, 61-167284  
 Int. Cl.<sup>3</sup> B32B 5/16; B05D 7/00; C01B 33/34 8 Claims  
 U.S. Cl. 428—403



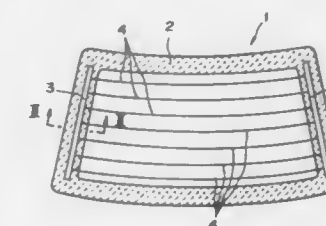
1. A polymer containing amorphous aluminosilicate particles, said polymer comprising an organic polymer and amorphous aluminosilicate solid particles coating agent, at least some of said amorphous aluminosilicate solid particles having antibacterial or bactericidal metal ions on ion-exchangeable sites existing on and within the particles, wherein said amorphous aluminosilicate solid particles have a specific surface area of at least 5 m<sup>2</sup>/g and a SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> molar ratio of at least 1.3.

**4,959,269**  
**STRUCTURES WITH MULTIPLE POLYMERIC LAYERS COMPRISING A LAYER OF VINYLIDENE FLUORIDE POLYMER BONDED TO A LAYER OF PLASTICIZED VINYL CHLORIDE POLYMER AND USE OF THESE STRUCTURES FOR THE MANUFACTURE OF FLEXIBLE PACKAGING**  
 Claude Dehennan, Waterloo, Belgium, assignor to Solvay & Cie (Societe Anonyme), Brussels, Belgium  
 Filed Dec. 29, 1988, Ser. No. 291,654  
 Claims priority, application Belgium, Jan. 8, 1988, 06800018  
 Int. Cl.<sup>3</sup> B32B 27/08 8 Claims  
 U.S. Cl. 428—421

1. Structures with multiple polymeric layers comprising a layer of vinylidene fluoride polymer bonded to a layer of plasticized vinyl chloride polymer, which are characterized in

that the layer of vinylidene fluoride polymer is bonded to the layer of plasticized vinyl chloride polymer by means of a mixture of polymeric adhesives consisting of a copolymer of vinyl acetate and of ethylene and of a copolymer of vinyl chloride and of vinyl acetate, the said mixture containing from 36 to 95% by weight of vinyl acetate and exhibiting a dynamic viscosity equal to at least 55 kPa s at 100° C. and 1 s<sup>-1</sup>.

**4,959,270**  
**LAMINATED STRUCTURE FORMED OF CERAMIC COLOR LAYER AND CONDUCTIVE LAYER**  
 Jun Hasegawa, Osaka, Japan, assignor to Nippon Sheet Glass Co., Ltd., Osaka, Japan  
 Filed Jul. 20, 1988, Ser. No. 222,107  
 Claims priority, application Japan, Jul. 20, 1987, 62-110615  
 Int. Cl.<sup>3</sup> B32B 7/00, 17/06 14 Claims  
 U.S. Cl. 428—426



1. A laminated structure formed of a ceramic color layer and a conductive layer, comprising:  
 a ceramic color layer formed on a surface of a glass plate; and  
 a conductive layer formed on a surface of said ceramic color layer and containing silver ions; wherein a partial layer constituting at least said ceramic color layer, located on a same side of said plate as said conductive layer is located, comprises a ceramic layer containing a reducing agent.

**4,959,271**  
**MULTILAYER SHEET**  
 Yun C. Sun, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.  
 Filed Jul. 6, 1988, Ser. No. 215,851  
 Int. Cl.<sup>3</sup> B32B 27/08; B28B 3/20 32 Claims  
 U.S. Cl. 428—476.3

1. A multilayer structure of indefinite running length, said structure comprising:  
 (A) at least one skin layer of a supporting resin;  
 (B) a barrier layer comprising a vinylidene chloride interpolymer, the interpolymer being formed from a monomer mixture comprising vinylidene chloride in an amount of from about 60 to about 99 weight percent, based on total weight of monomer mixture, and at least one monoethylenically unsaturated monomer copolymerizable therewith in an amount of from about 40 to about 1 weight percent, based on total weight of monomer mixture; and  
 (C) at least one tie layer interposed between each skin layer and the barrier layer, said tie layer being present in an amount of between about 5 and about 40 weight percent based on the total weight of the multilayer structure, and said tie layer comprising a graft copolymer polymerized from a polymerizable mixture comprising (a) at least 40 weight percent, based on total polymerizable mixture weight, of a monomer portion having as its major component a monomer selected from the group consisting of vinylidene chloride and C<sub>1</sub>-C<sub>8</sub> alkyl methacrylates, and (b) a preformed polymer.



4,959,272

**GYPSUM WALLBOARD PAPER HAVING IMITATION MANILA COLORED COATING**

William J. Long, Chicago, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Filed Nov. 18, 1986, Ser. No. 932,224

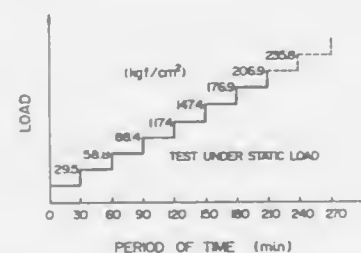
Int. Cl.<sup>3</sup> B32B 13/02

U.S. Cl. 428—537.7

6 Claims

1. A paper cover sheet particularly designed for use as the face sheet in manufacturing gypsum wallboard, comprising a base formed of a plurality of filler plies formed from recycled paper pulp, said cover sheet being free of topline plies and having a coating on the face surface thereof comprising a light colored mineral filler and a binder, thereby providing a finished face surface of light color.

less of phosphorus and the balance iron and incidental impurities;



and a copper plating layer of a thickness of 2 to 20  $\mu\text{m}$  disposed between said steel backing plate and said sintered iron-based alloy layer.

4,959,273

**CORROSION-RESISTANT PERMANENT MAGNET AND METHOD FOR PREPARING THE SAME**

Atsushi Hamamura, Kyoto; Takaki Hamada; Koiki Tokuhara, both of Takatsuki; Yukimitu Miyao; Fujidara; Tomoyuki Imai, and Nanao Horikoshi, both of Hiroshima, all of Japan, assignors to Sumitomo Special Metals Co., Ltd. and Toda Kogyo Corp., both of Hiroshima, Japan

Filed Sep. 18, 1989, Ser. No. 408,243

Claims priority, application Japan, Sep. 20, 1988, 63-237125

Int. Cl.<sup>3</sup> B22F 7/00

U.S. Cl. 428—548

44 Claims

1. A corrosion-resistant permanent magnet formed of a sintered body of a permanent magnet consisting essentially of 10 to 30 atomic % of R, wherein R is at least one of Nd, Pr, Dy, Ho and Tb, or at least one of Nd, Pr, Dy, Ho and Tb and at least one of La, Ce, Sm, Gd, Er, Eu, Tm, Yb, Lu and Y, 2 to 28 atomic % of B and 65 to 80 atomic % of Fe, and having a tetragonal phase as a major phase,

said magnet further comprising on the surface of said sintered body:

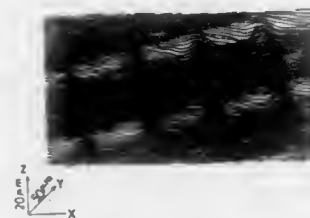
a layer of at least one noble metal selected from the group consisting of Pd, Ag, Pt and Au,

an electroless plating layer, formed on the noble metal layer, of at least one base metal selected from the group consisting of Ni, Cu, Sn and Co, and

on the surface of said electroless plating layer, a highly adherent metal coating formed of an electrolytic plating layer of at least one base metal selected from the group consisting of Ni, Cu, Sn and Co,

the permanent magnet exhibiting deterioration of not more than 5% from the initial magnetic properties, when tested, after being tested for 500 hours under the conditions of a temperature of 80° C. and a relative humidity of 90%.

6. A metallic sheet for use in press forming having on the surface thereof a micro-pattern composed of independent pond-shaped indentations and continuous grooved indentations, said grooved indentations enclosing the pond-shaped indentations and being arranged to form a network.



4,959,276

**HEAT-RESISTANT, WEAR-RESISTANT AND HIGH-STRENGTH AL-SI ALLOY, AND CYLINDER LINER EMPLOYING SAME**

Yoshitoshi Hagiwara; Eitaro Koya, both of Tokyo; Tetsuya Hayashi, Hyogo, and Yoshinobu Takeda, Hyogo, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka and Honda Motor Co., Ltd., Tokyo, both of Japan

Filed Oct. 31, 1989, Ser. No. 429,429

Claims priority, application Japan, Oct. 31, 1988, 63-273349

Int. Cl.<sup>3</sup> C22C 21/02

U.S. Cl. 428—614

3 Claims

1. A heat-resistant, wear-resistant and high-strength Al-Si alloy wherein

(A) 3 to 5% by weight based on the total amount of the alloy of alumina particles having a maximum particle diameter of 30  $\mu\text{m}$  or less and an average particle diameter of 10  $\mu\text{m}$  or less and having shapes with no sharp edge and

(B) 0.5 to 3% by weight based on the total amount of the alloy of graphite particles having a maximum particle

4,959,278

**TIN WHISKER-FREE TIN OR TIN ALLOY PLATED ARTICLE AND COATING TECHNIQUE THEREOF**

Hidenori Shimanchi, Takatsuki, and Keijiro Suzuki, Tokyo, both of Japan, assignors to Nippon Mining Co., Ltd., Japan

Filed Jun. 8, 1989, Ser. No. 363,615

Claims priority, application Japan, Jun. 16, 1988, 63-146772; Jun. 16, 1988, 63-146894; Jun. 16, 1988, 63-146895

Int. Cl.<sup>3</sup> B32B 15/00; C25D 5/10, 5/50

U.S. Cl. 428—642

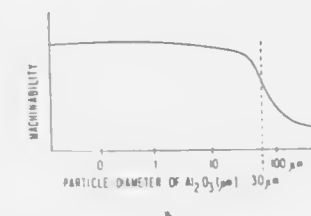
82 Claims

diameter of 10  $\mu\text{m}$  or less as measured on a cross section of the Al-Si alloy structure

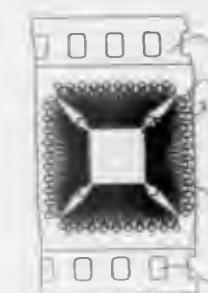
are dispersed in a matrix consisting essentially of ingredients for an Al-Si alloy and having primary Si crystals, the sizes of the primary Si crystals being not larger than 10  $\mu\text{m}$ .

3. A double-layered cylinder liner for use in making an internal combustion engine, which comprises:

an inner layer comprising a heat-resistant, wear-resistant and high-strength Al-Si alloy wherein (A) 3 to 5% by weight based on the total amount of the alloy of alumina particles having a maximum particle diameter of 30  $\mu\text{m}$  or less and an average particle diameter of 10  $\mu\text{m}$  or less and having shapes with no sharp edge and (B) 0.5 to 3% by weight



on the total amount of the alloy of graphite particles having a maximum particle diameter of 10  $\mu\text{m}$  or less as measured on a cross section of the Al-Si alloy structure are dispersed in a matrix consisting of ingredients for an Al-Si alloy and having primary Si crystals, the sizes of said primary Si crystals being not larger than 10  $\mu\text{m}$ , said inner layer having a thickness of 1 mm or more, and an outer layer made of a wrought aluminum alloy which has an aluminum content of 90% by weight or more, said outer layer being joined with said inner layer, the interface between said inner and outer layers and the outer periphery of said outer layer being uneven or corrugated in the circumferential direction.



1. A tin or tin alloy plated article protected against the generation of tin whiskers characterized in having an indium plated layer on the substrate thereof and a tin or tin alloy plated layer on said indium plated layer.

4,959,279

**SUPERCONDUCTING WIRE CONTAINING MULTIFILAMENTARY SUPERCONDUCTING ALLOY**

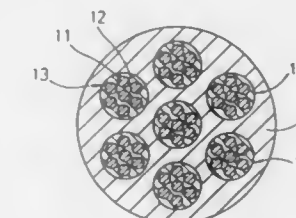
Yasuzo Tanaka; Kaname Matsumoto, both of Yokohama, and Yukio Yamada, Kanagawa, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Jan. 17, 1989, Ser. No. 297,949

Int. Cl.<sup>3</sup> H01L 39/24; B32B 15/00

U.S. Cl. 428—660

8 Claims



4,959,277

**PROCESS FOR TREATING PLATED STEEL SHEET**  
Kenshi Saeki, Kurashiki; Takao Ogino, Hiratsuka; Noriaki Yoshitake, Hiratsuka; Takumi Honda, Hiratsuka; Akira Nishihara, Yokohama; Hiroshi Okita, Yokosuka; Yukio Tsuge, Ebina, and Haruo Iizuka, Atagi, all of Japan, assignors to Nihon Parkerizing Co., Ltd. and Mitsubishi Kasei Corporation, both of Tokyo, Japan

Filed Dec. 1, 1989, Ser. No. 444,664

Claims priority, application Japan, Dec. 7, 1988, 63-309774

Int. Cl.<sup>3</sup> B32B 15/04, 15/08; C25D 13/06, 13/20

U.S. Cl. 428—623

13 Claims

1. A process for preparing a zinc-plated or zinc alloy-plated steel sheet for cathodic electrodeposition coating, said steel sheet having been chromate-treated, which comprises applying a protective coating material to said plated steel sheet and heat drying the resulting coating to form a protective film on said sheet, said protective coating material having as a principal component of a film-forming organic component a block isocyanate-containing prepolymer containing in one and the same molecule respectively at least one blocked isocyanate group, hydroxyl group, and tertiary amino group, and containing 10–100 parts by weight of silica sol relative to 100 parts by weight of said prepolymer, said coating material having been applied to the surface of said sheet in such a thickness that the resulting dry film is present in an amount of 0.3 g–4 g/m<sup>2</sup> of surface coated.

1. A superconducting wire containing a multifilamentary superconducting alloy, comprising:

at least one composite containing a first matrix in which a plurality of superconducting alloy filaments are arranged, said plurality of superconducting alloy filaments extending parallel to one another in a longitudinal direction of said at least one composite; and

a second matrix in which said at least one composite is embedded, said first matrix consisting essentially of a metal or an alloy which does not form any intermetallic compound with said superconducting alloy filament.

4,959,280

**BATTERY ASSEMBLY**

Helmut K. Amthor, Rocky River, Ohio, assignor to Eveready Battery Company, Inc., St. Louis, Mo.

Filed Nov. 13, 1989, Ser. No. 434,371

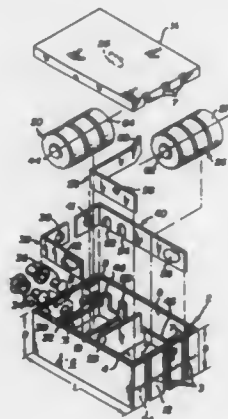
Int. Cl.<sup>3</sup> H01M 2/06

U.S. Cl. 429—27

14 Claims

1. A battery comprising a plurality of cylindrical cells assem-

bled in a rectangular housing comprising a base, upstanding walls and a cover, and having a length dimension, a width dimension and a depth dimension; an external first terminal spaced apart from an external second terminal on said housing; a first plurality of cylindrical cells connected in series and assembled in said housing such that the longitudinal axis of the cells is parallel to the width dimension of the housing, said first plurality of cells having a positive terminal at one end and a negative terminal at the opposite end; a second plurality of cylindrical cells connected in series and assembled in said housing such that the longitudinal axis of the cells is parallel to the width dimension of the housing and parallel to and in the plane of the longitudinal axis of the first plurality of cells, said



second plurality of cells having a positive terminal at one end and a negative terminal at the opposite end; a first conductive strip electronically connected to the first terminal on said housing at one end and to the positive terminal of said first plurality of cells at the opposite end; a second conductive strip electronically connected to the second terminal on said housing at one end and to the negative terminal of said second plurality of cells at the opposite end; a third conductive strip electronically connected to the negative terminal of said first plurality of cells at one end and to the positive terminal of said second plurality of cells at the opposite end so that all the cells within said housing are connected in series to the external terminals on said housing.

4,959,281

## NON AQUEOUS ELECTROLYTE CELL

Yoshio Nishi, Hideto Azuma, and Atsuo Omura, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

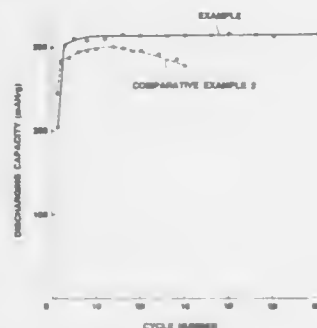
Filed Aug. 29, 1989, Ser. No. 399,982

Claims priority, application Japan, Aug. 30, 1988, 63-217295

Int. Cl.<sup>5</sup> H01M 4/38, 10/40

U.S. Cl. 429-194

3 Claims



1. A non-aqueous electrolyte cell comprising an anode of a carbonaceous material having an interlayer spac-

ing d002 of not less than 3.70 Å, true density of less than 1.70 g/cm<sup>3</sup> and not having exothermic peak at not less than 700° C. as measured by a differential thermal analysis in air stream,

a cathode containing Li in an amount corresponding to the charging/discharging capacity of not less than 200 mAh per 1 gram of said carbonaceous material; and a non-aqueous electrolyte.

4,959,282

## CATHODE ACTIVE MATERIALS, METHODS OF MAKING SAME AND ELECTROCHEMICAL CELLS INCORPORATING THE SAME

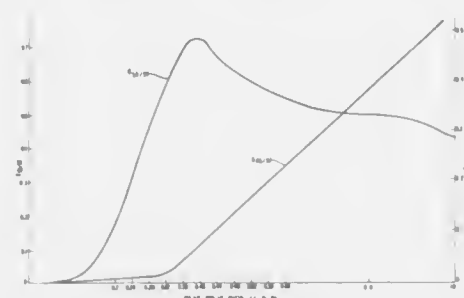
Jeffery R. Dahn, Surrey, and Brian M. Way, North Vancouver, both of Canada, assignors to Moli Energy Limited, Canada

Filed Jul. 11, 1988, Ser. No. 217,668

Int. Cl.<sup>5</sup> H01M 4/50; C01G 45/00; C01D 15/00

U.S. Cl. 429-224

19 Claims



1. A method of making a cathode active material for an electrochemical cell comprising the steps of providing a substantially dry intermediate including a lithium-containing compound and gamma MnO<sub>2</sub> at a mean molar ratio of lithium to gamma MnO<sub>2</sub> of about 0.33 to about 0.43 and heat-treating said intermediate in a drying atmosphere above about 300° C.

4,959,283

## DRY FILM PROCESS FOR ALTERING WAVELENGTH RESPONSE OF HOLOGRAMS

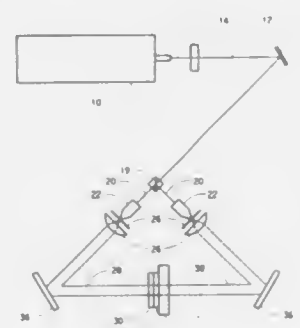
William K. Smothers, Hockessin; Krishna C. Doraiswamy; Mark L. Armstrong, both of Wilmington, and Torrence J. Trout, Yorklyn, all of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 144,840, Jan. 15, 1988, abandoned. This application Jul. 14, 1989, Ser. No. 380,933

Int. Cl.<sup>5</sup> G02H 1/04, 1/06

U.S. Cl. 430-1

26 Claims



1. A process for forming a volume phase hologram in a

substantially solid, transparent, photosensitive film element comprising, in sequence:

- holographically exposing said film element to coherent light to record a volume hologram within said element; and
- contacting said film element with a diffusion element for a time sufficient to modify the wavelength of light response by the hologram.

4,959,284

## HOLOGRAPHIC PHOTOPOLYMER COMPOSITIONS AND ELEMENTS CONTAINING A RING-OPENING MONOMER

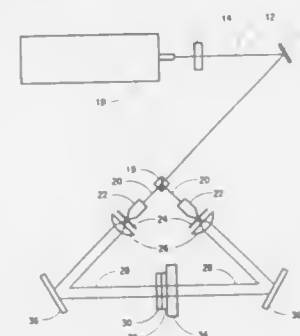
William K. Smothers, Hockessin; Bruce M. Monroe, and Dominic M. T. Chan, both of Wilmington, all of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 29, 1988, Ser. No. 291,582

Int. Cl.<sup>5</sup> G03H 1/10

U.S. Cl. 430-2

14 Claims



1. In a process for forming a volume reflection hologram by directing a reference beam and an object beam of coherent actinic radiation onto opposite sides of a recording medium, the improvement wherein the recording medium comprises a substrate that supports a substantially solid, photopolymerizable composition consisting essentially of:

- 25 to 75% of a solvent soluble, thermoplastic polymeric binder;
- 5 to 60% of a monomer capable of addition polymerization, said monomer having a boiling point above 100° C. and polymerizing via free radical ring-opening sigma-bond cleavage;
- up to 25% of a plasticizer; and
- 0.1 to 10% of a photoinitiator system that activates free radical polymerization of said monomer on exposure to actinic radiation;

wherein said percentages are weight percentages of the total composition.

4. The process of claim 1 wherein said monomer is a vinylcyclopropane.

4,959,285

## FLEXOGRAPHIC RELIEF PRINTING PLATE

Gerhard Hoffmann, Otterstadt, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 398,964, Aug. 28, 1989, which is a continuation of Ser. No. 93,170, Sep. 2, 1987, abandoned, which is a continuation of Ser. No. 919,054, Oct. 15, 1986, abandoned.

This application Feb. 8, 1990, Ser. No. 476,780

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1985, 3536957

Int. Cl.<sup>5</sup> G03C 3/00

U.S. Cl. 430-11

4 Claims

1. A flexographic relief printing plate comprising a dimensionally stable base and a photopolymerized relief layer which is obtained by imagewise exposing to actinic radiation a photo-

polymerizable elastomeric relief forming layer of a photopolymerizable element, said relief forming layer consisting essentially of

- from 58% to 92% by weight, based on the sum of all the components of the photopolymerizable elastomeric relief-forming layer, of a solvent soluble elastomeric diene block copolymer containing at least one vinylaromatic and at least one diene polymer block;
- from 2% to 16% by weight, based on the sum of all the components of the photopolymerizable elastomeric relief-forming layer, of one or more photopolymerizable, ethylenically unsaturated monomers being compatible with the elastomeric diene block copolymer (a);
- from 0.4% to 6% by weight, based on the sum of all the components of the photopolymerizable elastomeric relief-forming layer, of one or more photoinitiators; and
- from 3% to 22% by weight, based on the sum of the photopolymerizable elastomeric relief-forming layer, of a chloralkane of 8 to 40 carbons which has a chlorine content of about 49% by weight

and then developing the unexposed and unpolymerized areas by liquid solvent washout to obtain said flexographic relief printing plate.

4,959,286

## TWO-PASS HIGHLIGHT COLOR IMAGING WITH DEVELOPER HOUSING BIAS SWITCHING

Charles H. Tabb, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 3, 1989, Ser. No. 332,087

Int. Cl.<sup>5</sup> G03G 13/08

U.S. Cl. 430-45

10 Claims

1. The method of forming images, said method including the steps of:

- uniformly charging a charge retentive surface to a predetermined voltage level;
- forming, on said charge retentive surface at different locations thereof, first image and second latent electrostatic images;
- moving said first and second latent electrostatic images sequentially through two developer housings having different kinds of toner contained therein;
- electrically biasing said one of said developer housings at a first bias level when one of said images passes there-through and at a second level as the other of said images passes therethrough whereby development of said said one of said images is effected and development of said other images is precluded; and
- electrically biasing the other of said developer housings at a first level when said one of said images passes there-through and at a second level when said other of said images passes therethrough whereby development of said other image is effected and development of said one image is precluded.

4,959,287

## XERORADIOGRAPHIC IMAGING MEMBER

Damodar M. Pai, Fairport; Philip G. Perry, Webster, and Kenneth J. Pheasant, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sep. 27, 1989, Ser. No. 413,402

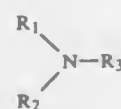
Int. Cl.<sup>5</sup> G03G 5/047, 13/22

U.S. Cl. 430-59

19 Claims

13. A xeroradiographic imaging member comprising a substrate having an electrically conductive surface, an electroradiographic insulating layer selected from the group consisting of selenium and selenium alloys, and an overcoating layer consisting essentially of nigrosene, a charge transport aromatic amine compound represented by the following formula:





wherein  $R_1$  and  $R_2$  are an aromatic group independently selected from the group consisting of a substituted or unsubstituted phenyl group, naphthyl group, and polyphenyl groups and  $R_3$  is selected from the group consisting of a substituted or unsubstituted aryl group, alkyl group having from 1 to 18 carbon atoms and cycloaliphatic compounds having from 3 to 18 carbon atoms and a copolyester resin represented by the following formula:



wherein said diacid is selected from the group consisting of terephthalic acid, isophthalic acid, and mixtures thereof, said diol comprises ethylene glycol, the mole ratio of said diacid to said diol is about 1:1,  $n$  is a number between about 175 and about 350 and the  $T_g$  of said copolyester resin is between about 50° C. about 80° C.

4,959,288

# PHOTOCONDUCTIVE IMAGING MEMBERS WITH DIARYL BIARYLAMINE COPOLYMER CHARGE TRANSPORT LAYERS

Beng S. Ong, Mississauga; Barkev Keoshkerian, Thornhill; Giuseppe Baranyi, and Dhanraj K. Murti, both of Mississauga, all of Canada, assignors to Xerox Corporation, Stamford, Conn.

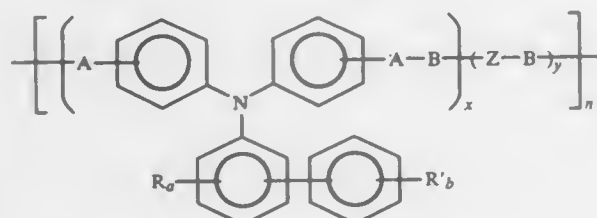
Filed Apr. 3, 1989, Ser. No. 332,207

Int. Cl.<sup>5</sup> G03G 5/10

U.S. Cl. 430—59

35 Claims

1. A photoconductive imaging member comprised of a photogenerating layer, and a charge transport layer comprised of diaryl biaryllamine copolymers of the formula



wherein A and B are independently selected from bifunctional linkages; Z is alkylendioxy, arylenedioxy, or substituted derivatives thereof; R and R' are alkyl, aryl, substituted alkyl, substituted aryl, alkoxy, or halogen;  $x$  and  $y$  are mole fractions wherein  $x$  and  $y$  are greater than 0 and the sum of  $x$  and  $y$  is equal to 1.0;  $a$  and  $b$  are the numbers 0, 1 or 2; and  $n$  represents the number of repeating segments.

4,959,289

# ELECTROPHOTOGRAPHIC ELEMENT HAVING A SURFACE LAYER AND METHOD FOR PRODUCING SAME

Masayuki Nishikawa, and Shigeru Yagi, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Jan. 3, 1989, Ser. No. 292,984

Claims priority, application Japan, Jan. 8, 1988, 63-1359

Int. Cl.<sup>5</sup> G03G 5/082

U.S. Cl. 430—64

7 Claims

1. An electrophotographic element comprising:

a support member serving as a substrate;  
a photosensitive layer deposited on said support member through a glow discharge decomposition process and including amorphous silicon doped with an impurity, said impurity including boron;  
a surface layer having a reflectance factor of 0.1 or less for laser light in a wavelength range of 780 nm, said surface layer being deposited on said photosensitive layer through a glow discharge decomposition process, including amorphous silicon doped with nitrogen atoms, and having an atom-number ratio of nitrogen to silicon of 0.5 or greater.

# 4,959,290 BENZYLIDENEINDENE COMPOUNDS AND ELECTROPHOTOGRAPHIC PHOTOCONDUCTOR USING THE SAME

Tamotsu Aruga, Numazu; Masao Sasaki, Susono, and Mitsuru Hashimoto, Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 8, 1988, Ser. No. 281,210

Claims priority, application Japan, Dec. 8, 1987, 62-308597; Mar. 8, 1988, 63-054548

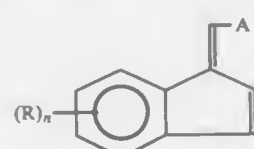
Int. Cl.<sup>5</sup> G03G 5/14, 5/06

U.S. Cl. 430—73

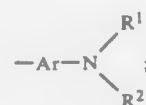
12 Claims



1. An electrophotographic photoconductor comprising an electroconductive support and a photoconductive layer formed thereon comprising at least one indenylidene compound having the formula (I):



wherein A represents a N-substituted carbazolyl group or



wherein

Ar represents an aromatic hydrocarbon group or a heterocyclic group; and  $R^1$  and  $R^2$  each represent a substituted or unsubstituted alkyl group, or an aryl group which may have a substituent.

R represents an alkyl group, an alkoxy group or a halogen; and  $n$  is an integer of 0 to 4, and when  $n$  is 2, 3 or 4, Rs may be the same or different.

4,959,291

# LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE, REDUCING AGENT, POLYMERIZABLE COMPOUND AND A DIAZAPHTHALIDE DYE

Toru Harada, and Toshiyuki Watanabe, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 115,067, Oct. 30, 1987, abandoned.

This application Aug. 8, 1989, Ser. No. 391,663

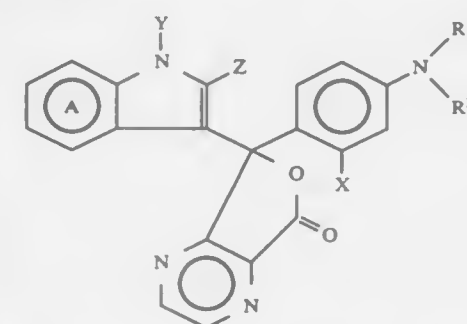
Claims priority, application Japan, Oct. 30, 1986, 61-259967

Int. Cl.<sup>5</sup> G03C 1/68, 1/733, 1/12

U.S. Cl. 430—138

6 Claims

1. A light-sensitive material comprising a light-sensitive layer containing a silver halide, a reducing agent, an ethylenically unsaturated polymerizable compound and a leuco dye provided on a support, wherein the leuco dye has the following formula (I):



in which each of  $R^1$  and  $R^2$  independently is a monovalent group selected from the group consisting of hydrogen, an alkyl group, a cycloalkyl group, an aralkyl group and an aryl group, or  $R^1$  and  $R^2$  together with the neighboring nitrogen atom form a 5- or 6-membered ring; X is a monovalent group selected from the group consisting of hydrogen, a halogen atom, an alkyl group, an alkoxy group,  $\text{—NHCOR}^3$ , wherein  $R^3$  is an alkyl group or an aryl group,  $\text{—OCOR}^4$ , wherein  $R^4$  is an alkyl group or an aryl group, and  $\text{—NR}^5\text{R}^6$ , wherein  $R^5$  and  $R^6$  have the same meanings as for  $R^1$  and  $R^2$ ; Y is an alkyl group or an aralkyl group; Z is a monovalent group selected from the group consisting of hydrogen, an alkyl group and an aryl group; each of  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^4$ ,  $R^5$ ,  $R^6$ , X, Y, Z and the benzene ring A may have one or more substituent groups; and at least one of  $R^1$ ,  $R^2$  and Y is an alkyl group having 5 or more carbon atoms.

4,959,292

# LIGHT-SENSITIVE O-QUINONE DIAZIDE COMPOSITION AND PRODUCT WITH PHENOLIC NOVOLAK PREPARED BY CONDENSATION WITH HALOACETOALDEHYDE

Andrew J. Blakeney, Seekonk, Mass.; Thomas Sarubbi, Providence, R.I., and Joseph J. Sizemsky, Seekonk, Mass., assignors to Olin Hunt Specialty Products Inc., Cheshire, Conn.

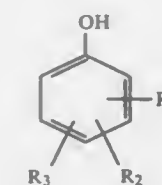
Filed Jul. 11, 1988, Ser. No. 217,512

Int. Cl.<sup>5</sup> G03C 1/60; G03F 7/023

U.S. Cl. 430—165

18 Claims

1. A light-sensitive composition comprising an admixture of at least one light-sensitive o-quinonediazide compound and a binder phenolic novolak resin comprising the product of a condensation reaction of an aldehyde comprising a haloacetaldehyde source or a mixture of a haloacetaldehyde source and a formaldehyde source with a phenolic monomer comprising at least one compound of the formula:



wherein  $R_1$ ,  $R_2$  and  $R_3$  are individually selected from hydrogen or a one to four carbon alkyl group and wherein the ratio of total carbon atoms in the sum of  $R_1$ ,  $R_2$  and  $R_3$  to the total number of phenolic nuclei in said resin is from about 0.5:1 to about 1.5:1 in the presence of a solvent; said resin made by employing a molar ratio of total aldehyde to total phenolic monomers from about 0.33:1 to about 0.70:1, the amount of said o-quinonediazide compound or compounds being about 5% to about 40% by weight and the amount of said binder resin being about 60% to 95% by weight, based on the total nonvolatile solids content of said light-sensitive composition.

4,959,293

# DEEP UV PHOTORESIST WITH ALKYL 2-DIAZO-1-ONES AS SOLUBILITY MODIFICATION AGENTS

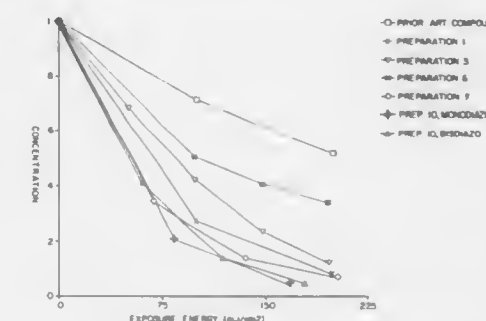
George Schwartzkopf, Franklin Township, Somerset County, N.J.; John B. Covington, and Kathleen B. Gabriel, both of Bethlehem, Pa., assignors to J. T. Baker, Inc., Phillipsburg, N.J.

Filed Oct. 28, 1988, Ser. No. 264,335

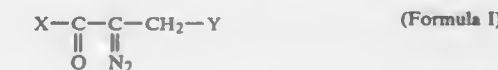
Int. Cl.<sup>5</sup> G03F 7/004, 7/022; G03C 1/54

U.S. Cl. 430—189

23 Claims

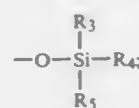


1. A lithographic deep UV light sensitive positive photoresist composition for use with deep UV light of less than 300 nm comprising a base soluble film-forming photoresist polymer and in admixture therewith an effective amount of a deep UV photosensitive solubility modification agent compound of the formula:



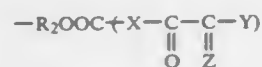
wherein:

X and Y are straight or branch chain alkyl or substituted alkyl radicals which may be joined together to form an unsubstituted or substituted straight or branched alkyl or fused ring alkyl chain and wherein the alkyl or fused ring alkyl radicals may be substituted with a radical selected from the group consisting of  $\text{—COOR}_1$  or



wherein:

R<sub>1</sub> is a straight or branched chain alkyl radical of from 1 to about 20 carbon atoms or



in which R<sub>2</sub> is alkyl of from 1 to 20 carbon atoms; Z is H<sub>2</sub> or N<sub>2</sub>; X and Y are as defined hereinbefore; and R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are each independently alkyl of from 1 to 20 carbon atoms.

4,959,294

**INFRA-RED SENSITISING DYES FOR SILVER HALIDE**  
Bernard A. Lea; Ronald W. Burrows; Thomas D. G. Hellings, all of Harlow, England; Charles G. Barlow, and Ivan H. Skoog, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

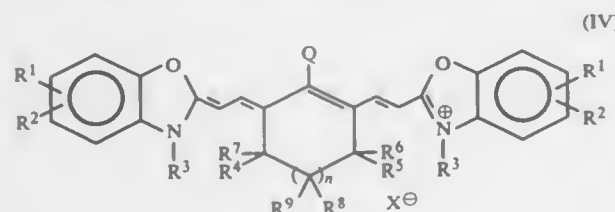
Filed Apr. 14, 1988, Ser. No. 181,545

Int. Cl.<sup>5</sup> G03C 1/20

U.S. Cl. 430—204

10 Claims

3. A photographic silver halide emulsion sensitive to infra-red radiation characterised in that it comprises from 0.5 to 500 mg per mole of silver halide of a dye of the general formula:



in which:

Q represents Cl or Br,

R<sup>3</sup> represents an alkyl or substituted alkyl group,

n is 0, 1, 2 or 3,

X is an anion of molecular weight up to 400 which may be incorporated in one R<sup>3</sup> group,

each R<sup>1</sup> and R<sup>2</sup> independently represent hydrogen or a substituent of the type present in cyanine dyes,

R<sup>4</sup> to R<sup>9</sup> each independently represent hydrogen or a lower alkyl group of 1 to 3 carbon atoms or any two of these substituents on adjacent carbon atoms may together represent the necessary atoms to complete a fused benzene ring, if n=0.

4,959,295

**PROCESS OF MAKING A PHOTSENSITIVE SEMI-AQUEOUS DEVELOPABLE CERAMIC COATING COMPOSITION**

William J. Nebe, Wilmington, Del., and James J. Osborne, Kennett Square, Pa., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 200,386, May 31, 1988, Pat. No. 4,908,296.

This application Nov. 3, 1989, Ser. No. 431,223

Int. Cl.<sup>5</sup> G03C 1/68

U.S. Cl. 430—281

3 Claims

1. In a method of making a photosensitive ceramic coating composition which is fireable in a substantially nonoxidizing atmosphere comprising an admixture of:

(a) finely divided particles of ceramic solids having a surface

area-to-weight ratio of no more than 10 m<sup>2</sup>/g and at least 80 wt. % of the particles having a size of 1–10 μm, and (b) finely divided particles of an inorganic binder having a glass transition temperature in the range from of 550° to 825° C., a surface area-to-weight ratio of no more than 10 m<sup>2</sup>/g and at least 90 wt. % of the particles having a size of 1–10 μm, the weight ratio of (b) to (a) being in a range from 0.6 to 2, dispersed in an organic medium comprising

(c) an organic polymeric binder, and  
(d) a photoinitiation system, dissolved in  
(e) photohardenable monomer, and  
(f) an organic medium

wherein the improvement comprises an organic polymeric binder containing a copolymer or interpolymers of a C<sub>1</sub>–C<sub>10</sub> alkyl acrylate or C<sub>1</sub>–C<sub>10</sub> alkyl methacrylate, or combinations thereof and an ethylenically unsaturated carboxylic acid, wherein a moiety in the binder derived from the unsaturated carboxylic acid comprises from 5 to less than 15 weight percent of the polymer and wherein the binder has a molecular weight not greater than 100,000 and wherein the composition upon imagewise exposure to actinic radiation is developable in an aqueous solution containing by weight 0.62 percent sodium borate and 8.7 percent butyl cellosolve wherein prior to mixing of component (a), (b), (c), (d), (e), (f), component (a) of finely divided particles of ceramic solids and component (b) of finely divided particles of an inorganic binder are freeze dried in formation of such particles.

4,959,296

**PROCESS FOR THE DEVELOPMENT OF DRY PS PLATES**

Susumu Yoshida; Tatsuji Higashi, and Hiroshi Takahashi, all of Shizuoka, Japan, assignors to Fujii Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Dec. 14, 1988, Ser. No. 284,400

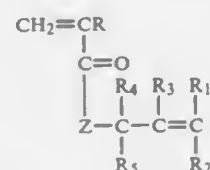
Claims priority, application Japan, Dec. 16, 1987, 62-317843

Int. Cl.<sup>5</sup> G03F 7/02

U.S. Cl. 430—302

19 Claims

1. A process for the development of an exposed dry PS plate comprising a substrate provided thereon with (1) a primer layer, (2) a photopolymerizable light-sensitive layer comprising (a) a water-soluble or water-swellaible copolymer comprising, as copolymerizable components, at least one monomer represented by the following general formula (I):



wherein R represents a hydrogen atom or a methyl group; R<sub>1</sub> to R<sub>5</sub> each represents a hydrogen atom, a halogen atom, a carboxyl group, a sulfo group, a nitro group, a cyano group, an amido group, an amino group, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkylamino group, an arylamino group, an alkylsulfonyl group or an arylsulfonyl group; and Z represents an oxygen or sulfur atom or a group: —NH— or —NR'— (wherein R' represents an alkyl group) and an ethylenically unsaturated monomer having hydrophilic groups; (b) a monomer or an oligomer having at least one photopolymerizable ethylenically unsaturated double bond; and (c) a photopolymerization initiator and (3) a silicone rubber layer in this order, said process comprising, after image-wise exposure, contacting said plate with a developer to remove said photopolymerizable light-sensitive layer and corresponding areas of said silicone rubber layer in non-exposed areas to give a dry lithographic printing plate, and wherein a developer comprises:

(i) an organic solvent which can dissolve or swell the non-

exposed areas of the photopolymerizable light-sensitive layer and whose solubility in water at ordinary temperature is not more than 20% by weight;

(ii) a surfactant; and

(iii) water, the developer being substantially free from any organic solvent capable of swelling the silicone rubber layer.

4,959,297

**TERNARY PHOTOINITIATOR SYSTEM FOR ADDITION POLYMERIZATION**

Michael C. Palazzotto, Saint Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn. Division of Ser. No. 130,606, Dec. 19, 1987, Pat. No. 4,889,792.

This application Nov. 22, 1989, Ser. No. 440,999

Int. Cl.<sup>5</sup> G03C 1/725, 1/053

U.S. Cl. 430—322

15 Claims

1. A method for addition photopolymerization comprising the step of irradiating a photopolymerizable composition comprising:

(a) at least one vinyl monomer capable of undergoing free-radical polymerization, and

(b) a photoinitiator system comprising photochemically effective amounts of

(i) a diaryliodonium salt,

(ii) an organic or inorganic pigment, insoluble in the photopolymerizable composition, which serves as a sensitizer, and

(iii) at least one electron donor compound, said donor compound being different from said pigment and having a potential between about 0.5 and 1.5 volts versus a saturated calomel electrode,

with light having a wavelength between about 300 and about 1000 nanometers until said composition gels or hardens.

4,959,298

**SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL**  
Akio Mitsui, and Takashi Ozawa, both of Minami Ashigara, Japan, assignors to Fujii Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 915,585, Oct. 6, 1986, abandoned. This application Oct. 7, 1988, Ser. No. 256,128

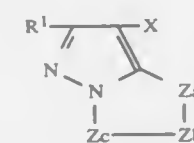
Claims priority, application Japan, Oct. 4, 1985, 60-221499; Jan. 8, 1986, 61-1866

Int. Cl.<sup>5</sup> G03C 7/38, 7/392

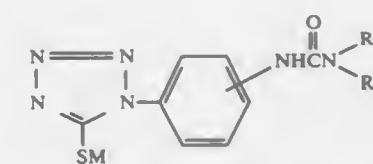
U.S. Cl. 430—496

10 Claims

1. A silver halide color photographic material, comprising a support having provided thereon at least one silver halide emulsion layer, and at least one magenta coupler represented by the following general formula (I)



wherein R<sup>1</sup> represents a hydrogen atom or a substituent; X represents a hydrogen atom or a coupling releasing group upon a coupling reaction with the oxidation product of an aromatic primary amine developing agent; Za, Zb and Zc each represents a methine group, a substituted methine group, =N— or —NH—; one of the Za—Zb bond and the Zb—Zc bond is a double bond while the other is a single bond; and Zb—Zc may be fused to an aromatic ring, said coupler may form a dimer or a higher polymer by linking at the R<sup>1</sup> or X position, and when Za, Zb or Zc is a substituted methine group, said coupler may form a dimer or a higher polymer through said substituted methine group, and at least one compound represented by the following general formula (II):



(II)

wherein M represents a hydrogen atom, an alkali metal atom, a quaternary ammonium group or a group that can be cleaved under alkaline conditions; and R<sub>2</sub> and R<sub>3</sub>, which may be the same as or different from each other, represent a hydrogen atom, a substituted or unsubstituted aliphatic hydrocarbon group, or a substituted or unsubstituted aromatic hydrocarbon group, or R<sub>2</sub> and R<sub>3</sub> may form together a ring, wherein said silver halide color photographic material is in the form of a packaged product and the relative humidity in said package product is up to about 58%.

4,959,299

**SILVER HALIDE COLOR PHOTOGRAPHIC MATERIALS**

Kel Sakanoue; Hidetoshi Kobayashi; Seiji Ichijima, and Shinji Ueda, all of Kanagawa, Japan, assignors to Fujii Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 7, 1988, Ser. No. 164,655

Claims priority, application Japan, Mar. 5, 1987, 62-50683

Int. Cl.<sup>5</sup> G03C 7/32, 7/42

U.S. Cl. 430—544

8 Claims

1. A silver halide color photographic material comprising at least one silver halide emulsion layer on a support wherein, at least one type of development inhibitor releasing type coupler is present which, by means of a coupling reaction with the oxidized form of a primary aromatic amine developing agent, releases a precursor of a compound, the precursor inhibiting the development of silver halide which subsequently, by means of an electron transfer reaction via an ethylenic conjugated chain, releases a compound which inhibits the development of silver halide, and

at least one type of bleach accelerating agent releasing type coupler is present which, by means of a coupling reaction with the oxidized form of a primary aromatic amine developing agent, releases a bleach accelerating agent or a precursor thereof.

4,959,300

**SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL WITH IMPROVED GRADATION BALANCE**  
Toyoki Nishijima, and Kaoru Onodera, both of Odawara, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Apr. 12, 1988, Ser. No. 180,478

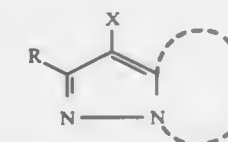
Claims priority, application Japan, Apr. 15, 1987, 62-90676

Int. Cl.<sup>5</sup> G03C 1/38, 7/38

U.S. Cl. 430—546

7 Claims

1. A silver halide photographic light-sensitive material comprising a support having thereon at least one silver halide emulsion layer, wherein said silver halide photographic light-sensitive material contains a magenta coupler represented by the Formula M-1



Formula M-1

wherein Z represents a group of non-metal atoms necessary for forming a nitrogen-containing heterocyclic which may have a substituent group; X represents a hydrogen atom, or a group capable of being split off upon the reaction with the oxidized



product of a color developing agent; and R represents a hydrogen atom or a substituent; and at least one surface active agent having in the molecule thereof at least two groups selected from the group consisting of a carboxy group and salts thereof, a sulfonic group and salts thereof, and a salt of a sulfuric ester group.

4,959,301

## PROCESS FOR RAPIDLY ENUMERATING VIABLE ENTITIES

James C. Weaver, Sudbury; Jonathan G. Bliss, Somerville; Gregory B. Williams, Tewksbury; Kevin T. Powell, Boston, and Gail I. Harrison, Watertown, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.  
Filed Apr. 22, 1988, Ser. No. 185,083  
Int. Cl.<sup>5</sup> C12Q 1/70, 1/02

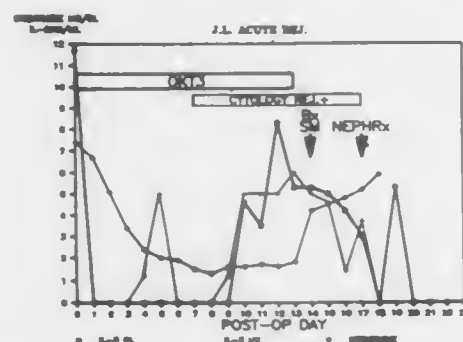
- U.S. Cl. 435—5 12 Claims
1. A method of determining the number of viable biological entities capable of growth per volume of a sample, comprising:
    - (a) forming microdroplets from a volume of the sample wherein some but not all of the microdroplets contain viable biological entities;
    - (b) measuring the volumes of at least a portion of the microdroplets formed in step (a) to obtain the volumes of the microdroplets;
    - (c) measuring the amount of biological material which constitutes part of the viable biological entities in the microdroplets; and
    - (d) determining the statistical distribution of the biological material in the microdroplet volumes as indicative of the number of viable biological entities per volume of the sample.

4,959,302

## METHOD OF EVALUATING IMMUNE SYSTEM RESPONSE TO ALLOGRAFTS, VIRAL INFECTION AND IMMUNOSUPPRESSIVE THERAPY

Andrew J. Cornaby, Boston, and Roy A. Dempsey, Cambridge, both of Mass., assignors to Endogen, Inc., Boston, Mass.  
Filed Aug. 20, 1987, Ser. No. 87,630  
Int. Cl.<sup>5</sup> G01N 33/543, 33/569

U.S. Cl. 435—5 22 Claims



1. A method of determining the status of an allograft recipient comprising measuring IL-2 levels in a biological fluid taken from the recipient after receipt of the allograft and comparing the levels obtained to predetermined levels as an indication of acceptability of the allograft.

4,959,303

## ASSAY FOR ANTIGENS BY BINDING IMMUNE COMPLEXES TO SOLID SUPPORTS FREE OF PROTEIN AND NON-IONIC BINDERS

Gary L. Milburn, Sunnyvale; Judith Rabbie, Palo Alto, and Thomas M. Houts, Mountain View, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Dec. 21, 1987, Ser. No. 135,869

Int. Cl.<sup>5</sup> G01N 33/53, 33/536, 33/537; C12Q 1/02  
U.S. Cl. 435—7 79 Claims

1. A method for detecting an antigen in a biological sample suspected of containing an antigen, said method comprising
  - a. providing in combination a solid support, which is hydrophobic or positively charged and substantially free of proteins, binding partners specific for said antigen, binding partners specific for antibody specific for said antigen, and non-ionic binders for an immune complex of said antigen and said antibody, and an aqueous medium comprising an antigen from said sample and an antibody specific for said antigen;
  - b. incubating said combination under conditions sufficient for said antibody when bound to said antigen to bind to said support; and
  - c. determining the antibody bound to said support or in said medium, the presence or amount thereof being related to the presence of antigen in said sample.

4,959,304

## PRODUCTION OF MONOCLONAL ANTIBODIES TO TREPONEMA DENTICOLA BY HYBRIDOMA TDIII, IIIBB2

Lloyd G. Simonson, Deerfield, Ill., assignor to United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 22, 1989, Ser. No. 355,575

Int. Cl.<sup>5</sup> C12Q 1/00; C07K 15/00  
U.S. Cl. 435—7 25 Claims

1. A monoclonal antibody reactive to *Treponema denticola* produced by the hybridoma deposited under accession number ATCC HB 9967.
2. A diagnostic reagent comprising the monoclonal antibody of claim 1 linked directly or indirectly to a detectable label.
3. A diagnostic reagent according to claim 2, wherein the detectable label is an enzyme.

4,959,305

## REVERSIBLE IMMOBILIZATION OF ASSAY REAGENTS IN A MULTIZONE TEST DEVICE

David L. Woodrum, Rancho Palos Verdes, Calif., assignor to Miles Inc., Elkhart, Ind.

Continuation of Ser. No. 875,464, Jun. 18, 1986, abandoned.

This application Oct. 31, 1988, Ser. No. 265,303

Int. Cl.<sup>5</sup> G01N 31/22, 33/53  
U.S. Cl. 435—7 20 Claims

ENZYME-LABELED ANTIBODY	REAGENT LAYER
IMMOBILIZED ANALYTE	REACTION LAYER
IMMOBILIZED SUBSTRATE	DETECTION LAYER
	SUPPORT MEMBER

1. A multizone test device for the immunoassay determination of an antigen or hapten analyte in a liquid test medium, comprising, in fluid flow contact,
  - (a) a reagent zone comprising a solid, porous matrix and a labeled reagent reversibly immobilized therein by a binding interaction between the labeled reagent and the matrix that is sufficiently disruptable by contact of the matrix

with a predetermined component of the test medium other than the analyte to release and thereby render diffusible an analytically effective amount of the labeled reagent independent of the presence or amount of analyte in the liquid test medium, the labeled reagent comprising one of the pair

- (i) the analyte or a binding analog thereof; and
  - (ii) an antibody which binds the analyte labeled with a detectable chemical group.
- (b) a reaction zone comprising a solid, porous matrix incorporated with an immobilized form of the other of said pair which interacts with both of the analyte and the labeled reagent to bind and thereby immobilize labeled reagent while leaving an amount of the labeled reagent diffusible as a function of the amount of analyte in the liquid test medium; and
  - (c) a detection zone comprising a solid, porous matrix for receiving labeled reagent which is free to diffuse thereinto from the reaction zone to provide a detectable signal related to the amount of analyte present in the liquid test medium.

4,959,306

## LABELING DESIGN FOR A BINDING ASSAY REAGENT

Naomi Kameda, Woodside, and Gerald L. Rowley, San Jose, both of Calif., assignors to Sclavo, Inc., Sunnyvale, Calif.

Filed Nov. 28, 1986, Ser. No. 935,952

Int. Cl.<sup>5</sup> G01N 33/53, 33/563, 33/531; G12N 11/06  
U.S. Cl. 435—7 21 Claims

1. A method to label a specific reaction partner (SRP) useful in a binding assay, which method comprises:
  - (a) conjugating label to a spacer protein selected from the group consisting of human alpha1-antitrypsin, mercaptoalbumin, and fragments of rabbit IgG containing only one—SH group, which spacer protein (SP) contains only one reactive center capable of combining with one of the functional groups of a heterobifunctional linker;
  - (b) reacting one of the labeled SP or the SRP with a heterobifunctional linker under conditions wherein the labeled SP or the SRP so reacted is capable of reacting with only a first functional group of the heterobifunctional linker, to obtain a product of said one of labeled SP or SRP conjugated to linker and
  - (c) reacting the product of said one of labeled SP or SRP conjugated to linker with the other of the SP or SRP wherein the reaction of linker to SP employs said one reactive center.

4,959,307

## IMMUNOSEPARATING STRIP

John D. Olson, Sunnyvale, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Sep. 5, 1986, Ser. No. 904,597

The portion of the term of this patent subsequent to Apr. 26, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> G01V 33/535, 33/543, 33/558  
U.S. Cl. 435—7 29 Claims

1. A method for determining the presence of an analyte, that is capable of binding specifically to an antibody, in a sample suspected of containing said analyte, which comprises:
  - (a) contacting, with a test solution containing said sample, antibodies to said analyte and a conjugate of said analyte and a label, a contact portion of a strip of bibulous material capable of being traversed by said test solution by capillary migration, said strip containing non-diffusively bound to a situs on said strip separated from said contact portion a first receptor capable of binding to said conjugate, the surface area of said situs being less than that of said strip, said strip further containing a second receptor capable of binding said antibodies to said analyte, said second receptor being non-diffusively bound to said strip between said situs and said contact portion,
  - (b) allowing at least a portion of said test solution to traverse

said strip by capillary migration and thereby contact said situs,

- (c) exposing said strip to a signal producing means capable of interacting with said label to produce a signal in relation to the amount of analyte in the test solution, and
- (d) detecting said signal at said situs and relating said signal to the presence of said analyte.

4,959,308

## IMMUNOASSAY FOR ANTIBODIES BINDING PLATELETS

Daryl M. Ogden, Houston, Tex., assignor to Board of Regents, The University of Texas System, Austin, Tex.

Filed Aug. 27, 1987, Ser. No. 89,884

Int. Cl.<sup>5</sup> C07K 17/00; G01N 33/543  
U.S. Cl. 435—7 17 Claims

1. A method for producing a substrate useful in the detection of antibodies directed against platelet antigens, the method comprising the steps of:
  - a. treating a platelet sample with an aqueous solution comprising a nonionic detergent to solubilize platelet antigens comprising HLA and platelet-specific antigens of the sample and to produce a lysate, said nonionic detergent being sufficiently separable from the lysate to minimize interference with subsequent binding of antibodies directed against platelet antigens to platelet antigens;
  - b. separating insoluble particles and excess detergent from the lysate to produce a solution comprising solubilized platelet antigens;
  - c. contacting said solution with matrix-bound human IgG to remove substances nonimmunologically binding to the matrix-bound human IgG from said solution to thereby produce partially purified platelet antigens; and
  - d. affixing the partially purified platelet antigens to a solid matrix to produce a substrate useful in the detection of antibodies directed against platelet antigens.

4,959,309

## FAST PHOTOCHEMICAL METHOD OF LABELLING NUCLEIC ACIDS FOR DETECTION PURPOSES IN HYBRIDIZATION ASSAYS

Nanibhushan Dattagupta, New Haven, and Donald M. Crothers, Northford, both of Conn., assignors to Molecular Diagnostics, Inc., West Haven, Conn.

Continuation of Ser. No. 611,668, May 18, 1984, Pat. No. 4,737,454, which is a continuation-in-part of Ser. No. 513,932, Jul. 14, 1983, abandoned. This application Oct. 9, 1987, Ser. No. 107,183

The portion of the term of this patent subsequent to Apr. 12, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> C12Q 1/68; C07H 21/00; C07D 493/04; G01N 33/53  
U.S. Cl. 435—6 36 Claims

1. A labeled hybridizable nucleic acid comprising (a) a nucleic acid component, (b) a nucleic acid-binding ligand photochemically linked to the nucleic acid component thereby modifying the nucleic acid such that the frequency of modification along a hybridizable single stranded portion of the nucleic acid not be so great as to substantially prevent hybridization, and (c) a label chemically linked to (b), said label selected from the group consisting of fluorescein and phycobiliprotein.

4,959,310

## MONOCLONAL ANTIBODIES TO SOYBEAN KUNITZ TRYPSIN INHIBITOR AND IMMUNOASSAY METHODS

David L. Brandon, Berkeley; Anne H. Bates, Lafayette, and Mendel Friedman, Moraga, all of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Sep. 28, 1987, Ser. No. 101,918

Int. Cl.<sup>5</sup> C12P 21/08; C12N 5/18; G01N 33/577; A61K 39/395  
U.S. Cl. 435—7 3 Claims

1. A continuous hybrid cell line which produces and secretes

monoclonal antibody specific for soybean Kunitz trypsin inhibitor (KTI) which:

- re acts and binds with KTI isoforms a and b;
  - does not react with Bowman-Birk inhibitors;
  - does not react with KTI isoforms a and b which have been denatured by moist heat or alkaline treatment or which have been subjected to disulfide exchange; and
  - does not react with KTI isoform c;
- wherein said cell line is ATCC HB 9517.

4,959,311

**METHOD OF DEGRADING KERATINACEOUS MATERIAL AND BACTERIA USEFUL THEREFORE**  
Jason C. H. Shih, and C. Michael Williams, both of Cary, N.C., assignors to North Carolina State University, Raleigh, N.C.  
Filed Mar. 31, 1988, Ser. No. 175,476

Int. Cl.<sup>5</sup> C12P 21/00; C12N 1/00, 9/56; C12R 1/10  
U.S. Cl. 435—68.1 22 Claims

1. A method of degrading keratinaceous material, comprising the steps of combining keratinaceous material with *Bacillus licheniformis* PWD-1 (PWD-1) to form a fermentation media, and then fermenting the media for a time sufficient to degrade the keratinaceous material.

4,959,312

**FULL SPECTRUM MUTAGENESIS**  
Karl M. Sirotkin, Knoxville, Tenn., assignor to The University of Tennessee Research Corporation, Knoxville, Tenn.  
Filed May 31, 1985, Ser. No. 739,962  
Int. Cl.<sup>5</sup> C12P 19/34

U.S. Cl. 435—91 22 Claims

1. An in vitro method for mutagenesis of a target DNA sequence comprising:  
producing a supply of a template for the target sequence;  
producing random primers having differing 3'-OH termini with each having a region complementary to said template adjacent to said 3'-OH termini;  
extending said random primers randomly from said 3'-OH termini by at least two deoxynucleotides to produce modified random primers, at least some of which have at least one nucleotide which is mismatched with respect to the template; wherein said step of extending said random primers is accomplished by random addition of nucleotides with terminal transferase in the presence of the four nucleotides at appropriate concentrations so that the probability of addition of any of the four nucleotides is approximately equal at any one site,  
employing said modified random primers as primers for DNA polymerization and polymerizing DNA along said template to form at least some mutagenized DNA containing double stranded regions each having a newly-polymerized strand with at least one nucleotide which is mismatched with respect to the template;  
transferring at least nucleic acid containing the equivalent sequence information of said newly-polymerized strands of said mutagenized DNA into organisms to cause at least some of said nucleic acid to be replicated in said host organisms to produce mutant DNA sequences;  
growing said host organisms to produce a population of clones containing a variety of mutant DNA sequences;  
selecting at least one clone from the population having selected characteristics; and  
growing host organisms containing mutant DNA sequences of said selected clones to amplify said sequences.

4,959,313

**CELLULAR ENHANCER FOR EXPRESSING GENES IN UNDIFFERENTIATED STEM CELLS**  
Makoto Taketo, Bar Harbor, Me., assignor to The Jackson Laboratory, Bar Harbor, Me.

Filed Jun. 22, 1987, Ser. No. 64,665  
Int. Cl.<sup>5</sup> C12N 15/00; C12P 21/00; C07H 15/12  
U.S. Cl. 435—69.1 22 Claims

1. An isolated cellular enhancer nucleotide sequence comprising:

CCTGGGCTCTACAGCAGAAGTCTAAGGGGAAAAGCT  
TAGGGAGGAATGCCTGGCAAAGGCCCTCATTACTTA  
AGAAACAAGTCTGACTTCAAAGTGAGTCCCC.

4,959,314

**CYSTEINE-DEPLETED MUTEINS OF BIOLOGICALLY ACTIVE PROTEINS**

David F. Mark, Danville; Leo S. Lin, Fremont, and Shi-da Yu Lu, Cupertino, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 564,224, Dec. 20, 1983, Pat. No. 4,518,584, which is a continuation-in-part of Ser. No. 486,162, Apr. 15, 1983, abandoned, which is a continuation-in-part of Ser. No. 435,154, Oct. 19, 1982, abandoned, which is a continuation of Ser. No. 695,934, Feb. 7, 1985, Pat. No. 4,959,314, which is a continuation-in-part of said Ser. No. 670,360, is a continuation-in-part of Ser. No. 661,026, Oct. 15, 1984, abandoned. This application Feb. 7, 1985, Ser. No. 698,939. The portion of the term of this patent subsequent to May 21, 2002, has been disclaimed.  
Int. Cl.<sup>5</sup> C12P 21/00, 19/34, 21/22

U.S. Cl. 435—69.1 22 Claims

1. A synthetic mutein of a biologically active native protein which native protein has at least one cysteine residue that is free to form a disulfide link and is nonessential to said biological activity, said mutein having at least one of said cysteine residues substituted by another amino acid and said mutein exhibiting the biological activity of said native protein.

4,959,315

**BIODEGRADATION OF CHLOROETHYLENE COMPOUNDS**

Michael J. K. Nelson, Pensacola, Fla.; Al W. J. Bourquin, Redmond, Wash., and Parmely H. Pritchard, Gulf Breeze, Fla., assignors to The United States of America as represented by the Administrator of the Environmental Protection Agency, Washington, D.C.

Filed Apr. 30, 1987, Ser. No. 44,213  
Int. Cl.<sup>5</sup> C02F 3/34; C12N 1/28; C12P 5/02  
U.S. Cl. 435—167 12 Claims

1. A method of degrading a chloroethylene compound comprising inducing microorganisms capable of degrading the chloroethylene compound by an aromatic degradative catechol ring fission pathway by incubating said microorganisms an aromatic compound capable in inducing said pathway, and incubating said induced microorganisms together with said chloroethylene compound, whereby said chloroethylene compound is degraded by said aromatic degradative catechol ring fission pathway.

4,959,316

**PROCESS FOR AMPLIFYING THE EXPRESSION OF A SPECIFIC GENE IN BACILLUS SUBTILIS, AND STRAINS OBTAINED**

Ehrlich Stanislas, Paris; Janniere Laurent, Vitry sur Seine; Pierre Evelynne, Etrecy, and Brigitte Naudet, Paris, all of France, assignors to Centre National de la Recherche Scientifique (CNRS), Paris, France

Continuation of Ser. No. 677,999, Dec. 4, 1984, abandoned. This application Dec. 18, 1987, Ser. No. 135,515

Claims priority, application France, Apr. 27, 1984, 84 6701  
Int. Cl.<sup>5</sup> C12N 15/00, 1/00, 1/20; C12P 21/00

U.S. Cl. 435—172.3 22 Claims

1. Process for preparing a strain of *Bacillus*, in the chromosome of which a specific gene has been amplified, said process comprising:

- integrating at least one plasmid integration vector bearing said specific gene into the *Bacillus* chromosome, said chromosome now comprising:  
(1) at least one heterologous DNA sequence which is an amplifiable unit, which comprises said specific gene, the expression elements of said gene and two identical sequences, wherein said sequences are tandemly duplicated; and  
(2) an amplifiable unit which also codes for a selectable gene; and
- selecting by culturing the strains of *Bacillus* obtained on a selection medium corresponding to the selectable gene; and
- isolating the strains which have the phenotype corresponding to the presence of an increased number of copies of said specific gene relative to the bacterial population before selection step (b).

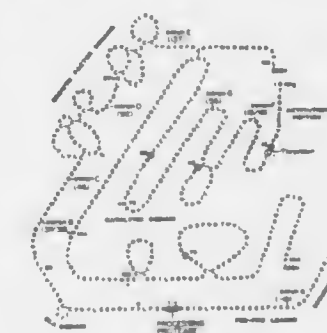
4,959,318

**EXPRESSION OF PROTEIN C**

Donald C. Foster, Mark J. Murray, and Kathleen L. Berkner, Seattle, Wash., assignors to ZymoGenetics, Inc., Seattle, Wash.

Continuation-in-part of Ser. No. 749,600, Jun. 27, 1985. This application Oct. 29, 1986, Ser. No. 924,462

Int. Cl.<sup>5</sup> C12N 15/00, 9/64, 5/02; C07H 15/12  
U.S. Cl. 435—69.1 20 Claims



1. A DNA sequence which codes for a protein having substantially the same biological activity as human protein C or human activated protein C, said sequence further coding for the pre-pro peptide of factor VII.

4,959,319

**PROCESS OF CORNEAL ENHANCEMENT**

Debra L. Skelnik, Box 344, Rte. 5, Cambridge, Minn. 55008, and Richard L. Lindstrom, 1065 W. Ferndale Rd., Wayzata, Minn. 55391

Continuation of Ser. No. 761,405, Aug. 1, 1985, abandoned. This application Feb. 17, 1989, Ser. No. 311,846

Int. Cl.<sup>5</sup> C12N 5/08, 5/00; A01N 1/02  
U.S. Cl. 435—240.2 1 Claim

1. A process for enhancing an intact endothelial monolayer of a human donor cornea to be used in penetrating keratoplasty, the method comprising:  
a. enzymatically isolating corneal endothelial cells from a human donor cornea;  
b. optionally, one of:  
1. in a suitable medium, establishing a primary line of cells isolated in (a), proliferating them and then maintaining them, or,  
2. storing the cells isolated in (a) at a temperature of about -80° C.; and then,  
c. seeding an enzymatically treated intact endothelial monolayer of a donor cornea with the cells prepared in (a) or (b)(1) or the thawed cells of (b)(2).

4,959,320

**MONOCLONAL ANTIBODY, PROCESS FOR PREPARING SAME, REAGENT FOR DETECTING CANCER ANTIGEN CONTAINING THE MONOCLONAL ANTIBODY AND PROCESS FOR PREPARING SAME**  
Yahiro Uemura, Osaka; Kazumi Fukuyama, Kyoto; Takashi Kobayashi, Hyogo; Yoshiaki Kanou, Osaka; Ryutaro Yamana, Osaka; Eiichi Kashiwagi, Osaka; Tomokuni Taniguchi, Osaka; Kazuaki Nakura, Osaka; Masahiro Watanabe, Hyogo; Masayuki Nishida, and Tadakazu Seyama, both of Kyoto, all of Japan, assignors to Green Cross Corporation, Osaka, Japan  
Filed Aug. 8, 1985, Ser. No. 763,587

Claims priority, application Japan, Aug. 8, 1984, 59-166980  
Int. Cl.<sup>5</sup> C12N 5/00, 15/00; C12P 21/00

U.S. Cl. 435—240.27 6 Claims

1. A monoclonal antibody having a binding specificity for pancreas cancer-associated antigen, *intestinum crassum* can-

4,959,317

**SITE-SPECIFIC RECOMBINATION OF DNA IN EUKARYOTIC CELLS**

Brian L. Sauer, Greenville, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 784,951, Oct. 7, 1985. This application Apr. 29, 1987, Ser. No. 43,795

Int. Cl.<sup>5</sup> C12P 21/00, 19/34; C12N 15/00, 5/00  
U.S. Cl. 435—172.3 40 Claims

1. A method for producing site-specific recombination of DNA in eukaryotic cells, comprising,

- introducing into the cells a first DNA sequence comprising a first lox site and a second DNA sequence comprising a second lox site, and
- contacting the lox sites with Cre, thereby producing the site specific recombination.



cer-associated antigen and hepatoma-associated antigen wherein said cancer-associated antigen has the following characteristics:

- (1) it exists in a blood serum of pancreas cancer, intestine crassum cancer and hepatoma patients;
- (2) it is glycoproteins;
- (3) it has a molecular weight of about 700,000 to 1,500,000, as measured by gel-filtration and determined by comparison with that of a known protein;
- (4) it has a maximum absorption of 280 nm when dissolved in 0.1M acetic acid buffer solution (pH 4.5);
- (5) it is released in a supernatant of culture medium of established cell line of COLO-201, TE-1, TE-2, TE-3, NRC-12, MKN-45 or KATO III; and
- (6) it is not released from a lung-derived established cancer cell line.

4,959,321

## CELL FUSION APPARATUS

Alan W. Preece, Radiotherapy Centre, Horfield Road, Bristol, BS2 8ED, United Kingdom, and Douglas H. Follett, Bristol General Hospital, Guinea Street, Bristol, BS1 6SP, United Kingdom

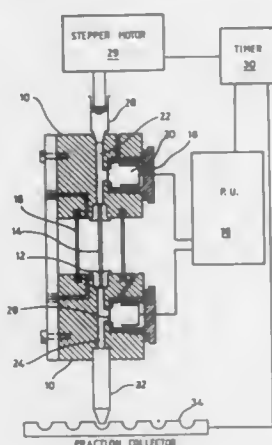
Filed Mar. 13, 1989, Ser. No. 322,349

Claims priority, application United Kingdom, Mar. 26, 1988, 8807271

Int. Cl.<sup>5</sup> C12M 1/38, 3/00; B01D 61/42

U.S. Cl. 435—284

8 Claims



1. Apparatus for the electrofusion of cells comprising a flow channel of specific flow capacity for passage of cells suspended in a medium, the flow channel being mounted between end blocks containing inlet/outlet passages communicating with said flow channel, said inlet/outlet passages connecting at one end block with a syringe adapted to be driven by a stepper motor for producing a pulsed flow of the medium and at the other end with an outlet tip for feeding samples into a fraction collector, respectively, cooling means surrounding the flow channel, an electrode at each end of the flow channel, the electrodes being accommodated in electrolyte contained in electrolyte chambers formed in the respective end blocks, the electrolyte being separated from the inlet/outlet passages in the end blocks by semipermeable membranes, and a high voltage pulse generating circuit for applying DC voltage pulses to the electrodes while the medium is caused to flow slowly through the flow channel.

4,959,322

## CULTURING APPARATUS

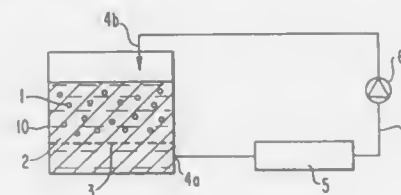
Mari Sakai, Tokyo, Japan, assignor to W. L. Gore & Associates, Inc., Newark, Del.

Filed Mar. 7, 1989, Ser. No. 320,147

Int. Cl.<sup>5</sup> C12M 1/12

U.S. Cl. 435—311

1 Claim



1. A culturing apparatus in which a gas is caused to contact a culture solution via a gas-permeable membrane so that said gas is supplied to said culture solution, comprising:

- (a) gas-permeable membrane module which surrounds a gas-permeable membrane tube which allows gas to pass through without allowing culture solution to pass through, and the aforementioned gas-permeable membrane module is divided by a partition, with the pressure on one side of the partition lowered so that product gases are removed from the culture solution, and the pressure on the other side of the partition is raised so that gas is supplied to the culture solution and
- (b) a culture solution supply means, which supplies culture solution to the aforementioned gas-permeable membrane from a supply source.

4,959,323

## PRODUCTION AND USE OF PRE S POLYPEPTIDES OF HEPATITIS B VIRUS

George Aca, Manhasset, N.Y.; Judith K. Christman, Wyckoff, N.J.; Peter Price, New York, N.Y.; Wolf Offensperger, Bad Dürkheim, Fed. Rep. of Germany, and Silke Wahl, Buehl, Fed. Rep. of Germany, assignors to Mt. Sinai School of Medicine of the City University of New York, New York, N.Y.

Filed Nov. 4, 1985, Ser. No. 794,504

Int. Cl.<sup>5</sup> C12N 15/63, 15/70

U.S. Cl. 435—320

10 Claims

1. A recombinant plasmid comprising a lacZ gene and a DNA sequence encoding a preS polypeptide, a preS2 polypeptide or both of hepatitis B virus envelope protein wherein the polypeptide sequence is inserted within the lacZ gene.

4,959,324

## SAMPLE PAD ASSAY INITIATION DEVICE AND METHOD OF MAKING

Urs A. Ramel, Portola Valley; Michael P. Allen, Sunnyvale, and Prithpal Singh, Los Alto Hills, all of Calif., assignors to ChemTrak, Inc., Sunnyvale, Calif.

Continuation-in-part of Ser. No. 324,407, Mar. 16, 1989, which is a continuation-in-part of Ser. No. 195,881, May 19, 1988, and Ser. No. 64,883, Jun. 22, 1987. This application May 18, 1989, Ser. No. 353,910

Int. Cl.<sup>5</sup> G01N 21/79, 31/22; C12Q 1/54, 1/60

U.S. Cl. 436—169

19 Claims

1. An analyte measuring device which cooperates with a signal producing system for producing a detectable signal in a detection zone, said device comprising:

- a housing comprising a well adjacent to one end of said housing, a flow path for holding in position two bibulous strips spaced apart in tandem relationship to define a space, and proximal to said well an space for receiving a slide mechanism;
- an orifice for receiving a sample displaced from and substan-

tially aligned with the space between said two bibulous strips;

a slide element in said interspace comprising: (1) a sample receiving element positioned (i.) under said orifice when said slide element is in a first position, and (ii.) positioned in said space, when said slide is in a second position; and means for releasing a liquid into said well when said slide



is moved from said first position to said second position; and

first and second bibulous strips in said flow path, said first strip extending from said well to said space to transport liquid from said well to said sample receiving element and said second strip comprising said detection zone and extending from said space toward the end opposite from said well.

4,959,325

## REDUCTION OF ELECTRIC FIELD EFFECT IN THE BIRD'S BEAK REGION OF A DRAM CELL FOLLOWING EXPANSION OF ACTIVE REGION THROUGH LOCAL ENCROACHMENT REDUCTION

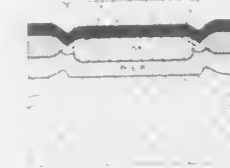
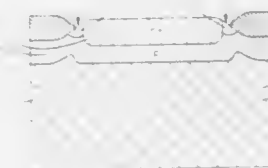
Ruoqia R. Lee, and D. M. Durcan, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Feb. 24, 1989, Ser. No. 316,135

Int. Cl.<sup>5</sup> H01L 21/425, 29/96

U.S. Cl. 437—30

7 Claims



1. A process for reducing the electric field effect in the bird's beak region of a DRAM cell following expansion of the cell's active area, which had previously been implanted with arsenic to create N+ regions, through local encroachment reduction, said process comprising the step of blanket implanting the active area with phosphorus to create N- regions between the N+ regions and the edge of the field oxide.

4,959,326

## FABRICATING T-GATE MESFETS EMPLOYING DOUBLE EXPOSURE, DOUBLE DEVELOP TECHNIQUES

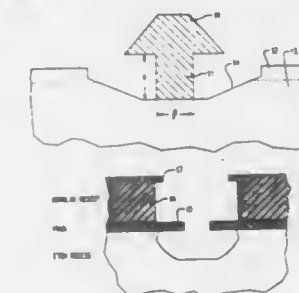
Bernard J. Roman, Summit, N.J., and Richard E. Muller, Pasadena, Calif., assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 22, 1988, Ser. No. 289,071

Int. Cl.<sup>5</sup> H01L 21/338

U.S. Cl. 437—40

20 Claims



1. A method for fabricating a T-gate FET structure, comprising the steps of:

- applying a layer of PMMA to the top surface of a GaAs wafer,
- forming a gate pattern on said layer of PMMA,
- first developing said gate pattern as formed on said wafer, coating said developed wafer with a second layer of resist of a thicker dimension than said layer of PMMA and not reactive with said PMMA layer,
- forming said gate pattern on said second layer of resist,
- second developing said gate pattern on said second layer to form a composite T-gate configuration pattern,
- etching said wafer to form a T-gate recess in said wafer, and
- depositing a gate structure on said wafer to form a T-gate FET.

4,959,327

## VECTORS AND METHOD OF PENICILLIUM CHRYSOGENUM TRANSFORMATION

Florentina S. Sanchez; Victor R. Susan; Miguel A. P. Soto, and Agustin P. A. Ortega, all of Madrid, Spain, assignors to Antibiotics, S.A., Madrid, Spain

Filed Feb. 2, 1987, Ser. No. 9,713

Claims priority, application United Kingdom, Jan. 31, 1986, 8602479; Mar. 26, 1986, 8607502; Jun. 27, 1986, 8615798

Int. Cl.<sup>5</sup> C12N 1/13, 15/01, 15/52, 15/11

U.S. Cl. 435—172.3

11 Claims



1. A method of preparing transformed *penicillium chrysogenum* comprising:

- (a) identifying a *P. chrysogenum* trp<sup>-</sup> auxotrophic mutant having identifying characteristics of ATCC deposited cell

- line accession number #10003 that is deficient in a tryptophan biosynthetic enzyme;
- (b) transforming the identified *P. chrysogenum* mutant with an exogenous DNA segment which comprises a *P. chrysogenum* trpC gene marker and encodes the tryptophan biosynthetic enzyme which will complement said enzyme deficiency in said mutant to produce a transformed phototrophic *P. chrysogenum*; and
- (c) selecting for the transformed phototrophic *P. chrysogenum* on culture medium lacking the nutrient required by the mutant auxotrophic *P. chrysogenum*; wherein transformed *P. chrysogenum* auxotrophic mutants exhibit restored phototrophy.

4,959,328

# METHOD FOR MANUFACTURING A SEMICONDUCTOR COMPONENT CONTACTABLE ON BOTH SIDES

Wolfgang Behr, Thalflagen; Johann-Friedrich Luy, and Karl Strohm, both of Ulm, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed May 27, 1988, Ser. No. 199,922

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 3718683

Int. Cl.<sup>5</sup> H01L 21/20, 21/329

U.S. Cl. 437—86

7 Claims

1. A method of manufacturing a semiconductor component which is contacted on both sides comprising the steps of: providing a silicon substrate; epitaxially growing a sequence of differently doped silicon semiconductor layers, corresponding to the layer sequence of the semiconductor component, on a surface of said substrate with the first silicon semiconductor layer of said sequence directly grown on said surface of said substrate being a p<sup>+</sup>-doped silicon layer which is doped with boron, of a concentration in excess of  $7 \times 10^{19} \text{ cm}^{-3}$ , and germanium of a concentration sufficient to compensate for mechanical stresses generated by the boron; removing said substrate by etching; contacting said first layer; and, contacting the last layer of said sequence of layers.

4,959,329

# SEMICONDUCTOR DEVICE

Tatsuo Okamoto, and Akihiko Ohsaki, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 174,498, Mar. 28, 1988, Pat. No. 4,887,143.

This application Oct. 24, 1989, Ser. No. 425,926

Int. Cl.<sup>5</sup> H01L 21/44, 21/48

U.S. Cl. 437—187

3 Claims

1. A method of manufacturing a semiconductor device, said method comprising:
- a first step of forming a second semiconductor layer of second conductivity type on a first semiconductor layer of first conductivity type;
- a second step of forming a first insulating layer on said second semiconductor layer;
- a third step of forming a mask having an opening at a specified position on said first insulating layer;
- a fourth step of utilizing said mask to implant oxygen ions or nitrogen ions through said first insulating layer into a region closed to a boundary of said first and second semiconductor layers, thereby forming a second insulating layer;
- a fifth step of utilizing said mask to remove by etching a portion of said first insulating layer which corresponds to said opening of said mask so that a surface of said second semiconductor layer is exposed, thereby forming a contact hole; and
- a sixth step of removing said mask, then and thereafter forming a conductive layer on said first insulating layer so that the

conductive layer is electrically connected to said second semiconductor layer through said contact hole.

4,959,330

# CRYSTALLIZABLE GLASS AND THICK FILM COMPOSITIONS THEREOF

Paul C. Donohue, Wilmington, Del.; Kenneth W. Hang, West Chester, Pa., and Michael J. Hann, Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 368,843, Jun. 20, 1989, abandoned, which is a continuation-in-part of Ser. No. 277,118, Nov. 29, 1988, abandoned. This application Nov. 17, 1989, Ser. No. 438,833

Int. Cl.<sup>5</sup> C03C 10/06, 3/085

U.S. Cl. 501—8

3 Claims

1. A dielectric glass composition consisting essentially on a molar basis of 15–27% ZnO, 8–30% alkaline earth metal oxides selected from 7–21% BaO, 0–20% CaO, 0–12% SrO and mixtures thereof, 40–60% SiO<sub>2</sub>, 3–14% Al<sub>2</sub>O<sub>3</sub>, 0–5% PbO and 0.5–5% of an oxide selected from ZrO<sub>2</sub>, 0.5 to 2.5% P<sub>2</sub>O<sub>5</sub> and mixtures thereof, the composition being crystallizable and non-reducing when fired at 850°–900° C.

4,959,331

# ALUMINA-ZIRCONIA-SILICON CARBIDE-MAGNESIA CUTTING TOOLS

Pankaj K. Mehrotra, and Elizabeth R. Billman, both of Greensburg, Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed Nov. 3, 1988, Ser. No. 266,721

The portion of the term of this patent subsequent to Sep. 25, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C04B 35/56

U.S. Cl. 501—89

37 Claims

1. A metalcutting insert comprising:
- a rake face;
- a flank face;
- a cutting edge at a juncture of said rake face and said flank face;
- said cutting insert having an alumina based ceramic composition consisting essentially of:
- about 1.5 to 17.5 v/o silicon carbide whiskers;
- about 5 to 17.5 v/o zirconia;
- a residue of a magnesia addition added in the amount of about 0.03 to 3 v/o;
- alumina forming essentially the remainder of said composition;
- wherein said silicon carbide whiskers, said zirconia and said residue of said magnesia addition are substantially homogeneously dispersed in a matrix formed of said alumina; and
- wherein at least about 4.0 v/o of said ceramic composition is tetragonal zirconia.

4,959,332

# ALUMINA-ZIRCONIA-CARBIDE WHISKER REINFORCED CUTTING TOOLS

Pankaj K. Mehrotra, and Elizabeth R. Billman, both of Greensburg, Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed Nov. 3, 1988, Ser. No. 266,719

The portion of the term of this patent subsequent to Sep. 25, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C04B 35/56

U.S. Cl. 501—89

64 Claims

1. A metalcutting insert comprising:
- a rake face;
- a flank face;
- a cutting edge at a juncture of said rake face and said flank face;
- and said metalcutting insert having an alumina based ceramic composition consisting essentially of about 1.5 to 12.5 v/o silicon carbide whiskers, about 7.5 to 17.5 v/o

zirconia, wherein at least about 7 v/o of said composition is tetragonal zirconia, and wherein said silicon carbide whiskers and zirconia are dispersed in an alumina based matrix.

4,959,333

# NON-REDUCING DIELECTRIC CERAMIC COMPOSITION

Yoshiaki Mori, Nagaokakyo; Hiroshi Takagi, Ohtsu; Masaru Fujino, Nagaokakyo, and Yukio Sakabe, Kyoto, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

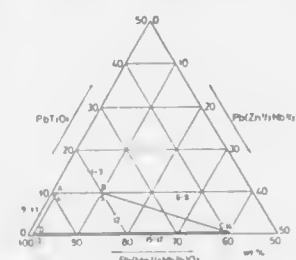
Filed Jul. 27, 1989, Ser. No. 386,790

Claims priority, application Japan, Jul. 28, 1988, 63-188696

Int. Cl.<sup>5</sup> C04B 35/46

U.S. Cl. 501—136

1 Claim



1. A non-reducing dielectric ceramic composition consisting essentially of 60 to 99.5 wt % of a basic composition expressed by the general formula:



where x, y and z are proportions by weight percentage of the three components,  $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ ,  $\text{Pb}(\text{Zn}_{1/3}\text{Nb}_{2/3})\text{O}_3$  and  $\text{PbTiO}_3$ , and 0.05 to 40 wt % of an anti-reducing agent incorporated therein and expressed by the general formula:



where R is at least one element selected from the group consisting of Mg, Ca, Sr and Ba, a, b and c are molar fractions of the respective component and take values within the following respective ranges:  $0 \leq a < 0.2$ ,  $0.1 \leq b < 0.55$ ,  $0 = c < 0.4$ , said basic composition having a set of proportions, by weight percentage, of the three components, x, y and z, falling within the compositional area encompassed by the polygon ABCD defined by points, A, B, C, and D shown in FIG. 1, the sets of proportions, by weight percentage, of the three components at said points being as follows:

x	y	z
89.0	1.0	10.0
80.0	10.0	10.0
59.5	40.0	0.5
98.5	1.0	0.5

4,959,334

# FLUIDIZED-BED CATALYST REGENERATION

Jean-Louis Mauleon, Marly-Le-Roy, and Jean-Bernard Sigaud, Vaucresson, both of France, assignors to C. Compagnie de Raffinage et de Distribution, Levallois-Perret, France

Filed Dec. 21, 1988, Ser. No. 287,500

Claims priority, application France, Dec. 21, 1987, 87 17822

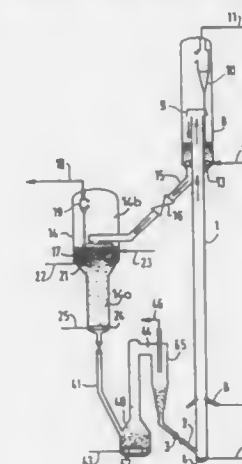
Int. Cl.<sup>5</sup> B01J 38/34, 38/36, 29/38; C10G 11/18

U.S. Cl. 502—43

12 Claims

1. A process for the regeneration of catalyst particles by combustion of coke deposited thereon during a hydrocarbon conversion reaction to which process more than 50 percent of

the coke is burned in at least one regeneration chamber operating with a fluidized bed of said particles, said process comprising carrying out the combustion of the coke at a temperature which does not exceed 750° C. in a fluidized bed having an upper dense portion and a lower ebullating portion, in which the spent catalyst coming from the hydrocarbon conversion reaction is dispersed above the surface or in the upper part of the upper dense portion and the catalyst particles move essentially from top to bottom countercurrent to an oxygen-containing gas which functions as a fluidizing medium whose rising superficial velocity in the ebullating lower portion at the base of the fluidized bed ranges from 1.2 to 3.5 meters/second to maintain in the effluent gases from said chamber a CO/CO<sub>2</sub>



4,959,335

# PROCESS FOR THE PREPARATION OF CLAY LOADED METAL COMPLEXES CATALYST AND A PROCESS FOR THE HYDROGENATION OF OILS USING THE CATALYST SO PREPARED

M. M. Taqui Khan, and M. R. Hussain Siddiqui, both of Bhavnagar, India, assignors to Council of Scientific & Industrial Research, New Delhi, India

Continuation of Ser. No. 114,118, Oct. 27, 1987, abandoned.

This application Mar. 2, 1989, Ser. No. 318,484

Int. Cl.<sup>5</sup> B01J 31/22, 31/24

U.S. Cl. 502—62

4 Claims

1. A process for the preparation of clay loaded metal complex hydrogenation catalyst which comprises refluxing a platinum group metal complex of the formula  $\text{MX}_n$ , wherein M is a platinum group metal, X is a halide and n is 1, 2, 3 or 4 with sigma-donor substituted phosphines or arsine ligand and clay in the presence of an organic solvent, precipitating the solution, drying under vacuum and, if required, re-precipitating for purification.



4,959,336

**SILICATE-MODIFIED MAGNESIUM ETHOXIDE  
POLYMERIZATION CATALYSTS**Robert C. Job, Houston, Tex., assignor to Shell Oil Company,  
Houston, Tex.

Filed Apr. 7, 1989, Ser. No. 334,407

The portion of the term of this patent subsequent to Oct. 17,  
2006, has been disclaimed.Int. Cl.<sup>5</sup> B01J 31/14; C08F 4/654

U.S. Cl. 502—107

6 Claims

1. A process for improving the productivity and morphology of a polymerization catalyst formed from a magnesium ethoxide, which comprises treating said magnesium ethoxide with a silane of the formula  $R'_mSi(OR)_{4-m}$  where  $R = C_nH_{2n+1}$ ,  $n \geq 2$ ,  $0 \leq m < 4$  and  $R'$  may be an aryl or alkyl, at or above the temperature at which any alcohol which may be bound to the magnesium ethoxide would dissociate from the ethoxide prior to subjecting said magnesium ethoxide to methathesis.

4,959,337

**WAX ISOMERIZATION CATALYST AND METHOD FOR  
ITS PRODUCTION**Ian A. Cody, Clearwater, Canada; Hamner, deceased Glen P.,  
late of Baton Rouge, La. (by Annabelle Hamner, executor);  
Willard H. Sawyer, Baton Rouge, La.; Willard H. Sawyer,  
Baton Rouge, La., and Davis S. Mark, Baton Rouge, La.,  
assignors to Exxon Research and Engineering Company,  
Florham Park, N.J.Continuation-in-part of Ser. No. 134,795, Dec. 18, 1987,  
abandoned. This application Dec. 13, 1988, Ser. No. 283,709Int. Cl.<sup>5</sup> B01J 21/04, 27/12, 27/13

U.S. Cl. 502—230

20 Claims

1. A wax isomerization catalyst comprising a Group VIII hydrogenation metal component on a fluorinated alumina or material containing alumina support, which catalyst is characterized by possessing a surface nitrogen content N/Al ratio as determined by X-ray photoelectron spectroscopy of about 0.01 N/Al or less, a bulk fluorine content of between about 2 to 10 wt%, a surface fluorine content, defined as the amount of fluorine present in the layer between the outer surface of the particle and extending about 1/100 of an inch in from the surface, of less than about 3 wt% provided that the surface fluoride concentration is less than the bulk fluoride concentration and an aluminum fluoride hydroxide hydrate peak height of 60 or less determined as the relative amount of hydrate represented by a peak in the X-ray diffraction (XRD) pattern at  $2\theta = 5.66^\circ$  when a hydrate level of 100 corresponds to the XRD peak height exhibited by a standard material which standard material is a platinum on fluorinated alumina containing 0.6 wt% Pt on 150 m<sup>2</sup>/g surface area alumina fluorinated using an aqueous solution containing a high concentration of HF to deposit 7.2 wt% fluorine on catalyst and dried at 150° C. for 16 hrs.

4,959,338

**HEAT-RESISTANT CATALYST CARRIER MOLDINGS  
AND CATALYSTS FOR COMBUSTION**Tadashi Miura; Takuji Itoh; Masaki Kadono, and Masakichi  
Shimada, all of Ooi, Japan, assignors to Toa Nenryo Kogyo  
Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 278,138

Claims priority, application Japan, Aug. 17, 1988, 63-204124;  
Sep. 10, 1988, 63-227277; Sep. 12, 1988, 63-227675Int. Cl.<sup>5</sup> B01J 21/12

U.S. Cl. 502—263

14 Claims

4. A catalyst for combustion, comprising a substrate comprising:  
a heat-resistant catalyst carrier molding comprising an inorganic oxide which comprises silica and alumina having a silica content in the range of 2% by weight to 30% by weight, an overall pore volume of at least 0.3 ml/g, a volume of pores of 100 Å or larger of at least 60% with

respect to said overall pore volume, as determined by the measurement of a pore distribution according to the nitrogen absorption method, and an NMR spectrum having a peak area at -50 ppm to -130 ppm of which 0 to 10% is with respect to a peak area at -100 ppm to -130 ppm, as measured by the nuclear magnetic resonance (<sup>29</sup>Si-NMR) method using silicone rubber (-21.9) as a reference peak after firing at 500° C. in air;

a layer comprising said inorganic oxide formed on said substrate; and  
a catalytically active metal component.

4,959,339

**HEAT-RESISTANT NOBLE METAL CATALYST AND  
METHOD OF PRODUCING THE SAME**Hiromichi Arai, Fukuoka, Japan, assignor to Catalysts and  
Chemicals Inc., Tokyo, Japan

Filed Apr. 11, 1989, Ser. No. 336,218

Claims priority, application Japan, Apr. 13, 1988, 63-88910

Int. Cl.<sup>5</sup> B01J 21/04, 23/10, 23/58, 23/64

U.S. Cl. 502—302

14 Claims

1. A heat-resistant noble metal catalyst consisting essentially of a composition having a formula  $A_{1-x}C_2B_zD_uAl_{1-2-y-u}O_{19-\alpha}$ , wherein A is at least one element selected from the group consisting of Ba, Ca and Sr, C is at least one element selected from the group consisting of K, Rb and rare earth elements, B is at least one element selected from the group consisting of Mn, Co, Fe, Ni, Cu and Cr, D is at least one element selected from the group consisting of Au, Ag and platinum group noble metals, z is a value in a range of 0-about 0.4, x is a value in a range of 0-about 4, y is a value in a range of 0-2x, u is a value of not less than about 0.01, x+u is a value of not more than about 4, and  $\alpha$  is a value which is determined by the valences X, Y, Z and U of the respective element A, C, B and D and the values of x, y, z and u and is expressed as

$$\alpha = 1 - \{X - x(X - Y) + xZ + uU - 3y - 3u\}.$$

4,959,340

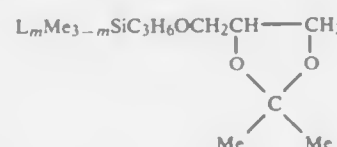
**METHOD OF MAKING LIQUID CHROMATOGRAPHY  
PACKING MATERIALS**Dwight E. Williams, Midland, Mich., assignor to Dow Corning  
Corporation, Midland, Mich.Division of Ser. No. 212,192, Jun. 27, 1988, Pat. No. 4,897,197,  
which is a division of Ser. No. 63,147, Jun. 17, 1987, Pat. No.  
4,773,994. This application Apr. 10, 1989, Ser. No. 335,588Int. Cl.<sup>5</sup> B01J 20/22, 20/10

U.S. Cl. 502—401

10 Claims

1. A method for making a packing material for liquid chromatography columns which comprises:

- providing a hydroxyl-bearing porous support selected from the group consisting of porous metalloid oxides, porous metallic oxides and porous mixed metallic oxides, and
- contacting said porous support with a ketal silane having the formula:



wherein L is chloro, a substituted amino or N-methylacetamido, Me is methyl, and m is 1-3, in sufficient amounts and for a sufficient period of time to form ketal blocked diol groups on the surfaces of said porous support.

2. The method of claim 1 wherein said porous support is porous silica containing silanol groups.

4,959,344

**METHOD OF MANUFACTURING SUPERCONDUCTIVE  
COIL BY EXPLOSIVE COMPACTION**Sadaaki Hagino; Motokazu Suzuki; Takuo Takeshita, all of  
Ohmiya; Hideki Tonda, and Kazuki Takashima, both of Ku-  
mamoto, all of Japan, assignors to Mitsubishi Metal Corpora-  
tion, Tokyo, Japan

Filed Jun. 29, 1989, Ser. No. 373,943

Claims priority, application Japan, Jul. 4, 1988, 63-166366;

Jul. 4, 1988, 63-166367

Int. Cl.<sup>5</sup> H01L 39/12, 5/08, 39/24

U.S. Cl. 505—1

18 Claims



4,959,341

**BIODEGRADABLE SUPERABSORBING SPONGE**Donald F. H. Wallach, Brookline, Mass., assignor to Micro  
Vesicular Systems, Inc., Nashua, N.H.

Filed Mar. 9, 1989, Ser. No. 320,944

Int. Cl.<sup>5</sup> B01J 13/00, 20/22, 20/26

U.S. Cl. 502—404

14 Claims

1. A composition of matter which acts as a synthetic sponge when allowed to hydrate comprising a non-hydrated mixture of:

- a carboxylic acid with a substantial hydrophobic region;
  - a branched complex carbohydrate; and
  - a separate cross-linking agent;
- whereby said composition can be hydrated and cross-linked simultaneously in the presence of a hydrating solution.

4,959,342

**METHOD OF PRODUCING CATALYST CARRIERS**Motonobu Shibata, 18-86, Andon, Nakanosho-cho, Inazawa  
City, Aichi Pref., Japan

Filed Dec. 22, 1988, Ser. No. 288,232

Claims priority, application Japan, Jun. 27, 1988, 63-156831

Int. Cl.<sup>5</sup> B01J 32/00

U.S. Cl. 502—439

4 Claims

1. A method of producing a catalyst carrier, consisting essentially of the following steps:

- preparing a metal strip from a stainless steel containing no aluminum;
- plating surfaces of said metal strip with aluminum to a thickness of 1-10 μm;
- rolling said aluminum-plated metal strip;
- corrugating said rolled metal strip to form a porous body having gas permeability in at least one direction; and
- simultaneously forming an aluminum-iron alloy layer, by reacting said plated aluminum with said stainless steel, and an alumina film on said rolled metal strip by oxidizing said plated aluminum through heat treating said porous body at 600° to 1000° C. in air for not less than 10 minutes.

4,959,343

**CARBONLESS TRANSFER SHEETS FOR MULTI-PART  
FORMS PACKS**Philip M. Weinstein, 3240 W. Bruce Dr., Dresher, Pa. 19025  
Continuation-in-part of Ser. No. 68,878, Jul. 1, 1987, Pat. No.4,912,080, Continuation-in-part of Ser. No. 72,465, Jul. 13, 1987,  
abandoned. This application Jun. 17, 1988, Ser. No. 206,108The portion of the term of this patent subsequent to Mar. 27,  
2007, has been disclaimed.Int. Cl.<sup>5</sup> B41M 5/22

U.S. Cl. 503—200

20 Claims

1. A pressure sensitive carbonless transfer sheet, capable of image formation by light impact marking means in multi-part forms packs containing at least six of the sheets, comprising a paper sheet having a hot melt coating on at least one surface thereof, at least one of the coatings having a chromogenic material dispersed therein, wherein the paper sheet is characterized by a basis weight of 9-12 lbs of a ream of 500 sheets of paper each having dimensions of 17 by 22 inches, a thickness of 40-50 microns, a Gurley porosity of 400-4000 seconds, and a Bendsten smoothness of 90-260 ml/min on the wire side and 60-280 ml/min on the felt side.

4,959,345

**METHOD OF ADDING OXYGEN INTO OXIDE  
SUPERCONDUCTING MATERIALS BY ION INJECTION**Shenpei Yamazaki, Tokyo, Japan, assignor to Semiconductor  
Energy Laboratory Co., Ltd., Hase Atsugi, Japan

Filed Apr. 27, 1988, Ser. No. 187,044

Claims priority, application Japan, May 6, 1987, 62-111611

The portion of the term of this patent subsequent to Apr. 10,  
2007, has been disclaimed.Int. Cl.<sup>5</sup> B05D 5/12, 3/06

U.S. Cl. 505—1

5 Claims

1. A method for manufacturing a superconducting device comprising the steps of:

- depositing a passivation film on the surface of an oxide superconducting material to substantially prevent escape of oxygen from said surface; and then
- adding oxygen through the passivation film into the oxide superconducting material by ion injection to compensate for any oxygen which may have escaped from the material so that the material will be superconducting throughout the bulk of the material.

**4,959,346**  
COMPOSITE WITH Y-BA-CU-O SUPERCONDUCTIVE FILM

Antonio Mogro-Campero, and Larry G. Turner, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 192,039, May 9, 1988, Pat. No. 4,882,312. This application May 22, 1989, Ser. No. 354,569

Int. Cl.<sup>3</sup> B32B 9/00

U.S. Cl. 505—1

21 Claims

12. A composite consisting essentially of a crystalline superconductive film, a microscopically pore-free zirconium dioxide film and a substrate, said superconductive film having a composition represented by the formula  $YBa_xCu_yO_z$ , where  $x$  ranges from about 1.9 to about 2.1, where  $y$  ranges from about 2.9 to about 3.1, and where  $z$  ranges from about 6.9 to about 7.0, said superconductive film having a zero resistance transition temperature of at least about 38 K and a thickness at least sufficient to be continuous ranging from about 0.4 micron to about 0.5 micron, said substrate being selected from the group consisting of monocrystalline elemental silicon, polycrystalline elemental silicon, oxidized monocrystalline elemental silicon, oxidized polycrystalline elemental silicon, amorphous silicon dioxide, monocrystalline aluminum oxide and polycrystalline aluminum oxide, said zirconium dioxide film being intermediate said superconductive film and said substrate, said zirconium dioxide film having a thickness ranging from about 2000 Angstroms to about 4000 Angstroms.

**4,959,347**  
FORMING HOMOGENEOUS PRECURSORS OF BI-SR-CA-CU VIA CARBOXYLATES IN THE PRESENCE OF OXIDIZING AGENTS

Toshio Kobayashi; Fusaoki Uchikawa, and Kenji Nomura, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

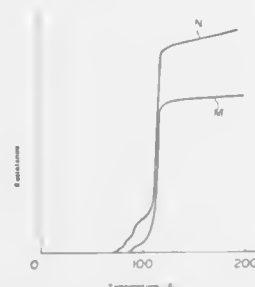
Filed Aug. 24, 1988, Ser. No. 235,497

Claims priority, application Japan, Aug. 24, 1987, 62-210940; Aug. 24, 1987, 62-210937; Mar. 31, 1988, 63-81715; Apr. 18, 1988, 62-96277

Int. Cl.<sup>3</sup> H01B 1/06; H01L 39/06

U.S. Cl. 505—1

12 Claims



1. A process for producing a superconductor of an oxide system containing metal elements in accordance with the formula:



which process comprises:

- uniformly dissolving, dispersing or suspending metal elements for constituting the oxide system in a solvent at least partly in the form of carboxylates, and in the presence of an oxidizing agent selected from the group consisting of hydrogen peroxide, benzoyl peroxide, peracetic acid, perbenzoic acid, ozone and m-chloroperbenzoic acid; and
- removing the solvent to obtain a homogenous mixture, and sintering the mixture in an oxygen atmosphere.

**4,959,348**  
Y-BA-CU-O SUPERCONDUCTOR FOR CONTAINING ANTIMONY OR BORON TO INCREASE CURRENT DENSITY

Kouji Higashibata, and Hironori Suzuki, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

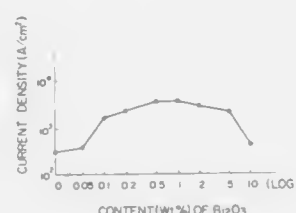
Filed Nov. 9, 1988, Ser. No. 269,065

Claims priority, application Japan, Nov. 9, 1987, 62-281004; Dec. 16, 1987, 62-316160

Int. Cl.<sup>3</sup> C01F 17/00, 11/02; C01G 3/02; H01L 39/12

U.S. Cl. 505—1

2 Claims



1. In a superconductor formed by sintering  $(Y_2O_3)_x(BaO)_y$  and  $(CuO)_z$ , the improvement comprising: admixing prior to sintering an oxide of antimony or boron such that the superconductor resulting from said sintering contains from 0.1 to 5 wt.% antimony or boron as the oxide thereof.

**4,959,349**  
INDANE DERIVATIVE AND PERFUMERY COMPOSITION COMPRISING THE SAME

Hiroaki Ohnuma, Ichikai; Yoshiaki Fujikura, Utsunomiya; Manabu Fujita, Kashiwa, and Nao Toi, Sakur, all of Japan, assignors to KAO Corporation, Tokyo, Japan

Filed Feb. 23, 1990, Ser. No. 483,881

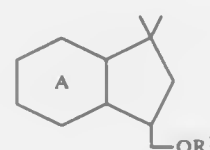
Claims priority, application Japan, Mar. 3, 1989, 1-51293; Mar. 3, 1989, 1-51292; Mar. 6, 1989, 1-53507

Int. Cl.<sup>3</sup> A61K 7/46

U.S. Cl. 512—14

2 Claims

2. A perfumery composition comprising as its fragrance imparting component an indane derivative represented by formula (I),



wherein ring A is a benzene or cyclohexane ring and R¹ is a hydrogen atom, an alkyl group having 1-4 carbon atoms, or an alkanoyl group having 1-6 carbon atoms, provided that when ring A is benzene, R¹ is a group other than hydrogen atom.

**4,959,350**  
ENTERAL DIET PRODUCT AND AGENT FOR PRODUCTION THEREOF

Sven Frokjaer, Naerum; Svend Eriksen, Allerød, and Jens L. Adler-Nielsen, Hellerup, all of Denmark, assignors to Novo Industri A/S, Bagsvaerd, Denmark

Filed Apr. 15, 1987, Ser. No. 38,668

Claims priority, application Sweden, Apr. 21, 1986, 8601828

Int. Cl.<sup>3</sup> A23J 1/14; A61K 37/18

U.S. Cl. 514—2

11 Claims

1. In an enteral diet product comprising dietary nitrogen compounds, carbohydrate(s) and water and characterized by a pH lower than about 4.5 and an osmolality below about 350

milli-osmol, the improvement which comprises at least 50% of the dietary nitrogen compounds being a vegetable protein hydrolysate characterized by being at least 95% soluble in aqueous media pH 2-7 and by being non-bitter in the enteral diet product, said product further containing fat and a total energy content of at least about 0.68 kcal/ml.

**4,959,351**  
CRYSTAL SUSPENSIONS OF INSULIN DERIVATIVES, PROCESSES FOR THEIR PREPARATION AND THEIR USE

Ulrich Grau, Hofheim am Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jul. 27, 1984, Ser. No. 635,257

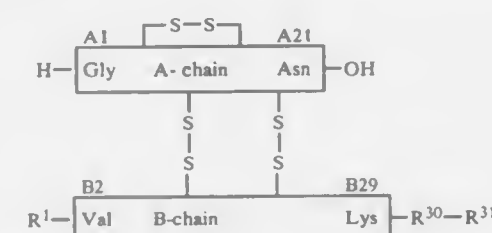
Claims priority, application Fed. Rep. of Germany, Jul. 29, 1983, 3327709

Int. Cl.<sup>3</sup> A61K 37/26

U.S. Cl. 514—4

20 Claims

1. A process for the preparation of a suspension of crystals of substantially uniform particle size and substantially uniform shape suitable for injection of at least one insulin derivative of the formula I



in which

R¹ denotes H or H-Phe,  
R² represents the radical of Ala, Thr or Ser and  
R³ represents a physiologically acceptable organic group of basic character of the formula  $X_n-S$  which has up to 50 carbon atoms, in which  $n$  is 0, 1, 2 or 3  
X represents identical or different radicals of naturally occurring basic L-amino acids or of the corresponding D-amino acids or both and  
S denotes OH or a physiologically acceptable protective group which blocks the carboxyl group, but S being, if  $n$  is 0, a positively charged or protonatable basic radical and, if  $n$  is greater than 0, S can carry such a radical and which contains or does not contain a terminal carboxyl function or an ester or an amide thereof, with an isoelectric point between 5.8 and 8.5, which comprises carrying out the crystallization in an aqueous medium closes to the isoelectric point of the derivative in the presence of at least one phenol and of glycerol as an isotonicity agent.

**4,959,352**  
CYCLIC GROWTH HORMONE RELEASING FACTOR ANALOGS AND METHOD FOR THE MANUFACTURE THEREOF

Arthur M. Felix, West Caldwell, and Edgar P. Helmer, Sparta, both of N.J., assignors to Hoffmann-la Roche Inc., Nutley, N.J.

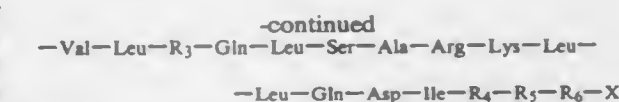
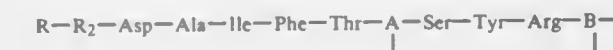
Continuation of Ser. No. 98,340, Sep. 18, 1987, abandoned. This application Aug. 28, 1989, Ser. No. 399,123

Int. Cl.<sup>3</sup> A61K 37/02; C07K 7/54

U.S. Cl. 514—9

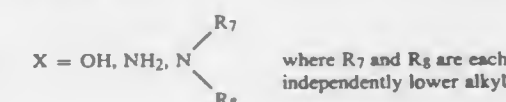
14 Claims

1. A cyclic peptide of the formula



wherein

R=Tyr, desNHhd 2-Tyr, Ac-Tyr, His or N-Methyl-L-Tyr  
R₂=Ala, D-Ala or N-methyl-D-Ala  
R₃=Gly, Ala, Leu, Val, Ile, Nle, NVal, β-Ala or "a-Aib"  
R₄=Met, Leu, Nle or Ile  
R₅=Ser or Asn  
R₆=an amino acid sequence selected from the group consisting of Arg-Gln-Gln-Gly-Glu-Ser-Asn-Gln-Glu-Arg-Gly-Ala-Arg-Ala-Arg-Leu and fragments thereof where the fragment is reduced in number by 1 to 15 amino acids from the carboxyl end



A=Asp, Glu, α-aminopimelic acid or α-aminoadipic acid  
B=Lys, Orn, diaminopropionic acid, diaminobutyric acid or a pharmaceutically acceptable salt thereof; and the side chain carboxy terminus of A is bonded via an amide bond to the side chain amino terminus of B.

**4,959,353**  
PROMOTION OF CORNEAL STROMA WOUND HEALING WITH HUMAN EPIDERMAL GROWTH FACTOR PREPARED FROM RECOMBINANT DNA

Gregory L. Brown, Atlanta, Ga.; Richard Elferman; Gregory L. Schultz, both of Louisville, Ky., and Valenzuela, Pablo D. T., San Francisco, Calif., assignors to University of Louisville Foundation, Louisville, Ky. and Chiron Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 663,092, Oct. 19, 1984, abandoned. This application Apr. 23, 1987, Ser. No. 41,695

Int. Cl.<sup>3</sup> A61K 37/36; C12P 21/02

U.S. Cl. 514—12

21 Claims

1. A method for treating corneal stromal wounds to promote healing, said method comprising applying human epidermal growth factor (hEGF) to the wound, where said hEGF is produced by expressing an hEGF gene encoding a polypeptide having at least substantially the same amino acid sequence and the same corneal stromal wound-healing activity as naturally occurring human epidermal growth factor in a microorganism.

**4,959,354**  
MIXTURES OF FSH AND LH FROM PIG HYPOPHYSES IN A DEFINITE RATIO

Manlio Barbetti, Rome, Italy, assignor to Istituto Farmacologico Sero S.p.A., Italy

Continuation of Ser. No. 834,141, Feb. 24, 1986, abandoned, which is a continuation of Ser. No. 578,517, Feb. 1, 1984, abandoned. This application Jul. 14, 1987, Ser. No. 73,901

Claims priority, application Italy, Feb. 11, 1983, 47699 A/83

Int. Cl.<sup>3</sup> A61K 37/36, 35/55

U.S. Cl. 514—21

7 Claims

1. A method of inducing superovulation in cows which comprises administering thereto a superovulation effective amount of a gonadotropin composition comprising a mixture of porcine FSH and porcine LH in an IU ratio of between 0.5 and 2.5.





R<sup>1</sup> is H or C<sub>1-6</sub>alkyl;  
 R<sup>10</sup> is C<sub>1-6</sub>alkyl or (CH<sub>2</sub>)<sub>0-6</sub>aryl;  
 R<sup>11</sup> and R<sup>16</sup> independently are H, C<sub>1-6</sub>alkyl, or (CH<sub>2</sub>)<sub>0-6</sub>aryl;  
 R<sup>12</sup> is H, C<sub>1-6</sub>alkyl, COR<sup>14</sup>, or SO<sub>2</sub>R<sup>15</sup>;  
 R<sup>13</sup> is H or C<sub>1-6</sub>alkyl;  
 R<sup>14</sup> and R<sup>15</sup> independently are C<sub>1-6</sub>alkyl or (CH<sub>2</sub>)<sub>0-6</sub>aryl;  
 Y and Z independently are H, NO<sub>2</sub>, C<sub>1-6</sub>alkyl, CH<sub>2</sub>CH<sub>2</sub>OH,  
 CN, CH<sub>2</sub>OR<sup>17</sup>, CH<sub>2</sub>SR<sup>18</sup>, COR<sup>2</sup>, CO<sub>2</sub>R<sup>2</sup>, CONR<sup>3</sup>R<sup>4</sup>,  
 SO<sub>2</sub>NR<sup>3</sup>R<sup>4</sup>, SO<sub>2</sub>R<sup>2</sup>, SO<sub>2</sub>R<sup>5</sup>, SOR<sup>5</sup>, P(O)(OR<sup>3</sup>)(OR<sup>4</sup>),  
 P(O)R<sup>5</sup>(OR<sup>3</sup>), P(O)R<sup>5</sup>R<sup>6</sup>, P(O)(OR<sup>2</sup>)NR<sup>3</sup>R<sup>4</sup>,  
 P(O)(NR<sup>3</sup>R<sup>4</sup>)<sub>2</sub>, P(O)R<sup>5</sup>(NR<sup>3</sup>R<sup>4</sup>), halo, CF<sub>3</sub>, or (CH<sub>2</sub>)<sub>0-6</sub>aryl;  
 R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> independently are H, C<sub>1-6</sub>alkyl,  
 C<sub>3-5</sub>alkenyl, or (CH<sub>2</sub>)<sub>0-6</sub>aryl; and  
 R<sup>5</sup> and R<sup>6</sup> independently are C<sub>1-6</sub>alkyl,  
 C<sub>3-5</sub>alkenyl, or (CH<sub>2</sub>)<sub>0-6</sub>aryl; or a pharmaceutically accept-  
 able salt thereof.

10. A method of antagonizing  $\alpha$ -adrenergic receptors in mammals that comprises administering to a subject in need thereof an effective amount of a compound of claim 1.

13. A method of reducing blood pressure in mammals that comprises administering to a subject in need thereof an effective amount of a compound of claim 1.

14. A method of treating cardiovascular diseases in mammals that comprises administering to a subject in need thereof an effective amount of a compound of claim 1.

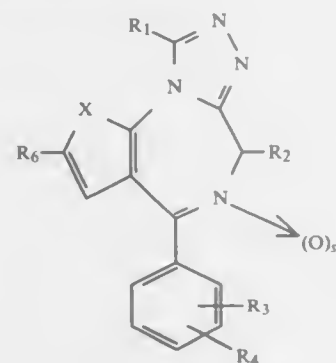
15. A method of treating benign prostatic hypertrophy in mammals that comprises administering to a subject in need thereof an effective amount of a compound of claim 1.

4,959,361  
**TRIAZOLO(4,3-a)(1,4)BENZODIAZEPINES AND THIENO (3,2-f)(1,2,4)TRIAZOLO(4,3-a)(1,4)DIAZEPINE COMPOUNDS WHICH HAVE USEFUL ACTIVITY AS PLATELET ACTIVATING FACTOR (PAF) ANTAGONISTS**  
 Armin Walser, West Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 227,948, Aug. 3, 1988, abandoned, which is a continuation-in-part of Ser. No. 134,726, Dec. 18, 1987, abandoned. This application Oct. 3, 1988, Ser. No. 252,964

Int. Cl. 5 A61K 31/55; C07D 495/14  
 U.S. Cl. 514—220

1. A compound of formula



wherein X is —CH=CH— or S;

R<sub>1</sub> is lower alkyl, lower alkoxy or trifluoromethyl;

R<sub>2</sub> is hydrogen, lower alkyl, lower alkoxy, hydroxy or acetyloxy;

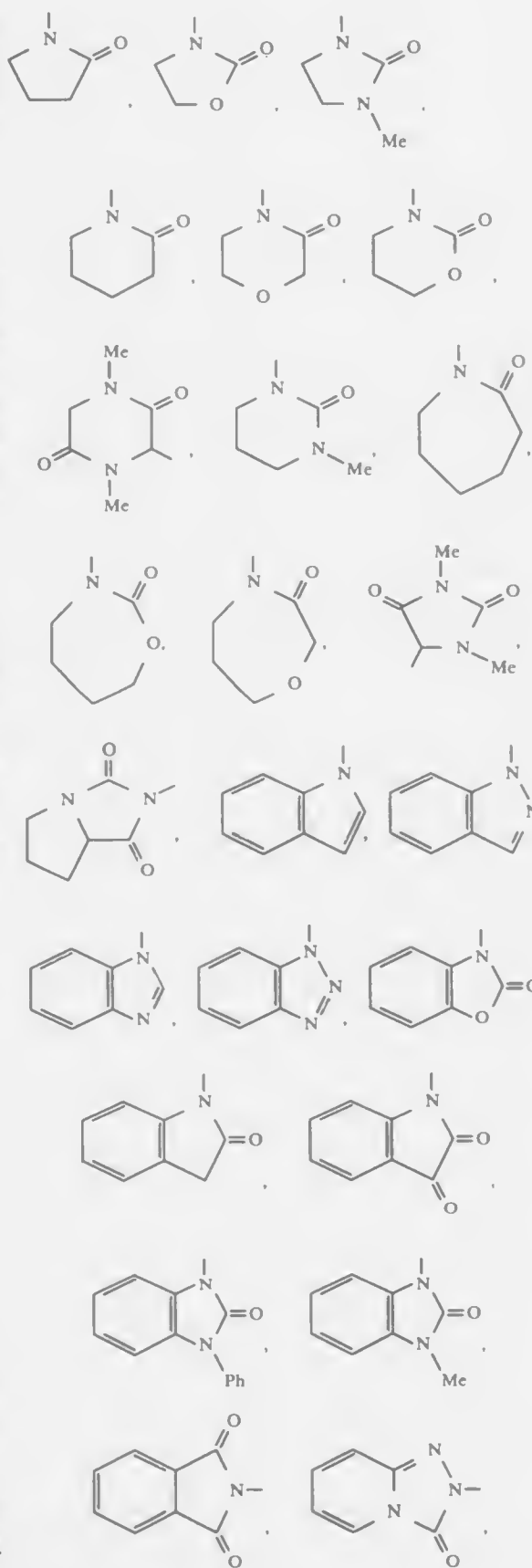
R<sub>3</sub> and R<sub>4</sub>, independently, are hydrogen, chlorine, fluorine, lower alkyl or lower alkoxy;

s is an integer from 0 to 1, provided that when s is 1, R<sub>2</sub> cannot be hydroxy, lower alkoxy or acetyloxy;

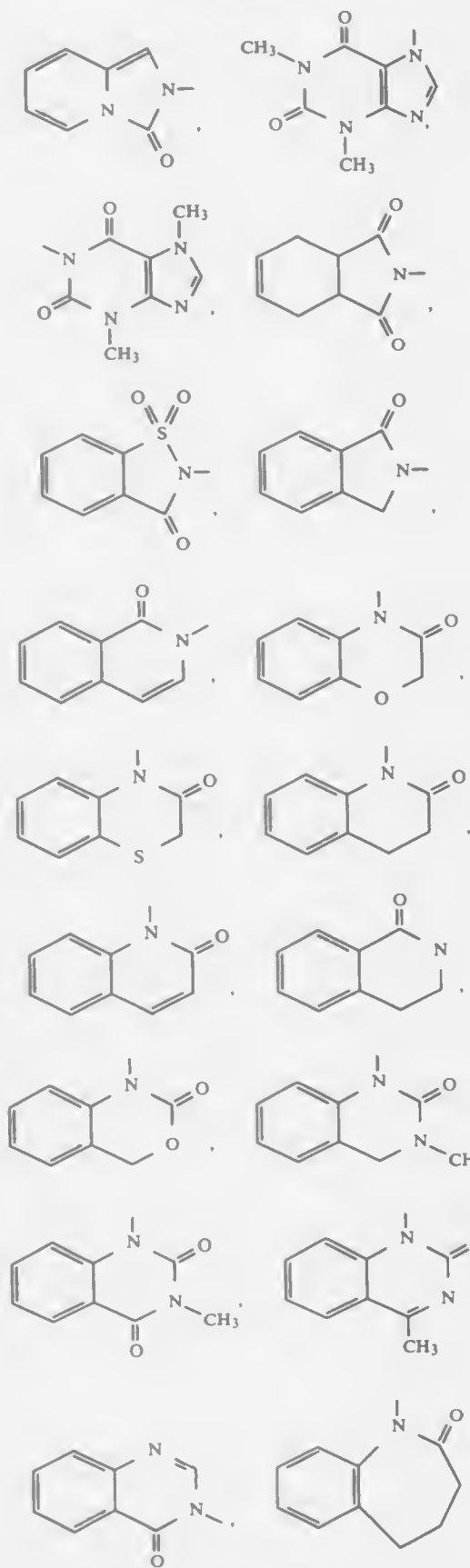
R<sub>5</sub> is a radical of the formula

R<sub>7</sub>—O—(CH<sub>2</sub>)<sub>m</sub>—C≡C— wherein R<sub>6</sub> and R<sub>7</sub> are naphthyl, phenyl or phenyl or naphthyl mono-, di-, or trisubstituted by chlorine, fluorine, lower alkoxy or lower alkoxy or a heterocyclic radical selected from the group consisting of

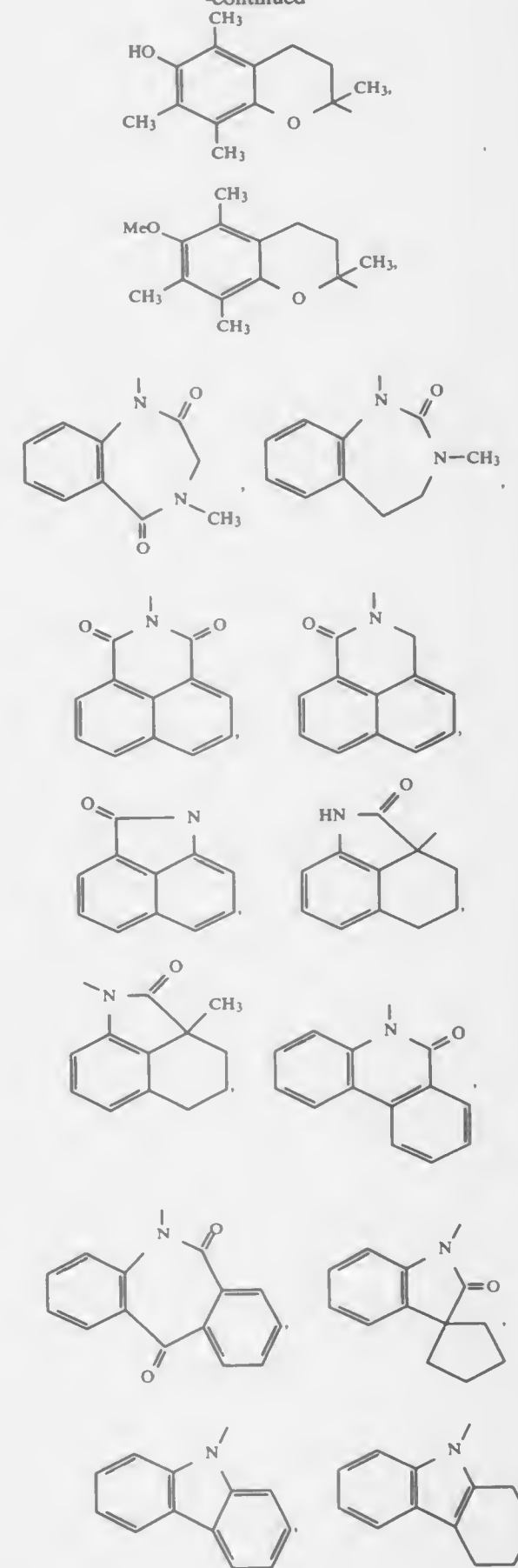
pyridinyl, imidazolyl, thienyl, furyl, pyrimidinyl, oxazolyl,



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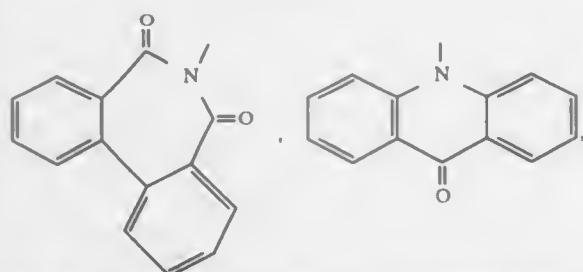


-continued





-continued



which can be substituted by one or two substituents selected from the group consisting of lower alkyl, lower alkoxy, chlorine and fluorine, n is an integer of from 0 to 2 and m is an integer of from 1 to 2, provided that, when n is OR<sub>6</sub> must be attached through a carbon to carbon bond, and provided that R<sub>7</sub> is always attached through a carbon to oxygen bond, or, when at least one asymmetric carbon is present, an enantiomer or racemate thereof, or a pharmaceutically acceptable acid addition salt thereof.

4,959,362

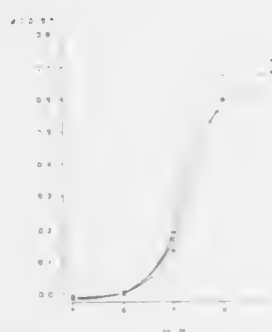
**PHARMACEUTICAL COMPOSITIONS CONTAINING CERTAIN ASCORBIC ACID DERIVATIVES USEFUL IN THE PROPHYLAXIS AND TREATMENT OF DISORDERS OF THE CIRCULATORY SYSTEM**

Shinji Terao, Toyonaka, and Minoru Hirata, Ikeda, both of Japan, assignors to Takeda Chemical Industries, Inc., Osaka, Japan

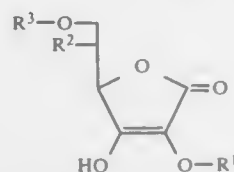
Continuation of Ser. No. 863,429, May 15, 1986, abandoned, which is a continuation-in-part of Ser. No. 683,136, Dec. 18, 1984, abandoned. This application Sep. 19, 1988, Ser. No. 245,943

Claims priority, application Japan, Dec. 19, 1983, 58-240741; PCT Int'l Appl., May 17, 1985, PCT/JP85/00272; Jun. 18, 1985, PCT/JP85/00340

Int. Cl.<sup>3</sup> A61K 31/455, 31/535, 31/40, 31/34  
U.S. Cl. 514—231.5 18 Claims



1. A pharmaceutical composition for treatment of prophylaxis or improvement of disorders in functions of the circulatory system caused by biologically activated oxygen species and reactive organic radicals, which composition contains in an amount for administering 0.1 mg/kg to 50 mg/kg of an ascorbic acid derivative of the formula:



wherein

R<sup>1</sup> is of the formula —CH<sub>2</sub>—R, wherein R is a C<sub>5</sub>-22 straight-chain or branched alkyl;

a C<sub>1</sub>-10 straight-chain or branched-chain alkyl group having one to three substituents selected from the group consisting of (1) C<sub>1</sub>-6 alkoxy, (2) phenyl or naphthyl optionally substituted with one to three substituents selected from the group consisting of C<sub>1</sub>-5 alkyl, C<sub>1</sub>-3 alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (3) benzyl or phenethyl optionally substituted with one to three substituents selected from the group consisting of C<sub>1</sub>-5 alkyl, C<sub>1</sub>-3 alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (4) phenyl-carbonyloxy or naphthylcarbonyloxy optionally substituted with one to three substituents selected from the group consisting of C<sub>1</sub>-5 alkyl, C<sub>1</sub>-3 alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (5) benzyl-carbonyloxy or phenethylcarbonyloxy optionally substituted with one to three substituents selected from the group consisting of C<sub>1</sub>-5 alkyl, C<sub>1</sub>-3 alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (6) 2,3,5-trimethyl-1,4-benzoquinonyl, (7) 2,3-dimethoxy-5-methyl-1,4-benzoquinonyl and (8) 2-methyl-1,4-naphthoquinonyl;

a C<sub>2</sub>-20 alkenyl group having one to three substituents selected from phenyl, naphthyl, benzyl or phenethyl, 3-pyridyl, thienyl and furyl;

a phenyl, naphthyl, benzyl or phenethyl optionally substituted with one to three substituents selected from the group consisting of C<sub>1</sub>-5 alkyl, methoxy, methylenedioxy and hydroxyl;

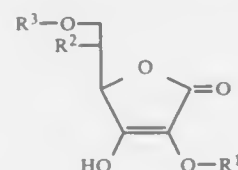
a C<sub>1</sub>-9 acyl group selected from the group consisting of formyl, acetyl, propionyl, n-butyryl, isobutyryl, benzoyl, morpholino-carbonyl, C<sub>1</sub>-3 alkoxy-carbonyl, pyrrolidinocarbonyl, C<sub>1</sub>-3 alkoxy-carbonyl, phenylcarbonyl or naphthylcarbonyl optionally substituted with one to three substituents selected from the group consisting of hydroxyl, C<sub>1</sub>-5 alkyl and C<sub>1</sub>-3 alkoxy, benzylcarbonyl or phenethylcarbonyl optionally substituted with one to three substituents selected from the group consisting of hydroxyl, C<sub>1</sub>-5 alkyl and C<sub>1</sub>-3 alkoxy;

a phenyloxy, naphthyloxy, benzyloxy or phenethyloxy optionally substituted with one to three substituents selected from the group consisting of hydroxyl, C<sub>1</sub>-5 alkyl and C<sub>1</sub>-3 alkoxy;

R<sup>2</sup> is hydrogen or hydroxy; and  
R<sup>3</sup> is hydrogen, or acyl; or R<sup>2</sup> and R<sup>3</sup> may together form an O,O-isopropylidene residue;

or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier, vehicle or diluent thereof.

10. A method of treatment of prophylaxis or improvement of disorders in functions of the circulatory system caused by biologically activated oxygen species and reactive organic radicals, which comprises administering to a mammal an effective amount of an ascorbic acid derivative of the formula:



wherein

R<sup>1</sup> is of the formula —CH<sub>2</sub>—R, wherein R is C<sub>5</sub>-22 straight-chain or branched alkyl;

a C<sub>1</sub>-10 straight-chain or branched-chain alkyl group having one to three substituents selected from the group consisting of (1) C<sub>1</sub>-6 alkoxy, (2) phenyl or naphthyl optionally substituted with one to three substituents selected from the group consisting of C<sub>1</sub>-5 alkyl, C<sub>1</sub>-3 alkoxy, halogen, nitro, amino, oxo, hydroxyl

and benzyloxy, (3) benzyl or phenethyl optionally substituted with one to three substituents selected from the group consisting of C<sub>1</sub>-5 alkyl, C<sub>1</sub>-3 alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (4) phenyl-carbonyloxy or naphthylcarbonyloxy optionally substituted with one to three substituents selected from the group consisting of C<sub>1</sub>-5 alkyl, C<sub>1</sub>-3 alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (5) benzyl-carbonyloxy or phenethylcarbonyloxy optionally substituted with one to three substituents selected from the group consisting of C<sub>1</sub>-5 alkyl, C<sub>1</sub>-3 alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (6) 2,3,5-trimethyl-1,4-benzoquinonyl, (7) 2,3-dimethoxy-5-methyl-1,4-benzoquinonyl and (8) 2-methyl-1,4-naphthoquinonyl;

a C<sub>2</sub>-20 alkenyl group having one to three substituents selected from phenyl, naphthyl, benzyl, phenethyl, 3-pyridyl, thienyl and furyl;

a phenyl, naphthyl, benzyl or phenethyl optionally substituted with one to three substituents selected from the group consisting of C<sub>1</sub>-5 alkyl, methoxy, methylenedioxy and hydroxyl;

a C<sub>1</sub>-9 acyl group selected from the group consisting of formyl, acetyl, propionyl, n-butyryl, isobutyryl, benzoyl, morpholino-carbonyl, C<sub>1</sub>-3 alkoxy-carbonyl, pyrrolidinocarbonyl, C<sub>1</sub>-3 alkoxy-carbonyl, phenylcarbonyl or naphthylcarbonyl optionally substituted with one to three substituents selected from the group consisting of hydroxyl, C<sub>1</sub>-5 alkyl and C<sub>1</sub>-3 alkoxy, benzylcarbonyl or phenethylcarbonyl optionally substituted with one to three substituents selected from the group consisting of hydroxyl, C<sub>1</sub>-5 alkyl and C<sub>1</sub>-3 alkoxy;

a phenyloxy, naphthyloxy, benzyloxy or phenethyloxy optionally substituted with one to three substituents selected from the group consisting of hydroxyl, C<sub>1</sub>-5 alkyl and C<sub>1</sub>-3 alkoxy;

R<sup>2</sup> is hydrogen or hydroxy; and  
R<sup>3</sup> is hydrogen, or acyl; or R<sup>2</sup> and R<sup>3</sup> may together form an O,O-isopropylidene residue;

or a pharmaceutically acceptable salt thereof.

4,959,363

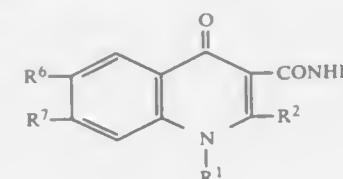
**QUINOLONECARBOXAMIDE COMPOUNDS, THEIR PREPARATION AND USE AS ANTIVIRALS.**

Mark P. Wentland, Colonie, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed Jun. 23, 1989, Ser. No. 370,926

Int. Cl.<sup>3</sup> C07D 215/233, 265/30; A61K 31/47, 31/535  
U.S. Cl. 514—235.2 12 Claims

1. A compound of the formula



wherein

R is hydrogen, hydroxy, amino, lower-alkyl or CH<sub>2</sub>N=Z, wherein N=Z is di-lower-alkylamino, 1-pyrrolidyl, 1-piperidyl or 4-morpholinyl; R<sup>1</sup> is lower-alkyl, lower-alkenyl, cycloalkyl, pyridinyl, or phenyl or phenylmethyl where phenyl can be substituted by from one to three substituents selected from halo, lower-alkyl, lower-alkoxy and trifluoromethyl;

R<sub>2</sub> is hydrogen, amino or hydroxy;

R<sub>6</sub> is hydrogen or fluoro; and

R<sub>7</sub> is pyridinyl, pyridinyl substituted by one or two lower-alkyl groups, pyridinyl-N-oxide, phenyl, 5-isoxazolyl, 3-methyl-5-isoxazolyl or 3-methyl-5-thiazolyl, with the

proviso that when R is hydrogen or lower-alkyl, R<sup>1</sup> is lower-alkyl and R<sub>7</sub> is phenyl, R<sub>2</sub> is other than hydrogen; or a pharmaceutically acceptable acid-addition salt thereof.

4,959,364

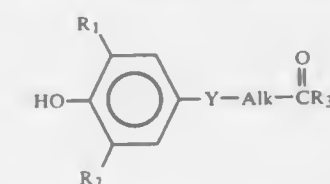
**METHOD OF TREATING INFLAMMATION, ALLERGY, ASTHMA AND PROLIFERATIVE SKIN DISEASE USING HETEROCYCLIC AMIDES**

Richard A. Mueller, Glencoe, and Richard A. Partis, Evanston, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

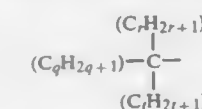
Division of Ser. No. 224,647, Jul. 27, 1988, abandoned, which is a continuation of Ser. No. 809,964, Dec. 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 698,047, Feb. 4, 1985, abandoned. This application Nov. 13, 1989, Ser. No. 435,230  
Int. Cl.<sup>3</sup> A61K 31/40, 31/445, 31/505, 31/535

U.S. Cl. 514—237.5 12 Claims

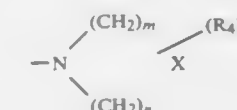
1. A method of treating inflammation comprising administering to an animal in need of such treatment a therapeutically effective amount of a compound of the formula:



wherein: R<sub>1</sub> and R<sub>2</sub> are the same or different members of the group consisting of halo, phenyl, substituted phenyl and a



group wherein q, r and t are independently an integer of from 1 to 8 provided that q + r + t is equal to or less than 10; Y is thio or sulfinyl; Alk is straight or branched chain lower alkyl; and R<sub>3</sub> is a heterocyclic amine represented by the formula:



wherein R<sub>4</sub> is selected from the group consisting of hydrogen, lower alkyl, phenyl, substituted phenyl, benzyl, substituted benzyl, carboxyl or carboxyl lower alkyl; X is selected from the group consisting of N-R<sub>4</sub>, O and —CH<sub>2</sub>; m is 2 or 3; n is 2 or 3 when X is O or N-R<sub>4</sub>, and is 1 to 3 when X is CH<sub>2</sub>; p is 0 to 2; or the pharmaceutical acceptable salts thereof.

4,959,365

**TOPICAL COMPOSITIONS OF LIPOPHILIC PHARMACEUTICALS AGENTS**

Michael L. Francoeur, Stonington, and Russell O. Potts, Old Saybrook, both of Conn., assignors to Pfizer Inc., New York, N.Y.

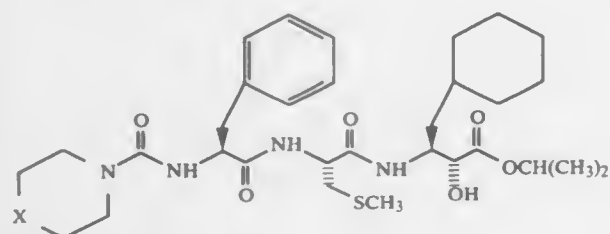
Continuation-in-part of Ser. No. 161,926, Feb. 29, 1988, which is a continuation-in-part of Ser. No. 925,641, Oct. 31, 1986, abandoned. This application Apr. 18, 1989, Ser. No. 340,112  
Int. Cl.<sup>3</sup> A61K 31/535, 31/505

U.S. Cl. 514—237.5 28 Claims

1. A pharmaceutical composition for the topical treatment of psoriasis or hypertension in a human or lower animal which comprises

(a) a safe and effective amount of a lipophilic pharmaceutical agent; wherein for the treatment of psoriasis the agent is

5-hydroxy-4,5-dimethyl-2-(6-phenylhexyl)aminopyrimidine or a pharmaceutically acceptable acid addition salt thereof; and for the treatment of hypertension the agent is compound of the formula



where X is O or C=O;

(b) a solvent system comprising water and from about 15 to 75% by volume of one or more water miscible solvents selected from the group consisting of methanol, ethanol and isopropyl alcohol; and

(c) from about 0.01 to 5% (w/v) of a compound which is a 1-alkylazacycloheptan-2-one, said alkyl having from 8 to 16 carbon atoms, or a cis-olefin of the formula



where  $\text{R}^3$  is  $\text{CH}_2\text{OH}$ ,  $\text{CH}_2\text{NH}_2$  or  $\text{COR}$ , and  $\text{R}^4$  is OH or  $(\text{C}_1-\text{C}_4)\text{alkoxy}$ , x and y are each an integer from 3 to 13 and the sum of x and y is from 10 to 16;

wherein in said solvent system said water miscible solvent content is within 10% of that which gives optimal flux across the topical biomembrane and/or maximal intramembrane levels for said agent.

15. A method of treating psoriasis or hypertension in a human or lower animal which comprises topical administration of a psoriasis alleviating or antihypertensive amount of a pharmaceutical composition of claim 1.

4,959,366

## ANTI-ARRHYTHMIC AGENTS

Peter E. Cross, Geoffrey N. Thomas, and John E. Arrowsmith, all of New York, N.Y., assignors to Pfizer Inc., New York, N.Y.

Filed Apr. 29, 1987, Ser. No. 44,086

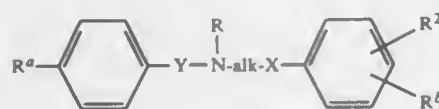
Claims priority, application United Kingdom, May 1, 1986, 8610668; Ireland, Dec. 17, 1986, 8630059

Int. Cl. 5 C07C 143/75, 93/06

U.S. Cl. 514-239.5

48 Claims

1. A compound of the formula:



or a pharmaceutically acceptable salt thereof; wherein

$\text{R}^a$  is  $-\text{NO}_2$ ,  $-\text{NH}_2$  or  $-\text{NHSO}_2\text{R}^1$  where  $\text{R}^1$  is a  $\text{C}_1-\text{C}_4$  alkyl group;

$\text{R}^b$  is  $-\text{NO}_2$ ,  $-\text{NH}_2$  or  $\text{R}^3$  where  $\text{R}^3$  is  $-\text{NHSO}_2(\text{C}_1-\text{C}_4\text{ alkyl})$  or  $-\text{CONR}^4\text{R}^5$  where  $\text{R}^4$  and  $\text{R}^5$  are each independently H or  $\text{C}_1-\text{C}_4$  alkyl or together with the nitrogen atom to which they are attached represent a 1-pyrrolidino, piperidino, morpholino or N-methylpiperazin-1-yl group; with the proviso that when one of  $\text{R}^a$  and  $\text{R}^b$  is  $-\text{NO}_2$ , then the other is not  $-\text{NH}_2$ ;

X is O or S absent;

Y is an ethylene group optionally substituted by a methyl group;

"alk" is an ethylene, trimethylene or tetramethylene group, "alk" being optionally substituted by a methyl group;

R is  $\text{C}_1-\text{C}_4$  alkyl; and

$\text{R}^2$  is H, halo,  $\text{CF}_3$  or  $\text{C}_1-\text{C}_4$  alkyl.

48. A method of treating cardiac arrhythmia comprising administering to an arrhythmic host in need of such treatment an anti-arrhythmic effective dose of a compound of claim 2 in combination with a pharmaceutically acceptable diluent or carrier.

4,959,367

## 4-OXO-1,2,3-BENZOTRIAZINES

Francis D. King, Bishop's Stortford, England, assignor to Beecham Group P.L.C., Middlesex, England

Filed Nov. 2, 1988, Ser. No. 266,122

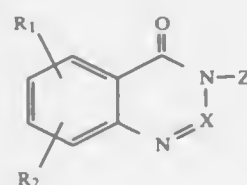
Claims priority, application United Kingdom, Nov. 4, 1987, 8725840; Feb. 11, 1988, 8803110

Int. Cl. 5 C07D 401/04, 401/14, 403/04; A61K 31/53

U.S. Cl. 514-243

10 Claims

1. A compound of formula (I), or a pharmaceutically acceptable salt thereof:

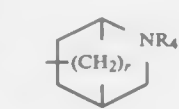
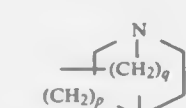
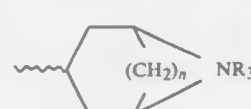


wherein

X is N;

$\text{R}_1$  and  $\text{R}_2$  are the same or different and are hydrogen, halogen,  $\text{CF}_3$ ,  $\text{C}_1-\text{C}_6$  alkyl,  $\text{C}_1-\text{C}_7$  acyl,  $\text{C}_1-\text{C}_7$  acylamino, or amino, aminocarbonyl or aminosulfonyl, optionally substituted by one or two  $\text{C}_1-\text{C}_6$  alkyl or  $\text{C}_3-\text{C}_8$  cycloalkyl groups, or by  $\text{C}_4-\text{C}_5$  polymethylene or by phenyl,  $\text{C}_1-\text{C}_6$  alkylsulfonyl,  $\text{C}_1-\text{C}_6$  alkylsulphonyl,  $\text{C}_1-\text{C}_6$  alkoxy,  $\text{C}_1-\text{C}_6$  alkylthio, hydroxy or nitro; or  $\text{R}_1$  and  $\text{R}_2$  taken together are methylenedioxy or ethylenedioxy;

Z is a group of formula (a), (b) or (c)



wherein

n is 2 or 3; p is 1 or 2; q is 1 to 3; r is 1 to 3; and

$\text{R}_3$  or  $\text{R}_4$  is  $\text{C}_1-\text{C}_4$  alkyl.

9. A pharmaceutical composition comprising a 5-HT<sub>3</sub> antagonist effective amount of a compound according to claim 1 and a pharmaceutically acceptable carrier.

4,959,368  
THERAPEUTIC AGENT FOR NEUROLOGICAL DISEASES

Akira Aways; Takuo Nakano, both of Yokohama; Hisashi Kobayashi, Mobarra; Ken E. Tan, Kamakura; Kazutoshi Horikomi; Tadayuki Sasaki, both of Mobarra; Kelichi Yokoyama; Hiroyasu Ohno, both of Iwakuni; Kozi Kato, Yamaguchi; Takumi Kitahara; Ikwo Tomino, both of Ohtake, and Shigeru Isayama, Tokyo, all of Japan, assignors to Mitsui Petrochemical Industries Ltd. and Mitsui Pharmaceuticals, Inc., both of Tokyo, Japan

PCT No. PCT/JP87/00120, § 371 Date Oct. 22, 1987, § 102(e) Date Oct. 22, 1987, PCT Pub. No. WO87/04928, PCT Pub. Date Aug. 27, 1987

PCT Filed Feb. 24, 1987, Ser. No. 130,533

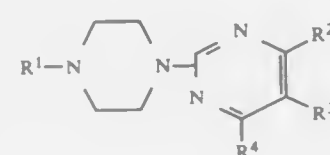
Claims priority, application Japan, Feb. 24, 1986, 61-37244; Mar. 31, 1986, 61-73443

Int. Cl. 5 A61K 31/505; C07D 403/04, 403/14

U.S. Cl. 514-252

43 Claims

13. A method for treating a patient having a neurological disease comprising a disorder of the peripheral nerves or central nerves requiring the proliferation of nerve cells, the formation and sprouting of neurites, nerve regeneration or motor function recovery, said method comprising administering to said patient a neurologically effective amount of a pyrimidine represented by the following formula (I)



wherein  $\text{R}^1$  represents a hydrogen atom, an acyl group having 2 to 4 carbon atoms, an alkoxycarbonyl group having 2 to 5 carbon atoms, an alkoxycarbonylmethyl group having 3 to 5 carbon atoms, a 3,4-dimethoxybenzoyl group or a 3,4-methylenedioxybenzyl group.

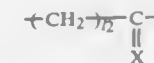
$\text{R}^2$  represents a hydrogen atom, an amino group, a monoalkylamino group having 1 to 4 carbon atoms, an alkoxy group having 1 to 5 carbon atoms or an alkoxycarbonyl group having 2 to 4 carbon atoms,

$\text{R}^3$  represents a hydrogen atom, an alkoxycarbonyl group having 2 to 4 carbon atoms, a dialkylaminocarbonyl group having 1 to 9 carbon atoms in each alkyl moiety, an alkoxy group having 1 to 5 carbon atoms, or a hydroxyethyl group,

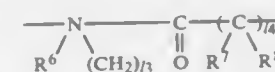
$\text{R}^2$  and  $\text{R}^3$  may together form a group selected from



wherein  $n$  is a number of 2, 3 or 4,

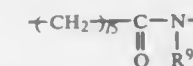


wherein X is  $=\text{O}$  or  $=\text{N}-\text{R}^5$  in which  $\text{R}^5$  is a hydroxyl, benzenesulfonyloxy or toluenesulfonyloxy group, and  $n$  is a number of 2, 3 or 4,

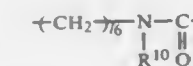


wherein  $\text{R}^6$  represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, or an alkoxyalkyl group resulting from substitution of an alkyl group having 2 to 4 carbon atoms by an alkoxy group having 1 to 4 carbon atoms,  $\text{R}^7$  and  $\text{R}^8$  are identical or different and each repre-

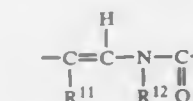
sents a hydrogen atom or an alkyl group having 1 to 4 carbon atoms and  $l_3$  is 2 and  $l_4$  is 0, or  $l_3$  is 0 and  $l_4$  is 1,



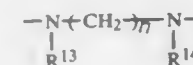
wherein  $\text{R}^9$  represents a hydrogen atom or an alkyl group having 1 to 4 carbon atoms, and  $l_5$  is a number of 2 or 3,



wherein  $\text{R}^{10}$  represents a hydrogen atom, an alkyl group having 1 to 10 carbon atoms, an acyl group having 1 to 4 carbon atoms or a carbamoylmethyl group, and  $l_6$  is a number of 1 or 2,

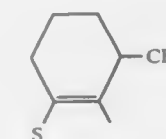


wherein  $\text{R}^{11}$  represents a hydrogen atom, a formyl group, an alkyl group having 1 to 4 carbon atoms or an aralkyl group having 7 to 9 carbon atoms and  $\text{R}^{12}$  represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, an alkenyl group having 3 to 4 carbon atoms, a hydroxyalkyl group having 2 to 4 carbon atoms, an alkoxyalkyl group resulting from substitution of an alkyl group having 2 to 4 carbon atoms by an alkoxy group having 2 to 4 carbon atoms, a benzyl group or a cycloalkyl group having 3 to 6 carbon atoms,



wherein  $\text{R}^{13}$  and  $\text{R}^{14}$  are identical or different and each represents a hydrogen atom or an alkyl group having 1 to 4 carbon atoms, and  $l_7$  is a number of 0, 2 or 3, or

$-\text{E}-\text{G}-$  wherein  $-\text{E}-\text{G}-$  is  $-\text{OCH}_2\text{CH}_2-$ ,  $-\text{OC}(\text{CH}_3)=\text{CH}-$ ,  $-\text{CH}_2\text{OCO}-$ ,  $-\text{OCOCH}_2-$ ,  $-\text{CH}_2\text{C}(\text{CH}_3)\text{OCO}-$ ,  $-\text{N}(\text{CH}_3)\text{CH}_2\text{CH}_2-$ ,  $-\text{CH}=\text{CH}-\text{CH}=\text{CH}-$ ,  $-\text{CH}=\text{C}(\text{OCH}_3)-\text{C}(\text{OCH}_3)=\text{CH}-$ , or



and

$\text{R}^4$  represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, or an alkylthio group having 1 to 4 carbon atoms, or a pharmaceutically acceptable salt thereof.

4,959,369

## SYNERGISTIC COMBINATIONS

Aws S. M. Salim, Department of Surgery, Royal Infirmary, Perth, PH1 1NX, Scotland

Filed Feb. 1, 1988, Ser. No. 150,896

Int. Cl. 5 A61K 31/195, 31/52

U.S. Cl. 514-264

18 Claims

1. A combination suitable for use in improving the condition of skin and mucosa which combination comprises an S-methyl



substituted ternary sulphonium derivative of methionine and cysteine wherein said cysteine and methionine derivative are present in a relative ratio of from 1:10 to 10:1, by weight.

a physiologically acceptable salt thereof, together with one or more pharmaceutical carriers or excipients.

4,959,370

## ALKALOIDS OF MARINE ORIGIN

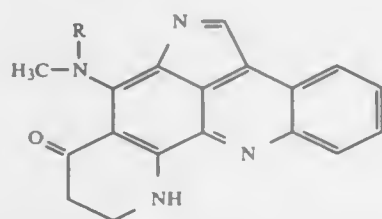
Phillip Crews, 7777 Monterey St., Santa Cruz, Calif. 95060; Thomas R. Matthews, 1579 Hidden Hill Pl., Los Gatos, Calif. 95030, and Wayne D. Inman, 11591 Lake Blvd., Felton, Calif. 95018

Filed Mar. 29, 1989, Ser. No. 330,164

Int. Cl.<sup>5</sup> A61K 31/44; C07D 471/16

U.S. Cl. 514—280

1. A compound of Formula (I):



wherein R is hydrogen or methyl, or a pharmaceutically acceptable salt thereof.

11 Claims

4,959,372

## ANTI-HYPERTENSIVE SUBSTITUTED

## 2-AZABICYCLOOCTANE-3-CARBOXYLIC ACIDS

Michel Vincent, Bagneux; Georges Remond, Versailles, and Michel Laubie, Vaucresson, all of France, assignors to Adir et lie, Neuilly-sur-Seine, France

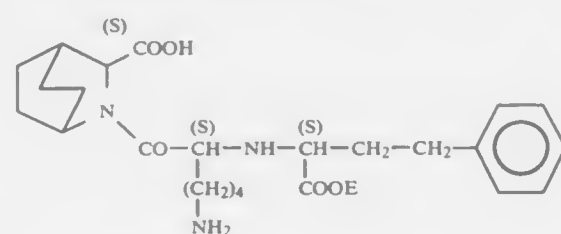
Filed Aug. 26, 1988, Ser. No. 237,497

Claims priority, application France, Aug. 28, 1987, 87 12013

Int. Cl.<sup>5</sup> A61K 31/44; C07D 471/08

U.S. Cl. 514—299

1. The compounds of formula (I):



in which E is a hydrogen atom or a lower alkyl radical, as well as their addition salts with a pharmaceutically acceptable base or acid.

6 Claims

4,959,371

## ISOQUINOLINE DERIVATIVES WITH ANTI-TUMOR ACTIVITY

Gordon H. Philipps, Wembley, and Michael G. Lester, Rickmansworth, both of United Kingdom, assignors to Glaxo Group Limited, London, England

Filed Nov. 25, 1987, Ser. No. 125,173

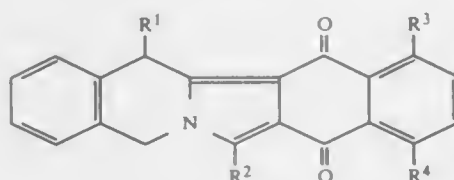
Claims priority, application United Kingdom, Nov. 27, 1986, 8628349; Nov. 27, 1986, 8628351; Nov. 27, 1986, 8628352

Int. Cl.<sup>5</sup> C07D 221/18; A61K 31/445

U.S. Cl. 514—283

1. A compound of formula (I)

17 Claims

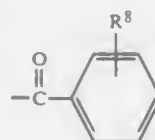


wherein

R<sup>1</sup> is a hydrogen atom or a methyl group; R<sup>2</sup> is a hydrogen or halogen atom or a methyl group; and one of R<sup>3</sup> and R<sup>4</sup> is a hydrogen atom and the other is a group —NR<sup>5</sup>R<sup>6</sup> (where R<sup>5</sup> is a hydrogen atom and R<sup>6</sup> is a group —COCH<sub>2</sub>NR<sup>7</sup>R<sup>8</sup> (wherein R<sup>7</sup> and R<sup>8</sup>, which may be the same or different, each represents a hydrogen atom or a C<sub>3-7</sub> cycloalkyl group or a C<sub>1-4</sub> alkyl group optionally substituted by a hydroxyl or benzoyloxy group), or R<sup>6</sup> is a group —COCH<sub>2</sub>NH(CH<sub>2</sub>)<sub>n</sub>NR<sup>7</sup>R<sup>8</sup> (where n is an integer from 2 to 5 inclusive and R<sup>7</sup> and R<sup>8</sup> are as defined above), or R<sup>6</sup> is a group —N=CR<sup>9</sup>R<sup>10</sup> (where R<sup>9</sup> is a hydrogen atom or a C<sub>1-4</sub> alkyl group and R<sup>10</sup> is a C<sub>1-4</sub> alkyl group optionally substituted by a group —NR<sup>7</sup>R<sup>8</sup> and R<sup>7</sup> and R<sup>8</sup> are as defined above) or R<sup>3</sup> is a hydrogen atom, a benzoyl group, a phenyl C<sub>1-6</sub> alkanoyl group, a C<sub>1-6</sub> alkanoyl group, or a halogenated C<sub>1-6</sub> alkanoyl group, and R<sup>4</sup> is a group —(CH<sub>2</sub>)<sub>n</sub>NR<sup>7</sup>R<sup>8</sup> (where n, R<sup>7</sup> and R<sup>8</sup> are as defined above) or a salt thereof.

15. A pharmaceutical composition comprising as an active ingredient a compound of formula (I) (as defined in claim 1) or

wherein R, R<sup>1</sup> and R<sup>3</sup> are identical or different and are each hydrogen, C<sub>1-4</sub>-alkyl, halogen or C<sub>1-4</sub>-alkoxy; X is —CH<sub>2</sub>—, —C(O)— or —C(R<sup>6</sup>)(OR<sup>7</sup>)—, wherein R<sup>6</sup> is hydrogen or C<sub>1-4</sub>-alkyl and R<sup>7</sup> is hydrogen, C<sub>1-4</sub>-alkyl or a moiety of the formula:



wherein R<sup>8</sup> is hydrogen, C<sub>1-4</sub>-alkyl, halogen or C<sub>1-4</sub>-alkoxy; Y is —CONH—; Z is C<sub>1-4</sub>-alkylene and R<sup>2</sup> is —NO<sub>2</sub>, —NH<sub>2</sub>, C<sub>1-4</sub>-alkyl, halogen, —CN, C<sub>1-4</sub>-alkoxy, —NH—SO<sub>2</sub>CH<sub>3</sub>, —CF<sub>3</sub>, —NH-acetyl or —NR<sup>9</sup>R<sup>10</sup>, wherein R<sup>9</sup> is C<sub>1-4</sub>-alkyl and R<sup>10</sup> is hydrogen or C<sub>1-4</sub>-alkyl; or the pharmaceutically-acceptable salts thereof.

(I)

4,959,373

## BISPIDINE DERIVATIVES AS CLASS III ANTIARRHYTHMIC AGENTS

Wilfried Lubisch, Mannheim; Fritz Binnig, Fussgoenheim, and Gerda von Philipsborn, Weinheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 22, 1988, Ser. No. 247,645

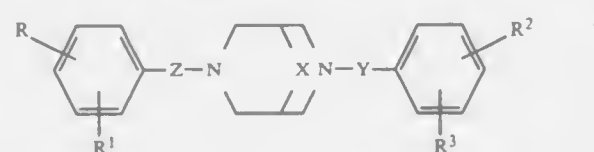
Claims priority, application Fed. Rep. of Germany, Sep. 24, 1987, 3732094

Int. Cl.<sup>5</sup> C07D 471/02

U.S. Cl. 514—300

1. A bispidine derivative of the formula (I):

11 Claims



4,959,374

## NOVEL COMPOUNDS

John M. Berge, Epsom, England, assignor to Beecham Group P.L.C., Middlesex, England

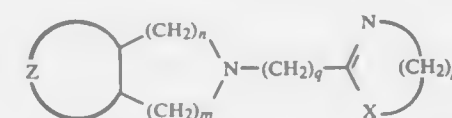
Filed Jul. 6, 1989, Ser. No. 376,140

Int. Cl.<sup>5</sup> A61K 31/47; C07D 401/06

U.S. Cl. 514—307

1. A compound of formula (I):

7 Claims



or a pharmaceutically acceptable salt, ester or amide thereof, wherein: Z represents a residue of a substituted or substituted aryl group, said aryl group being a phenyl or naphthyl group, X represents O or NR<sup>\*</sup> wherein R<sup>\*</sup> represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, an alkanoyl group substituted or unsubstituted in the alkyl moiety, or an arylalkyl moiety substituted or unsubstituted in the aryl moiety, n represents an integer 1 or 2, m represents an integer 1 or 2, p represents an integer 2 or 3, with the proviso that when n=1 and m=1, then p is not 2, and q represents an integer in the range of from 1 to 12; and wherein the substituents for any aryl group or alkyl group includes up to five groups selected from halogen, alkyl, alkenyl, alkynyl, phenyl, haloalkyl, hydroxy, alkoxy, arylalkoxy, amino, mono- and di-alkylamino, aminoalkyl, mono- and di-alkylaminoalkyl, nitro, carboxy, carboxyalkyl, alkoxy-carbonyl, alkoxy-carbonylalkyl or alkylcarbonyl.

7. A pharmaceutical composition comprising a compound of claim 1 of the formula (I), or a pharmaceutically acceptable salt, ester or amide thereof, and a pharmaceutically acceptable carrier therefor.

4,959,375

PIPERIDINE DERIVATIVES USEFUL AS 5-HT<sub>3</sub> ANTAGONISTS

Terence J. Ward, Maidenhead, England, assignor to John Wyeth & Brothers Limited, Maidenhead, England

Filed Feb. 21, 1989, Ser. No. 313,104

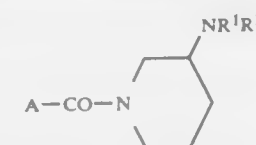
Claims priority, application United Kingdom, Mar. 3, 1988, 8805064

Int. Cl.<sup>5</sup> A61K 31/445; C07D 211/98

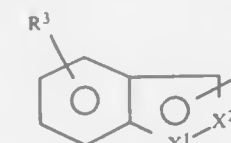
U.S. Cl. 514—323

11 Claims

10. A method for antagonizing 5-HT<sub>3</sub> receptors in a mammal, which comprises administering to a mammal in need thereof an amount effective to antagonize 5-HT<sub>3</sub> receptors of a compound of formula I



or a pharmaceutically acceptable acid addition salt thereof, wherein A represents an aromatic radical of the formula



wherein

R<sup>3</sup> is hydrogen, (C<sub>1-4</sub>)alkyl, (C<sub>1-4</sub>) alkoxy or halogen; X<sup>1</sup>—X<sup>2</sup> represents NR<sup>4</sup>—CH<sub>2</sub>—N, NR<sup>4</sup>—N, CH—NR<sup>4</sup> or N—NR<sup>4</sup>, where R<sup>4</sup> is hydrogen, (C<sub>1-4</sub>)alkyl, phenyl or phenyl(C<sub>1-4</sub>)alkyl; and R<sup>1</sup> and R<sup>2</sup> are independently hydrogen, (C<sub>1-4</sub>)alkyl or (C<sub>1-4</sub>)alkylphenyl or R<sup>1</sup> and R<sup>2</sup> together with the nitrogen atom to which they are attached represent pyrrolidino or piperidino.

4,959,376

## 1,4-BENZODIOXANE DERIVATIVES

Toshinobu Kuniti; Norio Misami; Fumihiro Ozaki; Nobuyuki Mori; Mikio Takeda, and Hiroshi Katoh, all of Ibaraki, Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 887,720, Jul. 18, 1986, Pat. No. 4,794,118. This application Oct. 4, 1988, Ser. No. 253,023

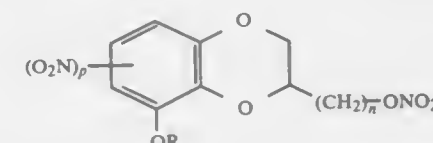
Claims priority, application Japan, Jul. 23, 1985, 60-161096

The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 31/455

U.S. Cl. 514—338

1. A pharmacological composition which comprises a 1,4-benzodioxane derivative represented by the following formula:



wherein p represents an integer of 0-2, R denotes hydrogen atom, a lower alkyl, a lower alkoxy-carbonyl, an alkanoyl, or nicotinoyl group, and n is an integer of 1-3, or a pharmacologically acceptable salt thereof and a pharmacologically acceptable carrier.

4,959,377

## PHENOXYPYRIDINAMINE COMPOUNDS WHICH ARE USE AS A DERMATOLOGICAL COMPOSITION

Richard C. Effland; Joseph T. Klein, both of Bridgewater; Gordon E. Olsen, Somerset, and Larry Davis, Sergeantsville, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

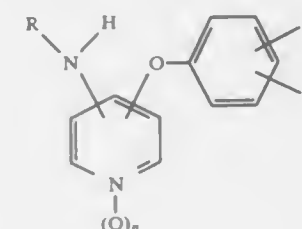
Filed Jun. 29, 1989, Ser. No. 372,970

Int. Cl.<sup>5</sup> C07D 213/30; A61K 31/44

U.S. Cl. 514—349

1. A compound having the formula,

30 Claims



where

n is 0 or 1; X is hydrogen, loweralkyl, loweralkoxy, halogen, formyl, loweralkylcarbonyl, loweralkoxy-carbonyl, loweralkoxy-carbonyl-loweralkyl or hydroxymethyl; Y is hydrogen or halogen; and R is hydrogen, loweralkyl, aryl-loweralkyl or loweralkylcarbonyl,

or a pharmaceutically acceptable acid addition salt thereof.

and each of the  $(\text{CH}_2)_n$  and  $(\text{CH}_2)_m$  groups may be unsubstituted or optionally substituted with one or two lower



alkyl groups and/or are one or two lower alkoxy groups.

9. A composition for inhibiting arachidonic acid-induced platelet aggregation and bronchoconstriction comprising a therapeutically effective amount of a compound as defined in claim 1 and a pharmaceutically acceptable carrier therefor.

#### 4,959,384 USE OF NITROFURANTOIN FOR THE TREATMENT AND PROPHYLAXIS OF GASTROINTESTINAL DISORDERS

William G. Kraft, Norwich, and Donna R. Morgan, Sherburne, both of N.Y., assignors to Norwich Eaton Pharmaceuticals, Inc., Norwich, N.Y.

Filed Oct. 24, 1985, Ser. No. 790,919

Int. Cl.<sup>5</sup> A61K 31/415

U.S. Cl. 514—390

11 Claims

1. A method for the treatment of a human subject having an infectious gastrointestinal disorder of the stomach or duodenum which is caused or mediated by *Campylobacter pyloridis* (renamed *Helicobacter pylori*) comprising the step of administering to said subject a safe and effective amount of nitrofurantoin.

#### 4,959,385 THIOFORMAMIDE DERIVATIVES

David C. Cook, London; Terance W. Hart, Brentwood; Iain M. McLay, Loughton; Malcolm N. Palfreyman, Upminster; Roger J. Walsh, Rayleigh, all of England, and Jean-Claude Alop, Villeneuve-le-Roi, France, assignors to May & Baker Limited, Dagenham, England

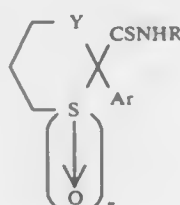
Filed Jan. 19, 1989, Ser. No. 299,039

Claims priority, application United Kingdom, Jan. 21, 1988, 8801300

Int. Cl.<sup>5</sup> A61K 31/38; C07D 333/20, 335/02, 337/04

U.S. Cl. 514—431

1. A thioformamide derivative of the formula:



wherein R represents a straight- or branched-chain alkyl radical containing from 1 to 4 carbon atoms, Ar represents a phenyl group unsubstituted or substituted in the 3- and/or 5-position with an electron-withdrawing group selected from a cyano, nitro, trifluoromethyl, carbamoyl, carboxy, C<sub>2</sub>-5-alkanoyl, C<sub>2</sub>-5-alkoxycarbonyl or C<sub>1</sub>-4-alkylsulphonyl group or a fluorine, chlorine or bromine atom, and optionally further substituted on the phenyl group with halogen atom(s), C<sub>1</sub>-4-alkyl or phenyl group(s) or the group Ar may be substituted with halogen atom(s), C<sub>1</sub>-4-alkyl or phenyl group(s) or with substituents which together form a naphthyl ring, Y represents an ethylene or methylene radical or a valency bond, and n represents 0 or 1, or a pharmaceutically acceptable salt thereof.

8. A pharmaceutical composition useful in the treatment of disorders associated with vascular smooth muscle contraction, respiratory smooth muscle contraction and contraction of smooth muscle of gastro-intestinal tract, urinary bladder and uterus which comprises a therapeutically effective amount of a thioformamide derivative of formula (I) as defined in claim 1 or a pharmaceutically acceptable salt thereof in association with a pharmaceutically acceptable carrier or coating.

#### 4,959,386 PESTICIDES

Bruno Frei, Liestal, Switzerland; Hari B. Mereyala, Pune, India; Anthony C. O'Sullivan, Basel, Switzerland; Kazuo Sato, and Toshiaki Yanai, both of Kanagawa, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 18,688, Feb. 25, 1987, abandoned, which is a continuation of Ser. No. 807,580, Dec. 11, 1985, abandoned. This application Sep. 28, 1988, Ser. No. 252,031

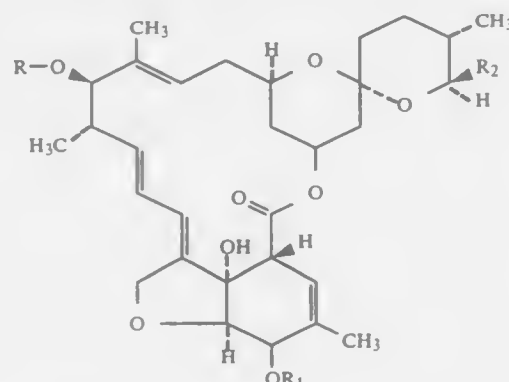
Claims priority, application Switzerland, Dec. 14, 1984, 5940/84; May 30, 1985, 2289/85

Int. Cl.<sup>5</sup> A61K 31/365; C07D 315/00

U.S. Cl. 514—450

7 Claims

1. A 13β-substituted compound of the formula:



wherein:

R is pivaloyl;

R<sub>1</sub> is hydrogen; alkanoyl of 2 to 11 carbon atoms, unsubstituted or substituted with halo; benzoyl, unsubstituted or substituted by halo, alkyl of 1 to 3 carbon atoms, haloalkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms, haloalkoxy of 1 to 3 carbon atoms, cyano, or nitro; or phenylacetyl, unsubstituted or substituted by halo, alkyl of 1 to 3 carbon atoms, haloalkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms, haloalkoxy of 1 to 3 carbon atoms, cyano, or nitro; and

R<sub>2</sub> is methyl, ethyl, isopropyl, or sec-butyl.

#### 4,959,387

#### MYCOPHENOLIC ACID DERIVATIVES IN THE TREATMENT OF RHEUMATOID ARTHRITIS

Peter H. Nelson, Los Altos; Anthony C. Allison; Elsie M. Eugui, both of Belmont, and Joseph M. Muchowski, Sunnyside, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 821,633, Jan. 23, 1986, Pat. No. 4,725,622.

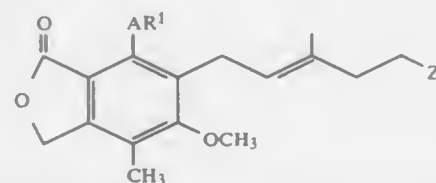
This application Nov. 24, 1987, Ser. No. 125,027

Int. Cl.<sup>5</sup> A61K 31/34

U.S. Cl. 524—469

1 Claim

1. A method of treating rheumatoid arthritis, which method comprises administering to a mammal in need of such a treatment a therapeutically effective amount of a compound of the formula:



or a pharmaceutically acceptable salt thereof, wherein:

A is oxygen or sulfur;

R<sup>1</sup> is selected from the group consisting of H,

#### 4,959,388

#### FUNGICIDAL COMPOSITION WITH SYNERGISTIC ACTIVITY

Thomas Wilde, Berlin, Fed. Rep. of Germany, assignor to Schering Aktiengesellschaft, Fed. Rep. of Germany

Division of Ser. No. 287,902, Dec. 21, 1988, Pat. No. 4,937,261.

This application Mar. 7, 1990, Ser. No. 490,153

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1987, 3744053

Int. Cl.<sup>5</sup> A01N 37/34, 42/10

U.S. Cl. 514—479

4 Claims

1. A fungicidal composition comprising a synergistic effective amount of the mixture of  
(A) propyl 3-(dimethylamino)propylcarbamate or an acid addition salt thereof, and  
(B) tetrachloroisophthalonitrile (chlorothalonil) and a carrier, wherein the ratio of component A to component B is from about 1:0.1 to 3.

#### 4,959,389

#### PHARMACEUTICAL PREPARATION FOR THE TREATMENT OF PSORIATIC ARTHRITIS

Peter P. Speiser, Freudenbergstrasse 101/D2, and Rajendra K. Joshi, Badenerstrasse 795, both of 8044 Zürich, Switzerland

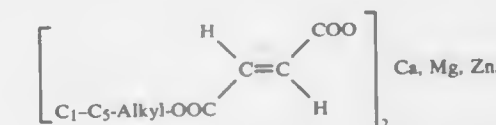
Filed Oct. 19, 1987, Ser. No. 109,780

Int. Cl.<sup>5</sup> A61K 31/315, 31/225

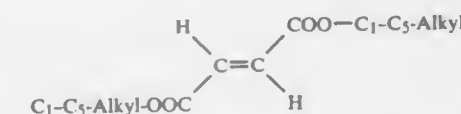
U.S. Cl. 514—494

2 Claims

1. A pharmaceutical composition for the treatment of psoriasis and psoriatic arthritis consisting essentially of a mixture of 10–250 parts by weight of the calcium, 1–50 parts by weight of the magnesium, and 1–50 parts by weight of the zinc salts of fumaric acid monoalkylesters of the general formula



in which C<sub>1</sub>–C<sub>5</sub>-alkyl stands for straight chain and branched-chain alkyl groups having from 1 to 5 carbon atoms, admixed with 250–10 parts by weight of a dialkylfumarate of the formula



in which C<sub>1</sub>–C<sub>5</sub>-alkyl has the meaning indicated above, the total weight of active substances not exceeding 300 mg per dosage form.

#### 4,959,390

#### POLYHYDROXYBENZYLXYPROPANOLAMINES

Ghanshyam Patil, Vernon Hills, Ill.; William L. Matier, Hockessin, Del., and Khuong H. X. Mai, Chatworth, Calif., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 15, 1988, Ser. No. 285,005

Int. Cl.<sup>5</sup> A61K 31/275; C07C 255/50

U.S. Cl. 514—522

12 Claims

1. A compound of the formula



in which

Y is oxygen or sulfur;

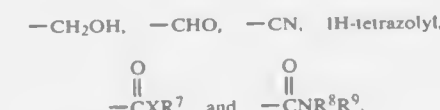
R<sup>2</sup> is alkyl, haloalkyl or —NR<sup>4</sup>R<sup>5</sup>, where R<sup>4</sup> and R<sup>5</sup> are independently H, alkyl, haloalkyl, cycloalkyl, phenyl optionally monosubstituted with halogen, hydroxy, carboxy, chlorocarbonyl, nitro, cyano, phenyl, alkyl, acyl, alkoxy, carbonyl, acylamino, dialkylamino or dialkylaminoethoxycarbonyl, phenyl optionally disubstituted with hydroxy, carboxy, nitro or alkyl, or benzyl optionally substituted with dialkylamino;

n is an integer from 0–6;

R<sup>3</sup> is H alkyl or a pharmaceutically acceptable cation;

Q and R are independently H or —CO<sub>2</sub>R<sup>3</sup>; and

Z is selected from the group consisting of



in which

X is oxygen or sulfur;

R<sup>7</sup> is H, alkyl, alkenyl cycloalkyl, optionally substituted phenyl, optionally substituted benzyl or a pharmaceutically acceptable cation; and

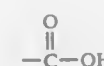
R<sup>8</sup> and R<sup>9</sup> are independently H, alkyl or cycloalkyl, or R<sup>8</sup> and R<sup>9</sup> taken together are —(CH<sub>2</sub>)<sub>4</sub>—, —(CH<sub>2</sub>)<sub>5</sub>— or —(CH<sub>2</sub>)<sub>2</sub>O(CH<sub>2</sub>)<sub>2</sub>—;

with the provisos that:

Z can not be

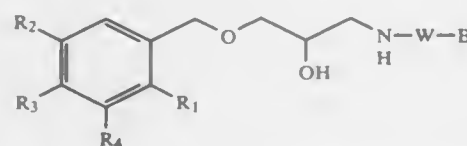


if A is oxygen and Z can not be



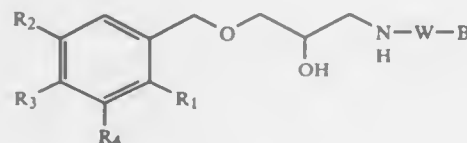
if A is sulfur and R<sup>1</sup> is H

alkyl includes from one to six carbon atoms, cycloalkyl includes cyclopentyl, cyclohexyl or cycloheptyl, optionally substituted phenyl includes a phenyl moiety optionally bearing one to three substituents independently chosen from the group consisting of halogen, hydroxy, carboxy, chlorocarbonyl, aminosulfonyl, NO<sub>2</sub>, CN, alkyl having one to six carbon atoms, alkoxy, carbonyl, acylamino, and dialkylaminoethoxycarbonyl, and optionally substituted benzyl includes a benzyl moiety optionally bearing one to three substituents independently selected from the group consisting of halogen, hydroxy, carboxy, chlorocarbonyl, aminosulfonyl, NO<sub>2</sub>, CN, alkyl having one to six carbon atoms, alkoxy, carbonyl, acylamino, and dialkylaminoethoxycarbonyl.



wherein  $R_1$  may be alkyl of from 1 to about 6 carbon atoms, alkenyl of from 2 to about 6 carbon atoms, alkynyl of from 2 to about 10 carbon atoms, cycloalkyl of from 3 to about 8 carbon atoms, halo, acetamido, amino, nitro, alkylamino of from 1 to about 6 carbon atoms, hydroxy, hydroxyalkyl of from 1 to about 6 carbon atoms, or cyano,  $R_2$ ,  $R_3$  and  $R_4$  are hydrogen or hydroxyl or the combination of either hydrogen or hydroxyl; W represents alkylene of from 1 to about 10 carbon atoms; and B represents hydrogen; or a pharmaceutically acceptable salt thereof.

5. A method of treating cardiac disorders in a patient comprising administering to a patient in need of such treatment a therapeutically effective amount of a compound of the formula



wherein  $R_1$  may be alkyl of from 1 to about 6 carbon atoms, alkenyl of from 2 to about 6 carbon atoms, alkynyl of from 2 to about 10 carbon atoms, cycloalkyl of from 3 to about 8 carbon atoms, halo, acetamido, amino, nitro, alkylamino of from 1 to about 6 carbon atoms, hydroxy, hydroxyalkyl of from 1 to about 6 carbon atoms, or cyano,  $R_2$ ,  $R_3$  and  $R_4$  are hydrogen or hydroxyl or the combination of either hydrogen or hydroxyl; W represents alkylene of from 1 to about 10 carbon atoms; and B represents hydrogen; or a pharmaceutically acceptable salt thereof.

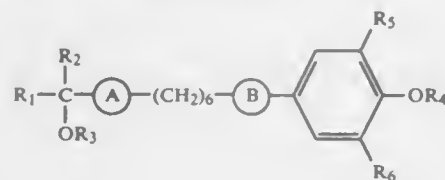
**4,959,391**  
PHENOL DERIVATIVES, PHARMACEUTICAL COMPOSITIONS CONTAINING THESE COMPOUNDS AND PROCESSES FOR THE PREPARATION OF THESE COMPOUNDS AND COMPOSITIONS

Oswald K. Zimmer, Dueren; Werner P. Vollenberg, Stolberg; Gerriet K. H. Loschen, Stolberg; Werner Winter, Aachen; Erwin O. Kieseewetter, Stolberg, and Ulrich G. P. Seipp, Aachen, all of Fed. Rep. of Germany, assignors to Gruenenthal GmbH, Stolberg, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 862,649, May 13, 1986, Pat. No. 4,760,087. This application Jul. 14, 1988, Ser. No. 218,981  
Claims priority, application Fed. Rep. of Germany, May 24, 1985, 3518655

Int. Cl.<sup>5</sup> C07C 57/42, 69/108

U.S. Cl. 514—546

I. A compound corresponding to the formula

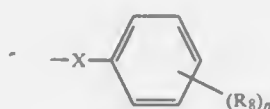


wherein

A and B have the same or different meanings and each represents one of the groups  $\text{—C=C—}$ ,  $\text{cis—CH=CH—}$

or  $\text{trans—CH=CH—}$ , with the proviso that A and B may not both be a  $\text{—C=C—}$  group,

$R_1$  is hydrogen, or a straight chain alkyl radical containing 1 to 6 carbon atoms, or a 5 to 7 membered cycloalkyl group, or a group of the formula  $\text{—(CH}_2\text{)}_m\text{—O—R}_7$ , wherein m is a number 1, 2 or 3 and  $R_7$  represents methyl or ethyl, or a group of the formula



in which X is a bond, a  $\text{—CH}_2\text{—}$  group or a  $\text{—CH}_2\text{O—}$  group,  $R_8$  is a hydrogen, fluorine or a chlorine atom or a methyl, methoxy or trifluoromethyl group and n represents a number 1 or 2,

$R_2$  is hydrogen, methyl or ethyl,

$R_3$  is hydrogen or an acetyl or a propionyl group,

$R_4$  is hydrogen, an acetyl or a propionyl group,

$R_5$  is a hydroxy, acetoxy or propionyloxy group or an alkoxy group  $\text{OR}_9$  wherein  $R_9$  is a straight chain or branched alkyl radical containing 1 to 4 carbon atoms, and

$R_6$  represents hydrogen, a hydroxy, acetoxy or propionyloxy group, an alkyl group  $R_9$  or an alkoxy group or  $\text{OR}_9$  wherein  $R_9$  has the meaning given above.

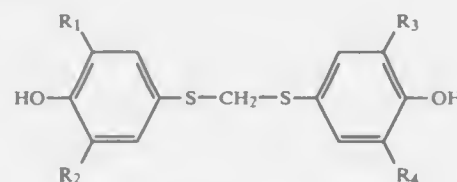
**4,959,392**  
METHOD OF TREATING DIABETES MELLITUS  
Keith M. Robinson, Glendale; Simon J. T. Mao, Loveland, and Richard L. Jackson, Cincinnati, all of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio  
Filed Jul. 24, 1989, Ser. No. 384,571

Int. Cl.<sup>5</sup> A61K 31/10

U.S. Cl. 514—712

3 Claims

1. A method of lowering blood glucose in a patient afflicted with diabetes mellitus comprising administering to said patient an effective blood glucose lowering amount of a compound of the formula



wherein  $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  are each independently a  $\text{C}_1\text{—C}_6$  alkyl group.

**4,959,393**  
SKIN DEPIGMENTAL AGENT  
Masahiro Torihara, Kurashiki; Yoshin Tamai, Shibata; Manzo Shiono, and Kenji Tasaka, both of Okayama, all of Japan, assignors to Kuraray Company, Ltd., Kurashiki, Japan  
Filed Apr. 27, 1989, Ser. No. 343,571

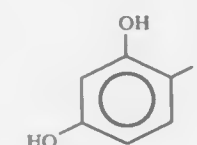
Claims priority, application Japan, May 9, 1988, 63-113286

Int. Cl.<sup>5</sup> A61K 31/045

U.S. Cl. 514—724

6 Claims

1. A skin depigmental composition, comprising a skin depigmenting effective amount of a resorcinol of the formula (I)



wherein R is a linear alkyl group having from 2–12 carbon atoms or a linear alkyl group having from 2–12 carbon atoms in which a hydrogen atom on the linear alkyl group is substituted by a methyl group, and a cosmetic base.

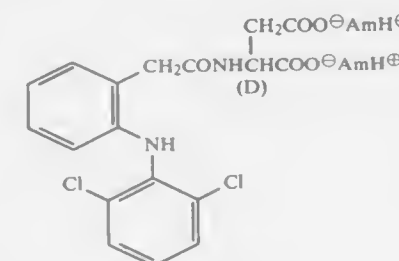
**4,959,394**  
NOVEL GUANIDINIUM ASPARTATES  
Gerhard Baschang, Bettingen, and Alfred Sallman, Bottmingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.  
Continuation of Ser. No. 353,160, May 15, 1989, abandoned, which is a continuation of Ser. No. 70,290, Jul. 6, 1987, abandoned. This application Nov. 17, 1989, Ser. No. 437,329  
Claims priority, application Switzerland, Jul. 11, 1986, 2795/86-1

Int. Cl.<sup>5</sup> A61K 31/205

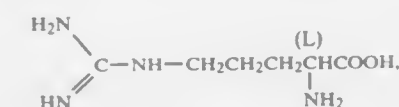
U.S. Cl. 514—555

12 Claims

1. The L-arginine salt of N-(D [2-(2,6-dichlorophenylamino)phenyl]acetyl)aspartic acid, of the formula



in which  $\text{AmH}^+$  represents the cation of L-arginine Am of the formula



3. Pharmaceutical preparations containing a compound according to claim 1 together with pharmaceutically acceptable adjuncts.

**4,959,395**  
BULK POLYMERIZED MOLDED PRODUCTS CONTAINING CYCLOOLEFIN MONOMENTS WITH MICROENCAPSULATED BLOWING AGENTS  
Dennis J. Janda, Parma, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio  
Continuation of Ser. No. 425,610, Oct. 23, 1989, abandoned, which is a division of Ser. No. 304,215, Jan. 31, 1989, abandoned, which is a continuation-in-part of Ser. No. 212,703, Jun. 28, 1988, abandoned. This application Feb. 21, 1990, Ser. No. 483,300

Int. Cl.<sup>5</sup> C08J 9/22

U.S. Cl. 521—54

19 Claims

1. A solid molded article which comprises polymers obtained by bulk ring-opened polymerization of cycloolefin monomers having a norbornene functional group and having dispersed within these polymers expanded microspheres comprised of

a synthetic thermoplastic resin shell having a softening point at a temperature below 180° C. that encapsulates a liquid

blowing agent when unexpanded, said synthetic thermoplastic shell being substantially impermeable to said liquid blowing agent.

**4,959,396**  
COMPOSITION FOR MICROPOROUS SEPARATORS AND METHOD FOR ITS PREPARATION

Lyuben K. Yankov, Stefka K. Filipova, Ivo Y. Zlatanov, and Evgeni B. Budevski, all of Sofia, Bulgaria, assignors to Central Institute Po Chimicheska Promishlenost, Sofia, Bulgaria

Continuation of Ser. No. 131,148, Dec. 10, 1987, abandoned.

This application Jan. 23, 1990, Ser. No. 469,699

Int. Cl.<sup>5</sup> B01D 39/20; C08K 3/36; C08L 23/02; H01M 2/16

U.S. Cl. 521—61

8 Claims  
1. A composition for preparing microporous separators comprising 5 to 60 wt % of a polyolefin; 10 to 60 wt % of a filler consisting of  $\text{SiO}_2$  having a particle size smaller than 20 microns a specific surface greater than 175  $\text{m}^2/\text{g}$  and an oil adsorption greater than 150g/100g; 10 to 75 wt % of a plasticizer and 0.2 to 20 wt % of an ethoxysiloxane.

**4,959,397**  
SOFT AND LOW-DENSITY FOAM MATERIALS FROM MODIFIED COPOLYMERS OF ETHYLENE WITH VINYL ACETATE AND/OR ALKYL ESTERS OF ACRYLIC OR METHACRYLIC ACID

Corrado Brichta, Milan; Annibale Vezzoli, Carugo, and Angelo Borghi, Gerenzano, all of Italy, assignors to Montedipe S.p.A., Milan, Italy

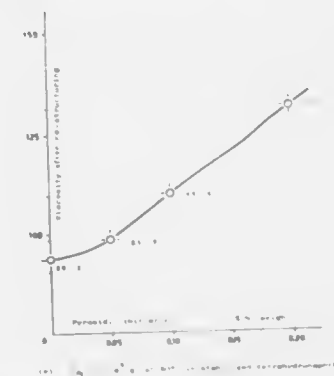
Continuation of Ser. No. 208,861, Jun. 14, 1988, abandoned, which is a continuation of Ser. No. 863,044, May 14, 1986, abandoned. This application Apr. 13, 1989, Ser. No. 338,369

Claims priority, application Italy, May 15, 1985, 20729 A85

Int. Cl.<sup>5</sup> C08J 9/14

U.S. Cl. 521—96

6 Claims



1. Soft and low-density non-crosslinked foam materials from copolymers of ethylene with vinyl acetate and/or alkyl esters of acrylic or methacrylic acid, comprising:

the copolymers are at least partially re-structured, in a selective way, substantially showing the particular fused structures (II) and/or (III), namely oxalic and/or succinic bridges at a temperature between 120° and 200° C. in the presence of from 0.05 to 0.5 by weight of a radical initiator;

the amount of co-monomer, with the copolymers, ranges from 5 to 30% by weight;

the copolymers contain an amount of non-hydrolyzable gel substantially null and anyway lower than 5% by weight;

the MFI index of the foams is not greater than 1.1 g/10' (at 2.16 Kg and 190° C.).



4,959,398  
POWDERY ADHESIVE AND PROCESS FOR  
PREPARATION THEREOF

Kotchiro Oka, Ibaraki, and Ikuro Hagiwara, Ohtsu, both of Japan, assignors to Toray Industries, Inc., Tokyo, Japan  
Filed Feb. 13, 1989, Ser. No. 310,171  
Int. Cl.<sup>5</sup> C08L 63/10

U.S. Cl. 523—400

23 Claims

1. A powdery adhesive comprised of spherical particles comprising 40 to 90 parts by weight of an epoxy resin component and 10 to 60 parts by weight of a rubber component, said spherical particles containing up to about 15 parts by weight of a latent curing agent for the epoxy resin component per 100 parts of the total weight of the epoxy resin component and the rubber component, wherein the average particle size of the particles is from 0.1 to 500  $\mu$ m.

4,959,399  
ACIDIC ADHESION PROMOTERS FOR PVC  
PLASTISOLS

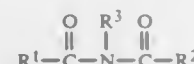
Trac-Chi Huynh-Tran, Burtonsville, Md., assignor to W. R. Grace & Co.-Conn., New York, N.Y.  
Filed May 20, 1988, Ser. No. 196,703  
Int. Cl.<sup>5</sup> C08L 27/06, 63/00; C08K 5/20, 5/3415

U.S. Cl. 523—437

11 Claims

1. Composition comprising:

- (i) poly(vinyl chloride) homopolymer or copolymer, in an amount of from about 5 to 200 parts by weight;
- (ii) plasticizer, in an amount of from about 1 to 400 parts by weight;
- (iii) epoxy resin, in an amount of from about 1 to 400 parts by weight, selected from the group consisting of:
  - (a) bisphenol-A epoxy resin diluted with about 15 wt. % C<sub>12</sub>-C<sub>14</sub> aliphatic glycidyl ether,
  - (b) cycloaliphatic epoxy resins, and
  - (c) epoxidized linseed oil;
- (iv) anhydride, in an amount of from about 0.1 to 200 parts by weight, selected from the group consisting of maleic anhydride, 1,2,4,5 benzenetetracarboxylic dianhydride, succinic anhydride, or polyadipic polyanhydride;
- (v) filler, in an amount of from about 0 to 500 parts by weight; and
- (vi) an inide, in an amount of from about 0.1 to 300 parts by weight, of the structure



wherein R<sup>1</sup> and R<sup>2</sup> are independently aliphatic, cycloaliphatic, or aromatic or may be joined in a ring and R<sup>3</sup> can be —H, —OH, alkyl (1-4 carbons), vinyl or alkali metal.

2. Composition according to claim 1, comprising

- (i) poly(vinyl chloride) homopolymer or copolymer, 15-70 parts;
- (ii) plasticizer, 15-80 parts;
- (iii) epoxy resin, 3-60 parts;
- (iv) anhydride, 0.1-30 parts;
- (v) filler, 30-90 parts; and
- (vi) imide, 0.1-70 parts.

4. Composition according to claim 2, comprising maleic anhydride, about 1.7 weight percent; succinimide, about 5 weight percent; polyadipic polyanhydride, about 0.3 weight percent; a bisphenol-A epoxy resin diluted with 5-20 weight percent of a C<sub>12</sub>-C<sub>14</sub> aliphatic glycidyl ether, about 3 weight percent; diisodecyl phthalate, about 28 weight percent; poly(vinyl chloride) copolymer with 5 weight percent vinyl acetate, about 10 weight percent; poly(vinyl chloride) homopolymer, about 8 weight percent; calcium oxide, about 2.8 weight percent; and calcium carbonate, 40 weight percent.

4,959,400  
RESIN COMPOSITION COMPRISING A POLYHYDRIC  
PHENOLIC HARDENER

Diane Sexton, Lauf, Fed. Rep. of Germany, assignor to The Dow Chemical Company, Midland, Mich.

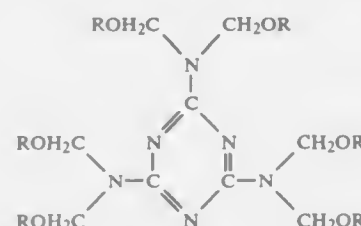
Continuation of Ser. No. 92,029, Sep. 1, 1987, abandoned, which is a division of Ser. No. 892,022, Jul. 30, 1986, Pat. No. 4,713,137. This application Aug. 24, 1989, Ser. No. 398,337  
Claims priority, application United Kingdom, Jul. 31, 1985, 85 19290

Int. Cl.<sup>5</sup> C08K 3/32; C08L 63/00

U.S. Cl. 523—451

18 Claims

1. An epoxy resin composition comprising an epoxy resin possessing more than one 1,2-epoxy group, a polyhydric phenolic hardener, a volatile organic solvent for said epoxy resin and said hardener and an acid having a pKa of 2.5 or less at 25° C. or an ester or anhydride of such acid in an amount of from 0.01 to 2 weight percent based on the total weight of the epoxy resin composition, and said acid, ester or anhydride being selected from the group consisting of a phosphoric acid anhydride, dimethyl sulfate or monomethyl sulfate, alkyl, aryl, or aralkyl sulfonic acids, and alkyl, aryl or aralkyl sulfonates; wherein the hardener is the reaction product of one or more hexa-alkyl ethers of a hexamethylol melamines having the general formula:



wherein each R is individually an alkyl radical having from 1 to 4 carbon atoms with one or more polyhydric phenol, or one or more polyhydric phenols and one or more monohydric phenols; the hexa-alkyl ether of the hexamethylol melamine and phenol being reacted in an amount sufficient to provide more than one reactive phenolic hydroxyl group for each alkoxy group.

4,959,401  
SYNTHETIC ROCK COMPOSITION OF MATTER AND  
METHOD OF PREPARATION

Jay G. Bellasalma, 3620 Calmbrook La., Diamond Bar, Calif. 91765, and Kenneth W. Lundrigan, 16337 Summershade Dr., La Mirada, Calif. 90638

Continuation of Ser. No. 80,962, Aug. 3, 1987, abandoned. This application Nov. 30, 1989, Ser. No. 443,025  
Int. Cl.<sup>5</sup> C08K 3/00

U.S. Cl. 523—466

11 Claims

1. A composition of matter for use in making synthetic rock comprising:

- an organic portion comprising one or more polymers selected from the group consisting of unsaturated polyesters, epoxies, phenolics and acrylics, wherein said polymer(s) comprise about 5-95% by weight of the organic portion;
- an inorganic portion comprising particles formed by fusing a mixture 0.1 to 20 weight percent of a metal, 0.1 to 12 weight percent of oxide pigment, 0 to 90 weight percent of kaolin and a sufficient amount of first and second inorganic binders to provide fusing of said mixture when it is heated to a temperature of between about 1800° F. and 3000° F., wherein said first inorganic binder is feldspar and said second inorganic binder is silicon dioxide; and
- wherein said inorganic portion is dispersed within the organic portion and is about 5 to 90 percent by weight of the organic portion.

4,959,402  
HIGH CLARITY RADIATION STABLE POLYMERIC  
COMPOSITION AND ARTICLES THEREFROM

Joel L. Williams, Cary, and George R. Titus, Raleigh, both of N.C., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Jun. 8, 1989, Ser. No. 362,999

The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C08K 5/34, 5/15

U.S. Cl. 524—99

7 Claims

1. A composition comprising a polyolefin having a crystalline content of about 20 to 90 percent and a weight distribution wherein the ratio of the weight average molecular weight to the number average molecular weight is no greater than 6, a mobilizing amount of a liquid mobilizer compatible with said polyolefin having a density of about 0.6 to 1.9 grams per cubic centimeter, a radiation stabilizing amount of a hindered piperidine stabilizer and a clarifying amount of a dibenzylidene sorbitol alkyl thioether clarifier.

4,959,403  
THERMOPLASTIC MOLDING COMPOSITIONS WITH  
COLD IMPACT STRENGTH

Martin Bartmann, Recklinghausen; Roland Feinaner, Marl; Uwe Hartkopf, Haltern, and Michael Schlobohm, Marl, all of Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Oct. 24, 1988, Ser. No. 261,147  
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 3805108

Int. Cl.<sup>5</sup> C08K 5/43

U.S. Cl. 524—169

5 Claims

1. A thermoplastic molding composition having good cold impact strength properties, consisting essentially of:

- (I) a polyamide 1212 having a relative viscosity, as determined by a m-cresol solution (100 cm<sup>3</sup>) containing 0.5 g PA 1212 at 25° C., in the range of from 1.5 to 3.0, and
- (II) 2 to 25% by weight, based on the polyamide, of a plasticizer.

4,959,404  
THERMOPLASTIC RESIN COMPOSITION

Toshio Nakane, Fuji; Yukihiko Kageyama, Fujinomiya, and Kenji Hijikata, Mishima, all of Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

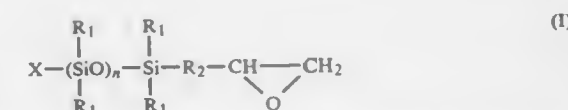
Filed Nov. 3, 1988, Ser. No. 266,800  
Claims priority, application Japan, Dec. 4, 1987, 62-307198

Int. Cl.<sup>5</sup> C08K 5/54

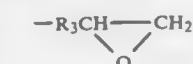
U.S. Cl. 524—267

4 Claims

1. A thermoplastic resin composition comprised of a homogeneous resin dispersion which comprises (A) a thermoplastic resin component having a solubility parameter of at least 9.5 cal<sup>1</sup>cm<sup>-3/2</sup> and being at least one thermoplastic resin selected from the group consisting of polyester, polyamide, polyesteramide, polyurethane, polyvinyl chloride, polycarbonate, polyacetal, polyvinylidene chloride, polyacrylonitrile, polymethacrylonitrile, polymethyl acrylate, polyvinyl alcohol, cellulose and their derivatives, (B) a modifier component having a solubility parameter of not greater than 8.5 cal<sup>1</sup>cm<sup>-3/2</sup> and being at least one polymer selected from the group consisting of homopolymers or copolymers of polytetrafluoroethylene, polyvinylidene chloride, polychlorotrifluoroethylene, fluororubber, polyalkylsiloxane, polyphenylsiloxane, butyl rubber, polyisobutylene, polyethylene, ethylene/propylene rubber and polypropylene, and (C) a dispersibility improver, wherein said dispersibility improver is comprised of a silicon-containing polyacetal copolymer having (i) a siloxane segment derived from between 0.01 to 30 wt. % of a terminal-reactive silicone oil of the following general formula I:



wherein R<sub>1</sub> represents an alkyl or phenyl group, R<sub>2</sub> represents a divalent organic group, X represents a group selected from the group consisting of —NH<sub>2</sub>, —OH,



—R<sub>4</sub>OH, —R<sub>5</sub>COOH, —R<sub>6</sub>COOR<sub>7</sub>, —R<sub>8</sub> and —OR<sub>9</sub>, where R<sub>3</sub> represents a divalent organic group, R<sub>4</sub> to R<sub>6</sub> each represent an alkylene group having 1 to 10 carbon atoms, R<sub>7</sub> to R<sub>9</sub> each represent an alkyl group having 1 to 10 carbon atoms and n represents a number between 5 to 10, and

(ii) between 99.99 to 70 wt. % of polyacetal segment covalently bonded to said siloxane segment wherein the degree of polymerization of the siloxane segment is between 5 to 1,000, and the degree of polymerization of the polyacetal segment is between 5 to 2,000 and wherein the weight ratio of thermoplastic resin component to the modifier component is 99.9 to 85/0.1 to 15, and the amount of the dispersibility improver is between 0.01 to 5 parts by weight per 100 parts by weight in total of the thermoplastic resin component and the modifier component.

4,959,405  
ACID MODIFIED ADHESIVE COMPOSITION

Paul C. Briggs, Charlestown, and Donald E. Gosiowski, Peabody, both of Mass., assignors to Illinois Tool Works, Inc. Continuation of Ser. No. 135,012, Dec. 18, 1987, abandoned, which is a division of Ser. No. 870,710, Jun. 4, 1986, Pat. No. 4,714,730. This application Jun. 2, 1989, Ser. No. 361,749

Int. Cl.<sup>5</sup> C08K 5/09

9 Claims

U.S. Cl. 524—321

1. An adhesive composition comprising:
  - (a) an acrylate or methacrylate ester monomer;
  - (b) a polymerization catalyst;
  - (c) a mixture of
    - (A) one or more of the members of the group consisting of:
      - (1) chlorinated polyethylene polymer resin and sulfonyl chloride;
      - (2) chlorosulfonated polyethylene polymer resin; and
      - (3) a polymer-in-monomer solution and (B) a graft copolymer resin having a backbone polymer with a glass transition temperature substantially below ambient temperature and a grafted polymer resin having a glass transition temperature substantially above ambient temperature; and
    - (d) an effective amount of strong organic acid wherein the acid has a dissociation constant (K<sub>a</sub> or K<sub>1d</sub>) within the range of from about 1×10<sup>-2</sup> to about 10×10<sup>-1</sup> or wherein an 0.2 N aqueous solution of the acid has a pH in the range of from about 1.2 to 2.0 at 2.5° C.

4,959,406

## LASER-WRITABLE MATERIAL

Eckard Foltin, Sinzig-Bodendorf; Hans-Werner Depcik, Dueseldorf; Karl Huff, Dormagen; Alfred Pischtschan, Kuerten; Mehmet C. Yesildag, Leverkusen, and Reiner Erkeleaz, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 6, 1989, Ser. No. 306,677

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1988, 3805056

Int. Cl.<sup>5</sup> C08K 3/04, 3/22, 7/14

U.S. Cl. 524-413

3 Claims

1. A composition which comprises
  - (i) a plastic material,
  - (ii) 0.001 to 2.2% by weight of TiO<sub>2</sub>,
  - (iii) no more than 0.1% by weight of carbon black having an average particle diameter of from 30 to 120 nm, and
  - (iv) 0.01 to 20% by weight of a tracking resistance reducing additive which is a halogen-containing compound, an antimony compound, a hydroxide or glass fibers,
 wherein said plastic material comprises polyethylene, polypropylene, polyisobutylene, polystyrene, polyvinyl chloride, polyvinylidene chloride, polyvinyl acetates, polyacrylonitrile, polyacrylates, polymethacrylates, polybutadiene, copolybutadiene, ABS plastics, ethylene-vinyl acetate copolymers, high-molecular-weight esters of aromatic polycarboxylic acids with polyfunctional alcohols, polyamides, polyimides, polyamideimides, liquid crystal polymers, aromatic polycarbonates, polyurethanes, polyethers, polyphenylene sulphides, polyacetates, products of the condensation of formaldehyde with phenols, products of the condensation of formaldehyde with urea, thiourea and melamine aminoplastics, epoxy resins, polyphenols, alkylid resins, maleate resins or mixtures thereof.

4,959,407

## RTV SILICONES HAVING BIS(UREIDO)SILANE CHAIN EXTENDERS AND AMINOXY SILOXANE CROSSLINKERS

Jonathan D. Rich, Rexford; David C. Gross; Timothy B. Burwell, both of Schenectady, and Jeffrey H. Wengrovius, Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 1, 1989, Ser. No. 359,818

Int. Cl.<sup>5</sup> C08K 3/26

U.S. Cl. 524-425

21 Claims

1. Solventless, moisture curable, room temperature vulcanizable organopolysiloxane compositions, comprising by weight,
  - (A) 100 parts of a silanol-terminated polydiorganosiloxane,
  - (B) 2.5 to 25 parts, of a bis(ureido)diorganosilicon coupler selected from the class consisting of diorganosilanes and ureido-chain-stopped polydiorganosiloxanes having an average of from 1 to 10 condensed diorganosiloxy units,
  - (C) 0.25 to 10 parts of an aminoxyorganosiloxane crosslinker selected from the class consisting of a cyclic siloxane, linear siloxane, and mixture thereof, having from 2 to about 100 silicon atoms substituted with C<sub>(1-13)</sub> monovalent organic radicals and from 3 to about 10-OY radicals attached to silicon by silicon-oxygen linkages, where there are less than 3-OY radicals per silicon atom, Y is a monovalent amine radical selected from the class consisting of N(R)<sub>2</sub> and a heterocyclic amine, and R is selected from the same or different C<sub>(1-13)</sub> monovalent organic radicals, and
  - (D) up to 400 parts of a non-siliceous filler comprising a mixture of ground calcium carbonate and 10% to 100% by weight thereof of precipitated calcium carbonate.

4,959,408

## POLY(METHYL METHACRYLATE) BLENDED WITH A SOLID POLY(BUTYL ACRYLATE-CO-ALLYL ACRYLATE) PLASTICIZER

Frank O. Grant, 2600 Windy Hill Dr. Pepper Pike, Ohio, 44124 43560

Filed Nov. 9, 1988, Ser. No. 269,432

Int. Cl.<sup>5</sup> C08L 33/12, 33/08

U.S. Cl. 524-523

16 Claims

1. A composition of matter comprising a miscible physical blend of homopoly(methyl methacrylate) and a linear rubber copolymer consisting essentially of polymerized moieties of butyl acrylate and allyl acrylate, said copolymer being soluble in methyl ethyl ketone, said miscibility being evidenced in that the physical blend has no glass transition temperature equal to or greater than said homopoly(methyl methacrylate) and said blend showing a decrease in the impact strength of said homopoly(methyl methacrylate).

4,959,409

## AMINO-FUNCTIONAL COMPOUNDS AS BUILDER/DISPERSANTS IN DETERGENT COMPOSITIONS

Stephen W. Heinzman, Cincinnati; Michael J. Eis, West Chester, and Molly P. Armstrong, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 14, 1988, Ser. No. 144,823

Int. Cl.<sup>5</sup> C08F 8/00

U.S. Cl. 525-61

5 Claims

1. A random copolymer especially adapted for use as a dispersant in laundry detergent compositions, said random copolymer having a molecular weight in the range from about 635 to about 50,000 and comprising from about 0.10 to about 0.95 mole fraction of repeat units of the formula



wherein M is sodium, A is selected from  $-\text{OC}(\text{O})\text{C}(\text{L})\text{HCH}_2\text{O}(\text{O})\text{C}-$ ,  $-\text{OC}(\text{O})\text{CH}_2\text{C}(\text{L})\text{H}(\text{O})\text{C}-$  and mixtures thereof and L is selected from the group consisting of aspartate, glutamate, glycinate, ethanolamino,  $\beta$ -alanate, taurine, aminoethylsulfate, alanate, sarcosinate, N-methylethanolamino, iminodiacetate, 6-aminohexanoate, N-methylaspartate and diethanolamino; wherein said random copolymer is produced by a process comprising

- (i) reacting a polyvinyl alcohol with maleic anhydride to produce a butenedioate half-ester of said polyvinyl alcohol; and
- (ii) reacting said butenedioate half-ester with an amine reactant selected from the group consisting of aspartic acid, glutamic acid, glycine,  $\beta$ -alanine, ethanolamino, taurine, aminoethylsulfate, alanine, sarcosine, N-methylethanolamine, iminodiacetic acid, 6-aminohexanoic acid, N-methylaspartic acid and diethanolamine; provided that in step (ii), the alkalinity is controlled by means of a carbonate-buffered reaction medium.

4,959,410

## POLYMER MIXTURES HAVING HIGH TENSILE STRENGTH AND GOOD TEAR PROPAGATION RESISTANCE

Herbert Eichenauer; Edgar Leitz, both of Dormagen; Karl Heinz Ott, Leverkusen; Christian Lindner, Cologne; Lothar Meler, Spockhoevel, and Otto Billinger, Rhein, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

Filed Mar. 6, 1989, Ser. No. 318,972

Claims priority, application Fed. Rep. of Germany, Mar. 17, 1988, 3808843

Int. Cl.<sup>5</sup> C08L 69/00, 55/02, 51/04, 35/00

U.S. Cl. 525-67

4 Claims

1. Polymer mixtures having high tensile strength and good tear propagation resistance comprising
  - (A) from 10 to 95 parts by weight of a graft polymer of from 40 to 85% by weight of a particulate, highly cross-linked diene- or alkylacrylate-rubber and from 60 to 15% by weight of graft polymerised alkylacrylates, alkylmethacrylates, acrylonitrile, methacrylonitrile, styrene, styrene-substituted in the nucleus,  $\alpha$ -methylstyrene, maleic acid anhydride, N-substituted maleimide, vinyl acetate and mixtures thereof,
  - (B) from 0 to 75 parts by weight of a thermoplastic polymer of alkylacrylates, alkylmethacrylates, acrylonitrile, methacrylonitrile, styrene,  $\alpha$ -methylstyrene or mixtures thereof, and
  - (C) from 5 to 60 parts by weight of a copolymer having a sequential structure corresponding to the idealized formula (I)

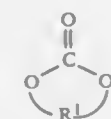


(I)

wherein

n=1 to 20 and

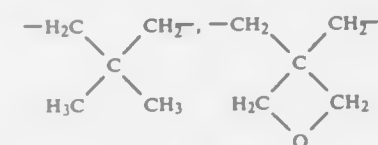
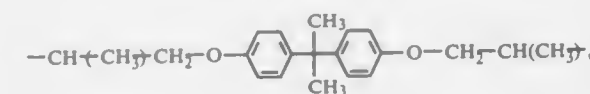
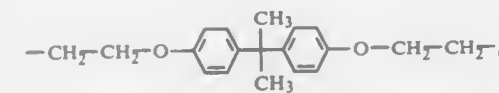
A=a polymer of a cyclic carbonate corresponding to formula (II) ("Block A")



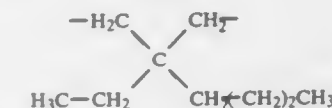
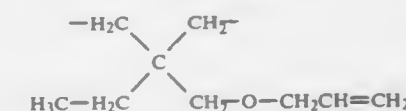
(II)

wherein

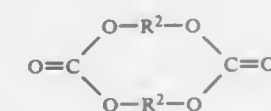
R<sup>1</sup>= $-(\text{CH}_2)_n-$  wherein n=3-12,  $-\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)-$ ,  $-\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2-$ ,  $-\text{CH}_2\text{CH}_2\text{OCH}_2\text{C}(\text{H}_2\text{OCH}_2\text{CH}_2)-$ ,  $-\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{C}(\text{CH}_3)_2\text{C}-\text{H}_2-$ ,



-continued



or corresponding to formula (III)

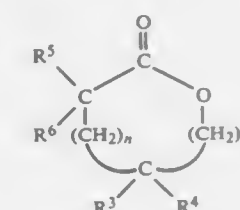


(III)

wherein

R<sup>2</sup>= $-(\text{CH}_2)_n$  wherein n=4-12,  $-\text{CH}_2\text{CH}_2\text{OCH}_2-$ ,  $-\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{OCH}_2\text{CH}_2-$

B=a polymer of a cyclic ester corresponding to formula (IV) ("Block B")



(IV)

wherein

R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>=H, C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-alkenyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy or C<sub>1</sub>-C<sub>6</sub>-alkenoxy-C<sub>1</sub>-C<sub>6</sub>-alkyl, in particular H, CH<sub>3</sub> or C<sub>2</sub>H<sub>5</sub> and m and n denote, independently of one another, 0, 1, 2, 3, 4, 5 or 6, and

X=the middle member containing both the cyclic carbonate corresponding to formula (II) or (III) or both and the cyclic ester corresponding to formula (IV) in polymerised form, the concentration of the structural units of compounds (II) or (III) or both continuously decreasing in the direction of  $-\text{B}-$  and the concentration of the structural units of compounds (IV) continuously decreasing in the direction of  $-\text{A}-$  ("tapered structure") and the proportion of blocks A amounting to from 1 to 45% by weight, based on the total quantity of blocks (A+B), the proportion of blocks B amounting from 99 to 55% by weight, based on the total quantity of blocks (A+B) and the proportion of middle members X amounting to from 5 to 95% by weight, based on the total quantity of A+B+X.

4,959,411

## PREPARATION OF COPOLYMER FROM CARBOXY-FUNCTIONALIZED POLYCARBONATE AND NUCLEOPHILIC POLYMER

Ronald J. Gambale, Clifton Park; Susan J. Hathaway, Albany; Kathryn L. Longley, Saratoga Springs, and Timothy J. Ullman, Niskayuna, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 109,873, Oct. 19, 1987, Pat. No. 4,853,458. This application Dec. 27, 1988, Ser. No. 289,860

Int. Cl.<sup>5</sup> C08G 64/42

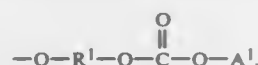
U.S. Cl. 525-67

10 Claims

1. A method for forming a copolymer which comprises effecting reaction between an amine-terminated polyamide or



epoxy-functionalized olefin polymer and a carboxy-functionalized polycarbonate containing end groups of the formula



wherein each R<sup>1</sup> is independently a divalent aliphatic, alicyclic or aromatic radical and A<sup>1</sup> is a carboxylic acid-substituted phenyl group or a functional derivative thereof.

4,959,412

## HIGH SHEAR TACKIFIER RESINS

William J. Arter, Goshen; Wayne K. Chu, Tarrytown, both of N.Y.; Erwin R. Ruckel, Wilton, Conn., and Roland P. F. Scharrer, Pelham, N.Y., assignors to Arizona Chemical Company, Panama City, Fla.

Filed Feb. 27, 1989, Ser. No. 316,237

Int. Cl.<sup>5</sup> C08L 25/04, 25/06, 53/02

U.S. Cl. 525—98

11 Claims

1. A method for the preparation of an adhesive with an improved high temperature shear strength comprising the steps of:

- blending from about 10 weight percent to about 25 weight percent of a styrene homopolymer with from about 90 weight percent to about 75 weight percent of a tackifier resin and forming a resin blend; and
- combining an effective amount of the resin blend with a block copolymer thermoplastic elastomer with at least one styrene domain and forming an adhesive.

4,959,413

## CROSSLINKABLE POLYMERS

Jeffrey D. Umpleby, Princeton, N.J., assignor to BP Chemicals Limited, London, England

PCT No. PCT/GB88/00448, § 371 Date Jan. 27, 1989, § 102(e) Date Jan. 27, 1989

PCT Filed Jun. 8, 1988, Ser. No. 312,590

Claims priority, application United Kingdom, Jan. 13, 1987, 8713867

Int. Cl.<sup>5</sup> C08F 8/00

U.S. Cl. 525—100

10 Claims

1. A crosslinkable polymer comprising an organic polymer, and pendant substituents having the general formula:



wherein the nitrogen atom N is connected to a carbon atom in the organic polymer,  
Q is a hydrogen atom or represents an additional connection to a carbon atom present in the organic polymer,  
X is a divalent hydrocarbyl group having one to six carbon atoms,  
m is zero or one and  
R is an alkyl group containing one to twenty carbon atoms.

4,959,414

## COMPOSITION COMPRISING CHLOROSULFONATED ETHYLENE COPOLYMER, EPOXY RESIN AND DIMALEIMIDE

Tatsunshi Nakagawa; Yoshiaki Ishida; Junichiro Kanesaka, and Yosuke Kanesake, all of Yamaguchi, Japan, assignors to Toosoh Corporation, Yamaguchi, Japan

Filed Mar. 18, 1988, Ser. No. 169,720

Claims priority, application Japan, Aug. 11, 1987, 62-199047

Int. Cl.<sup>5</sup> C08L 23/34

U.S. Cl. 525—11

7 Claims

1. A chlorosulfonated ethylene- $\alpha$ -olefin copolymer composition for rubber belts comprising

- (a) 100 parts by weight of a chlorosulfonated ethylene- $\alpha$ -

olefin copolymer containing from 25 to 32% by weight chlorine and from 0.3 to 2.5% by weight sulfur,

- (b) from 1 to 4 parts by weight of a metal oxide or a metal hydroxide,

- (c) from 3 to 15 parts by weight of an epoxy compound selected from bisphenol A epoxy resins

and phenol-novolac epoxy resins,

- (d) from 0.5 to 5 parts by weight of a thiuram, and

- (e) from 0.5 to 5 parts by weight of a dimaleimide.

4,959,415

## THERMOPLASTIC MOLDING MATERIALS BASED ON POLYPHENYLENE ETHERS, NYLONS AND STYRENE COPOLYMERS

Christof Tanblitz, Wachenheim; Erhard Seiler, Ludwigshafen; Juergen Hambrecht, Muenster-Hiltrup; Konrad Mitulla, Ludwigshafen, and Klaus Boehlke, Hessheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 2,237, Jan. 12, 1987, abandoned. This

application Apr. 11, 1988, Ser. No. 179,991

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1986, 3601581; Jun. 7, 1986, 3619224

Int. Cl.<sup>5</sup> C08L 71/04

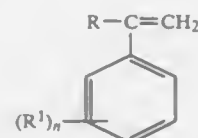
U.S. Cl. 525—133

5 Claims

1. A thermoplastic molding material comprising:

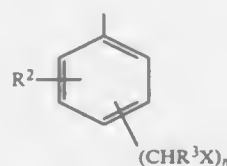
- (A) not less than 5% by weight of polyphenylene ether,
- (B) not less than 5% by weight of a nylon, and
- (C) not less than 0.1% by weight of a rubber-free copolymer composed of

- (C<sub>1</sub>) from 80 to 99.95% by weight of a styrene of the formula



wherein R and R<sup>1</sup> are alkyl of 1 to 8 carbon atoms, hydrogen, halogen, or mixtures thereof, and n is 0, 1, 2 or 3,

- (C<sub>3</sub>) from 0.05 to 20% by weight of a halobenzyl-containing monomer copolymerizable with C<sub>1</sub>, and possessing the structural unit



where X is halogen, R<sup>2</sup> and R<sup>3</sup> are each alkyl of 1 to 8 carbon atoms or hydrogen, and n is 1, 2 or 3, and

- (C<sub>5</sub>) from 0 to 10% by weight of acrylonitrile, methacrylonitrile or a mixture thereof, and

- (D) from 0 to 35% by weight of an impact-modifying rubber.

4,959,416

## POLYMERIC BLEND COMPOSITION

Yun C. Sun, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 45,748, May 4, 1987, abandoned, which is a continuation-in-part of Ser. No. 809,360, Dec. 16, 1985, abandoned. This application May 15, 1989, Ser. No. 352,622

Int. Cl.<sup>5</sup> C08L 27/08, 35/02

U.S. Cl. 525—222

10 Claims

1. A polymeric blend composition comprising a visually homogeneous blend of

- (a) from about 45 to about 98 weight percent, based on total blend composition weight, of a vinylidene chloride interpolymers having polymerized therein vinylidene chloride in an amount of from about 40 to about 98 percent by weight of interpolymers and at least one monoethylenically unsaturated monomer copolymerizable therewith in an amount of from about 60 to about 2 percent by weight of interpolymers;

- (b) from about 2 to about 70 weight percent, based on total blend composition weight, of a copolymer which is miscible with the vinylidene chloride interpolymers, said copolymer comprising a monovinylidene aromatic monomer and methyl methacrylate, said copolymer having polymerized therein a monovinylidene aromatic monomer in an amount of from about 20 to about 80 percent by weight of copolymer and a methyl methacrylate in an amount of 80 to about 20 percent by weight of copolymer, wherein the monovinylidene aromatic monomer and methyl methacrylate are each present in an amount effective for the copolymer and the vinylidene chloride interpolymers to be substantially miscible; and

- (c) from 0 to about 50 weight percent, based on total blend composition weight of a polymer formed from one or more monovinylidene aromatic monomers.

4,959,417

## COMPOSITE ACRYLIC RESIN PARTICLES

Tadafumi Miyazono, Osaka, and Shinichi Ishikura, Kyoto, both of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Apr. 22, 1988, Ser. No. 189,133

Claims priority, application Japan, Apr. 22, 1987, 62-99440

Int. Cl.<sup>5</sup> C08F 30/04, 275/00

U.S. Cl. 525—274

6 Claims

1. Composite acrylic resin particles each comprising a particulate metal-containing crosslinked acrylic polymer in which the metal constitutes part of the crosslinked acrylic polymer structure, to which metal-containing crosslinked acrylic structure, a number of substantially linear acrylic polymer chains are chemically bonded, prepared by a combination of steps of effecting an emulsion polymerization of a monomer mixture of:

- (A) at least one crosslinking monomer having in its molecule two or more radically polymerizable mono- or 1,1-di-substituted ethylenic unsaturation bonds, or a combination of at least two monomers each having a mutually reactive functional group and one or more radically polymerizable mono- or 1,1-di-substituted ethylenic unsaturation bonds,
- (B) at least on mono-functional polymerizable monomer other than aromatic compounds and metal-containing monomer hereinunder defined,

- (C) at least one metal-containing monomer, and

- (D) at least one monomer having in its molecule one or more radically polymerizable mono- or 1,1-di-substituted ethylenic unsaturation bonds and one or more radically polymerizable 1,2-, 1,1,2-tri- or 1,1,2,2-tetra-substituted ethylenic unsaturation bonds, to obtain an emulsion of metal-containing crosslinked polymer particles on which radically polymerizable 1,2-di-, 1,1,2-tri- or 1,1,2,2-tetra-substituted ethylenic unsaturation bonds still remain therein, and effecting a graft-polymerization of said polymer particles with a polymerizable aromatic compound together

with other optional mono-functional polymerizable monomers.

4,959,418

## POLYMERS IN PARTICLE FORM WITH IMPROVED PROPERTIES, FOR THE PREPARATION OF THERMOPLASTIC MOLDING MATERIALS

Christian Lindner, Cologne; Karl-Heinz Ott, Leverkusen; Dieter Wittmann, Krefeld, and Hans-Eberhard Braese, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 18, 1986, Ser. No. 897,348

Claims priority, application Fed. Rep. of Germany, Aug. 29, 1985, 3530818

Int. Cl.<sup>5</sup> C08F 265/04, 265/06, 265/10

U.S. Cl. 525—282

19 Claims

1. A particulate polymer consisting essentially of 90 to 99% by weight of a particulate core having a resin surface selected from a homo- or copolymer of resin forming monomers or a graft polymer comprising

- (a) a diene, olefin, alkyl acrylate rubber or mixtures thereof core and
- (b) a homo- or copolymer of resin-forming monomers shell and 10 to 1% by weight of a rubber-like homo- or copolymer, with a glass transition temperature of less than 30° C., graft polymerized onto the resin surface.

4,959,419

## POLYMERIC EMULSIFIERS BASED ON AMINOTELECHELIC OLIGOMERS I

Adolf Schmidt, Cologne; Udo W. Hendricks, Odenthal; Bruno Bömer, Bergisch Gladbach; Karl H. Ott, Leverkusen; Herbert Eichenauer, Dormagen, and Alfred Pischtschan, Kürten-Eichhof, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Dec. 16, 1987, Ser. No. 133,517

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1986, 3643792

Int. Cl.<sup>5</sup> C08F 8/46, 8/42

U.S. Cl. 525—301

3 Claims

1. Polycarboxylic acid salts corresponding to the following general formula



in which

X represents the residue of a hydrophobic, linear or branched vinyl oligomer having an average molecular weight  $\bar{M}_n$  of from 200 to 5000,  
Y is the 1,2-vinylene, 1,2-ethylene, 1,3-propylene, 1,2-phenylene, 1,2-cyclohexene-4-ylene or 1,2-cyclohexylene group,  
n is a number of from 1.4 to 3.0,  
M represents an alkali metal, an ammonium, C<sub>1</sub>–C<sub>4</sub> alkylammonium or C<sub>2</sub>–C<sub>3</sub> hydroxyalkylammonium group.

4,959,420

## CHLORINATED EPDM WITH SUPERIOR STABILITY

Stephen C. Davis, Bright's Grove; Janet B. Fulton, Sarnia, and Peter P. M. Hoang, Clearwater, all of Canada, assignors to Polysar Limited, Sarnia, Canada

Filed Nov. 1, 1989, Ser. No. 430,010

Int. Cl.<sup>5</sup> C08F 8/22

U.S. Cl. 525—331.7

11 Claims

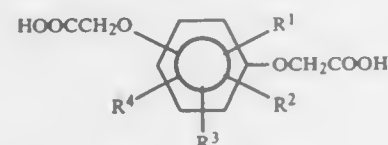
1. A chlorinated ethylene- $\alpha$ -olefin-nonconjugated diolefin terpolymer characterized by superior stability on storage or exposure to elevated temperatures having a chlorine content of from about 0.5 to 14 percent by weight based on the weight of said chlorinated terpolymer wherein the base ethylene- $\alpha$ -olefin-nonconjugated diolefin terpolymer comprises:

- (i) about 40 to 80 mol percent ethylene,
- (ii) about 20 to 60 mol percent of a C<sub>3</sub> to C<sub>8</sub>  $\alpha$ -olefin, and
- (iii) about 0.5 to 10 mol percent of a C<sub>7</sub> to C<sub>16</sub> nonconjugated

diolefin characterized in that it is an acyclic nonconjugated diolefin wherein one olefinic bond is monosubstituted and terminal and the other olefinic bond is trisubstituted.

**4,959,421**  
**COPOLYMERIZED POLYESTER HAVING EXCELLENT TRANSPARENCY AND GAS BARRIER PROPERTIES**  
 Takuji Hirahara, Kawasaki, Japan; Masahiro Nukui, Delden, Netherlands, and Katsuji Tanaka, Machida, Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan  
 Filed Mar. 24, 1989, Ser. No. 328,517  
 Claims priority, application Japan, Mar. 26, 1988, 63-72199; Mar. 29, 1988, 63-73422; Mar. 29, 1988, 63-73423; Sep. 20, 1988, 63-235181

U.S. Cl. 525-437 Int. Cl. C08G 63/66 2 Claims  
 1. A polyester composition comprising:  
 (i) a copolymerized polyester produced by copolymerizing a dicarboxylic acid component (A) comprising  
 (a) 10 to 90 mol % of isophthalic acid or an ester forming derivative thereof,  
 (b) 10 to 60 mol % of a phenylenedi(oxyacetic acid) represented by the formula [I]:



(wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> each represent a hydrogen atom, an alkyl group having 1 to 6 carbon atoms, an alkoxy group having 1 to 6 carbon atoms, a phenyl group, a chlorine atom, a bromine atom or a fluorine atom), or an ester forming derivative thereof; and  
 (c) 0 to 45 mol % of a naphthalenedicarboxylic acid or an ester forming derivative thereof, and a diol component (B); and  
 (ii) a polyester containing polyethylene terephthalate as the main constituent.

**4,959,422**  
**POLY EPOXY BRANCHED POLYCARBONATE AND METHOD FOR PREPARATION**  
 Ronald J. Gambale, Croton-on-Hudson, and Timothy J. Ullman, Voorheesville, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.  
 Filed Sep. 15, 1989, Ser. No. 407,978  
 Int. Cl. C08G 64/42

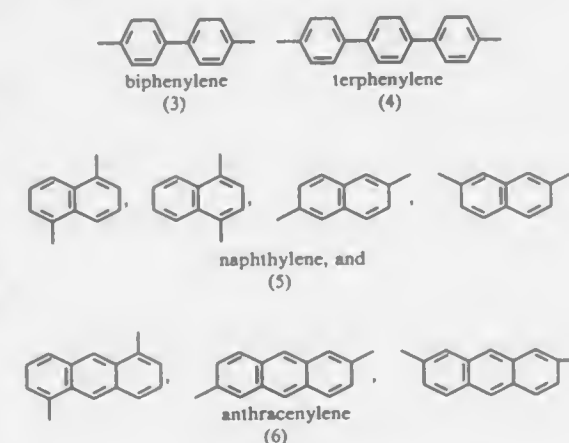
U.S. Cl. 525-463 20 Claims  
 1. A method for preparing a branched polycarbonate which comprises effecting reaction between at least one linear carboxylic acid-terminated polycarbonate and an amount effective for branching of at least one polyepoxy compound.

**4,959,423**  
**NUCLEATING AGENTS FOR POLY(ARYL ETHER KETONES)**

James E. Harris, Piscataway, and Paul A. Winslow, Millington, both of N.J., assignors to Amoco Corporation, Chicago, Ill.  
 Continuation-in-part of Ser. No. 40,300, Apr. 20, 1987, abandoned. This application May 9, 1988, Ser. No. 191,325  
 Int. Cl. C08L 61/00, 71/00, 79/08

U.S. Cl. 525-471 8 Claims  
 1. A poly(aryl ether ketone) composition having increased crystallization rates comprising:  
 (a) at least 98 percent by weight of a poly(aryl ether ketone) having a melting point no more than about 390° C., and further comprising ether groups joined to keto groups through 1,4-phenylene groups, with the proviso that

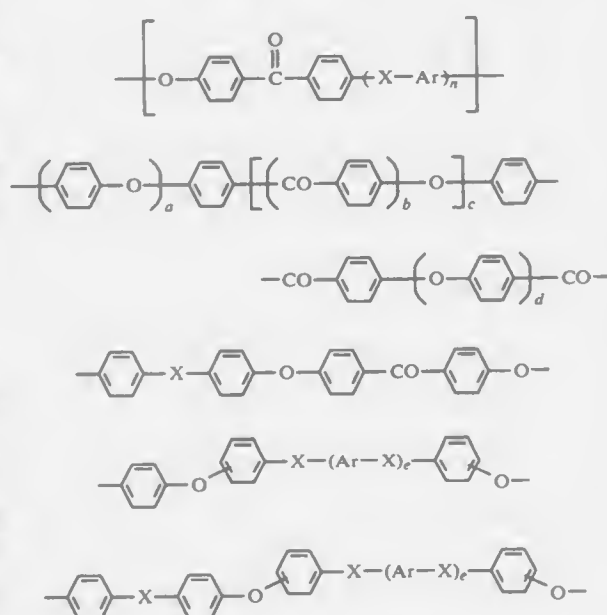
where two keto groups are attached to the same phenylene ring, up to 50 percent of the keto groups can be in position meta with respect to each other; and  
 (b) 2 percent or less by weight of a second poly(aryl ether ketone) having a melting point higher than about 400° C., and further comprising (i) either groups joined to keto groups through 1,4-phenylene groups and (ii) at least one member selected from the group consisting of:



with the proviso that where two keto groups are attached to the same phenylene ring, up to 50 percent of the keto groups can be in position meta with respect to each other.

**4,959,424**  
**AMINO-TERMINATED POLY(ARYL ETHER KETONES)**  
 Markus Matzner, Edison, N.J., and Donald M. Papuga, Ridgefield, Conn., assignors to Amoco Corporation, Chicago, Ill.  
 Filed Jul. 25, 1986, Ser. No. 889,203  
 Int. Cl. C08G 65/00, 10/00, 16/00

U.S. Cl. 525-471 10 Claims  
 1. A process for the preparation of a diamino-terminated poly(aryl ether ketone) which consists of repeating units of one or more of the following formulae:



wherein Ar is independently a divalent aromatic radical se-

lected from phenylene, biphenylene or naphthylene, X is independently 0,

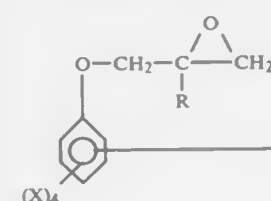


or a direct bond and n is an integer of from 0 to 3, b, c, d, and e are 0 to 1 and a is an integer of 1 to 4 which comprises reacting a corresponding dihalo-terminated oligomer with ammonia or a primary amine, in suspension or in solution at a temperature in a range from about 200° to about 350° C. in the presence of a catalyst which is a copper salt.

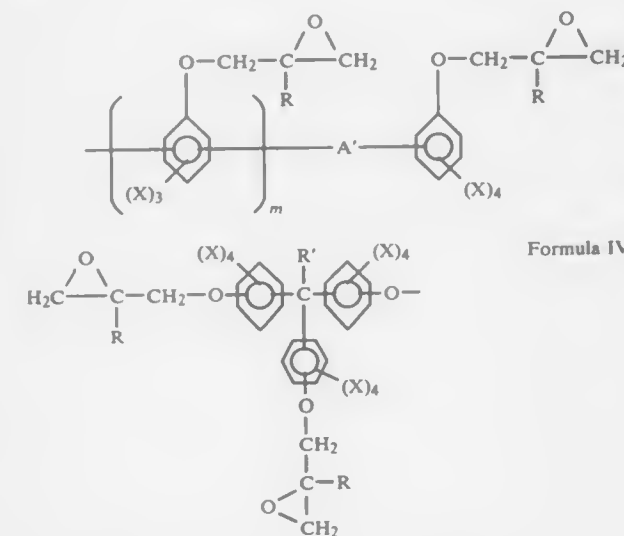
**4,959,425**  
**LAMINATING VARNISH COMPOSITION CONTAINING A DIFUNCTIONAL EPOXY RESIN, A POLYFUNCTIONAL EPOXY RESIN, A DIFUNCTIONAL PHENOL AND A POLYFUNCTIONAL PHENOL AND A SOLVENT**

Louis L. Walker, Clute, and Paul A. Larson, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.  
 Division of Ser. No. 121,329, Nov. 16, 1987, Pat. No. 4,868,059.  
 This application Jun. 27, 1989, Ser. No. 372,581  
 Int. Cl. C08G 59/08, 59/32; C08L 63/04

U.S. Cl. 525-482 6 Claims  
 1. A laminating varnish composition comprising a substantially unreacted mixture of  
 (A) an epoxy-containing composition consisting essentially of  
 (1) from about 5 to about 95 percent by weight of at least one epoxy resin having an average of not more than 2 vicinal epoxide groups per molecules; and  
 (2) from about 95 to about 5 percent by weight of at least one epoxy resin having an average of more than 2 vicinal epoxide groups per molecule, at least one such epoxy resin being represented by the following formulae III; or IV:



Formula III



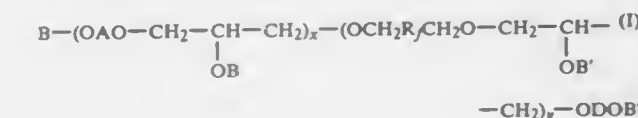
Formula IV

wherein each A' is independently a divalent hydrocarbyl group having from 1 to about 4 carbon atoms; each R is independently hydrogen or an alkyl group having from 1 to about 3 carbon atoms; each R' is independently hydrogen or a hydrocarbyl group having from 1 to about 5 carbon atoms; each X is independently hydrogen, an alkyl group having from 1 to about 5 carbon atoms or a halogen; m has a value from about 1 to about 4; and m' has a value from zero to about 1;

(B) a phenolic hydroxyl-containing composition consisting essentially of  
 (1) from about 10 to about 70 equivalent percent about at least one phenolic hydroxyl-containing compound having an average of not more than 2 phenolic hydroxyl groups per molecules; and  
 (2) from about 90 to about 30 equivalent percent of at least one phenolic hydroxyl-containing compound having an average of more than 2 phenolic hydroxyl groups per molecule; and wherein components (A) and (B) are present in quantities which provide a ratio of phenolic hydroxyl groups for each epoxy group of from about 0.75:1 to about 1.2:1;  
 (C) a catalytic quantity of at least one catalyst for effecting the reaction between components (A) and (B); and  
 (D) one or more solvents in an amount up to about 75 percent by weight of the total composition.

**4,959,426**  
**EPOXY RESINS PREPARED BY CO-CURING FLUORINATED EPOXY PREPOLYMERS AND NON-FLUORINATED EPOXY PREPOLYMERS**  
 Alberto Re, Milan, and Marco De Giorgi, Varese, both of Italy, assignors to Ansimont S.r.l., Milan, Italy  
 Continuation-in-part of Ser. No. 130,937, Dec. 10, 1987, abandoned. This application Nov. 3, 1988, Ser. No. 267,733  
 Claims priority, application Italy, Dec. 16, 1986, 22696 A/86  
 Int. Cl. C08L 63/02, 63/04, 63/06

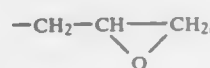
U.S. Cl. 525-527 3 Claims  
 1. A cross-linked epoxy fluorinated resin containing from 1% to 30% by weight of fluorine, prepared by co-curing, by means of known cross-linking agents suitable for epoxy resins, a mixture of:  
 (a) an epoxy prepolymer containing fluoro-alkylene or perfluoropolyether blocks of the formula:



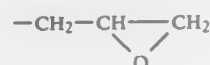
where:  
 x is an integer from 0 to 20; and



y is an integer from 0 to 20;  
B and B', either like or different from each other, are H or



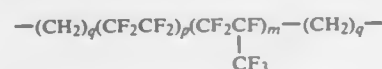
at least one of them being



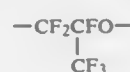
A is a radical of a fluorinated diol containing one or more aromatic rings;

D=---CH<sub>2</sub>R<sub>f</sub>CH<sub>2</sub>--- and may be also A when y is different from 0;

R<sub>f</sub> is either a fluoroalkylene radical ---CH<sub>2</sub>CF<sub>2</sub>CF<sub>2</sub>--- or ---CH<sub>2</sub>CF<sub>2</sub>--- where n is an integer from 2 to 8 and q is 0 or 1,



where n=2-8, q=0 or 1, p=1-8 and m=1-8 or a perfluoropolyether radical containing sequences of fluoroalkylene units selected from the and consisting of:



wherein the units having index x and y can be in random distribution in the chain; and of:

(b) a non-fluorinated epoxy prepolymer having at least two epoxy groups per molecule obtained from epichlorohydrin and from a diol containing one or more aromatic rings.

4,959,427

#### CATALYST COMPONENT FOR POLYMERIZATION OF OLEFINS

Hiroaki Furukashi, Tadashi Yamamoto, Masafumi Imai, and Hiroshi Ueno, all of Saitama, Japan, assignors to Toa Nenryo Kogyo, K.K., Tokyo, Japan

Division of Ser. No. 761,240, Jul. 31, 1985, Pat. No. 4,613,579.

This application May 12, 1986, Ser. No. 861,814

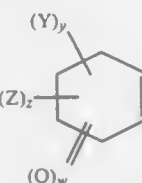
Claims priority, application Japan, Jul. 31, 1984, 59-159118

Int. Cl.<sup>3</sup> C08F 4/654, 10/00

U.S. Cl. 526-142

2 Claims

1. A process for the homopolymerization of an olefin or the copolymerization of an olefin with another olefin, said process comprising polymerizing the olefin(s) in the presence of a catalyst system comprising (A) a titanium-containing supported catalyst component comprising the product obtained by contacting (1) a reaction product of (a) a dihydrocarbyl magnesium compound, mixtures thereof or a complex with an organic compound of aluminum, boron, beryllium, or zinc, and (b) a chlorine-containing alcohol with (2) a di-, tri- or tetra-valent titanium compound, and (B) an organo metallic compound of Groups I through III.



in which

- (c) each Y is independently alkyl containing from 1 to about 4 carbon atoms;
- (d) Z is hydroxyl, 2-oxoethyl, alkoxy carbonyl containing from 2 to about 5 carbon atoms, or R<sub>3</sub>C(O)OR<sub>4</sub> in which R<sub>3</sub> is alkyl containing from 1 to about 4 carbon atoms and R<sub>4</sub> is alkanediyl containing from 2 to about 4 carbon atoms or alkylidene containing from 1 to about 5 carbon atoms;
- (e) y is an integer in the range of from 0 to about 3;

4,959,428

#### EMULSION POLYMERIZATION PROCESS

Tadashi Abe, Masahiro Aoki, and Takeo Tsukamoto, all of Mie, Japan, assignors to Mitsubishi Yuka Badische Company, Ltd., Yokkaichi, Japan

Filed Aug. 17, 1988, Ser. No. 233,127

Claims priority, application Japan, Aug. 17, 1987, 62-203187

Int. Cl.<sup>3</sup> C08F 2/22; 526 201, 304, 315, 316

U.S. Cl. 526-201

9 Claims

1. An emulsion polymerization process comprising: (A) employing as a dispersant a water soluble copolymer obtained by adding an alkali to a carbonyl group-containing copolymer, which comprises (a) 0.5 to 27 by weight of a carbonyl group-containing monomer unit having at least one aldehyde or keto group and a polymerizable double bond per molecule; (b) 2 to 28.5% by weight of a monoolefinically unsaturated carboxylic acid unit having 3 to 5 carbon atoms; (c) 71 to 97% by weight of a monomer unit selected from the group consisting of an alkyl acrylate an alkyl moiety of which has 1 to 8 carbon atoms, an alkyl methacrylate an alkyl moiety of which has 1 to 8 carbon atoms, a vinyl aromatic compound, a vinyl halide, acrylonitrile, methacrylonitrile and a saturated carboxylic acid vinyl ester; and (d) 0 to 10% by weight of a monomer unit other than those as defined in (a) to (c), with the total amount of the monomer units as defined in (a) to (d) being 100% by weight to thereby water-solubilize the same and (B) emulsion-polymerizing, including copolymerizing, unsaturated monomer(s) having polymerizable double bond(s).

4,959,429

#### CYCLOHEXENIC ADDITIVES FOR PRODUCING POLYCARBONATE POLYMERS OF HIGH REFRACTIVE INDEX AND LOW YELLOWNESS

Michael S. Misura, Barberton, and Edward J. Sare, Clinton, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 832,555, Feb. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 801,166, Nov. 22, 1985, abandoned. This application May 19, 1988, Ser. No. 196,861

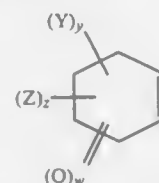
The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> C08F 4/36, 12/30, 18/24

U.S. Cl. 526-230.5

38 Claims

1. A polymerizable, homogeneous composition comprising: (a) bisphenol bis(allylic carbonate)-functional material comprising (i) bisphenol bis(allylic carbonate)-functional monomer, (ii) prepolymer of said monomer, or (iii) a mixture thereof; and (b) a yellowness reducing amount of cyclohexenic material which is a cyclohexenic compound or a mixture of such cyclohexenic compounds; wherein said cyclohexenic material comprises at least one cyclohexenic compound represented by the formula:



in which

- (c) each Y is independently alkyl containing from 1 to about 4 carbon atoms;
- (d) Z is hydroxyl, 2-oxoethyl, alkoxy carbonyl containing from 2 to about 5 carbon atoms, or R<sub>3</sub>C(O)OR<sub>4</sub> in which R<sub>3</sub> is alkyl containing from 1 to about 4 carbon atoms and R<sub>4</sub> is alkanediyl containing from 2 to about 4 carbon atoms or alkylidene containing from 1 to about 5 carbon atoms;
- (e) y is an integer in the range of from 0 to about 3;

- (f) z is 0 or 1;  
(g) w is 0 or 1; and  
(h) the sum of z and w is 0 or 1.

4,959,430

#### POLYTHIOPHENES, PROCESS FOR THEIR PREPARATION AND THEIR USE

Friedrich Jonas, Aachen; Gerhard Heywang, Bergisch Gladbach; Werner Schmidtberg, Leverkusen; Jürgen Heinze, and Michael Dietrich, both of Freiburg, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

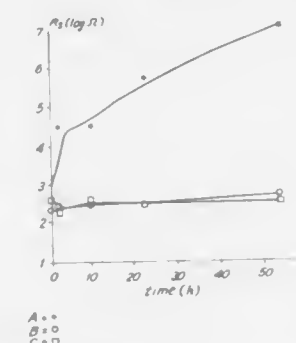
Filed Apr. 13, 1989, Ser. No. 337,498

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813589; Dec. 23, 1988, 3843412

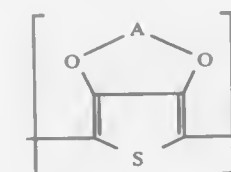
Int. Cl.<sup>3</sup> C08F 28/06

U.S. Cl. 526-257

4 Claims



1. A polythiophene containing structural units of the formula



in which

A is an C<sub>1</sub>-C<sub>4</sub>-alkylene radical or a substituted C<sub>1</sub>-C<sub>4</sub>-alkylene radical.

4,959,431

#### OPTICAL MATERIAL

Nobuhiro Watanabe, Matsudo, and Tetsuo Sakagami, Tokyo, both of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Japan

Filed Nov. 14, 1988, Ser. No. 270,802

Claims priority, application Japan, Dec. 8, 1987, 62-308516; Dec. 8, 1987, 62-308517

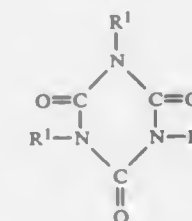
Int. Cl.<sup>3</sup> C08F 26/06

U.S. Cl. 526-261

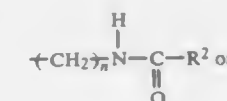
7 Claims

1. An optical material comprising a copolymer obtained by polymerizing a monomer composition composed of at least 30 parts by weight of Component A, which comprises a trifunctional monomer represented by the following formula [A], and at most 70 parts by weight of a monomer copolymerizable with Component A;

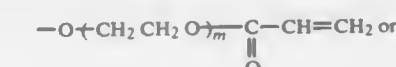
Formula [A]



wherein R<sup>1</sup> means



in which n is an integer of 2-8 and R<sup>2</sup> is a radically-polymerizable functional group represented by



m being an integer of 0-2.

4,959,432

#### ACID VISCOSIFIER COMPOSITIONS

You-Ling Fan, East Brunswick; George L. Brode, Bridgewater, and James P. Stanley, Bound Brook, all of N.J., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Continuation of Ser. No. 864,204, May 19, 1986, abandoned.

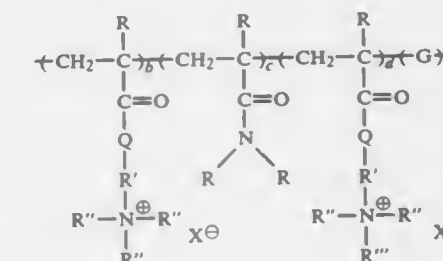
This application Jul. 18, 1988, Ser. No. 220,784

Int. Cl.<sup>3</sup> C08F 220/34, 220/60

U.S. Cl. 526-287

7 Claims

1. A cationic polymer of the formula:



wherein:

- R=H or CH<sub>3</sub>;
- R<sup>1</sup>=a linear or branched alkylene radical having from 2 to 4 carbon atoms;
- R<sup>2</sup>=H, CH<sub>3</sub> or CH<sub>2</sub>CH<sub>3</sub>;
- R<sup>3</sup>=an alkyl group, linear or branched, having from 8 to about 18 carbon atoms;
- Q=---NR--- or ---O---;

G=a residual unit derived from a polyunsaturated monomer;  
 $X^{\ominus}$ =a halogen ion (F, Cl, Br, I) or an alkyl sulfate ion;  
 b=from about 30 to about 50 mole percent;  
 c=from about 50 to about 70 mole percent;  
 d=from 0.1 to about 2 mole percent; and  
 e=from 0 to 0.5 mole percent.

**4,959,433**  
**PARTIALLY POLYMERIZED BIS(ALLYLIC CARBONATE) MONOMER HAVING HIGH ALLYLIC UTILIZATION**

Stephanie J. Oates, Wadsworth, and Edward J. Sare, Clinton, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 840,264, Mar. 17, 1986, abandoned.  
 This application Mar. 12, 1987, Ser. No. 24,878  
 Int. Cl.<sup>5</sup> C08F 18/24

- U.S. Cl. 526—314** **14 Claims**  
 1. A polymerizable, liquid, substantially gel-free, partially polymerized monomer composition wherein  
 (a) the monomer which has been partially polymerized is bis(allylic carbonate) monomer of at least one 4,4'-(alkylidene)bis[phenol], bis(allylic carbonate) monomer of at least one 4,4'-(phenylenebis(alkylidene))-bis[phenol], or a mixture thereof, and  
 (b) the allylic utilization of said composition is greater than 50 percent.

**4,959,434**  
**MODIFIED IMPACT-RESISTANT VINYLAROMATIC COPOLYMERS**

Gianfranco Biglione, Mantova, and Savino Matarrese, Verona, both of Italy, assignors to Montedison S.p.A., Milan, Italy  
 Continuation of Ser. No. 747,223, Jun. 21, 1985, abandoned.  
 This application Dec. 28, 1989, Ser. No. 455,762  
 Claims priority, application Italy, Jun. 22, 1984, 21560 A/84  
 Int. Cl.<sup>5</sup> C08F 220/44

- U.S. Cl. 526—342** **2 Claims**  
 1. An impact-resistant styrene copolymer containing from 2 to 8% by weight of an ethylenically unsaturated nitrile and from 8 to 30% by weight of aliphatic styrene and having a gel content higher than 23%, a cracking resistance, in an oil/oleic acid mixture in a 50/50 ratio by weight and under a load of 10 MPa higher than 100 minutes, a melt index 200° C./5 kg) lower than 1.5 g/10 minutes and obtained by polymerization carried out in the absence of lubricating oils.

**4,959,435**  
**ORIENTED OPTICALLY TRANSPARENT CRYSTALLINE SYNDIOTACTIC VINYLAROMATIC POLYMER**

Jerry T. Seltz, Charles A. Berglund, and Andrew J. Pasztor, Jr., all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich. and The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 152,126, Feb. 4, 1988, Pat. No. 4,824,629.  
 This application Apr. 24, 1989, Ser. No. 341,870  
 Int. Cl.<sup>5</sup> C08F 12/08, 12/06

- U.S. Cl. 526—347.2** **5 Claims**  
 1. An oriented, optically transparent, crystalline, syndiotactic, vinylaromatic polymer.

**4,959,436**  
**NARROW MWD ALPHA-OLEFIN COPOLYMERS**  
 Charles Cozewith, Westfield; Shiaw Ju, Edison, and Gary W. Verstrate, Matawan, all of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.  
 Continuation of Ser. No. 745,873, Jun. 17, 1985, Pat. No. 4,792,595, which is a division of Ser. No. 504,582, Jun. 15, 1983, Pat. No. 4,540,753. This application Jun. 27, 1988, Ser. No. 212,279

The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.  
 Int. Cl.<sup>5</sup> C08F 10/00

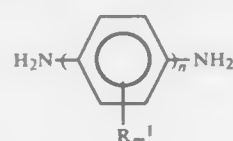
- U.S. Cl. 526—348** **84 Claims**  
 1. Copolymer of ethylene and at least one other alpha-olefin monomer, said copolymer having an average ethylene composition and comprising intramolecularly heterogeneous copolymer chains wherein at least two portions of an individual intramolecularly heterogeneous chain, each portion comprising at least 5 weight percent of said chain, differ in composition from one another by at least 5 weight percent ethylene, wherein said copolymer has an intermolecular compositional dispersity such that 95 weight percent of said copolymer chains have a composition 15 weight percent or less different from said average ethylene composition, and wherein said copolymer has a weight average molecular weight of from about 2,000 to about 12,000,000, and a MWD characterized by at least one of a ratio of  $\bar{M}_w/\bar{M}_n$  of less than 2 and a ratio of  $\bar{M}_z/\bar{M}_w$  of less than 1.8.

**4,959,437**  
**PROCESSES FOR PRODUCING A LOW THERMALLY EXPANSIVE AND HIGHLY ADHESIVE SILICON-CONTAINING POLYIMIDE AND A PRECURSOR THEREOF**

Kouichi Kunimune, Ichiharashi; Yoshiya Kutsuzawa, Yokohamashi, and Shiro Konotsune, Yokosukashi, all of Japan, assignors to Chisso Corporation, Osaka, Japan  
 Filed Jan. 1, 1988, Ser. No. 200,894

Claims priority, application Japan, Jun. 29, 1987, 62-162018  
 Int. Cl.<sup>5</sup> C08G 77/26, 73/10; B05D 3/02; B32B 27/28

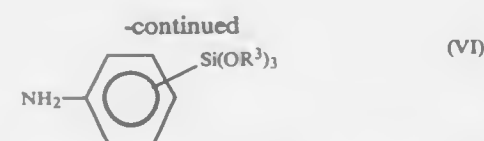
- U.S. Cl. 528—26** **7 Claims**  
 1. A process for producing a silicon-containing polyamic acid having an inherent viscosity of 0.05 to 5 dl/g as measured in a solvent of N-methyl-2-pyrrolidone in a concentration of 0.5 g/dl at 30°±0.01° C., which process comprises reacting  
 (1) anhydrides consisting of  $-A^1$  mols of pyromellitic acid dianhydride (hereinafter abbreviated to PMDA) and  $-A^2$  mols of 3,3',4,4'-biphenyltetracarboxylic acid dianhydride (hereinafter abbreviated to BPDA) with  
 (2) B mols of a diamine having the formula



- and with  
 (3) C mols of an aminosilicon compound selected from the group



and



- wherein  $R^3$  represents a methyl group or an ethyl group and  
 -wherein in (2) and (3)  
 $R^1$  represents a methyl, ethyl, methoxy or ethoxy group or a halogen atom,  
 $R^2$  represents an alkyl group of 1-6 carbon atoms a phenyl group or a phenyl group substituted by an alkyl group of 7-12 carbon atoms,  
 X represents a hydrolyzable alkoxy group, an acetoxy group or a halogen atom,  
 m represents 0, 1 or 2;  
 n represents 1 or 2; and k represents 1, 2 or 3,  
 the amounts of said reactants being present in quantities to satisfy the expressions:

$$0.1 \leq \frac{A^2}{A^1 + A^2} \leq 0.95$$

and

$$0.05 \leq \frac{C}{B + C}$$

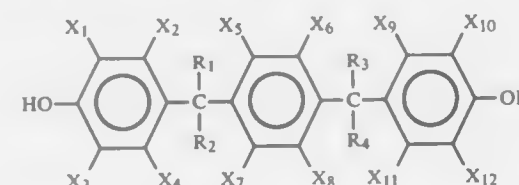
said silicon-containing polyamic acid having the property that when a solution of said acid in N-methyl-2-pyrrolidone is coated onto a polyester film by means of a coater, followed by drying the resulting film in a dryer at 100° C. for one hour to remove most of the solvent to thereby form a film thereon, stripping off this film from said polyester film, fixing the stripped off film at its periphery by means of two iron plates and baking it at 200° C. for one hour and successively at 350° C. for one hour, then a polyimide film having about 40  $\mu\text{m}$  thick and an average thermal expansion coefficient at 30° C. to 450° C. of 0.8 to  $1.8 \times 10^{-5}$  deg<sup>-1</sup> is obtained.

**4,959,438**  
**EPOXY RESIN COMPOSITION AND PREPREG FOR COMPOSITE MATERIALS USING THE SAME FROM BI AND TRI-EPOXIDES, TRIARYLBISPHENOLS AND DIAMINODIPHENYLSULFONES**

Hisashi Tada; Akira Agata, both of Aichi; Masahiro Saruta, Hiroshima, and Takashi Murata, Aichi, all of Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan  
 Filed Jan. 27, 1989, Ser. No. 302,199

Claims priority, application Japan, Jan. 29, 1988, 63-18779  
 Int. Cl.<sup>5</sup> C08G 59/56, 59/62

- U.S. Cl. 528—98** **22 Claims**  
 1. An epoxy resin composition which comprises the following elements:  
 (A) a bifunctional epoxy resin;  
 (B) a trifunctional epoxy resin;  
 (C) a phenolic compound represented by the following general formula:



wherein  $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}$ , formula:

$R_1, R_2, R_3$  and  $R_4$ , which may be the same or different, each represents a hydrogen atom or a methyl group; and (D) 4,4'-diaminodiphenyl sulfone or 3,3'-diaminodiphenyl sulfone, wherein the molar ratio of epoxy groups in element (A) to those in element (B) is in the range of from 1/4.0 to 0.1, element (C) is used in an amount that satisfies the condition:

$$1/0.9 \leq (A+B)/C \leq 1/0.1$$

and element (D) is used in an amount that satisfies the condition:

$$1/1.3 \leq (A+B-C)/D \leq 1/0.8$$

wherein A represents the number of epoxy groups by moles in element (A), B represents the number of epoxy groups by moles in element (B), C represents the number of phenolic hydroxyl groups by moles in element (C), and D represents the number of NH groups by moles in element (D).

**4,959,439**  
**METHOD OF MAKING PIEZOELECTRIC POLYMER USING POLYTETRAMETHYLENE OXIDE DI-P-AMINOBENZOATE**

Katsumi Tanino, and Morihito Nakada, both of Toyama, Japan, assignors to Toyokako Kabushiki Kaisha, Namerikawa, Japan  
 Division of Ser. No. 208,063, Jun. 17, 1988, Pat. No. 4,921,928.

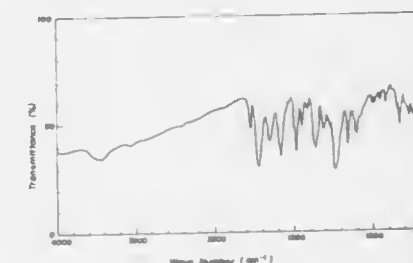
This application Feb. 27, 1990, Ser. No. 485,456  
 Claims priority, application Japan, Sep. 7, 1987, 62-223722  
 Int. Cl.<sup>5</sup> C08G 59/50, 59/52

- U.S. Cl. 528—111** **5 Claims**  
 1. A method for making a piezoelectric polymer material which comprises mixing suitable amounts of (1) an epoxy resin having at least two epoxy groups (2) a compound having at least two amino groups, at least two benzene rings, at least two carbonyl groups and at least 52 methylene groups and having a molecular weight of not less than 1200, and (3) a crosslinking agent made of an imidazole derivative and a pyridine derivative, subjecting the mixture to thermal curing by crosslinkage to form micro crystals therein, applying the resulting cured product with an electric field to cause dipolar orientation in the product, and freezing the oriented dipoles formed in the product.

**4,959,440**  
**POLYIMIDE FOR HIGH-TEMPERATURE ADHESIVE**  
 Sboji Tamai, Yokohama; Saburo Kawashima, Yokosuka; Yoshiho Sonobe, Yokohama; Masahiro Ohta, Yokohama; Hideaki Oikawa, Yokohama, and Akihiro Yamaguchi, Kamakura, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

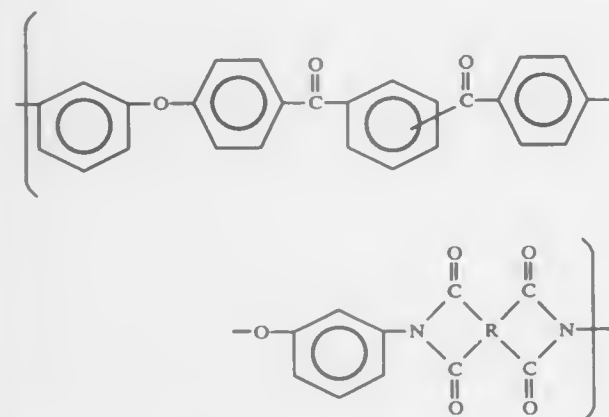
Filed Jan. 23, 1987, Ser. No. 6,513  
 Int. Cl.<sup>5</sup> C08G 8/02, 14/00

**U.S. Cl. 528—125** **9 Claims**



1. Polyimide consisting essentially of recurring units of the formula:





where the positions of two carbonyl radicals in a benzene ring are meta or para, and R is a tetravalent radical selected from the group consisting of an aliphatic radical having not less than two carbons, cycloaliphatic radical, monoaromatic radical, condensed polyaromatic radical, and non-condensed polyaromatic radical wherein aromatic radicals are mutually connected with a bond or a crosslinking function.

**4,959,441**  
**ALKENYLPHOSPHONIC AND -PHOSPHINIC ACID ESTERS, PROCESS FOR THEIR PREPARATION, HYDROGELS PRODUCED USING THEM, AND THEIR USE**

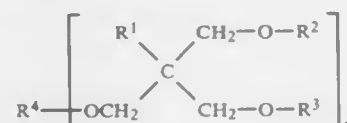
Friedrich Engelhardt; Ulrich Riegel, both of Frankfurt; Joachim Gersdorf, Wiesbaden, and Hans-Jerg Kleiner, Kronberg, all of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany  
Filed May 8, 1989, Ser. No. 348,395

Claims priority, application Fed. Rep. of Germany, May 21, 1988, 3817425

Int. Cl.<sup>3</sup> C07F 9/02

U.S. Cl. 558—161

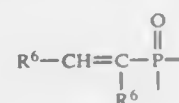
1. Compounds of the formula (I)



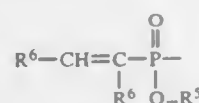
in which

n denotes 1 or 2

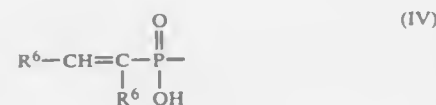
R<sup>1</sup> denotes alkyl having 1 to 4 carbon atoms, CH<sub>2</sub>OH or CH<sub>2</sub>OR<sup>7</sup> in which R<sup>7</sup> is as defined for R<sup>2</sup> or, when n is 1, R<sup>2</sup> is together with R<sup>4</sup>, moiety of the formula (II)



in which R<sup>6</sup>, independently of one another, denote hydrogen or alkyl having 1 to 4 carbon atoms, R<sup>2</sup> denotes the formula (III)



in which m denotes 0 or 1 and R<sup>5</sup> denotes alkyl having 1 to 4 carbon atoms, where, if a compound of the formula I contains more than one of formula III, each R<sup>5</sup> is independent of one another, R<sup>3</sup> denotes hydrogen or a moiety of formula (III), or R<sup>2</sup> and R<sup>3</sup> together form a moiety of formula (II), where n is 1, R<sup>4</sup> denotes hydrogen, a moiety of formula (III) or, when R<sup>1</sup> represents alkyl having 1 to 4 carbon atoms and R<sup>2</sup> and R<sup>3</sup> together are a moiety of the formula (II), R<sup>4</sup> denotes a moiety of the general formula (IV)



and, when n is 2, R<sup>4</sup> denotes a moiety of the formula (II).

**4,959,442**  
**PHOSPHAZENE ARTICLE AND PROCESS FOR PRODUCING THE SAME**

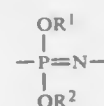
Kazumi Ohkawa, Kashiwara; Toshitsugu Matsuki, Matsuyama, and Noritsugu Saiki, Matsuyama, all of Japan, assignors to Teijin Limited, Osaka, Japan

Continuation of Ser. No. 40,485, Apr. 20, 1987, abandoned. This application Oct. 12, 1989, Ser. No. 421,305  
Int. Cl.<sup>3</sup> C08G 79/02

U.S. Cl. 528—168

12 Claims

1. A shaped polyphosphazene article comprising a polyphosphazene polymer having at least one type of repeating units of the formula



wherein R<sup>1</sup> and R<sup>2</sup> in the first and second side chains —OR<sup>1</sup> and —OR<sup>2</sup> respectively represent, independently from each other, a member selected from aliphatic, cycloaliphatic and aromatic radicals; whereon on at least a portion of the surface of the article, the first and second side chains —OR<sup>1</sup> and —OR<sup>2</sup> in the polyphosphazene polymer located in the above-mentioned portion are converted, to an extent of at least 5 molar% thereof, to at least one type of third side chains of the formula —OR<sup>3</sup> in which R<sup>3</sup> represents a member selected from aliphatic, cycloaliphatic and aromatic radicals and which are different from the first and second side chains —OR<sup>1</sup> and —OR<sup>2</sup>; and wherein only the surface portion of the shaped article is modified.

(II)

**4,959,443**  
**THERMOSETTING RESIN COMPOSITION FROM BIS MALEIMIDE AND AROMATIC AMINE RESIN**

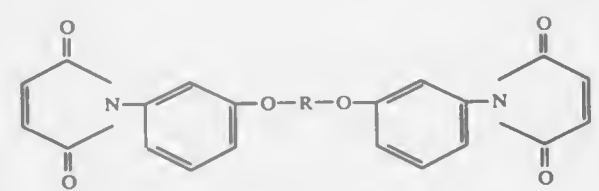
Norimasa Yamaya; Masahiro Ohta, and Akihiro Yamaguchi, all of Kanagawa, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed May 15, 1989, Ser. No. 351,471  
Claims priority, application Japan, May 17, 1988, 63-118363  
Int. Cl.<sup>3</sup> C08L 33/24

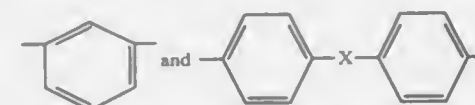
U.S. Cl. 528—170

21 Claims

1. A thermosetting resin composition comprising (i) about 100 parts by weight of a bismaleimide compound represented by the formula (I)

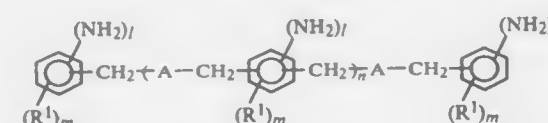


wherein R represents a divalent group selected from the group consisting of



wherein X is directly bonded to the benzene rings and is a group selected from the group consisting of a divalent hydrocarbon group having from 1 to 10 carbon atoms, an isopropylidene group having six fluorine atoms, a carbonyl group, a thio group, a sulfinyl group, a sulfonyl group and an oxo group,

and (ii) from about 5 to about 100 parts by weight of an aromatic amine resin represented by the formula (II)



wherein A represents a group selected from the group consisting of a phenylene group, an alkyl-substituted phenylene group, a diphenylene group, a diphenyl ether group and a naphthylene group; R<sup>1</sup> is selected from the group consisting of a halogen atom, a hydroxyl group, an alkoxy group having no greater than 4 carbon atoms, and an alkyl group having no greater than 5 carbon atoms; l is 1 to 2; m is an integer of from 0 to 3, and n is an integer of from 0 to 300.

**4,959,444**  
**REACTION INJECTION MOLDABLE (RIM) THERMOSET POLYIMIDE, AND POLYKETONE ELASTOMERS**

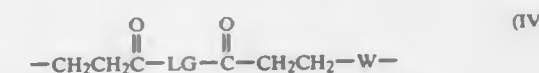
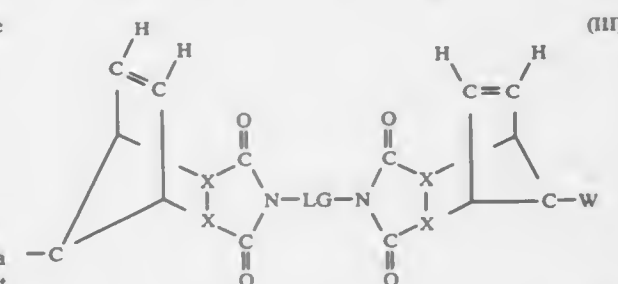
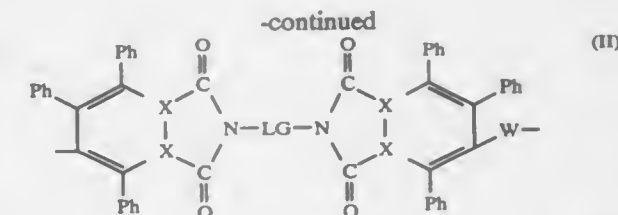
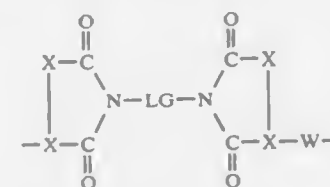
Charles M. Lewis, Springfield, Mo., and Nasser Pourahmady, Ridgeville, Ohio, assignors to Dayco Products, Inc., Dayton, Ohio

Filed Sep. 2, 1988, Ser. No. 241,168  
Int. Cl.<sup>3</sup> C08G 79/00

U.S. Cl. 528—170

27 Claims

1. A polyimide having a repeating unit of the formula (I), (II), or (III):



where LG is a linking group and W is an oligomeric chain selected from the group consisting of polyether, a polythioether, a polyetherthioether, a polycarbonyl, a polysulfonyl, and copolymers thereof.

**4,959,445**  
**PREPARATION OF GRAY TO BLUE AROMATIC POLYESTERS BY INCORPORATION OF COBALT INTO THE CATALYST SYSTEM**

Jerold C. Rosenfeld, Tonawanda, N.Y., assignor to Celanese Corporation, Chatham, N.J.

Continuation of Ser. No. 834,283, Feb. 25, 1986, abandoned. This application Jan. 30, 1987, Ser. No. 68,163  
Int. Cl.<sup>3</sup> C08G 63/181

U.S. Cl. 528—181

13 Claims

1. In a method of preparing aromatic polyesters from a molten mixture comprising an aromatic dicarboxylic acid diester and a bisphenol by melt transesterification in the presence of an alkali metal-containing transesterification catalyst, the improvement which comprises adding a trace amount of a cobalt-containing compound to the molten mixture in addition to said catalyst and recovering a polyester of improved color.

**4,959,446**  
**POLYAMIDE WITH IMPROVED GAS BARRIER PROPERTIES FROM CYCLO-ALKYLIDENE BISPHENOXY DIACETIC ACID**

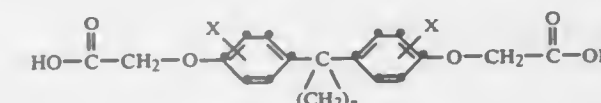
Burns Davis, deceased, late of Kingsport, Tenn. (by Bessie Anne Davis, executrix), and Theodore R. Walker, Jr., Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 26, 1989, Ser. No. 357,459  
Int. Cl.<sup>3</sup> C08G 69/26

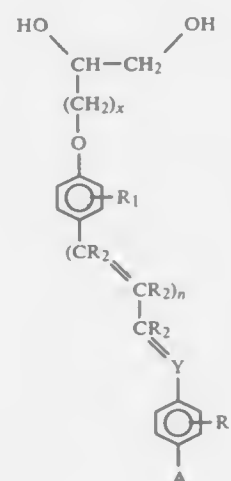
U.S. Cl. 528—185

7 Claims

1. A polyamide having an inherent viscosity of at least 0.5 measured at 25 degrees C. in a 60/40 by weight mixture of phenol/tetrachloroethane at a concentration of 0.5 g/100 mL comprising the polyamide reaction product of (A) a dicarboxylic acid corresponding to the structure



wherein X is hydrogen or unsubstituted alkyl containing 1-5 carbons and n is an integer in the range of 4 to 10, and (B) a diamine containing 5 to 16 carbon atoms.

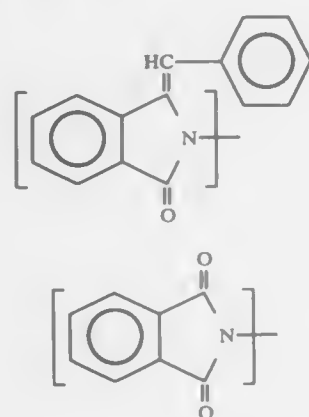


wherein

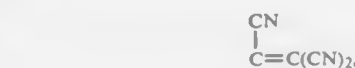
R<sub>1</sub> is halogen, R<sub>2</sub>, OR<sub>2</sub>, COR<sub>2</sub>, COOR<sub>2</sub>, CN[B] or CF<sub>3</sub>;  
R<sub>2</sub> is H or an alkyl group having 1-3 carbon atoms;  
Y is CR<sub>2</sub>, C-CN or N;  
A is CN, NO<sub>2</sub>, CH=C(CN)<sub>2</sub>.

**4,959,447**  
**COPOLY(IMIDINE-IMIDE)**  
Mitsuru Arai, San Marcos; Patrick E. Cassidy, Austin, and James M. Farley, League City, all of Tex., assignors to Nippon Steel Corporation, Tokyo, Japan  
Continuation-in-part of Ser. No. 114,288, Oct. 29, 1987, abandoned. This application Sep. 2, 1988, Ser. No. 240,491  
Int. Cl.<sup>5</sup> C08G 73/10, 73/14

**U.S. Cl. 528-188** **6 Claims**  
1. A copoly(imine-imide) comprising a copolymer of polyimides and polyimides having, in the basic chain structure of the polymer, imine structures represented by formula (I) and the imide structures represented by the formula (II):



(I)



or CF<sub>3</sub>;  
n is 0-4; and  
x is 0-6.

(II)

**4,959,449**  
**PROCESS FOR PREPARING LOW COLOR POLYARYLATES**

Adin L. Stautzenberger; Edward E. Quick, both of Corpus Christi, Tex., and Peter F. Lobo, North Plainfield, N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.  
Filed May 25, 1989, Ser. No. 356,692  
Int. Cl.<sup>5</sup> C08G 63/00, 63/02

**U.S. Cl. 528-271** **40 Claims**  
1. In a process for the production of polyarylates by reacting under esterification conditions a mixture of a diester of a dihydric phenol, at least one aromatic dicarboxylic acid and a non cobalt-containing polyesterification catalyst, the improvement which comprises: adding cobalt to the reaction mixture.

**4,959,450**  
**COPOLYESTERS FROM 4,4'-BIPHENYLDICARBOXYLIC ACID, 1,4-CYCLOHEXANEDIMETHANOL AND 1,6-HEXANEDIOL**

John C. Morris, and Winston J. Jackson, Jr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 23, 1988, Ser. No. 289,343  
The portion of the term of this patent subsequent to Apr. 10, 2090, has been disclaimed.  
Int. Cl.<sup>5</sup> C08G 63/02

**U.S. Cl. 528-272** **19 Claims**  
1. A copolyester comprising  
(A) an acid component comprising repeating units of at least 80 mol % 4,4'-biphenyldicarboxylic acid, and  
(B) a glycol component comprising repeating units of from about 95-30 mol % 1,6-hexanediol, and about 5-70 mol % 1,4-cyclohexanedimethanol, wherein the total mol % of acid component and glycol component are each 100 mol %.

**4,959,448**  
**LIQUID CRYSTALLINE SIDE-CHAIN POLYESTERS PREPARED BY POLYCONDENSATION REACTIONS**  
Carel T. J. Wreessmann, Arnhem, and Erwin W. P. Erdhuisen, Duiven, both of Netherlands, assignors to Akzo N.V., Netherlands

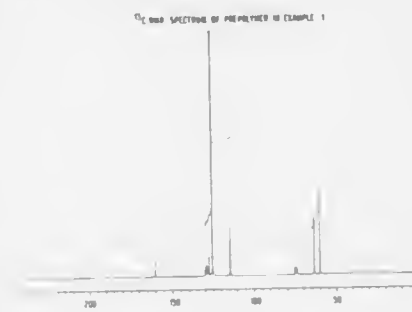
Filed Jun. 29, 1989, Ser. No. 373,373  
Claims priority, application Netherlands, Jul. 4, 1988, 8801681  
Int. Cl.<sup>5</sup> C08G 63/02, 63/60

**U.S. Cl. 528-192** **9 Claims**  
1. A polyester comprised of the polyester polycondensation product of a diol and a reactant selected from the group consisting of (1) dicarboxylic acids and (2) derivatives thereof, said diol of the formula:

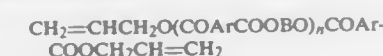
**4,959,451**  
**NOVEL DIALLYL TEREPHTHALATE PREPOLYMER AND METHOD FOR PREPARING IT**  
Hiroshi Uchida; Kunio Marumo, and Shigehiro Chasen, all of Ohita, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 17, 1989, Ser. No. 422,727  
Claims priority, application Japan, Oct. 18, 1988, 63-262217  
Int. Cl.<sup>5</sup> C08G 63/02

**U.S. Cl. 528-272** **8 Claims**



1. A diallyl terephthalate prepolymer essentially having the following structure



wherein B is a divalent organic residue derived from a diol having 2 to 20 carbon atoms, Ar is a 1,4-phenylene group, and n is a value of 1 to 100, and having an unsaturation in a range of 20 to 100, as represented by an iodine value determined by the Wijs method.

**4,959,452**  
**ALPHA-AMINO-EPSILON-CAPROLACTAM-MODIFIED POLYAMIDE PREPARATION**

Rolf-Volker Meyer; Rolf Dhein, both of Krefeld; Martin Wandel, Dormagen; Harald Selbeck, Krefeld; Friedrich Fahler, Krefeld; Hans-Detlef Heinz, Krefeld, and Peter-Rolf Müller, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

Filed Apr. 18, 1988, Ser. No. 182,336  
Claims priority, application Fed. Rep. of Germany, May 1, 1987, 3714607; Mar. 2, 1988, 3806632  
Int. Cl.<sup>5</sup> C08G 69/14

**U.S. Cl. 528-328** **17 Claims**  
1. A process for the preparation of predominantly aliphatic polyamide by the hydrolytic polymerization of at least one polyamide-forming lactam, wherein from 0.1 to 2% by weight of -amino-epsilon-caprolactam and a quantity of (poly)carboxylic acid, equivalent thereto are added to the lactam to be polymerized and to form a polyamide with increased viscosity and melt viscosity which has a branched structure but is still soluble in m-cresol.

**4,959,453**  
**PROCESS FOR THE PREPARATION OF A POLY(PARAPHENYLENE TEREPHTHALAMIDE)FIBROUS GEL COMPOSITION AND A PROCESS TO PRODUCE POLY(PARAPHENYLENE TEREPHTHALAMIDE) PAPER FROM THE COMPOSITION**

Wilfred Sweeney, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.  
Filed Apr. 3, 1989, Ser. No. 332,792  
Int. Cl.<sup>5</sup> C08G 69/28

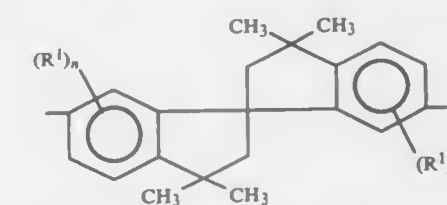
**U.S. Cl. 528-336** **7 Claims**  
1. A process for preparing a poly(paraphenylene terephthalamide) fibrous gel composition consisting essentially of placing substantially stoichiometric amounts of terephthaloyl chloride in reactive contact with paraphenylene diamine in a solution, under agitation of:

(a) at least one amide solvent in an amount sufficient to yield a final concentration of poly(paraphenylene terephthalamide) in the range from about 3 to about 7 percent by weight of the solvent;  
(b) at least 1.5 moles of an alkaline earth metal salt per mole of para-phenylenediamine;  
(c) and N-methylpyrrolidine present in the range of from 1.0 to 2.0 moles per mole of para-phenylenediamine.

**4,959,454**  
**SPIRO(BIS)INDANE POLYETHERSULFONES AND METHOD FOR THEIR PREPARATION**  
James M. Fukuyama, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.  
Continuation-in-part of Ser. No. 146,154, Jan. 20, 1988. This application May 19, 1989, Ser. No. 354,000  
Int. Cl.<sup>5</sup> C08G 69/42, 63/00, 63/02

**U.S. Cl. 528-352** **9 Claims**  
1. A composition comprising linear polyethersulfones comprising structural units of the formula

—O—A<sup>1</sup>—O—A<sup>2</sup>— (I)  
wherein A<sup>1</sup> is a spiro(bis)indane moiety of the formula



A<sup>2</sup> is an aromatic radical containing at least one —SO<sub>2</sub>— group, each R<sup>1</sup> is independently C<sub>1-4</sub> primary or secondary alkyl or halo and n is 0-3.

**4,959,455**  
**PRIMATE HEMATOPOIETIC GROWTH FACTORS IL-3 AND PHARMACEUTICAL COMPOSITIONS**  
Steven C. Clark, Winchester; Agnes B. Claretta, Tewksbury, and Yu-Chung Yang, Arlington, all of Mass., assignors to Genetics Institute, Inc., Cambridge, Mass.  
Continuation-in-part of Ser. No. 885,060, Jul. 14, 1986, abandoned, and Ser. No. 893,764, Aug. 6, 1986, abandoned, and Ser. No. 916,335, Oct. 7, 1986, Pat. No. 4,877,729. This application Mar. 4, 1987, Ser. No. 21,865  
Int. Cl.<sup>5</sup> C07K 13/00; A61K 37/02; C12N 1/00

**U.S. Cl. 530-351** **11 Claims**  
1. A polypeptide that is free of association with other polypeptides and is encoded by a DNA selected from the group consisting of:  
(i) the DNA insert in plasmid pXM (ATCC NO. 67154),  
(ii) the DNA insert in Bacteriophage CSF-16 (ATCC No. 40246),





5' →

10 CCCCGTTGCT GGGGCAACGA	20 TTCTTTACTT AAGAAATGAA	30 TCCTCCTCGC AGGAGGAGCG
40 TTCGGTCTCC AAGCCAGAGG	50 CCCTACTCCT GGGATGAGGA	60 AGCATCTCCT TCGTAGAGGA
70 CCTATCGCTA GGATAGCGAT	80 TGGTCTTACT ACCAGAATGA	90 CCTACCGCTC GGATGGCGAG
100 GAAGCGCCTC CTTCGCGGAG	110 TTGTTGCTGT AACAAGCGAC	120 AAGGGGTCCT TTCCCCAGGA
130 CTGGAGGTGA GACCTCCACT	140 TTTCTCTGCT AAAGAGACGA	150 CATCTCCGAG GTAGAGGCTC
160 TGGATTCTCT ACCTAAGGAG	170 CCTCTGGGTG GGAGACCCAC	180 CTACTCAACC GATGAGTTGG
190 CTTCGGGCGC GAAGCCCGGC	200 GAGTGCTCTC CTCACGAGAG	210 CAGATCTGGA GTCTAGACCT
220 GGTTGGGCCC CCAACCGGGG	230 CTCGGATCGG GAGCCTAGCC	240 GAGGCCCGCT CTCCGGGCGA
250 CCTTTTCTCT GGAAAAAGAA	260 CCACCTTCTT GGTGGAAGGA	270 CTTCCCTTCT GAAAGGGGAA
280 CCAGAGATTC GGTCTCTAAG	290 TCCGGCGTTG AGGCCGCAAC	300 TGGGGATCTC ACCCCTATAG
310 GTCCGCTTCC CAGGCGAAGG	320 TGAGACCTCT ACTCTGGAGA	330 CTTTGCTTCT GAAACGAAGA
340 TGGGAGTAGT ACCCTCATCA	350 TTCTCCGACG AAGAGGCTGC	360 TTCCAATGCT AAGGTTACGA
370 CTTTACCGTG GAAATGGCAC	380 ACATCCCTCT TGTAGGGGAG	390 TCGGGAGCTG AGCCCTCGAC

a DNA homologous therewith as to at least 60%, or a portion thereof, and capable of selective hybridization with δ-RNA.

**4,959,463**  
**INTERMEDIATES**  
Brian C. Froehler, Belmont, and Mark D. Matteucci, Redwood City, both of Calif., assignors to Genentech, Inc., South San Francisco, Calif.

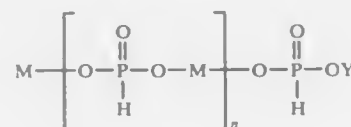
Continuation-in-part of Ser. No. 787,280, Oct. 15, 1985, abandoned. This application Sep. 19, 1986, Ser. No. 910,048  
Int. Cl.<sup>3</sup> C07H 19/06, 19/16, 21/04, 21/02

U.S. Cl. 536—27

1. A process for the synthesis of a polyribonucleotide or polydeoxyribonucleotide comprising (a) contacting a carrier-bound ribonucleotide or deoxyribonucleotide with a ribonucleoside H-phosphonate or deoxyribonucleoside H-phosphonate in the presence of an acylating agent under conditions for condensing the carrier-bound ribonucleotide or deoxyribonucleotide with the ribonucleoside H-phosphonate or deoxyribonucleoside H-phosphonate, wherein a hydroxyl of the ribonucleoside H-phosphonate or deoxyribonucleoside H-phosphonate is substituted with a blocking group for restricting the

condensation reaction to the carrier-bound ribonucleotide or deoxyribonucleotide, (b) removing the blocking group from the ribonucleotide or deoxyribonucleotide hydroxyl, and (c) sequentially repeating steps (a) and (b) until a polynucleotide H-phosphonate having greater than two nucleotides has been obtained.

12. A compound having the formula



wherein Y is a positively charged counterion, n is ≥ 1, M is a ribonucleoside or deoxyribonucleoside, and the ribonucleosides or deoxyribonucleosides are covalently linked through their 5' and 3' hydroxyl groups.

**4,959,464**  
**PROCESS FOR DERIVATIZING**  
**POLYGALACTOMANNAN USING WATER SOLUBLE**  
**ALUMINUM SALTS IN THE PROCESS**

Michael H. Yeh, Louisville, Ky., assignor to Hi-Tek Polymers, Inc., Jeffersonton, Ky.

Filed Nov. 7, 1988, Ser. No. 268,287  
Int. Cl.<sup>3</sup> C07H 1/00

U.S. Cl. 536—114

1. In a process for preparing derivatives of a polygalactomannan gum which comprises reacting the gum particles with a derivatizing agent in aqueous medium followed by the steps of washing with water and drying, the improvement which comprises reacting the gum with a water soluble aluminum salt after the derivatizing reaction and prior to the washing step, whereby the surface of the gum particles is crosslinked, thereby inhibiting absorption of the wash water into the gum particles.

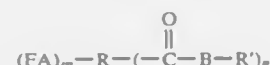
**4,959,465**  
**LOW CALORIE FAT MIMETICS**

Lawrence P. Klemann, Somerville; John W. Finley, Whippany, and Anthony Scimone, Cedar Grove, all of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

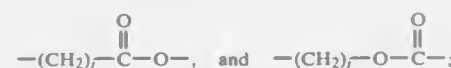
Filed Feb. 26, 1988, Ser. No. 160,851  
Int. Cl.<sup>3</sup> A23D 3/00, 5/00; C11C 3/00

U.S. Cl. 536—115

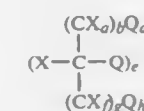
1. A fat mimetic composition having the following formula:



wherein  
FA represents a fatty acyl residue;  
R represents polyol residue;  
m is zero or an integer from 1 to 7;  
n is an integer from 1 to 7; and further  
B is selected from the group consisting of

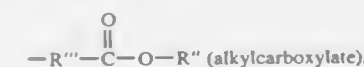


and the R' groups are the same or different and contain residues of the following structure:

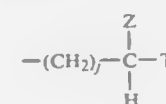


where:

C is a carbon atom;  
X is a bridging bonding valence, hydrogen, or substituted or unsubstituted lower aliphatic group, the various X groups being the same or different;  
Q is selected from the group consisting of



—O—R'' (alkoxy), and —R'''—O—R'' (alkylalkoxy) radicals;  
R'' is substituted or unsubstituted organic group defined by the following formula



R''' is a lower alkylene group;  
the various R', R'', and R''' groups, respectively, being the same or different;

T is hydrogen or a substituted or unsubstituted aliphatic group;

Z is a bridging bonding valence, hydrogen, or a residue of an alcohol, a glycol ester, or an ether; with the proviso that there is only one bridging bonding valence per R' group;

and where:

a=0 to 3;

b=0 to 4;

d=1 or 2;

e=0 to 5;

f=0 to 3;

g=0 to 4;

h=1 or 2;

j=0 to 10.

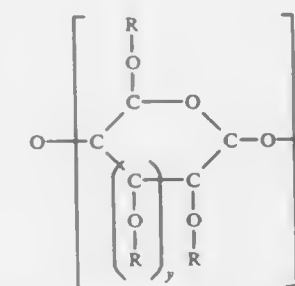
**4,959,466**  
**PARTIALLY ESTERIFIED POLYSACCHARIDE (PEP)**  
**FAT SUBSTITUTES**

John F. White, Summit, N.J., assignor to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Jan. 25, 1988, Ser. No. 147,806  
Int. Cl.<sup>3</sup> C07H 13/00; C08B 31/00, 35/00; A23D 7/00

U.S. Cl. 536—119

1. Partially esterified polysaccharides (PEPs) of the formula [P—O(R)<sub>x</sub>]<sub>n</sub> having the structure:



where P is a polysaccharide, n has an average value in the range of 3–50, y is 0–4, R is H or a same or different C<sub>3–28</sub> acyl moiety, and x is the degree of esterification ranging from 1–80 percent and is selected sufficient that the PEPs are resistant to digestive tract hydrolysis and absorption and exhibit properties ranging from oils through fats to greases.

14. A low calorie food composition containing fat-type organoleptic ingredients, comprising fat ingredients and non-fat ingredients, wherein from about 10 to 100% of the total fat-type ingredients comprises at least one partially esterified polysaccharide as in claim 1.

**4,959,467**  
**CONTROL OF PRODUCT SELECTIVITY IN THE**  
**ADDITION OF HCN TO ARABINOSE**

Blaise J. Arena, Des Plaines, Ill., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 802,503, Nov. 27, 1985, abandoned. This application Feb. 16, 1988, Ser. No. 156,500  
Int. Cl.<sup>3</sup> C07B 37/02; C07H 1/06

U.S. Cl. 536—124

1. In the method of making a mixture of L-glucose cyanohydrin and L-mannose cyanohydrin by hydrogen cyanide addition to an aqueous solution of L-arabinose, the improvement comprising increasing the relative amount of L-glucose cyanohydrin in the cyanohydrin mixture by effecting the hydrogen cyanide addition to L-arabinose in the presence of at least 0.1 molar proportions of a reagent selected from the group consisting of water soluble aluminates, vanadates, chromates, molybdates, manganates, ferrates, borates, cuprates, tungstates, silicates, stannates, plumbates, germanates, and rare earth salts.

5. A method of controlling the cyanohydrin product ratio in hydrogen cyanide addition to monosaccharides comprising reacting the elements of hydrogen cyanide with an aqueous solution of a complex of the monosaccharide resulting from complexation of the monosaccharide with an agent which complexes hydroxyl groups of monosaccharides, said complexing agent being selected from the group consisting of water soluble aluminates, vanadates, chromates, molybdates, manganates, ferrates, borates, cuprates, tungstate, silicates, stannates, plumbates, germanates or rare earth salts.

**4,959,468**  
**COLOR STABILIZATION METHOD FOR GLYCOSIDE**  
**PRODUCTS**

Prasad S. Ravi, Decatur; Hunter L. Kickle, Mt. Zion; Patrick M. McCarry, Decatur, and David J. Skogberg, Decatur, all of Ill., assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 61,859, Jun. 12, 1987, abandoned. This application Apr. 3, 1989, Ser. No. 333,820  
Int. Cl.<sup>3</sup> C07H 1/06

U.S. Cl. 536—127

1. A method for improving the color stability of glycoside products comprising: treating said glycoside product by contacting the glycoside product with a color stabilizing amount of from about 0.01 to about 2 weight percent, on a glycoside product dry weight basis, of a borohydride material selected



from the group consisting of Group I or Group II metal borohydride salts for a time period sufficient to substantially reduce the propensity of said glycoside product to darken upon exposure to elevated temperatures under alkaline conditions.

4,959,469

## CRYSTALLINE CEPHALOSPORIN COMPOUNDS

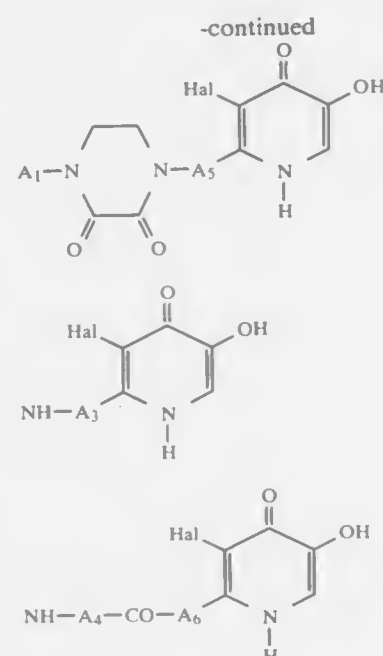
Susumu Nakagawa; Ryosuke Ushijima; Fumio Nakano; Koji Yamada, all of Okazaki, and Eiichi Mano, Kariya, all of Japan, assignors to Banyu Pharmaceutical Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 813,614, Dec. 26, 1985, Pat. No. 4,677,100. This application Feb. 27, 1989, Ser. No. 315,917. Claims priority, application Japan, Dec. 27, 1984, 59-273591; Aug. 6, 1985, 60-171839; Dec. 9, 1986, 61-291431; PCT Int'l Appl., Jan. 25, 1987, PCT/JP87/00417

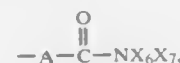
Int. Cl.<sup>5</sup> C07D 501/46

U.S. Cl. 540—222 3 Claims

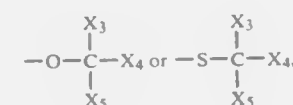
1. Crystalline (6R,7R)-7-[(Z)-2-(2-aminothiazol-4-yl)-2-(1-carboxy-1-methylethoxyimino)acetamido]-3-(5,6-dihydroxy-2-methyl-2-isindolinium)methyl-3-cephem-4-carboxylate sulfate or its hydrate.



R<sub>1</sub> is an acyl group derived from a carboxylic acid; R<sub>2</sub> and R<sub>3</sub> are the same or different and each is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, phenyl, substituted phenyl or a 4, 5, 6 or 7-membered heterocycle or one of R<sub>2</sub> and R<sub>3</sub> is hydrogen and the other is azido, halomethyl, dihalomethyl, trihalomethyl, alkoxy, carboxyl, —CH<sub>2</sub>X<sub>1</sub> wherein X<sub>1</sub> is azido, amino, hydroxy, carboxyl, alkoxy, alkanoylamino, phenylcarbamoyl, (substituted phenyl)-carbamoyl, alkylsulfonyloxy, phenylsulfonyloxy, (substituted phenyl)sulfonyloxy, phenyl, substituted phenyl, cyano,

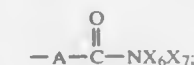


—S—X<sub>2</sub>, or —O—X<sub>2</sub> (wherein A, X<sub>2</sub>, X<sub>6</sub> and X<sub>7</sub> are as herein after defined); —S—X<sub>2</sub> or —O—X<sub>2</sub>; wherein X<sub>2</sub> is alkyl, substituted alkyl, phenyl, substituted phenyl, phenylalkyl, (substituted phenyl)alkyl, alkanoyl, substituted alkanoyl, phenylalkyl, (substituted phenyl)alkyl, alkanoyl, phenylcarbamoyl, (substituted phenyl)carbamoyl, or heteroarylcarmoyl; and in the case of when X<sub>1</sub> is O—X<sub>2</sub> then X<sub>2</sub> can also be alkylideneamino, alkanoylamino, carboxyalkylideneamino, alkylsulfonylamino, alkoxy, alkoxy, alkylsulfonylamino or N,N-cyclodialkanoylamino,

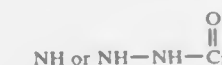


wherein one of X<sub>3</sub> and X<sub>4</sub> is hydrogen and the other is hydrogen or alkyl, or X<sub>3</sub> and X<sub>4</sub> when taken together with the carbon atom to which they are attached form a cycloalkyl group; and X<sub>5</sub> is formyl, alkanoyl, phenylcarbamoyl, (substituted phenyl)-carbamoyl, phenylalkylcarbamoyl, (substituted phenyl)alkyl-

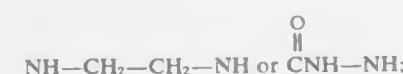
carbonyl, carboxyl, alkoxy, aminocarbonyl, (substituted amino)carbonyl, or cyano; or



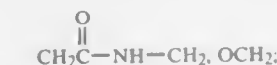
wherein A is CH=CH—, —(CH<sub>2</sub>)<sub>m</sub>—, —(CH<sub>2</sub>)<sub>m</sub>—O—, —(CH<sub>2</sub>)<sub>m</sub>—NH—, or —CH<sub>2</sub>—S—CH<sub>2</sub>—, m is 0, 1 or 2, and X<sub>6</sub> and X<sub>7</sub> are the same or different and each is hydrogen, alkyl, phenyl or substituted phenyl, or X<sub>6</sub> is hydrogen and X<sub>7</sub> is amino, substituted amino, alkanoylamino or alkoxy, or X<sub>6</sub> and X<sub>7</sub> when taken together with the nitrogen atom to which they are attached form a 4, 5, 6 or 7-membered heterocycle; A<sub>1</sub> is a single bond,



A<sub>2</sub> is a single bond,



A<sub>3</sub> is a (CH<sub>2</sub>)<sub>p</sub>—; NH—CH<sub>2</sub>—



A<sub>4</sub> is —NH—, n is two or three; p is zero or one; q is zero or one; t is one, two, three or four; Hal is Br, Cl, or I; A<sub>5</sub> is a single bond; CH<sub>2</sub>; NH—CH<sub>2</sub>; —N=CH—; —CO—NH—(CH<sub>2</sub>)<sub>q</sub>;

A<sub>6</sub> is a single bond; CH=CH; —(CH<sub>2</sub>)<sub>r</sub>—; wherein the term "substituted alkyl" refers to alkyl groups substituted with azio, amino, halogen, hydroxy, carboxy, cyano, alkoxy, alkoxy, aminocarbonyl, alkanoyloxy, alkoxy, phenyloxy, (substituted phenyl)oxy, mercapto, alkylthio, phenylthio, (substituted phenyl)-thio, alkylsulfonyl or alkylsulfonyl groups;

the term "substituted amino" refers to a group having the formula —NX<sub>8</sub>X<sub>9</sub> wherein X<sub>8</sub> is hydrogen, alkyl, phenyl, substituted phenyl, phenylalkyl or (substituted phenyl)alkyl, and X<sub>9</sub> is alkyl, phenyl, substituted phenyl, phenylalkyl, (substituted phenyl)alkyl, hydroxy, cyano, alkoxy, phenylalkoxy or amino;

the term "heteroaryl" refers to pyridinyl, furanyl, pyrrolyl, thienyl, 1,2,3-triazolyl, 1,2,4-triazolyl, imidazolyl, thiazolyl, thiadiazolyl, pyrimidinyl, oxazolyl, triazinyl, tetrazolyl, tetrazolyl or one of the above groups substituted with one of more halogen, hydroxy, nitro, amino, cyano, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylsulfonyl, phenyl, substituted phenyl, 2-furfurylideneamino, benzylideneamino, or substituted alkyl wherein the alkyl group has 1 to 4 carbon atoms, groups;

the term "a 4, 5, 6 or 7-membered heterocycle" refers to pyridinyl, furanyl, pyrrolyl, thienyl, 1,2,3-triazolyl, 1,2,4-triazolyl, imidazolyl, thiazolyl, thiadiazolyl, pyrimidinyl, oxazolyl, triazinyl, tetrazolyl, azetidinyl, oxetanyl, thietanyl, piperidinyl, piperazinyl, imidazolidinyl, oxazolidinyl, pyrrolidinyl, tetrahydropyrimidinyl, dihydrothiazolyl or hexahydropyrimidinyl or one of the above groups substituted with one or more oxo, halogen, hydroxy, nitro, amino, cyano, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylsulfonyl, phenyl, substituted phenyl, 2-furfurylideneamino, ben-

zylideneamino, or substituted alkyl wherein the alkyl groups has 1 to 4 carbon atom, groups.

4,959,471

## PHOTOCHROME SPIROINDOLINE-OXAZINES

Manfred Melzig, Wessling, Fed. Rep. of Germany, assignor to Optische Werke G. Rodenstock, Munich, Fed. Rep. of Germany

Filed May 1, 1989, Ser. No. 345,840

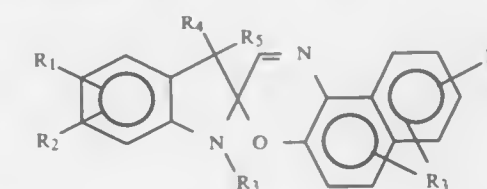
Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814631

Int. Cl.<sup>5</sup> C07D 498/10

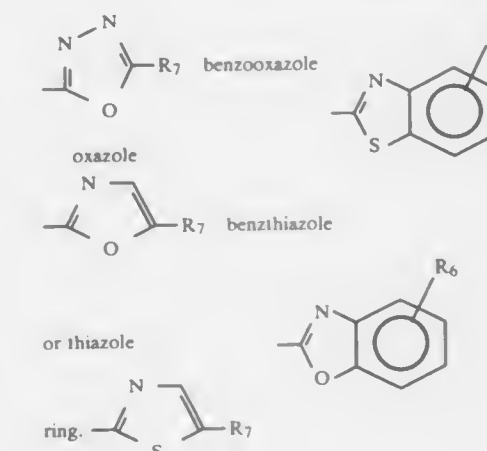
U.S. Cl. 544—71

13 Claims

1. A photochrome compound defined by the following general equation



wherein R<sub>1</sub>, R<sub>2</sub>, —CN, —CF<sub>3</sub>, —Y, OY, —NY<sub>2</sub> Y=H, alkyl residue with up to 8 C-atoms, aryl or heteroaryl residue; R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>—CH<sub>3</sub>, —C<sub>2</sub>H<sub>5</sub>, —C<sub>3</sub>H<sub>7</sub>, —phenyl, —benzyl, —pyridyl or R<sub>4</sub> and R<sub>5</sub> may close to form a C<sub>5</sub>—C<sub>7</sub> cycloalkane ring; R<sub>6</sub>—Y, OY, —CN, —NO<sub>2</sub>, —Cl, or —Br; R<sub>7</sub>—H, —CH<sub>3</sub>, —C<sub>2</sub>H<sub>5</sub>, —phenyl, —benzyl, —pyridyl, or —naphth(2)yl or —phenyl, —benzyl, —pyridyl, or —naphth(2)yl substituted by —OH in the ortho position; and R<sub>8</sub> is an oxadiazole



4,959,472

## PROCESS FOR PREPARING SUBSTANTIALLY PURE DIASTEREOISOMERS OF TETRAHYDROFOLIC DERIVATIVES

Hamish C. S. Wood; Colin J. Suckling, and Lillas G. Rees, all of Glasgow, Scotland, assignors to University of Strathclyde, Glasgow, Scotland

Continuation of Ser. No. 91,989, Sep. 2, 1987, abandoned. This application Sep. 1, 1989, Ser. No. 403,917

Claims priority, application United Kingdom, Sep. 3, 1986, 8621268

Int. Cl.<sup>5</sup> C07D 475/04

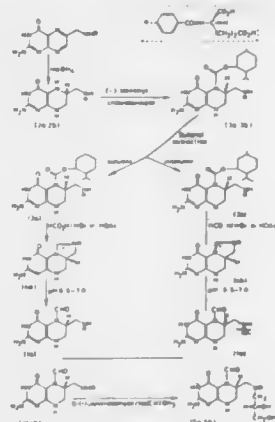
U.S. Cl. 544—258

8 Claims

1. A process for the preparation of a desired substantially

pure (6R or 6S) diastereoisomer of a derivative of tetrahydrofolic acid selected from leucovorin (5-formyltetrahydrofolic acid) or a salt or ester thereof, and 5-methyl- or 5,10-methylene- or 5,10-methanol-tetrahydrofolic acid or a salt or ester thereof which process compresses the steps of:

- (a) attaching a chiral auxiliary group at either N-5 or N-10 of a mixture of 6R and 6S diastereoisomers tetrahydrofolic acid or of a substituted tetrahydrofolic acid or said or ester thereof, so as to form a pair of new diastereoisomers, said chiral auxiliary group is one alcohol selected from the



group consisting of (—) menthol, (—) borneol, (—) isoborneol;

- (b) separating the pair of new diastereoisomers and recovering the new diastereoisomer (6R or 6S) diastereoisomer; and corresponding to said desired (6R or 6S) diastereoisomer; and
- (c) converting the substantially pure new diastereoisomer so isolated into the corresponding desired substantially pure (6R or 6R) diastereoisomer of a derivative of tetrahydrofolic acid or salt or ester thereof.

4,959,473

#### 7-ETHOXY-5-FLUOROMETHYL-1,2,4-TRIAZOLO[1,5-a]PYRIMIDINE-2-SULFONAMIDES

Norman R. Pearson, Walnut Creek; William A. Kleschick, Martinez, both of Calif., and Chrislyn M. Carson, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

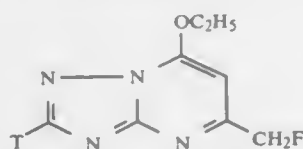
Filed Apr. 19, 1988, Ser. No. 183,571

The portion of the term of this patent subsequent to Feb. 27, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C07D 403/14

U.S. Cl. 544—263

1. A compound of the formula



wherein T represents (C<sub>2</sub>–C<sub>4</sub>)alkylthio, benzylthio, or ClSO<sub>2</sub>.

4,959,474

#### DIALKOXY PYRIDOPYRIMIDINE COMPOUNDS

Eugene M. Grivsky, Fairfax, Va., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Continuation of Ser. No. 381,365, May 24, 1982, abandoned, and a continuation of Ser. No. 159,246, Jan. 13, 1980, abandoned.

This application Oct. 15, 1985, Ser. No. 786,725

Claims priority, application United Kingdom, Jun. 14, 1979, 7920706

Int. Cl.<sup>5</sup> C07D 471/04

U.S. Cl. 544—279

3 Claims

1. 2,4-Diamino-6-(2,5-dimethoxybenzyl)-5-methylpyrido[2,3-d]pyrimidine.

4,959,475

#### PROCESS FOR THE PRODUCTION OF 2,4-DIAMINO-6-PIPERIDINYL-PYRIMIDINE-3-N-OXIDE

Lester Mills, Naters; Hans P. Mettler, Brig-Glis; Felix Previdoli, Brig, and Francois Moulin, Neuchâtel, all of Switzerland, assignors to Lonza Ltd., Gampel/Valais, Switzerland

Filed Dec. 28, 1989, Ser. No. 458,292

Claims priority, application Switzerland, Jan. 4, 1989, 20/89

Int. Cl.<sup>5</sup> C07D 401/04

U.S. Cl. 544—324

14 Claims

1. Process for the production of 2,4-diamino-6-piperidinylpyrimidine-3-N-oxide, comprising converting in situ hydroxylamine and cyanamide in a lower alcohol as a solvent in the presence of an alkali alcoholate into the corresponding hydroxyguanidine, converting the latter with a cyanoacetic acid ester, with ring formation, to the 2,4-diamino-6-hydroxypyrimidine-3-N-oxide, chlorinating the N-oxide by chlorination with POCl<sub>3</sub> the presence of an amine as a catalyst to 2,4-diamino-6-chloropyrimidine-3-N-oxide, and converting the latter with piperidine to the end product.

14. 2,4-Diamino-6-hydroxypyrimidine-3-N-oxide.

4,959,476

#### METHOD FOR THE PREPARATION OF HERBICIDAL O-CARBOXYARYLIMIDAZOLINONES

Robert F. Doehner, Jr., East Windsor, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 148,743, Jan. 27, 1988, Pat. No. 4,861,887.

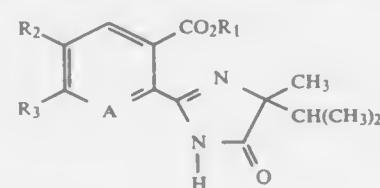
This application Jun. 30, 1989, Ser. No. 373,438

Int. Cl.<sup>5</sup> C07D 401/04

U.S. Cl. 546—167

7 Claims

1. A method for the preparation of o-carboxyaryl imidazolinone compounds represented by formula I



(I)

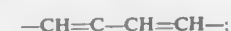
wherein

A is CH or N;

R<sub>1</sub> is H or C<sub>1</sub>–C<sub>12</sub> alkyl;

R<sub>2</sub> is H or C<sub>1</sub>–C<sub>6</sub> alkyl;

R<sub>3</sub> is H, C<sub>1</sub>–C<sub>6</sub> alkyl, or when R<sub>2</sub> and R<sub>3</sub> are taken together they may form a ring represented by



comprising, reacting a 2-[(1-carbamoyl-1,2-dimethylpropyl)amino]methylbenzoic acid, nicotinic acid, or quinoline-3-carboxylic acid of formula II

4,959,478

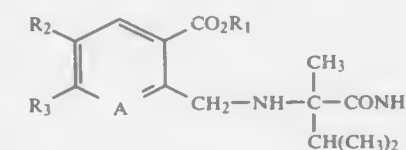
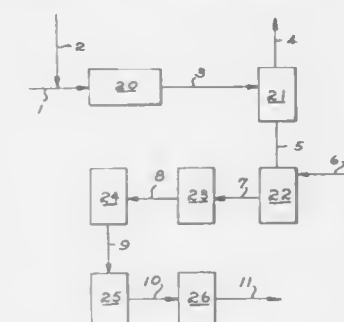
#### METHOD OF PRODUCING-COARSE CRYSTALLINE NICOTINIC ACID WITH A HIGH DEGREE OF PURITY

Alexander Möller, Gelnhausen; Heinz Friedrich, Hanau; Herbert Kuhn, Alzenau, and Kurt Winkler, Rossbach, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 41,004, Apr. 21, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 318,414

U.S. Cl. 546—319

7 Claims



wherein A, R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are as described for formula I above with a mixture of two molar equivalents of a brominating agent in the presence of an acid acceptor.

4,959,477

#### OPTICALLY NONLINEAR PYRIDINE-N-OXIDE COMPLEXES

Margaret C. Etter, St. Paul; Gayle M. Frankenbach, Minneapolis, and Thomas W. Panunto, St. Paul, all of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.

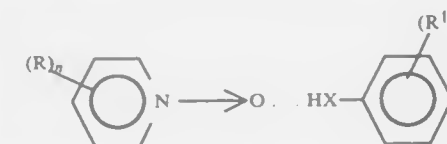
Division of Ser. No. 124,886, Nov. 24, 1987. This application Feb. 14, 1989, Ser. No. 312,364

Int. Cl.<sup>5</sup> C07D 213/89

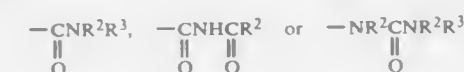
U.S. Cl. 546—307

36 Claims

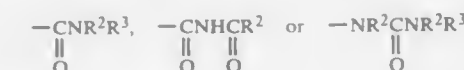
1. A crystalline compound of the formula:



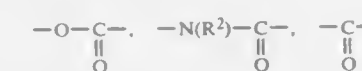
wherein n is 0–5, m is 0–5, R<sup>1</sup> is individually —NO<sub>2</sub>, —OR<sup>2</sup>, —CN, —NR<sup>2</sup>R<sup>3</sup>, —CH<sub>3</sub>, —CO<sub>2</sub>H, halo,



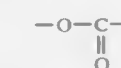
R is individually, —NO<sub>2</sub>, —CH<sub>3</sub>, —OR<sup>2</sup>, —NR<sup>2</sup>R<sup>3</sup>, —CN,



and X is —N(R<sup>2</sup>)—, —S—,



or —C≡C—; wherein R<sup>2</sup> and R<sup>3</sup> are individually H, (C<sub>1</sub>–C<sub>5</sub>)alkyl, aryl or ar(C<sub>1</sub>–C<sub>5</sub>)alkyl; with the proviso that when m=n=1, R<sup>1</sup> is 4-NH<sub>2</sub> and X is



R cannot be 4-NO<sub>2</sub>.

4,959,479

#### INDOLE DERIVATIVES

Yoshinobu Nagawa; Koichi Honda, both of Tsukuba, and Hiroshi Nakanishi, Tsuchiura, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Division of Ser. No. 237,465, Aug. 29, 1988, Pat. No. 4,889,937.

This application Oct. 26, 1989, Ser. No. 426,648

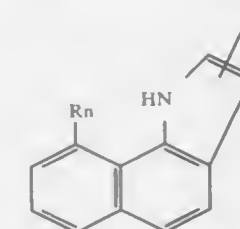
Claims priority, application Japan, Sep. 16, 1987, 62-231391

Int. Cl.<sup>5</sup> C07D 249/06, 403/02

U.S. Cl. 548—255

5 Claims

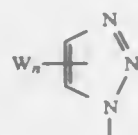
1. Indole derivatives of the following formula (I):



(I)

wherein R represents a Wn





group or a R'nN-group, Z represents a hydrogen atom or a C<sub>1</sub>-C<sub>5</sub> carboxylic acid alkyl ester group, W represents a hydrogen atom or a C<sub>1</sub>-C<sub>5</sub> carboxylic acid alkyl ester group, R' represents an C<sub>1</sub>-C<sub>5</sub> alkyl group, and n in each instance above is the number 1 or 2.

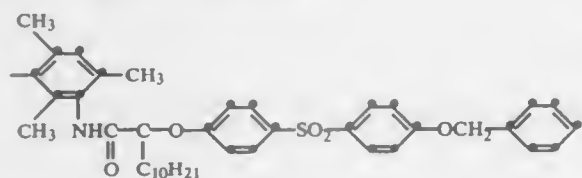
**4,959,480**  
PHOTOGRAPHIC SILVER HALIDE MATERIALS AND  
PROCESS COMPRISING A PYRAZOLOAZOLE  
COUPLER

Sharon E. Normandin, Macedon; Arlyce T. Bowne, Rochester, both of N.Y.; Nigel E. Milner, and David Clarke, both of Watford, Great Britain, assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 23,517, Mar. 9, 1987, abandoned. This application Mar. 9, 1988, Ser. No. 166,084

Int. Cl.<sup>3</sup> C07D 249/00, 215/26, 213/64; C07F 9/06  
U.S. Cl. 548—262.4 2 Claims

1. A 1H-pyrazolo[3,2-c]-s-triazole wherein the 6-position is substituted by a methyl, ethyl, propyl, n-butyl, or t-butyl group; wherein the 7-position is substituted by a halogen atom; and wherein the 3-position is substituted by an ortho-substituted phenyl group consisting of



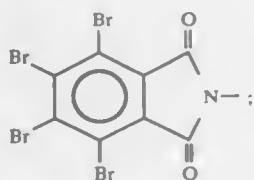
**4,959,481**  
FLAME RETARDANT COMPOUNDS AND  
THERMOPLASTIC COMPOSITIONS CONTAINING THE  
SAME

Robert J. Axelrod, Glenmont, N.Y.; Donald B. G. Jaquiss, Pittsfield, Mass., and John A. Tyrell, Mt. Vernon, Ind., assignors to General Electric Company, Selkirk, N.Y.

Division of Ser. No. 892,344, Aug. 1, 1986, Pat. No. 4,743,637. This application May 4, 1988, Ser. No. 789,970

Int. Cl.<sup>3</sup> C07D 209/02, 209/48  
U.S. Cl. 548—462 36 Claims

1. A flame retardant compound comprising a polyalkylene oxide or derivative thereof end-capped with brominated phthalimide groups and being of the formulae



R<sup>1</sup> is alkylene of from about 2 to about 6 carbon atoms, R<sup>2</sup> is alkyl of from about 1 to about 6 carbon atoms; n is from about 4 to about 40; and n' is from about 3 to about 15 and n'' is from about 1 to about 10.

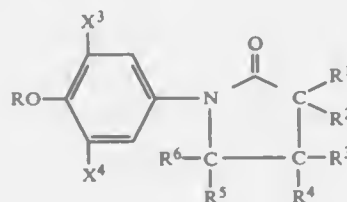
**4,959,482**  
PYRROLIDINONE COMPOUNDS AND  
PHARMACEUTICAL COMPOSITIONS CONTAINING  
SAME

Sang J. Lee, Clarks Summit, Pa., assignor to Blofor, Ltd., Waverly, Pa.

Filed Sep. 26, 1988, Ser. No. 248,942  
Int. Cl.<sup>3</sup> C07D 207/26; A61K 31/40

U.S. Cl. 548—543 20 Claims

1. A compound of the formula:



wherein:

R is a member selected from the group consisting of hydrogen, alkyl, alkanoyl and aryl;

R<sup>1</sup>-R<sup>6</sup> are the same or different and represent a member selected from the group consisting of hydrogen and lower alkyl; and

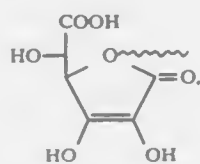
X<sup>3</sup> and X<sup>4</sup> are the same or different and represent a member selected from the group consisting of tertiary-lower alkyl and trimethylsilyl; and the non-toxic pharmacologically acceptable salts thereof.

**4,959,483**  
D-GLUCOSACCHAROASCORBIC ACID  
Koichi Matsumura, Ibaraki; Hiroshi Kimura, Suita; Noritoshi Mise, Takatsuki, and Hiroshi Miki, Suita, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 946,505, Dec. 19, 1986, abandoned. This application Jan. 28, 1989, Ser. No. 372,111  
Claims priority, application Japan, Dec. 25, 1985, 60-294575; Nov. 10, 1986, 61-268443

Int. Cl.<sup>3</sup> C07D 307/32 4 Claims

U.S. Cl. 549—315 1. A compound selected from the group consisting of D-glucosaccharoascorbic acid of the formula



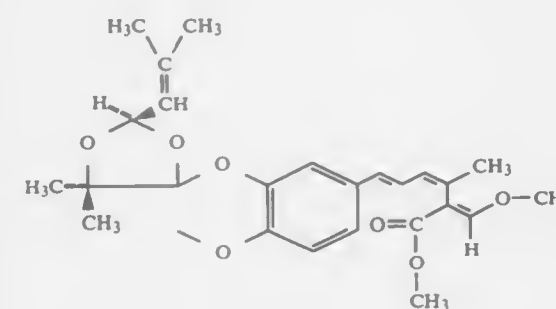
**4,959,484**  
NOVEL STROBILURINE DERIVATIVES, THEIR  
PREPARATION AND THEIR USE

Lothar Daum, Otterstadt; Gerhard Keilhauer, Dannstadt-Schauernheim; Gisela Lorenz, Neustadt; Eberhard Ammermann, Ludwigshafen; Wolfgang Weber, both of Kaiserslautern; Wolfgang Steglich, Bonn-Roettgen; Bert Steffan, Rheinbach, and Angela Scherer, Bonn, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 14, 1989, Ser. No. 338,174  
Claims priority, application Fed. Rep. of Germany, May 6, 1988, 3815484

U.S. Cl. 549—334 1 Claim

1. A compound of the formula



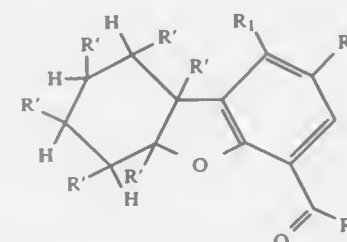
**4,959,485**  
HEXAHYDRODIBENZOFURAN CARBOXYLIC ACID  
DERIVATIVES

Raymond D. Yousefeyh, Princeton Junction, N.J.; Henry F. Campbell, North Wales, and Donald E. Kuhla, Doylestown, both of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

Division of Ser. No. 186,824, Apr. 27, 1988, Pat. No. 4,863,921. This application May 15, 1989, Ser. No. 351,625

Int. Cl.<sup>3</sup> C07D 307/91 11 Claims

U.S. Cl. 549—461 1. A compound of the formula



where R<sub>1</sub> is hydrogen, amino, alkylamino or halo; R<sub>2</sub> is hydrogen, halo, sulfamyl, alkylsulfamyl or alkylsulfonyl; R' is hydrogen or alkyl; and R<sub>3</sub> is hydroxy, halo, alkoxy or aralkoxy; provided that R', R<sub>1</sub> and R<sub>2</sub> are not all hydrogen at the same time.

**4,959,486**  
ALKYLENE OXIDES PRODUCTION FROM ALKANES  
OR ALKYLAROMATICS USING MOLTEN NITRATE  
SALT CATALYST

B. Timothy Pennington, Sulphur, La., assignor to Olin Corporation, Cheshire, Conn.

Division of Ser. No. 238,714, Aug. 31, 1988, Pat. No. 4,885,374, and a continuation-in-part of Ser. No. 929,552, Nov. 12, 1986, Pat. No. 4,785,123. This application Aug. 3, 1989, Ser. No. 402,091

The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.  
Int. Cl.<sup>3</sup> C07D 301/06 10 Claims

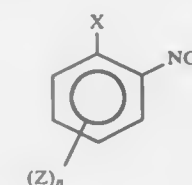
U.S. Cl. 549—532 1. A product for producing an alkylene oxide or mixture of alkylene oxides by a reaction which comprises reacting an alkane or alkylaromatic compound having from 3 to 22 carbon atoms per molecule, or mixture thereof, with an oxygen-containing gas, said alkane or alkylaromatic compound and said oxygen-containing gas being gaseous reactants, by contacting said gaseous reactants with a bath, stream, spray or mist of at least one molten nitrate salt catalyst, said catalyst being present in an amount sufficient to absorb any heat generated during said reaction while maintaining an essentially constant reaction temperature, said reaction being conducted at a reaction temperature of between about 135° C. and about 600° C. and a reaction pressure of between about 1 and about 50 atmo-

spheres, said process additionally employing a co-catalyst selected from the group consisting of elemental metals, and oxides and hydroxides thereof, and mixtures thereof, said co-catalyst being suspended, dispersed or dissolved in said molten nitrate salt catalyst.

**4,959,487**  
PROCESS FOR PRODUCING AROMATIC NITRILE  
Hirotaka Yamasaki, and Yoshio Hironaka, both of Sodegaura, Japan, assignors to Idemitsu Kosan Co., Ltd., Tokyo, Japan  
Filed Mar. 2, 1989, Ser. No. 318,170  
Claims priority, application Japan, Mar. 19, 1988, 63-66907  
Int. Cl.<sup>3</sup> C07C 253/14 25 Claims

U.S. Cl. 558—343 1. A process for producing an aromatic nitrile having a CN group and an NO<sub>2</sub> group on adjacent ring carbons atoms, said process comprising:

(a) reacting at a temperature of 100° to 250° C. an aromatic halide of the formula



wherein X is an halogen atom, Z is a halogen atom, an alkyl group having from 1 to 4 carbon atoms, a cyano group or a nitro group, and n is an integer of 1 to 4, with 0.2 to 0.5 mol of cuprous cyanide per mol of said aromatic halide and 0.1 to 2.0 mol of a cyanide of an alkali metal per mol of said aromatic halide in 0.1 to 30 parts by weight of at least one polar solvent selected from the group consisting of N,N-dimethyl formamide, N,N-dimethylacetamide, N-methyl-2-pyrrolidone, N,N'-dimethylimidazolidone, dimethylsulfoxide and sulfolane per 100 parts by weight of said aromatic halide to form a reaction product;

(b) extracting said reaction product from the resultant mixture at a temperature of at least 70° C. with an organic solvent having a boiling point of not less than 70° C.;

(c) washing the extracted solution with an alkaline aqueous solution and water, and

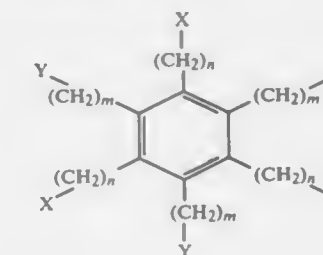
(d) removing solvent and aqueous wash solution to obtain said aromatic nitrile.

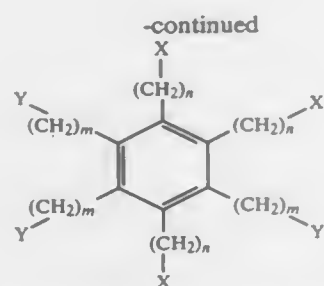
**4,959,488**  
POLYFUNCTIONAL HEXASUBSTITUTED BENZENE  
DERIVATIVES

James M. Renga; Alan G. Olivero, and Mark Bosse, all of Santa Rosa, Calif., assignors to Henkel Research Corporation, Santa Rosa, Calif.

Filed May 17, 1989, Ser. No. 353,371  
Int. Cl.<sup>3</sup> C07C 69/773, 57/30, 33/26, 67/30  
U.S. Cl. 560—76 31 Claims

1. A composition selected from the group consisting a compound of the formula I or II





wherein each of X and Y is independently selected from the group consisting of CH<sub>3</sub>, F, Cl, Br, I, and functional groups having N, O, S, P, or Si as hetero atom, with the proviso that X and Y are not both CH<sub>3</sub>; each of m and n is an integer having a value of from 0 to 20, such that m+n=2 to 20, and when X=Y, m+n=4 to 20.

4. A compound of claim 1 wherein X is CO<sub>2</sub>CH<sub>3</sub>, Y is CH<sub>3</sub>, m is 14 and n is 0.

4,959,489

#### PROCESS FOR MAKING AN ACRYLAMIDE CONTAINING A DIALKYL ACETAL GROUP

Andrew F. Nordquist, and Robert K. Pinschmidt, Jr., both of Whitehall, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Oct. 2, 1989, Ser. No. 416,289

Int. Cl.<sup>5</sup> C07C 229/30, 231/02

U.S. Cl. 560—170

11 Claims

1. A process for making an acrylamide dialkyl acetal which comprises:

- reacting an acrylic acid ester with a nucleophile to form a  $\beta$ -substituted propionate;
- separating any excess nucleophile from said  $\beta$ -substituted propionate;
- reacting said  $\beta$ -substituted propionate with an amino dialkyl acetal in the presence of an aminolysis catalyst and the absence of protic solvent to form a  $\beta$ -substituted propionamide dialkyl acetal; and
- pyrolyzing said  $\beta$ -substituted propionamide dialkyl acetal to form said acrylamide dialkyl acetal.

4,959,490

#### PROCESS FOR MANUFACTURING DISULFONATE SURFACTANTS

Margaret B. Parnell, Livermore, Calif.; Thomas L. Ashcraft, Jr., Baytown, and Kenneth M. Webber, Houston, both of Tex., assignors to Exxon Production Research Company, Houston, Tex.

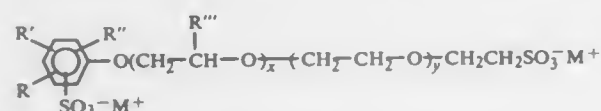
Filed Nov. 14, 1988, Ser. No. 270,190

Int. Cl.<sup>5</sup> C07C 149/30

U.S. Cl. 562—74

20 Claims

1. A process for synthesizing monosulfonated alkylphenol polyalkylene oxide sulfonates having the general formula:



where

R is a linear or branched alkyl group having from 3 to about 40 carbon atoms;  
R', R'' and R''' are independently H or C<sub>1-3</sub> alkyl groups;  
x ranges from 0 to about 10;  
y ranges from 0 to about 50; and  
each M<sup>+</sup> is a cation;  
comprising the steps of:  
(a) reacting an alkylphenol with alkylene oxide in an oxy-

alkylation reaction to produce an oxyalkylated alkylphenol including an oxyalkylate chain;

- reacting said oxyalkylated alkylphenol with a sulfonating reagent to produce a sulfonic/sulfate acid dianion having a sulfate group attached at the terminus of the said oxyalkylate chain and a sulfonate group attached to the phenol ring;
- reacting said sulfonic/sulfate acid dianion with a neutralizing agent to produce a dianion salt having a neutralized sulfate and a neutralized sulfonate group; and
- reacting said dianion salt with an agent capable of displacing said sulfate group with a sulfonate group to produce said monosulfonated alkylphenol polyalkylene oxide sulfonate; and
- extracting said monosulfonated alkylphenol polyalkylene oxide sulfonate with a low molecular weight oxygenated organic solvent.

4,959,491

#### DETERGENT GRADE OLEFINS, ALKYL BENZENES AND ALKYL BENZENE SULFONATES AND PROCESSES FOR PREPARING

Richard S. Threlkel, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 11, 1987, Ser. No. 24,742

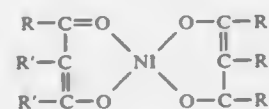
Int. Cl.<sup>5</sup> C07C 2/26, 143/24

U.S. Cl. 562—94

31 Claims

1. A process for preparing C<sub>12</sub> semi-linear olefins consisting essentially of the steps of:

- contacting a propylene feed with a selective dimerization catalyst, selective to the production of higher olefins, under dimerization conditions to produce a higher olefin product containing at least 60% by weight linear hexenes, under dimerization conditions and wherein said selective dimerization catalyst is selected from the group of:
- 1) a complex of a nickel chelate having the formula



wherein R and R' independently are hydrogen, alkyl or aryl of up to 10 carbon atoms, or haloalkyl or haloaryl of up to 10 carbon atoms, with the proviso that the two R' groups of each chelating ligand together with the adjacent carbon atoms to which they are attached, can form a six-membered carbocyclic aromatic ring or a halogen substituted six-membered carbocyclic aromatic ring have 1 to 4 halogen substituents selected from the group of fluoro, chloro, bromo or iodo; with an alkyl aluminum alkoxide having the formula



wherein each R'' independently is alkyl of up to 10 carbon atoms, preferably of up to 4 carbon atoms, m is a whole number from 1 to 2 inclusive and n is a whole number from 1 to 2 inclusive selected so that the sum of m and n equals 3;

- 2) a complex of bis(1,5-cyclooctadiene)nickel(O) with hexafluoro-2,4-pentanedione; and
- 3) a complex comprising transition metal complex selected from complexes of nickel and palladium with a fluoro-organic thiol or sulfide ligand, having a single sulfur atom in a ligating position and wherein the carbon atom adjacent the carbon atom to which the sulfur atom is attached has at least one fluoro substituent and with the proviso that said fluoro-organic thiol or sulfide does not contain any other ligating group or atom in a ligating position which will displace fluoro as a ligand, and an organometallic-reducing agent selected from the

4,959,494

#### OXIDATION OF ORGANIC COMPOUNDS WITH PYROCHLORE CATALYSTS

Timothy R. Felthouse, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 807,010, Dec. 11, 1985, abandoned.

This application Jul. 6, 1987, Ser. No. 70,091

Int. Cl.<sup>5</sup> C07C 51/21

U.S. Cl. 562—515

14 Claims

1. A method of producing organic compounds which comprises oxidizing alcohols, olefins, alkynes, carbohydrates and carbonyl compounds by contacting said compounds with molecular oxygen in the presence of noble metal pyrochlore compounds represented by



where A represents pyrochlore structure metal cation, B represents pyrochlore structure metal cation, which is selected from the group consisting of one or more of Ru, Rh, Ir, Os, and Pt, and wherein each of x and y is greater than or equal to zero and less than or equal to 1.0, in the liquid phase, at temperatures up to about 200° C., for a time sufficient to convert said compounds to the organic compounds.

4,959,492

#### PROCESS TO SYNTHESIZE AB-PBO MONOMER AND PHOSPHATE SALTS THEREOF

William J. Harris; Zenon Lysenko, both of Midland, and Carl W. Hurtig, Saginaw, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 14, 1989, Ser. No. 380,567

Int. Cl.<sup>5</sup> C07C 227/04

U.S. Cl. 562—453

34 Claims

1. A process for synthesizing an AB-PBO monomer, said process comprising the steps of:

- contacting a hydroxy-ester compound comprising:
  - an aromatic group;
  - a hydroxy group bonded to said aromatic group; and
  - an ester moiety having a carboxylate moiety linked to said aromatic group
 with a nitrating agent under conditions such that the aromatic group is nitrated in a position ortho to the hydroxy group, in an organic solvent, which is inert with respect to all reagents under reaction conditions;
- converting the nitrated hydroxy-ester of step (1) to a water-soluble nitrated hydroxy-benzoate salt and dissolving said water-soluble salt in an aqueous solvent; and
- contacting the water-soluble salt product of step (2) with a hydrogenating agent in the presence of a transition-metal-containing hydrogenation catalyst in an aqueous solution under conditions such that the nitrate group of said water-soluble salt is hydrogenated to form an amine group.

4,959,493

#### CARBOXYCYCLOPROPYLGLYCINE AND PROCESS FOR PRODUCING THE SAME

Yasufumi Ohfume; Kelko Shimamoto, both of Osaka, and Haruhiko Shinozaki, Omiya, all of Japan, assignors to Sun-tory Limited, Osaka, Japan

Filed Apr. 22, 1988, Ser. No. 184,920

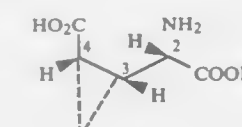
Claims priority, application Japan, Jan. 30, 1987, 62-163179

Int. Cl.<sup>5</sup> C07C 101/20

U.S. Cl. 562—506

1 Claim

1. (2S,3R,4S)-carboxycyclopropylglycine of the formula (1):



4,959,496

#### CHEMICAL PROCESS

Marvin M. Crutchfield; Lion-Liang Horng, both of Creve Coeur, and Robert G. Schultz, St. Louis, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 24, 1988, Ser. No. 235,854

The portion of the term of this patent subsequent to Aug. 21, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C07C 59/23

U.S. Cl. 562—583

49 Claims

1. A process for preparing ether carboxylates which comprises reacting in an alkaline reaction medium the salts of maleic acid and a carboxylic or polycarboxylic acid having a reactive hydroxyl group on a non-carbonyl carbon atom in the presence of calcium ion catalyst, reducing the pH of the reaction product to a range of from about 4 to about 6 whereby unreacted starting acids are precipitated, recovering said acids from the reaction product for reuse in said process.



4,959,497

## PROCESS FOR THE PRODUCTION OF WATER INSOLUBLE PEROXYCARBOXYLIC ACIDS

Manfred Dankowski, Karlsruhe, Fed. Rep. of Germany, assignor to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 688,359, Jan. 2, 1985, abandoned. This application Apr. 27, 1989, Ser. No. 344,483

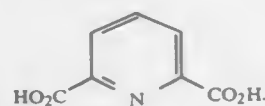
Claims priority, application Fed. Rep. of Germany, May 18, 1984, 3418450

Int. Cl.<sup>3</sup> C07C 409/00

U.S. Cl. 562—036

5 Claims

1. A process for the suppression of foam in peroxycarboxylic acid forming reactions comprising carrying out the peroxidation reaction of the carboxylic acid in the presence of a foam suppression agent, wherein said peroxidation reaction comprises reacting a carboxylic acid selected from aliphatic carboxylic acids having from 6 to 16 carbons and aromatic carboxylic acids having 7 to 9 carbons, with a peroxidation mixture comprising a mixture of H<sub>2</sub>O<sub>2</sub>, H<sub>2</sub>O and H<sub>2</sub>SO<sub>4</sub>, and wherein said foam suppression agent is 2,6-pyridine dicarboxylic acid, shown in the formula below:



and said foam suppression agent is present in the amount 0.35 to 1.6 wt % relative to the amount of H<sub>2</sub>O<sub>2</sub> present.

4,959,498

## PROCESS FOR THE PREPARATION OF MONOCARBOXYLIC ANHYDRIDES

Gerhard Luft, Ludwigstrasse 141a, Mühlthal, and Peter Trabold, Abornweg 19a, Dieburg, both of Fed. Rep. of Germany

Filed Mar. 17, 1989, Ser. No. 326,607

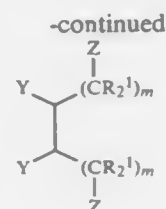
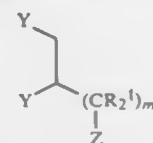
Claims priority, application Fed. Rep. of Germany, Apr. 2, 1988, 3811343

Int. Cl.<sup>3</sup> C07C 51/54

U.S. Cl. 562—891

15 Claims

1. In a process for the preparation of monocarboxylic anhydrides of the formula (RCO)<sub>2</sub>O by reaction of a carboxylic ester or dialkyl ether of the formula RCOOR or ROR, in which R in each case denotes the same alkyl radical having 1 to 4 carbon atoms, with carbon monoxide in the gas phase in the presence of iodine or bromine or compounds containing iodine or bromine at temperatures ranging from 130° to 400° C. and pressures of 1–150 bar, the improvement which comprises using a supported catalyst having a support material of inorganic oxides, mixed oxides, or activated carbon, supporting a noble metal chelate compound and optionally a base metal chelate compound, the noble metal chelate compound comprising a noble metal compound from group VIII of the periodic table and a chelating agent having organonitrogen, organophosphorus, organoarsenic, organosulfur or mercapto groups, wherein the chelating agent is substituted in its basic structure by alkyl or aralkyl groups and has one of the following structural formulae:



in which Y is —NR<sub>2</sub><sup>2</sup>, a nitrogen-containing aryl radical, —PR<sub>2</sub><sup>2</sup>, —AsR<sub>2</sub><sup>2</sup>, —SR<sup>2</sup> or —SH; Z is H, aryl, phenyl, R<sup>1</sup> is —H, C<sub>1</sub> to C<sub>3</sub>-alkyl; R<sup>2</sup> is C<sub>1</sub> to C<sub>6</sub>-alkyl, C<sub>5</sub> or C<sub>6</sub>-cycloalkyl, —C<sub>6</sub>H<sub>5</sub> or C<sub>6</sub>H<sub>5</sub>CH<sub>2</sub>—; m is 2–6.

4,959,499

## LIQUID POLYMERS CONTAINING URETHANE AND UREA MOIETIES AND HYDROXYL AND/OR AMINO END GROUPS AND A PROCESS FOR THE PREPARATION THEREOF

Robert F. Harris, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 926,692, Nov. 4, 1986. This application Jan. 2, 1987, Ser. No. 227

Int. Cl.<sup>3</sup> C08G 71/00, 71/02, 71/04

U.S. Cl. 564—59

7 Claims

1. A liquid polymer comprising (1) a backbone having: (a) at least one acyclic urethane moiety; (b) at least one acyclic urea moiety; and (c) at least two polyalkyleneoxy moieties; and (2) at least two terminal groups which are primary or secondary amine, hydroxyl or a combination thereof, wherein each urea of urethane moiety is separated from each urea or urethane moiety by a polyalkyleneoxy moiety.

4,959,500

## POLYBROMINATED BIS SULFONAMIDES

Robert A. Schleifstein, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

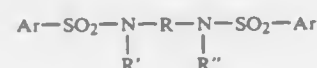
Filed May 23, 1989, Ser. No. 355,558

Int. Cl.<sup>3</sup> C07C 143/78

U.S. Cl. 564—82

8 Claims

1. A polybromoaromatic bis-sulfonamide containing in the molecule at least two bromoaromatic groups, from 18 to 30 carbon atoms (preferably 18 to 24), and from 6 to 14 bromine atoms substituted on the aromatic rings, said polybromoaromatic bis-sulfonamide being represented by the general formula



(a) where Ar are the same or different polybromoaromatic groups, R is a divalent aromatic or bromoaromatic group, and R' and R'' are independently hydrogen atoms, hydrocarbon groups or halohydrocarbon groups in which the halogen atoms are chlorine or bromine, the total number of bromine atoms substituted on the aromatic rings of the groups designated as Ar and R falling in the range of 6 to 14.

4,959,501

## PROCESS FOR THE PREPARATION OF 2-(2-CHLOROETHOXY)-BENZENESULFONAMIDE

Reinhard G. Hanreich, Basle, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 93,436, Sep. 4, 1987, Pat. No. 4,806,528. This application May 23, 1988, Ser. No. 197,480

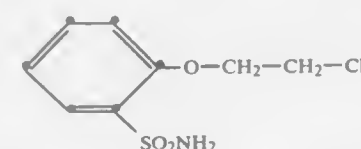
The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> C07C 143/78

U.S. Cl. 564—89

13 Claims

1. A process for the preparation of 2-(2-chloroethoxy)-benzenesulfonamide of formula I



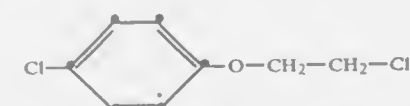
which process comprises the etherification of 4-chlorophenol of formula II



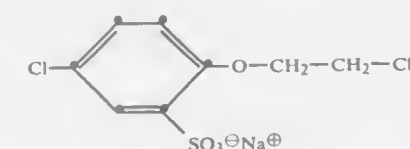
with ethylene carbonate at a temperature between +130° C. and +150° C. and chlorination of the resulting 4-(2-hydroxyethoxy)-chlorobenzene of formula III



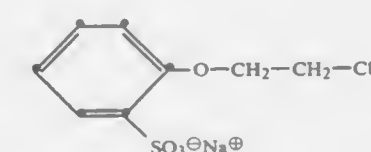
with phosgene or thionyl chloride at a temperature between +70° C. and +90° C. to give 4-(2-chloroethoxy)-chlorobenzene of formula IV



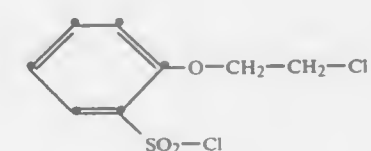
which is converted with chlorosulfonic acid, at a temperature between —20° C. and +60° C. and subsequent neutralization with sodium hydroxide to the sulfonic acid sodium salt of formula V



which is hydrogenated at a temperature between +20° C. and +70° C. to the compound of formula VI



which is subsequently reacted with phosgene at a temperature between +60° C. and +120° C. to the sulfonic acid chloride of formula VII



which is reacted with ammonia at a temperature between 0° C. and +100° C. to the sulfonamide of formula I.

4,959,502

## CATALYSTS AND THEIR USE IN THE HYDROLYSIS OF NITRILES

David Farrar, Gerald P. Benn, both of Bradford, and Seraj A. M. Karolia, Batley, all of England, assignors to Allied Colloids Ltd., Great Britain

Continuation-in-part of Ser. No. 52,030, May 19, 1987, Pat. No. 4,906,776. This application Nov. 22, 1988, Ser. No. 275,529

Claims priority, application United Kingdom, Nov. 23, 1987, 8727379

The portion of the term of this patent subsequent to Mar. 6, 2007, has been disclaimed.

Int. Cl.<sup>3</sup> C07C 231/06, 233/09; B01J 23/84, 25/00

U.S. Cl. 564—127

12 Claims

1. A process of making an amide of the formula RCONH<sub>2</sub> where R is a hydrocarbon of 1 to 10 carbon atoms by hydrolysis of the corresponding nitrile RCN in an aqueous medium containing a copper catalyst containing vanadium, characterized in that the catalyst has been made by providing a black copper catalyst and then improving its activity by contacting it with an aqueous solution of a water soluble vanadium compound and then rinsing the catalyst with water until the catalyst is substantially free of water soluble vanadium compound.

4,959,503

## DIARYLALKANOLIDS HAVING ACTIVITY AS LIPOXYGENASE INHIBITORS

David T. Connor, Ann Arbor, Mich., and Daniel L. Flynn, Mundelein, Ill., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 16,897, Mar. 3, 1987, Pat. No. 4,810,716, which is a continuation-in-part of Ser. No. 851,003, Apr. 11, 1986, abandoned. This application Nov. 2, 1988, Ser. No. 266,035

Int. Cl.<sup>3</sup> C07C 49/175, 251/40

U.S. Cl. 564—265

5 Claims

1. 1-(3-bromo-4-hydroxy-5-methoxyphenyl)-5-phenyl-1-penten-3-one.

4. 1-(4-hydroxy-3,5-dimethoxyphenyl)-5-phenyl-1-penten-3-one, (E,E)-oxime.

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## ELECTRICAL

4,959,504

## MAGNETICALLY AND RADIO FREQUENCY SHIELDED ENCLOSURE

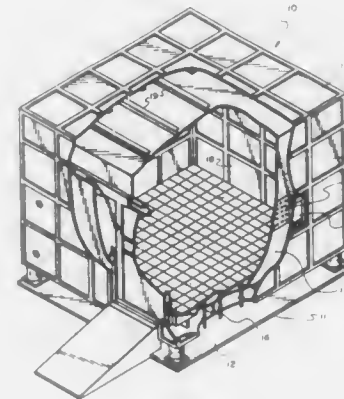
Eric J. Yarger, Idaho Falls, Id.; Rex D. Yarger, Brigham City, Utah, and Gary D. Clegg, Idaho Falls, Id., assignors to Mag-nashield Technologies, Inc., Idaho Falls, Id.

Filed Nov. 22, 1988, Ser. No. 274,864

Int. Cl.<sup>5</sup> H05K 9/00

U.S. Cl. 174—35 MS

12 Claims



1. A magnetic and radio frequency-shielded room comprising, in combination:

an aluminum sheet placed upon the existing floor of the building in which the room is to be placed; an outer enclosure comprised of four walls, a ceiling, and a floor, each side of said enclosure being constructed of mumetal sheets abutted together, the seam formed by said abutting of said sheets being pressure sealed by application of a mumetal strip overlayed by an aluminum flat bar strip, both strips then being attached to said mumetal sheets by screw means screwed through mumetal sheets to underlying structural members;

a plurality of pneumatic isolators attached to the bottom of said outer enclosure raising said enclosure above said aluminum sheet;

an inner enclosure disposed within, and of less dimensions than, said outer enclosure, comprised of four walls, a ceiling, and a floor, each side of said enclosure being constructed of mumetal sheets abutted together, the seam formed by said abutting of said sheets being pressure sealed by application of mumetal strip overlayed by an aluminum flat bar strip, both strips then being attached to said mumetal sheets by screw means screwed through mumetal sheets to the underlying structural members;

a sheet of underlying structural material underlying said enclosure and said connected and sealed mumetal sheets of said inner enclosure, said sheet of underlying structural material being screwed to said mumetal sheets;

an inner work floor comprised of layers of plywood overlayed by self adhesive tiling material;

a plurality of fiberglass dowels, the lower end of each being permanently affixed within an aluminum pipe stub permanently welded to said aluminum sheet, and the upper end of each said dowel being affixed within an aluminum pipe stub sunk into the bottom layer of said plywood of said inner floor, each dowel passing through said floor of said outer enclosure and said floor of said inner enclosure through holes drilled in said floor of said outer enclosure and through holes drilled in said floor of said inner enclosure, and through aluminum flat bar attached to and extending the length of the bottom surface of said inner floor, said holes being provided with magnetic wave guides and RF wave guides;

a crossed network of wooden beams disposed upon the

upper surface of said floor of said outer enclosure separating said outer enclosure from said inner enclosure; "I" beams welded to the upper surface of the ceiling of said inner enclosure;

a cable feed-through system comprised of a hooded plate disposed on said outer wall of said outer enclosure with honeycomb or rectangular cable feed through openings; an enclosure vent system comprised of mumetal tube perforated mumetal plate, aluminum collar, and plastic flex hose connecting two vent subassemblies.

4,959,505

## ELECTRICAL COMPONENT IN CHIP STRUCTURE AND METHOD FOR THE MANUFACTURE THEREOF

Guenter Ott, Schwanberg, Austria, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

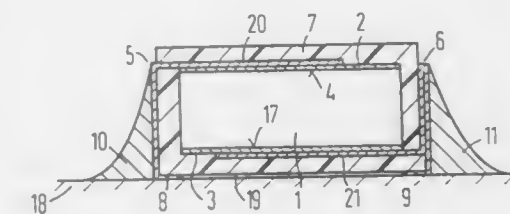
Filed Jan. 27, 1989, Ser. No. 302,682

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1988, 3804064

Int. Cl.<sup>3</sup> H01G 1/14; H01C 1/14

U.S. Cl. 174—52.2

4 Claims



1. An electrical component in the form of a chip structure adapted for fastening to a circuit board, comprising a wafer-shaped or lamina-shaped body (1) of material having a predetermined electrical characteristic, said body being provided with conductive coatings (2, 3) at two large end faces that lie at opposite ends of said body, a pair of ribbon-shaped terminal elements (5, 6) for connecting said coatings (2, 3) to spaced-apart contact locations (8, 9) of said component to be situated on a printed circuit board (18), and said body being pressure-coated with a lamina-shaped or cuboid insulating coat (7), characterized in that

(a) said terminal elements (5, 6) are planarly secured to the coatings (2, 3) and extend in first and second planes toward the outside of said component, through the insulating coat (7) approximately in the plane of said end faces of the body (1);

(b) outside of the insulating coat (7), that terminal element (5) which is secured to the upperside (4) of the body (1) relative to said circuit board (18) being bent off from said first plane in a downward direction, and then extending along the outer surface of said insulating coat (7) and is then bent over onto the underside (19) of said component;

(c) outside of said insulating coat (7), the terminal element (6) which is secured to the underside (17) of the body (1) is first bent off from said second plane in an upward direction, and then extends along the surface of the insulating coat (7) until it reaches approximately said first plane, and is then bent over by 180° in this level, end, lying against itself, is likewise bent over under the underside (19) of the insulating coat (7).



4,959,506

## JUNCTION BOX

John Petty, Bonnet Bay, and Sandy McNeil, Hunters Hill, both of Australia, assignors to Elconnex Pty. Limited, New South Wales, Australia

PCT No. PCT/AU87/00282, § 371 Date Apr. 11, 1988, § 102(e) Date Apr. 11, 1988, PCT Pub. No. WO88/01447, PCT Pub. Date Feb. 25, 1988

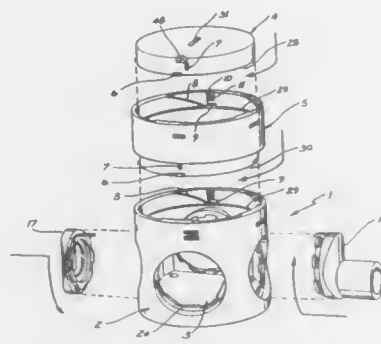
PCT Filed Aug. 21, 1987, Ser. No. 198,817

Claims priority, application Australia, Aug. 21, 1986, PH7588; May 18, 1987, P12014

Int. Cl.<sup>5</sup> H02G 3/14

U.S. Cl. 174—65 R

18 Claims



1. A junction box comprising a body, a plurality of ports of the same diameter formed in the body located around the body; each port having an inwardly radially extending wall with cutouts of at least two different sizes located around the periphery thereof, and a projection extending substantially radially inwardly into said port; and

at least one connector adapted to engage in any one of said ports, each connector having: a set of castellations at or adjacent one end, and being of a size complementary to the cutouts in said ports;

an annular recess located between an abutment surface and said castellations;

resilient ramp means with a locking recess at said one end of the connectors; and

tightening means located on said castellations facing said abutment surface whereby to connect said connector to a port, the castellations are aligned with, and pushed through their respective cutouts and the connector rotated such that the said projection rides up said ramp means and engages in said locking recess, with the said annular wall being held in said annular recess and being urged into abutment with said abutment surface by said tightening means so that the connector is releasably locked against rotational and lateral movement in said port and whereby to release the connector the ramp is deflecting so as to free the said projection from said locking recess to allow for rotation and then withdrawal of the connector.

11. A junction box having a circular opening; an annular wall extending from said opening to an inwardly projecting shoulder;

at least one recess located in said annular wall adjacent the inwardly projecting shoulder and;

a inwardly extending projection having a ramped surface and a locking recess located adjacent the projection;

a circular lid having a cylindrical outer wall with a first series of projections located thereon, a locking projection, and a recess in the lid adjacent said locking projection whereby when said lid is placed in said opening and rotated the first series of projections enter into the respective recesses holding the lid against axial movement while the locking projection rides up and over the ramped surface and locks into said locking recess locking the lid against rotational movement and whereby to remove the lid a tool

is placed in the recess in the lid and the wall of the opening is deflected to allow the locking projection to disengage from the locking recess to allow removal of the lid.

4,959,507

## BONDED CERAMIC METAL COMPOSITE SUBSTRATE, CIRCUIT BOARD CONSTRUCTED THEREWITH AND METHODS FOR PRODUCTION THEREOF

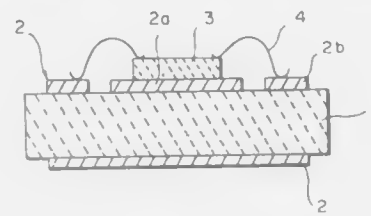
Tadashi Tanaka, Chiba; Kazuo Matsumura, Kanagawa; Hiroshi Komorita, Kanagawa, and Nobuyuki Mizunoya, Kanagawa, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 25, 1989, Ser. No. 342,843

Claims priority, application Japan, Apr. 25, 1988, 63-101681 Int. Cl.<sup>5</sup> H05K 1/00

U.S. Cl. 174—260

6 Claims



1. A bonded ceramic-metal composite substrate comprising a ceramic substrate having opposite surfaces and a copper sheet having one face directly bonded to one of the surfaces of the ceramic substrate, wherein the median surface roughness ( $R_a$ ) of the outer surface of the copper sheet is not greater than  $3 \mu\text{m}$ , and the maximum surface roughness ( $R_{\text{max}}$ ) of the outer surface of the copper sheet is not greater than  $18 \mu\text{m}$ .

4,959,508

## SUBMERSIBLE SPLICE APPARATUS

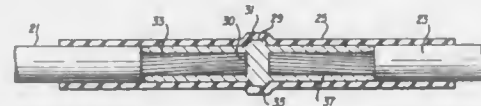
Eugene W. McGrane, Ormond Beach, Fla., assignor to Homac Mfg. Company, Ormond Beach, Fla.

Filed Aug. 4, 1989, Ser. No. 389,478

Int. Cl.<sup>5</sup> H01R 4/20

U.S. Cl. 174—84 C

4 Claims



1. Submersible splice apparatus for interconnecting insulated cables, said apparatus comprising

a deformable metal splice having a predetermined longitudinal length;

a radial rib integral with and extending outwardly from said splice, said rib being located substantially centrally on said splice;

a resilient splice cover slidably secured about and removable from said deformable splice, said splice cover having a longitudinal length greater than the longitudinal length of said splice and having an internal diameter smaller than the external diameter of said splice so as to ensure an interference fit about said splice; and

a recess extending outwardly from the interior of said splice cover, said recess having an interior dimension substantially the same as the exterior dimension of said radial rib on said splice and receiving said radial rib therein, said recess being located substantially centrally in said splice cover.

4,959,509

## GROMMET ASSEMBLY FOR MAIN AND AUXILIARY WIRE HARNESSES

Hideharu Takeuchi, Aichi, and Tsutomu Sakata, Mie, both of Japan, assignors to Sumitomo Wiring System, Ltd., Yokkaichi, Japan

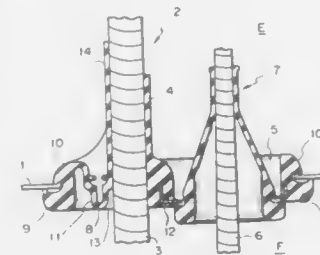
Filed Dec. 26, 1989, Ser. No. 456,749

Claims priority, application Japan, Dec. 27, 1988, 63-168484[U]

Int. Cl.<sup>5</sup> H01B 17/26; H02G 3/22

U.S. Cl. 174—153 G

1 Claim



1. A grommet assembly comprising a main grommet unit provided with a portion through which a main wire harness is to be put, said main grommet unit comprising a thick large diameter tubular portion and a thin small diameter tubular portion, said main grommet unit being further characterized in that an opening is formed in a part of a flange portion including said large diameter tubular portion; a separate grommet unit also comprising a thick large diameter tubular portion and a thin small diameter tubular portion fitted into said opening; and a hard plate embedded in that part of said flange portion confronting the outer periphery of said opening.

4,959,510

## PRINTED CIRCUIT BOARD

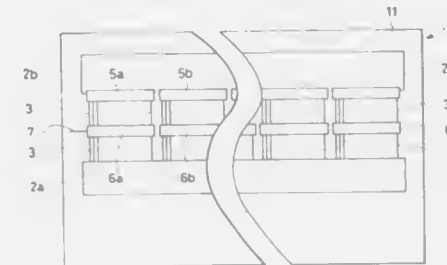
Yoshiki Matsusaka, and Susumu Ushiki, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed May 19, 1989, Ser. No. 354,221

Claims priority, application Japan, May 25, 1988, 63-125797 Int. Cl.<sup>5</sup> H05K 1/00

U.S. Cl. 174—261

8 Claims



1. A printed circuit board adapted for mounting devices thereon, comprising:

a glass sheet;

a power supply conductor, mounted on said glass sheet in a power supply conductor region thereof, for conducting power for the devices;

bonding pads mounted on said glass sheet in bonding pad regions thereof;

signal line conductors, mounted on said glass sheet in signal line conductor regions thereof, for conducting signals for the devices;

said power supply conductor, said bonding pads and said signal line conductors each comprise a first layer of a thin film of indium-tin oxide or tin oxide formed on said glass

sheet in said power supply conductor region, said bonding pad conductor regions and said signal line conductor regions, respectively;

said power supply conductor and said bonding pads each further comprise a second layer of conductive metal formed on said first layer in said power supply conductor region and said bonding pad regions, respectively; and said power supply conductor further comprises a third layer of a relatively thick conductive metal formed on said second layer in said power supply conductor region.

7. A method of producing a printed circuit board, adapted for mounting devices thereon and comprising a glass sheet, a power supply conductor mounted on the glass sheet in a power supply conductor region thereof for conducting power for the devices, bonding pads mounted on the glass sheet in bonding pad regions thereof, and signal line conductors mounted on the glass sheet in signal line conductor regions thereof for conducting signals for the devices, comprising the steps of:

providing the glass sheet;

forming a thin film of indium-tin oxide or tin oxide on the glass sheet in the power supply conductor region, the

bonding pad regions and the signal line conductor regions;

forming a first metal plating layer on said thin film in the power supply conductor region and the bonding pad regions; and

forming a metal paste layer or a second, relatively thick, metal plating layer on said first metal plating layer in the power supply conductor region.

4,959,511

## PEN CORD TENSIONING DEVICE

Graham P. Lloyd, Fremont, and Dennis R. Mitchell, San Jose, both of Calif., assignors to Grid Systems, Fremont, Calif.

Filed Jan. 12, 1989, Ser. No. 364,924

Int. Cl.<sup>5</sup> G08C 21/00

U.S. Cl. 178—18

15 Claims



1. An electrical conductor tensioning apparatus comprising a first electrical conductor;

a device in electrical communication with the electrical conductor, the electrical conductor having a point which is a first predetermined distance from the device;

means for allowing the point on the electrical conductor to be moved a second predetermined distance away from the device without breaking the electrical communication between the electrical conductor and the device, said means for allowing comprising a spring in electrical communication with the electrical conductor and with the device.

4,959,512

## APPLIANCE TIMER WITH IMPROVED TERMINAL ASSEMBLY

Ronald E. Cole, Greenwood; Daniel K. Amonett, and Steven W. Smock, both of Indianapolis, all of Ind., assignors to Emhart Industries Inc., Towson, Md.

Filed Mar. 29, 1989, Ser. No. 330,159

Int. Cl.<sup>5</sup> H01H 43/10, 1/58; H01R 9/00, 29/00

U.S. Cl. 200—38 R

10 Claims

1. An appliance timer comprising:

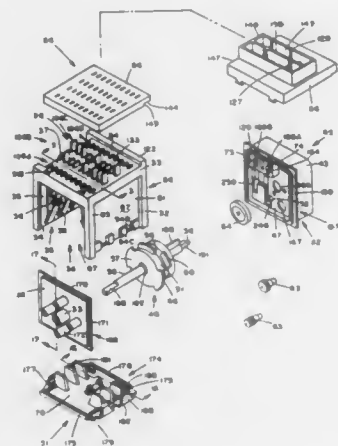
a motor-driven cam;

electrical switches responsive to said cam, each of said switches comprising a pair of contacts;

a plurality of electrical terminals for selective connection to

circuits in the appliance, at least one of which is electrically connected to at least one of said switches; housing means for supporting said cam, said switches, and said terminals;

said terminals defining  $n$  rows of terminals where  $n$  is 2 or more, each row having at least one terminal in it, and  $m$  of



said rows of terminals containing a plurality of longer terminals which extend further from said housing in a predetermined direction than terminals in the other rows of said terminals,  $m$  being less than  $n$  and at least one; and cover means for covering said other rows of terminals while leaving said longer terminals in said  $m$  rows exposed.

4,959,513

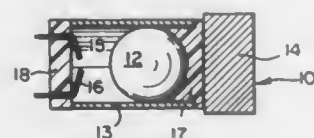
# MAGNETICALLY BIASED DEVICE INCORPORATING A FREE MACHINING, NON-MAGNETIC, AUSTENITIC STAINLESS STEEL

Guvant N. Maniar, Bern Township, Berks County, Pa., assignor to Carpenter Technology Corporation, Reading, Pa.  
Filed Nov. 3, 1989, Ser. No. 431,480

Int. Cl.<sup>5</sup> H01H 35/14

U.S. Cl. 200—61.45 M

6 Claims



1. In a magnetically biased accelerometer having a tube and a magnetically biased movable member positioned within said tube in close spaced relation to the interior wall thereof, said tube being formed of an alloy consisting essentially of, in weight percent, about

	w/o
C	0.04-0.10
N	0.03-0.07
Mn	2.00 max.
Si	1.00 max.
P	0.045 max.
S	0.015-0.10
Cr	19.00-24.00
Mo	0.75 max.
Ni	12.00-18.00

the balance essentially iron; said tube containing no more than about 2 v/o ferrite as determined by the DeLong diagram, said tube having a coefficient of thermal expansion of about

$14.5 \times 10^{-6}$  to  $16.5 \times 10^{-6}$  per °C. within the temperature range of about -51° to 121° C.

4,959,514

# FUSIBLE ELECTRIC SWITCH

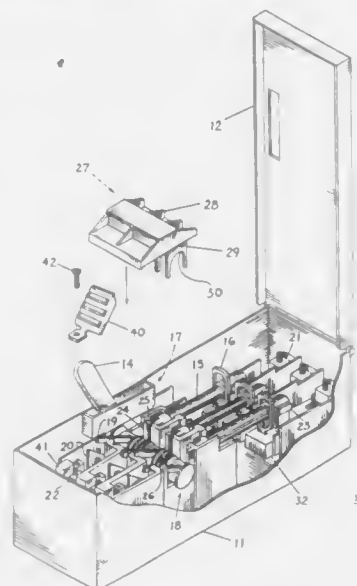
Dean A. Robarge, New Britain; John A. Morby, Farmington; Andre J. M'Sadoques, Southington, and Robert G. Markowski, Wallingford, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed Sep. 11, 1989, Ser. No. 405,172

Int. Cl.<sup>5</sup> H01H 33/08

U.S. Cl. 200—144 R

14 Claims



1. An electric fused disconnect switch comprising: an enclosure including a metallic case and cover, said cover being hingeably connected to said case to define a switch interior;
- a pair of line terminals at one end of said case for connection with an electric power distribution circuit and a pair of load terminals at an opposite end of said case for connection with an associated load;
- an operating mechanism and a rotor within said case and arranged for moving a plurality of contact blades between closed and open positions within a corresponding plurality of contact stabs under the urgency of an operating handle;
- a plurality of arc chutes arranged for cooling and extinguishing arcs that occur when said contact blades and stabs become connected and disconnected while said line lugs are connected with said power distribution circuit;
- an insulative arc gas controller arranged over said arc chutes, said arc gas controller having sealing means for sealing arc-generated gases from said interior and exhaust means for exhausting said gases in a predetermined direction outside said interior; and
- a first insulative base proximate said line terminals and arranged under said arc gas controller, said sealing means comprising first and second projections extending from said arc gas controller on opposite sides of said rotor and corresponding first and second barriers formed within said insulative base on said opposite side, said first and second projections being received within said first and second barriers.

4,959,515

# MICROMECHANICAL ELECTRIC SHUNT AND ENCODING DEVICES MADE THEREFROM

Paul M. Zavracky, Norwood, and Richard H. Morrison, Jr., Taunton, both of Mass., assignors to The Foxboro Company, Foxboro, Mass.

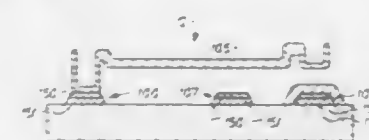
Division of Ser. No. 606,065, May 1, 1984, Pat. No. 4,674,180.

This application Feb. 6, 1987, Ser. No. 12,092

Int. Cl.<sup>5</sup> H01H 57/00

U.S. Cl. 200—181

31 Claims



1. Micromechanical shunt exhibiting hysteresis, comprising:
  - (a) an insulating substrate having a planar top surface;
  - (b) a first contact terminal on said planar top surface;
  - (c) a second contact terminal on said planar top surface;
  - (d) a cantilever beam having a free end and a fixed end which is attached to said first contact terminal, said free end being suprajacent said second contact terminal;
  - (e) means for establishing an electrostatic charge attraction between said cantilever beam and said second contact terminal; and
  - (f) a resistance layer intermediate said cantilever beam and said second contact terminal;
 whereby said free end of said cantilever beam may be deflected toward said second contact terminal by establishing an electrostatic charge between said first and second contact terminals.

4,959,516

# SUSCEPTOR COATING FOR LOCALIZED MICROWAVE RADIATION HEATING

Laurence E. Tighe, Milford, and Tim Parker, Shrewsbury, both of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Continuation-in-part of Ser. No. 304,734, Jan. 31, 1989, Pat. No. 4,876,423, which is a continuation-in-part of Ser. No. 194,260, May 16, 1988, Pat. No. 4,864,089. This application May 9, 1989, Ser. No. 348,012

The portion of the term of this patent subsequent to Oct. 24, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> H05B 6/80

U.S. Cl. 219—10.55 F

13 Claims



1. A microwave susceptor coating panel which comprises a heat resistant substrate and a susceptor coating on said substrate;
  - said susceptor coating comprising a combination of metallic particles and galvanic couple alloy particles, and a heat resistant polymeric binder wherein said coating converts microwave radiation to heat sufficient to cause heating to a temperature of at least 350° F. (177° C.) within about 4 minutes at a conventional microwave power output level of 700 watts at a frequency of 2450 Megahertz.

4,959,517

# MICROWAVE COOKING ASSEMBLY OF A MIXING BOWL, LOCKABLE TOP ASSEMBLY, SUPPORTING A STIRRER POWER ASSEMBLY

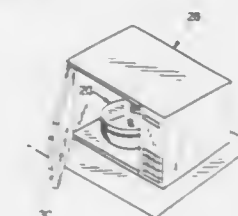
Jamice A. Jump, P.O. Box 1281, Ellensburg, Wash. 98926, and Thomas E. Hale, 9095 SW Taylor, Portland, Oreg. 97225

Filed Jan. 12, 1989, Ser. No. 296,515

Int. Cl.<sup>5</sup> H05B 6/78

U.S. Cl. 219—10.55 E

24 Claims



1. A microwave cooking assembly comprising:
  - (a) a mixing bowl
  - (b) a cover on said mixing bowl; and
  - (c) a self-contained stirrer power assembly in said cover,
  - (d) a stirring blade assembly depending from said stirrer power assembly and projecting into said bowl for wiping and mixing functions in said bowl,
  - (e) said mixing bowl, cover, stirrer power assembly and said stirring blade assembly "being independent of and freely movable into and out of a microwave oven and " comprising heat resistant plastic materials capable of operating up into the range of 300 to 375 degrees Fahrenheit and being compatible with microwave use, whereby foods in said bowl are capable of being cooked in a microwave oven and simultaneously stirred.

4,959,518

# METHOD OF WELDING STAINLESS STEEL STUDS

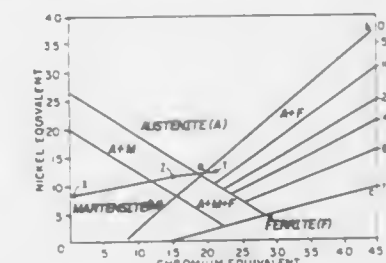
Samuel D. Reynolds, Jr., Oviedo, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 30, 1989, Ser. No. 359,020

Int. Cl.<sup>5</sup> B23K 9/20

U.S. Cl. 219—99

10 Claims



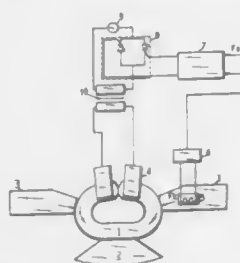
1. A method for stud welding stainless steel studs to carbon steel or low alloy steel components and producing a ductile weld therebetween, comprising:
  - determining the chromium equivalent and nickel equivalent contents of the steel component;
  - providing a stainless steel stud having a chromium equivalent and nickel equivalent content which, upon stud welding thereof with dilution by the steel from said steel component, will provide a structure of austenite plus ferrite in said resulting structure; and
  - welding said stainless steel stud to said steel component such that the weld metal, on admixture of the stud metal and the steel component metal, will produce a structure of austenite and ferrite in the resulting weld structure and thus a ductile weld between said stud and said component.



**4,959,519**  
**CONTROLLED PRESSURE BUTT WELDING PROCESS AND APPARATUS FOR CARRYING IT OUT**  
 Karl-Christoph Exner, Franz Reichow, and Horst Becker, all of Köln, Fed. Rep. of Germany, assignors to Meyer, Roth & Pastor Maschinenfabrik GmbH  
 Filed Feb. 23, 1989, Ser. No. 315,418  
 Claims priority, application Fed. Rep. of Germany, Feb. 27, 1988, 3806246

Int. Cl.<sup>5</sup> B23K 11/02  
 U.S. Cl. 219—110

7 Claims



1. A pressure butt welding process for welding chain links bent from round wire, comprising the steps of: pressing together areas of a workpiece to be welded with upsetting dies which are moved in a controlled manner by continuous cam disks; measuring pressure forces exerted on the workpiece areas by the upsetting dies; applying a welding voltage to the workpiece; and continuously adjusting the welding voltage as a function of the measured pressure forces.

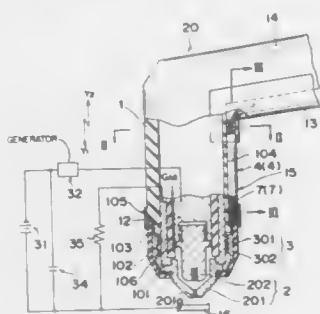
**4,959,520**  
**DETECTION MEANS FOR AN ELECTRIC ARC TORCH NOZZLE**

Toshihiko Okada, Takatsuki, and Masanobu Uchida, Suita, both of Japan, assignors to Daihen Corporation, Osaka, Japan  
 Filed Feb. 9, 1989, Ser. No. 308,440

Claims priority, application Japan, Feb. 15, 1988, 63-18542[U]; May 20, 1988, 63-67109[U]  
 Int. Cl.<sup>5</sup> B23K 9/00

U.S. Cl. 219—121.48

3 Claims



1. Electric arc torch having detection means for an electric torch nozzle, said electric arc torch having a handle portion and an end portion, said handle portion axis and said end portion axis crossing at a predetermined angle, said end portion having a power feeding member and a nozzle covering the power feeding member, said power feeding member and said nozzle being arranged coaxially on said end portion of the torch, said nozzle being provided with a pair of detection means for detecting a mounted and dismounted state of said nozzle, said detection means having a detection pin being slidable in parallel with the axis of said power feeding member,

said detection means further having a compression spring for biasing said detection pin, said detection means comprising: a pair of holders for holding respective detection means formed separately from said end portion of the torch; two grooves for containing said two holders therein formed on the periphery of said end portion at positions not included in a plane including the axis of said end portion which is perpendicular to a plane including both axes of said handle portion and said end portion, each said groove extending in the axial direction of said end portion; and a cover member for covering at least upper end portions of said pair of holders fitted into said grooves to fix said pair of holders, said cover member being detachably fixed to said end portion of the torch.

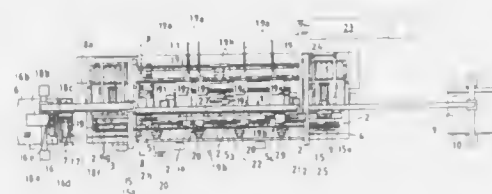
**4,959,521**  
**METHOD AND APPARATUS FOR FASTENING PARTS SECURELY IN PLACE USING A BAND**

Iwao Maruyama, and Kimitake Uzuyama, both of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 31, 1989, Ser. No. 401,253  
 Claims priority, application Japan, Sep. 8, 1988, 63-223443; Sep. 8, 1988, 63-223444

Int. Cl.<sup>5</sup> B23K 26/00  
 U.S. Cl. 219—121.63

6 Claims



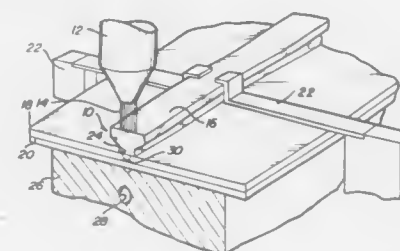
1. A method of fastening parts securely in place by a band comprising winding a band around each of tight-binding portions of a plurality of parts fitted over an article to which said parts are to be fastened using a band winding device and applying a laser beam emitted from a laser beam irradiation head to an overlapped portion of both ends of the band for welding thereof, said method further comprising the steps of: conveying the article successively to a plurality of working stations, each equipped with a band winding device, and performing at each of the working stations the band-winding for each of the predetermined tight-binding portions of the parts; and

dividing a plurality of band winding devices disposed at said working stations into at least two groups, one comprising those in front along the conveying direction in which the article is conveyed and the other comprising those in the rear, providing one laser beam irradiation head per group of band winding devices, moving the laser beam irradiation head provided to each group successively to each of a plurality of positions at which it is aligned with one of the band winding devices belonging to the corresponding group so as to be prepared for welding of the band, wherein said movement of one of the laser beam irradiation heads is alternated with that of the other one and, while said one laser beam irradiation head is being moved, leading a laser beam emitted from a common laser generator into the other laser beam irradiation head to carry out the welding.

**4,959,522**  
**TRANSPARENT PRESSURE FOOT**  
 Cristiano Rossi, Birmingham, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Jan. 12, 1990, Ser. No. 464,266  
 Int. Cl.<sup>5</sup> B23K 26/06  
 U.S. Cl. 219—121.75

10 Claims

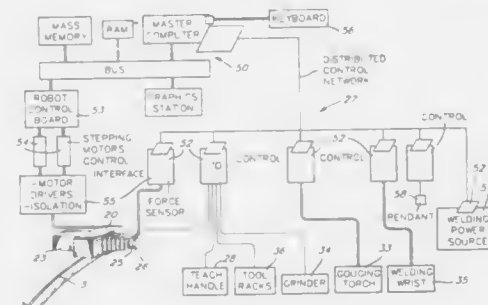


1. An apparatus for applying laser energy having a predetermined frequency band to a material, said apparatus comprising: a foot means for receiving and transmitting said laser energy to said material, said foot means having a contour surface for directing and concentrating portions of said laser energy received by said foot toward said material, said contour surface comprising side portions of said foot means and having generally the shape of a parabola in cross section, said contour surface including a reflective coating, said foot means being substantially transparent to said predetermined frequency band; said foot means having a top surface for receiving said laser energy, and a bottom surface for making contact with said material, said bottom surface having a contour that conforms to a desired contour for said material wherein said laser energy exits said foot means through said bottom surface; and clamping means associated with said foot means for positioning said foot means in contact with said material and exerting a predetermined force thereon.

**4,959,523**  
**METHOD AND APPARATUS FOR AUTOMATICALLY SENSING THE CONFIGURATION OF A SURFACE AREA AND EFFECTING A WORK FUNCTION THEREON**  
 Jean-Luc Fihey, Ste. Julie; Bruce Hazel, Montreal; Antonio Di Vincenzo, Ville d'Anjou; Mark Tinkler, Toronto, and Scott McNabb, Crescent Etobicoke, all of Canada, assignors to Hydro-Quebec, Quebec and Ontario Hydro, Ontario, both of, Canada

Filed Nov. 18, 1988, Ser. No. 273,075  
 Int. Cl.<sup>5</sup> B23K 9/12  
 U.S. Cl. 219—124.34

28 Claims



1. An apparatus for automatically sensing the configuration of a damaged surface area and being provided an arc gouging tool, a welding tool, and a grinding tool whereby to gouge damaged areas and fill same with weld material to at least the

surface profile of said surface in said working environment and grinding said filled areas flush with said surface of said working environment, said apparatus comprising a track, bendable to a profile enabling the apparatus to work without any collision with its environment while keeping full access to the work area, the geometry of said track being generally unknown to the control circuit of the robot, a motor-actuated robot member connectible to said track, said robot member having a motorized element provided with track coupling means engaged with said track for displacing said robot member at a predetermined base and position along said track, a working arm displaceably coupled to said robot member, said working arm having one or more working tools connectible thereto, a control circuit associated with said robot member for displacing same and operating said working arm and tool, a sensor connected to said working arm and having a probe to sense a distance which is measured along a normal of said surface or any surface calculated by said control circuit assumed to be representative of said surface in a delineated working environment of said robot member and working arm, said sensory feeding information data of said X and Y and Z coordinates to said control circuit to determine the geometry of the surface of said working environment and contour of areas in said working environment requiring a work procedure to be effected by said one or more working tools.

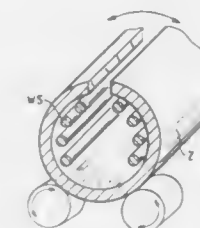
**4,959,524**  
**APPARATUS AND EVAPORATOR FOR METALLIZING FOILS**

Andre de Rudnay, 16 chemin de Renens, 1004 Lausanne, CH, Switzerland

Filed May 18, 1988, Ser. No. 195,519  
 Claims priority, application Fed. Rep. of Germany, Sep. 20, 1986, 3632027

Int. Cl.<sup>5</sup> C23C 14/26  
 U.S. Cl. 219—275

10 Claims



1. An evaporator especially for directing and condensing on a moving substrate high energy vapor beams of reactive metals, comprising in combination a hollow body having at least one opening shaped to substantially compress into a beam all vapor produced by said evaporator, within said hollow body, a container for holding liquid evaporant, said container being made of a photon absorbing and chemically resistant material, also within said hollow body, a radiation heater for heating said liquid evaporant indirectly through contact with said photon absorbing contained, and also directly, through direct photon absorption, the improvement wherein said evaporator comprises means for substantially distributing said liquid evaporant also directly heated by photon absorption, into a plurality of photon absorbing small containers shaped as capillaries, whereby said liquid evaporant is held by capillary forces in any convenient position and is more efficiently heated to fast evaporation through increased heat transmission due to the increased container/liquid interface, the capillaries being positioned around said radiation heater, whereby said vapor releasing capillaries are simultaneously useful as partial heat insulators.

4,959,525

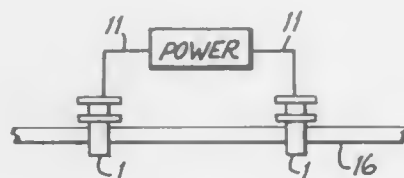
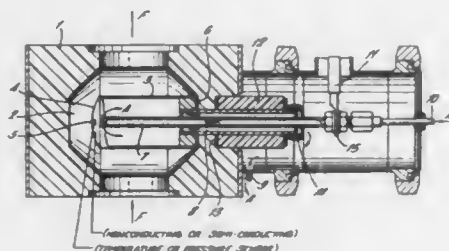
## APPARATUS FOR HEATING AN ELECTRICALLY CONDUCTIVE FLOWABLE MATERIAL FLOWING THROUGH A PIPELINE

Robert Stirling, Merseyside, and Steven A. Coombes, Crawley, both of England, assigns to Electricity Association Services Limited and APV U.K. Limited, both of, United Kingdom, part interest to each

Filed Feb. 7, 1989, Ser. No. 307,394

Claims priority, application United Kingdom, Feb. 9, 1988, 8802957

Int. Cl.<sup>3</sup> H05B 3/60, 1/02; A23L 3/32; F24H 1/10  
U.S. Cl. 219—291 9 Claims



1. Heating apparatus for heating an electrically conductive flowable medium, comprising a pipe through which, in use, a medium to be heated flows, the pipe having an electrical conductivity no greater than that of the medium; at least two heating electrodes arranged at spaced locations along the pipe and each having a surface exposed to the medium flowing in the pipe; and supply means for applying an alternating electrical supply across the heating electrodes such that an alternating current flows in the medium between the electrodes and heats the medium, in which apparatus each heating electrode is cylindrical and is arranged in the pipe with its axis transverse to the direction of flow of the medium in the pipe, and has only one end secured to the wall of the pipe whereby the heating electrode is supported by the wall of the pipe in the manner of a cantilever beam with its other end spaced from the inner surface of the pipe, electrical connection to each heating electrode being made through the wall of the pipe, and in which the connection of each heating electrode to the wall of the pipe is sealed with a flat faced aseptic seal formed between a flat end face of the cylindrical electrode and a cooperating flat face of the pipe wall.

4,959,526

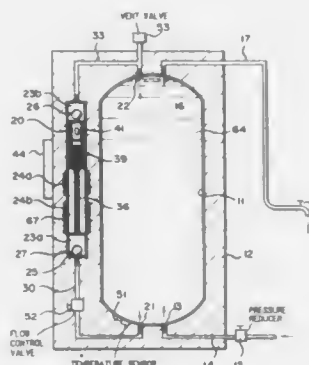
## STORAGE TYPE ELECTRIC WATER HEATER HAVING A CLOSED CIRCULATION LOOP WITH A BUBBLE PUMP

Yasuhiko Kurachi, Aichi; Kazumi Mori, Okazaki, and Hisao Koizumi, Zushi, all of Japan, assigns to Chubu Electric Power Company, Inc., Nagoya and Kabushiki Kaisha Toshiba, Kawasaki, both of, Japan

Continuation-in-part of Ser. No. 69,229, Jul. 2, 1987, Pat. No. 4,818,845. This application Sep. 21, 1988, Ser. No. 247,274

Claims priority, application Japan, Jul. 3, 1986, 61-154978; Sep. 21, 1987, 62-236859

Int. Cl.<sup>3</sup> H05B 1/02; F24H 1/10, 1/18  
U.S. Cl. 219—314 21 Claims



1. A hot water boiling apparatus comprising:  
a hot water tank having an upper end formed with a hot water supply port and a lower end formed with a water supply port, said tank containing water therein;  
a hot water supply pipe connected to the hot water supply port, for discharging the hot water from the tank to the outside;  
water supply means connected to the water supply port, for feeding water into the hot water tank; and  
bubble pump means arranged external of said hot water tank, for feeding hot water into the upper portion of the hot water tank after sucking the water from the lower portion of the inside of the tank and heating the sucked water, said pump means including a body having a boiling chamber, heating means for heating water in the boiling chamber and generating steam bubbles in the water, a first connecting pipe for guiding the water from the lower portion in the hot water tank to the body, a guide pipe for feeding the water, guided through the first connecting pipe, into the boiling chamber and condensing said steam bubbles by the water fed through the guide pipe, a second connecting pipe for guiding the water heated in the boiling chamber into the upper portion in the hot water tank, and first and second regulating means arranged in the first and second connecting pipes, for allowing the water to flow only from the lower portion of the hot water tank toward the upper portion thereof, said guide pipe being so arranged with respect to said pump means body that heat is exchanged between the water in the boiling chamber and the water flowing through the guide pipe to preheat the water prior to entry thereof into the boiling chamber.

4,959,527

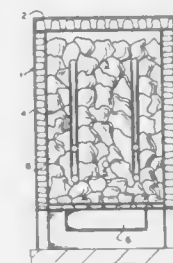
## ELECTRIC SAUNA HEATER

Antti Kivimaa, Kaunainen, and Reijo Perilä, Hangonkyliä, both of Finland, assigns to Oy Helo-Teknat-Helo Factories, Ltd., Helsinki, Finland

Filed Dec. 30, 1988, Ser. No. 292,230

Claims priority, application Finland, Dec. 31, 1987, 875786  
Int. Cl.<sup>3</sup> F24H 7/06; A61H 33/06

U.S. Cl. 219—365 13 Claims



1. An electric sauna heater for sauna rooms comprising, in combination:  
an outer casing having thermally insulated side walls and a thermally insulated top wall defining a space for containing heat-storing material and substantially tightly surrounding said space at least on the sides and at the top;  
a heat-storing material contained in said space;  
at least one electric resistor disposed within said space in contact with at least some of said heat-storing material for heating the heat-storing material;  
means for effecting application of electric power from a power supply to said at least one resistor in dependence on the temperature within said space for maintaining a constant temperature in said space;  
means for forming, when desired, a path for air to flow between said space and the room in which the sauna heater is positioned for transferring heat from said space into said room for warming up and making said room ready for a sauna bath; and  
switching means separate from said means for effecting application of electric power operative responsively to operation of said means for forming a path for the flow of air for connecting safety device means in circuit with said at least one resistor for preventing overheating of the sauna room.

4,959,528

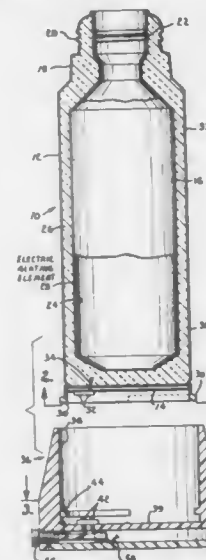
## ELECTRICALLY HEATED VESSEL AND BASE UNIT FOR USE IN A MOTOR VEHICLE

John R. Malloy, 2516 SW. Burnett Rd., Topeka, Kans. 66694  
Continuation of Ser. No. 86,963, Aug. 19, 1987, abandoned. This application Mar. 2, 1989, Ser. No. 318,116

Int. Cl.<sup>3</sup> H05B 1/00, 1/02; A47J 41/00; F24H 1/06  
U.S. Cl. 219—432 8 Claims

1. A self-heating container assembly comprising:  
an elongated, hand-portable vessel having an outer wall, a chamber therein, and a lower portion including a bottom;  
a liner in said vessel chamber, said liner being provided with an electric heating element and defining an inner chamber adapted to receive the material to be heated;  
insulation between said outer wall and said liner sufficient to maintain the temperature of the material to be heated at a desired temperature;  
first electrical contacts on said bottom with electrical lead means interconnecting said contacts and said heating element;  
a detachable, tubular base having an open upper end and a closed lower end, and presenting a tubular socket for coaxially and telescopically rotatably receiving a substantial portion of a longitudinal extent of said lower portion of said vessel, with said lower portion spaced apart from

an inner wall of said socket of said base when received therein and adapted to provide clearance for said vessel when said vessel is positioned within said socket, said socket having second electrical contacts therein registering with said first electrical contacts when said lower portion of said vessel is received by said socket;  
means for connecting said second electrical contacts with a power source; and



interengageable locking parts on said bottom of said vessel and said base for securing the same together upon said vessel bottom being received in said base and said bottom and said base being rotated coaxially relative to each other, whereby said vessel may be selectively interlocked within said base with said first and second contacts engaged to energize said heating element and maintain the vessel contents in a heated condition.

4,959,529

## SHEET HEATING DEVICE

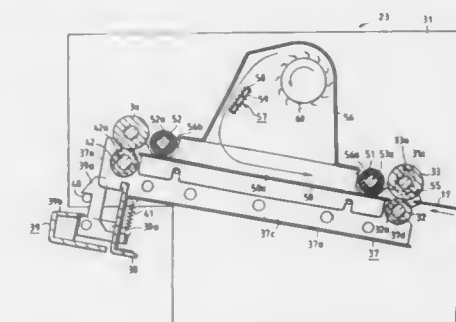
Yumio Matsumoto, Kasugai; Yasuo Kimura, Ichinomiya; Osamu Takagi, and Takatoshi Takemoto, both of Nagoya, all of Japan, assigns to Brother Kogyo Kabushiki Kaisha, Japan

Filed Oct. 24, 1989, Ser. No. 425,940

Claims priority, application Japan, Oct. 31, 1988, 63-142147[U]; Oct. 31, 1988, 63-142148[U]; Oct. 31, 1988, 63-142153[U]; Jan. 27, 1989, 1-8871[U]; Jan. 27, 1989, 1-8872[U]

Int. Cl.<sup>3</sup> G03G 15/20

U.S. Cl. 219—388 18 Claims

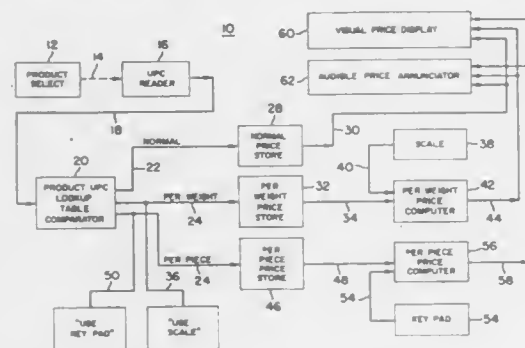


17. A sheet heating device comprising:  
a delivery means for delivering a piece of sheet, said delivery means including a first delivery means located on an up-



stream side and a second delivery means located on a downstream side for defining a delivery path of said sheet, and a guide plate;  
 a heating means for heating the sheet on said delivery path;  
 a heat insulating means for preventing a temperature increase of said delivery means due to heat of said heating means, said heat insulating means including a first heat insulating member for heating insulating said first delivery means and a second heat insulating member for heat insulating said second delivery means wherein a distance between said first heat insulating member and said guide plate is smaller than a distance between said second heat insulating member and said guide plate; and  
 a covering means for substantially hermetically covering said heating means in cooperation with said heat insulating means.

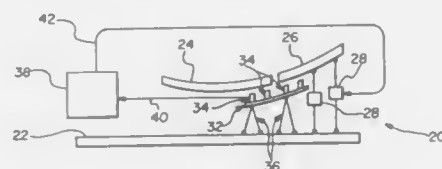
**4,959,530**  
**ARTICLE PRICE INDICATOR**  
 David F. O'Connor, Delray Beach, Fla., assignor to Checkrobot Inc., Deerfield Beach, Fla.  
 Filed Mar. 7, 1989, Ser. No. 320,236  
 Int. Cl.<sup>5</sup> G06K 19/06  
 U.S. Cl. 235—383 16 Claims



1. In combination, in a system for providing output indication prior to actual purchase of the price of articles bearing universal product code (UPC) indication and selected for purchase:

- reader means for reading article UPC indication and generating output signals indicative thereof;
- comparator means for receipt of the reader means output signals and for providing at least first and second output signals upon respective determinations that such received signals are indicative of an article retailed by bulk weight pricing or an article retailed per piece pricing;
- scale means accessible to a customer for weighing said articles and generating output signals indicative of the weight thereof;
- numeric entry means accessible to a customer for entering the numbers of pieces of said selected articles and generating output signals indicative of such entered numbers; and
- display means accessible to the customer and responsive to said first and second comparator means output signals respectively to provide indication to the customer for usage of said scale means or said numeric entry means.

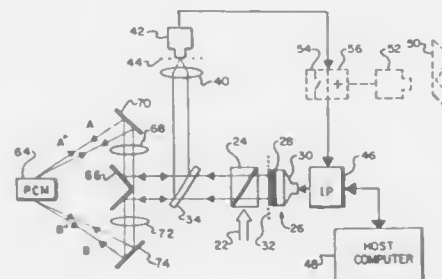
**4,959,531**  
**ALIGNMENT SENSING AND CORRECTING ASSEMBLY FOR AN OPTICAL ELEMENT**  
 Phillip F. Marino, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
 Filed Sep. 29, 1989, Ser. No. 414,558  
 Int. Cl.<sup>5</sup> G01J 1/20  
 U.S. Cl. 250—201.9 8 Claims



1. In an optical system comprising:  
 a. a base structure;  
 b. at least two optical elements; and  
 c. a plurality of displacement actuators for positioning at least one of the optical elements to the base structure in accordance with a known displacement matrix [D], so that the optical elements define a first curvature profile;  
 an assembly comprising:

- (1) a plurality of sensing means (a) positioned in accordance with a known position matrix [P] which is calculated based upon the position of each of the sensing means with respect to each of the optical elements; the sensing means (b) sensing changes in the first curvature profile, due to arbitrary inputs to the optical system; and providing a corresponding plurality of sensing output signals [S]; and
- (2) a computation means for:  
 (a) inputting the plurality of sensing output signals [S];  
 (b) inputting the position [P] and displacement matrices [D]; and  
 (c) computing, on the basis of the sensing output signals [S], and the position [P] and displacement [D] matrices, at least one displacement actuator command [C], whereby, a realization of displacement actuator re-positioning, in accordance with the or each displacement actuator command [C], restores the system first curvature profile.

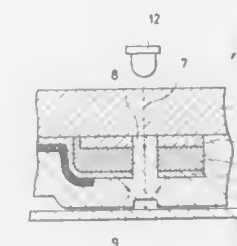
**4,959,532**  
**OPTICAL NEURAL NETWORK AND METHOD**  
 Yuri Owechko, Newbury Park, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
 Filed Feb. 16, 1989, Ser. No. 311,495  
 Int. Cl.<sup>5</sup> G01J 1/20  
 U.S. Cl. 250—201.9 39 Claims



1. An optical neural network, comprising:  
 means for presenting a pixelized input optical pattern,  
 means for receiving a pixelized output optical pattern,  
 a phase conjugate mirror (PCM) for both phase conjugation and routing and for storing optical transmission weightings between the pixels of the input and output

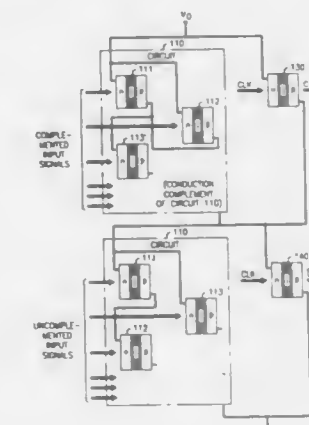
patterns as angularly and spatially distributed gratings within the PCM, and  
 optical transmission means directing a pixelized input beam from the input pattern to the PCM and a phase conjugate of the input beam returned from the PCM as said pixelized output optical pattern.

**4,959,533**  
**PHOTOSENSITIVE SEMICONDUCTOR CONTACT IMAGE SENSOR**  
 Shunpei Yamazaki, Tokyo; Takeshi Fukada, Ebina; Mitsunori Sakama, Hiratsuka; Hisato Shinohara, Sagami-hara; Nobumitsu Amachi, Atsugi; Naoya Sakamoto, Atsugi, and Takashi Inuzima, Atsugi, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan  
 Filed Oct. 18, 1988, Ser. No. 259,522  
 Claims priority, application Japan, Oct. 21, 1987, 62-266098; Oct. 21, 1987, 62-266099; Oct. 21, 1987, 62-266100  
 Int. Cl.<sup>5</sup> H01L 27/14, 31/00  
 U.S. Cl. 250—208.1 3 Claims



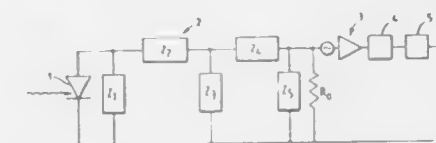
1. An image sensor comprising:  
 a light source;  
 a transparent substrate located in order to receive light rays from said light source;  
 a photosensitive semiconductor film formed on said substrate with a pair of electrodes in contact with opposed surfaces of said semiconductor film, one electrode of said pair being light blocking and located between said light source and said semiconductor film, and the other electrode being transparent;  
 a light window opened in said photosensitive film in order to be defined and interposed between two portions of said light blocking electrode; and  
 means for scattering at least some of the light rays that pass through said light window, said means including an uneven interface at a location along the path of light rays incident on said sensor.

**4,959,534**  
**DIFFERENTIAL OPTICAL LOGIC ARRANGEMENT**  
 Anthony L. Lentine, St. Charles, Ill., and David A. B. Miller, Fairhaven, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.  
 Filed Aug. 28, 1989, Ser. No. 399,730  
 Int. Cl.<sup>5</sup> H01J 40/14  
 U.S. Cl. 250—213 A 17 Claims



1. Apparatus comprising first and second electrical circuits connected in series for connection across a voltage source, said first circuit being responsive to a plurality of optical signal beams and comprising a plurality of photodetector means each having at least one of said optical signal beams incident thereon and being interconnected such that said first circuit corresponds to a logic function of said plurality of optical signal beams, said second circuit being responsive to a plurality of beams each complementary to one of said optical signal beams and comprising a plurality of photodetector means each having at least one of said complementary beams incident thereon and being interconnected as a conduction complement of the connections of said first circuit.

**4,959,535**  
**OPTICAL RECEIVER CIRCUIT INCLUDING A FILTER NETWORK TO MINIMIZE NOISE**  
 Ian Garrett, Ipswich, England, assignor to British Telecommunications, Great Britain  
 Continuation of Ser. No. 314,760, Feb. 2, 1989, abandoned. This application Oct. 10, 1989, Ser. No. 418,976  
 Claims priority, application United Kingdom, Jun. 11, 1987, 8713699  
 Int. Cl.<sup>5</sup> H01J 40/14  
 U.S. Cl. 250—214 R 14 Claims



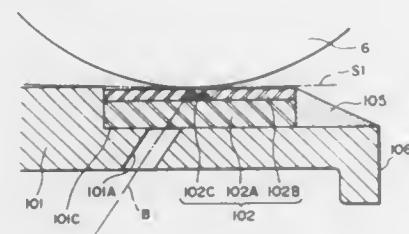
1. A receiver circuit for receiving a modulated optical signal and for generating a corresponding electrical signal, the circuit comprising a photodetector acting as a current source for generating a first modulated electrical signal; an amplification circuit to which the first electrical signal or a signal related thereto is fed; a first noise filter; and an n stage (where n is an odd integer 3) filter network connected between the detector and the amplification circuit, the characteristics of the filter

network being such that the total thermal noise power output of the first noise filter is substantially minimised.

**4,959,536**  
**SHEET CONVEYING AND READING APPARATUS**  
**HAVING A LIGHT-INTERCEPTING MEMBER FOR**  
**REDUCING NOISE**

Kazuya Ijima, Tokyo; Shinnichiro Otsuki, Yokohama; Yuji Nakano, Yokosuka, and Hiroshi Ogushi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 212,656, Jun. 28, 1988, abandoned.  
This application Feb. 7, 1990, Ser. No. 477,112  
Claims priority, application Japan, Jul. 6, 1987, 62-167053; Jul. 6, 1987, 62-167057

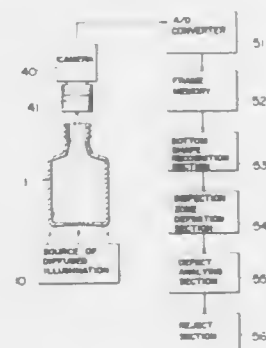
Int. Cl.<sup>5</sup> H01J 3/14  
U.S. Cl. 250—216 30 Claims



1. A sheet conveying and reading apparatus comprising:
  - a conveyance path for conveying sheets;
  - a transparent plate having a first surface at least a part of which is for contacting a surface of the sheets being conveyed on said conveyance path, and having a second surface opposed to said first surface;
  - a photoelectric conversion element abutting said second surface of said transparent plate, for reading an image on a conveyed sheet; and
  - a light-intercepting member for covering a side edge surface of said transparent plate to prevent light from entering said side edge surface.

**4,959,537**  
**METHOD AND APPARATUS FOR INSPECTING**  
**TRANSPARENT CONTAINERS**  
Tetsuya Kimoto, Yawata, and Masashi Nakagawa, Neyagawa, both of Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Jun. 13, 1989, Ser. No. 365,934  
Claims priority, application Japan, Jun. 16, 1988, 63-149000  
Int. Cl.<sup>5</sup> G01N 21/90  
U.S. Cl. 250—223 B 20 Claims



12. An apparatus for inspecting a transparent container having a defect on the container bottom comprising:

means for locating the container at an inspection station; a source of diffused illumination for directing the diffused light through the bottom of the container located at said inspection station, said diffused illumination being greater in intensity at a peripheral region of the container bottom than at a central region of the container bottom; light receiving means including a camera monitoring light energy transmitted through the container bottom and providing a distribution pattern of said monitored light energy along at least one dimension corresponding to a line extending in the plane of the container bottom; means for obtaining from said light energy distribution pattern a pair of peak values spaced along said dimension and a corresponding pair of positions having said peak values, respectively; calculator means for calculating a true center of the container bottom based upon thus obtained positions and defining based upon said true center an inspection zone in an exact coincidence with the container bottom; detector means for analyzing said light energy transmitted through the container bottom within the confines of said inspection zone to detect a defect on the container bottom; and reject means for rejecting a container having such detected defect.

**4,959,538**  
**INSPECTION DEVICE**  
Nicolaas C. Swart, Deventer, Netherlands, assignor to Heuft-Qualiplus B.V., Netherlands  
Filed Mar. 24, 1989, Ser. No. 328,297  
Claims priority, application Netherlands, Apr. 5, 1988, 8800866

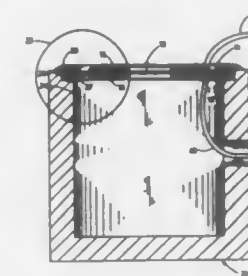
Int. Cl.<sup>5</sup> G01N 9/04  
U.S. Cl. 250—223 B 15 Claims



1. Device for inspecting the upper surfaces of successive objects, for instance the mouth edges of glass bottles carried by a conveyor belt and guided past the device thereby, which device is provided with an optical system, comprising:
  - a lighting system with a light source for lighting an upper surface of each successive object,
  - an optical imaging system for forming an image of an upper surface of each successive object,
  - measuring means for measuring the height of the upper surface of each successive object, and
  - adjustment means for setting the optical system on the basis of the height of the upper surface of each successive object as determined by said measuring means.

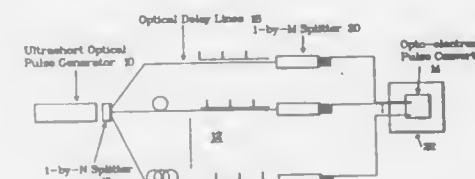
**4,959,539**  
**FLEXURAL DISK FIBER OPTIC HYDROPHONE**  
Thomas J. Hoffer, Monterey, and Steven L. Garrett, Pebble Beach, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 20, 1989, Ser. No. 326,819  
Int. Cl.<sup>5</sup> G01D 5/34; H01J 5/16; G01B 9/02  
U.S. Cl. 250—227.19 12 Claims



1. A sensor for acoustic vibrations in a fluid, the sensor comprising:
  - an elastic element having opposite sides;
  - body means for peripherally supporting said element in contact with the fluid so that said vibrations induce deflections of said element corresponding to the vibrations; and
  - an optical fiber fixedly connected to one side of said element and wound thereon in a spiral so that said deflections induce in the fiber variations in length corresponding to said vibrations for interferometric measurements of said variations in length.

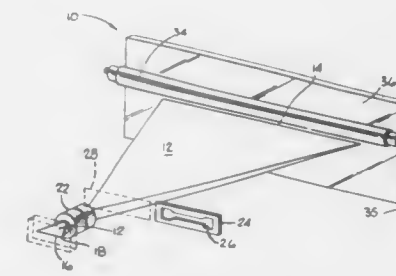
**4,959,540**  
**OPTICAL CLOCK SYSTEM WITH OPTICAL TIME**  
**DELAY MEANS**  
Bunsen Fan, Peekskill; Modest M. Oprysko, Mahopac, and Ricky A. Rand, Somers, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.  
Filed May 15, 1989, Ser. No. 351,686  
Int. Cl.<sup>5</sup> H01J 5/16; G02B 6/26  
U.S. Cl. 250—227.12 19 Claims



1. An optical clock distribution system comprising:
  - optical pulse timing generator means for generating optical pulses having a predetermined repetition rate and duration,
  - a passive optical time delay line network composed of a plurality of optical time delay means coupled to said optical timing generator means for propagating optical pulses with different transient times, and
  - a plurality of opto-electronic toggle means at different locations remote from said pulse timing generator means, each of said toggle means being coupled to a pair of optical time delay means for combining delayed optical timing signals to generate electrical clock signals with minimum skew at each of said different locations.

**4,959,541**  
**METHOD FOR DETERMINING APERTURE SHAPE**  
David W. Boyd, Greeley, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.  
Filed Aug. 3, 1989, Ser. No. 389,033  
Int. Cl.<sup>5</sup> H04N 1/10 10 Claims

U.S. Cl. 250—237 R



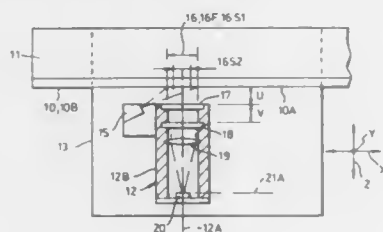
1. A method for selecting the shape of an occluding aperture which is to be positioned at a predetermined aperture location in a light path extending between an illuminated line object and a linear photosensor array whereby, through use of the aperture, a light intensity measurement is obtained across the linear photosensor array which is uniformly proportional to the light intensity across the illuminated line object, comprising the steps of:
  - (a) providing a constant light intensity across the illuminated line object during a testing period;
  - (b) measuring the light intensity across the linear photosensor array during the testing period without an occluding aperture in the light path;
  - (c) selecting a target, constant value light intensity which is to be achieved through use of occluding aperture;
  - (d) selecting an initial aperture shape and representing the selected shape mathematically;
  - (e) constructing a mathematical model for the light intensity at any point across the linear photosensor array, with an aperture of the selected shape in place at the predetermined aperture location;
  - (f) using the light intensity measured across the photosensor array during the testing period and the mathematical model to compute the light intensity across the photosensor array with an aperture of the selected shape in place;
  - (g) during a selected number of iterations, adjusting the mathematical expression representative of aperture shape in an orderly fashion adapted to minimize the total deviation of the computed light intensity across the linear photosensor array from the target constant value light intensity;
  - (h) selecting a final design aperture shape in accordance with the one of the adjusted mathematical expressions for aperture shape which produces the least total deviation in computed light intensity from the target constant value light intensity.

**4,959,542**  
**OPTO-ELECTRONIC SCALE-READING APPARATUS**  
William F. N. Stephens, Hawkesbury Upton, United Kingdom, assignor to Renishaw Plc, Gloucestershire, United Kingdom  
PCT No. PCT/GB85/00600, § 371 Date Aug. 19, 1986, § 102(e)  
Date Aug. 19, 1986, PCT Pub. No. WO86/03833, PCT Pub. Date Jul. 3, 1986  
PCT Filed Dec. 23, 1985, Ser. No. 368,075  
Claims priority, application United Kingdom, Dec. 22, 1984, 8432574

Int. Cl.<sup>5</sup> H01J 3/14  
U.S. Cl. 250—237 G 25 Claims  
1. Apparatus for measuring displacement between two members, comprising:



- (a) a scale on one of the members having marks defined by a light pattern;
- (b) a read head provided on the other member;
- (c) periodic diffraction means provided in the read head for interacting with said light pattern to produce interference fringes having movement relative to said read head responsive to a said displacement;
- (d) there being a nominal periodicity determined by the read head, and defining the periodicity which the scale must have to satisfy optical parameters of said read head; and
- (e) detecting means for detecting said movement, wherein
- (f) said scale marks have secondary periodicities offset by departures from said nominal periodicity;



- (g) means are provided defining the length of an effective sampling region of the scale, only light from said effective sampling region contributing to the production of said interference fringes;
- (h) the diffraction means and said means for defining the length of an effective sampling region constitute a spatial filter passing said nominal periodicity; and
- (i) said filter has a passband determined by the length of said effective sampling region and defining a maximum value of said departure, whereby secondary periodicities below said maximum departure contribute to production of said fringes, while secondary periodicities above said maximum departure do not contribute to production of said fringes.

4,959,543

# METHOD AND APPARATUS FOR ACCELERATION AND DETECTION OF IONS IN AN ION CYCLOTRON RESONANCE CELL

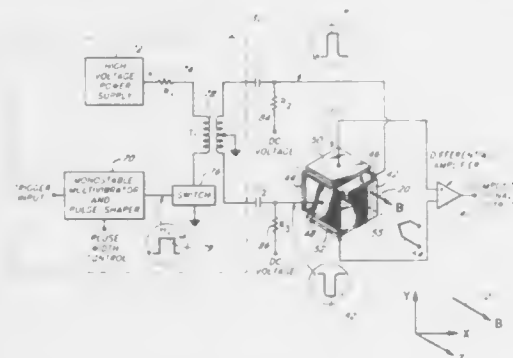
Robert T. McIver, Jr., and Richard L. Hunter, both of Irvine, Calif., assignors to Ionspec Corporation, Irvine and Knobbe, Martens, Olson & Bear, Newport Beach, both of, Calif.

Filed Jun. 3, 1988, Ser. No. 202,209

Int. Cl.<sup>3</sup> H01J 49/38

U.S. Cl. 250—291

29 Claims



1. A Fourier transform mass spectrometer comprising: an analyzer cell for receiving ions of a sample to be analyzed, said cell including a plurality of electrode plates and said cell mounted in an evacuable chamber;

- an ionizer for forming ions of said sample;
- a magnet for creating a unidirectional magnetic field, said magnetic field orientated so that it passes through said analyzer cell in a predetermined direction;
- a voltage source for producing voltages of magnitudes and polarities which are adequate to trap substantially all of said sample ions of a given charge sign contained within said cell when said voltages are applied to said plurality of electrode plates of said analyzer cell, said voltages further defining an electric potential at the approximate center of and within said cell, said unidirectional magnetic field causing said trapped ions to move orbitally at angular frequencies dependent on the mass-to-charge ratio of individual ions;

- a signal generator for producing a first acceleration pulse having a first polarity with respect to said electric potential within said cell and a second acceleration pulse having a second polarity with respect to said electric potential such that when said first pulse is applied to a first one of said electrode plates and said second pulse is applied to a second one of said electrode plates, the combined effect of said first and second pulses is capable of simultaneously exciting said trapped ions orbiting at said angular frequencies, said individual orbiting ions producing signals equal to their respective angular frequencies which combine to form a broadband composite transient signal, at least one of said acceleration pulses having an acceleration period which is less than a period of a maximum frequency of said angular frequencies, said acceleration pulses producing an electric field which is substantially perpendicular to said unidirectional magnetic field, said acceleration pulses simultaneously accelerating substantially all ions trapped within said cell;

- a broadband detector for simultaneously detecting said broadband composite transient signal which comprises the individual angular frequencies of a plurality of said individual ions contained in said cell and generating a time domain analog signal which contains information related to the magnitude and nature of the plurality of individual ions in the cell;

- a Fourier analyzer for receiving said analog time domain signal and transforming said time domain signal into a frequency domain signal which contains information about the numerical magnitude, frequency and phase of accelerated ions of each different mass-to-charge ratio trapped in said analyzer cell; and

- a sequencer for coordinating and controlling said ionizer, said voltage source, said acceleration pulses, said detector and said Fourier analyzer.

4,959,544

# ENERGY ANALYZER

Satoru Sukenobu, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 3, 1989, Ser. No. 416,455

Claims priority, application Japan, Oct. 7, 1988, 63-252976

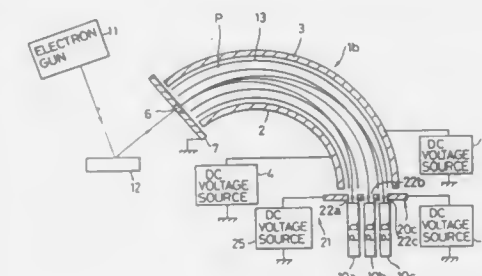
Int. Cl.<sup>3</sup> H01J 49/48

U.S. Cl. 250—305

10 Claims

1. An energy analyzer, comprising: a pair of electrodes for forming an electrostatic field for deflection; entrance and exit aperture plates having an aperture, arranged in entrance and exit portions of the electrostatic field;
- a particle detector arranged in front of the aperture of the exit aperture plate for detecting a particle passing through the electrostatic field and the apertures of the entrance and exit aperture plates to analyze energy of the particle; and

means connected to the sides of at least the exit aperture plate for controlling a voltage distribution of a surface of



at least the exit aperture plate to approximately equal to a voltage distribution of the electrostatic field.

4,959,545

# RADIATION IMAGE READ-OUT APPARATUS

Satoshi Arakawa, and Kenji Takahashi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

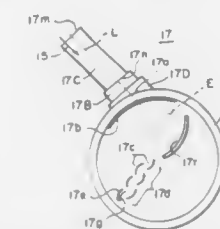
Filed Feb. 17, 1989, Ser. No. 312,099

Claims priority, application Japan, Feb. 19, 1988, 63-37002

Int. Cl.<sup>3</sup> G01N 23/04

U.S. Cl. 250—327.2

2 Claims



1. A radiation image read-out apparatus comprising:
- (i) a main scanning means for scanning a stimulable phosphor sheet, on which a radiation image has been stored, with stimulating rays in a main scanning direction, or along a main scanning line, thereby causing the stimulable phosphor sheet to emit light in proportion to the amount of energy stored during exposure to radiation,
- (ii) a sub-scanning means for moving the stimulable phosphor sheet with respect to the stimulating rays in a sub-scanning direction approximately normal to the main scanning direction, and
- (iii) a photo detecting means provided with an elongated photomultiplier having a light receiving face, which extends along the main scanning line on the stimulable phosphor sheet, for detecting the light emitted by the stimulable phosphor sheet, wherein the improvement comprises:
- (a) said elongated photomultiplier being provided with a cylindrical main body, a photocathode being provided on an inner surface of said main body, and a light guide member being provided on said light receiving face so as to extend along said light receiving face and projection outward therefrom, said light guide member guiding said light emitted by said stimulable phosphor sheet toward said main body and radiating said light toward said photocathode, and
- (b) said light guide member being inclined with respect to said cylindrical main body and said photocathode so that a line, passing through a point at the center of an inner edge face of said light guide member and a point at the center of an outer edge face (light input face) of

said light guide member, forms an acute angle at its intersection with said photocathode.

4,959,546

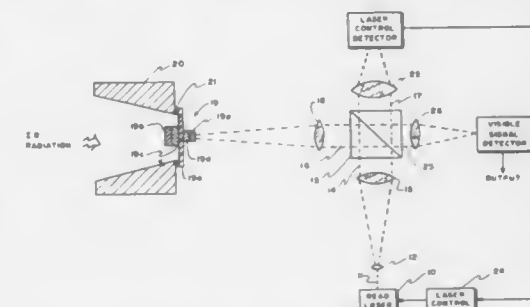
THERMO-OPTICAL FAR INFRARED SYSTEM  
Vincent T. Bly, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington

Filed Jun. 5, 1981, Ser. No. 282,615

Int. Cl.<sup>3</sup> G02F 1/01; H01L 31/00

U.S. Cl. 250—330

1 Claim



1. A thermo-optical far infrared system including: a thermo-optical detector; means for directing infrared radiation onto one side of said detector; means for directing a read laser beam onto the other side of said detector; and means for detecting the laser beam reflected from said detector, wherein said detector includes: an infrared absorbing layer; a reflective layer with one side essentially in thermal contact with said absorbing layer; and a layer of material essentially in thermal contact with said reflective layer and having a temperature-dependent index of refraction, and whereby the infrared radiation on the detector induces a temperature rise and a consequent change in index of refraction therein, and thereby said read beam is reflected in accordance with said index of refraction.

4,959,547

# APPARATUS AND METHODS FOR DETECTING, LOCALIZING, AND IMAGING OF RADIATION IN BIOLOGICAL SYSTEMS

Robert G. Carroll, Largo, Fla., and Robin A. Wise, Jr., Morgan Hill, Calif., assignors to Care Wise Medical Products Corporation, Morgan Hill, Calif.

Filed Jun. 8, 1989, Ser. No. 363,243

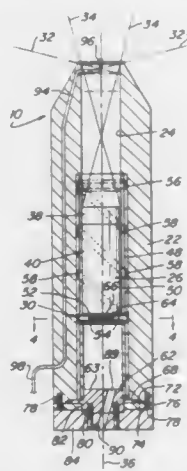
Int. Cl.<sup>3</sup> G01T 1/161

U.S. Cl. 250—336.1

45 Claims

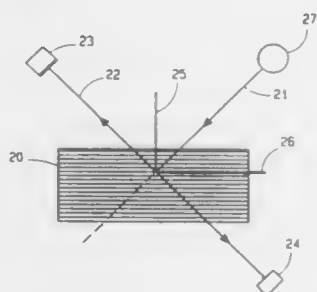
1. A well shielded collimating probe for detecting radiation emanating from a hidden source, said probe comprising a small probe body formed of a radiation blocking material and arranged to be held adjacent said hidden source, radiation detecting means located within said probe body, window means covering aperture means confronting said detecting means through which radiation may pass, and adjustment means for adjusting the solid angle which radiation may pass through said aperture means to said detecting means, said solid angle

being continuously variable between a predetermined maximum angle and a predetermined minimum angle and vice versa, whereupon the only radiation reaching said detecting means is that which is within said solid angle.



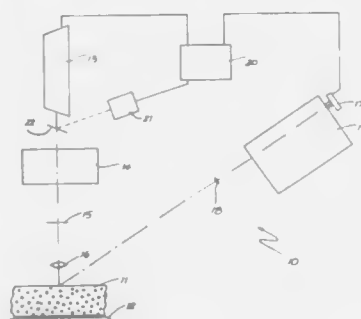
versa, whereupon the only radiation reaching said detecting means is that which is within said solid angle.

**4,959,548**  
**NEUTRON APPARATUS FOR MEASURING STRAIN IN COMPOSITES**  
David S. Kupperman, Oak Park; Saurindranath Majumdar, Naperville; John F. Faber, Jr., Downers Grove, and J. P. Singh, Bolingbrook, all of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
Filed May 2, 1989, Ser. No. 346,762  
Int. Cl.<sup>5</sup> G01N 23/207  
U.S. Cl. 250—390.09 12 Claims



1. A method for real-time simultaneous measurement of strain in the constituents of a composite comprising: directing a polychromatic beam of neutrons from a pulsed source toward a sample, orienting a multi-angle diffractometer so that two opposite detectors are on a line perpendicular to said neutron beam, measuring, using Bragg's law, the strain on a vector bisecting the angle between said neutron beam and said line perpendicular to said neutron beam.

**4,959,549**  
**DETERMINATION OF PROPERTIES OF COAL**  
John G. Hanb, Westworthville; John E. Eberhardt, Sans Souci, and David L. Death, Bankstown, all of Australia, assignors to Commonwealth Scientific and Industrial Research Organisation, Campbell, Australia  
Continuation of Ser. No. 126,914, Nov. 27, 1987, abandoned.  
This application Apr. 17, 1989, Ser. No. 339,926  
Claims priority, application Australia, Nov. 28, 1986, PH9237  
Int. Cl.<sup>5</sup> G01N 21/64, 21/63, 21/85  
U.S. Cl. 250—461.1 41 Claims

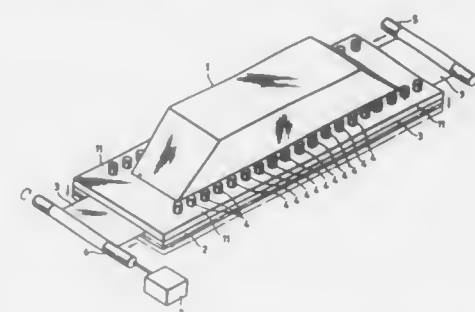


1. An apparatus for determining quantitatively a property of bulk coal from a fluorescence spectrum resulting from UV illumination of said coal, said apparatus comprising:  
a UV light source for illuminating a plurality of surface macerals of bulk coal with UV light;  
a fluorescent light detector positionable for detecting fluorescent light emitted by said macerals of said bulk coal in response to said illumination and for deriving output signals amplitude related to intensities of said detected fluorescent light as a function of wavelengths of said detected fluorescent light, and;  
calculating means operatively associated with said detector for calculating quantitatively a property of said bulk coal from said output signals said calculating means comprising:  
integration means integrating said output signals within a selected wavelength region for providing at least one integrated value; and  
comparing means comparing said integrated value with at least one standard value derived from a calibration study of coal whereby to indicate quantitatively said property of said bulk coal from said comparison.

**4,959,550**  
**AUTOMATIC EXCHANGER OF AN ELECTRON BEAM IRRADIATOR FOR WINDOW FOIL**  
Masayuki Kashiwagi, and Takashi Matsumoto, both of Kyoto, Japan, assignors to Nissin High Voltage Co., Ltd., Kyoto, Japan  
Filed May 17, 1988, Ser. No. 194,913  
Claims priority, application Japan, May 18, 1987, 62-120372  
Int. Cl.<sup>5</sup> H01J 33/04  
U.S. Cl. 250—492.3 5 Claims

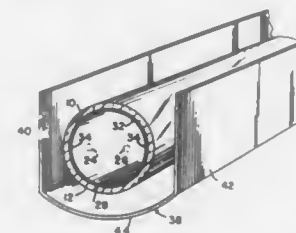
1. A roller-type automatic foil exchanger for supplying a foil beneath a window formed in a flange at a surface of a vacuum container in an electron beam irradiator comprising:  
a foil feed roller provided at one end of the flange and connected to one end of the foil, said feed roller for providing the foil;  
a foil take-up roller provided at the opposite end of the flange with respect to said foil feed roller and connected to the other end of the foil;  
a foil holder for supporting the foil such that the foil is between the flange and the foil holder;  
a winding motor for rotating said foil take-up roller to wind

the foil thereon and to cause foil to be unwound from said foil feed roller; and  
a plurality of clamber members having portions extending through said flange and said foil holder, said clamber



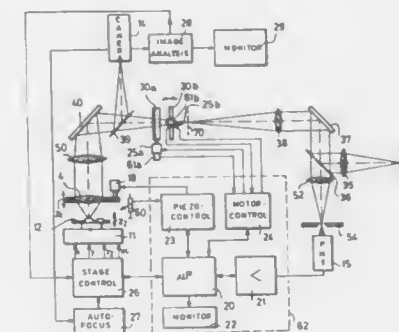
members being selectively actuatable to clamp said foil holder to the flange with the foil therebetween, said clamber members being disposed on either side of the foil along lines substantially parallel to the rolling direction of the foil.

**4,959,551**  
**COSMETIC TANNING LAMP AND SYSTEM HAVING ADJUSTABLE UVB PROPORTION**  
Steven C. Schlitt, Merrimac, Mass., assignor to GTE Products Corporation, Danvers, Mass.  
Filed Feb. 27, 1989, Ser. No. 315,647  
Int. Cl.<sup>5</sup> A61N 5/06; H01J 61/48  
U.S. Cl. 250—504 R 3 Claims



1. A suntanning system comprising:  
a fluorescent lamp including an ultraviolet-transmitting glass envelope of substantially circular configuration in cross-section, a first ultraviolet-emitting phosphor means having a predetermined proportion of UVB to UVA radiation disposed on a portion of the circumference of the interior surface of said envelope, a second ultraviolet-emitting phosphor means having a predetermined proportion of UVB to UVA disposed on the remaining portion of said circumference of said interior surface of said envelope, said predetermined proportion of UVB to UVA of said second ultraviolet-emitting phosphor means being greater than said predetermined proportion of UVB to UVA radiation of said first ultraviolet-emitting phosphor means, the proportion of UVB to UVA of the combined emission from said first and second ultraviolet-emitting phosphor means being controllable by the rotational alignment of said fluorescent lamp; and  
an external reflector means disposed adjacent said fluorescent lamp, said external reflector means being effective in maintaining the irradiance level in the UVA region at approximately the same level independent of the rotational alignment of said fluorescent lamp.

**4,959,552**  
**MICROSCOPE ARRANGED FOR MEASURING MICROSCOPIC STRUCTURES**  
Ralf Saffert, Lauterstein, and Albert Schilling, Aalen, both of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Fed. Rep. of Germany  
Filed Jan. 30, 1989, Ser. No. 303,923  
Claims priority, application Fed. Rep. of Germany, Feb. 9, 1988, 3803854  
Int. Cl.<sup>5</sup> G01N 21/86  
U.S. Cl. 250—560 8 Claims



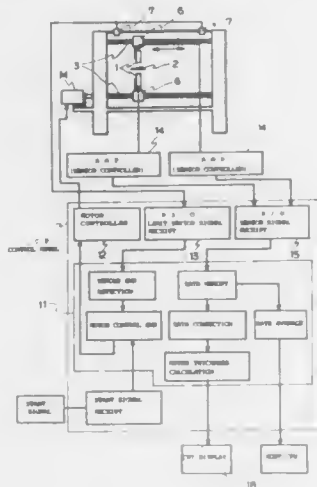
1. A microscope arranged for measuring microscopic structures by means of punctiform bundles of rays from a point source of light being focused by an optical system on a structure to be measured so that a photoelectric detector can receive the ray bundles reflected from said structure, said microscope comprising:  
a. a plane plate arranged in a non-parallel ray portion of the path of said optical system, said plate being pivotally mounted for movement through a predetermined angle for moving the focal point of said ray bundles on said structure;  
b. an encoder coupled with said plate for measuring the angle through which said plate is pivoted when moving said focal point; and  
c. a processor, supplied with signals from said encoder corresponding to said angle measurement and with signals from said detector corresponding to the intensity of said reflected ray bundles, for calculating the linear dimensions of said structure over which said focal point has moved.

**4,959,553**  
**METHOD FOR MEASURING SHAPE AND APPARATUS THEREFOR**  
Seiki Yamada, Ibaraki, and Takashi Kawamura, Kobe, both of Japan, assignors to Sumitomo Rubber Industries, Ltd., Kobe, Japan  
Filed Dec. 7, 1988, Ser. No. 280,798  
Claims priority, application Japan, Dec. 9, 1987, 62-311707  
Int. Cl.<sup>5</sup> G01N 21/86  
U.S. Cl. 250—560 9 Claims

1. A method for measuring a shape comprising the steps of: moving an article in a constant direction; locating a pair of displacement sensors substantially opposing each other with the article therebetween; scanning the article, having a cross sectional shape to be measured, along a direction of width of the article by moving said pair of displacement sensors laterally along a direction perpendicular to the direction of movement of the article; detecting displacements of a surface on one side and detect-

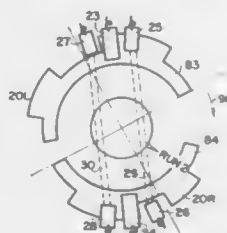


ing displacements of a surface on another side of the article at every constant pitch; and



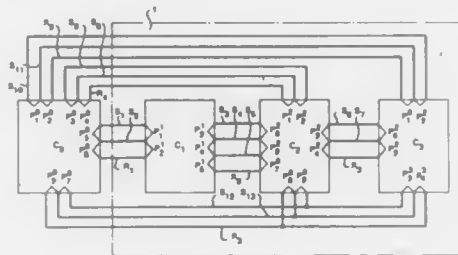
obtaining the cross sectional shape by processing the detected displacements.

**4,959,554**  
**DUAL INPUT-DUAL OUTPUT ELECTRIC SWITCH**  
Joseph W. T. Underwood, IV, 4322 Tidewater Dr., Jacksonville, Fla. 32250, and Eugene F. Rockefeller, P.O. Box 817, Big Pine Key, Fla. 33043  
Filed May 8, 1989, Ser. No. 348,908  
Int. Cl.<sup>5</sup> H01H 19/58; H02J 1/00  
U.S. Cl. 307—38



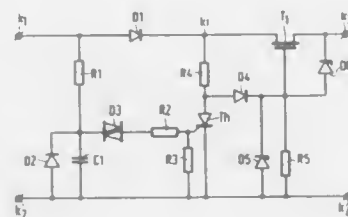
1. An electric vapor-proof, spark-proof, switch having two pair of current input terminals and of two current output terminals comprising a vapor-proof, electrically nonconductive housing enclosing a rotatable insulated disc having two current conductive plates attached thereto and insulated from each other each said pair of stationary current input terminals selectively engageable or disengageable with one said plate respectively of selected rotational positions of said disc; and the two said terminals of each said pair being electrically conductively connected to each other and insulated from the other said pair said two stationary said current output terminals each being continuously engageable with one of said plates respectively, an indicator outside of said housing to identify positions of said disc wherein selected input terminals are electrically connected to one of said output terminals, and a means outside of said housing for rotating said disc to any of said positions.

**4,959,555**  
**INTERCONNECTION MEDIUM**  
Douglas C. Schmidt, Summit, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.  
Filed Apr. 27, 1989, Ser. No. 345,274  
Int. Cl.<sup>5</sup> H01J 19/82; H03K 3/26  
U.S. Cl. 307—219



1. A circuit comprising:  
an interconnection medium comprising a substrate and plurality of conductors over a major surface of said substrate, said conductors being formed in a manner which provides electrical interconnection between components mounted to said medium;  
characterized in that said medium includes conductors between the same components which are in addition to the conductors needed to interconnect the components such that alternate conducting means are established between components in the event of a fault in one of the conductors needed to interconnect the components, and the conductors providing electrical interconnection between components are arranged in at least two sets with a first set of conductors coupled to a first set of components and a second set of conductors coupled to a second set of components, and there is further provided a shared conductor located between the two sets and which physically extends to both sets of conductors.

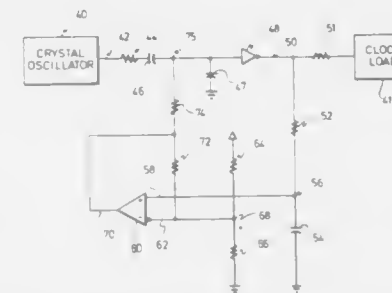
**4,959,556**  
**CIRCUIT ARRANGEMENT FOR DERIVING A DIRECT VOLTAGE FROM THE MAINS ALTERNATING VOLTAGE**  
Jan H. Dekker, Hoogeveen, and Ate K. Damstra, Drachten, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.  
Filed Feb. 2, 1989, Ser. No. 306,192  
Claims priority, application Netherlands, Feb. 5, 1988, 8800275  
Int. Cl.<sup>5</sup> H03K 5/01, 17/72, 17/687  
U.S. Cl. 307—261



1. A circuit arrangement for deriving a direct voltage from an alternating voltage, said circuit arrangement comprising:  
two input terminals,  
two output terminals one of which is connected to one of the input terminals,  
a switching transistor whose main current path is connected

between the other input terminal and the other output terminal,  
a control circuit for controlling the switching transistor, which control circuit includes a thyristor which is connected via a first resistor between the two input terminals, a node between the first resistor and thyristor being connected to a control electrode of the switching transistor, and  
a time-determining circuit comprising a series arrangement of a second resistor capacitor and a trigger element connected between a gate terminal of the thyristor and a node between said second resistor and capacitor, characterized in that the trigger element comprises a diac, in that the other input terminal is connected to an alternating voltage terminal via a rectifier diode arranged in the forward direction with the main current path of the switching transistor, in that the series arrangement of second resistor and capacitor is connected between the alternating voltage terminal and the one input terminal and in that a diode is coupled across the capacitor in such a way that said diode conducts during the periods when the rectifier diode is blocked.

**4,959,557**  
**NEGATIVE FEEDBACK CIRCUIT TO CONTROL THE DUTY CYCLE OF A LOGIC SYSTEM CLOCK**  
Joseph P. Miller, Houston, Tex., assignor to Compaq Computer Corporation, Houston, Tex.  
Filed May 18, 1989, Ser. No. 354,227  
Int. Cl.<sup>5</sup> H03K 5/13  
U.S. Cl. 307—265



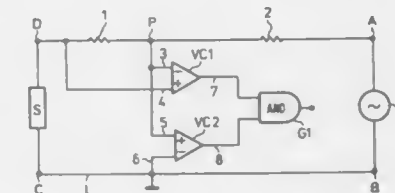
1. A device for dynamically regulating the duty cycle of an oscillating signal, comprising:  
a high-level buffer having an input for receiving said oscillating signal and generating a buffered signal at an output;  
a circuit receiving said buffered signal and generating a voltage signal corresponding to the duty cycle of said buffered signal;  
a comparator receiving said voltage signal and a reference signal and producing a biasing signal for applying to said buffer input as negative feedback.

**4,959,558**  
**CIRCUIT ARRANGEMENT FOR DETECTING CROSS-OVER BY AN ALTERNATING VOLTAGE OF A FIXED REFERENCE VOLTAGE LEVEL**  
Malcolm J. Kay, Lockleys, and Philip A. Tracy, Epping, both of Australia, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 21, 1989, Ser. No. 326,575  
Claims priority, application Australia, Mar. 31, 1988, P17555  
Int. Cl.<sup>5</sup> H03K 5/153, 5/24, 17/13  
U.S. Cl. 307—354

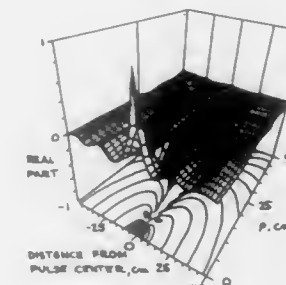
1. A circuit arrangement for detecting the crossings by an applied alternating voltage of two separate threshold levels respectively above and below a fixed reference voltage level comprising:  
a direct current source supplying a dc supply voltage of

fixed magnitude relative to the reference voltage, an electrical path extending between the applied alternating voltage and the dc supply voltage which includes a series combination of two resistances, a first voltage comparator having two possible logic output states and connected to compare the voltage at a junction of the two resistances with the dc supply voltage so that the logic output state of the first voltage comparator at any instant is determined by the voltage at the junction relative to the dc supply voltage, a second voltage comparator having two possible logic output states and connected to compare the voltage at the junction of the two resistances with the reference voltage so that the logic output state of the second voltage



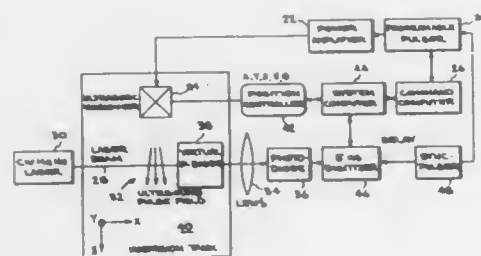
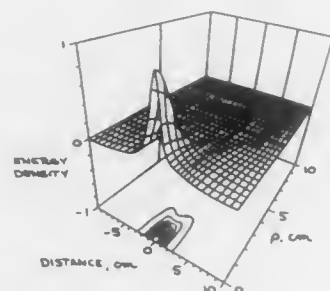
comparator at any instant is determined by the voltage at the junction relative to the reference voltage, and logic means in which the logic output state of the first comparator is combined logically with the logic output state of the second comparator to produce a pulse spanning each instant of cross-over by the applied alternating voltage of the fixed reference voltage, said pulse having a leading edge and a trailing edge which respectively correspond with the instants of crossing by the applied alternating voltage of the two separate threshold levels and whereby one threshold level is determined by the magnitude of the dc voltage and the other threshold level is determined by the ratio of the resistance values of the two resistances and the dc supply voltage.

**4,959,559**  
**ELECTROMAGNETIC OR OTHER DIRECTED ENERGY PULSE LAUNCHER**  
Richard W. Ziolkowski, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
Filed Mar. 31, 1989, Ser. No. 331,141  
Int. Cl.<sup>5</sup> H01Q 3/26; H04B 1/12; H01S 3/23, 3/30  
U.S. Cl. 307—425



1. A method of producing a localized packet of wave energy

which travels substantially large distances compared to the Rayleigh length without substantial divergence, comprising:



independently driving each element of a finite array of radiating elements with a drive function determined by

$$f(r,t) = \int_0^\infty \Phi_k(r,t) F(k) dk$$

where  $\Phi_k(r,t)$  is a basis function which is an exact or approximate non-separable space-time solution of the relevant wave propagation equation and  $F(k)$  is a spectrum function which satisfies

$$\int_0^\infty dk |F(k)|^2 e^{2kz_0} E_1(2kz_0) <$$

$$\frac{1}{2z_0} \int_0^\infty dk |F(k)|^2 \frac{1}{k} < \infty.$$

4,959,560

**ERROR PREVENTING CIRCUIT**

Takayuki Ootani, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 8, 1989, Ser. No. 320,741

Claims priority, application Japan, Mar. 8, 1988, 63-52524

Int. Cl.<sup>3</sup> H03K 17/16, 3/01, 19/094

U.S. Cl. 307-443

14 Claims

1. A semiconductor integrated circuit including an input buffer operation error preventing circuit, comprising: a data output signal generator for generating a first or a second logic level data output signal; an output control circuit means, including first and second current paths for first and second current path signals having first or second logic levels, for receiving the logic level data output signal from the data output signal generator, for generating said first and second current path signals from the logic level data output signal and for

generating an output control signal having a first or a second logic level from each current path signal; an output buffer, connected across first and second potential supply means, for receiving the output control signals from the output control circuit means and for generating a first or a second voltage level output buffer signal in accordance with the logic levels of the output control signals; an input buffer, connected across the first potential supply means and the second potential supply means, for receiving an input signal of a predetermined level; data output signal level detector means for detecting at least one of a transition of the output buffer signal from said first voltage level to said second voltage level and a transition of the output buffer signal from said second voltage



level to said first voltage level by detecting at least one of a transition of one of said current path signals from the first logic level to the second logic level and a transition of one of said current path signals from the second logic level to the first logic level and for generating at least a first or a second detection signal; and

input buffer threshold level control means, responsive to the first or the second detection signals, for controlling the input buffer so as to cancel a fall in a level detection margin of the input signal of the input buffer caused by a potential variation of the first or second potential supply means resulting from a transition of the output buffer signal from the first voltage level to the second voltage level or from the second voltage level to the first voltage level.

4,959,561

**MOS OUTPUT BUFFER WITH REDUCED SUPPLY LINE DISTURBANCE**

Mark W. McDermott, and Ernest A. Carter, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 293,245, Jan. 4, 1989, abandoned. This application Mar. 26, 1990, Ser. No. 499,569

Int. Cl.<sup>3</sup> H03K 17/16, 19/017, 5/12

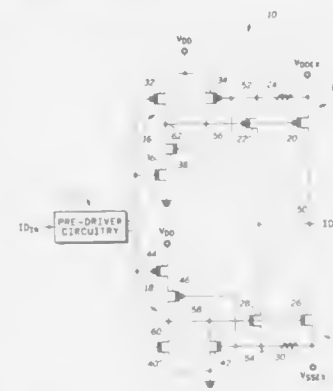
U.S. Cl. 307-443

9 Claims

1. An output buffer circuit, comprising:

driver means, coupled to an output terminal and having an input, for supplying current between a first power supply terminal and said output terminal in proportion to a control voltage on said input; sensing means, having an input, coupled to the input for said driver means, for receiving said control voltage, for detecting the current supplied between said output terminal and said first power supply terminal by said driver means, and providing a feedback voltage proportional thereto; input means for providing the control voltage in response to a data signal;

control means, coupled to said driver means, said input means, and said sensing means, for receiving said feedback



voltage, and for modulating said control voltage in response thereto.

4,959,562

**ERROR PREVENTION CIRCUIT WITH CAPACITIVE MEANS**

Takayuki Ootani, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

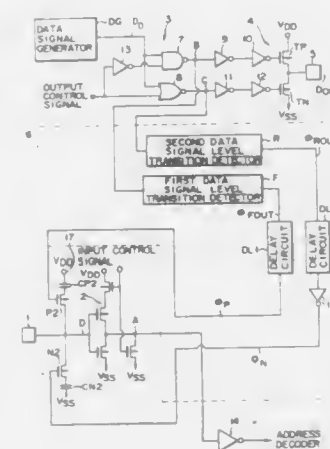
Filed Mar. 17, 1989, Ser. No. 325,186

Claims priority, application Japan, Mar. 18, 1988, 63-63462

Int. Cl.<sup>3</sup> H03K 17/16, 3/01, 19/094

U.S. Cl. 307-443

19 Claims



1. A semiconductor integrated circuit including an input buffer operation error preventing circuit, comprising: a data signal generator for generating a first or a second logic level data output signal;

an output control circuit means, including first and second current paths for first and second current path signals having first or second logic levels, for receiving the logic level data output signal from the data signal generator, for generating said first and second current path signals from the logic level data output signal and for generating an output control signal having a first or a second logic level from each current path signal; an output buffer, connected across first and second potential supply means and, for receiving the output control signals from the output control circuit means and for generating a first or a second voltage level output buffer signal in accordance with the logic levels of the output control signals; an input buffer, connected across the first potential supply

means and the second potential supply means, for receiving an input signal of a predetermined level; data output signal level transition detector means for detecting at least one of a transition of the output buffer signal from said first voltage level to said second voltage level and a transition of the output buffer signal from said second voltage level to said first voltage level by detecting at least one of a transition of one of said current path signals from the first logic level to the second logic level and a transition of one of said current path signals from the second logic level to the first logic level and for generating at least a first or a second detection signal; and input buffer signal terminal control means, responsive to the first or the second detection signals, for controlling the input buffer so as to cancel a fall in the level detection margin of the input signal of the input buffer caused by a potential variation of the first or second potential supply means resulting from a transition of the output buffer signal from the first voltage level to the second voltage level or from the second voltage level to the first voltage level, said input buffer signal terminal control means including capacitive means for preventing steep potential variations in an output of the input buffer.

4,959,563

**ADJUSTABLE LOW NOISE OUTPUT CIRCUIT**

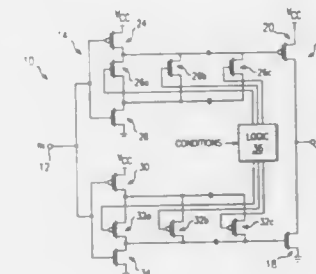
Stephen R. Schenck, McKinney, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 29, 1988, Ser. No. 213,060

Int. Cl.<sup>3</sup> H03K 19/017, 19/094, 19/173

U.S. Cl. 307-448

16 Claims



1. Output circuitry to reduce inductive voltage spikes in an integrated circuit comprising:

an input node for receiving an input voltage signal; an output transistor having first, second and control terminals;

voltage control circuitry responsive to the voltage at said input node for controlling the voltage of the control terminal of said output transistor with respect to time such that the change in output current between the first and second terminals with respect to time has a relatively constant magnitude and;

magnitude control circuitry connected to said voltage control circuitry for controlling the magnitude of constant change of output current with respect to time; wherein said output transistor comprises an N channel output transistor and said voltage control circuitry comprises: a first P channel transistor having its gate connected to said input node, a first terminal connected to a predetermined high voltage and a second terminal connected to a first node;

an N channel transistor having a gate connected to said input node, a first terminal connected to a predetermined low voltage and a second terminal connected to the gate of said output transistor; and

a plurality of P channel transistors each having gates selectively connected to a respective predetermined voltage and each having first and second terminals connected



between the second terminal of said first P channel transistor and said N channel transistor.

4,959,564

**SENSE AMPLIFIER POWER DOWN CIRCUITRY FOR PROGRAMMABLE LOGIC DEVICE**

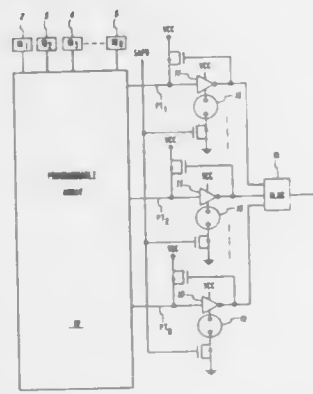
Randy C. Steele, Scottsdale, Ariz., assignor to SGS-Thomson Microelectronics, Inc., Carrollton, Tex.

Filed Jan. 6, 1989, Ser. No. 294,319

Int. Cl.<sup>5</sup> H03K 17/16, 19/094; H02H 7/20

U.S. Cl. 307—465

4 Claims



1. Sense amplifier circuitry for use in a programmable logic device, comprising:

- a power supply having positive and ground terminals;
- at least one sense amplifier input stage connected to said power supply and having an input terminal connected to a product term signal line of the programmable logic device;
- a sense amplifier output stage connected to said power supply and said sense amplifier input stage at a common node, said output stage having an output signal terminal; and
- a switch connected between one terminal of said power supply and said sense amplifier input stage and said sense amplifier output stage, wherein said switch has a control input, and wherein the application of a selected signal to the control input causes said switch to disconnect the sense amp from the one terminal of said power supply.

4,959,565

**OUTPUT BUFFER WITH GROUND BOUNCE CONTROL**  
Mark W. Knecht, Campbell, and Scott O. Frake, Santa Clara, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Feb. 10, 1989, Ser. No. 309,253

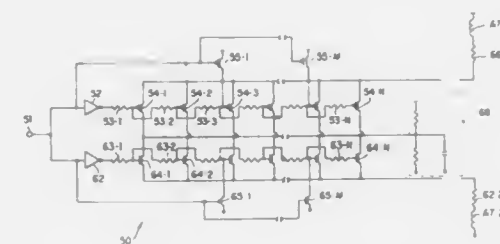
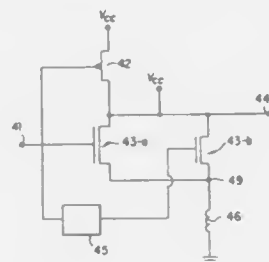
Int. Cl.<sup>5</sup> H03K 3/13, 5/13, 17/28, 17/687

U.S. Cl. 307—542

28 Claims

1. An output circuit comprising:
- a first supply terminal for receiving a first supply voltage;
  - an input terminal for receiving an input signal;
  - an output terminal for providing an output signal as a result of said input signal;
  - a first plurality of transistors, each having a first current carrying lead coupled to said first supply terminal, a second current carrying lead coupled to said output terminal, and a control lead having a capacitance associated therewith; and
  - a plurality of polycrystalline silicon resistors coupled in series between said control leads of adjacent ones of said plurality of transistors, one of said plurality of resistors also being coupled to said input terminal said polycrystalline silicon having a sheet resistance within the range of approximately 10 to 40 ohms/square,

wherein said plurality of resistors and said capacitances form a distributed RC network which causes said first plurality



of transistors to turn on in sequence in response to said control signal.

4,959,566

**LITHIUM-SULFUR HEXAFLUORIDE MAGNETOHYDRODYNAMIC POWER SYSTEM CONFIGURATIONS AND SYSTEM DESIGN CONSIDERATIONS**

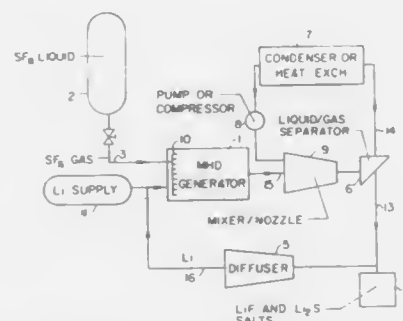
Flavio Dobran, 21st & Broadway, Long Island City, N.Y. 11106, assignor to Flavio Dobran, Long Island City, N.Y.

Filed Apr. 14, 1989, Ser. No. 338,103

Int. Cl.<sup>5</sup> H02K 44/08

U.S. Cl. 310—11

5 Claims



1. A magnetohydrodynamic power generation system using lithium and sulfur-hexafluoride whereby lithium supplied from a lithium supply tank and sulfur hexafluoride supplied from a storage tank are mixed and reacted in the magnetohydrodynamic channel and mixed with a transporting fluid downstream of the channel in a mixer/nozzle, or whereby the liquid lithium exiting from the magnetohydrodynamic channel is mixed and reacted with the sulfur hexafluoride gas and transporting fluid in a mixer/combustor/nozzle unit downstream of the channel and consequently separated into lithium and transporting fluid streams, such that after being cleaned from the products of combustion the unreacted lithium is returned to the generator channel inlet, whereas the transporting fluid is re-

turned to the mixer/nozzle or mixer/combustor/nozzle unit in a closed cycle or rejected in an open cycle system.

4,959,567

**MAGNETODISTORTIVE ACTUATOR WITH ADJUSTABLE MAGNETIC BIAS**

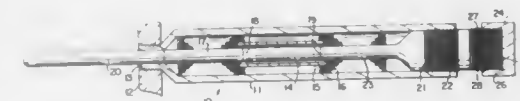
Mark A. Ealey, Ayer, Mass., and Robert L. Lillard, Jupiter, Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 20, 1988, Ser. No. 286,837

Int. Cl.<sup>5</sup> G02B 7/18

U.S. Cl. 310—26

11 Claims



1. A magnetodistortive actuator comprising a support; an elongated active component of a magnetodistortive material mounted on said support and having a stationary and a movable end portion; electromagnetic means for subjecting said active component to a variable magnetic field to selectively shorten and lengthen said active component with attendant movement of said movable end portion relative to said support, including a solenoid coil mounted on said support and surrounding said active component and means for supplying electric power to said solenoid coil to energize the same; and adjustable permanent magnet means separate from said electromagnetic means for applying a permanent magnetic bias to said active component to bring the latter to a desired point of a stress/field characteristic line independently of the action of said electromagnetic means on said active component, including at least one permanent magnet and means for selectively varying the strength of that portion of the magnetic field of said permanent magnet that acts on said active component even in the absence of energization of said solenoid coil.

4,959,568

**DYNAMICALLY TUNABLE RESONANT DEVICE WITH ELECTRIC CONTROL**

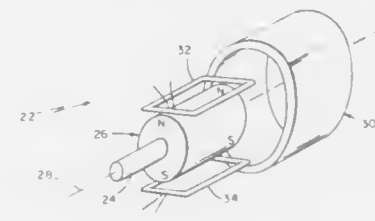
Brian P. Stokes, Arlington, Mass., assignor to General Scanning, Inc., Watertown, Mass.

Filed Aug. 5, 1986, Ser. No. 893,481

Int. Cl.<sup>5</sup> G02B 26/10; H02K 33/00

U.S. Cl. 310—51

19 Claims



1. Apparatus comprising an element mounted to rotate in oscillation about an axis, said element having a resonant frequency of rotation and being rotatable resonantly, and means for dynamically tuning said resonant frequency to a desired frequency, said means including two magnetic components which cooperate via their respective magnetic fields to form a resultant magnetic field for controlling the resonant frequency of said rotatable element, one said component being mounted for rotational motion with said element, the other said component having a fixed

mounting, said components being arranged to apply said resultant field to said element to magnetically tune said resonant frequency.

4,959,569

**STATOR COIL WATER SYSTEM EARLY ALERT HYDROGEN LEAKAGE MONITOR**

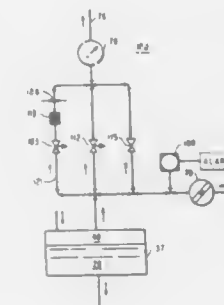
Owen R. Snuttjer, Oviedo, and Michael J. Rasinski, Winter Springs, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 22, 1989, Ser. No. 441,135

Int. Cl.<sup>5</sup> H02K 9/00, 9/24; G01M 3/08; F28V 00/00

U.S. Cl. 310—53

22 Claims



pressure switch so as to produce an alarm signal when said pressure switch is activated;  
f. a bypass valve in fluid communication with the holding tank so as to vent large volumes of gas from the tank when the bypass valve is opened; and  
g. a gas meter in fluid communication with each of said first and second pressure relief valves and the bypass valve so as to give an indication of the volume of gas that is vented from the holding tank.

4,959,570

**MOTOR COOLING SYSTEM**

Kosei Nakamura, Hino, and Yoshiyuki Hayashi, Yamanashi, both of Japan, assignors to Fanuc Ltd., Yamanashi, Japan  
PCT No. PCT/JP88/00690, § 371 Date Mar. 7, 1989, § 102(e)  
Date Mar. 7, 1989, PCT Pub. No. WO89/00784, PCT Pub. Date Jan. 26, 1989

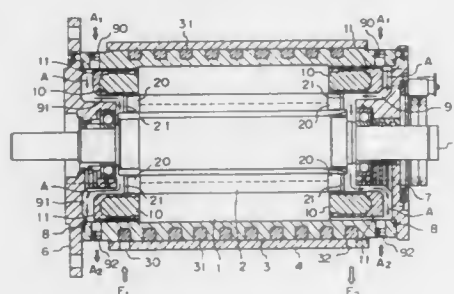
PCT Filed Jul. 9, 1988, Ser. No. 353,621

Claims priority, application Japan, Jul. 9, 1987, 62-169680

Int. Cl.<sup>3</sup> H02K 9/00

U.S. Cl. 310—54

4 Claims



1. A motor cooling system comprising:  
a coating layer coating projecting portions of stator coils of a stator of the motor;  
a cooling liquid cooling said projecting portions of said stator coils and cooling opposite ends of a rotor of said motor;  
an oil jacket surrounding said stator of the motor, said oil jacket having inlet and outlet openings formed on opposite sides of the oil jacket; and  
flow passages extending from the inlet opening, extending past the coating layer coating the projecting portions of the stator coils, extending past outer surfaces of end rings of the rotor and extending to the outlet openings of the oil jacket, wherein the cooling liquid flows through the flow passages.

4,959,571

**AXIAL-FLOW FAN WITH TAPERED HUB AND DUCT**  
Kazuhiro Yasumoto, and Ipppei Hagiwara, both of Nakatsugawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 9, 1989, Ser. No. 321,007

Claims priority, application Japan, Mar. 11, 1988, 63-57462

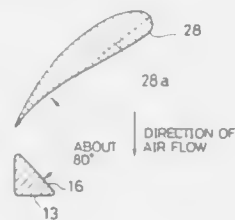
Int. Cl.<sup>3</sup> H02K 9/06; F04D 29/52

U.S. Cl. 310—67 R

15 Claims

1. An axial-flow fan comprising:  
a motor having a drive shaft;  
a motor support for supporting the motor;  
a frame having a generally cylindrical inner surface;  
legs each having one end connected to the frame and the other end connected to the motor support for supporting the motor support;  
a boss fixed to the drive shaft and having a generally cylindrical outer surface; and  
blades radially extending from the cylindrical outer surface of the boss;

said boss and blades being driven by said motor to cause an air stream along an axis of the motor;



wherein said legs each have three generally flat sides, one of said sides being inclined with respect to the direction of the incoming air stream.

4,959,572

**ROTATING RECTIFIER ASSEMBLY**

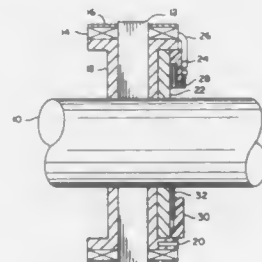
Richard J. Becker, Brick, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jun. 26, 1989, Ser. No. 371,362

Int. Cl.<sup>3</sup> H02K 15/14; B32B 15/08

U.S. Cl. 310—68 D

27 Claims



1. A rotating rectifier assembly in a generator for rectifying an ac signal generated by windings in an exciter rotor disposed about a rotatable shaft for rotation therewith, comprising:  
a substrate disposed about the shaft for rotation therewith;  
rectifying means secured to said substrate for rectifying the ac signal;  
ac conductor means having a first end connected to the windings and a second end for supplying the ac signal to the rectifying means;  
a conductive bus bar secured to said second end of said ac conductor means and to said rectifying means;  
a ring disposed about the shaft and secured to said substrate such that said bus bar curls around said ring, whereby said ring opposes centrifugal forces exerted on said bus bar during rotation of the shaft; and  
conductor means secured to said substrate on which a dc signal is provided upon rotation of the shaft and the rotating rectifier assembly.

4,959,573

**ELECTROMAGNETIC INDUCTION MACHINES HAVING REGULATED POLAR MAGNETIC SYMMETRY**  
Gary D. Roberts, Lindon, Utah, assignor to S.P.C. Holding, Co., Ltd., Salt Lake City, Utah

Continuation of Ser. No. 83,137, Aug. 12, 1987, Pat. No. 4,808,868, which is a continuation of Ser. No. 900,700, Aug. 27, 1986, abandoned. This application Feb. 27, 1989, Ser. No. 315,800

Int. Cl.<sup>3</sup> H02K 11/00; H02P 1/44

U.S. Cl. 310—68 R

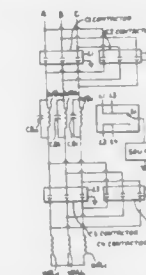
9 Claims

1. A reversible dynamoelectric machine adapted to be sup-

plied with three-phase power at three-power phase input terminals, said machine comprising:

a rotatable rotor carrying a plurality of interconnected rotor windings;  
a stationary stator operatively associated with said rotor;  
a first stator winding in parallel with a first capacitor;  
a second stator winding in parallel with a second capacitor;  
a third stator winding in parallel with a third capacitor;  
a fourth stator winding;  
a fifth stator winding;  
a sixth stator winding, each of said first through sixth windings having two ends, one end of each of said fourth, fifth and sixth stator windings being electrically connected together; and

relay switching means operative in first and second positions, said relay switching means operative in said first position for connecting one end of said first stator winding



to a first of said three power phase input terminals, connecting one end of said second stator winding to a second of said three power phase input terminals, connecting one end of said third stator winding to a third of said three power phase input terminals, connecting the other end of said fourth stator winding to the other end of said first stator winding, connecting the other end of said fifth stator winding to the other end of said second stator winding, and connecting the other end of said sixth stator winding to the other end of said third stator winding, and operative in said second position for changing the connection of the one ends of two of said first, second and third stator windings to different of said first, second and third input terminals, and connecting the other ends of two of said fourth, fifth and sixth stator windings to different of the other ends of said first, second and third stator windings.

4,959,574

**PRECISION GAP MAGNETIC ENCODE DEVICE**  
Hidemasa Suzuki; Ichiro Tokunaga, both of Furukawa; Hiraku Abe, Miyagi, and Yasuaki Ogawa, Furukawa, all of Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Mar. 31, 1989, Ser. No. 332,640

Claims priority, application Japan, May 28, 1988, 63-129461

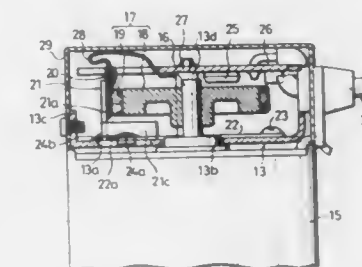
Int. Cl.<sup>3</sup> H02K 15/00, 5/26

U.S. Cl. 310—91

10 Claims

1. A magnetic encoder device, comprising:  
a magnetic scale having thereon a magnetic code which can be detected by a magnetic sensor;  
a sensor retaining member for securely retaining said magnetic sensor with a gap between said magnetic scale and said magnetic sensor to allow relative rotation between said magnetic scale and said magnetic sensor;  
a housing member to which said sensor retaining member is secured;  
first bonding agent for securing said housing member and a first portion of said sensor retaining member adjacent said housing member to each other; and

a second bonding agent for securing said housing member and a second portion of said sensor retaining member



which is remote from said first portion, said second bonding agent being softer than said first bonding agent.

4,959,575

**TRANSPPOSITIONED MULTI-STRAND CONDUCTOR FOR ELECTRIC ROTARY MACHINE**

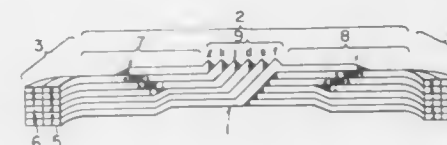
Toshio Saitoh; Noriyoshi Takahashi, and Masaki Satoh, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Continuation of Ser. No. 571,945, Jan. 19, 1984, abandoned. This application Jul. 10, 1989, Ser. No. 377,762

Claims priority, application Japan, Jan. 28, 1983, 58-11447

Int. Cl.<sup>3</sup> H02K 3/14

U.S. Cl. 310—213

2 Claims



1. A transposed multi-strand bar for a rotary electric machine, the transposed multi-strand bar being adapted to be received in a slot of a stator core of a rotary electric machine, the transposed multi-strand bar comprising:  
a centrally disposed slanted strand portion;  
a slot-inside end portion disposed on a first side of said centrally disposed slanted strand portion and on a second side thereof;  
slot-outside end portions leading out of opposite slot-inside end portions of said stator core;  
at least two adjacent groups of strands, each group of strands including a plurality of strands transposed in such a manner that the respective strands have different stacked portions in the respective slot-inside end portions and the centrally disposed slanted strand portion, each of said groups of strands being shorted at each end thereof, wherein the transposition of the respective strands of the first half of strands is effected in such a manner that strands disposed at an uppermost position of the first half of strands of the respective groups of strands are transposed in the slot-inside end portion on the first side of the centrally disposed slanted portion to longitudinally gradually descend through the centrally disposed slanted portion from the uppermost position to a lowermost position in the slot-inside end portion on the second side of the centrally disposed slanted portion and strands disposed in a lowermost position of the second half of strands longitudinally gradually ascend through the slot-inside end portion on the first side of the centrally disposed slanted portion so as to reach the uppermost position in the slot-inside end portion on the second side of the centrally disposed slanted portion and are transposed thereat, and



wherein strands arranged between the uppermost and lowermost position of the respective groups of strands are transposed at a position in a vicinity of an intersecting point with the strand which is descending from the uppermost position and the strand which is ascending from the lowermost position while following the descent and ascent of the respective descending and ascending strands from the uppermost and lowermost positions, whereby adjacent strands of the first half of strands are transposed to opposite strand stacks to each other in said slot-inside end portion on the first side of the centrally disposed slanted strand portion and adjacent strands of the second half of strands respectively located are transposed to opposite strand stacks in the slot-inside end portion on the second side of the centrally disposed slanted portion so that no circulating current flows between adjacent strands in the respective slot-inside end portions even if a magnetic flux is inputted in either a vertical or horizontal direction to the multi-strand bar.

4,959,576

## AUTOMOTIVE ALTERNATOR

Mitsutoshi Horibe, Anjo; Hiroshi Hamada, Kariya, and Hiroshi Sakakibara, Aichi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

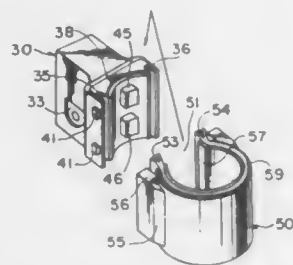
Filed Nov. 22, 1988, Ser. No. 274,856

Claims priority, application Japan, Nov. 25, 1987, 62-296894; Apr. 26, 1988, 63-103408

Int. Cl.<sup>5</sup> H02K 13/00

U.S. Cl. 310—239

9 Claims



## 1. An automotive alternator comprising:

- a rotor around which a rotor coil is wound, said rotor having a rotary shaft adapted to be coupled to and driven by an automotive engine;
- a frame for encasing said rotor in a way such that a portion thereof extends out of said frame;
- slip rings provided at one end portion of said portion of said rotary shaft extending outside of the frame, said slip rings being electrically connected to said rotor coil;
- a plurality of brushes that are in sliding contact with said slip rings;
- a brush holder, having receiving portions for encasing said brushes and having a pair of first members which are one of recess portions and projection portions, formed on both sides of said receiving portions, respectively, and extending in an axial direction of said rotary shaft;
- a cover body disposed around an outer periphery of said slip rings, said cover body including a cylindrical portion having in a side wall thereof an opening through which said brushes extend and having an axial length which is similar to an axial length of said brush holder, said cylindrical portion having second members which are one of recess portions and projection portions that are sealingly engageable with said one of the recess portions and projection portions of said brush holder;
- one of said first and second members being said recess portions and the other being said projection portions, wherein each said recess portion has a rectangular cross-section with an open end and two edge corners spaced from said

open end, wherein an end thereof into two parts, which respectively connect to said two edge corners;

a rear cover for encasing said brush holder and said cover body;

seal members interposed between said frame and said brush holder and cover body, and between said rear cover and said brush holder and cover body, respectively; and

means for pressing said brush holder, said cover body and said seal members toward said frame in the axial direction by said rear cover to assemble said brush holder, said cover body, and said seal members.

4,959,577

## ALTERNATING CURRENT GENERATOR

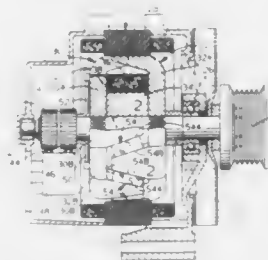
Thomas A. Radomski, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 23, 1989, Ser. No. 425,270

Int. Cl.<sup>5</sup> H02K 1/22

U.S. Cl. 310—263

2 Claims



1. An alternating current generator comprising, frame means, a stator supported by said frame means comprising a stator core formed of magnet material that has slots, an output winding carried by said stator core including conductors disposed within said slots, a rotor supported by rotation by said frame means disposed within said stator core, said stator core and rotor being spaced to provide an air gap between said rotor and stator core, said rotor comprising a shaft, first and second claw-pole members formed of magnetic material carried by said shaft, said first claw-pole member having a plurality of first circumferentially spaced and axially extending pole fingers, said second claw-pole member having a plurality of second circumferentially spaced and axially extending pole fingers, said first and second claw-pole members being so oriented on said shaft that the pole fingers of said first and second claw-pole members are interleaved, a rotor core formed of magnetic material carried by said shaft interposed between said claw-pole members having opposite ends respectively engaging said claw-pole members, a field coil disposed about said rotor core, slip rings carried by said shaft electrically connected to opposite sides of said field coil, brushes engaging said slip rings adapted to be connected to a source of unidirectional current to energize said field coil, a plurality of permanent magnets respectively interposed between said first and second circumferentially spaced axially extending pole fingers, each permanent magnet having a first end face engaging a side surface of said circumferentially spaced axially extending first pole finger and a second opposite end face engaging a side surface of said circumferentially spaced axially extending second pole finger, said end faces of said permanent magnets having opposite magnetic polarities and said magnets being so oriented that magnet end faces of like magnetic polarity respectively engage opposed side surfaces of a given pole finger, said first and second claw-pole members and said rotor core member defining a closed magnetic circuit formed entirely of magnetic material that magnetically connects opposed end faces of all said permanent magnets, said magnetic circuit shunting said air gap between said rotor and stator core whereby the flux developed by said permanent magnets is diverted from said air gap by said magnetic circuit and only

leakage flux developed by said permanent magnets traverses said stator core when said field coil is not energized, said field coil when energized with unidirectional current developing a field mmf in said magnetic circuit that is in such a direction as to oppose the mmf developed by said permanent magnets in said magnetic circuit whereby flux developed by said permanent magnets is caused to traverse said air gap through a path that includes adjacent first and second pole fingers, the flux developed by said field coil traversing said air gap and being applied to said stator core by said first and second pole fingers, the amount of permanent magnet flux applied to said stator core increasing as the unidirectional current applied to said field coil increases.

4,959,578

## DUAL ROTOR AXIAL AIR GAP INDUCTION MOTOR

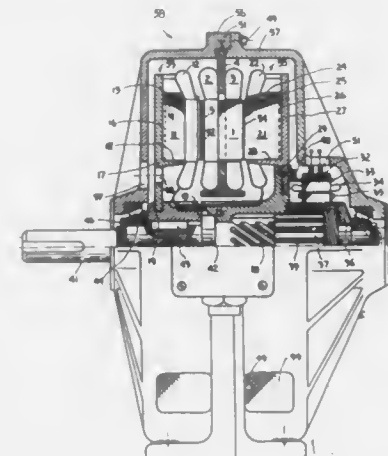
Joseph S. Varga, Little Rock, Ark., assignor to Axial Electric, Inc., Sberwood, Ark.

Filed Nov. 24, 1987, Ser. No. 125,615

Int. Cl.<sup>5</sup> H02K 1/22, 23/44

U.S. Cl. 310—268

7 Claims



1. An axial air gap type induction machine comprising:
  - a housing;
  - a shaft rotatably mounted in said housing;
  - a centrally located stator circumferentially surrounding said shaft and attached to said housing;
  - a first end rotor disposed on one side of said stator and firmly mounted to said shaft;
  - a second end rotor disposed on the other side of said stator and moveably mounted on said shaft, the movement of said second rotor being bidirectional about the circumference of said shaft, the movement of said second rotor causing phase shifting of both rotors, resulting in speed control of said induction machine; and
  - shifting means for turnably positioning the second end rotor in respect to the first end rotor.

4,959,579

## ULTRASONIC MOTOR

Yasuo Kawabara; Naofumi Fujie, both of Nagoya, and Takao Saeki, Chiryu, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jul. 19, 1989, Ser. No. 381,949

Claims priority, application Japan, Jul. 29, 1988, 63-191951

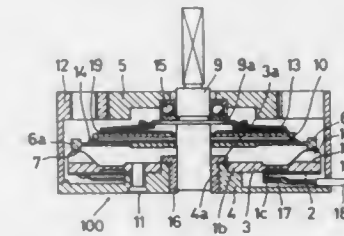
Int. Cl.<sup>5</sup> H01L 41/08

U.S. Cl. 310—323

13 Claims

1. An ultrasonic motor comprising:
  - stator means for generating a traveling wave;
  - rotor means operably engaged the stator means and driven by the traveling wave on the stator means;

spring means for generating a pressure pressing the rotor means toward the stator means; and



a stiff body disposed between said spring means and said rotor means for distributing the pressure from said spring means uniformly to the rotor means.

4,959,580

## PIEZOELECTRIC MOTOR

Vladimir S. Vishnevsky, and Vyacheslav V. Lavrinenko, both of Kiev, U.S.S.R., assignors to Kievsky Politekhichesky Institut Imeni, Kiev, U.S.S.R.

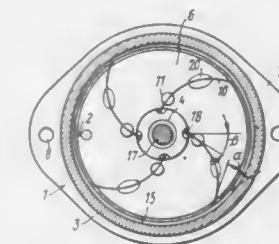
PCT No. PCT/SU87/00027, § 371 Date Oct. 24, 1988, § 102(c) Date Oct. 24, 1988, PCT Pub. No. WO88/06816, PCT Pub. Date Sep. 7, 1988

PCT Filed Feb. 26, 1987, Ser. No. 283,486

Int. Cl.<sup>5</sup> H01L 41/08

U.S. Cl. 310—323

2 Claims



1. A piezoelectric motor comprising a stator (1) having a housing (7); a rotor (3) frictionally interacting with said stator (1); a piezoelectric radial mode oscillator (6) mounted on said housing (7), said oscillator comprising a piezoelectric cell (9) disposed coaxially to the rotor (3) and made in the form of a disk (12) with electrodes (13) and defining major flat top and bottom surfaces (50), said disk (13) being polarized perpendicular to said electrodes (12); at least two pushers (10), each pusher having one end secured on said piezoelectric cell (9) and having another end resting against said rotor (3), one end of each pusher (10) being secured on at least one flat major surface (50) of said piezoelectric cell (9) so that a gap (14) is provided between said at least one flat major surface (50) of said piezoelectric cell (9) and an associated pusher (10).

4,959,581

## SERVO VALVE HAVING A PIEZOELECTRIC ELEMENT AS A CONTROL MOTOR

Jörg Dantigraber, Lohr-Sackebach, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 270,548

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1987, 3738630

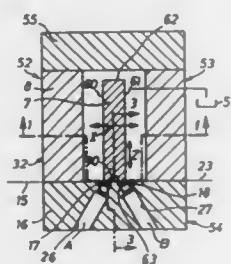
Int. Cl.<sup>5</sup> H01L 41/08

U.S. Cl. 310—328

28 Claims

1. An electrohydraulic pressure transducer apparatus comprising:
  - a control element comprising a piezoelectric element,

electrically actuated means for causing a movement of said control element for carrying out a control function so as to change a hydraulic output signal in accordance with an electric input signal, wherein the control function is provided for by a front face of said control element, the moment of resistance of the control element is small in the direction of movement of the con-



trol element, but large in the direction in which the force created by the pressure of the hydraulic output signal acts, the front face of the control element has a recess defined therein which is connected with a source of pressure medium, and said recess is connected with stationary recesses which are connected with control ports in the housing or cover of the apparatus.

4,959,582

## VIDEO STORAGE CABINET

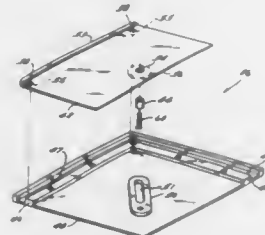
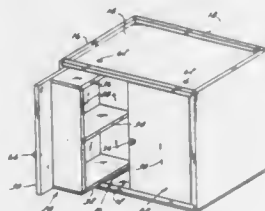
James M. Meyer, Oshkosh; David A. Schmidt, and Peter M. Donner, all of Oshkosh, Wis., assignors to Imago Quastus, Inc., Oshkosh, Wis.

Filed Aug. 28, 1986, Ser. No. 901,143

Int. Cl.<sup>5</sup> A47B 88/00

U.S. Cl. 312—307

5 Claims



1. A hinge assembly for supporting a storage type door for movement between an open position and a closed position in a cabinet, said assembly comprising a first plate in the form of a square adapted to be mounted in a cabinet, said first plate having a groove along two sides of the square, said groove intersecting at a right angle, supporting means defining an elongate guide track on said first plate, said guide track being aligned with a diagonal line drawn through the intersection of said grooves and the opposite corner of the square in said first plate, and a second plate adapted to be mounted on the storage door and having two guide members mounted on one edge of said second plate, said second plate being mounted on said first plate with said guide members aligned in one of the guide

grooves and a pivot post mounted on said second plate and aligned in said guide track, whereby the portion of the door supported by the second plate will pivot within said square defined by said first plate in the cabinet on movement of the door between the open position and the closed position.

4,959,583

## REFLECTIVE LAMPS HAVING AN IMPROVED LIGHT SOURCE MOUNTING ARRANGEMENT

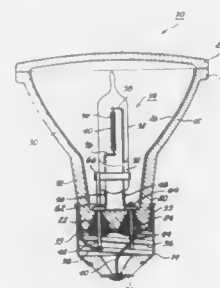
Vito J. Arsena, Highland Heights; Harvey C. Clough, Cleveland Heights, and Frank E. Zalar, Euclid, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 31, 1989, Ser. No. 331,154

Int. Cl.<sup>5</sup> H01J 61/40, 5/48; H01R 27/00

U.S. Cl. 313—113

10 Claims



1. An electric lamp comprising:
  - (a) a reflector having an internal electrically conductive reflective surface and a bottom portion having at least a pair of openings extending therethrough;
  - (b) a base section affixed to said bottom portion of said reflector;
  - (c) a light source having at least a pair of electrical conductors extending out of its bottom portion;
  - (d) means for electrically connecting said electrical conductors of said light source to said base section comprising at least a pair of electrically conductive post members extending through said openings and connected to said pair of electrical conductors; and
  - (e) means consisting of a cement substance within said openings for solely and spatially disposing said light source within said reflector and a barrier means within said openings to prevent said cement substance from entering the inner confines of said reflector.

4,959,584

## LUMINAIRE FOR AN ELECTRODELESS HIGH INTENSITY DISCHARGE LAMP

John M. Anderson, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 23, 1989, Ser. No. 370,664

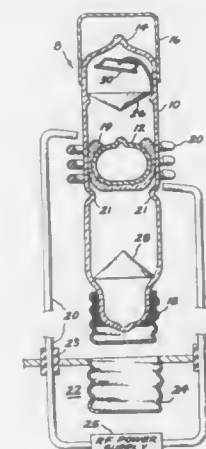
Int. Cl.<sup>5</sup> H01J 1/50, 63/02

U.S. Cl. 313—160000

32 Claims

1. A luminaire, comprising:
  - a replaceable lamp comprising an elongated, light-transmissive envelope and a light-transmissive arc tube disposed within said envelope for containing a fill, said envelope having a base;
  - an excitation coil disposed about said envelope for exciting an arc discharge in said fill; and
  - socket means for receiving the base of said envelope,

coil retaining means for supporting said excitation coil, said coil retaining means being adapted to be connected to a



radio frequency power supply for coupling radio frequency power to said fill.

4,959,585

## ELECTRIC INCANDESCENT LAMP AND METHOD OF MANUFACTURE THEREFOR

Leonard E. Hoegler, Solon; Gerald A. Johnson, Chagrin Falls; Diana M. Essock, Moreland Hills, and Kent K. Kipling, Solon, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Sep. 6, 1988, Ser. No. 240,336

Int. Cl.<sup>5</sup> H01J 1/94, 19/48, 9/02

U.S. Cl. 313—271

61 Claims



1. Light source means for an electric incandescent lamp having as the incandescent filament a continuous length of refractory metal wire formed directly into an elongated coil having a central axis and with coil turns at both ends of the elongated coil having a different diameter than the diameter of the central coil turns, at least one of said central turns or the end turns having a diameter selected relative to the inner diameter of an incandescent lamp in which said filament is to be used so as to be in close proximity or in actual physical abutment with a portion of the inner walls of said lamp so as to enable said filament to be coaxial with the longitudinal axis of said lamp when so inserted.

4,959,586

## ELECTRIC INCANDESCENT LAMP

Stephanus J. Claessens, and Laurent H. T. Dams, both of Turnhout, Belgium, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 11, 1989, Ser. No. 350,825

Claims priority, application Netherlands, May 24, 1988, 8801325

Int. Cl.<sup>5</sup> H01K 1/18

U.S. Cl. 313—273

2 Claims

1. An electric incandescent lamp comprising:
  - a. an elongated, light transmissive envelope sealed in a vacuum tight manner;

- b. first and second conductors extending through respective portions of the envelope;
- c. a continuous tungsten wire filament extending longitudinally in the envelope from the first conductor to the second conductor, said filament forming at least first and second helically wound light-emitting sections and a non-light-emitting section for spacing apart said first and second light-emitting sections, said non-light-emitting section having first and second helically wound portions formed at opposite ends thereof;



- d. an additional tungsten wire extending longitudinally in the envelope adjacent the non-light-emitting section and having first and second helically wound portions formed at opposite ends thereof, said helically wound portions being wound around the respective helically wound portions of said non-light-emitting section; and
- e. means for supporting the filament in the envelope at said helically wound portions of the additional tungsten wire.

4,959,587

## ARC TUBE ASSEMBLY

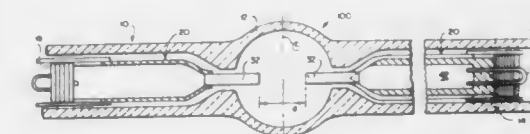
Stanley M. Schug, Monroeville, Ohio, assignor to Venture Lighting International, Inc., Oakwood Village, Ohio

Filed Jan. 13, 1989, Ser. No. 296,772

Int. Cl.<sup>5</sup> H01J 9/18, 9/32, 61/36

U.S. Cl. 313—623

37 Claims



1. An improved arc tube assembly for a high-intensity metal halide lamp, comprising:
  - (a) an arc tube discharge envelope assembly including:
    - (1) a glass arc tube envelope forming a cavity adapted to receive a pair of electrodes therein, and
    - (2) a pair of glass side arms with capillaries rigidly fused to said arc tube envelope on opposite sides thereof and coaxial therewith, each of the side arms being adapted to receive one electrode assembly therein; and
  - (b) a pair of electrode assemblies positioned one each in said side arms and comprising in combination:
    - (1) an elongated quartz slug with beveled edges in a substantially square cross section having a forward end tapered inwardly on each side and terminating with a flat face square in cross section, and a flat rearward end



- substantially square in cross section with a transverse groove therein,
- (2) a rod shaped electrode coaxial with said slug and abutting the forward end thereof,
  - (3) four molybdenum foils each overlying one side of said slug, each of said foils having a tapered front end projecting beyond said slug and attached to said electrode and a rear end having a tab rearwardly extending therefrom, and
  - (4) an electrical lead attached to the tabs at the rear end of said foils, said electrode assemblies being intimately fused to said side arms with said electrodes protruding into said arc tube envelope through said capillaries with said electrical leads projecting rearwardly from said side arms.

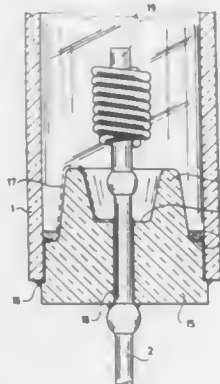
4,959,588

# DISCHARGE LAMP HAVING A DISCHARGE VESSEL MADE WITH A CERAMIC CLOSING MEMBER WITH AN INDENTED INNER SURFACE

Dénes Vida, and Péter Ferenci, both of Budapest, Hungary, assignors to Tungsram RT, Budapest, Hungary  
Filed Mar. 23, 1989, Ser. No. 327,892  
Claims priority, application Hungary, Mar. 28, 1988, 1533/88  
Int. Cl.<sup>5</sup> H01J 61/36

U.S. Cl. 313—625

7 Claims



1. In a high-pressure gas discharge lamp, particularly a high-pressure sodium vapor lamp, comprising a tubular discharge vessel enclosing a discharge space; said discharge vessel being made of a ceramic material and including electrodes and a filling, said filling consisting of at least one ionizable rare gas and a metal additive; ceramic plug elements respectively mounted at each end of said discharge vessel for closing the end regions of said discharge vessel, said ceramic plug elements each having a current lead-in passing therethrough for connecting said electrode with an outer source of supply voltage, said ceramic plug elements each forming front surfaces of said discharge space, at least one of said front surfaces having surface elements of different height levels to form a cold chamber for receiving said metal additive, wherein the shortest electrical conduction path between the surface of the metal additive and the current lead-in as measured along said front surface is at least 4 mm.

4,959,589

# GLOW DISCHARGE STARTER HAVING DISCHARGE EXTINGUISHING MEANS

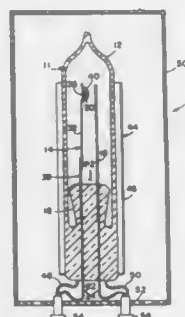
Nikolaos Barakitis, Salem; Sheppard Cohen, Danvers, and Gregory Zaslavsky, Brookline, all of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Nov. 28, 1988, Ser. No. 276,837

The portion of the term of this patent subsequent to Mar. 27, 2007, has been disclaimed.  
Int. Cl.<sup>5</sup> H01H 61/00

U.S. Cl. 315—58

10 Claims



1. A glow discharge starter comprising an hermetically sealed discharge envelope containing an ionizable medium, a bimetallic electrode and a counter electrode and a capacitor having a main body and a pair of conductors extending from said main body and electrically coupling respective electrodes of said discharge envelope, said main body of the capacitor being in a thermal relationship with said discharge envelope to be responsive to heat generated in said discharge envelope; said capacitor being adapted to create a short circuit within said main body of said capacitor to thereby extinguish the discharge within said discharge envelope when a maximum temperature limit is reached.

4,959,590

# LEAD CONNECTION STRUCTURE

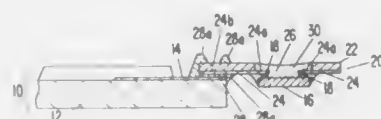
Kenzo Hatada, Katano, and Koichi Nagao, Chigasaki, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 18, 1986, Ser. No. 943,198

Int. Cl.<sup>5</sup> H05B 33/06

U.S. Cl. 315—169.3

11 Claims



1. A lead connection structure comprising: a base substrate on which at least one electrode is disposed; film tape comprising a flexible base and a pattern of electrically conductive material disposed on said flexible base, said film tape disposed against each said at least one electrode with said conductive material in an electrically conductive relationship with said at least one electrode, a connecting area being defined beside the location at which said film tape is disposed against said at least one electrode; and insulating resin disposed between said at least one electrode and said electrically conductive material and covering said connecting area, said insulating resin having been stiffened by the application of light thereto, and said film tape being mechanically coupled to said base substrate due to the application of light to the insulating resin disposed

between said at least electrode and said electrically conductive material and covering said connecting area.

4,959,591

# RECTIFIER-INVERTER CIRCUIT WITH LOW HARMONIC FEEDBACK, PARTICULARLY FOR OPERATION OF FLUORESCENT LAMPS

Walter Hirschmann, Munich, Fed. Rep. of Germany, assignor to Patent Treuhand Gesellschaft für elektrische Glühlampen m.b.H., Munich, Fed. Rep. of Germany

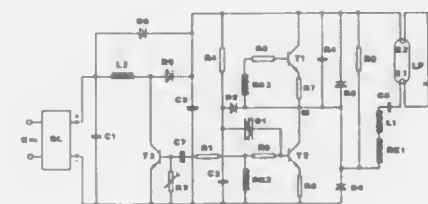
Filed Aug. 2, 1989, Ser. No. 388,642

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1988, 3829388

Int. Cl.<sup>5</sup> H05B 41/29

U.S. Cl. 315—209 R

19 Claims



1. Rectifier - inverter circuit for operation of a load (LP) by supplying the load with electrical energy from an a-c power network, at an elevated frequency high with respect to the power network frequency, having a rectifier circuit (GL) coupled to the power network; a first capacitor (C1) connected across the output terminals of rectifier; a push-pull oscillator circuit for providing said electrical energy at said elevated frequency, coupled to the output of the rectifier, said push-pull oscillator circuit including two transistors (T1, T2), a feedback circuit including a transformer having a first winding (RK1) in circuit with the load, and feedback winding means (RK2, RK3) in circuit with the transistors; an inductance (L1) connected between the output of the oscillator circuit and the load (LP); and an active harmonic filter circuit forming an elevated voltage maintenance, or step-up converter circuit coupled to the output of the rectifier circuit including a switching transistor (T3) having its switching path connected across the rectifier output; a choke (L2) in series with the switching path of said switching transistor, and a diode (D5) and a second capacitor (C2) circuit, coupled in circuit with the switching path of the transistor, and comprising, in accordance with the invention, means for controlling the switching of the switching transistor (T3) and for ensuring synchronous operation of the switching transistor and the oscillator circuit including circuit connection means (C7, R1) coupled to said oscillator circuit and to the control electrode of the switching transistor (T3) to control switching of the switching transistor from the same source of energy which provides the elevated frequency energy.

4,959,592

# STARTING ELECTRODES FOR HID LAMPS

John M. Anderson, Scotia, and Victor D. Roberts, Burnt Hills, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

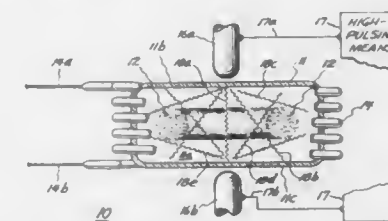
Continuation of Ser. No. 208,514, Jun. 20, 1988, abandoned.

This application Oct. 26, 1989, Ser. No. 427,058

Int. Cl.<sup>5</sup> H05B 41/24

U.S. Cl. 315—248

6 Claims



1. A high-intensity discharge lamp comprising: a radio-frequency (RF) excitation coil having a bore; an envelope situated within said RF excitation coil bore, having opposed first and second surfaces and an axis of symmetry, and containing means for sustaining a discharge plasma responsive to the RF magnetic field of said excitation coil; and starting electrode means, adapted to receive a starting signal pulse, for providing at least one spark channel within the envelope to at least assist in the initiation of the discharge plasma when said starting pulse signal is received, and including: a first conductive electrode positioned entirely beyond said first surface, with respect to said envelope, and adjacent to said first surface; and a second conductive electrode positioned entirely beyond said second surface, with respect to said envelope, and adjacent to said second surface; each of the elongated electrodes being aligned substantially along said axis and in a direction opposite to one another and away from envelope.

4,959,593

# TWO-LEAD IGNITER FOR HID LAMPS

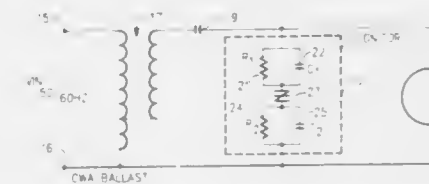
Fernando A. Joanino, Skokie, Ill., assignor to North American Philips Corporation, New York, N.Y.

Filed Feb. 15, 1989, Ser. No. 311,559

Int. Cl.<sup>5</sup> H05B 41/18

U.S. Cl. 315—290

13 Claims



1. Apparatus for starting and operating a high intensity discharge (HID) lamp comprising: a pair of input terminals for connection to a source of AC supply voltage, a ballast device coupling a discharge lamp to said pair of input terminals, and a starter-igniter device having first and second terminals coupled to first and second electrodes, respectively, of the discharge lamp via a circuit that excludes said ballast device, said starter-igniter device comprising: a first network including a resistor and capacitor connected in parallel, a second network including one or more passive circuit elements,

3. An apparatus for controlling torque of a door opening and closing motor for an automatic door in which said motor is



such a motor that the torque thereof is generated on the basis of controlling the total pulse width applied to said motor from a control unit, comprising means for regulating the total pulse width by changing the total pulse number of control pulses occurring in one cycle and means for determining whether acceleration of said motor is in a predetermined range, said acceleration determining means supplying change total pulse number signals to said regulating means when acceleration is not in said predetermined range, whereby acceleration of said motor is controlled.

4,959,599

## HEAD POSITIONER

Katsuo Nakadai; Izumi Miyake; Kiyotaka Kaneko, and Kazuya Oda, all of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 864,685, May 19, 1986, Pat. No. 4,811,133.

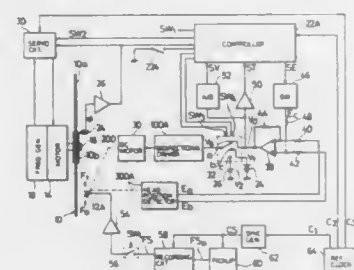
This application Nov. 8, 1988, Ser. No. 268,443

Claims priority, application Japan, May 22, 1985, 60-109512; May 23, 1985, 60-111252; Jun. 10, 1985, 60-125289; Aug. 16, 1985, 60-180742; Sep. 19, 1985, 60-207353; Sep. 28, 1985, 60-215606; Sep. 30, 1985, 60-217739; Nov. 1, 1985, 60-245927; Nov. 2, 1985, 60-246831; Nov. 13, 1985, 60-255685

Int. Cl.<sup>3</sup> H02P 5/46; G05B 19/28

U.S. Cl. 318—603

6 Claims



1. A bidirectional d.c. motor driving circuit with a speed servo, comprising

- a comparator receiving a single-pole speed control voltage at one input terminal and a feedback signal at another terminal, and producing an error control voltage at an output terminal, the level of said feedback signal fluctuating according to a d.c. motor speed;
- a first operational amplifier for receiving said error control voltage at a first input terminal and a motor stop voltage at a second input terminal, the level of said motor stop voltage being set at a predetermined level and having the same polarity as said error control voltage;
- a second operational amplifier for receiving said motor stop voltage at a first input terminal corresponding in polarity to the first input terminal of said first operational amplifier and said error control voltage at a second input terminal corresponding in polarity to the second terminal of said first operational amplifier;
- a first driving circuit having an input terminal connected to an output terminal of said first operational amplifier and an output terminal connected to one terminal of said d.c. motor;
- a second driving circuit having an input terminal connected to an output terminal of said second operational amplifier and an output terminal connected to another terminal of said d.c. motor through a first resistor;
- a second resistor and a third resistor being connected in series between the output terminals of said first and second driving circuits, said second and third resistors together with said d.c. motor and said first resistor constituting a bridge circuit; and
- a differential amplifier for a speed servo, said differential amplifier receiving at one input terminal a voltage produced at a junction between said another terminal of said d.c. motor and said first resistor, receiving at another input

terminal a voltage produced at a junction between said second and third resistors, and producing said feedback signal corresponding to the difference between both voltages

4,959,600

## MICROPROCESSOR SYSTEM CONTROLLER FOR MAIL PROCESSING SYSTEM APPLICATIONS

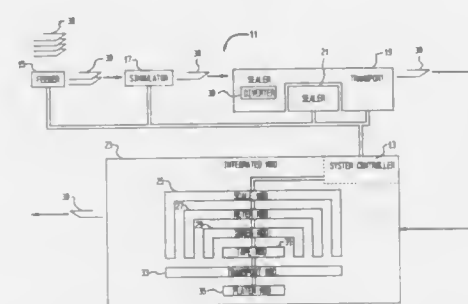
Peter C. DiGiulio, Bridgeport; Norman J. Bergman, Danbury; Frank D. Ramirez, Stamford, and Edilberto I. Salazar, Brookfield, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 8, 1988, Ser. No. 281,355

Int. Cl.<sup>3</sup> G06F 15/46

U.S. Cl. 318—625

18 Claims



1. A motor controller system for controlling the respective motors of a plurality of cooperative apparatus associated with an article processing system, said article processing system for performing a plurality of functions upon an article traversing said article processing system, comprising:

- a motor driver board having a plurality of input channels and a plurality of respective output channels;
- said motors being in line communication with a respective one of said output channels of said motor driver board;
- a programmable microprocessor in bus communication with said driver board's input channels;
- a plurality of sensors respectively mounted to each of said apparatus and in bus communication with said programmable microprocessor, said sensors being located on said apparatus to provide such information to said microprocessor as article size, position and velocity information and to provide apparatus operation information; and
- said microprocessor being programmed such that a cycle is performed at a desired frequency, each control cycle being divided into discrete time intervals during which respective time interval said microprocessor transmits motor control command information to said driver board for respective motors and during other of said time intervals said microprocessor reads information from said sensors.

4,959,601

## DRIVING DEVICE FOR A STEPPING MOTOR

Noriyuki Kikugawa, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 13, 1989, Ser. No. 309,481

Claims priority, application Japan, Feb. 23, 1988, 63-038531

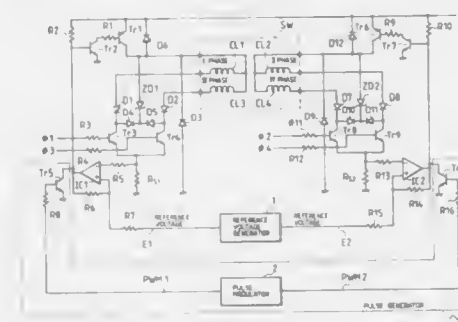
Int. Cl.<sup>3</sup> H02P 8/00

U.S. Cl. 318—696

3 Claims

1. A stepping motor driving device for supplying electric power to a coil of each phase, comprising:  
means for producing a phase signal for exciting the supply of electric power to said coil of each phase;  
coil driving means for effecting the supply of electric power to said coil by the signal of said phase signal producing means;

phase current detecting means for producing a signal corresponding to phase current in said coil;  
means for producing a reference signal;  
means for controlling the supply of electric power to said coil, said means including:  
means for comparing said reference signal with the signal from said phase current detecting means; and  
control means responsive to the signal of said comparing means to control the supply of electric power to said coil; and



pulse generator means for generating a variable width pulse of a predetermined period, said pulse generator means being connected to said means for controlling the supply of electric power to said coil and controlling the operation time of said control means;

said pulse generator means being connected to a processor for producing a data signal for varying said variable width pulse, and said variable width pulse generator means including means for controlling the pulse width of a clock signal from said processor to a pulse width corresponding to the variable width, and means for comparing said data signal with the signal of said pulse width control means.

4,959,602

## AC MOTOR DRIVE WITH IMPROVED VOLTAGE-SOURCE INVERTER

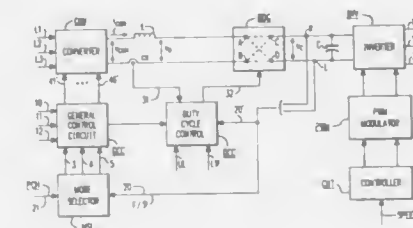
Kenneth C. Scott, San Diego, Calif., and Colin D. Schauder, Murrysville Boro, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 2, 1989, Ser. No. 360,633

Int. Cl.<sup>3</sup> H02D 3/18

U.S. Cl. 318—803

3 Claims



1. In an AC motor drive system including:  
an AC/DC converter having three-phase AC input lines, opposite poles, main thyristors forming a bridge across said AC input lines and said poles and means for sequentially firing said main thyristors; a precharged DC-link capacitor across said poles; an inverter having AC output lines, DC terminals connecting said DC-link capacitor to the inverter, and an AC motor supplied by said AC output lines;  
with first and second diode means operatively connected each between a corresponding pole of said thyristor bridge and an associated end of said DC-link capacitor for

providing a current path between conducting main thyristors when the motor drive system is operating in one of the motoring and regenerating modes;  
with additional first and second static switches cross-coupled between respective ends of said DC-link capacitor and respective poles of said thyristor bridge;  
with means for controlling said first and second additional static switches (a) OFF for passing said current path through said DC-link capacitor in one direction when the motor drive is in the motoring mode and (b) ON for passing current in the opposite direction when the motor drive is in the regenerating mode, thereby to allow feedback from said DC terminals through said converter onto said AC input lines;

means for sensing the current of said current path to derive current representative signal;

one forced-commutated switch being used as one of said first and second additional static switches and an auxiliary thyristor being used as the other of said first and second additional static switches, said DC-link capacitor being bypassed (1) in the motoring mode by said forced-commutated switch when turned ON and (2) in the regenerating mode by said auxiliary thyristor being ON whereas said forced-commutated switch is turned OFF; the combination of:

current control loop means operative upon said controlling means for applying to said forced-commutated switch a duty-cycle OFF/ON in accordance with, respectively, a given excess and a given want of said current relative to a reference current related to a boost voltage for said DC-link capacitor;

voltage control loop means being provided to generate said reference current and responsive to a present voltage of said DC-link capacitor and to a predetermined desired voltage for voltage boosting thereof to derive a voltage error, the sign of said voltage error being changed to the opposite when in the regenerating mode, said current reference being established in relation to said voltage error;

whereby said current control loop is effective in establishing said forced-commutated switch duty-cycle.

4,959,603

## SOLAR BATTERY EQUIPMENT

Shigeo Yamamoto, Kanagawa, and Toahio Noda, Hyogo, both of Japan, assignors to Osaka Titanium Co., Ltd., Tokyo, Japan

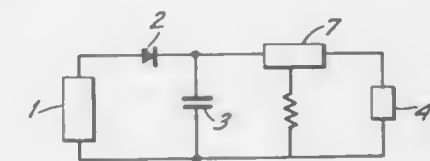
Filed Oct. 25, 1988, Ser. No. 262,445

Claims priority, application Japan, Oct. 27, 1987, 62-271328; Feb. 16, 1988, 63-033590; May 18, 1988, 63-121500

Int. Cl.<sup>3</sup> H02J 7/00

U.S. Cl. 320—1

7 Claims



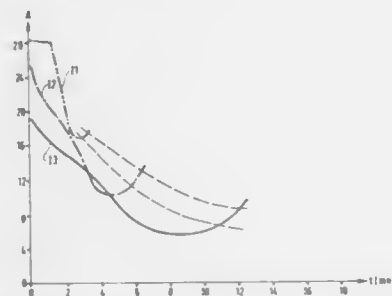
1. A solar battery system characterized by at least one solar cell for converting light energy to electrical energy which is stored in the system for use when light energy is not available, said solar battery system consisting essentially of:  
at least one solar cell formed of a semiconductor selected from the group consisting of single crystal and polycrystalline substrates,  
said solar cell having output terminals connecting said cell in parallel to an energy-storage capacitor, which capacitor is also connected in parallel with a loading circuit,  
said capacitor being formed of compressed particles of

activated carbon of particle size sufficient to provide a specific surface of about 1,000,000 to 20,000,000 cm<sup>2</sup> per gram of activated carbon with voids between said particles having absorbed therein an aqueous solution of sulfuric acid, said capacitor being capable of storing electrical energy charged to it by said solar cell at a selected voltage level for the gradual discharge of said capacitor to said loading circuit when needed;

a diode coupled in series to an output terminal of said solar cell to prevent the flow of reverse current to said solar cell; and

a variable voltage regulator disposed between said capacitor and said loading circuit to maintain the power fed to said loading circuit from said capacitor substantially constant.

**4,959,604**  
**PROCESS FOR ULTRA-RAPIDLY CHARGING A SEALED NICKEL-CADMIUM STORAGE BATTERY**  
Rosendo Caesta, Saint Loubes, France, assignor to Societe Anonyme dite: SAFT, France  
Filed Dec. 1, 1988, Ser. No. 278,547  
Claims priority, application France, Sep. 9, 1988, 88 11794  
Int. Cl.<sup>5</sup> H01H 10/44  
U.S. Cl. 320—20 3 Claims

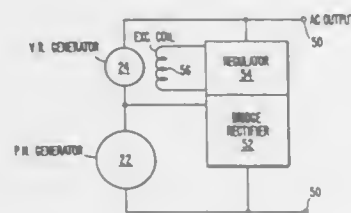


1. A process for ultra-rapidly charging a sealed nickel-cadmium storage battery, wherein the charging process comprises:

applying to the battery a charging voltage which is sufficient to complete the charging process in a time on the order of three to fifteen minutes but is lower than a voltage at which hydrogen is released in gaseous form; and

terminating the charging voltage when charging current intensity registers a significant increase following a gradual decrease.

**4,959,605**  
**HYBRID PERMANENT MAGNET AND VARIABLE RELUCTANCE GENERATOR**  
Jayant Valdy, and David J. Belanger, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.  
Filed Nov. 23, 1988, Ser. No. 275,576  
Int. Cl.<sup>5</sup> H02K 21/00  
U.S. Cl. 322—10 26 Claims



1. A hybrid electrical generator comprising:

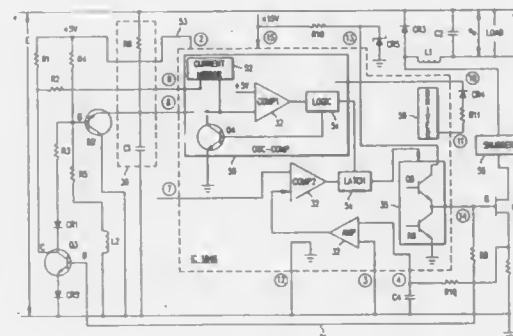
a permanent magnet generator having a permanent magnet rotor mounted on a shaft, the permanent magnet generator

providing an output voltage over an operating range which falls in response to an increasing electrical load;

a variable reluctance generator having a rotor mounted on the shaft with excitation of a stator of the variable reluctance generator being provided from the permanent magnet generator, the variable reluctance generator providing an output voltage which varies in response to an increasing electrical load over an operating range; and

a voltage regulator, responsive to combined output voltages of the generators, for controlling the output voltage provided by the variable reluctance generator to cause the hybrid generator to produce a regulated output voltage which is substantially constant independent of variation of an applied electrical load coupled to the hybrid generator output over an operating range.

**4,959,606**  
**CURRENT MODE SWITCHING REGULATOR WITH PROGRAMMED OFFTIME**  
Charles O. Forge, Los Altos, Calif., assignor to Uniphase Corporation, San Jose, Calif.  
Filed Jan. 6, 1989, Ser. No. 294,157  
Int. Cl.<sup>5</sup> H02M 3/156  
U.S. Cl. 323—286 13 Claims



1. A power supply regulator comprising:

a common terminal;

an input terminal for applying a direct current input;

an output terminal;

a catch diode having a first terminal connected to the common terminal;

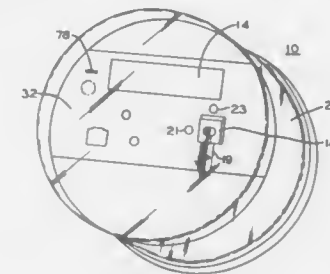
an inductor having a first terminal connected to a second terminal of the catch diode and a second terminal connected to the output terminal;

a capacitor having a first terminal connected to the common terminal, and a second terminal connected to the output terminal;

switch means connected between the second terminal of the catch diode and the input terminal for switching the direct current input between an on time and an off time; and

means operatively connected to the switch means for varying the off time of the switch means, wherein the duration of the off time is proportional to the difference between the voltage at the input terminal and the voltage at the output terminal divided by the voltage at the input terminal.

**4,959,607**  
**RESTRICTOR FOR MULTIPLE SWITCH EXTERNAL CONTROL ACTUATOR FOR ELECTRONIC ENERGY METER**  
Peter F. Coryea, Salem, and Warren R. Germer, Dover, both of N.H., assignors to General Electric Company, Somersworth, N.H.  
Filed Sep. 25, 1989, Ser. No. 411,963  
Int. Cl.<sup>5</sup> G01R 11/64, 11/24; H01H 3/00; G06C 15/42  
U.S. Cl. 324—103 R 34 Claims



1. A switching mechanism for an electric energy meter having a transparent cover, a display, and a plurality of switches within said energy meter below said cover which may be selectively actuated from outside said cover to display selected information unless actuation is precluded by a switch restrictor comprising:

a plurality of switches disposed in a pattern within said energy meter and below said transparent cover;

an actuating mechanism including a switch actuator positioned on said transparent cover, extending into said energy meter and including means to move said switch actuator into contact with an axial shaft of a selected one of said plurality of switches;

each of said switches being actuated by depressing the axial shaft associated with the switch;

one or more selectively positionable switch restrictors positioned about the axial shafts of one or more of said switches to prevent said switch actuator from depressing said switch;

a groove within said meter surrounding at least a substantial portion of each of said axial shafts and spaced from the end of the axial shaft adjacent said switch actuator;

said switch restrictor having a first portion thereof which surrounds only a segment of said axial shaft, and a second portion which is dimensioned to fit within, and to be secured by, each said groove;

said restrictors being selectively removable from, and positionable about, one or more of said switches;

each of said restrictors when positioned around one of said switches precluding the depressing of such one of said switches by said switch actuator from outside said transparent cover while not precluding the depressing of said one of said switches from within said transparent cover;

whereby said switch restrictors enable selective restriction of the actuation of said switches from outside said transparent cover, while enabling actuation of all of such switches when said transparent cover is removed.

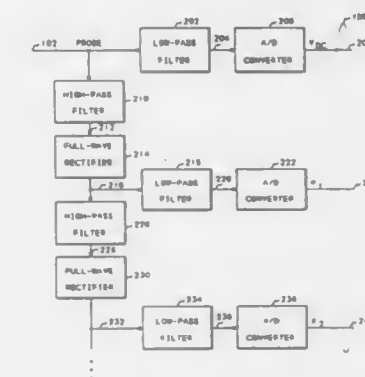
**4,959,608**  
**APPARATUS AND METHOD FOR EXTRACTING THE RMS VALUE FROM A SIGNAL**  
Norman G. Dillman, El Paso, Tex., assignor to Hewlett-Packard Company, Palo Alto, Calif.  
Filed Oct. 16, 1989, Ser. No. 422,335  
Int. Cl.<sup>5</sup> G01R 15/10, 19/22  
U.S. Cl. 324—132 11 Claims

1. A measurement instrument for deriving an RMS signal from an input signal comprising:

DC component conversion means connected to said input

signal for producing a digital value equivalent to the DC offset signal of said input signal;

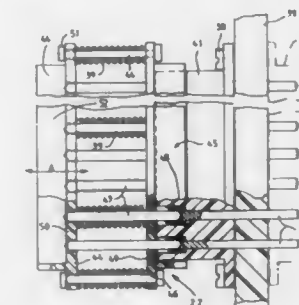
a plurality of AC conversion stages connected in series for producing an output equivalent to the AC RMS signal, wherein a first of said AC conversion stages has an input connected to said input signal and wherein subsequent stages have an input connected to a previous AC conversion stage;



a plurality of analog to digital conversion stages, one analog to digital conversion stage connected to said output of each of said AC conversion stages, for converting said output to a digital value; and

processing means for receiving each said digital value, squaring said digital value, adding said squared values producing a sum of squares, and outputting a square root of said sum of squares.

**4,959,609**  
**ELECTRICAL CONNECTING APPARATUS FOR AN ELECTRICAL OR ELECTRONIC TESTING UNIT**  
Manfred Prokopp, Am Felder 27, D-6980 Wertheim, Fed. Rep. of Germany, and Herbert Kaufmann, Cham, Switzerland, assignors to Manfred Prokopp, Wertheim, Fed. Rep. of Germany  
Filed Jan. 23, 1989, Ser. No. 300,957  
Claims priority, application Fed. Rep. of Germany, Jan. 27, 1988, 3802304  
Int. Cl.<sup>5</sup> G01R 31/04; H01R 13/44  
U.S. Cl. 324—158 F 24 Claims



24. A testing unit for contact strips having a multiplicity of terminal ends anchored in a strip body, said testing unit comprising:

an electrically insulating support plate displaceable toward and away from said strip body;

an electrically insulating further plate extending along and displaceable by said support plate;

a multiplicity of electrically conductive mutually parallel



contact pins positioned to register with said terminal ends anchored in said further plate and having contact ends engageable with said terminal ends, shanks extending to said contact ends from said further plate, and connecting end portions extending through said further plate and said support plate while projecting from said support plate away from said body;

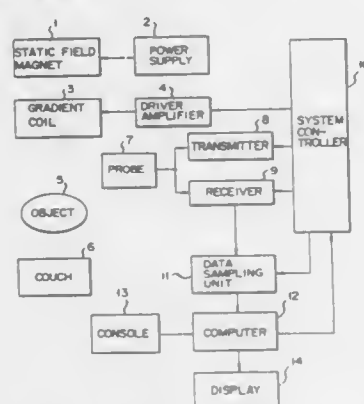
an electrically insulating pressing member shaped to interfit with said strip body and spaced from said further plate; a multiplicity of precompressed springs braced between said further plate and said pressing member for resisting displacement of said pressing member toward said further plate upon displacement of said support plate toward said body, at least some of said spring surrounding respective ones of said shanks; and

means limiting the displacement of said pressing member away from said further plate for disposing said contact ends of said pins substantially at a surface of said pressing member turned toward said body, whereby said contact ends remain retracted until said supporting plate is displaced toward said body and then grippingly engage said terminal ends, but said springs automatically draw said pins back into retracted positions upon displacement of said support plate away from said body and release said pressing member from said body.

**4,959,610**  
**MAGNETIC RESONANCE APPARATUS**  
Yoshinori Suzuki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Aug. 16, 1989, Ser. No. 394,675  
Claims priority, application Japan, Sep. 30, 1988, 63-246456  
Int. Cl.<sup>5</sup> G01R 33/20

U.S. Cl. 324—309

14 Claims



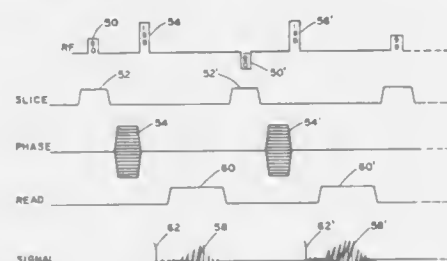
1. A magnetic resonance apparatus comprising: signal acquiring means for obtaining a magnetic resonance signal matrix by repeating a series of sequences a plurality of times, the sequences including (a) applying a gradient field to an object to be examined which is placed in a uniform static field, and at the same time executing a selective inversion pulse application sequence for sequentially applying a plurality of selective inversion pulses having different frequencies as high-frequency fields onto the object, (b) applying a non-selective excitation pulse as a high-frequency field to the object without application of a gradient field, and (c) acquiring a magnetic resonance signal generated upon application of the non-selective excitation pulse, while the number and frequencies of selective inversion pulses are sequentially selected to cause a magnetization vector of a nuclear spin of an area corresponding to one of "1" and "I" of an Hadamard matrix to be inverted by the selective inversion pulse application sequence; and signal processing means for obtaining chemical shift information by transforming the magnetic resonance signal matrix obtained by said signal acquiring means in an align-

ing direction of the magnetic resonance signal matrix by an inverse Hadamard transform, and transforming the transformed magnetic resonance signal matrix in a time base direction by an inverse Fourier transform.

**4,959,611**  
**OUT-OF-SLICE ARTIFACT REDUCTION TECHNIQUE FOR MAGNETIC RESONANCE IMAGERS**  
Terrence J. Brovost, Cleveland Hts.; David A. Lampman, Lakewood, and Kenneth S. Foster, Eastlake, all of Ohio, assignors to Picker International, Inc., Highland Hts., Ohio  
Filed Jun. 29, 1989, Ser. No. 373,344  
Int. Cl.<sup>5</sup> G01R 33/20

U.S. Cl. 324—309

13 Claims



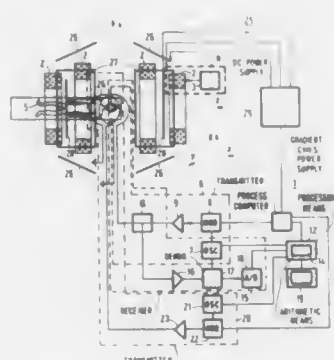
1. A method of magnetic resonance imaging comprising: measuring a magnetic resonance view attributable to out-of-slice magnetization; measuring a plurality of views with different phase encodings; subtracting the out-of-slice magnetization view from each of the phase encoded views to produce out-of-slice corrected phase encoded views; and transforming the out-of-slice corrected phase encoded views into an image representation.

**4,959,612**  
**METHOD OF HETERONUCLEAR DECOUPLING IN MAGNETIC RESONANCE SPECTROSCOPY, AND DEVICE FOR DETERMINING A SPECTRUM**  
Peter R. Luyten, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.  
Filed May 26, 1989, Ser. No. 358,326  
Claims priority, application Netherlands, Aug. 17, 1988, 8802036

U.S. Cl. 324—311

Int. Cl.<sup>5</sup> G01R 33/20

20 Claims



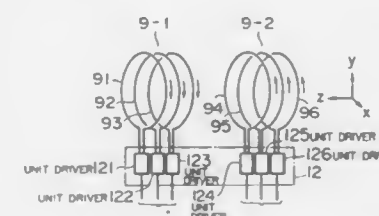
8. A device for determining a spectrum from at least one magnetic resonance signal, which device comprises means for generating a steady, uniform magnetic field, first transmitter

means for transmitting RF electromagnetic excitation pulses for exciting a first type of nucleus in an object, second transmitter means for transmitting inversion pulses to a second type of nucleus in the object, said second type of nucleus being spin-coupled to the first type of nucleus, in order to decouple the first type of nucleus from the second type of nucleus, receiver means for receiving resonance signals from the object, means for generating at least one magnetic field gradient, sampling means for sampling the magnetic resonance signal and display means for displaying the spectrum, and also comprises processing means which include programmed arithmetic means for determining the spectrum from sampling values obtained by means of the sampling means, the programmed means also being suitable for activating, at least during signal acquisition of the resonance signals, the second transmitter means in order to transmit the inversion pulses, characterized in that the programmed means are also suitable for controlling the second transmitter means so that the inversion pulses are pulses modulated in amplitude as well as in frequency or phase.

**4,959,613**  
**NMR IMAGING APPARATUS**  
Etsuji Yamamoto, Akiyama, and Hideki Kohno, Tokyo, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Mar. 7, 1989, Ser. No. 319,728  
Claims priority, application Japan, Mar. 8, 1988, 63-53942  
Int. Cl.<sup>5</sup> G01R 33/20

U.S. Cl. 324—318

6 Claims



1. An NMR imaging apparatus comprising: static magnetic field generating means for generating a uniform static magnetic field in a first direction in a space to be observed; and first, second and third field gradient generating means for generating in said space a first field gradient in said first direction and second and third field gradients in second and third directions orthogonal to said first direction and orthogonal to each other, respectively, at least one of said first, second and third field gradient generating means including a plurality of unit coils and a plurality of unit drivers for individually driving said unit coils respectively; wherein each of said unit coils has a similar form and an inductance which is substantially equal to one another.

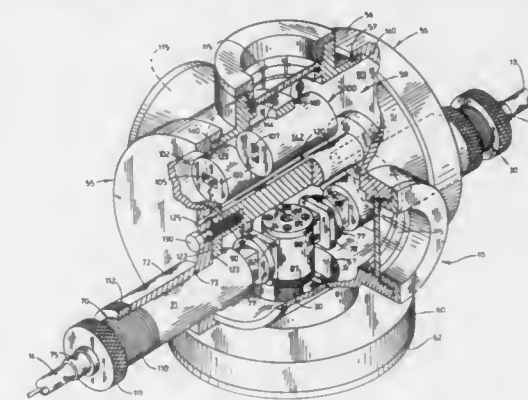
**4,959,614**  
**APPARATUS FOR DETERMINING MICROWAVE CHARACTERISTICS OF SUPERCONDUCTIVE MATERIALS USING A RESONANT CAVITY AND CALIBRATION WAVEGUIDES**  
Donald R. Bowling, and Charles F. Smith, both of Ridgecrest, Calif., assignors to The United States of America as Represented by the Secretary of the Navy, Washington, D.C.  
Filed Aug. 3, 1989, Ser. No. 389,233  
Int. Cl.<sup>5</sup> G01N 22/00; H01P 7/06

U.S. Cl. 324—636

13 Claims

1. Apparatus for determining microwave characteristics of a superconductive material having a transition temperature, the apparatus comprising: an element constructed of said superconductive material; a body defining a resonant cavity for microwave energy and

having means for mounting said element at said cavity for impingement by said energy; a test waveguide extending from said body and terminating in a test waveguide junction; a calibration waveguide extending along said test waveguide and terminating in a calibration waveguide junction; a wall defining a vacuum chamber enclosing said body, said test waveguide, and said calibration waveguide; a cold finger extending from said body through said wall to conduct heat from said body and maintain said element at

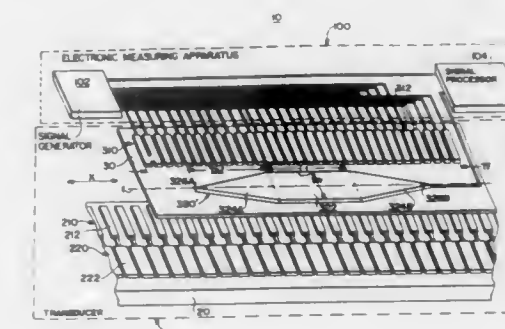


a temperature in a range of temperatures including said transition temperature; a connecting waveguide terminating at one end in a connecting microwave junction and having an opposite end connectable to microwave analyzer equipment; and means for mounting said connecting waveguide on said wall with vacuum sealed movement relative to said wall so as to juxtaposition said connecting junction to one junction selected from said test junction and said calibration junction without loss of vacuum in said chamber and without substantial change in said temperature of said element.

**4,959,615**  
**ELECTRODE STRUCTURE FOR CAPACITANCE-TYPE MEASUREMENT TRANSDUCERS**  
Nils I. Andermo, Kirkland, Wash., assignor to Micro Encoder, Inc., Kirkland, Wash.  
Continuation-in-part of Ser. No. 200,368, May 31, 1988, Pat. No. 4,879,508, which is a continuation-in-part of Ser. No. 30,346, Mar. 26, 1987, abandoned, and a continuation-in-part of Ser. No. 31,049, Mar. 26, 1987, abandoned, and a continuation-in-part of Ser. No. 35,859, Apr. 8, 1987, abandoned. This application May 31, 1989, Ser. No. 359,699  
Int. Cl.<sup>5</sup> G01R 27/26

U.S. Cl. 324—690

40 Claims



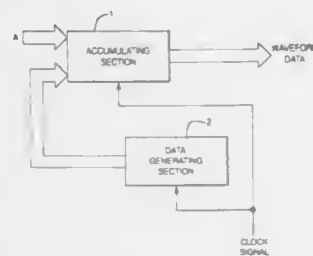
1. A transducer comprising: first and second support members, said support members

being relatively displaceable with respect to each other, and at least one of said support members being displaceable relative to a measurement axis;

first electrode means disposed on said first support member, and second electrode means disposed on said second support member and capacitively coupled to said first electrode means;

said first and second electrode means each having an elongate configuration extending in the direction of the measurement axis, and one of said first and second electrode means having two end portions configured such that the degree of coupling between said first and second electrode means decreases linearly relative to the measurement axis along the extent of each end portion, and such that the respective directions of the decrease in the degree of coupling for said two end members are opposite to each other, so that the effect of tilt between said first and second support members on a set of signals transferred between said first and second electrodes is reduced.

**4,959,616**  
**DIGITAL OSCILLATION APPARATUS**  
 Tokikazu Matsumoto, c/o Matsushita Electric Industrial Co., Ltd., 1006, Kadoma, Osaka, 571, Japan  
 Filed Oct. 11, 1988, Ser. No. 255,267  
 Claims priority, application Japan, Oct. 13, 1987, 62-257556  
 Int. Cl.<sup>5</sup> H03B 19/00; H03K 5/13, 4/02; G06F 1/00  
 U.S. Cl. 328—14 8 Claims



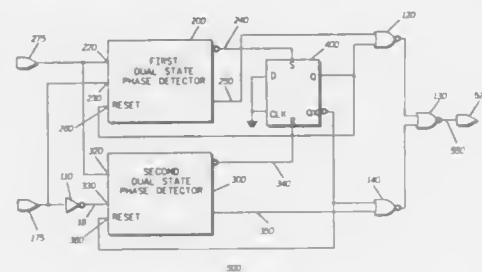
1. A digital oscillation apparatus for generating a periodic waveform data having a frequency  $f_s$  comprising:

a data generating means responsive to each clock of a clock signal having a frequency  $f_c$  for generating data used to periodically generate a data string having a constant total value of  $R$  with a period of  $m$  clocks so that the average value of each data of the data string generated in response to each clock of the clock signal is  $R/m$ , where each of  $R$  and  $m$  is an integer; and

an accumulating means having a dynamic range  $D$ , where  $D$  is an integer, and being responsive to each clock of the clock signal for accumulating a sum of each data of the data string generated by said data generating means and a constant  $A$ , wherein  $A$  is an integer, to obtain accumulated data until the accumulated data exceeds the dynamic range  $D$  and for subtracting the dynamic range  $D$  from the accumulated data when the accumulated data exceeds the dynamic range  $D$ , thereby generating a periodic waveform data having a frequency  $f_s$ ,

wherein the values of  $R$ ,  $m$ ,  $A$  and  $D$  satisfy a condition of  $f_s/f_c = (A + R/m)/D$  so that the frequency  $f_s$  of the periodic waveform data becomes  $f_s = (A + R/m)f_c/D$ .

**4,959,617**  
**DUAL STATE PHASE DETECTOR HAVING FREQUENCY STEERING CAPABILITY**  
 Frederick L. Martin, North Lauderdale, Fla., assignor to Motorola, Inc., Schaumburg, Ill.  
 Filed May 30, 1989, Ser. No. 357,912  
 Int. Cl.<sup>5</sup> H03K 9/06; H03D 13/00  
 U.S. Cl. 328—133 6 Claims



1. A phase detector for detecting the phase difference between a first input signal and a second input signal, comprising:

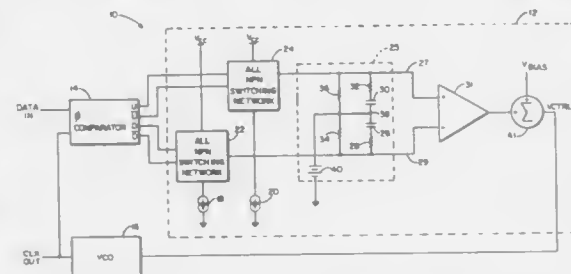
a first phase detecting means having a first predetermined phase detecting range for detecting the phase difference between said first input signal and said second input signal, to provide a first phase difference signal, said first phase detecting means including a first indicating means to indicate when said first predetermined phase detecting range is exceeded;

means for inverting said first input signal to provide an inverse of said first input signal;

a second phase detecting means having a second predetermined phase detecting range for detecting the phase difference between said second input signal and said inverse of said first input signal, to provide a second phase difference signal, said second phase detecting means including a second indicating means to indicate when said second predetermined phase detecting range is exceeded;

selecting means coupled to said first and second phase detecting means, said selecting means receives said first and second phase difference signals and is responsive to said first and second indicating means for selecting said first phase difference signal when said second predetermined phase detecting range is exceeded, and for selecting said second phase difference signal when said first predetermined phase detecting range is exceeded.

**4,959,618**  
**DIFFERENTIAL CHARGE PUMP FOR A PHASE LOCKED LOOP**  
 John S. Shier, Apple Valley, Minn., assignor to VTC Incorporated, Bloomington, Minn.  
 Filed Feb. 16, 1989, Ser. No. 311,216  
 Int. Cl.<sup>5</sup> H03D 13/00; H03K 9/06, 5/13  
 U.S. Cl. 328—155 10 Claims



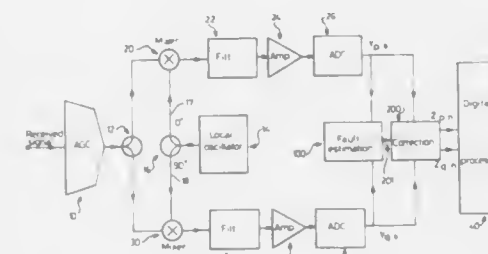
1. A charge pump for filtering and integrating first and second pulse trains for producing a voltage difference signal

proportional to the difference in relative duration of the pulses of the first and second pulse trains, the charge pump comprising:

- a common node;
- first capacitor means connected to the common node;
- first current source means for generating a first source current;
- a first switching circuit connected at a first terminal to the first capacitor means and at a second terminal to the first current source means and responsive to the first pulse train for passing the first source current through the first capacitor means from the common node;
- second capacitor means connected to the common node;
- second current source means for generating a second source current;
- a second switching circuit connected at a first terminal to the second capacitor means and at a second terminal to the second current source means and responsive to the second pulse train for passing the second source current through the second capacitor means from the common node;
- a differential amplifier connected at one input terminal to the first terminal of the first switching circuit and the remaining input terminal to the first terminal of the second switching circuit for generating the voltage difference signal; and
- first discharge resistor means connected across the first capacitor means and second discharge resistor means connected across the second capacitor means.

**4,959,619**  
**DIGITAL TRANSMISSION DEMODULATOR INCLUDING AN AUTOMATIC FAULT CORRECTOR**  
 Eugene Delacroix, Vanves; Jean-Marc Fargeas, Massy Villaine, and Jean-Claude Imbeaux, Paris Cedex, all of France, assignors to ETAT FRANCAIS, représenté par la Ministre des Postes, Télécommunications et de l'Espace (Centre National d'Etudes des Télécommunications), Issy les Moulineaux, France  
 Filed Nov. 20, 1989, Ser. No. 439,618  
 Claims priority, application France, Nov. 21, 1988, 88 15103  
 Int. Cl.<sup>5</sup> H03D 1/00 14 Claims

U.S. Cl. 329—306



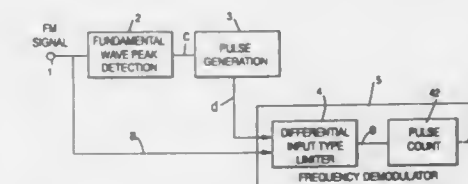
1. A demodulator for digital transmission using the technique known per se of transposing the signal to baseband and comprising separator means for operating a received HF signal into first and second identical auxiliary signals, a local oscillator providing an in-phase output signal and a quadrature output signal at 90° to its in-phase output signal, a first mixer for transposing the first auxiliary signal into an in-phase base component by multiplying it with the in-phase output signal from the local oscillator, a second mixer for transposing the second

auxiliary signal into a quadrature base component by multiplying it with the quadrature output signal from the local oscillator, and respective filter and amplifier means and analog-to-digital converters connected to the outputs from each of the mixers, wherein the demodulator further includes:

- estimation means suitable for estimating faults on groups of samples  $Y_{p,k}$ ,  $Y_{q,k}$  taken from the outputs of the analog-to-digital converters, faults being estimated in the form of five parameters, namely: the corrective gain  $\alpha$  to be applied to the in-phase channel, the corrective gain  $\beta$  to be applied to the quadrature channel, the voltage offset  $a$  on the in-phase channel, the voltage offset  $b$  on the quadrature channel, and phase error  $\delta\theta$  relative to true quadrature; and
- correction means for correcting the current samples  $Y_p$ ,  $Y_q$  on the basis of the parameters estimated on an earlier group of samples.

**4,959,620**  
**FREQUENCY DEMODULATION CIRCUIT**  
 Masahiro Honjo, Neyagawa, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 Filed Sep. 18, 1989, Ser. No. 408,220  
 Claims priority, application Japan, Sep. 19, 1988, 63-233912  
 Int. Cl.<sup>5</sup> H03D 3/02 31 Claims

U.S. Cl. 329—327



1. A frequency demodulation circuit comprising:

a peak detection circuit for detecting peaks of an input frequency-modulated signal;

a pulse generating circuit for generating, according to the detection result by the peak detection circuit, pulses respectively occurring at timings at which the peaks occur, polarities of the pulses being opposite to polarities of the respective corresponding peaks;

a differential input type limiter circuit which receives at its differential input terminals the input frequency-modulated signal and the train of pulses respectively for limiting the input frequency-modulated signal with the train of pulses as a reference signal; and

a pulse count circuit for producing a pulse having a predetermined width at each edge of pulses outputted from the differential input type limiter circuit, thereby to obtain a frequency-demodulated signal.

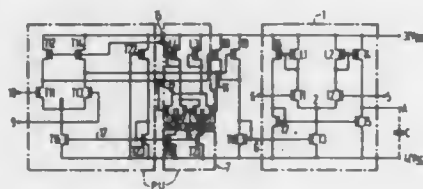
**4,959,621**  
**DIFFERENTIAL AMPLIFIER HAVING EXTERNALLY CONTROLLABLE POWER CONSUMPTION**  
 Bedrich Hosticka, Duisburg; Roland Klinke, Dortmund, and Hans-Joerg Pfeleiderer, Zorneding, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
 Filed Jun. 16, 1989, Ser. No. 367,319  
 Claims priority, application Fed. Rep. of Germany, Jul. 21, 1988, 3824830 10 Claims

U.S. Cl. 330—253

1. A differential amplifier having first and second parallel circuit branches each of which contains a load element ( $L_1$ ,  $L_2$ ) and a field effect transistor ( $T_1$ ,  $T_2$ ), respectively, and having a field effect transistor ( $T_3$ ) serving as a current source that is connected to both parallel circuit branches ( $L_1$ ,  $T_1$ ;  $L_2$ ,

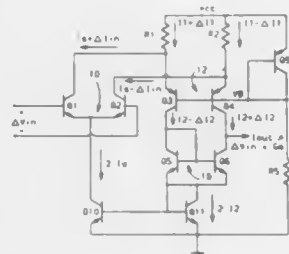


T2) via a first circuit node and whose gate terminal (G) is connected to a bias that defines the quiescent currents flowing in these circuit branches, comprising a circuit stage for setting the quiescent currents that is composed of two p-channel field effect transistors (T8, T9) that are connected in parallel and that are connected in series with a resistor located in an output side of the circuit stage; the resistor located in an output side of the circuit stage connected to a gate terminal (G) of the field effect transistor (T3) that serves as current source; a level-converting circuit having an input side connected to gate terminals



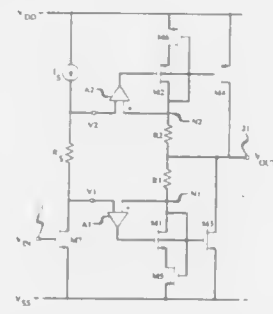
(5, 6) of the field effect transistors (T1, T2) in the parallel circuit branches, that, further, converts the DC part of the input signal to a higher output level that falls slightly below the value of the threshold voltage of the two p-channel field effect transistors (T8, T9) that are connected parallel to one another, and that has its output side connected to gate terminals of the two p-channel field effect transistors (T8, T9); and the level-converting circuit having a common-mode control circuit to which a reference voltage corresponding to the higher output level is supplied as a controlled variable.

**4,959,622**  
**OPERATIONAL AMPLIFIER WITH PRECISE BIAS CURRENT CONTROL**  
Mark B. Kearney, Kokomo, Ind., assignor to Delco Electronics Corporation, Kokomo, Ind.  
Filed Aug. 31, 1989, Ser. No. 401,205  
Int. Cl.<sup>3</sup> H03F 3/45  
U.S. Cl. 330—257  
5 Claims



1. In an operational amplifier comprising a differential input stage and a separate differential to single ended output stage, and means for establishing bias currents in said input and output stages, the improvement comprising a current mirror including an input current path and an output current path, means connecting said input current path with the combined currents in said output stage and means connecting said output current path with said input stage, whereby the combined bias currents in said input stage are precisely controlled relative to the combined bias currents in said output stage.

**4,959,623**  
**LOW IMPEDANCE BUFFER CIRCUIT**  
John M. Khoury, New Providence, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.  
Filed Jul. 19, 1989, Ser. No. 382,162  
Int. Cl.<sup>3</sup> H03F 3/26  
U.S. Cl. 330—265  
13 Claims

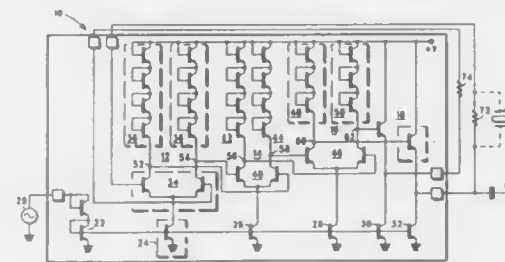


1. Amplifier circuitry including a buffer stage which comprises  
(a) first and second operational amplifiers each having an output terminal and a first and a second input terminal;  
(b) first and second resistance means;  
(c) first and second transistor devices respectively having first and second relatively high current carrying controlled paths and respectively having first and second relatively low current carrying control terminals;  
(d) first and second power rails;  
(e) first connection means for connecting, from the first power rail to the second power rail, serially the first high current path of the first transistor device, the first resistance means, the second resistance means, and the second high current path of the second transistor device;  
(f) second connection means for connecting a first node located between the first transistor device and the first resistance means to the second input terminal of the first operational amplifier;  
(g) third connection means for connecting a second node located between the second transistor device and the second resistance means to the second input terminal of the second operational amplifier; and  
(h) fourth and fifth connection means for connecting respectively the output terminal of the first operational amplifier and of the second operational amplifier to the control terminal of the first transistor device and of the second transistor device, respectively.

**4,959,624**  
**COIL-LESS OVERTONE CRYSTAL OSCILLATOR**  
Robert J. Higgins, Jr., Sunrise, Fla.; William J. Ooms, Chandler, Ariz., and James S. Irwin, Bastrop, Tex., assignors to Motorola, Inc., Schaumburg, Ill.  
Continuation of Ser. No. 358,059, May 30, 1989, abandoned.  
This application Apr. 9, 1990, Ser. No. 507,091  
Int. Cl.<sup>3</sup> H03B 5/36  
U.S. Cl. 331—116 R  
12 Claims

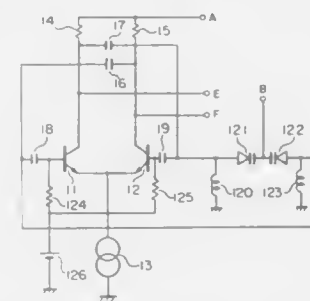
1. An oscillator circuit capable of oscillating at a resonant frequency of a resonator comprised of:  
inverting amplifier means having an input and an output for amplifying and inverting a signal, said inverting amplifier means including time delay means for temporally delaying signals in said amplifier means between said input and said output of said amplifier means, a time delay provided by said time delay means and signal inversion performed by said amplifier means providing signals at at least one frequency at the output of said inverting amplifier means that are amplified from and substantially in phase with signals at said input of said amplifier means;

resonator means having at least one resonant frequency corresponding to said at least one frequency at the output of said amplifier means, for phase-shifting signals at frequencies away from said at least one resonant frequency,



said resonator means coupled between said amplifier means input and output to provide a circuit capable of oscillating at said at least one resonant frequency of said resonator means.

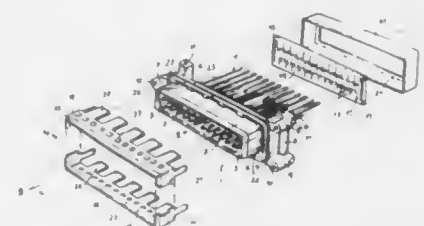
**4,959,625**  
**WIDE BAND BALANCED OUTPUT FREQUENCY MODULATOR USING A VIDEO SIGNAL AS A MODULATION SIGNAL**  
Fusahiro Kameoka, Ibaraki; Noriaki Omoto, and Toshihiro Shogaki, both of Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Filed Jul. 5, 1989, Ser. No. 375,418  
Claims priority, application Japan, Jul. 11, 1988, 63-172121  
Int. Cl.<sup>3</sup> H03C 3/20  
U.S. Cl. 332—135  
2 Claims



1. A frequency modulator comprising:  
first and second transistors composing a differential amplifier;  
first and second load resistors inserted between respective collectors of said first and second transistors and a power supply terminal (A);  
a series circuit of first and second feedback capacitors inserted between the collector of said first transistor and a base of said second transistor;  
a series circuit of third and fourth feedback capacitors inserted between the collector of said second transistor and a base of said first transistor;  
first and second variable capacitance diodes in which respective cathodes thereof are connected with each other and an anode of said first variable capacitance diode is connected to a junction point of said first and second feedback capacitors and an anode of said second variable capacitance diode is connected to a junction point of said third and fourth feedback capacitors;  
a first resonance coil having one end thereof connected to the anode of said first variable capacitance diode and the other end thereof connected to a reference potential point; and  
a second resonance coil having one end thereof connected to

the anode of said second variable capacitance diode and the other end thereof connected to the reference potential point, wherein a modulation signal is applied to the common cathode junction of said first and second variable capacitance diodes, and oscillation output signals are obtained from the respective collectors of said first and second transistors.

**4,959,626**  
**FILTER CONNECTOR WITH LOW FREQUENCY SCREENING**  
Bob Mouissie, Berlicum, Netherlands, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
Filed Mar. 2, 1989, Ser. No. 318,149  
Claims priority, application Netherlands, Mar. 11, 1988, 8800609  
Int. Cl.<sup>3</sup> H01P 13/648; H01R 13/66  
U.S. Cl. 333—182  
10 Claims



1. A filter connector comprising  
an elongated body of electrically insulating material having, at each end thereof, fastening means,  
a plurality of electrical contact elements of electrically conducting material disposed in said elongated body, each contact element having a contact end and a connection end,  
a filter unit having a plurality of capacitor filter elements formed on a substrate of electrically insulating material, said substrate having passages formed therein for the contact elements to pass through, each filter element being associated with a corresponding passage and having a first electrode in electrical contact with a corresponding contact element passing through said corresponding passage,  
a screen formed of electrically conductive material enclosing the contact elements passing through said filter unit, said screen including a first frame cover comprising two halves which when assembled around said elongated body encloses the contact ends of said contact elements, each half of said first frame cover having lips which project toward the connection ends of said contact elements past the contact ends, said lips electrically contacting corresponding second electrodes of the filter elements of said filter unit, said screen further including a second frame cover enclosing the connection ends of the contact elements, said second frame cover also electrically contacting said second electrodes of the filter elements, said first and second frame covers engaging one another so that the filter unit is confined between them.

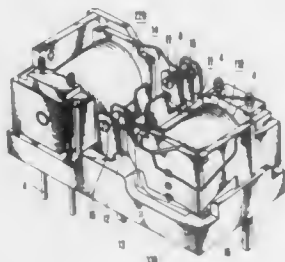
4,959,627

## ELECTROMAGNET RELAY

Makoto Iizumi; Tatsumi Ide; Noboru Kanzawa; Akira Sekiguchi; Masayuki Morimoto; Hitoshi Goto, and Tsutomu Ono, all of Tokyo, Japan, assignors to NEC Corporation, Japan  
 Filed Dec. 15, 1988, Ser. No. 284,908  
 Claims priority, application Japan, Dec. 23, 1987, 62-328153; Mar. 31, 1988, 63-41962; Jun. 30, 1988, 63-85875  
 Int. Cl.<sup>5</sup> H01H 67/00

U.S. Cl. 335—106

10 Claims



1. An electromagnetic relay comprising:
  - a flat base made of an insulating material;
  - two flexure type electromagnetic relay blocks fixed on said base so as to be point symmetrical with the center of said base and having the same structure, each of said flexure type electromagnetic relay blocks including an iron core having a coil wound therearound, a yoke fixed to one end of said iron core, an armature which opposes the other end of said iron core and is attracted to said iron core excited upon energization of said coil, a hinged spring for supporting movement of said armature, and a leaf spring having a movable contact and interlocked with said armature, a moving direction of said leaf spring being parallel to a surface of said base;
  - a first contact member made of a substantial U-shaped conductive member and including two make contacts respectively opposing said movable contacts of said two electromagnetic relay blocks and at least one first terminal inserted into a first through hole formed in a central portion of said base; and
  - a second contact member made of a substantially U-shaped conductive member and including two break contacts respectively opposing said movable contacts of said two electromagnetic relay blocks and at least one second terminal inserted into a second through hole formed in a central portion of said base;
  - said first and second contact members having four fixed contacts which are aligned at a center area of the base, the two make contacts of the first contact member being positioned inside the two break contacts of the second contact member;
  - and each of the leaf springs being moved to become closer to each other when each of the relay block is driven.

4,959,628

## ROTATING ELECTRIC SWITCH ACTUATED BY FIXED MAGNETIC MEANS, USABLE FOR A SURFACE CLEANING DEVICE

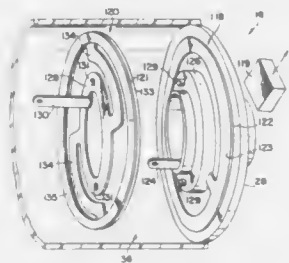
Francis W. MacGregor, Simsbury, Conn., assignor to Quad Research, Inc., Avon, Conn.  
 Division of Ser. No. 223,221, Jul. 22, 1988, This application Jul. 26, 1989, Ser. No. 385,673  
 Int. Cl.<sup>5</sup> H01H 36/00

U.S. Cl. 335—205

17 Claims

11. A rotary electrical switch for a device having a fixed part and a rotatable part supported for rotation relative to the fixed part, said electrical switch including a pair of electrical contacts having opposed contact surfaces mounted in spaced axial relationship for rotation with the rotatable part, flexible means maintaining said spaced relationship and permitting

movement of portions of said opposing contact surfaces toward each other against the bias of the flexible means, a magnetic actuator mounted on the fixed part of the device for movement toward and away from a switch actuating position, and magnetic means associated with at least one of said contacts responsive to said magnetic actuator in said actuating position to drive successive contiguous portions of the oppos-



ing contact surfaces toward each other against the bias of said flexible means and into electrical contacting engagement as the rotatable part rotates relative to the fixed part whereby to maintain portions of said contact surfaces in the region of said actuator in electrically contacting engagement with each other as the rotatable part rotates relative to the fixed part with said actuator in said actuating position.

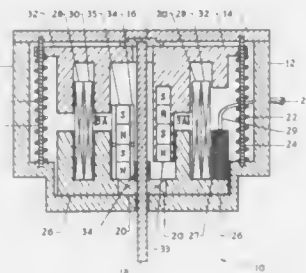
4,959,629

## HIGH TORQUE ROTARY SOLENOID

Robert H. Luetzow, Huntington, Ind., assignor to Kearney-National, Inc., White Plains, N.Y.  
 Filed May 24, 1989, Ser. No. 356,119  
 Int. Cl.<sup>5</sup> H01F 7/08

U.S. Cl. 335—228

7 Claims



1. A rotary solenoid comprising:
  - rotor means for producing rotary motion, said rotor means including a rotor member mounted on a shaft and rotor magnetic means mounted at a radius on said rotor member for producing directional magnetic flux substantially perpendicular to said shaft at a radius from said shaft;
  - stator means in close proximity to said rotor means for inducing a rotary force to said rotor means, said stator means including stator magnetic means for producing north polarity magnetic flux substantially perpendicular to said shaft at said radius and incident upon said rotor magnetic means in a first axial position of said stator means, said stator magnetic means also producing a south polarity magnetic flux substantially perpendicular to said shaft at said radius and incident upon said rotor magnetic means when said stator means is axially positioned in a second position;
  - solenoid actuator means connected to said stator means for moving said stator means from said first to said second position when said solenoid actuator means is activated; and
  - spring return means connected to said solenoid actuator

means for moving said actuator means from said second to said first position when said solenoid actuator means is deactivated.

4,959,630

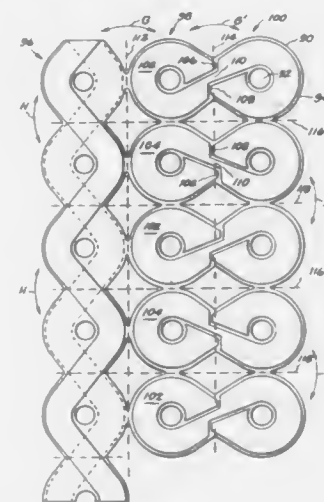
## HIGH-FREQUENCY TRANSFORMER

Alexander J. Yerman, Scotia, N.Y., and Khai D. Ngo, Gainesville, Fla., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 7, 1989, Ser. No. 390,036  
 Int. Cl.<sup>5</sup> H01F 15/02, 27/28

U.S. Cl. 336—83

34 Claims



1. A transformer, comprising:
  - a dielectric membrane having first and second major surfaces;
  - a primary winding comprising a primary conductive film disposed on each of the first and second major surfaces, respectively, of a first portion of said dielectric membrane, each said primary conductive film having a substantially serpentine configuration along a predetermined direction when disposed in a plane, said primary conductive films on the first and second major surfaces of said dielectric membrane being connected in series at one end to form said primary winding;
  - at least one secondary winding, each said secondary winding comprising a plurality of separate secondary conductive films electrically connected together, said secondary winding being disposed on the first major surface of a second portion of said dielectric membrane; said dielectric membrane being folded to form a stack of layers having an axis extending substantially longitudinally through said stack, said primary winding and said secondary winding each comprising a plurality of turns which encircle said axis and which are interleaved in said stack.

4,959,631

## PLANAR INDUCTOR

Michio Hasegawa, and Masashi Sahashi, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 28, 1988, Ser. No. 250,401

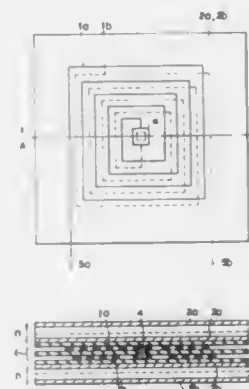
Claims priority, application Japan, Sep. 29, 1987, 62-245472; Sep. 29, 1987, 62-245473; Mar. 16, 1988, 63-62261; Mar. 16, 1988, 63-62262; Jun. 9, 1988, 63-142043; Jun. 20, 1988, 63-151779

Int. Cl.<sup>5</sup> H01F 15/02, 27/30

U.S. Cl. 336—83

4 Claims

1. A planar inductor comprising a laminated structure in-



ferromagnetic ribbons, each said ferromagnetic ribbon having a thickness of 100  $\mu$ m or less.

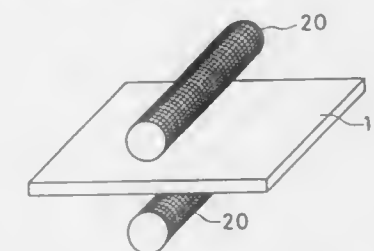
4,959,632

## ORGANIC PTC THERMISTOR

Katsuyuki Uchida, Kagaokakyo, Japan, assignor to Murata Manufacturing Co., Ltd., Japan  
 Filed Apr. 6, 1989, Ser. No. 334,213  
 Claims priority, application Japan, Apr. 6, 1988, 63-85864  
 Int. Cl.<sup>5</sup> H01C 7/00

U.S. Cl. 338—22 R

6 Claims



1. An organic PTC thermistor, comprising:
  - an organic PTC thermistor sheet, a surface of said organic PTC thermistor sheet being roughened by a mechanical method; and
  - a pair of electrodes formed on a thus roughened surface of said organic PTC thermistor sheet by means of conductive paste.

4,959,633

## TEMPERATURE SENDER CONNECTOR COVER AND TERMINAL

Patrick S. Kiraly, Youngstown; John R. Metzger, Cortland, and Randall K. Smith, Fowler, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.  
 Filed Sep. 5, 1989, Ser. No. 402,297  
 Int. Cl.<sup>5</sup> H01C 7/10

U.S. Cl. 338—22 R

8 Claims

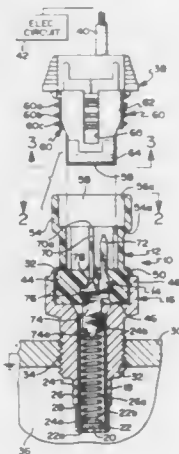
1. A temperature sender assembly including an electrically conductive shell having a tubular extension with a support surface, a thermistor element supported on the support surface, an electrically conductive compression spring located within said tubular extension having one end thereon engaged with the thermistor for completing an electrical circuit there across for sending a signal of the temperature sensed by the thermistor and electrical insulator means within the tubular extension for electrically insulating the spring from the shell and a female



connector cover connected to the shell and having a base of electrical insulation material defining a cavity for receiving a mating male connector and with an electrical terminal molded in-situ of the base the temperature sensor assembly further characterized by:

said electrical terminal configured as a flat element including a core embedded within the base of the female connector cover and a first integral segment extending from said core interiorly of the tubular extension;

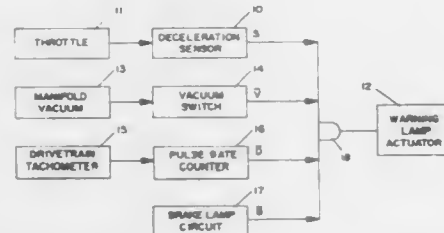
connector means on said first integral segment for capturing one end of the electrically conductive compression spring and for maintaining it in compression between the female connector cover and the thermistor when the female connector cover is fastened to said electrically conductive shell;



said electrical terminal having a second integral segment thereon extending from said core in the opposite direction from said first segment and including a piloting end thereon for mating the second segment with a terminal clip on a mating connector insertable into the cavity of the female connector cover; and

said terminal element having a third integral segment thereon at a point offset with respect to said second integral segment for indexing a mating connector within said female connector cover prior to connection of the mating connector to said second integral segment; said third integral segment extending a distance above the end of said second integral segment for defining a test probe surface for probing the female connector cover for electrical continuity between the spring, thermistor and electrically conductive shell.

**4,959,634**  
**VEHICLE DECELERATION WARNING APPARATUS**  
Ronald L. Miller, 7300 Cascade Rd., Grand Rapids, Mich. 49508  
Filed Oct. 4, 1988, Ser. No. 253,043  
Int. Cl.<sup>5</sup> B60Q 1/26  
U.S. Cl. 340-467 5 Claims



1. A vehicle warning signal actuating apparatus for monitor-

ing the operation of a vehicle and the engine thereof, said apparatus comprising:

deceleration sensor means for actuating a warning signal upon sensing the rate of vehicle deceleration that exceeds a predetermined rate;

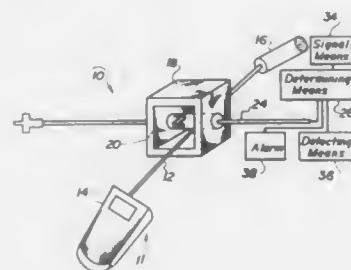
velocity sensing means for monitoring the operating velocity of the vehicle and producing a signal which is a function thereof;

vacuum sensing means for monitoring the vehicle engine manifold pressure and producing a signal which is a function thereof;

brake monitoring means for sensing activation of the vehicle braking system and producing a signal which is a function thereof; and

a warning signal actuator coupled to each of said deceleration sensor means, velocity sensing means, vacuum sensing means and brake monitoring means and producing a warning activation signal only when the predetermined rate of deceleration has been exceeded and the velocity and manifold pressure of the vehicle are not within normal operating conditions and the vehicle braking system has not been activated.

**4,959,635**  
**LOCK**  
Edwin P. Wilson, Allison Park, Pa., assignor to Minatronics Corporation, Pittsburgh, Pa.  
Filed May 16, 1989, Ser. No. 352,757  
Int. Cl.<sup>5</sup> G08B 13/14  
U.S. Cl. 340-568 8 Claims

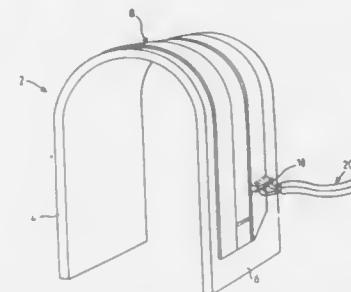


1. A lock for preventing the removal of an object having a first portion with a smaller cross-sectional area than the cross-sectional area of a second portion or the cross-sectional area of a third portion between which the first portion is disposed comprising:

a housing having an opening and a removable member disposed in the opening such that when the member is removed at least the second portion or the third portion of the object can fit through the opening in the housing, but when the member is disposed in the opening, only the first portion of the object can fit therethrough; and

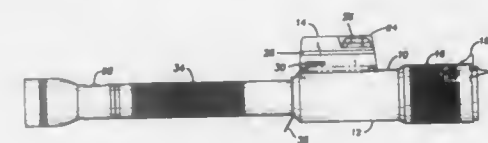
a cable which extends through the housing.

**4,959,636**  
**SEARCH HEAD FOR METAL DETECTORS**  
Anthony J. Maher, Vermont South, Australia, assignor to Detection Systems Pty. Ltd., Australia  
Filed Dec. 15, 1988, Ser. No. 285,607  
Claims priority, application Australia, Dec. 17, 1987, P15964  
Int. Cl.<sup>5</sup> G08B 13/14; G01V 3/08  
U.S. Cl. 340-568 10 Claims



1. A search head for a metal detector, said head comprising a support body and at least one conductive loop mounted on the body characterized in that the loop is formed from ribbon cable having a plurality of conductors in a single layer.

**4,959,637**  
**EMERGENCY SIGNALING DEVICE**  
Richard E. Woods, Markle; Guy Bonner, Jr.; Jerry S. Smyth, both of Huntington, and Roger D. Felton, Fort Wayne, all of Ind., assignors to National Safety Devices, Inc., Fort Wayne, Ind.  
Filed Aug. 7, 1989, Ser. No. 390,088  
Int. Cl.<sup>5</sup> G08B 23/00  
U.S. Cl. 340-573 2 Claims



2. An emergency signaling device adapted to attach to a flashlight having a lamp and battery means, said device comprising:

a housing adapted to attach to the flashlight;

a control means located within said housing;

a motion detection means located within said housing and operatively connected to said control means;

an audio alarm means located within said housing and operatively connected to said control means;

a means to flash the lamp, said lamp flashing means located within the housing and operatively connected to said control means and said lamp;

a strobe light located within said and operatively connected to said control means; and

a radio frequency alarm means located within said housing and operatively connected to said control means, said battery means providing electrical power for said control means, motion detection means, audio alarm means, lamp flashing means, strobe light and radio frequency alarm means, whereby a first audio alarm is produced after a first period of no movement of the device and a second audio alarm, a flashing lamp alarm, a strobe light alarm and a radio frequency alarm are produced if there is no movement of the device for a second period of time following the first period and wherein movement of the device during a first production of the second audio alarm, flashing lamp alarm, strobe light alarm and radio frequency

alarm cancels same but has no effect on any subsequent production.

**4,959,638**  
**COMBUSTION EFFICIENCY ANALYZER, ACOUSTIC**  
Herbert A. Palmer, Annapolis, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
Continuation of Ser. No. 130,503, Dec. 9, 1987, abandoned. This application Jul. 3, 1989, Ser. No. 374,710  
Int. Cl.<sup>5</sup> G08B 21/00  
U.S. Cl. 340-577 2 Claims



1. An acoustic combustion efficiency analyzer for monitoring the combustion efficiency of a burner unit with a burner flame for optimum efficiency which comprises:

an acoustic sensor probe for providing an electrical signal from the burner flame,

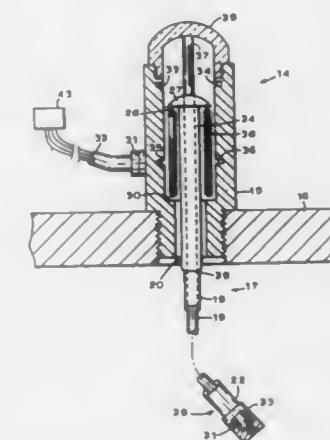
an amplifier circuit interfaced with the acoustic sensor probe for processing the signal received from the acoustic sensor probe,

a frequency spectrum discrimination circuit interfaced with the amplifier circuit and a comparative processor for processing the signal received from the amplifier circuit,

a comparative processor interfaced with the frequency spectrum discriminating circuit and an output circuit for analysis of the signal by comparison with a known optimum efficiency signal, and

an output circuit interfaced with the comparative processor for monitoring and displaying the combustion efficiency of the burner unit.

**4,959,639**  
**FLUID DETECTING**  
Robert A. Benson, 13 Commonwealth Ave., Boston, Mass. 02116  
Filed Mar. 27, 1989, Ser. No. 329,326  
Int. Cl.<sup>5</sup> G08B 21/00  
U.S. Cl. 340-618 10 Claims



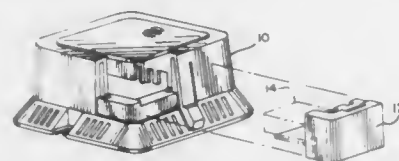
1. A device for detecting a fluid collected in a cavity comprising

a rod with a top and a bottom end, said sleeve being composed of a material which when exposed to said fluid loses its tensile strength,

said sleeve being fitted around said rod, and being dimensioned to slide over said rod, and said sleeve and said

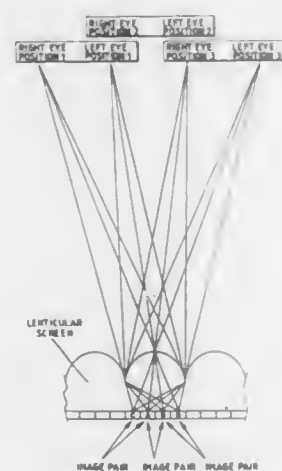
rod being affixed to each other at said respective bottom ends,  
biasing means engaging said rod and said sleeve for maintaining said rod in compression and said sleeve in tension,  
detection means for detecting movement of the top end of said sleeve relative to the top end of said rod and for signaling after such movement occurs.

**4,959,640**  
**APPARATUS FOR DETECT MISSING BATTERY IN SMOKE DETECTOR**  
Thomas L. Hall, Port Richey, Fla., assignor to Pioneer Manufacturing, Inc., Holiday, Fla.  
Filed Mar. 9, 1989, Ser. No. 320,946  
Int. Cl.<sup>7</sup> G08B 23/00  
U.S. Cl. 340—693



1. An apparatus for providing visible indication of absence of a battery from a battery-powered smoke detector having an insertable door that holds a battery, the apparatus comprising:  
a. a stop;  
b. a stop spring disposed to engage the stop so as to exert a force that maintains the stop in a position that prevents insertion of the door into the smoke detector;  
c. means for latching a stop into a position that permits insertion of the door into the smoke detector; and  
d. means for operating the means for latching upon insertion of a battery into a pair of terminals in the door.

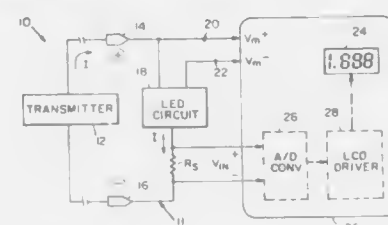
**4,959,641**  
**DISPLAY MEANS FOR STEREOSCOPIC IMAGES**  
Martin L. Bass, 25 Clydesway, Rise Park, Romford, Essex RM1 4UR, Great Britain, and Peter M. Rutherford, 9 Sumatra Road, London NW6 1PS, Great Britain  
Filed Sep. 28, 1987, Ser. No. 101,925  
Claims priority, application United Kingdom, Sep. 30, 1986, 8623490  
Int. Cl.<sup>5</sup> G09G 3/36  
U.S. Cl. 340—700



1. A stereoscopic display means comprising:  
a display surface;  
a plurality of discrete light sources arranged on the display

surface in sets, at least two light sources being arranged in a set;  
means for independently controlling each light source; and  
a light-transmissive lenticular screen having two or more lenses, said screen being disposed in fixed relation to the surface so as to enable the formation of a three dimensional image, each set of light sources being adapted and arranged in registration with a respective lenticle for the display of a pair of interlaced images and said three dimensional image comprising a pair of spaced apart images having parallax therebetween.

**4,959,642**  
**INSTRUMENTATION LOOP-POWERED BACKLIT LIQUID CRYSTAL DISPLAY**  
Kenneth R. Sharples, 102 Herbert St., Braintree, Mass. 02184  
Filed Sep. 27, 1988, Ser. No. 249,970  
Int. Cl.<sup>5</sup> G09G 3/18  
U.S. Cl. 340—716

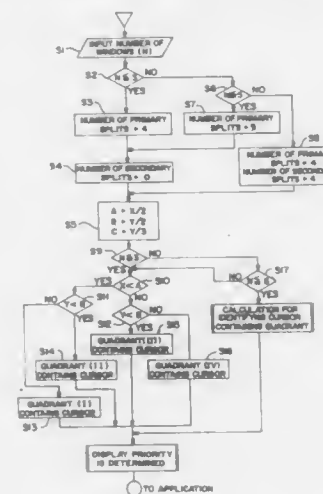


1. A loop-powered, backlit liquid crystal display (LCD) for displaying a measured value comprising:  
a current instrumentation loop for providing a current representative of a value to be measured;  
means for measuring the current value to provide a digital signal to an LCD;  
an LCD responsive to said means for measuring for displaying the measured value; and  
a light emitting diode (LED) circuit including an LED disposed proximate to said LCD and interconnected with, and driven by the current of, said current instrumentation loop for backlighting said LCD.

**4,959,643**  
**DISPLAY UNIT HAVING AN IMPROVED EDITING INPUT CAPABILITY**  
Yasuhiro Taguchi, and Hiroshi Yoshida, both of Yamatokoriyama, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
Continuation of Ser. No. 816,858, Jan. 7, 1986, abandoned. This application May 9, 1988, Ser. No. 191,825  
Claims priority, application Japan, Jan. 31, 1985, 60-18288  
Int. Cl.<sup>5</sup> G09G 1/00  
U.S. Cl. 340—721

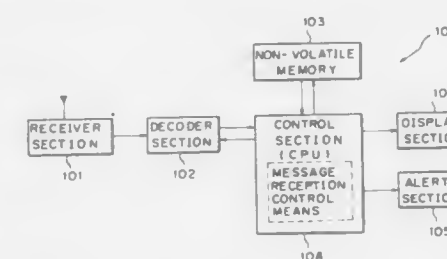
1. A display unit for a word processor, comprising:  
means for displaying current input data;  
means for displaying recalled data;  
means for dividing a reviewing screen of said display unit into a plurality of at least three display portions having a defined area when said current input data is displayed on said reviewing screen;  
cursor means for controlling the location of data input on said reviewing screen of said display unit;  
means for identifying one of said plurality of said display portions in which said cursor means is located;  
means for selecting a remaining one of said plurality of display portions which does not contain said cursor means according to said means for identifying;  
control means for displaying said recalled data in said selected one of said plurality of display portions, whereby

said recalled data is displayed in a display portion most remote from said cursor means; and  
wherein said plurality of display portions are assigned a



hierarchy of priorities, respectively, according to their location on said reviewing screen why with respect to said cursor means, said display portion having the highest priority being most remote from said cursor means.

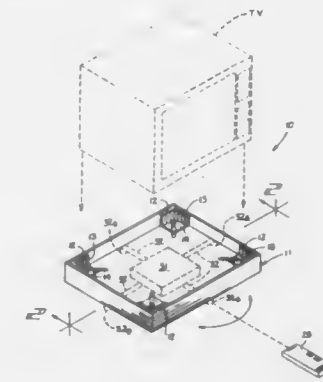
**4,959,644**  
**PAGING RECEIVER WITH A DISPLAY FUNCTION THAT INHIBITS DISPLAY OF A RECEIVED COMMAND SIGNAL**  
Toshifumi Sato, Tokyo, Japan, assignor to NEC Corporation, Japan  
Filed Sep. 8, 1990, Ser. No. 242,063  
Claims priority, application Japan, Sep. 14, 1987, 62-228276  
Int. Cl.<sup>5</sup> H04Q 7/00  
U.S. Cl. 340—825.44



1. A paging receiver with a display function comprising:  
non-volatile memory means for storing an identification in the paging receiver and for storing an operational mode of said receiver, said identification being preassigned to said receiver as its own paging signal;  
receiving means for receiving and demodulating a carrier wave which has been modulated by a paging signal and a message signal which follows the paging signal and contains a message, thereby producing a demodulated paging signal, the character signals S<sub>1</sub> and S<sub>2</sub> capable of being inserted in any position in a message signal, but only when control data is necessary; all of the ordinary messages, signals s<sub>1</sub> and s<sub>2</sub>, and control data having the same format;  
decoding means for comparing the demodulated paging signal and a predetermined station's own paging signal and, if the demodulated and station's own paging signals

are coincident, outputting the message signal which follows the paging signal;  
alerting means for alerting a user of said receiver to a reception of a call, said alerting being by sound, light or similar means;  
displaying means for displaying the message received; and  
control means responsive to the message signal from said decoding means for controlling said alerting means and causing said displaying means to display the message;  
said control means being provided with message reception control means which comprises first comparing means for comparing a predetermined first representative of the character signal S<sub>1</sub> character with the message contained in the message signal which is inputted from said decoding means, second comparing means for comparing the message received with a predetermined second representative of the character signal S<sub>2</sub> character, and switch means for extracting the received message which appears during a period beginning with an instant when said first comparing means detects the first character in the received message and ends with an instant when said second comparing means detects the second character in the received message;  
the message extracted by said message reception control means being treated as a receiver control signal which is not displayed by said displaying means.

**4,959,645**  
**REMOTELY ACTIVATED TELEVISION SWIVEL BASE**  
Richard C. Balz, 301 Heath St., Buffalo, N.Y. 14214  
Filed Dec. 23, 1988, Ser. No. 289,560  
Int. Cl.<sup>5</sup> H04Q 1/00  
U.S. Cl. 340—825.72



1. A remotely actuated apparatus for effecting rotative and vertical adjustment of a television receiving unit comprising, operator-actuable transmitting means for producing a plurality of output signals, and  
a first and second receiving means each arranged for receiving a predetermined signal from said plurality of output signals, and  
a rectangular television receiving support base including an adjustable corner bracket means positionable within each corner of the support base along a support floor of the support base, and  
first drive means responsive to said first receiving means for vertically adjusting the support base, and  
second drive means responsive to said second receiving means for rotatably adjusting said support base, and  
further including a support case underlying said support base wherein said support case includes a plurality of case braces extending outwardly of said support case, and wherein said first drive means includes a first motor drive housing fixedly secured to and extending upwardly of said



support case, and an adjustment housing vertically adjustable relative to said first motor drive housing, and wherein said adjustment housing includes the second drive means secured thereto wherein said second drive means includes an output drive for cooperation with a driven gear wherein said driven gear is fixedly secured to the floor of said support base, and wherein said adjustment housing includes a plurality of alignment pins extending through complementarily shaped openings extending through a floor of said support case for alignment of said adjustment housing relative to said support case, and wherein said first motor drive housing includes a rotatable output pinion rotatably and drivingly mounted from said first motor drive housing for cooperation with a vertical rack fixedly secured to said adjustment housing for vertical positioning of said adjustment housing, and wherein said adjustable corner bracket includes a plurality of "L" shaped vertical walls with padding formed to an interior of said walls and a bracket floor extending orthogonally outwardly relative to said walls for receiving said television receiver.

4,959,646

## DYNAMIC PLA TIMING CIRCUIT

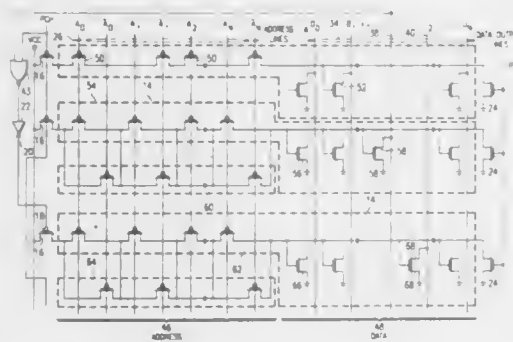
William J. Podkowna, and Clark R. Williams, both of Plano, Tex., assignors to Dallas Semiconductor Corporation, Dallas, Tex.

Filed Jun. 17, 1988, Ser. No. 208,891

Int. Cl.<sup>5</sup> H04Q 1/00

U.S. Cl. 340—825.83

4 Claims



2. Timing apparatus for use in a memory device comprising: a first dynamic PLA line having a series combination of a precharge transistor, a first address portion, and a data portion, said data portion being connected to the gate of at least one data line transistor, said data line forming the output of said timing apparatus; at least one additional address portion of at least one additional dynamic PLA line; and conduction means for shorting between said first address portion of said PLA line and said at least one additional address portion such that said PLA line in combination with said at least one additional address portion forms a conductive path from said precharge transistor to said data portion for any address provided to said memory device.

4,959,647

## WIRELESS POWER CONTROLLER FOR A MACHINE DEVICE

Joseph Daigle, Mission Hills, Calif., assignor to Alternative Industrial Devices for Safety, Inc., Suffield, Conn.

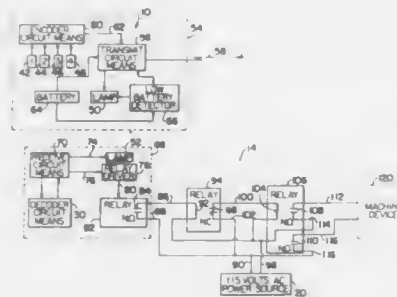
Continuation of Ser. No. 201,043, May 31, 1988, abandoned.

This application Mar. 5, 1990, Ser. No. 489,859

Int. Cl.<sup>5</sup> H04Q 7/02

U.S. Cl. 340—825.720

1 Claim



1. A wireless power controller apparatus for use with a machine device capable of presenting some imminent danger to an operator, said controller apparatus selectively connecting and disconnecting power from the machine device in response to instructions inputted to it by a person recognizing the imminent danger to the operator of the machine, said apparatus comprising:

transmitter circuit means for transmitting an energy wave having at least one predetermined frequency, said transmitter circuit having means for generating said energy wave at said at least one predetermined frequency and means for selecting said generated energy wave whereby said selected energy wave is transmitted by said transmitter circuit means;

receiving circuit means sensitive to said at least one predetermined frequency for sensing and detecting an energy wave transmitted from said transmitter circuit means, said receiving circuit means being located at the machine device;

electrical switching circuit means connected in series with a power source supplying power to the machine device and a power ON/OFF switch associated with the machine device to selectively connect and disconnect the power source from the power ON/OFF switch, said electrical switching means being coupled to and responsive to said receiving circuit means for connecting and disconnecting the power in response to sensing the absence and presence, respectively of said at least one predetermined frequency;

said transmitter circuit means including encoder circuit means for generating a number of different predetermined frequency energy waves;

said receiving circuit means including decoding circuit means for selectively setting one of a number of different sensing frequencies, each of said number of different sensing frequencies corresponding to one of said number of different predetermined frequency energy waves transmitted by said transmitter circuit means; f

said receiving circuit means further including a receiving relay having a normally open transfer contact, said receiving relay being operated to provide a contact closure upon the sensing and detecting of said at least one predetermined frequency, said normally open contact being electrically coupled to said electrical switching circuit means; said electrical switching circuit means further including a first relay having a normally closed transfer contact, said first relay being coupled to said receiving circuit means and being energized upon the sensing and detecting of said at least one predetermined frequency to open said nor-

mally closed contact, and a second relay having at least one normally open transfer contact, said second relay having an energizing coil connected in series with said normally closed contact of said first relay and a voltage power source for energizing said second relay when said first relay is unenergized to cause said at least one normally open contact of said second relay to provide a contact closure, said at least one normally open transfer contact being electrically connected in series with an associated voltage power line from the machine device power source and an input to the ON/OFF power switch; and wherein said second relay includes one-four-one a normally open transfer contact in series with each voltage power line connecting the machine device power source to the ON/OFF power switch.

4,959,648

## DUAL DYNAMIC PRIORITY CONTROL IN A SELECTIVE CALL SYSTEM

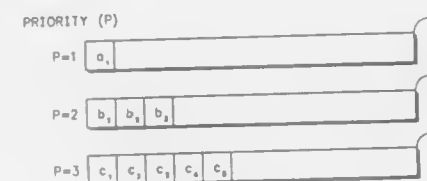
Robert L. Breeden; Douglas E. Griffin, and John H. Kinney, Jr., all of Boynton Beach, Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 10, 1989, Ser. No. 308,711

Int. Cl.<sup>5</sup> H04B 7/00; H04M 11/00

U.S. Cl. 340—825.44

11 Claims



1. A selective call controller comprising: means for receiving calls from call sources, for identifying the source of each call, each of said call sources having a predetermined priority; means for transmitting said calls to call receivers, each of said call receivers having a predetermined priority; and means for determining an order of transmission of the calls to the receivers as a function of the priorities of the source and the receiver for each call.

4,959,649

## CURRENT HOLDING CIRCUIT OF TWO-WIRE INSTRUMENT

Shinichi Akano, Tokyo, Japan, assignor to Yamatake-Honeywell Co., Ltd., Tokyo, Japan

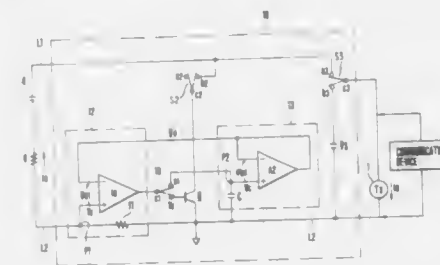
Filed Aug. 26, 1988, Ser. No. 237,107

Claims priority, application Japan, Sep. 3, 1987, 62-133916[U]

Int. Cl.<sup>5</sup> G08C 19/02

U.S. Cl. 340—870.420

3 Claims



1. In a two-wire instrument wherein a transmitter is coupled to a remotely located receiving resistor via a loop in order to

detect a signal from said transmitter as a change in loop current, a current holding circuit for maintaining loop current at a substantially constant value when a communication device is coupled to the transmitter, said current holding circuit comprising:

means for generating a loop-reference voltage, said means including a reference resistor for converting the loop current into a voltage and a first operational amplifier having a noninverting input for receiving the voltage obtained by said reference resistor, an inverting input for receiving a feedback signal, and an output for manifesting a voltage signal; sample-hold means for hold the voltage signal output from said loop reference voltage means; and current control means for controlling the loop current through said receiving resistor on the basis of the output from said operational amplifier, thereby holding the loop current at a constant value, said current control means including an input terminal coupled to said sample-hold means and an output coupled to the inverting input of said operational amplifier for supplying said feedback signal thereto, said current control means further including a first loop forming means for forming a first loop including said receiving resistor, said reference resistor, and a first power source; and a second loop forming means for forming a second loop including said transmitter and a second power source, when the output of said first operational amplifier is disconnected from said sample-hold means, said first loop forming means being controlled by the output from said first operational amplifier, said first loop forming means including a transistor having a control input and an output, a first normally closed switch coupled between the output of said first operational amplifier and said sample-hold means, said first switch having a normally open terminal coupled to the control input of said transistor, and a second normally open switch coupled between the output of said transistor and said first power source, said first switch normally connecting the output of said first operational amplifier to an input side of said sample-hold means, and when said communication device is used, said first switch connecting the output of said first operational amplifier to the control input of said transistor, and said second switch being closed to connect said transistor output to said first power source to form said first loop.

4,959,650

## DUAL CHANNEL A/D AND D/A CONVERTER WITH IMPROVED ISOLATIONS

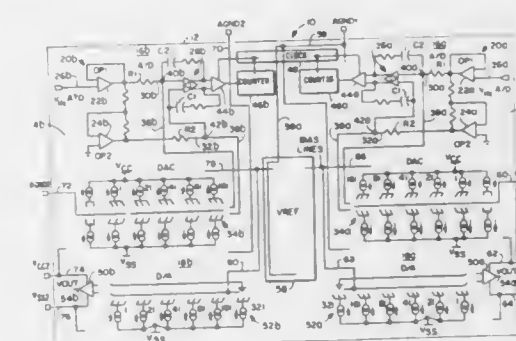
Miki Moyal, Austin, Tex., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Jul. 3, 1989, Ser. No. 375,082

Int. Cl.<sup>5</sup> H03M 1/00

U.S. Cl. 341—126

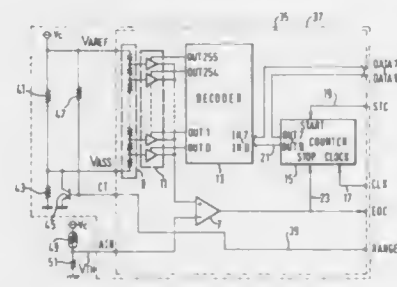
20 Claims



1. A dual channel A/D and D/A converter comprising:

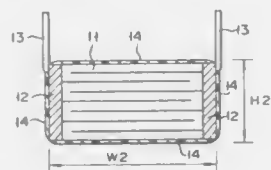
first channel means formed on a single semiconductor substrate for converting between analog signals and digital signals;  
second channel means formed on said semi-conductor substrate at a predetermined distance from said first channel means for converting between analog signals and digital signals;  
reference generator means formed on said semiconductor substrate and disposed intermediate said first channel converter and said second channel converter for functioning as a distance barrier therebetween;  
clock logic means formed on said semi-conductor substrate for generating clock signals on clock connection means;  
first ground connection means coupled to said first channel means defining a quiet ground bus line and which is disposed around said reference generator means to provide isolation from said clock signals;  
second ground connection means coupled to said second channel means and being separated from said first ground connection means; and  
barrier means formed around said quiet ground bus line and said reference generator means to provide further isolation of said first and second channel means from said clock signals.

**4,959,651**  
**TEMPERATURE DETECTION METHOD AND APPARATUS**  
Tetsuro Yamada, Ibaraki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Jun. 1, 1988, Ser. No. 200,893  
Claims priority, application Japan, Aug. 5, 1987, 62-195899  
Int. Cl.<sup>3</sup> H03M 1/20  
U.S. Cl. 341-131 9 Claims



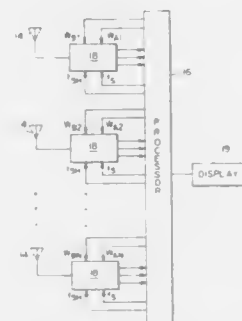
1. A temperature detector comprising:  
temperature sensing means for generating an analog voltage corresponding to a detected temperature;  
means for selecting one of a plurality of reference voltage ranges, the selecting means including switching means for selecting a reference voltage range which includes an analog voltage generated by the temperature sensing means when a failure has occurred in the temperature sensing means; and  
A/D conversion means for outputting digital data corresponding to the analog voltage from the temperature sensing means by comparing the analog voltage with the reference voltage range selected by the selecting means.

**4,959,652**  
**METALIZED FILM CAPACITOR AND METHOD OF MANUFACTURING THE SAME**  
Eiichi Hiram, Nagai, Japan, assignor to Marcon Electronics Company, Ltd., Nagai, Japan  
Filed Aug. 30, 1989, Ser. No. 400,874  
Claims priority, application Japan, Sep. 2, 1988, 63-116248[U]  
Int. Cl.<sup>3</sup> H01G 1/14, 7/00  
U.S. Cl. 361-310 12 Claims



1. A metal film capacitor comprising:  
a capacitor element obtained by winding or stacking metalized films;  
porous conductive layers respectively formed on outermost layers on both end faces of said capacitor element and made of a metal having a melting point higher than a surface-mounting heating temperature; and  
a coating resin which coats said capacitor element and a part of which is impregnated into said porous conductive layers, said coating resin being removed to expose said conductive layers including the resin, thereby constituting exposed portions as a pair electrodes of the capacitor element.

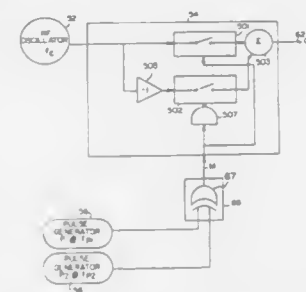
**4,959,653**  
**ADAPTIVE SIDELobe BLANKER**  
Matthew W. Ganz, Chelmsford, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.  
Filed Aug. 23, 1989, Ser. No. 397,658  
Int. Cl.<sup>3</sup> G01S 3/80  
U.S. Cl. 342-17 12 Claims



1. A method of detecting radar signals comprising:  
providing an antenna array;  
generating an interference representation of interference signals received through the antenna array;  
transmitting a radar signal and receiving through each antenna of the antenna array a reflected signal;  
generating an adaptively nulled representation of the reflected signal by weighting the received signals by a first weighting matrix which defines a main beam pattern with at least one dominant lobe, modified by the interference representation;  
generating a blanking signal by weighting the received signals by a second weighting matrix which defines a gener-

ally omnidirectional antenna pattern modified by the interference representation; and  
providing a radar display of the adaptively nulled representation blanked by the blanking signal.

**4,959,654**  
**DIGITALLY GENERATED TWO CARRIER PHASE CODED SIGNAL SOURCE**  
Merlin D. Bjerke, Hennepin, and Baard H. Thue, Anoka, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.  
Division of Ser. No. 40,036, Apr. 20, 1987, Pat. No. 4,851,852, which is a continuation-in-part of Ser. No. 713,118, Mar. 18, 1985, abandoned. This application Sep. 7, 1988, Ser. No. 241,688  
Int. Cl.<sup>3</sup> G01S 13/08; H04L 27/20  
U.S. Cl. 342-120 7 Claims

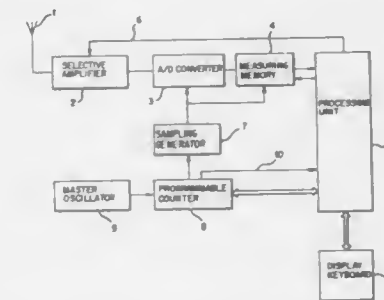


4. A signal generator for generating an RF signal comprised of two phase related frequency components, said signal generator comprising:  
a high frequency oscillator for generating a first RF signal;  
first and second phase related pulse generators for generating first and second pulse train signals having a first and a second repetition frequency, respectively;  
first means responsive to said first and second pulse train signals for providing a product signal representative of the product of said first and second pulse train signals; and  
a controllable bi-phase modulating switch having input means connected to the output of said high frequency oscillator, and an output means, said switch including control means for receiving said product signal, said switch means operative to pass said first RF signal to said output means in response to a first condition of said first product signal, and passing said first RF signal to said output means with 180° phase inversion in response to a second condition of said product signal.

**4,959,655**  
**METHOD FOR THE RADIOLOCATION OF A VEHICLE CARRYING A RECEIVING DEVICE, BY MEASURING THE DIFFERENCES BETWEEN THE TIMES FOR RECEIVING RADIO-FREQUENCY SIGNALS, AND RECEIVING DEVICE FOR CARRYING OUT THIS METHOD**  
Christian J. Lamiroux, Sebastien Sur Loire, France, assignor to MLR Electronique, Vallet, France  
Filed Jul. 6, 1988, Ser. No. 215,819  
Claims priority, application France, Jul. 6, 1987, 87 09556  
Int. Cl.<sup>3</sup> G01S 1/24; G01C 21/00  
U.S. Cl. 342-389 7 Claims

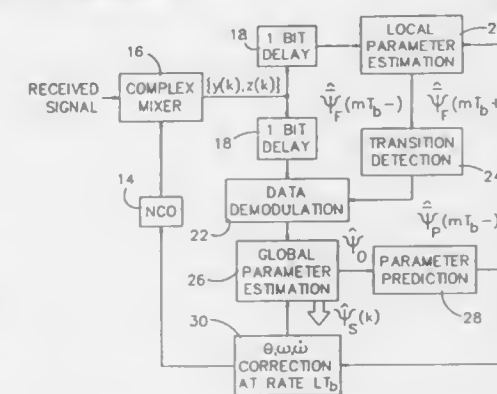
1. A method for the radiolocation of a vehicle carrying a receiving device, by measuring the differences between the times of receiving radiofrequency signals transmitted by two pairs of transmitting stations geographically separated from each other, one pair of transmitting stations from a first group of stations and the second pair of transmitting stations from a second group of stations, each group comprising at least two transmitting stations including one master transmitter station and at least one slave transmitter station which is controlled by the master transmitter, each station of the two pairs of trans-

mitting stations transmitting a series of electric pulses which is time-shifted in a predetermined way with respect to the series of pulses transmitted by the other stations of the two pairs of stations in a way to avoid simultaneous reception of said series of electric pulses coming from different stations, during a predetermined period of time specific for each group, the periods of specific time for each group being different from the ones of the other group, wherein an acquisition of the signals and a measurement of the difference between the times for



receiving the signals transmitted by transmitting stations of two different groups are performed in a unique receiving channel by performing the acquisitions and measurements of the signals transmitted by stations of the first group during the predetermined period of time specific for the first group and by performing the acquisitions and measurements of the signals of the transmitting stations of the second group during the interval of time which has been left available by the acquisition and the measurement of the signals from the first group, during the period specific for the first group.

**4,959,656**  
**EFFICIENT DETECTION AND SIGNAL PARAMETER ESTIMATION WITH APPLICATION TO HIGH DYNAMIC GPS RECEIVER**  
Rajendra Kumar, Cerritos, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.  
Filed Oct. 31, 1989, Ser. No. 429,734  
Int. Cl.<sup>3</sup> G01S 5/02; H04B 7/185; H04L 27/22  
U.S. Cl. 342-418 16 Claims



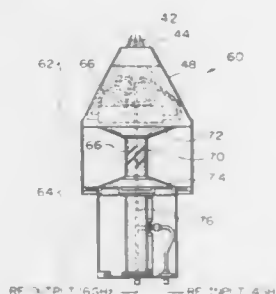
4. In a system for deriving position, velocity, and acceleration information from a received signal emitted from an object to be tracked wherein the signal comprises a carrier signal phase modulated by unknown binary data and experiencing very high Doppler and Doppler rate, the method of providing the parameters associated with the signal from which the



position, velocity, and acceleration information can be derived comprising the steps of:

- first estimating the received signal local (data dependent) parameters over two consecutive bit periods;
- detecting a possible jump in the parameters signifying a data transition;
- removing detected data transitions from the received signal to create an effectively demodulated signal; and,
- processing the effectively demodulated signal to provide estimates of global (data independent) parameters of the signal related to position, velocity, and acceleration of the object.

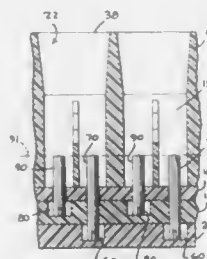
**4,959,657**  
**OMNIDIRECTIONAL ANTENNA ASSEMBLY**  
Akio Mochizuki, Tokyo, Japan, assignor to NEC Corporation, Japan  
Continuation of Ser. No. 70,259, Jul. 6, 1987, abandoned. This application Mar. 8, 1989, Ser. No. 320,467  
Claims priority, application Japan, Jul. 4, 1986, 61-157421  
Int. Cl.<sup>3</sup> H01Q 21/29  
U.S. Cl. 343—725 6 Claims



1. An omnidirectional antenna assembly comprising a four-element whip antenna, said four-element whip antenna including:

- first reflector having an outer perimeter which is disk shaped;
  - four whip elements mounted on said first reflector in such a manner that said four whip elements are located on a first side of said first reflector where said whip elements receive electromagnetic waves reflected by said first reflector;
  - second reflector; and
  - frustoconical reflector having a frustoconical shape for interconnecting said first reflector and said second reflector such that said frustoconical reflector is located on a second side of said first reflector and is coupled to and flares away from said outer perimeter of said first reflector and such that said second reflector is connected to an end of said frustoconical reflector that is opposite to said first reflector;
- the orientation of said first reflector, said frustoconical reflector, said second reflector and said four whip elements being such that electromagnetic waves radiated from said four whip elements reach behind said four-element whip antenna.

**4,959,658**  
**FLAT PHASED ARRAY ANTENNA**  
John L. Collins, 3 Cupar Road, Largoward, Leven, Fife KY9 1HX, Scotland  
Filed Aug. 12, 1987, Ser. No. 84,664  
Claims priority, application United Kingdom, Aug. 13, 1986, 8619680  
Int. Cl.<sup>3</sup> H01Q 13/02  
U.S. Cl. 343—786 17 Claims



- In an antenna, a waveguide system comprising:
  - a first substantially planar layer having first and second surfaces; first channels defined along said first surface and recessed within said first layer;
  - a first conductive network disposed in said first channels;
  - a second layer having a substantially planar third surface, said second layer being adjacent said first layer with said third surface of said second layer in intimate contact with said first surface, said third surface of said second layer providing a closure surface for closing said first channels;
  - support means originating within said first channels for supporting said first conductive network in spaced relation from the interior surface of said closed first channels;
  - an energy reflecting metallic coating surrounding the interior surfaces of said closed first channels, said metallic coating coated interior surfaces of said channels defining waveguide means for said first conductive network;
  - a conductive portion formed as part of said network, said conductive portion projecting outwardly from said first channels;
  - a third substantially planar layer having fourth and fifth surfaces;
  - second channels defined along said fourth surface and recessed within said third layer;
  - a second conductive network disposed in said second channels;
  - said second surface of said first layer being in intimate contact with said fourth surface of said third layer, said second surface providing a closure surface for closing said second channels; and
  - a metallic coating surrounding the interior surfaces of said closed second channels, said metallic coating coated interior surfaces of said second channels defining waveguide means for said second conductive network.

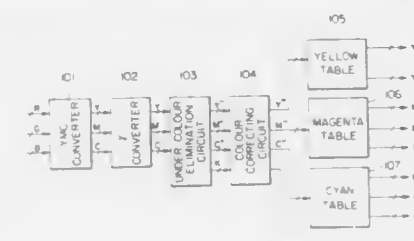
**4,959,659**  
**COLOR PICTURE FORMING APPARATUS AND METHOD**  
Takashi Sasaki, Tokyo; Nobuaki Sakurada, Yokohama, and Hideaki Kawamura, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Japan  
Continuation of Ser. No. 896,320, Aug. 13, 1986, abandoned, which is a continuation of Ser. No. 585,303, Mar. 1, 1984, abandoned. This application Jun. 27, 1988, Ser. No. 212,097  
Claims priority, application Japan, Mar. 8, 1983, 58-37698; Apr. 28, 1983, 58-75857  
Int. Cl.<sup>3</sup> E01D 15/16; H04N 1/46  
U.S. Cl. 346—1.1 69 Claims

- A color picture forming apparatus comprising:
  - magenta dot forming means for depositing magenta dots of

different sizes using a plurality of recording materials which have  $N_M$  different concentrations in order to enable representation of substantially all of the optical density gradations of the magenta components of the color picture;

cyan dot forming means for depositing cyan dots of different sizes using a plurality of recording materials which have  $N_C$  different concentrations in order to enable representation of substantially all of the optical density gradations of the cyan components of the color picture;

yellow dot forming means for depositing yellow dots of



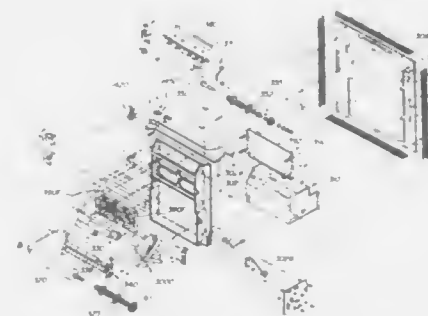
different sizes using a plurality of recording materials which have a plurality of  $N_Y$  different concentrations in order to enable representation of substantially all of the optical density gradations of the yellow components of the color picture;

signal generating means for generating recording color signals of magenta, cyan and yellow; and

control means for controlling the dot size and recording material concentration provided by each of said dot forming means according to each of the recording color signals,

wherein the relation among  $N_M$ ,  $N_C$  and  $N_Y$  is  $N_M, N_C > N_Y$ .

**4,959,660**  
**INK JET IMAGE FORMATION APPARATUS WITH MEANS FOR COLLECTING INK MIST**  
Tetsuo Suzuki, Kawasaki; Makoto Takemura, Tokyo, and Shigeru Yoshimura, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 27,617, Mar. 18, 1987, abandoned. This application Mar. 1, 1989, Ser. No. 319,878  
Claims priority, application Japan, Mar. 20, 1986, 61-062471  
Int. Cl.<sup>3</sup> B41J 2/17  
U.S. Cl. 346—1.1 21 Claims



- A method of collecting fine liquid droplets in an image forming apparatus, comprising the steps of:
  - recording images on a recording medium in a recording area by ejecting liquid from recording means through a space and onto a recording medium;
  - generating a suction airflow by a fan provided to draw the recording medium against a platen to form a recording

surface in the apparatus, with the air flow containing fine liquid droplets entrained therein;

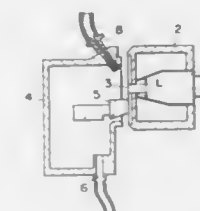
collecting the fine liquid droplets into a collecting member having a suction portion disposed proximate to the recording surface for the airflow having fine liquid droplets entrained therein, the suction portion being disposed at a side of the recording area, outside of the space and on the opposite side of the recording surface from the recording means and having a length corresponding to the length of the recording area in the conveyance direction of the recording medium; and

absorbing the entrained fine liquid droplets in an absorbing member.

**4,959,661**  
**INK-JET PRINTING PROCESS**  
Galina P. Buxton, Tenafly, and Harshad M. Shah, Fairlawn, both of N.J., assignors to Olin Hunt Specialty Products Inc., Cheshire, Conn.  
Filed Sep. 28, 1989, Ser. No. 413,898  
Int. Cl.<sup>3</sup> B41J 2/01; C09D 11/00  
U.S. Cl. 346—1.1 13 Claims

- A process for applying an ink-jet printing ink comprising the steps of:
  - preparing an aqueous Newtonian dispersion containing:
    - about 0.01% to about 5.0% by weight, based on the weight of the dispersion of particulate materials selected from the group consisting of an acidic or neutral carbon black and pigments, said particulate material, having an average particle size of less than about 3.0 microns in said dispersion;
    - an effective dispersing amount of an anionic, cationic, or nonionic surfactant which is compatible with said carbon black or pigment; and said dispersion having a surface tension of greater than 35 mN/m and a viscosity in the range of 1–10 mNs/m<sup>2</sup> and a pH of 8 to 11;
  - removing all aggregates larger than 5 microns; and
  - ink-jet printing said dispersion onto a receptor substrate.

**4,959,662**  
**INK JET RECORDER HAVING MEANS FOR REMOVING UNUSED INK FROM INK DISCHARGE ORIFICE AND FOR CAPPING SAME**  
Tohru Kobayashi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 60,474, Jun. 11, 1987, abandoned. This application Mar. 24, 1989, Ser. No. 327,428  
Claims priority, application Japan, Jun. 13, 1986, 61-136165  
Int. Cl.<sup>3</sup> B41J 2/165  
U.S. Cl. 346—1.1 8 Claims



- A method for recovering unused ink from an ink jet recording head during a recovery process, said method comprising the steps of:
  - providing an ink jet recording head having an orifice for discharging ink therefrom;
  - ejecting ink from said orifice during said recovery process;
  - jetting gas from above said orifice toward said orifice to blow ink ejected therefrom downwardly during said recovery process; and
  - collecting ink ejected from said orifice and blown down-

wardly therefrom by said jetted gas using an ink absorbing member disposed below said orifice and in abutment with a surface adjacent said orifice, wherein said ejecting and jetting steps are performed substantially at the same time.

4,959,663

## IMAGE RECORDING DEVICE

Kazuhiro Chiba, and Noriko Bamba, both of Kyoto, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

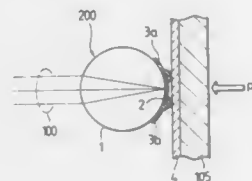
Filed Feb. 28, 1989, Ser. No. 317,284

Claims priority, application Japan, Feb. 29, 1988, 63-47333; Apr. 11, 1988, 63-88527

Int. Cl.<sup>3</sup> G01D 15/10; G03G 5/16

U.S. Cl. 346—76 PH

1 Claim



1. An image printing device using a laser beam, comprising: a head including a support transmitting a laser beam, a film resistor which reacts upon temperature or light quantity and electrodes for applying voltage to said film resistor; and means for generating a laser beam for controlling the generation of heat by said film resistor, in which the optical intensity of said laser beam is modulated according to an image signal, said laser beam thus modulated is converged so as to have a predetermined beam diameter and deflected in a scanning mode at a predetermined speed, said laser beam thus converged is applied spot-wise to said film resistor, to reduce the resistance thereof, and said resistance thus reduced cooperating with a voltage applied to said film resistor generates heat spot-wise in said film resistor, for monochromatic image printing operation or a color image printing operation.

4,959,664

## LASER SCANNER WITH BEAM TRANSMISSIVITY CONTROL

Toshio Nalki, and Muneco Kuroda, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

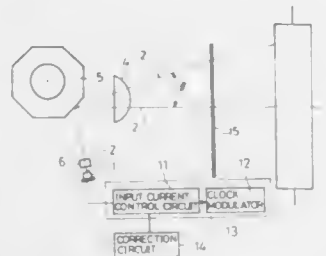
Filed Aug. 26, 1988, Ser. No. 237,294

Claims priority, application Japan, Aug. 27, 1987, 62-213739

Int. Cl.<sup>3</sup> G01D 15/14; A04N 1/40

U.S. Cl. 346—108

19 Claims



19. In an improved scanning optical system for use in a laser beam printer having a laser beam generating means for providing a laser beam that can be modulated with printing information and means for scanning the laser beam across a recording

surface from a central on axis position to respective peripheral portions of the recording surface with a resulting variance in angle of the laser beam from the central on axis position, the improvement comprising;

an optically transmissive member mounted in a scanning path of the laser beam before the recording surface and having a coating layer, an index of refraction and optical thickness of predetermined values, extending across the scanning path to lessen the angle of transmission of the incident laser beam relative to any corresponding increase in angle of incident on the coating layer to insure a relatively even transmission of the laser beam across the scan path to the recording member.

4,959,665

## LASER PRINTER WITH HARMONIC WAVE SEPARATION OF THE BEAM

Susumu Saito, Hachioji, and Akira Arimoto, Kodaira, both of Japan, assignors to Hitachi Koki Co., Ltd. and Hitachi, Ltd., both of Tokyo, Japan

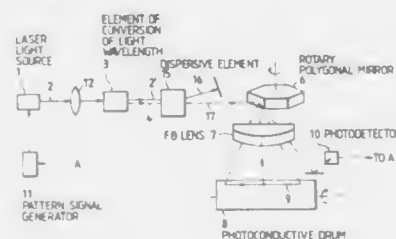
Filed Aug. 15, 1989, Ser. No. 393,888

Claims priority, application Japan, Sep. 9, 1988, 63-224673

Int. Cl.<sup>3</sup> G01D 9/00, 15/14; H01S 3/10

U.S. Cl. 346—108

15 Claims



1. An information device using laser light, comprising: a laser light source; a conversion element for converting laser fundamental wave light irradiated from said laser light source into harmonic wave light; a photo-receptor for receiving laser light passing through said conversion element; and a dispersive element which is provided in an optical path between said conversion element and said photo-receptor and separates an optical path of the fundamental wave light remaining in said laser light passing through said conversion element from an optical path of the harmonic wave light so as to allow the harmonic wave light to reach said photo-receptor but not to allow the fundamental wave light to reach said photo-receptor.

4,959,666

## IMAGE FORMING APPARATUS HAVING A PLATEN AND RECORDING MEANS ELASTICALLY PRESSED TOGETHER

Shigeru Yoshimura; Tetsuo Suzuki, both of Kanagawa, and Makoto Takemura, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

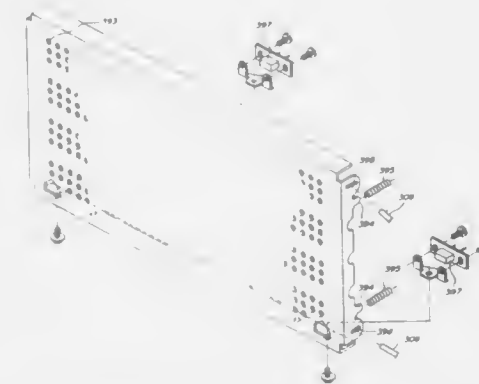
Continuation of Ser. No. 310,009, Feb. 9, 1989, abandoned, which is a continuation of Ser. No. 49,168, May 13, 1987, abandoned, which is a division of Ser. No. 844,132, Mar. 26, 1986, Pat. No. 4,692,778. This application Oct. 19, 1989, Ser. No. 423,747

Claims priority, application Japan, Mar. 25, 1985, 60-65106; Mar. 28, 1985, 60-65103; Mar. 28, 1985, 60-65108; Mar. 28, 1985, 60-65112; Mar. 28, 1985, 60-65114; Mar. 28, 1985, 60-65116; Mar. 28, 1985, 60-65117; Mar. 28, 1985, 60-65118; Mar. 28, 1985, 60-65119; Mar. 28, 1985, 60-65120; Mar. 28, 1985, 60-65121

Int. Cl.<sup>3</sup> B41J 2/01, 11/20

U.S. Cl. 346—136

14 Claims



1. An image forming apparatus comprising: a platen for contacting and holding a rear surface of a recording medium, said platen having a recording surface area and at least three positioning areas; recording means for recording on said recording medium by discharging a liquid, said recording means having at least three positioning portions corresponding to said positioning areas; and pressing means for elastically pressing said positioning areas against said positioning portions, wherein said positioning areas and said positioning portions are provided at both sides of said recording medium across said platen relative to a conveyance direction of said recording medium, wherein each said positioning area contacts a corresponding positioning portion to form a gap between said recording means and said recording medium, and said pressing means maintains simultaneous contact between at least three of said positioning areas and corresponding ones of said positioning portions.

4,959,667

## REFILLABLE INK BAG

George Kaplinsky, San Diego, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Feb. 14, 1989, Ser. No. 311,505

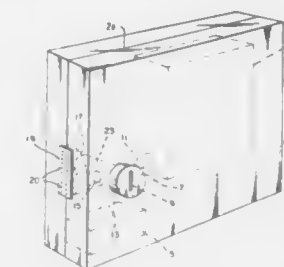
Int. Cl.<sup>3</sup> B41J 2/175, 2/05

U.S. Cl. 346—140 R

7 Claims

1. An ink delivery system (1) for a printer comprising: (a) an ink supply bag (3); (b) an ink regulating bag (5); (c) a print head (19); (d) a three way valve (7) comprising a rotatable stem having an angled channel therein; (e) means (11,13) for supplying ink from said ink supply bag

to said ink regulating bag through said angled channel in said three way valve; (f) means (13, 15) for supplying ink from said ink regulating bag to a print head through said angled channel in said three way valve;



(g) means (7) for selectively rotating said stem to shut off the flow of ink from the ink supply to the ink regulating bag of from the ink regulating bag to the print head for both; the ink regulating bag being positioned at a level lower than the print head.

4,959,668

## DEVICE FOR PRODUCING IMAGES ON PRINTING IMAGE CARRIERS

Alfred Hirt, München, Fed. Rep. of Germany, assignor to MAN Technologie GmbH, München, Fed. Rep. of Germany

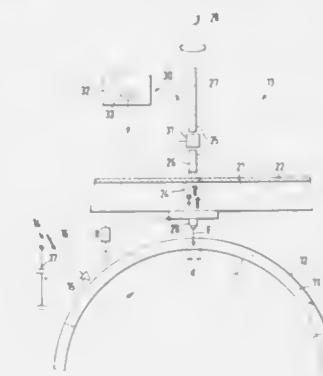
Filed Nov. 2, 1988, Ser. No. 266,167

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1987, 3740079

Int. Cl.<sup>3</sup> G01N 15/00

U.S. Cl. 346—155

25 Claims



1. An electric image producing device for use in conjunction with a printing image carrier of a printing press comprising at least one writing unit, in the form of an electrode means, for modifying said printing image carrier in a local and punctuate manner, said at least one writing unit being adapted to be connected with an electrical power supply and including means for driving it in accordance with an image on said printing image carrier, said printing image carrier being able to be modified electrochemically and said writing unit comprising a control electrode and a field forming intermediate electrode, which are same being at partly immersed in an electrolyte.



4,959,669

**COLOR CORRECTION DEVICE FOR A COLOR IMAGE FORMING APPARATUS**

Satoshi Haneda; Hisashi Sboji, both of Hachioji, and Kunihisa Yoshino, Mitaka, all of Japan, assignors to Konica Corporation, Tokyo, Japan

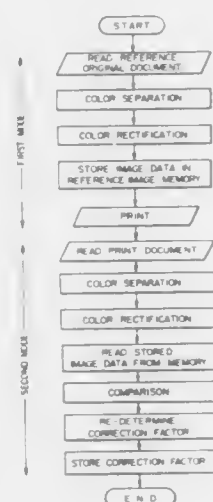
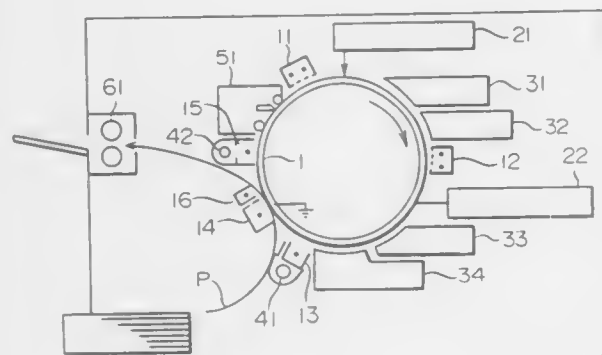
Filed Jan. 2, 1988, Ser. No. 201,206

Claims priority, application Japan, Jun. 3, 1987, 62-140414

Int. Cl.<sup>5</sup> G03G 15/01; G01D 15/06

U.S. Cl. 346—157

4 Claims



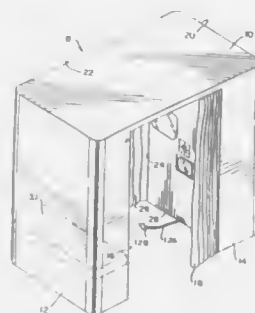
1. A color image processing apparatus comprising; image-reading means for reading a color image on an original to obtain first color image data; a factor memory for storing a predetermined correction factor; correction means for correcting the first color image data with the correction factor; an image memory for storing the corrected first color image data; image-producing means for producing a color copy image on the basis of the corrected first color image data, the image-reading means being adapted to read the color copy image to obtain second color image data and the correction means being adapted to correct the second color image data with the correction factor; and processing means for performing a comparison of the corrected first color image data stored in the image memory and the corrected second color image data, and changing the correction factor on the basis of the comparison.

4,959,670

**PHOTOGRAPHY BOOTH AND METHOD**  
Donald O. Thayer, Jr., 153 Lincoln St., Garden City, N.Y. 11530  
Division of Ser. No. 253,652, Oct. 5, 1988, Pat. No. 4,896,175, which is a continuation-in-part of Ser. No. 932,365, Nov. 19, 1986, Pat. No. 4,804,983. This application Dec. 11, 1989, Ser. No. 448,265Int. Cl.<sup>5</sup> G03B 15/06, 29/00

U.S. Cl. 354—76

13 Claims



1. A photography booth, comprising: (a) an enclosure including first and second spaced walls; (b) opening means disposed in said first wall; (c) a photographic camera in alignment with said opening means for perceiving said second wall; (d) a video camera; (e) means operably associating said photographic and video cameras for causing the image perceived by said photographic camera to be directed to said video camera; (f) video display means in alignment with said opening means, said video display means being operably associated with said video camera so that the image perceived by said photographic camera is displayed thereon and directed toward said second wall; (g) means operably associated with said photographic camera for causing a length of film therein to be exposed; (h) platform means pivotally associated with said first wall; (i) said photographic and video cameras being mounted to said platform means; and (j) means operably associated with said platform means for causing pivoting thereof.

4,959,671

**VERTICAL TILTING APPARATUS OF TRIPOD HEAD**  
Masao Ishikawa, Yashio, Japan, assignor to Heiwa Seiki Kogyo Co., Ltd., Yashio, Japan

Filed Feb. 9, 1989, Ser. No. 308,085

Int. Cl.<sup>5</sup> G03B 29/00

U.S. Cl. 354—81

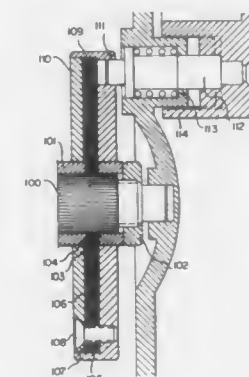
4 Claims

1. A torque changeover mechanism for a vertical tilting apparatus of a tripod head which incorporates a securing disk that maintains the horizontal state of a camera mounted thereon in balance with elastic bodies acting in opposition to each other at right and left ends of a horizontal shaft in the vertical tilting apparatus, said torque changeover mechanism comprising:

- a first unit incorporating the horizontal shaft and having a plurality of first damp adjusting plates and first intermediate bodies wherein the first change adjusting plates and the first intermediate bodies are concentrically and alternately arranged with each other along the longitudinal axis of the shaft, the first damp adjusting plates and the first intermediate bodies being securely fit with the shaft;
- a second unit having ring-shaped second intermediate bodies and second damp adjusting plates wherein the second intermediate bodies and second damp adjusting plates are concentrically and alternately arranged with each other relative to the longitudinal axis of the shaft, said first unit

being inter-engaged with said second unit such that each first damp adjusting plate is co-axially positioned with a corresponding second intermediate body along a first plane and each first intermediate body is co-axially positioned with a corresponding second damp adjusting plate along a second plane;

a unit case for holding and sealing therein said inter-engaged first and second units, said second unit being securely fit in



said unit case and said unit case having a plurality of securing holes defined along a radius on a surface of said unit case;

a unit securing pin releasably insertable into any of the securing holes on said unit case for securing said first and second units to allow torque balance adjustment; and viscous fluid filled into said unit case and between said inter-engaged first and second units.

4,959,672

**MOTOR-DRIVEN FILM WINDER**

Tsunemi Yoshino, Nara; Naoyuki Furutsuka, Kawabe; Naofumi Aoki, Takatsuki; Hiroshi Watanabe, Suita, and Akitoshi Morioka, Kitakatsuragi, all of Japan, assignors to West Electric Company, Ltd., Osaka, Japan

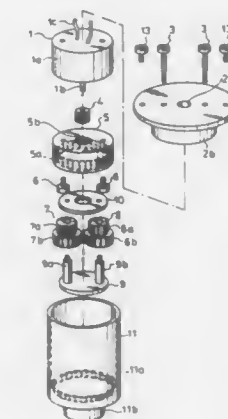
Filed Oct. 16, 1989, Ser. No. 421,461

Claims priority, application Japan, Oct. 17, 1988, 63-260836

Int. Cl.<sup>5</sup> G03B 1/18

U.S. Cl. 354—173.1

2 Claims



1. A motor-driven film winder comprising: a spool having a hollow cylindrical shape, which is rotatably arranged within a body frame of a camera; a motor which is arranged in said spool, and which is fixed to said body frame of said camera; a pinion gear which is fixed to an output shaft of said motor; an internal gear which is fixed to said motor; at least one planet gear having a stepped shape, which com-

prises a first gear to mesh with both of said pinion gear and an internal gear portion of said internal gear, and a second gear having larger diameter than said first gear; and an internal gear 11a which is provided on an internal circumference face of said spool to mesh with said second gear.

4,959,673

**INK JET RECORDING APPARATUS**

Atsushi Noda, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 291,763, Dec. 29, 1988, abandoned.

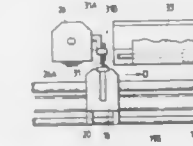
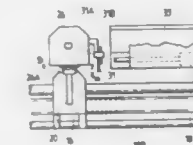
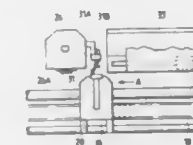
This application Oct. 10, 1989, Ser. No. 418,960

Claims priority, application Japan, Dec. 29, 1987, 62-335367

Int. Cl.<sup>5</sup> G01D 15/18

U.S. Cl. 346—140 R

32 Claims



1. An ink jet recording apparatus comprising a recording head having a surface in which is provided a discharge port for discharging ink therethrough and cleaning means with a cleaning member capable of contacting said surface, in which cleaning of said surface is performed by the relative movement of said cleaning member and said recording head, wherein said cleaning means includes changing means for changing a cleaning force of said cleaning member against said surface in response to a direction of said relative movement when cleaning is performed.

4,959,674

**ACOUSTIC INK PRINthead HAVING REFLECTION COATING FOR IMPROVED INK DROP EJECTION CONTROL**

Butrus T. Khri-Yakub; Scott A. Elrod, both of Palo Alto, and Calvin F. Quate, Stanford, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 3, 1989, Ser. No. 416,796

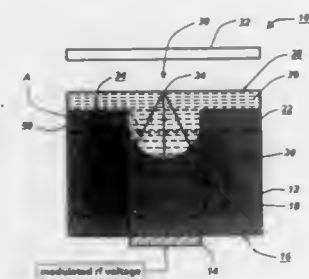
Int. Cl.<sup>5</sup> B41V 2/04

U.S. Cl. 346—140 R

14 Claims

1. An acoustic printhead for ejecting droplets of liquid on demand from a free surface of a liquid pool, comprising: a solid substrate having first and second surfaces, and having an acoustic focussing element formed therein; acoustic wave generating means intimately coupled to said second surface of said substrate for generating rf acoustic waves to illuminate said lens such that said lens launches converging acoustic beams into said liquid; and acoustically reflective means intimately coupled to and substantially entirely coating said first surface of said substrate except in the region proximate said acoustic lens

such as to define an opening corresponding to the position and size of said acoustic lens, for inhibiting extraneous



acoustic energy from coupling into the liquid pool other than through said lens.

4,959,675

#### DEVICE FOR ADJUSTING CAMERA IN THE INITIAL STAGE

Yoichi Seki, and Kazuo Akimoto, both of Chiba, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

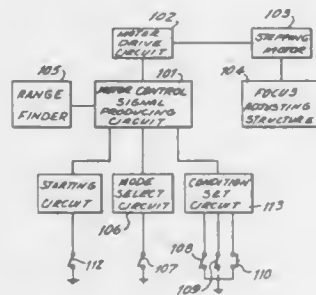
Filed Jun. 8, 1989, Ser. No. 363,039

Claims priority, application Japan, Jun. 8, 1988, 63-140795

Int. Cl.<sup>3</sup> G03B 13/00

U.S. Cl. 354—400

20 Claims



1. A device for initially adjusting an adjustable structure means, said adjustable structure means adjusting the lens or opening and closing sectors of a camera in response to variable criteria related to the subject matter to be photographed by said camera comprising:

motor means moving said adjustable structure means;  
motor control means connected to said motor means for controlling the rotation of said motor means;  
measuring means connected to said motor control means for measuring said variable criteria and outputting a measure signal to said motor control means; and  
measured signal compensating means connected to said motor control means and outputting an adjustment signal to said motor control means to correct said measured signal.

4,959,676

#### CONTROL DEVICE FOR USE IN A CAMERA HAVING AN OBJECTIVE LENS

Motosobu Matsuda, Kawachisagano; Yoshihiro Tanaka, Osaka; Motohiro Nakamishi, Kobe; Nobuyuki Taniguchi, Nishino-miya, and Hiroshi Ootsuka, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

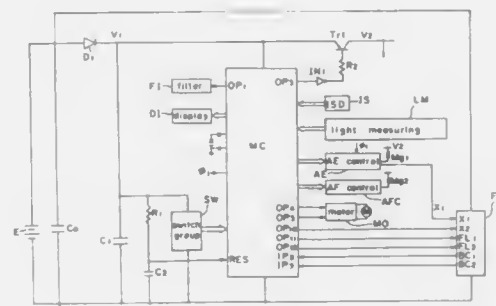
Continuation of Ser. No. 267,550, Nov. 7, 1988, abandoned, which is a division of Ser. No. 43,616, Apr. 28, 1987, Pat. No. 4,800,409. This application Dec. 4, 1989, Ser. No. 443,841

Claims priority, application Japan, Apr. 28, 1986, 61-99233; Jul. 16, 1986, 61-167466; Jul. 16, 1986, 61-167467; Jul. 16, 1986, 61-167468; Jul. 16, 1986, 61-167470

Int. Cl.<sup>3</sup> G03B 3/00, 7/095, 7/16, 15/03

U.S. Cl. 354—400

3 Claims





4,959,680

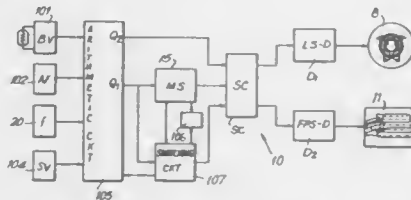
## CAMERA SYSTEM

Hiroaki Ishida; Ichiro Nemoto; Koji Sato; Atsushi Takami; Yoichi Nakano; Isamu Ishii, and Yoshiyuki Iwamatsu, all of Chiba, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan  
Filed Jun. 28, 1989, Ser. No. 372,729  
Claims priority, application Japan, Jun. 29, 1988, 63-161308; Jul. 4, 1988, 63-166398

Int. Cl.<sup>5</sup> G03B 7/00, 9/00

U.S. Cl. 354-435

13 Claims



1. A camera system of the type having a lens shutter for performing a programmed exposure operation with a programmed exposure value and a diaphragm-adjusting operation, a focal-plane shutter and an aperture defined by said lens shutter and through which an image of a subject to be photographed is passed for recording on a photosensitive material, said camera system comprising:

- (a) operation mode setting means for setting an operation mode of said camera system to one of the following modes:
  - (i) a lens shutter mode in which the lens shutter is operated as a programmed shutter, and
  - (ii) a focal-plane shutter mode in which shutter speed is controlled by the focal-plane shutter and the aperture of the camera system is controlled by said lens shutter;
- (b) selector means for controlling said setting means to set the operation mode of said camera system to one of the lens shutter mode and the focal-plane shutter mode; and
- (c) switching means for controlling said setting means to switch the operation mode of the camera system to the focal-plane shutter mode irrespective of the setting of the selector means when an exposure value to be controlled exceeds the programmed exposure value of the lens shutter.

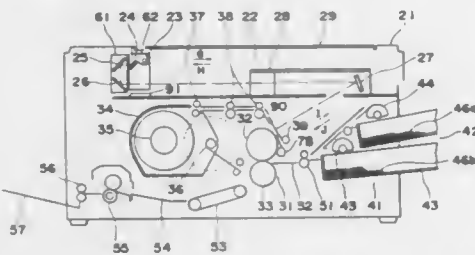
4,959,681

## IMAGE FORMING APPARATUS

Mitsuru Ogura, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan  
Filed Dec. 9, 1988, Ser. No. 282,327  
Claims priority, application Japan, Dec. 14, 1987, 62-317218  
Int. Cl.<sup>5</sup> G03B 27/32

U.S. Cl. 355-27

7 Claims



1. In an image forming apparatus for forming a colored image of an original by forming a selective hardened image through image-making an exposure onto a photoreceptive sheet coated with microcapsules containing colorless dyes and photo-hardening agents therein, overlapping the photoreceptive sheet with an image receiving sheet coated with a developing material, and pressing the photoreceptive sheet and the image receiving sheet together to transfer the non-hardened image, thereby forming a developed color image on the image receiving sheet, comprising:

movable original scanning means for scanning and exposing an image of a static original onto the photoreceptive sheet; transfer means for transferring the image on the photoreceptive sheet to the image receiving sheet; suspension means, provided between said movable original scanning means and said transfer means, for suspending the photoreceptive sheet; and driving means for moving both said original scanning means and said suspension means.

4,959,682

## COPYING APPARATUS

Takemi Yamamoto; Ryobel Komiya, both of Nagoya; Naoyuki Hatta, Gamagori; Yumio Matsumoto, Kasugai, and Fumihiro Sunda, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jul. 13, 1989, Ser. No. 379,339

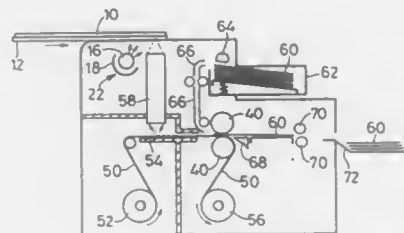
This application filed Jul. 13, 1989, Ser. No. 379,339Continuation of Ser. No. 172,383, Mar. 24, 1988, Pat. No. 4,870,444, which is a continuation-in-part of Ser. No. 943,195, Dec. 18, 1986, Pat. No. 4,742,374

Claims priority, application Japan, Dec. 24, 1985, 60-291159; Mar. 25, 1986, 61-64925; Jun. 10, 1987, 62-89131[U]

Int. Cl.<sup>5</sup> G03B 27/32, 27/52, 27/00, 27/54

U.S. Cl. 355-27

9 Claims



1. A copying apparatus operable with an original having an image-bearing surface on which images to be reproduced are supported, comprising:

- a image-illuminating device operable to produce a light for illuminating said image-bearing surface on the original;
- a photosensitive web disposed for exposure to the light reflected by said image-bearing surface of the original, said photosensitive web having a multiplicity of microcapsules each of which contains a chromogenic material, and a photosensitive resin which is sensitive to rays included in the light reflected by said image-bearing surface of the original;
- an optical system for converging and thereby focusing said reflected light on a surface of said photosensitive web, to image-wise expose said microcapsules, for forming latent images corresponding to said images on said original;
- a feeding device comprising a storage means for accommodating a stack of recording cut sheets, and means for feeding said cut sheets one after another, and said photosensitive web, each of said recording cut sheets having a developer layer with which said chromogenic material of each said microcapsule of said photosensitive web is adapted to react; and
- a developing device comprising a pair of nip rollers defining a pressure nip, and means for superposing each said recording cut sheet and an image-wise exposed portion of said photosensitive web on each other and guiding the superposed cut sheet and image-wise exposed portion of the web through said pressure nip, so as to cause an image-wise reaction between said chromogenic material of said microcapsules and said developer layer, thereby developing said latent images on said photosensitive web into visible images on each said cut sheet.

4,959,683

## PHOTOGRAPHIC PICTURE DISPLAY, APPARATUS AND METHOD OF MAKING ELEMENTAL PRINTS THEREOF

Katsumi Otake, Tokyo; Kiichiro Sakamoto, Kanagawa, and Mikio Kogane, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 196,524, May 20, 1980, Pat. No. 4,897,944.

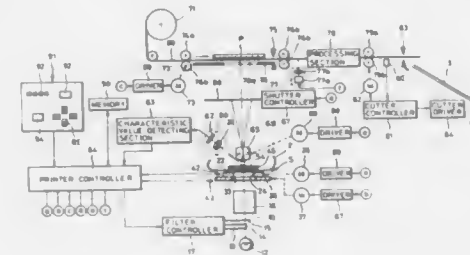
This application Nov. 9, 1989, Ser. No. 435,131

Claims priority, application Japan, May 20, 1987, 62-123053; Jun. 12, 1987, 62-146654; Jun. 17, 1987, 62-150810

Int. Cl.<sup>5</sup> G03B 29/00, 27/44, 27/32

U.S. Cl. 355-28

11 Claims



1. A method of making picture strips arranged on a display panel for forming a single picture, each picture strip including divisional images of a row or a column of smaller divisions of a matrix into which an image frame of a film is notionally divided, said method comprising the steps of:

- moving a film carrier in such a way to place said notionally divided smaller divisions in an exposure position;
- exposing a photographic paper to enlarged images of said smaller divisions in divided order for each row or column of said matrix;
- processing said exposed photographic paper to provide a print of a series of rows or columns of said enlarged divisional images of said smaller divisions; and
- cutting off said print by row or column to thereby provide picture strips.

4,959,684

## COPYING MACHINE

Hideo Ito, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jan. 2, 1989, Ser. No. 360,999

Claims priority, application Japan, Jun. 6, 1988, 63-139191; Jun. 6, 1988, 63-139192

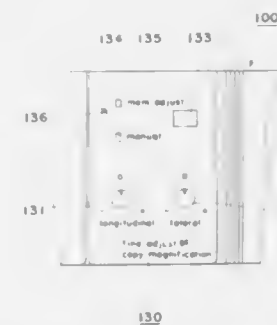
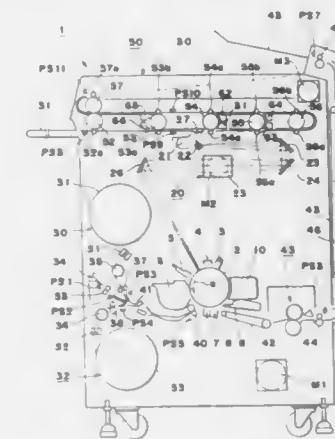
Int. Cl.<sup>5</sup> G03B 27/52; G03G 15/00

U.S. Cl. 355-55

15 Claims

1. A copying machine comprising:
  - image forming means for forming an image of an original to be copied on a copying paper;
  - magnifying means for setting copy magnifications in a longitudinal direction and a lateral direction independently;
  - first selecting means for selecting any one of the copy magnifications preliminarily stored;
  - first magnification control means for controlling said magnifying means so that the copy of the original has such magnifications in the longitudinal and lateral directions as selected by said first selecting means;
  - a plurality of memory means each comprising memory areas for storing a pair of adjusting values for adjusting the copy magnifications, the pair of adjusting values being a first adjusting value in the longitudinal direction and a second adjusting value in the lateral direction;
  - second selecting means for selecting one of said memory means;
  - second magnification control means for controlling said magnifying means based on the pair of adjusting values

stored in said selected memory means and the copy magnifications selected by said first selecting means; whereby the copy magnification in the longitudinal direction is set based on the copy magnification selected by said



first selecting means and the first adjusting value and the copy magnification in the lateral direction is set based on the copy magnification selected by said first selecting means and the second adjusting value.

4,959,685

## IMAGE FORMING APPARATUS PROVIDED WITH A SHEET STORING UNIT

Akio Kato, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 394,654, Aug. 16, 1989, abandoned.

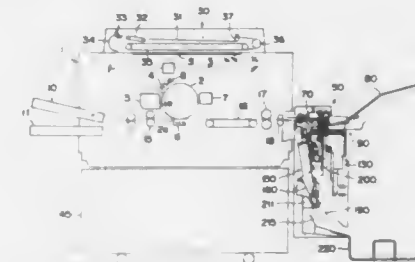
This application Feb. 27, 1990, Ser. No. 488,421

Claims priority, application Japan, Aug. 19, 1988, 63-206958; Aug. 19, 1988, 63-206959; Aug. 19, 1988, 63-206960

Int. Cl.<sup>5</sup> G03B 27/58

U.S. Cl. 355-72

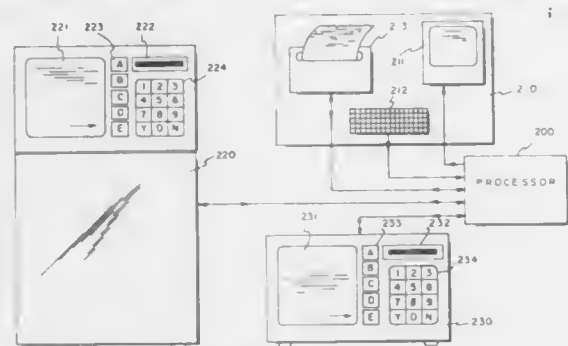
10 Claims



1. An image forming apparatus comprising:

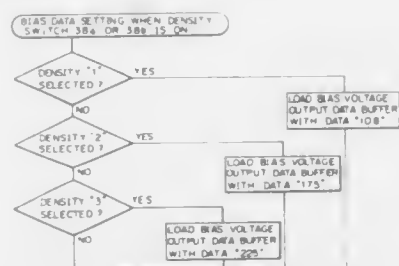
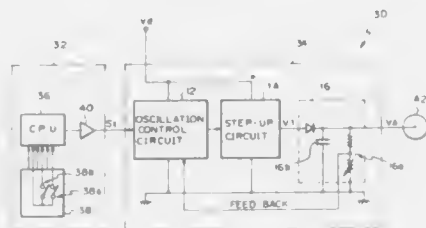
means for forming an image on a sheet;  
means for generating a signal commanding said image forming means to perform an image forming operation;  
a tray for receiving sheets, which is movable up and down;  
means for transporting sheets ejected from said image forming means to said tray;  
drive means for moving up and down said tray toward and away from a sheet ejection portion of said transporting means;  
first control means for commanding said drive means to move said tray to a proper position, where the upper surface of said tray or the upper surface of sheets stacked thereon is positioned below the sheet ejection portion of said transporting means with a specified space, when said commanding means generates a command signal to start an image forming operation; and  
second control means for inhibiting the image forming operation while said drive means is in operation at the request of said first control means.

**4,959,686**  
**AUTOMATED SHOPPING ORDER ENTRY SYSTEM**  
John J. Spallone, New Milford; William E. Doyle, Monroe, and Peter Cawley, Waterbury, all of Conn., assignors to Dexter Systems, Inc., New Milford, Conn.  
Filed Feb. 24, 1988, Ser. No. 159,758  
Int. Cl.<sup>5</sup> G06F 15/21  
U.S. Cl. 364-401 8 Claims



1. A system for automated shopping order entry for the delicatessen station of a supermarket, comprising:  
a processor subsystem including: means for storing data describing items available for purchase; means for computing and storing an estimated waiting time; means for controlling a sequence for shopping item data presentation for selection by a customer; selection data storage means for storing data representative of a customer's item selections; and means for controlling printing of a customer's item selections and the estimated waiting time;  
a customer subsystem, coupled with said processor subsystem, and including: a display for displaying shopping item data to a customer; customer input means for receiving customer item selection inputs to be stored by said selection data storage means; and customer printing means responsive to said printing controlling means for printing a customer copy of the customer item selections and said waiting time; and  
an employee subsystem, coupled with said processing subsystem, and including employee printing means responsive to said printing controlling means for printing an employee copy of said customer item selections;  
said means for computing and storing an estimated waiting time including means for accumulating a variable workload based on a prior workload, the number of items ordered by customers, the number of employees working on filling orders, and a periodic time decrement, and means for computing and storing said estimated waiting time as a function of said variable workload.

**4,959,687**  
**BIAS POWER SOURCE CONTROLLER FOR AN IMAGE FORMING APPARATUS**  
Eiichi Katoh; Hitoshi Hoshi; Tsunehide Takahashi, and Koichi Asakura, all of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan  
Filed Aug. 5, 1988, Ser. No. 228,462  
Claims priority, application Japan, Aug. 13, 1987, 62-200972  
Int. Cl.<sup>5</sup> G03G 21/00  
U.S. Cl. 355-214 3 Claims

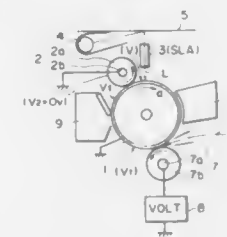


1. A controller for an image forming apparatus for controlling a bias power source to vary the level of a bias voltage outputted by said bias power source in order to provide desired image density, said controller comprising:  
density selecting means for selecting a desired image density;  
trigger pulse generating means for generating a trigger pulse signal for triggering said bias power source so that bias power source outputs a bias voltage corresponding to said selected image density;  
control means for controlling the pulse width of said trigger pulse signal so that the pulse width conforms to said selected image density; and  
means for causing said bias voltage to have a discharge time constant and means for providing a period of said trigger pulse signal which period is much smaller than said discharge time constant so that any ripples in said bias voltage which are ascribable to the modulation of said pulse width of said trigger pulse are substantially negligible.

**4,959,688**  
**IMAGE FORMING APPARATUS HAVING CHARGING AND DISCHARGING MEANS**  
Noribumi Koltabashi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Oct. 19, 1988, Ser. No. 259,700  
Claims priority, application Japan, Oct. 19, 1987, 62-263106; Dec. 28, 1987, 62-336342  
Int. Cl.<sup>5</sup> G03G 15/02, 15/16  
U.S. Cl. 355-219 49 Claims

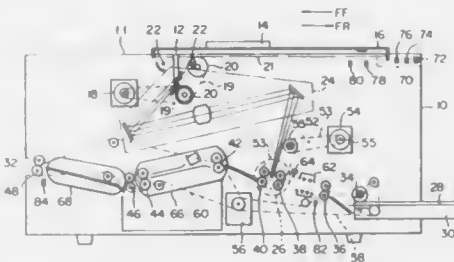
1. An image forming apparatus, comprising:  
a movable image bearing member;  
latent image forming means for forming a latent image on a surface of said image bearing member;  
contact type charging means contactable to said image bearing member for charging said image bearing member before the latent image is formed on said image bearing member by said latent image forming means; and

discharging means contactable to the surface of said image bearing member at a position between a latent image forming station having said latent image forming means and a charging station having said charging means where said image bearing member is electrically charged to



discharge the surface of said image bearing member to provide a surface potential of said image bearing member having an absolute value which is not less than an absolute value of a charge starting voltage  $V_{TH}$  (V) of said image bearing member.

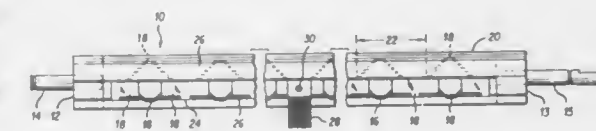
**4,959,689**  
**ELECTROPHOTOGRAPHIC PLATE-MAKING MACHINE WITH INDEPENDENT MOTORS FOR MOVING THE COPY HOLDER, CONVEYING ROLLERS AND FOCUS REGION ROLLERS**  
Nobuyoshi Hatori; Tamio Iwamoto, both of Tokyo, and Akira Kobashikawa, Okinawa, all of Japan, assignors to Iwatsu Electric Co., Ltd., Tokyo, Japan  
Filed Oct. 26, 1989, Ser. No. 428,069  
Claims priority, application Japan, Oct. 29, 1988, 63-271973  
Int. Cl.<sup>5</sup> G03G 15/28, 21/00  
U.S. Cl. 355-233 11 Claims



1. An electrophotographic plate-making machine comprising:  
a casing having a wall means provided with a slit for allowing a light beam to pass therethrough, a feeding means for feeding a sensitive paper, and an outlet for a treated sensitive paper;  
a copy holder arranged on said wall means and movable toward and away from said slit;  
a first electric drive motor operatively connected to and able to move said copy holder;  
a light source adapted for effecting a scanning exposure and arranged in said casing to direct a light beam on to a copy carried by said copy holder;  
an optical unit arranged in said casing so that a light beam reflected at said copy passed through said optical unit and is focused at a focus region;  
means for conveying a sensitive paper from said feeding means to said outlet along a predetermined travel path through said focus region, said conveying means comprising a plurality of conveying roller means arranged along said travel path and at least one focus region roller means arranged at said focus region in series with said conveying roller means, said focus region roller means being operative independently of said conveying roller means;

a second electric drive motor operatively connected to and able to move said conveying roller means; and  
a third electric drive motor operatively connected to and able to move said focus region roller means;  
whereby said first, second and third electric drive motor, respectively, can move said copy holder, said conveying roller means and said focus region roller means independently of each other, so that a first scanning exposure can be carried out on a portion of a sensitive paper carried by said focus region roller means while said copy holder is moved in one direction toward said slit, said copy holder is returned in the reverse direction while said sensitive paper is held at said focus region, and then a second scanning exposure can be carried out on the remaining portion of the sensitive paper while said copy holder is again moved in one direction toward said slit.

**4,959,690**  
**PADDLE WHEEL CROSS-MIXER**  
John W. Trainor, Vestal, and Bruce E. Holtje, Castle Creek, both of N.Y., assignors to Imagitek, Inc., Binghamton, N.Y.  
Filed Feb. 6, 1989, Ser. No. 307,317  
Int. Cl.<sup>5</sup> G03G 15/08  
U.S. Cl. 355-245 8 Claims



1. A mixer for developer mixture in a photocopier, comprising:  
a rod shaped body with means for rotation about a longitudinal axis of said body;  
at least a first and a second row of mixing baffles, said rows of mixing baffles being parallel to said longitudinal axis;  
at least two lifting plates, said lifting plates being parallel to said longitudinal axis; and  
wherein said rows of mixing baffles are alternated with said lifting plates whereby said mixture after being lifted by one of said lifting plates flows over said first row of baffles and then directly over said second row of baffles.

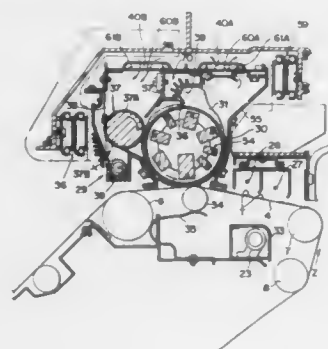
**4,959,691**  
**MAGNETIC BRUSH FORMING DEVICE FOR IMAGE GENERATING APPARATUS**  
Tsumori Satoh, Yokosuka, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan  
Filed Dec. 9, 1988, Ser. No. 281,753  
Claims priority, application Japan, Dec. 11, 1987, 62-313490; Mar. 24, 1988, 63-068300  
Int. Cl.<sup>5</sup> G03B 9/40, 9/06  
U.S. Cl. 355-246 12 Claims

1. A magnetic brush forming device for use in an image generating apparatus, comprising:  
a brush carrier for carrying an agent containing a carrier and a toner and transferring the agent while forming a magnetic brush of the agent;



a limiting member for limiting the thickness of a layer of said agent carried on said brush carrier, said limiting member being of a hollow structure for allowing air to flow therein;

wherein said brush carrier serves as a component in a rotational assembly in a magnetic brush developing device and comprises a sleeve of a non-magnetic material having opposite ends supported by sleeve support means, said rotational assembly comprising a through member extending axially through said sleeve, a magnet on said through



member, and through member support means supporting opposite ends of said through member, said sleeve and said through member being relatively rotatable, and said opposite ends of said sleeve communicating with ambient air; and

wherein said opposite ends of said sleeve are rotatably supported respectively on side plates, said magnet being mounted on said through hole in a region thereof positioned within said sleeve, said opposite ends of said through member projecting out of said opposite ends and being fixed to said lateral plates.

#### 4,959,692 DEVELOPING DEVICE WITH RETRACTABLE CUTOFF MEMBER

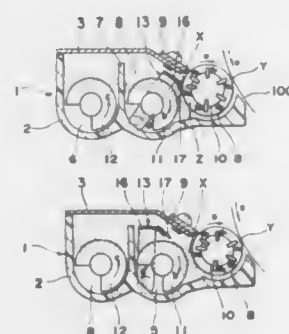
Yuji Hayashi; Susuma Sakakibara, and Katsumi Maeda, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 9, 1988, Ser. No. 282,449

Claims priority, application Japan, Dec. 11, 1987, 62-314428  
Int. Cl.<sup>3</sup> G03G 15/09

U.S. Cl. 355—253

6 Claims



1. A developing device comprising:
  - a developing sleeve rotatably provided in the vicinity of an electrostatic latent image support member;
  - a supply means for supplying developer to the peripheral surface of said developing sleeve;
  - a bristle height regulating member for regulating amount of the developer transported, according to rotation of said

developing sleeve, on the peripheral surface of said developing sleeve towards a developing region where said developing sleeve confronts said electrostatic latent image support member;

a removal means for removing from the peripheral surface of said developing sleeve the developer having passed through the developing region;

a cutoff member for cutting off supply of the developer from said supply means to said developing sleeve, said cutoff member being so provided as to be retractably projected into a developer supply region defined between said developing sleeve and said supply means; and

a magnet member which is fixedly provided in said developing sleeve and includes a developing magnetic pole confronting said electrostatic latent image support member, a first magnetic pole confronting said bristle height regulating member and a second magnetic pole confronting the developer supply region, said second magnetic pole having a polarity identical with that of said first magnetic pole such that the developer is continuously held in an erect state on said developing sleeve by said first and second magnetic poles.

#### 4,959,693 DUPLEX REPRODUCING APPARATUS WITH DEVICE FOR COOLING AND CONVEYING FUSED TONER IMAGE

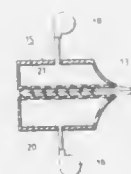
Teruaki Mitsuya, Katsuta; Takao Kumasaka, Takahagi; Takao Umeda, Mito; Yasuro Hori, Katsuta; Ikuo Shimokobe, Katsuta, and Nobuyoshi Hoashi, Katsuta, all of Japan, assignors to Hitachi, Ltd. and Hitachi Koki Co., Ltd., both of Tokyo, Japan

Filed Nov. 3, 1988, Ser. No. 266,842

Claims priority, application Japan, Nov. 10, 1987, 62-282179  
Int. Cl.<sup>3</sup> G03G 15/20

U.S. Cl. 355—290

9 Claims



1. A duplex reproducing apparatus comprising an image forming station, a fixing station and an inversion recording sheet carrying passage, a toner image is generated on a first face of a recording sheet in said image forming station, the toner image being fused, solidified and fixed on the recording sheet in said fixing station, and the recording sheet is turned over through said inversion recording sheet carrying passage and is fed again into said image forming station thereafter to generate a second toner image on a second face of the recording sheet, the second toner image being fused, solidified and fixed on the recording sheet in said fixing station,

said duplex reproducing apparatus further comprising support means for carrying the recording sheet from said fixing station while supporting the recording sheet out of contact with any solid members, the support means including means for providing an air stream which carries

and cools the recording sheet and the toner image thereon until the toner image on the recording sheet is solidified.

#### 4,959,694 SEMICONDUCTOR HETEROSTRUCTURES WITH SIGE MATERIAL

Michael A. Gell, Ipswich, England, assignor to British Telecommunications public limited company, England

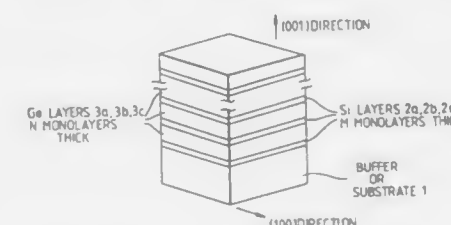
Filed Dec. 23, 1988, Ser. No. 288,828

Claims priority, application United Kingdom, Dec. 23, 1987, 8729953; Mar. 28, 1988, 8807350; Jul. 27, 1988, 8817884; Aug. 25, 1988, 8820150

Int. Cl.<sup>3</sup> H01L 29/165

U.S. Cl. 357—16

23 Claims



1. A semiconductor device comprising a short-period superlattice of alternating layers of first and second materials of different compositions within the Si/Ge system grown epitaxially on an (100) oriented substrate, the first material layers containing substantially more silicon than the second, the first material layers being M monolayers thick, the second material layers being N monolayers thick, M being smaller than N.

#### 4,959,695 METHOD AND APPARATUS FOR FORMING A MULTICOLOR PICTURE BY ELECTROPHOTOGRAPHY

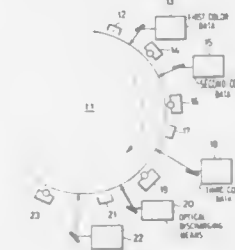
Katsuhiko Nishimura; Kazuyuki Shinbo, and Masahiro Kita, all of Tokyo, Japan, assignors to Asahi Kogyo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 9, 1987, Ser. No. 36,512

Claims priority, application Japan, Apr. 9, 1986, 61-81895  
Int. Cl.<sup>3</sup> G03G 15/01, 15/02

U.S. Cl. 355—327

8 Claims



1. An electrographic method for forming a multicolor picture, comprising the steps of:
  - forming a first color image on a photosensitive material by applying first color data to said photosensitive material and developing said photosensitive material, thereby causing first color toner to adhere to said photosensitive material;
  - forming a second color image on said photosensitive material by applying second color data to said photosensitive material and developing said photosensitive material, thereby causing second color toner to adhere to said photosensitive material;
  - forming a third color image on said photosensitive material

by applying third color data to said photosensitive material and developing said photosensitive material, thereby causing third color toner to adhere to said photosensitive material;

then discharging all of a surface of said photosensitive material to decrease a surface potential thereof;

recharging said discharging surface; and forming a fourth color image on said recharged surface of said photosensitive material by applying fourth color data to said recharged surface and developing said photosensitive material, thereby causing fourth color toner to adhere to said photosensitive material already having said first, second and third color toners adhered thereto,

wherein at least one of said first, second and third color images is formed by a developing process using negatively charged toner and at least another one of said first, second and third color images is formed by a developing process using positively charged toner.

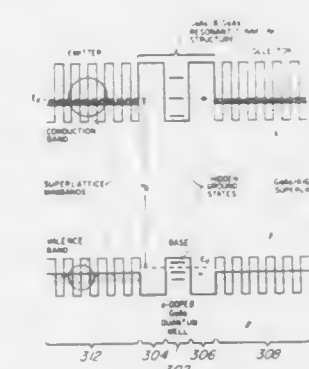
#### 4,959,696 THREE TERMINAL TUNNELING DEVICE AND METHOD

William R. Frensley, Richardson, and Mark A. Reed, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 231,622, Aug. 8, 1988, which is a continuation of Ser. No. 825,720, Jan. 31, 1986, abandoned, which is a continuation-in-part of Ser. No. 768,542, Aug. 23, 1985, abandoned. This application Oct. 26, 1988, Ser. No. 263,085

Int. Cl.<sup>3</sup> H01L 29/161, 29/205, 29/225  
U.S. Cl. 357—16

6 Claims



1. A resonant tunneling device, comprising:
  - (a) a narrow bandgap semiconductor material quantum well;
  - (b) first and second spaced apart, wide bandgap semiconductor material tunneling barriers abutting said well;
  - (c) an emitter abutting said first tunneling barrier, said emitter having a superlattice of alternating layers of said narrow bandgap semiconductor material and said wide bandgap semiconductor material;
  - (d) a collector abutting said second tunneling barrier; and
  - (e) a base in electrical communication with said well to inject and withdraw carriers from said well to control resonant tunneling of carriers from said emitter through a subband in said well into said collector.

4,959,697  
SHORT CHANNEL JUNCTION FIELD EFFECT  
TRANSISTOR

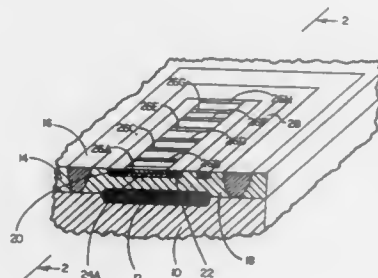
John S. Shier, Apple Valley, and Matthew F. Schmidt, Bloomington, both of Minn., assignors to VTC Incorporated, Bloomington, Minn.

Continuation of Ser. No. 221,524, Jul. 20, 1988, abandoned. This application Feb. 20, 1990, Ser. No. 481,803

Int. Cl.<sup>5</sup> H01L 29/80

U.S. Cl. 357—22

2 Claims



1. A rapid switching junction field effect transistor incorporated into a first conductivity type epitaxial layer of an integrated circuit, the junction field effect transistor comprising:
- a gate region formed from an electrically isolated portion of the epitaxial layer and having a surface thereon;
  - a pair of spaced-apart regions of a second conductivity type extending into the gate region from the surface thereof;
  - a plurality of subsurface channels of the second conductivity type extending between the pair of spaced-apart regions of the second conductivity type, the subsurface channels being spaced from each other by segments of the first conductivity type gate region;
  - a plurality of upper gate regions of an enhanced first conductivity type, each upper gate region being located between a subsurface channel and the surface wherein each upper gate region is vertically aligned with and adjacent its respective subsurface channel;
  - a diode junction between each upper gate region and its respective subsurface channel;
  - an enhanced first conductivity type gate contact region extending from the surface of the gate region into a region of the gate region at an area laterally spaced from the pair of spaced-apart regions of the second conductivity type and the upper gate regions; and
  - a buried layer of an enhanced first conductivity type underlying the plurality of subsurface channels and the enhanced first conductivity type gate contact region;
- electrodes connected to the pair of spaced-apart regions and to the gate contact region to define a source, a drain and a gate; and
- a primary electrical conduction path located between the subsurface channels and the gate contact region through the plurality of upper gate regions, through the segments of the gate region substantially adjacent the subsurface channels and the gate region to the buried layer and through the buried layer and the gate region to the enhanced gate contact region, wherein extension of space charge depletion zones into the subsurface channels occurs primarily from the diode junction between the subsurface channels and the upper gate regions upon application of an appropriate electrical potential to the gate contact region.

4,959,698  
MEMORY CELL OF A SEMICONDUCTOR MEMORY  
DEVICE

Sato Shinichi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

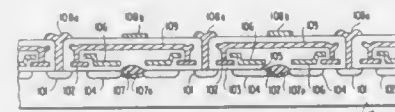
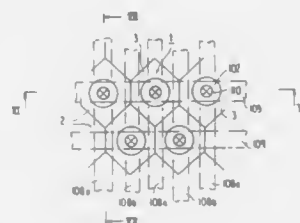
Continuation of Ser. No. 104,921, Oct. 6, 1987, abandoned. This application Jun. 14, 1989, Ser. No. 368,158

Claims priority, application Japan, Oct. 8, 1986, 61-240695; Oct. 22, 1986, 61-252563; Nov. 13, 1986, 61-270711; Nov. 13, 1986, 61-270713

Int. Cl.<sup>5</sup> H01L 27/02, 29/78, 27/10

U.S. Cl. 357—23.6

37 Claims



1. A memory cell in a semiconductor memory device comprising a plurality of memory cells, said memory cell comprising:
- a substrate;
  - a transistor comprising first and second transistor electrodes and a ring-shaped gate electrode;
  - a capacitor comprising first and second capacitor electrodes; an isolating region for isolating said memory cell from adjacent ones of said memory cells; and
  - a gate insulator formed around said first transistor electrode and on a major surface of said substrate;
- wherein:
- said first transistor electrode is formed in said major surface of said substrate;
  - said ring-shaped gate electrode is formed around said first transistor electrode on said major surface of said substrate and is separated from said first electrode by said gate insulator, an inner circumference of said ring-shaped gate electrode overlapping an outer circumference of said first transistor electrode through said gate insulator;
  - said second transistor electrode is formed around said ring-shaped gate electrode in said major surface of said substrate, an inner circumference of said second transistor electrode overlapping an outer circumference of said ring-shaped gate electrode through said gate insulator;
  - said capacitor is formed between said isolating region and said ring-shaped gate electrode and is connected electrically to said transistor; and
  - wherein said first and second transistor electrodes are shaped such that a current path between said first and second transistor electrodes is never parallel to a boundary between said isolating region and a remaining portion of said memory cell.

4,959,699  
HIGH POWER MOSFET WITH LOW ON-RESISTANCE  
AND HIGH BREAKDOWN VOLTAGE

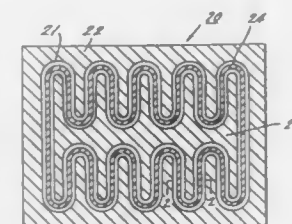
Alexander Lidow, Manhattan Beach, and Thomas Herman, Redondo Beach, both of Calif., assignors to International Rectifier Corporation, El Segundo, Calif.

Continuation of Ser. No. 90,664, Aug. 27, 1987, abandoned, which is a division of Ser. No. 456,813, Jan. 10, 1983, abandoned, which is a division of Ser. No. 232,713, Feb. 9, 1981, Pat. No. 4,376,286, which is a continuation of Ser. No. 951,310, Oct. 13, 1978, abandoned. This application Jun. 22, 1989, Ser. No. 371,678

Int. Cl.<sup>5</sup> H01L 29/68, 29/10, 27/02

U.S. Cl. 357—23.7

24 Claims



1. A high power metal oxide silicon field effect transistor device exhibiting relatively low on-resistance and relatively high breakdown voltage; said device comprising:
- a wafer of semiconductor material having first and second opposing semiconductor surfaces; said wafer of semiconductor material having a relatively lightly doped major body portion for receiving junctions and being doped with impurities of one conductivity type;
  - at least first and second spaced base regions of the opposite conductivity type to said one conductivity type formed in said wafer and extending from said first semiconductor surface to a first depth beneath said first semiconductor surface; the space between said at least first and second base regions defining a common conduction region of one conductivity type at a given first semiconductor surface location;
  - first and second source regions of said one conductivity type formed in each pair of said at least first and second base regions respectively at first and second first surface location to a depth less than said first depth; the outer rim of each of said first and second source regions being laterally spaced along said first semiconductor surface from the lateral outer periphery of its said base region to define first and second channel regions along said first semiconductor surface between each pair of said first and second source regions, respectively, and said common conduction region;
  - source electrode means connected to said source regions;
  - gate insulation layer means on said first surface, disposed at least on said first and second channel regions;
  - gate electrode means on said gate insulation layer means and overlying said first and second channel regions;
  - a drain conductive region remote from said common region and separated therefrom by said relatively lightly doped major body portion;
  - a drain electrode coupled to said drain conductive region; and
  - at least said first base region being a cellular polygonal region; said cellular polygonal region being surrounded by said common conduction region; said first source region having the shape of an annular ring disposed within said cellular polygonal first base region.

4,959,700  
INSULATED GATE FIELD EFFECT TRANSISTOR AND  
ITS MANUFACTURING METHOD

Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 735,697, May 20, 1985, abandoned.

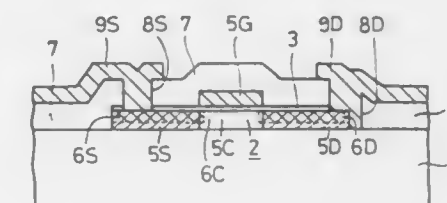
This application Feb. 3, 1988, Ser. No. 153,477

Claims priority, application Japan, May 18, 1984, 59-100250; May 18, 1984, 59-100251; May 18, 1984, 59-100252

Int. Cl.<sup>5</sup> H01L 29/78

U.S. Cl. 357—23.7

9 Claims



1. An insulated gate field effect transistor comprising:
- a non-single-crystalline semiconductor layer formed on a substrate;
  - a gate electrode formed on a portion of the surface of said semiconductor layer;
  - a gate insulated film disposed between said gate electrode and said semiconductor layer;
  - a non-single-crystalline channel region defined within said semiconductor layer just below said gate electrode;
  - a source region and a drain region which are transformed from and defined within said semiconductor layer immediately adjacent to said channel region in an opposed relation, said source and drain regions being crystallized to a higher degree than that of said channel region by selectively irradiating portions of said semiconductor layer using said gate electrode as a mask.

4,959,701  
VARIABLE SENSITIVITY FLOATING GATE  
PHOTOSENSOR

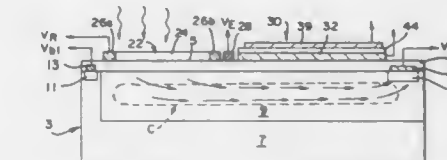
Leroy Colquitt, Jr., Columbia; Fred R. Sutherland, Catoonsville, both of Md., and Edward J. Boling, Newtown, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 1, 1989, Ser. No. 345,871

Int. Cl.<sup>5</sup> H01L 29/78

U.S. Cl. 357—24

21 Claims



1. A floating gate semiconductor device operable in either an enhanced transit speed mode or an enhanced responsivity mode, comprising:
- first and second contiguous layers of semiconductor material of different conductivity types, wherein said first layer includes a drain means at one end for receiving a flow of charges, and a buried channel that directs said flow of charges along a selected depth within said first layer, and
  - a floating gate assembly disposed over said buried channel for detecting changes in the flow of said charges, including a first gate electrode for selectively emanating an electric field that changes the width of the buried channel and hence varies the depth of the buried channel within

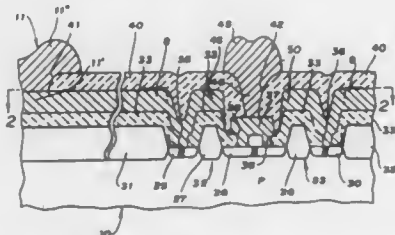




4,959,708

**MOS INTEGRATED CIRCUIT WITH VERTICAL SHIELD**  
Mark F. Henderson, Kokomo, and Thomas H. Manderfield, Greentown, both of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Continuation-in-part of Ser. No. 240,159, Aug. 26, 1988, abandoned. This application Dec. 19, 1988, Ser. No. 286,110  
Int. Cl.<sup>3</sup> H01L 29/06, 27/02, 27/10, 23/48  
U.S. Cl. 357—84 5 Claims



1. A MOS integrated circuit in which a plurality of MOS devices on a substrate are interconnected with each other and with signal, power and ground pads in first and second electric circuits adapted to process separate electric signals with a predetermined electric voltage applied across the power and ground pads and in which a dielectric passivation layer covers the integrated circuit to prevent the entry of ions from the external environment, the first and second electric circuits having signal carrying elements adjacent each other and the passivation layer such that high frequency signals tend to be coupled horizontally between the signal carrying elements through the passivation layer;

the MOS integrated circuit having a first metallization layer under the passivation layer including first portions of the signal, power and ground pads, ground lines from selected ones of the MOS devices to the first portion of the ground pad and a first metal member on the substrate between the signal carrying elements but electrically unconnected therefrom;

the MOS integrated circuit further having a second metallization layer above the passivation layer comprising second portions of the signal, power and ground pads connected to the respective first portions thereof through openings in the passivation layer and a second metal member extending downward through another opening in the passivation layer between the signal carrying elements to the first metal member and extending above the passivation layer and laterally substantially across the width of the signal carrying elements to prevent the horizontal capacitive coupling of the signal carrying elements through the passivation layer;

the MOS integrated circuit further having electrical ground connection means in one of the first and second metallization layers connecting the first and second metal members to the ground pad, whereby the first and second metal members comprise a grounded vertical shield between the signal carrying elements to prevent communication of signals therebetween.

4,959,709

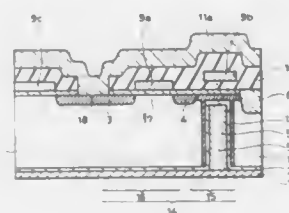
**SEMICONDUCTOR MEMORY DEVICE WITH CAPACITOR ON OPPOSITE SURFACE OF SUBSTRATE**  
Jinzo Watanabe, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 28, 1988, Ser. No. 276,596  
Claims priority, application Japan, Dec. 2, 1987, 62-306135  
Int. Cl.<sup>3</sup> H01L 29/78 8 Claims

U.S. Cl. 357—23.6

1. A semiconductor memory device comprising:  
a semiconductor substrate having a main surface and a surface on the reverse side;

a MOSFET formed on the main surface of said semiconductor substrate; and  
a storage capacity element formed on the surface of the reverse side of said semiconductor substrate, said storage capacity element having one and another electrode,



said one electrode of said storage capacity element being connected to said MOSFET, and  
said another electrode of said storage capacity element being formed on the surface of the reverse side of said semiconductor substrate.

4,959,710

**ELECTRONIC ENDOSCOPE WHEREBY THE POSITION OF THE INSERTABLE PART CAN BE KNOWN BY A TRANSMITTED LIGHT OUTSIDE A BODY**

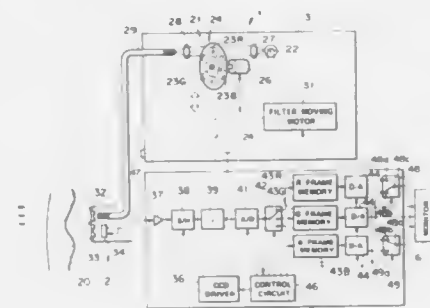
Masao Uehara; Masahide Kanno; Masahiko Sasaki; Katsuyoshi Sasagawa; Akinobu Uchikubo, all of Hachioji; Jun Hasegawa, Hino; Shinji Yamashita, Hachioji; Katsuyuki Saito, Hachioji, and Takehiro Nakagawa, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 16, 1989, Ser. No. 311,541  
Claims priority, application Japan, Mar. 1, 1988, 63-048361; Jul. 28, 1988, 63-188868; Feb. 8, 1989, 1-30643; Feb. 9, 1989, 1-31943

Int. Cl.<sup>3</sup> H04N 7/18

U.S. Cl. 358—98

27 Claims



1. An electronic endoscope apparatus whereby, when a light emitted from an illuminating window provided in a tip part of an insertable part inserted into a body cavity is transmitted out of the body from within the body cavity, the position of said tip part will be confirmed from outside the body, comprising:

an imaging means for producing an image of an inspected part obtained from an observing window provided in the tip part of said insertable part, and for converting this image to an electric signal and outputting it;

an illuminating means for feeding an illuminating light to said imaging means and for adjusting the brightness of the illuminating light when a confirming signal directing the confirmation of the position of the tip part of said insertable part is input;

a signal processing means for processing the electric signal obtained from said imaging means, outputting a video signal which is an ordinary observing picture image signal

of a moving picture in case said confirming signal is not input and outputting a video signal which is a picture image signal different from said ordinary observing picture image signal in case said confirming signal is input; and

a displaying means for receiving said video signal output by said signal processing means and displaying the picture image of the inspected part.

4,959,711

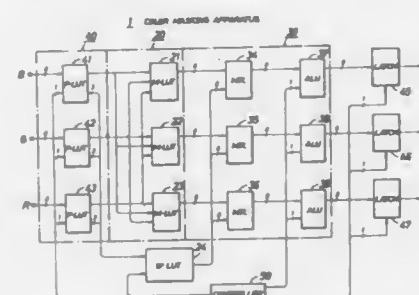
**METHOD AND APPARATUS FOR CORRECTING THE COLOR OF A PRINTED IMAGE**

Po-Chieh Hung, and Tatsuya Kanenawa, both of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan  
Filed Dec. 24, 1987, Ser. No. 137,885

Claims priority, application Japan, Dec. 25, 1986, 61-314636; Apr. 10, 1987, 62-89004; Apr. 10, 1987, 62-89005; Apr. 10, 1987, 62-89006; Apr. 10, 1987, 62-89007; Apr. 10, 1987, 62-89008; Apr. 10, 1987, 62-89009; Jul. 8, 1987, 62-170357  
Int. Cl.<sup>3</sup> H04N 1/46 16 Claims

U.S. Cl. 358—90

16 Claims



1. A color image correction apparatus, comprising:  
means for storing color data representative of a plurality of combinations of colors, each having a respective range of possible values for a designated mode of reproduction, each of said combinations being obtained by combining data selectively spaced within a respective one or respective ones of said ranges and representative of a respective one or respective ones of said colors, each of said combinations having an address corresponding to a respective point in another color system;  
means for calculating color data of the type represented by said combinations from assumed points in said other color system not directly corresponding to any said address, including:  
means for determining a plurality of addresses corresponding to a plurality of points arranged about each said assumed point;  
means for interpolating among a plurality of the color data representative of combinations having the respective corresponding addresses, including means for avoiding changes in hue and means including stored weighting data for weighting the combinations of color data for purposes of interpolation.

4,959,712

**METHOD AND APPARATUS FOR COLOR ADJUSTMENT**

Tohshiyuki Tsuzuki, and Masato Toho, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan  
Filed Oct. 31, 1989, Ser. No. 429,285

Claims priority, application Japan, Nov. 1, 1988, 63-274542  
Int. Cl.<sup>3</sup> H04N 1/387, 1/40, 1/46 4 Claims

U.S. Cl. 358—90

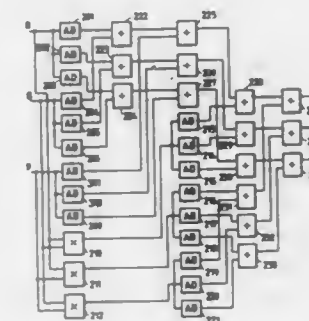
4 Claims

1. In a color image forming apparatus in which output signals of yellow, magenta and cyan are formed from color signals of blue, green, and red that are obtained by separating an image on an original, in forming the output signals, a matrix

masking is performed in which said respective color signals are multiplied by color correction coefficients in a coefficient matrix, thereby to correct irregular absorption of color materials, color adjusting coefficients are added to said correction coefficients corresponding to the respective colors in said coefficients matrix, and coefficients so as to zero the sum of said color adjusting coefficients in each row of said matrix are subtracted from said color signals, thereby to keep a gray level unchanged, and the color materials are outputted on a recording medium in accordance with said output signals, a method for adjusting colors comprising the steps of:

adjusting a red color by obtaining a yellow signal and a magenta signal which are color adjusted through a multiplication of said blue and green color signals by a red color adjusting coefficient;

adjusting a green color by obtaining a yellow signal and a



cyan signal which are color adjusted through a multiplication of said blue and red color signals by a green color adjusting coefficient;

adjusting a blue color by obtaining a magenta signal and a cyan signal which are color adjusted through a multiplication of said green and red color signals by a blue color adjusting coefficient;

adjusting a yellow color by obtaining a yellow signal which is color adjusted through a multiplication of said blue color signals by yellow color adjusting coefficients;

adjusting a magenta color by obtaining a magenta signal which is color adjusted through a multiplication of said green color signals by magenta color adjusting coefficients; and

adjusting a cyan color by obtaining a cyan signal color which is adjusted through a multiplication of said red color signals by cyan color adjusting coefficients.

4,959,713

**HOME AUTOMATION SYSTEM**

Noriaki Morotomi; Yasumasa Endo; Yoshinori Emura; Nobuyoshi Asaka, all of Fujisawa, and Hideki Inoue, Kamakura, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Oct. 10, 1989, Ser. No. 418,631

Int. Cl.<sup>3</sup> H04N 7/18

U.S. Cl. 358—108

17 Claims

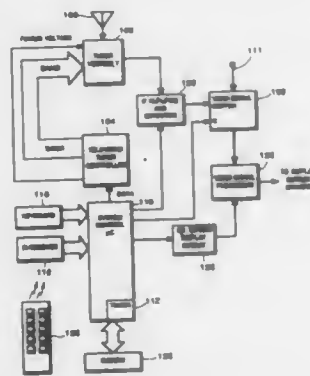
1. A home automation system which reproduces on a television receiver in a TV receiver block inside the residence the voices from a voice collection circuit and the video images from a telephone camera provided in an entrance unit, and which comprises the entrance unit and the TV receiver block being connected with the entrance unit via a home bus laid throughout the residence in this system,

said entrance unit including a TV modulator which modulates the video signal from a TV camera and the audio signal from a voice collection circuit, an audio signal receiver which receives the audio signal transmitted over the home bus, a speaker to project the output signal from the audio signal receiver, an interface unit which commu-





**4,959,720**  
**TUNER CONTROL APPARATUS HAVING**  
**TUNE-BY-LABEL CAPABILITY**  
 David J. Duffield, Indianapolis, and Billy W. Beyers, Jr., Green-  
 field, both of Ind., assignors to RCA Licensing Corporation,  
 Princeton, N.J.  
 Filed Apr. 6, 1989, Ser. No. 334,068  
 Int. Cl.<sup>3</sup> H04N 5/50, 5/44, 9/74  
 U.S. Cl. 358—191.1 **8 Claims**

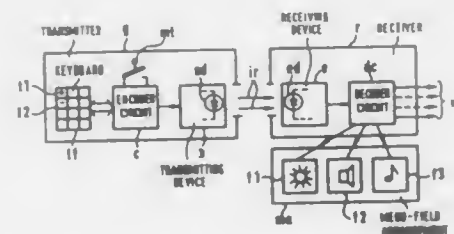


1. A signal selection system, comprising:  
 an RF input terminal for receiving a plurality of RF signals;  
 tuning means coupled to said RF input terminal for selecting  
 a particular RF signal from said plurality of RF signals in  
 response to a tuner control signal;  
 means, coupled to said tuning means, for detecting said RF  
 signal to produce a detected baseband video signal;  
 a baseband input terminal for receiving a second baseband  
 video signal;  
 selection means having first and second input terminals for  
 receiving said detected baseband video signal and said  
 second baseband signal, respectively, said selection means  
 selecting one of said baseband video signals at said first  
 and second input terminals in response to a selection sig-  
 nal;  
 memory means for storing label data representative of labels  
 comprising at least one alphabetical character, and tuning  
 data associated with respective ones of said RF signals for  
 tuning said RF signals, wherein one of said labels is associ-  
 ated with said baseband input terminal for selecting said  
 baseband signal;  
 data entry means for generating said label data and said  
 tuning data under user control; and  
 control means coupled to said data entry means and said  
 memory means for storing said label data and said tuning  
 data in said memory means during a programming mode,  
 said control means also being coupled to said selection  
 means, said control means retrieving said data from said  
 memory means and generating said selection control sig-  
 nal for selecting one of said baseband video signals in  
 response to label data input by a user.

**4,959,721**  
**REMOTE CONTROL SYSTEM WITH MENU DRIVEN**  
**FUNCTION SELECTION**  
 Ljubomir Micic, Freiburg, and Peter M. Flamm, March-Buch-  
 heim, both of Fed. Rep. of Germany, assignors to Deutche  
 IIT Industries GmbH, Freiburg, Fed. Rep. of Germany  
 Filed Jul. 17, 1989, Ser. No. 380,401  
 Claims priority, application European Pat. Off., Aug. 6, 1988,  
 88112829[U]

Int. Cl.<sup>3</sup> H04N 5/44 **7 Claims**  
 U.S. Cl. 358—194.1  
 1. A remote control system comprising:  
 a remote control transmitter having a transmitting device  
 that transmits remote control signals, an encoder circuit  
 that controls the signals transmitted by said transmitting

device, and manual control elements that control said  
 encoder circuit; and  
 a remote control receiver having a receiving device that  
 receives said remote control signals and a decoder circuit  
 that decodes said received remote control signals, said  
 remote control receiver further comprising a signal  
 source that generates a positioning signal that is directed  
 toward said remote control transmitter;  
 wherein said remote control transmitter comprises at least  
 one menu key, which, when activated causes said encoder  
 and said transmitting device to transmit a predetermined  
 remote control signal to said remote control receiver to  
 cause said remote control receiver to switch to a menu  
 mode, said remote control receiver causing at least first  
 and second menu fields to be displayed in said menu  
 mode, said first and second fields being individually  
 selectable in response to further remote control signals

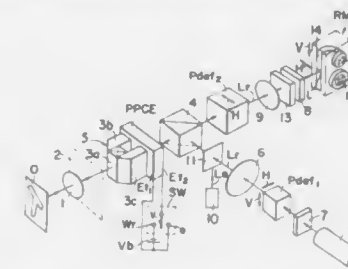


from said remote control transmitter such that a selected  
 one of said first and second menu fields is indicated  
 visually, said remote control transmitter further compris-  
 ing a position-sensing device having a plurality of sensing  
 elements which are selectively activated by said position-  
 ing signal generated by said signal source when aligned  
 with said positioning signal, said position-sensing device  
 generating an output signal responsive to the activation of  
 one of said sensing elements to cause said encoder to  
 generate a remote control signal identifying said one of  
 said sensing elements to select one of said first and second  
 menu fields; and  
 wherein when said manual control elements of said remote  
 control transmitter are activated while said remote con-  
 trol receiver is in said menu mode, a remote control sig-  
 nal is transmitted to said remote control receiver to cause  
 said remote control receiver to generate a control com-  
 mand assigned to the visually indicated menu field.

**4,959,722**  
**IMAGE PICKUP DEVICE USING A PHOTO-TO-PHOTO**  
**CONVERSION ELEMENT**  
 Itsuo Takanashi, Kamakura; Shintaro Nakagaki, Fujisawa;  
 Hirohiko Shimonaga; Tsutao Asakura, both of Yokohama, and  
 Masato Furuya, Yokosuka, all of Japan, assignors to Victor  
 Company of Japan, Ltd., Yokohama, Japan  
 Continuation-in-part of Ser. No. 139,005, Dec. 29, 1987, Pat. No.  
 4,831,452. This application Jan. 24, 1989, Ser. No. 301,188  
 Claims priority, application Japan, Jan. 25, 1988, 63-13944  
 Int. Cl.<sup>3</sup> H04N 5/30 **3 Claims**

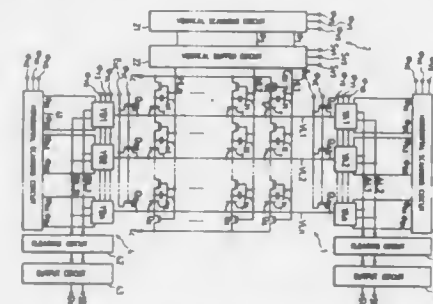
U.S. Cl. 358—211  
 1. An image pickup device comprising:  
 a photo-to-photo conversion element comprising at least a  
 photoconductive layer member, a dielectric mirror, and  
 an optical modulation layer member which are disposed  
 between two transparent electrodes;  
 a first image formation means for forming an optical image  
 of an object on said photo-to-photo conversion element;  
 a second image formation means for scanning, in two direc-  
 tions substantially perpendicular to each other, optical  
 image information corresponding to said optical image of  
 said object using a light beam and for forming the light  
 beam reading out said optical image information into a  
 scanning light beam, a scanning locus of which on a plane  
 becomes a line; and

recording medium transportation means for allowing a re-  
 cording surface of a recording medium to be located on  
 said plane where a linear image of said optical information



is formed, and for continuously moving said recording  
 medium in a direction having an angle with respect to said  
 line of the scanning locus.

**4,959,723**  
**SOLID STATE IMAGE PICKUP APPARATUS HAVING**  
**MULTI-PHASE SCANNING PULSE TO READ OUT**  
**ACCUMULATED SIGNAL**  
 Seiji Hashimoto, Yokohama, Japan, assignor to Canon Kabu-  
 shiki Kaisha, Tokyo, Japan  
 Filed Nov. 2, 1988, Ser. No. 266,158  
 Claims priority, application Japan, Nov. 6, 1987, 62-279390;  
 Dec. 21, 1987, 62-321423  
 Int. Cl.<sup>3</sup> H04N 3/14 **8 Claims**

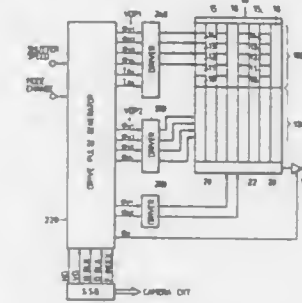


1. A solid state image pickup apparatus comprising a plural-  
 ity of photoelectric converting elements for accumulating  
 optical information to be read out to the outside by multi-phase  
 scanning pulses, wherein said multi-phase scanning pulses scan  
 temporary accumulation capacitors to read out to the outside  
 said optical information accumulated therein.

**4,959,724**  
**SOLID-STATE IMAGING APPARATUS AND METHOD**  
**OF DRIVING THE SAME**  
 Kazuhiko Ueda, Yokohama, Japan, assignor to Victor Company  
 of Japan, Ltd., Japan  
 Filed May 26, 1989, Ser. No. 357,498  
 Claims priority, application Japan, May 27, 1988, 63-129986  
 Int. Cl.<sup>3</sup> H04N 3/14 **2 Claims**

U.S. Cl. 358—213.29  
 1. A solid-state imaging apparatus comprising:  
 photoelectric conversion elements arranged in columns and  
 are further divided into rows of an A-field group and a B-field  
 of every frame of a video signal;  
 vertical transfer sections connected to the respective col-  
 umns of the photoelectric conversion elements;  
 storage sections connected to the respective vertical transfer  
 sections;  
 a horizontal transfer section connected to the storage sec-  
 tions;  
 a drain connected to the vertical transfer sections;  
 first means for transferring A-field signal charges from the

A-field group of the photoelectric conversion elements to  
 the vertical transfer sections;  
 second means for, after the A-field signal charges are trans-  
 ferred to the vertical transfer sections by the first means,  
 draining the A-field signal charges from the vertical trans-  
 fer sections to the drain;  
 third means for, after the A-field signal charges are drained  
 from the vertical transfer sections by the second means,  
 transferring B-field signal charges from the B-field group  
 of the photoelectric conversion elements to the vertical  
 transfer sections;  
 fourth means for, after the B-field signal charges are trans-  
 ferred to the vertical transfer sections by the third means,  
 draining the B-field signal charges from the vertical trans-  
 fer sections to the drain;  
 fifth means for, during a first vertical blanking period of the  
 video signal which starts after the B-field signal charges  
 are drained from the vertical transfer sections by the  
 fourth means, transferring A-field signal charges from the  
 A-field group of the photoelectric conversion elements to  
 the vertical transfer sections;  
 sixth means for, during the first vertical blanking period,



after the A-signal charges are transferred to the vertical  
 transfer sections by the fifth means, transferring the A-  
 field signal charges from the vertical transfer sections to  
 the storage sections;  
 seventh means for, during the first vertical blanking period,  
 after the A-signal charges are transferred to the storage  
 sections by the sixth means, transferring B-field signal  
 charges from the B-field group of the photoelectric con-  
 version elements to the vertical transfer sections;  
 eighth means for, after the first vertical blanking period and  
 before a second vertical blanking period of the video  
 signal, transferring the A-field signal charges from the  
 storage sections to the horizontal transfer section and  
 outputting the A-field signal charges from the horizontal  
 transfer section as an A-field portion of the video signal;  
 ninth means for, during the second vertical blanking period,  
 transferring the B-field signal charges from the vertical  
 transfer sections to the storage sections; and  
 tenth means for, after the second vertical blanking period  
 and before a third vertical blanking period of the video  
 signal, transferring the B-field signal charges from the  
 storage sections to the horizontal transfer section and  
 outputting the B-field signal charges from the horizontal  
 transfer section as a B-field portion of the video signal.

**4,959,725**  
**METHOD AND APPARATUS FOR PROCESSING**  
**CAMERA AN IMAGE PRODUCED BY A VIDEO**  
**CAMERA TO CORRECT FOR UNDESIRABLE MOTION OF**  
**THE VIDEO CAMERA**  
 Gary Mandle, Redwood City, Calif., assignor to Sony Corpora-  
 tion, Tokyo, Japan  
 Filed Jul. 13, 1988, Ser. No. 218,626  
 Int. Cl.<sup>3</sup> H04N 5/232 **28 Claims**

U.S. Cl. 358—222  
 1. A system for processing an image generated by a video  
 camera, including:



1. An electrographic printing apparatus, comprising:  
a housing,  
a photoconductive member,

means for uniformly charging said photoconductive, first and second means for selectively discharging said photoconductive member to produce a latent electrostatic image on said photoconductive member, means for developing said latent electrostatic image, and means for transferring the developed electrostatic image to copy material in a transfer zone, a paper path operative to transport copy material from a source of copy material, through said transfer zone, and to an exit of said housing, wherein said photoconductive member comprises a photoconductive belt horizontally disposed in said housing, said first and second selective discharge means are disposed above said photoconductive belt, and said transfer zone is located on a lower side of said photoconductive belt.

4,959,732

# STILL VIDEO SIGNAL PLAYBACK APPARATUS FOR CONVERTING AN INPUT VIDEO SIGNAL INTO A NOISE CANCELLED, DROP-OUT COMPENSATED PLAYBACK SIGNAL

Akio Seto, and Kazuo Okada, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

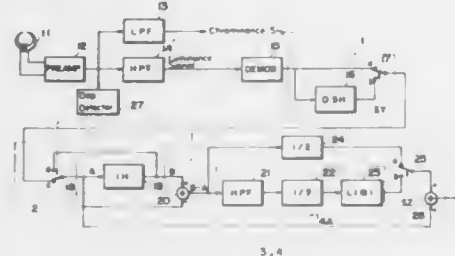
Filed Nov. 29, 1988, Ser. No. 277,327

Claims priority, application Japan, Nov. 30, 1987, 62-300064

Int. Cl.<sup>5</sup> H04N 5/94

U.S. Cl. 358—336

16 Claims



1. A still video signal playback apparatus for converting a video signal, recorded via field recording to frame recording, into a playback signal comprising:  
drop-out detector means, coupled to the video signal, for outputting a drop-out detection signal when a drop-out is detected;  
drop-out compensator means including  
first switch means, coupled to the video signal, for providing a first switch output signal, and  
1H delay means, wherein H refers to a horizontal scanning period, for delaying said first switch output signal by a period of 1H and for outputting a first delayed signal, said first switch means outputting as said first switch output signal said first delayed signal in response to said drop-out detection signal and the video signal otherwise; and noise cancellation means including  
first arithmetic means for subtracting said first switch output signal from said first delayed signal to output a first difference signal,  
noise component extract means, coupled to said first difference signal, for extracting and outputting a noise component signal from said first difference signal,  
attenuator means, coupled to and attenuating said first difference signal and said noise component signal according to a predetermined ratio, to output an attenuated first difference signal,  
second switch means, coupled to and selectively outputting as a second switch output signal, said attenuated first difference signal or said attenuated noise component signal based on whether the video signal was recorded via field recording or frame recording, and  
second arithmetic means, coupled to and adding said first

switch output signal and said second switch output signal to output the playback signal.

4,959,733

# MOTOR ROTATION CONTROL APPARATUS WITH MOTOR ROTATIONAL FREQUENCY MEMORY

Yoshio Miura; Motoyuki Suzuki; Akio Fukushima, and Yonemitsu Mori, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

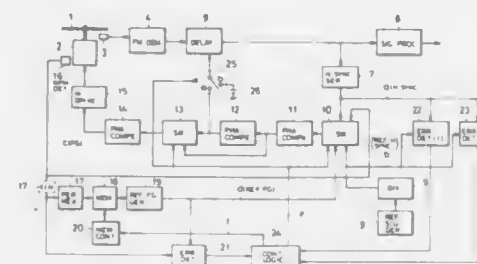
Filed May 16, 1988, Ser. No. 194,303

Claims priority, application Japan, May 18, 1987, 62-118770

Int. Cl.<sup>5</sup> H04N 5/76

U.S. Cl. 358—338

20 Claims



1. An apparatus for controlling the rotation of a motor to rotate a recording medium where an information signal and synchronizing signal are recorded, comprising:  
means for reproducing the information signal and the synchronizing signal recorded on said recording medium;  
synchronizing signal separating means connected to said reproducing means for separating the synchronizing signal from the reproduced signal;  
means for generating a reference synchronizing signal;  
means for generating a phase error signal by phase-comparing the synchronizing signal from said separating means with the reference synchronizing signal from said signal generating means;  
means for controlling the rotation of the motor in such a manner as to eliminate the phase error in accordance with the phase error signal obtained from said phase error signal generating means;  
means for detecting the rpm or rotational frequency of said motor;  
memory means for sequentially storing the data relative to the rotational frequency obtained from said detecting means;  
means for generating a reference frequency signal on the basis of the rotational frequency data stored in said memory means; and  
first detecting means for detecting the phase error between the synchronizing signal separated by said synchronizing signal separating means and the reference synchronizing signal generated from said reference synchronizing signal generating means;  
wherein, when said phase error is greater than a predetermined value on the basis of the output signal of said first detecting means, the rotational frequency detected by said rpm detecting means is phase-compared with the reference frequency signal produced from said reference frequency signal generating means, and the phase error signal thus obtained is fed to said motor rotation control means for uniformly charging said photoconductive member,

4,959,734

# PRESTORED RESPONSE PROCESSING SYSTEM FOR BRANCHING CONTROL OF INTERACTIVE VIDEO DISC SYSTEMS

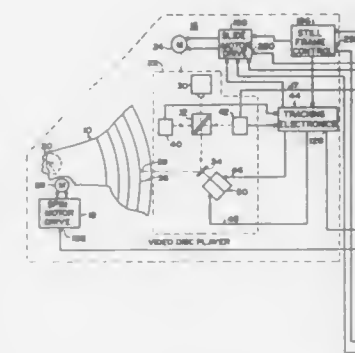
Richard W. Foster, Huntsville, Ala., assignor to Interactive Video Disc Systems, Inc., Huntsville, Ala.

Continuation of Ser. No. 30,453, Mar. 25, 1987, abandoned, which is a continuation of Ser. No. 692,654, Jan. 16, 1985, abandoned, which is a continuation-in-part of Ser. No. 311,939, Oct. 16, 1981, abandoned, which is a continuation of Ser. No. 29,282, Apr. 11, 1979, abandoned, which is a continuation-in-part of Ser. No. 18,583, Mar. 8, 1979, abandoned. This application Jan. 6, 1989, Ser. No. 294,767

Int. Cl.<sup>5</sup> H04N 5/76

U.S. Cl. 358—341

8 Claims



1. The method of production and reproduction of a recording comprising the steps of:  
(A) recording on a recording medium a plurality of spaced segments wherein at least one of said segments includes a combination of video and audio signals, and generally co-located with said video and audio signals there is a series of sequentially recorded, digitally encoded, signals, and wherein said last-named signals comprise sets of two signals, a first signal representative of a selected response or answer, and a second signal designative of a separate and remote location on said recording medium;  
(B) reproducing at least video and audio signals from at least a part of one of said segments of said recording medium on a digitally controlled positionable playback device and then displaying a still frame of said segment;  
(C) generating a signal external to said recording medium, which signal is of the character of said first, response or answer, signal, and storing the generated signal;  
(D) utilizing the externally generated, stored signal to direct reproduction from selected locations on said recording medium, this time reproducing a series of said sets of said two signals;  
(E) during reproduction of step (D), comparing said externally generated signal with a series of said first response signals from said recording medium;  
(F) upon there occurring a selected correlation with a particular said first signal during step (E), obtaining, as an output, a said second location signal; and  
(G) controlling said playback device to locate and reproduce from a said segment of said recording medium identified by said second location signal identified by step (F).

4,959,735

# RECORDING APPARATUS WITH REMAINING TIME INDICATION DISPLAY

Hisashi Kawai, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 159,232, Feb. 23, 1988, abandoned.

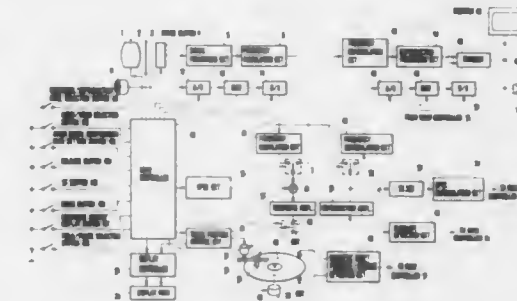
This application Nov. 7, 1989, Ser. No. 432,567

Claims priority, application Japan, Feb. 24, 1987, 62-041863

Int. Cl.<sup>5</sup> H04N 5/76

U.S. Cl. 358—342

25 Claims



1. A recording apparatus having selectable modes of recording in storing means, including a first mode of recording at least sound or audio information and a second mode of recording information other than said audio information, comprising:  
(a) detecting means for detecting an amount of unrecorded part in said storing means for recording; and  
(b) control means for varying the mode of displaying the amount of unrecorded part in said storing means in accordance with a selection made between said first and second recording modes.

4,959,736

# IMAGE SIGNAL PROCESSING METHOD AND APPARATUS WITH ELONGATED PICTURE ELEMENTS

Masayuki Mino, and Osamu Yamada, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 29, 1988, Ser. No. 291,565

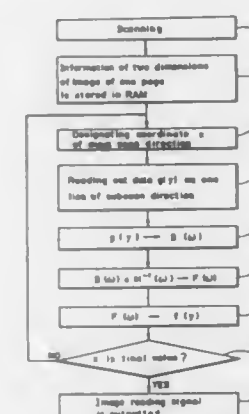
Claims priority, application Japan, Dec. 29, 1987, 62-334025;

Jul. 8, 1988, 63-171637

Int. Cl.<sup>5</sup> H04M 1/40

U.S. Cl. 358—471

11 Claims

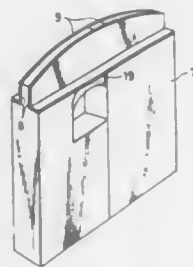


1. An image signal processing method for an image reader which reads an image of a document by scanning the document with the use of a CCD linear image sensor, wherein CCD picture elements are aligned in a main scan direction, each of which has a photosensitive area elongated in a subscan direction.



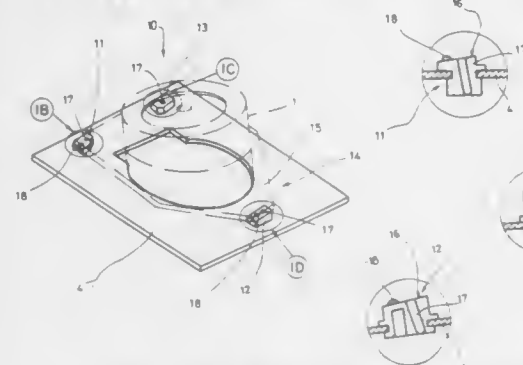
1. A magnetic head comprising a pair of magnetic cores, a gap-forming film joining said pair of magnetic cores which form a magnetic gap, both lateral sides of said gap being flat

except for a surface adapted to be in sliding contact with magnetic tape, said surface having the same width as a track width,



each of said flat sides being coated with a nonmagnetic thin hard film.

**4,959,742**  
**ROTARY HEAD MOUNTING DEVICE**  
Kazumasa Tsutsumi, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan  
Filed Sep. 8, 1988, Ser. No. 242,142  
Claims priority, application Japan, Sep. 11, 1987, 62-139059[U]  
Int. Cl.<sup>5</sup> G11B 15/60  
U.S. Cl. 360—130.23 7 Claims

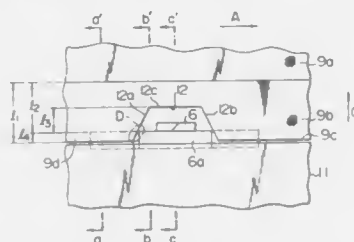


1. A rotary head mounting device for mounting a rotary head obliquely with respect to a primary surface of a chassis such that a rotational axis of the rotary head is oblique to the primary surface of the chassis, comprising at least one oblique base molded on the chassis, each oblique base having a mounting surface which is oblique to the primary surface of the chassis for mounting a rotary head thereon and a mounting hole for receiving a fastener for fixing the rotary head to the mounting surface of the oblique base, wherein the mounting hole extends from the mounting surface of the oblique base into the oblique base, the central axis of the mounting hole being substantially perpendicular to the mounting surface of the oblique base, and wherein a mounting portion of the rotary head is fixedly mounted to the mounting surface of each oblique base by providing a fastener through the mounting portion of the rotary head and the corresponding mounting hole in each oblique base.

6. A method for making a mounting device for mounting a rotary head such that a rotational axis of the rotary head is oblique to a primary surface of a chassis, wherein the mounting device comprises at least one base having a mounting surface oblique to the primary surface of the chassis and a corresponding mounting hole such that when a mounting portion of the rotary head is mounted to the oblique mounting surface of the base by way of a fastener inserted through the mounting portion of the rotary head and the mounting hole of the base, the rotational axis of the rotary head is oblique to the primary surface of the chassis, the method comprising the sequential steps of:

providing a chassis having a primary surface; molding a base on the primary surface of the chassis such that the base is fixedly attached to the primary surface of the chassis, the base being molded so as to have a mounting surface oblique to the primary surface of the chassis and a mounting hole extending from the mounting surface of the base into the base, the central axis of the mounting hole being substantially perpendicular to the mounting surface of the base.

**4,959,743**  
**JITTER REDUCING TAPERED ROTARY DRUM FOR MAGNETIC HEAD APPARATUS**  
Mashanori Kochi, Katsuta; Juichi Morikawa, Katsuta; Makoto Ibe, Katsuta; Shinji Ozaki, Funabashi, and Hitoshi Takizawa, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Jul. 15, 1988, Ser. No. 219,268  
Claims priority, application Japan, Jul. 24, 1987, 62-183406  
Int. Cl.<sup>5</sup> G11B 15/61  
U.S. Cl. 360—130.24 4 Claims

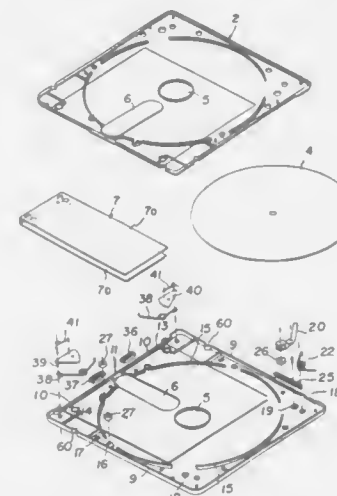


1. A rotary magnetic head drum apparatus comprising at least one video head, a rotary drum having an axis of rotation, a tape running surface and a head mounting surface to which said video head is securely mounted, and a stationary drum provided with a tape guide and a tape running surface, wherein said tape running surface of said rotary drum has an upper portion extending parallel to the axis of rotation of the rotary drum and a lower end portion whose diameter becomes gradually smaller along the axis of rotation of said rotary drum, said lower end portion being projected such that a bottom end surface thereof is located below a plane of said head mounting surface of said rotary drum, said lower end portion having at least one window through which a part of said video head is exposed, wherein a lower end of said lower end portion of said rotary drum and an upper end of said tape running surface of said stationary drum have chamfered edges.

**4,959,744**  
**SHUTTER ASSEMBLED DISC CARTRIDGE**  
Yasunori Kanazawa, Hachioji; Yoshiyuki Nakamori, Ibaragi; Tadahiro Kuwa, Ibaragi; Nobuyuki Fujimoto, Odawara, and Shinichi Abe, Kanagawa, all of Japan, assignors to Hitachi Maxell, Ltd. and Hitachi, Ltd., both of Osaka, Japan  
Division of Ser. No. 13,051, Feb. 10, 1987, Pat. No. 4,811,151, which is a continuation of Ser. No. 642,508, Aug. 20, 1984, abandoned. This application Sep. 1, 1988, Ser. No. 239,756  
Claims priority, application Japan, Aug. 20, 1983, 58-150963; Aug. 27, 1983, 58-155723  
Int. Cl.<sup>5</sup> G11B 23/02, 5/012  
U.S. Cl. 360—133 4 Claims

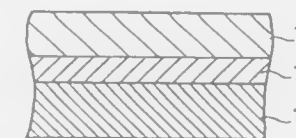
1. A disc cartridge comprising a disc case formed by a top half and a bottom half each having a spindle hole and a head insertion hole provided therein, said disc case defining a disc chamber bounded by peripheral walls of said respective top half and bottom half, a recording disc rotatably enclosed in said disc chamber of said disc case, shutter means for closing and opening said spindle holes and head insertion holes, and three guide rollers rotatably arranged in one of said top half or bottom half of said disc case disposed in such a manner so as to define an imaginary isosceles triangle within said chamber,

with each of said rollers being located at a corner of said triangle, said three guide rollers being engageable with a peripheral edge of said recording disc for supporting said record-



ing disc when said recording disc cartridge is not in use, and wherein one of said three guide rollers is releasable from said peripheral edge of said recording disc when said recording disc cartridge is in use.

**4,959,745**  
**CAPACITOR AND METHOD FOR PRODUCING THE SAME**  
Kyolchi Suguro, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Mar. 6, 1989, Ser. No. 319,342  
Claims priority, application Japan, Mar. 4, 1988, 63-049736  
Int. Cl.<sup>5</sup> H01G 7/00, 9/00  
U.S. Cl. 361—311 6 Claims

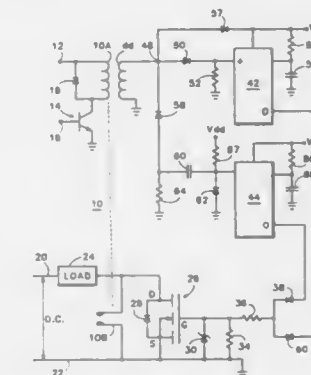


1. A capacitor comprising: a dielectric film of a metal oxide; and two electrodes contacting with surfaces of the dielectric film, wherein at least one of the electrodes comprises a conductive metal compound having a sufficient amount of added oxygen so as to reduce leakage current resistivity of said conductive metal compound to less than 1000 ohms-cm, to reduce a crystal size of the electrode and to smooth surfaces of said electrodes contacting said dielectric film to restrict electric field concentration effect.

**4,959,746**  
**RELAY CONTACT PROTECTIVE CIRCUIT**  
Chester C. Hongel, Brush Prairie, Wash., assignor to Electronic Specialty Corporation, Vancouver, Wash.  
Continuation-in-part of Ser. No. 9,236, Jan. 30, 1987. This application Aug. 29, 1988, Ser. No. 237,547  
Int. Cl.<sup>5</sup> H02H 7/22 29 Claims

1. A contact protective circuit for a relay including a pair of contacts and an operating coil for changing the circuit-completing status of said contacts between an open circuit and a closed circuit condition, comprising: means for detecting a transient in said operating coil pursu-

ant to a change in the energization of said operating coil prior to the resulting change in circuit-completing status of said contacts, a field effect transistor having a drain terminal, a source terminal and a gate terminal, means connecting said drain terminal and said source terminal respectively to contacts of said pair, and



timing means responsive to said detecting means and coupled to said gate terminal of said field effect transistor for gating said field effect transistor to an on condition, shunting current around said contacts, starting at least as soon as the beginning of said change in circuit-completing status of said contacts.

**4,959,747**  
**CIRCUIT ARRANGEMENT FOR CURRENT LIMITING**  
Thomas Koelpin, Amberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
Filed Mar. 28, 1986, Ser. No. 845,907  
Int. Cl.<sup>5</sup> H02H 7/08 4 Claims  
U.S. Cl. 361—31



1. In a.c. machines having phase gating current control by solid state devices in which a smooth start of the a.c. machine is provided by arresting a steady decrease in the ignition angle of the solid state devices upon the occurrence of a predetermined limiting current value, an improved current limiting circuit comprising:

one phase load current measurement means including a circuit measuring an instantaneous limiting value of the magnitude of the load current and having an output signal; and means responsive to said output signal including a circuit providing a control signal to said solid state devices to arrest the decrease of the ignition angle of said solid state devices, wherein the means providing the control signal comprises a retriggerable monostable element.



**4,959,748**  
**FILM CAPACITOR, METHOD OF AND APPARATUS**  
**FOR MANUFACTURING THE SAME**

Tadashi Kimura, Yawata; Tanejiro Ikeda, Nara; Hisaaki Tachihara, and Kunio Oshima, both of Matsue, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

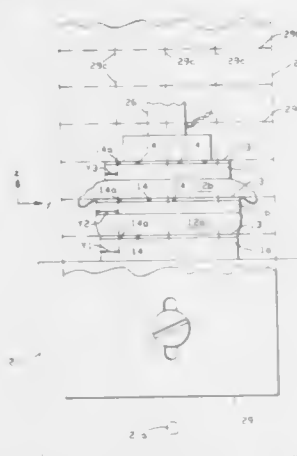
Filed Mar. 27, 1989, Ser. No. 329,351  
 Claims priority, application Japan, Mar. 30, 1988, 63-76797  
 Int. Cl.<sup>5</sup> H01G 4/08, 1/14, 4/06  
 U.S. Cl. 361—323 20 Claims



18. A film capacitor comprising: a plurality of superposed laminations having two electrodes lead-out sides, each of said laminations comprising a dielectric film and an electrode layer formed on said dielectric film, said electrode layer having marginal sections which project from said first dielectric film on both said electrode lead-out sides; and end surface electrodes formed on both said electrode lead-out sides such that said marginal sections of said electrode layer are embedded in said end surface electrodes, said dielectric films having first and second ends which are disposed respectively on both said electrode lead-out sides, said first ends being non-aligned with each other and said second ends being non-aligned with each other respectively on said electrode lead-out sides so as to enhance electrical connection and binding strength between said electrode layer and said end surface electrodes.

**4,959,749**  
**LAYERED ELECTRONIC ASSEMBLY HAVING**  
**COMPENSATION FOR CHIPS OF DIFFERENT**  
**THICKNESS AND DIFFERENT I/O LEAD OFFSETS**  
 John E. Dzarnowski, Jr., Poway, and James W. Babcock, Escondido, both of Calif., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Aug. 16, 1989, Ser. No. 395,236  
 Int. Cl.<sup>5</sup> H05K 7/00  
 U.S. Cl. 361—396 12 Claims



1. A layered electronic assembly that is comprised of: a plurality of integrated circuit chips which are arranged in a stack, respective adhesive layers which interleave the chips and hold them together, and I/O leads on said chips which

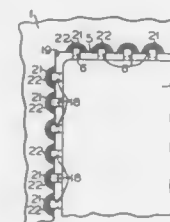
extend to one face of said stack; wherein said chips have respective thicknesses which vary from chip to chip, and said I/O leads are offset from one edge of the chip on which they lie by respective distances which vary from chip to chip; and wherein said adhesive layers have respective thicknesses which compensate for said thickness variations in said chips such that said I/O leads on adjacent chips are spaced by predetermined distances along said stack face, and said one edge on said chips are out of line relative to one another such that said I/O leads on adjacent chips are aligned on said stack face.

**4,959,750**  
**PRINTED CIRCUIT BOARD FOR CARRYING A**  
**MIXED-COMPONENT ASSEMBLY**

Henner Cayrim, Laatz, and Peter Felsen, Wennigsen, both of Fed. Rep. of Germany, assignors to Wabco Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Filed Jun. 21, 1988, Ser. No. 209,658  
 Claims priority, application Fed. Rep. of Germany, Jun. 25, 1987, 3720925  
 Int. Cl.<sup>5</sup> H05K 1/18 3 Claims

U.S. Cl. 361—401



1. A printed circuit board manufactured of insulated carrier material having a plurality of conductive tracks comprising, indentations formed by bore holes for guiding a surface-mounted component into a recess, the recess is provided with the dimensions which approximately correspond to the peripheral surface of the surface-mounted component to be inserted, into said recess and a side wall of the recess is provided with a plurality of said indentations each having a contact surface with solder disposed thereon for being electrically connected to each of the plurality of conductive tracks for providing electrical connections to wire leads of the surface-mounted component and wherein the indentations automatically guide the wire leads to cause the exact positioning of the surface-mounted component in the printed circuit board.

**4,959,751**  
**CERAMIC HYBRID INTEGRATED CIRCUIT HAVING**  
**SURFACE MOUNT DEVICE SOLDER STRESS**  
**REDUCTION**

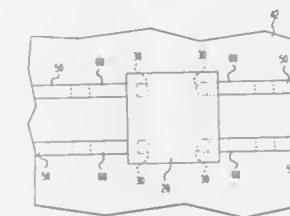
John A. Hearn; Dwight L. Schwarz, both of Kokomo; Dwadas H. R. Sarma, West Lafayette, and Ponnusamy Palanisamy, Kokomo, all of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Continuation-in-part of Ser. No. 232,743, Aug. 16, 1988. This application Jan. 17, 1989, Ser. No. 297,212  
 Int. Cl.<sup>5</sup> H01R 9/00; H05K 7/20

U.S. Cl. 361—406 4 Claims

1. An assembly comprising: a ceramic support member having a top surface for receiving and supporting a semiconductor chip, said top surface of said ceramic support member also having contact areas thereon;  
 a semiconductor chip having external contacts for electrical interconnection to the contact areas on said ceramic support member; and  
 a plurality of first conductor means, each being supported on the ceramic support member and having first and second ends and an intermediate portion, the first end of a respective conductor means being securely and conductively

connected by solder to a respective one of said external contacts of the chip, the second end being securely and conductively connected without solder to one of said contact areas of said ceramic support member, respectively; and



the intermediate portion and the first end of each of said first conductor means being controllably adherent to the top surface of the support member, effective to prevent buildup of stress in solder at said a respective external contact due to a difference in thermal expansion characteristics between said solder and said ceramic support member.

**4,959,752**  
**ELECTRONIC MODULE RFI/EMI SHIELDING**

Victor M. Samarov, Carlisle; George A. Doumani, Jr., North Andover, both of Mass., and Philip F. Becker, Bedford, N.H., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Oct. 24, 1988, Ser. No. 262,436  
 Int. Cl.<sup>5</sup> H05K 9/00 25 Claims

U.S. Cl. 361—424



1. The method of RFI/EMI shielding an individual module of an electronic assembly comprising the steps of:  
 (a) applying a substantially continuous, conformal, electrically insulating material to predetermined surfaces of the module to a thickness to reliably cover protruding features of electronic components carried on the module;  
 (b) applying a substantially continuous, electrically conductive coating over the insulating material;  
 (c) masking predetermined surface of the module prior to applying said electrically insulating material; and,  
 (d) removing said masking following application of said electrically conductive coating.

**4,959,753**  
**SOLID ELECTROLYTIC CAPACITOR AND METHOD OF**  
**MANUFACTURING THE SAME**

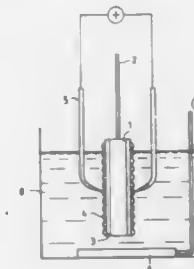
Yasuo Kudoh, Yokohama; Sohji Tauchiya, Kanagawa; Toshikuni Kojima, Kawasaki; Masao Fukuyama; Susumu Yoshimura, both of Yokohama, and Kenji Kuranuki, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Sep. 8, 1989, Ser. No. 404,465  
 Claims priority, application Japan, Sep. 9, 1988, 63-227024; Nov. 11, 1988, 63-286136; Jun. 29, 1989, 1-169311  
 Int. Cl.<sup>5</sup> H01G 9/00; B01J 17/00

U.S. Cl. 361—525 18 Claims

1. A solid electrolytic capacitor comprising:  
 an electrolyte comprising a conductive polymer (i) having a repeating unit of at least one compound selected from a heterocyclic compound and (ii) containing as a dopant at

least one anion selected from a naphthalenesulfonate, an alkyl naphthalenesulfonate at least one of hydrogen atoms on the naphthalene ring of which has been substituted with an alkyl group having 1 to 12 carbon atoms, an anthraquinonesulfonate, and an alkyl anthraquinonesul-



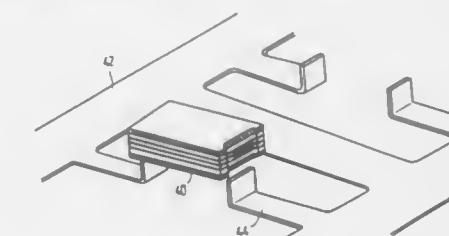
fonate at least one of hydrogen atoms on the anthraquinone ring of which has been substituted with an alkyl group having 1 to 12 carbon atoms;  
 said electrolyte being provided on a valve metal on the surface of which a dielectric film is formed by anodic oxidation or anodic chemical conversion.

**4,959,754**  
**ELECTROLYTIC CAPACITOR**

Siegfried Stüfeler, Klagenfurt; Georg Hetzendorf, Vienna, both of Austria; Benedictus C. H. Fransen; Antonius G. Rijnbeek, both of Eindhoven, Netherlands, and Helfried Schmickl, Vienna, Austria, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 28, 1989, Ser. No. 387,453  
 Claims priority, application European Pat. Off., Aug. 16, 1988, 88201740  
 Int. Cl.<sup>5</sup> H01G 9/00 14 Claims

U.S. Cl. 361—527



1. An electrolytic capacitor comprising a stack of capacitor elements, each capacitor element comprising an anode foil having a dielectric oxide layer as well as a cathode contact layer having a solid electrolytic material, characterized in that the cathode contact layer has a porous ceramic spacing layer which is impregnated with the solid electrolytic material.

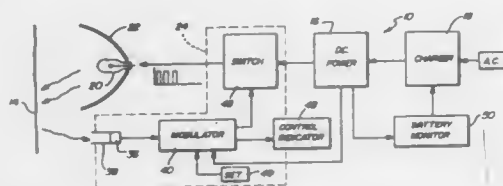
**4,959,755**  
**AUTOMATIC BATTERY POWERED VIDEO LIGHT**

Peter A. Hochstein, 2966 River Valley Dr., Troy, Mich. 48098

Filed Feb. 13, 1989, Ser. No. 310,307  
 Int. Cl.<sup>5</sup> G03B 15/02; G01J 1/32; G05F 1/00; H05B 39/04  
 U.S. Cl. 362—4 23 Claims

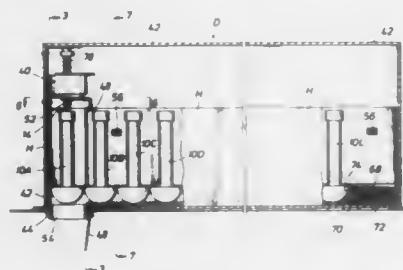
1. A portable light assembly adapted to be connected to a camera and directed toward a scene, said assembly comprising: portable housing means adapted to be connected to a camera; battery power means for supplying d.c. power; radiant means supported by said housing means and connected to said battery power means for producing radiant energy to illuminate a scene; control means supported by said housing means and

connected between said battery power means and said radiant means for receiving a control signal and for switching d.c. power to said radiant means controlling the intensity of illumination by said radiant means; said control means including sensor means for sensing ambient light and reflected radiant energy from the scene indicative of brightness of the scene and for producing said control signal, pulse width modulator for receiving said d.c. power and connected to and responsive to



the sensed brightness by said sensor means for producing said control signal comprising pulses at a predetermined frequency and for controlling the width of said pulses to control the intensity of illumination by said radiant means, and switching means in series with said power means and said radiant means for receiving said control signal and for switching power to said radiant means controlling the brightness, said switching means including a transistor operating in switch mode for switching the d.c. power to said radiant means.

**4,959,756**  
**CHEMILUMINESCENT LIGHT ELEMENT DISPENSING AND ACTIVATING APPARATUS**  
James W. Dodson, 1115 Sheffield, Bellair, Tex. 77401  
Filed Mar. 15, 1989, Ser. No. 324,603  
Int. Cl.<sup>5</sup> F21K 2/00  
U.S. Cl. 362—34 17 Claims

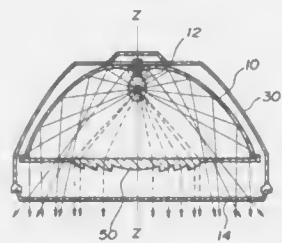


1. Apparatus adapted for use with a vehicle for dispensing and activating a signal device comprising:  
a housing having an aperture,  
a disposable holder means operatively releasably connected to said housing for positioning a plurality of signal devices relative to said housing aperture, and  
means for dispensing each positioned signal device and activating a chemical reaction in the signal device to operably provide a chemiluminescent light.

**4,959,757**  
**AUTOMOTIVE LAMP ASSEMBLY**  
Yutaka Nakata, Isehara, Japan, assignor to Ichikoh Industries, Ltd., Tokyo, Japan  
Filed May 8, 1989, Ser. No. 348,917  
Claims priority, application Japan, May 9, 1988, 63-110420; May 9, 1988, 63-110421; May 17, 1988, 63-118182; May 30, 1988, 63-130407; Jan. 24, 1988, 63-155005; Jun. 30, 1988, 63-160792  
Int. Cl.<sup>5</sup> B60Q 1/04  
U.S. Cl. 362—61 12 Claims

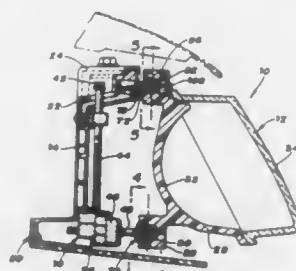
1. An automotive lamp assembly comprising a concave mirror having an optical axis and a lamp bulb disposed on said optical axis of said concave mirror, wherein said concave

mirror is formed by a central reflecting area intersecting said optical axis and peripheral reflecting areas continuously extending rightward and leftward from said central reflecting area, said peripheral reflecting areas are formed as first reflecting curved surface consisting of a part of a paraboloid of revolution and which reflects the incident rays of light from said lamp bulb in directions parallel to said optical axis, and said



central reflecting area is formed as a second reflecting curved surface which reflects horizontally the rays of light emitted from said lamp bulb in directions convergent toward or divergent from said optical axis depending upon the distance from the vertical plane in which said optical axis lies and also reflects vertically the rays of light in directions parallel to each other and to the horizontal plane in which said optical axis lies.

**4,959,758**  
**HEADLAMP ASSEMBLY**  
Philip C. Filosa; Robert G. Roeske, and Bartley A. Haydu, all of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.  
Filed Jul. 28, 1989, Ser. No. 386,167  
Int. Cl.<sup>5</sup> B60Q 1/06  
U.S. Cl. 362—66 2 Claims



1. The combination with a headlamp assembly adapted to be mounted to a support panel at the front end of a motor vehicle through a pair of longitudinally adjustable ball pivots and a fixed ball pivot so as to allow selective adjustable movement of the lamp body about a vertical aim axis and horizontal aim axis, said lamp body including a reflector member the front of which is closed by a lens and the rear of which is integrally formed with a plurality of enlarged boss portions, each of said boss portions having a tapered wall cavity that opens to the rear of said reflector member, a bearing member located in each of said cavities and serving to connect one of said ball pivots to said lamp body, said bearing member comprising two mirror image portions which when combined provide a spherical bearing surface which encapsulates essentially the entire ball portion of the associated ball pivot so as to prevent foreign material from gaining access to said spherical bearing surface, said bearing member having an outer configuration that conforms with the tapered inner walls of said cavity in which said bearing member is inserted, and fastener means accessible from the front of said reflector member for securing each of said mirror image portions to said reflector member.

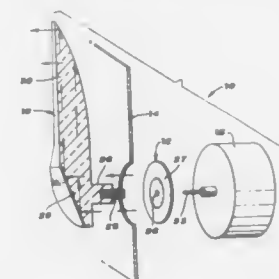
**4,959,759**  
**AUTOMOTIVE INSTRUMENT DISPLAY HAVING A THICKFILM ELECTROLUMINESCENT LIGHTPIPE POINTER**

James L. Kohler, Kokomo, Ind., assignor to Delco Electronics Corporation, Kokomo, Ind.

Filed Aug. 4, 1989, Ser. No. 389,446  
Int. Cl.<sup>5</sup> B60Q 3/04

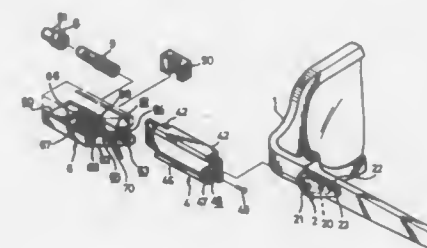
U.S. Cl. 362—80

5 Claims



1. Apparatus for the illumination of a vehicle instrument pointer during low ambient light conditions, comprising:  
a thickfilm electroluminescent lamp emitting an area of relatively dim light, the lamp having a first side and a second side;  
a pointer disposed on the first side of the electroluminescent lamp, the pointer including an internal mirrored surface for collecting the light emitted by the electroluminescent lamp and directing such light through the pointer to be reflected toward an observer of the instrument; and  
a pointer driver mechanism disposed on the second side of the electroluminescent lamp and attached to the lamp and the pointer.

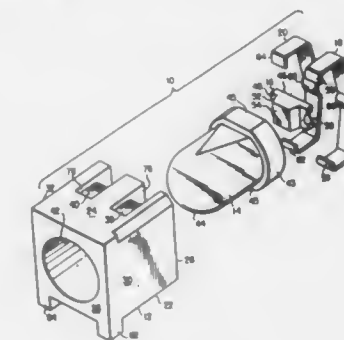
**4,959,760**  
**LIGHTING EQUIPMENT FOR AN EYEGLASSES**  
Te Sheng Wu, No. 11, Alley 17, Lane 58, Ma Tsu Miao St., She Tou Hsiang, Chang Hua Hsien, Taiwan  
Filed Jan. 19, 1990, Ser. No. 467,158  
Int. Cl.<sup>5</sup> F21L 15/14  
U.S. Cl. 362—105 9 Claims



1. A lighting equipment for an eyeglasses comprising a fin attached to one side of a main frame of said eyeglasses; a clamping frame having a retaining means formed at one side thereof and having a clamping means formed at an other side thereof, said fin being force-fitted within said retaining means of said clamping frame so that said clamping frame is vertically rotatable relative to said fin; a housing having an open lateral end enclosable by said clamping frame and having an open front end; a side contact conductor and a resilient conductor being provided within said housing; and a bulb being force-fitted within said housing, a peripheral surface of a base of said bulb being electrically contacted to said side contact conductor, a center electrode of said base of said bulb being electrically contacted to said resilient conductor, a front end of said

bulb being touchable from said open front end of said housing, and said bulb being laterally rotatable within said housing.

**4,959,761**  
**SURFACE MOUNTED LED PACKAGE**  
John Critelli, Point Pleasant; Klaus Oesterheld, Middletown; Carleton DeBaun, Toms River, and Bart Dowstra, Barnegat, all of N.J., assignors to Dialight Corporation, Manasquan, N.J.  
Filed Dec. 21, 1989, Ser. No. 454,468  
Int. Cl.<sup>5</sup> F21V 17/00  
U.S. Cl. 362—226 10 Claims



1. A surface mounted LED package comprising:  
(a) a housing having:  
(i) a generally rectangular parallelepipedal shape;  
(ii) a first surface that, in use, is adjacent a printed circuit board;  
(iii) a second surface opposite said first surface;  
(iv) a third surface joining said first and second surfaces;  
(v) a fourth surface opposite said third surface;  
(vi) a fifth surface joining said first and second surfaces;  
(vii) a sixth surface opposite said fifth surface;  
(viii) a first shoulder recessed beneath said first surface;  
(ix) a second shoulder recessed beneath said second surface;  
(x) a third shoulder recessed beneath said second surface;  
(xi) a fourth shoulder recessed beneath said second surface; and  
(xii) a passageway extending from said third surface to said fourth surface;  
(b) a lens received in said passageway and having:  
(i) a radiating surface extending beyond said third surface of said housing;  
(ii) a rear surface with a cavity sized and shaped to receive an LED; and  
(iii) a light collecting surface inside above said cavity;  
(c) an LED received in said cavity in said rear surface of said lens, said LED having:  
(i) a first surface;  
(ii) a second surface opposite said first surface;  
(iii) a first electrical contact on said first surface;  
(iv) a second electrical contact on said first surface; and  
(v) a light emitting portion in said second surface facing said lens;  
(d) a first conductive spring clip having:  
(i) a first finger engaging said first shoulder;  
(ii) a second finger engaging said third shoulder; and  
(iii) a contact portion in electrical contact with said first electrical contact on said first surface of said LED; and  
(e) a second conductive spring clip having:  
(i) a first finger engaging said second shoulder;  
(ii) a second finger engaging said fourth shoulder; and  
(iii) a contact portion in electrical contact with said second electrical contact on said first surface of said LED.



4,959,762

**LUMINAIRE CONTAINMENT MEANS FOR LAMP RUPTURING**

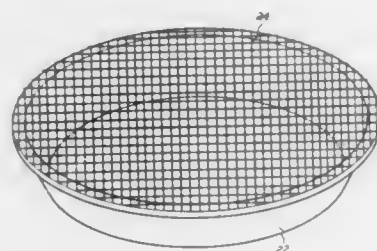
Trasimond A. Solleau, Flat Rock, N.C., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 8, 1988, Ser. No. 241,723

Int. Cl.<sup>3</sup> F21V 11/00

U.S. Cl. 362—376

15 Claims

**1. A luminaire comprising;**

- (a) an upper housing;
- (b) a pressurized lamp accommodated by said upper housing, said pressurized lamp capable of encountering a non-passive explosive condition so as to project hot quartz particles having predetermined dimensions, heat capacity and temperatures;
- (c) an enclosure having a window area and said enclosure capable of being ignited if subjected to encountering said hot quartz particles and;
- (d) a mesh assembly interposed between said pressurized lamp and said window area of said enclosure, said mesh having openings small enough to prevent passage of said hot quartz particles having said heat capacities and said temperatures which are great enough to ignite said enclosure and yet such mesh openings being large enough to yield adequate optical transmission.

4,959,763

**DISPLAY FRAME SYSTEM**

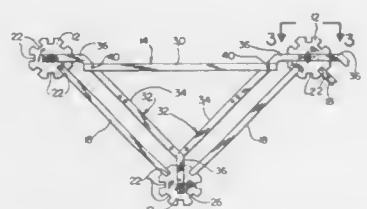
George T. Baggott, Cleveland, Ohio, assignor to Import-Export Research &amp; Development, Inc., Cleveland, Ohio

Filed May 19, 1989, Ser. No. 354,628

Int. Cl.<sup>3</sup> G09F 7/00

U.S. Cl. 362—382

15 Claims

**1. A display frame unit for supporting panels with parallel opposite edges for display, the frame unit comprising three posts,**

- a strut assembly for connecting the posts to each other, and fastener means for connecting the strut assembly to the ends of the posts;
- pairs of posts including opposed, parallel slots for receiving the edge portions of a panel,
- the strut assembly including at least one offset strut extending between a pair of posts and having a central portion offset from a plane defined by the opposed pair of slots in said pair of posts.

4,959,764

**DC/DC CONVERTER SWITCHING AT ZERO VOLTAGE**

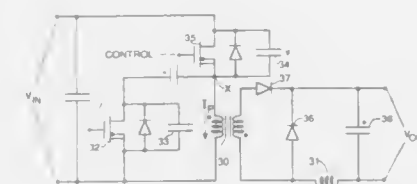
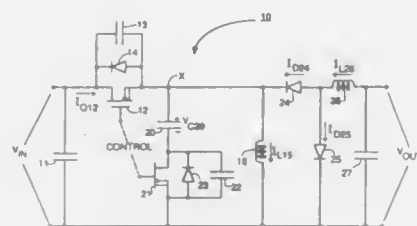
John A. Bassett, Pleasanton, Calif., assignor to Computer Products, Inc., Boca Raton, Fla.

Filed Nov. 14, 1989, Ser. No. 436,394

Int. Cl.<sup>3</sup> H02M 3/335

U.S. Cl. 363—16

10 Claims

**1. A single ended, zero voltage switching converter circuit comprising:**

- a first inductive element having a first terminal and a second terminal;
- a first switching means for selectively coupling power from a power supply to said first inductive element, said first switching means including an intrinsic capacitance;
- a first capacitive element having a first plate and a second plate, the first plate connected to the first terminal of said first inductive element;
- a second switching means connected to the second plate of said first capacitive element and in series with said first capacitive element across said first inductive element, said second switching means including an intrinsic capacitance;
- a first diode having a first terminal and a second terminal, the first terminal of said first diode connected to the first terminal of said first inductive element;
- a second diode having a first terminal and a second terminal, the first terminal of said second diode connected to the second terminal of said first inductive element, and the second terminal of said second diode connected to the second terminal of said first diode;
- a second inductive element having a first terminal and a second terminal, the first terminal connected to the second terminals of said first and second diodes, and the second terminal connected to an output of said converter circuit;
- a third diode in parallel with said first switching means; and
- a fourth diode in parallel with said second switching means; wherein energy stored in said first inductive element discharges the intrinsic capacitance of said first switching means prior to turning on said first switching means, and wherein energy stored in said first inductive element discharges the intrinsic capacitance of said second switch-

ing means prior to turning on said second switching means.

said periodic switching means to zero when switching occurs in said switching means.

4,959,765

**DC TO DC CONVERTER USING QUASI-RESONANCE**

Alan Weinberg, Samenheilm, Netherlands, assignor to Agence Spatiale Europeenne, France

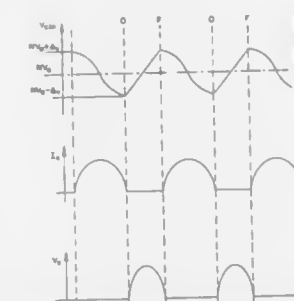
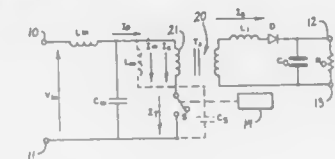
Filed Feb. 22, 1989, Ser. No. 314,373

Claims priority, application France, Feb. 24, 1988, 88 02239

Int. Cl.<sup>3</sup> H02M 3/335

U.S. Cl. 363—20

5 Claims

**1. A DC to DC converter for supplying direct current from a source to a load, in particular one for operating at high frequency and for feeding traveling wave tube amplifiers (TWTAs), said converter comprising:**

- a transformer having a primary circuit connectable to the source and containing a primary winding, said transformer having a secondary circuit connectable to the load and containing a secondary winding, said transformer possessing a magnetizing inductance ( $L_m$ ) and a series inductance ( $L_s$ );
- periodic switching means ( $S, S_1, S_2$ ) connected in series with said primary winding in said primary circuit of said transformer, said switching means switching between a closed period when said switching means is closed and an open period when said switching means is open;
- an output capacitor ( $C_o$ ) connected in parallel in the secondary circuit of said transformer; and
- an input capacitor ( $C_{in}$ ) connected in parallel in the primary circuit of said transformer, the capacitance of said input capacitor ( $C_{in}$ ) being much lower than the capacitance of said output capacitor ( $C_o$ );
- said converter possessing parasitic capacitance ( $C_p$ ) including that of said primary winding and said periodic switching means, said parasitic capacitance being referable to the primary circuit of said transformer;
- said input capacitor ( $C_{in}$ ) and said series inductance ( $L_s$ ) of said transformer forming a first circuit in said converter having a resonance period shorter than the on period of said periodic switching means ( $S, S_1, S_2$ ) and controlling the current through said periodic switching means in the on periods for reducing the current through said periodic switching means to essentially zero when switching occurs in said switching means, and
- said parasitic capacitance ( $C_p$ ) of said converter referred to primary circuit of said transformer and said magnetizing inductance ( $L_m$ ) of said transformer forming a second circuit in said converter having a resonance period shorter than the off period of said periodic switching means and controlling the voltage across said periodic switching means in the off period for reducing the voltage across

4,959,766

**AC/DC CONVERTER USING RESONANT NETWORK FOR HIGH INPUT POWER FACTOR**

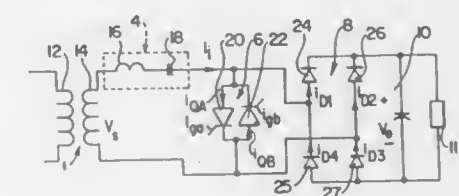
Praveen K. Jain, Nepean, Canada, assignor to National Research Council of Canada/Conseil National de Recherches du Canada, Ottawa, Canada

Filed Jul. 7, 1989, Ser. No. 376,854

Int. Cl.<sup>3</sup> H02M 7/06

U.S. Cl. 363—48

10 Claims

**1. An AC to DC converter comprising:**

- (a) an input transformer for connection to a single phase, high frequency, sinusoidal wave form, AC voltage source, the transformer, in operation, providing a matching output voltage for, and isolating from, the AC voltage source;
- (b) a resonant network for converting the single phase, high frequency, sinusoidal wave form, AC voltage to a sinusoidal, high frequency bi-directional current output;
- (c) a current controller connected in parallel to the resonant network to receive the sinusoidal high frequency current output therefrom and provide the desired output current from the converter;
- (d) a diode rectifier connected in parallel with the current controller, and for converting the bi-directional current into a unidirectional current output; and
- (e) an output filter connected to the rectifier to provide an essentially ripple free, substantially constant voltage DC output.

4,959,767

**PARAMETER ESTIMATION TECHNIQUE FOR CLOSED LOOP SYSTEM**

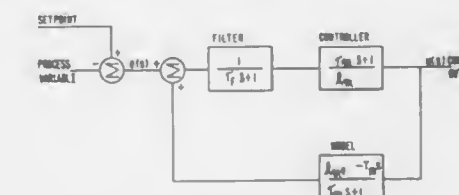
Marc Buchner, Beachwood, Ohio; John D. Lane, McLean, Va.; Ken Loparo, and Thomas J. Schell, both of Chesterland, Ohio, assignors to Eldec International B.V., Amsterdam, Netherlands

Filed Nov. 23, 1988, Ser. No. 275,813

Int. Cl.<sup>3</sup> G05B 13/02

U.S. Cl. 364—151

5 Claims

**1. A process control system, comprising:**

- a controller for producing a control output for said process; means for providing a first response, resulting from a comparison of a process variable and a setpoint, to a summation unit;
- a model, connected to said controller and located in a feedback loop, for receiving said control output and providing an output to said summation unit; and

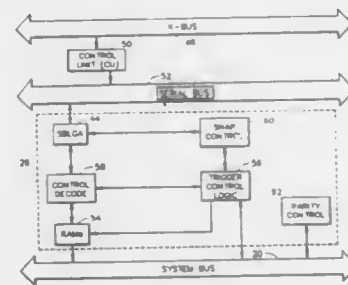
1. A system for monitoring and capturing bus data in a digital computer having a CPU, a memory, at least one I/O module, each having a parity generator for generating a parity bit, a system bus for permitting communication between the CPU, memory and I/O module, the system bus including an address field, a data field and a control field, each field including a plurality of lines for transmitting digital signals representing predetermined information, and a plurality of clock generators for timing the transmission of the digital signals on the lines,

a buffer for storing information represented by the digital signals;

means for accessing the system bus and storing in the buffer the information represented by the digital signals transmit-



ted on the lines of the fields during pre-selected time intervals; and  
means for analyzing the information stored in the buffer to



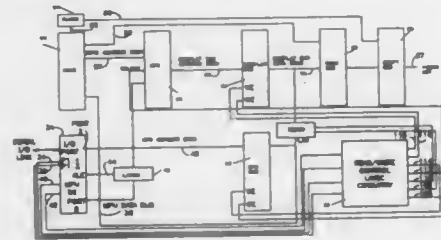
locate faults in the computer without disrupting the normal operation thereof; and  
means for controlling operation of the clock commands of the plurality of clock generators.

#### 4,959,773 ADAPTER FOR ATTACHING I/O DEVICES TO I/O COMMUNICATIONS WITH ALTERNATING READ AND WRITE MODES LINK

John D. Landers, Jr., Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.  
Continuation of Ser. No. 672,512, Nov. 19, 1984, abandoned.  
This application Jan. 7, 1988, Ser. No. 143,283  
Int. Cl.<sup>3</sup> G06F 13/00, 15/62

U.S. Cl. 364-200

6 Claims



1. An adapter for interfacing a device with a serial data link comprising:
  - a first storage means for storing data supplied from the serial data link;
  - a second storage means for storing device data;
  - a device address bus coupled to the second storage means;
  - a device data bus coupled to the second storage means;
  - a microprocessor coupled to the serial data link and for generating enabling signals;
  - a microprocessor address bus interconnecting the first storage means and the microprocessor;
  - a microprocessor data bus interconnecting the first storage means and the microprocessor;
  - a first control means for controlling the flow of data between the device data bus and the microprocessor data bus;
  - a second control means for interconnecting the microprocessor address bus and the device address bus; and
  - a third control means responsive to the enabling signals and to generate other control signals for activating the first and second control means and for simultaneously placing the first storage means and the second storage means into respective read and write modes so that if the microprocessor executes a first command on the first storage means when it is in read mode data stored at a selected address in said first storage means is copied at an identical address in the second storage means and if the microprocessor executes the first command on the second stor-

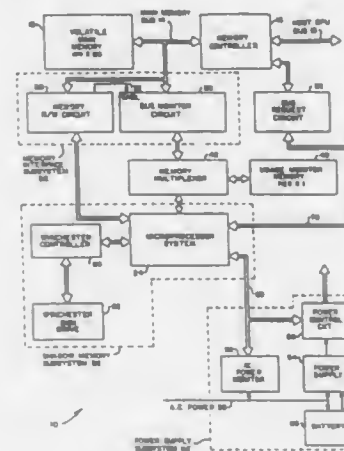
age means when it is in a read mode data stored at a selected address in the second storage means is copied in the first storage means.

#### 4,959,774 SHADOW MEMORY SYSTEM FOR STORING VARIABLE BACKUP BLOCKS IN CONSECUTIVE TIME PERIODS

John E. Davis, Reseda, Calif., assignor to Ampex Corporation, Redwood City, Calif.  
Continuation of Ser. No. 628,417, Jul. 6, 1984, abandoned. This application Jun. 30, 1989, Ser. No. 374,614  
Int. Cl.<sup>3</sup> G06F 15/00, 11/30, 12/16

U.S. Cl. 364-200

23 Claims



17. A backup data storage system for a primary data store having a plurality of storage locations addressable by a data processing system, each primary data store addressable storage location being assigned to one of a plurality of primary store data blocks, each containing the data stored by all of the addressable storage locations assigned thereto, the backup data storage system comprising:

first means for storing a write indication at each of a plurality of addressable storage locations, each of which has a predetermined correspondence with one of the data block; means for writing a write indication into the first means for storing a write indication each time data is written by the data processing system into the primary data store, the write indication being stored at a location corresponding to a primary store data block into which the data has been written;

second means for storing a plurality of backup data blocks, each corresponding to a different primary store data block; and

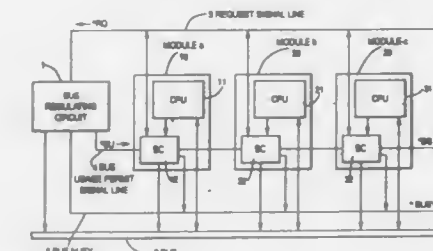
data processing means, connected to the first storing means, the means for writing a write indication, the second storing means, and the primary data store, comprising means coupled to the first storing means for determining when said writing means is not accessing the first storing means, means for continually accessing said first storing means when said first storing means is available for data communication and for repetitively reading sequential addressable storage locations of the first storing means, wherein the number of addressable storage locations read varies with the time during which said first storing means is available for data communications, and means, upon reading a write indication from a currently addressed storage location, for copying the primary store data block corresponding thereto to the corresponding backup data block stored by the second storing means.

#### 4,959,775 BUS REGULATING SYSTEM

Mikio Yonekura, Hachioji, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan  
PCT No. PCT/JP87/00306, § 371 Date Dec. 22, 1987, § 102(e)  
Date Dec. 22, 1987, PCT Pub. No. WO87/07409, PCT Pub. Date Dec. 3, 1987

PCT Filed May 16, 1987, Ser. No. 145,751  
Claims priority, application Japan, May 29, 1986, 61-124236  
Int. Cl.<sup>3</sup> G06F 13/14, 13/36  
U.S. Cl. 364-200

2 Claims



1. A bus regulating system for regulating the right to use a plurality of modules commonly connected to a bus for transferring data, the modules coupled to each other in the form of a chain by a bus usage permit signal line means, said bus regulating system comprising:

request signal line means for transferring a first request signal and commonly coupling the modules to each other; bus busy signal line means for transferring a bus busy signal and commonly coupling the modules to each other; a bus regulating circuit, coupled to said request signal line means, said bus busy signal line means and the bus usage permit signal line means, for inputting a bus usage permit signal to the bus usage permit signal line means in accordance with said first request signal and said bus busy signal;

a microprocessor, mounted in each of the modules, for controlling each of the modules for outputting a second request signal for requesting use of the bus and outputting first and second control signals; and

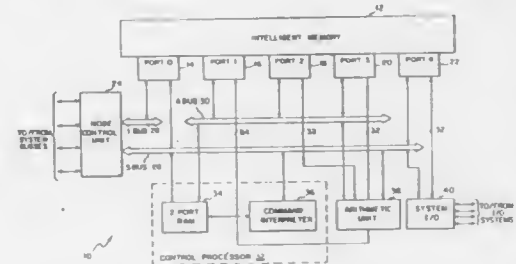
bus control circuit means, coupled to said microprocessor, each of said bus control circuit means mounted on each of said modules and coupled to each of said request signal line means, the bus usage permit line means, and said bus busy signal line means, for receiving, respectively, said second request signal output from said microprocessor, said first and second control signals output from said microprocessor, and the bus usage permit signal on the bus usage permit signal line, and outputting said bus busy signal on said bus busy signal line means, for determining whether or not said first request signal is to be output to said request signal line means in accordance with said second request signal and said first and second control signals, for obtaining a right to use the bus when the bus usage permit signal is input to said bus control circuit when said first request signal is output on said request signal line means by outputting said bus busy signal on said bus busy signal line means, for transferring the bus usage permit signal to a next one of said bus control circuit means when said first request signal is not output, and for outputting said bus busy signal on said bus busy signal line means while said second control signal is input and until said first request signal is output from another module.

#### 4,959,776 METHOD AND APPARATUS FOR ADDRESSING A MEMORY BY ARRAY TRANSFORMATIONS

Alan J. Deerfield, Newport, R.I., and Sun-Chi Siu, Marlboro, Mass., assignors to Raytheon Company, Lexington, Mass.  
Division of Ser. No. 135,579, Dec. 21, 1987, Pat. No. 4,819,152.  
This application Dec. 5, 1988, Ser. No. 279,607  
Int. Cl.<sup>3</sup> G06F 12/06

U.S. Cl. 364-200

18 Claims



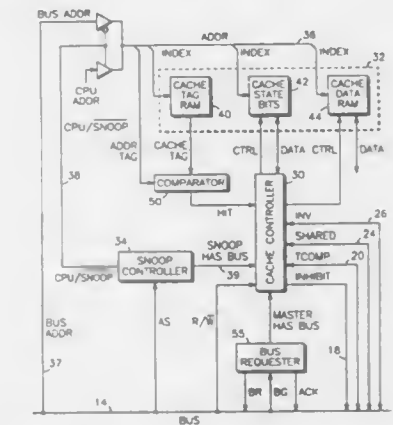
1. A method of generating addressing sequences for accessing a multidimensional array of data in a digital system comprising the steps of:
  - interpreting instruction commands;
  - performing arithmetic operations based on said commands;
  - storing data used in said arithmetic operations in a memory means;
  - generating addressing sequences specified by an array transformation of a high-level programming language in accordance with a nested series of a plurality of parameters of said array transformation, for serially accessing all elements of said data array;
  - interpreting a boundary parameter of said array transformation for controlling the generating of said addressing sequences when an address of said sequence is generated outside a boundary of said array; and
  - transferring said data between said memory means and arithmetic means performing said arithmetic operations as specified by said array transformation.

#### 4,959,777 WRITE-SHARED CACHE CIRCUIT FOR MULTIPROCESSOR SYSTEM

Thomas H. Holman, Jr., Austin, Tex., assignor to Motorola Computer X, Schaumburg, Ill.  
Filed Jul. 27, 1987, Ser. No. 78,436  
Int. Cl.<sup>3</sup> G06F 13/00

U.S. Cl. 364-200

5 Claims



1. A multiprocessor system comprising:
  - a random access memory (RAM);
  - a plurality of central processing units (CPU's);

- a plurality of cache memories, one of said cache memories being coupled to each of said plurality of CPU's;
- a plurality of logic means for coordinating data transfer, one of said logic means being coupled to each of said plurality of cache memories;
- a system bus to which said RAM, said plurality of CPU's, and said plurality of cache memories are coupled, said system bus enabling address and data information to be exchanged among said RAM, said plurality of CPU's, and said plurality of cache memories;
- a first signal line to which each of said plurality of logic means is coupled;
- a first one of said plurality of logic means, being coupled to a first cache memory of said plurality of cache memories, comprising means for monitoring said system bus to determine whether a data block being read by a CPU coupled to a second cache memory of said plurality of cache memories is contained in said first cache memory and, if so, generating a first signal level on said first signal line, and otherwise generating a second signal level on said first signal line; and
- a second one of said plurality of logic means, being coupled to said second cache memory, comprising means for enabling said CPU coupled to said second cache memory, if it subsequently performs a write operation to a data block in said second cache memory, to write the data in said data block through to said RAM if said first signal level is present on said first signal line, and for inhibiting said CPU from writing said data through to said RAM if said second signal level is present on said first signal line,
- whereby said CPU coupled to said second cache memory is inhibited from using said system bus when it performs a write operation on said data block in said second cache memory, if said data block is not contained in said first cache memory, thereby reducing traffic on said system bus.

4,959,778

## ADDRESS SPACE SWITCHING APPARATUS

Hiroo Miyadera, Atsugi; Toru Ohtsuki, and Toshiaki Kawamura, both of Hadano, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

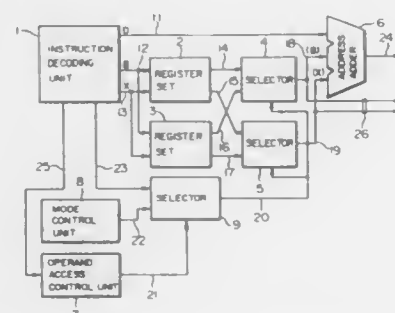
Filed Sep. 30, 1988, Ser. No. 251,841

Claims priority, application Japan, Oct. 2, 1987, 62-247798

Int. Cl.<sup>5</sup> G06F 9/34

U.S. Cl. 364-200

10 Claims



1. An address space switching apparatus comprising:
- address computing means for computing an address;
- a first group of registers for storing address information;
- a second group of registers for storing address information that is longer than the address information stored in said first group of registers;
- selector means controlled by a first control signal for respectively selecting, in response to a first state or a second state of the first control signal, an output from said first group of registers or said second group of registers in order to

- supply the selected output to said address computing means;
- means for generating a second control signal indicating a time period during which an operand address is to be generated;
- means for generating a third control signal indicating whether or not an operand address space is to be extended; and
- means responsive to the third control signal when the second control signal indicates the time period during which an operand address is to be generated for forcing the first control signal into the second state when the third signal indicates that an operand address space is to be extended and for forcing the first signal into the first state when the third signal indicates that an operand address space is not to be extended.

4,959,779

## DUAL BYTE ORDER COMPUTER ARCHITECTURE A FUNCTIONAL UNIT FOR HANDLING DATA SETS WITH DIFFERENT BYTE ORDERS

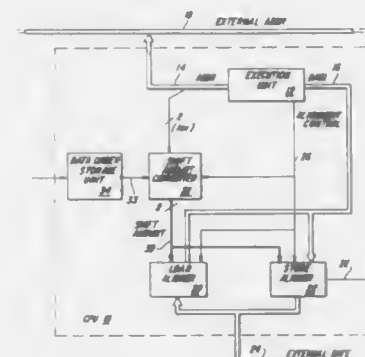
Larry B. Weber, Palo Alto; Craig C. Hansen, Mountain View; Thomas J. Riordan, Atherton, and Steven A. Przybylski, Menlo Park, all of Calif., assignors to MIPS Computer Systems, Inc., Mountain View, Calif.

Continuation of Ser. No. 827,282, Feb. 6, 1986, abandoned. This application Nov. 28, 1988, Ser. No. 277,406

Int. Cl.<sup>5</sup> G06F 7/00

U.S. Cl. 364-200

4 Claims



1. A data processing unit, which comprises:
- an execution unit for processing data;
- an internal data bus coupled to said execution unit for input of internal bus data to said execution unit, the internal bus data being organized into information units, each comprising a series of individual data groups, the individual data groups of each respective information unit being arranged within the respective information unit and relative to one another, in a preselected internal data ordering sequence for processing by said execution unit;
- means for aligning data groups within a respective information unit coupled to said internal data bus;
- an external data bus coupled to said means for aligning data groups, for input of external bus data to said means for aligning data groups, said external bus data being organized into the information units, each comprising a series of the individual data groups, the individual data groups of each information unit of the external bus data being arranged within the respective information unit and relative to one another, in an external data ordering sequence;
- a shift amount converter unit coupled to said means for aligning data groups within a respective information unit;
- means for storing information indicative of the preselected internal data ordering sequence and the external data ordering sequence and for generating a control signal

- indicative of a relationship between the preselected internal data ordering sequence and the external data ordering sequence;
- said means for generating a control signal being coupled to said shift amount converter unit for input of said control signal to said shift amount converter;
- said shift amount converter being responsive to said control signal to control said means for aligning to realign the data groups of each information unit of the external bus data, input to said means for aligning data groups, from the external data ordering sequence into the preselected internal data ordering sequence to provide the internal bus data for input to said execution unit; and
- means to selectively input information indicative of the external data ordering sequence to said means for storing information.

4,959,780

## MICROPROGRAM PROCESSOR WITH LOGIC CIRCUITRY FOR COMBINING SIGNALS FROM A MICROCODE DECODER AND AN INSTRUCTION CODE DECODER TO PRODUCE A MEMORY ACCESS SIGNAL

Akio Miyoshi, Ome, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

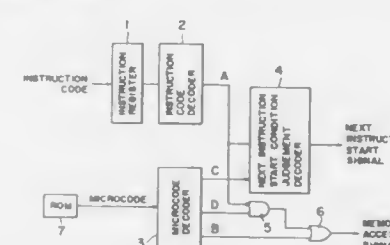
Filed Mar. 3, 1988, Ser. No. 175,293

Claims priority, application Japan, Mar. 31, 1987, 62-79164

Int. Cl.<sup>5</sup> G06F 13/00, 9/22

U.S. Cl. 364-200

1 Claim



1. A microprogram processor comprising:
- instruction holding means for receiving and holding a unit length of a macro instruction code;
- instruction code decoding means for receiving said instruction code from said instruction holding means and decoding said code to generate an output signal dependent upon the fact that the operand and said received instruction code indicates a register or a memory;
- storing means for storing microprograms provided for respective macro instruction codes and supplying microcodes;
- microcode decoding means for decoding said microcodes supplied from said storing means and generating an unconditional memory access signal and a conditional signal for starting a next instruction depending upon said macro instruction code, and generating a conditional memory access signal when a conditional memory access microcode causes said microcode decoding means to generate a specific output if said operand for said instruction indicates a memory;
- means for judging a next instruction start condition connected to receive said output signal from said instruction code decoding means and said conditional signal for starting a next instruction from said microcode decoding means to judge whether or not said next instruction start is correct; and
- means for generating a memory access signal for starting access of a memory on the basis of said unconditional memory access signal, said conditional memory access signal and said output signal from said instruction code decoding means,
- wherein said microcode decoding means comprises decoding means for decoding a specific microcode to generate

- said conditional signal for starting said next instruction and
- wherein said means for generating said memory access signal comprises a logical product circuit for generating said memory access signal which is a logical product signal of said conditional memory access signal and said output from said instruction code decoding means, and a logical sum circuit for generating a logical sum signal of the logical product signal and said unconditional memory access signal.

4,959,781

## SYSTEM FOR ASSIGNING INTERRUPTS TO LEAST BUSY PROCESSOR THAT ALREADY LOADED SAME CLASS OF INTERRUPT ROUTINES

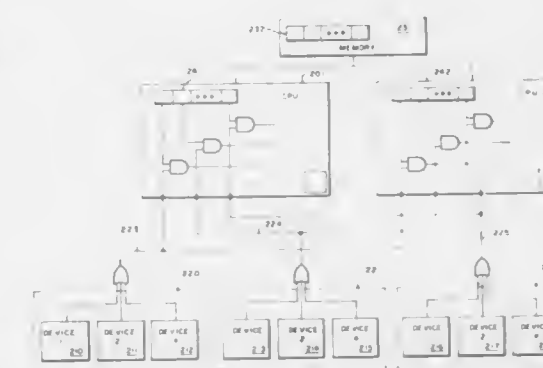
Joa Rubinstein, Palo Alto, and Kenneth C. Klingman, Portola, both of Calif., assignors to Stardent Computer, Inc., Sunnyvale, Calif.

Filed May 16, 1988, Ser. No. 194,457

Int. Cl.<sup>5</sup> G06F 9/46, 13/14, 13/24, 15/16

U.S. Cl. 364-200

7 Claims



1. A computer system having means for processing interrupts comprising:
- one to four MIPS processors for servicing interrupts, each of said processors having means for disabling processing of said interrupts, each of said means for disabling processing of said interrupts comprising a register means having Y memory areas, where Y is a positive number, each of said Y memory areas corresponding to one of Y interrupt classes, said means for disabling processing of interrupts further comprising Y logic gates, each of said Y logic gates having as inputs a signal line from one of said Y memory areas, and a signal line from one of said Y interrupt classes;
- a plurality of devices for asserting interrupts, each of said plurality of devices for asserting interrupts coupled to all of said processors for substantially at the same time asserting interrupts to each of said processors, said plurality of devices grouped into said Y interrupt classes;
- memory means coupled to all of said processors, said memory means having Y memory locations, each of said Y memory locations corresponding to one of said Y interrupt classes, each of said Y memory locations for indicating whether each of said corresponding Y interrupt classes has been assigned for processing by one of said processors;
- means for assigning processing of all interrupts corresponding to one of said Y interrupt classes to one of said N processors.



4,959,782  
ACCESS ARBITRATION FOR AN INPUT-OUTPUT CONTROLLER

Bhalchandra R. Tulpale, Vernon, and Daniel G. Binnall, Simsbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

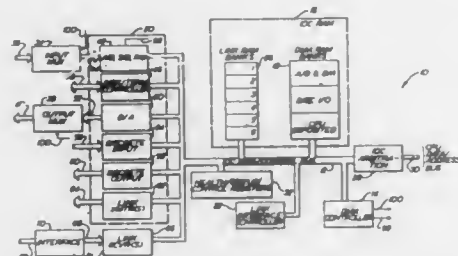
Continuation of Ser. No. 924,647, Oct. 29, 1986, abandoned.

This application Jan. 18, 1990, Ser. No. 465,590

Int. Cl.<sup>5</sup> G06F 13/28, 13/00

U.S. Cl. 364—200

7 Claims



1. A method for arbitrating access to an input-output controller's (IOC's) random access memory (RAM) between the IOC's input-output (I/O) bus and a signal processor's I/O bus, the IOC's I/O bus being connected to a plurality of sensors and actuators, the signal processor having an instruction set, each instruction requiring one or more minimum machine cycles for execution, comprising the steps of:

- having the IOC always grants the signal processor access to the IOC's RAM upon receipt of a demand by the signal processor for access to the IOC's RAM;
- having the IOC monitor the signal processor's activity at the beginning of each machine cycle to detect the signal processor engaged in an activity which does not require access to the IOC's RAM and in which it will be engaged in a non-IOC RAM access activity for the minimum machine cycle; and
- having the IOC, upon detecting the processor so engaged, permit the IOC's I/O bus to gain access to the IOC's RAM, but only during the minimum machine cycle.

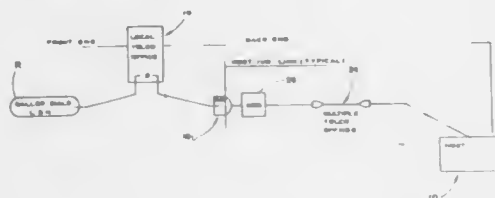
4,959,783  
SYSTEM AND METHOD FOR CHOOSING RANDOM NUMBERS AND DELIVERING SUCH NUMBERS TO SUBSCRIBERS FOR PLAYING GAMES OF CHANCE  
James Scott, Sunrise, and Dennis Mosley, Pembroke Pines, both of Fla., assignors to Lotto Pick Quick Winning Odds, Ltd., Ft. Lauderdale, Fla.

Filed Apr. 6, 1989, Ser. No. 334,168

Int. Cl.<sup>5</sup> G06F 15/28

U.S. Cl. 364—412

11 Claims



9. A method of providing multiple digit random number picks to a caller/subscriber using conventional telephone facilities, said method comprising the steps of:

- a. dialing an indicated telephone number by a caller/subscriber using the conventional telephone facilities;
- b. establishing communication to one of a plurality of processing means and interconnecting the one processing

means to a host computer using the conventional telephone facilities,

- c. generating at least one multi-digit random number pick within a preselected numerical range and transmitting the one random number pick to the one processing means;
- d. communicating the one random number pick to the caller/subscriber in an audible mode;
- e. generating a predetermined plurality of random number picks by said host computer and transmitting said predetermined plurality of random number picks to said one processing means; and
- f. storing said predetermined plurality of random number picks in said one processing means prior to establishing a call-in link with a caller/subscriber.

4,959,784  
METHOD AND SYSTEM FOR ADJUSTING RELAY ARMATURES

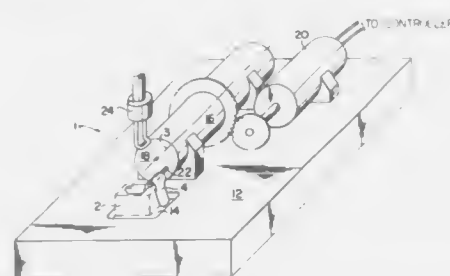
Steven J. Kwapiak, Madison Heights, Mich., assignor to United Technologies Automotive, Dearborn, Mich.

Filed Sep. 28, 1989, Ser. No. 413,668

Int. Cl.<sup>5</sup> G01R 31/32

U.S. Cl. 324—418

7 Claims



1. A system for adjusting the curvature of an electrical relay armature in an electrical relay, wherein the system determines the adjustment necessary for the required electrical operation of the electrical relay in a preselected voltage range based on a comparison of the electrical relay's actual energizing voltage with the preselected energizing voltage range, comprising:

- a rotatable carrier;
- a cam supported by the carrier, rotation of the carrier causing the cam to strike the relay armature at a predetermined location, resulting in a precalculated permanent deformation to the relay armature;
- means for rotating the carrier;
- means for supporting the relay armature during adjustment thereof;
- means for determining the electrical relay energizing voltage; and
- means, responsive to the determined electrical relay energizing voltage, for controlling the carrier rotating means.

4,959,785  
CHARACTER PROCESSING SYSTEM WITH SPELLING CHECK FUNCTION THAT UTILIZES CONDENSED WORD STORAGE AND INDEXED RETRIEVAL

Yasushi Yamamoto, Kyoto, and Keizo Saito, Souraku, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 25, 1988, Ser. No. 198,503

Claims priority, application Japan, May 26, 1987, 62-128687

Int. Cl.<sup>5</sup> G06F 15/38

U.S. Cl. 364—419

11 Claims

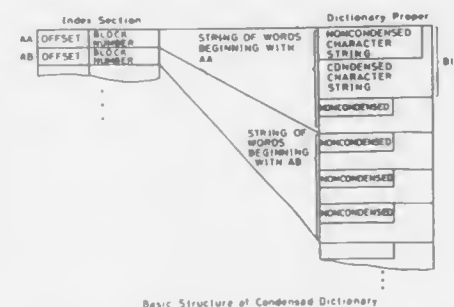
1. A character processing system with a spelling check function comprising:

- input means for inputting character information and instructions;
- storage means for storing said character information;

display means for displaying said character information and said instructions;

control means, coupled to said input means, said storage means, and said display means, for supplying said character information input by said input means to said storage means for storage therein and for outputting said character information to said display means for display thereon; condensed dictionary storage means including;

a dictionary proper composed of a plurality of n-byte blocks, said dictionary proper storing a respective first word in each of said blocks in the form of a character string composed of noncondensed bytes with subsequent words thereafter stored in the form of a condensed relative code with a common part relative to an immediately preceding word as the object, said dictionary proper storing words



not transformable into condensed relative code via Huffman encoding allocated in consideration of frequency of occurrence, and

an index section for storing offsets derived from the dictionary proper which indicate the number of bytes from an initial position of the dictionary proper a specified block is located and for storing block numbers which indicate the number of blocks in a specified group; and spelling check means, coupled to said control means and said condensed dictionary storage means, for performing a dichotomizing search of a specified block, the address of said specified block being determined thereby as a function of the first two letters of a search word which specify the offset and block number stored in the index section corresponding to the specified block to thereby retrieve said search word.

4,959,786  
DUAL REGULATOR FOR REDUCING SYSTEM CURRENT DURING AT LEAST ONE MODE OF OPERATION

Thomas Glowczewski, Washington Township; Keith B. Carle, Hartland, and Michael R. Lindsay, Livonia, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Apr. 29, 1988, Ser. No. 188,600

Int. Cl.<sup>5</sup> B60K 41/18; G06F 1/32

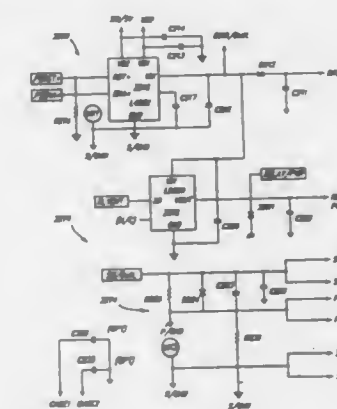
U.S. Cl. 364—424.1

4 Claims

4. In an automatic transmission control system having a plurality of gears for transmitting power from a prime mover to a load device over desired ranges of torque and speed, and an assembly of friction elements with hydraulic fluid associated therewith, the friction elements for selectively disengaging and engaging the gears from the prime mover, where the control system includes means for sensing the input and output speeds of the transmission and generating signals representative thereof, means for sensing the power demand on the prime mover and generating signals representative thereof, means for providing an indication of a manually selected mode of operation for the transmission and generating signals representative thereof, and means for controlling the flow of hydraulic fluid associated with the operation of the friction elements; an electronic controller means for controlling the actuation of the means for controlling the flow of hydraulic fluid in response to said representative signals; a regulator circuit to generate a

switched voltage for the electronic controller; the regulator circuit comprising:

- a dual regulator having at least two voltage outputs, where at least one voltage output is switchable;
- high priority circuitry including a microcomputer electrically connected to one voltage output of the dual regulator;
- low priority circuitry including circuits peripheral to the microcomputer and electrically connected to the switchable voltage output of the dual regulator;



means for providing a signal to the dual regulator in response to a "key-on" condition to enable the one voltage output to provide power continuously to both the high and low priority circuitry; and the microcomputer including means for controlling the dual regulator to disengage the switchable voltage output in response to a "key-off" condition to reduce power to the low priority circuitry after a time period determined by the microcomputer when predetermined conditions exist.

4,959,787  
ELECTRIC POWER STEERING DEVICE HAVING A CLUTCH

Mitsuharu Morishita, Kosaku Uota, and Takeshi Yasukawa, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

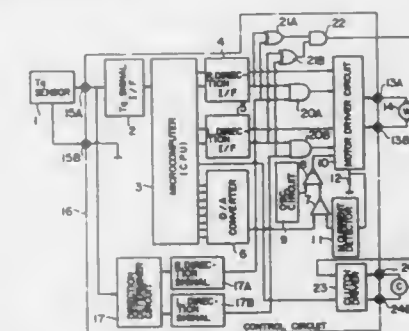
Filed Apr. 5, 1989, Ser. No. 333,503

Claims priority, application Japan, Apr. 6, 1988, 63-86121; Apr. 6, 1988, 63-86122; Apr. 26, 1988, 63-104706

Int. Cl.<sup>5</sup> B62D 5/04

U.S. Cl. 364—424.05

9 Claims



1. An electric motor assisted power steering device for an automotive vehicle which includes a steering wheel operated by an operator of the vehicle, at least one steered wheel, and a steering shaft operatively coupling the steering wheel to the steered wheel, said power steering device comprising:

- an electric motor rotatable in first and second directions by

a supply of a current in said first and second directions, wherein said electric motor provides an auxiliary torque to the steering shaft in right and left directions by rotating in said first and second directions, respectively;

clutch means for connecting and disconnecting said electric motor to and from the steering shaft;

torque sensor means for detecting a steering torque of the steering shaft applied by the operator of the vehicle via the steering wheel;

computation means, including a microcomputer coupled to an output of said torque sensor, for determining a direction of said auxiliary torque corresponding to said steering torque of the steering shaft applied by the operator, and for determining an amount of the auxiliary torque which is to be provided by said electric motor to the steering shaft;

direction determiner circuit means, coupled to an output of said torque sensor means, for determining a direction of said auxiliary torque corresponding to said steering torque of the steering shaft applied by the operator;

first logical circuit means, coupled to outputs of said computation means and said direction determiner circuit means, for generating a right direction signal when the directions determined by said computation means and said direction determiner circuit means are both the right direction, and generating a left direction signal when both are the left direction;

second logical circuit means, coupled to said outputs of said computation means and said direction determiner circuit means, for generating an output signal when the directions determined by said computation means and said direction determiner circuit means are in disagreement;

motor current control means, coupled to an output of said first logical circuit means, for controlling a current supplied to said electric motor to an amount corresponding to said amount of auxiliary torque determined by said computation means, wherein said motor current control means controls a direction of current supplied to said electric motor to said first direction in response to said right direction signal and to said second direction in response to said left direction signal; and

clutch driver means, coupled to an output of said second logical circuit means, for disengaging said clutch means to disconnect said electric motor from said steering shaft, in response to said output signal of said second logical circuit means.

**4,959,788**  
**IC CARD WITH KEYBOARD FOR PRESTORING**  
**TRANSACTION DATA**

**Masamori Nagata; Shinya Yoshida, both of Kyoto; Susumu Yamashita, Kanagawa, and Makoto Okahashi, Osaka, all of Japan, assignors to Omron Tateisi Electronics Co., Japan**  
**Continuation-in-part of Ser. No. 55,258, May 29, 1967, abandoned, and Ser. No. 711,818, Mar. 19, 1985, abandoned, said Ser. No. 55,258, is a continuation-in-part of Ser. No. 711,818. This application Apr. 14, 1988, Ser. No. 181,716**  
**Claims priority, application Japan, Mar. 19, 1984, 59-53949; Mar. 21, 1984, 59-54966; Mar. 21, 1984, 59-54967; Mar. 21, 1984, 59-54968; May 30, 1986, 61-126897**

Int. Cl.<sup>3</sup> G07F 7/10; G06K 1/18; G06F 15/30

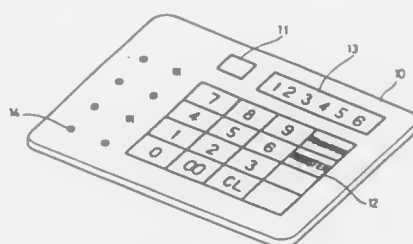
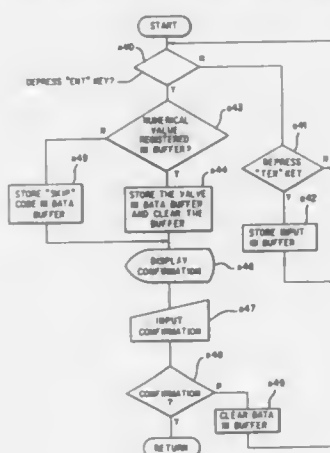
U.S. Cl. 364-408

1. An IC card transaction system comprising:

an IC card comprising first entry means for entering at least a part of the transaction processing data required to complete a transaction processing, and data storage means for storing the transaction processing data entered by said first entry means; and

an automatic transaction processing unit comprising (i) read out means for reading out transaction processing data stored in said data storage means of said IC card, (ii) a memory for storing transaction processing data read out from said data storage means of said IC card by said readout means, (iii) check means for checking said memory to determine what transaction data, which is required

for the processing of said transaction, is not stored in said memory, (iv) second entry means for entering transaction data into said transaction processing unit required for processing of said transaction which is not stored in said memory, and (v) means for executing said transaction processing using transaction data read out from said data storage means of said IC card and said transaction data entered by said



second entry means, wherein said first entry means includes means for entering and storing a "skip" code in said data storage means corresponding to those portions of said required transaction processing data which are not entered into said IC card, and wherein said check means checks said skip code to determine what transaction data, required for processing of said transaction, is not stored in said memory.

**4,959,789**  
**FUEL INJECTION CONTROL SYSTEM FOR AN**  
**AUTOMOTIVE ENGINE**

Mitsuo Nakamura, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 2, 1989, Ser. No. 306,868

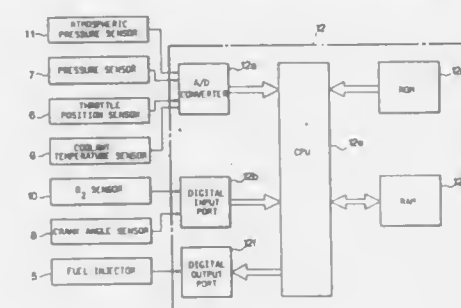
Claims priority, application Japan, Feb. 24, 1968, 63-41574  
Int. Cl.<sup>5</sup> F02M 51/00

U.S. Cl. 364-431.05

1. In a fuel injection control system for an automotive engine having a fuel injector for injecting a predetermined amount of fuel into said engine, a throttle valve mounted in an intake passage of said engine for controlling air-fuel mixture, an engine speed sensor for detecting engine speed and for producing a corresponding engine speed signal, a throttle position sensor for detecting opening degree of said throttle valve and for producing a corresponding throttle position signal, and a pressure sensor for sensing intake air pressure in said intake passage and for generating a corresponding pressure signal, the improvement in the control system which comprises:

averaging means responsive to said engine speed and said pressure signals for averaging said intake air pressure in

dependency on said engine speed and for producing a corresponding average signal;  
estimating means responsive to said engine speed and throttle position signals for estimating pressure in said intake passage for producing a corresponding estimated pressure signal;  
determining means responsive to said average signal and said estimated pressure signal for selecting said estimated pressure signal in a transient state of an operating condition of



the engine, and respectively, for selecting said average signal when said operating condition is in a steady state, for producing a set value signal corresponding to each of the transient and steady states; and

a calculator responsive to said engine speed signal and said set value signal for calculating a correct value of said predetermined amount for injecting an optimum amount of said fuel from said fuel injector so as to control said engine without any response delay in all ranges of said operating condition of said engine.

4,959,790  
APPARATUS AND METHOD FOR PRODUCING COLOR  
CORRECTED REPRODUCTION OF COLORED  
ORIGINAL IMAGES

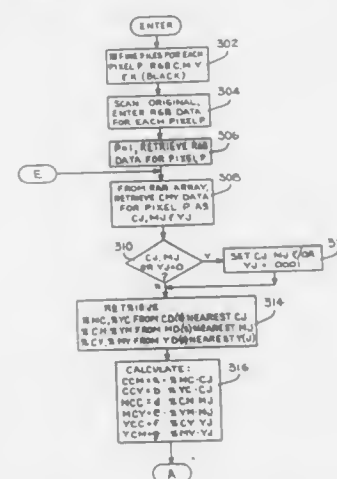
Fred P. Morgan, Fortson, Ga., assignor to F & S Corporation of  
Columbus, Georgia, Fortson, Ga.

Filed Jun. 28, 1988, Ser. No. 212,714

Int. Cl.<sup>5</sup> G03F 3/08, 3/10; G06F 15/64

U.S. Cl. 364-518

## 21 Claims



12. An apparatus for producing output signals representative of the agent color densities of coloring agents such as process inks or toners, to be used in producing a color-corrected image unit of an initial image unit using the coloring agents, said apparatus comprising:

a processing unit, having memory means for storing selected

data therein, for receiving input signals and for producing output signals in response thereto;

means for entering input signals into the processing unit which are respectively representative of color readings of the image to be finally produced using the coloring agents;

said processing unit including

means for determining initial agent color densities that correspond relatively to said color readings entered into said processing unit,

means for retrieving from said memory means previously stored data representative of respective contribution factors corresponding to the contribution to each of the agent colors from each of the other coloring agents,

means for retrieving from the memory means previously stored data representative of certain predetermined non-linearity correction factors which are representative of the particular coloring agents to be used in producing said image unit,

means for calculating, for each agent color of a respective coloring agent, a contribution amount to each of the other coloring agents as a function of the effected thereon of the respective initial color density, contribution factor, and correction factor;

means for calculating, for each agent color, a final agent color density as a function of its corresponding initial density and the contribution amounts from the other coloring agents, and

means for producing output signals representative of each of said final agent color densities.

**4,959,791**  
**CONTROL SYSTEM FOR ENHANCING GRAY TONES**  
**OF A DIGITALLY OPERATED PRINTER**

Richard S. Salisbury, Saffron Walden, and Michael R. Preece, Rampton, both of England, assignors to Amansol Enterprises No. 17 Ltd., Gibraltar

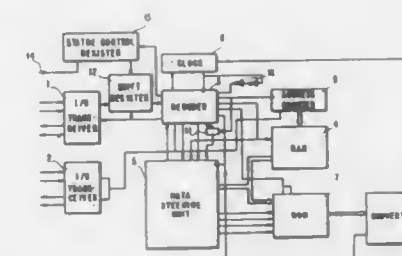
Filed Feb. 19, 1988, Ser. No. 157,961

Claims priority, application United Kingdom, Feb. 20, 1987  
8704051

U.S. Cl. 364-519

Int. Cl.<sup>5</sup> G09G 1/14

### 11 Claims



1. A control system for enhancing an image signal in a digitally operated printing system of the kind having a printer mechanism operated by operational digital data signals for printing matrices of dots defining pictures elements, wherein each matrix has a gray tone determined by the pattern of dots in the respective matrix, and image signal generating means for generating such operational digital data signals representative of tonal characteristics of an image to be printed, wherein said control system is connected between the image signal generating means and the printer mechanism to modify the data signals produced by the image signal generating means and to supply modified data signals to the printer mechanism to cause the printer mechanism to print enhanced matrices defining picture elements having enhanced gray tones, said control system comprising an input device to supply a stream to input operational digital data signals from said image signal generating means, and an output device connected to said input device to produce modified operational digital data signals, said input



and output devices being interconnected by a conversion device to identify patterns of predetermined input groups of said input operational digital data signals and to produce therefrom output groups of said modified operational digital data signals corresponding to said enhanced matrices, each such output group having a pattern predetermined by the pattern of the corresponding input group and comprising a greater number of digital data signals supplied at a greater rate relative to the corresponding input group.

4,959,792

## HARNESS INTEGRITY TESTER (HIT)

Thomas P. Sullivan, 10427 W. Calle de Plata, Phoenix, Ariz. 85039

Continuation-in-part of Ser. No. 822,212, Jan. 24, 1986, abandoned. This application Sep. 10, 1987, Ser. No. 95,016

Int. Cl.<sup>5</sup> G05B 23/02; G01R 19/25

U.S. Cl. 364-579

6 Claims



1. A maintenance system for detecting, in each of a plurality of generally identical cables, faults which cause intermittent attenuation of electromagnetic radiation transmitted through the cable, each of said cables including a plurality of lines extending the length of the cable, each of said cables having a first end including first connector means and having a second end including second connector means, each of said plurality of lines terminating at said first and second connector means, each of said first and second connector means normally being removably connected to mating means in a system, each of said connector means being disconnected from said mating means during utilization of said maintenance system, said maintenance system including:

(a) a transportable control unit including:

- (i) means for attaching said control unit to said first connector means of a selected one of said cables to connect said control unit and the selected cable, and
- (ii) control means for selectively directing both a first continuity evaluation quantity of electromagnetic radiation and a second load evaluation quantity of electromagnetic radiation sequentially into each of said lines at said first end of the selected cable, said first continuity evaluation quantity of electromagnetic radiation being relatively minimal in degree by comparison to the amount of electromagnetic radiation normally conducted by each of said lines of the selected cable under normal load conditions and serving merely to confirm that such electromagnetic radiation reaches the second end of the selected cable, said second load evaluation quantity of electromagnetic radiation being relatively similar in degree to the amount of electromagnetic radiation normally conducted by each of said lines of the selected cable under normal load conditions;

(b) a transportable detector unit independent of said control unit and including:

- (i) means for attaching said detector unit to said second connector means of the selected cable to connect said detector unit and the selected cable, and
- (ii) sensor means for measuring the quantity of electromagnetic radiation reaching said second end of the selected cable in each of said lines when said control means directs said first and second quantities of electromagnetic radiation into each of said lines of said first end of the selected cable, said sensor means measuring continuity evaluation fault detection information for each of said lines when said control means directs said first continuity evaluation quantity of electromagnetic

radiation sequentially into each of said lines at said first end of the selected cable, said sensor means measuring load evaluation fault detection information for each of said lines when said control means directs said second load evaluation quantity of electromagnetic radiation sequentially into each of said lines at said first end of the selected cable;

(iii) storage means for storing, as continuity evaluation-reference information and load evaluation-reference information for each of said lines, nominal quantities of electromagnetic radiation measured for each of said lines at said second end of a plurality of said identical cables when said first and second quantities of electromagnetic radiation respectively are directed into said lines at said first end of said plurality of identical cables, said storage means including means for recalling said continuity evaluation-reference information and load evaluation-reference information stored therein for each of said lines; and

(iv) comparison means coupled to said sensor means and coupled to said storage means for comparing said load evaluation-fault detection information and continuity evaluation-fault detection information with said recalled reference measurement information and generating load fault-identification information and continuity fault-identification information in response to such comparison.

4,959,793

## MICROCOMPUTER HAVING FUNCTION OF GENERATING DATA SIGNALS USED FOR DISPLAYING CHARACTERS

Hiroyuki Suzuki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

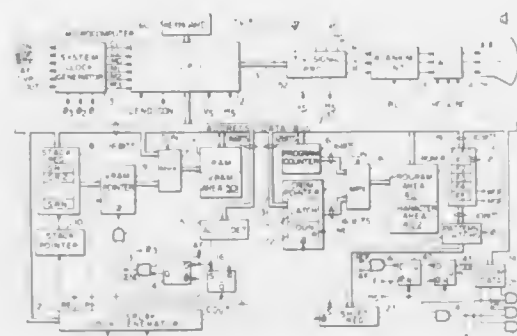
Filed Apr. 21, 1988, Ser. No. 184,567

Claims priority, application Japan, Apr. 22, 1987, 62-100502

Int. Cl.<sup>5</sup> G06F 13/00

U.S. Cl. 364-900

10 Claims



1. A microcomputer comprising:

- a memory including a first area storing a plurality of instructions and a second area storing character data,
- first means for making access to said first area to read an instruction,
- second means for executing said instruction read from said first area, said second means including means for generating a character display command signal by executing said instruction read from said first area, said character display command signal changing between a first state and a second state in a predetermined cycle,
- third means, including first storage means, for temporarily storing address information for reading said character data from said second area,
- fourth means, responsive to said character display command signal, for coupling said first means to said memory to allow said first means to read said instruction from said

first area when said character display command signal is in said first state and for coupling said third means to said memory to allow said third means to access said second area when said character display command signal is in said second state, said character data being read from an address location in said second area designated by said address information when said access to said second area is allowed,

second storage means for temporarily storing character data read from said second area, and

fifth means for receiving character data stored in said second storage means in response to a character data output command signal and for shifting received character data in response to a shift clock,

wherein said second means suspends execution of instructions during a term in which said character display command signal is in said second state and resumes execution of instructions in response to a change of said character display command signal to said first state.

4,959,794

## DRIVING WHEEL SLIP CONTROL DEVICE

Shuji Shiraiishi, Wako, Hirohisa Kiyu; Takashi Nishihara; Naoki Omomo and Makoto Sato, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

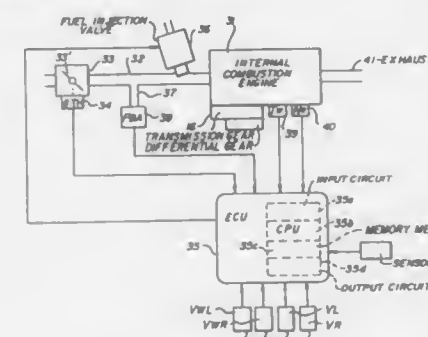
Filed Dec. 5, 1988, Ser. No. 279,693

Claims priority, application Japan, Oct. 12, 1987, 62-314589

Int. Cl.<sup>5</sup> B60K 31/00

U.S. Cl. 364-426.03

7 Claims



1. A driving wheel slip control device comprising:

- a driving wheel velocity sensor means for detecting velocity of a driving wheel of a vehicle;
- a vehicle velocity means for detecting velocity of the vehicle;
- an engine revolution number sensor means for detecting number of revolutions of an engine of the vehicle;
- a slip detecting means, connected to said driving wheel velocity sensor means, for detecting a state of slip of the driving wheel according to an output from said driving wheel velocity sensor means;
- an engine output reducing means, connected to said slip detecting means, for reducing an output of the engine in accordance with an output from said slip detecting means;
- a prohibition region determining means, connected to said vehicle velocity sensor means and said engine revolution number sensor means, for determining a control prohibition region in accordance with velocity of the vehicle and number of revolutions of the engine; and
- a prohibition means, connected to said engine output reducing means and said prohibition region determining means, for prohibiting said engine output reducing means from operating to reduce an output of the engine when an output from said vehicle velocity sensor or engine revolution number sensor is in said control prohibition region.

4,959,795

## INSERTION MACHINE WITH DISTRIBUTED CHARGEBACK

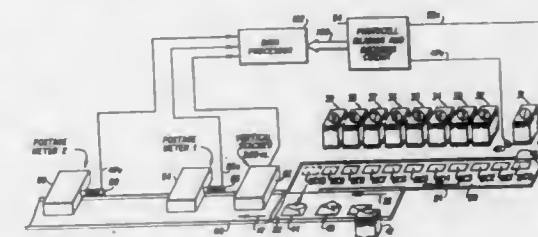
Dean Christensen, St. Louis, Mo.; David J. Helfrich, Bethlehem, Pa.; Christopher K. Scullion, Catasauqua, Pa., and Edward W. Hindle, Whitehall, Pa., assignors to Bell & Howell Company, Chicago, Ill.

Continuation-in-part of Ser. No. 6,853, Jan. 27, 1987, Pat. No. 4,797,830, which is a continuation of Ser. No. 818,389, Jan. 13, 1986, Pat. No. 4,639,873, which is a continuation of Ser. No. 576,839, Feb. 3, 1984, abandoned. This application Jan. 9, 1989, Ser. No. 294,726

Int. Cl.<sup>5</sup> G07B 17/02

U.S. Cl. 364-464.03

22 Claims



1. A machine of the type in which a plurality of feed stations feed items onto an insertion track for inclusion with an associated group of items, wherein the improvement comprises:

- means for designating at least one of said feed stations as a primary feed station;
- means for designating at least two of said feed stations as chargeback feed stations;
- processing means including memory means and arithmetic logic means;
- means including said processing arithmetic logic means for using values indicative of the per item weight of items held in said primary feed station and said chargeback feed stations to obtain a calculated total weight with respect to a group of items;
- means for using said calculated total weight to determine a postage category in which said group of items is to be classified;
- means for determining whether the feeding from at least one chargeback station requires that said group of items be classified in a higher postage category than in which said group otherwise would have been classified; and
- means for apportioning, among the chargeback feed stations which fed items for inclusion with said group, the increase in postage cost occasioned by the classification of said group in said higher postage category.

4,959,796

## METHOD OF PRODUCING ANALYTICAL CURVE

Seiji Hiedaka; Takashi Ishihara, both of Tachikawa; Takahiko Hamaguchi, Hachioji; Nobuaki Segiyama, Hino, and Koukei Toura, Hachioji, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Nov. 9, 1988, Ser. No. 268,928

Claims priority, application Japan, Nov. 10, 1987, 62-283763

Int. Cl.<sup>5</sup> G06F 15/42

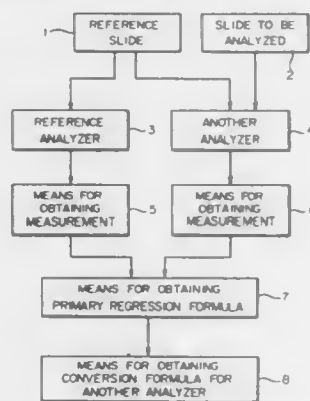
U.S. Cl. 364-497

13 Claims

1. A method of producing an analytical curve for an analyzing apparatus, the apparatus providing an analysis result on the basis of said analytical curve in response to a measurement value obtained by photoelectrically measuring light intensity reflected from a slide to be analyzed, the method comprising the steps of:

- measuring a plurality of reference slides by using a first analyzing apparatus which has a predetermined analytical curve, thereby obtaining a plurality of first measurement values and providing a plurality of first analysis results;
- measuring said plurality of reference slides by using a second

analyzing apparatus, thereby obtaining a plurality of second measurement values; and  
producing an analytical curve for said second analyzing apparatus to provide a plurality of second analysis results



on the basis of a relation between said first measurement values and said second measurement values so that said plurality of second analysis results correspond to said plurality of first analysis results.

4,959,797

**SYSTEM FOR TIGHTENING THREADED FASTENER ASSEMBLIES**

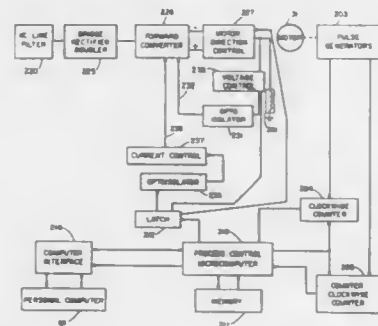
James L. McIntosh, Westminster, Colo., assignor to Tensor Development, Inc., Westminster, Colo.

Continuation-in-part of Ser. No. 805,719, Dec. 6, 1985, abandoned, and a continuation-in-part of Ser. No. 131,991, Dec. 11, 1987, Pat. No. 4,891,764. This application Mar. 18, 1988, Ser. No. 169,974

Int. Cl.<sup>3</sup> G05D 13/02, 17/02; G05F 1/10

U.S. Cl. 364—506

39 Claims



1. A system for the tightening of threaded fastener assemblies comprising:

- a driveshaft having an adapter on one end for receiving a tool for receiving and rotating a threaded fastener;
- a direct current electric motor having a shaft connected to said driveshaft, said motor being operable in the current mode to control the force applied to the shaft thereof by varying the current through the windings;
- means mounted to said motor shaft for rotation therewith and for providing an output signal indicative of the rotary position of said shaft with respect to a reference position, said means for providing an output signal including: optical encoder means operably connected to said shaft of said electric motor for rotation therewith;
- means responsive to movement of said encoder means for producing a train of output pulse patterns; and
- counter means connected to said output pulse pattern

producing means for maintaining a value indicative of the displacement of said shaft;  
a clock for providing timing pulses;  
current regulator means connected to windings of said motor; and

processor means responsive to said output signals and to said timing pulses for controlling the output of said regulator and varying the current through the windings of said motor to provide a preprogrammed value of force exerted by the shaft of said motor and, thereby, the force exerted by said drive shaft in rotating a fastener to tighten it upon a threaded receiving means, said processor means includes a microprocessor responsive to both a predetermined value in said counter means and to the force exerted upon said driveshaft by said motor shaft exceeding a preselected value for interrupting the current from said current regulator means to the windings of the motor.

8. A method for determining the value of an unknown torque opposing the rotation of a tool driveshaft for tightening of a threaded fastener assembly which driveshaft is connected to the shaft of an electric motor of the type in which the force applied to the shaft is a linear function of the current through the motor, comprising:

- supplying current to the motor with a current mode controlled regulator having a plurality of discrete selectable current values;
- producing signals indicative of the direction and extent of the movement of the driveshaft of the tool;
- providing regular periodic timing pulses;
- providing a program controlled processor for receiving said driveshaft movement signals and said timing pulses;
- periodically calculating from said driveshaft movement signals and said time pulses the acceleration of the driveshaft;
- calibrating the motor of the tool by calculating driveshaft acceleration values with no load and a resistance torque of known value for a plurality of discrete current values being supplied to the motor to determine the torque applied to a threaded fastener by the driveshaft of the motor for each of said discrete selectable current values from the regulator;
- performing said calculations using said processor;
- varying the current supplied by the regulator to the motor with the resistance torque of unknown value connected to the driveshaft thereof until the acceleration of the driveshaft is about zero and determining the value of the unknown torque from the current value at that point; and
- controlling said current regulator using said processor to vary the current delivered to the motor in accordance with said calculations.

4,959,798

**ROBOTIC TELEVISION-CAMERA DOLLY SYSTEM**  
Gary B. Gordon, Saratoga, Calif., and Robert R. Gonnelli, Valley Cottage, N.Y., assignors to Total Spectrum Manufacturing Inc., Valley Cottage, N.Y.

Filed Jan. 23, 1988, Ser. No. 228,933

Int. Cl.<sup>3</sup> F16M 3/00

U.S. Cl. 364—513

13 Claims

1. A positioning system for moving a dolly member between first and second positions in a plane, said dolly member having an axis of rotation normal to the plane and a reference direction normal to said axis of rotation, said dolly member further including first means for the translation thereof in the plane and second means for the rotation thereof about said axis of rotation, the system comprising:

- first and second target means having fixed locations relative to the first and second positions on said plane respectively, each of said target means having an origin defining its respective position and reference means defining a given direction in the plane;
- first control means coupled to said first means for translating said dolly member, said first control means controlling the

translation of said dolly member along a predetermined path from said first position to a position at which the axis of rotation of said dolly member is in the vicinity of said second position;

detecting means for generating first and second control signals, said first control signal corresponding to the non-coincidence of the axis of rotation of said dolly member with the origin of said second target means and said second control signal corresponding to the non-coincidence of the reference direction of said dolly member with the given direction defined by said second target means; and

means for storing a set of knowledge items therein, and inference means for interpreting the knowledge items for execution, an inference method comprising the steps of:

- (a) storing a plurality of series of priority level information items which set precedence degrees among the knowledge items within the knowledge set;
- (b) designating one of the plurality of series of priority level information items; and
- (c) selecting one knowledge item on the basis of the priority level information series designated by the designating step, in a case where a plurality of available knowledge items exist when said inference means interprets the knowledge items for execution.

4,959,800

**METHOD AND APPARATUS FOR DETERMINING THE POSITION AND VELOCITY OF A TARGET IN INERTIAL SPACE**

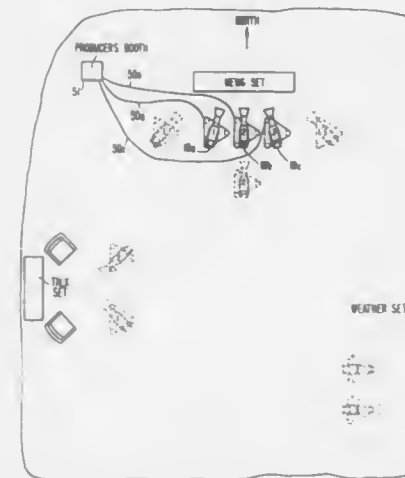
Richard L. Woolley, Canoga Park, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed May 20, 1988, Ser. No. 197,015

Int. Cl.<sup>3</sup> G01S 13/06

U.S. Cl. 364—516

10 Claims



second control means coupled to said first and second means for translating and rotating respectively said dolly member, said second control means being responsive to said first and second control signals for controlling the translation of said dolly member to bring the axis of rotation thereof into coincidence with the origin of said second target means and controlling the rotation of said dolly member to bring the reference direction thereof into coincidence with the given direction defined by said second target means.

4,959,799

**INFERENCE METHOD AND SYSTEM**

Hiroshi Yoshimura, Takeshi Chusho, both of Yokohama; Shoichi Masui, Kawasaki, and Hideo Ohata, Machida, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

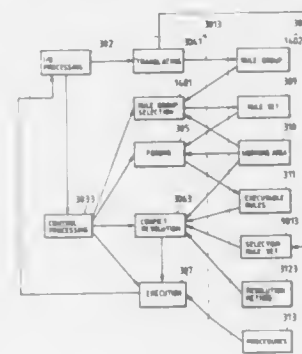
Filed Nov. 3, 1988, Ser. No. 266,898

Claims priority, application Japan, Nov. 5, 1987, 62-279878

Int. Cl.<sup>3</sup> G05B 15/18

U.S. Cl. 364—513

19 Claims



4,959,801

**OUTLINE-TO-BITMAP CHARACTER GENERATOR**  
Philip G. Apley, Allston; David A. Berlow, and John S. Collins, both of Boston, all of Mass., assignors to Bitstream Inc., Cambridge, Mass.

Continuation of Ser. No. 827,239, Feb. 7, 1986, Pat. No. 4,785,391. This application Oct. 14, 1988, Ser. No. 257,636. The portion of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> G06F 3/14

U.S. Cl. 364—518

8 Claims

- 1. In an inference machine having knowledge set memory of a selected character from a digital representation of the





storing only the most recently received signal, said coordinate memory means providing at an output terminal, the signal representative of the coordinate value stored in said coordinate memory means;

detection signal memory means for receiving and storing a detection status signal indicating that a coordinate input operation has occurred, said detection signal memory means having a detection status signal receiving input terminal, and providing at an output terminal a detection signal status signal which indicates whether a coordinate input operation has occurred since the time a previous coordinate value was provided from said coordinate detecting device to said host computer;

comparing means including a preceding coordinate value memory means for storing a signal representative of the last coordinate value sent by said coordinate detecting device to said host computer, said comparing means having a first input terminal for receiving a signal representative of the last coordinate value sent by said coordinate detecting device to said host computer and having a second input terminal for receiving a signal representative of a coordinate value from said coordinate value obtaining means output terminal representing an indication that no detection signal has been received by said detection presence/absence judging means, said signal is provided to said preceding coordinate value memory means when a host computer reset signal is provided to said coordinate detecting device, said preceding coordinate value memory means further having a first preceding coordinate value means input terminal coupled to said coordinate value obtaining means output terminal, said preceding coordinate value means input terminal coupled to said coordinate detecting device output terminal which provides an output to said host computer, said comparing means having an output comparator which receives a signal representative of the signal stored in the preceding coordinate value memory means at a first input terminal, said comparing means output comparator having a second input terminal coupled to said coordinate memory means output terminal for receiving the signal representative of the coordinate value stored in said coordinate memory means, and said output comparator compares said signal representative of a coordinate value stored in said preceding coordinate value memory means with the signal representative of a coordinate value stored in said coordinate memory means and provides at an output terminal of said output comparator a signal for controlling the output of the last signal representative of a coordinate value last stored in said coordinate memory means to said host computer when said comparing means output comparator determines that said signal representative of a coordinate value stored in said coordinate memory means is different than said signal representative of a coordinate value stored in said preceding coordinate value memory means and when a comparing means controlling input signal is received at an input terminal of said output comparator causing said comparing means output comparator signal to be generated to permit said signal representative of a coordinate value stored in said coordinate memory means to be outputted to said host computer;

operation controlling means, including status generating circuitry for generating a detection status signal in response to receipt of a series sensing signal, said operation controlling means having an output terminal coupled to said counting circuit reset input terminal, an input terminal coupled to said scan termination judging means output terminal, having an input coupled to said detection signal series sensing signal output terminal, an output terminal for providing said detection status signal, an input terminal coupled to said output terminal of said detection signal memory means, an output terminal coupled to said coordinate value outputting control signal terminal, and an output terminal at which a coordinate memory means output controlling signal is provided, said operation controlling

means further including control circuitry for providing control signals upon receipt of each said scan termination signal, said control circuitry providing a reset signal to said counting circuit if no series sensing signal was received and no coordinate input operation has occurred since the time a previous coordinate value was provided from said coordinate detecting device to said host computer, said circuitry further providing a reset signal to said counting circuit, providing a coordinate value outputting control signal, providing a detection status signal, and providing a comparing means controlling input signal, if a series sensing signal was received, and said control circuitry providing a coordinate memory means output controlling signal and providing an output signal to cause said coordinate value stored in said coordinate memory means to be outputted, if no series sensing signal was received and at least one coordinate input operation had occurred since the time a previous coordinate value was provided from said coordinate detecting device to said host computer; and

outputting means, including at least one control terminal, for selectively coupling said coordinate memory means output terminal to said host computer, and providing an input signal to said host computer in response to receipt of said coordinate memory means output controlling output signal from said output controlling means, at said at least one control terminal and further providing an input signal to said host computer in response to receipt of said comparing means output comparator signal from said comparing means output comparator at said at least one control terminal, said at least one control terminal being coupled to said said coordinate memory means output controlling output terminal of said operation controlling means and said output comparator signal terminal of said comparing means output comparator.

4,959,806

#### APPROXIMATED ROTATIONAL SPEED SIGNAL FOR SHIFTING TRANSMISSION

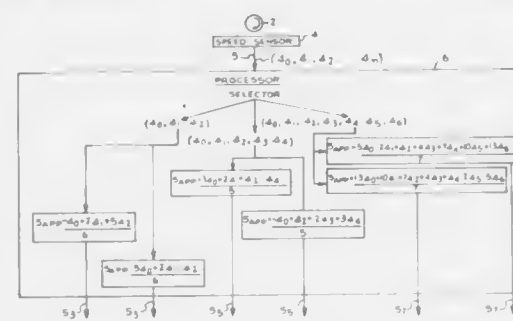
Gary L. Gold, Schoolcraft, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Oct. 24, 1988, Ser. No. 261,448

Int. Cl. 5 G01P 3/00

U.S. Cl. 364-565

15 Claims



1. A linear method for determining approximate mean rotational speed of a rotating member for controlling shifting points of a vehicular transmission, said method including the steps of:

(a) determining a desired array of linear equivalents for the equation:

$$S_{(approx)} = \frac{\sum t_n s_n}{\sum t_n^2} \left( \frac{N-1}{2} \right) + \frac{\sum s_n}{N}$$

4,959,808

#### METHOD AND APPARATUS FOR THE DISTANCE CONTROL OF A POSITIONING DRIVE

Ingemar Neuffer, Erlangen, and Christian Keller, Nuremberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

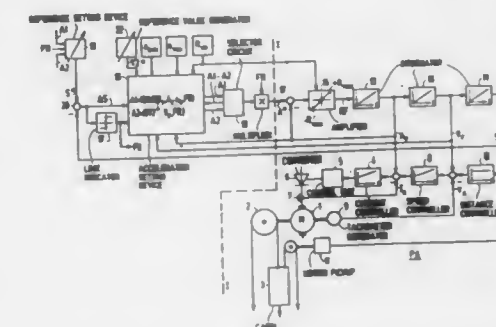
Filed Apr. 18, 1988, Ser. No. 182,847

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1987, 3713271

Int. Cl. 5 G01P 15/00; B66B 1/24

U.S. Cl. 364-566

8 Claims



Wherein N is an odd whole integer greater than one and equals the number of speed measurements taken within a predetermined time period T;

$t_n$  equals selected incremental time periods within time period T at which rotational speed  $s_n$  of the rotating member is measured such that  $t_n = t_0, t_1, t_2, t_3, \dots$  and  $(t_1 - t_0) = (t_2 - t_1) = (t_3 - t_2) = \dots$ ;

$s_n$  are the individual speed measurements taken within time period T where  $s_n = s_1, s_2, s_3, \dots, s_N$ ;

$(N-1/2)$  is the even number of speed measurements on opposite sides of an orthogonal axis whose origin is located at the middle value of  $t_n$  and whose ordinate is speed and whose abscissa is time and for which  $t_n$  has the value of zero at the origin with values of  $t_n$  having opposite signs on opposite sides of the ordinate and the value of  $s_n$  is positive in all quadrants;

- selecting a desired linear equivalent for  $S_{(approx)}$  from the array of step (a);
- measuring and providing signals indicative of the rotational speed values  $s_n$  of the rotating member according to the linear equivalent selected for  $S_{(approx)}$  at step (b);
- determining  $S_{(approx)}$  by processing the speed signals of step (c) according to the linear equivalent selected therefor at step;
- providing a signal corresponding to  $S_{(approx)}$  step (d), and
- controlling the shifting points of the transmission with the signal of step (e).

4,959,807

#### DEVICE FOR MEASURING THE SPEED OF A MOVING OBJECT

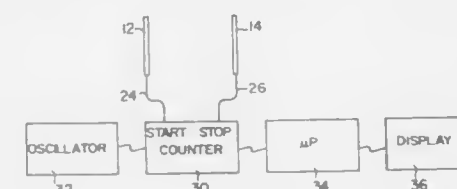
Mitchell L. Thompson, Exton; Kyung T. Park, Upper Darby; Kumar Ogale, Philadelphia, and William B. Powers, Exton, all of Pa., assignors to Atochem North America, Inc., Philadelphia, Pa.

Filed Oct. 11, 1988, Ser. No. 255,932

Int. Cl. 5 G01P 3/66

U.S. Cl. 364-565

16 Claims



1. Apparatus for measuring speed of a moving object, comprising:

- first impact detection means disposed in a path of movement of the object including a piezoelectric film transducer for generating an electrical signal upon an impact on the first impact detection means;
- second impact detection means, disposed in the path of movement of the object, parallel to and separated by a preselected distance from the first impact detection means including a transducer for generating an electrical signal upon an impact on the second impact detection means, the respective signals from the first and second impact detection means being separated by a time interval representative of the preselected distance;
- means responsive to the respective signals from the first and second impact detection means for measuring the time interval between the respective signals; and
- computing means for computing the speed of the object from the time interval.

1. A method for providing a stepwise, acceleration and velocity limited travel distance control for a positioning drive having a subordinated velocity control where an acceleration value, a controlled velocity reference value and a distance reference value of the positioning drive are controlled with multiple time integration of a step value, an amplified difference between an acceleration reference value and a time integral of the step value being limited in maximum magnitude to form the step value, comprising the steps of:

- forming a first alternative acceleration reference value as a function of a residual travel distance with which the positioning drive would not go beyond a predetermined point that is located at a given travel distance ahead of a predetermined stopping point using constant deceleration;
- forming a second alternative acceleration reference value as a function of the controlled velocity reference value with which the positioning drive can be brought to a determinable velocity without overshoot;
- limiting the second alternative acceleration reference value between the limits for the acceleration and deceleration as a function of the controlled velocity reference value and a travel direction signal according to the relationship:

$$A2 = \sin(V2^\circ - FR \cdot V) \cdot \sqrt{|V2^\circ - FR \cdot V| \cdot 2 \cdot R_{max}}$$

where  $R_{max}$  represents the maximum step value and  $V2^\circ$  is a predeterminable velocity value which is set to the value zero when the first alternative acceleration reference value becomes smaller than zero; and

- selecting with a selection circuit, at each of a number of possible stopping points, either said first or second alternative acceleration reference values according to the following:
  - using the second alternative acceleration reference value once motion has started;
  - using the first alternative acceleration reference value to initiate destination braking; and
  - using the second alternative acceleration reference value for approaching the predetermined stopping point if the positioning drive has reached a point that is located four times the value of the given travel distance ahead of the predetermined stopping point.



4,959,809

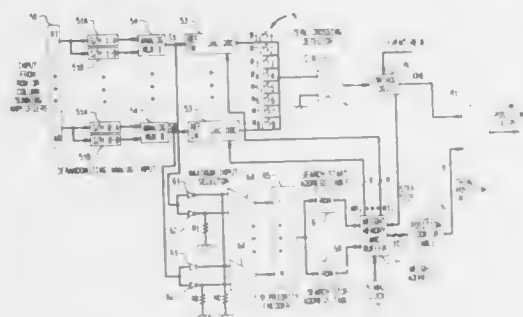
**MULTIPLE SENSOR POSITION LOCATING SYSTEM**  
W. Leslie Rogers, and Neal H. Clithorne, both of Ann Arbor, Mich., assignors to The University of Michigan, Ann Arbor, Mich.

Continuation-in-part of Ser. No. 876,762, Jun. 20, 1986, Pat. No. 4,852,056, and a continuation-in-part of Ser. No. 196,928, May 20, 1988. This application Dec. 28, 1988, Ser. No. 322,095. The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> G06F 15/20; G01T 1/20

U.S. Cl. 364—581

11 Claims



1. A system for locating a position of a source of a detectable emittance, the system comprising:

- a plurality of sensors arranged in a predetermined configuration with respect to one another, each for detecting the detectable emittance and producing at an associated output thereof a respective sensor signal having a sensor signal value which is substantially responsive to the detectable emittance impinging on said associated sensor;
- memory means for storing a plurality of weighting values, each associated with a respective one of said sensors, said weighting values being responsive to a sensor response characteristic of said associated one of said sensors and corresponding to a predetermined distance value;
- means for searching said memory means and selecting at least one of said weighting values, within a predetermined range of memory addresses;
- arithmetic combiner means having a first input for receiving at least one of said sensor signals, and a second input for receiving a weighting value from said memory means, for producing at an output thereof a composite weighted signal having a composite weighted signal value responsive to said sensor signal value and said weighting value; and
- position encoder means for producing a position value responsive to a composite weighted signal value, said position value corresponding to the a maximum likelihood position estimate of the detectable emittance.

4,959,810

**UNIVERSAL REMOTE CONTROL DEVICE**

Paul V. Darbee, Santa Ana; Richard E. Ellis, Garden Grove; Louis S. Jansky, Long Beach, and Avram S. Grossman, Santa Ana, all of Calif., assignors to Universal Electronics, Inc., Tustin, Calif.

Continuation-in-part of Ser. No. 109,336, Oct. 14, 1987, abandoned. This application Dec. 2, 1987, Ser. No. 127,999

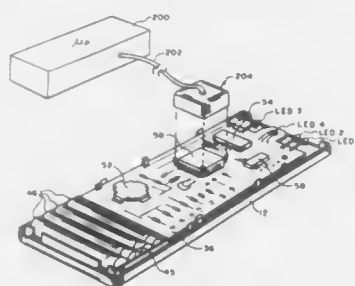
Int. Cl.<sup>3</sup> H04B 9/00; G08C 19/00; H04Q 1/00

U.S. Cl. 364—900

38 Claims

1. In a universal remote control system having input means for inputting commands, signal output means for supplying an infrared signal to a controlled device and a central processing unit (CPU) coupled to said input means and to said signal output means, the improvement residing in said system comprising no ROM, a single non-volatile, read-write RAM coupled to said central processing unit and data coupling means

including terminal means coupled to the CPU for enabling new code data to be supplied from outside the system to, or retrieved from, said RAM through said terminal means and the CPU.



trieved from, said RAM through said terminal means and the CPU.

4,959,811

**CONTENT ADDRESSABLE MEMORY INCLUDING COMPARISON INHIBIT AND SHIFT REGISTER CIRCUITS**

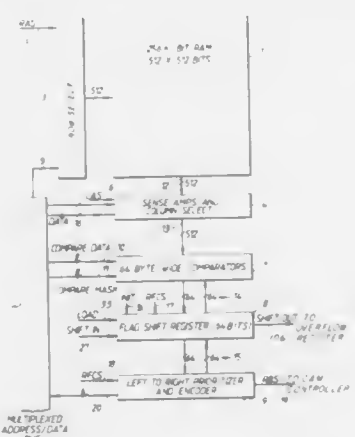
Andre Szczepanek, Bedford, England, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 3, 1986, Ser. No. 926,433

Int. Cl.<sup>3</sup> G11C 15/04

U.S. Cl. 365—49

16 Claims



1. A content addressable memory including comparison inhibit and shift register circuits comprising: memory means having a plurality of storage elements accessible in blocks, each block including the same number of elements in a plurality of equal groups in a particular order; comparator means having a plurality of comparators respectively corresponding to the groups in each block, each comparator having first and second sets of inputs, each set equal in number to the elements in a group, and producing a match indication as to whether or not the groups of data bits applied to the sets of inputs are the same, means storing an input key code consisting of a plurality of groups of data bits, each group of data bits having the same number of data bits as there are storage elements in a group; control means for selectively accessing a block of storage elements in the memory means so that the data bits stored therein are simultaneously applied to the first set of inputs of respective ones of the comparators, and for applying a group of data bits from an input key code simultaneously to the second set of inputs of each comparator, characterized in that there is provided flag register means having storage elements respectively corresponding to the comparators of the comparator means, the match indications from the comparators being stored in the storage elements of the flag register means, the

control means being arranged to apply the groups of data bits from the input key code in succession in a predetermined order to the second set of inputs of each comparator, each comparator including means for disabling itself following a comparison of an immediately preceding group of data bits from the input key code, where that comparison produced, from the next adjacent comparator earlier in the particular order, an indication that the groups did not match; output means responsive to a positive match indication from the comparators following a comparison with the final group of data bits from the input key code to identify the location in the accessed block of groups of data bits matching the input key code.

4,959,812

**ELECTRICALLY ERASABLE PROGRAMMABLE READ-ONLY MEMORY WITH NAND CELL STRUCTURE**

Masaki Momodomi; Fujio Masumoto, both of Yokohama; Rii-chiro Shirota; Yasuo Itoh, both of Kawasaki; Kazuo Ohuchi, and Ryohei Kirisawa, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 27, 1988, Ser. No. 289,702

Claims priority, application Japan, Dec. 28, 1987, 62-329781

Int. Cl.<sup>3</sup> G11C 17/00

U.S. Cl. 365—185

15 Claims



1. A non-volatile dynamic semiconductor memory device comprising:

- (a) a semiconductive substrate having a major surface;
- (b) a semiconductive well region formed in said surface of said substrate, said well region being provided separate from a well region in which transistors are formed to constitute a peripheral circuit of said memory device;
- (c) parallel bit lines provided above said substrate;
- (d) rewritable memory cells connected to said bit lines, said memory cells comprising NAND cell blocks each of which has a series array of memory cell transistors, each of said memory cell transistors having a charge accumulation layer, a control gate and semiconductive layers formed in said well region to function as sources and drains, and said well region functioning as a surface breakdown prevention layer; and
- (e) control means for writing data into memory cells of a selected NAND cell block sequentially during a data write mode subsequent to the data erase mode, said control means applying, when a certain memory cell of said selected NAND cell block is subjected to writing, to said control gate of said certain memory cell a voltage to form such a strong electric field as to allow the transfer of charges between said charge accumulation layer of said certain memory cell and said well region.

4,959,813

**SERIAL INPUT-OUTPUT CIRCUIT FOR FORWARD AND BACKWARD PRODUCING BITS FROM BIDIRECTIONAL SHIFT REGISTERS**

Toshiya Todoroki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

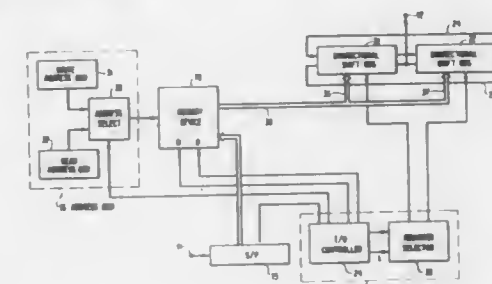
Filed Apr. 14, 1989, Ser. No. 338,070

Claims priority, application Japan, Apr. 14, 1988, 63-92831

Int. Cl.<sup>3</sup> G11C 7/00

U.S. Cl. 365—189,12

4 Claims



1. In a serial input-output circuit comprising an input shift register supplied with an input serial bit sequence for producing a sequence of output bit groups, each consisting of a first predetermined number of parallel bits, a memory device for memorizing said output bit groups as memorized bit groups, and output means connected to said memory device for producing a predetermined part of said memorized bit groups as an output serial bit sequence selectively forwardly and backwardly of said input serial bit sequence, the improvement wherein said output means comprises:

- first and second bidirectional shift registers, each for one of said memorized bit groups;
- storing means connected to said memory device and said first and said second bidirectional shift registers for bit parallel storing the parallel bits of a selected one of said memorized bit groups as partial held bits in a selected one of said first and said second bidirectional shift registers;
- shifting means for bidirectionally shifting through said first and said second bidirectional shift registers total held bits held in said first and said second bidirectional shift registers; and
- producing means connected to one of said first and said second bidirectional shift registers for producing a second predetermined number of the total held bits in bit series as said predetermined part of the memorized bit groups.

4,959,814

**SENSING DETECTION CIRCUIT IN DYNAMIC RANDOM ACCESS MEMORY**

Soo I. Cho, Seoul, and Si D. Choi, Suwon, both of Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed Dec. 28, 1988, Ser. No. 290,991

Claims priority, application Rep. of Korea, Mar. 17, 1988, 88-2801

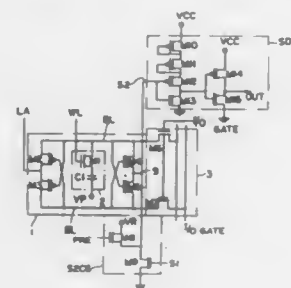
Int. Cl.<sup>3</sup> G11C 7/00

U.S. Cl. 365—207

4 Claims

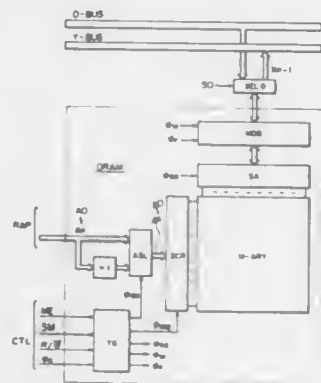
1. A sensing detection circuit for a memory comprising: a first clock signal generator (CG1) responsive to an input signal for generating a clock signal; a sensing clock signal generator (SCG) controlled by said first clock signal generator (CG1) for supplying a sensing signal (S1) to a memory array (1); a sensing detector (SD) for detecting a first output signal (S2) from said memory array signifying the completion of the sensing of data from said memory array (1) and gener-

ating, in response to said first output signal, a second output signal (OUT) and;



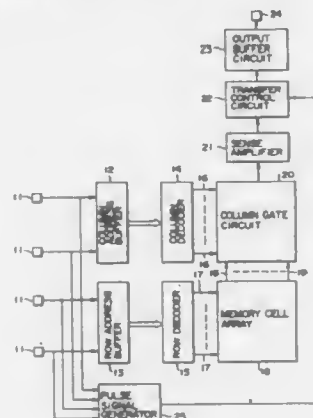
a second clock signal generator (CG2) responsive to said second output signal from said sensing detector (SD) for generating a successive clock signal.

**4,959,815**  
**DIGITAL SIGNAL PROCESSOR**  
Hirohumi Wada, Tokyo, Japan, assignor to Hitachi, Ltd., Tokyo, Japan  
Filed Apr. 21, 1988, Ser. No. 184,242  
Claims priority, application Japan, Apr. 24, 1987, 62-99778  
Int. Cl.<sup>5</sup> G11C 8/00  
U.S. Cl. 365—230.06 13 Claims



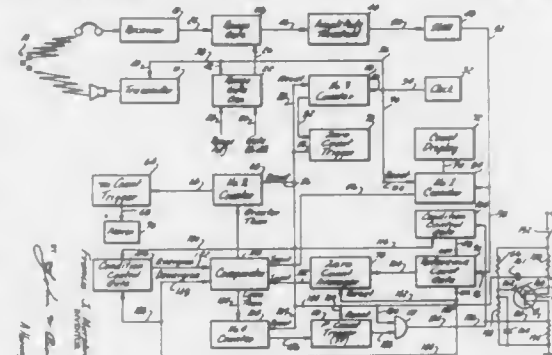
1. A semiconductor integrated circuit device comprising:  
data lines;  
a plurality of memory cells each having input/output terminals and a selection terminal, wherein said input/output terminals are connected to said data lines, respectively;  
a plurality of word lines connected to said selection terminals of said memory cells, respectively;  
address signal generation means for generating a second address signal different from a first address signal upon receipt of said first address signal;  
selection means for selecting a first word line in accordance with said first address signal upon receipt of said first address signal, and thereafter selecting a second word line in accordance with said second address signal; and,  
amplification means for amplifying data transmitted from a first memory cell connected to the first word line selected in accordance with said first address signal to said data lines, said amplification means being connected to said data lines; wherein the memory data of said first memory cell selected in accordance with said first address signal is written into said second memory cell connected to said second word line selected in accordance with said second address signal.

**4,959,816**  
**SEMICONDUCTOR INTEGRATED CIRCUIT**  
Hiroshi Iwahashi, Yokohama; Hideo Kato, Kawasaki, and Yuichi Tatsumi, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Dec. 27, 1988, Ser. No. 290,721  
Claims priority, application Japan, Dec. 28, 1987, 62-330056; Oct. 7, 1988, 63-252971; Nov. 18, 1988, 63-291969  
Int. Cl.<sup>5</sup> G11C 7/00  
U.S. Cl. 365—233.5 51 Claims



1. A semiconductor integrated circuit comprising:  
data storage means;  
pulse signal generating means for detecting a change in an address input and generating a first pulse signal;  
data detecting means for detecting data stored in said data storage means corresponding to the address input;  
data output means for externally outputting the data detected by said data detecting means; and  
data output operation control means for controlling a level of the data output from said data output means so as not to be changed when a pulse width of the first pulse signal generated by said pulse signal generating means is smaller than a predetermined value, and for causing said data output means to set the level of the output data on the basis of the data detected by said data detecting means when the pulse width is larger than the predetermined value.

**4,959,817**  
**INTRUDER TARGET MONITORING SONAR ALARM SYSTEM**  
Francis J. Murphree, Maitland, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
Filed Aug. 26, 1969, Ser. No. 853,069  
Int. Cl.<sup>5</sup> G01S 15/00  
U.S. Cl. 367—97 10 Claims

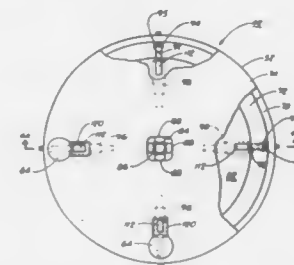


1. In a sonar system including a sound transmitter and re-

ceiver for monitoring an area where the number of normal targets therein may vary and for producing an alarm signal responsive to the presence of an intruder target in said area, the improvement comprising:

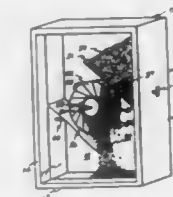
- a timer connected to said transmitter and adjustable to provide a desired ping signal repetition rate;
- a receiver range gate and range gate generator connected to said timer, transmitter and receiver to time sample the output of said receiver to produce gated output signals representative of an actual count of targets in said monitored area in the time period of said gate;
- a first monitor circuit including a first counter connected to receive said gated output signals and a comparator connected to said counter;
- said comparator being adjustable to provide in said comparator a reference count representative of normal target count to provide an error output signal when said actual target count received from said first counter exceeds said reference count in said time sample period;
- a second monitor circuit including a second counter connected to receive said error output signals and an "m" count adjustable trigger programmed to pass an output alarm signal only when said error output signal count exceeds a predetermined "m" count allowable for normal target number variation to thereby avoid developing false alarm signals due to said normal target number variation.

**4,959,818**  
**APPARATUS FOR GENERATING ELLIPTICALLY POLARIZED SHEAR WAVES**  
Jack H. Cole, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.  
Division of Ser. No. 207,935, Jun. 13, 1988, Pat. No. 4,853,906, which is a continuation of Ser. No. 897,434, Aug. 18, 1986, abandoned. This application Jul. 20, 1989, Ser. No. 382,871  
Int. Cl.<sup>5</sup> G01V 1/00  
U.S. Cl. 367—189 13 Claims



1. Apparatus for generation of elliptically polarized shear waves in an earth medium, comprising:  
baseplate means including an earth engaging surface which is equally omni-directionally resistant to movement relative to said earth medium; and  
force generation means affixed centrally to said baseplate means and consisting of a non-rotative, resiliently suspended reaction mass means and at least two hydraulic, linear drive means secured to said reaction mass and generating an effective radial force directed outward against the omni-directional resistance of said baseplate means and generally parallel to the earth engaging surface, which effective radial force is instantaneously linear but rotating at a preselected angular velocity relative to said earth engaging surface of said baseplate means.

**4,959,819**  
**REGENERATING POWER UNIT**  
Joseph J. Haczewski, Jr., 1424 Poquoson Ave., Poquoson, Va. 23662  
Filed Jul. 18, 1989, Ser. No. 381,273  
Int. Cl.<sup>5</sup> G04F 1/04; A63H 29/17  
U.S. Cl. 368—93 14 Claims



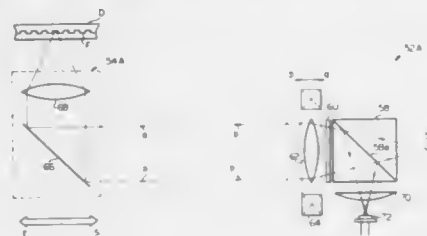
1. A regenerating power unit comprising:  
a box housing having a pair of end members, a pair of side members and a front and back member, said front and said back members being attached to and contained in spaced relationship with said pair of ends and said pair of sides,  
at least one of said front and said back members being formed of a transparent material,  
a rotatable axle member perpendicularly disposed relative to said front and said back members and having a length thereof extending through at least one of said front and said back members,  
a wheel having a hub portion rotatable therewith, said wheel being disposed between and adjacent said front and said back members,  
said wheel including a plurality of vanes tangentially extending from said hub portion to a distance spaced from said hub portion, each of said plurality of vanes having a surface that terminates at a point on said hub and merges at said point with a surface of an adjacent vane, a circular wheel cover on each side of said wheel abutting said plurality of vanes and forming a plurality of elongated, open end, triangular, chambers therewith,  
at least one of said circular wheel covers on said wheel being formed of a transparent material,  
a pair of elongated diagonal supports in contacting relationship with said front and said back members,  
said pair of elongated diagonal supports each having one end thereof fixedly connected to one of said side members and the other end thereof unattached and spaced from the opposite side member to thereby form a pair of open substantially triangular reservoirs on opposite sides of said wheel,  
a quantity of a flowable medium disposed within one of said triangular reservoirs,  
said flowable medium being selected from the group of flowable media consisting of a liquid, granular, finely divided sand particles, and equal sized microspheres,  
aperture means formed in each said diagonal support to permit flow of said flowable medium therethrough, said wheel being positioned relative to said aperture means such that any flow of said flowable medium therethrough will be received by at least one of said open end triangular chambers,  
means for selectively closing and adjustably opening said aperture means and to control the rate of flow of said flowable medium therethrough, whereby flow of said flowable medium passing through said





beam reflected from the optical disk to said stationary unit, said stationary unit comprising:

- emitting means for emitting the beam;
- collimating means for collimating the beam from said emitting means;
- light sensitive means for receiving the beam reflected from the optical disk and for producing focus-state information;
- guide means for directing the beam from said emitting means toward said movable unit and for directing the beam from said movable unit toward said light sensitive means, and



focusing means responsive to said focus-state information for moving said collimating means along the optical axis, said movable unit comprising:

- carrier means being movable with respect to the optical disk so that the beam is directed to a desired location on the optical disk, and
- only a single reflecting member fixedly mounted on said carrier means for directing the beam received from said stationary unit toward the optical disk and for returning the beam reflected from the optical disk toward the stationary unit.

4,959,825

#### RECORDED INFORMATION REPRODUCING APPARATUS WITH READING AND WRITING PHASE ADJUSTMENT

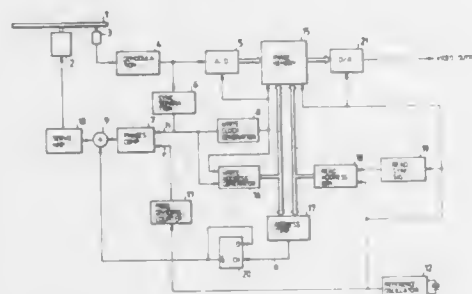
Takashi Okano, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jan. 22, 1988, Ser. No. 209,812

Claims priority, application Japan, Jun. 29, 1987, 62-163201  
Int. Cl.<sup>5</sup> H04N 5/95; G11B 20/00

U.S. Cl. 369—48

7 Claims



1. A reproducing apparatus for reproducing information recorded on a recording medium comprising:
  - means for reading information recorded on the recording medium;
  - separation means for separating a synchronizing signal contained within the read information;
  - means for generating a reference synchronizing signal;
  - means for comparing a phase of the synchronizing signal separated by said separation means with a phase of the reference synchronizing signal, and for generating an error signal which represents a phase difference therebetween;
  - memory means, coupled to said reading means, for storing

- and reading the information read from the recording medium;
- means for generating a write clock signal in phase synchronous with said synchronizing signal;
- means for generating a write address signal in response to said write clock signal;
- means for generating a read address signal for said memory means in response to said generated reference synchronizing signal;
- address comparing means for comparing the generated write and read addresses, said address comparing means being operable for generating a control signal when the absolute value of the difference between the generated write and read addresses is less than a predetermined value;
- adding means for adding an offset signal to said error signal;
- voltage varying means for varying a voltage of said offset signal in response to said control signal;
- means for driving the recording medium according to an output of said adding means; and
- means for reading the information written into said memory means.

4,959,826

#### SPREAD SPECTRUM OPTICAL COMMUNICATION SYSTEM WITH HETERODYNE DETECTION

David W. Smith, Woodbridge, England, assignor to British Telecommunications public limited company, United Kingdom  
PCT No. PCT/GB87/00449, § 371 Date Feb. 29, 1988, § 102(e)  
Date Feb. 29, 1988, PCT Pub. No. WO88/00415, PCT Pub. Date Jan. 14, 1988

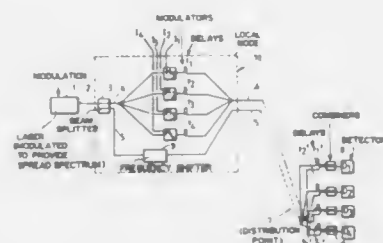
PCT Filed Jun. 26, 1987, Ser. No. 159,368

Claims priority, application United Kingdom, Jul. 1, 1986, 8616050

U.S. Cl. 370—1

Int. Cl.<sup>5</sup> H04J 14/00

21 Claims



1. A method of transmitting information using a broad spectrum optical carrier signal source, said method comprising:
  - dividing the carrier signal over at least two paths,
  - modulating the carrier signal in at least a first one of the paths in accordance with information and recombining the divided signals with delay multiplexing onto a common path, and
  - receiving the information by combining a portion of the recombined signal from said common path in heterodyne detection with a local oscillator signal having a frequency shifted with respect to the carrier, and in which the local oscillator signal is delayed prior to combination by a delay corresponding to a delay of the delay multiplexing.

4,959,827

#### LASER SIGNAL MIXER CIRCUIT

Timothy L. Grotzinger, Manheim, and Herbert A. Frederiksen, Mountville, both of Pa., assignors to Laser Communications, Inc., Lancaster, Pa.

Filed Mar. 30, 1989, Ser. No. 331,253

Int. Cl.<sup>5</sup> H04B 9/00

U.S. Cl. 370—3

4 Claims



4,959,828

#### MULTI-CHANNEL INFRARED CABLELESS COMMUNICATION SYSTEM

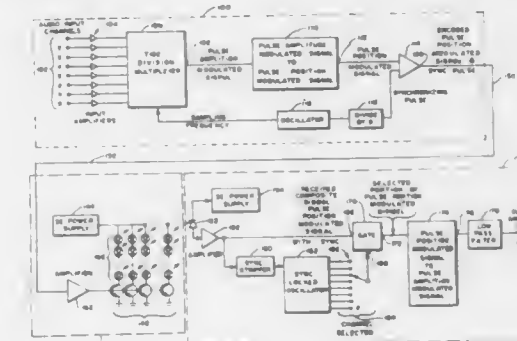
Lawrence C. Austin, Orem, Utah, assignor to Corporation of the President of the Church of Jesus Christ of Latter-Day Saints, Salt Lake City, Utah

Filed May 31, 1988, Ser. No. 201,581

Int. Cl.<sup>5</sup> H04J 14/08; H04B 10/24

U.S. Cl. 370—4

40 Claims



1. A method of simultaneously transmitting and receiving video, audio and data signals with a laser beam link which comprises:
  - modulating an input video signal and passing it through a first bandpass filter after modulation;
  - frequency shift key modulating an input data signal and passing it through a second bandpass filter whose lowest pass frequency is at least three times the highest audio frequency;
  - combining an input audio frequency signal with the frequency shift key modulated and filtered data signal;
  - frequency modulating the combined audio frequency signal and data signal and passing it through a first low pass filter whose pass frequency is no more than one-third of the frequency of the modulated and filtered video signal;
  - combining the video signal with the combined audio frequency and data signals and feeding the combined three frequencies to a laser drive circuit which causes the combined frequencies to be transmitted on a laser beam;
  - receiving the laser beam on a photodetector which converts the light beam to an electrical output signal similar to the signal fed to the laser drive circuit;
  - feeding the photodetector output signal to a third bandpass filter of approximately the same characteristics as the first bandpass filter and to a second low pass filter with approximately the same characteristics as the first low pass filter;
  - demodulating the output of the third bandpass filter to yield a signal similar to the input video signal;
  - feeding the output of the second low pass filter to an FM demodulator to produce a demodulated signal combining the original input data signal and input audio frequency signal;
  - feeding the demodulated signal to a third low pass filter which yields only a signal similar to the input audio frequency signal;
  - feeding the demodulated signal to a fourth bandpass filter with approximately the same characteristics as the second bandpass filter; and
  - frequency shift key demodulating the output of the fourth bandpass filter to yield a signal similar to the input data signal.

35. A system for receiving at least a first and a second audio signal comprising:

- means for receiving a broadcast optical signal carrying a time multiplexed pulse position modulated signal, the carried pulse position modulated signal comprising a plurality of time slots, at least some of the time slots containing pulses, the positions of the pulses within each corresponding time slot indicating the amplitude of sampled portions of the first and second audio signals, the means for receiving an optical signal including means for translating the optical signal into a received pulse position modulated signal comprising a plurality of time slots containing pulses positioned therein so as to correspond to the pulse positions of the carried pulse position modulated signal;
- means for selecting a time slot from the received pulse position modulated signal;
- means for converting the pulse position information of said selected time slot so as to reproduce therefrom one of said first and second audio signals; and
- means for presenting the audio signal to a user.

4,959,829

#### DUAL CABLE COMMUNICATION SYSTEM

John Griesing, Nashua, N.H., assignor to Wang Laboratories, Inc., Lowell, Mass.

Filed Mar. 30, 1989, Ser. No. 331,468

Int. Cl.<sup>5</sup> H04J 3/02

U.S. Cl. 370—85.3

3 Claims

1. A local area network (LAN) communication system comprising:
  - a plurality of data terminal equipment (DTE) with each DTE including at least a transmit signal line, a receive signal line and a collision signal line for, respectively, transmitting data from the DTE in an CSMA/CD format, receiving data into the DTE in an CSMA/CD format and receiving a signal into the DTE in an CSMA/CD format indicating the detection of a data collision,
  - a data coaxial cable at least three meters long coupled to the DTEs for transmission between DTEs of electrical signals representative of serial digital data,
  - a reference coaxial cable of substantially the same length as the data cable coupled to the DTEs for electrically indicating to the DTEs when two or more DTEs are transmitting data onto the data cable at the same time,
  - the data and reference cables comprising dual coaxial cables



that are mechanically coupled to each other over a substantial portion of their length as if the two were a single cable and

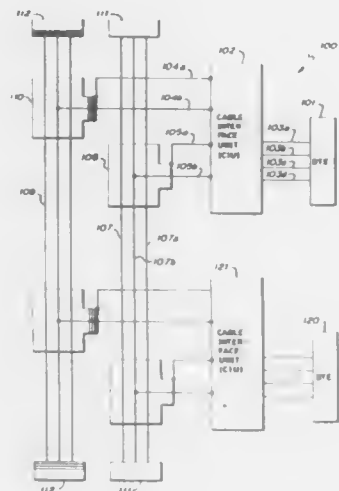
a plurality of cable interface units (CIUs) wherein a single CIU is coupled between a single DTE and the data and reference cables, each CIU including

at least first, second and third isolation circuits coupled to the receive, transmit and collision signal lines respectively of the DTEs for electrically isolating the CIUs and DTEs from each other,

a transmitter circuit coupled to the transmit signal line of a DTE through the first isolation circuit and to the data cable for transmitting serial data onto the data cable,

a receiver circuit coupled to the data cable and to the receive signal line of the DTE through the second isolation circuit for receiving serial data transmitted by a remote DTE and for transmitting the received data to the local DTE,

a collision signal circuit also coupled to the transmit signal line of the local DTE through the first isolation circuit and to the reference cable for applying a collision signal to the reference cable concurrently with the transmission of



data by the local DTE for indicating to remote DTEs that a DTE is transmitting data onto the data cable and

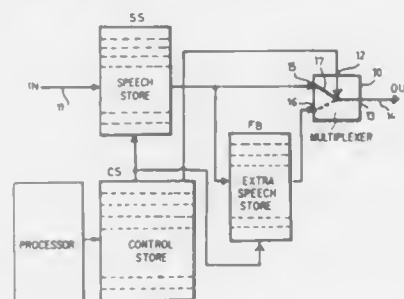
a collision detection circuit including

a comparator circuit coupled to the reference cable for testing a signal on the reference cable including the collision signal applied to the reference cable by the local DTE and like signals, if any, applied to the reference cable by one or more remote DTEs and for generating an output signal indicating when two or more DTEs are transmitting data onto the data cable at the same time and

a generator circuit coupled to the comparator circuit and to the collision signal line of the local DTE through the third isolation circuit for signaling the local DTE in response to the output signal indicating that two or more DTEs are transmitting data onto the data cable at the same time

wherein the local DTE, functioning in accordance with an CSMA/CD procedure, in response to the output signal stops transmission of data and restarts the transmission of the same data after a delay.

4,959,830  
METHOD AND APPARATUS FOR  
THROUGH-CONNECTING A WIDEBAND CONNECTION  
IN A DIGITAL TIME SWITCH  
Lars-Göran Petersen, Tumba, Sweden, assignor to Telefonaktiebolaget L. M. Ericsson, Stockholm, Sweden  
Filed Jun. 14, 1989, Ser. No. 365,769  
Claims priority, application Sweden, Jul. 12, 1988, 8802605  
Int. Cl.<sup>5</sup> H04J 3/06; H04L 7/00  
U.S. Cl. 370-108 2 Claims



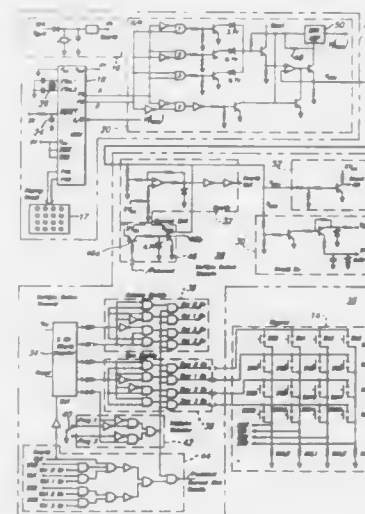
1. Method of connecting a wideband connection comprising at least two channels through a digital time switch, incoming time slots arranged in successive frames being written in sequentially in said time switch, from which outgoing slots are read out sequentially, the content in incoming slots being switched to outgoing slots corresponding to said incoming slots, this switching being controlled from a control store, characterized in that the content in incoming slots is written frame by frame into a speech store and after the content in a first frame of slots is written in, the content in the slots in the subsequent frame is written into said speech store, whereby the content in the first frame is read out from the speech store and written into an extra speech store, the content of which is thus delayed one frame in relation to the content in the speech store, and that for each of the outgoing slots of the wideband connection, their ordinal numbers are compared in a processor with the ordinal number of a corresponding incoming slot, and for an outgoing slot which is an undelayed slot with an ordinal number which is greater than or equal to the ordinal of the corresponding incoming slot a first indication is made in said control store, and for an outgoing slot which is a delayed slot with an ordinal number which is less than the ordinal number of a corresponding incoming slot a second indication in said control store is made, and in that each outgoing time slot in the wideband connection has its indication in the control store read out, the content during an outgoing slot being read out from said extra speech store if the slot has said first indication, and from said speech store if the slot has said second indication, the contents in the outgoing undelayed slots of the wideband communication being delayed one frame in relation to the contents in the slots in an incoming frame, so that the contents in all outgoing slots of the wideband connection are delayed one frame, whereby the contents in the outgoing time slot are given the same order as the contents in corresponding incoming slots.

4,959,831  
SINGLE WIRE BUS SMART KEYPAD CONTROLLER  
SYSTEM  
Thomas R. Wroblewski, Sterling Heights, Mich., assignor to Chrysler Corporation, Highland Park, Mich.  
Filed Jul. 31, 1989, Ser. No. 386,840  
Int. Cl.<sup>5</sup> H04J 3/02  
U.S. Cl. 370-112 10 Claims

1. A single wire bus multiplex system for a smart multiple switch scanner for use with a pulse-train signal comprising a succession of coded-pulse signals superimposed over an offset-voltage signal, said coded-pulse signals providing a series of

address codes for addressing a plurality of switches arranged as a matrix of switches at a remote location, said matrix comprising a plurality of row and column lines with each switch having a post connected to a row line and another post connected to a column, said system comprising:

- means for generating the pulse-train signal;
- a bi-directional, single-wire bus adapted to transfer the pulse-train signal from a first end of said bus in a first direction to the remote location of the matrix and a series of current signals from a second end in a second direction, said bus being routed near the matrix;
- switch scanning means connected between said bus and the matrix, responsive to said pulse-train signal comprising:
  - means for developing an internal power source from said offset-voltage signal;
  - means for decoding said coded-pulse signals to obtain a series of address codes for addressing all but one switch of the matrix, said decoding means including an asynchronous counting means, said counting means having a capacity to count up to an exact count of one less than twice the total number of switches in the matrix;



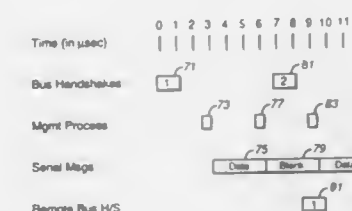
- means for using said series of address codes to sequentially scan the column and row lines of the matrix so as to sequentially address each switch; and
- means for generating a first current signal on said bus in the second direction indicative that each switch with an address has been addressed and a second current signal indicative of each switch being pressed;
- for the switch without an address, means for generating a first current signal on said bus in the second direction indicative that the switch without an address is present and a second current signal of the switch without an address has been pressed;
- analog means at the first end of said bus for receiving the current signals on said bus and producing therefrom a series of analog voltage signal messages;
- means for converting said analog voltage signal messages into a first series of digital-coded messages;
- means responsive to the digital-coded messages for analyzing the messages and providing a second series of digital-coded messages that provide an interpretation of the analyses; and
- display means responsive to said second series of digital-coded messages for transforming said second series of digital-coded messages into a visible intelligible message.

4,959,832  
PARALLEL PSEUDORANDOM PATTERN GENERATOR  
WITH VARYING PHASE SHIFT  
Paul H. Bardell, Jr., Carmel, N.Y., assignor to International Business Machines, Armonk, N.Y.  
Filed Dec. 9, 1988, Ser. No. 281,617  
Int. Cl.<sup>5</sup> G06F 11/00  
U.S. Cl. 371-27 13 Claims



1. A pseudorandom pattern generator comprising:
- linear feedback shift register means having a plurality of cells for storing and sequentially shifting data patterns, each cell having input and output signal lines, said cells being connected in a feedback arrangement so that collectively said cells are cyclable through a pattern sequence determined by said feedback arrangement; and
- phase shift enhancement means for increasing the phase shift between adjacent cell output lines.

4,959,833  
DATA TRANSMISSION METHOD AND BUS EXTENDER  
Gerald K. Mercola, Pleasanton, and Shih-Hsing Huang, San Jose, both of Calif., assignors to ICS Electronics Corporation, San Jose, Calif.  
Filed Mar. 8, 1989, Ser. No. 321,528  
Int. Cl.<sup>5</sup> G06F 11/08  
U.S. Cl. 371-32 11 Claims



1. A method of transmitting data and signals from a parallel bus comprising,
- receiving data and signals from a local parallel bus as they arrive at a local bus extender,
  - continuously constructing serial messages of fixed size for transmission over a serial extender link, said messages including a tag number, mode bits representing the type of message, error checking bits and, whenever available, said data and signals, "blank" messages being constructed without data and signals whenever said data and signals are not available,
  - continuously sending said constructed serial messages over a serial link to a remote bus extender,
  - receiving said serial messages from said serial link at said remote bus extender, said received serial message being checked for an expected tag number and error checking bits corresponding to a valid error-free message, said data and signals, whenever present, being buffered for transmission over a remote parallel bus, and
  - loading said data and signals of said valid error-free messages onto said remote parallel bus,
- wherein, a "request for retransmission" message frame identi-

fying the last error-free message is sent over said serial link from said remote extender to said local extender only when an error in said received serial message, said expected tag number corresponding to said last error-free message.

4,959,834

**WORD SYNCHRONIZATION SYSTEM AND METHOD**  
Satoru Aikawa, and Yoichi Saito, both of Kanagawa, Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

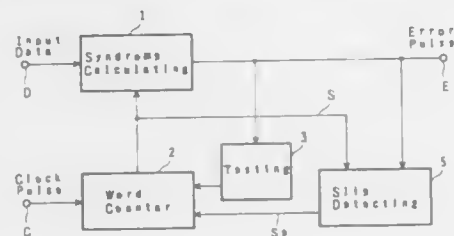
Filed Feb. 13, 1989, Ser. No. 309,587

Claims priority, application Japan, Feb. 13, 1988, 63-31137

Int. Cl.<sup>5</sup> G06F 11/10

U.S. Cl. 371-47.1

8 Claims



1. A word synchronization system comprising: circuit means, receiving encoded signals including error correction codes as an input, for calculating a syndrome indicative of a synchronization state, out of one initial phase; controlling means, for:

- (1) changing a current phase of said circuit means when the syndrome calculated by said circuit means is not a predetermined value indicative of synchronization,
- (2) obtaining a new syndrome at a changed phase, and
- (3) repeating the operations (1) and (2) until the syndrome becomes said predetermined value for a sequence of M times; and

synchronization slip detecting means, for determining a synchronization slip in the word synchronization when a particular syndrome is repeatedly detected for  $K_0$  times out of a sequence of K times in the outputs from said circuit means, where  $K_0 \leq K \leq M$ .

4,959,835

**SEMICONDUCTOR MEMORY**

Nobuo Yosida, and Teruhisa Shimizu, both of Ohme, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 4, 1989, Ser. No. 293,444

Claims priority, application Japan, Jan. 12, 1988, 63-4417

Int. Cl.<sup>5</sup> G06F 11/00

U.S. Cl. 371-51.1

10 Claims

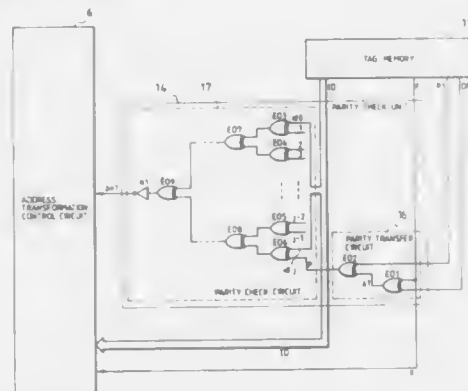
1. A semiconductor memory comprising:

a memory array including a plurality of word lines, a plurality of complementary data lines and a plurality of memory cells respectively coupled to the corresponding word lines and the corresponding complementary data lines, wherein to each of said word lines are coupled first memory cells for holding a plurality of bits of data, a second memory cell for holding data representing whether or not said data is valid, a third memory cell for holding parity data concerning the first-mentioned data, and a fourth memory cell for holding data used to make a judgement as to whether or not the data held in said second memory cell has changed;

selecting means coupled to said a plurality of word lines, wherein said selecting means selects one word line according to an address signal supplied thereto;

check means supplied with data held in the memory cells which are coupled to one word line selected by said selecting means, wherein said check means judges whether

or not the pieces of data respectively held in said second and fourth memory cells, which are supplied thereto, are coincident with each other and outputs the result of the judgement; and



output means supplied through said check means the data held in said first memory cells and the data held in said second memory cell, wherein said output means, when receiving a coincidence signal from said check means, outputs the data held in said first memory cells and the data held in said second memory cell.

4,959,836

**REGISTER ROBUSTNESS IMPROVEMENT CIRCUIT AND METHOD**

Paul M. Berard, and Ajaib S. Bhadare, both of Phoenix, Ariz., assignors to Siemens Transmission Systems, Inc., Phoenix, Ariz.

Filed Dec. 9, 1987, Ser. No. 130,850

Int. Cl.<sup>5</sup> G06F 11/08

U.S. Cl. 371-69.1

2 Claims

1. A robust control circuit for coupling input data to system control points, comprising:

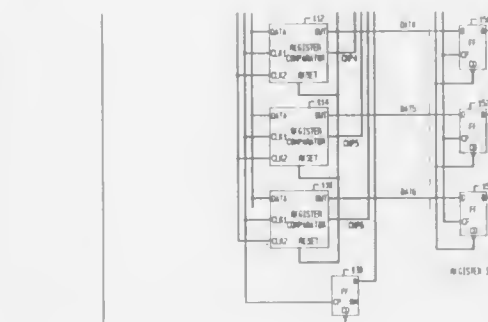
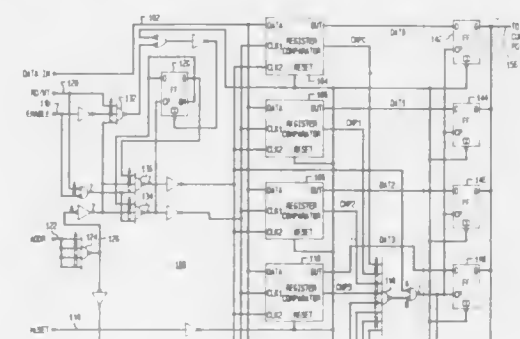
- a digital data input for receiving an input of two data words of N bits each following in sequence, and a data output for outputting a valid data word to system control points only if the two compared data words are identical;
- a plurality N of register/comparator circuits, each of which includes a first single-bit register element provided with a first single-bit data input, a first clock signal input, and a first single-bit data output, a second single-bit register element provided with a second single-bit data input, a second clock signal input, and a second single-bit data output, and a comparator element for comparing the first and second single-bit data outputs from said first and second register elements and providing a match signal output only if they are identical;

sequencer means, including an input for a READ, a first WRITE, and a second WRITE command sequence, a WRITE enabling circuit for providing clock signals for clocking N bits of a first data word from said digital data input into the N first single-bit register elements of said N register/comparator circuits upon receipt of the first WRITE command by said sequencer means and for clocking N bits of a second data word following said first data word into the N second single-bit register elements of said N register/comparator circuits upon receipt of the second WRITE command, and a pointer element for providing a pointer signal to said WRITE enabling circuit for alternately writing said first and second single-bit register elements upon receipt of said first WRITE and said second WRITE commands, said pointer element being reset upon receipt of said READ command;

a plurality of data transmission lines connecting the digital data input for said control circuit to each of the single-bit

data inputs of said first and second single-bit register elements of said N register/comparator circuits, and first and second sets of clock signal lines, each set being respectively connected between said WRITE enabling circuit and the clock signal inputs of respective ones of said first and second single-bit register elements of said N register/comparator circuits;

a gate element for receiving the outputs of said comparator elements of said N register/comparator circuits and for providing an output of a valid data signal only if match signal outputs are received from all comparator elements; and



a third register circuit having input means connected to the single-bit data outputs of said second register elements of said N register/comparator circuits, an enable signal input connected to the output of said gate element, and output means forming said data output for said control circuit, said third register circuit being enabled to receive the N data output bits of said second register elements only if a valid data signal is provided to said enable signal input from said gate element, whereby said third register circuit receives and outputs a valid data word of said N data output bits only if the two data words input to said first and second register elements, respectively, of said register/comparator circuits are identical.

4,959,837

**DOPED OPTICAL FIBER LASER AMPLIFIER**

Hervé Février, Massy; Josiane Ramos, Bondoufle; Jacques Ange, Saint-Cheron; Jean-François Marceau, Caderousse; Bernard Jacquier, Marcoussis, and Jean-Claude Gâcon, Neuville S/Saone, all of France, assignors to Societe Anonyme dite: Compagnie Generale d'Electricite, Paris, France

Filed Nov. 13, 1989, Ser. No. 434,192

Claims priority, application France, Nov. 10, 1988, 88 14711

Int. Cl.<sup>5</sup> H01S 3/30

U.S. Cl. 372-6

2 Claims

1. An erbium-doped fiber laser amplifier, characterized by the fact that said fiber is doped to a concentration lying in the

range 5 ppm to 50 ppm, that the length of said fiber lies in the range 250 m to 30 m depending on the selected concentration



of doping, and that the radial position of the doped zone substantially coincides with the energy maximum of the set of propagation modes in said fiber at the pumping wavelength.

4,959,838

**METHOD AND CIRCUIT FOR SHAPING LASER OUTPUT PULSES**

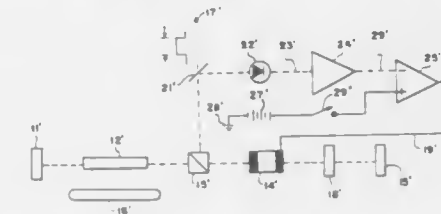
Norman P. Barnes, Tabb, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 31, 1989, Ser. No. 359,459

Int. Cl.<sup>5</sup> H01S 3/10

U.S. Cl. 372-25

12 Claims



11. In a laser resonator including a laser medium and a voltage responsive Q-switch and a polarizer acting in combination to establish the loss level of said resonator in response to a first variable voltage of an initial value applied to said Q-switch to initiate laser action and produce a laser output pulse upon the pumping of said laser medium, the improvement comprising:

means for sensing the level of said laser output pulse upon its initiation and producing a second variable voltage responsive thereto; and

means for varying said first variable voltage from said initial determined value in response to said second variable voltage for a determined duration thereby controlling the length of said laser output pulse.

4,959,839

**RIB WAVEGUIDE TYPE SEMICONDUCTOR LASER**

Motoyuki Yamamoto, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 24, 1989, Ser. No. 383,530

Claims priority, application Japan, Jul. 25, 1988, 63-183495

Int. Cl.<sup>5</sup> H01S 3/19

U.S. Cl. 372-46

11 Claims

1. In a rib waveguide type semiconductor laser, the improvement comprising:

a compound semiconductor substrate of a first conductivity type;

a lower cladding layer of the first conductivity type formed on said semiconductor substrate;

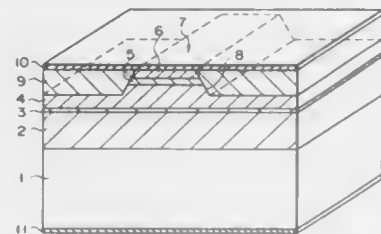
an active layer formed on said lower cladding layer;

an upper cladding layer of a second conductivity type formed on said active layer and having a mesa portion formed in a stripe configuration to extend in a direction parallel to the main surface of said semiconductor substrate;

an ohmic layer of the second conductivity type formed on said mesa portion of said upper cladding layer;



a current inhibition layer of the first conductivity type formed on portion of said upper cladding layer other than said mesa portion; and



a high impurity concentration layer of the second conductivity type formed between said upper cladding layer and said ohmic layer and having an impurity concentration higher than the upper cladding layer and said ohmic layer.

4,959,840

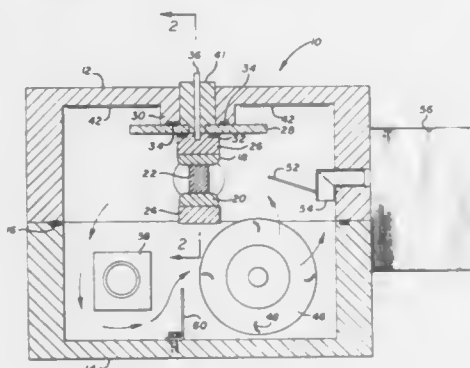
# COMPACT EXCIMER LASER INCLUDING AN ELECTRODE MOUNTED IN INSULATING RELATIONSHIP TO WALL OF THE LASER

Robert P. Akins; Donald G. Larson, both of San Diego; Uday K. Sengupta, Del Mar, and Richard L. Sandstrom, Encinitas, all of Calif., assignors to Cymer Laser Technologies, San Diego, Calif.

Filed Jan. 15, 1988, Ser. No. 144,799  
Int. Cl.<sup>5</sup> H01S 3/22

U.S. Cl. 372-57

21 Claims



1. In combination in a laser for use with a gas capable of a lasing action,  
a housing structure having a plurality of walls forming an internal laser cavity,  
a pair of spaced electrodes located within the laser cavity and forming an electrical discharge area between the electrodes for stimulating gas within the discharge area to lasing action in accordance with an electrical discharge between the electrodes,  
a first one of the pair of electrodes located at a central position within the cavity and grounded to the housing structure,  
an insulator member,  
the other of the pair of electrodes located adjacent to, but spaced from, a first one of the walls of the housing structure and mounted on the insulator member, the insulator member being located intermediate to the first wall of the housing and the other electrode but spaced from the first wall and having first and second portions extending beyond the other electrode to have the extending portions of the insulator member floating relative to the housing structure, and  
the insulator member being compressively supported at a

central position of the insulator member and the first and second portions extending beyond the other electrode from this central position without any additional support to have the insulator member respond to any bending forces within the laser without any constraint other than the support at the central position.

4,959,841

# PROCESS FOR REDUCING CONTAMINATION OF HIGH TEMPERATURE MELTS

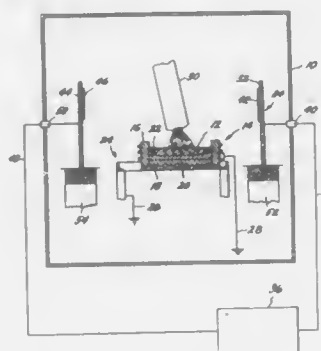
Neil A. Johnson, Schenectady; Russell S. Miller, Ballston Spa, both of N.Y., and Gordon B. Hunter, Loveland, Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 6, 1989, Ser. No. 376,095

Int. Cl.<sup>5</sup> H05B 7/00

U.S. Cl. 373-10

14 Claims



1. The method of reducing contamination of melts melted by high intensity heat sources which comprises, providing an enclosure in which such melting is to be accomplished, providing an inert atmosphere or vacuum in said enclosure, applying heat at high intensity to a metal in a heating zone within said enclosure, providing at least one metal surface in said enclosure adjacent to the heating zone, applying a charge of at least five kilovolts to said at least one metal surface to create an electric field in said zone to induce collection of a significant portion of the particulate and vaporous material emanating from said heating zone.

4,959,842

# SIGNAL CONSTELLATIONS

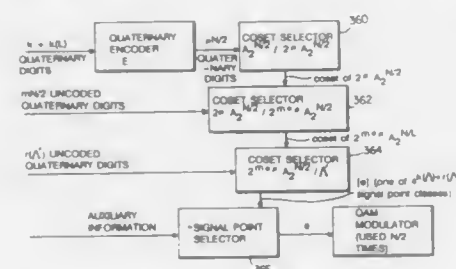
G. David Forney, Jr., Cambridge, Mass., assignor to Codex Corporation, Canton, Mass.

Filed Apr. 13, 1988, Ser. No. 181,203

Int. Cl.<sup>5</sup> H04L 27/34

U.S. Cl. 375-39

31 Claims



3. Apparatus for communicating data over a channel comprising an encoder for selecting a series of signal points from a

constellation of available points, said constellation comprising points of a lattice  $A$  (or a coset  $A+c$ , where  $c$  is a translation vector) that lie within a Voronoi region of a sublattice  $A'$  of  $A$ ,  $A'$  comprising a version of a binary lattice of depth at least two and normalized informativity less than one, and

a modulator for modulating a carrier on said channel in accordance with said selected series of signal points.

4,959,843

# CONTENT INDUCED TRANSACTION OVERLAP (CITO) BLOCK TRANSMITTER

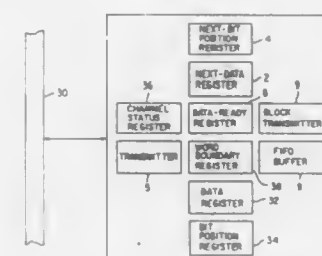
Yon K. Park, Vienna, Va., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed May 8, 1989, Ser. No. 348,435

Int. Cl.<sup>5</sup> H04L 27/04

U.S. Cl. 375-59

17 Claims



1. A block transmitter of data comprising:  
a plurality of register means for storing and positioning data for transmission;  
FIFO buffer means for storing and providing a continuous supply of data from a data source to said plurality of register means;  
block transmitter means for loading said plurality of register means from said FIFO buffer means; and,  
means for transmitting said data from said plurality of register means onto a communication channel so that a full block of data is transmitted in a single data bucket using a block transmission method;  
said plurality of register means comprises:  
data register means for storing a multi-bit data word; each data bit of said multi-bit data word having one of two possible states;  
word boundary register means for storing a number corresponding to the number of data bits in said multi-bit data word;  
bit position register means for storing a number corresponding to the number of bits in said multi-bit data word;  
channel status register means for functioning as a receiver portion of a plurality of senders and for storing a bit value of last transmission;  
next-data register means for storing a next multi-bit data word after said next multi-bit data word is received from said FIFO buffer means, said next multi-bit data word is eventually loaded into said data register means after completion of transmission of said data register means;  
next-bit position register means for storing a number corresponding to the number of bits in said next multi-bit data word, and,  
data-ready register means for monitoring whether said data register means is ready to be loaded from said next-data register means.

4,959,844

# CLOCK RECOVERY CIRCUIT FOR DIGITAL DEMODULATOR

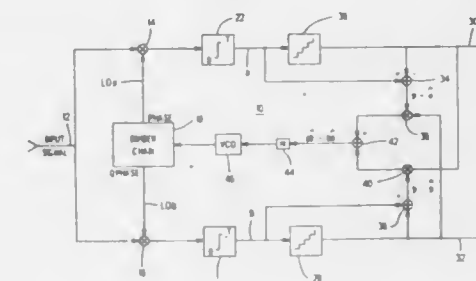
Patrick K. Walp, Pennsgrove, Calif., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 24, 1989, Ser. No. 426,367

Int. Cl.<sup>5</sup> H04L 27/06

U.S. Cl. 375-97

7 Claims



1. In a digital demodulator of the type comprising means for multiplying an input signal with first and second orthogonal demodulation reference signals to generate respective product signals, means for integrating the product signals to generate first and second integrated values indicative of digital data encoded in the input signal, and means for digitizing the integrated values to generate first and second digital values, the improvement comprising:

first means for generating a first error signal indicative of the difference between the first integrated value and the first digital value;  
second means for combining the first error signal with the second digital value to generate a first feedback signal;  
third means for utilizing the first feedback signal to generate a control signal indicative of a phase difference between the input signal and the demodulation reference signals.

4,959,845

# RECEIVER OF A SYSTEM FOR TRANSMITTING DATA SYMBOLS AT A GIVEN BAUD-RATE

Simon J. M. Tol, Hilversum, and Kornelis J. Wouda, Nuenen, both of Netherlands, assignors to AT&T Bell Laboratories, Murray Hill, N.J.

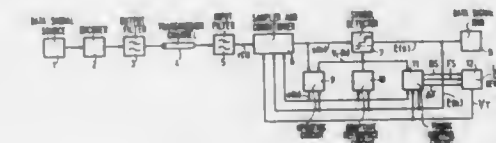
Filed Feb. 9, 1989, Ser. No. 308,707

Claims priority, application Netherlands, Feb. 26, 1988, 8800490

Int. Cl.<sup>5</sup> H04L 7/027

U.S. Cl. 375-106

10 Claims



1. A receiver of a system for transmitting data symbols at a given baud-rate  $1/T$ , this receiver comprising a symbol detector operating at the baud-rate  $1/T$ ; means for optimally conditioning the received data symbols for symbol detection; means for deriving from a conditioned symbol an error signal which is representative of a phase difference between a baud-rate clock signal associated with the received data symbols and a locally generated baud-rate clock signal for the symbol detector; and phase control means for reducing this phase difference in a step-by-step fashion in response to the error signal, characterized in that the receiver comprises means for establishing whether the mean value of the error signal, over a predetermined number of symbol intervals, is situated in a zone whose

[illegible][illegible]

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graph TD
    302([START]) --> 303[SET INBIT]
    303 --> 304{FIRST INBIT}
    304 -- YES --> 305{"0" SET ?}
    304 -- NO --> 306{INBIT AND SET}
    305 -- YES --> 307[SET FLAG]
    305 -- NO --> 308[SEND INBIT TO TRANSMITTER]
    306 -- YES --> 309{"0" SET ?}
    306 -- NO --> 310[SEND "0" TO TRANSMITTER AND CLEAR FLAG]
    307 --> 311[SAVE INBIT "1"]
    309 -- YES --> 312[SAVE INBIT "0"]
    309 -- NO --> 313{INBIT AND SET}
    313 -- YES --> 314{"0" SET ?}
    313 -- NO --> 315[SEND INBIT "1"]
    314 -- YES --> 316[SEND INBIT "0"]
    314 -- NO --> 317[SEND INBIT "1"]
    316 --> 318[SAVE INBIT "0"]
    317 --> 319[SEND INBIT "1"]
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receiving each entered digit;  
setting a feature flag signal when the first one of the received digits corresponds to the function digit;  
storing, when the feature flag signal is set, the second one of the received digits in the memory means; and  
transmitting a coded message to said cellular transceiver means when the feature flag signal is set and the third one of the received digits corresponds to the function digit, the coded message being coded to identify the

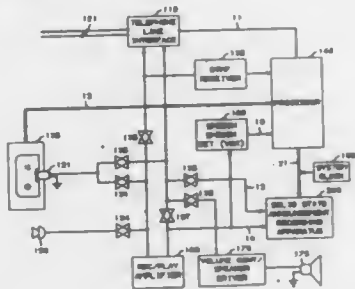


feature corresponding to the dialing sequence represented by the first, second and third received digits; and in said cellular transceiver means: receiving the transmitted coded message from said interface means; and selecting the feature of the cellular telephone corresponding to the received coded message.

**4,959,852**  
**TELEPHONE ANSWERING MACHINE HAVING SOLID STATE AND MAGNETIC TAPE STORAGE FOR OUTGOING ANNOUNCEMENTS**  
Ronald J. Kern; Alan D. Michel, both of Noblesville, and William V. Powell, Jr., Indianapolis, all of Ind., assignors to AT&T Information Systems Inc., Morristown, N.J.  
Filed Oct. 19, 1987, Ser. No. 110,243  
Int. Cl.<sup>5</sup> H04M 1/65

U.S. Cl. 379-70

16 Claims



11. In a telephone answering machine including random access memory means for storing an announcement in binary digital form; and digital-to-analog conversion means for converting the binary digital announcement, stored in the random access memory means, into an analog announcement signal for transmission over a telephone line, the improvement comprising:

means responsive to the initial recording of said analog announcement signal for storing said signals exclusively on a magnetic tape storage means; and analog-to-digital conversion means operative after the completion of said initial recording of said analog announcement signal, for converting said analog announcement stored on the magnetic tape, into a binary digital signal for storage in the random access memory means.

**4,959,853**  
**FREQUENCY RESPONSIVE SELECTIVE RINGING CIRCUIT**  
Philip J. Del Monte, 0701 County Rd. 143 A, Florence, Colo. 81226, and Jackie L. Vanvey, 24662 Webb Ct., Pueblo, Colo. 81006

Filed Feb. 2, 1989, Ser. No. 305,853  
Int. Cl.<sup>5</sup> H04M 13/00

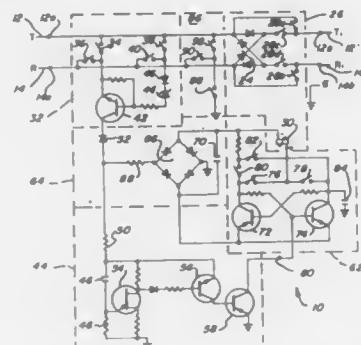
U.S. Cl. 379-180

19 Claims

1. A frequency responsive selective ringing circuit for ringing telephone equipment connected to a telephone line upon receipt of a predetermined one of plurality of frequency-distinctive AC ringing signals which have potentials on the telephone line that alternate at predetermined different frequencies and for preventing ringing of the telephone equipment upon receipt of any other frequency-distinctive ringing signals, the telephone equipment ringing only in response to a ringing signal conducted therethrough, said selective ringing circuit comprising in combination:

rectifier and bypass means connected to the telephone line and operative for rectifying each of the ringing signals to a DC signal when not activated and for supplying the DC signal to the telephone equipment, and operative for elec-

trically conducting the ringing signal to the telephone equipment when activated; and detection and activation means connected to the telephone line and to the rectifier and bypass means, and operative in response to the potential of the AC ringing signals for



detecting a selected one of the frequency-distinctive AC ringing signals on the basis of one cycle of the AC ringing signal applied to the telephone line and for activating the rectifier and bypass means in response to the detection of the selected ringing signal.

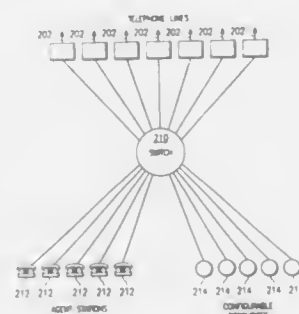
**4,959,854**  
**APPARATUS AND METHOD FOR AUTOMATICALLY RECONFIGURING TELEPHONE NETWORK RESOURCES**

Ellis K. Cave, Garland; Dwain H. Hammond, Plano, and Michael J. Polcyn, Allen, all of Tex., assignors to InterVoice Inc., Dallas, Tex.

Filed Jan. 26, 1990, Ser. No. 471,284  
Int. Cl.<sup>5</sup> H04M 1/64, 3/50

U.S. Cl. 379-157

52 Claims



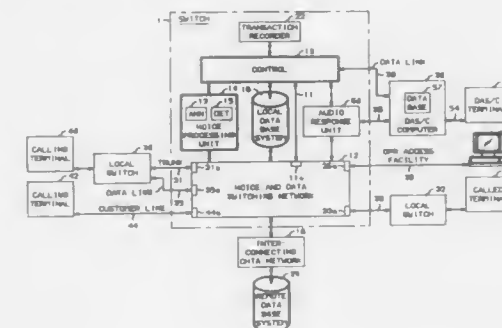
35. A system for reconfiguring resources in a telephone network, comprising:  
a resource manager; and  
a plurality of standard resource modules coupled to the telephone network, each of said resource modules configurable under control of said resource manager to perform a plurality of resource functions.

**4,959,855**  
**DIRECTORY ASSISTANCE CALL PROCESSING AND CALLING CUSTOMER REMOTE SIGNAL MONITORING ARRANGEMENTS**

Abraham N. Daudella, Colts Neck, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.  
Continuation of Ser. No. 916,615, Oct. 8, 1986, abandoned. This application Jul. 25, 1988, Ser. No. 225,607  
Int. Cl.<sup>5</sup> H04M 3/50, 1/64

U.S. Cl. 379-213

15 Claims



15. A method of setting up a telecommunications call connection in a telecommunications switching system comprising the steps of:

responsive to receiving, over a connection to a calling customer, an oral directory assistance request by an operator at an operator's position, entering data corresponding to the request into said operator position and transmitting the entered data to a directory number data base; generating a directory number corresponding to the entered data;

CHARACTERISED IN THAT the method further comprises the steps of:

releasing the operator position from the connection; testing whether establishment of a call from a caller on said link to a station identified by said directory number is permitted;

if said testing indicates that said call to said station is permitted, monitoring the connection for speech or non-supervisory multifrequency signals; and

if a selected signal is detected, automatically setting up a connection to a customer station identified by the directory number without any further calling action from the calling subscriber.

**4,959,856**  
**AUTOMATIC ADMINISTRATION OF A TELECOMMUNICATION SYSTEM**

Raymond B. Bischoff, Westminster, and Norman C. Chan, Louisville, both of Colo., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

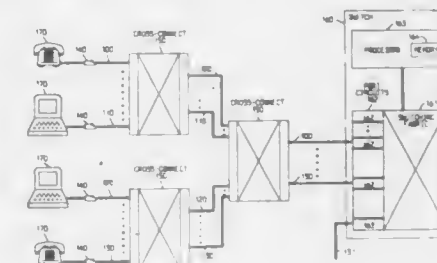
Filed May 4, 1989, Ser. No. 347,551  
Int. Cl.<sup>5</sup> H04M 3/00

U.S. Cl. 379-245

43 Claims

1. An apparatus comprising:

a plurality of communication ports each addressable by an extension number; and



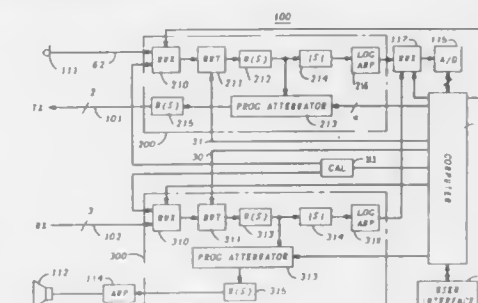
means responsive to receipt of an extension number at an individual one of the ports for assigning the received extension number to serve as an address of the one port.

**4,959,857**  
**ACOUSTIC CALIBRATION ARRANGEMENT FOR A VOICE SWITCHED SPEAKERPHONE**  
Richard H. Erving, Red Bank, and Robert R. Miller, II, Convent Station, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 28, 1988, Ser. No. 298,526  
Int. Cl.<sup>5</sup> H04M 9/08

U.S. Cl. 379-390

12 Claims



1. In a voice switching apparatus for processing speech signals on a communication line, the apparatus including means for switching between a receive state for receiving speech signals from the communication line and a transmit state for transmitting speech signals over the communication line, an acoustic calibration circuit for determining the type of acoustic environment in which the voice switching apparatus is employed, the calibration circuit comprising:

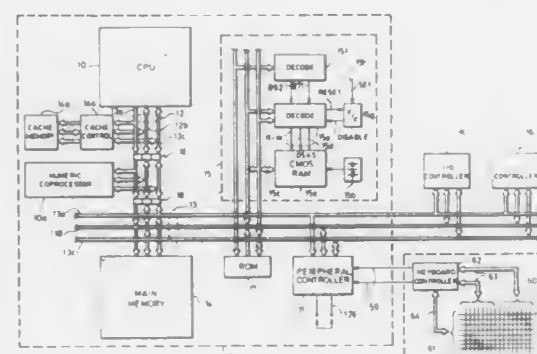
means for generating a tone burst signal in said environment, the tone burst signal comprising multiple frequency signals generated separately at different time intervals and for a common fixed time period;

measuring means responsive to the return of the tone burst signal to said apparatus for measuring the resulting time-domain acoustic response of said environment; and

calibration means operably responsive to the measuring means for adjusting threshold switching levels at which the apparatus switches between the receive state and the transmit state.

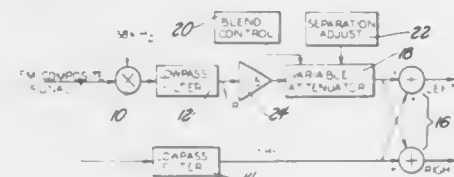
ite signal with base band left minus right channel content, and means for deriving from the composite signals separate right and left channel signals with each channel signal being substantially free of components of the other channel, means for adjusting the static separation of the channel signals comprising, means for increasing the gain of one of the composite signals with respect to the other composite signal, and blend control means including variable attenuator means for dynamically attenuating said one of said composite signals as a function of a signal strength, means for statically attenuating the said one composite signal by limiting the range of the blend control means to equalize the signal strengths of the two composite signals, whereby the derived left and right channels will be substantially free of signals from the other channel.

## 20 Claims



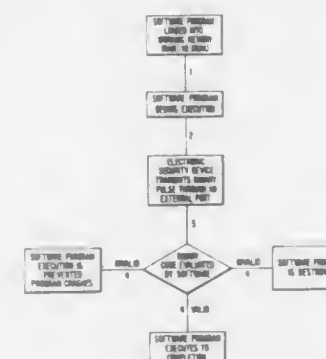
- (a) storing a password and a pair of representations of said password in a non-volatile memory accessible by a CPU of said system;
- (b) upon power-on initialization of said system, accessing said non-volatile memory to check said password against one of said pair of representations, and, if a match is not found, to check said password against the other of said pair;
- (c) if a match is found in either of said checks, then writing the good one of the pair to the other or said pair, and comparing with said stored password a password entered by a user from a keyboard of said computer system, and if the passwords are the same, allowing normal operation of said system by said user to proceed, but, if the passwords do not agree, locking said user out of the system;
- (d) if a match is not found in either one of said checks, then zeroing said stored password and said representations and allowing normal operation of the system to proceed without entry of a password by the user.

#### 4 Claims



1. In an FM stereo circuit having a composite signal with base band left plus right channel content and another compos-

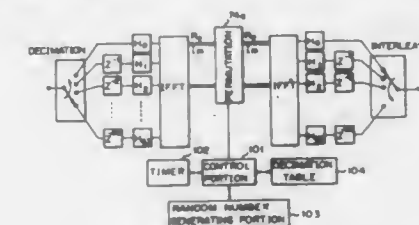
### 13 Claims



- (1) attaching a key for generating a predetermined coded signal to an input port of said computer said generation of said coded signal being independent of said software;
- (2) loading a program into said memory, said program containing an algorithm for evaluating said signal generated by said key, and instructions for
  - (i) accessing the signal being evaluated and
  - (ii) allowing execution of said program according to predetermined security criteria;
- (3) commencing execution of said program;
- (4) transmitting said coded signal from said key to said memory;
- (5) evaluating said coded signal according to the security criteria; and
- (6) allowing said computer to complete the execution of said program only if said coded signal from said key satisfies the predetermined security criteria.

U.S. Cl. 380-38

### 15 Claims



decimation means for sequentially supplying every  $2n$  samples of an input sampling signal having a period  $T$  in parallel outputs, each having a period  $nT$ ;

$2n$  first polyphase filters, each receiving one of the parallel outputs of said decimation means and passing one  $1/(2n)$ -split frequency band of the analog voice signal, to produce outputs;

a first inverse fast Fourier transformer changing phase characteristics of the outputs of said polyphase filters to obtain complex signals, each being a  $2n$ -multiplexed signal of a corresponding frequency band;

permutating means for permutating, in the frequency domain, frequency bands of the complex signals to produce outputs;

a second inverse fast Fourier transformer for applying an operation, reverse to that in said first fast Fourier transformer, to the outputs of said permutating means;

second polyphase filters, having substantially identical, char-

U.S. Cl. 380-10

### 13 Claims

means for frequency modulating a baseband audio signal to form intermediate frequency (IF) audio signals,  
means for amplitude modulating a baseband video signal to form intermediate frequency (IF) video signals,  
means for scrambling said IF video and IF audio signals to form scrambled IF video and IF audio signals and control information therein,  
means for mixing said scrambled IF signals with local oscil-



acteristics as said first polyphase filters, connected to said second inverse fast Fourier transformer, producing output signals corresponding to the frequency bands in the outputs of said permutating means; and interleaving means for multiplexing and synthesizing the output signals of said second polyphase filters.

4,959,864

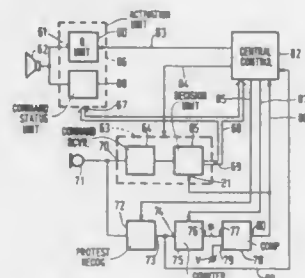
**METHOD AND SYSTEM FOR PROVIDING ADAPTIVE INTERACTIVE COMMAND RESPONSE**

Floris L. Van Nes; Frederik F. Leopold, both of Eindhoven, and Frederik J. Schaffers, Hilversum, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.  
Continuation of Ser. No. 825,836, Feb. 4, 1986, abandoned. This application Sep. 19, 1989, Ser. No. 409,996

Claims priority, application Netherlands, Feb. 7, 1985, 8500339

Int. Cl.<sup>5</sup> G10L 7/08

U.S. Cl. 381—43



7. A user interactive system for carrying out successive sections of a program in accordance with successive verbal commands given by the user in response to successive verbal questions presented to the user by the system, such system comprising:

- an activation unit including a question unit for presenting verbal questions to the user and a command status unit for presenting to the user a verbal system reaction in response to each user command;
- a command recognition unit for recognizing each user command;
- a decision unit comprised in said command recognition unit for evaluating the reliability of recognition of each user command, and on the basis of such evaluation selecting one verbal reaction from a group of at least two possible verbal reactions of the system to such user command, the chosen system reaction being in accordance with a predetermined decision model;
- a protest recognition unit for receiving a protest from the user each time the user perceives that the system reaction given in response to a user command is inconsistent with such command;
- a counter coupled to the protest recognition unit for counting the number of user protests ('protest score') at least during each program section; and
- a comparison circuit coupled to said counter for comparing the protest score of said counter with a predetermined level of at least two protests and supplying a control signal to said decision unit if said protest score exceeds said predetermined level;
- said control signal causing said decision unit to initiate a time interval (T) during which interval said decision unit chooses another verbal reaction from said group of possible verbal reactions of said system in response to one or more user commands recognized by said command recognition unit during said time interval (T), said other verbal system reaction being presented to the user by said command status unit and including information describing such recognized commands.

4,959,865

**A METHOD FOR INDICATING THE PRESENCE OF SPEECH IN AN AUDIO SIGNAL**

Yoram Stettiner, Ramat-Hasharon; Shabtai Adlersberg, Petah-Tikva, and Mendel Aizner, Rishon-Le-Zion, all of Israel, assignors to The DSP Group, Inc., Emeryville, Calif.

Filed Feb. 3, 1988, Ser. No. 151,740

Claims priority, application Israel, Dec. 21, 1987, 84902

Int. Cl.<sup>5</sup> G10L 7/02

U.S. Cl. 381—46

11 Claims



8. An apparatus for indicating the presence of speech in an audio signal comprising:

- a digital low-pass filter and clipping means coupled to filter time-invariant frames of an audio input signal;
- means coupled to receive signals processed by said filter and clipping means for obtaining an autocorrelation function for each of a plurality of said frames of said audio signal;
- means coupled to process said autocorrelation function for detecting peaks indicative of the presence of pitch of each of said frames of said audio in put signal, said processing means comprising:
  - a first peak decision processor for determining the amplitude of the highest ACF peak;
  - a second peak decision processor for determining the amplitude of the second highest ACF peak; and
  - a periodicity detector means for determining the periodicity of ACF peaks within each of said plurality of frames, whose amplitude exceeds a predetermined threshold, noting how many ACF peaks having the determined periodicity are detected; and providing a pitch/no pitch decision based on a weighted sum of non-linear functions of the amplitudes of the highest and second highest ACF peak and the number of detected ACF peaks having the determined periodicity;
- means for analyzing said ACF of each of said plurality of frames to detect a tone in each of said plurality of frames and to obtain a tone/no tone decision for said frame;
- an autocorrelation function periodicity detection means coupled to process said autocorrelation function for detecting the presence of pitch and tone in said audio input signal; and
- decision combining means coupled to receive a pitch/no-pitch decision and a tone/no-tone decision for indicating the presence of voice speech upon coincidence of a no-tone decision and a pitch decision.

4,959,866

**SPEECH SYNTHESIZER USING SHIFT REGISTER SEQUENCE GENERATOR**

Noriko Matsuo, and Yukio Mitome, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Dec. 29, 1988, Ser. No. 291,827

Claims priority, application Japan, Dec. 29, 1987, 62-333373

Int. Cl.<sup>5</sup> G10L 9/18, 3/00

U.S. Cl. 381—51

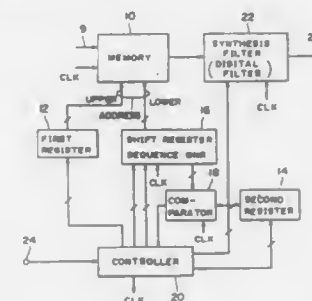
5 Claims

1. A speech synthesizer comprising:

- a memory, said memory storing at least one voiced sound source and at least one unvoiced sound source;
- a first register, said first register being coupled to said memory and arranged so that the content of said first register forms a first portion of an address signal applied to said memory;
- a shift register sequence generator, said shift register sequence generator being coupled to said memory and ar-

ranged so that the content of said shift register sequence generator forms a second portion of said address signal; a second register, the register length of said second register being equal to the register length of said shift register sequence generator;

a comparator, said comparator being connected to said shift register sequence generator and said second register in such a way that the contents of said shift register sequence generator and said second register are caused to flow into said comparator, said comparator being arranged to out-



put a coincidence signal in the event that the contents of said shift register sequence generator and said second register coincide; and

- a controller, said controlling being connected to said shift register sequence generator, said first register, said second register and said comparator, said controller being responsive to said coincidence signal to reset at least said shift register sequence generator, said controller providing inputs to said shift register sequence generator, said first register, and said second register.

4,959,867

**AUDIOMETER ATTENUATION METHOD AND APPARATUS**

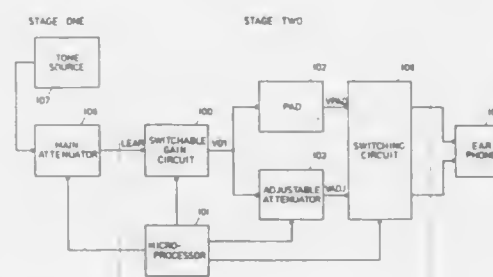
William J. Latz, Middleton, Wis., assignor to Nicolet Instrument Corporation, Madison, Wis.

Filed Aug. 11, 1988, Ser. No. 231,115

Int. Cl.<sup>5</sup> H03G 3/00

U.S. Cl. 381—107

18 Claims



1. Attenuation apparatus for an audiometer of the type having an earphone with at least two input terminals with the sound output determined by the difference voltage between the input terminals, a tone signal source which provides a selected tone, and a main attenuator which attenuates the volume of the tone in steps to provide an output signal for transmission to the earphone, comprising:

- (a) means for receiving the tone signal from the main attenuator and providing a selected low range signal to a first one of the input terminals of the earphone;
- (b) adjustable attenuator means for receiving the signal from the main attenuator and providing an output signal to the other second input terminal of the earphone at a controllable level of attenuation, the means including a multiplying

digital-to-analog converter having a digital word input, a digital input magnitude range, and an analog voltage reference input connected to receive the tone signal from the main attenuator, the analog voltage output of the multiplying digital to analog converter connected to provide its signal to the second terminal of the earphone, the output of the multiplying digital-to-analog converter being equal to the analog input signal times a fraction equal to the digital input word magnitude divided by the digital input magnitude range of the multiplying digital-to-analog converter.

4,959,868

**IMAGE PROCESSING SYSTEM**

Hiroshi Tanioka, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 790,309, Oct. 22, 1985, abandoned.

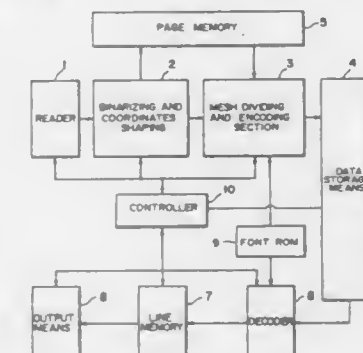
This application Jul. 5, 1988, Ser. No. 214,876

Claims priority, application Japan, Oct. 31, 1984, 59-229265; Oct. 31, 1984, 59-229266; Sep. 4, 1985, 60-196182

Int. Cl.<sup>5</sup> G06K 9/36

U.S. Cl. 382—41

19 Claims



1. An image processing system comprising:

- storage means for storing a binarized document image;
- dividing means for dividing the document image stored in said storage means into rectangular areas in each of which a single character is included, detected by scanning all of the document image stored in said storage means;
- discriminating means for discriminating a character image area and a non-character image area included in each of said rectangular areas; and
- encoding means for compressing and encoding said image areas included in each of said rectangular areas on the basis of a first or second encoding method in accordance with the result of the discrimination of said discriminating means.

4,959,869

**METHOD FOR DETERMINING BINARY CODING THRESHOLD VALUE**

Yasuo Hongo, Kanagawa, Japan, assignor to Fuji Electric Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 737,437, May 24, 1985,

abandoned. This application Nov. 25, 1987, Ser. No. 125,813

Claims priority, application Japan, May 31, 1984, 59-109665

Int. Cl.<sup>5</sup> G06K 9/38

U.S. Cl. 382—51

4 Claims

1. A method for determining a set of binarization characteristic values representing area  $A_0$ , threshold  $t_0$ , and gradient  $\gamma_0$  to be used for threshold control in processing video signals of a target object comprising the steps of:

- generating a histogram for each of a plurality of reference objects representing an area of each of the objects in area percents for different values of a binary coding threshold value;

plurality of receivers for receiving optical signals from said terminals and from said other optical repeaters, and means for determining destination of optical signals wherein said optical repeater converts the frequency of received optical signals from one frequency to another frequency to transmit said converted signals from said transmitter of said optical repeater to said terminals and to other optical repeaters coupled thereto when said optical repeater receives said optical signals at said receiver therein from one terminal through said one optical wireless communication channel and said optical repeater transmits optical signals from said transmitter incorporated therein to said terminals and to all of the other optical repeaters coupled thereto except the transmitting optical repeater of said optical signals when each of the other optical repeaters receives said optical signals from another optical repeater coupled to said receiver through said another optical wireless communication channel.



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DESIGN PATENTS  
GRANTED SEP. 25, 1990  
ERRATA

For CLASS	See PATENT NO.
D09-305 .....	310,774
D08-382 .....	310,780
D34-023 .....	310,894
D34-026 .....	310,895
D34-046 .....	310,896
D32-060 .....	310,897

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## DESIGNS

SEPTEMBER 25, 1990

310,750

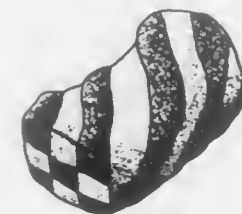
## ZEBRA COOKIE

Patricia Constance, Wyckoff, N.J., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Filed Jun. 14, 1985, Ser. No. 744,534

Term of patent 14 years

U.S. Cl. D1—128



310,753

## KEY HOLDER

James R. Stillwagon, 890 Gatehouse La., Worthington, Ohio 43235, and Scott H. Lee, R.R. #2, Church St., Putnam, Conn. 06260

Filed Jan. 11, 1989, Ser. No. 295,582

Term of patent 14 years

U.S. Cl. D3—61



310,751

## COMBINED HAT AND PARTY BLOWOUT

Karola Finley, Rte. 4, Box 120, Gouverneur, N.Y. 13642

Filed Sep. 23, 1988, Ser. No. 248,472

Term of patent 14 years

U.S. Cl. D2—514



310,752

## COMPACT DISC FILE

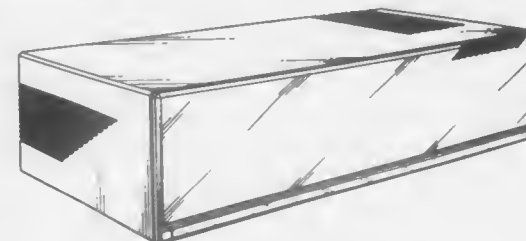
Jerry M. Long, Scotts Valley, and Peter J. Palmer, Cupertino, both of Calif., assignors to Creative Point, Inc., Fremont, Calif.

Filed Sep. 5, 1986, Ser. No. 904,236

The portion of the term of this patent subsequent to Sep. 11, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D3—35



310,754

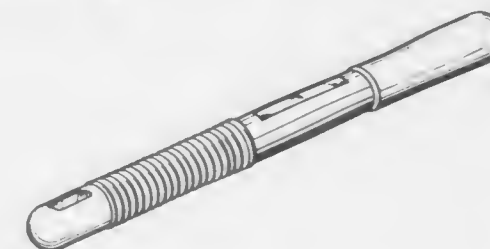
## BRUSH BLOCK AND HANDLE UNIT

Eric Gingras, Cross Junction, Va., assignor to Rubbermaid Commercial Products Inc., Winchester, Va.

Filed Dec. 3, 1987, Ser. No. 127,970

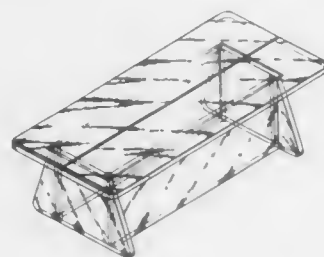
Term of patent 14 years

U.S. Cl. D4—138

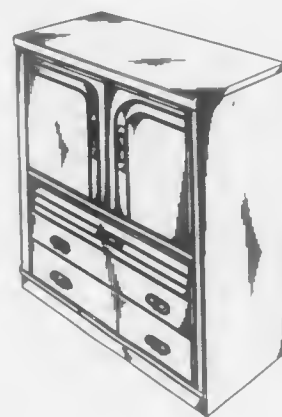




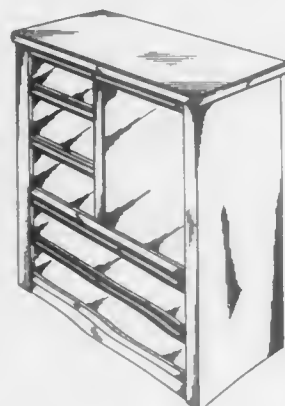
310,755  
SUPPORT STAND FOR USE IN X-RAYING A HUMAN  
FOOT  
Kevin A. Kirby, 3577 Imperial Way, Sacramento, Calif. 95826  
Filed Jan. 8, 1987, Ser. No. 59,689  
Term of patent 14 years  
U.S. Cl. D6—349



310,757  
DOOR CHEST  
Jericho P. Pauer, Onalaska; Jane Pronschinske, Arcadia, and  
Rick Lappin, La Crosse, all of Wis., assignors to Ashley Fur-  
niture Industries, Inc., Arcadia, Wis.  
Filed Dec. 30, 1987, Ser. No. 139,425  
Term of patent 14 years  
U.S. Cl. D6—446



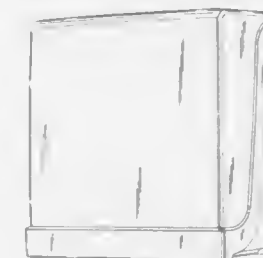
310,756  
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Jericho P. Pauer, Onalaska; Jane Pronschinske, Cochrane, and  
Rick Lappin, La Crosse, all of Wis., assignors to Ashley Fur-  
niture Industries, Inc., Arcadia, Wis.  
Filed Dec. 30, 1987, Ser. No. 139,375  
Term of patent 14 years  
U.S. Cl. D6—445



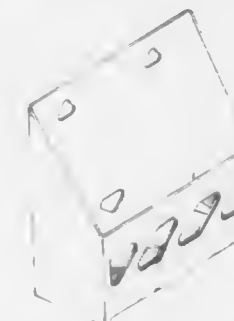
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ROLLER DISPENSER  
Carl-Arne Breger, Malmö, Sweden, assignor to Holmens Bruk  
Aktiebolag, Norrköping, Sweden  
Filed Sep. 21, 1988, Ser. No. 247,329  
Claims priority, application Sweden, Mar. 22, 1988, 880738  
Term of patent 14 years  
U.S. Cl. D6—518



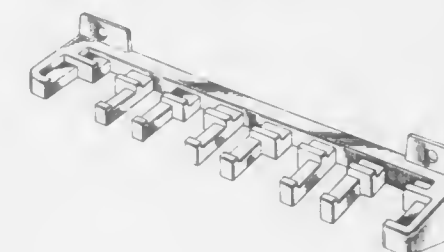
310,759  
TOILET PAPER DISPENSER  
Carl-Arne Breger, Malmö, Sweden, assignor to Holmens Bruk  
Aktiebolag, Norrköping, Sweden  
Filed Sep. 21, 1988, Ser. No. 247,330  
Claims priority, application Sweden, Mar. 22, 1988, 88-0739  
Term of patent 14 years  
U.S. Cl. D6—523



310,761  
HANGING FILE  
Bob Mervar, Columbus; Kent W. Murphy, Wooster, and Charles  
W. Craft, Jr., Apple Creek, all of Ohio, assignors to Rubber-  
maid Incorporated, Wooster, Ohio  
Filed Jul. 21, 1988, Ser. No. 222,248  
Term of patent 14 years  
U.S. Cl. D6—567



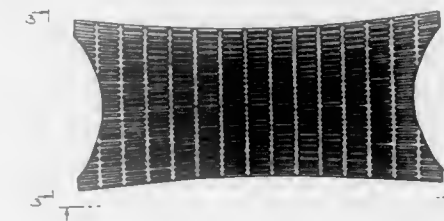
310,762  
WRENCH RACK  
Donald Embree, Copley, and David L. Hamann, Cincinnati, both  
of Ohio, assignors to Rubbermaid Incorporated, Wooster,  
Ohio  
Filed Aug. 15, 1988, Ser. No. 232,508  
Term of patent 14 years  
U.S. Cl. D6—569



310,760  
STORAGE CADDY FOR HOUSEHOLD BAGS  
Kent W. Murphy, Wooster, Ohio, assignor to Rubbermaid In-  
corporated, Wooster, Ohio  
Filed Sep. 16, 1988, Ser. No. 245,080  
Term of patent 14 years  
U.S. Cl. D6—515



310,763  
NON-SLIP SURFACE UNIT FOR BATHTUBS OR THE  
LIKE  
Thomas W. Hillebrand, Janesville, Wis., assignor to Kohler Co.,  
Kohler, Wis.  
Filed May 23, 1986, Ser. No. 867,277  
Term of patent 14 years  
U.S. Cl. D6—583

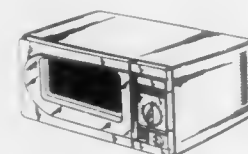
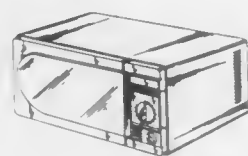


310,764

## MICROWAVE OVEN

Hideo Nishikawa, Osaka, Japan, assignor to Imanishi Kinzoku Kogyo Kabushiki Kaisha, Osaka, Japan  
 Filed Aug. 10, 1988, Ser. No. 230,856  
 Claims priority, application Japan, Feb. 10, 1988, 63-5223  
 Term of patent 14 years

U.S. Cl. D7—351

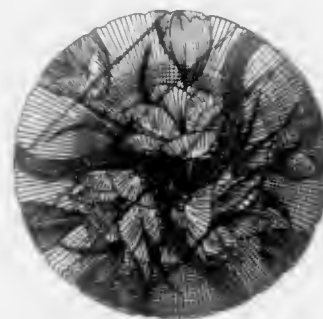


310,766

## PLATE OR SIMILAR ARTICLE

Philippe J. Durand, Les Daneaux, Chemin de la Garenne, 62510 Arques, France  
 Filed Feb. 3, 1988, Ser. No. 151,789  
 The portion of the term of this patent subsequent to Oct. 2, 2004, has been disclaimed.  
 Term of patent 14 years

U.S. Cl. D7—564



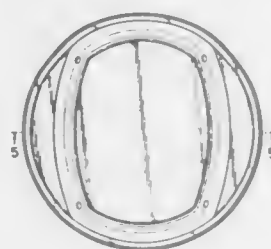
310,765

## ELECTRIC HEATED WARMING PLATE

Franz A. Stützer, Offenbach am Main, and Bernd Figur, Seligenstadt, both of Fed. Rep. of Germany, assignors to Rowenta-Werke GmbH, Offenbach am Main, Fed. Rep. of Germany  
 Filed Jan. 20, 1988, Ser. No. 208,637  
 Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 5 MR 10808

Term of patent 14 years

U.S. Cl. D7—362

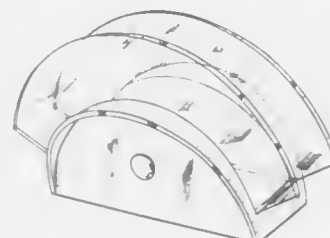


310,767

## HOLDER FOR NAPKINS

Furio Minuti, Macerata, Italy, assignor to Fratelli Guzzini S.p.A., Recanatì, Italy  
 Filed Apr. 13, 1988, Ser. No. 181,493  
 Claims priority, application Italy, Dec. 1, 1987, 22814 B/87  
 Term of patent 14 years

U.S. Cl. D7—631

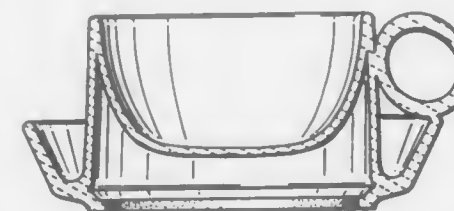
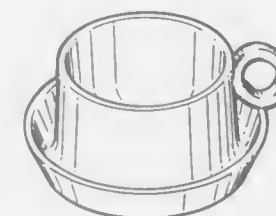


310,768

## BOWL

Susan H. Levine, Richmond, Calif., assignor to Pottery by Levine, Inc., Richmond, Calif.  
 Filed Mar. 21, 1988, Ser. No. 171,528  
 Term of patent 14 years

U.S. Cl. D7—543



310,770

COMBINED SOCKET HOLDER AND SOCKET WRENCH  
 Santiago J. Zamarripa, 4401 Sheridan Rd., El Paso, Tex. 79906  
 Filed Jul. 6, 1988, Ser. No. 215,928  
 Term of patent 14 years

U.S. Cl. D8—29

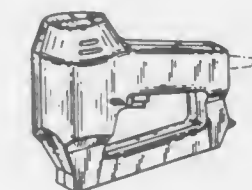


310,771

## ELECTRIC STAPLER

John F. Ewig, Worcester, Mass., assignor to Parker Manufacturing Company, Mass.  
 Filed Apr. 4, 1988, Ser. No. 176,985  
 Term of patent 14 years

U.S. Cl. D8—69

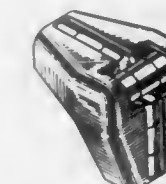


310,772

## MULTI-VIAL LEVEL ATTACHMENT FOR HAND-HELD DRILLS

David E. Johnson, 2296 Seaside Dr., Lancaster, Ohio 43130  
 Filed Apr. 24, 1986, Ser. No. 857,619  
 Term of patent 14 years

U.S. Cl. D8—70



310,769

## DOUBLE CLAMP TREE BRACE

Donald W. Jensen, Long Beach, Calif., assignor to Sullivan & Mann Lumber Co., Santa Ana, Calif.  
 Filed Nov. 23, 1988, Ser. No. 275,553  
 Term of patent 14 years

U.S. Cl. D8—1





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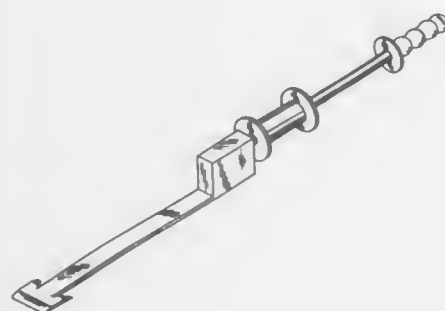
## SLATE SHINGLE REMOVER

Steve A. Frady, 1000 W. College, Grapevine, Tex. 76051

Filed Sep. 28, 1988, Ser. No. 232,128

Term of patent 14 years

U.S. Cl. D8—89



310,775

## CURTAIN TRACK UNIT

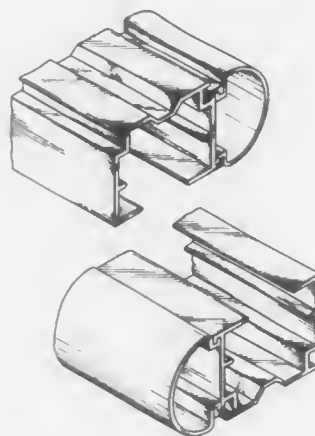
Matti Ruonala, Queensland, Australia, assignor to Uniline Australia Limited, Queensland, Australia

Filed Jan. 5, 1988, Ser. No. 141,037

Claims priority, application Australia, Sep. 3, 1987, 3209/87

Term of patent 14 years

U.S. Cl. D6—377



310,776

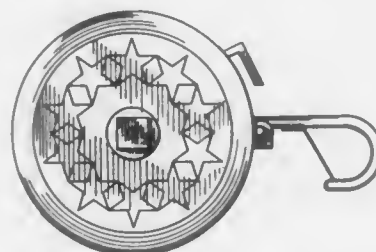
## RETRACTABLE SKI ROPE REEL MATE

Larry Cason, 3317 Young Forest Dr., Augusta, Ga. 30906

Filed Mar. 7, 1988, Ser. No. 164,647

Term of patent 14 years

U.S. Cl. D6—358



310,774

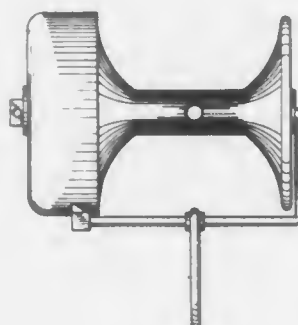
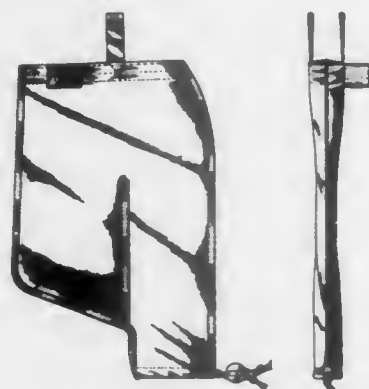
## RECLOSABLE DEBRIS BAG WITH DEBRIS TRAP

Christopher G. Collins, 13946 Dawson St., Garden Grove, Calif. 92643, and Millie A. Carthew, Auckland, New Zealand, assignors to Christopher G. Collins, Garden Grove, Calif.

Filed May 1, 1987, Ser. No. 44,571

Term of patent 14 years

U.S. Cl. D9—305



SEPTEMBER 25, 1990

U.S. PATENT AND TRADEMARK OFFICE

2317

310,777

## LIQUID CONTAINER

Daniel S. Ross, Wylie; Alan M. Weintraub, Garland, and Joseph K. Ross, deceased, late of Wylie, all of Tex. (by Mary M. Ross Legal Representative), assignors to Ken Ross, Inc., Wylie, Tex.

Filed Sep. 6, 1988, Ser. No. 240,845

Term of patent 14 years

U.S. Cl. D9—378



310,779

## COMBINED DEODORANT BOTTLE AND CAP

Rolf W. Gloeckler, Bonn, Fed. Rep. of Germany, assignor to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf, Fed. Rep. of Germany

Filed Apr. 7, 1987, Ser. No. 35,696

Claims priority, application Norway, Oct. 7, 1986, DM/007583

Term of patent 14 years

U.S. Cl. D9—377



310,780

## FENCE POST CLIP

Donald W. Kelley, 6205 Glenmoor, Garland, Tex. 75043, and Arthur L. Saell, 16650 Jones Maltzberger, San Antonio, Tex. 78247

Filed May 31, 1988, Ser. No. 200,195

Term of patent 14 years

U.S. Cl. D6—382



310,778

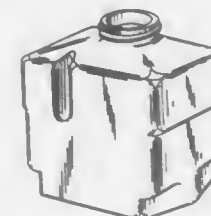
## BOTTLE OR SIMILAR ARTICLE

Nicholas Williamson, Burlington, Canada, assignor to Debus, Inc., South Bend, Ind.

Filed Mar. 3, 1987, Ser. No. 21,024

Term of patent 14 years

U.S. Cl. D9—367



310,781  
BOTTLE

Leon J. Scott, III, Marietta, Ga., assignor to Alpha Products, Inc., Atlanta, Ga.

Filed Jan. 14, 1989, Ser. No. 366,026

Term of patent 14 years

U.S. Cl. D9—398

310,782  
PERFUME BOTTLE

Jean-Jacques Durand, LaBute, 62510 Arques, France

Filed Feb. 12, 1988, Ser. No. 155,623

Term of patent 14 years

U.S. Cl. D9—404

310,783  
BOTTLE

Everett C. Beeman, Wallingford, Conn., assignor to Innopak Plastics Corporation, Stonington, Conn.

Filed May 5, 1988, Ser. No. 190,415

Term of patent 14 years

U.S. Cl. D9—404

310,784  
TEAR STRIP CARTON

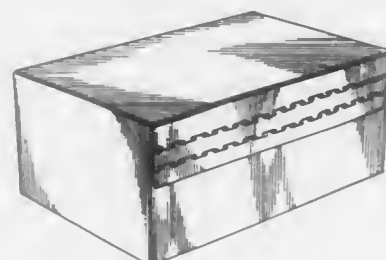
Hampton E. Forbes, Jr., Newark, Del., assignor to Westvaco Corporation, New York, N.Y.

Filed May 7, 1987, Ser. No. 46,628

The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D9—416

310,785  
TEAR STRIP CARTON

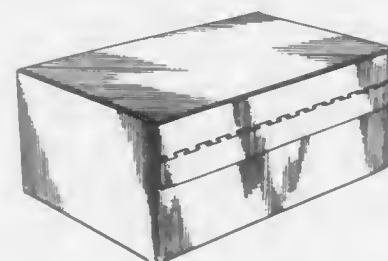
Hampton E. Forbes, Jr., Newark, Del., assignor to Westvaco Corporation, New York, N.Y.

Filed May 7, 1987, Ser. No. 46,629

The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D9—416

310,786  
CONTAINER CLOSURE

Dieter F. Lay, Hawthorn Woods, Ill., assignor to Seagist Closures, a division of Pittway Corporation, Crystal Lake, Ill.

Filed May 9, 1988, Ser. No. 191,596

Term of patent 14 years

U.S. Cl. D9—435

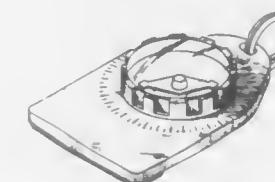
310,787  
COMBINED COMPASS AND THERMOMETER

Marlin D. Iden, Riverton, Wyo., assignor to The Brunton Company, Riverton, Wyo.

Filed Feb. 13, 1987, Ser. No. 14,645

Term of patent 14 years

U.S. Cl. D10—53

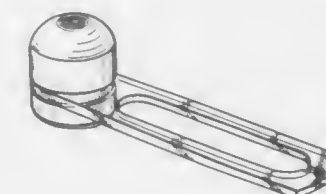
310,790  
GAUGE INDICATOR

Vincent D. Reilly, 219 Eagle St., Tenafly, N.J. 07670

Filed Oct. 5, 1987, Ser. No. 104,496

Term of patent 14 years

U.S. Cl. D10—103

310,791  
KEYBOARD AND DISPLAY PANEL FOR AN INTRUSION DETECTION SYSTEM

Richard Farrell, West Babylon, and Richard Soloway, Lido Beach, both of N.Y., assignors to Napco Security Systems, Inc., Amityville, N.Y.

Filed Jul. 25, 1988, Ser. No. 223,759

Term of patent 14 years

U.S. Cl. D10—106

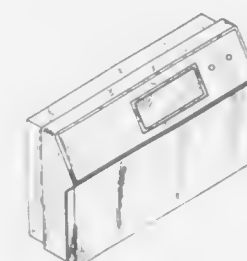
310,788  
CLOCK THERMOSTAT

N. Thomas Wolfe, Minnetonka, Minn., assignor to Hoeywell Inc., Minneapolis, Minn.

Filed May 26, 1987, Ser. No. 54,167

Term of patent 14 years

U.S. Cl. D10—53

310,792  
LIGHTED MARKER BUOY

Bradley E. Dalbec, 316 Iris Ln., St. Michael, Minn. 55376

Filed Apr. 5, 1988, Ser. No. 176,989

Term of patent 14 years

U.S. Cl. D10—107

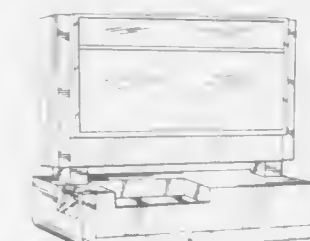
310,789  
ENGINE ANALYZER

James R. Shaffer, Mount Prospect, and Lee F. Radtke, Lake Zurich, both of Ill., assignors to Sun Electric Corporation, Crystal Lake, Ill.

Filed Jan. 28, 1987, Ser. No. 8,609

Term of patent 14 years

U.S. Cl. D10—75





310,793

**LIGHT BAR ASSEMBLY FOR VEHICLE ROOFS**  
John F. Castagna, Milford, Pa., assignor to Sparkomatic Corporation, Milford, Pa.

Filed May 2, 1988, Ser. No. 189,401  
Term of patent 14 years

U.S. Cl. D10—114

310,796  
SCARF SLIDE

Josette Boivin, 50-52 rue de la Saussière, 92100 Boulogne S/Seine, France

Filed Apr. 28, 1988, Ser. No. 189,486  
Term of patent 14 years

U.S. Cl. D11—203

310,794  
SCARF SLIDE

Josette Boivin, 50-52 rue de la Saussière, 92100 Boulogne S/Seine, France

Filed Apr. 28, 1988, Ser. No. 187,433  
Term of patent 14 years

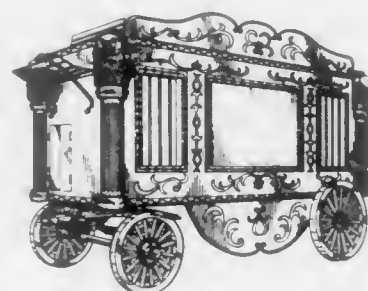
U.S. Cl. D11—202

310,797  
CIRCUS WAGON

Thomas J. Smrt, 640 Industrial Dr., Cary, Ill. 60013

Filed Mar. 11, 1987, Ser. No. 24,403  
Term of patent 14 years

U.S. Cl. D12—17

310,795  
SCARF SLIDE

Josette Boivin, 50-52 rue de la Saussière, 92100 Boulogne S/Seine, France

Filed Apr. 28, 1988, Ser. No. 189,487  
Term of patent 14 years

U.S. Cl. D11—202



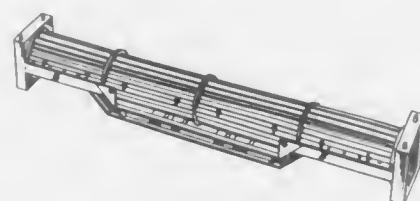
310,798

**ROLLTRANSPORT CONTAINER**

Esbrörn Stake, Hudiksvall, and Lennart Magnusson, Iggesund, both of Sweden, assignors to Mecania HB, Hudiksvall, Sweden

Filed Jul. 17, 1987, Ser. No. 74,912  
Claims priority, application Sweden, Jan. 19, 1987, 87-0080  
Term of patent 14 years

U.S. Cl. D12—97



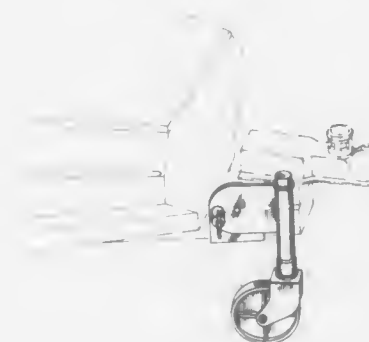
310,799

**TRAILER STAND**

Jacobus C. van der Merwe, 801 Beechwood Dr., Kingsport, Tenn. 37663, and Lucas C. van der Merwe, 113 Dover La., Bristol, Tenn. 37620

Filed Jul. 19, 1988, Ser. No. 221,239  
Term of patent 14 years

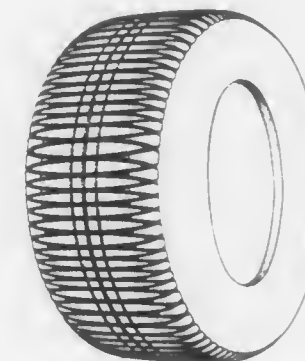
U.S. Cl. D12—106

310,801  
TIRE

Paul B. Maxwell, Akron, and William E. Egan, Tallmadge, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 28, 1988, Ser. No. 264,310  
Term of patent 14 years

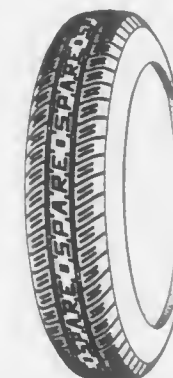
U.S. Cl. D12—146

310,800  
TIRE

Maurice Graas, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 7, 1988, Ser. No. 164,685  
Term of patent 14 years

U.S. Cl. D12—137

310,802  
AUTOMOBILE TIRE

Yasuo Himuro, and Yuji Tateo, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Jul. 24, 1987, Ser. No. 77,539

Claims priority, application Japan, Jan. 26, 1987, 62-2312  
The portion of the term of this patent subsequent to Jun. 21, 2002, has been disclaimed.  
Term of patent 14 years

U.S. Cl. D12—147



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## AUTOMOBILE TIRE

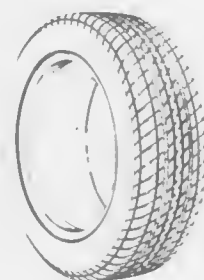
Hirotsugu Hasegawa, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Nov. 20, 1987, Ser. No. 123,648

Claims priority, application Japan, May 20, 1987, 62-19757

Term of patent 14 years

U.S. Cl. D12-147



310,805

## AUTOMOBILE TIRE

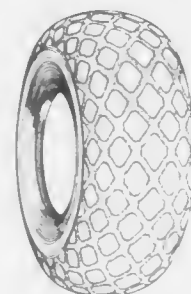
Toshio Hayakawa, and Hideaki Hashimoto, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Aug. 20, 1987, Ser. No. 87,713

Claims priority, application Japan, Apr. 21, 1987, 62-15319

Term of patent 14 years

U.S. Cl. D12-151



310,806

## TELESCOPIC CAMPER CAP

William E. Hertzberg, Santa Barbara; Michael J. Botich, Ventura, and Mark Murphy, Thousand Oaks, all of Calif., assignors to Zipper Project, Inc., Santa Barbara, Calif.

Filed Oct. 24, 1988, Ser. No. 261,471

Term of patent 14 years

U.S. Cl. D12-156

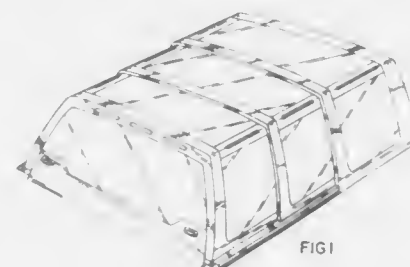


FIG 1

310,804

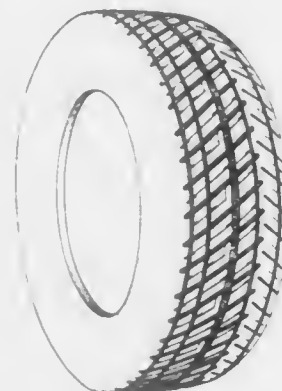
## TIRE

Darrell E. Covert, Uniontown; Philip S. Hammond, Mogadore, and Paul B. Maxwell, Akron, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jul. 12, 1988, Ser. No. 218,594

Term of patent 14 years

U.S. Cl. D12-147



310,807

## BICYCLE MOUNTABLE GOLF CLUB RACK

Richard L. Lynch, 1047 Wellsville, Memphis, Tenn. 38117

Filed Apr. 18, 1988, Ser. No. 182,585

Term of patent 14 years

U.S. Cl. D12-158

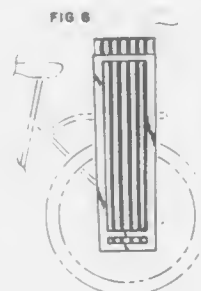


FIG 6

310,808

## BICYCLE RACK

Irving W. Kosecoff, 2852 Sawtelle Blvd., No. 25, Los Angeles, Calif. 90064

Filed Nov. 2, 1988, Ser. No. 265,924

Term of patent 14 years

U.S. Cl. D12-158



310,810

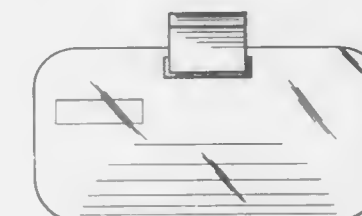
## PORTABLE VEHICLE SUN VISOR

Leslie B. Lewis, 79 Mosswood Dr., Suisun City, Calif. 94585

Filed Mar. 2, 1988, Ser. No. 162,860

Term of patent 14 years

U.S. Cl. D12-191



310,811

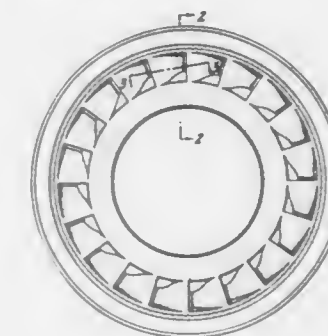
## WHEEL COVER

David R. North, Warren, and Charles H. Stewart, Royal Oak, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 1, 1988, Ser. No. 227,050

Term of patent 14 years

U.S. Cl. D12-206



310,809

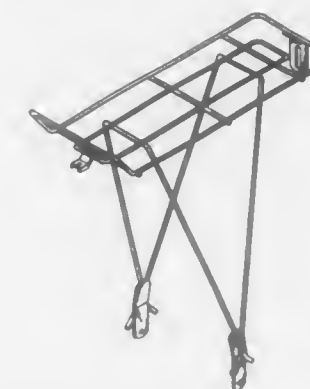
## BICYCLE CARRIER RACK

Dennis P. Pawasat, and David K. McMurtrey, both of Maysville, Ky., assignors to Wald Manufacturing Co., Inc., Maysville, Ky.

Filed Dec. 1, 1988, Ser. No. 278,620

Term of patent 14 years

U.S. Cl. D12-158



310,812

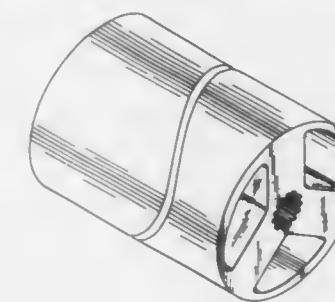
## PROPELLER HUB EXTRUSION

Robert M. Bergeron, Withers Grove, Derry, N.H. 03038

Filed Feb. 17, 1988, Ser. No. 156,655

Term of patent 14 years

U.S. Cl. D12-214





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310,813

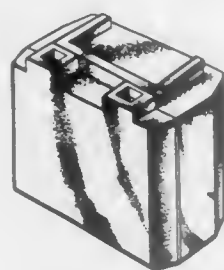
## BATTERY FOR A PORTABLE RADIO

Richard Culbertson, and Henry A. Schaefer, both of Lynchburg, Va., assignors to Ericsson GE Mobile Communications Inc., Lynchburg, Va.

Continuation-in-part of Ser. No. 851,425, Apr. 11, 1986, Pat. No. D. 300,132. This application May 24, 1988, Ser. No. 202,653. The portion of the term of this patent subsequent to Mar. 7, 2003, has been disclaimed.

Term of patent 14 years

U.S. Cl. D13—103



310,815

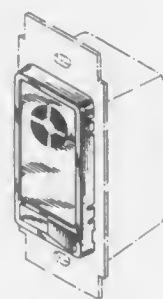
## COMBINED SOUND ACTIVATED SWITCH AND COVER PLATE

Douglas Watson, Stamford, Conn.; Saul Rosenbaum, East Meadow, N.Y.; Joseph G. Justiniano, Bethpage, N.Y., and Lester Rivera, Glendale, N.Y., assignors to Leviton Manufacturing Co., Inc., Little Neck, N.Y.

Filed Aug. 11, 1988, Ser. No. 230,930

Term of patent 14 years

U.S. Cl. D13—158



310,814

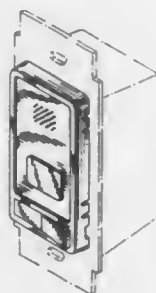
## COMBINED SOUND ACTIVATED SWITCH AND COVER PLATE

Saul Rosenbaum, East Meadow, N.Y.; Douglas Watson, Stamford, Conn.; Joseph G. Justiniano, Bethpage, and Lester Rivera, Glendale, both of N.Y., assignors to Leviton Manufacturing Co., Inc., Little Neck, N.Y.

Filed Aug. 11, 1988, Ser. No. 230,927

Term of patent 14 years

U.S. Cl. D13—158



310,816

## ELECTRIC MOTOR WITH HINGED MOUNTING BRACKET

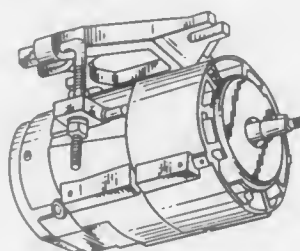
Tatsuya Sawato; Takashi Nakamura, and Hiroshi Kumatani, all of Nagoya, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 4, 1987, Ser. No. 57,977

Claims priority, application Japan, Jan. 26, 1987, 62-2610

Term of patent 14 years

U.S. Cl. D13—112



SEPTEMBER 25, 1990

U.S. PATENT AND TRADEMARK OFFICE

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310,817

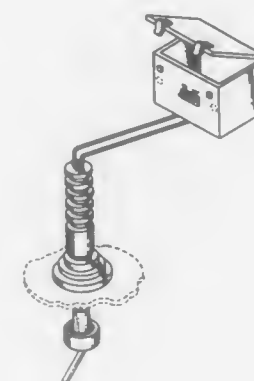
## ENGINE HEATING UNIT

Larry Johnson, Box 70, and Leonard McCommon, 105 Pinehill Dr., both of Woodstock, Ga. 30188

Filed Apr. 25, 1988, Ser. No. 185,813

Term of patent 14 years

U.S. Cl. D13—119



310,819

## COMBINED DIMMER, FAN SPEED CONTROL SWITCHES AND COVER PLATE

Douglas Watson, Sanford, Conn.; Lester Rivera, Glendale, N.Y.; Joseph G. Justiniano, Bethpage, N.Y.; Saul Rosenbaum, East Meadow, N.Y.; Lawrence Melly, Pemaquid Harbor, Me., and Thomas A. Blumberg, New York, N.Y., assignors to Leviton Manufacturing Co., Inc., Little Neck, N.Y.

Filed Aug. 11, 1988, Ser. No. 230,925

Term of patent 14 years

U.S. Cl. D13—125



310,820

## COMBINED DIMMER, FAN SPEED CONTROL SWITCHES AND COVER PLATE

Douglas Watson, Sanford, Conn.; Lester Rivera, Glendale; Joseph G. Justiniano, Bethpage; Saul Rosenbaum, East Meadow, all of N.Y.; Lawrence Melly, Pemaquid Harbor, Me., and Thomas A. Blumberg, New York, N.Y., assignors to Leviton Manufacturing Co., Inc., Little Neck, N.Y.

Filed Aug. 11, 1988, Ser. No. 230,926

Term of patent 14 years

U.S. Cl. D13—125

310,818

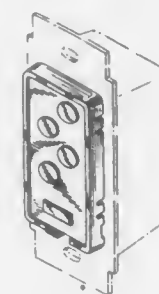
## COMBINED DIMMER SWITCHES AND COVER PLATE

Albert Zaretsky, Brooklyn; Saul Rosenbaum, East Meadow; Lester Rivera, Glendale, and Benjamin Neiger, Floral Park, all of N.Y., assignors to Leviton Manufacturing Co., Inc., Little Neck, N.Y.

Filed Aug. 11, 1988, Ser. No. 230,922

Term of patent 14 years

U.S. Cl. D13—125



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OFFICIAL GAZETTE

SEPTEMBER 25, 1990

310,821

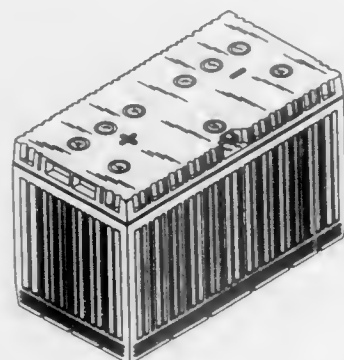
## BATTERY CONTAINER

Randy K. Hulsebus, Colgate; Edward N. Mrotek, Grafton, and Douglas C. Brown, Glendale, all of Wis., assignors to Globe-Union Inc., Milwaukee, Wis.

Filed Nov. 14, 1988, Ser. No. 271,193

Term of patent 14 years

U.S. Cl. D13—104



310,823

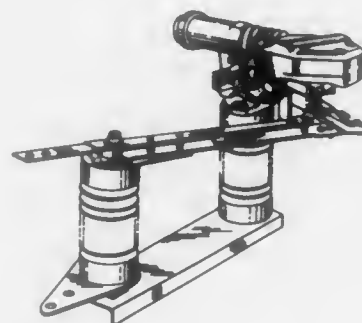
## INTERRUPTER SWITCH

Leonard V. Chabala, Maywood, and Edward J. Rogers, Chicago, both of Ill., assignors to S&C Electric Company, Chicago, Ill.

Filed Nov. 18, 1988, Ser. No. 273,437

Term of patent 14 years

U.S. Cl. D13—175



310,824

## ELECTRICAL TRUNKING, UTILITY BOX

David E. Layton, North Wales, United Kingdom, assignor to EGA Limited, North Wales, United Kingdom

Filed Aug. 1, 1988, Ser. No. 226,988

Claims priority, application United Kingdom, May 9, 1988, 1050605

Term of patent 14 years

U.S. Cl. D13—152

310,822

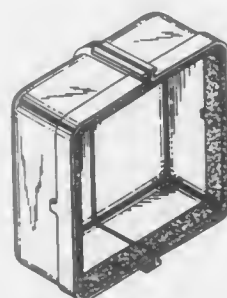
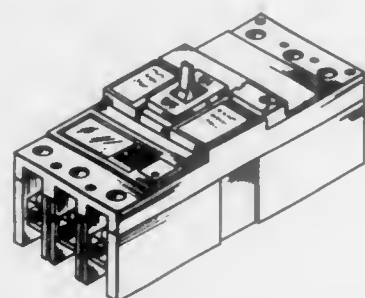
## PROGRAMMABLE ELECTRONIC CIRCUIT BREAKER

Robert J. Danek, Andover, Conn., assignor to General Electric Company, New York, N.Y.

Filed Jun. 24, 1988, Ser. No. 211,189

Term of patent 14 years

U.S. Cl. D13—160



SEPTEMBER 25, 1990

U.S. PATENT AND TRADEMARK OFFICE

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310,825

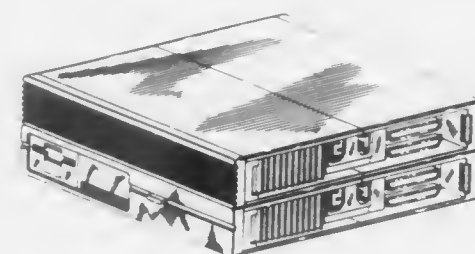
## MODULAR PERSONAL COMPUTER SYSTEM OR SIMILAR ARTICLE

Pierre L. Crease, Centerville, Ohio, and Werner B. Stephan, Augsburg, Fed. Rep. of Germany, assignors to NCR Corporation, Dayton, Ohio

Filed May 13, 1987, Ser. No. 50,277

Term of patent 14 years

U.S. Cl. D14—100



310,827

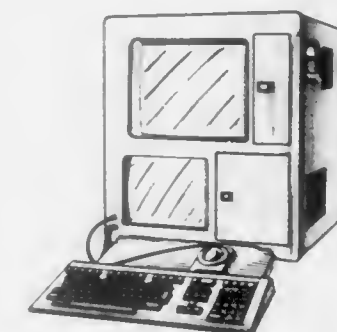
## DATA DISPLAY WORK STATION

Donald Z. LaRochelle, Germantown; Brian G. Cooper, Mount Airy, and Vincent J. Melchiorre, Rockville, all of Md., assignors to Fairchild Space and Defense Corporation, Germantown, Md.

Filed Feb. 24, 1988, Ser. No. 159,644

Term of patent 14 years

U.S. Cl. D14—106



310,828

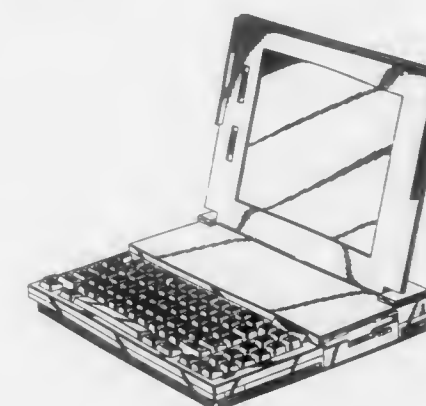
## PERSONAL COMPUTER

Douglas R. Grundstrom, San Jose; Dennis J. Boyle, Menlo Park; Nelson S. Au, Foster City; Michael J. Nuttal, Palo Alto, and Matthew A. Heron, Menlo Park, all of Calif., assignors to Dynabook Technologies Corporation, Westlake Village, Calif.

Filed Dec. 22, 1988, Ser. No. 288,108

Term of patent 14 years

U.S. Cl. D14—106



310,826

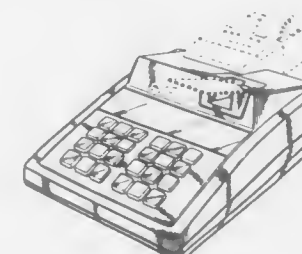
## CREDIT CARD INPUT/OUTPUT TERMINAL

Masami Suda, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Dec. 31, 1987, Ser. No. 141,311

Term of patent 14 years

U.S. Cl. D14—105





310,829

## DISPLAY MONITOR

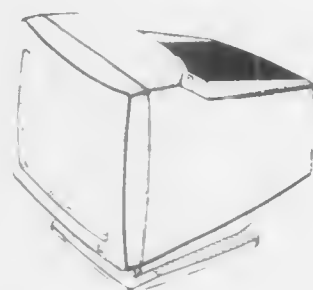
Tsutomu Suyama; Masaharu Wakamatsu, both of Hyogo; Koji Saito, and Kiyofumi Koya, both of Nagasaki, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 17, 1987, Ser. No. 87,947

Claims priority, application Japan, Feb. 17, 1987, 62-5873

Term of patent 14 years

U.S. Cl. D14—113



310,831

## CLEANING CASSETTE FOR A MAGNETIC HEAD

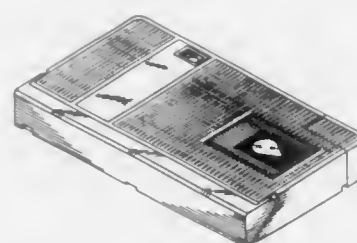
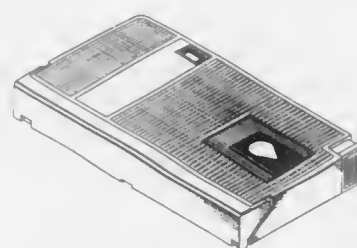
Yeh T. Wan, No. 436, Nan Da Road, Hsinchu, Taiwan

Filed Nov. 29, 1988, Ser. No. 277,224

Claims priority, application Taiwan, Mar. 17, 1988, 77301392

Term of patent 14 years

U.S. Cl. D14—121



310,832

## TELEVISION RECEIVER

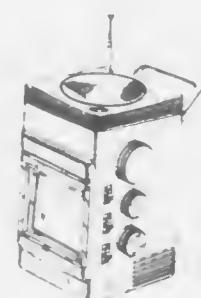
Richard Gioscia, Garfield, N.J., and Ichiro Hino, Yokohama, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 14, 1988, Ser. No. 258,311

Claims priority, application Japan, Apr. 26, 1988, 63-16958

Term of patent 14 years

U.S. Cl. D14—131



310,830

## ANTI-THEFT ANCHOR

Robert Perry, 5755 SW. Willow La., Lake Oswego, Oreg. 97034

Filed Sep. 25, 1987, Ser. No. 101,151

Term of patent 14 years

U.S. Cl. D14—114



310,833

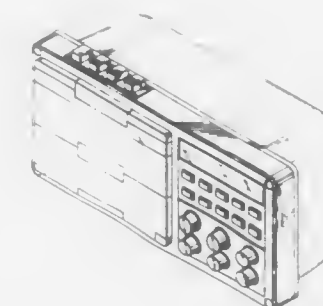
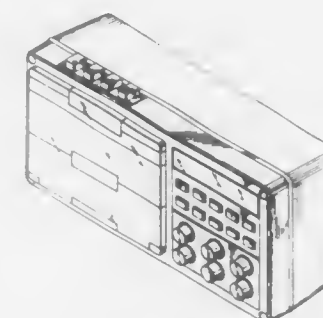
## MARINE RADIO

Douglas W. Low, Essex, Conn., and Elizabeth M. Pierotti, Grand View, N.Y., assignors to International Marine Industries, Inc., Stamford, Conn.

Filed Sep. 23, 1988, Ser. No. 249,081

Term of patent 14 years

U.S. Cl. D14—137



310,835

## COMBINED RADIO AND CASSETTE RECORDER

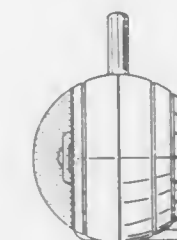
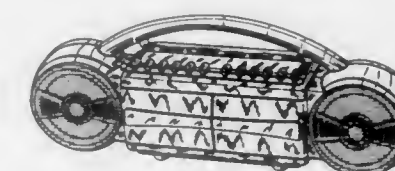
Gary E. Grimes, Eersel, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 9, 1988, Ser. No. 206,158

Claims priority, application United Kingdom, Dec. 22, 1987, 1047291

Term of patent 14 years

U.S. Cl. D14—163



310,834

## DIGITAL AUDIO DISC PLAYER

Hirokazu Shibata, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan

Filed Aug. 30, 1988, Ser. No. 238,877

Claims priority, application Japan, Mar. 18, 1988, 63-11138

Term of patent 14 years

U.S. Cl. D14—156



VOL

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SE

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UMI

310,836

## TAPE PLAYER

Hideki Tsuboi, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 10, 1988, Ser. No. 166,154

Claims priority, application Japan, Sep. 11, 1987, 62-36922

Term of patent 14 years

U.S. Cl. D14—165



310,838

## WALL-MOUNTED AQUARIUM PUMP

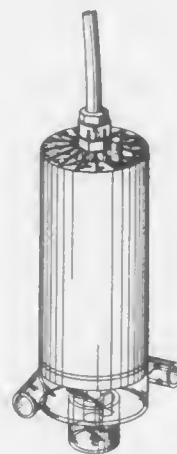
Heinz Turbanisch, Nuremberg, Fed. Rep. of Germany, assignor to Jet-Pumpen HT GmbH, Fed. Rep. of Germany

Filed Jun. 18, 1987, Ser. No. 63,903

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1986, MR VII 324

Term of patent 14 years

U.S. Cl. D15—8



310,839

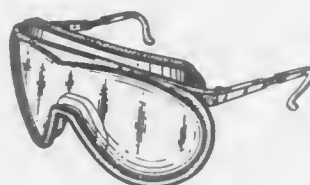
## PAIR OF SUNGLASSES

Maurice Bollé, Cedex, France, assignor to Etablissements Bollé S.N.C., Cedex, France

Filed Feb. 29, 1988, Ser. No. 161,661

Term of patent 14 years

U.S. Cl. D16—102



310,837

## COMBINED COMPACT DISC PLAYER, RADIO, RECEIVER AND TAPE RECORDER

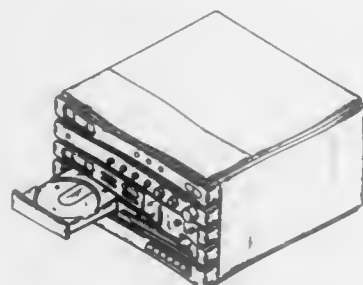
Makoto Takimoto, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan

Filed Sep. 20, 1988, Ser. No. 247,093

Claims priority, application Japan, Mar. 22, 1988, 63-11582

Term of patent 14 years

U.S. Cl. D14—168



310,840

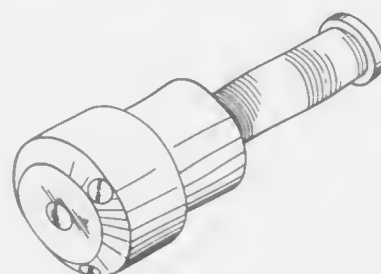
## DOOR VIEWER

Donald E. Degnan, 314 E. 77th St., New York, N.Y. 10021

Filed Sep. 2, 1988, Ser. No. 240,048

Term of patent 14 years

U.S. Cl. D16—134

310,841  
CAMERA

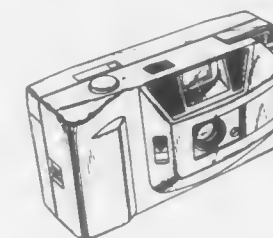
Ritsuko Inoue, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Nov. 19, 1987, Ser. No. 122,425

Claims priority, application Japan, May 30, 1987, 62-022101

Term of patent 14 years

U.S. Cl. D16—209

310,842  
GUITAR

Richard F. Vito, 931 N. Rose St., Burbank, Calif. 91505

Filed Dec. 14, 1987, Ser. No. 132,863

Term of patent 14 years

U.S. Cl. D17—14



310,843

## SORTER FOR COPYING MACHINE

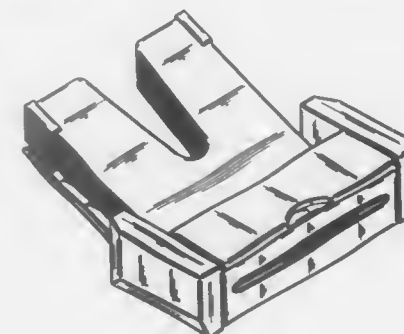
Mikio Kosako; Ritsuko Makiyama, and Yoichi Tatsuta, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Apr. 20, 1987, Ser. No. 40,235

Claims priority, application Japan, Oct. 20, 1986, 61-41608

Term of patent 14 years

U.S. Cl. D18—42



310,844

## TONER CARTRIDGE

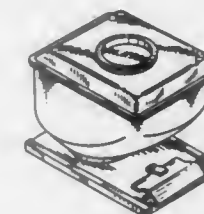
Yousuke Ohata, Osaka, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Filed Dec. 8, 1987, Ser. No. 130,047

Claims priority, application Japan, Jul. 2, 1987, 62-26979

Term of patent 14 years

U.S. Cl. D18—43



310,845

## TONER CARTRIDGE

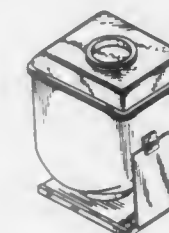
Yousuke Ohata, Osaka, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Filed Dec. 8, 1987, Ser. No. 130,048

Claims priority, application Japan, Jul. 2, 1987, 62-26978

Term of patent 14 years

U.S. Cl. D18—43



310,846

## TAPE HOLDER

Hiroyuki Sakurai, Yokohama, Japan, assignor to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Filed Feb. 10, 1987, Ser. No. 12,937

Claims priority, application Japan, Sep. 27, 1986, 61-37948

Term of patent 14 years

U.S. Cl. D19—69





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OFFICIAL GAZETTE

SEPTEMBER 25, 1990

310,847

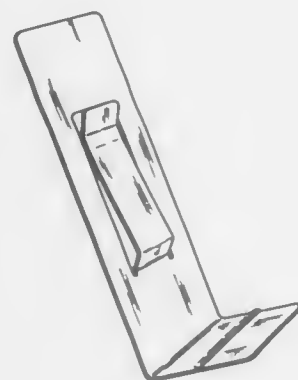
## MESSAGE HOLDER

Robert E. Dietz, 99 Queen St East, Welleale, Ontario, Canada  
NOB 2T0

Filed Feb. 25, 1987, Ser. No. 18,949

Term of patent 14 years

U.S. Cl. D19—90



310,849

## MEDICAL INFORMATION TAG

Jeffrey B. Davis, Lisle, Ill., assignor to CritiCard, Inc., Naperville, Ill.

Filed Feb. 9, 1988, Ser. No. 154,185

Term of patent 14 years

U.S. Cl. D20—22



310,850

## SIMULATIVE DIE

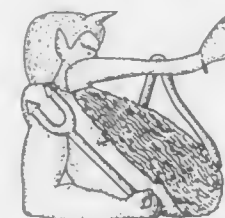
Peter Hendriks, Dusseldorf, Fed. Rep. of Germany, assignor to  
C.C. Creative Consulting S.A., Kronbuhl, Switzerland

Filed Feb. 4, 1988, Ser. No. 152,219

Claims priority, application United Kingdom, Aug. 13, 1987,  
1044188

Term of patent 14 years

U.S. Cl. D21—41



310,848

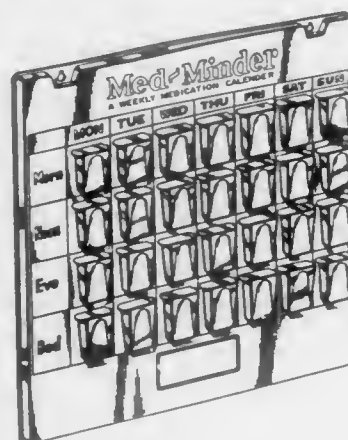
COMBINED SET OF CONTAINERS AND WALL  
MOUNTED HANGING UNIT THEREFOR

Richard D. Perbitz, 410 Comstock La., Plymouth, Minn. 55447

Filed Jan. 15, 1988, Ser. No. 144,083

Term of patent 14 years

U.S. Cl. D20—18



SEPTEMBER 25, 1990

U.S. PATENT AND TRADEMARK OFFICE

2333

310,851

## SIMULATIVE DIE

Peter Hendriks, Dusseldorf, Fed. Rep. of Germany, assignor to  
C.C. Creative Consulting S.A., Kronbuhl, Switzerland

Filed Feb. 4, 1988, Ser. No. 152,220

Claims priority, application United Kingdom, Aug. 13, 1987,  
1044189

Term of patent 14 years

U.S. Cl. D21—41



310,853

## SIMULATIVE GLIDER

Dennis Kupperman, Glenview, Ill., assignor to RB Toy Develop-  
ment, Skokie, Ill.

Filed Oct. 24, 1988, Ser. No. 261,177

Term of patent 14 years

U.S. Cl. D21—89



310,854

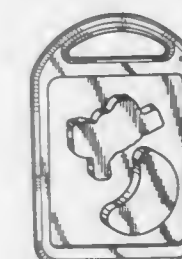
## TOY PUZZLE

Nancy D. Slayton, Cumberland, R.I.; John R. Nottingham, and  
John W. Spirk, Moreland Hills, both of Ohio, assignors to  
Dart Industries Inc., Deerfield, Ill.

Filed Aug. 4, 1988, Ser. No. 228,657

Term of patent 14 years

U.S. Cl. D21—105



310,852

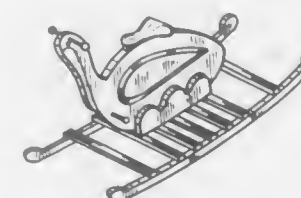
## SIMULATIVE ROCKER

John G. Freiburger, Jr., 4722 Trade Winds Dr. South, and Kelly  
M. Allen, 2825 53rd St., South, both of Gulfport, Fla. 33707

Filed Sep. 7, 1988, Ser. No. 241,145

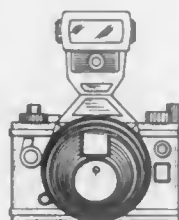
Term of patent 14 years

U.S. Cl. D21—69



310,855  
TOY CAMERA

Janet E. Snel-Kelly, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.  
Filed Sep. 29, 1987, Ser. No. 102,085  
Term of patent 14 years  
U.S. Cl. D21—110



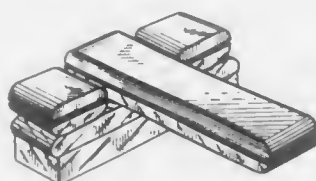
310,857  
DOLL

Trevor A. Robinson, 1624 Nostrand Ave., Brooklyn, N.Y. 11226  
Filed Jan. 8, 1987, Ser. No. 1,544  
The portion of the term of this patent subsequent to Oct. 9, 2004, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D21—168



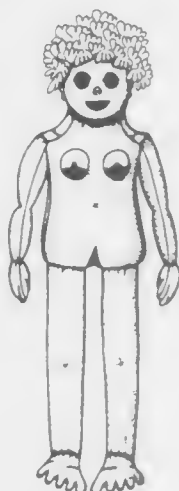
310,858  
BATHROOM FAUCET

Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.  
Filed Apr. 16, 1987, Ser. No. 39,637  
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D23—241



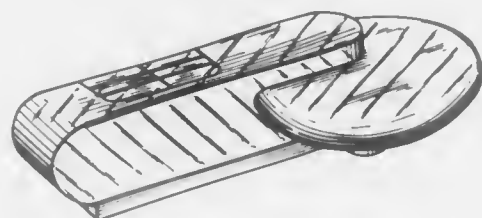
310,856  
ANATOMICAL DOLL FOR CHILD ABUSE INVESTIGATIONS

Carol M. Pedersen, 20075 SW. Imperial, Aloha, Oreg. 97006  
Filed Mar. 16, 1987, Ser. No. 26,137  
Term of patent 14 years  
U.S. Cl. D21—166



310,859  
BATHROOM FAUCET

Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.  
Filed Apr. 16, 1987, Ser. No. 39,639  
Term of patent 14 years  
U.S. Cl. D23—241



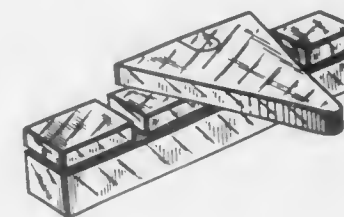
310,860  
ELONGATED SHOWER HEAD WITH PLURAL SPRAY NOZZLES

Jean-Claude Delepine, 23, rue Clapeyron, 75008 Paris, France  
Filed Jul. 12, 1988, Ser. No. 217,891  
Claims priority, application Int'l Pat. Institute, Jan. 13, 1988, DM/010048  
Term of patent 14 years  
U.S. Cl. D23—213

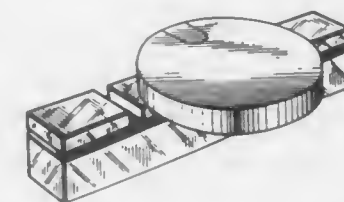


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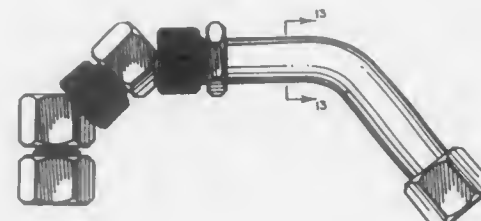
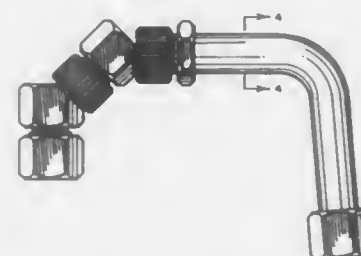
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.  
Filed Apr. 16, 1987, Ser. No. 39,645  
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D23—241



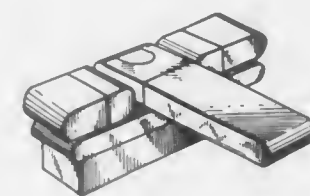
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BATHROOM FAUCET  
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Filed Apr. 16, 1987, Ser. No. 39,647  
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D23—241



310,861  
COMBINED CURVED WAND TIP WITH SWIVEL-MOUNTED NOZZLE  
Robert W. Hengesbach, 7886 Munson Rd., Mentor, Ohio 44060  
Division of Ser. No. 224,251, Jul. 26, 1988, which is a continuation of Ser. No. 15,604, Feb. 17, 1987, abandoned, which is a continuation-in-part of Ser. No. 674,272, Nov. 23, 1984, Pat. No. Des. 293,127, and a continuation-in-part of Ser. No. 461,874, Jan. 28, 1983, Pat. No. Des. 282,392. This application Feb. 21, 1989, Ser. No. 312,238  
Term of patent 14 years  
U.S. Cl. D23—213

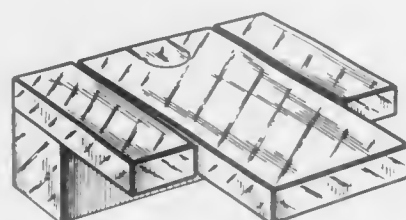


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Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.  
Filed Apr. 16, 1987, Ser. No. 39,650  
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D23—241

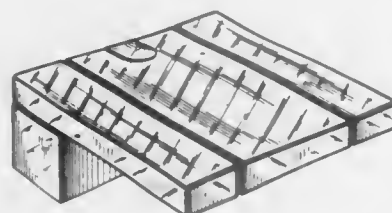




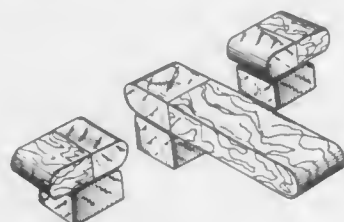
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BATHROOM FAUCET  
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.  
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Term of patent 14 years  
U.S. Cl. D23—241



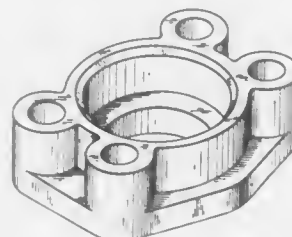
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BATHROOM FAUCET  
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.  
Filed May 1, 1987, Ser. No. 45,014  
Term of patent 14 years  
U.S. Cl. D23—241



310,867  
FAUCET SET  
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.  
Filed May 1, 1987, Ser. No. 45,015  
Term of patent 14 years  
U.S. Cl. D23—242



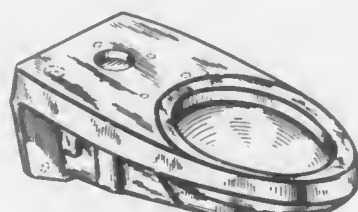
310,868  
WELD FLANGE  
Don R. Wilder, 1881 N. Ukiah Way, Upland, Calif. 91783  
Filed May 21, 1987, Ser. No. 52,742  
Term of patent 14 years  
U.S. Cl. D23—265



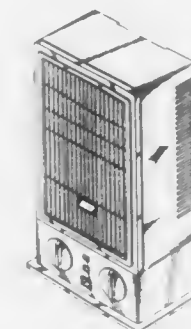
310,869  
TOILET TRAINING SEAT FOR CHILDREN  
Mark Sedlack, Macedonia, Ohio, assignor to Century Products Company, Macedonia, Ohio  
Filed Nov. 1, 1988, Ser. No. 265,723  
Term of patent 14 years  
U.S. Cl. D23—296



310,870  
TOILET  
Mark A. Zmuda, and Mary J. Reid, both of Sheboygan, Wis., assignors to Kohler Co., Kohler, Wis.  
Filed Oct. 14, 1987, Ser. No. 108,738  
Term of patent 14 years  
U.S. Cl. D23—300



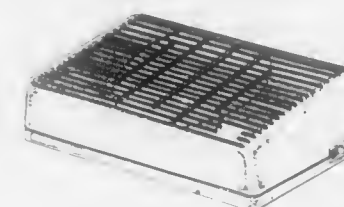
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FAN HEATER  
Su-Liang Liu, 6F-4, No. 102, Nan King East Rd., Sec. 5, Taipei, Taiwan  
Filed Oct. 20, 1988, Ser. No. 260,543  
Term of patent 14 years  
U.S. Cl. D23—335



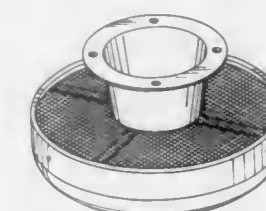
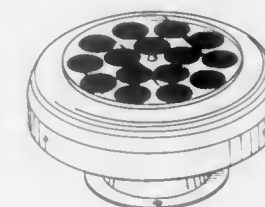
310,872  
AIR FRESHENER DOLL  
Sherna F. Cain, Van Buren, Ark., assignor to Triple H Industries, Inc., Van Buren, Ark.  
Filed Mar. 3, 1987, Ser. No. 21,028  
Term of patent 14 years  
U.S. Cl. D23—368



310,873  
FAN  
Christophe K. J. Asselbergs, Calgary, Canada, assignor to Sun-court Holdings Inc., Calgary, Canada  
Filed Sep. 9, 1988, Ser. No. 242,299  
Claims priority, application Canada, Mar. 10, 1988, 10-03-88-6  
Term of patent 14 years  
U.S. Cl. D23—370



310,874  
SOLAR POWERED ROOF VENT FAN  
James E. Utley, Jr., 228 Day St., Tallahassee, Fla. 32304  
Filed Sep. 14, 1988, Ser. No. 244,469  
Term of patent 14 years  
U.S. Cl. D23—376



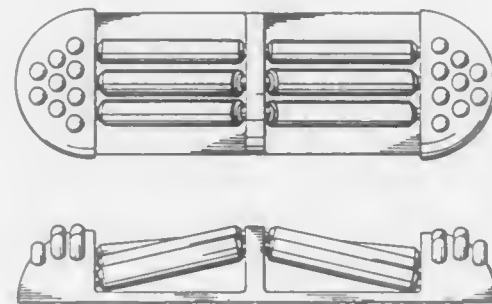
310,875  
STANDUP DENTAL APPLIANCE  
Jack E. Hokanson, 1147 Fewtrell Dr., Campbell, Calif. 95008  
Filed May 19, 1988, Ser. No. 196,991  
Term of patent 14 years  
U.S. Cl. D24—10



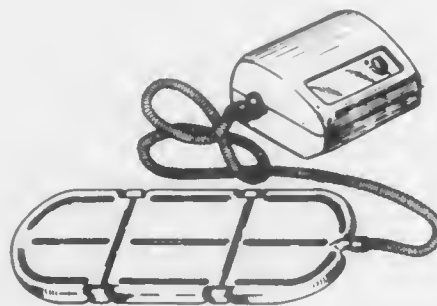
310,876  
**DENTAL SYRINGE**  
 John Jervis, Fort Collins, Colo., assignor to Perio Dental, Inc.,  
 Fort Collins, Colo.  
 Filed Sep. 6, 1988, Ser. No. 240,246  
 Term of patent 14 years  
 U.S. Cl. D24—14



310,879  
**FOOT MASSAGER**  
 John W. Matlock, Edmonton, Canada, assignor to International  
 Network Marketing  
 Filed Dec. 17, 1987, Ser. No. 134,168  
 Claims priority, application Canada, Jun. 18, 1987, 18-06-87-5  
 Term of patent 14 years  
 U.S. Cl. D24—36



310,877  
**HYDRO-MASSAGE APPLIANCE**  
 Kevin E. Reeves, Trumbull, Conn., and Harold G. Young, South  
 Plainfield, N.J., assignors to TRC Acquisition Corporation,  
 Atlanta, Ga.  
 Filed Oct. 19, 1987, Ser. No. 110,766  
 Term of patent 14 years  
 U.S. Cl. D24—38



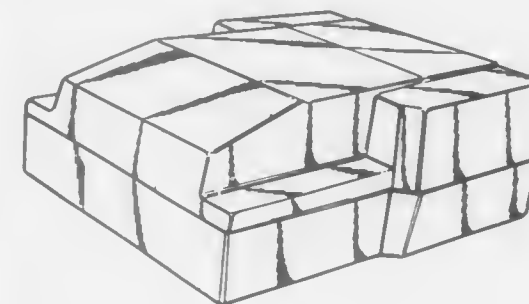
310,880  
**DIAPER COVER**  
 Chester A. Majewski, 5124 Karen Dr., Fort Worth, Tex. 76118  
 Filed Jan. 22, 1988, Ser. No. 146,798  
 Term of patent 14 years  
 U.S. Cl. D24—50



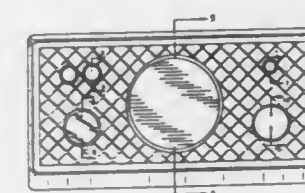
310,878  
**COMBINED TANNING AND EXERCISE STATION**  
 Larry D. Young, 1917 North Silverwood, Orange, Calif. 92665  
 Filed Jun. 10, 1988, Ser. No. 204,783  
 Term of patent 14 years  
 U.S. Cl. D24—39



310,881  
**SPIKE TRANSFER HOUSING FOR USE IN PERITONEAL  
 DIALYSIS OR THE LIKE**  
 Mark E. Larkin, 419 Northgate, Lindenhurst, Ill. 60046, and  
 Robert G. Bergen, 2625 Mapletree Ct., Cincinnati, Ohio  
 45236  
 Filed Jan. 15, 1988, Ser. No. 144,448  
 Term of patent 14 years  
 U.S. Cl. D24—51



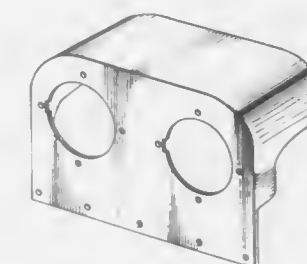
310,884  
**COVER FOR TOPS OF LADDERS**  
 Russell S. Patton, Jamestown; Dale R. King, and Edward E.  
 Heald, both of Greenville, all of Pa., assignors to R. D. Wer-  
 ner Co., Inc., Greenville, Pa.  
 Filed Sep. 24, 1987, Ser. No. 100,432  
 Term of patent 14 years  
 U.S. Cl. D25—68



310,882  
**ORTHOPEDIC UNIT OR THE LIKE FOR RELIEF OF  
 BACK AILMENT**  
 John A. Pope, 4 Karee Court, Greensborough, Victoria, Australia  
 Filed Apr. 8, 1987, Ser. No. 35,726  
 Claims priority, application Australia, Dec. 11, 1986, 7883/86  
 Term of patent 14 years  
 U.S. Cl. D24—64



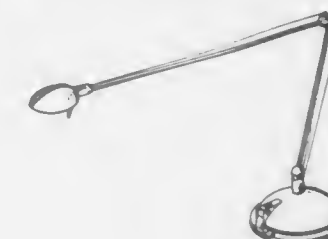
310,885  
**HOUSING FOR DUAL VEHICLE WARNING LIGHTS**  
 Joseph E. Bader, 333 Holiday Dr., Springfield, Ohio 45505  
 Filed Jun. 3, 1988, Ser. No. 202,064  
 Term of patent 14 years  
 U.S. Cl. D26—139



310,883  
**FINGER SPLINT**  
 Kenneth W. Ellis, #1 Schroeder Estates, Kearney, Nebr. 68847  
 Filed Aug. 9, 1988, Ser. No. 230,120  
 Term of patent 14 years  
 U.S. Cl. D24—64



310,886  
**ARTICULATED TABLE LAMP**  
 Ernesto Giamondi, Milan, Italy, and John T. Bissell, Los An-  
 geles, Calif., assignors to Artemide S.p.A., Milan, Italy  
 Filed Dec. 12, 1988, Ser. No. 283,756  
 Claims priority, application Italy, Jun. 10, 1988, 21407 B/88  
 Term of patent 14 years  
 U.S. Cl. D26—65





310,887

## EXTERIOR LIGHTING FIXTURE

Emilio F. Paris, Barcelona, Spain, assignor to Hijo De E.F. Escofet S.A., Barcelona, Spain

Filed Nov. 30, 1988, Ser. No. 278,163

Claims priority, application Spain, May 31, 1988, 116,104

Term of patent 14 years

U.S. Cl. D26—68

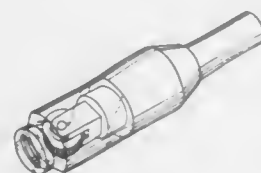
310,888  
LIGHTER

Shintaro Tsuji, Tokyo, Japan, assignor to Sanrio Company, Ltd., Tokyo, Japan

Filed Aug. 5, 1988, Ser. No. 229,029

Term of patent 14 years

U.S. Cl. D27—158



310,889

## COMBINATION RAZOR AND SHAVING CREAM DISPENSER

Thomas Concialdi, 6119 S. Albany, Chicago, Ill. 60629

Filed Feb. 18, 1988, Ser. No. 156,945

Term of patent 14 years

U.S. Cl. D28—45



310,890

## ELECTRIC LINT REMOVER

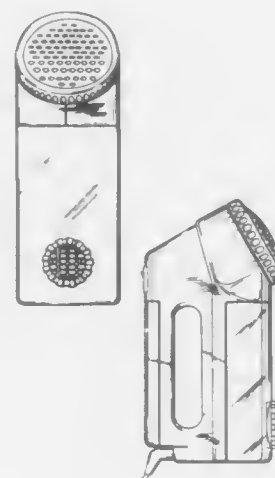
Elizabeth Ho, Kowloon, Hong Kong, assignor to Windmere Corporation, Hialeah, Fla.

Filed Feb. 16, 1988, Ser. No. 155,695

Claims priority, application United Kingdom, Dec. 9, 1987, 1046948; Jan. 14, 1988, 1047708

Term of patent 14 years

U.S. Cl. D28—50



310,891

## COMBINATION TOOL

Anthony Varick, 662 Essex Ct., Warrenton, Va. 22186

Filed Sep. 16, 1988, Ser. No. 245,542

The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D28—59



310,892

## COMBINATION TOOL

Anthony Varick, 622 Essex Ct., Warrenton, Va. 22186

Filed Sep. 16, 1988, Ser. No. 245,543

The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D28—59



310,893

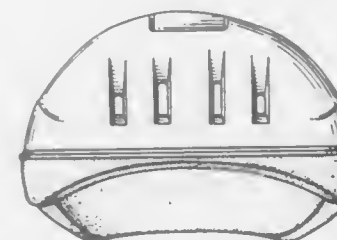
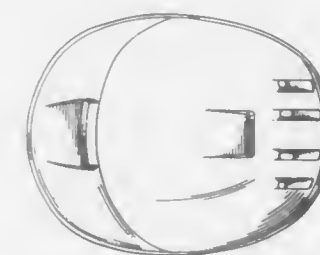
## CYCLIST'S VENTILATED HELMET

Lester V. Broerema, Bellflower, Calif., assignor to Bell Bicycles Inc., Norwalk, Calif.

Filed Oct. 16, 1987, Ser. No. 109,254

Term of patent 14 years

U.S. Cl. D29—12



310,894

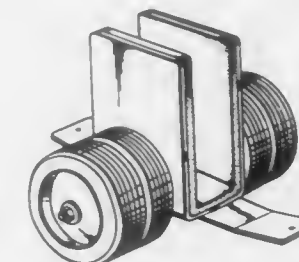
## DOOR DOLLY

Ramon R. Smith, 14935 W. 155th Ter., Olathe, Kans. 66062

Filed Jul. 6, 1988, Ser. No. 215,946

Term of patent 14 years

U.S. Cl. D34—23



310,895

## LUGGAGE CARRIER

Osamu Iwaki, Nagoya, Japan, assignor to Kobayashi Hansokiki Co., Ltd., Japan

Filed Oct. 14, 1988, Ser. No. 262,339

Claims priority, application Japan, Apr. 15, 1988, 63-15509

Term of patent 14 years

U.S. Cl. D34—26



310,896

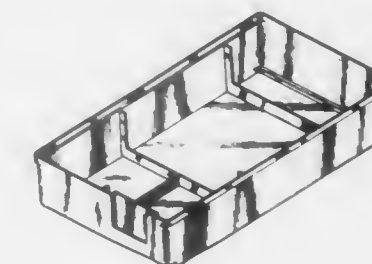
## TRAY

Jack Winjum, 117 E. Salem, Indianola, Iowa 50125

Filed Jun. 13, 1988, Ser. No. 206,331

Term of patent 14 years

U.S. Cl. D34—46

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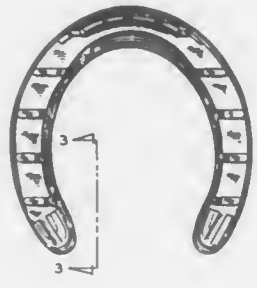
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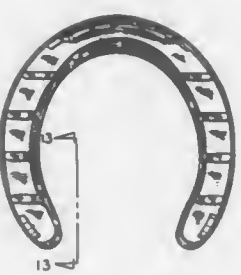
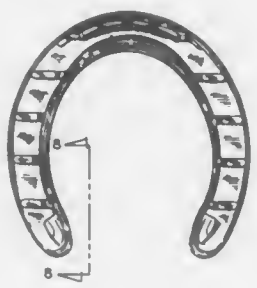
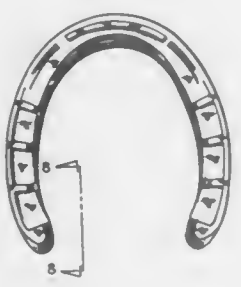
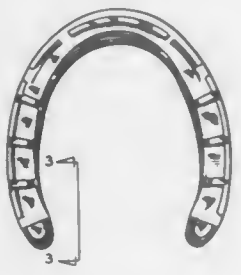
310,897  
FASTENER FOR USE IN MAINTAINING TENSION IN A  
CLOTHESLINE OR SIMILAR ARTICLE  
Michael R. Bell, Box 184 R.F.D. #2, Houlton, Me. 04730  
Filed Jun. 22, 1988, Ser. No. 211,395  
Term of patent 14 years  
U.S. Cl. D32—60



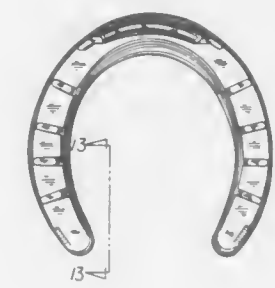
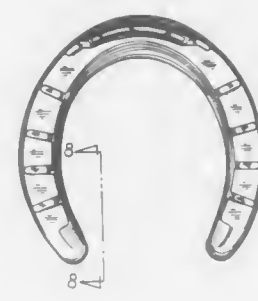
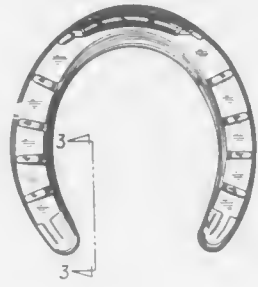
310,899  
HORSESHOE FOR A FRONT HOOF  
Joseph Kulak, 73 Buell St., New Britain, Conn. 06051  
Filed Jun. 8, 1988, Ser. No. 203,867  
The portion of the term of this patent subsequent to Sep. 25,  
2004, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D30—148



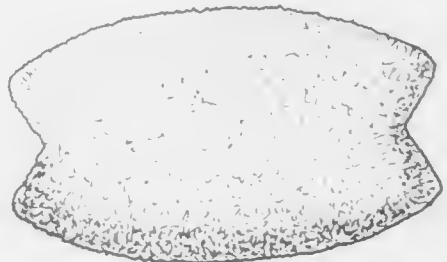
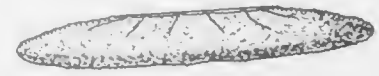
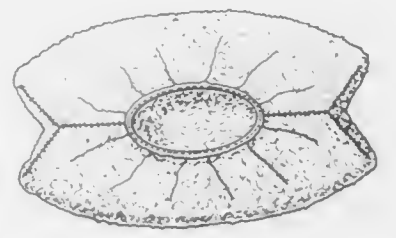
310,898  
HORSESHOE FOR A HIND HOOF  
Joseph Kulak, 73 Buell St., New Britain, Conn. 06051  
Filed Jun. 8, 1988, Ser. No. 203,868  
Term of patent 14 years  
U.S. Cl. D30—147



310,900  
HORSESHOE FOR A FRONT HOOF  
Joseph Kulak, 73 Buell St., New Britain, Conn. 06051  
Filed Jun. 8, 1988, Ser. No. 203,873  
The portion of the term of this patent subsequent to Sep. 25,  
2004, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D30—147



310,901  
FLEXIBLE COVER FOR A SPONGE MOP  
Francis P. Paciullo, Middlesex, and Ligia A. Rivera, North  
Brunswick, both of N.J., assignors to Colgate-Palmolive Com-  
pany, Piscataway, N.J.  
Filed Apr. 14, 1988, Ser. No. 181,992  
Term of patent 14 years  
U.S. Cl. D32—40





310,902

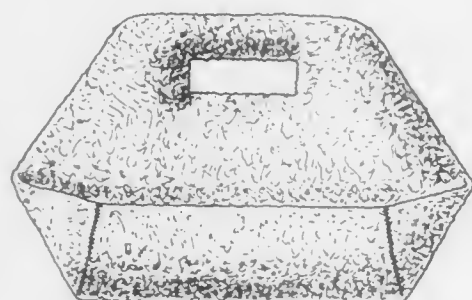
## FLEXIBLE COVER FOR A SPONGE MOP

Francis P. Paciullo, Middlesex, and Ligia A. Rivera, North Brunswick, both of N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.

Filed Apr. 14, 1988, Ser. No. 183,027

Term of patent 14 years

U.S. Cl. D32—40



310,903

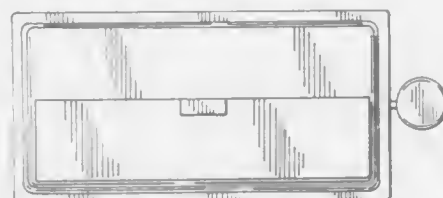
## WASTE RECEPTACLE

Robert S. Anderson, Wauconda, Ill., assignor to Premium Plastics, Inc., Chicago, Ill.

Filed Mar. 1, 1988, Ser. No. 162,465

Term of patent 14 years

U.S. Cl. D34—9



310,904

## CART FOR SNOWMOBILES OR THE LIKE

George N. Dinges, Mead, Wash., assignor to Patco, Inc., Mead, Wash.

Filed Apr. 21, 1988, Ser. No. 184,155

Term of patent 14 years

U.S. Cl. D34—12



## LIST OF PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 25TH DAY OF SEPTEMBER, 1990

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- See—  
Oxenrider, Bryce C.; Hopf, Frederick R.; and , 4,959,248, Cl. 427-385.500.  
Steininger, Helmut; and , 4,959,243, Cl. 427-48.000.  
A.I.R. Foundation: See—  
Muller, George H.; 4,959,067, Cl. 606-190.000.  
AB A.Svensson & Co.: See—  
Hannershg, Christer, 4,958,646, Cl. 160-348.000.  
Abdel-Malik, Magdy M.: See—  
Yalpani, Manssur; and Abdel-Malik, Magdy M., 4,959,461, Cl. 536-18.700.  
Abe, Hideo: See—  
Iguchi, Takaaki; Tamari, Takanori; Hira, Takaaki; Isobe, Kunio; Yurita, Ikuo; and Abe, Hideo, 4,959,275, Cl. 428-603.000.  
Abe, Hiraku: See—  
Suzuki, Hidemasa; Tokunaga, Ichiro; Abe, Hiraku; and Ogawa, Yasuaki, 4,959,574, Cl. 310-91.000.  
Abe, Shinichi: See—  
Kanazawa, Yasunori; Nakamori, Yoshiyuki; Kuwa, Tadahi; Fujimoto, Nobuyuki; and Abe, Shinichi, 4,959,744, Cl. 360-133.000.  
Abe, Tadashi; Aoki, Masahiro; and Tsukamoto, Takeo, to Mitsubishi Yuka Badische Company, Ltd. Emulsion polymerization process, 4,959,428, Cl. 526-201.000.  
Abiru, Masao: See—  
Yamamoto, Tameyuki; and Abiru, Masao, 4,959,220, Cl. 424-490.000.  
Acs, George; Christman, Judith K.; Price, Peter; Offensperger, Wolf; and Wahl, Silke, to Mt. Sinai School of Medicine of the City University of New York. Production and use of pre S polypeptides of hepatitis B virus, 4,959,323, Cl. 435-320.000.  
Acumet Precision Instruments Limited: See—  
Skratic, Damir M. J.; Mitchinson, James C.; and Graham, John A., 4,959,228, Cl. 426-11.000.  
Acushnet Company: See—  
Giza, John P., 4,959,000, Cl. 425-116.000.  
Acustar, Inc.: See—  
Markow, Paul A.; and Nolle, William, 4,958,777, Cl. 242-7.110.  
Adachi, Meiro: See—  
Kumura, Atsuhiko; Ishii, Ryuichi; Luo, Bing-Shan; Adachi, Meiro; Hamada, Kenji; and Fujita, Fumio, 4,959,091, Cl. 71-77.000.  
Adachi, Sakashi, to Toshiba Kikai Kabushiki Kaisha. Spindle feed mechanism for a machine tool, 4,958,967, Cl. 409-185.000.  
Adams, Louis R., to Astro Aerospace Corporation. Truss structure, 4,958,474, Cl. 52-646.000.  
Adcock, Mark W., to Eastman Kodak Company. Field inversion electroblotting & electroelution, 4,959,133, Cl. 204-182.800.  
Adeka Argus Chemical Co., Ltd.: See—  
Shibata, Toshihiro; Kurosawa, Norio; and Kimura, Masaki, 4,959,173, Cl. 252-299.650.  
Adir et al.: See—  
Vincent, Michel; Remond, Georges; and Laubie, Michel, 4,959,372, Cl. 514-299.000.  
Adler-Nissen, Jens L.: See—  
Frokjaer, Sven; Eriksen, Svend; and Adler-Nissen, Jens L., 4,959,350, Cl. 514-2.000.  
Adlersberg, Shabtai: See—  
Stettiner, Yoram; Adlersberg, Shabtai; and Aizner, Mendel, 4,959,865, Cl. 381-46.000.  
Admassu, Wudneh; and Clark, Daniel O., to Dow Chemical Company. The Polycarbonate gas separation membranes containing substituted benzenes and processes for making and using the same, 4,959,082, Cl. 55-16.000.  
Advanced Micro Devices, Inc.: See—  
Moyal, Miki, 4,959,650, Cl. 341-126.000.  
Advanced Products Inc.: See—  
Frentzel, Richard L.; and Peralta, Noel C., 4,959,178, Cl. 252-514.000.  
Advanced Surgical Intervention, Inc.: See—  
Rosenbluth, Robert F.; and Cox, Brian J., 4,958,630, Cl. 128-79.000.  
Aerospaciale Societe Nationale Industrielle: See—  
Labrot, Maxime; Feuillerat, Jean; and Valvy, Yves, 4,958,767, Cl. 239-13.000.  
AGA AB: See—  
MacNeal, James R.; Rack, Timothy P.; and Corns, Ronald R., 4,959,101, Cl. 75-685.000.  
Agata, Akira: See—  
Tada, Hisashi; Agata, Akira; Saruta, Masahiro; and Murata, Taka-shi, 4,959,438, Cl. 528-98.000.  
Agence Spatiale Europeenne: See—  
Weinberg, Alan, 4,959,765, Cl. 363-20.000.
- Agency of Industrial Science & Technology: See—  
Nagawa, Yoshinobu; Honda, Koichi; and Nakanishi, Hiroshi, 4,959,479, Cl. 548-255.000.  
Agfa-Gevaert Aktiengesellschaft: See—  
Kocourek, Franz; Ketterer, Hans; Kastl, Alfons; and Loistl, Rudolf, 4,958,666, Cl. 141-114.000.  
Ago, Kyoichi: See—  
Hamaie, Buji; Ago, Kyoichi; and Hatano, Kazufumi, 4,958,764, Cl. 228-248.000.  
Agranat, Edward A.: See—  
Swain, Eugene A.; Menzin, Marvin; Agranat, Edward A.; Cofek, Henry R.; and Fisher, Daniel J., 4,959,109, Cl. 156-73.400.  
Ahmed, Salah H.; and Luksa, Anthony J., to Electric Power Research Institute. Method for improving the taste, texture and mouth feel of a liquid dairy product and for concentrating same, 4,959,234, Cl. 426-580.000.  
Aikawa, Satoru; and Saito, Yoichi, to Nippon Telegraph and Telephone Corporation. Word synchronization system and method, 4,959,834, Cl. 371-47.100.  
Aikawa, Takeshi: See—  
Mori, Akio; Aikawa, Takeshi; and Saito, Mitsuo, 4,959,871, Cl. 382-59.000.  
Air Products and Chemicals, Inc.: See—  
Howells, Roger A., 4,958,466, Cl. 51-425.000.  
Nordquist, Andrew F.; and Pinschmidt, Robert K., Jr., 4,959,489, Cl. 560-170.000.  
Aisin Seiki Kabushiki Kaisha: See—  
Kuwabara, Yasuo; Fujie, Naofumi; and Sacki, Takao, 4,959,579, Cl. 310-323.000.  
Aitkhodzhi, Murat A., deceased: See—  
Gross, Valery N.; Kozhanov, Evgeny V.; Aitkhodzhi, Murat A., deceased; Beritashvili, David R.; Tverdokhlebov, Evgeny N.; and Georgiev, Georgy P., 4,959,134, Cl. 204-182.800.  
Aizner, Mendel: See—  
Stettiner, Yoram; Adlersberg, Shabtai; and Aizner, Mendel, 4,959,865, Cl. 381-46.000.  
Akagawa, Minoru, to Intelmatec Corporation. Multi-disk clamp end effector, 4,958,873, Cl. 294-93.000.  
Akai, Mikio; and Mori, Masami, to Ikeda Bussan Co., Ltd. Method of producing skin-covered foamed plastic article, 4,959,184, Cl. 264-40.300.  
Akano, Shinichi, to Yamatake-Honeywell Co., Ltd. Current holding circuit of two-wire instrument, 4,959,649, Cl. 340-870.420.  
Akimoto, Kazuo: See—  
Seki, Yoichi; and Akimoto, Kazuo, 4,959,675, Cl. 354-400.000.  
Akins, Robert F.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., to Cymer Laser Technologies. Compact excimer laser including an electrode mounted in insulating relationship to wall of the laser, 4,959,840, Cl. 372-57.000.  
Akira, Nishio: See—  
Muraoka, Takatoshi; Akira, Nishio; and Tsuji, Tomohiro, 4,958,693, Cl. 177-25.170.  
Akitsu, Yasuo, to NGK Insulators, Ltd. Vibro-isolating joint, 4,958,860, Cl. 285-49.000.  
Akiyama, Ryota: See—  
Azuma, Mitsuhiro; Amano, Fumio; Akiyama, Ryota; and Torii, Naoya, 4,959,863, Cl. 380-38.000.  
Akiyama, Shigeru: See—  
Yokoyama, Yoshiharu; and Akiyama, Shigeru, 4,958,599, Cl. 123-41.500.  
Akojima, Kazuo: See—  
Nambu, Masao; Watari, Tsutomu; Sakamoto, Tomoyuki; and Akojima, Kazuo, 4,958,626, Cl. 128-24.00A.  
Akzo N.V.: See—  
Wreesmann, Carel T. J.; and Erdhuisen, Erwin W. P., 4,959,448, Cl. 528-192.000.  
Alcan International Limited: See—  
Dube, Ghyslain; Hui, Jean-Paul; Lavoie, Serge; and Stevens, Wesley D., 4,959,100, Cl. 75-10.190.  
Wai, Patrick P.; and Rogers, Steven, 4,958,809, Cl. 266-229.000.  
Alcatel N.V.: See—  
Guichard, Pascal, 4,958,783, Cl. 242-157.00R.  
Aldissi, Mahmoud: See—  
Armes, Steven P.; and Aldissi, Mahmoud, 4,959,162, Cl. 252-519.000.  
Armes, Steven P.; and Aldissi, Mahmoud, 4,959,180, Cl. 252-519.000.  
Aldrich, Jay L., to Sterling Bouquet. Floral holder and display, 4,958,461, Cl. 47-41.010.  
Alesi, Thomas W., Jr.: See—  
Dannatt, Hugh S.; Alesi, Thomas W., Jr.; and Kulpa, Walter J., 4,958,782, Cl. 242-75.430.

- Alfa Lancia S.p.A.: See—  
Truzzi, Sergio; Oldani, Emilio; and Malter, Ugo, 4,958,614, Cl. 123-585.000.
- Alford, George W.; and Rogers, William C. Method and apparatus for treating wells. 4,958,683, Cl. 166-247.000.
- Alfred Teves GmbH: See—  
Lohberg, Peter; May, Arno; Krause, Hans J.; Oberdorfer, Dietmar; and Plueguett, Ulrich, 4,958,937, Cl. 374-16.000.
- Alfred University: See—  
Bhargava, Atit; and Snyder, Robert L., 4,959,089, Cl. 65-33.000.
- Algae Farms: See—  
Nielson, Jay P.; and Sturm, Paul A., 4,958,460, Cl. 47-1.400.
- Allaire, Jacky; and Kozlowskyj, Wasil, to Devanlay. Process for making socks. 4,958,507, Cl. 66-19.000.
- Allen, Jonathan: See—  
Ellis, Frank B., Jr.; Delahdy, Alan E.; Allen, Jonathan; and Volltrauer, Hermann, 4,959,112, Cl. 156-248.000.
- Allen, Michael P.: See—  
Ramel, Urs A.; Allen, Michael P.; and Singh, Prithpal, 4,959,324, Cl. 436-169.000.
- Allen, Richard C.; Klein, Joseph T.; and Effland, Richard C., to Hoechst-Roussel Pharmaceuticals Inc. Aminopyridinylaminophenol compounds useful as topical antiinflammatory agents for the treatment of skin disorders. 4,959,378, Cl. 514-352.000.
- Allied Colloids Ltd.: See—  
Farrar, David; Bann, Gerald P.; and Karolia, Seraj A. M., 4,959,502, Cl. 564-127.000.
- Allied-Signal: See—  
Oxenrieder, Bryce C.; Hopf, Frederick R.; and , 4,959,248, Cl. 427-385.500.
- Allied-Signal Inc.: See—  
Arenas, Blaise J., 4,959,467, Cl. 536-124.000.  
Becker, Richard J., 4,959,572, Cl. 310-68.00D.  
Park, You K., 4,959,843, Cl. 375-59.000.
- Allison, Anthony C.: See—  
Nelson, Peter H.; Allison, Anthony C.; Eugui, Elsie M.; and Muchowski, Joseph M., 4,959,387, Cl. 524-469.000.
- Almaguer, Michael J.: See—  
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- Aloup, Jean-Claude: See—  
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- Alpia S.A.: See—  
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- Alps Electric Co., Ltd.: See—  
Ohouchi, Junichi; Sasaki, Hiroaki; and Hasegawa, Kazuo, 4,959,805, Cl. 364-562.000.  
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- Altenburger, John W.: See—  
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- Alternative Industrial Devices for Safety, Inc.: See—  
Daigle, Joseph, 4,959,647, Cl. 340-825.720.
- Alza Corporation: See—  
Eckenhoff, James B.; Magruder, Judy A.; Cortese, Richard; Peery, John R.; and Wright, Jeremy C., 4,959,218, Cl. 424-473.000.
- Amachi, Nobumitsu: See—  
Yamazaki, Shunpei; Fukada, Takeshi; Sakama, Mitsunori; Shinohara, Hisato; Amachi, Nobumitsu; Sakamoto, Naoya; and Inuzima, Takashi, 4,959,533, Cl. 250-208.100.
- Amada Company, Limited: See—  
Yoshida, Sumio; Takegawa, Yoshikazu; Tsujimoto, Susumu; and Kawabata, Katsuhiko, 4,958,546, Cl. 83-848.000.
- Amano, Fumio: See—  
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- Amansol Enterprises No. 17 Ltd.: See—  
Salisbury, Richard S.; and Pries, Michael R., 4,959,791, Cl. 364-519.000.
- Ampcor Limited: See—  
McKinlay, Peter R., 4,958,522, Cl. 73-847.000.
- Amer, Moh. S. High dietary fiber low lactose liquid food and a method of producing same. 4,959,227, Cl. 426-35.000.
- American Cyanamid Company: See—  
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Doehner, Robert F., Jr., 4,959,476, Cl. 546-167.000.
- American Home Products Corporation: See—  
Glass, Richard A.; Rycer, Robert F., II; and Tomcanin, Deborah T., 4,959,051, Cl. 604-77.000.
- American Screen Printing Company: See—  
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- American Standard Inc.: See—  
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- Ammermann, Eberhard: See—  
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- Matzner, Markus; and Papuga, Donald M., 4,959,424, Cl. 525-471.000.
- Amonett, Daniel K.: See—  
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- Amos, Dennis R.: See—  
Clark, Robert E.; and Amos, Dennis R., 4,958,431, Cl. 29-889.100.
- AMP Incorporated: See—  
Grabbe, Dimitry G., 4,959,029, Cl. 439-862.000.  
Kreinberg, Earl R., 4,959,026, Cl. 439-651.000.  
Walp, Patrick K., 4,959,844, Cl. 375-97.000.
- Ampex Corporation: See—  
Bennett, Phillip P., 4,959,718, Cl. 358-148.000.  
Davis, John E., 4,959,774, Cl. 364-200.000.
- Amthor, Helmut K., to Eveready Battery Company, Inc. Battery assembly. 4,959,280, Cl. 429-27.000.
- Andermo, Nils I., to Micro Encoder, Inc. Electrode structure for capacitance-type measurement transducers. 4,959,615, Cl. 324-690.000.
- Andersen Corporation: See—  
Plummer, David D., 4,958,469, Cl. 52-213.000.
- Anderson, Charles A. Downhole stabilizers. 4,958,692, Cl. 175-323.000.
- Anderson, Jeffrey R. Archery arrow and sabot. 4,958,617, Cl. 124-24.100.
- Anderson, John M., to General Electric Company. Luminaire for an electrodeless high intensity discharge lamp. 4,959,584, Cl. 313-16000.000.
- Anderson, John M.; and Roberts, Victor D., to General Electric Company. Starting electrodes for HID lamps. 4,959,592, Cl. 315-248.000.
- Anderson, Robert D., to Facet Quantek, Inc. Fuel filter with positive water shutoff. 4,959,141, Cl. 210-109.000.
- Anderson, Vincent P.; and Cordill, Rexford W., to Whirlpool Corporation. Refrigerator cabinet flange reinforcement bar. 4,958,890, Cl. 312-214.000.
- Ando, Satoshi: See—  
Hagiwara, Zenji; Ando, Satoshi; Ichihashi, Kunio; and Dono, Akira, 4,959,268, Cl. 428-403.000.
- Andreas Stihl: See—  
Hopfner, Klaus; Friedrich, Reinhard; and Weiss, Hermann, 4,958,602, Cl. 123-195.00C.
- Andrews, Edward A. Tool holder bushing. 4,958,966, Cl. 408-239.00A.
- Angell, Cyril N. E., to Avon Industrial Polymers Limited. Valve for respirator. 4,958,633, Cl. 128-201.190.
- Annis, Jeffrey R.; Herman, Timm R.; and Strobel, Ronald T., to Snap-on Tools Corporation. Electronic torque wrench with tactile indication. 4,958,541, Cl. 81-479.000.
- Anthony, Thomas R.; DeVries, Robert C.; Engler, Richard A.; Ettinger, Robert H.; and Fleischer, James F., to General Electric Company. Resistance heater for diamond production by CVD. 4,958,592, Cl. 118-724.000.
- Antibiotics, S.A.: See—  
Sanchez, Florentina S.; Susan, Victor R.; Soto, Miguel A. P.; and Ortega, Agustin P. A., 4,959,327, Cl. 435-172.300.
- Antosh, Mark J. Transit vehicle apparatus and method for solar induction monorails. 4,958,575, Cl. 104-288.000.
- Aoi, Tomio; and Kameda, Toshihiro, to Honda Giken Kogyo Kabushiki Kaisha. Fuel pump having improved shaft/impeller coupling. 4,958,984, Cl. 415-55.100.
- Aoki, Atsuhito, to Ryobi Ltd. Fishing reel drag mechanism. 4,958,785, Cl. 242-295.000.
- Aoki, Masahiro: See—  
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- Aoki, Naofumi: See—  
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- Aoki, Yoshio: See—  
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- Aonuma, Masashi; Okita, Tsutomu; Hashimoto, Hiroshi; Araki, Hiroaki; Fukino, Kiyotaka; and Ejiri, Kiyomi, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,959,263, Cl. 428-329.000.
- Aoyagi, Nobutoshi: See—  
Saito, Hirokazu; Yukawa, Seiichi; Sato, Takashi; Ushirokozi, Kiyoyuki; Aoyagi, Nobutoshi; Suzuki, Tomio; and Tanaka, Minoru, 4,958,934, Cl. 366-145.000.
- AP Parts Manufacturing Company: See—  
Moring, Walter G., III, 4,958,701, Cl. 181-282.000.
- Apley, Philip G.; Berlow, David A.; and Collins, John S., to Bitstream Inc. Outline-to-bitmap character generator. 4,959,801, Cl. 364-518.000.
- Apple, William R.; Freeman, William R.; Soderberg, Paulmer M.; Thompson, Lyle; and Thomas, Mark S., to Raynet Corporation. Clock recovery apparatus including a clock frequency adjuster. 4,959,846, Cl. 375-118.000.
- Aprica Kassai Kabushikikaisha: See—  
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- APV U.K. Limited: See—  
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- Aquanautics Corporation: See—  
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- Aquino, Agostino; and Lang, Karl U., to Nabisco Brands, Inc. Filled cracker making apparatus. 4,958,556, Cl. 99-355.000.

- Aquino, Agostino; and Lang, Karl U., to Nabisco Brands, Inc. Filled cracker making process. 4,959,235, Cl. 426-281.000.
- Arai, Hideyuki: See—  
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- Arai, Hiromichi, to Catalysts and Chemicals Inc. Heat-resistant noble metal catalyst and method of producing the same. 4,959,339, Cl. 502-302.000.
- Arai, Mitsuru; Cassidy, Patrick E.; and Farley, James M., to Nippon Steel Corporation. Copoly(imidine-imide). 4,959,447, Cl. 528-188.000.
- Arakawa, Kazuhiko: See—  
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- Arakawa, Satoshi; and Takahashi, Kenji, to Fuji Photo Film Co., Ltd. Radiation image read-out apparatus. 4,959,545, Cl. 250-327.200.
- Araki, Hiroaki: See—  
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- Arao, Kozo: See—  
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, 4,959,106, Cl. 136-258.000.
- Arasmith, Stanley. Grate knife for use with winged cutting knife for producing wood chips or flakes. 4,958,775, Cl. 241-88.100.
- Arco Chemical Technology, Inc.: See—  
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- Ardac, Inc. (Dixie-Narco, Inc.): See—  
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- Ardini, Joseph L., Jr.; and Small, Steven, to Prime Computer, Inc. Write buffer for a digital processing system. 4,959,771, Cl. 364-200.000.
- Arena, Blaise J., to Allied-Signal Inc. Control of product selectivity in the addition of HCN to arabinose. 4,959,467, Cl. 536-124.000.
- Arimoto, Akira: See—  
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- Arimoto, Sachiro: See—  
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- Aritomi, Toshiaki, to Hitachi, Ltd. MR examining apparatus of heart beat synchronous type. 4,958,637, Cl. 128-653.00A.
- Arizona Chemical Company: See—  
Arter, William J.; Chu, Wayne K.; Ruckel, Erwin R.; and Scharrer, Roland P. F., 4,959,412, Cl. 525-98.000.
- Armes, Steven P.; and Aldissi, Mahmoud, to United States of America, Energy. Colloidal polypyrrole. 4,959,162, Cl. 252-519.000.
- Armes, Steven P.; and Aldissi, Mahmoud, to United States of America, Energy. Colloidal polyaniline. 4,959,180, Cl. 252-519.000.
- Armstrong, Mark L.: See—  
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- Armstrong, Molly P.: See—  
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- Arnett, G. William; Buss, Rick A.; and Bruce, Robert A., to Tech-medica, Inc. Bone plate with positioning member. 4,959,065, Cl. 606-69.000.
- Aronson, Michael P.; Cardinali, Martin S.; and McCown, Jack T., to Lever Brothers Company. Stabilized enzymes liquid detergent composition containing lipase and protease. 4,959,179, Cl. 252-135.000.
- Arrizon-Lopez, Vivian: See—  
Slocum, Robert H.; Lee, Patrick L. Y.; and Arrizon-Lopez, Vivian, 4,959,176, Cl. 252-389.530.
- Arrowsmith, John E.: See—  
Crosa, Peter E.; Thomas, Geoffrey N.; and Arrowsmith, John E., 4,959,366, Cl. 514-239.500.
- Arsena, Vito J.; Clough, Harvey C.; and Zalar, Frank E., to General Electric Company. Reflective lamps having an improved light source mounting arrangement. 4,959,583, Cl. 313-113.000.
- Arter, William J.; Chu, Wayne K.; Ruckel, Erwin R.; and Scharrer, Roland P. F., to Arizona Chemical Company. High shear tackifier resins. 4,959,412, Cl. 525-98.000.
- Artomick International, Inc.: See—  
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- Aruga, Tamotsu; Sasaki, Masaomi; and Hashimoto, Mitsuru, to Ricoh Company, Ltd. Benzylideneindene compounds and electrophotographic photoconductor using the same. 4,959,290, Cl. 430-73.000.
- Asaba, Yutaka; and Chikamura, Masaharu, to Juki Corporation. Sewing machine lateral feed apparatus. 4,958,580, Cl. 112-314.000.
- Asahi Kogaku Kogyo Kabushiki Kaisha: See—  
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- Asaka, Nobuyoshi: See—  
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- Asakura, Koichi: See—  
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- Asakura, Tsutou: See—  
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- Ascom Autelca AG.: See—  
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- Ashcraft, Thomas L., Jr.: See—  
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- Ashida, Takashi; Kunishi, Noriyuki; and Yamamoto, Koji, to Idemitsu Petrochemical Co., Ltd. Multistage process for producing polycarbonate from oligomer. 4,959,456, Cl. 528-371.000.
- Asta Pharma AG: See—  
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- Asten Group, Inc.: See—  
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- Astro Aerospace Corporation: See—  
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- AT&T Bell Laboratories: See—  
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- Cobb, Gary S.; and Thomas, Phillip M., 4,958,903, Cl. 350-96.200.
- Daudelin, Abraham N., 4,959,855, Cl. 379-213.000.
- Erving, Richard H.; and Miller, Robert R., II, 4,959,857, Cl. 379-390.000.
- Fuchs, Harold E.; and McAnany, Robert E., 4,959,129, Cl. 204-28.000.
- Khouri, John M., 4,959,623, Cl. 330-265.000.
- Lentine, Anthony L.; and Miller, David A. B., 4,959,534, Cl. 120-213.00A.
- Schmidt, Douglas C., 4,959,555, Cl. 307-219.000.
- Tol, Simon J. M.; and Wouda, Kornelis J., 4,959,845, Cl. 375-106.000.
- AT&T Information Systems Inc.: See—  
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- Atco Products, Inc.: See—  
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- Atlantic Richfield Company: See—  
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- Atochem North America, Inc.: See—  
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- Auerbach, Abraham E. CRT or computer monitor acrometry tray. 4,958,737, Cl. 206-557.000.
- Auge, Jacques: See—  
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- Aulik, David J.; and Christensen, Robert E., to Horizons International Foods, Inc. Potato-based foodstuff. 4,959,240, Cl. 426-637.000.
- Ausimont S.r.l.: See—  
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- Re, Alberto; and De Giorgi, Marco, 4,959,426, Cl. 525-527.000.
- Austin, Lawrence C., to Corporation of the President of the Church of Jesus Christ of Latter-Day Saints. Multi-channel infrared cableless communication system. 4,959,828, Cl. 370-4.000.
- Austria Metall Aktiengesellschaft: See—  
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- Autoflug GmbH: See—  
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- Automotive Products plc: See—  
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- Leigh-Monstevens, Keith V., 4,959,188, Cl. 264-255.000.
- Automotive Systems Laboratory, Inc.: See—  
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- Avdel Limited: See—  
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- Avdel Systems Limited: See—  
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- Avon Industrial Polymers Limited: See—  
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- Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Koji; Kitahara, Takumi; Tomino, Ikuro; and Isayama, Shigeru, to Mitsui Petrochemical Industries Ltd.; and Mitsui Pharmaceuticals, Inc. Therapeutic agent for neurological diseases. 4,959,368, Cl. 514-252.000.
- Axelrod, Robert J.; Jaquis, Donald B. G.; and Tyrell, John A., to General Electric Company. Flame retardant compounds and thermoplastic compositions containing the same. 4,959,481, Cl. 548-462.000.
- Axelsson, Bygg S. Method of breaking up bundles of adherent hard fibers and an oscillating screen. 4,958,935, Cl. 366-154.000.
- Axial Electric, Inc.: See—  
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- AXIC Inc.: See—  
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- Azuma, Hideto: See—  
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- Azuma, Mitsuhiro; Amano, Fumio; Akiyama, Ryota; and Torii, Naoya, to Fujitsu Limited. Secret speech equipment. 4,959,863, Cl. 380-38.000.



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B-Line Systems, Inc.: See—  
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Babcock Industries, Inc.: See—  
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Babcock, James W.: See—  
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Badiali, Roberto: See—  
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Bachr, Bernd D.; Rall, Ulrich; van Delden, Hildegard; and Lillotte, Wolfgang, to Henkel Kommanditgesellschaft auf Aktien. Silicate- and magnesium-free stabilizer hydrogen peroxide mixtures for bleaching processes. 4,959,075, Cl. 8-111.000.  
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Baker, Johnny P.: See—  
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Baker, Quentin A.: See—  
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Banyu Pharmaceutical Company, Ltd.: See—  
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Barakitis, Nikolaos; Cohen, Sheppard; and Zaslavsky, Gregory, to GTE Products Corporation. Glow discharge starter having discharge extinguishing means. 4,959,589, Cl. 315-58.000.  
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Barbetti, Manlio, to Istituto Farmacologico Serson S.p.A. Mixtures of FSH and LH from pig hypophyses in a definite ratio. 4,959,354, Cl. 514-21.000.  
Bardell, Paul H., Jr., to International Business Machines. Parallel pseudorandom pattern generator with varying phase shift. 4,959,832, Cl. 371-27.000.  
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Barlow, Charles G.: See—  
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Barnes, Norman P., to United States of America, National Aeronautics and Space Administration. Method and circuit for shaping laser output pulses. 4,959,838, Cl. 372-25.000.  
Barnes, Peter H.; and Nooyen, Johannes L., to Shell Oil Company. Apparatus for particulate solids regeneration. 4,958,680, Cl. 165-104.180.  
Barthmann, Martin; Feinauer, Roland; Hartkopf, Uwe; and Schlobohm, Michael, to Huel Aktiengesellschaft. Thermoplastic molding compositions with cold impact strength. 4,959,403, Cl. 524-169.000.  
Baschang, Gerhard; and Sallman, Alfred, to Ciba-Geigy Corporation. Novel Guanidinium aspartates. 4,959,394, Cl. 514-555.000.  
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Bass, Martin L.; and Rutherford, Peter M. Display means for stereoscopic images. 4,959,641, Cl. 340-700.000.  
Bassett, John A., to Computer Products, Inc. DC/DC converter switching at zero voltage. 4,959,764, Cl. 363-16.000.  
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- Dube, Ghyslain; Humi, Jean-Paul; Lavoie, Serge; and Stevens, Wesley D., to Alcan International Limited. Recovery of non-ferrous metals from dross. 4,959,100, Cl. 75-10.190.
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- Duffield, David J.; and Beyers, Billy W., Jr., to RCA Licensing Corporation. Tuner control apparatus having tune-by-label capability. 4,959,720, Cl. 358-191.100.
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- Dufour, Pierre, to Salomon S.A. Lace tightening apparatus. 4,958,418, Cl. 24-713.600.
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- Engelhardt, John A., to Boehringer Mannheim Corporation. Dynamic tension bone screw. 4,959,064, Cl. 606-65.000.
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- Engelmann, William H.; Watson, Pamela J.; Tuzinski, Patrick A.; Pahlman, John E.; and Khalafalla, Sanaa E., to United States of America, Interior. Rock fragmentation method. 4,959,164, Cl. 252-8.510.
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- Fukada, Takeshi: See—  
Yamazaki, Shunpei; Fukada, Takeshi; Sakama, Mitsunori; Shinohara, Hisato; Amachi, Nobumitsu; Sakamoto, Naoya; and Inuzuma, Takashi, 4,959,533, Cl. 250-208.100.
- Fukae, Kensuke, to Kentek Information Systems, Inc. Combined electrographic printer, copier, and telefax machine, 4,959,731, Cl. 358-300.000.
- Fukazawa, Keiichi: See—  
Kobayashi, Yousuke; and Fukazawa, Keiichi, 4,958,950, Cl. 400-629.000.
- Fukino, Kiyotaka: See—  
Aonuma, Masashi; Okita, Tsutomu; Hashimoto, Hiroshi; Araki, Hiroaki; Fukino, Kiyotaka; and Ejiri, Kiyomi, 4,959,263, Cl. 428-329.000.
- Fukuda, Aoi: See—  
Dempo, Fumio, 4,959,142, Cl. 210-167.000.
- Fukuda, Hiroshi; Miura, Hideo; and Mizuno, Masahiko, to Fuji Photo Film Co., Ltd. Video camera having rotatable viewfinder, 4,959,729, Cl. 358-229.000.
- Fukuhou Teisan Co., Ltd.: See—  
Nakano, Genichi; Higami, Sadao; and Hashimoto, Yasutaka, 4,958,501, Cl. 62-125.000.
- Fukuoka, Kazuhiko: See—  
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- Fukuoka, Tatsuhiko: See—  
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- Fukushima, Akio: See—  
Miura, Yoshio; Suzuki, Motoyuki; Fukushima, Akio; and Mori, Yonemitsu, 4,959,733, Cl. 358-338.000.
- Fukuyama, James M., to General Electric Company. Spiro(bis)indane polyethersulfones and method for their preparation, 4,959,454, Cl. 528-352.000.
- Fukuyama, Kazumi: See—  
Uemura, Yahiho; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.
- Fukuyama, Masao: See—  
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- Fulton, Janet B.: See—  
Davis, Stephen C.; Fulton, Janet B.; and Hoang, Peter P. M., 4,959,420, Cl. 525-331.700.
- Funahashi, Nobuhiro: See—  
Sato, Shinji; Isomichi, Kanji; Ogawa, Hiroshi; Yamashita, Toshio; and Funahashi, Nobuhiro, 4,958,502, Cl. 62-126.000.
- Furuhashi, Hiroyuki; Yamamoto, Tadashi; Imai, Masafumi; and Ueno, Hiroshi, to Toa Nenryo Kogyo, K.K. Catalyst component for polymerization of olefins, 4,959,427, Cl. 526-142.000.
- Furukawa Electric Co., Ltd.: See—  
Tanaka, Yasuo; Matsumoto, Kaname; and Yamada, Yukio, 4,959,279, Cl. 428-660.000.
- Yanagawa, Hisaharu; Ochiai, Toshihiro; Hayakawa, Hirokazu; and Miyazawa, Hidehisa, 4,958,897, Cl. 350-96.150.
- Furusaki, Keizo: See—  
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- Furutsuka, Naoyuki: See—  
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- Furuya, Masato: See—  
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- G-C Dental Industrial Corporation: See—  
Yamamoto, Tameyuki; and Abiru, Masao, 4,959,220, Cl. 424-490.000.
- G. D. Searle & Co.: See—  
Mueller, Richard A.; and Partis, Richard A., 4,959,364, Cl. 514-237.500.
- Gabel, Detlef: See—  
Miura, Michiko; and Gabel, Detlef, 4,959,356, Cl. 514-64.000.
- Gabriel, Kathleen B.: See—  
Schwartzkopf, George; Covington, John B.; and Gabriel, Kathleen B., 4,959,293, Cl. 430-189.000.
- Gacon, Jean-Claude: See—  
Fevrier, Herve; Ramos, Josiane; Auge, Jacques; Marcerou, Jean-Francois; Jacquier, Bernard; and Gacon, Jean-Claude, 4,959,837, Cl. 372-6.000.
- Gaddipati, Achuta R.: See—  
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- Gambale, Ronald J.; Hathaway, Susan J.; Longley, Kathryn L.; and Ullman, Timothy J., to General Electric Company. Preparation of

- copolymer from carboxy-functionalized polycarbonate and nucleophilic polymer, 4,959,411, Cl. 525-67.000.
- Gambale, Ronald J.; and Ullman, Timothy J., to General Electric Company. Poly epoxy branched polycarbonate and method for preparation, 4,959,422, Cl. 525-463.000.
- Ganz, Matthew W., to Massachusetts Institute of Technology. Adaptive sidelobe blanker, 4,959,653, Cl. 342-17.000.
- Garay, Antonio A.; Spaulding, Tedford H.; and Valteau, Robert L., to Switchcraft Inc. Electrical power connector, 4,959,028, Cl. 439-733.000.
- Gardner, Deane; and Fellingham, George, to Rastergraphics Inc. Method and apparatus for precisely positioning and stabilizing a continuous belt or web or the like, 4,959,040, Cl. 474-103.000.
- Gardner, John G.: See—  
Bernard, Robin D.; and Gardner, John G., 4,959,144, Cl. 210-232.000.
- Garfinkel, Henry. Writing doll, 4,959,037, Cl. 446-299.000.
- Garrett, Ian, to British Telecommunications. Optical receiver circuit including a filter network to minimize noise, 4,959,535, Cl. 250-214.000.
- Garrett, Michael E., to BOC Group plc. The Separation of gas mixtures, 4,959,083, Cl. 55-26.000.
- Garrett, Steven L.: See—  
Hoffler, Thomas J.; and Garrett, Steven L., 4,959,539, Cl. 250-227.190.
- Garrison, John M. Runoff water trap, 4,958,528, Cl. 73-864.630.
- Gas Research Institute: See—  
Cook, Ronald L.; and Sammelis, Anthony F., 4,959,131, Cl. 204-59.000.
- Lee, Douglas W., 4,958,689, Cl. 175-19.000.
- Gateway Industries, Inc.: See—  
Doty, Gerald A., 4,958,853, Cl. 280-801.000.
- GEC-Marconi Limited: See—  
Wells, Paul J.; and Bloor, David, 4,958,895, Cl. 350-96.120.
- Geiger, Herbert B.: See—  
Smith, David A.; Geiger, Herbert B.; and Behr, R. Douglas, 4,959,044, Cl. 493-194.000.
- Gell, Michael A., to British Telecommunications public limited company. Semiconductor heterostructures with SiGe material, 4,959,694, Cl. 357-16.000.
- Gellman, Barry, to C. R. Bard, Inc. Integrated soft shell reservoir, 4,959,062, Cl. 604-403.000.
- Genentech, Inc.: See—  
Bringman, Timothy S., 4,959,457, Cl. 530-387.000.
- Froehler, Brian C.; and Matteucci, Mark D., 4,959,463, Cl. 536-27.000.
- General Atomics: See—  
Goforth, Robert R., 4,958,590, Cl. 118-723.000.
- General Electric Company: See—  
Anderson, John M., 4,959,584, Cl. 313-160.000.000.
- Anderson, John M.; and Roberts, Victor D., 4,959,592, Cl. 315-248.000.
- Anthony, Thomas R.; DeVries, Robert C.; Engler, Richard A.; Ettinger, Robert H.; and Fleischer, James F., 4,958,592, Cl. 118-724.000.
- Arsena, Vito J.; Clough, Harvey C.; and Zalar, Frank E., 4,959,583, Cl. 313-113.000.
- Axelrod, Robert J.; Jaquiss, Donald B. G.; and Tyrell, John A., 4,959,481, Cl. 548-462.000.
- Charles, Richard J.; and Gaddipati, Achuta R., 4,959,262, Cl. 428-329.000.
- Coryea, Peter F.; and Germer, Warren R., 4,959,607, Cl. 324-103.000.
- Dumas, William V.; and Foust, Donald F., 4,959,121, Cl. 156-668.000.
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- Gordon, James F.; Scheldorf, Owen H.; and Scheldorf, Gary O., 4,958,990, Cl. 417-410.000.
- Hoegler, Leonard E.; Johnson, Gerald A.; Easock, Diana M.; and Kipling, Kent K., 4,959,585, Cl. 313-271.000.
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- Johnson, Neil A.; Miller, Russell S.; and Hunter, Gordon B., 4,959,841, Cl. 373-10.000.
- MacMinn, Stephen R.; Stephens, Charles M.; and Szczesny, Paul M., 4,959,596, Cl. 318-254.000.
- Mogro-Campero, Antonio; and Turner, Larry G., 4,959,346, Cl. 505-1.000.
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- Rich, Jonathan D.; Goss, David C.; Burnell, Timothy B.; and Wengrovius, Jeffrey H., 4,959,407, Cl. 524-425.000.
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- Simmons, John R., 4,958,489, Cl. 60-226.300.
- Soileau, Trarmond A., 4,959,762, Cl. 362-376.000.
- Yerman, Alexander J.; and Ngo, Khai D., 4,959,630, Cl. 336-83.000.
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Rialand, Lars Y., 4,958,854, Cl. 280-806.000.
- General Motors Corporation: See—  
Danek, Michael J., 4,958,655, Cl. 137-80.000.

- Filosa, Philip C.; Roeske, Robert G.; and Haydu, Bartley A., 4,959,758, Cl. 362-66.000.
- Gold, Thomas P.; Hamberg, James P.; Manesa, Darren K.; and Muzechuk, Richard A., 4,958,810, Cl. 267-140.100.
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- Hoffman, Charles T., Jr.; Altenburger, John W.; and Ramos, John A., 4,958,654, Cl. 137-72.000.
- Janthur, Ingo, 4,958,600, Cl. 123-41.310.
- Kadle, Durgaprasad S., 4,958,681, Cl. 165-151.000.
- Kennedy, Lawrence C., 4,958,709, Cl. 192-58.00B.
- Kiraly, Patrick S.; Metzger, John R.; and Smith, Randall K., 4,959,633, Cl. 338-22.00R.
- Kirschner, Jochem, 4,958,698, Cl. 180-140.000.
- Klomp, Edward D., 4,958,771, Cl. 239-453.000.
- Marcus, Leon, 4,958,511, Cl. 73-7.000.
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- Stiles, Steven D.; Reinke, Paul E.; and Gomez, Aparicio J., 4,958,516, Cl. 73-118.200.
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Stokes, Brian P., 4,959,568, Cl. 310-51.000.
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Clark, Steven C.; Ciarletta, Agnes B.; and Yang, Yu-Chung, 4,959,455, Cl. 530-351.000.
- Gentner, Donald R.: See—  
Strubbe, Hugo J.; and Gentner, Donald R., 4,959,719, Cl. 358-183.000.
- Georg Knoblauch, Firma: See—  
Rau, Georg; and Budert, Gunter H., 4,958,732, Cl. 206-379.000.
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Sharpe, Steven M.; Seals, Joseph; MacDonald, Anita H.; and Crowgey, Scott R., 4,958,638, Cl. 128-653.00R.
- Georgiev, Georgy P.: See—  
Gross, Valery N.; Kozhanov, Evgeny V.; Aitkhodzhi, Murat A.; deceased; Bentashvili, David R.; Tverdokhlebov, Evgeny N.; and Georgiev, Georgy P., 4,959,134, Cl. 204-182.800.
- Gerhart, Paul B., to Honeywell Inc. Apparatus for tracking predetermined data for updating a secondary data base, 4,959,768, Cl. 364-187.000.
- Germer, Warren R.: See—  
Coryea, Peter F.; and Germer, Warren R., 4,959,607, Cl. 324-103.000.
- Gersdorf, Joachim: See—  
Engelhardt, Friedrich; Riegel, Ulrich; Gersdorf, Joachim; and Kleiner, Hans-Jerg, 4,959,441, Cl. 558-161.000.
- Gerstung Enterprises, Inc.: See—  
Gerstung, William, 4,958,755, Cl. 222-402.230.
- Gerstung, William, to Gerstung Enterprises, Inc. Valve for pressurized dispensing cans, 4,958,755, Cl. 222-402.230.
- Getreuer, Kurt H.; and Verboom, Johannes J., to Laser Magnetic Storage International Company. Tracking and seeking system for use with an optical record carrier having a wobbled track format, 4,959,823, Cl. 369-44.130.
- Giaccardi, Eraldo: See—  
Di Nunzio, Vittorio; and Giaccardi, Eraldo, 4,958,616, Cl. 123-635.000.
- Gillum, Julius H. Auto sun visor, 4,958,879, Cl. 296-97.600.
- Giza, John P., to Acushnet Company. Retractable pin mold, 4,959,000, Cl. 425-116.000.
- Glass, Richard A.; Ryer, Robert F., II; and Tomcanin, Deborah T., to American Home Products Corporation. Dual chambered oral dosage delivery container, 4,959,051, Cl. 604-77.000.
- Glasscock, M. Sidney: See—  
Turner, James W.; and Glasscock, M. Sidney, 4,958,960, Cl. 405-195.000.
- Glaxo Group Limited: See—  
Lunta, Lawrence H. C.; Skidmore, Ian F.; Finch, Harry; Naylor, Alan; and Campbell, Ian B., 4,959,381, Cl. 514-357.000.
- Phillips, Gordon H.; and Lester, Michael G., 4,959,371, Cl. 514-283.000.
- Glottzbach, Joseph: See—  
Bubley, Henry J.; Glottzbach, Joseph; and Motev, Phil, 4,958,559, Cl. 101-123.000.
- Glowczewski, Thomas; Carle, Keith B.; and Lindsay, Michael R., to Chrysler Corporation. Dual regulator for reducing system current during at least one mode of operation, 4,959,786, Cl. 364-424.100.
- Goforth, Robert R., to General Atomics. Microwave traveling-wave diamond production device and method, 4,958,590, Cl. 118-723.000.
- Gold, Gary L., to Eaton Corporation. Approximated rotational speed signal for shifting transmission, 4,959,806, Cl. 364-565.000.
- Gold, Peter N. Vehicle safety bar assembly, 4,958,884, Cl. 296-188.000.
- Gold, Thomas P.; Hamberg, James P.; Manesa, Darren K.; and Muzechuk, Richard A., to General Motors Corporation. Hydraulic engine mount with domed orifice plate, 4,958,810, Cl. 267-140.100.
- Golden Valley Microwave Foods, Inc.: See—  
Wilson, David, 4,959,120, Cl. 156-651.000.
- Goldstein, Gideon: See—  
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- Gomes, Anderson S. L.: See—  
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- Gomes, Daniel. Knock-down furniture coupling device, 4,958,425, Cl. 29-433.000.
- Gomez, Aparicio J.: See—  
Stiles, Steven D.; Reinke, Paul E.; and Gomez, Aparicio J., 4,958,516, Cl. 73-118.200.
- Gomez, Luis. Method for the purification of fluids such as water, aqueous fluids and fuel fluids, 4,959,155, Cl. 210-687.000.
- Gonnelli, Robert R.: See—  
Gordon, Gary B.; and Gonnelli, Robert R., 4,959,798, Cl. 364-513.000.
- Gopwani, Raj K.: See—  
Pinch, William D.; Dolengowski, Douglas A.; Longard, R. Kevin; and Gopwani, Raj K., 4,958,849, Cl. 280-668.000.
- Gordon, Gary B.; and Gonnelli, Robert R., to Total Spectrum Manufacturing Inc. Robotic television-camera dolly system, 4,959,798, Cl. 364-513.000.
- Gordon, James F.; Scheldorf, Owen H.; and Scheldorf, Gary O., to General Electric Company. Motor-compressor with means to reduce noise, 4,958,990, Cl. 417-410.000.
- Gosiewski, Donald E.: See—  
Briggs, Paul C.; and Gosiewski, Donald E., 4,959,405, Cl. 524-321.000.
- Goto, Hitoshi: See—  
Iizumi, Makoto; Ide, Tatsumi; Kanzawa, Noboru; Sekiguchi, Akira; Morimoto, Masayuki; Goto, Hitoshi; and Ono, Tsutomu, 4,959,627, Cl. 335-106.000.
- Goto, Nobutaka: See—  
Kurematsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, 4,959,122, Cl. 159-42.000.
- Gould Inc.: See—  
Smith, Royston L.; and Rabaza, Maria V., 4,959,772, Cl. 364-200.000.
- Gouveia-Neto, Artur D.: See—  
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- Grabbe, Dmitry G., to AMP Incorporated. Electrical contact, 4,959,029, Cl. 439-862.000.
- Grabinger, Scott R.: See—  
Stasz, Peter; Solberg, Jeffrey J.; and Grabinger, Scott R., 4,958,539, Cl. 76-104.100.
- Graham, John A.: See—  
Skrgatic, Damir M. J.; Mitchinson, James C.; and Graham, John A., 4,959,228, Cl. 426-11.000.
- Graham, N. Bruce: See—  
Lakey, Robert B.; and Graham, N. Bruce, 4,959,231, Cl. 426-111.000.
- Grant, Frank O. Poly(methyl methacrylate) blended with a solid poly(butyl acrylate-co-allyl acrylate) plasticizer, 4,959,408, Cl. 524-523.000.
- Grau, Ulrich, to Hoechst Aktiengesellschaft. Crystal suspensions of insulin derivatives, processes for their preparation and their use, 4,959,351, Cl. 514-4.000.
- Green Cross Corporation: See—  
Uemura, Yahiho; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.
- Greenberg, George. Leaf wagon, 4,958,846, Cl. 280-652.000.
- Greenebaum, James E., II, to Pittway Corporation. Ferrule for sealing with a container, 4,958,757, Cl. 222-394.000.
- Gregersen, Agner R., to KVM Industriemaskiner A/S. Device for die-casting of concrete goods such as block stones in a cellular mould, 4,959,003, Cl. 425-346.000.
- Greif, Norbert: See—  
Martischius, Franz-Dieter; Rath, Hans P.; Vogel, Hans-Henning; Greif, Norbert; Oppenlaender, Knut; Denzinger, Walter; and Hartmann, Heinrich, 4,959,077, Cl. 44-62.000.
- Greve, Christopher G.: See—  
Lapeyre, James M.; Weber, Peter G.; and Greve, Christopher G., 4,958,720, Cl. 198-666.000.
- Grey, Ronald T.: See—  
Chapdelaine, Albert H.; Kures, Vasek J.; and Grey, Ronald T., 4,959,226, Cl. 426-3.000.
- Grid Systems: See—  
Lloyd, Graham P.; and Mitchell, Dennis R., 4,959,511, Cl. 178-18.000.
- Grieb, John H.; and Joseph, J. Michael, to Siemens-Bendix Automotive Electronics L.P. Manufacturing process for manufacturing thin edge orifice disks for fuel injectors, 4,958,430, Cl. 29-888.020.
- Griese, Klaus; Jons, Claus; Muller, Karl-Heinz; Muller, Rudolf; and Muhlbauer, Werner, to Robert Bosch GmbH. Gear Machine for a pump or engine having bearing members with circumferential relief grooves, 4,958,994, Cl. 418-132.000.
- Griesing, John, to Wang Laboratories, Inc. Dual cable communication system, 4,959,829, Cl. 370-85.300.
- Griffin, Douglas E.: See—  
Breedon, Robert L.; Griffin, Douglas E.; and Kinney, John H., Jr., 4,959,648, Cl. 340-825.440.
- Grimsley, R. Leroy, to Conoco Inc. Well completion and servicing fluid, 4,959,165, Cl. 252-8.551.
- Grivsky, Eugene M., to Burroughs Wellcome Co. Dialkoxypyridopyrimidine compounds, 4,959,474, Cl. 544-279.000.



Gross, David C.: See—  
Rich, Jonathan D.; Gross, David C.; Burnell, Timothy B.; and Wengrovius, Jeffrey H., 4,959,407, Cl. 524-425.000.

Gross, Valery N.; Kozhanov, Evgeny V.; Aitkhodzhi, Mural A., deceased (by Darkanbaeva, Galina T., administrator); Beritashvili, David R.; Tverdokhlebov, Evgeny N.; and Georgiev, Georgy P., to Institut Molekulyarnoy Biologii i Biokhimii Akademii Nauk KazSSR. Process and apparatus for electrophoretic determination of primary structure of nucleic acids. 4,959,134, Cl. 204-182.800.

Grosshauser, Heinrich K.; Kutzner, Willi A. P.; and Schneider, Georg, to Koenig & Bauer Aktiengesellschaft. Inking bar for flush inking unit. 4,958,361, Cl. 101-363.000.

Grossman, Avram S.: See—  
Darbee, Paul V.; Ellis, Richard E.; Jansky, Louis S.; and Grossman, Avram S., 4,959,810, Cl. 364-900.000.

Grotz, Bernard J.; and Frankini, Vito, to Santa Fe Braun Inc. Steam reforming process with low fired duty. 4,959,079, Cl. 48-198.700.

Grotzinger, Timothy L.; and Frederiksen, Herbert A., to Laser Communications, Inc. Laser signal mixer circuit. 4,959,827, Cl. 370-3.000.

Grubbs, Jeffrey W.; and Chapin, David S., to Cooper Industries, Inc. Ripping scissors. 4,958,435, Cl. 30-248.000.

Gruenthal GmbH: See—  
Zimmer, Oswald K.; Vollenberg, Werner P.; Loschen, Gertiet K. H.; Winter, Werner; Kiesewetter, Erwin O.; and Seippl, Ulrich G. P., 4,959,391, Cl. 514-546.000.

GTE Products Corporation: See—  
Baraskitis, Nikolaos; Cohen, Sheppard; and Zaslavsky, Gregory, 4,959,589, Cl. 315-58.000.

Schlitt, Steven C., 4,959,551, Cl. 250-504.00R.

Guenther, Horst: See—  
David, Marie-Henriette L.; Guenther, Horst; Lemmens, Hilde O. J.; and Roeper, Harald W. W., 4,959,459, Cl. 536-1.100.

Guest, John D. Tube couplings. 4,958,858, Cl. 285-24.000.

Guichard, Pascal, to Alcatel N.V. Cable or wire guide for a guide system. 4,958,783, Cl. 242-157.00R.

Guilbaud, Vincent, to Chantiers Beneteau S.A. Method for the protection against water of a laminated resin wall, and a protected laminated resin wall thus obtained. 4,959,259, Cl. 428-215.000.

Guilhem, Jacques R. J.; and Wengler, Roger L. L. Container for transporting grafts. 4,958,506, Cl. 62-457.200.

Gunnerson, Robert E.; and Bruno, Richard C., to Sun-Diamond Growers of California. Process for removing pellicle from nut meats. 4,959,236, Cl. 426-288.000.

Gutberlet, Louis C.: See—  
Kules, Simon G.; Gutberlet, Louis C.; and Hensley, Albert L., 4,959,140, Cl. 208-59.000.

Guzik, Nahum; and Rao, Vinod, to Guzik Technical Enterprises, Inc. Disc clamp employing resilient cone for spreading balls. 4,958,839, Cl. 279-2.00R.

Guzik Technical Enterprises, Inc.: See—  
Guzik, Nahum; and Rao, Vinod, 4,958,839, Cl. 279-2.00R.

Gvex, Inc.: See—  
Urheim, John E., 4,958,736, Cl. 206-531.000.

Haarstad, Donald M.: See—  
Schutten, Herman P.; Stephenson, Dwight B.; and Haarstad, Donald M., 4,958,493, Cl. 60-384.000.

Haczewski, Joseph J., Jr. Regenerating power unit. 4,959,819, Cl. 368-93.000.

Haeffner, Hans-Ulrich; Klotz, Manfred; and Strasser, Wilhelm, to Leybold Aktiengesellschaft. Method and apparatus for checking the operation of a refrigerator-operated cryogenic pump. 4,958,499, Cl. 62-55.500.

Haftmann, Johannes; and Schmeiykal, Rudolf, to TA Triumph-Adler Aktiengesellschaft. Drive element for platens of typewriters or similar office machines. 4,958,949, Cl. 400-314.000.

Hagan, Thomas E.; and McGowan, John B., Sr., to Umac Incorporated. Gas supply safety device. 4,958,657, Cl. 137-513.500.

Hagen, Michael P.: See—  
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Hall, Thomas L., to Pioneer Manufacturing, Inc. Apparatus for detecting missing battery in smoke detector. 4,959,640, Cl. 340-693.000.

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Han, Chris M.; Long, Vernal V.; and Silver, Douglas T., to Silver Metal Products, Inc. Elevated post anchor. 4,958,470, Cl. 52-296.000.

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Ohta, Hiroki; Sato, Katantoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seichi; Umeki, Yoi-chiro; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.

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Hancock, John P., to British Alcan Aluminium PLC. Load bearing structural member and frame structure. 4,958,844, Cl. 280-185.000.

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Hannen, Jakob; Zajec, Jozef-Franc; and Piesen, Stephan, to Kleinewefers GmbH. Apparatus for storing and supplying end closures for envelopes of cylindrical commodities. 4,958,478, Cl. 53-415.000.

Hannenberg, Christor, to AB A.Svensson & Co. Method for draping curtains. 4,958,646, Cl. 160-348.000.

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Schilling, Bernd; Brink, Gerhard; Harder, Ingo; and Wiest, Hubert, 4,959,249, Cl. 427-387.000.

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Harris Corporation: See—  
Smith, Terry L.; and Krietzman, William D., 4,958,427, Cl. 27-566.400.

Harris, David A. Bullet assembly and method of making the same. 4,958,570, Cl. 102-517.000.

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Harris, Jim: See—  
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Harris, William J.; Lysenko, Zenon; and Hurtig, Carl W., to Dow Chemical Company, The. Process to synthesize AB-PBO monomer and phosphate salts thereof. 4,959,492, Cl. 562-453.000.

Harrison, Gail I.: See—  
Weaver, James C.; Bliss, Jonathan G.; Williams, Gregory B.; Powell, Kevin T.; and Harrison, Gail I., 4,959,301, Cl. 435-5.000.

Hart, Terance W.: See—  
Cook, David C.; Hart, Terance W.; McLay, Iain M.; Palfreyman, Malcolm N.; Walsh, Roger J.; and Aloup, Jean-Claude, 4,959,385, Cl. 514-431.000.

Hartkopf, Uwe: See—  
Bartmann, Martin; Feinauer, Roland; Hartkopf, Uwe; and Schlobohm, Michael, 4,959,403, Cl. 524-169.000.

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Harwath, Frank L., to Suntec Industries Incorporated. Two-stage gear pump with improved spur gear mounting. 4,958,997, Cl. 418-171.000.

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Aonuma, Masashi; Okita, Tsutomu; Hashimoto, Hiroshi; Araki, Hiroaki; Fukino, Kiyotaka; and Ejiri, Kiyomi, 4,959,263, Cl. 428-329.000.

Hashimoto, Kenji: See—  
Kobayashi, Hiroaki; and Hashimoto, Kenji, 4,958,722, Cl. 198-735.300.

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Aruga, Tamotsu; Sasaki, Masaomi; and Hashimoto, Mitsuru, 4,959,290, Cl. 430-73.000.

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Hauer, Horst-Walter; and Hauer, Gerda E., 4,958,525, Cl. 073-862.480.

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Lehmann, Klaus; Domsch, Andreas; and Hawel, Hans, 4,959,123, Cl. 162-5.000.

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Hearn, John A.; Schwarz, Dwight L.; Sarma, Dwadasi H. R.; and Palanisamy, Ponnusamy, to Delco Electronics Corporation. Ceramic hybrid integrated circuit having surface mount device solder stress reduction. 4,959,751, Cl. 361-406.000.

Heckethorn, John E.; and Whittle, Danny J., to 3900 Corp. Dual loop hose clamp. 4,958,419, Cl. 24-283.000.

Hegedus, Leslie J. Mobile exhibition unit. 4,958,874, Cl. 296-26.000.

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- Heimann, Richard A., to Toro Company, The. Rope guide. 4,958,483, Cl. 56-17.500.
- Heisterhagen, Rolf: See—  
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- Heiwa Seiki Kogyo Co., Ltd.: See—  
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- Helffrich, David J.: See—  
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- Helix Medical, Inc.: See—  
Seder, Edmund V.; and Sardi, William F., 4,959,048, Cl. 604-9.000.
- Heller, Rudolf; and Michel, Alfred, to Carl-Zeiss-Stiftung. Operating table. 4,958,817, Cl. 269-323.000.
- Hellings, Thomas D. G.: See—  
Lea, Bernard A.; Burrows, Ronald W.; Hellings, Thomas D. G.; Barlow, Charles G.; and Skoug, Ivan H., 4,959,294, Cl. 430-204.000.
- Helms, Israel F., to Brown & Sharpe Manufacturing Company. Coordinate measuring machine with vibration damper. 4,958,437, Cl. 33-503.000.
- Hennas, James W. Hand tool for picking up animal droppings. 4,958,871, Cl. 294-1.400.
- Hennelgarn, Thomas L., to Warner & Swasey Company, The. Rotary table for a coordinate measuring machine and method of determining the axis of table rotation. 4,958,438, Cl. 33-503.000.
- Hennsath, Klaus H., to Indugas, Inc. Pulse burner and method of operation. 4,959,009, Cl. 431-1.000.
- Henderson, Mark F.; and Manderfield, Thomas H., to Delco Electronics Corporation. MOS integrated circuit with vertical shield. 4,959,708, Cl. 357-84.000.
- Hendricks, Udo W.: See—  
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- Busch, Peter; and Thiele, Klaus, 4,958,647, Cl. 132-119.100.
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- Kuenzel, Werner; and Vierkoetter, Peter, 4,958,749, Cl. 222-133.000.
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- Herbin, Patrick; and Lacroix, Jean-Claude, to Essilor International (Compagnie Generale d'Optique). Apparatus for applying a protective film on one face of a series of ophthalmic lenses. 4,959,118, Cl. 156-512.000.
- Herbst, Thomas; and Jungwirth, Dieter, to Dyckerhoff & Widmann Aktiengesellschaft. Anchoring arrangement for a rod-shaped tension member formed of fiber reinforced composite material. 4,958,961, Cl. 405-260.000.
- Hergeth Hollingsworth GmbH: See—  
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- Hess, Arthur E.; and Sanger, Gregory M., to United Technologies Corporation. Optical surface quality improving arrangement. 4,958,463, Cl. 51-72.00R.
- Hess, Norman B. Stanchion. 4,958,793, Cl. 248-122.000.
- Hesse, Philip W.: See—  
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- Dillman, Norman G., 4,959,608, Cl. 324-132.000.
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- Hidaka, Seiji; Ishihara, Takashi; Hamaguchi, Takehiko; Sugiyama, Nobuaki; and Taura, Kosuke, to Konica Corporation. Method of producing analytical curve. 4,959,796, Cl. 364-497.000.
- Higami, Sadao: See—  
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- Higashibata, Kouji; and Suzuki, Hironori, to Kabushiki Kaisha Toshiba. Y-Ba-Cu-O superconductor for containing antimony or boron to increase current density. 4,959,348, Cl. 505-1.000.
- Higginbottom, Charles: See—  
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- Higgins, Robert J., Jr.; Ooms, William J.; and Irwin, James S., to Motorola, Inc. Coil-less overtone crystal oscillator. 4,959,624, Cl. 331-116.00R.
- Hihara, Takeshi; Yanagiya, Masahide; and Ono, Kazuhito, to Toho Kagaku Kogyo Co., Ltd. Method for plugging lost circulation areas and lost circulation material to be used therefor. 4,958,685, Cl. 166-291.000.
- Hijikata, Kenji: See—  
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- Hillstrom, Brian J.: See—  
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- Hillyer, Janice L. Retainer for a percutaneous tube. 4,959,055, Cl. 604-179.000.
- Hinatase, Fumio: See—  
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- Hindle, Edward W.: See—  
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- Hipp, James. Fluid operated vibratory jar with rotating bit. 4,958,691, Cl. 175-296.000.
- Hira, Takaaki: See—  
Iguchi, Takaaki; Tamari, Takanori; Hira, Takaaki; Isobe, Kunio; Yaita, Ikuo; and Abe, Hideo, 4,959,275, Cl. 428-603.000.
- Hirahara, Takuji; Nukui, Masahiro; and Tanaka, Katsuji, to Mitsubishi Kasei Corporation. Copolymerized polyester having excellent transparency and gas barrier properties. 4,959,421, Cl. 525-437.000.
- Hirama, Eiichi, to Marcon Electronics Company, Ltd. Metalized film capacitor and method of manufacturing the same. 4,959,652, Cl. 361-310.000.
- Hirano, Sadayuki: See—  
Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 4,958,538, Cl. 74-866.000.
- Hiraoka, Toyoki; Murakami, Yuichi; and Okitsu, Nobuyuki, to Nissan Motor Co., Ltd. Internal combustion engine with crankcase ventilation system. 4,958,613, Cl. 123-572.000.
- Hirata, Minoru: See—  
Terao, Shinji; and Hirata, Minoru, 4,959,362, Cl. 514-231.500.
- Hirayama, Akihiko: See—  
Tanaka, Masahiro; Ohya, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, 4,958,956, Cl. 405-23.000.
- Hironaka, Yoshio: See—  
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- Hirose, Satoshi: See—  
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- Hirschmann, Walter, to Patent Treuhand Gesellschaft für elektrische Glühlampen m.b.H. Rectifier-inverter circuit with low harmonic feedback, particularly for operation of fluorescent lamps. 4,959,591, Cl. 315-209.00R.
- Hirt, Alfred, to MAN Technologie GmbH. Device for producing images on printing image carriers. 4,959,668, Cl. 346-155.000.
- Hishi, Wakichiro: See—  
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tunchiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.
- Hitachi Koki Co., Ltd.: See—  
Mitsuya, Teruaki; Kumasaka, Takao; Umeda, Takao; Hori, Yasuro; Shimokobe, Ikuo; and Hoshi, Nobuyoshi, 4,959,693, Cl. 355-290.000.
- Saito, Susumu; and Arimoto, Akira, 4,959,665, Cl. 346-108.000.
- Hitachi, Ltd.: See—  
Aritomi, Toshiaki, 4,958,637, Cl. 128-653.00A.
- Homma, Masatoshi; Yamaguchi, Tetsuo; and Hasegawa, Tuneyuki, 4,958,589, Cl. 118-672.000.
- Imaide, Takuya; and Kinugasa, Toshiro, 4,959,727, Cl. 358-228.000.
- Isomura, Satoru; Iwabuchi, Masato; and Ogiue, Katsumi, 4,959,704, Cl. 357-41.000.
- Iyoda, Hiromi, 4,958,473, Cl. 52-646.000.
- Kanazawa, Yasunori; Nakamori, Yoshiyuki; Kuwa, Tadashi; Fujimoto, Nobuyuki; and Abe, Shinichi, 4,959,744, Cl. 360-133.000.
- Kimura, Tomoaki, 4,958,677, Cl. 164-452.000.

- Kochi, Masahori; Morikawa, Juichi; Ibe, Makoto; Ozaki, Shinji; and Takizawa, Hitoshi, 4,959,743, Cl. 360-130.240.
- Kondo, Megumu; Kamiya, Shuji; Fukuoka, Kazuhiko; Shinozaki, Masatsugu; and Sadamitsu, Hitoshi, 4,959,770, Cl. 364-200.000.
- Kuroda, Shigeaki; Oguni, Kensaku; Senabu, Takao; Terada, Hirokiyo; Nagai, Makoto; and Hanada, Masamichi, 4,958,500, Cl. 62-89.000.
- Mitsuya, Teruaki; Kumasaka, Takao; Umeda, Takao; Hori, Yasuro; Shimokobe, Ikuo; and Hoshi, Nobuyoshi, 4,959,693, Cl. 355-290.000.
- Miura, Yoshio; Suzuki, Motoyuki; Fukushima, Akio; and Mori, Yonemitsu, 4,959,733, Cl. 358-338.000.
- Miyadera, Hiroo; Ohtsuki, Toru; and Kawamura, Tohiaki, 4,959,778, Cl. 364-200.000.
- Saito, Susumu; and Arimoto, Akira, 4,959,665, Cl. 346-108.000.
- Saitoh, Tochio; Takahashi, Noriyo; and Satoh, Masaki, 4,959,575, Cl. 310-213.000.
- Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tunchiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.
- Wada, Hirohumi, 4,959,815, Cl. 365-230.060.
- Yamamoto, Etsuji; and Kohno, Hideki, 4,959,613, Cl. 324-318.000.
- Yoneda, Kenji; Kajiyama, Toshiaki; Sakata, Kazuhiro; Munakata, Mitsuo; and Suzuki, Masato, 4,958,707, Cl. 187-101.000.
- Yoshiura, Hiroshi; Chusho, Takeshi; Masui, Shiochi; and Ohata, Hideo, 4,959,799, Cl. 364-513.000.
- Yosida, Nobuo; and Shimizu, Teruhisa, 4,959,835, Cl. 371-51.100.
- Hitachi Maxell, Ltd.: See—  
Kanazawa, Yasunori; Nakamori, Yoshiyuki; Kuwa, Tadashi; Fujimoto, Nobuyuki; and Abe, Shinichi, 4,959,744, Cl. 360-133.000.
- Hitachi Microcomputer Engineering: See—  
Kondo, Megumu; Kamiya, Shuji; Fukuoka, Kazuhiko; Shinozaki, Masatsugu; and Sadamitsu, Hitoshi, 4,959,770, Cl. 364-200.000.
- Hitco: See—  
Miller, Wilbur T.; Calamito, Dominic P.; and Pusch, Richard H., 4,958,663, Cl. 139-384.00R.
- Hitomi, Mitsuo; Sasaki, Junso; Takai, Akira; Umezono, Kazuaki; and Hinatase, Fumio, to Mazda Motor Corporation. Supercharged engine. 4,958,606, Cl. 123-316.000.
- Hoang, Peter P. M.: See—  
Davis, Stephen C.; Fulton, Janet B.; and Hoang, Peter P. M., 4,959,420, Cl. 525-331.700.
- Hobart Corporation: See—  
Treiber, Fritz F., 4,958,479, Cl. 53-441.000.
- Hochstein, Peter A. Automatic battery powered video light. 4,959,755, Cl. 362-4.000.
- Hoechst AG: See—  
Ulrich, Hannsjorg; and Westermann, Lothar, 4,959,170, Cl. 252-135.000.
- Hoechst Celanese Corporation: See—  
Stautzenberger, Adin L.; Quick, Edward E.; and Lobo, Peter F., 4,959,449, Cl. 528-271.000.
- Hoechst-Roussel Pharmaceuticals Inc.: See—  
Allen, Richard C.; Klein, Joseph T.; and Effland, Richard C., 4,959,378, Cl. 514-352.000.
- Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, 4,959,377, Cl. 514-349.000.
- Hoegler, Leonard E.; Johnson, Gerald A.; Essock, Diana M.; and Kipling, Kent K., to General Electric Company. Electric incandescent lamp and method of manufacture therefor. 4,959,585, Cl. 313-271.000.
- Hoescht Aktiengesellschaft: See—  
Gruu, Ulrich, 4,959,351, Cl. 514-4.000.
- Hoffman, Charles T., Jr.; Altenburger, John W.; and Ramos, John A., to General Motors Corporation. Check valve with ephemeral seal. 4,958,654, Cl. 137-72.000.
- Hoffmann, Gerhard, to BASF Aktiengesellschaft. Flexographic relief printing plate. 4,959,285, Cl. 430-11.000.
- Hoffmann-La Roche Inc.: See—  
Felix, Arthur M.; and Heimer, Edgar P., 4,959,352, Cl. 514-9.000.
- Mohacsi, Erno; and O'Brien, Jay P., 4,959,359, Cl. 514-211.000.
- Walsler, Armin, 4,959,361, Cl. 514-220.000.
- Hofler, Thomas J.; and Garrett, Steven L., to United States of America, Navy. Flexural disk fiber optic hydrophone. 4,959,539, Cl. 250-227.190.
- Hofmann, Heinrich; and Troster, Manfred, to FAG Kugelfischer Georg Schafer (KGaA). Bearing for wheel mount. 4,958,944, Cl. 384-512.000.
- Hogan, Billy M.: See—  
Dunn, Paul S.; Sheinberg, Haskell; Hogan, Billy M.; Lewis, Homer D.; and Dickinson, James M., 4,959,194, Cl. 419-46.000.
- Hohjoh, Tadashi: See—  
Hayashi, Sei-ichi; Hohjoh, Tadashi; Shida, Atsuhiko; and Ikekawa, Nobuo, 4,959,097, Cl. 71-112.000.
- Holbrook-Patterson, Inc.: See—  
Mendenhall, David L., 4,958,390, Cl. 5-110.000.
- Holman, Thomas H., Jr., to Motorola Computer X. Write-shared cache circuit for multiprocessor system. 4,959,777, Cl. 364-200.000.
- Holmes, Gerald E.; and Cannon, Fleming V., Jr., to Century Wrecker Corporation. Quick connect/disconnect wheel cradle arrangement for wheel lift towing systems. 4,958,980, Cl. 414-563.000.
- Holmes, Iris. Pest exterminating composition. 4,959,221, Cl. 424-659.000.
- Holtermann, Ludwig K.; and Lee, Leighton, II, to Lee Company, The. Check valve. 4,958,661, Cl. 137-843.000.
- Holtje, Bruce E.: See—  
Trainor, John W.; and Holtje, Bruce E., 4,959,690, Cl. 355-245.000.
- Holtmyer, Martin D.; and Hunt, Charles V., to Halliburton Company. Polyampholyte-high temperature polymers and method of use. 4,959,163, Cl. 252-8.551.
- Homac Mfg. Company: See—  
McGrane, Eugene W., 4,959,508, Cl. 174-84.00C.
- Homayoun, Habib: See—  
Digby, Dennis; and Homayoun, Habib, 4,958,641, Cl. 128-702.000.
- Homma, Masatoshi; Yamaguchi, Tetsuo; and Hasegawa, Tuneyuki, to Hitachi, Ltd. Continuous melt-plating apparatus. 4,958,589, Cl. 118-672.000.
- Honda Giken Kogyo K.K.: See—  
Kato, Akira; and Yano, Toru, 4,958,612, Cl. 123-489.000.
- Honda Giken Kogyo Kabushiki Kaisha: See—  
Aoi, Tomio; and Kameda, Toshihiro, 4,958,984, Cl. 415-55.100.
- Iwakura, Masato; and Nakano, Hiroshi, 4,958,451, Cl. 40-204.000.
- Maki, Kazuya; Ishikawa, Yoshikazu; Yamaguchi, Kouji; and Sasajima, Koji, 4,958,492, Cl. 60-327.000.
- Maki, Kazuya; and Yamaguchi, Kouji, 4,958,494, Cl. 60-468.000.
- Maruyama, Iwao; and Uzuyama, Kimitake, 4,959,521, Cl. 219-121.630.
- Matsuoka, Isamu; and Sato, Noboru, 4,959,137, Cl. 204-299.00C.
- Shiraishi, Shuji, 4,959,794, Cl. 364-426.030.
- Yamaguchi, Kouji, 4,958,495, Cl. 60-468.000.
- Honda, Koichi: See—  
Nagawa, Yoshinobu; Honda, Koichi; and Nakanishi, Hiroshi, 4,959,479, Cl. 548-255.000.
- Honda Motor Co., Ltd.: See—  
Hagiwara, Yoshitoshi; Koya, Eitaro; Hayashi, Tetsuya; and Takeda, Yoshinobu, 4,959,276, Cl. 428-614.000.
- Honda, Takumi: See—  
Saeiki, Kenichi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.
- Honeywell Inc.: See—  
Bjork, Merlin D.; and Thoe, Baard H., 4,959,654, Cl. 342-120.000.
- Gerhart, Paul B., 4,959,768, Cl. 364-187.000.
- Rasinski, John E.; and Delong, Christian P., 4,959,015, Cl. 434-2.000.
- Rawski, John M., 4,958,904, Cl. 350-96.200.
- Ruby, Joseph H., 4,959,594, Cl. 315-397.000.
- Samad, Tariq, 4,958,939, Cl. 382-35.000.
- Hongel, Chester C., to Electronic Specialty Corporation. Relay contact protective circuit. 4,959,746, Cl. 361-13.000.
- Hongo, Yasuo, to Fuji Electric Co., Ltd. Method for determining binary coding threshold value. 4,959,869, Cl. 382-51.000.
- Honjo, Masahiro, to Matsushita Electric Industrial Co., Ltd. Frequency demodulation circuit. 4,959,620, Cl. 329-327.000.
- Hopf, Frederick R.: See—  
Osenrider, Bryce C.; Hopf, Frederick R.; and , 4,959,248, Cl. 427-385.500.
- Hoppner, Klaus; Friedrich, Reinhard; and Weiss, Hermann, to Andreas Suhl. Internal combustion engine. 4,958,602, Cl. 123-195.00C.
- Hori, Yasuro: See—  
Mitsuya, Teruaki; Kumasaka, Takao; Umeda, Takao; Hori, Yasuro; Shimokobe, Ikuo; and Hoshi, Nobuyoshi, 4,959,693, Cl. 355-290.000.
- Horihe, Mitsutoshi; Hamada, Hiroshi; and Sakakibara, Hiroshi, to Nippondenso Co., Ltd. Automotive alternator. 4,959,576, Cl. 310-239.000.
- Horiishi, Nanao: See—  
Hamamura, Atsushi; Hamada, Takaki; Tokuhara, Kouki; Miyao, Yukimitsu; Imai, Tomoyuki; and Horiishi, Nanao, 4,959,273, Cl. 428-548.000.
- Horikomi, Kazutoshi: See—  
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
- Horikoshi, Yukio: See—  
Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,958,995, Cl. 418-152.000.
- Horimai, Hideyoshi; and Aoki, Yoshio, to Sony Corporation. Magneto-optical recording apparatus with constant leakage magnetic and pulse modulated magnetic field. 4,959,820, Cl. 369-13.000.
- Horizons International Foods, Inc.: See—  
Aulik, David J.; and Christensen, Robert E., 4,959,240, Cl. 426-637.000.
- Hornig, Liou-Liang: See—  
Crutchfield, Marvin M.; Hornig, Liou-Liang; and Schultz, Robert G., 4,959,496, Cl. 562-583.000.
- Horvath, Bela: See—  
Toth, Laszlo P.; Kiss, Endre; Pasztor, Endre; Purebl, Gyorgy; Kormendy, Agoston; Mares, Gyula; Yoa, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.
- Horvath, Edward, to Otto Bock Orthopädische Industrie Besitz-Und Verwaltungen - KG. Hydraulic controller, especially for the movement of a prosthetic joint. 4,958,705, Cl. 188-314.000.
- Hoshi, Hitoshi: See—  
Katoh, Eiichi; Hoshi, Hitoshi; Takahashi, Tsunehide; and Asakura, Koichi, 4,959,687, Cl. 355-214.000.



- Hoashi, Nobuyoshi: See—  
Mitsuya, Teruaki; Kumasaka, Takao; Umeda, Takao; Hori, Yasuro; Shimokobe, Ikuo; and Hoashi, Nobuyoshi, 4,959,693, Cl. 355-290.000.
- Hosticka, Bedrich; Klinke, Roland; and Pfeleiderer, Hans-Joerg, to Siemens Aktiengesellschaft. Differential amplifier having externally controllable power consumption. 4,959,621, Cl. 330-253.000.
- Houticoolon, Roland; and Kloettschen, Hermann, to Henkel Kommanditgesellschaft auf Aktien. Apparatus for scraping solid materials from a conveyor surface. 4,958,719, Cl. 198-635.000.
- Houser, Clarence G., to Phillips Petroleum Company. Drummed waste incineration. 4,958,578, Cl. 110-246.000.
- Houts, Thomas M.: See—  
Milburn, Gary L.; Rabbie, Judith; and Houts, Thomas M., 4,959,303, Cl. 435-7.000.
- Howells, Roger A., to Air Products and Chemicals, Inc. Exhaust gas media separator with recycling and dust collection. 4,958,466, Cl. 51-425.000.
- Howlette, Edward L. Security system for computer software. 4,959,861, Cl. 380-4.000.
- Hsu, Paul K. H. Device for fitting a hose on a club shaft. 4,958,424, Cl. 29-252.000.
- Huang, Shih-Hsing: See—  
Mercola, Gerald K.; and Huang, Shih-Hsing, 4,959,833, Cl. 371-32.000.
- Huang, Shu-Jen W.; and Stenger, Claudia V., to Nalco Chemical Company. Paint detackification using inorganic particles. 4,959,147, Cl. 210-712.000.
- Hubbell Incorporated: See—  
Kuntz, Robert J., 4,958,676, Cl. 164-340.000.
- Neuroth, David H., 4,959,022, Cl. 439-589.000.
- Huels Aktiengesellschaft: See—  
Bartmann, Martin; Feinauer, Roland; Hartkopf, Uwe; and Schlobohm, Michael, 4,959,403, Cl. 524-169.000.
- Huff, Karl: See—  
Foltn, Eckard; Depick, Hans-Werner; Huff, Karl; Pischtschan, Alfred; Yesildag, Mehmet C.; and Erkelenz, Reiner, 4,959,406, Cl. 524-413.000.
- Huggins, Jack D.; and Pannel, John. Exercise apparatus. 4,958,830, Cl. 272-69.000.
- Hughes Aircraft Company: See—  
Lo, Thomas K.; Sacks, Jack M.; and Simoni, Wayne P., 4,959,714, Cl. 358-125.000.
- Owechko, Yuri; and Soffer, Bernard H., 4,958,914, Cl. 350-342.000.
- Owechko, Yuri, 4,959,532, Cl. 250-201.900.
- Rochester, James R., 4,958,899, Cl. 350-96.200.
- Rockwell, Davis A.; Lind, Richard C.; and Pepper, David M., 4,958,908, Cl. 350-311.000.
- Woolley, Richard L., 4,959,800, Cl. 364-516.000.
- Humpolik, Bohumil, to Suddeutsche Kuehlerfabrik Julius Fr. Behr GmbH & Co. K.G. Process and an arrangement for producing a supporting body for a catalytic reactor. 4,958,428, Cl. 29-890.000.
- Hung, Po-Chieh; and Kaneniwa, Tatsuya, to Konica Corporation. Method and apparatus for correcting the color of a printed image. 4,959,711, Cl. 358-80.000.
- Huni, Jean-Paul: See—  
Dube, Ghislain; Huni, Jean-Paul; Lavoie, Serge; and Stevens, Wesley D., 4,959,100, Cl. 75-10.190.
- Hunsbedt, Anstein; and Boardman, Charles E., to General Electric Company. Indirect passive cooling system for liquid metal cooled nuclear reactors. 4,959,193, Cl. 376-299.000.
- Hunt, Charles C.: See—  
Reddy, Malireddy S.; Mullen, John; Washam, Clinton J.; Brown, C. Gordon; and Hunt, Charles C., 4,959,229, Cl. 426-39.000.
- Hunt, Charles V.: See—  
Holmyer, Martin D.; and Hunt, Charles V., 4,959,163, Cl. 252-8.551.
- Hunter Douglas International N.V.: See—  
Spangenberg, Robert E., 4,958,421, Cl. 29-24.500.
- Hunter, Frederick J.: See—  
Ng, Howard C. H.; and Hunter, Frederick J., 4,959,267, Cl. 428-390.000.
- Hunter, Gordon B.: See—  
Johnson, Neil A.; Miller, Russell S.; and Hunter, Gordon B., 4,959,841, Cl. 373-10.000.
- Hunter, Richard L.: See—  
McIver, Robert T., Jr.; and Hunter, Richard L., 4,959,543, Cl. 250-291.000.
- Hurlburt, James P.; and Lagasse, Michael R. Vivarium. 4,958,593, Cl. 119-5.000.
- Hurtig, Carl W.: See—  
Harris, William J.; Lysenko, Zenon; and Hurtig, Carl W., 4,959,492, Cl. 562-453.000.
- Hutchison, Steven; and Bruno, Leonard, to United Technologies Corporation. Solder-coating fixture and arrangement. 4,958,588, Cl. 118-423.000.
- Huynh-Tran, Truc-Chi, to W. R. Grace & Co.-Conn. Acidic adhesion promoters for PVC plastisols. 4,959,399, Cl. 523-437.000.
- Hydro-Quebec: See—  
Fihery, Jean-Luc; Bruce, Di Vincenzo; Antonio; Tinkler, Mark; and McNabb, Scott, 4,959,523, Cl. 219-124.340.
- I. C. Moller A/S: See—  
Pedersen, Hans N., 4,958,958, Cl. 405-154.000.
- Ian Wilson Technology Limited: See—  
Wilson, Alexander I., 4,959,099, Cl. 72-244.000.
- Ibe, Makoto: See—  
Kochi, Mashanori; Morikawa, Juichi; Ibe, Makoto; Ozaki, Shinji; and Takizawa, Hitoshi, 4,959,743, Cl. 360-130.240.
- Ichihashi, Kunio: See—  
Hagiwara, Zenji; Ando, Satoshi; Ichihashi, Kunio; and Dono, Akira, 4,959,268, Cl. 428-403.000.
- Ichii, Seiji: See—  
Tanaka, Masahiro; Ohya, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, 4,958,956, Cl. 405-23.000.
- Ichijima, Seiji: See—  
Sakanoue, Kei; Kobayashi, Hidetoshi; Ichijima, Seiji; and Ueda, Shinji, 4,959,299, Cl. 430-544.000.
- Ichikawa, Toru; Nishihata, Hideo; Kagoroku, Nobuo; and Ito, Shotaro, to Matsushita Electric Industrial Co., Ltd. Air conditioning apparatus for use in automobile. 4,958,504, Cl. 62-244.000.
- Ichikoh Industries, Ltd.: See—  
Nakata, Yutaka, 4,959,757, Cl. 362-61.000.
- ICS Electronics Corporation: See—  
Mercola, Gerald K.; and Huang, Shih-Hsing, 4,959,833, Cl. 371-32.000.
- Ide, Tatsumi: See—  
Iizumi, Makoto; Ide, Tatsumi; Kanzawa, Noboru; Sekiguchi, Akira; Morimoto, Masayuki; Goto, Hitoshi; and Ono, Tsutomu, 4,959,627, Cl. 335-106.000.
- Idemitsu Kosen Co., Ltd.: See—  
Yamasaki, Hirotaka; and Hironaka, Yoshio, 4,959,487, Cl. 558-343.000.
- Idemitsu Petrochemical Co., Ltd.: See—  
Ashida, Takashi; Kunishi, Noriyuki; and Yamamoto, Koji, 4,959,456, Cl. 528-371.000.
- Iguchi, Takaaki; Tamari, Takanori; Hira, Takaaki; Isobe, Kunio; Yaita, Ikuo; and Abe, Hideo, to Kawasaki Steel Corporation. Process and equipment for micro-pattern forming on roll surface, metal sheets for pressworking prepared by the roll, and method of preparing same. 4,959,275, Cl. 428-603.000.
- Iino, Shinji; Oshima, Minoru; Kitoh, Shinya; and Kobayashi, Toshiaki, to Mitsui Toatsu Chemicals, Inc.; and Lion Corporation. Self-hardenable material. 4,959,104, Cl. 106-85.000.
- Iizuka, Haruo: See—  
Saeiki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.
- Iizumi, Makoto; Ide, Tatsumi; Kanzawa, Noboru; Sekiguchi, Akira; Morimoto, Masayuki; Goto, Hitoshi; and Ono, Tsutomu, to NEC Corporation. Electromagnet relay. 4,959,627, Cl. 335-106.000.
- Ijuin, Kazuya; Otsuki, Shinnichi; Nakano, Yuji; and Ogushi, Hiroshi, to Canon Kabushiki Kaisha. Sheet conveying and reading apparatus having a light-intercepting member for reducing noise. 4,959,536, Cl. 250-216.000.
- Ikarus Karoszeria es Jarmugyari: See—  
Toth, Laszlo P.; Kiss, Endre; Pasztor, Endre; Purebl, Gyory; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.
- Ikeda Bussan Co., Ltd.: See—  
Akai, Mikio; and Mori, Masami, 4,959,184, Cl. 264-40.300.
- Ikeda, Shigeyuki: See—  
Iwamoto, Hironori; and Ikeda, Shigeyuki, 4,958,628, Cl. 128-36.000.
- Ikeda, Tanejiro: See—  
Kimura, Tadashi; Ikeda, Tanejiro; Tachihara, Hisaaki; and Oshima, Kunio, 4,959,748, Cl. 361-323.000.
- Ikekawa, Nobuo: See—  
Hayashi, Sei-ichi; Hobjoh, Tadashi; Shida, Atsuhiko; and Ikekawa, Nobuo, 4,959,097, Cl. 71-112.000.
- Ikemoto, Hiroyuki: See—  
Buma, Shuichi; and Ikemoto, Hiroyuki, 4,958,850, Cl. 280-714.000.
- Ikezawa, Atsushi: See—  
Minamitani, Hiromu; Yano, Norio; Ikezawa, Atsushi; Kanayama, Toshio; Ushijima, Takashi; Teraoka, Masao; and Ishikawa, Osamu, 4,959,166, Cl. 252-327.00E.
- Illinois Tool Works, Inc.: See—  
Briggs, Paul C.; and Gosiewski, Donald E., 4,959,405, Cl. 524-321.000.
- Imagitek, Inc.: See—  
Trainor, John W.; and Holtje, Bruce E., 4,959,690, Cl. 355-245.000.
- Imago Quaestus, Inc.: See—  
Meyer, James M.; Schmidt, David A.; and Donner, Peter M., 4,959,582, Cl. 312-307.000.
- Imai, Masafumi: See—  
Furuhashi, Hiroyuki; Yamamoto, Tadashi; Imai, Masafumi; and Ueno, Hiroshi, 4,959,427, Cl. 526-142.000.
- Imai, Tadashi; and Okita, Shinobu, to Kabushiki Kaisha Toshiba. Automatic frequency control apparatus for FM receivers. 4,959,872, Cl. 455-164.000.
- Imai, Tomoyuki: See—  
Hamamura, Atsushi; Hamada, Takaki; Tokuhara, Kouki; Miyao, Yukimitsu; Imai, Tomoyuki; and Horiishi, Nanao, 4,959,273, Cl. 428-548.000.
- Imaide, Takuya; and Kinugasa, Toshiro, to Hitachi, Ltd. Image pick-up apparatus. 4,959,727, Cl. 358-228.000.
- Imanari, Yoshifumi, to Nippon Seiko Kabushiki Kaisha. Support unit. 4,958,941, Cl. 384-474.000.
- Imbeaux, Jean-Claude: See—  
Delacroix, Eugene; Fargeas, Jean-Marc; and Imbeaux, Jean-Claude, 4,959,619, Cl. 329-306.000.

- Import-Export, Research & Development, Inc.: See—  
Baggett, George T., 4,959,763, Cl. 362-382.000.
- Inaba, Hiroshi: See—  
Hashimoto, Chikara; Inaba, Hiroshi; Nakase, Kiyoshi; and Yanagida, Yukitoshi, 4,958,917, Cl. 350-357.000.
- Inaba, Shin-ichi; and Nagahama, Hideki, to Chisso Corporation. Process for manufacturing silane. 4,959,200, Cl. 423-347.000.
- Inaba, Yutaka; Kawagishi, Hideyuki; Kojima, Makoto; and Kaneko, Shuzo, to Canon Kabushiki Kaisha. Image forming apparatus. 4,958,912, Cl. 350-333.000.
- Inaba, Yutaka: See—  
Okada, Shinjiro; Takahashi, Tohru; Kawagishi, Hideyuki; Inaba, Yutaka; and Taniguchi, Osamu, 4,958,915, Cl. 350-345.000.
- Indugas, Inc.: See—  
Hemsath, Klaus H., 4,959,009, Cl. 431-1.000.
- Ingold Messtechnik AG: See—  
Brinkmann, Heinz-Jurgen; Buhler, Hans W.; and Lohrum, Albert, 4,959,138, Cl. 204-414.000.
- Inman, Wayne D.: See—  
Crews, Phillip; Matthews, Thomas R.; and Inman, Wayne D., 4,959,370, Cl. 514-280.000.
- Ino, Mayumi: See—  
Minamitaka, Junichi; Sato, Kunio; and Ino, Mayumi, 4,958,552, Cl. 84-603.000.
- Inoue, Hideki: See—  
Morotomi, Noriaki; Endo, Yasumasa; Emura, Yoshinori; Asaka, Nobuyoshi; and Inoue, Hideki, 4,959,713, Cl. 358-108.000.
- Inoue, Hitoshi: See—  
Uchinami, Masanobu; Takahashi, Toshihisa; Inoue, Hitoshi; Moronaga, Takahiro; and Nishida, Shinichi, 4,958,611, Cl. 123-479.000.
- Institut Francais du Pétrole: See—  
Tong, Wuwei; Sun, Deyu; Zhang, Qingyuan; Wu, Lielai; Zhou, Shicheng; Yu, Shande; Du, Daoji; and Yang, Shili, 4,959,126, Cl. 201-2.000.
- Institut Molekulyarnoy Biologii i Biokhimii Akademii Nauk KazSSR: See—  
Gross, Valery N.; Kozhanov, Evgeny V.; Aitkhodzhi, Murat A.; deceased; Beritashvili, David R.; Tverdokhlebov, Evgeny N.; and Georgiev, Georgy P., 4,959,134, Cl. 204-182.800.
- Institute of Gas Technology: See—  
Kardas, Alan, 4,958,619, Cl. 126-85.00R.
- Instrumedix, Inc.: See—  
Digby, Dennis; and Homayoun, Habib, 4,958,641, Cl. 128-702.000.
- Intelmatec Corporation: See—  
Akagawa, Minoru, 4,958,873, Cl. 294-93.000.
- Interactive Video Disc Systems, Inc.: See—  
Foster, Richard W., 4,959,734, Cl. 358-341.000.
- Interatom GmbH: See—  
Knaak, Joachim, 4,958,523, Cl. 73-861.110.
- International Business Machines: See—  
Bardell, Paul H., Jr., 4,959,832, Cl. 371-27.000.
- International Business Machines Corporation: See—  
Fan, Bunsen; Oprysko, Modest M.; and Rand, Ricky A., 4,959,540, Cl. 250-227.120.
- Landers, John D., Jr., 4,959,773, Cl. 364-200.000.
- International Flavors & Fragrances Inc.: See—  
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mook-berjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,959,209, Cl. 424-81.000.
- International Marketing, Inc.: See—  
Fogal, Robert D., Sr.; Fogal, Robert D., Jr.; and Morgan, George E. D., 4,958,587, Cl. 118-206.000.
- International Paper Company: See—  
Tsai, Ted Y., 4,959,124, Cl. 162-65.000.
- International Rectifier Corporation: See—  
Lidow, Alexander; and Herman, Thomas, 4,959,699, Cl. 357-23.700.
- International Standard Electric Corporation: See—  
Cleemput, Camiel D., 4,959,246, Cl. 427-97.000.
- InterVoice Inc.: See—  
Hammond, Dwain H.; Cave, Ellis K.; and Polcyn, Michael J., 4,959,854, Cl. 379-157.000.
- Inuzima, Takashi: See—  
Yamazaki, Shunpei; Fukada, Takeshi; Sakama, Mitsunori; Shinohara, Hisato; Amachi, Nobumitsu; Sakamoto, Naoya; and Inuzima, Takashi, 4,959,533, Cl. 250-208.100.
- Inverness Corporation: See—  
Mann, Samuel J., 4,958,951, Cl. 401-1.000.
- Ionspec Corporation: See—  
McIver, Robert T., Jr.; and Hunter, Richard L., 4,959,543, Cl. 250-291.000.
- Irwin, James S.: See—  
Higgins, Robert J., Jr.; Ooms, William J.; and Irwin, James S., 4,959,624, Cl. 331-116.00R.
- Isaac, Otto: See—  
Sauerbier, Dieter; Isaac, Otto; and Brade, Wolfgang P., 4,959,215, Cl. 424-422.000.
- Isayama, Shigeru: See—  
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Koji; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
- Iscor Limited: See—  
Lake, Alan W., 4,959,160, Cl. 252-340.000.
- Ishida, Hiroaki; Nemoto, Ichiro; Sato, Koji; Takami, Atsushi; Nakano, Yoichi; Ishii, Isamu; and Iwamatsu, Yoshiyuki, to Seikosha Co., Ltd. Camera system. 4,959,680, Cl. 354-435.000.
- Ishida, Masaji: See—  
Onomoto, Ryuichi; Nishikawa, Masato; Ishida, Masaji; and Arimoto, Sachiro, 4,958,825, Cl. 271-119.000.
- Ishida, Tsuyoshi: See—  
Matsuo, Yukito; Ishida, Tsuyoshi; and Iwamoto, Masanori, 4,958,716, Cl. 198-346.100.
- Ishida, Yoshiaki: See—  
Nakagawa, Tatsushi; Ishida, Yoshiaki; Kanesaka, Junichiro; and Kanesage, Yosuke, 4,959,414, Cl. 525-11.000.
- Ishihara, Shunichi: See—  
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arai, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, 4,959,106, Cl. 136-258.000.
- Ishihara, Takashi: See—  
Hidaka, Seiji; Ishihara, Takashi; Hamaguchi, Takehiko; Sugiyama, Nobuaki; and Taura, Kosuke, 4,959,796, Cl. 364-497.000.
- Ishihara, Yoshiko. Artificial potted flower. 4,958,768, Cl. 239-34.000.
- Ishii, Isamu: See—  
Ishida, Hiroaki; Nemoto, Ichiro; Sato, Koji; Takami, Atsushi; Nakano, Yoichi; Ishii, Isamu; and Iwamatsu, Yoshiyuki, 4,959,680, Cl. 354-435.000.
- Ishii, Kazuo: See—  
Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seichi; Umeki, Yoichi; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.
- Ojima, Juji; Ishii, Kazuo; and Numakura, Fumio, 4,959,041, Cl. 474-111.000.
- Ishii, Ryuichi: See—  
Kumura, Atsuhiko; Ishii, Ryuichi; Luo, Bing-Shan; Adachi, Meiro; Hamada, Kenji; and Fujita, Fumio, 4,959,091, Cl. 71-77.000.
- Ishii, Yoshitaro: See—  
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tunchiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.
- Ishikawa, Atsushi: See—  
Yamauchi, Michihide; Nagamori, Hiroyuki; Wakasa, Masanobu; and Ishikawa, Atsushi, 4,958,998, Cl. 423-445.000.
- Ishikawa, Masao, to Heiwa Seiki Kogyo Co., Ltd. Vertical tilting apparatus of tripod head. 4,959,671, Cl. 354-81.000.
- Ishikawa, Osamu: See—  
Minamitani, Hiromu; Yano, Norio; Ikezawa, Atsushi; Kanayama, Toshio; Ushijima, Takashi; Teraoka, Masao; and Ishikawa, Osamu, 4,959,166, Cl. 252-327.00E.
- Ishikawa, Yoshikazu: See—  
Maki, Kazuya; Ishikawa, Yoshikazu; Yamaguchi, Kouji; and Sasajima, Koji, 4,958,492, Cl. 60-327.000.
- Ishikura, Shinichi: See—  
Miyazono, Tadafumi; and Ishikura, Shinichi, 4,959,417, Cl. 525-274.000.
- Ishizaki, Kunihiko: See—  
Shimomura, Tadao; Harada, Nobuyuki; and Ishizaki, Kunihiko, 4,959,060, Cl. 604-368.000.
- Isobe, Kunio: See—  
Iguchi, Takaaki; Tamari, Takanori; Hira, Takaaki; Isobe, Kunio; Yaita, Ikuo; and Abe, Hideo, 4,959,275, Cl. 428-603.000.
- Isomichi, Kanji: See—  
Sato, Shinji; Isomichi, Kanji; Ogawa, Hiroshi; Yamashita, Toshio; and Funahashi, Nobuhiro, 4,958,502, Cl. 62-126.000.
- Isomura, Satoru; Iwabuchi, Masato; and Ogue, Katsumi, to Hitachi, Ltd. Semiconductor integrated circuit device. 4,959,704, Cl. 357-41.000.
- Isothermica Incorporated: See—  
Chaudoin, James J.; and Linford, Michael R., 4,958,456, Cl. 43-124.000.
- Istituto Farmacologico Sironi S.p.A.: See—  
Barbetti, Manlio, 4,959,354, Cl. 514-21.000.
- Isuzu Ceramics Research Institute Co., Ltd.: See—  
Kawamura, Hideo, 4,958,497, Cl. 60-608.000.
- Isuzu Motors Limited: See—  
Kawamura, Hideo, 4,958,708, Cl. 192-0.098.
- Itabashi, Masaki: See—  
Nogura, Angel R.; Planells, Carlos C.; and Itabashi, Masaki, 4,959,206, Cl. 424-70.000.
- ITI/CLM Impianti Tecnici Industriali S.p.A.: See—  
Mancini, Flavio, 4,958,573, Cl. 104-2.000.
- Ito, Hideo, to Minolta Camera Kabushiki Kaisha. Copying machine. 4,959,684, Cl. 355-55.000.
- Ito, Shotaro: See—  
Ichikawa, Toru; Nishihata, Hideo; Kagoroku, Nobuo; and Ito, Shotaro, 4,958,504, Cl. 62-244.000.
- Ito, Yujiro, to Sony Corporation. Optical space transmission apparatus. 4,958,902, Cl. 350-96.180.
- Itoh, Hiroki, to Mitsubishi Denki Kabushiki Kaisha. Method for forming a thin film. 4,959,242, Cl. 427-38.000.
- Itoh, Takuji: See—  
Miura, Tadaaki; Itoh, Takuji; Kadono, Masaaki; and Shimada, Masakichi, 4,959,338, Cl. 502-263.000.
- Itoh, Yasuo: See—  
Momodomi, Masaki; Masuoka, Fujio; Shiota, Riichiro; Itoh, Yasuo; Ohuchi, Kazunori; and Kiraawa, Ryoshei, 4,959,812, Cl. 365-185.000.



ITT Corporation: See—  
Muzalay, Steven Z., 4,959,027, Cl. 439-655.000.  
Iwabuchi, Masato: See—  
Isumura, Satoru; Iwabuchi, Masato; and Ogue, Katsumi, 4,959,704, Cl. 357-41.000.  
Iwahashi, Hiroshi; Kato, Hideo; and Tatsumi, Yuuichi, to Kabushiki Kaisha Toshiba. Semiconductor integrated circuit. 4,959,816, Cl. 365-233.500.  
Iwaki, Hiroshi; Mita, Yoshiharu; Miyazaki, Jiro; Suto, Akihiko; Hirose, Satoshi; and Renbutsu, Tadashi, to Sanyo Electric Co., Ltd. Paper feeding stand. 4,958,823, Cl. 271-9.000.  
Iwaki, Tetsuhiro; and Seikaku, Hazime, to Mazda Motor Corporation. Automotive door trim mounting structure. 4,958,883, Cl. 296-152.000.  
Iwakura, Masato; and Nakano, Hiroshi, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle license plate mounting mechanism. 4,958,451, Cl. 40-204.000.  
Iwamatsu, Yoshiyuki: See—  
Ishida, Hiroaki; Nemoto, Ichiro; Sato, Koji; Takami, Atsushi; Nakano, Yoichi; Ishii, Isamu; and Iwamatsu, Yoshiyuki, 4,959,680, Cl. 354-335.000.  
Iwamoto, Hiroshi; and Ikeda, Shigeyuki, to Matsushita Electric Works, Ltd. Hand-held vibratory massager. 4,958,628, Cl. 128-36.000.  
Iwamoto, Masanori: See—  
Matsuo, Yukito; Ishida, Tsuyoshi; and Iwamoto, Masanori, 4,958,716, Cl. 198-346.100.  
Iwamoto, Tamio: See—  
Hatori, Nobuyoshi; Iwamoto, Tamio; and Kobashikawa, Akira, 4,959,689, Cl. 355-233.000.  
Iwano, Fumiyuki, to Shikoku Kakoki Co., Ltd. Apparatus for adjusting level of liquid to be filled into packaging tube. 4,958,665, Cl. 141-95.000.  
Iwata, Michihiro: See—  
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,959,679, Cl. 354-419.000.  
Iwatsu Electric Co., Ltd.: See—  
Hatori, Nobuyoshi; Iwamoto, Tamio; and Kobashikawa, Akira, 4,959,689, Cl. 355-233.000.  
Iyoda, Hiromi, to Hitachi, Ltd. Frame, angle member for use in the frame and method of making joint portion of the angle member. 4,958,473, Cl. 52-646.000.  
Izatt, Reed M.: See—  
Bradshaw, Jerald S.; Tarbet, Byron J.; Krakowiak, Krzysztof E.; Biernat, Jan F.; Bruening, Ronald L.; and Izatt, Reed M., 4,959,153, Cl. 210-670.000.  
J. Eberspacher: See—  
Wirth, Georg; and Wirth, Siegfried, 4,958,491, Cl. 60-299.000.  
J. M. Voith GmbH: See—  
Eckhardt, Roland, 4,958,442, Cl. 33-783.000.  
J. T. Baker, Inc.: See—  
Schwartzkopf, George; Covington, John B.; and Gabriel, Kathleen B., 4,959,293, Cl. 430-189.000.  
Jackson Laboratory, The: See—  
Taketo, Makoto, 4,959,313, Cl. 435-69.100.  
Jackson, Richard L.: See—  
Robinson, Keith M.; Mao, Simon J. T.; and Jackson, Richard L., 4,959,392, Cl. 514-712.000.  
Jackson, Winston J., Jr.: See—  
Morris, John C.; and Jackson, Winston J., Jr., 4,959,450, Cl. 528-272.000.  
Jacobsen, Gary: See—  
Jacobsen, Roger V., 4,958,455, Cl. 40-495.000.  
Jacobsen, Roger V., to Jacobsen, Gary. Pivotless wheel indicia display device. 4,958,455, Cl. 40-495.000.  
Jacquier, Bernard: See—  
Fevrier, Herve; Ramon, Josiane; Auge, Jacques; Marcerou, Jean-Francois; Jacquier, Bernard; and Gacon, Jean-Claude, 4,959,837, Cl. 372-6.000.  
Jaguar Cars Limited: See—  
Parsons, Bryan N. V., 4,958,531, Cl. 74-63.000.  
Jain, Praveen K., to Canada National Research Council of Canada/Conseil National de Recherches du AC/DC converter using resonant network for high input power factor. 4,959,766, Cl. 363-48.000.  
Jameson, Graeme J. Aeration apparatus. 4,959,183, Cl. 261-87.000.  
Janda, Dennis J., to B. F. Goodrich Company, The. Bulk polymerized molded products containing cycloolefin monomers with microencapsulated blowing agents. 4,959,395, Cl. 521-54.000.  
Jang, Cheng-Houng. Automatic stopping device for the intravenous drip. 4,959,053, Cl. 604-127.000.  
Jang, G. David. Limacon geometry balloon angioplasty catheter systems and method of making same. 4,958,634, Cl. 606-194.000.  
Jansson, Joanna L.: See—  
Jansson, Tomasz P.; and Jansson, Joanna L., 4,958,892, Cl. 350-3.600.  
Jansson, Tomasz P.; and Jansson, Joanna L., to Physical Optics Corporation. Diffraction coherence filter. 4,958,892, Cl. 350-3.600.  
Jansky, Louis S.: See—  
Darbee, Paul V.; Ellis, Richard E.; Janaky, Louis S.; and Grossman, Avram S., 4,959,810, Cl. 364-900.000.  
Janssen, Petrus C. H.: See—  
van den Nieuwelaar, Adrianus J.; and Janssen, Petrus C. H., 4,958,694, Cl. 177-145.000.  
Janssen, Sylvain; Fournaud, Claude; and Lagarde, Gerard, to Schlumberger Industries, S.A. Rotary device having inter-engaging internal and external teeth. 4,958,996, Cl. 418-152.000.

Janthur, Ingo, to General Motors Corporation. Liquid cooling system for a supercharged internal combustion engine. 4,958,600, Cl. 123-41.310.  
Japan Aviation Electronics Industry, Limited: See—  
Tatebe, Yu; Yasui, Hiroshi; Matsuyama, Yukio; and Takahashi, Hiroji, 4,959,030, Cl. 439-67.000.  
Jaquiss, Donald B. G.: See—  
Axelrod, Robert J.; Jaquiss, Donald B. G.; and Tyrell, John A., 4,959,481, Cl. 548-462.000.  
Jarrell, Lamont R.: See—  
Wolverton, Billy C.; and Jarrell, Lamont R., 4,959,084, Cl. 55-68.000.  
Jarvis, Irene. Combined book cover book carrier. 4,958,759, Cl. 224-151.000.  
Jaseck, James E.; and Fereshetian, Eric A., to Ford Motor Company. Moisture seal for a translatable pinion gear assembly in a starter motor. 4,958,530, Cl. 74-7.00A.  
Jean Walterscheid GmbH: See—  
Konrad, Mathias; and Weber, Wolfgang, 4,958,859, Cl. 285-39.000.  
Jester, Willi: See—  
von Haas, Rainer; and Jester, Willi, 4,958,968, Cl. 409-232.000.  
Jinnouchi, Takeshi: See—  
Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,958,995, Cl. 418-152.000.  
Joanino, Fernando A., to North American Philips Corporation. Two-lead igniter for HID lamps. 4,959,593, Cl. 315-290.000.  
Job, Robert C., to Shell Oil Company. Silicate-modified magnesium ethoxide polymerization catalysts. 4,959,336, Cl. 502-107.000.  
Johann, Gerhard: See—  
Wegner, Peter; Kruger, Martin; Johann, Gerhard; Rusch, Reinhart; Rees, Richard; Head, John; and Rowson, Graham, 4,959,094, Cl. 71-92.000.  
Johanson, Jerry R., to Jr Johanson, Inc. Modular mass-flow bin. 4,958,741, Cl. 220-83.000.  
Johdai, Akiyoshi; Kinoshita, Keichi; Yamashita, Hiroki; and Matsui, Toshio, to Minolta Camera Kabushiki Kaisha. Sheet storing apparatus for copying machine. 4,958,820, Cl. 270-52.000.  
John Wyeth & Brothers Limited: See—  
Ward, Terence J., 4,959,375, Cl. 514-323.000.  
Johnsen, Oddvard. Method and a device for use in determining conditions of runway friction and braking. 4,958,512, Cl. 73-9.000.  
Johnson, Brian A. Interval locator. 4,958,814, Cl. 269-43.000.  
Johnson, Calvin S., to CTR Manufacturing, inc. Tree felling apparatus. 4,958,670, Cl. 144-34.00R.  
Johnson, Earl W.: See—  
Eke, Daniel A.; Eke, Alan B.; and Johnson, Earl W., 4,958,660, Cl. 137-625.230.  
Johnson, Eric, to Quality Chain Corp. Connector for lateral cable of tire chains. 4,958,415, Cl. 24-69.0TT.  
Johnson, Gerald A.: See—  
Hoegler, Leonard E.; Johnson, Gerald A.; Essock, Diana M.; and Kipling, Kent K., 4,959,585, Cl. 313-271.000.  
Johnson, Harlan B.: See—  
Chakrabarti, Paritosh M.; Denison, John M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; Schwarz, Richard A.; and Simmons, Robert B., 4,959,208, Cl. 424-78.000.  
Johnson, Neil A.; Miller, Russell S.; and Hunter, Gordon B., to General Electric Company. Process for reducing contamination of high temperature melts. 4,959,841, Cl. 373-10.000.  
Johnson, Samuel V. Auxiliary tool handle. 4,958,407, Cl. 16-114.00R.  
Jonand, Inc.: See—  
Beiswenger, John L.; and Chelcun, Darrell N., 4,958,911, Cl. 350-331.00R.  
Jonas, Friedrich; Heywang, Gerhard; Schmidtberg, Werner; Heinze, Jürgen; and Dietrich, Michael, to Bayer Aktiengesellschaft. Polythiophenes, process for their preparation and their use. 4,959,430, Cl. 526-257.000.  
Jones, William C.: See—  
Trundle, Mark H.; and Jones, William C., 4,959,192, Cl. 376-260.000.  
Jons, Claus: See—  
Griese, Klaus; Jons, Claus; Muller, Karl-Heinz; Muller, Rudolf; and Muhlbauer, Werner, 4,958,994, Cl. 418-132.000.  
Jorgens, Reinhard; and Faltermeier, Bernd, to Carl-Zeiss-Stiftung. Process and apparatus for the automatic focusing of microscopes. 4,958,920, Cl. 350-530.000.  
Joseph, J. Michael: See—  
Grieb, John H.; and Joseph, J. Michael, 4,958,430, Cl. 29-888.020.  
Joishi, Rajendra K.: See—  
Speiser, Peter P.; and Joishi, Rajendra K., 4,959,389, Cl. 514-494.000.  
Jozowicz, Mira; and Potje-Kamloth, Karin. Ultramicroelectrode, process for making same and its application. 4,959,130, Cl. 204-32.100.  
Jr Johanson, Inc.: See—  
Johanson, Jerry R., 4,958,741, Cl. 220-83.000.  
JSS Scientific Corporation: See—  
Stupakia, John S., 4,958,586, Cl. 114-297.000.  
Ju, Shiao: See—  
Cozewith, Charles; Ju, Shiao; and Verstrate, Gary W., 4,959,436, Cl. 526-348.000.  
Juki Corporation: See—  
Asaba, Yutaka; and Chikamura, Masaharu, 4,958,580, Cl. 112-314.000.

Jump, Janeice A.; and Hale, Thomas E. Microwave cooking assembly of a mixing bowl, lockable top assembly, supporting a stirrer power assembly. 4,959,517, Cl. 219-10.55E.  
Jung, Rolf, to Krauss u. Reichert GmbH & Co. Laying machine. 4,958,819, Cl. 270-31.000.  
Jungwirth, Dieter: See—  
Herbst, Thomas; and Jungwirth, Dieter, 4,958,961, Cl. 405-260.000.  
Jyoraku, Fumio: See—  
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tanehiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.  
Kabelmetal Electro GmbH: See—  
Bruenn, Rainer; Heisterhagen, Rolf; Klebl, Wolfram; and Staschewski, Harry, 4,958,780, Cl. 242-47.000.  
Kabitvritum AB: See—  
Petho, Lajos, 4,958,649, Cl. 134-159.000.  
Kabushiki Kaisha Kawai Gakki Seisakusho: See—  
Kugimoto, Hidenori, 4,958,550, Cl. 84-454.000.  
Kabushiki Kaisha Nihon Pipe Conveyor: See—  
Hashimoto, Kunio, 4,958,724, Cl. 198-819.000.  
Kabushiki Kaisha Toshiba: See—  
Hasegawa, Michio; and Sahashi, Masashi, 4,959,631, Cl. 336-83.000.  
Higashibata, Kouji; and Suzuki, Hironori, 4,959,348, Cl. 505-1.000.  
Imai, Tadashi; and Okitsu, Shinobu, 4,959,872, Cl. 455-164.000.  
Iwahashi, Hiroshi; Kato, Hideo; and Tatsumi, Yuuichi, 4,959,816, Cl. 365-233.500.  
Kobayashi, Hiroaki; and Hashimoto, Kenji, 4,958,722, Cl. 198-735.300.  
Kurachi, Yasuhiko; Mori, Kazumi; and Koizumi, Hisao, 4,959,526, Cl. 219-314.000.  
Marui, Kuniyoshi, 4,959,850, Cl. 379-58.000.  
Matsuo, Yukito; Ishida, Tsuyoshi; and Iwamoto, Masanori, 4,958,716, Cl. 198-346.100.  
Miyoshi, Akio, 4,959,780, Cl. 364-200.000.  
Momodomi, Masaki; Masuoka, Fujio; Shiota, Riichiro; Itoh, Yasuo; Ohuchi, Kazunori; and Kirisawa, Ryouhei, 4,959,812, Cl. 365-185.000.  
Mori, Akio; Aikawa, Takeshi; and Saito, Mitsuo, 4,959,871, Cl. 382-59.000.  
Ogura, Tsuneo; and Nakagawa, Akio, 4,959,703, Cl. 357-38.000.  
Ootani, Takayuki, 4,959,560, Cl. 307-443.000.  
Ootani, Takayuki, 4,959,562, Cl. 307-443.000.  
Shimizu, Yasuhiko; Kobayashi, Hiroaki; and Matsumoto, Osamu, 4,958,762, Cl. 228-1.100.  
Suguro, Kyoichi, 4,959,745, Cl. 361-311.000.  
Sukenobu, Satoru, 4,959,544, Cl. 250-305.000.  
Suzuki, Yoshinori, 4,959,610, Cl. 324-309.000.  
Tanaka, Tadashi; Matsumura, Kazuo; Komorita, Hiroshi; and Mizunoya, Nobuyuki, 4,959,507, Cl. 174-260.000.  
Ueda, Katsunobu; and Sumiya, Mitsuo, 4,958,815, Cl. 269-58.000.  
Yamada, Tetsuro, 4,959,651, Cl. 341-131.000.  
Yamamoto, Motoyuki, 4,959,839, Cl. 372-46.000.  
Kadle, Durgaprasad S., to General Motors Corporation. Heat exchanger with bypass channel louvered fins. 4,958,681, Cl. 165-151.000.  
Kadono, Masaaki: See—  
Miura, Tadashi; Itoh, Takuji; Kadono, Masaaki; and Shimada, Masakichi, 4,959,338, Cl. 502-263.000.  
Kagechika, Takashi: See—  
Miida, Takashi; Murayama, Jin; Tamada, Kazukiyo; and Kagechika, Takashi, 4,959,726, Cl. 358-227.000.  
Kageyama, Yukihiko: See—  
Nakane, Toshio; Kageyama, Yukihiko; and Hijikata, Kenji, 4,959,404, Cl. 524-267.000.  
Kagoroku, Nobuo: See—  
Ichikawa, Toru; Nishihata, Hideo; Kagoroku, Nobuo; and Ito, Shotaro, 4,958,504, Cl. 62-244.000.  
Kajiyama, Toshiki: See—  
Yoneda, Kenji; Kajiyama, Toshiki; Sakata, Kazuhiro; Munakata, Mitsuo; and Suzuki, Masato, 4,958,707, Cl. 187-101.000.  
Kakiuchi, Toshihito: See—  
Kamuro, Yasuo; Kakiuchi, Toshihito; and Takatsudo, Suguru, 4,959,093, Cl. 71-88.000.  
Kameda, Naomi; and Rowley, Gerald L., to Sclavo, Inc. Labeling design for a binding assay reagent. 4,959,306, Cl. 435-7.000.  
Kameda, Toshihiro: See—  
Aoi, Tomio; and Kameda, Toshihiro, 4,958,984, Cl. 415-55.100.  
Kameoka, Fusahiro; Omoto, Noriaki; and Shogaki, Toshihiro, to Matsushita Electric Industrial Co., Ltd. Wide band balanced output frequency modulator using a video signal as a modulation signal. 4,959,625, Cl. 332-135.000.  
Kamiya, Shuji: See—  
Kondo, Megumu; Kamiya, Shuji; Fukuoka, Kazuhiko; Shinozaki, Masatsugu; and Sadamitsu, Hitoshi, 4,959,770, Cl. 364-200.000.  
Kamuro, Yasuo; Kakiuchi, Toshihito; and Takatsudo, Suguru, to Fujisawa Pharmaceutical Co., Ltd. (22R,23R,24S)-22,23-epoxy-2a3a-isopropylidenedioxy-B-homo-7-oxa-5a-stigmastan-6-one and plant growth regulating method containing the same. 4,959,093, Cl. 71-88.000.  
Kanai, Masahiro: See—  
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arai, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, 4,959,106, Cl. 136-258.000.

Kanayama, Toshio: See—  
Minamitani, Hiroshi; Yano, Norio; Ikezawa, Atsushi; Kanayama, Toshio; Ushijima, Takashi; Terakawa, Masao; and Ishikawa, Osamu, 4,959,166, Cl. 252-327.00E.  
Kanazawa, Yasumori; Nakamori, Yoshiyuki; Kuwa, Tadashi; Fujimoto, Nobuyuki; and Abe, Shimichi, to Hitachi Maxell, Ltd.; and Hitachi, Ltd. Shutter assembled disc cartridge. 4,959,744, Cl. 360-133.000.  
Kanebo Ltd.: See—  
Hagiwara, Zenji; Ando, Satoshi; Ichihashi, Kunio; and Dono, Akira, 4,959,268, Cl. 428-403.000.  
Tomoyasu, Haruo; Tango, Chobe; Omote, Takuo; and Kato, Yoshinori, 4,959,260, Cl. 428-255.000.  
Kaneko, Kiyotaka: See—  
Nakadai, Katsuo; Miyake, Izumi; Kaneko, Kiyotaka; and Oda, Kazuya, 4,959,599, Cl. 318-603.000.  
Kaneko, Shuzo: See—  
Inaba, Yutaka; Kawagishi, Hideyuki; Kojima, Makoto; and Kaneko, Shuzo, 4,958,912, Cl. 350-333.000.  
Kaneko, Tamaki, to Ricoh Company, Ltd. Sheet ejector. 4,958,827, Cl. 271-176.000.  
Kanenawa, Tatsuya: See—  
Hung, Po-Chieh; and Kanenawa, Tatsuya, 4,959,711, Cl. 358-80.000.  
Kanesaka, Junichiro: See—  
Nakagawa, Tatsushi; Ishida, Yoshiaki; Kanesaka, Junichiro; and Kaneshige, Yosuke, 4,959,414, Cl. 525-11.000.  
Kaneshige, Yosuke: See—  
Nakagawa, Tatsushi; Ishida, Yoshiaki; Kanesaka, Junichiro; and Kaneshige, Yosuke, 4,959,414, Cl. 525-11.000.  
Kanno, Masahide: See—  
Uehara, Masao; Kanno, Masahide; Sasaki, Masahiko; Saegawa, Katsuyoshi; Uchikubo, Akinobu; Hasegawa, Jun; Yamashita, Shinji; Saito, Katsuyuki; and Nakagawa, Takehiro, 4,959,710, Cl. 358-98.000.  
Kanou, Yoshiaki: See—  
Uemura, Yahiho; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutarou; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.  
Kanzawa, Noboru: See—  
Iizumi, Makoto; Ide, Tatsumi; Kanzawa, Noboru; Sekiguchi, Akira; Morimoto, Masayuki; Goto, Hitoshi; and Ono, Tsutomu, 4,959,627, Cl. 335-106.000.  
KAO Corporation: See—  
Noguera, Angel R.; Planells, Carlos C.; and Itabashi, Masaki, 4,959,206, Cl. 424-70.000.  
Ohnura, Hiroaki; Fujikura, Yoshiaki; Fujita, Manabu; and Toi, Nao, 4,959,349, Cl. 512-14.000.  
Yamauchi, Michihide; Nagamori, Hiroyuki; Wakasa, Masanobu; and Ishikawa, Atsushi, 4,958,998, Cl. 423-445.000.  
Kaplinsky, George, to Hewlett-Packard Company. Refillable ink bag. 4,959,667, Cl. 346-140.00R.  
Kappernaros, James. Air conditioning system filter with variable rate scent release. 4,959,087, Cl. 55-279.000.  
Karbowsk, Robert J., to Dow Chemical Company, The. Wastewater disinfection with a combination of biocides. 4,959,157, Cl. 210-752.000.  
Kardas, Alan, to Institute of Gas Technology. Portable, flueless, low nox, low co space heater. 4,958,619, Cl. 126-85.00R.  
Karl Kassbohrer Fahrzeugwerke GmbH: See—  
Kauer, Kurt, 4,958,576, Cl. 108-35.000.  
Karmarkar, Subhash D.: See—  
Divecha, Amarnath P.; Ferrando, William A.; Hesse, Philip W.; and Karmarkar, Subhash D., 4,958,763, Cl. 228-193.000.  
Karolia, Seraj A. M.: See—  
Farrar, David; Benn, Gerald P.; and Karolia, Seraj A. M., 4,959,502, Cl. 564-127.000.  
Kashiwagi, Eiji: See—  
Uemura, Yahiho; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutarou; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.  
Kashiwagi, Masayuki; and Matsumoto, Takashi, to Nissin High Voltage Co., Ltd. Automatic exchanger of an electron beam irradiator for window foil. 4,959,550, Cl. 250-492.300.  
Kassai, Kenzo, to Aprica Kassai Kabushikikaisha. High chair. 4,958,885, Cl. 297-55.000.  
Kastl, Alfons: See—  
Kocourek, Franz; Ketterer, Hans; Kastl, Alfons; and Loistl, Rudolf, 4,958,666, Cl. 141-114.000.  
Kato, Akio, to Minolta Camera Kabushiki Kaisha. Image forming apparatus provided with a sheet storing unit. 4,959,685, Cl. 355-72.000.  
Kato, Akira; and Yano, Toru, to Honda Giken Kogyo K.K. Air-fuel ratio control method for internal combustion engines. 4,958,612, Cl. 123-489.000.  
Kato, Hideo: See—  
Iwahashi, Hiroshi; Kato, Hideo; and Tatsumi, Yuuichi, 4,959,816, Cl. 365-233.500.  
Kato, Kozi: See—  
Awata, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuro; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.



- Kato, Yoshinori: See—  
Tomoyasu, Haruo; Tango, Chobe; Omote, Takuo; and Kato, Yoshinori, 4,959,260, Cl. 428-255.000.
- Kato, Eiichi; Hoshi, Hitoaki; Takahashi, Tsunehide; and Asakura, Koichi, to Ricoh Company, Ltd. Bias power source controller for an image forming apparatus. 4,959,687, Cl. 355-214.000.
- Kato, Hiroshi: See—  
Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiko; Mori, Nobuyuki; Takeda, Mikio; and Kato, Hiroshi, 4,959,376, Cl. 514-338.000.
- Katsuki, Shinji: See—  
Fujii, Hiroshi; and Katsuki, Shinji, 4,959,738, Cl. 360-78.130.
- Katsura, Yutaka: See—  
Tanaka, Masahiro; Ohya, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, 4,958,956, Cl. 405-23.000.
- Katz, Ira: See—  
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,959,209, Cl. 424-81.000.
- Kauer, Kurt, to Karl Kassbohrer Fahrzeugwerke GmbH. Fold-away table. 4,958,576, Cl. 108-35.000.
- Kaufmann, Herbert: See—  
Prokopp, Manfred; and Kaufmann, Herbert, 4,959,609, Cl. 324-158.00F.
- Kawabata, Katsuhiko: See—  
Yoshida, Sumio; Takegawa, Yoshikazu; Tsujimoto, Susumu; and Kawabata, Katsuhiko, 4,958,546, Cl. 83-848.000.
- Kawagishi, Hideyuki: See—  
Inaba, Yutaka; Kawagishi, Hideyuki; Kojima, Makoto; and Kaneko, Shuzo, 4,958,912, Cl. 350-333.000.
- Okada, Shinjiro; Takahashi, Tohru; Kawagishi, Hideyuki; Inaba, Yutaka; and Taniguchi, Osamu, 4,958,915, Cl. 350-345.000.
- Kawahara, Hideo: See—  
Takahashi, Koji; Kozuki, Susumi; Mogi, Hirokazu; Kawahara, Hideo; Arai, Hideyuki; Suzuki, Katsushi; Mabuchi, Toshiaki; and Kobayashi, Takashi, 4,959,728, Cl. 358-228.000.
- Kawai, Hisashi, to Canon Kabushiki Kaisha. Recording apparatus with remaining time indication display. 4,959,735, Cl. 358-342.000.
- Kawai, Masahiko: See—  
Kusui, Jun; Kawai, Masahiko; Odani, Yusuke; and Takeda, Yoshinobu, 4,959,195, Cl. 419-67.000.
- Kawamura, Hideaki; Fujibayashi, Kentaro; and Otsuki, Toshiaki, to Fanuc Ltd. Numerical control apparatus. 4,959,597, Cl. 318-568.150.
- Kawamura, Hideaki: See—  
Sasaki, Takashi; Sakurada, Nobuaki; and Kawamura, Hideaki, 4,959,659, Cl. 346-1.100.
- Kawamura, Hideo, to Isuzu Ceramics Research Institute Co., Ltd. Drive system for turbochargers with rotary electric machines. 4,958,497, Cl. 60-608.000.
- Kawamura, Hideo, to Isuzu Motors Limited. Drive system for turbocharger with rotary electric machine. 4,958,708, Cl. 192-0.098.
- Kawamura, Takashi: See—  
Yamada, Seiki; and Kawamura, Takashi, 4,959,553, Cl. 250-560.000.
- Kawamura, Toshiaki: See—  
Miyadera, Hiroo; Ohtsuki, Toru; and Kawamura, Toshiaki, 4,959,778, Cl. 364-200.000.
- Kawamura, Yuzo; and Nakagawa, Sigeo, to Yugenkaisha Idearesearch; and Matsuo Sangyo Co., Ltd. Method for producing reinforced block material of metal or the like. 4,958,678, Cl. 164-461.000.
- Kawasaki Steel Corporation: See—  
Iguchi, Takaaki; Tamari, Takanori; Hira, Takaaki; Isobe, Kunio; Yaritha, Ikuo; and Abe, Hideo, 4,959,275, Cl. 428-603.000.
- Kawashima, Saburo: See—  
Tamai, Shoji; Kawashima, Saburo; Sonobe, Yoshiho; Ohta, Masahiro; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,959,440, Cl. 528-125.000.
- Kay, Malcolm J.; and Tracy, Philip A., to U.S. Philips Corporation. Circuit arrangement for detecting cross-over by an alternating voltage of a fixed reference voltage level. 4,959,558, Cl. 307-354.000.
- Kearney, Mark B., to Delco Electronics Corporation. Operational amplifier with precise bias current control. 4,959,622, Cl. 330-257.000.
- Kearney-National, Inc.: See—  
Luetzow, Robert H., 4,959,629, Cl. 335-228.000.
- Keegan, Robert R.: See—  
Thompson, Richard A., 4,958,383, Cl. 2-150.000.
- Keen, Cletia F. Garment hanger caddy cart. 4,958,841, Cl. 280-47.350.
- Kegelman, Jerry T.; Kroutil, Joseph C.; and Lusk, Rodney, to McDonnell Douglas Corporation. Optical measuring apparatus. 4,958,932, Cl. 356-383.000.
- Keilhauer, Gerhard: See—  
Draum, Lothar; Keilhauer, Gerhard; Lorenz, Gisela; Ammermann, Eberhard; Weber, Wolfgang; Steglich, Wolfgang; Steffan, Bert; and Scherer, Angela, 4,959,484, Cl. 549-334.000.
- Keiper, Winfried: See—  
Bruggen, Gerhard; Keiper, Winfried; and Steinke, Leo, 4,958,515, Cl. 73-116.000.
- Keller, Christian: See—  
Neuffer, Ingemar; and Keller, Christian, 4,959,808, Cl. 364-566.000.
- Kemp, James H.: See—  
Curtis, John P.; and Kemp, James H., 4,958,751, Cl. 222-192.000.
- Kempers, Gordon, to Prince Corporation. Headliner with integral visor. 4,958,878, Cl. 296-97.500.
- Kennametal Inc.: See—  
Mehrotra, Pankaj K.; and Billman, Elizabeth R., 4,959,331, Cl. 501-89.000.
- Mehrotra, Pankaj K.; and Billman, Elizabeth R., 4,959,332, Cl. 501-89.000.
- Kennedy, Lawrence C., to General Motors Corporation. Integrally formed wiper and orifice for a pump plate of a viscous fluid clutch. 4,958,709, Cl. 192-58.00B.
- Kennedy, Richard A.: See—  
Manlove, Gregory J.; Marrah, Jeffrey J.; and Kennedy, Richard A., 4,959,859, Cl. 381-10.000.
- Kennedy, Todd R.: See—  
Diao, Joseph; and Kennedy, Todd R., 4,958,876, Cl. 296-39.200.
- Kentek Information Systems, Inc.: See—  
Fukae, Kensuke, 4,959,731, Cl. 358-300.000.
- Keoshkerian, Barkev: See—  
Ong, Beng S.; Keoshkerian, Barkev; Baranyi, Giuseppe; and Murti, Dasarao K., 4,959,288, Cl. 430-59.000.
- Kermici, Michel: See—  
Brod, Joel; and Kermici, Michel, 4,959,213, Cl. 514-21.000.
- Kern, Ronald J.; Michel, Alan D.; and Powell, William V., Jr., to AT&T Information Systems Inc. Telephone answering machine having solid state and magnetic tape storage for outgoing announcements. 4,959,852, Cl. 379-70.000.
- Kerr, John B.: See—  
Zenner, Bruce D.; Ciccone, Joseph P.; De Castro, Emory S.; Deardurff, Larrie A.; and Kerr, John B., 4,959,135, Cl. 204-129.000.
- Ketterer, Hans: See—  
Kocourek, Franz; Ketterer, Hans; Kastl, Alfons; and Loistl, Rudolf, 4,958,666, Cl. 141-114.000.
- Khalafalla, Sanaa E.: See—  
Engelmann, William H.; Watson, Pamela J.; Tuzinski, Patrick A.; Pahlman, John E.; and Khalafalla, Sanaa E., 4,959,164, Cl. 252-8.510.
- Khan, M. M. Taqui; and Siddiqui, M. R. Hussain, to Council of Scientific & Industrial Research. Process for the preparation of clay loaded metal complexes catalyst and a process for the hydrogenation of oils using the catalyst so prepared. 4,959,335, Cl. 502-62.000.
- Khoury, John M., to AT&T Bell Laboratories. Low impedance buffer circuit. 4,959,623, Cl. 330-265.000.
- Knowles, Carl H., to Metrologic Instruments, Inc. Bouncing oscillating scanning device for laser scanning apparatus. 4,958,894, Cl. 350-6.600.
- Khri-Yakub, Butrus T.; Elrod, Scott A.; and Quate, Calvin F., to Xerox Corporation. Acoustic ink printhead having reflection coating for improved ink drop ejection control. 4,959,674, Cl. 346-140.00R.
- Kickle, Hunter L.: See—  
Ravi, Prasad S.; Kickle, Hunter L.; McCurry, Patrick M.; and Skogberg, David J., 4,959,468, Cl. 536-127.000.
- Kidd, Thomas F., to Electrovert Ltd. Method for casting metal alloys with low melting temperatures. 4,958,675, Cl. 164-120.000.
- Kiesewetter, Erwin O.: See—  
Zimmer, Oswald K.; Vollenberg, Werner P.; Loschen, Gerriet K. H.; Winter, Werner; Kiesewetter, Erwin O.; and Seippel, Ulrich G. P., 4,959,391, Cl. 514-546.000.
- Kievsky Politekhicheskii Institut Imeni: See—  
Vishnevsky, Vladimir S.; and Lavrenko, Vyacheslav V., 4,959,580, Cl. 310-323.000.
- Kikuchi, Kazuto, to Sanden Corporation. Scroll type compressor with discharge through drive shaft. 4,958,991, Cl. 418-55.600.
- Kikugawa, Noriyuki, to Canon Kabushiki Kaisha. Driving device for a stepping motor. 4,959,601, Cl. 318-696.000.
- Kim, Sam H. Bos-cording apparatus. 4,958,481, Cl. 53-592.000.
- Kim, Sang-Sup. Stationary exercising bicycle apparatus. 4,958,831, Cl. 272-73.000.
- Kim, Sang-Sup. Stationary exercising bicycle apparatus. 4,958,832, Cl. 272-73.000.
- Kimberly-Clark Corporation: See—  
Fischer, Roy; and Fair, Paul F., 4,958,864, Cl. 292-19.000.
- Kimoto, Tetsuya; and Nakagawa, Masashi, to Matsushita Electric Works, Ltd. Method and apparatus for inspecting transparent containers. 4,959,537, Cl. 250-223.00B.
- Kimura, Hiroshi: See—  
Matsumura, Koichi; Kimura, Hiroshi; Mise, Noritoshi; and Miki, Hiroshi, 4,959,483, Cl. 549-315.000.
- Kimura, Masaki: See—  
Shibata, Toshihiro; Kurosawa, Norio; and Kimura, Masaki, 4,959,173, Cl. 252-299.650.
- Kimura, Tadashi; Ikeda, Tanejiro; Tachihara, Hisaaki; and Oshima, Kunio, to Matsushita Electric Industrial Co., Ltd. Film capacitor, method of and apparatus for manufacturing the same. 4,959,748, Cl. 361-323.000.
- Kimura, Tomoaki, to Hitachi, Ltd. Rolling installation for and rolling method of continuous cast strip. 4,958,677, Cl. 164-452.000.
- Kimura, Yasuo: See—  
Matsumoto, Yumio; Kimura, Yasuo; Takagi, Osamu; and Takemoto, Takatoshi, 4,959,529, Cl. 219-388.000.
- King, Francis D., to Beecham Group P.L.C. 4-oxo-1,2,3-benzotriazines. 4,959,367, Cl. 514-243.000.
- King, Gerard: See—  
Flynn, Stephen J.; and King, Gerard, 4,959,873, Cl. 455-303.000.
- Kingsley Nominees Pty. Ltd.: See—  
Bayly, Peter K., 4,958,744, Cl. 220-305.000.
- Kinney, John H., Jr.: See—  
Breedon, Robert L.; Griffin, Douglas E.; and Kinney, John H., Jr., 4,959,648, Cl. 340-825.440.
- Kinoshita, Keichi: See—  
Jobdai, Akiyoshi; Kinoshita, Keichi; Yamashita, Hiroki; and Matsui, Toshio, 4,958,820, Cl. 270-52.000.

- Kinugasa, Toshiro: See—  
Imade, Takuya; and Kinugasa, Toshiro, 4,959,727, Cl. 358-228.000.
- Kioritz Corporation: See—  
Masuda, Isao; Taomo, Toshio; and Sasaki, Fujio, 4,958,745, Cl. 220-375.000.
- Kipling, Kent K.: See—  
Hoegler, Leonard E.; Johnson, Gerald A.; Essock, Diana M.; and Kipling, Kent K., 4,959,585, Cl. 313-271.000.
- Kiraly, Patrick S.; Metzger, John R.; and Smith, Randall K., to General Motors Corporation. Temperature sender connector cover and terminal. 4,959,633, Cl. 338-22.00R.
- Kirin Beer Kabushiki Kaisha: See—  
Nakajima, Shohachi; and Komeshima, Nobuyasu, 4,959,460, Cl. 536-6.400.
- Kirisawa, Ryouhei: See—  
Momodomi, Masaki; Masuoka, Fujio; Shiota, Riichiro; Itoh, Yasuo; Ohuchi, Kazunori; and Kirisawa, Ryouhei, 4,959,812, Cl. 365-185.000.
- Kirschner, Jochem, to General Motors Corporation. Method for steering a motor vehicle. 4,958,698, Cl. 180-140.000.
- Kiss, Endre: See—  
Toth, Laszlo P.; Kiss, Endre; Pasztor, Endre; Purebl, Gyorgy; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.
- Kita, Masahiro: See—  
Nishimura, Katsuhiko; Shinho, Kazuyuki; and Kita, Masahiro, 4,959,695, Cl. 355-327.000.
- Kitahara, Takumi: See—  
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
- Kitoh, Shinya: See—  
Iino, Shinji; Oshima, Minoru; Kitoh, Shinya; and Kobayashi, Toshiaki, 4,959,104, Cl. 106-85.000.
- Kivimaa, Antti; and Perala, Reijo, to Oy Helo-Tehtaat-Helo Factories, Ltd. Electric sauna heater. 4,959,527, Cl. 219-365.000.
- Kiyohara, Toshimi; and Morita, Toshiya, to Sharp Kabushiki Kaisha. Display control system. 4,959,803, Cl. 364-521.000.
- Kiyokawa, Tetsushi: See—  
Tanaka, Masahiro; Ohya, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, 4,958,956, Cl. 405-23.000.
- Klebl, Wolfram: See—  
Bruenn, Rainer; Heisterhagen, Rolf; Klebl, Wolfram; and Staschewski, Harry, 4,958,780, Cl. 242-47.000.
- Klein, Joseph T.: See—  
Allen, Richard C.; Klein, Joseph T.; and Effland, Richard C., 4,959,378, Cl. 514-352.000.
- Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, 4,959,377, Cl. 514-349.000.
- Kleiner, Hans-Jerg: See—  
Engelhardt, Friedrich; Riegel, Ulrich; Gersdorf, Joachim; and Kleiner, Hans-Jerg, 4,959,441, Cl. 558-161.000.
- Kleinewefers GmbH: See—  
Hannen, Jakob; Zajec, Jozef-Franc; and Piesen, Stephan, 4,958,478, Cl. 53-415.000.
- Klemann, Lawrence P.; Finley, John W.; and Scimone, Anthony, to Nabisco Brands, Inc. Low calorie fat mimetics. 4,959,465, Cl. 536-115.000.
- Kleppe, Mari A.: See—  
Nadland, Karl J.; and Kleppe, Mari A., 4,959,222, Cl. 424-692.000.
- Kleschick, William A.: See—  
Pearson, Norman R.; Kleschick, William A.; and Carson, Chialyn M., 4,959,473, Cl. 544-263.000.
- Kline, John F.: See—  
Lewis, Thomas E.; Davidson, Bradley W.; Williams, Richard A.; Nowak, Michael T.; and Kline, John F., 4,958,562, Cl. 101-457.000.
- Lewis, Thomas E.; Davidson, Bradley W.; Williams, Richard A.; Nowak, Michael T.; and Kline, John F., 4,958,563, Cl. 101-458.000.
- Klingman, Kenneth C.: See—  
Rubinstein, Jon; and Klingman, Kenneth C., 4,959,781, Cl. 364-200.000.
- Klinke, Roland: See—  
Hosticka, Bedrich; Klinke, Roland; and Pfeiderer, Hans-Joerg, 4,959,621, Cl. 330-253.000.
- Klinker, Walter: See—  
Leiber, Heinz; Klinker, Walter; and Meier, Gerhard, 4,958,704, Cl. 188-285.000.
- Kloetschen, Hermann: See—  
Hourticolon, Roland; and Kloetschen, Hermann, 4,958,719, Cl. 198-635.000.
- Klomp, Edward D., to General Motors Corporation. Injection nozzle. 4,958,771, Cl. 239-453.000.
- Klotz, James R.; Mikel, Steven A.; Frait, John A.; and Martin, Berthold, to Chrysler Corporation. Multi-pinion differential assembly. 4,959,043, Cl. 475-230.000.
- Klotz, Manfred: See—  
Haefner, Hans-Ulrich; Klotz, Manfred; and Strasser, Wilhelm, 4,958,499, Cl. 62-55.000.
- Knaak, Joachim, to Interatom GmbH. Apparatus for measuring the flow rate of electrically conductive liquids. 4,958,523, Cl. 73-861.110.
- Knecht, Mark W.; and Frake, Scott O., to National Semiconductor Corporation. Output buffer with ground bounce control. 4,959,565, Cl. 307-542.000.
- Knobbe, Marten; Olson & Bear: See—  
Melver, Robert T., Jr.; and Hunter, Richard L., 4,959,543, Cl. 250-291.000.
- Knoerr, Susan B.; and Robins, Robert G., to Cominco Ltd. Preparation of copper arsenate. 4,959,203, Cl. 423-602.000.
- Kobashikawa, Akira: See—  
Hatori, Nobuyoshi; Iwamoto, Tamio; and Kobashikawa, Akira, 4,959,689, Cl. 355-233.000.
- Kobayashi, Hidetoshi: See—  
Sakanoue, Kei; Kobayashi, Hidetoshi; Ichijima, Seiji; and Ueda, Shinji, 4,959,299, Cl. 430-544.000.
- Kobayashi, Hiroaki; and Hashimoto, Kenji, to Kabushiki Kaisha To-shiba. Transfer apparatus for lead frame. 4,958,722, Cl. 198-735.300.
- Kobayashi, Hiroaki: See—  
Shimizu, Yasuhiko; Kobayashi, Hiroaki; and Matsumoto, Osamu, 4,958,762, Cl. 228-1.100.
- Kobayashi, Hisashi: See—  
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
- Kobayashi, Takashi: See—  
Takahashi, Koji; Kozuki, Susumi; Mogi, Hirokazu; Kawahara, Hideo; Arai, Hideyuki; Suzuki, Katsushi; Mabuchi, Toshiaki; and Kobayashi, Takashi, 4,959,728, Cl. 358-228.000.
- Uemura, Yohiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.
- Kobayashi, Tohru, to Canon Kabushiki Kaisha. Ink jet recorder having means for removing unused ink from ink discharge orifice and for capping same. 4,959,662, Cl. 346-1.100.
- Kobayashi, Toshiaki: See—  
Iino, Shinji; Oshima, Minoru; Kitoh, Shinya; and Kobayashi, Toshiaki, 4,959,104, Cl. 106-85.000.
- Kobayashi, Toshio; Uchikawa, Fusaoki; and Nomura, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Forming homogeneous precursors of Bi-Sr-Ca-Cu via carboxylates in the presence of oxidizing agents. 4,959,347, Cl. 505-1.000.
- Kobayashi, Toshiyuki: See—  
Sakamoto, Tamaki; Kobayashi, Toshiyuki; Yamamoto, Norihito; and Miyake, Tamio, 4,958,936, Cl. 374-1.000.
- Kobayashi, Yousuke; and Fukazawa, Keiichi, to Mitsubishi Denki Kabushiki Kaisha. Paper feeder for printer. 4,958,950, Cl. 400-629.000.
- Koboshi, Shigeharu: See—  
Kurematsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, 4,959,122, Cl. 159-42.000.
- Koch Industries, Inc.: See—  
Raneri, Joseph J., 4,959,149, Cl. 210-636.000.
- Koch, Mark A., to Raven Industries, Inc. Inflatable decelerator. 4,958,565, Cl. 102-386.000.
- Kochi, Masahiro; Morikawa, Juichi; Ibe, Makoto; Ozaki, Shinji; and Takizawa, Hitoshi, to Hitachi, Ltd. Jitter reducing tapered rotary drum for magnetic head apparatus. 4,959,743, Cl. 360-130.240.
- Kocourek, Franz; Ketterer, Hans; Kastl, Alfons; and Loistl, Rudolf, to Agfa-Gevaert Aktiengesellschaft. Storage canister for process liquids for use in an apparatus for wet processing of photographic material. 4,958,666, Cl. 141-114.000.
- Koelpin, Thomas, to Siemens Aktiengesellschaft. Circuit arrangement for current limiting. 4,959,747, Cl. 361-31.000.
- Koenig & Bauer Aktiengesellschaft: See—  
Grosshauser, Heinrich K.; Kutzner, Willi A. P.; and Schneider, Georg, 4,958,561, Cl. 101-363.000.
- Hauer, Horst-Walter; and Hauer, Gerda E., 4,958,523, Cl. 073-862.480.
- Kogane, Mikio: See—  
Otake, Katsumi; Sakamoto, Kiichiro; and Kogane, Mikio, 4,959,683, Cl. 355-28.000.
- Koh, Chang-Am. Doll assembled of prefabricated weave sections of rush stalks. 4,959,036, Cl. 446-385.000.
- Koharagi, Haruo: See—  
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tanehiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.
- Kohler, James L., to Delco Electronics Corporation. Automotive instrument display having a thickfilm electroluminescent lightpipe pointer. 4,959,759, Cl. 362-80.000.
- Kohno, Hideki: See—  
Yamamoto, Etsuji; and Kohno, Hideki, 4,959,613, Cl. 324-318.000.
- Kohno, Masahito; and Nakamura, Yoshiyuki, to Koyo Seiko Co., Ltd. Tilt steering device. 4,958,852, Cl. 280-775.000.
- Kohtabashi, Noribumi, to Canon Kabushiki Kaisha. Image forming apparatus having charging and discharging means. 4,959,688, Cl. 355-219.000.
- Koizumi, Hisao: See—  
Kurachi, Yasuhiko; Mori, Kazumi; and Koizumi, Hisao, 4,959,526, Cl. 219-314.000.
- Kojima, Makoto: See—  
Inaba, Yutaka; Kawagishi, Hideyuki; Kojima, Makoto; and Kaneko, Shuzo, 4,958,912, Cl. 350-333.000.



Kojima, Toshikuni: See—  
Kudoh, Yasuo; Tsuchiya, Sohji; Kojima, Toshikuni; Fukuyama, Masao; Yoshimura, Susumu; and Kuranuki, Kenji, 4,959,753, Cl. 361-525.000.

Kojima, Toshio, to Osada Research Institute, Ltd. Spinal needle with optical fiber means for radiating a laser beam. 4,959,063, Cl. 606-15.000.

Kokusan Denki Company, Ltd.: See—  
Saito, Akihiko; and Yukawa, Hideki, 4,958,608, Cl. 123-427.000.

Kolb, Eugen, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Folding top for vehicles. 4,958,882, Cl. 296-108.000.

Komeshima, Nobuyasu: See—  
Nakajima, Shohachi; and Komeshima, Nobuyasu, 4,959,460, Cl. 536-6.400.

Komiya, Ryohei: See—  
Yamamoto, Takemi; Komiya, Ryohei; Hatta, Naoyuki; Matsumoto, Yumio; and Sunda, Fumihiko, 4,959,682, Cl. 355-27.000.

Komorita, Hiroshi: See—  
Tanaka, Tadashi; Matsumura, Kazuo; Komorita, Hiroshi; and Mizuno, Nobuyuki, 4,959,507, Cl. 174-260.000.

Kondo, Megumu; Kamiya, Shuji; Fukuoka, Kazuhiko; Shinozaki, Masatsugu; and Sadamitsu, Hitoshi, to Hitachi Ltd.; and Hitachi Microcomputer Engineering. Data processing system employing two address translators, allowing rapid access to main storage by input/output units. 4,959,770, Cl. 364-200.000.

Kondo, Michio, to Brother Kogyo Kabushiki Kaisha. Optical fiber sensor. 4,958,929, Cl. 356-345.000.

Koniarek, Jan P.: See—  
Fischberg, Jorge; Liebovitch, Larry S.; and Koniarek, Jan P., 4,959,355, Cl. 514-23.000.

Konica Corporation: See—  
Haneda, Satoshi; Shoji, Hisashi; and Yoshino, Kunihisa, 4,959,669, Cl. 346-157.000.

Hidaka, Seiji; Ishihara, Takashi; Hamaguchi, Takehiko; Sugiyama, Nobuaki; and Taura, Kosuke, 4,959,796, Cl. 364-497.000.

Hung, Po-Chieh; and Kaneniwa, Tatsuya, 4,959,711, Cl. 358-80.000.

Kosugi, Akira; and Hanada, Kouichi, 4,958,821, Cl. 271-3.100.

Kurematsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, 4,959,122, Cl. 159-42.000.

Nishijima, Toyoki; and Onodera, Kaoru, 4,959,300, Cl. 430-546.000.

Konotsune, Shiro: See—  
Kunimune, Kouichi; Kutsuzawa, Yoshiya; and Konotsune, Shiro, 4,959,437, Cl. 528-26.000.

Konrad Doppelmayr & Sohn Maschinenfabrik Gesellschaft m.b.H. & Co. KG: See—  
Meindl, Bernd, 4,958,574, Cl. 104-88.000.

Konrad, Mathias; and Weber, Wolfgang, to Jean Walterscheid GmbH. Pre-assembly muff for the cutting or clamping ring of a pipe coupling. 4,958,859, Cl. 285-39.000.

Korach, Malcolm: See—  
Chakrabarti, Paritosh M.; Denison, John M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; Schwarz, Richard A.; and Simmons, Robert B., 4,959,208, Cl. 424-78.000.

Kormendy, Agoston: See—  
Toth, Laszlo P.; Kiss, Endre; Pasztor, Endre; Purebl, Gyorgy; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.

Kos, Antonides: See—  
Dijkema, Reinder; and Kos, Antonides, 4,959,462, Cl. 536-27.000.

Koster, Chester A. Oil spill recovery vessel. 4,959,143, Cl. 210-242.300.

Kosugi, Akira; and Hanada, Kouichi, to Konica Corporation. Recording sheet stacking apparatus in image recording system. 4,958,821, Cl. 271-3.100.

Kotter, Rodman W. Adaptive architectural cover panel system. 4,958,476, Cl. 52-745.000.

Koves, William J., to UOP. Downwardly forced particle bed for gas contacting. 4,959,198, Cl. 422-220.000.

Koya, Eitaro: See—  
Hagiwara, Yoshitoshi; Koya, Eitaro; Hayashi, Tetsuya; and Takeda, Yoshinobu, 4,959,276, Cl. 428-614.000.

Koyama, Takeshi: See—  
Suda, Yasuo; Arakawa, Kazuhiko; Ohtaka, Keiji; Koyama, Takeshi; and Ohnuki, Ichiro, 4,959,677, Cl. 354-402.000.

Koyo Seiko Co., Ltd.: See—  
Kohno, Masahito; and Nakamura, Yoshiyuki, 4,958,852, Cl. 280-775.000.

Shimizu, Shiro, 4,958,942, Cl. 384-486.000.

Kozai, Masafumi: See—  
Yoshioka, Masanori; and Kozai, Masafumi, 4,959,191, Cl. 264-529.000.

Kozhanov, Evgeny V.: See—  
Gross, Valery N.; Kozhanov, Evgeny V.; Aitkhodzhin, Murat A.; deceased; Beritashvili, David R.; Tverdokhlebov, Evgeny N.; and Georgiev, Georgy P., 4,959,134, Cl. 204-182.800.

Kozlowskyj, Wasi: See—  
Allaire, Jacky; and Kozlowskyj, Wasi, 4,958,507, Cl. 66-19.000.

Kozuki, Susumi: See—  
Takahashi, Koji; Kozuki, Susumi; Mogi, Hirokazu; Kawahara, Hideo; Arai, Hideyuki; Suzuki, Katsushi; Mabuchi, Toshiaki; and Kobayashi, Takashi, 4,959,728, Cl. 358-228.000.

Kraft General Foods, Inc.: See—  
Wyna, Clement R.; McGuire, Michael T.; and Frost, John R., 4,959,230, Cl. 426-102.000.

Kraft, William G.; and Morgan, Donna R., to Norwich Eaton Pharmaceuticals, Inc. Use of nitrofurantoin for the treatment and prophylaxis of gastrointestinal disorders. 4,959,384, Cl. 514-390.000.

Krakowiak, Krzysztof E.: See—  
Bradshaw, Jerald S.; Tarbet, Byron J.; Krakowiak, Krzysztof E.; Biernat, Jan F.; Bruening, Ronald L.; and Izatt, Reed M., 4,959,153, Cl. 210-670.000.

Krause, Hans J.: See—  
Lohberg, Peter; May, Arno; Krause, Hans J.; Oberdorfer, Dietmar; and Plueguett, Ulrich, 4,958,937, Cl. 374-16.000.

Krauss u. Reichert GmbH & Co.: See—  
Jung, Rolf, 4,958,819, Cl. 270-31.000.

Krebs, John L.: See—  
Wallick, Claude R., Jr.; Schmitt, Thomas J.; Bogart, Bruce E.; and Krebs, John L., 4,959,107, Cl. 148-13.000.

Kreinberg, Earl R., to AMP Incorporated. Power distribution adapter. 4,959,026, Cl. 439-651.000.

Krietzman, William D.: See—  
Smith, Terry L.; and Krietzman, William D., 4,958,427, Cl. 27-566.400.

Kristan, Louis L. Remotely operated submersible underwater suction apparatus. 4,959,146, Cl. 210-237.000.

Kroutil, Joseph C.: See—  
Kegelman, Jerry T.; Kroutil, Joseph C.; and Lusk, Rodney, 4,958,932, Cl. 356-383.000.

Kruck, Richard W.; and Cur, Omer N., to Whirlpool Corporation. Heavy gas-filled multilayer insulation panels and method of manufacture thereof. 4,959,111, Cl. 156-145.000.

Kruger, Martin: See—  
Wegner, Peter; Kruger, Martin; Johann, Gerhard; Rusch, Reinhart; Rees, Richard; Head, John; and Rowson, Graham, 4,959,094, Cl. 71-92.000.

Krupp Widia GmbH: See—  
von Haas, Rainer; and Jester, Willi, 4,958,968, Cl. 409-232.000.

Kubo, Nobuhiko, to Yamashita Denso Corporation. Method of adjusting light source position in convergence device employing spheroidal mirror. 4,958,909, Cl. 350-320.000.

Kuderer, Hubert, to Hewlett-Packard Company. Photodiode array spectrometer. 4,958,928, Cl. 356-328.000.

Kudoh, Yasuo; Tsuchiya, Sohji; Kojima, Toshikuni; Fukuyama, Masao; Yoshimura, Susumu; and Kuranuki, Kenji, to Matsushita Electric Industrial Co., Ltd. Solid electrolytic capacitor and method of manufacturing the same. 4,959,753, Cl. 361-525.000.

Kuenzel, Werner; and Vierkoetter, Peter, to Henkel Kommanditgesellschaft auf Aktien. Appliance for simultaneously dispensing both free-flowing and pourable substances. 4,958,749, Cl. 222-133.000.

Kugimoto, Hidenori, to Kabushiki Kaisha Kawai Gakki Seisakusho. Tuning method and apparatus for keyboard musical instrument. 4,958,550, Cl. 84-454.000.

Kugler, Stanley: See—  
Schwartz, Bradley N.; Kugler, Stanley; and Selg, Donald W., 4,958,938, Cl. 374-208.000.

Kuhbauch, Gerd, to Robert Bosch GmbH. Wiper device for a curved windshield of a vehicle. 4,958,405, Cl. 15-250.330.

Kuhla, Donald E.: See—  
Youssefieh, Raymond D.; Campbell, Henry F.; and Kuhla, Donald E., 4,959,485, Cl. 549-461.000.

Kuhn, Herbert: See—  
Moller, Alexander; Friedrich, Heinz; Kuhn, Herbert; and Winkler, Kurt, 4,959,478, Cl. 546-319.000.

Kukes, Simon G.; Gutberlet, Louis C.; and Hensley, Albert L., to Amoco Corporation. Two-catalyst hydrocracking process. 4,959,140, Cl. 208-59.000.

Kulpa, Walter J.: See—  
Dannatt, Hugh S.; Alesi, Thomas W., Jr.; and Kulpa, Walter J., 4,958,782, Cl. 242-75.430.

Kumar, Rajendra, to United States of America, National Aeronautics and Space Administration. Efficient detection and signal parameter estimation with application to high dynamic GPS receiver. 4,959,656, Cl. 342-418.000.

Kumasaka, Takao: See—  
Mitsuya, Tetsuaki; Kumasaka, Takao; Umeda, Takao; Hori, Yasuro; Shimokobe, Ikuo; and Hoshi, Nobuyoshi, 4,959,693, Cl. 355-290.000.

Kumura, Atsuhiko; Ishii, Ryuichi; Luo, Bing-Shan; Adachi, Meiro; Hamada, Kenji; and Fujita, Fumio, to National Federation of Agricultural Co-Operative Associations; and Nissan Chemical Industries. Method for increasing the yield of crops. 4,959,091, Cl. 71-77.000.

Kung, Patrick C.; and Goldstein, Gideon, to Ortho Pharmaceutical Corporation. Hybrid cell line for producing monoclonal antibody to a human monocyte antigen, antibody, and methods. 4,959,458, Cl. 530-387.000.

Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiro; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, to Eisai Co., Ltd. 1,4-benzodioxane derivatives. 4,959,376, Cl. 514-338.000.

Kunimune, Kouichi; Kutsuzawa, Yoshiya; and Konotsune, Shiro, to Chisso Corporation. Process for producing a low thermally expansive and highly adhesive silicon-containing polyimide and a precursor thereof. 4,959,437, Cl. 528-26.000.

Kunishi, Noriyuki: See—  
Ashida, Takashi; Kunishi, Noriyuki; and Yamamoto, Koji, 4,959,456, Cl. 528-371.000.

Kuntz, Robert J., to Hubbell Incorporated. Die casting apparatus for casting articles with an internally threaded bore. 4,958,676, Cl. 164-340.000.

Kunz, Walter: See—  
Zondler, Helmut; and Kunz, Walter, 4,959,096, Cl. 514-356.000.

Kupperman, David S.; Majumdar, Saurindranath; Faber, John F., Jr.; and Singh, J. P., to United States of America, Energy. Neutron apparatus for measuring strain in composites. 4,959,548, Cl. 250-390.090.

Kurachi, Yasuhiko; Mori, Kazumi; and Koizumi, Hisao, to Chubu Electric Power Company, Inc.; and Kabushiki Kaisha Toshiba. Storage type electric water heater having a closed circulation loop with a bubble pump. 4,959,526, Cl. 219-314.000.

Kuranuki, Kenji: See—  
Kudoh, Yasuo; Tsuchiya, Sohji; Kojima, Toshikuni; Fukuyama, Masao; Yoshimura, Susumu; and Kuranuki, Kenji, 4,959,753, Cl. 361-525.000.

Kuraray Company, Ltd.: See—  
Torihara, Masahiro; Tamai, Yoshin; Shiono, Manzo; and Tasaka, Kenji, 4,959,393, Cl. 514-724.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: See—  
Watanabe, Nobuhiko; and Sakagami, Teruo, 4,959,431, Cl. 526-261.000.

Kurematsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, to Konica Corporation. Apparatus for treating photographic process waste liquor. 4,959,122, Cl. 159-42.000.

Kures, Vasek J.: See—  
Chapelaine, Albert H.; Kures, Vasek J.; and Grey, Ronald T., 4,959,226, Cl. 426-3.000.

Kurihara, Takashi: See—  
Uchida, Koh; and Kurihara, Takashi, 4,958,695, Cl. 180-142.000.

Kuroda, Muneco: See—  
Naiki, Toshio; and Kuroda, Muneco, 4,959,664, Cl. 346-108.000.

Kuroda, Shigeaki; Oguni, Kensaku; Senshu, Takao; Terada, Hirokiyo; Nagai, Makoto; and Hanada, Masamichi, to Hitachi, Ltd. Air conditioner and air conditioning method. 4,958,500, Cl. 62-89.000.

Kurosawa, Norio: See—  
Shibata, Toshihiro; Kurosawa, Norio; and Kimura, Masaki, 4,959,173, Cl. 252-299.650.

Kurz, Jurgen, to Cooper Industries, Inc. Universal tool for soldering and de-soldering apparatus. 4,958,401, Cl. 15-104.160.

Kusaba, Yoshiaki; Matoba, Hiroyuki; and Yamada, Tsuneo, to Sumitomo Metal Industries, Ltd. Rolling method for parallel-flange steel shapes. 4,958,509, Cl. 72-225.000.

Kusui, Jun; Kawai, Masahiko; Odani, Yusuke; and Takeda, Yoshinobu, to Sumitomo Electric Industries, Ltd.; and Toyo Aluminium Kabushiki Kaisha. Method of forming large-sized aluminum alloy product. 4,959,195, Cl. 419-67.000.

Kusuki, Yoshihiro: See—  
Nakatani, Masayuki; Matsuo, Makoto; and Kusuki, Yoshihiro, 4,959,151, Cl. 210-640.000.

Kutsuzawa, Yoshiya: See—  
Kunimune, Kouichi; Kutsuzawa, Yoshiya; and Konotsune, Shiro, 4,959,437, Cl. 528-26.000.

Kutzner, Willi A. P.: See—  
Grosshauser, Heinrich K.; Kutzner, Willi A. P.; and Schneider, Georg, 4,958,561, Cl. 101-363.000.

Kuwa, Tadahi: See—  
Kanazawa, Yasunori; Nakamori, Yoshiyuki; Kuwa, Tadahi; Fujimoto, Nobuyuki; and Abe, Shinichi, 4,959,744, Cl. 360-133.000.

Kuwabara, Yasuo; Fujie, Naofumi; and Saeki, Takao, to Aisin Seiki Kabushiki Kaisha. Ultrasonic motor. 4,959,579, Cl. 310-323.000.

KVM Industriemaschinen A/S: See—  
Gregersen, Agner R., 4,959,003, Cl. 425-346.000.

Kwapiaz, Steven J., to United Technologies Automotive. Method and system for adjusting relay armatures. 4,959,784, Cl. 324-418.000.

Lahrot, Maxime; Feuillerat, Jean; and Valvy, Yves, to Aerospatiale Societe Nationale Industrielle. Process and device for injecting a matter in fluid form into a hot gaseous flow and apparatus carrying out this process. 4,958,767, Cl. 239-13.000.

Lacey, Raymond D.; and Bradley, William D., to Avdel Limited. Break-stem blind rivet. 4,958,971, Cl. 411-38.000.

Lacroix, Jean-Claude: See—  
Herbin, Patrick; and Lacroix, Jean-Claude, 4,959,118, Cl. 156-512.000.

Lacy, Robert M. Method of producing blocks of self-adhesive labels or the like and of applying the labels to a body. 4,959,115, Cl. 156-264.000.

Laditka, Alexander. Methods and apparatus for dispensing, mixing and applying coating constituents to traffic surfaces using tandem operated sets of rotary tools. 4,958,955, Cl. 404-75.000.

Lafferty, John J.; Demarinis, Robert M.; and Venslavsky, Joseph W., to SmithKline Beecham Corporation.  $\alpha$ -adrenergic receptor antagonists. 4,959,360, Cl. 514-217.000.

Lagarde, Gerard: See—  
Janssen, Sylvain; Fouinaud, Claude; and Lagarde, Gerard, 4,958,996, Cl. 418-152.000.

Lagares, Narciso C., to Metalquima, S.A. Machine for meat treatment and maceration with automatic loading and unloading. 4,958,410, Cl. 17-25.000.

Lagasse, Michael R.: See—  
Hurlbut, James P.; and Lagasse, Michael R., 4,958,593, Cl. 119-5.000.

Lagerwall, Sven T.: See—  
Clark, Noel A.; and Lagerwall, Sven T., 4,958,916, Cl. 350-350.00S.

Laitram Corporation, The: See—  
Lapeyre, James M.; Weber, Peter G.; and Greve, Christopher G., 4,958,720, Cl. 198-666.000.

Lake, Alan W., to Iscor Limited; and Scientific Construction CC. Process for the treatment of contaminated emulsion. 4,959,160, Cl. 252-340.000.

Lakey, Robert B.; and Graham, N. Bruce, to Marquee Foods, Incorporated. Microwave food packaging. 4,959,231, Cl. 426-111.000.

Lamiroux, Christian J., to MLR Electronique. Method for the radiolocalization of a vehicle carrying a receiving device, by measuring the differences between the times for receiving radio-frequency signals, and receiving device for carrying out this method. 4,959,655, Cl. 342-389.000.

Lampman, David A.: See—  
Brovost, Terrence J.; Lampman, David A.; and Foster, Kenneth S., 4,959,611, Cl. 324-309.000.

Landers, John D., Jr., to International Business Machines Corporation. Adapter for attaching I/O devices to I/O communications with alternating read and write modes link. 4,959,773, Cl. 364-200.000.

Lane, John D.: See—  
Buchner, Marc; Lane, John D.; Loparo, Ken; and Scheib, Thomas J., 4,959,767, Cl. 364-151.000.

Lang, Karl U.: See—  
Aquino, Agostino; and Lang, Karl U., 4,958,556, Cl. 99-355.000.

Aquino, Agostino; and Lang, Karl U., 4,959,235, Cl. 426-281.000.

Lang, Thomas, to Fresenius Ag. Catheter for organ perfusion. 4,959,057, Cl. 604-264.000.

Langenberg, Hans; and Wessel, Jurgen, to Blohm + Voss AG. Water craft with guide fins. 4,959,032, Cl. 440-66.000.

Langer, Ruth. Connecting arrangement for horizontal scaffolding supports. 4,958,702, Cl. 187-95.000.

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- Maness, Darren K.: See—  
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Marcus, Leon, to General Motors Corporation. Method and apparatus for wear testing anodized surfaces, 4,958,511, Cl. 73-7.000.

Mares, Gyula: See—  
Toth, Laszlo P.; Kiss, Endrene; Pasztor, Endre; Purebl, Gyoray; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.

Marino, Philip F., to Eastman Kodak Company. Alignment sensing and correcting assembly for an optical element, 4,959,531, Cl. 250-201.900.

Mark, David F.; Lin, Leo S.; Yu Lu, Shi-da; and Wang, Alice M., to Cetus Corporation. Cysteine-depleted mucins of biologically active proteins, 4,959,314, Cl. 435-69.100.

Marketing Displays, Inc.: See—  
Hillstrom, David U.; Palmer, Randall; and Hillstrom, Brian J., 4,958,458, Cl. 40-156.000.

Markow, Paul A.; and Nolle, William, to Acustar, Inc. Winding machine for woven crossed-coil air core gauge, 4,958,777, Cl. 242-7.110.

Markowski, Robert G.: See—  
Robarge, Dean A.; Morby, John A.; M'Sadoques, Andre J.; and Markowski, Robert G., 4,959,514, Cl. 200-144.00R.

Maron, Robert, to Teleco Oilfield Services Inc. Apparatus for measuring weight, torque and side force on a drill bit, 4,958,517, Cl. 73-151.000.

Marquee Foods, Incorporated: See—  
Lakey, Robert B.; and Graham, N. Bruce, 4,959,231, Cl. 426-111.000.

Marrash, Jeffrey J.: See—  
Manlove, Gregory J.; Marrash, Jeffrey J.; and Kennedy, Richard A., 4,959,859, Cl. 381-10.000.

Marrow, Brett; and Harris, Jim. Power driven golf hole cutting apparatus, 4,958,688, Cl. 172-22.000.

Mary GB Ltd.: See—  
Hall, Simon R.; and Wills, Garry D., 4,959,238, Cl. 426-447.000.

Marschner, Charles F. Holding device and shearing device used in concert for hand held shearing of thin-wall tubes, 4,958,434, Cl. 30-101.000.

Marshall, Willie J. Rotary hair trimmer, 4,958,432, Cl. 30-29.300.

Marsland, Anne J.: See—  
Mangler, Robert J.; Marsland, Anne J.; Podd, George O.; and Schweizer, Russell, 4,958,453, Cl. 40-352.000.

Martel, Bernard: See—  
Le Mer, Joseph; and Martel, Bernard, 4,958,765, Cl. 236-20.00R.

Martel, Yvan, to Canada, Her Majesty the Queen in Right of, as represented by the Minister of National Defence of Her Majesty's Canadian Government. Non-ricocheting projectile and method of making same, 4,958,572, Cl. 102-529.000.

Martin, Berthold: See—  
Klotz, James R.; Mikel, Steven A.; Frait, John A.; and Martin, Berthold, 4,959,043, Cl. 475-230.000.

Nogle, Thomas D.; Martin, Berthold; and O'Brien, Thomas M., 4,958,753, Cl. 192-85.0AA.

Martin, Frederick L., to Motorola, Inc. Dual state phase detector having frequency steering capability, 4,959,617, Cl. 328-133.000.

Martin, Hans; and Stutz, Gerhard, to Sueddeutsche Kuehlerfabrik. Fluid friction clutch with a temperature control, 4,958,710, Cl. 192-58.00B.

Martin, Jeff L.: See—  
Brown, David R.; and Martin, Jeff L., 4,959,071, Cl. 623-20.000.

Martin, LaVerne L. Bar-b-qe grill scraper, 4,958,403, Cl. 15-236.070.

Martin, William G.: See—  
Montgomery, Terry G.; and Martin, William G., 4,958,485, Cl. 57-210.000.

Martischius, Franz-Dieter; Rath, Hans P.; Vogel, Hans-Henning; Greif, Norbert; Oppenlaender, Knut; Denzinger, Walter; and Hartmann, Heinrich, to BASF Aktiengesellschaft. Fuels for gasoline engines, 4,959,077, Cl. 44-62.000.

Marui, Kuniyoshi, to Kabushiki Kaisha Toshiba. Radio telephone apparatus, 4,959,850, Cl. 379-58.000.

Marumo, Kuniomi: See—  
Uchida, Hiroshi; Marumo, Kuniomi; and Chaen, Shigehiro, 4,959,451, Cl. 528-272.000.

Maruyama, Iwao; and Uzuyama, Kimitake, to Honda Giken Kogyo Kabushiki Kaisha. Method and apparatus for fastening parts securely in place using a band, 4,959,521, Cl. 219-121.630.

Massachusetts Institute of Technology: See—  
Ganz, Matthew W., 4,959,653, Cl. 342-17.000.

Weaver, James C.; Bliss, Jonathan G.; Williams, Gregory B.; Powell, Kevin T.; and Harrison, Gail I., 4,959,301, Cl. 435-5.000.

Masuda, Isao; Taomo, Toshio; and Sasaki, Fujio, to Kioritz Corporation. Connector tank means for cap for mouth of tank, 4,958,745, Cl. 220-375.000.

Masuda, Yoshiji, to Eiwa Industry Co., Ltd. Container for accommodating string-like articles and taking out the same, 4,958,733, Cl. 206-409.000.

Masui, Shoichi: See—  
Yoshiura, Hiroshi; Chusho, Takeshi; Masui, Shoichi; and Ohata, Hideo, 4,959,799, Cl. 364-513.000.

Masuoka, Fujio: See—  
Momodomi, Masaki; Masuoka, Fujio; Shiota, Riichiro; Itoh, Yasuo; Ohuchi, Kazunori; and Kiraawa, Ryouhei, 4,959,812, Cl. 365-185.000.

Matarrese, Savino: See—  
Biglione, Gianfranco; and Matarrese, Savino, 4,959,434, Cl. 526-342.000.

Mathellier, Lionel, to Drafest Industries Limited. Sealing and trimming, 4,959,081, Cl. 49-490.000.

Matier, William L.: See—  
Patil, Ohanshyam; Matier, William L.; and Mai, Khuong H. X., 4,959,390, Cl. 514-522.000.

Matoba, Hiroyuki: See—  
Kusaba, Yoshiaki; Matoba, Hiroyuki; and Yamada, Tsuneo, 4,958,509, Cl. 72-225.000.

Matsuda, Motonobu; Tanaka, Yoshihiro; Nakanishi, Motohiro; Taniguchi, Nobuyuki; and Ootsuka, Hiroshi, to Minolta Camera Kabushiki Kaisha. Control device for use in a camera having an objective lens, 4,959,676, Cl. 354-400.000.

Matsui, Toshio: See—  
Johdai, Akiyoshi; Kinoshita, Keichi; Yamashita, Hiroki; and Matsui, Toshio, 4,958,820, Cl. 270-52.000.

Matsuki, Toshitsugu: See—  
Ohkawa, Kazumi; Matsuki, Toshitsugu; and Saiki, Noritsugu, 4,959,442, Cl. 528-168.000.

Matsumoto, Kaname: See—  
Tanaka, Yasuzo; Matsumoto, Kaname; and Yamada, Yukio, 4,959,279, Cl. 428-660.000.

Matsumoto, Osamu: See—  
Shimizu, Yasuhiko; Kobayashi, Hiroaki; and Matsumoto, Osamu, 4,958,762, Cl. 228-1.100.

Matsumoto, Susumu: See—  
Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seichi; Umeki, Yoichi; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.

Matsumoto, Takashi: See—  
Kashiwagi, Masayuki; and Matsumoto, Takashi, 4,959,550, Cl. 250-492.300.

Matsumoto, Tokikazu. Digital oscillation apparatus, 4,959,616, Cl. 328-14.000.

Matsumoto, Yumio; Kimura, Yasuo; Takagi, Osamu; and Takemoto, Takatoshi, to Brother Kogyo Kabushiki Kaisha. Sheet heating device, 4,959,529, Cl. 219-388.000.

Matsumoto, Yumio: See—  
Ueda, Masashi; Makino, Kazumasa; Matsumoto, Yumio; Sago, Akira; Hayakawa, Kiyoharu; and Takagi, Osamu, 4,958,781, Cl. 242-71.700.

Yamamoto, Takemi; Komiya, Ryohei; Hata, Naoyuki; Matsumoto, Yumio; and Sunda, Fumihiro, 4,959,682, Cl. 355-27.000.

Matsumura, Kazuo: See—  
Tanaka, Tadashi; Matsumura, Kazuo; Komori, Hiroshi; and Mizunoya, Nobuyuki, 4,959,507, Cl. 174-260.000.

Matsumura, Koichi; Kimura, Hiroshi; Mise, Noritoshi; and Miki, Hiroshi, to Takeda Chemical Industries, Ltd. D-glucosaccharoascorbic acid, 4,959,483, Cl. 549-315.000.

Matsuoka, Makoto: See—  
Nakatani, Masayuki; Matsuoka, Makoto; and Kusuki, Yoshihiro, 4,959,151, Cl. 210-640.000.

Matsuoka, Noriko; and Mitome, Yukio, to NEC Corporation. Speech synthesizer using shift register sequence generator, 4,959,866, Cl. 381-51.000.

Matsuo Sangyo Co., Ltd.: See—  
Kawamura, Yuzo; and Nakagawa, Sigeo, 4,958,678, Cl. 164-461.000.

Matsuoka, Yukito; Ishida, Tsuyoshi; and Iwamoto, Masanori, to Kabushiki Kaisha Toshiba. Apparatus for conveying articles, 4,958,716, Cl. 198-346.100.

Matsuoka, Isamu; and Sato, Noboru, to Honda Giken Kogyo Kabushiki Kaisha. Electrocoating system with multistage voltage application to prevent electrode coating, 4,959,137, Cl. 204-299.00C.

Matsusaka, Yoshiki; and Ushiki, Susumu, to Oki Electric Industry Co., Ltd. Printed circuit board, 4,959,510, Cl. 174-261.000.

Matsushita Electric Industrial Co., Ltd.: See—  
Fujio, Katuharu, 4,958,993, Cl. 418-55.300.

Hatada, Kenzo; and Nagao, Koichi, 4,959,590, Cl. 315-169.300.

Honjo, Masahiro, 4,959,620, Cl. 329-327.000.

Ichikawa, Toru; Nishihata, Hideo; Kagoroku, Nobuo; and Ito, Shotaro, 4,958,504, Cl. 62-244.000.

Kameoka, Fusahiro; Omoto, Noriaki; and Shogaki, Toshihiro, 4,959,625, Cl. 332-135.000.

Kimura, Tadashi; Ikeda, Tanejiro; Tachihara, Hisaaki; and Oshima, Kunio, 4,959,748, Cl. 361-323.000.

Kudoh, Yasuo; Tsuchiya, Sohji; Kojima, Toshikuni; Fukuyama, Masao; Yoshimura, Susumu; and Kuranuki, Kenji, 4,959,753, Cl. 361-525.000.

Morotomi, Noriaki; Endo, Yasumasa; Emura, Yoshinori; Asaka, Nobuyoshi; and Inoue, Hideo, 4,959,713, Cl. 358-108.000.

Nakano, Genichi; Higami, Sadao; and Hashimoto, Yasutaka, 4,958,501, Cl. 62-125.000.

Seima, Toshiaki; Yamamoto, Susumu; and Nakano, Hiromitsu, 4,958,948, Cl. 388-812.000.

Matsushita Electric Works, Ltd.: See—  
Iwamoto, Hironori; and Ikeda, Shigeyuki, 4,958,628, Cl. 128-36.000.

Kimoto, Teisuya; and Nakagawa, Masashi, 4,959,537, Cl. 250-223.00B.

Matsuura, Toshitaka: See—  
Takami, Akio; Matsuura, Toshitaka; and Furusaki, Keizo, 4,958,514, Cl. 73-25.030.

Matsuyama, Yukio: See—  
Tatebe, Yu; Yasui, Hiroshi; Matsuyama, Yukio; and Takahashi, Hiroji, 4,959,030, Cl. 439-67.000.

Matter & Siegmund AG: See—  
Burtscher, Heinz; Schmidt-Ott, Andreas; and Siegmund, Hans-Christoph, 4,959,010, Cl. 431-12.000.

Matteucci, Mark D.: See—  
Froehler, Brian C.; and Matteucci, Mark D., 4,959,463, Cl. 536-27.000.

Mathews, Thomas R.: See—  
Crews, Phillip; Mathews, Thomas R.; and Inman, Wayne D., 4,959,370, Cl. 514-280.000.

Mattson, Roy D. Ball and socket attachment for fluid spray gun plunger, 4,959,159, Cl. 239-526.000.

Matzner, Markus; and Papuga, Donald M., to Amoco Corporation. Amino-terminated poly(aryl ether ketones), 4,959,424, Cl. 525-471.000.

Mauleon, Jean-Louis; and Sigaud, Jean-Bernard, to C. Compagnie de Raffinage et de Distribution. Fluidized-bed catalyst regeneration, 4,959,334, Cl. 502-43.000.

May, Arno: See—  
Lohberg, Peter; May, Arno; Krause, Hans J.; Oberdorfer, Dietmar; and Plueguett, Ulrich, 4,958,937, Cl. 374-16.000.

May & Baker Limited: See—  
Cook, David C.; Hart, Terance W.; McLay, Iain M.; Palfreyman, Malcolm N.; Walsh, Roger J.; and Aloup, Jean-Claude, 4,959,385, Cl. 514-431.000.

Maya, Rachel. Portable sun shade, 4,958,652, Cl. 135-87.000.

Mazda Motor Corporation: See—  
Hitomi, Mitsuo; Sasaki, Junso; Takai, Akira; Umezono, Kazuaki; and Hinatake, Fumio, 4,958,606, Cl. 123-316.000.

Iwaki, Tetsuhiro; and Seikaku, Hazime, 4,958,883, Cl. 296-152.000.

Tanaka, Hideo; and Umemura, Kyoichi, 4,959,042, Cl. 474-134.000.

McAnalley, Bill H., to Carrington Laboratories Inc. Processes for preparation of aloe products produced thereby and compositions thereof, 4,959,214, Cl. 424-195.100.

McAnany, Robert E.: See—  
Fuchs, Harold E.; and McAnany, Robert E., 4,959,129, Cl. 204-28.000.

McClellan, Paul G.: See—  
Owens, R. Larry; and McClellan, Paul G., 4,959,251, Cl. 428-41.000.

McCown, Jack T.: See—  
Aronson, Michael P.; Cardinali, Martin S.; and McCown, Jack T., 4,959,179, Cl. 252-135.000.

McCrane, David P. Safety glove, 4,958,384, Cl. 2-162.000.

McCullough, Francis P., Jr.; and Novak, Leo R., to Dow Chemical Company, The. Fluorinated non-graphitic carbonaceous films and foams, 4,959,261, Cl. 428-312.200.

McCurry, Patrick M.: See—  
Ravi, Prasad S.; Kieck, Hunter L.; McCurry, Patrick M.; and Skogberg, David J., 4,959,468, Cl. 536-127.000.

McDermott, Mark W.; and Carter, Ernest A., to Motorola, Inc. MOS output buffer with reduced supply line disturbance, 4,959,561, Cl. 307-443.000.

McDonald, Henry H. Intraocular lens implantation, 4,959,070, Cl. 623-6.000.

McDonnell Douglas Corporation: See—  
Kegelman, Jerry T.; Kroutil, Joseph C.; and Lusk, Rodney, 4,958,932, Cl. 356-383.000.

McGowan, John B., Sr.: See—  
Hagan, Thomas E.; and McGowan, John B., Sr., 4,958,657, Cl. 137-513.500.

McGrane, Eugene W., to Homac Mfg. Company. Submersible splice apparatus, 4,959,508, Cl. 174-84.00C.

McGraw, Philip W.; Ward, Eldon L.; and Edens, Michael W., to Dow Chemical Company, The. Esterified polyglycol lubricants for refrigeration compressors, 4,959,169, Cl. 252-68.000.

McGuire, Michael T.: See—  
Wys, Clement R.; McGuire, Michael T.; and Frost, John R., 4,959,230, Cl. 426-102.000.

McIntosh, James L., to Tensor Development, Inc. System for tightening threaded fastener assemblies, 4,959,797, Cl. 364-508.000.

McIntyre, David G.: See—  
Lemnios, Zachary J.; McIntyre, David G.; Lau, Chung-Lim; and Williams, Dennis A., 4,959,705, Cl. 357-51.000.

McIver, Robert T., Jr.; and Hunter, Richard L., to Ionspec Corporation; and Knobbe, Martens, Olson & Bear. Method and apparatus for acceleration and detection of ions in an ion cyclotron resonance cell, 4,959,343, Cl. 250-291.000.

McKinlay, Peter R., to Amcor Limited. Shear stiffness tester, 4,958,522, Cl. 73-847.000.

McKinnon, Gordon. Simulated marble, 4,959,250, Cl. 428-15.000.

McLay, Iain M.: See—  
Cook, David C.; Hart, Terance W.; McLay, Iain M.; Palfreyman, Malcolm N.; Walsh, Roger J.; and Aloup, Jean-Claude, 4,959,385, Cl. 514-431.000.

McNabb, Scott: See—  
Fibey, Jean-Luc; Hazel, Bruce; Di Vincenzo, Antonio; Tinkler, Mark; and McNabb, Scott, 4,959,523, Cl. 219-124.340.

McNeil, Sandy: See—  
Petty, John; and McNeil, Sandy, 4,959,506, Cl. 174-65.00R.

Mead Corporation, The: See—  
Spaner, William S., 4,958,739, Cl. 211-153.000.

Wood, Prentice J.; and Calvert, Rodney K., 4,958,734, Cl. 206-435.000.

Meade, Alan J.; and Smith, Paul W., to Simplimatic Engineering Company. Conveyor guide railing assembly, 4,958,725, Cl. 198-836.100.

Mechanical Technology Incorporated: See—  
Corey, John A., 4,958,496, Cl. 60-521.000.

McCreedy, Henry E., III: See—  
O'Neal, Glenn B.; Baker, Quentin A.; McCreedy, Henry E., III; and Terna, Daniele, 4,958,605, Cl. 123-300.000.

Medalart Incorporated: See—  
Minet, Ronald G.; Tsotais, Theodore T.; and Benson, Sidney W., 4,959,202, Cl. 423-502.000.

Medtronic, Inc.: See—  
Duggan, Stephen R., 4,958,632, Cl. 128-419.0PG.

Meeker, Paul K., to Spalding & Evenflo Co., Inc. Infant carrier with hooks for use with shopping carts, 4,958,887, Cl. 297-250.000.

Mehrotra, Pankaj K.; and Billman, Elizabeth R., to Kennametal Inc. Alumina-zirconia-silicon carbide-magnesia cutting tools, 4,959,331, Cl. 501-89.000.

Mehrotra, Pankaj K.; and Billman, Elizabeth R., to Kennametal Inc. Alumina-zirconia-carbide whisker reinforced cutting tools, 4,959,332, Cl. 501-89.000.

Meier, Gerhard: See—  
Leiber, Heinz; Klinker, Walter; and Meier, Gerhard, 4,958,704, Cl. 188-285.000.

Meier, Lothar: See—  
Eichenauer, Herbert; Leitz, Edgar; Ott, Karl-Heinz; Lindner, Christian; Meier, Lothar; and Billinger, Otto, 4,959,410, Cl. 525-67.000.

Meikrantz, David H., to United States of America, Energy. Method for separating disparate components in a fluid stream, 4,959,158, Cl. 210-787.000.

Meindl, Bernd, to Konrad Doppelmayr & Sohn Maschinenfabrik Gesellschaft m.H. & Co. KG. Cable transport system with garaging of carriers, 4,958,574, Cl. 104-88.000.

Meiri, Samuel: See—  
Willits, Samuel P.; Meiri, Samuel; and Muckerheide, Jon C., 4,958,824, Cl. 271-11.000.

Melzig, Manfred, to Optische Werke G. Rodenstock. Photochrome spiroindoline-oxazines, 4,959,471, Cl. 544-71.000.

Mendenhall, David L., to Holbrook-Patterson, Inc. Rest cot assembly, 4,958,390, Cl. 5-110.000.

Menendez, Alfredo S. Lapping machine, 4,958,464, Cl. 51-241.0VS.

Menzin, Marvin: See—  
Swain, Eugene A.; Menzin, Marvin; Agranat, Edward A.; Cofek, Henry R.; and Fisher, Daniel J., 4,959,109, Cl. 156-73.400.

Mercatali, Lucinao: See—  
Brunetto, Lari; and Mercatali, Lucinao, 4,959,046, Cl. 493-382.000.

Merc & Co., Inc.: See—  
Muir, Larry A., 4,959,382, Cl. 514-378.000.

Mercola, Gerald K.; and Huang, Shih-Hsiung, to ICS Electronics Corporation. Data transmission method and bus extender, 4,959,833, Cl. 371-32.000.

Mereyala, Hari B.: See—  
Frei, Bruno; Mereyala, Hari B.; O'Sullivan, Anthony C.; Sato, Kazuo; and Yanai, Toshiaki, 4,959,386, Cl. 514-450.000.

Merlette, John. Foot prosthesis and method of making same, 4,959,073, Cl. 623-55.000.

Merrell Dow Pharmaceuticals Inc.: See—  
Robinson, Keith M.; Mao, Simon J. T.; and Jackson, Richard L., 4,959,392, Cl. 514-712.000.

Mestek, Inc.: See—  
Lentz, Gary J.; and Almaguer, Michael J., 4,958,555, Cl. 98-121.100.

Metallurgie Hoboken-Overpelt: See—  
Van Camp, Maurits C.; Wattel, Philippe M.; and Delvaux, Andre L., 4,959,085, Cl. 55-72.000.

Metalsquima, S.A.: See—  
Lagares, Narciso C., 4,958,410, Cl. 17-25.000.

Metrologic Instruments, Inc.: See—  
Khowles, Carl H., 4,958,894, Cl. 350-6.600.

Mettler, Hans P.: See—  
Mills, Lester; Mettler, Hans P.; Previdoli, Felix; and Moulin, Francois, 4,959,475, Cl. 544-324.000.

Metzger, John R.: See—  
Kraly, Patrick S.; Metzger, John R.; and Smith, Randall K., 4,959,633, Cl. 338-22.00R.

Meyer, James M.; Schmidt, David A.; and Donner, Peter M., to Imago Quastus, Inc. Video storage cabinet, 4,959,582, Cl. 312-307.000.

Meyer, Norbert: See—  
Schwalge, Barbara; Plath, Peter; Eicken, Karl; Rueb, Lothar; Wuerzer, Bruno; Westphalen, Karl-Otto; and Meyer, Norbert, 4,959,098, Cl. 71-95.000.

Meyer, Pieter N. Suspension system for vertical blinds, 4,958,672, Cl. 160-168.100.

Meyer, Rolf-Volker; Dhein, Rolf; Wandel, Martin; Selbeck, Harald; Fahlner, Friedrich; Heinz, Hans-Detlef; and Muller, Peter-Rolf, to Bayer Aktiengesellschaft. Alpha-amino-epsilon-caprolactam-modified polyamide preparation, 4,959,452, Cl. 528-328.000.

Meyer, Roth & Pastor Maschinenfabrik GmbH: See—  
Exner, Karl-Christoph; Reichow, Franz; and Becker, Horst, 4,959,519, Cl. 219-110.000.

Meyers, Theodore W., to Tuf-Tite, Inc. Gas baffle device for on-site waste disposal systems, 4,959,145, Cl. 210-532.200.



Meyn, Cornelis. Device for removing the craw of slaughtered poultry. 4,958,408, Cl. 17-11.000.

Michel, Alan D.: See—  
Kern, Ronald J.; Michel, Alan D.; and Powell, William V., Jr., 4,959,852, Cl. 379-70.000.

Michel, Alfred: See—  
Heller, Rudolf; and Michel, Alfred, 4,958,817, Cl. 269-323.000.

Michelson, Gary K. Cannula having side opening. 4,959,058, Cl. 604-280.000.

Michaas, Claus G. System for desalinization of saltwater. 4,959,127, Cl. 202-177.000.

Micic, Ljubomir; and Flamm, Peter M., to Deutsche ITT Industries GmbH. Remote control system with menu driven function selection. 4,959,721, Cl. 358-194.100.

Micro Encoder, Inc.: See—  
Andremo, Nils I., 4,959,615, Cl. 324-690.000.

Micro Vascular Systems, Inc.: See—  
Wallach, Donald F. H., 4,959,341, Cl. 502-404.000.

Micron Technology, Inc.: See—  
Lee, Ruojia R.; and Durcan, D. M., 4,959,325, Cl. 437-30.000.

Microtek Lab., Inc.: See—  
Chen, Philip L., 4,958,826, Cl. 271-124.000.

Midmark Corporation: See—  
Chaney, David B.; Oldiges, John H.; and Milbourn, Bart L., 4,958,816, Cl. 269-328.000.

Midwest Power Concepts, Ltd.: See—  
Fonseca, Dwayne, 4,958,598, Cl. 123-1.00A.

Mies, Eric W.: See—  
Tyne, Arthur R.; and Mies, Eric W., 4,958,905, Cl. 350-96.210.

Miida, Takashi; Murayama, Jin; Tamada, Kazukiyo; and Kagechika, Takashi, to Fuji Photo Film Co., Ltd. Automatic focusing adjusting device. 4,959,726, Cl. 358-227.000.

Mikel, Steven A.: See—  
Klotz, James R.; Mikel, Steven A.; Frait, John A.; and Martin, Berthold, 4,959,043, Cl. 475-230.000.

Miki, Hiroshi: See—  
Matsumura, Koichi; Kimura, Hiroshi; Mise, Noritoshi; and Miki, Hiroshi, 4,959,483, Cl. 549-315.000.

Miki, Yoshiaki: See—  
Ueda, Tsunehisa; Miyazaki, Kouji; Natsuume, Tadao; and Miki, Yoshiaki, 4,959,207, Cl. 424-76.100.

Milbourn, Bart L.: See—  
Chaney, David B.; Oldiges, John H.; and Milbourn, Bart L., 4,958,816, Cl. 269-328.000.

Milburn, Gary L.; Rabbie, Judith; and Houta, Thomas M., to Syntex (U.S.A.) Inc. Assay for antigens by binding immune complexes to solid supports free of protein and non-ionic binders. 4,959,303, Cl. 435-7.000.

Milner, Richard C. Pet restraint. 4,958,597, Cl. 119-109.000.

Miles Inc.: See—  
Woodrum, David L., 4,959,305, Cl. 435-7.000.

Miles, Peter J.: See—  
Dunk, Paul; Hindin, Roger M.; and Miles, Peter J., 4,959,264, Cl. 428-331.000.

Miller, David A. B.: See—  
Lentine, Anthony L.; and Miller, David A. B., 4,959,534, Cl. 250-213.00A.

Miller, Joseph P., to Compaq Computer Corporation. Negative feedback circuit to control the duty cycle of a logic system clock. 4,959,557, Cl. 307-265.000.

Miller, Robert R., II: See—  
Erving, Richard H.; and Miller, Robert R., II, 4,959,857, Cl. 379-390.000.

Miller, Ronald L. Vehicle deceleration warning apparatus. 4,959,634, Cl. 340-467.000.

Miller, Russell S.: See—  
Johnson, Neil A.; Miller, Russell S.; and Hunter, Gordon B., 4,959,841, Cl. 373-10.000.

Miller, Wilbur T.; Calamito, Dominic P.; and Pusch, Richard H., to Hitco. Woven multi-layer angle interlock fabrics having fill weaver yarns interwoven with relatively straight extending warp yarns. 4,958,663, Cl. 139-384.00R.

Millhone, Ralph S.: See—  
Nguyen, Tanh V.; Davenport, C. Brent; Stevens, Christopher E.; Reis, John C.; and Millhone, Ralph S., 4,958,684, Cl. 166-252.000.

Mills, Lester; Mettler, Hans P.; Previdoli, Felix; and Moulin, Francois, to Lonza Ltd. Process for the production of 2,4-diamino-6-piperidinyl-pyrimidine-3-N-oxide. 4,959,475, Cl. 544-324.000.

Milner, Nigel E.: See—  
Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, 4,959,480, Cl. 548-262.400.

Milwaukee Electric Tool Corporation: See—  
Palm, Bernhard, 4,958,840, Cl. 279-62.000.

Minami, Norio: See—  
Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiko; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, 4,959,376, Cl. 514-338.000.

Minamitaka, Junichi; Sato, Kunio; and Ino, Mayumi, to Casio Computer Co., Ltd. Apparatus for extracting envelope data from an input waveform signal and for approximating the extracted envelope data. 4,958,552, Cl. 84-603.000.

Minamitani, Hiromu; Yano, Norio; Ikezawa, Atsushi; Kanayama, Toshio; Ushijima, Takashi; Teroka, Masao; and Ishikawa, Osamu, to Cosmo Oil Co., Ltd.; Dow Corning Kabushiki Kaisha; and To-chigafujisangyo Kabushiki Kaisha. Fluid composition for use in viscous coupling. 4,959,166, Cl. 232-327.00E.

Minatronics Corporation: See—  
Wilson, Edwin P., 4,959,635, Cl. 340-568.000.

Minet, Ronald G.; Tsotsis, Theodore T.; and Benson, Sidney W., to Medalert Incorporated. Recovery of chlorine from hydrogen chloride by carrier catalyst process. 4,959,202, Cl. 423-502.000.

Minnesota Mining and Manufacturing Company: See—  
Lea, Bernard A.; Burrows, Ronald W.; Hellings, Thomas D. G.; Barlow, Charles G.; and Skoog, Ivan H., 4,959,294, Cl. 430-204.000.

Palazzotto, Michael C., 4,959,297, Cl. 430-322.000.

Wood, Leigh E.; and Noreen, Allen L., 4,959,265, Cl. 428-343.000.

Mino, Masayuki; and Yamada, Osamu, to Minolta Camera Kabushiki Kaisha. Image signal processing method and apparatus with elongated picture elements. 4,959,736, Cl. 358-471.000.

Minolta Camera Kabushiki Kaisha: See—  
Hayashi, Yuji; Sakakibara, Susumu; and Maeda, Katsumi, 4,959,692, Cl. 355-253.000.

Ito, Hideo, 4,959,684, Cl. 355-55.000.

Johdai, Akiyoshi; Kinoshita, Keichi; Yamashita, Hiroki; and Matsui, Toshio, 4,958,820, Cl. 270-52.000.

Kato, Akio, 4,959,685, Cl. 355-72.000.

Matsuda, Motonobu; Tanaka, Yoshihiro; Nakanishi, Motohiro; Taniguchi, Nobuyuki; and Ootsuka, Hiroshi, 4,959,676, Cl. 354-400.000.

Mino, Masayuki; and Yamada, Osamu, 4,959,736, Cl. 358-471.000.

Naiki, Toshio; and Kuroda, Muneco, 4,959,664, Cl. 346-108.000.

Nakatani, Munehiro, 4,959,737, Cl. 358-475.000.

Saito, Naomasa, 4,958,828, Cl. 271-186.000.

Ueda, Toshihiko; Tutiya, Koujiro; Yoshida, Kazuyuki; and Yagoto, Mitsutoshi, 4,959,824, Cl. 369-44.140.

Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,959,679, Cl. 354-419.000.

Mips Computer Systems, Inc.: See—  
Weber, Larry B.; Hansen, Craig C.; Riordan, Thomas J.; and Przybylski, Steven A., 4,959,779, Cl. 364-200.000.

Mise, Noritoshi: See—  
Matsumura, Koichi; Kimura, Hiroshi; Mise, Noritoshi; and Miki, Hiroshi, 4,959,483, Cl. 549-315.000.

Misura, Michael S.; and Sare, Edward J., to PPG Industries, Inc. Cyclohexenic additives for producing polycarbonate polymers of high refractive index and low yellowness. 4,959,429, Cl. 526-230.500.

Mita, Yoshiharu: See—  
Iwaki, Hiroshi; Mita, Yoshiharu; Miyazaki, Jiro; Suto, Akihiko; Hirose, Satoshi; and Renbutsu, Tadashi, 4,958,823, Cl. 271-9.000.

Mitchell, Dennis R.: See—  
Lloyd, Graham P.; and Mitchell, Dennis R., 4,959,511, Cl. 178-18.000.

Mitchell, William S., to Precision Porous Pipe, Inc. Process for making uniform porosity flexible irrigation pipe. 4,958,770, Cl. 239-145.000.

Mitchinson, James C.: See—  
Skratic, Damir M. J.; Mitchinson, James C.; and Graham, John A., 4,959,228, Cl. 426-11.000.

Mitome, Yukio: See—  
Matsuo, Noriko; and Mitome, Yukio, 4,959,866, Cl. 381-51.000.

Mitsubishi Denki Kabushiki Kaisha: See—  
Chiba, Kazuhiro; and Bamba, Noriko, 4,959,663, Cl. 346-76.0PH.

Itoh, Hiroki, 4,959,242, Cl. 427-38.000.

Kobayashi, Toshio; Uchikawa, Fusaoki; and Nomura, Kenji, 4,959,347, Cl. 505-1.000.

Kobayashi, Yousuke; and Fukazawa, Keiichi, 4,958,950, Cl. 400-629.000.

Morishita, Mitsuhiro; Ueta, Kosaku; and Yasukawa, Takeshi, 4,959,787, Cl. 364-424.050.

Nishimura, Shinji, 4,959,595, Cl. 318-138.000.

Ohashi, Yutaka, 4,958,615, Cl. 123-617.000.

Okamoto, Tatsu; and Ohsaki, Akihiko, 4,959,329, Cl. 437-187.000.

Shinichi, Sato, 4,959,698, Cl. 357-23.600.

Uchinami, Masanobu; Takahashi, Toshihisa; Inoue, Hitoashi; Moronaga, Takahiro; and Nishida, Shinichi, 4,958,611, Cl. 123-479.000.

Watanabe, Jinzo, 4,959,709, Cl. 357-23.600.

Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 4,958,538, Cl. 74-866.000.

Yasumoto, Kazuhiro; and Hagiwara, Ippei, 4,959,571, Cl. 310-67.00R.

Mitsubishi Jukogyo K.K.: See—  
Sato, Shinji; Isomichi, Kanji; Ogawa, Hiroshi; Yamashita, Toshio; and Funahashi, Nobuhiro, 4,958,502, Cl. 62-126.000.

Mitsubishi Kasei Corporation: See—  
Hirahara, Takuji; Nukui, Masahiro; and Tanaka, Katsuji, 4,959,421, Cl. 525-437.000.

Miura, Konoe; Ozawa, Tetsuo; and Yoneyama, Keiko, 4,959,172, Cl. 252-299.100.

Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seichi; Umeki, Yoichi; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.

Saeiki, Kenashi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.

Mitsubishi Metal Corporation: See—  
Hagino, Sadaaki; Suzuki, Motokazu; Takeshita, Takuo; Tonda, Hideki; and Takashima, Kazuki, 4,959,344, Cl. 505-1.000.

Mitsubishi Pencil Co., Ltd.: See—  
Suda, Yoshihisa, 4,959,183, Cl. 264-81.000.

Mitsubishi Rayon Company, Ltd.: See—  
Tada, Hisashi; Agata, Akira; Saruta, Masahiro; and Murata, Takashi, 4,959,438, Cl. 528-98.000.

Mitsubishi Yuka Badische Company, Ltd.: See—  
Abe, Tadashi; Aoki, Masahiro; and Tsukamoto, Takeo, 4,959,428, Cl. 526-201.000.

Mitsui, Akio; and Ozawa, Takashi, to Fuji Photo Film Co., Ltd. Silver halide color photographic material. 4,959,298, Cl. 430-496.000.

Mitsui, Kenichi: See—  
Shigeki, Terumitsu; and Mitsui, Kenichi, 4,958,789, Cl. 248-56.000.

Mitsui Petrochemical Industries Ltd.: See—  
Aways, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozu; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.

Mitsui Pharmaceutical, Inc.: See—  
Aways, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozu; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.

Mitsui Toatsu Chemicals, Inc.: See—  
Iino, Shinji; Oshima, Minoru; Kitoh, Shinya; and Kobayashi, Toshiaki, 4,959,104, Cl. 106-85.000.

Tamai, Shoji; Kawashima, Saburo; Sonobe, Yoshiho; Ohta, Masahiro; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,959,440, Cl. 528-125.000.

Yamaya, Norimasa; Ohta, Masahiro; and Yamaguchi, Akihiro, 4,959,443, Cl. 528-170.000.

Mitsuya, Teruaki; Kumasaka, Takao; Umeda, Takao; Hori, Yasuro; Shimokobe, Ikuo; and Hoshi, Nobuyoshi, to Hitachi, Ltd.; and Hitachi Koki Co., Ltd. Duplex reproducing apparatus with device for cooling and conveying fused toner image. 4,959,693, Cl. 355-290.000.

Mitulla, Konrad: See—  
Taubitz, Christof; Seiler, Erhard; Hambrecht, Juergen; Mitulla, Konrad; and Boehlke, Klaus, 4,959,415, Cl. 525-133.000.

Miura, Hideo: See—  
Fukuda, Hiroshi; Miura, Hideo; and Mizuno, Masahiko, 4,959,729, Cl. 358-229.000.

Miura, Konoe; Ozawa, Tetsuo; and Yoneyama, Keiko, to Mitsubishi Kasei Corporation. Liquid crystal composition containing a pleochroic azo type compound. 4,959,172, Cl. 252-299.100.

Miura, Michiko; and Gabel, Detlef, to United States of America, Energy. Porphyrins for boron neutron capture therapy. 4,959,356, Cl. 514-64.000.

Miura, Tadashi; Itoh, Takuji; Kadono, Masaki; and Shimada, Masaki-chi, to Toa Nenryo Kogyo Kabushiki Kaisha. Heat-resistant catalyst carrier moldings and catalysts for combustion. 4,959,338, Cl. 502-263.000.

Miura, Yoshio; Suzuki, Motoyuki; Fukushima, Akio; and Mori, Yonemitsu, to Hitachi, Ltd. Motor rotation control apparatus with motor rotational frequency memory. 4,959,733, Cl. 358-338.000.

Miura, Yumiko: See—  
Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seichi; Umeki, Yoichi; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.

Miyadera, Hiroo; Ohtsuki, Toru; and Kawamura, Toshiaki, to Hitachi, Ltd. Address space switching apparatus. 4,959,778, Cl. 364-200.000.

Miyake, Izumi: See—  
Nakadai, Katsuo; Miyake, Izumi; Kaneko, Kiyotaka; and Oda, Kazuya, 4,959,599, Cl. 318-603.000.

Miyake, Tamio: See—  
Sakamoto, Tamaki; Kobayashi, Toshiyuki; Yamamoto, Norihito; and Miyake, Tamio, 4,958,936, Cl. 374-1.000.

Miyamoto, Kouichi, to Ryobi Ltd. Radial arm saw. 4,958,544, Cl. 83-471.300.

Miyao, Yukimitsu: See—  
Hamamura, Atsushi; Hamada, Takaki; Tokuhara, Kouki; Miyao, Yukimitsu; Imai, Tomoyuki; and Horiishi, Nanao, 4,959,273, Cl. 428-548.000.

Miyashita, Kunio: See—  
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tunchiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.

Miyazaki, Jiro: See—  
Iwaki, Hiroshi; Mita, Yoshiharu; Miyazaki, Jiro; Suto, Akihiko; Hirose, Satoshi; and Renbutsu, Tadashi, 4,958,823, Cl. 271-9.000.

Miyazaki, Kouji: See—  
Ueda, Tsunehisa; Miyazaki, Kouji; Natsuume, Tadao; and Miki, Yoshiaki, 4,959,207, Cl. 424-76.100.

Miyazawa, Hidehisa: See—  
Yanagawa, Hisaharu; Ochiai, Toshihiro; Hayakawa, Hirokazu; and Miyazawa, Hidehisa, 4,958,897, Cl. 350-96.150.

Miyazono, Tadafumi; and Ishikura, Shinichi, to Nippon Paint Co., Ltd. Composite acrylic resin particles. 4,959,417, Cl. 525-274.000.

Miyoshi, Akio, to Kabushiki Kaisha Toshiba. Microprogram processor with logic circuitry for combining signals from a microcode decoder and an instruction code decoder to produce a memory access signal. 4,959,780, Cl. 364-200.000.

Mizuno, Masahiko: See—  
Fukuda, Hiroshi; Miura, Hideo; and Mizuno, Masahiko, 4,959,729, Cl. 358-229.000.

Mizunoya, Nobuyuki: See—  
Tanaka, Tadashi; Matsumura, Kazuo; Komorita, Hiroshi; and Mizunoya, Nobuyuki, 4,959,507, Cl. 174-260.000.

MLR Electronique: See—  
Lamirault, Christian J., 4,959,655, Cl. 342-389.000.

Mochizuki, Akio, to NEC Corporation. Omnidirectional antenna assembly. 4,959,657, Cl. 343-725.000.

Mogi, Hirokazu: See—  
Takahashi, Koji; Kozuki, Susumi; Mogi, Hirokazu; Kawahara, Hideo; Arai, Hideyuki; Suzuki, Katsushi; Mabuchi, Toshiaki; and Kobayashi, Takashi, 4,959,728, Cl. 358-228.000.

Mogro-Campero, Antonio; and Turner, Larry G., to General Electric Company. Composite with Y-BA-CU-O superconductive film. 4,959,346, Cl. 505-1.000.

Moguri Gejarmu Kulkereskedelmi Vallalat: See—  
Toth, Laszlo P.; Kiss, Endre; Paaztor, Endre; Purebl, Gyory; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.

Mohaci, Erno; and O'Brien, Jay P., to Hoffmann-La Roche Inc. Phenyl-thiazepinones as calcium regulating agents. 4,959,359, Cl. 514-211.000.

Mohs, Lawrence: See—  
Berg, Robin; Mohs, Lawrence; and Oswald, Richard, 4,958,957, Cl. 405-55.000.

Moisson, Claude, to Biovalles. Device for blood sampling and analysis. 4,959,196, Cl. 422-68.050.

Molecular Diagnostics, Inc.: See—  
Dattagupta, Nanibhushan; and Crothers, Donald M., 4,959,309, Cl. 435-6.000.

Moli Energy Limited: See—  
Dahn, Jeffery R.; and Way, Brian M., 4,959,282, Cl. 429-224.000.

Moller, Alexander; Friedrich, Heinz; Kuhn, Herbert; and Winkler, Kurt, to Degussa Aktiengesellschaft. Method of producing coarse crystalline nicotinic acid with a high degree of purity. 4,959,478, Cl. 546-319.000.

Momodomi, Masaki; Masuoka, Fujio; Shiota, Riichiro; Itoh, Yasuo; Ohuchi, Kazunori; and Kirasawa, Ryouhei, to Kabushiki Kaisha Toshiba. Electrically erasable programmable read-only memory with NAND cell structure. 4,959,812, Cl. 365-185.000.

Mondek, Martin J.: See—  
Bland, Gerald F.; Freitag, Michael W.; and Mondak, Martin J., 4,959,033, Cl. 440-76.000.

Mongia, Hukam C.: See—  
Wilkes, Colin; Mongia, Hukam C.; and Tramm, Peter C., 4,958,488, Cl. 60-39.550.

Monroe, Bruce M.: See—  
Smothers, William K.; Monroe, Bruce M.; and Chan, Dominic M. T., 4,959,284, Cl. 430-2.000.

Monsanto Company: See—  
Crutchfield, Marvin M.; Horng, Liou-Liang; and Schultz, Robert G., 4,959,496, Cl. 562-583.000.

Felthouse, Timothy R., 4,959,494, Cl. 562-515.000.

Montedipe S.p.A.: See—  
Brichta, Corrado; Vezzoli, Annibale; and Borghi, Angelo, 4,959,397, Cl. 521-96.000.

Montedison S.p.A.: See—  
Biglione, Gianfranco; and Matarrese, Savino, 4,959,434, Cl. 526-342.000.

Montgomery, Terry G.; and Martin, William G., to Springs Industries, Inc. Corespun yarn for fire resistant safety apparel. 4,958,485, Cl. 57-210.000.

Moody, Harold G., to United States of America, Army. Anatomically shaped carcasses for headsets. 4,958,697, Cl. 181-129.000.

Mookherjee, Braja D.: See—  
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,959,209, Cl. 424-81.000.

Morby, John A.: See—  
Robarge, Dean A.; Morby, John A.; M'Sadoques, Andre J.; and Markowski, Robert G., 4,959,514, Cl. 200-144.00R.

Morey, Booker W. Hair roller and heat source therefor. 4,958,648, Cl. 132-220.000.

Morgan, Donna R.: See—  
Kraft, William G.; and Morgan, Donna R., 4,959,384, Cl. 514-390.000.

Morgan, Fred P., to F & S Corporation of Columbus, Georgia. Apparatus and method for producing color corrected reproduction of colored original images. 4,959,790, Cl. 364-518.000.

Morgan, George E. D.: See—  
Fogal, Robert D., Sr.; Fogal, Robert D., Jr.; and Morgan, George E. D., 4,958,587, Cl. 118-206.000.

Mori, Akio; Aikawa, Takeshi; and Saito, Mitsuo, to Kabushiki Kaisha Toshiba. Image input/output apparatus. 4,959,871, Cl. 382-59.000.

Mori, Hidenobu, to Osada Electric Co., Ltd. Water-supplying cord and a tool for inserting a hose in it. 4,958,423, Cl. 29-235.000.

Mori, Kazumi: See—  
Kurachi, Yasuhiko; Mori, Kazumi; and Koizumi, Hisao, 4,959,526, Cl. 219-314.000.

Mori, Masami: See—  
Akai, Mikio; and Mori, Masami, 4,959,184, Cl. 264-40.300.

Mori, Nobuyuki: See—  
Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiko; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, 4,959,376, Cl. 514-338.000.

Mori, Sanse; Sakamoto, Masaki; Yamamoto, Koichi; and Sakai, Kenji, to Daido Metal Company, Ltd. Multilayered iron-copper-lead alloy bearing material. 4,959,274, Cl. 428-555.000.



- Mori, Yonemitsu: See—  
Miura, Yoshio; Suzuki, Motoyuki; Fukushima, Akio; and Mori, Yonemitsu, 4,959,733, Cl. 358-338.000.
- Mori, Yoshiaki; Takagi, Hiroshi; Fujino, Masaru; and Sakabe, Yukio, to Murata Manufacturing Co., Ltd. Non-reducing dielectric ceramic composition. 4,959,333, Cl. 501-136.000.
- Morikawa, Juichi: See—  
Kochi, Mashanori; Morikawa, Juichi; Ibe, Makoto; Ozaki, Shinji; and Takizawa, Hitoshi, 4,959,743, Cl. 360-130.240.
- Morimoto, Kazuhiro; and Taki, Tsuneo, to Murata Manufacturing Co., Ltd. Method and apparatus for measuring a force required for stripping adhered tape. 4,958,521, Cl. 73-827.000.
- Morimoto, Masayuki: See—  
Iizumi, Makoto; Ide, Tatsumi; Kanzawa, Noboru; Sekiguchi, Akira; Morimoto, Masayuki; Goto, Hitoshi; and Ono, Tsutomu, 4,959,627, Cl. 335-106.000.
- Morimoto, Yasuaki; and Zucker, Friedhelm, to Deutsche Thomson-Brandt GmbH. Optical pick-up for scanning a magneto-optically recorded medium. 4,959,821, Cl. 369-13.000.
- Morin, Alain: See—  
Bonnet, Claude; Quentin, Jean-Pierre; and Morin, Alain, 4,959,252, Cl. 428-64.000.
- Moring, Walter G., III, to AP Parts Manufacturing Company. Stamp formed muffler with pocket-free baffle crease. 4,958,701, Cl. 181-282.000.
- Morioka, Akitoshi: See—  
Yoshino, Tsunemi; Furutsuka, Naoyuki; Aoki, Naofumi; Watanabe, Hiroshi; and Morioka, Akitoshi, 4,959,672, Cl. 354-173.100.
- Morishita, Mitsuharu; Uota, Koosaku; and Yasukawa, Takeshi, to Mitsubishi Denki Kabushiki Kaisha. Electric power steering device having a clutch. 4,959,787, Cl. 364-424.050.
- Morita, Toshiya: See—  
Kiyohara, Toshiaki; and Morita, Toshiya, 4,959,803, Cl. 364-521.000.
- Morlotti, Norberto: See—  
Cappelli, Cataldo; and Morlotti, Norberto, 4,958,862, Cl. 285-334.000.
- Moronaga, Takahiro: See—  
Uchinami, Masanobu; Takahashi, Toshihisa; Inoue, Hitoshi; Moronaga, Takahiro; and Nishida, Shinichi, 4,958,611, Cl. 123-479.000.
- Morotomi, Noriaki; Endo, Yasumasa; Emura, Yoshinori; Asaka, Nobuyoshi; and Inoue, Hideki, to Matsushita Electric Industrial Co., Ltd. Home automation system. 4,959,713, Cl. 358-108.000.
- Morrill, Wayne J. Electric motor lubrication. 4,958,940, Cl. 384-398.000.
- Morris, John C.; and Jackson, Winston J., Jr., to Eastman Kodak Company. Copolymers from 4,4'-biphenyldicarboxylic acid, 1,4-cyclohexanedimethanol and 1,6-hexanediol. 4,959,450, Cl. 528-272.000.
- Morrison, Richard H., Jr.: See—  
Zavracky, Paul M.; and Morrison, Richard H., Jr., 4,959,515, Cl. 200-181.000.
- Morsch, Erwin W.; and Frey, Otto, to Sulzer Brothers Limited; and Protek AG. Implant for strengthening the edge of a hip bone. 4,959,072, Cl. 623-22.000.
- Morse, Robin C.: See—  
Vaccaro, Angelo M.; and Morse, Robin C., 4,958,975, Cl. 414-259.000.
- Morton Thiokol Inc.: See—  
Russell, Peter G., 4,959,110, Cl. 156-187.000.
- Moser, Frank H.; and Lynam, Niall R., to Donnelly Corporation. Electrochromic coating and method for making same. 4,959,247, Cl. 427-126.500.
- Moses, Alan C.: See—  
Carey, Martin C.; Moses, Alan C.; and Flier, Jeffrey S., 4,959,358, Cl. 514-171.000.
- Mosley, Dennis: See—  
Scott, James; and Mosley, Dennis, 4,959,783, Cl. 364-412.000.
- Motev, Phil: See—  
Bubley, Henry J.; Glotzbach, Joseph; and Motev, Phil, 4,958,559, Cl. 101-123.000.
- Motorola Computer X: See—  
Holman, Thomas H., Jr., 4,959,777, Cl. 364-200.000.
- Motorola, Inc.: See—  
Breedon, Robert L.; Griffin, Douglas E.; and Kinney, John H., Jr., 4,959,648, Cl. 340-825.440.
- Higgins, Robert J., Jr.; Ooms, William J.; and Irwin, James S., 4,959,624, Cl. 331-116.000.
- Martin, Frederick L., 4,959,617, Cl. 328-133.000.
- McDermott, Mark W.; and Carter, Ernest A., 4,959,561, Cl. 307-443.000.
- Moyer, Curtis D.; and Tsui, Raymond K., 4,959,702, Cl. 357-34.000.
- Tobolski, Francis P., Jr.; and D'Avello, Robert F., 4,959,851, Cl. 379-59.000.
- Mouissie, Bob, to Du Pont de Nemours, E. I., and Company. Filter connector with low frequency screening. 4,959,626, Cl. 333-182.000.
- Moulin, Francois: See—  
Mills, Lester; Mettler, Hans P.; Previdoli, Felix; and Moulin, Francois, 4,959,475, Cl. 544-324.000.
- Moyal, Miki, to Advanced Micro Devices, Inc. Dual channel A/D and D/A converter with improved isolations. 4,959,650, Cl. 341-126.000.
- Moyer, Curtis D.; and Tsui, Raymond K., to Motorola, Inc. Si-GaP-Si heterojunction bipolar transistor (HBT) on Si substrate. 4,959,702, Cl. 357-34.000.
- MPV, Inc.: See—  
Williamson, Roger L., 4,958,584, Cl. 114-270.000.
- M'Sadoques, Andre J.: See—  
Robarge, Dean A.; Morby, John A.; M'Sadoques, Andre J.; and Markowski, Robert G., 4,959,514, Cl. 200-144.000.
- Mt. Sinai School of Medicine of the City University of New York: See—  
Acs, George; Christman, Judith K.; Price, Peter; Offensperger, Wolf; and Wahl, Silke, 4,959,323, Cl. 435-320.000.
- Muchowski, Joseph M.: See—  
Nelson, Peter H.; Allison, Anthony C.; Eugui, Elsie M.; and Muchowski, Joseph M., 4,959,387, Cl. 524-469.000.
- Muckerheide, Jon C.: See—  
Willits, Samuel P.; Meiri, Samuel; and Muckerheide, Jon C., 4,958,824, Cl. 271-11.000.
- Mueller, Richard A.; and Partis, Richard A., to G. D. Searle & Co. Method of treating inflammation, allergy, asthma and proliferative skin disease using heterocyclic amides. 4,959,364, Cl. 514-237.500.
- Muhlbaier, Werner: See—  
Griese, Klaus; Jons, Claus; Muller, Karl-Heinz; Muller, Rudolf; and Muhlbaier, Werner, 4,958,994, Cl. 418-132.000.
- Muir, Larry A., to Merck & Co., Inc. The use of certain compounds in livestock food as growth promotants for better feed utilization and improved carcass composition. 4,959,382, Cl. 514-378.000.
- Mukherjee, Arabinda, to Lucas Industries public limited company. Transparencies. 4,959,257, Cl. 428-156.000.
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- Mule, Ethel; and Mule, Charles. Multi-purpose carrier for skis and the like. 4,958,760, Cl. 224-153.000.
- Mullen, John: See—  
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- Muller, George H., to Berke, Joseph J.; and A.I.R. Foundation, a part interest. Manual surgical separator structure and method. 4,959,067, Cl. 606-190.000.
- Muller, Karl-Heinz: See—  
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- Muller, Peter-Rolf: See—  
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- Muller, Richard E.: See—  
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- Muller, Rudolf: See—  
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- Munakata, Mitsuo: See—  
Yoneda, Kenji; Kajiyama, Toshiki; Sakata, Kazuhiro; Munakata, Mitsuo; and Suzuki, Masato, 4,958,707, Cl. 187-101.000.
- Mundus, Friedhelm, to Windmoller & Holscher. Process for producing flattened gusseted tubing from flat plastic film. 4,959,114, Cl. 156-204.000.
- Murai, Shigenobu: See—  
Yoshida, Yukio; Takimoto, Akiyoshi; and Murai, Shigenobu, 4,959,598, Cl. 318-599.000.
- Murakami, Tsutomu: See—  
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, 4,959,106, Cl. 136-258.000.
- Murakami, Yuichi: See—  
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- Murano, Katsuaki: See—  
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- Murasaki, Keiichi, to Sega Enterprises, Ltd. Miniature storage container for a manually propelled toy member. 4,959,035, Cl. 446-40.000.
- Murata Kikai Kabushiki Kaisha: See—  
Suganuma, Buro; Nishimura, Shinichi; and Takeshita, Akihiko, 4,958,487, Cl. 57-328.000.
- Murata Manufacturing Co., Ltd.: See—  
Mori, Yoshiaki; Takagi, Hiroshi; Fujino, Masaru; and Sakabe, Yukio, 4,959,333, Cl. 501-136.000.
- Morimoto, Kazuhiro; and Taki, Tsuneo, 4,958,521, Cl. 73-827.000.
- Uchida, Katsuyuki, 4,959,632, Cl. 328-22.000.
- Murata, Takashi: See—  
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- Murayama, Jin: See—  
Miida, Takashi; Murayama, Jin; Tamada, Kazukiyo; and Kagechika, Takashi, 4,959,726, Cl. 358-227.000.
- Murphree, Francis J., to United States of America, Navy. Intruder target monitoring sonar alarm system. 4,959,817, Cl. 367-97.000.
- Murray, Mark J.: See—  
Foster, Donald C.; Murray, Mark J.; and Berkner, Kathleen L., 4,959,318, Cl. 435-69.100.
- Murti, Dasarao K.: See—  
Ong, Beng S.; Keoshkerian, Barkev; Baranyi, Giuseppe; and Murti, Dasarao K., 4,959,288, Cl. 430-59.000.
- Muzechuk, Richard A.: See—  
Gold, Thomas P.; Hamberg, James P.; Maness, Darren K.; and Muzechuk, Richard A., 4,958,810, Cl. 267-140.100.

- Muzalay, Steven Z., to ITT Corporation. Fuel injector adaptor. 4,959,027, Cl. 439-655.000.
- Nabisco Brands, Inc.: See—  
Aquino, Agostino; and Lang, Karl U., 4,958,556, Cl. 99-355.000.
- Aquino, Agostino; and Lang, Karl U., 4,959,235, Cl. 426-281.000.
- Klemann, Lawrence P.; Finley, John W.; and Scimone, Anthony, 4,959,465, Cl. 536-115.000.
- Nadland, Karl J.; and Kleppe, Mari A., to Collett-Marwell Hauge A/S. Magnesium additive for nutrients, feed, and medicaments. 4,959,222, Cl. 424-692.000.
- Nagahama, Hideki: See—  
Inaba, Shin-ichi; and Nagahama, Hideki, 4,959,200, Cl. 423-347.000.
- Nagai, Makoto: See—  
Kuroda, Shigeaki; Oguni, Kensaku; Senshu, Takao; Terada, Hirokiyo; Nagai, Makoto; and Hanada, Masamichi, 4,958,500, Cl. 62-89.000.
- Nagamori, Hiroyuki: See—  
Yamauchi, Michihide; Nagamori, Hiroyuki; Wakasa, Masanobu; and Ishikawa, Atsushi, 4,958,998, Cl. 423-445.000.
- Nagao, Koichi: See—  
Hatada, Kenzo; and Nagao, Koichi, 4,959,590, Cl. 315-169.300.
- Nagata, Masanori; Yoshida, Shinya; Yamashita, Susumu; and Okahashi, Makoto, to Omron Tateisi Electronics Co. IC card with keyboard for prestoring transaction data. 4,959,788, Cl. 364-408.000.
- Nagawa, Yoshinobu; Honda, Koichi; and Nakanishi, Hiroshi, to Agency of Industrial Science & Technology. Indole derivatives. 4,959,479, Cl. 548-255.000.
- Naiki, Toshio; and Kuroda, Muneco, to Minolta Camera Kabushiki Kaisha. Laser scanner with beam transmissivity control. 4,959,664, Cl. 346-108.000.
- Naimpally, Saiprasad V.: See—  
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- Najm, Emile G. Impact cushioning and avoiding device. 4,958,651, Cl. 135-82.000.
- Nakada, Akio: See—  
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- Nakada, Morihito: See—  
Tanino, Katsumi; and Nakada, Morihito, 4,959,439, Cl. 528-111.000.
- Nakadai, Katsuo; Miyake, Izumi; Kaneko, Kiyotaka; and Oda, Kazuya, to Fuji Photo Film Co., Ltd. Head positioner. 4,959,599, Cl. 318-603.000.
- Nakagaki, Shintaro: See—  
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,959,722, Cl. 358-211.000.
- Nakagawa, Akio: See—  
Ogura, Tsuneo; and Nakagawa, Akio, 4,959,703, Cl. 357-38.000.
- Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, to Canon Kabushiki Kaisha. Photovoltaic element with a semiconductor layer comprising non-single crystal material containing at least Zn, Se and H in an amount of 1 to 4 atomic %, 4,959,106, Cl. 136-258.000.
- Nakagawa, Katsuyoshi, to Daito Tech Kabushiki Kaisha. Fire damper. 4,958,687, Cl. 169-60.000.
- Nakagawa, Masashi: See—  
Kimoto, Tetsuya; and Nakagawa, Masashi, 4,959,537, Cl. 250-223.000.
- Nakagawa, Sigco: See—  
Kawamura, Yuzo; and Nakagawa, Sigco, 4,958,678, Cl. 164-461.000.
- Nakagawa, Susumu; Ushijima, Ryosuke; Nakano, Fumio; Yamada, Koji; and Mano, Eiichi, to Banyu Pharmaceutical Company, Ltd. Crystalline cephalosporin compounds. 4,959,469, Cl. 540-222.000.
- Nakagawa, Tadashi, to Seikosha Co., Ltd. Automatic focusing camera. 4,959,678, Cl. 354-403.000.
- Nakagawa, Takehiro: See—  
Uehara, Masao; Kanno, Masahide; Sasaki, Masahiko; Sasagawa, Katsuyoshi; Uchikubo, Akinobu; Hasegawa, Jun; Yamashita, Shinji; Saito, Katsuyuki; and Nakagawa, Takehiro, 4,959,710, Cl. 358-98.000.
- Nakagawa, Tatsushi; Ishida, Yoshiaki; Kanesaka, Junichiro; and Kane-shige, Yosuke, to Tosoh Corporation. Composition comprising chlorosulfonated ethylene copolymer, epoxy resin and dimaleimide. 4,959,414, Cl. 525-11.000.
- Nakajima, Shigeharu; Shinomiya, Genichi; Takeda, Mizuho; and Chikutei, Satoru, to Nichia Kagaku Kogyo K.K. Phosphor which emits light by the excitation of X-ray. 4,959,174, Cl. 252-301.60R.
- Nakajima, Shohachi; and Komeshima, Nobuyasu, to Kirin Beer Kabushiki Kaisha. 3'-deamino-3'-(2'-substituted-4'-morpholino)-anthracene compounds. 4,959,460, Cl. 536-6.400.
- Nakamori, Yoshiyuki: See—  
Kanzawa, Yasunori; Nakamori, Yoshiyuki; Kuwa, Tadahiyo; Fujimoto, Nobuyuki; and Abe, Shinichi, 4,959,744, Cl. 360-133.000.
- Nakamura, Ikushi: See—  
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiko, 4,959,679, Cl. 354-419.000.
- Nakamura, Kosei; and Hayashi, Yoshiyuki, to Fanuc Ltd. Motor cooling system. 4,959,570, Cl. 310-54.000.
- Nakamura, Mitsuo, to Fuji Jukogyo Kabushiki Kaisha. Fuel injection control system for an automotive engine. 4,959,789, Cl. 364-431.050.
- Nakamura, Toshinobu, to Shinagawa Shoko Co., Ltd. Tying means. 4,958,791, Cl. 248-74.100.
- Nakamura, Yoshiyuki: See—  
Kohno, Masahito; and Nakamura, Yoshiyuki, 4,958,852, Cl. 280-775.000.
- Nakane, Toshio; Kageyama, Yukihiko; and Hijikata, Kenji, to Polyplastics Co., Ltd. Thermoplastic resin composition. 4,959,404, Cl. 524-267.000.
- Nakanishi, Hiroshi: See—  
Nagawa, Yoshinobu; Honda, Koichi; and Nakanishi, Hiroshi, 4,959,479, Cl. 548-255.000.
- Nakanishi, Motohiro: See—  
Matsuda, Motonobu; Tanaka, Yoshihiro; Nakanishi, Motohiro; Taniguchi, Nobuyuki; and Ootsuka, Hiroshi, 4,959,676, Cl. 354-400.000.
- Nakanishi, Tsutomu, to C.S.U. Ltd. Ball bearing. 4,958,943, Cl. 384-488.000.
- Nakanishi, Tsutomu, to C.S.U. Ltd. Spindle unit. 4,958,945, Cl. 384-512.000.
- Nakano, Fumio: See—  
Nakagawa, Susumu; Ushijima, Ryosuke; Nakano, Fumio; Yamada, Koji; and Mano, Eiichi, 4,959,469, Cl. 540-222.000.
- Nakano, Genichi; Higami, Sadao; and Hashimoto, Yasutaka, to Matsushita Electric Industrial Co., Ltd.; Fukuhon Teisan Co., Ltd.; and Dengen Co., Ltd. Refrigerant charging apparatus. 4,958,501, Cl. 62-125.000.
- Nakano, Hiromitsu: See—  
Seima, Toshiaki; Yamamoto, Susumu; and Nakano, Hiromitsu, 4,958,948, Cl. 388-812.000.
- Nakano, Hiroshi: See—  
Iwakura, Masato; and Nakano, Hiroshi, 4,958,451, Cl. 40-204.000.
- Nakano, Takuo: See—  
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Koji; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
- Nakano, Yoichi: See—  
Ishida, Hiroaki; Nemoto, Ichiro; Sato, Koji; Takami, Atsushi; Nakano, Yoichi; Ishii, Isamu; and Iwamatsu, Yoshiyuki, 4,959,680, Cl. 354-435.000.
- Nakano, Yuji: See—  
Ijuin, Kazuya; Otsuki, Shinnichiro; Nakano, Yuji; and Ogushi, Hiroshi, 4,959,536, Cl. 250-216.000.
- Nakanosono, Haruhiko: See—  
Takeda, Kazuyoshi; Takayama, Tadashi; Suzuki, Takanori; and Nakanosono, Haruhiko, 4,958,534, Cl. 74-475.000.
- Nakase, Kiyoshi: See—  
Hashimoto, Chikara; Inaba, Hiroshi; Nakase, Kiyoshi; and Yanagida, Yukitoshi, 4,958,917, Cl. 350-357.000.
- Nakata, Yutaka, to Ichikoh Industries, Ltd. Automotive lamp assembly. 4,959,757, Cl. 362-61.000.
- Nakatani, Masayuki; Matsuo, Makoto; and Kusuki, Yoshihiro, to UBE Industries. Pervaporation method of separating liquid organic compound mixture through aromatic imide polymer asymmetric membrane. 4,959,151, Cl. 210-640.000.
- Nakatani, Munehiro, to Minolta Camera Kabushiki Kaisha. Image scanning apparatus for use in an image reader, a copying machine and the like. 4,959,737, Cl. 358-475.000.
- Nakura, Kazuaki: See—  
Uemura, Yohiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.
- Nalco Chemical Company: See—  
Huang, Shu-Jen W.; and Stenger, Claudia V., 4,959,147, Cl. 210-712.000.
- Nambu, Masao; Watari, Tsutomu; Sakamoto, Tomoyuki; and Akojima, Kazuo, to Nippon Oil Co., Ltd. Method for applying electromagnetic wave and ultrasonic wave therapies. 4,958,626, Cl. 128-24.00A.
- Namco Ltd.: See—  
Tashiro, Koichi; Okamoto, Shinichiro; and Okamoto, Tatsuro, 4,958,835, Cl. 273-85.00G.
- Namera, Takakazu; and Ogura, Naoto, to NEC Corporation. Orbit control system for a satellite. 4,958,788, Cl. 244-169.000.
- Nandzik, Bernd: See—  
Dollhope, Rudiger; and Nandzik, Bernd, 4,959,186, Cl. 264-102.000.
- Nash, Boyd B. Pintle type trailer coupling. 4,958,848, Cl. 280-509.000.
- Nassi, Menahem: See—  
Christian, Jeffrey J.; and Nassi, Menahem, 4,958,642, Cl. 128-772.000.
- National Federation of Agricultural Co-Operative Associations: See—  
Kumura, Atsuhiko; Ishii, Ryuichi; Luo, Bing-Shan; Adachi, Meiro; Hamada, Kenji; and Fujita, Fumio, 4,959,091, Cl. 71-77.000.
- National Safety Devices, Inc.: See—  
Woods, Richard E.; Bonner, Guy, Jr.; Smyth, Jerry S.; and Felton, Roger D., 4,959,637, Cl. 340-573.000.
- National Semiconductor Corporation: See—  
Knecht, Mark W.; and Frake, Scott O., 4,959,565, Cl. 307-542.000.
- National Starch and Chemical Investment Holding Corporation: See—  
Wasulko, William M., 4,959,008, Cl. 428-40.000.
- Natsume, Tadao: See—  
Ueda, Tsunehisa; Miyazaki, Kouji; Natsume, Tadao; and Miki, Yoshiaki, 4,959,207, Cl. 424-76.100.
- Natural Fibers Corp.: See—  
Ragsdale, George, 4,959,038, Cl. 460-149.000.



Naturin-Werk Becker & Co.: See—  
Winkler, Bruno, 4,958,477, Cl. 53-138.00R.  
Naudin, Jacky, to Valeo. Torsion damping device, in particular for a flywheel type transmission of an automotive vehicle. 4,959,039, Cl. 464-66.000.  
Naylor, Alan: See—  
Lunts, Lawrence H. C.; Skidmore, Ian F.; Finch, Harry; Naylor, Alan; and Campbell, Ian B., 4,959,381, Cl. 514-357.000.  
NCR Corporation: See—  
Lyons, Dale R., 4,958,797, Cl. 248-345.100.  
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Neave, James H.: See—  
Dobson, Peter J.; and Neave, James H., 4,959,245, Cl. 427-53.100.  
Nebe, William J.; and Osborne, James J., to Du Pont de Nemours, E. I., and Company. Process of making a photosensitive semi-aqueous developable ceramic coating composition. 4,959,295, Cl. 430-281.000.  
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Matsuo, Noriko; and Mitome, Yukio, 4,959,866, Cl. 381-51.000.  
Mochizuki, Akio, 4,959,657, Cl. 343-725.000.  
Namera, Takakazu; and Ogura, Naoto, 4,958,788, Cl. 244-169.000.  
Sato, Toshifumi, 4,959,644, Cl. 340-825.440.  
Suzuki, Hiroyuki, 4,959,793, Cl. 364-900.000.  
Tatebe, Yu; Yasui, Hiroshi; Matsuyama, Yukio; and Takahashi, Hiroji, 4,959,030, Cl. 439-67.000.  
Todoroki, Tooshiya, 4,959,813, Cl. 365-189.120.  
Nederlandse Centrale Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek: See—  
Dijkema, Reinder; and Kos, Antonides, 4,959,462, Cl. 536-27.000.  
Neidiffer, Fred; Fox, Charles E.; and Fox, Patsy E. Aluminium cleaning composition and process. 4,959,105, Cl. 134-3.000.  
Nelson, Michael J. K.; Bourquin, Al W. J.; and Pritchard, Parmely H., to United States of America, Environmental Protection Agency. Biodegradation of chloroethylene compounds. 4,959,315, Cl. 435-167.000.  
Nelson, Norman A.: See—  
Putch, Samuel W., 4,958,686, Cl. 166-348.000.  
Nelson, Peter H.; Allison, Anthony C.; Eugui, Elsie M.; and Muchowski, Joseph M., to Syntex (U.S.A.) Inc. Mycophenolic acid derivatives in the treatment of rheumatoid arthritis. 4,959,387, Cl. 524-469.000.  
Nelson, Thomas E., to Sotex, Inc. Water heater construction. 4,958,620, Cl. 126-344.000.  
Nemoto, Ichiro: See—  
Ishida, Hiroaki; Nemoto, Ichiro; Sato, Koji; Takami, Atsushi; Nakano, Yoichi; Ishii, Isamu; and Iwamatsu, Yoshiyuki, 4,959,680, Cl. 354-435.000.  
Neuffer, Ingemar; and Keller, Christian, to Siemens Aktiengesellschaft. Method and apparatus for the distance control of a positioning drive. 4,959,808, Cl. 364-566.000.  
Neurodelivery Technology, Inc.: See—  
Coombs, Dennis W., 4,958,901, Cl. 604-44.000.  
Neuroth, David H., to Hubbell Incorporated. Electrical connector for high pressure applications with rapid pressure transients. 4,959,022, Cl. 459-589.000.  
Newton, George; and Parzuchowski, Douglas A., to Dunham Tool Co., Inc., The. Overhead loader and related mechanisms for high speed automatic lathes and the like. 4,958,543, Cl. 82-124.000.  
NEXUS Aps: See—  
Schou, Herbert W. D., deceased; and Dreyer, Jack A., 4,959,233, Cl. 426-443.000.  
Ng, Howard C. H.; and Hunter, Frederick J., to Du Pont Canada Inc. Fiber reinforced rubber products. 4,959,267, Cl. 428-390.000.  
Ng, Yee S.: See—  
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NGK Insulators, Ltd.: See—  
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NGK Spark Plug Co., Ltd.: See—  
Takami, Akio; Matsuura, Toshitaka; and Furusaki, Keizo, 4,958,514, Cl. 73-25.030.  
Ngo, Khai D.: See—  
Yerman, Alexander J.; and Ngo, Khai D., 4,959,630, Cl. 336-83.000.  
Nguyen, Tanh V.; Davenport, C. Brent; Stevens, Christopher E.; Reis, John C.; and Millhone, Ralph S., to Chevron Research Company. Steam injection profiling. 4,958,684, Cl. 166-252.000.  
NHK Spring Co., Ltd.: See—  
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Niaudet, Brigitte: See—  
Stanislas, Ehrlich; Laurent, Janniere; Evelynne, Pierre; and Niaudet, Brigitte, 4,959,316, Cl. 435-172.300.  
Nichia Kagaku Kogyo K.K.: See—  
Nakajima, Shigeharu; Shinomiya, Genichi; Takeda, Mizuho; and Chikotei, Satoru, 4,959,174, Cl. 252-301.60R.  
Nicholas, Edward D.: See—  
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Nichols, Randall W., to Standard Oil Company, The. Hollow fiber separation module and method for the use thereof. 4,959,152, Cl. 210-651.000.

Nicolet Instrument Corporation: See—  
Lutz, William J., 4,959,867, Cl. 381-107.000.  
Nielsen, Jay P.; and Sturm, Paul A., to Algae Farms. Method of growing and harvesting microorganisms. 4,958,460, Cl. 47-1.400.  
Niemeyer, Tjaard R. J.: See—  
Ernsting, Peter B.; Van Heteren, Jan; and Niemeyer, Tjaard R. J., 4,959,239, Cl. 426-603.000.  
Nihon Parkerizing Co., Ltd.: See—  
Saeki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.  
Nihon Samicon Co., Ltd.: See—  
Sato, Akira; and Ono, Masatoshi, 4,958,806, Cl. 256-12.500.  
Nihon Tokushu Orimono Co., Ltd.: See—  
Tomoyasu, Haruo; Tango, Chobe; Omote, Takuo; and Kato, Yoshinori, 4,959,260, Cl. 428-255.000.  
Nilsson, Karl E., to Bayern-Chemie, Gesellschaft fur flugchemische Antriebe mbH. Electric ignition system. 4,959,011, Cl. 431-263.000.  
Nippon Kayaku Kabushiki Kaisha: See—  
Hayashi, Sei-ichi; Hohjoh, Tadashi; Shida, Atsuhiko; and Ikekawa, Nobuo, 4,959,097, Cl. 71-112.000.  
Nippon Mining Co., Ltd.: See—  
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Nippon Oil Co., Ltd.: See—  
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Nippon Paint Co., Ltd.: See—  
Miyazono, Tadafumi; and Ishikura, Shinichi, 4,959,417, Cl. 525-274.000.  
Nippon Seiko Kabushiki Kaisha: See—  
Imanari, Yoshifumi, 4,958,941, Cl. 384-474.000.  
Nippon Sheet Glass Co., Ltd.: See—  
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Nippon Shokubai Kagaku Kogyo Co., Ltd.: See—  
Shimomura, Tadao; Harada, Nobuyuki; and Ishizaki, Kunihiko, 4,959,060, Cl. 604-368.000.  
Nippon Steel Corporation: See—  
Arai, Mitsuru; Cassidy, Patrick E.; and Farley, James M., 4,959,447, Cl. 528-188.000.  
Nippon Telegraph and Telephone Corporation: See—  
Aikawa, Satoru; and Saito, Yoichi, 4,959,834, Cl. 371-47.100.  
Nippon Zeon Co., Ltd.: See—  
Ueda, Tsunehisa; Miyazaki, Kouji; Natsume, Tadao; and Miki, Yoshiaki, 4,959,207, Cl. 424-76.100.  
Nippondenso Co., Ltd.: See—  
Horibe, Mitsutoshi; Hamada, Hiroshi; and Sakakibara, Hiroshi, 4,959,576, Cl. 310-239.000.  
Nishi, Yoshio; Azuma, Hideto; and Oamaru, Atsuo, to Sony Corporation. Non aqueous electrolyte cell. 4,959,281, Cl. 429-194.000.  
Nishida, Masayuki: See—  
Uemura, Yohiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutarou; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.  
Nishida, Shinichi: See—  
Uchinami, Masanobu; Takahashi, Toshihisa; Inoue, Hitoshi; Moronaga, Takahiro; and Nishida, Shinichi, 4,958,611, Cl. 123-479.000.  
Nishihara, Akira: See—  
Saeki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.  
Nishihata, Hideo: See—  
Ichikawa, Toru; Nishihata, Hideo; Kagoroku, Nobuo; and Ito, Shotaro, 4,958,504, Cl. 62-244.000.  
Nishijima, Toyoki; and Onodera, Kaoru, to Konica Corporation. Silver halide photographic light-sensitive material with improved gradation balance. 4,959,300, Cl. 430-546.000.  
Nishikawa, Masato: See—  
Onomoto, Ryuichi; Nishikawa, Masato; Ishida, Masaji; and Arimoto, Sachiro, 4,958,825, Cl. 271-119.000.  
Nishikawa, Masayuki; and Yagi, Shigeru, to Fuji Xerox Co., Ltd. Electrophotographic element having a surface layer and method for producing same. 4,959,289, Cl. 430-64.000.  
Nishikawa, Tatsu, to Canon Denshi Kabushiki Kaisha. Disc recording and/or reproducing apparatus including means for minimizing the effects of temperature changes. 4,959,740, Cl. 360-106.000.  
Nishimura, Katsuhiko; Shinho, Kazuyuki; and Kita, Masahiro, to Asahi Kogyo Kogyo Kabushiki Kaisha. Method and apparatus for forming a multicolor picture by electrophotography. 4,959,695, Cl. 355-327.000.  
Nishimura, Shinichi: See—  
Suganuma, Buro; Nishimura, Shinichi; and Takeshita, Akihiko, 4,958,487, Cl. 57-328.000.  
Nishimura, Shinji, to Mitsubishi Denki Kabushiki Kaisha. Rotating electric machine having a coil coaxial with rotating shaft. 4,959,595, Cl. 318-138.000.  
Nissan Chemical Industries: See—  
Kumura, Atsuhiko; Ishii, Ryuichi; Luo, Bing-Shan; Adachi, Meiro; Hamada, Kenji; and Fujita, Fumio, 4,959,091, Cl. 71-77.000.  
Nissan Motor Co., Ltd.: See—  
Hiraoka, Toyoki; Murakami, Yuichi; and Okitsu, Nobuyuki, 4,958,613, Cl. 123-572.000.  
Okubo, Takashi; and Takemura, Toji, 4,958,711, Cl. 192-60.000.  
Uchida, Koh; and Kurihara, Takashi, 4,958,695, Cl. 180-142.000.

Yamamoto, Tadahiho; and Ota, Ken, 4,958,610, Cl. 123-478.000.  
Yoshioka, Masanori; and Kozai, Masafumi, 4,959,191, Cl. 264-529.000.  
Nissin High Voltage Co., Ltd.: See—  
Kashiwagi, Masayuki; and Matsumoto, Takashi, 4,959,550, Cl. 250-492.300.  
Nix, Charles D.; and Baker, Johnny P. Cable boot. 4,958,790, Cl. 248-56.000.  
Noda, Atsushi, to Canon Kabushiki Kaisha. Ink jet recording apparatus. 4,959,673, Cl. 346-140.00R.  
Noda, Toshio: See—  
Yamamoto, Shigeo; and Noda, Toshio, 4,959,603, Cl. 320-1.000.  
Nogle, Thomas D.; Martin, Berthold; and O'Brien, Thomas M., to Chrysler Corporation. Clutch reaction and pressure plates in an automatic transmission. 4,958,753, Cl. 192-85.0AA.  
Noguchi, Masaru; and Yamamoto, Masafumi, to Fuji Photo Film Co., Ltd. Semiconductor laser beam source apparatus. 4,958,893, Cl. 350-6.600.  
Noguchi, Naoto: See—  
Suganuma, Tatsumi; Nozue, Shigehiro; Fukuoka, Tatsuhiko; Noguchi, Naoto; and Takenaka, Akira, 4,958,712, Cl. 192-70.120.  
Noguera, Angel R.; Planells, Carlos C.; and Itabashi, Masaki, to KAO Corporation. Pearling agent dispersion. 4,959,206, Cl. 424-70.000.  
Nolan, William A., to United Technologies Automotive, Inc. Combination support and attachment bar for a window. 4,958,468, Cl. 52-204.000.  
Nolle, William: See—  
Markow, Paul A.; and Nolle, William, 4,958,777, Cl. 242-7.110.  
Nomura, Kenji: See—  
Kobayashi, Toshio; Uchikawa, Fusaoki; and Nomura, Kenji, 4,959,347, Cl. 505-1.000.  
Nooyen, Johannes L.: See—  
Barnes, Peter H.; and Nooyen, Johannes L., 4,958,680, Cl. 165-104.180.  
Nordischer Maschinenbau Rud. Baader GmbH & Co.: See—  
Braeger, Horst K. H.; and Pontow, Hugo, 4,958,409, Cl. 17-24.000.  
Nordquist, Andrew F.; and Pinschmidt, Robert K., Jr., to Air Products and Chemicals, Inc. Process for making an acrylamide containing a dialkyl acetal group. 4,959,489, Cl. 560-170.000.  
Noreen, Allen L.: See—  
Wood, Leigh E.; and Noreen, Allen L., 4,959,265, Cl. 428-343.000.  
Norlen, Hakan. Tensile force transmitting device, in particular a lifting device. 4,958,872, Cl. 294-75.000.  
Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, to Eastman Kodak Company. Photographic silver halide materials and process comprising a pyrazoloazole coupler. 4,959,480, Cl. 548-262.400.  
North American Philips Corporation: See—  
Bugni, Anthony R.; Phillips, Larry G.; Darby, Ted A.; Naimpally, Saiprasad V.; and Burdick, William S., 4,959,716, Cl. 358-139.000.  
Joanino, Fernando A., 4,959,593, Cl. 315-290.000.  
Prodan, Richard S., 4,959,715, Cl. 358-140.000.  
Strubbe, Hugo J.; and Gentner, Donald R., 4,959,719, Cl. 358-183.000.  
North Carolina State University: See—  
Fedkiw, Peter S., Jr., 4,959,132, Cl. 204-101.000.  
Shih, Jason C. H.; and Williams, C. Michael, 4,959,311, Cl. 435-68.100.  
Norwich Eaton Pharmaceuticals, Inc.: See—  
Kraft, William G.; and Morgan, Donna R., 4,959,384, Cl. 514-390.000.  
Notron Engineering: See—  
Winger, Gerhard, 4,958,992, Cl. 418-29.000.  
Novak, Leo R.: See—  
McCullough, Francis P., Jr.; and Novak, Leo R., 4,959,261, Cl. 428-312.200.  
Novo Industri A/S: See—  
Frokjaer, Sven; Eriksen, Svend; and Adler-Nissen, Jens L., 4,959,350, Cl. 514-2.000.  
Nowak, Michael T.: See—  
Lewis, Thomas E.; Davidson, Bradley W.; Williams, Richard A.; Nowak, Michael T.; and Kline, John F., 4,958,562, Cl. 101-457.000.  
Lewis, Thomas E.; Davidson, Bradley W.; Williams, Richard A.; Nowak, Michael T.; and Kline, John F., 4,958,563, Cl. 101-458.000.  
Nowakowski, Stanley M., to Sure-Cast Pattern Works, Inc. Pad-forming device with hold-down knockout pin. 4,959,004, Cl. 425-397.000.  
Nozue, Shigehiro: See—  
Suganuma, Tatsumi; Nozue, Shigehiro; Fukuoka, Tatsuhiko; Noguchi, Naoto; and Takenaka, Akira, 4,958,712, Cl. 192-70.120.  
Nuckols, James H.: See—  
Watters, Jeffrey S.; Brown, Norman P.; and Nuckols, James H., 4,959,860, Cl. 380-4.000.  
Nuhn, Wolfgang: See—  
Langlois, Jacques A. E.; Bergmann, Heinrich M. G.; and Nuhn, Wolfgang, 4,959,001, Cl. 425-147.000.  
Nukui, Masahiro: See—  
Hirahara, Takuji; Nukui, Masahiro; and Tanaka, Katsuji, 4,959,421, Cl. 525-437.000.  
Numakura, Funio: See—  
Ojima, Juji; Ishii, Kazuo; and Numakura, Funio, 4,959,041, Cl. 474-111.000.  
Oakland Engineering, Inc.: See—  
Fisch, Alfred C., 4,958,983, Cl. 414-795.300.

Oates, Stephanie J.; and Sare, Edward J., to PPG Industries, Inc. Partially polymerized bis(allylic carbonate) monomer having high allylic utilization. 4,959,433, Cl. 526-314.000.  
Ober, Jan K.; and Udden, Per, to Udden, Per. Eye movement measurement device with multiple light emitting and detecting elements. 4,958,925, Cl. 351-210.000.  
Oberdorfer, Dietmar: See—  
Lohberg, Peter; May, Arno; Krause, Hans J.; Oberdorfer, Dietmar; and Pluggett, Ulrich, 4,958,937, Cl. 374-16.000.  
O'Brien, Jay P.: See—  
Mohacsi, Erno; and O'Brien, Jay P., 4,959,359, Cl. 514-211.000.  
O'Brien, Thomas M.: See—  
Nogle, Thomas D.; Martin, Berthold; and O'Brien, Thomas M., 4,958,753, Cl. 192-85.0AA.  
O'Bryant, Carl E.: See—  
Swagerty, Billy H., 4,958,594, Cl. 119-7.000.  
O'Bryant, Linda K.: See—  
Swagerty, Billy H., 4,958,594, Cl. 119-7.000.  
Och, Rudolf, to Frenco Verzahnungstechnik GmbH, Firma. Adapter sleeve. 4,958,969, Cl. 409-234.000.  
Ochiai, Toshihiro: See—  
Yanagawa, Hisaharu; Ochiai, Toshihiro; Hayakawa, Hirokazu; and Miyazawa, Hidehisa, 4,958,897, Cl. 350-96.150.  
O'Connor, David P., to Checkrobot Inc. Article price indicator. 4,959,530, Cl. 235-383.000.  
Oda, Kazuya: See—  
Nakadai, Katsuo; Miyake, Izumi; Kaneko, Kiyotaka; and Oda, Kazuya, 4,959,599, Cl. 318-603.000.  
Odabashian, Robert A., to W. R. Grace & Co.-Conn. Easy open, hermetically sealed, display package made from heat shrinkable film. 4,958,735, Cl. 206-497.000.  
Odani, Yusuke: See—  
Kusui, Jun; Kawai, Masahiko; Odani, Yusuke; and Takeda, Yoshiobu, 4,959,195, Cl. 419-67.000.  
Oelschlaeger, Karl G.: See—  
Fett, Jurgen; Oelschlaeger, Karl G.; and Bannert, Wolfgang, 4,958,726, Cl. 198-852.000.  
Oesterheld, Klaus: See—  
Critteli, John; Oesterheld, Klaus; DeBaun, Carleton; and Dowstra, Bart, 4,959,761, Cl. 362-226.000.  
Offensperger, Wolf: See—  
Acs, George; Christman, Judith K.; Price, Peter; Offensperger, Wolf; and Wahl, Silke, 4,959,323, Cl. 435-320.000.  
Officina Meccantica Giuseppe Conti: See—  
Brunetto, Lari; and Mercatali, Luciano, 4,959,046, Cl. 493-382.000.  
Ogale, Kumar: See—  
Thompson, Mitchell L.; Park, Kyung T.; Ogale, Kumar; and Powers, William B., 4,959,807, Cl. 364-565.000.  
Ogawa, Hiroshi: See—  
Sato, Shinji; Isomichi, Kanji; Ogawa, Hiroshi; Yamashita, Toshio; and Funahashi, Nobuhiro, 4,958,502, Cl. 62-126.000.  
Ogawa, Koji; and Machida, Hikoichi, to Sumitomo Precision Products Co., Ltd. Active control mechanism for a helicopter. 4,958,786, Cl. 244-17.130.  
Ogawa, Yasuaki: See—  
Suzuki, Hidemasa; Tokunaga, Ichiro; Abe, Hiraku; and Ogawa, Yasuaki, 4,959,574, Cl. 310-91.000.  
Ogden, Daryl M., to Board of Regents, The University of Texas System. Immunoassay for antibodies binding platelets. 4,959,308, Cl. 435-7.000.  
Ogino, Takao: See—  
Saeki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.  
Ogiue, Katsumi: See—  
Isomura, Satoru; Iwabuchi, Masato; and Ogiue, Katsumi, 4,959,704, Cl. 357-41.000.  
Oguni, Kensaku: See—  
Kuroda, Shigeaki; Oguni, Kensaku; Senahu, Takao; Terada, Hirokiyo; Nagai, Makoto; and Hanada, Masamichi, 4,958,500, Cl. 62-89.000.  
Ogura, Mitsuru, to Sharp Kabushiki Kaisha. Image forming apparatus. 4,959,681, Cl. 355-27.000.  
Ogura, Naoto: See—  
Namera, Takakazu; and Ogura, Naoto, 4,958,788, Cl. 244-169.000.  
Ogura, Tsuneo; and Nakagawa, Akio, to Kabushiki Kaisha Toshiba. Turn-on/off driving technique for insulated gate thyristor. 4,959,703, Cl. 357-38.000.  
Ogushi, Hiroshi: See—  
Ijuin, Kazuya; Otsuki, Shinnichi; Nakano, Yuji; and Ogushi, Hiroshi, 4,959,536, Cl. 250-216.000.  
Ohashi, Yutaka, to Mitsubishi Denki Kabushiki Kaisha. Signal generator for an internal combustion engine. 4,958,615, Cl. 123-617.000.  
Ohata, Hideo: See—  
Yoshiura, Hiroshi; Chuabo, Takeshi; Masui, Shoichi; and Ohata, Hideo, 4,959,799, Cl. 364-513.000.  
Ohata, Takumi: See—  
Oshima, Masahiko; Ohata, Takumi; and Hatori, Toshiyuki, 4,958,422, Cl. 29-129.500.  
Ohba, Shinji: See—  
Tatsumi, Kazumasa; and Ohba, Shinji, 4,959,739, Cl. 360-95.000.  
Ohfume, Yasufumi; Shimamoto, Keiko; and Shinozaki, Haruhiko, to Suntory Limited. Carboxycyclopropylglycine and process for producing the same. 4,959,493, Cl. 562-506.000.



Ohkawa, Kazumi; Matsuki, Toshitsugu; and Saiki, Noritsugu, to Teijin Limited. Phosphazene article and process for producing the same. 4,959,442, Cl. 528-168.000.

Ohno, Hiroyasu: See—  
Awai, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,361, Cl. 514-252.000.

Ohnuki, Ichiro: See—  
Suda, Yasuo; Arakawa, Kazuhiko; Ohtaka, Keiji; Koyama, Take-shi; and Ohnuki, Ichiro, 4,959,677, Cl. 354-402.000.

Ohnuma, Hiroaki; Fujikura, Yoshiaki; Fujita, Manabu; and Toi, Nao, to KAO Corporation. Indane derivative and perfume composition comprising the same. 4,959,349, Cl. 512-14.000.

Ohouchi, Junichi; Sasaki, Hiroaki; and Hasegawa, Kazuo, to Alps Electric Co., Ltd. Coordinate detecting device. 4,959,805, Cl. 364-562.000.

Ohsaki, Akihiko: See—  
Okamoto, Tatsuo; and Ohsaki, Akihiko, 4,959,329, Cl. 437-187.000.

Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seichi; Umeki, Yoichi; and Hanabe, Hiroshi, to Mitsubishi Kasei Corporation. Substituted phenyl (or pyridyl) urea compound and herbicidal composition containing the same as active ingredient. 4,959,092, Cl. 71-88.000.

Ohta, Masahiro: See—  
Tamai, Shoji; Kawashima, Saburo; Sonobe, Yoshiho; Ohta, Masahiro; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,959,440, Cl. 528-125.000.

Yamaya, Norimasa; Ohta, Masahiro; and Yamaguchi, Akihiro, 4,959,443, Cl. 528-170.000.

Ohta, Shohhei, to Shikoku Kakoki Co., Ltd. Device for filling specified amount of liquid. 4,958,669, Cl. 141-311.00A.

Ohtaka, Keiji: See—  
Suda, Yasuo; Arakawa, Kazuhiko; Ohtaka, Keiji; Koyama, Take-shi; and Ohnuki, Ichiro, 4,959,677, Cl. 354-402.000.

Ohtsuki, Toru: See—  
Miyadera, Hiroo; Ohtsuki, Toru; and Kawamura, Toshiaki, 4,959,778, Cl. 364-200.000.

Ohuchi, Kazunori: See—  
Momodomi, Masaki; Masuoka, Fujio; Shiota, Riichiro; Itoh, Yasuo; Ohuchi, Kazunori; and Kirisawa, Ryouhei, 4,959,812, Cl. 365-185.000.

Ohyama, Takumi: See—  
Tanaka, Masahiro; Ohyama, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, 4,958,956, Cl. 405-23.000.

Oikawa, Hideaki: See—  
Tamai, Shoji; Kawashima, Saburo; Sonobe, Yoshiho; Ohta, Masahiro; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,959,440, Cl. 528-125.000.

Ojima, Juji; Ishii, Kazuo; and Numakura, Funio, to NHK Spring Co., Ltd. Tensioner for a chain, a belt or the like. 4,959,041, Cl. 474-111.000.

Oka, Koichiro; and Hagiwara, Ikuo, to Toray Industries, Inc. Powdery adhesive and process for preparation thereof. 4,959,398, Cl. 523-400.000.

Okada, Kazuo: See—  
Sato, Akio; and Okada, Kazuo, 4,959,732, Cl. 358-336.000.

Okada, Shinjiro; Takahashi, Tohru; Kawagishi, Hideyuki; Inaba, Yutaka; and Taniguchi, Osamu, to Canon Kabushiki Kaisha. Liquid crystal apparatus having light quantity of the backlight in synchronism with writing signals. 4,958,915, Cl. 350-345.000.

Okada, Toshihiko; and Uchida, Masanobu, to Daihen Corporation. Detection means for an electric arc torch nozzle. 4,959,520, Cl. 219-121.80.

Okahashi, Makoto: See—  
Nagata, Masanori; Yoshida, Shinya; Yamashita, Susumu; and Okahashi, Makoto, 4,959,788, Cl. 364-408.000.

Okamoto, Shinichi: See—  
Tashiro, Koichi; Okamoto, Shinichi; and Okamoto, Tatsuo, 4,958,835, Cl. 273-85.00G.

Okamoto, Tatsuo; and Ohsaki, Akihiko, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device. 4,959,329, Cl. 437-187.000.

Okamoto, Tatsuo: See—  
Tashiro, Koichi; Okamoto, Shinichi; and Okamoto, Tatsuo, 4,958,835, Cl. 273-85.00G.

Okano, Takashi, to Pioneer Electronic Corporation. Recorded information reproducing apparatus with reading and writing phase adjustment. 4,959,825, Cl. 369-48.000.

Oki Electric Industry Co., Ltd.: See—  
Matsusaka, Yoshiki; and Ushiki, Susumu, 4,959,510, Cl. 174-261.000.

Okino, Kazuo: See—  
Yasunaga, Susumu; and Okino, Kazuo, 4,958,513, Cl. 73-23.200.

Okita, Hiroshi: See—  
Saeiki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.

Okita, Tsutomu: See—  
Aonuma, Masashi; Okita, Tsutomu; Hashimoto, Hiroshi; Araki, Hiroaki; Fukino, Kiyotaka; and Ejiri, Kiyomi, 4,959,263, Cl. 428-329.000.

Okitsu, Nobuyuki: See—  
Hirooka, Toyoki; Murakami, Yuichi; and Okitsu, Nobuyuki, 4,958,613, Cl. 123-572.000.

Okitsu, Shinobu: See—  
Imai, Tadaaki; and Okitsu, Shinobu, 4,959,872, Cl. 455-164.000.

Okubo, Takashi; and Takemura, Toji, to Nissan Motor Co., Ltd. Rotational speed differential responsive type joint. 4,958,711, Cl. 192-60.000.

Okuyama, Kazuhiko, to Sumitomo Heavy Industries Ltd. Insert-type rotary core mold apparatus. 4,959,007, Cl. 425-577.000.

Oldani, Emilio: See—  
Truzzi, Sergio; Oldani, Emilio; and Malter, Ugo, 4,958,614, Cl. 123-585.000.

Oldiges, John H.: See—  
Chaney, David B.; Oldiges, John H.; and Milbourn, Bart L., 4,958,816, Cl. 269-328.000.

Olin Corporation: See—  
Buenemann, Morris C., 4,958,568, Cl. 102-466.000.

Lickel, Donald L.; Rosin, Michael L.; and Shen, Ming, 4,959,156, Cl. 210-701.000.

Mandigo, Frank N., 4,958,569, Cl. 102-476.000.

Olson, Richard H., 4,958,567, Cl. 102-444.000.

Pennington, B. Timothy, 4,959,486, Cl. 549-532.000.

Olin Hunt Specialty Products Inc.: See—  
Blakeney, Andrew J.; Sarubbi, Thomas; and Sizensky, Joseph J., 4,959,292, Cl. 430-165.000.

Buxton, Galina P.; and Shah, Harshad M., 4,959,661, Cl. 346-1.100.

Olivero, Alan G.: See—  
Renga, James M.; Olivero, Alan G.; and Bosse, Mark, 4,959,488, Cl. 560-76.000.

Olsen, Gordon E.: See—  
Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, 4,959,377, Cl. 514-349.000.

Olson, John D., to Syntex (U.S.A.) Inc. Immunoseparating strip. 4,959,307, Cl. 435-7.000.

Olson, Richard H., to Olin Corporation. Training cartridge with improved case for fixing propellant position in powder chamber. 4,958,567, Cl. 102-444.000.

Olympus Optical Co., Ltd.: See—  
Uchiyama, Naoki; Nakada, Akio; Taguchi, Akihiro; Hatta, Shinji; Takayama, Syuichi; Tsukaya, Takashi; Takehana, Sakae; Sekino, Naomi; and Hayashi, Masaaki, 4,958,639, Cl. 128-660.030.

Uehara, Masao; Kanno, Masahide; Sasaki, Masahiko; Sasagawa, Katsuyoshi; Uchikubo, Akinobu; Hasegawa, Jun; Yamashita, Shinji; Saito, Katsuyuki; and Nakagawa, Takehiro, 4,959,710, Cl. 358-98.000.

Omaru, Atsuo: See—  
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Omote, Takuo: See—  
Tomoyasu, Haruo; Tango, Chobe; Omote, Takuo; and Kato, Yoshinori, 4,959,260, Cl. 428-255.000.

Omoto, Noriaki: See—  
Kameoka, Fusahiro; Omoto, Noriaki; and Shogaki, Toshihiro, 4,959,625, Cl. 332-135.000.

Omron Tateisi Electronics Co.: See—  
Nagata, Masanori; Yoshida, Shinya; Yamashita, Susumu; and Okahashi, Makoto, 4,959,788, Cl. 364-408.000.

Onomoto, Ryuichi; Nishikawa, Masato; Ishida, Masaji; and Arimoto, Sachiro, 4,958,825, Cl. 271-119.000.

Sakamoto, Tamaki; Kobayashi, Toshiyuki; Yamamoto, Norihito; and Miyake, Tamio, 4,958,936, Cl. 374-1.000.

Ondria, Jeffrey M.: See—  
Dunn, Harold K.; Lazzeri, Mark A.; and Ondria, Jeffrey M., 4,959,066, Cl. 606-89.000.

O'Neal, Glenn B.; Baker, Quentin A.; McCreedy, Henry E., III; and Terna, Daniele, to Euron S.p.A. Fuel injection nozzle. 4,958,605, Cl. 123-300.000.

Ong, Beng S.; Keoshkerian, Barkev; Baranyi, Giuseppe; and Murti, Dasarao K., to Xerox Corporation. Photoconductive imaging members with diaryl biaryllamine copolymer charge transport layers. 4,959,288, Cl. 430-59.000.

Ono, Kazuhito: See—  
Hihara, Takeshi; Yanagiya, Masahide; and Ono, Kazuhito, 4,958,685, Cl. 166-291.000.

Ono, Masatoshi: See—  
Sato, Akira; and Ono, Masatoshi, 4,958,806, Cl. 256-12.500.

Ono, Tadashi: See—  
Tanaka, Masahiro; Ohyama, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, 4,958,956, Cl. 405-23.000.

Ono, Tsutomu: See—  
Iizumi, Makoto; Ide, Tatsumi; Kanzawa, Noboru; Sekiguchi, Akira; Morimoto, Masayuki; Goto, Hitoshi; and Ono, Tsutomu, 4,959,627, Cl. 335-106.000.

Onodera, Kaoru: See—  
Nishijima, Toyoki; and Onodera, Kaoru, 4,959,300, Cl. 430-546.000.

Onomoto, Ryuichi; Nishikawa, Masato; Ishida, Masaji; and Arimoto, Sachiro, to Omron Tateisi Electronics Company. Paper let-out apparatus. 4,958,825, Cl. 271-119.000.

Onozuka, Kuniharu; and Yoshino, Takashi, to Sony Corporation. Golf simulator. 4,958,836, Cl. 273-184.00R.

Ontario Hydro: See—  
Fihey, Jean-Luc; Hazel, Bruce; Di Vincenzo, Antonio; Tinkler, Mark; and McNabb, Scott, 4,959,527, Cl. 219-124.340.

Ooms, William J.: See—  
Higgins, Robert J., Jr.; Ooms, William J.; and Irwin, James S., 4,959,624, Cl. 331-116.00R.

Ootani, Takayuki, to Kabushiki Kaisha Toshiba. Error preventing circuit. 4,959,560, Cl. 307-443.000.

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Op Den Camp, Eckard, to Lucas Industries public limited company. Spot-type disc brake. 4,958,703, Cl. 188-73.310.

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Martischus, Franz-Dieter; Rath, Hans P.; Vogel, Hans-Henning; Greif, Norbert; Oppenlaender, Knut; Denzinger, Walter; and Hartmann, Heinrich, 4,959,077, Cl. 44-62.000.

Oppl, Othmar; Rupp, Wilhelm; and Wahnoud, Adnan, to Lindauer Dornier Gesellschaft GmbH. Air jet loom with a jacquard frame and a variable drawing-in width. 4,958,664, Cl. 139-435.100.

Oprysko, Modest M.: See—  
Fan, Bunsen; Oprysko, Modest M.; and Rand, Ricky A., 4,959,540, Cl. 250-227.120.

Optische Werke G. Rodenstock: See—  
Melzig, Manfred, 4,959,471, Cl. 544-71.000.

Ormat Turbines, Ltd.: See—  
Regev, Mordechai, 4,958,988, Cl. 417-53.000.

Ortega, Augustin P. A.: See—  
Sanchez, Florentina S.; Susan, Victor R.; Soto, Miguel A. P.; and Ortega, Augustin P. A., 4,959,327, Cl. 435-172.300.

Ortho Pharmaceutical Corporation: See—  
Kung, Patrick C.; and Goldstein, Gideon, 4,959,458, Cl. 530-387.000.

Ortiz, Angel L., Jr., to General Electric Company. Multi-fiber holder for output coupler and methods using same. 4,958,900, Cl. 350-96.180.

Osada Electric Co., Ltd.: See—  
Mori, Hidenobu, 4,958,423, Cl. 29-235.000.

Osada Research Institute, Ltd.: See—  
Kojima, Toshio, 4,959,063, Cl. 606-15.000.

Osaka Titanium Co., Ltd.: See—  
Yamamoto, Shigeo; and Noda, Toshio, 4,959,603, Cl. 320-1.000.

Osaka, Victor: See—  
Chan, Mary K.; and Osaka, Victor, 4,958,454, Cl. 40-495.000.

Osborne, James J.: See—  
Nebe, William J.; and Osborne, James J., 4,959,295, Cl. 430-281.000.

Oshima, Kunio: See—  
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Oshima, Masahiko; Ohta, Takumi; and Hatori, Toshiyuki, to 501 Hitachi Metals, Ltd. Wear-resistant compound roll. 4,958,422, Cl. 29-129.500.

Oshima, Minoru: See—  
Iino, Shinji; Oshima, Minoru; Kitoh, Shinya; and Kobayashi, Toshiaki, 4,959,104, Cl. 106-85.000.

O'Sullivan, Anthony C.: See—  
Frei, Bruno; Merreyala, Hari B.; O'Sullivan, Anthony C.; Sato, Kazuo; and Yanai, Toshiaki, 4,959,386, Cl. 514-450.000.

Oswald, Richard: See—  
Berg, Robin; Mohns, Lawrence; and Oswald, Richard, 4,958,957, Cl. 405-55.000.

Ota, Hiroyuki; and Sato, Kazuhiko, to Pioneer Electronic Corporation. Magnetic head with a controlled gap width. 4,959,741, Cl. 360-122.000.

Ota, Ken: See—  
Yamamoto, Tadashi; and Ota, Ken, 4,958,610, Cl. 123-478.000.

Otake, Katsumi; Sakamoto, Kiichiro; and Kogane, Mikio, to Fuji Photo Film Co., Ltd. Photographic picture display, apparatus and method of making elemental prints thereof. 4,959,683, Cl. 355-28.000.

Otake, Masaaki, to Sekisui-Iko Co., Ltd. Adhesive container/feeder. 4,958,748, Cl. 222-131.000.

Otsuki, Shinnichi: See—  
Ijuin, Kazuya; Otsuki, Shinnichi; Nakano, Yuji; and Ogushi, Hiroshi, 4,959,536, Cl. 250-216.000.

Otsuki, Toshiaki: See—  
Kawamura, Hideaki; Fujibayashi, Kentaro; and Otsuki, Toshiaki, 4,959,597, Cl. 318-568.150.

Ott, Quenter, to Siemens Aktiengesellschaft. Electrical component in chip structure and method for the manufacture thereof. 4,959,505, Cl. 174-52.200.

Ott, Karl H.: See—  
Schmidt, Adolf; Hendricks, Udo W.; Bomer, Bruno; Ott, Karl H.; Eichenauer, Herbert; and Pischtschan, Alfred, 4,959,419, Cl. 525-301.000.

Ott, Karl-Heinz: See—  
Eichenauer, Herbert; Leitz, Edgar; Ott, Karl-Heinz; Lindner, Christian; Meier, Lothar; and Billinger, Otto, 4,959,410, Cl. 525-67.000.

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Otto Bock Orthopädische Industrie Besitz-Und Verwaltungs - KG: See—  
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Outokumpu Oy: See—  
Harjunpaa, Harri J., 4,958,490, Cl. 60-274.000.

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Owechko, Yuri, to Hughes Aircraft Company. Optical neural network and method. 4,959,532, Cl. 250-201.900.

Owens, R. Larry; and McClellan, Paul G. Elastic patch for holes in walls. 4,959,251, Cl. 428-41.000.

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Oy Helo-Tehtaat-Helo Factories, Ltd.: See—  
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Oy Tampella AB: See—  
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Ozaki, Fumihiko: See—  
Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiko; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, 4,959,376, Cl. 514-338.000.

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Yamamoto, Masaki; Sato, Hisashi; and Ozaki, Keiichi, 4,959,018, Cl. 439-76.000.

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Mitsui, Akio; and Ozawa, Takashi, 4,959,298, Cl. 430-496.000.

Ozawa, Tetsuo: See—  
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Engelmann, William H.; Watson, Pamela J.; Tuzinski, Patrick A.; Pahlman, John E.; and Khalafalla, Sanaa E., 4,959,164, Cl. 252-8.510.

Pai, Damodar M.; Perry, Philip G.; and Pheishifter, Kenneth J., to Xerox Corporation. Xeroradiographic imaging member. 4,959,287, Cl. 430-59.000.

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Hearn, John A.; Schwarz, Dwight L.; Sarma, Dwadasi H. R.; and Palanisamy, Ponnusamy, 4,959,751, Cl. 361-406.000.

Palazzotto, Michael C., to Minnesota Mining and Manufacturing Company. Ternary photoinitiator system for addition polymerization. 4,959,297, Cl. 430-322.000.

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Brunner, Maureen; and Palefsky, Howard, 4,959,205, Cl. 424-59.000.

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Cook, David C.; Hart, Terence W.; McLay, Iain M.; Palfreyman, Malcolm N.; Walsh, Roger J.; and Aloup, Jean-Claude, 4,959,385, Cl. 514-431.000.

Pall Corporation: See—  
Degen, Peter J., 4,959,150, Cl. 210-638.000.

Palm, Bernhard, to Milwaukee Electric Tool Corporation. Self disengaging keyless chuck. 4,958,840, Cl. 279-62.000.

Palmer, Herbert A., to United States of America, Navy. Combustion efficiency analyzer, acoustic. 4,959,638, Cl. 340-577.000.

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Hillstrom, David U.; Palmer, Randall; and Hillstrom, Brian J., 4,958,458, Cl. 40-156.000.

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Pantini, Giovanni; and Savonelli, Susanna, to Ausimont S.r.l. Syndet soap cakes (soap bars) having improved properties. 4,959,171, Cl. 252-174.000.

Panunto, Thomas W.: See—  
Eiter, Margaret C.; Frankenbach, Gayle M.; and Panunto, Thomas W., 4,959,477, Cl. 546-307.000.

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Matzner, Markus; and Papuga, Donald M., 4,959,424, Cl. 525-471.000.

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Park, Kyung T.: See—  
Thompson, Mitchell L.; Park, Kyung T.; Ogale, Kumar; and Powers, William B., 4,959,807, Cl. 364-565.000.

Park, You K., to Allied-Signal Inc. Content induced transaction overlap (CITO) block transmitter. 4,959,843, Cl. 375-59.000.

Parker, Julie W. Cocktail napkin. 4,958,798, Cl. 248-346.100.

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Parker, William S. Low vision eye glasses. 4,958,924, Cl. 351-57.000.

Parks, Donald J. Extendable trailer apparatus. 4,958,845, Cl. 280-407.100.

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- Parsons, Bryan N. V., to Jaguar Cars Limited. Mechanism for transmitting rotational motion from one shaft to another. 4,958,531, Cl. 74-63.000.
- Partis, Richard A.: See—  
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- Parzuchowski, Douglas A.: See—  
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- Pascale, Carmine: See—  
De Leonibus, Vittore; and Pascale, Carmine, 4,959,117, Cl. 156-497.000.
- Pasman, Johannes H. T.; and Van Hijningen, Nicolaas C. J. A., to U.S. Philips Corporation. Record-carrier body provided with a relief structure of optically detectable servo-track portions and sector addresses and apparatus for forming said structure. 4,959,822, Cl. 369-44.110.
- Pasztor, Andrew J., Jr.: See—  
Seitz, Jerry T.; Berglund, Charles A.; and Pasztor, Andrew J., Jr., 4,959,435, Cl. 526-347.200.
- Pasztor, Endre: See—  
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- Patel, Ajitkumar G., to Dresser Industries, Inc. Pressure relief valve. 4,958,656, Cl. 137-467.000.
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Hirschmann, Walter, 4,959,591, Cl. 315-209.00R.
- Patil, Ghanashyam; Matier, William L.; and Mai, Khuong H. X., to Du Pont de Nemours, E. I., and Company. Polyhydroxybenzyloxypropanolamines. 4,959,390, Cl. 514-522.000.
- Peace, Steven L.; and Petrovic, John E., to Teledyne Industries, Inc. Water-powered oral hygiene device. 4,958,629, Cl. 128-66.000.
- Pearson, Norman R.; Kleschick, William A.; and Carson, Chrislyn M., to Dow Chemical Company. The 7-ethoxy-5-fluoromethyl-1,2,4-triazolo[1,5]-pyrimidine-2-sulfonamides. 4,959,473, Cl. 544-263.000.
- Pedersen, Hans N., to I. C. Moller A/S. Subterranean heat insulated pipe system with a bending, and a method of establishing such a system. 4,958,958, Cl. 405-154.000.
- Peelle Company, The: See—  
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- Peery, John R.: See—  
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- Peets, Edwin A.: See—  
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- Penney, Carl M.; and Chande, Tushar S., to General Electric Company. Temperature measurement and control for photothermal processes. 4,959,244, Cl. 427-53.100.
- Pennington, B. Timothy, to Olin Corporation. Alkylene oxides production from alkanes or alkylaromatics using molten nitrate salt catalyst. 4,959,486, Cl. 549-532.000.
- Pepper, David M.: See—  
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- Perala, Reijo: See—  
Kivimaa, Antti; and Perala, Reijo, 4,959,527, Cl. 219-365.000.
- Peralta, Noel C.: See—  
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- Perfetti, Gary L., to Shell Oil Company. Apparatus for repairing brick/refractory in a process heater. 4,959,012, Cl. 432-76.000.
- Perrault, Ronald. Mobile work station for podiatrist. 4,958,963, Cl. 408-56.000.
- Perry, Philip G.: See—  
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- Persson, Lars-Olov, to Pressmaster Tool AB. Cable stripping tool. 4,958,433, Cl. 30-91.200.
- Peter, Heinz; and Schurger, Rainer, to SKF GmbH. Axial rolling bearing. 4,958,947, Cl. 384-609.000.
- Petersen, Lars-Goran, to Telefonaktiebolaget L M. Ericsson. Method and apparatus for through-connecting a wideband connection in a digital time switch. 4,959,830, Cl. 370-108.000.
- Petho, Lajos, to Kavivitrumb AB. Apparatus for treating articles with a gaseous and/or liquid medium. 4,958,649, Cl. 134-159.000.
- Petrovic, John E.: See—  
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- Petty, John; and McNeil, Sandy, to Elconex Pty. Limited. Junction box. 4,959,506, Cl. 174-65.00R.
- Pfaffhauser, Hans-Ulrich: See—  
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- Pfeiffer, Douglas R.: See—  
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- Pfeiffer, Pierre; Cheval, Benoit; and Sigwalt, Paul, to Sotralentz S.A. Process for making a plastic container by blow molding. 4,959,190, Cl. 264-516.000.
- Pfizer Inc.: See—  
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- Francocour, Michael L.; and Potts, Russell O., 4,959,365, Cl. 514-237.500.
- Pfleiderer, Hans-Joerg: See—  
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- Pheishifter, Kenneth J.: See—  
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- Phillips, Gordon H.; and Lester, Michael O., to Glaxo Group Limited. Isoquinoline derivatives with anti-tumor activity. 4,959,371, Cl. 514-283.000.
- Phillips, Larry G.: See—  
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- Phillips Petroleum Company: See—  
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- Physical Optics Corporation: See—  
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- Picker International, Inc.: See—  
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- Piera, Henri, to SEB S.A. Enamel coating charged with glass beads for the bottom of cooking utensils and utensils coated in this manner. 4,959,256, Cl. 428-144.000.
- Piera, James: See—  
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- Pierre Fabre Medicament: See—  
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- Piesen, Stephan: See—  
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- Pilkington plc: See—  
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- Pinch, William D.; Dolengowski, Douglas A.; Longard, R. Kevin; and Gopwani, Raj K., to Saturn Corporation. Mounting assembly and method for a damper. 4,958,449, Cl. 280-668.000.
- Pinchott, Gordon A., to Sundstrand Corporation. Rotating rectifier assembly. 4,959,707, Cl. 357-76.000.
- Pinschmidt, Robert K., Jr.: See—  
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- Pioneer Electronic Corporation: See—  
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- Ota, Hiroyuki; and Sato, Kazuhiko, 4,959,741, Cl. 360-122.000.
- Pioneer Manufacturing, Inc.: See—  
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- Pipes, George R., to Eaton Corporation. Stacker alignment device. 4,958,440, Cl. 33-645.000.
- Piro, Israel. Theft proof protective covering for parked vehicle. 4,958,881, Cl. 296-98.000.
- Pischtschan, Alfred: See—  
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- Schmidt, Adolf; Hendricks, Udo W.; Bomer, Bruno; Ott, Karl H.; Eichenauer, Herbert; and Pischtschan, Alfred, 4,959,419, Cl. 525-301.000.
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- DiGiulio, Peter C.; Bergman, Norman J.; Ramirez, Frank D.; and Salazar, Edilberto I., 4,959,600, Cl. 318-625.000.
- Pittway Corporation: See—  
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- Planells, Carlos C.: See—  
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- Plaschka, Reinhard: See—  
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- Plath, Peter: See—  
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- Pleasant, Ronald E. Inserts for injection mold machine. 4,959,002, Cl. 425-192.00R.
- Pletsch, Hubert: See—  
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- Plueguett, Ulrich: See—  
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- Plummer, David D., to Andersen Corporation. Collapsible window flange apparatus. 4,958,469, Cl. 52-213.000.
- Podd, George O.: See—  
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- Pollina, Peter J. Brick supporting structure. 4,958,475, Cl. 52-712.000.
- Polyplastics Co., Ltd.: See—  
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- Polystyrene Limited: See—  
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- Potts, Russell O.: See—  
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- Pourahmady, Nasser: See—  
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- Powell, Kevin T.: See—  
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- Powell, William V., Jr.: See—  
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- Powers, William B.: See—  
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- PPG Industries, Inc.: See—  
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- Misura, Michael S.; and Sare, Edward J., 4,959,429, Cl. 526-230.500.
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- Precision Cutters, Inc.: See—  
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- Preece, Alan W.; and Follett, Douglas H. Cell fusion apparatus. 4,959,321, Cl. 435-284.000.
- Prees, Michael R.: See—  
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- Precision Porous Pipe, Inc.: See—  
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- Pressmaster Tool AB: See—  
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- Prestek, Inc.: See—  
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- Prime Computer, Inc.: See—  
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- Printec: See—  
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- Prince Corporation: See—  
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- Pritchard, Parmely H.: See—  
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- Procter & Gamble Company, The: See—  
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- Spendel, Wolfgang U., 4,959,125, Cl. 162-158.000.
- Proctor & Gamble Company, The: See—  
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- Quick, Edward E.: See—  
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- R&G Sloane Manufacturing Co.: See—  
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- Rabaza, Maria V.: See—  
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- Russell, Peter G., to Morton Thiokol Inc. Method for lining the inner surface of a cylindrical or domed cylindrical member with an elastic material. 4,959,110, Cl. 156-187.000.
- Rutherford, Peter M.: See—  
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- Ryan, Timothy J. Power rain gutter cleaning tool. 4,958,397, Cl. 15-93.100.
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- Sacki, Kenichi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, to Nihon Parkerizing Co., Ltd.; and Mitsubishi Kasei Corporation. Process for treating plated steel sheet. 4,959,277, Cl. 428-623.000.
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- Saito, Mitsuo: See—  
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- Sakagami, Teruo: See—  
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- Sakai, Mari, to W. L. Gore & Associates, Inc. Culturing apparatus. 4,959,322, Cl. 435-311.000.
- Sakakibara, Hiroshi: See—  
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- Sakakibara, Susumu: See—  
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- Sakama, Mitsunori: See—  
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- Sakata, Tsutomu: See—  
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- Sakurada, Nobuaki: See—  
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- Salazar, Edilberto I.: See—  
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- Sallman, Alfred: See—  
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- Salzgitter Maschinenbau GmbH: See—  
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- Sampson, Craig F.: See—  
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- Samsung Electronics Co., Ltd.: See—  
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- Sanger, Gregory M.: See—  
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- San Soucie, Marc D.: See—  
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- Santa Fe Braun Inc.: See—  
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- Sanyo Electric Co., Ltd.: See—  
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- Sapienza, Michael A.: See—  
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- Sardi, William F.: See—  
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- Sare, Edward J.: See—  
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- Oates, Stephanie J.; and Sare, Edward J., 4,959,433, Cl. 128-87.00B.
- Sarkozi, Jeff. Self adjusting, soft neck support collar. 4,958,631, Cl. 428-87.00B.
- Sarma, Dwadasi H. R.: See—  
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- Sarubbi, Thomas: See—  
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- Saruta, Makoto; and Suzuki, Tatsuhiro, to NCR Corporation. Optical wireless communication system. 4,959,874, Cl. 455-601.000.
- Saruta, Masahiro: See—  
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- Sasagawa, Katsuyoshi: See—  
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- Sasajima, Koji: See—  
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- Sasaki, Fujio: See—  
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- Sasaki, Hiroaki: See—  
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- Sasaki, Masahiko: See—  
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- Sasaki, Tadayuki: See—  
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- Sato, Akio; and Okada, Kazuo, to Fuji Photo Film Co., Ltd. Still video signal playback apparatus for converting an input video signal into a noise cancelled, drop-out compensated playback signal. 4,959,732, Cl. 358-336.000.
- Sato, Akira; and Ono, Masatoshi, to Nihon Samicon Co., Ltd. Snow-storm guard fence structures and jet roofs. 4,958,806, Cl. 256-12.500.
- Sato, Hisashi: See—  
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- Sato, Kazuhiko: See—  
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- Sato, Kazuo: See—  
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- Sato, Koji: See—  
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- Sato, Kunio: See—  
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- Sato, Noboru: See—  
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- Sato, Takashi: See—  
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- Sato, Toshifumi, to NEC Corporation. Paging receiver with a display function that inhibits display of a received command signal. 4,959,644, Cl. 340-825.440.
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- Satoh, Shinji; Isomichi, Kanji; Ogawa, Hiroshi; Yamashita, Toshio; and Funahashi, Nobuhiro, to Mitsubishi Jukogyo K.K. Controller for a refrigeration unit. 4,958,502, Cl. 62-126.000.
- Satoh, Shuichi; and Tsuji, Kazuo, to Sumitomo Electric Industries, Ltd. Green diamond and method of producing the same. 4,959,201, Cl. 423-446.000.
- Satoh, Tsumori, to Ricoh Company, Ltd. Magnetic brush forming device for image generating apparatus. 4,959,691, Cl. 355-246.000.
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- Pinch, William D.; Dolengowski, Douglas A.; Longard, R. Kevin; and Gopwani, Raj K., 4,958,849, Cl. 280-668.000.
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- Sauer, Harry: See—  
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- Savage, Donald S.: See—  
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- Savio S.p.A.: See—  
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- Savonelli, Susanna: See—  
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- Sawyer, Willard H.: See—  
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- Schaap, Arthur P., to Board of Governors of Wayne State University. Method and compositions providing enhanced chemiluminescence from 1,2-dioxetanes. 4,959,182, Cl. 252-700.000.
- Schaffer, Irving, to Luxo Lamp Corporation. Magnifier lens assembly. 4,958,913, Cl. 350-252.000.
- Schaffers, Frederik J.: See—  
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- Schafhaupt, Horst, to Rheinhold & Mahla GmbH. Protective facility for suppressing noise produced at high gas flows by engines installed on aircraft. 4,958,700, Cl. 181-218.000.
- Scharrer, Roland P. F.: See—  
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- Scheib, Thomas J.: See—  
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- Scheldorf, Owen H.: See—  
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- Schenck, Stephen R., to Texas Instruments Incorporated. Adjustable low noise output circuit. 4,959,563, Cl. 307-448.000.
- Schenk, Richard C., to Xerox Corporation. Damped binding apparatus. 4,958,974, Cl. 412-37.000.
- Scherer, Angela: See—  
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- Schilling, Bernd; Brink, Gerhard; Harder, Ingo; and Wiest, Hubert. Self-crosslinking vinyl ester dispersions having a reduced formaldehyde content or containing no formaldehyde for strengthening textile fiber structures. 4,959,249, Cl. 427-387.000.
- Schleifstein, Robert A., to Ethyl Corporation. Polybrominated bis sulfonamides. 4,959,500, Cl. 564-82.000.
- Schliht, Steven C., to GTE Products Corporation. Cosmetic tanning lamp and system having adjustable UVB proportion. 4,959,551, Cl. 250-504.00R.
- Schlobohm, Michael: See—  
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- Schlumberger Industries, S.A.: See—  
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- Schmidt, Adolf; Hendricks, Udo W.; Bomer, Bruno; Ott, Karl H.; Eichenaue, Herbert; and Pischtschan, Alfred, to Bayer Aktiengesellschaft. Polymeric emulsifiers based on aminotelecheic oligomers I. 4,959,419, Cl. 525-301.000.
- Schmidt, Charles J. Robot cleaner for use between parallel platens. 4,958,398, Cl. 15-93.100.
- Schmidt, David A.: See—  
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- Schmidt, Douglas C., to AT&T Bell Laboratories. Interconnection medium. 4,959,555, Cl. 307-219.000.
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- Schmidtberg, Werner: See—  
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- Schmidberg, Winfried F., to SMS Engineering Incorporated. Article centering device. 4,958,718, Cl. 196-456.000.
- Schmitt, Thomas J.: See—  
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- Schneider, Georg: See—  
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- Schneider Metal Manufacturing Co.: See—  
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- Schou, Gudrun, heiress: See—  
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- Schou, Herbert W. D., deceased (by Schou, Gudrun, heiress); and Dreyer, Jack A., to NEXUS ApS. Emulsifier and a method for its preparation. 4,959,233, Cl. 426-443.000.
- Schowiak, Duane C., to Ford Motor Company. Compressed O-ring spray gun needle valve seal. 4,958,769, Cl. 239-114.000.
- Schrinkel, Kenneth R.: See—  
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- Schroepel, Ralph: See—  
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- Schubert & Salzer Maschinenfabrik Aktiengesellschaft: See—  
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- Schug, Stanley M., to Venture Lighting International, Inc. Arc tube assembly. 4,959,587, Cl. 313-623.000.
- Schultz, Gregory L.: See—  
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- Schultz, Robert G.: See—  
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- Schulze, Eckehart. Hydraulic drive mechanism. 4,958,548, Cl. 91-420.000.
- Schuriger, Rainer: See—  
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- Schutt, Hans U., to Shell Oil Company. Reducing stress corrosion cracking in treating gases with alkanol amines. 4,959,177, Cl. 252-391.000.
- Schutten, Herman P.; Stephenson, Dwight B.; and Haarstad, Donald M., to Eaton Corporation. Open-center steering control unit with flow amplification. 4,958,493, Cl. 60-384.000.
- Schwabe, Barbara; Plath, Peter; Eicken, Karl; Rueb, Lothar; Wuerzer, Bruno; Westphalen, Karl-Otto; and Meyer, Norbert, to BASF Aktiengesellschaft. N-substituted 3,4,5,6-tetrahydrothalamide derivatives. 4,959,098, Cl. 71-95.000.
- Schwartz, Bradley N.; Kugler, Stanley; and Selg, Donald W., to Rosemount Inc. Temperature transmitter with integral secondary seal. 4,958,938, Cl. 374-208.000.
- Schwartz, Wilbur E., Jr.: See—  
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- Schwartzkopf, George; Covington, John B.; and Gabriel, Kathleen B., to J. T. Baker, Inc. Deep UV photoresist with alkyl 2-diazo-1-ones as solubility modification agents. 4,959,293, Cl. 430-189.000.
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- Schwarz, Richard A.: See—  
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- Scott & Fyfe Limited: See—  
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- Scott, James; and Mosley, Dennis, to Lotto Pick Quick Winning Odds, Ltd. System and method for choosing random numbers and delivering such numbers to subscribers for playing games of chance. 4,959,783, Cl. 364-412.000.
- Scott, Kenneth C.; and Schauder, Colin D., to Westinghouse Electric Corp. Ac motor drive with improved voltage-source inverter. 4,959,602, Cl. 318-803.000.



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Job, Robert C., 4,959,336, Cl. 502-107.000.  
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- Spaeth, Michael M. Fire protection filter. 4,958,554, Cl. 98-1.000.
- Spain, Patrick L.: See—  
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- Spalding & Evenflo Co., Inc.: See—  
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- Spallone, John J.; Doyle, William E.; and Cawley, Peter, to Dexter Systems, Inc. Automated shopping order entry system. 4,959,686, Cl. 364-401.000.
- Spamer, William S., to Mead Corporation. The Composite organizer and gravity feed shelf. 4,958,739, Cl. 211-153.000.
- Spangenberg, Robert E., to Hunter Douglas International N.V. Method for assembling a venetian blind. 4,958,421, Cl. 29-24.500.
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- Spectra-Physics, Inc.: See—  
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- Speiser, Peter P.; and Joshi, Rajendra K. Pharmaceutical preparation for the treatment of psoriatic arthritis. 4,959,389, Cl. 514-494.000.
- Spendel, Wolfgang U., to Procter & Gamble Company. The Soft tissue paper containing noncationic surfactant. 4,959,125, Cl. 162-158.000.
- Spiliadis, Apostol: See—  
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- Springs Industries, Inc.: See—  
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- Stanley, James P.: See—  
Fan, You-Ling; Brode, George L.; and Stanley, James P., 4,959,432, Cl. 526-287.000.
- Stanley, Thomas R., to Teepack, Inc. Dual tube stuffing horn with expanding spring for size control. 4,958,411, Cl. 17-41.000.
- Stardent Computer, Inc.: See—  
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- Starr, Ruth L.: See—  
Blandino, Thomas; and Starr, Ruth L., 4,958,636, Cl. 128-630.000.
- Staschewski, Harry: See—  
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- Stasz, Peter; Solberg, Jeffrey J.; and Grabinger, Scott R., to Everest Medical Corporation. Method of making an electrosurgical spatula blade. 4,958,539, Cl. 76-104.100.
- Stater, Vernon L. Apparatus for adjusting the resting heights of free-moving barbells on weight-training racks or stands. 4,958,833, Cl. 272-123.000.
- Stautzenberger, Adin L.; Quick, Edward E.; and Lobo, Peter F., to Hoechst Celanese Corporation. Process for preparing low color polyarylates. 4,959,449, Cl. 528-271.000.
- Steele, Randy C., to SGS-Thomson Microelectronics, Inc. Sense amplifier power down circuitry for programmable logic device. 4,959,564, Cl. 307-465.000.
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- Steininger, Helmut; and , to BASF Aktiengesellschaft. Production of a sheet-like, multilayer magneto-optical recording material. 4,959,243, Cl. 427-48.000.
- Steinke, Leo: See—  
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- Stellar, Albert: See—  
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- Stenger, Claudia V.: See—  
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- Stephens, Charles M.: See—  
MacMinn, Stephen R.; Stephens, Charles M.; and Szczesny, Paul M., 4,959,596, Cl. 318-254.000.
- Stephens, William F. N., to Renishaw Plc. Opto-electronic scale-reading apparatus. 4,959,542, Cl. 250-237.000.
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Schutten, Herman P.; Stephenson, Dwight B.; and Haarstad, Donald M., 4,958,493, Cl. 60-384.000.
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Aldrich, Jay L., 4,958,461, Cl. 47-41.010.
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- Sterling, Duane M. Kite. 4,958,787, Cl. 244-153.000.
- Sterling, Charles V., to Shell Oil Company. Process for gasification of coal utilizing reactor protected internally with slag coalescing materials. 4,959,080, Cl. 48-210.000.

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- Stettner, Ernest R.; Stoltman, Donald D.; and Taylor, Robert S., to General Motors Corporation. Fuel injection. 4,958,773, Cl. 239-584.000.
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- Stirling, Robert; and Coombes, Steven A., to Electricity Association Services Limited; and APV U.K. Limited, part interest to each. Apparatus for heating an electrically conductive flowable material flowing through a pipeline. 4,959,525, Cl. 219-291.000.
- Stoffel, Florence: See—  
Bendel, Lee; and Stoffel, Florence, 4,959,068, Cl. 606-222.000.
- Stokes, Brian P., to General Scanning, Inc. Dynamically tunable resonant device with electric control. 4,959,568, Cl. 310-51.000.
- Stoltman, Donald D.: See—  
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- Stone, R. Douglas; and Turner, Thomas W., to Welch Allyn, Inc. Interchangeable laryngeal blade. 4,958,624, Cl. 128-11.000.
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- Strasser, Wilhelm: See—  
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- Strobel, Ronald T.: See—  
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- Strohm, Karl: See—  
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- Strubbe, Hugo J.; and Gentner, Donald R., to North American Philips Corporation. Picture-in-picture television receiver control. 4,959,719, Cl. 358-183.000.
- Stuffer, Siegfried; Hetzendorf, Georg; Fransen, Benedictus C. H.; Rijnbeek, Antonius G.; and Schmickl, Helfried, to U.S. Philips Corporation. Electrolytic capacitor. 4,959,754, Cl. 361-527.000.
- Stupakis, John S., to JSS Scientific Corporation. Folding anchor. 4,958,586, Cl. 114-297.000.
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- Sturm, Paul A.: See—  
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- Sturzenbecher, Bruno: See—  
Siebrand, Gerhard; and Sturzenbecher, Bruno, 4,958,566, Cl. 102-400.000.
- Stutz, Gerhard: See—  
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- Submarine and Surface Blaster Pty. Limited: See—  
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- Suckling, Colin J.: See—  
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- Suda, Yoshihisa, to Mitsubishi Pencil Co., Ltd. Process for producing acoustic carbon diaphragm. 4,959,185, Cl. 264-81.000.
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- Suddeutsche Kuehlerfabrik Julius Fr. Behr GmbH & Co. KG: See—  
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- Suder, William H., III: See—  
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- Suganuma, Buro; Nishimura, Shinichi; and Takeshita, Akihiko, to Murata Kikai Kabushiki Kaisha. Apparatus for producing spun yarn. 4,958,487, Cl. 57-328.000.
- Suganuma, Tatsumi; Nozue, Shigehiro; Fukuoka, Tatsuhiko; Noguchi, Naoto; and Takenaka, Akira, to Taiho Kogyo Co. Ltd. Wet clutch device. 4,958,712, Cl. 192-70.120.
- Sugimura, Nobuyuki. Internal-pressure-bearing female screw. 4,958,973, Cl. 411-423.000.
- Sugita, Masahiko. Line cleaning apparatus. 4,958,400, Cl. 15-79.100.
- Sugiyama, Nobuaki: See—  
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- Suguro, Kyoichi, to Kabushiki Kaisha Toshiba. Capacitor and method for producing the same. 4,959,745, Cl. 361-31.000.
- Sukenobu, Satoru, to Kabushiki Kaisha Toshiba. Energy analyzer. 4,959,544, Cl. 250-305.000.
- Sullivan, Thomas P. Harness integrity tester (hit). 4,959,792, Cl. 364-579.000.
- Sulzer Brothers Limited: See—  
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- Ziegler, Georg, 4,959,078, Cl. 48-128.000.
- Sumitomo Electric Industries, Ltd.: See—  
Hagiwara, Yoshitoshi; Koya, Eitaro; Hayashi, Tetsuya; and Takeda, Yoshinobu, 4,959,276, Cl. 428-614.000.
- Kusui, Jun; Kawai, Masahiko; Odani, Yusuke; and Takeda, Yoshinobu, 4,959,195, Cl. 419-67.000.
- Satoh, Shuichi; and Tsuji, Kazuo, 4,959,201, Cl. 423-446.000.
- Tanaka, Satoshi, 4,958,778, Cl. 242-25.00A.
- Ueno, Keiji; and Uda, Ikujiro, 4,959,266, Cl. 428-383.000.
- Sumitomo Heavy Industries Ltd.: See—  
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- Sumitomo Metal Industries, Ltd.: See—  
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- Sumitomo Precision Products Co., Ltd.: See—  
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- Sumitomo Rubber Industries, Ltd.: See—  
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- Sumitomo Special Metals Co., Ltd.: See—  
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- Sumitomo Wiring System, Ltd.: See—  
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- Sumiya, Mitsuo: See—  
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- Sun, Deyu: See—  
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- Sun-Diamond Growers of California: See—  
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- Sun Refining & Marketing Company: See—  
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- Sun, Yun C., to Dow Chemical Company. The Multilayer sheet. 4,959,271, Cl. 428-476.300.
- Sun, Yun C., to Dow Chemical Company. The Polymeric blend composition. 4,959,416, Cl. 525-222.000.
- Sunda, Fumihiko: See—  
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- Sundstrand Corporation: See—  
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- Vaidya, Jayant; and Belanger, David J., 4,959,605, Cl. 322-10.000.
- Suntec Industries Incorporated: See—  
Harwath, Frank L., 4,958,997, Cl. 418-171.000.
- Suntory Limited: See—  
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- Sure-Cast Pattern Works, Inc.: See—  
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- Suria, Vladimir, to Ardac, Inc. (Dixie-Narco, Inc.). Transport system for currency validator. 4,958,715, Cl. 194-206.000.
- Susan, Victor R.: See—  
Sanchez, Florentina S.; Susan, Victor R.; Soto, Miguel A. P.; and Ortega, Agustin P. A., 4,959,327, Cl. 435-172.300.
- Sutherland, Fred R.: See—  
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- Suto, Akihiko: See—  
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- Suyama, Tadakazu: See—  
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- Suzuki, Go, to NGK Insulators, Ltd. Ceramic substrates and method of manufacturing the same. 4,959,255, Cl. 428-143.000.
- Suzuki, Hidemasa; Tokunaga, Ichiro; Abe, Hiraku; and Ogawa, Yasuaki, to Alps Electric Co., Ltd. Precision Gap Magnetic Encode Device. 4,959,574, Cl. 310-91.000.
- Suzuki, Hironori: See—  
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- Suzuki, Hiroshi: See—  
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- Suzuki, Hiroyuki, to NEC Corporation. Microcomputer having function of generating data signals used for displaying characters. 4,959,793, Cl. 364-900.000.
- Suzuki Jidosha Kogyo Kabushiki: See—  
Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Taksumi, Takumi; and Yamamoto, Hiroaki, 4,958,538, Cl. 74-866.000.
- Suzuki, Katsushi: See—  
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- Suzuki, Keiji: See—  
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- Suzuki, Kiyoko: See—  
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- Suzuki, Masato: See—  
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- Suzuki, Motokazu: See—  
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- Suzuki, Motoyuki: See—  
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- Suzuki, Seichi: See—  
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- Suzuki, Takanori: See—  
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- Suzuki, Tatsuhiko: See—  
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- Suzuki, Tetsuo: See—  
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- Suzuki, Tetsuo: See—  
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- Suzuki, Tomio: See—  
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- Suzuki, Yoshinori: See—  
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- Svensson, Ingemar: See—  
Svensson, Ingemar. Arrangement for a lift adapted to a motor vehicle. 4,958,979, Cl. 414-549.000.
- Swagerty, Billy H., to O'Bryant, Carl E.; and O'Bryant, Linda K. Modular tack room. 4,958,594, Cl. 119-7.000.
- Swain, Eugene A.; Menzin, Marvin; Agranat, Edward A.; Cofek, Henry R.; and Fisher, Daniel J., to Xerox Corporation. Apparatus and process for preparing belts. 4,959,109, Cl. 156-73.400.
- Swanson, Craig A., to Schneider Metal Manufacturing Co. Ice cooled beverage dispenser and method of making same. 4,958,505, Cl. 62-398.000.
- Swart, Nicolaas C., to Heuft-Quaflplus B.V. Inspection device. 4,959,538, Cl. 250-232.00B.
- Swartzendruber, James A., to Deere & Company. Transmission control structure including a combination direction and cruise control and a brake interlock. 4,958,535, Cl. 74-481.000.
- Sweeny, Wilfred, to Du Pont de Nemours & E. I., and Company. Process for the preparation of a poly(paraphenylene terephthalamide)/fibrous gel composition and a process to produce poly(paraphenylene terephthalamide) paper from the composition. 4,959,453, Cl. 528-336.000.
- Switchcraft Inc.: See—  
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- Syntax (U.S.A.) Inc.: See—  
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- Nelson, Peter H.; Allison, Anthony C.; Eugui, Elsie M.; and Muchowski, Joseph M., 4,959,387, Cl. 524-469.000.
- Olson, John D., 4,959,307, Cl. 435-7.000.
- Sanders, Lynda M.; and Domb, Abraham, 4,959,217, Cl. 424-473.000.
- Szczepanek, Andre, to Texas Instruments Incorporated. Content addressable memory including comparison inhibit and shift register circuits. 4,959,811, Cl. 365-49.000.
- Szczesny, Paul M.: See—  
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- TA Triumph-Adler Aktiengesellschaft: See—  
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- Tabb, Charles H., to Xerox Corporation. Two-pass highlight color imaging with developer housing bias switching. 4,959,286, Cl. 430-45.000.
- Tachi-S Co., Ltd.: See—  
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- Tachihara, Hisaki: See—  
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- Tachikawa, Michiyoshi, to Ricoh Company, Ltd. Character recognition apparatus having means for compressing feature data. 4,959,870, Cl. 382-56.000.
- Tada, Hisashi; Agata, Akira; Saruta, Masahiro; and Murata, Takashi, to Mitsubishi Rayon Company, Ltd. Epoxy resin composition and prepreg for composite materials using the same from bi and tri-epoxides, triarylbisphenols and diaminodiphenylsulfones. 4,959,438, Cl. 528-98.000.
- Taguchi, Akihiro: See—  
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- Taguchi, Yasuhiro; and Yoshida, Hiroshi, to Sharp Kabushiki Kaisha. Display unit having an improved editing input capability. 4,959,643, Cl. 340-721.000.
- Tahara, Kazuo: See—  
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- shita, Kunio; Endo, Tanehiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.
- Tai, Hwai T.; and Ng, Yee S., to Eastman Kodak Company. False density contour suppression using randomly modified input signals for comparison to threshold values. 4,959,730, Cl. 358-298.000.
- Taiho Kogyo Co. Ltd.: See—  
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- Takabayashi, Naoki: See—  
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- Takada, Kazuyoshi; Takayama, Tadashi; Suzuki, Takanori; and Nakanosono, Haruhiko, to Yamaha Hatsudoki Kabushiki Kaisha. Shift device for hydraulic transmission. 4,958,534, Cl. 74-475.000.
- Takagi, Hiroshi: See—  
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- Takagi, Osamu: See—  
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- Takahashi, Hiroji: See—  
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- Takahashi, Hiroshi: See—  
Yoshida, Susumu; Higashi, Tatsuji; and Takahashi, Hiroshi, 4,959,296, Cl. 430-302.000.
- Takahashi, Kenji: See—  
Arakawa, Satoshi; and Takahashi, Kenji, 4,959,545, Cl. 250-327.200.
- Takahashi, Koji; Kozuki, Susumi; Mogi, Hirokazu; Kawahara, Hideo; Arai, Hideyuki; Suzuki, Katsushi; Mabuchi, Toshiaki; and Kobayashi, Takashi, to Canon Kabushiki Kaisha. Interchangeable lens and interchangeable lens system. 4,959,728, Cl. 358-228.000.
- Takahashi, Noriyoshi: See—  
Saitoh, Toshio; Takahashi, Noriyoshi; and Satoh, Masaki, 4,959,575, Cl. 310-213.000.
- Takahashi, Tohru: See—  
Okada, Shinjiro; Takahashi, Tohru; Kawagishi, Hideyuki; Inaba, Yutaka; and Taniguchi, Osamu, 4,958,915, Cl. 350-345.000.
- Takahashi, Toshihisa: See—  
Uchinami, Masanobu; Takahashi, Toshihisa; Inoue, Hitoshi; Moronaga, Takahiro; and Nishida, Shimichi, 4,958,611, Cl. 123-479.000.
- Takahashi, Tsunehide: See—  
Katoh, Eiichi; Hoshi, Hitoshi; Takahashi, Tsunehide; and Asakura, Koichi, 4,959,687, Cl. 355-214.000.
- Takai, Akira: See—  
Hitomi, Mitsuo; Sasaki, Junso; Takai, Akira; Umezono, Kazuaki; and Hinatase, Fumio, 4,958,606, Cl. 123-316.000.
- Takami, Akio; Matsura, Toshitaka; and Furusaki, Keizo, to NGK Spark Plug Co., Ltd. Gas sensing element. 4,958,514, Cl. 73-25.030.
- Takami, Atsushi: See—  
Ishida, Hiroaki; Nemoto, Ichiro; Sato, Koji; Takami, Atsushi; Nakano, Yoichi; Ishii, Isamu; and Iwamatsu, Yoshiyuki, 4,959,680, Cl. 354-435.000.
- Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, to Victor Company of Japan, Ltd. Image pickup device using a photo-to-photo conversion element. 4,959,722, Cl. 358-211.000.
- Takashima, Kazuki: See—  
Hagino, Sadaaki; Suzuki, Motokazu; Takeshita, Takuo; Tonda, Hideki; and Takashima, Kazuki, 4,959,344, Cl. 505-1.000.
- Takatsudo, Suguru: See—  
Kamuro, Yasuo; Kakiuchi, Toshihito; and Takatsudo, Suguru, 4,959,093, Cl. 71-88.000.
- Takayama, Syuichi: See—  
Uchiyama, Naoki; Nakada, Akio; Taguchi, Akihiro; Hatta, Shinji; Takayama, Syuichi; Tsukaya, Takashi; Takehana, Sakae; Sekino, Naomi; and Hayashi, Masaaki, 4,958,639, Cl. 128-660.030.
- Takayama, Tadashi: See—  
Takada, Kazuyoshi; Takayama, Tadashi; Suzuki, Takanori; and Nakanosono, Haruhiko, 4,958,534, Cl. 74-475.000.
- Takeda Chemical Industries, Inc.: See—  
Terao, Shinji; and Hirata, Minoru, 4,959,362, Cl. 514-231.500.
- Takeda Chemical Industries, Ltd.: See—  
Matsumura, Koichi; Kimura, Hiroshi; Mise, Noritoshi; and Miki, Hiroshi, 4,959,483, Cl. 549-315.000.
- Takeda, Mikio: See—  
Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiko; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, 4,959,376, Cl. 514-338.000.
- Takeda, Mizuho: See—  
Nakajima, Shigeharu; Shinomiya, Genichi; Takeda, Mizuho; and Chikutei, Satoru, 4,959,174, Cl. 252-301.50R.
- Takeda, Yoshinobu: See—  
Hagiwara, Yoshitoshi; Koya, Eitaro; Hayashi, Tetsuya; and Takeda, Yoshinobu, 4,959,276, Cl. 428-614.000.
- Kusui, Jun; Kawai, Masahiko; Odani, Yusuke; and Takeda, Yoshinobu, 4,959,195, Cl. 419-67.000.
- Takegawa, Yoshikazu: See—  
Yoshida, Sumio; Takegawa, Yoshikazu; Tsujimoto, Susumu; and Kawabata, Katsuhiko, 4,958,546, Cl. 83-848.000.

- Takegawa, Yujiro, to Tsudakoma Corporation. Pick extracting device with rotative drive. 4,958,662, Cl. 139-116.200.
- Takehana, Sakae: See—  
Uchiyama, Naoki; Nakada, Akio; Taguchi, Akihiro; Hatta, Shinji; Takayama, Syuichi; Tsukaya, Takashi; Takehana, Sakae; Sekino, Naomi; and Hayashi, Masaaki, 4,958,639, Cl. 128-660.030.
- Takemoto, Takatoshi: See—  
Matsumoto, Yumio; Kimura, Yasuo; Takagi, Osamu; and Takemoto, Takatoshi, 4,959,529, Cl. 219-388.000.
- Takemura, Makoto: See—  
Suzuki, Tetsuo; Takemura, Makoto; and Yoshimura, Shigeru, 4,959,660, Cl. 346-1.100.
- Yoshimura, Shigeru; Suzuki, Tetsuo; and Takemura, Makoto, 4,959,666, Cl. 346-136.000.
- Takemura, Toji: See—  
Okubo, Takashi; and Takemura, Toji, 4,958,711, Cl. 192-60.000.
- Takenaka, Akira: See—  
Suganuma, Tatsumi; Nozue, Shigehiro; Fukuoka, Tatsuhiko; Noguchi, Naoto; and Takenaka, Akira, 4,958,712, Cl. 192-70.120.
- Takeshita, Akihiko: See—  
Suganuma, Buro; Nishimura, Shinichi; and Takeshita, Akihiko, 4,958,487, Cl. 57-328.000.
- Takeshita, Takuo: See—  
Hagino, Sadaaki; Suzuki, Motokazu; Takeshita, Takuo; Tonda, Hideki; and Takashima, Kazuki, 4,959,344, Cl. 505-1.000.
- Taketo, Makoto, to Jackson Laboratory, The. Cellular enhancer for expressing genes in undifferentiated stem cells. 4,959,313, Cl. 435-69.100.
- Takeuchi, Hideharu; and Sakata, Tsutomu, to Sumitomo Wiring System, Ltd. Grommet assembly for main and auxiliary wire harnesses. 4,959,509, Cl. 174-153.00G.
- Taki, Tsuneo: See—  
Morimoto, Kazuhiro; and Taki, Tsuneo, 4,958,521, Cl. 73-827.000.
- Takimoto, Akiyoshi: See—  
Yoshida, Yukio; Takimoto, Akiyoshi; and Murai, Shigenobu, 4,959,598, Cl. 318-599.000.
- Takizawa, Hitooshi: See—  
Kochi, Masahiro; Morikawa, Juichi; Ibe, Makoto; Ozaki, Shinji; and Takizawa, Hitooshi, 4,959,743, Cl. 360-130.240.
- Tama Biochemical Co., Ltd.: See—  
Hayashi, Sei-ichi; Hohjoh, Tadashi; Shida, Atsuhiko; and Ikekawa, Nobuo, 4,959,097, Cl. 71-112.000.
- Tamada, Kazukiyo: See—  
Miida, Takashi; Murayama, Jin; Tamada, Kazukiyo; and Kagechika, Takashi, 4,959,726, Cl. 358-227.000.
- Tamai, Shoji; Kawashima, Saburo; Sonobe, Yoshiho; Ohta, Masahiro; Oikawa, Hideaki; and Yamaguchi, Akihiro, to Mitsui Toatsu Chemicals, Inc. Polyimide for high-temperature adhesive. 4,959,440, Cl. 528-125.000.
- Tamai, Yoshin: See—  
Torihara, Masahiro; Tamai, Yoshin; Shiono, Manzo; and Tasaka, Kenji, 4,959,393, Cl. 514-724.000.
- Tamari, Takanori: See—  
Iguchi, Takaaki; Tamari, Takanori; Hira, Takaaki; Isobe, Kunio; Yaritha, Ikuro; and Abe, Hideo, 4,959,275, Cl. 428-603.000.
- Tan, Ken E.: See—  
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisaaki; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Koji; Kitahara, Takumi; Tomino, Ikuro; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
- Tanaka, Hideki; and Umemura, Kyoichi, to Mazda Motor Corporation. Layout of auxiliary mechanisms for an engine. 4,959,042, Cl. 474-134.000.
- Tanaka, Katsuji: See—  
Hirahara, Takuji; Nukui, Masahiro; and Tanaka, Katsuji, 4,959,421, Cl. 525-437.000.
- Tanaka, Masahiro; Ohya, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, to Shimizu Construction Co., Ltd. Submerged flexible wave restraining structure and a method of constructing it. 4,958,956, Cl. 405-23.000.
- Tanaka, Minoru: See—  
Saito, Hirokazu; Yukawa, Seichi; Sato, Takashi; Ushirokozi, Kiyoyuki; Aoyagi, Nobutoshi; Suzuki, Tomio; and Tanaka, Minoru, 4,958,934, Cl. 366-145.000.
- Tanaka, Satoshi, to Sumitomo Electric Industries, Ltd. Device for continuously winding a wire-like element. 4,958,778, Cl. 242-25.00A.
- Tanaka, Tadashi; Matsumura, Kazuo; Komorita, Hiroshi; and Mizunoya, Nobuyuki, to Kabushiki Kaisha Toshiba. Bonded ceramic metal composite substrate, circuit board constructed therewith and methods for production thereof. 4,959,507, Cl. 174-260.000.
- Tanaka, Yasuo; Matsumoto, Kaname; and Yamada, Yukio, to Furukawa Electric Co., Ltd., The. Superconducting wire containing multifilamentary superconducting alloy. 4,959,279, Cl. 428-660.000.
- Tanaka, Yoshihiro: See—  
Matsuda, Motonobu; Tanaka, Yoshihiro; Nakanishi, Motohiro; Taniguchi, Nobuyuki; and Ootsuka, Hiroshi, 4,959,676, Cl. 354-400.000.
- Tango, Chobe: See—  
Tomoyasu, Haruo; Tango, Chobe; Omote, Takuo; and Kato, Yoshinori, 4,959,260, Cl. 428-255.000.
- Taniguchi, Nobuyuki: See—  
Matsuda, Motonobu; Tanaka, Yoshihiro; Nakanishi, Motohiro; Taniguchi, Nobuyuki; and Ootsuka, Hiroshi, 4,959,676, Cl. 354-400.000.
- Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,959,679, Cl. 354-419.000.
- Taniguchi, Osamu: See—  
Okada, Shinjiro; Takahashi, Tohru; Kawagishi, Hideyuki; Inaba, Yutaka; and Taniguchi, Osamu, 4,958,915, Cl. 350-345.000.
- Taniguchi, Tomokuni: See—  
Uemura, Yahiyo; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.
- Tanino, Katsumi; and Nakada, Morihito, to Toyotoko Kabushiki Kaisha. Method of making piezoelectric polymer using polytetramethylene oxide di-p-aminobenzoate. 4,959,439, Cl. 528-111.000.
- Tanioka, Hiroshi, to Canon Kabushiki Kaisha. Image processing system. 4,959,868, Cl. 382-41.000.
- Tanner, Daniel J.: See—  
Smiles, Kenneth A.; Peets, Edwin A.; and Tanner, Daniel J., 4,959,210, Cl. 424-85.700.
- Tanzawa, Kenji: See—  
Sakamaki, Hiroshi; Horikoshi, Yukio; Jimouchi, Takeshi; and Tanzawa, Kenji, 4,958,995, Cl. 418-152.000.
- Taomo, Toshio: See—  
Masuda, Isao; Taomo, Toshio; and Sasaki, Fujio, 4,958,745, Cl. 220-375.000.
- Tarbet, Byron J.: See—  
Bradshaw, Gerald S.; Tarbet, Byron J.; Krakowiak, Krzysztof E.; Biernat, Jan F.; Bruening, Ronald L.; and Izatt, Reed M., 4,959,153, Cl. 210-670.000.
- Tasaka, Kenji: See—  
Torihara, Masahiro; Tamai, Yoshin; Shiono, Manzo; and Tasaka, Kenji, 4,959,393, Cl. 514-724.000.
- Tashiro, Koichi; Okamoto, Shinichi; and Okamoto, Tatsuro, to Namco Ltd. Game playing system. 4,958,835, Cl. 273-85.00G.
- Tate, Lloyd, to Zeecon Corporation. Animal identification ear tag assembly. 4,958,452, Cl. 40-301.000.
- Tatebe, Yu; Yasui, Hiroshi; Matsuyama, Yukio; and Takahashi, Hiroji, to Japan Aviation Electronics Industry, Limited; and NEC Corporation. Electrical connector for connecting two flat cables to a circuit board. 4,959,030, Cl. 439-67.000.
- Tatian, Berge, to Litton Systems, Inc. System utilizing an achromatic null lens for correcting aberrations in a spherical wavefront. 4,958,931, Cl. 356-360.000.
- Tatsumi, Takumi: See—  
Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 4,958,538, Cl. 74-866.000.
- Tatsumi, Yuichi: See—  
Iwahashi, Hiroshi; Kato, Hideo; and Tatsumi, Yuichi, 4,959,816, Cl. 365-233.000.
- Tattermusch, Peter, to Daimler-Benz A.G. Triangular swinging arm for wheel suspensions of motor vehicles. 4,958,863, Cl. 280-696.000.
- Taubitz, Christof; Seiler, Erhard; Hambrecht, Juergen; Mitulla, Konrad; and Boelike, Klaus, to BASF Aktiengesellschaft. Thermoplastic molding materials based on polyphenylene ethers, nylons and styrene copolymers. 4,959,415, Cl. 525-133.000.
- Taylor, James R.; Gomes, Anderson S. L.; and Gouveia-Neto, Artur D., to British Telecommunications public limited company. Radiation pulse generation. 4,958,910, Cl. 350-321.000.
- Taylor, Marc D.; and Beardsley, Duane, to Artromick International, Inc. Split drawer assembly. 4,958,891, Cl. 312-287.000.
- Taylor, Robert S.: See—  
Stettner, Ernest R.; Stoltman, Donald D.; and Taylor, Robert S., 4,958,773, Cl. 239-584.000.
- Taylor, Roland S., to General Motors Corporation. Fuel injection. 4,958,774, Cl. 239-584.000.
- Tchilinguirian, George G. Anti auto theft retractable pole. 4,958,699, Cl. 180-287.000.
- Techmedica, Inc.: See—  
Arnett, G. William; Buss, Rick A.; and Bruce, Robert A., 4,959,065, Cl. 606-69.000.
- Teepak, Inc.: See—  
Stanley, Thomas R., 4,958,411, Cl. 17-41.000.
- Tegal Corporation: See—  
Zajac, John P., 4,958,658, Cl. 137-613.000.
- Teijin Limited: See—  
Ohkawa, Kazumi; Matsuki, Toshitsugu; and Saiki, Noritsugu, 4,959,442, Cl. 528-168.000.
- Teleco Oilfield Services Inc.: See—  
Maron, Robert, 4,958,517, Cl. 73-151.000.
- Teledyne Industries, Inc.: See—  
Peace, Steven L.; and Petrovic, John E., 4,958,629, Cl. 128-66.000.
- Telefonaktiebolaget L M. Ericson: See—  
Peterson, Lars-Goran, 4,959,830, Cl. 370-108.000.
- Teletron Limited: See—  
Dowdall, Dennis S., 4,958,659, Cl. 137-624.120.
- Tennessee Valley Authority: See—  
Trundle, Mark H.; and Jones, William C., 4,959,192, Cl. 376-260.000.
- Tenney, Allen. Debris deflector for transported cycle. 4,958,761, Cl. 224-316.000.
- Tensor Development, Inc.: See—  
McIntosh, James L., 4,959,797, Cl. 364-508.000.
- Terada, Hirokiyo: See—  
Kuroda, Shigeaki; Oguni, Kensaaku; Senbu, Takao; Terada, Hirokiyo; Nagai, Makoto; and Hanada, Masamichi, 4,958,500, Cl. 62-89.000.



- Terada, Katsuaki: See—  
Watanabe, Hiroshi; and Terada, Katsuaki, 4,959,023, Cl. 439-595.000.
- Terao, Shinji; and Hirata, Minoru, to Takeda Chemical Industries, Inc. Pharmaceutical compositions containing certain ascorbic acid derivatives useful in the prophylaxis and treatment of disorders of the circulatory system. 4,959,362, Cl. 514-231.500.
- Teraoka, Masao: See—  
Minamitani, Hiromu; Yano, Norio; Ikezawa, Atsushi; Kanayama, Tsugio; Ushijima, Takashi; Teraoka, Masao; and Ishikawa, Osamu, 4,959,166, Cl. 252-327.00E.
- Terna, Daniele: See—  
O'Neal, Glenn B.; Baker, Quentin A.; Mccredy, Henry E., III; and Terna, Daniele, 4,958,605, Cl. 123-300.000.
- Terrell, Robert B.: See—  
Slaughter, John E.; and Terrell, Robert B., 4,959,802, Cl. 364-521.000.
- Texas Instruments Incorporated: See—  
Frenley, William R.; and Reed, Mark A., 4,959,696, Cl. 357-16.000.  
Schenck, Stephen R., 4,959,563, Cl. 307-448.000.  
Slaughter, John E.; and Terrell, Robert B., 4,959,802, Cl. 364-521.000.
- Szczepanek, Andre, 4,959,811, Cl. 365-49.000.
- Thayer, Donald O., Jr. Photography booth and method. 4,959,670, Cl. 354-76.000.
- Thiele, Klaus: See—  
Busch, Peter; and Thiele, Klaus, 4,958,647, Cl. 132-119.100.
- Thomas, Geoffrey N.: See—  
Cross, Peter E.; Thomas, Geoffrey N.; and Arrowsmith, John E., 4,959,366, Cl. 514-239.500.
- Thomas, Mark S.: See—  
Apple, William R.; Freeman, William R.; Soderberg, Paulmer M.; Thompson, Lyle; and Thomas, Mark S., 4,959,846, Cl. 375-118.000.
- Thomas, Phillip M.: See—  
Cobb, Gary S.; and Thomas, Phillip M., 4,958,903, Cl. 350-96.200.
- Thomas, Wayne M.; and Nicholas, Edward D., to Welding Institute, The. Surfacing method. 4,959,241, Cl. 427-11.000.
- Thompson, Barbara J.; and Ursery, Jesse, Jr., to Tutor Toys, Inc. Electronic learning device for teaching how to handle money. 4,959,017, Cl. 434-110.000.
- Thompson, Lyle: See—  
Apple, William R.; Freeman, William R.; Soderberg, Paulmer M.; Thompson, Lyle; and Thomas, Mark S., 4,959,846, Cl. 375-118.000.
- Thompson, Mark S. Gas detector and method for refrigeration systems. 4,958,503, Cl. 62-129.000.
- Thompson, Richard A., to Keegan, Robert R., a part interest. Snap-on tie with slider simulating windsor knot. 4,958,383, Cl. 2-150.000.
- Thompson, Mitchell L.; Park, Kyung T.; Ogale, Kumar; and Powers, William B., to Atochem North America, Inc. Device for measuring the speed of a moving object. 4,959,807, Cl. 364-565.000.
- Threlkel, Richard S., to Chevron Research Company. Detergent grade olefins, alkylbenzenes and alkylbenzene sulfonates and processes for preparing. 4,959,491, Cl. 562-94.000.
- Thue, Baard H.: See—  
Bjorke, Merlin D.; and Thue, Baard H., 4,959,654, Cl. 342-120.000.
- Tighe, Laurence E.; and Parker, Tim, to Dennison Manufacturing Company. Susceptor coating for localized microwave radiation heating. 4,959,516, Cl. 219-10.55F.
- Tinkler, Mark: See—  
Fihery, Jean-Luc; Hazel, Bruce; Di Vincenzo, Antonio; Tinkler, Mark; and McNabb, Scott, 4,959,523, Cl. 219-124.340.
- Tipple, Jerome E.; and Tipple, Margie K. Multi-looped cane retaining strap. 4,958,758, Cl. 224-267.000.
- Tipple, Margie K.: See—  
Tipple, Jerome E.; and Tipple, Margie K., 4,958,758, Cl. 224-267.000.
- Titus, George R.: See—  
Williams, Joel L.; and Titus, George R., 4,959,402, Cl. 524-99.000.
- Toa Nenryo Kogyo, K.K.: See—  
Furuhashi, Hiroyuki; Yamamoto, Tadashi; Imai, Masafumi; and Ueno, Hiroshi, 4,959,427, Cl. 526-142.000.
- Toa Nenryo Kogyo Kabushiki Kaisha: See—  
Miura, Tadashi; Itoh, Takuji; Kadono, Masaki; and Shimada, Masakichi, 4,959,338, Cl. 502-263.000.
- Toal, Hugh F.; Careyote, Nicholas J.; and Sapienza, Michael A., to Congoleum Corporation. Trowel assembly. 4,958,399, Cl. 15-104.00S.
- Tobin, Theodore W.: See—  
Clauw, Mitchell J.; Stupera, Neal G.; Tobin, Theodore W.; and Viscome, Dennis M., 4,958,799, Cl. 248-430.000.
- Tobolski, Francis P., Jr.; and D'Avello, Robert F., to Motorola, Inc. Dialing features for cellular telephone with standard telephone set. 4,959,851, Cl. 379-59.000.
- Tochigifujisangyo Kabushiki Kaisha: See—  
Minamitani, Hiromu; Yano, Norio; Ikezawa, Atsushi; Kanayama, Tsugio; Ushijima, Takashi; Teraoka, Masao; and Ishikawa, Osamu, 4,959,166, Cl. 252-327.00E.
- Toda Kogyo Corp.: See—  
Hamamura, Atsushi; Hamada, Takaki; Tokuhara, Kouki; Miyao, Yukimitsu; Imai, Tomoyuki; and Horiishi, Nanso, 4,959,273, Cl. 428-548.000.
- Todoroki, Tohiya, to NEC Corporation. Serial input-output circuit for forward and backward producing bits from bidirectional shift registers. 4,959,813, Cl. 365-189.120.
- Toho Kagaku Kogyo Co., Ltd.: See—  
Hihara, Takeshi; Yanagiya, Masahide; and Ono, Kazuhito, 4,958,685, Cl. 166-291.000.
- Toho, Masato: See—  
Tsuzuki, Tohiyuki; and Toho, Masato, 4,959,712, Cl. 358-80.000.
- Toi, Nao: See—  
Ohnuma, Hiroaki; Fujikura, Yoshiaki; Fujita, Manabu; and Toi, Nao, 4,959,349, Cl. 512-14.000.
- Tokuha, Kouki: See—  
Hamamura, Atsushi; Hamada, Takaki; Tokuhara, Kouki; Miyao, Yukimitsu; Imai, Tomoyuki; and Horiishi, Nanso, 4,959,273, Cl. 428-548.000.
- Tokunaga, Ichiro: See—  
Suzuki, Hidemasa; Tokunaga, Ichiro; Abe, Hiraku; and Ogawa, Yasuaki, 4,959,574, Cl. 310-91.000.
- Tol, Simon J. M.; and Wouda, Kornelis J., to AT&T Bell Laboratories. Receiver of a system for transmitting data symbols at a given baud rate. 4,959,845, Cl. 375-106.000.
- Tomcanin, Deborah T.: See—  
Glass, Richard A.; Ryer, Robert F., II; and Tomcanin, Deborah T., 4,959,051, Cl. 604-77.000.
- Tominaga, Shinji: See—  
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,959,679, Cl. 354-419.000.
- Tomino, Ikuo: See—  
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
- Tomoyasu, Haruo; Tango, Chobe; Omote, Takuo; and Kato, Yoshinori, to Nihon Tokushu Orimono Co., Ltd.; and Kanebo Ltd. Mesh fabric for printing screen. 4,959,260, Cl. 428-255.000.
- Tonda, Hideki: See—  
Hagino, Sadaaki; Suzuki, Motokazu; Takeshita, Takuo; Tonda, Hideki; and Takashima, Kazuki, 4,959,344, Cl. 505-1.000.
- Tong, Wuwei; Sun, Deyu; Zhang, Qingyuan; Wu, Lieli; Zhou, Shicheng; Yu, Shande; Du, Daoji; and Yang, Shili, to LuoYang Petrochemical Engineering Corporation SINOPEC (LPEC); and Institut Francais du Petrole. Process for decoking a delayed coker. 4,959,126, Cl. 201-2.000.
- Topel, Howard C.; and Foster, Thomas L., to Vance Products Incorporated. Endoscopic aspiration instrument. 4,958,621, Cl. 128-4.000.
- Toray Industries, Inc.: See—  
Oka, Koichiro; and Hagiwara, Ikuo, 4,959,398, Cl. 523-400.000.
- Torihara, Masahiro; Tamai, Yoshin; Shiono, Manzo; and Tasaka, Kenji, to Kuraray Company, Ltd. Skin depigment agent. 4,959,393, Cl. 514-724.000.
- Torii, Naoya: See—  
Azuma, Mitsuhiro; Amano, Fumio; Akiyama, Ryota; and Torii, Naoya, 4,959,863, Cl. 380-38.000.
- Toro Company, The: See—  
Heimann, Richard A., 4,958,483, Cl. 56-17.500.
- Toshiba Kikai Kabushiki Kaisha: See—  
Adachi, Sakashi, 4,958,967, Cl. 409-185.000.
- Tosoh Corporation: See—  
Nakagawa, Tatsushi; Ishida, Yoshiaki; Kanesaka, Junichiro; and Kaneshige, Yosuke, 4,959,414, Cl. 525-11.000.
- Total Spectrum Manufacturing Inc.: See—  
Gordon, Gary B.; and Gonnelli, Robert R., 4,959,798, Cl. 364-513.000.
- Toth, Laszlo P.; Kiss, Endrene.; Paztor, Endre; Purebl, Gyoray; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, to Budapesti Muszaki Egytem; Moguri Gepjarmu Kulkereskedelmi Vallalat; and Ikarus Karosszeria es Jarmugyar. Appliance for heating motor vehicles, mainly buses driven with internal combustion engine. 4,958,766, Cl. 237-12.30B.
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- Toyoda Gosei Co., Ltd.: See—  
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- Toyokako Kabushiki Kaisha: See—  
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- Trabold, Peter: See—  
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- Tracy, Philip A.: See—  
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- Trainor, John W.; and Holje, Bruce E., to Imagitec, Inc. Paddle wheel cross-mixer. 4,959,690, Cl. 355-245.000.

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- Trommler, Craig S.; and Finefrock, Mark D., to Bourns Instruments, Inc. Digital piezoresistive pressure transducer. 4,958,520, Cl. 73-727.000.
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Hoffmann, Heinrich; and Troster, Manfred, 4,958,944, Cl. 384-512.000.
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- Tsuji, Masato, to Alps Electric Co., Ltd. Production of metal base laminate plate including applying an insulator film by powder coating. 4,959,116, Cl. 156-283.000.
- Tsuji, Tomohiro: See—  
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- Tuf-Tite, Inc.: See—  
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- Tulpule, Bhachandra R.; and Binnall, Daniel G., to United Technologies Corporation. Access arbitration for an input-output controller. 4,959,782, Cl. 364-200.000.
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Vida, Denes; and Ferenci, Peter, 4,959,588, Cl. 313-625.000.
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- Turner, Larry G.: See—  
Mogro-Campero, Antonio; and Turner, Larry G., 4,959,346, Cl. 505-1.000.
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- Tutor Toys, Inc.: See—  
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- Tuzinski, Patrick A.: See—  
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- Tverdokhlebov, Evgeny N.: See—  
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Palmert, Steven H.; and Ziema, Robert F., 4,958,750, Cl. 222-135.000.
- Tynes, Arthur R.; and Mies, Eric W. Method and apparatus for forming high strength splices in optical fibers. 4,958,905, Cl. 350-96.210.
- Tyree, Gerald W.: See—  
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- Tyrell, John A.: See—  
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- Uchida, Katsuyuki, to Murata Manufacturing Co., Ltd. Organic PTC thermistor. 4,959,632, Cl. 338-22.00R.
- Uchida, Koh; and Kurihara, Takashi, to Nissan Motor Company, Limited. Variable assist power steering system. 4,958,695, Cl. 180-142.000.
- Uchida, Masanobu: See—  
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- Uchihashi, Masatoshi. Attachment connector assembly for hydraulic shovel type excavator. 4,958,981, Cl. 414-694.000.
- Uchikawa, Fusaoki: See—  
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- Uda, Ikujiro: See—  
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- Ueda, Hiroshi: See—  
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- Ueda, Kazuhiko, to Victor Company of Japan, Ltd. Solid-state imaging apparatus and method of driving the same. 4,959,724, Cl. 358-213.290.
- Ueda, Masashi; Makino, Kazumasa; Matsumoto, Yumio; Sago, Akira; Hayakawa, Kiyoharu; and Takagi, Osamu, to Brother Kogyo Kabushiki Kaisha. Cassette for photo-sensitive recording medium. 4,958,781, Cl. 242-71.700.
- Ueda, Shinji: See—  
Sakanoue, Kei; Kobayashi, Hidetoshi; Ichijima, Seiji; and Ueda, Shinji, 4,959,299, Cl. 430-544.000.
- Ueda, Tohihiko; Tutiyasu, Kouitirow; Yoshida, Kazuyuki; and Yagoto, Mitsutoshi, to Minolta Camera Kabushiki Kaisha. Optical information record/pickup head assembly. 4,959,824, Cl. 369-44.140.
- Ueda, Tsunehisa; Miyazaki, Kouji; Natsume, Tadao; and Miki, Yoshiaki, to Nippon Zeon Co., Ltd. Deodrant composition, deodrant resin composition and deodrant resin shaped article. 4,959,207, Cl. 424-76.100.
- Uehara, Masao; Kanno, Masahide; Sasaki, Masahiko; Sasagawa, Katsuyoshi; Uchikubo, Akinobu; Hasegawa, Jun; Yamashita, Shinji; Saito, Katsuyuki; and Nakagawa, Takehiro, to Olympus Optical Co., Ltd. Electronic endoscope whereby the position of the insertable part can be known by a transmitted light outside a body. 4,959,710, Cl. 358-98.000.
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- Ueno, Hiroshi: See—  
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- Ueno, Katsumi, to Diesel KIKI Co., Ltd. Hydraulic controller. 4,958,553, Cl. 91-447.000.



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- Uhrman, Robert L., Jr.: See—  
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- Ullman, Timothy J.: See—  
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- Umac Incorporated: See—  
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- Umeki, Yoichiro: See—  
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- Umemura, Kyoichi: See—  
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- Umpleby, Jeffrey D., to BP Chemicals Limited. Crosslinkable polymers. 4,959,413, Cl. 525-100.000.
- Underwood, David T., to United States Brass Corporation. Stop valve. 4,958,802, Cl. 251-310.000.
- Underwood, Gary, to Red Arrow Products Company, Inc. Process for making liquid smoke compositions and resin treated liquid smoke compositions. 4,959,232, Cl. 426-271.000.
- Underwood, Joseph W. T., IV; and Rockefeller, Eugene F. Dual input-output electric switch. 4,959,554, Cl. 307-38.000.
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- Unisys Corporation: See—  
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- United States Brass Corporation: See—  
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- Dunn, Paul S.; Sheinberg, Haskell; Hogan, Billy M.; Lewis, Homer D.; and Dickinson, James M., 4,959,194, Cl. 419-46.000.
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- Divecha, Amarnath P.; Ferrando, William A.; Hesse, Philip W.; and Karmarkar, Subhash D., 4,958,763, Cl. 228-193.000.
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- Murphree, Francis J., 4,959,817, Cl. 367-97.000.
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- Dobson, Peter J.; and Neave, James H., 4,959,245, Cl. 427-53.100.
- Kay, Malcolm J.; and Tracy, Philip A., 4,959,558, Cl. 307-354.000.
- Langlois, Jacques A. E.; Bergmann, Heinrich M. G.; and Nuhn, Wolfgang, 4,959,001, Cl. 425-147.000.
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- Pasman, Johannes H. T.; and Van Hijningen, Nicolaas C. J. A., 4,959,822, Cl. 369-44.110.
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- Ealey, Mark A.; and Lillard, Robert L., 4,959,567, Cl. 310-26.000.
- Hess, Arthur E.; and Sanger, Gregory M., 4,958,463, Cl. 51-72.00R.
- Hutchison, Steven; and Bruno, Leonard, 4,958,588, Cl. 118-423.000.
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- Reers, Martin; and Pfeiffer, Douglas R., 4,959,357, Cl. 514-103.000.
- University of Nebraska, The Board of Regents of the: See—  
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- University of Queensland: See—  
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- University of Strathclyde: See—  
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- University of Tennessee Research Corporation, The: See—  
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- UOP: See—  
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- Uota, Kosaku: See—  
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- Upjohn Company, The: See—  
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- Urai, Muneharu; and Suzuki, Hiroshi, to Tachi-S Co., Ltd. Seat cushion for vehicle and method of making the same. 4,958,394, Cl. 5-475.000.
- Urheim, John E., to Gynex, Inc. Package for oral contraceptive tablet. 4,958,736, Cl. 206-531.000.
- Ursery, Jesse, Jr.: See—  
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- Ushijima, Takashi: See—  
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- Ushiki, Susumu: See—  
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- Ushirokozi, Kiyoyuki: See—  
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- Uzuyama, Kimitake: See—  
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- Valleau, Robert L.: See—  
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- Wood, Prentice J.; and Calvert, Rodney K., to Mead Corporation. The. End loaded carton having a triple ply wall. 4,958,734, Cl. 206-435.000.
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- Schenk, Richard C., 4,958,974, Cl. 412-37.000.
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- Yamaya, Norimasa; Ohta, Masahiro; and Yamaguchi, Akihiro, 4,959,443, Cl. 528-170.000.
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- Yokoyama, Yoshiharu; and Akiyama, Shigeru, 4,958,599, Cl. 123-41.500.
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- Yamamoto, Masafumi: See—  
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- Yamamoto, Motoyuki, to Kabushiki Kaisha Toshiba. Rib waveguide type semiconductor laser. 4,959,839, Cl. 372-46.000.
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- Yamanaka, Akira: See—  
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- Yamasaki, Hirotaka; and Hironaka, Yoshio, to Idemitsu Kosan Co., Ltd. Process for producing aromatic nitrile. 4,959,487, Cl. 558-343.000.
- Yamashita Denso Corporation: See—  
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- Yamashita, Hiroki: See—  
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- Yamashita, Shinji: See—  
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- Yamashita, Susumu: See—  
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- Yamashita, Toshio: See—  
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- Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatum, Takumi; and Yamamoto, Hiroaki, to Suzuki Jidosha Kogyo Kabushiki; and Mitsubishi Denki Kabushiki Kaisha. Method and apparatus for controlling line pressure of continuously variable transmission system. 4,958,538, Cl. 74-866.000.
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- Yamazaki, Itaru, to Canon Kabushiki Kaisha. Apparatus for forming a functional deposited film by means of plasma chemical vapor deposition. 4,958,591, Cl. 118-723.000.
- Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Method of adding oxygen into oxide superconducting materials by ion injection. 4,959,345, Cl. 505-1.000.
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- Yanagiya, Masahide: See—  
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- Yanai, Toshiaki: See—  
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- Yang, Shili: See—  
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- Yang, Yu-Chung: See—  
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- Yankov, Lyuben K.; Filipova, Stefka K.; Zlatanov, Ivo Y.; and Budevski, Evgeni B., to Centralen Institut Po Chimicheska Promishlenost. Composition for microporous separators and method for its preparation. 4,959,396, Cl. 521-61.000.
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- Yano, Toru: See—  
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- Yarger, Eric J.; Yarger, Rex D.; and Clegg, Gary D., to Magnashield Technologies, Inc. Magnetically and radio frequency shielded enclosure. 4,959,504, Cl. 174-35.0MS.
- Yarger, Rex D.: See—  
Yarger, Eric J.; Yarger, Rex D.; and Clegg, Gary D., 4,959,504, Cl. 174-35.0MS.
- Yarita, Ikuo: See—  
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- Yasui, Hiroshi: See—  
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- Yasukawa, Takeshi: See—  
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- Yasumoto, Kazuhiro; and Hagiwara, Ipepi, to Mitsubishi Denki Kabushiki Kaisha. Axial-flow fan with tapered hub and duct. 4,959,571, Cl. 310-67.00R.
- Yasunaga, Susumu; and Okino, Kazuo, to Figaro Engineering, Inc. Gas detecting device. 4,958,513, Cl. 73-23.200.
- Yatzidia, Hippocrates, to Pierre Fabre Medicament. Solution for dialyses and use of peptides based on glycine for preparing it. 4,959,175, Cl. 252-364.000.
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Endo, Takayoshi; and Hatagishi, Yuuji, 4,958,426, Cl. 29-623.000.
- Shimochi, Eiji, 4,959,019, Cl. 439-76.000.
- Watanabe, Hiroshi; and Terada, Katsuaki, 4,959,023, Cl. 439-595.000.

- Yamamoto, Masaki; Sato, Hisashi; and Ozaki, Keiichi, 4,959,018, Cl. 439-76.000.
- Yeh, Michael H., to Hi-Tek Polymers, Inc. Process for derivatizing polygalactomannan using water soluble aluminum salts in the process. 4,959,464, Cl. 536-114.000.
- Yerman, Alexander J.; and Ngo, Khai D., to General Electric Company. High-frequency transformer. 4,959,630, Cl. 336-83.000.
- Yesildag, Mehmet C.: See—  
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- Yokoyama, Keiichi: See—  
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- Yokoyama, Yoshiharu; and Akiyama, Shigeru, to Yamaha Hatsudoki Kabushiki Kaisha. Cooling device for engine. 4,958,599, Cl. 123-41.500.
- Yoneda, Kenji; Kajiyama, Toshiaki; Sakata, Kazuhiro; Munakata, Mitsuo; and Suzuki, Masato, to Hitachi, Ltd. Elevator control system. 4,958,707, Cl. 187-101.000.
- Yonekura, Mikio, to Fanuc Ltd. Bus regulating system. 4,959,775, Cl. 364-200.000.
- Yoneyama, Keiko: See—  
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- Yos, Geza E.: See—  
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- Yoshida, Akihiko; and Yamada, Naohito, to NGK Insulators, Ltd. Joined metal-ceramic assembly method of preparing the same. 4,959,258, Cl. 428-192.000.
- Yoshida, Hiroichi: See—  
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- Yoshida, Kazuyuki: See—  
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- Yoshida Kogyo K.K.: See—  
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- Yoshida, Shinya: See—  
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- Yoshida, Sumio; Takegawa, Yoshikazu; Tsujimoto, Susumu; and Kawabata, Katsuhiko, to Amada Company, Limited. Saw blade. 4,958,546, Cl. 83-848.000.
- Yoshida, Susumu; Higashi, Tatsuji; and Takahashi, Hiroshi, to Fuji Photo Film Co., Ltd. Process for the development of dry PS plates. 4,959,296, Cl. 430-302.000.
- Yoshida, Yukio; Takimoto, Akiyoshi; and Murai, Shigenobu, to Yoshida Kogyo K.K. Method and apparatus for controlling torque of a door opening and closing motor for an automatic door. 4,959,598, Cl. 318-599.000.
- Yoshimura, Shigeru; Suzuki, Tetsuo; and Takemura, Makoto, to Canon Kabushiki Kaisha. Image forming apparatus having a platen and recording means elastically pressed together. 4,959,666, Cl. 346-136.000.
- Yoshimura, Shigeru: See—  
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- Yoshimura, Susumu: See—  
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- Yoshino, Kunihisa: See—  
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- Yoshino, Takashi: See—  
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- Yoshino, Tsunemi; Furutsuka, Naoyuki; Aoki, Naofumi; Watanabe, Hiroshi; and Morioka, Akitoshi, to West Electric Company, Ltd. Motor-driven film winder. 4,959,672, Cl. 354-173.100.
- Yoshioka, Masanori; and Kozai, Masafumi, to Nissan Motor Company, Ltd. Method for blow molding large hollow bodies. 4,959,191, Cl. 264-529.000.
- Yoshitake, Noriaki: See—  
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- Yoshiura, Hiroshi; Chusho, Takeshi; Masui, Shoichi; and Ohata, Hideo, to Hitachi, Ltd. Inference method and system. 4,959,799, Cl. 364-513.000.
- Yosida, Nobuo; and Shimizu, Teruhisa, to Hitachi, Ltd. Semiconductor memory. 4,959,835, Cl. 371-51.100.
- Youssefeyeh, Raymond D.; Campbell, Henry F.; and Kuhla, Donald E., to Rorer Pharmaceutical Corporation. Hexahydrodibenzofuran carboxylic acid derivatives. 4,959,485, Cl. 549-461.000.
- Yu Lu, Shi-da: See—  
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- Yu, Shande: See—  
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- Yugen Kaisha Shinjoseisakusho: See—  
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- Yugenkaisha Idearesearch: See—  
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- Yukawa, Hideki: See—  
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- Yukawa, Seiichi: See—  
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- Zajac, John P., to Tegal Corporation. Mass flow stabilized. 4,958,658, Cl. 137-613.000.
- Zajec, Jozef-Franc: See—  
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- Zakich, Paul. Cooler-extruder device. 4,958,933, Cl. 366-81.000.
- Zalar, Frank E.: See—  
Arsena, Vito J.; Clough, Harvey C.; and Zalar, Frank E., 4,959,583, Cl. 313-113.000.
- Zamzow, Larry A. Truck pocket rail attachment. 4,958,875, Cl. 296-32.000.
- Zanxx, Inc.: See—  
Forish, John A.; and Rogers, John J., 4,958,429, Cl. 29-877.000.
- Zaslavsky, Gregory: See—  
Barakitis, Nikolaos; Cohen, Sheppard; and Zaslavsky, Gregory, 4,959,589, Cl. 315-58.000.
- Zavacky, Paul M.; and Morrison, Richard H., Jr., to Foxboro Company, The. Micromechanical electric shunt and encoding devices made therefrom. 4,959,515, Cl. 200-181.000.
- Zenji Hagiwara: See—  
Hagiwara, Zenji; Ando, Satoshi; Ichihashi, Kunio; and Dano, Akira, 4,959,268, Cl. 428-403.000.
- Zenner, Bruce D.; Ciccone, Joseph P.; De Castro, Emory S.; Dearduff, Larrie A.; and Kerr, John B., to Aquanautics Corporation. Polyalkylamine complexes for ligand extraction and generation. 4,959,135, Cl. 204-129.000.
- Zhang, Qingyuan: See—  
Tong, Wuwei; Sun, Deyu; Zhang, Qingyuan; Wu, Lielai; Zhou, Shicheng; Yu, Shande; Du, Daoji; and Yang, Shili, 4,959,126, Cl. 201-2.000.
- Zhou, Shicheng: See—  
Tong, Wuwei; Sun, Deyu; Zhang, Qingyuan; Wu, Lielai; Zhou, Shicheng; Yu, Shande; Du, Daoji; and Yang, Shili, 4,959,126, Cl. 201-2.000.
- Ziegler, Georg, to Sulzer Brothers Limited. Hot-gas cooling plant. 4,959,078, Cl. 48-128.000.
- Zielske, Alfred G.: See—  
Fong, Ronald A.; Lewis, Sheldon N.; Wiersema, Richard J.; and Zielske, Alfred G., 4,959,187, Cl. 260-402.000.
- Ziems, Robert F.: See—  
Palmer, Steven H.; and Ziems, Robert F., 4,958,750, Cl. 222-135.000.
- Zimmer, Inc.: See—  
Dunn, Harold K.; Lazzeri, Mark A.; and Ondria, Jeffrey M., 4,959,066, Cl. 606-89.000.
- Zimmer, Oswald K.; Vollenberg, Werner P.; Loschen, Gerriet K. H.; Winter, Werner; Kiesewetter, Erwin O.; and Seipp, Ulrich G. P., to Gruenthal GmbH. Phenol derivatives, pharmaceutical compositions containing these compounds and processes for the preparation of these compounds and compositions. 4,959,391, Cl. 514-546.000.
- Ziolkowski, Richard W., to United States of America, Energy. Electromagnetic or other directed energy pulse launcher. 4,959,559, Cl. 307-425.000.
- Zlatanov, Ivo Y.: See—  
Yankov, Lyuben K.; Filipova, Stefka K.; Zlatanov, Ivo Y.; and Budevski, Evgeni B., 4,959,396, Cl. 521-61.000.
- Zoecon Corporation: See—  
Tate, Lloyd, 4,958,452, Cl. 40-301.000.
- Zoerner, Walter: See—  
Drosdzio, Armin; Sauer, Harry; and Zoerner, Walter, 4,958,679, Cl. 165-13.000.
- Zondler, Helmut; and Kunz, Walter, to Ciba-Geigy Corporation. Compositions for protecting plants against disease. 4,959,096, Cl. 514-356.000.
- Zucker, Friedhelm: See—  
Morimoto, Yasuaki; and Zucker, Friedhelm, 4,959,821, Cl. 369-13.000.
- ZymoGenetics, Inc.: See—  
Foster, Donald C.; Murray, Mark J.; and Berkner, Kathleen L., 4,959,318, Cl. 435-69.100.
- 3900 Corp.: See—  
Heckethorn, John E.; and Whittle, Danny J., 4,958,419, Cl. 24-283.000.
- 501 Hitachi Metals, Ltd.: See—  
Oshima, Masahiko; Ohata, Takumi; and Hatori, Toshiyuki, 4,958,422, Cl. 29-129.500.

## LIST OF REISSUE PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 25TH DAY OF SEPTEMBER, 1990

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- Abe, Kazuki: See—  
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.
- Baker, Richard W.: See—  
Roman, Ian C.; and Baker, Richard W., Re. 33,352, Cl. 55-38.000.
- Bend Research, Inc.: See—  
Roman, Ian C.; and Baker, Richard W., Re. 33,352, Cl. 55-38.000.
- Brauer, Melvin: See—  
Downey, William J.; Brauer, Melvin; and Chao, Jerry C., Re. 33,354, Cl. 428-375.000.
- Brindak, Nicholas J.: See—  
Knudsen, James G.; and Brindak, Nicholas J., Re. 33,346, Cl. 73-61.200.
- CasChem, Inc.: See—  
Downey, William J.; Brauer, Melvin; and Chao, Jerry C., Re. 33,354, Cl. 428-375.000.
- Chao, Jerry C.: See—  
Downey, William J.; Brauer, Melvin; and Chao, Jerry C., Re. 33,354, Cl. 428-375.000.
- Downey, William J.; Brauer, Melvin; and Chao, Jerry C., to CasChem, Inc. Process for using ester plasticized polyurethanes for sealing electrical devices. Re. 33,354, Cl. 428-375.000.
- Drew Chemical Corporation: See—  
Knudsen, James G.; and Brindak, Nicholas J., Re. 33,346, Cl. 73-61.200.
- Ellington, William E.: See—  
Matza, Stephen D.; Ellington, William E.; and Fleming, Henry C., III, Re. 33,349, Cl. 175-40.000.
- Enoshita, Ryosuke: See—  
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.
- Fleming, Henry C., III: See—  
Matza, Stephen D.; Ellington, William E.; and Fleming, Henry C., III, Re. 33,349, Cl. 175-40.000.
- Heinecke, Steven B., to Minnesota Mining and Manufacturing Company. Thin film surgical dressing with delivery system. Re. 33,353, Cl. 428-40.000.
- Himeno, Takuji: See—  
Tanaka, Masato; and Himeno, Takuji, Re. 33,356, Cl. 341-72.000.
- Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, to Mitsui Toatsu Chemicals, Incorporated. Agent for absorbing and releasing water vapor. Re. 33,355, Cl. 524-434.000.
- Johnson, Johnny, III. Air-driven ceiling fan. Re. 33,347, Cl. 98-40.050.
- Kamio, Hideo: See—  
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.
- Key Technology, Inc.: See—  
Randall, Malcolm W., Re. 33,357, Cl. 358-106.000.
- Knudsen, James G.; and Brindak, Nicholas J., to Drew Chemical Corporation. Process and apparatus for testing fluids for fouling. Re. 33,346, Cl. 73-61.200.
- Kobayashi, Sadao: See—  
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.
- Lower, Jerry L., to Zimmer, Inc. Bone screw. Re. 33,348, Cl. 606-65.000.
- Matza, Stephen D.; Ellington, William E.; and Fleming, Henry C., III, to Shell Oil Company. Controlling sulfide scavenger content of drilling fluid. Re. 33,349, Cl. 175-40.000.
- Minnesota Mining and Manufacturing Company: See—  
Heinecke, Steven B., Re. 33,353, Cl. 428-40.000.
- Mitsui Toatsu Chemicals, Incorporated: See—  
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.
- Nakagawa, Toshimi: See—  
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.
- Nitta, Atsuhiko: See—  
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.
- Ouchi, Takahiro: See—  
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.
- Papajohn, Elissa D. Menstrual and incontinence pad. Re. 33,351, Cl. 604-387.000.
- Randall, Malcolm W., to Key Technology, Inc. Optical inspection apparatus for moving articles. Re. 33,357, Cl. 358-106.000.
- Roman, Ian C.; and Baker, Richard W., to Bend Research, Inc. Absorption process for producing oxygen and nitrogen and solution therefor. Re. 33,352, Cl. 55-38.000.
- Shell Oil Company: See—  
Matza, Stephen D.; Ellington, William E.; and Fleming, Henry C., III, Re. 33,349, Cl. 175-40.000.
- Sony Corporation: See—  
Tanaka, Masato; and Himeno, Takuji, Re. 33,356, Cl. 341-72.000.
- Stuart, David H.: See—  
Whitaker, Richard A.; and Stuart, David H., Re. 33,350, Cl. 280-624.000.
- Tanaka, Masato; and Himeno, Takuji, to Sony Corporation. Frequency modulation coding methods with reduced transition intervals. Re. 33,356, Cl. 341-72.000.
- Tanaka, Tomio: See—  
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.
- Uejima, Tamotu: See—  
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.
- Whitaker, Richard A.; and Stuart, David H. Ski binding having preset means and detent trigger for said preset means. Re. 33,350, Cl. 280-624.000.
- Zimmer, Inc.: See—  
Lower, Jerry L., Re. 33,348, Cl. 606-65.000.

## LIST OF REEXAMINATION PATENTEEES

TO WHOM

CERTIFICATES WERE ISSUED

- Conrad, Peter G., to CTL, Inc. Composite thread line sails. CTL, Inc.: See—  
B1 4,708,080, 9-25-90, Cl. 114-103.000.
- Cook, William A.; Fearnot, Neal E.; and Geddes, Leslie A., to Purdue Research Foundation. Exercise responsive cardiac pacemaker. B1 4,436,092, 9-25-90, Cl. 128-419.0PG.
- Datascope Corp.: See—  
Hanson, Bruce L.; and Wolvek, Sidney, B1 4,261,339, Cl. 606-194.000.

## LIST OF REEXAM PATENTEEES

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- Fearnot, Neal E.: See—  
Cook, William A.; Fearnot, Neal E.; and Geddes, Leslie A., B1 4,436,092, Cl. 128-419.0PG.
- Geddes, Leslie A.: See—  
Cook, William A.; Fearnot, Neal E.; and Geddes, Leslie A., B1 4,436,092, Cl. 128-419.0PG.
- Hanson, Bruce L.; and Wolvek, Sidney, to Datascope Corp. Balloon catheter with rotatable support. B1 4,261,339, 9-25-90, Cl. 606-194.000.
- Interface, Inc.: See—  
Tibbals, Edward C., Jr., B1 4,848,725, Cl. 251-129.020.
- Kudlacek, Donald S. Compound archery bow with eccentric cam elements. B1 4,060,066, 9-25-90, Cl. 124-25.600.
- Purdue Research Foundation: See—  
Cook, William A.; Fearnot, Neal E.; and Geddes, Leslie A., B1 4,436,092, Cl. 128-419.0PG.
- Tibbals, Edward C., Jr., to Interface, Inc. Valve construction. B1 4,848,725, 9-25-90, Cl. 251-129.020.
- Wolvck, Sidney: See—  
Hanson, Bruce L.; and Wolvek, Sidney, B1 4,261,339, Cl. 606-194.000.

## LIST OF DESIGN PATENTEEES

- Allen, Kelly M.: See—  
Freiberger, John G., Jr.; and Allen, Kelly M., 310,852, Cl. D21-69.000.
- Alpha Products, Inc.: See—  
Scott, Leon J., III, 310,781, Cl. D9-398.000.
- Anderson, Robert S., to Premium Plastics, Inc. Waste receptacle. 310,903, 9-25-90, Cl. D34-9.000.
- Artemide S.p.A.: See—  
Gismondi, Ernesto; and Bissell, John T., 310,886, Cl. D26-65.000.
- Ashley Furniture Industries, Inc.: See—  
Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, 310,756, Cl. D6-445.000.
- Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, 310,757, Cl. D6-446.000.
- Asselbergs, Christophe K. J., to Suncoast Holdings Inc. Fan. 310,873, 9-25-90, Cl. D23-370.000.
- Au, Nelson S.: See—  
Grundstrom, Douglas R.; Boyle, Dennis J.; Au, Nelson S.; Nuttal, Michael J.; and Herron, Matthew A., 310,828, Cl. D14-106.000.
- Baader, Joseph E. Housing for dual vehicle warning lights. 310,885, 9-25-90, Cl. D26-139.000.
- Beeman, Everett C., to Innopak Plastics Corporation. Bottle. 310,783, 9-25-90, Cl. D9-404.000.
- Bell Bicycles Inc.: See—  
Broersma, Lester V., 310,893, Cl. D29-12.000.
- Bell, Michael R. Fastener for use in maintaining tension in a clothesline or similar article. 310,897, 9-25-90, Cl. D32-60.000.
- Bergen, Robert G.: See—  
Larkin, Mark E.; and Bergen, Robert G., 310,881, Cl. D24-51.000.
- Bergeron, Robert M. Propeller hub extrusion. 310,812, 9-25-90, Cl. D12-214.000.
- Bissell, John T.: See—  
Gismondi, Ernesto; and Bissell, John T., 310,886, Cl. D26-65.000.
- Blumberg, Thomas A.: See—  
Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,819, Cl. D13-125.000.
- Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,820, Cl. D13-125.000.
- Boivin, Josette. Scarf slide. 310,794, 9-25-90, Cl. D11-202.000.
- Boivin, Josette. Scarf slide. 310,795, 9-25-90, Cl. D11-202.000.
- Boivin, Josette. Scarf slide. 310,796, 9-25-90, Cl. D11-203.000.
- Bolle, Maurice, to Etablissements Bolle S.N.C. Pair of sunglasses. 310,839, 9-25-90, Cl. D16-102.000.
- Botich, Michael J.: See—  
Hertzberg, William E.; Botich, Michael J.; and Murphy, Mark, 310,806, Cl. D12-156.000.
- Boyle, Dennis J.: See—  
Grundstrom, Douglas R.; Boyle, Dennis J.; Au, Nelson S.; Nuttal, Michael J.; and Herron, Matthew A., 310,828, Cl. D14-106.000.
- Breger, Carl-Arne, to Holmens Bruk Aktiebolag. Roller dispenser. 310,758, 9-25-90, Cl. D6-518.000.
- Breger, Carl-Arne, to Holmens Bruk Aktiebolag. Toilet paper dispenser. 310,759, 9-25-90, Cl. D6-523.000.
- Bridgestone Corporation: See—  
Hayakawa, Toshio; and Hashimoto, Hideaki, 310,805, Cl. D12-151.000.
- Himuro, Yasuo; and Tateo, Yuji, 310,802, Cl. D12-147.000.
- Broersma, Lester V., to Bell Bicycles Inc. Cyclist's ventilated helmet. 310,893, 9-25-90, Cl. D29-12.000.
- Brown, Douglas C.: See—  
Hulsebus, Randy K.; Mrotek, Edward N.; and Brown, Douglas C., 310,821, Cl. D13-104.000.
- Brunton Company, The: See—  
Iden, Marlin D., 310,787, Cl. D10-53.000.
- C.C. Creative Consulting S.A.: See—  
Hendrikx, Peter, 310,850, Cl. D21-41.000.
- Hendrikx, Peter, 310,851, Cl. D21-41.000.
- Cain, Sherna F., to Triple H Industries, Inc. Air freshener doll. 310,872, 9-25-90, Cl. D23-368.000.
- Carthew, Millie A.: See—  
Collins, Christopher G.; and Carthew, Millie A., 310,774, Cl. D9-305.000.
- Cason, Larry. Retractable ski rope reel mate. 310,776, 9-25-90, Cl. D8-358.000.
- Castagna, John F., to Sparkomatic Corporation. Light bar assembly for vehicle roofs. 310,793, 9-25-90, Cl. D10-114.000.
- Century Products Company: See—  
Sedlack, Mark, 310,869, Cl. D23-296.000.
- Chabala, Leonard V.; and Rogers, Edward J., to S&C Electric Company. Interrupter switch. 310,823, 9-25-90, Cl. D13-175.000.
- Colgate-Palmolive Company: See—  
Paciullo, Francis P.; and Rivera, Ligia A., 310,901, Cl. D32-40.000.
- Paciullo, Francis P.; and Rivera, Ligia A., 310,902, Cl. D32-40.000.
- Collins, Christopher G.; and Carthew, Millie A., to Collins, Christopher G. Reclosable debris bag with debris trap. 310,774, 9-25-90, Cl. D9-305.000.
- Concialdi, Thomas. Combination razor and shaving cream dispenser. 310,889, 9-25-90, Cl. D28-45.000.
- Constance, Patricia, to Nabisco Brands, Inc. Zebra cookie. 310,750, 9-25-90, Cl. D1-128.000.
- Cooper, Brian G.: See—  
LaRochelle, Donald Z.; Cooper, Brian G.; and Melchiorre, Vincent J., 310,827, Cl. D14-106.000.
- Covert, Darrell E.; Hammond, Philip S.; and Maxwell, Paul B., to Goodyear Tire & Rubber Company, The. Tire. 310,804, 9-25-90, Cl. D12-147.000.
- Craft, Charles W., Jr.: See—  
Mervar, Bob; Murphy, Kent W.; and Craft, Charles W., Jr., 310,761, Cl. D6-567.000.
- Crease, Pierre L.; and Stephan, Werner B., to NCR Corporation. Modular personal computer system or similar article. 310,825, 9-25-90, Cl. D14-100.000.
- Creative Point, Inc.: See—  
Long, Jerry M.; and Palmer, Peter J., 310,752, Cl. D3-35.000.
- CritiCard, Inc.: See—  
Davis, Jeffrey B., 310,849, Cl. D20-22.000.
- Culbertson, Richard; and Schaefer, Henry A., to Ericsson GE Mobile Communications Inc. Battery for a portable radio. 310,813, 9-25-90, Cl. D13-103.000.
- Dalbec, Bradley E. Lighted marker buoy. 310,792, 9-25-90, Cl. D10-107.000.
- Danek, Robert J., to General Electric Company. Programmable electronic circuit breaker. 310,822, 9-25-90, Cl. D13-160.000.
- Dart Industries Inc.: See—  
Slayton, Nancy D.; Nottingham, John R.; and Spirk, John W., 310,854, Cl. D21-105.000.
- Davis, Jeffrey B., to CritiCard, Inc. Medical information tag. 310,849, 9-25-90, Cl. D20-22.000.
- Debus, Inc.: See—  
Williamson, Nicholas, 310,778, Cl. D9-367.000.
- Degnan, Donald E. Door viewer. 310,840, 9-25-90, Cl. D16-134.000.
- Delepine, Jean-Claude. Elongated shower head with plural spray nozzles. 310,860, 9-25-90, Cl. D23-213.000.
- Dietz, Robert E. Message holder. 310,847, 9-25-90, Cl. D19-90.000.
- Dinges, George N., to Pattco, Inc. Cart for snowmobiles or the like. 310,904, 9-25-90, Cl. D34-12.000.
- Durand, Jean-Jacques. Perfume bottle. 310,782, 9-25-90, Cl. D9-404.000.
- Durand, Philippe J. Plate or similar article. 310,766, 9-25-90, Cl. D7-564.000.
- Dynavook Technologies Corporation: See—  
Grundstrom, Douglas R.; Boyle, Dennis J.; Au, Nelson S.; Nuttal, Michael J.; and Herron, Matthew A., 310,828, Cl. D14-106.000.
- EGA Limited: See—  
Layton, David E., 310,824, Cl. D13-152.000.
- Egan, William E.: See—  
Maxwell, Paul B.; and Egan, William E., 310,801, Cl. D12-146.000.
- Ellis, Kenneth W. Finger splint. 310,883, 9-25-90, Cl. D24-64.000.
- Embrée, Donald; and Hamann, David L., to Rubbermaid Incorporated. Wrench rack. 310,762, 9-25-90, Cl. D6-569.000.



- Ericsson GE Mobile Communications Inc.: See—  
Culbertson, Richard; and Schaefer, Henry A., 310,813, Cl. D13-103.000.
- Etablissements Bolle S.N.C.: See—  
Bolle, Maurice, 310,839, Cl. D16-102.000.
- Ewig, John F., to Parker Manufacturing Company. Electric stapler. 310,771, 9-25-90, Cl. D8-69.000.
- Fairchild Space and Defense Corporation: See—  
LaRochelle, Donald Z.; Cooper, Brian G.; and Melchiorre, Vincent J., 310,827, Cl. D14-106.000.
- Farrell, Richard; and Soloway, Richard, to Napco Security Systems, Inc. Keyboard and display panel for an intrusion detection system. 310,791, 9-25-90, Cl. D10-106.000.
- Figur, Bernd: See—  
Stutzer, Franz A.; and Figur, Bernd, 310,765, Cl. D7-362.000.
- Finley, Karola. Combined hat and party blowout. 310,751, 9-25-90, Cl. D2-514.000.
- Forbes, Hampton E., Jr., to Westvaco Corporation. Tear strip carton. 310,784, 9-25-90, Cl. D9-416.000.
- Forbes, Hampton E., Jr., to Westvaco Corporation. Tear strip carton. 310,785, 9-25-90, Cl. D9-416.000.
- Frady, Steve A. Slate shingle remover. 310,773, 9-25-90, Cl. D8-89.000.
- Fratelli Guzzini S.p.A.: See—  
Minetti, Furio, 310,767, Cl. D7-631.000.
- Freiberger, John G., Jr.; and Allen, Kelly M. Simulative rocker. 310,852, 9-25-90, Cl. D21-69.000.
- General Electric Company: See—  
Danek, Robert J., 310,822, Cl. D13-160.000.
- General Motors Corporation: See—  
North, David R.; and Stewart, Charles H., 310,811, Cl. D12-206.000.
- Gingras, Eric, to Rubbermaid Commercial Products Inc. Brush block and handle unit. 310,754, 9-25-90, Cl. D4-138.000.
- Gioscia, Richard; and Hino, Ichiro, to Sony Corporation. Television receiver. 310,832, 9-25-90, Cl. D14-131.000.
- Gismondi, Ernesto; and Bissell, John T., to Artemide S.p.A. Articulated table lamp. 310,886, 9-25-90, Cl. D26-65.000.
- Globe-Union Inc.: See—  
Hulsebus, Randy K.; Mrotek, Edward N.; and Brown, Douglas C., 310,821, Cl. D13-104.000.
- Gloeckler, Rolf W., to Henkel Kommanditgesellschaft auf Aktien. Combined deodorant bottle and cap. 310,779, 9-25-90, Cl. D9-377.000.
- Goodyear Tire & Rubber Company, The: See—  
Covert, Darrell E.; Hammond, Philip S.; and Maxwell, Paul B., 310,804, Cl. D12-147.000.
- Graas, Maurice, 310,800, Cl. D12-137.000.
- Maxwell, Paul B.; and Egan, William E., 310,801, Cl. D12-146.000.
- Graas, Maurice, to Goodyear Tire & Rubber Company, The. Tire. 310,800, 9-25-90, Cl. D12-137.000.
- Grimes, Gary E., to U.S. Philips Corporation. Combined radio and cassette recorder. 310,835, 9-25-90, Cl. D14-163.000.
- Grundstrom, Douglas R.; Boyle, Dennis J.; Au, Nelson S.; Nuttal, Michael J.; and Herron, Matthew A., to Dynabook Technologies Corporation. Personal computer. 310,828, 9-25-90, Cl. D14-106.000.
- Hamann, David L.: See—  
Embrece, Donald; and Hamann, David L., 310,762, Cl. D6-569.000.
- Hammond, Philip S.: See—  
Covert, Darrell E.; Hammond, Philip S.; and Maxwell, Paul B., 310,804, Cl. D12-147.000.
- Haegawa, Hirotsugu, to Sumitomo Rubber Industries, Ltd. Automobile tire. 310,803, 9-25-90, Cl. D12-147.000.
- Hashimoto, Hideaki: See—  
Hayakawa, Toshio; and Hashimoto, Hideaki, 310,805, Cl. D12-151.000.
- Hayakawa, Toshio; and Hashimoto, Hideaki, to Bridgestone Corporation. Automobile tire. 310,805, 9-25-90, Cl. D12-151.000.
- Heald, Edward E.: See—  
Patton, Russell S.; King, Dale R.; and Heald, Edward E., 310,884, Cl. D25-68.000.
- Hendricks, Peter, to C.C. Creative Consulting S.A. Simulative die. 310,850, 9-25-90, Cl. D21-41.000.
- Hendricks, Peter, to C.C. Creative Consulting S.A. Simulative die. 310,851, 9-25-90, Cl. D21-41.000.
- Hengebach, Robert W. Combined curved wand tip with swivel-mounted nozzle. 310,861, 9-25-90, Cl. D23-213.000.
- Henkel Kommanditgesellschaft auf Aktien: See—  
Gloeckler, Rolf W., 310,779, Cl. D9-377.000.
- Herron, Matthew A.: See—  
Grundstrom, Douglas R.; Boyle, Dennis J.; Au, Nelson S.; Nuttal, Michael J.; and Herron, Matthew A., 310,828, Cl. D14-106.000.
- Hertzberg, William E.; Botich, Michael J.; and Murphy, Mark, to Zipper Project, Inc. Telescopic camper cap. 310,806, 9-25-90, Cl. D12-156.000.
- Hijo De E.F. Escofet S.A.: See—  
Paris, Emilio F., 310,887, Cl. D26-68.000.
- Hillebrand, Thomas W., to Kohler Co. Non-slip surface unit for bathtubs or the like. 310,763, 9-25-90, Cl. D6-583.000.
- Himuro, Yasuo; and Tateo, Ynji, to Bridgestone Corporation. Automobile tire. 310,802, 9-25-90, Cl. D12-147.000.
- Hino, Ichiro: See—  
Gioscia, Richard; and Hino, Ichiro, 310,832, Cl. D14-131.000.
- Ho, Elizabeth, to Windmere Corporation. Electric lint remover. 310,890, 9-25-90, Cl. D28-50.000.
- Hokanson, Jack E. Standup dental appliance. 310,875, 9-25-90, Cl. D24-10.000.
- Holmens Bruk Aktiebolag: See—  
Breger, Carl-Arne, 310,758, Cl. D6-518.000.
- Breger, Carl-Arne, 310,759, Cl. D6-523.000.
- Honeywell Inc.: See—  
Wolfe, N. Thomas, 310,788, Cl. D10-53.000.
- Hulsebus, Randy K.; Mrotek, Edward N.; and Brown, Douglas C., to Globe-Union Inc. Battery container. 310,821, 9-25-90, Cl. D13-104.000.
- I.W. Industries: See—  
Strignano, Joseph, 310,858, Cl. D23-241.000.
- Strignano, Joseph, 310,859, Cl. D23-241.000.
- Strignano, Joseph, 310,862, Cl. D23-241.000.
- Strignano, Joseph, 310,863, Cl. D23-241.000.
- Strignano, Joseph, 310,864, Cl. D23-241.000.
- Strignano, Joseph, 310,865, Cl. D23-241.000.
- Strignano, Joseph, 310,866, Cl. D23-241.000.
- Strignano, Joseph, 310,867, Cl. D23-242.000.
- Iken, Marlin D., to Brunton Company, The. Combined compass and thermometer. 310,787, 9-25-90, Cl. D10-53.000.
- Imanishi Kinzoku Kogyo Kabushiki Kaisha: See—  
Nishikawa, Hideo, 310,764, Cl. D7-351.000.
- Innopak Plastics Corporation: See—  
Beeman, Everett C., 310,783, Cl. D9-404.000.
- Inoue, Ritsuko, to Ricoh Company, Ltd. Camera. 310,841, 9-25-90, Cl. D16-209.000.
- International Marine Industries, Inc.: See—  
Low, Douglas W.; and Pierotti, Elizabeth M., 310,833, Cl. D14-137.000.
- International Network Marketing: See—  
Matlock, John W., 310,879, Cl. D24-36.000.
- Iwaki, Osamu, to Kobayashi Hansokiki Co., Ltd. Luggage carrier. 310,895, 9-25-90, Cl. D34-26.000.
- Jensen, Donald W., to Sullivan & Mann Lumber Co. Double clamp tree brace. 310,769, 9-25-90, Cl. D8-1.000.
- Jervis, John, to Perio Dental, Inc. Dental syringe. 310,876, 9-25-90, Cl. D24-14.000.
- Jet-Pumpen HT GmbH: See—  
Turbanisch, Heinz, 310,838, Cl. D15-8.000.
- Johnson, David E. Multi-vial level attachment for hand-held drills. 310,772, 9-25-90, Cl. D8-70.000.
- Johnson, Larry; and McCommon, Leonard. Engine heating unit. 310,817, 9-25-90, Cl. D13-119.000.
- Justiniano, Joseph G.: See—  
Rosenbaum, Saul; Watson, Douglas; Justiniano, Joseph G.; and Rivera, Lester, 310,814, Cl. D13-158.000.
- Watson, Douglas; Rosenbaum, Saul; Justiniano, Joseph G.; and Rivera, Lester, 310,815, Cl. D13-158.000.
- Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,819, Cl. D13-125.000.
- Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,820, Cl. D13-125.000.
- Kabushiki Kaisha Toshiba: See—  
Tsuboi, Hideki, 310,836, Cl. D14-165.000.
- Kelley, Donald W.; and Snell, Arthur L. Fence post clip. 310,780, 9-25-90, Cl. D8-382.000.
- Ken Ross, Inc.: See—  
Ross, Daniel S.; Weintraub, Alan M.; and Ross, Joseph K., deceased, 310,777, Cl. D9-378.000.
- King, Dale R.: See—  
Patton, Russell S.; King, Dale R.; and Heald, Edward E., 310,884, Cl. D25-68.000.
- Kirby, Kevin A. Support stand for use in X-raying a human foot. 310,755, 9-25-90, Cl. D6-349.000.
- Kobayashi Hansokiki Co., Ltd.: See—  
Iwaki, Osamu, 310,895, Cl. D34-26.000.
- Kohler Co.: See—  
Hillebrand, Thomas W., 310,763, Cl. D6-583.000.
- Zmuda, Mark A.; and Reid, Mary J., 310,870, Cl. D23-300.000.
- Kosako, Mikio; Makihara, Ritsuko; and Tatsuta, Yoichi, to Sharp Corporation. Sorter for copying machine. 310,843, 9-25-90, Cl. D18-42.000.
- Kosecoff, Irving W. Bicycle rack. 310,808, 9-25-90, Cl. D12-158.000.
- Koya, Kiyofumi: See—  
Suyama, Tsutomu; Wakamatsu, Masaharu; Saito, Koji; and Koya, Kiyofumi, 310,829, Cl. D14-113.000.
- Kulak, Joseph. Horseshoe for a hind hoof. 310,898, 9-25-90, Cl. D30-147.000.
- Kulak, Joseph. Horseshoe for a front hoof. 310,899, 9-25-90, Cl. D30-148.000.
- Kulak, Joseph. Horseshoe for a front hoof. 310,900, 9-25-90, Cl. D30-147.000.
- Kumatani, Hiroshi: See—  
Sawato, Tatsuya; Nakamura, Takashi; and Kumatani, Hiroshi, 310,816, Cl. D13-112.000.
- Kupperman, Dennis, to RB Toy Development. Simulative glider. 310,853, 9-25-90, Cl. D21-89.000.
- Lappin, Rick: See—  
Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, 310,756, Cl. D6-445.000.
- Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, 310,757, Cl. D6-446.000.
- Larkin, Mark E.; and Bergen, Robert G. Spike transfer housing for use in peritoneal dialysis or the like. 310,881, 9-25-90, Cl. D24-51.000.

- LaRochelle, Donald Z.; Cooper, Brian G.; and Melchiorre, Vincent J., to Fairchild Space and Defense Corporation. Data display workstation. 310,827, 9-25-90, Cl. D14-106.000.
- Lay, Dieter P., to Seagist Closures, a division of Pittway Corporation. Container closure. 310,786, 9-25-90, Cl. D9-435.000.
- Layton, David E., to EGA Limited. Electrical trunking, utility box. 310,824, 9-25-90, Cl. D13-152.000.
- Lee, Scott H.: See—  
Stillwagon, James R.; and Lee, Scott H., 310,753, Cl. D3-61.000.
- Levine, Susan H., to Pottery by Levine, Inc. Bowl. 310,768, 9-25-90, Cl. D7-543.000.
- Leviton Manufacturing Co., Inc.: See—  
Rosenbaum, Saul; Watson, Douglas; Justiniano, Joseph G.; and Rivera, Lester, 310,814, Cl. D13-158.000.
- Watson, Douglas; Rosenbaum, Saul; Justiniano, Joseph G.; and Rivera, Lester, 310,815, Cl. D13-158.000.
- Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,819, Cl. D13-125.000.
- Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,820, Cl. D13-125.000.
- Zaretaky, Albert; Rosenbaum, Saul; Rivera, Lester; and Neiger, Benjamin, 310,818, Cl. D13-125.000.
- Lewis, Leslie B. Portable vehicle sun visor. 310,810, 9-25-90, Cl. D12-191.000.
- Liu, Su-Liang. Fan heater. 310,871, 9-25-90, Cl. D23-335.000.
- Long, Jerry M.; and Palmer, Peter J., to Creative Point, Inc. Compact disc file. 310,752, 9-25-90, Cl. D3-35.000.
- Low, Douglas W.; and Pierotti, Elizabeth M., to International Marine Industries, Inc. Marine radio. 310,833, 9-25-90, Cl. D14-137.000.
- Lynch, Richard L. Bicycle mountable golf club rack. 310,807, 9-25-90, Cl. D12-158.000.
- Magnusson, Lennart: See—  
Stake, Esbrorn; and Magnusson, Lennart, 310,798, Cl. D12-97.000.
- Majewski, Chester A. Diaper cover. 310,880, 9-25-90, Cl. D24-50.000.
- Makihara, Ritsuko: See—  
Kosako, Mikio; Makihara, Ritsuko; and Tatsuta, Yoichi, 310,843, Cl. D18-42.000.
- Matlock, John W., to International Network Marketing. Foot massager. 310,879, 9-25-90, Cl. D24-36.000.
- Maxwell, Paul B.; and Egan, William E., to Goodyear Tire & Rubber Company, The. Tire. 310,801, 9-25-90, Cl. D12-146.000.
- Maxwell, Paul B.: See—  
Covert, Darrell E.; Hammond, Philip S.; and Maxwell, Paul B., 310,804, Cl. D12-147.000.
- McCommon, Leonard: See—  
Johnson, Larry; and McCommon, Leonard, 310,817, Cl. D13-119.000.
- McMurtrey, David K.: See—  
Pawst, Dennis P.; and McMurtrey, David K., 310,809, Cl. D12-158.000.
- Mecania HB: See—  
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- Melchiorre, Vincent J.: See—  
LaRochelle, Donald Z.; Cooper, Brian G.; and Melchiorre, Vincent J., 310,827, Cl. D14-106.000.
- Mellyn, Lawrence: See—  
Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,819, Cl. D13-125.000.
- Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,820, Cl. D13-125.000.
- Mervar, Bob; Murphy, Kent W.; and Craft, Charles W., Jr., to Rubbermaid Incorporated. Hanging file. 310,761, 9-25-90, Cl. D6-567.000.
- Minuti, Furio, to Fratelli Guzzini S.p.A. Holder for napkins. 310,767, 9-25-90, Cl. D7-631.000.
- Mita Industrial Co., Ltd.: See—  
Ohata, Yousuke, 310,844, Cl. D18-43.000.
- Ohata, Yousuke, 310,845, Cl. D18-43.000.
- Mitsubishi Denki Kabushiki Kaisha: See—  
Sawato, Tatsuya; Nakamura, Takashi; and Kumatani, Hiroshi, 310,816, Cl. D13-112.000.
- Suyama, Tsutomu; Wakamatsu, Masaharu; Saito, Koji; and Koya, Kiyofumi, 310,829, Cl. D14-113.000.
- Mitsubishi Pencil Co., Ltd.: See—  
Sakurai, Hiroyuki, 310,846, Cl. D19-69.000.
- Mrotek, Edward N.: See—  
Hulsebus, Randy K.; Mrotek, Edward N.; and Brown, Douglas C., 310,821, Cl. D13-104.000.
- Murphy, Kent W., to Rubbermaid Incorporated. Storage caddy for household bags. 310,760, 9-25-90, Cl. D6-515.000.
- Murphy, Kent W.: See—  
Mervar, Bob; Murphy, Kent W.; and Craft, Charles W., Jr., 310,761, Cl. D6-567.000.
- Murphy, Mark: See—  
Hertzberg, William E.; Botich, Michael J.; and Murphy, Mark, 310,806, Cl. D12-156.000.
- Nabisco Brands, Inc.: See—  
Constance, Patricia, 310,750, Cl. D1-128.000.
- Nakamura, Takashi: See—  
Sawato, Tatsuya; Nakamura, Takashi; and Kumatani, Hiroshi, 310,816, Cl. D13-112.000.
- Napco Security Systems, Inc.: See—  
Farrell, Richard; and Soloway, Richard, 310,791, Cl. D10-106.000.
- NCR Corporation: See—  
Crease, Pierre L.; and Stephan, Werner B., 310,825, Cl. D14-100.000.
- Neiger, Benjamin: See—  
Zaretaky, Albert; Rosenbaum, Saul; Rivera, Lester; and Neiger, Benjamin, 310,818, Cl. D13-125.000.
- Nishikawa, Hideo, to Imanishi Kinzoku Kogyo Kabushiki Kaisha. Microwave oven. 310,764, 9-25-90, Cl. D7-351.000.
- North, David R.; and Stewart, Charles H., to General Motors Corporation. Wheel cover. 310,811, 9-25-90, Cl. D12-206.000.
- Nottingham, John R.: See—  
Slayton, Nancy D.; Nottingham, John R.; and Spirk, John W., 310,854, Cl. D21-105.000.
- Nuttall, Michael J.: See—  
Grundstrom, Douglas R.; Boyle, Dennis J.; Au, Nelson S.; Nuttal, Michael J.; and Herron, Matthew A., 310,828, Cl. D14-106.000.
- Ohata, Yousuke, to Mita Industrial Co., Ltd. Toner cartridge. 310,844, 9-25-90, Cl. D18-43.000.
- Ohata, Yousuke, to Mita Industrial Co., Ltd. Toner cartridge. 310,845, 9-25-90, Cl. D18-43.000.
- Oki Electric Industry Co., Ltd.: See—  
Suda, Masami, 310,826, Cl. D14-105.000.
- Paciullo, Francis P.; and Rivera, Ligia A., to Colgate-Palmolive Company. Flexible cover for a sponge mop. 310,901, 9-25-90, Cl. D32-40.000.
- Paciullo, Francis P.; and Rivera, Ligia A., to Colgate-Palmolive Company. Flexible cover for a sponge mop. 310,902, 9-25-90, Cl. D32-40.000.
- Palmer, Peter J.: See—  
Long, Jerry M.; and Palmer, Peter J., 310,752, Cl. D3-35.000.
- Paris, Emilio F., to Hijo De E.F. Escofet S.A. Exterior lighting fixture. 310,887, 9-25-90, Cl. D26-68.000.
- Parker Manufacturing Company: See—  
Ewig, John F., 310,771, Cl. D8-69.000.
- Patton, Russell S.: See—  
Dinges, George N., 310,904, Cl. D34-12.000.
- Patton, Russell S.; King, Dale R.; and Heald, Edward E., to R. D. Werner Co., Inc. Cover for tops of ladders. 310,884, 9-25-90, Cl. D25-68.000.
- Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, to Ashley Furniture Industries, Inc. Door chest. 310,756, 9-25-90, Cl. D6-445.000.
- Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, to Ashley Furniture Industries, Inc. Door chest. 310,757, 9-25-90, Cl. D6-446.000.
- Pawst, Dennis P.; and McMurtrey, David K., to Wald Manufacturing Co., Inc. Bicycle carrier rack. 310,809, 9-25-90, Cl. D12-158.000.
- Pedersen, Carol M. Anatomical doll for child abuse investigations. 310,856, 9-25-90, Cl. D21-166.000.
- Perbis, Richard D. Combined set of containers and wall mounted hanging unit therefor. 310,848, 9-25-90, Cl. D20-18.000.
- Perio Dental, Inc.: See—  
Jervis, John, 310,876, Cl. D24-14.000.
- Perry, Robert. Anti-theft anchor. 310,830, 9-25-90, Cl. D14-114.000.
- Pierotti, Elizabeth M.: See—  
Low, Douglas W.; and Pierotti, Elizabeth M., 310,833, Cl. D14-137.000.
- Pope, John A. Orthopedic unit or the like for relief of back ailment. 310,882, 9-25-90, Cl. D24-64.000.
- Pottery by Levine, Inc.: See—  
Levine, Susan H., 310,768, Cl. D7-543.000.
- Premium Plastics, Inc.: See—  
Anderson, Robert S., 310,903, Cl. D34-9.000.
- Pronschinske, Jane: See—  
Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, 310,756, Cl. D6-445.000.
- Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, 310,757, Cl. D6-446.000.
- Quaker Oats Company, The: See—  
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- R. D. Werner Co., Inc.: See—  
Patton, Russell S.; King, Dale R.; and Heald, Edward E., 310,884, Cl. D25-68.000.
- Radtko, Lee F.: See—  
Shaffer, James R.; and Radtko, Lee F., 310,789, Cl. D10-75.000.
- RB Toy Development: See—  
Kupperman, Dennis, 310,853, Cl. D21-89.000.
- Reeves, Kevin E.; and Young, Harold G., to TRC Acquisition Corporation. Hydro-massage appliance. 310,877, 9-25-90, Cl. D24-38.000.
- Reid, Mary J.: See—  
Zmuda, Mark A.; and Reid, Mary J., 310,870, Cl. D23-300.000.
- Reilly, Vincent D. Gauge indicator. 310,790, 9-25-90, Cl. D10-103.000.
- Representative, Mary M. Ross Legal: See—  
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- Ricoh Company, Ltd.: See—  
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- Rivera, Lester: See—  
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- Watson, Douglas; Rosenbaum, Saul; Justiniano, Joseph G.; and Rivera, Lester, 310,815, Cl. D13-158.000.
- Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,819, Cl. D13-125.000.

- Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,820, Cl. D13-125.000.
- Zaretsky, Albert; Rosenbaum, Saul; Rivera, Lester; and Neiger, Benjamin, 310,818, Cl. D13-125.000.
- Rivera, Ligia A.: See—
- Paciullo, Francis P.; and Rivera, Ligia A., 310,901, Cl. D32-40.000.
- Paciullo, Francis P.; and Rivera, Ligia A., 310,902, Cl. D32-40.000.
- Robinson, Trevor A. Doll, 310,857, 9-25-90, Cl. D21-168.000.
- Rogers, Edward J.: See—
- Chabala, Leonard V.; and Rogers, Edward J., 310,823, Cl. D13-175.000.
- Rosenbaum, Saul; Watson, Douglas; Justiniano, Joseph G.; and Lester, to Leviton Manufacturing Co., Inc. Combined sound activated switch and cover plate, 310,814, 9-25-90, Cl. D13-158.000.
- Rosenbaum, Saul: See—
- Watson, Douglas; Rosenbaum, Saul; Justiniano, Joseph G.; and Rivera, Lester, 310,815, Cl. D13-158.000.
- Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,819, Cl. D13-125.000.
- Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,820, Cl. D13-125.000.
- Zaretsky, Albert; Rosenbaum, Saul; Rivera, Lester; and Neiger, Benjamin, 310,818, Cl. D13-125.000.
- Ross, Daniel S.; Weintraub, Alan M.; and Ross, Joseph K., deceased (by Representative, Mary M. Ross Legal), to Ken Ross, Inc. Liquid container, 310,777, 9-25-90, Cl. D9-378.000.
- Ross, Joseph K., deceased: See—
- Ross, Daniel S.; Weintraub, Alan M.; and Ross, Joseph K., deceased, 310,777, Cl. D9-378.000.
- Rowenta-Werke GmbH: See—
- Stutzer, Franz A.; and Figur, Bernd, 310,765, Cl. D7-362.000.
- Rubbermaid Commercial Products Inc.: See—
- Gingras, Eric, 310,754, Cl. D4-138.000.
- Rubbermaid Incorporated: See—
- Embrece, Donald; and Hamann, David L., 310,762, Cl. D6-569.000.
- Mervar, Bob; Murphy, Kent W.; and Craft, Charles W., Jr., 310,761, Cl. D6-567.000.
- Murphy, Kent W., 310,760, Cl. D6-515.000.
- Ruonala, Matti, to Uniline Australia Limited. Curtain track unit, 310,775, 9-25-90, Cl. D8-377.000.
- S&C Electric Company: See—
- Chabala, Leonard V.; and Rogers, Edward J., 310,823, Cl. D13-175.000.
- Saito, Koji: See—
- Suyama, Tsutomu; Wakamatsu, Masaharu; Saito, Koji; and Koya, Kiyofumi, 310,829, Cl. D14-113.000.
- Sakurai, Hiroyuki, to Mitsubishi Pencil Co., Ltd. Tape holder, 310,846, 9-25-90, Cl. D19-69.000.
- Sanrio Company, Ltd.: See—
- Tsuji, Shintaro, 310,888, Cl. D27-158.000.
- Sawato, Tatsuya; Nakamura, Takaishi; and Kumatani, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Electric motor with hinged mounting bracket, 310,816, 9-25-90, Cl. D13-112.000.
- Schaefer, Henry A.: See—
- Culbertson, Richard; and Schaefer, Henry A., 310,813, Cl. D13-103.000.
- Scott, Leon J., III, to Alpha Products, Inc. Bottle, 310,781, 9-25-90, Cl. D9-398.000.
- Sequist Closures, a division of Pittway Corporation: See—
- Lay, Dieter F., 310,786, Cl. D9-435.000.
- Sedlack, Mark, to Century Products Company. Toilet training seat for children, 310,869, 9-25-90, Cl. D23-296.000.
- Shaffer, James R.; and Radtke, Lee F., to Sun Electric Corporation. Engine analyzer, 310,789, 9-25-90, Cl. D10-75.000.
- Sharp Corporation: See—
- Kosako, Mikio; Makihara, Ritsuko; and Tatsuta, Yoichi, 310,843, Cl. D18-42.000.
- Shibata, Hirokazu, 310,834, Cl. D14-156.000.
- Takimoto, Makoto, 310,837, Cl. D14-168.000.
- Shibata, Hirokazu, to Sharp Corporation. Digital audio disc player, 310,834, 9-25-90, Cl. D14-156.000.
- Slayton, Nancy D.; Nottingham, John R.; and Spirk, John W., to Dart Industries Inc. Toy puzzle, 310,854, 9-25-90, Cl. D21-105.000.
- Smith, Ramon R. Door dolly, 310,894, 9-25-90, Cl. D34-23.000.
- Smrt, Thomas J. Circus wagon, 310,797, 9-25-90, Cl. D12-17.000.
- Snell, Arthur L.: See—
- Kelley, Donald W.; and Snell, Arthur L., 310,780, Cl. D8-382.000.
- Snell-Kelly, Janet E., to Quaker Oats Company, The. Toy camera, 310,855, 9-25-90, Cl. D21-110.000.
- Soloway, Richard: See—
- Farrell, Richard; and Soloway, Richard, 310,791, Cl. D10-106.000.
- Sony Corporation: See—
- Giacia, Richard; and Hino, Ichiro, 310,832, Cl. D14-131.000.
- Sparkomatic Corporation: See—
- Castagna, John F., 310,793, Cl. D10-114.000.
- Spirk, John W.: See—
- Slayton, Nancy D.; Nottingham, John R.; and Spirk, John W., 310,854, Cl. D21-105.000.
- Stake, Eabron; and Magnusson, Lennart, to Mecania HB. Rolltransport container, 310,798, 9-25-90, Cl. D12-97.000.
- Stephan, Werner B.: See—
- Crease, Pierre L.; and Stephan, Werner B., 310,825, Cl. D14-100.000.
- Stewart, Charles H.: See—
- North, David R.; and Stewart, Charles H., 310,811, Cl. D12-206.000.
- Stillwagon, James R.; and Lee, Scott H. Key holder, 310,753, 9-25-90, Cl. D3-61.000.
- Strignano, Joseph, to I.W. Industries. Bathroom faucet, 310,858, 9-25-90, Cl. D23-241.000.
- Strignano, Joseph, to I.W. Industries. Bathroom faucet, 310,859, 9-25-90, Cl. D23-241.000.
- Strignano, Joseph, to I.W. Industries. Bathroom faucet, 310,862, 9-25-90, Cl. D23-241.000.
- Strignano, Joseph, to I.W. Industries. Bathroom faucet, 310,863, 9-25-90, Cl. D23-241.000.
- Strignano, Joseph, to I.W. Industries. Bathroom faucet, 310,864, 9-25-90, Cl. D23-241.000.
- Strignano, Joseph, to I.W. Industries. Bathroom faucet, 310,865, 9-25-90, Cl. D23-241.000.
- Strignano, Joseph, to I.W. Industries. Bathroom faucet, 310,866, 9-25-90, Cl. D23-241.000.
- Strignano, Joseph, to I.W. Industries. Faucet set, 310,867, 9-25-90, Cl. D23-242.000.
- Stutzer, Franz A.; and Figur, Bernd, to Rowenta-Werke GmbH. Electric heated warming plate, 310,765, 9-25-90, Cl. D7-362.000.
- Suda, Masami, to Oki Electric Industry Co., Ltd. Credit card input/output terminal, 310,826, 9-25-90, Cl. D14-105.000.
- Sullivan & Mann Lumber Co.: See—
- Jensen, Donald W., 310,769, Cl. D8-1.000.
- Sumitomo Rubber Industries, Ltd.: See—
- Hasegawa, Hirotsugu, 310,803, Cl. D12-147.000.
- Sun Electric Corporation: See—
- Shaffer, James R.; and Radtke, Lee F., 310,789, Cl. D10-75.000.
- Suncourt Holdings Inc.: See—
- Asselberga, Christophe K. J., 310,873, Cl. D23-370.000.
- Suyama, Tsutomu; Wakamatsu, Masaharu; Saito, Koji; and Koya, Kiyofumi, to Mitsubishi Denki Kabushiki Kaisha. Display monitor, 310,829, 9-25-90, Cl. D14-113.000.
- Takimoto, Makoto, to Sharp Corporation. Combined compact disc player, radio, receiver and tape recorder, 310,837, 9-25-90, Cl. D14-168.000.
- Tateo, Yuji: See—
- Himuro, Yasuo; and Tateo, Yuji, 310,802, Cl. D12-147.000.
- Tatsuta, Yoichi: See—
- Kosako, Mikio; Makihara, Ritsuko; and Tatsuta, Yoichi, 310,843, Cl. D18-42.000.
- TRC Acquisition Corporation: See—
- Reeves, Kevin E.; and Young, Harold G., 310,877, Cl. D24-38.000.
- Triple H Industries, Inc.: See—
- Cain, Sherna F., 310,872, Cl. D23-368.000.
- Tsuboi, Hideki, to Kabushiki Kaisha Toshiba. Tape player, 310,836, 9-25-90, Cl. D14-165.000.
- Tsuji, Shintaro, to Sanrio Company, Ltd. Lighter, 310,888, 9-25-90, Cl. D27-158.000.
- Turbanisch, Heinz, to Jet-Pumpen HT GmbH. Wall-mounted aquarium pump, 310,838, 9-25-90, Cl. D15-8.000.
- Uniline Australia Limited: See—
- Ruonala, Matti, 310,775, Cl. D8-377.000.
- U.S. Philips Corporation: See—
- Grimes, Gary E., 310,835, Cl. D14-163.000.
- Udey, James E., Jr. Solar powered roof vent fan, 310,874, 9-25-90, Cl. D23-376.000.
- van der Merwe, Jacobus C.; and van der Merwe, Lucas C. Trailer stand, 310,799, 9-25-90, Cl. D12-106.000.
- van der Merwe, Lucas C.: See—
- van der Merwe, Jacobus C.; and van der Merwe, Lucas C., 310,799, Cl. D12-106.000.
- Varick, Anthony. Combination tool, 310,891, 9-25-90, Cl. D28-59.000.
- Varick, Anthony. Combination tool, 310,892, 9-25-90, Cl. D28-59.000.
- Vito, Richard F. Guitar, 310,842, 9-25-90, Cl. D17-14.000.
- Wakamatsu, Masaharu: See—
- Suyama, Tsutomu; Wakamatsu, Masaharu; Saito, Koji; and Koya, Kiyofumi, 310,829, Cl. D14-113.000.
- Wald Manufacturing Co., Inc.: See—
- Pawzat, Dennis P.; and McMurtrey, David K., 310,809, Cl. D12-158.000.
- Wan, Yeh T. Cleaning cassette for a magnetic head, 310,831, 9-25-90, Cl. D14-121.000.
- Watson, Douglas; Rosenbaum, Saul; Justiniano, Joseph G.; and Rivera, Lester, to Leviton Manufacturing Co., Inc. Combined sound activated switch and cover plate, 310,815, 9-25-90, Cl. D13-158.000.
- Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., to Leviton Manufacturing Co., Inc. Combined dimmer, fan speed control switches and cover plate, 310,819, 9-25-90, Cl. D13-125.000.
- Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., to Leviton Manufacturing Co., Inc. Combined dimmer, fan speed control switches and cover plate, 310,820, 9-25-90, Cl. D13-125.000.
- Watson, Douglas: See—
- Rosenbaum, Saul; Watson, Douglas; Justiniano, Joseph G.; and Rivera, Lester, 310,814, Cl. D13-158.000.
- Weintraub, Alan M.: See—
- Ross, Daniel S.; Weintraub, Alan M.; and Ross, Joseph K., deceased, 310,777, Cl. D9-378.000.
- Westvaco Corporation: See—
- Forbes, Hampton E., Jr., 310,784, Cl. D9-416.000.
- Forbes, Hampton E., Jr., 310,785, Cl. D9-416.000.

- Wilder, Don R. Weld flange, 310,868, 9-25-90, Cl. D23-265.000.
- Williamson, Nicholas, to Debus, Inc. Bottle or similar article, 310,778, 9-25-90, Cl. D9-367.000.
- Windmere Corporation: See—
- Ho, Elizabeth, 310,890, Cl. D28-50.000.
- Winjum, Jack. Tray, 310,896, 9-25-90, Cl. D34-46.000.
- Wolfe, N. Thomas, to Honeywell Inc. Clock thermostat, 310,788, 9-25-90, Cl. D10-53.000.
- Young, Harold G.: See—
- Reeves, Kevin E.; and Young, Harold G., 310,877, Cl. D24-38.000.
- Young, Larry D. Combined tanning and exercise station, 310,878, 9-25-90, Cl. D24-39.000.
- Zamarripa, Santiago J. Combined socket holder and socket wrench, 310,770, 9-25-90, Cl. D8-29.000.
- Zaretsky, Albert; Rosenbaum, Saul; Rivera, Lester; and Neiger, Benjamin, to Leviton Manufacturing Co., Inc. Combined dimmer switches and cover plate, 310,818, 9-25-90, Cl. D13-125.000.
- Zipper Project, Inc.: See—
- Hertzberg, William E.; Botich, Michael J.; and Murphy, Mark, 310,806, Cl. D12-156.000.
- Zmuda, Mark A.; and Reid, Mary J., to Kohler Co. Toilet, 310,870, 9-25-90, Cl. D23-300.000.



## LIST OF PLANT PATENTEES

Ayusawa, Sumio: See—  
Inoue, Sadayuki; and Ayusawa, Sumio, 7,339, Cl. 89.000.

Conard-Pyle Company, The: See—  
Meilland, Marie-Louise, deceased, 7,334, Cl. 28.000.

Evera, Hans, to Jackson & Perkins Company. Rose plant Tancredor.  
7,333, 9-25-90, Cl. 20.000.

Hokken Sangyo Co., Ltd.: See—  
Inoue, Sadayuki; and Ayusawa, Sumio, 7,339, Cl. 89.000.

Hrebeniuk, Alexander. Distinct variety of Poinsettia named H-477/86.  
Red, 7,338, 9-25-90, Cl. 86.000.

Inoue, Sadayuki; and Ayusawa, Sumio, to Hokken Sangyo Co., Ltd.  
Shiitake mushroom plant named 'Hokken 601'. 7,339, 9-25-90, Cl.  
89.000.

Jackson & Perkins Company: See—  
Evera, Hans, 7,333, Cl. 20.000.

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Langford, Mitchell; Langford, Rose M.; and Langford, Vernon, to  
Plum-Cot, Inc. Peach tree (Snow Diamond). 7,336, 9-25-90, Cl.  
42.000.

Langford, Rose M.: See—  
Langford, Mitchell; Langford, Rose M.; and Langford, Vernon,  
7,336, Cl. 42.000.

Langford, Vernon: See—  
Langford, Mitchell; Langford, Rose M.; and Langford, Vernon,  
7,336, Cl. 42.000.

Le Naour, Jean-Pierre, legal representative: See—  
Meilland, Marie-Louise, deceased (by Le Naour, Jean-Pierre, legal  
representative), to Conard-Pyle Company, The. Rose plant—Mei-  
chevil variety, 7,334, 9-25-90, Cl. 28.000.

Neufeld, Charles H. Plum tree, "First Beaut". 7,335, 9-25-90, Cl. 38.000.

Plum-Cot, Inc.: See—  
Langford, Mitchell; Langford, Rose M.; and Langford, Vernon,  
7,336, Cl. 42.000.

Sprague, James W. *Prunus persica* sprague peach bush. 7,337, 9-25-90,  
Cl. 43.000.

## CLASSIFICATION OF PATENTS

ISSUED SEPTEMBER 25, 1990

NOTE.—First number, class; second number, subclass; third number, patent number

150	4,958,383	7.5	4,958,445	23	4,959,088	603	4,958,552	479	4,958,610	187	4,959,110
162	4,958,384	11.5	4,958,446	51.1	4,958,498	420	4,958,548	489	4,958,611	204	4,959,114
174	4,958,385	101	4,958,447	55.5	4,958,499	447	4,958,553	572	4,958,612	248	4,959,112
227	4,958,386	119	4,958,448	89	4,958,500		CLASS 90	585	4,958,613	264	4,959,115
239	4,958,388			125	4,958,501		4,958,554	617	4,958,614	283	4,959,116
				126	4,958,502		Re.33,347	635	4,958,615	497	4,959,117
				129	4,958,503		4,958,555		4,958,616	512	4,959,118
236	4,958,387	93	4,958,449	244	4,958,504	40.05			4,958,617	636	4,959,113
547	4,958,389	94	4,958,457	398	4,958,505	121.1		24.1	4,958,617	644	4,959,119
				457.2	4,958,506		CLASS 99	25.6	B1 4,060,066	651	4,959,120
							4,958,556		4,958,618	668	4,959,121
							4,958,557		4,958,619		
110	4,958,390	156	4,958,458	33	4,959,089	355	4,958,556	9 B	4,958,618	42	4,959,122
127	4,958,391	159	4,958,450	60.4	4,959,090	495	4,958,557	85 R	4,958,619		
431	4,958,393	204	4,958,451			862.48	4,958,525		4,958,620		
475	4,958,394	301	4,958,452				4,958,525		4,958,621		
507	4,958,392	352	4,958,453				4,958,525		4,958,622		
		495	4,958,454				4,958,525		4,958,623		
			4,958,455				4,958,525		4,958,624		
			4,958,459				4,958,525		4,958,625		
145	4,958,395	636	4,958,459				4,958,525		4,958,626		
							4,958,525		4,958,627		
							4,958,525		4,958,628		
111	4,959,075	124	4,958,456				4,958,525		4,958,629		
402	4,959,076						4,958,525		4,958,630		
							4,958,525		4,958,631		
							4,958,525		4,958,632		
							4,958,525		4,958,633		
							4,958,525		4,958,634		
							4,958,525		4,958,635		
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							4,958,525		4,958,637		
							4,958,525		4,958,638		
							4,958,525		4,958,639		
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							4,958,525		4,958,641		
							4,958,525		4,958,642		
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							4,958,525		4,958,661		
							4,958,525		4,958,662		
							4,958,525		4,958,663		
							4,958,525		4,958,664		
							4,958,525		4,958,665		
							4,958,525		4,958,666		
							4,958,525		4,958,667		
							4,958,525		4,958,668		
							4,958,525		4,958,669		
							4,958,525		4,958,670		
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							4,958,525		4,958,672		
							4,958,525		4,958,673		
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							4,958,525		4,958,677		
							4,958,525		4,958,678		
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							4,958,525		4,958,692		
							4,958,525		4,958,693		
							4,958,525		4,958,694		
							4,958,525		4,958,695		
							4,958,525		4,958,696		
							4,958,525		4,958,697		
							4,958,525		4,958,698		
							4,958,525		4,958,699		
							4,958,525		4,958,700		
							4,958,525		4,958,701		
							4,958,525		4,958,702		
							4,958,525		4,958,703		
							4,958,525		4,958,704		
							4,958,525		4,958,705		
							4,958,525		4,958,706		

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CLASS 192	314	4,959,526	305	4,959,544	423	4,958,838	CLASS 313	120	4,959,654	
0.098	4,958,708	365	4,959,527	327.2	4,959,545	CLASS 279	000	4,959,584	389	4,959,655
58 B	4,958,709	388	4,959,529	330	4,959,546	2 R	113	4,959,583	418	4,959,656
60	4,958,710	432	4,959,528	336.1	4,959,547	62	271	4,959,585	CLASS 343	
70.12	4,958,711			390.09	4,959,548	CLASS 280	623	4,959,586	725	4,959,657
85 AA	4,958,712	83	4,958,741	461.1	4,959,549	7.1	625	4,959,587	786	4,959,658
88 B	4,958,713	209	4,958,742	492.3	4,959,550	47.35	58	4,959,588	CLASS 346	
111 A	4,958,714	288	4,958,743	504 R	4,959,551	185	169.3	4,959,589	1.1	4,959,659
CLASS 194	4,958,715	305	4,958,744	560	4,959,552	407.1	209 R	4,959,590	76 PH	4,959,660
206	4,958,715	375	4,958,745		4,959,553	502	248	4,959,591	108	4,959,661
CLASS 196	4,958,716			CLASS 251	4,958,801	624	290	4,959,592	136	4,959,662
346.1	4,958,716	24	4,958,746	11	4,958,802	652	397	4,959,593	140 R	4,959,663
416	4,958,717			129.02	B1 4,848,725	668		4,959,594		4,959,664
456	4,958,718	67	4,958,747	310	4,958,802	696		4,959,595		4,959,665
635	4,958,719	131	4,958,748	342	4,958,803	714		4,959,596		4,959,666
666	4,958,720	133	4,958,749	CLASS 252	4,958,863	735		4,959,597		4,959,667
710	4,958,721	135	4,958,750	8.51	4,959,164	775		4,959,598		4,959,668
735.3	4,958,722	135	4,958,750	8.551	4,959,165	806		4,959,599		4,959,669
781	4,958,723	164	4,958,751		4,959,166	CLASS 281		4,959,600		4,959,670
819	4,958,724	192	4,958,752	32.7 E	4,959,167	45		4,959,601		4,959,671
836.1	4,958,725	321	4,958,753	48.6	4,959,168	CLASS 285		4,959,602		4,959,672
852	4,958,726	383	4,958,754	68	4,959,169	1		4,959,603		4,959,673
CLASS 200	4,959,512	394	4,958,757	135	4,959,170	20		4,959,604		4,959,674
38 R	4,959,512	402.23	4,958,755	174	4,959,171	21		4,959,605		4,959,675
61.45 M	4,959,513			299.1	4,959,172	24		4,959,606		4,959,676
144 R	4,959,514	151	4,958,759	299.65	4,959,173	39		4,959,607		4,959,677
181	4,959,515	153	4,958,760	301.6 R	4,959,174	49		4,959,608		4,959,678
CLASS 201	4,959,515	267	4,958,758	327 E	4,959,166	175		4,959,609		4,959,679
2	4,959,126	316	4,958,761	340	4,959,167	334		4,959,610		4,959,680
CLASS 202	4,959,127			389.53	4,959,176	CLASS 292		4,959,611		4,959,681
177	4,959,127	1.1	4,958,762	391	4,959,177	103 R		4,959,612		4,959,682
CLASS 203	4,959,128	193	4,958,763	396	4,959,178	132		4,959,613		4,959,683
57	4,959,128	248	4,958,764	514	4,959,179	132 F		4,959,614		4,959,684
CLASS 204	4,959,129	383	4,959,530	519	4,959,180	239 R		4,959,615		4,959,685
28	4,959,129			625	4,959,181	339		4,959,616		4,959,686
32.1	4,959,130	20 R	4,958,765	700	4,959,182	106		4,959,617		4,959,687
59 R	4,959,131			CLASS 254	4,958,804	1.4		4,959,618		4,959,688
101	4,959,132	12.3 B	4,958,766	CLASS 255	4,958,805	75		4,959,619		4,959,689
129	4,959,133			CLASS 256	4,958,806	93		4,959,620		4,959,690
182.8	4,959,133	13	4,958,767	12.5	4,958,806	CLASS 296		4,959,621		4,959,691
192.15	4,959,134	34	4,958,768	65	4,958,807	26		4,959,622		4,959,692
299 EC	4,959,137	114	4,958,769	402	4,959,187	32		4,959,623		4,959,693
414	4,959,138	526	4,958,770	87	4,959,183	39.2		4,959,624		4,959,694
CLASS 206	4,958,727	584	4,958,774	40.3	4,959,184	65.1		4,959,625		4,959,695
6.1	4,958,728			40.3	4,959,184	97.5		4,959,626		4,959,696
44 B	4,958,728			81	4,959,185	97.6		4,959,627		4,959,697
315.1	4,958,729			102	4,959,186	97.7		4,959,628		4,959,698
315.110	4,958,730			255	4,959,188	97.8		4,959,629		4,959,699
379	4,958,732	88.1	4,958,775	510	4,959,189	98		4,959,700		4,959,700
409	4,958,733	171	4,958,776	510	4,959,189	98.1		4,959,701		4,959,701
435	4,958,734			529	4,959,191	98.2		4,959,702		4,959,702
497	4,958,735			154	4,958,808	98.3		4,959,703		4,959,703
531	4,958,736	7.11	4,958,777	229	4,958,809	98.4		4,959,704		4,959,704
557	4,958,737	23 A	4,958,778	140.1	4,958,810	98.5		4,959,705		4,959,705
CLASS 208	4,959,139	47	4,958,780	294	4,958,812	98.6		4,959,706		4,959,706
39	4,959,140	71.7	4,958,781	32	4,958,813	98.7		4,959,707		4,959,707
59	4,959,141	75.43	4,958,782	43	4,958,814	98.8		4,959,708		4,959,708
CLASS 210	4,959,142	129.6	4,958,784	58	4,958,815	98.9		4,959,709		4,959,709
109	4,959,143	157 R	4,958,783	136	1,958,818	99		4,959,710		4,959,710
167	4,959,144	295	4,958,785	323	4,958,817	99.1		4,959,711		4,959,711
232	4,959,144			328	4,958,816	99.2		4,959,712		4,959,712
237	4,959,146			CLASS 266	4,958,808	99.3		4,959,713		4,959,713
242.3	4,959,143	17.13	4,958,786	CLASS 267	4,958,809	99.4		4,959,714		4,959,714
532.2	4,959,145	153 R	4,958,787	140.1	4,958,810	99.5		4,959,715		4,959,715
635	4,959,148	169	4,958,788	294	4,958,812	99.6		4,959,716		4,959,716
636	4,959,149			32	4,958,813	99.7		4,959,717		4,959,717
640	4,959,150			43	4,958,814	99.8		4,959,718		4,959,718
651	4,959,151			58	4,958,815	99.9		4,959,719		4,959,719
670	4,959,152	74.1	4,958,791	136	1,958,818			4,959,720		4,959,720
680	4,959,153	74.2	4,958,792	323	4,958,817			4,959,721		4,959,721
687	4,959,154	122	4,958,793	328	4,958,816			4,959,722		4,959,722
701	4,959,155	183	4,958,794	CLASS 270	4,958,819			4,959,723		4,959,723
712	4,959,156	317	4,958,795	31	4,958,819			4,959,724		4,959,724
752	4,959,157			52	4,958,820			4,959,725		4,959,725
787	4,959,158			CLASS 271	4,958,821			4,959,726		4,959,726
CLASS 211	4,958,738	345.1	4,958,797	3.1	4,958,822			4,959,727		4,959,727
89	4,958,739	346.1	4,958,798	9	4,958,823			4,959,728		4,959,728
153	4,958,739	430	4,958,799		4,958,823			4,959,729		4,959,729
CLASS 215	4,958,740			11	4,958,824			4,959,730		4,959,730
6	4,958,740			119	4,958,825			4,959,731		4,959,731
10.55 E	4,959,517			124	4,958,826			4,959,732		4,959,732
10.55 F	4,959,518			176	4,958,827			4,959,733		4,959,733
99	4,959,519			186	4,958,828			4,959,734		4,959,734
110	4,959,520			273	4,958,829			4,959,735		4,959,735
121.48	4,959,521			CLASS 272	4,958,830			4,959,736		4,959,736
121.63	4,959,522			69	4,958,831			4,959,737		4,959,737
121.75	4,959,523			73	4,958,832			4,959,738		4,959,738
124.34	4,959,524			123	4,958,833			4,959,739		4,959,739
275	4,959,525			77 A	4,958,834			4,959,740		4,959,740
291	4,959,525			85 G	4,958,835			4,959,741		4,959,741
CLASS 341	4,959,531			184 R	4,958,836			4,959,742		4,959,742
72	4,958,838			237	4,958,837			4,959,743		4,959,743
76	4,958,840			CLASS 273	4,958,838			4,959,744		4,959,744
80	4,958,842			140.3	4,958,839			4,959,745		4,959,745
84	4,958,843			208	4,958,840			4,959,746		4,959,746
88	4,958,844			214	4,958,841			4,959,747		4,959,747
92	4,958,845			287	4,958,842			4,959,748		4,959,748
96	4,958,846			307	4,958,843			4,959,749		4,959,749
100	4,958,847			CLASS 312	4,958,844			4,959,750		4,959,750
104	4,958,848			140.3	4,958,845			4,959,751		4,959,751
108	4,958,849			208	4,958,846			4,959,752		4,959,752
112	4,958,850			214	4,958,847			4,959,753		4,959,753
116	4,958,851			287	4,958,848			4,959,754		4,959,754
120	4,958,852			307	4,958,849			4,959,755		4,959,755
124	4,958,853			CLASS 313	4,958,850			4,959,756		4,959,756
128	4,958,854			140.3	4,958,851			4,959,757		4,959,757
132	4,958,855			208	4,958,852			4,959,758		4,959,758
136	4,958,856			214	4,958,853			4,959,759		4,959,759
140	4,958,857			287	4,958,854			4,959,760		4,959,760
144	4,958,858			307	4,958,855			4,959,761		4,959,761
148	4,958,859			CLASS 314	4,958,856			4,959,762		4,959,762
152	4,958,860			140.3	4,958,857			4,959,763		4,959,763
156	4,958,861			208	4,958,858			4,959,764		4,959,764
160	4,958,862			214	4,958,859			4,959,765		4,959,765
164	4,958,863			287	4,958,860			4,959,766		4,959,766
168	4,958,864			307	4,958,8					

51	4,959,705	519	4,959,791	107	4,959,867	CLASS 423	224	4,959,282	CLASS 460			
68	4,959,706	521	4,959,802	CLASS 382		347	4,959,200	CLASS 430	149	4,959,038		
76	4,959,707		4,959,803	35	4,958,939	445	4,958,998	1	4,959,283	CLASS 464		
84	4,959,708	557	4,959,804	41	4,959,868	446	4,959,201	2	4,959,284	66	4,959,039	
CLASS 358			562	4,959,805	51	4,959,869	502	4,959,202	11	4,959,285	CLASS 474	
80	4,959,711	565	4,959,806	56	4,959,870	602	4,959,203	45	4,959,286	103	4,959,040	
	4,959,712		4,959,807	59	4,959,871			59	4,959,287	134	4,959,041	
98	4,959,710	566	4,959,808	CLASS 384		54	4,959,204	64	4,959,288	230	4,959,043	
106	Re.33.357	579	4,959,792	398	4,958,940	59	4,959,205	73	4,959,289	CLASS 475		
108	4,959,713	581	4,959,809	474	4,958,941	70	4,959,206	138	4,959,290	194	4,959,044	
125	4,959,714	900	4,959,810	486	4,958,942	76.1	4,959,207	165	4,959,291	254	4,959,045	
139	4,959,715			488	4,958,943	78	4,959,208	189	4,959,292	382	4,959,046	
140	4,959,716	49	4,959,811	512	4,958,944	81	4,959,209	204	4,959,293	CLASS 493		
147	4,959,717	185	4,959,812	523	4,958,945	85.7	4,959,210	281	4,959,294	8	4,959,330	
148	4,959,718	189.12	4,959,813	609	4,958,946	93	4,959,211	302	4,959,295	89	4,959,331	
183	4,959,719	207	4,959,814		4,958,947	94.1	4,959,212	322	4,959,296	136	4,959,333	
191.1	4,959,720	230.06	4,959,815	812	4,958,948	195.1	4,959,213	382	4,959,297	CLASS 502		
194.1	4,959,721	233.5	4,959,816			422	4,959,214	496	4,959,298	43	4,959,334	
211	4,959,722					430	4,959,215	544	4,959,299	62	4,959,335	
213.11	4,959,723					473	4,959,216	546	4,959,300	230	4,959,337	
213.29	4,959,724						4,959,217			263	4,959,338	
222	4,959,725	81	4,958,933	314	4,958,949	480	4,959,218	1	4,959,009	302	4,959,339	
227	4,959,726	145	4,958,934	629	4,958,950	490	4,959,220	12	4,959,010	401	4,959,340	
228	4,959,727	154	4,958,935	CLASS 401		659	4,959,221	263	4,959,011	404	4,959,341	
	4,959,728			1	4,958,951	692	4,959,222			439	4,959,342	
229	4,959,729			131	4,958,952	CLASS 425		76	4,959,012	CLASS 503		
298	4,959,730	97	4,959,817	CLASS 403		110	4,958,999	CLASS 432	43	4,959,336		
300	4,959,731	189	4,959,818	297	4,958,953	116	4,959,000	76	4,959,012	67	4,959,337	
336	4,959,732			CLASS 404		147	4,959,001	CLASS 433	102	4,959,338		
338	4,959,733	93	4,959,819	10	4,958,954	192 R	4,959,002	35	4,959,013	230	4,959,339	
341	4,959,734	13	4,959,820	40	4,958,956	346	4,959,003	72	4,959,014	263	4,959,340	
342	4,959,735	44.11	4,959,821	75	4,958,955	397	4,959,004	CLASS 434	404	4,959,341		
471	4,959,736	44.13	4,959,822	23	4,958,956	533	4,959,005	2	4,959,015	439	4,959,342	
475	4,959,737	44.14	4,959,823	55	4,958,957	577	4,959,006	22	4,959,016	CLASS 505		
CLASS 360			48	4,959,825	154	4,958,958	CLASS 426		110	4,959,017	200	4,959,343
78.13	4,959,738			184	4,958,959	2	4,959,223	CLASS 435	5	4,959,301	1	4,959,344
95	4,959,739			195	4,958,960	3	4,959,225	68.1	4,959,302	2	4,959,350	
106	4,959,740			260	4,958,961	11	4,959,226	69.1	4,959,303	9	4,959,351	
122	4,959,741			267	4,958,962	35	4,959,227		4,959,304	12	4,959,352	
130.23	4,959,742	1	4,959,826	CLASS 408		39	4,959,229	91	4,959,305	23	4,959,353	
130.24	4,959,743	3	4,959,827	56	4,958,963	102	4,959,230	167	4,959,306	23	4,959,354	
133	4,959,744	4	4,959,828	226	4,958,965	111	4,959,231	172.3	4,959,307	64	4,959,355	
CLASS 361			85.3	4,959,829	239 A	4,958,966	288	4,959,232	171	4,959,356		
13	4,959,746	108	4,959,830	CLASS 409		330.5	4,959,233	284	4,959,236	171	4,959,357	
31	4,959,747	112	4,959,831	185	4,958,967	443	4,959,234	284	4,959,237	211	4,959,358	
310	4,959,748			234	4,958,969	447	4,959,235	311	4,959,238	217	4,959,359	
311	4,959,749			CLASS 411		580	4,959,236	320	4,959,239	220	4,959,360	
323	4,959,748	27	4,959,832	12	4,958,970	603	4,959,237			231.5	4,959,361	
396	4,959,749	32	4,959,833	38	4,958,971	637	4,959,238	169	4,959,240	235.2	4,959,362	
401	4,959,750	47.1	4,959,834	423	4,958,973	11	4,959,241	240.2	4,959,241	237.5	4,959,363	
406	4,959,751	51.1	4,959,835	CLASS 412		38	4,959,242	240.7	4,959,242	239.5	4,959,364	
424	4,959,752	69.1	4,959,836	37	4,958,974	48	4,959,243	284	4,959,243	243	4,959,365	
525	4,959,753			259	4,959,975	53.1	4,959,244	311	4,959,244	252	4,959,366	
527	4,959,754			331	4,959,976	97	4,959,245	320	4,959,245	252	4,959,367	
CLASS 362			6	4,959,837	CLASS 414		126.5	4,959,246	169	4,959,246	252	4,959,368
4	4,959,755	25	4,959,838	12	4,958,977	126.5	4,959,247			252	4,959,369	
34	4,959,756	46	4,959,839	38	4,958,978	385.5	4,959,248	311	4,959,247	252	4,959,370	
61	4,959,757	57	4,959,840	387	4,958,979	387	4,959,249	311	4,959,248	252	4,959,371	
66	4,959,758			423	4,958,973	CLASS 428		311	4,959,249	252	4,959,372	
80	4,959,759	10	4,959,841	CLASS 415		13	4,959,250	311	4,959,250	252	4,959,373	
105	4,959,760			55.1	4,958,984	15	4,959,251	311	4,959,251	252	4,959,374	
226	4,959,761			143	4,958,985	40	4,959,252	311	4,959,252	252	4,959,375	
376	4,959,762	1	4,958,936	144	4,958,986	41	4,959,253	311	4,959,253	252	4,959,376	
382	4,959,763	16	4,958,937	156	4,958,987	62	4,959,254	311	4,959,254	252	4,959,377	
CLASS 363			208	4,958,938	CLASS 416		192	4,959,255	311	4,959,255	252	4,959,378
16	4,959,764			339	4,959,977	215	4,959,256	311	4,959,256	252	4,959,379	
20	4,959,765	39	4,959,842	483	4,958,978	255	4,959,257	311	4,959,257	252	4,959,380	
48	4,959,766	59	4,959,843	549	4,958,979	312.2	4,959,258	311	4,959,258	252	4,959,381	
CLASS 364			97	4,959,844	CLASS 417		329	4,959,259	311	4,959,259	252	4,959,382
151	4,959,767	106	4,959,845	563	4,958,980	331	4,959,260	311	4,959,260	252	4,959,383	
187	4,959,768	118	4,959,846	694	4,958,981	343	4,959,261	311	4,959,261	252	4,959,384	
200	4,959,769			751	4,958,982	375	4,959,262	311	4,959,262	252	4,959,385	
	4,959,770			795.3	4,958,983	383	4,959,263	311	4,959,263	252	4,959,386	
	4,959,771	260	4,959,192	CLASS 418		390	4,959,264	311	4,959,264	252	4,959,387	
	4,959,772	299	4,959,193	29	4,958,992	401	4,959,265	311	4,959,265	252	4,959,388	
	4,959,773			55.3	4,958,993	423	4,959,266	311	4,959,266	252	4,959,389	
	4,959,774	46	4,959,848	55.6	4,958,994	426	4,959,267	311	4,959,267	252	4,959,390	
	4,959,775			132	4,958,995	436	4,959,268	311	4,959,268	252	4,959,391	
	4,959,776	32	4,959,849	152	4,958,996	476.3	4,959,269	311	4,959,269	252	4,959,392	
	4,959,777	58	4,959,850	CLASS 419		537.7	4,959,270	311	4,959,270	252	4,959,393	
	4,959,778	59	4,959,851	171	4,958,997	548	4,959,271	311	4,959,271	252	4,959,394	
	4,959,779			222	4,958,998	555	4,959,272	311	4,959,272	252	4,959,395	
	4,959,780	70	4,959,852	40	4,959,194	603	4,959,273	311	4,959,273	252	4,959,396	
	4,959,781	157	4,959,854	66	4,959,195	614	4,959,274	311	4,959,274	252	4,959,397	
	4,959,782	180	4,959,855	CLASS 422		623	4,959,275	311	4,959,275	252	4,959,398	
	4,959,783	213	4,959,856	68.05	4,959,196	642	4,959,276	311	4,959,276	252	4,959,399	
	4,959,784	245	4,959,857	101	4,959,197	660	4,959,277	311	4,959,277	252	4,959,400	
	4,959,785	390	4,959,858	220	4,959,198			311	4,959,278	252	4,959,401	
	4,959,786	445	4,959,859	300	4,959,199			311	4,959,279	252	4,959,402	
	4,959,787							311	4,959,280	252	4,959,403	
	4,959,788							311	4,959,281	252	4,959,404	
	4,959,789							311	4,959,282	252	4,959,405	
	4,959,790							311	4,959,283	252	4,959,406	
	4,959,791							311	4,959,284	252	4,959,407	
	4,959,792							311	4,959,285	252	4,959,408	
	4,959,793							311	4,959,286	252	4,959,409	
	4,959,794							311	4,959,287	252	4,959,410	
	4,959,795							311	4,959,288	252	4,959,411	
	4,959,796							311	4,959,289	252	4,959,412	
	4,959,797							311	4,959,290	252	4,959,413	
	4,959,798							311	4,959,291	252	4,959,414	
	4,959,799							311	4,959,292	252	4,959,415	
	4,959,800							311	4,959,293	252	4,959,416	
	4											



## CLASSIFICATION OF PATENTS

99	CLASS 524	482	4,959,425	328	4,959,451	263	4,959,473	CLASS 562	175	4,959,054
169	4,959,402	527	4,959,426	336	4,959,452	279	4,959,474	74	179	4,959,055
267	4,959,403	CLASS 526	4,959,427	352	4,959,453	324	4,959,475	94	186	4,959,056
321	4,959,404	142	4,959,428	371	4,959,456	CLASS 546	4,959,476	006	264	4,959,057
413	4,959,405	201	4,959,429	CLASS 530	167	4,959,477	453	4,959,492	280	4,959,058
425	4,959,406	230.5	4,959,430	351	4,959,455	307	4,959,478	506	358	4,959,059
434	Re.33,355	257	4,959,431	387	4,959,457	319	4,959,478	515	368	4,959,060
469	4,959,387	261	4,959,432	CLASS 536	255	4,959,479	560	4,959,493	387	Re.33,351
523	4,959,408	287	4,959,433	CLASS 536	262.4	4,959,480	583	4,959,495	403	4,959,062
		314	4,959,434	CLASS 536	543	4,959,482	891	4,959,498	CLASS 606	
	CLASS 525	342	4,959,435	1.1	4,959,459	CLASS 564	59	4,959,499	15	4,959,063
11	4,959,414	347.2	4,959,436	6.4	4,959,460	82	4,959,500	65	65	Re.33,348
61	4,959,409	348	4,959,437	18.7	4,959,461	89	4,959,501	69	69	4,959,064
67	4,959,410	CLASS 528	4,959,438	27	4,959,462	127	4,959,502	89	89	4,959,065
98	4,959,411	26	4,959,439	114	4,959,463	265	4,959,503	194	194	4,959,066
100	4,959,412	98	4,959,440	115	4,959,464	CLASS 549	19	4,959,047	222	B1 4,261,339
133	4,959,413	111	4,959,441	119	4,959,465	CLASS 600	222	4,959,068	228	4,959,069
222	4,959,415	125	4,959,442	124	4,959,466	CLASS 604	9	4,959,048	CLASS 623	
274	4,959,416	168	4,959,443	127	4,959,467	22	4,959,049	44	4,958,901	4,959,070
282	4,959,417	170	4,959,444	CLASS 540	161	4,959,441	49	4,959,050	20	4,959,071
301	4,959,419	181	4,959,445	222	4,959,469	343	4,959,487	77	22	4,959,072
331.7	4,959,420	185	4,959,446	363	4,959,470	CLASS 560	76	4,959,488	55	4,959,073
437	4,959,421	188	4,959,447	CLASS 544	71	4,959,471	127	4,959,053	66	4,959,074
463	4,959,422	192	4,959,448	258	4,959,472	170	4,959,489			
471	4,959,423	271	4,959,449							
	4,959,424	272	4,959,450							

## CLASSIFICATION OF DESIGNS

D1—	128	310,750		382	310,780	147	310,802		310,828		105	310,854		50	310,880	
D2—	514	310,751	D9—	305	310,774		310,803	113	310,829		110	310,855		51	310,881	
D3—	35	310,752		367	310,778		310,804	114	310,830		166	310,856		64	310,882	
	61	310,753		377	310,779	151	310,805	121	310,831		168	310,857			310,883	
D4—	138	310,754		378	310,777	156	310,806	131	310,832	D23—	213	310,860	D25—	68	310,884	
D6—	349	310,755		398	310,781	158	310,807	137	310,833			310,861	D26—	65	310,886	
	445	310,756		404	310,782		310,808	156	310,834		241	310,858		68	310,887	
	446	310,757			310,783		310,809	163	310,835			310,859		139	310,885	
	515	310,760		416	310,784	191	310,810	165	310,836			310,862	D27—	158	310,888	
	518	310,758			310,785	206	310,811	168	310,837			310,863	D28—	45	310,889	
	523	310,759		435	310,786	214	310,812	D15—	8	310,838		310,864		50	310,890	
	567	310,761	D10—	53	310,787	D13—	103	310,813	D16—	102	310,839		310,865		59	310,891
	569	310,762			310,788		310,814	134	310,840			310,866			310,892	
	583	310,763		75	310,789		310,815	209	310,841		242	310,867	D29—	12	310,893	
D7—	351	310,764		103	310,790		310,816	D17—	14	310,842		265	310,868	D30—	147	310,898
	362	310,765		106	310,791	125	310,818	D18—	42	310,843		296	310,869			310,900
	543	310,768		107	310,792		310,819		43	310,844		300	310,870			310,901
	564	310,766		114	310,793		310,820			310,845		335	310,871	148	310,895	
	631	310,767	D11—	202	310,794	152	310,824	D19—	69	310,846		368	310,872	D32—	40	310,901
D8—	29	310,770			310,795	158	310,814		90	310,847		370	310,873			310,902
	69	310,771		203	310,796		310,815		18	310,848		376	310,874		60	310,897
	70	310,772	D12—	17	310,797		310,822	D20—	22	310,849	D24—	10	310,875	D34—	9	310,903
	89	310,773		97	310,798		310,823		18	310,848		14	310,876		12	310,904
	358	310,776		106	310,799	D14—	100	310,825		310,851		36	310,879		23	310,894
	377	310,775		137	310,800		310,826		69	310,852		38	310,877		26	310,895
				146	310,801		310,827		89	310,853		39	310,878		46	310,896

## CLASSIFICATION OF PLANTS

P.—	20	7,333										
	28	7,334	38	7,335	42	7,336	43	7,337	86	7,338	89	7,339

GEOGRAPHICAL INDEX  
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

01 :	4,958,777	4,958,839	4,959,473	4,958,913	4,959,648	4,959,593
	4,958,790	4,958,841	4,959,488	4,959,022	4,959,772	4,959,605
	4,959,734	4,958,855	4,959,490	4,959,127	4,959,783	4,959,707
02 :	4,958,582	4,958,857	4,959,491	4,959,133	4,959,817	4,959,851
04 :	4,958,575	4,958,873	4,959,511	4,959,156	13 : 4,958,412	18 : Re.33,348
	4,958,737	4,958,879	4,959,532	4,959,227	4,958,638	4,958,429
	4,958,843	4,958,881	4,959,539	4,959,309	4,958,734	4,958,472
	4,958,845	4,958,889	4,959,543	4,959,365	4,958,739	4,958,488
	4,958,864	4,958,892	4,959,559	4,959,514	4,958,775	4,958,570
	4,958,899	4,958,908	4,959,565	4,959,600	4,958,797	4,958,625
	4,959,026	4,958,914	4,959,602	4,959,628	4,958,903	4,958,758
	4,959,564	4,958,919	4,959,606	4,959,686	4,959,102	4,958,853
	4,959,594	4,958,962	4,959,614	4,959,782	4,959,251	4,958,890
	4,959,702	4,958,970	4,959,647	4,708,080	4,959,353	4,958,940
	4,959,792	4,958,989	4,959,656	10 : Re.33,352	4,959,790	4,959,064
	4,959,836	4,959,005	4,959,667	4,958,930	16 : 4,959,146	4,959,071
05 :	4,958,383	4,959,013	4,959,674	4,958,987	4,959,158	4,959,512
	4,959,578	4,959,027	4,959,699	4,959,113	4,959,325	4,959,622
06 :	4,958,384	4,959,040	4,959,714	4,959,189	4,959,504	4,959,629
	4,958,416	4,959,048	4,959,717	4,959,237	17 : 4,958,433	4,959,637
	4,958,427	4,959,050	4,959,718	4,959,283	4,958,455	4,959,708
	4,958,454	4,959,058	4,959,725	4,959,284	4,958,557	4,959,720
	4,958,456	4,959,065	4,959,749	4,959,295	4,958,559	4,959,751
	4,958,457	4,959,070	4,959,764	4,959,317	4,958,617	4,959,758
	4,958,470	4,959,079	4,959,774	4,959,330	4,958,619	4,959,759
	4,958,474	4,959,082	4,959,779	4,959,453	4,958,621	4,959,852
	4,958,476	4,959,105	4,959,781	11 : 4,958,465	4,958,736	4,959,859
	4,958,503	4,959,135	4,959,798	4,958,627	4,958,757	4,436,092
	4,958,520	4,959,143	4,959,800	12 : 4,958,431	4,958,792	19 : 4,958,403
	4,958,547	4,959,176	4,959,804	4,958,434	4,958,824	4,958,596
	4,958,586	4,959,178	4,959,810	4,958,461	4,958,831	4,958,729
	4,958,590	4,959,187	4,959,833	4,958,463	4,958,832	20 : 4,958,800
	4,958,593	4,959,193	4,959,840	4,958,467	4,958,837	4,959,528
	4,958,597	4,959,197	4,959,844	4,958,485	4,958,923	21 : 4,958,468
	4,958,618	4,959,199	4,959,846	4,958,496	4,958,997	4,958,620
	4,958,630	4,959,202	4,959,848	4,958,643	4,959,012	4,958,667
	4,958,631	4,959,205	4,959,862	4,958,683	4,959,028	4,958,990
	4,958,634	4,959,217	4,959,869	4,958,727	4,959,033	4,959,107
	4,958,642	4,959,218	4,959,870	4,958,740	4,959,131	4,959,464
	4,958,644	4,959,236	4,959,874	4,958,924	4,959,140	22 : Re.33,347
	4,958,648	4,959,240	4,959,881	4,958,985	4,959,145	4,958,392
	4,958,652	4,959,303	4,959,705	4,959,155	4,959,147	4,958,691
	4,958,658	4,959,305	4,959,706	4,959,250	4,959,198	4,958,720
	4,958,663	4,959,306	4,959,797	4,959,315	4,959,226	4,958,747
	4,958,684	4,959,307	4,959,823	4,959,508	4,959,234	4,959,014
	4,958,706	4,959,310	4,959,853	4,959,518	4,959,272	4,959,148
	4,958,730	4,959,314	4,959,856	4,959,530	4,959,304	4,959,486
	4,958,741	4,959,324	4,958,462	4,959,547	4,959,364	4,959,500
	4,958,743	4,959,370	4,958,517	4,959,554	4,959,390	23 : 4,959,313
	4,958,755	4,959,387	4,958,543	4,959,569	4,959,467	24 : 4,958,571
	4,958,793	4,959,401	4,958,569	4,959,617	4,959,468	4,958,595
	4,958,826	4,959,457	4,958,661	4,959,624	4,959,534	4,958,738
	4,958,833	4,959,463	4,958,782	4,959,640	4,959,548	4,958,829

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## GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

25 :	4,959,399 4,959,638 4,959,701 4,959,861 4,958,386 4,958,326 4,958,697 4,958,898 4,958,931 4,959,000 4,959,062 4,959,149 4,959,292 4,959,301 4,959,302 4,959,341 4,959,358 4,959,405 4,959,455 4,959,515 4,959,516 4,959,551 4,959,567 4,959,568 4,959,589 4,959,639 4,959,642 4,959,653 4,959,752 4,959,769 4,959,771 4,959,801 4,959,842 4,958,458 4,958,498 4,958,516 4,958,527 4,958,530 4,958,536 4,958,609 4,958,651 4,958,655 4,958,721 4,958,753 4,958,769 4,958,771 4,958,799 4,958,813 4,958,814 4,958,834 4,958,849 4,958,851 4,958,877 4,958,878 4,958,880 4,958,907 4,958,966 4,958,983 4,959,021 4,959,043 4,959,044 4,959,056 4,959,067 4,959,076 4,959,103 4,959,111 4,959,157 4,959,182 4,959,188 4,959,247 4,959,271 4,959,340 4,959,380 4,959,416 4,959,435 4,959,492 4,959,499 4,959,503 4,959,522 4,959,577	4,959,634 4,959,755 4,959,784 4,959,786 4,959,806 4,959,809 4,959,831 4,958,539 4,958,632 4,958,660 4,958,904 4,958,938 4,958,939 4,959,034 4,959,159 4,959,164 4,959,265 4,959,297 4,959,319 4,959,357 4,959,477 4,959,618 4,959,654 4,959,697 4,958,756 4,959,084 4,958,389 4,958,411 4,958,432 4,958,439 4,958,567 4,958,568 4,958,754 4,958,932 4,959,129 4,959,444 4,959,494 4,959,496 4,959,795 4,958,650 4,959,128 4,958,484 4,958,519 4,959,038 4,958,784 4,958,847 4,958,954 4,958,562 4,958,563 4,958,901 4,959,006 4,959,607 4,959,829 4,958,354 4,958,399 4,958,450 4,958,556 4,958,751 4,958,803 4,958,876 4,958,894 4,958,905 4,958,951 4,959,004 4,959,068 4,959,069 4,959,112 4,959,209 4,959,210 4,959,212 4,959,221 4,959,230 4,959,235 4,959,248 4,959,254 4,959,293 4,959,326 4,959,352 4,959,359 4,959,361	4,959,377 4,959,378 4,959,382 4,959,383 4,959,413 4,959,423 4,959,424 4,959,432 4,959,436 4,959,458 4,959,465 4,959,466 4,959,476 4,959,485 4,959,555 4,959,572 4,959,623 4,959,661 4,959,761 4,959,849 4,959,855 4,959,857 4,959,858 4,958,339 4,958,921 4,959,015 4,959,162 4,959,180 4,959,194 4,958,351 4,958,388 4,958,407 4,958,425 4,958,475 4,958,496 4,958,511 4,958,533 4,958,551 4,958,577 4,958,588 4,958,592 4,958,624 4,958,681 4,958,699 4,958,731 4,958,759 4,958,773 4,958,774 4,958,846 4,958,884 4,958,900 4,958,974 4,959,037 4,959,059 4,959,074 4,959,089 4,959,109 4,959,124 4,959,136 4,959,150 4,959,179 4,959,219 4,959,225 4,959,244 4,959,262 4,959,286 4,959,287 4,959,323 4,959,346 4,959,355 4,959,356 4,959,363 4,959,366 4,959,384 4,959,407 4,959,411 4,959,412 4,959,422 4,959,445 4,959,454	4,959,480 4,959,481 4,959,495 4,959,531 4,959,540 4,959,566 4,959,584 4,959,592 4,959,596 4,959,630 4,959,645 4,959,670 4,959,690 4,959,719 4,959,730 4,959,731 4,959,832 4,959,841 4,958,397 4,958,435 4,958,447 4,958,485 4,958,542 4,958,670 4,958,869 4,958,975 4,959,119 4,959,132 4,959,311 4,959,402 4,959,762 4,959,773 4,959,829 4,959,031 4,959,087 4,959,090 4,959,208 4,958,479 4,958,489 4,958,555 4,958,622 4,958,654 4,958,656 4,958,671 4,959,489 4,959,513 4,958,713 4,958,715 4,958,798 4,958,810 4,958,816 4,958,838 4,958,887 4,958,891 4,958,933 4,959,008 4,959,054 4,959,069 4,959,047 4,959,101 4,959,125 4,959,152 4,959,168 4,959,204 4,959,280 4,959,392 4,959,395 4,959,408 4,959,450 4,959,716 4,959,409 4,959,429 4,959,433 4,959,583 4,959,585 4,959,587 4,959,611 4,959,633 4,959,763 4,959,767 4,958,449 4,958,578 4,958,689 4,958,830	4,959,139 4,959,141 4,959,163 4,959,165 4,959,818 Re.33,346 Re.33,357 4,958,390 4,958,594 4,958,601 4,958,607 4,958,641 4,958,717 4,958,761 4,958,787 4,958,867 4,959,055 4,958,385 4,958,436 4,958,445 4,958,466 4,958,587 4,958,657 4,958,676 4,958,718 4,958,796 4,958,801 4,958,868 4,958,888 4,959,978 4,958,999 4,959,029 4,959,031 4,959,087 4,959,090 4,959,208 4,958,479 4,958,489 4,958,555 4,958,622 4,959,343 4,959,360 4,959,482 4,959,489 4,959,513 4,959,635 4,959,768 4,959,807 4,959,827 4,959,776 4,958,437 4,959,480 4,958,540 4,958,735 4,959,933 4,959,008 4,959,054 4,959,069 4,959,047 4,959,101 4,959,125 4,959,152 4,959,168 4,959,204 4,959,280 4,959,392 4,959,395 4,959,408 4,959,450 4,959,716 4,959,409 4,959,429 4,959,433 4,959,583 4,959,585 4,958,452 4,958,505 4,958,528 4,958,529 4,958,583 4,958,584 4,958,605 4,958,653 4,958,686	4,958,802 4,958,861 4,958,870 4,958,875 4,958,926 4,958,960 4,958,977 4,959,049 4,959,080 4,959,169 4,959,177 4,959,214 4,959,231 4,959,261 4,959,308 4,959,336 4,959,425 4,959,447 4,959,449 4,959,557 4,959,561 4,959,563 4,959,608 4,959,646 4,959,650 4,959,696 4,959,736 4,959,777 4,959,802 4,959,854 4,959,860 4,958,440 4,958,460 4,959,066 4,959,073 4,959,110 4,959,153 4,959,573 4,959,828 4,959,121 4,958,430 4,958,441 4,958,459 4,958,725 4,958,763 4,959,051 4,959,474 4,959,546 4,959,715 4,959,819 4,959,838 4,959,843 4,958,415 4,958,640 4,958,794 4,958,848 4,958,871 4,959,144 4,959,318 4,959,517 4,959,615 4,959,746 4,959,066 Re.33,353 4,958,469 4,958,493 4,958,535 4,958,541 4,958,636 4,958,750 4,958,804 4,958,840 4,958,911 4,958,957 4,959,232 4,959,582 4,959,847 4,959,867 4,958,395
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## DESIGN PATENTS

05 :	310,872	310,819	310,823	34 :	310,750	310,866	47 :	310,799
06 :	310,752	310,820	310,849		310,790	310,867		310,807
	310,755	310,822	310,853		310,832	310,753	48 :	310,770
	310,768	310,833	310,881		310,901	310,760		310,773
	310,769	310,877	310,889		310,902	310,761		310,777
	310,774	310,898	310,903	36 :	310,751	310,762		310,780
	310,806	310,899	310,896		310,791	310,772	51 :	310,754
	310,808	310,900	310,894		310,814	310,801		310,880
	310,810	310,784	310,809		310,818	310,804		310,813
	310,828	310,785	310,897		310,840	310,825		310,891
	310,842	310,852	310,827		310,855	310,861		310,892
	310,868	310,874	310,771		310,857	310,869	53 :	310,904
	310,875	310,776	310,811		310,858	310,885	55 :	310,756
	310,878	310,781	310,788		310,859	310,830		310,757
	310,893	310,817	310,792		310,862	310,856		310,763
08 :	310,876	310,786	310,848		310,863	310,793		310,821
09 :	310,783	310,789	310,883		310,864	310,884		310,870
	310,815	310,797	310,812		310,865	310,854	56 :	310,787

## PLANT PATENTS

06 :	7,335	7,336	7,337	42 :	7,338
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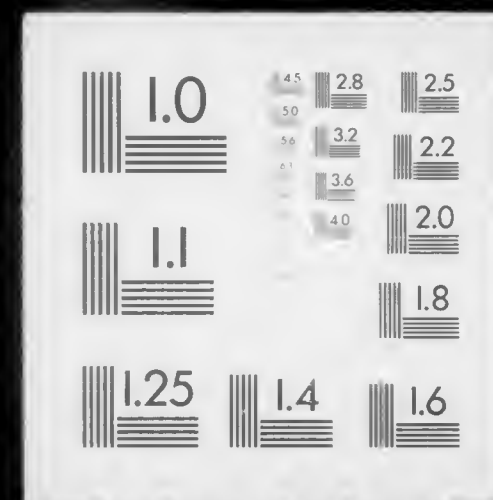
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